STORMWATER MASTER PLAN

Civil West Engineering Services, Inc.

AUGUST 2023

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REGISTERED PROFESSIONAL ENGINEER
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OREGON
NOV. 10, 2009
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EXPIRATION DATE: 06/30/2024

Civil West
Engineering Services, Inc.

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EXECUTIVE SUMMARY

Background

The City of Sweet Home, Oregon commissioned this stormwater master plan to evaluate the City's stormwater drainage system and prioritize improvement projects for a 20-year planning period. The City is located in central Linn County, OR at coordinates 44°24′2″N 122°42′57″W. It is located approximately halfway between the Cascade Range and Interstate 5. Highway 20 intersects the City and is the primary transportation route connecting to other areas. The City's limits are bordered to the north by the South Santiam River, and Foster Lake is located directly northeast of the City.

The majority of the City is located in the upper portion of the Hamilton Creek-South Santiam River subwatershed (HUC-10: 1709000608). The most eastern part of the City, near Foster Lake, drains into the lower portion of the Wiley Creek watershed (HUC-10: 1709000605). These water sheds are part of the larger South Santiam Watershed, which is part of the TMDL-regulated Willamette Basin. The City's topography is influenced by its location in the western foothills of the Cascade Mountain Range. The South Santiam River flows at an elevation of around 500 feet at the western portion of the City.

The City's drainage infrastructure flows entirely via gravity. There are approximately 160,000 lineal feet of drain pipe and culverts, and 1,100 catch basins in the City's stormwater infrastructure inventory. The majority of pipe and culvert is concrete (>100,000 feet), with approximately 23,000 feet of plastic (PVC and HDPE) pipe, and the reamainder consisting of metal, corrugated metal, and perforated pipe. Approximately 20,000 feet of pipe in the City is of unknown material. There are additionally 246,000 feet of open channels, including ditches, swales, and streams. Of the open channels, approximately 53,000 feet include the streams Ames Creek, Wiley Creek, Taylor Creek, and Cotton Creek, all of which are tributaries to the South Santiam River within the City's limits.

Soils in the area are primarily silty and clay loams. Thirty-nine soil groups are present within the City Limits. There are multiple freshwater forested/shrub wetland areas in City limits along Ames Creek, and North of Highway 20 near Clark Mill Road. Notable of these are the wetlands associated with Hobart Natural Area in the southern part of the City and pockets of freshwater emergent wetlands at Quarry Park.

Drainage Analysis

The analyses conducted as part of this planning effort involved outreach to community members and public works staff via surveys and workshops, and modeling of the City's drainage system via the Autodesk Storm and Sanitary Analysis Software.

From the public outreach activities, thirty-one areas were identified that currently experience frequent flooding, pooling, or otherwise standing water. Eight areas were identified where drainage infrastructure is undersized, access is restricted due to structures on private property, inlet structures buried from construction activities, or damaged.

Approximately 33,000 feet of pipes and culverts are projected to be undersized within the planning period for a 10-year design storm as determined by hydraulic modeling. Additionally, another 12,000 feet are projected to be undersized based on future residential development and the consequential increase in impervious areas. In multiple instances, pipes and culverts that were identified by the modeling analysis as undersized overlapped with the areas with flooding issues as determined via public outreach.

Recommendations were made based on analyses after review of identified issues. In total, 63 recommendations were made to improve the City's drainage infrastructure. These recommendations were organized into three priority levels, based on the following definitions:

- **Priority 1 (Near-term Improvements) -** These projects address existing system deficiencies or problem areas needing immediate attention. It is recommended that Priority 1 improvements be accomplished as soon as practical considering financing, construction time requirements and timing associated with other related projects.
- **Priority 2 (Future Improvements) -** These are improvement projects that will be needed likely within the planning period to meet projected development conditions and design flows, or where there are moderate capacity deficiencies. Although not vital at the time of implementing this planning document, they should be considered as improvement projects to add to the City's capital improvement plan budget after completing the Priority 1 projects, or when development in the contributing drainage area increases the volume of conveyed runoff.
- **Priority 3 (Development Contingent Improvements)** These improvements are needed to improve system reliability and convey future design flows if land develops in specific parts of the City. While important, they are not considered to be critical at the present time. These projects should be moved up in priority if development occurs in the contributing drainage areas. These improvements should be incorporated into street or other utility improvement projects that may allow for concurrent construction, or they may be constructed by developers in conjunction with the utility improvements associated with the development project.

This plan also evaluated the regulatory framework for the City's stormwater management activities. Currently, the City maintains an implementation plan that describes multiple City policies and activities commensurate with the Oregon Department of Environmental Quality's water quality management plan and the Willamette Basin Total Maximum Daily Loads for mercury, temperature, and bacteria.

Throughout this planning period, as the City's TMDL-Implementation Plan is updated in 5-year intervals, the City is recommended to update the actions in the plan to overlap with the MS4 Phase II General Permit requirements. These requirements are detailed in Section 3.2.2 of this plan. While the City is not expected to reach the 50,000-person threshold for full M4 Phase II General Permit coverage within the planning period of this plan, proactively implementing these requirements will ensure that the City maintains good regulatory standing and help protect the health of the City's water resources.

It is possible that the City may experience growth and development of new impervious area before recommended downstream improvements can be made. To reduce the risk of development-induced capacity issues, this plan recommends the City retains the following detention requirements for new development:

1. Detention of the stormwater volume associated with new impervious area for development sites equal to or greater than four acres.
2. Sites less than four acres are exempt from detention requirements.
3. Maintain runoff rate from developed land equal to peak runoff from 10 year storm on undeveloped land.
4. Provide storage resulting from the difference between the 10 year release rate (item 3) and the 10 year storm runoff after development.

Detention and runoff volume calculations may utilize the Rational Method provided that the planned area is not larger than 20 acres. A more comprehensive, site-specific hydrological study should be conducted for larger developments. All detention and runoff calculations for applicable sites must be submitted to the City for review and approval. These calculations must be accompanied with prepared site plans that clearly show the acreage of planned impervious area.

Recommendations

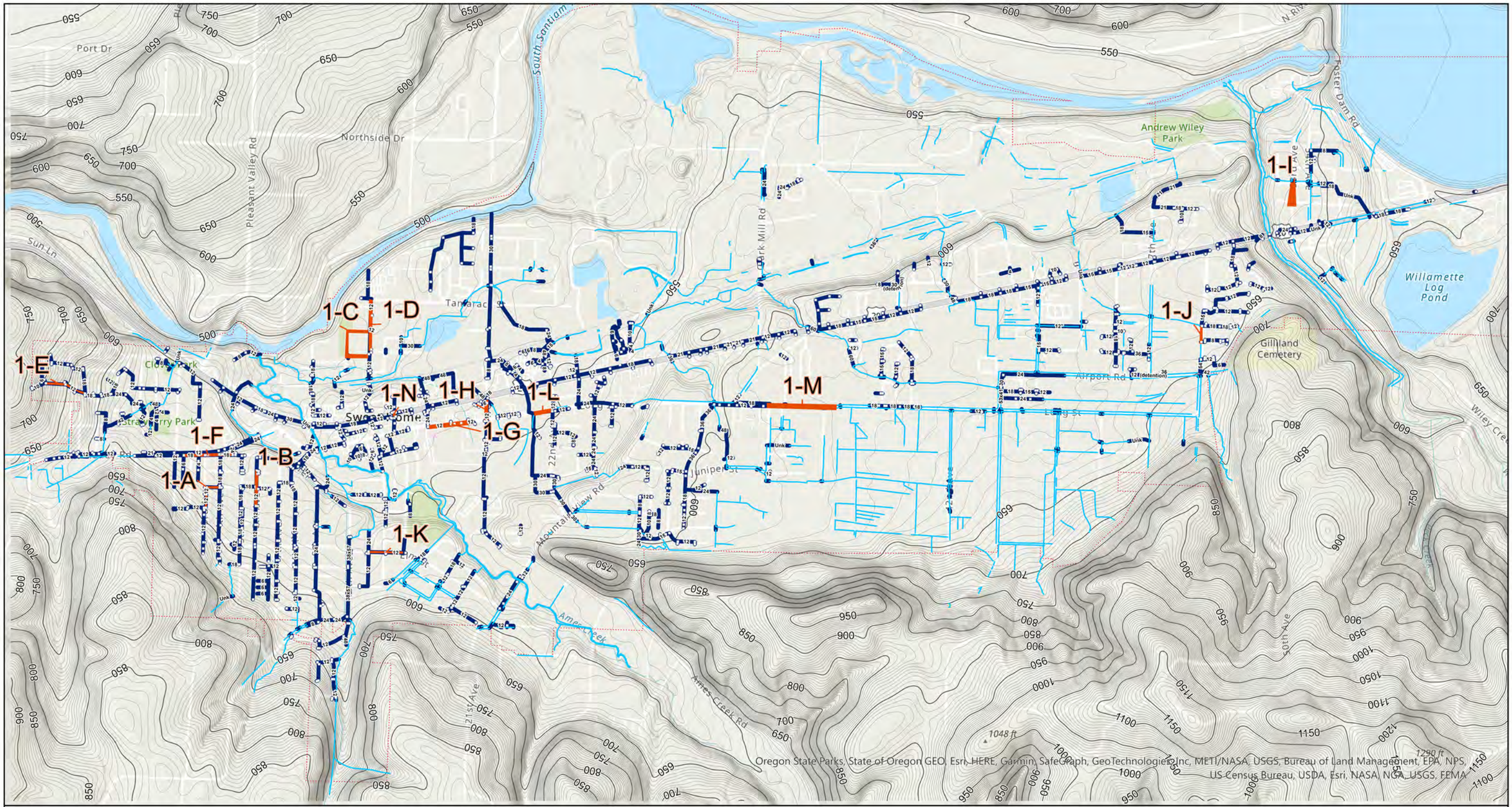
The recommended improvement projects are presented with project locations and estimated costs in the tables below. Additionally, maps showing the locations of each project, organized via priority grouping, are provided on the following pages. Projects listed with an asterisk in the following tables indicate a project that involves infrastructure under an Oregon Department of Transportation managed road. These projects would need to be coordinated with the agency prior to the design phase.

Summary of Recommended Drainage Improvement Projects

Priority 1 Projects	Suggested Improvement	Cost Estimate
1-A: 3rd Ave. from Hawthorne St to Ironwood St	Upgrade 330 feet of existing 12" storm drain to 18" at 4% grade	$224,949
1-B: 6th Ave. south of Ironwood St to Methodist Church	Upgrade 290 feet of existing 12" storm drain to 24" at minimum 0.35% grade	$228,818
1-C: 11th Ave, Redwood St, Poplar St.	Construct 1430 feet of 12" Storm Mains at minimum 0.35% grade with 12 inlets in area that lacks drainage infrastructure	$925,299
1-D: 12th Ave from Poplar St. to Tamarack St.	Upgrade 925 feet of existing 12" storm drain to 18" at minimum 0.35% grade	$635,638
1-E: Nandina St. from Strawberry Ridge	Upgrade 650 feet of existing 12" storm drain to 18" at 10% grade	$628,758
1-F: Holley Rd on south side between 2nd and 3rd	Upgrade 150 feet of existing 18" storm drain to 24" at minimum 0.35% grade	$170,641
1-G: Long St. from 15th to 18th	Upgrade 850 feet of existing 12" storm drain to 18" at minimum 0.35% grade	$587,847
1-H: 18th Ave from Long St. to Santiam Hwy	Upgrade 300 feet of existing 12" storm drain to 18" at 0.7% grade	$413,303
1-I: 53rd Ave from Nandina St to Osage St	Construct 350 feet of 12" storm drain under at 1% grade with 6 inlets in area that lacks drainage infrastructure	$279,750
1-J: 49th Ave from Locust Court to Maple Drive	Clear debris and landscape inundated ditch. Inspect and remove all debris from culverts	$91,780
1-K: Elm St. between 11th and 14th.	Upgrade 280 feet of existing 12" storm drain to 15" at minimum 0.35% grade	$216,753
1-L: Long St. from 22nd to 23rd St.	Upgrade 320 feet of existing 12" storm drain to 18" at 0.6% grade	$221,415
1-M: Long St. from 35th St To 29th St	Upgrade existing 24" culverts to 30" at 2% grade	$298,149
1-N*: Main St. crossing at 13th. Ave.	Upgrade 100 feet of existing 12" storm drain to 15" at minimum 0.35% grade	$123,878
	Priority 1 Project Total:	**$5,046,978**

Priority 2 Projects		Cost Estimate
2-A: North Side of W Holley Rd by Evergreen Ln.	Upgrade 140 feet of existing 12" storm drain to 15" at 3% grade	$106,241
2-B: 18th St. from R.R. crossing to Tamarack St.	Upgrade 1260 feet of existing 24" storm drain to 30" at 0.8% grade.	$1,208,845
2-C: Sweet Home Junior High School along football field	Upgrade 805 feet of existing 24" storm drain to 30" at minimum 0.35% grade	$660,484
2-D: Nandina St from Sunset Ln past Westwood Ln.	Upgrade 500 feet of existing 12" storm drain to 18" at 3% grade	$340,074
2-E*: Main St. between 22nd and 24th St.	Upgrade 905 feet of existing 18" storm drain to 24" at 2% grade	$553,767
2-F: 8th Ave. from Dogwood to Stormwater Junction from 7th Ave.	Upgrade 1364 feet of existing 12" storm drain to 18" at 1.6% grade	$898,977
2-G: 5th Ave. from St. Helen Church to Ironwood	Upgrade 340 feet of existing 18" storm drain to 24" at minimum 0.35% grade	$255,303
2-H: Ditch from 49th to 45th Ave.	Clear debris and landscape inundated ditch. Inspect and remove all debris from culverts	$99,147
2-I: Kalmia St. between 14th and 12th St.	Upgrade 400 feet of existing 12" storm drain to 18" at minimum 0.35% grade	$286,041
2-J: 8" S.D. under private property between Jefferson St. and Harding St.	Relocate pipe out from private property or acquire easement. Upgrade 325 feet of existing 8" pipe to 10" at 1.5% grade	$156,471
2-K: Long Street between 23rd and 24th.	Upgrade 300 feet of existing 12" storm drain to 18" at 0.5% grade	$247,192
2-L: Locust Street off of Wiley Creek Drive	Construct four catch basins or alternative inlets in area that lacks inlet capacity	$12,332
2-M: 7th Ave. from Dogwood to Ironwood	Upgrade 1360 feet of existing 12" storm drain to 18" at 1.9% grade	$897,849
2-N: Holley Rd on South Side Between 1st and Alley	Upgrade 140 feet of existing 12" storm drain to 18" at 1.9% grade	$124,219
2-O: Tamarack and 22nd Ave.	Construct 1570 feet of 12" storm drain with 14 inlets in area that lacks drainage infrastructure	$1,085,209
2-P: Quince St. to 54th Ave.	Upgrade 430 feet of existing 8" storm drain to 10" at 1.6% grade	$268,160
2-Q: 8" Storm Drain under private property near Evergreen Lane	Relocate pipe out from private property or acquire easement. Upgrade 100 feet of existing 8" storm drain to 10" at 1.5% grade	$57,709
2-R: 14th Ave south of Kalmia St.	Construct 660 feet of 8" storm drain with four inlets in area that lacks drainage infrastructure	$517,353
2-S: 32nd Ct. off of Juniper St.	Install 2 inlets in stretch of storm drain that lacks inlet capacity	$86,199
	Priority 2 Project Total:	**$7,861,572**

Priority 3 Projects		Cost Estimate
3-A: 4" Drainpipe under Strawberry Park	Upgrade 4" pipe under Strawberry Park to 10" at 1.5% grade	$137,908
3-B: 2nd Ave. Storm Main	Upgrade 1190 feet of existing 12" storm drain to 18" at minimum 0.35% grade. Dependent on development in the area between 2nd Ave to 4th Ave, south of HWY 20	$696,621
3-C: 19th St. from Santiam Hwy to R.R. Crossing	Upgrade 1200 feet of existing 24" storm drain to 36" at 1% grade. Dependent on development in the area between 2nd Ave to 4th Ave, south of HWY 20	$1,165,386
3-D: 18th from Tamarack ST. to Yucca St.	Upgrade 1140 feet of existing 30" storm drain to 36" at 0.8% grade. Dependent on development in the area near HWY 20, Long Street, and 22nd Street	$726,107
3-E*: Main St. at 12th St. Crossing	Upgrade existing 12" culvert to 18" at 2% grade. Dependent on development from Main Street to 13th Avenue. Coordinate with Project 3-F	$91,990
3-F*: Main St. between 12th and 10th	Upgrade existing 18" storm drain to 24" at minimum 0.35% grade. Dependent on development from Main Street to 13th Avenue. Coordinate with Project 3-E	$368,595
3-G: 9th Ave from Birch to Oak Terrace	Upgrade 2000 feet of existing 24" storm drain to 36" at minimum 0.35% grade. Dependent on development in the area of 9th Avenue from Birch Street to Oak Terrace. Coordinate with Project 3-H	$1,890,127
3-H: Link from Oak Terrace and 9th to Taylor creek	Upgrade 100 feet of existing 24" storm drain to 36" at minimum 0.35% grade. Dependent on development in the area of 9th Avenue from Birch Street to Oak Terrace. Coordinate with Project 3-G	$96,609
3-I: 7th Ave to 8th Ave to Terrace Ln.	Upgrade 440 feet of existing 18" pipe to 24" at 3.4% grade. Dependent on development in the area between 7th and 8th Avenues, south of Oak Terrace	$285,788
3-J: Oak Terrace to Long St. on the south side of Terrace Ln.	Upgrade 380 feet of existing 12" storm drain to 24" at 3% grade. Dependent on development in the areas near Oak Terrace east of Taylor Creek, and between 7th and 8th Avenues south of Oak Terrace	$266,812
3-K: Oak Terrace between 6th and 7th Ave.	Upgrade 310 feet of existing 24" storm drain to 30" at 4% grade. Dependent on development in the area from Oak Terrace and 6th Avenue.	$362,817
3-L: Hawthorne St. between 1st and 3rd	Upgrade 510 feet of existing 12" storm drain to 18" at 1% grade. Dependent on development on Hawthorne St.	$319,934
3-M: 4th Ave. from Ironwood to Holley Rd.	Upgrade 530 feet of existing 18" storm drain to 24" at 4% grade. Dependent on development on 4th Ave and 3rd Ave.	$385,393
3-N: South Side of Holley rd. btw. 4th and 5th and Taylor Creek	Upgrade 485 feet of existing 24" storm drain to 30" at 2.5% grade. Dependent on development in the area of Holley Rd and 1st – 4th St.	$517,419
3-O: North of Long St. from 40th to 41st.	Upgrade 830 feet of existing 18" storm drain to 24" at 0.45% grade. Dependent on development south of Long Street between 38th Ave and 42nd Ave	$617,212
3-P: 47th Ave from Nandina to Outfall	Upgrade 610 feet of existing 24" storm drain to 30" at minimum 0.35% grade. Dependent on development on Nandina St and 4th Ave.	$618,576
	Priority 3 Project Total:	**$8,547,294**



Storm Drainage Improvement Recommendations - Priority 1

- Catch Basins
- Storm Channels
- Storm Mains
- City Limits

N
W E
S

0 0.1 0.2 0.4 0.6 0.8 1 Miles

Topography - Linn County
Spatial Reference
GCS: GCS North American 1983 HARN
Datum: North American 1983 HARN

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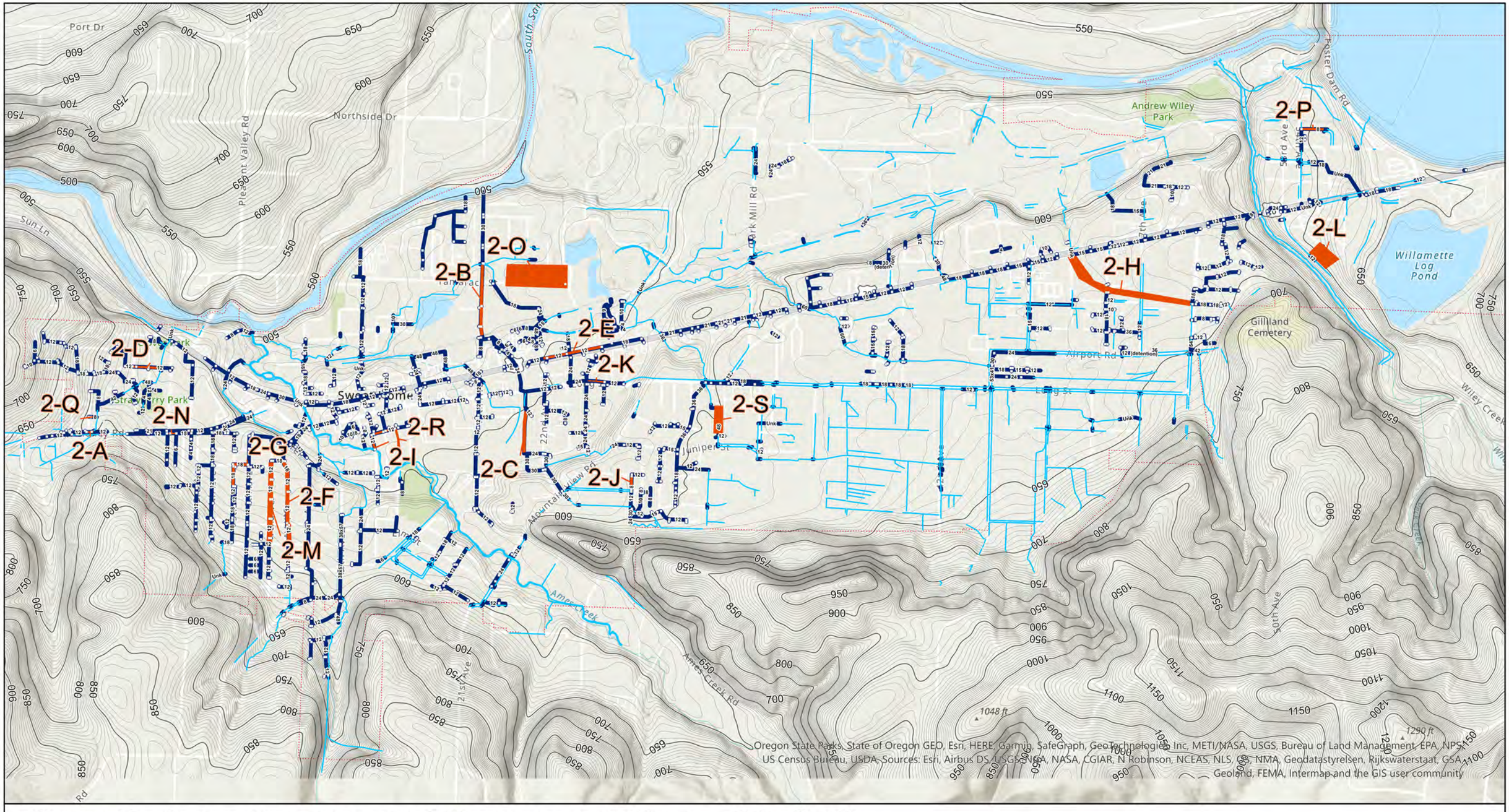

Storm Drainage Improvement Recommendations - Priority 2

- Catch Basins
- Storm Mains
- Storm Channels
- City Limits

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Topography - Linn County
Spatial Reference
GCS: GCS North American 1983 HARN
Datum: North American 1983 HARN

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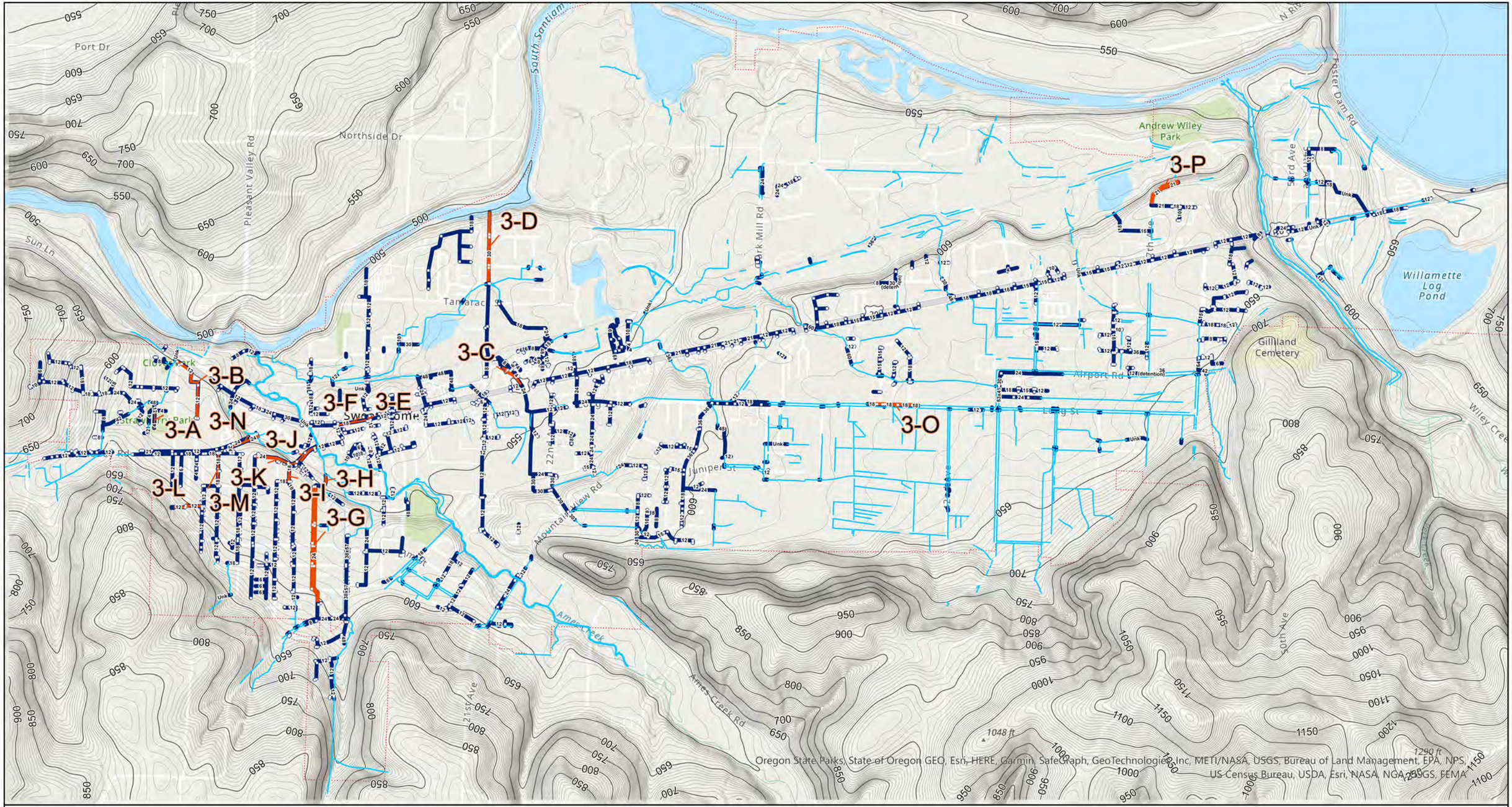
Storm Drainage Improvement Recommendations - Priority 3



Catch Basins
Storm Channels
Storm Mains
City Limits

N
W E
S

0 0.1 0.2 0.4 0.6 0.8 1 Miles

Topography - Linn County
Spatial Reference
GCS: GCS North American 1983 HARN
Datum: North American 1983 HARN

Civil West Engineering Services, Inc.

