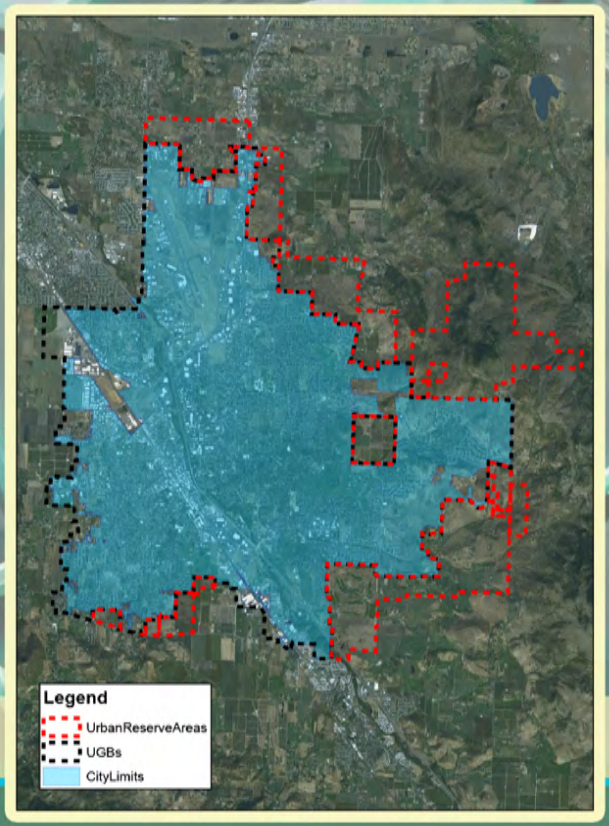

Sanitary Sewer Collection System Master Plan

FINAL • JANUARY 2019

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Acted on by Medford City Council
Resolution No. 2018-134

CITY OF MEDFORD

SANITARY SEWER MASTER PLAN

Acted on by Medford City Council, Resolution No. 2018-134

January 2019

FINAL

REGISTERED PROFESSIONAL ENGINEER
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CITY OF MEDFORD

SANITARY SEWER MASTER PLAN

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LIST OF ACRONYMS AND ABBREVIATIONS

AACE	Advancement of Cost Engineering
ADS	ADS Environmental Services, LLC
ADWF	Average Dry Weather Flow
AMP	Asset Management Program
BI	Baseline Infiltration
BWP	Base Wastewater Production
CCI	Construction Cost Index
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan
City	The City of Medford
d/D	depth over diameter ratio
DEQ	Department of Environmental Quality
DWF	Dry Weather Flow
EDSPI	Engineering Design Standards for Public Improvements
ELA	Engineering, Legal, and Administration
ENRCCI	Engineering News Record Construction Cost Index
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit
ºF	Fahrenheit
FOG	Fats, Oils, and Grease
ft	feet
ft/sec	feet per second
FTE	Full Time Employee
FY	Fiscal Year
GIS	Geographic Information System
GLUP	General Land Use Plan
gpad	gallons per acre per day
gpcd	gallons per capita per day
gpm	gallons per minute
HGL	Hydraulic Grade Line
hp	horsepower
I/I	Inflow and Infiltration

I-5	Interstate 5
mgd	million gallon per day
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
O&M	Operation and Maintenance
ORS	Oregon Revised Statutes
PACP	Pipeline Assessment and Certification Program
PDWF	Peak Dry Weather Flow
PS	Pump Station
PWWF	Peak Wet Weather Flow
R&R	Repair and Replacement
RDII	Rainfall Dependent Inflow
ROW	Right-of-Way
RRC	Regional Rate Committee
RVSS	Rogue Valley Sewer Services
RWRF	Regional Water Reclaimed Facility
SCADA	Supervisory Control and Data Acquisition
SCS	Soil Conservation Service
SDC	System Development Charge
SSES	Sanitary Sewer Evaluation Survey
SSMP	Sanitary Sewer Master Plan
SSOs	Sanitary Sewer Overflow
UGB	Urban Growth Boundary
URA	Urban Reserve Area
WaPUG	Wastewater Planning Users Group
WWF	Wet Weather Flow

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The City of Medford (City) has prepared this Sanitary Sewer Master Plan (SSMP) to document the status of the City's sewer system and analyze the system to anticipate future needs. In order to provide effective, reliable, and safe sewer service, this SSMP will be used as a guide for operation, maintenance, and expansion of the sewer system for the next 20 years and beyond. This SSMP plans for the build-out condition of the Service Area. This SSMP is a planning level document utilizing the best practices in the industry. The City's sewer collection system contains over 7,000 individual pipe segments. This SSMP was assembled using flow monitoring data from 12 basins, and models almost all the individual pipes in the City' service area, but is limited in specificity to generally accepted modeling assumptions. The engineer may rely on the data and capacities within the SSMP until such time as the City updates its SSMP as better and even more accurate information becomes available.

Recognizing the importance of planning, developing, and financing sewer system facilities to provide reliable service for the existing customers and to serve anticipated growth, the City initiated the preparation of this Plan. In 2015, the City selected Carollo Engineers, Inc., along with ADS Environmental, LLC, to develop this plan in accordance with applicable rules and regulations governing planning for wastewater utility systems.

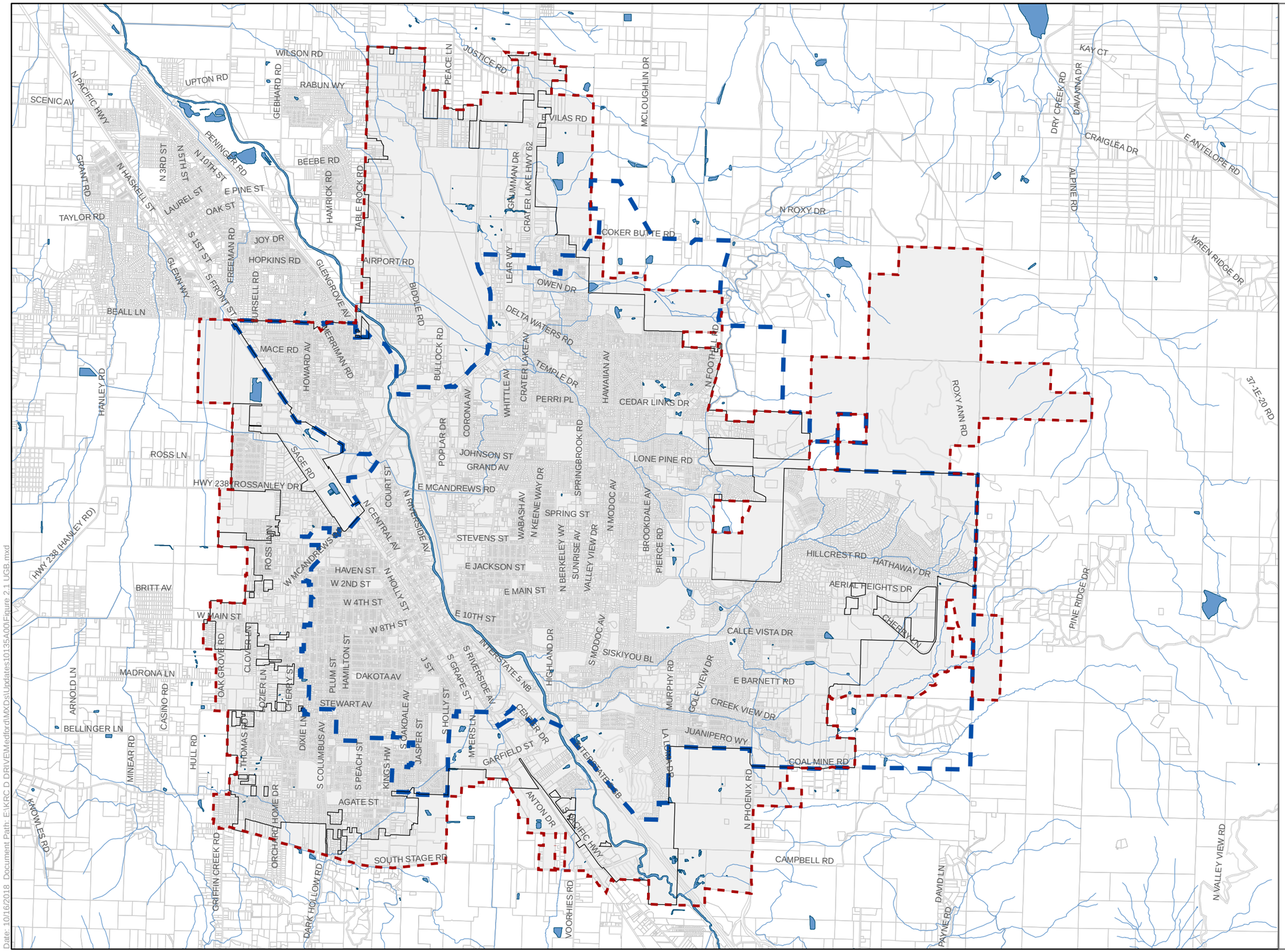
The following sections summarize the planning assumptions, methodologies, and results of the SSMP, which are described in further detail in the Chapters and Appendices of this plan.

ES.2 BASIS OF PLANNING

The City was incorporated in 1885. Today, the City is one of the fastest growing cities in the state with a population of over 80,000 in 2015, per Census data. It is the largest city in Southern Oregon and the seat of Jackson County government. The oldest sanitary sewers in the City were built in the late 1800s to early 1900s and still serve the downtown core area.

As development of this SSMP began, planning periods and corresponding service area boundaries were established to help the City identify available collection and expansion options of their current system. The City's service area abuts the Rogue Valley Sewer Service (RVS), which collects and conveys sewage to the City's Regional Water Reclamation Facility (RWRF). The three service areas evaluated in this SSMP are shown in Figure ES.1 and described as follows:

1. Existing system and currently sewered area (currently sewered area information was obtained from April 2016 data provided by the City,
2. 2036 Service Area,
3. Service Area (considered as build-out, and includes development of the Urban Reserve Areas).



Legend

- Urban Growth Boundary (UGB)
- Service Area
- Medford City Limits (Source: Jackson County GIS as of 02/25/2016)
- Taxlots
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

0 5,000 Feet

SERVICE AREAS AND BOUNDARIES

FIGURE ES.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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CITY OF MEDFORD OREGON

Date: 10/16/2018 Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 2.1 UGB.mxd

Existing and future land use information is an integral component in projecting sewer flow generation within the Service Area. Assumptions for future development are consistent with the City's comprehensive plan. Maps of the City's existing and future land use within the Service Area are presented in Chapter 2.

Also presented in Chapter 2 are the sewer system policies and criteria that have been established by the City to facilitate the successful management of the wastewater system and compliance with all local, state, and federal regulations. The policies and criteria are organized into the categories of sewer service and service extensions, system reliability, environmental policies, coordination with Other Agencies, financial policies, and design criteria.

ES.2.1 Flow Projections

Chapter 2 and Appendix B summarizes the results of a two-month flow monitoring program performed by ADS Environmental, Inc. during development of this SSMP. The main purposes of flow monitoring are to accurately determine average dry weather flow (ADWF), define the collection system's weekday and weekend diurnal flow patterns, and develop land use flow factors that facilitate the development of future flow projections given planned land use. Chapter 2 describes how the results of the flow monitoring program were used to estimate existing and future sewer flows. As seen in Table ES.1, Current ADWFs amount to 9.05 millions of gallons per day (mgd), while the Service Area ADWF is projected to be 14.71 mgd, increasing current flows by approximately 63 percent by build-out.

Table ES.1 Existing and Projected Wastewater Flows to RWRF
Sanitary Sewer Master Plan
City of Medford

Condition(3)	Average Dry Weather Flow (ADWF) (mgd)	Peak Wet Weather Flow (PWWF)(1) (mgd)	Peaking Factor (PWWF:ADWF)(2)
Existing	9.05	67.70	7.5
2036 Service Area	13.39	75.68	5.6
Service Area (URA)	14.71	79.12	5.4

Notes:
(1) The PWWF flow (design flow) is the peak hourly flow.
(2) Peaking factor is the Peak Wet Weather Flow divided by the Average Dry Weather Flow.
(3) These conditions represent the flows to the interceptor if the capacity bottlenecks are resolved. This ensures that the PWWF truly represents the peak hour flow, without dampening due to upstream capacity deficiencies.
(4) The City's system has several connections to the RVS Interceptor. When adding or subtracting flows between basins, the accuracy in reported peak flow decreases. The "level of confidence" for these basins are less than basins with one direct outflow.

Flow monitoring data was also used to calibrate the City's collection system hydraulic model and identify areas with high inflow and infiltration (I/I). Peak Wet Weather Flows

(PWWF) for each basin were derived for a design storm consisting of a synthetic 5-year, 24-hour storm applied to the model. The PWWF represents the maximum hourly flow rate under the design storm and assumed growth conditions, and are used to evaluate the capacity of the current wastewater system. Current and predicted future PWWF is presented in Table ES.1. The values shown are conservative but realistic, as they assume bottlenecks that limit conveyance are removed. PWWFs from these scenarios more closely represent the wastewater inflows to the system and the potential existing and future PWWFs to the RVS Interceptor and RWRF once necessary improvements are implemented. It is important to note that these flows are conveyed to multiple connection points to the RVS interceptor.

ES.3 EXISTING SYSTEM

Chapter 3 provides a description of the City's existing collection system and an inventory of the City's assets. The City's collection system consist of approximately 260 miles of gravity mains, 1.1 miles of force mains, and 5 pump stations that collect and convey wastewater to the regional Rogue Valley Sewer (RVS) interceptor running south-north along Bear Creek. RVS customers contribute flow both upstream and downstream of the City, and all wastewater is sent to the Regional Wastewater Reclamation Facility owned and operated by the City. The City's collection system is shown in Figure ES.2.

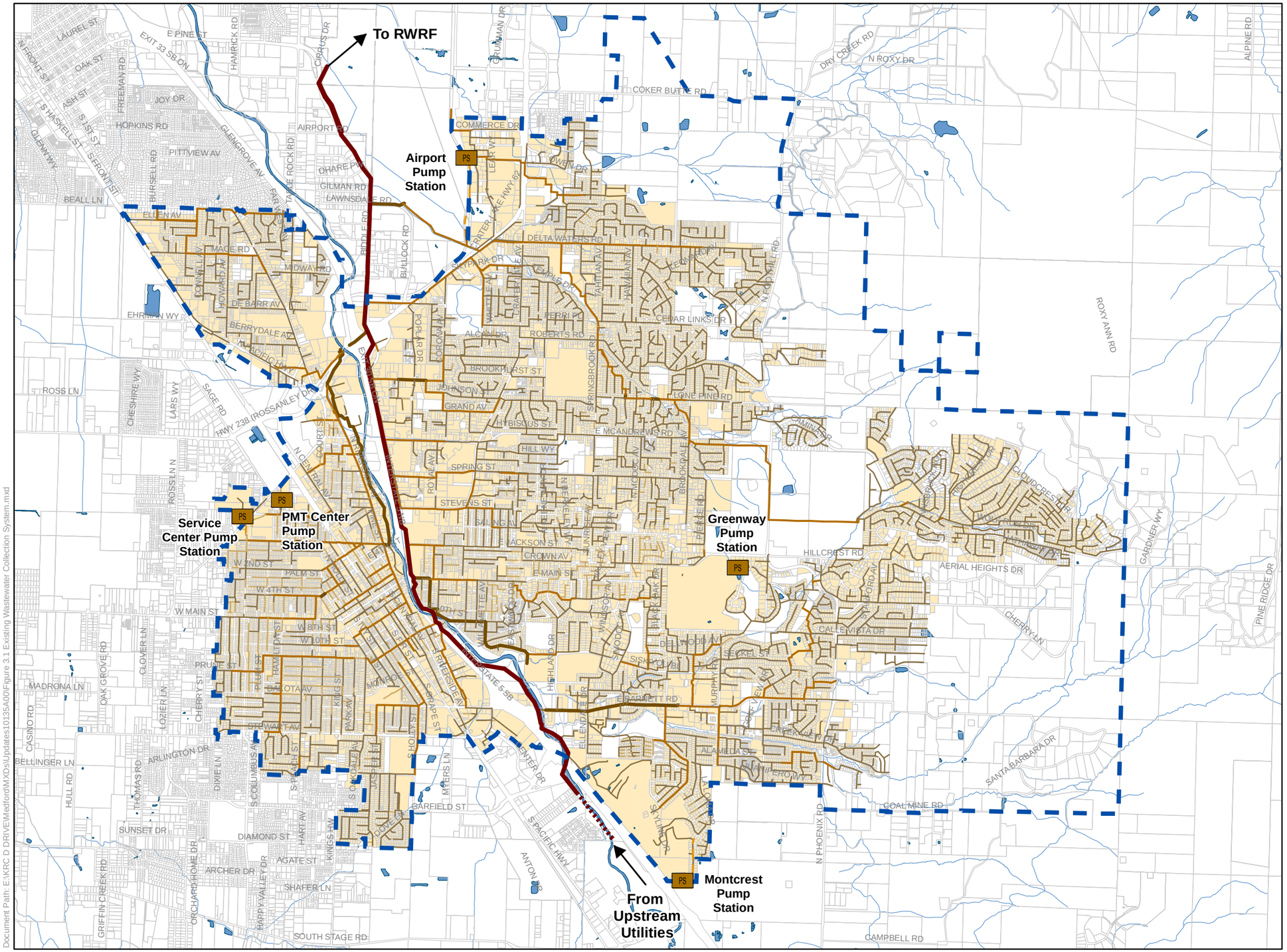
ES.4 HYDRAULIC MODEL DEVELOPMENT

Carollo assisted the City to convert its previous collection system hydraulic model to a new software platform. Innovyze’s InfoSWMM was selected and was developed using all pipes 6-inches in diameter and larger and the RVS interceptor. The modeled sewer system consists of approximately 266 miles of sanitary sewer pipelines (including both gravity, force mains, and a portion of the RVS Interceptor) ranging in diameter from 6 inches to 54 inches, 5 city-owned sanitary sewer pump stations, 35 diversions, and 2 siphons.

Baseline wastewater flows were assigned in the hydraulic model based on land use data and wastewater flow coefficients. As described in Chapter 4, calibration of the City’s hydraulic model was a multi-step process that involved comparing model-simulated flow to the actual field-measured data for both dry and wet weather conditions. Results indicated that the model correlated well with the field-measured data, meeting industry calibration standards. The City can be confident in their new calibrated model to serve as a useful tool for evaluating the collection system.

The SSMP is a living document, and will allow for amendments as conditions change. The City has flexibility to respond to opportunities as they present. The City anticipates that updates to the model will be done at 10-year intervals. The City may, as resources and funding permit, update the model to show changes and modifications more frequently.

A change log shall be maintained on the City website for all capacity related improvements. Developer's consultants are encouraged to model the City sewer system (or a portion of) using any industry standard software available, using parameters set forth in this SSMP. The consultant may consider alternative flow routing across basins where consistent with the City ordinance for orderly development. Where the City finds that criteria is met, modeling is accurate, and there are no negative consequences, the consultants work will be accepted as an amendment to the SSMP.



Legend

Sewer Gravity Main by Diameter

- > 18"
- 10 - 18"
- 8"
- < 8"
- Sewer Force Main
- Sewer Gravity Interceptor
- Service Area
- Currently Developed and Connected Parcels
- Taxlots
- Pump Station
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

Feet
0 4,000

EXISTING WASTEWATER COLLECTION SYSTEM

FIGURE ES.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates10135A00\Figure 3.1 Existing Wastewater Collection System.mxd

ES.5 CAPACITY EVALUATION AND PROPOSED IMPROVEMENTS

Using the calibrated hydraulic model, Carollo evaluated the capacity of the City's collection system against the performance criteria developed for this SSMP. An existing sewer was identified as deficient when the Hydraulic Grade Line (HGL) exceeded three feet below the manhole rim or surcharging occurred in shallow manholes (d/D>1).

Several pockets of deficiencies are predicted in the model. Existing deficiencies, largely due to high I/I, are mainly predicted in sewer Basins C, D, L, M, and N. Additional projected flows from new development intensify the capacity issues, exacerbating existing deficiencies and adding new deficiencies in Basins A, B, E, and J. Deficiencies observed in Basins A and J are mainly caused by the addition of flows from the expansion areas east of the system.

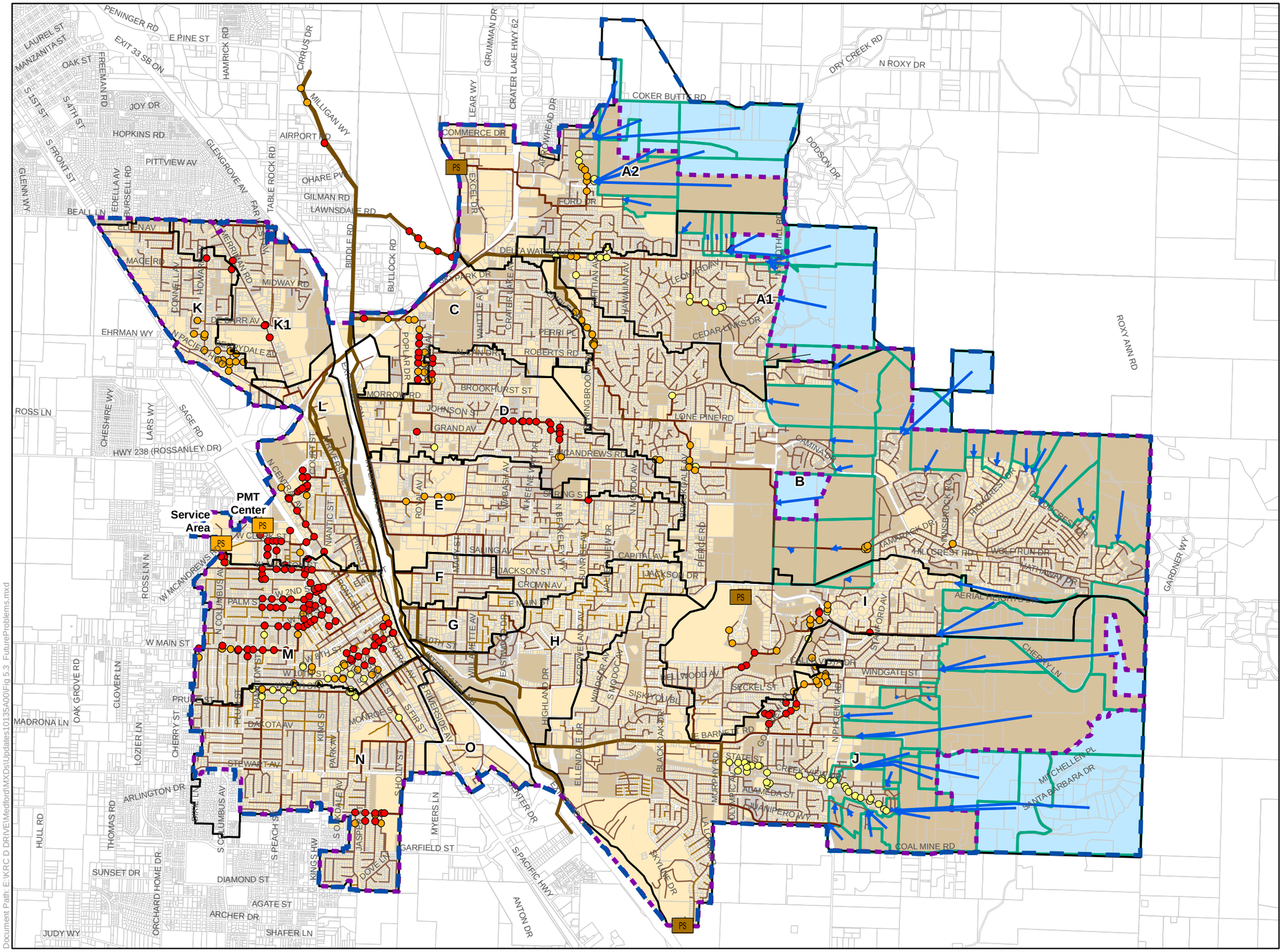
Figure ES.3 presents the deficiencies under PWWF conditions and are color coded to match the timing of the deficiency. Red dots represent existing system deficiencies, orange and yellow represent predicted new deficiencies associated with 2036 and build-out development, respectively.

A total of 74,500 linear feet of pipes ranging from 12-inch to 24-inch are recommended to alleviate capacity deficiencies for the City's three planning conditions (existing, 2036 Service Area, and Service Area). Two of the five City pump stations (PS) only have one pump and even though each pump has sufficient capacity, they should be upgraded in the future to meet redundancy criteria. Table ES.2 summarizes all recommended improvement projects by phase. The recommended improvements are further described in Chapter 5 – Capacity Evaluation, and cost estimates are provided for each project in Chapter 7 – CIP. This Plan assumes the entire Service Area will be build-out, the improvements summarized in the table below are therefore planned for build-out condition.

Table ES.2 Improvement Projects Summary
Sanitary Sewer Master Plan
City of Medford

Proposed Project	Short-Term	Mid-Term	Long-Term
Existing Pipe Upsize	34,501 ft	22,955 ft	17,009 ft
New Sewer for Expansion Areas	-	16,800(1) ft	9,100 ft (2)
PMT PS		X	
Service Center PS		X	

Note:
(1) Includes the recommended developer's driven "expansion" sewers located in the 2036 Service Area.
(2) Includes the recommended developer's driven "expansion" sewers located in the Service Area and Urban Reserves.



Legend

- Existing Deficiencies
- 2036 Deficiencies
- URA Deficiencies
- Pump Station
- Mid-Term Pump Station

Modeled Sewer Pipeline

- > 18"
- 10" - 18"
- 8" - 10"
- < 8"
- Service Area
- 2036 Service Area
- Sanitary Sewer Basin
- Parcel Contributing to Existing System
- Expansion Areas
- Taxlots
- Currently Developed and Connected Parcels
- Urban Reserves
- 2036 Parcels

N

Feet

0 2,000 4,000

POTENTIAL PROBLEM AREAS AND DEFICIENCIES

FIGURE ES.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

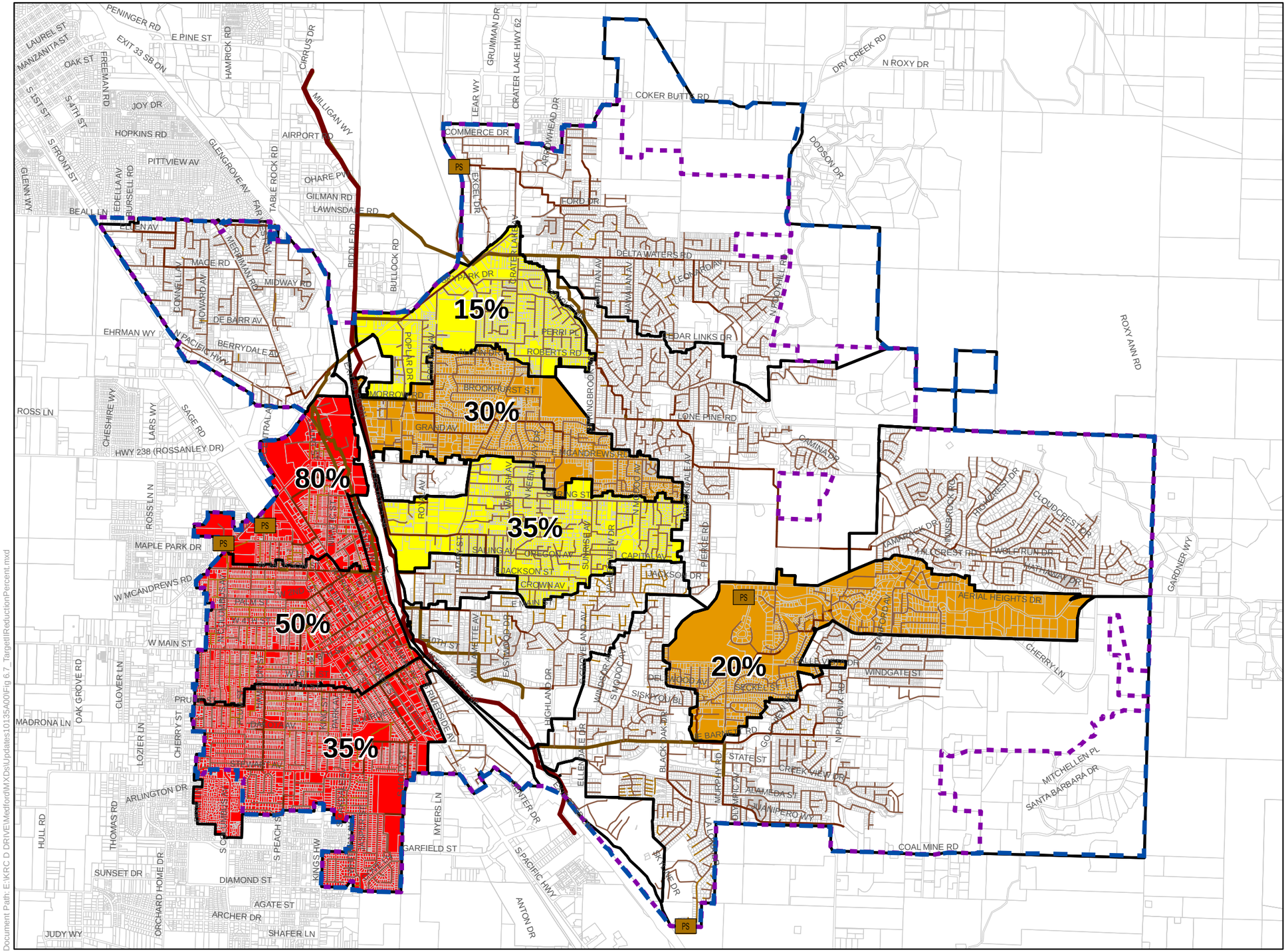
CITY OF MEDFORD OREGON

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Fig 5.3_FutureProblems.mxd

ES.6 I/I REDUCTION PROGRAM

Infiltration and inflow (I/I) are known problems for the City's sewer system. The City has investigated causes of these flows to the sewer system since the 1960's and has actively removed direct connections over time. High I/I indicates aging infrastructure, and potential storm drains directly connected to the sewer system, and results in higher peak flows at the City's pump stations, the RVS interceptor, and at the City's RWRF. The City's hydraulic model predicts moderately high I/I in several City basins, particularly the downtown area. These results are confirmed by City staff. However, overall the City's I/I is not as high as other sewer agencies in the state. Cost estimates were developed for an I/I reduction program that offsets the need for the capacity improvement projects identified in Chapter 5. Figure ES.4 illustrates the location and I/I reduction target values for the basins included in the I/I Reduction Program. The cost estimates rely heavily on the estimated I/I reduction through various techniques as published by King County, Washington.

Given the assumptions for costs and the effectiveness of I/I reduction techniques, a system-wide I/I reduction program was estimated to cost approximately $91M. In contrast, pipe capacity projects to accommodate I/I were estimated to be far less expensive, thus performing a system-wide I/I reduction program is not recommended at this time. The City plans to continue to investigate I/I issues in the downtown area (Basins L and M). The City also plans to continue annual maintenance projects that improve sewer pipe integrity and result in lower I/I. It is further recommended that the City determine a method to implement its policy for private property owners to maintain their sewer laterals, which are known to be high contributors of I/I.



Legend

- Service Area
- 2036 Service Area
- Pump Station
- Sewer Gravity Interceptor

Modeled Sewer Pipeline

- > 18"
- 10" - 18"
- 8" - 10"
- < 8"
- Taxlots

I/I Reduction Targets

- Priority A
- Priority B
- Priority C
- Calibration Basin

N

0 — 4,000 Feet

TARGET I/I REDUCTION PERCENTAGES

FIGURE ES.4

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

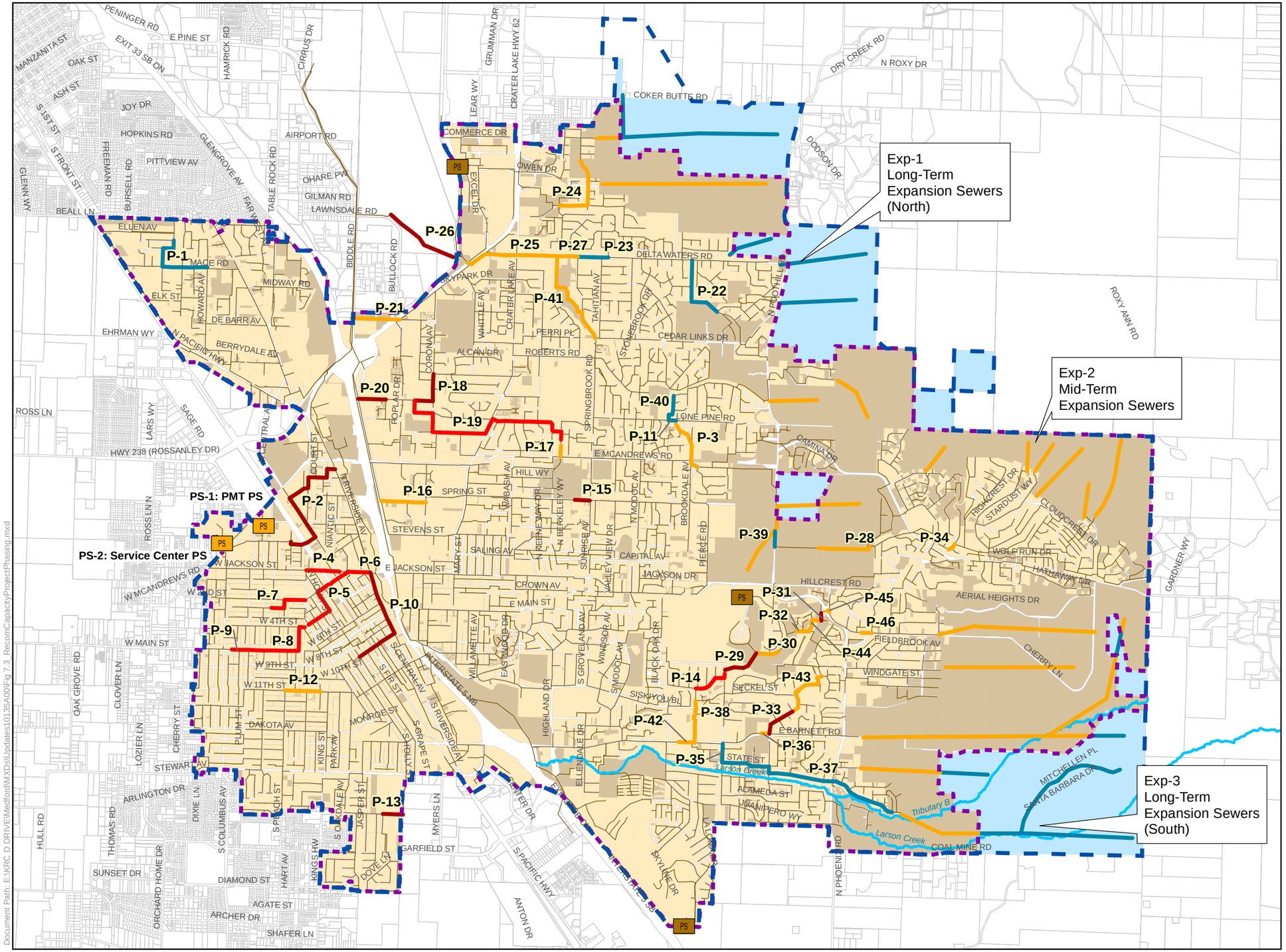
ES.7 CAPITAL IMPROVEMENT PLAN

The necessary pipeline, and other general projects are compiled into a comprehensive capital improvement plan (CIP) for the sewer system. The purpose of the CIP is to provide the City with a guideline for planning and budgeting its sewer system. The CIP consists of schedule and cost estimates for the recommended improvements. The CIP is separated into four phases:

- Short-Term (ST) Priority 1 (2017-2022). Proposed projects recommended to alleviate deficiencies under existing conditions. These projects commonly have structural deficiencies and high inflow and infiltration (I/I), and were prioritized by City staff due to these known issues. Timing for these projects is planned between 2017 and 2022. These are the high priority projects/programs that the City plans to implement in the next five years.
- Short-Term (ST) Priority 2 (2017-2026). Proposed projects recommended to alleviate deficiencies under existing conditions. Structural deficiencies and high I/I are present, but these projects were not as critical to the City as the Priority 1 projects. Timing for these projects is planned between 2017 and 2026.
- Mid-Term (MT) (2027- 2036). Proposed projects recommended to alleviate deficiencies and serve new development by planning year 2036 (in the Urban Growth Area), and medium priority for I/I reduction. These projects are mostly development driven and could be implemented earlier or later based on developer's needs. It is recommended that the City monitors these areas and implement these projects as growth occurs.
- Long-Term (LT) (2037-2040). Proposed projects recommended to alleviate deficiencies and serve new development under build-out conditions (in the Urban Reserves), and low priority for I/I reduction. It is recommended that the City monitors these areas and implement these projects as growth occurs. These are estimated based on how the City is expecting to develop in the next 25 years and accommodates all future growth areas identified by the City; timing may be adjusted with growth.

A map of pipeline replacement projects is presented in Figure ES.5.

The proposed CIP for the City's SSMP is presented in Table ES.3. The table includes the un-escalated estimated costs for pipe, pump station, and general projects and allocates the projects by phase based on their priority. As seen in the table, the total cost for all recommended improvement projects is $31.4 M. Annually, this can be expressed as approximately $1.3 M per year. The majority of costs are recommended for the Short- and Mid-Terms. Approximately $15.6 M of the total CIP is for future development and is System Development Charge (SDC) eligible. Financial only looks at the SDS eligibility in the next 20 years.



RECOMMENDED CAPACITY PROJECTS PHASING

FIGURE ES.5

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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Table ES.3 Capital Improvement Plan
Sanitary Sewer Master Plan
City of Medford

Project ID	Improvement Type	Description	Total Capital Improvement Cost(1)	Total Short-Term Priority 1 (2017-2021)	Total Short-Term Priority 2 (2017-2026)	Mid-Term (2027-2036)	Long-Term (2037 – Build-Out)	SDC Allocation	
								SDC Eligibility (%)	SDC Eligibility ($)
PIPE PROJECTS									
P-1 to P-46	**Gravity**	Improvement and Capacity-Related Pipe Projects	$ 29,894,000	$ 6,569,000	$ 6,895,000	$ 11,285,000	$ 5,145,000	49	$ 14,444,000
Exp-1	**Expansion**	Alternative 2 - "Regional Sewers" to Expansion Areas	$ 25,000	$ –	$ –		$ 25,000	100	$ 25,000
Exp-2	**Expansion**	Alternative 2 - Expansion pipes above 8-inch in diameter. 8-inch pipes are paid for by developers.	$ 100,000	$ –	$ –	$ 100,000	$ –	100	$ 100,000
Exp-3	**Expansion**	Alternative 2 - Expansion pipes above 8-inch in diameter. 8-inch pipes are paid for by developers.	$ 25,000	$ –	$ –	$ –	$ 25,000	100	$ 25,000
TOTAL PIPE PROJECTS			**$ 30,044,000**	**$ 6,569,000**	**$ 6,895,000**	**$ 11,385,000**	**$ 5,195,000**	**54**	**$ 14,594,000**
PUMP STATION PROJECTS									
PS-1	Pump Station	PMT Pump Station - 1024 Summit Ave. (No redundant pump)	$ 50,000	$ –	$ –	$ 50,000	$ –	0	$ –
PS-2	Pump Station	Service Center Pump Station - 821 Columbus Ave. (No redundant pump)	$ 50,000	$ –	$ –	$ 50,000	$ –	0	$ –
TOTAL PUMP STATION PROJECTS			**$ 100,000**	**$ –**	**$ –**	**$ 100,000**	**$ –**		**$ –**
GENERAL PROJECTS									
G-1	General	I/I Reduction Program - Basin M	$ 675,000	$ 675,000	$ –	$ –	$ –	100	$ 675,000
G-2	General	Master Plan Updates	$ 300,000	$ –	$ –	$ 300,000	$ –	50	$ 150,000
G-3	General	Master Plan Updates	$ 300,000	$ –	$ –	$ –	$ 300,000	50	$ 150,000
TOTAL GENERAL PROJECTS			**$ 1,275,000**	**$ 675,000**	**$ –**	**$ 300,000**	**$ 300,000**		**$ 975,000**
TOTAL ($)			**$ 31,419,000**	**$ 7,244,000**	**$ 6,895,000**	**$ 11,785,000**	**$ 5,495,000**		**$ 15,569,000**
Total Annual ($/year)			**$ 1,309,125**	**$ 1,207,333**	**$ 1,723,750**	**$ 1,178,500**	**$ 1,373,750**		

ES.8 FINANCIAL ANALYSIS

The last chapter of the SSMP assesses the City's ability to fund the CIP, and includes a financial status of the sewer utility, funding required to finance the scheduled improvements, updating the system development charges (SDC), potential funding sources, and the impacts of sanitary sewer improvements on sewer rates.

Given historical revenue and expenses, the City has maintained an adequate amount of revenue from sanitary sewer fees to cover their operating and capital expenses, and the City maintains a no-debt policy. The City's current sewer system development charges are well below the average SDC when compared to other Oregon cities, and are proposed to increase to $1,030 or $1,036 per Equivalent Residential Unit (ERU), depending on funding options for the EXP projects. The proposed increase would increase the City's SDC revenue and, assuming the annual growth continues, would help reduce rate increases beyond Fiscal Year (FY) 2027.

The City's sanitary sewer utility would have sufficient funds for the recommended CIP provided the City consider reasonable rate increases and, if necessary, issuing debt. The options given in Chapter 8 show a strong analysis in the short-term, as the City is more confident with the priority of the projects and assumed growth. As the analysis goes beyond the ten-year period, the assumptions become more unpredictable as the City's growth and CIP tend to be adjusted. The recommended CIP in Chapter 7 was adjusted to delay some projects in order to maintain lower, more consistent rate increases. This revised CIP to meet funding goals is shown in Chapter 8. It is recommended to conduct a more in-depth rate study and cost of service study in the near future that will help the City understand the financial impacts and the suggestions identified herein.

INTRODUCTION

1.1 INTRODUCTION

The City of Medford (City) has prepared this Sanitary Sewer Master Plan (SSMP) to document the status of the City's sewer system and analyze the system to anticipate future needs. In order to provide effective, reliable, and safe sewer service, this SSMP will be used as a guide for operation, maintenance, and expansion of the sewer system for the next 20 years and beyond.

Recognizing the importance of planning, developing, and financing sewer system facilities to provide reliable service for the existing customers and to serve anticipated growth, the City initiated the preparation of this Plan. In 2015, the City selected Carollo Engineers, Inc. and ADS Environmental Services, LLC to develop this Sanitary Sewer Master Plan in accordance with applicable rules and regulations governing planning for wastewater utility systems.

