City of Marysville

Sewer Comprehensive Plan

November 2011

2011 Sewer Comprehensive Plan

This 2011 Sewer Comprehensive Plan for the City of Marysville has been prepared under the direction of the following Registered Professional Engineers.

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Signed: 12/05/2011
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LIST OF ABBREVIATIONS

AAF	average annual flow
ADWF	average dry weather flow
AKART	All known, available, and reasonable technologies
BOD_5	5-day biochemical oxygen demand
$CBOD_5$	5-day Carboneous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
cfu	colony forming units
CIP	Capital Improvement Plan
City	City of Marysville
CMOM	Capacity Management Operation Maintenance
CWA	Clean Water Act
DI	ductile iron
DMR	discharge monitoring reports
DNS	determination of non-significance
DOH	Washington State Department of Health
DU	Dwelling Unit
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit
ESA	Endangered Species Act
FTE	full time equivalent
GIS	Global Information System
GMA	Growth Management Act
gpcd	gallons per capita per day
gpd	gallons per day
gpd/acre	Gallons per day - per acre
gpm	gallons per minute
gpm/sf	gallons per minute per square foot
HDPE	high density polyethylene
hp	horsepower
hpa	Hydraulic project approval
HRT	hydraulic residence time
I/I	infiltration and inflow
kW	kilowatt
kWhr	kilowatt hour
lb.	pounds
lb./day	pounds per day
lb/sf/day	pounds per square foot per day
lf	linear foot
LS	lump sum
MCRI	Municipal, residential, commercial and industrial development
MCRT	Mean cell residence time
MDF	maximum daily flow

LIST OF ABBREVIATIONS - continued

MG	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
MH	manhole
mL	milliliters
MLSS	Mixed liquor suspended solids
MMC	Marysville Municipal Code
MMF	maximum monthly flow
mpn	most probable number
NA	not applicable
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NO_3-N	nitrate - nitrogen
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
O&M	operations and maintenance
pH	negative log hydronium ion concentration
PHF	peak hour flow
POTW	Publicly owned treatment works
PPC	Persons per Capita
psi	pounds per square inch
PSRP	process to significantly reduce pathogens
PVC	polyvinyl chloride
RDI/I	Rain dependent I/I
RAS	return activated sludge
RCW	Revised Code of Washington
RUSA	Rural Utility Service Area
scfm	standard cubic feet per minute
SEPA	State Environmental Policy Act
SRT	Sludge Retention Time
TKN	total Kjehldahl nitrogen
TMDL	total maximum daily load
TSS	total suspended solids
UGA	Urban Growth Area
ULID	Utility Local Improvement District
UPA	Ultimate Planning Area
USA	Utility Service Area
UV	Ultraviolet Radiation
USFWS	United States Fish and Wildlife Service
$uW/s*cm^2$	microwatts per second centimeter squared
VFD	variable frequency drive
WAC	Washington Administrative Code
WAS	waste activated sludge
WSDF&W	Washington State Department of Fish Wildlife
WSDOT	Washington State Department of Transportation
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

INTRODUCTION

The 2011 Sewer Comprehensive Plan for the City of Marysville addresses the City's comprehensive planning needs for wastewater collection, transmission, treatment, and disposal for the next 20 years. This Plan was prepared in accordance with the provisions of the Revised Code of Washington (RCW), Section 90.48, *Water Pollution Control*, Washington Administrative Code (WAC) Section 173-240-050, *General Sewer Plan*, and WAC 173-240-060, *Engineering Report*. Development of the Plan has been coordinated with the City's Comprehensive Plan and local agreements with adjacent jurisdictions.

This Plan includes discussion of general planning issues including growth management, land use, zoning, and population projections. Regulatory issues that are relevant to the planning and implementation of wastewater service improvements are discussed. The existing facilities for wastewater collection, conveyance, treatment, and biosolids handling are described and evaluated in detail. A computerized hydraulic model is used to assess the capacity of the existing collection system and to plan for future facilities. Capital improvement recommendations and an implementation schedule for these improvements are presented.

SERVICE AREA DEVELOPMENT

Chapter 2 provides a description of the planning area for the City of Marysville. The planning area consists of three components: the City's corporate boundary, approximately 13,370 acres, the Urban Growth Area (UGA) covering 13,660 acres, and the ultimate planning area, approximately 24,000 acres, or 37.5 square miles. The UGA is the City's primary planning area for locating sewers and other types of urban development. The ultimate planning area is located outside of the UGA but has the potential of inclusion in future UGA boundary adjustments. The three components of the City's planning area are shown on Figure E-1.

Chapter 3 develops population estimates for the City's UGA and adjacent areas using information from the 2005 Marysville Comprehensive Plan and the Snohomish County Buildable Lands reports. The City's UGA population in 2010 was approximately 60,183 and is expected to grow to 84,989 in 2031 under a moderate growth rate of 2 percent. For sewer, the City provides service to three areas outside of its UGA, a part of Arlington to the north, part of the Tulalip Tribes to the west, and Mountain View Shores also to the west. In addition, not all current residences are connected to the City's service system. Table E-1 presents the population connected to the sewer system through 2025. The City has averaged 445 sewer connections per year between 2001 and 2005 and 353 sewer connections per year between 2006 and 2010.

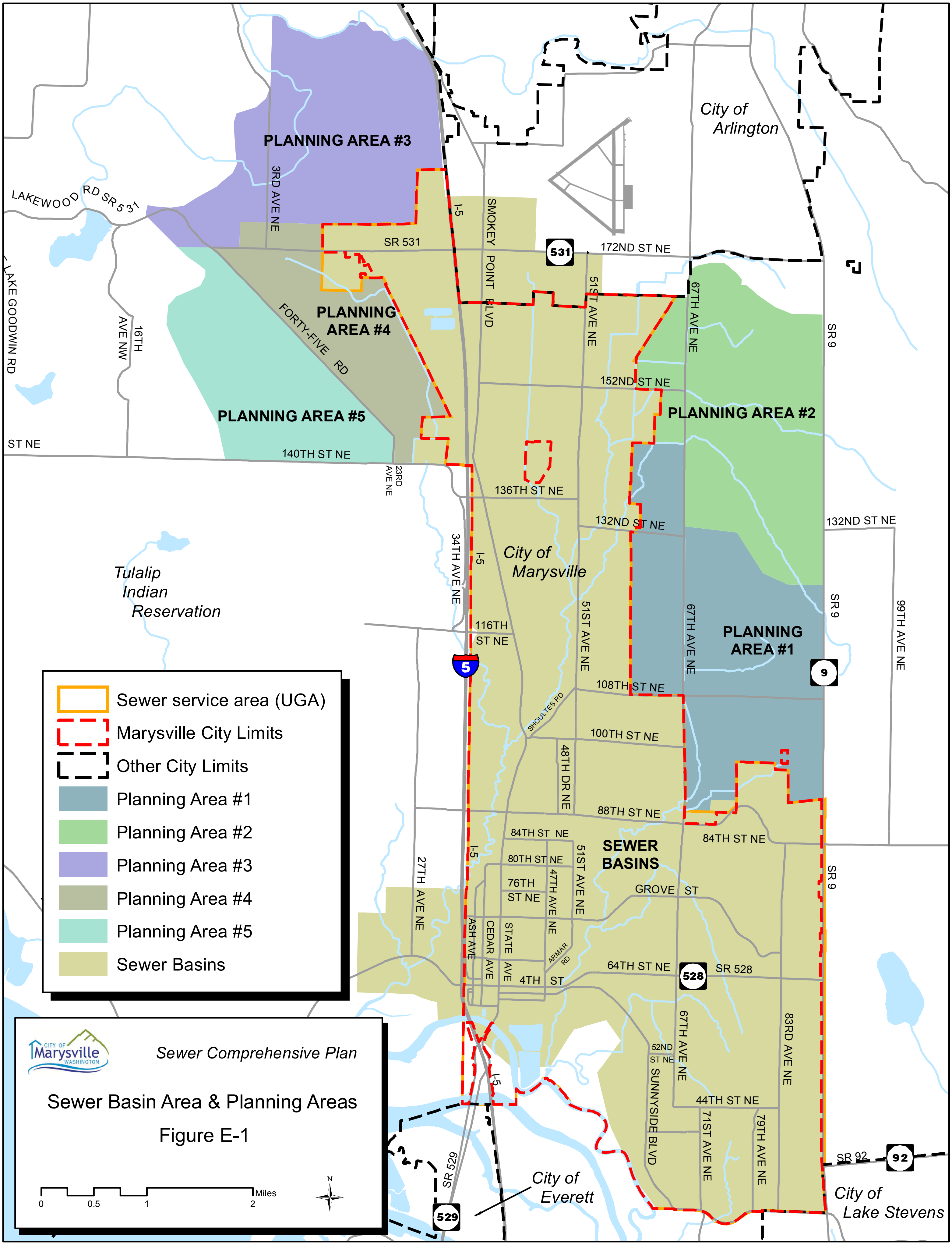

PLANNING AREA #3
PLANNING AREA #4
PLANNING AREA #5
PLANNING AREA #2
PLANNING AREA #1
SEWER BASINS
City of Arlington
City of Marysville
Tulalip Indian Reservation
City of Everett
City of Lake Stevens
LAKEWOOD RD SR 531
SR 531
172ND ST NE
152ND ST NE
140TH ST NE
136TH ST NE
132ND ST NE
116TH ST NE
108TH ST NE
100TH ST NE
88TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
64TH ST NE
SR 528
4TH ST
GROVE ST
52ND ST NE
44TH ST NE
SR 92
SR 529
SR 9
I-5
SMOKEY POINT BLVD
FORTY-FIVE RD
3RD AVE NE
16TH AVE NW
LAKE GOODWIN RD
23RD AVE NE
34TH AVE NE
27TH AVE NE
51ST AVE NE
48TH DR NE
47TH AVE NE
67TH AVE NE
71ST AVE NE
79TH AVE NE
83RD AVE NE
99TH AVE NE
SUNNYSIDE BLVD
SHOULTES RD
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
Sewer service area (UGA)
Marysville City Limits
Other City Limits
Planning Area #1
Planning Area #2
Planning Area #3
Planning Area #4
Planning Area #5
Sewer Basins
Sewer Comprehensive Plan
Sewer Basin Area & Planning Areas
Figure E-1
0 0.5 1 2 Miles
N

TABLE E-1

Projected Sewer Service Population Summary

Year	Service Area Population*	Service Area Population On Sewer	Percent Service Area Population On Sewer
2011	64,669	50,543	78.2%
2017	72,616	62,250	85.7%
2031	88,032	87,757	99.7%

*Service Area includes West Marysville and Arlington Interlocal Agreement

EXISTING FACILITIES

Chapter 5 provides a description of City's wastewater collection system, pump stations, wastewater treatment plant and disposal facilities. The gravity collection system includes 210 miles of pipeline with diameters 6-inch to 48-inch. Approximately 60 percent of the pipelines are 8-inch diameter and approximately two-thirds (67%) of the collection system is constructed with PVC pipe material.

In addition to the gravity pipe system, the City operates and maintains 15 pump stations, approximately 4.2 miles of force main pipe and 3.9 miles of effluent discharge piping to the City of Everett's deep water outfall. The City's primary pump stations are Soper Hill, Sunnyside, 51st Avenue, 88th Street, Marysville West, and West Trunk. The other 9 pump stations are smaller developer-type stations.

A major upgrade to the City's wastewater treatment plant was completed in 2004. Improvements included the addition of four complete-mixed aerated lagoon cells, hydraulic curtains, effluent filter expansion, UV disinfection facilities, effluent pump upsizing, and a new pipeline to Everett for seasonal disposal of treated effluent in Port Gardner Bay. This upgrade increased the plant capacity from 6.1 mgd (maximum month design) to 12.7 mgd. In addition, the plant loading capacity, as measured by BOD_5 increased from 10,200 lbs/day to 20,143 lbs/day. Essentially, the upgrade doubled the wastewater treatment plant capacity.

WASTEWATER CHARACTERISTICS AND FLOWS

Chapter 6 quantifies the wastewater from the City's service area estimated from treatment plant flow records and domestic water system records from the City. Use of the City's water records for wintertime consumption, established a sewer base flow of 182 gallons per day for a single-family residence, or ERU. For the total sewer system, the estimated base flow is 4.45 mgd. Recorded wastewater flow above this value is attributed to infiltration and inflow (I/I). Infiltration and inflow for the City's system is not excessive, yet represents approximately 6 percent of the average annual flow. During particularly wet periods, or maximum month conditions, I/I increases to approximately 27 percent of the total flow.

Table E-2 presents both current and projected wastewater flows and loadings for the City's Wastewater Treatment Plant (WWTP).

TABLE E-2

Current and Projected Flows and Loadings

Year	2011	2017	2031
ERUs			
	24,427	30,084	42,413
Flows (gpd)			
Sewer Service Area (ac.)	4,979	5,708	7,340
Total Baseflow	4,030,000	5,480,000	7,720,000
Dry Season Average Flow	4,160,000	5,240,000	7,620,000
Average Annual Flow	4,730,000	5,830,000	8,230,000
Maximum Month	6,120,000	7,600,000	11,250,000
Peak Day	9,310,000	10,530,000	13,790,000
Peak Hour(1)	10,700,000	12,710,000	16,880,000
Peak Hour Factor	2.26	2.18	2.05
Loading (lb/day)			
Annual Average BOD_5	10,419	12,846	18,110
Maximum Month BOD_5	13,812	16,997	23,963
Annual Average TSS	10,029	12,365	17,432
Maximum Month TSS	14,356	17,689	24,939

(1) Peak Hour Flow: Average Annual Flow x Peaking Hour Factor

COLLECTION SYSTEM EVALUATION

Chapter 7 develops the hydraulic model of the City's service area used as a tool to assess the capacity and deficiencies of the existing collection system and pump stations. The hydraulic model, InfoSewer developed by Innovyze (formerly MWHSoft), was used to analyze the major gravity lines within the collection system for 2011, 2017, 2031. Inputs for the hydraulic model include invert elevations for manholes and pipeline lengths and unit residential and commercial flows developed in Chapter 6. Infiltration and inflow were developed from existing plant records and water consumption records.

The hydraulic model was run for 2011, 2017, and 2031 conditions as shown in Table E-2. The model results indicated a total of 118 pipeline deficiencies thru 2031. A number of these deficiencies were determined to be insignificant enough to warrant a 6-year capital improvement based on modeling alone. These areas were analyzed separately and have been added to the City's ongoing inspection list. Other pipe segments either deemed critical by the City or would be subject to future development were identified as a capital improvement.

The most serious current deficiencies with the collection are low velocity pipelines (<2.0 fps). Of the 318,865 lf of pipeline modeled, approximately 50 percent were found to have low velocities. Most of these pipelines are large enough to provide adequate capacity, but these low velocity pipelines will collect grease and inert material and require more frequent cleaning and flushing. City staff recognizes this problem and have a maintenance program in place to clean its gravity sewers every two years. In addition, the City has a wastewater pretreatment program to limit grease discharged to its collection system.

The hydraulic model results for 2031 show nearly double the number of capacity deficiencies than the 2011 and 2017 results, mostly due to the assumptions set forth in Chapter 3 to project future sewer service area population. One area of the collection system with a large number of future deficiencies is the Smokey Point area near I-5. The recommended approach to address deficiencies in this area is to divert flow to future pipelines to the Lakewood Sewer Extension rather than pipeline replacement in this commercial area.

The other areas with a few surcharged pipelines in 2031 are located in East Sunnyside and Getchell Hill areas. Where these pipelines were not already part of the City's CIP, they have been added to the 20-year CIP Plan.

Most of the City's pump stations have adequate capacity through 2031. The West Trunk Pump Station will be near its capacity prior to 2017 and improvements are included in the 6 year CIP. The 51st Street and Soper Hill pump stations will near their capacity prior to 2031 as well. They are both included for improvements in the 20 year CIP.

Buildout conditions were also modeled using an estimated buildout population of approximately 160,000. The primary, long-term impacts to the City's collection system are the upper reaches of Trunk A from 103rd Street to 143rd Street. In addition, several pipeline areas for Trunk D and CE are undersized for buildout conditions.

In general, the hydraulic model is only one tool for assessing the condition of the collection system. Where "sagging" has occurred, offset joints have developed or manholes have been improperly installed, the hydraulic model most likely will not reflect those problems. Where the model has identified capacity deficiencies, particularly for 2031 and buildout, it is recommended that the model results be confirmed by survey, TV inspection, or a flow study prior to the capital expense of pipeline replacement.

WASTEWATER TREATMENT EVALUATION

Chapters 8 and 9 evaluate the City's WWTP. The projected peak hour flow for 2031 of 16.9 mgd as presented in Table E-2 is less than the WWTP's hydraulic design capacity of 20.3 mgd following the 2004 plant upgrades. Thus, the WWTP has sufficient hydraulic capacity for the next 20 years.

The projected loadings, however, for 2031 exceed the plant's design capacity for both BOD_5 and TSS. The City had plans for two additional complete-mix aerated cells, to be constructed by 2015 to ensure adequate treatment capacity, but due to lower than projected flows and loadings, the construction of those can be moved further out into the future. Other future improvements include repairs to the influent parshall flume, installation of mechanical barscreens with smaller spacing between bars or an alternative screening method, upsizing of the filter reject pump station, extension of the filter reject line from the west trunk pump station to complete mix cell 1A, and construction of a pre-settling basin to be used prior to effluent filtration.

The most significant item for the City's WWTP operation is biosolids removal. The City last removed biosolids from its lagoon system in 2003. Biosolids removal was evaluated in 2011 and it was determined that the removal could wait until 2018 or beyond due to lower than expected accumulations. A biosolids profile is projected to be completed in 2016 to assess sludge depth, location, and quantities. Each biosolids removal project is expected to cost in excess of $3.0 million.

OPERATION AND MAINTENANCE

Chapter 10 addresses the operation and maintenance staff for the City's wastewater treatment plant and collection system. Currently, there are approximately 15 full-time employees both for the WWTP and collection system. Of this number, four are assigned to the wastewater treatment plant operations and four are assigned to wastewater treatment plant and pump station maintenance. The remaining employees are assigned to the flushing, cleaning, inspection and repair of the collection system.

For future operation and maintenance needs, City staff is adequate for its WWTP. However, the collection system will continue to expand with population growth and the City will need to add to staff in order to maintain the gravity sewers, force mains, and pump stations. One additional employee should be added to staff in 2017, with another added in 2031.

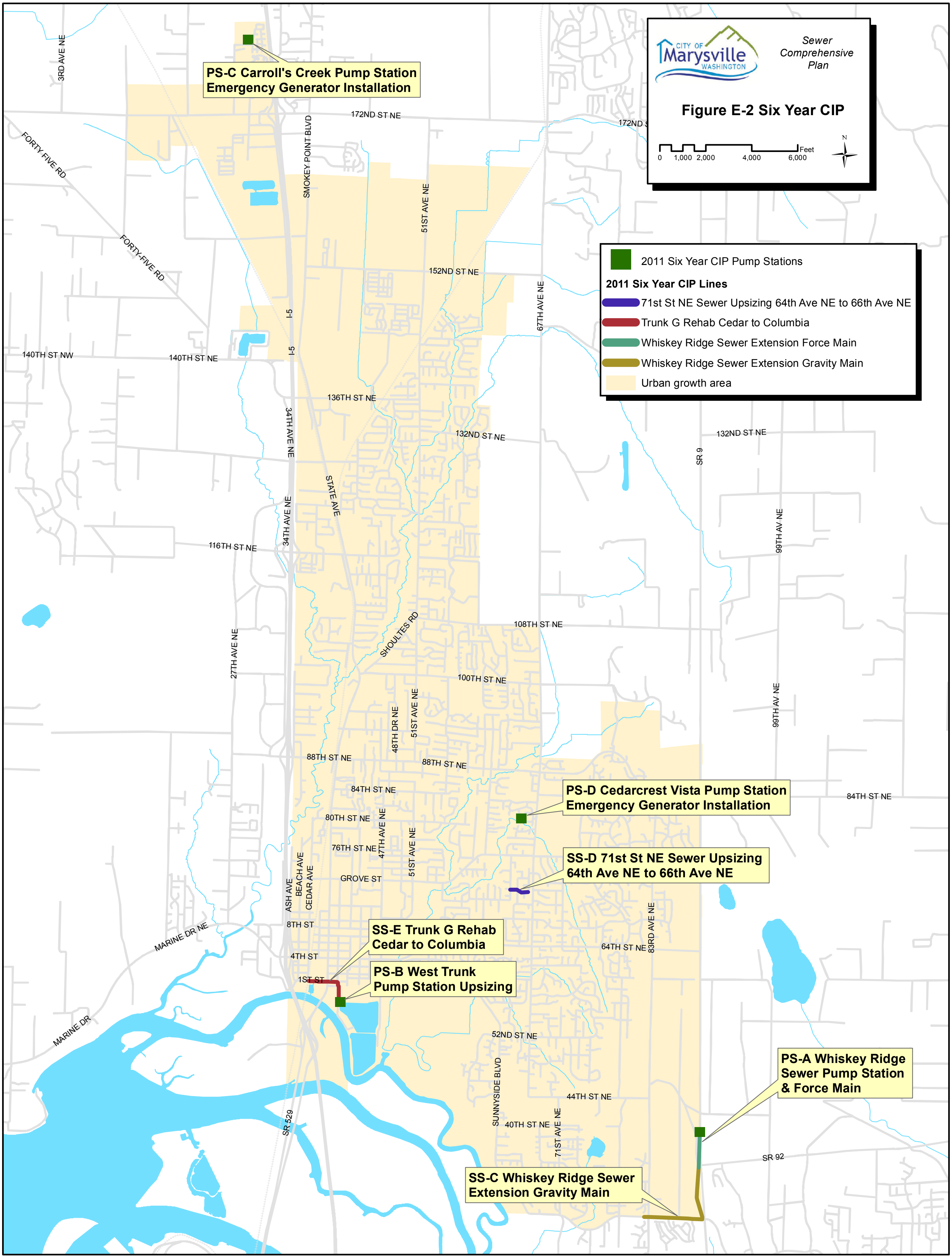
CAPITAL IMPROVEMENT PLAN

Chapter 11 summarizes the CIP and prioritizes projects identified in this Plan. Summaries of each capital improvement project include proposed construction dates, and estimated project costs (including construction, contingency, administration, sales tax, and engineering). Table E-3 and Figure E-2 present the 6-year CIP projects. CIP Projects up to 2031 are shown in Chapter 11.

Future projects that are not identified as part of the City's CIP may become necessary. Such projects may be required in order to remedy an emergency situation, to address unforeseen problems, or to accommodate improvements from adjacent jurisdictions. Due to budgetary constraints, the completion of such projects may require modifications to the recommended CIP. The City retains the flexibility to reschedule, expand, or reduce the projects included in the CIP and to add new projects to the CIP, as best determined by the Council, when new information becomes available for review and analysis.

The total 6-year CIP is $10,207,000. Amounts for each of the four categories for the 6-year CIP are shown below:

Sanitary Sewer Mains	$ 4,630,000
Pump Stations	$ 1,575,000
WWTP Improvements	$ 3,402,000
General System Improvements	$ 600,000
Total: 6-Year CIP	**$10,207,000**



CITY OF Marysville WASHINGTON
Sewer Comprehensive Plan
Figure E-2 Six Year CIP
0 1,000 2,000 4,000 6,000 Feet
N
2011 Six Year CIP Pump Stations
2011 Six Year CIP Lines
71st St NE Sewer Upsizing 64th Ave NE to 66th Ave NE
Trunk G Rehab Cedar to Columbia
Whiskey Ridge Sewer Extension Force Main
Whiskey Ridge Sewer Extension Gravity Main
Urban growth area
PS-C Carroll's Creek Pump Station Emergency Generator Installation
PS-D Cedarcrest Vista Pump Station Emergency Generator Installation
SS-D 71st St NE Sewer Upsizing 64th Ave NE to 66th Ave NE
SS-E Trunk G Rehab Cedar to Columbia
PS-B West Trunk Pump Station Upsizing
PS-A Whiskey Ridge Sewer Pump Station & Force Main
SS-C Whiskey Ridge Sewer Extension Gravity Main
3RD AVE NE
172ND ST NE
SMOKEY POINT BLVD
FORTY FIVE RD
FORTY-FIVE RD
51ST AVE NE
152ND ST NE
67TH AVE NE
I-5
140TH ST NW
140TH ST NE
136TH ST NE
34TH AVE NE
132ND ST NE
132ND ST NE
SR 9
STATE AVE
99TH AV NE
116TH ST NE
108TH ST NE
SHOULTES RD
27TH AVE NE
100TH ST NE
48TH DR NE
51ST AVE NE
88TH ST NE
88TH ST NE
84TH ST NE
84TH ST NE
80TH ST NE
47TH AVE NE
76TH ST NE
GROVE ST
ASH AVE
BEACH AVE
CEDAR AVE
8TH ST
MARINE DR NE
64TH ST NE
83RD AVE NE
4TH ST
1ST ST
MARINE DR
52ND ST NE
SUNNYSIDE BLVD
44TH ST NE
40TH ST NE
71ST AVE NE
SR 529
SR 92

TABLE E-3

6-Year Capital Improvements Plan(1)

		2011	2012	2013	2014	2015	2016	2017
Sanitary Sewer Mains								
a.	Sewer Main Oversizing	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
b.	Renewals and Replacement	$0		$300,000	$300,000	$300,000	$300,000	$300,000
c.	Whiskey Ridge Sewer Extension	$200,000	$1,200,000					
d.	71st St NE Sewer Upsizing: 64th Ave NE to 66th Ave NE					$410,000		
e.	Trunk "G" Rehab.: Cedar to Columbia						$1,340,000	
Total Sanitary Sewer Mains		**$230,000**	**$1,230,000**	**$330,000**	**$330,000**	**$740,000**	**$1,670,000**	**$330,000**
Pump Stations								
a.	Whiskey Ridge Sewer Lift Station and Force Main				$1,000,000			
b.	West Trunk Pump Station Upsizing			$225,000				
c.	Carroll's Creek Pump Station Emergency Generator Installation						$175,000	
d.	Cedarcrest Vista Pump Station Emergency Generator Installation							$175,000
Total Pump Station Improvements		**$0**	**$0**	**$225,000**	**$1,000,000**	**$0**	**$175,000**	**$175,000**

TABLE E-3 - (continued)

6-Year Capital Improvements Plan[1]

	2011	2012	2013	2014	2015	2016	2017
WWTP Improvements							
a. Biosolids Removal				$300,000	$300,000	$300,000	$300,000
b. Replacement/Reconstruction of Headworks Parshall Flume			$50,000				
c. Filter Reject Line Extension			$100,000				
d. Upsize Filter Reject Wet Well and Pump System				$500,000			
e. Pre-Settling Basin					$1,000,000		
f. Screen Replacement for Mechanical Screens							$500,000
g. Flow Study			40,000				
h. Preliminary Biosolids Profile						$12,000	
i. Wastewater Treatment Plant Generator	$400,000						
Total WWTP Improvements	**$400,000**	**$0**	**$190,000**	**$800,000**	**$1,300,000**	**$312,000**	**$800,000**
General System Improvements							
Cost of Service Study						$250,000	
Sanitary Comp. Plan/Model	$300,000						$300,000
Sewer Rate Study			$50,000				
Total General Sewer Improvements	**$300,000**	**$0**	**$50,000**	**$0**	**$0**	**$250,000**	**$300,000**
Total Sanitary Sewer	**$930,000**	**$1,230,000**	**$795,000**	**$2,130,000**	**$2,040,000**	**$2,407,000**	**$1,605,000**

(1) The 6-year CIP covers the period of 2012 - 2017. 2011 CIP projects are included for reference.

CHAPTER 1

INTRODUCTION

This Sewer Comprehensive Plan (Plan) for the City of Marysville addresses comprehensive planning needs for wastewater collection, transmission, treatment, and disposal for the next twenty years. This Plan has been prepared in accordance with the provisions of the Revised Code of Washington (RCW), Section 90.48, *Water Pollution Control;* Washington Administrative Code (WAC) Section 173-240-050, *General Sewer Plan*; and WAC 173-240-060, *Engineering Report.* Development of the Plan has been coordinated with the 2005 *City of Marysville Comprehensive Plan*, Snohomish County *2006 Comprehensive Plan*, *the City of Marysville 2005 Comprehensive Sanitary Sewerage Plan*, and with the *City of Marysville 2009 Water System Plan Update.*

WASTEWATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Marysville owns and operates a sanitary sewer system and wastewater treatment facility. The Mayor and seven council members oversee and provide review and approval authority for issues that relate to the City's public works systems. The Department of Public Works maintains and operates the sewer, water, drainage, solid waste, and street systems, including construction, engineering, construction inspection, and fleet and facilities. The Director of Public Works oversees two departments managed by the Assistant City Engineer and Public Works Superintendent. The Public Works Director directly manages the City's facilities division. The City's addresses and telephone numbers are listed below and a location map is shown in Figure 1-1.

City of Marysville City Hall
1049 State Avenue
Marysville, Washington 98270
(360) 363-8000

City of Marysville Public Works
80 Columbia Avenue
Marysville, Washington 98270
(360) 363-8100

PURPOSE

The purpose of this Plan is to address the City's comprehensive planning needs for wastewater collection, transmission, treatment, and disposal for the next 20 years. In 2004 the City completed significant improvements to its wastewater treatment plant (WWTP) and effluent disposal system. These improvements included modifications to its aerated lagoons, installation of UV disinfection, and construction of an effluent pump station and pipeline intertie with the City of Everett for effluent disposal in Puget Sound. These improvements were designed for WWTP compliance with the City's NPDES permit, No. WA-002249-7, and for an increase in plant capacity. A copy of the NPDES permit is included as Appendix A.

The primary focus of this Plan is to continue development of the hydraulic model of the City's sanitary sewer system consistent with GIS, provide preliminary plans to provide sewer service to new areas, and to develop a capital improvement plan with cost estimates and schedule for six- and twenty-year planning periods. The City of Marysville has experienced rapid growth over the past twenty years that has required an expansion of its sanitary sewer system. In 1980, the City's population was 5,000; by 1992 the population increased to 14,122 and to 60,183 in 2010 (inclusive of the urban growth area (UGA)). Future population projections show the UGA exceeding 84,989 by 2031.

This Plan addresses known wastewater system planning issues, assesses the condition and capabilities of the existing sewer system and wastewater treatment plant, develops a plan for the level of service within the defined study area, and determines the required system improvements including project construction schedules and costs.

SCOPE

The City of Marysville Sewer Comprehensive Plan is organized into twelve chapters as follows:

Chapter 1, Introduction, includes descriptions of the purpose and scope of the Plan and provides background information used to address the issues discussed in this Plan.

Chapter 2, Sewer Service Area, includes a description of study area boundaries and physical environment.

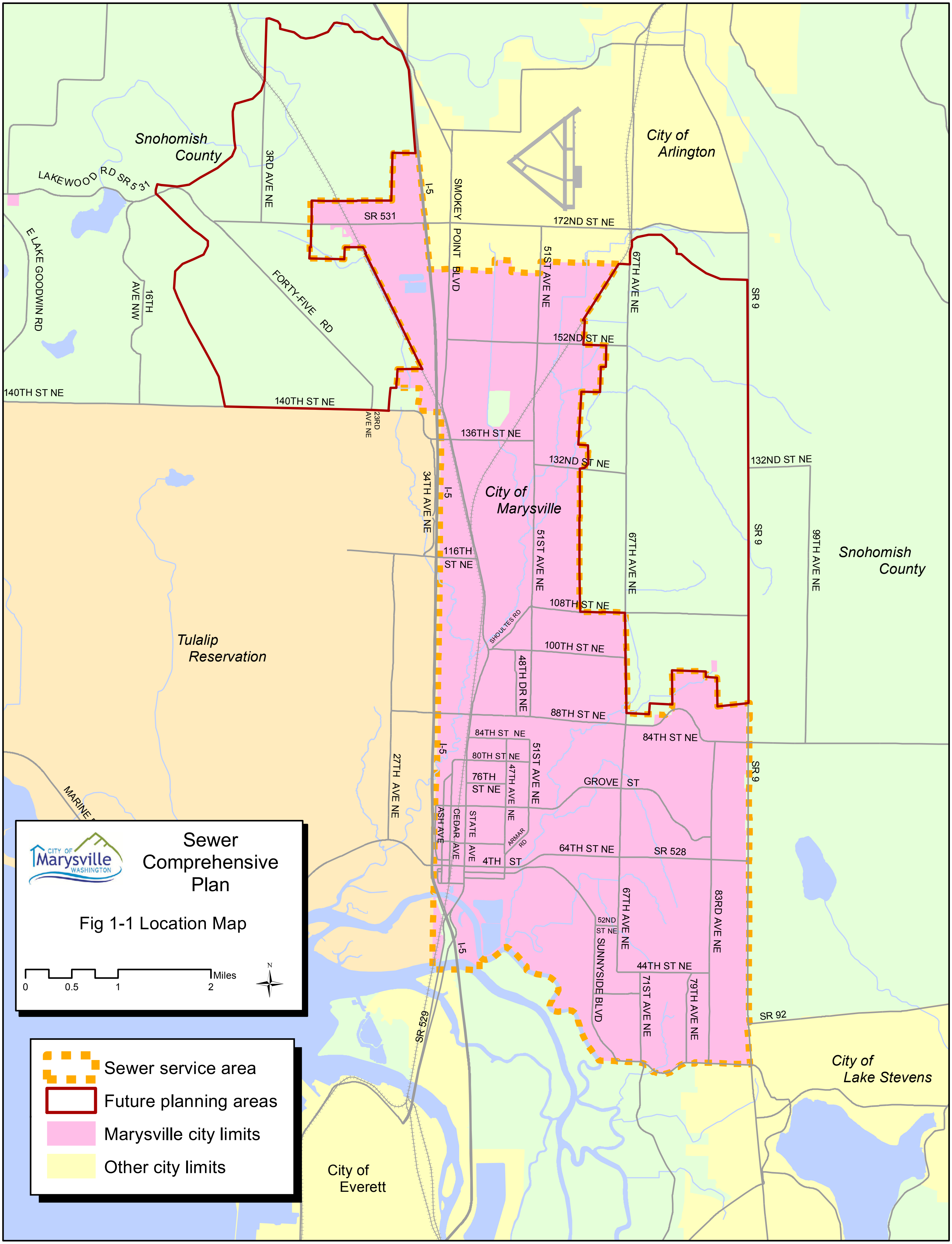
Chapter 3, Land Use and Planning Criteria, reviews general planning issues, including growth management, land use, and zoning, and provides current and projected population.

Chapter 4, Regulatory Requirements, consists of descriptions of pertinent regulations that apply to the City's wastewater collection, treatment and effluent disposal facilities.

Chapter 5, Existing Facilities, describes and assesses the existing components of the collection system, wastewater treatment plant, and sewer agreements with adjacent jurisdictions.

Chapter 6, Wastewater Flows and Loading, applies planning information and historical records to establish design criteria for existing and future flows and loadings.

Chapter 7, Collection System Evaluation, presents a computer model of the sewer system components, including pump stations, force mains, and gravity lines


Sewer Comprehensive Plan
Fig 1-1 Location Map
CITY OF Marysville WASHINGTON
0 0.5 1 2 Miles
N
Sewer service area
Future planning areas
Marysville city limits
Other city limits
Snohomish County
City of Arlington
City of Marysville
Tulalip Reservation
Snohomish County
City of Lake Stevens
City of Everett
LAKEWOOD RD SR 531
E LAKE GOODWIN RD
16TH AVE NW
3RD AVE NE
FORTY-FIVE RD
140TH ST NE
140TH ST NE
23RD AVE NE
SR 531
I-5
SMOKEY POINT BLVD
172ND ST NE
51ST AVE NE
67TH AVE NE
SR 9
152ND ST NE
136TH ST NE
132ND ST NE
132ND ST NE
34TH AVE NE
I-5
116TH ST NE
51ST AVE NE
67TH AVE NE
SR 9
99TH AVE NE
108TH ST NE
SHOULTES RD
100TH ST NE
48TH DR NE
88TH ST NE
84TH ST NE
84TH ST NE
80TH ST NE
47TH AVE NE
51ST AVE NE
76TH ST NE
GROVE ST
SR 9
27TH AVE NE
MARINE
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
64TH ST NE
SR 528
4TH ST
52ND ST NE
SUNNYSIDE BLVD
67TH AVE NE
83RD AVE NE
I-5
44TH ST NE
71ST AVE NE
79TH AVE NE
SR 92
SR 529

and provides modeling results at current and future flows to identify deficiencies and improvements.

Chapter 8, Wastewater Treatment Plant Analysis, evaluates plant capacity and effluent discharge based on projected flows and loadings.

Chapter 9, Biosolids Management, evaluates the existing methods of biosolids disposal and estimates the schedule for future biosolids removal projects.

Chapter 10, Operation and Maintenance, provides an overview of the City's operation and maintenance program including a summary of existing and future staffing needs.

Chapter 11, Capital Improvement Plan, recommends sewer system and wastewater treatment plant improvements and provides cost estimates and an implementation schedule for those improvements.

Chapter 12, Financial Program, provides an assessment of current financial status of the utility, discusses available and potential revenue sources for system improvements, assesses the General Facilities Charge, and establishes operation and maintenance costs that relate to the recommended Capital Improvement Plan (CIP).

HISTORY OF WASTEWATER SYSTEM DEVELOPMENT

The development of the City's wastewater facilities parallels the growth of its population and land area. The City of Marysville was established as a Fourth Class City in 1891, with a population of 350 residents. Its early development depended on the abundant timber resources and the construction of the Great Northern Railroad. The construction of Highway 99 between Everett and Marysville provided an additional development boost to the City.

In 1905, the City's population was 1,250 and it was not until 1954 that the population doubled to 2,500. The earliest sewers to serve the Marysville downtown core were constructed prior to 1940. The first sanitary sewers were combined sewers collecting both wastewater and stormwater. The downtown combined sewers were eventually separated through a series of capital improvement projects.

An extensive expansion of the original sewer system was completed over the past 35 years. As reported in the 1997 Comprehensive Sanitary Sewerage Plan (Hammond, Collier & Wade-Livingstone Associates), trunk sewers C, D, and G extended the sewer system north, east, and west in 1968. In 1970, trunk sewer A was constructed to serve the area northeast of Marysville.

In 1982, the City established boundaries for its Rural Utility Service Area (RUSA) as a basis for planning for water and sewer service. The RUSA covered approximately 12 square miles. By 1991, the sanitary sewer system had 6,755 connections with 6,233 residential customers and 522 school, commercial, and institutional customers. Chapter 14.32, Utility Service Area, of the Marysville Municipal Code (MMC) replaced the RUSA with the Utility Service Area (USA). The USA set the boundaries of the sanitary sewers service area.

In 1990, a Sewer Comprehensive Plan was prepared by Hammond, Collier & Wade-Livingstone that set the groundwork for a major upgrade to the City's wastewater treatment plant in 1994. The recommended improvements subsequently included a major modification of the 72-acre lagoon system. The project included development of two 2.5 acre complete mix aerated lagoon cells, installation of two 10,600 gpm recirculation pumps to increase lagoon treatment capacity, a new headworks facility with a mechanical bar screen, and two 4,500 gpm influent screw lift pumps.

The improvements also included new deep bed single media sand filters to treat up to 2,400 gpm of plant effluent, a new chlorine contact chamber with chlorination facilities, and a 3,000 gpm lift station upstream of the plant.

The 1994 improvements increased plant capacity from 2.8 mgd to 6.1 mgd. In addition, a new 28-inch HDPE outfall pipe and pump station were installed to convey effluent to Steamboat Slough.

The 1997 Sewer Comprehensive Plan prepared by Hammond, Collier & Wade-Livingstone and KCM set the ground work for the 2004 upgrades to the City's wastewater treatment plant. Phase 1 of the upgrades included 2 additional completed mix cells, one additional influent screw pump, one additional barscreen, and upsizing of the effluent pumps. Phase 2 added 1600 SF to the effluent sand filters, a new maintenance facility, UV disinfection, and an effluent pipeline to the City of Everett's South Everett Pump Station in route to the Deep Marine Outfall in Puget Sound (Port Gardner Bay).

The 2004 upgrades to the City's wastewater treatment plant increased plant capacity from 6.1 MGD to 12.7 MGD.

In 1990, the State of Washington enacted the Growth Management Act (GMA). The GMA developed criteria for urban growth areas, which superceded the need for the Rural Utility Service Area (RUSA). In 1996, the City's Planning Department completed its first Comprehensive Plan under GMA. By 1996, the estimated number of sewer connections was 8,957, a 40 percent increase over the number of connections in 1991.

Table 1-1 provides a history of sewer connections since 1990. Since 1990, the City has experienced rapid growth in residential connections, but a declining number of non-residential customers since 1998.

During the past 10 years, the City has added an average of 464 connections per year to its sewer system.

TABLE 1-1

City of Marysville Sewer Service Connections Growth

Year	Residential Customers	Non-Residential Customers	New Customers	Total
1990	6,130	296	--	6,426
1991	6,439	344	357	6,783
1992	6,763	399	379	7,162
1993	7,104	463	405	7,567
1994	7,462	537	432	7,999
1995	8,013	624	638	8,637
1996	8,393	724	480	9,117
1997	9,014	818	715	9,832
1998	9,496	778	442	10,274
1999	10,004	712	442	10,716
2000	10,540	620	444	11,160
2001	11,003	600	443	11,603
2002	11,604	620	621	12,224
2003	12,330	691	797	13,021
2004	12,831	703	513	13,534
2005	13,327	703	496	14,030
2006	13,774	717	461	14,491
2007	14,202	723	434	14,925
2008	14,474	724	273*	15,198
2009	14,700	730	232*	15,430
2010	15,064	734	368*	15,798

Data on connections for the years 1990 through 1996 were obtained from the City of Marysville 1997 Comprehensive Sanitary Sewerage Plan. Data after 1996 from City of Marysville sources.

* New customers totals are based on connection fees paid. Connection fees were prepaid at final plat. However, based on economic conditions during this time, many plats remain empty and parcels are not actually connected to the sewer. Therefore, the total number of residential customers is not equal to the total number of customers actually being billed.

PROJECTS COMPLETED SINCE THE 2005 COMPREHENSIVE SANITARY SEWERAGE PLAN

The Sewer Comprehensive Plan was last updated in April 2005. Table 1-2 provides the projects listed in the Capital Improvement Plan (CIP) included in the 2005 Plan and the status of each project for both the collection system and the wastewater treatment plant.

TABLE 1-2

Projects Completed Since
2005 Sanitary Sewerage Plan CIP

Project Description	Status or Year Completed
Sanitary Sewer Mains	
Sewer Main Oversizing	Ongoing
Smokey Pt. Blvd Ext. 116th – 136th	2006
Smokey Pt. Blvd. Ext. 136th – 152nd	2009
State Avenue Trunk 98th – 113th LID	2003
Trunk "G" Rehab. Beach – 1st	2006 (west of BNRR only)
Lakewood Sewer Extension: Phase 1	2006
Lakewood Sewer Extension: Phase 2	2009*
Renewals and Replacement	Ongoing
Soper Hill Road Ext. 71st – 83rd	2004
88th Street at 60th Drive	2006
70th Drive and 88th (Trunk C)	2006
Delta Avenue 5th – 9th	2007
State Avenue 1st – Grove	2004
Pump Stations	
Regan Road Pump Station	2005
General Sewer Improvements	
Cost of Service Study	2008
Sanitary Comp. Plan/Model	In Progress
Sewer Rate Study	2007
Wastewater Treatment Plant Improvements	
Phase II WWTP	2004
MV/Everett Effl. Horizontal Drilling	2004
MV/Everett Effl. Open Cut	2004
So. Everett Pumping Station	2004
Cross Town	2004
Everett (Deep Water)	2004
Extra Capacity	2005
Flow Study	2005

*Partially constructed along Smokey Point Blvd from 136th St NE to 148th St NE.

RELATED PLANNING DOCUMENTS

The following documents were consulted in the preparation of the *City of Marysville System Comprehensive Plan.*

WATER SYSTEM PLANS

City of Marysville 2009 Water System Plan Update, HDR Engineering, Inc. June 2009.

The Water System Plan evaluated the existing water system to identify existing and future demands, review and recommend capital project to address the needs of the system, and ensure that the system has the operational, technical, staff, and financial ability to comply with all local, state, and federal regulations, including local planning efforts. The recommended capital improvements through the year 2014 were estimated to cost $37,578,000, with an additional $40,470,000 to the year 2028. Relevant information includes land use, population, equivalent residential units, and water demands.

WASTEWATER COMPREHENSIVE/FACILITY PLANS

City of Marysville Wastewater Treatment Plant Capital Facilities Plan, Tetra Tech/KCM, Inc., February 2001

The Wastewater Treatment Plant Capital Facilities Plan reviewed the hydraulic capacity of the treatment process and recommended improvements to provide adequate capacity to the year 2020. Alternatives were reviewed for the upgrade of the wastewater treatment plant that included cost estimates and schedule for implementation. The plan estimated the cost of the recommended improvements in the amount of $69,320,000.

City of Marysville Comprehensive Sanitary Sewerage Plan, Gray and Osborne, Inc., April 2005

The purpose of this Comprehensive Sanitary Sewerage Plan was to prepare a long-range plan to develop an adequate sanitary sewer system to the year 2031. The Plan updates land use and population data, incorporates recent changes to the sewer service area, evaluates the system for infiltration and inflow, integrates a computerized hydraulic model to assess capacity of the existing collection system and provides a capital improvement plan for the City and its urban growth area.

GMA COMPREHENSIVE PLANS

City of Marysville Comprehensive Plan, April 2005

Snohomish County Comprehensive Plan, General Policy Plan, February 2006, amended as of January 2011

CHAPTER 2

PLANNING AREA

INTRODUCTION

The configuration of a sewer system can be influenced by many factors including development trends, political considerations, and topography. Sewer lines should follow natural drainage patterns to maximize gravity flow. A comprehensive sewer plan establishes a sewer service area based on topography, the drainage characteristics of the area, and the City's growth objectives. Modifications may then be made in consideration of the influence of existing facilities, political boundaries, and growth patterns before finalizing a specific plan. The Marysville planning area consists of three components; the City's corporate boundary, the existing Urban Growth Area (UGA), and the ultimate planning boundary.

PLANNING AREA

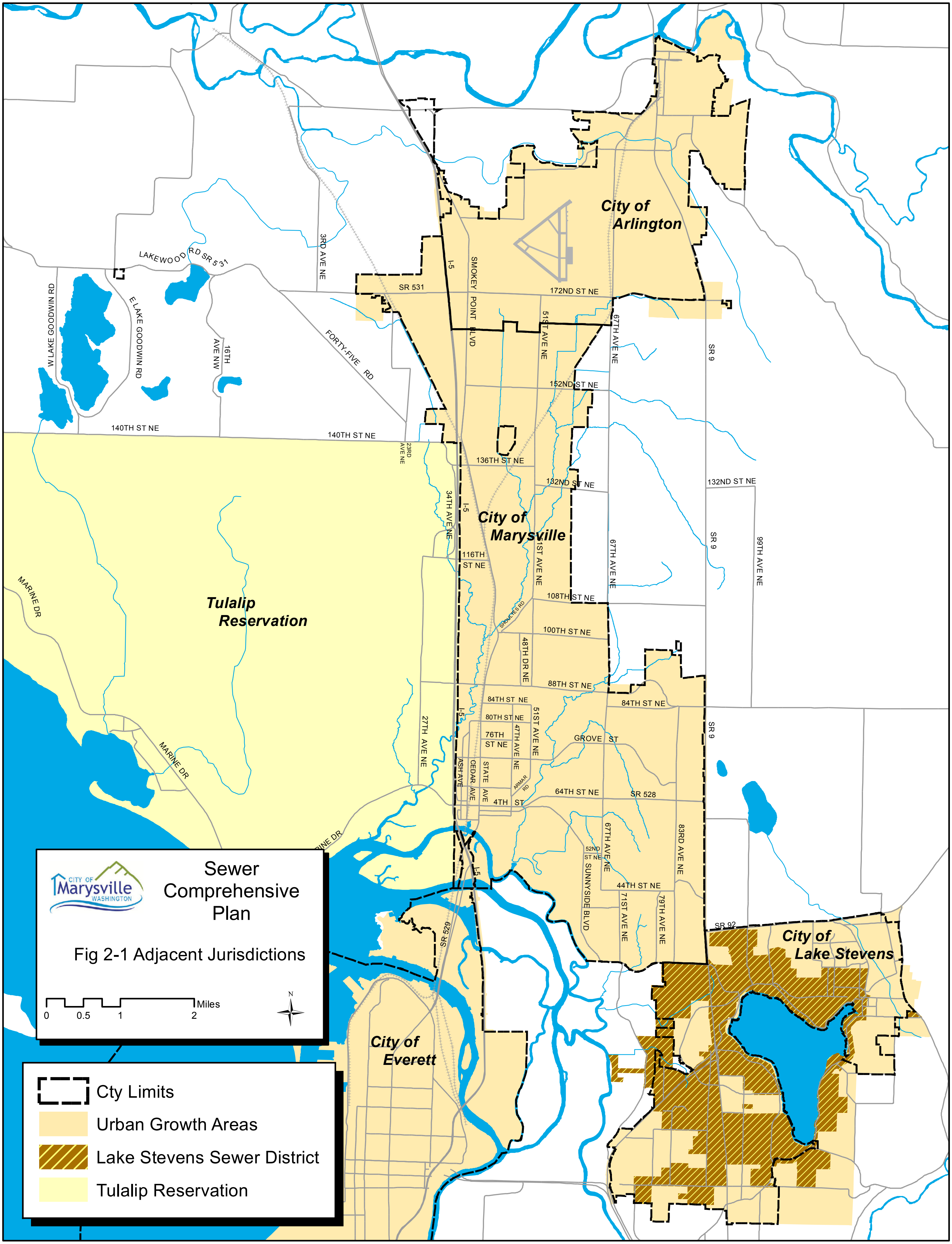
The City of Marysville is located in Snohomish County approximately 5 miles north of the City of Everett. The City is surrounded by the communities of Everett to the south, Lake Stevens to the southeast, Arlington to the north, and the Tulalip Indian Reservation to the west. Other areas are adjacent to rural Snohomish County. The location of the City in relation to surrounding jurisdictions is presented in Figure 2-1.

The City of Marysville planning area includes the City of Marysville (City), the Marysville Urban Growth Area (UGA), and the Marysville Ultimate Planning Boundary as shown in Figure 2-2. The Ultimate Planning Boundary includes areas that are outside of the City UGA but have the potential for future development and sewer service and inclusion into the UGA. Long range planning for these planning areas is covered by an interlocal agreement between the City and Snohomish County and included in Appendix B. The current City planning area encompasses a total area of approximately 24,000 acres (37.5 square miles) as indicated in Table 2-1.

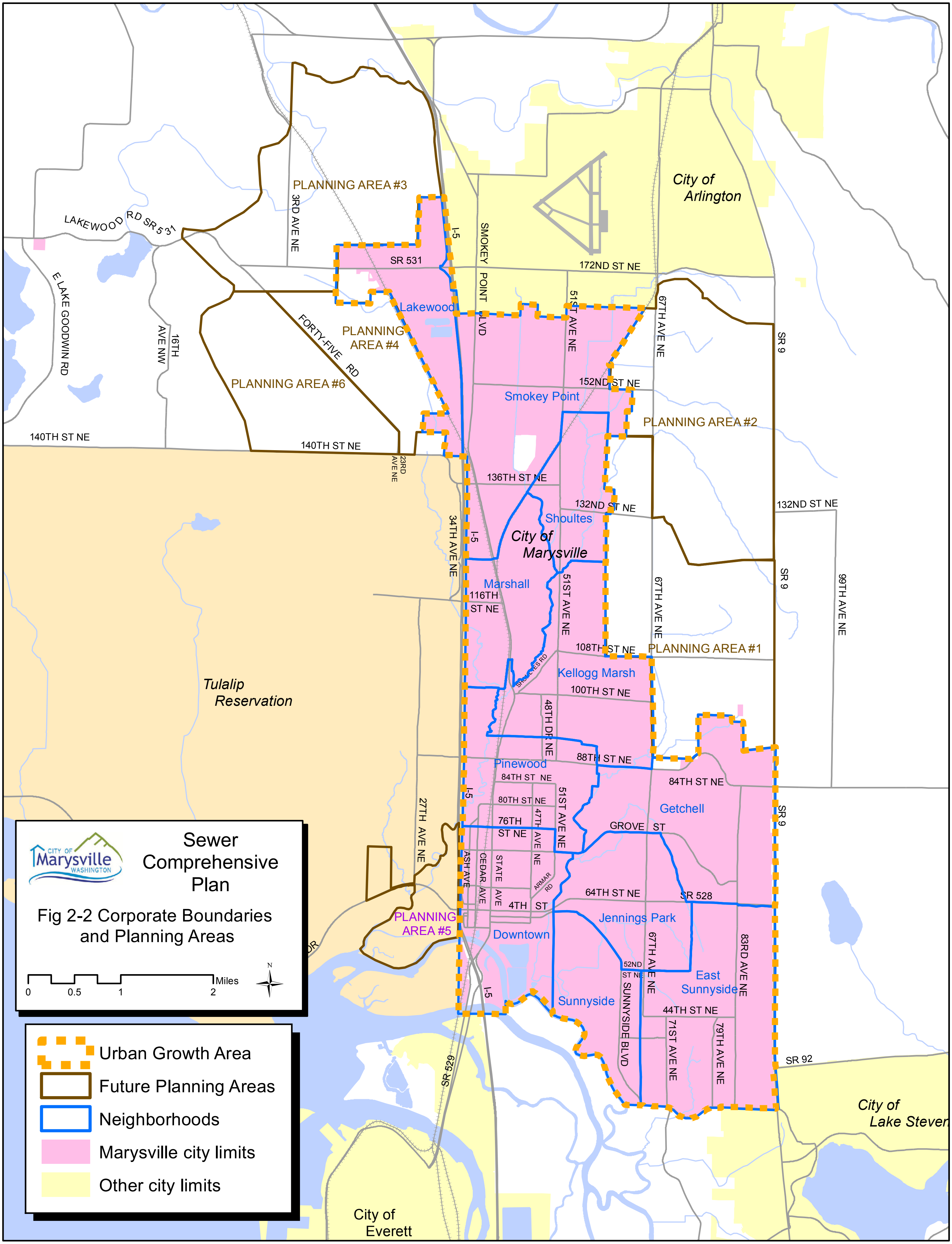
TABLE 2-1

Planning Area Acreage

Location	Acreage
City of Marysville (City)	13,370
Marysville (UGA)	13,660
Ultimate Planning Boundary	24,000



Sewer Comprehensive Plan
Fig 2-1 Adjacent Jurisdictions
CITY OF Marysville WASHINGTON
0 0.5 1 2 Miles
N
Cty Limits
Urban Growth Areas
Lake Stevens Sewer District
Tulalip Reservation
City of Arlington
City of Marysville
City of Lake Stevens
City of Everett
Tulalip Reservation
LAKEWOOD RD SR 531
SR 531
172ND ST NE
W LAKE GOODWIN RD
E LAKE GOODWIN RD
16TH AVE NW
3RD AVE NE
FORTY-FIVE RD
I-5
SMOKEY POINT BLVD
51ST AVE NE
67TH AVE NE
SR 9
152ND ST NE
140TH ST NE
23RD AVE NE
136TH ST NE
132ND ST NE
34TH AVE NE
116TH ST NE
108TH ST NE
100TH ST NE
SHOULTES RD
48TH DR NE
88TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
47TH AVE NE
27TH AVE NE
GROVE ST
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
4TH ST
64TH ST NE
SR 528
83RD AVE NE
99TH AVE NE
52ND ST NE
SUNNYSIDE BLVD
44TH ST NE
71ST AVE NE
79TH AVE NE
SR 92
SR 529
MARINE DR



Sewer Comprehensive Plan

Fig 2-2 Corporate Boundaries and Planning Areas

NATURAL FEATURES OF THE PLANNING AREA

Various natural features of the planning area are discussed below, including climate and precipitation, geography, topography, soils and geology, surface water, and site sensitive areas. Information on the public utilities available in the area is also presented.

TOPOGRAPHY AND GEOGRAPHY

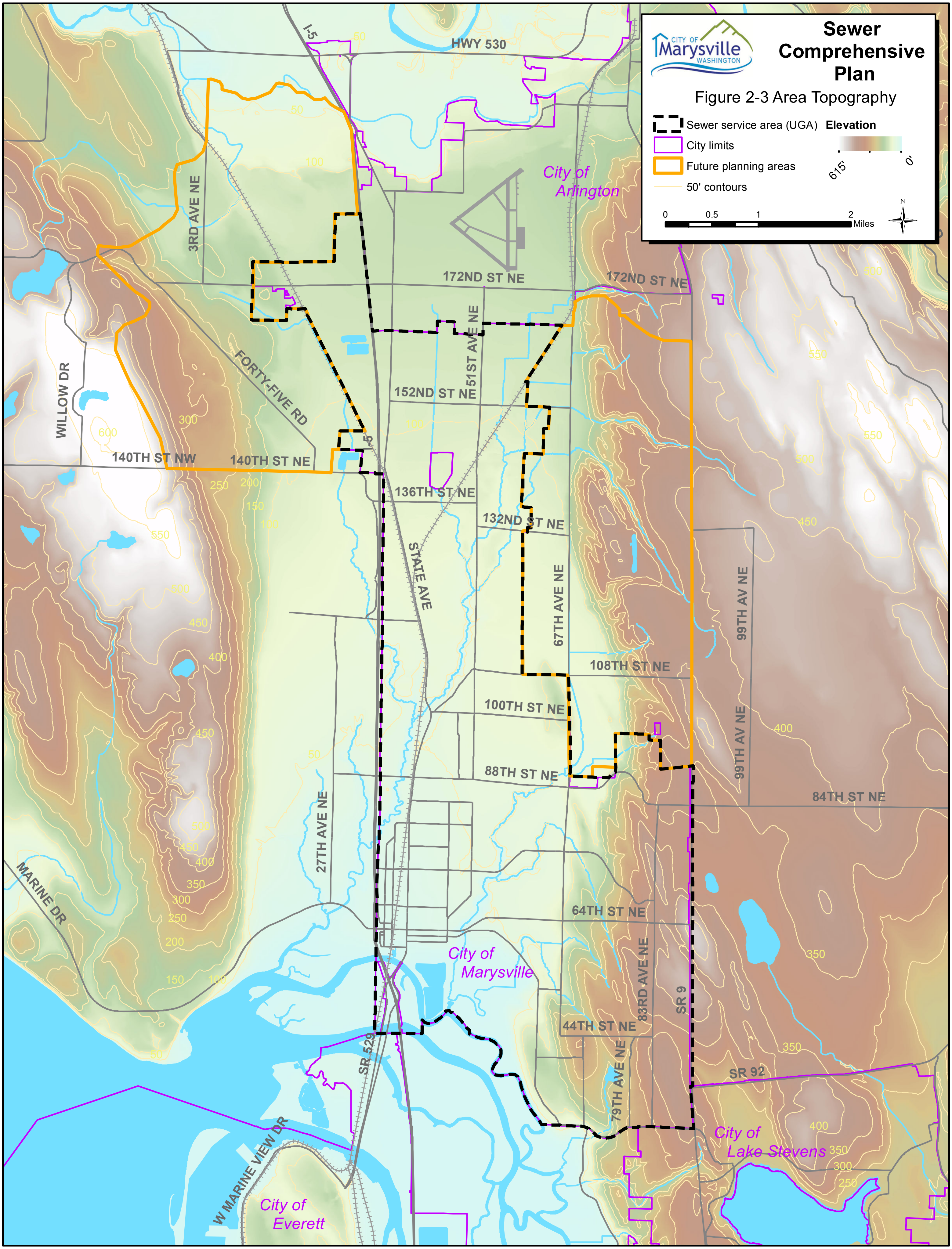
The topography of the City of Marysville has a significant influence on the sewer system. The City is in an area known as the Marysville Trough. The trough is a long flat valley gently sloping to the south and bordered to the west by the Tulalip Plateau and to the east by the Getchell Hill Plateau. The northern and eastern portions of the City slopes southwest towards Ebey Slough. The elevations of the Trough vary from sea level at the slough to more than 90 feet above sea level at the north end. The elevations to the east rise sharply to elevations up to 430 feet. The contours of the planning area and surrounding region are shown in Figure 2-3.

SOILS AND GEOLOGY

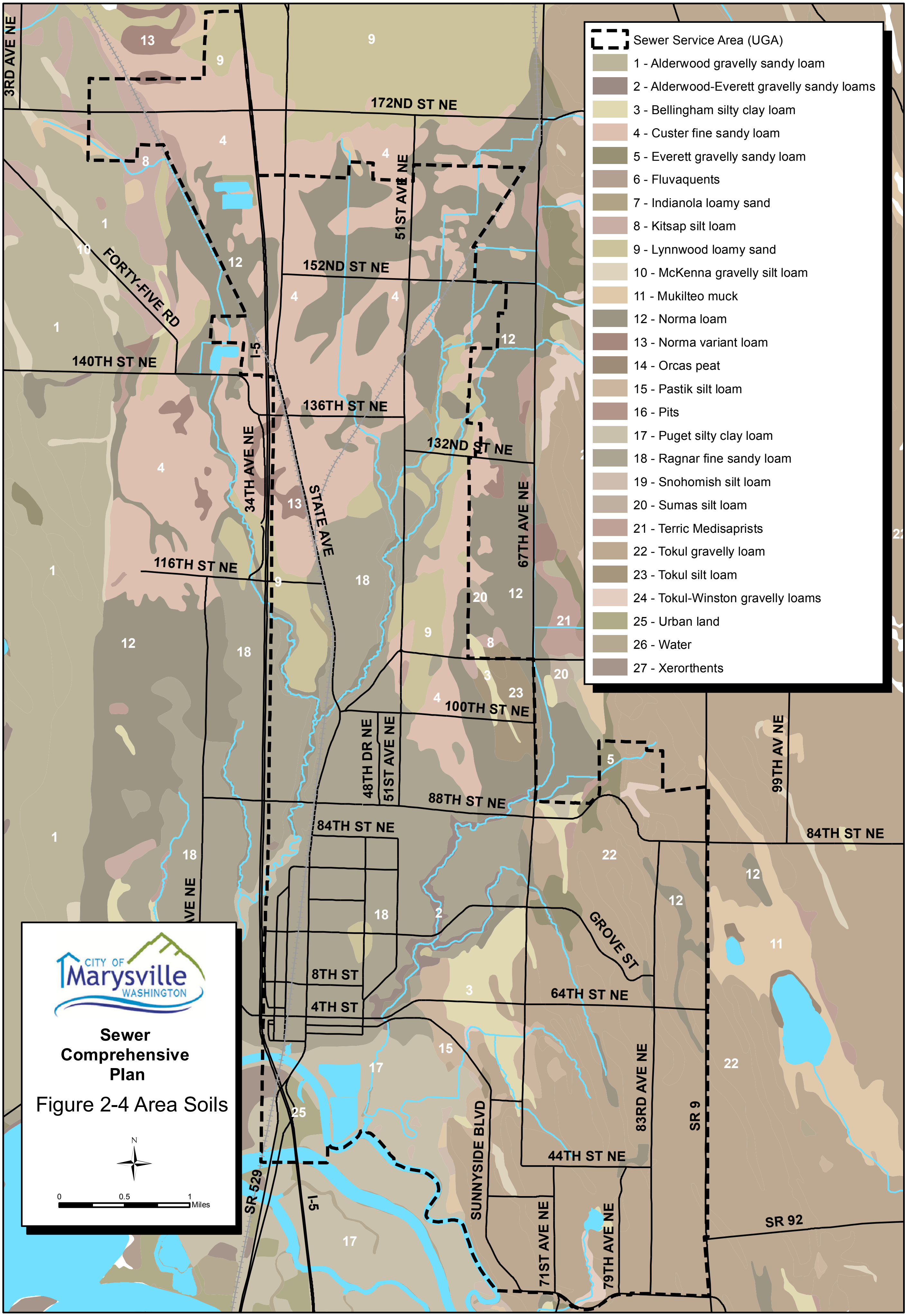
The classification of soils within the City of Marysville is provided by the *1983 Soils Survey for Snohomish County Area*, compiled by the Natural Resource Conversation Service (formerly known as the Soil Conservation Service). A soils map is presented in Figure 2-4. The major classifications of soils within the Trough area are Ragnar, Norma, and Custer.

Ragnar is a very deep well drained soil located on outwash plains. The surface layer is dark brown fine sandy loam about 2 inches thick. The subsoil is dark brown and brown sandy loam about 22 inches thick. The substratum to a depth of 60 inches or more is dark yellowish brown and dark gray loamy sand and sand. In some areas the surface layer is loamy, the subsoil is gravelly, and the substratum is very gravelly. Permeability of the soil is moderately rapid and water runoff is slow. According to the Natural Resource Conversation Service, if the density of housing is moderate to high, community sewage systems may be needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Norma is very deep, poorly drained soil located in depressional areas on outwash plains and till plains. The surface layer is dark gray loam about 10 inches thick. The subsoil is dark grayish brown sandy loam about 18 inches thick. The substratum to a depth of 60 inches or more is dark gray sandy loam. Permeability of the soil is moderately rapid and available water capacity is moderate. The soil is limited by a high water table and underlying till, therefore, runoff is very slow. The soil is classified as poorly suited to urban development and subject to ponding of water.



CITY OF Marysville WASHINGTON
Sewer Comprehensive Plan
Figure 2-3 Area Topography
Sewer service area (UGA)
City limits
Future planning areas
50' contours
Elevation
615'
0'
0
0.5
1
2
Miles
N
HWY 530
I-5
3RD AVE NE
City of Arlington
172ND ST NE
172ND ST NE
51ST AVE NE
FORTY-FIVE RD
152ND ST NE
WILLOW DR
140TH ST NW
140TH ST NE
136TH ST NE
132ND ST NE
STATE AVE
67TH AVE NE
99TH AV NE
108TH ST NE
100TH ST NE
88TH ST NE
84TH ST NE
27TH AVE NE
MARINE DR
64TH ST NE
City of Marysville
83RD AVE NE
SR 9
44TH ST NE
SR 529
79TH AVE NE
SR 92
City of Lake Stevens
W MARINE VIEW DR
City of Everett



Sewer Comprehensive Plan

Figure 2-4 Area Soils

Custer is a very deep poorly drained soil located on outwash plains. The surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The upper part of the subsoil is loamy fine sand about 7 inches thick. The lower part is gray and olive sand about 19 inches thick. The substratum is gray sand about 14 inches thick over gravelly coarse sand that extends to a depth of 60 inches or more. Permeability of the soil is slow in the hardpan and rapid below it. This soil also has a high water table with slow runoff and ponding occurs from November to March.

The slopes above the Trough area on the east side of the City contain different soil types. The major classifications of these soils are Tokul and Bellingham.

Tokul is a moderately deep, moderately well drained soil. The surface layer is dark brown gravelly loam about 4 inches thick. The subsoil is brown gravelly loam about 18 inches thick. The substratum is light brown gravelly fine sandy loam about 9 inches thick. A hardpan is located at a depth of about 31 inches. The permeability of this soil is moderate to the hardpan and very slow through it. Available water capacity is moderate and runoff is slow. The main limitations for septic tank absorption fields are the depth to the hardpan and wetness. Onsite sewage disposal systems often fail or do not function properly during periods of high rainfall.

Bellingham is a very deep poorly drained soil. The surface layer is very dark gray silty clay loam about 9 inches thick. The subsoil to a depth of 60 inches or more is gray silty clay. Permeability of this soil is slow and the water capacity is high. Ponding can occur from November to June. The main limitations for septic tank absorption fields are slow permeability and ponding. Onsite waste disposal systems fail or do not function properly.

SURFACE WATER

The surface water in the planning area includes creeks, small ponds and sloughs. The large surface waters in the area are the marine sloughs to the south of the City including Ebey Slough, Steamboat Slough, and Union Slough. A slough is defined as a creek in a marsh or tide flat. Water in the sloughs comes from the Snohomish River and the lower reaches are influenced by tidal fluctuations. The outfall from the Wastewater Treatment Plant runs into Steamboat Slough, which flows into Possession Sound, a part of Puget Sound.

The City of Marysville constructed a new effluent transfer pipeline, conveying effluent from the City of Marysville Wastewater Treatment Plant to the City of Everett Sewage Treatment Plant. The pipeline will enable the City of Marysville to divert effluent discharge during the summer months into the combined deep-water outfall in Port Gardner Bay, in order to meet summer water quality requirements for Steamboat Slough. During winter months, the water quality requirements for Steamboat Slough will be less stringent and the existing outfall can be used or flow could still be routed to Everett.

CLIMATE

The climate of the Snohomish County area is tempered by winds from the Pacific Ocean. Summers are fairly warm with an occasional hot day. The closest and most reliable weather station is Everett, approximately five miles south of Marysville. The average summer temperature in Everett is 60 degrees Fahrenheit (F) with an average daily maximum temperature of approximately 72 degrees F. Winters are cool with occasional snow and freezing temperatures. The average winter temperature in Everett is 40 degrees F with an average daily minimum temperature of 34 degrees F. Summer rainfall is light, but rains during the rest of the year are frequent, particularly in the fall and winter. The average total annual precipitation for Everett is 36 inches. Approximately 20 to 30 percent of the total precipitation falls during the period of April through September. Average annual snowfall for the Everett area is 8 inches.

Average wind speed is approximately 10 miles per hour and is highest in the winter. Usually one or two storms per winter bring damaging winds and heavy rains, which may result in power outages and flooding.

SITE SENSITIVE AREAS

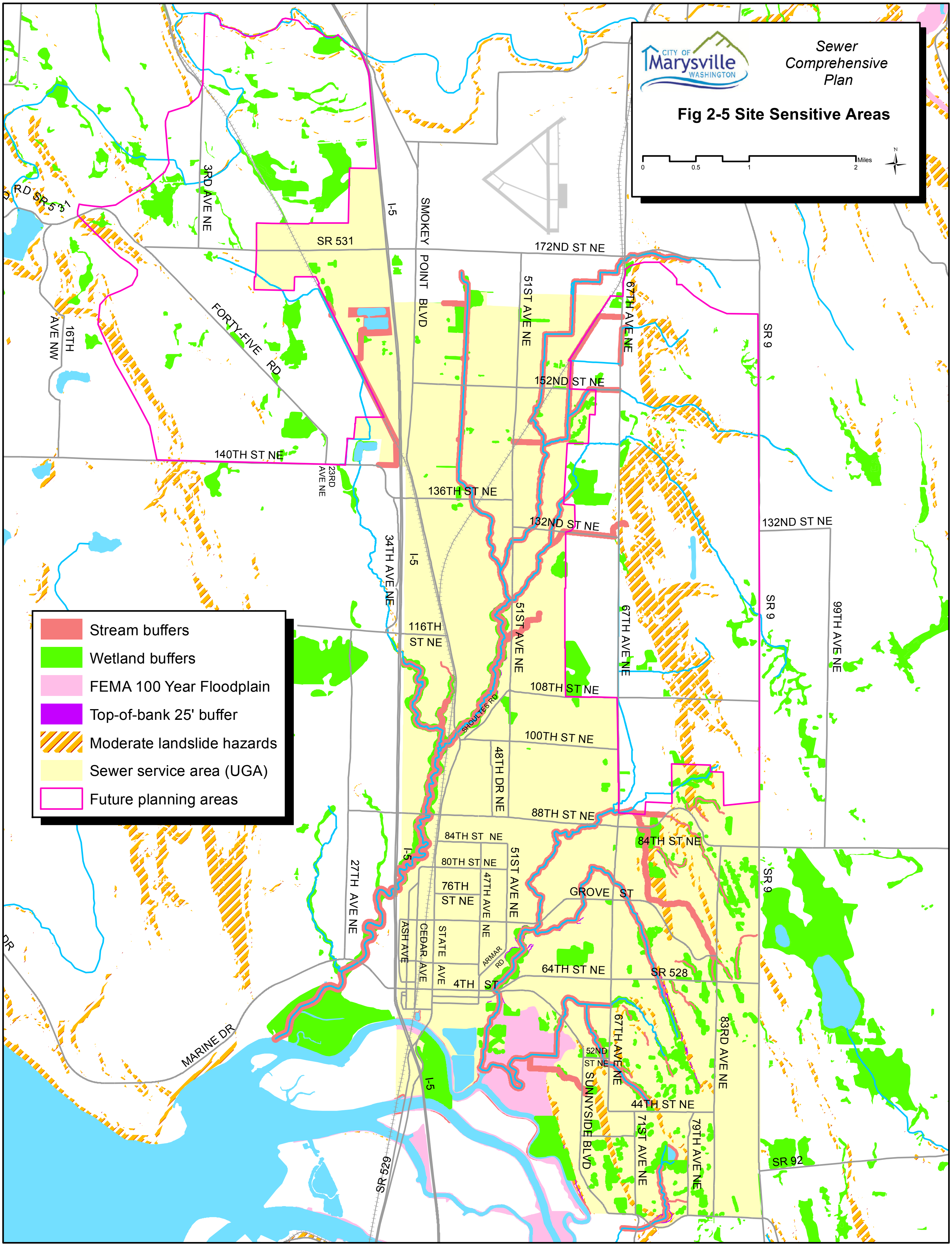
Site sensitive areas within the planning area include those classified as wetlands, seismic hazard areas, slide hazard areas, flood hazard areas, and water bodies. The site sensitive areas within the planning area are described in the following sections.

Erosion Hazard Areas

These areas are especially subject to erosion, if disturbed, and may not be well suited for high-density developments or intensive land uses. Erosion hazard areas include areas with steep slopes, which are shown in Figure 2-5.

Seismic Hazard Areas

Seismic hazard areas are those with low-density soils that are more likely to experience greater damage due to seismic-induced subsidence, liquefaction, or landslides. The City of Marysville is located approximately 10 miles north of the Whidbey Island Fault. This fault runs from the Strait of Juan de Fuca along the southwestern edge of Whidbey Island, crosses Puget Sound, and continues through the Cities of Mukilteo, north Lynnwood, and south Mill Creek to Duvall. The Whidbey Island Fault has seen increased activity in the past 25 years including three earthquakes with a magnitude greater than 3.7 on the Richter Scale. The Geological Society of America Bulletin, March 1996 states "The southern Whidbey Island Fault should be considered capable of generating large earthquakes (Magnitude equal to or greater than 7) and may represent a significant seismic hazard to the Puget Lowland."


CITY OF Marysville WASHINGTON
Sewer Comprehensive Plan
Fig 2-5 Site Sensitive Areas
0
0.5
1
2
Miles
N
Stream buffers
Wetland buffers
FEMA 100 Year Floodplain
Top-of-bank 25' buffer
Moderate landslide hazards
Sewer service area (UGA)
Future planning areas
SR 531
172ND ST NE
152ND ST NE
140TH ST NE
136TH ST NE
132ND ST NE
116TH ST NE
108TH ST NE
100TH ST NE
88TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
GROVE ST
64TH ST NE
4TH ST
52ND ST NE
44TH ST NE
SR 528
SR 9
SR 92
SR 529
I-5
SMOKEY POINT BLVD
51ST AVE NE
67TH AVE NE
3RD AVE NE
16TH AVE NW
FORTY-FIVE RD
23RD AVE NE
34TH AVE NE
27TH AVE NE
48TH DR NE
47TH AVE NE
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
SHOULTES RD
SUNNYSIDE BLVD
71ST AVE NE
79TH AVE NE
83RD AVE NE
99TH AVE NE
132ND ST NE
MARINE DR

Flood Hazard Areas

Flood hazard areas are those adjacent to lakes, rivers, and streams that are prone to flooding during peak runoff periods. Flood hazard areas deserve special attention due to the sensitive nature of their ecosystems as well as the potential for damage to structures located in the floodplain. The majority of the flood areas appear to be in the southwest corner of the City near Ebey Slough as shown in Figure 2-5. The flood plains in the area can also be seen on the Federal Emergency Management Agency (FEMA) flood maps panel numbers 535534 0190B and 535534 0180B.

Slide Hazard Areas

Slide hazards areas are those that are prone to unstable behavior due to steep slopes, lack of vegetation, or unconsolidated soils. The eastern portion of the planning area has the potential to slide due to the steep slopes as shown in Figure 2-5.

Wetlands

Wetlands are defined by the Environmental Protection Agency (EPA) as areas that are inundated for at least part of the year. Wetlands support valuable and complex ecosystems and consequently development is severely restricted if not prohibited in most wetlands. There are numerous wetlands in the planning area as shown in Figure 2-5.

Water Bodies/major drainage basins

Lakes and streams are classified as sensitive areas due to the variety of plants and animals that they support. The streams and creeks within the planning area are classified as having excellent water quality. The naturally occurring streams include the Quilceda Creek to the west and the Allen Creek to the east, both of which drain into Ebey Slough. The planning area is primarily located within two separate drainage basins as seen in Figure 2-6 and as described in the City's Comprehensive Plan. The Quilceda drainage basin drains the Quilceda Creek and the Allen/Munson Creek drainage basin drains Allen Creek.

The Quilceda drainage basin is the larger of the two with an area of approximately 38 square miles. The Allen/Munson drainage basin has an area of approximately 13 square miles. Both drainage basins discharge into Ebey Slough, which in turn discharges into Possession Sound. Historically, many of the tributary streams in the basins, especially the upper tributaries have been modified and straightened for agricultural purposes. Cross culverts have been installed at roads and access points. Both drainage basin surface waters flow generally in a northwesterly direction in the upper reaches of the tributaries, and a southwesterly direction in the lower reaches.

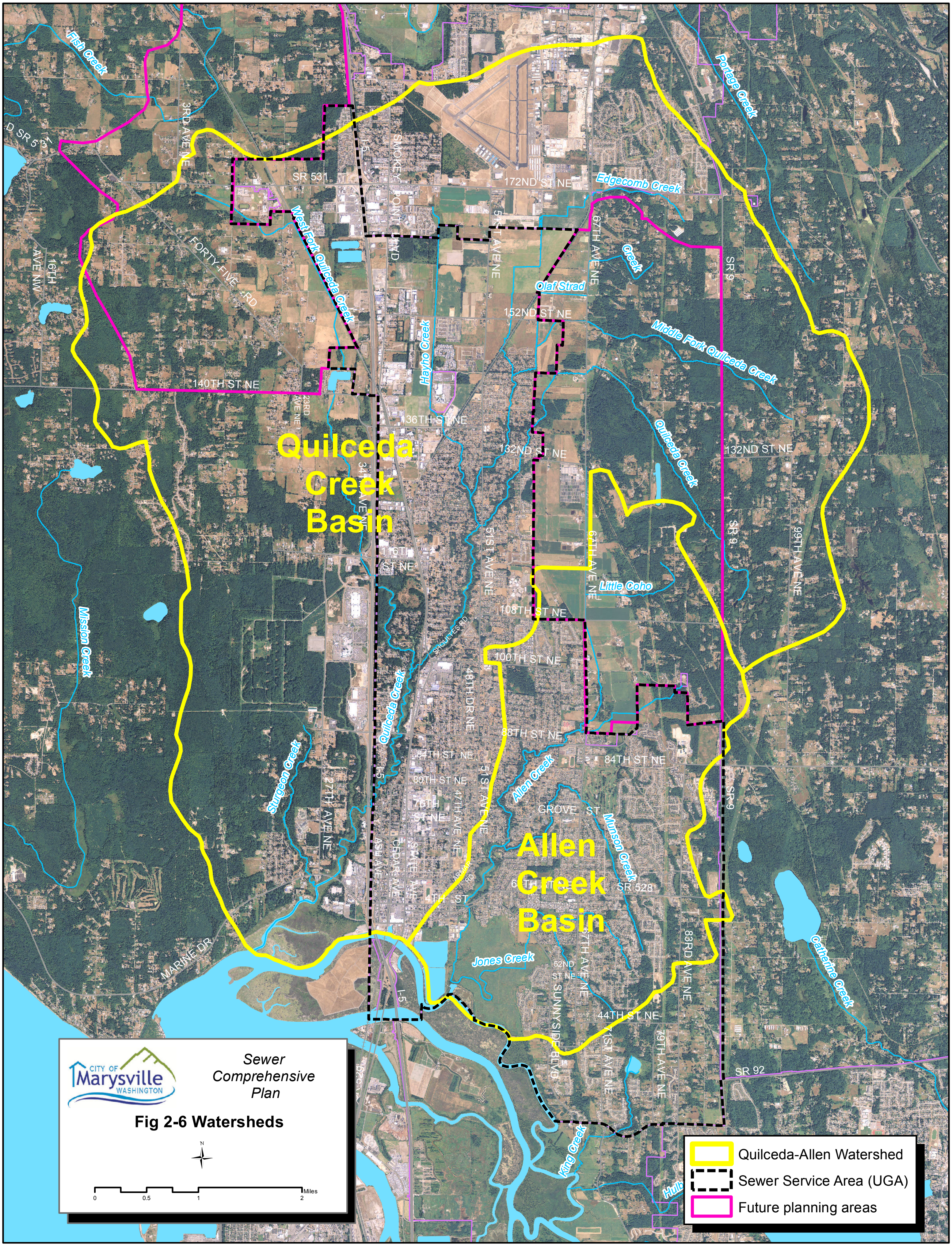


Fig 2-6 Watersheds

Section 303(d) of the federal Clean Water Act requires Washington State periodically to prepare a list of all surface waters in the state for which beneficial uses of the water such as for drinking, recreation, aquatic habitat, and industrial use which are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years. Waters placed on the 303(d) list require the preparation of Total Maximum Daily Loads (TMDLs), a key tool in the work to clean up polluted waters. TMDLs identify the maximum amount of a pollutant to be allowed to be released into a waterbody so as not to impair uses of the water, and allocate that amount among various sources. In addition, even before a TMDL is completed, the inclusion of a water on the 303(d) list can reduce the amount of pollutants allowed to be released under permits issued by Ecology. Ecology's assessment of which waters to place on the 303(d) list is guided by federal laws, state water quality standards, and the state's 303(d) policy. This policy describes how the standards are applied, requirements for the data used, and how to prioritize TMDLs, among other issues. The goal is to make the best possible decisions on whether each body of water is impaired by pollutants, to ensure that all impaired waters are identified and that no waters are mistakenly identified.

The Allen Creek is listed under section the current 303(d) (2008) and the proposed 2010 303(d) list for impairment from oxygen and pH. The Quilceda Creek is listed under section 303(d) for impairment from dissolved oxygen. Ebey Slough is listed for fecal coliform. There are also existing TMDLs for the Snohomish River Estuary (ammonia, CBOD, dissolved oxygen) and the Snohomish River tributaries (fecal coliform).

Classification of marine waters changed in the 2006 water quality standard revisions (WAC 173-201A). Port Gardner Bay is classified "excellent quality" – the sloughs fall under marine water or freshwater standards according to their salinity levels, and streams flowing into the sloughs are probably freshwater. Ebey slough is classified as a Class A marine surface water, which is defined as having excellent quality.

Fish and Wildlife Habitat

The distribution of protected fish species was determined from Snohomish County wildlife habitat maps. Bull Trout are known to be present in the Snohomish River as well as Ebey Slough and Union Slough. It is presumed that they are also present in Allen Creek and Quilceda Creek. It is also known that Chinook Salmon are present in the Snohomish River, Ebey Slough, Union Slough, Allen Creek, and Quilceda Creek.

WATER SYSTEM

The Marysville water system was first established in the 1930s and is owned and operated by the City of Marysville. The system currently consists of 292 miles of pipe, seven reservoirs, one clearwell, one standpipe, three booster pump stations, 29 pressure reducing valves, and eight pressure zones. The City served 19,234connections in 2009 for a population of 56,000 people. The 2009 Water System Plan uses a standard of 188 gallons per day per ERU for estimating future water demand.

The sources of supply include Edward Springs (a spring and three wells), Stillaguamish Ranney Collector Well, Lake Goodwin Well, and an intertie to the City of Everett water system through the Everett-Marysville pipeline. The City also has two secondary sources of supply including the Highway 9 Well and Sunnyside Well No 2.

When the water system first began operation in the 1930s, the source of supply was Edward Springs with an initial water right of 0.5 mgd. Later applications provided additional rights up to 2.0 mgd. The Sunnyside well was brought online in the 1950s and 1960s, Lake Goodwin came online in 1970, the City began withdrawing water from the Stillaguamish River in 1978, and Highway 9 Well was constructed in 1981.

Under a 1991 Joint Operating Agreement, Marysville began receiving wholesale treated water from the City of Everett. The total capacity of the Everett-Marysville pipeline is 20 mgd, of which Marysville receives 11.3 mgd.

The Stillaguamish River Ranney Well Collector has the ability to supply its full water right of 3.2 mgd. In 2006, the City constructed the Stillaguamish Water Treatment Plant to treat the Ranney Well Collector source water, primarily due to turbity, thereby allowing year round operation and allowing full use of the water right.

Table 2-2 is a list of water system projects from the City of Marysville 2009 Six-Year Capital Improvement Plan (CIP). The list is included to coordinate with sewer capital projects that may be identified in this Plan. The City may potentially reduce project costs by installing both water and sewer pipeline as part of one project when it is feasible to do so.

TABLE 2-2

2009 to 2014 Water System Capital Improvements

Project No.	Project Title
Water Supply and Treatment	
WS-1	Additional Spring Collector Improvements
WS-2	Lake Goodwin Well Development
WS-3	Sunnyside Well #1 Relocate & #2 Rehab
WS-4	Ultraviolet Treatment
Water Storage	
ST-1	Edward Springs Baffles
ST-2	Hwy 9 Reservoir Demolition
ST-3	Hwy 9 Reservoir
ST-4	Soper Hill (Whiskey Ridge) Property & Reservoir (1 MG)
ST-5	North 510 Zone Reservoir (1 MG)
Water Booster Pump Stations	
PS-1	Edward Springs Pump Modification
PS-2	Edward Springs Booster Pump Building
PS-3	Cedarcrest Pump Station Rehab (Motor Control/Valve Replacement)
PS-4	Soper Hill (Whiskey Ridge) Pump Station (Design Point=700 gpm @ 130'; 35 hp)
PS-5	North 510 Zone Pump Station (Design Point=300 gpm @ 300'; 40 hp)
Water Transmission and Distribution System	
WD-1	State Ave (102nd to 116th; 4,578', replace 12" AC with 18" DI)
WD-2	67th Ave (100th to 132nd; 10,469', new 18") and PRV
WD-3	83rd Ave NE (60th to 64th; 1,301', upsize 12" to 16")
WD-4	67th Ave NE (52nd to 64th; 3,943', upsize 10" to 16")
WD-5	51st Avenue (119th Pl NE to 122nd Pl NE; 820', replace 12" CI with 12" DI)
WD-6	Ebey Slough Bridge (717', new 12")
WD-7	Cedar Avenue 1st - 5th (1,407', new 8")
WD-8	Quinn Avenue 6th - 8th (972', new 8")
WD-9	67th Ave NE (44th to 52nd); 44th St NE (67th to 71st); 71st Ave NE (to Sunnyside Res) (4,697', new 18")
WD-10	140th Pl NE (23rd to I-5); north on 23rd Ave NE, then northwest on 45 Road (144th to 156th) (10,053', replace 12" AC with 18" DI)
WD-11	71st Ave NE (52nd to 72nd; 6,559', 12")
WD-12	52nd St NE (67th to 73rd; 2,023', replace 10" with 12")
WD-13	Soper Hill (Whiskey Ridge) Reservoir waterline (4,378', new 12")
WD-14	Soper Hill (Whiskey Ridge) PRVs (3)
WD-15	Connection of Soper Hill to 360 Zone on 49th St NE (200', new 8")
WD-16	83rd Ave NE (Soper Hill Res to 60th St; 6,859', new 16")
WD-17	North 510 Zone Reservoir waterline (22,838', new 12")

TABLE 2-2… (continued)

2009 to 2014 Water System Capital Improvements

Project No.	Project Title
Water Transmission and Distribution System	
WD-18	52nd Dr NE (north from 81st Pl NE to existing 6" CI; 340', new 8")
WD-19	77th Pl NE (600', replace 6" with 8"); 76th St NE (410', replace 6" with 8")
WD-20	60th Dr NE (3,842', upsize from 6" to 8")
WD-21	61st Dr NE and 84th Pl NE (758', upsize from 6" to 8")
WD-21	87th St NE (621', upsize from 6" to 8")
WD-21	86th St NE (855', upsize from 6" to 8")
WD-22	50th Ave NE (250', upsize from 6" to 8")
WD-23	92nd St NE (561', upsize from 6" to 8")
WD-24	134th Pl NE and 54th Dr NE (1,502', upsize from 6" to 8" and some new 8")
WD-25	140th Pl NE (305', upsize from 4" to 8")
WD-26	Pipes and valves to adjust North/South boundary (5 segments, 25' ea, 8")
Water Maintenance and Operations	
WM-1	Watermain R&R
WM-2	Watermain Oversizing
WM-3	PRV Rate of Flow
WM-4	Stillaguamish Fiber Optics
WM-5	Water Meter AMR
WM-6	Water System Plan Update

OTHER PUBLIC UTILITIES

Telephone service in the area is provided by Frontier, and Cable TV by Comcast. Power service in the area is provided by Snohomish County Public Utility District (PUD) #1. Natural gas is provided by Puget Sound Energy.

Nearby public wastewater treatment plants are operated by the Cities of Arlington, Granite Falls, Everett, and the Lake Stevens Sewer District. A private wastewater treatment plant is operated by the Tulalip Tribe.

CHAPTER 3

LAND USE AND PLANNING CRITERIA

INTRODUCTION

Specific land uses, such as residential and commercial developments, provide flows and loadings to the City's wastewater treatment facilities. In addition, the configuration of the sewer system is based on growth projections, development trends, political considerations, topography, and the drainage characteristics of the area. Based on the City's growth history and the need to provide wastewater treatment facilities services for future growth, the wastewater treatment and sewer systems are in need of continuous evaluation and improvement.

This Chapter provides information relating to land use and associated zoning designations, existing and projected population, and the City's growth history. These data are used in later chapters to evaluate if the City's wastewater and sewer facilities are adequate to serve future growth and to meet regulatory requirements to the year 2031. In addition, buildout population is developed in this Chapter for a long-term assessment of the City's collection system.

PLANNING PERIOD

The planning period for the City's wastewater system should be long enough to be useful for an extended period of time, but not so long to be impractical. This Plan includes 6-year, and 20-year planning periods to allow for the implementation of the City's capital improvement program. The 6-year planning period extends to the year 2017. The City of Marysville's current Comprehensive Plan sets the 20-year planning period to the year 2025, which is consistent with Snohomish County Planning. This Plan will extend the capital improvement program to the year 2031.

GROWTH MANAGEMENT

The Growth Management Act (GMA) was enacted in 1990 to address the population growth that occurred in areas of Washington State during the 1980s. To ensure a continuation of Washington's high quality of life, officials across the state have addressed growth management within various levels of government. The basic objective of the GMA is to encourage local county and city governments to develop and implement a 20-year comprehensive plan that incorporates their vision of the future within the framework of the broader needs of the state.

Under the GMA, cities within a county must complete their own planning and coordinate the planning efforts with those of the county. The planning effort of a city includes the establishment of an Urban Growth Area (UGA). The City established its first UGA in 1996, and also a planning area to accommodate future growth of the UGA.

LAND USE AND ZONING

The City of Marysville Municipal Code (MMC), Title 22, Unified Development Code , provides density and design requirements for the main land use categories within the City's corporate boundaries and UGA, including residential, business, commercial, mixed use, industrial, business park, recreation and public/institutional, as shown on Figure 3-1. The City has five planning areas outside the UGA, each of which fall under the jurisdiction of Snohomish County's zoning regulations. A description of the individual planning areas follows:

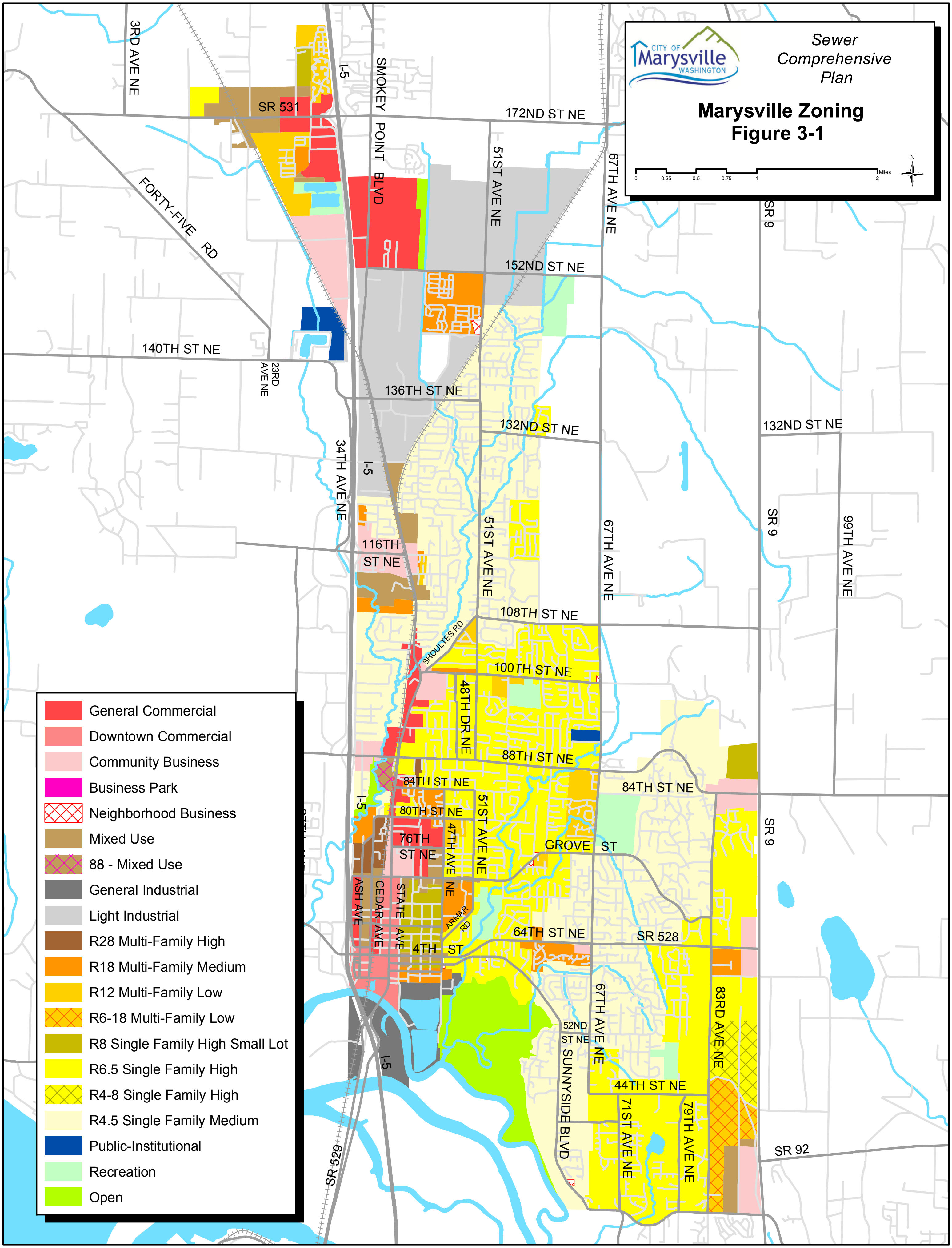
- Planning Area #1: This area is generally located north of 90th Street NE, east of the eastern Marysville UGA boundary, south of 132nd Street NE and west of SR 9. This area is comprised of R-5 (1 d.u. per 5-acres) and A-10 (1 d.u. per 10-acres) zoning designations.
- Planning Area #2: This area is generally located north of 132nd Street NE, east of the eastern Marysville UGA boundary, south of 172nd Street NE and west of SR 9. This area is comprised of R-5 (1 d.u. per 5-acres) and A-10 (1 d.u. per 10-acres) zoning designations.
- Planning Area #3: This area is generally located north of the northern Marysville UGA boundary at approximately 17600 Block, east of 3rd Avenue NE, south of Portage Creek and west of I-5. This area is comprised of R-5 (1 d.u. per 5-acres) and RC (rural conservation) zoning designations.
- Planning Area #4: This area is generally located north 140th Street NE, east of Forty-Five Road, south of SR 531 and west of the Marysville UGA boundary. This area is comprised of R-5 (1 d.u. per 5-acres) zoning designation.
- Planning Area #5: This area is generally located north of 140th Street NE, east of 4th Avenue NW, south of SR 531 and west of Forty-Five Road. This area is comprised of R-5 (1 d.u. per 5-acres) zoning designation.

The development densities listed above for each planning area may change if they become part of the City's UGA.

For the purposes of this Plan, the Planning Areas noted above along with the existing UGA will be referred to as the Ultimate Planning Area (UPA).

CITY OF MARYSVILLE

The purpose of designating land use within the City is to guide development to meet land use regulations and implement the land use goals identified in the City's Comprehensive Plan. These land use designations apply to the City's corporate boundaries and UGA,


City of Marysville Washington
Sewer Comprehensive Plan
Marysville Zoning
Figure 3-1
General Commercial
Downtown Commercial
Community Business
Business Park
Neighborhood Business
Mixed Use
88 - Mixed Use
General Industrial
Light Industrial
R28 Multi-Family High
R18 Multi-Family Medium
R12 Multi-Family Low
R6-18 Multi-Family Low
R8 Single Family High Small Lot
R6.5 Single Family High
R4-8 Single Family High
R4.5 Single Family Medium
Public-Institutional
Recreation
Open
172ND ST NE
152ND ST NE
140TH ST NE
136TH ST NE
132ND ST NE
116TH ST NE
108TH ST NE
100TH ST NE
88TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
GROVE ST
64TH ST NE
4TH ST
SR 528
52ND ST NE
44TH ST NE
SR 92
SR 531
SR 529
SR 9
I-5
SMOKEY POINT BLVD
FORTY-FIVE RD
3RD AVE NE
23RD AVE NE
34TH AVE NE
51ST AVE NE
67TH AVE NE
99TH AVE NE
48TH DR NE
47TH AVE NE
SHOULTES RD
ARMAR RD
ASH AVE
CEDAR AVE
STATE AVE
SUNNYSIDE BLVD
71ST AVE NE
79TH AVE NE
83RD AVE NE

while Snohomish County land use designations apply to the planning areas outside of the UGA. The boundaries for these areas are shown on Figure 3-1, Existing Zoning.

MMC 22C.010.020 and MMC 22C.020.020 includes the following zoning designations within the City of Marysville. Density limits are provided for the residential zones.

TABLE 3-1

City of Marysville Zoning Designations

Zone	Land Use Designation	Residential Density (dwelling units per acre)
R-4.5	Medium density single-family	4.5
R-6.5	High density single-family	6.5
R-8	High density single-family, small lots	8
WR R-4-8	Whiskey Ridge, high density single-family	4.5-8
R-12	Low density multiple-family	12-18
R-18	Medium density multiple-family	18-28
R-28	High density multiple-family	28-36
WR R-6-18	Whiskey Ridge, medium density multiple-family	6-18
NB	Neighborhood Business	
CB	Community Business	12 (1)
GC	General Commercial	12 (1)
DC	Downtown Commercial	12 (1)
MU	Mixed Use	28
LI	Light Industrial	
GI	General Industrial	
BP	Business Park	
REC	Recreation	
P/I	Public/Institutional	
WR-MU	Whiskey Ridge Mixed Use	12
WR-CB	Whiskey Ridge Community Business	

(1)All units must be located above a street-level commercial use.

At the time of development all residential, commercial, business, and industrial zoning designations must be served by public sewers, water, roads, and other needed public facilities and services.

Residential Zones
The purpose of the residential zone (R) is to implement comprehensive plan goals and policies for housing quality, diversity and affordability, and to efficiently use residential land, public services and energy. These purposes are accomplished by:

(1) Providing, in the R-4.5, R-6.5, and R-8 zones, for a mix of predominantly single detached dwelling units and other development types, with a variety of densities and sizes in locations appropriate for urban densities;

(2) Providing, in the R-12, R-18, and R-28 zones, for a mix of predominantly apartment and townhome dwelling units and other development types, with a variety of densities and sizes in locations appropriate for urban densities;

(3) Providing and preserving high density, affordable detached single-family and senior housing, in the R-MHP zone. This zone is assigned to existing mobile home parks within residential zones which contain rental pads, as opposed to fee simple owned lots, and as such are more susceptible to future development.

(4) Allowing only those accessory and complementary nonresidential uses that are compatible with residential communities; and

(5) Establishing density designations to facilitate advanced area-wide planning for public facilities and services, and to protect environmentally sensitive sites from overdevelopment.

Use of this zone is appropriate in residential areas designated by the comprehensive plan as follows:

(1) Urban lands that are served at the time of development, by adequate public sewers, water supply, roads and other needed public facilities and services; and

(2) The corresponding comprehensive plan designations are as follows:

R-4.5	=	Medium density single-family
R-6.5	=	High density single-family
R-8	=	High density single-family, small lot
R-12	=	Low density multiple-family
R-18	=	Medium density multiple-family
R-28	=	High density multiple-family

Neighborhood Business Zone
The purpose of the neighborhood business zone (NB) is to provide convenient daily retail and personal services for a limited service area and to minimize impacts of commercial activities on nearby properties. These purposes are accomplished by:

(1) Limiting nonresidential uses to those retail or personal services which can serve the everyday needs of a surrounding residential area;

(2) Allowing for a mix of housing and retail/service uses; and

(3) Excluding industrial and community/regional business-scaled uses.

Use of this zone is appropriate in neighborhood centers designated by the comprehensive plan which are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

Community Business Zone
The purpose of the community business zone (CB) is to provide convenience and comparison retail and personal services for local service areas which exceed the daily convenience needs of adjacent neighborhoods but which cannot be served conveniently by larger activity centers, and to provide retail and personal services in locations within activity centers that are not appropriate for extensive outdoor storage or auto-related and industrial uses. These purposes are accomplished by:

(1) Providing for limited small-scale offices as well as a wider range of the retail, professional, governmental and personal services than are found in neighborhood business areas;

(2) Allowing for a mix of housing and retail/service uses; and

(3) Excluding commercial uses with extensive outdoor storage or fabrication and industrial uses.

Use of this zone is appropriate in community commercial areas that are designated by the comprehensive plan and are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

General Commercial Zone
The purpose of the general commercial zone (GC) is to provide for the broadest mix of commercial, wholesale, service and recreation/cultural uses with compatible storage and fabrication uses, serving regional market areas and offering significant employment. These purposes are accomplished by:

(1) Encouraging compact development that is supportive of transit and pedestrian travel, through higher nonresidential building heights and floor area ratios than those found in CB zoned areas;

(2) Allowing for outdoor sales and storage, regional shopping areas and limited fabrication uses; and

(3) Concentrating large-scale commercial and office uses to facilitate the efficient provision of public facilities and services.

Use of this zone is appropriate in general commercial areas that are designated by the comprehensive plan that are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

Downtown Commercial Zone
The purpose of the downtown commercial zone (DC) is to provide for the broadest mix of comparison retail, service and recreation/cultural uses with higher density residential uses, serving regional market areas and offering significant employment. These purposes are accomplished by:

(1) Encouraging compact development that is supportive of transit and pedestrian travel, through higher nonresidential building heights and floor area ratios than those found in GC zoned areas;

(2) Allowing for regional shopping areas, and limited fabrication uses; and

(3) Concentrating large-scale commercial and office uses to facilitate the efficient provision of public facilities and services.

Use of this zone is appropriate in downtown commercial areas that are designated by the comprehensive plan that are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

Mixed Use Zone

The purpose of the mixed use zone (MU) is to provide for pedestrian and transit-oriented high-density employment uses together with limited complementary retail and higher density residential development in locations within activity centers where the full range of commercial activities is not desirable. These purposes are accomplished by:

(1) Allowing for uses that will take advantage of pedestrian-oriented site and street improvement standards;

(2) Providing for higher building heights and floor area ratios than those found in the CB zone;

(3) Reducing the ratio of required parking to building floor area;

(4) Allowing for on-site convenient daily retail and personal services for employees and residents; and

(5) Minimizing auto-oriented, outdoor or other retail sales and services which do not provide for the daily convenience needs of on-site and nearby employees or residents.

Use of this zone is appropriate in areas designated by the comprehensive plan for mixed use, or mixed use overlay, which are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

Light Industrial Zone

The purpose of the light industrial zone (LI) is to provide for the location and grouping of non-nuisance-generating industrial enterprises and activities involving manufacturing, assembly, fabrication, processing, bulk handling and storage, research facilities, warehousing and limited retail uses. It is also a purpose of this zone to protect the industrial land base for industrial economic development and employment opportunities. These purposes are accomplished by:

(1) Allowing for a wide range of industrial and manufacturing uses;

(2) Establishing appropriate development standards and public review procedures for industrial activities with the greatest potential for adverse impacts; and

(3) Limiting residential, institutional, service, office and other nonindustrial uses to those necessary to directly support industrial activities.

Use of this zone is appropriate in light industrial areas designated by the comprehensive plan which are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

General Industrial Zone

The purpose of the general industrial zone (GI) is to provide for the location and grouping of industrial enterprises and activities involving manufacturing, assembly, fabrication, processing, bulk handling and storage, research facilities, warehousing and heavy trucking and equipment but also for commercial uses having special impacts and regulated by other chapters of this title. It is also a purpose of this zone to protect the industrial land base for industrial economic development and employment opportunities. These purposes are accomplished by:

(1) Allowing for a wide range of industrial and manufacturing uses;

(2) Establishing appropriate development standards and public review procedures for industrial activities with the greatest potential for adverse impacts; and

(3) Limiting residential, institutional, service, office and other nonindustrial uses to those necessary to directly support industrial activities.

Use of this zone is appropriate in general industrial areas designated by the comprehensive plan which are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

Business Park Zone

The purpose of the business park zone (BP) is to provide for those business/industrial uses of a professional office, wholesale, and manufacturing nature which are capable of being constructed, maintained and operated in a manner uniquely designed to be compatible with adjoining residential, retail commercial or other less intensive land uses, existing or planned. Strict zoning controls must be applied in conjunction with private covenants and unified control of land; many business/industrial uses otherwise provided for in the development code will not be suited to the BP zone due to an inability to comply with its provisions and achieve compatibility with surrounding uses.

Use of this zone is appropriate in business park areas designated by the comprehensive plan which are served at the time of development by adequate public sewers, water supply, roads and other needed public facilities and services.

Recreation Zone

The purpose of the recreation zone (REC) is to establish areas appropriate for public and private recreational uses. Recreation would permit passive as well as active recreational uses such as sports fields, ball courts, golf courses, and waterfront recreation, but not hunting. This zone would also permit some resource land uses related to agriculture and fish and wildlife management.

This recreation zone is applied to all land designated as “Recreation” on the comprehensive plan map.

Public/Institutional Zone

The purpose of the public/institutional (P/I) land use zone is to establish a zone for governmental buildings, churches and public facilities.

This public/institutional zone is applied to all land designated as “public/institutional” on the comprehensive plan map.

Whiskey Ridge
The purpose of the whiskey ridge overlay zone (WR suffix to zone's map symbol) is to create an urban community that provides an attractive gateway into Marysville and becomes a prototype for developing neighborhoods within the City. The WR suffix identifies those areas required to comply with the East Sunnyside/Whiskey Ridge Design Standards and Guidelines, and Streetscape Design Plan.

SNOHOMISH COUNTY

Snohomish County land use regulations apply to those areas outside of the Marysville corporate boundaries and UGA. The *Snohomish County GMA Comprehensive Plan*, August 1, 2010, provides land use designations. The land use designations that apply to the Marysville UPA are listed below in Table 3-2. The land use designations may change as these areas are included in the UGA.

The City provides sewer services within the unincorporated Marysville UGA consistent with the City's Comprehensive Plan.

TABLE 3-2

Snohomish County Marysville UPA Future Land Use Designation[1]

Zone	Future Land Use Designation	Residential Density
R-7,200	Public/Institutional	5-6 d.u. per acre
R-5	Rural Residential	1 d.u. per 5-acres basic
RC	Local Commercial Farmland	N/A
R-5	Rural Residential-5	1 d.u. per 5-acres
A-10	Rural Residential-10	1 d.u. per 10-acres

(1) Snohomish County Zoning, January 18, 2011, and GMA Comprehensive Plan Future Land Use Map, August 1, 2010.

Urban Single-family Residential R-7,200

The intent and function of Single Family Residential zones is to provide for predominantly single family residential development that achieves a minimum net density of four dwelling units per net acre. These zones may be used as holding zones for properties that are designated Urban Medium-Density Residential, Urban High-Density Residential, Urban Commercial, Urban Industrial, Public/Institutional use (P/IU), or Other land uses in the comprehensive plan. Single family residential zones consist of Residential 7,200 sq. ft. (R-7,200), Residential 8,400 sq. ft. (R-8,400) and Residential 9,600 sq. ft. (R-9,600).

Rural Single-family Residential R-5

The intent and function of the Rural-5 Acre zone (R-5) is to maintain rural character in areas that lack urban services. The R-5 zone permits single-family development at a density of one (1) dwelling unit per five (5) acres.

Other Zones, Rural Conservation (RC)

The Other zones category consists of existing zoning classifications that are no longer primary implementing zones but may be used in special circumstances due to topography, natural features, or the presence of extensive critical areas. Other zones consist of Suburban Agriculture-1 Acre (SA-1), Rural Conservation (RC), Rural Use (RU), Residential 20,000 sq. ft. (R-20,000), Residential 12, 500 sq. ft. (R-12,500) and Waterfront beach (WFB).

Resource Zones, Agricultural 10-Acre (A-10)

The Resource zones category consists of zoning classifications that conserve and protect lands useful for agriculture, forestry, or mineral extraction or lands which have long-term commercial significance for these uses. The intent and function of the Agricultural-10 Acre zone is to protect agricultural lands and promote agriculture as a component of the County economy, protect and promote the continuation of farming in areas where it is already established and in locations where farming has traditionally been a viable component of the local economy and permit in agricultural lands, with limited exceptions, only agricultural land uses and activities and farm-related uses that provide a support infrastructure for farming, or that support, promote or sustain agricultural operations and production including compatible accessory commercial or retail uses on designated agricultural lands.

TABLE 3-3

UGA Land Use Designation Acreage From Marysville Comprehensive Plan 2011

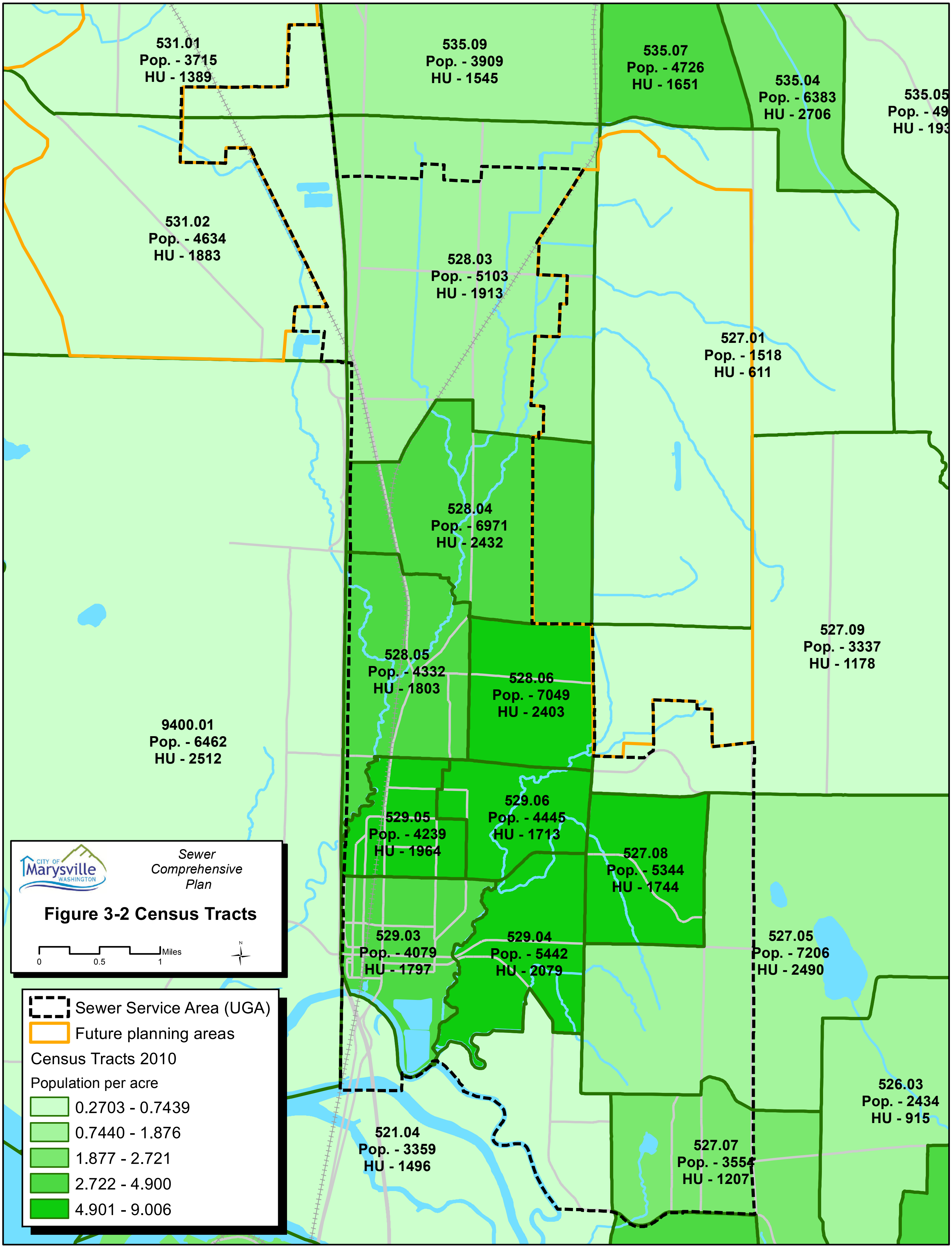
DESIGNATION	ACRES
88 - Mixed Use	24.5
Business Park	92.0
Community Business	463.8
Downtown Commercial	161.7
General Commercial	650.2
General Industrial	396.1
Light Industrial	1,401.7
Mixed Use	542.7
Neighborhood Business	14.7
Open	532.8
Public-Institutional	77.0
R12 Multi-Family Low	360.1
R18 Multi-Family Medium	477.5
R28 Multi-Family High	70.7
R4-8 Single Family High	155.8
R4.5 Single Family Medium	3,967.5
R6-18 Multi-Family Low	161.9
R6.5 Single Family High	3,468.4
R8 Single Family High Small Lot	214.6
Recreation	345.4

POPULATION

To evaluate the wastewater system's existing facilities and to determine requirements for future facilities, the City's existing and future population has been estimated and is used to project future wastewater flows.

EXISTING POPULATION

The 2010 US Census data provided the population and number of housing units for the City of Marysville. Table 3-4 shows the City's population by Census Tract, and Figure 3-2 shows the primary census tracts, covering the City and its UGA for 2010. On November 9, 2009, Marysville City Council adopted Ordinance No. 2792, approving the "Central Marysville Annexation," with an effective date of December 30, 2009. The Central Marysville Annexation annexed almost the entire Marysville UGA, adding an additional 20,000 people to the city. The difference in population between the city limits and the UGA is approximately 200 people.



531.01
Pop. - 3715
HU - 1389
535.09
Pop. - 3909
HU - 1545
535.07
Pop. - 4726
HU - 1651
535.04
Pop. - 6383
HU - 2706
535.05
Pop. - 49
HU - 193
531.02
Pop. - 4634
HU - 1883
528.03
Pop. - 5103
HU - 1913
527.01
Pop. - 1518
HU - 611
528.04
Pop. - 6971
HU - 2432
527.09
Pop. - 3337
HU - 1178
528.05
Pop. - 4332
HU - 1803
528.06
Pop. - 7049
HU - 2403
9400.01
Pop. - 6462
HU - 2512
529.06
Pop. - 4445
HU - 1713
529.05
Pop. - 4239
HU - 1964
527.08
Pop. - 5344
HU - 1744
529.03
Pop. - 4079
HU - 1797
529.04
Pop. - 5442
HU - 2079
527.05
Pop. - 7206
HU - 2490
526.03
Pop. - 2434
HU - 915
521.04
Pop. - 3359
HU - 1496
527.07
Pop. - 3554
HU - 1207
CITY OF Marysville WASHINGTON
Sewer Comprehensive Plan
Figure 3-2 Census Tracts
0
0.5
1
Miles
N
Sewer Service Area (UGA)
Future planning areas
Census Tracts 2010
Population per acre
0.2703 - 0.7439
0.7440 - 1.876
1.877 - 2.721
2.722 - 4.900
4.901 - 9.006

TABLE 3-4

2010 Population and Housing Units[1]
Corporate Boundary

TRACT (PART)	POPULATION	HOUSING UNITS
0521.04	2,724	944
0527.05	5,752	1,938
0527.07	2,306	776
0527.08	5,344	1,744
0527.09	1,413	459
0528.03	4,162	1,586
0528.04	6,928	2,416
0528.05	4,332	1,803
0528.06	7,049	2,403
0529.03	4,079	1,797
0529.04	5,442	2,079
0529.05	4,239	1,964
0529.06	4,445	1,713
0531.01	1,589	566
0531.02	379	235
TOTAL	60,183	22,423

(1) 2010 US Census

The data in Table 3-4 indicates the City's 2010 population was 60,183 with 22,423 housing units, equivalent to 2.68 persons per household.