1 INTRODUCTION

The City of Sweet Home (City) commissioned the development of this Stormwater Master Plan (SMP) to guide drainage capital project and policy decisions. This SMP provides guidance for maintaining existing stormwater infrastructure and developing new drainage facilities to accommodate future growth of the City over a 20-year planning period.

The City manages public stormwater infrastructure through a Storm Water Drainage Utility that was established in 2008. The City's existing drainage system consists of catch basins, pipes, culverts, ditches, and the tributaries Wells and Ames Creeks that runoff into the South Santiam River. This SMP covers drainage through existing pipe systems and open channels (i.e., ditches and tributaries) and addresses current and projected water quantity and quality requirements for City-managed stormwater infrastructure.

1.1 Objectives

The primary goal of this SMP is to provide guidance for stormwater infrastructure improvements managed by the City. Improvements must address capacity, maintenance, and regulatory requirements for both existing and future conditions.

The specific objectives of this SMP include:

- Identification of areas in need of stormwater infrastructure improvements
- Regulatory assessment
- Hydraulic and hydrologic analysis of the City's stormwater system
- Development of improvement project recommendations, and prioritization of the projects for the city to implement as part of its capital improvement program.

This Plan details infrastructure improvements required to maintain compliance with State and Federal standards and to provide drainage capacity for anticipated growth. Recommended improvement projects are presented with estimated costs and priorities to allow simple integration into the City's capital improvement program. The planning period for this SMP is 20 years, commensurate with the planning period of the City of Sweet Home Comprehensive Plan. The end of this SMP's planning period is the year 2043.

1.2 Background

1.2.1 Previous Master Plan

The City's last storm drainage master plan was prepared in 1980 by Devco Engineering, Inc (1980 Plan). The 1980 Plan prepared topographical maps of the City, developed rainfall Intensity-Frequency-Duration (IFD) curves, and recommended 10 miles of pipe construction and 28 culvert improvements to meet the goals of the City's comprehensive plan at the time.

Additionally, the construction of a large detention pond on the site of the Old Mill Pond behind 14th Avenue on Ames Creek was proposed.

1.2.2 Capital Improvement Plan

The City develops a Public Works Capital Improvement Plan (CIP) in five-year intervals which is used to budget for needed stormwater infrastructure construction or upgrades.

1.2.3 Need for Updated Plan

Over four decades have passed since the 1980 Plan was published. The Oregon Department of Environmental Quality (ODEQ) has also requested an update to the City's stormwater planning documentation in accordance with the City's TMDL implementation plan.

1.3 Acknowledgements

Members of the City staff have contributed significant efforts to ensure complete information and proper planning of the community's storm drain system. In addition to providing GIS information, the city staff assisted with field research, and provided requested information promptly, and with a sense of urgency.

Greg Springman
Public Works Director

Patricia Rice
Engineering Tech II

Dominic Valloni
Public Works Supervisor

Blair Larson
Economic Development Director

Susan Coleman
Mayor

Sweet Home City Council

2 STUDY AREA

2.1 General Information

The City of Sweet Home was officially incorporated in 1893 and underwent significant development driven by the Oregon logging industry in the 1940s. Presently, Sweet Home has evolved into an outdoor-enthusiast tourist destination known for its rustic charm. Situated in the western foothills of the Cascade Mountain Range, the city offers a range of outdoor recreational activities centered around Foster Lake and multiple campgrounds.

2.1.1 Location

The City is located in central Linn County, OR at coordinates 44°24′2″N, 122°42′57″W. It is located approximately halfway between the Cascade Range and Interstate 5. Highway 20 intersects the City and is the primary transportation route connecting to other areas.

The City's Limits are bordered to the north by the South Santiam River, and Foster Lake/Reservoir is located directly northeast of the City. A proximity map of Sweet Home is provided in Figure 2-1.

2.1.2 Land Use and Zoning

The City originally developed as a major hub for the Oregon timber industry and still has several operational mills as well as defunct sites. Aggregate mining was once a significant industry via the Morse Bros. Company on the Northern end of Clark Mill Road. This property was purchased by the City in 2019 and has since become Quarry Park.

The City has established zoning areas for residential, commercial, industrial, public, natural resource protection areas, and planned development regions as defined by the City’s Comprehensive Plan. A copy of the City’s most recent (2022) zoning map is presented in Figure 2-2.

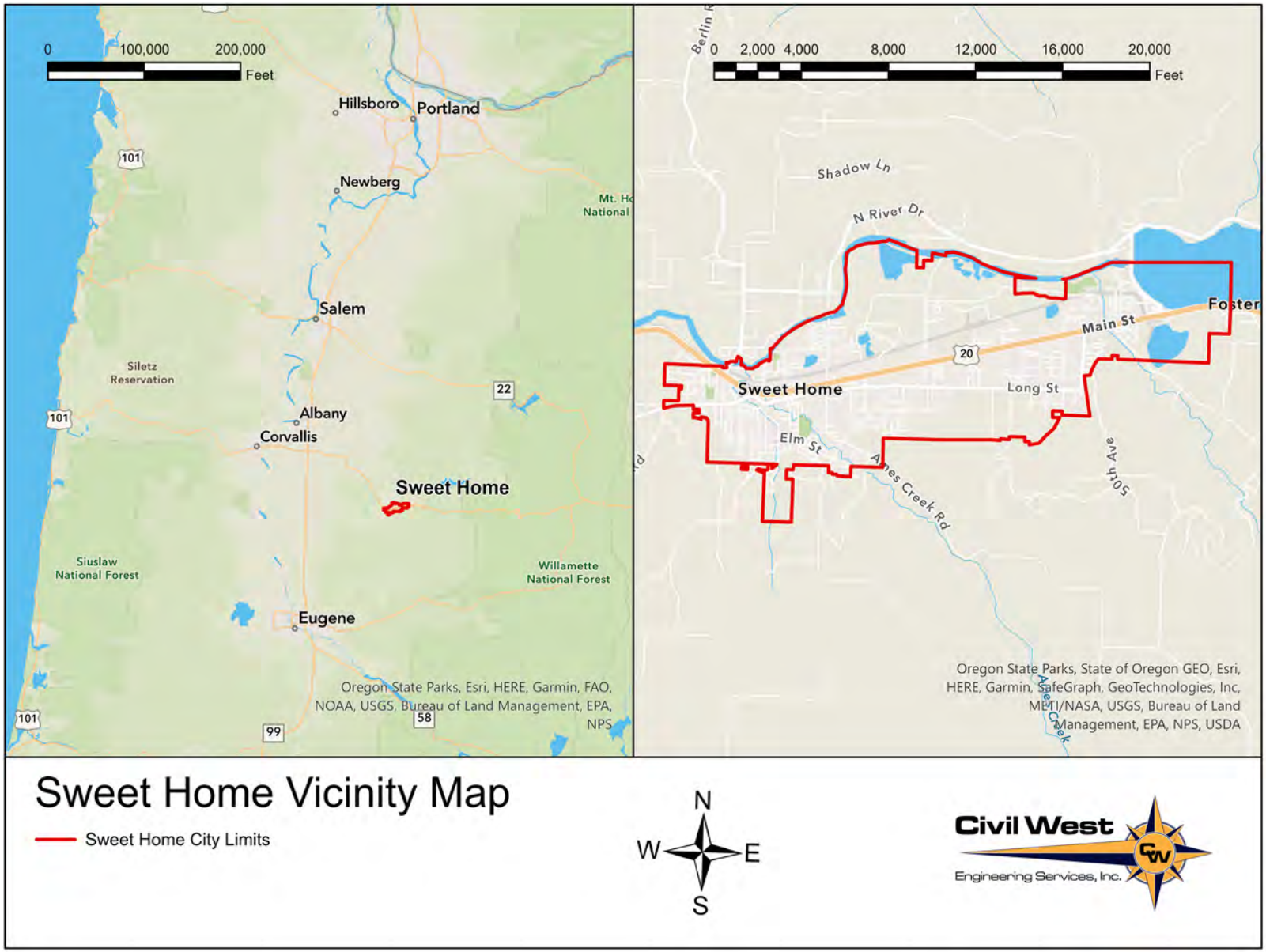


Figure 2-1: Vicinity Map of Sweet Home, Oregon

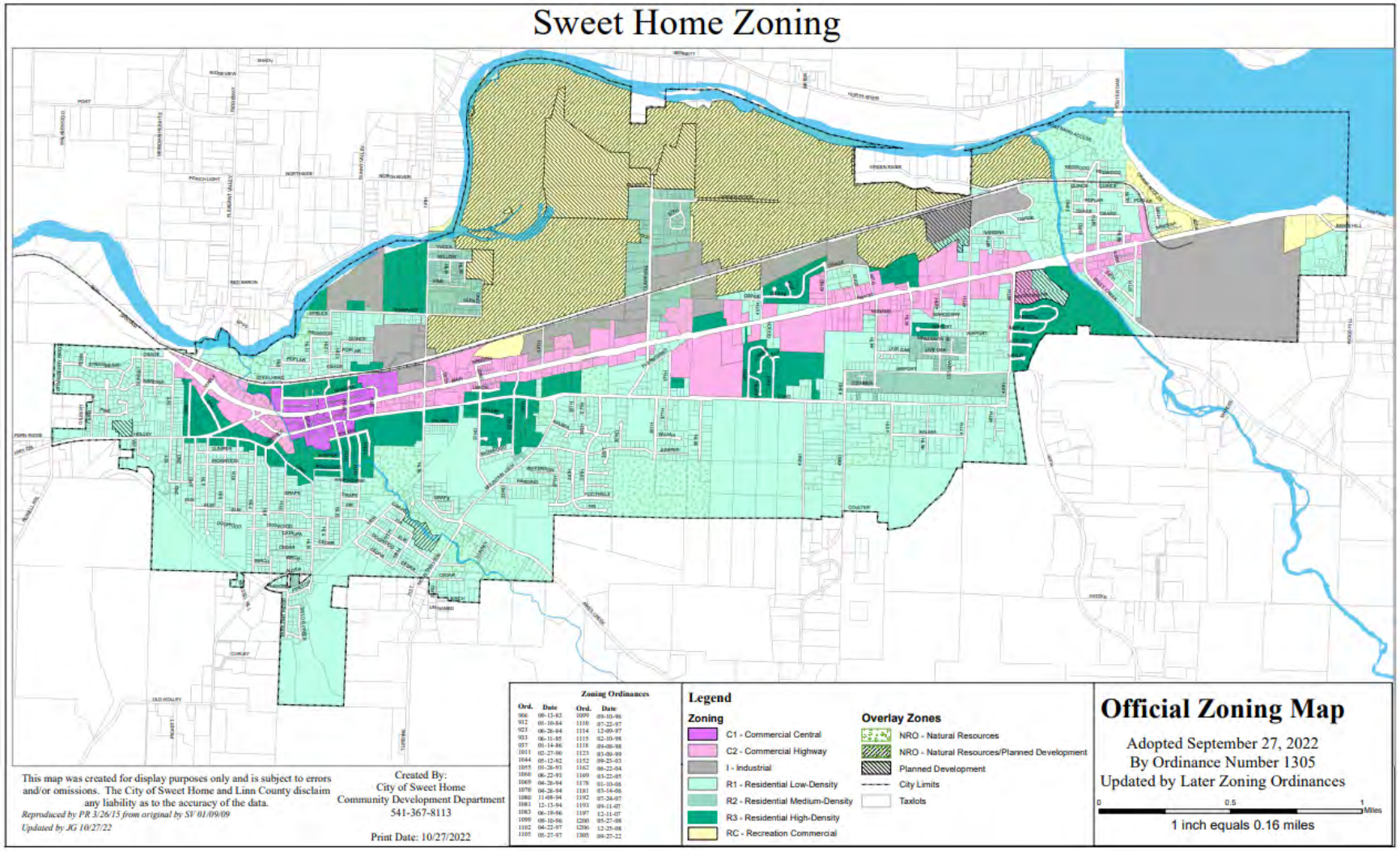


Figure 2-2: Zoning Map of Sweet Home, Oregon

2.2 Population

2.2.1 Population and Projections

The most recent U.S. Census (2020) determined a population of 9,828 for the City. The data shown in Table 2-1. The yearly percent change from 2020 to 2021 was estimated at 1.2%, which is lower than the 1.7% rate of Linn County. Population density from 2020 census data was calculated at 1,854 population per square mile.

According to the Portland State University Population Research Center, the City will grow at an AAGR of 0.7% between 2020 and 2045. The most recent certified population estimate from PSU in July 2022 was 10,097. The population of the City is projected to be approximately 11,690 people in 2043. Figure 2-3 shows population growth in the City from the last six census measurements with the projected population growth to 2043.

Table 2-1: Historical Population Growth

Year	Population (Thousands)
1970	3.8
1980	6.9
1990	6.8
2000	8.0
2010	8.9
2020	9.8

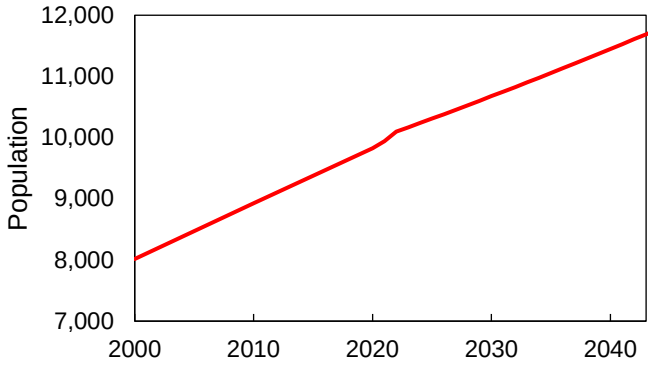


Figure 2-3: Projected population to 2050
Source: Oregon OEA

2.2.2 Socio-Economics

According to 2020 U.S. Census data, median household income in the City is $45,424 and mean income is $20,539 per capita. 19.8% of population are below the poverty line. Demographics of the city are as followed: 89.5% White, 5.1% Hispanic or Latino, 2.4% Black, 2.3% Asian, 0.4% Native American, 3.5% Two or More Races.

2.3 Physical Geography

2.3.1 Watersheds

The majority of the City is located in the upper portion of the Hamilton Creek-South Santiam River subwatershed (HUC-10: 1709000608) The most eastern portion of the City, near Foster Lake, drains into the lower portion of the Wiley Creek watershed (HUC-10: 1709000605). As

shown in Figure 2-4, these watersheds are part of the South Santiam Subbasin (HUC-8: 17090006), which contributes to the broader Willamette Basin (HUC-6: 170900).

2.3.2 Topography

The City's topography is influenced by its location in the western foothills of the Cascade Mountain Range. The elevation of Sweet Home ranges from approximately 500 feet to approximately 850 feet above sea level. The South Santiam River, which borders the city's Urban Growth Boundary to the north, flows at an elevation of around 500 feet at the western portion of the City. The City's drainage infrastructure, shown with the area's topography in Figure 2-5, flows entirely via gravity.

2.3.3 Soils

Soils in the area are primarily silty and clay loams. Thirty-nine soil groups (not including the concrete dam and water) are present within the UGB as described in the Natural Resources Conservation Service Soil Report in Appendix A. The soil types within the City are shown in Figure 2-6, with a legend and summary statistics provided in Table 2-3.

2.3.4 Wetlands

As identified by the U.S. Fish and Wildlife Service's National Wetlands Inventory, there are multiple freshwater forested/shrub wetland areas in City limits along Ames Creek, South Sharon Creek, and North of Highway 20 near Clark Mill Road (Figure 2-7). Notable of these are the wetlands associated with Hobart Natural Area on the southern part of the City. There are also pockets of Freshwater Emergent Wetlands at the former "Morse Bros" mining site or Quarry Park. A comprehensive analysis of City wetlands was performed previously by Pacific Habitat Services, Inc in 2000. A summary of the wetland acreage from that report is provided in Table 2-2. Many of the wetlands listed this report connected to the South Santiam River or Wiley Creek were designated as Locally Significant Wetlands due to either "diverse wildlife habitat, intact water quality function and/or intact hydrologic control function."

Table 2-2: Wetland Acreage from 2000 report by Pacific Habitat Services, Inc.

Wetland Classification	Area (acres)	Percent
Palustrine forested (PFO)	43.42	13%
Palustrine scrub-shrub (PSS)	25.35	8%
Palustrine emergent (PEM)	100.12	30%
Palustrine open water (POW)	66.70	20%
Palustrine aquatic bed (PAB)	13.01	4%
Palustrine unconsolidated bottom (PUB)	70.46	21%
Riverine (R)	10.35	3%
Total	**329.41**	**100%**

