City of WILSONVILLE in OREGON
Planning Division
29799 SW Town Center Lp. E
Wilsonville, OR 97070
503-682-4960

THE WILSONVILLE PLANNING COMMISSION*

In its role as the

Committee for Citizen Involvement (CCI)

is hosting:

Wastewater Collection System Master Plan
Public Open House

Wilsonville City Hall Council Chambers
29799 SW Town Center Loop East

Wednesday, November 12, 2014
6:00 p.m.

The Committee for Citizen Involvement invites you to a public Open House to learn about, ask questions, and comment on the future planning for this piece of essential City infrastructure. To help ensure there is a system to meet the City's needs over the next 20 years, the City would like the community to become aware of and give their input on the wastewater collection system plan and projects.

The project will result in a Wastewater Collection System Master Plan that will identify system needs and a 20-year list of prioritized capital improvement projects that will be used to efficiently program improvements and maintain infrastructure with long-term capacity to serve the City over time.

*** The regular November 12, 2014 Planning Commission meeting has been cancelled.**

EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this wastewater Collection System Master Plan (CSMP) is to provide the City of Wilsonville (City) a guidance document that summarizes the needs of the collection system and assists in its sound stewardship. The primary goals of this CSMP are to: present criteria required for evaluating the system; identify current and future system deficiencies and describe recommended improvements to correct them; and provide planning-level cost information for general budgeting and the development of a prioritized Capital Improvement Program (CIP).

Study Area

The study area for the CSMP, presented in Figure ES-1, includes the urban growth boundary (UGB), where the City currently provides wastewater collection service. Also included within the study area are urban reserve areas (URAs) identified by the Metropolitan Service District (METRO). Build-out of the UGB is estimated to occur over the next 20 years. Over the planning horizon, consideration will be given to incorporating the adjacent URAs into the UGB. Because wastewater flows from the URAs would likely impact the collection system, these future growth areas are also included within the study area.

The study area has been delineated at the northern border with the City of Tualatin, allowing service by gravity conveyance based on topography. The exact delineation of the Tualatin/Wilsonville service area will be further refined as future planning of the Basalt Creek Planning Area continues over the next several years.

Wastewater Collection System and Sewer Basins

Wastewater generated within Wilsonville is conveyed through a City-owned and operated sewer collection system. These wastewater flows are transmitted through both gravity and pumped pipelines to the Wilsonville Wastewater Treatment Plant (WWTP). The existing and future wastewater service areas are divided into seven primary basins, covering nearly 12 square miles. The primary basins and associated main interceptors are identified in red text in Figure ES-2.

The collection system is comprised of gravity pipes between 4 and 36 inches in diameter. The total length of the gravity collection system is approximately 69.5 miles, nearly 70% of which consists of pipelines 8-inches in diameter and smaller. The oldest portion of the collection system is referred to as Old Town and is located around the WWTP, Boones Ferry Road, Town Center and Charbonneau areas. The pipes within these areas are 35 to 40 years old and comprised primarily of original concrete pipe and manholes. As the collection system has expanded over time, newer piping generally consists of polyvinyl chloride (PVC) with concrete manholes.

FIGURE ES-1

City of WILSONVILLE in OREGON

CITY OF WILSONVILLE

SANITARY SEWER COLLECTION SYSTEM STUDY AREA

MSA Murray, Smith & Associates, Inc. Engineers/Planners
123 S.W. Salmon, Suite 900 PHONE 503.225.9010
Portland, Oregon 97204-2919 FAX 503.225.9022

OCTOBER 2014

MCCAMANT
ONEIDA
COMLITZ
TONQUIN
WALDO
NORWOOD
84TH
I5
82ND
GREENHILL
CLAY
GRAHAMS FERRY
BOONES FERRY
DAY
COMMERCE
GARDEN ACRES
ELLIGSEN
WHEATLAND
CLUTTER
RIDDER
MORGAN
65TH
GAGE
NODAWAY
BRIAR PATCH
CANYON CREEK
95TH
FREEMAN
PRINTER
KAME
TOOZE
MALLOY
WESTFALL
FROGPOND
XEROX
PARKWAY
STAFFORD
BOECKMAN
ADVANCE
110TH
KINSMAN
BOBERG
60TH
53RD
KRUSE
TOWN CENTER
WILSONVILLE
BRUCK
CAMELOT
MONTEBELLO
INDUSTRIAL
COURTSIDE
MONTGOMERY
EILERS
JAMAICA
WILLAMETTE RIVER
FRENCH PRAIRIE
GLASS
BUTTEVILLE
FAIRWAY
MILEY
LAWNVIEW
AIRPORT
PRAIRIE VIEW
GRAHAM
CEDAR BROOK
DENBROOK
HWY 551
COUNTRYSIDE
KNIGHTS BRID

County Boundary
City Boundary
Street
Water Body
Study Area
Urban Growth Boundary
Urban Reserve Area
Taxlot

0 2,500 5,000 Feet

N

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The City owns and operates eight public pump stations (lift stations) of various sizes, which discharge wastewater through pressurized force main piping to the gravity trunk system. The largest and most significant pump station within the system is the Memorial Park Pump Station. In addition to these public pump stations, there are several privately-owned pump stations within the City maintained by their respective owners. Figure ES-2 shows the pump station locations throughout the system.

Flow Projection and Capacity Analysis

The CSMP documents existing wastewater flows and future flow projections based on designated land use. For future flow assumptions, all currently unsewered parcels within the UGB were assumed to be sewered. The capacity of the collection system was evaluated using an estimate of the total peak wastewater flow projected for both existing and future conditions.

The peak wastewater flow is a combination of dry weather flow (DWF), groundwater infiltration (GWI), and wet weather flow (WWF). DWF is the assumed wastewater base flow contributed by residents and businesses, and varies throughout the day in response to personal habits and business operations. GWI is water which enters the collection system through defective pipes, pipe joints, and manhole walls. GWI varies with groundwater depth and is generally seasonal in nature. WWF is stormwater inflow which enters the collection system during or immediately following a precipitation event. This water enters the system through leaky manhole covers and defective underground pipes, as well as through illegal direct connections such as roof drains, yard and area drains, and storm drains. Figure ES-3 illustrates how these flow components are combined to estimate the peak wastewater flow for all areas in the collection system.

Existing peak wastewater flows were derived from water usage records and flow measurement data collected at the wastewater treatment plant and at 11 flow measurement sites over the past 7 years. Future flows were estimated assuming complete build-out of the City, including all parcels within the City limits and UGB, and development of specific areas of the URA, as currently defined by the City. Future peak wastewater flows used in analysis of the system were generated using a hypothetical winter rainfall event with a reoccurrence interval once in 10 years, or 10 percent probability, in accordance with City standards.

Three scenarios assuming relative low, medium and high development densities were applied to undeveloped areas, with the medium density scenario representing the average development potential. The low and high density scenarios were used to characterize system sensitivity to higher or lower peak flows, and provide an overall range of capacity-related improvements anticipated to be necessary as the City develops.

A computer model of the collection system was created using the Innovyze InfoSWMM software package to evaluate the capacity of the various system components under peak wastewater flows. To maximize accuracy of the analysis, the model was first calibrated using flow measurement data collected by the City during the most significant winter storm event in the recent past, the January 18-19, 2012 storm.

FIGURE ES-2

City of WILSONVILLE in OREGON

CITY OF WILSONVILLE

SANITARY SEWER COLLECTION SYSTEM BASIN AND SYSTEM MAP

MSA Murray, Smith & Associates, Inc. Engineers/Planners

121 S.W. Salmon, Suite 900 PHONE 503.225.9010
Portland, Oregon 97204-2919 FAX 503.225.9022

OCTOBER 2014

Coffee Creek

Railroad Undercrossing

Canyon Creek

Boeckman

Villebois

Boberg Diversion

Parkway Interceptor I-5 Undercrossing

Canyon Creek/ Town Center

Town Center

Canyon Creek Flow Splitter

Wood School Interceptor

Seely Ditch Undercrossing

Old Town

Memorial Drive Flow Splitter

Wood School

Memorial Park

Beockman Creek Interceptor I-5 Undercrossing

Corral Creek

River Village

Rivergreen

Moreys Landing

Charbonneau

Coffee Creek Interceptor

Parkway Interceptor

Canyon Creek Interceptor

Boeckman Interceptor

Coffee Creek Correctional Facility

MCCAMANT, ONEIDA, TONQUIN, WALDO, NORWOOD, GREENHILL, CLAY, DAY, COMMERCE, ELLIGSEN, CLUTTER, RIDDER, BRIAR PATCH, FROGPOND, BOECKMAN, ADVANCE, KAME, TOOZE, MALLOY, WESTFALL, CAMELOT, FREEMAN, PRINTER, PARKWAY, TOWN CENTER, KRUSE, BRUCK, EILERS, GLASS, FAIRWAY, LAWNVIEW, CEDAR BROOK, DENBROOK, BUTTEVILLE, WILLAMETTE RIVER, MORGAN, WHEATLAND, NODAWAY, GAGE, KAHLE, GRAHAMS FERRY, BOONES FERRY, 82ND, 76TH, 65TH, 60TH, 53RD, 95TH, 110TH, I5, PS