For determining the average household size the census bureau does not distinguish between single-family and multi-family housing.

SCHOOLS

MARYSVILLE SCHOOLS

The Marysville School District has 22 schools and serves a student/staff population of 13,862. Each school and its student population are shown in Table 3-5.

LAKEWOOD SCHOOLS

The Lakewood School District has five (5) schools and serves a student/staff population of 3,625. Each school and its student population is shown in Table 3-6.

TABLE 3-5

Marysville School District Student and Staff Population: 2002 - 2010

School	Population		
	2002	2003	2010
Elementary Schools			
Allen Creek	677	680	648
Cascade	559	574	504
Grove	-	-	550
Kellogg-Marsh	709	736	576
Liberty	477	483	552
Marshall	589	497	456
Pinewood	596	618	528
Quil Ceda	303	335	528
Shoultes	489	555	420
Sunnyside	660	655	624
Tulalip	271	363	288
Subtotal	**5,330**	**5,496**	**5,674**
Middle Schools			
Cedarcrest	982	956	838
Marysville Junior High (Totem)	993	957	893
Marysville Secondary Campus	-	-	200**
Marysville Middle School	1,082	1,070	1,000
Tenth Street School	156	166	-*
Tulalip Heritage	73	72	-*
Subtotal	**3,286**	**3,221**	**2,931**
High Schools			
Marysville-Pilchuck	2,764	2,978	1,888
Marysville Secondary Campus	-	-	500**
Mountain View (formerly known as Marysville Alternative High School)	287	294	338
Getchell High School	-	-	1,331
Arts & Technology (new)		150	-*
Subtotal	**3,051**	**3,422**	**4,057**
Total Students	11,667	12,139	12,662
Total Staff	1,200	1,200	1,200
TOTAL: Students & Staff	**12,867**	**13,339**	**13,862**

*See Marysville Secondary Campus. **The Marysville Secondary Campus includes the following schools co-located on one campus: Arts & Technology, Tulalip Heritage, and the 10th Street School. Grades 6-12 are served at the Marysville Secondary Campus.

TABLE 3-6

Lakewood School District Student and Staff Population: 2010

School	Population
Elementary Schools	
English Crossing	614
Cougar Creek	500
Lakewood	598
Subtotal	**1,712**
Middle Schools	
Lakewood Middle	843
Subtotal	**843**
High Schools	
Lakewood High	772
Subtotal	**772**
Total Students	3,327
Total Staff	298
TOTAL:	**3,625**

PROJECTED FUTURE POPULATION

Table 3-6 presents population projections for both the City and the existing UGA through the year 2035. The projected population for the City in the year 2035 is 88,448.

TABLE 3-7

Projected Population 2010-2035 (1)

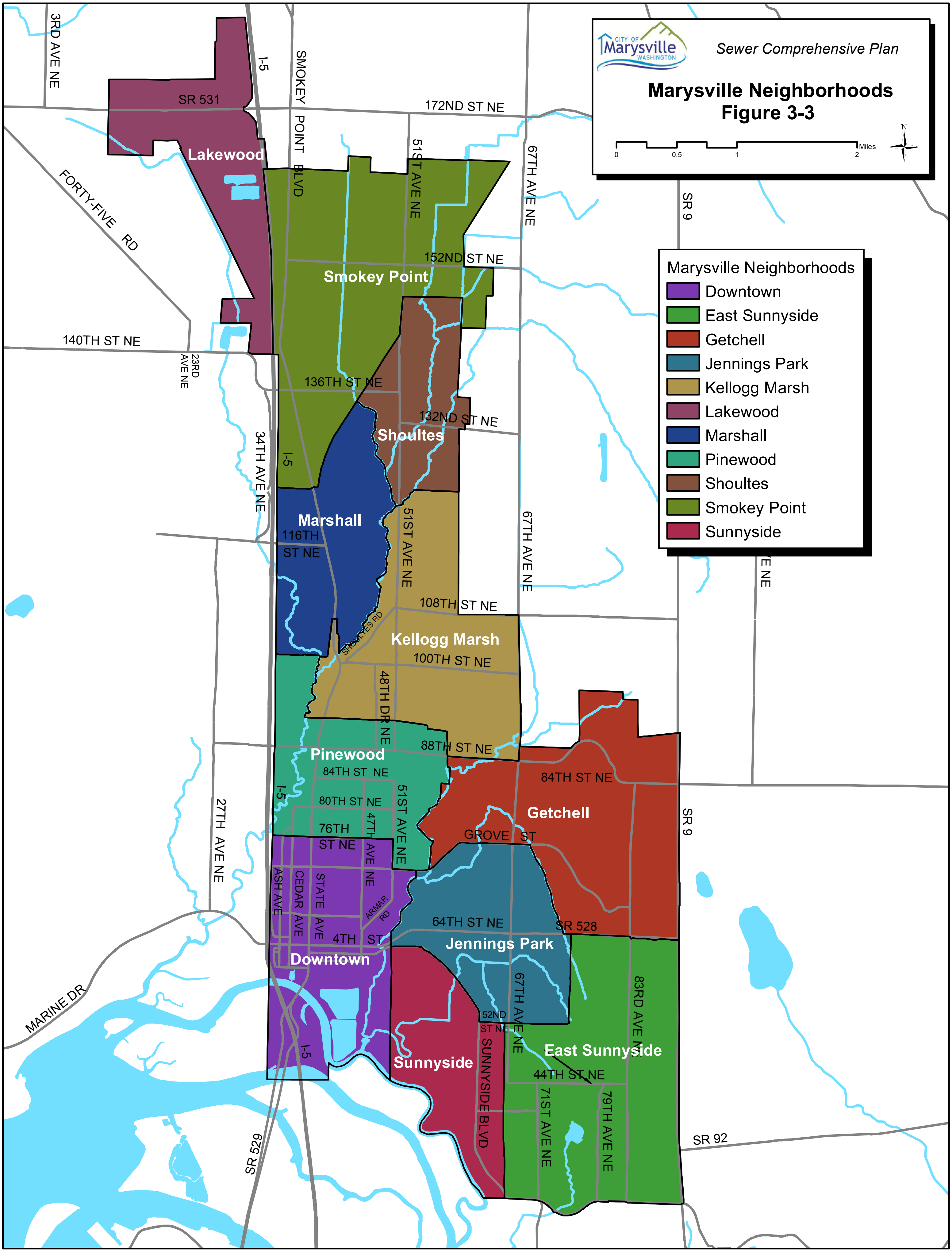
YEAR	UGA POPULATION
2010	60,183
2011	61,491
2012	62,799
2013	64,106
2014	65,414
2015	66,722
2016	68,030
2017	69,338
2018	70,645
2019	71,953
2020	73,261
2021	74,569
2022	75,877
2023	77,184
2024	78,492
2025	79,800
2026	80,665
2027	81,530
2028	82,394
2029	83,259
2030	84,124
2031	84,989
2032	85,854
2033	86,718
2034	87,583
2035	88,448

(1) From Snohomish County Tomorrow Vision 2040 Preliminary Growth Distribution Working Paper, May 12, 2011

NEIGHBORHOOD POPULATION PLANNING

In addition to the UGA population projections shown in Table 3-7, the City's Community Development Department has prepared a population capacity analysis for 11 individual neighborhood planning areas as shown in Figure 3-3 and Table 3-8. Table 3-8 presents the additional number of housing units and the current additional population capacity as of 2011.

For the analysis shown in Table 3-8, the City's Community Development Department uses a unit occupancy rate of 3.0 persons per dwelling unit (DU) for single-family population and 2.0 persons per dwelling unit for multi-family. Census data presented in Tables 3-4 and 3-5 provides an average household size of 2.68 persons per household but does not distinguish between single-family and multi-family households.



CITY OF Marysville WASHINGTON
Sewer Comprehensive Plan
Marysville Neighborhoods
Figure 3-3
0
0.5
1
2
Miles
N
Marysville Neighborhoods
Downtown
East Sunnyside
Getchell
Jennings Park
Kellogg Marsh
Lakewood
Marshall
Pinewood
Shoultes
Smokey Point
Sunnyside
Lakewood
Smokey Point
Shoultes
Marshall
Kellogg Marsh
Pinewood
Getchell
Jennings Park
Downtown
Sunnyside
East Sunnyside
3RD AVE NE
I-5
SMOKEY POINT BLVD
SR 531
172ND ST NE
51ST AVE NE
67TH AVE NE
SR 9
FORTY-FIVE RD
152ND ST NE
140TH ST NE
23RD AVE NE
136TH ST NE
132ND ST NE
34TH AVE NE
116TH ST NE
108TH ST NE
SHOULTES RD
100TH ST NE
48TH DR NE
88TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
47TH AVE NE
27TH AVE NE
GROVE ST
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
64TH ST NE
SR 528
4TH ST
MARINE DR
52ND ST NE
SUNNYSIDE BLVD
44TH ST NE
71ST AVE NE
79TH AVE NE
83RD AVE NE
SR 92
SR 529

TABLE 3-8

UGA Additional Population Capacity(1)

NEIGHBORHOOD	ADDITIONAL SINGLE FAMILY HOUSING UNITS	ADDITIONAL MULTI-FAMILY HOUSING UNITS	ADDITIONAL SINGLE FAMILY POPULATION	ADDITIONAL MULTI-FAMILY POPULATION	TOTAL ADDITIONAL POPULATION CAPACITY	% OF TOTAL
Downtown	101	913	303	1,826	2,129	6.0%
East Sunnyside	2,776	2,210	8,328	4,420	12,748	35.7%
Getchell	1,451	23	4,353	46	4,399	12.3%
Jennings Park	109	0	327	0	327	0.9%
Kellogg Marsh	743	59	2,229	118	2,347	6.6%
Lakewood	552	2,154	1,656	4,308	5,964	16.7%
Marshall	376	1,293	1,128	2,586	3,714	10.4%
Pinewood	232	249	696	498	1,194	3.3%
Shoultes	253	0	759	0	759	2.1%
Smokey Point	19	518	57	1,036	1,093	3.1%
Sunnyside	347	0	1,041	0	1,041	2.9%
Total	6,959	7,419	20,877	14,838	35,715	100.0%

(1) Updated from City of Marysville/Snohomish County 2007 Capacity Analysis

NON-UGA SEWERED AREAS

There are three areas within the Rural Utility Service Area (RUSA) that are currently served by the sewer collection system but are located outside of the Urban Growth Area. Agreements covering these areas are included in Appendix B. Current and future population estimates presented in Table 3-7 do not include these areas. Population for each of these areas has been estimated from aerial photographs. Each area is briefly described below:

- **Smokey Point:** A 504-acre area of Smokey Point is served by Marysville although it is located within the City of Arlington's UGA. It is bounded by I-5 on the west, 180th Street NE on the north, 43rd Avenue NE on the east, and 164th Street NE on the south. Approximately 50 percent of this area is classified commercial with the remainder single-family residential. The estimated 2010 population for the Smokey Point area is 2,560.

- **Mountain View Shores:** This subdivision is located at 104th Street NE west of I-5 and contains 36 lots. A private pump station serves this subdivision. The estimated 2010 population for the Mountain View Shore area is 84.

- **Tulalip Area:** This area is located west of I-5 and is connected to the sewer system through the Marysville West Pump Station. This area contains the Tierra Bonita subdivision with about 240 lots, and a commercial area of the Tulalip Tribe, and two schools. The estimated 2010 population in the Tulalip area served by the sewer system is 1,038. The Tulalip Tribe has recently constructed a new treatment facility north of this area, which serves other parts of the Tulalip area. A purchase agreement for the Marysville West Pump Station is currently being negotiated between the City of Marysville and the Tulalip Tribes. Purchase of the pump station by the Tribes is anticipated to take place in the near future, therefore, this area may no longer be part of the City's sewer system.

SEWER CONNECTIONS

Table 3-9 provides the average number of sewer service connections by customer class for 2011, based on billing records provided by the City. As shown in Table 3-9, the number of sewer connections throughout 2011 was 18,421. The majority of the sewer service connections are in the City Single Family Residential (13,885 connections) and Rural Single Family Residential (2,932 connections) customer classes. The term *City* designates customers within the City limits, while *Rural* indicates customers outside the City limits but within the UGA.

TABLE 3-9

2011 Sewer Service Connections

RATE CODE	DESCRIPTION	CUSTOMERS
S01	City Single Family Residential	13,885
S02	Rural Single Family Residential	2,932
S03	City Multi-Family	686
S04	Rural Multi-Family	40
S05	City Motel/Hotel	4
S06	Rural Motel/Hotel	5
S10	Rural Overnight Camping	1
S35	City Commercial Class 1	7
S38	City Commercial Class 2	20
S39	Rural Commercial Class 2	2
S41	City Commercial Class 3	655
S42	Rural Commercial Class 3	125
S50	City Commercial Class 6	3
S51	Rural Commercial Class 6	2
S53	City Class 3 Restaurant w/Surcharge	2
S54	Rural Class 3 Restaurant w/Surcharge	1
S55	City Restaurant w/o GT No Surcharge	17
S56	Rural Restaurant w/o GT No Surcharge	1
S60	Monthly Rural Class 3	2
S63	Monthly Rural Hotel/Motel	1
S65	School	30
	TOTAL	**18,421**

CURRENT SEWER SERVICE AREA POPULATION

Table 3-10 provides the estimated average population connected to the sewer in 2011, based on City of Marysville billing records. As shown in Table 3-10, approximately 48,451 single-family and multi-family residents within the UGA have sewer service and approximately 2,092 single-family and multi-family residents located outside of the UGA, but within the UPA, have sewer service. The total estimated population served by the City of Marysville sewer system in 2011 is 50,543.

TABLE 3-10

Marysville 2011 Estimated Sewer Service Population

TYPE	HOUSING UNITS	PERSONS PER HOUSEHOLD	OCCUPATION RATE	POPULATION
Single Family UGA	15,005	3	0.95	42,764
Multi-Family UGA	2,993	2	0.95	5,687
Single Family Non UGA	564	3	0.95	1,607
Multi-Family Non UGA	255	2	0.95	485
TOTAL				50,543

PROJECTED SEWER SERVICE AREA POPULATION

The projected year 2017 and 2031 sewer service area population is summarized in Table 3-11. In developing these projections the following assumptions were made:

- All of the currently unconnected population in the City limits connects to the sewer system by 2031 at a constant rate.
- Half of the currently unconnected rural UGA population connects to the sewer system by 2031 at a constant rate.
- The population growth within the UGA will follow the pattern presented in Tables 3-7 and 3-8.
- All new single-family and multi-family residences within the City's UGA will connect to the sewer system.

TABLE 3-11

Projected Sewer Service Population Summary

	2011	2017	2031
UGA Population*	61,491	69,338	84,989
Service Area Population including Non UGA**	64,669	72,616	87,757
Service Area Population Connected to Sewer	50,543	62,250	87,757
Percent Increase		23.16%	73.63%
Percent Connected	78%	86%	100%

*UGA population from Snohomish County Tomorrow Vision 2040 Preliminary Growth Distribution Working Paper, May 12, 2011
**Service Area population taken from sewer model loading tables

Ultimate Buildout Population

Population projections presented in Tables 3-7 and 3-8 address current and future population for existing corporate City limits and UGA. The buildout population for the existing UGA is shown in the summary below:

60,183 (Existing population)
+ 35,715 (Additional population)
95,898 buildout population from UGA(1)

(1) Information from the City of Marysville/Snohomish County 2007 Capacity Analysis.

Future expansion of the UGA boundary would include the six planning areas identified on Figure 2-2. The UGA may be expanded to include part, or all of these areas. For the ultimate buildout population estimate, it is assumed that the UGA will include all six areas.

The basis for the ultimate buildout population is a combination of net buildable acreage, allowable development density, and the population per dwelling unit. Each of these factors is discussed below for areas outside the current UGA boundary.

Net Acreage

Each of the six planning areas shown in Figure 3-4 along with the "unbuildable" lands identified as steep slopes, wetlands, lakes and other critical areas. Removing the "unbuildable" lands from the total acreage leaves the maximum buildable acreage.

The City's Community Development Department estimates a net reduction factor of about 44 percent to allow for unbuildable lands, roads, public use, and right-of-ways. To reach this reduction factor, the maximum buildable acreage is reduced by 30 percent for roads, public use, and right-of-ways.

Another adjustment covers Planning Area #5. This planning area is within the jurisdiction of the Tulalip Tribe. Only limited future development is expected consisting of "infill" of areas currently sewered.

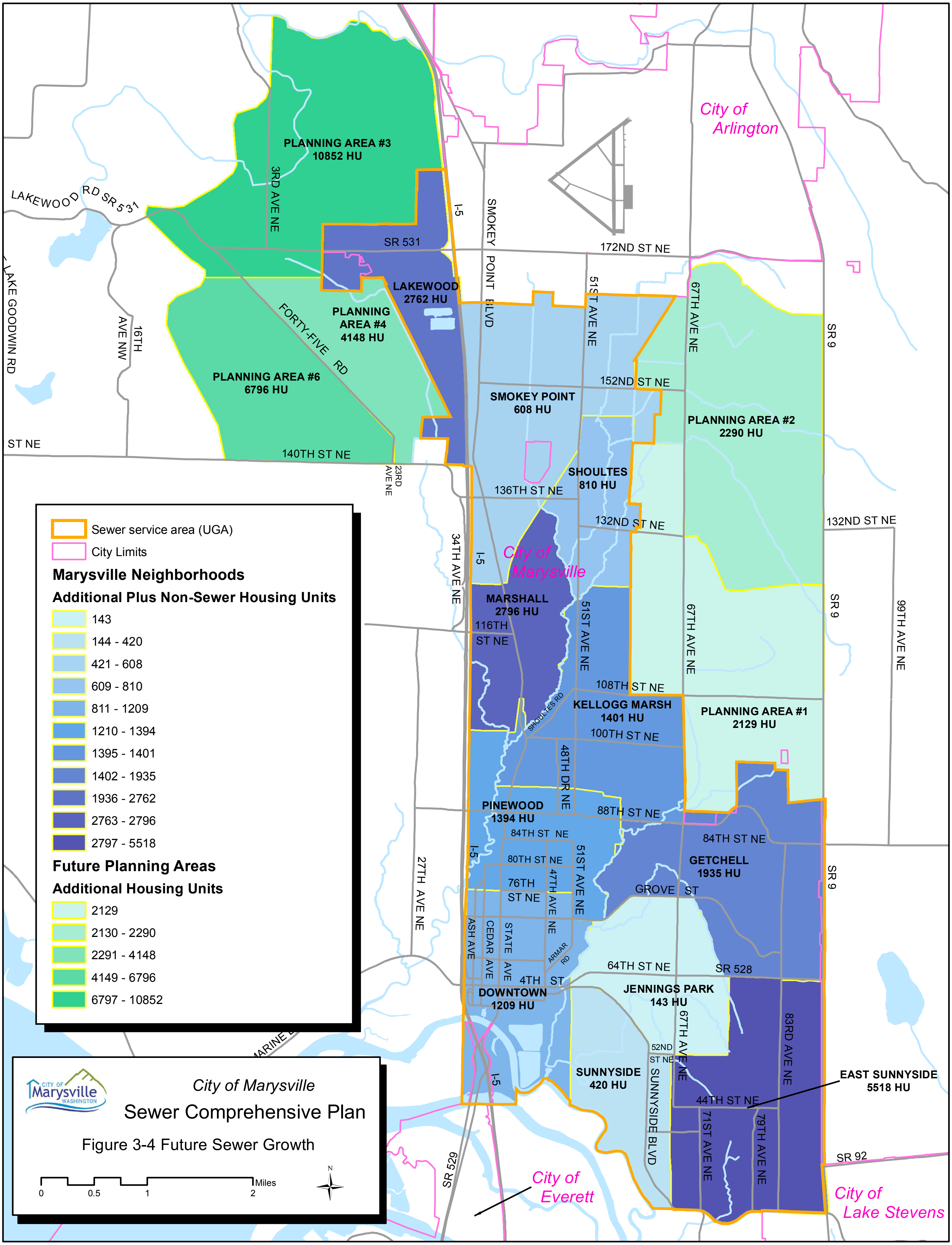
In addition to these reductions, Planning Areas #1 and #2 located north and east of the City are expected to remain substantially rural. According to the City's Community Development Department, about 1,950 acres would develop only at 0.2 dwelling units per acre.

Development Density

Recent development trends favor smaller lot sizes (i.e., 3,500 square feet), which is equivalent to 8 to 10 dwelling units per acre. Actual development in the nearby rural areas of the Lake Stevens Sewer District is closer to 6.5 to 8.0 (average 7.25) dwelling units per acre due to lot averaging. For the ultimate buildout population, the development density will cover a range of 0.2 (rural) to a higher density of 7.25 dwelling units per acre. The majority of Planning Areas #1 and #2 will remain rural at 0.2 Du/acre. For the remainder of these two planning areas, a development density of 4.5 Du/acre will be utilized. A higher development density of 7.25 Du/acre will be utilized for Planning Areas #3, #4, and #6.

Household Population

For single-family residences, a rate of 3.0 person per household was used. For multi-family units, it is 2.0 persons per household. Table 3-12 incorporates each of the factors for net acreage, development density and household population to develop the ultimate buildout population. Including the existing UGA, areas served by agreements, and the planning areas, the estimated ultimate build out population is 161,554. As shown in Table 3-12, the total acreage is 10,436 acres with a net average of 6,015 acres, a reduction of 58 percent.



City of Arlington
PLANNING AREA #3
10852 HU
LAKEWOOD RD SR 531
3RD AVE NE
I-5
SMOKEY POINT BLVD
SR 531
172ND ST NE
LAKE GOODWIN RD
16TH AVE NW
LAKEWOOD
2762 HU
PLANNING AREA #4
4148 HU
FORTY-FIVE RD
51ST AVE NE
67TH AVE NE
SR 9
PLANNING AREA #6
6796 HU
152ND ST NE
SMOKEY POINT
608 HU
PLANNING AREA #2
2290 HU
ST NE
140TH ST NE
23RD AVE NE
SHOULTES
810 HU
136TH ST NE
132ND ST NE
132ND ST NE
34TH AVE NE
City of Marysville
MARSHALL
2796 HU
116TH ST NE
99TH AVE NE
108TH ST NE
KELLOGG MARSH
1401 HU
SHOULTES RD
100TH ST NE
PLANNING AREA #1
2129 HU
48TH DR NE
PINEWOOD
1394 HU
88TH ST NE
84TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
47TH AVE NE
GETCHELL
1935 HU
GROVE ST
27TH AVE NE
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
64TH ST NE
SR 528
4TH ST
DOWNTOWN
1209 HU
JENNINGS PARK
143 HU
MARINE DR
52ND ST NE
83RD AVE NE
SUNNYSIDE
420 HU
SUNNYSIDE BLVD
EAST SUNNYSIDE
5518 HU
44TH ST NE
71ST AVE NE
79TH AVE NE
SR 529
SR 92
City of Everett
City of Lake Stevens
Sewer service area (UGA)
City Limits
Marysville Neighborhoods
Additional Plus Non-Sewer Housing Units
143
144 - 420
421 - 608
609 - 810
811 - 1209
1210 - 1394
1395 - 1401
1402 - 1935
1936 - 2762
2763 - 2796
2797 - 5518
Future Planning Areas
Additional Housing Units
2129
2130 - 2290
2291 - 4148
4149 - 6796
6797 - 10852
City of Marysville Washington
City of Marysville
Sewer Comprehensive Plan
Figure 3-4 Future Sewer Growth
0 0.5 1 2 Miles
N

TABLE 3-12

2031 Capacity Population

Planning Area	Total Acres	Buildable Acres	Net Acres	Density	PPH	Population
#1 Low	1,653.6	1,258.9	881.3	0.2	2.6	458
#1 Medium	814.4	620.1	434.0	4.5	2.6	5,078
#2 Low	1,702.5	1,432.5	1,002.7	0.2	2.6	521
#2 Medium	838.5	666.6	466.6	4.5	2.6	5,459
#3	2,539.7	2,138.4	1,496.9	7.5	2.6	29,189
#4	903.1	817.3	572.1	7.5	2.6	11,156
#5	570.8	320.7	224.5	0.0	0.0	0
#6	1,413.1	1,339.0	937.3	7.5	2.6	18,277
Subtotal Planning Areas						70,140
UGA Capacity						88,032*
Non-UGA						3,382
Total Capacity						161,554

** Snohomish County Buildable Lands Report 2007*

CHAPTER 4

REGULATORY REQUIREMENTS

INTRODUCTION

Regulatory requirements have been used in developing the design criteria for improvements to Marysville's wastewater collection, treatment, and disposal systems. The purpose of this chapter is to identify and summarize the regulations that are applicable to the planning, design, and approval of the capital improvements discussed in this Plan.

This Chapter does not describe each regulation in detail; rather, it addresses important elements of the regulations that affect the planning and design process. Subsequent sections of this Plan address technical requirements of the regulations at a level of detail appropriate for the evaluation provided by that section. For instance, Chapter 9 contains a discussion of biosolids regulations.

FEDERAL AND STATE STATUTES, REGULATIONS AND PERMITS

This section provides a summary of various state and federal laws that may affect wastewater system construction and operations, as well as other relevant permits, programs, and regulations.

FEDERAL CLEAN WATER ACT

The Federal Water Pollution Control Act is the principal law regulating the water quality of the nation's waterways. Originally enacted in 1948, it was significantly revised in 1972 and 1977, when it was given the common title "Clean Water Act" (CWA). The CWA has been amended several times since 1977. The 1987 amendments replaced the Construction Grants program with the State Revolving Fund (SRF), which provides low-cost financing for a range of water quality infrastructure projects.

The National Pollutant Discharge Elimination System (NPDES) is established by Section 402 and subsequent amendments of the CWA. The Department of Ecology (Ecology) administers NPDES permits for the United States Environmental Protection Agency (EPA). Most NPDES permits have a five-year life span and place limits on the quantity and quality of pollutants that may be discharged.

The City's current NPDES permit, No. WA002249-7, is attached as Appendix A. The City's current NPDES permit effluent limits are shown in Table 5-6 in Chapter 5.

Condition S.2 of the City's permit lists the WWTP's required testing schedule. In addition to typical monitoring requirements such as influent and effluent flow, $CBOD_5$, TSS, etc., the City must monitor for effluent ammonia and whole effluent toxicity.

Condition S.4 of the NPDES permit requires the City to prepare a plan to maintain adequate capacity when flows and loadings to the WWTP exceed 85 percent of design capacity. Condition S.4 also specifies the design capacity of the WWTP. The WWTP's design capacity for maximum month BOD_5 loading is 20,143 lbs/day, and the design capacity for maximum month TSS loading is 24,229 lbs/day. The flow capacity for the WWTP is 12.7 million gallons per day (mgd).

Section 303 of the CWA established the Total Maximum Daily Load (TMDL) program. Under this program, states must establish a list of water bodies that do not achieve water quality standards even with "all known available and reasonable technology (AKART)" in place. In such situations, Ecology conducts a TMDL analysis to determine the capacity of the water body to absorb pollutants and allocates pollutant loads among point and nonpoint discharges. Based on this loading capacity, "waste load allocations" are established for different pollutant sources within the watershed. Additional information about the effect of TMDLs on the City's wastewater effluent discharge is provided later in this chapter.

Section 307 of the CWA established the National Pretreatment Program. This program is designed to protect publicly owned treatment works (POTWs) and limits the amount of industrial or other non-residential pollutant discharged to municipal sewer systems.

PROPOSED EPA CAPACITY, MANAGEMENT OPERATION AND MAINTENANCE REGULATIONS

EPA has proposed a new round of regulations regarding sewer system Capacity, Management Operation and Maintenance (CMOM). Although the regulations have not been formally adopted by EPA, some municipalities are anticipating the adoption and have moved forward with implementation. CMOM focuses on the failure of collection systems to have a program for long-term finance and repair. This has resulted in sanitary sewer overflows (SSO) that EPA has proposed to address under its authority granted by the federal CWA.

In general the CMOM requirements can be broken into the following areas:

1. General performance standards including system maps, information management, and odor control.

2. Program documentation including the goals, organizational and legal authority of the organization operating the collection system.

3. An overflow response plan, which requires response in less than one hour and is demonstrated to have sufficient and adequate personnel and equipment, etc. Estimated volumes and duration of overflows must be accurately measured and reported to the regulatory agency.

4. System evaluation requires that the entire system be cleaned on a scheduled basis (for example, once every 5 years), be regularly inspected through TV work and that a program for short and long term rehabilitation replacement be generated. EPA has proposed, as a rule of thumb, a 1-1/2 to 2 percent system replacement rate which implies that an entire collection system is replaced somewhere in the range of a 50 – 70 year time period.

5. A capacity assurance plan that will use flow meters to model I&I, ensure pump stations are properly operated and maintained and that source control is maintained.

6. A program for self-audit to evaluate and adjust performance.

7. A communication program to communicate problems, costs, and improvements to the public and decision-makers.

EPA is considering some changes in design standards for collection systems including requiring that sanitary sewer overflows not occur except in extreme storms. They have also decided that they will not predefine what that type of storm is, leaving that decision to the design engineer.

Proposed CMOM requirements are discussed in greater detail in Chapter 10.

BIOSOLIDS

Chapter 9 of this Plan provides a discussion of the regulatory requirements relating to biosolids treatment and management.

FEDERAL ENDANGERED SPECIES ACT

On March 24, 1999 the National Marine Fisheries Service (NMFS) listed the Puget Sound Chinook as "threatened" under the Endangered Species Act (ESA) and reaffirmed on June 28, 2005. National Oceanic and Atmospheric Administration (NOAA) Fisheries issued results of a five year review on August 15, 2011, and concluded that this species should remain listed as threatened. On June 10, 1998, the USFWS listed the Bull Trout as "threatened." ESA listings are expected to significantly impact activities that affect salmon and trout habitat, such as water use, land use, construction activities, and wastewater disposal.

The National Marine Fisheries Service (NMFS) has listed a number of "Evolutionarily Significant Units" of chinook salmon. In addition, the United States Fish and Wildlife Service (USFWS) listed the Bull Trout as "threatened" during the summer of 1998. ESA listings are expected to significantly impact activities that affect salmon and trout habitat, such as water use, land use, construction activities, and wastewater disposal. Impacts to the greater Marysville area may include longer timelines for permit applications, and more stringent regulation of construction impacts and activities in riparian corridors.

In response to existing and proposed ESA listings of salmon, steelhead, and trout species throughout Washington State, Governor Locke established the Office of Salmon Recovery in 1997 to direct the State's salmon recovery efforts. Rather than attempting to avert additional ESA listings, the Statewide Strategy intends to provide local input into, and hopefully maintain some local control over the salmon recovery regulatory processes that will inevitably affect the majority of Washington State. The Statewide Strategy was submitted to NMFS in 1999 for possible inclusion in the Section 4(d) rule. Before 2000, NOAA Fisheries Service had simply adopted 4(d) rules that prohibited take of threatened species. In a salmon and steelhead 4(d) rule singed in July of 2000, the agency pioneered a new approach. It applied take prohibitions to all actions except those within 13 "limits" to the rules (described in detail in the rules) where the specified categories of activities contribute to conserving listed salmon.

In order to minimize liability under the ESA, local governments need to demonstrate that their land use regulations will not result in a prohibited "take" of a listed species, including adverse modification of critical habitat. Impacts to the City may include longer timelines for permit applications, and more stringent regulation of construction impacts and activities in riparian corridors. Additionally, the City of Marysville's wastewater treatment plant discharges to Steamboat Slough, a part of the Snohomish River system that flows into Puget Sound. Salmon and bull trout are expected to be present in the vicinity of the outfall and could potentially impact future WWTP and outfall modifications. In an effort to minimize the impact to critical fish habitat in Steamboat Slough, the City of Marysville constructed a pipeline to the City of Everett's South End Pump Station during the 2004 treatment plant upgrades. From Everett's pump station, the effluent is discharged to the Deep Marine Outfall in Port Gardner Bay. Marysville discharges all of its flow to Everett's pump station during periods of low river flow (July through October).

RECLAIMED WATER STANDARDS

The standards for the use of reclaimed water are outlined in RCW 90.46 and in a separate document published by the Washington State Departments of Health and Ecology entitled "Water Reclamation and Reuse Standards." Reclaimed water is the effluent derived in any part from wastewater from a wastewater treatment system that has been adequately and reliably treated, such that it is no longer considered wastewater and is suitable for a beneficial use or a controlled use that would not otherwise occur. The legislature has declared that "the utilization of reclaimed water by local communities for domestic, agricultural, industrial, recreational, and fish and wildlife habitat creation and enhancement purposes (including wetland enhancement) will contribute to the peace, health, safety, and welfare of the people of the State of Washington." RCW 90.48.112 requires consideration of reclaimed water in general sewer plans. Chapter 8 provides an evaluation of reclaimed water opportunities for the City of Marysville.

The *Water Reclamation and Reuse standards* define the water quality standards for reclaimed water. A Class "A" reclaimed water treatment facility must meet four minimum requirements, as follows:

> **Continuously Oxidized:** Wastewater that at all times has been stabilized such that the monthly average BOD_5 and TSS are less than 30 mg/L, is non-putrescable, and contains dissolved oxygen.
>
> **Continuously Coagulated:** Oxidized wastewater that at all times has been treated by a chemical equally effective method to destabilize and agglomerate colloidal and finely suspended mater prior to filtration.
>
> **Continuously Filtered:** Oxidized and coagulated wastewater that at all times has been passed through a filtering media so that the turbidity of the filtered effluent does not exceed an average of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.
>
> **Continuously Disinfected:** Oxidized, coagulated, and filtered wastewater that at all times has been disinfected to destroy or inactivate pathogenic organisms. A group of indicator microorganisms, coliform bacteria, are used to measure the effectiveness of the disinfection process. The Class "A" reclaimed water standard is a total coliform density of 2.2 per 100 milliliters (ml) for the median of the last seven days of samples, with no sample having a density greater than 23 per 100 ml.

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) was established in 1969 and requires federal agencies to determine environmental impacts on all projects requiring federal permits or funding. Federally delegated activities such as NPDES permits or Section 401 Certification are considered state actions and do not require NEPA compliance. If a project involves federal action (through, for example, an Army Corps of Engineers Section 404 permit), and is determined to be environmentally insignificant, a Finding of No Significant Impact (FONSI) is issued, otherwise an Environmental Impact Statement (EIS) is required. NEPA is not applicable to projects that do not include a federal component that would trigger the NEPA process.

FEDERAL CLEAN AIR ACT

The Federal Clean Air Act requires all wastewater facilities to plan to meet the air quality limitations of the region. The City falls in the jurisdiction of the Puget Sound Clean Air Agency. An air quality permit for the City's WWTP is not required.

STATE STATUTES, REGULATIONS AND PERMITS

STATE WATER POLLUTION CONTROL ACT

The intent of the state Water Pollution Control Act is to "maintain the highest possible control standards to ensure the purity of all waters of the state consistent with public health and the enjoyment…the propagation and protection of wildlife, birds, game, fish, and other aquatic life, and the industrial development of the state." Under the Revised Code of Washington (RCW) 90.48 and the Washington Administrative Code (WAC) 173-240, Ecology issues permits for wastewater treatment facilities and also land application of wastewater under WAC 246-271.

Submission of Plans and Reports for Construction of Wastewater Facilities, WAC 173-240

Prior to construction or modification of domestic wastewater facilities, engineering reports and plans, and specifications must be submitted to and approved by Ecology. This regulation outlines procedures and requirements for the development of an engineering report, which thoroughly examines the engineering and administrative aspects of a domestic wastewater facility project. This regulation defines a facility plan as described in federal regulations, 40 CFR Part 35, as an engineering report.

Key provisions of WAC 173-240 are provided below.

- An engineering report for a wastewater facility project must contain everything required for a general sewer plan unless an up-to-date general sewer plan is on file with Ecology.

- An engineering report shall be sufficiently complete so that plans and specifications can be developed from it without substantial changes.

- A wastewater facility engineering report must be prepared under the supervision of a professional engineer.

Criteria for Sewage Works Design, Washington State Department of Ecology (Orange Book)

Ecology has published design criteria for collection systems and wastewater treatment plants. While these criteria are not legally binding, their use is strongly encouraged by Ecology since the criteria are used by the agency to review engineering reports for upgrading wastewater treatment systems. These design criteria, commonly referred to as the "Orange Book," primarily emphasize unit processes through secondary treatment, and also includes criteria for planning for, and design of, wastewater collection systems. Any expansion or modification of the City of Marysville's collection system and/or treatment plant will require continued conformance with Ecology criteria.

Certification of Operators of Wastewater Treatment Plants, WAC 173-230

Wastewater treatment plant operators are certified by the State water and wastewater operators' certification board. The operator assigned for the overall responsibility of operation of a wastewater treatment plant is defined by WAC 173-230 as the "operator in responsible charge." This individual must be State certified at or above the classification rating of the plant. The City's wastewater treatment plant is currently assigned a Class III rating and the operating staff assigned to the plant has the required certification.

WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF WASHINGTON, CHAPTER 173-201A WAC

Basis of Regulations

The State of Washington has authority under the federal Water Pollution Control Act, also known as the Clean Water Act (CWA), to establish and administer programs to meet the requirements of the CWA. Under RCW 98.40.35, the Washington Department of Ecology has the authority to establish "rules and regulations relating to standards of quality for waters of the State and for substances discharged therein..." The state of Washington also implements the NPDES program created under the CWA.

Description of Regulations

WAC 173-201A establishes water quality standards within the state of Washington. The State adopted revised water quality standards in 2006. The standards are based on two objectives: protection of public health and enjoyment, and protection of fish, shellfish, and wildlife. For each surface water body in the state, the revised standards assign specific uses, such as aquatic life, recreation, or water supply. Water quality standards have been developed for each use, for parameters such as fecal coliform, dissolved oxygen, temperature, pH, turbidity, and toxic, radioactive, deleterious substances. The water uses that are defined in the standards for freshwater are summarized as follows:

Aquatic life uses

- Char
- Salmon and trout spawning, core rearing, and migration
- Salmon and trout spawning, non-core rearing, and migration
- Salmon and trout rearing and migration only
- Non-anadromous interior redband trout
- Indigenous warm water species

Recreational uses

- Extraordinary primary contact recreation
- Primary contact recreation
- Secondary contact recreation

Water supply uses

- Domestic water supply
- Agricultural water supply
- Industrial water supply
- Stock watering

Miscellaneous uses

- Wildlife habitat
- Harvesting
- Commerce and navigation
- Boating
- Aesthetics

The water uses that are defined in the standards for marine waters include:

Aquatic life uses

- Extraordinary quality
- Excellent quality
- Good quality
- Fair quality

Shellfish harvesting and Recreational uses

- Primary contact recreation
- Secondary contact recreation

Miscellaneous uses

- Wildlife habitat
- Harvesting
- Commerce and navigation
- Boating
- Aesthetics

Water Quality Classification

One of the City's discharge locations is to Steamboat Slough that is a tributary of the Snohomish River. The Snohomish River is classified in WAC 173-201A-602 as having the following uses:

- Aquatic Life Use: Non-core salmon/trout rearing and migration
- Recreation Use: Primary contact recreation
- Water Supply Uses: Domestic water supply, agricultural water supply, industrial water supply, stock watering
- Miscellaneous Uses: Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics

Water quality criteria for the salmon and trout spawning use is shown in Table 4-1:

TABLE 4-1

Water Quality Criteria for the Salmon and Trout Spawning, Non-core Rearing and Migration Use

Parameter	Surface Water Criteria Value
Dissolved Oxygen	>8.0 mg/L
Temperature	17.5 degrees C (7-day average of daily maximum), (1) with no increase greater than t=28/(T+5) or (2) if natural temperature is >17.5 degrees C, then no increase >0.3 degrees C
pH	Not outside the range of 6.5 to 8.5 standard units, with no human-caused variation >0.5 standard units
Turbidity	<5 NTU over background (background <50 NTU) <10 percent increase over background (background >50 NTU)
Total dissolved gas	<110 percent of saturation

The bacterial water quality criteria for the Snohomish River, as shown in Table 4-2, is based on the assigned recreational use for freshwater.

TABLE 4-2

Water Quality Criteria for the Freshwater Primary Contact Recreational Use

Parameter	Surface Water Criteria Value
Fecal Coliform	100 fecal coliform colonies/100 mL

Water supply and miscellaneous uses do not have additional numerical criteria.

The water quality standards also have narrative criteria regarding toxic, radioactive, otherwise deleterious materials, or materials that impair aesthetics. These materials are prohibited in concentrations that affect aquatic life, human health, or impair aesthetics.

Numeric criteria for 29 toxic substances are listed in WAC 173-201A-040. Criteria are listed for both an acute and chronic basis and for certain substances (e.g., metals, chlorine, and ammonia), the criteria must be calculated as a function of receiving water pH, hardness, and whether salmonids are present.

The water quality standards allow for variances and site-specific criteria to be developed on an individual basis.

To remove a use from the list of uses for which a water body is protected, a use attainability analysis (UAA) must be performed. The UAA must demonstrate that the use does not exist in the water body or would not be attainable. The proposed change to the assigned uses must be consistent with federal laws and subject to a public involvement process and include a consultation with tribes.

Mixing Zones

WAC 173-201A-100 has provisions for mixing zones for a permitted discharge. Deviations from water quality standards for the surface water are allowed within the mixing zone. Mixing zones are allowed under the following conditions:

1. All known, available, and reasonable treatment (AKART) technology is applied prior to discharge to the mixing zone.

2. Water quality is not violated outside the mixing zone boundary.

3. When the potential does not exist for damage to sensitive ecosystem or aquatic habitat, adverse public health effects, or interference with characteristic uses of the water.

4. Chronic toxicity criteria are met within a mixing zone that does not exceed 25 percent of the river width, use more than 25 percent of the river flow,

and does not extend more than 100 ft upstream or 300 ft downstream (plus the depth of water over the discharge port).

5. Acute toxicity criteria are met within a mixing zone that does not exceed 2.5 percent of the river flow, does not occupy more than 2.5 percent of the width of the river, and does not extend beyond 10 percent of the distance towards the upstream and downstream boundaries of an authorized mixing zone.

The City's mixing zone is described in its NPDES Permit No. WA-002249-7 included in Appendix A.

Anti-degradation policy

The anti-degradation policy aims to maintain the highest possible quality of water in the State, by preventing the deterioration of water bodies that currently have higher quality than the water quality standards require. The revised water quality standards define three tiers of waters in the anti-degradation policy.

Tier I water bodies are those with violations of water quality standards, from natural or human-caused conditions. The focus of water quality management is on maintaining or improving current uses, and preventing any further human-caused degradation.

Tier II water bodies are those of higher quality than required by the water quality standards. The focus of the policy is on preventing degradation of the water quality and to preserve the excellent natural qualities of the water body. New or expanded actions are not allowed to cause a "measurable change" in the water quality, unless they are demonstrated to be "necessary and in the overriding public interest."

New or expanded actions that may cause a measurable change in water quality must conduct a Tier II review. For increased wastewater treatment plant discharges, this review will take place as part of the NPDES permit modification process. Measurable change, for the purpose of the anti-degradation policy, is defined as follows:

- Temperature increase greater than 0.3 degrees C
- Dissolved oxygen concentration decrease greater than 0.2 mg/L
- Bacteria level increase greater than 2 CFU/100 mL
- pH change greater than 0.1 standard units
- Turbidity increase greater than 0.5 NTU
- Any detectable change in concentration of toxic or radioactive substances, which include ammonia and chloride.

A new or expanded action may be determined by the Ecology to be necessary and in the overriding public interest based on a review of the following factors:

- Economic benefits, such as job creation
- Providing or contributing to necessary social services
- Status as a demonstration project using innovative technical or management approaches that produce a significant improvement over AKART
- Prevention or remediation of environmental or public health threats
- Societal or economic benefits of better health protection
- The loss of assimilative capacity for future industry or development
- The loss of benefits associated with the current high water quality, such as fishing or tourism uses.

The new or expanded action would be allowed to measurably reduce the water quality only if it is demonstrated that the action has selected the combination of site, technical and managerial approaches that will minimize the effect on water quality. Alternative approaches that must be evaluated include:

- Pollution prevention or source control to reduce toxic compound discharges
- Reuse or recycling of wastewater
- Water conservation to minimize production of wastewater
- Land application or infiltration to reduce surface water discharges
- Alternative or enhanced treatment technologies
- Improved operation and maintenance of existing facilities
- Seasonal or controlled discharge to avoid critical water quality conditions
- Water quality offsets with another water quality action (point or non-point source), providing no net decrease of water quality

Tier III water bodies are specially designated as outstanding resource waters. The revised standards do not initially define Tier III water bodies; however, the standards allow the public or the Ecology to nominate water bodies for inclusion in the Tier III class. There are two classes within Tier III: Tier III(A) prohibits all future degradation, while Tier III(B) allows future degradation that does cause a "measurable change" to occur from well-controlled activities.

Total Maximum Daily Load (TMDL) Studies

Assimilative capacity is a term that describes the surface water's ability to accept waste loadings without a permanent degradation of water quality. Ecology has conducted and completed waste load capacity studies, also known as Total Maximum Daily Load (TMDL) studies, for several major watersheds in the State of Washington. TMDL studies are used to determine the assimilative capacity of watersheds that are noted as "impaired" for having temperature or concentrations of a pollutant that are too high, such as BOD_5; or potentially toxic pollutants, such as chlorine, ammonia, and metals. TMDL studies for dissolved oxygen have been conducted in the Snohomish River, impacting

CBOD, and ammonia effluent limitations for the major dischargers to the river system, including Marysville.

Effluent limits for ammonia-N and CBOD were included in the 2005 permit based on Ecology's findings in the Snohomish River Estuary TMDL study. The City's WWTP discharges to Steamboat Slough, a branch of the Snohomish River, and therefore was included in the TMDL study. Table 4-3 summarizes the more stringent effluent limits that were placed on the City during its 2005 NPDES permit renewal.

TABLE 4-3

City of Marysville 2005 NPDES/TMDL Seasonal Effluent Limits

Parameter	Average Month (lb/d)	Maximum Day (lb/d)
Ammonia-N	178	403
$CBOD_5$	419	672

The limits shown in Table 4-3 apply to the low flow season from July through October.

STATE ENVIRONMENTAL POLICY ACT

The WAC 173-240-050 requires a statement in all wastewater comprehensive plans regarding proposed projects in compliance with the State Environmental Policy Act (SEPA), if applicable. The capital improvements proposed in this plan will fall under SEPA regulations. A SEPA checklist is included in Appendix I of this report for use in the environmental review for this NON-PROJECT action**.** In most cases a determination of non-significance is issued (DNS), however, if a project will have a probable significant adverse environmental impact an environmental impact statement (EIS) will be required.

GROWTH MANAGEMENT

Snohomish County's GMA Comprehensive Plan establishes 13 sub-areas in which the county and cities within the sub-areas work together to set out urban growth areas (UGAs), policies for directing urban growth, and land use designations within urban and rural areas. The Marysville Comprehensive Plan includes land use policies and zoning designations that are consistent with the Snohomish County GMA Comprehensive Plan.

Marysville City Council adopted a Comprehensive Land Use Plan on April 25, 2005, Ordinance #2569.

ACCREDITATION OF ENVIRONMENTAL LABORATORIES (WAC 173-050)

The State of Washington recently established a requirement that all laboratories reporting data to comply with NPDES permits must be generated by an accredited laboratory. This accreditation program establishes specific tasks for quality control and quality assurance (QA/QC) that are intended to ensure the integrity of laboratory procedures. Accreditation requirements must be met for any on-site laboratory or outside laboratory used to analyze samples. Only accredited laboratories may be used for analyses reported for compliance with NPDES permits. In planning for an on-site laboratory, staffing must be sufficient to allow for QA/QC procedures to be performed. The City of Marysville's laboratory is currently accredited to perform BOD, TSS, Dissolved Oxygen, PH, Total Residual Chlorine, and Fecal Coliform testing.

MINIMAL STANDARDS FOR SOLID WASTE HANDLING (WAC 173-304)

Grit and screenings are not subject to the sludge regulations in WAC 173-308, but its disposal is regulated under the State solid waste regulations, WAC 173-304. Waste placed in a municipal solid waste landfill must not contain free liquids, nor exhibit any of the criteria of a hazardous waste as defined by WAC 173-303. To be placed in a municipal solid waste landfill, grit and screenings must pass the paint filter test, which determines the amount of free liquids associated with the solids, and the toxic characteristics leachate procedure (TCLP) test, which determines if the waste has hazardous characteristics.

WETLANDS

Dredging and Filling Activities in Natural Wetlands (Section 404 of the Federal Water Pollution Control Act)

A Corps permit is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters. Typical projects requiring these permits include the construction and maintenance of piers, wharves, dolphins, breakwaters, bulkheads, jetties, mooring buoys, and boat ramps.

If wetland fill activities cannot be avoided, negative impacts can be mitigated by creating new wetland habitat in upland areas, and if other federal agencies agree, the Corps will generally issue a permit.

Wetlands Executive Order 11990

This order directs federal agencies to minimize degradation of wetlands and enhance and protect the natural and beneficial values of wetlands. This could affect siting of pump stations and sewer lines.

SHORELINE MANAGEMENT ACT

The Shoreline Management Act of 1971 (RCW 90.58) establishes a broad policy giving preference to shoreline uses that protect water quality and the natural environment, depend on proximity to the water, and preserve or enhance public access to the water. Shoreline Management Act jurisdiction extends to lakes or reservoirs of 20 acres or greater, streams with a mean annual flow of 20 cubic feet per second (CFS) or greater, marine waters, and an area inland 200 feet from the ordinary high water mark. Projects are reviewed by local governments according to state guidelines and a local Shoreline Master Program. Marysville's wastewater treatment plant is located on the east side of Interstate 5 and the existing outfall is located within the shoreline of Steamboat Slough, a tributary of the Snohomish River. Due to the requirements imposed by the TMDL on the Snohomish River, the City constructed a new effluent transfer pipeline conveying effluent from the City of Marysville Wastewater Treatment Plant to the City of Everett Sewage Treatment Plant. The pipeline will enable the City of Marysville to divert effluent discharge during the summer months into the combined deep-water outfall in Port Gardner Bay, in order to meet summer water quality requirements for Steamboat Slough. During winter months, the water quality requirements for Steamboat Slough will be less stringent and the existing outfall can be used or flow could still be routed to Everett.

FLOODPLAIN DEVELOPMENT PERMIT

Local governments that are participating in the National Flood Insurance Program are required to review projects (including wastewater collection facilities) in a mapped flood plain and impose conditions to reduce potential flood damage from floodwater. A Floodplain Development Permit is required prior to construction.

HYDRAULIC PROJECT APPROVAL

Under the Washington State Hydraulic Code (WAC 220-110), the Washington State Department of Fish and Wildlife (WDFW) requires a hydraulic project approval (HPA) for activities that will "use, divert, obstruct, or change the natural flow or bed" of any waters of the state. For City activities such as pipeline crossings of streams, or WWTP outfall modifications, an HPA will be required, and will include provisions necessary to minimize project specific and cumulative impacts to fish.

PRETREATMENT REQUIREMENTS

Publicly owned treatment works are subject to local and national pretreatment standards. The federal standards are provided in 40 Code of Federal Register, Part 403. Chapter 14.20 of the Marysville Municipal Code sets pretreatment standards to prevent the introduction of pollutants in the collection system. Prohibited discharges could disrupt operations at the WWTP and potentially pass through the treatment process inadequately treated and discharge to receiving waters. Prohibited discharges, at a minimum, include solids that could cause obstructions, high temperature wastes, petroleum wastes, radioactive materials, flammable/explosive waste, or oxygen demanding pollutants. In general, waste discharged to the sewer system is expected to contain characteristics similar to residential wastewater (i.e., pH, temperature, TSS, turbidity, color, BOD, chemical oxygen demand (COD), toxicity, or odor). The City's pretreatment standards also control the introduction of fats, oils, and grease (FOG).

ON-SITE SEPTIC SYSTEM REGULATIONS

In some cases wastewater may be treated and disposed of on-site either by individual septic systems or community systems. On-site septic systems should be designed to meet the DOH design standards. Approval of the systems will be made either by the Snohomish Health District for systems under 3,500 gallons per day, or DOH for large on-site sewage systems (LOSS) less than 100,000 gallons per day but greater than 3,500 gallons per day as per RCW 70.118B and WAC 246-272B, or Ecology for systems that are over 100,000 gallons per day in capacity. The State Board of Health statute that provides the authority for the DOH to adopt rules for sewage is found in RCW 43.20.

It is the City's policy that all future development within the UGA connects to the sewer system instead of installing individual septic systems. The City is planning for service to all areas within its sewer boundary whether or not the area is currently sewered. Service to areas currently on septic

SEWER ORDINANCES AND PLANNING POLICIES

The Marysville Municipal Code Title 14 sets rules and regulations for the City's water and sewer systems. The sections of this code relevant to this Plan are listed in Table 4-5 and provided in Appendix B. MMC 14.01.050 *Sewer connection required,* requires structures within its service area 200 feet from available utilities to connect to the sewer system. (Note: Homes and businesses within the City's UGA in Snohomish County jurisdiction are usually served by septic systems.) MMC 14.05.020 *Discharge restriction into sanitary sewers*, prohibits the discharge of unsuitable materials or stormwater into the sewer system. Chapter 14.07 MMC *Fees, Charges and Reimbursements*, establishes water and sewer rates for customers inside and outside the City limits. Chapter 14.03 MMC *Rules for Construction, Installation and Connection*, sets rules for construction standards and Chapter 14.20 MMC *Wastewater Pretreatment*, sets the requirements for wastewater pretreatment. Chapter 14.05 MMC *Rules for Customers – Payment and Collection of Accounts* provides additional information on sewer rates, connection charges, utility bills, and disconnection and reconnection service and charges. The siting of any wastewater facilities, such as pump stations or wastewater treatment plant, must adhere to the City's Comprehensive Plan and Unified Development Codes at the time of construction.

TABLE 4-4

Title 14 MMC Water and Sewers

Chapter	Title
14.01	General Provisions
14.03	Rules for Construction, Installation, and Connection
14.05	Rules for Customers-Payment and Collection of Accounts.
14.07	Fees, Charges, and Reimbursements
14.09	Water and Sewer Conservation Measures
14.20	Wastewater Pretreatment
14.32	Utility Service Area

CITY WASTEWATER OPERATION AND MAINTENANCE STANDARDS

Chapter 14.03 MMC sets forth the wastewater requirements for construction, installation and connection. All wastewater facilities must meet Washington State Department of Ecology design standards as delineated in *Criteria for Sewage Works Design* (Orange Book). The code also includes appropriate reference to the Uniform Plumbing Code.

The City's *Sanitary Sewer Design Standards* were last revised in May 2007.

CHAPTER 5

EXISTING FACILITIES

INTRODUCTION

This Chapter describes existing facilities that are relevant to the City of Marysville's wastewater collection and treatment systems. The facilities include the wastewater collection system, pump stations and force mains, wastewater treatment and disposal facilities. This Chapter also describes interlocal agreements the City has with local jurisdictions.

WASTEWATER COLLECTION SYSTEM

PRESSURE AND GRAVITY SEWERS

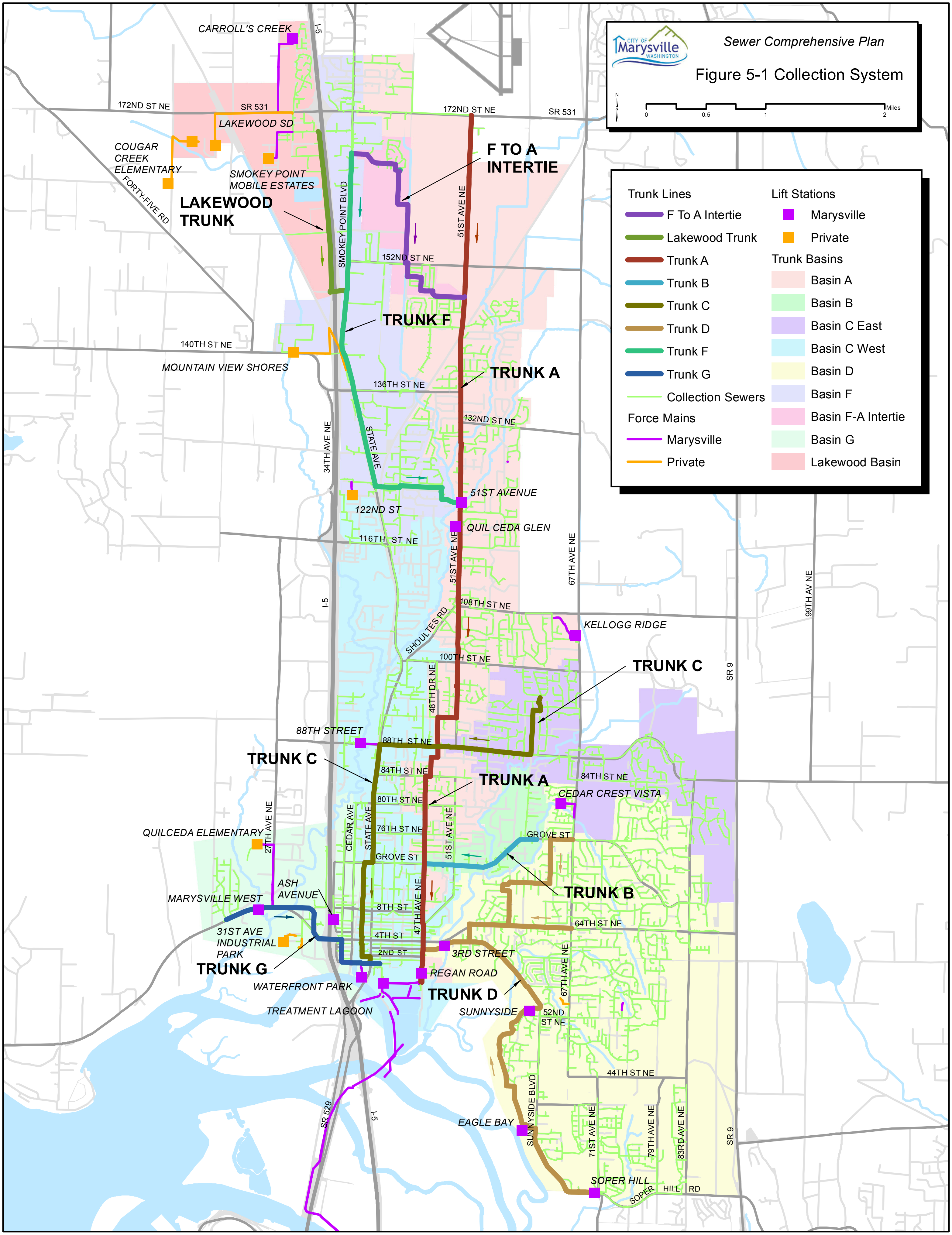
The City's collection system is organized around eight trunk sewer systems: A, B, C, D, F, F-A, G and the Lakewood Trunk. Each trunk sewer is listed in Table 5-1 along with the approximate area of the existing service area. The potential service area for each trunk sewer is also shown on Figure 5-1. All components of the collection system discharge to the treatment facility either through Trunk A or Trunk C.

TABLE 5-1
Trunk Sewer Service Area

Trunk Sewer ID	Service Area (Acres)[1]
A	3,341
B	307
C (East and West)	3,267
D	4,054
F	1,447
F-A	301
G	965
Lakewood	901

(1) Trunk area within UGA

The general direction of flow in the City's collection system is from north to south, starting near Arlington and discharging to the wastewater treatment facility at the south end of the service area. Most of the service area is served by gravity sewers. The City operates and maintains 15 pump stations; over half of these stations serve small developments, while the rest serve significant portions of the sewer service area.



Sewer Comprehensive Plan
Figure 5-1 Collection System
City of Marysville Washington
0 0.5 1 2 Miles
Trunk Lines
F To A Intertie
Lakewood Trunk
Trunk A
Trunk B
Trunk C
Trunk D
Trunk F
Trunk G
Collection Sewers
Force Mains
Marysville
Private
Lift Stations
Marysville
Private
Trunk Basins
Basin A
Basin B
Basin C East
Basin C West
Basin D
Basin F
Basin F-A Intertie
Basin G
Lakewood Basin
CARROLL'S CREEK
172ND ST NE
SR 531
LAKEWOOD SD
COUGAR CREEK ELEMENTARY
SMOKEY POINT MOBILE ESTATES
FORTY-FIVE RD
LAKEWOOD TRUNK
F TO A INTERTIE
SMOKEY POINT BLVD
51ST AVE NE
152ND ST NE
TRUNK F
140TH ST NE
MOUNTAIN VIEW SHORES
TRUNK A
136TH ST NE
132ND ST NE
34TH AVE NE
STATE AVE
51ST AVENUE
122ND ST
QUIL CEDA GLEN
116TH ST NE
67TH AVE NE
99TH AV NE
I-5
108TH ST NE
SHOULTES RD
KELLOGG RIDGE
100TH ST NE
TRUNK C
SR 9
48TH DR NE
88TH STREET
88TH ST NE
84TH ST NE
84TH ST NE
CEDAR CREST VISTA
80TH ST NE
76TH ST NE
CEDAR AVE
QUILCEDA ELEMENTARY
27TH AVE NE
GROVE ST
GROVE ST
TRUNK B
ASH AVENUE
MARYSVILLE WEST
8TH ST
47TH AVE NE
64TH ST NE
31ST AVE INDUSTRIAL PARK
4TH ST
2ND ST
3RD STREET
TRUNK G
REGAN ROAD
WATERFRONT PARK
TRUNK D
TREATMENT LAGOON
SUNNYSIDE
52ND ST NE
44TH ST NE
SR 529
EAGLE BAY
SUNNYSIDE BLVD
71ST AVE NE
79TH AVE NE
83RD AVE NE
SOPER HILL
SOPER HILL RD

The trunk sewer serving the largest portion of the sewer service area population is Trunk A. Trunk A is located in the middle of the sewer service area and extends the full length of the current urban growth area. Along this alignment, other trunk tributary areas discharge into Trunk A. Trunk F discharges to Trunk A upstream of the 51st Avenue Pump Station. Trunk A discharges to the 51st Pump Station and flow continues south through a 36-inch gravity pipeline. Trunk C (east) discharges to Trunk A at 88th Street. Trunk B discharges to Trunk A at 72nd Street NE. Trunk D connects to Trunk A near 47th Avenue and 1st Street. Trunk A discharges to the headworks of the WWTP.

Only Trunk G and Trunk C (west) are not a directl tributary to Trunk A. Trunk G serves part of the Tulalip Tribe west of Interstate 5 and connects to Trunk C (west) through the Marysville West Pump Station. Trunk C (west) discharges to the West Trunk Pump Station which then discharges to the headworks of the wastewater treatment plant.

The City's collection system includes 210 miles of gravity sewer ranging from 6- to 48-inch diameter pipe, force main ranging from 2- to 12-inch diameter pipe, and 15 pump stations. As of December 2010, the collection system had a total of 15,963 connections. Of this total, approximately 15,103 were residential connections, and 860 were schools, commercial and industrial connections.

Table 5-2 provides an inventory of the gravity sewer lines by length, pipe diameter, and material for all pipe diameters 6-inches and greater. This inventory is based on GIS information compiled by City staff. Approximately two-thirds of the City's sewer system is constructed with PVC pipe.

Table 5-3 provides a similar inventory of the force main pipe. The table includes the force main associated with the City of Everett outfall as well as force main piping for each individual pump station.

PUMP STATIONS

An inventory of the City's sewage pump stations is presented in Table 5-4. The pump stations with the highest capacities are the Soper Hill Pump Station, Sunnyside Pump Station, 51st Avenue Pump Station, Marysville West Pump Station and the West Trunk Pump Station. The location of each of the City's pump station is shown on Figure 5-1. Privately owned pump stations are not listed in Table 5-4.

Table 5-4 also presents information regarding the year installed, trunk sewer service area, auxiliary power, and other features for each pump station. Additional details are included in Appendix C.

TABLE 5-2

Gravity Sewer Inventory

Diameter (inches):	Unknown	< 6	6	7 - 8	10	12	14	15	16 - 18	20 - 21	24	30	36	42	48	Total (ft.)
Asbestos Cement				5,616	252		5,197									11,064
Cast Iron			188	296												484
Clay			462	4,256	475					432					474	6,099
Concrete	140		1,414	59,820	9,149	9,095	284	8,506	27,124	13,102	6,704	5,734	7,845	9,375	7,537	165,829
Ductile Iron	38			3,984	1,052	1,526			873		1,163	773				9,407
HDPE				1,773	915	1,022			80	51						3,842
PVC	1,686	539	11,763	573,150	103,798	67,865		22,505	18,967	4,277	5,602	9,588				819,740
PVC Perforated			294													294
Reinforced Concrete Pipe					1,325				136			213	70			1,744
Unknown	13,843	47	7,788	42,286	4,545	6,124	53	2,863	8,062	1,784	2,524	2,119		249	546	92,831
Total (ft.)	**15,708**	**586**	**21,908**	**691,180**	**121,510**	**85,633**	**5,534**	**33,874**	**55,242**	**19,646**	**15,992**	**18,426**	**7,915**	**9,624**	**8,556**	**1,111,334**
Total (%)	**1.41%**	**0.05%**	**1.97%**	**62.19%**	**10.93%**	**7.71%**	**0.50%**	**3.05%**	**4.97%**	**1.77%**	**1.44%**	**1.66%**	**0.71%**	**0.87%**	**0.77%**	**100.00%**
Total (Miles)	**3.0**	**0.1**	**4.1**	**130.9**	**23.0**	**16.2**	**1.0**	**6.4**	**10.5**	**3.7**	**3.0**	**3.5**	**1.5**	**1.8**	**1.6**	**210.5**

TABLE 5-3

Inventory of Force Main

Pump Station	Length (feet)	Diameter (inches)	Material
Soper Hill	4,295	10	DI
Carrol's Creek	3,820	6	DI
88th Street	4,464	10	DI
Regan Road	25	4	DI
3rd Street	35	8	DI
Marysville West	1,928	14	CI
Cedar Crest Vista	1,188	4	DI
51st Avenue	352	20	HDPE
Sunnyside	461	12	DI
Kellogg Ridge	1,692	4	DI
Quilceda Glen	147	4	DI
Ash Avenue	63	4	DI
West Trunk	2,325	16	DI
Eagle Bay	628	4	DI
Waterfront Park	618	2.5	PVC
Total: Pump Stations	**22,041**		
City of Everett(1) Effluent Discharge	4,700 16,000	36 26	HDPE HDPE

(1) One 36-inch boring (4,700 feet total) and two parallel 26-inch-diameter pipes.

TABLE 5-4

Inventory Of Sewage Pump Stations

ID	Year Online	Trunk Sewer System	Station Type	Pump Manufacturer /Model	No. of Pump Capacity (gpm)		TDH (ft)	Motor (hp)	Standby Power/Capacity (kW)		Telemetry	Other
Soper Hill Pump Station(1)	2003	D	Submersible Pre-rotation	Wemco F4K-S-F-E5B5	2	550 1250	83 115	20.9 60	Yes	3 Phase 175KW	Yes	Two speed motors
Carroll's Creek Pump Station	2002 (2004 upgrade)	F	Submersible Pre-rotation	Wemco S4PX750FC	2	400	40	7.5	No		Yes	Portable Generator
88th Street Pump Station	1999 (2009 upgrade)	C	Submersible	Flygt/3127.090	2	500	38	10	Yes	3 Phase 90KW	Yes	Control Panel Upgrade in 2009
Regan Road Pump Station	1983 (2007 upgrade)	A	Submersible Pre-rotation	Wemco D4K-HS-DKXA6	2	120	22	4.1	Yes	3 Phase 25KW	Yes	Portable Generator
Marysville West Pump Station	1968	G	Wet Well/Dry Pit	Fairbank Morse/541 3B28	2	1,150	Unkown	10	No		Yes	Portable Generator
Cedar Crest Vista Pump Station	1996 (2008 upgrade)	D	Submersible Pre-rotation	Wemco D3K-5-DKXA4	2	450	Unkown	7.5	No		Yes	Portable Generator
51st Avenue Pump Station(2)	1969 (2004 upgrade)	A	Submersible Pre-rotation	Wemco/F10K-SS-870	3	800	30	10	Yes	3 Phase 180KW	Yes	Two speed motors
				Wemco/F10K-SS-1160	3	3,250	23	30				
Sunnyside Pump Station	2000 (2010 upgrade)	D	Wet Well/Dry Pit	Wemco/E5K-EEXR4	3	890	53.3	20	Yes	3 Phase 150KW	Yes	Third pump upsized in 2010
3rd Street Pump Station(3)	1997	D	Submersible	Flygt/3085.092 -6011	2	200	18	3	No		Yes	Portable Generator

TABLE 5-4 - (continued)

Inventory Of Sewage Pump Stations

ID	Year Online	Trunk Sewer System	Station Type	Pump Manufacturer /Model	No. of Pump Capacity (gpm)		TDH (ft)	Motor (hp)	Standby Power/Capacity (kW)		Telemetry	Other
Kellogg Ridge Pump Station[4]	2003	A	Submersible	Hydromatic S4PX	2	400	66	10	No		Yes	Portable Generator
Quilceda Glen Pump Station[4]	2003	A	Submersible	Hydromatic S4NX	2	250	14	2	No		Yes	Portable Generator
Ash Avenue Pump Station	2004	C	Submersible	Pumpex	2	200	Unkown	3	No		Yes	Portable Generator
West Trunk Pump Station	1994	C	Dry Pit/Wet Pit	Wemco F10K-SS	3	3,300	22	25	Yes	125 kW 3 Ph	Yes	
Eagle Bay Pump Station	2009	D	Submersible Non-Clog	Hydromatic H4H-H4HX-1500JC	2	850	Unknown	15.6	No		Yes	Portable Generator
Waterfront Park Pump Station	2005	C	Submersible Grinder	Hydromatic HPG-FHX-300JC	2	57	Unknown	3	No		No	Portable Generator

(1) The 2 pumps at the Soper Hill Lift Station are set for 1,160 and 1,750 rpm's. At the lower speed, pump capacity is 550 gpm; at the higher speed, capacity is 1,250 gpm.

(2) The 3 pumps at the 51st Street Lift Station are set for 870 and 1,160 rpm's. At the lower speed, capacity for each pump is 800 gpm at the higher speed each pump has a capacity of 3,250 gpm.

(3) The 3rd Street Lift Station capacity is estimated from pump curve information.

(4) Pump capacity estimated from pump model and standard pump curve for horsepower rating.

WASTEWATER TREATMENT PLANT

The existing lagoon wastewater treatment plant (WWTP) is in the southwest corner of the City on Ebey Slough. The WWTP was originally constructed at the current site in 1959. After a plant expansion in 1980-1981, the biological treatment train consisted of two lagoons, each divided with curtains into two treatment cells. The first three cells in the train were partially mixed and aerated with aspirating-type aerators, while the fourth cell served as a stabilizing pond. In addition to the lagoons, the WWTP included influent and effluent flow monitoring flumes, manually cleaned bar screens, a grit chamber, and a chlorine contact chamber using gaseous chlorine.

Another plant expansion occurred in 1994. A portion of the north lagoon system was converted to two complete mix aerated lagoon cells. Influent screw pumps and mechanically cleaned bar screens were added to the headworks. A third channel was constructed in the headworks to accommodate a future screw pump. Effluent sand filters (manufactured by Dynasand) were added to remove solids from the lagoon effluent, and a new chlorine contact tank was constructed.

In 2004 another upgrade of the wastewater treatment plant was completed in two phases. Phase 1 of the upgrade included the addition of 2 new complete mix aerated lagoon cells, one new influent screw pump, one new influent bar screen, and 4 effluent pumps. Phase 2 of the upgrade included the addition of 2 more complete mix aerated lagoon cells, 1,600 square feet of effluent sand filters (manufactured by Dynasand), UV disinfection, and an effluent pipeline to the City of Everett. The WWTP biological treatment components include six complete mix aerated lagoon cells, three partially mixed facultative lagoons, and a facultative only stabilization lagoon. The plant discharges to Steamboat Slough in the Snohomish River Estuary (designated as a Class A Marine receiving water in the vicinity of the outfall) during high river flow months (November through June). The plant discharges to the City of Everett's South Everett Pump Station (SEPS) in route to the Deep Marine Outfall in Puget Sound, during low river flow periods (July through October).

WWTF DESIGN CRITERIA AND CURRENT PLANT LOADINGS

The design criteria for the Marysville WWTP, as presented in the drawings for Phase 2 of the WWTP Upgrade and Expansion (Tetratech/KCM, 2003) are shown in Table 5-5. Phase 2 was completed at the end of 2004.

TABLE 5-5

Wastewater Treatment Plant Design Flows and Loading(1)

Parameter	Phase 1	Phase 2
Design Year	2004	2010
Flows (mgd)		
Average Annual	8.52	10.1
Maximum Month	10.7	12.7
Maximum Day	13.1	15.6
Peak Hour	17.2	20.3
Mass Loading (lb/day)		
Annual Average		
BOD_5	14,943	17,070
TSS	14,943	17,815
Average Day, Max. Month		
BOD_5	17,632	20,143
TSS	20,322	24,229
Maximum Day		
BOD_5	21,816	24,922
TSS	31,977	38,125

(1) This information is from the design drawings prepared by Tetratech/KCM, Phase 2 (2003).

NPDES Permit

The City's most recent NPDES permit was issued by the Department of Ecology on July 1, 2005 and expired on June 30, 2010.

The City submitted an application for NPDES renewal in December 2009. As of the writing of this document, the City has not received their new NPDES permit. It is expected that they will receive the new permit sometime in late 2011 to early 2012.

Due to the outcome of the past TMDL Study on the Snohomish River, the WWTP has different NPDES permit limits for the low river flow period (July through October) than the high river flow period (November through June). The permit issued in 2005 included new limits for the low flow period. These new limits are summarized in Tables 5-6 and 5-7.

TABLE 5-6

Wastewater Treatment Plant NPDES Permit Limits
Low Flow Season (July – October)

NPDES Effluent Limitations	Average Monthly	Average Weekly
$CBOD_5$	25 mg/L(1)	40 mg/L
TSS	30 mg/L(1) (3,180 lb/d)	45 mg/L (4,770 lb/d)
pH		6.0 - 9.0 (daily)
Fecal Coliform	200 cfu / 100mL	400 cfu / 100mL
NPDES Effluent Limitations	**Average Monthly**	**Maximum Daily**
Ammonia (as N)	178 lb/d	403 lb/d
$CBOD_5$	419 lb/d	672 lb/d

(1) Or 15 percent of the respective monthly average influent concentrations, whichever is more stringent

TABLE 5-7

Wastewater Treatment Plant NPDES Permit Limits
High Flow Season (November through June)

NPDES Effluent Limitations	Average Monthly	Average Weekly
$CBOD_5$	25 mg/L(1) (2,650 lb/d)	40 mg/L (4,240 lb/d)
TSS	30 mg/L(1) (3,180 lb/d)	45 mg/L (4,770 lb/d)
PH		6.0-9.0 (daily)
Fecal Coliform	200 cfu / 100mL	400 cfu / 100mL

(1) Or 15 percent of the respective monthly average influent concentrations, whichever is more stringent

Table 5-8 summarizes the WWTP NPDES Permit Facility Loading Criteria.

TABLE 5-8

Wastewater Treatment Plant NPDES Permit Facility Loading Criteria(1)

Parameter	Value
Average Flow for the Maximum Month	12.7 MGD
Influent BOD_5 Loading for Maximum Month	20,143 lbs/day
Influent TSS Loading for the Maximum Month	24,229 lbs/day

(1) Current NPDES limits through 2010 (Appendix A).

The 2004 WWTP Phase 1 and Phase 2 upgrades included:

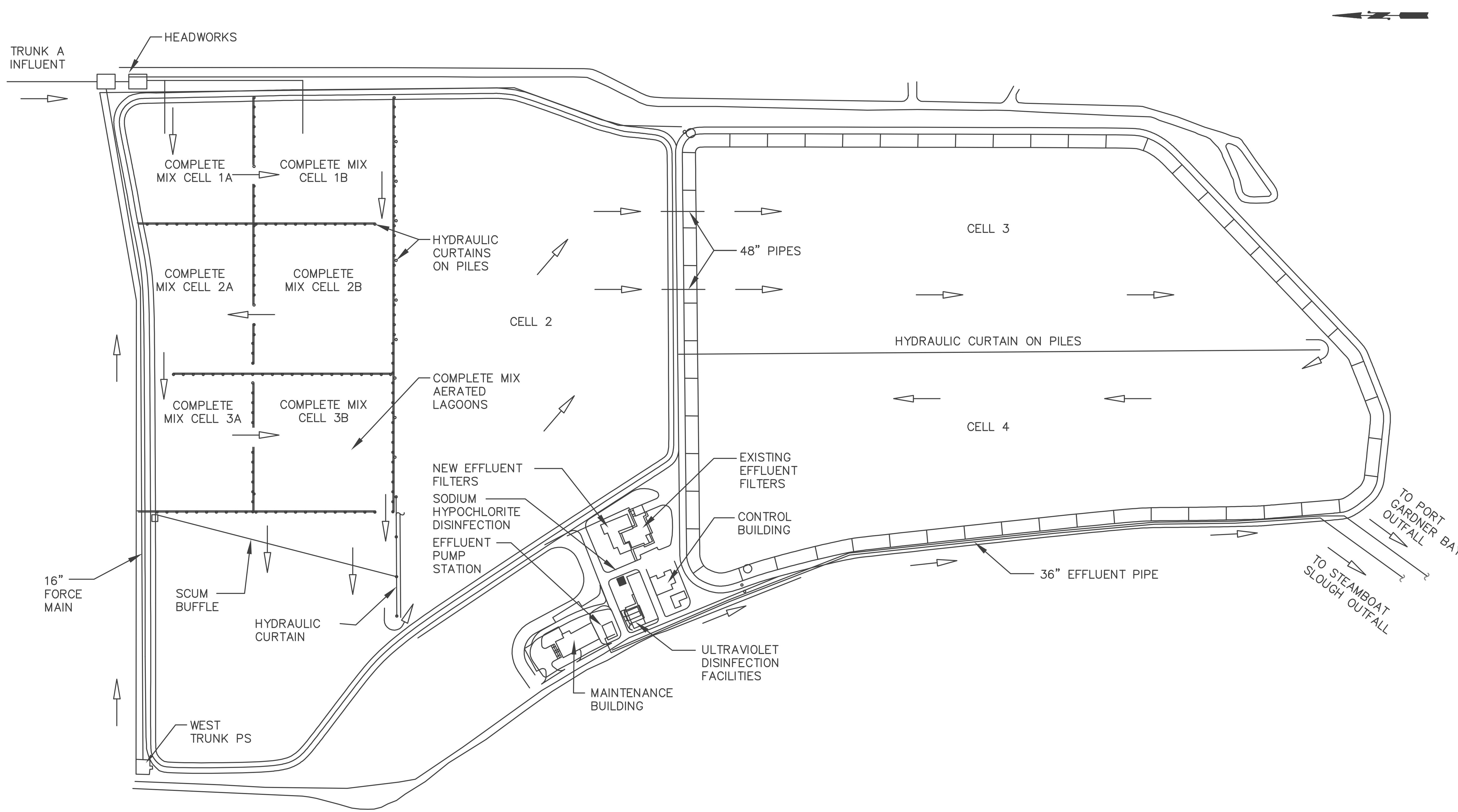
- Installation of an additional influent screw pump.
- Construction of four new complete mix aerated lagoon cells.
- The addition of 20 high-speed surface aerators and 16 surface aspirating aerators in complete mix lagoon cells 2A, 2B, 3A, and 3B;
- Modification and expansion of continuous backwash, upflow sand filters, with construction of an additional 1600 square feet;
- Installation of a low-pressure-high-intensity UV disinfection system in the renovated North Chlorine Contact Basin;
- Installation of a supplemental hypochlorite disinfection storage and delivery system;
- Installation of four 200 horsepower vertical turbine effluent pumps.
- Construction and installation of a new effluent discharge pipeline to the City of Everett.
- Modifications and renovations to the existing plant control/laboratory building;
- Construction of a new maintenance building;
- Associated site civil, electrical, instrumentation and control facilities.

WWTP DESCRIPTION

Figure 5-2 shows the site layout for the WWTP. The WWTP liquid stream treatment processes include influent screening, biological treatment and sludge settling in the complete mix cells, partially mixed and unmixed lagoon cells, coagulation, filtration, and ultraviolet disinfection.

Headworks

Incoming raw wastewater entering the WWTP from Trunk A is pumped with three Archimedes screw pumps to the level of the headworks. The force main from the West Trunk Pump Station discharges into the headworks upstream of the bar screens but downstream of the influent screw pumps.



NOTE:

AERATED LAGOONS IN SERIES.

CITY OF MARYSVILLE
SEWER COMPREHENSIVE PLAN
FIGURE 5-2
WWTP SITE LAYOUT

The incoming wastewater is screened at the headworks to remove large solids. The headworks includes two mechanically cleaned screens (front-raked climber type, manufactured by John Meunier, Inc., of Quebec) and a manual screen in a bypass channel. The mechanically cleaned screens have a 1 ½ inch bar spacing.

Influent Flow Measurement

Influent flow is measured with a Parshall flume with a 30-inch throat width.

Lagoon System

Biological treatment of the wastewater is provided in the lagoon system. Design criteria for the lagoon system are summarized in Table 5-9. Following completion of the Phase 2 upgrades, the lagoon system consists of six complete mix aerated lagoons with mechanical surface and floating aerators, three partially mixed oxidation ponds and one unmixed stabilization pond.

TABLE 5-9

Lagoon System Design Criteria

Parameter	Value
Complete Mix Lagoons	
Number	6
Depth, feet	6.2
Volume, each, Million gallons	4.89
Total Area, Acres	14.5
Hydraulic Residence Time at Maximum Month Flow, Days, total	2.3
Number of Aspirating Aerators	24
Horsepower (each)	15
Number of High Speed Surface Aerators	30
Horsepower (each)	15
Oxidation Ponds	
Number	4
Depth, feet	6.2
Volume, total, Million gallons	116
Total Area, Acres	52.5
Hydraulic Residence Time at Maximum Month Flow, Days, total	9.0
Number of Aspirating Aerators	5
Horsepower (each)	7.5

Coagulation and Filtration Facilities

Effluent sand filters enable the WWTP to meet NPDES permit requirements for effluent TSS (30 mg/L monthly average – 45 mg/L weekly average). Particularly in the spring and summer, the lagoons generate significant blooms of algae that must be removed with the filtration system. The filtration system is an upflow continuous backwash, monomedia type (Parkson Dynasand). The size of the filtration system was tripled during 2004 Phase 2 upgrades to 2,400 square feet of filter surface area from the previous 800 square feet. Alum (at a design dosage of 100 mg/L) is used for coagulation.

Ultraviolet Disinfection System

The WWTP had historically used gaseous chlorine for disinfection, prior to the 2004 upgrades. An Ultraviolet Light (UV) Disinfection System, manufactured by Infilco Degremont, Inc. (IDI, formerly Ondeo Degremont) was constructed and installed in the north chlorine contact tank for the design flow of 12.7 mgd. Each channel contains six Aquaray 40 units, each with 40 low pressure-high intensity lamps. There are a total of 480 lamps. The UV system increases its dose with an increase in flow and a reduction in transmittance. The IDI’s standard system was installed, with vertically oriented lamps arrayed perpendicular to flow. An additional channel was constructed for future growth.

The UV system was designed for a minimum dose of 35,000 microwatt-sec/cm^2. The design transmittance is 60 percent for filtered flow and 25 percent for unfiltered flow.

A sodium hypochlorite system, a backup method for disinfection, was also constructed. The system utilizes the existing south chlorine contact tank, and was designed for 25 minutes contact time at year 2010 average annual flow and 20 minutes contact time at year 2010 maximum month flow.

Effluent Pumps

In Phase 1 of the 2004 upgrades, four new vertical turbine pumps were installed. The capacity of each of the 200 horsepower pumps is 4,700 gpm at a total dynamic head of 104 feet. The total capacity of the pumps, with one pump out of service, is 20.4 MGD.

Effluent Disposal

A new effluent pipeline was constructed in Phase 2 of the 2004 upgrades. In the summer low-river flow months (July through October), the WWTP conveys effluent through this pipeline to the City of Everett, and to the Deep Marine Outfall in Puget Sound. This second outfall allows the City to meet TMDL limits established for Steamboat Slough during low-river flow months. Effluent is conveyed through a 36-inch pipe across the Ebey, Steamboat, and Union Sloughs and then through twin 26-inch pipes to the City of Everett’s South End Pump Station (SEPS). From there it is discharged to the outfall in

Puget Sound. Effluent flow is measured through a 30-inch magnetic flow meter located at Marysville's WWTP.

During the balance of the year, effluent is discharged through the existing 28-inch pipeline to the outfall in Steamboat Slough. Effluent flow is measured with a 20-inch magnetic flow meter located at Marysville's WWTP.

INTERLOCAL AGREEMENTS

The City of Marysville has updated or established service agreements with the City of Arlington, Snohomish County, Tulalip Tribes, Lake Stevens Sewer District, and the City of Everett. Some of these agreements cover items such as roads, fire and police service in addition to policies relating to sewer service. Each of these agreements is discussed below regarding land use and sewer planning considerations. In addition, the areas covered by these agreements are presented in Figure 5-3.

CITY OF ARLINGTON

In October 1996, the City completed an agreement with the City of Arlington titled Annexation and Service Area Settlement Agreement. This agreement established separate UGAs for each city which were approved by Snohomish County. Among other provisions of this agreement were that Marysville would continue to provide sewer service for the Smokey Point area that is within Arlington's UGA and that Arlington would proceed with purchasing water and sewer facilities owned by Marysville that serve the Island Crossing area of Arlington. This part of the 1996 agreement has been completed, and Marysville no longer serves Island Crossing. Other parts of this agreement state that the two cities will coordinate land use planning for areas east of 67th Avenue SE, north of the Lakewood area and in the vicinity of the Arlington Airport.

A copy of this agreement is included in Appendix B.

SNOHOMISH COUNTY

In June 1999, the City and Snohomish County completed an agreement titled Interlocal Agreement between the City of Marysville and Snohomish County Concerning Annexation and Urban Development within the Marysville Urban Growth Area. The primary purpose of this agreement was to identify areas within Snohomish County which the City may annex in the future. Under this agreement, both the City and County recognize the need to coordinate land use densities and designations and to facilitate an orderly transition of services and capital project at the time of annexation. Of specific importance for sewer planning is the need to reconcile land use densities between the City and County. The City requires a minimum of four dwelling units per acre in its UGA while the County may allow lower densities in its unincorporated areas.

A copy of this agreement is included in Appendix B.

TULALIP TRIBES

In December 1998, the City of Marysville and the Tulalip Tribes executed a Memorandum of Understanding regarding sanitary sewer and water service for a portion of the Tulalip Business Park. For sewer service, this agreement would allow up to 150,000 gpd with a peak flow of 150 gpm. The agreement allow for average strength waste of 201 – 300 mg/L BOD_5. the Tribe's point of connection is located at 90^{th} Street and 35^{th} Avenue in the vicinity of the 88^{th} Street Pump Station. Flow from the Tulalip Business Park will be subject to the City's Pretreatment Resolution and installation of a master meter and flow monitoring station.

A copy of this agreement is included in Appendix B.

As of 2004, it was not expected that the Tulalip Tribes would utilize this capacity due to construction of its own membrane bioreactor (MBR) treatment plant.

LAKE STEVENS SEWER DISTRICT

In April 1999, the City and the Lake Stevens Sewer District entered into a Sewerage Disposal Agreement to address sewer service in a "overlap" area shown on Figure 5-3. This area is located southeast of the City between State Highway 9 to the east, 83^{rd} Street to the west, Soper Hill Road to the south, and 44^{th} Street to the north. This area is currently only partly sewered, but the City has recently completed the Soper Hill Pump Station and a 12-inch gravity pipeline along this road. The Plat of Ridgewood is sewered, and under this agreement the District will continue to own and operate this sewer system. The intent of this agreement is for both the City and District to cooperate for providing sewer service to other parts of the "overlap" area.

In addition to the Sewage Disposal Agreement, the City passed Ordinance No. 2284 establishing a satellite sewer rate classification for the "overlap." For this area, the City shall charge the same sewer rate as the District's plus an administrative fee of 15 percent.

Copies of both agreements are included in Appendix B.

CITY OF EVERETT

In March 2002, the City of Marysville and the City of Everett entered into an agreement for Conveyance and Discharge of Treated Wastewater. Under this agreement the City of Marysville has the ability to pump, convey and discharge up to 20 mgd (peak flow) of effluent to Everett's Port Gardner Bay marine outfall. Under the terms of this agreement, the City of Marysville agreed to pay 33.3 percent for design, permitting and construction of new facilities, $499,500 for its portion for existing facilities, and 15 percent of the amounts in the first two parts plus 33 percent of any interest costs. Marysville would also be responsible for 100 percent of the cost for its own pumping and conveyance facilities and agreed to its proportionate share of operation and maintenance costs.

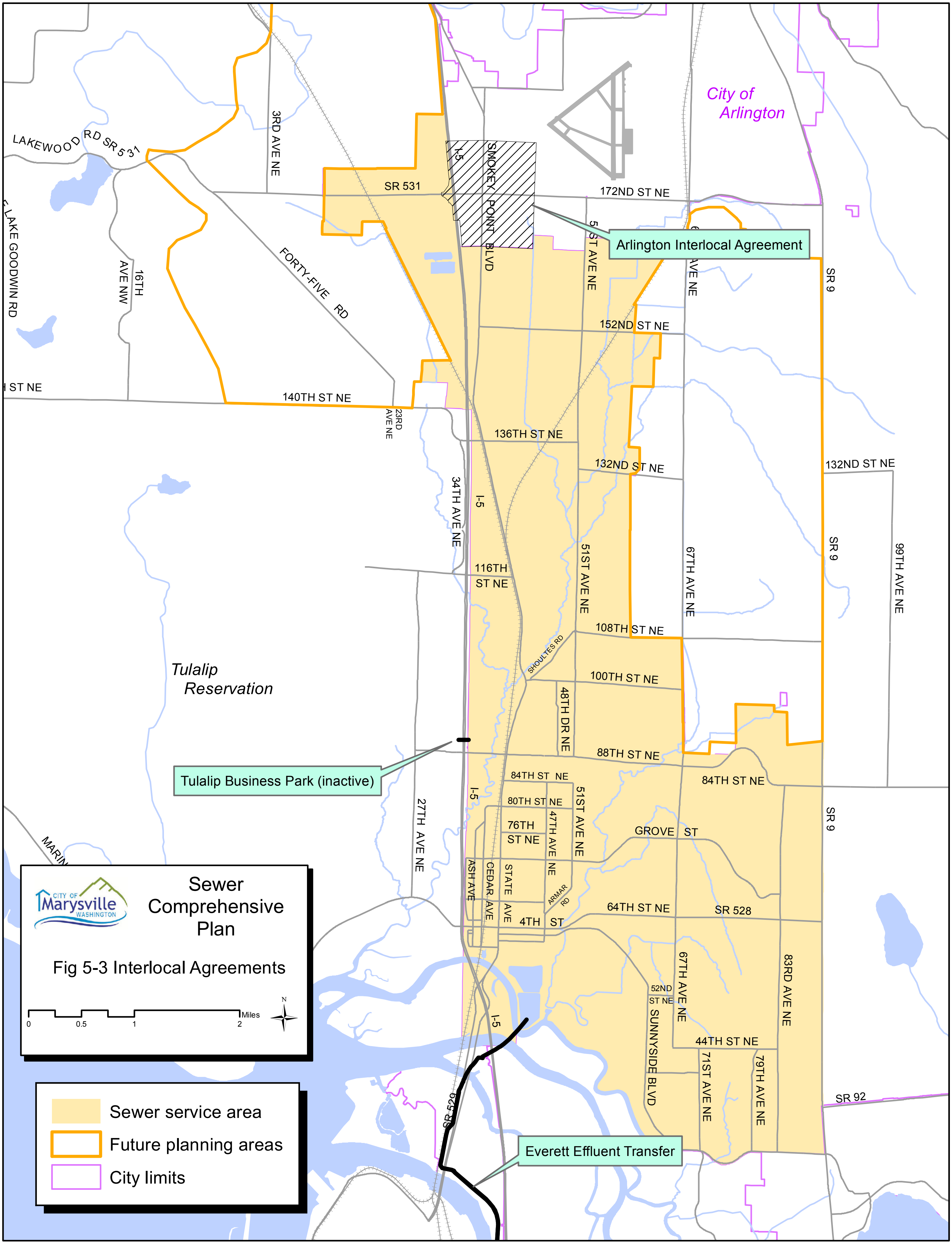
Following the Agreement for Conveyance and Discharge of Treatment Wastewater, the City of Marysville and the City of Everett also entered into an Agreement for Operation of the South Effluent Pump Station (SEPS). This agreement establishes the terms and conditions under which Everett shall operate and maintain the SEPS. Among the provisions are ones where Everett will notify Marysville of flow, chlorine levels, scheduled maintenance requirements, and emergency operations. In turn, Marysville shall notify Everett of changed conditions in the quantity of its effluent, scheduled maintenance requiring termination flows, and emergency operation.

Copies of both agreements are included in Appendix B.

MUTUAL AID AGREEMENT

Marysville is party to a 2006 “Sewer and Water Mutual Aid Agreement” that addresses sharing of personnel and equipment during emergency conditions. Such mutual aid is authorized in State law, at Chapter 39.34 RCW. Other parties to the agreement include the Cities of Edmonds, Everett, Lynnwood, Monroe, Arlington and Snohomish: and the following special districts: Alderwood, Mukilteo, Olympic View and Silver Lake Water and Sewer Districts.

A copy of this agreement is included in Appendix B.


Sewer Comprehensive Plan
Fig 5-3 Interlocal Agreements
CITY OF Marysville WASHINGTON
0 0.5 1 2 Miles
N
Sewer service area
Future planning areas
City limits
Arlington Interlocal Agreement
Tulalip Business Park (inactive)
Everett Effluent Transfer
City of Arlington
Tulalip Reservation
LAKEWOOD RD SR 531
SR 531
3RD AVE NE
SMOKEY POINT BLVD
I-5
172ND ST NE
FORTY-FIVE RD
16TH AVE NW
E LAKE GOODWIN RD
H ST NE
140TH ST NE
23RD AVE NE
152ND ST NE
136TH ST NE
132ND ST NE
132ND ST NE
34TH AVE NE
116TH ST NE
51ST AVE NE
67TH AVE NE
SR 9
99TH AVE NE
108TH ST NE
SHOULTES RD
100TH ST NE
48TH DR NE
88TH ST NE
84TH ST NE
84TH ST NE
80TH ST NE
76TH ST NE
47TH AVE NE
27TH AVE NE
GROVE ST
ASH AVE
CEDAR AVE
STATE AVE
ARMAR RD
4TH ST
64TH ST NE
SR 528
52ND ST NE
SUNNYSIDE BLVD
83RD AVE NE
44TH ST NE
71ST AVE NE
79TH AVE NE
SR 92
SR 529
MARIN

REFERENCES

1. *Comprehensive Sanitary Sewerage Plan*, City of Marysville , HCWL, October 1990

2. *Comprehensive Sanitary Sewerage Plan*, City of Marysville , HCWL, KCM, Jones and Stokes, June 1997

3. *Sanitary Sewer Infiltration/Inflow Analysis*, HCWL, September, 1999

4. *Wastewater Treatment Plant Capital Facilities Plan*, Final, February, 2001, KCM

5. *Wastewater Treatment Plant Upgrade and Expansion –Phase 1, Volume 2 and Phase 2, Volume 2 Drawings,* KCM, 2002

CHAPTER 6

EXISTING AND PROJECTED WASTEWATER FLOWS AND CHARACTERISTICS

INTRODUCTION

Adequate design of wastewater treatment and conveyance facilities requires the determination of the quantity and quality of wastewater generated from each of the contributing sources. Typically, wastewater is predominantly domestic in origin with lesser amounts contributed by commercial and industrial businesses and by public use facilities such as schools, parks, hospitals, and municipal functions. Infiltration and inflow (I/I) contributions result from groundwater and surface water entering the sewer system during periods of high groundwater levels and rainfall, respectively.

DEFINITION OF TERMS

In this Chapter, the existing wastewater characteristics for the service area are analyzed and projections made for future conditions. The terms and abbreviations used in the analysis are described below.

WASTEWATER

Wastewater is water-carried waste from residential, business and public use facilities, together with quantities of groundwater and surface water which enter the sewer system through defective piping and direct surface water inlets. The total wastewater flow is quantitatively expressed in millions of gallons per day (mgd).

DOMESTIC WASTEWATER

Domestic Wastewater is wastewater generated from single and multifamily residences, permanent mobile home courts, and group housing facilities such as nursing homes. Domestic wastewater flow is generally expressed as a unit flow based on the average contribution from each person per day. The unit quantity is expressed in terms of gallons per capita per day (gpcd).

EQUIVALENT RESIDENTIAL UNIT (ERU)

An Equivalent Residential Unit (ERU) is a baseline wastewater generator that represents the average single family residential household. An ERU can also express the average annual flow contributed by a single-family household, in units of gallons per day, or an annual average loading (of 5-day biochemical oxygen demand or total suspended solids) contributed by a single-family household, in units of pounds per day.

NON-RESIDENTIAL WASTEWATER

Non-residential Wastewater is wastewater generated from business activities, such as restaurants, retail and wholesale stores, service stations, and office buildings. Non-residential wastewater quantities are expressed in this Plan in terms of equivalent residential units (ERUs).

INFILTRATION

Infiltration is groundwater entering a sewer system by means of defective pipes, pipe joints or manhole walls. Infiltration quantities exhibit seasonal variation in response to groundwater levels. Storm events or irrigation trigger a rise in the groundwater levels and increase infiltration. The greatest infiltration is observed following significant storm events prolonged periods of precipitation. Since infiltration is related to the total amount of piping and appurtenances in the ground and not to any specific water use component, it is generally expressed in terms of the total land area being served. The unit quantity generally used is gallons per acre per day.

INFLOW

Inflow is surface water entering the sewer system from yard, roof and footing drains, from cross connections with storm drains and through holes in manhole covers. Peak inflow occurs during heavy storm events when storm sewer systems are taxed beyond their capacity, resulting in hydraulic backups and local ponding. Inflow, like infiltration, can be expressed in terms of gallons per capita day or gallons per acre per day.

WWTP flow records are utilized to characterize combined infiltration and inflow in the Marysville system in terms of peak hour, peak day, maximum month, and average annual I/I.

AVERAGE DRY WEATHER FLOW

Average Dry Weather Flow is wastewater flow during periods when the groundwater table is low and precipitation is at its lowest of the year. The dry weather flow period in western Washington normally occurs during July through October. During this time, the wastewater strength is highest, due to the lack of dilution with the ground and surface water components of infiltration and inflow. The higher strength coupled with higher temperatures and longer detention times in the sewer system create the greatest potential for system odors during this time. The average dry weather flow is the average daily flow during the three lowest consecutive flow months of the year.

AVERAGE ANNUAL FLOW

Average Annual Flow is the average daily flow over a calendar year. This flow parameter is used to estimate annual operation and maintenance costs for treatment and pump station facilities.

MAXIMUM MONTH FLOW (TREATMENT DESIGN FLOW)

Maximum Month Flow is the highest monthly flow during a calendar year. In western Washington, the maximum month flow occurs in the winter due to the presence of more I/I. This wintertime flow is composed of the normal domestic, commercial and public use flows with significant contributions from inflow and infiltration. The predicted maximum month flow at the end of the design period is used as the design flow for sizing treatment processes and selecting treatment equipment.

PEAK HOUR FLOW

Peak Hour Flow is the highest hourly flow during a calendar year. The peak hour flow in western Washington usually occurs in response to a significant storm event preceded by prolonged periods of rainfall, which have previously developed a high groundwater table in the service area. Peak hour flows are used in sizing the hydraulic capacity of wastewater collection, treatment and pumping components. Peak hour flow is typically determined from treatment plant flow records and used to estimate future flows. However, in this analysis there is concern that the WWTP flow meters may not be reading accurately at peak hour flows. Without accurate data for peak hour flows, the recommended approach is to calculate a flow based on accepted criteria. Ecology's Orange Book provides a method shown in its Figure C1-1 based on a ratio of peak hourly flow to design average flow as presented below:

$$\frac{Q \text{ peak hourly}}{Q \text{ design average}} = \frac{18 + \text{square root }(P)}{4 + \text{square root }(P)} \quad \text{where:}$$

Q peak hourly = Maximum rate of wastewater flow

Q design average = Design average, or average annual, recorded wastewater flow

P = Population in thousands.

BIOCHEMICAL OXYGEN DEMAND (BOD)

Biochemical Oxygen Demand (BOD) is a measure of the oxygen required by microorganisms in the biochemical oxidation (digestion) of organic matter. BOD is an indicator of the organic strength of the wastewater. If BOD is discharged untreated to the environment, biodegradable organics will deplete natural oxygen resources and result in the development of septic (anaerobic) conditions. BOD data together with other parameters are used in the sizing of the treatment facilities and provide a measurement for determining the effectiveness of the treatment process. BOD is expressed as a concentration in terms of milligrams per liter (mg/L) and as a load in terms of pounds per day (lb/d). The term BOD typically refers to a 5-day BOD, often written BOD_5, since the BOD test protocol requires five days for completion. BOD_5 of a wastewater is composed of two components – a carbonaceous oxygen demand ($CBOD_5$) and a nitrogenous oxygen demand ($NBOD_5$). The use of $CBOD_5$ as a parameter for evaluating wastewater strength removes the influence of nitrogenous components, including ammonia and organic nitrogen. As shown in Chapter 5, the NPDES permit for the City of Marysville WWTP includes effluent limits expressed in terms of $CBOD_5$, and influent limits expressed in terms of BOD_5.

SUSPENDED SOLIDS

Suspended Solids is the solid matter carried in the waste stream. The Total Suspended Solids (TSS) in a wastewater sample is determined by filtering a known volume of the sample, drying the filter paper and measuring the increase in weight of the filter paper. TSS is expressed in the same terms as BOD; milligrams per liter for concentration and pounds per day for mass load. The amount of TSS in the wastewater is used in the sizing of treatment facilities and provides another measure of the treatment effectiveness. The concentration of TSS in wastewater affects the treatment facility biosolids production rate, treatment and storage requirements, and ultimate disposal requirements.

CHLORINE

Chlorine is a chemical element that acts as a strong oxidant when exposed to certain components of organic matter. Chlorine is widely used as a disinfectant in wastewater treatment, and is available both in gaseous (elemental chlorine) and solution forms (hypochlorite). Chlorine is a toxic chemical and is lethal to aquatic biota if present in too high a concentration. Additionally, some organic constituents may react with the chlorine to interfere with chlorination or form toxic compounds, such as chloroform, that can have long-term adverse effect on the beneficial uses of the waters to which they are discharged. To minimize the effects of potentially toxic chlorine residuals on the environment, it has sometimes been found necessary to dechlorinate wastewater treated with chlorine or substitute alternative disinfection systems such as ultraviolet disinfection.

ULTRAVIOLET DISINFECTION

Ultraviolet disinfection is used as a reliable means of disinfection in the wastewater industry. In UV disinfection, contaminated water is exposed to special lamps that generate radiation. The lamps create UV light by striking an electric arc through low-pressure mercury vapor. The lamps emit a broad spectrum of radiation to destroy bacteria between 250nm and 270nm (nanometers). The treatment works because UV light penetrates an organism's cell walls and disrupts the cell's genetic material, making reproduction impossible.

SAND FILTER

Sand filters can be used for many applications including denitrification, phosphorus removal, algae filtration, and turbidity reduction.

The Dynasand Filter is a continuous-backwash, upflow, deep-bed, granular media filter. Filter media is continuously cleaned by recycling the sand internally through an airlift pipe and sand washer. The cleansed sand is redistributed on top of the sand bed, allowing for an uninterrupted flow of filtrate and reject (backwash water).

Feed is introduced at the bottom of the filter and flows upward through the sand bed bottom. Solids are trapped in the sand bed and the filtrate exits over the effluent weir. The sand bed, along with the accumulated solids, is drawn downward into an airlift pipe. Compressed air, introduced at the bottom of the airlift, draws sand into the airlift, scours it, and rejects the backwash water.

OTHER CONTAMINANTS OF CONCERN

Other contaminants of concern in wastewater include nutrients, priority pollutants, heavy metals and dissolved organics. The City's NPDES permit requires the removal of biodegradable organics ($CBOD_5$), ammonia, suspended solids and pathogens. Nutrients such as ammonia, other forms of nitrogen and phosphorus, along with carbon, are essential requirements for growth. When discharged to the aquatic environment, these nutrients can lead to the growth of undesirable aquatic life. When discharged in excessive amounts on land, they can also lead to the pollution of groundwater. Additionally, in too high a concentration, nutrients, particularly ammonia, can be toxic to aquatic life.

Priority pollutants are organic and inorganic compounds selected on the basis of their known or suspected carcinogenicity, mutagenicity, teratogenicity, or high acute toxicity. Many of these compounds are found in wastewater. Inorganic constituents, including heavy metals, are often present in wastewater due to commercial and industrial activities and may have to be removed from the wastewater if the presence of the metals will adversely affect the receiving water, or, if the wastewater is to be reused. Some heavy metals (most notably copper) can be present in wastewater due to leaching from drinking water pipes.

EXISTING WASTEWATER FLOWS AND LOADING

WWTP records for the five-year period from 2006 through 2010 have been reviewed and analyzed to determine current wastewater characteristics and influent loadings. Current wastewater flows and loadings are used in conjunction with projected population data to determine projected future wastewater flows and loadings.

HISTORICAL WASTEWATER FLOWS AND LOADINGS AT CITY OF MARYSVILLE WWTP

Table 6-1 summarizes WWTP influent flows for the 5-year period of 2006 - 2010. The reported monthly average influent WWTP flows ranged from 3.92 mgd to 6.12 mgd.

Following the 2004 Phase I and Phase II upgrades to the wastewater treatment plant, it was discovered that by removing the Parshall Flume fiberglass insert that had been in use since the 1994 upgrades, that the concrete structure that was intended to be used as flows increased, was not poured uniformly and did not provide accurate combined influent flow measurements from Trunks A and C. For this reason, influent flows are measured using the Trunk A Palmer Bowlus flume, and the Trunk C Magnetic Flow Meter. Those flows are combined for the total combined influent as reported on the discharge monitoring reports. For the purposes of this Plan, influent flows reported on the DMRs are utilized.

TABLE 6-1

Historical WWTP Influent Flows(1) (2006-2010)

Flow	Flow Rate (mgd)
Average Dry Weather Flow(2)	4.16
Annual Average Flow	4.73
Maximum Month Flow(3)	6.12
Peak Day Flow(4)	9.31
Peak Hour Flow(5)	10.7

(1) Based on Monthly Influent flows as reported on the WWTP DMRs.
(2) Average of July, August, September from 2006-2010, as described in the text.
(3) Reported for June 2010
(4) Reported for June 9, 2010
(5) Calculated using Ecology's Orange Book Figure C1-1:

$$\frac{Q\ \text{peak hourly}}{Q\ \text{design average}} = \frac{18 + \text{square root (P)}}{4 + \text{square root (P)}} = \frac{18 + 7.11}{4 + 7.11} = 2.3$$

Where P = 50.543 (50,543 sewered population)
Peak Hour Flow = 4.73 mgd x 2.26 = 10.7 mgd

Monthly discharge monitoring report (DMR) data for this period are summarized in Table 6-2. Graphical representations of average monthly WWTP flows, influent BOD_5 and TSS loadings, and effluent $CBOD_5$ concentrations and maximum peak weeks for the period from January 2006 through December 2010 are shown in Figures 6-1, 6-2, and 6-3, and 6-4, respectively.