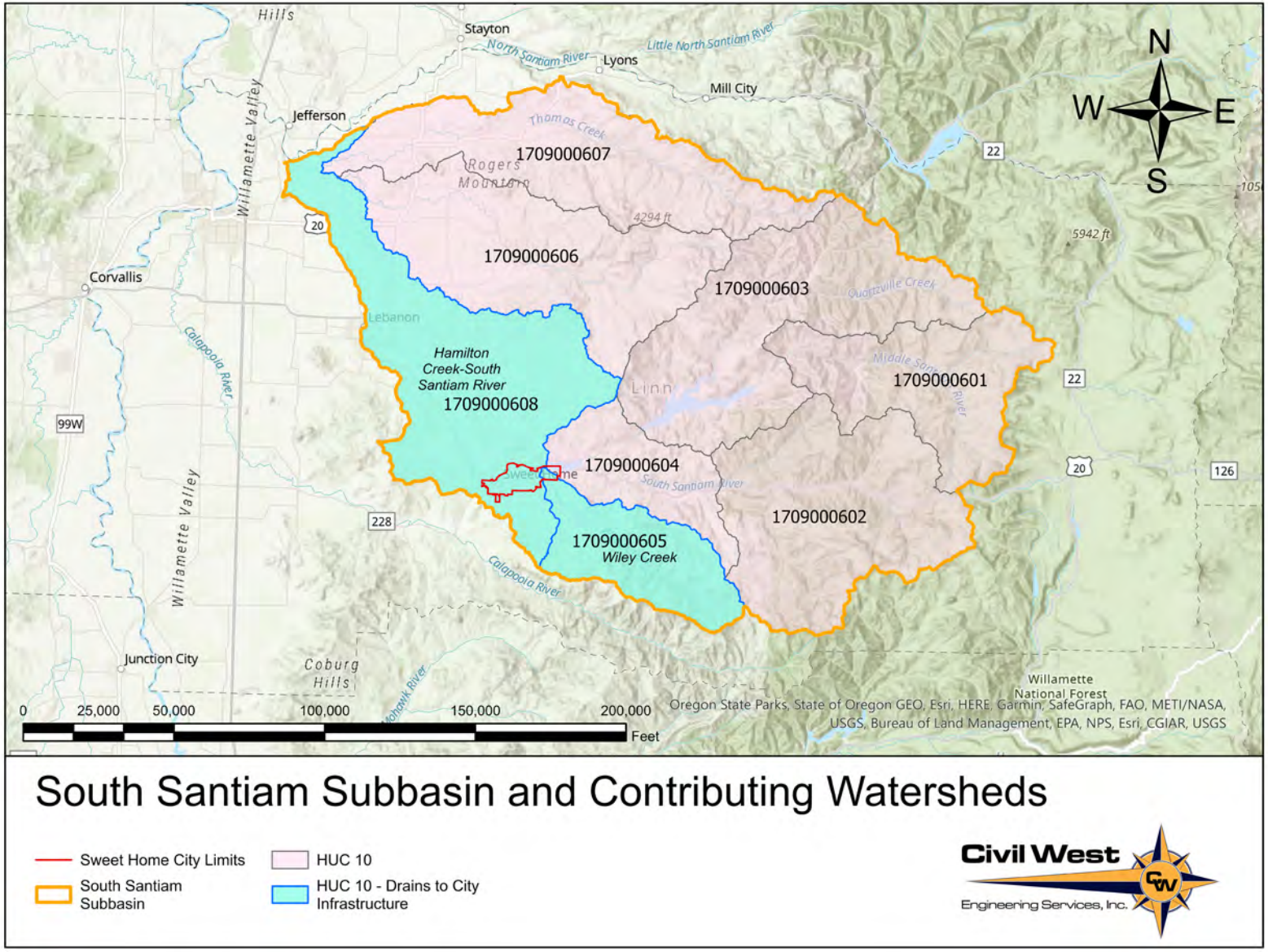


Figure 2-4: Watersheds in the South Santiam Subbasin

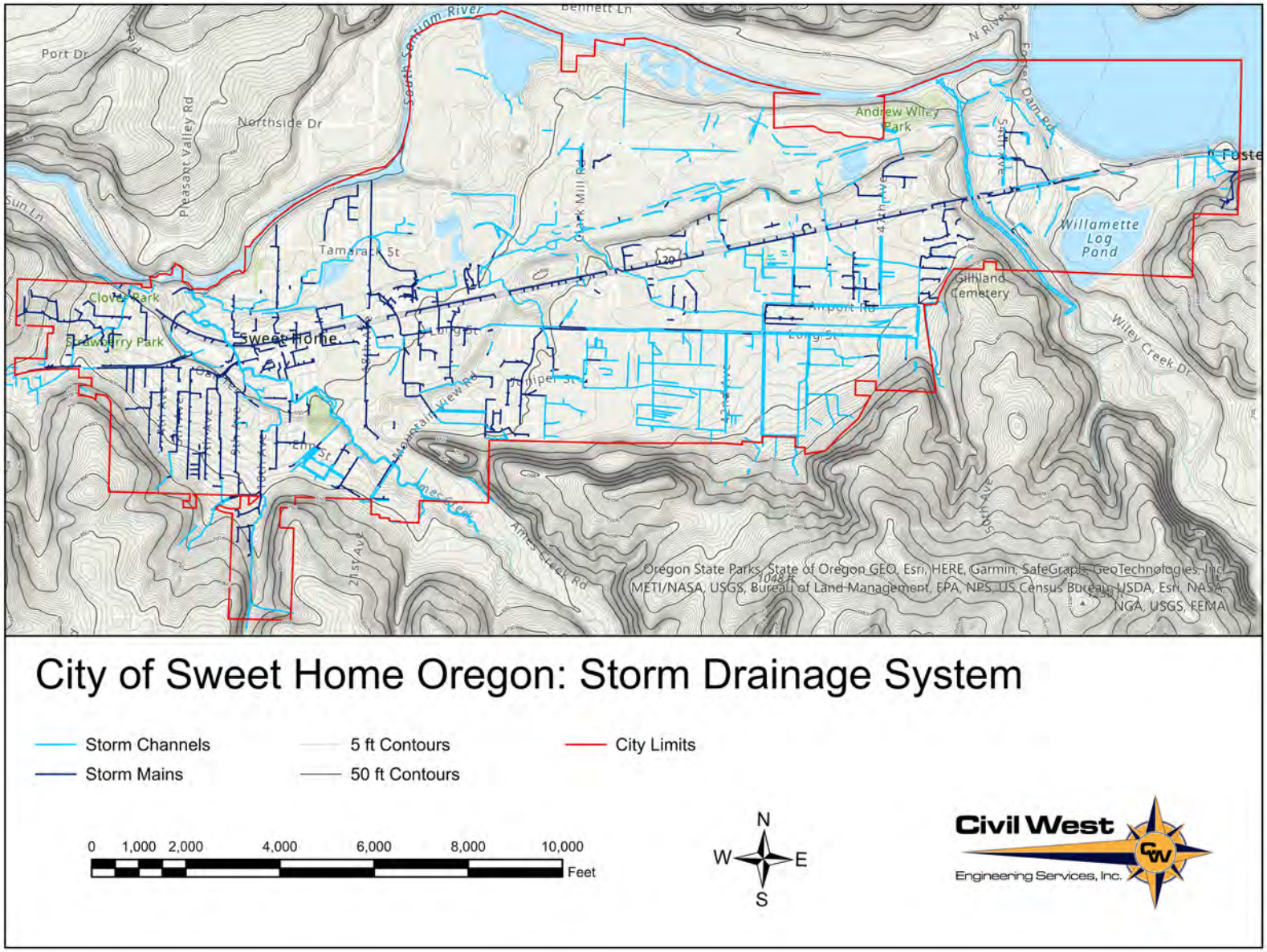


Figure 2-5: Topography and Drainage Infrastructure in Sweet Home

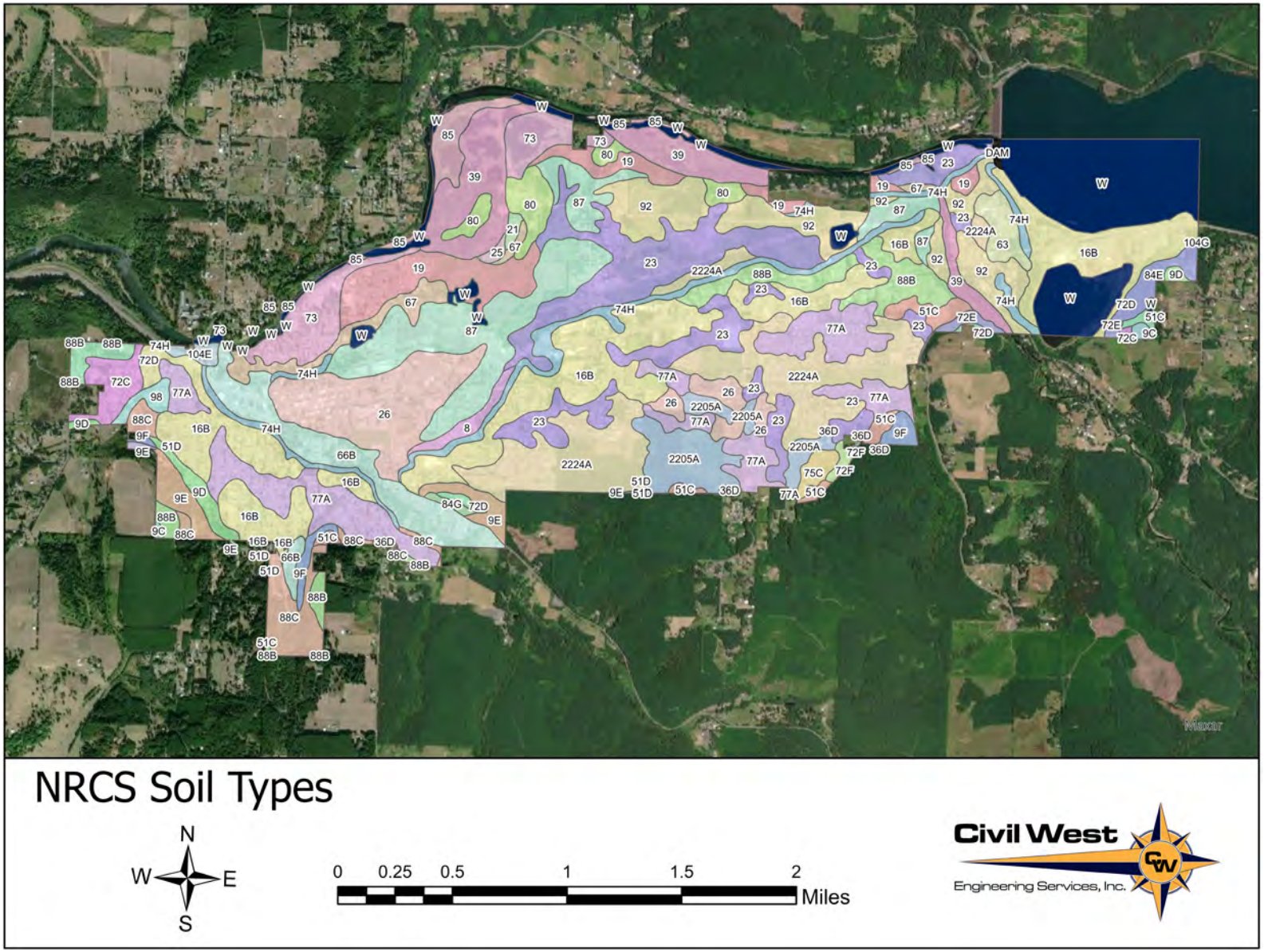


Figure 2-6: Soil Types within Sweet Home's City Limits

Table 2-3: Soil Types within Sweet Home

Sweet Home Soil Map Unit Legend			
Symbol	**Soil Type**	**Acres**	**Percent of AOI**
87	Salem gravelly silt loam	246.2	6.7%
21	Chehalis silty clay loam	4.9	0.1%
9D	Bellpine silty clay loam, 12 to 20 percent slopes	25.3	0.7%
2224A	Courtney gravelly silty clay loam, 0 to 3 percent slopes	297	8.1%
W	Water	314.7	8.5%
88B	Salkum silty clay loam, 2 to 8 percent slopes	97.4	2.6%
80	Pits	58.3	1.6%
23	Clackamas gravelly silt loam	328.4	8.9%
39	Fluvents-Fluvaquents complex, nearly level	171.1	4.6%
92	Sifton variant gravelly loam	170.4	4.6%
16B	Briedwell silt loam, 0 to 7 percent slopes	490.9	13.3%
77A	Pengra silt loam, 1 to 4 percent slopes	241.9	6.6%
72E	Nekia silty clay loam, 20 to 30 percent slopes	11.3	0.3%
26	Coburg silty clay loam	199.6	5.4%
2205A	Conser silty clay loam, 0 to 3 percent slopes	93.8	2.5%
85	Riverwash	40.6	1.1%
88C	Salkum silty clay loam, 8 to 15 percent slopes	68.6	1.9%
104G	Witzel very cobbly loam, 30 to 70 percent slopes	0.1	0.0%
84E	Ritner cobbly silty clay loam, 2 to 30 percent slopes	25.4	0.7%
72D	Nekia silty clay loam, 12 to 20 percent slopes	28	0.8%
9C	Bellpine silty clay loam, 3 to 12 percent slopes	5.1	0.1%
98	Waldo silty clay loam	12.5	0.3%
9F	Bellpine silty clay loam, 30 to 50 percent slopes	22	0.6%
67	McBee silty clay loam	46.2	1.3%
51C	Jory silty clay loam, 2 to 12 percent slopes	34.3	0.9%
66B	McAlpin silty clay loam, 3 to 6 percent slopes	128.3	3.5%
25	Cloquato silt loam	4.3	0.1%
84G	Ritner cobbly silty clay loam, 30 to 60 percent slopes	4.4	0.1%
36D	Dupee silt loam, 3 to 20 percent slopes	9.6	0.3%
63	Malabon silty clay loam	28.5	0.8%
73	Newberg fine sandy loam	104.8	2.8%
19	Chapman loam	137.5	3.7%
51D	Jory silty clay loam, 12 to 20 percent slopes	2.5	0.1%
74H	Ochrepts, very steep	106.8	2.9%
9E	Bellpine silty clay loam, 20 to 30 percent slopes	47.3	1.3%
75C	Panther silty clay loam, 2 to 12 percent slopes	13.4	0.4%
72C	Nekia silty clay loam, 2 to 12 percent slopes	35.8	1.0%
8	Bashaw silty clay	17.2	0.5%
DAM	Concrete dam	2.6	0.1%
104E	Witzel very cobbly loam, 3 to 30 percent slopes	9.4	0.3%
72F	Nekia silty clay loam, 30 to 50 percent slopes	0.2	0.0%
		3686.6	**100%**

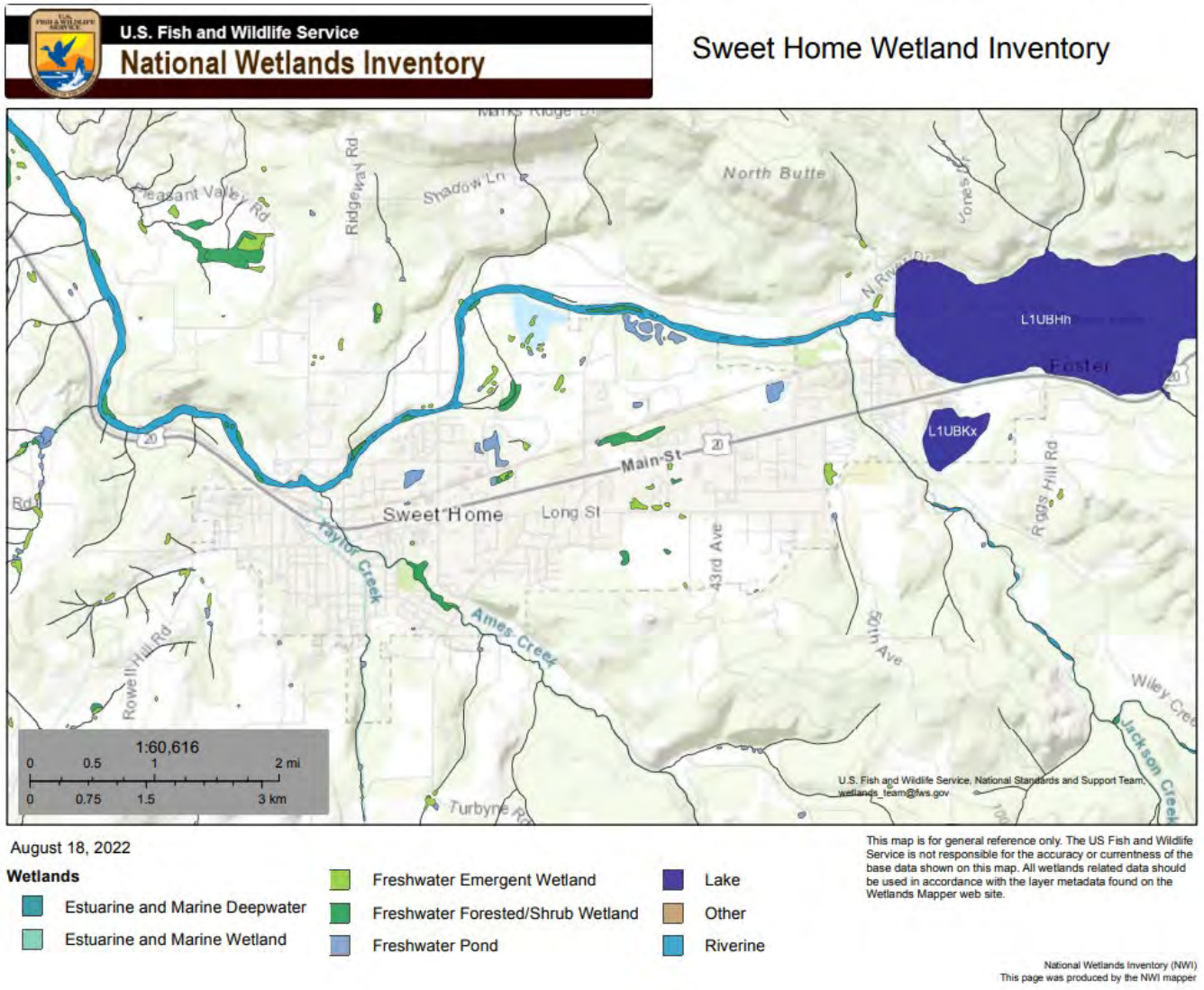


Figure 2-7: National Wetland Inventory within Sweet Home

2.4 Climate

Climate data was obtained from the Foster Dam station (Station Number 353047), as reported by the Western Regional Climate Center. Records have been kept at this station since 11/01/1969.

The City experiences a moderate amount of precipitation throughout the year. The annual average rainfall is approximately 54.4 inches, while the average snowfall amounts to 1.2 inches. The wettest months are November and December, with an average rainfall of around 8.2 inches. July is historically the driest month, with an average rainfall of 0.72 inches.

The City's temperatures exhibit a seasonal variation. The annual mean temperature ranges from a low of 41.1°F to a high of 63.1°F. January tends to be the coldest month, with an average low temperature of 33.7°F. On the other hand, August is the warmest month, with an average high temperature of 81.2°F.

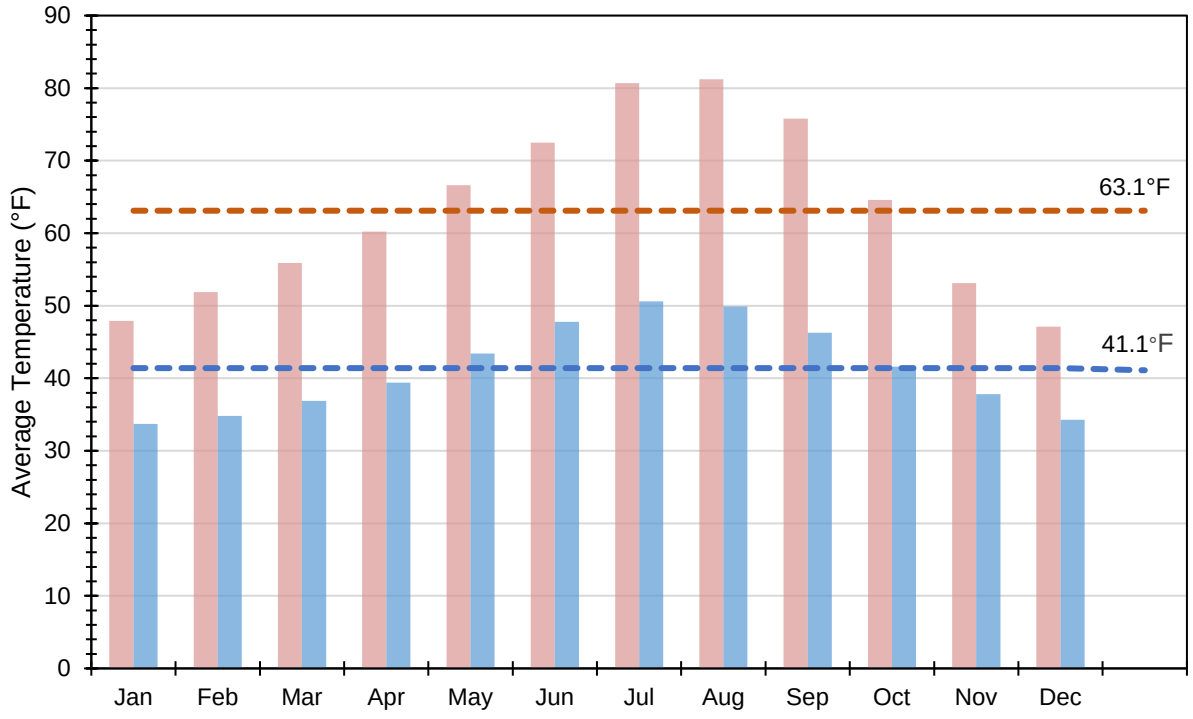


Figure 2-8: Average High and Low Temperatures as recorded at Foster Dam Station (353047)

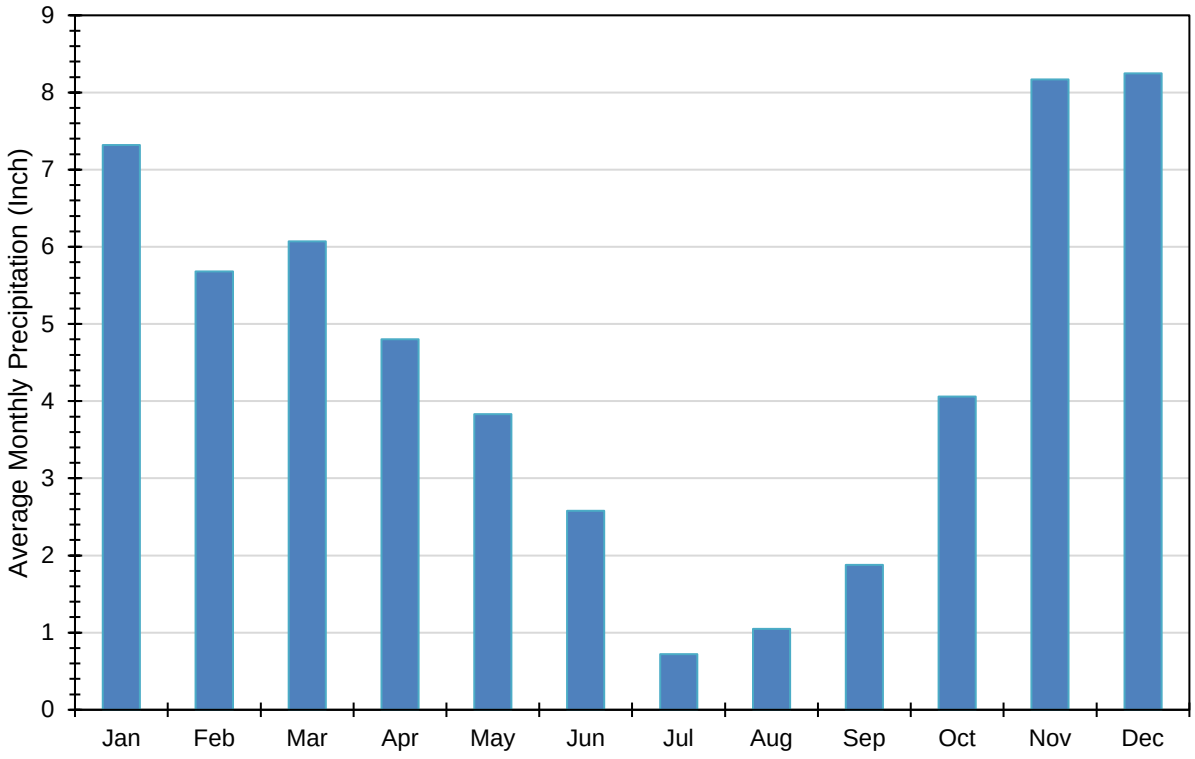


Figure 2-9: Average Rainfall as recorded at Foster Dam Station (353047)

2.4.1 Intensity-Frequency-Duration Curves

The 1980 Plan developed the first I-F-D curves specifically for the City of Sweet Home using rainfall data from the National Weather Service's Cascadia and Foster Dam precipitation recording stations. The I-F-D curves prepared in the 1980 plan correlated well with the I-F-D curves for Portland, Corvallis, Salem, and Eugene up to one hour but deviated for longer duration curves. The lack of maintained I-F-D curves in Oregon outside of the large cities necessitated the 1980 plan to develop curves specifically for Sweet Home. Today, the Oregon Department of Transportation maintains I-F-D curves for various regions in Oregon and presents them in the regularly updated ODOT Hydraulics Manual. The City of Sweet Home is considered within "Oregon Zone 5". The I-F-D curve of Zone 5 is presented in Figure 2-10.

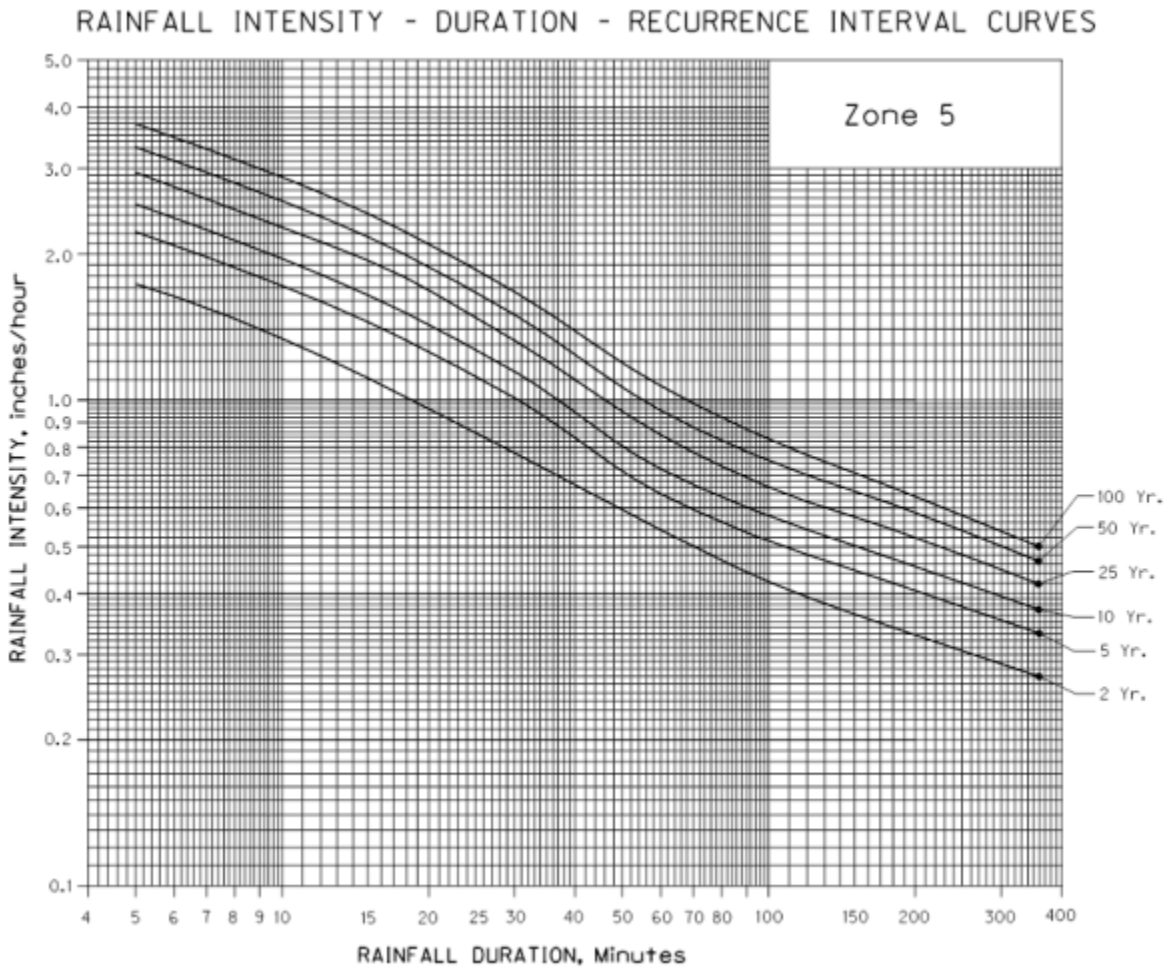


Figure 2-10: Rainfall Intensity - Frequency - Duration curve for Sweet Home's region. Source: ODOT Hydraulics Manual Appendix A.

2.4.2 Air Quality

ODEQ's annual air quality report showed that the City has air quality typically in the "Good" category of <50 AQI (Figure 2-11). In 2020, there was about one week of hazardous air quality in mid-September due to abnormal fire conditions throughout central Oregon and the Willamette Valley.

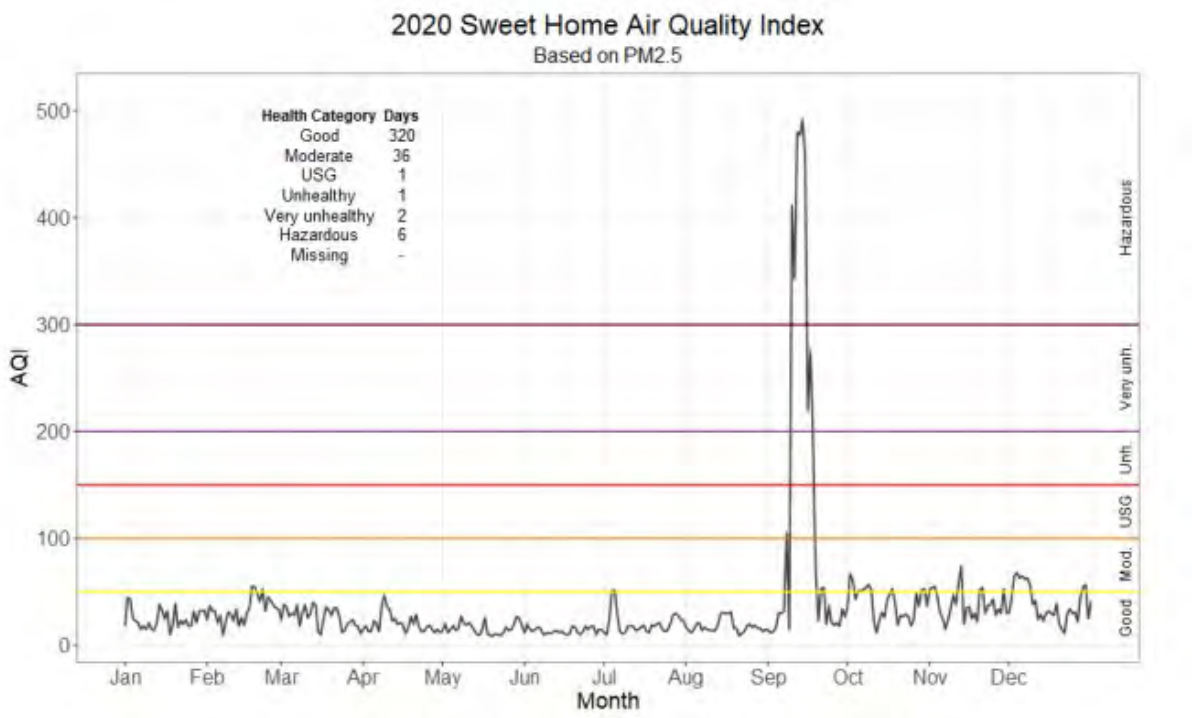


Figure 2-11: Air Quality Index from January to December 2020. Source: Oregon DEQ 2020 Annual Report

3 REGULATORY ANALYSIS

This section provides a summary of the current regulations that pertain to the City's management of stormwater and presents an analysis of future regulations that could apply within the planning period.

3.1 Current Regulatory Framework

Under Oregon Water Law, landowners are entitled to have the natural drainage courses of water maintained. Water flowing past, through, or under property is not allowed to be used or controlled by a landowner without following provisions that are specific to each usage type. Under Oregon Revised Statutes (ORS) Section 536.360, all Cities must provide for the management and control of public waters in accordance with the statute.

The City's management and enforcement code for the stormwater utility is outlined in the City's Municipal Code. Sections of the City's most relevant to drainage include: Title 13 Chapter 6 (Stormwater Drainage), Title 15 Chapter 12 (Flood Hazard Area Regulations), and Title 17, Article III, Chapter 46 (Storm Drainage and Grading).

3.1.1 Willamette Basin Total Maximum Daily Loads (TMDLs)

To protect water quality of the broader Willamette Basin, the City is required to implement the provisions of ODEQ's water quality management plan for the Willamette Basin TMDLs. The most recently issued TMDLs for the Willamette Basin were published in 2006 for temperature and bacteria, and in 2021 for mercury. A summary of these TMDLs is provided in the following sections.

3.1.1.1 Mercury TMDL

Methylmercury, an organic form of mercury, is highly toxic. Mercury that enters a riverine system can enter the food chain, and bioaccumulate in fish as methylmercury. This becomes a risk to human health when these fish are eaten by humans. Throughout the Willamette Basin, fish consumption advisories are in place due to exceeded water quality standards for mercury.