W WWTP
PS Public Pump Station
PS Private Pump Station
Manhole

D Flow Diversion
S Flow Splitter
U Undercrossing

Pipe Public
Pipe Private
Forcemain Public
Forcemain Private

Study Area
Urban Growth Boundary
City Boundary
Street
Water Body

Sewer Basin
Charbonneau
Canyon Creek/Town Center
Coffee Creek
Boeckman
Villebois
Old Town
Wood School

0 2,500 5,000 Feet

N

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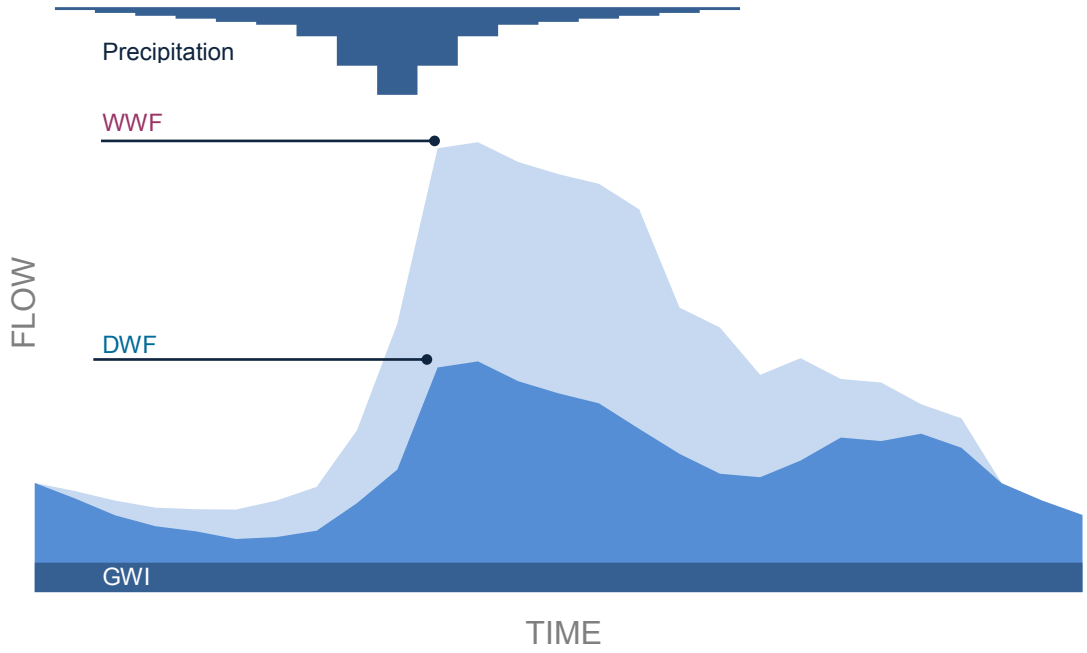
Figure ES-3 | Generic Schematic of Wastewater Flow Components



The system analysis identified components which do not meet minimum criteria as defined by City Public Works Standards and the Oregon Department of Environmental Quality (DEQ). The primary standard is that the depth of flow in all pipes must be less than the pipe diameter at peak flow. Where the pipe is flowing at greater than full depth, this condition is called "surcharged", and the pipe is considered to be capacity-deficient. Pump stations are considered deficient when they are not able to handle the peak flow with their largest pump out of service. Other criteria were also evaluated to identify areas where additional maintenance and flushing may be required due to low pipeline velocities.

Historic and Future Population Data

For consistency purposes, this wastewater CSMP utilized population projections previously developed for the City's 2012 Waster Master Plan (WSMP). Based on land use and densities outlined in the WSMP, a population build-out condition of 52,400 residents for the study area may be reached in the year 2045, assuming an annual growth rate of 2.9%.

The City selected the high density growth scenario for capital improvement selection and sizing. The peak total flow projections (DWF+WWF) at build-out conditions under the high density scenario are 17.9 million gallons per day (mgd) within the UGB and 23.5 mgd within the UGB and potential URA. Those improvements identified in the high density scenario, but not identified in the medium and low density scenarios were given lowest priority in the CIP. Improvements identified in all three scenarios or to serve future areas within the UGB were given highest priority in the CIP. Sizing improvements based on these flow projections

accommodates the future population projections as well as industrial and commercial growth potential.

Condition Assessment Results

A general condition assessment for the gravity piping and pump stations was conducted. The majority of the City's gravity piping system is reported to function in good condition; however, known problem areas were identified within the Charbonneau basin and select areas containing concrete piping installed in the 1970s. Several pump stations that require regular maintenance were indicated. All of the City's pump stations are projected to require some level of condition-based upgrades within the CIP timeframe due to the wear of mechanical and electrical components.

Capacity Analysis Results and Capital Improvement Plan Summary

The capacity analysis indicated that there are no capacity-related restrictions under existing development conditions. To accommodate full build-out of the UGB, the collection system requires capacity upgrades at an estimated cost of $9.9 million over the next ten years. The collection system would require an additional $19.1 million of capacity upgrades over the next 20 years to accommodate areas within the URA but outside the UGB. Capacity upgrade improvements related to future growth are funded by development through system development charges (SDCs). Memorial Park Pump Station, diversion structure, and flow splitter improvements in the CIP are required for both capacity and condition-based issues. The capacity portion of these improvements are also funded by development through SDCs. An additional $15.0 million in condition-based only improvements were identified over the 20-year planning horizon. The recommended CIP for the short-term period (next 5 years) includes $8.0 million in capacity and condition-based improvements.

Placeholder costs for new collection system infrastructure needed to serve future development within the study area were estimated. The new infrastructure costs will be entirely paid for by new development through a combination of SDCs and infrastructure constructed by developers. These costs are estimated at $114 million and are currently under review.

The overall CIP cost estimates for the 20-year period between 2014 and 2034 are summarized in Table ES-1. Capital improvements are illustrated in Figures ES-4 (capacity upgrades), ES-5 (condition-based improvements), and ES-6 (new infrastructure).

It is recommended the City implement the short-term improvements identified in the CIP to address capacity and condition issues. It is also recommended that the City continue to improve the quality of available collection system information, through continued flow monitoring, and maintaining a consistent program of performing closed-circuit television (CCTV) inspections of all pipelines. Additionally, it is recommended the City reassess long-term improvements (beyond 6 years) by periodically updating the hydraulic model using actual development conditions and additional flow monitoring information.

Table ES-1 Capital Improvement Program Summary (Estimated Costs)[1]					
Improvement Category	Prioritization Category	Time Frame (Cost)			Total Cost
		0-5 Years	6-10 Years	11-20 Years	
Existing System Upgrades for Future Development[2]	UGB	$3,100,000	$6,830,000	---	$9,930,000
	Advance Road URA	---	$7,510,000	---	$7,510,000
	URA	---	$500,000	$11,225,000	$11,725,000
	Total	$3,100,000	$14,840,000	$11,225,000	$29,165,000
Condition Based	UGB	$4,876,000	$3,125,000	$6,993,000	$14,994,000
New Infrastructure for Future Development[3]	UGB	$29,170,000	$32,620,000	---	$61,790,000
	Advance Road URA	---	$7,440,000	---	$7,440,000
	URA	---	---	$44,840,000	$44,840,000
	Total	$29,170,000	$40,060,000	$44,840,000	$114,070,000

Note 1. Cost estimates represent a Class 5 budget estimate, as established by the *American Association of Cost Engineers*. This preliminary estimate class is used for conceptual screening and assumes project definition maturity level below two percent. The expected accuracy range is -20 to -30 percent on the low end, and +30 to +50 percent on the high end, meaning the actual cost should fall in the range of 30 percent below the estimate to 50 percent above the estimate.

Note 2: Capacity upgrade improvements related to future growth are funded by development through SDCs. Memorial Park Pump Station, diversion structure, and flow splitter improvements in the CIP are required for both capacity and condition-based issues and listed in the "Existing System Upgrades for Future Development" category. The capacity portion of these improvements are also funded by development through SDCs.

Note 3: New infrastructure costs are funded through SDCs and infrastructure constructed by developers. These cost estimates are under review.

Note: See Section 7, "Capital Improvement Program" for additional cost assumptions and notes.