Figure 6-1
Average and Peak Day WWTP Influent Flow

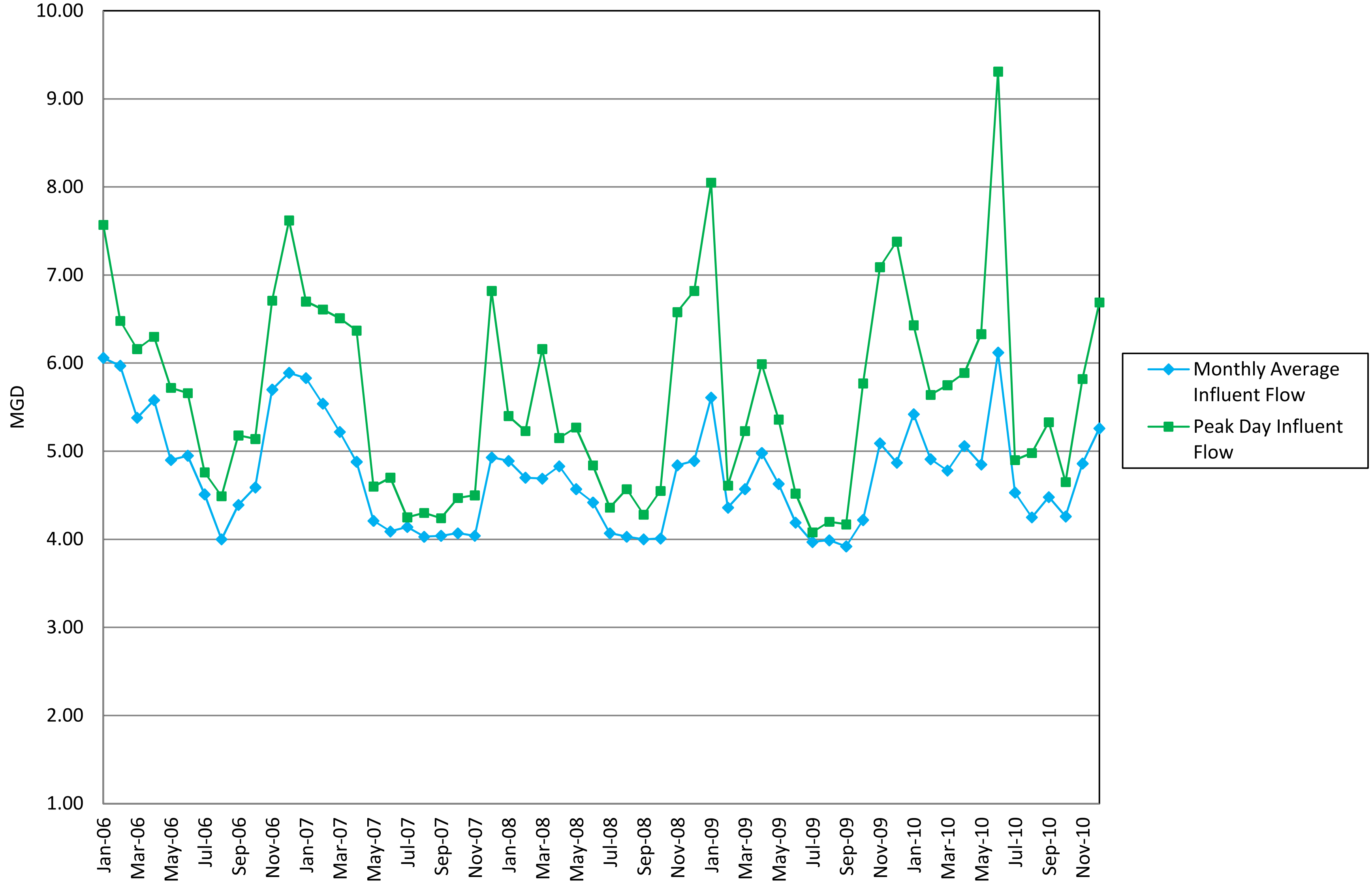


Figure 6-2
Monthly Average Influent BOD & TSS lbs/Day

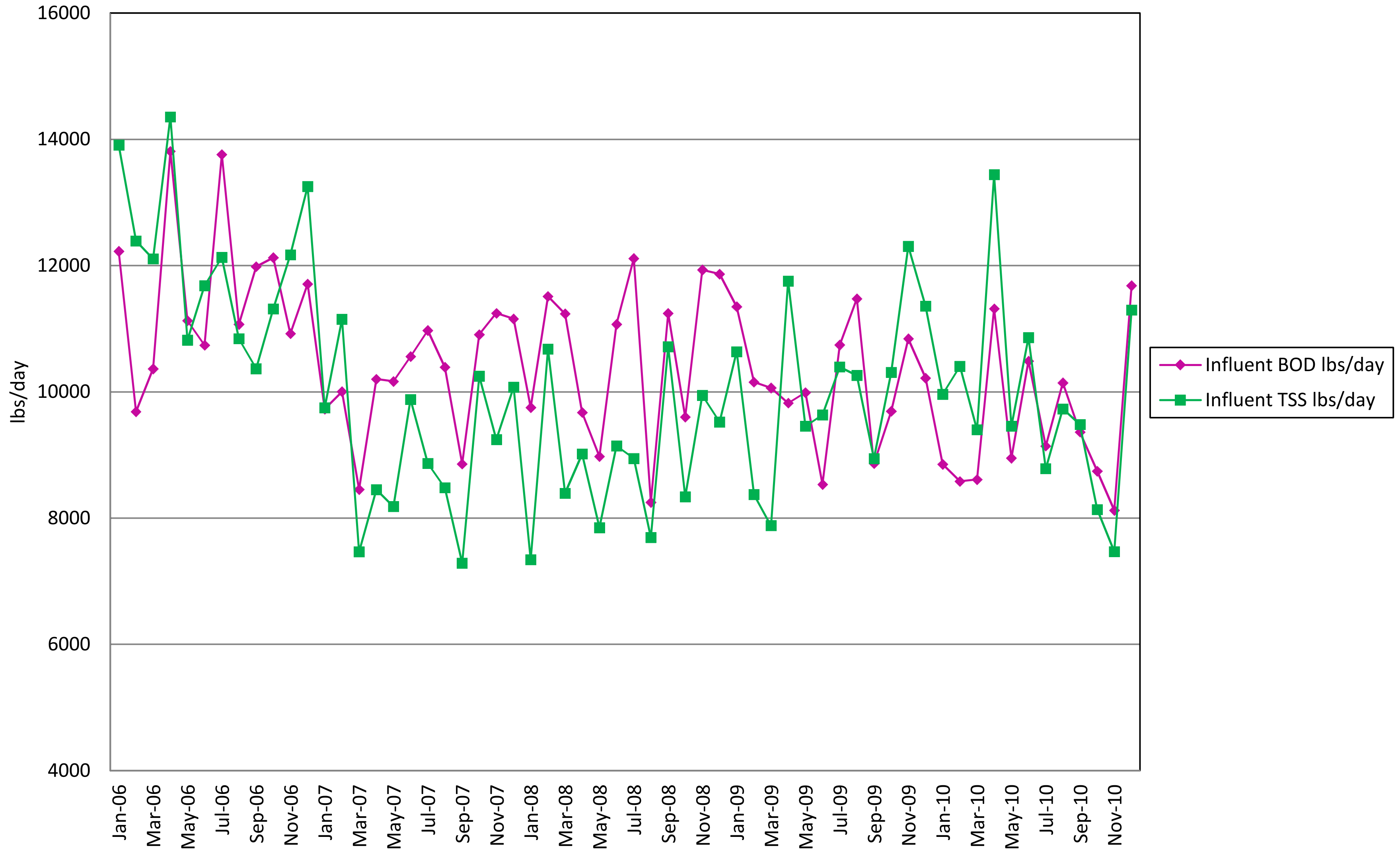
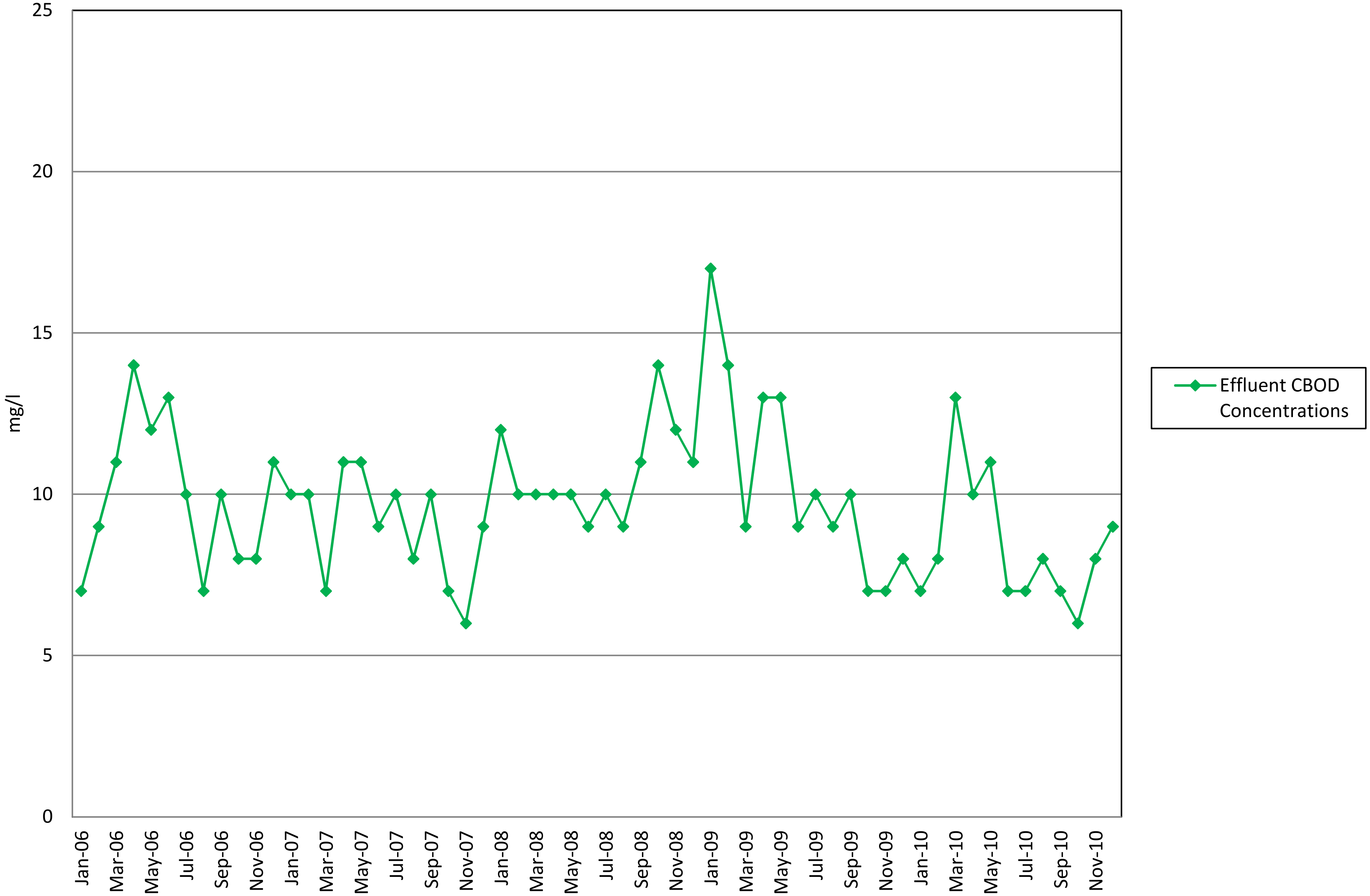


Figure 6-3
Monthly Average Effluent CBOD5 Concentrations



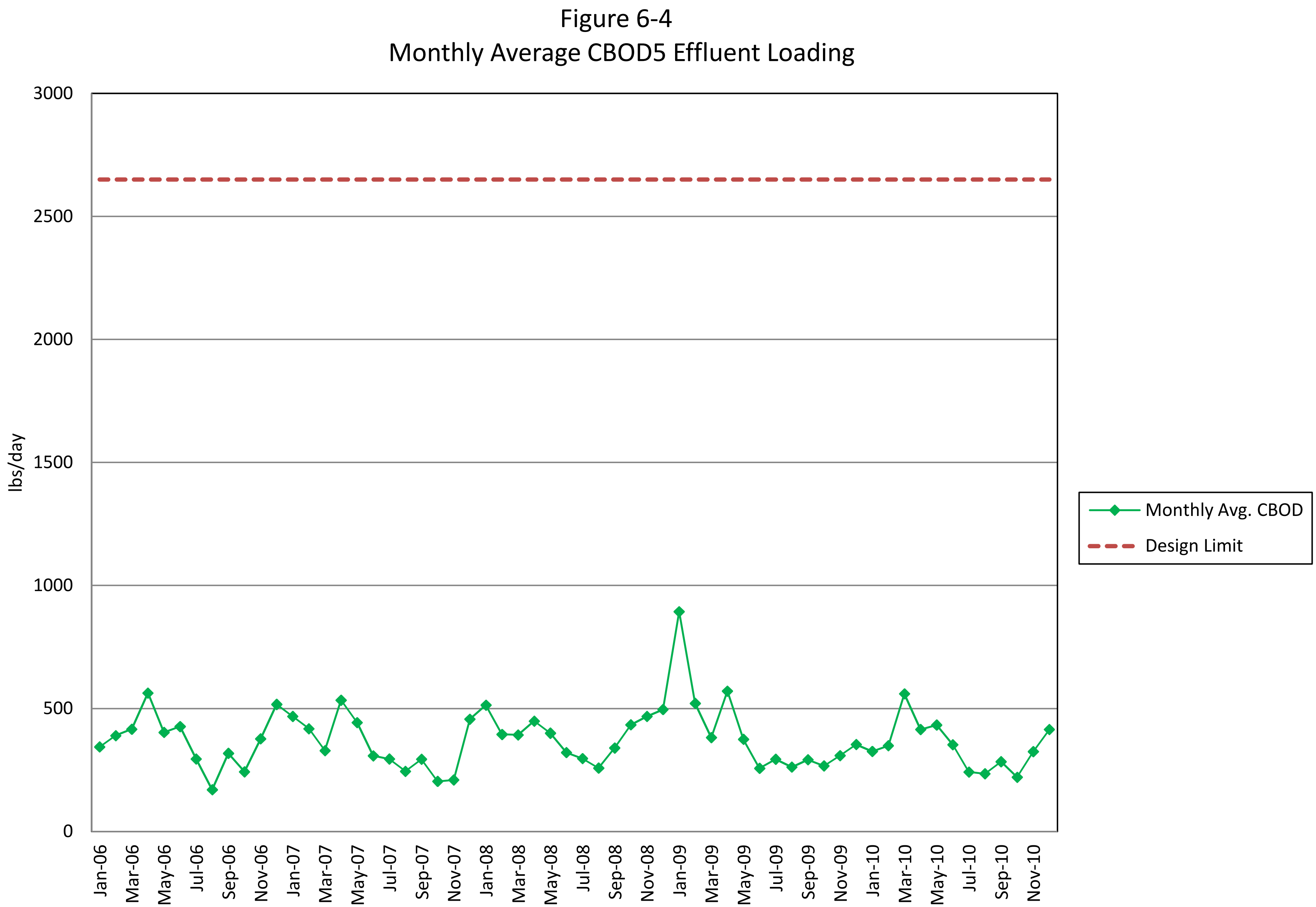


Figure 6-4
Monthly Average CBOD5 Effluent Loading
lbs/day
3000
2500
2000
1500
1000
500
0
Jan-06
Mar-06
May-06
Jul-06
Sep-06
Nov-06
Jan-07
Mar-07
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Monthly Avg. CBOD
Design Limit

TABLE 6-2

Summary of Discharge Monitoring Reports (DMR's)
WWTP Influent and Effluent Monthly Averages

Date	Influent Flow		Influent BOD$_5$		Influent TSS		Eff Flow mgd	Eff Flow mgd	Eff CBOD$_5$ mg/L	Eff CBOD$_5$ mg/L
	mgd avg	mgd Peak day	mg/L	lb/d	mg/L	lb/d	avg	peak	mo avg	Peak week
Jan-06	6.06	7.57	245	12227	279	13911	5.62	6.05	7	9
Feb-06	5.97	6.48	195	9686	247	12390	5.22	5.73	9	11
Mar-06	5.38	6.16	232	10365	270	12107	4.74	5.04	11	16
Apr-06	5.58	6.30	296	13812	308	14356	4.68	5.24	14	20
May -06	4.90	5.72	280	11128	273	10820	4.14	5.20	12	17
Jun-06	4.95	5.66	261	10739	284	11683	4.10	5.79	13	15
Jul-06	4.51	4.76	361	13760	318	12131	3.35	4.60	10	13
Aug-06	4.00	4.49	333	11070	326	10842	3.14	4.12	7	9
Sep-06	4.39	5.18	322	11984	278	10368	3.93	4.95	10	12
Oct-06	4.59	5.14	320	12127	295	11314	3.61	4.84	8	10
Nov-06	5.70	6.71	235	10923	261	12172	5.81	7.45	8	12
Dec-06	5.89	7.62	237	11709	267	13255	5.67	6.62	11	13
Jan-07	5.83	6.70	203	9729	202	9748	5.35	6.25	10	13
Feb-07	5.54	6.61	222	10004	247	11151	5.15	6.86	10	16
Mar-07	5.22	6.51	199	8454	171	7466	5.54	6.58	7	8
Apr-07	4.88	6.37	249	10202	206	8451	5.40	6.50	11	12
May-07	4.21	4.60	282	10166	227	8183	4.39	5.44	11	15
Jun-07	4.09	4.70	305	10560	284	9880	4.02	5.08	9	12
Jul-07	4.14	4.25	315	10973	255	8868	3.54	4.98	10	14
Aug-07	4.03	4.30	304	10391	248	8481	3.55	4.40	8	13
Sep-07	4.04	4.24	281	8858	213	7286	3.59	4.07	10	11
Oct-07	4.07	4.47	318	10908	300	10249	3.92	4.73	7	8
Nov-07	4.04	4.50	334	11246	275	9245	3.99	4.63	6	7
Dec-07	4.93	6.82	274	11157	247	10075	5.46	6.92	9	13
Jan-08	4.89	5.40	240	9752	180	7341	5.14	6.69	12	14
Feb-08	4.70	5.23	297	11513	276	10677	5.11	6.33	10	10
Mar-08	4.69	6.16	296	11237	221	8393	4.86	6.04	10	12
Apr-08	4.83	5.15	241	9673	225	9017	5.11	6.44	10	15
May-08	4.57	5.27	231	8977	202	7850	4.53	5.55	10	13
Jun-08	4.42	4.84	296	11070	243	9143	4.25	5.47	9	11
Jul-08	4.07	4.36	353	12113	260	8946	3.58	5.44	10	13
Aug-08	4.03	4.57	242	8250	226	7695	3.63	5.33	9	12
Sep-08	4.00	4.28	336	11244	320	10716	3.53	4.98	11	12
Oct-08	4.01	4.55	289	9601	251	8338	3.74	4.79	14	20
Nov-08	4.84	6.58	297	11933	246	9945	3.33	4.66	12	14
Dec-08	4.89	6.82	300	11867	239	9522	5.22	6.87	11	17

TABLE 6-2 – (continued)

Summary of Discharge Monitoring Reports (DMR's)
WWTP Influent and Effluent Monthly Averages

Date	Influent Flow mgd avg	Influent Flow mgd Peak day	Influent BOD_5 mg/L	Influent BOD_5 lb/d	Influent TSS mg/L	Influent TSS lb/d	Eff Flow mgd avg	Eff Flow mgd peak	Eff $CBOD_5$ mg/L mo avg	Eff $CBOD_5$ mg/L Peak week
Jan-09	5.61	8.05	241	11349	220	10637	6.15	8.27	17	22
Feb-09	4.36	4.61	281	10155	232	8376	4.46	4.59	14	16
Mar-09	4.57	5.23	264	10063	207	7881	4.83	5.61	9	12
Apr-09	4.98	5.99	239	9823	284	11754	5.15	6.69	13	16
May-09	4.63	5.36	252	9989	238	9456	4.63	7.22	13	16
Jun-09	4.19	4.52	244	8534	275	9635	3.79	4.97	9	11
Jul-09	3.97	4.08	322	10744	312	10395	3.40	4.52	10	15
Aug-09	3.99	4.20	342	11475	306	10261	3.49	5.24	9	12
Sep-09	3.92	4.17	271	8864	274	8944	3.39	5.13	10	12
Oct-09	4.22	5.77	285	9693	304	10310	4.17	5.46	7	8
Nov-09	5.09	7.09	252	10842	285	12306	3.66	4.82	7	7
Dec-09	4.87	7.38	252	10219	277	11358	4.49	5.79	8	13
Jan-10	5.42	6.43	193	8853	216	9962	5.37	6.68	7	8
Feb-10	4.91	5.64	210	8583	254	10405	4.70	6.39	8	12
Mar-10	4.78	5.75	218	8611	238	9400	4.89	5.82	13	16
Apr-10	5.06	5.89	262	11318	311	13441	4.78	6.74	10	12
May-10	4.85	6.33	229	8951	241	9456	4.63	6.41	11	12
Jun-10	6.12	9.31	204	10488	209	10861	6.13	9.19	7	9
Jul-10	4.53	4.90	239	9141	229	8783	3.98	4.35	7	9
Aug-10	4.25	4.98	280	10143	269	9731	3.75	5.12	8	9
Sep-10	4.48	5.33	249	9363	252	9484	4.47	5.96	7	8
Oct-10	4.26	4.65	245	8744	229	8135	4.16	5.44	6	8
Nov-10	4.86	5.82	201	8124	185	7470	4.94	7.00	8	11
Dec-10	5.26	6.69	264	11683	255	11298	5.58	7.02	9	16
Average	**4.73**	**5.62**	**268**	**10419**	**255**	**10029**	**4.48**	**5.75**	**10**	**13**
Maximum	**6.12**	**9.31**	**361**	**13812**	**326**	**14356**	**6.15**	**9.19**	**17**	**22**
Minimum	**3.92**	**4.08**	**193**	**8124**	**171**	**7286**	**3.14**	**4.07**	**6**	**7**

The 5-year coverage concentrations for Influent BOD_5 and TSS are 268 mg/L and 255 mg/L respectively. The average monthly concentrations for Influent BOD_5 covered a range from 193 mg/L to 361 mg/L over the period from 2006 to 2010. Similarly, average monthly concentrations for Influent TSS covered a range from 171 mg/L to 326 mg/L. Average and maximum monthly concentrations in these ranges would be considered low to medium strength domestic wastewater.

The maximum monthly Influent BOD_5 loading shown in Table 6-2 is 13,812 lb/d for April 2006. Being as other monthly averages for BOD_5 loading were well below 13,812 lb/d, this value is considered representative of maximum month conditions. As discussed below in the "Existing BOD_5 Loading" section, use of this maximum month loading value yields a relatively high per capita loading value of 0.310 lb/cap/d, and 0.699 lb/ERU/d, respectively. The ratio of the maximum month BOD_5 loading to the annual average BOD_5 loading is 1.33 to 1. This ratio is used in the calculation of future loadings to the plant.

The maximum monthly Influent TSS loading shown in Table 6-2 is 14,356 lb/d for April 2006. Since other monthly averages (13,911 lb/d in January 2006 and 13,441 lb/d in April 2010) were well below this value, this value is considered representative of maximum month conditions. The ratio of maximum month TSS loading to annual average TSS loading is 1.43 to 1. This ratio is used in the calculation of future loadings to the plant.

The annual average and maximum month influent BOD_5 and TSS mass loading, along with annual average effluent and influent flows, for 2006 through 2010 are listed in Table 6-3.

TABLE 6-3

WWTP Flow and Loading Summary(1)

Year	Annual Average Influent Flow (mgd)	Annual Average Effluent Flow (mgd)	Annual Average Influent BOD_5 (lb/d)	Annual Average Influent TSS (lb/d)	Maximum Month Influent BOD_5 (lb/d)	Maximum Month Influent TSS (lb/d)
2006	5.16	4.50	11,628	12,112	13,812	14,356
2007	4.59	4.49	10,221	9,090	11,246	11,151
2008	4.50	4.34	10,603	8,965	12,113	10,716
2009	4.53	4.30	10,146	10,109	11,475	12,306
2010	4.90	4.78	9,500	9,869	11,683	13,441
Average(1)	**4.74**	**4.48**	**10,420**	**10,029**	**12,066**	**12,394**

(1) Average of yearly averages.

Changes in influent BOD_5 and TSS loadings have generally correlated with changes in influent flows. Annual average influent flows and loadings decreased from 2007 to 2009 relative to 2006. Flows began to increase in 2010 although loadings remained nearly as low or lower than previous years.

EXISTING EQUIVALENT RESIDENTIAL UNITS (ERUS)

To determine the number of residential units with sewer service, water consumption, water billing and sewer billing records were reviewed.

WATER CONSUMPTION

Water use (consumption) is used to estimate wastewater volumes entering the collection system because the amount of water use typically is equal to wastewater flow except for an amount of water that does not enter the sewer system (such as irrigation flows).

Table 6-4 presents the number of total water accounts, the number of total sewer accounts and the total number of sewer only accounts (no water). For single family residential, there were 14,405 sewer accounts of which 12,234 of these accounts also received water (the difference of 14,405 and 2,171). It is this percentage of single family (12,234 divided by 16,581) by which Table 6-4 presents water use from all 16,581 single family accounts and water use from all 12,234 single family accounts receiving City water. The table also presents the same for multi-family, school and commercial.

Table 6-4 also presents the annual average water consumption in gallons per day (gpd) by customer class for 2010. For this analysis, flows from querying the City's billing database for the various customer classes are used. For the summary of water use presented in Table 6-4, the customer classes have been combined into four categories.

TABLE 6-4

2010 Annual Average Water Use by Customer Class

Customer Grouping	Water Accounts	Sewer Accounts	Sewer Only Accounts	Percent Difference
Single Family Residential	16,581	14,405	2,171	73.8%
Multi Family Residential	840	698	9	82.0%
School	49	32	0	65.3%
Commercial	933	827	0	88.6%

Customer Grouping	Water Use (gpd)	Water Use (gpd) by Combined Sewer-Water Accounts
Single Family Residential	2,695,353	2,342,262
Multi Family Residential	676,301	562,006
School	172,666	112,751
Commercial	1,407,696	1,247,219
TOTAL	**4,952,016**(1)	**4,264,238**

(1) Compared to a 2010 average of 4.14 MGD based on metered water consumption data.

Table 6-5 provides average water consumption for the City's major water consumers.

TABLE 6-5

Major Water Consumers for 2010

	Customer	2010 Annual Average Consumption (gpd)	% of Total Annual City Water Consumption$^{(1)}$
1	Pacific Coast Feather Co.	78,093	1.9%
2	National Food Corp	34,962	0.8%
3	Marysville Care Center	10,677	0.3%
4	Captain Dizzy Car Wash	10,548	0.3%
5	Marysville YMCA	9,337	0.2%
6	Fred Meyer Inc	8,512	0.2%
7	Medallion Hotel	8,419	0.2%
8	Holiday Inn Express	8,263	0.2%
9	Haggen Food & Pharmacy	8,104	0.2%
10	Northwest Composites	7,660	0.2%
TOTAL		184,575	4.5%

EQUIVALENT RESIDENTIAL UNITS

Use of Equivalent Residential Units (ERUs) is a method to express the amount of water or sewer use by non-residential customers as an equivalent number of residential customers. The *water consumption* ERU value is calculated by dividing the total volume of water utilized in the single-family residential (SFR) customer class by the total number of active single-family residential connections. The *wastewater* ERU value is calculated based on water use. For typical wastewater collection systems, it is estimated that, depending on the City, anywhere from 0 percent (negligible) to as much as 15 percent of the water consumption does not enter the wastewater collection system. The wastewater ERU value is calculated by dividing the water use for single family residential units by the number of single family units and multiplying by the fraction of water estimated to enter the sewer (0.85 to 1.00). The average daily volume of water used by other customer classes can then be multiplied by this factor and divided by the average daily single-family residential water use to determine the number of equivalent residential units consumed by other customer classes.

With 12,234 single-family residences receiving water and sewer service and an estimated 2,342,262 gpd water consumed by these customers (per Table 6-4), the average daily single-family residential water use (which is equivalent to one ERU) for the City in 2010 was 191 gpd/ERU. Since the water use records account for annual average, for planning purposes it is estimated that 5% of water does not enter the sewer system. Therefore, the estimated water entering the sewer system from single-family residential use is 2,225,150 gpd and the average daily single-family residential water use (which is equivalent to one ERU) for the City in 2010 is **182 gpd/ERU**. Table 6-6 summarizes current wastewater ERUs based on an analysis of water use.

As shown in Table 6-6, the total water use among the combined City sewer/water customers was 4.45 mgd in 2010. This is less than the annual average influent sewage flow (4.73 mgd) as determined by analysis of the DMRs which indicates I/I.

The second column in this table shows water use for customers who receive both sewer and water service from the City; as in Table 6-4, this does not include water use by water-only customers. The third column provides the estimated additional sewage flow discharged from customers who receive sewer service, but not City water service. In 2010, there were 2,169 residential sewer-only accounts within the City and 2 residential sewer-only accounts outside City limits. There were 9 multi-family residential sewer-only accounts. This additional sewage flow was estimated by multiplying the per connection water use by the number of sewage service connections that are not provided water service. The fourth column provides a sum of water use and sewage flow from sewer-only customer. The fifth and six columns show the estimated number of ERUs and percentage of total ERUs, respectively, for each customer class.

TABLE 6-6

Current Wastewater ERUs

	Water Use By Combined Sewer-Water Customers Minus 5% (gpd)	Estimated Additional Flow from Sewer-Only Customers (gpd) (1)	Sum of Water Use and Estimated Additional Flow from Sewer-Only Customers (gpd)	Sewer ERUs(1)	% of Total ERUs
Single Family Residential	2,225,150	392,951	2,618,101	14,385	58.9%
Multi Family Residential	533,906	1,629	535,535	2,943	12.0%
School	107,113	(0)	107,113	589	2.4%
Commercial	1,184,858	(0)	1,184,858	6,510	26.7%
TOTAL	**4,051,027**		**4,445,607**	**24,427**	**100.0%**

(1) Based on 182 gpd/ERU

INFILTRATION AND INFLOW

The amount of infiltration and inflow (I/I) can be estimated on an annual average, maximum month, and maximum day basis by subtracting the dry weather flow at the WWTP from the annual average, maximum month, and maximum day flows at the WWTP.

For this Plan, infiltration and inflow is expressed in units of gallons per acre per day (gpad). The average developed sewer service area, which includes the majority of the City and portions of its UGA, for the period of analysis, is comprised of approximately 4,979 acres from parcels. The total acreage of the UGA is approximately 13,660 acres. Areas designated for recreation and open space and unsewered areas are excluded from the total acreage to estimate the developed sewer service area.

Table 6-7 summarizes the infiltration/inflow analysis. The data contained in this table is useful as a baseline for evaluating changes in infiltration and inflow in the future. This data is also used to estimate future flows.

Infiltration and Inflow Analysis using EPA criteria

Another analysis of infiltration and inflow was performed to compare estimates of per capita I/I to EPA criteria. These infiltration and inflow rates are summarized in Table 6-8.

TABLE 6-7

Estimated Infiltration and Inflow

Flow	Influent Flow at WWTP (mgd)	Base Flow (mgd) (1)	I/I (mgd)	Service Area (acre)(3)	I/I (gpad)
Dry Weather (July – Sept.)	4.16	4.45	0	4,979	0
Annual Average	4.73	4.45	0.28	4,979	56
Max. Month	6.12	4.45	1.67	4,979	335
Peak Day	9.31	4.45	4.86	4,979	976
Peak Hour	10.7	5.5(2)	5.2	4,979	1,044

(1) Base flow as estimated in Table 6-6
(2) The one hour peak flow during a day with average dry weather peak flow (4.16 mgd)
(3) Estimate of developed, sewered parcels only in the Marysville sewer service area.

The U.S. EPA manual entitled *I/I Analysis and Project Certification* provides recommended guidelines for determining if infiltration and/or inflow is excessive.

1. To determine if excessive *infiltration* is occurring, a threshold value of 120 gallons per capita per day (gpcd) is used. This infiltration value is based on an average daily flow over a seven to fourteen day non-rainfall period during seasonal high ground water conditions.

2. To determine if excessive *inflow* is present in a collection system, the USEPA uses a threshold value of 275 gpcd. If the average daily flow (excluding major commercial and industrial flows greater than 50,000 gpd

each) during periods of significant rainfall exceeds 275 gpcd, the amount of inflow is considered excessive.

Infiltration

WWTP precipitation records show a 6-day period, November 28 through December 3, 2006 during which no rainfall was measured. This would also be a period of relatively high groundwater due to a total rainfall of over seven inches earlier in November. The average daily flow recorded during this time period was 5,410,000 gallons per day. (The highest daily flow was 5,660,000 gpd.) Since the intent of the EPA criteria was to only include domestic flows, 1,444,470 gpd (26.7 percent of the baseflow) for commercial flow was neglected. With a total population of sewer users of 50,543 and a residential flow of 3,965,530 gpd (equal to 5,410,000 gpd minus 1,444,470 gpd) for this period, the peak infiltration is estimated at 78 gpcd. Because this value is less than the EPA guideline of 120 gpcd, Marysville is not considered to have excessive infiltration by EPA criteria.

Inflow

The maximum day flow at the WWTP over the period of 2006 - 2010 was 9.31 mgd (recorded in June, 2010), as shown in Table 6-2. Since the intent of the EPA criteria was to only include domestic (residential) flows, 2.46 mgd (26-percent of the 9.31 mgd) of commercial flow was neglected. With an estimated total population of sewer users in 50,543, and a non-commercial flow of 6,850,000 gpd (equal to 9,310,000 gpd minus 2,460,000 gpd) for this day, the residential peak inflow is estimated at 136 gpcd. Because this value is less than the EPA guideline of 275 gpcd, the City is not considered to have excessive inflow by EPA criteria.

Flow Monitoring

There was no flow monitoring performed as an update to this Plan.

I/I Summary

In general, I/I for the City's sewer collection system can be considered a moderate problem. Based on EPA criteria, I/I is not considered excessive but on an annual average basis, I/I represents about 6 percent of the total wastewater flow. Yet because of the large area covered by the collection system, I/I is only 56 gpad as presented in Table 6-7. I/I contributions increase to 335 gpad during maximum month periods, or about 27 percent of the total flow. I/I values typically cover a range of 20 to 3,000 gpad (*Wastewater Engineering Treatment Disposal and Reuse,* Metcalf and Eddy, Inc., 3rd Edition). For the City's flows, I/I values fall at the low end of this range.

Another indicator of I/I is related to the concentration of BOD_5. The influent BOD_5 concentration is medium strength indicating relatively low levels of I/I. High I/I flows will dilute the strength of BOD_5 but the DMR data shows relatively little difference between dry and wet weather concentrations. For the 5-year period presented in Table 6-2, the average dry weather (July, August, and September) BOD_5 concentration was 303 mg/L, and the average wet weather (December, January, and February) BOD_5 concentration was 231 mg/L, a difference of 23 percent.

TABLE 6-8

Per Capita Infiltration and Inflow Based on EPA Criteria

Parameter	EPA Criteria for Excessive I/I (gpcd)	Estimated Marysville I/I Value (gpcd)
EPA Excessive Infiltration Criteria	120	78
EPA Excessive Inflow Criteria	275	136

PROJECTED SEWER SERVICE AREA POPULATION, ERU AND FLOWS

As discussed in Chapter 3, an estimated population of 50,543 (44,372 Single Family Residential plus 6,172 Multi-Family) out of the total service area population of 64,669 within the sewer service area was provided sewer service by the City in 2010, while the total population estimated to be served by the City's sewer system in 2010 was 61,491.

The current and projected 6-year and 20-year ERUs and flows are summarized in Table 6-9. The projected flows and ERUs are based on the growth rates developed in Table 3-11, including the following assumptions:

- In the existing sewer system, the I/I contribution to the WWTP will increase with increases in the age of the sewer system and the size of the service area. The increase with system age accounts both for deterioration of system components with time, as well as assumed increased density, and thus overall pipe length, that occur with time.

- For the *existing* sewer service area, the 2011 peak day I/I rate shown in Table 6-7 increases at a linear rate to 1,000 gpad over the next 20 years. *New* sewer service area served will be assumed to have a peak day I/I rate of 100 gpad I/I initially, increasing at a linear rate to 1,000 gpad over 50 years.

- For the *existing* sewer service area, the other I/I rates – dry season, annual average, maximum month, and peak hour – grow at the sewer population growth rates determined in Chapter 3. *New* sewer service area served will be assumed to have a lower – dry season, annual average, maximum month, and peak hour – I/I rate initially, increasing at the sewer population growth rates determined in Chapter 3.

- To estimate future dry season, annual average, maximum month, and peak day flows, the projected I/I flowrates are added to the base level wastewater flows derived from the population projections to obtain the respective future WWTP influent flowrates.

As shown in Table 6-9, the projected year 2031 maximum month flow is 11.25 mgd, which is below the rated hydraulic capacity of the WWTP (12.7 mgd after completion of Phase 2 improvements in 2004.)

TABLE 6-9

Current and Projected Future Wastewater Flows (gpd)

Year	2010	2017	2031
ERUs	24,427	30,084	42,413
Sewer Service Area(1)	4,979	5,708	7,340
Total Baseflow	4,030,000	5,480,000	7,720,000
Dry Season Average Flow	4,160,000	5,240,000	7,620,000
Average Annual Flow	4,730,000	5,830,000	8,230,000
Maximum Month	6,120,000	7,600,000	11,250,000
Peak Day	9,310,000	10,530,000	13,790,000
Peak Hour(2)	10,700,000	12,710,000	16,880,000
Peak Hour Factor(3)	2.26	2.18	2.05

(1) In acres, per Chapter 7.
(2) Peak Hour: Average Annual Flow x Peak Hour Factor
(3) See Table 6-1 for Peak Hour Factor calculation. See Chapter 7 for populations.

EXISTING AND PROJECTED INFLUENT BOD_5 AND TSS LOADING

EXISTING BOD_5 LOADING

Monthly average influent BOD_5 loadings ranged from 8,124 lb/d to 13,812 lb/d for the 5-year period of analysis as shown in Table 6-2 and Figure 6-1. The average influent BOD_5 concentration for the 5-year period is 268 mg/L, which would be considered medium strength domestic wastewater. The average loading of 10,419 lb/d (see Table 6-2) and an average sewer service population of 48,200 for the 5-year time period of 2006-2010 translate to an average BOD_5 loading of 0.227 lb/cap/d. This value is just slightly higher than the DOE Orange Book criteria of 0.2 lb/cap/d, possibly due to industrial and commercial loading.

To convert the current maximum month BOD_5 loading to a per capita and an ERU basis, the service population of 48,200 and number of ERUs (24,427) and maximum month BOD_5 of 13,812 lb/d for the 5-year analysis period were used to calculate a maximum month per capita and ERU BOD_5 loading of 0.287 lb/cap/d and 0.565 lb/ERU/d, respectively. The ratio of the maximum month BOD_5 loading to the annual average BOD_5 loading is 13,812 : 10,419 or 1.33:1. This ratio is used in the development of future loadings to the WWTP later in the chapter.

EXISTING TOTAL SUSPENDED SOLIDS LOADING

A review of Table 6-2 shows that monthly average TSS loadings ranged from 7,286 lb/d to 14,356 lb/d. The average month loading of 10,029 lb/d and an average population and average ERUs of 48,200 and 24,427, respectively, for the 5-year time period translate to an average month TSS loading of approximately 0.208 lb/cap/d or 0.411 lb/ERU/d.

The maximum month TSS loading is 14,356 lbs/d. Using the same population and ERU values as derived for the BOD analysis, this approach results in a current maximum month value of 0.298 lbs TSS/cap/d or 0.588 lb/ERU/d. The ratio of the maximum month TSS loading to the annual average TSS loading is 14,356 : 10,029 or 1.43:1. This ratio is used in the development of future flow and loadings to the WWTP later in the Chapter.

PROJECTED WASTEWATER LOADINGS

Future WWTP maximum month BOD_5 and TSS loadings are estimated by multiplying the projected ERUs by the respective ERU-based loadings. Future annual average BOD_5 and TSS loadings are estimated using the ratio of the maximum month to annual average loadings of these parameters. The current maximum month BOD_5 and TSS loadings are 0.565 lb BOD_5/ERU/d and 0.588 lb TSS/ERU/d. The ratio of the maximum month to annual average BOD_5 is 1.33:1. The ratio of the maximum month to annual average TSS is 1.43:1. Table 6-10 provides a summary of projected future WWTP influent BOD_5 and TSS loadings.

The projected year 2017 loadings are less than the design capacity of the WWTP for both BOD and TSS. The year 2031 maximum month loading for BOD_5 (23,963 lb/d) exceed the rated capacity of 20,143 lb/d BOD_5, and the year 2031 maximum month loading for TSS (24,939 lb/d) exceed the rated capacity of 24,229 lb/day (Table 5-5).

TABLE 6-10

Current and Projected WWTP Loadings

ERUs/Loading	2010	2017	2031
ERUs	24,427	30,084	42,413
Annual Average BOD_5, lb/d	10,419	12,846	18,110
Max Month BOD_5, lb/d	13,812	16,997	23,963
Annual Average TSS, lb/d	10,029	12,365	17,432
Max Month TSS, lb/d	14,356	17,689	24,939

INDUSTRIAL WASTEWATER

The City's major industrial wastewater producers currently account for approximately 225,000 gpd or about 5.5% of the daily flow. Table 6-11 summarizes the City's major Industrial Wastewater Producers for 2011 and includes operating hours, industrial process, estimated wastewater volume per day and wastewater characteristics. The City is currently not affected by these significant industrial users. However, they do have the potential to discharge high BOD, TSS and heavy metals if their pretreatment systems are not maintained. Significant industrial users that have pretreatment systems in place are required to have a discharge permit with Department of Ecology. In addition, the City also tests and monitors pretreatment systems monthly or quarterly.

Much of the City's industrial zoning is concentrated in the Smokey Point neighborhood and within the southerly portion of the Downtown neighborhood. (Refer to Figure 3-1 and Figure 3-3). Light industrial, as described in Chapter 3, is zoned for in the Smokey Point neighborhood. General Industrial, as also described in Chapter 3, is zoned for in the Downtown neighborhood.

Most of the available General Industrial land available in the Downtown neighborhood is occupied. There is approximately 750 acres (out of 1,100 total) of available land for light industrial in the Smokey Point neighborhood. Based on modeling at 2,700 gpd/acre, this could equate to approximately 2.0 MGD of wastewater from the light industrial. This flow has been accounted for in the modeling efforts described in Chapter 7 and therefore the existing sewer infrastructure is modeled to account for the expansion of light industrial.

Certain industrial wastewater processes will carry pollutants or levels of certain pollutants which are prohibited to discharge to the City's sewer system and could cause detriment to the City's WWTP. Therefore, before discharging to the City's sewer system, the industrial wastewater must undergo pretreatment. Such significant industrial users would be subject to wastewater pretreatment in accordance with Chapter 14.20 MMC.

TABLE 6-11

City of Marysville Industrial Wastewater Producers - 2011

	Industrial Users	Operating Shifts Hours/Days	Process	Wastewater Volume gallons/day	Wastewater Characteristics
1	Aerocell Inc.	24 Hours Weekdays 16 Hours Weekends	Honey comb composite manufacturing	3,000 – 5,000	Discharges from bathrooms only. No pretreatment facility. Spill protection plan in place for oils.
2	Artisan Finishing	5 Days Week 0630 – 1530	Kynar Coating of Architectural Metals	2,000	Discharges from bathrooms and manufacturing process. Pretreatment includes a clarifier and pH adjustment.
3	B.E. Aerospace	12 Hour Day 0600 - 1400	Design, certification and manufacturing of aircraft standard components.	3,000	Discharges from bathrooms, kitchen, floor drains and an abrasive water jet cutter. Spill plan in place.
4	C & D Zodiac	24 Hours Day	Aircraft part manufacturing	8,000	Discharges from bathrooms and manufacturing process including water from plaster casting and cleaning of spray guns for water soluble adhesives. No pretreatment facility. Spill protection plan in place for oils.
5	Centralia Fur and Hide	5 Days Week 0700 - 1530	Leather Manufacturing including processing of animal hides and hair removal	5000 - 10,000	Discharges from manufacturing process. Pretreatment includes aeration and settling tanks.
6	Iversen Distributing	24 Hours Day	Warehouse and distribution center for dairy products.	2,000	Discharges from bathrooms only. No processing of dairy products at this site.

TABLE 6-11 Cont…

City of Marysville Industrial Wastewater Producers - 2011

	Industrial Users	Operating Shifts/ Hours/Days	Process	Wastewater Volume gallons/day	Wastewater Characteristics
7	Metal Finishing, Inc.	16 Hours Day 0730 - 2300	Cleaning, conversion coating, anodizing and tin plating of metals.	3,000 – 5,000	Discharges from bathrooms and manufacturing process. Pretreatment includes batch treatment for Chrome containing solutions and pH adjustment.
8	National Foods Corporation	7 Days Week 20 Hours Day 0300 -0100	Whole egg and egg product processing	50,000 – 60,000	Discharges from bathrooms and manufacturing process. Pretreatment includes a poly based coagulation system for BOD/TSS removal and clarifier and pH adjustment
9	Pacific Coast Feathers	4 Days Week 0700 – 1700	Washing, drying and separating down from feather material.	70,000 – 120,000	Discharges from bathrooms and manufacturing process. Pretreatment includes a hydroscreen to separate down form feathers and a clarifier and pH adjustment
10	Pacific Grinding Wheel	5 Days Week 0730 - 1630	Grinding wheel manufacturing	2,600	Discharges from bathrooms, kitchen and clean up sink in the vitrified mixing area. No pretreatment facility. Spill protection plan in place for oils.
11	Sea Cast, Inc	18 Hours Day 0800 - 0200	Stainless Steel investment casting	4,000	Discharges from bathrooms and manufacturing process. Pretreatment facility includes a system for neutralizing rinse water and removing metals.
12	Thomas Machine & Foundry	20.5 Hours Day 0500 - 0130	Aluminum Castings and Machining	700 – 1,000	Discharges from bathrooms, kitchen, floor drains and vibratory tumbler. No Pretreatment facility.

REFERENCES

1. *Comprehensive Sanitary Sewerage Plan*, City of Marysville , HCWL, October 1990

2. *Comprehensive Sanitary Sewerage Plan*, City of Marysville , HCWL, KCM, Jones and Stokes, June 1997

3. *Sanitary Sewer Infiltration / Inflow Analysis*, HCWL, September 1999

4. *Wastewater Treatment Plant Capital Facilities Plan*, Final, February 2001, KCM

5. *Comprehensive Sanitary Sewerage Plan*, City of Marysville , G&O, May 2005

CHAPTER 7

COLLECTION SYSTEM EVALUATION

INTRODUCTION

The purpose of the hydraulic/hydrologic analysis is to evaluate the City's sewer collection system based on existing and future conditions. Existing and future population, land use, and wastewater flows presented in Chapters 3 and 6 of this Plan are utilized to develop data for use in the hydraulic model. Total area population and wastewater flows are allocated to individual subareas to identify current and future deficiencies in the collection system.

The components of the City's sewer system are organized into three categories for capacity evaluation:

- Major Gravity Lines
- Force Mains
- Main Sewage Pump Stations

The hydraulic model, InfoSewer developed by Innovyze (formerly MWHSoft), has been used to analyze the major gravity lines within the collection system for current conditions (2011), and future conditions for the years 2017, 2031, and buildout. For the capacity analysis for the force mains and sewage pump stations, peak wet weather flows for 2031 conditions were estimated and compared to existing pump capacity.

HYDRAULIC MODEL

The development of the hydraulic model is described and the assumptions used to develop the model are presented in this Chapter. The output from this model is used to evaluate the capacity of the existing collection system and to identify improvements that will be required to handle the wastewater flows. The model can be updated and maintained for use as a tool to aid in future planning and design.

The hydraulic model was developed by Innovyze. Version 7.5 for Windows was designed for steady-state analysis of gravity flow and pressure flow pipe networks. Version 7.5 is capable of modeling up to 6,000 nodes and is also capable for integration with the City's GIS mapping. This version of InfoSewer also has the capability of extended time modeling.

The hydraulic model used for the 2005 Plan utilized SewerCAD. The information from this model was imported into InfoSewer and updated with the latest GIS-based sewer data.

MODEL LAYERS

The hydraulic model consists of numerous layers, each of which mimics a shapefile (.shp or layer) utilized in GIS. Although the layers are not specific .shp files, they can be exported as a .shp file which can be utilized in a GIS system. The layers consist of manholes, outlet, wetwells, pipes, force mains, and pumps. In the model, each of the smaller pump stations is included as fixed discharges to downstream manholes. Six of the City's main pump stations are included with the hydraulic model and are located on a pump layer. Flow loadings were calculated separately in an Excel spreadsheet (i.e. based on area, population, and infiltration and inflow) and then input into the model at specific designated manholes.

For economy, only a portion of the total collection system is modeled. All pipelines greater than 10-inch diameter are included as well as selected 8-inch pipelines. A schematic of the skeletonized system is shown in Figure 7-1 along with the basin overlay. A larger size figure of the pipe network is presented in the jacket of the Plan. Necessary data for the model are shown in Table 7-1.

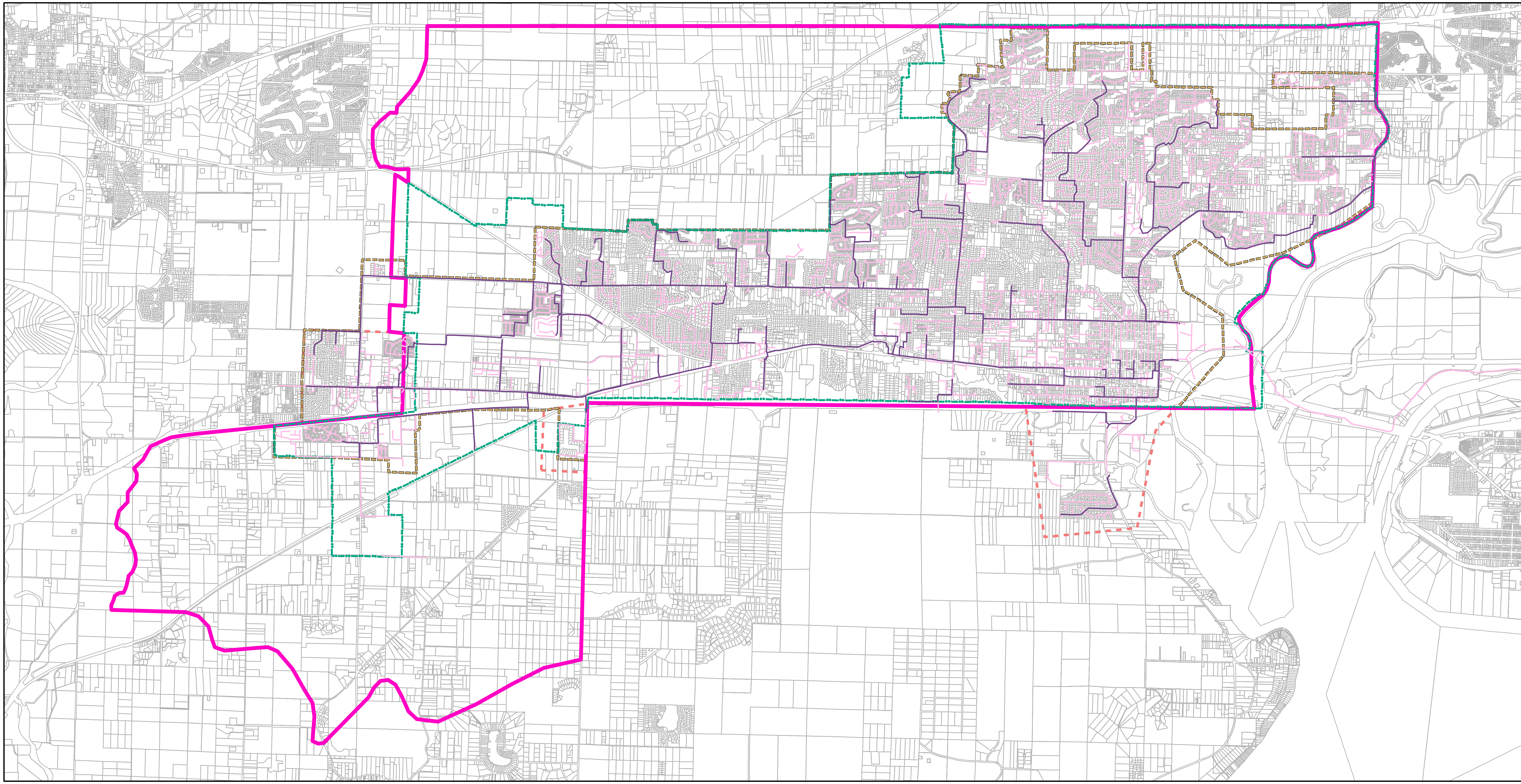
TABLE 7-1

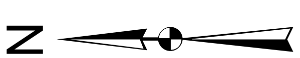
Collection System Information(1)

Category	Gravity Sewers	Manholes	Pump Stations
Dimensions	Length (Calculated from X and Y coordinates of manholes and Pump Stations)	Location (X and Y coordinate from City's GIS system)	Location (X and Y coordinates from City's GIS system)
Identification No.(1)	Name (from City e.g., S-Line-5165)	Name (from City, e.g., S-MH-3830)	Name
Base Elevation	--	Rim Elevation	Ground Elevation
Depth	Upstream and Downstream Invert Elevations	--	Water Level Setting
Size	Pipe Diameter	Manhole Diameter	Wet Well Diameter
Flow Criteria	Pipe Material	--	Pump Curve
Vertical Datum	NGVD 88	NGVD 88	NGVD 88

(1) This information was collected for the 2005 SewerCAD model and was then imported into InfoSewer in 2011. This data was verified and updated with the City's current GIS based data.

Information required to construct the original model was obtained from record drawings, linear interpolation between known inverts, survey, and pump curves. Use of each item is described below:





N

0 2,250 4,500 9,000

Feet

SCALE 1"=4500'

LEGEND:

- MODELED SEWER LINES
- EXISTING SEWER LINES (2011)
- URBAN GROWTH AREA
- ULTIMATE PLANNING BOUNDARY
- SEWERED AREA (2011)
- SEWERED AREA OUTSIDE UGA (2011)

CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN
FIGURE 7-1
MODELED SEWER LINES

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M:\MARYSVILLE\11447_Sewer_Comp_Plan\Figures\Fig 7-1 MODEL_SEWER11x17.mxd

Record Drawings

The pipeline and manhole information for the model has been obtained from the City's GIS information. The GIS information provided by the City includes the location of the manholes, the manhole identification, pipe segment identification, and the size and lengths of pipelines. From the GIS system, the manhole identification system follows the format S-MH-# with a three or four digit number system. The City also provided record drawings for the sewer system. These record drawings have been used to verify the pipe size and lengths and to determine the manhole rim and invert elevations. The initial vertical datum NGVD 29 was used for elevations, because the majority of the City's record drawings used this datum. However, all elevation data were converted to NAVD 88 by adding 3.67 feet to NGVD 29 datum. NAVD 88 is the current City standard.

Interpolated Manholes

After collecting all the information available from the record drawings in 2004, there were gaps in the information necessary for a functional model. During compilation of the last Plan, the SewerCAD model created manholes at all intersections between two gravity sewer lines that did not already have a manhole. These manholes are created for any bends in the pipe and ends of the pipe where there are clean-outs in lieu of manholes. In the majority of these cases, the upstream and downstream invert elevations were known and a constant slope was assumed in between the manholes. The length of pipe to each junction is known from the GIS system. The invert elevations of these manholes and junctions are determined by linear interpolation between the upstream and downstream manholes. Where the SewerCAD model created "new" manholes, it utilized the manhole identification format of MH-#. Numbered manholes used in the model are presented in Exhibit III.

Surveyed Manholes

In the 2004 model, there were also a few sections of gravity pipe where the elevations were either missing or were incorrect. These sections, including some post 2004 sewer construction projects, were surveyed and updated for the 2011 model.

In some areas, the missing information was the rim and invert elevations for saddle manholes, which were most likely installed after the original construction. In these cases, key manholes upstream and downstream in these unknown sections were surveyed. Additional survey information had been used in conjunction with the as-built drawings to convert the unknown elevations on the as-builts into invert and rim elevations using the NAVD 88 datum.

One significant area of the City without known elevations was the downtown area where some of the older sewers are located. The as-built drawings provided the pipeline lengths and constructed slopes, but not elevation. Field survey in 2004 established invert elevations for these manholes.

In some instances adjacent sets of “as-builts” did not match indicating “negative” pipeline slopes. Survey information had been used to correct or confirm this “as-built” information.

Pump Stations

For simplicity, the small pump stations are modeled as constant-discharge pumps, so that the pump stations produce a constant discharge regardless of head conditions. Only the force mains and pump curves for Marysville West, West Trunk, Soper Hill Road, Sunnyside, 88th Street, and 51st Avenue Pump Stations are included in the model at this time. A future refinement of the model may include the pump curves for the smaller pump stations and/or the results from drawdown tests for each pump station. For the modeled pump stations, three points from the station’s pump curve were originally utilized for model input in InfoSewer. However, four of the stations were changed to constant discharge pumps to ensure that the flow mimicking the lift station capacity would continue downstream (i.e. 1,250 gpm capacity resulted in 1,250 gpm being transported downstream). These lift stations include Marysville West, West Trunk, Soper Hill Rd, and Sunnyside. The remaining lift stations however, transported all flow reaching a particular pump station so that downstream pipelines were accurately modeled.

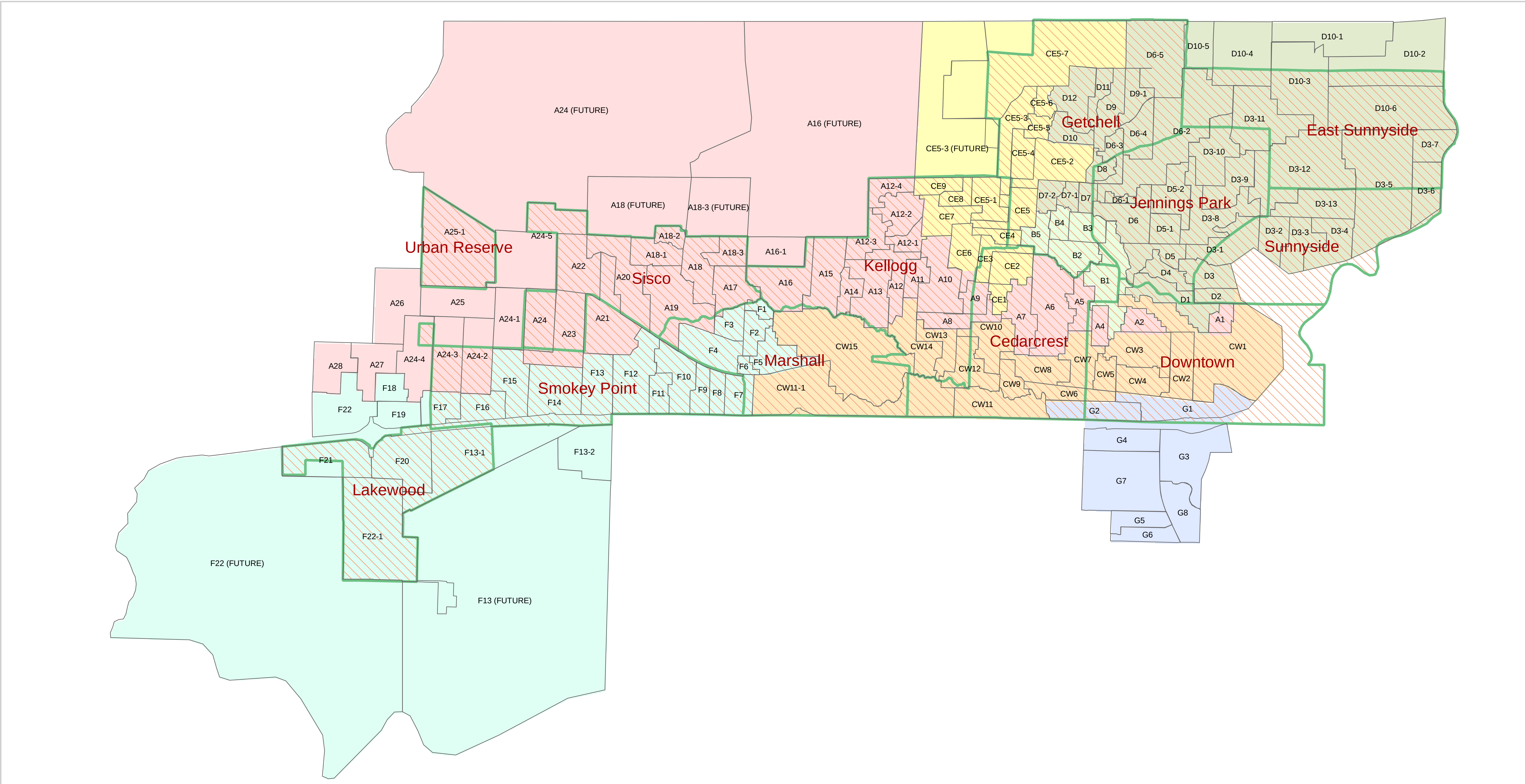
BASINS

The City’s collection system is organized around seven trunk sewers or basins. Within each trunk sewer area, individual subareas were identified. These subareas were established primarily around topographic areas. Altogether there are 214 subareas within City’s UGA and planning areas. Figure 7-2 presents each numbered subarea in relation to the seven basin and 11 neighborhood planning areas.

The model inputs for InfoSewer originated from loading tables set up in an Excel spreadsheet (see Appendix D). The loads resulted in average sanitary flow, peak I/I flow, peak commercial flow and fixed flow. For average sanitary flows, InfoSewer applies peaking factors for identified residential load. A summary of these peaking factors based on flow is shown in Table 7-2. Lower estimated flows (such as those in Subbasins A24-5 and F-12) are subject to high peaking factors while as the flows within a basin get larger (such as those in Subbasins CE5-7 and D6-2), the peaking factor diminishes. Higher flows have lower peaking factors. Together with peak I/I, peak commercial and pumped flow, the model evaluates the impact of peak flow on the sewer collection system. The schematic, Figure 7-3, illustrates the organization of these model inputs and outputs for InfoSewer.

TABLE 7-2
Peaking Factors

Average Sanitary Sewer Flow (mgd)	Peak Factor for InfoSewer Model
0.04	3.7
0.1	3.6
0.2	3.4
0.3	3.2
0.4	3.1
0.5	3.0
0.7	2.9
0.9	2.8
1.2	2.7
1.5	2.6
2.0	2.4
3.0	2.3
4.5	2.1
6.0	2.0
9.0	1.9
12.0	1.8
15.0	1.7
20.0	1.6



N

0 2,150 4,300 8,600
Feet
SCALE 1" = 4300'

LEGEND:
MODELED SUB-BASINS
PLAN AREAS
BASINS:
BASIN A
BASIN B
BASIN C EAST
BASIN C WEST
BASIN D
BASIN F
BASIN G

CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN
FIGURE 7-2
NEIGHBORHOOD PLANNING

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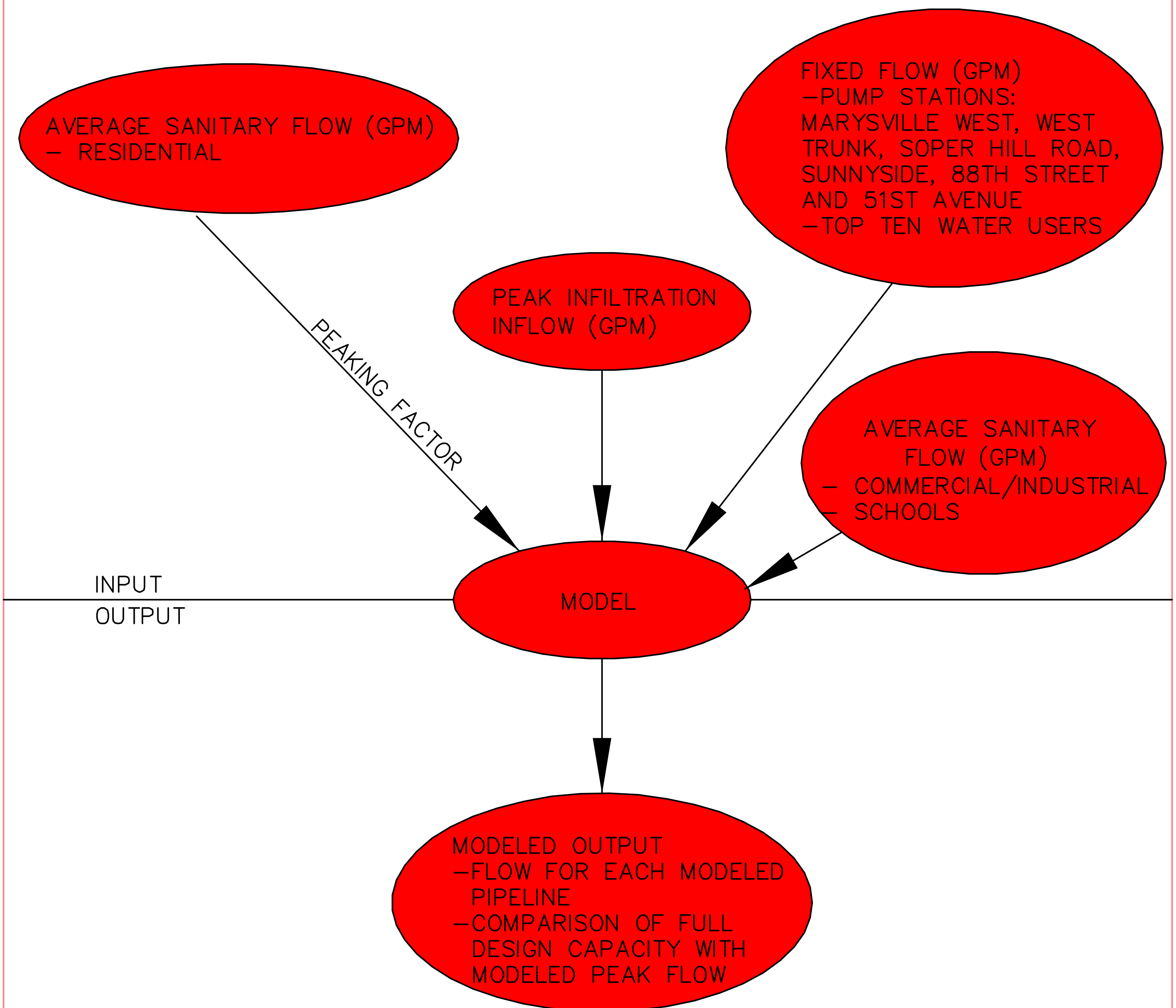
M:\MARYSVILLE\11447_Sewer_Comp_Plan\Figures\Fig 7-2 NBRHD-PLANNING.MXD

MODEL DATA CATEGORIES:



CITY OF MARYSVILLE
SEWER COMPREHENSIVE PLAN
FIGURE 7–3
MODEL INPUTS

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HYDRAULIC MODELING ANALYSIS

Hydraulic models have been first developed for 2011, 2017, and 2031 conditions for the existing sewer collections system. This approach was used to identify any patterns, which may exist for pipeline deficiencies. Once the analyses have been completed for these conditions, an additional hydraulic model is prepared with improvements to correct pipeline deficiencies. A final hydraulic model is prepared for "build-out" conditions.

Basin data for 2011, 2017, and 2031 are presented in Appendix D. Pipe deficiencies resulting from the model are included in Appendix E for 2011, 2017, and 2031. For the initial model set-up (2011), there are a total of 1,225 nodes, or manholes, in the InfoSewer format. Approximately 318,865 lineal feet of pipe is included for the hydraulic model, 27 percent of the total collection system.

To support the development of the hydraulic model and to present the model results, six exhibits have been prepared. Each of these is listed below and included in jackets at the end of this Plan.

Exhibit I:	Existing Sewer System and Land Use Subareas
Exhibit II:	Sewer System Aerial Map
Exhibit III:	Modeled Sewer Lines, Manhole IDs, and Basins
Exhibit IV:	Pipe ID and Capacity Deficiencies (Model Runs 2011, 2017, and 2031)
Exhibit V:	Modeled Sewer Lines w/Improvements and Buildout Conditions
Exhibit VI:	Pipe ID and Pipeline Velocity Deficiencies (2011)

YEAR 2011 HYDRAULIC MODELING ANALYSIS

EXISTING POPULATION

There are three requirements for identifying existing population for 2011 conditions. The first is to establish the total population for the sewer service area. The second is the population within the UGA and the third is the population currently sewered. These population numbers were developed in Chapter 3 and are summarized in Table 7-3.

TABLE 7-3

2011 Population

Sewer Service Area		Sewered Population
UGA	61,491	48,449
Non-UGA	3,178	2,094
Total	64,669	50,543

The population numbers were developed using the land use codes assigned to individual parcels in the Snohomish County Assessor parcel database, also known as the Integrated Land Records system. These codes can be used to categorize each residential parcel into single family or multi-family housing units. Single family units were assigned 3.0 persons per household and multi-family units were assigned 2.0 persons per household per the City's Community Development Department. The number and locations of parcels connected to sewer was determined by address matching a table of utility billing account information to the parcel data. Population not connected to the sewer system was excluded from the hydraulic model.

Average residential wastewater flow for each subarea has been determined by multiplying the connected sewer population by a unit flow factor of 60 gallons per day per person.

SCHOOLS

Based on the City's water records during compilation of the 2005 Plan, the average daily water use by the school system was 132,000 gpd. For the hydraulic model, a unit flow rate of 10 gpd per student was calculated using a total student/staff population of 13,339 (11,390 students based off of 2010 annual enrollment and approximately 2,000 staff). In 2011, records showed similar results. Therefore, the flow rate of 10 gpd continued to be used for the recent model. Individual school addresses have been used to locate each school and its student/staff population within the appropriate subarea.

COMMERCIAL/INDUSTRIAL

The basis for commercial/industrial inputs into the hydraulic model is a combination of water records and acreages used for this category. The ten largest commercial/industrial customers were identified (Table 6-5) and placed in the "fixed" category. For example, Pacific Coast Feather Co., the largest commercial/industrial user, is located in subarea F-14 and is shown as a "fixed" or pumped flow for this subarea. Based on water consumption records, the total commercial/industrial use is 513,810 gallons per day, and the 10 largest users account for 184,575 gallons per day, or 36 percent of the total. For the other commercial/industrial connections a peaked flow rate of 2,700 gallons per acre per day (gpad) was used to account for anticipated commercial and industrial development. This flow rate is based on a typical planning number. Actual water consumption resulted in 1,023 gpad (after taking out the top ten largest water consumers). A conservative approach was decided upon when selecting the 2,700 gpad commercial flow rate.

The 150 gpm allowed by agreement with the Tulalip Tribes was not included in the model since the Tribes now own and operate a wastewater treatment plant.

INFILTRATION/INFLOW

In Chapter 6 of the Plan, infiltration/inflow has been characterized for average, maximum month, peak day, and peak hour conditions. For the hydraulic model, the unit flow rate for the peak hour flow is used. Based on a service area of 4,979 acres and a peak hour I/I, the unit flow rate is 1,044 gallons per day per acre (i.e 5.2 MGD divided by 4,979 acres). For the model, the peak rate of 1,100 gpd/acre for the 2011 modeling scenario was selected. For the 2017 and 2031 gpad this rate has been decreased to 800 gpad to account for the assumption that deteriorating pipes are being replaced through the City's Sewer Renewal and Replacement program within these years.

YEAR 2011 HYDRAULIC MODELING DATA

Appendix D summarizes the loading data required for the 2011 hydraulic model. For InfoSewer input, four loadings were used: total residential flow, commercial/industrial flow, peak infiltration/inflow, and fixed or pumped flow as shown in Figure 7-3. For each subarea the average annual sanitary flow is determined based on residential population, student/staff population, and commercial/industrial use. For the residential sanitary flow, a range of peaking factors is applied as presented in Table 7-2 whereas the commercial/industrial and I/I flows were already peaked prior to being entered into the model.

Appendix E and Figure 7-4 presents the initial modeling results for 2011 conditions. The report in Appendix E identifies each pipeline segment and compares estimated peak flows with design capacity. About 50 percent of the modeled pipeline segments are characterized by low velocity (less than 2.0 feet per second). A total of 35 segments are shown to have insufficient pipeline capacity.

YEAR 2017 HYDRAULIC MODELING ANALYSIS

The data developed for 2011 conditions was updated for 2017 projections. The basis for these future population estimates was the overall population projection for the UGA (Table 3-7) and the neighborhood planning capacity analysis (Table 3-8). In addition, all new population was assumed to connect to the sewer system while a steady decrease in unsewered population was expected. The summary of the 2017 population is shown in Table 7-4.

TABLE 7-4

2017 Population

Sewer Service Area		Sewered Population
UGA	69,338	59,656
Non-UGA	3,278	2,594
Total	72,616	62,250

Table 7-4 shows an increase of 15,000 sewered population for 2017 compared to 2011. Overall, the increase in sewered population is 28 percent. A percentage of 2.7% increase in population per year is applied to project future school populations.

For all scenarios, the top ten commercial/industrial water users are included in the hydraulic model as “fixed” sources. The balance of the commercial/industrial is included based on acreage at a peaked flow rate of 2,700 gpad. This model assumes all available commercial/industrial is built out by 2017. This is to gain a better understanding of the City’s sewer needs for future commercial areas, specifically Lakewood and Whiskey Ridge.

For the hydraulic model, the infiltration/inflow unit flow rate is 800 gpd/acre in 2017. During this modeling scenario, the acreage served is increased from 4,979 acres in 2011 to 5,708 acres in 2017. So although the unit flow rate is less than 2011, the amount of I/I in 2017 (i.e. 5,708 acres x 800 gpd/acre) increases overall due to the increase in amount of acreage being sewered.

Appendix D summarizes the loading data required for each subarea for 2017 conditions, and Appendix E and Figure 7-5 presents the modeling results for 2017. For 2017, there are 31 new pipe segments with insufficient pipeline capacity. The total number, including 2011 model results, is 66.

YEAR 2031 HYDRAULIC MODELING ANALYSIS

Similar to the development of the 2017 loading table, the initial data developed for 2011 was also updated for 2031 conditions. The overall population projections were based on the UGA population for 2031 and the neighborhood capacity analysis. Individual subareas were assigned population based on their land use designation (single-family and multi-family) and the available land for development. The summary of the 2031 population is shown in Table 7-5.

TABLE 7-5

2031 Population

Sewer Service Area		Sewered Population
UGA	84,989	84,989
Non-UGA	3,278	3,278
Total	87,757	87,757

Overall, the increase in sewered population from 2011 to 2031 is 37,214, or 73 percent. As with the 2017 flows, a percentage of 2.7% increase in population per year is applied to project future school populations.

For all scenarios, the top ten commercial/industrial water users are included in the hydraulic model as “fixed” sources. The balance of the commercial/industrial is included based on acreage at a peaked flow rate of 2,700 gpad. This model assumes all available commercial/industrial is built out by 2017. This is to gain a better understanding of the City’s sewer needs for future commercial areas, specifically Lakewood and Whiskey Ridge.

For the hydraulic model, the infiltration/inflow unit flow rate is 800 gpad in 2031. The acreage served for 2031 is 7,340 acres, a 47% increase above the amount of I/I acres used for 2011.

Appendix D summarizes the loading data required for each subarea for 2031 conditions, and Appendix E and Figure 7-6 presents the modeling results for 2031.

YEAR 2011, 2017, AND 2031 MODELING RESULTS WITHOUT IMPROVEMENTS

Modeled peak flows are compared to projected peak flows developed in Table 6-9. As presented in Table 7-6, the modeled peak flows are much higher than projected peak flows due to the conservative approach to model the sewer system as indicated in Chapter 3.

TABLE 7-6

Modeled Peak Flows vs. Projected Peak Flows

Year	Projected Peak Flow (mgd from Table 6-9)	Modeled Peak Flow (mgd)
2010	10.7	21.7
2017	12.7	22.2
2031	16.9	23.8

The three hydraulic modeling analyses identified a total of 118 pipeline capacity deficiencies. Many other pipelines have velocities less than 2 feet per second (a deficiency criteria) but are capable of handling the existing and projected flows. Table 7-7 summarizes these pipeline capacity deficiencies by model year and basin.

TABLE 7-7

Pipeline Capacity Deficiencies for 2011, 2017, and 2031 without Improvements

Basin ID	Year			
	2011	**Additions in 2017**	**Additions in 2031**	**Total**
Trunk A	0	2	3	5
Trunk B	0	0	0	0
Trunk CE	7	2	8	17
Trunk CW	6	1	15	22
Trunk D	12	3	12	27
Trunk F	3	23	14	40
Trunk G	7	0	0	7
Total	**35**	**31**	**52**	**118**

Exhibit IV in the jacket of the Plan presents the locations of each of the pipe capacity deficiencies by year and basin.

Of the 118 deficiencies identified, Basin F contained 40 deficient pipes. These pipes are clustered mostly into two areas. The first is located near 169th Pl. NE and 27th Ave. NE in the Lakewood area and consists of mostly 12-inch diameter pipes constructed at flat grades. The second area lies along State Ave. between 124th St. NE and 136th St. NE. with 18-inch and 21-inch diameter pipes that have minimal grade. This area will be relieved with the addition of the Lakewood Sewer Extension Project Phase II which would extend a new 36-inch pipe east along 136th St., diverting Lakewood flows to Trunk A.

The Trunk D Basin had the second highest number of pipeline deficiencies with 27. These deficiencies are scattered mostly over the northwest corner of the basin, along 70th St. NE. These pipes are generally the result of pipelines constructed at flat grades. Two pipelines, S-LINE-716 and S-LINE-712, have reverse or very flat grades. Basin D3-11 also contained a few deficient pipes along 75th Ave. NE. This is a relatively newer area, constructed in the 1990's with 8-inch PVC pipes. Very minimal surcharging resulted from the model for this area.

The Trunk CW Basin has the third highest number of pipeline deficiencies with 22. The deficiencies are scattered all throughout the basin but the majority lie between 1st St. and Grove St. in the older downtown portion of the City. Most of these pipes are 18-inch diameter. At 1st St. they become 21-inch and 24-inch diameter pipes. Many of these pipes were installed over 50 years ago and have relatively flat slopes. As with Basin F, this area will benefit by diverting future Lakewood flows east along 136th St. NE toward Trunk A.

The Trunk CE Basin has a total of 17 pipeline deficiencies primarily located along 88th Street. The most significant deficiencies are sections of 12-inch pipe in the vicinity of 88th Street east of 51st Dr. NE based on 2031 conditions.

The Trunk G Basin contained 7 pipes that were found to not have capacity in 2031. All of these pipes are located along Beach Ave. and 1st St. This deficiency was previously identified as a capital project in the 2005 Comprehensive Plan.

The Trunk A Basin has a total of 5 pipe capacity deficiencies. The deficiencies begin to occur in 2017. A segment of 8-inch pipe along 80th St. NE near 52nd Dr. NE was constructed at a flat slope. A second deficiency was identified along 122nd Pl. NE and 51st Ave. NE for a 21-inch diameter pipe yet this area was not considered deficient in 2011 or 2017. The third deficiency is located along 51st Ave. NE near 142nd Pl. NE and is a segment of a 30-inch pipe constructed with a slope of zero.

No pipe capacity deficiencies were identified in the Trunk B Basin.

The hydraulic model determines pipeline capacity deficiencies by comparing design capacity with total projected flow in isolated, individual pipe segments. This evaluation, however, is not complete until a surcharge analysis is prepared. A surcharge analysis considers both upstream and downstream conditions to establish a hydraulic grade line. A surcharge analysis will first determine if a surcharge exists at a manhole and then the level of the water surface under peak flow conditions. A surcharge pipeline can be a priority due to the potential for backups into residential or commercial services. The surcharge analyses were based on 2011, 2017, and 2031 flow conditions.

Two pipeline segments illustrate the importance of the surcharge analysis. One is S-LINE-4849 which is a 14-inch-diameter pipe located at 172nd St. NE just west of 51st Ave. NE. Because of zero slope, the model calculates zero design capacity and identifies this pipeline as a deficiency. Yet when the surcharge analysis is prepared, the results are that there are no surcharge conditions upstream of the pipe through 2031 due to the steeper hydraulic grade line.

Another pipeline is S-LINE-711, an 18-inch concrete pipe with a constructed slope of 0.001 located near the intersection of 57th Dr. NE and 70th St. NE. The model results shows a capacity deficiency since the calculated design capacity is only 1,488 gpm and the modeled flow exceeds 1,768 gpm in 2031. Yet the surcharge analysis only shows a surcharge of 0.1 feet (1 inch).

Figures 7-4 through 7-6 located in Appendix E graphically present the modeling results for 2011, 2017 and 2031. The maps show the pipeline deficiencies with associated surcharged manholes. Appendix E lists the depth of surcharge associated with the deficient pipelines. Of the 142 pipeline capacity deficiencies in 2031, 104 of them have surcharges in at least one of the model years greater than 0.5’ above the top of the pipe. Many of these are minimized or deleted with the diversion of flow from Trunk F to Trunk A along 136th St. NE.

Some of the surcharged pipelines are scheduled for CIP improvements and the remainder are identified as potential areas for the City staff to observe in future years since many of these manholes showed a surcharge depth of less than 0.5' and are not anticipated to cause a problem to neighboring properties. Numerous deficiencies are due to flat grades.

YEAR 2011, 2017, AND 2031 MODELING RESULTS WITH IMPROVEMENTS

Figure 7-6 shows surcharge conditions for 118 pipelines identified with capacity deficiencies.

A large majority of the surcharge conditions, are identified with Trunk F. Each of these pipelines is 10- or 12-inch PVC constructed at minimum grade, or less. While these pipelines are adequate for current conditions, the results of the hydraulic model for 2017 and 2031 show that these pipelines exceed their capacity and surcharge. Increasing the diameter of these pipelines from 18- to 24-inch is one approach to eliminating pipeline surcharges in this area of the collection system. Another approach is to direct future flows to the planned Lakewood Sewer Extension Project (Phase II). This approach, as shown for build-out modeling conditions, will eliminate each of these deficiencies in Trunk F.

With many of the surcharge conditions eliminated with the Lakewood Sewer Extension Project, there are a few remaining surcharged pipelines. These areas are included in Basins CW1, CE5-3, CE5, D3, D6-1 and F21. Each of the improvements for these basins are described below.

In Basin CW1, this area includes some of the City's oldest pipelines. The model demonstrated pipes that were under capacity along Columbia Ave. and west along 1st St. Improvements here include replacement of approximately 615 lf of 21-inch sewer with 24-inch gravity sewer. In addition, the 580 LF of 24-inch pipe downstream of the existing 21-inch pipeline shall be replaced to a more consistent slope of 0.0029.

In Basin CE5-3, the pipe in 89th Pl. NE showed a substantial amount of minor surcharging within the model amongst the 12-inch concrete pipes located in this area. Improvements to the pipes would include rehabilitation with a cured-in-place liner for a distance of approximately 2,170 lineal feet between manholes S-MH-1993 and S-MH-1665.

Along 88th St NE, in Basin CE5, surcharging resulted in the existing 12-inch pipes along this area. Improvements would include increasing the pipe size from 12-inch diameter pipes to 15-inch diameter pipes for a distance of approximately 1,020 lineal feet between manhole S-MH-4608 to S-MH-1665. City staff recognizes that this area is prone to sags in the pipe. The City intends to construct this project in conjunction with any future road related projects.

Along Sunnyside Blvd. from 53rd Ave. NE to 60th Dr. NE (Basin D3), the hydraulic model demonstrated surcharging results. Improvements in this area would include replacing approximately 2,750 lineal feet of existing 24-inch pipe to 30-inch between manhole S-MH-624 to S-MH-3608.

At 64th Avenue and approximately 71st Street (Basin D6-1), an existing 18-inch sewer is connected to a 12-inch sewer. The 2031 results for the hydraulic model showed surcharging for 508 linear feet of 12-inch sewer between manholes S-MH-702 and S-MH-733. To ensure future capacity, these two pipe segments should be upsized to 18-inch.

The model showed significant surcharging occurring during 2031 along 169th Pl. NE extending up north along 277th Ave and Spring Lane Ave. (Basin F21). The recommended project in this area would be to replace the current 10-inch and 12-inch pipes with 15-inch pipes for approximately 3,035 lineal feet. However, future development could be directed south toward an existing 15-inch stub located on 164th Pl. NE which would thereby allow additional capacity to the north.

Each of the summary sheets for 2011, 2017 and 2031, presented in Appendix E, lists each surcharged pipeline. Exhibit V in the back of the Plan shows the planned improvement to correct these deficiencies.

BUILDOUT HYDRAULIC MODELING ANALYSIS

Buildout conditions for the City's UGA will occur near 2031. The projected population within the UGA for 2031 is 84,989 while the holding capacity is 88,032, a difference of about 3,000.

For buildout conditions for the City's sewer system, both the current UGA and planning areas located outside of the UGA must be considered. There are a total of five planning areas as presented in Figure 2-2. Population estimates for each of these areas are presented in Table 3-12 and the summary of buildout population is shown in Table 7-8.

TABLE 7-8

Buildout Population

Sewer Service Area	Sewered Population
UGA	88,032
NON-UGA	3,278
Sub Total	**91,310**
Planning Areas #3, #4, #6	56,694
Sub Total	**148,004**
Planning Areas #1 and #2	11,571
Total	**159,575**

To model buildout conditions for Planning Areas #3, #4, and #5 (the Lakewood area), planned CIP improvements and a preliminary layout of the expanded collection system were prepared. This layout is included in Exhibit V in the jacket of the Plan. The layout includes three future pump stations, one sized for 2,800 gpm, another for 3,600 gpm, and one smaller station for 300 gpm.

Similarly, a preliminary layout was prepared for the East Sunnyside area. The layout includes preliminary pipeline sizes and one future pump station sized for 200 gpm. This layout is also included in Exhibit V in the jacket of the Plan.

Appendix E and Figure 7-7 presents a summary of the modeling results for buildout conditions.

BUILDOUT MODELING RESULTS

With the buildout populations for the planning areas and UGA, the modeled peak flow increases from approximately 23.8 mgd in 2031to 25.6 mgd. This additional peak flow is primarily confined to impacts on Trunks A and CE. The pipeline capacity deficiencies are shown on Figure 7-7 along with the results of the surcharge analysis.

The hydraulic model results for buildout conditions are based on the assumption that planned CIP improvements are completed. The most significant improvement is the extension of the Lakewood Sewer Extension Project from State Street to Trunk A, For buildout conditions, a 36-inch sewer should be constructed along 136th Street to connect to Trunk A. The Lakewood Sewer Extension Project and other CIP improvements are shown on Exhibit V in the pocket of the Plan.

The primary impact to Trunk A is confined to 51st Avenue from 126th Pl. NE to approximately 148th Street, 116th St. NE and approximately 102nd Pl. NE. Five pipelines have capacity deficiencies along 51st Ave., mostly due to fairly flat grades. The surcharging along 51st Ave.is a result of the upstream Lakewood Sewer Extension connection. The model also revealed significant surcharging at the input points along

116th St. NE (manhole S-MH-4739) and 109th St.NE (S-MH-3789). In the future, the flow from the planning areas may be more disbursed into the existing pipe network then what is represented by the skeletonized hydraulic model and therefore, the pipes within these areas may not present a problem. Individual subbasin analyzes shall be conducted prior to specific developments occurring within the planning areas. The locations of the buildout pipe deficiencies are presented in Exhibit V.

For Trunk CE, 17 pipelines have capacity deficiencies under buildout conditions. Most of the capacity issues exist with the 18-inch pipes lying just west of 60th Dr. NE.

Details and figures of each pipeline capacity, deficiency and surcharge analysis are included in Appendix E.

OTHER PIPELINE DEFICIENCIES

The hydraulic model can provide some, but not all, information about current pipeline deficiencies. Where “sagging” has occurred, offset joints developed, or manholes have been improperly installed, the hydraulic model most likely will not reflect these problems.

City staff has identified a few other problem areas which were not shown by the results of the hydraulic model or are not already included with the City’s CIP. Several noted problem areas were associated with minimum pipeline grades and therefore, require frequent pipe cleaning. These areas are addressed in a separate memorandum to the City and will continue to be assessed throughout future years.

PUMP STATION CAPACITY ANALYSIS

The City operates and maintains 15 pump stations. Several of the City’s pump stations can be considered “developer-type” stations with limited service area. The City’s primary pump stations, and ones which are included as part of the hydraulic model, are Marysville West, 88th Street, 51st Avenue, Soper Hill, Sunnyside, and West Trunk.

For the pump station capacity analysis, the smaller pump stations were analyzed based on available “as-built” information and other land use information. The primary information was the number of single family lots served by the pump station and the estimated area with the pump station service area. Together, this information was used to estimate buildout peak flows.

Table 7-9 presents the capacity evaluation for the small pump stations. The “developer type” pump stations all have sufficient, or surplus capacity. Generally, the City standards result in more than adequate pump station capacity.

For the City’s main pump stations, the results of the hydraulic model estimated peak flows for 2017 and 2031 conditions. These peak flows are compared to each of the pump station's existing capacity in Table 7-10. For both 2017 and 2031, capacity surplus or deficiency is determined.

The results of Table 7-10 show that each of the City's main pump stations have adequate capacity through 2017 except for the West Trunk Pump Station. The rated pump station capacity is based on the assumption that the third pump is out of service. Current records indicate that one pump tends to pump between 1,500 gpm to 1,800 gpm and two pumps tend to pump 2,800 gpm. As flow increases in the region, the pumps can be upsized to allow for the additional 1,800 gpm increase anticipated to flow to the station by 2031. The Soper Hill Pump Station No. 11 and the 51st St. Pump Station No. 6 also appear to be undersized by 2031. The Soper Hill is just barely out of capacity by 33 gpm and the 51st St. Station is estimated to be undersized by approximately 700 gpm.

RECOMMENDED PUMP STATION IMPROVEMENTS

The West Trunk pump station will reach its rated capacity of 3,300 gpm prior to 2017. Upsizing of the pumps to meet future peak flow demands is being analyzed, and money has been allocated in the 6 year CIP to make the needed improvements.

Installation of emergency generators at two of the city's pump stations are included in the 6 year CIP. The generator installation at Carroll's Creek pump station is scheduled for 2016 and the generator installation at Cedarcrest Vista pump station is scheduled for 2017.

Construction of the new Whiskey Ridge Sewer Pump Station and force main is included in the 6 year CIP and is estimated to be constructed in 2014.

A purchase agreement for the Marysville West Pump Station is currently being negotiated between the City of Marysville and the Tulalip Tribes. Purchase of the pump station by the Tribes is anticipated to take place in the near future, therefore, no upgrades to the station are being considered at this time.

Although flow projections show both the 51st Street pump station and the Soper Hill pump station being undersized by year 2031, they meet projections through 2017, so no improvements are schedule for either of those during this 6 year CIP.

TABLE 7-9

"Developer-Type" Pump Station Capacity Analysis

Pump Station ID	No. of Existing Single Family Lots	Single Family Population	Average Sanitary Flow (gpd)	Peak[1] Sanitary Flow (gpd)	Est.[2] Peak I/I (gpd)	Total Peak Flow (gpm)	Pump Station Capacity (gpm)	Surplus (+)/ Def (-) (gpm)
Carrol's Creek, Station No. 7	288	864	51,840	207,360	58,000	184	400	+216
Regan Road[3] Station No. 9	--		8,610	34,440	11,950	32	122	+90
3rd St. Pump Station	4	12	720	2,880	2,750	4	200	+196
Ash Ave. Pump Station	8	24	1,440	5,760	2,530	6	200	+194
Kellogg Ridge	67	201	12,060	48,240	10,000	40	400	+360
Quilceda Glen[4]	33	99	5,940	23,760	3,560	19	250	+231
Cedar Crest	148	444	26,640	106,560	9,000	80	450	+370
Eagle Bay	12	36	2,160	8,640	2,200	8	850	+842
Waterfront Park[5]	--		300	1,200	5,500	5	57	+52

(1) For small pump stations, a peaking factor of 4 is utilized.
(2) Estimated peak I/I is based on acreage served times 1,100 gpad.
(3) Based on 50 percent of estimated flows for subarea A1.
(4) Only 13 lots in plat. Estimate includes potential for an additional 20 lots from adjacent vacant property.
(5) Designed for 57 gpm capacity to serve park restroom and facilities.

TABLE 7-10

Main Pump Station Capacity Analysis

Pump Station ID	Pump Station Capacity (gpm)	Estimated Peak Flow (gpm)		Capacity Surplus (+) or Deficit (-)	
		2017	2031	2017	2031
Soper Hill Station No. 11	550 (1,160 rpm), 1,250 (1,750 rpm)	783	1,283	+467	-33
88th Street(1) Pump Station, Station No. 2	500	142	313	+358	+187
Marysville West Pump Station, Station No. 5	1,150	295	358	+855	+792
51st Street Pump Station, Station No. 6	6,500 (1,160 rpm)	6,380	7,207	+120	-707
Sunnyside Pump Station, Station No. 3	1,780	1,570	1,643	+210	+137
West Trunk Pump Station	3,300	4,490	5,112	-1190	-1812

(1) Estimated peak flow is based on 2,700 gpad for commercial flows, an I/I rate of acreage served times 800 gpad, and a weighted peaking factor on residential flow times 60 gal/capita/day.

FORCE MAIN CAPACITY EVALUATION

The capacity evaluation for the City's force mains is tied directly to the pump station capacity evaluation. The capacity of each force main is based on a maximum design velocity of 8 feet per second (fps). This capacity is compared to the existing pump station capacity and the predicted peak flow at the year 2031. The results of this evaluation are shown in Table 7-11.

As seen in Table 7-11, both the 51st Avenue Pump Station force main and the West Trunk force main exceed capacity by 2031. Both force mains exceed their capacity by approximately 2%. As these areas develop, the City may want to evaluate these force mains in greater detail to ensure capacity is provided by 2031.

Of the smaller developer type, pump stations, both Cedar Crest Vista and Kellogg Ridge have 4-inch force mains with pipeline velocities in excess of 8 fps. Both pump stations appear to have pump capacities well beyond the peak flow requirements. These velocities of 10 - 11 fps are not considered serious enough deficiencies to warrant replacement with larger pipe diameters.

TABLE 7-11

Force Main Capacity Evaluation

Pump Station (Force Main Source)	**Pump Station Capacity gpm**	**Force Main Diameter inches**	**Existing[1] Capacity (gpm)**	**Peak Flow Requirement (gpm)**
Soper Hill	1,250	10	1,957	1,283
Carrol's Creek Landing	400	6	705	184
88th Street	500	10	1,957	313
Regan Road	122	4	313	32
Marysville West	1,150	14	3,838	358
Cedar Crest Vista	450	4	313	32
51st Avenue	**6,500**	**20**	**7,037**	**7,207**
Sunnyside	1,780	12	2,820	1,643
3rd St. Station	200	8	1,253	4
Kellogg Ridge	400	4	313	40
Quilceda Glen	250	4	313	19
Ash Avenue	200	4	313	6
Cedar Crest	450	4	313	80
Eagle Bay	850	4	313	8
Waterfront Park	57	2.5	122	5
West Trunk	**3,300**	**16**	**5,010**	**5,112**
To Everett SEP	14,100	36	25,377	16,535
To Everett SEP	14,100	2-26	22,558	16,535

(1) Based on pipeline velocity of 8 fps.
(2) Numbers shown in bold represent a capacity that is anticipated to be exceeded in 2031.

SUMMARY OF COLLECTION SYSTEM IMPROVEMENTS

Proposed improvements can be characterized as projects to correct current deficiencies or ones to accommodate future growth. The first priority is to address any current pipeline and pump station deficiencies.

The results of the hydraulic model for 2011 indicated 35 pipeline capacity deficiencies with mostly minimal surcharge issues. The one exception is the area near Columbia and 1st St. which identified an extensive backwater effect due to undersized pipes along 1st St. Many deficiencies in the 2011 scenario can be attributed to flat or minimally sloped pipes. Two deficiencies were either confirmed or identified by survey in the previous 2005 Plan. One problem area is located near the intersection of Grove and 67th Streets. Two short pipeline segments have negative to flat slope. Another problem area, located at 43rd Avenue and 123rd Place, is backflow caused by incorrect manhole installation. The outlet of S-MH-2382 was installed 4 inches higher than the inlet. Both areas will be monitored in the future to observe whether these pipes provide concern in terms of backwater effects.

Depending on the extent of new development, the Lakewood Sewer will need to be connected to Trunk A to alleviate a number of surcharged pipes along State Ave. This extension includes a 36-inch diameter pipeline along 136th Street to Trunk A at 51st Avenue and is shown to be constructed in 2018. This project is presented on Exhibit V.

The most serious deficiencies with the collection system are low velocity pipelines (<2.0 fps). Of the 318,865 lf of pipeline modeled, approximately 50 percent of the pipelines were found to have low velocities. Most of these pipelines were large enough in diameter to provide sufficient capacity. However, these low velocity pipelines will collect grease and inert material and require more frequent cleaning and flushing than pipelines with velocity greater than 2 fps. Exhibit VI show the location of the low velocity pipelines, which were part of the hydraulic model.

As noted in the 2005 Plan, there are several areas of the collection system, which are recommended for further study. The limited data from the 2004 flow monitoring showed above normal infiltration/inflow for Trunk CE and the as-built drawings present very flat grades for part of the 18-inch sewer. Trunk CE should include additional flow monitoring and TV inspection to better assess any potential problems.

The Trunk D Basin contains one of the fastest developing areas of the City, where several pipelines are shown to surcharge in 2017 and beyond. Better flow characterization along Sunnyside Road near the 3rd St. Pump Station, and along 70th Street would allow refinements to the hydraulic model, particularly regarding the level of infiltration/inflow. Most of the City's pump stations have adequate capacity through 2031. The three exceptions include the West Trunk pump station, the 51st Street pump station, and the Soper Hill pump station, where capacity deficits reach 1812, 707, and 33 gpm respectively in 2031. The deficiencies can be corrected by upsizing pumps at the stations. The West Trunk pump station shows a deficiency of 1190 gpm in 2017, therefore it has been included in the 6 year CIP for pump upsizing improvements in order to maintain sufficient capacity at the station. The 51st Street pump station shows a deficiency of 707 gpm capacity in 2031 and will be monitored in the future to ensure adequate capacity is maintained. The Soper Hill Station shows a small deficiency of 33 gpm capacity in 2031 and will be monitored in the future to ensure adequate capacity can be provided.

Table 7-12 provides a list of the capital improvement projects for the collection system and pump stations. Project costs and descriptions are included in Chapter 11.

TABLE 7-12

Collection System and Pump Station Capital Improvement Projects

ID	Description	Construction Year
Sanitary Sewer Mains		
SS-A	Sewer Main Oversizing	2012 thru 2017
SS-B	Renewals and Replacements	2013 thru 2017
SS-C	Whiskey Ridge Sewer Extension	2012
SS-D	71st St NE Sewer Upsizing - 64th Ave NE to 66th Ave NE	2015
SS-E	Trunk G Rehabilitation – Cedar to Columbia	2016
-	Lakewood Sewer Extension Project – Phase 2	2018
-	88th St NE at Allen Creek	2022
-	Sunnyside Blvd from 53rd Ave. NE to 60th Dr. NE	2024
-	169th Pl. NE and 277th Pl. NE	2026
-	152nd Trunk (51st to the East)	2028
Pump Stations		
PS-A	Whiskey Ridge Sewer Pump Station and Force Main	2012 thru 2014
PS-B	West Trunk Pump Station – Upsizing Pumps	2013
PS-C	Carroll's Creek Pump Station – Emergency Generator	2016
PS-D	Cedarcrest Vista Pump Station – Emergency Generator	2017
-	51st St. Pump Station – Upsizing Pumps	2025
-	Soper Hill Pump Station – Upsizing Pumps	2030

CHAPTER 8

WASTEWATER TREATMENT PLANT ANALYSIS

INTRODUCTION

The purpose of this Chapter is to evaluate the wastewater treatment plant (WWTP) for its ability to meet its treatment objectives based on projected future flow and loadings. The projected flow and loading rates for the planning period 2010 to 2031 were developed in Chapter 6 (Tables 6-9 and 6-10). The treatment plant effluent quality must meet the requirements in the existing and future NPDES permits for $CBOD_5$, TSS, fecal coliform, and pH. The existing permit conditions are presented in Tables 5-6 and 5-7 for both low and high-river flow conditions. The loading limits shown in these tables are likely to remain the same upon issuance of the City's new permit in 2011/2012. The concentration limits should also remain unchanged and are presented in Table 8-1. These limits serve as the basis for the performance evaluation for the liquid stream processes. The hydraulic capacity of the WWTP is also evaluated at the projected peak hour flow.

The Phase 2 upgrade work that was completed in 2004, included new effluent pumps and a pipeline to discharge treated effluent to the City of Everett and the Deep Marine Outfall. Use of this marine discharge during low flow periods avoids the TMDL limits established for the Snohomish River and the Steamboat Slough Outfall. These limits include a seasonal limit on ammonia of 178 lbs/day on a monthly average. (Table 5-6). The current lagoon treatment system was not designed to achieve this limit. Instead, WWTP effluent is discharged to the deepwater outfall from July through October to avoid the need for ammonia removal. As a result of this outfall discharge, ammonia removal is not evaluated in this Chapter.

This Chapter also evaluates the potential for water reclamation and reuse.

TABLE 8-1

NPDES Effluent Concentration Limitations

Parameter	Average Monthly	Average Weekly	Maximum Daily
$CBOD_5$	25 mg/L[(1)]	40 mg/L	N/A
TSS	30 mg/L[(1)]	45 mg/L	N/A
pH	N/A	N/A	6.0 to 9.0
Fecal Coliform	200 cfu/100 ml	400 cfu/100 ml	N/A

(1) Or 15 percent of the respective monthly average influent concentrations, whichever is more stringent.

CAPACITY EVALUATION AT DESIGN FLOWS AND LOADINGS

Table 8-2 presents a comparison of the WWTP capacity upon completion of Phase 2 work with the projected flows and loading developed in Chapter 6.

TABLE 8-2

Comparison of Phase 2 Capacity Rating to Current and Projected WWTP Flows and Loadings

Parameter	Phase 2 Design Criteria(1)	2010 (2)	2017 Projection(2)	2031 Projection(2)
Average Annual Flow (mgd)	10.1	4.7	5.8	8.2
Maximum Month Flow (mgd)	12.7	6.1	7.6	11.3
Peak Hour (mgd)	20.3	10.7	12.7	16.9
Average Annual BOD_5 Loading (lbs/day)	17,070	10,419	12,846	*18,110*
Maximum Month BOD_5 Loading (lbs/day)	20,143	13,812	16,997	*23,963*
Average Annual TSS Loading (lbs/day)	17,815	10,029	12,365	17,432
Maximum Month TSS Loading (lbs/day)	24,229	14,356	17,689	*24,939*

(1) Drawing G-5, WWTP Upgrade and Expansion - Phase 2, Tetratech/KCM, Inc. (May 2003)
(2) Tables 6-9 and 6-10 of this Plan.

The following sections evaluate the capacity requirements of major WWTP components at 2017 and 2031 projected flow and loadings. The five major WWTP's components evaluated are the headworks, aeration system (lagoons), effluent filtration, disinfection, and effluent disposal. Figure 8-1 presents each of these components as part of the WWTP hydraulic profile. Where applicable, system components are compared to accepted design criteria, such as published in the Washington State Department of Ecology *Criteria for Sewage Works Design (Orange Book, 1998),* WEF *Manual of Practice No. 8* (MOP 8, 1998), and Metcalf & Eddy *Wastewater Engineering* (4th Edition, 2003).

HEADWORKS

INFLUENT SCREW LIFT PUMPS

Influent wastewater from Trunk A is discharged to three screw pumps, each with a capacity of 6,215 gpm, or 8.95 mgd. Ecology Orange Book reliability requirements state that pumping stations must be capable of pumping the peak flow with the largest unit out of service. Peak day influent flow in 2031 is forecasted at 16.9 mgd, and less than the pumping capacity of 17.9 mgd with one unit out of service, therefore the screw pumps are considered adequate for peak day flow through the year 2031.

INFLUENT SCREENING

The headworks includes two mechanical bar screens each with a rated capacity of 13.7 mgd. There is also a manual bar screen in a bypass channel. Ecology's Orange Book requires that influent screening be provided to handle the peak hour flow and that a bypass screen be available for the peak hour flow. With both mechanical screens in operation, the capacity is 27.4 mgd, which is greater than the peak hour flow of 16.9 mgd projected for 2031. Therefore, the screens are adequate for peak flow conditions.

The mechanically cleaned screens have a 1 1/2-inch bar spacing, which allows a significant amount of plastics and other debris to pass into downstream processes. One option that has been considered, is to retrofit the screens with 3/8-inch bar spacing to remove more inert material and prevent this material from reaching the lagoons.

INFLUENT FLOW MEASUREMENT

Influent flow measurement is measured with a 30-inch Parshall flume. A flume with this dimension has a range of flow measurement of 0.5 to 27 mgd. The peak flow capacity exceeds the projected peak hour flow of 16.9 mgd in 2031, and therefore the flume is adequate for peak flow conditions. Some repairs to the existing concrete parshall flume structure are necessary in the future to obtain more accurate combined flows.

LAGOON SYSTEM

As part of the 2004 Phase 2 construction, the aerated lagoon system was expanded from four to six complete mix cells. Each cell contains five 15-hp, high speed, surface aerators and four 15-hp surface aspirating aerators.

Following completion of the 2004 upgrades and issuance of the city's new NPDES Permit in June of 2005, it became a requirement that all effluent flow be filtered prior to discharge. Filtering all of the effluent removes a greater percentage of the algae, and therefore has proven to more efficient at removing more of the effluent $CBOD_{5.}$

For current flows and loadings, and future flows and loadings through the next six year comprehensive planning period, concentrations indicate effluent $CBOD_5$ less than the NPDES permit limit of 25 mg/L. Actual effluent concentrations from 2006 through 2010 averaged 9 mg/L in summer and 10 mg/L in winter.

Trend line charts for Effluent $CBOD_5$ and TSS (Appendix F) are showing a decreasing trend in both $CBOD_5$ and TSS for the period of 2006 through 2010. Although the city realizes that downward trends are not likely in future years, upward trends appear to be happening more slowly than past projections had indicated. This is attributed to better customer awareness of water use efficiency standards, and more purchases of water efficient appliances and devices, which maintains lower flows to the wastewater plant. The lower flows to the plant will maintain lagoon detention times for a much longer period of time into the future, thereby delaying the time before additional aerated cells need to be installed to compensate for higher flows and loadings.

Because of the uncertainty associated with the predicted results in the 2005 sewer comprehensive plan, several steps were recommended in the plan to better assess the lagoons and wastewater treatment plant performance. These steps are listed below.

- Conduct a study of $CBOD_5$ concentrations at additional points in the process to improve understanding of lagoon and filter performance. The recommended points were at the WWTP influent, the last aeration cell, effluent from oxidation pond #2, final pond effluent, and filtered effluent. It was recommended that $CBOD_5$, soluble $CBOD_5$, and TSS be measured at each point. **(Since the 2005 sewer comp plan, this has been done, and continues to be done on a bi-monthly basis).**

- Consider removing the south oxidation ponds from service in the summer when algae growth rates are highest. This bypass may require installation of new pipes. (**No progress has been made since the 2005 comp plan to assess this operational strategy).**

In the 2005 sewer comprehensive plan, conditions were also evaluated with the addition of aerated cells #7 and #8. With eight aerated lagoons, predicted effluent $CBOD_5$ concentrations were substantially reduced, and the effluent filters would reliably meet the effluent $CBOD_5$ limits into the future. As indicated above, due to slower than predicted flow increases, aerated cells #7 and #8 will be constructed well into the future and are not included in the City's CIP for this comprehensive plan.

EFFLUENT FILTRATION

The effluent filter system is a continuous upflow monomedia (sand) type with a total surface area of 2,400 square feet. The filter hydraulic loading rate varies based on the design flow basis. For maximum monthly flow, the rate is 3.0 gpm/ft^2; for maximum daily flow the rate is 4.0 gpm/ft^2. Metcalf & Eddy lists a filter loading rate of 5.0 gpm/ft^2 for these type of filters so both rates are within accepted design criteria.

Based on past calculations of 3.0 gpm/ft^2, the effluent filter system has a capacity of 10.4 mgd, which exceeds the filter loading rate for the projected maximum monthly flow of 7.60 mgd in 2017. At 4.0 gpm/ft^2, the capacity is 13.8 mgd which meets the projected maximum monthly flow in 2031 of 11.3 mgd. Although the calculations show that the filters are adequate through the 20 year planning period, operators of the plant have experienced difficulty getting good TSS reductions through the filters when flows near 10 mgd. Installation of additional sand filters, or some other alternative filtering system, may be necessary in the near future to accommodate higher winter time flows.

The system includes two 720 gpm pumps at 5 hp each to handle filter reject water flow. The estimated reject water flow was 512 gpm, but has proven to be closer to 750 gpm. Both pumps must run to keep up with the reject flow. An additional pump was purchased as a spare, for back up to this station, but upsizing of the pumps and/or wet well needs to be considered in the not too distant future, and is included as part of the 6 year CIP. In addition to the reject pumps, there is also a hypochlorite system in place to reduce the amount of algae recycled back to the ponds.

The coagulant used for effluent filtration is alum at a design dose of 100 mg/L. At the projected maximum monthly flow of 11.3 mgd in 2031, the WWTP will use about 9,674 lbs/day of alum.

$$11.3 \text{ mgd} \times 100 \text{ mg/L alum} \times 8.34 = 9{,}674 \text{ lbs/day}$$

At a density of 80 lbs/ft^3 for liquid alum, the coagulant feed system will need to supply 900 gallons per day of alum at maximum month flow. The chemical metering system includes three metering pumps, each sized at 600 gpd and three storage tanks sized at 2,500 gallons. Total storage, therefore, is 7,500 gallons.

The chemical metering pumps are capable of meeting maximum month demand with one pump out of service. However, the storage capacity under 2031 maximum month conditions is only 6.6 days. Thirty day storage is desirable but with a reliable supplier less storage is acceptable. Alum is currently delivered to the plant every week to two weeks, depending on flows, with a two to three day order time. By 2031, the city may need to add at least one additional 2,500 gallon storage tank for alum to increase storage capacity. According to the manufacturing representative, the life of an alum tank is approximately 20 years. Two of the existing alum tanks were installed during the 1994 upgrades and the third tank was installed during the 2004 upgrades.

DISINFECTION

The WWTP has two methods available for disinfection. One, UV disinfection, is the primary disinfection method and is designed to treat a maximum monthly flow of 12.7 mgd. This UV system by Infilco Degremont is a vertically oriented arrangement installed in two channels. Each channel contains six Aquaray 40 units with 40 low-pressure, high intensity lamps each. With both channels, the system has a maximum of 480 lamps for use. The UV system is controlled to increase its dose based on higher flows and reduced transmittance. A single Allen Bradley 1200 screen monitors the operation of the UV system.

The capacity of the UV system exceeds the 2031 projected maximum monthly flow of 11.3 mgd and therefore is adequate for the planning period of 20 years.

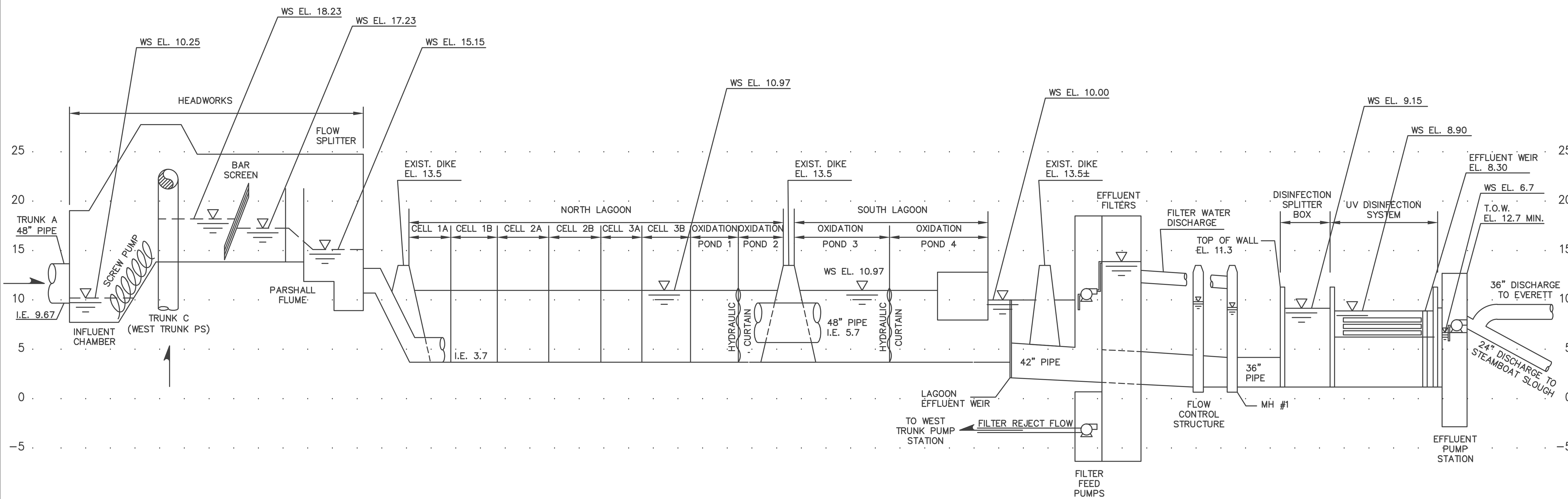
The chlorine contact tank and hypochlorite system serve as a reserve disinfection system. The chlorine contact tank of 175,000 gallons provides sufficient capacity for 4.2 mgd at the recommended contact time of 60 minutes. At a flow of 12.7 mgd, the contact time is 20 minutes, or less than the Orange Book recommendations.

In addition to providing a reserve method of disinfection, the existing hypochlorite system is also utilized to maintain a chlorine residual of 0.1 mg/L for discharge to the City of Everett's South Effluent Pump Station (SEPS). This requirement of the interlocal agreement with Everett is presented in Appendix B.

EFFLUENT DISPOSAL

The City's WWTP utilizes two outfalls for effluent disposal. One is a deepwater outfall in Puget Sound owned by Kimberly Clark. This marine outfall to Puget Sound is used primarily during low river flow conditions in Steamboat Slough. Effluent conveyance facilities used for this outfall system include an effluent pump station with four 4,700 gpm pumps, a 36-inch HDPE pipeline crossing under Ebey, Steamboat, and Union Sloughs, twin 26-inch HDPE pipes to the South Everett Pump Station, and a 30-inch magnetic flow meter. The other means for effluent disposal includes a 28-inch HDPE pipeline to an outfall in Steamboat Slough with a 20-inch magnetic flow meter. This outfall is used during high river flow conditions.

Ecology Orange Book reliability requirements state that pumping stations must be capable of pumping peak flow with the largest unit out of service. Peak pumping capacity with three of the four effluent pumps is 20.3 mgd, which exceeds the projected peak flow of 16.9 mgd in 2031. Pipeline velocity at peak flow in the twin 26-inch pipelines (OD) to Everett would be an estimated 5 feet per second. For the single 28-inch pipe (OD) to Steamboat Slough, the pipeline velocity at peak flow would be approximately 8 fps. Since the velocities in both pipeline systems are below the maximum design value of 10 fps, these pipeline velocities are acceptable.



HYDRAULIC PROFILE

NOT TO SCALE

CITY OF MARYSVILLE
SEWER COMPREHENSIVE PLAN
FIGURE 8-1
HYDRAULIC PROFILE

EVALUATION OF WATER RECLAMATION AND REUSE

This Plan evaluates the potential for wastewater reuse from the WWTP. Wastewater reuse can potentially be cost-effective by generating revenue from selling reclaimed effluent to customers for non-potable uses, while providing environmental benefits. This section presents a brief evaluation of the feasibility of reusing effluent from the WWTP. Chapter 4, in part, covers regulations concerning water reuse.

The Washington State Water Reclamation and Reuse Standards define four classes of reclaimed water (Classes A, B, C and D), distinguished by treatment technologies and the final bacterial concentration. Class A reclaimed water, the highest classification, is generally required for uses with potential for public contact, such as would be encountered in the City. Under RCW 90.46, Class A reclaimed water means reclaimed water that, at a minimum, is at all times an oxidized, coagulated, filtered, disinfected wastewater. To meet Class A reclaimed water standards, the facility effluent must be coagulated and filtered in order to meet a turbidity standard. Reclaimed water must be disinfected to meet a coliform standard that is much stricter than the standard for secondary effluent. In addition, reclaimed water processes must meet the reliability and redundancy requirements in the state standards.

Generally, the state standards require system storage capacity, for interruptions in the final reuse system, and bypass storage, to store partially treated wastewater that does not meet the reclaimed water standards. Where no alternative reuse or disposal system exists, system storage capacity shall be the volume equal to three times that portion of the daily flow of reuse capacity, and bypass storage at least one times that volume. However, the City is permitted for discharge to Puget Sound based on limits established for $CBOD_5$, TSS, ammonia, and fecal coliform. It is possible that the City can meet its NPDES discharge limits, yet at times not meet all of the limits for Class A reclaimed water. Thus, storage at the WWTP may not be a requirement. The City can utilize its outfall or the Everett discharge in these instances.

Potential for Reuse

Potential uses of reclaimed water for the City are limited, but several possible beneficial uses are discussed below. Most of these potential uses would require Class A reclaimed water.

Industrial Cooling Water

One potential use for reclaimed water is industrial cooling water for cogeneration power plants. The city has been approached over the past several years by more than one company that was interested in using the city's effluent for this purpose. However, no interest has been shown recently for this use.

Irrigation/Landscaping Use

Potential uses of reclaimed water include irrigation of park grounds and golf courses. In the vicinity of the WWTP is Jennings Nature Park (31 acres) and Jennings Memorial Park (20 acres). The Jennings Memorial Park is primarily used for recreational facilities, including baseball and play areas. About 2 miles northeast of the WWTP is the 120-acre Cedarcrest Golf Course. The golf course is owned and operated by the City of Marysville Parks and Recreation Department.

Fire Protection

Reclaimed water can be used for fire protection in hydrants and sprinkler systems located in commercial or industrial facilities, hotels, and motels.

Ground Water Recharge

Another possible use for reclaimed water is ground water recharge or aquifer replenishment.

Other Possiblities

Possible uses for reclaimed water by the City's public works department includes using the water in street sweepers, to wash down streets, to flush sanitary sewer lines, or as washdown water at its wastewater treatment plant.

Offsets to Existing Water Rights

The service area for the City of Marysville is supplied potable water from several different sources as presented in Table 8-3.

TABLE 8-3

Sources of Supply for the Marysville Coordinated Service Area[(1)]

Primary Supply Source	Reliable Capacity (mgd)	Water Rights (mgd)
Everett-Marysville Pipeline	13.15	13.15
Stillaguamish Ranney Collector	3.2	3.2
Edward Springs	2.5	2.1
Lake Goodwin Well	0.5	0.8
Subtotal	19.35	19.25
Secondary Supply Source		
Highway 9 Well	1.4	1.4
Sunnyside Well No. 2	1.1	1.1
Subtotal	2.5	2.5
Total	**21.85 mgd**	**21.75 mgd**

(1) City of Marysville 2009 Water System Plan Update.

Based on the City's Water System Plan, the projected demands for 2028 are 16.6 mgd average day, and 22.9 mgd peak day. In addition, the City of Everett has certified water rights of 246 mgd for its overall service. Currently, the City of Everett operates its filtration plant at less than 100 mgd. Because of existing and potential water rights, use of reclaimed water would have a minimum impact offsetting water rights.

Wetlands Flow Augmentation

Reclaimed water can be used to augment flow in wetland areas. In fact, the City has created a wetland area near its WWTP which is now classified as a natural wetland area. However, other wetland areas are owned by the Tulalip Tribes. The Tribe has not expressed any interest for use of its wetland areas for this purpose.

Of the potential uses for reclaimed water, irrigation/landscaping provides the highest and most reasonable alternative for reuse. This alternative is presented in more detail below.

CONCEPTUAL DESIGN AND COST ESTIMATE

Irrigation Demands

Irrigation rates were estimated from the net irrigation demands listed in the Washington State Irrigation Guide for turf grass at the Everett Station. The annual net irrigation demand is 13 inches/year with an irrigation season from mid May to mid November (6 months/year). The irrigation demand varies during the irrigation season, with the peak irrigation demand in July (4.46 inches). Table 8-4 lists estimated potential reclaimed water usage for irrigation.

TABLE 8-4

Potential Irrigation Use for Reclaimed Water

Irrigation Area	Irrigated Area (acres)	Annual$^{(1)}$ Usage (MG/year)	Peak$^{(2)}$ Day (gpd)
Cedar Crest Golf Course	120	42.40	605,000
Jennings Memorial Park$^{(3)}$	10	3.6	50,000
Jennings Nature Park$^{(4)}$	10	3.6	50,000
Total	**140**	**49.6**	**705,000**

(1) Annual irrigation usage based on 13 inches per year over a 6-month irrigation season per Washington State Irrigation Guidelines, Everett location.
(2) Peak day irrigation usage based on an irrigation demand of 4.46 inches in July.
(3) Estimated irrigated area 50 percent of total.
(4) Estimated irrigated area 33 percent of total.

According to the Water Reclamation and Reuse Standards, Class A reclaimed water is required for irrigation of public areas. The estimated peak day demand is 705,000 gpd, approximately 15 percent of the current annual average flow.

Production of Reclaimed Water

The WWTP currently produces secondary effluent for discharge to Puget Sound. Production of Class A reclaimed water would be required for irrigation of public contact areas. As production of reclaimed water is more expensive then secondary effluent, it is recommended to develop a sidestream water reclamation process.

Several alternatives are available for production of reclaimed water. Under RCW 90.48, Class A reclaimed water must be continuously oxidized, coagulated, filtered and disinfected. The existing facility provides the oxidation step so the sidestream process must contain a coagulation system, filter, and UV disinfection system. The Class A reclamation sidestream would be operated when there is a demand for irrigation water. At other times, and in case Class A reclamation standards are not met, the sidestream would shutdown and the main facility would process and discharge (alternate disposal system). Reclaimed water system storage or bypass storage is not required.

The reclaimed water sidestream will be sized to provide the annual average demand with a 25 percent factor for additional capacity. Peak day demand will be met with off-site storage. The average annual usage is 49.6 MG, but distributed over a 180-day period. The design capacity is 0.275 mgd plus 25 percent, or 0.34 mgd. Rounding up, the design of the sidestream reclaimed water system would be 0.35 mgd.

Coagulation and Filtration

Existing coagulation chemical feed equipment and sand filters are used at the WWTP. The filtration system is a continuous, monomedia type which will tripled to 2,400 square feet of filter surface area in the 2004 Phase 2 plant upgrade. The coagulation chemical feed system uses alum at a dosage of 100 mg/L. There are three metering pumps and three alum storage tanks.

Recent performance data show that the filters produce an effluent with an average TSS of 22 mg/L. Therefore, it is not expected that the filters are capable with the current feed and loading to produce an effluent turbidity less than 2.0 NTU as required for reuse standards. Therefore, a separate sidestream filter process should be constructed.

To meet Class A reclaimed water standards, the coagulation and filtration equipment would need to be continuously monitored to ensure filtered turbidity of less than 2.0 NTU.

UV Disinfection System

The WWTP has a UV system but it is designed for secondary effluent standards. For Class A reclaimed water, the UV disinfection system must be capable of disinfecting filtered secondary effluent to produce an effluent with 2.2 total coliform/100 mL (weekly median). The effluent UV transmittance (a measure of UV absorbance by dissolved or suspended materials in the water) was estimated at 60 percent, for filtered Marysville effluent based on field measurements. The National Water Research Institute has developed guidelines for UV disinfection, which recommend a design dose of 100 mJ/cm^2 for production of reclaimed water from media-filtered effluent.

The reclaimed water UV disinfection system will be a low pressure, horizontal, high intensity UV system consisting of three reactors in series, one as standby. Each UV lamp is capable of disinfecting 5 gpm per lamp. Based on this criteria, 75 lamps will be provided, 25 lamps per reactor.

Alarms and Telemetry

The use of reclaimed water for irrigation in open access areas demands a higher level of quality control than normal WWTP operations. An alarm system will be installed to notify staff if the coagulation, filtration, or disinfection systems fail, or if the reclaimed water quality falls below an acceptable level. The level of the reclaimed water reservoir described production control system. At this point, the reclaimed water production will cease and effluent will be recycled back to the lagoon system.

Distribution and Storage

The layout of the distribution system is shown in Figure 8-2.

Irrigation of public access areas, such as schools, must be performed at the time when risk of public contract is least (nighttime). Assuming a 6-hour irrigation period (11:00 p.m. to 5:00 a.m.), the peak day irrigation demand is 1,960 gpm (705,000 gpd/6 hr). Instead of producing reclaimed water at this rate, it is more cost effective to operate the reclaimed water facility 24 hours per day at a lower rate, and provide irrigation distribution storage. Approximately 600,000 gallons of storage will be required for equalization located in the vicinity of the Cedarcrest Golf Course.