ODEQ proposed a mercury TMDL revision in 2019, and the USEPA revised and issued the TMDL in 2021. ODEQ calculated the excess mercury load in the Willamette Basin as 318 g/day. Nonpoint sources, such as stormwater runoff and erosion, make up a substantial portion of the mercury loads. The reduction requirement of mercury loadings is 75% for non-permitted urban stormwater.

3.1.1.2 Temperature TMDL

The life cycles of fish are intrinsically linked to the temperatures of their habitats. Human activity and improper management of riparian areas can lead to increases of thermal energy to water bodies. Persistent elevation of stream temperatures caused by anthropogenic activity can threaten the viability of fish, such as salmon and steelhead.

The South Santiam River was listed as core cold-water habitat and a designated stream for salmonid spawning in the 2006 Temperature TMDL. Approximately 1,200 miles of river and stream in the Willamette Basin were listed on the 2002 §303(d) list as impaired for temperature,

including River Miles 35.7 to 63.4 of the South Santiam River. The section below Foster Reservoir and throughout the city limits was not listed as impaired.

3.1.1.3 Bacteria TMDL

Pathogenic microorganisms, including bacteria, viruses, and protozoa, can cause deadly disease when ingested. The presence of pathogenic microorganisms has traditionally been inferred by the presence of indicator microorganisms, which in Oregon and many other states, is the enteric, gram-negative, lactose-fermenting bacteria *Escherichia coli*. While most *E. coli* are not pathogenic, their association with fecal matter is indicative of pollution sources that are likely to include pathogens.

Historically, bacterial exceedances occur between October and March in the Willamette Basin. The City of Portland collected data that was published in the 2006 Temperature TMDL that indicated violations of bacteria standards cooccurred with storm events in the reach of the Willamette River impacted by combined sewer overflows. While disturbances at point sources like wastewater treatment plants are probably responsible for much of the fecal contamination in the Willamette basin, stormwater runoff from public areas with improper waste management practices can also significantly contribute to bacterial loads into rivers and streams.

Nonpoint Sources, including stormwater, contribute an excess load of 2.31 x 10^14 *E. coli*/day to the Willamette Basin according to the 2006 Bacteria TMDL. Implementation of the Bacteria TMDL was expected to bring the entirety of the upper reach of the Willamette River into compliance with the bacteria water quality standards. Bacteria targeted reductions range from 66% to 83% for agricultural regions and 80% to 94% for urban areas. No streams were identified in the South Santiam Subbasin as water quality impaired for bacteria, but ODEQ concluded that water quality across the basin would benefit from comprehensive implementation of targeted reductions even in the absence of documented *E. coli* exceedances.

3.1.2 TMDL Implementation Plan

The City currently has a TMDL Implementation Plan registered with ODEQ pertaining to runoff conveyed by the City's drainage system into Ames Creek, Wiley Creek, and the South Santiam River. This plan documents the City's planned strategies and policies to reduce Temperature, Bacteria, and Mercury pollution into the receiving waters. This plan is updated on a 5-year cycle per ODEQ requirements. A copy of the City's most recent TMDL Implementation Plan is provided in Appendix B.

Strategies for reducing temperature pollution in the existing plan include enforcement of riparian protection measures as defined in the City of Sweet Home Development Code, collaboration with the South Santiam Watershed Council on riparian restoration projects, implementing a riparian vegetation plan for Sankey Park, and temperature monitoring on the river and the City's most significant point source discharger: the municipal wastewater treatment plant.

Strategies for reducing bacteria pollution include monitoring wastewater treatment plant effluent bacterial levels, public educational materials, installing and maintaining pet waste stations, adding "this drain goes to stream" catch basin stickers, maintenance of drainage collection systems, and a City-wide leaf collection program.

Strategies for reducing Mercury pollution include enforcing erosion control plans with developers per the City's building program and auditing/updating City codes pertaining to illicit discharges and construction site pollution control. General strategies for all pollutants include staff training, City Council TMDL updates, resolving illicit discharges, and maintaining an updated stormwater system map.

3.2 Future Regulatory Outlook

3.2.1 Temperature TMDL Update

At the time of this plan, ODEQ is under court order to update and replace several temperature TMDLs, including subbasins to the Willamette Basin, to make them consistent with current federal temperature standards. The South Santiam subbasin will be directly affected by this. The deadline for ODEQ to submit the new TMDL is January 15, 2024.

At this time, it is not clear how this will specifically impact the City's TMDL Implementation Plan or management strategies, although updates to temperature load allocations and ODEQ's water quality management plan are expected. With these updates, the City should expect to be required sometime in 2024-2025 to update its TMDL Implementation Plan in accordance with the new TMDL and management plan.

ODEQ has provided some information on implementation strategy examples that could be used to address the new temperature TMDL update. The City should perform a feasibility analysis on these strategies, listed below, to determine which would be possible for the City to implement:

- Riparian tree and shrub planting;
- Stream restoration to restore altered bank and channel morphology;
- Protection and restoration of cold water refuges;
- Stream flow protection measures;
- Use regulatory programs and voluntary activities, including incentive-based projects, outreach and education.

3.2.2 Municipal Separate Storm Sewer System (MS4) Requirements

The Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) program requires permits for stormwater discharges via 40 CFR 122.26. The permitting program for municipal separate storm sewer systems (MS4) is covered in two phases. Phase I pertains to MS4s serving populations larger than 100,000 people or to construction activities disturbing five or more acres of land. Phase II MS4 regulations are developed for small municipalities in areas with a population of at least 50,000, or a density of 1,000 people per square mile based on the most recent US census data. The Phase II rule also requires criteria be established for MS4's that serve populations of at least 10,000 if the local NPDES permitting authority (ODEQ) concludes that stormwater run-off could pollute receiving waters.

The City could potentially be regulated under the Phase II rule within the next planning period. In discussions with ODEQ, Civil West staff, and City staff, the City's stormwater is not currently considered to be a significant risk for polluting the receiving waterbodies. However, as the City expands and TMDLs are updated, this classification could change. In 2019, Oregon DEQ established an MS4 Phase II General Permit for small communities to comply with state and federal regulations. The City should closely evaluate the requirements of the Phase II General Permit, and be proactive with implementing stormwater management strategies consistent with the permit when feasible. By aligning the City's implementation plan and management practices with the General Permit requirements proactively, the City will be more likely to avoid the

regulatory burden of full Phase II coverage until the City exceeds the 50,000-person threshold. The City will also be more prepared for implementation of the Phase II rule when it is ultimately required, and cost-effectively protect water quality for both Sweet Home citizens and downstream users.

The General Permit implementation requirements can be divided into the following categories: public outreach, public involvement and participation, illicit discharge detection and elimination, construction site runoff control, post-construction site runoff for new development and redevelopment, and pollution prevention and housekeeping for municipal operations. For full details, refer to the most recent copy of the General Permit as issued by ODEQ. A general overview of the Phase II General Permit requirements the City should evaluate is outlined in the following sections.

3.2.2.1 Public Education and Outreach

Under the MS4 Phase II General Permit, the City would be expected to develop and maintain a comprehensive Education and Outreach program. This program should address practices that cause or contribute to adverse impacts on waters that receive the City's stormwater and promote practices that reduce pollutant discharges and illicit discharges.

Specifically, the City would be required to offer at least two educational messages or activities per year. These may include the following:

- Printed materials (brochures, newsletters)
- Electronic materials (social media posts, webpage updates, e-newsletters)
- Mass media (utility bill inserts, advertisements in public locations, public service announcements, newspaper articles)
- Targeted workshops

Reuse of activities or materials is permissible under the General Permit.

According to the most recent Census, 5.1% of the City's population is Hispanic or Latino and 4.9% speak a language other than English at home. The City should consider delivering selected messages or activities in Spanish.

The activities or materials should address the following target audiences and include information on the most appropriate target topics for Sweet Home:

Target Audiences:

- General public, homeowners, homeowner association, schoolchildren, and businesses (including home-based and mobile business)
- Local elected officials, land use planners and engineers
- Construction site operators

Target Topics:

- Impacts of illicit discharges on receiving waters and how to report them.
- Impacts from impervious surfaces and appropriate techniques to avoid adverse impacts.
- Best management practices for proper use, application and storage of pesticides and fertilizers.
- Best management practices for litter and trash control.

- Best management practices for recycling programs.
- Best management practices for power washing, carpet cleaning and auto repair and maintenance.
- Low-impact development/green infrastructure.
- Septic systems, information pertaining to maintenance of septic systems.
- Watershed awareness and how storm drains lead to local creeks and rivers, and potential impacts to fish and other wildlife.
- Stormwater issues of significance identified by permit registrant.

3.2.2.2 Public Involvement and Participation

The City would be expected to maintain at least one publicly accessible website with information on the City's implementation of MS4 policies and educational materials. The website would be required to be updated at least annually with current information. The website must contain the following:

- Illicit Discharge Complaint or Report requirements
- Documents issued for public comment, final reports, plans and other official stormwater policy documents
- Links to all ordinances, policies and/or guidance documents related to the construction and post-construction stormwater management control programs, including education, training, licensing, and permitting
- Contact information for relevant staff, including phone numbers, mailing addresses and email addresses

The City must participate either through creating or partnering in stormwater stewardship opportunities. The General Permit requires involvement in at least one stewardship opportunity. Examples of stewardship opportunities as listed in the most recent General Permit:

- Stream team activities
- Storm drain marking or stenciling
- Volunteer monitoring
- Riparian plantings/facility enhancement
- Neighborhood low-impact development activities
- Adopt-A-Road
- Citizen advisory committee
- Other locally relevant opportunities.

3.2.2.3 Illicit Discharge

The City would be expected to develop, implement, and enforce a program to detect and eliminate non-stormwater discharge into City storm drainage infrastructure. A substantial number of conditional exceptions are listed in Section A.1.d of the General Permit. Tracking and enforcement of the Illicit discharge program will require upkeep of stormwater-related GIS resources and the development and enforcement of local regulations.

GIS Inventory Requirements: Maintain a map of all MS4 outfalls, conveyance system, structural stormwater control locations, and locations of chronic illicit discharges, identify location of dry weather flows. Features must have identifiers and geographic information necessary to locate these outfalls in the field. Maps and GIS layers must be given to DEQ upon request and be included in the annual report.

Ordinances are necessary to enforce the prohibition of non-stormwater discharge into the storm drainage system. The addition of language into Sweet Home Municipal Code Title 13 should implement appropriate enforcement mechanisms to prohibit the following:

- Septic, sewage, and dumping or disposal of liquids or materials other than stormwater into the MS4
- Discharges of washwater resulting from the hosing or cleaning of gas stations, auto repair garages, or other types of automotive services facilities
- Discharges resulting from the cleaning, repair, or maintenance of any type of equipment, machinery, or facility, including motor vehicles, cement-related equipment, and port-a-potty servicing, etc.
- Discharges of washwater from mobile operations, such as mobile automobile or truck washing, steam cleaning, power washing, and carpet cleaning, etc.
- Discharges of washwater from the cleaning or hosing of impervious surfaces in municipal, industrial, commercial, or residential areas (including parking lots, streets, sidewalks, driveways, patios, plazas, work yards and outdoor eating or drinking areas, etc.) where detergents are used and spills or leaks of toxic or hazardous materials have occurred (unless all spilled material has been removed)
- Discharges of runoff from material storage areas, which contain chemicals, fuels, grease, oil, or other hazardous materials from material storage areas
- Discharges of pool or fountain water containing chlorine, biocides, or other chemicals; discharges of pool or fountain filter backwash water
- Discharges of sediment, unhardened concrete, pet waste, vegetation clippings, or other landscape or construction-related wastes
- Discharges of trash, paints, stains, resins, or other household hazardous wastes
- Discharges of food-related wastes (grease, restaurant kitchen mat and trash bin washwater, etc.)

The City would be expected to respond to complaints/reports of illicit discharges as soon as possible, within an average of two days or faster if the illicit discharge constitutes a threat to human health, welfare, or the environment. Serious instances must be reported to the Oregon Emergency Response system. Illicit discharges originating outside the City's jurisdiction would require the City to report to and collaborate with the appropriate authorities. All complaints and reports of illicit discharges must be tracked and thoroughly documented for inclusion in the annual report.

The City would be required to perform dry weather screening of the MS4 outfalls on a routine basis. This would require general observations of the outfalls, field analysis if flow is detected during dry-weather, field-testing of indicator pollutants (i.e., pH, temperature, conductivity, color, odor), and laboratory analysis if indicator pollutants are detected. This would require retaining trained staff or other personnel to conduct the field testing on a regular basis.

3.2.2.4 Construction Runoff Control

The City would be required to create and enforce a program to control runoff from construction sites. This program would require land developers to provide erosion and sediment control plans to the City for review and approval prior to development on projects 10,890 square feet or more. This may be implemented via ordinance or another regulatory mechanism. For larger construction projects (one or more acres), the City would be required to refer the project to DEQ to obtain NPDES Construction Stormwater Permit coverage.

As part of the construction runoff control program, the City would be required to inspect construction sites for compliance with erosion and sediment control plans at least once during the permit term, or more if sediment is visible or reported in runoff from the construction site. As part of the Public Education and Outreach Program, the City would be required to target construction site operators on the selection, design, installation, and use of erosion and sediment control systems.

3.2.2.5 Post-Construction Runoff Control

The City would be required to enforce that project sites creating or replacing 5,000 square feet or more of impervious area develop site-specific stormwater management plans and construct and maintain structural stormwater controls. General Permitees should prioritize low impact development or green infrastructure such as bioinfiltration or bioretention facilities.

Post-construction stormwater management systems would be expected to meet site performance standards. This would oblige the City to develop numeric stormwater retention requirements to retain stormwater onsite. Essentially, the numeric requirement will allow engineers to design systems that treat an appropriate volume of stormwater on-site without inundating the City's stormwater system. These numeric requirements must be developed using one of the following methods:

- Volume-based method (for example, the first inch of each storm event)
- Storm event percentile-based method (for example, the 95th percentile storm event-95% of the time the data is below this value)
- Annual average runoff-based method (for example 80% of annual average runoff)

Sites unable to meet the numerical stormwater retention requirements would be required to comply with treatment standards. A common treatment standard is 80% removal of suspended solids by filtration through blended soil prior to discharge into the public stormwater system. It would ultimately be up to the City to establish treatment standards that comply with DEQ requirements. The City would be required to keep records of all plans for stormwater controls, ensure compliance with inspections, maintain a tracking mechanism for documenting inspections and operation and maintenance requirements, implement reporting requirements for stormwater controls, and inclusion of new or replaced stormwater controls on the MS4 map.

3.2.2.6 Pollution Prevention and Good Housekeeping for Municipal Operations

Stormwater facilities owned and operated by the City must be regularly maintained to prevent pollutant discharges into the South Santiam. The requirements for post-construction controls for facilities on private properties as described above must also apply to the public facilities. Catch basins, culverts, drainage ditches, and other stormwater infrastructure must be regularly inspected, cleaned, and materials removed from cleaning properly disposed. Inspection and cleaning activities must be documented and records maintained. The inspection and cleaning

schedule must be designed so that each inlet facility is maintained at least once every five years or as otherwise approved by DEQ.

The City would be required to maintain good housekeeping policies, including:

- Operation and maintenance of public streets, roads, bridges, highways, and associated stormwater controls, ditches, and pipes over which the permittee has authority
- Control and minimization of the use and application of pesticides, herbicides, and fertilizers on permittee-owned properties and facilities
- Control or minimization of stormwater runoff from municipal facilities that treat, store or transport municipal waste, such as yard waste or other municipal waste and are not already covered under an NPDES permit, a DEQ solid waste, or other permit designed to reduce the discharge of pollutants
- Control measures to limit or eliminate infiltration of seepage from the municipal sanitary sewer system to the MS4
- Municipal landscape maintenance
- Fleet maintenance and vehicle washing
- Management practices that prevent or control the release of materials related to fire-fighting training activities.

Industrial sites owned and/or operated by the City must have coverage under the DEQ's NPDES Industrial Stormwater General Permit

The City must insure winter operations, such as use of anti-icing and de-icing materials, do not impact runoff quality by proper usage and storage. A Winter Maintenance Strategy or equivalent document must be provided with or referenced by the SMP. Winter maintenance activities would be required to be documented for the annual report.

All City employees that apply pesticide and/or fertilizers to publicly owned landscaped areas must follow all label requirements to avoid contamination of runoff with these pollutants.

Areas identified as having an adverse impact on water quality (i.e., contaminated industrial sites), undersized and/or difficult to maintain systems, or lacking stormwater quality controls will be required to be retrofitted to comply with Phase II requirements via a Stormwater Quality Retrofit Strategy.

3.2.3 Existing Overlap with Future Requirements

As mentioned previously, it is recommended that the City updates its TMDL Implementation Plan throughout the planning period to align with MS4 requirements. This will not be difficult given that many of the requirements of the TMDL Implementation Plans and MS4 Phase II General Permit converge. Indeed, the City's existing TMDL Implementation Plan already overlaps considerably with the MS4 requirements. Future updates should continue to bridge the gap between the two regulatory frameworks. A summary of existing TMDL Implementation Plan actions that overlap with MS4 Phase II General Permit requirements are shown in Table 3-1.

Table 3-1 Current Strategies in TMDL Implementation Plan that Overlap with MS4 Phase II General Permit Requirements

MS4 Phase II Category	TMDL Implementation Plan Action	Strategy/Action
Public Education and Outreach	2.2 Bacteria Source: Sediments entering City stormwater collection system	Publish educational materials in local newspapers and other City publications such as informational inserts in water bills. Select resources from EPA's Survey's & Evaluations webpage to gauge community awareness of the City's stormwater system
Public Education and Outreach	3.1 Mercury Source: Sediments entering City stormwater collection system	Erosion control fact sheets to be included in permit application packets for commercial and large residential projects. Developers referred to Low Impact Development information listed on City website
Public Involvement and Participation	1.1 Temperature Source: solar radiation input	Work with the South Santiam Watershed Council on at least one riparian project by 2025
Public Involvement and Participation	2.2 Bacteria Source: Sediments entering City stormwater collection system	Update the City's public stormwater website to include information to prevent illicit discharges and provide links to stormwater related documentation and policies.
Public Involvement and Participation	2.2 Bacteria Source: Sediments entering City stormwater collection system	Install "This drain goes to stream" stickers on 450 unmarked catch basins. Incorporate sticker replacement into biennial catch basin maintenance & inspection program
Illicit Discharge	4.0 Strategies for all pollutants	Keep records of illicit discharge complaints and follow-up actions/investigations. Update city code to address discharge violations. Ongoing maintenance of stormwater system map.
Construction and Post-Construction Runoff	1.1 Temperature Source: solar radiation input	Enforce Municipal Code section 17.72 which requires erosion control measures on new developments
Construction and Post-Construction Runoff	3.1 Mercury Source: Sediments entering City stormwater collection system	Enforcement of Municipal Code 13.06.030 to notify DEQ of soils contaminated with hazardous materials or chemicals in construction site.
Pollution Prevention and Housekeeping	2.2 Bacteria Source: Sediments entering City stormwater collection system	Street sweeping once per month in residential areas and once per week in business core. Implement fall leaf collection program
Multiple	4.0 Strategies for all pollutants	Conduct annual staff training on stormwater management regarding public facility cleaning/maintenance and illicit discharge detection

4 DRAINAGE SYSTEM ASSESSMENT

4.1 Drainage System Assessment

The City's drainage system was assessed via public outreach, hydrologic and hydraulic modeling, and site evaluation.

4.1.1 Public Outreach

Public outreach was conducted throughout the planning process to obtain feedback from community members and City staff regarding areas in the City where flooding, pooling, sheet flow, and other drainage issues have been observed. This occurred via public in-person events and via an online survey.

4.1.2 System Modeling

The drainage infrastructure was analyzed in Autodesk Storm and Sanitary Sewer Analysis 2022 (SSA). Stormwater modeling involves both hydraulic and hydrologic portions. The purpose of the hydraulic modeling portion is to estimate the capacity of drainpipes and ditches based on criteria such as pipe size, material, slope, and inlet conditions. The City provided a GIS dataset that contained information on pipe size, location and material. In a few areas, the dataset was missing necessary information (i.e., unknown outfall locations, missing pipe sizes) to fully model the drainage system. In this case, surveying was conducted in a few areas to obtain pipe sizes, location, and slopes. Because a full system survey was outside the scope of this planning document, it was assumed that most of the drainpipe and ditch slopes were consistent with the area's topography.

The purpose of the hydrologic portion of the model is to estimate flows associated with a design storm that the drainage infrastructure would need to convey. This portion depends on the rainfall pattern of the design storm and the amount of impervious area in a drainage basin. The design storm was a 10-year, 24-hour design storm as recommended by the Portland Stormwater Management Manual. For the Sweet Home area, the design storm was modeled with a cumulative rainfall of 3.7 inches based on the isopluvial map in NOAA Atlas 2, Volume X Figure 27 (Appendix C) using an SCS Type IA 24-Hour storm distribution (Figure 4-1).

To account for growth throughout the planning period, the model was analyzed at both current and future impervious area estimates. Current impervious area estimates were made via analysis of the most recently available aerial imagery (Google Earth, 7/13/2022). Future impervious area estimates were made by assuming that undeveloped residential zoned areas of the City would be built out with similar impervious area as the existing conditions. Specifically, undeveloped drainage areas that overlapped with R1 (Low Density) zoning areas were assigned an impervious area percentage of 40%, R2 (medium density) areas were allocated with 50% impervious area, and R3 (High Density) were allocated with 70% impervious area.

The overall goal of the modeling analysis is to determine if any of the City's infrastructure is undersized for the volume of runoff that would need to be conveyed in a major storm event. The SSA program returns an estimate of the hydraulic capacity of the drainage infrastructure and an estimate of the runoff volume. At points in the system where the runoff volume exceeds the

capacity of the receiving pipe or channel, the infrastructure was determined likely to be undersized.

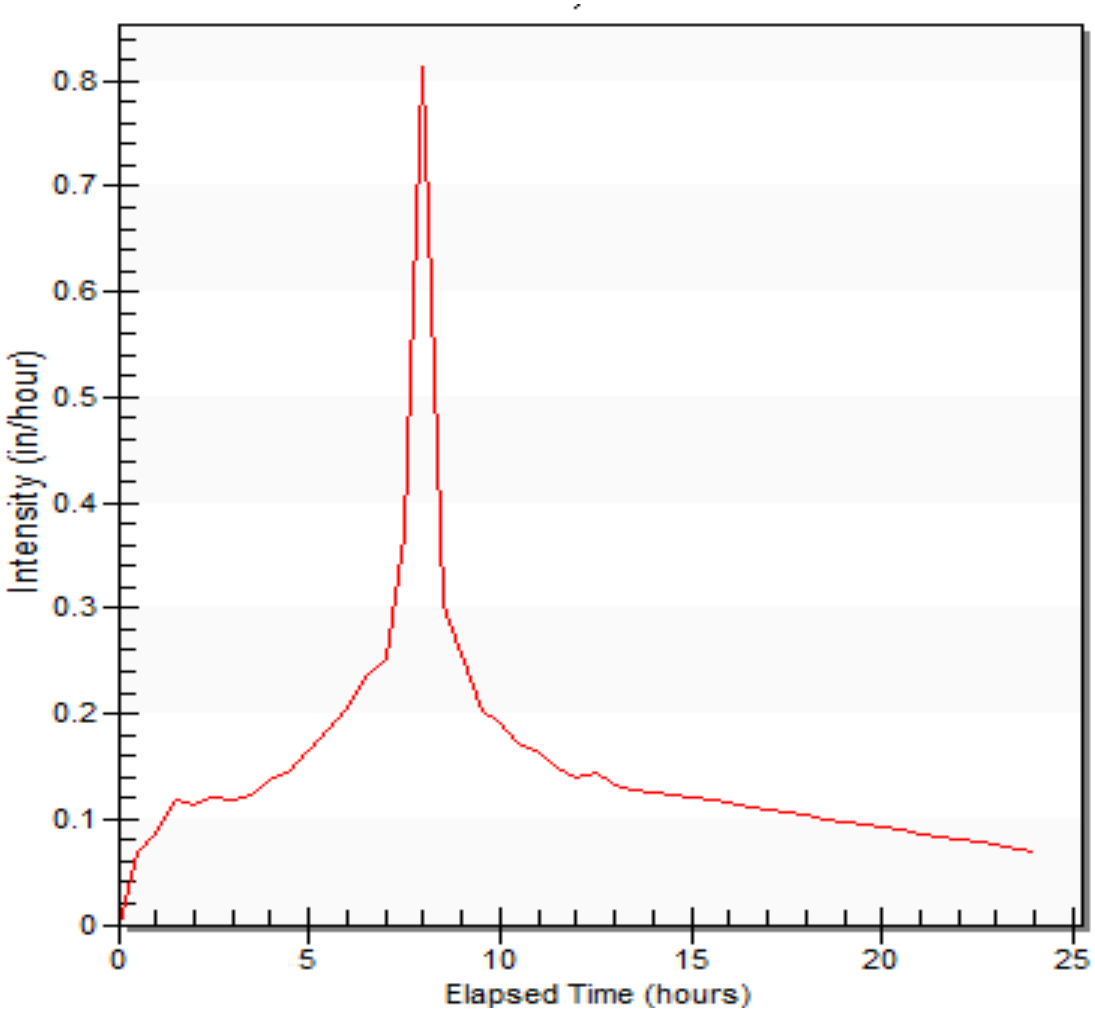


Figure 4-1: 10 year, 24-hour design storm for Sweet Home with Type IA Storm Distribution

4.1.3 Site Evaluation

In some instances, the drainage issues discovered as part of the public outreach portion corresponded with the results of the SSA model. This indicates that the drainage issue is most likely a result of undersized drainage infrastructure (i.e., pipes or channels). In other cases, the model indicated that receiving pipes or channels were sized appropriately despite drainage issues being observed in the public involvement phase. The SSA model does not fully consider inlet characteristics of the drainage system (i.e., undersized drains, blocked gutters, inundated ditches). For these areas, the site was assessed in-person by Civil West staff to determine if debris blockage, too few catch basins, or undersized inlets could explain the drainage issue.