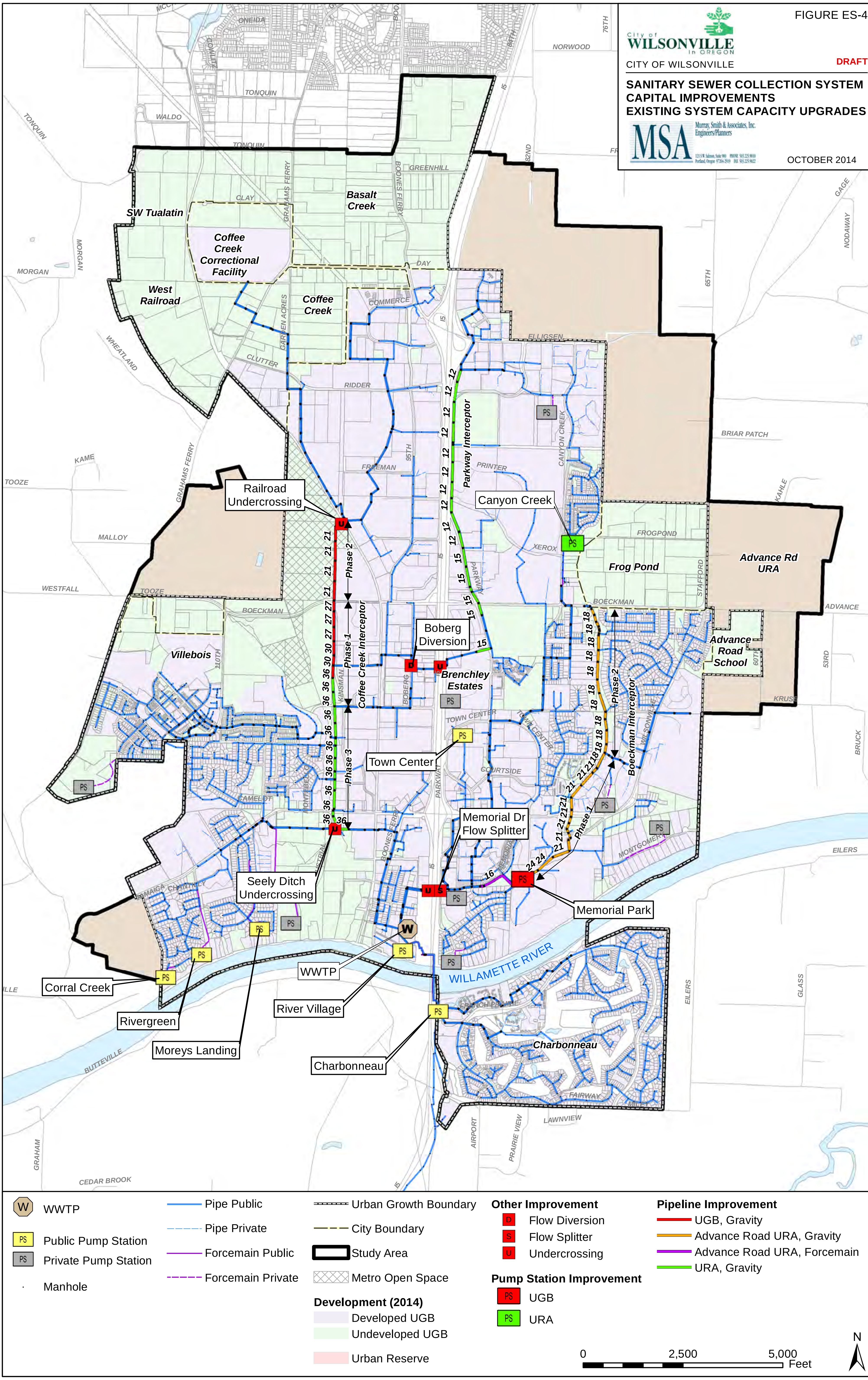


FIGURE ES-4
City of WILSONVILLE in OREGON
CITY OF WILSONVILLE
DRAFT
SANITARY SEWER COLLECTION SYSTEM
CAPITAL IMPROVEMENTS
EXISTING SYSTEM CAPACITY UPGRADES
MSA Murray, Smith & Associates, Inc. Engineers/Planners
OCTOBER 2014
SW Tualatin
Basalt Creek
Coffee Creek Correctional Facility
West Railroad
Coffee Creek
Railroad Undercrossing
Parkway Interceptor
Canyon Creek
Frog Pond
Advance Rd URA
Advance Road School
Villebois
Coffee Creek Interceptor
Phase 1
Phase 2
Phase 3
Boberg Diversion
Brenchley Estates
Town Center
Boeckman Interceptor
Memorial Dr Flow Splitter
Memorial Park
Seely Ditch Undercrossing
WWTP
River Village
Corral Creek
Rivergreen
Moreys Landing
Charbonneau
WILLAMETTE RIVER
WWTP
Public Pump Station
Private Pump Station
Manhole
Pipe Public
Pipe Private
Forcemain Public
Forcemain Private
Urban Growth Boundary
City Boundary
Study Area
Metro Open Space
Development (2014)
Developed UGB
Undeveloped UGB
Urban Reserve
Other Improvement
Flow Diversion
Flow Splitter
Undercrossing
Pump Station Improvement
UGB
URA
Pipeline Improvement
UGB, Gravity
Advance Road URA, Gravity
Advance Road URA, Forcemain
URA, Gravity
0 2,500 5,000 Feet
N
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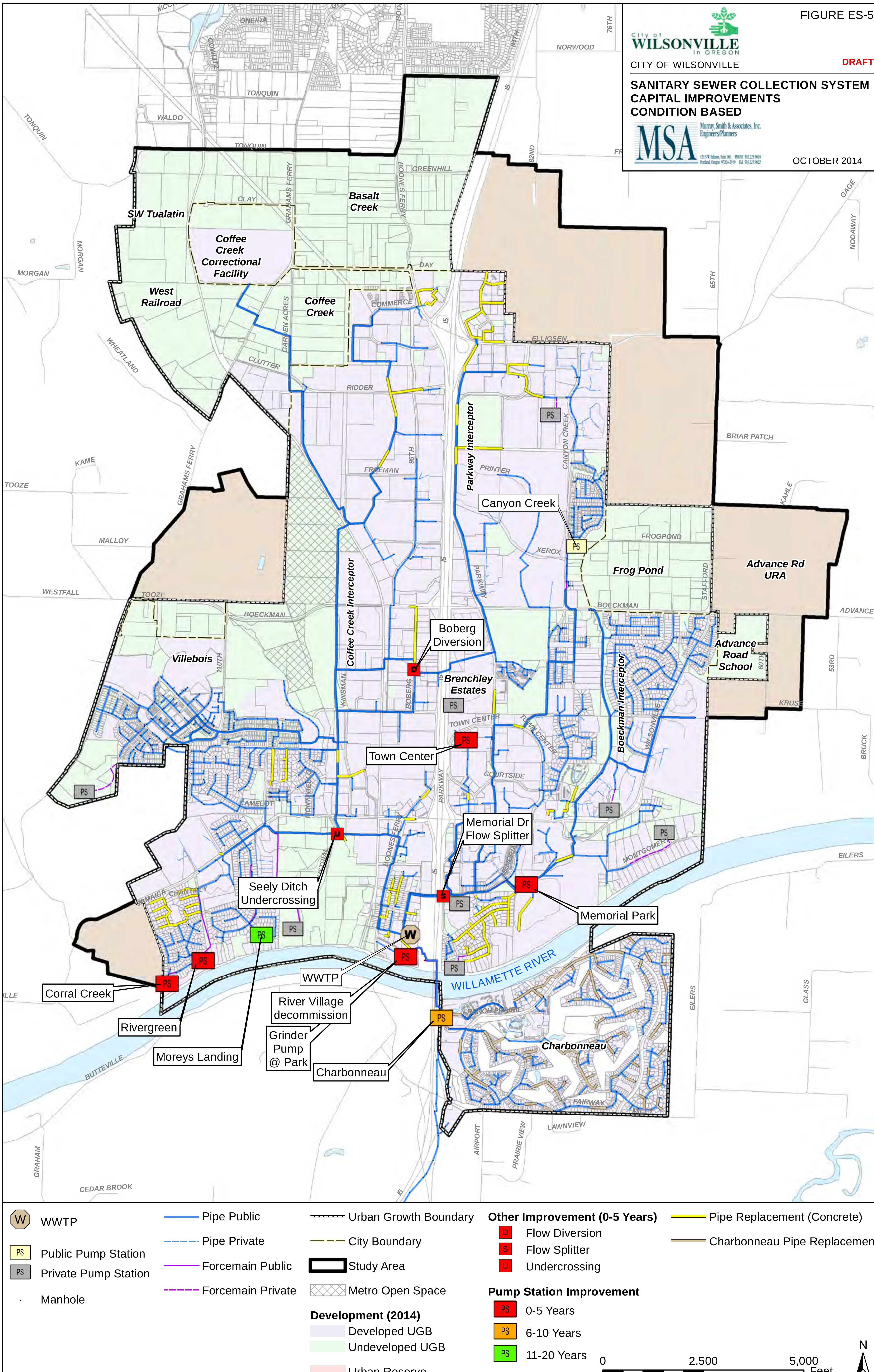

FIGURE ES-6

City of WILSONVILLE in OREGON

CITY OF WILSONVILLE

DRAFT

SANITARY SEWER COLLECTION SYSTEM CAPITAL IMPROVEMENTS NEW INFRASTRUCTURE

MSA Murray, Smith & Associates, Inc. Engineers/Planners

OCTOBER 2014

SW Tualatin
Coffee Creek Correctional Facility
Basalt Creek
West Railroad
Coffee Creek
Parkway Interceptor
Canyon Creek
Frog Pond
Advance Rd URA
Advance Road School
Coffee Creek Interceptor
Villebois
Brenchley Estates
Boeckman Interceptor
Town Center
Memorial Park
WWTP
River Village
Rivergreen
Moreys Landing
Corral Creek
Charbonneau