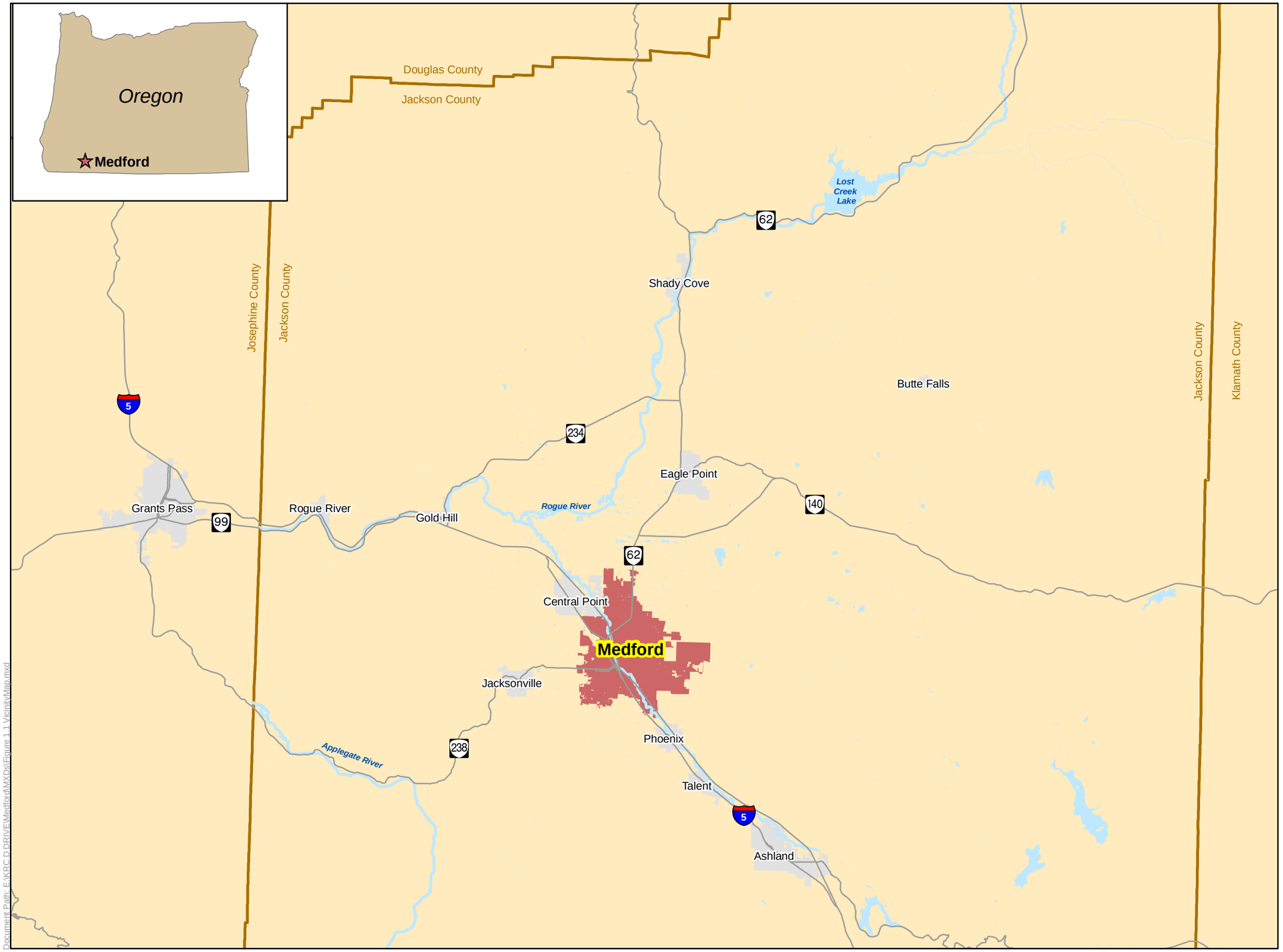
This chapter presents the objectives of this SSMP, and a brief overview of the City's wastewater collection system. A list of abbreviations is provided in the Table of Contents to assist the reader in understanding the information presented in this SSMP.

1.2 BACKGROUND AND REFERENCE MATERIALS

The City of Medford is located along Bear Creek in Jackson County, Oregon, approximately 280 miles south of the City of Portland. Figure 1.1 illustrates the location of the City of Medford. The City owns and operates most of the sewer collection system within the City limits and the Regional Water Reclamation Facility (RWRF), which receives and treats wastewater from most of the Rogue Valley. The City collects wastewater from residential, commercial, and industrial customers within the Service Area, described in Chapter 2.

The following documents were referenced in the preparation of this Sanitary Sewer Master Plan:

- City of Medford 2005 Sanitary Sewer Master Plan, Brown and Caldwell, 2005
- City of Medford Comprehensive Land Use Plan, January 2016.



Legend

- City of Medford
- Urban Areas
- Major Highways
- County Boundaries
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

Miles
0 5

CITY OF MEDFORD VICINITY MAP

FIGURE 1.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

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1.3 OBJECTIVES

The major objectives of this SSMP are to identify capacity deficiencies in the wastewater collection system, develop feasible alternatives to correct these deficiencies, and plan the infrastructure that will serve future development. The City's last wastewater master plan was completed in 2005.

The original goals set for this plan are as follows:

- Perform flow monitoring of critical sewer basins, resulting in clear base flows, peak flows, inflow and infiltration (I/I) flow rates;
- Update flow projections that consider infill, redevelopment, and expansion areas;
- Update the sewer model to meet calibration standards and be exported for use by the City for future evaluations;
- Develop an I/I Reduction Plan that guides the City on where to focus I/I reduction efforts that will offset downstream capacity improvements;
- Develop a plan for serving development of remaining undeveloped lands in the Study Area, which are mainly in the southeast of the City, such as diverting flows to an interceptor;
- Develop a financially constrained Capital Improvement Plan that prioritizes all projects including those for improving capacity, repairs, and I/I reduction;
- Prepare defensible sewer rates and System Development Charge (SDC)s that ensure growth pays for growth;
- Provide a comprehensive Sanitary Sewer Master Plan that provides a clear strategy for managing the City's investment in its sewer infrastructure.

1.4 SSMP PURPOSE AND USE

This SSMP is a planning level document utilizing the best practices in the industry. The City's sewer collection system contains over 7,000 individual pipe segments. This SSMP was assembled using flow monitoring data from 12 basins, and models almost all the individual pipes in the City' service area, but is limited in specificity to generally accepted modeling assumptions. The engineer may rely on the data and capacities within the SSMP until such time as the City updates its SSMP as better and even more accurate information becomes available. Note, this SSMP has been developed using "n" values varying from 0.011 to 0.016 depending on model calibration considerations (see Chapter 4). When an engineer would like to perform modeling of a specific location, the City will allow an n value of 0.013 for PVC and 0.015 for other pipe materials. Where the City or an engineer can show data to justify lower n values, the City will consider allowing the lower value be used for a study.

The SSMP is a living document, and will allow for amendment as conditions change. The City has flexibility to respond to opportunities as they present. The City anticipates that updates to the model will be done at 10-year intervals. The City may, as resources and funding permits, update the model to show changes and modifications more frequently. A change log shall be maintained on the City website for all capacity related improvements.

Developer's consultants are encouraged to model the City sewer system (or a portion of) using any industry standard software available, using parameters set forth in this SSMP. The consultant may consider alternative flow routing across basins where consistent with the City ordinance for orderly development. Where the City finds that criteria is met, modeling is accurate, and there are no negative consequences, the consultants work will be accepted as an amendment to the SSMP.

1.5 REPORT ORGANIZATION

The SSMP report contains eight chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 – Introduction: This chapter presents the need for this Plan and the objectives of the study. Lists of abbreviations and reference materials are also provided to assist the reader in understanding the information presented.

Chapter 2 - Basis of Planning: This chapter presents the policies for ownership, operations, and maintenance of the collection system. It also reviews the criteria for evaluating the wastewater collection system. This chapter also presents a description of the study area, defines the planning horizon for this study, and summarizes the land use classifications. Lastly, this chapter summarizes the methodology and results for estimating existing and future sanitary sewer flows resulting from the flow monitoring program.

Chapter 3 – Existing System: This chapter describes the existing wastewater collection system.

Chapter 4 – Hydraulic Model Development: This chapter describes the development and calibration of the City's wastewater collection system hydraulic model.

Chapter 5 – Capacity Evaluation: This chapter discusses hydraulic evaluation of the wastewater collection system.

Chapter 6 – Infiltration & Inflow Reduction Program: This chapter presents the estimated inflow and infiltration in the system and evaluates the costs of implementing an inflow and infiltration reduction program to offset capacity improvements.

Chapter 7 – Capital Improvement Plan: This chapter presents the capital improvement projects, cost estimates, project timing. This chapter is organized to assist the City in making financial decisions.

Chapter 8 – Financial Analysis: This chapter presents recommendations for financing requirements that are necessary to implement the CIP.

1.6 ACKNOWLEDGMENTS

Carollo Engineers, Inc. and their team member, including ADS Environmental Services, LLC, would like to acknowledge and thank the following individuals for their efforts and assistance in completing this SSMP. Their cooperation and courtesy in obtaining a variety of necessary information were valuable components in completing and producing this report:

- Roger E. Thom, City of Medford Utility Manager, Project Manager
- Alex Georgevitch, City of Medford Deputy Public Works Director/City Engineer
- Cory Crebbin, City of Medford Public Works Director
- Lorraine Peterson, City of Medford Public Works Business Manager
- Patrick Percey, City of Medford Public Works
- Jeff Farschon, City of Medford Public Works
- Richard D. Agee, City of Medford Mapping and Records Coordinator
- Andrew Hislop, City of Medford Public Works
- Mike Pina, ADS Environmental Services, LLC Project Manager
- Daniel Sinkovich, ADS Environmental Services, LLC Field Manager
- Kristen Daye, ADS Environmental Services, LLC Data Manager
- Lara Kammereck, Carollo Engineers, Inc., Principal-in-Charge
- Rachel Lanigan, Carollo Engineers, Inc., Project Manager
- Aurelie Nabonnand, Carollo Engineers, Inc., Project Engineer
- Kevin Tice, Carollo Engineers, Inc., Financial Analyst
- Dan Vizzini, Carollo Engineers, Inc., Financial Analyst
- Karen Hooge, Carollo Engineers, Inc., Document Processor
- Jackie Silber, Carollo Engineers, Inc., GIS Analyst

Chapter 2

BASIS OF PLANNING

2.1 INTRODUCTION

This chapter provides an overview of the planning elements required for evaluating the City's sanitary sewer system. It serves as the framework on which to evaluate future growth and estimate system capacity, ultimately leading to an updated Capital Improvement Plan as part of the Sanitary Sewer Master Plan (SSMP). This basis of planning includes information regarding the sewer service area's history and physical characteristics, a review of the policies in place to guide the management and extension of the system, and current and future flow projections. The flow monitoring program performed by ADS Environmental Services, LLC (ADS) and the resulting flow calculations used to model the existing and future sewer system are also summarized herein.

2.2 POLICIES AND CRITERIA

The City is responsible for managing and operating its sewer system in accordance with local, state, and federal regulations. To best manage the sewer system and comply with regulations, the City has adopted sewer system policies and criteria. These policies guide the development and financing of the infrastructure required to provide sewer service, and document the City’s commitments to current sewer system customers as well as those considering service from the City.

The City's overall level of service goals are as follows (as updated from the 2005 SSMP):

- The City shall efficiently convey sanitary flows in a manner that protects the safety and health of the public, and the environment.
- Sanitary sewer overflows (SSOs), backups, and other service interruptions are to be prevented during the design storm.

Carollo performed a high-level review of the City's existing policies against similar policies developed for other wastewater agencies to identify potential missing policies or clarifications to better meet the City's current sewer management needs. While not comprehensive, this review provides recommended direction for future policy revisions. Recommended changes and additions to the policies were discussed with City staff and are included in the tables below. Where applicable, the recommendations include suggested language from other wastewater agencies; the suggested language should be further reviewed, refined, and approved by appropriate means to supplement or change existing policies.

The policy tables are organized into subject categories as listed below. The policies within the tables are organized according to subject.

- Table 2.1 – Service Policies & Extensions
- Table 2.2 – System Reliability
- Table 2.3 – Environmental Policies
- Table 2.4 – Coordination with Other Agencies
- Table 2.5 – Financial Policies
- Table 2.6 – Design Policies & Criteria

Existing policies listed in the tables were compiled from the following sources:

- 2005 Sanitary Sewer Master Plan (2005 SSMP)
- 2016 Comprehensive Plan
- City of Medford Municipal Code
- City of Medford Public Works Engineering Design Standards for Public Improvements (EDSPI)

In general the City has comprehensive policies covering the requirements of sewer service connections. Carollo's recommendations are to review the requirements of sewer extensions and annexation requirements in more detail, and to clarify connection versus inspection fees.

Table 2.1 Service Policies and Extensions
Sanitary Sewer Master Plan
City of Medford

Subject	Policy
Public Service	The city shall assure that development is guided and supported by appropriate types and levels of urban facilities and services, provided in a timely, orderly, and efficient arrangement. **Policy 1-A:** The City of Medford shall provide, where feasible and as sufficient funds are available from public or private sources, water service, sanitary sewers, stormwater management facilities, fire and emergency services, law enforcement, parks and recreation, planning, zoning, and subdivision control. **Policy 1-B:** The City of Medford shall encourage other agencies that are responsible for the planning and/or provision of public facilities and services within Medford to coordinate public facility planning consistent with Medford's Comprehensive Plan. **Policy 1-C:** The City of Medford shall acknowledge its role as the principal provider of urban services within the City, and shall plan a phased improvement program that meets the service needs of individual areas of the City.
General Land Use Plan	The city shall assure that General Land Use Plan (GLUP) designations and the development approval process remain consistent with the City of Medford's ability to provide adequate levels of essential public facilities and services. **Policy 2-A**: In cases where the timely provision of essential urban facilities and services cannot be accomplished so as to achieve minimum adequate service levels, that portion of the Medford urban growth area subject to inadequate services shall be designated a limited service area, and any or all development may be restricted until threshold levels of essential services can be achieved. A determination of minimum adequate service levels for essential urban facilities and services shall be based on the following: Sanitary Sewers - Sufficient to serve any proposed development consistent with the General Land Use Plan (GLUP) designation. Sanitary sewer facilities shall be considered adequate if they are consistent with the adopted sewer plan document, as interpreted by the City Engineer. Domestic Water - Sufficient to serve any proposed development with a permanent urban domestic water system capable of supplying minimum pressure and volume for projected domestic and fire control needs consistent with the General Land Use Plan (GLUP) designation. **Policy 2-B**: The City of Medford shall strive to ensure that new development does not create public facility demands that diminish the quality of services to current residences and businesses below established minimum levels. • Develop thresholds and performance criteria for use in development review to gauge ability of public services to sustain growth. • Coordinate capital improvement planning for public facility infrastructure with the direction, extent, and timing of growth. • Establish equitable methods for distributing development costs associated with providing water, sanitary sewer, and stormwater management services and facilities. • Continue to require annexation to the City as a condition of extending urban services.
Service Responsibility in the Urban Reserve	There will be no provision of these services in the UR until City and/or Rogue Valley Sewer (RVSS) services are available consistent with the provisions of Statewide Planning Goal 11, its implementing regulations, and the regulations of the respective sanitary sewer service provider. Subsequent to annexation, City may require hook-up, per City standards, to sanitary sewer services. Nothing in this provision shall limit the ability of individuals to provide individual services, under provisions of applicable State and local law(s), on their own private property within the Urban Reserve. County has no sanitary sewer service responsibilities.
Sewer Connections - Definitions	As used in Section 4.305 to 4.425, unless the context otherwise requires, the following words and phrases shall mean: 1) Sewer System: The sanitary sewer system of the city. 2) House Sewer: The sewer service line from a building to the point of connection with the sewer main or trunk lateral sewer.

Table 2.1	**Service Policies and Extensions Sanitary Sewer Master Plan City of Medford**
Subject	**Policy**
Sewer Connections - Sewers in Public Streets	That part of the house sewer connection within a street, from the sewer main to the street right-of-way line, shall be constructed under the direction of the city manager and shall become a part of the city sewer system; provided, however, that the owner/user shall be responsible for maintaining the house sewer connection from the house or other building to the point of connection with the sewer main.
Sewer Connections - Authorization	No person, other than a person authorized by the city manager or authorized under the city and state law licensing plumbers, shall connect a house sewer to the sewer system.
Sewer Connections	Subject to the provisions of Sections 4.310 to 4.355, a person desiring to connect property which abuts upon a public sewer of the city, with the city sewer system, may have the property connected to the sewer upon application to the city manager for a permit and payment to the city of the fees provided for in Section 4.400.
Sewer Connections - Inside City Limits	No sewer permits shall be issued or connection allowed for property located inside the city but not located or abutting on a street or alley having a trunk lateral sewer.
Sewer Connections - Outside City Limits	No sewer permit shall be issued or sewer connection allowed for property located outside the city limits without city council approval. Such approval may be given under the following circumstances: 1) Where there are prior city commitments made during negotiations for right-of-way acquisition. 2) When required by the Camp White Trunk Line Agreement of March 3, 1969. 3) Upon request of a homeowner when the following findings are made: a) Service could be provided in a logical and efficient manner by connection to the city system. b) Service could be for the benefit of a dwelling unit located within the Urban Growth Boundary which existed in that location prior to September 30, 1978. c) A "danger to public health," as defined in ORS 222.850, has been verified. d) There is no other reasonable solution which would serve to alleviate the danger to public health. e) There is a demonstrable reason why such property cannot be immediately annexed to the city. 4) Upon request by Rogue Valley Sewer Services for the purpose of providing service to property within the boundaries of RVSS when: a) Such service cannot be efficiently provided by RVSS. b) Service can be efficiently provided by the city. c) Such property lies within the Urban Growth Boundary. d) There is a demonstrable reason why such property cannot be annexed to the city. Unless required by the Camp White Trunk Line Agreement, no extension of sewer service outside the city limits shall be made until and unless the recipient property owner agrees in writing to the annexation of the subject property to the City of Medford at such time as the city shall determine that such annexation is in the best interests of the city. Such consent to annex shall be an irrevocable covenant running with the title to the land and shall be binding upon all heirs and assigns.
Annexations	Unincorporated property shall be required to annex prior to the receipt of City sanitary sewer service, or as set forth below: Each of the following conditions must be met to provide unincorporated property with City sanitary sewer service prior to annexation: 1) The property shall be located within the Urban Growth Boundary; 2) Existing sanitary sewer line operated by the City to which connection can be made in accordance with subsection (4) below is within 300 feet of the property; 3) The County has found that the septic system serving the property is failing and the County has directed connection to a sanitary sewer system; 4) The extension of a sanitary sewer line to be connected to the City sanitary sewer line shall be subject to acceptance of an approved plan by the City Engineer.
Sewer Study For Oversizing	A sanitary sewer study will be required when an 8-inch diameter gravity sewer is inadequate to serve the current or future development or when the City Engineer determines that a recently annexed area situated outside the limits of the currently adopted SSMP warrants a study. The study shall

Table 2.1	**Service Policies and Extensions Sanitary Sewer Master Plan City of Medford**
Subject	**Policy**
	incorporate the proposed design system including features as the pipe slope, cover, and size; the study shall include, but not be limited to, a detailed map of the sanitary sewer service, sewage flow calculations, and pipe hydraulic calculations. Sanitary sewer design criteria are included in the Appendices, Part II - Design.
Oversizing Pipes	When land outside a new development will logically direct flow into a storm drain or sanitary sewer within the new development, the system shall be “public” and shall be extended to one or more of the upstream development boundaries. The pipes shall be sized to accommodate all off-site flows, based on a fully developed condition using the current Comprehensive Plan.
Sewer Connections - Between Premises	No person shall connect a sewer located on property described in the application required under Section 4.305 with a house sewer located on other premises.
Sewer Connections - Disconnection of Private Connections	**Action Item: Review language for current applicability.** The city official charged with the supervision of the sewers shall disconnect any private connection with any trunk or lateral sewers from any property in the city not located or abutting on a street having a trunk or lateral sewer, when in the judgment of the council it is deemed advisable in order to give the property owners abutting on any trunk or lateral sewer the reasonable or necessary use of the sewer installed for their use or benefit.
Sewer Connections - Unauthorized Connections	**Action Item: Review swimming pool water discharges for inclusion in this policy.** No person shall discharge or cause discharge of any storm water, surface water, ground water, roof run-off, sub-surface drainage, uncontaminated cooling water, swimming pool water or unpolluted industrial process water to any sanitary sewer.
Sewer Connections - Fees	**Action Item: Review language to clarify inspection fee versus system development charges; include reference to established system development charges.** 1) A person desiring to connect property which abuts upon a public sewer of the city with the city sewer system may have the property connected to the public sewer upon application to the City Engineer for a permit and payment to the City of the fees provided for in this section. 2) Where the sewer connection serving the property has previously been paid for by the owner or developer, a permit must be obtained but no fee shall be charged under subsection (3) of this section. 3) Except as provided in subsection (2) of this section, a person desiring to connect abutting property to a public sewer shall pay the appropriate connection fee provided in the most recent schedule approved by resolution of the City Council. The fee shall not exceed the average cost of inspecting the connections. 4) When a sanitary sewer, either trunk or lateral, is constructed by the city on a local assessment basis, and the cost thereof is determined, and it appears to the council that areas not included in the proposed assessment district may at some future date be connected to the sewer, the council, after considering the recommendation of the city manager, shall determine the amount which should be recovered from the unassessed area by fees in lieu of assessment calculated on the same basis as the assessments on property in the assessment district. The amount to be recovered by fees in lieu of assessment shall be deducted from the total amount to be assessed for the sewer. In order to obtain a permit for a sewer connection in the area designated as "in lieu of assessment," the applicant shall pay a fee equal to the amount that would have been assessed to a parcel of like dimension and nature within the original assessment district plus interest on that amount at the rate of five percent (5%) per annum compounded annually from the date of assessment to the date of permit application. Fees in lieu of assessment recovered under this Subsection (4) shall be applied to the reimbursement of public funds advanced for the cost of the sewer.

Table 2.1	**Service Policies and Extensions Sanitary Sewer Master Plan City of Medford**
Subject	**Policy**
Construction and Repair of On-Site Sewerage System	Except as provided in subsections (1) and (2) below, no person shall repair, replace or increase the capacity of an existing on-site sewerage system, nor construct a new on-site sewerage system in order to avoid connection to a public sewer collection system. 1) An existing on-site sewerage system may be repaired or replaced provided the building(s) served is more than 300 feet from a public sewer, measured by the shortest distance, or connection to a public sewer is physically impractical due to topographic or man-made features. 2) An on-site sewage system may be expanded, or a new system installed, provided the following conditions are met: a) The subject parcel is more than 300 feet from the nearest existing public sewer. b) No more than one single family residence exists or is proposed for the parcel. c) The new or expanded system receives approval from the Oregon Department of Environmental Quality and/or any other agencies with authority to regulate on-site sewerage systems. d) A financial guarantee is provided to the City in the amount of 125 percent of the City Engineer's estimate of the costs for extending a public sewer through the property. This guarantee must be accepted by the City prior to the issuance of any permits for the property. Said financial guarantee shall be held until one of the following conditions has been met: i) The public sewer improvements have been constructed by the property owner, at which time the guarantee may be released in whole or in part; ii) The required sewer improvements have been constructed as part of a Local Improvement District, in which case the deposit shall be applied to the proportional share of the property owner's obligation and the remainder, if any, returned. iii) The sewer improvements are constructed by the owner of the public sewer, in which case the guaranty shall be applied as a proportional share toward the necessary extension. If the subject property's proportional share of the improvement project is less than the amount of the guarantee, the difference shall be released. New development which does not meet the criteria of (1) and (2) above, including partitions or subdivisions on which there exists an existing septic system, are required to connect to the public sewer as described in Medford Municipal Code Chapter 10.
Sewers in Public Street	That part of the house sewer connection within a street, from the sewer main to the street right-of-way line, shall be constructed under the direction of the city manager and shall become a part of the city sewer system; provided, however, that the owner/user shall be responsible for maintaining the house sewer connection from the house or other building to the point of connection with the sewer main.
Sewer Drainage Basins	Each facility system serves different geographic sub-areas of the City. While facilities such as parks and schools relate more to neighborhoods defined by population size and travel time/distance, systems such as sewers, water, and storm water drainage are more logically defined by topography, soils, and other natural constraints. Such disparities can interfere with coordination of planning for public facilities, affecting different client populations. To help overcome these barriers, the "Public Facilities Element" is organized, where possible, in relation to a common set of geographic sub-areas. These sub-areas are the nine Drainage Basins as defined in the 1996 Comprehensive Medford Area Drainage Master Plan.

Table 2.2	System Reliability Sanitary Sewer Master Plan City of Medford
Subject	**Policy**
Security	The City shall make reasonable attempts to protect the security of its sewer collection system. The City shall determine what information about the system should remain unavailable to the general public.
Reliability	The City shall manage the sewer collection system through developing design standards, overseeing construction, operating, and maintaining the system such that service to areas in the Urban Services Boundary is adequate and reliable. Whenever possible, the City shall anticipate system interruptions, such as power outages, and design and operate the system to minimize the impact of such interruptions on its customers and the environment.
Facility Standards	Operate sewer collection facilities to meet or exceed federal, state, and local standards.
Maintenance	Unless specifically directed otherwise by the City, all facilities and equipment shall be maintained in accordance with manufacturers' specifications. The City adheres to maintenance and replacement schedules for all facilities and equipment.
Equipment Inventory	The City shall maintain a complete inventory of all City-owned equipment, supplies, parts, and service vehicles used for maintenance of sewer facilities. The inventory should include planned replacement dates as applicable.
Emergency Response Plan	On a regular basis, the City shall update an Emergency Response Plan that focuses on problems created by major disasters (such as earthquakes, floods, or windstorms). The plan should ensure that adequate emergency provisions and procedures are in place to provide sewer services to the extent possible during an emergency event.
Vulnerability Assessment & Hazard Mitigation Plan	The City shall prepare and maintain a Vulnerability Assessment & Hazard Mitigation Plan addressing risks associated with natural and human-made hazards on the sewer. The plan should identify how the public and environment may be damaged by such a hazard, and provide detailed procedures for responding to such an act to minimize harm to the public. The Vulnerability Assessment shall not be made available to the public.
FOG	The City shall develop and maintain a Fats, Oils, and Grease (FOG) Control Program to address excessive buildup of FOG in the sewer.

Table 2.3	Environmental Policies Sanitary Sewer Master Plan City of Medford
Subject	**Policy**
Sustainability	The City will manage the sewer collection system, including monitoring and adapting plans, policies, and practices to collect and convey wastewater from its customers in a safe and sustainable manner in accordance with the City's Environmental element of the Comprehensive Plan.
Waterways and Wetlands	Medford's waterways and wetlands are essential components of the urban landscape that improve water quality, sustain wildlife habitat, and provide open space. **Policy 6-A:** The City of Medford shall regulate land use activities and public improvements that could adversely impact waterways in the interest of preserving and enhancing such natural features to improve water quality and fish and wildlife habitat. **Policy 6-C:** The City of Medford shall encourage the incorporation of waterways, wetlands, and natural features into site design and operation of development projects. Promote clustered development in order to avoid alteration of topographical and natural features, to reduce impervious surfaces, and to enhance the aesthetics of development projects. Investigate incentives for clustering development. **Policy 6-D:** The City of Medford shall support the efforts of organizations such as the Bear Creek Watershed Council and the Bear Creek Greenway Foundation, which strive to improve the quality of Bear Creek and its tributaries with activities such as greenway formation, environmental education workshops, creek cleanup events, etc.
Overflows	The City has implemented programs to prevent overflows of wastewater in the existing system, and requires all new construction to convey peak flows and storm events without overflowing the sewer during the design storm event.
Infrastructure Siting	New wastewater infrastructure will be sited outside of stream corridors, wetlands, and significant tree groves whenever feasible.

Table 2.4	Coordination with Other Agencies Sanitary Sewer Master Plan City of Medford
Subject	**Policy**
General	The City shall support and participate in regional planning of sewer service with neighboring jurisdictions and sewer districts.
Planning & Regional Projects	The City shall work closely with adjacent jurisdictions to coordinate sewer service issues related to regional growth, regulatory requirements and changes, and opportunities for regional projects.

Table 2.5	Financial Policies Sanitary Sewer Master Plan City of Medford
Subject	**Policy**
SDC Methodology	**Action Item: Update Sewer Master Plan reference data upon completion of this Plan.** The methodology of the SCSDC (Sewer Collection System Development Charge) is based on future capacity-increasing capital improvements as identified in the City's Capital Improvement Plan for the Sanitary Sewer Collection System Development Charge Fund, and on planning criteria as identified in the report entitled "City of Medford Sewer Master Plan" dated April 2005 and prepared by Brown and Caldwell Consulting Engineers.
Future Costs	**Action Item: Confirm definition is still accurate during financial analysis.** The projected cost of future system additions shall be determined on the basis of the capital improvements identified in the "City of Medford Sewer Master Plan." The future system additions required to serve growth will be adjusted to current dollars and divided by the number of ERU's for which these improvements will provide service. The future costs of compliance with Oregon law in the determination of SDC's shall include the estimated cost of engineering, legal, planning, administrative and accounting services. Compliance costs per ERU shall be determined on the basis of projected population growth. The calculations shall be done on a city-wide basis so that the charge reflects the cost per ERU throughout the City. The charge for future system addition and compliance costs shall be designated an improvement fee.

Table 2.6	Design Policies and Criteria Sanitary Sewer Master Plan City of Medford
Subject	**Policy**
City Standards	**Action Item: Update sewer flow from ERU method to flow factors in gpd/acre method.** All sanitary sewers and appurtenant structures shall be designed and constructed in conformance with the Engineering Design Standards for Public Improvements (EDSPI), developed jointly by the City of Medford and the City of Ashland to be used for the design of public improvements. Adopted by Medford City Council in December 2004. The current design criteria utilized by the Regional Wastewater Treatment Plant in the determination of equivalent residential units (ERU's) and as specified in the engineering report is 350-gallons/day/ERU average dry weather flow (ADWF). Sanitary flows should be determined using the flow factors in gpd/acre in developed in Table 2.21.
Professional Engineer	All sewer facilities and appurtenant structures shall be designed in accordance with good engineering practice by a professional engineer licensed in the State of Oregon.
DEQ Requirements	All sewer facilities and appurtenant structures shall be designed in conformance with the Oregon Department of Environmental Quality regulations, except when City standards are more stringent.

Table 2.6	**Design Policies and Criteria Sanitary Sewer Master Plan City of Medford**
Subject	**Policy**
Preference of Gravity Systems	Gravity sewer systems shall be used wherever feasible to provide wastewater service since they are less susceptible to interruption of service and require the least amount of maintenance.
Inspection	New gravity sewer construction shall be inspected with video equipment to assure compliance with the design standards and contract documents. Final acceptance of gravity sewers will be subject to City approval.
Pump Stations - Operability During Design Storm	Provisions shall be included in the design of any pump station to allow the station to remain fully operational and accessible during the design storm.
Pump Stations - Redundancy	All pump stations, except for private stations for a single-family home, shall have a minimum of two pump units, each with the capacity to handle the expected maximum flow.
Pump Stations - Flow Meters	Permanent flow meters shall be provided in a separate vault for all new pump stations.
Pump Stations - Reliability	In order to reduce the risk of overflows during power outages or when performing routine maintenance, the City shall install emergency back-up power generators, receptacles for portable generators and/or bypass pump connections at all of its pump stations. The telemetry system shall have back-up battery power that allows the telemetry system to continue to operate for up to seven days.
Pump Stations - Emergency Back-up Power	Power sources shall be capable of powering all equipment. Permanent on-site generators shall be sized to provide continuous power for a minimum of 24 hours before servicing is required. Telemetry systems within those pump stations without permanent onsite generators shall have battery systems for back-up power. The back-up batteries shall allow the telemetry system to continue to operate so the City can monitor the sewage levels in those stations during power outages. During power outages, the City shall connect portable generators or bypass pumps to pump stations without permanent back-up power to convey sewage to downstream facilities.
Pump Stations - Bypass Pumping Requirements	The City's pump stations shall be designed with bypass pump connections that will allow the City to pump directly from the wet well into the pump station's force main with a portable pump, thus bypassing the pumps in the dry well. This feature should allow the City to manage wet well levels during power outages and routine maintenance.
Pump Stations - Operations & Maintenance Manuals	Operation and Maintenance (O&M) manuals shall be prepared for all pump stations and shall conform to DEQ Guidelines for Writing Pump Station O&M Manuals.
Pump Stations - DEQ Documentation	Design engineers shall provide to the City and DEQ all documentation required by OAR 340-052-0040 including the final O&M Manuals and certification that the construction was inspected by the design engineer and found to be in accordance with the plans and specifications.
Pump Stations - Location	Sanitary sewer pump stations shall be located outside the street section or traveled areas**.**
Sewer and Storm Drain Locations	All manholes for public sanitary sewers and storm drains shall be located within the public right-of-way. Generally, sanitary sewer pipes and storms shall also be placed within the public right-of-way, although in some instances the piped sections may be outside the public right-of-way, provided the manholes are within the street public right-of-way. Where sewer mains cannot be located within a public right-of-way, they shall be located within an easement. Easements for sewers shall have a width equal to twice the depth of the sewer main, or 10 feet, whichever is greater. The entire easement shall be located on one side of the property line. Unless otherwise approved by the City, sanitary sewers and storm drains in easements shall be positioned such that outer edge of the pipe is 3 feet or more from the easement boundary. Other utilities within the same easement shall maintain 3 feet of separation on either side of the sewer or storm drain.

Table 2.6	**Design Policies and Criteria Sanitary Sewer Master Plan City of Medford**
Subject	**Policy**
Main Line Alignment	Sewer mains shall generally be constructed in straight lines from manhole to manhole within the public right-of-way. Horizontal and vertical curves are generally discouraged. However, if conditions warrant: a. One horizontal curve is permitted between any two manholes. b. The horizontal curve shall either begin or terminate at a manhole. c. A maximum of two vertical curves is permitted between any two manholes. Curved sanitary sewer and storm drain mains may be used under certain conditions using the following minimum radii: Pipe size — Minimum curve radius 8-inch — 420 feet 10-inch — 525 feet 12-inch — 630 feet 15-inch — 735 feet The minimum pipe segment length shall be 12.5 feet for PVC pipe. No deflection will be allowed in metal pipe.
Covers - Sanitary Sewers	At least 3 feet of cover shall be provided over sanitary sewers from expected finish grade, except that 4 feet of cover or more shall generally be provided over sanitary sewers in streets.
Covers - Manholes	Watertight manhole covers shall be used when the cover is either below the 100-year flood plain or in a location where overland runoff could enter the manhole.
Piping - Extensions	For pipes that are to be extended as part of a project, the Engineer shall have the end of the line potholed and obtain exact location and elevation of the existing pipe. This information is to be provided on the plans.
Piping - Watertight Joints	Watertight joints shall be used for all storm drains and all sanitary sewers. The pipe joints shall be pressure testable.
Manholes - Locations	Whenever possible, manhole covers shall be positioned outside normal wheel travel locations. Distances between manholes shall not exceed 500 ft. except as approved by the City. Manholes shall be located at all sewer main intersections, at all changes in vertical or horizontal alignment, and at the beginning and/or end of curved sewer sections. Manholes shall also be provided at the end of all terminating sewers. Cleanouts may only be used on a sewer that will be extended in the near future that is less than 180' to the next downstream manhole.
Manholes - Diameter	Manholes 48 inches in diameter shall be used for pipes up to and including 18 inches diameter and depths up to 15 feet. Manholes 60 inches in diameter shall be used for larger pipes up to and including 36 inches diameter and depths up to 22 feet, or where the alignment of the main lines is such that the distance between pipe openings would be less than 1.5 feet using a smaller manhole. Manholes 72" inches in diameter shall be used for larger pipes up to and including 60" diameter pipes. Above 60 inch diameter pipes shall use specially designed manholes.
Manholes - Channel Slope	Fall through manholes shall match the slope of the upstream pipe except when the minimum fall across the manhole base is less than 0.1 feet. The minimum allowable fall through a manhole shall be 0.1 feet for straight runs and 0.2 feet where a change in horizontal alignment of 45° or more, or intersecting pipes occur. The maximum fall through a manhole shall be 2 feet. Manholes with falls greater than 2 feet shall be constructed with outside drop structures using the Standards Drawings found in Appendices Part II – Design.
Manholes - Adjustments	Manhole frames and covers shall be adjusted to finished grade within any traveled way. Manholes constructed in easements outside a traveled way shall project 6 inches above the adjacent ground. The manhole shall have a 3-inch minimum height of extension rings. The maximum height of extension rings shall be 12 inches for new construction and 18 inches for modifications to existing manholes. The Adjustments beyond these limits shall be made with full manhole barrel sections.

Table 2.6	**Design Policies and Criteria Sanitary Sewer Master Plan City of Medford**
Subject	**Policy**
Manholes - Hydrogen Sulfide Protection	Downstream transition manholes originating from a pump station or manholes where turbulence is a factor shall be coated with hydrogen sulfide resistant material.
Manholes - Monitoring	Monitoring manholes may be required at commercial/industrial service connections at the direction of the City.
Manholes - Covers	Watertight manhole covers shall be used when the cover is either below the 100-year flood plain or in a location where overland runoff could enter the manhole.
Manholes - Flat Top	A flat top manhole shall only be used in shallow conditions where use of a manhole cone is not possible, or where the manhole diameter is greater than 48 inches.
Piping - Anchor Blocks	Anchor blocks shall be used on sanitary sewers and storm drains with slopes in excess of 20% per the Standard Drawing found in Appendices Part II – Design.
Piping - Manning's "n" Value	**See the SSMP Purpose and Use Statement for more detailed criteria on allowable use of n values.** The design "n" value for pvc and hdpe pipe used for storm drain applications shall be 0.011. The design "n" value for concrete pipe and all sanitary sewer pipes regardless of material shall be 0.013. The design "n" value for storm drain metal pipe is as indicated in the metal pipe handbook, with the exception that .011 is the minimum "n" allowed for any pipe.
Piping - Allowable Material	Allowable pipe materials are listed in Appendices Part II – Design.
Vehicular Access	Year-round vehicular access roadways shall be provided to all sanitary sewer and storm drain manholes, pump stations, and detention control structures not located within a paved access. The minimum vehicle access roadway shall be 8 inches of compacted crushed rock, 10 feet wide.
Sanitary Sewer and Storm Drain Laterals	A separate lateral or service from the main shall be extended to each Lot, Parcel, or building, and the lateral shall be extended to a point two feet beyond the property line or back of the PUE as applicable.
Parallel Sewers	Sewers in streets shall be designed parallel to street centerlines. Exceptions must be approved by the City Engineer.
Sewer and Water Line Separation Requirements	Minimum separations between sanitary sewers and water line shall conform to the current DEQ regulations. The regulations are included in the references.
Design Approach - Slope and depth	The minimum desirable manhole depth at the extreme upstream end of a service area is 5 feet. Peak design flow design depth shall not exceed 0.80 full. The minimum design velocity shall be 2 fps. The minimum design slope for 8-inch mainline sewers is 0.4%. Minimum design slopes for other pipe sizes are tabulated in Appendices, Part II - Design. Where minimum sewer depth is not a factor in the design control, the grade of an 8-inch pipe used in the last two upstream segments of a collection system branch should be 1% or more so that the typically encountered low flows can achieve cleansing velocities. The Medford Code does not permit public system sanitary sewer pump stations.

Table 2.6	Design Policies and Criteria Sanitary Sewer Master Plan City of Medford
Subject	**Policy**
Design Approach - Design Flows	Sewer flows are composed of residential, institutional, commercial, and industrial sewage, along with infiltration and inflow. Sewers must be capable of conveying the ultimate peak hour flows of these wastewater sources as estimated using the design storm.
Design Approach - Storm	In accordance with all applicable federal, state, and local regulations, the City should design its sewer facilities to adequately and reliably convey peak hour flows associated with a 24-hour, 5-year recurring storm event without overflowing or discharging to any water bodies.
Surcharging	New facilities shall be designed to prevent the hydraulic grade line from exceeding the crown of pipe The existing system shall be evaluated for two conditions of surcharging, as follows: 1) Under Peak Dry Weather Flow (PDWF), pipes can flow full with a depth to full depth (d/D) ratio of 0.92 2) Under Peak Wet Weather Flow (PWWF), the Hydraulic Grade Line (HGL) may not rise above three feet below any manhole rim. Allowable depth to full depth (d/D) ratios are based on a graduated criteria according to pipe size, as shown in the following: <=12-inch; d/D = 0.65 >=15-inch; d/D = 0.75

2.3 PLANNING PERIOD

Three planning periods are evaluated in this SSMP:

1. Existing system and currently sewered area,
2. 2036 Service Area,
3. Service Area (considered as build-out, and includes development of the Urban Reserve Areas).

2.4 SEWER SERVICE AREA

2.4.1 History and Service Areas Descriptions

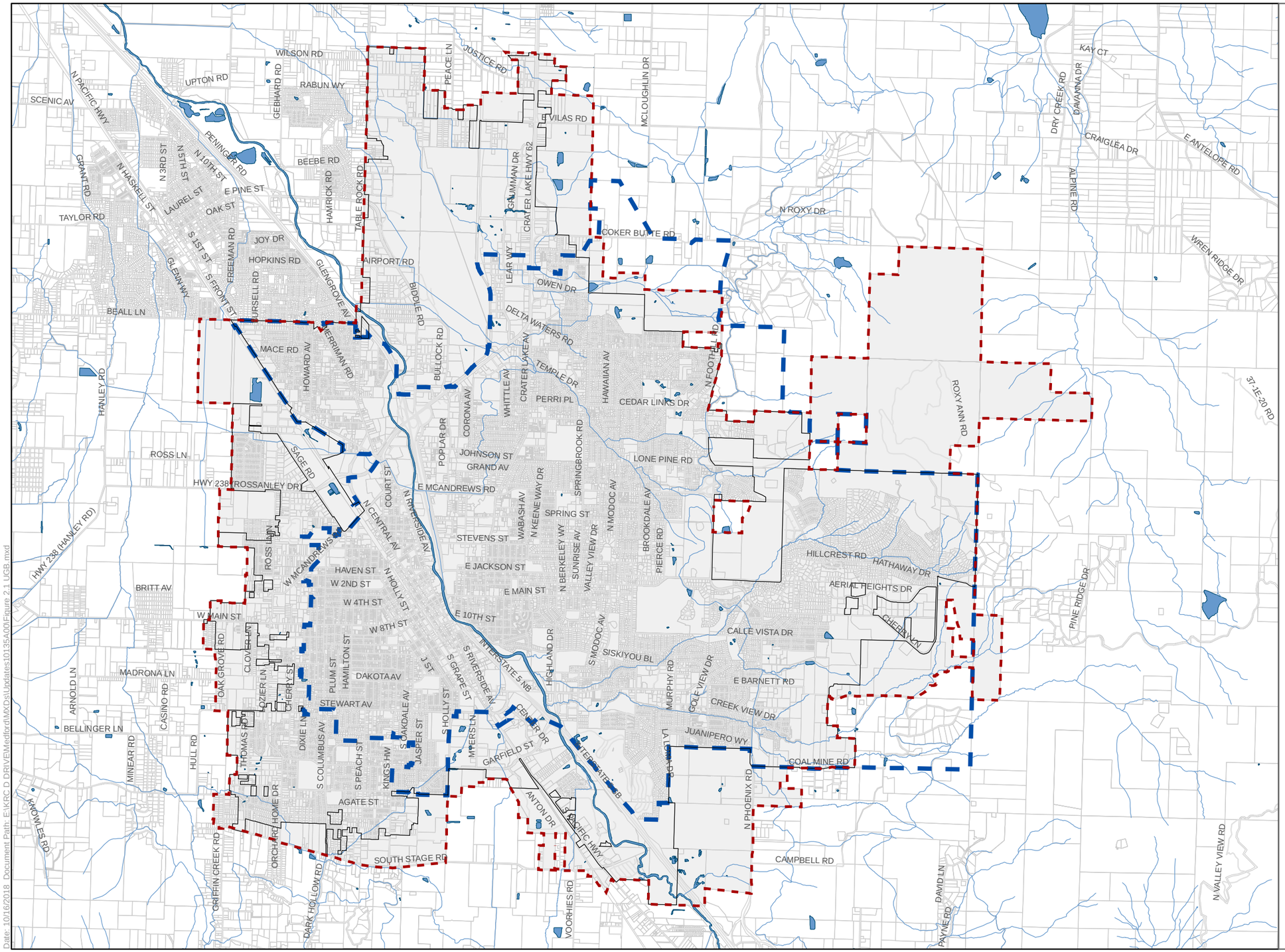
2.4.1.1 History of the City and the Sewer System

The City was settled in the early 1880's as part of efforts to run a rail line through the Bear Creek Valley by the Oregon & California Railroad. It was named in 1883 by David Loring. The City was incorporated in 1885. The oldest sanitary sewers in the City were built in the late 1800s to early 1900s and still serve the downtown core area. Similar to other Oregon cities, growth spurts were experienced after World War II and from the 1970s through the present. Today, the City is one of the fastest growing cities in the state with a population of over 80,000 in 2015. It is the largest city in Southern Oregon and the seat of Jackson County government.