Areas that the model indicated that receiving pipe or channel sizes were nominally large enough to handle expected flows, but still experience issues as determined through the public comment process were evaluated in the field to determine if inlet capacity is insufficient for the flow associated with large rain events. The required number of inlets or the appropriate inlet size for a drainage area is a function of local hydrology and slope. For this planning effort, the inlet requirements were based on design standards from the Portland Stormwater Management Manual (PSWMM) (2020), Figure 4-2.

Table 4-3. Number of Inlets Required for 25-Year Design Storm

1.5-ft Inlets, 2-Inch Depressed Curb											2-ft Inlets, 2-Inch Depressed Curb										
Drainage Area, ft²	All Metal Inlets					First Inlet Is Metal w/G-1 or G-2, All Others Are Side Inlets					Drainage Area, ft²	All Metal Inlets					First Inlet Is Metal w/G-1 or G-2, All Others Are Side Inlets				
	LONGITUDINAL SLOPE											LONGITUDINAL SLOPE									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%		1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
500	2	2	2	2	2	2	2	2	2	2	500	1	2	2	2	2	2	2	2	2	2
1,000	2	3	3	3	3	2	2	3	3	3	1,000	2	2	3	3	3	3	3	3	3	3
1,500	3	3	4	4	4	4	4	4	4	4	1,500	2	3	3	3	3	3	3	3	3	3
2,000	3	4	4	5	5	5	5	5	5	5	2,000	2	3	3	4	4	4	4	4	4	4
2,500	4	4	5	5	6	6	6	6	6	6	2,500	3	3	4	4	4	4	4	4	4	4
3,000	4	5	5	6	6	6	6	6	6	6	3,000	3	3	4	4	4	4	4	4	4	4
3,500	4	5	5	6	6	6	6	6	6	6	3,500	3	4	4	4	5	5	5	5	5	5
4,000	4	5	6	6	7	7	7	7	7	7	4,000	3	4	4	5	5	5	5	5	5	5
4,500	4	5	6	7	7	7	7	7	7	7	4,500	3	4	5	5	5	5	5	5	5	5
5,000	5	6	6	7	7	7	7	7	7	7	5,000	3	4	5	5	6	6	6	6	6	6
5,500	5	6	7	7	8	8	8	8	8	8	5,500	4	4	5	5	6	6	6	6	6	6
6,000	5	6	7	7	8	8	8	8	8	8	6,000	4	5	5	6	6	6	6	6	6	6
6,500	5	6	7	8	8	8	8	8	8	8	6,500	4	5	5	6	6	6	6	6	6	6
7,000	5	6	7	8	8	8	8	8	8	8	7,000	4	5	5	6	6	6	6	6	6	6
7,500	5	7	7	8	9	9	9	9	9	9	7,500	4	5	6	6	7	7	7	7	7	7
8,000	6	7	8	8	9	9	9	9	9	9	8,000	4	5	6	6	7	7	7	7	7	7
8,500	6	7	8	9	9	9	9	9	9	9	8,500	4	5	6	6	7	7	7	7	7	7
9,000	6	7	8	9	9	9	9	9	9	9	9,000	4	5	6	7	7	7	7	7	7	7
9,500	6	7	8	9	10	10	10	10	10	10	9,500	5	6	6	7	7	7	7	7	7	7
10,000	6	7	8	9	10	10	10	10	10	10	10,000	5	6	6	7	7	7	7	7	7	7

Number of 18-inch or 24-inch inlets required for the runoff from the 25-year design storm to enter the facility.
When the facility has a 6% slope or more, the first inlet must be P-305: Metal Inlet Modified with G-1 or G-2.

Figure 4-2: Inlet requirements for Drainage Areas (Portland Stormwater Management Manual, 2020)

4.2 Issues Identified

4.2.1 Issues Identified via Public Outreach

A summary of issues identified in the public outreach is presented in Table 4-1. In total, 52 issues were identified. Thirty-one areas were identified that currently experience frequent flooding, pooling, or otherwise standing water. Eight areas were identified where drainage infrastructure is undersized, access is restricted due to structures on private property, inlet structures buried from construction activities, or damaged. Of special note are five instances of drainage issues near Highway 20, including those related to flooding and undersized infrastructure. Additionally, a survey was distributed to the public via the City's website to assess the City's public outreach program. The results of this survey are provided in Figure 4-3.

Table 4-1: Issues Identified via Public Outreach

#	Location	Issue
1	Strawberry Ridge and Nandina Street	Sheet flow across road
2	Evergreen Lane near Holley Road	Storm drain runs under garage on private property
3	Holley Road from 1st Avenue to 4th Avenue	Vaults have been buried/paved over
4	Highway 20 near 4th Avenue	Undersized storm drain under the highway
5	3rd Avenue and Elm Street	Infrastructure missing from most recent stormwater system map
6	Ironwood Street from 6th Avenue to 7th Avenue	Pooling in gutters
7	3rd Avenue and Hawthorne Street	Pooling in gutters
8	10th Avenue and Elm Street	4" perforated storm drain missing from most recent stormwater system map
9	9th Avenue and Elm Street	Pooling at intersection
10	12th Avenue and Elm Street	Pooling and sheet flow
11	13th Avenue and Elm Street	4" perforated storm drain missing from most recent stormwater system map
12	12th Avenue at Ames Creek	Catch Basin missing from most recent stormwater system map
13	14th Avenue from Kalmia Street to Ames Creek	Pooling on road
14	18th Avenue and Long Street	Plugged catch basin
15	18th Avenue and Elm Street	Tree has damaged gutter
16	Fir Street near 16th Avenue	Water Quality Manhole Location
17	Cedar Street near Mountain View Road	Additional infrastructure needed to mitigate pooling
18	18th Avenue and Highway 20	Storm drain runs under building on private property
19	Long Street near 22nd Avenue	Vaults have been buried/paved over
20	23rd Avenue near Ironwood Street	Frequent flooding
21	12th Avenue and Tamarack Street	Frequent flooding
22	11th Avenue from Redwood Street to Poplar Street	Frequent flooding
23	13th Avenue and Nandina Street	Frequent flooding
24	12th Avenue and 13th Avenue near Railroad Tracks	Inundated infrastructure at storm drain and ditch junction
25	18th Avenue and Willow Street	Damaged storm drain
26	18th Avenue and Yucca Street	Damaged storm drain - Sewer laterals installed through pipe
27	22nd Avenue from Tamarack Street to Ulex Street	Frequent flooding
28	Clark Mill Road and Railroad Tracks	Frequent flooding - Suspected collapsed culvert
29	End of 32nd Court from Juniper Street	Stretch of storm drain lacks inlet
30	End of Foothill Drive to Jefferson Court near Hobart Nature Reserve	Inundated ditch
31	38th Avenue from Long Street to Hobart Nature Reserve	Frequent flooding - Suspected undersized culvert
32	37th Avenue and Long Street	Frequent flooding - Suspected clogged culvert
33	Highway 20 to Osage Street	Headwall needed
34	42nd Avenue South of Long Street	Frequent flooding
35	43rd Avenue South of Long Street	Sheet flow and flooding across road
36	47th Avenue and Kalmia Street	Frequent flooding - Suspected ditch needing clearing
37	Between Kalmia Street and Long Street near 46th Avenue	Frequent flooding - Suspected ditch needing clearing
38	Long Street from 43rd Avenue to 45th Avenue	Sheet flow and flooding across road
39	45th Avenue near Sweet Home Water Treatment	New subdivision construction planned
40	43rd Avenue and Railroad Tracks	Frequent flooding
41	45th Avenue to 47th Avenue south of Highway 20	Frequent flooding
42	Neighborhood near 49th Avenue from Airport Road to Maple Drive	Frequent flooding
43	53rd Avenue and Nandna Street	Frequent flooding
44	53rd Avenue and Wiley Creek Road	Frequent flooding
45	Highway 20 and 46th Avenue	Standing water near stop sign during rain events
46	Poplar Street east of 13th Avenue	Infrastructure missing from most recent stormwater system map
47	8th Avenue and Elm Street	Slow drainage - Likely clogging
48	12th Avenue near Nandina Street	Pooling in alley
49	9th Avenue and Poplar Street	Suspected collapsed drain pipe
50	Nandina Street from 13th Avenue to 15th Avenue	Frequent flooding
51	38th Street and Long Avenue	Frequent flooding
52	Birch Street and 8th Street	Flooding on private property spills onto roadway

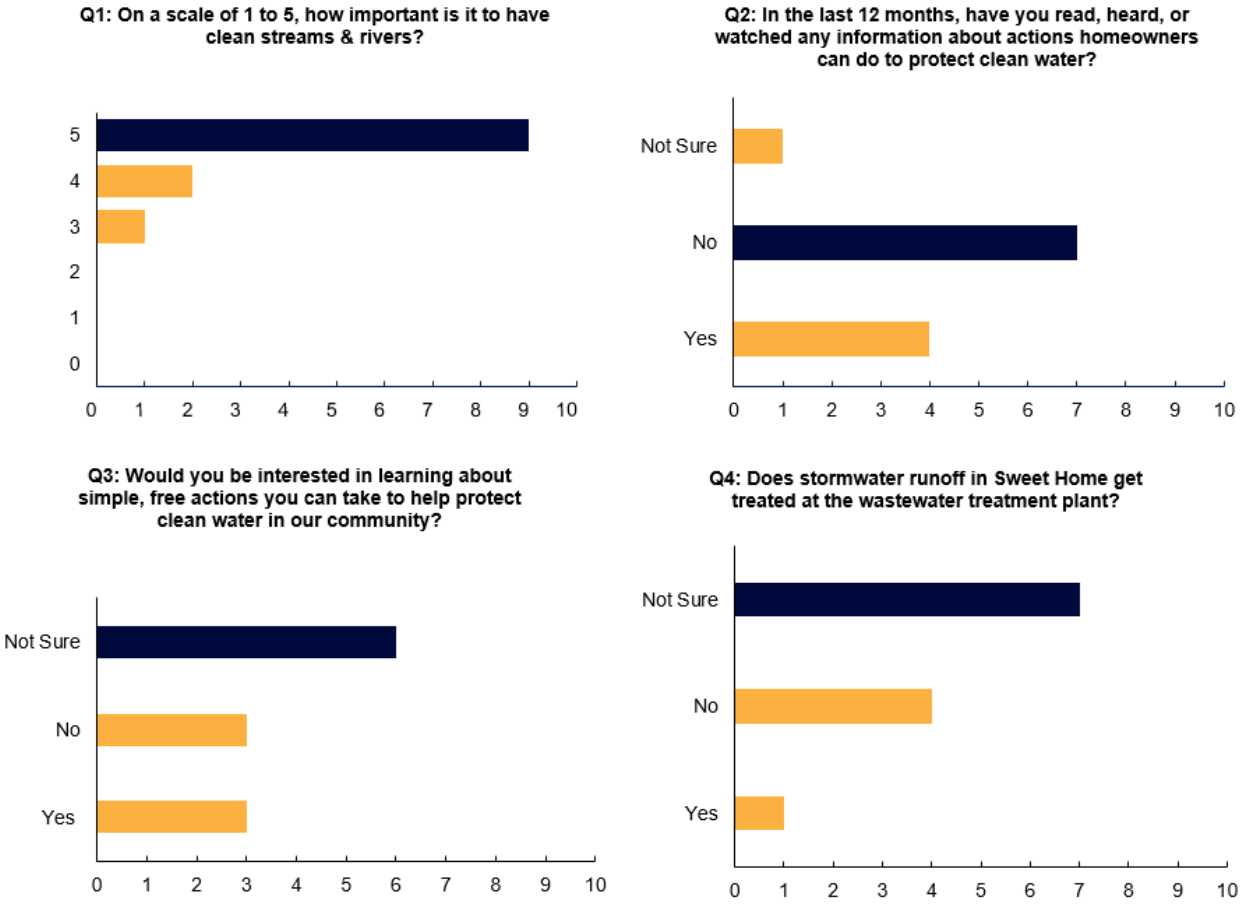


Figure 4-3: Public Stormwater Survey Results.

X-axis indicates the number of respondents.

4.2.2 Issues Identified via Drainage Modeling

Capacity issues identified by the SSA model are presented in Table 4-2. In total, sixty-eight areas were identified with undersized capacity for the design storm in present and future conditions. Of those, forty-two areas are currently under capacity for the design storm. Twenty-six stretches of pipe were identified to be undersized or at capacity based upon future growth/buildout projections. These areas are denoted in Table 4-2 by italics.

In total, 32,785 feet of storm drain is projected to be undersized within the planning period. Of the 32,785 feet, 11,789 feet are projected to be undersized based on future residential development and the subsequent increase in impervious areas.

Hydrologic and hydraulic models are approximate representations of natural processes based on estimated or measured data. Examples of estimated data in the model are the sizes and slopes of swales and channels. In addition, slopes of drainpipes and culverts are estimated to follow surface contours. Due to limited survey data, some inaccuracies may remain.

Table 4-2: Undersized Pipes and Culverts according to Model

Italics: Buildout/Growth related recommendation

Significant Drainpipes and Culverts under Capacity									
Location	**Material**	**Size (in)**	**Length (ft)**	**Slope (ft/ft)**	**Approximate Capacity (CFS)**	**Modeled Flow, Current (CFS)**	**Modeled Flow, Future (CFS)**	**Recommended size (in)**	**Recommended Capacity (CFS)**
North Side of W Holley Rd by Evergreen Lane	CON	12"	138	0.03	5.41	5.53	5.70	15"	9.63
Nandina St from Strawberry Ridge	CON	12"	400	0.102	9.86	10.58	10.59	15"	17.87
8" Storm drain under private property near Evergreen Lane	UNK	8"	100	0.016	1.32	1.38	1.39	10"	2.4
4" Drainpipe under Strawberry Park	CON	4"	292	0.016	0.21	1.7	1.9	10"	2.46
2nd Avenue Storm Main	*CON*	*12"*	*585*	*0.004*	*2.4 - 3.6*	*2.24 - 3.28*	*2.9 - 7.8*	*18"*	*9.24*
Nandina St from Sunset Ln past Westwood Ln	CON	12"	500	0.033	5.6	6.07	6.07	18"	16.46
12th Ave from Spruce St to Tamarack St	CON	12"	925	0.003	1.63	1.76	1.77	18"	4.82
Long St. from 15th to 18th	CON	12"	380	0.004	1.83	1.96	1.97	18"	5.39
18th Ave from Grape St. to Santiam Highway	CON	12"	2144	0.007	2.53	1.74-2.73	1.74-2.73	24"	16.05
Sweet Home Junior High School running along football field	UNK	24"	805	0.003	10.74	11.6	11.6	36"	31.66
Long street from 22nd to 23rd St.	CON	12"	322	0.006	2.39	2.59	2.59	18"	7.05
8" storm drain under private property between Jefferson St. and Harding St.	PVC	8"	235	0.015	1.28	1.36	1.36	10"	2.33
18th St. from Santiam Hwy to Railroad Crossing	*CON*	*24"*	*1207*	*0.01*	*19.61*	*16.42*	*20.24*	*30"*	*35.55*

Italics: Buildout/Growth related recommendation

Significant Drainpipes and Culverts under Capacity

Location	Material	Size (in)	Length (ft)	Slope (ft/ft)	Approximate Capacity (CFS)	Modeled Flow, Current (CFS)	Modeled Flow, Future (CFS)	Recommended size (in)	Recommended Capacity (CFS)
18th St. from Railroad Crossing to Tamarack St.	CON	24"	1256	0.008	17.65	18.83	18.88	36"	52.02
18th St. from Tamarack St. to Yucca St.	*CON*	*30"*	*1140*	*0.008*	*31.99*	*24.53*	*34.05*	*36"*	*52.02*
Long Street Between 23rd and 24th St.	CON	12"	300	0.005	2.18	2.28	2.35	24"	13.86
Main St. between 22nd and 24th St.	CON	12"	906	0.02	4.37	4.66	4.67	18"	12.87
Sweet Home Public Works Department	ADS	6"	675	0.016	0.62	0.67	0.67	10"	2.42
Main St. Crossing at 13th Ave	CON	12"	81	0.0035	1.83	1.88	1.88	15"	5.39
13th Ave Between Long and Kalmia	CON	10"	300	0.0011	1.02	1.12	1.12	18"	3.02
Kalmia St. Between 14th and 12th St.	CON	12"	400	0.0033	1.77	1.83	1.83	18"	5.23
Long Street between 10th Ave and Terrace Lane	CON	12"	330	0.001	0.98	1.02	1.02	15"	1.77
10th Ave. S. at Main St.	CON	12"	211	0.0034	1.8	1.8	1.8	15"	3.26
Elm Street Between 11th and 14th.	CON	12"	280	0.01	3.09	3.31	3.31	15"	5.6
Storm Drain from Elm St. through Elm Street Baptist church to Taylor Creek	CON	12"	334	0.0256	4.94	5.27	5.05	18"	14.57
Main ST at 12TH St. crossing	*CON*	*12"*	*21*	*0.0219*	*4.57*	*4.48*	*4.81*	*18"*	*13.47*
Main St. between 12th and 10th St.	*CON*	*18"*	*566*	*0.0035*	*5.39*	*5.17*	*5.81*	*24"*	*11.6*
18th Ave between Cedar St. and Ames Creek Ct.	CON	12"	595	0.0092	2.96	3.16	3.16	18"	8.73
9th Ave from Birch to Oak Terrace	*CON*	*24"*	*2005*	*0.0035*	*11.6*	*6.5*	*12.26*	*36"*	*34.2*

Italics: Buildout/Growth related recommendation

Significant Drainpipes and Culverts under Capacity

Location	Material	Size (in)	Length (ft)	Slope (ft/ft)	Approximate Capacity (CFS)	Modeled Flow, Current (CFS)	Modeled Flow, Future (CFS)	Recommended size (in)	Recommended Capacity (CFS)
Link from Oak Terrace and 9th to Taylor Creek	*CON*	*24"*	*93*	*0.0034*	*11.43*	*11.12*	*12.03*	*36"*	*33.71*
8th Ave from Dogwood to Stormwater Junction from 7th Ave.	CON	12"	1364	0.0166	3.98	4.1	4.07	18"	11.73
7th Ave from Dogwood to Ironwood	CON	12"	1357	0.019	4.26	4.53	4.53	18"	12.55
7th Ave to 8th Ave to Terrace Ln.	*CON*	*18"*	*440*	*0.0338*	*16.74*	*10.75*	*17.66*	*24"*	*36.05*
Oak Terrace to Long St. on the South side of Terrace Lane.	*CON*	*18"*	*381*	*0.0303*	*15.85*	*14.67*	*16.91*	*24"*	*34.13*
5th Ave from St Helen Church to Ironwood	CON	18"	340	0.0035	5.39	5.7	5.7	24"	11.6
Ironwood St. from 5th to 6th Ave.	CON	18"	238	0.0035	5.39	5.61	5.82	24"	11.6
6th Ave South of Ironwood to end of Methodist Church Property	CON	12"	288	0.0016	1.24	1.29	1.31	24"	7.84
6Th Ave from Ironwood to Oak Terrace	*CON*	*24"*	*481*	*0.0039*	*12.24*	*8.89*	*13.26*	*30"*	*22.2*
Oak Terrace Between 6th and 7th Ave.	*CON*	*24"*	*317*	*0.0044*	*13.01*	*11.83*	*13.63*	*30"*	*23.58*
North side of Terrace Lane from 8th Ave to Long St.	CON	24"	297	0.0035	11.6	12.02	12.11	36"	34.2
Hawthorne St. between 1st and 3rd	*CON*	*12"*	*512*	*0.0114*	*3.3*	*2.21*	*3.52*	*24"*	*20.93*
3rd Ave from Hawthorne to Ironwood	CON	12"	333	0.0429	6.4	6.76	6.75	18"	40.61
Ironwood from 3rd to 4th.	CON	12"	220	0.0429	6.4	6.71	6.76	24"	40.61
4th Ave from Ironwood to Juniper	*CON*	*18"*	*280*	*0.0415*	*18.55*	*12.6*	*19.47*	*24"*	*39.94*
4th Ave from Juniper to Holley Rd.	*CON*	*18"*	*287*	*0.0244*	*14.22*	*9.89*	*14.87*	*30"*	*55.53*
Alley between 2nd and 3rd Ave	CON	4"	315	0.05	0.37	0.4	0.4	8"	2.34

Italics: Buildout/Growth related recommendation

Significant Drainpipes and Culverts under Capacity

Location	Material	Size (in)	Length (ft)	Slope (ft/ft)	Approximate Capacity (CFS)	Modeled Flow, Current (CFS)	Modeled Flow, Future (CFS)	Recommended size (in)	Recommended Capacity (CFS)
Alley between 1st and 2nd Ave	PERF	6"	230	0.0409	0.98	1.01	1.01	12"	6.24
Holley Rd on South Side between 1st and Alley	CON	12"	140	0.019	4.26	4.43	4.36	18"	12.55
Holley Rd on South side between 2nd and 3rd	CON	18"	205	0.0035	5.39	5.74	5.76	24"	11.6
Holley Rd from 4th to Oak Terrace	CON	18"	200	0.0254	14.51	15.21	15.61	30"	56.65
Oak Terrace to Holley Rd	*CON*	*24"*	*92*	*0.0109*	*20.47*	*17.66*	*21.79*	*36"*	*60.35*
South Side of Holley Rd Between 4th and 5th and Taylor Creek	*CON*	*24"*	*485*	*0.0435*	*40.89*	*18.29*	*43.78*	*30"*	*74.14*
Main St. and 45th to Sweet Home Ranger Station	*CON*	*12"*	*244*	*0.0138*	*3.63*	*0.59*	*3.86*	*18"*	*10.69*
Main St. from Ranger Station to 44th.	*CON*	*15"*	*185*	*0.0035*	*3.31*	*2.89*	*3.58*	*30"*	*21.03*
Main St. from 43rd to 44th	CON	15"	359	0.005	3.96	4.24	4.27	30"	35.14
Main St. from 43rd to Storage Depot	CON	18"	1057	0.0051	6.5	6.82	6.84	30"	25.39
South side of Long St. from 35th to 39th	PVC	12"	921	0.0213	4.51	4.8	4.8	30"	52.73
North side of Long St. from 35th to Clark Mill Rd	CON	18"	567	0.0035	5.39	5.48	5.62	24"	11.6
North side of Long St. from 40th to 41st.	*PVC*	*18"*	*350*	*0.0045*	*6.11*	*3.07*	*6.57*	*24"*	*13.15*
Locust Ct. Near 49th Ave	*DI*	*8"*	*350*	*0.0159*	*1.32*	*1.28*	*1.38*	*10"*	*2.39*
Riggs Hill Rd Near Lakepoint	*PVC*	*12"*	*67*	*0.0128*	*3.49*	*2.94*	*3.73*	*15"*	*6.33*
Quince St. to 54th Ave	CON	8"	428	0.016	1.32	1.43	1.43	15"	7.08
54th Ave from Quince to Poplar	*CON*	*12"*	*359*	*0.016*	*3.91*	*2.99*	*4.16*	*15"*	*7.08*
48th loop to Nandina St.	ADS	10"	228	0.0034	1.11	1.19	1.19	15"	3.26

Italics: Buildout/Growth related recommendation

Significant Drainpipes and Culverts under Capacity

Location	Material	Size (in)	Length (ft)	Slope (ft/ft)	Approximate Capacity (CFS)	Modeled Flow, Current (CFS)	Modeled Flow, Future (CFS)	Recommended size (in)	Recommended Capacity (CFS)
Nandina St in front of 48th Loop	*ADS*	*12"*	*240*	*0.0035*	*1.83*	*0.63*	*1.88*	*24"*	*11.6*
Nandina St west of 48th Loop	*ADS*	*18"*	*155*	*0.0033*	*5.23*	*2.64*	*5.58*	*24"*	*11.26*
Nandina St between 47th and 48th	*ADS*	*21"*	*336*	*0.0027*	*7.14*	*3.92*	*7.71*	*30"*	*18.47*
47th Ave from Nandina to outfall	*ADS*	*21"*	*611.35*	*0.0033*	*7.89*	*4.87*	*8.46*	*30"*	*20.42*

5 RECOMMENDATIONS

This section summarizes Civil West's recommendations to improve the City's drainage infrastructure. These recommendations were made based on the data collected from the city, hydraulic modeling, and results from public outreach. These recommendations are presented in order of priority as described in the next section. A summary of the recommended improvement projects is presented in Table 5-1.

5.1 Prioritization

The priorities assigned to the recommended projects were based on the following definitions.

- **Priority 1 (Near-term Improvements) -** These projects address existing system deficiencies or problem areas needing immediate attention. It is recommended that Priority 1 improvements be accomplished as soon as practical considering financing, construction time requirements and timing associated with other related projects.
- **Priority 2 (Future Improvements) -** These are improvement projects that will be needed likely within the planning period to meet projected development conditions and design flows, or where there are moderate capacity deficiencies. Although not vital at the time of implementing this planning document, they should be considered as improvement projects to add to the City's capital improvement plan budget after completing the Priority 1 projects, or when development in the contributing drainage area increases the volume of conveyed runoff.
- **Priority 3 (Development Contingent Improvements)** These improvements are needed to improve system reliability and convey future design flows if land develops in specific parts of the City. While important, they are not considered to be critical at the present time. These projects should be moved up in priority if development occurs in the contributing drainage areas. These improvements should be incorporated into street or other utility improvement projects that may allow for concurrent construction, or they may be constructed by developers in conjunction with the utility improvements associated with the development project.

Projects 1-N, 2-E, 3-E and 3-F are projects that involve infrastructure under an Oregon Department of Transportation managed road. These projects would need to be coordinated with the agency prior to the design phase. It is possible that cost-sharing opportunities with the department will be available when these projects are undertaken, but to be conservative the full cost estimate for each of these projects was added to the City's recommended capital project list. Preliminary discussions should be held with ODOT prior to these projects to discuss funding available.