Future Development Area
1
2
3
4
5
6
7
8
9
10
11
12
13
14

W WWTP
PS Public Pump Station
PS Private Pump Station
Manhole

Pipe Public
Pipe Private
Force Main Public
Force Main Private

Urban Growth Boundary
City Boundary
Study Area
Metro Open Space

Development (2014)
Developed UGB
Undeveloped UGB
Urban Reserve

New Infrastructure (No Concept Plan)
UGB, Gravity
UGB, Pump
URA, Gravity
URA, Pump

Planned Piping
UGB
Advance Road URA

Pump Station Improvement
PS Advance Road URA

0 2,500 5,000 Feet

N

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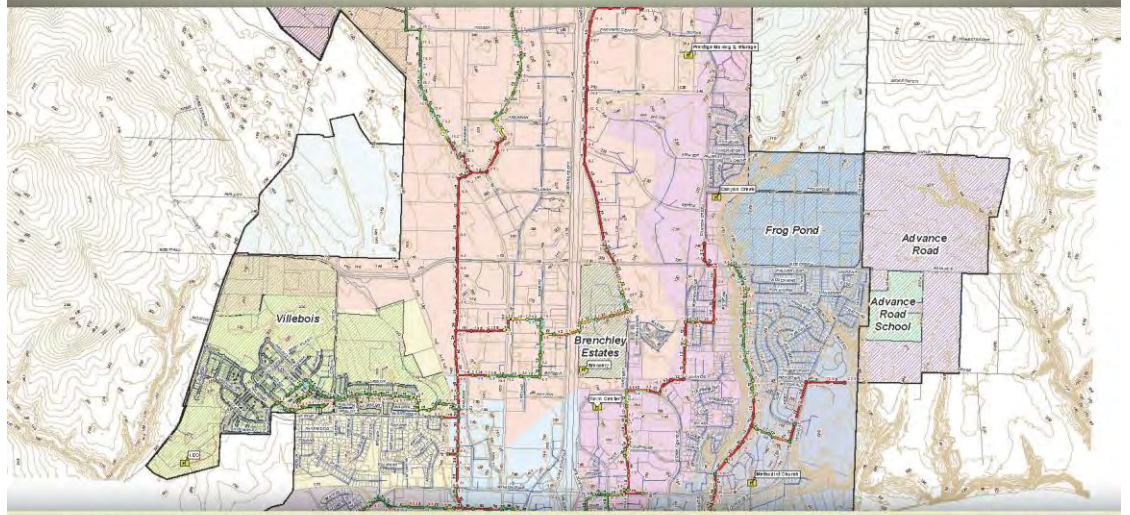
ENGINEERS | PLANNERS



CITY OF WILSONVILLE

WASTEWATER COLLECTION SYSTEM MASTER PLAN

November 2014

CITY OF WILSONVILLE IN OREGON

Wastewater Collection System Master Plan

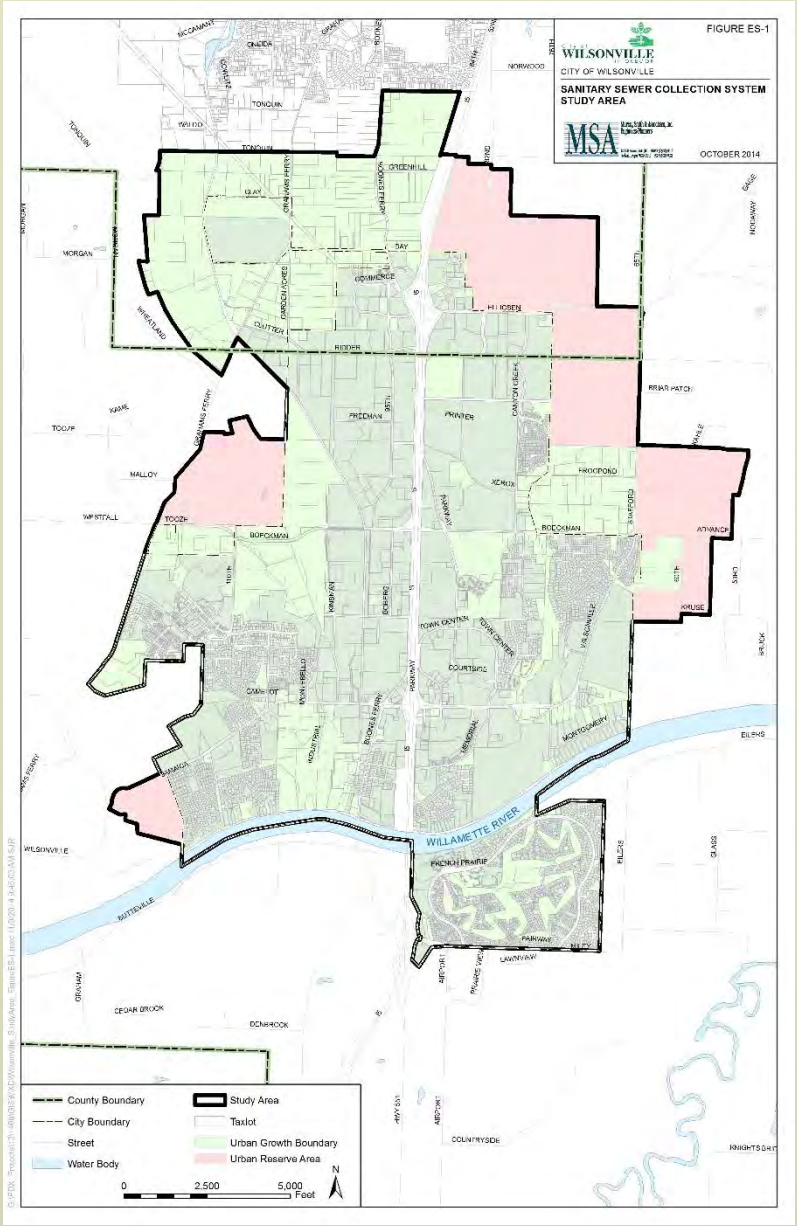
- Describes the existing wastewater collection system
- Present criteria for evaluating the system
- Identifies current and future system deficiencies & improvements
- Develops a prioritized Capital Improvement Program
- Contains planning level cost information for budgeting
- Provides a tool for informing City leaders, staff, customers, and others
- Facilitates logical planning decisions and utility coordination
- Incorporates community values and priorities through public process

MSA

City of Wilsonville in Oregon

Study Area

- Existing Development
- Future Development
  - Urban Growth Boundary
  - Urban Reserve