2.4.1.2 Existing Sewer Providers

The City owns and operates most of the sewer collection system within the City limits and the Regional Water Reclamation Facility (RWRF), which receives and treats wastewater from most of the Rogue Valley. The City limits are shown in Figure 2.1. This figure also shows the most recently adopted Urban Growth Boundary (UGB), along with the planning boundaries, which are detailed in the following sections and figures.

Rogue Valley Sewer Services (RVSS) owns and operates the interceptor system and provides sanitary service to a portion of Medford' south/west/north boundary and the unincorporated area of the county. RVSS was created in 1966 to help protect water quality in the region, and provide direct service to businesses and households. It also provides sewer service to seven cities including the City, Phoenix, Jacksonville, White City, Talent, Eagle Point, and Central Point.



Legend

- Urban Growth Boundary (UGB)
- Service Area
- Medford City Limits (Source: Jackson County GIS as of 02/25/2016)
- Taxlots
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

Feet
0 5,000

CITY OF MEDFORD BOUNDARIES

FIGURE 2.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Date: 10/16/2018 Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 2.1 UGB.mxd

The City and RVSS have developed an agreement that defines service areas for each entity. The City/RVSS agreement also defines two special situations: first, it allows flow from a small unincorporated area to discharge into the City system; and second, it permits the City to discharge to RVSS sewers at selected locations other than at the interceptors. The part of RVSS discharging sewer into the City's system is shown in orange on Figure 2.2.

2.4.1.3 Existing Customers

The City sewer system spans approximately 8.8 square miles with approximately 65,000 residents of its population served by the City's collection system. The existing sewered area is presented in Figure 2.2, which includes currently developed and connected parcels contributing sanitary flows to the collection system. In part of the City, wastewater is treated by private septic tanks. Septic tanks' assumed locations are shown as green dots on Figure 2.2. Approximately 141 of the total currently developed taxlots within the City's Service Area have private septic systems.

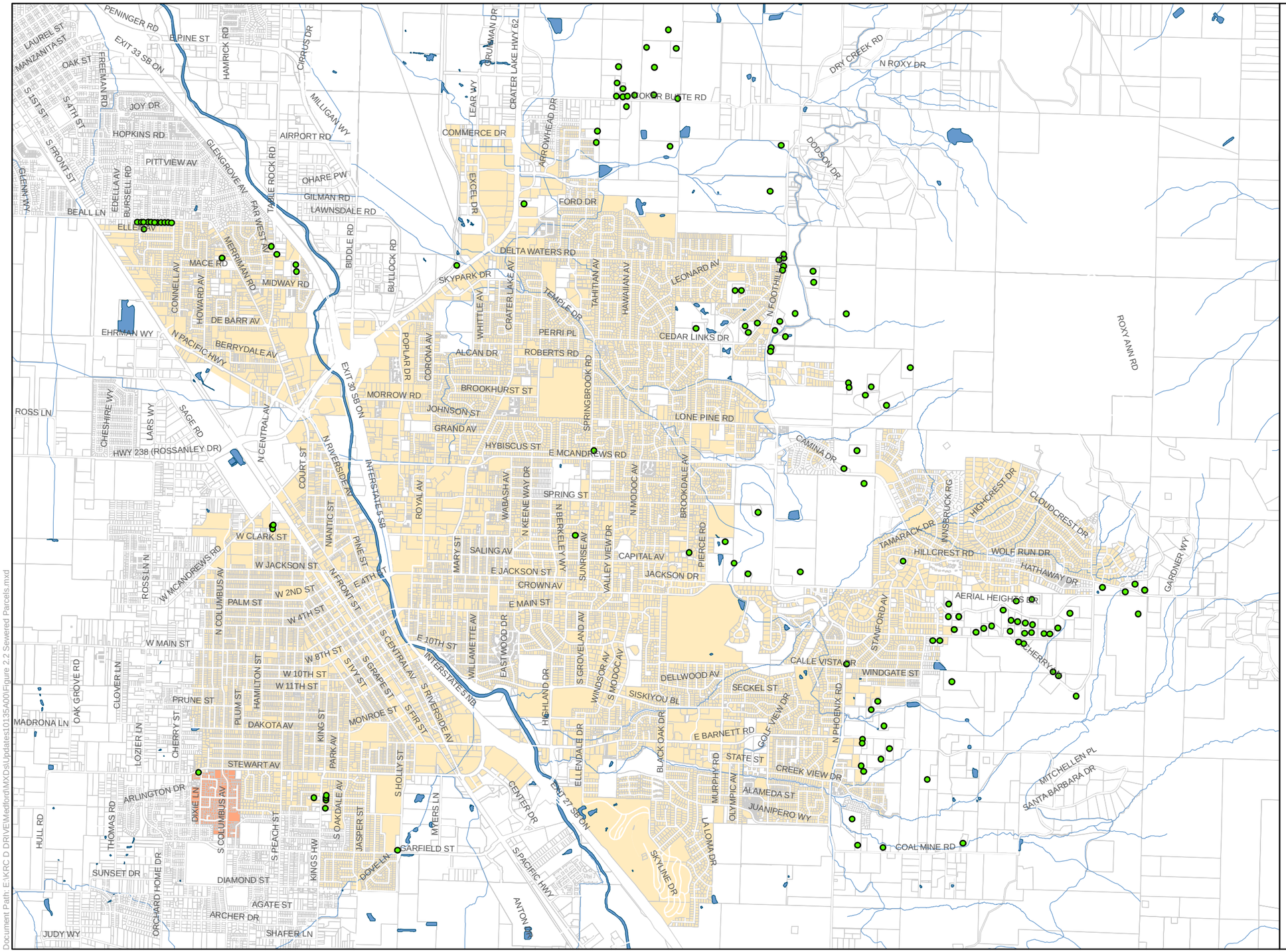
2.4.1.4 2036 Service Area

As growth occurs in the City, the current City limits will extend out in the Urban Growth Boundary (UGB), and the City's existing sewered area will increase as well. Concurrent with the City's Comprehensive Plan, all properties within the UGB are anticipated to be developed and served by the City in the next 20-year planning period. For this SSMP, the 2036 Service Area was delineated by the City's UGB line and is limited in some places by the City's sewer Service Area. The assumed 2036 Service Area is delineated with a dashed purple line in Figure 2.3. For this SSMP, it is assumed that all currently sewered parcels will be developed to their maximum allowable density as part of the 2036 Service Area. It is also assumed that all properties currently on septic systems within the 2036 Service Area will be connected to the collection system.

2.4.1.5 Service Area

The Service Area, shown as a dashed blue line in Figure 2.3, is the currently agreed-upon service boundary between the City and RVSS. The Service Area extends beyond the City's UGB in some areas, and includes Urban Reserve Areas (URA) that are anticipated to be added to the City beyond 2036 (shown in blue in Figure 2.3). Most growth will occur in the outskirts of the City, east of the currently developed area. The Service Area will be used for build-out analyses performed in this SSMP. This SSMP assumes that all properties within the Service Area will be developed for estimating future wastewater flows. Per the City's direction, this SSMP also assumes that the triangular area located north of Coker Butte Rd will not contribute any flow to the system in the future.

This SSMP is intended as the guiding document to plan and implement sewer system improvements to accommodate future growth within the Service Area. Existing and future land uses within the Service Area are discussed in this chapter.



Legend

- Possible Septic Systems
- RVSS System to City System
- Currently Developed and Connected Parcels
- Taxlots
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

0 Feet 4,000

CURRENTLY SEWERED PARCELS

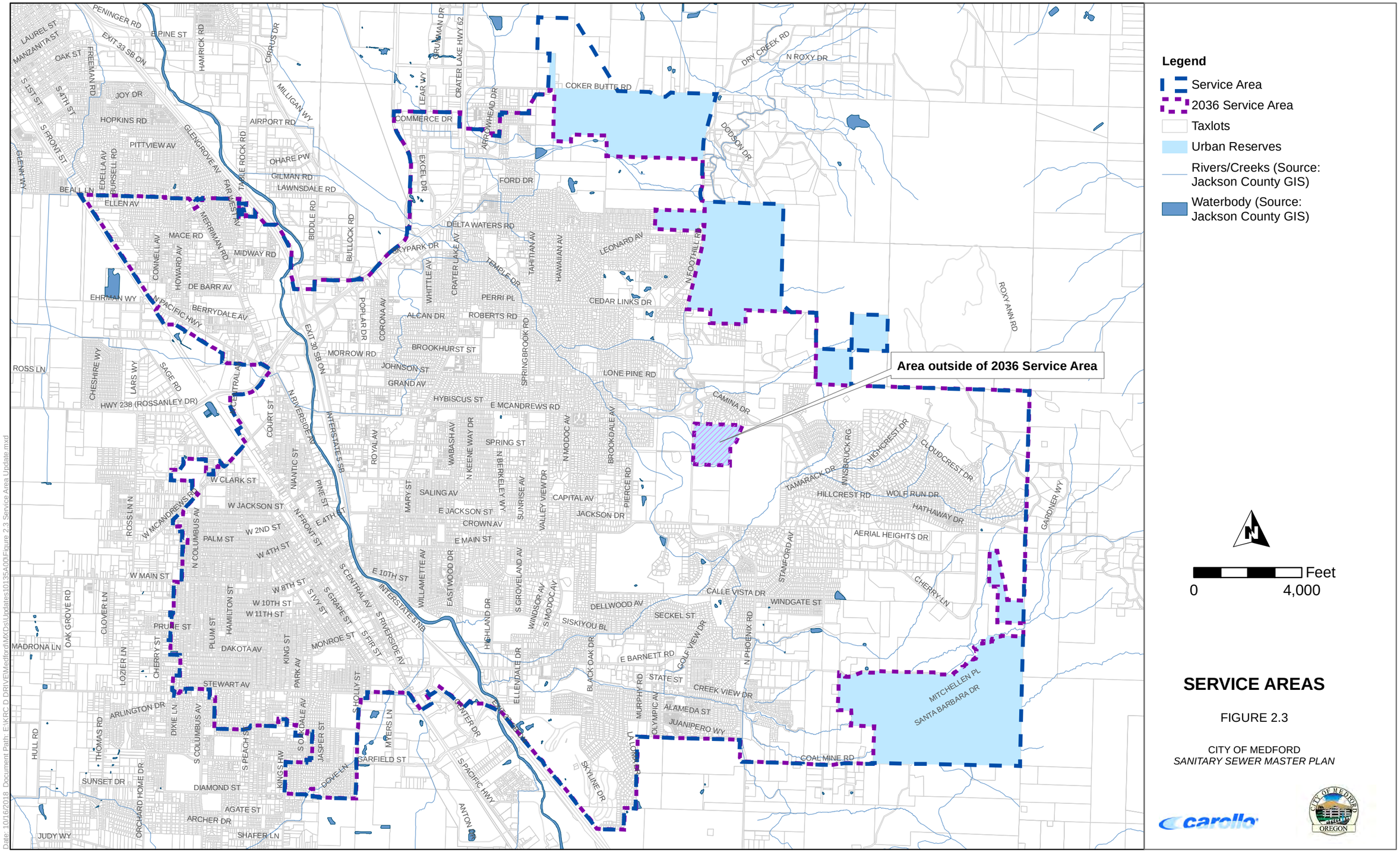
FIGURE 2.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 2.2 Sewered Parcels.mxd


Legend
Service Area
2036 Service Area
Taxlots
Urban Reserves
Rivers/Creeks (Source: Jackson County GIS)
Waterbody (Source: Jackson County GIS)
Area outside of 2036 Service Area
Feet
0
4,000
SERVICE AREAS
FIGURE 2.3
CITY OF MEDFORD
SANITARY SEWER MASTER PLAN
carollo
CITY OF MEDFORD
OREGON
Date: 10/16/2018 Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 2.3 Service Area Update.mxd

2.4.2 Service Area Physical Features

This section describes the unique physical features of the Service Area including water bodies, climate, and topography.

2.4.2.1 Topography

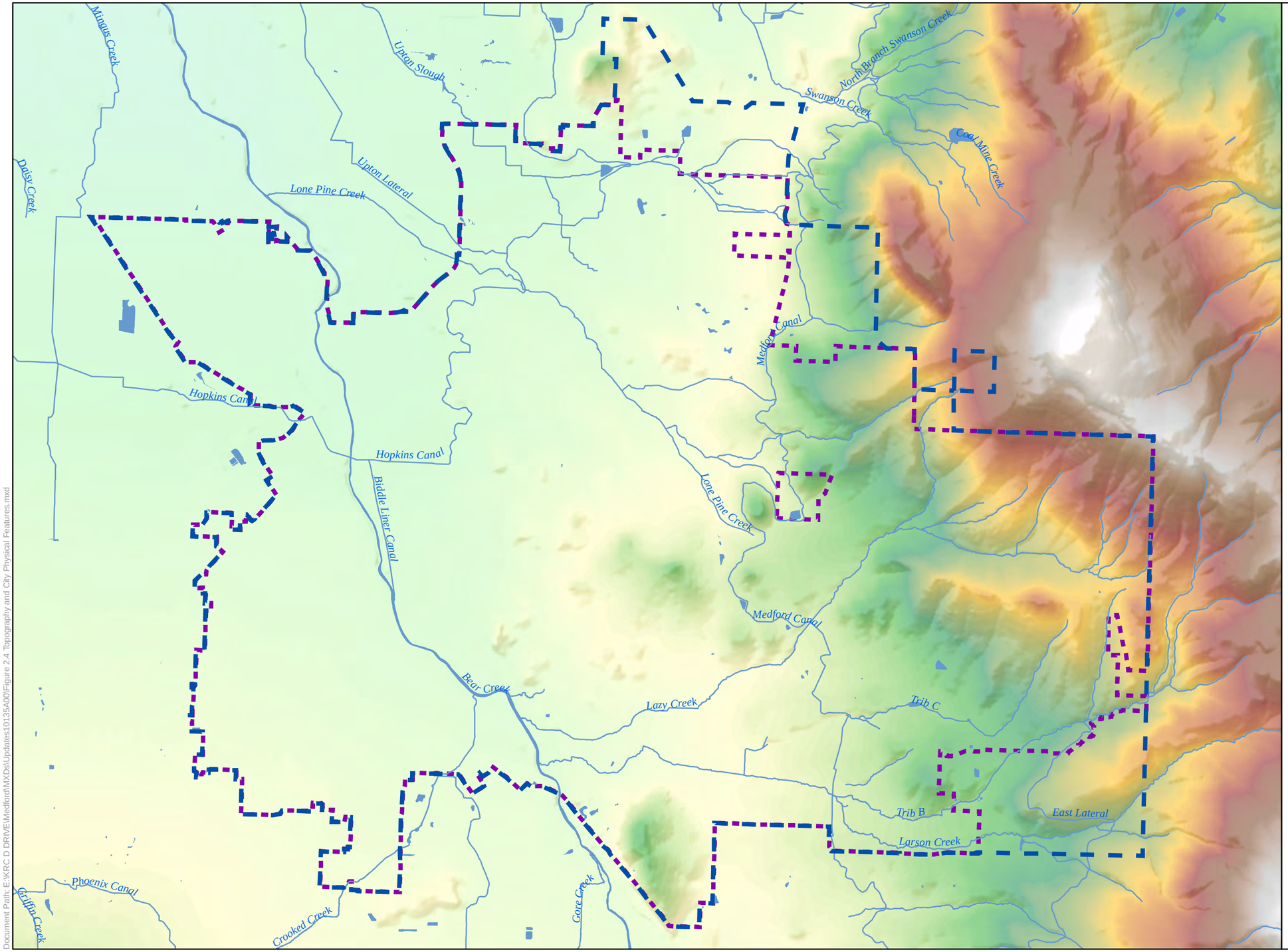
The City is located along Bear Creek toward the south end of the Rogue Valley. The area to the west of Interstate 5 (I-5) is primarily flat with elevations ranging from about approximately 1,300 feet to approximately 1,500 feet above sea level. The east side of the City extends into the foothills of the Cascade Range. Some of the higher elevations on the east side exceed 1,800 feet or more above sea level. Figure 2.4 shows the general topography of the City.

2.4.2.2 Surface Waters

The Service Area's surface water system consists of natural and constructed drainages that discharge to Bear Creek and the Rogue River. A number of streams bisect the City on their way to Bear Creek. Bear Creek runs south-north in the center of the City. Figure 2.4 illustrates all water bodies located within the Service Area.

2.4.2.3 Climate

The City sits in a rain shadow between the Cascade Range and Siskiyou Mountains called the Rogue Valley. As such, most of the rain associated with the Pacific Northwest and Oregon in particular skips Medford, making it drier and sunnier than the Willamette Valley. Medford's climate is considerably warmer, both in summer and winter, than its latitude would suggest, with a Mediterranean climate. Summers are similar to Eastern Oregon, and winters resemble the coast. Summer temperatures vary from an average of 57 days over 90 degrees Fahrenheit to 11 days over 100 degrees Fahrenheit. Freezing temperatures occur on 69 nights of the year on average, and in some years there may be a day or two where the high stays at or below freezing. Table 2.7 summarizes the maximum and minimum monthly temperatures as well as the average monthly precipitation.



Legend

Elevations

High : 3770'

Low : 1170'

Service Area

2036 Service Area

Rivers/Creeks (Source: Jackson County GIS)

Waterbody (Source: Jackson County GIS)

N

0 Feet 4,000

TOPOGRAPHY AND CITY PHYSICAL FEATURES

FIGURE 2.4

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 2.4 Topography and City Physical Features.mxd

Table 2.7	Medford Temperature and Rainfall Statistics Sanitary Sewer Master Plan City of Medford		
Month	**Average Maximum Temperature (ºF)**	**Average Minimum Temperature (ºF)**	**Average Monthly Rainfall (inches)**
January	47	31	2.76
February	53	32	2.32
March	58	35	2.24
April	64	38	1.61
May	72	42	1.42
June	80	47	0.79
July	88	51	0.51
August	87	51	0.55
September	80	44	0.94
October	67	37	1.50
November	51	34	3.19
December	45	31	3.27
Annual	**66**	**39.4**	**21.1**

Note:

(1) Source: U.S. Climate data - http://www.usclimatedata.com/climate/medford/oregon/united-states/usor0215

2.4.3 Land Use

Land use designations and regulations provide important information in evaluating sewer system capacity. Existing and future land use information is an integral component in projecting wastewater generation within the Service Area. The type of land use in an area will affect the volume of the wastewater generated. Adequately estimating the generation of wastewater from various land use types is important in sizing collection system facilities.

2.4.3.1 Zoning and Land Use Correspondence

Maps of the City's existing and future land use within the Service Area were developed with data from the City's planning department. Existing development information was provided by zoning data. However, future land use designations being different from the existing designations, the City provided a relationship between existing zoning and future land use designations.

Table 2.8 summarizes the correspondence used between zoning and land use for the purpose of this SSMP. This relationship is used to develop flow factors (Section 2.8.2) and will be used in the future flow projections (Section 2.8.3).

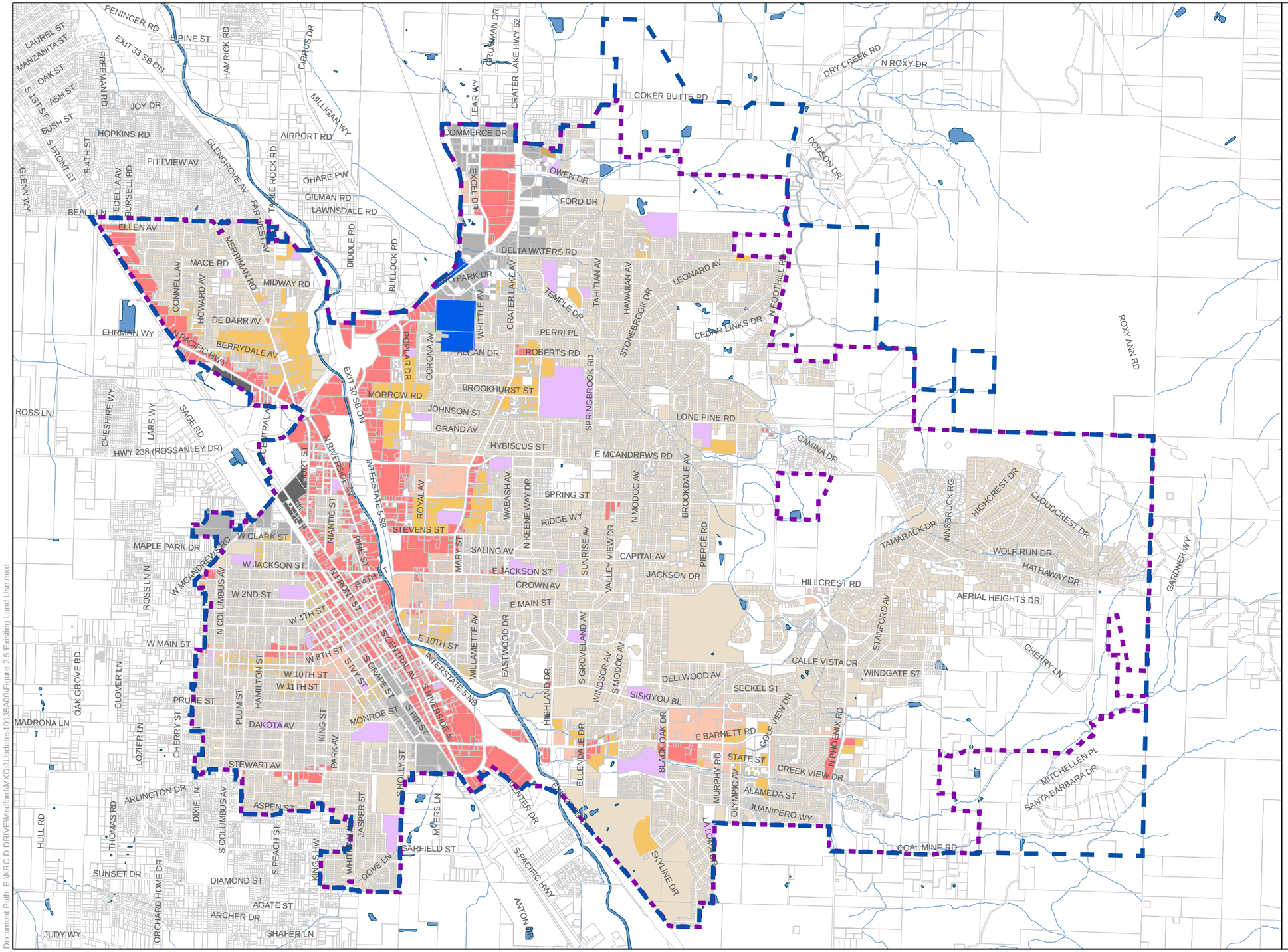
Table 2.8 Existing Zoning and Future Land Use Correlation Sanitary Sewer Master Plan City of Medford	
Existing Zoning Designation	**Comprehensive Plan Land Use**
I-L	Airport
SFR-00/SFR-10/SFR-2/SFR-4/SFR-6	Urban Low Density Residential
MFR-15	Urban Medium Density Residential
MFR-20/MFR-30	Urban High Density Residential
C-S/P	Service Commercial
C-C/C-H/C-N/C-R	Commercial
I-G/I-L	General Industrial
I-H/I-G	Heavy Industrial
No specific zoning	Schools
No specific zoning	Parks and Open Spaces
No existing zoning	City Center

2.4.3.2 Existing Land Use

Maps of the City's existing land use were developed with Geographic Information System (GIS) data from the City's planning department. Existing zoning information was used to develop existing land use information using the correspondence presented in Section 2.4.3.1. Existing land use is shown on Figure 2.5. Only land use for parcels that are currently developed and connected are shown on this figure.

Parcels were organized into ten land use categories including:

- Airport
- Urban Low Density Residential
- Urban Medium Density Residential
- Urban High Density Residential
- Service Commercial
- Commercial
- General Industrial
- Heavy Industrial
- Schools
- Parks and Open Spaces



Legend

Existing Land Use

- Urban Residential
- Urban Medium Residential
- Urban High Residential
- Service Commercial
- Commercial
- General Industrial
- Heavy Industrial
- Airport
- School
- Service Area
- 2036 Service Area
- Taxlots
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

Simplified land use based on 2016 City of Medford zoning.

N

0 Feet 4,000

EXISTING LAND USE MAP

FIGURE 2.5

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 2.5 Existing Land Use.mxd

The distribution in terms of acreage and percentage of existing land use is presented in Table 2.9.

Table 2.9 Existing Land Use Summary Sanitary Sewer Master Plan City of Medford

Land Use Category	Total Existing Sewered Area (acres)	Percent of Total Area (%)
Airport	49	0.7%
Urban Low Density Residential	4,598	65.8%
Urban Medium Density Residential	5	0.1%
Urban High Density Residential	467	6.7%
Service Commercial	277	4.0%
Commercial	805	11.5%
General Industrial	246	3.5%
Heavy Industrial	28	0.4%
Schools	258	3.7%
Parks and Open Space	252	3.6%
Total	**6,985**	**100.0%**

Note:
(1) Acreage presented in this table corresponds to currently developed and connected parcel only.

Approximately 66 percent of the currently developed and connected land area is classified as Urban Low Density Residential, and 7 percent of the developed and connected land as either Urban Medium Density Residential or Urban High Density Residential. Approximately 19 percent of the developed land is classified as either commercial or industrial, with less than one percent being Heavy Industrial. The majority of the industrial areas are located along the I-5 corridor, mainly in the north side of the City.

2.4.3.3 Future Land Use

The 2016 Comprehensive Plan guides development within the City's planning boundary and establishes the long-range development policies. The 2016 Comprehensive Plan also provides land use projections. Appendix A includes the Land Use Element of the 2016 Comprehensive Plan.

Service Area future land use designations were developed with the guidance of the City’s Planning Department and were based on the Land Use Plan Element of the 2016 Comprehensive Plan. Since the land use assumptions forecast the type of growth within the Service Area, this association to the SSMP should ensure that the sewer flow projections and facilities required to serve future growth are consistent with the City's guiding document on development.

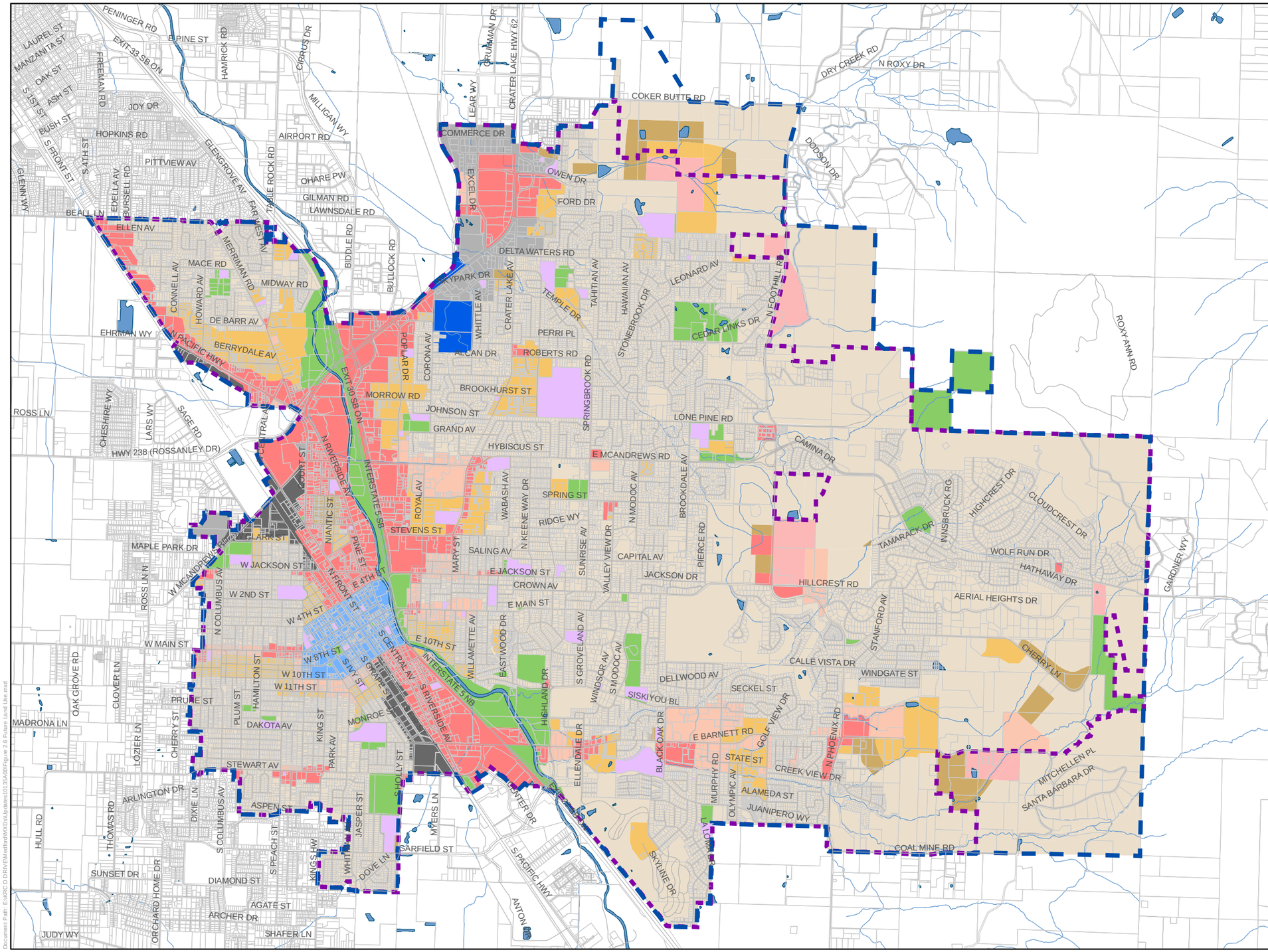
The future land use designations represent the maximum build-out feasible of the Service Area. It is assumed that all parcels within the 2036 Service Area will be served by the City's collection system in the next twenty years.

Parcels were organized into eleven land use designations as shown in Table 2.10. The future land use categories used in this SSMP are the same as the existing land use categories with the addition of a City Center category that is defined by parcels mostly located in the downtown core of the City. This designation identifies the regional governmental, financial, and business service center complex in the downtown area.

Table 2.10 Future Land Use Summary
Sanitary Sewer Master Plan
City of Medford

	Area without Right-of-way		
Future Land Use	**2036 Service Area**	**URA**	**Service Area**
Airport	51		51
City Center	104		104
Commercial	1,061	88	1,148
General Industrial	183		183
Heavy Industrial	130		130
Park	463	81	544
Service Commercial	370		370
Schools	258		258
Urban Low Density Residential	7,064	964	8,028
Urban Medium Density Residential	119	107	226
Urban High Density Residential	768	31	800
Total Area (acres)	**10,571**	**1,271**	**11,841**

The majority of future development will be infill, redevelopment, or new developments located within the Service Area. Figure 2.6 and Table 2.10 presents the Service Area future land use. As seen in Tables 2.9 and 2.10, the City is expected to grow from 6,935 acres of currently developed lands to 10,811 acres, or approximately 56 percent in 20 years. The Urban Reserves are expected to add an additional 1,312 acres beyond the 2036 Service Area. Not all land uses will contribute sewer flows to the system, such as Parks and Open Space, which comprise 507 acres. Appendix A provides a description of the different land uses.



Legend

General Plan Land Use

- Urban Residential
- Urban Medium Density
- Urban High Density
- City Center
- Service Commercial
- Commercial
- General Industrial
- Heavy Industrial
- Airport
- Parks
- School
- Service Area
- 2036 Service Area
- Taxlots
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

Simplified future land use based on 2016 City of Medford land use plan.

N

0 4,000 Feet

FUTURE LAND USE MAP

FIGURE 2.6

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Document Path: E:\KRC D DRIV\Medford\MXD\Updated\013\SAM\Figure 2.6 Future Land Use.mxd

2.4.4 Population Information

Many factors influence growth. The state of the economy, interest rates, annexation of adjacent areas, and up-zoning all influence new development and population growth. The City's population within the city limits over the next 20 years has been estimated by the City Planning Department and is summarized in Table 2.11.

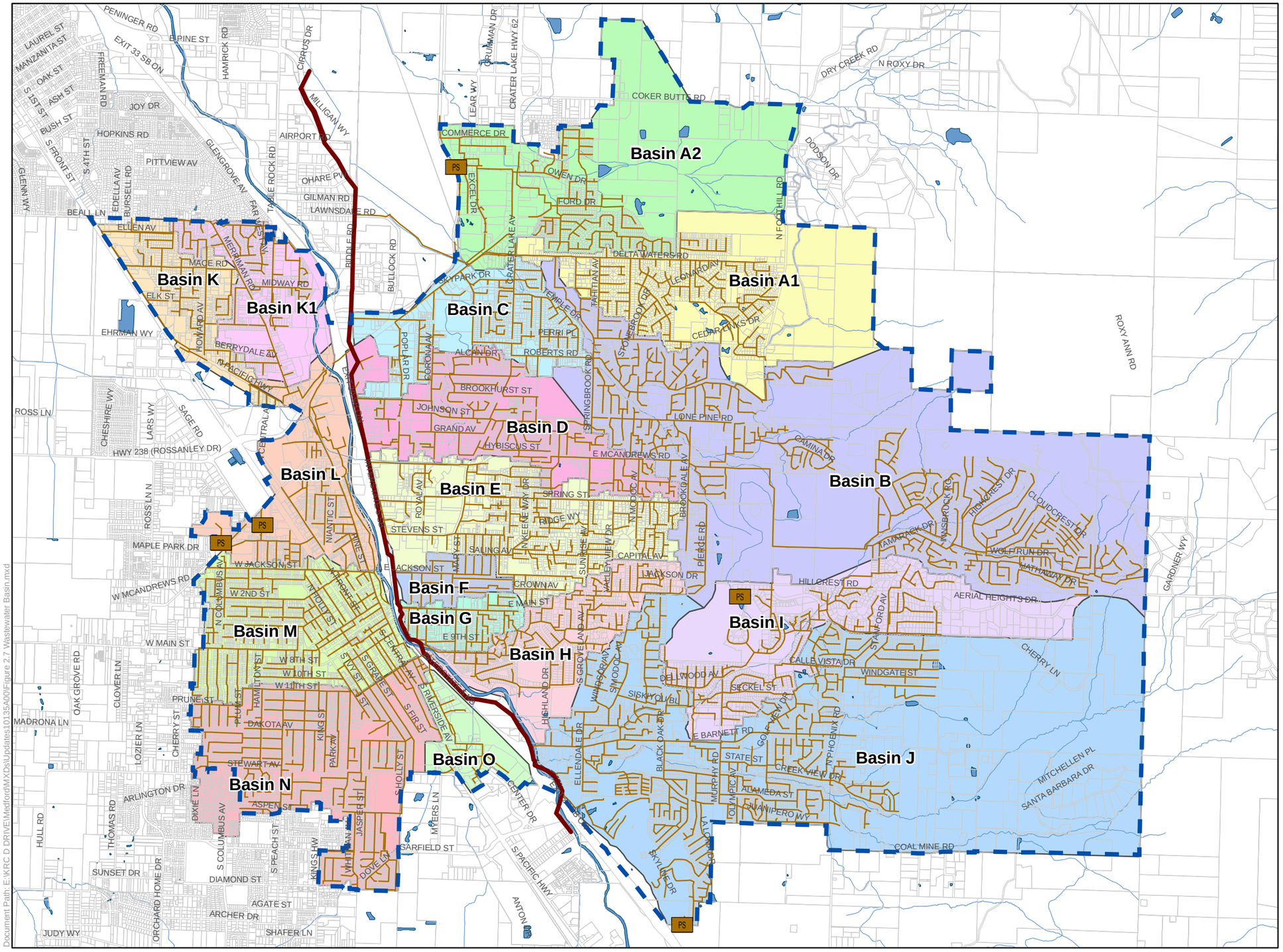
Table 2.11 Summary of Population Projections
Sanitary Sewer Master Plan
City of Medford

Year	Population	Percent Annual Growth
2005	70,855	N/A
2010	74,907	0.90%
2015	80,024	1.07%
2026	111,025	2.33%
2040	133,397	1.12%

Notes:
(1) Source 1 - Census Data.
(2) Source 2 - City of Medford Demographics Website.

2.4.5 Wastewater Basins

The City has identified 17 primary sewer basins in the Service Area. The wastewater basins have been defined with the Service Area boundary, and generally delineate large areas of the conveyance network that ultimately flow to one location, specifically the RVSS Interceptor. The primary sewer basins are shown in Figure 2.7. These basins are well known by City staff and will be used for calculation of sanitary flows based on land use types, area, and flow factors, and for summarizing deficiencies when developing system analysis later in this SSMP.



Legend

Wastewater Basins

A1 D H K1 O
A2 E I L
B F J M
C G K N

Sewer Gravity Interceptor

Sewer Gravity Main

Service Area

Taxlots

Pump Station

Rivers/Creeks (Source: Jackson County GIS)

Waterbody (Source: Jackson County GIS)

N

0 4,000 Feet

WASTEWATER BASINS

FIGURE 2.7

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

2.5 FLOW PROJECTIONS OVERVIEW

The remaining sections in this Chapter describe the data and methods used to estimate future sewer flows. This includes establishing the sewer flow definitions, reviewing the results of the 2016 flow monitoring program, confirming existing flows, establishing flow factors, and estimating future flows.

2.5.1 Sewer Collection System Flows Definitions

As a way to help the reader understand the wastewater flow components, this section describes and provides definitions of commonly used terminology in the wastewater collection system analysis and evaluations conducted as part of this SSMP. In general, wastewater consists of the following two components: Average Dry Weather Flow and Wet Weather Flow.

2.5.1.1 Average Dry Weather Flow (ADWF)

ADWF is the average flow that occurs on a daily basis during the dry weather season. ADWF is representative of routine wastewater discharges into the collection system from customers as well as baseline groundwater infiltration into pipes and manholes.

There are two primary components of ADWF:

1. Baseline Infiltration (BI). Baseline Infiltration (BI) is groundwater that enters the sewer system when the relative depth of the groundwater table is higher than the depth of the pipeline and when the susceptibility of the sanitary sewer pipe allows infiltration through defects such as cracks, misaligned joints, and broken pipelines.
2. Base Wastewater Production (BWP). The BWP is the flow generated by routine water usage of the City's residential, commercial, and industrial customers.

2.5.1.1.1 *Baseline Infiltration (BI)*

BI cannot easily be separated from BWP by flow measurement techniques. Therefore, BI is estimated using the Stevens/Schutzbach empirical method. BI was estimated using an empirical method to try and isolate BWP from the ADWF. The Stevens/Schutzbach equation uses a curve fitting technique to increase the reliability of the BI estimation at meters with higher flows and is more tolerant of basins with less stable/measurable minimum flows. The equation below was used to estimate base infiltration in the basins in this SSMP:

$$BI = \frac{0.4*MDF}{(1-(0.6*\left(\frac{MDF}{ADWF}\right)^{ADWF^{0.7}})}$$

With:

BI= Baseline Groundwater Infiltration

MDF = Minimum Hourly Dry Flow

ADWF = Average Dry Weather Flow

The method described above is not applied to basins with large customers that are operated 24-hours. Basin 1 has Timber Products, an industrial customer, and because part of the minimum flow includes industrial flow from night time wastewater production, the Stevens/Schutzbach equation was not applied to this basin. The average BI of the other basins was instead applied to Basin 1. BI remains constant over time, no diurnal pattern is allocated.

2.5.1.1.2 *Baseline Wastewater Production (BWP)*

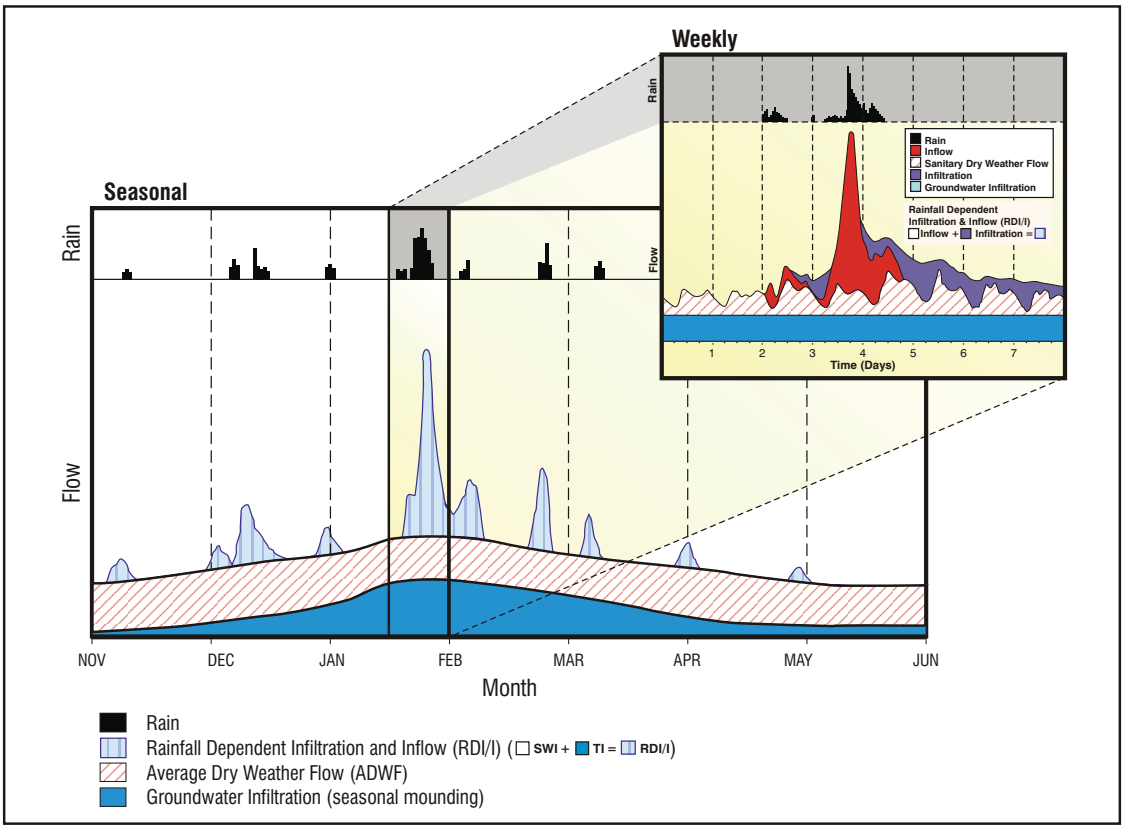
BWP is determined by subtracting BI from the ADWF determined from the flow monitoring program data. The flow has a diurnal pattern that varies by flow monitoring basin.