A pump station and transmission main will convey the reclaimed water from the WWTP to the irrigation storage reservoir. The elevation at the discharge of the reclamation facility would be about 5 feet and the elevation at the irrigation area is about 105 feet. The pumps (one duty, one standby) will be rated at 500 gpm at 140 total dynamic head (TDH). The motor horsepower will be 40 hp, 3 phase.

Total irrigation supply pumps will be provided to transfer reclaimed water from the storage reservoir to the golf course irrigation system. Three of the pumps will operate to provide the necessary irrigation demand in 6 hours. One pump will be standby. Each pump will be sized for 560 gpm at 70 psi to produce sufficient pressure for golf course irrigation. The motor horsepower will be 50 hp each. Irrigation for the smaller areas in Jennings Park will be provided from the transmission main and pump station.

Approximately 17,900 LF of 8-inch pipe will be required between the WWTP and the storage reservoir located on the golf course, primarily following City rights-of-way. An additional 1,500 LF of pipe has been estimated to supply reclaimed water from existing irrigation connections.

ECONOMIC FEASIBILITY OF REUSE

Production of reclaimed water is economically feasible if the cost of producing and distributing reclaimed water is less than the cost of purchasing potable water. The economic feasibility of reuse if evaluated by comparing the annualized cost of providing reclaimed water ($/gal.) with the current purchased price.

The City's water billing is based on a meter size and then a volume change over a certain use. For the two smaller connections at Jennings Park, a 4-inch meter is assumed. For a 4-inch meter, the bimonthly meter charge is $310 with an allowance of 150,000 gpd. For use in excess of 150,000 gallons, the volume charge is $2.02/1,000 gallons. Similarly, for a 6-inch meter, the meter charge is $735 with an allowance of 150,000 gallons. For the annual usage estimate in Table 8-5; the estimated cost for potable water is $101,530.

Capital costs for constructing the treatment, storage and distribution system are summarized in Table 8-5.

TABLE 8-5

Capital Cost Estimate for Water Reuse System

Item	Quantity	Unit	Unit Price	Total Price
Mobilization/Demobilization	1	LS	$150,000	$ 150,000
Class A Filtration System	1	LS	$200,000	$ 200,000
Class A UV Disinfection System	1	LS	$245,000	$ 245,000
Alarms and Instrumentation	1	LS	$ 25,000	$ 25,000
Reclaimed Water Pump Station	1	LS	$150,000	$ 150,000
Reclaimed Water Pipeline	17,900	LF	$ 75	$1,327,500
Reclaimed Water Reservoir	1	LS	$600,000	$ 600,000
Irrigation Supply Pumping Station	1	LS	$160,000	$ 160,000
Irrigation Supply Piping	1,500	LF	$ 60	$ 90,000
Subtotal				$2,941,500
Contingency (20%)				$ 589,500
Subtotal				$3,537,000
Sales Tax				$ 314,793
Total Construction Cost				$3,851,793
Engineering and Administrative Costs (25%)				$ 962,948
Total Estimated Project Cost (Rounded)				**$4,800,000**

The estimated annual operation and maintenance cost for the reclaimed water system is per year, as shown on Table 8-6.

TABLE 8-6

Annual O&M Cost Estimate for Water Reuse System

Item	Annual Quantity	Unit	Unit Price	Annual Cost
Labor (2 hr/day)	240	HR	$35	$8,400
Electricity	180,000	kWhr	$0.07	$12,600
Maintenance(1)	1	LS		$17,400
Lab/Miscellaneous	1	LS		$10,000
Total Annual Cost				**$48,400**

(1) 3 percent of capital cost of new equipment.

Table 8-7 provides a comparison of the annual cost for reclaimed water to the existing cost for irrigation with potable water. The annualized debt service based on a 20-year 1.5 percent PWTF loan for the capital cost would be $279,360/year. Combined with the additional O&M cost of $48,000, and the annual average demand of 49.6 MG, the cost for reclaimed water would be $6.60 per 1,000 gallons.

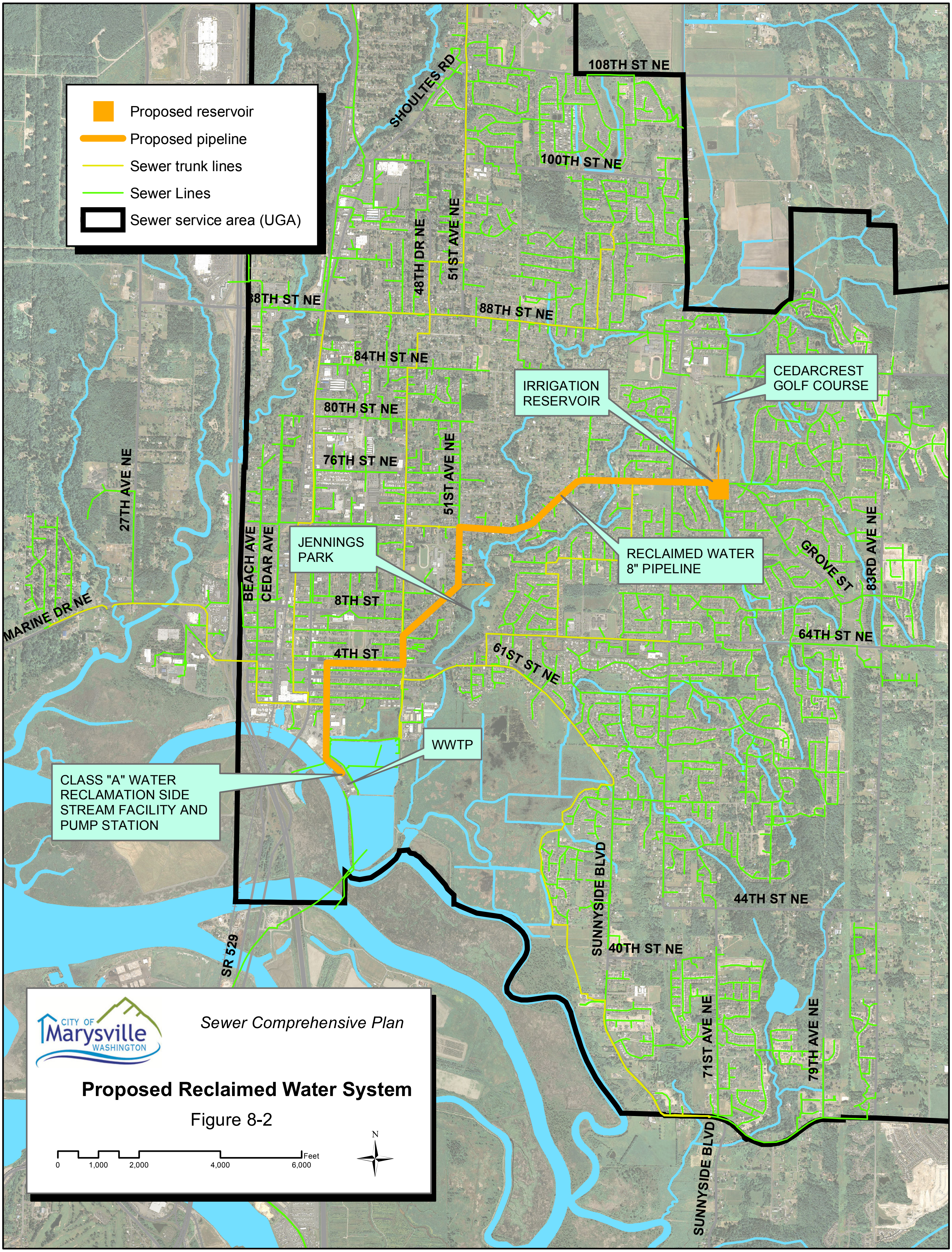
The annual cost for potable water is $101,530 or equivalent to $2.05 per 1,000 gallons. Therefore, production of reclaimed water does not appear to be economically feasible at this time.

TABLE 8-7

Comparison of Reclaimed Water and Potable Water Costs

	Water Reuse Alternative	Potable Water Use
Capital Cost	$4,800,000	N/A
Annual O&M Cost	$ 48,400	$101,530
20-Year Present Worth(1)	$5,630,960	$1,743,067
Annual Debt Payment	$ 279,360	N/A
Total Annualized Cost	$ 327,760	$101,530
Cost of Water ($/1,000 gal)	$6.60	$2.05

(1) 1-1/2 percent, 20-year basis for present worth.



Proposed Reclaimed Water System

Figure 8-2

WWTP RECOMMENDED IMPROVEMENTS

This plan includes several recommended mechanical improvements for the current plan period as shown below.

- Replacement or reconstruction of the concrete influent parshall flume at the headworks of the plant, or to install a fiberglass insert to correct the current deficiencies in the flow measurement there. The existing concrete structure would need to be resurfaced and leveled. This work is projected to be completed in year 2013 and the budgetary cost is projected at $50,000.

- Extension of the filter reject line from the West Trunk Pump Station to Complete Mix Cell 1A at the headworks of the plant. This work is projected to be completed in the year 2013 and the budgetary cost is projected at $117,000.

- Upsizing of the filter reject pump station wet well and pumps. This work is projected to be completed in year 2014 and the budgetary cost is projected at $500,000.

- Construction of a pre-settling basin to allow flocculation and settling prior to effluent filtration. This work is projected to be completed in year 2015 and the budgetary cost is projected at $1,000,000.

- Replace the existing barscreens with a barscreen that has a 3/8" or smaller bar spacing, or replace with an alternative screen that meets the 3/8" spacing requirement. This work is projected to be completed in year 2017 and the budgetary cost is projected at $500,000.

- A preliminary biosolids profile is scheduled for year 2016. This will be used to assess the need for biosolids removal, but it is not anticipated that the removal will take place within this 6 year comprehensive plan.

Future planned WWTP improvements, outside of the current plan period, include the addition of aerated cells #7 and #8, and addition of alum storage capacity. (*Capital Facilities Plan*, KCM 2001). These improvements will be assessed as future flows and loadings increase.

Table 8-8 provides a list of both capital improvements and other recommendations for the WWTP.

TABLE 8-8

Recommended WWTP Improvements and Actions

Description	Year
Replacement or reconstruction of the Headworks Parshall Flume	2013
Extension of the Filter Reject Line to Complete Mix Cell 1A	2013
Upsizing of the Filter Reject Wet Well and Pumping System	2014
Pre-Settling Basin prior to Effluent Filtration	2015
Preliminary Biosolids Profile	2016
Screen Replacement for the Mechanical Barscreens	2017

Costs associated with these improvements are also summarized in Chapter 11, Capital Improvement Plan.

CHAPTER 9

BIOSOLIDS MANAGEMENT

GENERAL

This Chapter discusses and estimates the quantity and quality of biosolids that accumulate in the oxidation ponds of the City's WWTP. Information on biosolids is based on data found in the 1997 Comprehensive Sanitary Sewer Plan, testing data from 2002 provided by Hammond Collier & Wade-Livingstone Engineers, and other information provided by City staff.

The City removed approximately 4,300 dry tons of biosolids from its oxidation ponds in 2003. This quantity represented an accumulation of 40 years, primarily in the south end of the ponds. The method used was dredge and dewater, hauling, and land application. The cost was about $1.4 million exclusive of trucking costs.

This Chapter also presents a discussion of biosolids regulations and future management of biosolids.

BIOSOLIDS REGULATIONS

Regulations pertaining to biosolids include 40 CFR Part 503, WAC 173-308, and WAC 173-200.

40 CFR PART 503

40 CFR Part 503, regulating the disposition of municipal sewage sludge, went into effect in 1993. The 503 rule applies to the sewage sludge generated from municipal wastewater systems, i.e., municipal wastewater treatment systems, and domestic septic tanks. EPA allows states the ability to enforce their own version of biosolids regulations. Under 40 CFR 503, these state biosolids regulations must be at least as stringent as the federal 503 regulations.

WAC-173-308 BIOSOLIDS MANAGEMENT

The State of Washington has adopted the 503 requirements in its own regulations governing the use or disposal of biosolids, WAC 173-308. These regulations became effective in March 1998 and are enforced by the State Department of Ecology (Ecology). The requirements in WAC 173-308 are very similar to the requirements of the federal 503 regulations.

There are three fundamental elements of the federal 503 and state 308 regulations that establish minimum criteria for beneficial use of biosolids:

(1) pollutant concentrations and application rates

(2) pathogen reduction measures

(3) vector attraction reduction measures

Trace Pollutant Concentrations and Application Rates

Maximum allowable concentrations in biosolids are established for nine heavy metals (arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium and zinc). If a biosolids sample exceeds the ceiling concentration of any of these metals, it cannot be land applied. A second pollutant threshold concentration is identified for Exceptional Quality (EQ) biosolids. If biosolids are shown to be below these concentrations, they may be considered EQ, and thus be eligible for relatively unrestricted land application, provided they meet other EQ requirements. To be considered "EQ," biosolids must not only meet the EQ *pollutant* requirement, but also meet Class "A" pathogen reduction requirements and vector attraction reduction requirements (see below).

Cumulative trace pollutant loading rates for biosolids are designated for these nine heavy metals. These rates cannot be exceeded during the life of an application site. Once a cumulative loading limit is reached for a particular limiting pollutant, the land can no longer receive biosolids containing any level of the limiting pollutant. Annual trace pollutant loading rates are also set for the same nine heavy metals.

Pathogen Reduction Requirements

In order for biosolids to be land applied, they must meet specific criteria demonstrating a minimum level of treatment to reduce the density or limit growth of pathogenic bacteria. By meeting these minimum criteria, a biosolids sample is referred to as meeting Class "B" pathogen reduction requirements. The term "Class B biosolids" is sometimes erroneously referred to as any biosolids meeting all minimum criteria that allow the biosolids to be land applied, which is not the case. Biosolids must meet vector attraction reduction requirements and minimum pollutant concentration standards as well as Class "B" pathogen reduction requirements (at a minimum) in order to be acceptable for land application.

Class "B" biosolids must meet one or more of three alternative criteria for pathogen reduction described in the 503 and 308 regulations. The 503 and 308 regulations provide six alternative methods to demonstrate that biosolids are Class "A" with respect to pathogens. When biosolids meet the Class "A" standard, they are subject to fewer restrictions for land application as long as they also meet the lower (WAC-173-308) Table 3 pollutant concentration thresholds and vector attraction reduction standards.

Vector Attraction Reduction Requirements

The third minimum requirement for biosolids to be land applied is the vector attraction requirement. This measure is designed to make the biosolids less attractive to disease-carrying pests such as rodents and insects. These measures typically reduce the liquid content and/or volatile solids content of the biosolids or they make the biosolids relatively inaccessible to vector contact by soil injection or tilling. The 503 and 308 regulations list seven alternative treatment techniques and/or laboratory tests that would qualify a sludge as meeting vector attraction reduction requirements. If biosolids are not treated by one of the listed treatment techniques to provide vector attraction reduction, and if it does not pass the laboratory tests for vector attraction reduction, then it can meet the requirements during land application by subsurface injection or immediate tilling into the ground.

Management Practices

For biosolids that are Class “B” with respect to pathogens and have met the three criteria discussed above, the 503 and 308 regulations identify specific management practices that must be followed during land application of biosolids. The biosolids must be applied at a rate that is equal to or less than the agronomic rate. The placement of biosolids on land cannot adversely affect a threatened or endangered species. Biosolids cannot be applied to ground in a manner that would cause it to enter wetlands or a surface water body (e.g. on frozen ground or snow-covered ground) nor can it be applied within 10 meters or less of surface water. Class “B” biosolids may not be applied to lawns or gardens.

If biosolids meet lower pollutant threshold limits, Class “A” pathogen reduction requirements, and vector attraction reduction requirements, they are eligible for relatively unrestricted application. Biosolids in this category are referred to as "Exceptional Quality" (EQ). EQ biosolids can be containerized and sold or given away in quantities up to one metric ton provided a label or information sheet is provided with:

(1) the biosolids preparer's name and address,

(2) sufficient information (nitrogen concentrations) for the recipient to determine an agronomic rate of application,

(3) a statement that application is prohibited except in accordance with instructions provided with the container.

Monitoring Requirements

Monitoring frequencies are based on quantities of biosolids produced. (It is not generally necessary to verify that pathogen and vector attraction reduction measures are met for each individual load of biosolids that is land applied, per WAC 173-308-150 (3)). The actual monitoring frequencies will depend on the frequency of applications.

Record-keeping, Reporting and Certifications

The 503 and 308 regulations have specific record-keeping, reporting, and certification requirements for land application of biosolids. The general biosolids permit implements requirements for record keeping and reporting in accordance with WAC 173-308-290 and –295. Records must be kept for meeting all pathogen reduction and vector attraction reduction requirements for biosolids and domestic septage. For biosolids, records must be kept of analyses performed for meeting trace pollutant criteria. Ecology requires that *all* facilities, regardless of size, make annual reports to both Ecology's headquarters and the appropriate regional office, by March 1st of each year.

Permitting

WAC-173-308-310 lists permitting requirements for municipalities managing biosolids. The primary permit required for biosolids management activities is *the State General Permit for Biosolids Management*. The permittee must carry out public notice as required under WAC 173-308-310(11), and public hearings if required, in accordance with WAC 173-308-310(12), and comply with requirements of the State Environmental Policy Act (SEPA) as stipulated under WAC 173-308-310(030).

Treatment works treating domestic sewage that come under the State general permit must also comply with requirements of the State Environmental Policy Act (SEPA) per WAC 173-308-030. The Department of Ecology carries out public notice as a part of the process of issuing a general permit. Public notice requirements for facilities subject to this permit vary depending on the purpose the notice is serving and the quality of biosolids being managed. When a facility applies for initial coverage under the general permit it must carry out public notice for that purpose as specified in WAC 173-308-310(11). Notification must be made to the general public, affected local health departments, and interested parties.

WAC-173-308-205 SIGNIFICANTLY REMOVE MANUFACTURED INERTS

WAC-173-308-205 requires all biosolids (including septage) or sewer sludge to be treated by a process such as a physical screening or another method to significantly remove manufactured inerts prior to final disposition. Meeting this requirement may occur at any point in the wastewater treatment or biosolids manufacturing process.

Meeting the requirements can be accomplished by either of the following methods:

(a) Screening through a bar screen with a maximum aperture of 3/8 inch (0.95 cm).

(b) Obtaining approval from the Department of Ecology for an alternative method that achieves a removal rate similar to or greater than that achieved by the screening standard in (a).

The requirements of WAC-173-308-205 must be met by July 1, 2012, or at the time of final disposition if the material will not be managed prior to July 1, 2012.

The City looked into retrofitting their existing John Meunier bar screens to meet the new requirement, and found that they could only be reduced to a minimum 1/2 inch spacing which did not meet the department's requirement. After looking at several alternative bar screen makers and alternative screening options and the capital cost for each, the City has opted to have the biosolids screened at the time of removal from the lagoons by the contractor.

This method for meeting the requirement was discussed with the Department of Ecology and was addressed in the City's 2010 Application for Coverage Under the General Permit for Biosolids Management.

BIOSOLIDS QUALITY AND CHARACTERISTICS

Table 9-1 presents the metals concentrations and other characteristics for biosolids from the City's oxidation ponds in 1994. Results from a 1994 hydrographic survey and sampling program (Hammond Collier & Wade-Livingstone, 1994) showed that biosolids accumulated in two zones. The "high solids zone" was located at the south end of the ponds. The "low solids zone" was the remaining areas in the ponds. Biosolids characteristics for both areas are presented in Table 9-1.

In 2003, Hammond Collier & Wade-Livingstone conducted additional sampling for the City's oxidation ponds prior to the biosolids removal project in 2003. These results are presented in Table 9-2 for metal concentrations and other biosolids characteristics. In addition to metals and solids characteristics, the City's biosolids were also analyzed for PCBs, pathogens, and vector attraction requirements. PCBs were found to be 1.0 mg/kg, or less. Pathogen testing showed the density of fecal coliform to be significantly less than the standard of 2,000,000 Colony Forming Units (FCUs) per gram of total solids (dry weight basis). In addition, vector attraction requirements were met in all cases.

TABLE 9-1

Pollutant and Other Characteristics in Biosolids from Marysville WWTP (1994 Sampling Data)

Parameter Metals	**Units**	**Low Solids Zone**	**High Solids Zone**	**WAC-173-308 Table 3 Threshold (EQ)**	**Compliance (Y/N)**	**WAC-173-308 Table 1 Ceiling Conc. Limits**	**Compliance (Y/N)**
Arsenic	mg/kg	32	24	41	Yes	75	Yes
Cadmium	mg/kg	8	5.6	39	Yes	85	Yes
Copper	mg/kg	305	277	1,500	Yes	43	Yes
Lead	mg/kg	168	197	300	Yes	810	Yes
Mercury	mg/kg	6	1.3	17	Yes	57	Yes
Molybdenum	mg/kg					75	
Nickel	mg/kg	66	63	420	Yes	420	Yes
Selenium	mg/kg	32	22	100	Yes	100	Yes
Zinc	mg/kg	560	637	2,800	Yes	7,500	Yes
Other Characteristics[1]				**Total**			
Acre of Oxidation Ponds	acres	44	23	67	N/A	N/A	N/A
Volume	cubic yard	76,985	34,100	111,085	N/A	N/A	N/A
Solids Content	percent	3.35	6.3	N/A	N/A	N/A	N/A
Mass Dry Solids	tons	2,170	2,150	4,320	N/A	N/A	N/A
Percent of Total	percent	50%	50%	100%	N/A	N/A	N/A

(1) Results of the *Lagoon Hydrographic Survey Results*, Hammond, Collier & Wade-Livingstone, 1994.

TABLE 9-2

Pollutant and Other Characteristics in Biosolids from Marysville WWTP (2002Sampling Data)[1]

Parameter Metals	Units	Low Solids Zone (N)	High Solids Zone (S)	WAC-173-308 Table 3 Threshold (EQ)	Compliance (Y/N)	WAC-173-308 Table 1 Ceiling Conc. Limits	Compliance (Y/N)
Arsenic	mg/kg	28	26	41	Yes	75	Yes
Cadmium	mg/kg	4.9	5	39	Yes	85	Yes
Chromium	mg/kg	359	357	N/A	N/A	N/A	N/A
Copper	mg/kg	287	338	1,500	Yes	43	Yes
Lead	mg/kg	147	143	300	Yes	810	Yes
Mercury	mg/kg	1.63	2.97	17	Yes	57	Yes
Molybdenum	mg/kg	9.38	7.95	N/A	N/A	75	N/A
Nickel	mg/kg	77	67	420	Yes	420	Yes
Selenium	mg/kg	6.9	7.8	100	Yes	100	Yes
Silver	mg/kg	18.3	21.4	N/A	N/A	N/A	N/A
Zinc	mg/kg	635	803	2,800	Yes	7,500	Yes
Other Characteristics							
Ammonia	mg-N/kg	1,508	1,983	N/A	N/A	N/A	N/A
N-NO3 NO2	mg-N/kg	3.0	3.7	N/A	N/A	N/A	N/A
O-Phos	mg-P/kg	63	175	N/A	N/A	N/A	N/A
PCB	mg/kg	<1	<1	N/A	N/A	N/A	N/A
Sulfate	mg/kg	2,220	2,850	N/A	N/A	N/A	N/A
T-Phos	mg/kg	4360	7,967	N/A	N/A	N/A	N/A
TKN	mg/N/kg	21,000	23,650	N/A	N/A	N/A	N/A
Solids Content	percent	10.3	15.3	N/A	N/A	N/A	N/A

(1) Results for the Biosolids Removal Project, Hammond, Collier & Wade-Livingstone, 2002.

In both Tables 9-1 and 9-2, the analytical results for metals are compared with the pollutant limits listed in WAC 173-308. Generally, the higher the concentration of pollutants the more restricted disposal options will be. If any of the WAC 173-308 Table 1 ceiling concentration limits are exceeded, the sludge is considered a solid waste, not biosolids, and cannot be beneficially reused. If all of the pollutant concentrations are below the Table 3 limits from WAC 173-308, the sludge is eligible for "EQ-exceptional quality" status and thus relatively unrestricted management alternatives (assuming appropriate pathogen reduction and vactor attraction measures are employed).

The City's biosolids, as shown in Table 9-1 and Table 9-2, satisfied the requirement for metals concentration for EQ biosolids. Another requirement for land application is pathogen removal. To be classified as Class "B," fecal coliform concentration must be less than 2,000,000 MPN/gram. To meet Class "A" standards, the fecal coliform concentration must be less than 1,000 MPN/gram. Analyses conducted in 2002 indicate that the City's biosolids complies with this requirement for Class "A."

In order to land apply the biosolids as Class "B," with respect to the pathogen removal, the City must perform the following tests during the process of applying for the Biosolids General Permit:

- Fecal coliform concentration (seven samples)
- Pollutant concentrations, including metals and PCBs.
- Vector attraction reduction, particularly the long-term anaerobic degradability bench test.

In order to land apply biosolids as Class "A," EQ biosolids, the City must perform the following tests in addition to those for Class "B":

- Enteric virus concentrated
- Viable helminthova concentrations

The 1994 analytical results showed an average concentration of total solids of 4.8 percent. The 2002 date showed a range for the north and south lagoon areas of 10 to 15 percent. Typical values for lagoon sludge are 3 to 15 percent, therefore, the City's concentration is considered normal.

The change in solids content from 4.8 percent in 1994 to an average of 12.8 percent in 2002 can be partly explained by the additional settling time. The additional time allows additional consolidation of biosolids within the oxidation ponds. However, predicting the change in solids content is difficult. In this case, the change was 8 percent in only 8 years.

BIOSOLIDS MANAGEMENT

In the 2001 Capital Facilities Plan (TetraTech/KCM, Inc.), three biosolids management alternatives were evaluated:

- Low rate lagoons
- High rate lagoons
- Mechanical solids handling

The recommended alternative was the low rate lagoons, the system which has been in place for the past 40 years. The Capital Facilities Plan stated that if the selected liquid-stream process was an activated sludge process, then the mechanical solids handling would be required. However, because Phase 2 construction was an expanded aerated lagoon system, biosolids storage, or the low rate lagoons, will continue as part of the City's plan.

The complete components of this low-rate lagoon plan included continued storage of biosolids in the oxidation ponds and periodic removal by contract dredging, dewatering, and disposal of the accumulated biosolids at an approved beneficial use facility. A contractor will dredge the oxidation ponds, then dewater the biosolids onsite (approximately 20 to 25 percent solids) with a mobile dewatering system. Biosolids that meet the criteria for disposal at a contracted land application facility are transported by the contractor and disposed at such a facility. Beneficial use facilities are located in Cinebar, Lewis County (Fire Mountain Farms), Mansfield, Washington (Boulder Park), and other eastern Washington sites.

As presented in Table 9-1, the City's biosolids do meet some of the criteria for Class "A" EQ biosolids. However, the complete analysis conducted in 2002 resulted in a Class "B" biosolids classification. For future biosolids removal projects where Class "B" biosolids are land applied at a beneficial use facility, the City must complete the following:

- Application for coverage under the Statewide General Permit for biosolids. This action will include SEPA and public notice for the hauling activity in Snohomish County and in the County where biosolids will be land applied. The beneficial use facility will already have been permitted for its site.

- Signed certification statements that the biosolids meet all application quality regulations.

- Annual report to Ecology including laboratory results and records of amount of biosolids that were land applied.

- Measure and report the nitrogen concentration in the biosolids to the operators of the beneficial use facility.

- A contract with a Contractor(s) to dredge, dewater, haul and land apply the Class "B" biosolids.

A contractor would use an auger-head dredge unit to remove the accumulated biosolids from the oxidation ponds. Portable polymer feed and dewatering equipment, such as a centrifuge or a belt filter press, would be installed on site to dewater the biosolids to 20 to 25 percent. The dewatered biosolids would be deposited into a truck for transport to the beneficial use facility for land application.

The impact on current City staff would be temporary since the dredging, dewatering and hauling operation can be completed in 4 to 6 months.

For contract hauling and land application of Class "B" biosolids, the primary challenge for the City staff is to plan for the next biosolids removal project since biosolids were last removed from the oxidation ponds in 2003. The schedule for the next removal project is dependent upon a variety of factors, which are listed below:

- Loading rates to the WWTP
- Solids content of accumulated biosolids
- Percentage of oxidation ponds volume with accumulated biosolids
- Inert solids concentration

Most of these factors are considered in the following equation which calculates annual sludge accumulate rate:

$$R_y = \frac{365\ QX_i}{x\rho}$$

Where: R_Y = annual accumulation rate, m^3/yr
Q = average wastewater flow rate, m^3/day
X_i = inert solids, mg/L
x = weight fraction of solids in the sludge, and
ρ = density of water = $10^6 g/m^3$

(Equation 4.4.1-*High Performance Aerated Lagoon Systems*, Linvil Rich, 1999.)

This equation can be modified slightly so that the annual accumulation rate is presented in cubic yards per year. This unit is consistent with previous work which characterizes the oxidation pond volume in terms of cubic yards. The modified equation with the appropriate conversion units is shown below:

$$R_y = \frac{365\ QX_i}{x\rho\ (7.48\ \text{gal/ft}^3)\ (27\ \text{ft}^3/\text{yd}^3)}$$

Where:
- R_Y = annual accumulation rate, yd^3/yr
- Q = average wastewater flow rate, mgd
- X_i = inert solids, mg/L
- x = weight fraction of solids in the sludge, and
- ρ = density of water = 1 g/mL

Based on work completed for this Plan and references from previous work, information about several of these factors is available. Existing and projected flows are shown in Table 6-10. The weight fraction of solids in the sludge is an average of 4.8 percent (*Wastewater Treatment Hydrographic Survey and Biosolids Evaluation for the High Solids Zone*, HCW-L, 1996.) For this evaluation, the solids content value is rounded up to 5 percent.

The primary unknown is the inert solids concentration. The City's WWTP does not have grit removal facilities at the headworks therefore a primary component of the accumulated biosolids would be expected to consist of inert material.

One reference for this inert solids value is *High Performance Aerated Lagoon Systems* (Rich, 1999). In the discussion for inert solids concentration, Rich notes that solids that are subjected to stabilization processes over a period of several years can be expected to display higher biodegradability than shorter processes such as 1 month. Furthermore, he states that solids at 4 percent in a stabilized sludge that have been observed to accumulate over a period of years, in aerated lagoon sludges, lead to an estimate of X_i of about 90 mg/L.

Comparing this inert concentration of 90 mg/L with the influent TSS concentration of 254 mg/L (Table 6-2) results in an inert fraction of 35 percent. According to Metcalf & Eddy, a high strength wastewater, such as the City's, could be expected to contain 75 mg/L as "fixed" or inert solids. However, other solids formed by the biological process in the aerated lagoon will settle in the oxidation pond and stabilize over a period of years. Most of these solids, but not all, will be converted to methane, ammonia, and other reduced compounds. A small fraction will accumulate as inert material. Based on the high concentration of influent TSS and the processes in the oxidation ponds, a value of 90 mg/L would appear to be representative of the inert solids in the oxidation ponds. With this value of 90 mg/L for X_i, the annual accumulation of biosolids can be estimated from the equation presented above.

For the existing WWTP flow of 4.5 mgd, the annual biosolids accumulation is 14,635 yd^3/year with a 5 percent solids content as shown below:

$$Ry = \frac{365\ (4.5\ mgd)\ (90\ mg/L)}{(0.05)\ (1\ mg/mL)(7.48\ gal/ft^3)\ (27\ ft^3/yd^3)}$$

$$= 14{,}635\ yd^3/year$$

Typically, biosolids are removed from wastewater lagoons every 10 to 20 years. A better approach, however, is to establish a volume accumulation which would then establish the next removal schedule. The 1996 HCW-L Report suggested 20 percent of the lagoon volume as the basis for the need for the biosolids removal operation. The percentage volume amounts to about 130,000 cubic yards. The solids content of the biosolids within the oxidation ponds is a significant variable determining when the 20 percent level will be reached. In addition, based on the available data, it is a variable which will change over time. The 1994 data showed an average solids content of 4.8 percent but by 2002 it had increased to 12.8 percent. The higher solids content means that less of the pond is utilized for biosolids accumulation and that the schedule for the next biosolids removal project can be extended.

Table 9-3 illustrates the potential difference with an average solids content of 5 percent and 10 percent. The 5 percent solids represents the results of the 1994 sampling and 10 percent the average for the north lagoon in 2002. It is not known what solids content will be representative when 20 percent biosolids accumulation is reached in the future.

TABLE 9-3

Biosolids Accumulation Rates

		5 Percent		10 Percent	
Year	**Average Annual Flow (mgd)(1)**	**Annual Biosolids Accumulation (yd^3/year)(1)**	**Cumulative Total in Lagoons (yd^3)**	**Annual Biosolids Accumulation (yd^3/year)(2)**	**Cumulative Total in Lagoons (yd^3)**
2010	5.57	18,114	114,702	9,060	57,369
2011	5.75	18,700	**133,402**	9,353	66,722
2012	5.91	19,220	19,220	9,613	76,335
2013	6.07	19,740	38,960	9,873	86,208
2014	6.23	20,260	59,220	10,133	96,341
2015	6.39	20,781	80,001	10,394	106,735
2016	6.55	21,301	101,302	10,654	117,389
2017	6.71	21,822	123,124	10,914	128,303
2018	6.87	22,342	145,466	11,174	**139,477**

(1) Estimated flows from Table 6-10.
(2) Based on inert solids concentration, X_i of 90 mg/L.

In Table 9-3, with the lower solids content the next biosolids removal project would be scheduled for 2011 based on a volume accumulation of 130,000 cubic yards. With the higher solids content, the next project would be in 2018. It is recommended that the City conduct another study, similar to the ones in 1994 and 2002, to characterize actual pattern and solids content within the oxidation ponds. The estimated cost for this study is $15,000.

If the biosolids removal operation is conducted when sludge accumulation reaches 20 percent of lagoon capacity, approximately 133,000 cubic yards (5,620 dry tons at 5 percent solids) will be dredged, dewatered, and hauled. In the 2003 project, 4,300 dry tons of biosolids were removed.

TABLE 9-4

Cost Estimate for Contract Land Application of Class "B" Biosolids(1)

Item	Total Cost
Permitting and Sampling	$ 15,000
Contractor Mobilization/Demobilization	$ 50,000
Contractor Dredging and Dewatering(2)	$2,107,500
Contracted Hauling and Land Application(3)	$ 252,900
Subtotal	$2,425,400
Contingency (20%)	$ 485,080
Subtotal	$2,910,480
Sales Tax (8.5%)	$ 247,390
Total Construction Cost	$3,157,870
Engineering and Administrative (8%)	$ 250,000
	$3,407,870
(rounded)	**$3,400,000**

(1) 2011 estimate, based on 2004 dollars.
(2) Quote from Tri Max, Inc. at $377/dry ton
(3) Estimate from Fire Mountain Farms at $45/dry ton

In the City's 2005 sewer comprehensive plan, the recommended schedule for biosolids removal was based on the accumulation of approximately 5,620 dry tons. Therefore, the next biosolids removal was projected for 2011 with another removal in 2018.

Although the City's Utility Model Budget projected a cost of $2,080,000 for this project in 2016, the solids have accumulated slower than previous projections. Given the slower accumulation of solids, as measured by city staff twice per year over the past five years, it is now projected that the next biosolids removal project will be scheduled for 2018 or beyond.

Costs for biosolids dredging, screening, dewatering, hauling, and land application in 2018 or beyond, could easily exceed $4,000,000, given the estimates presented in Table 9-4 above, based on 2004 dollars, and including reasonable inflation factors.

CHAPTER 10

OPERATION AND MAINTENANCE

INTRODUCTION

This Chapter addresses the operation and maintenance of the components in the City's sewer collection system. Those components include the pump stations and generators, force mains, and gravity pipelines. The sections of this Chapter include responsibility and authority, normal system operation, routine preventative maintenance criteria, current staffing organization and needs, capacity management operation and maintenance (CMOM) and future staffing needs, discharge policy, new construction, records, safety, and emergency response procedures.

There are two primary objectives of this Chapter. The first objective is to provide documentation of satisfactory wastewater system management operations in accordance with WAC 173-230. This objective includes a description of the staff organization, existing facilities and their normal operation. The second objective of this manual is to provide an evaluation of staffing needs for existing responsibilities and new ones the City may assume in the future. These future responsibilities may include tasks associated with programs such as CMOM and the expanded collection system to serve growth.

RESPONSIBILITY AND AUTHORITY

The City is governed by a Mayor and seven council members. The Chief Administrative Officer reports directly to the Mayor, and oversees the management of the Public Works Department and its sewer system through the City's Public Works Director. The organization chart for the Public Works Department is shown in Figure 10-1.

There are currently a total of 87 FTEs on the Public Works staff. This department is responsible for the water system, streets, storm sewers, sanitation, the wastewater treatment plant, the sewer collection systems, and other special projects. Seven personnel are assigned to the Wastewater Treatment Plant and are responsible for the operation and maintenance of the plant and pump stations. Two lead workers and six maintenance workers are assigned to the vactor crew. Three employees from the vactor crew spend approximately 50 percent of their time flushing and cleaning the gravity sewer mains. The entire vactor crew spends about 10 percent of their time with repair and maintenance of sewer pipelines. Other tasks such as utility locates are done by water system maintenance personnel. Altogether there are approximately 15 full-time employees (FTEs) for the operation and maintenance of the wastewater treatment plant and sewer collection system. Of this number, 4 FTEs are assigned to the wastewater treatment plant and pump station maintenance.

CITY OF MARYSVILLE
Public Works Department

Public Works Director
Kevin Nielsen

Public Works Superintendent
Larry Larson

Operations Manager
Karen Latimer

MAINTENANCE
Lead Worker II
Maint. Worker II (5)
Maint. Worker I
Meter Repair

CONSTRUCTION
Lead Worker II
Lead Worker I
Maint. Worker II (7)

SOLID WASTE
Lead Worker II
Maint. Worker II (5)
Collector

Water Quality Manager
Doug Byde

WASTE WATER
WWTP Lead (2)
WW Maint. Tech II
WW Maint. Tech I (2)
WWTP Operator (2)

WATER QUALITY
Water Quality Lead
Water Quality Spec. (2)

Street/Surface Water Manager
Charles Burk

STREETS
Lead Worker II
Lead Worker I
Maint. Worker II (8)
Maint. Worker I (2)

SW - VACTOR
Lead Worker II
Lead Worker I
Maint. Worker II (2)
Maint. Worker I (4)

Fleet Manager
Vacant

Lead Worker II
Equipment Mech. (2)

Project Engineer
Paul Federspiel

Asst City Engineer
John Cowling

Surface Water Supervisor
Kari Chennault

Surface Water Specialist (2)
SW Inspector

Project Manager
Pat Gruenhagen

Engineering Tech (2)
Eng. Project. Aid
GIS Administrator
GIS Analyst

Traffic Engineer
John Tatum

Project Engineer
Sr. Traffic Cont Tech
TrafficControl System Tech
Maint. Worker II

Admin Services Manager
Tonya Miranda

Admin Secretary
Program Clerk (2.5)
Procurement Assn't

Facilities
Maint. Workers II
(2)

OPERATIONS..........................62
- Utilities/Solid waste..............24
- WWTP/Water Quality............10
- Streets/SW.........................20
- Fleet..................................3
- Project Engineer....................1
- Managers.............................3
- Superintendent.....................1

ENGINEERING........................16
- Surface Water Supervisor........1
- Surface water Specialist..........2
- Surface water inspector...........1
- Project Manager.....................1
- Engineering Tech...................2
- Engineering Project Aid...........1
- GIS Administrator..................1
- GIS Analyst...........................1
- Traffic Engineer......................1
- Project Engineer.....................1
- Sr. Yraffic Control Tech...........1
- Traffic Control System Tech......1
- Maint. Worker II......................1
- Assn't City Engineer...............1

DIRECTOR/ADMIN..............8.5
- Public Works Director.........1
- Admin. Services Manager....1
- Admin Secretary................1
- Progran Clerk..................2.5
- Procyrement Assn't............1
- Facilities..........................2

PUBLIC WORKS DEPARTMENT
TOTAL...86.5

PERSONNEL CERTIFICATION

The Washington State Department of Ecology, under WAC 173-230, requires every operator in charge of a wastewater treatment plant to be certified at a level equal to or higher than the classification rating of the facility. Under condition S5 of the City's NPDES permit, an operator certified for at least a Class III Plant shall be in responsible charge of the day-to-day operations and an operator certified for a Class II Plant shall be in charge during all regularly scheduled shifts.

There are currently no Washington State certification requirements for wastewater collection system operators. However, the Department of Ecology encourages participation in a program for collection system certification.

Table 10-1 summarizes the certification of staff personnel as of August 2011.

TABLE 10-1

2011 Wastewater Treatment Plant Personnel Certifications

Name	Title	Certification Level
Wastewater Treatment Plant Operations		
Doug Byde	Water Quality Manager	Group IV
Jeff Cobb	WWTP Lead, Operations	Group III
Jason Crain	WWTP Operator	Group III
Shane Freeman	WWTP Operator	Group II
Wastewater Treatment Plant & Pump Station Maintenance		
Dennis Roodzant	WWTP Lead, Maintenance	Group II & Collection Specialist I
Steven Bryant	WWTP Maintenance Technician II	Group I
John Filori	WWTP Maintenance Technician I	Group I
Frank Stair	WWTP Maintenance Technician I	Group I

FULL-TIME EMPLOYEES (FTEs)

Characterization of staffing often refers to full-time employees (FTEs). One FTE is defined as the equivalent manpower of one person working full time for one year. One employee may work a maximum of 2,080 hours per year. However, due to vacation days and other time off, the hours worked by one FTE is less than the maximum number of hours. Based on the City's policies of 10 holidays, 12 sick days, two training days, and an average of 15 vacation days, one FTE is equal to 1,768 hours in 1-year.

NORMAL SYSTEM OPERATION

The existing system of pump stations, force mains, and gravity lines is summarized in Tables 5-1, 5-2, and 5-3 with additional details included in Appendix C.

The City's wastewater collection system currently consists of 15 sewage pump stations, approximately 4.2 miles of force main, and 210 miles of gravity sewer line. Detailed operating instructions for pump station components are provided in the O&M Manuals for each station. The manuals have been compiled by the pump manufacturers and are on file at the wastewater facility.

ROUTINE AND PREVENTATIVE MAINTENANCE CRITERIA

Planning for present and future maintenance for the wastewater collection system can be considered as a task equally important to planning capital improvements or system expansion. If the maintenance effort is not expanded proportionately to system expansion, the reliability and efficiency of the system may be diminished. Goals of the maintenance program are to preserve the value of the physical infrastructure, and to ensure that all wastewater is conveyed safely, efficiently, and reliably. A planned preventative maintenance program provides the most cost-effective method for performing the optimum level of maintenance at the lowest cost. In addition to the actual maintenance tasks for system facilities, scheduling, administration, inventory, and record keeping are key components of the City's maintenance program.

The primary tasks associated with the operation and maintenance of the wastewater collection system include inspection of pump stations and generators, televising and flushing gravity sewer lines, and manhole inspection. Staffing and equipment requirements vary greatly with age, size, and type of system.

For the City of Marysville, the annual budget for the operation and maintenance costs is approximately $500,000. Table 10-2 shows a more specific breakdown of actual data and costs.

TABLE 10-2

2010 Operation and Maintenance Budget for Collection System

Category	Data
Annual Budget per Mile of Sewer	$2,381.00
Maintenance Dollars per Service Connection	$31.32
Maintenance Workers per Mile of Sewer	0.0238
Percent of System Cleaned Annually	33 percent (target)
Percent of System Video Recorded Annually	5 percent (target)

The City's preventative maintenance (PM) program involves defining the tasks to be performed, scheduling the frequency of each task, and then providing the necessary staff to perform the task. The City's current PM schedule for the major components of the sewer collection system is shown in Table 10-3.

TABLE 10-3

Preventative Maintenance Schedule

Component	Visitation Schedule	Maintenance Schedule
Telemetry	Daily	• System checked daily.
Gravity Sewer and Manholes	Every year	• Pipelines cleaned. • Video inspected as required. • Lines identified as potential problem areas are maintained on a quarterly basis. • Manholes inspected.
Force Mains	As necessary	• As necessary.
Pump Stations	Weekly	• Inspected 3 times per week. • Site cleaned monthly. • Wet well vactored out 2 or 4 times per year depending on station needs.
Generators	Weekly	• Exercised automatically by the telemetry system on a weekly basis. • Fuel storage tanks are checked for fuel level and refilled monthly. • Preventative maintenance checks by in-house mechanics twice per year. • Annual services by Cummins Northwest.

PUMP STATION AND GENERATOR MAINTENANCE

An inventory of the mechanical equipment for each of the City's sewage pump stations is summarized in Table 5-3. The major pieces of information recorded by City personnel, are pump run times, wet well level, running time pump amperage, and flow for major stations.

Table 4-1 from the Water Environment Federation's (WEF) Manual of Practice 7, *Wastewater Collection Systems Management* provides an extensive list, of the tasks associated with preventative maintenance at pump stations. Some of these tasks may not be required as frequently, if at all, at some of the smaller pump stations. An abbreviated table, Table 10-4, covers maintenance items for the City's larger wet well/dry well pump stations.

TABLE 10-4

Pump Station Maintenance Schedule

Item	Weekly	Monthly	Quarterly	Yearly
Pump Station	Write down hours Check pump cycle counter Check wet well ventilation Check for leaks in dry well Check sump pump Check telemetry in pump stations	Clean Floats Clean and sanitize dry well Drain air Compressors Clean out Drain Sumps	Pump out and clean wet well Grease all pumps Clean check valves	Paint interior and piping (5 years) Check all force mains that discharge to manholes Check all Electric panels Inspect pump impellers <u>Twice Per Year</u> Use portable generator to test transfer switches and proper electrical transfer at stations without onsite generators.
Generators	Test Run Exercise Check oil Check coolant level	Check and top off fuel level		<u>Twice Per Year</u> Check oil filter Check air filter Check battery fluid level and fan belts Check battery terminals for corrosion Check alternator output volts Check RPM

Pump station staffing requirements vary greatly depending on the size and complexity of the station as well as the scheduled maintenance routine. Inspection and maintenance staffing needs typically range from 0.052 to 0.42, and 0.07 to 0.63 FTEs per pump station, respectively. Combining both tasks results in a range of 0.12 to 1.05 FTEs per pump station.

The City has three of its staff assigned to mechanical inspection of equipment at the wastewater treatment plant and the pump stations. Each pump station is physically inspected three times per week. The auxiliary generators are exercised and checked weekly. Assuming a 50 percent allocation to pump station inspection and maintenance, approximately 1.5 FTEs are assigned full-time to pump station maintenance. In addition to the regularly scheduled inspections, the vactor crew pumps out each wet well 2 to 4 times per year, depending on the specific needs at each station. This work adds 0.2 FTE to pump station maintenance. With an additional 0.3 FTE for supervision (20 percent of the maintenance lead's time), the City's total for pump station O&M is 2.0 FTEs.

The City's pump stations can be organized into two groups based on maintenance requirements. Its smaller development type pump stations include Carrol's Creek, Regan Road, Cedar Crest Vista, 3rd Street, Kellogg Ridge, Quilceda Glen, Ash Avenue, Eagle Bay, and the Waterfront Park pump stations. These pump stations are equipped with small horsepower motors and do not have onsite auxiliary generators (with the exception of Regan Road, which has an onsite generator). All of the stations are equipped with an emergency generator plug that adapt to the City's portable generator. A staffing value of 0.12 FTE is assigned to each of the small pump stations.

The City's primary pump stations include Soper Hill, 88th Street, Marysville West, 51st Avenue, Sunnyside, and West Trunk. These six pump stations are equipped with larger horsepower pumps and auxiliary generators (except Marysville West). In addition, two of these pump stations, 51st Avenue and Sunnyside, have three pumps instead of the standard of two found at other stations. It is assumed that the City's six primary pump stations require on average, 40 percent more manpower than the smaller pump stations. A staffing level of 0.17 FTEs is assigned to each of the primary pump stations due to their complexity and additional equipment.

Table 10-5 summarizes the estimated staffing requirements for the City's pump stations based on the two categories. The minimum recommended staffing level for the City's 15 pump stations is 2.10 FTEs, which is only slightly greater than the current staffing level of 2.0 FTEs. Based on the existing number of pump stations, the City's staffing is adequate for routine, preventative maintenance.

TABLE 10-5

Pump Station Inspection and Maintenance Staffing Requirements

Category	Number	Employees Per	Total Employees
Developer	9	0.12	1.08
Primary	6	0.17	1.02
Total	15		2.10 FTEs

GRAVITY SEWERS AND MANHOLES

The major maintenance activities with respect to gravity sewers and manholes are periodic inspection and flushing. The older portions of the City's sewer collection system should be given special attention because of the potential for breaks in sewer lines or accumulated solids in these areas. For the City of Marysville, the older sewers are located in the neighborhood areas of Downtown, Cedar Crest, and Jennings Park. In addition, sewers with minimum grade require more frequent cleaning. These sewers were identified from the results of the hydraulic model and are shown in Appendix E and Exhibit VI.

City staff has made cleaning its gravity sewers a priority with a goal of flushing its sewer system every two and a half years. This frequency is supported by the results of the hydraulic model, which showed that 45 percent of the modeled trunk sewers had pipeline velocities less than 2 fps.

PIPELINE CLEANING

Periodic cleaning of the sewer collection system will ensure that sewers remain clear of blockages and free of odors. Root intrusion, grease, and deposited solids are the most common cleaning problems. Root intrusions develop through deteriorated joints or broken pipe. Over time, roots cause restrictions in the pipeline, which may cause system backups. Grease buildup in a pipe results from waste oils from commercial and residential food preparation. Grease floats to the surface and coats the inside of the pipe. Repeated coatings harden over time and may constrict the pipe diameter to a fraction of its original size. Deposit of solids result from low flow pipelines or low pipeline velocities. To maintain minimum scouring in pipelines, a velocity greater than 2-feet per second is required. However, because of minimum slope, low flow, and misaligned joints, this minimum velocity is not always achieved and solid material has an opportunity to deposit in the pipe channel.

There are several methods available for pipeline cleaning: hydraulic, mechanical, and chemical. Each one is described below.

HYDRAULIC CLEANING

Hydraulic cleaning refers to any application of water to clean the pipe. Typically, the hydraulic unit is either trailer or truck mounted and has various sizes of water tanks and different types of power drives. A water pump delivers water through a nozzle at a high pressure and volume moving most materials in a pipe.

The newest development in high velocity cleaning is the addition of vacuum systems to form a combination cleaner. This system employs the same cleaning techniques as high velocity cleaners but also use a vacuum to remove material from the pipe. A positive displacement or air pump is used to generate the vacuum. Water from the collected material can be siphoned off and returned to the sewer system.

MECHANICAL CLEANING

Power rodding equipment is utilized to remove blockages in sewer pipelines such as those caused by root intrusion or grease accumulations. The rod, which is stored on a reel, is fed into the line and turned on automatically. Rodding machines can be trailer or truck-mounted and are available with various engine sizes and a wide array of rod diameters and lengths. Rodders are often used in conjunction with high velocity hydraulic cleaners to first remove debris. Then, the rodder is used to remove the blockage. For follow-up action, the high velocity cleaner should be used periodically to prevent future buildup and blockages. The location of all blockages should be mapped and used for the cleaning program.

CHEMICAL CLEANING

Chemical treatment can be used for root and grease control. Chemical products such as copper sulfate and sodium hydroxide may kill roots with repeated applications but do not necessarily inhibit regrowth. Typically, roots would first be removed by mechanical means and then herbicides applied to prevent regrowth. Herbicides can inhibit growth for two to seven years. Chemical additives are also available for grease control. Agents such as bacterial cultures, enzymes, hydroxides, caustics, bioacids, and neutralizers are available to help control severe grease buildups but require regular application.

Chemical applications for root and grease control are recommended only as a last resort. These applications may negatively impact the operation of the treatment plant or simply transfer a problem to a downstream location. However, in limited access or high-traffic areas where set-up of cleaning or rodding machinery may be difficult, chemicals may be the only viable solution.

VIDEO INSPECTION

Inspection by closed circuit television is the most effective method of determining the nature and extent of internal problems in the sewer collection. The video inspection can locate misaligned joints, broken and cracked pipe, pipeline intrusions, and other structural defects. Particularly where older pipe is in service, a record of structural defects is required for establishing a pipeline rehabilitation program. When structural defects are found, open cut and replacement is required. If the pipeline contains deteriorated joints but is otherwise in good condition, trenchless means for pipeline rehabilitation are an available alternative.

The current range of inspection is almost unlimited. Small cameras can inspect even 4-inch service laterals, so long as a suitable cleanout is available for access. Also as with rodding equipment, video inspection equipment is often utilized with hydraulic cleaning.

Video inspection equipment will not operate well in pipelines with debris and gravel accumulation.

CLEANING AND INSPECTION STANDARDS

There is no well established industry standard for cleaning and inspection intervals. Cleaning is typically performed more often than inspection and varies between 25 and 40 percent of the system per year. Cleaning is performed more often than inspection because it addresses the accumulation of debris which can cause hydraulic disruptions in a short period of time. Inspection, on the other hand, identifies deteriorated or damaged structures due to corrosion, root penetration, or soil shifting which occur at a relatively slow, albeit consistent rate. At this time the City will continue to place emphasis on cleaning as compared to video inspection. System goals are 40 percent for cleaning and 5 percent for video inspection.

Typical rates of inspection and cleaning vary from 12 to 97, and 29 to 932 feet per hour. Table 10-6 estimates the staffing requirements for the current system. An inspection and cleaning rate of 50 and 250 feet per hour, respectively, is used as the basis for the calculations. The results in Table 10-6 show 2,900 crew hours per year, or 3.2 FTEs.

TABLE 10-6

Staffing Requirements for Inspection and Cleaning

	Length of Gravity Pipe (miles)	Target Interval (years)	Length per Year (feet)	Rate per Crew (ft/hour)[2]	Required Number of Crew Hours
Video Inspection	210	20	55,000	50	1,100
Pipeline Cleaning	210	2.5	450,000	250	1,800
Total					**2,900 hrs/yr[1]**

(1) 2,900 hrs/1,768 hrs/FTE x 2 FTEs/Crew=3.2 FTEs
(2) Annual basis.

CURRENT STAFFING NEEDS

Based on the estimated staffing requirements for the City's pump stations and gravity sewers (Table 10-6), the total staffing requirements for the existing collection system is 5.3 FTEs, slightly more than the number of staff currently assigned (5.0 FTE's).

FUTURE STAFFING NEEDS

The unit rates for pump station maintenance and gravity sewer cleaning and inspection can be used to estimate future staffing needs. As the sewer system expands, the operation and maintenance requirements will expand accordingly. Growth in the collection system is based on the area covered by the sewer system. This basis is more representative than population since it recognizes some "in-fill" (therefore no growth in the sewer collection) and also an expansion of the area served (therefore, additional requirements to maintain new sewer mains).

Table 10-7 presents an estimate of the future staff needs based on the expected number of new pump stations and the future size of the gravity sewer system through the year 2025.

TABLE 10-7

Estimation of Future Staffing Needs Collection System

Year	2010	2017	2031
Estimated Sewer Service Area (Ac)(1)	4,979	5,708	7,340
Miles of Sewer	210	240	310
Number of Pump Stations(2)	15	16	19
Gravity System FTEs	3.2	3.7	4.8
Pump Station FTEs	2.1	2.2	2.7
Total Maintenance FTEs	5.0	5.9	7.0

(1) Table 6-10.
(2) One pump station by 2017 in Whiskey Ridge.

Based on the analysis presented in Table 10-7, the City's staffing needs for the collection system are expected to increase by 0.9 FTEs by 2017 and 2.0 FTEs by 2031. An additional FTE should be added in 2017, followed by one more additional FTE by 2031.

CAPACITY MANAGEMENT OPERATION AND MAINTENANCE (CMOM) AND FUTURE STAFFING NEEDS

Capacity Management Operation and Maintenance (CMOM)

This Section evaluates staffing requirements for new responsibilities the City may assume under the proposed Capacity Management Operation and Maintenance (CMOM) regulation by the Environmental Protection Agency. The legal basis for the CMOM regulation is that nearly all collection systems have unplanned releases at sometime and that these releases are regulated under the jurisdiction of the Clean Water Act. The purpose of CMOM regulations is to ensure that collection systems are operated and maintained with the same level of attention that treatment plants receive. The regulation has been issued only in draft form and it is uncertain when the final regulation will be issued.

The draft regulation contains several requirements regarding the operation of the sewer collection system. The City currently addresses most of the proposed requirements through its normal operations or studies, which it has authorized in recent years. However, other requirements may represent new responsibilities, which have not previously been part of the City's normal operation. Each of the draft regulatory requirements under CMOM is presented below along with a brief discussion of how the City is or will need to address each one. Those items, which are not currently included in the City's normal operation, are discussed in more detail with the impact to City staffing.

CAPACITY MANAGEMENT OPERATION AND MAINTENANCE (CMOM) DRAFT REQUIREMENTS

1. **Meet additional general sewer system performance standards including up to date system maps, information management systems, and odor control requirements.**

   The City has an up-to-date sewer basemap and a geographical information system (GIS) and a set of Developer Standards to ensure the consistency and quality of sewer construction. The City's sanitary sewer design standards are reviewed and revised on a regular basis.

   A major step towards preventing problems within the sewer collection system is proper installation at the time of construction. The City has adopted Developer Standards pertaining to the sanitary sewer system. These standards are continually reviewed and updated by engineering and maintenance personnel. Standard designs should be developed to minimize total life cycle costs, which include capital, O&M, and financing costs. Also, as the system becomes more complex, special attention should be given to its ability to function during emergency situations.

2. **Maintain program documentation including the goals, organization, and legal authority of the organization operating the collection system.**

   The City has well defined lines of authority for the operation of its sewer collection system. The organizational chart is presented in Figure 10-1.

3. **Develop an overall response plan that can respond to releases in less than 1 hour and is demonstrated to have sufficient personnel and resources.**

   The City has an emergency response plan in place.

4. **Plan for system maintenance, evaluation, and replacement requirements mandating that the collection system be cleaned on scheduled basis, be regularly video inspected, and develop a short- and long-term program for pipeline replacement and rehabilitation.**

The City has a full-time vactor crew with a target goal of cleaning 50 percent of its sewer system each year. In addition, Exhibit VI of this Plan shows the location of trunk sewers with low pipeline velocities, the priority areas for cleaning. Over the past several years the city has budgeted for annual sewer pipeline renewals and replacements. In 2011, due to budget constraints, no monies were budgeted for renewals and replacements. The city plans to continue budgeting for this in future years.

5. Plan for controlling Fats, Oils, and Grease (FOG) that increases in incidences of SSOs.

The City of Marysville has an effective FOG program under the City's Muncipal Code 14.20, wastewater pretreatment. The City maintains a database of all of its FOG dischargers, including dates for next and last inspections, last cleaned, type of FOG device, and general condition of system. All dischargers are required to complete and submit a cleaning maintenance log for the City's records.

6. Develop a capacity assurance and management plan with flow meters to model Infiltration and Inflow (I/I) and system capacity.

The City has flow meters installed at its wastewater treatment plant and 51st Avenue, Soper Hill and Sunnyside Pump Stations. In addition, the City completed an I/I study in 1999. To date, however, the available data has not successfully characterized I/I by individual basins or specific sections of the sewer collection system. Based on average annual flow data, I/I accounts for approximately 20 percent of the plant flow.

7. Develop a self-audit program to evaluate and adjust performance.

The City maintains detailed records at its wastewater treatment plant and pump stations. The City has the capability of determining the success of any pipeline replacement or rehabilitation program through its historical plant flow records and flow meter located at the main pump stations. The City will need to implement a program for compiling and evaluating these records and implementing a system for system maintenance based on identified and reoccurring problem areas.

8. Develop a program to communicate information on problems, costs, and improvements to the public and decision-makers.

Along with the CMOM program, EPA has provided a self assessment checklist which can be utilized to identify areas of strength and weaknesses of utility operations. A copy of this checklist is included in

Appendix G. This checklist should be updated periodically to provide a comparison of performance over time.

The City has consistently updated its Sewer Comprehensive Plans and prepared facility plans specifically to identify problems, develop costs for improvements, and inform the decision-makers. The City conducts regularly scheduled public meetings and sends out brochures informing the public of project updates. The City will need to periodically provide information to the public on the number of sewer spills and backups during the year and explain the City's short and long term response to these incidents.

SAFETY

An important consideration of any successful maintenance program is the safety and well being of all employees. The City's safety program addressing accidents, fall protection, confined spaces, and lockout/tagouts are based on the standards of the Washington State Department of Labor and Industries (L&I). The safety program addresses the situations that employees may encounter during the performance of operation and maintenance tasks. Field employees meet weekly for safety meetings, which include training and discussion of safety issues.

The following section includes applicable recommended and required safety provisions for confined spaces, electrical and mechanical equipment, fire hazards, and health hazards.

CONFINED SPACES

The principle hazards associated with confined spaces, including wet wells, sewer manholes, and pump stations, are oxygen deficiency, explosions, and toxic gases. Oxygen deficiency occurs whenever air is displaced by some other gas, which may or not be toxic.

L&I has established regulations governing entrance into confined spaces in WAC 296-62-145. The regulations include the completion of a Confined Space Entry Permit, the establishment of Safe Operating Procedures, and the completion of a Confined Space Pre-Entry Checklist.

A minimum of two individuals is required when any work is to be accomplished within pump stations, wet wells, or sewer manholes. A gas monitor is required for measuring oxygen levels, explosion potential (LEL), and toxic gases. The gas monitor must be used to continually monitor gas levels while any person is within the confined space. Rapid changes in gas levels can occur in sewage effluent due to upstream spills or discharges, and result in rapid atmospheric changes. The gas monitor will sound an alarm if a critical level for a measured gas is reached.

A portable air blower should be available to the operator whenever work in manholes or wet wells is performed. The air blower can be used to provide ventilation in confined spaces, but the motor should be kept away from the opening to the space to avoid the ignition of explosive gases that may be present and to keep carbon monoxide from entering the confined space, creating a dangerous situation.

City confined space procedures should be reviewed with maintenance personnel on a regular basis and revised as new regulations and equipment evolve.

ELECTRICAL AND MECHANICAL EQUIPMENT

The presence of electrical mechanical equipment at the pump stations may present hazards to personnel during the performance of operation and maintenance tasks. Precautions should be taken whenever working on or near the pump station mechanical and electrical equipment.

Rubber mats should be placed on the floor in front of all electrical control panels. When working on any piece of electrical equipment, the operator should ensure that all switches are opened and tagged, all electrical equipment is grounded, and all exposed wire is taped. All portable power tools, extension cords, and lights should be of the three-wire grounding type.

Exposed shafts and belts are hazardous items of mechanical equipment that can be found in pump stations. Belts and shafts should be enclosed in sheet metal or wire guards. When work is being conducted on any piece of equipment with exposed shafts or belts, the item of equipment should be taken off line so that it will not start.

Other safety precautions that should be observed by City personnel are to avoid contact with energized circuits or rotating parts, to avoid bypassing or rendering inoperative any safeguards or protective devices, and to avoid extended exposure in close proximity to machinery with high noise levels.

FIRE HAZARDS

Fires are possible in any area of a pump station if debris is allowed to accumulate. Precautions should be taken to reduce the possibility of a fire. Oily rags should be kept in a tightly sealed metal can, preferably at a location away from the pump station. All areas should be kept free of clutter or debris, especially if flammable in nature. Gasoline or solvents should only be used in well-ventilated areas, away from sources of ignition. A carbon dioxide type, dry chemical, or foam fire extinguisher should be permanently mounted at each pump station. The extinguisher should be tagged and checked semi-annually to ensure that it is operational.

HEALTH/SAFETY

The possibility exists that any particle of wastewater may contain disease-causing bacteria. Operators should take precautions to avoid disease at all times. Principle water-borne diseases include typhoid fever, dysentery, Giardia, Cryptosporidium, infectious jaundice, and tetanus. Immunization against some of the diseases is possible and all operators should be vaccinated periodically. Operators should take individual precautions to avoid disease, including the following:

- Keep hands below collar when working at sewer facilities
- Wear rubber gloves whenever directly handling sewage
- Disinfect hands with hot water and soap or antibacterial location before eating
- Treat minor cuts and wounds immediately

Additionally, emergency first aid kit should be kept in each City vehicle and other convenient locations, so as to be readily available to operators.

EMERGENCY RESPONSE

The operation of the sewer system under emergency conditions is an important responsibility of the City's staff. Emergency response procedures should be rehearsed and reviewed by personnel.

An overview of the potential effects and recommended actions for emergency situations is presented in Tables 10-8 and 10-9. The five emergency situations considered are power loss, flooding, hazardous waste spill, earthquake, and sabotage/vandalism. The potential effects and recommended actions are identified for sewage pump stations, force mains, and the gravity sewer system.

The City has established an emergency response plan. Also, field staff is trained in established procedures for after-hours and emergency service calls.

TABLE 10-8

Emergency Response Actions for Pump Stations

Emergency	Pump Stations	
	Potential Effects	**Recommended Actions**
Power Loss	Pumps rendered inoperable, auxiliary generators activated to run pumps.	Transport portable generators to pump stations that do not have auxiliary power, check other pump stations to ensure generators are operating.
Flooding	Station overflow.	Use Pumper Trucks to move sewage until flooding effects subside.
Hazardous Waste Spill	Spill enters wet well at a pump station.	Isolate pump station receiving spill, pump out of wet well and dispose of hazardous materials, notify Snohomish County, DOH, and DOE of situation.
Earthquake	Wet well damaged, inlet and outlet piping severed or damaged.	Use Pumper Trucks to move sewage while repairs are made.
Sabotage/Vandalism	One or more pumps rendered inoperable.	Isolate damaged pump(s) and operate other pumps while repairs are made.

TABLE 10-9

Emergency Response Actions for Force Mains

Emergency	Pump Stations	
	Potential Effects	**Recommended Actions**
Power Loss	No anticipated effects	No actions anticipated
Flooding	No anticipated effects	No actions anticipated
Hazardous Waste Spill	No anticipated effects	No actions anticipated
Earthquake	Breaks in force main pipes	Implement bypass pumping at critical areas.
Sabotage/Vandalism	Force mains plugged or broken	Isolate damaged area, implement bypass pumping until affected area is repaired.

TABLE 10-10

Emergency Response Actions for Gravity Sewer

Emergency	Pump Stations	
	Potential Effects	**Recommended Actions**
Power Loss	No anticipated effects	No actions anticipated
Flooding	Manholes surcharged	Implement bypass pumping at critical areas.
Hazardous Waste Spill	Spill enters sewer system	Isolate pump station receiving spill, pump out of wet well and dispose of hazardous material, notify Snohomish County Health, and DOE of situation.
Earthquake	Breaks in sewer lines. Damaged manholes	Isolate damaged area, implement bypass pumping until affected area is repaired.
Sabotage/Vandalism	Gravity sewers plugged or broken. Manholes damaged	Isolate damaged area, implement bypass pumping until affected area is repaired.

MAINTENANCE PERSONNEL QUALIFICATIONS

A well-trained staff is an essential part of an effective operation and maintenance program. Maintenance personnel should be familiar with current equipment and procedures, as well as all applicable regulations. Training criteria should be established for each job description and reviews conducted accordingly. Training activities should be considered to be as important as any other maintenance activity and should be included and budgeted into the regularly scheduled tasks.

The City regularly budgets for training. In 2011, the City budgeted $8,000 for travel and training of its collection system and wastewater treatment plant personnel.

CHAPTER 11

CAPITAL IMPROVEMENT PLAN

INTRODUCTION

This Chapter presents a 6-year Capital Improvement Plan (CIP) in accordance with the requirements of WAC 173-240 as well as a 20-year CIP. Wastewater system capital improvements have been scheduled and prioritized on the basis of growth, regulatory requirements, component reliability, system benefit, and cost.

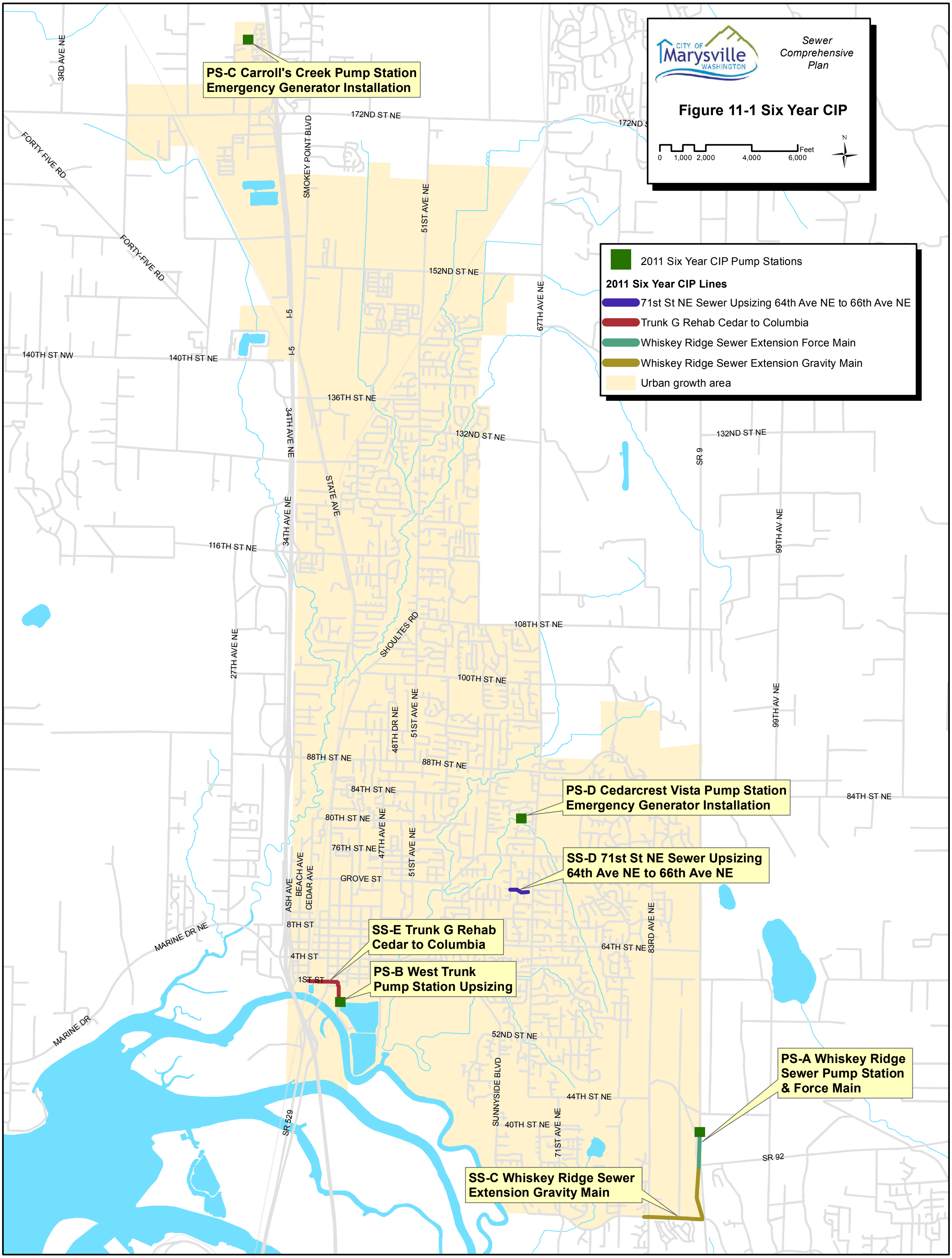
Location maps for the collection system and wastewater treatment plant CIP improvements are presented on Figure 11-1. For each capital improvement project, detailed project descriptions and preliminary project cost estimates are provided. Each project cost estimate includes design and engineering, construction with a 20 percent contingency, 8.6 percent state sales tax, and construction management. Costs are based on 2010 construction dollars. Selected cost estimates are presented in Appendix H.

The required capacity and timing of each recommended improvement is provided for budgeting and financial projection purposes only. The actual design parameters should be evaluated at the design phase of the project, using the hydraulic model or another accepted engineering procedure. Updated population and flow data should be used when available to ensure that the proposed facilities are adequately sized to handle build-out flows.

The City regularly updates its 6-year CIP project list and currently has a 6-year list extending from 2011 to 2017. The development of this Plan confirmed several of the CIP projects, which were already scheduled. The revised 6-year CIP begins with the year 2012 and extends through 2017 as shown in Table 11-1.

The City's CIP projects for 2011 are included in Table 11-1 for reference.

Future projects that are not identified as part of the City's CIP presented in this Chapter may become necessary. Such projects may be required in order to remedy an emergency situation, to address unforeseen problems, or to accommodate improvements from adjacent jurisdictions. Due to budgetary constraints, the completion of such projects may require modifications to the recommended CIP. The City retains the flexibility to reschedule, expand, or reduce the projects included in the CIP and to add new projects to the CIP, as best determined by the Council, when new information becomes available for review and analysis.



CITY OF Marysville WASHINGTON
Sewer Comprehensive Plan
Figure 11-1 Six Year CIP
0 1,000 2,000 4,000 6,000 Feet
N
2011 Six Year CIP Pump Stations
2011 Six Year CIP Lines
71st St NE Sewer Upsizing 64th Ave NE to 66th Ave NE
Trunk G Rehab Cedar to Columbia
Whiskey Ridge Sewer Extension Force Main
Whiskey Ridge Sewer Extension Gravity Main
Urban growth area
PS-C Carroll's Creek Pump Station Emergency Generator Installation
PS-D Cedarcrest Vista Pump Station Emergency Generator Installation
SS-D 71st St NE Sewer Upsizing 64th Ave NE to 66th Ave NE
SS-E Trunk G Rehab Cedar to Columbia
PS-B West Trunk Pump Station Upsizing
PS-A Whiskey Ridge Sewer Pump Station & Force Main
SS-C Whiskey Ridge Sewer Extension Gravity Main
3RD AVE NE
172ND ST NE
SMOKEY POINT BLVD
FORTY FIVE RD
FORTY-FIVE RD
51ST AVE NE
152ND ST NE
67TH AVE NE
I-5
140TH ST NW
140TH ST NE
136TH ST NE
34TH AVE NE
132ND ST NE
132ND ST NE
SR 9
STATE AVE
116TH ST NE
99TH AV NE
108TH ST NE
SHOULTES RD
27TH AVE NE
100TH ST NE
48TH DR NE
51ST AVE NE
88TH ST NE
88TH ST NE
84TH ST NE
84TH ST NE
80TH ST NE
47TH AVE NE
76TH ST NE
GROVE ST
ASH AVE
BEACH AVE
CEDAR AVE
8TH ST
MARINE DR NE
4TH ST
1ST ST
64TH ST NE
83RD AVE NE
MARINE DR
52ND ST NE
SUNNYSIDE BLVD
44TH ST NE
40TH ST NE
71ST AVE NE
SR 529
SR 92

PROPOSED SYSTEM IMPROVEMENTS FROM 2011 TO 2017

The recommended CIP projects are summarized using the existing City descriptions:

- Sanitary sewer mains (SS)
- Pump stations (PS)
- WWTP improvements (WWTP)
- General system improvements (GS)

After a brief description for each CIP category, each CIP project is described with use of a lettered subscript, "a," "b," etc., and a total project cost is presented.

SANITARY SEWER MAINS

The results of the hydraulic model for 2010, 2017, and 2031 indicated 118 pipeline capacity deficiencies. Eliminating or preventing surcharged pipelines is the priority of the recommended CIP improvements for the sewer system.

The impact on the numerous surcharged pipelines in Trunk F will be lessened when the Lakewood Sewer Extension Project – Phase II is constructed and flow is diverted to this new pipeline.

Numerous surcharged manholes were identified in the model. However, a number of these surcharges were determined to be insignificant enough to warrant a 6-year capital improvement project. These areas were analyzed in a separate memorandum to the city and are not included in the following CIP plan.

The following projects are intended to be a part of the 6-year CIP. Other pipeline deficiencies identified by the hydraulic model are included in the 20-year CIP.

6-YEAR CIP (2012 – 2017)

SS-a: SEWER MAIN OVERSIZING

The City has budgeted an annual amount to cover the costs of oversizing sewer mains for various developer extension projects.

Estimated Project Cost:.. $30,000 annually

SS-b: RENEWALS AND REPLACEMENTS

The City has budgeted an annual amount beginning in 2013 to cover renewals and replacements of 8-inch or less pipe within its sewer system.

Estimated Project Cost:...$300,000 annually

SS-c: WHISKEY RIDGE SEWER EXTENSION (2012)

This project extends gravity sewer east on Soper Hill Rd from 200-feet west of 83rd Ave NE to Densmore Rd and north on Densmore Rd to the approximate intersection of State Route 92. The project includes construction of 4,300 linear feet of 12-inch gravity sewer.

Estimated Project Cost:..$ 1,200,000

SS-d: 71ST ST NE SEWER UPSIZING – 64TH AVE NE to 66TH AVE NE (2015)

At 64th Avenue and approximately 71st Street, an existing 18-inch sewer is connected to a 12-inch sewer. Modeling results show surcharging upstream of this connection. To ensure future capacity, 510 linear feet of 18-inch gravity sewer will replace existing 12-inch sewer.

Estimated Project Cost:..$ 410,000

SS-e: TRUNK "G" REHABILITATION - CEDAR TO COLUMBIA (2016)

This project includes some of the City's older pipelines and includes rehabilitation and replacement of approximately 415 linear feet of 15-inch gravity sewer and 1,000 linear feet of 21-inch sewer, including pipe located just east of the Burlington Northern crossing. The pipe will be replaced with 1,415 linear feet of 24-inch PVC. In addition, the slope of 580 LF of 24-inch pipe downstream of the existing 21-inch shall be revised to a more consistent slope of 0.0029 to remove a known sag in the pipe.

Estimated Project Cost:..$1,340,000

PUMP STATIONS

City staff has indentified one of its pump stations (West Trunk) that will have a flow deficiency by 2017. Of the four pump station projects, which the City has included in its CIP, only the West Trunk project is due to a deficiency in the system. The other three projects included, the Whiskey Ridge pump station and force main, which is a new installation being made to accommodate growth in the Southeast section of the city, and the Carroll's Creek and Cedarcrest Vista pump station generator installations are proactive improvements to reduce risk to the city during prolonged power outages.

PS-a: WHISKEY RIDGE SEWER PUMP STATION AND FORCE MAIN (2014)

A sewer pump station will be constructed along Densmore Rd. near the intersection of Densmore Rd and Sunnyside School Rd to accommodate growth in the East Sunnyside/Whiskey Ridge subarea. Additionally, 1,500 lineal feet of 4-inch diameter force main will be installed along Densmore Rd. to south of SR 92 where it will enter a 12-inch gravity line that is intended to be installed in 2012.

Estimated Project Cost:...$1,000,000

PS-b: WEST TRUNK PUMP STATION – PUMP UPSIZING (2013)

Larger pumps, and improvements to wiring and controls will be installed to maintain adequate capacity at the pump station. The improvements are scheduled for 2013.

Estimated Project Cost:……………………………………………………….$225,000

PS-c: CARROLL'S CREEK PUMP STATION EMERGENCY GENERATOR INSTALLATION (2016)

An emergency generator, proper wiring, and automated transfer switch will be installed at the pump station, to provide power to the station during prolonged power outages.

Estimated Project Cost:………………………………………………………$175,000

PS-d: CEDARCREST VISTA PUMP STATION EMERGENCY GENERATOR INSTALLATION (2017)

An emergency generator, proper wiring, and automated transfer switch will be installed at the pump station, to provide power to the station during prolonged power outages.

Estimated Project Cost:………………………………………………………$175,000

WWTP IMPROVEMENTS

Several projects and improvements are included in the City's CIP for the wastewater treatment plant. The most significant costs are for biosolids removal, which is not anticipated to be completed until 2018 or beyond, however the city has allocated $300,000 from 2014 through 2017 to help defer the cost of the project, which is estimated at $3.4 million. In addition, due to the difficulty in predicting the schedule for biosolids removal, a preliminary biosolids profile is scheduled for 2016. The profile will help the city determine sludge depth, location, quantities, solids concentration, classification, and need for scheduling the removal.

Other scheduled improvements include replacement or reconstruction of the headworks parshall flume, extension of the filter reject line to complete mix cell 1 at the headworks of the plant, upsizing the filter reject pump station wet well and pumps, construction of a pre-settling basin, and replacement of the mechanical barscreens at the headworks.

A flow study listed for 2013 is intended to better identify I/I in the collection system. The results of the flow study can be used to refine the hydraulic model by identifying I/I in individual basins.

Another project that is currently underway and anticipated to be completed before the end of 2011, is the installation of an onsite generator at the wastewater treatment plant. The generator is intended to power the effluent side of the plant and the laboratory building during prolonged power outages in the future.

WWTP-a: BIOSOLIDS REMOVAL (2018 or Beyond)

This part of the CIP covers an annual amount for future biosolids removal projects. The next project in 2018 is estimated to cost $3.4 million.

Estimated Project Cost…………………….. annually beginning in 2014 - $300,000

WWTP-b: REPLACEMENT/RECONSTRUCTION OF HEADWORKS PARSHALL FLUME (2013)

Replacement or reconstruction the concrete influent parshall flume at the headworks of the plant, or to install a fiberglass insert to correct the current deficiencies in the flow measurement there. The existing concrete structure would need to be resurfaced and leveled.

Estimated Project Cost:..$50,000

WWTP-c: EXTENSION OF THE FILTER REJECT LINE TO COMPLETE MIX CELL 1A (2013)

Extension of the filter reject line from the West Trunk Pump Station to Complete Mix Cell 1A at the Headworks of the WWTP.

Estimated Project Cost:...$100,000

WWTP-d: UPSIZING OF THE FILTER REJECT WET WELL AND PUMP SYSTEM (2014)

This project would construct a larger wet well, upsize to larger pumps, and make improvements to wiring, controls, and telemetry at the station.

Estimated Project Cost:...$500,000

WWTP-e: PRE-SETTLING BASIN PRIOR TO EFFLUENT FILTRATION (2015)

This project would construct a pre-settling basin to allow flocculation and settling prior to effluent filtration.

Estimated Project Cost:...$1,000,000

WWTP-f: SCREEN REPLACEMENT FOR MECHANICAL SCREENS (2017)

Both of the City's mechanical screens have bar spacings of 1 ½ inches, which allows a significant amount of debris to pass through to downstream processes such as the effluent filters and effluent pumps. The proposed project would replace these screens with ones with bar spacings of 3/8 inch or less.

Estimated Project Cost:...$500,000

WWTP-g: FLOW STUDY (2013)

The purpose of the proposed flow study is to monitor flow at different locations within the City's collection system to provide better information about the extent and location of infiltration/inflow. The available information indicates that parts of the upper Trunk A and Trunk CE systems are two areas with higher than normal infiltration/inflow.

Estimated Project Cost:...$40,000

WWTP-h: PRELIMINARY BIOSOLIDS PROFILE (2016)

This project is one of the preliminary steps to determine the schedule for the next biosolids removal project from the City's lagoons. The work would include an evaluation of the accumulation of biosolids by location, depth, and solids content. Based on this data, the City can estimate the rate of biosolids accumulation since 2003 and when the next project will be required.

Estimated Project Cost:..$12,000

WWTP-i: WASTEWATER TREATMENT PLANT GENERATOR (2011)

This project is currently in progress and scheduled for completion by the end of 2011. The work includes installation of an emergency generator, wiring, transfer switches, controls, and telemetry to power essential buildings and equipment at the effluent side of the wastewater treatment plant during prolonged power outages.

Estimated Project Cost:……………………………………………………………$400,000

GENERAL SYSTEM IMPROVEMENTS

The proposed general system improvements for 2012 – 2017 include a cost of service study (2016), an update for the sewer comprehensive plan (2017) and a sewer rate study (2013).

TOTAL 6-YEAR CIP

The total amount for the 6-year CIP (2012 – 2017) for all of the projects listed in Table 11-1 is $10,207,000. The total amount includes the following amounts for each category:

Sanitary Sewer Mains	$4,630,000
Pump Stations	$ 1,575,000
WWTP Improvements	$ 3,402,000
General System Improvements	$ 600,000
Total	**$10,207,000**

TABLE 11-1

6-Year Capital Improvements Plan(1)

		2011	2012	2013	2014	2015	2016	2017
Sanitary Sewer Mains								
a.	Sewer Main Oversizing	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
b.	Renewals and Replacement			$300,000	$300,000	$300,000	$300,000	$300,000
c.	Whiskey Ridge Sewer Extension	$200,000	$1,200,000					
d.	71st St NE Sewer Upsizing: 64th Ave NE to 66th Ave NE					$410,000		
e.	Trunk "G" Rehab.: Cedar to Columbia						$1,340,000	
Total Sanitary Sewer Mains		**$230,000**	**$1,230,000**	**$330,000**	**$330,000**	**$740,000**	**$1,670,000**	**$330,000**
Pump Stations								
a.	Whiskey Ridge Sewer Lift Station and Force Main				$1,000,000			
b.	West Trunk Pump Station Upsizing			$225,000				
c.	Carroll's Creek Pump Station Emergency Generator Installation						$175,000	
d.	Cedarcrest Vista Pump Station Emergency Generator Installation							$175,000
Total Pump Stations		**$0**	**$0**	**$225,000**	**$1,000,000**	**$0**	**$175,000**	**$175,000**

(1) The 6-year CIP covers the period of 2012 - 2017. 2011 CIP projects are included for reference.

TABLE 11-1 – (continued)

6-Year Capital Improvements Plan[1]

	2011	2012	2013	2014	2015	2016	2017
WWTP Improvements							
a. Biosolids Removal				$300,000	$300,000	$300,000	$300,000
b. Replacement/Reconstruction of Headworks Parshall Flume			$50,000				
c. Filter Reject Line Extension			$100,000				
d. Upsize Filter Reject Wet Well and Pump System				$500,000			
e. Pre-Settling Basin					$1,000,000		
f. Screen Replacement for Mechanical Screens							$500,000
g. Flow Study			$40,000				
h. Preliminary Biosolids Profile						$12,000	
i. Wastewater Treatment Plant Generator	$400,000						
Total WWTP Improvements	**$400,000**	**$0**	**$190,000**	**$800,000**	**$1,300,000**	**$312,000**	**$800,000**
General Sewer Improvements							
Cost of Service Study						$250,000	
Sanitary Comp. Plan/Model	$300,000						$300,000
Sewer Rate Study			$50,000				
Total General Sewer Improvements	**$300,000**	**$0**	**$50,000**	**$0**	**$0**	**$250,000**	**$300,000**
Total Sanitary Sewer 6 Year CIP Costs	**$930,000**	**$1,230,000**	**$795,000**	**$2,130,000**	**$2,040,000**	**$2,407,000**	**$1,605,000**

(1) The 6-year CIP covers the period of 2012 - 2017. 2011 CIP projects are included for reference.

PROPOSED SYSTEM IMPROVEMENTS FROM 2018 TO 2031

CIP projects recommended for the 20-year CIP are based both on the results of hydraulic model for 2031 and buildout conditions. Similar to the 6-year CIP, descriptions for each component of the 20-year CIP are included below:

SANITARY SEWER MAINS

SEWER MAIN OVERSIZING

The City has budgeted an annual amount for oversizing sewer mains. An annual amount is shown through 2031.

Estimated Project Cost:...$30,000 annually

RENEWALS AND REPLACEMENTS

An annual amount is shown through 2031 for renewals, replacement of side sewers, and replacement of 8-inch sewer pipe within the sewer system.

Estimated Project Cost:...$500,000 annually

LAKEWOOD SEWER EXTENSION PROJECT – PHASE 2 (2018)

This project is a continuation of the Lakewood Sewer Extension project from the previous Plan. The remaining Phase 2 improvements include construction of a new 36-inch pipeline along 136th St NE from Smokey Point Blvd to connect to Trunk A at 51st Ave NE. This alignment consists of a total of 6,010 linear feet of 36-inch gravity sewer pipe, including the replacement of 1,350 linear feet of existing 30-inch (Trunk A) with 36-inch from 136th St NE to 132nd St NE.

Estimated Project Cost:...$6,570,000

88TH STREET NE AT ALLEN CREEK (2022)

Due to surcharging and video inspection that revealed sagging in the pipe, 1,020 linear feet of 15-inch gravity sewer will replace existing 12-inch sewer. City staff recognizes that this area is prone to sags in the pipe. This project would be constructed in conjunction with any future road related projects.

Estimated Project Cost:..$ 640,000

SUNNYSIDE BLVD UPSIZING – 53RD AVE NE to 60TH DR NE (2024)

The hydraulic model demonstrated surcharging within the existing 24-inch sewer between 52nd Ave NE and 60th Dr NE. This project includes 3,150 linear feet of 30-inch gravity sewer to replace the existing 24-inch sewer.

Estimated Project Cost:..$3,590,000

169TH PL NE AND 27TH PL NE (2026)

Significant surcharging occurred in the hydraulic model during 2031 along 169th Pl. NE extending up north along 27th Ave and Spring Lane Ave. The recommended project in this area would be to replace the current 10-inch and 12-inch pipes with 15" pipes for approximately 3,035 lineal feet. This is a lower priority project as future development could be directed south toward an existing 15-inch stub located on 164th Pl. NE or south towards 156th St NE which would thereby allow additional capacity to the north.

Estimated Project Cost:..$1,290,000

152ND TRUNK - 51ST TO EAST (2028)

This project begins at 51st Street (Trunk A) and extends along 152nd Street to 850-feet east of the railroad tracks (within City limits). The project includes construction of 2,625 linear feet of 21-inch gravity sewer.

Estimated Project Cost:..$2,300,000

PUMP STATIONS

The primary pump station improvements for the 20-year CIP are upsizing the pumps, wiring, and components at the 51st Street and Soper Hill pump stations.

51ST STREET PUMP STATION UPSIZING (2025)

This pump station will be reaching its capacity prior to 2031, so upsizing of the pumps, wiring, controls and telemetry will need to be completed.

Estimated Project Cost:……………………………………………………….$250,000

SOPER HILL PUMP STATION (2030)

This pump station will be reaching its capacity by 2031, so upsizing of the pumps, wiring, controls, and telemetry will need to be completed.

Estimated Project Cost:...$100,000

WWTP IMPROVEMENTS

The most significant 20-year CIP item is biosolids removal, which may be required twice during the next 20 years. Another important improvement includes additional complete mix aerated cells #7 and #8. Sufficient alum storage will also need to be looked at.

PRELIMINARY BIOSOLIDS PROFILE (2016 AND 2023)

Prior to each biosolids removal project, a preliminary evaluation is recommended to determine the accumulation of biosolids, by location, depth, and solids content. This evaluation will provide the necessary information for scheduling the next project.

Estimated Project Cost:..$12,000

BIOSOLIDS REMOVAL (2018, AND 2025)

Biosolids removal is anticipated at 7-year intervals with each project removing approximately 5,600 dry tons. The total amount for each project is $3.4 million. An annual amount of $300,000 is recommended to buffer the amount for the project year.

Estimated Project Cost:..$3,400,000

COMPLETE MIX AERATED CELLS #7 AND #8 (2020)

Phase 2 construction provided a total of six complete mix, aerated cells to the lagoon system. The addition of cells #7 and #8 will ensure NPDES permit compliance in the future, particularly for $CBOD_5$.

Estimated Project Cost:..$4,000,000

ALUM STORAGE (2026)

The current storage volume of 7,500 gallons will need to be increased to 10,000 gallons as WWTP flows increase.

Estimated Project Cost:..$35,000

GENERAL SYSTEM IMPROVEMENTS

The proposed general system improvements for the 20-year CIP include periodic updates to the Sewer Comprehensive Plan and Sewer Rate Studies.

SEWER COMPREHENSIVE PLAN/MODEL (2022 AND 2028)

This plan will update the City's CIP and hydraulic model for the collection system.

Estimated Project Cost:..$300,000

SEWER RATE STUDY (2018, 2024, AND 2030)

This study will review the City's CIP and O&M costs and evaluate the sewer rates to meet projected needs.

Estimated Project Cost:..$50,000

TOTAL 20-YEAR CIP

Table 11-2 summarizes the CIP projects from 2018 to 2031. The total amount for projects from 2018 to 2031 is $34,269,000. The total amount for the 20-year CIP (from 2012 to 2031) is $44,476,000.

TABLE 11-2

Capital Improvements Plan
2018 - 2031

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sanitary Sewer Mains															
Sewer Main Oversizing	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Renewals and Replacement	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Lakewood Sewer Extension: Phase 2		$6,570,000													
88^{th} St NE at Allen Creek						$640,000									
Sunnyside Blvd Upsizing – 53^{rd} St NE to 60^{th} Dr Ne								$3,590,000							
169^{th} Pl NE and 27^{th} Pl NE										$1,290,000					
152^{nd} St NE – 51^{st} to East												$2,300,000			
Total Sanitary Sewer Mains	**$530,000**	**$7,100,000**	**$530,000**	**$530,000**	**$530,000**	**$1,170,000**	**$530,000**	**$4,120,000**	**$530,000**	**$1,820,000**	**$530,000**	**$2,830,000**	**$530,000**	**$530,000**	**$530,000**
Pump Stations															
51^{st} Street Pump Station Upsizing									$250,000						
Soper Hill Pump Station Upsizing														$100,000	
Total Pump Stations	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$250,000**	**$0**	**$0**	**$0**	**$0**	**$100,000**	**$0**
WWTP Improvements															
Biosolids Removal	$300,000	$2,200,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$1,600,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Preliminary Biosolids Profile							$12,000							$12,000	
Alum Storage										$35,000					
Lagoon Improvements: Cells #7 and #8				$4,000,000											
Total WWTP Improvements	**$300,000**	**$2,200,000**	**$300,000**	**$4,300,000**	**$300,000**	**$300,000**	**$312,000**	**$300,000**	**$1,600,000**	**$335,000**	**$300,000**	**$300,000**	**$300,000**	**$312,000**	**$300,000**
General System Improvements															
Sewer Comp. Plan/Model	$300,000					$250,000						$250,000			
Sewer Rate Study		$50,000						$50,000						$50,000	
Subtotal	**$300,000**	**$50,000**	**$0**	**$0**	**$0**	**$250,000**	**$0**	**$50,000**	**$0**	**$0**	**$0**	**$250,000**	**$0**	**$50,000**	**$0**
Total Sanitary Sewer	**$1,130,000**	**$9,350,000**	**$830,000**	**$4,830,000**	**$830,000**	**$1,720,000**	**$842,000**	**$4,470,000**	**$2,380,000**	**$2,155,000**	**$830,000**	**$3,380,000**	**$830,000**	**$992,000**	**$830,000**

CHAPTER 12

FINANCIAL PLAN

INTRODUCTION

This Chapter reviews the financial status of current wastewater system operations and the rates and charges used to fund the maintenance, replacement, and construction of new facilities as recommended in this Plan.

WASTEWATER RATES & CHARGES

Table 12-1 summarizes wastewater rates and Table 12-2 lists existing GFCs. Current wastewater rates are billed bi-monthly and include uniform rates for residential, multi-family, and motel/hotel customers and flow based rates ($/1,000 gallons) for commercial/industrial customers. Flow based rates for commercial/industrial customers are based on assigned concentrations of BOD (organic loading) with BOD concentrations (mg/L) ranging from 31-100 mg/L for Class 1 and 501-600 mg/L for Class 6 customers. Commercial/industrial customers are charged a minimum base rate plus the volume charge for their given strength class.

In addition to the rates shown in Table 12-1, the City has elected to increase rates for 2 percent per year to offset increases in expenses from price inflation. The rate ordinance specifies automatic 2 percent adjustments unless the City Council elects to defer implementation in a given year based on an updated financial review.

TABLE 12-1

Wastewater Bi-Monthly Rates

Customer Classes	City Rate	Rural Rate	Outside UGA
Rates(1)			
Single-family home	$75.02	$112.54	$ 150.05
Multiple-residential	$71.34	$107.01	$ 142.68
Hotels/Motels per unit	$52.55	$ 78.83	$ 105.10
Class 1 (31 to 100 mg/l) per 1,000 gal	$ 1.57	$ 2.36	$ 3.14
Class 2 (101 to 200 mg/l) per 1,000 gal	$ 2.16	$ 3.24	$ 4.32
Class 3 (201 to 300 mg/l) per 1,000 gal	$ 2.76	$ 4.15	$ 5.54
Class 4 (301 to 400 mg/l) per 1,000 gal	$ 3.36	$ 5.04	$ 6.72
Class 5 (401 to 500 mg/l) per 1,000 gal	$ 3.96	$ 5.93	$ 7.91
Class 6 (501 to 600 mg/l) per 1,000 gal	$ 5.74	$ 8.62	$ 11.49
Overnight Camping			
Individual connections per unit	$52.55	$ 78.83	$ 105.10
Other connections each	$71.34	$107.01	$ 142.68
Schools			
Minimum	$75.02		
Per 1,00 gallons	$ 4.26		
Restaurants w/o grease trap surcharge	$ 3.60		

(1) Source: City of Marysville Ordinance No. 2836, effective January 1, 2011.

The wastewater utility also utilizes a capital charge for new customers connecting to the wastewater system know as a general facility charge or connection charge. General facility charges (GFCs) are intended to ensure a new customer pays a pro –rata share of both existing facilities from which they will benefit and a share of the cost of planned facilities. Revenues from GFCs are used to minimize the impact on bi-monthly rates to provide new capital facilities required to serve growth. Table 12-2 lists existing GFCs.

The City charges higher GFCs for customers outside of City limits (rural) because of higher permitting, planning, and construction costs for projects constructed in the County. For example, Snohomish County requires the City to install a full overlay (instead of a patch) when installing pipe in County roadways.

TABLE 12-2

Existing General Facility Charges [1]

Customer Type	City Rate ($/Unit)	Rural Rate ($/Unit)
Residential GFC (January 1, 2006)	$4,490.00	$4,890.00

(1) Source: City of Marysville Ordinance No. 2345, effective January 1, 2000.

The City also charges commercial customers a GFC based on the square footage of the building being provided service. These rates are calculated utilizing the residential GFC listed in Table 12-2.

FINANCIAL STATUS OF THE EXISTING SYSTEM

The City operates a combined utility fund with some revenues and expenses segregated between water, wastewater, and stormwater and others commingled. As part of this analysis historical water/wastewater/stormwater revenues and expenses were segregated and the following analysis presents only those revenues and expenses identified as wastewater related. Further, the City utilizes a detailed schedule of expenses that have been summarized for presentation purposes.

HISTORICAL OPERATING CASH FLOWS

Table 12-3 presents a summary of historical revenues and expenses associated with the wastewater system. The data presented in Table 12-3 represents cash flows from operating activities and does not include significant capital improvement costs. Positive operating cash flows indicate the ability of existing revenue sources to fund existing operations and meet current debt obligations. This net operating revenue is then available to fund capital construction, additional debt obligations, or to build capital reserves.

TABLE 12-3

Historical Wastewater Revenues and Expenses(1)

Operating Cash Flows	2008	2009	2010
(+) Total Revenues	$ 9,855,328	$ 9,724,904	$ 9,846,333
(-) Total Operations & Maintenance	$ (4,393,875)	$ (4,466,021)	$ (5,028,102)
(-) Total Debt(2)	$ (3,278,600)	$ (3,274,700)	$ (4,363,957)
Net Operating Revenue	**$ 2,182,853**	**$ 1,984,184**	**$ 454,274**

(1) These wastewater cash flows are estimated based on a segregation of combined water, wastewater, and stormwater revenues and expenses assuming commingled accounts are split according to the Utility Rate Model created for the City by Peninsula Financial Consulting.

(2) Some debts constructed both water and wastewater facilities and were therefore segregated evenly between water and sewer, other debts constructed water, wastewater, and stormwater facilities and were therefore segregated based on the cost of the infrastructure as a percent of the total debt. Additional debts were identified as constructing only water facilities and are not included.

As can be seen in Table 12-3, the total amount expended on debt rose sharply from 2009 to 2010. In an effort to reduce outstanding debt the City opted to call, early, the remaining bonds of an outstanding 1998 refunding issue of a 1993 bond. In doing so the City will save interest costs in future years, increasing net operating revenue.

PROJECTED OPERATING CASH FLOWS

The City's projected operating cash flows show a gradual increase in both estimated revenues and operations and maintenance costs. Revenue increases are attributable to the aforementioned 2 percent annual increase and anticipated annual growth. Additional expenditures are due to the effect of price inflation and system growth. A budget forecast summary is presented in Table 12-4.

TABLE 12-4

Projected Operating Cash Flows

Operating Cash Flows	2011	2012	2013	2014	2015	2016	2017
(+) Total Revenues[(1)]	$ 8,768,567	$ 8,768,567	$ 9,389,600	$ 9,533,700	$ 9,770,500	$ 10,078,900	$ 10,358,900
(-) Total Operations & Maintenance	$ (5,282,569)	$ (5,812,597)	$ (5,835,800)	$ (6,032,700)	$ (6,245,900)	$ (6,417,900)	$ (6,652,700)
(-) Total Debt	$ (2,861,700)	$ (2,467,100)	$ (2,997,500)	$ (2,992,200)	$ (2,986,300)	$ (2,980,000)	$ (2,975,700)
Net Operating Revenue	**$ 624,298**	**$ 488,870**	**$ 556,300**	**$ 508,800**	**$ 538,300**	**$ 681,000**	**$ 730,500**

(1) Projected revenues include the 2% annual rate increase as mentioned on page 12-1 of this section.

CAPITAL FUNDS AVAILABLE FOR FUTURE IMPROVEMENTS

As indicated in Table 12-4, wastewater operations are expected to generate revenues in excess of O&M and debt costs that will be available for funding future capital projects. The wastewater utility also generates capital revenues from sources such as general facility charges and recovery contracts (latecomer agreements) that also are available for funding capital projects. Table 12-5 presents a summary of forecasted net revenue from operations and capital revenues that are available for funding planned capital improvements.

As shown in Table 12-5, the wastewater utility is expected to generate from around $1 million to $1.5 million per year in excess revenues that will be available to construct future facilities identified in this Plan.

Table 11-1 presents current (2011) and proposed capital projects for the 6-year CIP (2012 – 2017). The total amount for 2012 – 2017 is $10.2 million. Sanitary sewer main projects account for $4.6 million, while Wastewater Treatment Plant improvements total $3.4 million. The remaining funds are dedicated to pump station upgrades and general system improvements.

The City must generate $10.2 million over the next six years in order to fund planned capital improvements. According to the projected cash flows summarized in Table 12-5, the wastewater utility will generate approximately $7.3 million between 2012 and 2017.

Due to rate increases in previous years the wastewater utility can fund most of its planned capital improvements from projected operating and capital revenues. However, the planned improvements exceed the expected revenue by $2.9 million over the next 6-years.

Several alternative funding options, grants or low interest rate loans such as Public Works Trust Fund Loans, are available to the City for consideration in funding capital projects for the wastewater utility. These sources shall be considered when determining additional funding sources for the capital improvement projects in the 6-year CIP.

TABLE 12-5

Projected Funds Available for Capital Funding

Cash Flows	2011	2012	2013	2014	2015	2016	2017
Transfer from Operations	$ 624,298	$ 488,870	$ 556,300	$ 508,800	$ 538,300	$681,000	$ 735,500
City Sewer Recovery Contracts	$ 50,000	$ 30,000	$ 60,000	$ 66,000	$ 66,000	$ 102,000	$ 102,000
Sewer Connection Charges	$ 400,000	$ 400,000	$ 449,000	$ 493,900	$ 493,900	$ 763,300	$ 763,300
Total Cash Flows	**$ 1,074,298**	**$ 918,870**	**$ 1,065,300**	**$ 1,062,700**	**$ 1,092,200**	**$ 1,546,300**	**$ 1,600,800**

(1) Transfers from operations are net revenues listed in Table 12-4.

(3) City wastewater recovery contracts are estimated payments from new connections for local facilities funded by the City for a specific service area to be repaid by as new customers in the latecomer's area connect to the system. The amounts shown are estimates based on the Utility Rate Model created for the City by Peninsula Financial Consulting.

APPENDIX A

NPDES PERMIT NO. WA-002249-7

Issuance Date: July 1, 2005
Effective Date: July 1, 2005
Expiration Date: June 30, 2010

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT No. WA-002249-7

State of Washington
DEPARTMENT OF ECOLOGY
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, WA 98008-5452

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

CITY OF MARYSVILLE
80 Columbia Avenue
Marysville, WA 98270

Plant Location: Columbia Avenue and Ebey Slough	Receiving Water: Steamboat Slough (Snohomish River) Port Gardner Bay
Water Body I.D. No.: WA-07-1005 WA-PS-0030	Discharge Location: Steamboat Slough (Outfall 001) Latitude: 48° 02' 08" N Longitude: 122° 10' 20" W Port Gardner Bay (Outfall 100) Latitude: 47° 58' 10" N Longitude: 122° 14' 48" W
Plant Type: Aerated and Oxidation (Waste Stabilization) Pond System	

is authorized to discharge in accordance with the special and general conditions that follow.

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office
Washington State Department of Ecology

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GENERAL CONDITIONS

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.	Discharge Monitoring Report	Monthly	August 15, 2005
S3.E.	Noncompliance Notification	As necessary	
S3.G.	Shellfish Protection	As necessary	
S4.B.	Plans for Maintaining Adequate Capacity	As necessary	
S4.D.	Notification of New or Altered Sources	As necessary	
S4.E.	Infiltration and Inflow Evaluation	2/permit cycle	June 1, 2006 June 1, 2009
S4.F.	Wasteload Assessment	1/permit cycle	June 1, 2009
S5.G.	Operations and Maintenance Manual	1/permit cycle	October 1, 2005
S5.G.	Operations and Maintenance Manual Update or Review Confirmation Letter	Annually or as necessary	
S6.D.1.	Industrial User Survey	1/permit cycle	June 1, 2006
S6.D.2.	Industrial User Survey Update	Annually	June 1, 2007
S8.B.	Acute Toxicity Compliance Monitoring Reports	3/year	December 15, 2005
S8.C.	Acute Toxicity: “Causes and Preventative Measures for Transient Events Report”	As necessary	
S8.C.	Acute Toxicity TI/RE Plan	As necessary	
S9.A.	Chronic Toxicity Characterization Data	2/permit cycle (conduct testing in November 2005 and May 2006)	December 15, 2005 June 15, 2006
S9.C.	Chronic Toxicity Compliance Monitoring Reports	Biannually, if needed	
S9.D.	Chronic Toxicity: “Causes and Preventative Measures for Transient Events Report”	As necessary	
S9.D.	Chronic Toxicity TI/RE Plan	As necessary	
S9.E.	Chronic Toxicity Effluent Characterization with Permit Renewal Application	2/permit cycle (conduct testing in May 2009 and November 2009)	June 30, 2009
S10.A.	Chemical Analysis of Influent and Effluent	Annually	December 15, 2005
S11.	Outfall Evaluation	1/permit cycle	June 30, 2009
G1.	Notice of Change in Authorization	As necessary	
G4.	Reporting Planned Changes	As necessary	
G5.	Engineering Report for Construction or Modification Activities	As necessary	
G7.	Application for Permit Renewal	1/permit cycle	December 30, 2009
G21.	Reporting Anticipated Noncompliance	As necessary	
G22.	Reporting Other Information	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE LIMITATIONS

A. Effluent Limitations – Low River Flow Period (July through October)

All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration date, the Permittee is authorized to discharge municipal wastewater at the permitted location subject to complying with the following limitations:

EFFLUENT LIMITATIONS[a]: Steamboat Slough - OUTFALL #001		
Outfall #001 may be used only to discharge treated effluent for the purpose of outfall and diffuser flushing and maintenance. Maximum frequency of this use shall be once weekly for up to three hours at a flow rate of up to 8 MGD.		
Parameter	**Average Monthly**	**Average Weekly**
Carbonaceous Biochemical Oxygen Demand[b] (5-day)	25 mg/L	40 mg/L
Total Suspended Solids[c]	30 mg/L	45 mg/L
Fecal Coliform Bacteria	200/100 mL	400/100 mL
pH[d]	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	
Parameter	**Average Monthly**	**Maximum Daily[e]**
Carbonaceous Biochemical Oxygen Demand (5-day)	419 lbs/day	672 lbs/day
Total Ammonia (as N)	178 lbs/day	403 lbs/day

EFFLUENT LIMITATIONS[a]: Port Gardner - OUTFALL #100		
Parameter	**Average Monthly**	**Average Weekly**
Carbonaceous Biochemical Oxygen Demand[b] (5-day)	25 mg/L 2,650 lbs/day	40 mg/L 4,240 lbs/day
Total Suspended Solids[c]	30 mg/L 3,180 lbs/day	45 mg/L 4,770 lbs/day
Fecal Coliform Bacteria	200/100 mL	400/100 mL
pH[d]	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	
[a] The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.		
[b] The average monthly effluent concentration for $CBOD_5$ shall not exceed 25 mg/L or 15 percent of the monthly average influent concentration, whichever is more stringent.		

[c] The average monthly effluent concentration for Total Suspended Solids shall not exceed 30 mg/L or 15 percent of the monthly average influent concentration, whichever is more stringent.
[d] Indicates the range of permitted values. Effluent values for pH collected as single grab samples shall not exceed the limits of 6.0-9.0 where such values are attributable to inorganic industrial contributions.
[e] The maximum daily effluent limitation is defined as the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day.

B. <u>Effluent Limitations – High River Flow Period (November through June)</u>

All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration date, the Permittee is authorized to discharge municipal wastewater at the permitted location subject to complying with the following limitations:

EFFLUENT LIMITATIONS[a]: Steamboat Slough - OUTFALL #001		
Parameter	**Average Monthly**	**Average Weekly**
Flow	6.6 MGD	
Carbonaceous Biochemical Oxygen Demand[b] (5-day)	25 mg/L	40 mg/L
Total Suspended Solids[c]	30 mg/L	45 mg/L
Fecal Coliform Bacteria	200/100 mL	400/100 mL
pH[d]	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	
Parameter		
Acute Toxicity	The effluent limit for acute toxicity is no acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC). See Section S8.	
Chronic Toxicity	An effluent limit for chronic toxicity may apply after characterization testing is complete. See Section S9.	

EFFLUENT LIMITATIONS[a]: Port Gardner - OUTFALL #100		
Parameter	**Average Monthly**	**Average Weekly**
Carbonaceous Biochemical Oxygen Demand[b] (5-day)	25 mg/L	40 mg/L
Total Suspended Solids[c]	30 mg/L	45 mg/L
Fecal Coliform Bacteria	200/100 mL	400/100 mL
pH[d]	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	

EFFLUENT LIMITATIONS[a]: COMBINED OUTFALLS #001 + 100		
Parameter	**Average Monthly**	**Average Weekly**
Carbonaceous Biochemical Oxygen Demand (5-day)	2,650 lbs/day	4,240 lbs/day
Total Suspended Solids	3,180 lbs/day	4,770 lbs/day

[a] The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.

[b] The average monthly effluent concentration for $CBOD_5$ shall not exceed 25 mg/L or 15 percent of the monthly average influent concentration, whichever is more stringent.

[c] The average monthly effluent concentration for Total Suspended Solids shall not exceed 30 mg/L or 15 percent of the monthly average influent concentration, whichever is more stringent.

[d] Indicates the range of permitted values. Effluent values for pH collected as single grab samples shall not exceed the limits of 6.0-9.0 where such values are attributable to inorganic industrial contributions.

C. Mixing Zone Descriptions

The maximum boundaries of the mixing zones are defined as follows:

Steamboat Slough - Outfall 001:

1. The width of the mixing zone is limited to 98 feet and is centered on the middle of the multi-port diffuser 180 feet from the east bank of the river at MLLW.

2. The length of the mixing zone downstream perpendicular to the outfall is 214 feet; the length of the mixing zone upstream perpendicular to the outfall is 214 feet. The Chronic Dilution Factor DF_c = 27.1.

3. The zone where acute criteria may be exceeded shall extend a distance of 21.5 feet in any horizontal direction from the diffuser and extends vertically to the surface. The Acute Dilution Factor DF_a = 10.9.

Port Gardner – Outfall 100:

1. The mixing zone shall not extend in any horizontal direction from the discharge ports for a distance greater than two hundred feet plus the depth of water over the discharge ports as measured during mean lower low water.
2. A zone where acute criteria may be exceeded shall not extend beyond ten percent of the distance to the boundary of the mixing zone as measured independently from the discharge ports.
3. The Chronic Dilution Factor DF_c = 696.
   The Acute Dilution Factor DF_a = 156.

S2. MONITORING REQUIREMENTS

A. Monitoring Schedule

The Permittee shall monitor in accordance with the following schedule:

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Wastewater Influent	Flow	MGD	Plant influent	Continuous	Measurement
"	$CBOD_5$	mg/l	Plant influent	3/week	24-hr composite
"	BOD_5	mg/l	Plant influent	2/month	24-hr composite
"	TSS	mg/l	Plant influent	3/week	24-hr composite
Wastewater Effluent	Flow to Steamboat Slough	MGD	Effluent to Steamboat Slough	Continuous	Measurement
"	Flow to Everett WWTP	MGD	Effluent to Everett	Continuous	Measurement
"	$CBOD_5$	mg/l	Final Effluent	3/week	24-hr composite
"	TSS	mg/l	Final Effluent	3/week	24-hr composite
"	Fecal Coliform Bacteria	Cfu/100 mL	Final Effluent	3/week	Grab
"	pH	Standard Units	Final Effluent	5/week	Grab
"	Total ammonia	mg/l	Final Effluent	2/month	24-hr composite

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
“	Pollutants listed in EPA form 3510-2A parts B.6 and D for NPDES permit reapplication (See Section S10.)		Final Effluent	1/year	24-hr composite
Acute Toxicity Testing	See Section S8.		Final Effluent	3/year (February, May, and November)	24-hr composite
Chronic Toxicity Testing	See Section S9.		Final Effluent	2/year (May and November) in first and last year	24-hr composite

B. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit shall be representative of the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the monitoring requirements specified in this permit shall conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 or to the latest revision of *Standard Methods for the Examination of Water and Wastewater* (APHA), unless otherwise specified in this permit or approved in writing by the Department of Ecology (Department).

C. Flow Measurement

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the quantity of monitored flows. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted industry standard for that type of device. Frequency of calibration shall be in conformance with manufacturer's recommendations and at a minimum frequency of at least one calibration per year. Calibration records shall be maintained for at least three years.

D. Laboratory Accreditation

All monitoring data required by the Department shall be prepared by a laboratory registered or accredited under the provisions of, *Accreditation of Environmental Laboratories*, Chapter 173-50 WAC. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. Conductivity and pH shall be accredited if the laboratory must otherwise be registered or accredited. The Department exempts crops, soils, and hazardous waste data from this requirement pending accreditation of laboratories for analysis of these media.

S3. REPORTING AND RECORDKEEPING REQUIREMENTS

The Permittee shall monitor and report in accordance with the following conditions. The falsification of information submitted to the Department shall constitute a violation of the terms and conditions of this permit.

A. Reporting

The first monitoring period begins on the effective date of the permit. Monitoring results shall be submitted monthly. Monitoring data obtained during each monitoring period shall be summarized, reported, and submitted on a Discharge Monitoring Report (DMR) form provided, or otherwise approved, by the Department. DMR forms shall be received by the Department no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit. Priority pollutant analysis data shall be submitted no later than forty-five (45) days following the monitoring period. Unless otherwise specified, all toxicity test data shall be submitted within sixty (60) days after the sample date. The report(s) shall be sent to the Department of Ecology, Northwest Regional Office, 3190 – 160th Avenue SE, Bellevue, Washington 98008-5452.

All laboratory reports providing data for organic and metal parameters shall include the following information: sampling date, sample location, date of analysis, parameter name, CAS number, analytical method/number, method detection limit (MDL), laboratory practical quantitation limit (PQL), reporting units, and concentration detected.

Discharge Monitoring Report forms must be submitted monthly whether or not the facility was discharging. If there was no discharge during a given monitoring period, submit the form as required with the words "no discharge" entered in place of the monitoring results.

B. Records Retention

The Permittee shall retain records of all monitoring information for a minimum of three (3) years. Such information shall include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Department.

C. Recording of Results

For each measurement or sample taken, the Permittee shall record the following information: (1) the date, exact place, method, and time of sampling or measurement; (2) the individual who performed the sampling or measurement; (3) the dates the analyses were performed; (4) the individual who performed the analyses; (5) the analytical techniques or methods used; and (6) the results of all analyses.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Condition S2 of this permit, then the results of such monitoring shall be included in the calculation and reporting of the data submitted in the Permittee's DMR.

E. Noncompliance Notification

In the event the Permittee is unable to comply with any of the terms and conditions of this permit due to any cause, the Permittee shall:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance, correct the problem and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to the Department within thirty (30) days after becoming aware of the violation.