Table 5-1: Recommended Improvement Projects

Summary of Recommended Drainage Improvement Projects		
Priority 1 Projects		Cost Estimate
1-A: 3rd Ave. from Hawthorne St to Ironwood St		$224,949
1-B: 6th Ave. south of Ironwood St to Methodist Church		$228,818
1-C: 11th Ave, Redwood St, Poplar St.		$925,299
1-D: 12th Ave from Poplar St. to Tamarack St.		$635,638
1-E: Nandina St. from Strawberry Ridge		$628,758
1-F: Holley Rd on south side between 2nd and 3rd		$170,641
1-G: Long St. from 15th to 18th		$587,847
1-H: 18th Ave from Long St. to Santiam Hwy		$413,303
1-I: 53rd Ave from Nandina St to Osage St		$279,750
1-J: 49th Ave from Locust Court to Maple Drive		$91,780
1-K: Elm St. between 11th and 14th.		$216,753
1-L: Long St. from 22nd to 23rd St.		$221,415
1-M: Long St. from 35th St To 29th St		$298,149
1-N: Main St. crossing at 13th. Ave.		$123,878
	Priority 1 Project Total:	**$5,046,978**
Priority 2 Projects		Cost Estimate
2-A: North Side of W Holley Rd by Evergreen Ln.		$106,241
2-B: 18th St. from R.R. crossing to Tamarack St.		$1,208,845
2-C: Sweet Home Junior High School along football field		$660,484
2-D: Nandina St from Sunset Ln past Westwood Ln.		$340,074
2-E: Main St. between 22nd and 24th St.		$553,767
2-F: 8th Ave. from Dogwood to Stormwater Junction from 7th Ave.		$898,977
2-G: 5th Ave. from St. Helen Church to Ironwood		$255,303
2-H: Ditch from 49th to 45th Ave.		$99,147
2-I: Kalmia St. between 14th and 12th St.		$286,041
2-J: 8" S.D. under private property between Jefferson St. and Harding St.		$156,471
2-K: Long Street between 23rd and 24th.		$247,192
2-L: Locust Street off of Wiley Creek Drive		$12,332
2-M: 7th Ave. from Dogwood to Ironwood		$897,849
2-N: Holley Rd on South Side Between 1st and Alley		$124,219
2-O: Tamarack and 22nd Ave.		$1,085,209
2-P: Quince St. to 54th Ave.		$268,160
2-Q: 8" stormdrain under private property near Evergreen Lane		$57,709
2-R: 14th Ave south of Kalmia St.		$517,353
2-S: 32nd Ct. off of Juniper St.		$86,199
	Priority 2 Project Total:	**$7,861,572**
Priority 3 Projects		Cost Estimate
3-A: 4" Drainpipe under Strawberry Park		$137,908
3-B: 2nd Ave. Storm Main		$696,621
3-C: 19th St. from Santiam Hwy to R.R. Crossing		$1,165,386
3-D: 18th from Tamarack ST. to Yucca St.		$726,107
3-E: Main St. at 12th St. Crossing		$91,990
3-F: Main St. between 12th and 10th		$368,595
3-G: 9th Ave from Birch to Oak Terrace		$1,890,127
3-H: Link from Oak Terrace and 9th to Taylor creek		$96,609
3-I: 7th Ave to 8th Ave to Terrace Ln.		$285,788
3-J: Oak Terrace to Long St. on the south side of Terrace Ln.		$266,812
3-K: Oak Terrace between 6th and 7th Ave.		$362,817
3-L: Hawthorne St. between 1st and 3rd		$319,934
3-M: 4th Ave. from Ironwood to Holley Rd.		$385,393
3-N: South Side of Holley rd. btw. 4th and 5th and Taylor Creek		$517,419
3-O: North of Long St. from 40th to 41st.		$617,212
3-P: 47th Ave from Nandina to Outfall		$618,576
	Priority 3 Project Total:	**$8,547,294**

Recommended Improvement Projects Total:	**$21,455,844**

5.2 Basis for Cost Estimates

The cost estimates presented in this report typically include four components: construction cost, engineering cost, contingency, and administrative costs. Each of the cost components is discussed in this section. The estimates presented herein are preliminary and are based on the level and detail of planning presented in this study.

5.2.1 Construction Costs

The estimated construction costs in this report are based on actual construction bidding results from similar work, published cost guides, budget quotes obtained from equipment suppliers, and other construction cost experience. Construction costs are preliminary budget level estimates prepared without design plans and details.

Future changes in the cost of labor, equipment, and materials may justify comparable changes in the cost estimates presented herein. For this reason, common engineering practices usually tie the cost estimates to an index that varies in proportion to long-term changes in the national economy. The Engineering News Record (ENR) construction cost index (CCI) is most commonly used. This index is based on the value of 100 for the year 1913. Average values for the past 10 years are summarized in Table 5-2.

Table 5-2: ENR Construction Cost Index History

Year	Average CCI	% Change/Year
2010	8801	2.70%
2011	9070	3.06%
2012	9309	2.64%
2013	9547	2.55%
2014	9807	2.72%
2015	10036	2.34%
2016	10331	2.95%
2017	10681	3.39%
2018	11062	3.56%
2019	11281	1.98%
2022	11457	1.55%
2021	12149	6.04%
2022	13007	7.06%

The preliminary cost estimates are based on several assumptions, including the following:

- Standard depth mainlines (i.e., 6 ft cover or less over top of pipe).
- Adequate right-of-way or easements exist or can be acquired to construct the storm lines shown. Easement acquisition costs are not included.
- HDPE pipe used for all pipe 15” and larger and PVC for pipes 12” and smaller. If concrete pipe must be used due to actual shallow design cover depths or agency requirements, construction costs will be greater.

- Granular backfill and pavement patching will be required where noted (i.e., improvements constructed separately from street improvements). Construction costs will decrease if storm drains are constructed as part of a street project or outside of street areas.
- Bored crossing will be required under the railroad and Highway 20.
- Storm drainage improvements can be provided without extensive traffic control.
- Does not include wetland delineation, mitigation, or landscaping.
- Assumes dry weather construction.
- Bore prices assume the use of PVC pipe as carrier conduit through casing (i.e., smaller OD than concrete pipe or HDPE).
- Prices shown include engineering design as part of a major improvement project. Unit design costs may increase for minor small-scale projects.

These construction costs are planning level estimates, but they should help the City in the process of planning and allocating resources in the most cost-effective manner. All costs are estimates of probable costs and do not reflect changes that could include increasing labor costs, material, and phased construction dates.

Once the master plan is adopted by the City, the projects listed can be selected for completion through the City's budgeting process. The steps for completion are:

1. Project identification and planning level cost estimate (completed by master plan)
2. Project selection and secure project financing
3. Retain consulting engineer for project;
4. Prepare pre-design report, if necessary, for review by regulatory agencies and to refine cost estimates
5. Preparation of plans, specifications, and final engineering cost estimates
6. Bidding and contract award
7. Construction

5.2.2 Contingencies

A contingency factor equal to approximately twenty-five percent of the estimated construction cost has been added to the budgetary costs estimated in this report. In recognition that the cost estimates presented are based on conceptual planning, allowances must be made for variations in final quantities, bidding market conditions, adverse construction conditions, unanticipated specialized investigation and studies, and other difficulties which cannot be foreseen at this time but may tend to increase final costs.

Upon completion of final design, the contingency can be reduced to 10%. A contingency of at least 10% should always be maintained going into a construction project to allow for variances in quantities of materials and unforeseen conditions.

5.2.3 Engineering

Engineering services for major projects typically include surveying, preliminary and final design, preparation of contract/construction drawings and specifications, bidding services, construction management, inspection, start-up services, and the preparation of operation and maintenance manuals. Depending on the size and type of project, engineering costs may range from 18 to 25% of the contract cost when all the above services are provided. The lower percentage applies to large projects without complicated mechanical systems. The higher percentage applies to small or complicated projects.

Engineering costs for basic design and construction services presented in this section are estimated at 20% of the estimated construction cost. Other engineering costs such as specialized geotechnical explorations, hydro-geologic studies, easement research and preparation, pre-design reports, and other services outside the normal basic services will typically be in addition to the basic engineering fees charged by firms. When it was suspected that a specific project in this report may need any special engineering services, an effort has been made to include additional budget costs for such needs. Specific efforts required for individual basic engineering tasks such as surveying, design, construction management, etc. vary widely depending on the type of project, scheduling and timeframes, level of service desired during construction, and other project/site-specific conditions however an approximate breakdown of the 20% engineering budget is as follows:

- Surveying and Data Collection – 1%
- Civil/Mechanical Design – 8%
- Electrical/Controls Design – 1%
- Bid Phase Services – 1%
- Construction Management – 4%
- Construction Observation (Inspection) – 5%

5.2.4 Administration

An allowance of five percent (5%) of construction cost has been added for legal and other project management services. This allowance is intended to include internal project planning and budgeting, funding program management, interest on interim loan financing, legal review fees, advertising costs, wage rate monitoring, and other related expenses associated with the project that could be incurred.

5.3 Priority 1: Near-term Improvements

Several areas were identified has having undersized drainpipe for the flow volumes under current conditions that either overlapped with public concerns about flooding, or are located in heavily developed areas of the City where flooding damage would be costly. There were also multiple instances where the City lacks drainage infrastructure in areas where the public has expressed concerns about flooding.

1-A: 3rd Avenue from Hawthorne Street and Ironwood Street to 4th Avenue

This existing 12" storm drain is under capacity by an estimated 0.35 cfs at peak flow under current conditions. The public also expressed concerns about flooding occurring at the intersection of 3rd Avenue and Hawthorne Street.

It is recommended to upgrade these 333 feet of pipe to have a capacity of at least 10 cfs. This could be accomplished by replacing the existing drain pipe with an 18" pipe at the approximate ground slope of 4%.

Table 5-3: Project 1-A Cost Estimate

1-A: 3rd Ave. from Hawthorne St to Ironwood St				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	333	$168	$56,104
Curb and Gutter	ft	333	$99	$33,047
Manholes	ea	1	$8,697	$8,697
Inlets	ea	3	$2,055	$6,166
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	444	$100	$44,400
			Construction Total	$149,966
			Contingency (25%)	$37,492
			Engineering (20%)	$29,993
			Administrative Costs (5%)	$7,498
			Total Project Cost	**$224,949**

1-B: 6th Avenue from Ironwood Street to Juniper Street

The existing 12” storm drain that runs approximately 500 feet south of Ironwood is under capacity at peak flow under current conditions by approximately 0.1 cfs. There were also complaints about flooding that occur at the intersection of Ironwood and 6th.

It is recommended to upgrade this stretch of 12” pipe to have a capacity of at least 7 cfs, or to replace the drainpipe with an 24” pipe at a slope of at least 0.3%. If future development is expected in the southern part of 6th avenue, it may also be necessary to upsize the 24” pipe up to Juniper Street.

Table 5-4: Project 1-B Cost Estimate

1-B: 6th Ave. south of Ironwood to end of Methodist Church property				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	288	$235	$67,596
Curb and Gutter	ft	288	$99	$28,581
Manholes	ea	1	$8,697	$8,697
Inlets	ea	3	$2,055	$6,166
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	384	$100	$38,400
			Construction Total	$152,545
			Contingency (25%)	$38,136
			Engineering (20%)	$30,509
			Administrative Costs (5%)	$7,627
			Total Project Cost	**$228,818**

1-C: Lack of Infrastructure on 11th Ave, Redwood St, and Poplar St by Northside Park

The public involvement process highlighted that the streets adjacent to Northside Park experience flooding issues. Currently, this area does not have underground storm drainage infrastructure. It is recommended to construct 12" storm mains with capacity of at least 5 cfs that connect back into the main under 12th Avenue. This project should be coordinated with project 1-D.

Table 5-5: Project 1-C Cost Estimate

1-C: 11th Ave, Redwood St, Poplar St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
12" Storm Drain	ft	1434	$147	$211,486
Curb and Gutter	ft	1689	$99	$167,616
Manholes	ea	2	$8,697	$17,395
Inlets	ea	12	$2,055	$24,664
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	1912	$100	$191,200
			Construction Total	$616,866
			Contingency (25%)	$154,216
			Engineering (20%)	$123,373
			Administrative Costs (5%)	$30,843
			Total Project Cost	**$925,299**

1-D: 12th Avenue from Poplar Street to Tamarack Street

The approximately 925 feet of existing 12” pipe under 12th Ave is under capacity by 0.2 cfs at peak flow and is the likely cause for flooding issues experienced at the intersections of 12th and Spruce, and 12th and Tamarack. If new drains are added to Poplar and Redwood Streets as recommended in 1-C, this will also increase the flow into this storm main. This pipe should be upsized to 18” at a minimum slope of 0.35%.

Table 5-6: Project 1-D Cost Estimate

Project 1-D: 12th Ave from Poplar St. to Tamarack St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	925	$168	$155,844
Curb and Gutter	ft	925	$99	$91,797
Manholes	ea	4	$8,697	$34,789
Inlets	ea	8	$2,055	$16,443
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	1233	$100	$123,333
			Construction Total	$423,758
			Contingency (25%)	$105,940
			Engineering (20%)	$84,752
			Administrative Costs (5%)	$21,188
			Total Project Cost	**$635,638**

1-E: Nandina Street from Strawberry Ridge

The approximately 650 feet of existing 12” pipe under Nandina Street in northwest Sweet Home had public complaints about flooding, and the hydraulic model indicated was under capacity by approximately 0.7 cfs at peak flow. This segment should be replaced with an 18” pipe at a 10% slope with a capacity of at least 12 cfs, and tie into the existing 18” pipe on Nandina.

Table 5-7: Project 1-E Cost Estimate

1-E: Nandina St. from Strawberry Ridge				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	925	$168	$155,844
Curb and Gutter	ft	925	$99	$91,797
Manholes	ea	3	$8,697	$26,092
Inlets	ea	10	$2,055	$20,554
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	1233	$100	$123,333
			Construction Total	$419,172
			Contingency (25%)	$104,793
			Engineering (20%)	$83,834
			Administrative Costs (5%)	$20,959
			Total Project Cost	**$628,758**

1-F: Holley Road between 2nd and 3rd Avenues

The approximately 150 feet of existing 18” pipe under Holley Road had public complaints about flooding, and the hydraulic model indicated this segment of pipe was under capacity by approximately 0.35 cfs. This segment should be replaced with a 24” pipe at a minimum slope of 0.3% and tie into the existing 24” culvert under Holley Road.

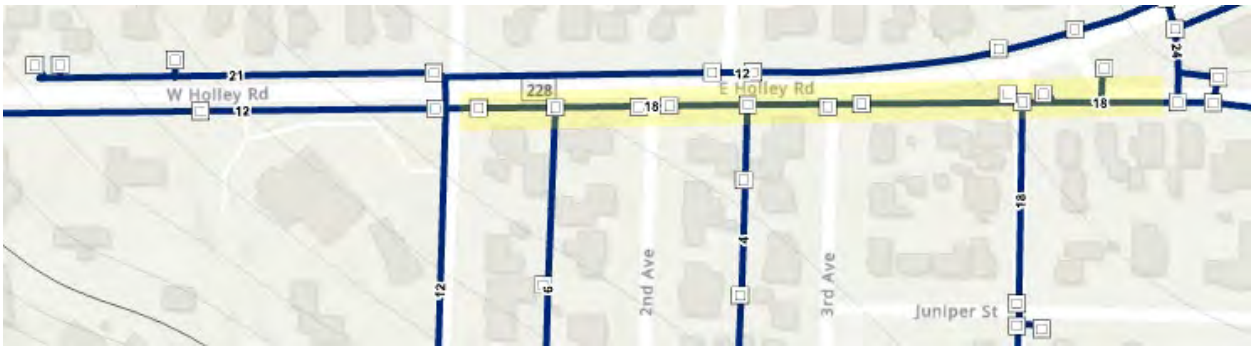


Table 5-8: Project 1-F Cost Estimate

1-F: Holley Rd on south side between 2nd and 3rd				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	205	$235	$48,116
Curb and Gutter	ft	205	$99	$20,344
Manholes	ea	1	$8,697	$8,697
Inlets	ea	3	$2,055	$6,166
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	273	$100	$27,333
			Construction Total	$113,761
			Contingency (25%)	$28,440
			Engineering (20%)	$22,752
			Administrative Costs (5%)	$5,688
			Total Project Cost	**$170,641**

1-G: Long Street from 15th Ave to 18th Ave

This existing 848 feet of 12” pipe is under capacity by 0.13 cfs at peak flow and correlates with an area that the public expressed concerns about flooding. It is recommended to upgrade this pipe to 18” at minimum 0.35% slope, or otherwise have a design capacity of at least 6 cfs.

Table 5-9: Project 1-G Cost Estimate

1-G: Long St. from 15th to 18th				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	848	$168	$142,871
Curb and Gutter	ft	848	$99	$84,156
Manholes	ea	3	$8,697	$26,092
Inlets	ea	11	$2,055	$22,609
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	1131	$100	$113,067
			Construction Total	$391,898
			Contingency (25%)	$97,975
			Engineering (20%)	$78,380
			Administrative Costs (5%)	$19,595
			Total Project Cost	**$587,847**

1-H: 18th Avenue from Long Street to Main Street

The approximate 300 ft of 12” pipe under 18th Avenue north of Long Street is under capacity by 0.2 cfs. The public expressed concerns about flooding in this area. It is recommended to upgrade this line to 18” with a 0.7% grade, or to otherwise increase the capacity of this line to at least 5 cfs.

Table 5-10: Project 1-H Cost Estimate

1-H: 18th Ave from Long St. to Santiam Hwy				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	330	$168	$55,598
Curb and Gutter	ft	848	$99	$84,156
Manholes	ea	6	$8,697	$52,184
Inlets	ea	17	$2,055	$34,941
Connect to existing storm drain system	ea	3	$1,552	$4,657
Road resurfacing	SQYD	440	$100	$44,000
			Construction Total	$275,535
			Contingency (25%)	$68,884
			Engineering (20%)	$55,107
			Administrative Costs (5%)	$13,777
			Total Project Cost	**$413,303**

1-I: 53rd Avenue from Nandina Street to Osage Street

The public involvement process highlighted that 53rd avenue from Osage St to Nandina St experiences flooding issues, and currently this area does not have underground storm drainage infrastructure. It is recommended to construct a 12" storm main with a minimum slope of 1% under Nandina Street to outflow into the existing ditch system on 54th Avenue.

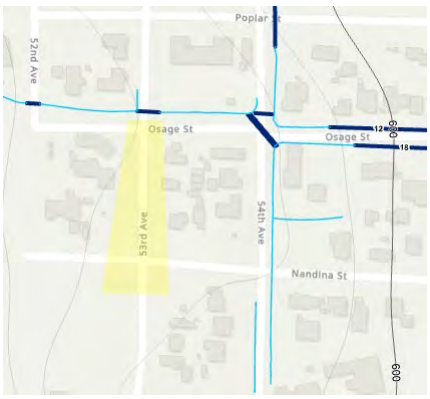


Table 5-11: Project 1-I Cost Estimate

1-I: 53rd Ave from Nandina St to Osage St				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
12" Storm Drain	ft	342	$147	$50,438
Curb and Gutter	ft	684	$99	$67,880
Manholes	ea	1	$8,697	$8,697
Inlets	ea	6	$2,055	$12,332
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	456	$100	$45,600
			Construction Total	$186,500
			Contingency (25%)	$46,625
			Engineering (20%)	$37,300
			Administrative Costs (5%)	$9,325
			Total Project Cost	**$279,750**

1-J: 49th Avenue from Locust Court to Maple Drive

The public expressed concerns about flooding issues here. There was not an apparent pipe that was over capacity according to the hydraulic modeling. Likely, the ditches that the pipes on Maple Dr and Locust Ct drain to are inundated with debris, or need landscaping. It is recommended to perform maintenance on ditch and culverts throughout the City annually. Ensure that all culverts on 49th St are at least 18" and a minimum slope of 0.3%, or otherwise have at least 5 cfs capacity.

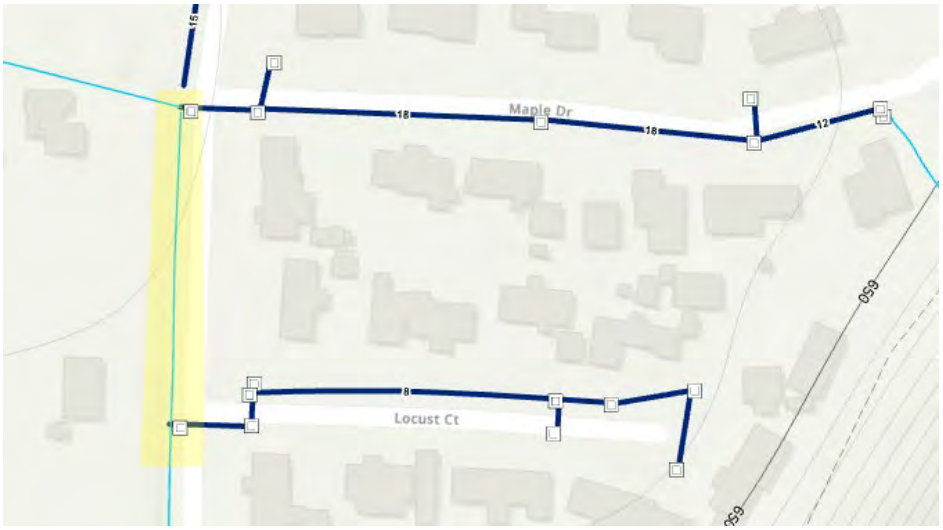


Table 5-12: Project 1-J Cost Estimate

1-J: 49th Ave from Locust Court to Maple Drive				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
Ditch Maintenance, Shrubbing	SQYD	353	$200	$70,600
			Construction Total	$70,600
			Contingency (25%)	$17,650
			Engineering (20%)	N/A
			Administrative Costs (5%)	$3,530
			Total Project Cost	**$91,780**

1-K: Elm Street Between 11th and 14th.

Existing 12” pipe under capacity by 0.22 cfs. Public has expressed concerns about flooding here. Recommended to upsize to 15" at minimum 0.35% grade, or increase capacity to at least 5 cfs.

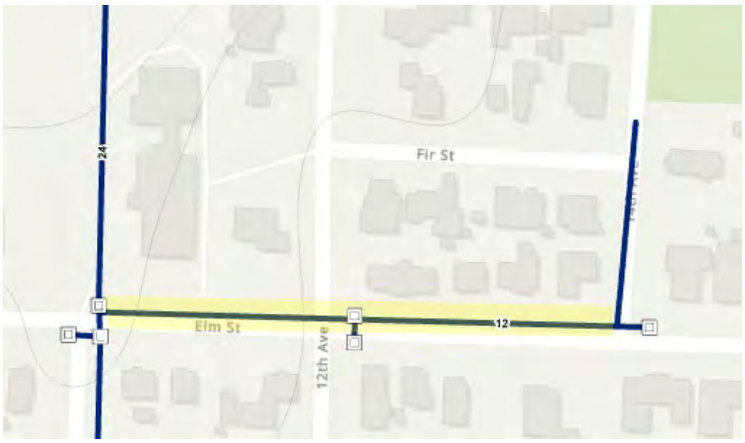


Table 5-13: Project 1-K Cost Estimate

1-K: Elm St. between 11th and 14th.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
15" Storm Drain	ft	280	$152	$42,440
Curb and Gutter	ft	280	$99	$27,787
Manholes	ea	2	$8,697	$17,395
Inlets	ea	8	$2,055	$16,443
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	373	$100	$37,333
			Construction Total	$144,502
			Contingency (25%)	$36,125
			Engineering (20%)	$28,900
			Administrative Costs (5%)	$7,225
			Total Project Cost	**$216,753**

1-L: Long street from 22nd to 23rd St.

Existing 322 ft of 12” pipe is under capacity by 0.2 cfs. Recommended to upsize to 18" at a minimum slope of 0.6%, or to otherwise increase capacity to at least 7 cfs.

Table 5-14: Project 1-L Cost Estimate

1-L: Long St. from 22nd to 23rd St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	322	$168	$54,251
Curb and Gutter	ft	322	$99	$31,955
Manholes	ea	1	$8,697	$8,697
Inlets	ea	4	$2,055	$8,221
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	429	$100	$42,933
			Construction Total	$147,610
			Contingency (25%)	$36,903
			Engineering (20%)	$29,522
			Administrative Costs (5%)	$7,381
			Total Project Cost	**$221,415**

1-M: South side of Long St. from 35th to 39th

Culverts on the south side of Long Street are under capacity by 0.25 cfs at peak flow. Recommended to upsize culverts along Long Street to 24" at minimum slope of 2%.

Table 5-15: Project 1-M Cost Estimate

1-M: Long St. from 35th St To 29th St				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Culvert	ft	200	$480	$95,966
Curb and Gutter	ft	921	$99	$91,400
Headwall/Outfall Construction	ea	6	$1,400	$8,400
Road resurfacing	SQYD	30	$100	$3,000
			Construction Total	$198,766
			Contingency (25%)	$49,692
			Engineering (20%)	$39,753
			Administrative Costs (5%)	$9,938
			Total Project Cost	**$298,149**

1-N: 13th Avenue and Main Street

Existing 12” pipe under Main Street (HWY 20) under capacity by 0.1 cfs under current conditions at peak flow. Public has also expressed concerns about flooding here. Recommended to upsize to 15" at a minimum slope of 0.3%, or to otherwise increase capacity to at least 5 cfs.