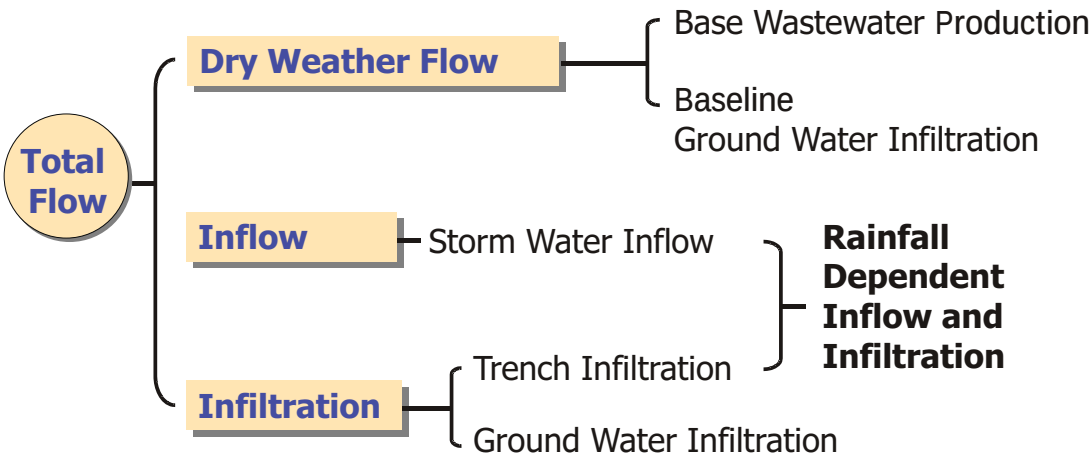
2.5.1.2 Wet Weather Flow (WWF)

WWF is flow during or immediately after a storm and is greater than dry weather flows due to direct inflow into the system and increased groundwater infiltration. This type of inflow and infiltration is called rainfall dependent inflow and infiltration (RDII). Figure 2.8 illustrates the different flow components discussed in the following sections. Wet Weather Flow (WWF) corresponds to the flows in a collection system during rainfall events. Wet Weather Flows comprise DWF and RDII.

The RDII flow response in the sewer system to rainfall is seen immediately (inflow) or within hours after the storm (infiltration). All wastewater collection systems have some RDII, although the characteristics and severity vary by region and individual collection system.

Infiltration is stormwater that enters the sewer system by percolating through the soil and then through defects in pipelines, manholes, and joints. Inflow is stormwater that enters the sewer system via a direct connection to the system, such as roof drain and downspout connections, leaky manhole covers, and storm drain connections. Some of the most common sources of RDII are shown in Figure 2.9.





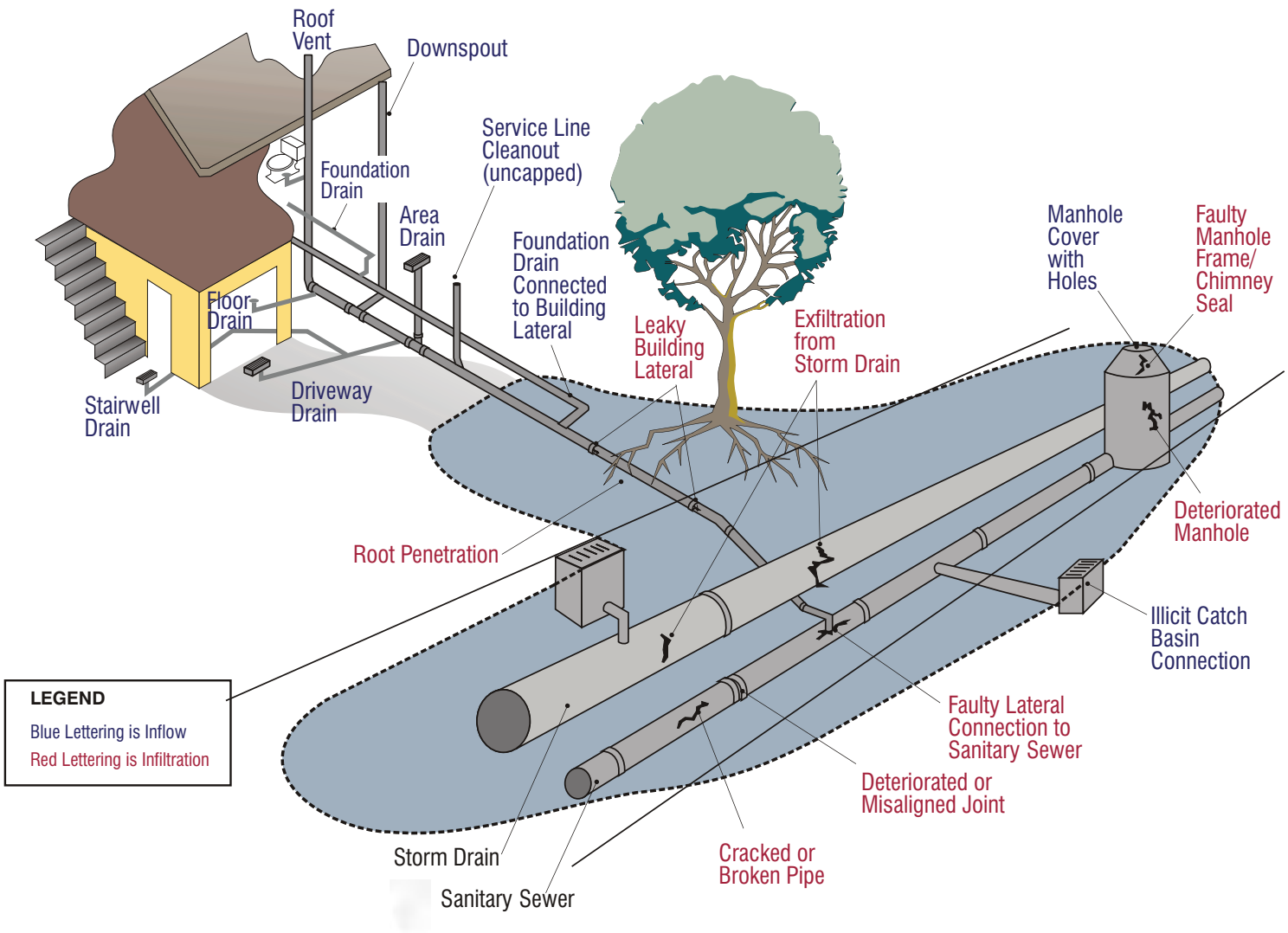
Note: This figure is not based on flow data specific to the City or this Master Plan

TYPICAL WASTEWATER FLOW COMPONENTS

FIGURE 2.8

CITY OF MEDFORD
*SAN**ITARY SEWER** MASTER PLAN*

carollo



TYPICAL SOURCES OF INFLOW AND INFILTRATION

FIGURE 2.9

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

The adverse effects of RDII entering the sewer system is that it increases both the flow volume and peak flows such that the sewer system is operating at or above its capacity, as illustrated in Figure 2.10. If too much RDII enters the sewer system, sanitary sewer overflows (SSOs) could occur. The flow monitoring program results indicate that the City collection system does have significant RDII in certain parts of the system. The extent of the City's RDII is described in Section 2.9.

2.5.1.3 Peak Wet Weather Flow (Design Flow)

Peak Wet Weather Flow (PWWF) is the highest observed hourly flow that occurs following the design storm event, and is typically used for designing sewers and pump stations (therefore referred to as the "design flow"). PWWF occurs because wet weather RDII causes flows in the collection system to increase. While there is a peak flow associated with each storm event, in this study the PWWF represents the peak flow resulting from a design storm. PWWFs are modeled by simulating a storm event in the hydraulic model, after RDII unit hydrographs have been assigned to the collection system and calibrated. The combination of the ADWFs and the RDII occurring from the storm event results in increased wet weather flows; during the design storm, these wet weather flows constitute the PWWF for the system.

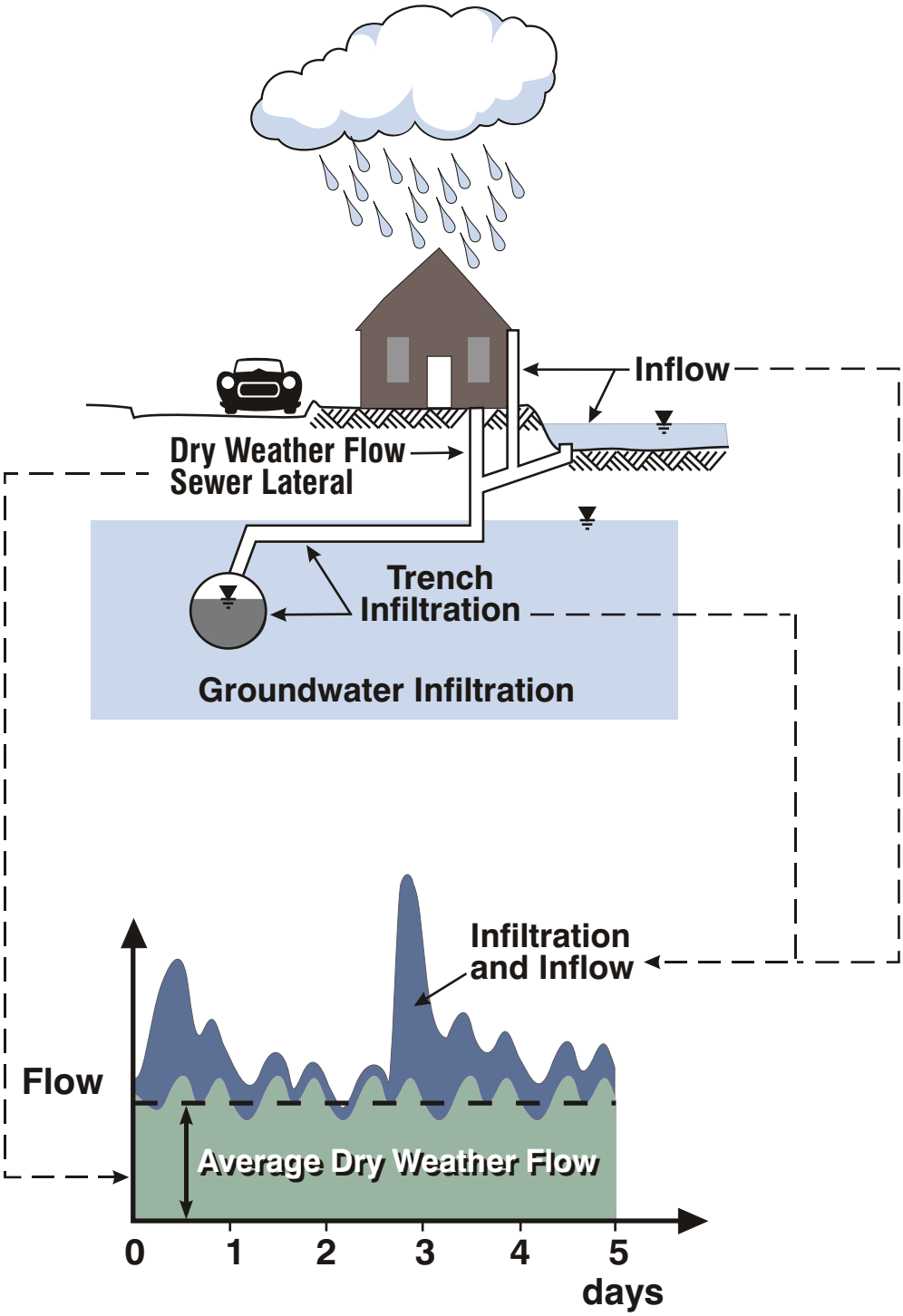
2.6 FLOW MONITORING PROGRAM

As part of the Scope of Services for this SSMP, Carollo Engineers, Inc. (Carollo) contracted with ADS to conduct a temporary flow monitoring program within the City's sanitary sewer collection system. The purposes of the flow monitoring program were to correlate actual collection system flows to the hydraulic model predicted flows, evaluate the system's capacity, and estimate basin inflow and infiltration. The temporary flow monitoring data was collected for a period of approximately 60 days from December 10, 2015 to February 11, 2016. The "Wastewater Collection System Infiltration & Inflow Study" prepared by ADS summarizes the flow monitoring program and was submitted to the City as a stand-alone report. A copy of the report is included in Appendix B.

2.6.1 Flow Monitoring Program Description

2.6.1.1 Flow Monitoring Sites and Tributary Areas

Twelve (12) sewer basins were monitored during the flow monitoring period. Ten (10) open-channel flowmeters were installed, maintained, and monitored by ADS at locations selected by Carollo and the City. Two additional City-owned meters provided flow monitoring data during the same time period at two additional basins.



TYPICAL EFFECTS OF INFLOW AND INFILTRATION

FIGURE 2.10

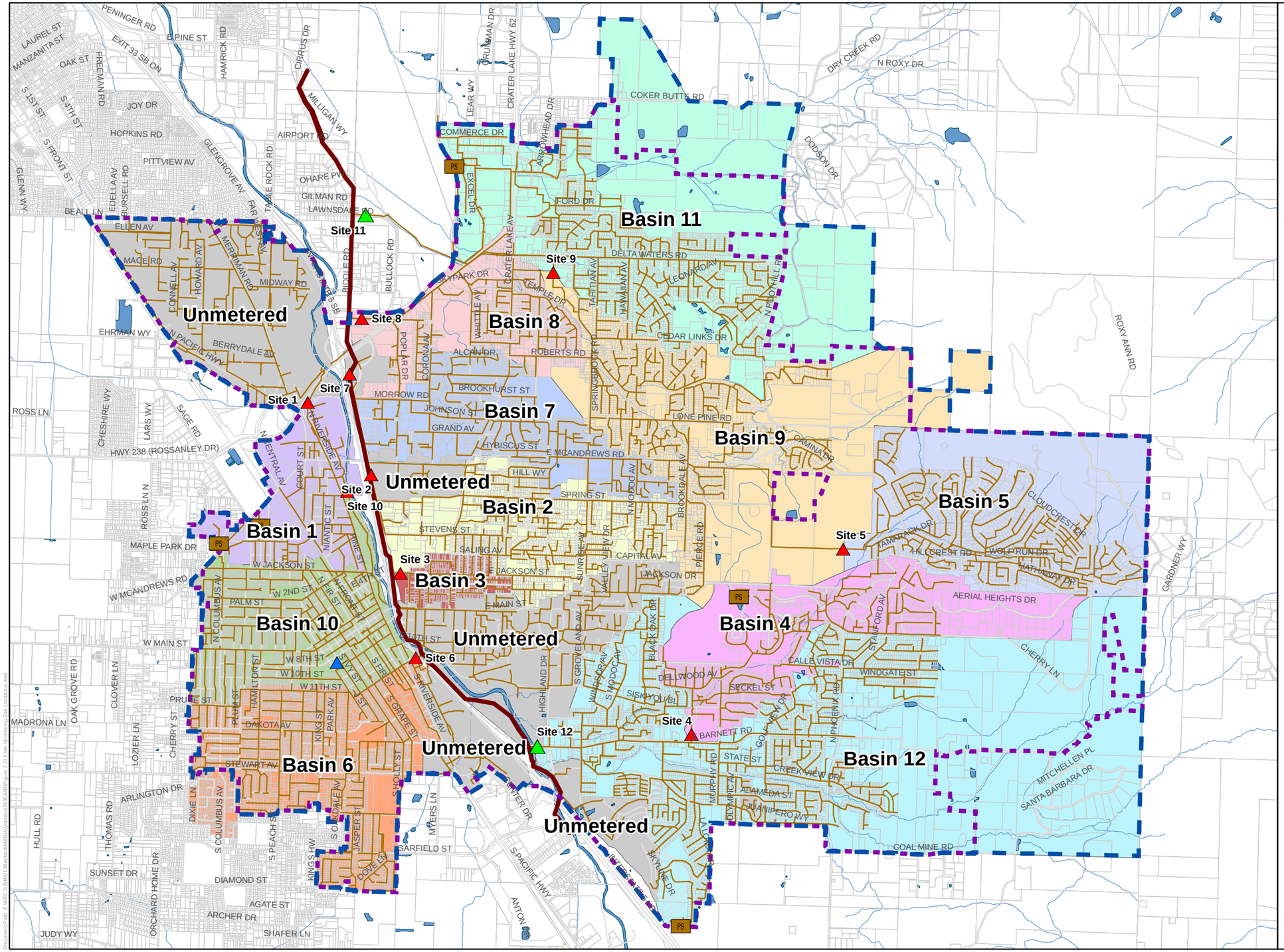
CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

The meter sites were selected to best isolate and model the critical areas and subareas within the sewer system. The 12 flow monitoring locations, as well as the area tributary to each site, are shown on Figure 2.11. Table 2.12 lists the flow monitoring locations and the diameters for the sewers where the meters were installed. Figure 2.12 provides a schematic illustrating the flow monitoring locations to help understand how the basins connect.

Table 2.12 Flow Monitoring Locations
Sanitary Sewer Master Plan
City of Medford

Monitor Site	Manhole ID	Pipe Diameter (in.)	Location
Site 1	7390	33	At the intersection of Crater Lake Highway and N Pacific Highway.
Site 2	5646	18	Along Birdie Road, 450 feet south of E McAndrews Road.
Site 3	3481	12	Along E Jackson Street, 300 feet west of Hawthorne Avenue.
Site 4	4226	15	At the intersection between E Barnett Road and Medical Center Drive.
Site 5	4839	10	2,400 feet east of N Foothill Road and 1,300 feet north of Hillcrest Road.
Site 6	3301	18	At the intersection of Franquette Street and E 12th Street.
Site 7	5883	24	At the intersection of Crater Lake Highway and Interstate 5.
Site 8	7606	16	At the intersection of Hilton Road and Biddle Road.
Site 9	6204	18	Along Kennedy School Park.
Site 10	7596	27	Along Bear Creek at the intersection of N Riverside Avenue and Manzanita Street.
Site 11(1)	10083	24	Along Lawnsdale Road, 450 feet east of Biddle Road.
Site 12(1)	2865	21	Along E Barnett Road, 100 feet east of Bear Creek.

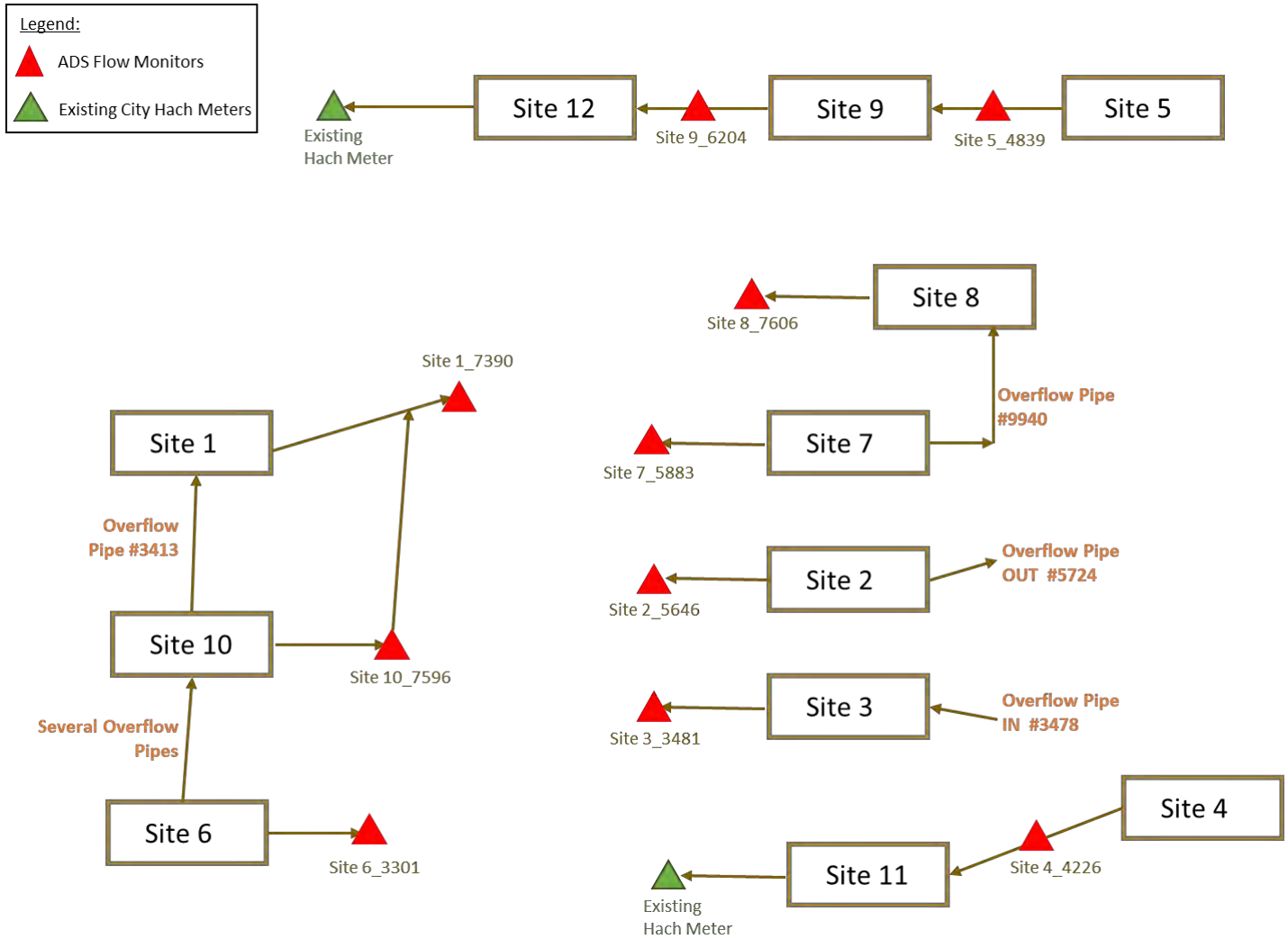
Note:
(1) Site 11 and Site 12 are permanent Hach meters owned by the City.



FLOW MONITORING SITE LOCATIONS

FIGURE 2.11

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



FLOW MONITORING SCHEMATIC

FIGURE 2.12

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

2.6.1.2 Flow Meter Installation and Flow Calculation

ADS installed ten ADS Model 8000 Triton+™ Wireless Open Channel Flow Monitors. These meters use a pressure transducer to collect depth readings and ultrasonic Doppler sensors on the probe to determine the average fluid velocity. The flow meters used are non-contact meters that use radar to measure velocity and down-looking ultrasonic sensors to measure depth. ADS selected the optimal type of flow meter to use on a site-to-site basis based on the hydraulic characteristics at each site, as well as other factors.

ADS conducted an analysis of the data retrieved from each flow meter, and made adjustments as needed for calibration based on the field measurements. The flow at each meter was then calculated at 15-minute intervals based on the continuity equation:

$$Q = V \times A$$

where,

Q = Pipeline flow rate, cfs

V = Average velocity, ft/s

A = Cross sectional flow area, ft2

2.6.1.3 Rain Gauges

One rain gauge was installed by ADS to capture rainfall that occurred throughout the flow monitoring program. The tipping bucket type rain gauge was installed on the roof of City Hall and its geographical location is shown on Figure 2.8.

2.6.2 Flow Monitoring Results

This section summarizes the results of the flow monitoring program, including dry weather flow data, rainfall data, and wet weather flow data. Data collected from Meter 02 is presented throughout this and other chapters as an example of the type of data and the results from the flow monitoring program. Refer to Appendix B for additional data summaries and other information associated with the remaining meter sites.

2.6.2.1 Dry Weather Flow Data

During the flow monitoring period, depth and velocity data were collected at each meter at 15-minute intervals. Carollo aggregated the 15-minute data to hourly data for use in the hydraulic model.

ADWF was developed using the driest days from the flow monitoring period defined based on the following set of minimum criteria:

- No rain occurring within the previous 3-day period,
- Selected days must exhibit average-day flows within 85 percent to 115 percent of the average-day flows of remaining dry days,
- In addition, those dry days that exhibited unusual flow patterns were not used to generate net dry day flow values for a basin.

Characteristic dry weather 24-hour diurnal flow patterns for each site were developed based on the hourly data. The hourly flow data were used to calibrate the hydraulic model for the observed dry weather flows during the flow monitoring period.

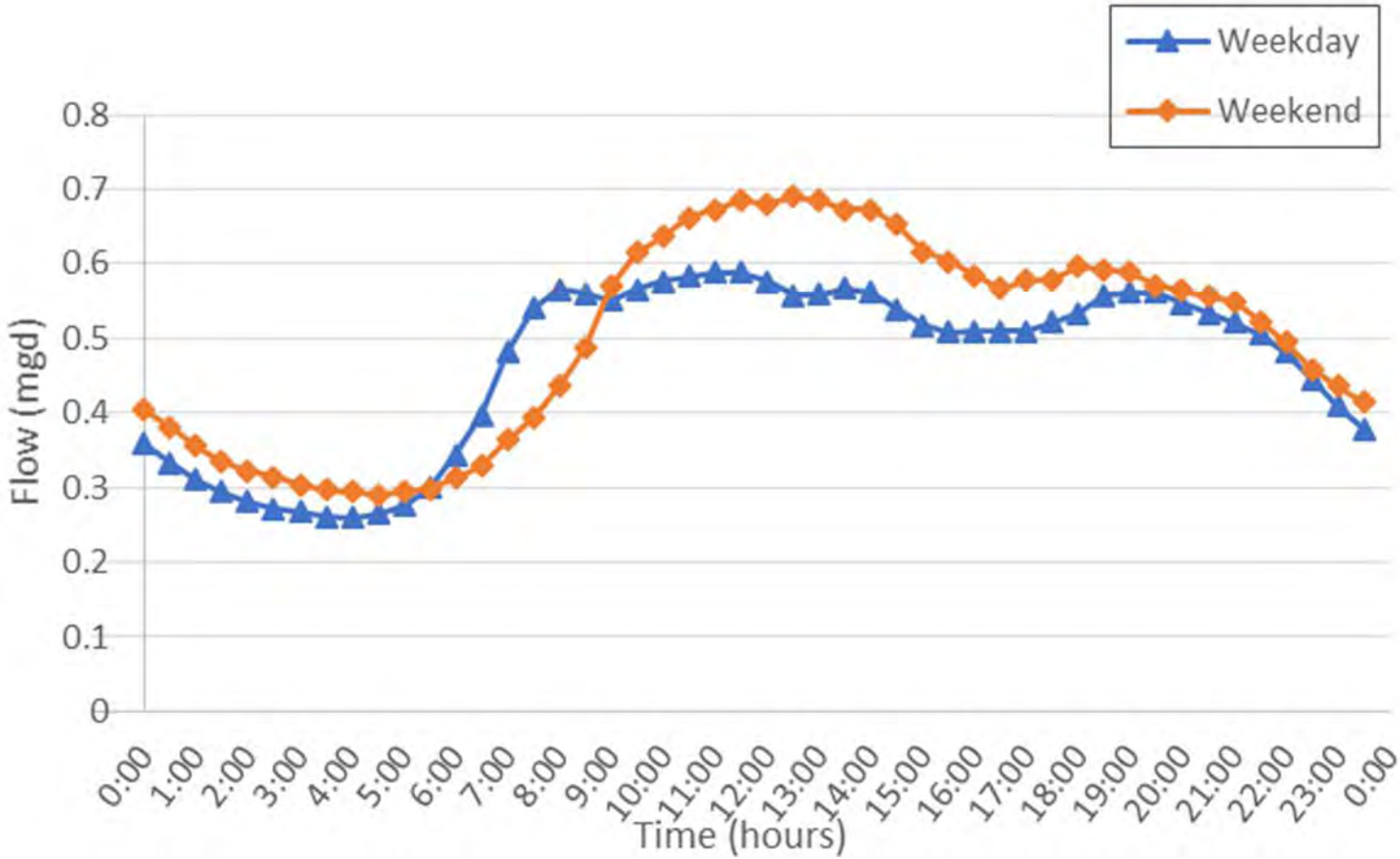
Typically, a diurnal pattern with mostly residential uses has two peaks with the more pronounced peak following the wake-up hours of the day, and a less pronounced peak occurring in the evening. Commercial and industrial oriented-patterns, though they vary depending on the type of use, typically have more consistent higher flow patterns during business hours, and lower flows at night. Hourly patterns for weekday and weekend flows vary and were separated to better understand dry weather flow.

In addition, Carollo estimated the average weekday and weekend dry weather levels and velocities at each site from the data provided by ADS, which are used in the dry weather flow calibration.

Figure 2.13 illustrates a typical variation of weekday and weekend flow in the City, which is based on the data collection from Meter 02. Similar graphics associated with the remaining sites are included in Appendix B. Table 2.13 summarizes the dry weather flows at each meter, and the different components of ADWF at each meter.

2.6.2.2 Rainfall Data

An important part of the RDII study is the collection and analysis of rainfall data. One tipping bucket type rain gauge was temporarily set up for this SSMP. Four significant rainfall events occurred during the course of the flow monitoring period, as well as a few other relatively minor events. The rainfall data recorded over the course of the flow monitoring program is illustrated in Figure 2.14. Figure 2.15 illustrates the total accumulation of rainfall over the course of the flow monitoring period for the ADS tipping bucket type rain gauge. Table 2.14 summarizes the total rainfall recorded at the ADS rain gauge during the main rainfall event, as well as over the entire flow monitoring period.



TYPICAL WEEKDAY VS WEEKEND DRY WEATHER FLOW VARIATION (METER 2)

FIGURE 2.13

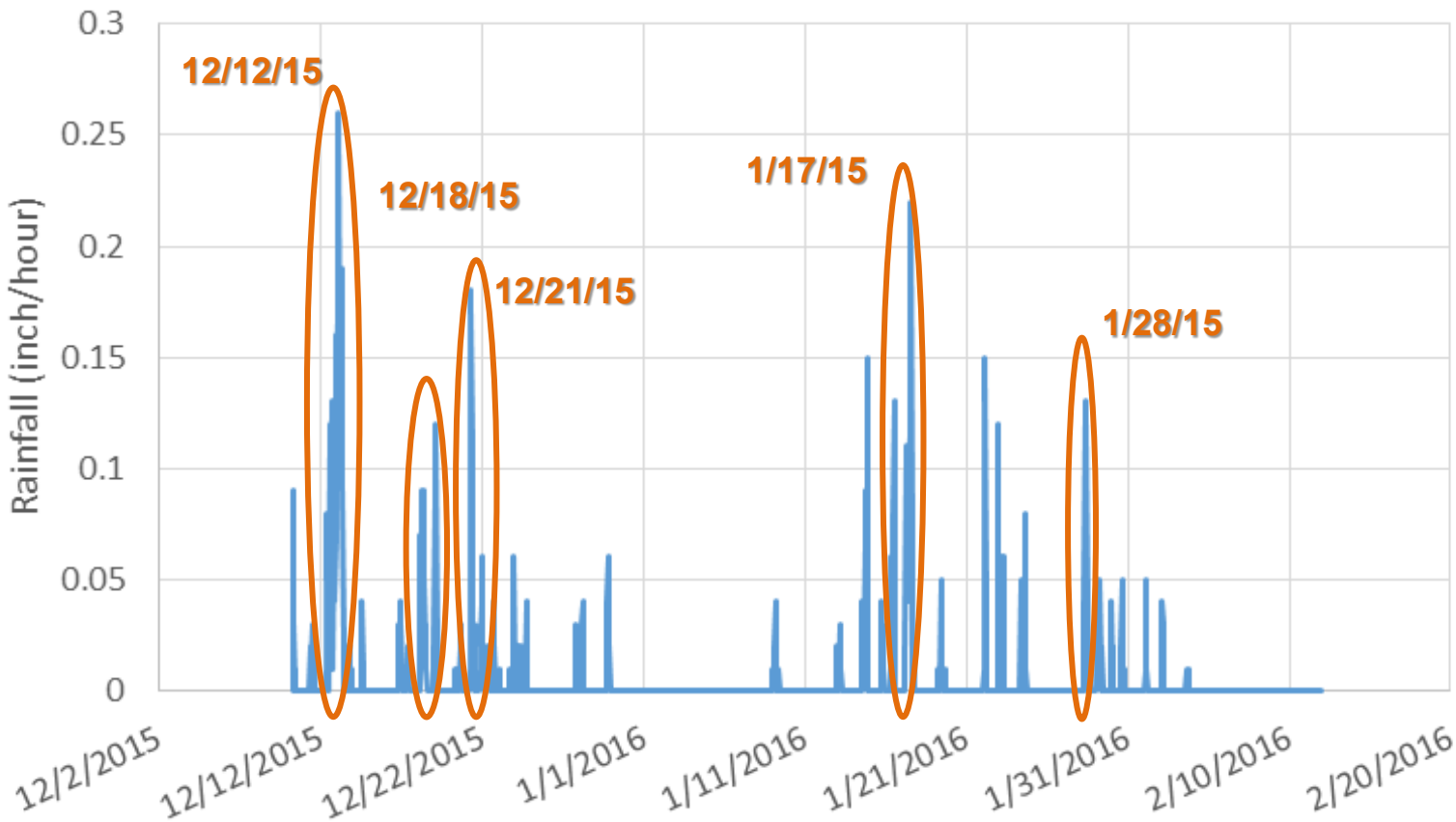
CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Table 2.13 Dry Days and Base Infiltration Estimates[1]
Sanitary Sewer Master Plan
City of Medford

Monitor Site	Gross[2] ADWF (mgd)	Gross BI[3] (mgd)	Net[4][5] ADWF (mgd)	Net BI(6) (mgd)	Net BWP[7][8] (mgd)	Net BI (% ADWF)[7]
Site 1	1.22	0.51	0.46	0.24	0.28	0.55
Site 2	0.47	0.18	0.47	0.18	0.29	0.39
Site 3	0.12	0.04	0.12	0.04	0.08	0.36
Site 4	0.26	0.14	0.26	0.14	0.12	0.54
Site 5	0.18	0.06	0.18	0.06	0.12	0.35
Site 6	1.92	1.16	1.92	1.15	0.77	0.60
Site 7	0.80	0.33	0.77	0.33	0.44	0.44
Site 8	0.46	0.22	0.46	0.22	0.24	0.49
Site 9	0.69	0.21	0.51	0.15	0.36	0.30
Site 10	0.76	0.27	0.76	0.27	0.49	0.36
Site 11	0.99	0.31	0.73	0.17	0.56	0.24
Site 12	0.79	0.31	0.35	0.10	0.25	0.27

Notes:

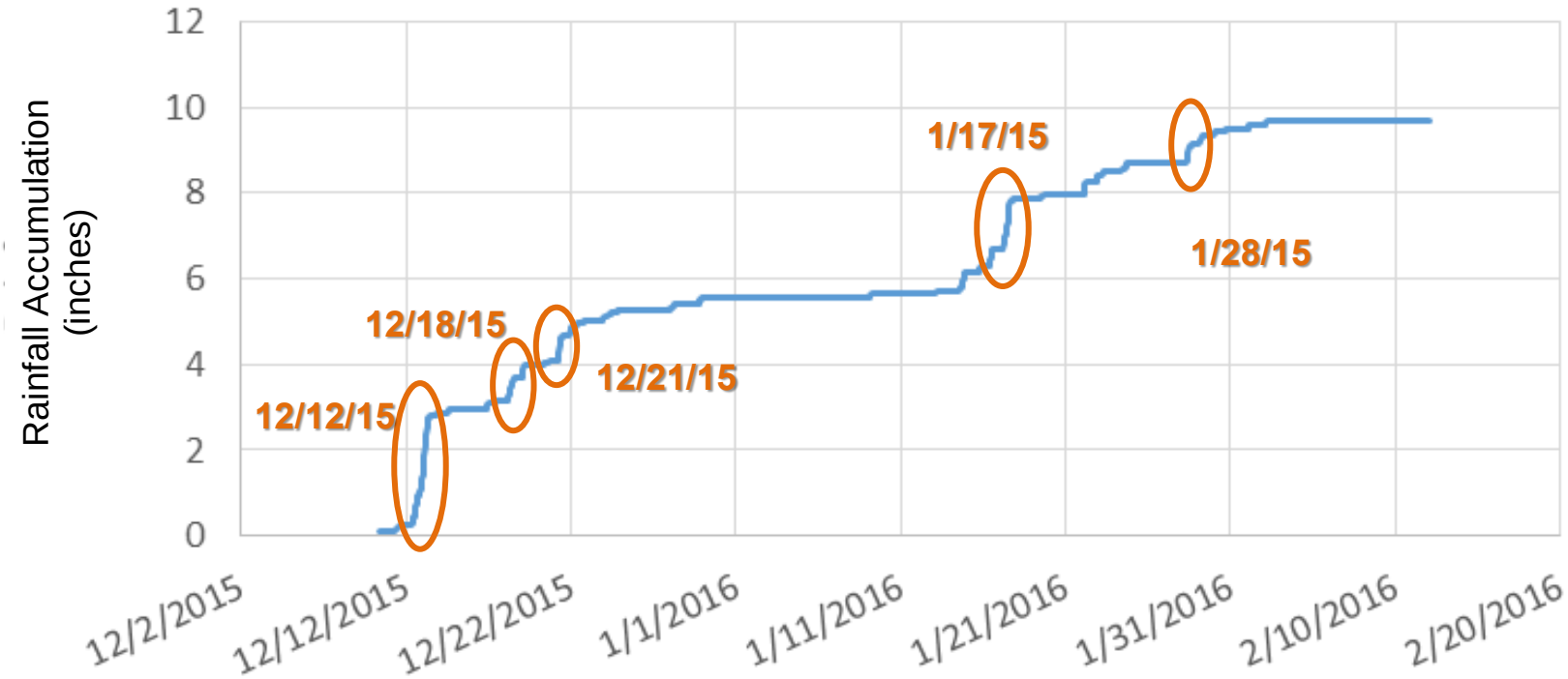
(1) Source: Wastewater Collection System Flow Monitoring and Inflow & Infiltration Study, June 2016.
(2) Gross values include the meter basin flow and all flows coming from any upstream meters.
(3) BI = Base Infiltration and is calculated using the Stevens/Schutzbach empirical method.
(4) Net values correspond to the meter basin flow independently from the upstream meters. Upstream meters flows are subtracted to obtain the net values.
(5) ADWF was calculated as follows (5*Weekday ADWF + 2*Weekend ADWF) / 7.
(6) Net BI (% ADWF) is a metric estimating the severity of infiltration in each basin.
(7) BWP = Base Wastewater Production and is calculated by subtracting BI to ADWF.
(8) Net BWP = Net ADWF-Net BI



RAINFALL ACTIVITY OVER FLOW MONITORING PERIOD

FIGURE 2.14

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



RAINFALL ACCUMULATION PLOT

FIGURE 2.15

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Table 2.14 Rainfall Event Summary Sanitary Sewer Master Plan City of Medford	
	Measured Rainfall (in.)
Rainfall Event	**ADS City Hall**
12/12/2015	2.86
12/18/2015	0.96
12/21/2015	1.14
01/17/2016	1.26
Total over Monitoring Period	

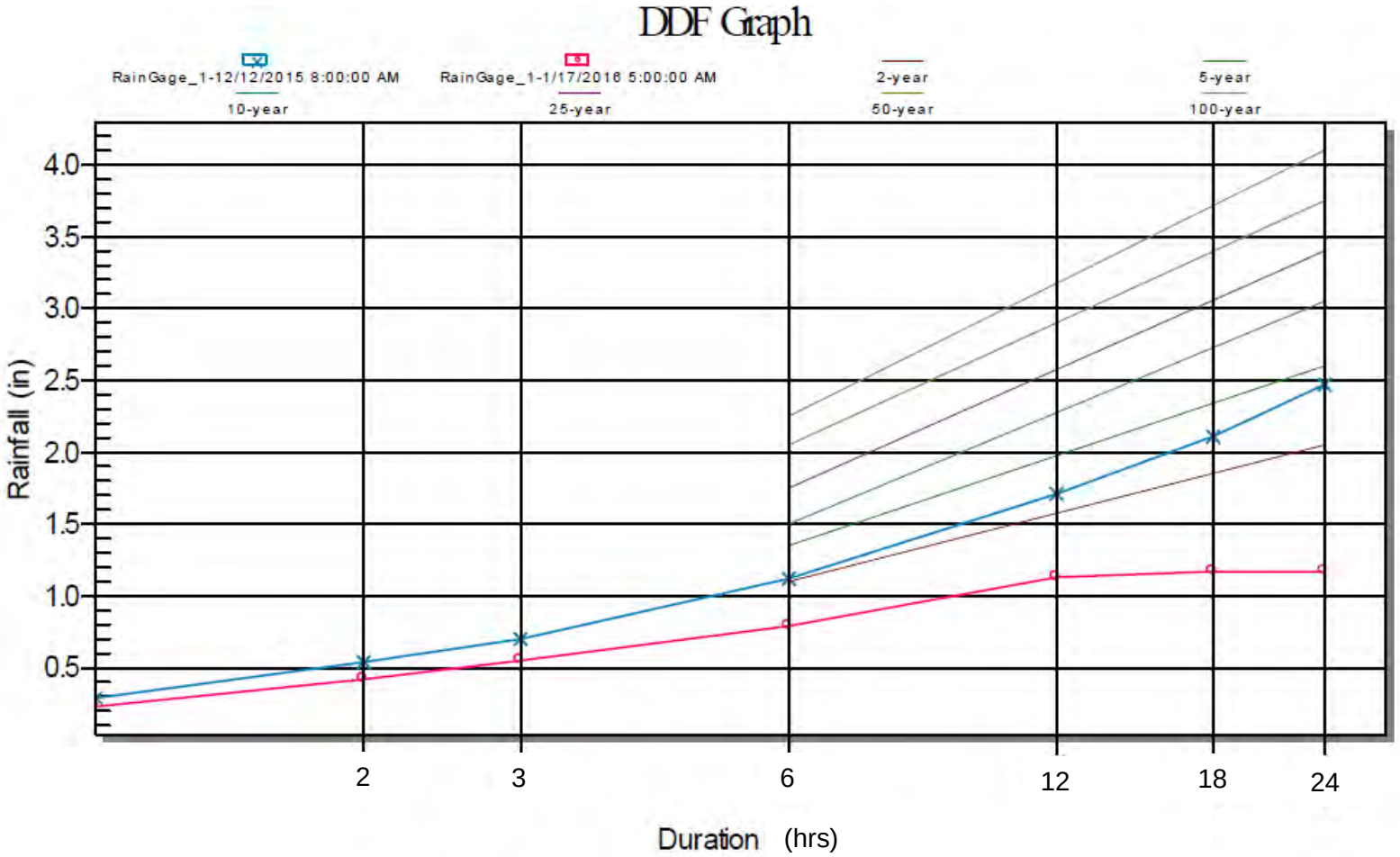
The flow monitoring report prepared by ADS (Appendix B) classifies the 12/12/2015 event as a 4-year, 24-hour event, and each of the three other rainfall events as less than 2-year, 24-hour event. However, the storms did provide data in terms of the collection system's RDII response to wet weather flow events, and is appropriate for RDII analysis and model calibration purposes. The rainfall event classification is shown in Figure 2.16.

The total rainfall recorded over the duration of the flow monitoring period ranged from 0.96 inches to 2.86-inches.

2.6.2.3 Wet Weather Flow Data

The flow monitoring data were also evaluated to determine how the collection system responds to wet weather events. As mentioned above, the flow monitoring program captured one main rainfall event. The rainfall event that occurred on December 12, 2015 was associated with the largest RDII response during the flow monitoring period, and is the most appropriate to be used for RDII analysis.