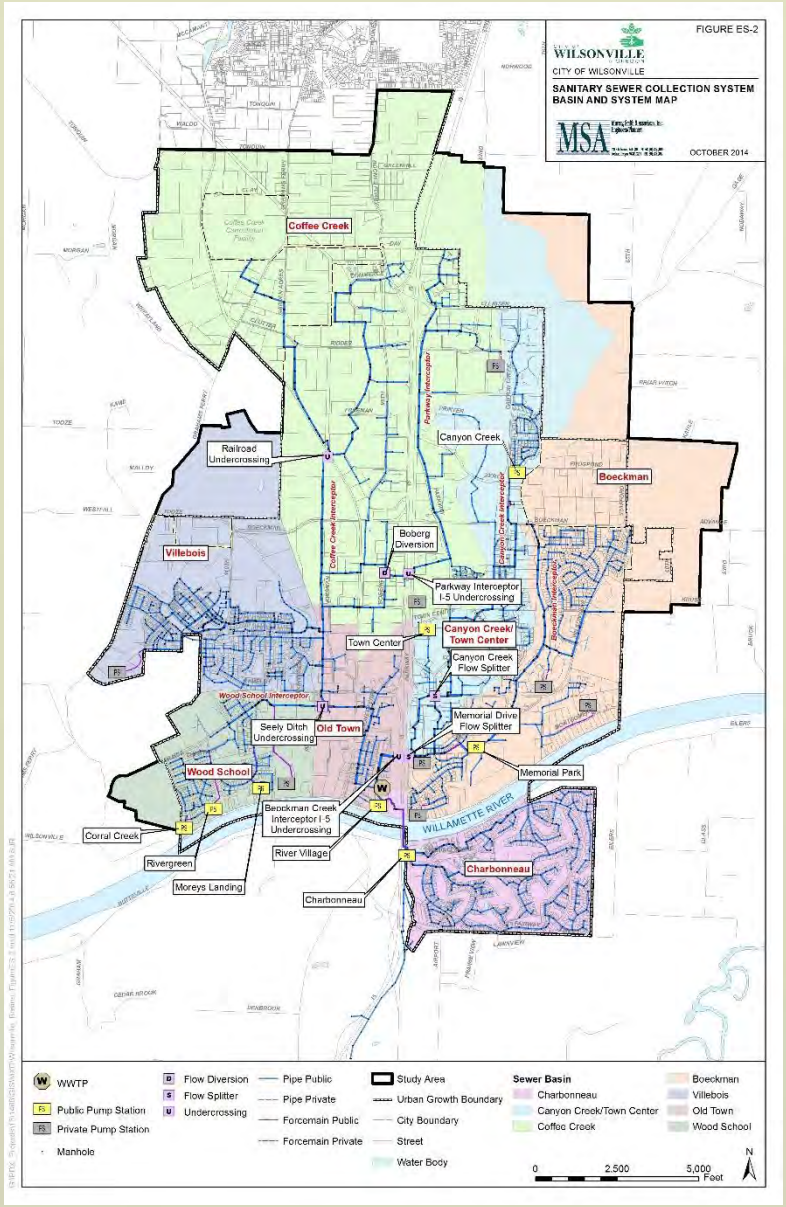


MSA

City of Wilsonville in Oregon

Existing System Description

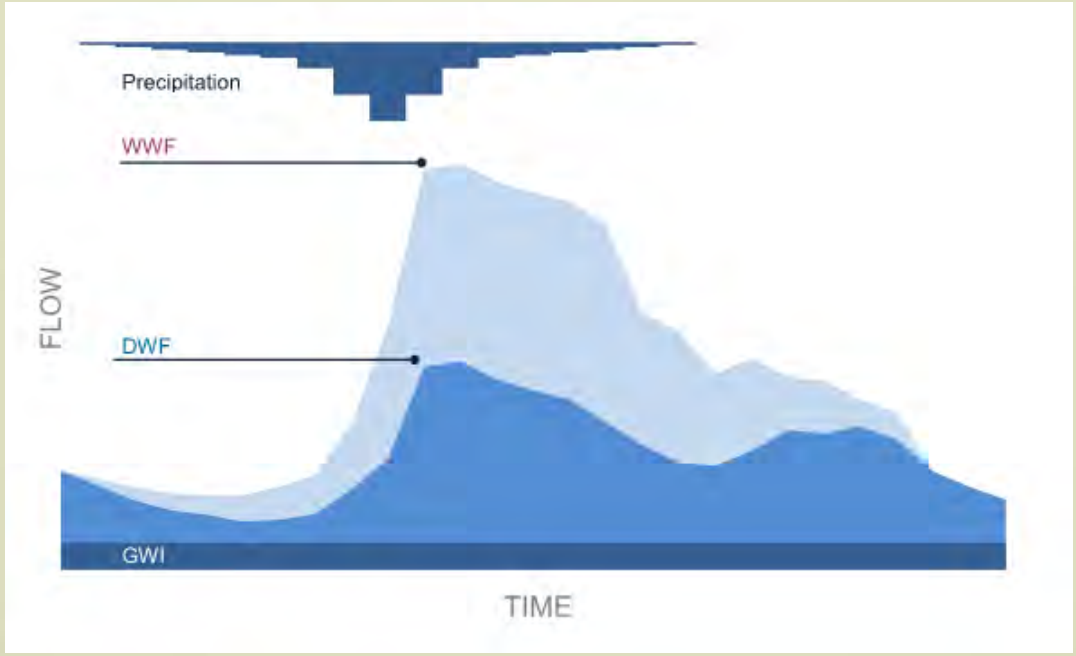
- Basins
- Interceptors
- Piping
- Pump Stations



MSA

City of Wilsonville in Oregon

Flow Definition



- Dry Weather Flow (DWF) – base flow contributed by residents and businesses
- Groundwater Infiltration (GWI) – groundwater enters system through pipe joints and walls
- Wet Weather Flow (WWF) – stormwater enters the system through leaky manholes or defective pipes

MSA

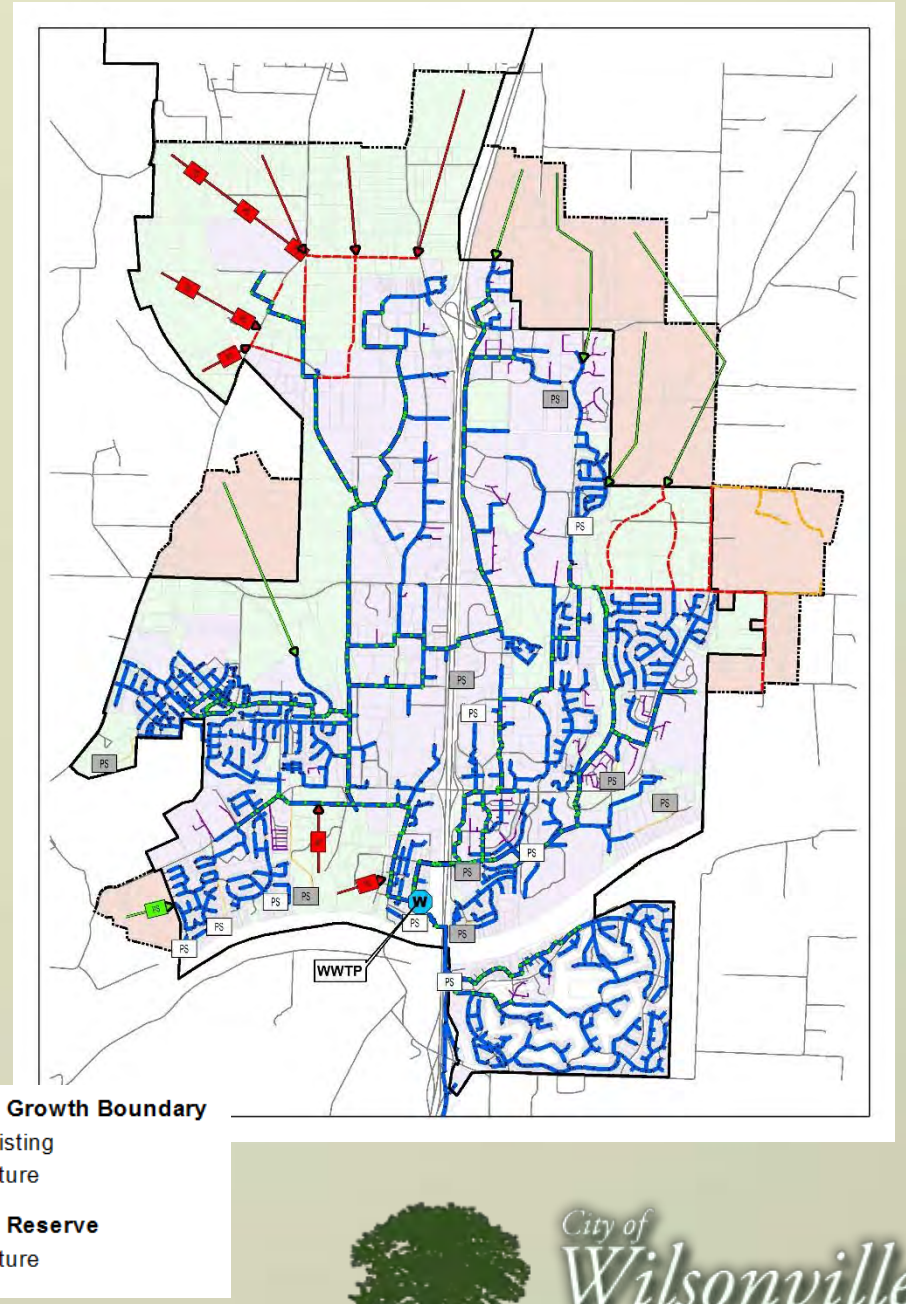
City of Wilsonville in Oregon

Existing and Future Flows

- Flow Monitoring
- Future Unit Flow Factors
- Sensitivity Analysis
- Design Storm

Land Use	Land Use Description	High Density		Medium Density		Low Density	
		Equivalent Dwelling Units per Acre	Unit Load (gpad)	Equivalent Dwelling Units per Acre	Unit Load (gpad)	Equivalent Dwelling Units per Acre	Unit Load (gpad)
Commercial							
CN	Neighborhood Commercial		1,000		750		500
PF	Public Facilities		1,000		750		500
Industrial							
IC	Campus/Industrial/Business Park		1,000		500		350
IH	Heavy Industrial		1,000		500		350
IL	Light Industrial		1,000		500		350
RI	Rural Industrial		1,000		500		350
Residential and Mixed-Use							
SFR1	Single Family 1 acre lot	1	166	1	166	1	166
SFR3	Single Family 10,000 sqft lot	3	498	3	498	3	498
SFR5	Single Family 7,000 sqft lot	5	831	5	831	5	831
SFR7	Single Family 5,000 sqft lot	7	1,163	7	1,163	7	1,163
SFR10	Single Family 3,500 sqft lot	10	1,662	10	1,662	10	1,662
MFR1	Multi-family Very Low Density	12.3	2,044	12.3	2,044	12.3	2,044
MFR2	Multi-family Low Density	17.8	2,958	17.8	2,958	17.8	2,958
MUR1	Mixed Use	11.2	1,861	11.2	1,861	11.2	1,861
Variable Density (Re-Zoning)							
EFU	Exclusive Farm or Forest Use	15	2,492	10	1,662	6	997
FUD	Future Urban Development	15	2,492	10	1,662	6	997
RRFU	Rural Residential	15	2,492	10	1,662	6	997

Note: Unit loads for land use classifications with equivalent dwellings units are calculated assuming 67 gpcd and 2.48 people per unit.