2. Immediately notify the Department of the failure to comply.

3. Submit a detailed, written report to the Department within thirty (30) days (five [5] days for upsets and bypasses), unless requested earlier by the Department. The report shall contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

F. Maintaining a Copy of This Permit

A copy of this permit must be kept at the treatment plant and be made available upon request to the public or Ecology inspectors.

G. Reporting - Shellfish Protection

Unauthorized discharges, such as collection system overflows, plant bypasses, or failure of the disinfection system, shall be reported immediately to the Department of Ecology and the Department of Health, Shellfish Program. The Department of Ecology's Northwest Regional Office 24-hr. number is 425-649-7000, and the Department of Health's Shellfish 24-hr. number is 360-236-3330.

S4. FACILITY LOADING

A. Design Criteria

Flows or waste loadings of the following design criteria for the permitted treatment facility shall not be exceeded:

Average flow for the maximum month:	12.7 MGD
BOD_5 loading for the maximum month:	20,143 lbs/day
TSS loading for the maximum month:	24,229 lbs/day

B. Plans for Maintaining Adequate Capacity

The Permittee shall submit to the Department a plan and a schedule for continuing to maintain capacity when:

1. The actual flow or waste load reaches 85 percent of any one of the design criteria in S4.A for three consecutive months; or
2. When the projected increase would reach design capacity within five years,

whichever occurs first. If such a plan is required, it shall contain a plan and schedule for continuing to maintain capacity. The capacity as outlined in this plan must be sufficient to achieve the effluent limitations and other conditions of this permit. This plan shall address any of the following actions or any others necessary to meet the objective of maintaining capacity.

1. Analysis of the present design including the introduction of any process modifications that would establish the ability of the existing facility to achieve the effluent limits and other requirements of this permit at specific levels in excess of the existing design criteria specified in paragraph A, above.
2. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.
3. Limitation on future sewer extensions or connections or additional waste loads.

4. Modification or expansion of facilities necessary to accommodate increased flow or waste load.

5. Reduction of industrial or commercial flows or waste loads to allow for increasing sanitary flow or waste load.

Engineering documents associated with the plan must meet the requirements of WAC 173-240-060, "Engineering Report," and be approved by the Department prior to any construction. The plan shall specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

C. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

D. Notification of New or Altered Sources

The Permittee shall submit written notice to the Department whenever any new discharge or a substantial change in volume or character of an existing discharge into the POTW is proposed which: (1) would interfere with the operation of, or exceed the design capacity of, any portion of the POTW; (2) is not part of an approved general sewer plan or approved plans and specifications; or (3) would be subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act. This notice shall include an evaluation of the POTW's ability to adequately transport and treat the added flow and/or waste load, the quality and volume of effluent to be discharged to the POTW, and the anticipated impact on the Permittee’s effluent [40 CFR 122.42(b)].

E. Infiltration and Inflow Evaluation

1. The Permittee shall conduct an infiltration and inflow evaluation twice during the permit term. Refer to the U.S. EPA publication, *I/I Analysis and Project Certification*, available as Publication No. 97-03 at: Publications Office, Department of Ecology, PO Box 47600, Olympia, WA 98504-7600. Plant monitoring records may be used to assess measurable infiltration and inflow.

2. A report shall be prepared which summarizes any measurable infiltration and inflow. If infiltration and inflow have increased by more than 15 percent from that found in the first report based on equivalent rainfall, the report shall contain a plan and a schedule for: (1) locating the sources of infiltration and inflow; and (2) correcting the problem.

3. The reports shall be submitted by June 1, 2006, and June 1, 2009.

F. Wasteload Assessment

The Permittee shall conduct an assessment of their flow and waste load and submit a report to the Department by June 1, 2009. The report shall contain the following: an indication of compliance or noncompliance with the permit effluent limitations; a comparison between the existing and design monthly average dry weather and wet weather flows, peak flows, BOD, and total suspended solids loadings. The report shall also state the present and design population or population equivalent, projected population growth rate, and the estimated date upon which the design capacity is projected to be reached, according to the most restrictive of the parameters above.

S5. OPERATION AND MAINTENANCE

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

A. Certified Operator

An operator certified for at least a Class III plant by the state of Washington shall be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class II plant shall be in charge during all regularly scheduled shifts.

B. O & M Program

The Permittee shall institute an adequate operation and maintenance program for the entire sewage system. Maintenance records shall be maintained on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records shall clearly specify the frequency and type of maintenance recommended by the manufacturer and shall show the frequency and type of maintenance performed. These maintenance records shall be available for inspection at all times.

C. Short-term Reduction

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limitations on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee shall give written notification to the Department, if possible, thirty (30) days prior to such activities, detailing the reasons for, length of time of, and the potential effects of the reduced level of treatment. This notification does not relieve the Permittee of its obligations under this permit.

D. Electrical Power Failure

The Permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electrical power failure at the treatment plant and/or sewage lift stations either by means of alternate power sources, standby generator, or retention of inadequately treated wastes.

The Permittee shall maintain Reliability Class II (EPA 430-99-74-001) at the wastewater treatment plant, which requires a backup power source sufficient to operate all vital components and critical lighting and ventilation during peak wastewater flow conditions, except vital components used to support the secondary processes (i.e., mechanical aerators or aeration basin air compressors) need not be operable to full levels of treatment, but shall be sufficient to maintain the biota.

E. Prevent Connection of Inflow

The Permittee shall strictly enforce their sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system.

F. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited, and the Department may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, or 3) is applicable.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

   Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health as determined by the Department prior to the bypass. The Permittee shall submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass which is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

c. The Department is properly notified of the bypass as required in Condition S3E of this permit.

3. Bypass which is anticipated and has the potential to result in noncompliance of this permit

The Permittee shall notify the Department at least thirty (30) days before the planned date of bypass. The notice shall contain: (1) a description of the bypass and its cause; (2) an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing; (3) a cost-effectiveness analysis of alternatives including comparative resource damage assessment; (4) the minimum and maximum duration of bypass under each alternative; (5) a recommendation as to the preferred alternative for conducting the bypass; (6) the projected date of bypass initiation; (7) a statement of compliance with SEPA; (8) a request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated; and (9) steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above shall be considered during preparation of the engineering report or facilities plan and plans and specifications and shall be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

The Department will consider the following prior to issuing an administrative order for this type of bypass:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, the Department will approve or deny the request. The public shall be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by the Department under RCW 90.48.120.

G. Operations and Maintenance Manual

The approved Operations and Maintenance Manual shall be kept available at the treatment plant and all operators shall follow the instructions and procedures of this manual.

An updated Operations and Maintenance (O&M) Manual shall be prepared by the Permittee in accordance with WAC 173-240-080 and be submitted to the Department for approval by October 1, 2005. In addition to requirements of WAC 173-240-080 (1) through (5) the O&M Manual shall include:

1. Emergency procedures for plant shutdown and cleanup in event of wastewater system upset or failure.

2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.

3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (e.g. defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine).

4. The treatment plant process control monitoring schedule.

5. Operation instructions for the Effluent Pump Station and use of the Steamboat Slough outfall.

The O&M Manual shall be reviewed by the Permittee at least annually and the Permittee shall confirm this review by letter to the Department. Substantial changes or updates to the O&M Manual shall be submitted to the Department whenever they are incorporated into the manual.

S6. PRETREATMENT

A. General Requirements

The Permittee shall work with the Department to ensure that all commercial and industrial users of the publicly owned treatment works (POTW) are in compliance with the pretreatment regulations promulgated in 40 CFR Part 403 and any additional regulations that may be promulgated under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

B. Wastewater Discharge Permit Required

The Permittee shall not allow significant industrial users (SIUs) to discharge waste water to the Permittee's sewerage system until such user has received a wastewater discharge permit from the Department in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.

C. Identification and Reporting of Existing, New, and Proposed Industrial Users

1. The Permittee shall take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging or proposing to discharge to the Permittee's sewerage system (see Appendix B of Fact Sheet for definitions).

2. Within thirty (30) days of becoming aware of an unpermitted existing, new, or proposed industrial user who may be an SIU, the Permittee shall notify such user by registered mail that, if classified as an SIU, they shall be required to apply to the Department and obtain a State Waste Discharge Permit. A copy of this notification letter shall also be sent to the Department within this same thirty (30)-day period.

3. The Permittee shall also notify all PSIUs, as they are identified, that if their classification should change to an SIU, they shall be required to apply to the Department for a State Waste Discharge Permit within thirty (30) days of such change.

D. Industrial User Survey

1. The Permittee shall complete and submit to the Department an Industrial User Survey listing all SIUs and PSIUs discharging to the POTW. The survey shall be received by the Department by June 1, 2006. At a minimum, the list of SIUs and PSIUs shall be developed by means of a telephone book search, a water utility billing records search, and a physical reconnaissance of the service area. Information on PSIUs shall at least include: the business name, telephone number, address, description of the industrial process(es), and the known wastewater volumes and characteristics. For assistance with the development of the Industrial User Survey, the Permittee shall refer to the Department's guidance document entitled "Performing an Industrial User Survey."

2. The Permittee shall update the Industrial User Survey annually. The updated Industrial User Survey shall be received by the Department by June 1, 2007 and annually thereafter. The updated survey shall include a list of all new industrial users, as well as existing industrial users which are known or discovered to have significantly altered processes or disposal practices since submittal of the last survey or survey update. For industrial users for which there are potentially significant nondomestic discharges, the minimum information described in Section D.1, above, for PSIUs shall be obtained and included in the report.

E. Duty to Enforce Discharge Prohibitions

1. In accordance with 40 CFR 403.5(a), the Permittee shall not authorize or knowingly allow the discharge of any pollutants into its POTW which cause pass-through or interference, or which otherwise violates general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The Permittee shall not authorize or knowingly allow the introduction of any of the following into their treatment works:

   a. Pollutants which create a fire or explosion hazard in the POTW (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).

   b. Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.

   c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTW.

   d. Any pollutant, including oxygen-demanding pollutants, (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.

   e. Petroleum oil, nonbiodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass-through.

   f. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

   g. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40º C (104º F) unless the Department, upon request of the Permittee, approves, in writing, alternate temperature limits.

   h. Any trucked or hauled pollutants, except at discharge points designated by the Permittee.

   i. Waste waters prohibited to be discharged to the POTW by the Dangerous Waste Regulations (Chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. All of the following are prohibited from discharge to the POTW unless approved in writing by the Department under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or the need to augment sewage flows due to septic conditions):

   a. Noncontact cooling water in significant volumes.

   b. Stormwater, and other direct inflow sources.

   c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The Permittee shall notify the Department if any industrial user violates the prohibitions listed in this section.

S7. RESIDUAL SOLIDS

Residual solids include screenings, grit, scum, primary sludge, waste activated sludge, and other solid waste. The Permittee shall store and handle all residual solids in such a manner so as to prevent their entry into state ground or surface waters. The Permittee shall not discharge leachate from residual solids to state surface or ground waters.

S8. ACUTE TOXICITY

A. Effluent Limit for Acute Toxicity (Steamboat Slough discharge only)

The effluent limit for acute toxicity is no acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC).

The ACEC means the maximum concentration of effluent during critical conditions at the boundary of the zone of acute criteria exceedance assigned pursuant to WAC 173-201A-100. The zone of acute criteria exceedance is authorized in Section S1.C. of this permit. The ACEC equals 9.2% effluent.

In the event of failure to pass the test described in Subsection B of this section for compliance with the effluent limit for acute toxicity, the Permittee is considered to be in compliance with all permit requirements for acute whole effluent toxicity as long as the requirements in Subsection C are being met to the satisfaction of the Department.

B. Monitoring for Compliance With an Effluent Limit for Acute Toxicity

The Permittee shall conduct monitoring to determine compliance with the effluent limit for acute toxicity. The acute toxicity tests shall be performed using at a minimum 100% effluent, the ACEC, and a control. Acute toxicity testing shall follow protocols, monitoring requirements, and quality assurance/quality control procedures specified in this section. Testing shall begin in November 2005. A written report shall be submitted to the Department by December 15, 2005 and every three months (quarterly) thereafter except for the summer low-flow season (July-October). The percent survival in 100% effluent shall be reported along with all compliance monitoring results.

Compliance monitoring shall be conducted quarterly using each of the species and protocols listed below on a rotating basis:

1) Fathead minnow, *Pimephales promelas* (96-hour static-renewal test, method: EPA/600/4-90/027F)

2) Daphnid, *Ceriodaphnia dubia*, *Daphnia pulex*, or *Daphnia magna* (48-hour static test, method: EPA/600/4-90/027F).

The Permittee is in violation of the effluent limit for acute toxicity in Subsection A and shall immediately implement Subsection C if any acute toxicity test conducted for compliance monitoring determines a statistically significant difference in survival between the control and the ACEC using hypothesis testing at the 0.05 level of significance (Appendix H, EPA/600/4-89/001). If the difference in survival between the control and the ACEC is less than 10%, the hypothesis test shall be conducted at the 0.01 level of significance.

C. Response to Noncompliance With an Effluent Limit for Acute Toxicity

If a toxicity test conducted for compliance monitoring under Subsection B determines a statistically significant difference in response between the ACEC and the control, the Permittee shall begin additional compliance monitoring within one week from the time of receiving the test results. This additional monitoring shall be conducted weekly for four consecutive weeks using the same test and species as the failed compliance test. Testing shall be conducted using a series of at least five effluent concentrations and a control in order to be able to determine appropriate point estimates. One of these effluent concentrations shall equal the ACEC and be compared statistically to the nontoxic control in order to determine compliance with the effluent limit for acute toxicity as described in Subsection B. The discharger shall return to the original monitoring frequency in Subsection B after completion of the additional compliance monitoring.

If the Permittee believes that a test indicating noncompliance will be identified by the Department as an anomalous test result, the Permittee may notify the Department that the compliance test result might be anomalous and that the Permittee intends to take only one additional sample for toxicity testing and wait for notification from the Department before completing the additional monitoring required in this subsection. The notification to the Department shall accompany the report of the compliance test result and identify the reason for considering the compliance test result to be anomalous. The Permittee shall complete all of the additional monitoring required in this subsection as soon as possible after notification by the Department that the compliance test result was not anomalous. If the one additional sample fails to comply with the effluent limit for acute toxicity, then the Permittee shall proceed without delay to complete all of the additional monitoring required in this subsection. The one additional test result shall replace the compliance test result upon determination by the Department that the compliance test result was anomalous.

If all of the additional compliance monitoring conducted in accordance with this subsection complies with the permit limit, the Permittee shall search all pertinent and recent facility records (operating records, monitoring results, inspection records, spill reports, weather records, production records, raw material purchases, pretreatment records, etc.) and submit a report to the Department on possible causes and preventive measures for the transient toxicity event which triggered the additional compliance monitoring.

If toxicity occurs in violation of the acute toxicity limit during the additional compliance monitoring, the Permittee shall submit a Toxicity Identification/Reduction Evaluation (TI/RE) plan to the Department within sixty (60) days after the sample date. The TI/RE plan shall be based on WAC 173-205-100(2) and shall be implemented in accordance with WAC 173-205-100(3).

D. <u>Sampling and Reporting Requirements</u>

1. All reports for effluent characterization or compliance monitoring shall be submitted in accordance with the most recent version of Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, in regards to format and content. Reports shall contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data on floppy disk for electronic entry into the Department's database, then the Permittee shall send the disk to the Department along with the test report, bench sheets, and reference toxicant results.

2. Testing shall be conducted on 24-hour composite effluent samples. Samples taken for toxicity testing shall be cooled to 4 degrees Celsius while being collected and shall be sent to the lab immediately upon completion. The lab shall begin the toxicity testing as soon as possible but no later than 36 hours after sampling was ended.

3. All samples and test solutions for toxicity testing shall have water quality measurements as specified in Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, or most recent version thereof.

4. All toxicity tests shall meet quality assurance criteria and test conditions in the most recent versions of the EPA manual listed in Subsection A and the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If test results are determined to be invalid or anomalous by the Department, testing shall be repeated with freshly collected effluent.

5. Control water and dilution water shall be laboratory water meeting the requirements of the EPA manual listed in Subsection A or pristine natural water of sufficient quality for good control performance.

6. The whole effluent toxicity tests shall be run on an unmodified sample of final effluent.

7. The Permittee may choose to conduct a full dilution series test during compliance monitoring in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the ACEC.

8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing and do not comply with the acute statistical power standard of 29% as defined in WAC 173-205-020 must be repeated on a fresh sample with an increased number of replicates to increase the power.

S9. CHRONIC TOXICITY

A. Effluent Characterization

The Permittee shall conduct chronic toxicity testing on the final effluent. The two chronic toxicity tests listed below shall be conducted on each sample taken for effluent characterization.

Testing shall be conducted during November 2005 and May 2006. Written reports shall be submitted to the Department by December 15, 2005 and June 15, 2006.

The Permittee shall conduct chronic toxicity testing during effluent characterization on a series of at least five concentrations of effluent in order to determine appropriate point estimates. This series of dilutions shall include the ACEC. The Permittee shall compare the ACEC to the control using hypothesis testing at the 0.05 level of significance as described in Appendix H, EPA/600/4-89/001.

Chronic toxicity tests shall be conducted with the following two species and the most recent version of the following protocols:

Saltwater Chronic Toxicity Test Species		**Method**
Topsmelt-	*Atherinops affinis*	EPA/600/R-95/136
Mysid shrimp	*Holmesimysis costata* or *Mysidopsis bahia*	EPA/600/R-95/136 or EPA/600/4-91/003

The Permittee shall use the West Coast mysid (*Holmesimysis costata*) for toxicity testing unless the lab cannot obtain a sufficient quantity of a West Coast species in good condition in which case the East Coast mysid (*Mysidopsis bahia*) may be substituted.

B. Effluent Limit for Chronic Toxicity (Steamboat Slough discharge only)

After completion of effluent characterization, the Permittee has an effluent limit for chronic toxicity if any test conducted for effluent characterization shows a significant difference between the control and the ACEC at the 0.05 level of significance using hypothesis testing (Appendix H, EPA/600/4-89/001) and shall complete all applicable requirements in Subsections C, D, and F.

If no significant difference is shown between the ACEC and the control in any of the chronic toxicity tests, the Permittee has no effluent limit for chronic toxicity and only Subsections E and F apply.

The effluent limit for chronic toxicity is no toxicity detected in a test concentration representing the chronic critical effluent concentration (CCEC).

In the event of failure to pass the test described in Subsection C, of this section, for compliance with the effluent limit for chronic toxicity, the Permittee is considered to be in compliance with all permit requirements for chronic whole effluent toxicity as long as the requirements in Subsection D are being met to the satisfaction of the Department.

The CCEC means the maximum concentration of effluent allowable at the boundary of the mixing zone assigned in Section S1.C. pursuant to WAC 173-201A-100. The CCEC equals 3.7% effluent.

C. Monitoring for Compliance with an Effluent Limit for Chronic Toxicity

Monitoring to determine compliance with the effluent limit shall be conducted biannually for the remainder of the permit term using each of the species listed in Subsection A on a rotating basis and performed using at a minimum the CCEC, the ACEC, and a control. The Permittee shall schedule the toxicity tests in the order listed in the permit unless the Department notifies the Permittee in writing of another species rotation schedule.

Compliance with the effluent limit for chronic toxicity means no statistically significant difference in response between the control and the test concentration representing the CCEC. The Permittee shall immediately implement Subsection D if any chronic toxicity test conducted for compliance monitoring determines a statistically significant difference in response between the control and the CCEC using hypothesis testing at the 0.05 level of significance (Appendix H, EPA/600/4-89/001). If the difference in response between the control and the CCEC is less than 20%, the hypothesis test shall be conducted at the 0.01 level of significance.

In order to establish whether the chronic toxicity limit is eligible for removal from future permits, the Permittee shall also conduct this same hypothesis test (Appendix H, EPA/600/4-89/001) to determine if a statistically significant difference in response exists between the ACEC and the control.

D. Response to Noncompliance With an Effluent Limit for Chronic Toxicity

If a toxicity test conducted for compliance monitoring under Subsection C determines a statistically significant difference in response between the CCEC and the control, the Permittee shall begin additional compliance monitoring within one week from the time of receiving the test results. This additional monitoring shall be conducted monthly for three consecutive months using the same test and species as the failed compliance test. Testing shall be conducted using a series of at least five effluent concentrations and a control in order to be able to determine appropriate point estimates. One of these effluent concentrations shall equal the CCEC and be compared statistically to the nontoxic control in order to determine compliance with the effluent limit for chronic toxicity as described in Subsection C. The discharger shall return to the original monitoring frequency in Subsection C after completion of the additional compliance monitoring.

If the Permittee believes that a test indicating noncompliance will be identified by the Department as an anomalous test result, the Permittee may notify the Department that the compliance test result might be anomalous and that the Permittee intends to take only one additional sample for toxicity testing and wait for notification from the Department before completing the additional monitoring required in this subsection. The notification to the Department shall accompany the report of the compliance test result and identify the reason for considering the compliance test result to be anomalous. The Permittee shall complete all of the additional monitoring required in this subsection as soon as possible after notification by the Department that the compliance test result was not anomalous. If the one additional sample fails to comply with the effluent limit for chronic toxicity, then the Permittee shall proceed without delay to complete all of the additional monitoring required in this subsection. The one additional test result shall replace the compliance test result upon determination by the Department that the compliance test result was anomalous.

If all of the additional compliance monitoring conducted in accordance with this subsection complies with the permit limit, the Permittee shall search all pertinent and recent facility records (operating records, monitoring results, inspection records, spill reports, weather records, production records, raw material purchases, pretreatment records, etc.) and submit a report to the Department on possible causes and preventive measures for the transient toxicity event which triggered the additional compliance monitoring.

If toxicity occurs in violation of the chronic toxicity limit during the additional compliance monitoring, the Permittee shall submit a Toxicity Identification/Reduction Evaluation (TI/RE) plan to the Department. The TI/RE plan submittal shall be within sixty (60) days after the sample date for the third additional compliance monitoring test. If the Permittee decides to forgo the rest of the additional compliance monitoring tests required in this subsection because one of the first two additional compliance monitoring tests failed to meet the chronic toxicity limit, then the Permittee shall submit the TI/RE plan within sixty (60) days after the sample date for the first additional monitoring test to violate the chronic toxicity limit. The TI/RE plan shall be based on WAC 173-205-100(2) and shall be implemented in accordance with WAC 173-205-100(3).

E. Monitoring When There Is No Permit Limit for Chronic Toxicity

The Permittee shall test final effluent during May 2009 and November 2009, prior to submission of the application for permit renewal. All species used in the initial chronic effluent characterization or substitutes approved by the Department shall be used and results submitted to the Department as a part of the permit renewal application process.

F. Sampling and Reporting Requirements

1. All reports for effluent characterization or compliance monitoring shall be submitted in accordance with the most recent version of Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, in regards to format and content. Reports shall contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data on floppy disk for electronic entry into the Department's database, then the Permittee shall send the disk to the Department along with the test report, bench sheets, and reference toxicant results.

2. Testing shall be conducted on 24-hour composite effluent samples. Composite samples taken for toxicity testing shall be cooled to 4 degrees Celsius while being collected and shall be sent to the lab immediately upon completion. Grab samples must be shipped on ice to the lab immediately upon collection. If a grab sample is received at the testing lab within one hour after collection, it must have a temperature below 20° C at receipt. If a grab sample is received at the testing lab within 4 hours after collection, it must be below 12° C at receipt. All other samples must be below 8° C at receipt. The lab shall begin the toxicity testing as soon as possible but no later than 36 hours after sampling was ended. The lab shall store all samples at 4° C in the dark from receipt until completion of the test.

3. All samples and test solutions for toxicity testing shall have water quality measurements as specified in Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, or most recent version thereof.

4. All toxicity tests shall meet quality assurance criteria and test conditions in the most recent versions of the EPA manual listed in Subsection A and the Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If test results are determined to be invalid or anomalous by the Department, testing shall be repeated with freshly collected effluent.

5. Control water and dilution water shall be laboratory water meeting the requirements of the EPA manual listed in Subsection A or pristine natural water of sufficient quality for good control performance.

6. The whole effluent toxicity tests shall be run on an unmodified sample of final effluent.

7. The Permittee may choose to conduct a full dilution series test during compliance monitoring in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the ACEC and the CCEC.

8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing, and do not comply with the chronic statistical power standard of 39% as defined in WAC 173-205-020, must be repeated on a fresh sample with an increased number of replicates to increase the power.

S10. ADDITIONAL CHEMICAL ANALYSIS OF INFLUENT AND EFFLUENT

A. Additional Effluent Testing

To provide required data for EPA Form 3510-2A, Part B6 (NPDES application) for the next permit cycle, the following additional tests shall be conducted on the final plant effluent. Samples shall be collected for analysis annually during the term of this permit, and results shall be reported with the next NPDES permit application.

Ammonia-N
Chlorine (Total Residual, TRC)
Dissolved Oxygen
Total Kjeldahl Nitrogen
$NO_3 + NO_2$-N
Oil & Grease
Total Phosphorus
Total Dissolved Solids

B. Priority Pollutant Scans

The Permittee shall conduct annual priority pollutant scans of the influent and final treatment plant effluent. The samples analyzed shall be 24-hour composites. The parameters to be tested are listed in EPA Form 3510-2A, Part D (NPDES application). The results shall be submitted no later than forty-five (45) days following the monitoring period. The first submission shall be no later than December 15, 2005, and the results of all priority pollutant scans shall be submitted with the next NPDES permit application.

C. Protocols

Sample analysis shall be conducted in accordance with 40 CFR Part 136.

D. Quality Assurance/Quality Control Procedures

The Permittee shall follow the quality assurance procedures of 40 CFR Part 136.

S11. OUTFALL EVALUATION

The Permittee shall inspect the submerged portion of the Steamboat Slough outfall line and diffuser to document its integrity and continued function. If conditions allow for a photographic verification, it shall be included in the report. The inspection report shall be submitted to the Department by December 2009 along with the application for permit renewal.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Department shall be signed and certified.

A. All permit applications shall be signed by either a principal executive officer or a ranking elected official.

B. All reports required by this permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to the Department.

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

C. Changes to authorization. If an authorization under paragraph B.2, above, is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph B.2, above, must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section shall make the following certification:

> *"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

G2. RIGHT OF INSPECTION AND ENTRY

The Permittee shall allow an authorized representative of the Department, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit.

B. To have access to and copy - at reasonable times and at reasonable cost - any records required to be kept under the terms and conditions of this permit.

C. To inspect - at reasonable times - any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor - at reasonable times - any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G3. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated either at the request of any interested person (including the Permittee) or upon the Department's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 122.64 or WAC 173-220-150 according to the procedures of 40 CFR 124.5.

A. The following are causes for terminating this permit during its term, or for denying a permit renewal application:

1. Violation of any permit term or condition.

2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts.

3. A material change in quantity or type of waste disposal.

4. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination [40 CFR Part 122.64(3)].

5. A change in any condition that requires either a temporary or permanent reduction, or elimination of any discharge or sludge use or disposal practice controlled by the permit [40 CFR Part 122.64(4)].

6. Nonpayment of fees assessed pursuant to RCW 90.48.465.

7. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

B. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:

1. A material change in the condition of the waters of the state.

2. New information not available at the time of permit issuance that would have justified the application of different permit conditions.

3. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.

4. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.

5. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.

6. The Department has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.

7. Incorporation of an approved local pretreatment program into a municipality's permit.

C. The following are causes for modification or alternatively revocation and reissuance:

1. Cause exists for termination for reasons listed in A1 through A7 of this section, and the Department determines that modification or revocation and reissuance is appropriate.

2. The Department has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer (General Condition G8) but will not be revoked and reissued after the effective date of the transfer except upon the request of the new permittee.

G4. REPORTING PLANNED CHANGES

The Permittee shall, as soon as possible, but no later than sixty (60) days prior to the proposed changes, give notice to the Department of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in: 1) the permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b); 2) a significant change in the nature or an increase in quantity of pollutants discharged; or 3) a significant change in the Permittee's sludge use or disposal practices. Following such notice, and the submittal of a new application or supplement to the existing application, along with required engineering plans and reports, this permit may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation of the terms and conditions of this permit.

G5. PLAN REVIEW REQUIRED

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications shall be submitted to the Department for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications shall be submitted at least one hundred and eighty (180) days prior to the planned start of construction unless a shorter time is approved by Ecology. Facilities shall be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit shall be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. DUTY TO REAPPLY

The Permittee shall apply for permit renewal at least one hundred and eighty (180) days prior to the specified expiration date of this permit.

G8. TRANSFER OF THIS PERMIT

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Department.

A. Transfers by Modification

Except as provided in paragraph (B) below, this permit may be transferred by the Permittee to a new owner or operator only if this permit has been modified or revoked and reissued under 40 CFR 122.62(b)(2), or a minor modification made under 40 CFR 122.63(d), to identify the new Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

B. Automatic Transfers

This permit may be automatically transferred to a new permittee if:

1. The Permittee notifies the Department at least thirty (30) days in advance of the proposed transfer date.
2. The notice includes a written agreement between the existing and new Permittees containing a specific date transfer of permit responsibility, coverage, and liability between them.
3. The Department does not notify the existing Permittee and the proposed new Permittee of its intent to modify or revoke and reissue this permit. A modification under this subparagraph may also be minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the written agreement.

G9. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee, in order to maintain compliance with its permit, shall control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

G10. REMOVED SUBSTANCES

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

G11. DUTY TO PROVIDE INFORMATION

The Permittee shall submit to the Department, within a reasonable time, all information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee shall also submit to the Department upon request, copies of records required to be kept by this permit.

G12. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G13. ADDITIONAL MONITORING

The Department may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G14. PAYMENT OF FEES

The Permittee shall submit payment of fees associated with this permit as assessed by the Department.

G15. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G16. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
1) an upset occurred and that the Permittee can identify the cause(s) of the upset;
2) the permitted facility was being properly operated at the time of the upset;
3) the Permittee submitted notice of the upset as required in Condition S3.E; and
4) the Permittee complied with any remedial measures required under S4.C of this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G17. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G18. DUTY TO COMPLY

The Permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G19. TOXIC POLLUTANTS

The Permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G20. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two (2) years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this Condition, punishment shall be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both.

G21. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Department by submission of a new application or supplement thereto at least one hundred and eighty (180) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, shall be scheduled during noncritical water quality periods and carried out in a manner approved by the Department.

G22. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the Department, it shall promptly submit such facts or information.

G23. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than fourteen (14) days following each schedule date.

APPENDIX B

CITY OF MARYSVILLE AGREEMENTS

ANNEXATION AND SERVICE AREA SETTLEMENT AGREEMENT

THIS AGREEMENT is made this 7th day of October, 1996, between and among the **CITY OF ARLINGTON**, ("Arlington"), and the **CITY OF MARYSVILLE**, ("Marysville"), and **SNOHOMISH COUNTY FIRE PROTECTION DISTRICT 12** (*operating pursuant to interlocal agreement with the City of Marysville as the Marysville Fire District*), ("Fire District").

WHEREAS, the parties to this Annexation and Service Area Settlement Agreement, ("Agreement"), are presently engaged in litigation involving future annexation and service areas, and

WHEREAS, the parties believe it is in the best interests of each jurisdiction, and the public's best interest, to resolve their differences through compromise and negotiation; and

WHEREAS, the parties each recognize that resolving the complex issues associated with their competing interests through litigation is costly to the taxpayers and unlikely to bring about resolution of the issues for many months or years, contrary to the best interests of their citizens and those citizens in the areas affected by the disagreement; and

WHEREAS, the parties have engaged in ongoing discussions and mediation in an effort to resolve their differences; and

WHEREAS, the parties have resolved the disputes between them in a manner satisfactory to each jurisdiction in a way which provides a basis for planning and cooperation into the future; and

WHEREAS, the parties have pledged to the other to treat all residents and property owners in a fair and impartial manner, regardless of any past actions and regardless of where the residents and property owners are located;

NOW, THEREFORE, in consideration of mutual benefits and promises, the parties agree as follows:

A. GENERAL

1. Upon approval of this agreement by all parties hereto, a joint meeting shall be held with the County Executive, County Council Representative, and Director of Planning and Development Services to present, explain, and seek Snohomish County's support of the provisions of this agreement. All parties will use their best efforts to obtain the approval of

the County Executive and the County Council of the terms of this Agreement. Such approval will include elimination of joint urban growth boundaries and the establishment of the separate urban growth areas of Arlington and Marysville as set forth herein.

2. Neither Arlington nor Marysville will share revenue with the other from their respective annexations in areas that are within the amended Arlington Smokey Point annexation as described in Snohomish County Boundary Review Board file #22-95.

3. The parties shall have in place a timetable for announcing this settlement and for implementing this Agreement. The public announcement of this agreement shall be pursuant to a joint press release which shall be as provided in **Exhibit 1**. The timetable for implementation shall be as set forth in **Exhibit 2**, subject to revision by mutual agreement of the parties.

B. ANNEXATION BOUNDARIES

1. The parties agree on the separate urban growth boundary lines as set forth on the map attached hereto as **Exhibit 3** and incorporated herein by this reference. Such lines shall be proposed to Snohomish County as the Urban Growth Boundary for each City, and each City and the Fire District shall actively encourage adoption of such boundaries by the Snohomish County Planning Commission and the Snohomish County Council pursuant to ordinance and amendment of the Snohomish County Comprehensive Plan. In the event the County Council does not approve the boundaries agreed upon in **Exhibit 3**, the parties hereto agree to reopen this agreement and mediate alternative agreements in good faith. Neither City will annex outside of its agreed upon urban growth boundary as set forth in **Exhibit 3**. Provided, however, that with respect to the area which is crosshatched on **Exhibit 3**, Marysville agrees that if Arlington acquires any property in this area for municipal purposes, then Marysville will agree to the modification of the designated line so that Arlington may annex the property that it has acquired.

2. With respect to the property which is shaded on **Exhibit 3**, the parties recognize that in order for this area to be annexed to Marysville, changes in the urban growth line will need to be made in order for this area to be contiguous with Marysville. Arlington agrees to support modifications to the urban growth boundary line in this shaded area. However, if within ten (10) years of the date of this Agreement the urban growth boundary line has not been modified such that this shaded area can be contiguous with Marysville, then Marysville agrees to support this shaded area being added to Arlington's urban growth boundary. Provided, however, in the event the Snohomish County Council does not modify the urban growth boundary through the docketing request process or Phase II planning process during said 10-year period, both Cities may thereafter request the urban growth boundary be modified so as to include the shaded area within its urban growth boundary.

C. LAND USE

1. To the extent either City enters into any interlocal agreement with Snohomish County for the purpose of addressing issues relating to future annexations, such agreement shall be consistent with this agreement.

2. Arlington and Marysville agree to enter into an interlocal planning agreement with each other and Snohomish County relating to the urban growth boundaries of each City covered by and consistent with this agreement, utility service area boundaries consistent with this agreement, and such other regional issues as are necessary to meet the consistency requirements of the Growth Management Act.

3. Marysville acknowledges Arlington's strong interest in assuring that development east of 43rd and north of 152nd is compatible with continued operations of the Arlington airport and Arlington's Airport Master Plan. As such, Arlington and Marysville agree to enter into an interlocal agreement committing both jurisdictions to a process that will result in development standards for the area east of 43rd and north of 152nd. Height, type and density will be land use issues of concern to Arlington. The development standards will be consistent with Arlington Airport Master Plan and will include the following provisions to protect the Arlington Airport from future conflicts within its area of impact and to give both cities some certainty in predicting future land uses and utility planning in the area:

a. Strict compliance with current and future Federal Aviation Regulations (including, but not limited to, Part 77) within the area.

b. Requirements in land use applications, permit and planning processes requiring the granting or dedication, when reasonable, of avigation easements by owners of property located within the approach zone south of runway 34. Following annexation, Marysville will provide written notice to Arlington of land use applications, permit and planning processes in this area and Arlington will provide written comments and proposed conditions and language for such easements. To the extent allowed by law, such avigation easement will hold the Airport (City of Arlington) and the City of Marysville harmless from all current and future activities.

c. Encouragement of industrial and business park uses within this area, and discouragement of residential and other uses within this area which would conflict with the Arlington Airport.

d. Site plan review and input regarding consistency with agreed upon development standards by Arlington of the area east of 43rd Avenue and north of 152nd Street to insure that conflicting land uses including, but not limited to, large bodies of water, tall structures, smoke, light and glare, electrical interference, and uses that are sensitive to high noise levels, do not occur within the area.

e. Arlington will provide Marysville and the District with advance written notice and an opportunity to provide input on any proposed changes to Arlington's Airport Master Plan.

D. SEWER AND WATER SERVICE

1. The parties agree on the "water and sewer utility service areas" as set forth on **Exhibit 4**, attached hereto and incorporated herein by this reference. For purposes of this agreement, "water and sewer utility service areas" shall mean those areas within each City's urban growth boundary and future annexation area within which that City shall have the authority to serve or plan for the services of sewer and water utilities. Such areas may be amended by future mutual agreements of the parties. Both cities shall work to cause the Water Utility Coordinating Committee (WUCC) to amend water service areas to be consistent with this agreement. Each city shall apply to have its water and sewer comprehensive plan amended consistent with this agreement.

2. The parties agree that they shall continue to study those areas east of the agreed upon urban growth boundary line in the area generally east of 67th Avenue N.E. and the area generally north of the Lakewood area, north of the existing urban growth boundary and west of I-5 with the idea of agreeing to annexation and planning boundaries for each city.

3. Arlington acknowledges Marysville's critical need to assure adequate long-range utility planning and the economic viability of its water and sewer systems as well as the ability to meet or exceed present and future environmental standards. The Cities of Arlington and Marysville are committed to entering into an interlocal agreement that will assure these goals are met and provide for present and future utility service in the area designated for utility service by the City of Marysville and for annexation to the City of Arlington. If necessary, an interim agreement will be implemented to provide a smooth transition while the permanent agreement is drafted. Under the terms of these agreements, Marysville will continue to provide water and sewer service to the Smokey Point area, including that portion south of approximately 180th Street NE, upon the following conditions:

a. Property owners within the Arlington annexation area will receive the same level and quality of service as other comparable property owners located in Marysville or in the Marysville urban growth boundary.

b. There shall be equitable monthly rates, connection fees and development fees within that part of Arlington's urban growth boundary served by Marysville as within adjacent unincorporated areas. Marysville agrees to hold a public hearing prior to any increase in utility rates or fees and shall consider testimony of all speakers prior to adjusting rates or fees. Marysville will provide Arlington with sixty (60) days' advance notice of any such public hearing.

c. Marysville will provide timely utility service to property owners within that part of Arlington's urban growth boundary served by Marysville as set forth in **Exhibit 4** upon developer application provided development is in conformance with either the County's or Arlington's Comprehensive Plan, as applicable. Service shall be provided in as timely a manner within Arlington's urban growth boundary area as outside of Arlington's urban growth boundary. Service shall be contingent on compliance with Marysville's codified discharge limitations and its NPDES permit.

d. Any service moratoriums by Marysville that are not necessitated by conditions that are specifically related to the service area defined in **Exhibit 4** shall be applied system-wide, rather than just within the area served by Marysville within Arlington's urban growth boundary. The two Cities will work together to alleviate any moratorium within the Arlington annexation area properties through provision of short- or long-term sewage collection and disposal or water service. In such situations, the Cities shall coordinate their efforts to alleviate service problems to the greatest extent practicable.

e. Agreement by Arlington on issues relating to controlling the volume of sewage and the quality of the material discharged into the sewer system. These issues shall be addressed in connection with the interlocal agreement described in Section C-2, above or in a separate interlocal agreement between the parties.

4. The parties agree it is in their mutual interests to continue ongoing discussions regarding the provision of water and sewer service north of approximately 180th St. NE. Said discussions shall be based on the premises set forth in paragraph 5, below.

5. Arlington may have the option of purchasing Marysville's water and sewer service facilities north of approximately 180th Street NE upon the following conditions:

a. The option to purchase shall be exercised within twelve (12) months of the date of this agreement. During that period of time, the parties shall agree upon the terms of such sale, which shall be governed by subparagraphs 5(b) through 5(e), below.

b. Transfer of the system to Arlington shall be at the earliest possible date after the exercise of the option to purchase.

c. Diversion of effluent collected within Marysville's sewer system north of approximately 180th Street NE at the time of the transfer of the system to Arlington, or such other date as may be agreed upon.

d. Allowance for Arlington within the area to be transferred to purchase water from Marysville at nondiscriminatory cost-based wholesale rates and have it provided to them, using a master meter installed at Arlington's expense to measure the water consumed.

e. The parties agree to negotiate in good faith to establish the purchase price of the system. If no such agreement is reached, then the price shall be set by an independent arbitrator with payout terms extended, at Arlington's discretion, over a maximum of 15 years, so long as such payment terms do not conflict with Marysville's bond covenants. Any agreement and any payment terms, whether reached by negotiation or through arbitration, shall be consistent with the provisions of Marysville ordinance #1995. Provision shall be made in such agreement for securing payment for sale of the utility system.

f. In the event Arlington elects not to exercise the option to purchase the utility system, Marysville will continue to serve existing customers with the understanding that it shall not be obligated to make any expansion of infrastructure to serve new customers. Provided, however, in the event expansion of the infrastructure occurs, the parties will work cooperatively in the planning and financing of such expansion.

6. Both Cities recognize the need for long-range utility service planning. The Cities, within twelve (12) months of the full execution of this agreement, shall reach agreements regarding the boundaries for long-range utility service for the area within Arlington's urban growth boundary generally north of the agreed upon urban growth boundary line and east of 43rd, which area is crosshatched on **Exhibit 4**. Until such agreements are reached, Marysville will continue to provide, as necessary, water and sewer service in said area on similar terms to service provided to other areas within Arlington's urban growth boundary served by Marysville.

7. Marysville and Arlington will commit to work together to strengthen the integrity, quality, pressure and capacity of the systems providing water to areas of mutual interest through appropriate and agreed-upon mechanisms including, but not limited to, interconnects between the Arlington and Marysville systems. The parties also agree to promptly

discuss, but shall not be required to agree upon, treatment of some Ranney well water in the Arlington system, and construction dependent on the joint funding of a two-phase water plant project to benefit the systems.

8. The Cities shall appoint a committee consisting of the City Administrators and Public Works Directors and/or City Engineers, together with such other staff each city shall mutually agree to. Such committee shall meet on a periodic basis and consult on issues relating to operational, technical and utility planning issues of mutual concern.

E. FIRE SERVICE

1. Arlington will enter into a contract with Marysville and Fire District 12 for continued fire and emergency medical services for all areas within the Fire District's existing service area which is within Arlington's urban growth boundary as described in **Exhibit 3**. The contract shall be for seven (7) years commencing from the date Arlington first annexes land in its Smokey Point annexation area, with a three (3) year notice of termination to be exercised at the end of the 7-year period. Other terms shall be as mutually agreed.

2. Upon annexation by Marysville of territory within Fire District 21 Marysville, through the Marysville Fire District, will commit to at least a seven (7) year contract with Fire District 21, if requested by Fire District 21, for continued fire service in Marysville's urban growth area currently served by Fire District 21. Said agreement will have similar provisions relating to assets and revenue as provided District 12 by Arlington in the contract referenced in E-1 above. In the event Fire District 21 or Arlington continues to serve territory of Fire District 21 that is annexed by Marysville, the same level of service as provided to adjacent areas by Marysville Fire District shall be provided. In the event such level of service cannot be provided, Marysville Fire District shall serve said area on terms as agreed by contract. Other terms of such contract shall be as mutually agreed.

F. MISCELLANEOUS

1. Marysville and Arlington will cooperate in regional management of drainage, including, but not limited to, drainage relating to the areas within each City's urban growth boundary. These issues could be addressed in connection with the interlocal agreement described in Section C-2 above.

2. Marysville and Arlington will work together to extend 43rd Avenue from 172nd Street to 152nd Street, and, subject to each City's budgetary constraints and further agreements of the parties, pay their proportionate share of costs, when both jurisdictions determine that development and traffic justifies the street extension. Participation in the street extension shall not be unreasonably withheld by either party. Both parties will seek to include Snohomish

County in any cost-sharing agreement.

G. DISPUTE RESOLUTION

1. Arlington, Marysville and the Fire District agree to the following procedure for resolving disputes in connection with issues arising under this agreement. Except as specifically provided for elsewhere in this settlement agreement, and except where a mandatory specific dispute resolution process is already established by law, this procedure will begin with good faith negotiations between the jurisdictions, followed by mediation should the jurisdictions reach an impasse, followed by binding arbitration should the jurisdictions reach an impasse in mediated negotiations.

H. APPEALS

1. Marysville and Fire District 12 will dismiss their lawsuits challenging the Smokey Point annexation.

2. Marysville and Fire District 12 will, upon request by Arlington, support and participate in Arlington's efforts to pursue annexation of the Smokey Point annexation area consistent with this agreement, including, but not limited to, participation in and support of a request to the court to remand the Boundary Review Board decision on the Smokey Point annexation to the Boundary Review Board for further fact finding consistent with this settlement agreement. However, regardless of the decision of the Boundary Review Board, Arlington agrees to abide by the annexation boundaries set forth in **Exhibit 3** and will not adopt any annexation ordinance or conclude any annexation of an area inconsistent therewith.

3. Marysville and Fire District 12 will not oppose Arlington's appeal of the Boundary Review Board's Island Crossing decision.

4. Marysville will amend Chapter 14.32 of its municipal code to not require annexation covenants as a condition to water and sewer service within that portion of the Arlington urban growth boundary served by Marysville. Marysville will release the obligation requiring citizens to annex to Marysville in existing annexation covenants with property owners within said area. In the interim, upon adoption of the proper ordinance, which shall be within thirty (30) days of the execution of this settlement agreement, Marysville will commence to provide water and sewer service to property owners in the Arlington annexation area who request or have requested such service on terms and conditions that are consistent with the Marysville Utility Code (excepting the annexation covenant requirements) and on terms and conditions that reflect the understandings reached by the parties in this settlement agreement.

5. Marysville will dismiss its appeal of Arlington's amendments to its sewer and water comprehensive plans so long as such plans are consistent with the terms of this agreement. Arlington will prepare and submit written amendments to said plans consistent with this agreement to all agencies with jurisdiction and to Marysville.

6. Arlington will dismiss its appeal of Marysville's comprehensive plan. Marysville will amend said comprehensive plan, consistent with the terms of this agreement, and will submit such amendments to Arlington for review and comment prior to adoption.

7. Arlington will amend its Comprehensive Plan to be consistent with the terms of this agreement and will submit it to Marysville prior to adoption.

8. Arlington will support and not challenge any revisions by Marysville to its RUSA boundary necessitated by this settlement agreement.

9. Marysville and Fire District 12 will not challenge future annexations by Arlington of the Arlington urban growth boundary areas identified in **Exhibit 3**.

10. Arlington will not challenge future annexations by Marysville of the Marysville urban growth boundary areas identified in **Exhibit 3**.

11. Nothing contained in this agreement shall be intended to create or otherwise establish any particular class or group of persons or property owners who will or should be especially protected or benefitted by the terms of this agreement. No provision or term of this agreement is intended to limit either City's authority to impose lawful regulations for the provision of services. This agreement shall not be construed as an admission of any duty to provide municipal services absent compliance with all lawful rules, regulations or ordinances.

DATED this 7th day of October, 1996.

CITY OF ARLINGTON

Robert J Kraski

Robert Kraski, Mayor

Larry Caldwell

Larry Caldwell

Monty Hagenston

Montey Hagenston

Richard Larsen

Richard Larsen

Sally Lien

Bea Randall

Bea Randall

Don Regan

Don Regan

Ollie Smith

Oliver Smith

ATTEST/AUTHENTICATED

By Kathy Peterson

City Clerk

CITY OF MARYSVILLE

David Weiser

David Weiser, Mayor

Shirley Bartholomew

Ken Baxter

Otto Herman

Mike Leighan

John Myers

Donna Pedersen

Donna Wright

ATTEST/AUTHENTICATED

By________________________
City Clerk

FIRE DISTRICT 12

Paul Rochon

James Shipman

Kay Smith

ATTEST/AUTHENTICATED

By______________________

Board Secretary

EXHIBIT 1

JOINT PRESS RELEASE

As a result of extensive negotiations which were facilitated by mediation, the cities of Marysville and Arlington and the Marysville Fire District have reached a comprehensive agreement for the settlement of a number of issues of importance relating to Smokey Point, Island Crossing and surrounding areas.

The mediated settlement which was initiated, encouraged, and supported by Snohomish County Executive Bob Drewel addresses a number of key issues relating to future planning, growth and services provided by both cities and the Fire District.

Some of the key features of the settlement include:

- Agreements for urban growth areas between the cities of Marysville and Arlington, subject to approval of Snohomish County.
- Agreements for water and sewer utility service to the Smokey Point area by the City of Marysville and potential sale of utilities in the Island Crossing area to Arlington.
- A long-term interlocal agreement for provision of fire and emergency medical services in the Smokey Point area by the Marysville Fire District.
- Agreements for coordinated land use planning in areas located between the two cities, including protections relating to the Arlington Airport.
- Resolution and dismissal of all pending litigation between the parties to the agreement.

Implementation of the many agreements reached by the parties will require further discussion, and importantly, the cooperation and assistance of the Snohomish County Planning Commission and County Council.

While all three parties acknowledge that there was considerable give and take in reaching a settlement, all agree that the mediated settlement marks the beginning of a new era of cooperation between the two cities, the Fire District and Snohomish County.

Both Marysville Mayor Dave Weiser and Arlington Mayor Robert Kraski have indicated their support for the settlement agreement and have each stated that the citizens of both cities and the Smokey Point area are the true winners of the negotiated settlement, as the agreements will result in predictable water, sewer and fire services within urban growth areas, and reliable, coordinated planning for anticipated future growth in the area.

The agreement does not explicitly reference the pending Navy Housing Project located at Smokey Point. Both cities have indicated an interest in cooperating with Snohomish County to address utility issues for the project.

For additional information, contact Thom Myers at 435-0361 or Dave Zabell at 651-5000.

/mv/arlington.rel

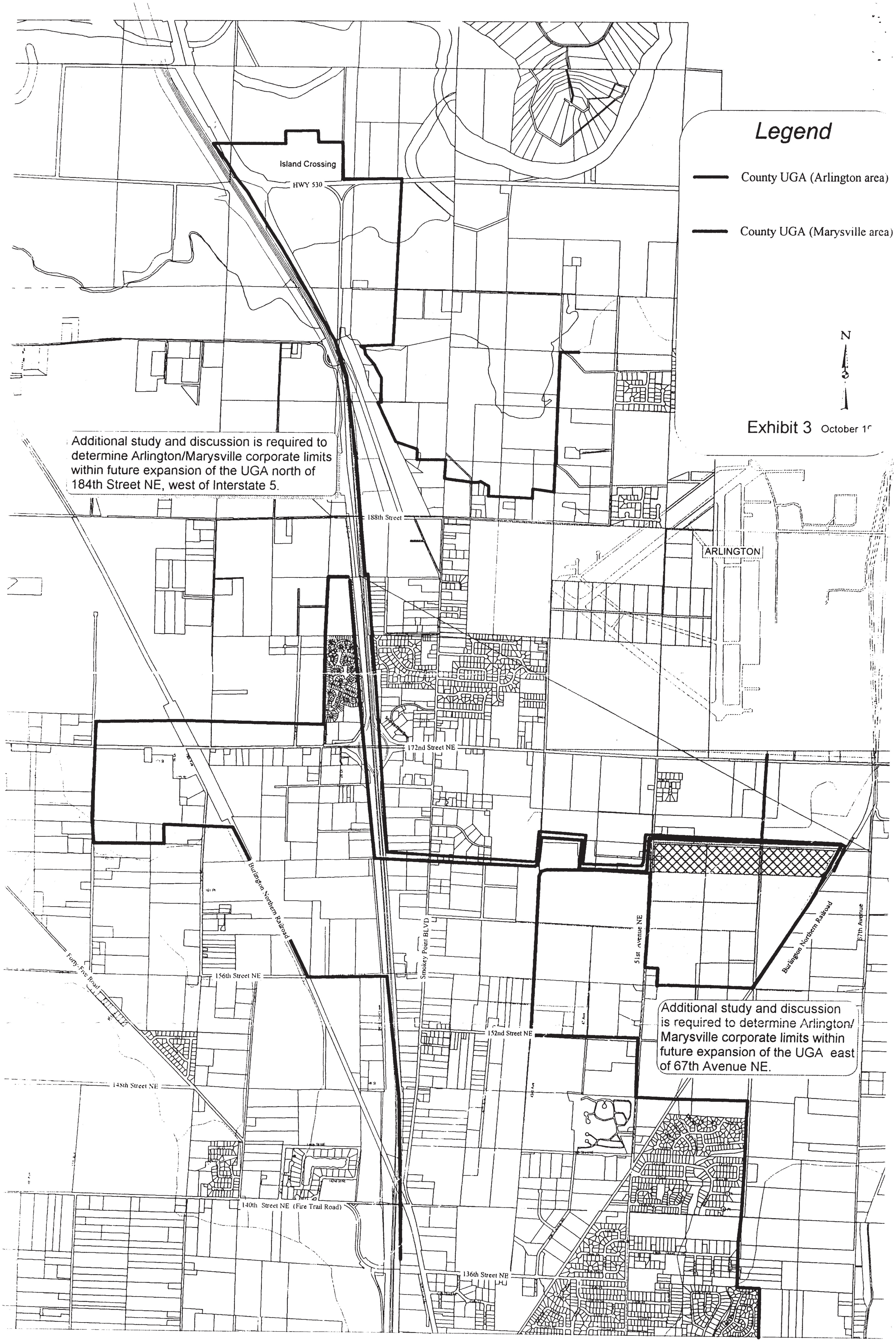
EXHIBIT 2

TIMETABLE FOR IMPLEMENTATION OF ANNEXATION AND SERVICE AREA SETTLEMENT AGREEMENT

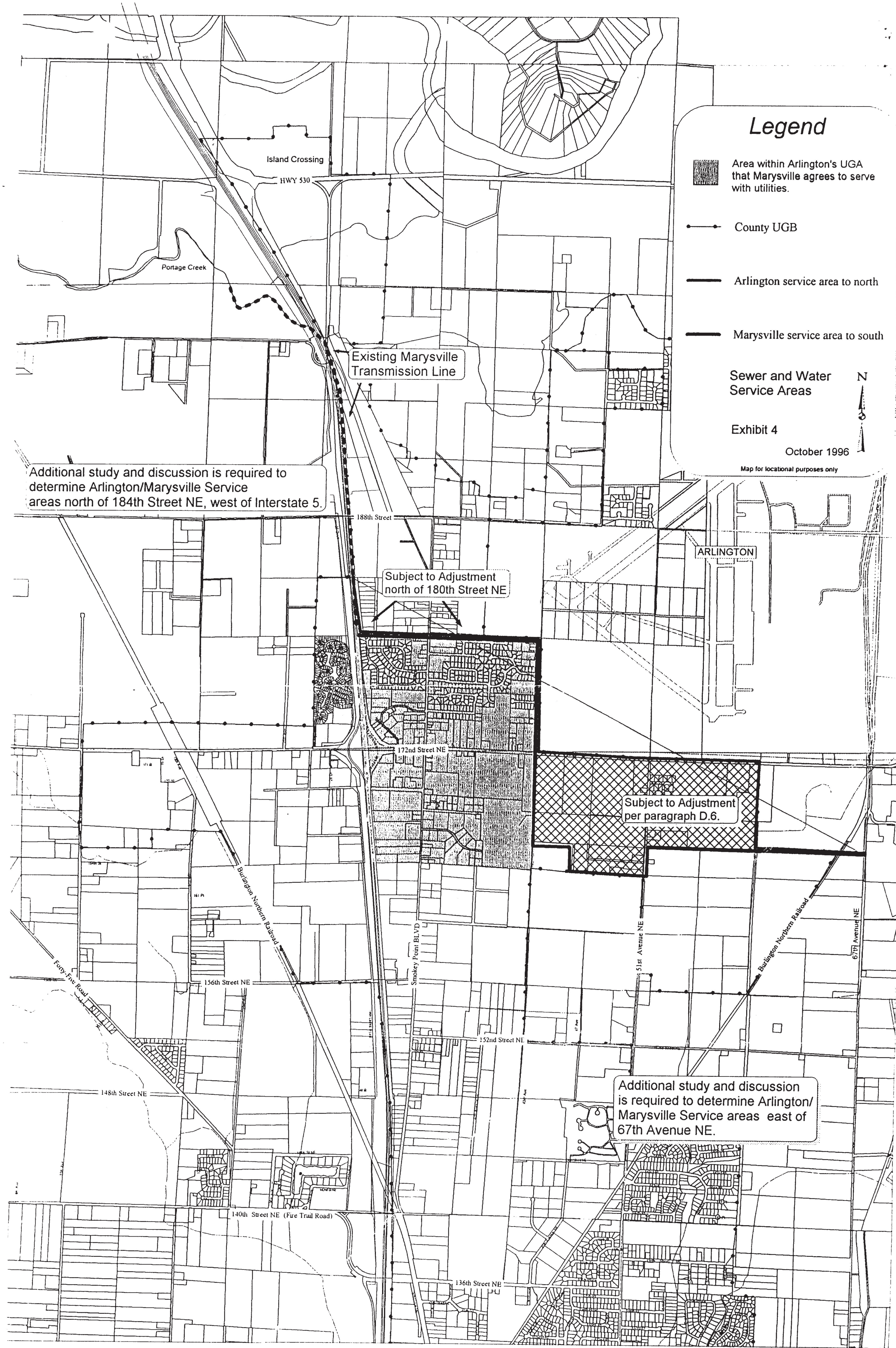
TASK	TIME FRAME
Joint meeting with County Executive, Planning Director and County Council	Earliest possible date after full execution of settlement agreement
Joint Press Release	Immediately after full execution of agreement
Interlocal agreement with County regarding future annexation	To be agreed on
Planning agreement between both cities and County	Within 90 days from the execution of this agreement or per agreement of the parties
Interlocal agreement for development standards in South Arlington area.	Within 180 days from the execution of this agreement or per agreement of the parties
Amendment of water service areas through WUCC	Within 180 days from execution of this agreement
Interim utility agreement	90 days from execution of this agreement
Permanent interlocal agreement re: long-range utility planning	12 months from execution of this agreement
Sale of Island Crossing utilities to Arlington	As per agreement
Agreement for wholesale purchase of water from Marysville	Prior to purchase and transfer
Negotiation and agreement regarding long-range utility service boundaries north of 164th and east of 43rd	Within 12 months of execution of this agreement

/mv/arling.time

Discussions regarding water system interconnects and two-phase water plant project	Commence discussions within 30 days of execution of this agreement
Interlocal agreement between Fire District and Arlington for fire and EMS services	Execute concurrent with execution of Annexation and Service Area Settlement Agreement
Interlocal agreement regarding fire services between Marysville and District 21	Upon annexation by Marysville of territory within District 21
Dismissal of lawsuits challenging Smokey Point annexation	Within 20 days of full execution of this agreement
Joint request to remand Smokey Point annexation to Boundary Review Board	Upon request by Arlington
Dismiss appeal of Arlington's amendments to sewer and water comprehensive plan	Within 20 days of the date of execution of this agreement
Dismissal of appeal of Marysville's comprehensive plan	Within 10 days of full execution of this agreement
Arlington and Marysville amendment of land use comprehensive plan	Within 180 days of full execution of this agreement
Marysville amendment of RUSA code regarding annexation covenant	Within 30 days of full execution of this agreement
Marysville release of existing annexation covenant within Arlington annexation area	Within 30 days of full execution of this agreement



Legend
County UGA (Arlington area)
County UGA (Marysville area)
N
Exhibit 3 October 1
Island Crossing
HWY 530
Additional study and discussion is required to determine Arlington/Marysville corporate limits within future expansion of the UGA north of 184th Street NE, west of Interstate 5.
188th Street
ARLINGTON
172nd Street NE
Burlington Northern Railroad
Smokey Point BLVD
51st Avenue NE
67th Avenue
Forty-Five Road
156th Street NE
152nd Street NE
Additional study and discussion is required to determine Arlington/Marysville corporate limits within future expansion of the UGA east of 67th Avenue NE.
148th Street NE
140th Street NE (Fire Trail Road)
136th Street NE



Legend
Area within Arlington's UGA that Marysville agrees to serve with utilities.
County UGB
Arlington service area to north
Marysville service area to south
Sewer and Water Service Areas
N
Exhibit 4
October 1996
Map for locational purposes only
Island Crossing
HWY 530
Portage Creek
Existing Marysville Transmission Line
Additional study and discussion is required to determine Arlington/Marysville Service areas north of 184th Street NE, west of Interstate 5.
188th Street
ARLINGTON
Subject to Adjustment north of 180th Street NE
172nd Street NE
Subject to Adjustment per paragraph D.6.
Burlington Northern Railroad
Smokey Point BLVD
51st Avenue NE
67th Avenue NE
Forty-Five Road
156th Street NE
152nd Street NE
148th Street NE
Additional study and discussion is required to determine Arlington/ Marysville Service areas east of 67th Avenue NE.
140th Street NE (Fire Trail Road)
136th Street NE

INTERLOCAL AGREEMENT BETWEEN THE CITY OF MARYSVILLE AND SNOHOMISH COUNTY CONCERNING ANNEXATION AND URBAN DEVELOPMENT WITHIN THE MARYSVILLE URBAN GROWTH AREA

1. PARTIES

This Interlocal Agreement (hereinafter "AGREEMENT") is entered into pursuant to Chapter 36.70A RCW (the Growth Management Act), Chapter 36.115 RCW (the Governmental Services Act), and Chapter 39.34 RCW (the Interlocal Cooperation Act) by the City of Marysville, a Washington municipal corporation (hereinafter "CITY") and Snohomish County, a political subdivision of the State of Washington (hereinafter "COUNTY").

2. PURPOSE AND RECITALS

2.1 As required by the Growth Management Act (GMA), the COUNTY Council has adopted an Urban Growth Area for Marysville (hereinafter "MUGA") that identifies areas within unincorporated COUNTY which the CITY may annex in the future (see Exhibit 1).

2.2 GMA encourages cities with urban services to annex unincorporated urban areas within a county.

2.3 Annexations proposed by the CITY are pursued in accordance with RCW 35A.14 and intended to be consistent with RCW 36.93.157 and RCW 36.93.180.

2.4 The CITY and COUNTY recognize the need to facilitate an orderly transition of services and capital projects from the COUNTY to the CITY at the time of annexation.

2.5 The CITY and COUNTY recognize that mutual coordination of land use densities and designations is necessary to reduce urban sprawl, support urban infrastructure and protect rural areas within the COUNTY.

2.6 The CITY and COUNTY recognize that annexations can have extra-jurisdictional impacts and that intergovernmental cooperation is an effective way to deal with impacts and opportunities that transcend jurisdictional boundaries.

2.7 The CITY and COUNTY believe it is in the best interest of the citizens of both jurisdictions to enable reciprocal imposition of impact mitigation requirements and regulations that effect improvements in both jurisdictions.

2.8 The CITY and COUNTY wish to establish a generalized, framework interlocal agreement to implement urban development standards within the Urban Growth Area prior to annexation, for the planning and funding of capital facilities in the unincorporated portion of urban growth areas, and to enable consistent responses to future annexations.

2.9 The CITY and COUNTY share a commitment to ensure that infrastructure will be in place within the urban growth area to serve new development as it is ready for occupancy and use without decreasing service levels below locally established minimum standards and which is within funding capacities of the City and County; and

2.10 The CITY and COUNTY agree that RCW 36.70A.110 provides a process for designating urban growth boundaries that begins with each county consulting with the city on its respective urban growth area, in recognition of the role that cities serve in providing public facilities and services for urban growth.

2.11 The CITY and COUNTY also recognize that this framework agreement will include general statements of principle and policy for additional agreements on specific topical subjects relating to annexation and service transition, including, but not limited to streets, surface water, parks and open space.

APPLICABILITY, ADDENDA AND AMENDMENTS

3.1 Applicability. This agreement shall apply to all annexations for which the CITY files a Notice of Intent (NOI) to the Boundary Review Board (BRB) after the effective date of this agreement.

3.2 Addendum for annexation. An addendum to this agreement shall be prepared for each annexation if necessary to address parks, transportation surface water management, facilities, or other issues. The CITY and COUNTY will negotiate the addendum during the forty-five day review period following the date the BRB accepts the CITY'S NOI for the annexation. If the CITY and COUNTY are unable to reach agreement during this period, the COUNTY may request that the BRB invoke jurisdiction and hold a public hearing on the proposed annexation. Even if the COUNTY requested the BRB invoke jurisdiction, the CITY and COUNTY, may by mutual agreement, continue to negotiate an annexation addendum to this agreement. The addendum will become effective on the effective date of the CITY ordinance approving the annexation.

3.3 Amendments. The CITY and COUNTY recognize that amendments to this agreement other than those described in section 3.2 above may be necessary to clarify particular sections or to update and expand the agreement. These amendments may be pursued as necessary by both parties.

3.4 Process for addending or amending this agreement. An addendum or amendment must be mutually agreed by the parties and executed in writing before becoming effective. Any addendum or amendment to the agreement shall be executed in the same manner as provided by law for the execution of the agreement.

4. LAND USE

4.1. Comprehensive Plan and Urban density requirements. The CITY's GMA Comprehensive Plan establishes land use designations within the MUGA, including unincorporated areas of the MUGA. These designations provide residents and the COUNTY notice of the CITY's intentions with respect to land uses for the area and requires a minimum residential density of four (4) dwelling units per net acre in the MUGA. The COUNTY will continue to work with the CITY to reconcile land use designations within the unincorporated MUGA to ensure consistency with the CITY's Comprehensive Plan, Comprehensive Water Plan and Comprehensive Sewer Plan and Rural Utility Service Area (RUSA) Plan.

4.2. Pre-zoning. The City agrees to pre-zone a proposed annexation area at the time it accepts the sixty-percent petition to annex, by any method authorized by RCW Chapter 35A.14. The CITY will provide adequate notice of the zoning hearings to affected property owners and the COUNTY.

4.3 City urban design and development standards. All County development applications subject to SEPA within the MUGA will be reviewed under the terms of the Interlocal Agreement Between Snohomish County and the City of Marysville on Reciprocal Mitigation of Transportation Impacts, the provisions of SEPA, and any other interlocal agreements relating to interjurisdictional coordination. Any County development within the MUGA may also be required to provide improvements, dedicate or deed right-of-way, and meet road standards consistent with minimum unincorporated UGA infrastructure standards identified in Exhibit 2, when adopted by the COUNTY. When the development is contingent upon extension of sewer or water services provided by the CITY, the COUNTY agrees to impose conditions negotiated between the developer and the CITY as a condition of a sewer and water contract between the property owner or developer and CITY, provided that the conditions meet minimum county development standards and mitigation conditions. The CITY agrees that the COUNTY can only impose standards and conditions in addition to those which the COUNTY would impose under COUNTY codes if the applicant agrees in writing or in the utility service agreement.

4.4 Urban Growth Area. The COUNTY agrees to consult with the CITY on any proposals to amend the MUGA, which are contingent upon service provision by the CITY and which will ultimately be within the CITY. The COUNTY agrees to work cooperatively with the CITY to establish a priority system for evaluating UGA amendment requests within the MUGA and which are consistent with buildable lands requirements of the Growth Management Act (RCW 36.70A.215) and the monitoring guidelines established by Snohomish County Tomorrow as adopted by the COUNTY in its General Policy Plan. The priority system will be based on availability of public facilities and services within the existing UGA.

4.5 Endangered Species Act compliance. The COUNTY and CITY agree to work towards one or more interlocal agreements to achieve recovery of any federally listed threatened or endangered species. These agreements may include, but are not limited to, land use planning, development regulations, code enforcement, capital projects, public involvement and education, facilities operations and maintenance and scientific inventory and monitoring.

5. TRANSFER OF PERMITS IN PROCESS BY THE COUNTY

5.1 County will process permits within four months of annexation. The COUNTY agrees to continue processing both building and major development permit applications in an annexed area for which complete applications were filed before the effective date of annexation, as provided below.

5.2 City will adopt County Code. The CITY agrees to adopt the COUNTY'S permitting code by reference. The relevant code is listed as Exhibit 3 to this agreement.

5.3 Building permits issued within four months of annexation. In areas that have been annexed, the COUNTY shall continue to process through completion building permits under COUNTY code and permit requirements for which it received a complete permit application prior to the effective date of the annexation. In addition, the COUNTY shall accept, process, and conduct inspections for any associated permits for which it receives an application through completion.. For the purposes of this agreement, "associated permits" means mechanical, plumbing, and sign permits for the building being permitted. For the purposes of this agreement, "completion" means final administrative or quasi-judicial approvals, including final inspection and issuance of an occupancy permit. The COUNTY shall be responsible for defending any administrative, quasi-judicial or judicial appeals of building permits issued by the COUNTY in the annexed area. (Building permits under 5.3) For permit renewals, see Section 5.6.

5.4 Building permit applications not issued within four months after annexation. In areas that have been annexed, the COUNTY shall continue to process permit applications (exclusive of major development permits as defined in Section 5.5) under the COUNTY code and permit application requirements for which it received a complete permit application prior to the effective date of the annexation, for up to four months following the effective date of the annexation. Four (4) months following the effective date of the annexation, permit application processing responsibility will be transferred to the CITY if a permit was not issued. Alternatively, the CITY may also request the COUNTY to transfer pending building permit applications upon receipt of a written request by the permit applicant. The COUNTY will contact applicants for pending permit applications to provide advance notification of the transfer date. The CITY will honor any intermediate approvals (such as building plan check approval) which are effective prior to transfer of the permit application. Extension of intermediate approvals following the annexation must be approved by the CITY following consultation with County staff.

5.5 Major development permits. In areas that have been annexed, the COUNTY shall continue to process to completion any major development permits for which it received a complete permit application prior to the effective date of an annexation. Major development permits are defined as: non- single family building permits for structures greater than 4,000 square feet in size, subdivisions, Planned Residential Developments, short subdivisions, conditional uses, special uses, rezones, shoreline substantial development permits and variances. Processing to completion shall be to the end of a review process that was commenced by the county prior to the date of the annexation. The term "review process" is defined as follows for a subdivision: preliminary plat approval, plat construction plan approval, inspection and final plat processing. Final plats shall be transmitted to the CITY for City Council acceptance of dedication of right-of-way or other public easements, if dedication occurs after the effective date of annexation. . The COUNTY shall be responsible for defending any administrative, quasi-judicial or judicial appeals of major development permits issued by the COUNTY in the annexed area. (Building permits under 5.3)

5.6 Permit renewal or extension. Any request to renew a building permit or to renew or extend a major development permit issued by the COUNTY prior to the effective date of the annexation which is received after the effective date of the annexation shall be made to and administered by the CITY.

5.7 Land use code enforcement cases. Any land use code enforcement cases in the annexation area pending in the COUNTY will be transferred to the CITY on the effective date of the annexation. Any further action in those cases will be the responsibility of the CITY. The COUNTY agrees to make its employees available as witnesses at no cost to the CITY if necessary to prosecute transferred cases.

5.8 Enforcement of County conditions. Following the effective date of annexation, the CITY agrees to enforce any conditions imposed by the COUNTY relating to the issuance of a building or major development permit in an area which has been annexed. Any performance or other bonds held by the COUNTY to guarantee performance or completion of work associated with the issuance of a permit shall be transferred to the CITY along with responsibility for enforcement of condition tied to said bonds. The COUNTY agrees to make its employees available to provide assistance in areas involving enforcement of conditions on permits originally processed by County personnel, at no cost to the CITY.

5.9 Quarterly permit report. Fifteen days following the end of each calendar quarter, the COUNTY shall provide the CITY a report listing the file numbers and addresses of all major development permits, code enforcement cases and building permits inside the CITY limits that were pending during the previous quarter.

5.10 Proportionate share of application fees. The CITY and COUNTY shall proportionately share the permit application fees for any transferred cases. The COUNTY shall transfer a proportionate share of the application fee collected to the CITY, commensurate with the amount of work left to be completed on the permit. The City may also request transfer for permit responsibility upon receipt of a written request by the permit applicant.

6. RECORDS TRANSFER

6.1 Transfer or copying of records. The City Clerk or designee, at his or her discretion, shall either take custody of or copy relevant COUNTY records prior to and following annexation. COUNTY records to be transferred or copied will include, but are not limited to, records from The Departments of Public Works and Planning and Development Services, including all permit records and files, inspections reports and approved plans, approved zoning files, code enforcement files, fire inspection records, easements, plats, data bases for land use, drainage, street lights, streets, regulatory and animal license records, and any available data on the location, size and condition of utilities, and other items identified during the transfer process. Transfer of COUNTY records will be subject to an interlocal agreement between the CITY and the COUNTY relating to records retention and standards.

6.2 Costs. The CITY will reimburse the COUNTY for the costs of any COUNTY materials necessary for duplication or transfer, including microfilming. The CITY may arrange for off-site duplication of records under appropriate safeguards for the protections of records as approved by the COUNTY.

6.3 Custody and documentation. The transfer of any original COUNTY records to the permanent custody of the City Clerk will be fully documented by itemized receipts signed by both the original County custodian of the records and the City Clerk. The CITY agrees to maintain these records as any other CITY records of the same type in accordance with all legal records management requirements.

7. ROADS

7.1 Ownership and Maintenance. Except for noncontiguous municipal purpose annexations, the CITY will propose annexation of the entire right-of-way of COUNTY roads adjacent to an annexation boundary and will assume full ownership and maintenance responsibility for those roads upon the effective date of annexation.

7.2 Uncommitted proportionate share mitigation payments. The COUNTY collects proportionate share mitigation payments (impact fees and road related State Environmental Policy Act (SEPA) capacity mitigation payments) as a condition of land development permit approval pursuant to SCC Title 26B. Proportionate share mitigation payments collected by the COUNTY from developments within an annexation area shall be transferred to the CITY subject to the following criteria:

a) Transfers shall include payments collected by the COUNTY in accordance with the formula identified below and payment obligations imposed by the COUNTY but not yet paid,

b) Transfers shall only include payments that have been collected within the four year period prior to the annexation date to ensure compliance with the expenditure time limitations of RCW 82.02.020 and RCW 82.02.070,

c) Transfers shall not include payments expended or budgeted by the COUNTY as of the effective date of an annexation, and
d) Transfers shall occur within ninety (90) days following either the effective date of an annexation or the date of payment receipt, whichever occurs later.

The COUNTY shall provide documentation to the CITY of such mitigation funds by defining the time periods and conditions for expenditure of the funds under the requirements of RCW 82.02.020 and RCW 82.02.070, and will assist the CITY in auditing mitigation payment records. The CITY acknowledges that mitigation funds must be spent or refunded in accordance with state law. The CITY shall assume all responsibility and liability for reimbursement of any mitigation amounts transferred to the CITY, with any required interest, if the funds are not expended or encumbered within the time required by law. The amount of such mitigation funds transferred shall be determined at the time of annexation by the following formula:

$RA = (EC1 \div EC2) \times MP$, where:

RA = The amount of mitigation funds to be transferred to the CITY,
EC1 = Estimated Costs of Improvements to Annexed Roads in the Impact Fee Cost Basis,
EC2 = Estimated Costs of Improvements to All Roads in the Impact Fee Cost Basis for Transportation Service Area A, and
MP = The Total of Uncommitted Capacity Mitigation Payments Collected from developments within the annexation area within Transportation Service Area A within the Past 4 Years

Estimated Costs will be based on amounts contained in the Snohomish County Transportation Needs Report and its technical appendices, as now existing or hereafter amended, which determine the impact fee cost basis for proportionate share mitigation payments made pursuant to COUNTY code.

7.3 Reciprocal impact mitigation. The CITY and COUNTY agree to mutually enforce each others traffic mitigation ordinances and policies to address multi-jurisdictional impacts under the terms and conditions as provided for in the "Interlocal Agreement Between Snohomish County and the City of Marysville on Reciprocal Mitigation of Transportation Impacts" will be adopted at or near the time of this AGREEMENT.

7.4 Recovery of historical capital expenditures. The CITY recognizes the potential need to reimburse the COUNTY for the depreciated value of the construction and property acquisition costs of some capital road expenditures made in the five year period preceding the effective date of this agreement on roads annexed into the CITY during the five year period following the effective date of this agreement. These projects and a schedule of potential reimbursements by calendar year are shown in Exhibit 4. After the effective date of this agreement, as a part of the process of addendum for each annexation described in section 3.2 above, the CITY and COUNTY will review the projects in Exhibit 4 to determine if any may be included in the proposed annexation area. If so, the CITY and COUNTY will meet to decide what recovery compensation, if any, the CITY will pay to the COUNTY for those projects on the effective date of the annexation. Actual reimbursement amounts shall be negotiated between the CITY and the COUNTY at the time of annexation. The agreement shall be included as part of the annexation related addendum as provided in Section 3.2. Actual reimbursement amounts and appropriate repayment schedules shall be negotiated between the CITY and the COUNTY at the time of annexation. The parties recognize that the potential reimbursement amounts are not mandated by the terms of this agreement and should be considered at the time of a specific annexation along with any other factors relevant to adjustment of a reimbursement amount, if any.

7.5 Consultation on capital expenditures for active and future projects. The COUNTY agrees to consult with the CITY in planning for all new capital road construction projects within the MUGA. The COUNTY and the CITY agree to begin consultation within sixty days of approval of this agreement regarding existing active COUNTY projects. At the time of consultation, the parties will discuss the need for shared responsibilities in implementing a project, including the potential for indebtedness by bonding or loans. Any agreements related to shared responsibilities for road projects within the MUGA shall be by separate interlocal agreement for the specific capital road construction projects.

8. SURFACE WATER MANAGEMENT

8.1 Fees. The COUNTY collects fees for unincorporated areas that lie within County designated Watershed Management Areas (WMAs). Watershed management fees are collected at the beginning of each year through real property tax assessments. These fees are to be used within the year in which they were collected. Upon the effective date of an annexation which occurs within a County WMA, the CITY hereby agrees that the COUNTY will continue to apply the fees collected pursuant to Chapter 25.20 SCC in providing watershed management services and programmed improvements and maintenance through the end of the year in which an annexation became effective. These services shall be the same as those provided to other fee payers in the County, including drainage complaint response.

8.2 Maintenance and Ownership responsibilities. If an annexed area includes drainage improvements or facilities the COUNTY currently owns or maintains, the CITY and COUNTY shall agree to the disposition of maintenance and ownership responsibilities by the end of the year in which the annexation becomes effective. Exhibit 5 lists those facilities identified at this time. The responsibilities resulting from such discussions shall be included as part of an annexation- related addendum as provided in section 3.2 of this agreement.

If the COUNTY's current Annual Construction Program includes major drainage improvements in the area to be annexed, the CITY and COUNTY shall agree how funding, construction, and subsequent operational responsibilities will be assigned for these improvements, taking into account the total WMA and source of funds, and historical improvement expenditures within the WMA and area to be annexed.

8.3 Improvement responsibilities. The revenues for any surface water management activity which were collected by the COUNTY from within the territory to be annexed to the CITY shall be completely expended as part of any surface water management activity for which the revenues were designated in that year.

8.4 Local and Regional Services. The CITY and COUNTY recognize that watershed management planning is ongoing and that all needed surface water improvements and solutions have not been identified. The CITY and COUNTY intend to work towards one or more interlocal agreements for joint watershed management planning, capital construction and other related services. The CITY and COUNTY also agree to address regional service issues as a part of the interlocal agreement. By June 15, 2000 the COUNTY and CITY agree to have developed a framework for one or more interlocals to provide for storm and surface water services in the Urban Growth Area as annexations occur.

9. PARK, OPEN SPACE AND RECREATIONAL FACILITIES

9.1 Ownership and maintenance. If an annexed area includes park, open space or recreational facilities listed as a local or community park, the CITY shall assume maintenance, operation and ownership responsibilities for this facility upon the effective date of the annexation unless, prior to the annexation, the COUNTY declares its intention to retain ownership of the park. The COUNTY, in consultation with the CITY, will make this decision based on the following criteria:

a) The park has a special historic, environmental, or cultural value associated with the Snohomish County Department of Parks and Recreation and to the citizens of Snohomish County;
b) There are efficiencies with the COUNTY's operation and/or maintenance of the park property;
c) The COUNTY has made a substantial capital investment in the park property including the purchase of the property, the development of the park, and the construction of facilities;
d) There are specialized stewardship or maintenance issues associated with the park that the COUNTY is best equipped to address;
e) The property generates revenue that is part of the larger park operation budget; and
f) The facility serves as a regional park and would be better included in the COUNTY'S regional network.

Any agreed partnership or division of responsibility shall be documented in an amendment to this interlocal agreement within the forty-five (45) day review period following the CITY's NOI to the BRB, as described in section 3.2 above.

9.2 Uncommitted park mitigation payments. Funds for park mitigation payments and park or open space related SEPA mitigation payments received by the COUNTY as a condition of land development permit approval pursuant to SCC Title 26A collected by the COUNTY from property within the annexation area which, as of the effective date of an annexation, are committed to local or community parks or unbudgeted, will be transferred to the CITY.

9.3 Calculation of fund amounts. The amount of park mitigation funds transferred shall be equal to those funds collected in the annexation area, minus those funds committed to regional parks. The COUNTY will provide to the CITY documentation of such mitigation funds by defining the time periods for expenditure of the funds under RCW 82.02.020 and will assist the CITY in auditing mitigation payment records.

9.4 Joint planning for parks, recreation and open space. The CITY and COUNTY shall, upon the effective date of this Agreement, establish an interlocal agreement for parks, open space and recreational facilities. This agreement shall be based upon the CITY and COUNTY's efforts to provide parks, recreational and open space within the MUGA and surrounding area. This agreement shall establish the nature and type of facilities the jurisdictions have planned or anticipate for the area, identify ways to jointly provide these services and identify transition of ownership and maintenance responsibilities as annexations occur. This effort will result in a mutual ongoing planning effort, joint capital improvement plans and reciprocal impact mitigation.

10. POLICE SERVICES

10.1 Transfer of police services. As necessary, the CITY and COUNTY shall discuss the needs for contracting or transfer of police services within the annexed areas and unincorporated UGA. Agreements between the CITY and COUNTY shall be consistent with RCW 41.14.250 through 41.14.280 and RCW 35.13.360 through 35.13.400. The County Sheriff's Department, upon request by the CITY, shall provide detailed service and cost information for the area to be annexed.

10.2 Form of agreement. Any agreements on transfer of police services will be documented as part of an annexation- related amendment to this interlocal agreement.

11. ANNEXATION SUPPORT

When the COUNTY finds that a proposed annexation is consistent with this Agreement, the County legislative authority will not oppose the annexation, and will send a letter to the Boundary Review Board in support of annexations within the MUGA that are processed during the term of this agreement.

12. DISPUTE RESOLUTION

The CITY and COUNTY mutually agree to use a formal dispute process such as mediation, through an agreed upon mediator and process, if agreement cannot be reached regarding interpretation or implementation of any provision of this agreement. The CITY and COUNTY agree to mediate any disputes regarding the annexation process or responsibilities of the parties prior to any Boundary Review Board hearing on a proposed annexation. The parties shall use the mediation process in good faith to attempt to come to agreement early in the annexation process, and prior to any hearings which may be required before the Boundary Review Board.

13. RELATIONSHIP TO EXISTING LAWS AND STATUTES

This AGREEMENT in no way modifies or supersedes existing laws and statutes. In meeting the commitments encompassed in this AGREEMENT, all parties shall comply with the requirements of the Open Meetings Act, Growth Management Act, State Environmental Policy Act, Annexation Statutes and all other applicable federal, state or local law. The ultimate authority for land use and development decisions is retained by the COUNTY and CITY within their respective jurisdictions. By executing this AGREEMENT, the COUNTY and CITY do not purport to abrogate the decision- making responsibility vested in them by law.

14. EFFECTIVE DATE, DURATION AND TERMINATION

14.1 This AGREEMENT shall become effective following the approval of the AGREEMENT by the official action of the governing bodies of each of the parties hereto and the signing of the AGREEMENT by the duly authorized representative of each of the parties hereto.

14.2 Each party may terminate its obligations under this AGREEMENT upon thirty (30) days advance written notice to the other party. Any amendments and termination shall be in writing and executed in the same manner as provided by law for the execution of this AGREEMENT.

15. INDEMNIFICATION AND LIABILITY

15.1 The CITY shall protect, save harmless, indemnify, and defend, at its own expense, the COUNTY, its elected and appointed officials, officers, employees and agents, from any loss or claim for damages of any nature whatsoever, arising out of the CITY'S performance of this AGREEMENT, including claims by the CITY'S employees or third parties, except for those damages solely caused by the negligence or willful misconduct of the COUNTY, its elected and appointed officials, officers, employees or agents.

15.2 The COUNTY shall protect, save harmless, indemnify, and defend, at its own expense the CITY, its elected and appointed officials, officers, employees and agents from any loss or claim for damages of any nature whatsoever, arising out of the COUNTY'S performance of this AGREEMENT, including claims by the COUNTY'S employees or third parties, except for those damages solely caused by the negligence or willful misconduct of the CITY, its elected and appointed officials, officers, employees or agents.

15.3 In the event of liability for damages of any nature whatsoever arising out of the performance of this AGREEMENT by the CITY and the COUNTY, including claims by the CITY'S or the COUNTY'S own officers, officials, employees, agents, volunteers, or third parties, caused by or resulting from the concurrent negligence of the COUNTY and the CITY, their officers, officials, employees and volunteers, each party's liability hereunder shall only be to the extent of that party's negligence.

15.4 No liability shall be attached to the CITY or the COUNTY by reason of entering into this AGREEMENT except as expressly provided herein. The CITY shall hold the COUNTY harmless and defend at its expense any legal challenges to the CITY'S requested mitigation and/or any failure by the CITY to comply with RCW 82.02.020 or RCW 82.02.070.

16. SEVERABILITY

Should any clause, phrase, sentence or paragraph of this AGREEMENT or its application be declared invalid or void by a court of competent jurisdiction, the remaining provisions of this AGREEMENT not so declared shall remain in full force and effect.

17. EXERCISE OF RIGHTS OR REMEDIES

Failure of either party to exercise any rights or remedies under this AGREEMENT shall not be a waiver of any obligation by either party and shall not prevent either party from pursuing that right at any future time.

18. RECORDS

Both parties shall maintain adequate record to document obligations performed under this Agreement. Both parties shall have the right to review the other party's records with regard to the subject matter of this AGREEMENT, upon reasonable notice. Such rights last for six(6) years from the date of permit issuance for each specific development subject to this Agreement.

19. ENTIRE AGREEMENT

This AGREEMENT constitutes the entire agreement between the parties with respect to the framework issues for annexations. It is anticipated that the parties will enter into further interlocal agreements on specific subject areas, as indicated in the text of the agreement.

20. GOVERNING LAW AND STIPULATION OF VENUE

This AGREEMENT shall be governed by the laws of the State of Washington. any action hereunder must be brought in the Superior court of Washington for Snohomish County.

21. CONTACTS FOR AGREEMENT

The contact persons for this AGREEMENT are:

Gloria Hirashima
Planning Director
City of Marysville
80 Columbia Avenue
Marysville, WA 98270
(360) 651-5100

Denny Derickson
Snohomish County
Department of Planning and Development Services
3000 Rockefeller Ave.
Everett, WA 98201
(425) 388-3311

IN WITNESS WHEREOF, the parties have signed this AGREEMENT, effective on the later date indicated below.

Dated this ______ day of ______________ 19___.

CITY OF MARYSVILLE
BY:

____
David Weiser
Mayor

Date: ______________________

ATTEST:

____
Mary Swenson
City Clerk

Approved as to form:
Office of the City Attorney

Grant K. Weed
Grant Weed
Attorney for the City of Marysville

SNOHOMISH COUNTY
BY:

Gary Weikel
for Robert J. Drewel
County Executive

GARY WEIKEL
Executive Director

Date: June 30, 1999 D-17

ATTEST:

Sheila McCallister
Clerk of the County Council, Asst.

Approved as to form:
Snohomish County Prosecutor

Barbara J. Dykes 6/30/99
Barbara J. Dykes
Deputy Prosecuting Attorney for Snohomish County

MEMORANDUM OF AGREEMENT
BETWEEN
THE CITY OF MARYSVILLE
AND THE TULALIP TRIBES OF WASHINGTON

RECITALS

A. The Tulalip Tribes of Washington ("Tribes"), and the City of Marysville ("City"), deem it to be in their mutual interests to cooperate to the greatest extent possible in the development of each party's system of sanitary sewer and water utilities.

B. The City and Tribes developed, adopted and executed a Memorandum of Understanding (MOU) on 14 December 1998, which is attached hereto as Exhibit A. The MOU provides substance and preliminary processes for implementation of both parties' intent with regard to public utilities.

C. Within the above referenced MOU the parties approved the following Recital: "The Tribes and City jointly agree to develop a (MOA) which shall specifically address the provision of a sanitary sewer from 50,000 to potentially 150,000 gallons/day average daily flow to serve a portion of the Tulalip Business Park. The parties recognize that the agreed upon sanitary sewer daily flow will be obtained (peak flows) from interim unused capacity. The City and Tribes herewith direct respective staffs to provide each party with a detailed implementation plan for said provision of sanitary sewer within thirty (30) days of execution by both parties to the MOU. The implementation plan shall, at a minimum, address the overall costs, timing, engineering, and other relevant technical data."

D. The implementation plan proposes the following government-to-government level of understanding(s), and specific activities to allow for the incremental provision by the City of sanitary sewer of 50,000 gpd average daily flow and 150 gpm pgpm to the Tribes point of connection (90th Street and 35th Avenue).

E. Both parties intend that, as developed and adopted, this agreement reflects the parties' commitment to a continued participatory government-to-government relationship.

1. Policy Issue:

a. Clarification by the City through Washington State Department of Ecology whether the provision of sanitary sewer services resulting from the Tribal Government outside the established Service Area (from the SE quadrant of the Business Park) requires amendment/clarification in the City's General Sewer Plan. If such amendment/clarification is required, then the specification of the process and time schedule involved in obtaining necessary approvals shall be considered in the implementation of this agreement.

2. Engineering Issues:

a. The Tribes shall fund all required surveys, engineering, permitting, and environmental analysis for the design and construction of a sanitary sewer system and gravity service line originating in the SE quadrant of the Business Park and the subsurface pressure connector line terminating in the City at the point of connection (approximately the intersection of 90th Street/35th Avenue location).

b. The City shall provide the Tribes with required engineering detail for City wastewater facilities including conveyance systems, and recorded City right-of-way documentation and maps, sufficient to permit connection to the City's wastewater conveyance system which is located at the 90th Street/35th Avenue location. It is understood and agreed upon that upon receipt of proper application, any City right-of-way or easement required by the City or for the extension of the sanitary pressure connector line from the Business Park terminating at the City's facilities shall be granted and the same recorded with the applicable governmental agency.

c. The City shall provide the Tribes with construction plan review including the connection details, and provide written comments and requirements on the same. The Tribes shall adhere to all current City engineering and construction standards for work within the City right-of-way.

d. The Tribes and City shall cooperate to the fullest extent in the expedited review of civil engineering plans, specifications, and materials for the sanitary sewer interconnect and the timely processing and approval of any required permits for the same.

e. The Tribes sanitary sewer line and conveyance system design shall include a metering station and sampling port. The metering station and/or sampling port will be either located at the Tribes proposed pump station or within City of Marysville right-of-way.

3. Cost:

a. The Tribes agree to provide the required finances for development, construction, and operation of the sanitary sewer line originating in the Business Park and terminating in the City at the 90th Street/35th Avenue location. It is further understood and agreed upon that the portion of the sanitary line outside of the Reservation Exterior Boundaries required to complete connection to the City's system, from the east edge of Interstate 5 right-of-way to the connection point to the City of Marysville's existing sanitary sewer gravity collection system, shall, upon construction and acceptance, be conveyed by Bill of Sale to the City at no cost.

b. The Tribes agree to pay the City initially based upon a monthly service fee for sanitary services based upon wastewater flow, and wastewater strength. The monthly service fee shall be indexed to the City's Urban Growth Area (UGA) rate, classification 3. This classification allows the Tribes to discharge wastewater with an average organic strength ranging between 201-300 BOD5. The City will sample the wastewater strength a minimum of every 6 months to determine if adjustments in the Tribes classification is needed. Changes in the Tribes UGA Classification, if any, shall be made annually after notification to the Tribes. The Tribes has the option of performing independent BOD5 tests to confirm wastewater strength.

c. The Tribes agree to pay the City for all required engineering, reviews, and project inspection fees. The current MMC, Chapter 14.07.070 is attached as Exhibit B.

4. Construction:

a. The Tribes agree, for the purpose of furthering this MOA, to allow the City to review and observe the construction progress inside/outside the Reservation boundaries to assure compliance to agreed upon contract documents. The Tribes shall reimburse the City for required observation and associated fees. See Exhibit B.

b. The City shall issue a letter of acceptance once all improvements have been installed in accordance with the approved contract documents. Upon City receipt of all appropriate fees and charges, and issuance of said letter of acceptance, the Tribes shall receive written authorization to commence discharge of sanitary waste flow to the City system.

5. Operations & Maintenance:

a. The Tribes shall operate and maintain the wastewater conveyance system to the City of Marysville collection line/system. The City of Marysville shall operate and maintain the meter and sampling station, if located east of Interstate 5. The Tribes may opt to locate the metering and sampling station at the Tribes proposed pump station. If located within the Reservation boundary line the Tribes shall be responsible for system maintenance, shall install an external meter reading device, and shall allow the City access at all reasonable times to the meter and sampling station.

b. The City shall review the actual, versus projected, wastewater flow and strength throughout each calendar year. When the Tribes wastewater discharges reach approximately 85% of the capacity listed in 7a and 7b. Tribes shall notify the City and take all measures to assure the maximum allowable flow is not exceeded.

c. Individual sanitary sewer connections discharging to the Tribes wastewater system shall meet pretreatment standards, attached hereto as Exhibit B, as they now read or are hereafter amended. Failure of system users to comply with the pre-treatment standards may result in increased service charges or a moratorium on further connections.

d. It is anticipated that wastewater strength will have a monthly average strength between 200-300 mg/l for both total suspended solid's TSS and biological oxygen demand BOD. Variations in wastewater strength outside these parameters shall be the subject to adjusted monthly service fees in accordance with the City of Marysville UGA classification rate structure. Volume from the Tribes proposed pump station shall not exceed a peak hour volume of 150 gallons per minute (G.P.M.).

6. User Fee Basis/Structure:

a. The Tribes and City in executing the prior MOU dated 14 December 1998, have discussed and reached agreement that the interconnection for sanitary sewer purposes originating in the Business Park between the Tribes and City, shall involve a connection fee, and user fee based upon a (rural) UGA fee structure, current city fees are attached herewith as Exhibit C, MMC 14.07.005.

The Tribes agree to pay to the City a pump station recovery fee of $161,550 as a reimbursement to the City for a portion of the cost of designing and constructing the 88th Street N.E. Pump Station. The pump station recovery fee amount is based upon $1,077/gallon per minute (peak hour) of capacity reserved for the Tribes in the 88th Street N.E. Pump Station.

b. The City shall notify the Tribes a minimum of 60 calendar days prior to implementing UGA rate modifications and/or increases. Modification and/or increases consist of adjustments to the City's UGA rates or the Tribe's UGA classification. The tribes agree to pay said adjusted rates as they are adopted.

c. The Tribes shall pay to the City a sewer Capital Improvement Charge as connections occur within the Tulalip Business Park. The fees shall be paid prior to any flow entering the Tulalip collection system. The amount of the fee shall be determined from the City's established then current fee schedule at the time of each connection. A current schedule of fees is attached herewith as Exhibit D, MMC 14.07.010

7. Capacity Issues:

a. The Tribes are purchasing an initial capacity of 150 gallons per minute of the 88th Street N.E. Pump Station.

b. At the current time, additional unassigned capacity is available in the 88th Street Pump Station, the collection system, and the City's Wastewater Treatment Plant. The City is reserving for the Tribe an initial capacity in the 88th Street N.E. Pumping Station and the collection system west of State Avenue. The City does not guarantee to the Tribes that additional capacity will be available in the future. Sewer availability of 50,000 g.p.d. in the City's collection system and Wastewater Treatment Plant is contingent upon payment of CIP fees and issuance of building permits.

8. Entire Agreement:

This MOA, and the enabling MOU executed on 14 December 1998, express the entire understanding of the parties and replaces any and all former agreements, understanding, or representations relating in any way to the subject of it. The parties expressly waive any other or further representations, warranties, or agreements not set forth in the enabling MOU and this MOA.

9. Modifications and Amendments:

This MOA shall not be amended or modified except by written agreement signed by all parties to this MOA.

10. Severability:

Each section, part, term and provision of this MOA shall be considered severable. If, for any reason, any section, part, term, or provision of this MOA is determined to be invalid and contrary to, or in conflict with, and existing or future law or regulation of a court or agency having valid jurisdiction, such determination shall not impair the operation or effect the remaining portions, sections, parts, terms, or provisions of the MOA, and the latter will continue to be given full force and effect and bind the parties. The invalid section, part, term, or provision shall be deemed not to be part of this MOA.

11. Enforcement of Payment:

The period of billing for sanitary sewer service provided by the City under this agreement shall be on regular monthly intervals.

The "Master Meter" shall be read and recorded near the last normal workday of the month in which the service was furnished. Billing to the TRIBES will be made by the 10^{th} day of the month following, and payment to the CITY becomes due by the 30^{th} day of the month in which the statement is received. If any payment or portion thereof due to the CITY shall remain unpaid for 15 days following its due date, the TRIBES shall be charged with and pay to the CITY interest on the amount unpaid from its due date until paid at the rate of 12% per annum. In the event the CITY is required to collect any delinquent fees, rates, costs, or billings which become past due, both parties stipulate and consent to both venue and jurisdiction of the Snohomish County Superior Court. The substantially prevailing party in such action shall be entitled to its cost and reasonable attorney fees from the other.

12. Dispute Resolution:

The parties desire to avoid and settle without litigation future disputes which may arise between them relative to this agreement. Accordingly, the parties agree to engage in good faith negotiations to resolve any such dispute. In the event of any dispute arising out of this agreement, the parties agree to submit the dispute to non-binding mediation and subsequently, binding arbitration under the then prevailing rules of the American Arbitration Association (AAA) for construction industry disputes, provided that no party objects to arbitration within 30 days after a demand for arbitration is filed with AAA. In the event a party objects to arbitration, the parties each consent to the jurisdiction of Snohomish County Superior Court for resolution of the dispute. In any action brought for such dispute, whether through AAA or in Superior Court, the prevailing party shall be entitled to recover its reasonable costs and attorney fees.

13. Moratorium:

In the event a moratorium on connections or additional loading to the City's WWTP is declared or imposed, as a result of regulatory action, lawful third party actions or lawsuits, or violation of any permit or standard that governs the operation by the City's WWTP, the City reserves the exclusive right to limit, restrict, or disallow additional connections to the Tribes sanitary sewer system on the same basis as all other non-City customers.

The effective date of this Memorandum of Agreement is the 12th day of April 1999.

Stanley G. Jones, Sr. Chairman
The Tulalip Tribes of Washington

4-12-99
Date

David A. Weiser, Mayor
City of Marysville

4/12/99
Date

MEMORANDUM OF UNDERSTANDING
BETWEEN
TULALIP TRIBES OF WASHINGTON
AND CITY OF MARYSVILLE

RECITALS

A. The Tulalip Tribes of Washington ("Tribes") and the City of Marysville ("City") deem it to be in both parties' best interests to cooperate to the greatest extent possible in the development of each party's system of sanitary sewer and water utilities.

B. The Tribes wish to continue to develop and maintain its system of sanitary sewer and water infrastructure within the Tulalip Reservation exterior boundaries, including an area west of I-5 consistent with its comprehensive water and sanitary sewer utility plans, and other Tribal ordinances.

C. The City wishes to continue to develop and maintain its system of water, sanitary sewer and wastewater treatment facilities consistent with its long-range utility plans as set forth in its sewer and water comprehensive plans, and other City ordinances and policies.

D. The City and Tribes commit to a partnership with the potential of developing a solution for the provision of public water and sanitary sewer in the near term, as well as meeting the needs of the regional community into the 21st Century. To this end, the Tribes and City agree to jointly pursue planning, and feasibility analysis; and to seek financial assistance with the U.S. Department of Interior, Bureau of Reclamation, and other appropriate governmental agencies.

E. The Tribes and City jointly agree to develop and implement an (MOA) which shall specifically address the provision of sanitary sewer from 50,000 to potentially 150,000 gallons/day to serve a portion of the Tulalip Business Park. The parties recognize that the agreed upon sanitary sewer daily flow will be obtained from interim unused capacity. The City and Tribes herewith direct respective staffs to provide each party with a detailed implementation plan for said provision of sanitary sewer within thirty (30) days of execution by both parties to this MOU. The implementation plan shall address at a minimum, the overall costs, timing, engineering, and other relevant technical data.

F. Based upon the above, the parties agree to jointly prepare a scope of services for a long-range Sanitary Sewer Feasibility Study within one hundred and twenty (120) days from execution by both parties to this MOU. Said scope of services will address such issues as:

1. Near and long term sanitary sewer service area and requirements including the Tulalip Business Park.

2. Necessary sanitary sewer conveyance and treatment infrastructure improvements through a minimum 25 year planning horizon.

3. Discharge alternatives.

4. Compliance with applicable wastewater standards and regulations.

5. Such other and further water and sewer utility related issues as the parties deem appropriate.

G. It is recognized that the Sanitary Sewer Feasibility Study is intended to address the near and long term sanitary sewer needs of the Tulalip Tribes, as well as impacts to the City's wastewater treatment facilities and sewage conveyance system. It is further acknowledged that the subject study will not answer all the questions pertaining to each party's future wastewater needs and capabilities. It is therefore agreed that neither party shall be bound by the findings or recommendations contained in the completed Sanitary Sewer Feasibility Study.

The effective date of this Memorandum of Understanding is the 14th day of December, 1998.

Stanley G. Jones Sr — 12-14 98

Stanley G. Jones, Sr., Chairman — Date
The Tulalip Tribes of Washington

David A. Weiser — 12/14/98

David A. Weiser, Mayor — Date
City of Marysville

not. (Ord. 2181 §§ 1, 2, 1998; Ord. 2130 § 1, 1997; Ord. 2117 §§ 1, 2, 1997; Ord. 2109 § 1, 1996; Ord. 1840 § 1, 1991; Ord. 1809 § 1, 1990; Ord. 1789, 1990; Ord. 1434, 1985).

14.07.070 Sewer rates.

(1) Definitions.

(a) The normal "billing period" shall be a two-month cycle and shall be that period falling between two consecutive water meter read dates. Charges for periods of less than two months shall be prorated; provided, however, the city may, at its discretion, elect to use a monthly billing period for selected accounts. If a monthly billing period is used, the rate shall be one-half that set forth in the bimonthly rate schedule.

(b) "City rates" are those which shall be charged to all properties connected to the sewer system which are located within the city limits of Marysville.

(c) "UGA rates" are those which shall be charged to all properties connected to the sewer system which are located outside of the city limits of Marysville but are within the urban growth area of the city of Marysville or that portion of the city of Arlington urban growth area which Marysville has agreed by interlocal agreement to provide service.

(d) "OUGA rates" are those which shall be charged to all properties connected to the sewer system which are located outside the Marysville city limits and outside area where "UGA rates" apply.

(e) "Single-family residences" shall refer exclusively to detached single-family dwelling units.

(f) "Multiple residential units" shall be defined as attached dwelling units which share a common water meter, including duplexes, townhouses, apartments, and condominiums, and shall be defined as including mobile home parks.

(g) "Commercial/industrial" refers to all nonresidential land uses which are not specifically itemized or defined as being included within other classifications.

(2) Calculation of Commercial/Industrial Sewer Rates. Commercial/industrial sewer rates shall be based upon the quantity of water consumed or used on the premises during the billing period, as determined by the water meter reading and the strength of the discharge as measured by total suspended solids (TSS) and biochemical oxygen demand (BOD); provided, that a property owner may, at his own expense, arrange the plumbing on commercial premises so as to separate water which will be discharged into the sewer system from water which will not be so discharged, and a separate meter shall be installed to measure the amount of actual sewage discharged. In such a case the sewer rate shall be based only on the actual sewer use. The installation of such plumbing and meters must be inspected and approved by the city utility department.

Where a commercial property is connected to sewer service but not to water service, the City Council shall determine the sewer rate to be charged on a case-by-case basis, using an estimated figure for water consumption.

(3) Sewer Rates. Sewer rates are established as follows:

Classification	City Bimonthly Rate	UGA Bimonthly Rate	OUGA Bimonthly Rate
Single-family residences	$40.00 per unit	$48.00 per unit	$80.00 per unit
Multiple residential units	$38.00 per unit	$46.00 per unit	$72.00 per unit
Hotels/motels	$28.00 per unit	$34.00 per unit	$56.00 per unit
Commercial/Industrial (BOD/TSS Range mg/l)			
Class 1 (31 to 100 mg/l) (pretreatment required)	$0.55 per 1000 gal., $40.00 min.	$0.65 per 1000 gal., $48.00 min.	$1.10 per 1000 gal., $80.00 min.
Class 2 (101 to 200 mg/l) (pretreatment required)	$0.80 per 1000 gal., $40.00 min.	$0.95 per 1000 gal., $48.00 min.	$1.60 per 1000 gal., $80.00 min.
Class 3 (201 to 300 mg/l)	$1.00 per 1000 gal., $40.00 min.	$1.20 per 1000 gal., $48.00 min.	$2.00 per 1000 gal., $80.00 min.

Classification	City Bimonthly Rate	UGA Bimonthly Rate	OUGA Bimonthly Rate
Class 4 (301 to 400 mg/l)	$1.40 per 1000 gal., $40.00 min.	$1.70 per 1000 gal., $48.00 min.	$2.80 per 1000 gal., $80.00 min.
Class 5 (401 to 500 mg/l)	$1.70 per 1000 gal., $40.00 min.	$2.05 per 1000 gal., $48.00 min.	$3.40 per 1000 gal., $80.00 min.
Class 6 (501 to 1000 mg/l)	$2.60 per 10.00 gal., $40.00 min.	$3.10 per 1000 gal., $48.00 min.	$5.20 per 1000 gal., $80.00 min.
Overnight camping facilities	$28.00 per unit having individual connections; other connections at $38.00 each	$34.00 per unit having individual connections; other connections at $46.00 each	$56.00 per unit having individual connections; other connections at $72.00 each
Schools (9-month school year)			
Elementary	$1.35 per pupil	$1.35 per pupil	$1.35 per pupil
Junior High	$1.35 per pupil	$1.35 per pupil	$1.35 per pupil
Senior High	$1.55 per pupil	$1.55 per pupil	$1.55 per pupil
Schools (3 months summer vacation)			
Without pool operation	$108.00/2 months	$108.00/2 months	$108.00/2 months
With pool operation	Follow city commercial/ industrial rates	Follow city commercial/ industrial rates	Follow city commercial/ industrial rates

(4) Calculation of Sewer Rates for Mobile Home Parks. The total sewer bill for mobile home parks shall be calculated by applying the rate schedule above to the total number of pads or mobile home sites on the premises which are in a condition ready for occupancy, regardless of whether the same are occupied during the billing period; provided that for the first 24 months after a mobile home park, or a new addition thereto, is opened and connected to city utilities, the sewer bill shall be calculated by applying the rates only to such pads or mobile home sites as are actually occupied by mobile homes during each billing period; provided, however, for mobile home parks whose utility meter with the city was first activated less than three years preceding June 9, 1997, the effective date of Ordinance 2130, and for which billing on all pads or mobile home sites has occurred for less than two years preceding June 9, 1997, such mobile home parks shall be granted an additional 12 months from June 9, 1997, to pay only for such pads or mobile home sites which are actually occupied during each billing period; provided, further, that all fees, charges and rates paid by h mobile home parks to the city under prior pr. .sions of this section and MMC 14.07.060 and 14.07.070 as such sections originally read or as subsequently amended, shall be nonrefundable notwithstanding the provisions of this subsection.

(5) Restaurants, for the purpose of sewer rates, shall be classified as Class 3 strength as described in subsection (3) of this section. Restaurants without approved grease traps, including those restaurants where a variance has been granted eliminating the necessity of a grease trap, shall be surcharged $1.50 per 1,000 gallons. (Ord. 2130 § 2, 1997; Ord. 2117 § 3, 1997; Ord. 2109 § 2, 1996; Ord. 1840 § 2, 1991; Ord. 1809 § 2, 1990; Ord. 1798, 1990; Ord. 1434, 1985)

14.07.080 Reimbursement for oversized water and sewer mains.

In all cases, the city engineer shall determine the size and depth of water and sewer mains connected to the city utility system. The determination shall be consistent with the city's comprehensive plan and the long-range objectives for the water and sewer utility. If a property owner/developer of residential property is required to install a water main with a diameter in excess of eight inches or a sewer main with a diameter in excess of 10 inches, and if the purpose of such oversizing is to provide for future

(2) There shall be a reconnection charge assessed for each reconnection; provided, that the reconnection charge shall be more if the utility department is required to make a special trip for one account. The reconnection charges are set forth in MMC 14.07.005. If a customer insists upon a reconnection after 4:30 p.m. on weekdays, weekends or holidays, the fee for such after-hours reconnection is set forth in MMC 14.07.005.

(3) If service is shut off by reason of an account being delinquent at a single premises more than once within a 12-month period, the shutoff and reconnection charges after the first time during the 12-month period shall be doubled. (Ord. 2106 § 15, 1996; Ord. 1434, 1985).

Chapter 14.07

FEES, CHARGES AND REIMBURSEMENTS

Sections:

14.07.005 General fee structure.

The fees for public works development and construction in the city fall into five general categories: (1) subdivision, (2) site development, (3) streets and sidewalks, (4) utilities, and (5) other fees. The public works department is authorized to charge and collect the following fees:

Type of Activity	Fee
1. Subdivision Fees.	
Preliminary engineering plat review	$150.00 + $30.00/hour and/or consultant fee
Final short plat	$100.00 + $30.00/hour and/or consultant fee
Final long plat check fees	$150.00 + $30.00/hour and/or consultant fee
2. Site Development.	
Engineering construction plan review	$300.00 + $30.00/hour and/or consultant fee
Engineering inspection fee	$40.00/hour; $100.00 minimum
Storm sewer inspection fee	$15.00/hour + $0.50/lf
3. Streets and Sidewalks	
Right-of-way permit	$100.00 + $40.00/hour inspection fee
Street closure notice	$60.00
Install/repair street sign	Materials and expenses
Street code variance	$100.00
Application for vacation of streets, roads and alleys	$50.00, plus time and expenses, including without limitation engineering fees, appraisal fees, advertising for public hearings
Vegetation abatement	Cost to abate plus a 10% surcharge (see MMC 12.36.020, 12.36.030)
4. Utilities.	
Storm connection fee	$100.00
Construction water	$1.25/1,000 gallons

Type of Activity	Fee
Hydrant water	$30.00 setup + $1.25/1,000 gallons used
Sanitary sewer extension inspection charge	$500.00 minimum for 500 feet or less + $1.00 per foot over 500 feet
Sanitary sewer installation fee (mainline to right-of-way)	City installed: cost per foot at time and materials
Sanitary sewer installation fee (right-of-way to residence)	$100.00 per connection
Segregations (LID fees)	$100.00, plus actual engineering costs incurred by the city
Disconnection charges:	
Voluntary disconnection of service	$5.00
Involuntary disconnection of service	$10.00; $20.00 if the utility department is required to make a special trip for a single account in an involuntary disconnection situation
Reconnection charges:	
Voluntary reconnection	$5.00
Involuntary reconnection	$10.00; $20.00 if the utility department is required to make a special trip for a single account in an involuntary reconnection situation
Shut-off/turn-on fee after hours (water)	$75.00
Unauthorized connection: water or sewer	$200.00
Variances: water/sewer	$200.00
Water system extension inspection fee	$0.30/foot
Miscellaneous utility relocation (hydrants, meters, blow-offs)	Time and materials
Water use violation	
Commercial	$200.00
Residential	$50.00
Water and/or sanitary sewer plan review	$300.00 + $30.00/hour and/or consultant fee
Water/sewer connection filing fee	$20.00
Water/sewer system design standard specifications manual	$10.00 – $50.00
Account change water meter read	$15.00
Recovery contract	$250.00 minimum of one percent of project + $50.00 collection fee
Emergency locate (after hours)	$100.00

Type of Activity	Fee
5. Other Fees.	
Late payment fees	Five percent of account for first notice; additional five percent of account for second notice
NSF checks	$20.00
Photocopies	See MMC 1.16.070
Blueprint copies	See MMC 1.16.070
Staff time	See MMC 1.16.070
Tape duplication	See MMC 1.16.070
Mailing costs	See MMC 1.16.070

(Ord. 2106 § 2, 1996).

14.07.010 Capital improvement charges.

(1) Capital improvement charges shall be assessed on all new connections to the water and sewer system. They constitute an equity payment by new customers for a portion of the previously existing capital assets of the system. They also constitute a contribution to a long-term capital improvement program for the utility system which includes acquisition of new or larger water sources, construction of water storage and transmission facilities, and construction of sewer trunk lines and sewage treatment facilities. Capital improvement charges shall be paid in full before a new connection shall be approved. All payments shall be deposited in the utility construction fund.

(2) The following capital improvement charges are established:

Type of Connection	City Water	Rural Water	City Sewer	Rural Sewer
Residential living units including multiunit housing, mobile homes and motels	$715 per unit	$930 per unit	$780 per unit	$1,000 per unit
Commercial and industrial units and schools, churches, etc.	$0.64 per sq. ft. of floor space	$0.83 per sq. ft. of floor space	$0.71 per sq. ft. of floor space	$0.90 per sq. ft. of floor space

(3) "Floor space" is defined as the net square footage measured from the interior walls, including interior partitions.

(4) The capital improvement charges for sewer connections shall be reduced by $50.00 per unit or $0.045 per square foot when the affected property participated in a utility local improvement for the construction of the sewer main.

(5) Capital improvement charges for sewer connections to commercial and industrial units shall be reduced by 50 percent for any floor space in the premises which is committed to being used as warehouse space for storage purposes only.

(6) If the use of any premises connected to city utilities is converted from a residential occupancy to a commercial or industrial occupancy (as defined in subsection (2) of this section), or from a warehouse use to an active commercial or industrial use, the owner of the premises shall immediately report such conversion to the city and shall pay the extra capital improvement charge which is then required for such an occupancy. Failure to report such a conversion, and pay the extra charge, within 90 days of the new occupancy shall result in the extra charge being doubled as a penalty.

(7) The capital improvement charge for utility connections in recreational vehicle parks shall be calculated as follows:

(a) For each connection to a recreational vehicle pad, the charge shall be 50 percent of the charge provided in subsection (2) of this section relating to residential living units.

(b) For every other connection in a recreational vehicle park, the charge shall be the same as provided in subsection (2) of this section for residential living units.

(8) If a building with a lawful water and/or sewer connection to the city utility system is demolished and replaced with a new building requiring utility connections, the capital improvement charges assessed for the new connections shall be discounted by the amount which would have been paid, under current schedules, for the connections which previously served the demolished building. (Ord. 1841 § 1, 1991; Ord. 1509, 1986; Ord. 1496, 1986; Ord. 1492 §§ 1, 2, 1986; Ord. 1480, 1986; Ord. 1434, 1985).

14.07.020 Utility main charge.

(1) A utility main charge shall be assessed to all new connections which utilize water or sewer mains already existing across the frontage of the property being served. The charges constitute payment to the city for the actual costs incurred in originally constructing the main across the frontage of the subject property. Such charges shall not apply when the affected property participated in a utility local improvement district for the construction of a water or sewer main; nor shall such charges be applicable in cases where the main was built and totally paid for by the owner of the subject property or by any private developer who may still be entitled to reimbursement from abutting owners pursuant to a recorded recovery contract (see MMC 14.07.090).

) The utility main charge shall be the actual construction cost of the main in question up to eight inches in size for a water main and up to 10 inches in size for a sewer main. The charge shall be prorated on a front foot basis. For convenience in computing the rates charged for older mains in the city, they are restated as follows:

(a) Water mains constructed prior to October 1, 1967: $2.25 per front foot;

(b) Water mains constructed in 1976 or 1977: $5.50 per front foot;

(c) Sewer mains constructed prior to January 1, 1970: $3.00 per front foot;

(d) Sewer mains constructed in 1976 or 1977: $9.00 per front foot.

The city utility department shall keep a record, open to the public, of the prorated construction cost for all city utility mains.

In cases where the city has participated with a private party or utility local improvement district in constructing a main, only that portion of the total cost actually paid by the city shall be used for calculating the utility main charge.