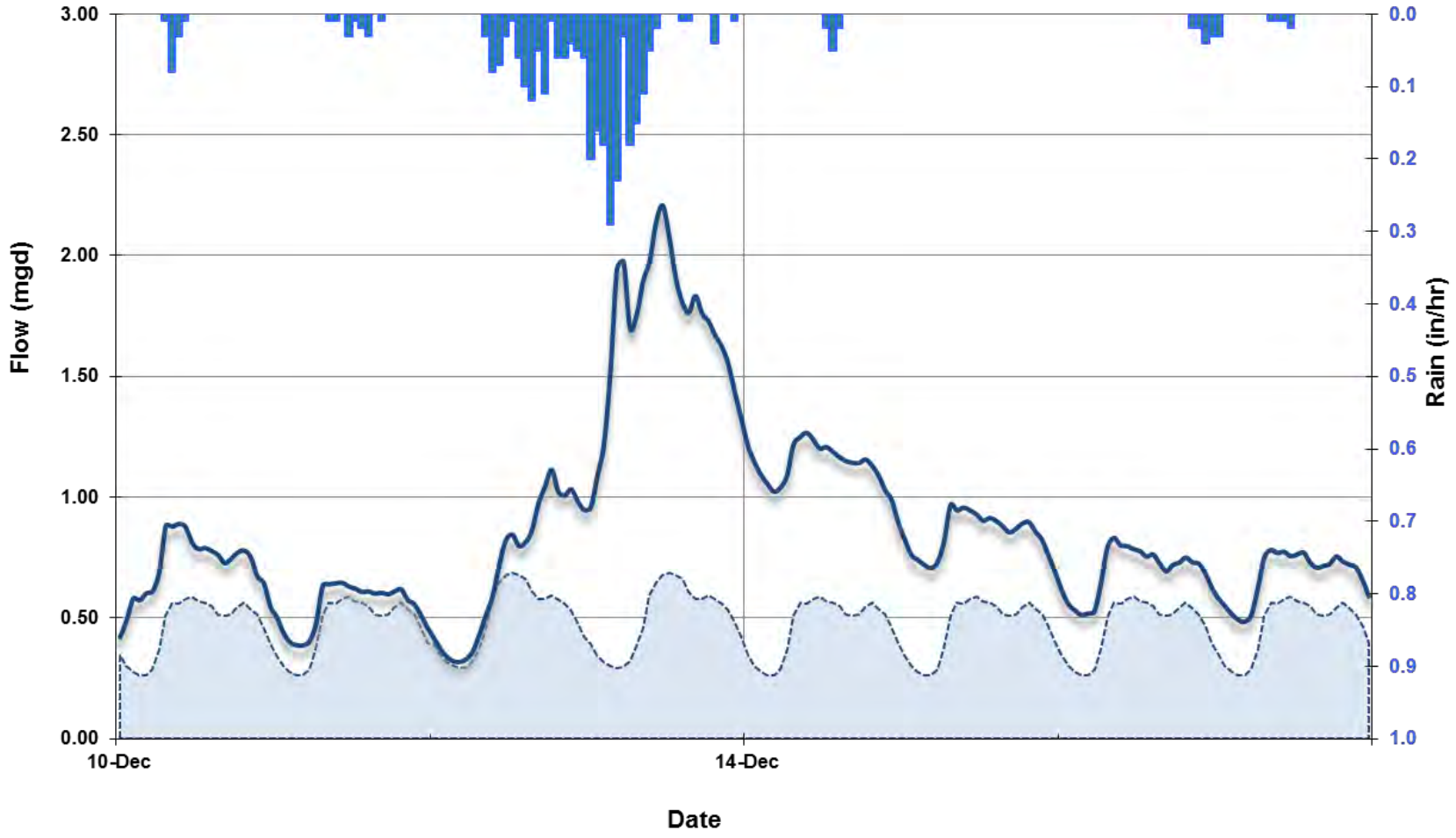
Figure 2.17 shows an example of the wet weather response at Meter 02 during the December 12, 2015 rainfall event. This figure also illustrates the volume of RDII that entered the system from the collection system upstream of Meter 02. The light blue area is the base sanitary flow while the dark blue line is the measured flow from the flow monitoring period. As can be seen in the figure, discernible amounts of RDII do enter the system during wet weather events. Similar graphs were generated for the remaining monitoring sites and can be found in Appendix B, as well as capacity indicators in the collection system during the flow monitoring period, such as the depth vs diameter (d/D) ratio.



CLASSIFICATION OF RAINFALL EVENTS

FIGURE 2.16

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



EXAMPLE WET WEATHER FLOW RESPONSE (METER 2)

FIGURE 2.17

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

2.7 DRY WEATHER FLOW PROJECTIONS

Developing an accurate estimate of the future quantity of wastewater generated at build-out of the collection system is an important step in maintaining and sizing sewer system facilities, for both existing conditions and future scenarios.

Base flow can be estimated for a sewer system by comparing dry weather flow and wet weather flow at the various flow monitoring locations. To estimate ADWF for more specific areas, such as individual wastewater basins, dry weather flows are typically estimated based on the area contributing to flows and flow factors developed for each land use type. This method is developed based on the assumption that areas with similar land uses, such as low density residential parcels, produce equivalent quantities of wastewater flow. System-wide flows can be compared to known flows at flow monitors, or at the treatment plant to verify accuracy. This method of estimating base flows is an industry standard for planning and provides sufficiently accurate data for planning purposes.

2.7.1 Existing Average Dry Weather Flows

This section presents the existing flow data available for this SSMP. Overall ADWF, BWP, and BI were estimated using data from the Flow Monitoring Program for each of the twelve flow monitoring basins. The City's four largest industrial customers were evaluated separately and water consumption data was provided to estimate sewer flows.

2.7.1.1 Baseline Wastewater Production and Infiltration

After reviewing the flow monitoring data, BWP and BI were estimated for each flow monitoring basin and were presented in Section 2.6.2.1 in Table 2.13.

2.7.1.2 Largest Industrial Customers

The City serves four large industrial dischargers within the Service Area, as follows:

- Tree Top, Inc Located 662 S Grape Street,
- Roseburg Forest Products, located 2685 N Pacific Highway,
- Timber Products, located 25 E McAndrews Ave,
- Steiner Corp, located 980 Ellen Ave.

The location of these customers is illustrated in Figure 2.18. The City provided data for its four largest water use industrial customers for years 2013 to 2016. Table 2.15 shows the historic water consumption for the four largest customers in the City. Figure 2.19 presents the historic flows by month for the past four years. Table 2.16 presents the provided water consumption data and the assumed existing flows for these customers.

Table 2.15 Historic Largest Industrial Customers Water Consumption
Sanitary Sewer Master Plan
City of Medford

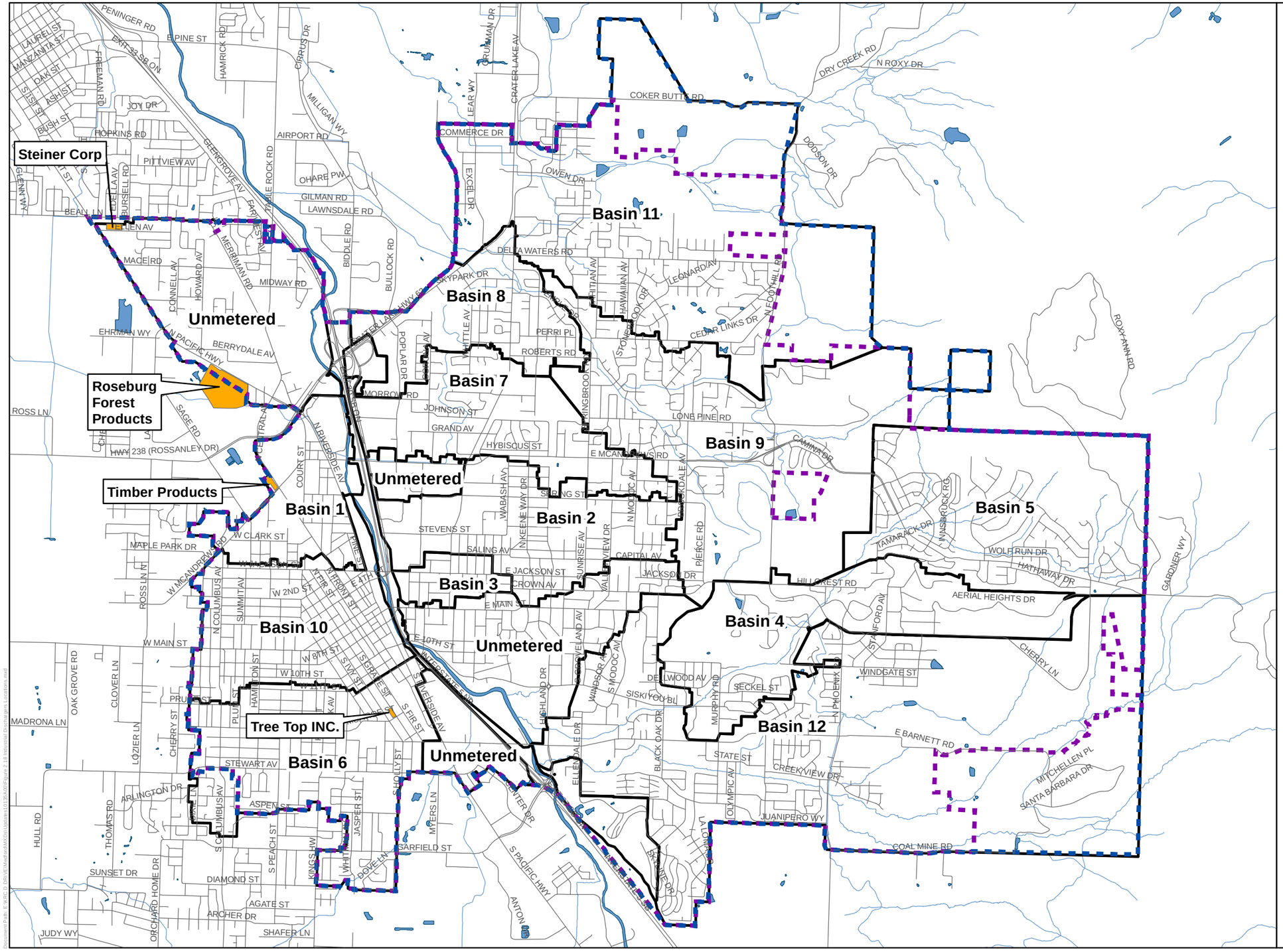
Annual Average (mgd)	2013	2014	2015	2016 (1)
Tree Top, Inc	0.36	0.35	0.35	0.29
Roseburg Forest Products	0.35	0.30	0.27	0.27
Timber Products	0.05	0.08	0.08	0.04
Steiner Corp	0.05	0.06	0.06	0.06

Note:
(1) Year 2016 only includes partial data from January to July 2016.

Table 2.16 Largest Industrial Customers Flows
Sanitary Sewer Master Plan
City of Medford

Customer Name	Existing Water Consumption(1) (mgd)	Data Assumption	Estimated Existing Sewer Flows(2) (mgd)	Sewer Contract Limit	Flow Monitoring Basin ID
Tree Top, Inc.	0.33	Winter Only (2014-2016)	0.28	0.4	Site 6
Roseburg Forest Products	0.27	Year-round (2015-2016)	0.23	0.12	Unmetered
Timber Products	0.065	Year-round (2015-2016)	0.055	0.029	Site 1
Steiner Corp	0.06	Year-round (2014-2016)	0.051	0.09	Unmetered

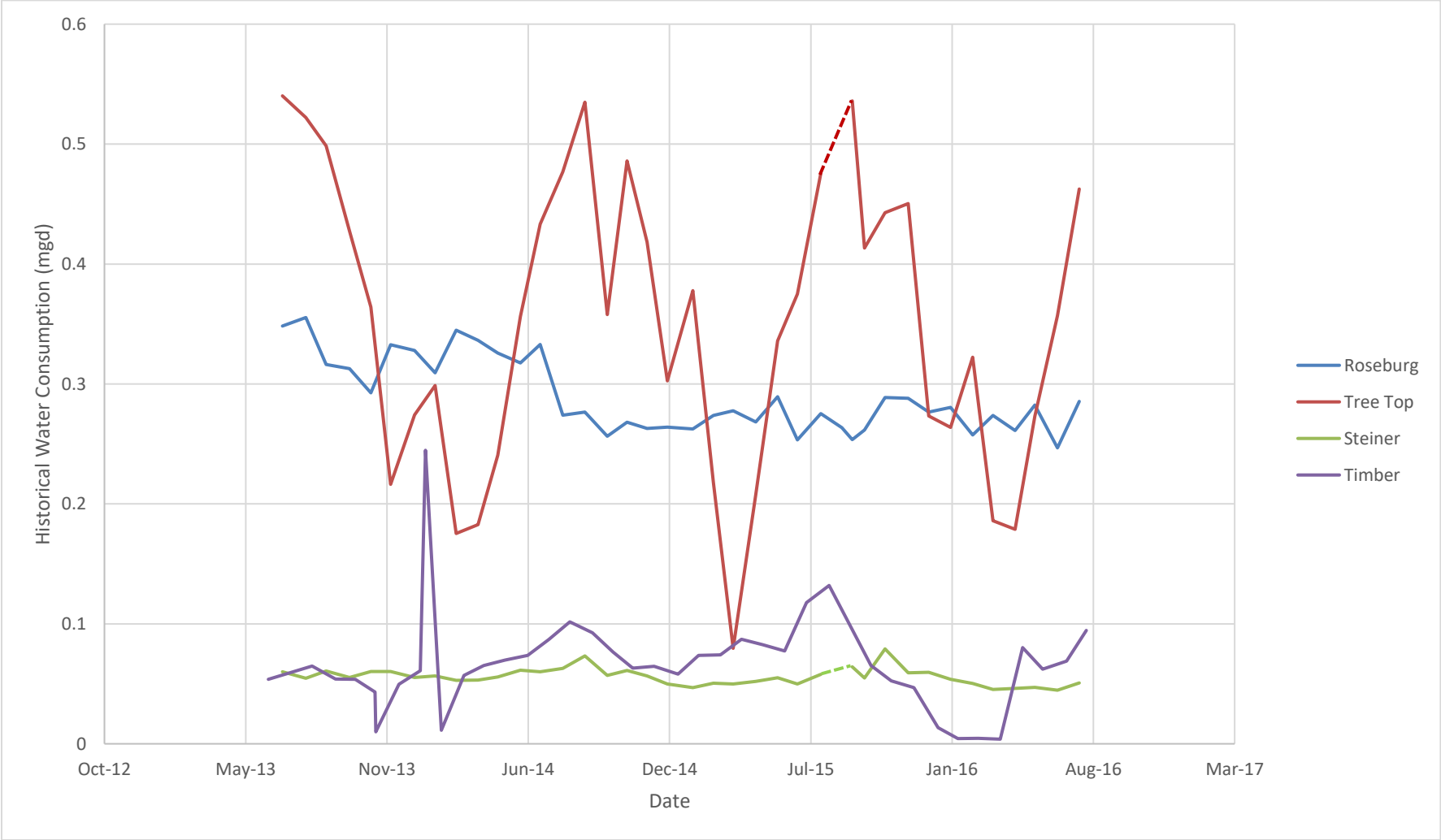
Notes:
(1) Data Assumption column states the assumptions made to estimate Existing Water Consumption. Tree Top, Inc is irrigating during the summer, therefore, only winter months were used to estimate sewer flows.
(2) Water to Sewer Ratio of 85%.



LARGEST INDUSTRIAL DISCHARGERS LOCATIONS

FIGURE 2.18

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



HISTORIC INDUSTRIAL DISCHARGERS FLOWS

FIGURE 2.19

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

The monthly water use data was used to estimate the ADWF by using an assumed ratio of potable water consumed to wastewater generated. This ratio typically ranges between 40 and 90 percent and is heavily dependent on the types of land use within the contributing area. The existing area of the City contains both residential and mixed use commercial. Therefore, a water to sewer ratio of 85% was applied to estimate sewer flows from water consumption data, which is a typical industry standard ratio, and was deemed reasonable for this SSMP.

Table 2.16 also shows the customer's sewer contract limit.

Per City's direction, it was assumed that the City does not plan on adding additional industrial customers to the Service Area. It is however to be noted that at the end of developing this SSMP, it was determined that the majority of the sewer flows from Timber Products discharges to RVSS. Given the small flows, almost negligible, from this customer, no changes were made to the flow projections on this chapter.

2.7.1.3 Existing Parks Flows

The City decided to allocate an existing flow of 1,600 gpd to the following parks to account for flows from toilets and other amenities:

- Bear Creek Park,
- Donahue,
- Fichtner,
- Hawthorn Park,
- Jackson Park,
- Lone Pine Park,
- Railroad Park.

2.7.1.4 Existing ADWF Summary

The different components of the existing ADWF determined from the flow meters available for each wastewater basin are summarized in Table 2.17, along with the existing flows from the four largest customers in the collection system. The net BWP presented in the last column in Table 2.17 is the BWP used to develop the planning flow factors in Section 2.8.2.

Table 2.17	Existing ADWF Summary[1] Sanitary Sewer Master Plan City of Medford				
Monitor Site	**Total Net ADWF [2] (mgd)**	**Total Net BWP (mgd)**	**Total Parks Flow (mgd)**	**Total Largest Customers Flow (mgd)**	**Total BWP - parks and Largest Industries**
Site 1	0.46	0.28	0.002	0.06	0.22
Site 2	0.47	0.29	0.002		0.29
Site 3	0.12	0.08	0.002		0.08
Site 4	0.26	0.12	0.000		0.12
Site 5	0.18	0.12	0.000		0.12
Site 6[3]	1.92	0.77	0.002	0.28	0.49
Site 7	0.77	0.44	0.000		0.44
Site 8	0.46	0.24	0.000		0.24
Site 9	0.51	0.36	0.002		0.36
Site 10	0.76	0.49	0.000		0.49
Site 11	0.73	0.56	0.000		0.56
Site 12	0.35	0.25	0.000		0.25
Unmetered	2.05[5]	1.24	0.004	0.28	0.96[4]

Notes:

(1) Source: Wastewater Collection System Flow Monitoring and Inflow & Infiltration Study, June 2016.
(2) ADWF = BWP + BI, with BWP = Land use based BWP + four largest customers + parks.
(3) Site 6 flow includes flow from RVSS, that are estimated at 0.05 mgd.
(4) Unmetered Land Use Based BWP was estimated based on the flow factors developed in Section 2.13.
(5) BI for the unmetered areas was estimated using the average BI from the flow monitoring basins.

The current ADWFs are also estimated for the wastewater basins presented in Section 2.4.5. ADWFs in the wastewater basins are estimated using the planning flow factors developed in the section below (Section 2.8.2). Table 2.18 summarizes BWP, BI, and ADWF for the City's wastewater basins.

2.7.2 Planning Wastewater Flow Factors

In order to develop wastewater flow projections and allocate future flows to the collection system, relationships between land use and wastewater generation were developed. These relationships, called planning wastewater flow factors are established based on the average wastewater flow generated for each existing land use type. The land use flow factors were established to project the estimated BWP through build out of the City’s wastewater collection system and project future flows within the study area boundary.

Table 2.18 Existing ADWF Components by Wastewater Basin
Sanitary Sewer Master Plan
City of Medford

FM Basin ID	Total Existing ADWF [1] (mgd)	Total BI[4] (mgd)	Total BWP[3][5] (mgd)	Largest Industrial Customers (mgd)	Parks (mgd)
A1	0.11	0.03	0.08		
A2	0.24	0.07	0.18		
B	0.75	0.26	0.49		0.002
C	0.37	0.14	0.23		
D	0.82	0.36	0.46		
E	0.57	0.22	0.35		0.002
F	0.16	0.06	0.10		0.002
G	0.14	0.06	0.09		
H	0.24	0.09	0.14		
I	0.26	0.14	0.12		
J	0.84	0.20	0.64		
K	0.75	0.30	0.45	0.28	0.004
K1	0.42	0.16	0.25		
L	0.63	0.25	0.39	0.06	0.002
M	0.66	0.24	0.43		
N[2]	1.94	1.16	0.77	0.28	0.002
O	0.18	0.07	0.11		
Total	**9.05**	**3.80**	**5.25**	**0.62**	**0.014**

Notes:

(1) ADWF = BWP + BI, with BWP = Land use based BWP + four largest customers + parks.
(2) Basin N flows includes flow from RVSS, which are estimated at 0.05 mgd.
(3) Unmetered Land Use Based BWP was estimated based on the flow factors developed in Section 2.13.
(4) BI for the unmetered areas was estimated using the average BI from the flow monitoring basins.
(5) Total BWP includes flows from the four largest industrial customers and specific park flows.

2.7.2.2 Flow Factors Development Methodology

Planning wastewater flow factors are rates, usually expressed in gallons per day per acre (gpda), applied to either gross or net acres for calculating average day flow generated from a particular land use. A flow factor was developed for each of the land use classifications discussed previously. The flow factor provides a means to transform a land use category from acreage into wastewater flow. The resulting flow is then input into the appropriate sewer area in the sewer system model. Wastewater flow factors for residential areas can range between 200 to 3,000 gpda, and commercial and industrial areas might range from 500 to 2,500 gpda, with typical values averaging approximately 1,000 gpda for commercial areas. Land uses designated as vacant, parks and open space are assumed to generate negligible amounts of sewage flow, and as a result have a flow factor of zero.

The coefficients are developed using the following procedure:

- Average flows for each flow metering tributary area were derived from the flow-monitoring data (described in Section 2.7).
- Using GIS, the acres for each land use type contained in each flow-monitoring tributary area were calculated.
- Preliminary factors for each land use type were assumed based on typical values, which can be estimated from the approximate number of dwelling units per acre, the assumed per capita wastewater generation rates, and/or the typical number of people per dwelling unit for each land use type.
- The factors for each flow metering tributary area were adjusted up or down (balanced) within a reasonable amount (based on engineering judgment) until the calculated average flows from each tributary match what was measured during the flow monitoring period. If the flow factors produced average flows that were significantly different from the field measured flows, further investigation was conducted to verify that the tributary basins were delineated correctly and if the collection system configuration was correct. Flow Factors are developed using the field estimated BWP excluding parks and the four largest industries.
- Once the factors for the 12 flow meter tributary areas were balanced, the weighted average of the factors for each land use type was calculated based on the acreage contribution from each metering tributary area. The weighted average factors are considered representative of wastewater generation by land use for the City as a whole, and are used to project future average wastewater flows.

2.7.2.3 Existing Flow Factors

For example, for Flow Meter 2, the base wastewater production (BWP) during the flow-monitoring period was approximately 0.29 mgd. The tributary service area upstream of this flow monitor is developed with buildings falling into a variety of zoning categories, including commercial, Urban Low Density Residential, and Urban High Density Residential. The

preliminary flow factors were multiplied by the acreages for each land use designation and adjusted until the flows equaled 0.29 mgd. This process was repeated for each flow meter, and weighted flow factors were calculated for each land use category.

Table 2.19 presents the weighted wastewater flow factors and land use areas that represent the City's existing BWP. As with most cities, residential land use makes up the majority of developed land and wastewater flow. For the City, residential customers make up approximately 70 percent of the current base flow. The calibrated wastewater flow factors developed for this SSMP range from 200 gpd/acre to 1800 gpd/acre, as shown in Table 2.19. The land use coefficients generate a BWP to the metered areas of 3.65 mgd, a 0.2 percent different from the metered data observed during the Flow Monitoring Program. Flow Factor development for all other basins can be found in Appendix C.

Table 2.19 Flow Factors Development Summary
Sanitary Sewer Master Plan
City of Medford

Existing Land Use Classification	Total Developed Area (acres)	Wastewater Flow Factor (gpad)	Existing BWP (mgd)
Airport	47	200	0.01
Urban Low Density Residential	3,958	500	1.98
Urban Medium Density Residential	5	930	0.004
Urban High Density Residential	305	1,800	0.55
Service Commercial	200	840	0.17
Commercial	539	940	0.51
General Industrial	231	1,000	0.23
Heavy Industrial	20	1,600	0.03
Schools	242	700	0.17
Parks and Open Space(3)	113	0	0
		Total Estimated BWP =	**3.65**
		Measured BWP(1) =	**3.66**
		% Difference(2) =	**-0.2%**

Notes:
(1) Measured BWP was determined using the City's Flow Monitoring Program data.
(2) % Difference = (Total Estimated BWP - Measured BWP)/Total Estimated BWP.
(3) Park flows were allocated individually to specific parks only (See Section 2.10.3).

2.7.2.4 Future Planning Flow Factors

The adjusted weighted average flow factors for each land use, as shown in Table 2.20, were used to project future flows.

Table 2.20 Future Planning Flow Factors Sanitary Sewer Master Plan City of Medford	
Land Use Classification	**Wastewater Flow Factor (gpd/acre)**
Airport	200
City Center	2,640
Urban Residential	500
Urban Residential (URA)	750
Urban Medium Density Residential	930
Urban High Density Residential	1,800
Service Commercial	840
Commercial	940
Commercial (URA)	1770
General Industrial	1,000
Heavy Industrial	1,600
Schools	700

Note:

(1) Information from the Comprehensive Plan was provided on April 2016, and therefore, the Internal Study Areas (ISA's) was not included as the amendment was approved after this analysis was performed.

The downtown area is planned to redevelop with mixed-used developments and was allocated a specific land use category in the Comprehensive Plan: City Center. This land use type is not represented on the existing land use maps, therefore, no existing flow factor was developed for this specific land use category. A city center (Mixed-Use) flow factor was therefore developed for planning purposes by combining the balanced Service Commercial flow factor with the balanced Urban High Density Residential flow factor resulting in a new City Center flow factor of 2,640 gpd/acre.

The Urban Reserve Urban Residential is expected to be of higher density than the average existing Urban Residential development. The City is expecting the Urban Low Density Residential developments to be approximately 1.5 times denser than the average current development density. Therefore, an Urban Residential flow factor was developed for the Urban Reserves area (URA), resulting in a new flow factor of 750 gpd/acre.

Additionally, the City wishes to use a Commercial flow factor in the Urban Reserve areas higher than the existing Commercial flow factor developed from the flow monitoring data. The City expects these commercial areas to be denser in the future and for planning purposes, the balanced Service Commercial flow factor was combined with the balanced Urban Medium Density Residential flow factor resulting in a new Commercial flow factor of 1,770 gpd/acre for all commercial land in the Urban Reserves area.

Table 2.20 presents the flow factors used to project future flows in the collection system.

2.7.3 Future Projected Average Dry Weather Flows

2.7.3.1 Future Customer Connection Assumptions

Some areas in the City's study area are currently undeveloped and not connected to the collection system. As these areas develop, the City will need to expand its existing collection system to serve these new customers. Figure 2.20 shows the assumptions on where these areas are planned to be connected. Infrastructure recommendations to serve the future undeveloped area are developed as part of Chapter 5.

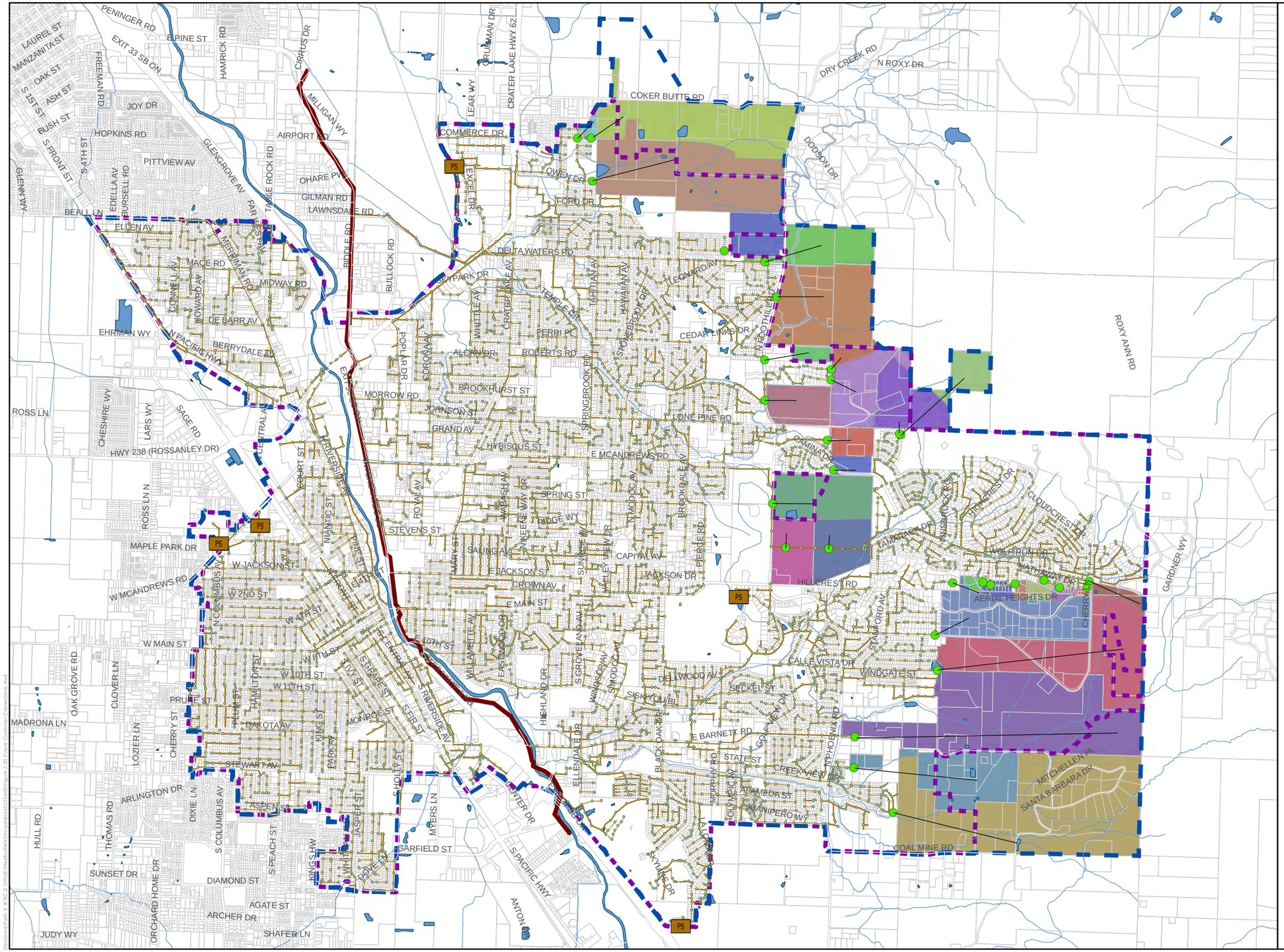
2.7.3.2 Land Use Based BWP Projections

The projected BWPs were developed based on the future land use map (Figure 2.19). The flow factors shown in Table 2.20 were applied to the future build-out land use (acres) to project the wastewater flow generated from infill and new development. The resulting flows represent the projected inflow in the hydraulic model.

Flows were developed for each parcel in the collection system. Flows are separated between existing flows and infill/growth flows. Existing flows developed in Section 7.0 remain the same for each wastewater basin. Infill/growth flows correspond to additional flows expected in the future. Parcels currently vacant and parcels with projected higher flow usage than existing are assigned planning flow factors to estimate additional future flows.

Each parcel's existing land use classification is compared with future land use classification from the Comprehensive Plan. The following analysis was then performed:

- Parcels that show the same land use classification are left as is; (existing flow developed remains as is and no additional flow is assigned).
- Parcels that show a higher future land use classification than the existing ones will be assigned additional ADWF. ADWFs for currently vacant parcels are developed using planning flow factors for each land use type. ADWFs for parcels that are currently developed, but assumed to be redeveloped with a higher wastewater production, are developed using the difference between existing and future flow factors. Only additional flow on top of the existing flow is assigned to these parcels.
- The assumption was made that when the provided land use data showed a decrease in land use classification, no change will be implemented and the existing flow for the parcel will remain the same. This is a conservative assumption that assumes that existing flows will not decrease in the future in the collection system.
- Unmetered areas were allocated the weighted average Flow Factors from the areas that the City monitored during the Flow Monitoring program (Refer to Section 2.13.2).



Legend

- Contributing Manhole
- Other Manhole
- Sewer Gravity Interceptor
- Sewer Main
- Flow Contributing Manhole
- Future growth area
- 2036 Service Area
- Service Area
- Taxlots
- Pump Station
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

Feet
0 4,000

FUTURE CUSTOMER CONNECTION PRELIMINARY ASSUMPTIONS

FIGURE 2.20

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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CITY OF MEDFORD OREGON

2.7.3.3 Largest Industrial Customers Flow Projections

Flow data trends from 2013 to 2016 were evaluated individually for each of the four customers presented in Section 2.8.1.2. It was assumed that no additional large industrial customer is anticipated in the City for the planning period of this SSMP. Future flows were assumed based on historic flow trends. All customers showed almost constant flows over the past 3 years, therefore, existing flows were kept as is for future conditions, as shown in Table 2.21.

Table 2.21 Projected Future BWP - Largest Industrial Customers
Sanitary Sewer Master Plan
City of Medford

	Existing Sewer Flows (mgd)	2036 Projected Sewer Flows (mgd)	Build-out Projected Sewer Flows (mgd)
Tree Top, Inc.	0.280	0.280	0.280
Roseburg Forest Products	0.230	0.230	0.230
Timber Products	0.055	0.055	0.055
Steiner Corp	0.051	0.051	0.051

Note:
(1) Assumptions on determining existing flows can be found in Table 2.17, and sewer flows are based on historical water consumption data. Tree Top flows only include historical winter months. Flows in the summer are impacted by irrigation and are therefore not use to estimate sewer flows.

2.7.3.4 Baseline Infiltration (BI) Projections

Baseline Infiltration projections were calculated based on the following assumptions:

- All Parcels located within the 2036 Service Area will be applied the existing BI rate from the existing flow monitoring basin each parcel to develop is located in. This assumes similar soil and system conditions as what is currently estimated.
- All parcels located in the Urban Reserve Areas will be applied a BI rate of 25% of ADWF. This is the average rate observed in the most recently developed basins (Basin 9, 11, and 12). These parcels are located further from the current collection system and new piping will need to be installed to connect these areas to the City's collection system. New pipes are assumed to be less permeable to flow than the currently installed pipes and that the soil conditions in the URAs are similar to the newly developed basins.

2.7.3.5 Projected Average Dry Weather Flows

Developing an accurate estimate of the future quantity of wastewater generated at build-out of the collection system is an important step in maintaining and sizing sewer system facilities, for both existing conditions and future scenarios. Base flow can be estimated for a sewer by comparing dry weather flow and wet weather flow at the various flow monitoring locations. To estimate ADWF for more specific areas, such as individual wastewater basins,

dry weather flows are typically estimated based on the area contributing to flows and flow factors developed for each land use type.

The future build-out ADWFs were developed by projecting the planning base flows to the build-out planning year land uses.

Projected flows were generated in a similar manner as the existing ADWF. The flow factors developed for the existing land use categories were applied to the future build-out land use (acres) to project the wastewater flow generated from infill and new development. The resulting flows represent the projected inflow in the hydraulic model.

The projected ADWF are estimated for each flow monitoring basin and wastewater basin using the developed planning flow factors are summarized in Table 2.22 and Table 2.23, respectively.

Table 2.22 ADWF Projections Summary by Flow Monitoring Basin
Sanitary Sewer Master Plan
City of Medford

FM Basin ID	Total Existing ADWF (1) (mgd)	Additional 2036 ADWF (mgd)	Additional URA ADWF (mgd)	Total Projected Service Area ADWF (mgd)
Site 1	0.46	0.16	0.00	0.62
Site 2	0.47	0.05	0.00	0.52
Site 3	0.12	0.00	0.00	0.12
Site 4	0.26	0.34	0.00	0.60
Site 5	0.18	0.45	0.02	0.65
Site 6(2)	1.92	0.08	0.00	2.00
Site 7	0.77	0.11	0.00	0.88
Site 8	0.46	0.09	0.00	0.55
Site 9	0.51	0.80	0.00	1.31
Site 10	0.76	0.30	0.00	1.06
Site 11	0.73	1.02	0.61	2.36
Site 12	0.35	0.66	0.70	1.70
Unmetered	2.06	0.26	0.00	2.32
Total	**9.05**	**4.33**	**1.33**	**14.71**

Notes:
(1) ADWF = BWP + BI, with BWP = Land use based BWP + four largest customers + parks.
(2) Site 6 flows includes flow from RVSS, which are estimated at 0.05 mgd.

Table 2.23	ADWF Projections Summary by Wastewater Basin Sanitary Sewer Master Plan City of Medford			
Wastewater Basin ID	**Total Existing ADWF(2) (mgd)**	**Additional 2036 ADWF (mgd)**	**Additional URA ADWF (mgd)**	**Total Projected Service Area ADWF (mgd)**
A1	0.11	0.20	0.38	0.69
A2	0.24	0.47	0.26	0.97
B	0.75	1.24	0.02	2.01
C	0.37	0.09	0.00	0.46
D	0.82	0.10	0.00	0.92
E	0.57	0.07	0.00	0.64
F	0.16	0.00	0.00	0.16
G	0.14	0.01	0.01	0.17
H	0.24	0.03	0.00	0.27
I	0.26	0.32	0.00	0.58
J	0.84	1.12	0.66	2.62
K	0.75	0.08	0.00	0.83
K1	0.42	0.07	0.00	0.49
L	0.63	0.17	0.00	0.80
M	0.66	0.27	0.00	0.93
N(2)	1.94	0.08	0.00	2.02
O	0.18	0.02	0.00	0.20
Total	**9.05**	**4.33**	**1.33**	**14.71**

Notes:
(1) ADWF = BWP + BI, with BWP = Land use based BWP + four largest customers + parks.
(2) Wastewater Basin N flows includes flow from RVSS, that are estimated at 0.05 mgd.

The projected dry weather flows were developed based on the future land-use map presented in Section 2.11.3. Future ADWF for the Service Area are anticipated to increase to 14.71 mgd under build-out conditions. BWP is expected to increase from 5.25 mgd to 9.14 mgd, while BI is expected to increase from 3.80 mgd to 5.57 mgd.

2.7.4 Average Dry Weather Flow Projections Summary

Table 2.24 summarizes the projected components of ADWF for the different planning periods evaluated in this SSMP.

Table 2.24 ADWF Projections Summary Sanitary Sewer Master Plan City of Medford

Flow Component	Existing Conditions	2036 Service Area	Service Area
Parks	0.014	0.014	0.014
Largest Industrial Customers	0.62	0.62	0.62
All Other Customers	4.62	7.51	8.51
Total BWP	**5.25**	**8.14**	**9.14**
Total BI	**3.80**	**5.24**	**5.57**
Total ADWF	**9.05**	**13.38**	**14.71**

2.8 WET WEATHER FLOW PROJECTIONS

Peak wet weather flows in a sewer system, can be more than ten times the base flow, causing utilities to construct high-capacity infrastructure to convey and treat these extraneous flows. This section describes the methodology used for developing existing and future peak flow projections within the City's sanitary sewer system, which was subsequently used for performing the capacity analysis as described in Chapter 5.

2.8.1 Design Storm

Design storms are rainfall events used to analyze the performance of a collection system under peak flows, and have a specific recurrence interval and rainfall duration. The National Oceanic and Atmospheric Administration (NOAA) publishes isopluvial (rainfall contour) maps[1] that can be used to approximate the total rainfall depth for a range of design storms. In Oregon, the 5-year, 24-hour design storm is typical for use with modeling wet weather flows in collection systems. The City selected the 5-year, 24-hour design storm for sizing the City's sewer infrastructure as it meets industry standards, Oregon Department of Environmental Quality standards, and it is the same as the City's DMP 5-year, 24-hour design storm. Total rainfall for the 5-year, 24-hour storm for the Medford area is predicted to be 2.6 inches. Essentially, this design storm has a five percent chance (1/20) that 2.6 inches of rain will fall in any 24-hour period in a given year.

[1] Miller, J., R. Frederick, and R, Tracey. Precipitation-Frequency Atlas of the Western United States, Volume IX-Washington. Washington DC, NOAA 1973.

For the distribution of the design storm, it is possible to utilize a synthetic distribution or to establish a custom distribution based on historical data. The Natural Resources Conservation Service (NRCS), formally known as the Soil Conservation Service (SCS), method is typically used to distribute the rainfall volume and establish a peak intensity over a given storm duration. The NRCS method includes the use of developed normalized rainfall hyetograph distribution curves based on the storm's geographical location. The Type 1A distribution curve was used for the City's design storm. Figure 2.21 shows the distribution curve recommended based on geographical location.

Figure 2.22 shows the custom design storm used for the capacity analysis. Applying the synthetic distribution curve to the total rainfall volume resulted in an hourly peak rainfall intensity of 0.41 inches.

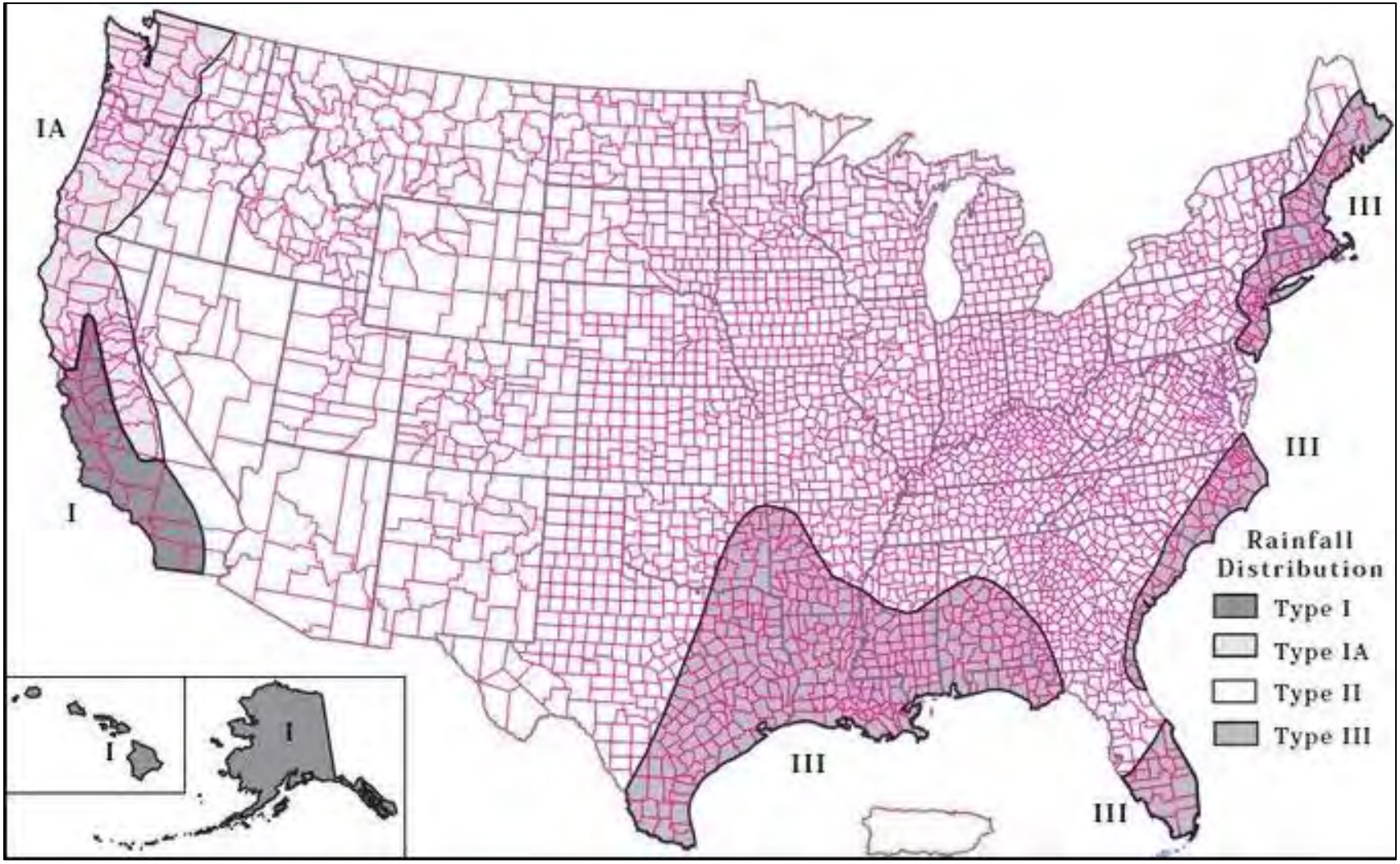
2.8.2 RDII Assumptions for Future Service Areas

To predict future peak flows, RDII in the future service area must be as defined. A direct inflow technique is used. Instead of simulating RDII using an RDII unit hydrograph, RDII is simulated by assuming a constant RDII flow factor per acre of new development. RDII flow factors can range from 1,000 to over 10,000 gpd/acre in the northwest. An RDII Flow Factor of 1,500 gpd/acre was selected for estimating RDII in areas of new development to reflect improved construction methods and integrity of new materials. Additionally, this value also meets the Department of Environmental Quality (DEQ) recommendation.