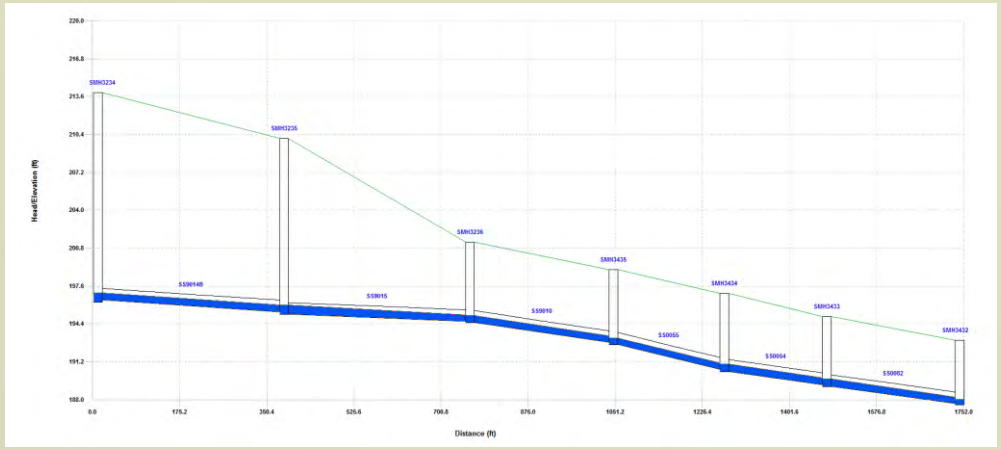


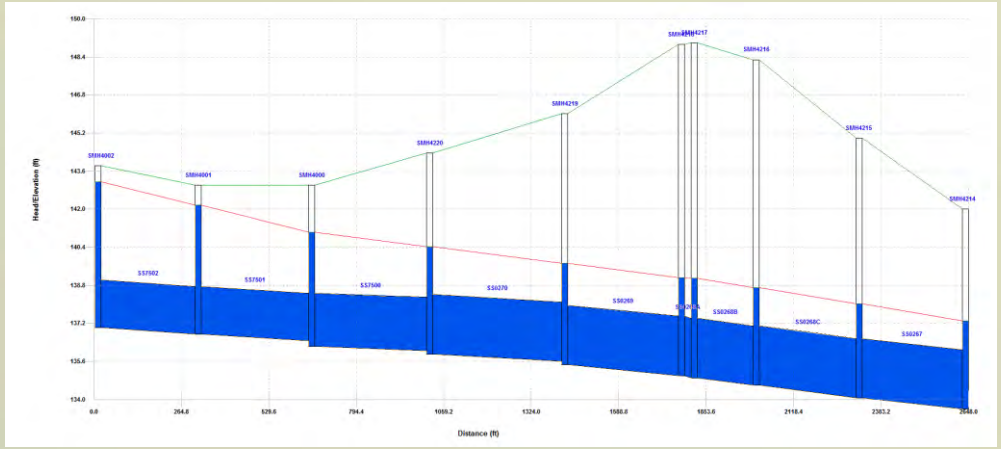
MSA

City of Wilsonville in Oregon

Evaluation Criteria

Capacity



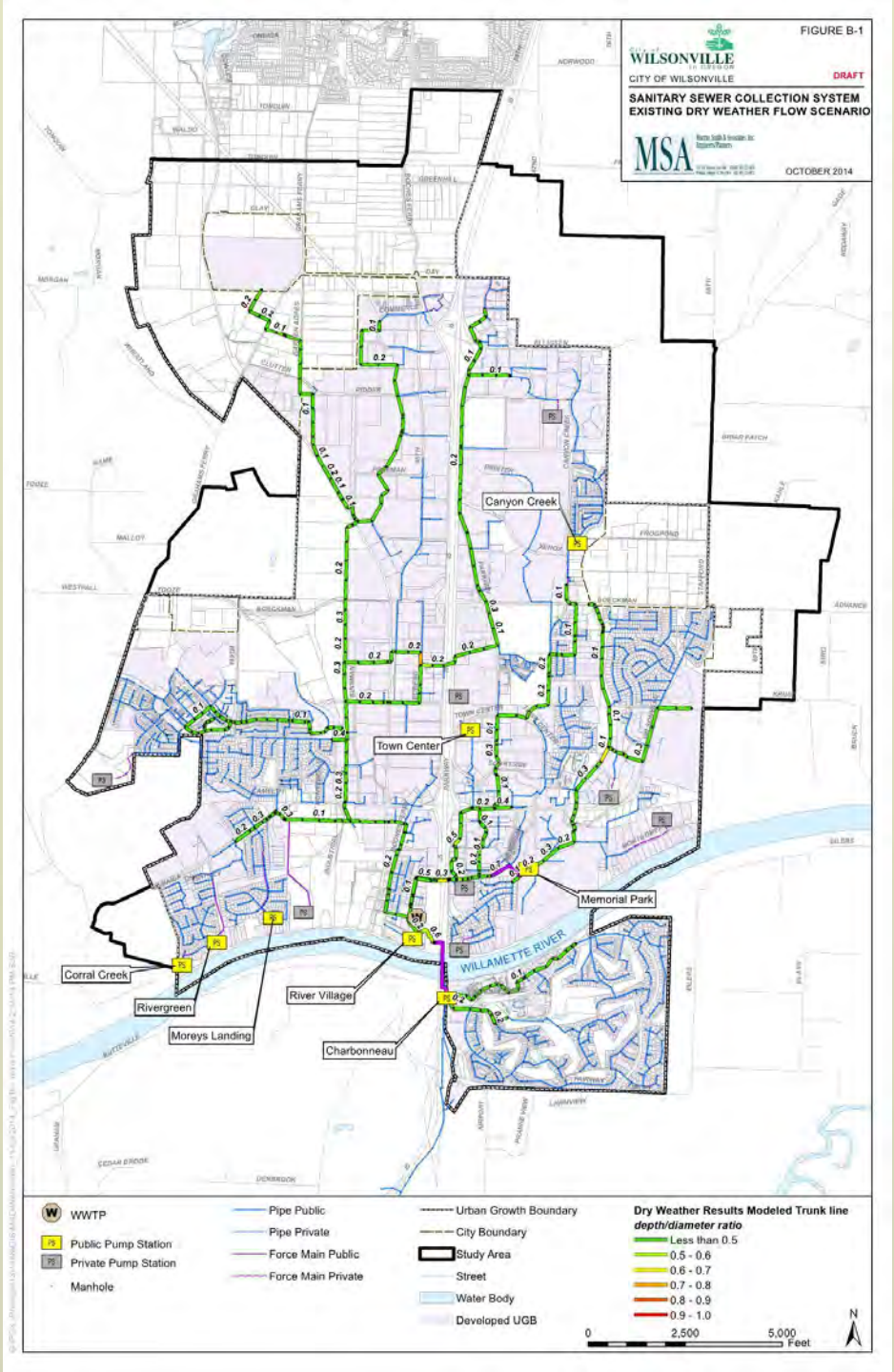


Condition

MSA

City of Wilsonville in Oregon

Existing System Capacity



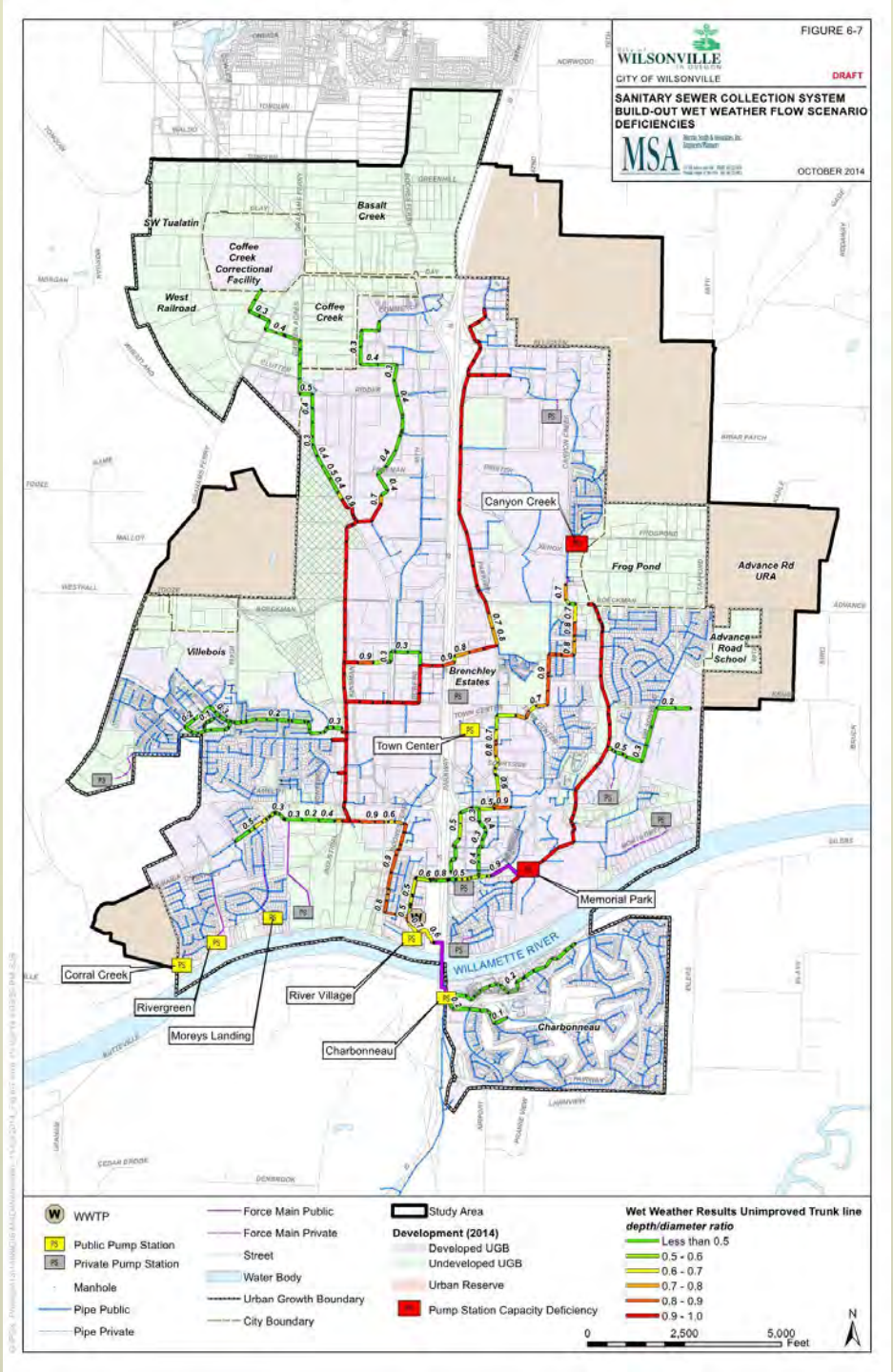
DEPTH RATIO

- < 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1.0

MSA

City of Wilsonville in Oregon

Future System Capacity



DEPTH RATIO

- < 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1.0

MSA

City of Wilsonville in Oregon

Improvement Types