(3) In addition to the per-front-foot cost reference in subsection (2) of this section, the city may assess a charge for any other water or sewer mains constructed with city funds subsequent to 1976. The public works department shall establish a schedule of fees and a map open to the public at the public works department showing the utility mains which are subject to this charge. The per-front-foot charge for such mains constructed after 1976 shall be administratively calculated by the city engineer; provided the total of all fees charged on a front-foot basis shall not exceed the total original cost of the project, including all construction, engineering, right-of-way and easement acquisition, and administrative fees. (Ord. 2067, 1996; Ord. 1635, 1988; Ord. 1434, 1985).

14.07.030 Sewer and water extensions inspection charge.

Any party extending a public sewer line or water system line shall pay the city an inspection fee. This charge is to pay for the cost of city employees inspecting the installation of the sewer or water line to assure that it complies with city standards. The charges are set forth in MMC 14.07.005, and must be paid prior to any connection being approved. (Ord. 2106 § 16, 1996; Ord. 1434, 1985).

14.07.040 Water service installation fee.

(1) A service installation fee shall be assessed at the time any property is connected to the city's water system. In return for the fee the city shall install the service connection, including the water meter. At the owner's option the service connection

Filing
Agreement

The Tulalip Tribes
Of
Washington
RESOLUTION NO. 95 - 0129

BE IT RESOLVED, By the Board of Directors of the Tulalip Tribes of Washington, an Indian Tribe organized pursuant to the Indian Reorganization Act of June 18, 1934 (25 U.S.C.A. 476), and in accordance with Article VI of its Constitution, and the ByLaws of the Tulalip Tribes of Washington as approved by the Secretary of the Interior; and

WHEREAS, the Joint Operating Agreement (JOA) with he City of Marysville and Snohomish County PUD No. 1 required the City to negotiate a water wheeling contract with the Tribes in order to move water from the Sunny Side terminus of the Marysville/Everett Water Pipeline via the Marysville Water System to the Reservation: and

WHEREAS, Marysville staff/consultants/RUSA Committee and Tulalip Tribes staff/consultants have completed a Water Wheeling Agreement in the form attached hereto; and

WHEREAS, this Water Wheeling Agreement is required in order to deliver potable water to the new Destination Resort and to the 4th Street commercial area.

WHEREAS, NOW THEREFORE, the Board of Directors of the Tulalip Tribes approve the above said contract, and the Chairman of the Board of Directors be and the same is authorized to for and on behalf of the Tulalip Tribes of Washington.

PASSED this 18th day of July 1995 at a Regular meeting of the Board of Directors of the Tulalip Tribes of Washington, with a quorum present by a vote of 6 FOR and 0 AGAINST.

By: Stanley G. Jones Sr.
Stanley G. Jones, Sr., Chairman

ATTEST:
Marie M. Zackuse
Marie M. Zackuse, Secretary

ADDENDUM TO 1995 AGREEMENT
BETWEEN THE CITY OF MARYSVILLE
AND THE TULALIP TRIBES TO WHEEL WATER

This Addendum is hereby entered into by and between the City of Marysville, a municipal corporation of Snohomish County, Washington, hereinafter referred to as the "City," and the Tulalip Tribes of Washington, hereinafter referred to as the "Tribes," as follows:

1. This Addendum is intended to supplement and amend that certain agreement between the parties entitled "1995 Agreement Between City of Marysville and the Tulalip Tribes to Wheel Water" dated September 5, 1995.

2. The purpose of this Addendum is to enable the Tribes to connect to the City's water supply system in order to enable the Tribes to supply water service to certain properties within the Tulalip Tribes reservation due to a documented health issue affecting up to sixteen homes. The area of concern is identified on the map attached hereto as **Exhibit A** and incorporated by this reference. The area depicted on Exhibit A shall be the only area for which the water provided by the City under this Addendum shall be served to customers of the Tribes.

3. For purposes of enabling the Tribes to serve the properties described in Exhibit A, the City shall provide a point of connection at 19th Avenue N.E. and 70th N.E., with an anticipated peak day water demand of 160 gallons per minute. The point of connection shall be equipped with a separate two-inch master meter and check valve which shall be installed by the City at the Tribes' expense. All other expense to make the connection to the Tribes' water system in 19th Avenue N.E. shall also be at the Tribes' expense. All water utilized shall be counted against the peak day water demand of 440 gallons per minute authorized for the Tribes' point of connection at 4th Street and Marine Drive.

4. All water utility infrastructure down stream from the master meter provided at the point of connection shall be the sole responsibility of the Tribes.

5. The Tribes agree to pay for water delivered at the point of connection at the water rate specified in Section VIII of the 1995 Agreement between the City and the Tribes. In light of the relatively small area to be provided water service through the point of connection, there shall not be a storage deficiency demand charge or wheeling charge.

6. Except as otherwise provided in this Addendum, all other provisions of that certain 1995 Agreement between the City of Marysville and the Tulalip Tribes to wheel water shall be applicable to this Addendum. This Addendum shall be attached to said 1995 Agreement and is hereby incorporated therein by this reference.

7. This Addendum shall be in effect until an alternate source of water supply by the Tribes is available, but in no event shall this Addendum extend more than three (3) years from the date set forth below without the written mutual agreement of the parties.

DATED this _____ day of June, 1999.

TULALIP TRIBES

By______________________________
HERMAN WILLIAMS, Chairman

CITY OF MARYSVILLE

By______________________________
DAVID WEISER, Mayor

SEWAGE DISPOSAL AGREEMENT BETWEEN LAKE STEVENS SEWER DISTRICT AND CITY OF MARYSVILLE

THIS AGREEMENT is entered into this 22nd day of April, 1999 by and between the LAKE STEVENS SEWER DISTRICT, a municipal corporation of the State of Washington (the "District"), and the CITY OF MARYSVILLE, a municipal corporation of the State of Washington (the "City"). This agreement is entered into in accordance with Chapter 35.13A RCW and Chapter 57 RCW.

I. RECITALS

A. The District has constructed, owns and operates a sanitary sewage collection system, sewage trunk lines, sewage pump stations, sewage force mains, sewage treatment facilities and sewage outfall line. These facilities provide sanitary sewer service and sewage treatment to areas within the District.

B. The City is in the process of constructing a sewage collection system, sewage trunk lines, sewage pumping stations and sewage force mains to serve the area within its urban growth boundary.

C. There is an area within the City's Urban Growth Boundary and the City and District Comprehensive Sewer Planning Boundaries which shall be referred to as the "overlap" area, within which both the City and the District are capable of providing sanitary sewer service. The overlap area is depicted on **Exhibit A**, which is attached hereto and incorporated by this reference.

D. It is the intent of the parties to this agreement to resolve the dispute relating to the provision of sewer service to the "overlap" area depicted on **Exhibit A** and to provide an equitable formula for dividing the costs of maintaining and operating those portions of the District's system of sewers which benefit both parties.

II. TEMPORARY SEWER CONVEYANCE AND TREATMENT BY DISTRICT

A. The District agrees to provide for the temporary treatment of domestic sewage on behalf of the City of Marysville within that portion of the "overlap" area depicted on **Exhibit A** which is within the City's urban growth boundary. Such service shall continue to be served by the District until such time as the City's own sewage collection system is available to convey such sewage to the City's wastewater treatment plant.

B. For the conveyance and treatment of the City's sewage under this Agreement, the District agrees to bill the City at the same rate per unit as it does other single-family residential sewer customers within the District. The City shall pay the District within thirty (30) days of receipt of its billing. The City shall pay on late payments a penalty of ten percent (10%) of the delinquent amount and, in addition, from the date of delinquency there shall be charged interest at the rate of eight percent (8%) per annum on the delinquency charges and penalty added thereto.

C. The construction or extension of any sewage lines or collection facilities and/or appurtenances shall be in accordance with the development standards of the City.

D. The City shall review all proposals for developer extension of sewer lines within that part of the overlap area which is within the City's urban growth boundary and the District will be provided with a copy of such proposals for courtesy review and comment.

III. CITY OBLIGATIONS

A. The City shall be responsible for billing all sewer utility customers within that part of the overlap area which is within the City's urban growth boundary. The City shall bill said customers in accordance with the sewer rates as established by the City. All customers shall be required to apply for utility service on the contractual forms provided by the City and shall be subject to the rules, policies and regulations for utility service as established pursuant to City ordinance.

B. The City shall operate and maintain that portion of the sewage system that is within the City's urban growth boundary and within the overlap area in accordance with customary engineering standards of practice and in conformity with standards established by the Washington State Department of Ecology, the Washington State Department of Health, the United States Environmental Protection Agency, and other applicable standards.

C. The City agrees to meet, consult and work cooperatively with any property owner or owners who wish to petition for the formation of a ULID for sewer utility service within the overlap area.

D. The City and the District will cooperate to identify a location for a proper connection point that will enable the sewage within the City's urban growth boundary to be collected and transferred to Marysville's collection system at such time as said system is constructed and available for use.

E. Until such time as flows from the City's collection system within the overlap area are diverted from the District, the City shall charge its overlap customers all sewer connection fees as established by City ordinance. Within 30 days of a customer connection to its collection system within the overlap area, the City agrees to remit to the District, per unit capital improvement fees at the applicable rates in then effect by the District. The District agrees to keep the City informed as to current capital improvement fees, provide all copies relating thereto, and a 30-day notification of any District hearing in which changes would be considered.

IV. OTHER AGREEMENTS

A. That area known as the Plat of Ridgewood shall not be subject to this agreement, and the District shall continue to own, maintain and have full authority and jurisdiction over the sewer collection system contained therein.

B. The parties agree to amend their sewer comprehensive plans consistent with the terms of this agreement and shall specifically delete that portion of the City's urban growth boundary that is within the overlap area from the District's comprehensive planning area. In turn, the City shall withdraw its current SEPA appeal as set forth in the letter dated September 17, 1998.

C. In the event of a District-wide or area-wide moratorium affecting the **Exhibit A** area, the District shall not take action that would result in the discontinuance of service to customers within such area. Sewer connections that have been applied for or which are in process shall be honored upon payment of the connection fee. The District agrees to notify the City in writing at such time its wastewater treatment plant or applicable trunkage capacity reaches 85%. In such cases, the City will provide the District with notification of all development requests and/or applications for sewer service so that it may have an opportunity to review, prior to approval.

D. The City and the District each retain their rights to issue bonds and other obligations in accordance with applicable law, but neither party shall act in such a manner as to impair the rights of the holders or owners of bonds issued by the other.

E. The parties agree that any and all claims, disputes, differences and misunderstandings concerning this contract and its interpretation which may arise between the parties shall be determined and settled by binding arbitration. In the event the parties are unable to agree upon an arbitrator, each party shall designate an arbitrator, and the two arbitrators so chosen shall select a third arbitrator. The Rules of Mandatory Arbitration for Snohomish County Superior Court shall control. In the event of arbitration, the decision of the arbitrators shall be final and binding upon the parties. Arbitration expenses shall be shared equally by the parties.

F. This contract shall not be assigned by either party without the written consent of the other.

G. This contact may be mutually amended in writing by the parties.

H. This contract amends and replaces all prior agreements between the parties. It shall be binding upon the parties and upon their successors in interest indefinitely and until such time as the parties by mutual agreement terminate the same.

CITY OF MARYSVILLE

By______________________________
MAYOR

ATTEST:

By______________________________
CITY CLERK

Approved as to form:

By______________________________
CITY ATTORNEY

LAKE STEVENS SEWER DISTRICT

By______________________________
Commissioner

By Jack B Hatlen
Commissioner

By______________________________
Commissioner

Approved as to form:

By______________________________
ATTORNEY FOR THE DISTRICT

1 - Code Publishing
1 - Mun Res
1 - Finance
1 - Public Works

CITY OF MARYSVILLE
Marysville, Washington

ORDINANCE NO. 2284

AN ORDINANCE OF THE CITY OF MARYSVILLE ESTABLISHING A SATELLITE SEWER RATE CLASSIFICATION AND AMENDING MMC 14.07.070.

WHEREAS, the City has entered into an Interlocal Agreement with Lake Stevens Sewer District to provide sanitary sewer service to an identified area that is within the City's Urban Growth Area and/or Sewer Utility Service Area; and

WHEREAS, pursuant to the Interlocal Agreement between the parties, Lake Stevens Sewer District has agreed to bill the City for utility service provided to customers within the City's service area; and

WHEREAS, the City will, in turn, bill said customers for said sewer utility service; and

WHEREAS, the City deems it necessary and appropriate to bill customers in the area served by Lake Stevens Sewer District the same rate as billed by Lake Stevens Sewer District plus an administrative fee to cover the costs of the City billing and collection functions; NOW, THEREFORE,

THE CITY COUNCIL OF THE CITY OF MARYSVILLE, WASHINGTON DO ORDAIN AS FOLLOWS:

Section 1. MMC 14.07.070 is hereby amended to read as follows:

14.07.070 Sewer rates.

(1) Definitions.

(a) The normal "billing period" shall be a two-month cycle and shall be that period falling between two consecutive water meter read dates. Charges for periods of less than two months shall be prorated; provided, however, the city may, at its discretion, elect to use a monthly billing period for selected accounts. If a monthly billing period is used, the rate shall be one-half that set forth in the bimonthly rate schedule.

(b) "City rates" are those which shall be charged to all properties connected to the sewer system which are located within the city limits of Marysville.

(c) "UGA rates" are those which shall be charged to all properties connected to the sewer system which are located outside of the city limits of Marysville but are within the urban growth area of the city of Marysville or that portion of the city of Arlington urban growth area which Marysville has agreed by interlocal agreement to provide service.

(d) "OUGA rates" are those which shall be charged to all properties connected to the sewer system which are located outside the Marysville city limits and outside area where "UGA rates" apply.

(e) "Single-family residences" shall refer exclusively to detached single-family dwelling units.

(f) "Multiple residential units" shall be defined as attached dwelling units which share a common water meter, including duplexes, townhouses, apartments, and condominiums, and shall be defined as including mobile home parks.

(g) "Commercial/industrial" refers to all nonresidential land uses which are not specifically itemized or defined as being included within other classifications.

(h) "Satellite system rate" refers to that rate charged to the city by Lake Stevens Sewer District for the "overlap" area as described in the interlocal agreement between the parties dated April 22, 1999, plus an administrative overhead cost of fifteen percent (15%).

(2) Calculation of Commercial/Industrial Sewer Rates. Commercial/industrial sewer rates shall be based upon the quantity of water consumed or used on the premises during the billing period, as determined by the water meter reading and the strength of the discharge as measured by total suspended solids (TSS) and biochemical oxygen demand (BOD); provided, that a property owner may, at his own expense, arrange the plumbing on commercial premises so as to separate water which will be discharged into the sewer system from water which will not be so discharged, and a separate meter shall be installed to measure the amount of actual sewage discharged. In such a case the sewer rate shall be based only on the

actual sewer use. The installation of such plumbing and meters must be inspected and approved by the city utility department.

Where a commercial property is connected to sewer service but not to water service, the City Council shall determine the sewer rate to be charged on a case-by-case basis, using an estimated figure for water consumption.

(3) Sewer Rates. Sewer rates are established as follows:

(4) Calculation of Sewer Rates for Mobile Home Parks. The total sewer bill for mobile home parks shall be calculated by applying the rate schedule above to the total number of pads or mobile home sites on the premises which are in a condition ready for occupancy, regardless of whether the same are occupied during the billing period; provided that for the first 24 months after a mobile home park, or a new addition thereto, is opened and connected to city utilities, the sewer bill shall be calculated by applying the rates only to such pads or mobile home sites as are actually occupied by mobile homes during each billing period; provided, however, for mobile home parks whose utility meter with the city was first activated less than three years preceding June 9, 1997, the effective date of Ordinance 2130, and for which billing on all pads or mobile home sites has occurred for less than two years preceding June 9, 1997, such mobile home parks shall be granted an additional 12 months from June 9, 1997, to pay only for such pads or mobile home sites which are actually occupied during each billing period; provided, further, that all fees, charges and rates paid by such mobile home parks to the city under prior provisions of this section and MMC 14.07.060 and 14.07.070 as such sections originally read or as subsequently amended, shall be nonrefundable notwithstanding the provisions of this subsection.

(5) Restaurants, for the purpose of sewer rates, shall be classified as Class 3 strength as described in subsection (3) of this section. Restaurants without approved grease traps, including those restaurants where a variance has been granted eliminating the necessity of a grease trap, shall be surcharged $1.50 per 1,000 gallons.

(6) Satellite system rate. Notwithstanding any other rate established by this section, for that area defined as the satellite system area the city shall charge the same rate as charged by Lake Stevens Sewer District plus an administrative fee of fifteen percent (15%). This rate shall be in effect for such properties until such time as the city's sewer collection system is constructed and sewer flows

are diverted from the Lake Stevens Sewer District system to the city's sewer collection system.

PASSED by the City Council and APPROVED by the Mayor this 27th day of September, 1999.

CITY OF MARYSVILLE

By David A. Weiser
DAVID A. WEISER, Mayor

ATTEST:

By Mary Swenson
MARY SWENSON, City Clerk

Approved as to form:

By Grant K. Weed
GRANT K. WEED, City Attorney

Date of Publication: 9/29/99

Effective Date (5 days after publication): 10/4/99

AGREEMENT FOR CONVEYANCE AND DISCHARGE OF TREATED WASTEWATER

BETWEEN

THE CITY OF MARYSVILLE

AND

THE CITY OF EVERETT

This Agreement between the City of Marysville ("Marysville") and the City of Everett ("Everett") is effective as of the date of the last Mayor to sign it.

WHEREAS,

- Marysville is designing, permitting, and constructing effluent conveyance facilities that will deliver treated municipal wastewater ("Effluent") from the Marysville Wastewater Treatment Plant to the Everett Wastewater Treatment Plant.

- Marysville desires to have the ability to pump, convey and discharge of up to 20 million gallons per day (MGD) peak day flow of Effluent in Port Gardner Bay by June 30, 2004, but has not yet decided whether it needs or will use all 20 MGD.

- Everett has previously entered into an agreement with Kimberly-Clark ("K-C") to acquire capacity in a deep-water outfall ("Joint Use Facilities") to be constructed by K-C.

- Everett is designing, permitting and constructing effluent pumping and cross-town conveyance systems ("Municipal Conveyance Facilities") that will deliver Effluent to Joint Use Facilities currently being designed, and constructed by the Kimberly-Clark Corporation (Kimberly-Clark).

- Everett and Kimberly-Clark have successfully acquired all major federal, state, and local permits required for the Joint Use Facilities.

- The definition, construction, and ultimate operation of the Joint Use Facilities are outlined in the *"Port Gardner Bay Outfall Replacement Agreement"* signed by the City of Everett and Kimberly-Clark on June 21, 1999 ("Outfall Replacement Agreement").

- Section 15 of the Outfall Replacement Agreement provides for the assignment of excess capacity in the Joint Use Facilities.

- Marysville wishes to acquire a portion of Everett's capacity in the Joint Use Facilities and Municipal Conveyance Facilities.

NOW, THEREFORE, in consideration of the premises, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby expressly acknowledged, Marysville and Everett agree as follows:

1. Sale of Capacity in Conveyance Facilities and Joint Use Facilities

Everett hereby assigns, sells, and conveys and Marysville hereby purchases capacity of twenty million gallons per day (20 MGD) of the Municipal Conveyance Facilities and ten million gallons per day (10 MGD) of Everett's share of the capacity of the Joint Use Facilities. Exhibit 1 displays the individual components that make up the Municipal Conveyance Facilities and the Joint Use Facilities. Legend items 5, 6, 7, 8 and 9 of Exhibit 1 represent the Municipal Conveyance Facilities and legend items 13 (including associated connection facility), 14 and 15 of Exhibit 1 represent the Joint Use Facilities

2. Term

The term of this Agreement shall be co-extensive with the term of the Outfall Replacement Agreement, including all renewals and extensions thereof.

3. Payment

3.1 *Municipal Conveyance Facilities*

3.1.1 Amount

Marysville shall pay Everett for capacity in the Municipal Conveyance Facilities an amount equal to: (a) thirty-three and three tenths percent (33.3%) of the total costs incurred for design, permitting and construction of the Municipal Conveyance Facilities to be constructed, i.e., items 5, 7, and 9 in Exhibit 1; (b) four hundred ninety-nine thousand five hundred dollars ($499,500.00), which is thirty-three and three tenths percent (33.3%) of the value of the existing facilities consisting of 7,762 ft of 40-inch diameter concrete lined steel pipe (Item 6 in Exhibit 1) and a 36-inch diameter pipe section that crosses the Snohomish River (Item 8 in Exhibit 1), as calculated in Exhibit 2; (c) fifteen percent (15%) of the amounts in (a) and (b); and one third (33%) of any interest costs, including imputed interest, Everett may incur to finance construction of the Municipal Conveyance Facilities. Imputed interest will be calculated based on City of Everett managed investments rate of return for the same period.

3.1.2 Payment for Existing Facilities

Within thirty days of Marysville's final acceptance of the Effluent conveyance facility that will enable delivery of Marysville's Effluent from the Marysville Wastewater Treatment Plant to the Municipal Conveyance facility (hereinafter referred to as "Marysville Conveyance Facility"), Marysville shall purchase capacity in the existing parts of the Municipal Conveyance Facilities by paying Everett the sum of five hundred seventy four thousand four hundred twenty-five dollars ($574,425.00), which amount consists of §3.1.1 (b) plus fifteen percent of such amount.

3.1.3 Payment for New Facilities (SEPS)

As Everett incurs costs of designing, permitting, and constructing the new items of the Municipal Conveyance Facilities, Everett will bill Marysville for thirty-three and three tenths percent (33.3%) of the total costs incurred, plus fifteen percent (15%) of such amount and plus one third (33.3%) of any interest costs, including imputed interest, Everett may incur to finance construction of the Municipal Conveyance Facilities. Imputed interest will be calculated based on City of Everett managed investments rate of return for the same period. Everett shall invoice Marysville no more frequently than monthly. Marysville shall pay Everett within thirty (30) days of receiving invoices.

3.2 Joint Use Facilities

3.2.1 Amount

For its share of capacity in the Joint Use Facilities, Marysville will pay Everett nine and forty-five hundredths percent (9.45%) of the total costs incurred for design, permitting, and construction of the Joint Use Facilities, plus fifteen percent (15%) of such amount.

3.2.2 When Paid

Within thirty days of Marysville's final acceptance of the Marysville Conveyance Facility, Marysville shall pay Everett an amount equal to the sum of : (a) nine and forty-five hundredths percent (9.45%) of the total costs of design, permitting and construction to the date of Final Acceptance of the Marysville Conveyance Facility by Marysville; (b) fifteen percent of (a); and (c) nine and forty-five hundredths percent (9.45%) of any interest costs Everett incurred in financing Marysville's share of the Joint Use Facilities. Thereafter, Everett will bill Marysville no more frequently than monthly for nine and forty-five hundredths percent (9.45%) of the total cost of permitting, design and construction of the Joint Use Facilities, plus fifteen percent of such amount and plus nine and forty-five hundredths percent (9.45%) of any interest costs, including imputed interest, Everett may incur to finance construction of the Municipal Conveyance Facilities. Imputed interest will be calculated based on City of Everett managed investments rate of return for the same period. Marysville shall pay Everett within thirty days of its receipt of each invoice.

3.3 Operations and Maintenance

3.3.1 How Established

The Public Works Directors of Everett and Marysville shall agree upon a schedule of anticipated cost elements, which schedule may be amended from time to time by their mutual agreement. Everett and Marysville expect the major operating expense will be the power consumption of the pump station of the Municipal Conveyance Facility. Maintenance expenses shall include capital investments to improve or replace elements of either the Municipal Conveyance Facilities or the Joint Use Facilities.

3.3.2 When Paid

Commencing sixty days after the date Marysville begins to convey Effluent to Everett, Marysville agrees to make periodic payments to Everett for the operating and maintenance (O&M) costs of the Joint Use Facilities, as determined by Section 12 of the Outfall Agreement, and the Municipal Conveyance Facilities. Marysville's pro rata share of routine O&M operating expenses shall be based on Marysville's use of the Joint Use and Municipal Conveyance Facilities. Marysville's use shall be determined by the average monthly flow for the months for which the O&M costs apply, or, for those O&M costs determined on an annual basis, the average flow for the preceding year. However, capital expenditures or one-time payments for substantial O&M expenses approved in an Annual O&M Budget may be charged on the basis of Marysville's pro rata share of capacity in the Joint Use and Municipal Conveyance Facilities.

4. Marysville's Pumping and Conveyancing Systems

Marysville will be responsible for the design, permitting, and construction of all pumping and conveyance systems required to deliver Effluent to the Municipal Conveyance Facilities pump station at the Everett Water Pollution Control Facility.

5. Outfall Replacement Agreement

5.1. The following articles of the Outfall Replacement Agreement are incorporated in this Agreement by reference. Everett and Marysville agree to be bound to each other by such terms and conditions as if both had executed the Outfall Replacement Agreement. If any term, condition or provision of this Agreement conflicts or contradicts any term, provision, or condition of the incorporated sections of the Outfall Replacement Agreement, this term, condition, or provision of this Agreement supercedes or modifies the incorporated term, condition, or provision.

1	Recitals
6	Term
12	Operation and Maintenance
14	Water Reuse
18	Insurance
19	Indemnity
21	Miscellaneous Provisions
22	Definitions

5.2 Marysville hereby irrevocably designates Everett to act as Marysville's representative to the Project Review Team as provided in §7.2 of the Outfall Replacement Agreement. Unless otherwise agreed by Kimberly-Clark and Everett, this designation shall continue for the term of this Agreement. Everett shall, consistent with § 7.5 of the Outfall Replacement Agreement, invite one or more Marysville representatives to participate and attend all conferences, meetings, or other communications of the PRT. All minutes of meetings shall be forwarded to a designated representative of Marysville. Consistent with § 7.6 of the Outfall Replacement Agreement, Everett shall promptly inform Marysville through its PRT lead representative of any formal or informal expression of concerns, correspondence, meetings other communications from a regulatory agency regarding the Joint Use Facilities or the NPDES permit compliance. Everett shall make available any and all records relating to the business of the PRT to Marysville upon request.

5.3 Marysville consents and agrees to Everett's rights pursuant to Article 17 (City Assumption of Control) of the Outfall Replacement Agreement.

6. Authorized Use

Marysville may deliver Effluent originating from within Marysville's utility service area (Exhibit 3) as defined by RCW Chap. 14.32 and successors and Marysville's contractual commitments which were in effect prior to the effective date of this agreement from its wastewater treatment plant to Everett for transmission to the Joint Use Facilities; provided, however, that the amount of such Effluent shall not exceed Marysville's share of the capacity of the Joint Use Facilities without Everett's prior written approval; and provided further that all such existing contractual commitments are disclosed to Everett prior to Everett's execution of this Agreement.

Everett shall accept Effluent delivered for discharge as hereinafter provided subject to such rules and regulations as may be adopted from time to time by Everett that may be reasonably necessary for the safe, efficient, and lawful operation of the Joint Use Facilities and Municipal Conveyance Facilities; provided, however, that Marysville shall be consulted regarding such regulations prior to their adoption or implementation. Marysville shall treat all Effluent prior to delivery to Everett at the connection at the Municipal Conveyance Facility so that all such Effluent meets all environmental requirements existing at the time of such delivery. Marysville shall be solely responsible for obtaining and fulfilling permit requirements imposed on Marysville by any regulatory agency, including, but not limited to, NPDES permit requirements imposed on Marysville by the Washington State Department of Ecology.

7. Local Facilities

7.1. Marysville may connect its sewerage facilities to Everett's facilities to the extent required for the delivery of Effluent to Everett pursuant to this Agreement. The initial point of connection of Marysville's system to Everett's system shall be at the Municipal Conveyance Facilities pump station at the Everett Water Pollution Control Facility. Marysville and Everett may agree to designate additional or alternate points of connection for delivering Marysville's Effluent into the Everett system. Marysville shall install flow meters at its expense at locations, which will most accurately measure the flow of Marysville's Effluent delivered to the Everett system. All connections shall be accomplished at Marysville's sole expense and in a manner mutually agreeable to Everett and Marysville. Everett and Marysville authorize the Directors of Public Works or their successors or designees to draft and agree upon an Operating Agreement to govern Everett and Marysville' duties to each other with regard to operation and maintenance of the Municipal Conveyance Facilities and Marysville connection to it. The Directors of

Public Works of Everett and Marysville may agree to modify such Operating Agreement during the term of this Agreement.

7.2. Marysville shall be solely responsible for the construction, maintenance and operation of its local sewerage facilities, and for the payment of all costs incident to the collection and treatment of such Effluent and its delivery to the Everett system. All sewerage facilities carrying Effluent delivered to Everett shall be constructed and maintained in accordance with American Public Works Association, Washington State Department of Health and Washington State Department of Ecology standards, rules, requirements, and regulations. All such facilities will be operated and maintained by Marysville at no expense or risk to Everett.

8. Dispute Resolution

8.1. Disputes shall be resolved by structured negotiation. If structured negotiation fails to resolve the dispute, the dispute may be resolved by a lawsuit in Snohomish County Superior Court under Washington law and procedure. Any time period stated herein may be modified by mutual agreement of Everett and Marysville.

8.2. Disputes that are not solved at a working level shall be referred to the Directors of Public Works for Everett and Marysville. The Directors may agree to engage outside experts and facilitators to assist resolution of disputes and such expenses shall be deemed part of the Construction Budget or the Annual O&M Budget.

8.3. If the Directors cannot reach agreement within twenty (20) days of receiving a referral, they may either initiate: (a) a ten (10) day cooling off period; and/or (b) voluntary non-binding mediation by a mutually agreed-upon mediator. Everett and Marysville intend that any mediation process or any cooling off period followed by further negotiations be completed within fifty (50) days of the Directors receiving the referral.

8.4. If Everett and Marysville are still unable to resolve the dispute, they may seek judicial review in the Superior Court in Snohomish County under the laws of the state of Washington.

9. Indemnity

As provided in Articles 12 and 19 of the Outfall Replacement Agreement that is incorporated herein by reference, Everett and Marysville are responsible to each other and to Kimberly-Clark for cost of identification and corrective action if either causes the combined discharge to exceed or violate any applicable water quality requirements.

10. Miscellaneous Provisions

10.1. Completion of construction of the Municipal Conveyance Facilities and Joint Use Facilities is a condition subsequent of this Agreement.

10.2. Completion of construction of Marysville's facilities that will enable it to convey Effluent from the Marysville WasteWater Treatment Plant to the Municipal Conveyance Facilities is a condition subsequent of this Agreement.

10.3. If any provision of this Agreement is held to be invalid, such invalidity shall not affect any other provision hereunder; provided, however, the Participants shall negotiate in good faith any amendments to this Agreement necessary to effect the Participants' original intent.

10.4. Everett and Marysville may only amend this Agreement in writing, except the authority given the Project Review Team under the Outfall Replacement Agreement to take certain actions and make certain adjustments (e.g., to the schedule and adoption of the Annual O&M Budget).

10.5. Everett expressly disclaims any and all warranties except those expressly stated herein, including, but not limited to, implied warranties and whether the easement from the Washington Department of Natural Resources can or will be renewed after its expiration. Marysville expressly acknowledges that the only representations upon which it relied, if any, are contained in this written agreement. Everett and Marysville agree this written Agreement contains all of the agreements of Everett and Marysville and there are no oral or other terms, conditions, and provisions that are not stated herein.

10.6. Everett and Marysville agree to execute any documents that are reasonably required to effect the terms of this Agreement and to provide each other such reasonable assistance as may be requested and available to assure the timely and safe operation of the Joint Use Facilities.

10.7. Any notice or other communications required or permitted by this Agreement shall be in writing and shall be deemed properly given when personally delivered to the other party's Director of Public Works or sent by: (a) first class mail, certified or registered postage prepaid, (b) a recognized courier service; or (c) facsimile transmission with a confirmation of receipt followed by first-class mail addressed as follows:

If to Marysville:

The City of Marysville
Director of Public Works
80 Columbia Ave.
Marysville, Washington 98270

If to Everett:

The City of Everett
Attention: Director of Public Works
3200 Cedar Street
Everett, Washington 98201

10.8 Because Everett and Marysville and their counsel negotiated this Agreement and exchanged drafts, no one party was responsible for drafting the Agreement. Therefore, Everett and Marysville agree that the Agreement should not be construed for or against either party.

10.7 This Agreement does not restrict or limit either city's police powers or power of eminent domain.

10.8 This Agreement does not create any enforceable rights in any third parties, or any causes of action by third parties against Everett and Marysville, except as otherwise provided herein.

10.9 Everett hereby consents to the assignment by Kimberly-Clark of 10 MGD of Kimberly-Clark's capacity in the Joint Use Facilities to Marysville, if Marysville should decide to exercise its option to acquire such capacity under the terms of its option agreement with Kimberly-Clark.

10.10 Except as otherwise provided herein, Marysville shall not have the right to assign this Agreement or any of its rights and obligations hereunder either by operation of law or by voluntary agreement without the written consent of Everett (and, if required by the Outfall Replacement Agreement, Kimberly-Clark). This Agreement shall be binding upon and inure to the benefit of the respective successors and assigns of Everett and Marysville hereto.

CITY OF EVERETT

By ______________________________
Edward D. Hansen, Mayor

ATTEST:

____
Sharon Marks, City Clerk

APPROVED AS TO FORM:

____
Mark Soine, City Attorney

CITY OF MARYSVILLE

By ______________________________
David Weiser, Mayor

APPROVED AS TO FORM:

____
Gerry Becker, City Clerk

APPROVED AS TO FORM:

____
Grant K. Weed, City Attorney

Exhibit 1
Project Layout Map

Exhibit 2
Existing Facilities Present Value Calculation

Effluent Transfer Project to the Port Gardner Outfall

Present Value Calculations for Existing Pipelines used for Effluent Transfer

Calculated Value of 36" Snohomish River Crossing:

Current Installed Pipe Costs:

In 1990 **$262,200** was paid for the material and installation of 36" River Crossing. This pipe is CCP w/mortar lining, flanged joints and SS bolts. This pipe has never been used.

The present day construction cost for this line is estimated by inflating the original cost by the Seattle CPI since 1990.

YEAR	Seattle CPI (%)	VALUE
1990		$262,000
1991	5.80	$277,408
1992	3.70	$287,672
1993	2.80	$295,726
1994	3.40	$305,781
1995	3.00	$314,955
1996	3.40	$325,663
1997	3.50	$337,061
1998	2.90	$346,836
1999	3.00	$357,241
2000	3.70	$370,459
2001	3.70 (est.)	$384,166
2002	3.70 (est.)	**$398,380**

Estimated Life of the 36" Pipe:

The estimated life of this pipe is 75 years. Therefore, its remaining life is 65 years or 87% life remaining. Using 87% remaining life, the estimated present value of the 36" Snohomish River crossing is:

$398,380 x (87%) = **$346,590**

Calculated Value of 40" Pipeline on 25th St (7,762 Ft):

Current Installed Pipe Costs:

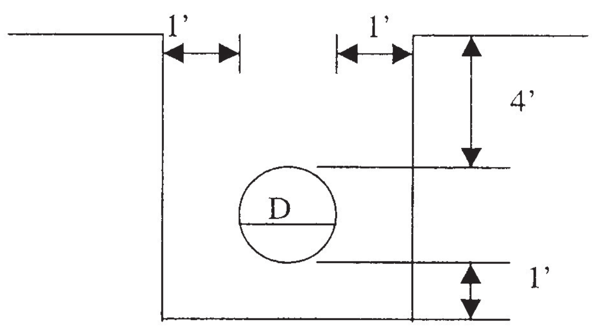
K-C is installing 400' of 54" diameter pipe to avoid conflict with construction of a proposed bridge. The project was bid and the costs were as follows:

Material Costs	$ 99,660.00
Construction	$221,576.00
	$321,236 (400' Installed)

Therefore, the installed per foot cost for a 54" diameter pipe is:

$321,236 ÷ 400 = **$803/ft.**

Determine Ratio to Apply to Current Pipe Cost:



Trench:

$$A = (D+2)\ (D+5)$$
$$A = D^2 + 7D + 10$$

54" $\quad D_1 = 4.5' \Rightarrow A_1 = (4.5^2 + 7\ (4.5) + 10\ ) = 61.75$

40" $\quad D_2 = 3.5' \Rightarrow A_2 = (3.5^2 + 7\ (3.5) + 10\ ) = 46.75$

$$\frac{A_1}{A_2} \quad \frac{46.75}{61.75} = \boxed{0.76}$$

For Installation

$$\frac{D_1}{D_2} \quad \frac{40"}{54"} = \boxed{0.74}$$

For Pipe Cost

Using 0.74 as the ratio for 40" Pipe, and $803/ft for the current installed pipe costs, the estimated present value of the 40" line on 25th Street is:

7,762' x ($803/ft) x (0.74) = **$4,612,336**

Estimated Life of the 40" Pipe:

In the mid 1980's the 40" line was re-lined with concrete mortar. It has been pressurized since then but not used to transport water. It was previously estimated the line had 25% life remaining (50 yr x 25%) = 12½ min expected life remaining. Using 25% remaining life, the estimated present value of the 40" line on 25th Street is:

$4,612,236 x (25%) = **$1,153,084**

Estimated Total Value Existing Pipelines used for Effluent Transfer:

$1,153,084 + $346,590 = **$1,499,674**

Exhibit 3
Utility Service Area for City of Marysville

<u>AGREEMENT FOR OPERATION OF THE SOUTH EFFLUENT PUMP STATION</u>

BETWEEN

THE CITY OF MARYSVILLE

AND

THE CITY OF EVERETT

This Agreement between the City of Marysville ("Marysville") and the City of Everett ("Everett") is effective as of the date of the last Mayor to sign it.

WHEREAS,

- Everett and Marysville have both previously entered into agreements with Kimberly-Clark ("K-C") to acquire capacity in a deep-water outfall ("Joint Use Facilities") to be constructed by K-C; and

- Everett and Marysville entered into an *Agreement For Conveyance and Discharge of Treated Wastewater* (Conveyance and Discharge Agreement) on March 27, 2002 to share capital, operating and maintenance expenses; and

- Everett is designing, permitting and constructing the South Effluent Pump Station ("SEPS") located at the Everett Water Pollution Control Facility to accept and pump treated municipal wastewater ("Effluent") to Port Gardner Bay; and

- Marysville is designing, permitting, and constructing effluent conveyance facilities that will deliver Effluent from the Marysville Wastewater Treatment Plant (WWTP) to the SEPS; and

- Everett has the technical staff to operate the SEPS, and Everett and Marysville have concluded that a Pump Station Operation Agreement between Everett and Marysville is in the public interest; and

NOW, THEREFORE, in consideration of the premises, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby expressly acknowledged, Marysville and Everett agree as follows:

1. PURPOSE

1.1. This Agreement establishes the terms and conditions under which Everett shall operate and maintain the SEPS.

2. PUMP STATION OPERATION AND MAINTENANCE.

2.1. Throughout the term of this Agreement Everett shall provide qualified personnel, experienced in pump station operation, to operate the SEPS to convey municipal Effluent to Port Gardner Bay.

2.2. For the purpose of this Agreement, "operation and maintenance" means:

- Start-up of one or more pumps
- Shut-down of one or more pumps
- Varying pumping rates of one or more pumps
- Varying chlorination feed rates
- Monitoring flow rates from all municipal sources feeding the SEPS
- Monitoring chlorine feed rates and chlorine residuals in each separate municipal effluent and the final mixed effluent
- Diverting flow from the Port Gardner outfall #100 to the Snohomish River outfall #015A
- Diverting flow back to the WPCF lagoon process with eventual discharge to the Snohomish River outfall #015B

3. RESPONSIBILITY OF PARTIES

With respect to the SEPS, the parties shall have the following responsibilities:

3.1.1. Everett shall be responsible for the operation of the SEPS and notifying Marysville of operating conditions as follows:

3.1.1.1. Normal Operation

3.1.1.2. Everett shall notify the Maryville WWTP during normal working hours (0730-1600) as soon as possible whenever flow or residual chlorine levels of effluent entering the SEPS go above or below an agreed upon range of operation.

3.1.1.3. Everett shall provide Marysville with a monthly operations report to include Everett's water quality and flow data for Marysville's flow received at the SEPS and the mixed effluent delivered to the Deep Water Outfall.

3.1.2. Routine Maintenance

3.1.2.1. Everett shall give Marysville at least 30 calendar days notice of scheduled maintenance that requires stopping Maryville's flow to the SEPS for longer than 4 hours or outside of regular working hours (0730-1600).

3.1.2.2. Everett shall give Marysville at least 7 calendar days notice of scheduled maintenance that requires stopping Marysville's flow to the SEPS for 4 hrs or less during regular working hours.

3.1.2.3. Everett shall give Marysville at least 24-hrs notice of unscheduled maintenance that is unavoidable but not an emergency and requires stopping Maryville's flow to the SEPS for longer than 2 hours or outside of regular working hours.

3.1.2.4. Everett shall be responsible for contacting the Marysville WWTP to inform them of the re-start of the SEPS following any maintenance shutdown

3.1.3. Emergency Operation

3.1.3.1. For purposes of this agreement an emergency is defined as any SEPS or conveyance system operational problem where corrective action is required in less than 24 hours.

3.1.3.2. Everett shall immediately notify the Marysville WWTP (see 4.1) whenever it initiates an emergency shutdown of the SEPS. During emergency shutdown of the SEPS, effluent from Marysville and Everett will be discharged to the Snohomish River via Outfall 015A. Everett shall be responsible for shutting down the SEPS during any shutdown emergency in a manner that will not have significant negative impact on the pump station or Marysville's conveyance systems.

3.1.3.3. If Outfalls #100 and #015A both fail, Marysville shall immediately cease pumping effluent upon notification by Everett per section 3.1.3.2.

3.1.3.4. Everett shall be responsible for contacting the Marysville WWTP to inform them of the re-start of the SEPS following any emergency shutdown.

3.2. Marysville shall be responsible for pumping and conveying treated wastewater effluent to the SEPS as follows:

3.2.1. Normal Operation

3.2.1.1. Provide Everett with 24hour advance notification when a delivered change in effluent volume of greater than 0.5 MGD is expected.

3.2.1.2. Maintain a chlorine residual (total chlorine) of 0.5 mg/L in un-mixed Marysville Effluent to the point of connection of Marysville's facilities to the SEPS.

3.2.2. Routine Maintenance

3.2.2.1. Marysville shall give Everett at least 30-days notice of scheduled maintenance that requires stopping Maryville's flow to the SEPS for longer than 4 hours or outside of regular working hours (0730 -1600).

3.2.3. Emergency Operation

3.2.3.1. Marysville shall immediately notify Everett's operational contact (see 4.1) whenever it initiates an emergency shutdown of the effluent conveyance system or has any other emergency as defined in 3.1.3.1

4. OPERATIONS CONTACTS

4.1 The following serve as the point of contact for notification of all changes that impact the operation of the pump station, piping or outfalls under normal and emergency conditions:

Plant Day Operator
City of Everett Water Pollution Control Facility
(425) 257-8244 OR (425) 257-8220
After Hours: City of Everett Dispatch
(425) 257-8200

City of Marysville Wastewater Treatment Plant
(360) 651- 5131
After Hours: City of Marysville Dispatch
(360) 651-5080

5. PUMP STATION TESTING, INITIAL STARTUP, AND OPERATION REVIEW

5.1 Everett shall include a minimum of one Marysville designated staff member to participate in the initial startup and testing of the SEPS.

5.2 Designated Everett and Marysville operations staff will conduct monthly pump station operation review meetings during the first year of operation of the SEPS. During the first year of operation, operating procedures may be amended as necessary when both parties are in agreement with the proposed changes.

5.3 Following the first year of operation, Everett and Marysville staff shall work together to modify, as necessary, and develop detailed written operating procedures within 90 days of the final monthly meeting referred to in the previous paragraph. Operating procedures may be modified at any time by mutual agreement.

5.4 Designated Everett and Marysville operations staff will conduct quarterly Pump Station Operation Review meetings after the initial first year of operation. Changes shall be made whenever modifications are identified. Everett and Marysville staff shall work together to update the written operations procedures prior to the next meeting.

5.5 In the event of an NPDES permit violation, Everett and Marysville operations staff will work together to investigate the cause(s) of the violation. Operations procedures will be updated with any necessary corrective actions to avoid future violations and meet objectives agreed to in sections 5 and 6 of the *Agreement For Conveyance and Discharge of Treated Wastewater.*

6. FEES AND CHARGES

6.1 Everett will charge Marysville for operation and maintenance of the SEPS in accordance with section 3.3 of the *Agreement For Conveyance and Discharge of Treated Wastewater.*

6.2 Charges may include but are not limited to:

- Flow based, pro-rata power costs for SEPS operations
- Flow and disinfection demand based, pro-rata chlorine costs in the event Marysville's effluent requires additional disinfection
- Manpower and equipment costs associated with all SEPS and emergency outfall (#015A) operation and maintenance

7. CONVEYANCE AND DISCHARGE AGREEMENT

7.1 All articles of the Conveyance and Discharge Agreement are incorporated in this Agreement by reference. If any term, condition or provision of this Agreement conflicts or contradicts any term, provision, or condition of the incorporated sections of the Conveyance and Discharge Agreement, this term, condition, or provision of this Agreement supercedes or modifies the incorporated term, condition, or provision.

CITY OF EVERETT		**City of Marysville**	
Frank E. Anderson, Mayor	Date	David Weiser, Mayor	Date
ATTEST:			
Sharon Marks, City Clerk		Gerry Becker, City Clerk	
APPROVED AS TO FORM:		**APPROVED AS TO FORM:**	
Mark Soine, City Attorney		Grant Weed, City Attorney	

WATER AND SEWER MUTUAL AID AGREEMENT - 2006

THIS MUTUAL AID AGREEMENT is by and between all water and sewer utilities (Purveyors) in Snohomish County that have approved this Agreement, who are authorized to provide the benefits and undertake the obligations contained in this Agreement, and have executed this Agreement.

RECITAL

Subject to the terms and conditions below, each of the Purveyors agrees to provide personnel, materials and equipment to other Purveyors who are parties to this Agreement and who request assistance to handle a disaster or emergency.

AGREEMENT

It is agreed by the Purveyors as follows:

1. Request for Assistance. A Purveyor, through its Designated Official, may request another Purveyor to send personnel, materials and equipment to deal with a disaster or emergency. A request for assistance may be oral or written. If the request is oral, it shall be confirmed in writing by the requesting Purveyor's Designated Official as soon as practicable after the request. A written request or confirmation shall be in a form sufficient to demonstrate that it was made by a Designated Official. Each request or confirmation shall describe the equipment, personnel, materials, and other resources that are needed to address the disaster or emergency.

2. Definition of Disaster or Emergency. A disaster or emergency is an event or situation which (1) demands immediate action to preserve public health or protect life or property or (2) reaches a dimension or degree of destructiveness as to warrant the Governor of the State of Washington declaring a state of emergency.

3. Response to Request. The responding Purveyor, through its Designated Official, should, as soon as reasonably possible determine whether personnel, materials and equipment are available to respond to the request for disaster or emergency assistance. Following that determination, the responding Purveyor's Designated Official should, as soon as reasonably possible advise the requesting Purveyor of the availability of personnel, materials and equipment; and, if any or all of such items are available, the approximate time when such will be provided. The judgment of the responding Purveyor's Designated Official shall be final as to the availability of personnel, materials and equipment. A responding Purveyor shall not be liable to the requesting Purveyor or any person or entity for failing to respond to a request for assistance or provide personnel, materials and equipment. By signing this Agreement, any party who requests assistance pursuant to this Agreement waives and releases all claims for damages of any kind against any other party who fails to respond to a request for, or does not provide assistance, personnel, materials or equipment.

4. Control of Personnel and Equipment. Personnel and equipment of the responding Purveyor that are made available to the requesting Purveyor shall, to the fullest extent possible, remain under the control and direction of the responding Purveyor; the responding Purveyor shall be and remain at all times an independent contractor. The responding Purveyor's employees shall remain solely the employees of the responding Purveyor. The requesting

Purveyor shall coordinate the activities of personnel and equipment of the responding Purveyor, provided however, employees of the responding Purveyor remain employees of the responding Purveyor while performing functions and duties on behalf of the requesting Purveyor. The responding Purveyor shall retain the right to withdraw at any time some or all of its personnel, materials and equipment for any reason. Notice of intention to withdraw shall be communicated to the requesting Purveyor's Designated Official, as soon as possible; however, it need not be in writing. A responding Purveyor shall not be liable to the requesting Purveyor or any person or entity for first providing personnel, materials or equipment and later withdrawing some or all of the same personnel, materials or equipment, according to the provisions of this Agreement. By signing this Agreement, any party who requests assistance pursuant to this Agreement waives and releases all claims for damages of any kind against the responding Purveyor for withdrawing some or all of its personnel, materials or equipment that were provided pursuant to this Agreement.

5. Status of Personnel. All privileges, immunities, rights, duties and benefits of officers and employees of the responding Purveyor shall apply while those officers and employees are performing functions and duties on behalf of the requesting Purveyor, unless otherwise provided by law.

6. Indemnification. To the extent permitted by law, the requesting Purveyor shall protect, defend, hold harmless and indemnify all other responding signatory Purveyors, and their officers and employees from any and all claims, suits, costs, damages of any nature, or causes of action, including the cost of defense and attorneys fees, by reason of the acts or omissions, whether negligent, willful, or reckless, of the requesting Purveyor's officers, employees,

agency or any other person arising out of or in connection with any acts or activities authorized by this Agreement, and will pay all judgments, if any, rendered. This obligation shall not include such claims, costs, damages or other expenses which may be caused by the sole negligence of the responding Purveyors or their authorized agents or employees.

This indemnity obligation extends to all claims against the responding Purveyor by an employee or former employee of the requesting Purveyor, and for this purpose, by mutual negotiation, the requesting Purveyor expressly waives as respects to the responding Purveyor only, all immunity and limitation and liability under any industrial insurance act, including Title 51, other worker's compensation act, disability benefit act, or other employee benefit act of any jurisdiction which would otherwise be applicable in the case of such claim.

7. Insurance. A Purveyor shall maintain insurance or adequately self-insure for the activities of its personnel and equipment while operating under this Agreement.

8. Cost Reimbursement. The requesting Purveyor shall reimburse the responding Purveyor for the actual cost of providing assistance. The reimbursement will be based upon the responding Purveyor's regular schedule of hourly rates for personnel and equipment, and the actual costs of materials, reasonable food, lodging and out-of-pocket expenses; reimbursement shall include all salaries, benefits, administrative costs and overhead of the responding Purveyor, determined in accordance with the responding Purveyor's then-existing regularly adopted policies and practices. Reimbursement shall be made within 90 days after receipt by the requesting Purveyor of an itemized voucher of costs. The requesting Purveyor shall have the right to audit books and records related to the cost of providing assistance.

9. Authorization: Effective Date: Duration. A Purveyor shall authorize and approve this Agreement by formal action of its governing body. This Agreement shall be effective upon authorizing actions by two or more Purveyors and is subject to the termination procedures set out herein, and shall remain in effect as long as two or more authorizing actions are in effect. Upon an authorizing action and execution of this Agreement, a Purveyor shall send a certified copy of the action and the Agreement to the City of Everett. The Everett Utilities Director shall maintain a list of mutual aid Purveyors hereunder and the job title of their respective Designated Officials and shall send an updated list to all Purveyors annually, and whenever Purveyors are added to or eliminated from the list or whenever a Purveyor changes the job title or title holder of its Designated Official for this Agreement.

10. Rescission of Prior Agreements.

This Agreement, once formally authorized by each signing Purveyor, shall, one at a time, immediately supersede and rescind that same signing Purveyor's prior SEWER AND WATER MUTUAL AID AGREEMENT (developed in 1995) with all other signers of that Agreement.

11. Termination. This Agreement shall remain binding upon a Purveyor until that Purveyor repeals or revokes its authorizing action. Upon repeal or revocation, the Purveyor shall send a certified copy of the action to the Everett Utilities Director. Withdrawal from this Agreement shall not relieve the withdrawing Purveyor from the obligations incurred under this Agreement prior to the effective date of the withdrawal, which is the date upon which the withdrawing Purveyor delivers a copy of its repealing action or revocation to the Utilities Director for the City of Everett.

12. <u>No Third Party Rights.</u> This Agreement is for the benefit of the Purveyors who are active parties to this Agreement and no other person or entity shall have any rights under this Agreement as a third party beneficiary nor shall any Purveyor owe any duty to a third party not a signatory of this Agreement by virtue of this Agreement.

13. <u>Designated Official.</u> All Agreement references to the Designated Official, whose job title is identified at the end of this Agreement, shall refer to the holder of that job title or his or her designee. The Purveyor may, at its discretion, change the job title of their Designated Official by notifying the City of Everett.

Job Title of Designated Official for the purposes of initiating this Agreement:

Public Works Director
[Printed JOB TITLE]

City of Marysville
[Printed NAME of PURVEYOR]

By (Signature) Dennis L Kendall

Dennis L. Kendall, Mayor
[Printed NAME, TITLE]

Dated: August 11, 2006

ATTEST:

By (Signature) Gerry Becker

Gerry Becker, City Clerk
[Printed NAME, TITLE]

Dated: August 14, 2006

APPROVED AS TO FORM:

By (Signature) Grant K Weed

Grant K. Weed City Attorney
[Printed NAME, TITLE]

Dated: 8-10-06

APPENDIX C

PUMP STATION INVENTORY

PUMP STATION INVENTORY

Sunnyside Pump Station - 6213 - 52nd Street NE, Marysville, Washington

PUD Meter No. 126280

Wet well – approx. one day between pump starts at this time.

Main Electrical Panel, Cutler Hammer – Freedom Series 2100 Motor Control Center.
HSE 39462-002/P0C
12/99 H.BUS 600A/65
480V 3PH 3W 60HZ
SEC. 3-4 300A
Main 400A

Pump Controls – Superior Custom Controls

PUMPS – THREE
Wemco – Hydrostal Screw Centrifugal
Pumps 1 and 2, 890 GPM, Head 53.3 ft., RPM 1750
6x5 model – E5K-EEXR4
Wemco Ser. No. 99X21929, 99X21930
Pump 3, Small original pump replaced in 2010.
6X5 Model-M_EEXR4
Ser. No. 0DW07608-01
1730 RPM 920GPM @ 50 ft. TDH
High Crome Liner (regulable)

MOTORS – THREE
20.7 HP., 1728 RPM, 460-VOLTS
Model No. EEXR4-MYAK-XBLB-16
F.L. amps 27, HZ – 60, PH 3
S.F.I.O. Part No. 126317XP

Back Up Generator
Model No. OTC-3383933
Ser. No. J990008806
SPEC-K
Amps – 400
VOLTAGE – 480
Frequency – 60
Poles – 4

Transfer Switch
P/N – 0306-3479-03
MAX-AC VOLTS – 600
PH 1 OR 3
HZ 50 OR 60
AC AMP CONT. – 150
OPR. VOLTS – 208/220/240
POLES - 3

Valves
5 – 10 INCH CLOW 175 C W P
1 – 6 INCH CLOW 175 C W P
1 – 12 INCH CLOW 175 C W P
2 – 10 INCH KENNEDY CHECK VALVES
1 – 6 INCH KENNEDY CHECK VALVE

PUMP STATION INVENTORY

Soper Hill Pump Station - 6914 Sunnyside Blvd, Marysville, Washington

PUD meter no. 126675

Controls – Superior Custom Control's.
12544 27th Ave N.E.
Seattle, WA. 98125
Telephone, (206) 362 8866

On Site Generator, ONAN. Mod. No. DGFB-5564206
Ser. No. GO20391069
3 PH. 175 KW. RATED KVA 218.7
Transfer Switch, ONAN. Mod. No. OTPCC-5564280.
Ser. No. GO20392624

Milltronics Multiranger Plus.

PUMPS-TWO
WEMCO-HYDROSTAL SCREW CENTRIFUGAL PUMP
8X4 Model F4K-S-FE5B5
Ser. No. (S) O2DWO3680-01,-02
Address, WEMCO PUMP
440 West 800 South
Salt Lake City, UT 84101
Telephone, (801) 359-8731
Local Rep. APSCO 935 Kirkland Ave. Suite # 3.
Kirkland, Wa 98033
(425) 822-3335

WEMCO MOTOR-Wemco Hydrostal immersible motor
Model: FE5B5
60.4/20.9 HP, 1750/1150 RPM
3 PH. 60 HZ 460 VOLTS
Fiberglass prerotation basin, size 800

Discharge 6 in. D.I. pipe too valve vault, 6 in. swing checks (2), Clow, Mod: 106, 6 in. Millcentric plug valves (2), series 600. No drain in valve vault

Meter vault, Two Milliken 10 in. 285 CWP DI valves.
Flow Meter, Danfoss Magflow.
Sump pump in vault.

7/20/11

PUMP STATION INVENTORY

Regan Rd. Pump Station – 5502 47th Ave NE Marysville WA

Wet well size – 72 inches X 15 ft. deep.

Retention time – approx. two days.

Main Electrical Panel – SIEMENS, Panel type P1, System 240/120 3 Ph 4W Del.

30 KVA transformer, 240/208-120 V

Control Panel – Systems Interface, Milltronics—MultiRanger PLUS

Telemetry – Allen Bradley

Pumps – Two

WEMCO Hydrostal Screw Centrifugal – Pre-rotation

4X4 Mod. No. D4K-HS-DKXA6

Conditions: 120 GPM

Against: 27 ft. TDH, at 1180 RPM.

PRE-RO RANGE: 82-130 GPM @ 24-28 ft.

CW viewed from top of motor.

Motors

WEMCO-Hydrostal Immersible Motor:

Model: DKXA6, 4.1 HP. 1155 Full Load RPM.

3 Phase. 60 HZ, 208 Volt

Service factor 1.0

Valves – 3 – 4in, Homestead series 120 eccentric plug valves.

2 – 4in Kennedy check valves

1 – 4in emergency bypass port, Female cam lock.

GENERAC GEN SET—ON SITE, SD020, 20 KW, 208 3 PHASE

Site is also compatible with our portable gen- set.

PUMP STATION INVENTORY

Quilceda Glen Pump Station - 11910 - 51st Avenue NE, Marysville, WA.

P.U.D. Meter No. 485639
P.U.D. Account # 450033638

Wet well – 72 in. X 11 ft. Only able to use 10 in. of well. Even 10 in. surcharges an already short collection system. Minimal retention time.

Main Electrical and control's – Calvert Technologies.
2 Cutler Hamer disconnects, 230 volt, 30 amp.
Pumps controlled by Milltronics Hydroranger

Pumps – Two
Hydromatic
HP. 2
Model No. S4NX200CB
Ser. No. 508542
Phase 1, Volts 230, HZ 60.
FLA 16.2

Back Up - Portable Generator
Appleton male receptacle AR200 34RS
Cutler Hamer double throw safety switch, 60 amp, 250 volt.

Valves, in vault.
2 check valves – Clow Kennedy 4 in.
11071
2 gate valves – Mueller 4 in.
2360 AWWA 250W
All pipe and fittings in vault are 4-in. ductile iron.

PUMP STATION INVENTORY

Marysville West Pump Station - 2510 Marine View Drive, Marysville, Washington.

Wet Well: Retention time approximately 16 hours till overflow to Sturgeon Creek.

Main Electrical Panel: Square D.

Control Panel: Superior Custom Controls

PUMPS – 2

FAIRBANKS MORSE
Stage 1 Size 6
Model – 5413B28
Imp. 10 Total H.D. 23 ft.
Serial Number K2N0152370
RPM: 1150 GPM: 1150

MOTORS – 2

GENERAL ELECTRIC
Model Number SK6236XH205B
Horsepower: 10
Type K Code H
Frame: 256TP10
Nema Class B
Volts: 230 / 460
Cycles: 60 3PH.
F.L. Amps: 29 / 14.5
F.L. Speed: 1165
60C Rise Continuous
No. JDJ925367
Upper Bearing: 590-3493P11
Lower Bearing: 629-A310FLP1

Back Up – Portable Generator

PUMP STATION INVENTORY

Kellogg Ridge Pump Station – 6623 - 105th Street NE, Marysville, Washington

Wet well size – 72 inches x 14 ft
Retention Time – Unknown.

Main electrical panel, Square D – 100 amp, 480 volt.
Cat. No. NF412L1C

Pump Controls-Systems Interface Inc.
480 volt 3-PH
1—45 amp main breaker, Siemens- cat. No. ED43BO45
2—20 amp pump breakers, Siemens- cat. No. ED43BO20

Control panel—Systems Interface Inc.
Rugid Telemetry
Milltronics Transducer

Pumps – Two
Hydromatic – S4PX

Back Up – Portable Generator

Transfer Switch- Midwest

Check Valves in vault- 2 Mueller 4 in. 175 WP

Isolation Valves- 2 Milliken 4 in. 175 CWP DI

PUMP STATION INVENTORY

Ebey Slough Waterfront Park

PUD METER NO. 509747

Wet Well Size—5’W X 9’ D

Electrical Panel—Square “D”

Control Panel -Pentiar Pumps

Control Model 6204E01149937

Ashland Ohio

419-298-3042

Pumps—Two

Hydromatic-Grinder

Model No. HPGFHX300JC

Ser. No. G82806

Hp. 3, Volts/460/PH 3

RPM 1750 FLA 4.8 SFA 5.6

CL.ins-F / code B / Temp code T.4

Imp 7.46 / BC-O MFG date 11-04

Motor model No. GA8X300JC

Valves—two

Brass wheel valves six feet down in earth on PVC force main w/valve stacks.

Force main is 2 ½ in. PVC too man hole at 1st St.

PUMP STATION INVENTORY

Eagle Bay Pump Station – 6112 36th PL NE, Marysville, WA   DEC. 2008.

PUD meter no. 744360. Water meter no. 170384W

Wet Well – 72 in. X 30 ft. Retention time – Days, only 11 lots as of this inventory. Lift station design
Shows possible 200 lot expansion and pump up grade in future.
4 in. emergency by pass connection.

Electrical – Square "D" Service Disconnect #DT363
Motor starters – Square "D" cat. No. 85395DA52V8ICCF4H201P1P2TX1125
Manual Transfer Switch – Square "D' #DTU363RB

Telemetry – Systems Interface. Allen Bradley -- Hydroranger 200.

Pumps – Two,
HYDROMATIC mod. No. H4HX 4 in.
15 hp. 160 gpm @ 90 ft TDH. 1750 rpm
S.F. 1.2 460 volt
3 PH 60 HZ FLA 22.1
Ser. No. S495 88

Valves – Two ea. – in vault
Check Valves – CLOW KENNEDY 4 in. 11071
Plug Valves – CLOW 1.5K-E

Ventilation – Above ground blower – Granger, Item #7A918.

Back up – Portable generator.

7/25/11.

PUMP STATION INVENTORY

Cedar Crest Vista Pump Station

Address – 8102 67th Ave. N.E.
PUD Meter No. – 438729

Wet Well – 72 in. X 20 ft.
12 – 16 hr. retention time.

Electrical – USEMCO Control Panel
No. 14843
P.O. Box 583
Tomah, Wisconsin

Telemetry – Systems Interface, Allen Bradley, Siemens Hydroranger 200.

Pumps – 2- upgraded March 2008

WEMCO HYDROSTAL – with prerotation basins, size 600
4X4 Model D3K-S DKXA4
Ser, No. 07DW06595-01,-02
150 GPM @ 40 ft. TDH, at 1755 rpm.
CW viewed from top of motor.
Motor – Wemcp-Hydrostal imersible
Model DK4A4, 7.9 hp. 3 ph, 60 HZ, 460 V.

Valves, in vault.

Check valves – 2 Muller 4 in. 1996 175 WP, Chat. Tenn.
Control Valves – 3 Gate Valves, Muller 86, 4 in. A2360, AWWA 250W, 200 (FM)

7/21/11

PUMP STATION INVENTORY

Carroll's Creek Pump Station - 18111 - 25th Avenue NE, Arlington, WA.

PUD meter no. 482462

Wet well 10ft.X 24ft. Approx. 4 hr. retention time. Without power.

Main Control panel – Superior Custom Controls
Milltronics Multiranger Plus

PUMPS – TWO
HYDROMATIC – submersible
Model: S4PX750FC
Type: non-clog 4in.
HP. 7.5
Phase: 3
Voltage: 460
Pump speed: 1750 RPM.
Frequency: 60 HZ.

VALVES
Two – CAM-CETRIC plug valves 4 in.
Valmatic-CWP PSI 175
Mod. No. 5804RN
Ser. No. M218510

Two – WATEROUS check valves 4 in.
604
175-W

Ventilation Blower in valve vault
Dayton
13X11/16 in.
Mod. No. 3C494B

Back Up – Portable Generator

Transfer Switch – Cuttler Hammer

Pump Station Inventory

ASH AVE. PUMP STATION. AUG. 2007.

Address – 625 Ash Ave.

PUD Meter No. 493410

Wet Well – 72 in. X 15 ft. Retention time – 7 days.

Electrical – Systems Interface, 480 V   3 ph.
Siemans Manual Transfer Switch

Telemetry – Allen Bradley / Milltronics Hydro-Ranger 200

Pumps – Two
PUMPEX K 80 Submersible
Ser no. 80004078
Mod. No. K 80
3 HP
460 V, 3 PH, 5-A, 60 HZ
1700 RPM

Valves – In Vault – Two Ea.
Check Valves – CLOW KENNEDY
11071
Plug valves – DeZURIK
Pt. no. 9070594R004

Back up – Portable Generator.

<u>PUMP STATION INVENTORY</u>

88th Street Pump Station – 3801 - 88th Street NE, Marysville, Washington

PUD Meter No. 420444

Wet well - 12-20 hr. retention time
96 in. X 15 ft.

Main Electrical – International Control Systems
1911 61st Ave. N.E.
Arlington WA 98223

Hydroranger Plus (Milltronics)

PUMPS – 2
FLYGT – 3127.090 – 1025 15
9810089 484
FLS M21 – 12 – 4AL
Y ser/ Y11 7.5 KW – 10hp. Cos 0.89
460/230 V 13/25 A 1735R/min

VALVES – in vault
Check Valves – 2, Mueller 6 in.
175WP
2 – Kestone Ballcentric 6 in.
All pipe and fittings in vault – 6 in. ductile.

BACK UP GENERATOR – F. G. WILSON

Type – P95E	Ser. No. – K3320A/001
KVA 112.5	Volts – 240/120
KW – 90	Amps – 270.6
HZ – 60	PF – 0.8
RPM – 1800	Phase – 3
STAT. CON. S/DELTA	Amb. Temp. – 30 C

VENTALATION FAN
Blower 3C494
3-11/16 in. diameter
Daton motor- Mod. # 3K0390
½ HP. AMPS 9.0/4.5
VOLTS 113/230
RPM 1725

TRANSFER SWITCH Service, 1-800-800-ASCO
ASCO automatic switch co.
Florham Park, N.J. 07932
104 amps 480 volts 60 Hz. 3 phase
Cat. No. A300310491C
BOM 601351-003
Control Pnl. 473670-006 Wiring Dwg. 493577

PUMP STATION INVENTORY

51st Pump Station - 12209 - 51st Avenue NE, Marysville, Washington

PUD Meter No. - 498763
Wet well – approx. 30-min. storage time after high water alarm before overflow to Quilceda creek.

Control panel- TESCO 480 V, 3 phase, 200 amp, HZ 60.
Telemetry- Radio/Alan Bradley.

PUMPS – THREE
WEMCO HYDROSTAL—PREROTATION
10X10 MODEL F10K-SS-FE457
Ser. No. 03DW04146-01,-02,-03.
Conditions: 3100/600 GPM
Against: 22'/24' TDH
At: 1170/870 RPM

MOTORS THREE
WEMCO-HYDROSTAL Immersible Motor
MODEL FE547
29.5/14.7 HP, 1150/870 RPM
3 PHASE, 60 HZ, 230/460 VOLT
SF 1.0

VALVES
3 check valves – in vault-12" WATEROUS 612 175-W
4 12" plug valves downstream, buried, between check valves and meter.
1 16" plug valve buried downstream of meter.

FLOW METER
In Vault
DANFOSS-SITRANS FM MAG FLOW-MAG 3100
Signal Converter-MAG 5000
MILLTRONICS HYDRORANGER 200

BACK UP GENERATOR – F.G. WILSON, PERKINS DEISEL
Type P 180 Ser. No. X3320B/001
KVA 225 Volts 480/277
KW 180 , Amps 270.6
HZ 60 , P.F. 0.8
RPM 1800 , Phase 3
Stat. Con. S/STAR amb. Temp. 30 C

TRANSFER SWITCH LAKE SHORE ELECTRIC
Trans-o-matic
Ser. No. 931-0833
Part No. 17330400
Amps 400, Volts 480
Ph. 3, wire 4, HZ 60

PUMP STATION INVENTORY

3rd Street Pump Station – 4932 - 61st Street NE, Marysville, Washington

PUD Meter No. 439162

Wet well – 24-hr. capacity without power.

Electrical – Superior Custom Controls

Telemetry – Rugid, Circuit No. VMNA .31810 A04

PUMPS – 2
FLIGT – submersible, 3 hp.
Product no. 3085. 092 – 6011
Factory code. 15
Serial No. 9730364
Curve code, first didgit=number of poles, 440
Motor No. M15 – 10 – 4AL
Stator con. YSER/Y/
Shaft Power, 2.2 KW - 3 HP
Power Factor, 0.83
Rated Voltage, 460/230
Rated Current, 4.3/8.7
Number of Phases, type of current, frequency 3-60
Operating duty, cont./int. S1 %
Rated speed, 1700 rpm

VALVES, - in vault.
Check valves – 2 Hillen DE Lelie,
DN 100 4in.
2 - Millikin 4in. 175CWP A126 CLB
All pipe and fittings in vault, 4in. ductile

Back Up – Portable Generator

PUMP STATION INVENTORY

West Trunk Pump Station

Wet Well Size-45'X12'-9"x24' deep

Electrical controls-GE 8000 – 600 A   480 V   3 Phase

Pumps – Three – in dry pit.

Wemco Hydrostal Mod. E8K-HD-EE324 Ser. No. 9311624-1,2,3.

Motor Mod. EE3Z4-MXA-Y23C-16   Hp. 25.5 RPM 1748 Volts 460 FLA 41.5 HZ 60 SF 1.0

Isolation Valves

DeZerik   16" plug valves, three, Part no. 9253145

DeZerik   12" plug valves, three, Part no. 9253148

Check valves

MH 12", three, 412095

Backup generator

Cummins/Onan Generator Set

Model: 125 DGEA

S/N C940538066

Transfer Switch

Onan

Model: OTCU 225G

Meter-Siemens

MAGFLOW   MAG 5100 W

Inverter –Siemens

SITRANS FM MAGFLOW

MAG 6000

APPENDIX D

LAND USE DATA/LOADING TABLES

Marysville Sewer Comprehensive Plan
2011 Sewer Sub-Basin Land Use

Sub-Basin	Single Family Residential Dwelling Units	Multi Family Residential Dwelling Units	Commercial (acres)	Non-Sewered Single Family Residential Dwelling Units	Non-Sewered Multi Family Residential Dwelling Units	Non-Sewered Commercial (acres)
A1	0	0	11.1	1	0	0.0
A10	202	0	0.0	33	16	0.0
A11	117	4	3.1	2	0	0.0
A12	181	0	0.0	44	0	0.0
A12-1	116	3	0.0	4	0	0.0
A12-2	267	0	0.0	13	0	0.0
A12-3	145	0	0.0	0	0	0.0
A12-4	97	0	0.0	9	0	0.0
A13	265	2	2.4	17	0	0.0
A14	66	0	0.0	25	0	0.0
A15	128	0	0.0	3	0	0.0
A16	98	13	0.0	65	0	8.4
A16-1	163	0	0.0	113	0	0.0
A17	78	8	0.6	65	0	0.0
A18	205	0	0.0	7	0	0.0
A18-1	6	0	0.0	102	0	0.0
A18-2	101	0	0.0	0	0	0.0
A18-3	50	0	0.0	17	0	0.0
A19	228	0	0.0	196	0	0.0
A2	18	155	1.0	2	0	0.0
A20	261	2	0.0	74	0	0.0
A21	86	0	56.5	7	0	0.0
A22	167	0	1.7	96	0	0.0
A23	167	31	0.5	6	0	0.0
A24	263	34	0.0	0	0	0.0
A24-1	2	0	1.0	1	0	0.0
A24-2	0	0	0.0	0	0	0.0
A24-3	0	0	0.0	0	0	0.0
A24-4	63	180	18.0	1	1	0.0
A24-5	2	0	0.0	4	0	0.0
A25	2	0	0.0	2	0	0.0
A25-1	2	0	0.0	1	0	0.0
A26	18	0	8.5	2	0	5.0
A27	5	0	31.7	3	0	5.4
A28	138	0	0.0	101	0	0.0
A4	83	57	0.7	31	6	0.0
A5	61	155	0.5	53	0	0.0
A6	202	330	2.2	185	10	1.0
A7	86	4	0.2	95	0	0.0
A8	77	6	3.4	50	14	0.0
A9	61	0	8.4	20	0	0.0
B1	105	75	7.5	177	4	2.4
B2	0	0	0.0	119	0	0.0
B3	52	7	6.5	44	18	0.0
B4	19	0	0.0	60	0	0.0
B5	12	0	0.0	58	0	0.0
CE1	42	4	0.0	26	3	0.0

Marysville Sewer Comprehensive Plan
2011 Sewer Sub-Basin Land Use

Sub-Basin	Single Family Residential Dwelling Units	Multi Family Residential Dwelling Units	Commercial (acres)	Non-Sewered Single Family Residential Dwelling Units	Non-Sewered Multi Family Residential Dwelling Units	Non-Sewered Commercial (acres)
CE2	66	26	0.2	93	0	0.0
CE3	94	0	0.0	30	0	0.0
CE4	62	0	0.0	13	0	0.0
CE5	43	0	0.0	65	0	0.0
CE5-1	72	0	0.0	1	0	0.0
CE5-2	0	130	99.4	0	0	0.0
CE5-3	228	6	0.0	6	0	0.0
CE5-4	38	0	3.1	0	0	3.9
CE5-5	27	28	0.0	1	0	0.0
CE5-6	78	0	0.0	0	0	0.0
CE5-7	433	0	14.1	53	0	0.0
CE6	152	0	0.0	53	0	0.0
CE7	258	0	0.0	5	0	0.0
CE8	124	0	0.0	0	0	0.0
CE9	115	0	0.0	3	0	0.0
CW1	283	189	48.0	44	13	0.0
CW10	124	2	1.7	72	0	3.4
CW11	14	0	15.6	100	0	0.0
CW11-1	35	0	28.1	347	0	0.0
CW12	41	3	18.6	34	0	4.3
CW13	35	95	33.3	22	0	0.0
CW14	45	28	17.4	52	8	0.0
CW15	20	1	3.8	537	13	5.8
CW2	144	31	10.6	1	0	0.5
CW3	241	100	9.0	1	0	0.0
CW4	36	126	30.1	2	18	2.7
CW5	2	6	25.5	1	0	0.1
CW6	24	282	3.1	19	5	0.6
CW7	79	37	34.1	3	0	2.6
CW8	120	160	24.4	18	0	0.1
CW9	1	0	15.4	0	0	1.1
D1	24	10	4.1	14	0	0.0
D10	96	0	0.0	0	0	0.0
D10-1	0	0	0.0	38	0	6.2
D10-2	130	0	0.0	55	0	0.0
D10-3	0	0	0.0	36	0	0.0
D10-4	0	0	0.0	44	0	0.0
D10-5	0	0	0.0	12	0	0.0
D10-6	167	0	0.0	58	40	0.0
D11	73	0	0.0	0	0	0.0
D12	226	0	0.0	0	0	0.0
D2	50	0	0.0	1	0	0.0
D3	85	0	5.7	4	0	0.0
D3-1	137	3	0.0	3	0	0.0
D3-10	250	8	0.0	7	0	0.0
D3-11	414	0	0.0	17	0	0.0
D3-12	388	2	0.0	71	0	0.0

Marysville Sewer Comprehensive Plan
2011 Sewer Sub-Basin Land Use

Sub-Basin	Single Family Residential Dwelling Units	Multi Family Residential Dwelling Units	Commercial (acres)	Non-Sewered Single Family Residential Dwelling Units	Non-Sewered Multi Family Residential Dwelling Units	Non-Sewered Commercial (acres)
D3-13	50	0	0.0	41	0	0.0
D3-2	133	0	0.0	1	0	0.0
D3-3	111	0	0.0	7	0	0.0
D3-4	81	4	0.0	16	0	0.0
D3-5	523	1	3.5	57	1	0.0
D3-6	41	1	0.0	17	1	0.0
D3-7	127	0	0.0	14	0	0.0
D3-8	460	0	0.0	2	0	0.0
D3-9	252	0	0.0	3	0	0.0
D4	140	1	0.0	1	1	0.0
D5	183	0	3.3	11	0	0.0
D5-1	0	0	6.1	0	0	0.0
D5-2	181	203	6.1	3	0	0.0
D6	211	0	0.0	3	0	0.0
D6-1	88	0	0.0	1	0	0.0
D6-2	752	0	3.2	19	0	0.0
D6-3	97	2	0.0	1	0	0.0
D6-4	157	0	0.0	1	0	0.0
D6-5	263	0	0.0	7	0	0.0
D7	49	0	0.0	4	0	0.0
D7-1	133	0	0.0	0	0	0.0
D7-2	146	0	0.0	0	0	0.0
D8	52	0	2.8	2	0	0.0
D9	145	0	0.0	3	0	0.0
D9-1	122	0	0.0	2	0	0.0
F1	7	0	0.0	19	0	0.0
F10	0	0	50.6	1	0	21.5
F11	1	0	23.3	0	0	0.0
F12	4	0	50.8	2	0	5.7
F13	1	0	35.9	0	0	0.0
F13-1	0	0	1.0	3	0	0.0
F13-2	36	0	0.0	3	0	0.0
F14	11	0	35.1	18	0	0.0
F15	83	0	34.1	4	0	0.0
F16	2	4	9.2	0	0	13.8
F17	4	0	20.9	9	0	0.0
F18	0	0	26.3	0	0	0.0
F19	0	0	48.5	0	0	0.0
F2	13	0	0.0	110	0	0.0
F20	160	42	52.7	1	0	0.0
F21	249	293	1.8	8	0	0.0
F22	26	75	30.4	197	14	0.0
F22-1	0	0	2.5	44	0	22.8
F3	69	18	0.0	0	0	0.0
F4	240	0	0.0	73	0	0.0
F5	22	58	18.5	28	0	0.0
F6	45	0	0.0	0	0	0.0

Marysville Sewer Comprehensive Plan
2011 Sewer Sub-Basin Land Use

Sub-Basin	Single Family Residential Dwelling Units	Multi Family Residential Dwelling Units	Commercial (acres)	Non-Sewered Single Family Residential Dwelling Units	Non-Sewered Multi Family Residential Dwelling Units	Non-Sewered Commercial (acres)
F7	21	0	15.1	11	0	0.0
F8	5	6	9.5	5	0	0.0
F9	0	0	19.0	0	0	0.0
G1	93	93	31.4	4	3	0.6
G2	121	104	6.4	44	10	0.0
G3	1	0	76.9	0	0	0.0
G4	0	0	22.5	10	0	0.0
G5	144	0	0.0	0	0	0.0
G6	130	0	0.0	0	0	0.0
G7	3	0	0.0	63	0	28.8
G8	0	0	11	10	0	0
Total:	**15,569**	**3,248**	**1,269**	**4,753**	**199**	**147**

Marysville 2011
Sewer Sub-Basin Flows

	Residential						Schools		Commercial/			Inflitration / Inflow			
BASINS (service area)	Sewered Single Family Units	Sewered Multi Family Units	Single Family Population on Sewer	Multi-Family Population on Sewer	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)	Total Residential/ School Flow (gpd)	Area (acres)	Peak I/I Flow (gpd)	Fixed or Pumped Flow (gpd)	Remark
A1	0	0	0	0	0	0		0	11.1	30,034	0	11.1	12,206	0	
A10	202	0	606	0	606	36,360	626	6,260	0.0	0	42,620	46.0	50,651	0	
A11	117	4	351	8	359	21,540		0	3.1	8,239	21,540	16.7	18,365	0	
A12	181	0	543	0	543	32,580		0	0.0	0	32,580	32.6	35,901	0	
A12-1	116	3	348	6	354	21,240		0	0.0	0	21,240	19.9	21,924	0	
A12-2	267	0	801	0	801	48,060		0	0.0	0	48,060	31.7	34,898	0	
A12-3	145	0	435	0	435	26,100	1,268	12,680	0.0	0	38,780	20.6	22,676	0	
A12-4	97	0	291	0	291	17,460		0	0.0	0	17,460	11.3	12,418	0	
A13	265	2	795	4	799	47,940		0	2.4	6,414	47,940	47.1	51,767	0	
A14	66	0	198	0	198	11,880		0	0.0	0	11,880	19.9	21,872	0	
A15	128	0	384	0	384	23,040		0	0.0	0	23,040	131.8	144,973	0	
A16	98	13	294	26	320	19,200		0	0.0	0	19,200	28.9	31,747	0	
A16-1	163	0	489	0	489	29,340		0	0.0	0	29,340	18.9	20,777	0	
A17	78	8	234	16	250	15,000		0	0.6	1,620	15,000	32.5	35,804	0	
A18	205	0	615	0	615	36,900		0	0.0	0	36,900	43.9	48,261	0	
A18-1	6	0	18	0	18	1,080		0	0.0	0	1,080	2.4	2,609	0	
A18-2	101	0	303	0	303	18,180		0	0.0	0	18,180	18.4	20,231	0	
A18-3	50	0	150	0	150	9,000		0	0.0	0	9,000	8.0	8,844	0	
A19	228	0	684	0	684	41,040	511	5,110	0.0	0	46,150	63.4	69,762	0	
A2	18	155	54	310	364	21,840	920	9,200	1.0	2,802	31,040	32.7	36,021	0	
A20	261	2	783	4	787	47,220		0	0.0	0	47,220	57.5	63,214	0	
A21	86	0	258	0	258	15,480		0	56.5	152,601	15,480	83.3	91,617	0	
A22	167	0	501	0	501	30,060		0	1.7	4,692	30,060	34.4	37,869	0	
A23	167	31	501	62	563	33,780		0	0.5	1,409	33,780	35.0	38,451	0	
A24	263	34	789	68	857	51,420		0	0.0	0	51,420	5.3	5,785	0	
A24-1	2	0	6	0	6	360		0	1.0	2,626	360	6.7	7,401	0	
A24-2	0	0	0	0	0	0		0	0.0	0	0		0	0	
A24-3	0	0	0	0	0	0		0	0.0	0	0		0	0	
A24-4	63	180	189	360	549	32,940		0	18.0	48,579	32,940	14.8	16,225	0	
A24-5	2	0	6	0	6	360		0	0.0	0	360	2.3	2,537	0	
A25	2	0	6	0	6	360		0	0.0	0	360	6.7	7,319	0	
A25-1	2	0	6	0	6	360		0	0.0	0	360	20.4	22,397	0	
A26	18	0	54	0	54	3,240		0	8.5	22,950	3,240	14.8	16,306	34,962	National Food Corp
A27	5	0	15	0	15	900		0	31.7	85,653	900	43.0	47,249		
A28	138	0	414	0	414	24,840		0	0.0	0	24,840	31.7	34,874	0	
A4	83	57	249	114	363	21,780		0	0.7	1,986	21,780	15.7	17,317	0	
A5	61	155	183	310	493	29,580		0	0.5	1,270	29,580	20.1	22,136	0	
A6	202	330	606	660	1,266	75,960		0	2.2	5,904	75,960	64.0	70,420	0	
A7	86	4	258	8	266	15,960	603	6,030	0.2	540	21,990	30.2	33,194	0	
A8	77	6	231	12	243	14,580		0	3.4	9,101	14,580	21.5	23,636	0	
A9	61	0	183	0	183	10,980		0	8.4	22,809	10,980	25.3	27,831	0	
B1	105	75	315	150	465	27,900		0	7.5	20,349	27,900	34.9	38,372	0	
B2	0	0	0	0	0	0		0	0.0	0	0		0	0	
B3	52	7	156	14	170	10,200		0	6.5	17,668	10,200	15.9	17,520	0	
B4	19	0	57	0	57	3,420		0	0.0	0	3,420	2.2	2,384	0	
B5	12	0	36	0	36	2,160		0	0.0	0	2,160	2.0	2,198	0	
CE1	42	4	126	8	134	8,040		0	0.0	0	8,040	10.1	11,147	0	
CE2	66	26	198	52	250	15,000		0	0.2	540	15,000	14.4	15,847	0	
CE3	94	0	282	0	282	16,920		0	0.0	0	16,920	22.0	24,243	0	
CE4	62	0	186	0	186	11,160		0	0.0	0	11,160	15.5	17,075	0	
CE5	43	0	129	0	129	7,740	953	9,530	0.0	0	17,270	38.2	42,070	0	
CE5-1	72	0	216	0	216	12,960	654	6,540	0.0	0	19,500	33.1	36,447	0	
CE5-2	0	130	0	260	260	15,600		0	99.4	268,325	15,600	106.9	117,570	0	
CE5-3	228	6	684	12	696	41,760		0	0.0	0	41,760	52.3	57,485	0	
CE5-4	38	0	114	0	114	6,840		0	3.1	8,424	6,840	13.9	15,237	0	
CE5-5	27	28	81	56	137	8,220		0	0.0	0	8,220	10.0	10,994	0	
CE5-6	78	0	234	0	234	14,040		0	0.0	0	14,040	15.6	17,205	0	
CE5-7	433	0	1,299	0	1,299	77,940	1,611	16,110	14.1	38,189	94,050	104.2	114,648	0	
CE6	152	0	456	0	456	27,360		0	0.0	0	27,360	32.2	35,437	0	
CE7	258	0	774	0	774	46,440		0	0.0	0	46,440	44.4	48,849	0	
CE8	124	0	372	0	372	22,320		0	0.0	0	22,320	20.0	21,991	0	
CE9	115	0	345	0	345	20,700		0	0.0	0	20,700	20.6	22,691	0	
CW1	283	189	849	378	1,227	73,620		0	48.0	129,557	73,620	107.4	118,138	0	
CW10	124	2	372	4	376	22,560		0	1.7	4,596	22,560	28.4	31,227		

Marysville 2011
Sewer Sub-Basin Flows

	Residential						Schools		Commercial/			Inflitration / Inflow			
BASINS (service area)	Sewered Single Family Units	Sewered Multi Family Units	Single Family Population on Sewer	Multi-Family Population on Sewer	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)	Total Residential/ School Flow (gpd)	Area (acres)	Peak I/I Flow (gpd)	Fixed or Pumped Flow (gpd)	Remark
CW11	14	0	42	0	42	2,520		0	15.6	42,131	2,520	19.7	21,689	16,367	Holiday Inn Exp (8263), Haggen (8104)
CW11-1	35	0	105	0	105	6,300		0	28.1	75,863	6,300	35.7	39,316		
CW12	41	3	123	6	129	7,740		0	18.6	50,242	7,740	31.0	34,152	0	
CW13	35	95	105	190	295	17,700		0	33.3	89,933	17,700	43.2	47,496	8,512	Fred Meyer
CW14	45	28	135	56	191	11,460		0	17.4	46,903	11,460	23.4	25,734	0	
CW15	20	1	60	2	62	3,720		0	3.8	10,269	3,720	9.0	9,846	0	
CW2	144	31	432	62	494	29,640		0	10.6	28,580	29,640	32.7	35,967	0	
CW3	241	100	723	200	923	55,380	1,304	13,040	9.0	24,360	68,420	76.8	84,494	10,677	Marysville Care Center
CW4	36	126	108	252	360	21,600		0	30.1	81,262	21,600	39.5	43,489		
CW5	2	6	6	12	18	1,080		0	25.5	68,860	1,080	26.4	29,093	10,548	Captain Dizzy Car Wash
CW6	24	282	72	564	636	38,160		0	3.1	8,385	38,160	25.2	27,678	0	
CW7	79	37	237	74	311	18,660	274	2,740	34.1	92,138	21,400	55.5	61,093	0	
CW8	120	160	360	320	680	40,800		0	24.4	65,760	40,800	44.4	48,790	0	
CW9	1	0	3	0	3	180		0	15.4	41,588	180	31.2	34,373	0	
D1	24	10	72	20	92	5,520		0	4.1	11,070	5,520	21.1	23,164	0	
D10	96	0	288	0	288	17,280		0	0.0	0	17,280	20.9	23,012	0	
D10-1	0	0	0	0	0	0		0	0.0	0	0		0	0	
D10-2	130	0	390	0	390	23,400		0	0.0	0	23,400	23.8	26,186	0	
D10-3	0	0	0	0	0	0		0	0.0	0	0		0	0	
D10-4	0	0	0	0	0	0		0	0.0	0	0		0	0	
D10-5	0	0	0	0	0	0		0	0.0	0	0		0	0	
D10-6	167	0	501	0	501	30,060		0	0.0	0	30,060	26.5	29,181	0	
D11	73	0	219	0	219	13,140		0	0.0	0	13,140	27.1	29,791	0	
D12	226	0	678	0	678	40,680		0	0.0	0	40,680	60.5	66,585	0	
D2	50	0	150	0	150	9,000		0	0.0	0	9,000	9.7	10,628	0	
D3	85	0	255	0	255	15,300		0	5.7	15,347	15,300	28.5	31,384	0	
D3-1	137	3	411	6	417	25,020		0	0.0	0	25,020	43.4	47,729	0	
D3-10	250	8	750	16	766	45,960		0	0.0	0	45,960	48.5	53,401	0	
D3-11	414	0	1,242	0	1,242	74,520		0	0.0	0	74,520	71.0	78,150	0	
D3-12	388	2	1,164	4	1,168	70,080		0	0.0	0	70,080	92.5	101,765	0	
D3-13	50	0	150	0	150	9,000		0	0.0	0	9,000	19.3	21,275	0	
D3-2	133	0	399	0	399	23,940		0	0.0	0	23,940	19.7	21,644	0	
D3-3	111	0	333	0	333	19,980		0	0.0	0	19,980	25.4	27,895	0	
D3-4	81	4	243	8	251	15,060	607	6,070	0.0	0	21,130	17.1	18,851	0	
D3-5	523	1	1,569	2	1,571	94,260	658	6,580	3.5	9,409	100,840	103.5	113,825	0	
D3-6	41	1	123	2	125	7,500		0	0.0	0	7,500	17.6	19,385	0	
D3-7	127	0	381	0	381	22,860		0	0.0	0	22,860	21.4	23,542	0	
D3-8	460	0	1,380	0	1,380	82,800		0	0.0	0	82,800	60.1	66,141	0	
D3-9	252	0	756	0	756	45,360		0	0.0	0	45,360	54.3	59,763	0	
D4	140	1	420	2	422	25,320		0	0.0	0	25,320	27.0	29,728	0	
D5	183	0	549	0	549	32,940		0	3.3	8,910	32,940	39.4	43,341	0	
D5-1	0	0	0	0	0	0	618	6,180	6.1	16,401	6,180	17.0	18,718	9,337	YMCA
D5-2	181	203	543	406	949	56,940		0	6.1	16,585	56,940	56.9	62,586	0	
D6	211	0	633	0	633	37,980		0	0.0	0	37,980	50.7	55,809	0	
D6-1	88	0	264	0	264	15,840		0	0.0	0	15,840	19.5	21,458	0	
D6-2	752	0	2,256	0	2,256	135,360		0	3.2	8,631	135,360	155.6	171,187	0	
D6-3	97	2	291	4	295	17,700		0	0.0	0	17,700	28.2	30,989	0	
D6-4	157	0	471	0	471	28,260		0	0.0	0	28,260	29.9	32,903	0	
D6-5	263	0	789	0	789	47,340		0	0.0	0	47,340	40.3	44,283	0	
D7	49	0	147	0	147	8,820		0	0.0	0	8,820	16.3	17,934	0	
D7-1	133	0	399	0	399	23,940		0	0.0	0	23,940	11.8	13,005	0	
D7-2	146	0	438	0	438	26,280		0	0.0	0	26,280	20.2	22,180	0	
D8	52	0	156	0	156	9,360		0	2.8	7,493	9,360	20.2	22,267	0	
D9	145	0	435	0	435	26,100		0	0.0	0	26,100	42.9	47,186		
D9-1	122	0	366	0	366	21,960		0	0.0	0	21,960	22.6	24,828		
F1	7	0	21	0	21	1,260		0	0.0	0	1,260	2.4	2,587	0	
F10	0	0	0	0	0	0		0	50.6	136,704	0	48.5	53,396	0	
F11	1	0	3	0	3	180		0	23.3	62,854	180	23.9	26,337	0	
F12	4	0	12	0	12	720		0	50.8	137,065	720	50.2	55,175		
F13	1	0	3	0	3	180		0	35.9	96,926	180	41.2	45,367	0	
F13-1	0	0	0	0	0	0		0	1.0	2,700	0	43.6	47,962	0	
F13-2	36	0	108	0	108	6,480		0	0.0	0	6,480	19.3	21,184	0	
F14	11	0	33	0	33	1,980		0	35.1	94,683	1,980	42.5	46,779	78,093	Pacific Coast Feather

Marysville 2011
Sewer Sub-Basin Flows

	Residential						Schools		Commercial/	
BASINS (service area)	Sewered Single Family Units	Sewered Multi Family Units	Single Family Population on Sewer	Multi-Family Population on Sewer	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)
F15	83	0	249	0	249	14,940		0	34.1	92,148
F16	2	4	6	8	14	840		0	9.2	24,736
F17	4	0	12	0	12	720		0	20.9	56,306
F18	0	0	0	0	0	0		0	26.3	70,935
F19	0	0	0	0	0	0		0	48.5	130,954
F2	13	0	39	0	39	2,340		0	0.0	0
F20	160	42	480	84	564	33,840		0	52.7	142,361
F21	249	293	747	586	1,333	79,980		0	1.8	4,831
F22	26	75	78	150	228	13,680		0	30.4	82,109
F22-1	0	0	0	0	0	0	304	3,040	2.5	6,750
F3	69	18	207	36	243	14,580		0	0.0	0
F4	240	0	720	0	720	43,200		0	0.0	0
F5	22	58	66	116	182	10,920	434	4,340	18.5	50,082
F6	45	0	135	0	135	8,100		0	0.0	0
F7	21	0	63	0	63	3,780		0	15.1	40,732
F8	5	6	15	12	27	1,620		0	9.5	25,650
F9	0	0	0	0	0	0		0	19.0	51,300
G1	93	93	279	186	465	27,900		0	31.4	84,897
G2	121	104	363	208	571	34,260		0	6.4	17,306
G3	1	0	3	0	3	180		0	76.9	207,602
G4	0	0	0	0	0	0		0	22.5	60,698
G5	144	0	432	0	432	25,920		0	0.0	0
G6	130	0	390	0	390	23,400		0	0.0	0
G7	3	0	9	0	9	540	1,126	11,260	0.0	0
G8	0	0	0	0	0	0		0	10.5	28,381
Totals:	15,569	3,248	46,707	6,496	53,203	3,192,180	12,471	124,710	1,269	3,425,707

		Inflitration / Inflow			
BASINS (service area)	Total Residential/ School Flow (gpd)	Area (acres)	Peak I/I Flow (gpd)	Fixed or Pumped Flow (gpd)	Remark
F15	14,940	44.9	49,429	0	
F16	840	24.5	26,930	0	
F17	720	21.5	23,694		
F18	0	54.3	59,719	0	
F19	0	48.6	53,495	8,419	Medallion Hotel
F2	2,340	3.0	3,306	0	
F20	33,840	74.6	82,051	0	
F21	79,980	46.0	50,587	0	
F22	13,680	47.1	51,827	0	
F22-1	3,040	87.2	95,918	0	
F3	14,580	32.3	35,504	0	
F4	43,200	50.8	55,848	0	
F5	15,260	38.7	42,581	0	
F6	8,100	9.1	10,059	0	
F7	3,780	22.4	24,668	0	
F8	1,620	14.6	16,032	0	
F9	0	19.3	21,252	7,660	Northwest Composites
G1	27,900	64.8	71,310	0	
G2	34,260	42.2	46,468	0	
G3	180	48.4	53,186	0	
G4	0	22.4	24,637	0	
G5	25,920	29.0	31,925	0	
G6	23,400	24.8	27,320	0	
G7	11,800	7.0	7,689	0	
G8	0	10.5	11,563	0	
Totals:	3,316,890	4,979	5,476,950	184,575	

Population Table

Total Population	
UGA Population	
Non-UGA Population	

Sewered Population

UGA Sewered Population	
Non-UGA Sewered Population	
Total Sewered Population	

Unit Flow Table

Unit	Unit Flow Rate	
Person	60	gpd/person
Student/Staff	10	gpd/stud. of staff
Commercial	2,700	gpd/acre
Industrial	2,700	gpd/acre
Peak I/I	1,100	gpd/acre
Single Family	3.0	people/residence
Multi Family	2.0	people/residence

Marysville 2017
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/ Industrial			Inflitration / Inflow			
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Commercial Flow (gpd)	Total Residential/ School Flow (gpd)	2017 Area (acres)	Peak I/I Flow (gpd)	2017 Fixed or Pumped Flow (gpd)	Remark
A1	1	83		0	11.1	30,034	83	12.9	10,332	0	
A10	766	45,963	729	7,286	0.0	0	53,249	53.6	42,873	0	
A11	421	25,236		0	3.1	8,239	25,236	19.4	15,544	0	
A12	693	41,592		0	0.0	0	41,592	38.0	30,388	0	
A12-1	370	22,176		0	0.0	0	22,176	23.2	18,557	0	
A12-2	950	57,020		0	0.0	0	57,020	36.9	29,538	0	
A12-3	441	26,460	1,476	14,758	0.0	0	41,218	24.0	19,194	0	
A12-4	351	21,072		0	0.0	0	21,072	13.1	10,511	0	
A13	865	51,918		0	2.4	6,414	51,918	54.8	43,817	0	
A14	221	13,230		0	0.0	0	13,230	23.1	18,513	0	
A15	451	27,066		0	0.0	0	27,066	108.0	86,430	0	
A16	463	27,773		0	8.4	22,801	27,773	33.6	26,872	0	
A16-1	726	43,582		0	0.0	0	43,582	22.0	17,587	0	
A17	381	22,885		0	0.6	1,620	22,885	37.9	30,306	0	
A18	687	41,238		0	0.0	0	41,238	51.1	40,850	0	
A18-1	163	9,773		0	0.0	0	9,773	2.8	2,208	0	
A18-2	303	18,180		0	0.0	0	18,180	21.4	17,124	0	
A18-3	198	11,894		0	0.0	0	11,894	9.4	7,486	0	
A19	926	55,584	595	5,947	0.0	0	61,531	73.8	59,049	0	
A2	390	23,388	1,071	10,707	1.0	2,802	34,095	37.0	29,570	0	
A20	965	57,876		0	0.0	0	57,876	66.9	53,506	0	
A21	270	16,218		0	91.5	247,101	16,218	96.9	77,548	0	
A22	717	43,001		0	1.7	4,692	43,001	40.1	32,053	0	
A23	664	39,816		0	16.5	44,609	39,816	40.7	32,546	0	
A24	941	56,460		0	0.0	0	56,460	6.1	4,897	0	
A24-1	7	414		0	69.0	186,226	414	7.8	6,264	0	
A24-2	0	0		0	80.0	216,000	0	0.0	0	0	
A24-3	0	0		0	72.0	194,400	0	0.0	0	0	
A24-4	551	33,030		0	43.0	116,079	33,030	17.2	13,734	0	
A24-5	10	576		0	100.0	270,000	576	2.7	2,148	0	
A25	8	468		0	90.0	243,000	468	7.7	6,195	0	
A25-1	7	414		0	195.0	526,500	414	23.7	18,958	0	
A26	56	3,348		0	78.5	211,950	3,348	17.3	13,802	40,690	National Food Corp
A27	18	1,062		0	62.1	167,782	1,062	50.0	39,993	0	
A28	553	33,174		0	0.0	0	33,174	36.9	29,519	0	
A4	415	24,870		0	0.7	1,986	24,870	18.3	14,658	0	
A5	573	34,362		0	0.5	1,270	34,362	23.4	18,737	0	
A6	1,697	101,790		0	3.2	8,604	101,790	74.5	59,606	0	
A7	442	26,507	702	7,018	0.2	540	33,525	35.1	28,096	0	
A8	344	20,664		0	3.4	9,101	20,664	25.0	20,007	0	
A9	241	14,449		0	8.4	22,809	14,449	29.4	23,557	0	
B1	762	45,702		0	9.9	26,707	45,702	40.6	32,480	0	
B2	166	9,936		0	0.0	0	9,936	0.0	0	0	
B3	276	16,547		0	6.5	17,668	16,547	18.5	14,830	0	
B4	150	8,990		0	0.0	0	8,990	2.5	2,018	0	
B5	129	7,752		0	0.0	0	7,752	2.3	1,860	0	
CE1	183	10,992		0	0.0	0	10,992	11.8	9,435	0	
CE2	370	22,182		0	0.2	540	22,182	16.8	13,414	0	
CE3	339	20,340		0	0.0	0	20,340	25.7	20,520	0	
CE4	219	13,122		0	0.0	0	13,122	18.1	14,453	0	
CE5	200	11,970	1,109	11,091	0.0	0	23,061	44.5	35,609	0	
CE5-1	253	15,167	761	7,612	0.0	0	22,779	38.6	30,850	0	
CE5-2	260	15,600		0	99.4	268,325	15,600	112.0	89,601	0	
CE5-3	725	43,524		0	0.0	0	43,524	60.8	48,657	0	
CE5-4	114	6,840		0	7.0	18,946	6,840	16.1	12,897	0	
CE5-5	161	9,650		0	0.0	0	9,650	11.6	9,305	0	
CE5-6	237	14,220		0	0.0	0	14,220	18.2	14,563	0	
CE5-7	1,586	95,135	1,875	18,750	54.1	146,189	113,885	121.3	97,042	0	
CE6	540	32,382		0	0.0	0	32,382	37.5	29,995	0	
CE7	791	47,430		0	0.0	0	47,430	51.7	41,348	0	
CE8	372	22,320		0	0.0	0	22,320	23.3	18,614	0	
CE9	348	20,862		0	1.0	2,700	20,862	24.0	19,206	0	

Marysville 2017
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/ Industrial			Inflitration / Inflow		2017 Fixed or Pumped Flow (gpd)	
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Commercial Flow (gpd)	Total Residential/ School Flow (gpd)	2017 Area (acres)	Peak I/I Flow (gpd)		Remark
CW1	1,501	90,080		0	48.0	129,557	90,080	125.0	99,996	0	
CW10	519	31,128		0	5.1	13,691	31,128	33.0	26,432	0	
CW11	188	11,282		0	15.6	42,131	11,282	22.9	18,358	19,049	Holiday Inn Exp (8263), Haggen (8104)
CW11-1	605	36,304		0	28.1	75,863	36,304	41.6	33,279	0	
CW12	166	9,936		0	23.9	64,517	9,936	36.1	28,907	0	
CW13	315	18,888		0	33.3	89,933	18,888	50.3	40,203	9,907	Fred Meyer
CW14	302	18,125		0	17.4	46,903	18,125	27.2	21,782	0	
CW15	831	49,889		0	9.6	25,934	49,889	10.4	8,334	0	
CW2	495	29,694		0	11.9	32,090	29,694	38.1	30,444	0	
CW3	1,076	64,537	1,518	15,177	9.0	24,360	79,714	89.4	71,518	12,426	Marysville Care Center
CW4	438	26,308		0	34.3	92,539	26,308	46.0	36,811	0	
CW5	19	1,134		0	25.8	69,750	1,134	30.8	24,625	12,276	Captain Dizzy Car Wash
CW6	771	46,277		0	3.7	10,005	46,277	29.3	23,428	0	
CW7	314	18,822	319	3,189	46.7	126,058	22,011	64.6	51,711	0	
CW8	736	44,172		0	25.5	68,730	44,172	51.6	41,298	0	
CW9	3	180		0	24.5	66,202	180	35.9	28,734	0	
D1	108	6,456		0	4.1	11,070	6,456	24.5	19,607	0	
D10	288	17,280		0	0.0	0	17,280	24.3	19,478	0	
D10-1	72	4,342		0	23.0	62,082	4,342	0.0	0	0	
D10-2	498	29,863		0	66.0	178,200	29,863	27.7	22,165	0	
D10-3	122	7,338		0	0.0	0	7,338	0.0	0	0	
D10-4	119	7,116		0	0.0	0	7,116	0.0	0	0	
D10-5	100	5,988		0	11.0	29,700	5,988	0.0	0	0	
D10-6	853	51,198		0	0.0	0	51,198	30.9	24,700	0	
D11	219	13,140		0	0.0	0	13,140	31.5	25,216	0	
D12	729	43,740		0	0.0	0	43,740	70.4	56,360	0	
D2	166	9,954		0	0.0	0	9,954	11.2	8,996	0	
D3	302	18,141		0	5.7	15,347	18,141	33.2	26,564	0	
D3-1	495	29,682		0	0.0	0	29,682	50.5	40,400	0	
D3-10	901	54,075		0	0.0	0	54,075	56.5	45,200	0	
D3-11	1,377	82,638		0	0.0	0	82,638	82.7	66,148	0	
D3-12	1,458	87,490		0	0.0	0	87,490	107.7	86,137	0	
D3-13	232	13,898		0	0.0	0	13,898	22.5	18,008	0	
D3-2	409	24,534		0	0.0	0	24,534	22.9	18,320	0	
D3-3	397	23,838		0	0.0	0	23,838	29.5	23,612	0	
D3-4	314	18,863	706	7,065	0.0	0	25,928	19.9	15,956	0	
D3-5	1,909	114,519	766	7,658	3.5	9,409	122,177	120.4	96,345	0	
D3-6	170	10,204		0	1.5	4,050	10,204	20.5	16,408	0	
D3-7	463	27,774		0	0.0	0	27,774	24.9	19,927	0	
D3-8	1,382	82,908		0	0.0	0	82,908	70.0	55,984	0	
D3-9	879	52,722		0	0.0	0	52,722	63.2	50,586	0	
D4	424	25,410		0	0.0	0	25,410	31.5	25,162	0	
D5	565	33,894		0	3.3	8,910	33,894	45.9	36,685	0	
D5-1	0	0	719	7,193	6.1	16,401	7,193	19.8	15,844	10,867	YMCA
D5-2	961	57,642		0	6.1	16,585	57,642	66.2	52,975	0	
D6	675	40,482		0	0.0	0	40,482	59.0	47,239	0	
D6-1	271	16,254		0	0.0	0	16,254	22.7	18,163	0	
D6-2	2,510	150,606		0	3.2	8,631	150,606	181.1	144,899	0	
D6-3	302	18,114		0	0.0	0	18,114	32.8	26,230	0	
D6-4	472	28,314		0	0.0	0	28,314	34.8	27,850	0	
D6-5	928	55,681		0	20.0	54,000	55,681	46.9	37,482	0	
D7	151	9,036		0	0.0	0	9,036	19.0	15,180	0	
D7-1	399	23,940		0	0.0	0	23,940	13.8	11,007	0	
D7-2	438	26,280		0	0.0	0	26,280	23.5	18,774	0	
D8	161	9,648		0	2.8	7,493	9,648	23.6	18,847	0	
D9	477	28,602		0	0.0	0	28,602	49.9	39,940	0	
D9-1	429	25,725		0	0.0	0	25,725	26.3	21,016	0	
F1	51	3,053		0	0.0	0	3,053	2.7	2,190	0	
F10	1	54		0	78.1	210,951	54	56.5	45,196	0	
F11	3	180		0	29.3	79,054	180	27.9	22,292	0	
F12	14	828		0	106.5	287,564	828	58.4	46,702	0	

Marysville 2017
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/ Industrial			Infiltration / Inflow			
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Commercial Flow (gpd)	Total Residential/ School Flow (gpd)	2017 Area (acres)	Peak I/I Flow (gpd)	2017 Fixed or Pumped Flow (gpd)	Remark
F13	3	180		0	70.9	191,426	180	48.0	38,400	0	
F13-1	4	250		0	121.0	326,700	250	50.7	40,596	0	
F13-2	130	7,792		0	66.0	178,200	7,792	22.4	17,931	0	
F14	49	2,952		0	85.1	229,683	2,952	49.5	39,596	90,888	Pacific Coast Feather
F15	253	15,156		0	64.1	173,192	15,156	52.3	41,838	0	
F16	14	840		0	51.0	137,632	840	28.5	22,794	0	
F17	20	1,206		0	40.9	110,306	1,206	25.1	20,056	0	
F18	0	0		0	38.3	103,335	0	39.6	31,699	0	
F19	0	0		0	48.5	130,954	0	52.5	42,016	9,798	Medallion Hotel
F2	138	8,280		0	0.0	0	8,280	3.5	2,798	0	
F20	658	39,468		0	74.7	201,761	39,468	86.8	69,450	0	
F21	1,563	93,753		0	19.8	53,431	93,753	53.5	42,819	0	
F22	468	28,062		0	30.4	82,109	28,062	54.8	43,869	0	
F22-1	61	3,674	354	3,538	105.3	284,223	7,212	101.5	81,188	0	
F3	243	14,580		0	0.0	0	14,580	37.6	30,051	0	
F4	786	47,142		0	0.0	0	47,142	59.1	47,272	0	
F5	251	15,047	505	5,051	23.5	63,582	20,098	45.1	36,042	0	
F6	135	8,100		0	0.0	0	8,100	10.6	8,515	0	
F7	89	5,318		0	29.1	78,532	5,318	26.1	20,880	0	
F8	38	2,303		0	18.5	49,950	2,303	17.0	13,570	0	
F9	0	0		0	31.0	83,700	0	22.5	17,989	8,915	Northwest Composites
G1	550	32,972		0	37.0	99,996	32,972	75.4	60,360	0	
G2	735	44,104		0	11.4	30,806	44,104	49.2	39,332	0	
G3	3	180		0	76.9	207,602	180	56.3	45,019	0	
G4	9	540		0	27.5	74,198	540	26.1	20,854	0	
G5	432	25,920		0	0.0	0	25,920	33.8	27,023	0	
G6	390	23,400		0	0.0	0	23,400	28.9	23,124	0	
G7	98	5,889	1,310	13,105	28.8	77,764	18,993	8.1	6,508	0	
G8	14	835		0	10.5	28,381	835	12.2	9,787	0	
Totals:	65,024	3,901,417	14,514	145,143	2,963	8,000,808	4,046,560	5,708	4,566,294	214,817	

Population Table

Total Population	**72,616**
UGA Population	**69,338**
Non-UGA Population	**3,278**

Sewered Population

UGA Sewered Population	**59,656**
Non-UGA Sewered Population	**2,594**
Total Sewered Population	**62,250**

Unit Flow Table

Unit	Unit Flow Rate	
Person	60	gpd/person
Student/Staff	10	gpd/stud. of staff
Commercial	2,700	gpd/acre
Industrial	2,700	gpd/acre
Peak I/I	800	gpd/acre
Single Family	3.0	people/residence
Multi Family	2.0	people/residence

Marysville 2031
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/			Inflitration / Inflow		2031 Fixed or Pumped Flow (gpd)	
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)	Total Residential/ School Flow (gpd)	2031 Area (acres)	Peak I/I Flow (gpd)		Remark
A1	23	1,400		0	11.1	30,034	1,400	17.2	13,726	0	
A10	900	53,979	968	9,679	0.0	0	63,658	71.2	56,956	0	
A11	453	27,189		0	3.1	8,239	27,189	25.8	20,651	0	
A12	809	48,564		0	0.0	0	48,564	50.5	40,370	0	
A12-1	359	21,546		0	0.0	0	21,546	30.8	24,653	0	
A12-2	946	56,772		0	0.0	0	56,772	49.1	39,242	0	
A12-3	419	25,137	1,961	19,605	0.0	0	44,742	31.9	25,499	0	
A12-4	422	25,308		0	0.0	0	25,308	17.5	13,964	0	
A13	856	51,357		0	2.4	6,414	51,357	72.8	58,211	0	
A14	259	15,561		0	0.0	0	15,561	30.7	24,594	0	
A15	577	34,636		0	0.0	0	34,636	108.0	86,430	0	
A16	680	40,812		0	8.4	22,801	40,812	44.6	35,699	0	
A16-1	1,023	61,389		0	0.0	0	61,389	29.2	23,364	0	
A17	523	31,350		0	0.6	1,620	31,350	50.3	40,261	0	
A18	667	40,014		0	0.0	0	40,014	67.8	54,268	0	
A18-1	416	24,966		0	0.0	0	24,966	3.7	2,933	0	
A18-2	288	17,271		0	0.0	0	17,271	25.3	20,202	0	
A18-3	342	20,534		0	0.0	0	20,534	12.4	9,945	0	
A19	1,271	76,266	790	7,901	0.0	0	84,167	98.1	78,445	0	
A2	374	22,458	1,422	14,225	1.0	2,802	36,683	37.0	29,570	0	
A20	1,064	63,840		0	0.0	0	63,840	88.9	71,083	0	
A21	271	16,245		0	91.5	247,101	16,245	128.8	103,022	0	
A22	878	52,668		0	1.7	4,692	52,668	53.2	42,582	0	
A23	1,002	60,144		0	16.5	44,609	60,144	54.0	43,237	0	
A24	894	53,637		0	0.0	0	53,637	8.1	6,506	0	
A24-1	9	513		0	69.0	186,226	513	10.4	8,322	0	
A24-2	0	0		0	80.0	216,000	0	0.0	0	0	
A24-3	0	0		0	72.0	194,400	0	0.0	0	0	
A24-4	526	31,578		0	43.0	116,079	31,578	22.8	18,245	0	
A24-5	17	1,026		0	100.0	270,000	1,026	3.6	2,853	0	
A25	11	684		0	90.0	243,000	684	10.3	8,231	0	
A25-1	9	513		0	195.0	526,500	513	31.5	25,185	0	
A26	57	3,420		0	78.5	211,950	3,420	22.9	18,336	54,057	National Food Corp
A27	23	1,368		0	62.1	167,782	1,368	66.4	53,130	0	
A28	727	43,605		0	0.0	0	43,605	49.0	39,216	0	
A4	464	27,816		0	0.7	1,986	27,816	24.3	19,473	0	
A5	650	38,988		0	0.5	1,270	38,988	31.1	24,892	0	
A6	1,994	119,643		0	3.2	8,604	119,643	99.0	79,185	0	
A7	660	39,615	932	9,323	0.2	540	48,938	46.7	37,326	0	
A8	446	26,733		0	3.4	9,101	26,733	33.2	26,578	0	
A9	285	17,100		0	8.4	22,809	17,100	35.8	28,665	0	
B1	1,082	64,923		0	9.9	26,707	64,923	53.9	43,149	0	
B2	430	25,821		0	0.0	0	25,821	0.0	0	0	
B3	467	28,044		0	6.5	17,668	28,044	24.6	19,701	0	
B4	276	16,587		0	0.0	0	16,587	3.4	2,681	0	
B5	363	21,808		0	0.0	0	21,808	3.1	2,472	0	
CE1	230	13,794		0	0.0	0	13,794	15.7	12,535	0	
CE2	537	32,205		0	0.2	540	32,205	22.3	17,820	0	
CE3	382	22,914		0	0.0	0	22,914	34.1	27,261	0	
CE4	234	14,022		0	0.0	0	14,022	24.0	19,200	0	
CE5	319	19,152	1,473	14,735	0.0	0	33,887	59.1	47,306	0	
CE5-1	262	15,732	1,011	10,112	0.0	0	25,844	51.2	40,984	0	
CE5-2	247	14,820		0	99.4	268,325	14,820	112.0	89,601	0	
CE5-3	701	42,066		0	0.0	0	42,066	80.8	64,641	0	
CE5-4	108	6,498		0	7.0	18,946	6,498	21.4	17,134	0	
CE5-5	162	9,690		0	0.0	0	9,690	15.5	12,362	0	
CE5-6	225	13,509		0	0.0	0	13,509	24.2	19,347	0	
CE5-7	2,949	176,915	2,491	24,909	54.1	146,189	201,824	161.1	128,919	0	
CE6	618	37,107		0	0.0	0	37,107	49.8	39,849	0	
CE7	761	45,657		0	0.0	0	45,657	68.6	54,876	0	
CE8	353	21,204		0	0.0	0	21,204	27.3	21,828	0	
CE9	336	20,178		0	1.0	2,700	20,178	31.9	25,515	0	
CW1	1,575	94,506		0	48.0	129,557	94,506	166.1	132,843	0	
CW10	637	38,190		0	5.1	13,691	38,190	43.9	35,114	0	