2.8.3 Existing and Projected Peak Wet Weather Flows

The PWWF represents the maximum hourly flow rate under the selected design storm and growth conditions. Components of the design flow include the ADWF predicted for the scenario and the peak RDII rate predicted by the model using the assumptions described above. To develop the design flows in the hydraulic model, the design storm is routed through the model and the resulting RDII from existing and future development creates the PWWF. Estimated PWWF for the various planning scenarios are summarized in Table 2.25. The maximum PWWF predicted for the Service Area at build-out is 79.1 mgd.

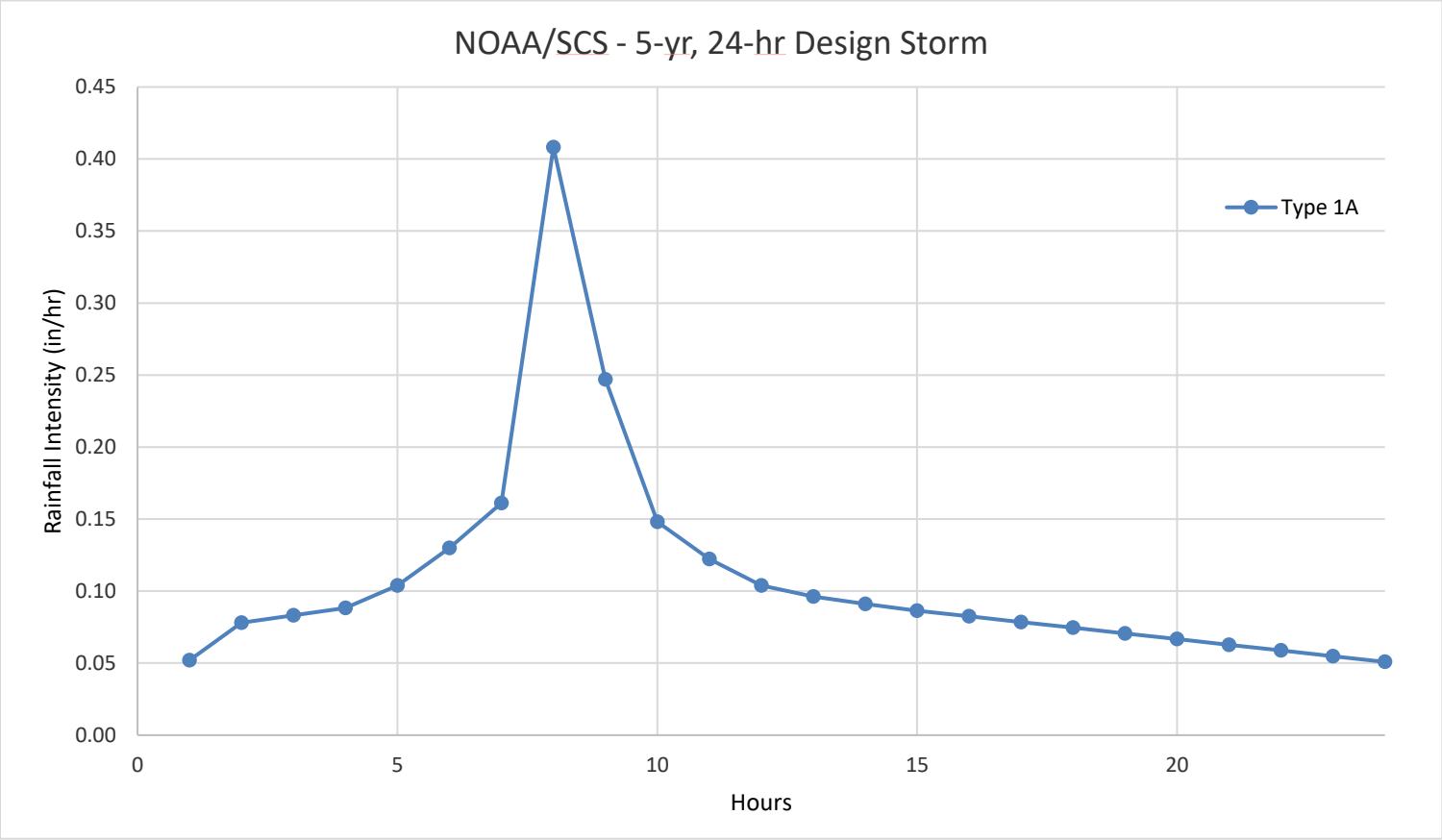
The peak flows presented in Table 2.25 assume that improvements to correct capacity deficiencies (as presented in Chapter 5 - System Analysis) are implemented. The improvement projects alleviate capacity bottlenecks upstream in each basin, which allows higher peak flows to be conveyed through the system. The values in Table 2.25 represent the flows to the RVSS Interceptor if the capacity bottlenecks are resolved. This ensures that the PWWF truly represents the highest flow, without dampening due to upstream capacity deficiencies. Peak flows without improvements would underestimate actual peak system inflow.



NRCS DISTRIBUTION RAINFALL CURVE LOCATIONS

FIGURE 2.21

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



DESIGN STORM HYETOGRAPH

FIGURE 2.22

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Table 2.25 Existing and Projected Wastewater Flows to RVSS Interceptor Sanitary Sewer Master Plan City of Medford			
Condition(3)	**Average Dry Weather Flow (ADWF) (mgd)**	**Peak Wet Weather Flow (PWWF)(1) (mgd)**	**Peaking Factor (PWWF:ADWF)(2)**
Existing	9.05	67.70	7.5
2036 Service Area	13.39	75.68	5.6
Service Area (URA)	14.71	79.12	5.4

Notes:
(1) The PWWF flow (design flow) is the peak hourly flow.
(2) Peaking factor is the Peak Wet Weather Flow divided by the Average Dry Weather Flow.
(3) These conditions represent the flows to the interceptor if the capacity bottlenecks are resolved. This ensures that the PWWF truly represents the peak hour flow, without dampening due to upstream capacity deficiencies.
(4) The City's system has several connections to the RVSS Interceptor. When adding or subtracting flows between basins, the accuracy in reported peak flow decreases. The “level of confidence” for these basins are less than basins with one direct outflow.

2.9 FLOW PROJECTION SUMMARY

Table 2.25 presents the total projected ADWF and PWWF for the three planning periods. The table also includes the ratio between PWFF to ADWF, called the Peaking Factor, which ranges from 5.4 to 7.5.

EXISTING SYSTEM

3.1 INTRODUCTION

This chapter provides an overview of the City's existing wastewater collection system. The City operates and maintains approximately 260 miles of wastewater pipes, pump stations, diversions, and siphons. This chapter provides a description of the City's existing collection system and an inventory of the City's assets. No condition assessment of the existing system was performed.

3.2 COLLECTION SYSTEM FACILITIES

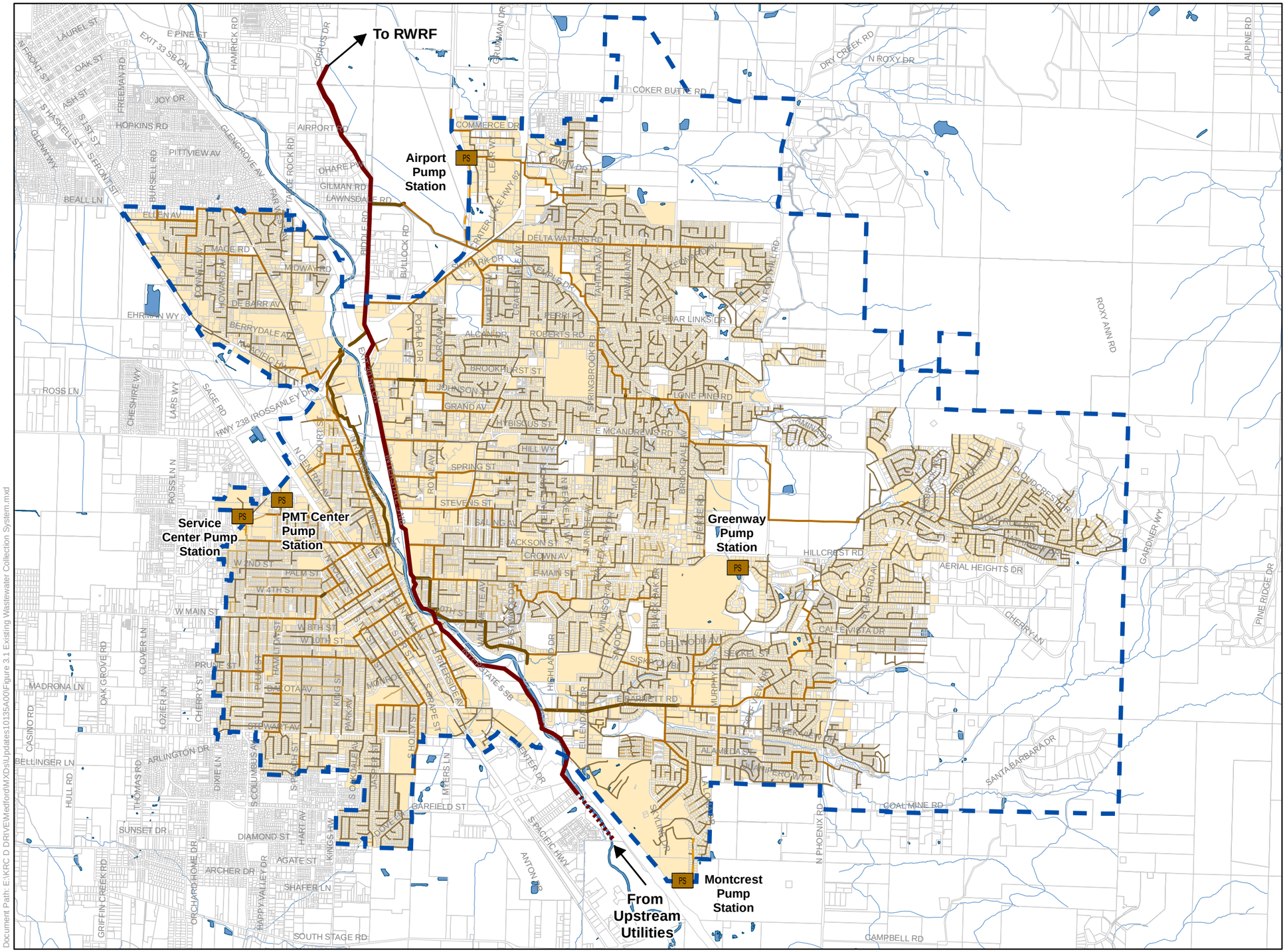
The City's collection system consists of approximately 260 miles of gravity mains, 1.1 miles of force mains, and 5 pump stations that collect and convey wastewater to the Rogue Valley Sewer (RVSS) interceptors running south-north along Bear Creek. RVSS customers contribute flow both upstream and downstream of the City, and all wastewater is sent to the regional wastewater treatment plant owned and run by the City. Figure 3.1 presents the City's existing collection system, and shows the currently connected and contributing taxlots as provided by the City. Additional explanation on study area boundaries can be found in Chapter 2 - Basis of Planning.

3.2.1 Wastewater Basins

The City's collection system is divided into 18 wastewater basins that are denoted alphabetically, as shown in Figure 3.2. Wastewater basins delineate large areas of the conveyance system network that ultimately flow to one location, specifically the regional interceptor running throughout the City's collection system. The basin boundaries almost always follow topographic features such as ridge lines, streams, rivers, and capture each property contributing flow to the sewer collectors in that basin. The City and Carollo reviewed and updated the basin boundaries as part of this Plan such that all properties contributing flow to a basin are captured in the correct basin's boundary. To identify capacity requirements for specific facilities throughout the system, flows were developed for each wastewater basin, as presented in Chapter 2 - Basis of Planning.

3.2.2 Gravity Collection System

The City's existing collection system gravity pipelines range from 4 to 33-inches in diameter. About 85 percent (%) of the system is 8-inches or less in diameter, while 76% of the entire system is 8-inch sewers. Table 3.1 provides an inventory of the gravity mains within the City's collection system. This table only includes pipes owned by the City and excludes private pipes and the RVSS interceptor. The two RVSS interceptors range between 33- and 54-inches in diameter where it collects sewer flows from the City.



Legend

Sewer Gravity Main by Diameter

- > 18"
- 10 - 18"
- 8"
- < 8"
- Sewer Force Main
- Sewer Gravity Interceptor
- Service Area
- Currently Developed and Connected Parcels
- Taxlots
- Pump Station
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

Feet
0 4,000

EXISTING WASTEWATER COLLECTION SYSTEM

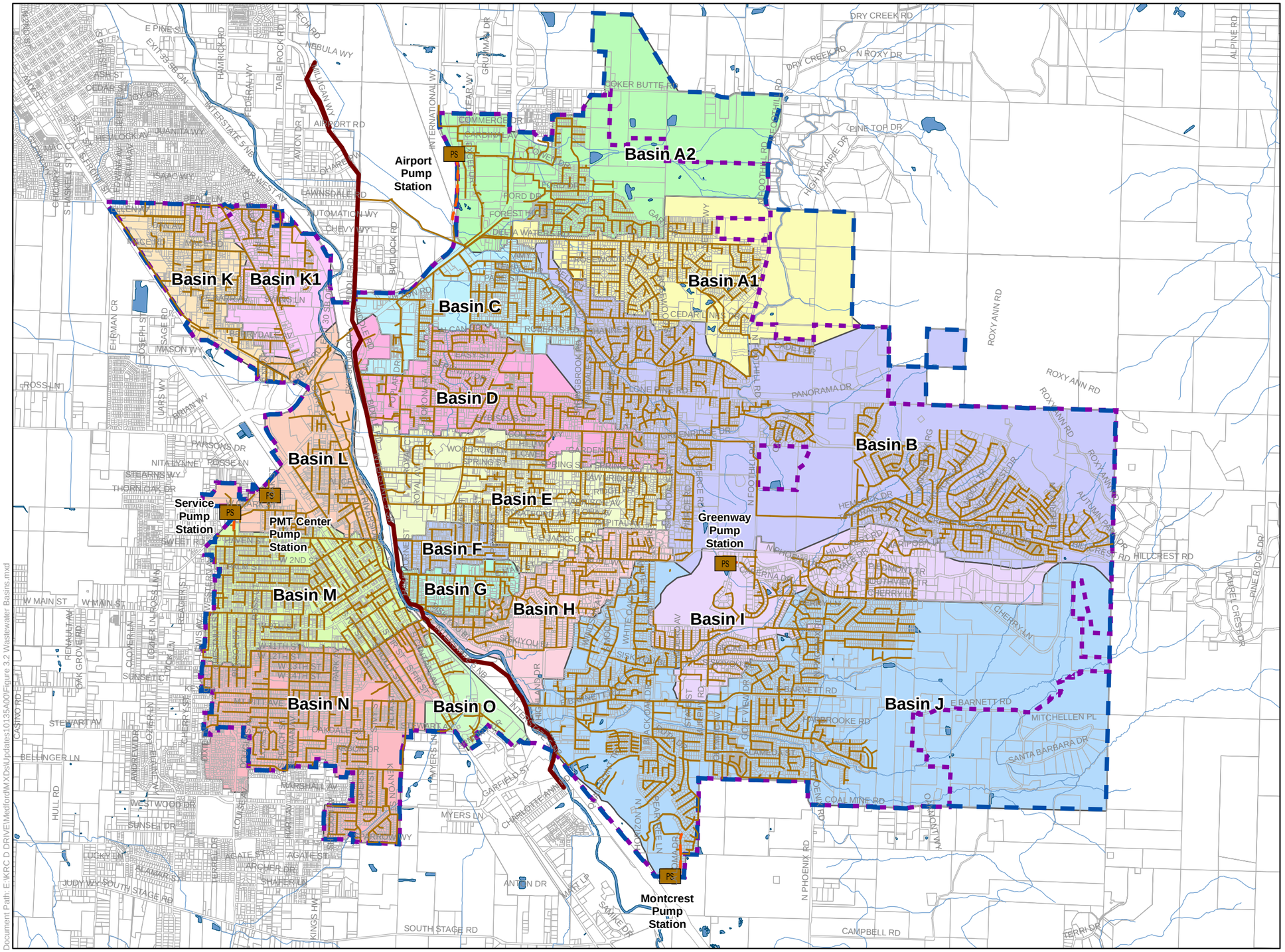
FIGURE 3.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates10135A00\Figure 3.1 Existing Wastewater Collection System.mxd



Legend

Wastewater Basins

A1 D H K1 O
A2 E I L
B F J M
C G K N

Sewer Force Main
Sewer Gravity Interceptor
Sewer Gravity Main
Service Area
2036 Service Area
Taxlots
Pump Station
Rivers/Creeks (Source: Jackson County GIS)
Waterbody (Source: Jackson County GIS)

N

0 4,000 Feet

WASTEWATER BASINS

FIGURE 3.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Table 3.1 Collection System Gravity Main Inventory Sanitary Sewer Master Plan City of Medford		
Diameter (inch)	**Length (LF)**	**Percentage of System**
≤ 6	121,806	8.8%
8	1,045,544	76.0%
10	65,746	4.8%
12	45,520	3.3%
14	1,327	0.1%
15	29,634	2.2%
16	7,361	0.5%
18	28,902	2.1%
20	415	0.03%
21	6,146	0.5%
24	12,149	0.9%
27	1,532	0.1%
≥ 30	4,191	0.3%
Total (feet)	**1,370,273**	**100%**
Total (miles)	**259.5**	**100%**

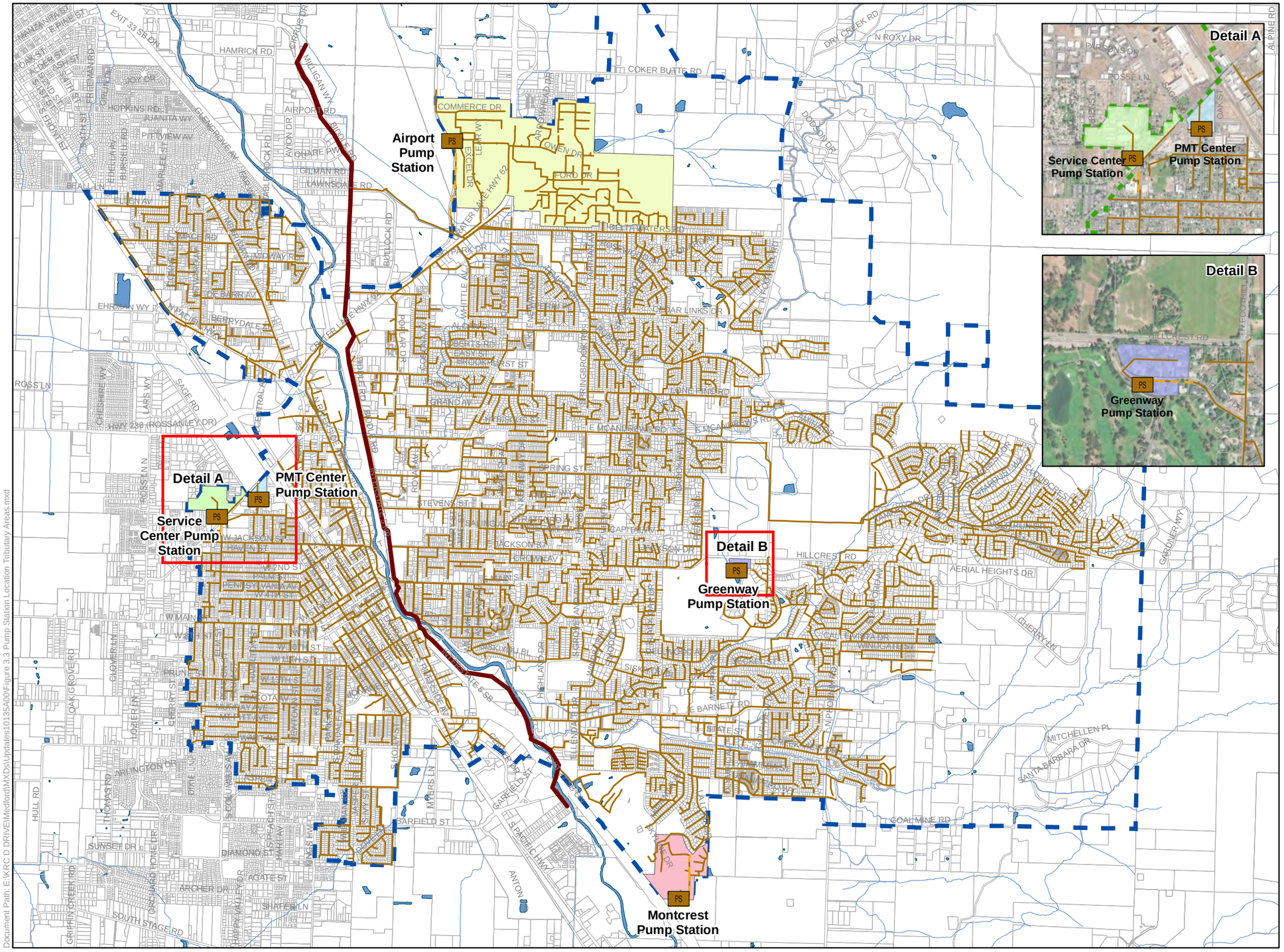
Notes:
(1) System only includes gravity mains and excludes private sewers and RVSS interceptors.

3.2.3 Pump Stations and Force Mains

The topography of the City's service area is such that most of the system is operated under gravity flow conditions, with the exception of some areas that require pumping to higher elevations. The City operates and maintains five pump stations as illustrated in Figure 3.3. Figure 3.3 presents the pump station tributary areas and Table 3.2 summarizes the location and key features of each station as provided by the City. Site visits were not performed as part of this study.

The five pump stations in the system include the following:

- Airport Pump Station.
- Greenway Pump Station.
- Montcrest Pump Station.
- PMT Center Pump Station.
- Service Center Pump Station.



Legend

PS Tributary Basins
- Airport Pump Station
- Greenway Pump Station
- Monturest Pump Station
- PMT Center Pump Station
- Service Area Pump Station

Sewer Force Main

Sewer Gravity Interceptor

Sewer Gravity Main

Service Area

Taxlots

Pump Station

Rivers/Creeks (Source: Jackson County GIS)

Waterbody (Source: Jackson County GIS)

Imagery Source: ESRI

N

Feet
0 4,000

PUMP STATION LOCATIONS AND TRIBUTARY AREAS

FIGURE 3.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

Table 3.2 Existing Pump Stations Inventory Summary
Sanitary Sewer Master Plan
City of Medford

Pump Station	Sewer Basin	Address	Number of Pumps	Horsepower (hp)	Head (feet)	Pump Type	Pump Station Capacity		Year Constructed/ Rehabilitated
							Total (gpm)	Firm[1] (gpm)	
Airport	A2	3633 Aviation Way	2	34	70	FLYGT VFD Alternating pumps	3,246	1,623	2009
Greenway	I	2916 Fairview Place	2	3	22	FLYGT Submersible pumps	620	310	2003
Montcrest	J	2750 Donnalee Drive	2	15	35	FLYGT Alternating pumps	470	235	2005
PMT Center	L	North Dead End of Broad St or 1024 Summit Ave	1	3	13	FLYGT Submersible pump	238	0[2]	2000
Service Center	L	821 North Columbus Ave	1	3	16	FLYGT Submersible pump	318	0[2]	2000

Note:
(1) Pump Station firm capacity corresponds to the capacity of the station assuming the largest pump us out of service.
(2) Both PMT and Service Center pump stations only have one pump. These pump stations are therefore not considered redundant and their firm capacities were set at 0.

3.2.3.1 Airport Pump Station

The Airport Pump Station is located at 3633 Aviation Way and was rebuilt in 2009. The Airport Pump Station is the City's largest pump station, serving a significant number of properties on both sides of Crater Lake Highway. It operates two alternating 34-horsepower (hp) Flygt pumps that discharge, on average, 440,000 gallons of wastewater per day into a 12-inch gravity flow pipeline. The wet well for the station is a 8-feet diameter and 8-feet and 19.25-feet deep square vault with a dual opening vault top lid and is fed by two sewer pipes. The largest is an 18-inch pipe that enters from the Northeast side of the well, the second is an 8-inch pipe entering from the Southwest side. The pump station is equipped with a control room with a pump drive control panel, supervisory control and data acquisition (SCADA) alarm communication, and a back-up generator.

3.2.3.2 Greenway Pump Station

The Greenway Pump Station is located adjacent to 2916 Fairview Place, and was constructed in 2003 to serve approximately 10 homes in Fairview Place. The station alternates two Flygt 3-hp submersible pumps that discharge an average of 11,000 gallons of wastewater per day into a 4-inch force main flowing east and discharging into an 8-inch concrete gravity flow sewer pipeline. The pump station contains a control panel, a wet well, a back-up power generator and a valve vault box.

The pump control panel contains the components for operation and SCADA equipment. The wet well contains the sewage inflow to be pumped with the submersible pumps. The wet well for the station is a 6 feet diameter and 12 feet and 9 inches deep cylinder vault. Both pumps installed at the bottom of the well. A by-pass pumping stand pipe is available to be connected if needed.

3.2.3.3 Montcrest Pump Station

The Montcrest Pump Station is located at 2750 Donnalee Drive and was rebuilt in 2005. It operates two alternating 15-hp Flygt pumps out of a drywell. The station discharges, on average, 29,000 gallons of wastewater 2,024 feet through a 6-inch force main flowing north and discharging into an 8-inch gravity sewer at the intersection of LaLoma Drive and Honor Drive.

The pump stations is composed of a control room (with station controls, SCADA alarm communication, and a back-up generator), a wet well (which contains sewage inflow), and a dry well (which contains the pumps and valves). The wet well for the station is a 6-foot diameter cylinder, 13-feet deep, with a dual opening vaulted lid and is fed by an 8-inch pipe from the north.

3.2.3.4 PMT Center Pump Station

The PMT Center Pump Station is located at the north dead-end of Broad Street, and was installed in 1973 and updated in 2000 with a 3-hp Flygt submersible pump. The pump discharges an average of 1,284 gallons of wastewater per day through a 4-inch force main flowing 20 feet south to a gravity manhole.

The pump station consists of two sections: a pump control panel, and a wet well. A spare pump is located at the service center. The station wet well is a 4-foot diameter and 17-foot deep cylinder with a vault top lid and one pump mounted at the bottom of the wet well.

3.2.3.5 Service Center Pump Station

The Service Center Pump Station is located in the southeast corner of the City's Service Center parking lot and serves approximately 12 properties. The station was initially constructed in 1971 and updated in 2000. The station operates one 3-hp Flygt submersible pump, discharging, on average, 6,750 gallons of wastewater per day through a 4-inch force main flowing 685 feet south and discharging to a 6-inch diameter gravity pipeline.

The station is composed of a pump, a pump control panel (with station controls, SCADA alarm communication), and a wet well. A by-pass pumping stand pipe is available at the pump site and a spare pump is located at the City's service center.

3.2.3.6 Force Mains

Wastewater from the pump stations are conveyed through the collection system via force mains as stated in the descriptions above. An inventory of all force mains operated by the City is summarized in Table 3.3.

Table 3.3 Collection System Gravity Main Inventory
Sanitary Sewer Master Plan
City of Medford

Pump Station	4-inch	6-inch	12-inch	Total (ft)	Percent of System (%)
Service Center PS	675			**675**	**11.59%**
Montcrest PS		2,015		**2015**	**34.59%**
Greenway PS	543			**543**	**9.32%**
PMT Center PS		38		**38**	**0.65%**
Airport PS			2,554	**2554**	**43.85%**
Total (ft)	**1218**	**2053**	**2554**	**5825**	**100.00%**
Percent of System (%)	**20.91%**	**35.24%**	**43.85%**	**100.00%**	

3.2.4 Diversion Structures

The City has 35 diversion structures located throughout the collection system. Diversions shunt flow from over-capacity pipelines to adjacent pipelines and can be considered to reduce peak flows in the over-capacity pipelines during high-flow events. Diversions can be an operationally effective and economic means of alleviating hydraulic constraints and preventing sanitary sewer overflows (SSOs). Some diversions are located because they act as terminal manholes at the crest of a hill.

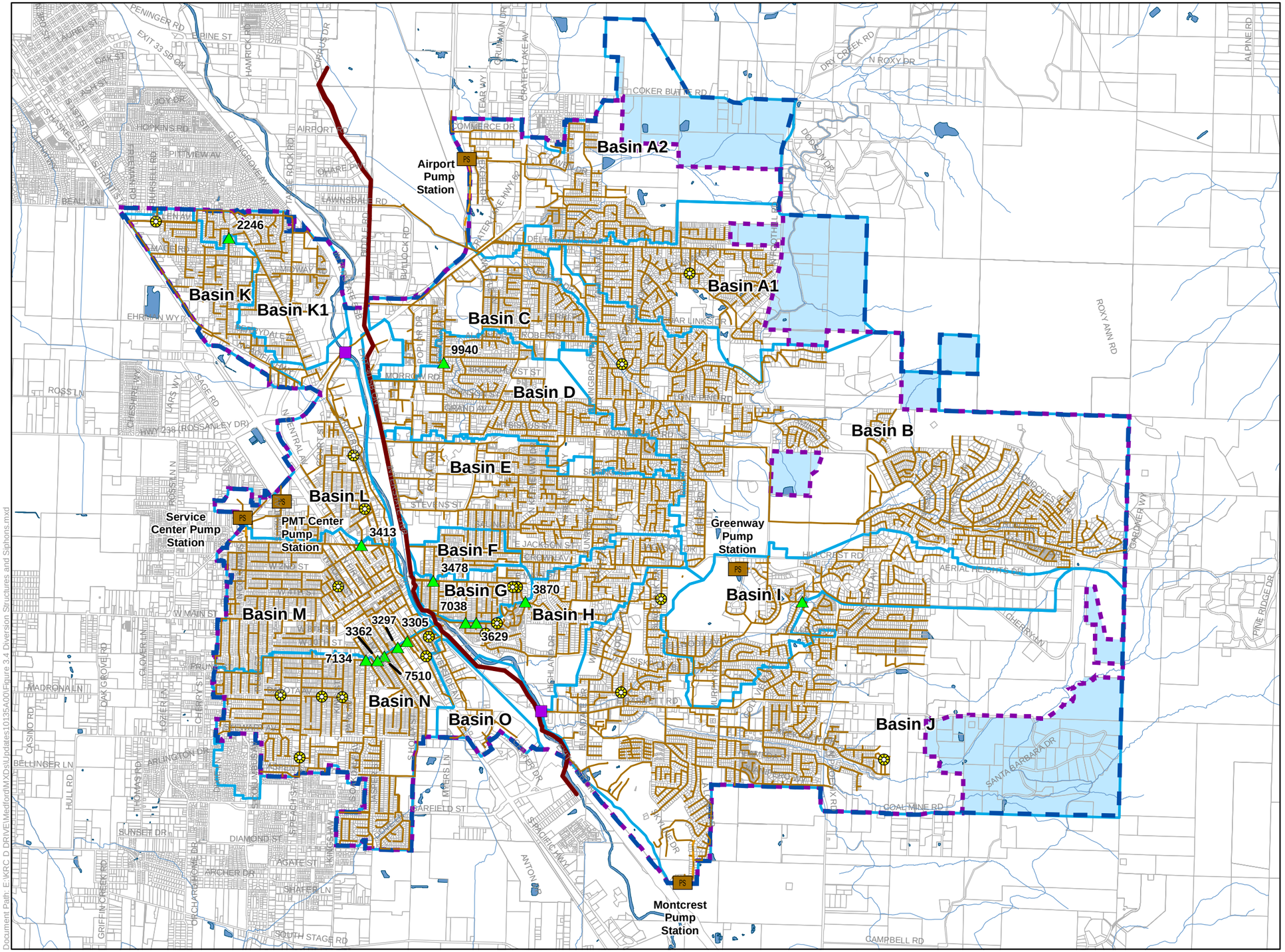
The City's diversion structures are classified into two categories based on whether they shift flow from one basin to another or within the same wastewater basin. Diversions shifting flows between basins are illustrated in Figure 3.4 as green triangles, while diversions located within the same wastewater basin are illustrated as yellow dots in Figure 3.4. Table 3.4 details the locations of all thirteen diversions shifting flows from one basin to another. These diversions are essential to the collection system, especially during rainfall events, as they reduce flows in under-capacity basins and utilize available capacity in adjacent basins. City staff noted that some diversions are not intentional, and may not necessarily be beneficial.

Table 3.4 Diversion Structures Locations
Sanitary Sewer Master Plan
City of Medford

Structure ID	Structure Type	Location		Basin Change	
		EW Cross Street	NS Cross Street	From	To
2246	Overflow Manhole	Between Sunwood Dr and Mace Rd	Howard Ave	K	K1
3297	Overflow Manhole	W 12th St	S Fir St	N	M
3305	Overflow Manhole	E 12th St	S Front St	N	M
3362	Overflow Manhole	W 12th St	S Ivy St	N	M
3413	Overflow Manhole	E Jackson St	N Bartlett St	M	L
3478	Overflow Manhole	E Main St	Genessee St	G	F
3629	Overflow Manhole	E 10th St	Vancouver Ave	H	G
3870	Overflow Manhole	S Keene Way Dr	Eastwood Dr	H	G
4320	Overflow Manhole	Between Arnold Palmer Way and	Island Pointer Dr	I	J
7038	Overflow Manhole	E 10th St	Portland Ave	H	G
7134	Overflow Manhole	W 11th St	S Oakdale Ave	N	M
7510	Overflow Manhole	W 12th St	S Holly St	N	M
9940	Overflow Manhole	La Mesa St	Corona Ave	D	C

3.2.5 Siphons

The City has siphon pipes located at two locations in the collection system. They are necessary to cross Bear Creek to connect the collection system to the RVSS interceptor. Siphon No. 1 is 278 feet long and is located just north of Crater Lake Highway. Siphon No. 2 is 148 feet long and is located just south the E Barnett Road Bridge. These structures are illustrated in Figure 3.4 as purple squares.



Legend

- Siphons
- Overflow Shifting Flows Between Basins
- Overflow Manholes
- Pump
- Sewer Force
- Sewer Gravity
- Sewer Gravity
- 2036 Service Area
- Service Area
- Taxlots
- Wastewater Basins Boundaries
- Urban Reserves
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

Feet
0 4,000

DIVERSION STRUCTURES AND SIPHONS

FIGURE 3.4

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

HYDRAULIC MODEL DEVELOPMENT

4.1 INTRODUCTION

Sanitary Sewer collection system models are valuable tools used to assess the performance of collection systems during dry and wet weather conditions, and to plan for future improvements. These models provide a means to simulate the impact of different sized storms on the collection system, and determine where system deficiencies are likely to occur. In addition, a well-calibrated model provides an easy way to test alternative improvement scenarios. This chapter summarizes the City's sewer collection system hydraulic model development and calibration for use in the City's sewer system conveyance planning.

4.2 HYDRAULIC MODEL DEVELOPMENT

A sewer collection system model is a simplified representation of the real sewer system. Sewer system models assess the conveyance capacity for a collection system. In addition, sewer system models perform "what if" scenarios to assess the impacts of future developments and land use changes. The City's collection system hydraulic model was constructed using a multi-step process utilizing data from a variety of sources. This section summarizes the hydraulic model development process, including a summary of the modeling software selection, a description of the modeled collection system, the hydraulic model elements, and the model creation process.

4.2.1 Hydraulic Modeling Software Selection

In the past decade, significant improvements have been made to the hydraulic modeling software available on the market. Some examples of the improvements that have been made include modifications to the hydraulic routing engine as well as an enhanced graphical user interface, model output reports, and GIS compatibility. This Sanitary Sewer Master Plan (SSMP) provided the City an opportunity to examine the software available on the market today and make a decision on which hydraulic modeling software to use to develop its model.

Carollo conducted an evaluation of the major sanitary sewer hydraulic modeling software applications. The results of the evaluation are presented in a technical memorandum, which is provided in Appendix D for reference. This technical memorandum summarizes the major software vendors, briefly explains software features, compares the advantages and disadvantages of each software program, and provides a software program recommendation.

Based on the results of the evaluation, it was agreed that InfoSWMM, by Innovyze, would be used to assemble the City's hydraulic model. InfoSWMM is a fully dynamic, geospatial sewer and stormwater modeling and management software application, which is built to run

within the ESRI ArcGIS software platform. The hydraulic modeling engine for the InfoSWMM software package uses the Environmental Protection Agency's (EPA) Storm Water Management Model (SWMM), which is widely used throughout the world for planning, analysis, and design related to stormwater runoff, combined sewers, sanitary sewers, and other drainage systems. InfoSWMM routes flows through the model using the Dynamic Wave method, which solves the complete Saint Venant, one dimensional equations of fluid flow.

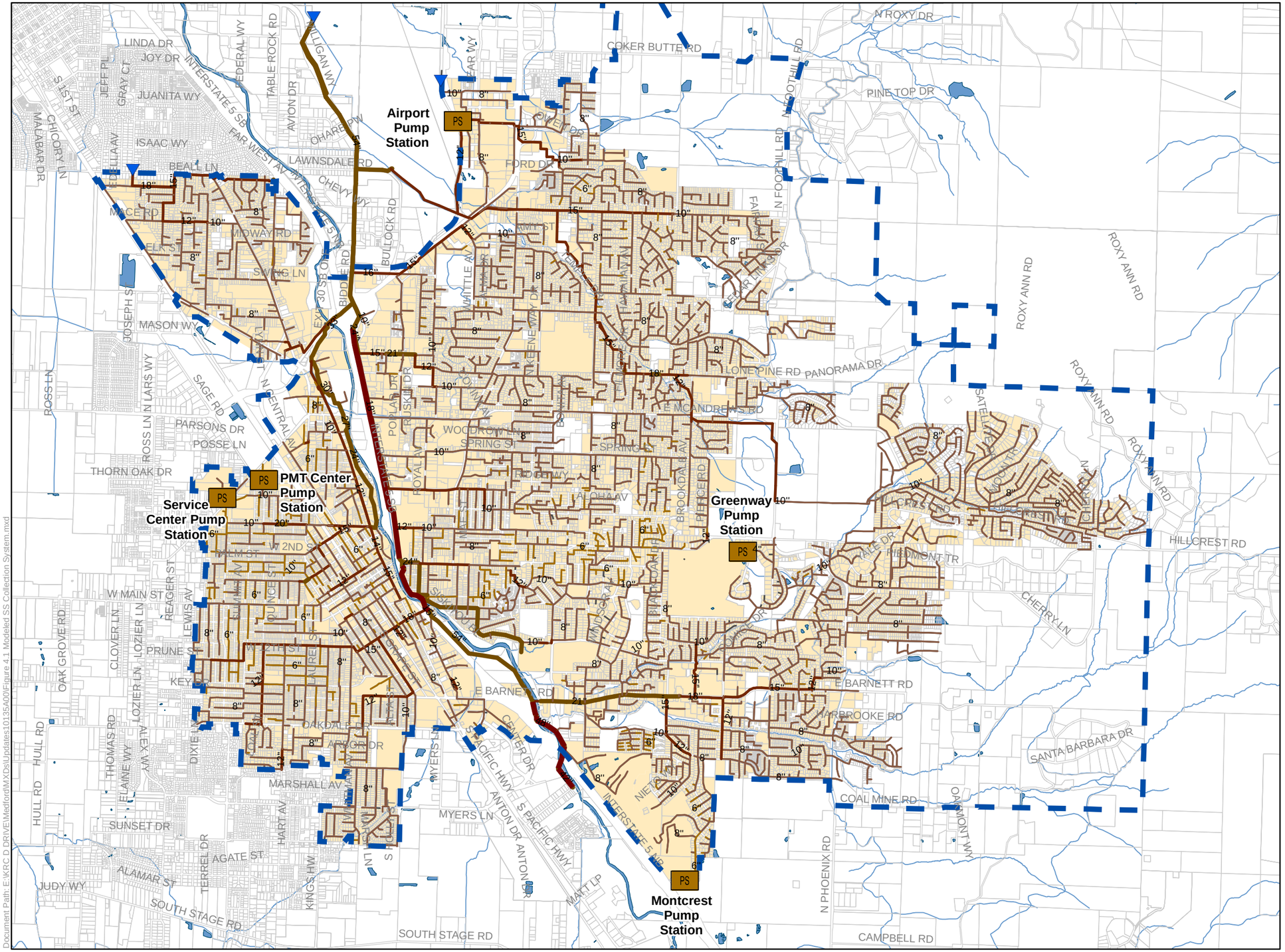
The latest version (v 12.0) of InfoSWMM was used to assemble the City's hydraulic model as further described below.

4.2.2 Elements and Inputs of the Hydraulic Model

The following provides a brief overview of the major elements of the hydraulic model and the required input parameters associated with each:

- **Junctions**: Sewer manholes, cleanouts, as well as other locations where pipe sizes change or where pipelines intersect are represented by junctions in the hydraulic model. Required inputs for junctions include rim elevation, invert elevation, and surcharge depth (used to represent pressurized systems). Junctions are also used to represent locations where flows are split or diverted between two or more downstream links.
- **Pipes**: Gravity sewers and force mains are represented as pipes in the hydraulic model. Input parameters for pipes include length, friction factor (e.g., Manning's n for gravity mains, Hazen Williams C for force mains), invert elevations, diameter, and whether or not the pipe is a force main.
- **Storage Nodes**: For sewer system modeling, storage nodes typically are used to represent pump station wet wells (although other storage basins, etc. can be modeled as storage nodes). Input parameters for storage nodes include invert elevation, wet well depth, and wet well cross section.
- **Pumps**: Pumps are included in the hydraulic model as links. Input parameters for pumps include pump curves and operational controls.
- **Outfalls**: Outfalls represent areas where flow leaves the system. For sewer system modeling, an outfall typically represents the connection to the influent pump station at a wastewater treatment plant. For the City, the main outfall in the system is located north of the Service Area on the RVSS Interceptor. Another outfall is modeled in the northwest area of the collection system (Basin K), another discharge point to the RVSS system.
- **Rain Gauges**: Rain gauges are input into the hydraulic model to simulate historical or theoretical hourly rainfall events.

- **Inflows**: The following are the three types of sewer flow sources that can be injected into individual model junctions (and storage nodes):
  - External. External inflows can represent any number of flows into the collection system, such as metered flow data or groundwater inflow. External inflows are applied to a specific model junction by applying a baseline flow value and a pattern that varies the flow by hour, day, or month of the year. In the model, external flows are allocated for the Rogue Valley Sewer Services (RVSS) system connecting at MH 1311 which represents the flow coming from all upstream areas of the City in the RVSS Interceptor. The location of MH 1311 is shown on Figure 4.1.
  - Dry Weather. Dry weather inflows simulate base sanitary sewer flows and represent the average flow. The dry weather flows can be multiplied by up to four patterns that vary the flow by month, day, hour, and day of the week (e.g., weekday or weekend). The dry weather diurnal patterns are adjusted during the dry weather calibration process. The City's model includes one weekday and one weekend pattern for each flow monitoring basin.
  - RDII. Rainfall Derived Infiltration and Inflows (RDII) are applied in the model by assigning a unit hydrograph and a corresponding tributary area to a given junction. The unit hydrographs consist of several parameters that are used to adjust the volume of RDII that enters the system at a given location. These parameters are adjusted during the wet weather calibration process.