- Existing System Capacity Upgrades
- Condition Based
- New Infrastructure for Future Development

Prioritization Category

DEVELOPMENT AREA

- UGB
- Advanced Road URA
- URA

TIMING

- 0-5 Years
- 5-10 Years
- 10-20 Years

OTHER INFORMATION

- Project Drivers
- Growth Percentage

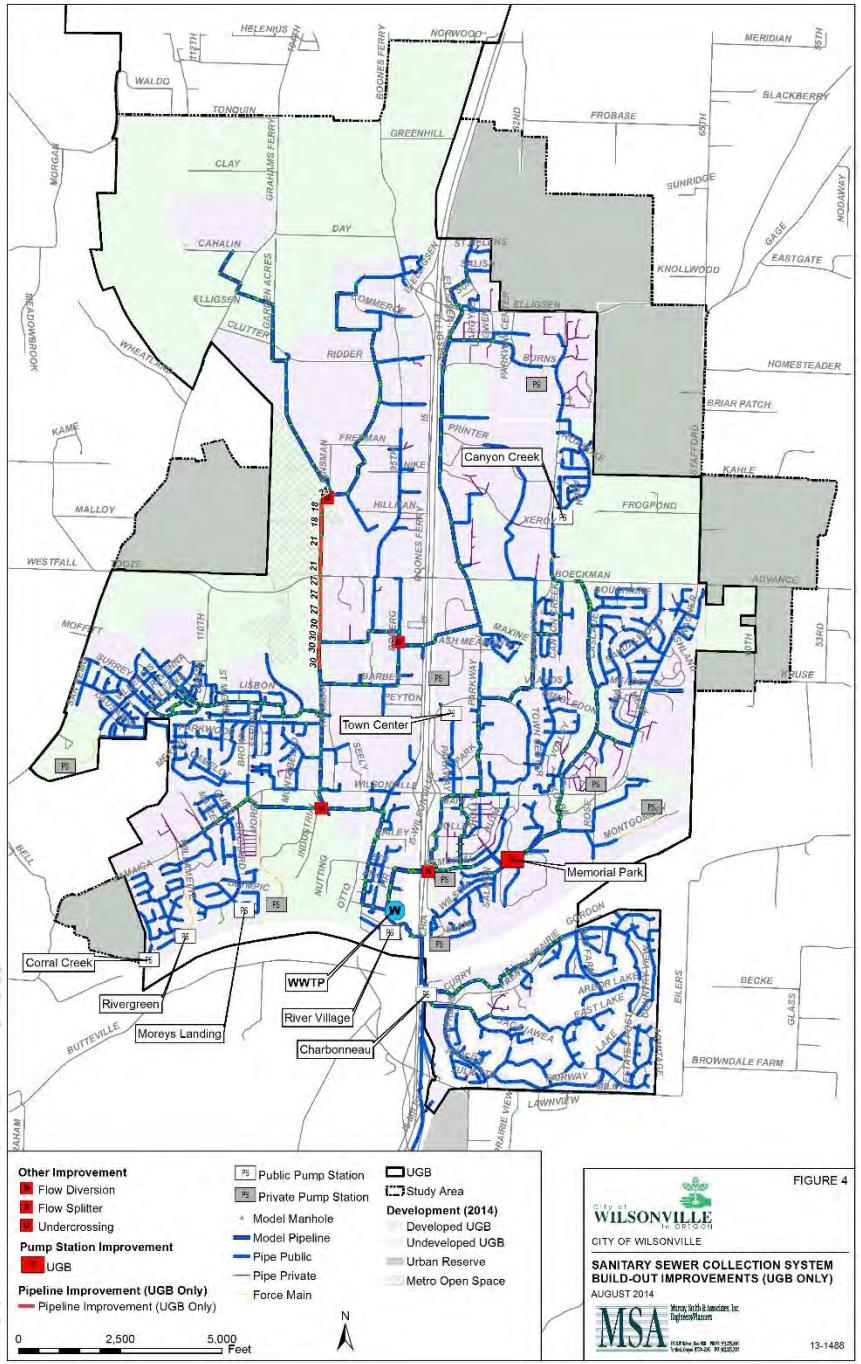
MSA

City of Wilsonville in Oregon

CIP Existing System Upgrades UGB Only

$9.9 Million over 10 years

SDC and Rate Funded

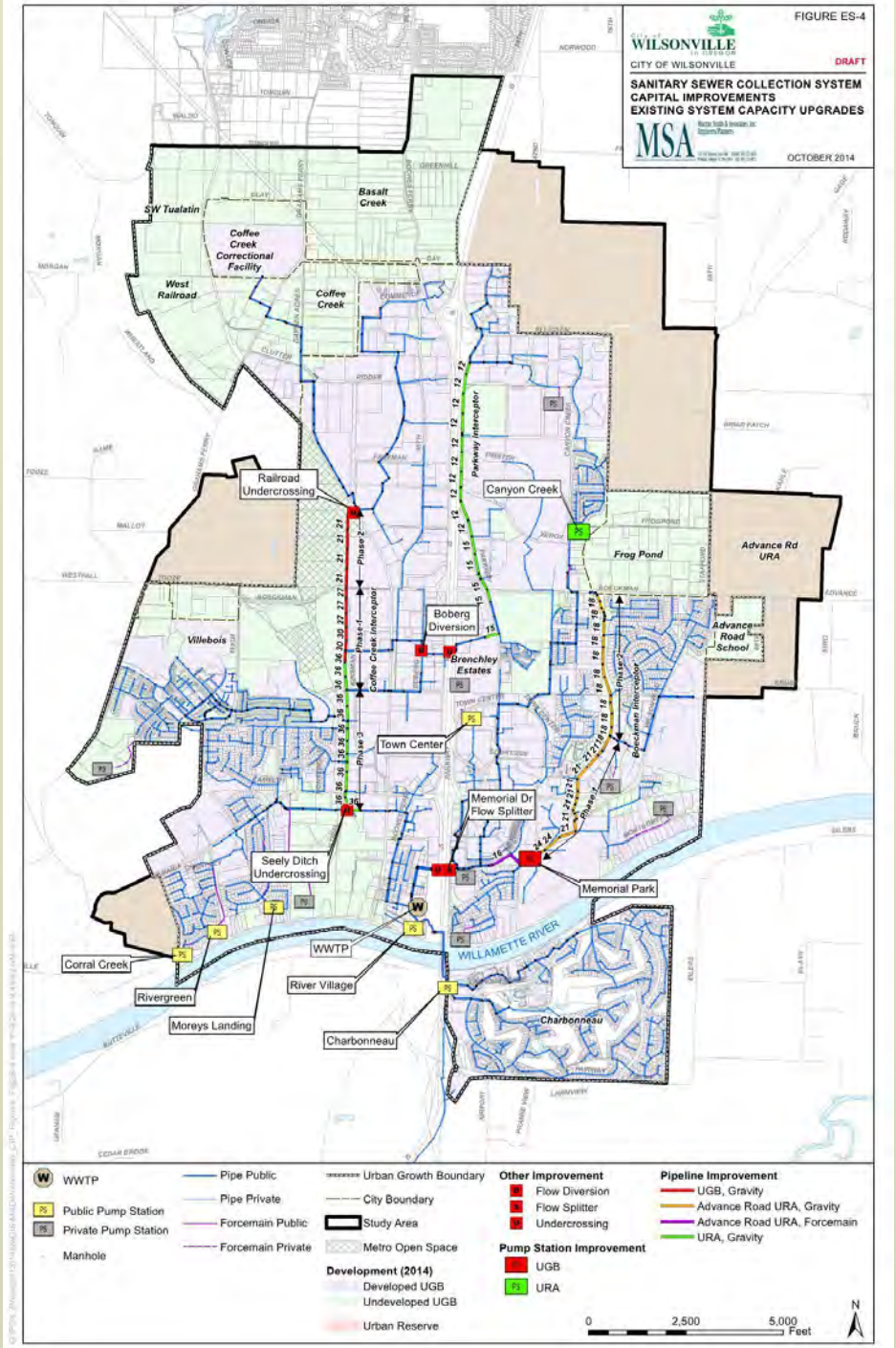


CIP – Existing System Upgrades

$9.9 Million over 10 years within UGB

$19.1 Million over 20 years outside UGB (URA)