Table 5-16: Project 1-N Cost Estimate

1-N: Main St. crossing at 13th. Ave.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
15" Storm Drain	ft	100	$152	$15,157
Curb and Gutter	ft	100	$99	$9,924
Manholes	ea	1	$8,697	$8,697
Inlets	ea	1	$2,055	$2,055
Bore under Highway	ft	100	$303	$30,314
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	133	$100	$13,333
			Construction Total	$82,585
			Contingency (25%)	$20,646
			Engineering (20%)	$16,517
			Administrative Costs (5%)	$4,129
			Total Project Cost	**$123,878**

5.4 Priority 2: Future Improvements

2-A: Holley Rd and Evergreen Lane

Existing 12” pipe under capacity by 0.12 cfs currently, 0.29 cfs if full development occurs upstream. Recommended to upsize to a 15" pipe at 3% minimum slope, or increase capacity to at least 6 cfs

Table 5-17: Project 2-A Cost Estimate

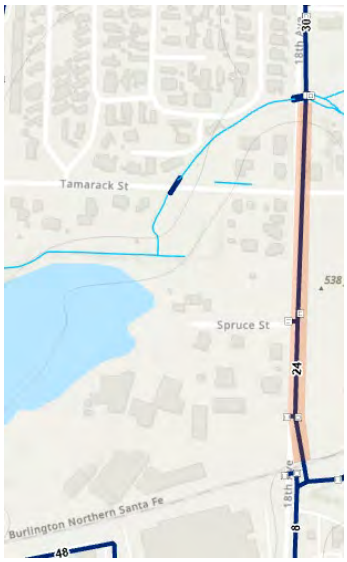
2-A: North Side of W Holley Rd by Evergreen Ln.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
15" Storm Drain	ft	138	$152	$20,917
Curb and Gutter	ft	138	$99	$13,695
Manholes	ea	1	$8,697	$8,697
Inlets	ea	3	$2,055	$6,166
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	184	$100	$18,400
			Construction Total	$70,827
			Contingency (25%)	$17,707
			Engineering (20%)	$14,165
			Administrative Costs (5%)	$3,541
			Total Project Cost	**$106,241**

2-B: 18th St. from Railroad Crossing to Tamarack St

Existing 24” pipe under capacity by 1 cfs if expected development occurs in the drainage area. This project was elevated from Priority 3 despite being mostly development driven, because the pipe will ultimately convey drainage from a large portion of the City east of the downtown area that will likely experience significant growth during the planning period. Recommended to upsize to 30" at a minimum slope of 0.8%, or otherwise increase of the capacity of this main to at least 50 cfs

Table 5-18: Project 2-B Cost Estimate

2-B: 18th St. from R.R. crossing to Tamarack St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
30" Storm Drain	ft	1256	$376	$472,256
Curb and Gutter	ft	1256	$99	$124,645
Manholes	ea	3	$8,697	$26,092
Inlets	ea	6	$2,055	$12,332
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	1675	$100	$167,467
			Construction Total	$805,896
			Contingency (25%)	$201,474
			Engineering (20%)	$161,179
			Administrative Costs (5%)	$40,295
			Total Project Cost	**$1,208,845**



2-C: Sweet Home High School along football field

Existing 24” pipe under capacity by 0.9 cfs at peak flow. This line runs under the Sweet Home High football field according to City’s GIS data. Recommended to upsize this line to 30" at a minimum slope of 0.35% rerouted around football field, or improve drainage capacity in the area at least to 10 cfs.

Table 5-19: Project 2-C Cost Estimate

2-C: Sweet Home Junior High School along football field				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
30" Storm Drain	ft	805	$376	$302,680
Curb and Gutter	ft	140	$99	$13,894
Manholes	ea	1	$8,697	$8,697
Inlets	ea	3	$2,055	$6,166
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	1073	$100	$107,333
			Construction Total	$440,322
			Contingency (25%)	$110,081
			Engineering (20%)	$88,064
			Administrative Costs (5%)	$22,016
			Total Project Cost	**$660,484**

2-D: Nandina St from Sunset Ln past Westwood Ln

Existing 12” pipe under capacity by 0.5 cfs from Sunset Ln to the outfall at the culvert interestion west of 1st Ave. Recommended to upsize this pipe to 18" at a minimum slope of 3%, or to otherwise increase capacity to at least 7 cfs.

Table 5-20: Project 2-D Cost Estimate

2-D: Nandina St from Sunset Ln past Westwood Ln.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	500	$168	$84,240
Curb and Gutter	ft	500	$99	$49,620
Manholes	ea	1	$8,697	$8,697
Inlets	ea	7	$2,055	$14,387
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	667	$100	$66,667
			Construction Total	$226,716
			Contingency (25%)	$56,679
			Engineering (20%)	$45,343
			Administrative Costs (5%)	$11,336
			Total Project Cost	**$340,074**

2-E: Main St. between 22nd and 24th St.

This pipe is under capacity by 0.3 cfs when expected development occurs upstream. Recommended to upsize to 24" at a minimum slope of 2%, or to increase capacity to at least 7 cfs.

Table 5-21: Project 2-E Cost Estimate

2-E: Main St. between 22nd and 24th St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	906	$168	$152,643
Curb and Gutter	ft	500	$99	$49,620
Manholes	ea	4	$8,697	$34,789
Inlets	ea	4	$2,055	$8,221
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	1208	$100	$120,800
			Construction Total	$369,178
			Contingency (25%)	$92,294
			Engineering (20%)	$73,836
			Administrative Costs (5%)	$18,459
			Total Project Cost	**$553,767**

2-F: 8th Ave. from Dogwood to Junction from 7th Ave.

Existing 12” pipe under capacity by 1.2 cfs if full development occurs in this area. Recommended to upsize to 18" at a minimum slope of 1.6%, or to increase capacity to at least 10 cfs.

Table 5-22: Project 2-F Cost Estimate

2-F: 8th Ave. from Dogwood to Stormwater Junction from 7th Ave.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	1364	$168	$229,807
Curb and Gutter	ft	1364	$99	$135,363
Manholes	ea	4	$8,697	$34,789
Inlets	ea	7	$2,055	$14,387
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	1819	$100	$181,867
			Construction Total	$599,318
			Contingency (25%)	$149,829
			Engineering (20%)	$119,864
			Administrative Costs (5%)	$29,966
			Total Project Cost	**$898,977**

2-G: 5th Ave from St Helen Church to Ironwood

Existing 18” pipe under capacity by 0.31 cfs at peak flow. Recommended to upsize to 24" at a minimum slope of 0.35%, or to increase capacity to at least 10 cfs.

Table 5-23: Project 2-G Cost Estimate

2-G: 5th Ave. from St. Helen Church to Ironwood				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	340	$235	$79,801
Curb and Gutter	ft	340	$99	$33,742
Manholes	ea	0	$8,697	$0
Inlets	ea	4	$2,055	$8,221
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	453	$100	$45,333
			Construction Total	$170,202
			Contingency (25%)	$42,551
			Engineering (20%)	$34,040
			Administrative Costs (5%)	$8,510
			Total Project Cost	**$255,303**

2-H: 5th Ave from St Helen Church to Ironwood

Flooding in this area was reported during the public engagement project. It is likely that the ditch highlighted below needs to be landscaped and culverts cleared of debris to improve drainage in the Airport Lane, 47th Avenue, and 49th Avenue areas.

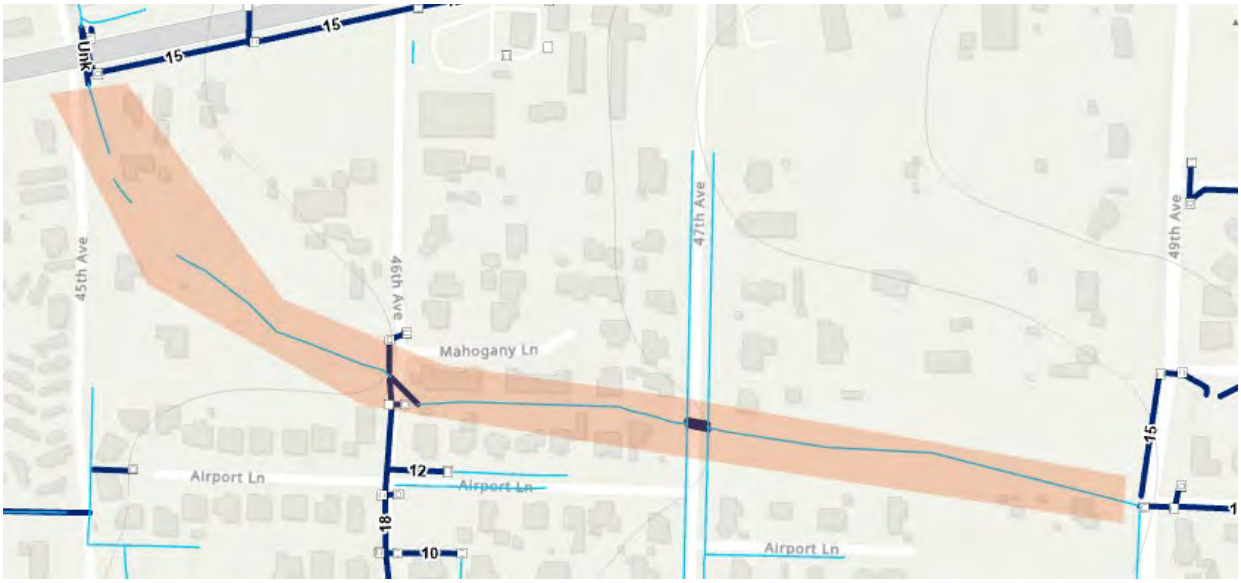


Table 5-24: Project 2-H Cost Estimate

2-H: Ditch from 49th to 45th Ave.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
Ditch Maintenance, Shrubbing	SQYD	3051	$25	$76,267
			Construction Total	$76,267
			Contingency (25%)	$19,067
			Engineering (20%)	N/A
			Administrative Costs (5%)	$3,813
			Total Project Cost	**$99,147**

2-I: Kalmia St. Between 14th and 12th St.

12” pipe under capacity by 0.1 cfs at peak flow. Recommended to upsize to 15" at minimum 0.35% slope, or to otherwise increase capacity to at least 5 cfs.

Table 5-25: Project 2-I Cost Estimate

2-I: Kalmia St. between 14th and 12th St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	400	$168	$67,392
Curb and Gutter	ft	400	$99	$39,696
Manholes	ea	2	$8,697	$17,395
Inlets	ea	4	$2,055	$8,221
Connect to existing storm drain system	ea	3	$1,552	$4,657
Road resurfacing	SQYD	533	$100	$53,333
			Construction Total	$190,694
			Contingency (25%)	$47,673
			Engineering (20%)	$38,139
			Administrative Costs (5%)	$9,535
			Total Project Cost	**$286,041**

2-J: Between Jefferson St. and Harding St.

Existing 8” storm drain is currently under private property, and modeled as under capacity by 0.1 cfs at peak flow. Recommended to upsize to 10" at a minimum slope of 1.5%, or otherwise increase capacity to at least 2 cfs. City needs to obtain an easement to place new pipe in this location, or redirect flow to appropriately sized infrastructure under an existing easement or public right of way.

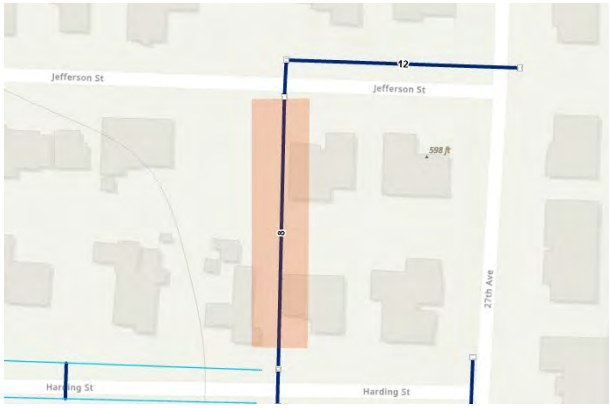


Table 5-26: Project 2-J Cost Estimate

2-J: 8" S.D. under private property between Jefferson St. and Harding St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
10" Storm Drain	ft	325	$266	$86,346
Manholes	ea	1	$8,697	$8,697
Inlets	ea	3	$2,055	$6,166
Connect to existing storm drain system	ea	2	$1,552	$3,104
			Construction Total	$104,314
			Contingency (25%)	$26,078
			Engineering (20%)	$20,863
			Administrative Costs (5%)	$5,216
			Total Project Cost	**$156,471**

2-K: Long Street Between 23rd and 24th St.

Existing 12” pipe under capacity by 0.1 cfs at peak flow, 0.2 cfs in the future if full development occurs south of Long Street in the 23rd – 24th Ave area. Recommended to upsize this pipe to 18" at a minimum slope of 0.5%, or to otherwise increase capacity to at least 5 cfs.

Table 5-27: Project 2-K Cost Estimate

2-K: Long Street between 23rd and 24th.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	300	$235	$70,413
Curb and Gutter	ft	300	$99	$29,772
Manholes	ea	2	$8,697	$17,395
Inlets	ea	2	$2,055	$4,111
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	400	$100	$40,000
			Construction Total	$164,795
			Contingency (25%)	$41,199
			Engineering (20%)	$32,959
			Administrative Costs (5%)	$8,240
			Total Project Cost	**$247,192**

2-L: Locust Street off of Wiley Creek Drive

This area was identified to be deficient in inlet capacity, which likely contributes to the sheet flow complaints that were received by the City in this location. The City should install at least 4 storm drains (i.e., catch basins on low points of Locust Street and 54th Ave) in this area to drain into the ditch and culvert system that currently exists in this area.

Table 5-28: Project 2-L Cost Estimate

Project 2-L: Locust Street off of Wiley Creek Drive				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
Inlets	ea	4	$2,055	$8,221
			Construction Total	$8,221
			Contingency (25%)	$2,055
			Engineering (20%)	$1,644
			Administrative Costs (5%)	$411
			Total Project Cost	**$12,332**

2-M: 7th Ave. from Dogwood to Ironwood

Existing 12” pipe under capacity by 0.1 cfs at peak flow. Recommended to upsize to 18" at a minimum slope of 1.9%, or to increase capacity to at least 10 cfs.

Table 5-29: Project 2-M Cost Estimate

2-M: 7th Ave. from Dogwood to Ironwood				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	1357	$168	$228,627
Curb and Gutter	ft	1357	$99	$134,669
Manholes	ea	4	$8,697	$34,789
Inlets	ea	8	$2,055	$16,443
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	1809	$100	$180,933
			Construction Total	$598,566
			Contingency (25%)	$149,641
			Engineering (20%)	$119,713
			Administrative Costs (5%)	$29,928
			Total Project Cost	**$897,849**

2-N: Holley Rd on South Side between 1st and Alley

Existing 12” pipe under capacity by 0.1 cfs at peak flow. Recommended to upsize to 18" at minimum slope of 1.9%, or otherwise increase capacity to at least 5 cfs.

Table 5-30: Project 2-N Cost Estimate

2-N: Holley Rd on South Side Between 1st and Alley				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	140	$168	$23,587
Curb and Gutter	ft	140	$99	$13,894
Manholes	ea	2	$8,697	$17,395
Inlets	ea	3	$2,055	$6,166
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	187	$100	$18,667
			Construction Total	$82,812
			Contingency (25%)	$20,703
			Engineering (20%)	$16,562
			Administrative Costs (5%)	$4,141
			Total Project Cost	**$124,219**

2-O: Tamarack and 22nd Ave

This area lacks storm drain or underground drainage infrastructure, and flooding issues were reported by the public. Recommended to add approximately 1500 feet of 12" storm drains, with approximately 14 inlets every 100 feet. New infrastructure should outlet north of the culvert on Tamarack Street.

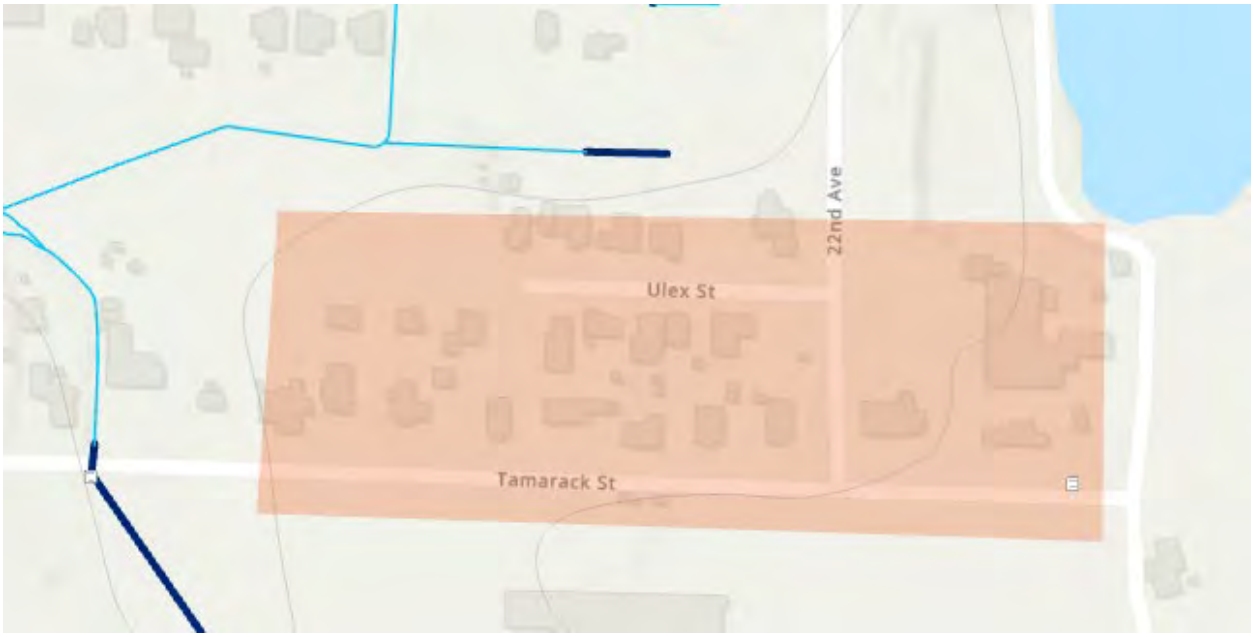


Table 5-31: Project 2-O Cost Estimate

2-O: Tamarack and 22nd Ave.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
12" Storm Drain	ft	1569	$147	$231,396
Curb and Gutter	ft	2019	$99	$200,366
Manholes	ea	6	$8,697	$52,184
Inlets	ea	14	$2,055	$28,775
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	2092	$100	$209,200
			Construction Total	$723,472
			Contingency (25%)	$180,868
			Engineering (20%)	$144,694
			Administrative Costs (5%)	$36,174
			Total Project Cost	**$1,085,209**

2-P: Quince St. to 54th Ave

Existing 8” pipe under capacity by 0.1 cfs at peak flow. Recommended to upsize to 10" at minimum slope of 1.6%, or increase capacity to at least 2 cfs.

Table 5-32: Project 2-P Cost Estimate

2-P: Quince St. to 54th Ave.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
10" Storm Drain	ft	428	$152	$64,872
Curb and Gutter	ft	428	$99	$42,475
Manholes	ea	1	$8,697	$8,697
Inlets	ea	2	$2,055	$4,111
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	571	$100	$57,067
			Construction Total	$178,774
			Contingency (25%)	$44,693
			Engineering (20%)	$35,755
			Administrative Costs (5%)	$8,939
			Total Project Cost	**$268,160**

2-Q: 8" Storm drain under private property near Evergreen Lane

Existing 8” pipe under capacity by 0.06 cfs at peak flow, and is currently located under private property. Recommended to upsize to 10" at minimum slope of 1.5%, or increase capacity to at least 2 cfs. Relocate outside of private property or obtain an easement.

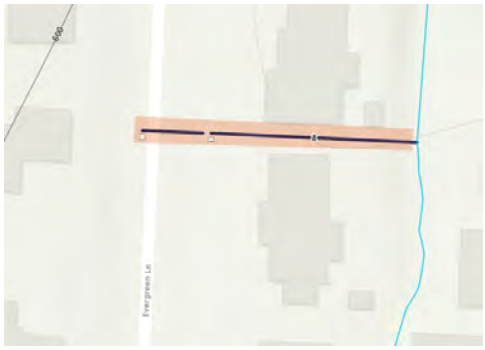


Table 5-33: Project 2-Q Cost Estimate

2-Q: 8" Stormdrain under private property near Evergreen Lane				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
10" Storm Drain	ft	100	$266	$26,568
Curb and Gutter	ft	8	$99	$794
Manholes	ea	0	$8,697	$0
Inlets	ea	2	$2,055	$4,111
Outfall/Headwall	ea	1	$1,400	$1,400
Road resurfacing	SQYD	56	$100	$5,600
			Construction Total	$38,473
			Contingency (25%)	$9,618
			Engineering (20%)	$7,695
			Administrative Costs (5%)	$1,924
			Total Project Cost	**$57,709**

2-R: 14th Ave South of Kalmia Street

Add storm drains here to fix pooling issues reported by public outreach. Construct minimum approximately 660 feet of 8" pipes at minimum slope of 1% or sized to approximately 1 cfs. Drain to upsized storm drain on 12th Ave or new outfall NW of Northside Park

Table 5-34: Project 2-R Cost Estimate

2-R: 14th Ave south of Kalmia St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
8" Storm Drain	ft	660	$147	$97,337
Curb and Gutter	ft	1320	$99	$130,997
Manholes	ea	2	$8,697	$17,395
Inlets	ea	4	$2,055	$8,221
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	880	$100	$88,000
			Construction Total	$344,902
			Contingency (25%)	$86,225
			Engineering (20%)	$68,980
			Administrative Costs (5%)	$17,245
			Total Project Cost	**$517,353**

2-S: 32nd Ct off Juniper Street

This stretch of 48" culvert goes approximately 450 feet without an inlet. Recommended to install approximately two catch basins, one every 200 feet.

Table 5-35: Project 2-S Cost Estimate

2-S: 32nd Ct. off Juniper St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
Curb and Gutter	ft	450	$99	$44,658
Manholes	ea	1	$8,697	$8,697
Inlets	ea	2	$2,055	$4,111
			Construction Total	$57,466
			Contingency (25%)	$14,366
			Engineering (20%)	$11,493
			Administrative Costs (5%)	$2,873
			Total Project Cost	**$86,199**

5.5 Priority 3: Development Contingent Improvemnts

3-A: 4” Pipe under Strawberry Park

The drainpipe under Strawberry Park was modeled to be under capacity by 1.5 cfs at peak flow at the assumed slope of 1.5% It is recommended to upsize this line to 10", or increase capacity of this pipe to at least 2 cfs. This project was not considered higher in priority due to the potential flooding occurring in a park, rather than a dense residential or commercial area.

Table 5-36: Project 3-A Cost Estimate

3-A: 4" Drainpipe under Strawberry Park				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
10" Storm Drain	ft	292	$266	$77,579
Manholes	ea	1	$8,697	$8,697
Inlets	ea	2	$2,055	$4,111
Connect to existing storm drain system	ea	1	$1,552	$1,552
			Construction Total	$91,939
			Contingency (25%)	$22,985
			Engineering (20%)	$18,388
			Administrative Costs (5%)	$4,597
			Total Project Cost	**$137,908**

3-B: 2nd Avenue Storm Main

Existing 12” pipe under capacity by 4.2 cfs, dependent on development in the area between 2nd Ave to 4th Ave, south of HWY 20. Recommended to upsize to 18” at a minimum slope of 0.35%, or increase capacity to at least 9 cfs.

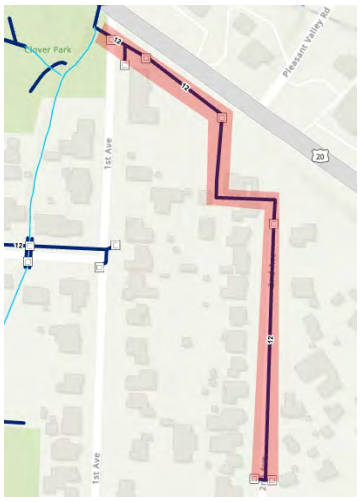


Table 5-37: Project 3-B Cost Estimate

3-B: 2nd Ave. Storm Main				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	1187	$168	$199,986
Curb and Gutter	ft	772	$99	$76,613
Manholes	ea	6	$8,697	$52,184
Inlets	ea	9	$2,055	$18,498
Outfall/Headwall	ea	1	$1,400	$1,400
Road resurfacing	SQYD	1157	$100	$115,733
			Construction Total	$464,414
			Contingency (25%)	$116,104
			Engineering (20%)	$92,883
			Administrative Costs (5%)	$23,221
			Total Project Cost	**$696,621**

3-C: 19th St. from Santiam Hwy to Railroad Crossing

Existing 24” pipe undersized by 3 cfs if full development occurs upstream. Upsize to 36" at a minimum slope of 1%, or increase capacity to at least 50 cfs

Table 5-38: Project 3-C Cost Estimate

3-C: 19th St. from Santiam Hwy to R.R. Crossing				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
30" Storm Drain	ft	1207	$480	$579,155
Curb and Gutter	ft	597	$99	$59,246
Manholes	ea	5	$8,697	$43,486
Inlets	ea	6	$2,055	$12,332
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	796	$100	$79,600
			Construction Total	$776,924
			Contingency (25%)	$194,231
			Engineering (20%)	$155,385
			Administrative Costs (5%)	$38,846
			Total Project Cost	**$1,165,386**

3-D: 18th St. from Tamarack St. to Yucca St.