Legend

- Model Outfall
- Modeled Sewer Pipeline
  - > 18"
  - 10" - 18"
  - 8" - 10"
  - < 8"
- Sewer Gravity Interceptor
- Non Modeled Sewer Pipelines
- Service Area
- Currently Developed and Connected Parcels
- Taxlots
- Pump Station
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

N

0 — 4,000 Feet

MODELED SANITARY SEWER COLLECTION SYSTEM

FIGURE 4.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

4.2.3 Model Construction

The City's hydraulic model combines information on the physical and operational characteristics of the sewer collection system, and performs calculations to solve a series of mathematical equations to simulate flows in pipes.

The model construction process consisted of eight steps, as described below:

- **Step 1** - The City's geographic information system (GIS) shape files for the sewer collection system were obtained. The City cleaned the GIS shapefiles and provided model specific shapefiles only including the infrastructure to be modeled.
- **Step 2** - The GIS data were reviewed and formatted to allow easy import into the InfoSWMM modeling platform. The City's GIS did not include information on manhole rims. Manhole rims were calculated in GIS using elevation contours.
- **Step 3** - The City's GIS data set was skeletonized to exclude gravity sewers less than six inches in diameter. Skeletonization is the process by which sewer systems are stripped of pipelines not considered essential for the intended analysis purpose. The purpose of skeletonizing a system is to develop a model that accurately simulates the hydraulics of a collection system, while at the same time reducing the complexity of a large model. All pipes smaller than six inches were excluded from the hydraulic model.
- **Step 4** - The collection system pipeline and facility data were imported into the modeling software and verified. Physical and operational data for the City's sewer collection facilities was not available from the GIS data. This type of data, such as wet well dimensions, pump stations, and other special features, were input manually into the model based on available information. The model was checked and fixed for connectivity issues.
- **Step 5** - Once all the relevant data was input into the hydraulic model, the model was reviewed to verify that the model data was input correctly and that the flow direction, size, and layout of the modeled pipelines were logical. Additionally, the modeled pump stations were also checked to verify that they operated correctly (i.e. pumps were turning on and off according to settings, and were operating reasonably on their pump curves).
- **Step 6** - Dry weather sewer flows were then allocated to the appropriate model junctions as described in Section 4.2.4.
- **Step 7** - The hydraulic model contains certain run parameters that need to be set by the user at the beginning of the project. These include run dates, time steps, reporting parameters, output units, and flow routing method. Once the run parameters were established, the model was debugged to ensure that it ran without errors or warnings.

The modeled sewer system consists of approximately 266 miles of sanitary sewer pipelines (including both gravity, force mains, and a portion of the Rogue Valley Sewer Services' (RVSS') Interceptor) ranging in diameter from 6 inches to 54 inches, five city-owned

sanitary sewer pump stations, 35 diversions, and 2 siphons. The model also includes the Regional Interceptor collecting flows from the City's system and conveying it to the Regional Water Reclamation Facility (RWRF).

Figure 4.1 presents the City's modeled sewer collection system. Table 4.1 presents a summary of the modeled sewer system by diameter and length of pipe. Not included in these totals are the small sewer mains that were excluded during model skeletonization and therefore not modeled (less than 6 inches in diameter). Chapter 3 - Existing System provides statistics for all sewer system pipes based on the City's GIS data, including those not in the model.

Table 4.1 Modeled System Pipelines
Sanitary System Master Plan
City of Medford

Diameter (inch)	Total Length (ft)	Percent (%) System
6"	118,738	8.3%
8"	1,045,940	73.3%
10-12"	114,071	8.0%
15"-21"	75,177	5.3%
24"-30"	25,714	1.8%
>30"	46,924	3.3%
Total Model (ft)	1,426,564	100%

4.2.4 Sewer Flows Allocation

Determining the quantity of dry weather sewer flows generated by a municipality and how they are distributed throughout the collection system is an important component of the hydraulic modeling process. Various techniques can be used to assign sewer flows to individual model junctions, depending on the type of data that is available. Adequate estimates of the volume of wastewater are important in maintaining and sizing sewer system facilities, both for present and future conditions.

Baseline sewer flows were allocated (assigned to specific nodes) in the hydraulic model based on land use data provided by the City and sewer flow coefficients developed in Chapter 2. This method was used to be consistent with the future flow projection method used in this SSMP. The flow coefficients and land use data provide a means to transform a specific land use category into an average dry weather flow, as described below:

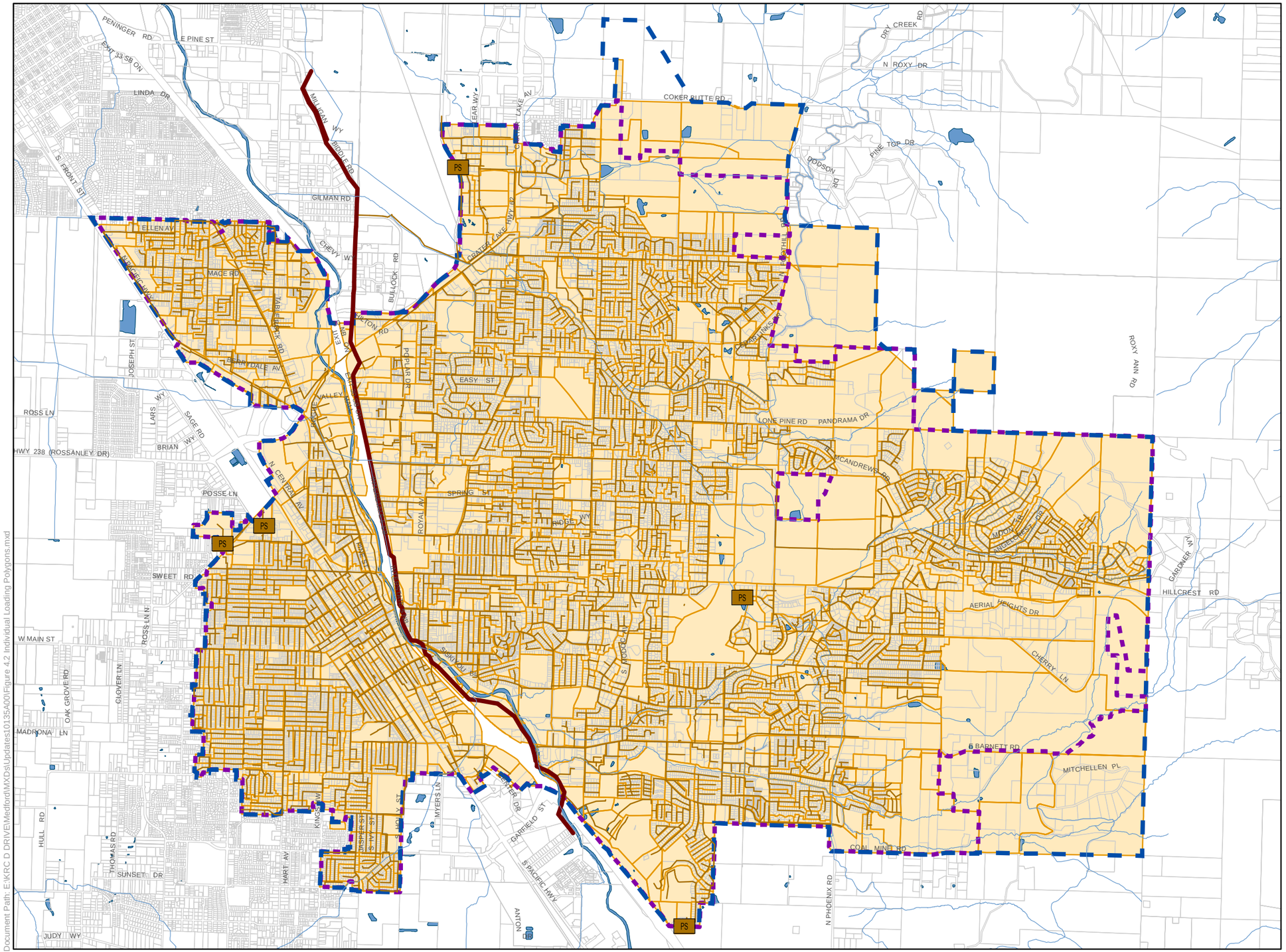
- **Step 1** - The City's service area was broken up into 1,583 individual loading polygons. Each loading polygon represents the geographic area that contributes flows into a single model node (i.e., trunk system manhole). In an all pipe model, a loading polygon could be as small as a few parcels. In a skeletonized model, a

loading polygon will usually encompass a particular subdivision or grouping of lots. Figure 4.2 shows the different individual loading polygons developed in this step.

- **Step 2** - The flows were calculated for each loading polygon using GIS by multiplying the appropriate flow factor (having units of gpad) by the currently developed and connected land use acreage. A description of flow factor development is provided in Chapter 2.
- **Step 3** - The flows obtained in Step 2 correspond to the average dry weather flow and were allocated to the appropriate node in the sewer system model.
- **Step 4** - Diurnal patterns were then allocated to sewer flows to simulate sanitary sewer flow variation throughout the day. These patterns were developed from the flow monitoring program data presented in Chapter 2. The allocated flows were adjusted as necessary during the dry weather flow calibration process (see Section 4.3.2) to closely match the actual measured dry weather flows recorded during the flow monitoring period.

RDII is modeled through the development of RDII Unit Hydrographs for the collection system. Unit Hydrographs provide a method for the hydraulic model to simulate the varying I/I that occurs based on the intensity and duration of storm events and the location within the collection system.

Typically, multiple RDII hydrographs are developed for a collection system to describe the RDII occurring at different locations throughout the system. Twelve RDII hydrographs were developed for the City's hydraulic model (one per flow monitoring basin) and were calibrated as part of the wet weather calibration process, described in Section 4.3.3.



Legend

- Sewer Gravity Interceptor
- Sewer Main
- 2036 Service Area
- Service Area
- Taxlots
- Pump Station
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)
- Loading Polygon

Feet
0 4,000

INDIVIDUAL LOADING POLYGONS - FOR EXISTING SYSTEM

FIGURE 4.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\0135A00\Figure 4.2 Individual Loading Polygons.mxd

4.3 HYDRAULIC MODEL CALIBRATION

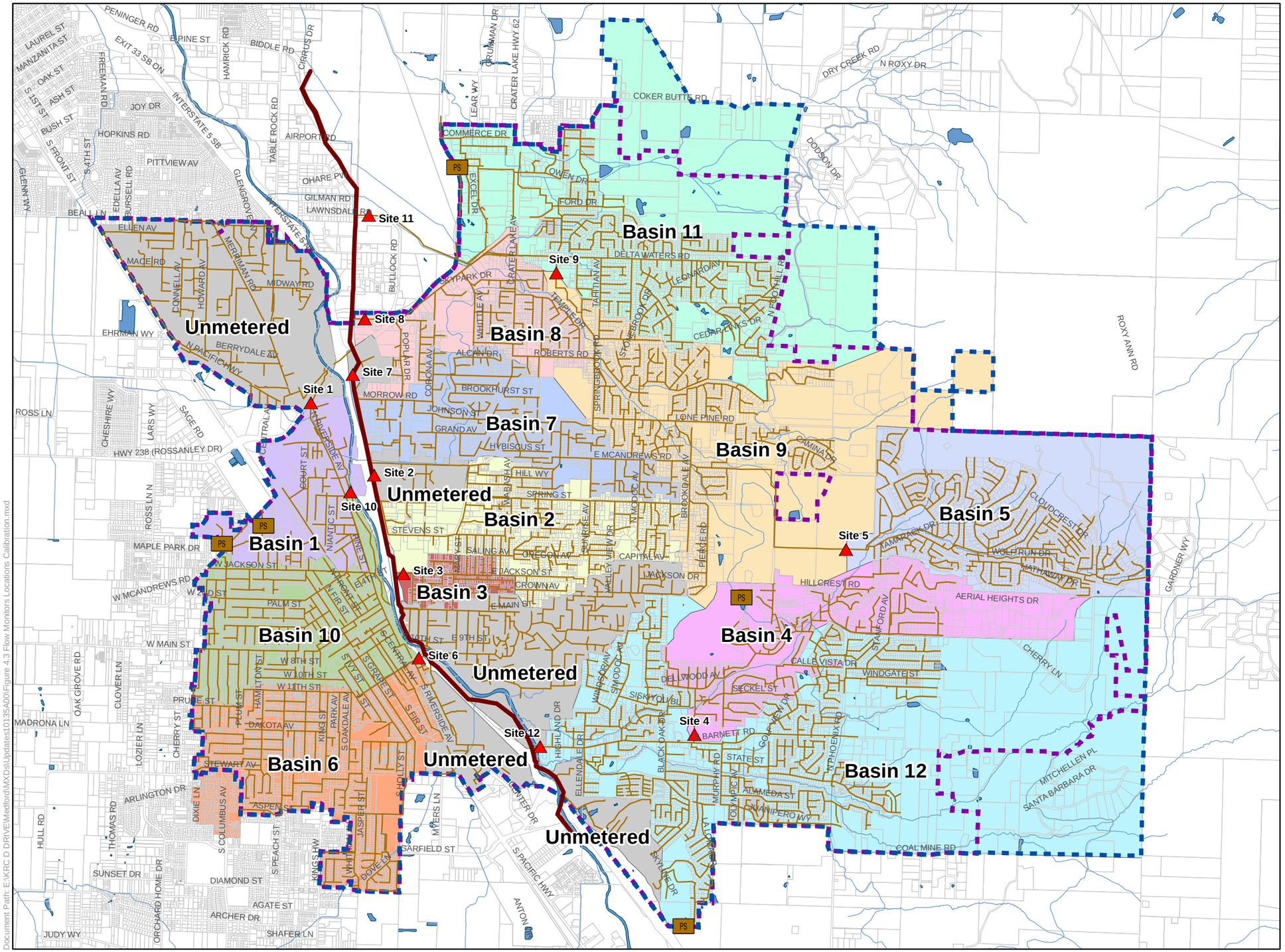
Hydraulic model calibration is a crucial component of the hydraulic modeling effort. Calibrating the model to match data collected during the flow-monitoring program improves confidence that the model accurately represents the collection system during dry and wet weather conditions. The calibration process consists of calibrating to both dry and wet weather conditions.

For this project, flow monitoring was conducted by ADS Environmental Services, LLC (ADS) at 10 meter sites for a period of approximately 60 days from December 2015 to January 2016. Additionally, two existing City-owned Hach meters were used for calibration. Dry weather flow (DWF) calibration ensures an accurate depiction of base sewer flow generated within the Service Area. The wet weather flow (WWF) calibration consists of calibrating the hydraulic model to specific storm events to accurately simulate the peak and volume of RDII into the sewer system. The amount of RDII is essentially the difference between the WWF and DWF components. The location of the twelve flow monitors used for calibration is illustrated in Figure 4.3.

This SSMP has been developed using “n” values varying from 0.011 to 0.016 depending on model calibration considerations. When an engineer would like to perform modeling of a specific location, the City will allow an n value of 0.013 for PVC and 0.015 for other pipes. Where the City or an engineer can show data to justify lower n values, the City will consider allowing the lower value be used for a study.

The SSMP is a living document, and will allow for amendment as conditions change. The City has flexibility to respond to opportunities as they present. The City anticipates that updates to the model will be done at 10-year intervals. The City may, as resources and funding permit, update the model to show changes and modifications more frequently.

Developer’s consultants are encouraged to model the city sewer system (or a portion of) using any industry standard software available, using parameters set forth in this master plan. The consultant may consider alternative flow routing across basins where consistent with the City ordinance for orderly development. Where the City finds that criteria is met, modeling is accurate, and there are no negative consequences, the consultants work will be accepted as an amendment to the SSMP.



Legend

Flow Monitor Site
- ADS Meter
- Sewer Gravity Interceptor
- Sewer Main
- Basin 1
- Basin 2
- Basin 3
- Basin 4
- Basin 5
- Basin 6
- Basin 7
- Basin 8
- Basin 9
- Basin 10
- Basin 11
- Basin 12
- Unmetered
- Service Area
- 2036 Service Area
- Taxlots
- Pump Station
- Rivers/Creeks (Source: Jackson County GIS)
- Waterbody (Source: Jackson County GIS)

Feet
0 4,000

FLOW MONITOR LOCATIONS FOR CALIBRATION

FIGURE 4.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\0135A00\Figure 4.3 Flow Monitors Locations Calibration.mxd

4.3.1 Calibration Standards

The hydraulic model was calibrated in accordance with international modeling standards. The Wastewater Planning Users Group (WaPUG), a section of the Chartered Institution of Water and Environmental Management, has established generally agreed upon principles for model verification. The dry weather and wet weather calibration focused on meeting the recommendations on model verification contained in the "Code of Practice for the Hydraulic Modeling of Sewer Systems," published by the WaPUG (WaPUG 2002), as summarized below:

- **Dry Weather Calibration Standards**: Dry weather calibration should be carried out for two dry weather days and the modeled flows and depths should be compared to the field measured flows and depths. Both the modeled and field measured flow hydrographs should closely follow each other in both shape and magnitude.

  In addition to the shape, the flow hydrographs should also meet the following criteria as a general guide:

  – The timing of flow peaks and troughs should be within one hour.

  – The peak flow rate should be within the range of ±10 percent (%).

  – The volume of flow (or the average rate of flow) should be within the range of ±10%. If applicable, care should be taken to exclude periods of missing or inaccurate data.

- **Wet Weather Calibration Standards**: For at least three storm events from the flow monitoring period, the model simulated flows and depths should be compared to the field measured flows and depths. The flow hydrographs for both events should closely follow each other in both shape and magnitude, until the flow has substantially returned to dry weather flow rates for at least two out of the three storms compared.

  In addition to the shape, the flow hydrographs should also meet the following criteria as a general guide:

  – The timing of the peaks and troughs should be similar with regard to the duration of the events.

  – The peak flow rates at significant peaks should be in the range of +25% to -15% and should be generally similar throughout.

  – The volume of flow (or the average flow rate) should be within the range of +20% to -10%.

  The WaPUG discusses criteria on level during wet weather conditions so that the field measured and modeled levels are within +/- 4-inches. Additionally, Carollo developed the following guidelines for levels and velocities in the system:

  – The average velocity should be within the range of +20% to -10%.

  – The average level should be within the range of +20% to -10%.

The WaPUG criterion was used as a secondary criterion on level when the Carollo standards could not be met. The 4-inches criterion was considered not strict enough for small diameter pipes to be used as the primary criterion. For instance, in an 8-inch pipe, if the modeled level is 4-inches off, that corresponds to a minimum 50 percent uncertainty. However, all pipes where monitors were installed are larger than 10 inches and therefore, this criterion was considered acceptable, as a secondary standard. These guidelines are secondary to the WaPUG calibration criteria for average and peak flow.

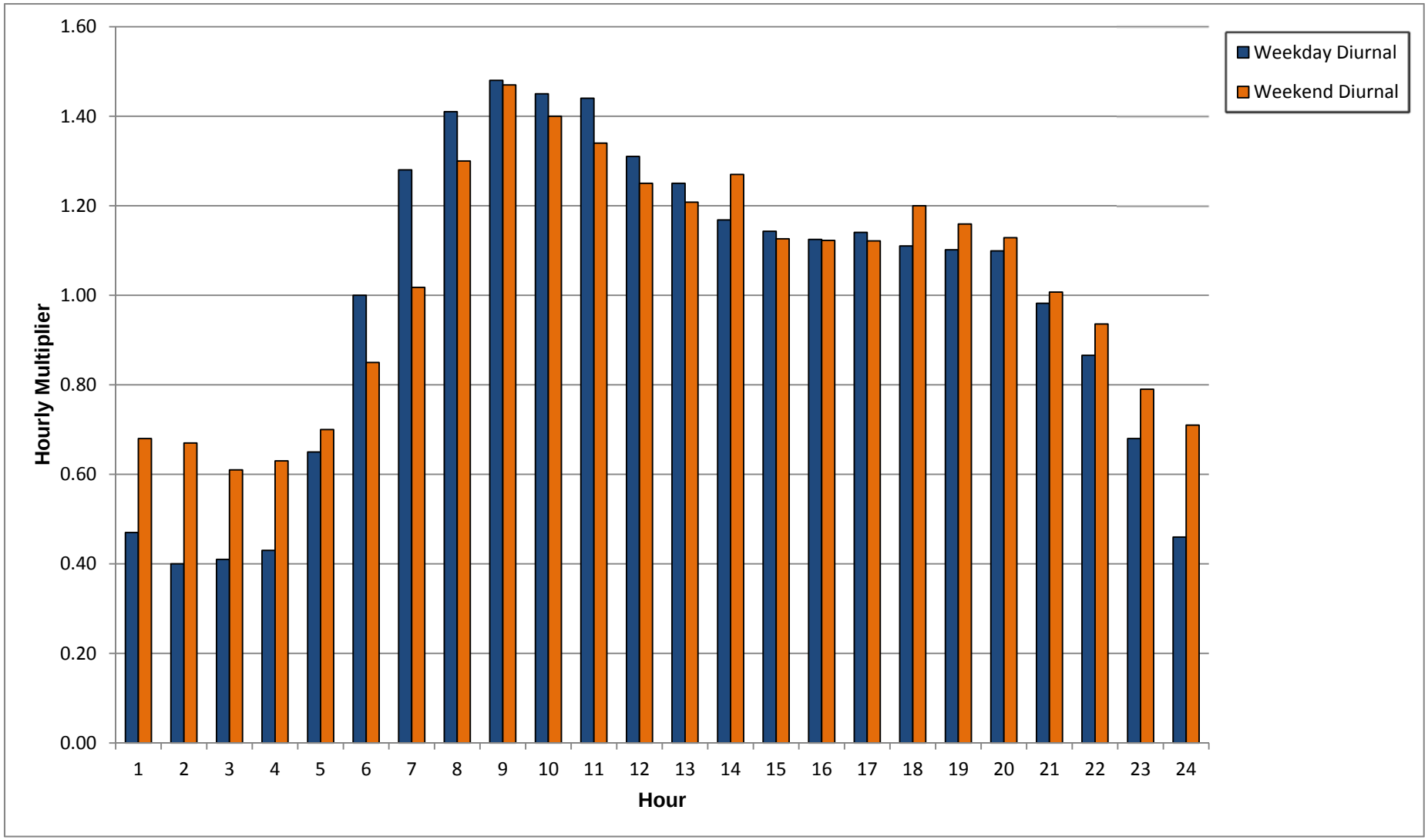
The WaPUG recommends that for wet weather calibration, the use of a single calibration period incorporating a number of rainfall events should be considered whenever possible. In other words, if the flow monitoring program captured several back to back storms, it may be preferable to use the back to back storm events as the calibration storms, as opposed to calibrating to two separate storms that have occurred weeks or months apart.

4.3.2 Dry Weather Flow Calibration

4.3.2.1 Dry Weather Calibration Process

The DWF calibration process consists of several elements, as outlined below:

- **Divide the system into areas tributary to each flow meter**. The first step in the calibration process was to divide the sewer service area into flow meter tributary areas. Twelve tributary areas were created, one for each flow meter from the temporary flow monitoring program. A map showing the locations of each flow monitoring site and their associated tributary area are provided in Chapter 2.
- **Define flow volumes within each area**. The next step was to define the dry weather flow volumes within each area, which was accomplished in the flow allocation step of model construction (see section 4.2.5).
- **Create diurnal patterns to match the temporal distribution of flow**. A diurnal curve is a pattern of hourly multipliers that are applied to the base flow to simulate the variation in flow that occurs throughout the day. Two diurnal curves were developed for each flow monitoring tributary area; one representing weekday flow and one representing weekend flow. The diurnal patterns were initially developed based on the flow monitoring data and adjusted as part of the calibration process until the model simulated flows closely matched the field measured flows. Figure 4.4 shows the calibrated weekday and weekend diurnal patterns for the area tributary to Site 4. Similar diurnal curves were developed for each of the meters and its tributary area. These additional curves are available in Appendix E.



EXAMPLE DIURNAL PATTERN (SITE 4)

FIGURE 4.4

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

4.3.2.2 Dry Weather Calibration Results

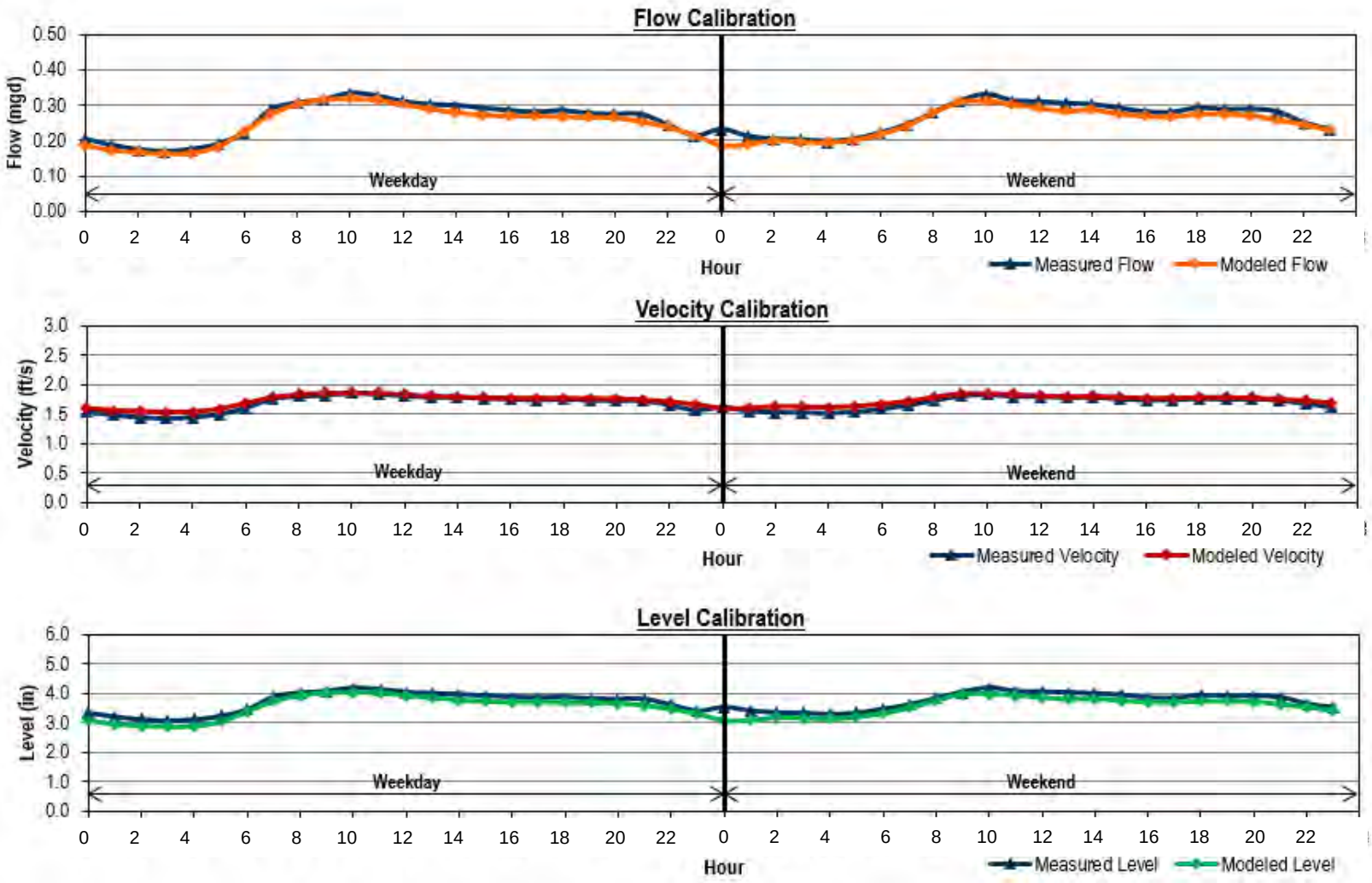
Table 4.2 provides a summary of the dry weather flow calibration using the average and daily peak flow results for weekday and weekend conditions, respectively. As shown in Table 4.2, the model simulated average flows, levels, and velocities for both weekday and weekend DWF have been calibrated to meet the standards (less than 10% difference). In general, the percent difference between the overall modeled and measured DWF ranged between -6.0% and 9.0%, with most sites being around 2 to 4%.

Table 4.2 Dry Weather Flow Calibration Results(1)
Sanitary Sewer Master Plan
City of Medford

Meter ID	Pipe Diameter (in)	Weekday Average Dry Weather Flow		Weekend Average Dry Weather Flow		Average Dry Weather Flow(2)
		Percent Error(3)				
		Average Flow(4) (%)	Peak Flow(5) (%)	Average Flow(4) (%)	Peak Flow(5) (%)	Average Flow(4) (%)
Site 1	33	3.5%	-2.1%	1.3%	-4.3%	2.9%
Site 2	18	-2.4%	2.8%	-2.2%	0.5%	-2.3%
Site 3	12	-1.9%	-6.8%	-1.9%	-4.6%	-1.9%
Site 4	15	-3.8%	-4.6%	-4.4%	-5.5%	-4.0%
Site 5	10	-1.6%	-8.4%	-5.5%	-4.1%	-2.8%
Site 6	18	5.0%	-1.0%	5.9%	-2.2%	5.2%
Site 7	24	5.9%	-1.9%	-1.6%	2.7%	3.4%
Site 8	16	1.5%	-2.8%	-0.2%	-5.5%	1.0%
Site 9	18	1.1%	-5.3%	-1.0%	3.6%	0.4%
Site 10	27	3.9%	-3.4%	3.8%	-6.0%	3.8%
Site 11	24	2.3%	7.0%	8.4%	1.3%	4.1%
Site 12	21	3.6%	-6.2%	9.0%	-7.3%	5.1%

Notes:
(1) Source for field measured data the model is compared to: ADS Flow Monitoring Data Report.
(2) Average Dry Weather Flow = (5*Weekday Dry Weather Flow + 2*Weekend Dry Weather Flow)/7.
(3) Percent Difference = (Modeled - Measured)/Measured*100.
(4) Average Flow corresponds to the volume of flow for the period for an average weekday, average weekend, or average week.
(5) Peak flow corresponds to the maximum hourly flow during a weekday or a weekend.

Appendix E provides a detailed dry weather flow calibration summary sheet for each of the twelve meter sites. Each calibration sheet includes plots comparing the model-simulated and field-measured flow data for both weekday and weekend conditions. An example of the dry weather calibration for Site 4 is shown on Figure 4.5. As shown in Figure 4.5 and in Appendix E, there is good overall correlation of the field-measured data to the model output results.



EXAMPLE OF DRY WEATHER CALIBRATION (SITE 4)

FIGURE 4.5

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

4.3.3 Wet Weather Flow Calibration

4.3.3.1 Wet Weather Calibration Process

The WWF calibration enables the hydraulic model to accurately simulate RDII entering the collection system during a large storm. As outlined below, the WWF calibration process consists of several elements:

- **Identify calibration rainfall events**. The WWF calibration process consists of running model simulations of historic rainfall events based on data collected as part of the flow monitoring program. The goal of any wet weather flow monitoring program is to capture and characterize a system's response to a significant rainfall event, preferably during wet antecedent moisture conditions.

  The selection of a particular calibration storm or group of storms is based on a review of the flow and rainfall data. For WWF calibration, the model was run from 12/07/15 to 02/12/16, and calibrated to the three main rainfall events that occurred during the course of the flow monitoring period:

  – Storm 1: From 12/12/15 to 12/17/15
  – Storm 2: From 12/18/15 to 12/25/15
  – Storm 3: From 1/14/16 to 1/22/16

  Figure 4.6 illustrates the three storms used for wet weather calibration. As stated in the ADS Flow Monitoring Program Report, Storm 1 was estimated to be a one-in-four year storm event according to NOAA hydrograph data.

  In order to run a model simulation for the period of these storms, the hourly rainfall data were input into the model for these events.

- **Define RDII tributary areas**. For the WWF calibration, RDII flows are superimposed over the DWF. The model calculates RDII by assigning "RDII Inflows" to each node in the model. RDII inflows consist of both a unit hydrograph and the total area that is tributary to the model node. The RDII tributary areas were calculated in GIS using the loading polygons, excluding any large vacant, open space, or other areas in the system which are not expected to contribute RDII into the collection system. The tributary area provides a means to transform hourly rainfall depth from the rainfall hyetographs into a rainfall volume. The rainfall volume is transformed into actual RDII flows using the unit hydrograph, as described in the next step.

- **Create RDII parameter database and modify to match field measured flows**. The main step in the WWF calibration process involves creating custom unit hydrographs representing the tributary areas' unique responses to the rainfall. Custom hydrographs were developed for each flow monitoring tributary area, using the "RTK Method," which is widely used in collection system master planning. Using the RTK Method, the RDII unit hydrograph is the summation of three separate triangular hydrographs (short-term, medium-term, and long-term), which are each defined by three parameters: R, T, and

K. R represents the fraction of rainfall over the basin that enters the collection system; T represents the time to peak of the hydrograph; and K represents the ratio of time to recession to the time to peak. Therefore, each unit hydrograph has a total of nine separate variables. Figure 4.7 shows an example of an RTK unit hydrograph.

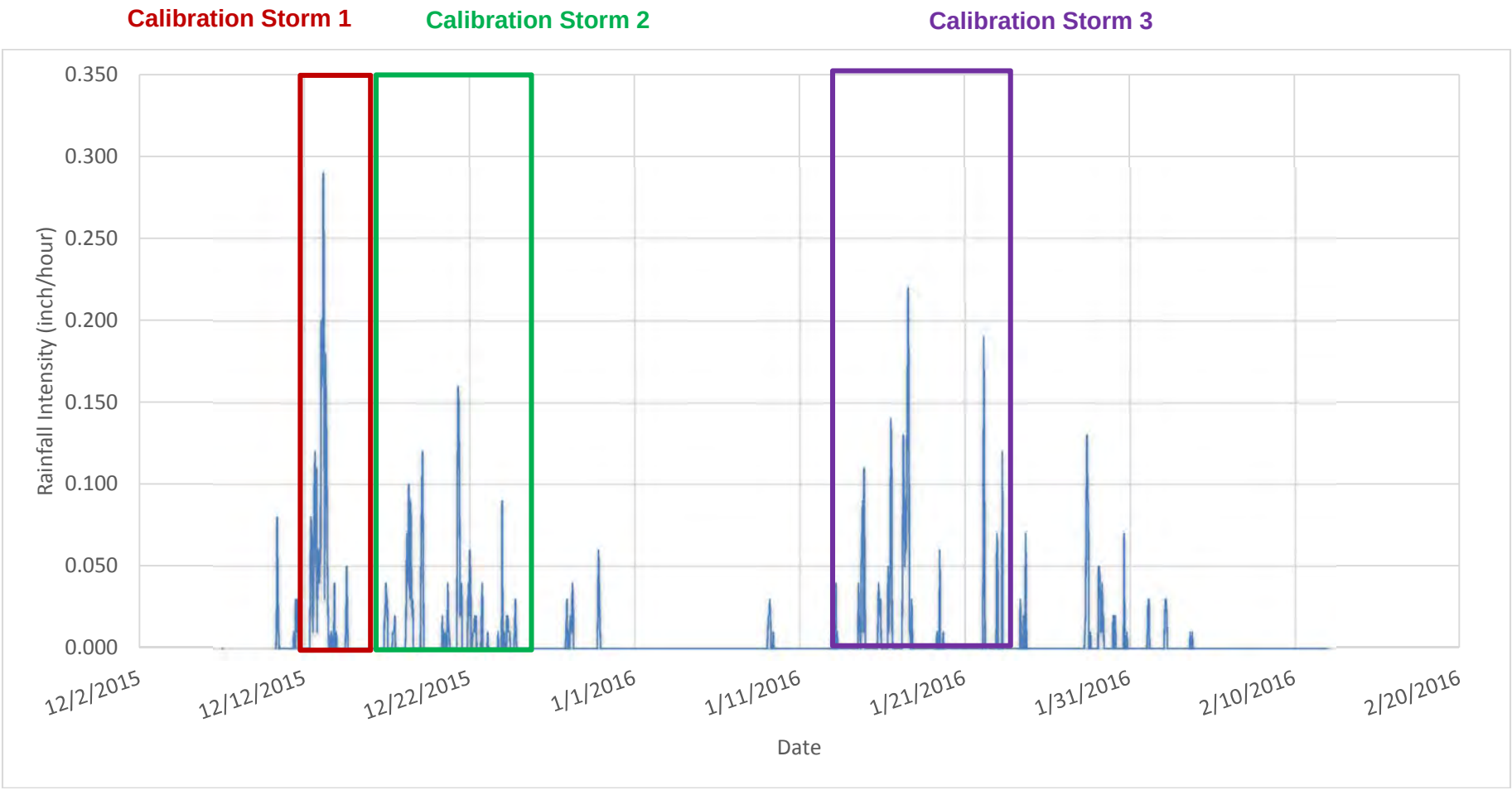
The hydrographs utilize the R-values (percent of rainfall that enters the collection system) calculated for each basin to simulate RDII. The nine variables in each unit hydrograph were initially set based on engineering judgment. Through an iterative process, the variables are then adjusted until the model-simulated flows (both peak flows and average flows) match closely with the field-measured flows.

As with the dry weather calibration, the wet weather calibration process compared the meter data with the model output. Comparisons were made for average and peak flows as well as the temporal distribution of flow until flows returned to their baseline levels.

- **Adjust model variables to match field measured velocity and flow depths**. Once the model simulated flows acceptably matched the field measured flows, the model simulated velocity and flow depth were compared to the field measured velocity and flow depth. Adjustments were made to various model parameters until the modeled and measured velocity and depth closely matched one another. The primary variable parameters for this process are pipeline roughness (Calibration Head loss Factor) and sediment build up in the pipe, although other parameters can also be adjusted as calibration results are generated.

  Manning's roughness coefficients, or n values, have industry accepted ranges based on a number of variables. Roughness coefficients increase over time depending on the construction methods, installation quality, system maintenance, and other environmental factors. There can be certain factors within the City's collection system that can result in roughness coefficients which differ from the typical range. For example, joint misalignment, cracks, and debris (e.g., root intrusion, etc.) lead to increased turbulence in a pipe, which affects the Manning's n factor. Therefore, the head loss factors in the hydraulic model are called basin calibration head loss factors, as they incorporate Manning's "n" and associated head loss and minor losses caused by a variety of factors (manhole losses, joints, bends).

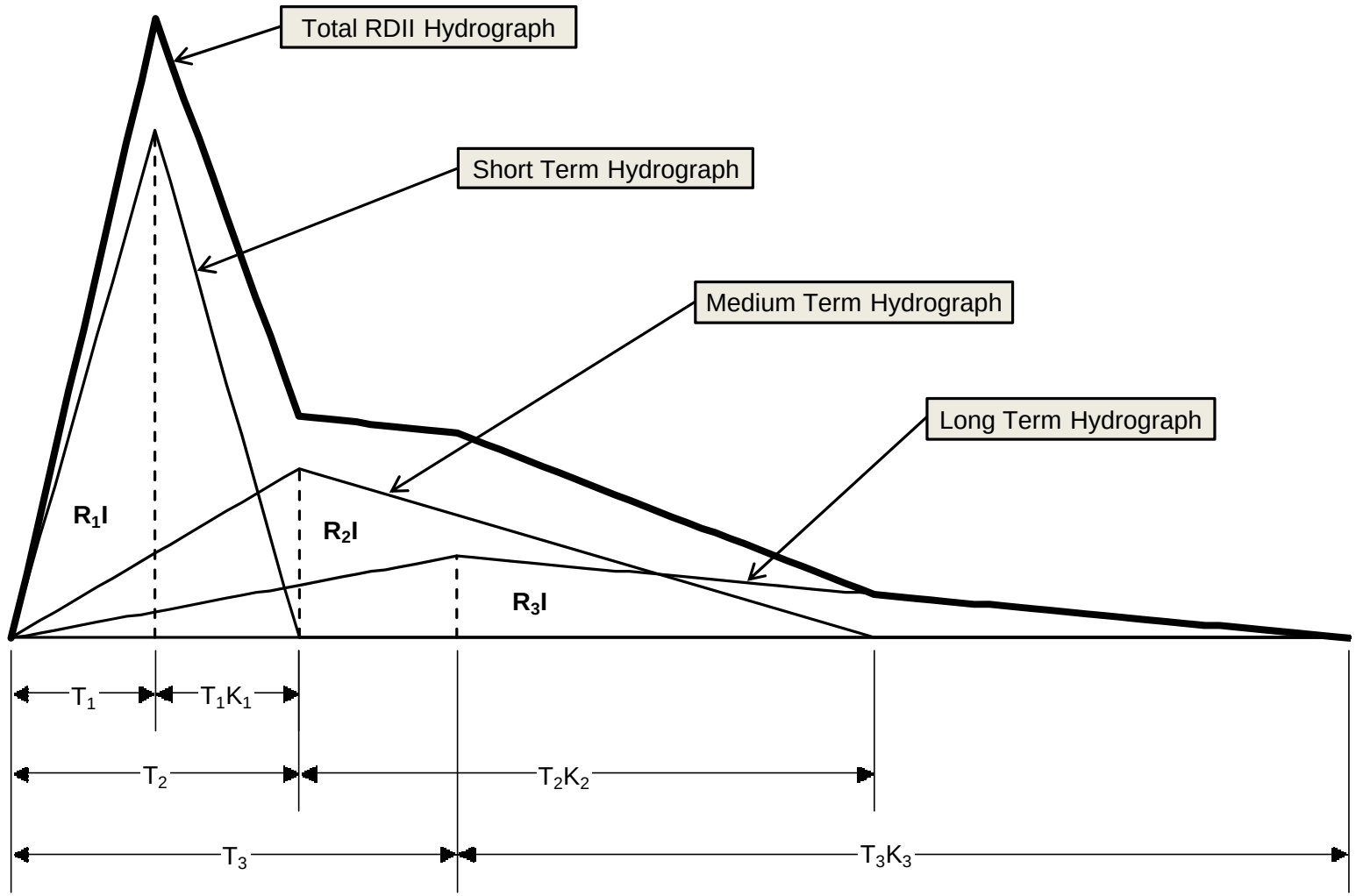
  If the model is unable to reasonably match the field measured flow depth and velocity without leaving the acceptable range of basins calibration head loss factors, further investigation is conducted to help determine the cause of the discrepancy. Some issues that could cause such a discrepancy can include errors in the slope or diameter of a pipeline, downstream blockages, pipeline sags, and, in some cases, influences from downstream pump station operations.



CALIBRATION STORMS

FIGURE 4.6

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



EXAMPLE RDII HYDROGRAPH

FIGURE 4.7

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

4.3.3.2 Wet Weather Calibration Results

An example of the wet weather calibration for Site 4 is shown on Figure 4.8. Table 4.3 provides a summary of the wet weather flow calibration using the average and peak flow results for all twelve sites. As shown in Table 4.3, the model simulated average and peak flows at all meter sites were within the acceptable tolerances for at least two of the three calibration storms, and therefore the model was considered calibrated and ready to use for capacity analysis purposes.

Appendix F contains a detailed wet weather flow calibration summary sheet for each of the twelve meter sites. Each calibration sheet provides plots that compare the model simulated and field measured flow, velocity, and level data for the calibration storms.

4.3.3.3 Wet Weather Calibration Discussion

Basin calibration head loss factors were kept within acceptable ranges as much as possible. All meters were calibrated to the same three storms. Sites 1, 4, 7, and 8 all match the field measured data metrics well for the three storms. Additionally, Site 6 shows good correlation for all metrics for two out of the three storms and is considered calibrated per the WaPUG standards.