Marysville 2031
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/			Infiltration / Inflow			
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)	Total Residential/ School Flow (gpd)	2031 Area (acres)	Peak I/I Flow (gpd)	2031 Fixed or Pumped Flow (gpd)	Remark
CW11	502	30,096		0	15.6	42,131	30,096	30.5	24,389	25,306	Holiday Inn Exp (8263), Haggen (8104)
CW11-1	2,097	125,838		0	28.1	75,863	125,838	55.3	44,210	0	
CW12	225	13,509		0	23.9	64,517	13,509	48.0	38,403	0	
CW13	343	20,577		0	33.3	89,933	20,577	52.4	41,919	13,161	Fred Meyer
CW14	720	43,212		0	17.4	46,903	43,212	36.2	28,938	0	
CW15	2,985	179,075		0	9.6	25,934	179,075	13.8	11,072	0	
CW2	472	28,329		0	11.9	32,090	28,329	50.6	40,444	0	
CW3	1,060	63,612	2,016	20,162	9.0	24,360	83,774	101.6	81,292	16,508	Marysville Care Center
CW4	476	28,557		0	34.3	92,539	28,557	61.1	48,902	0	
CW5	20	1,197		0	25.8	69,750	1,197	33.6	26,916	16,309	Captain Dizzy Car Wash
CW6	833	49,989		0	3.7	10,005	49,989	38.9	31,124	0	
CW7	304	18,240	424	4,236	46.7	126,058	22,476	76.4	61,085	0	
CW8	735	44,118		0	25.5	68,730	44,118	68.6	54,863	0	
CW9	3	171		0	24.5	66,202	171	35.9	28,734	0	
D1	130	7,809		0	4.1	11,070	7,809	32.6	26,048	0	
D10	274	16,416		0	0.0	0	16,416	32.3	25,877	0	
D10-1	791	47,487		0	23.0	62,082	47,487	0.0	0	0	
D10-2	1,591	95,473		0	66.0	178,200	95,473	36.8	29,446	0	
D10-3	868	52,056		0	0.0	0	52,056	0.0	0	0	
D10-4	712	42,744		0	0.0	0	42,744	0.0	0	0	
D10-5	295	17,712		0	11.0	29,700	17,712	0.0	0	0	
D10-6	1,488	89,279		0	0.0	0	89,279	41.0	32,814	0	
D11	208	12,483		0	0.0	0	12,483	34.1	27,267	0	
D12	693	41,553		0	0.0	0	41,553	88.8	71,036	0	
D2	160	9,576		0	0.0	0	9,576	14.9	11,951	0	
D3	316	18,981		0	5.7	15,347	18,981	44.1	35,290	0	
D3-1	553	33,174		0	0.0	0	33,174	67.1	53,670	0	
D3-10	884	53,067		0	0.0	0	53,067	75.1	60,048	0	
D3-11	1,342	80,541		0	0.0	0	80,541	109.8	87,878	0	
D3-12	2,294	137,669		0	0.0	0	137,669	143.0	114,432	0	
D3-13	531	31,860		0	0.0	0	31,860	29.9	23,923	0	
D3-2	390	23,427		0	0.0	0	23,427	30.4	24,339	0	
D3-3	430	25,821		0	0.0	0	25,821	39.2	31,368	0	
D3-4	513	30,791	939	9,385	0.0	0	40,176	26.5	21,198	0	
D3-5	2,503	150,195	1,017	10,174	3.5	9,409	160,369	160.0	127,994	0	
D3-6	368	22,075		0	1.5	4,050	22,075	27.2	21,798	0	
D3-7	510	30,609		0	0.0	0	30,609	33.1	26,472	0	
D3-8	1,317	79,002		0	0.0	0	79,002	93.0	74,374	0	
D3-9	841	50,445		0	0.0	0	50,445	79.8	63,811	0	
D4	406	24,339		0	0.0	0	24,339	38.9	31,126	0	
D5	559	33,516		0	3.3	8,910	33,516	59.2	47,361	0	
D5-1	0	0	956	9,555	6.1	16,401	9,555	26.3	21,048	14,436	YMCA
D5-2	919	55,119		0	6.1	16,585	55,119	78.5	62,789	0	
D6	647	38,817		0	0.0	0	38,817	76.3	61,059	0	
D6-1	259	15,561		0	0.0	0	15,561	26.8	21,467	0	
D6-2	2,423	145,350		0	3.2	8,631	145,350	240.6	192,497	0	
D6-3	289	17,328		0	0.0	0	17,328	37.9	30,345	0	
D6-4	450	27,018		0	0.0	0	27,018	46.2	36,998	0	
D6-5	1,389	83,326		0	20.0	54,000	83,326	62.2	49,795	0	
D7	151	9,063		0	0.0	0	9,063	23.5	18,824	0	
D7-1	379	22,743		0	0.0	0	22,743	18.3	14,623	0	
D7-2	416	24,966		0	0.0	0	24,966	31.2	24,941	0	
D8	157	9,405		0	2.8	7,493	9,405	28.4	22,692	0	
D9	459	27,531		0	0.0	0	27,531	66.3	53,060	0	
D9-1	422	25,308		0	0.0	0	25,308	34.9	27,919	0	
F1	130	7,779		0	0.0	0	7,779	3.6	2,909	0	
F10	3	171		0	78.1	210,951	171	75.1	60,042	0	
F11	3	171		0	29.3	79,054	171	37.0	29,615	0	
F12	17	1,026		0	106.5	287,564	1,026	77.6	62,044	0	
F13	3	171		0	70.9	191,426	171	63.8	51,014	0	
F13-1	413	24,793		0	121.0	326,700	24,793	67.4	53,932	0	
F13-2	154	9,234		0	66.0	178,200	9,234	29.8	23,821	0	
F14	83	4,959		0	85.1	229,683	4,959	65.8	52,602	120,744	Pacific Coast Feather

Marysville 2031
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/			Inflitration / Inflow		2031 Fixed or Pumped Flow (gpd)	
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)	Total Residential/ School Flow (gpd)	2031 Area (acres)	Peak I/I Flow (gpd)		Remark
F15	248	14,877		0	64.1	173,192	14,877	69.5	55,582	0	
F16	13	798		0	51.0	137,632	798	37.9	30,282	0	
F17	37	2,223		0	40.9	110,306	2,223	33.3	26,644	0	
F18	0	0		0	38.3	103,335	0	39.6	31,699	0	
F19	0	0		0	48.5	130,954	0	52.5	42,016	13,017	Medallion Hotel
F2	351	21,033		0	0.0	0	21,033	4.6	3,718	0	
F20	1,088	65,270		0	74.7	201,761	65,270	115.3	92,264	0	
F21	1,745	104,709		0	19.8	53,431	104,709	71.1	56,884	0	
F22	856	51,357		0	30.4	82,109	51,357	72.8	58,279	0	
F22-1	1,146	68,753	470	4,700	105.3	284,223	73,454	134.8	107,858	0	
F3	231	13,851		0	0.0	0	13,851	39.2	31,341	0	
F4	892	53,523		0	0.0	0	53,523	78.5	62,800	0	
F5	562	33,703	671	6,710	23.5	63,582	40,413	59.9	47,882	0	
F6	128	7,695		0	0.0	0	7,695	13.2	10,579	0	
F7	213	12,808		0	29.1	78,532	12,808	34.7	27,739	0	
F8	135	8,102		0	18.5	49,950	8,102	22.5	18,028	0	
F9	0	0		0	31.0	83,700	0	29.9	23,898	11,844	Northwest Composites
G1	709	42,567		0	37.0	99,996	42,567	100.2	80,187	0	
G2	1,406	84,359		0	11.4	30,806	84,359	65.3	52,253	0	
G3	3	171		0	76.9	207,602	171	74.8	59,807	0	
G4	29	1,710		0	27.5	74,198	1,710	34.6	27,704	0	
G5	410	24,624		0	0.0	0	24,624	44.9	35,899	0	
G6	371	22,230		0	0.0	0	22,230	38.4	30,720	0	
G7	335	20,111	1,741	17,410	28.8	77,764	37,521	10.8	8,646	0	
G8	66	3,975		0	10.5	28,381	3,975	16.3	13,002	0	
Totals:	86,732	5,203,895	19,282	192,822	2,963	8,000,808	5,396,717	7,340	5,871,741	285,382	19,554,649
							5.40		5.87	0.29	19.55

Population Table

Total Population	**84,989**
UGA Population	**87,757**
Non-UGA Population	**3,278**

Sewered Population

UGA Sewered Population	**84,989**
Non-UGA Sewered Population	**3,278**
Total Sewered Population	**87,757**

Unit Flow Table

Unit	Unit Flow Rate	
Person	60	gpd/person
Student/Sta	10	gpd/stud. of staff
Commercial	2,700	gpd/acre
Industrial	1,000	gpd/acre
Peak I/I	800	gpd/acre
Single Fam	3.0	people/residence
Multi Famil	2.0	people/residence

Marysville 2031
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/					Infiltration / Inflow		2031	
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)			Total Residential/ School Flow (gpd)	2031 Area (acres)	Peak I/I Flow (gpd)	Fixed or Pumped Flow (gpd)	Remark
A1	23	1,400		0	11.1	30,034			1,400	17.2	13,726	0	
A10	900	53,979	968	9,679	0.0	0			63,658	71.2	56,956	0	
A11	453	27,189		0	3.1	8,239			27,189	25.8	20,651	0	
A12	809	48,564		0	0.0	0			48,564	50.5	40,370	0	
A12-1	359	21,546		0	0.0	0			21,546	30.8	24,653	0	
A12-2	946	56,772		0	0.0	0			56,772	49.1	39,242	0	
A12-3	419	25,137	1,961	19,605	0.0	0			44,742	31.9	25,499	0	
A12-4	422	25,308		0	0.0	0			25,308	17.5	13,964	0	
A13	856	51,357		0	2.4	6,414			51,357	72.8	58,211	0	
A14	259	15,561		0	0.0	0			15,561	30.7	24,594	0	
A15	577	34,636		0	0.0	0			34,636	108.0	86,430	0	
A16	680	40,812		0	8.4	22,801			40,812	44.6	35,699	0	
A16(Future)	3,484	209,040		0	0.0	0			209,040	1182.0	945,600	0	
A16-1	1,023	61,389		0	0.0	0			61,389	29.2	23,364	0	
A17	523	31,350		0	0.6	1,620			31,350	50.3	40,261	0	
A18	667	40,014		0	0.0	0			40,014	67.8	54,268	0	
A18(Future)	531	31,860		0	0.0	0			31,860	180.0	144,000	0	
A18-1	416	24,966		0	0.0	0			24,966	3.7	2,933	0	
A18-2	288	17,271		0	0.0	0			17,271	25.3	20,202	0	
A18-3	342	20,534		0	0.0	0			20,534	12.4	9,945	0	
A18-3(Future	473	28,380		0	0.0	0			28,380	160.0	128,000	0	
A19	1,271	76,266	790	7,901	0.0	0			84,167	98.1	78,445	0	
A2	374	22,458	1,422	14,225	1.0	2,802			36,683	37.0	29,570	0	
A20	1,064	63,840		0	0.0	0			63,840	88.9	71,083	0	
A21	271	16,245		0	91.5	247,101			16,245	128.8	103,022	0	
A22	878	52,668		0	1.7	4,692			52,668	53.2	42,582	0	
A23	1,002	60,144		0	16.5	44,609			60,144	54.0	43,237	0	
A24	894	53,637		0	0.0	0			53,637	8.1	6,506	0	
A24(Future)	5,993	359,580		0	0.0	0			359,580	2034.0	1,627,200	0	
A24-1	9	513		0	69.0	186,226			513	10.4	8,322	0	
A24-2	0	0		0	80.0	216,000			0	0.0	0	0	
A24-3	0	0		0	72.0	194,400			0	0.0	0	0	
A24-4	526	31,578		0	43.0	116,079			31,578	22.8	18,245	0	
A24-5	17	1,026		0	100.0	270,000			1,026	3.6	2,853	0	
A25	11	684		0	90.0	243,000			684	10.3	8,231	0	
A25-1	9	513		0	195.0	526,500			513	31.5	25,185	0	
A26	57	3,420		0	78.5	211,950			3,420	22.9	18,336	54,057	National Food Corp
A27	23	1,368		0	62.1	167,782			1,368	66.4	53,130	0	
A28	727	43,605		0	0.0	0			43,605	49.0	39,216	0	
A4	464	27,816		0	0.7	1,986			27,816	24.3	19,473	0	
A5	650	38,988		0	0.5	1,270			38,988	31.1	24,892	0	
A6	1,994	119,643		0	3.2	8,604			119,643	99.0	79,185	0	
A7	660	39,615	932	9,323	0.2	540			48,938	46.7	37,326	0	
A8	446	26,733		0	3.4	9,101			26,733	33.2	26,578	0	
A9	285	17,100		0	8.4	22,809			17,100	35.8	28,665	0	
B1	1,082	64,923		0	9.9	26,707			64,923	53.9	43,149	0	
B2	430	25,821		0	0.0	0			25,821	0.0	0	0	
B3	467	28,044		0	6.5	17,668			28,044	24.6	19,701	0	
B4	276	16,587		0	0.0	0			16,587	3.4	2,681	0	
B5	363	21,808		0	0.0	0			21,808	3.1	2,472	0	
CE1	230	13,794		0	0.0	0			13,794	15.7	12,535	0	
CE2	537	32,205		0	0.2	540			32,205	22.3	17,820	0	
CE3	382	22,914		0	0.0	0			22,914	34.1	27,261	0	
CE4	234	14,022		0	0.0	0			14,022	24.0	19,200	0	
CE5	319	19,152	1,473	14,735	0.0	0			33,887	59.1	47,306	0	
CE5-1	262	15,732	1,011	10,112	0.0	0			25,844	51.2	40,984	0	
CE5-2	247	14,820		0	99.4	268,325			14,820	112.0	89,601	0	
CE5-3	701	42,066		0	0.0	0			42,066	80.8	64,641	0	
CE5-3(Future	1,092	65,520		0	0.0	0			65,520	370.0	296,000	0	
CE5-4	108	6,498		0	7.0	18,946			6,498	21.4	17,134	0	
CE5-5	162	9,690		0	0.0	0			9,690	15.5	12,362	0	
CE5-6	225	13,509		0	0.0	0			13,509	24.2	19,347	0	
CE5-7	2,949	176,915	2,491	24,909	54.1	146,189			201,824	161.1	128,919	0	
CE6	618	37,107		0	0.0	0			37,107	49.8	39,849	0	

Marysville 2031
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/					Infiltration / Inflow			
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)			Total Residential/ School Flow (gpd)	2031 Area (acres)	Peak I/I Flow (gpd)	2031 Fixed or Pumped Flow (gpd)	Remark
CE7	761	45,657		0	0.0	0			45,657	68.6	54,876	0	
CE8	353	21,204		0	0.0	0			21,204	27.3	21,828	0	
CE9	336	20,178		0	1.0	2,700			20,178	31.9	25,515	0	
CW1	1,575	94,506		0	48.0	129,557			94,506	166.1	132,843	0	
CW10	637	38,190		0	5.1	13,691			38,190	43.9	35,114	0	
CW11	502	30,096		0	15.6	42,131			30,096	30.5	24,389	25,306	Holiday Inn Exp (8263), Haggen (8104)
CW11-1	2,097	125,838		0	28.1	75,863			125,838	55.3	44,210	0	
CW12	225	13,509		0	23.9	64,517			13,509	48.0	38,403	0	
CW13	343	20,577		0	33.3	89,933			20,577	52.4	41,919	13,161	Fred Meyer
CW14	720	43,212		0	17.4	46,903			43,212	36.2	28,938	0	
CW15	2,985	179,075		0	9.6	25,934			179,075	13.8	11,072	0	
CW2	472	28,329		0	11.9	32,090			28,329	50.6	40,444	0	
CW3	1,060	63,612	2,016	20,162	9.0	24,360			83,774	101.6	81,292	16,508	Marysville Care Center
CW4	476	28,557		0	34.3	92,539			28,557	61.1	48,902	0	
CW5	20	1,197		0	25.8	69,750			1,197	33.6	26,916	16,309	Captain Dizzy Car Wash
CW6	833	49,989		0	3.7	10,005			49,989	38.9	31,124	0	
CW7	304	18,240	424	4,236	46.7	126,058			22,476	76.4	61,085	0	
CW8	735	44,118		0	25.5	68,730			44,118	68.6	54,863	0	
CW9	3	171		0	24.5	66,202			171	35.9	28,734	0	
D1	130	7,809		0	4.1	11,070			7,809	32.6	26,048	0	
D10	274	16,416		0	0.0	0			16,416	32.3	25,877	0	
D10-1	791	47,487		0	23.0	62,082			47,487	0.0	0	0	
D10-2	1,591	95,473		0	66.0	178,200			95,473	36.8	29,446	0	
D10-3	868	52,056		0	0.0	0			52,056	0.0	0	0	
D10-4	712	42,744		0	0.0	0			42,744	0.0	0	0	
D10-5	295	17,712		0	11.0	29,700			17,712	0.0	0	0	
D10-6	1,488	89,279		0	0.0	0			89,279	41.0	32,814	0	
D11	208	12,483		0	0.0	0			12,483	34.1	27,267	0	
D12	693	41,553		0	0.0	0			41,553	88.8	71,036	0	
D2	160	9,576		0	0.0	0			9,576	14.9	11,951	0	
D3	316	18,981		0	5.7	15,347			18,981	44.1	35,290	0	
D3-1	553	33,174		0	0.0	0			33,174	67.1	53,670	0	
D3-10	884	53,067		0	0.0	0			53,067	75.1	60,048	0	
D3-11	1,342	80,541		0	0.0	0			80,541	109.8	87,878	0	
D3-12	2,294	137,669		0	0.0	0			137,669	143.0	114,432	0	
D3-13	531	31,860		0	0.0	0			31,860	29.9	23,923	0	
D3-2	390	23,427		0	0.0	0			23,427	30.4	24,339	0	
D3-3	430	25,821		0	0.0	0			25,821	39.2	31,368	0	
D3-4	513	30,791	939	9,385	0.0	0			40,176	26.5	21,198	0	
D3-5	2,503	150,195	1,017	10,174	3.5	9,409			160,369	160.0	127,994	0	
D3-6	368	22,075		0	1.5	4,050			22,075	27.2	21,798	0	
D3-7	510	30,609		0	0.0	0			30,609	33.1	26,472	0	
D3-8	1,317	79,002		0	0.0	0			79,002	93.0	74,374	0	
D3-9	841	50,445		0	0.0	0			50,445	79.8	63,811	0	
D4	406	24,339		0	0.0	0			24,339	38.9	31,126	0	
D5	559	33,516		0	3.3	8,910			33,516	59.2	47,361	0	
D5-1	0	0	956	9,555	6.1	16,401			9,555	26.3	21,048	14,436	YMCA
D5-2	919	55,119		0	6.1	16,585			55,119	78.5	62,789	0	
D6	647	38,817		0	0.0	0			38,817	76.3	61,059	0	
D6-1	259	15,561		0	0.0	0			15,561	26.8	21,467	0	
D6-2	2,423	145,350		0	3.2	8,631			145,350	240.6	192,497	0	
D6-3	289	17,328		0	0.0	0			17,328	37.9	30,345	0	
D6-4	450	27,018		0	0.0	0			27,018	46.2	36,998	0	
D6-5	1,389	83,326		0	20.0	54,000			83,326	62.2	49,795	0	
D7	151	9,063		0	0.0	0			9,063	23.5	18,824	0	
D7-1	379	22,743		0	0.0	0			22,743	18.3	14,623	0	
D7-2	416	24,966		0	0.0	0			24,966	31.2	24,941	0	
D8	157	9,405		0	2.8	7,493			9,405	28.4	22,692	0	
D9	459	27,531		0	0.0	0			27,531	66.3	53,060	0	
D9-1	422	25,308		0	0.0	0			25,308	34.9	27,919	0	
F1	130	7,779		0	0.0	0			7,779	3.6	2,909	0	
F10	3	171		0	78.1	210,951			171	75.1	60,042	0	
F11	3	171		0	29.3	79,054			171	37.0	29,615	0	

Marysville 2031
Sewer Sub-Basin Flows

	Residential		Schools		Commercial/					Infiltration / Inflow			
BASINS (service area)	Total Existing Population On Sewer	Residential Wastewater Flow (gpd)	School Population	School Wastewater Flow (gpd)	Area (acres)	Average Flow (gpd)			Total Residential/ School Flow (gpd)	2031 Area (acres)	Peak I/I Flow (gpd)	2031 Fixed or Pumped Flow (gpd)	Remark
F12	17	1,026		0	106.5	287,564			1,026	77.6	62,044	0	
F13	3	171		0	70.9	191,426			171	63.8	51,014	0	
F13(Future)	28,405	1,704,300		0	0.0	0			1,704,300	2153.0	1,722,400	0	
F13-1	413	24,793		0	121.0	326,700			24,793	67.4	53,932	0	
F13-2	154	9,234		0	66.0	178,200			9,234	29.8	23,821	0	
F14	83	4,959		0	85.1	229,683			4,959	65.8	52,602	120,744	Pacific Coast Feather
F15	248	14,877		0	64.1	173,192			14,877	69.5	55,582	0	
F16	13	798		0	51.0	137,632			798	37.9	30,282	0	
F17	37	2,223		0	40.9	110,306			2,223	33.3	26,644	0	
F18	0	0		0	38.3	103,335			0	39.6	31,699	0	
F19	0	0		0	48.5	130,954			0	52.5	42,016	13,017	Medallion Hotel
F2	351	21,033		0	0.0	0			21,033	4.6	3,718	0	
F20	1,088	65,270		0	74.7	201,761			65,270	115.3	92,264	0	
F21	1,745	104,709		0	19.8	53,431			104,709	71.1	56,884	0	
F22	856	51,357		0	30.4	82,109			51,357	72.8	58,279	0	
F22(Future)	28,291	1,697,460		0	0.0	0			1,697,460	2144.0	1,715,200	0	
F22-1	1,146	68,753	470	4,700	105.3	284,223			73,454	134.8	107,858	0	
F3	231	13,851		0	0.0	0			13,851	39.2	31,341	0	
F4	892	53,523		0	0.0	0			53,523	78.5	62,800	0	
F5	562	33,703	671	6,710	23.5	63,582			40,413	59.9	47,882	0	
F6	128	7,695		0	0.0	0			7,695	13.2	10,579	0	
F7	213	12,808		0	29.1	78,532			12,808	34.7	27,739	0	
F8	135	8,102		0	18.5	49,950			8,102	22.5	18,028	0	
F9	0	0		0	31.0	83,700			0	29.9	23,898	11,844	Northwest Composites
G1	709	42,567		0	37.0	99,996			42,567	100.2	80,187	0	
G2	1,406	84,359		0	11.4	30,806			84,359	65.3	52,253	0	
G3	3	171		0	76.9	207,602			171	74.8	59,807	0	
G4	29	1,710		0	27.5	74,198			1,710	34.6	27,704	0	
G5	410	24,624		0	0.0	0			24,624	44.9	35,899	0	
G6	371	22,230		0	0.0	0			22,230	38.4	30,720	0	
G7	335	20,111	1,741	17,410	28.8	77,764			37,521	10.8	8,646	0	
G8	66	3,975		0	10.5	28,381			3,975	16.3	13,002	0	
Totals:	65,024	9,300,035	19,282	192,822	2,963	8,000,808			9,492,857	15,563	12,450,141	285,382	

Population Table

Total Planning Population	**159,575**
UGA Population	**88,032**
Non-UGA Population	**71,543**

Unit Flow Table

Unit	Unit Flow Rate	
Person	60	gpd/person
Student/Staff	10	gpd/stud. of staff
Commercial	2,700	gpd/acre
Industrial	1,000	gpd/acre
Peak I/I	800	gpd/acre
Single Family	3.0	people/residence
Multi Family	2.0	people/residence

Marysville Sewer Comprehensive Plan
2011 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
A1	0.0	20.9	8.5	0.0	S-MH-3559
A10	10.8	0.0	0.0	0.0	S-MH-2323
A10	9.4	0.0	17.6	0.0	S-MH-2141
A10	9.4	0.0	17.6	0.0	S-MH-2332
A11	15.0	5.7	12.8	0.0	S-MH-2189
A12	11.3	0.0	12.5	0.0	S-MH-2290
A12	11.3	0.0	12.5	0.0	S-MH-2198
A12-1	14.8	0.0	15.2	0.0	S-MH-2300
A12-2	33.4	0.0	24.2	0.0	S-MH-2225
A12-3	15.5	0.0	0.0	0.0	S-MH-3632
A12-3	5.9	0.0	7.9	0.0	S-MH-2259
A12-3	5.7	0.0	7.9	0.0	S-MH-2235
A12-4	12.1	0.0	8.6	0.0	MH-231
A13	23.5	2.2	24.0	0.0	S-MH-2315
A13	9.8	2.2	12.0	0.0	S-MH-3791
A14	8.3	0.0	15.2	0.0	S-MH-2386
A15	8.0	0.0	50.3	0.0	S-MH-2396
A15	8.0	0.0	50.3	0.0	S-MH-2419
A16	6.7	0.0	11.0	0.0	S-MH-2402
A16	6.7	0.0	11.0	0.0	S-MH-2401
A16-1	20.4	0.0	14.4	0.0	S-MH-4810
A16-1	20.4	0.0	14.4	0.0	S-MH-4742
A17	10.4	1.1	24.9	0.0	S-MH-2739
A18	9.9	0.0	13.6	0.0	S-MH-2743
A18	7.9	0.0	9.9	0.0	S-MH-2742
A18	7.9	0.0	9.9	0.0	S-MH-2856
A18-1	0.8	0.0	1.8	0.0	S-MH-2915
A18-2	12.6	0.0	14.0	0.0	S-MH-2865
A18-3	6.3	0.0	6.1	0.0	S-MH-2840
A19	32.0	0.0	48.4	0.0	S-MH-2733
A2	21.6	1.9	25.0	0.0	S-MH-336
A20	10.9	0.0	14.6	0.0	S-MH-2887
A20	10.9	0.0	14.6	0.0	MH-4
A20	10.9	0.0	14.6	0.0	S-MH-2727
A21	5.6	0.0	27.9	0.0	S-MH-2597
A21	2.7	53.0	14.0	0.0	S-MH-2980
A21	2.4	53.0	21.7	0.0	S-MH-2772
A22	8.7	0.0	8.8	0.0	S-MH-2795
A22	8.7	1.6	8.8	0.0	S-MH-2781
A22	3.6	1.6	8.8	0.0	S-MH-3595
A23	11.7	0.8	13.3	0.0	S-MH-2919
A23	11.7	0.2	13.4	0.0	S-MH-2969
A24	35.7	0.0	4.0	0.0	S-MH-3016
A24-1	0.1	0.9	2.6	0.0	S-MH-2815
A24-1	0.1	0.9	2.6	0.0	S-MH-3022
A24-2	0.0	0.0	0.0	0.0	S-MH-3614
A24-2	0.0	0.0	0.0	0.0	S-MH-3619
A24-3	0.0	0.0	0.0	0.0	S-MH-3622
A24-3	0.0	0.0	0.0	0.0	S-MH-3617
A24-4	7.6	0.0	3.8	0.0	S-MH-3080
A24-4	7.6	33.7	3.7	0.0	S-MH-3099
A24-4	7.6	0.0	3.7	0.0	S-MH-3077
A24-5	0.3	0.0	1.8	0.0	S-MH-2814
A25	0.3	0.0	5.1	0.0	S-MH-3837
A25-1	0.3	0.0	15.6	0.0	S-MH-3143
A26	0.9	4.0	3.8	24.3	S-MH-3422
A26	0.7	8.0	3.8	0.0	S-MH-3838
A26	0.7	4.0	3.8	0.0	S-MH-3139
A27	0.5	59.5	26.2	0.0	S-MH-3415
A27	0.1	0.0	6.6	0.0	S-MH-3403
A28	11.5	0.0	16.1	0.0	S-MH-3430
A28	5.8	0.0	8.1	0.0	S-MH-3443
A4	15.1	1.4	12.0	0.0	S-MH-357
A5	20.5	0.9	15.4	0.0	S-MH-277
A6	18.1	2.0	16.3	0.0	MH-22
A6	17.3	2.0	16.3	0.0	S-MH-3768
A6	17.3	0.0	16.3	0.0	S-MH-1548
A7	8.9	0.0	23.1	0.0	S-MH-1455
A7	6.4	0.4	0.0	0.0	S-MH-1494
A8	10.1	6.3	16.4	0.0	S-MH-1795
A9	7.6	15.8	19.3	0.0	S-MH-2333
B1	9.8	7.1	13.3	0.0	S-MH-750
B1	9.6	7.1	13.3	0.0	S-MH-800

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
2011 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
B2	0.0	0.0	0.0	0.0	S-MH-795
B3	7.1	12.3	12.2	0.0	S-MH-789
B4	2.4	0.0	1.7	0.0	S-MH-1648
B5	1.5	0.0	1.5	0.0	MH-216
CE1	5.6	0.0	7.7	0.0	S-MH-1522
CE2	10.4	0.4	11.0	0.0	S-MH-1751
CE3	11.8	0.0	16.8	0.0	S-MH-1745
CE4	7.8	0.0	11.9	0.0	S-MH-1743
CE5	8.3	0.0	0.0	0.0	S-MH-1753
CE5	3.7	0.0	29.2	0.0	S-MH-1688
CE5-1	10.6	0.0	12.5	0.0	S-MH-1679
CE5-1	2.9	0.0	12.8	0.0	S-MH-1671
CE5-2	10.8	186.3	81.6	0.0	S-MH-1657
CE5-3	29.0	0.0	39.9	0.0	S-MH-1964
CE5-4	4.8	5.9	10.6	0.0	S-MH-3757
CE5-5	5.7	0.0	7.6	0.0	S-MH-1973
CE5-6	9.8	0.0	11.9	0.0	S-MH-1943
CE5-7	65.3	26.5	79.6	0.0	S-MH-4642
CE6	19.0	0.0	24.6	0.0	S-MH-2074
CE7	32.3	0.0	33.9	0.0	S-MH-2117
CE8	15.5	0.0	15.3	0.0	S-MH-2062
CE9	14.4	0.0	15.8	0.0	S-MH-2281
CW1	25.7	90.0	27.4	0.0	S-MH-3577
CW1	25.4	0.0	54.7	0.0	S-MH-483
CW10	15.7	3.2	21.7	0.0	S-MH-1513
CW11	1.8	29.3	15.1	11.4	S-MH-1765
CW11-1	2.2	0.0	13.7	0.0	S-MH-1775
CW11-1	2.2	52.7	13.7	0.0	S-MH-4716
CW12	5.4	34.9	23.7	0.0	S-MH-1537
CW13	12.3	62.5	33.0	5.9	S-MH-1800
CW14	5.6	16.3	8.9	0.0	S-MH-1852
CW14	2.3	16.3	8.9	0.0	S-MH-1849
CW15	1.3	7.1	3.4	0.0	S-MH-1834
CW15	1.3	0.0	3.4	0.0	S-MH-4377
CW2	13.8	9.9	16.7	0.0	S-MH-481
CW2	6.8	9.9	8.3	0.0	S-MH-477
CW3	47.5	16.9	58.7	7.4	S-MH-308
CW4	15.0	56.4	30.2	0.0	S-MH-449
CW5	0.8	47.8	20.2	7.3	S-MH-4089
CW6	26.5	5.8	19.2	0.0	S-MH-1369
CW7	14.9	64.0	42.4	0.0	S-MH-246
CW8	14.2	0.0	16.9	0.0	S-MH-1564
CW8	14.1	45.7	16.9	0.0	S-MH-1567
CW9	0.1	28.9	23.9	0.0	S-MH-1568
D1	3.8	7.7	16.1	0.0	S-MH-533
D10	12.0	0.0	16.0	0.0	S-MH-2007
D10-1	0.0	0.0	0.0	0.0	S-MH-3916
D10-2	16.3	0.0	18.2	0.0	S-MH-4192
D10-3	0.0	0.0	0.0	0.0	S-MH-4546
D10-4	0.0	0.0	0.0	0.0	S-MH-4864
D10-5	0.0	0.0	0.0	0.0	S-MH-905
D10-6	20.9	0.0	20.3	0.0	S-MH-4545
D11	9.1	0.0	20.7	0.0	S-MH-1924
D12	28.3	0.0	46.2	0.0	S-MH-3732
D2	6.3	0.0	7.4	0.0	S-MH-624
D3	10.6	10.7	21.8	0.0	S-MH-641
D3-1	8.7	0.0	16.6	0.0	S-MH-1305
D3-1	8.7	0.0	16.6	0.0	S-MH-635
D3-10	16.0	0.0	18.5	0.0	S-MH-40
D3-10	16.0	0.0	18.5	0.0	S-MH-975
D3-11	51.8	0.0	54.3	0.0	S-MH-4872
D3-12	48.7	0.0	70.7	0.0	S-MH-110
D3-13	6.3	0.0	14.8	0.0	S-MH-1318
D3-2	16.6	0.0	15.0	0.0	S-MH-1209
D3-3	13.9	0.0	19.4	0.0	S-MH-1216
D3-4	14.7	0.0	13.1	0.0	S-MH-3697
D3-5	31.5	3.3	35.6	0.0	S-MH-3382
D3-5	21.0	1.6	23.7	0.0	S-MH-3357
D3-5	17.5	1.6	19.8	0.0	S-MH-3381
D3-6	5.2	0.0	13.5	0.0	S-MH-3309
D3-7	15.9	0.0	16.3	0.0	S-MH-3294
D3-8	28.8	0.0	23.0	0.0	MH-162

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

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Marysville Sewer Comprehensive Plan
2011 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
D3-8	28.8	0.0	23.0	0.0	S-MH-3672
D3-9	15.8	0.0	20.8	0.0	S-MH-3677
D3-9	15.7	0.0	20.8	0.0	S-MH-3705
D4	17.6	0.0	20.6	0.0	S-MH-844
D5	22.9	6.2	30.1	0.0	S-MH-669
D5-1	4.3	11.4	13.0	6.5	S-MH-852
D5-2	19.8	11.5	21.7	0.0	S-MH-853
D5-2	19.7	0.0	21.7	0.0	S-MH-916
D6	26.4	0.0	38.8	0.0	S-MH-706
D6-1	11.0	0.0	14.9	0.0	S-MH-717
D6-2	94.0	6.0	118.9	0.0	S-MH-906
D6-3	12.3	0.0	21.5	0.0	S-MH-898
D6-4	19.6	0.0	22.8	0.0	S-MH-1006
D6-5	32.9	0.0	30.8	0.0	S-MH-1071
D7	6.1	0.0	12.5	0.0	S-MH-1609
D7-1	16.6	0.0	9.0	0.0	S-MH-1591
D7-2	18.3	0.0	15.4	0.0	S-MH-1593
D8	6.5	5.2	15.5	0.0	S-MH-2001
D9	18.1	0.0	32.8	0.0	S-MH-924
D9-1	15.3	0.0	17.2	0.0	S-MH-1169
F1	0.9	0.0	1.8	0.0	S-MH-2362
F10	0.0	19.0	24.8	0.0	S-MH-2705
F10	0.0	75.9	12.3	0.0	MH-102
F11	0.1	43.6	18.3	0.0	S-MH-2589
F12	0.3	47.6	19.2	0.0	S-MH-2719
F12	0.3	47.6	19.2	0.0	S-MH-2596
F13	0.1	67.3	31.5	0.0	S-MH-3462
F13-1	0.0	0.9	16.7	0.0	S-MH-4564
F13-1	0.0	0.9	16.7	0.0	S-MH-4568
F13-2	4.5	0.0	14.7	0.0	S-MH-4576
F14	0.6	32.9	10.8	54.2	S-MH-3847
F14	0.4	0.0	10.8	0.0	S-MH-3845
F14	0.4	32.9	10.8	0.0	S-MH-3467
F15	3.6	25.6	11.4	0.0	S-MH-3470
F15	3.5	25.6	11.5	0.0	S-MH-3044
F15	3.3	12.8	11.5	0.0	S-MH-3638
F16	0.3	8.6	9.4	0.0	S-MH-3527
F16	0.3	8.6	9.4	0.0	S-MH-3525
F17	0.3	19.6	8.2	0.0	S-MH-3531
F17	0.2	19.6	8.2	0.0	S-MH-3533
F18	0.0	24.6	20.7	0.0	S-MH-3538
F18	0.0	24.6	20.7	0.0	S-MH-3109
F19	0.0	36.4	18.6	0.0	S-MH-3536
F19	0.0	54.6	18.6	5.8	S-MH-3498
F2	1.6	0.0	2.3	0.0	S-MH-2363
F20	18.1	98.9	25.9	0.0	S-MH-3506
F20	5.4	0.0	31.1	0.0	S-MH-3510
F21	55.5	3.4	35.1	0.0	S-MH-3205
F22	3.2	0.0	12.0	0.0	S-MH-3155
F22	3.2	57.0	12.0	0.0	S-MH-3148
F22	3.2	0.0	11.9	0.0	S-MH-4910
F22-1	2.1	4.7	66.6	0.0	S-MH-3239
F3	10.1	0.0	24.7	0.0	S-MH-2364
F4	30.0	0.0	38.8	0.0	S-MH-2708
F5	8.5	34.8	23.7	0.0	S-MH-2357
F5	2.1	34.8	5.9	0.0	S-MH-2356
F6	5.6	0.0	7.0	0.0	S-MH-3860
F7	2.6	28.3	17.1	0.0	MH-166
F8	1.1	17.8	11.1	0.0	S-MH-2760
F9	0.0	35.6	14.8	5.3	S-MH-2684
G1	19.4	59.0	49.5	0.0	S-MH-428
G2	11.9	12.0	16.1	0.0	S-MH-420
G2	11.9	0.0	16.1	0.0	S-MH-464
G3	0.1	144.2	36.9	0.0	S-MH-2476
G4	0.0	42.2	17.1	0.0	S-MH-2540
G5	18.0	0.0	22.2	0.0	S-MH-2482
G6	16.3	0.0	19.0	0.0	S-MH-2509
G7	8.2	0.0	5.3	0.0	S-MH-2548
G8	0.0	19.7	8.0	0.0	S-MH-2550
Total (gpm):	**2,324**	**2,414**	**3,818**	**128**	

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
2017 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
A1	0.1	20.9	7.2	0.0	S-MH-3559
A10	13.5	0.0	0.0	0.0	S-MH-2323
A10	11.7	0.0	14.9	0.0	S-MH-2141
A10	11.7	0.0	14.9	0.0	S-MH-2332
A11	17.5	5.7	10.8	0.0	S-MH-2189
A12	14.4	0.0	10.6	0.0	S-MH-2290
A12	14.4	0.0	10.6	0.0	S-MH-2198
A12-1	15.4	0.0	12.9	0.0	S-MH-2300
A12-2	39.6	0.0	20.5	0.0	S-MH-2225
A12-3	6.1	0.0	6.7	0.0	S-MH-3632
A12-3	6.2	0.0	6.7	0.0	S-MH-2259
A12-3	16.4	0.0	0.0	0.0	S-MH-2235
A12-4	14.6	0.0	7.3	0.0	MH-231
A13	10.6	2.2	10.1	0.0	S-MH-2315
A13	25.4	2.2	20.3	0.0	S-MH-3791
A14	9.2	0.0	12.9	0.0	S-MH-2386
A15	9.4	0.0	30.0	0.0	S-MH-2396
A15	9.4	0.0	30.0	0.0	S-MH-2419
A16	9.6	0.0	9.3	0.0	S-MH-2402
A16	9.6	15.8	9.3	0.0	S-MH-2401
A16-1	30.3	0.0	12.2	0.0	S-MH-4810
A16-1	30.3	0.0	12.2	0.0	S-MH-4742
A17	15.9	1.1	21.0	0.0	S-MH-2739
A18	8.8	0.0	8.4	0.0	S-MH-2743
A18	11.0	0.0	11.5	0.0	S-MH-2742
A18	8.8	0.0	8.4	0.0	S-MH-2856
A18-1	6.8	0.0	1.5	0.0	S-MH-2915
A18-2	12.6	0.0	11.9	0.0	S-MH-2865
A18-3	8.3	0.0	5.2	0.0	S-MH-2840
A19	42.7	0.0	41.0	0.0	S-MH-2733
A2	23.7	1.9	20.5	0.0	S-MH-336
A20	13.4	0.0	12.4	0.0	S-MH-2887
A20	13.4	0.0	12.4	0.0	MH-4
A20	13.4	0.0	12.4	0.0	S-MH-2727
A21	2.6	0.0	18.4	0.0	S-MH-2597
A21	5.9	85.8	23.6	0.0	S-MH-2980
A21	2.8	85.8	11.8	0.0	S-MH-2772
A22	12.4	0.0	7.4	0.0	S-MH-2795
A22	12.4	1.6	7.4	0.0	S-MH-2781
A22	5.1	1.6	7.4	0.0	S-MH-3595
A23	13.8	24.8	11.3	0.0	S-MH-2919
A23	13.8	6.2	11.3	0.0	S-MH-2969
A24	39.2	0.0	3.4	0.0	S-MH-3016
A24-1	0.1	64.7	2.2	0.0	S-MH-2815
A24-1	0.1	64.7	2.2	0.0	S-MH-3022
A24-2	0.0	0.0	0.0	0.0	S-MH-3614
A24-2	0.0	150.0	0.0	0.0	S-MH-3619
A24-3	0.0	135.0	0.0	0.0	S-MH-3622
A24-3	0.0	0.0	0.0	0.0	S-MH-3617
A24-4	7.6	0.0	3.2	0.0	S-MH-3080
A24-4	7.6	80.6	3.2	0.0	S-MH-3099
A24-4	7.7	0.0	3.2	0.0	S-MH-3077
A24-5	0.4	187.5	1.5	0.0	S-MH-2814
A25	0.3	168.8	4.3	0.0	S-MH-3837
A25-1	0.3	365.6	13.2	0.0	S-MH-3143
A26	0.7	36.8	3.2	0.0	S-MH-3422
A26	0.9	73.6	3.2	28.3	S-MH-3838
A26	0.7	36.8	3.2	0.0	S-MH-3139
A27	0.6	116.5	22.2	0.0	S-MH-3415
A27	0.1	0.0	5.6	0.0	S-MH-3403
A28	7.7	0.0	6.8	0.0	S-MH-3430
A28	15.3	0.0	13.7	0.0	S-MH-3443
A4	17.3	1.4	10.2	0.0	S-MH-357
A5	23.9	0.9	13.0	0.0	S-MH-277
A6	23.2	3.0	13.8	0.0	MH-22
A6	24.3	3.0	13.8	0.0	S-MH-3768
A6	23.2	0.0	13.8	0.0	S-MH-1548
A7	13.6	0.0	19.5	0.0	S-MH-1455
A7	9.7	0.4	0.0	0.0	S-MH-1494
A8	14.4	6.3	13.9	0.0	S-MH-1795
A9	10.0	15.8	16.4	0.0	S-MH-2333
B1	16.1	9.3	11.3	0.0	S-MH-750
B1	15.7	9.3	11.3	0.0	S-MH-800

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
2017 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
B2	6.9	0.0	0.0	0.0	S-MH-795
B3	11.5	12.3	10.3	0.0	S-MH-789
B4	6.2	0.0	1.4	0.0	S-MH-1648
B5	5.4	0.0	1.3	0.0	MH-216
CE1	7.6	0.0	6.6	0.0	S-MH-1522
CE2	15.4	0.4	9.3	0.0	S-MH-1751
CE3	14.1	0.0	14.3	0.0	S-MH-1745
CE4	9.1	0.0	10.0	0.0	S-MH-1743
CE5	11.1	0.0	0.0	0.0	S-MH-1753
CE5	4.9	0.0	24.7	0.0	S-MH-1688
CE5-1	12.4	0.0	10.6	0.0	S-MH-1679
CE5-1	3.4	0.0	10.8	0.0	S-MH-1671
CE5-2	10.8	186.3	62.2	0.0	S-MH-1657
CE5-3	30.2	0.0	33.8	0.0	S-MH-1964
CE5-4	4.8	13.2	9.0	0.0	S-MH-3757
CE5-5	6.7	0.0	6.5	0.0	S-MH-1973
CE5-6	9.9	0.0	10.1	0.0	S-MH-1943
CE5-7	79.1	101.5	67.4	0.0	S-MH-4642
CE6	22.5	0.0	20.8	0.0	S-MH-2074
CE7	32.9	0.0	28.7	0.0	S-MH-2117
CE8	15.5	0.0	12.9	0.0	S-MH-2062
CE9	14.5	1.9	13.3	0.0	S-MH-2281
CW1	31.1	90.0	46.3	0.0	S-MH-3577
CW1	31.4	0.0	23.2	0.0	S-MH-483
CW10	21.6	9.5	18.4	0.0	S-MH-1513
CW11	7.8	29.3	12.7	13.2	S-MH-1765
CW11-1	12.6	0.0	11.6	0.0	S-MH-1775
CW11-1	12.6	52.7	11.6	0.0	S-MH-4716
CW12	6.9	44.8	20.1	0.0	S-MH-1537
CW13	13.1	62.5	27.9	6.9	S-MH-1800
CW14	8.9	16.3	7.6	0.0	S-MH-1852
CW14	3.7	16.3	7.6	0.0	S-MH-1849
CW15	17.3	18.0	2.9	0.0	S-MH-1834
CW15	17.3	0.0	2.9	0.0	S-MH-4377
CW2	6.8	11.1	7.0	0.0	S-MH-481
CW2	13.8	11.1	14.1	0.0	S-MH-477
CW3	55.4	16.9	49.7	8.6	S-MH-308
CW4	18.3	64.3	25.6	0.0	S-MH-449
CW5	0.8	48.4	17.1	8.5	S-MH-4089
CW6	32.1	6.9	16.3	0.0	S-MH-1369
CW7	15.3	87.5	35.9	0.0	S-MH-246
CW8	15.4	0.0	14.3	0.0	S-MH-1564
CW8	15.3	47.7	14.3	0.0	S-MH-1567
CW9	0.1	46.0	20.0	0.0	S-MH-1568
D1	4.5	7.7	13.6	0.0	S-MH-533
D10	12.0	0.0	13.5	0.0	S-MH-2007
D10-1	3.0	43.1	0.0	0.0	S-MH-3916
D10-2	20.7	123.8	15.4	0.0	S-MH-4192
D10-3	5.1	0.0	0.0	0.0	S-MH-4865
D10-4	4.9	0.0	0.0	0.0	S-MH-4864
D10-5	4.2	20.6	0.0	0.0	S-MH-1088
D10-6	35.6	0.0	17.2	0.0	S-MH-4545
D11	9.1	0.0	17.5	0.0	S-MH-1924
D12	30.4	0.0	39.1	0.0	S-MH-3732
D2	6.9	0.0	6.2	0.0	S-MH-624
D3	12.6	10.7	18.4	0.0	S-MH-641
D3-1	10.3	0.0	14.0	0.0	S-MH-1305
D3-1	10.3	0.0	14.0	0.0	S-MH-635
D3-10	18.8	0.0	15.7	0.0	S-MH-40
D3-10	18.8	0.0	15.7	0.0	S-MH-975
D3-11	57.4	0.0	45.9	0.0	S-MH-4872
D3-12	60.8	0.0	59.8	0.0	S-MH-110
D3-13	9.7	0.0	12.5	0.0	S-MH-1318
D3-2	17.0	0.0	12.7	0.0	S-MH-1209
D3-3	16.6	0.0	16.4	0.0	S-MH-1216
D3-4	18.0	0.0	11.1	0.0	S-MH-3697
D3-5	25.5	3.3	20.1	0.0	S-MH-3382
D3-5	38.2	1.6	30.1	0.0	S-MH-3357
D3-5	21.2	1.6	16.7	0.0	S-MH-3381
D3-6	7.1	2.8	11.4	0.0	S-MH-3309
D3-7	19.3	0.0	13.8	0.0	S-MH-3294
D3-8	28.8	0.0	19.4	0.0	MH-162

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
2017 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
D3-8	28.8	0.0	19.4	0.0	S-MH-3672
D3-9	18.3	0.0	17.6	0.0	S-MH-3677
D3-9	18.3	0.0	17.6	0.0	S-MH-3705
D4	17.6	0.0	17.5	0.0	S-MH-844
D5	23.5	6.2	25.5	0.0	S-MH-669
D5-1	5.0	11.4	11.0	7.5	S-MH-852
D5-2	20.0	11.5	18.4	0.0	S-MH-853
D5-2	20.0	0.0	18.4	0.0	S-MH-916
D6	28.1	0.0	32.8	0.0	S-MH-706
D6-1	11.3	0.0	12.6	0.0	S-MH-717
D6-2	104.6	6.0	100.6	0.0	S-MH-906
D6-3	12.6	0.0	18.2	0.0	S-MH-898
D6-4	19.7	0.0	19.3	0.0	S-MH-1006
D6-5	38.7	37.5	26.0	0.0	S-MH-1071
D7	6.3	0.0	10.5	0.0	S-MH-1609
D7-1	16.6	0.0	7.6	0.0	S-MH-1591
D7-2	18.3	0.0	13.0	0.0	S-MH-1593
D8	6.7	5.2	13.1	0.0	S-MH-2001
D9	19.9	0.0	27.7	0.0	S-MH-924
D9-1	17.9	0.0	14.6	0.0	S-MH-1169
F1	2.1	0.0	1.5	0.0	S-MH-2362
F10	0.0	29.3	21.0	0.0	S-MH-2705
F10	0.0	117.2	10.4	0.0	MH-102
F11	0.1	54.9	15.5	0.0	S-MH-2589
F12	0.3	99.8	16.2	0.0	S-MH-2719
F12	0.3	99.8	16.2	0.0	S-MH-2596
F13	0.1	132.9	26.7	0.0	S-MH-3462
F13-1	0.1	113.4	14.1	0.0	S-MH-4564
F13-1	0.1	113.4	14.1	0.0	S-MH-4568
F13-2	5.4	123.8	12.5	0.0	S-MH-4576
F14	0.8	79.8	9.1	63.1	S-MH-3847
F14	0.6	0.0	9.2	0.0	S-MH-3845
F14	0.6	79.8	9.2	0.0	S-MH-3467
F15	3.4	48.1	9.7	0.0	S-MH-3470
F15	3.5	48.1	9.7	0.0	S-MH-3044
F15	3.6	24.1	9.6	0.0	S-MH-3638
F16	0.3	47.8	7.9	0.0	S-MH-3527
F16	0.3	47.8	7.9	0.0	S-MH-3525
F17	0.4	38.3	7.0	0.0	S-MH-3531
F17	0.4	38.3	7.0	0.0	S-MH-3533
F18	0.0	35.9	11.0	0.0	S-MH-3538
F18	0.0	35.9	11.0	0.0	S-MH-3109
F19	0.0	36.4	14.6	0.0	S-MH-3536
F19	0.0	54.6	14.6	6.8	S-MH-3498
F2	5.8	0.0	1.9	0.0	S-MH-2363
F20	6.3	140.1	26.3	0.0	S-MH-3506
F20	21.1	0.0	21.9	0.0	S-MH-3510
F21	65.1	37.1	29.7	0.0	S-MH-3205
F22	6.5	0.0	10.1	0.0	S-MH-3155
F22	6.5	57.0	10.2	0.0	S-MH-3148
F22	6.5	0.0	10.2	0.0	S-MH-4910
F22-1	5.0	197.4	56.4	0.0	S-MH-3239
F3	10.1	0.0	20.9	0.0	S-MH-2364
F4	32.7	0.0	32.8	0.0	S-MH-2708
F5	11.2	44.2	20.0	0.0	S-MH-2357
F5	2.8	44.2	5.0	0.0	S-MH-2356
F6	5.6	0.0	5.9	0.0	S-MH-3860
F7	3.7	54.5	14.5	0.0	MH-166
F8	1.6	34.7	9.4	0.0	S-MH-2760
F9	0.0	58.1	12.5	6.2	S-MH-2684
G1	22.9	69.4	41.9	0.0	S-MH-428
G2	15.3	21.4	13.7	0.0	S-MH-420
G2	15.3	0.0	13.7	0.0	S-MH-464
G3	0.1	144.2	31.3	0.0	S-MH-2476
G4	0.4	51.5	14.5	0.0	S-MH-2540
G5	18.0	0.0	18.8	0.0	S-MH-2482
G6	16.3	0.0	16.1	0.0	S-MH-2509
G7	13.2	54.0	4.5	0.0	S-MH-2548
G8	0.6	19.7	6.8	0.0	S-MH-2550
Total (gpm):	2,840.5	5,600.3	3,183.2	149.2	

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

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Marysville Sewer Comprehensive Plan
2031 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
A1	1.0	20.9	9.5	0.0	S-MH-3559
A10	16.2	0.0	0.0	0.0	S-MH-2323
A10	14.0	0.0	19.8	0.0	S-MH-2141
A10	14.0	0.0	19.8	0.0	S-MH-2332
A11	18.9	5.7	14.3	0.0	S-MH-2189
A12	16.9	0.0	14.0	0.0	S-MH-2290
A12	16.9	0.0	14.0	0.0	S-MH-2198
A12-1	15.0	0.0	17.1	0.0	S-MH-2300
A12-2	39.4	0.0	27.3	0.0	S-MH-2225
A12-3	6.6	0.0	8.9	0.0	S-MH-3632
A12-3	6.8	0.0	8.9	0.0	S-MH-2259
A12-3	17.8	0.0	0.0	0.0	S-MH-2235
A12-4	17.6	0.0	9.7	0.0	MH-231
A13	10.5	2.2	13.5	0.0	S-MH-2315
A13	25.2	2.2	27.0	0.0	S-MH-3791
A14	10.8	0.0	17.1	0.0	S-MH-2386
A15	12.0	0.0	30.0	0.0	S-MH-2396
A15	12.0	0.0	30.0	0.0	S-MH-2419
A16	14.2	0.0	12.4	0.0	S-MH-2402
A16	14.2	15.8	12.4	0.0	S-MH-2401
A16-1	42.6	0.0	16.2	0.0	S-MH-4810
A16-1	42.6	0.0	16.2	0.0	S-MH-4742
A17	21.8	1.1	28.0	0.0	S-MH-2739
A18	8.6	0.0	11.2	0.0	S-MH-2743
A18	10.7	0.0	15.3	0.0	S-MH-2742
A18	8.6	0.0	11.2	0.0	S-MH-2856
A18-1	17.3	0.0	2.0	0.0	S-MH-2915
A18-2	12.0	0.0	14.0	0.0	S-MH-2865
A18-3	14.3	0.0	6.9	0.0	S-MH-2840
A19	58.4	0.0	54.5	0.0	S-MH-2733
A2	25.5	1.9	20.5	0.0	S-MH-336
A20	14.8	0.0	16.4	0.0	S-MH-2887
A20	14.8	0.0	16.4	0.0	MH-4
A20	14.8	0.0	16.4	0.0	S-MH-2727
A21	2.6	0.0	24.4	0.0	S-MH-2597
A21	5.9	85.8	31.4	0.0	S-MH-2980
A21	2.8	85.8	15.7	0.0	S-MH-2772
A22	15.2	0.0	9.9	0.0	S-MH-2795
A22	15.2	1.6	9.9	0.0	S-MH-2781
A22	6.2	1.6	9.9	0.0	S-MH-3595
A23	20.8	24.8	15.0	0.0	S-MH-2919
A23	20.9	6.2	15.0	0.0	S-MH-2969
A24	37.2	0.0	4.5	0.0	S-MH-3016
A24-1	0.2	64.7	2.9	0.0	S-MH-2815
A24-1	0.2	64.7	2.9	0.0	S-MH-3022
A24-2	0.0	0.0	0.0	0.0	S-MH-3614
A24-2	0.0	150.0	0.0	0.0	S-MH-3619
A24-3	0.0	135.0	0.0	0.0	S-MH-3622
A24-3	0.0	0.0	0.0	0.0	S-MH-3617
A24-4	7.3	0.0	4.2	0.0	S-MH-3080
A24-4	7.3	80.6	4.2	0.0	S-MH-3099
A24-4	7.3	0.0	4.2	0.0	S-MH-3077
A24-5	0.7	187.5	2.0	0.0	S-MH-2814
A25	0.5	168.8	5.7	0.0	S-MH-3837
A25-1	0.4	365.6	17.5	0.0	S-MH-3143
A26	0.7	36.8	4.2	0.0	S-MH-3422
A26	1.0	73.6	4.2	37.5	S-MH-3838
A26	0.7	36.8	4.2	0.0	S-MH-3139
A27	0.8	116.5	29.5	0.0	S-MH-3415
A27	0.2	0.0	7.4	0.0	S-MH-3403
A28	10.1	0.0	9.1	0.0	S-MH-3430
A28	20.2	0.0	18.2	0.0	S-MH-3443
A4	19.3	1.4	13.5	0.0	S-MH-357
A5	27.1	0.9	17.3	0.0	S-MH-277
A6	27.3	3.0	18.3	0.0	MH-22
A6	28.6	3.0	18.3	0.0	S-MH-3768
A6	27.3	0.0	18.3	0.0	S-MH-1548
A7	19.8	0.0	25.9	0.0	S-MH-1455
A7	14.2	0.4	0.0	0.0	S-MH-1494
A8	18.6	6.3	18.5	0.0	S-MH-1795
A9	11.9	15.8	19.9	0.0	S-MH-2333
B1	22.8	9.3	15.0	0.0	S-MH-750
B1	22.3	9.3	15.0	0.0	S-MH-800

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
2031 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
B2	17.9	0.0	0.0	0.0	S-MH-795
B3	19.5	12.3	13.7	0.0	S-MH-789
B4	11.5	0.0	1.9	0.0	S-MH-1648
B5	15.1	0.0	1.7	0.0	MH-216
CE1	9.6	0.0	8.7	0.0	S-MH-1522
CE2	22.4	0.4	12.4	0.0	S-MH-1751
CE3	15.9	0.0	18.9	0.0	S-MH-1745
CE4	9.7	0.0	13.3	0.0	S-MH-1743
CE5	16.3	0.0	0.0	0.0	S-MH-1753
CE5	7.2	0.0	32.9	0.0	S-MH-1688
CE5-1	14.1	0.0	14.1	0.0	S-MH-1679
CE5-1	3.9	0.0	14.4	0.0	S-MH-1671
CE5-2	10.3	186.3	62.2	0.0	S-MH-1657
CE5-3	29.2	0.0	44.9	0.0	S-MH-1964
CE5-4	4.5	13.2	11.9	0.0	S-MH-3757
CE5-5	6.7	0.0	8.6	0.0	S-MH-1973
CE5-6	9.4	0.0	13.4	0.0	S-MH-1943
CE5-7	140.2	101.5	89.5	0.0	S-MH-4642
CE6	25.8	0.0	27.7	0.0	S-MH-2074
CE7	31.7	0.0	38.1	0.0	S-MH-2117
CE8	14.7	0.0	15.2	0.0	S-MH-2062
CE9	14.0	1.9	17.7	0.0	S-MH-2281
CW1	32.7	90.0	61.5	0.0	S-MH-3577
CW1	33.0	0.0	30.8	0.0	S-MH-483
CW10	26.5	9.5	24.4	0.0	S-MH-1513
CW11	20.9	29.3	16.9	17.6	S-MH-1765
CW11-1	43.7	0.0	15.4	0.0	S-MH-1775
CW11-1	43.7	52.7	15.4	0.0	S-MH-4716
CW12	9.4	44.8	26.7	0.0	S-MH-1537
CW13	14.3	62.5	29.1	9.1	S-MH-1800
CW14	21.2	16.3	10.0	0.0	S-MH-1852
CW14	8.8	16.3	10.0	0.0	S-MH-1849
CW15	62.2	18.0	3.8	0.0	S-MH-1834
CW15	62.2	0.0	3.8	0.0	S-MH-4377
CW2	6.5	11.1	9.3	0.0	S-MH-481
CW2	13.1	11.1	18.8	0.0	S-MH-477
CW3	58.2	16.9	56.5	11.5	S-MH-308
CW4	19.8	64.3	34.0	0.0	S-MH-449
CW5	0.8	48.4	18.7	11.3	S-MH-4089
CW6	34.7	6.9	21.6	0.0	S-MH-1369
CW7	15.6	87.5	42.4	0.0	S-MH-246
CW8	15.3	0.0	19.0	0.0	S-MH-1564
CW8	15.3	47.7	19.0	0.0	S-MH-1567
CW9	0.1	46.0	20.0	0.0	S-MH-1568
D1	5.4	7.7	18.1	0.0	S-MH-533
D10	11.4	0.0	18.0	0.0	S-MH-2007
D10-1	33.0	43.1	0.0	0.0	S-MH-3916
D10-2	66.3	123.8	20.4	0.0	S-MH-4192
D10-3	36.2	0.0	0.0	0.0	S-MH-4546
D10-4	29.7	0.0	0.0	0.0	S-MH-4864
D10-5	12.3	20.6	0.0	0.0	S-MH-905
D10-6	62.0	0.0	22.8	0.0	S-MH-4545
D11	8.7	0.0	18.9	0.0	S-MH-1924
D12	28.9	0.0	49.3	0.0	S-MH-3732
D2	6.7	0.0	8.3	0.0	S-MH-624
D3	13.2	10.7	24.5	0.0	S-MH-641
D3-1	11.5	0.0	18.6	0.0	S-MH-1305
D3-1	11.5	0.0	18.6	0.0	S-MH-635
D3-10	18.4	0.0	20.8	0.0	S-MH-40
D3-10	18.4	0.0	20.8	0.0	S-MH-975
D3-11	55.9	0.0	61.0	0.0	S-MH-4872
D3-12	95.6	0.0	79.5	0.0	S-MH-110
D3-13	22.1	0.0	16.6	0.0	S-MH-1318
D3-2	16.3	0.0	16.9	0.0	S-MH-1209
D3-3	17.9	0.0	21.8	0.0	S-MH-1216
D3-4	27.9	0.0	14.7	0.0	S-MH-3697
D3-5	33.4	3.3	26.7	0.0	S-MH-3382
D3-5	50.1	1.6	40.0	0.0	S-MH-3357
D3-5	27.8	1.6	22.2	0.0	S-MH-3381
D3-6	15.3	2.8	15.1	0.0	S-MH-3309
D3-7	21.3	0.0	18.4	0.0	S-MH-3294
D3-8	27.4	0.0	25.8	0.0	MH-162

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
2031 Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
D3-8	27.4	0.0	25.8	0.0	S-MH-3672
D3-9	17.5	0.0	22.2	0.0	S-MH-3677
D3-9	17.5	0.0	22.2	0.0	S-MH-3705
D4	16.9	0.0	21.6	0.0	S-MH-844
D5	23.3	6.2	32.9	0.0	S-MH-669
D5-1	6.6	11.4	14.6	10.0	S-MH-852
D5-2	19.1	11.5	21.8	0.0	S-MH-853
D5-2	19.2	0.0	21.8	0.0	S-MH-916
D6	27.0	0.0	42.4	0.0	S-MH-706
D6-1	10.8	0.0	14.9	0.0	S-MH-717
D6-2	100.9	6.0	133.7	0.0	S-MH-906
D6-3	12.0	0.0	21.1	0.0	S-MH-898
D6-4	18.8	0.0	25.7	0.0	S-MH-1006
D6-5	57.9	37.5	34.6	0.0	S-MH-1071
D7	6.3	0.0	13.1	0.0	S-MH-1609
D7-1	15.8	0.0	10.2	0.0	S-MH-1591
D7-2	17.3	0.0	17.3	0.0	S-MH-1593
D8	6.5	5.2	15.8	0.0	S-MH-2001
D9	19.1	0.0	36.8	0.0	S-MH-924
D9-1	17.6	0.0	19.4	0.0	S-MH-1169
F1	5.4	0.0	2.0	0.0	S-MH-2362
F10	0.1	29.3	27.9	0.0	S-MH-2705
F10	0.0	117.2	13.8	0.0	MH-102
F11	0.1	54.9	20.6	0.0	S-MH-2589
F12	0.4	99.8	21.5	0.0	S-MH-2719
F12	0.4	99.8	21.5	0.0	S-MH-2596
F13	0.1	132.9	35.4	0.0	S-MH-3462
F13-1	8.6	113.4	18.7	0.0	S-MH-4564
F13-1	8.6	113.4	18.7	0.0	S-MH-4568
F13-2	6.4	123.8	16.5	0.0	S-MH-4576
F14	1.4	79.8	12.1	83.9	S-MH-3847
F14	1.0	0.0	12.2	0.0	S-MH-3845
F14	1.0	79.8	12.2	0.0	S-MH-3467
F15	3.3	48.1	12.9	0.0	S-MH-3470
F15	3.4	48.1	12.9	0.0	S-MH-3044
F15	3.6	24.1	12.8	0.0	S-MH-3638
F16	0.3	47.8	10.5	0.0	S-MH-3527
F16	0.3	47.8	10.5	0.0	S-MH-3525
F17	0.8	38.3	9.3	0.0	S-MH-3531
F17	0.7	38.3	9.3	0.0	S-MH-3533
F18	0.0	35.9	11.0	0.0	S-MH-3538
F18	0.0	35.9	11.0	0.0	S-MH-3109
F19	0.0	36.4	14.6	0.0	S-MH-3536
F19	0.0	54.6	14.6	9.0	S-MH-3498
F2	14.6	0.0	2.6	0.0	S-MH-2363
F20	10.5	140.1	35.0	0.0	S-MH-3506
F20	34.9	0.0	29.1	0.0	S-MH-3510
F21	72.7	37.1	39.5	0.0	S-MH-3205
F22	11.9	0.0	13.4	0.0	S-MH-3155
F22	11.9	57.0	13.5	0.0	S-MH-3148
F22	11.9	0.0	13.5	0.0	S-MH-4910
F22-1	51.0	197.4	74.9	0.0	S-MH-3239
F3	9.6	0.0	21.8	0.0	S-MH-2364
F4	37.2	0.0	43.6	0.0	S-MH-2708
F5	22.5	44.2	26.6	0.0	S-MH-2357
F5	5.6	44.2	6.7	0.0	S-MH-2356
F6	5.3	0.0	7.3	0.0	S-MH-3860
F7	8.9	54.5	19.3	0.0	MH-166
F8	5.6	34.7	12.5	0.0	S-MH-2760
F9	0.0	58.1	16.6	8.2	S-MH-2684
G1	29.6	69.4	55.7	0.0	S-MH-428
G2	29.3	21.4	18.1	0.0	S-MH-420
G2	29.3	0.0	18.1	0.0	S-MH-464
G3	0.1	144.2	41.5	0.0	S-MH-2476
G4	1.2	51.5	19.2	0.0	S-MH-2540
G5	17.1	0.0	24.9	0.0	S-MH-2482
G6	15.4	0.0	21.3	0.0	S-MH-2509
G7	26.1	54.0	6.0	0.0	S-MH-2548
G8	2.8	19.7	9.0	0.0	S-MH-2550
Total (gpm):	**3,790**	**5,600**	**4,094**	**198**	

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
Buildout Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
A1	1.0	20.9	9.5	0.0	S-MH-3559
A10	16.2	0.0	0.0	0.0	S-MH-2323
A10	14.0	0.0	19.8	0.0	S-MH-2141
A10	14.0	0.0	19.8	0.0	S-MH-2332
A11	18.9	5.7	14.3	0.0	S-MH-2189
A12	16.9	0.0	14.0	0.0	S-MH-2290
A12	16.9	0.0	14.0	0.0	S-MH-2198
A12-1	15.0	0.0	17.1	0.0	S-MH-2300
A12-2	39.4	0.0	27.3	0.0	S-MH-2225
A12-3	6.6	0.0	8.9	0.0	S-MH-3632
A12-3	6.8	0.0	8.9	0.0	S-MH-2259
A12-3	17.8	0.0	0.0	0.0	S-MH-2235
A12-4	17.6	0.0	9.7	0.0	MH-231
A13	10.5	2.2	13.5	0.0	S-MH-2315
A13	25.2	2.2	27.0	0.0	S-MH-3791
A14	10.8	0.0	17.1	0.0	S-MH-2386
A15	12.0	0.0	30.0	0.0	S-MH-2396
A15	12.0	0.0	30.0	0.0	S-MH-2419
A16	14.2	0.0	12.4	0.0	S-MH-2402
A16	14.2	15.8	12.4	0.0	S-MH-2401
A16(Future)	97.3	0.0	440.0	0.0	S-MH-4739
A16(Future)	47.9	0.0	216.7	0.0	S-MH-3789
A16-1	42.6	0.0	16.2	0.0	S-MH-4810
A16-1	42.6	0.0	16.2	0.0	S-MH-4742
A17	21.8	1.1	28.0	0.0	S-MH-2739
A18	8.6	0.0	11.2	0.0	S-MH-2743
A18	10.7	0.0	15.3	0.0	S-MH-2742
A18	8.6	0.0	11.2	0.0	S-MH-2856
A18(Future)	22.1	0.0	100.0	0.0	S-MH-2882
A18-1	17.3	0.0	2.0	0.0	S-MH-2915
A18-2	12.0	0.0	14.0	0.0	S-MH-2865
A18-3	14.3	0.0	6.9	0.0	S-MH-2840
A18-3(Future)	19.7	0.0	88.9	0.0	S-MH-2843
A19	58.4	0.0	54.5	0.0	S-MH-2733
A2	25.5	1.9	20.5	0.0	S-MH-336
A20	14.8	0.0	16.4	0.0	S-MH-2887
A20	14.8	0.0	16.4	0.0	MH-4
A20	14.8	0.0	16.4	0.0	S-MH-2727
A21	2.6	0.0	24.4	0.0	S-MH-2597
A21	5.9	85.8	31.4	0.0	S-MH-2980
A21	2.8	85.8	15.7	0.0	S-MH-2772
A22	15.2	0.0	9.9	0.0	S-MH-2795
A22	15.2	1.6	9.9	0.0	S-MH-2781
A22	6.2	1.6	9.9	0.0	S-MH-3595
A23	20.8	24.8	15.0	0.0	S-MH-2919
A23	20.9	6.2	15.0	0.0	S-MH-2969
A24	37.2	0.0	4.5	0.0	S-MH-3016
A24(Future)	249.7	0.0	1,130.0	0.0	S-MH-2816
A24-1	0.2	64.7	2.9	0.0	S-MH-2815
A24-1	0.2	64.7	2.9	0.0	S-MH-3022
A24-2	0.0	0.0	0.0	0.0	S-MH-3614
A24-2	0.0	150.0	0.0	0.0	S-MH-3619
A24-3	0.0	135.0	0.0	0.0	S-MH-3622
A24-3	0.0	0.0	0.0	0.0	S-MH-3617
A24-4	7.3	0.0	4.2	0.0	S-MH-3080
A24-4	7.3	80.6	4.2	0.0	S-MH-3099
A24-4	7.3	0.0	4.2	0.0	S-MH-3077
A24-5	0.7	187.5	2.0	0.0	S-MH-2814
A25	0.5	168.8	5.7	0.0	S-MH-3837
A25-1	0.4	365.6	17.5	0.0	S-MH-3143
A26	0.7	36.8	4.2	0.0	S-MH-3422
A26	1.0	73.6	4.2	37.5	S-MH-3838
A26	0.7	36.8	4.2	0.0	S-MH-3139
A27	0.8	116.5	29.5	0.0	S-MH-3415
A27	0.2	0.0	7.4	0.0	S-MH-3403
A28	10.1	0.0	9.1	0.0	S-MH-3430
A28	20.2	0.0	18.2	0.0	S-MH-3443
A4	19.3	1.4	13.5	0.0	S-MH-357
A5	27.1	0.9	17.3	0.0	S-MH-277
A6	27.3	3.0	18.3	0.0	MH-22
A6	28.6	3.0	18.3	0.0	S-MH-3768
A6	27.3	0.0	18.3	0.0	S-MH-1548
A7	19.8	0.0	25.9	0.0	S-MH-1455
A7	14.2	0.4	0.0	0.0	S-MH-1494
A8	18.6	6.3	18.5	0.0	S-MH-1795
A9	11.9	15.8	19.9	0.0	S-MH-2333
B1	22.8	9.3	15.0	0.0	S-MH-750
B1	22.3	9.3	15.0	0.0	S-MH-800

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

Marysville Sewer Comprehensive Plan
Buildout Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
B2	17.9	0.0	0.0	0.0	S-MH-795
B3	19.5	12.3	13.7	0.0	S-MH-789
B4	11.5	0.0	1.9	0.0	S-MH-1648
B5	15.1	0.0	1.7	0.0	MH-216
CE1	9.6	0.0	8.7	0.0	S-MH-1522
CE2	22.4	0.4	12.4	0.0	S-MH-1751
CE3	15.9	0.0	18.9	0.0	S-MH-1745
CE4	9.7	0.0	13.3	0.0	S-MH-1743
CE5	16.3	0.0	0.0	0.0	S-MH-1753
CE5	7.2	0.0	32.9	0.0	S-MH-1688
CE5-1	14.1	0.0	14.1	0.0	S-MH-1679
CE5-1	3.9	0.0	14.4	0.0	S-MH-1671
CE5-2	10.3	186.3	62.2	0.0	S-MH-1657
CE5-3	29.2	0.0	44.9	0.0	S-MH-1964
CE5-3(Future)	45.5	0.0	205.6	0.0	S-MH-2055
CE5-4	4.5	13.2	11.9	0.0	S-MH-3757
CE5-5	6.7	0.0	8.6	0.0	S-MH-1973
CE5-6	9.4	0.0	13.4	0.0	S-MH-1943
CE5-7	140.2	101.5	89.5	0.0	S-MH-4642
CE6	25.8	0.0	27.7	0.0	S-MH-2074
CE7	31.7	0.0	38.1	0.0	S-MH-2117
CE8	14.7	0.0	15.2	0.0	S-MH-2062
CE9	14.0	1.9	17.7	0.0	S-MH-2281
CW1	32.7	90.0	61.5	0.0	S-MH-3577
CW1	33.0	0.0	30.8	0.0	S-MH-483
CW10	26.5	9.5	24.4	0.0	S-MH-1513
CW11	20.9	29.3	16.9	17.6	S-MH-1765
CW11-1	43.7	0.0	15.4	0.0	S-MH-1775
CW11-1	43.7	52.7	15.4	0.0	S-MH-4716
CW12	9.4	44.8	26.7	0.0	S-MH-1537
CW13	14.3	62.5	29.1	9.1	S-MH-1800
CW14	21.2	16.3	10.0	0.0	S-MH-1852
CW14	8.8	16.3	10.0	0.0	S-MH-1849
CW15	62.2	18.0	3.8	0.0	S-MH-1834
CW15	62.2	0.0	3.8	0.0	S-MH-4377
CW2	6.5	11.1	9.3	0.0	S-MH-481
CW2	13.1	11.1	18.8	0.0	S-MH-477
CW3	58.2	16.9	56.5	11.5	S-MH-308
CW4	19.8	64.3	34.0	0.0	S-MH-449
CW5	0.8	48.4	18.7	11.3	S-MH-4089
CW6	34.7	6.9	21.6	0.0	S-MH-1369
CW7	15.6	87.5	42.4	0.0	S-MH-246
CW8	15.3	0.0	19.0	0.0	S-MH-1564
CW8	15.3	47.7	19.0	0.0	S-MH-1567
CW9	0.1	46.0	20.0	0.0	S-MH-1568
D1	5.4	7.7	18.1	0.0	S-MH-533
D10	11.4	0.0	18.0	0.0	S-MH-2007
D10-1	33.0	43.1	0.0	0.0	S-MH-3916
D10-2	66.3	123.8	20.4	0.0	S-MH-4192
D10-3	36.2	0.0	0.0	0.0	S-MH-4546
D10-4	29.7	0.0	0.0	0.0	S-MH-4864
D10-5	12.3	20.6	0.0	0.0	S-MH-905
D10-6	62.0	0.0	22.8	0.0	S-MH-4545
D11	8.7	0.0	18.9	0.0	S-MH-1924
D12	28.9	0.0	49.3	0.0	S-MH-3732
D2	6.7	0.0	8.3	0.0	S-MH-624
D3	13.2	10.7	24.5	0.0	S-MH-641
D3-1	11.5	0.0	18.6	0.0	S-MH-1305
D3-1	11.5	0.0	18.6	0.0	S-MH-635
D3-10	18.4	0.0	20.8	0.0	S-MH-40
D3-10	18.4	0.0	20.8	0.0	S-MH-975
D3-11	55.9	0.0	61.0	0.0	S-MH-4872
D3-12	95.6	0.0	79.5	0.0	S-MH-110
D3-13	22.1	0.0	16.6	0.0	S-MH-1318
D3-2	16.3	0.0	16.9	0.0	S-MH-1209
D3-3	17.9	0.0	21.8	0.0	S-MH-1216
D3-4	27.9	0.0	14.7	0.0	S-MH-3697
D3-5	33.4	3.3	26.7	0.0	S-MH-3382
D3-5	50.1	1.6	40.0	0.0	S-MH-3357
D3-5	27.8	1.6	22.2	0.0	S-MH-3381
D3-6	15.3	2.8	15.1	0.0	S-MH-3309
D3-7	21.3	0.0	18.4	0.0	S-MH-3294
D3-8	27.4	0.0	25.8	0.0	MH-162
D3-8	27.4	0.0	25.8	0.0	S-MH-3672
D3-9	17.5	0.0	22.2	0.0	S-MH-3677
D3-9	17.5	0.0	22.2	0.0	S-MH-3705
D4	16.9	0.0	21.6	0.0	S-MH-844

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

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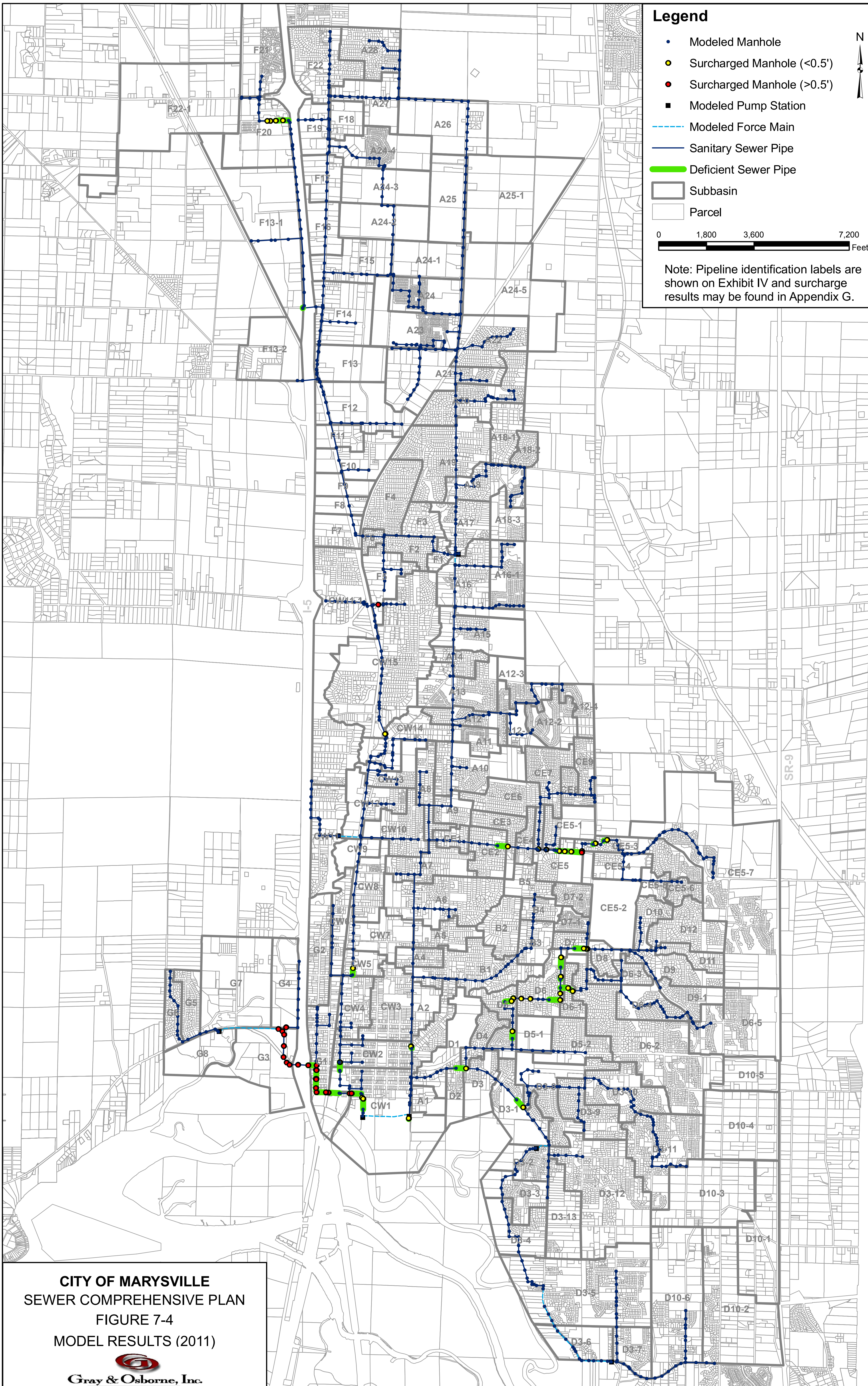
Marysville Sewer Comprehensive Plan
Buildout Model Input

Sub-Basin	Load 1: Residential Input[1] (gpm)	Load 2: Commercial Input (gpm)	Load 3: I/I Input (gpm)	Load 4: Fixed Flow (gpm)	Input Node
D5	23.3	6.2	32.9	0.0	S-MH-669
D5-1	6.6	11.4	14.6	10.0	S-MH-852
D5-2	19.1	11.5	21.8	0.0	S-MH-853
D5-2	19.2	0.0	21.8	0.0	S-MH-916
D6	27.0	0.0	42.4	0.0	S-MH-706
D6-1	10.8	0.0	14.9	0.0	S-MH-717
D6-2	100.9	6.0	133.7	0.0	S-MH-906
D6-3	12.0	0.0	21.1	0.0	S-MH-898
D6-4	18.8	0.0	25.7	0.0	S-MH-1006
D6-5	57.9	37.5	34.6	0.0	S-MH-1071
D7	6.3	0.0	13.1	0.0	S-MH-1609
D7-1	15.8	0.0	10.2	0.0	S-MH-1591
D7-2	17.3	0.0	17.3	0.0	S-MH-1593
D8	6.5	5.2	15.8	0.0	S-MH-2001
D9	19.1	0.0	36.8	0.0	S-MH-924
D9-1	17.6	0.0	19.4	0.0	S-MH-1169
F1	5.4	0.0	2.0	0.0	S-MH-2362
F10	0.1	29.3	27.9	0.0	S-MH-2705
F10	0.0	117.2	13.8	0.0	MH-102
F11	0.1	54.9	20.6	0.0	S-MH-2589
F12	0.4	99.8	21.5	0.0	S-MH-2719
F12	0.4	99.8	21.5	0.0	S-MH-2596
F13	0.1	132.9	35.4	0.0	S-MH-3462
F13(Future)	887.7	0.0	897.1	0.0	S-MH-4581
F13(Future)	295.9	0.0	299.0	0.0	S-MH-4575
F13-1	8.6	113.4	18.7	0.0	S-MH-4564
F13-1	8.6	113.4	18.7	0.0	S-MH-4568
F13-2	6.4	123.8	16.5	0.0	S-MH-4576
F14	1.4	79.8	12.1	83.9	S-MH-3847
F14	1.0	0.0	12.2	0.0	S-MH-3845
F14	1.0	79.8	12.2	0.0	S-MH-3467
F15	3.3	48.1	12.9	0.0	S-MH-3470
F15	3.4	48.1	12.9	0.0	S-MH-3044
F15	3.6	24.1	12.8	0.0	S-MH-3638
F16	0.3	47.8	10.5	0.0	S-MH-3527
F16	0.3	47.8	10.5	0.0	S-MH-3525
F17	0.8	38.3	9.3	0.0	S-MH-3531
F17	0.7	38.3	9.3	0.0	S-MH-3533
F18	0.0	35.9	11.0	0.0	S-MH-3538
F18	0.0	35.9	11.0	0.0	S-MH-3109
F19	0.0	36.4	14.6	0.0	S-MH-3536
F19	0.0	54.6	14.6	9.0	S-MH-3498
F2	14.6	0.0	2.6	0.0	S-MH-2363
F20	10.5	140.1	35.0	0.0	S-MH-3506
F20	34.9	0.0	29.1	0.0	S-MH-3510
F21	72.7	37.1	39.5	0.0	S-MH-3205
F22	11.9	0.0	13.4	0.0	S-MH-3155
F22	11.9	57.0	13.5	0.0	S-MH-3148
F22	11.9	0.0	13.5	0.0	S-MH-4910
F22(Future)	1,178.8	0.0	1,191.1	0.0	S-MH-4569
F22-1	51.0	197.4	74.9	0.0	S-MH-3239
F3	9.6	0.0	21.8	0.0	S-MH-2364
F4	37.2	0.0	43.6	0.0	S-MH-2708
F5	22.5	44.2	26.6	0.0	S-MH-2357
F5	5.6	44.2	6.7	0.0	S-MH-2356
F6	5.3	0.0	7.3	0.0	S-MH-3860
F7	8.9	54.5	19.3	0.0	MH-166
F8	5.6	34.7	12.5	0.0	S-MH-2760
F9	0.0	58.1	16.6	8.2	S-MH-2684
G1	29.6	69.4	55.7	0.0	S-MH-428
G2	29.3	21.4	18.1	0.0	S-MH-420
G2	29.3	0.0	18.1	0.0	S-MH-464
G3	0.1	144.2	41.5	0.0	S-MH-2476
G4	1.2	51.5	19.2	0.0	S-MH-2540
G5	17.1	0.0	24.9	0.0	S-MH-2482
G6	15.4	0.0	21.3	0.0	S-MH-2509
G7	26.1	54.0	6.0	0.0	S-MH-2548
G8	2.8	19.7	9.0	0.0	S-MH-2550
Totals:	**6,635**	**5,600**	**8,662**	**198**	

(1) Residential flows shown are prior to peaking. All residential flow was peaked within the model.

APPENDIX E

HYDRAULIC MODEL RESULTS



CITY OF MARYSVILLE
SEWER COMPREHENSIVE PLAN
FIGURE 7-4
MODEL RESULTS (2011)

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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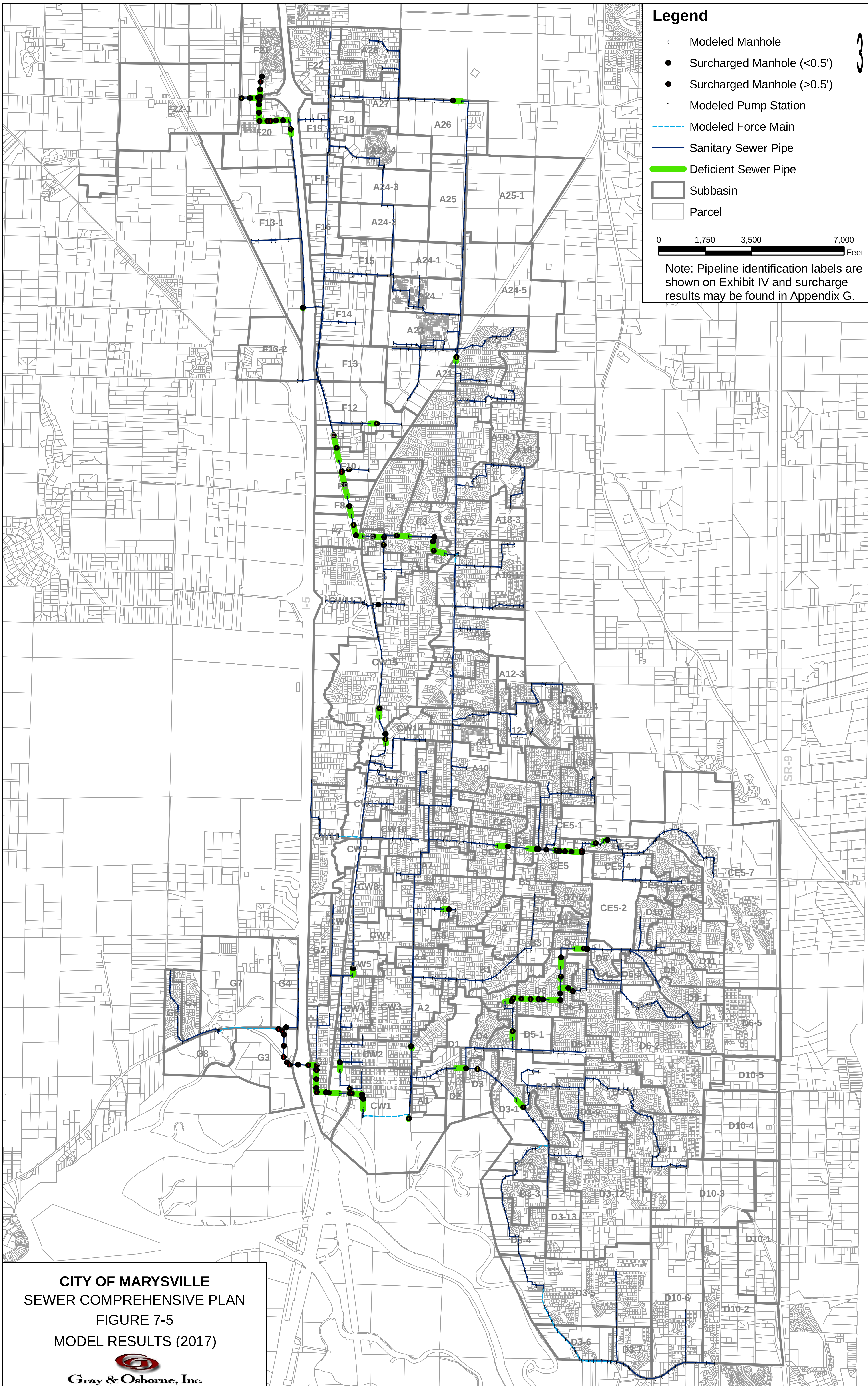
Marysville Sewer Comprehensive Plan
2011 Modeled Pipe Deficiencies

City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-1010	15	360	Concrete	0.0000	S-MH-708	S-MH-706	48.61	48.61	130.3	190.5	634.9	91.9	6.91	1.15	0.17
S-LINE-1011	15	102	Concrete	0.0000	S-MH-704	S-MH-703	47.09	47.09	156.7	229.3	751.3	91.9	8.17	1.36	0.07
S-LINE-11994	15	333	PVC	0.0040	S-MH-6727	S-MH-3546	12.09	10.80	43.3	1,863.0	2,020.8	1,809.4	1.12	3.67	3.05
S-LINE-11995	15	157	PVC	0.0040	S-MH-3546	S-MH-3547	10.70	10.12	43.3	1,863.0	2,020.8	1,766.9	1.14	3.67	2.83
S-LINE-11996	15	353	PVC	0.0020	S-MH-3547	S-MH-3548	10.02	9.48	43.3	1,863.0	2,020.8	1,137.0	1.78	3.67	2.74
S-LINE-1462	24	374	Unknown	0.0000	S-MH-3608	S-MH-3802	24.67	24.57	236.6	1,212.4	1,958.7	1,680.5	1.17	1.39	0.04
S-LINE-2097	12	338	PVC	0.0010	S-MH-1606	S-MH-1605	51.61	51.23	130.3	190.5	634.9	537.6	1.18	1.80	0.15
S-LINE-2099	12	36	PVC	0.0010	S-MH-900	S-MH-857	51.80	51.78	89.3	153.6	468.0	377.9	1.24	1.33	0.15
S-LINE-2185	18	389	Concrete	0.0010	S-MH-1746	S-MH-1748	51.06	50.75	251.7	622.7	1,410.8	1,334.5	1.06	1.78	0.04
S-LINE-2197	12	100	PVC	0.0010	S-MH-1754	S-MH-1755	55.30	55.14	133.7	449.9	905.1	614.3	1.47	2.57	0.19
S-LINE-2198	12	203	DI	0.0020	S-MH-1753	S-MH-1754	55.80	55.30	133.7	449.9	905.1	795.7	1.14	2.57	0.34
S-LINE-2199	12	242	DI	0.0030	S-MH-1651	S-MH-1753	56.45	55.80	125.4	449.9	878.8	830.9	1.06	2.49	0.42
S-LINE-2203	12	407	DI	0.0030	S-MH-1657	S-MH-1651	57.50	56.45	125.4	449.9	878.8	814.4	1.08	2.49	0.60
S-LINE-2214	12	98	PVC	0.0010	S-MH-2034	S-MH-1661	62.01	61.94	114.6	182.0	576.6	428.5	1.35	1.64	0.06
S-LINE-2544	12	133	Unknown	0.0000	S-MH-1998	S-MH-1999	63.13	63.08	114.6	182.0	576.6	310.9	1.86	1.64	0.12
S-LINE-475	48	74	Clay	0.0000	S-MH-540	S-MH-541	20.94	20.94	707.4	6,190.9	8,139.0	2,044.3	3.98	1.44	0.01
S-LINE-5004	12	220	PVC	0.0010	S-MH-4594	S-MH-4596	110.05	109.81	81.1	265.7	554.1	544.6	1.02	1.57	0.01
S-LINE-5005	12	273	PVC	0.0000	S-MH-3506	S-MH-4594	110.15	110.05	81.1	265.7	554.1	301.4	1.84	1.57	0.25
S-LINE-510	18	258	Unknown	0.0010	S-MH-379	S-MH-4089	26.98	26.75	89.4	1,274.0	1,588.7	1,411.4	1.13	2.00	0.06
S-LINE-5113	21	372	Unknown	0.0020	S-MH-3574	S-MH-3575	6.26	5.44	294.2	3,623.8	4,527.3	3,347.9	1.35	4.19	0.69
S-LINE-5116	24	58	Unknown	0.0010	S-MH-3591	S-MH-3870	3.43	3.36	294.2	3,623.8	4,527.3	3,477.4	1.30	3.21	0.49
S-LINE-5117	24	395	Unknown	0.0010	S-MH-3870	S-MH-3594	3.36	3.01	294.2	3,623.8	4,527.3	3,030.5	1.49	3.21	0.44
S-LINE-5119	21	75	Unknown	0.0040	S-MH-3585	S-MH-3574	6.61	6.36	294.2	3,623.8	4,527.3	4,231.3	1.07	4.19	0.63
S-LINE-5218	15	417	Unknown	0.0000	S-MH-3581	S-MH-3582	8.81	8.78	43.3	1,863.0	2,020.8	246.6	8.20	3.67	2.10
S-LINE-624	18	315	Unknown	0.0020	S-MH-4862	S-MH-327	12.22	11.53	199.8	1,588.7	2,232.5	2,161.6	1.03	2.82	0.05
S-LINE-6493	30	24	PVC	0.0000	S-MH-4552	S-MH-4551	93.28	93.28	81.1	300.9	589.3	583.7	1.01	0.27	0.00
S-LINE-661	21	307	Concrete	0.0000	MH-13	S-MH-432	13.44	13.30	0.1	1,710.3	1,710.6	1,522.7	1.12	1.59	1.77
S-LINE-664	21	319	Unknown	0.0000	S-MH-328	S-MH-469	11.83	11.81	0.1	1,710.3	1,710.6	568.2	3.01	1.59	3.09
S-LINE-675	24	368	Concrete	0.0010	S-MH-651	S-MH-624	21.77	21.57	666.7	1,848.4	3,698.7	2,373.4	1.56	2.62	0.29
S-LINE-703	21	259	Concrete	0.0000	S-MH-591	S-MH-597	40.83	40.80	349.4	480.5	1,528.9	767.4	1.99	1.42	0.09
S-LINE-711	18	252	Concrete	0.0010	S-MH-670	S-MH-671	43.09	42.84	349.4	480.5	1,528.9	1,488.9	1.03	1.93	0.02
S-LINE-712	18	123	Concrete	0.0000	S-MH-669	S-MH-670	43.16	43.16	349.4	480.5	1,528.9	149.5	10.23	1.93	0.13
S-LINE-717	18	423	Concrete	0.0010	S-MH-700	S-MH-697	45.62	45.28	326.5	444.2	1,432.4	1,340.2	1.07	1.81	0.05
S-LINE-731	12	289	PVC	0.0020	S-MH-717	S-MH-702	47.24	46.76	169.8	214.9	773.9	653.4	1.18	2.20	0.20
S-LINE-852	12	219	PVC	0.0020	S-MH-733	S-MH-717	47.61	47.24	158.8	200.0	728.0	659.0	1.11	2.07	0.28



CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

FIGURE 7-5

MODEL RESULTS (2017)

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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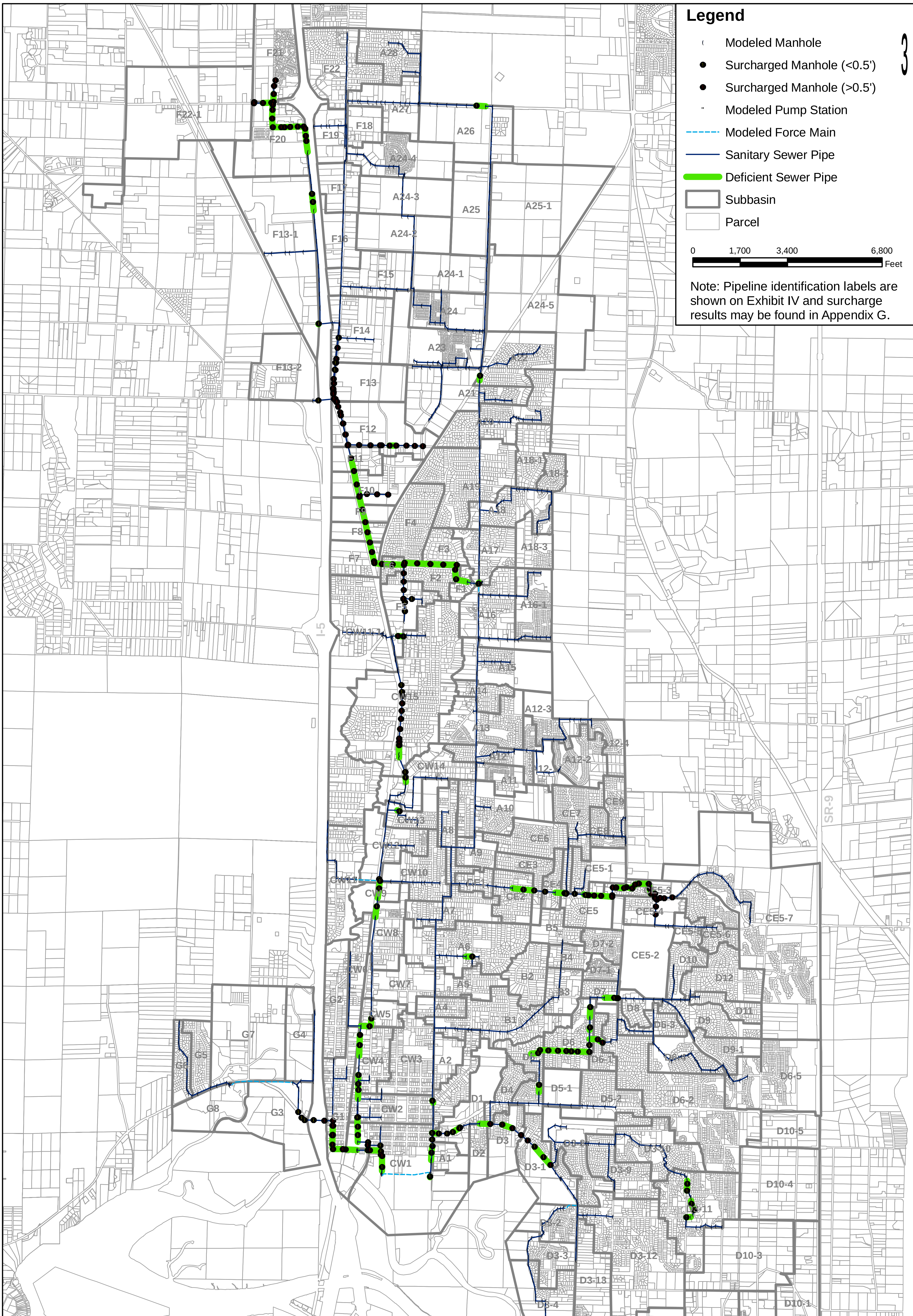
Marysville Sewer Comprehensive Plan
2017 Modeled Pipe Deficiencies

City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-1010	15	360	Concrete	0.0000	S-MH-708	S-MH-706	48.61	48.61	137.2	161.8	628.1	91.9	6.83	1.14	0.17
S-LINE-1011	15	101	Concrete	0.0000	S-MH-704	S-MH-703	47.09	47.09	165.3	194.6	740.9	91.9	8.06	1.35	0.07
S-LINE-11994	15	333	PVC	0.0040	S-MH-6727	S-MH-3546	12.09	10.80	54.0	1,871.5	2,067.7	1,809.4	1.14	3.75	3.38
S-LINE-11995	15	157	PVC	0.0040	S-MH-3546	S-MH-3547	10.70	10.12	54.0	1,871.5	2,067.7	1,766.9	1.17	3.75	3.07
S-LINE-11996	15	353	PVC	0.0020	S-MH-3547	S-MH-3548	10.02	9.48	54.0	1,871.5	2,067.7	1,137.0	1.82	3.75	2.95
S-LINE-1462	24	367	Unknown	0.0000	S-MH-3608	S-MH-3802	24.67	24.57	280.0	1,169.0	2,035.3	1,680.5	1.21	1.44	0.05
S-LINE-2097	12	338	PVC	0.0010	S-MH-1606	S-MH-1605	51.61	51.23	137.2	161.8	628.1	537.6	1.17	1.78	0.14
S-LINE-2099	12	36	PVC	0.0010	S-MH-900	S-MH-857	51.80	51.78	96.0	130.7	466.3	377.9	1.23	1.32	0.13
S-LINE-2185	18	389	Concrete	0.0010	S-MH-1746	S-MH-1748	51.06	50.75	281.9	638.0	1,509.2	1,334.5	1.13	1.90	0.09
S-LINE-2195	12	58	PVC	0.0040	S-MH-1755	S-MH-4607	55.14	54.92	152.6	490.0	1,000.4	987.5	1.01	2.84	0.01
S-LINE-2197	12	109	PVC	0.0010	S-MH-1754	S-MH-1755	55.30	55.14	152.6	490.0	1,000.4	614.3	1.63	2.84	0.27
S-LINE-2198	12	203	DI	0.0020	S-MH-1753	S-MH-1754	55.80	55.30	152.6	490.0	1,000.4	795.7	1.26	2.84	0.57
S-LINE-2199	12	242	DI	0.0030	S-MH-1651	S-MH-1753	56.45	55.80	141.5	490.0	969.1	830.9	1.17	2.75	0.81
S-LINE-2203	12	407	DI	0.0030	S-MH-1657	S-MH-1651	57.50	56.45	141.5	490.0	969.1	814.4	1.19	2.75	1.25
S-LINE-2214	12	98	PVC	0.0010	S-MH-2034	S-MH-1661	62.01	61.94	130.7	241.5	687.2	428.5	1.60	1.95	0.11
S-LINE-2371	8	219	PVC	0.0000	S-MH-3769	S-MH-1422	45.74	45.67	24.3	16.8	106.2	97.2	1.09	0.68	0.01
S-LINE-2488	15	161	PVC	0.0000	S-MH-1834	S-MH-1838	47.90	47.89	47.2	88.1	259.9	229.1	1.14	0.47	0.00
S-LINE-2544	12	133	Unknown	0.0000	S-MH-1998	S-MH-1999	63.13	63.08	130.7	241.5	687.2	310.9	2.21	1.95	0.20
S-LINE-3188	21	420	Concrete	0.0020	S-MH-2362	S-MH-2384	63.13	62.48	193.4	2,507.9	3,133.6	2,805.2	1.12	2.90	0.17
S-LINE-3191	21	347	Concrete	0.0020	S-MH-2363	S-MH-2362	63.72	63.13	191.3	2,506.4	3,126.2	2,940.3	1.06	2.90	0.25
S-LINE-3200	21	407	Concrete	0.0010	MH-221	S-MH-2383	68.72	68.20	128.7	2,337.4	2,776.7	2,548.8	1.09	2.57	0.11
S-LINE-3201	21	14	Concrete	0.0010	S-MH-2383	S-MH-2382	68.20	68.18	142.7	2,450.8	2,933.3	2,695.1	1.09	2.72	0.00
S-LINE-3295	21	466	Concrete	0.0020	S-MH-3792	S-MH-3793	66.89	66.07	175.4	2,483.6	3,058.5	2,991.2	1.02	2.83	0.04
S-LINE-3300	21	264	Concrete	0.0010	S-MH-3861	S-MH-3860	69.84	69.51	123.1	2,331.5	2,753.1	2,521.1	1.09	2.55	0.07
S-LINE-3586	18	497	Concrete	0.0020	S-MH-2757	MH-102	80.08	79.03	117.8	1,963.7	2,368.5	2,172.8	1.09	2.99	0.21
S-LINE-3588	18	479	Concrete	0.0010	S-MH-2701	S-MH-2761	76.69	76.00	117.8	2,141.6	2,546.4	1,794.2	1.42	3.21	0.96
S-LINE-3589	18	467	Concrete	0.0020	S-MH-2761	S-MH-2684	76.00	74.89	117.8	2,141.6	2,546.4	2,304.7	1.11	3.21	0.25
S-LINE-3597	18	369	Concrete	0.0030	S-MH-2760	S-MH-2759	73.67	72.64	119.4	2,262.5	2,672.3	2,497.5	1.07	3.37	0.16
S-LINE-3604	18	360	Concrete	0.0030	MH-1422	MH-166	71.43	70.33	119.4	2,262.5	2,672.3	2,613.1	1.02	3.37	0.06
S-LINE-3833	18	481	Concrete	0.0020	S-MH-2589	S-MH-2757	80.90	80.08	117.8	1,963.7	2,368.5	1,951.8	1.21	2.99	0.60
S-LINE-3881	12	233	Concrete	0.0000	MH-212	S-MH-2713	85.83	85.82	0.3	116.0	117.1	105.0	1.12	0.33	0.00
S-LINE-4246	30	178	Concrete	0.0000	S-MH-3025	S-MH-3024	83.10	83.08	174.8	2,118.3	2,691.5	1,956.7	1.38	1.22	0.02
S-LINE-4479	10	274	PVC	0.0010	S-MH-3203	S-MH-3204	112.20	111.96	65.1	66.8	302.8	291.8	1.04	1.24	1.68
S-LINE-4555	10	298	PVC	0.0010	S-MH-3242	S-MH-3241	112.73	112.55	5.0	253.8	272.2	242.3	1.12	1.11	1.19
S-LINE-475	48	74	Clay	0.0000	S-MH-540	S-MH-541	20.94	20.94	875.3	6,116.8	8,459.5	2,044.3	4.14	1.50	0.01
S-LINE-4849	14	331	Asbestos Cement	0.0000	S-MH-3424	S-MH-3425	112.45	112.36	25.3	309.9	403.0	398.8	1.01	0.84	0.00
S-LINE-5004	12	208	PVC	0.0010	S-MH-4594	S-MH-4596	110.05	109.81	97.5	508.9	849.3	544.6	1.56	2.41	0.35
S-LINE-5005	12	283	PVC	0.0000	S-MH-3506	S-MH-4594	110.15	110.05	97.5	508.9	849.3	301.4	2.82	2.41	1.05
S-LINE-5007	12	200	PVC	0.0010	S-MH-4595	S-MH-3506	110.40	110.20	91.2	342.5	662.9	507.0	1.31	1.88	1.14
S-LINE-5008	12	307	PVC	0.0010	S-MH-3510	S-MH-3505	110.81	110.55	91.2	342.5	662.9	466.6	1.42	1.88	1.45
S-LINE-5009	12	317	PVC	0.0010	S-MH-3521	S-MH-3510	111.16	110.85	70.1	320.6	574.1	501.4	1.15	1.63	1.51
S-LINE-5010	12	307	PVC	0.0010	S-MH-3513	S-MH-3521	111.52	111.18	70.1	320.6	574.1	533.6	1.08	1.63	1.55
S-LINE-5012	12	188	PVC	0.0010	S-MH-3522	S-MH-3513	111.86	111.64	70.1	320.6	574.1	548.5	1.05	1.63	1.45
S-LINE-5013	12	113	PVC	0.0010	S-MH-3204	S-MH-3522	111.96	111.86	70.1	320.6	574.1	477.0	1.20	1.63	1.49
S-LINE-510	18	258	Unknown	0.0010	S-MH-379	S-MH-4089	26.98	26.75	147.5	1,311.4	1,807.4	1,411.4	1.28	2.28	0.15
S-LINE-5113	21	372	Unknown	0.0020	S-MH-3574	S-MH-3575	6.26	5.44	391.2	3,648.0	4,807.0	3,347.9	1.44	4.45	0.88
S-LINE-5116	24	60	Unknown	0.0010	S-MH-3591	S-MH-3870	3.43	3.36	391.2	3,648.0	4,807.0	3,477.4	1.38	3.41	0.60

Marysville Sewer Comprehensive Plan
2017 Modeled Pipe Deficiencies

City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-5117	24	395	Unknown	0.0010	S-MH-3870	S-MH-3594	3.36	3.01	391.2	3,648.0	4,807.0	3,030.5	1.59	3.41	0.54
S-LINE-5119	21	71	Unknown	0.0040	S-MH-3585	S-MH-3574	6.61	6.36	391.2	3,648.0	4,807.0	4,231.3	1.14	4.45	0.86
S-LINE-5218	15	417	Unknown	0.0000	S-MH-3581	S-MH-3582	8.81	8.78	54.0	1,871.5	2,067.7	246.6	8.39	3.75	2.22
S-LINE-5974	18	333	PVC	0.0010	S-MH-4289	S-MH-4290	49.16	48.84	29.9	67.2	177.0	146.5	1.21	0.22	0.15
S-LINE-624	18	330	Unknown	0.0020	S-MH-4862	S-MH-327	12.22	11.53	274.7	1,617.0	2,468.9	2,161.6	1.14	3.11	0.22
S-LINE-6493	30	24	PVC	0.0000	S-MH-4552	S-MH-4551	93.28	93.28	97.7	763.9	1,104.9	583.7	1.89	0.50	0.00
S-LINE-6534	12	185	PVC	0.0030	S-MH-4586	S-MH-4584	108.26	107.76	97.5	508.9	849.3	833.5	1.02	2.41	0.02
S-LINE-661	21	307	Concrete	0.0000	MH-13	S-MH-432	13.44	13.30	0.5	1,711.4	1,713.2	1,522.7	1.13	1.59	2.09
S-LINE-664	21	315	Unknown	0.0000	S-MH-328	S-MH-469	11.83	11.81	0.5	1,711.4	1,713.2	568.2	3.02	1.59	3.42
S-LINE-675	24	368	Concrete	0.0010	S-MH-651	S-MH-624	21.77	21.57	745.4	1,774.9	3,814.3	2,373.4	1.61	2.71	0.32
S-LINE-703	21	259	Concrete	0.0000	S-MH-591	S-MH-597	40.83	40.80	379.9	467.1	1,596.2	767.4	2.08	1.48	0.10
S-LINE-711	18	252	Concrete	0.0010	S-MH-670	S-MH-671	43.09	42.84	379.9	467.1	1,596.2	1,488.9	1.07	2.01	0.04
S-LINE-712	18	121	Concrete	0.0000	S-MH-669	S-MH-670	43.16	43.16	379.9	467.1	1,596.2	149.5	10.68	2.01	0.14
S-LINE-713	18	308	Concrete	0.0010	S-MH-679	S-MH-669	43.47	43.16	356.4	435.4	1,502.3	1,499.7	1.00	1.89	0.14
S-LINE-714	18	343	Concrete	0.0010	S-MH-682	S-MH-679	43.86	43.52	356.4	435.4	1,502.3	1,488.3	1.01	1.89	0.10
S-LINE-716	18	182	Concrete	0.0010	S-MH-692	S-MH-690	44.44	44.26	356.4	435.4	1,502.3	1,486.6	1.01	1.89	0.01
S-LINE-717	18	423	Concrete	0.0010	S-MH-700	S-MH-697	45.62	45.28	356.4	435.4	1,502.3	1,340.2	1.12	1.89	0.09
S-LINE-731	12	289	PVC	0.0020	S-MH-717	S-MH-702	47.24	46.76	191.1	240.8	860.0	653.4	1.32	2.44	0.36
S-LINE-7446	12	114	PVC	0.0010	S-MH-3505	S-MH-4595	110.51	110.40	91.2	342.5	662.9	498.0	1.33	1.88	1.22
S-LINE-852	12	219	PVC	0.0020	S-MH-733	S-MH-717	47.61	47.24	179.8	228.2	815.5	659.0	1.24	2.31	0.56



CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

FIGURE 7-6

MODEL RESULTS (2031)

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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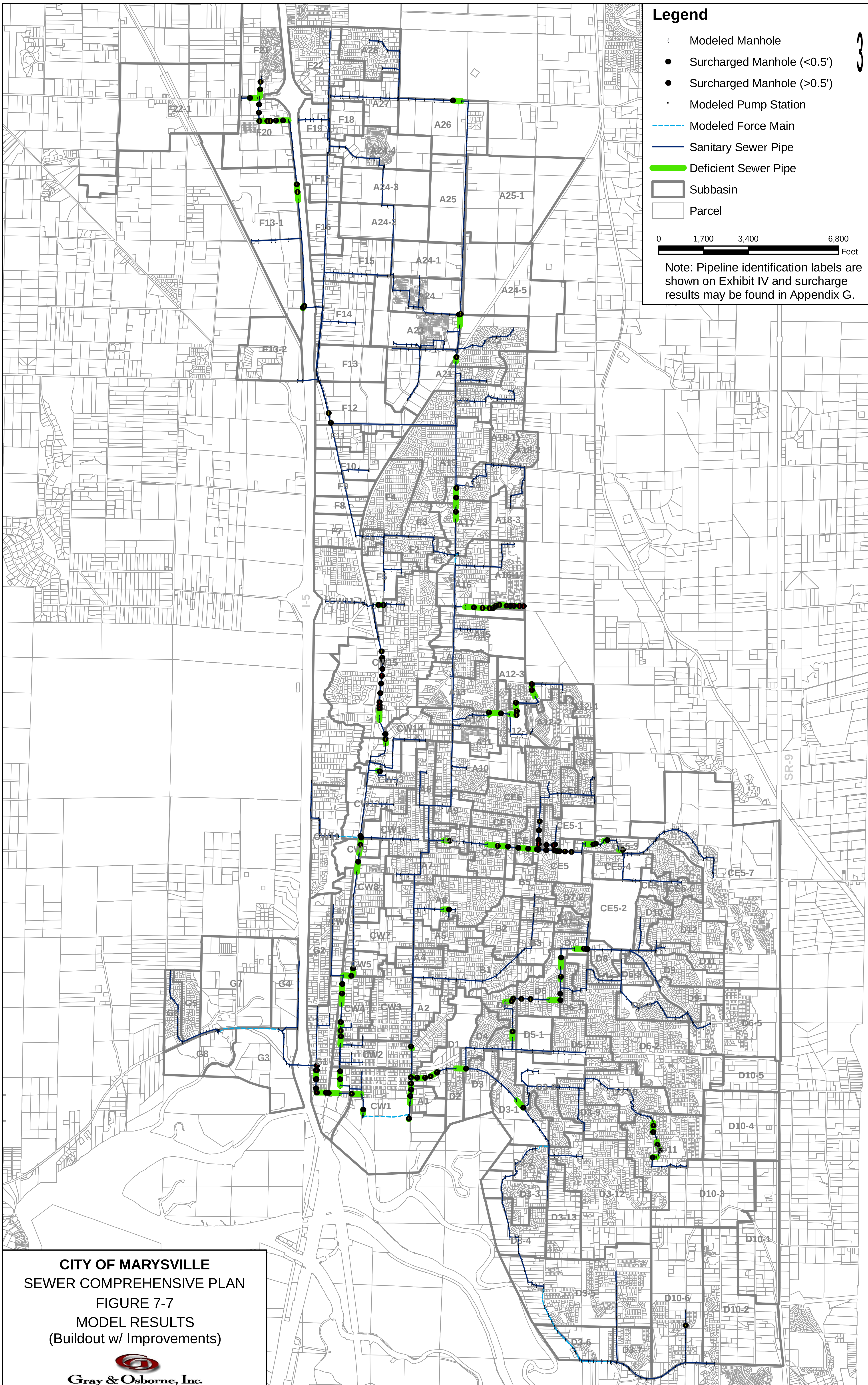
Marysville Sewer Comprehensive Plan
2031 Modeled Pipe Deficiencies