Undersized by 2 cfs if full development occurs on 18th street, or upstream pipes near HWY 20, Long Street, and 22nd Street. Upsize to 36" at minimum slope of 0.8%, or increase capacity to at least 50 cfs

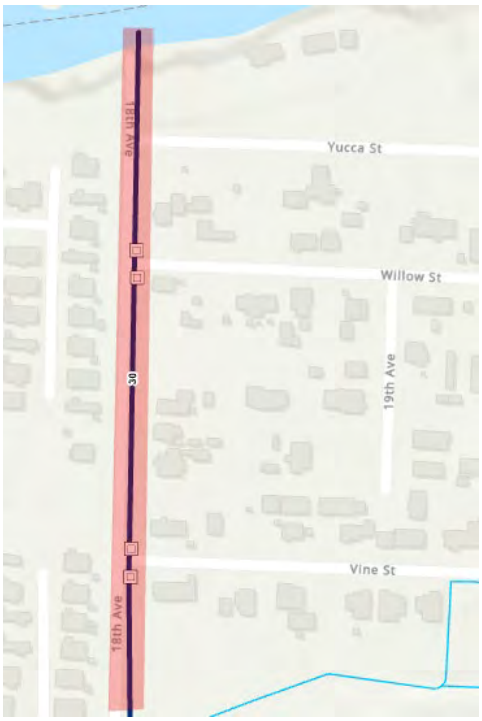


Table 5-39: Project 3-D Cost Estimate

3-D: 18th from Tamarack ST. to Yucca St.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
36" Storm Drain	ft	1140	$376	$428,640
Manholes	ea	3	$8,697	$26,092
Inlets	ea	7	$2,055	$14,387
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	120	$100	$12,000
			Construction Total	$484,071
			Contingency (25%)	$121,018
			Engineering (20%)	$96,814
			Administrative Costs (5%)	$24,204
			Total Project Cost	**$726,107**

3-E: Main St. at 12th St. Crossing

Under capacity by 0.24 cfs if major development occurs upstream, from Main Street to 13th Avenue. Upsize to 18" at minimum slope of 2%, or increase capacity to at least 10 cfs. Coordinate this project with project 3-F

Table 5-40: Project 3-E Cost Estimate

3-E: Main St. at 12th St. Crossing				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
18" Storm Drain	ft	21	$168	$3,538
Curb and Gutter	ft	8	$99	$794
Manholes	ea	2	$8,697	$17,395
Bore under Highway	ft	100	$337	$33,696
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	28	$100	$2,800
			Construction Total	$61,327
			Contingency (25%)	$15,332
			Engineering (20%)	$12,265
			Administrative Costs (5%)	$3,066
			Total Project Cost	**$91,990**

3-F: Main St. between 12th and 10th St

Under capacity by 0.4 cfs if full development occurs upstream, Main Street to 13th Avenue. Upsize to 24" at minimum slope of 0.35%, or increase capacity to at least 10 cfs. Should be coordinated and constructed at the same time as project 3-E.

Table 5-41: Project 3-F Cost Estimate

3-F: Main St. between 12th and 10th				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	566	$235	$132,846
Manholes	ea	3	$8,697	$26,092
Inlets	ea	4	$2,055	$8,221
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	755	$100	$75,467
			Construction Total	$245,730
			Contingency (25%)	$61,433
			Engineering (20%)	$49,146
			Administrative Costs (5%)	$12,287
			Total Project Cost	**$368,595**

3-G: 9th Ave. from Birch to Oak Terrace

Under capacity by 5 cfs if full development occurs in this area, 9th Avenue from Birch Street to Oak Terrace. Upsize to 36" at minimum slope of 0.35%, or increase capacity to at least 30 cfs. Coordinate with project 3-H.

Table 5-42: Project 3-G Cost Estimate

3-G: 9th Ave from Birch to Oak Terrace				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
36" Storm Drain	ft	2005	$376	$753,880
Curb and Gutter	ft	1879	$99	$186,472
Manholes	ea	5	$8,697	$43,486
Inlets	ea	11	$2,055	$22,609
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	2505	$100	$250,533
			Construction Total	$1,260,085
			Contingency (25%)	$315,021
			Engineering (20%)	$252,017
			Administrative Costs (5%)	$63,004
			Total Project Cost	**$1,890,127**

3-H: 9th Ave. from Birch to Oak Terrace

Under capacity by 0.31 cfs if full development occurs in this area, from 9th Avenue from Birch Street to Oak Terrace. Upsize to 36" at minimum slope of 0.35%, or increase capacity to at least 30 cfs. Should be coordinated to construct at the same time as project 3-G.

Table 5-43: Project 3-H Cost Estimate

3-H: Link from Oak Terrace and 9th to Taylor creek				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
36" Storm Drain	ft	93	$376	$34,968
Curb and Gutter	ft	40	$99	$3,970
Manholes	ea	1	$8,697	$8,697
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	123	$100	$12,267
			Construction Total	$64,406
			Contingency (25%)	$16,101
			Engineering (20%)	$12,881
			Administrative Costs (5%)	$3,220
			Total Project Cost	**$96,609**

3-I: 7th Ave to 8th Ave to Terrace Ln.

18” pipe under capacity by approximately 1 cfs if full development occurs in the area between 7th and 8th Avenues, south of Oak Terrace. Upsize to 24" at minimum slope of 3.4%, or increase capacity to at least 30 cfs.

Table 5-44: Project 3-I Cost Estimate

3-I: 7th Ave to 8th Ave to Terrace Ln.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	440	$235	$103,272
Curb and Gutter	ft	245	$99	$24,314
Manholes	ea	2	$8,697	$17,395
Inlets	ea	4	$2,055	$8,221
Connect to existing storm drain system	ea	3	$1,552	$4,657
Road resurfacing	SQYD	327	$100	$32,667
			Construction Total	$190,525
			Contingency (25%)	$47,631
			Engineering (20%)	$38,105
			Administrative Costs (5%)	$9,526
			Total Project Cost	**$285,788**

3-J: 7th Ave to 8th Ave to Terrace Ln.

Existing 12” pipe under Terrace Lane (southern line) will be under capacity by 1 cfs if full development occurs in the areas near Oak Terrace east of Taylor Creek, and between 7th and 8th Avenues south of Oak Terrace. Upsize to 24" at minimum slope of 3%, or increase capacity to at least 30 cfs.

Table 5-45: Project 3-J Cost Estimate

3-J: Oak Terrace to Long St. on the south side of Terrace Ln.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	381	$235	$89,425
Curb and Gutter	ft	262	$99	$26,001
Manholes	ea	1	$8,697	$8,697
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	508	$100	$50,800
			Construction Total	$177,875
			Contingency (25%)	$44,469
			Engineering (20%)	$35,575
			Administrative Costs (5%)	$8,894
			Total Project Cost	**$266,812**

3-K: Oak Terrace Between 6th and 7th Ave.

Existing 24” pipe under Terrace Lane (northern pipe) will be under capacity by 0.6 cfs if full development occurs in the area from Oak Terrace and 6th Avenue. Recommended to upsize to 30" at minimum slope of 4%, or increase capacity to at least 20 cfs.

Table 5-46: Project 3-K Cost Estimate

3-K: Oak Terrace between 6th and 7th Ave.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
30" Storm Drain	ft	317	$480	$152,106
Curb and Gutter	ft	210	$99	$20,840
Inlets	ea	3	$2,055	$6,166
Manholes	ea	2	$8,697	$17,395
Connect to existing storm drain system	ea	2	$1,552	$3,104
Road resurfacing	SQYD	423	$100	$42,267
			Construction Total	$241,878
			Contingency (25%)	$60,470
			Engineering (20%)	$48,376
			Administrative Costs (5%)	$12,094
			Total Project Cost	**$362,817**

3-L: Hawthorne St. between 1st and 3rd

Existing 12” pipe under capacity by 0.2 cfs if full development occurs on Hawthorne St. Recommended to upsize to 18" at minimum slope of 1.1%, or increase capacity to at least 5 cfs

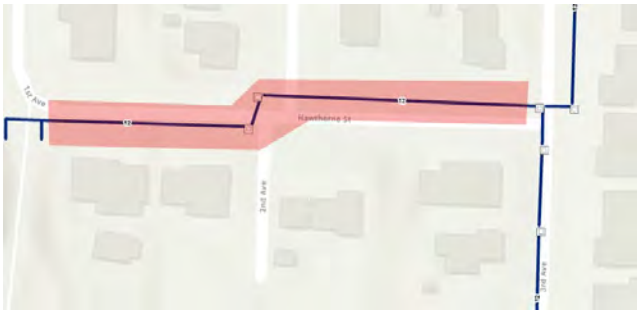


Table 5-47: Project 3-L Cost Estimate

3-L: Hawthorne St. between 1st and 3rd				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	512	$168	$86,262
Curb and Gutter	ft	210	$99	$20,840
Inlets	ea	5	$2,055	$10,277
Manholes	ea	3	$8,697	$26,092
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	683	$100	$68,267
			Construction Total	$213,290
			Contingency (25%)	$53,322
			Engineering (20%)	$42,658
			Administrative Costs (5%)	$10,664
			Total Project Cost	**$319,934**

3-M: 4th Ave. from Ironwood to Holley Rd

Existing 18" pipe under 4th Avenue will be under capacity by approximately 0.2 cfs if full development occurs on 4th Ave and 3rd Ave. Upsize to 24" at minimum slope of 4% or increase capacity to at least 25 cfs

Table 5-48: Project 3-M Cost Estimate

3-M: 4th Ave. from Ironwood to Holley Rd.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	530	$235	$124,396
Curb and Gutter	ft	210	$99	$20,840
Inlets	ea	5	$2,055	$10,277
Manholes	ea	3	$8,697	$26,092
Connect to existing storm drain system	ea	3	$1,552	$4,657
Road resurfacing	SQYD	707	$100	$70,667
			Construction Total	$256,929
			Contingency (25%)	$64,232
			Engineering (20%)	$51,386
			Administrative Costs (5%)	$12,846
			Total Project Cost	**$385,393**

3-N: Holley Rd from 4th to Oak Terrace

Under capacity by 1.3 cfs if full development occurs in the area of Holley Rd and 1st – 4th St. Upsize to 30" at minimum slope of 2.5%, or increase capacity to at least 20 cfs.

Table 5-49: Project 3-N Cost Estimate

3-N: South Side of Holley Rd between 4th and 5th and Taylor Creek				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
30" Storm Drain	ft	485	$480	$232,718
Curb and Gutter	ft	200	$99	$19,848
Inlets	ea	2	$2,055	$4,111
Manholes	ea	2	$8,697	$17,395
Connect to existing storm drain system	ea	4	$1,552	$6,209
Road resurfacing	SQYD	647	$100	$64,667
			Construction Total	$344,946
			Contingency (25%)	$86,237
			Engineering (20%)	$68,989
			Administrative Costs (5%)	$17,247
			Total Project Cost	**$517,419**

3-O: North side of Long St. from 40th to 41st.

Under capacity by 3 cfs if full development occurs south of Long Street between 38th Ave and 42nd Ave. Upsize to 24" at minimum slope of 0.45%, or increase capacity to at least 10 cfs.

Table 5-50: Project 3-O Cost Estimate

3-O: North of Long St. from 40th to 41st.				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
24" Storm Drain	ft	831	$235	$195,044
Curb and Gutter	ft	721	$99	$71,552
Inlets	ea	6	$2,055	$12,332
Manholes	ea	2	$8,697	$17,395
Outfall/Headwall	ea	2	$1,400	$2,800
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	1108	$100	$110,800
			Construction Total	$411,475
			Contingency (25%)	$102,869
			Engineering (20%)	$82,295
			Administrative Costs (5%)	$20,574
			Total Project Cost	**$617,212**

3-P: 47th Ave from Nandina to outfall

Under capacity by 3 cfs if full development occurs on Nandina St and 4th Ave. Recommended to upsize to 30" at minimum slope of 0.35%, or increase capacity to at least 20 cfs.

Table 5-51: Project 3-P Cost Estimate

3-P: 47th Ave from Nandina to Outfall				
Line Item	**Unit**	**Quantity**	**Unit Cost**	**Estimate**
30" Storm Drain	ft	611	$480	$293,176
Manholes	ea	4	$8,697	$34,789
Outfall/Headwall	ea	1	$1,400	$1,400
Connect to existing storm drain system	ea	1	$1,552	$1,552
Road resurfacing	SQYD	815	$100	$81,467
			Construction Total	$412,384
			Contingency (25%)	$103,096
			Engineering (20%)	$82,477
			Administrative Costs (5%)	$20,619
			Total Project Cost	**$618,576**

5.6 Implementation and Monitoring

5.6.1 Green Infrastructure Initiatives

To ensure water quality is protected and maintain compliance with the City's TMDL implementation plan, the City should encourage developers to consider green infrastructure projects, such as rain gardens, bioswales, and permeable pavements, to manage stormwater runoff. Management of stormwater on site via detention, infiltration, and treatment infrastructure will reduce the amount of pollutants that enter the City's stormwater infrastructure, and ultimately the river.

The City should collaborate with developers, landscape architects, and engineers to design and implement green infrastructure projects effectively when development opportunities arise. The City should also plan to provide educational programs to raise awareness about the benefits of green infrastructure among residents and developers to meet the public outreach requirements of ODEQ's water quality management plan.

5.6.2 Cleaning and Televising

The City should develop a program to regularly and systematically televise the entire system. Through this approach, the entire storm drain system will be cleaned and deficiencies can be discovered and corrected over a period of time. All television inspection tapes should be provided to the engineering staff at the City for review. Deficiencies should be noted and catalogued for potential improvement projects. Serious deficiencies should be corrected immediately.

5.6.3 System Management and Maintenance

A program of regular investment in system maintenance will do much to eliminate major system overhauls, replacement projects, and costly system breakdowns. Storm drain systems are continuously deteriorating with use; the state of deterioration is unique to each section of pipe based on the age of the pipe, soil conditions, and characteristics of flows within the pipe. The City has a partially complete inventory of its infrastructures including storm drains, catch basins, and manholes within a GIS platform. Currently the system maps hold basic display information as well as some component/material information.

It is recommended that the City continue to update the GIS mapping for the storm drain system, and add to the GIS database more specific information related to system components such as: age, component condition, and descriptions of any possible failure points (Cracks, pipe sag, obstructions, etc.). ArcGIS also has the capability of adding links to system components that will bring up associated pictures and videos. As system components are televised, and/or examined and documented with pictures, these files should be added to the GIS mapping. These additions to the current mapped system will aid in the organization and management of system maintenance efforts.

5.7 Detention Requirements

It is possible that the City may experience growth and development of new impervious area before recommended downstream improvements can be made. To reduce the risk of development-induced capacity issues, this plan recommends the City retains the following detention requirements for new development:

5. Detention of the stormwater volume associated with new impervious area for development sites equal to or greater than four acres.
6. Sites less than four acres are exempt from detention requirements.
7. Maintain runoff rate from developed land equal to peak runoff from 10 year storm on undeveloped land.
8. Provide storage resulting from the difference between the 10 year release rate (item 3) and the 10 year storm runoff after development.

Detention and runoff volume calculations may utilize the Rational Method provided that the planned area is not larger than 20 acres. A more comprehensive, site-specific hydrological study should be conducted for larger developments. All detention and runoff calculations for applicable sites must be submitted to the City for review and approval. These calculations must be accompanied with prepared site plans that clearly show the acreage of planned impervious area.

6 CAPITAL IMPROVEMENT PLANNING

The City publishes a Capital Improvement Plan (CIP) on a five-year basis, which is reviewed and modified yearly as public works, police, and library needs and priorities change. For the recommendations discussed in the previous section, it is recommended to add the Priority 1 projects to the CIP as soon as possible within the City's budgetary constraints. When the Priority 1 projects are completed, Priority 2 projects should be added to the CIP and budgeted appropriately. Priority 3 projects should be added to the CIP if development in the areas discussed with each project warrants the project to be undertaken. A discussion of financing options to fund the recommended capital projects is given in the sections below.

6.1 Financing

The City will soon be considering undertaking numerous storm drain system improvement projects. The overall cost of these projects will be more than five million dollars for the highest priority recommended projects. This section summarizes potential grant and non-grant funding mechanisms. Grant programs are discussed first, followed by non-grant funding alternatives. Grant opportunities are limited for stormwater system improvements due to lack of regulations in most areas.

6.1.1 Federal Emergency Management Agency (FEMA) Grants

The U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) programs present a critical opportunity to reduce the risk to individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds. HMA programs reduce community vulnerability to disasters and their effects, promote individual and community safety and resilience, and promote community vitality after an incident. Furthermore, HMA programs reduce response and recovery resource requirements in the wake of a disaster or incident, which results in a safer community that is less reliant on external financial assistance.

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. Accordingly, States, Territories, Indian Tribal governments, and communities are encouraged to take advantage of funding that HMA programs provide in both the pre- and post-disaster timelines.

Potential funding for a portion of the Capital Improvements could be funded through the Flood Mitigation Assistance (FMA) and Pre-Disaster Mitigation (PDM) HMA programs. These programs are described below.

6.1.1.1 Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation (PDM) program was authorized by the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 USC, as amended by the Disaster Mitigation Act of 2000. Funding for the program is provided through the National Pre-Disaster Mitigation Fund to assist States and local governments (to include Indian Tribal governments) in implementing cost-effective hazard mitigation activities that complement comprehensive mitigation programs, reduce injuries, loss of life, and damage and destruction of property. PDM is a pre-disaster grant program.

Grants are available for the creation of Local Hazard Mitigation Plans (LHMPs) and for the implementation of mitigation projects prior to a disaster event. The following entities are eligible for grant funds: state-level agencies including state institutions (e.g., state hospital or university); Federally-recognized Indian tribal governments; local governments, including state-recognized Indian tribes, authorized Indian tribal organizations; public colleges and universities; and Indian tribal colleges and universities.

All applicants must have a FEMA-approved Local Hazard Mitigation Plan (LHMP) in order to be eligible to receive PDM project funding. In addition, all applicants MUST have a FEMA-approved State/Tribal Standard or Enhanced hazard mitigation plan in accordance with 44 CFR Part 201.

6.1.1.2 Flood Mitigation Assistance Program (FEMA)

The Flood Mitigation Assistance (FMA) grant program provides funding to States, Federally-recognized Indian tribal governments, and communities so that cost-effective measures are taken to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program (NFIP). The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities. Three types of grants are available under FMA: Planning, Project, and Technical Assistance.

The primary funding source for the National Flood Mitigation Fund (NFMF) is the National Flood Insurance Fund (NFIF). The FMA program is subject to the availability of appropriation funding and is dependent upon the amount available for transfer from the NFIF through offset collections assessed and collected under the NFIP. The allocation formula provides base allocations to each State with surplus amounts allocated based on the total number of NFIP insurance policies and the total number of repetitive loss properties within each State/Territory.

Program Requirements Include the following: All applicants must be participating in the NFIP, and must not be on probation, suspended, or withdrawn from the NFIP, to be eligible to apply for FMA funds, and project applicants must demonstrate cost-effectiveness through a BCR of 1.0 or greater.

6.1.2 Department of Environmental Quality Clean Water State Revolving Fund (SRF)

The Clean Water State Revolving Fund loan program provides low-cost loans to public agencies for the planning, design or construction of various projects that prevent or mitigate water pollution. The Oregon Department of Environmental Quality administers the program.

Eligible agencies include federally recognized Indian tribal governments, cities, counties, sanitary districts, soil and water conservation districts, irrigation districts, various special districts and certain intergovernmental entities. DEQ partners with Oregon communities to implement

projects that attain and maintain water quality standards, and are necessary to protect recreation, fish habitat, boating, irrigation, drinking water and other beneficial uses.

Four different types of loans are available within the program including loans for planning, design, construction, and local community projects. A portion of the fund is reserved for small communities, planning and green projects. All loans, except for planning loans, include an annual loan fee on the outstanding balance.

Interest rates for the loan program change quarterly based on a percentage of the national municipal bond rate. Those percentages vary from 25% to 55% of the bond rate. For example, with a quarterly bond rate of 3.75%, CWSRF interest rates range from .94% to 2.06% depending on the length of the loan repayment period. Interest rates are found on DEQ's website (https://www.oregon.gov/deq/wq/cwsrf/Pages/CWSRF-Rates.aspx).

The low-interest rates and terms inherent with these loans make this program an attractive alternative to the municipal bond market. For example, a $1.5 million, 20-year loan with a CWSRF interest rate one-percentage point lower than a bond would reduce the interest cost by about $180,000 over the life of the loan.

DEQ accepts new applications year-round. Applicants must provide information on the Project's water quality benefits, environmental impact and estimated cost. Applications are available by contacting DEQ's regional project officers and are on DEQ's website.

DEQ reviews and scores all projects based on information submitted in the application. DEQ scores proposed projects using points associated with specific ranking criteria. Scored projects are initially listed in rank order on the program's project priority list.

Applicants whose projects are on the project priority list must complete all required program documents. These documents may include environmental reviews, land-use compatibility statements and financial reports. Once DEQ approves the documentation, the project becomes ready-to-proceed. Only projects listed as ready-to-proceed are considered for a loan. The Intended Use Plan, which describes the program's plans and goals for each fiscal year, includes both the project priority list and those projects deemed ready-to-proceed.

When sufficient funds are available, DEQ negotiates a loan agreement with an applicant who is ready-to-proceed. Projects are funded in rank order, with a maximum of 15 percent of the monies going to any one applicant. The program typically provides about $50 million annually for funding projects. A portion of the CWSRF funds are set aside in reserves to fund specific types of projects:

- Small communities (population of 10,000 or less) are funded from a reserve equaling 25 percent of total available monies.
- Planning projects are funded from a reserve not to exceed $3 million.
- Green projects are funded from a reserve whose amount is determined by the annual capitalization grant.

The balance of the program funds are allocated from the CWSRF general fund to remaining projects in rank order. DEQ will provide increases to previous, partially funded projects first as funds become available. New projects receive any remaining funds in rank order from one of the fund reserves or from the program's general fund.

6.1.3 Oregon Section 319 Non-Point Source Implementation Grants

The Oregon Section 319 grant program funds projects that aim to reduce non-point source pollution to waterbodies. Projects funded through this program must directly address one or more of DEQ's treatment priorities of that funding cycle. Projects funded through this program are required to provide matching funds equal to 40% of the total cost.

6.1.4 General Obligation Bonds

General Obligation (GO) bonds have the full faith and resources of the City behind them including property taxes, rate income, and other revenues to ensure that obligations are met. As a result of this backing, GO bonds often have a lower interest rate and are generally considered to have lower risk and are a more attractive investment in the municipal bond market. For a community to undertake a project funded with a GO bond, they must pass a vote of the people in order to sell the bonds. In some cases, communities spend a great deal of time, money and effort only to have the electorate reject the project by denying the GO bond funding measure. As a result, many communities shy away from GO bond funding options.

6.1.5 Fee-In-Lieu of On-Site Detention

Another option for funding the construction of stormwater infrastructure is to add a fee option for on-site detention. If the development is unable to include on-site detention for whatever reason, a fee will be levied on the property to fund additional detention elsewhere. This fee should be disproportionately high in order to encourage developers to include on-site detention into their plans. This option could be well suited for funding priority 3 projects.

6.1.6 Local Improvement Districts and Special Assessments

A local improvement district (LID) is a financing approach whereby property owners receiving a special benefit from a project are charged a portion of the costs associated with the construction. Requirements pertaining to assessments for local improvements are established in ORS 223.387 through 223.401. The establishment of a LID would be an effective approach to funding centralized stormwater system improvements in the Riverside District and could be used elsewhere in the City to fund other stormwater infrastructure.

6.1.7 Plan Review and Inspection Fees

The City should consider levying fees to cover the costs associated with reviewing stormwater plans and inspecting the final product. The time and cost of these processes will not be insignificant, and fees would allow for direct cost offsetting, if they do not cover the costs entirely.

6.1.8 Stormwater Service Charges

The City currently charges a stormwater service charge on its utility bills. The service charge is currently a flat fee of $3.00 per month for drainage infrastructure maintenance and improvements. Upon completion of this SDMP, the City should undertake a rate study to evaluate the adequacy of this service charge for covering costs associated with system operations and maintenance and funding future system improvements.

6.1.9 Ad Valorem Taxes

Ad valorem property taxes are often used as a revenue source for utility improvements. Property taxes may be levied on real estate, personal property, or both. Historically, ad valorem taxes were the traditional means of obtaining revenue to support all local governmental functions.

A major advantage of these taxes is the simplicity of the system. It requires no monitoring program for developing charges, additional accounting and billing work is minimal, and default on payments is rare. In addition, ad valorem taxation provides a means of financing that reaches all property owners that benefit from a wastewater system, whether a property is developed or not. The construction costs for a project are shared proportionally among all property owners based on the assessed value of each property.

Depending on the project, ad valorem taxation may result in property owners paying a disproportionate share of the project costs compared to the benefits received. Public hearings and an election with voter approval would be required to implement ad valorem taxation.

6.1.10 Revenue Bonds

Revenue bonds are a special type of municipal bond characterized by the guarantee of repayment being born solely by a single revenue-generating entity associated with the purpose of the bonds. Although these bonds are the second most secure type of municipal bond, they typically have a higher interest rate than that of the General Obligation bond because the security is not as intact.

The City of Sweet Home could pursue these types of bonds with the use of their ‘Stormwater Utility’ fee, and by developing a Service Development Charge (SDC). There are little funds available through SDCs, and thus much of the debt associated with this bond would rely on the increase of Stormwater Utility fees.

9.5.1 Impact on Rate Payers

The impact to rate payers will depend on the projects that the City undertakes, the schedule that they follow, and the rate structure that is established. Typically, loans periods are 20 years and have lower interest rates 2-5%. Depending on the loan amount, this will increase the stormwater utility fee.

The City currently adds a flat fee of $3.00 to utility billing statements as a Stormwater Utility Fee. The City should consider reviewing this rate on a yearly or bi-yearly basis to establish a fund that can be used to maintain the drainage system and/or undergo any projects that are needed. Adequate funding must be raised to finance repairs of a constantly degrading infrastructure, promote development where land is available, and overcome inflation. These increases will, inevitably, require raising user rates within the City.

Described below, is a scenario in which the city undertakes Priority 1 projects.

Scenario: The total cost to complete Priority 1 projects is $5,046,978. This scenario is based on 100% financing. The user fee will be equal to for all users and will be calculated by dividing the total monthly payment requirement by the total number of EDUs (5,066).

Principle: $5,046,978
Interest Rate: 3.5%
Term: 20 years (240 months)

Monthly payment: $29,270
Required fee: $5.78
Current fee: $3.00
Total Fee: $8.78

Based on these terms above, the rate increase to pay back the loan would be $8.70 for a total monthly stormwater utility bill of $8.78.

6.1.11 System Development Charges

The State of Oregon has established statutory law for the development, assessment, and administration of system development charges (SDC's) for local governments, utility districts, and similar agencies. Oregon Revised Statutes (ORS) 223.297 - 223.314 authorizes local governments and service districts to assess SDC's for various infrastructure sectors including sewer, water, storm drainage, streets, and others. As streets and developed areas expand, so does the storm drain system.

The City of Sweet Home is currently utilizing SDC's, although SDC's do not provide funds for completing most capital improvement projects. The City has a current stormwater SDC schedule of $1,303 per equivalent dwelling unit (EDU) for single family residential housing. Non-residential development is assessed SDC's based on the calculated number of EDUs (total measured impervious area for the development divided by 3,200 square feet).