SDC and Rate Funded



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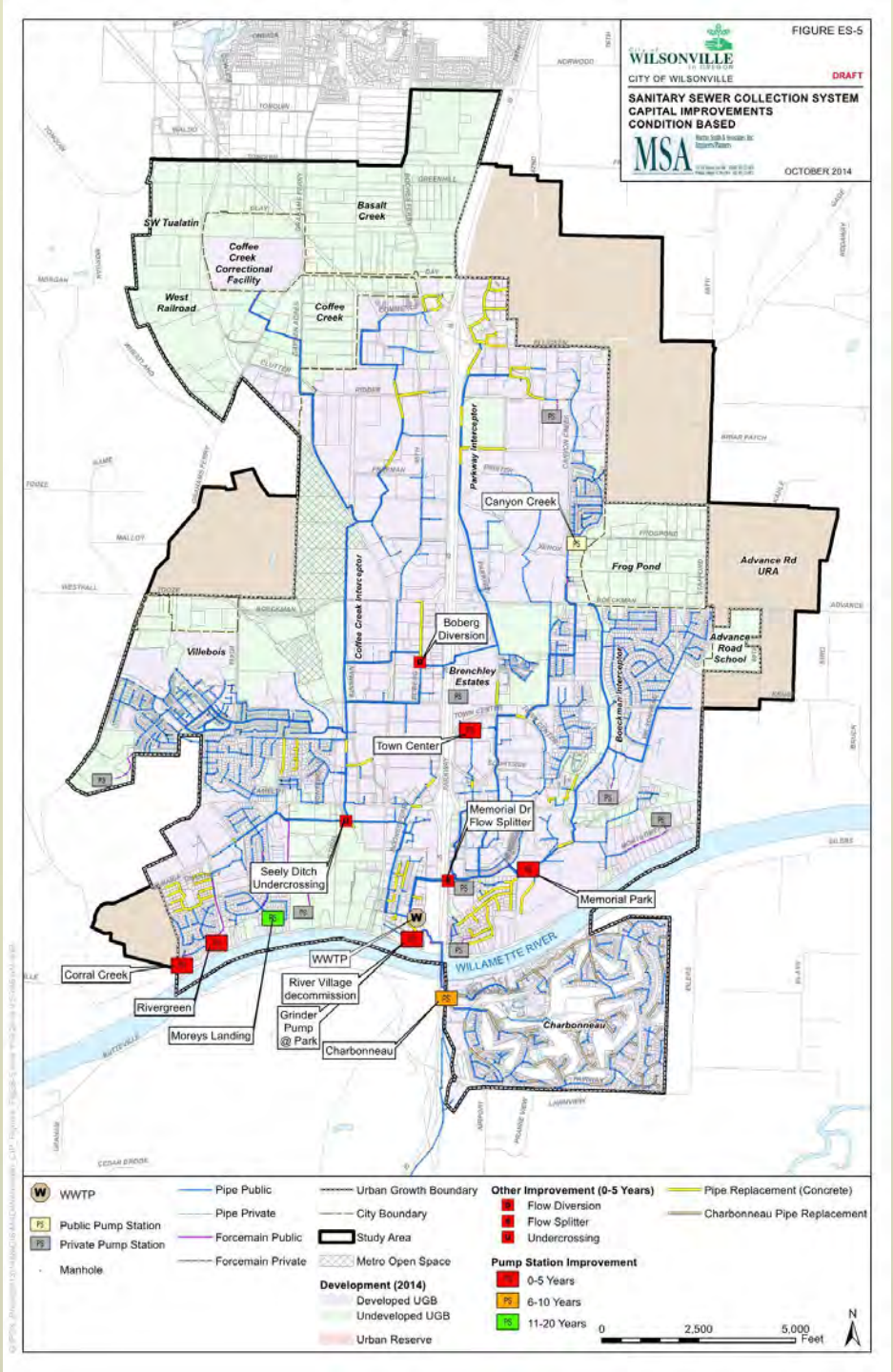
City of Wilsonville in Oregon

CIP – Condition Based

$15.0 Million
over 20 years

Rate Funded



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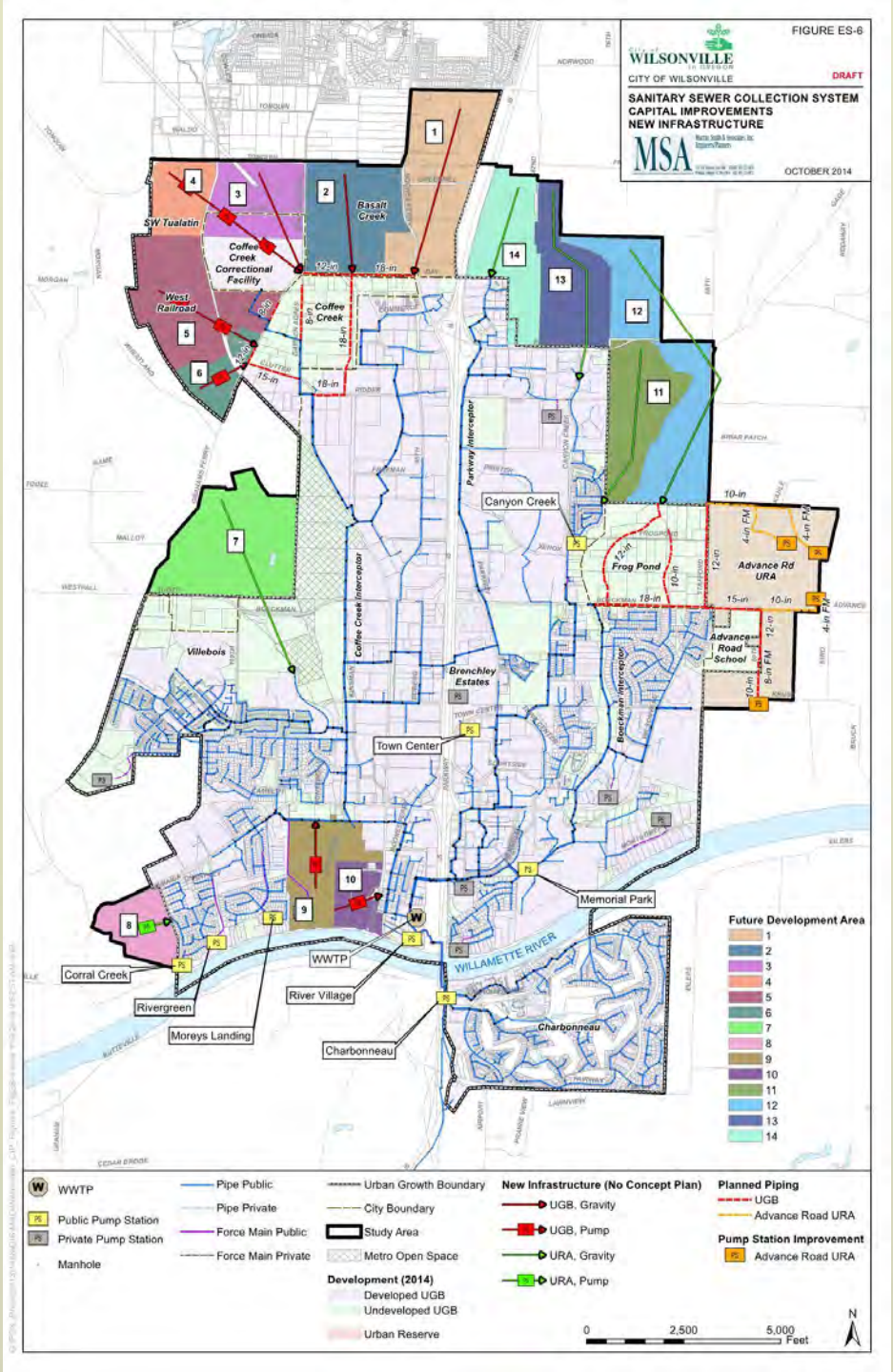
City of Wilsonville in Oregon

CIP – New Infrastructure for Future Development

Development Funded



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City of Wilsonville in Oregon

Cost Summary

Capital Improvement Program Summary (Estimated Costs)			
Improvement Category	**Prioritization Category**	**Total Cost**	**Comment**
Existing System Upgrades	UGB	$9.93 million	SDC and Rate Funded
	Advance Road URA	$7.51 million	
	URA	$11.73 million	
	Total	$29.17 million	
Condition Based	UGB	$15.0 million	Rate Funded
New Infrastructure for Future Development	Development Funded		SDC

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City of Wilsonville in Oregon