City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-2488	15	161	PVC	0.0000	S-MH-1834	S-MH-1838	47.90	47.89	168.1	93.7	647.9	229.1	2.83	1.18	0.07
S-LINE-2414	10	85	PVC	0.0000	MH-170	S-MH-1845	46.60	46.58	14.3	100.7	153.3	151.2	1.01	0.63	0.001
S-LINE-1909	18	274	Unknown	0.0010	S-MH-1558	MH-110	40.15	39.90	248.3	1,072.1	1,850.8	1,427.9	1.30	2.33	0.227
S-LINE-1910	18	340	Unknown	0.0010	MH-110	S-MH-1568	39.90	39.43	248.3	1,072.1	1,850.8	1,757.6	1.05	2.33	0.054
S-LINE-1912	18	396	Unknown	0.0020	S-MH-1567	S-MH-1566	38.79	38.17	263.7	1,204.8	2,026.2	1,870.5	1.08	2.56	0.112
S-LINE-664	21	315	Unknown	0.0000	S-MH-328	S-MH-469	11.83	11.81	1.3	1,406.4	1,411.2	568.2	2.48	1.31	2.234
S-LINE-5218	15	417	Unknown	0.0000	S-MH-3581	S-MH-3582	8.81	8.78	89.5	1,589.1	1,904.1	246.6	7.72	3.46	1.8
S-LINE-510	18	258	Unknown	0.0010	S-MH-379	S-MH-4089	26.98	26.75	294.6	1,353.7	2,258.3	1,411.4	1.60	2.85	0.363
S-LINE-554	18	295	Unknown	0.0020	S-MH-458	S-MH-380	25.83	25.22	295.4	1,432.1	2,338.8	2,149.6	1.09	2.95	0.117
S-LINE-545	18	373	Unknown	0.0020	S-MH-353	S-MH-562	23.95	23.15	330.1	1,460.6	2,458.3	2,189.2	1.12	3.10	0.557
S-LINE-547	18	383	Unknown	0.0020	S-MH-562	S-MH-563	23.15	22.45	330.1	1,460.6	2,458.3	2,020.9	1.22	3.10	0.342
S-LINE-616	18	197	CI	0.0020	S-MH-440	S-MH-441	19.75	19.37	330.1	1,460.6	2,458.3	2,249.2	1.09	3.10	0.077
S-LINE-620	18	329	PVC	0.0030	S-MH-350	S-MH-346	16.91	16.07	349.9	1,558.9	2,608.6	2,388.6	1.09	3.29	0.168
S-LINE-624	18	330	Unknown	0.0020	S-MH-4862	S-MH-327	12.22	11.53	427.7	1,694.1	2,949.8	2,161.6	1.37	3.72	0.603
S-LINE-635	21	307	PVC	0.0010	S-MH-326	S-MH-324	10.54	10.13	427.7	1,694.1	2,949.8	2,605.9	1.13	2.73	0.192
S-LINE-5109	21	240	PVC	0.0010	S-MH-324	S-MH-3551	10.13	9.79	427.7	1,694.1	2,949.8	2,683.9	1.10	2.73	0.074
S-LINE-5119	21	71	Unknown	0.0040	S-MH-3585	S-MH-3574	6.61	6.36	582.9	3,465.5	5,112.5	4,231.3	1.21	4.74	1.123
S-LINE-5113	21	372	Unknown	0.0020	S-MH-3574	S-MH-3575	6.26	5.44	582.9	3,465.5	5,112.5	3,347.9	1.53	4.74	1.105
S-LINE-5116	24	60	Unknown	0.0010	S-MH-3591	S-MH-3870	3.43	3.36	582.9	3,465.5	5,112.5	3,477.4	1.47	3.63	0.744
S-LINE-5117	24	395	Unknown	0.0010	S-MH-3870	S-MH-3594	3.36	3.01	582.9	3,465.5	5,112.5	3,030.5	1.69	3.63	0.662
S-LINE-5227	24	141	Unknown	0.0020	S-MH-3594	S-MH-3868	3.01	2.66	582.9	3,465.5	5,112.5	5,072.3	1.01	3.63	0.008
S-LINE-2099	12	36	PVC	0.0010	S-MH-900	S-MH-857	51.80	51.78	92.2	163.4	487.0	377.9	1.29	1.38	0.186
S-LINE-2097	12	338	PVC	0.0010	S-MH-1606	S-MH-1605	51.61	51.23	131.6	204.0	652.5	537.6	1.21	1.85	0.183
S-LINE-1010	15	360	Concrete	0.0000	S-MH-708	S-MH-706	48.61	48.61	131.6	204.0	652.5	91.9	7.10	1.19	0.182
S-LINE-1011	15	101	Concrete	0.0000	S-MH-704	S-MH-703	47.09	47.09	158.6	246.4	773.8	91.9	8.42	1.41	0.072
S-LINE-852	12	219	PVC	0.0020	S-MH-733	S-MH-717	47.61	47.24	207.1	286.8	951.3	659.0	1.44	2.70	1.18
S-LINE-731	12	289	PVC	0.0020	S-MH-717	S-MH-702	47.24	46.76	217.9	301.7	996.1	653.4	1.52	2.83	0.775
S-LINE-717	18	423	Concrete	0.0010	S-MH-700	S-MH-697	45.62	45.28	376.5	548.1	1,668.2	1,340.2	1.25	2.10	0.19
S-LINE-1707	18	226	Concrete	0.0010	S-MH-697	S-MH-692	44.72	44.49	376.5	548.1	1,668.2	1,508.0	1.11	2.10	0.345
S-LINE-716	18	182	Concrete	0.0010	S-MH-692	S-MH-690	44.44	44.26	376.5	548.1	1,668.2	1,486.6	1.12	2.10	0.342
S-LINE-715	18	297	Concrete	0.0010	S-MH-690	S-MH-682	44.21	43.91	376.5	548.1	1,668.2	1,502.4	1.11	2.10	0.344
S-LINE-714	18	343	Concrete	0.0010	S-MH-682	S-MH-679	43.86	43.52	376.5	548.1	1,668.2	1,488.3	1.12	2.10	0.322
S-LINE-713	18	308	Concrete	0.0010	S-MH-679	S-MH-669	43.47	43.16	376.5	548.1	1,668.2	1,499.7	1.11	2.10	0.282
S-LINE-712	18	121	Concrete	0.0000	S-MH-669	S-MH-670	43.16	43.16	399.8	587.2	1,769.0	149.5	11.83	2.23	0.206
S-LINE-711	18	252	Concrete	0.0010	S-MH-670	S-MH-671	43.09	42.84	399.8	587.2	1,769.0	1,488.9	1.19	2.23	0.105
S-LINE-1462	24	367	Unknown	0.0000	S-MH-3608	S-MH-3802	24.67	24.57	347.1	2,093.3	3,135.6	1,680.5	1.87	2.22	0.523
S-LINE-990	24	491	Concrete	0.0010	S-MH-3802	S-MH-3801	24.57	24.27	347.1	2,093.3	3,135.6	2,516.5	1.25	2.22	0.272
S-LINE-989	24	400	Concrete	0.0000	S-MH-642	S-MH-641	22.47	22.27	358.6	2,111.9	3,184.6	2,276.5	1.40	2.26	0.875
S-LINE-703	21	259	Concrete	0.0000	S-MH-591	S-MH-597	40.83	40.80	399.8	587.2	1,769.0	767.4	2.31	1.64	0.13
S-LINE-675	24	368	Concrete	0.0010	S-MH-651	S-MH-624	21.77	21.57	833.4	2,847.0	5,097.9	2,373.4	2.15	3.62	0.729
S-LINE-2549	12	141	Unknown	0.0020	S-MH-1993	S-MH-1992	65.23	64.94	190.0	283.0	899.1	727.1	1.24	2.55	2.343
S-LINE-2547	12	181	Unknown	0.0030	S-MH-1992	S-MH-1995	64.94	64.42	190.0	283.0	899.1	859.4	1.05	2.55	2.187
S-LINE-2546	12	183	Unknown	0.0020	S-MH-1995	S-MH-1994	64.42	63.97	190.0	283.0	899.1	795.1	1.13	2.55	2.135
S-LINE-2545	12	355	Unknown	0.0020	S-MH-1994	S-MH-1998	63.97	63.13	190.0	283.0	899.1	779.9	1.15	2.55	2.007
S-LINE-2544	12	133	Unknown	0.0000	S-MH-1998	S-MH-1999	63.13	63.08	190.0	283.0	899.1	310.9	2.89	2.55	1.725
S-LINE-2543	12	179	Unknown	0.0030	S-MH-1999	S-MH-1997	63.08	62.60	190.0	283.0	899.1	830.3	1.08	2.55	1.354
S-LINE-2540	12	208	Unknown	0.0030	S-MH-1997	S-MH-2034	62.60	62.01	190.0	283.0	899.1	853.9	1.05	2.55	1.269
S-LINE-2214	12	98	PVC	0.0010	S-MH-2034	S-MH-1661	62.01	61.94	190.0	283.0	899.1	428.5	2.10	2.55	1.201
S-LINE-2213	12	283	PVC	0.0020	S-MH-1661	S-MH-1658	61.94	61.32	190.0	283.0	899.1	750.5	1.20	2.55	0.962
S-LINE-2203	12	407	DI	0.0030	S-MH-1657	S-MH-1651	57.50	56.45	200.3	531.5	1,176.7	814.4	1.45	3.34	3.094
S-LINE-2199	12	242	DI	0.0030	S-MH-1651	S-MH-1753	56.45	55.80	200.3	531.5	1,176.7	830.9	1.42	3.34	1.941
S-LINE-2198	12	203	DI	0.0020	S-MH-1753	S-MH-1754	55.80	55.30	216.6	531.5	1,222.3	795.7	1.54	3.47	1.281
S-LINE-2197	12	109	PVC	0.0010	S-MH-1754	S-MH-1755	55.30	55.14	216.6	531.5	1,222.3	614.3	1.99	3.47	0.595
S-LINE-2195	12	58	PVC	0.0040	S-MH-1755	S-MH-4607	55.14	54.92	216.6	531.5	1,222.3	987.5	1.24	3.47	0.119
S-LINE-2185	18	389	Concrete	0.0010	S-MH-1746	S-MH-1748	51.06	50.75	353.6	725.7	1,785.2	1,334.5	1.34	2.25	0.355
S-LINE-2184	18	388	Concrete	0.0010	S-MH-1748	S-MH-1729	50.75	50.30	353.6	725.7	1,785.2	1,609.9	1.11	2.25	0.107
S-LINE-2371	8	219	PVC	0.0000	S-MH-3769	S-MH-1422	45.74	45.67	28.6	21.3	126.5	97.2	1.30	0.81	0.049
S-LINE-475	48	74	Clay	0.0000	S-MH-540	S-MH-541	20.94	20.94	1,098.5	6,323.4	9,133.2	2,044.3	4.47	1.62	0.015
S-LINE-5234	30	29	DI	0.0010	S-MH-533	S-MH-532	11.92	11.90	845.5	2,881.1	5,158.5	4,847.6	1.06	2.34	0.037
S-LINE-431	30	277	DI	0.0010	S-MH-532	S-MH-529	11.90	11.69	845.5	2,881.1	5,158.5	5,082.5	1.02	2.34	0.034
S-LINE-484	30	237	Unknown	0.0010	S-MH-527	S-MH-549	11.30	11.12	845.5	2,881.1	5,158.5	5,087.1	1.01	2.34	0.025

Marysville Sewer Comprehensive Plan
2031 Modeled Pipe Deficiencies

City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-5156	30	235	PVC	0.0010	S-MH-3563	MH-1361	10.75	10.57	845.5	2,881.1	5,158.5	5,108.7	1.01	2.34	0.018
S-LINE-5159	30	271	PVC	0.0010	MH-1361	MH-1362	10.57	10.37	845.5	2,881.1	5,158.5	5,014.6	1.03	2.34	0.013
S-LINE-4555	10	298	PVC	0.0010	S-MH-3242	S-MH-3241	112.73	112.55	51.0	272.3	457.8	242.3	1.89	1.87	5.784
S-LINE-4479	10	274	PVC	0.0010	S-MH-3203	S-MH-3204	112.20	111.96	72.7	76.6	338.3	291.8	1.16	1.38	5.805
S-LINE-5013	12	113	PVC	0.0010	S-MH-3204	S-MH-3522	111.96	111.86	123.7	348.9	772.4	477.0	1.62	2.19	5.554
S-LINE-5012	12	188	PVC	0.0010	S-MH-3522	S-MH-3513	111.86	111.64	123.7	348.9	772.4	548.5	1.41	2.19	5.39
S-LINE-5010	12	307	PVC	0.0010	S-MH-3513	S-MH-3521	111.52	111.18	123.7	348.9	772.4	533.6	1.45	2.19	5.292
S-LINE-5009	12	317	PVC	0.0010	S-MH-3521	S-MH-3510	111.16	110.85	123.7	348.9	772.4	501.4	1.54	2.19	4.936
S-LINE-5008	12	307	PVC	0.0010	S-MH-3510	S-MH-3505	110.81	110.55	158.6	378.0	905.4	466.6	1.94	2.57	4.547
S-LINE-7446	12	114	PVC	0.0010	S-MH-3505	S-MH-4595	110.51	110.40	158.6	378.0	905.4	498.0	1.82	2.57	3.863
S-LINE-5005	12	283	PVC	0.0000	S-MH-3506	S-MH-4594	110.15	110.05	169.1	553.1	1,110.2	301.4	3.68	3.15	3.217
S-LINE-5004	12	208	PVC	0.0010	S-MH-4594	S-MH-4596	110.05	109.81	169.1	553.1	1,110.2	544.6	2.04	3.15	1.953
S-LINE-4849	14	331	Asbestos Cement	0.0000	S-MH-3424	S-MH-3425	112.45	112.36	33.0	337.0	457.9	398.8	1.15	0.95	0.029
S-LINE-4246	30	178	Concrete	0.0000	S-MH-3025	S-MH-3024	83.10	83.08	217.3	2,198.9	2,891.7	1,956.7	1.48	1.31	0.024
S-LINE-3881	12	233	Concrete	0.0000	MH-212	S-MH-2713	85.83	85.82	0.4	121.3	122.8	105.0	1.17	0.35	3.893
S-LINE-3833	18	481	Concrete	0.0020	S-MH-2589	S-MH-2757	80.90	80.08	209.5	2,094.7	2,765.9	1,951.8	1.42	3.49	6.637
S-LINE-3586	18	497	Concrete	0.0020	S-MH-2757	MH-102	80.08	79.03	209.5	2,094.7	2,765.9	2,172.8	1.27	3.49	5.8
S-LINE-3587	18	410	Concrete	0.0030	MH-102	S-MH-2702	79.03	77.75	209.5	2,225.7	2,896.9	2,641.3	1.10	3.65	5.138
S-LINE-3588	18	479	Concrete	0.0010	S-MH-2701	S-MH-2761	76.69	76.00	209.6	2,282.9	2,954.3	1,794.2	1.65	3.73	5.775
S-LINE-3589	18	467	Concrete	0.0020	S-MH-2761	S-MH-2684	76.00	74.89	209.6	2,282.9	2,954.3	2,304.7	1.28	3.73	4.583
S-LINE-3596	18	378	Concrete	0.0030	S-MH-2684	S-MH-2760	74.89	73.67	209.6	2,365.8	3,037.2	2,685.6	1.13	3.83	3.857
S-LINE-3597	18	369	Concrete	0.0030	S-MH-2760	S-MH-2759	73.67	72.64	215.2	2,413.0	3,100.0	2,497.5	1.24	3.91	3.507
S-LINE-1171	18	362	Concrete	0.0030	S-MH-2759	MH-1422	72.64	71.43	215.2	2,413.0	3,100.0	2,733.0	1.13	3.91	2.94
S-LINE-3604	18	360	Concrete	0.0030	MH-1422	MH-166	71.43	70.33	215.2	2,413.0	3,100.0	2,613.1	1.19	3.91	2.583
S-LINE-3300	21	264	Concrete	0.0010	S-MH-3861	S-MH-3860	69.84	69.51	224.1	2,486.8	3,198.4	2,521.1	1.27	2.96	2.195
S-LINE-3196	21	390	Concrete	0.0020	S-MH-3860	MH-221	69.51	68.72	229.4	2,494.1	3,220.4	3,209.3	1.00	2.98	1.99
S-LINE-3200	21	407	Concrete	0.0010	MH-221	S-MH-2383	68.72	68.20	229.4	2,494.1	3,220.4	2,548.8	1.26	2.98	1.979
S-LINE-3201	21	14	Concrete	0.0010	S-MH-2383	S-MH-2382	68.20	68.18	257.5	2,615.8	3,420.0	2,695.1	1.27	3.17	1.663
S-LINE-3296	21	454	Concrete	0.0020	S-MH-2708	S-MH-3792	67.91	66.89	294.7	2,659.4	3,564.2	3,379.9	1.06	3.30	1.757
S-LINE-3295	21	466	Concrete	0.0020	S-MH-3792	S-MH-3793	66.89	66.07	294.7	2,659.4	3,564.2	2,991.2	1.19	3.30	1.634
S-LINE-3294	21	472	Concrete	0.0020	S-MH-3793	S-MH-3794	66.07	65.17	294.7	2,659.4	3,564.2	3,113.7	1.15	3.30	1.282
S-LINE-3293	21	478	Concrete	0.0020	S-MH-3794	S-MH-2364	65.17	64.12	294.7	2,659.4	3,564.2	3,342.0	1.07	3.30	0.995
S-LINE-3194	21	173	Concrete	0.0020	S-MH-2364	S-MH-2363	64.12	63.72	304.3	2,681.2	3,611.2	3,428.8	1.05	3.35	0.842
S-LINE-3191	21	347	Concrete	0.0020	S-MH-2363	S-MH-2362	63.72	63.13	318.9	2,683.8	3,652.1	2,940.3	1.24	3.38	0.796
S-LINE-3188	21	420	Concrete	0.0020	S-MH-2362	S-MH-2384	63.13	62.48	324.3	2,685.8	3,668.3	2,805.2	1.31	3.40	0.469
S-LINE-3185	21	45	Concrete	0.0020	S-MH-2403	S-MH-2405	44.97	44.87	324.3	2,685.8	3,668.3	3,361.4	1.09	3.40	0.02
S-LINE-5007	12	200	PVC	0.0010	S-MH-4595	S-MH-3506	110.40	110.20	158.6	378.0	905.4	507.0	1.79	2.57	3.608
S-LINE-5738	8	112	PVC	0.0040	S-MH-4096	S-MH-55	260.20	259.71	91.3	61.0	381.7	359.7	1.06	2.44	0.064
S-LINE-5737	8	245	PVC	0.0040	S-MH-219	S-MH-4096	261.30	260.20	91.3	61.0	381.7	364.4	1.05	2.44	0.175
S-LINE-164	8	111	PVC	0.0040	S-MH-215	S-MH-216	267.58	267.13	91.3	61.0	381.7	346.2	1.10	2.44	0.099
S-LINE-163	8	242		0.0040	S-MH-214	S-MH-215	268.66	267.61	91.3	61.0	381.7	358.2	1.07	2.44	0.216
S-LINE-160	8	158	PVC	0.0050	S-MH-63	S-MH-212	271.22	270.47	91.3	61.0	381.7	374.7	1.02	2.44	0.031
S-LINE-6493	30	24	PVC	0.0000	S-MH-4552	S-MH-4551	93.28	93.28	186.3	817.3	1,423.0	583.7	2.44	0.65	0.001
S-LINE-6504	15	301	PVC	0.0010	S-MH-4562	S-MH-4561	101.85	101.43	177.7	685.2	1,266.6	1,085.9	1.17	2.30	0.155
S-LINE-6505	15	301	PVC	0.0020	S-MH-4563	S-MH-4562	102.40	101.90	177.7	685.2	1,266.6	1,184.8	1.07	2.30	0.179
S-LINE-6535	12	396	PVC	0.0030	S-MH-4584	S-MH-4583	107.66	106.52	169.1	553.1	1,110.2	860.3	1.29	3.15	0.768
S-LINE-6534	12	185	PVC	0.0030	S-MH-4586	S-MH-4584	108.26	107.76	169.1	553.1	1,110.2	833.5	1.33	3.15	1.059
S-LINE-6533	12	262	PVC	0.0040	S-MH-4587	S-MH-4586	109.28	108.36	169.1	553.1	1,110.2	950.1	1.17	3.15	1.302
S-LINE-7441	12	87	PVC	0.0040	S-MH-4596	S-MH-4587	109.71	109.33	169.1	553.1	1,110.2	1,059.6	1.05	3.15	1.291
S-LINE-618	18	213	PVC	0.0020	S-MH-351	S-MH-350	17.49	17.01	349.9	1,558.9	2,608.6	2,244.1	1.16	3.29	0.241
S-LINE-5974	18	333	PVC	0.0010	S-MH-4289	S-MH-4290	49.16	48.84	105.9	71.9	438.9	146.5	3.00	0.55	2.569
S-LINE-11994	15	333	PVC	0.0040	S-MH-6727	S-MH-3546	12.09	10.80	89.5	1,589.1	1,904.1	1,809.4	1.05	3.46	2.283
S-LINE-11995	15	157	PVC	0.0040	S-MH-3546	S-MH-3547	10.70	10.12	89.5	1,589.1	1,904.1	1,766.9	1.08	3.46	2.236
S-LINE-11996	15	353	PVC	0.0020	S-MH-3547	S-MH-3548	10.02	9.48	89.5	1,589.1	1,904.1	1,137.0	1.68	3.46	2.239
S-LINE-3242	8	190	DI	0.0010	S-MH-2406	S-MH-2344	57.19	56.96	62.2	3.8	229.4	189.2	1.21	1.46	0.109



CITY OF MARYSVILLE
SEWER COMPREHENSIVE PLAN
FIGURE 7-7
MODEL RESULTS
(Buildout w/ Improvements)

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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Marysville Sewer Comprehensive Plan
Buildout Modeled Pipe Deficiencies

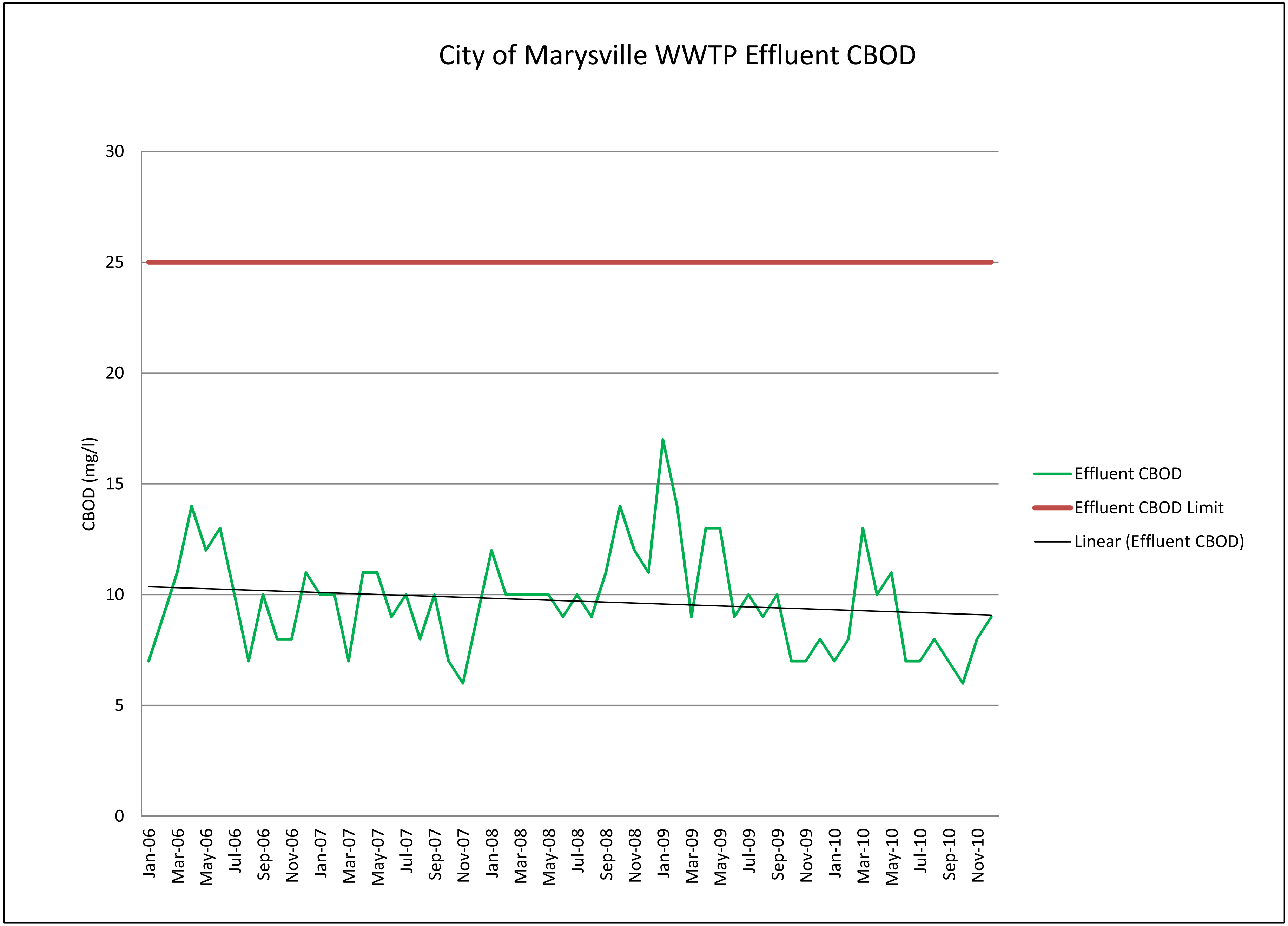
City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-1010	15	360	Concrete	0.0000	S-MH-708	S-MH-706	48.61	48.61	131.6	204.0	652.5	91.9	7.10	1.19	0.18
S-LINE-1011	15	101	Concrete	0.0000	S-MH-704	S-MH-703	47.09	47.09	158.6	246.4	773.8	91.9	8.42	1.41	0.07
S-LINE-11996	15	353	PVC	0.0020	S-MH-3547	S-MH-3548	10.02	9.48	89.5	1,589.1	1,904.1	1,343.7	1.42	3.46	1.79
S-LINE-1462	30	367	Unknown	0.0000	S-MH-3608	S-MH-3802	24.67	24.57	347.1	2,093.3	3,135.6	3,047.0	1.03	1.42	0.01
S-LINE-160	8	158	PVC	0.0050	S-MH-63	S-MH-212	271.22	270.47	91.3	61.0	381.7	374.7	1.02	2.44	0.03
S-LINE-163	8	242		0.0040	S-MH-214	S-MH-215	268.66	267.61	91.3	61.0	381.7	358.2	1.07	2.44	0.22
S-LINE-164	8	111	PVC	0.0040	S-MH-215	S-MH-216	267.58	267.13	91.3	61.0	381.7	346.2	1.10	2.44	0.10
S-LINE-1909	18	274	Unknown	0.0010	S-MH-1558	MH-110	40.15	39.90	248.3	1,072.1	1,850.8	1,427.9	1.30	2.33	0.23
S-LINE-1910	18	340	Unknown	0.0010	MH-110	S-MH-1568	39.90	39.43	248.3	1,072.1	1,850.8	1,757.6	1.05	2.33	0.05
S-LINE-1912	18	396	Unknown	0.0020	S-MH-1567	S-MH-1566	38.79	38.17	263.7	1,204.8	2,026.2	1,870.5	1.08	2.56	0.11
S-LINE-2028	18	237	Concrete	0.0020	S-MH-1523	S-MH-1522	45.52	45.07	421.5	944.1	2,183.3	2,059.9	1.06	2.75	0.06
S-LINE-2097	12	338	PVC	0.0010	S-MH-1606	S-MH-1605	51.61	51.23	131.6	204.0	652.5	537.6	1.21	1.85	0.18
S-LINE-2099	12	36	PVC	0.0010	S-MH-900	S-MH-857	51.80	51.78	92.2	163.4	487.0	377.9	1.29	1.38	0.19
S-LINE-2184	18	388	Concrete	0.0010	S-MH-1748	S-MH-1729	50.75	50.30	399.1	931.3	2,111.2	1,609.9	1.31	2.66	0.33
S-LINE-2185	18	389	Concrete	0.0010	S-MH-1746	S-MH-1748	51.06	50.75	399.1	931.3	2,111.2	1,334.5	1.58	2.66	0.80
S-LINE-2187	18	384	Concrete	0.0020	S-MH-1743	S-MH-1745	52.46	51.87	383.2	912.4	2,050.2	1,853.0	1.11	2.59	0.91
S-LINE-2197	15	109	PVC	0.0010	S-MH-1754	S-MH-1755	55.30	55.14	216.6	531.5	1,222.3	1,113.8	1.10	2.22	0.63
S-LINE-2213	12	283	PVC	0.0020	S-MH-1661	S-MH-1658	61.94	61.32	190.0	283.0	899.1	886.9	1.01	2.55	0.02
S-LINE-2214	12	98	PVC	0.0010	S-MH-2034	S-MH-1661	62.01	61.94	190.0	283.0	899.1	506.4	1.78	2.55	0.17
S-LINE-2371	8	219	PVC	0.0000	S-MH-3769	S-MH-1422	45.74	45.67	28.6	21.3	126.5	97.2	1.30	0.81	0.05
S-LINE-2414	10	85	PVC	0.0000	MH-170	S-MH-1845	46.60	46.58	14.3	100.7	153.3	151.2	1.01	0.63	0.00
S-LINE-2488	15	161	PVC	0.0000	S-MH-1834	S-MH-1838	47.90	47.89	168.1	93.7	647.9	229.1	2.83	1.18	0.07
S-LINE-2544	12	133	Unknown	0.0000	S-MH-1998	S-MH-1999	63.13	63.08	190.0	283.0	899.1	367.4	2.45	2.55	0.25
S-LINE-2549	12	141	Unknown	0.0020	S-MH-1993	S-MH-1992	65.23	64.94	190.0	283.0	899.1	859.3	1.05	2.55	0.03
S-LINE-3036	12	85	PVC	0.0020	MH-234	S-MH-2201	63.47	63.26	168.0	302.6	856.6	796.9	1.08	2.43	0.03
S-LINE-3037	12	453	PVC	0.0030	S-MH-2290	MH-234	64.71	63.47	168.0	302.6	856.6	838.8	1.02	2.43	0.09
S-LINE-3052	10	245	PVC	0.0030	S-MH-2306	S-MH-2305	66.73	65.97	96.7	244.2	582.0	549.2	1.06	2.38	0.10
S-LINE-3053	10	140	PVC	0.0030	S-MH-2307	S-MH-2306	67.15	66.73	96.7	244.2	582.0	540.0	1.08	2.38	0.17
S-LINE-3055	8	224	PVC	0.0040	MH-156	S-MH-2260	76.83	75.95	72.1	235.3	495.1	340.8	1.45	3.16	2.12
S-LINE-3056	8	272	PVC	0.0040	S-MH-2260	S-MH-2259	75.95	74.81	72.1	235.3	495.1	352.1	1.41	3.16	1.13
S-LINE-3084	10	314	PVC	0.0030	S-MH-2235	S-MH-2307	67.98	67.15	96.7	244.2	582.0	506.9	1.15	2.38	0.44
S-LINE-3242	8	190	DI	0.0010	S-MH-2406	S-MH-2344	57.19	56.96	62.2	3.8	229.4	189.2	1.21	1.46	0.11
S-LINE-3806	36	372	Concrete	0.0010	S-MH-2742	S-MH-2741	66.52	66.32	2,078.5	5,747.6	10,530.1	6,959.9	1.51	3.32	0.50
S-LINE-3850	36	302	Concrete	0.0010	S-MH-2739	S-MH-2738	65.67	65.32	2,100.3	5,776.7	10,598.1	10,218.6	1.04	3.34	0.03
S-LINE-3851	36	359	Concrete	0.0010	S-MH-2741	S-MH-2740	66.32	66.11	2,078.5	5,747.6	10,530.1	7,259.8	1.45	3.32	0.24
S-LINE-3959	24	454	Concrete	0.0010	S-MH-2817	S-MH-2818	87.86	87.53	380.2	1,963.4	3,093.3	2,744.8	1.13	2.19	0.09
S-LINE-4246	30	178	Concrete	0.0000	S-MH-3025	S-MH-3024	83.10	83.08	467.0	2,198.9	3,558.6	1,956.7	1.82	1.62	0.05
S-LINE-431	30	277	DI	0.0010	S-MH-532	S-MH-529	11.90	11.69	845.5	2,894.1	5,171.5	5,082.5	1.02	2.35	0.04
S-LINE-438	30	294	Unknown	0.0010	S-MH-528	S-MH-527	11.53	11.30	845.5	2,894.1	5,171.5	5,163.0	1.00	2.35	0.03
S-LINE-4479	10	274	PVC	0.0010	S-MH-3203	S-MH-3204	112.20	111.96	72.7	76.6	338.3	291.8	1.16	1.38	0.33
S-LINE-4555	10	298	PVC	0.0010	S-MH-3242	S-MH-3241	112.73	112.55	51.0	272.3	457.8	242.3	1.89	1.87	0.47
S-LINE-475	48	74	Clay	0.0000	S-MH-540	S-MH-541	20.94	20.94	1,289.2	7,185.7	10,338.9	2,044.3	5.06	1.83	0.02
S-LINE-484	30	237	Unknown	0.0010	S-MH-527	S-MH-549	11.30	11.12	845.5	2,894.1	5,171.5	5,087.1	1.02	2.35	0.03
S-LINE-4849	14	331	ASBESTOS CEMENT	0.0000	S-MH-3424	S-MH-3425	112.45	112.36	33.0	337.0	457.9	398.8	1.15	0.95	0.03
S-LINE-5004	15	208	PVC	0.0010	S-MH-4594	S-MH-4596	110.05	109.81	169.1	553.1	1,110.2	987.5	1.12	2.02	0.07
S-LINE-5005	15	283	PVC	0.0000	S-MH-3506	S-MH-4594	110.15	110.05	169.1	553.1	1,110.2	546.5	2.03	2.02	0.38
S-LINE-5008	15	307	PVC	0.0010	S-MH-3510	S-MH-3505	110.81	110.55	158.6	378.0	905.4	846.0	1.07	1.64	0.33
S-LINE-510	18	258	Unknown	0.0010	S-MH-379	S-MH-4089	26.98	26.75	294.6	1,353.7	2,258.3	1,411.4	1.60	2.85	0.36
S-LINE-5109	21	240	PVC	0.0010	S-MH-324	S-MH-3551	10.13	9.79	427.7	1,694.1	2,949.8	2,683.9	1.10	2.73	0.07

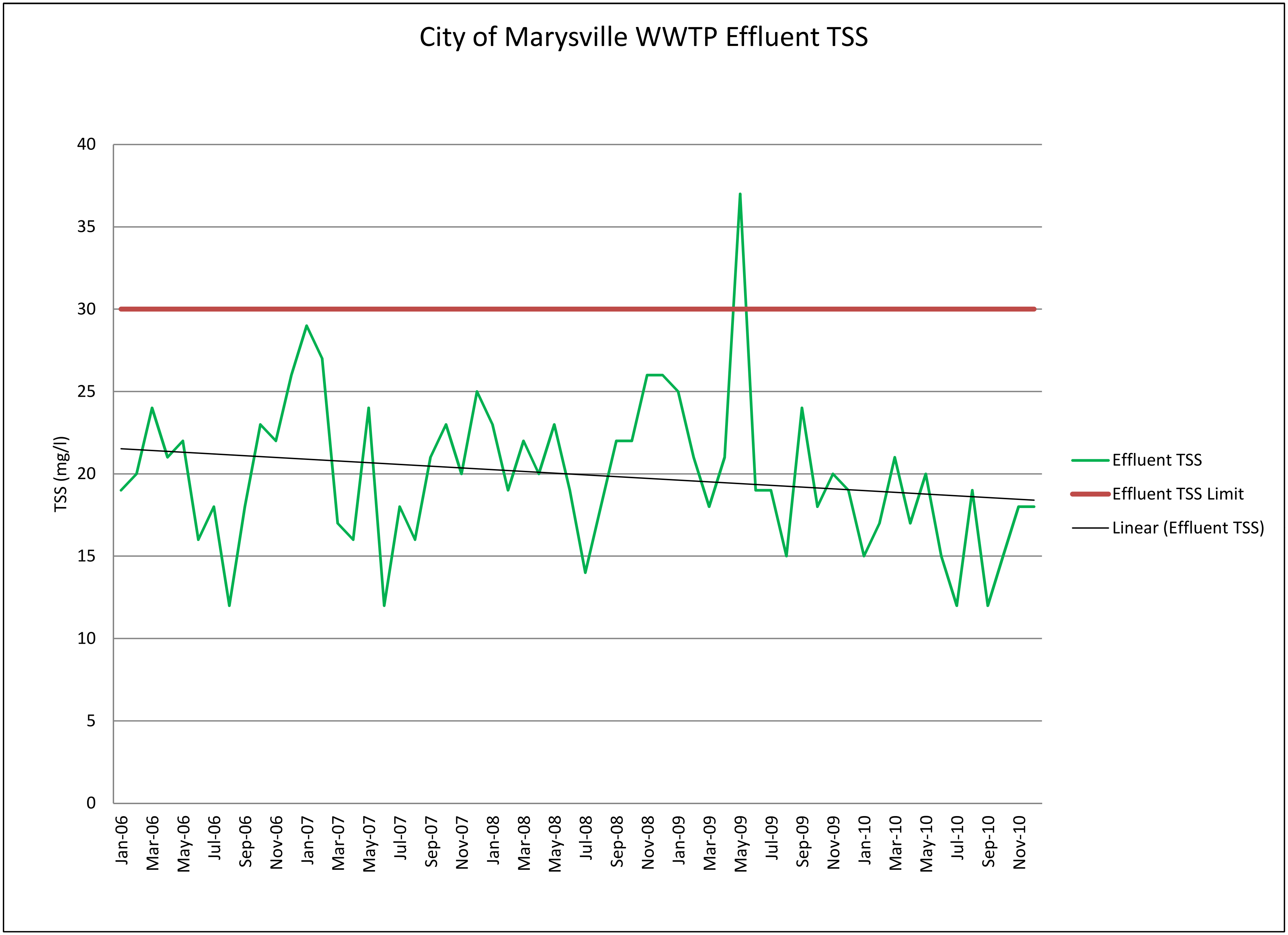
Marysville Sewer Comprehensive Plan
Buildout Modeled Pipe Deficiencies

City Pipe Number	Diameter (inches)	Length (Ft)	Material	Slope (ft/ft)	Upstream Manhole	Downstream Manhole	Upstream Invert (ft)	Downstream Invert (ft)	Peakable (Residential) Flow (gpm)	Unpeakable (Commercial / I&I) Flow (gpm)	Total Flow (gpm)	Design Capacity (gpm)	Modeled Flow to Design Flow Ratio	Velocity (ft/s)	Upstream Surcharge Depth (ft)
S-LINE-5113	24	372	Unknown	0.0020	S-MH-3574	S-MH-3575	6.26	5.44	582.9	3,465.5	5,112.5	4,779.8	1.07	3.63	0.13
S-LINE-5154	30	230	PVC	0.0010	S-MH-3571	S-MH-3563	10.93	10.75	845.5	2,894.1	5,171.5	5,163.9	1.00	2.35	0.02
S-LINE-5156	30	235	PVC	0.0010	S-MH-3563	MH-1361	10.75	10.57	845.5	2,894.1	5,171.5	5,108.7	1.01	2.35	0.02
S-LINE-5159	30	271	PVC	0.0010	MH-1361	MH-1362	10.57	10.37	845.5	2,894.1	5,171.5	5,014.6	1.03	2.35	0.01
S-LINE-5218	15	417	Unknown	0.0000	S-MH-3581	S-MH-3582	8.81	8.78	89.5	1,589.1	1,904.1	246.6	7.72	3.46	1.80
S-LINE-5227	24	141	Unknown	0.0020	S-MH-3594	S-MH-3868	3.01	2.66	582.9	3,465.5	5,112.5	5,072.3	1.01	3.63	0.01
S-LINE-5234	30	29	DI	0.0010	S-MH-533	S-MH-532	11.92	11.90	845.5	2,894.1	5,171.5	4,847.6	1.07	2.35	0.05
S-LINE-545	18	373	Unknown	0.0020	S-MH-353	S-MH-562	23.95	23.15	330.1	1,460.6	2,458.3	2,189.2	1.12	3.10	0.56
S-LINE-547	18	383	Unknown	0.0020	S-MH-562	S-MH-563	23.15	22.45	330.1	1,460.6	2,458.3	2,020.9	1.22	3.10	0.34
S-LINE-554	18	295	Unknown	0.0020	S-MH-458	S-MH-380	25.83	25.22	295.4	1,432.1	2,338.8	2,149.6	1.09	2.95	0.12
S-LINE-5737	8	245	PVC	0.0040	S-MH-219	S-MH-4096	261.30	260.20	91.3	61.0	381.7	364.4	1.05	2.44	0.18
S-LINE-5738	8	112	PVC	0.0040	S-MH-4096	S-MH-55	260.20	259.71	91.3	61.0	381.7	359.7	1.06	2.44	0.06
S-LINE-5974	18	333	PVC	0.0010	S-MH-4289	S-MH-4290	49.16	48.84	105.9	71.9	438.9	146.5	3.00	0.55	2.57
S-LINE-616	18	197	CI	0.0020	S-MH-440	S-MH-441	19.75	19.37	330.1	1,460.6	2,458.3	2,249.2	1.09	3.10	0.08
S-LINE-618	18	213	PVC	0.0020	S-MH-351	S-MH-350	17.49	17.01	349.9	1,558.9	2,608.6	2,244.1	1.16	3.29	0.24
S-LINE-620	18	329	PVC	0.0030	S-MH-350	S-MH-346	16.91	16.07	349.9	1,558.9	2,608.6	2,388.6	1.09	3.29	0.17
S-LINE-635	21	307	PVC	0.0010	S-MH-326	S-MH-324	10.54	10.13	427.7	1,694.1	2,949.8	2,605.9	1.13	2.73	0.19
S-LINE-6493	30	24	PVC	0.0000	S-MH-4552	S-MH-4551	93.28	93.28	1,074.0	1,714.4	4,480.0	583.7	7.68	2.03	0.01
S-LINE-6494	30	95	PVC	0.0000	S-MH-4553	S-MH-4552	93.42	93.38	1,074.0	1,714.4	4,480.0	3,787.7	1.18	2.03	0.02
S-LINE-6504	15	301	PVC	0.0010	S-MH-4562	S-MH-4561	101.85	101.43	177.7	685.2	1,266.6	1,085.9	1.17	2.30	0.16
S-LINE-6505	15	301	PVC	0.0020	S-MH-4563	S-MH-4562	102.40	101.90	177.7	685.2	1,266.6	1,184.8	1.07	2.30	0.18
S-LINE-6603	18	59	PVC	0.0010	S-MH-4610	S-MH-4611	52.85	52.77	373.5	899.1	2,011.3	1,740.7	1.16	2.54	1.32
S-LINE-664	21	315	Unknown	0.0000	S-MH-328	S-MH-469	11.83	11.81	1.3	1,406.4	1,411.2	568.2	2.48	1.31	1.18
S-LINE-675	30	368	Concrete	0.0010	S-MH-651	S-MH-624	21.77	21.57	833.4	2,860.0	5,110.9	4,303.3	1.19	2.32	0.08
S-LINE-6778	12	324	PVC	0.0030	S-MH-4720	S-MH-4719	67.79	66.83	139.9	456.2	930.7	872.7	1.07	2.64	0.14
S-LINE-6779	12	337	PVC	0.0030	S-MH-4721	S-MH-4720	68.82	67.89	139.9	456.2	930.7	842.3	1.11	2.64	0.25
S-LINE-6780	12	268	PVC	0.0030	S-MH-4722	S-MH-4721	69.76	68.92	139.9	456.2	930.7	897.6	1.04	2.64	0.22
S-LINE-6783	12	121	PVC	0.0020	S-MH-4725	S-MH-4722	70.14	69.86	139.9	456.2	930.7	771.3	1.21	2.64	0.25
S-LINE-6784	12	149	PVC	0.0020	S-MH-4726	S-MH-4725	70.57	70.24	139.9	456.2	930.7	754.5	1.23	2.64	0.32
S-LINE-6785	12	129	PVC	0.0020	S-MH-4729	S-MH-4726	70.96	70.67	139.9	456.2	930.7	760.2	1.22	2.64	0.37
S-LINE-6788	12	278	PVC	0.0020	S-MH-4730	S-MH-4729	71.67	71.06	139.9	456.2	930.7	751.0	1.24	2.64	0.60
S-LINE-6793	12	136	PVC	0.0020	S-MH-4735	S-MH-4730	72.04	71.77	139.9	456.2	930.7	714.4	1.30	2.64	0.69
S-LINE-6794	12	135	PVC	0.0020	S-MH-4736	S-MH-4735	72.42	72.14	139.9	456.2	930.7	730.2	1.28	2.64	0.77
S-LINE-6797	12	221	PVC	0.0020	S-MH-4739	S-MH-4736	72.98	72.52	139.9	456.2	930.7	731.5	1.27	2.64	0.96
S-LINE-703	21	259	Concrete	0.0000	S-MH-591	S-MH-597	40.83	40.80	399.8	600.2	1,782.0	767.4	2.32	1.65	0.13
S-LINE-711	18	252	Concrete	0.0010	S-MH-670	S-MH-671	43.09	42.84	399.8	600.2	1,782.0	1,759.6	1.01	2.25	0.01
S-LINE-712	18	121	Concrete	0.0000	S-MH-669	S-MH-670	43.16	43.16	399.8	600.2	1,782.0	176.7	10.09	2.25	0.12
S-LINE-717	18	423	Concrete	0.0010	S-MH-700	S-MH-697	45.62	45.28	376.5	561.1	1,681.2	1,583.9	1.06	2.12	0.05
S-LINE-7446	15	114	PVC	0.0010	S-MH-3505	S-MH-4595	110.51	110.40	158.6	378.0	905.4	903.0	1.00	1.64	0.33

APPENDIX F

EFFLUENT TSS AND CBOD TRENDING CHARTS


City of Marysville WWTP Effluent CBOD
CBOD (mg/l)
30
25
20
15
10
5
0
Jan-06
Mar-06
May-06
Jul-06
Sep-06
Nov-06
Jan-07
Mar-07
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Effluent CBOD
Effluent CBOD Limit
Linear (Effluent CBOD)



City of Marysville WWTP Effluent TSS
TSS (mg/l)
40
35
30
25
20
15
10
5
0
Jan-06
Mar-06
May-06
Jul-06
Sep-06
Nov-06
Jan-07
Mar-07
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Effluent TSS
Effluent TSS Limit
Linear (Effluent TSS)

APPENDIX G

CMOM CHECKLIST

About the CMOM Program Self Assessment Checklist

Introduction
A sanitary sewer collection system is a vital element of any community's infrastructure and a critical component of the wastewater treatment process. The nation's sanitary sewer infrastructure has been built over the last 100 years or more using a variety of materials, design standards, installation techniques, and maintenance practices. As this valuable infrastructure ages, the importance of preventive and predictive maintenance increases.

What is CMOM?
CMOM stands for "capacity, management, operations, and maintenance." It is a flexible, dynamic framework for municipalities to identify and incorporate widely-accepted wastewater industry practices to:

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

The CMOM approach helps municipal wastewater utility operators provide a high level of service to customers and reduce regulatory non-compliance. CMOM can help utilities optimize use of human and material resources by shifting maintenance activities from "reactive" to "predictive" - often leading to cost savings through avoided overtime, emergency construction costs, increased insurance premiums, and the possibility of lawsuits. CMOM information and documentation can also help improve communications with the public, other municipal works, and regional planning organizations, and regulators.

In CMOM planning, the utility selects performance goal targets, and designs CMOM activities to meet the goals. The CMOM planning framework covers operation and maintenance (O&M) planning, capacity assessment and assurance, capital improvement planning, and financial management planning. Information collection and management practices are used to track how well each CMOM activity is meeting the performance goals, and whether overall system efficiency is improving. On an ongoing basis, activities are reviewed and adjusted to better meet the change. For instance, an initial goal may be to develop a geographic information system (GIS) of the system. Once the GIS is complete, a new goal might be to use the GIS to track emergency calls and use the information to improve maintenance planning.

An important component of a successful CMOM program is to periodically collect information on current systems and activities and develop a "snapshot-in-time" analysis. From this analysis, the utility establishes its performance goals and plans its CMOM program activities.

Additional information describing CMOM can be found at www.epa.gov/npdes/sso or www.epa.gov/region4/water/wpeb/pdfs/self-audit_review2-3.pdf.

About this Checklist (Continued)

What is the purpose of the CMOM program checklist?
This document is a screening-level tool that can help utilities evaluate CMOM programs and identify general areas of strength and weakness. Completing this CMOM assessment will allow the utility to flag CMOM program areas that need improvement and establish priorities for additional, more detailed assessments. In addition, the checklist will allow the utility to compare annual performance (e.g., percent of employees meeting training standards).

This document is not intended to be all-inclusive. It addresses the types of practices EPA believes should be considered by most utilities when implementing a CMOM program. However, the ways in which utilities use the information gathered through the checklist will depend on the complexity and site-specific issues facing individual collection systems. When reviewing the questions, utilities should use their judgment to determine if the question is reasonable for their collection system size and design.

How do I use this checklist?
The questions on the checklist will request answer in three different formats:

- Check yes, no, or not applicable (N/A)
- Fill in the blank, and
- Check all that apply.

At the end of each section, additional space is provided to allow for comments on or explanations of the answers recorded (information that will be useful to the utility in follow-on planning). Each utility should make an effort to answer all the questions that are applicable to its system. If a particular question takes a significant amount of time to answer, this could be an indication of an area of weakness. Utilities should plan to invest approximately one day to complete the checklist.

This document is designed to help utilities perform an initial evaluation of CMOM activities. **It is not intended to serve as an absolute indicator of a successful CMOM program, nor will all of the questions apply to every utility.** By working through these questions, utilities will be able to identify strengths and areas for improvements for in their CMOM programs. If a utility has a significant number of “no” answers or very few items selected in the checklist, this could indicate an area of weakness. The utility manager then can make a more detailed evaluation, including identifying specific actions needed to address areas for improvement.

General Information

CHECKLIST COMPLETED BY:

Name ______________________ Date ______________________

Daytime telephone Number ______________________

UTILITY CONTACT INFORMATION

Utility Name: City of Marysville

LOCATION:

80 Columbia Avenue
Street Address

Street Address (continued)

Marysville	Washington	98270
City	State	Zip

STAFF:

Name

Title

Email

Phone ( ) - Fax ( ) -

PERMITTED TREATMENT & COLLECTION FACILITIES

NPDES or State Permit #	Permittee/Co-Permittee/Jurisdictions	PERMIT COVERAGE: WWTP Effluent	PERMIT COVERAGE: Collection System	PERMIT COVERAGE: Wet-Weather Facility
WA-002249-7	City of Marysville	☑	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐

Collection System Description

SYSTEM INVENTORY

1 (Number)	# of treatment facilities

Treatment Facilities

WWTP design capacity	12.7	MGD
Average daily flow	4.73	MGD
Average dry weather flow	4.16	MGD

Access & Maintenance

Manholes		Number
Number of air vacuum relief valves		Number

Conveyance & Pumping

	Gravity Sewers	Force Mains	Pump Stations
Pipes and pumps Length/quantity	210.5 Miles	Miles	14 Miles
Age of system 0 - 25 years old	% Percent	% Percent	% Percent
26 - 50 years old	% Percent	% Percent	% Percent
51 - 75 years old	% Percent	% Percent	% Percent
>76 years old	% Percent	% Percent	% Percent

Number of inverted siphons ____________________

Service Area Characteristics

Service area	6,050	ACRES
Service population	53,203	PEOPLE
Annual precipitation	42±	INCHES

Number of Service Connections

Residential		Commercial		Industrial		TOTAL
15,103 NUMBER	+	860 NUMBER	+	NUMBER	=	15,963 NUMBER

- [ ] At main line connection only
- [ ] Beyond porperty line/clean out
- [ ] From main line to property line or easement/cleanout
- [ ] Other: ________________________________

Combined Sewer Systems
What percent of sewer system is served by combined sewers (i.e., sanitary sewage and storm water in the same pipe)?

0% PERCENT

Collection System Description

	Gravity Sewers	Force Mains
PIPE DIAMETER		
8 inches or less*	66% PERCENT	% PERCENT
9 - 18 inches	27% PERCENT	% PERCENT
19 - 36 inches	6% PERCENT	% PERCENT
>36 inches	2% PERCENT	% PERCENT

*Assumed <6 = FM. Also, approx. 2% unknown

	Gravity Sewers	Force Mains
PIPE MATERIALS		
Prestressed concrete cylinder pipe (PCCP)	% PERCENT	% PERCENT
High density polyethylene (HDPE)	0.3% PERCENT	% PERCENT
Reinforced concrete pipe (RCP)	0.2% PERCENT	% PERCENT
Polyvinyl chloride (PVC)	74% PERCENT	N/A PERCENT
Vitrified clay pipe (VCP)	0.5% PERCENT	N/A PERCENT
Ductile iron	0.8% PERCENT	% PERCENT
Non-reinforced concrete pipe	15% PERCENT	% PERCENT
Asbestos cement pipe	0.1% PERCENT	% PERCENT
Cast iron	0.04% PERCENT	% PERCENT
Brick	% PERCENT	% PERCENT
Fiberglass	% PERCENT	% PERCENT
Other *(Explain)* Unknown	8.4% PERCENT	% PERCENT

Engineering Design (ED)

ED-01	Is there a document, which includes design criteria and standard construction details?	☑ Yes	☐ No
ED-02	Is there a document that describes the procedures that the utility follows in construction design review?	☑ Yes	☐ No
ED-03	Are WWTP and O&M staff involved in the design review process?	☑ Yes	☐ No
ED-04	Is there a procedure for testing and inspecting new or rehabilitated system elements both during and after the construction is completed?	☑ Yes	☐ No
ED-05	Are construction sites supervised by qualified personnel (such as professional engineers or certified engineering technicians) to ascertain that the construction is taking place in accordance with the agreed upon plans and specifications?	☐ Yes	☐ No
ED-06	Are new manholes tested for inflow and infiltration?	☑ Yes	☐ No
ED-07	Are new gravity sewers checked suing closed circuit TV inspection?	☑ Yes	☐ No
ED-08	Does the utility have documentation on private service lateral design and inspection standards?	☐ Yes	☐ No
ED-09	Does the utility attempt to standardize equipment and sewer system components?	☑ Yes	☐ No

Satellite Communities and Sewer Use Ordinance (SUO)

SUO-01	Does the utility receive flow from satellite communities? IF NO, GO TO PAGE 6	☐ Yes ☑ No
SUO-02	What is the total area from satellite communities that contribute flow to the collection system? *(Acres or square miles)*	________________
SUO-03	Does the utility require satellite communities to enter into an agreement? IF NO, GO TO QUESTION SUO-06.	☐ Yes ☐ No
SUO-04	Does the agreement include the requirements listed in the sewer use ordinance (SUO)?	☐ Yes ☐ No
SUO-05	Do the agreements have a date of termination and allow for renewal under different terms?	☐ Yes ☐ No
SUO -06	Does the utility maintain the legal authority to control the maximum flow introduced into the collection system from satellite communities?	☐ Yes ☐ No
SUO -07	Are standards, inspections, and approval for new connections clearly documented in a SUO?	☐ Yes ☐ No
SUO -08	Does the SUO require satellite communities to adopt the same industrial and commercial regulator discharge limits as the utility?	☐ Yes ☐ No
SUO -09	Does the SUO require satellite communities to adopt the same inspection and sampling schedules as required by the pretreatment ordinance?	☐ Yes ☐ No
SUO-10	Does the SUO require that satellite communities or the utility to issue control permits for significant industrial users?	☐ Yes ☐ No
SUO-11	Does the SUO contain provisions for addressing overstrength wastewater from satellite communities?	☐ Yes ☐ No

SUO-12 Does the SUO contain procedures for the following? (*Check all that apply)*

☐ Inspection standards ☑ Pretreatment requirements ☐ Building/sewer permit issues

SUO-13 Does the SUO contain general prohibitions of the following materials? *(Check all that apply)*

☑ Fire and explosion hazards ☑ Corrosive materials ☑ Obstructive materials

☑ Oils or petroleum ☑ Material which may cause interference at the wastewater treatment plant

SUO-14 Does the SUO contain procedures and enforcement actions for the following? *(Check all that apply)*

☑ Fats, oils, and grease (FOG) ☑ Stormwater connections to sanitary lines (downspouts)

☐ Infiltration/Inflow ☐ Defects in service laterals located on private property

☐ Building structures over the sewer lines ☐ Sump pumps, air conditioner connections

Organizational Structure (OC)

OC-01	Is an organizational chart available that shows the overall personnel structure for the utility, including operation and maintenance staff.	☑ Yes ☐ No
OC-02	Are up-to-date job descriptions available that delineate responsibilities and authority for each position?	☑ Yes ☐ No

OC-03 Are the following items discussed in the job descriptions? (*Check all that apply)*

- ☑ Nature of work to be performed
- ☑ Examples of the types of work
- ☑ Minimum requirements for the position
- ☑ List of licenses required for the position
- ☑ Necessary special qualifications or certifications
- ☐ Performance measures or promotion potential

OC-04 What percent of staff positions are currently vacant? ________________ %

OC-05 On average how long do positions remain vacant? *(months)* ________________

OC-06 What percent of utility work is contracted out? ________________ %

Internal Communications (IC)

IC-01	Which of the following methods are used to communicate with utility staff? *(Check all that apply)* ☑ Regular meetings ☑ Bulletin boards ☑ Email ☑ Other (cell phones, radio)	
IC-02	How often are staff meetings held? (e.g., Daily, Weekly, Monthly, etc.)	WEEKLY
IC-03	Are incentives offered to employees for performance improvements?	☐ Yes ☐ No
IC-04	Does the utility have an "Employee of the Month/Quarter/Year" program?	☑ Yes ☐ No
IC-05	How often are performance reviews conducted? *(e.g., Semi-Annually, Annually, etc.)*	ANNUALLY
IC-06	Does the utility regularly communicate/coordinate with other municipal departments?	☑ Yes ☐ No

Budgeting (BUD)

BUD-01	What is the average annual fee for residential users?	$________________
BUD-02	How often are user charges evaluated and adjusted? (*e.g. annually, biannually, etc.)*	_________________
BUD-03	Are utility-generated funds used for non-utility programs?	☐ Yes ☐ No
BUD-04	Are costs for collection system operation and maintenance (O&M) separated from other utility services such as water, stormwater, and treatment plant? IF NO, GO TO QUESTION BUD-07.	☐ Yes ☐ No
BUD-05	What is your average annual (O&M) budget?	$________________
BUD-06	What percentage of the utility's overall budget is allocated to maintenance of the collection system?	$________________
BUD-07	Does the utility have a Capital Improvement Program (CIP) that provides for system repairs/replacements on a prioritized basis?	☑ Yes ☐ No
BUD-08	What is your average annual CIP budget?	$________________
BUD-09	What percentage of the maintenance budget is allotted to the following maintenance>	
	Predictive maintenance (tracking design, life span, and scheduled parts replacements)	_______________%
	Preventive maintenance (identifying and fixing system weaknesses which, if left unaddressed, could lead to overflows)	_______________%
	Corrective maintenance (fixing system components that are functioning but not at 100% capacity/efficiency; for example partially blocked lines)	_______________%
	Emergency maintenance (reactive maintenance, overflows, equipment breakdowns)	_______________%
BUD-10	Does the utility have a budgeted program for the replacement of under-capacity pipes?	☑ Yes ☐ No
BUD-11	Does the utility have a budgeted program for the replacement of over-capacity pipes?	☐ Yes ☐ No

Training (TR)

TR-01 Does the utility have a formal job knowledge, skills, and abilities (KSA) training program? ☐ Yes ☑ No

TR-02 Does the training program address the fundamental mission, goals, and policies of the utility? ☐ Yes ☐ No

TR-03 Does the utility have mandatory training requirements identified for key employees? ☐ Yes ☐ No

TR-04 What percentage of employees met or exceeded their annual training goals during the past year? ______________%

TR-05 Does the utility provide training in the following areas? *(Check all that apply)*

☑ Safety ☑ Traffic control ☐ Public relations

☐ Routine line maintenance ☐ Record keeping ☐ SSO/Emergency Response

☑ Safety ☐ Electrical and instrumentation ☐ Pump Station operations and maintenance

☐ Other ☐ Pipe repair ☑ CCTV and trench/shoring

☐ Bursting CIP

TR-06 Are operator and maintenance certification programs used? IF NO, GO TO QUESTION TR-08 ☐ Yes ☐ No

TR-07 Are operator and maintenance certification programs required? ☐ Yes ☐ No

TR-08 Is on-the-job training progress and performance measured? ☐ Yes ☐ No

TR-09 Which of the following methods are used to assess the effectiveness of the training?

☐ None ☐ Periodic testing ☐ Drills ☐ Demonstrations

TR-10 What percentage of the training offered by the utility is in the form of the following?

Manufacturer training ___________% In-house classroom training ____________%

On-the-job training ___________% Industry-wide training ____________%

Safety (SAF)

SAF-01	Does the utility have a written safety policy?	☑ Yes ☐ No
SAF-02	How often are safety procedures reviewed and revised? *(e.g., Semiannually, Annually, etc.)*	☐ Yes ☐ No
SAF-03	Does the utility have a safety committee?	☑ Yes ☐ No
SAF-04	Are regular safety meetings held with the utility employees?	☑ Yes ☐ No
SAF-05	Does the utility have a safety training program?	☑ Yes ☐ No
SAF-06	Are records of employee safety training kept up to date?	☑ Yes ☐ No

SAF-07 Does the utility have written procedures for the following? *(check all that apply)*

- ☑ Lockout/tagout
- ☑ Material safety data sheets (MSDS)
- ☑ Chemical handling
- ☑ Confined spaces permit program
- ☑ Trenching and excavations safety
- ☑ Biological hazards in wastewater
- ☐ Traffic control and work site safety
- ☐ Electrical and mechanical systems
- ☐ Pneumatic and hydraulic safety systems

SAF-08 What is your agency's lost-time injury rate? ____________% or __________hours

SAF-09 Are the following equipment items available and in adequate supply? *(Check all that apply)*

- ☑ Rubber/disposable gloves
- ☑ Confined space ventilation equipment
- ☑ Hard hats, safety glasses, rubber boots
- ☑ Antibacterial soap and first aid kit
- ☑ Tripods or non-entry rescue equipment
- ☑ Fire extinguishers
- ☑ Equipment to enter manholes
- ☐ Portable crane/hoist
- ☑ Atmospheric testing equipment and gas detectors
- ☑ Oxygen Sensors
- ☑ H_2S
- ☐ Full body harness
- ☑ Protective clothing
- ☐ Traffic/public access control equipment
- ☐ 5-minute escape breathing devices
- ☑ Life preservers for lagoons
- ☐ Safety buoy at activated sludge plants
- ☑ Fiberglass or wooden ladders for electrical work
- ☑ Respirators and/or self contained breathing apparatus
- ☐ Methane gas or optical vector (OVA) analyzer
- ☑ Lower explosion limit (LEL) metering

SAF-10	Are safety monitors clearly identified?	☐ Yes ☐ No

Customer Service (CS)

CS-01 Does the utility have a customer service and public relations program? IF NO GO TO QUESTION CS-03 ☐ Yes ☐ No

CS-02 Does the customer service program include giving formal presentations on the wastewater field to the following?

☐ Schools and universities ☐ Local officials ☐ Media ☐ Building Inspector(s)

☐ Community gatherings ☐ Businesses ☐ Citizens ☐ Public utility officials

CS-03 Are employees of the utility specifically trained in customer service? ☐ Yes ☐ No

CS-04 Are there sample correspondence Q/A's, or "scripts" to help guide staff through written or oral responses to customers? ☐ Yes ☐ No

CS-05 What methods are used to notify the public of major construction or maintenance work? *(Check all that apply)*

☐ Door hangers ☐ Newspapers ☐ Fliers ☐ Signs ☐ Other ☐ None

☐ Public radio or TV announcements

CS-06 Is a homeowner notified prior to construction that his/her property may be affected? ☐ Yes ☐ No

CS-07 Do you provide information to residents on cleanup and safety procedures following basement backups and overflows from manholes when they occur? ☐ Yes ☐ No

CS-08 Does the utility have a customer service evaluation program to obtain feedback from the community? ☐ Yes ☐ No

CS-09 Do customer service records include the following information? *(Check all that apply)*

☐ Personnel who received the complaint or request ☐ Name, address, and telephone number of customer

☐ Nature of the complaint or request ☐ Location of the problem

☐ To whom the follow-up action was assigned ☐ Date the follow up action was assigned

☐ Date of the complaint or request ☐ Cause of the problem

☐ Date the complaint or request was resolved ☐ Feedback to customer

☐ Total days to end the problem

CS-10 Does the utility have a goal for how quickly customer complaints (or emergency calls) are resolved? IF NO, GO TO THE NEXT PAGE. ☐ Yes ☐ No

CS-11 What percentage of customer complaints (or emergency calls) are resolved within the timeline goals? ___________%

Equipment and Collection System Maintenance (ESM)

ESM-01	Is a maintenance card or record kept for each piece of mechanical equipment within the collection system? IF NO, GO TO QUESTION ESM-03	☐ Yes ☐ No
ESM-02	Do maintenance records include the following information? (*Check all that apply)* ☐ Maintenance recommendations ☐ Maintenance schedule ☐ Instructions on conducting the specific maintenance activity ☐ A record of maintenance on the equipment to date ☐ Other observations on the equipment	
ESM-03	Are dated tags used to show out-of-service equipment?	☐ Yes ☐ No
ESM-04	Is there an established system for prioritizing equipment maintenance needs?	☐ Yes ☐ No
ESM-05	What percent of repair funds are spent on emergency repairs?	________________%
ESM-06	Are corrective repair work orders backlogged more than six months?	☐ Yes ☐ No
ESM-07	Do collection system personnel coordinate with state, county, and local personnel on repairs, before the street is paved?	☐ Yes ☐ No

Equipment Parts Inventory (EPI)

EPI-01	Have critical spare parts been identified?	☐ Yes	☐ No
EPI-02	Are adequate supplies on hand to allow for two point repairs in any part of the system?	☐ Yes	☐ No
EPI-03	Is there a part standardizations policy in place?	☐ Yes	☐ No
EPI-04	Does the utility have a central location for storing spare parts?	☐ Yes	☐ No
EPI-05	Does the utility maintain a stock of spare parts on its maintenance vehicles?	☐ Yes	☐ No
EPI-06	Does the utility have a system in place to track and maintain an accurate inventory of spare parts?	☐ Yes	☐ No
EPI-07	For those parts which are not kept in inventory, does the utility have a readily available source or supplier?	☐ Yes	☐ No

Management Information Systems (MIS)

MIS-01 Does the utility have a management information system (MIS) in place for tracking maintenance activities? *(Either electronic or good paper files)* IF NO, GO TO PAGE 15

- [x] Yes
- [ ] No

MIS-02 Are the MIS records maintained for a period of at least three years?

- [x] Yes
- [ ] No

MIS-03 Is the MIS able to distinguish activities taken in response to an overflow event?

- [ ] Yes
- [ ] No

MIS-04 Are there written instructions for managing and tracking the following information?

- [ ] Complaint work orders
- [ ] Scheduled inspections
- [ ] Compliance/overflow tracking
- [ ] Schedule work orders
- [ ] Sewer System inventory
- [ ] Equipment tools/tracking
- [ ] Customer service
- [ ] Safety incidents
- [ ] Parts inventory
- [ ] Scheduled preventative maintenance
- [ ] Scheduled monitoring/sampling

MIS-05 Do the written instructions for tracking procedures include the following information? *(Check all that apply)*

- [ ] Accessing data and information
- [ ] Updating the MIS
- [ ] Instructions for using the tracking system
- [ ] Developing and printing reports

MIS-06 How often is the management information system updated? *(Check one)*

- [ ] Immediately
- [ ] Within one week of the "incident"
- [ ] Monthly
- [ ] As time permits

System Mapping (MAP)

MAP-01 Are "as-built" plans (record drawings) or maps available for use by field crews in the office and in the field?

- [x] Yes
- [ ] No

MAP-02 Is there a procedure for field crews to record changes or inaccuracies in the maps and update the mapping system?

- [ ] Yes
- [ ] No

MAP-03 Do the maps show the date the map was drafted and the date of the last revision?

- [ ] Yes
- [ ] No

MAP-04 Do the sewer line maps include the following? *(Check all that apply)*

- [x] Scale
- [x] North arrow
- [ ] Date the map was drafted
- [ ] Date of last revision
- [ ] Service area boundaries
- [ ] Property lines
- [x] Other landmarks (roads, water bodies, etc.)
- [x] Manhole and other access points
- [ ] Location of building laterals
- [x] Street names
- [ ] SSOs occurences/SCOs outfalls
- [ ] Flow monitors
- [x] Force mains
- [x] Pump stations
- [ ] Lined sewers
- [ ] Main, trunk, and interceptor sewers
- [ ] Easement lines and dimensions
- [x] Pipe material
- [x] Pipe diameter
- [x] Installation date
- [x] Slope
- [x] Manhole rim
- [x] Manhole coordinates (GIS)
- [x] Manhole invert elevations
- [x] Distance between manholes

MAP-05 Are the following sewer attributes recorded? (*Check all that apply)*

- [x] Size
- [ ] Shape
- [x] Invert elevations
- [x] Material
- [ ] Separate/combined sewers
- [x] Installation date

MAP-06 Are the following manhole attributes recorded? *(Check all that apply)*

- [ ] Shape
- [x] Type (e.g., precast, cast-in-place, etc.)
- [x] Depth
- [x] Material
- [x] Age

MAP-07 Is there a systematic numbering and identification method/system established to identify sewer system manholes, sewer lines, and other items (pump stations, etc.)

- [x] Yes
- [ ] No

Internal TV Inspection (TVI)

TVI-01 Does the utility have a standardized pipeline condition assessment program? ☐ Yes ☐ No

TVI-02 Is internal TV inspection used to perform condition assessment? IF NO, GO TO PAGE 17 ☑ Yes ☐ No

TVI-03 Are there written operation procedures and guidelines for the internal TV inspection program? ☐ Yes ☐ No

TVI-04 Do the internal TV record logs include the following? *(Check all that apply)*

- ☐ Pipe size, type, length, and joint spacing
- ☐ Internal TV operator name
- ☐ Distance recorded by internal TV
- ☐ Cleanliness of the line
- ☐ Results of the internal TV inspection (including structural rating)
- ☐ Location and identification of line being televised by manholes

TVI-05 Is a rating system used to determine the severity of the defects found during the inspection process? ☐ Yes ☐ No

TVI-06 Is there documentation explaining the codes used for internal TV results reporting? ☐ Yes ☐ No

TVI-07 Approximately what percent of the total defects determined by TV inspection during the past 5 years were the following?

Failed coatings or linings	______ %	Line deflection	______ %
House connection leaks	______ %	Joint separation	______ %
Illegal connections	______ %	Crushed pipes	______ %
Pipe corrosion (H_2S)	______ %	Collapsed pipes	______ %
Fats, oil, and grease	______ %	Offset joints	______ %
Broken pipes	______ %	Root intrusions	______ %
Debris	______ %	Minor cracks	______ %
Other	______ %		

TVI-08 Are main line and lateral repairs checked by internal TV inspection after the repair(s) have been made? ☐ Yes ☐ No

Sewer Cleaning (CLN)

CLN-01	What is the system cleaning frequency? (the entire system is cleaned every "X" years)	__________________
CLN-02	What is the utility's plan for system cleaning (% or frequency in years)?	__________________
CLN-03	What percent of the sewer lines are cleaned, even high/repeat cleaning trouble spots, during the past year?	________________%
CLN-04	Is there a program to identify sewer line segments, with chronic problems, that should be cleaned on a more frequent schedule?	☐ Yes ☐ No
CLN-05	Does the utility have a root control program?	☐ Yes ☐ No
CLN-06	Does the utility have a fats, oils, and grease (FOG) program?	☑ Yes ☐ No
CLN-07	What is the average number of stoppages experienced per mile of sewer pipe per year?	________________%
CLN-08	Has the number of stoppages increased, decreased, or stayed the same over the past 5 years? ☐ Increased ☐ Decreased ☐ Stayed the same	
CLN-09	Are stoppages plotted on maps and correlated with other data such as pipe size and material or location?	☐ Yes ☐ No
CLN-10	Do the sewer cleaning records include the following information? *(Check all that apply)* ☐ Date and time ☐ Method of cleaning ☐ Identity of cleaning crew ☐ Cause of stoppage ☐ Location of stoppage or routine cleaning activity ☐ Further actions necessary/initiated	
CLN-11	If sewer cleaning is done by a contractor are videos taken of before and after cleaning?	☐ Yes ☐ No

Manhole Inspection and Assessment (MAN)

MAN-01 Does the utility have a routine manhole inspection and assessment program? IF NO, GO TO QUESTION MAN-06 ☐ Yes ☐ No

MAN-02 Are the results and observations from the routine manhole inspections recorded? ☐ Yes ☐ No

MAN-03 Does the utility have a goal for the number of manholes inspected annually? ☐ Yes ☐ No

MAN-04 How many manholes were inspected during the past year? ________________

MAN-05 Do the records for manhole/pipe inspection include the following? *(Check all that apply)*

- ☐ Conditions of the frame and cover
- ☐ Evidence of surcharge
- ☐ Offsets or misalignments
- ☐ Atmospheric hazards measurements (especially hydrogen sulfide)
- ☐ Details on the root cause of cracks or breaks in the manhole or pipe including blockages
- ☐ Recording conditions of corbel, walls, bench, tough and pipe seals)
- ☐ Presence of corrosion
- ☐ If repair is necessary
- ☐ Manhole identifying number/location
- ☐ Wastewater flow characteristics (flowing freely or backed up)
- ☐ Accumulations of grease, debris, or grit
- ☐ Presence of infiltration, location, and estimated quantity
- ☐ Inflow from manhole covers

MAN-06 Does the utility have a grouting program? ☐ Yes ☐ No

PUMP STATIONS (PS)

PS-01	Are Standard Operation Procedures (SOPs) and Standard Maintenance Procedures (SMPs) used for each pump station?	☑ Yes ☐ No
PS-02	Are there enough trained personnel to properly maintain all pump stations?	☑ Yes ☐ No
PS-03	Is there an emergency operating procedure for each pump station?	☐ Yes ☐ No
PS-04	Is there an alarm system to notify personnel of pump station failures and overflow?	☑ Yes ☐ No
PS-05	Percent of pump stations with backup power sources	35%
PS-06	Does the utility use the following methods when loss of power occurs? *(Check all that apply)* ☐ On-site electrical generators ☐ Portable electric generators ☐ Alternate power source ☐ Other ☐ Vacuum trucks to bypass pump station	
PS-07	Is there a procedure for manipulating pump operations (manually or automatically) during wet weather to increase in-line storage of wet weather flows?	☐ Yes ☐ No
PS-08	Are wet well operating levels set to limit pump start/stops?	☑ Yes ☐ No
PS-09	Are the lead, lag, and backup pumps rotated regularly?	☑ Yes ☐ No
PS-10	Are operation logs maintained for all pump stations?	☑ Yes ☐ No
PS-11	Are the original manuals that contain the manufacturers recommended maintenance schedules for all pump station equipment easily available?	☐ Yes ☐ No
PS-12	On average, how often were pump stations inspected during the past year?	☐ Yes ☐ No
PS-13	Are records maintained for each inspection?	☑ Yes ☐ No
PS-14	Average annual labor hours spent on pump station inspection	________________
PS-15	Percent of pump stations with pump capacity redundancy	______________%
PS-16	Percent of pump stations with dry weather capacity limitations	______________%
PS-17	Percent of pump stations with wet weather capacity limitations	______________%
PS-18	Percent of pump stations calibrated annually	______________%
PS-19	Percent of pump stations with permanent flow meters	______________%

Capacity Assessment (CA)

CA-01 Does the utility have a flow-monitoring program? [x] Yes [ ] No

CA-02 Does the utility have a comprehensive capacity assessment and planning program? [ ] Yes [ ] No

CA-03 Are flows measured prior to allowing new connections? [ ] Yes [ ] No

CA-04 Do you have a tool (hydraulic model, spreadsheet, etc.) for assessing whether adequate capacity exists in the sewer system? IF NO, GO TO QUESTION CA-06 [x] Yes [ ] No

CA-05 Does you capacity assessment tool produce results consistent with conditions observed in the system? [ ] Yes [ ] No

CA-06 What is the ratio of peak wet weather flow to average dry weather flow at the wastewater treatment plant? 2.5

CA-07 How many permanent flow meters are currently in the system? *(Include meters at pump stations and wastewater treatment plants)* 8

CA-08 How frequently are the flow meters checked? *(e.g. Daily, weekly, monthly, etc.)* ___________________

CA-09 Do the flow meter checks include the following? *(check all that apply)*

- [ ] Independent water level
- [ ] Velocity reading
- [ ] Down loading data
- [ ] Checking the desiccant
- [ ] Cleaning away debris
- [ ] Battery condition

CA-10 Are records maintained for each inspection? IF NO, GO TO QUESTION CA-12. [x] Yes [ ] No

CA-11 Do the flow monitoring records include the following? *(Check all that apply)*

- [ ] Descriptive location of flow meter
- [ ] Frequency of flow meter inspection
- [ ] Type of flow meter
- [ ] Frequency of flow meter calibration

CA-12 Does the utility maintain any rain gauges or have access to local rainfall data? [ ] Yes [ ] No

CA-13 Does the utility have any wet weather capacity problems? Trunk F appears to have some problems. [x] Yes [ ] No

CA-14 Are low points or flood-plain areas monitored during rain events? [ ] Yes [ ] No

CA-15 Does the utility have any dry weather capacity problems? [ ] Yes [x] No

CA-16 Is flow monitoring used for billing purposes, capacity analysis, and/or inflow and infiltration investigations? [x] Yes [ ] No

Tracking SSOs (TRK)

TRK-01 How many SSO events have been reported in the last 5 years? ________________

TRK-02 What percent of the SSOs were less than 1,000 gallons in the past 5 years? _______________%

TRK-03 Does the utility document and report all SSOs regardless of size? ☐ Yes ☐ No

TRK-04 Does the utility document basement backups? ☐ Yes ☐ No

TRK-05 Are there areas that experience frequent basement or street flooding? ☐ Yes ☐ No

TRK-06 Approximately what percent of SSOs discharges were from each of the following in the least 5 years?

Manholes ________% Main and trunk sewers ________% Structural bypasses ____________%

Pump Stations ________% Lateral and branch sewers________%

TRK-07 Approximately what percent of SSOs discharges were caused by the following in the last 5 years?

Debris buildup ________% Root intrusion ________% Excessive infiltration and inflow ____________%

Collapsed pipe ________% Capacity limitations ________% Fats, oil, and grease____________%

Vandalism________%

TRK-07A What percentage of SSOs were released to:

Soil ________% Basements ________% Paved areas ____________%

Surface water (rivers/lakes/streams) ____________________% Coastal, ocean, beaches ___________%

TRK-07B For surface water releases, what percent are to areas that could affect:

Contract recreation (beaches, swimming areas) ___________% Drinking water sources ____________%

Shellfish growing areas ___________%

TRK-08 How many chronic SSO locations are in the collection system? _________________

TRK-09 Are pipes with chronic SSOs being monitored for sufficient capacity and/or structural condition? ☐ Yes ☐ No

TRK-10 Prior to collapse, are structurally deteriorating pipelines being monitored for renewal or replacement? ☐ Yes ☐ No

Overflow Emergency Response Plan (OERP)

OERP-01	Does the utility have a documented OERP available for utility staff to use? IF NO, GO TO QUESTION OERP-04	☐ Yes ☐ No
OERP-02	How often is the OERP reviewed and updated? (*Annually, Biannually, etc.)*	________________
OERP-03	Are specific responsibilities detailed in the OERP for personnel who respond to emergencies?	☐ Yes ☐ No
OERP-04	Are staffing continuously trained and drilled to respond to emergency situations?	☐ Yes ☐ No
OERP-05	Do work crews have immediate access to tools and equipment during emergencies?	☐ Yes ☐ No
OERP-06	Does the utility have standard procedures for notifying state agencies, local health departments, the NPDES authority, the public, and drinking water authorities of significant overflow events?	☐ Yes ☐ No
OERP-07	Does the procedure include a current list of the names, titles, phone numbers, and responsibilities of all personnel involved?	☐ Yes ☐ No
OERP-08	Does the utility have a public notification plan?	☐ Yes ☐ No
OERP-09	Does the utility have procedures to limit public access to an contact with areas affected with SSOs? *(Procedure can be delegated to another authority)*	☐ Yes ☐ No
OERP-10	Does the utility use containment techniques to protect the storm drainage systems?	☐ Yes ☐ No
OERP-11	Do the overflow records include the following information? *(Check all that apply)* ☐ Date and time ☐ Location ☐ Any remediation efforts ☐ Cause(s) ☐ How it was stopped ☐ Estimated flow/volume discharged ☐ Names of affected receiving water(s) ☐ Duration of overflow	
OERP-12	Does the utility have signage to keep public from effected area?	☐ Yes ☐ No

Smoke and Dye Testing (SDT)

SDT-01	Does the utility have a smoke-testing program to identify sources of inflow and infiltration?	☐ Yes ☐ No
SDT-01A	Does the utility have a smoke testing program to identify sources of inflow and infiltration in legal connectors?	☐ Yes ☐ No
SDT-01B	Does the utility have a smoke-testing program to identify sources of inflow and infiltration in house laterals (private service laterals)?	☐ Yes ☐ No
SDT-02	Are there written procedures for the frequency and schedule of smoke testing?	☐ Yes ☐ No
SDT-03	Is there a documented procedure for isolating line segments?	☐ Yes ☐ No
SDT-04	Is there a documented procedure for notifying local residents that smoke testing will be conducted in their area?	☐ Yes ☐ No
SDT-05	What is the guideline for the maximum amount of the line to be tested at one time? *(Feet or Miles)*	___________________
SDT-06	Are there guidelines for the weather conditions under which smoke testing should be conducted?	☐ Yes ☐ No
SDT-07	Does the utility have a goal fro the percent of the system smoke tested each year?	☐ Yes ☐ No
SDT-08	What percent of the system has been smoke tested over the past year?	__________________%
SDT-09	Do the written records contain location, address, and description of the smoking element that produced a positive result?	☐ Yes ☐ No
SDT-10	Does the utility have a dye-testing program?	☐ Yes ☐ No
SDT-11	Are there written procedures for dye testing?	☐ Yes ☐ No
SDT-12	Does the utility have a goal for the percent of the system dye tested each year?	☐ Yes ☐ No
SDT-13	What percent of the main collection system has been dye tested over the past year?	__________________%
SDT-14	Does the utility share smoke and dye testing equipment with another utility?	☐ Yes ☐ No

Hydrogen Sulfide Monitoring and Control (HSMC)

HSMC-01	How would you rate the systems vulnerability for hydrogen sulfide corrosion? *(Check only one)* ☑ Not a problem ☐ Only in a few isolated areas ☐ A major problem	
HSMC-02	Does the utility have a corrosion control program?	☐ Yes ☐ No
HSMC-03	Does the utility take hydrogen sulfide corrosion into consideration when designing new or replacement sewers?	☐ Yes ☐ No
HSMC-04	Does the utility have written procedures for the application of chemical dosages?	☐ Yes ☐ No
HSMC-05	Are the chemical dosages, dates, and locations documented?	☐ Yes ☐ No
HSMC-06	Does the utility document where odor is a continual problem in the system?	☐ Yes ☐ No
HSMC-07	Does the utility have program in place for renewing or replacing severely corroded sewer lines to prevent collapse?	☐ Yes ☐ No
HSMC-08	Are the following methods used for hydrogen sulfide control? *(Check all that apply)* ☐ Aeration ☐ Chlorine ☐ Potassium permanganate ☐ Iron salts ☐ Sodium hydroxide ☐ Biofiltration ☐ Enzymes ☐ Hydrogen peroxide ☐ Other ☐ Activated charcoal canisters	
HSMC-09	Does the system contain air relief valves at the high points of the force main system?	☐ Yes ☐ No
HSMC-10	How often are the valves maintained and inspected? *(Weekly, Monthly, etc.)*	____________________
HSMC-11	Does the utility enforce pretreatment requirements?	☑ Yes ☐ No

Infrastructure Security

Although outside the scope of a CMOM program, municipal wastewater utilities should also consider security vulnerabilities. To reduce the threat of both intentional and natural disasters, the utility should take steps to implement appropriate countermeasures and develop or update emergency response plans.

APPENDIX H

COST ESTIMATES

11/17/2011

WHISKEY RIDGE SEWER EXTENSION PROJECT #S0903

Section	Item	Description	Quantity	Units	Unit Prices	Total Price
1-04.4	1	Minor Change	1	LS	$20,000.00	$20,000.00
1-05.5	2	Surveying and As-builts	1	LS	$15,000.00	$15,000.00
1-07.15(1)	3	SPCC Plan	1	LS	$2,500.00	$2,500.00
1-09.7	4	Mobilization	1	LS	$68,800.00	$68,800.00
1-10.5	5	Project Temporary Traffic Control	1	LS	$15,000.00	$15,000.00
2-01.5	6	Clearing and Grubbing	1	LS	$10,000.00	$10,000.00
2-03.5	7	Imported Trench Backfill (Densmore only, top 4' only)	2500	TON	$15.00	$37,500.00
2-09.5	8	Shoring	1	LS	$20,000.00	$20,000.00
4-04.5	9	Crushed Surfacing Base Course (Soper, 87th backfill)	1500	TON	$30.00	$45,000.00
4-04.5	10	Crushed Surfacing Top Course	100	TON	$50.00	$5,000.00
4-06.5	11	Asphalt Treated Base (8" Soper, 8" 87th, 4" Densmore)	400	TON	$80.00	$32,000.00
5-04.5	12	Planing Bituminous Pavement	3350	SY	$4.00	$13,400.00
5-04.5	13	HMA Cl. 1/2", PG 64-22 (full overlay Soper Hill Rd and 83rd, partial overlay 87th, half road overlay Densmore)	500	TON	$95.00	$47,500.00
7-05.5	14	Manhole 54 In. Diam. Type 1	13	EA	$5,500.00	$71,500.00
7-05.5	15	Manhole 54 In. Diam. Type 3	1	EA	$5,000.00	$5,000.00
7-05.5	16	Manhole Additional Height	56	VF	$350.00	$19,600.00
7-05.5	17	Connection to Existing	1	EA	$2,000.00	$2,000.00
7-08.5	18	Dewatering	1	FA	$50,000.00	$50,000.00
7-08.5	19	Removal and Replacement of Unsuitable Material	250	CY	$50.00	$12,500.00
7-17.5	20	Drainage Cutoff Collar	12	EA	$2,000.00	$24,000.00
7-17.5	21	PVC Sanitary Sewer Pipe 12" Diam.	4300	LF	$75.00	$322,500.00
8-01.5	22	Temporary Erosion and Water Pollution Control	1	LS	$25,000.00	$25,000.00
8-02.5	23	Property Restoration	1	LS	$35,000.00	$35,000.00
8-02.5	24	Wetland Mitigation	1	LS	$25,000.00	$25,000.00
8-22.5	25	Restore Pavement Markings	1	LS	$5,000.00	$5,000.00
		Subtotal Amount				$928,800.00
		Design and Construction Management				$185,760.00
		States Sales Tax at 8.6%				$79,876.80
					Construction Total:	**$1,194,436.80**

City of Marysville
2011 Sanitary Sewer Comprehensive Plan
Preliminary Cost Estimate
Project SS-D (Basin D6-1)
71st Street NE Sewer Upsizing - 64th Ave NE to 66th Ave. NE

	Item	Quantity			Unit Cost		Total
1	Mobilization/Demobilization	1	LS	$	30,000	$	30,000
2	Surveying, Staking and As-Built Dwgs	1	LS	$	5,000	$	5,000
3	Environmental Controls	1	LS	$	3,000	$	3,000
4	Trench Excavation Safety Systems	1	LS	$	5,000	$	5,000
5	Dewatering	1	LS	$	6,000	$	6,000
6	Temporary Bypass Pumping	1	LS	$	7,000	$	7,000
7	Traffic Control	1	LS	$	6,000	$	6,000
8	Locate Existing Utilities	1	LS	$	3,000	$	3,000
9	Removal of Structures and Obstructions	1	LS	$	16,000	$	16,000
10	18" PVC (Including bedding, backfill)	510	LF	$	120	$	61,200
	in improved RoW	510					
	in unimp easmnt	0					
11	48" Precast Manhole (Basic to 8')	2	EA	$	3,500	$	7,000
	48" Precast Manhole (Height Over 8')	14	VF	$	200	$	2,800
12	Connection to Existing Manhole	2	EA	$	2,500	$	5,000
13	Special Excavation of Unsuitable Material	10	CY	$	35	$	350
14	Foundation Gravel	70	TN	$	20	$	1,400
15	Gravel Base (Trench Backfill)	1,900	TN	$	20	$	38,000
16	Asphalt Treated Base (Trench Patch	170	TN	$	100	$	17,000
17	Planing Bituminous Pavement	1,000	SY	$	4	$	4,000
18	Hot Mix Asphalt	130	TN	$	100	$	13,000
19	Sawcutting	1,040	LF	$	3	$	3,120

Subtotal	$	233,870
Contingency (20%)	$	46,774
Subtotal	$	280,644
Sales Tax (8.6%)	$	24,135
Total	$	304,779
Total Construction Cost (Rounded)	**$**	**310,000**
Design, CM, Permitting (30%)	$	100,000
Total Project Cost (Rounded)	**$**	**410,000**

City of Marysville
2011 Sanitary Sewer Comprehensive Plan
Preliminary Cost Estimate
Project SS-e (Basin CW1)
Trunk G Rehabilitation - Cedar to Columbia Avenue

	Item	Quantity		Unit Cost	Total
1	Mobilization/Demobilization	1	LS	$ 85,000	$ 85,000
2	Surveying, Staking and As-Built Dwgs	1	LS	$ 16,000	$ 16,000
3	Environmental Controls	1	LS	$ 10,000	$ 10,000
4	Trench Excavation Safety Systems	1	LS	$ 16,000	$ 16,000
5	Dewatering	1	LS	$ 20,000	$ 20,000
6	Temporary Bypass Pumping	1	LS	$ 40,000	$ 40,000
7	Traffic Control	1	LS	$ 12,000	$ 12,000
8	Locate Existing Utilities	1	LS	$ 10,000	$ 10,000
9	Removal of Structures and Obstructions	1	LS	$ 62,000	$ 62,000
10	24" PVC (Including bedding, backfill)	1,995	LF	$ 165	$ 329,175
	in improved ROW	1,195			
	in unimproved easement	0			
11	72" Precast Manhole (Basic to 8')	7	EA	$ 8,000	$ 56,000
12	Special Excavation of Unsuitable Material	600	CY	$ 35	$ 21,000
13	Foundation Gravel	560	TN	$ 20	$ 11,200
14	Gravel Base (Trench Backfill)	1,600	TN	$ 20	$ 32,000
15	Asphalt Treated Base-Trench Patch	260	TN	$ 100	$ 26,000
16	Planing Bituminous Pavement	1,000	SY	$ 4	$ 4,000
17	Hot Mix Asphalt	230	TN	$ 100	$ 23,000
18	Sawcutting	4,010	LF	$ 3	$ 12,030
		Subtotal			$ 785,405
		Contingency (20%)			$ 157,081
		Subtotal			$ 942,486
		Sales Tax (8.6%)			$ 81,054
		Total			$ 1,023,540
		Total Construction Cost (Rounded)			**$ 1,030,000**
		Design, CM, Permitting (30%)			$ 310,000
		Total Project Cost (Rounded)			**$ 1,340,000**

WHISKEY RIDGE AREA SEWER SYSTEM
#S0903

Lift Station and Forcemain

Section	Item	Description	Quantity	Units	Unit Prices	Total Price
	1	Mobilization (8% max)	1	LS	$49,240.00	$49,240.00
	2	Mechanical (Pumps, Piping, Wet Well, Dry Well, Etc)	1	LS	$250,000.00	$250,000.00
	3	Electrical and Instrumentation	1	LS	$75,000.00	$75,000.00
	4	Structure	1	LS	$75,000.00	$75,000.00
	5	EG	1	LS	$50,000.00	$50,000.00
	6	Site Improvements	1	LS	$35,000.00	$35,000.00
	7	Miscellaneous	1	LS	$15,000.00	$15,000.00
	8	8" Sanitary Sewer Force Main	1650	LF	$70.00	$115,500.00
		Construction Subtotal				$664,740.00
		States Sales Tax at 8.6%				$57,167.64
		Site Acquisition				$100,000.00
		Permitting				$10,000.00
		Survey/Engineering (15%)				$99,711.00
		Contingency (10%)				$66,474.00
					Total:	$998,092.64

City of Marysville

Sewer System CIP

West Trunk Pump Station

Preliminary Cost Estimate

Item	Description	Quantity	Unit	Unit Cost	Amount
1	Mobilization & Demobilization	1	LS	$11,000	$11,000
2	Trench Safety System	1	LS	$2,500	$2,500
3	Pump Replacement	3	EA	$35,000	$105,000
4	Electrical and Instrumentation	1	LS	$30,000	$30,000
	Subtotal				$148,500
	Contingency (20%)				$29,700
	Subtotal				$178,200
	Sales Tax (8.6%)				$15,325
	Total Construction Cost				$193,525
	Engineering & Administration (15%)				$29,029
	Total				$222,554
	Total Project Cost				**$225,000**

City of Marysville

Sewer System CIP

Cedarcrest Vista Pump Station Emergency Generator Installation

Preliminary Cost Estimate

Item	Description	Quantity	Unit	Unit Cost	Amount
1	Mobilization & Demobilization	1	LS	$9,000	$9,000
2	Generator	1	EA	$100,000	$100,000
3	Electrical	1	LS	$10,000	$10,000
4	Site Improvements	1	LS	$2,500	$2,500
	Subtotal				$121,500
	Contingency (20%)				$24,300
	Subtotal				$145,800
	Sales Tax (8.6%)				$12,539
	Total Construction Cost				$158,339
	Engineering & Administration (10%)				$15,834
	Total				$174,173
	Total Project Cost				**$175,000**

City of Marysville

Sewer System CIP

Carroll's Creek Pump Station Emergency Generator Installation

Preliminary Cost Estimate

Item	Description	Quantity	Unit	Unit Cost	Amount
1	Mobilization & Demobilization	1	LS	$9,000	$9,000
2	Generator	1	EA	$100,000	$100,000
3	Electrical	1	LS	$10,000	$10,000
4	Site Improvements	1	LS	$2,500	$2,500
	Subtotal				$121,500
	Contingency (20%)				$24,300
	Subtotal				$145,800
	Sales Tax (8.6%)				$12,539
	Total Construction Cost				$158,339
	Engineering & Administration (10%)				$15,834
	Total				$174,173
	Total Project Cost				**$175,000**

City of Marysville

Sewer System CIP

Biosolids Removal

Preliminary Cost Estimate

Item	Description	Quantity	Unit	Unit Cost	Amount
1	Permitting and Sampling	1	LS	$15,000	$15,000
2	Mobilization and Demobilization	1	LS	$50,000	$50,000
3	Dredging and Dewatering	5600	TN	$376	$2,105,600
4	Hauling and Land Application	5600	TN	$45	$252,000
	Subtotal				$2,422,600
	Contigency (20%)				$484,520
	Subtotal				$2,907,120
	Sales Tax (8.5%)				$247,105
	Total Construction Cost				$3,154,225
	Engineering & Administration (8%)				$252,338
	Total				$3,406,563
	Total Project Cost				**$3,400,000**

City of Marysville

Sewer System CIP

Screen Replacement for Mechanical Screens

Preliminary Cost Estimate

Item	Description	Quantity	Unit	Unit Cost	Amount
1	Mobilization & Demobilization	1	LS	$25,000	$25,000
2	1/2-Inch Bar Screen(1)	2	EA	$150,000	$300,000
	Subtotal				$325,000
	Contigency (20%)				$65,000
	Subtotal				$390,000
	Sales Tax (8.6%)				$33,540
	Total Construction Cost				$423,540
	Engineering & Administration (15%)				$63,531
	Total				$487,071
	Total Project Cost				**$500,000**

APPENDIX I

SEPA CHECKLIST

COMMUNITY DEVELOPMENT DEPARTMENT
80 Columbia Avenue, Marysville, WA 98270
(360) 363-8100, (360) 651-5099 FAX

Environmental Review (SEPA) Application Checklist

Washington State Environmental Policy Act, RCW 43.21C

Washington State Administrative Code, WAC 197-11-960 Environmental Checklist

Purpose of Checklist:
The State Environmental Policy Act (SEPA), Chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. The purpose of this checklist is to provide information to help you and the City of Marysville identify impacts from your proposal; to reduce or avoid impacts from the proposal, if possible; and to help the agency decide whether an EIS is required. In addition to RCW 43.21C and WAC 197-11, the city follows the requirements of the Washington State Local Project Review Act (ESHB 1724).

Instructions for Applicant:
This environmental checklist asks you to describe some basic information about your proposal. Answer all of the questions descriptively, briefly, but accurately and carefully, with the most precise information known and to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer or if a question does not apply to your proposal, write "do not know" or "does not apply". Complete answers to the questions now many avoid unnecessary delays later. Note that some questions are two part questions. Some questions ask about governmental regulations such as zoning, shoreline, comprehensive plan designation and landmark designation. If you need information, contact the City of Marysville Community Development Department at (360) 363-8100.

NOTE:
The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. You may be asked to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of Checklist for Nonproject Proposals:
Complete this checklist for nonproject proposals, even though questions may be answered "does not apply". IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (Part D). For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area" respectively.

Required Attachments
Submit the original checklist form and six (6) copies (for a total of seven (7)) along with seven (7) copies of each of the following:
1. Vicinity map clearly showing the location of the project with respect to public streets and other parcels and development
2. Site plan (at original drawing size)
3. Site plan (reduced to not larger than 8 ½ x 14-inch size)
4. Conceptual building elevations
5. Conceptual vehicle maneuvering diagram (when applicable)

Submit four (4) copies of the following when appropriate:

1. Wetland Delineation
2. Geotechnical Reports
3. Fisheries Study

All maps must be folded to fit into an 8½ by 14-inch mailing envelope.

The site plan must show north arrow and engineering scale; any significant or natural features such as creeks, wetlands, steep slopes; dimensions and shape of the lot; location and size of existing and proposed buildings and development, including parking and landscape areas, adjacent streets and point of ingress and egress, and adjacent uses.

Correspondence
Note that all correspondence regarding the environmental review of your project will be sent to the person listed as **Applicant.**

Application Format
The application will only be accepted if the original form is used (with typewritten answers in the spaces provided) or the application is reproduced in identical form.

Fees
There is a nonrefundable application fee for all environmental checklists. Submit the fee with the application(s) and make checks payable to the City of Marysville.

Residential (1-9 lots or dwelling units)	$350.00
Residential (10-20 lots or dwelling units)	$500.00
Residential (21-100 lots or dwelling units)	$1,000.00
Residential (greater than 100 lots or dwelling units)	$1,500.00
Commercial/Industrial (0 to 2 acres)	$350.00
Commercial/Industrial (2.1 to 20 acres)	$750.00
Commercial/Industrial (greater than 20 acres)	$1,500.00

Pre-application Conference
Most projects that are not categorically exempt from SEPA will require a pre-application conference; in some cases, at the discretion of the Community Development Director, the pre-application conference may be waived.

The pre-application conference must be conducted prior to the submittal of the environmental checklist.

SEPA Exempt Determinations
Projects that meet the thresholds for categorical exemptions of Chapter 19.22 are exempt from filing an environmental checklist. All other project and non-project actions require a completed environmental checklist and a project permit application to be submitted. If an applicant feels that their proposal should be considered to be SEPA-exempt, the applicant can submit a letter requesting a SEPA exempt determination with the environmental checklist and fee. The Community Development Director will review the request and if the application is determined to be SEPA exempt, a letter will be issued confirming the SEPA exempt status.

Project Phasing
The Checklist questions apply to all parts of your proposal, even if you plan to phase the project over a

period of time or on different parcels of land. You must include any additional information that helps describe your proposal or its environmental effects. You may be asked to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact(s).

SEPA Appeals
Any agency or person may appeal a Determination of Non Significance (DNS) or Determination of Significance (DS) by completing and submitting an appeal form to the Hearing Examiner within fourteen (14) calendar days of the date the determination is final. Such appeals must be filed with Hearing Examiner Secretary at Planning Services. Appeals of environmental determination under SEPA, including administrative appeals of a threshold determination, shall be heard by the Hearing Examiner and shall proceed pursuant to City of Marysville Code Section 19.22.070(3)-Appeals. There is a nonrefundable $500 Administrative Appeal fee to be submitted with appeal.

<u>TO BE COMPLETED BY APPLICANT</u>

BACKGROUND

1. Name of proposed project, if applicable: **City of Marysville Sewer Comprehensive Plan**

2. Name of applicant: **City of Marysville**

3. Address and phone number of applicant and contact person:
   City of Marysville Public Works
   Attn: Jeff Laycock
   80 Columbia Ave
   Marysville, WA 98270
   (360) 363-8274

4. Date checklist prepared: **July 26, 2011**

5. Agency requesting checklist: **City of Marysville Public Works**

6. Proposed timing or schedule (including phasing, if applicable): **Projects are identified for construction over a 6-year (2017) and 20-year (2031) periods.**

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. **No. This proposal is a result of the Sewer Comprehensive Plan. Future plan updates or developments unknown to the City at this time may identify wastewater system needs that are not identified in this plan.**

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. **Each proposed project, unless determined to be exempt, will be subject to SEPA review for approval.**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. **There are ongoing residential and commercial projects throughout the City's sewer service area. These proposals will continue to be developed and submitted to the City for approval.**

10. List any government approvals or permits that will be needed for your proposal, if known. **No permits are required. The Washington State Department of Ecology and Snohomish County will be required to approve the Plan. Approvals and permits for specific projects will be part of the project phase.**

11. Give brief, complete description of your proposal, including all proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) **The City of Marysville Sewer Comprehensive Plan is a planning document describing the location and type of facilities needed to provide wastewater service through 2031. It provides recommendations for Capital Improvement Projects which include extensions, repairs, upgrades, rehabilitation and improvements to sanitary sewer mains, pump stations and the wastewater treatment plant.**

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topography map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications to this checklist. **The project area includes the City's sewer service area as shown in the Plan.**

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other **The service area is generally flat except for higher topographical features along the eastern boundary of the City limits.**

b. What is the steepest slope on the site (approximate percent slope)? **The steepest slope generally observed within the City's sewer service area is about 12%.**

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of the agricultural soils, specify them and note any prime farmland. **The major classification of soils within the City's sewer service area are Ragnar, Norma, Custer, Tokul and Bellingham. Ragnar, Norma and Custer are found at the lower elevations. Ragnar is a dark brown, sandy loam. Both Norma and Custer are dark gray, sandy loams. Tokul, found at higher elevations, is a brown, gravelly loam. Bellingham, also found at higher elevations, is a dark gray, silty clay loam.**

d. Are there any surface indications or history of unstable soils in the immediate vicinity? If so, describe. **The eastern portion of the City's sewer service area has the potential for unstable soils due to steep slopes.**

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill. **No filling or grading will occur at this time. Grading and filling quantities will be addressed during the project phase..**

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. **Erosion control measures will be addressed during the project phase.**

g. About what percent of the site will be covered with impervious surfaces after the project construction (for example, asphalt or buildings)? **Sewer projects generally do not increase impervious surfaces. This will be addressed during the project phase.**

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: **This will be addressed during the project phase.**

2. AIR

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known. **Construction dust and increased exhaust from construction equipment will have a short term impact during construction. This will be addressed during the project phase.**

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. **None known.**

c. Proposed measures to reduce or control emissions or other impacts to air, if any: **Use dust control measures during construction and construction equipment equipped with emission control devices.**

3. WATER

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. **Ebey, Steamboat, and Union Sloughs, all extensions of Puget Sound and the Snohomish River basin, are located south of the City's service area. Ebey Slough is located adjacent to the City's Wastewater Treatment Plant. The Quilceda creek drainage basin covers a total of 38 square miles, approximately 2/3 of the City's sewer service area. The Allen creek drainage basin covers 13 square miles, about 1/3 of the City's sewer service area. Both drain to Ebey Slough.**

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. **The Plan identifies some projects within 200' of these described waters. Plans will be provided during the project phase.**

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. **No specific projects have been identified at this time. This will be addressed during the project phase.**

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
Location within the 100-year floodplain will be determined for each specific project.

6) Does the proposal involve any discharge of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. **No discharge of waste material into surfaces waters will occur as a result of the Plan other than treated effluent permitted by the City's NPDES permit.**

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground waters? Give general description, purpose, and approximate quantities if known. **Groundwater disturbance will be addressed during the project phase.**

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
Not applicable.

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
The method and collection and disposal of stormwater runoff will be determined on a project specific basis.

2) Could waste materials enter ground or surface waters? If so, generally describe.
Only if there is a leak in the sewer conveyance system. Project specifications require testing to ensure the system is water tight.

d. Proposed measure to reduce or control surface, ground and runoff water impacts, if any:
Measures would be consistent with Department of Ecology and the City of Marysville Standards and applicable code conditions.

4. Plants

a. Check or circle types of vegetation found on the site:
_x_ deciduous tree: alder, maple, aspen, other
_x_ evergreen tree: fir, cedar, pine, other
_x_ shrubs
_x_ grass
_x_ pasture
__ crop or grain

_x_ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
_x_ water plants: water lily, eelgrass, milfoil, other
__ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?
Removal and alteration of vegetation will be addressed during the project phase.

c. List threatened or endangered species known to be on or near the site.
None known. To be addressed during the project phase.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
Re-vegetation will be required to meet City standards.

5. Animals

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site: **To be addressed during the project phase.**

birds: hawk, heron, eagle, songbirds, other ....
mammals: deer, bear, elk, beaver, other common mammals native to this region.
fish: bass, salmon, trout, herring, shellfish, other ....

b. List any threatened or endangered species known to be on or near the site.
None known. To be addressed during the project phase.

c. Is the site part of a migration route? If so, explain.
Not known. To be addressed during the project phase.

d. Proposed measure to preserve or enhance wildlife, if any:
To be addressed during the project phase.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. **Fuel will be required to power construction equipment. Equipment for facilities such as pump stations and wastewater treatment plants will require electricity.**

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. **No.**

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.
To the extent feasible, new sewer service will be installed via gravity to minimize pumping requirements.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. **During construction of sewer projects, there is a small risk of spills from hydraulic fluid or from sewer bypass pumping.**

1) Describe special emergency services that might be required. **An emergency spill prevention and pollution control plan will be in place during construction.**

2) Proposed measures to reduce or control environmental health hazards, if any. **An emergency spill prevention and pollution control plan will be in place during construction.**

8. Noise

1) What types of noise exist in the area which may affect your project for example: traffic, equipment, operation, other)? **Ambient noise is primarily from traffic and will not affect the project.**

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. **Construction equipment will create a short-term noise effect. Hours of construction would be allowed per Marysville code. Long term noise may be created from propose sewer facilities such as pump stations (ie. engine generators).**

3) Proposed measures to reduce or control noise impacts, if any: **Construction equipment is required to follow local noise ordinances. The effects of long term noise are mitigated to reduce sound. This would be addressed at the project level.**

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? **Land use in the area is a mixture of residential, commercial, and industrial. Sewer work is typically located with City right-of-way or easements or on City property.**

b. Has the site been used for agriculture? If so, describe. **To be addressed during the project phase.**

c. Describe any structures on the site. **Residential, commercial, industrial and public structures existing throughout the City's sewer service area.**

d. Will any structures be demolished? If so, what? **Not likely. To be addressed during the project phase.**

e. What is the current zoning classification of the site? **Zoning classifications are established by the City's Planning Department and are a mixture of single-family, multi-family, mixed use, commercial, industrial, open space, rural and public use.**

f. What is the current comprehensive plan designation of the site? **There are several shoreline classifications within the City's sewer service area as shown in the City's Shoreline Master Plan.**

g. If applicable, what is the current shoreline master program designation for the site? **Site sensitive areas have been mapped for the City's UGA and vicinity. The primary areas include FEMA flood areas, wetlands along various water bodies, and steep slopes.**

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify. **Not applicable. To be addressed during the project phase.**

i. Approximately how many people would reside or work in the completed project? **Not applicable. To be addressed during the project phase.**

j. Approximately how many people would the completed project displace? **Not applicable. To be addressed during the project phase.**

k. Proposed measures to avoid or reduce displacement impacts, if any: **Not applicable. To be addressed during the project phase.**

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: **All projects as a result of this Plan must comply with the City's land use and zoning policies.**

9. Housing

a. Approximately how many housing units would be provided, if any? Indicate whether high, middle, or low-income housing. **Not applicable. To be addressed during the project phase.**

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. **Not applicable. To be addressed during the project phase.**

c. Proposed measures to reduce or control housing impacts, if any: **Not applicable. To be addressed during the project phase.**

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal, exterior building material(s) proposed? **Facilities proposed under this Plan include pump station buildings and wastewater treatment buildings. Such facilities would be addressed during the project phase.**

b. What views in the immediate vicinity would be altered or obstructed? **Not applicable. To be addressed during the project phase.**

c. Proposed measures to reduce or control aesthetic impacts, if any: **To be addressed during the project phase. Project plans will be subject to review by the City's Planning Department.**

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? **None of the projects are anticipated to generate light or glare.**

b. Could light or glare from the finished project be a safety hazard or interfere with views? **Not applicable. To be addressed during the project phase.**

c. What existing off-site sources of light or glare may affect your proposal? **Not applicable. To be addressed during the project phase.**

d. Proposed measures to reduce or control light and glare impacts, if any: **Not applicable. To be addressed during the project phase.**

12. Recreation

a. What designated and informal recreation opportunities are in the immediate vicinity? **Not applicable. To be addressed during the project phase.**

b. Would the proposed project displace any existing recreational uses? If so, describe. **No.**

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: **Impacts to recreational areas will be limited with the primary goal to ensure continued access to such areas.**

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be or next to the site? If so, generally describe. **Not applicable. To be addressed during the project phase.**

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site. **Not applicable. To be addressed during the project phase.**

c. Proposed measures to reduce or control impacts, if any: **Not applicable. To be addressed during the project phase.**

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any. **Projects proposed in the Plan typically occur within City right-of-way and on public streets. To be addressed during the project phase.**

b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop? **The service area is served by Community Transit. Proximity to transit stops will be addressed during the project phase.**

c. How many parking spaces would the completed project have? How many would the project eliminate? **Not applicable. To be addressed during the project phase.**

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private). **Sewer improvements impacting existing streets will require restoration in accordance with City standards.**

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. **Not applicable.**

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur. **Not applicable.**

g. Proposed measures to reduce or control transportation impacts, if any: **Not applicable. To be addressed during the project phase.**

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe. **The Plan by itself would not require an increased need for public services. The Plan addresses the need for future sewer service and is a direct correlation of the City's anticipated growth.**

b. Proposed measures to reduce or control direct impacts on public services, if any: **None.**

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other. **All of the above**.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. **Not applicable. To be addressed during the project phase.**

C. SIGNATURE

I certify (or declare) under penalty of perjury under the laws of the State of Washington that the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: ____
Date Submitted: ____________________________________

EXHIBITS

CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

EXHIBIT I: EXISTING SEWER SYSTEM AND LAND USE / SUB-AREAS

CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

EXHIBIT II: SEWER SYSTEM AERIAL

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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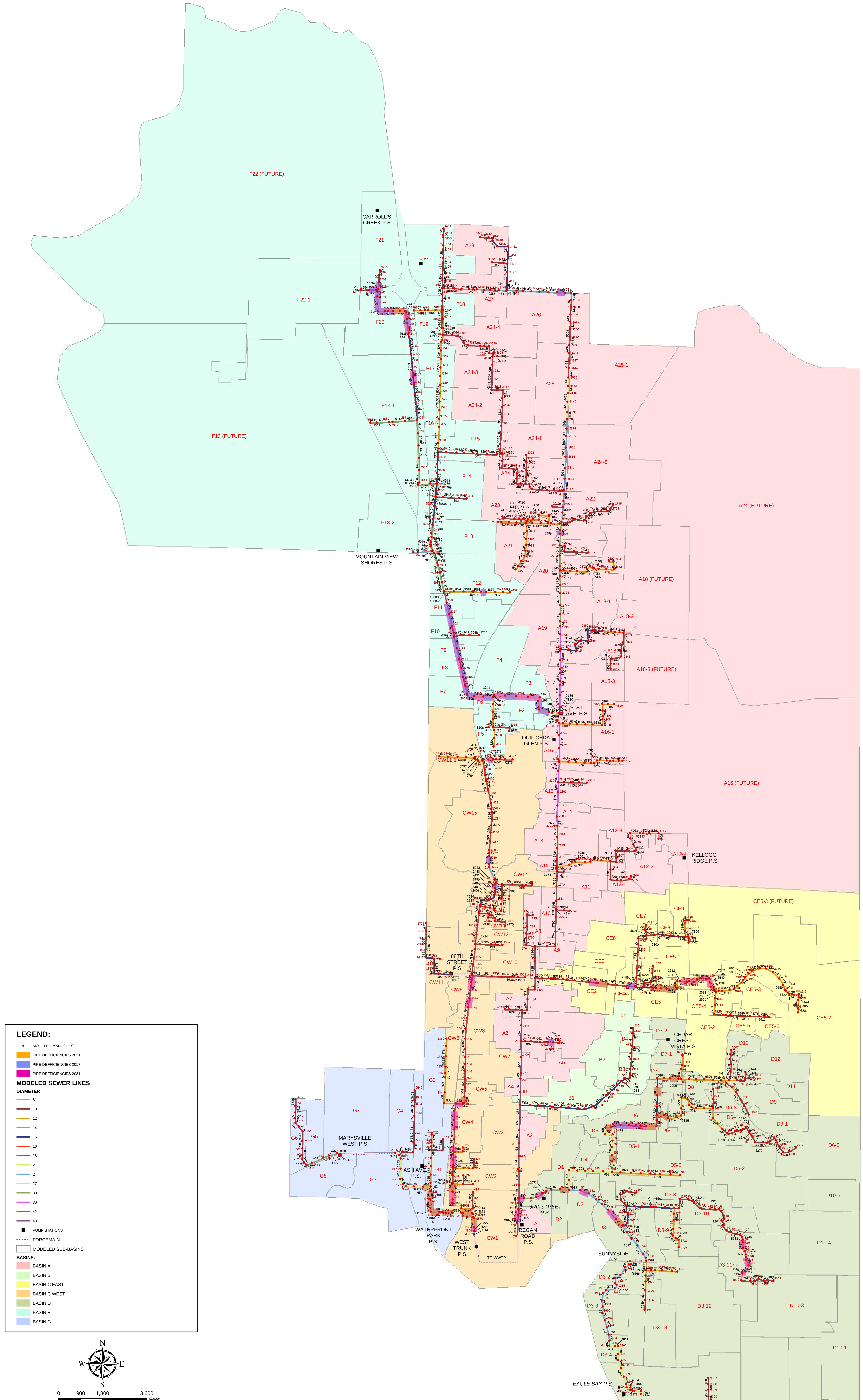
LEGEND:
MODELED MANHOLES
MODELED SEWER LINES
DIAMETER
8"
10"
12"
14"
15"
16"
18"
21"
24"
27"
30"
36"
42"
48"
parcels_2011
FORCEMAIN
MODELED SUB-BASINS
BASINS:
BASIN A
BASIN B
BASIN C EAST
BASIN C WEST
BASIN D
BASIN F
BASIN G
N
S
E
W
0
900
1,800
3,600
Feet
SCALE 1" = 1800'
CITY OF MARYSVILLE
SEWER COMPREHENSIVE PLAN
EXHIBIT III: MODELED SEWER LINES, MANHOLE ID'S AND BASINS
Gray & Osborne, Inc.
CONSULTING ENGINEERS
CARROLL'S CREEK P.S.
MOUNTAIN VIEW SHORES P.S.
51ST AVE. P.S.
QUIL CEDA GLEN P.S.
KELLOGG RIDGE P.S.
88TH STREET P.S.
CEDAR CREST VISTA P.S.
MARYSVILLE WEST P.S.
ASH AVE P.S.
WATERFRONT PARK P.S.
WEST TRUNK P.S.
REGAN ROAD P.S.
3RD STREET P.S.
SUNNYSIDE P.S.
EAGLE BAY P.S.
SOPER HILL P.S.
F22 (FUTURE)
F13 (FUTURE)
A24 (FUTURE)
A18 (FUTURE)
A18-3 (FUTURE)
A16 (FUTURE)
CE5-3 (FUTURE)



CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

EXHIBIT IV: PIPE ID AND CAPACITY DEFFICIENCIES (MODEL RUNS 2011, 2017 AND 2031)

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

EXHIBIT V: MODELED SEWER LINES W/ IMPROVEMENTS AND BUILDOUT CONDITIONS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CITY OF MARYSVILLE

SEWER COMPREHENSIVE PLAN

EXHIBIT VI: PIPE ID AND PIPELINE VELOCITY DEFFICIENCIES (2011)

Gray & Osborne, Inc.
CONSULTING ENGINEERS