Sites 2 and 5 show a good match for average and peak flows, level, and velocity for all three storms. Both sites also show good peak flow correlation for Storms 2 and 3. The model predicted higher peak flows during Storm 1, which seemed to be recurrent for most sites. This might be caused by differences in rainfall distribution across the system during Storm 1, as peak flows for the other two storms show good results. Therefore the results for Sites 2 and 5 were accepted as there may have been more localized rainfall intensity at the time of the event or some other source of unknown inflow.

Site 5's response to Storm 1 is not consistent with the response to rainfall from the other storms during the flow monitoring period. Sharp decrease in flow during the peak rainfall intensity is a sign of overflow and might have been caused by temporary blockage upstream or downstream of the meter. This storm was excluded as it was not consistent with the rest of the data.

Site 3 shows good correlation for flow and level for all three storms. Velocities for this site are on the low side for all three storms, exceeding the criteria for percentage difference. However, the velocities at this site were relatively low; the largest difference between modeled and measured velocity was only 0.5 fps. Given the small measured value difference, and because velocity criteria are secondary to flow criteria, the results for this site were accepted.

Site 9 matches the field measured peak flow and volume, and levels within criteria, but the model predicts lower velocity for all three storms. The difference in velocity for all three storms is less than 1 fps (maximum recorded velocity being 5 fps). The velocity difference was considered not significant and therefore results were accepted. Level is the metrics

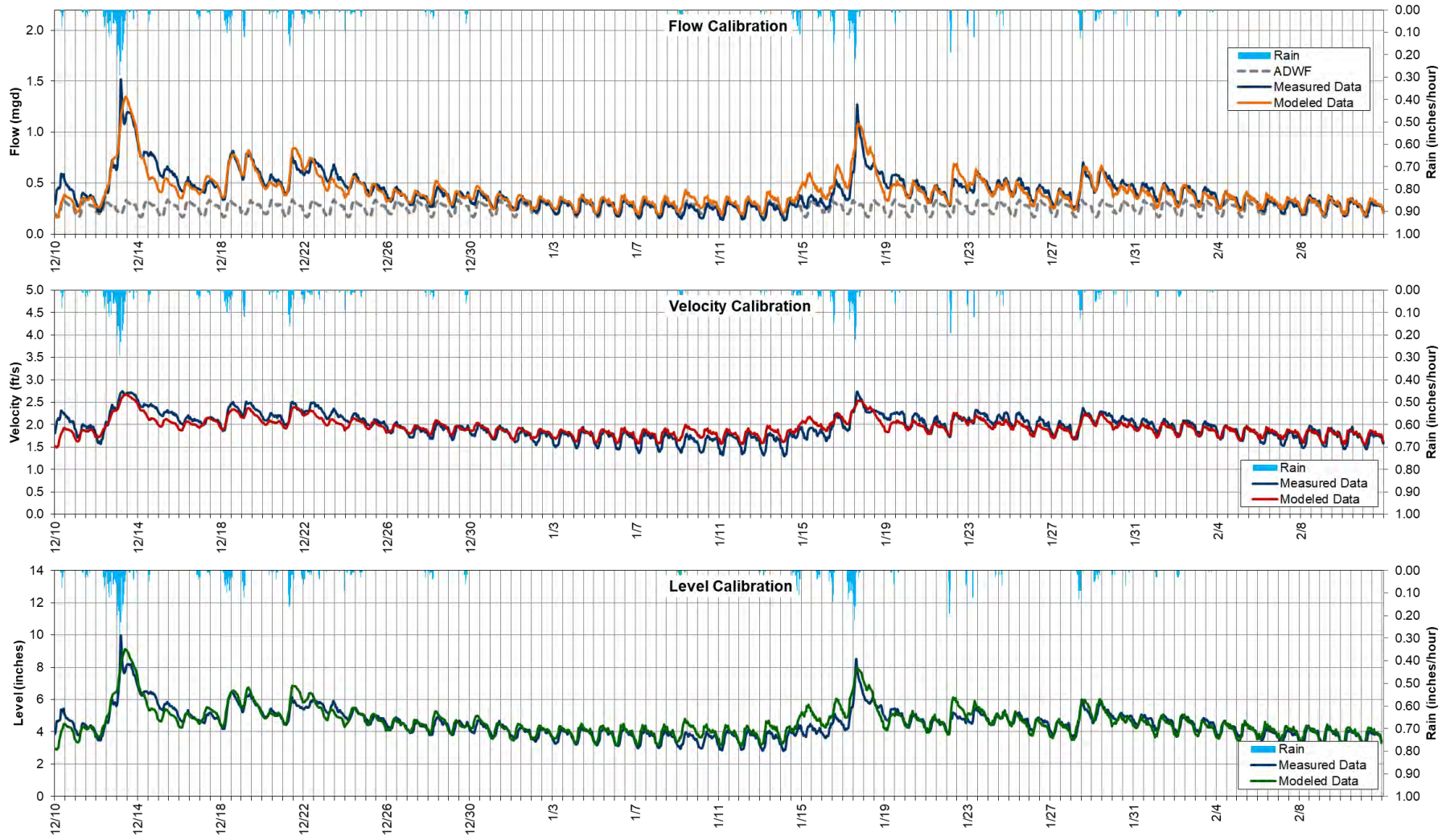
used to trigger deficiencies in the system and is therefore a more important metric than velocity.

Sites 10, 11, and 12 all show good correlation with the field measured data flow average and peak flow metrics for all three storms. However, levels are slightly outside the Carollo-adopted level criteria for these meters. Intensive checks and evaluations were performed, however, levels could not be brought within the -10%/+20% criteria while keeping the flow calibration parameters within acceptable ranges.

The pipe geometry and connectivity for Site 10 were checked and no clear source of the depth or velocity discrepancy could be identified. However, Site 10 shows levels for two out of three storms within the secondary level criteria of +/- 4-inches.

Modeled levels for Sites 11 and 12 are within the +/- 4-inches criteria recommended by the WaPUG documentation for two out of the three storms, therefore, these results were accepted and the model was considered calibrated. Basin 11 appears like it might be impacted by the RVSS interceptor levels. The hydraulic model was not calibrated to levels in the RVSS interceptor. Only high level field flow was provided for this SSMP, and it is recommended that the City coordinate with RVSS to better understand hydraulic condition in the regional interceptor. Calibration shows that head loss factors in flow monitoring basin 11 were slightly outside accepted value ranges to match level data. It was assumed, for the system analysis, that head loss factors in this basin were typical values instead.

Modeled velocities for Site 12 are slightly outside criteria (11.7% and 11.3 % vs 10%); results were accepted. Modeled velocities for Site 11 are outside criteria for two out of three storms, however, modeled velocities are closely matching the measured peak values (less than 1% difference on 12/13/15 and 1/17/16). Peak Wet Weather Flow (PWWF) conditions are the conditions that matter most in the model evaluation as they correspond to the worst case scenario. The maximum difference for velocities occurs during lower flow conditions and corresponds to approximately 0.5 fps, therefore, velocity values were accepted, and this site was considered calibrated.



EXAMPLE OF WET WEATHER CALIBRATION (SITE 4)

FIGURE 4.8

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Table 4.3 Wet Weather Flow Calibration Results
Sanitary Sewer Master Plan
City of Medford

Meter ID	Pipe Diameter (in)	Storm 1 (12/12/2015 - 12/17/2015)					Storm 2 (12/18/2015 - 12/25/2015)					Storm 3 (1/14/2016 - 1/22/2016)				
		Percent Error(3)				Max Level Diff. (in.)	Percent Error(3)				Max Level Diff. (in.)	Percent Error(3)				Max Level Diff. (in.)
		Avg. Flow(2) (%)	Peak Flow (%)	Avg. Velocity (%)	Avg. Level (%)		Avg. Flow(2) (%)	Peak Flow (%)	Avg. Velocity (%)	Avg. Level (%)		Avg. Flow(2) (%)	Peak Flow (%)	Avg. Velocity (%)	Avg. Level (%)	
Site 1	33	13.9%	19.2%	1.0%	10.1%	3.4	-2.8%	-11.4%	-3.1%	3.2%	3.2	18.8%	-3.9%	-5.5%	21.1%	3.9
Site 2	18	5.7%	33.7%	-4.4%	6.5%	2.9	-3.6%	13.6%	-6.1%	1.4%	1.0	4.1%	-2.8%	-3.7%	6.3%	2.1
Site 3	12	-3.4%	10.6%	-19.5%	5.8%	1.2	-2.1%	24.7%	-19.4%	6.1%	0.8	-4.1%	-33.7%	-19.9%	6.9%	1.3
Site 4	15	-4.7%	-10.5%	-4.8%	-0.4%	1.8	-2.7%	3.5%	-5.2%	1.4%	1.1	10.3%	-15.0%	0.2%	7.6%	1.6
Site 5	10	6.9%	82.0%	-5.7%	8.6%	3.2	-2.4%	-2.4%	-5.7%	2.7%	1.3	13.7%	11.5%	-0.4%	11.3%	1.6
Site 6	18	21.4%	27.4%	8.2%	9.2%	2.2	1.1%	-14.7%	2.5%	-0.8%	2.3	7.7%	-1.6%	0.3%	6.3%	2.2
Site 7	24	-1.7%	-7.2%	25.3%	-20.0%	3.4	2.3%	4.9%	26.6%	-18.8%	3.0	8.2%	-12.5%	36.3%	-19.2%	3.6
Site 8	16	7.6%	18.3%	-4.1%	8.2%	3.5	3.3%	-0.5%	-5.8%	7.6%	1.6	10.5%	-16.4%	-4.9%	12.3%	4.6
Site 9	18	-1.2%	15.5%	-31.5%	31.4%	4.6	2.4%	10.6%	-28.8%	30.9%	2.9	5.3%	-9.9%	-30.7%	37.0%	3.2
Site 10	27	17.7%	19.1%	38.9%	-11.3%	2.6	-0.8%	-18.3%	33.6%	-19.4%	4.6	12.5%	2.2%	44.5%	-15.7%	4.2
Site 11	24	2.4%	-0.6%	18.0%	-10.5%	4.0	1.8%	-3.1%	23.5%	-8.3%	3.6	9.8%	-9.4%	29.3%	-10.2%	2.8
Site 12	21	0.5%	25.4%	-11.7%	-18.2%	2.8	1.9%	-1.5%	-11.3%	-15.6%	1.7	8.6%	-5.7%	-9.4%	-11.7%	3.0

Notes:
(1) Source: City of Medford Flow Monitoring Report, ADS Report (2016).
(2) Average flows are calculated from flow monitoring data. Maximum flow values are hourly peaks.
(3) Percent Difference = (Modeled - Measured)/Measured*100.
(4) Bold numbers are outside calibration criteria.

4.3.4 Hydraulic Model Calibration Summary

Calibration of the City's hydraulic model was a multi-step process that involved comparing model-simulated flow to the actual field-measured data for both dry and wet weather conditions. Results indicated that the model correlated well with the field-measured data.

The hydraulic model was calibrated at 100% during dry weather conditions. For wet weather calibration, 86% of the metrics were within a range of 25% for peak flows, and 97% were within a range of 20% for flow volume.

Approximately 83% of the metrics were within the WaPUG level criteria of +/-4-inches with 60% of meters within the tighter +/-10% criteria. Sites 9 through 12 did not meet the velocity criteria for percentage difference, however these sites are still considered calibrated because the velocity discrepancies were small and this criterion is secondary to average and peak flow criteria.

This provides model's accuracy such that the model can be considered calibrated and ready to use for subsequent capacity analysis.

This SSMP has been developed using "n" values varying from 0.011 to 0.016 depending on model calibration considerations. When an engineer would like to perform modeling of a specific location, the City will allow an n value of 0.013 for PVC and 0.015 for other pipes. Where the City or an engineer can show data to justify lower n values, the City will consider allowing the lower value be used for a study.

4.4 HYDRAULIC MODEL MAINTENANCE

The sewer system hydraulic model will likely be maintained by a consulting firm through an on-call modeling contract. Many consulting firms in the wastewater industry maintain licenses for Innovyze InfoSWMM and can perform modeling tasks when needed. Generally, an on-call modeling contract consists of an hourly fee schedule. If no modeling services are required for the duration of the contract, the City incurs no cost. Ultimately, the costs of using and maintaining the sewer model depend on how the City plans to utilize the model in the future. The City may use the model to size developer extensions, consider new service areas, evaluate flooding, and size capital projects. To maintain and update the model and to make model runs to assess the impacts of system changes and growth proposals is estimated to require approximately 120 man-hours per year. Alternatively, the City may opt to import the updated model data into other City-run modeling platforms for internal analysis of the system. The City is aware that differences in the model calculation engines may lead to different system analysis results.

Chapter 5

CAPACITY EVALUATION

5.1 INTRODUCTION

As the City of Medford (City) continues to develop and expand its boundaries, some of the City's sewer infrastructure may reach capacity for adequately handling flows. This chapter presents an evaluation of the available capacity of the existing system to convey current and future sewer flows. Using the City's updated sewer model, each pipe and pump station in the system are evaluated for meeting established capacity criteria. This chapter also presents recommended projects that correct capacity deficiencies and are required to serve future users.

5.2 EVALUATION CRITERIA

Defining performance criteria is a critical step in the master planning process because it sets metrics by which the collection system infrastructure will be evaluated to meet service goals set by the City. Sewer pipe capacities are dependent on many factors, including roughness of the pipe, the maximum allowable depth of flow, or slope of pipe. The City's assumptions of these factors are discussed below.

It is important to differentiate performance criteria from design criteria for judging the performance of collection system infrastructure. Design criteria establish the standards for designing and constructing new sewers. Performance criteria establish the standards that are used to analyze adequacy of existing facilities and to trigger future infrastructure needs. Performance criteria are commonly less stringent than design criteria because existing sewer systems typically have aged significantly and would require extensive reconstruction to meet standards for new design. It is generally inappropriate to use standard design criteria as performance criteria, especially when significant wet weather flows impact an existing collection system (as is the case with an aged sewer system). For instance, new sewers are designed to convey flow under non-surcharged conditions (assuming limited inflow and infiltration), while surcharging may be permissible during the analysis of existing sewers, especially during peak wet weather flows. The following sections describe the City's established design criteria and performance criteria used herein.

5.2.1 Design Criteria

The City's design criteria including design storm, Manning's Coefficient (n), velocities, minimum slopes, and change in pipe size are detailed in Section 2.2 located in Chapter 2 – Basis of Planning. In this system evaluation, the design criteria are used to size new infrastructure recommended to alleviate system deficiencies.

5.2.1.1 Conveyance System

When designing new sewers, it is common practice to adopt variable flow depth criteria for different pipe sizes. The d/D value is defined as the depth (d) of flow in a pipe during peak flow conditions divided by the pipe's diameter (D). Design d/D ratios typically range from 0.5 to 0.92, with the lower values used for smaller pipes that may experience flow peaks greater than design flow or may experience blockages from debris, paper or rags. The City's Sewer Standards define the acceptable d/D values for design of new sewers for the design storm:

- Sewers equal to or less than 12-inches in diameter shall be designed to flow at a d/D of 0.65 at peak flow rates.
- Sewers 15 inches and greater in diameter shall be designed to flow at a d/D of 0.75 at peak flow rate.

These design flow depths are relatively conservative and provide for additional capacity if projected flows are higher than estimated.

5.2.1.2 Pump Stations and Force Mains

Any new pump stations recommended will need to follow the City's Sewer Standards for pump stations and force main construction to meet Department of Environmental Quality (DEQ) requirements. These are detailed in Section 2.2 of Chapter 2 – Basis of Planning.

5.2.2 Performance Criteria

5.2.2.1 Design Storm

The sewer system hydraulic capacity analysis was performed using a synthetic National Oceanic and Atmospheric Administration/ Soil Conservation Service (NOAA/SCS) 5-year, 24-hour design storm. The design storm is discussed in Section 2.8 of Chapter 2 - Basis of Planning.
For this SSMP, the City and Carollo have chosen to use the NOAA design storm for modeling. For three reasons, the NOAA IDF was chosen:

- The 5-year 24-hour NOAA is the industry standard for design storm.
- The 5-year 24-hour NOAA meets DEQ standards.
- The City of Medford DMP 5-year, 24-hour volume is the same as the NOAA, 5-year.

5.2.2.2 Conveyance System

When evaluating existing sewers, using a conservative d/D ratio may lead to unnecessary replacement of existing pipelines. During Peak Wet Weather Flow (PWWF) for the design storm, water levels were not allowed to rise up to three feet below manhole rim, or to surcharge (d/D>1) for shallow manholes. Shallow manholes were defined as manholes

where the distance between the crown of the pipe and the manhole rim was less than 3 feet. Shallow manholes locations are shown on Figure 5.1.

Sewer pipes were allowed to surcharge under these maximum flow conditions. If the flow depth was greater than the maximum allowable Hydraulic Grade Line (HGL), then the sewer was deemed deficient and a larger sewer might be proposed to provide greater flow capacity.

It is important to note that meeting the evaluation criteria (maintaining an HGL three feet below the manhole rim) is particularly difficult for shallow manholes and pipes. As described above, shallow manholes were defined as manholes with a distance less than three feet between top of pipe crown and manhole rim, and are shown on Figure 5.1.

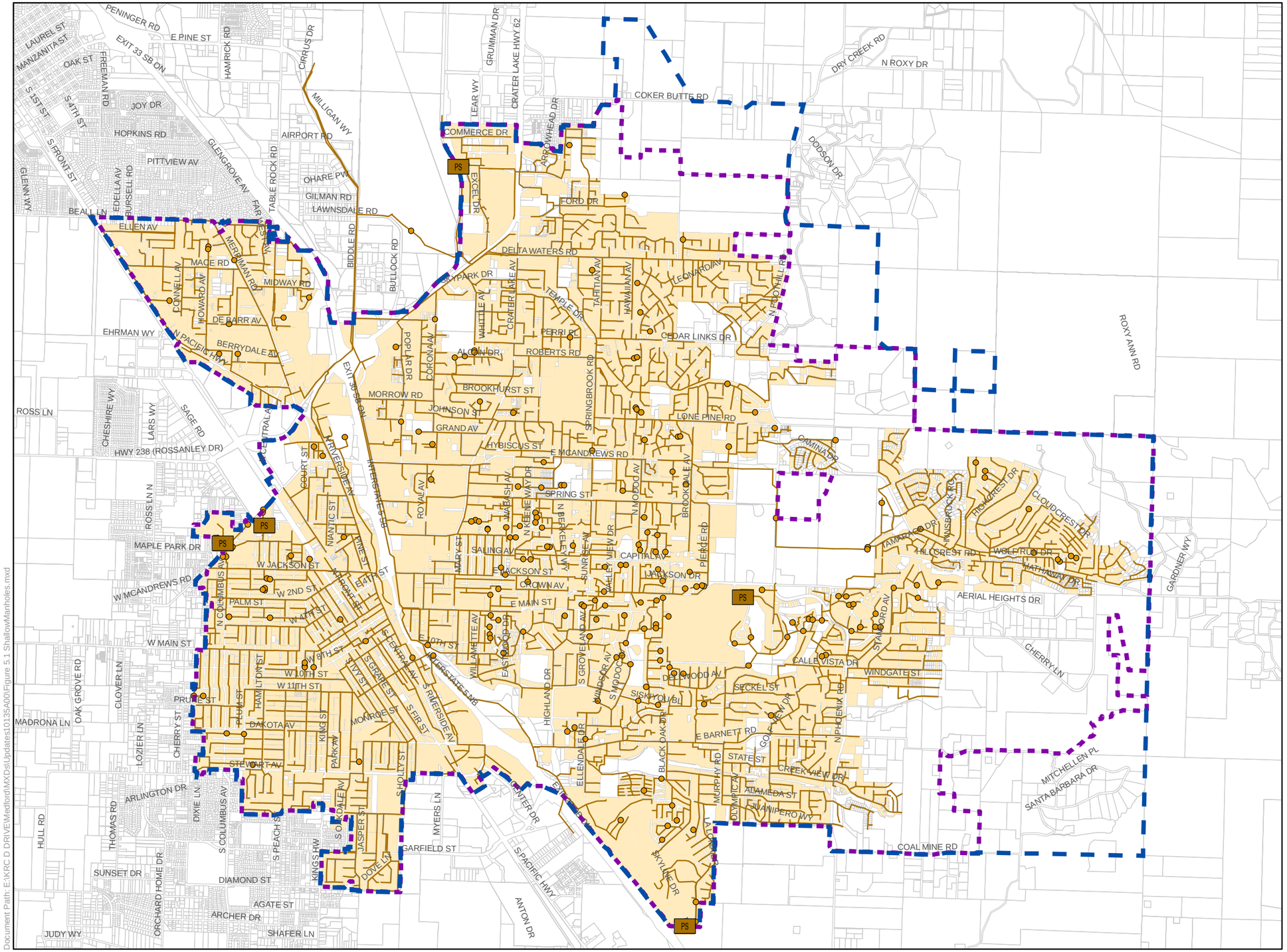
The maximum allowable d/D ratios for design flow conditions are summarized in Table 5.1.

Table 5.1 Flow Depth Criteria Used in Modeling Sanitary Sewer Master Plan City of Medford	
Existing Sewers	
Flow Condition	**Maximum Surcharge Depth**
Peak Wet Weather Flow (Design Flow)	No less than three feet below manhole rim, no more than d/D>1 for shallow manholes only.
New Sewers	
Diameter	**Design Flow Maximum d/D Ratio**
Less than or equal to 12-inches	0.65
Greater than or equal to 15-inches	0.75

5.2.2.3 Pump Stations and Force Mains

The performance criteria for existing pump stations include the City's firm capacity requirements and force main velocities. According to City Sewer Standards, pump capacity shall be provided to handle the ultimate peak flow, also known as the peak wet weather flow (PWWF), from the pump station's tributary area with the largest pump out of service. Therefore, the City's sewage pump stations should have sufficient firm capacity (capacity with the largest pump out of service) to pump the PWWF during the design storm.

The evaluation of existing force mains is based on a maximum pipe velocity of 8 feet per second (ft/sec) for the design storm.



Legend

- Service Area
- 2036 Service Area
- Shallow Manholes
- Modeled Sewer Pipeline
- Currently Developed and Connected Parcels
- Taxlots

N

Feet

0 2,000 4,000

SHALLOW MANHOLES LOCATION

FIGURE 5.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

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5.3 GRAVITY COLLECTION SYSTEM EVALUATION

A capacity analysis of the modeled collection system was performed using the City's calibrated hydraulic model and using the evaluation criteria outlined above. The capacity analysis entailed identifying areas in the sewer system where the performance criteria for surcharging was exceeded, or where the capacity of pump stations was exceeded. The collection system was evaluated for three development scenarios:

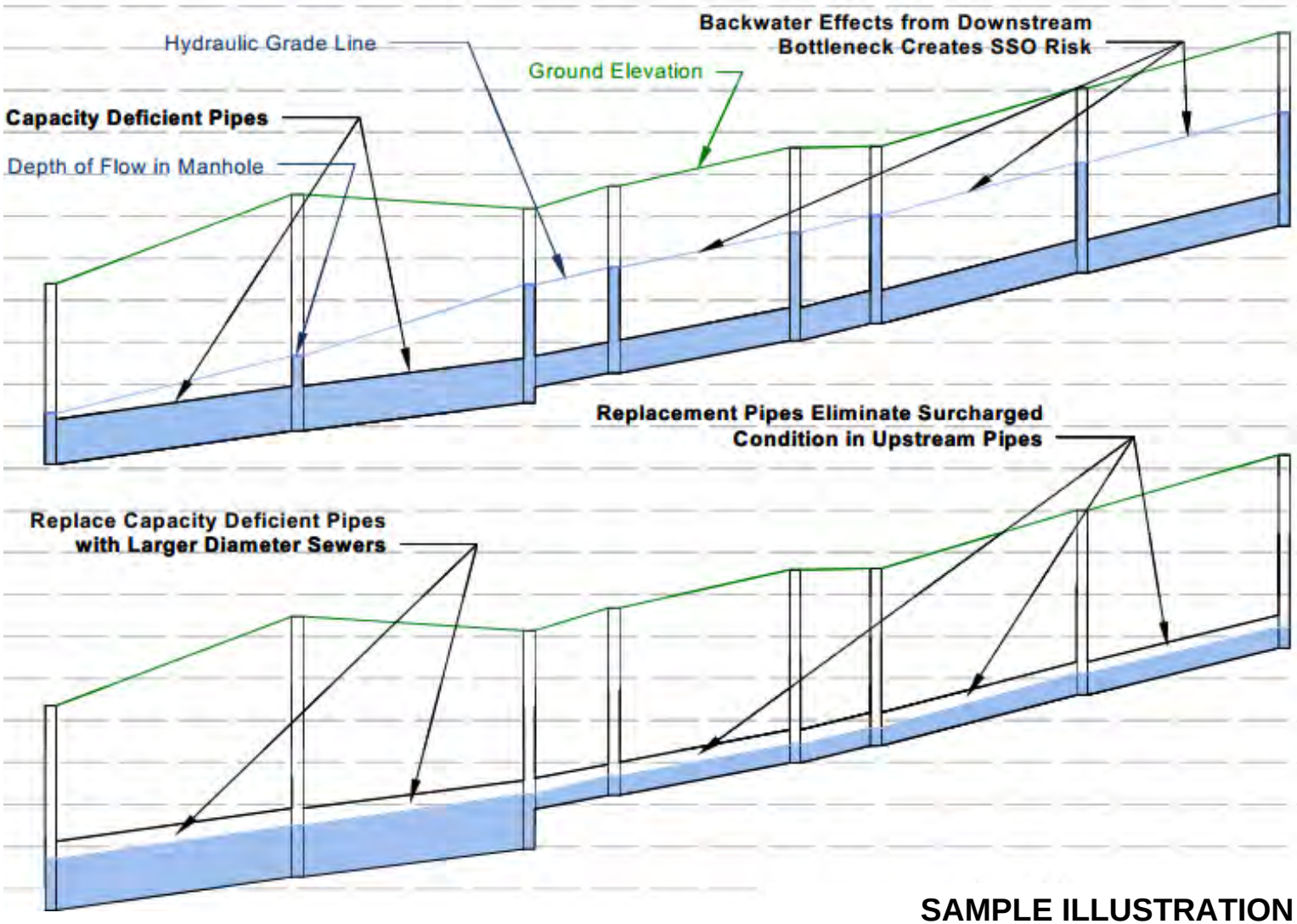
- Existing conditions (existing).
- 2036 Service Area conditions and (2036).
- Service Area including Urban Reserve (build-out).

5.3.1 Surcharge Due To Backwater

Sewers that lack sufficient capacity to convey design flows could produce backwater effects in the collection system that potentially lead to sanitary sewer overflows (SSOs). Pipelines with an HGL that encroached within less than three feet below manhole rim are not necessarily capacity deficient.

Surcharging of a pipe can occur due to backwater effects of a downstream pipe, not due to insufficient capacity of the pipe itself. If the downstream pipe is capacity deficient, it can cause backup - and even reversal - of flow in the upstream pipe, resulting in surcharge of the upstream pipe that otherwise is not capacity limited. If the downstream pipe capacity is increased, then the upstream pipe may no longer show failure conditions. An illustration of backwater effects is shown in Figure 5.2. Additionally, bottlenecks causing backwater in the collection system generally do not allow for the full PWWF to flow downstream. Therefore, PWWF observed under existing system condition (no improvements) may underestimate flow if all capacity restraints are removed. Therefore, it is recommended that the City address downstream issues to limit the overall cost of the Capital Improvement Plan (CIP), rather than backwater improvements.

For this reason, the hydraulic model was analyzed to identify the pipeline segments that are the cause of the surcharged conditions.



SAMPLE ILLUSTRATION OF BACKWATER EFFECTS IN A SEWER

FIGURE 5.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

5.3.2 Key Causes for Deficiencies

The calibrated hydraulic model run with the design storm was analyzed using the performance criteria to determine manholes that are failing the maximum HGL criteria. The key causes triggering deficiencies in the City's collection system include:

- Adverse slopes and misaligned inverts.
- Shallow manholes.
- Pipe restrictions (a single or few smaller diameter pipes between larger diameter pipe).
- Pipe diameter too small to convey the PWWF.
- Pump station firm capacity (capacity assuming the largest pump in the station out of service) too small to pump the PWWF.
- Backwater condition.

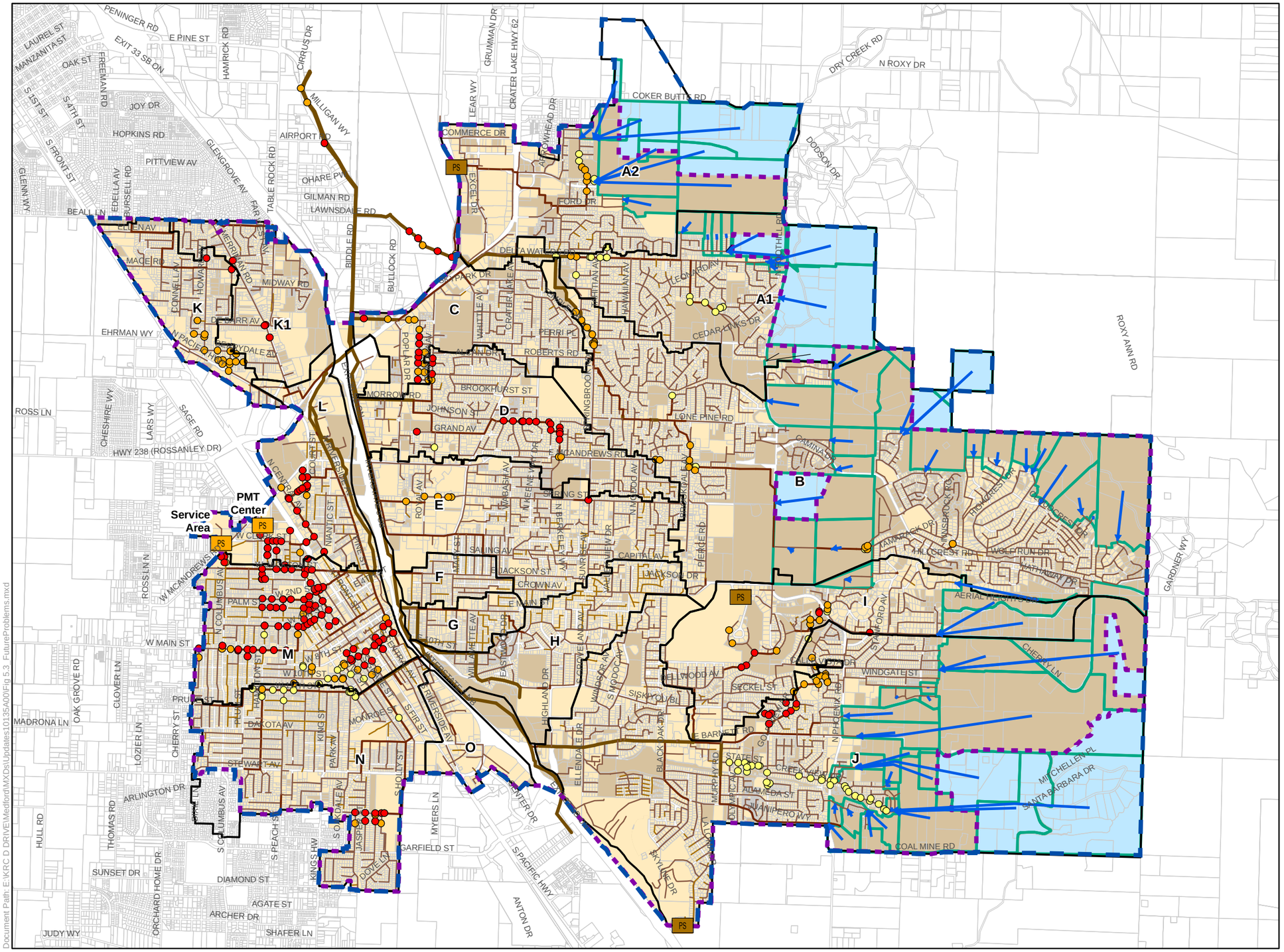
A large portion of the shallow manholes were not predicted to surcharge and no improvements were recommended. Shallow manholes where the HGL exceeded two feet above pipe crown were noted and it was recommended to upsize the section of pipes so no surcharging was allowed.

5.3.3 Existing System Problem Areas

For the existing sewer collection system, the PWWF was routed through the hydraulic model. In accordance with the established criteria for existing sewers, manholes where the HGL encroached within three feet below manhole rim were identified. Capacity deficiencies were identified that will require improvements prior to serving future users.

In general, the small sewer mains (8-inches) throughout the City have sufficient capacity to convey existing flows during the design storm. The primary capacity issues derive from the larger trunk lines that receive flow from multiple basins and deliver sewage to the Rogue Valley Sewer Services (RVSS) Interceptor, and the sewer basins located west of Bear Creek in the downtown area; Basins L and N primarily. The downtown core area experiences large amount of I/I that appear to mainly be the cause for the observed deficiencies.

The existing deficiencies are mainly predicted in sewer Basins C, D, L, M, and N. The locations of these deficiency areas under current PWWF conditions are shown on Figure 5.3 in red. Appendix G details modeled results for existing condition and benefits of recommended improvements.



Legend

- Existing Deficiencies
- 2036 Deficiencies
- URA Deficiencies
- Pump Station
- Mid-Term Pump Station

Modeled Sewer Pipeline

- > 18"
- 10" - 18"
- 8" - 10"
- < 8"
- Service Area
- 2036 Service Area
- Sanitary Sewer Basin
- Parcel Contributing to Existing System
- Expansion Areas
- Taxlots
- Currently Developed and Connected Parcels
- Urban Reserves
- 2036 Parcels

N

Feet
0 2,000 4,000

POTENTIAL PROBLEM AREAS AND DEFICIENCIES

FIGURE 5.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

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5.3.4 2036 Service Area Problem Areas

The 2036 Service Area system analysis was performed in a similar manner to the existing system analysis. The 2036 condition evaluated whether or not the sewers would be adequately sized to convey the 2036 PWWFs, which represent the Urban Growth Boundary, and includes the preliminary assumption made to serve all expansion areas (See Chapter 2 for the 2036 service boundary definition).

The additional projected flows from new development intensify the capacity issue, exacerbating existing deficiencies. Additional pockets of deficiencies are located in sewer Basins B, E, J, and N and are shown in orange on Figure 5.3.

Deficiencies observed in Basins B and J are mainly caused by the addition of flows from expansion areas east of the City. The addition of the expansion areas located in the 2036 Service Area exacerbate the main sewers in these basins and create surcharging conditions above the City's criteria. The assumption of degradation of I/I over time also contributes to the additional deficiencies in the collection system, especially in Basin N located in the downtown core. As discussed in Chapter 2, it was assumed that, for the capacity evaluation, I/I would degrade over time at a rate of 7 percent per decade.

5.3.5 Service Area Problem Areas

The build-out system analysis was performed in a similar manner to the existing and 2036 system analysis. The Service Area scenario (build-out) evaluated whether or not the sewers would be adequately sized to convey the build-out PWWFs, including urban reserve areas. This analysis incorporates the preliminary assumptions made for how/where to connect the growth areas to the existing system presented in Chapter 2. An alternative analysis was performed to try and mitigate these deficiencies, and is presented in Section 5.6.

The additional projected flows from the urban reserve development intensify the capacity issue projected under 2036 conditions. The additional pockets of deficiencies are located in Basins A, J, and B and are shown in yellow on Figure 5.3.

Deficiencies observed in Basins A and J are mainly caused by the addition of the flows from the expansion areas in the east of the system. The main deficiencies in these basins are located along Creek View Drive in Basin J and Bailey Avenue, Saint Augustine Drive, and Webfoot Drive in Basin A.

5.4 PUMP STATION EVALUATION

Ensuring that pump stations have adequate capacity to convey peak flows is important to prevent unwanted sewage overflows at pump stations. In accordance with the established performance criteria, the City’s existing modeled lift stations were evaluated to determine if each one has available capacity to convey existing and future PWWFs. Pump stations with an

influent PWWF above the existing firm capacity were flagged as deficient. The firm capacity of a pump station is defined as the capacity with the largest pump out of service.

If a pump station has inadequate capacity to pump the PWWFs, the water level in the wet well may rise to the overflow point, discharging sewage to stormwater collection systems that eventually discharge to water bodies. The following sections present the pump station capacity evaluation, which compares the estimated current and future peak flows to the pump station firm capacities. Recommendations to address identified deficiencies are presented in Section 5.7.

The City's hydraulic model includes five pump stations located in the City's Service Area. Table 5.2 summarizes the results of the pump station evaluation.

Table 5.2 Pump Station Evaluation
Sanitary Sewer Master Plan
City of Medford

Pump Station	Firm Capacity (gpm)	Total Capacity (gpm)	Modeled PWWF (gpm)			Deficiency
			Existing	2036 Service Area	Service Area	Yes/No
Airport PS	1,623	3,246	621	1,108	1,141	No
Greenway PS(3)	310	620	19	22	23	No
Montcrest PS	235	470	78	81	84	No
PMT PS	0	238	174	204	210	Yes (redundancy)
Service Center PS	0	318	228	258	266	Yes (Redundancy)

Notes:
(1) Assumes piping improvements upstream of each pump station is incorporated. This maximizes the potential PWWFs when all bottlenecks and potential overflows are removed.
(2) PMT PS only has one pump in its station, therefore, the pump station is not considered as a redundant station and does not have firm capacity.
(3) Greenway PS operates two pumps previously rated at 310 gpm. However, "N" impellers have been added, which reduces output.

Based on the analysis and the results presented in Table 5.2, two out of five of the City's pump stations are considered deficient per City's redundancy criteria. The total capacity of both PMT Pump Station and Service Center Pump Station can handle build-out PWWFs of the collection system, however, these station only have one pump and do not meet the pump redundancy criterion.

The City has spare pumps for these two stations and also has the ability to bypass these pump stations when pump service is required. Both pumps operate a few hours a week at most.

5.5 CAPACITY EVALUATION SUMMARY

The City's model identified several locations where the sewer system fails the capacity criteria under existing conditions. These deficiencies are mainly located on larger trunks collecting most of the flow from the system, and in the downtown core where large amount of I/I seem to enter the collection system during rainfall events. The deficiencies worsen as additional growth and City expansion occurs.

Two out of the five City's pump stations are considered deficient due to lack of pump redundancy.

Figure 5.3 summarizes all system capacity deficiencies identified in this analysis based on the established performance criteria.

Following the completion of the existing, 2036 Service Area, and Service Area system analysis, improvement projects and alternatives were identified in order to mitigate existing system pipeline capacity deficiencies. The recommended improvement projects are discussed in greater detail in Section 5.7.

5.6 EXPANSION AREAS ALTERNATIVES ANALYSIS

The City is anticipating continued significant growth east of the City in the Urban Growth Boundary and Urban Reserves. Because of the significant additional flows anticipated from these areas, the City needs a strategic plan for limiting the impact on existing sewers. The City's previous conceptual ideas include constructing a regional interceptor and/or a new pump station to direct flow away from the existing system.

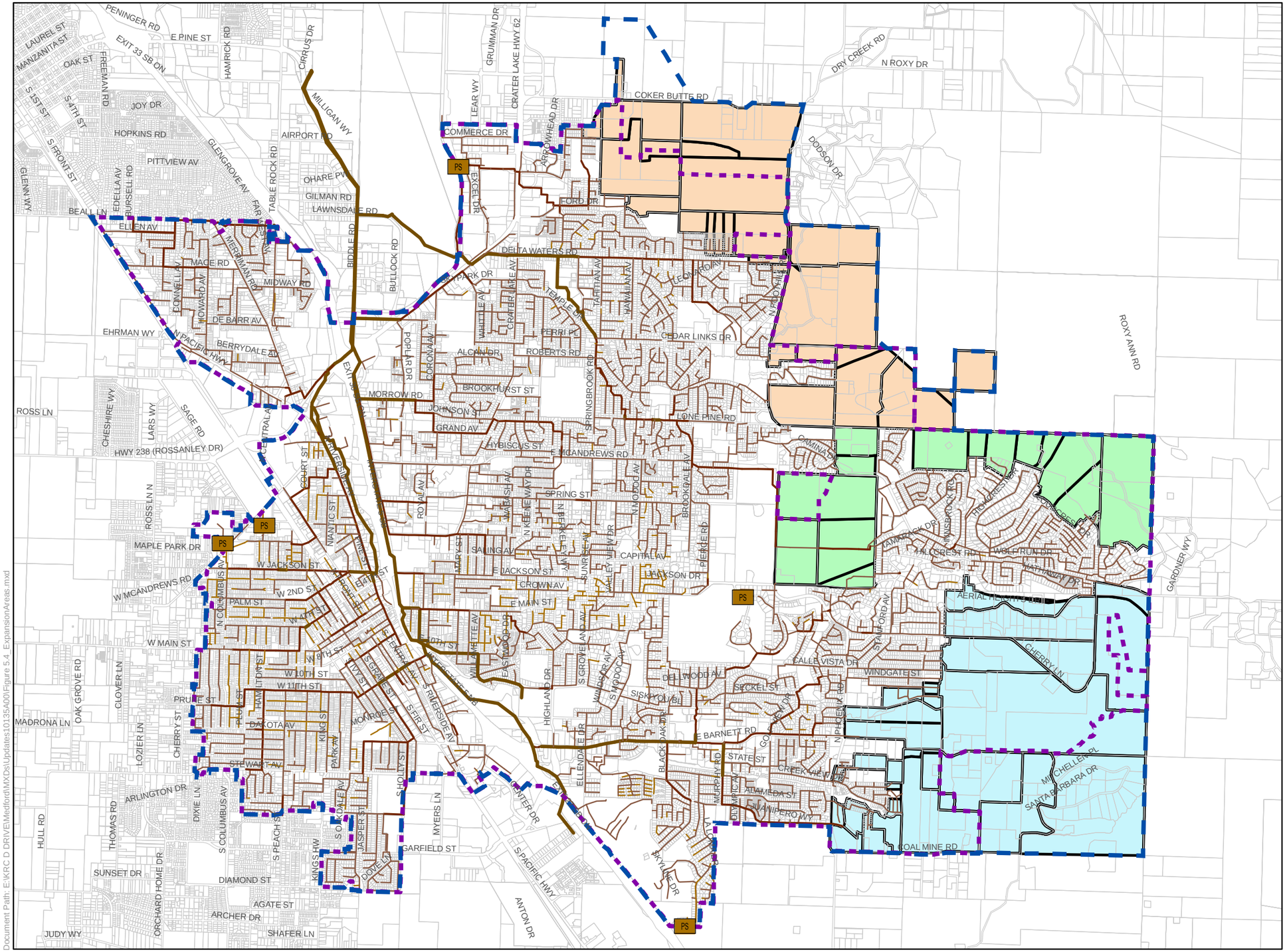
5.6.1 Initial Screening of Alternatives

As part of this SSMP, the City and Carollo developed potential alternatives to serve the expansion areas presented on Figure 5.4. Both impacts and benefits of the alternatives to the community as a whole were considered. A total of four alternatives were kept and developed further in the sections below.

The initial screening of these alternatives was based on:

- Constructability, and
- Operations and maintenance of physical facilities.

No viable alternatives for serving growth areas east of Basin A were identified because of limitations in topography and the inability to construct sewer pipes through the airport. Thus new growth in the northeast of the City is recommended to be directed towards the existing sewer system (see Figure 5.5 for current assumptions), and the alternatives below focus on new growth in the southeast of the City.



Legend

- Pump Station
- Modeled Sewer Pipeline
  - > 18"
  - 10" - 18"
  - 8" - 10"
  - < 8"
- Service Area
- 2036 Service Area
- Taxlots
- Expansion Areas to Basin B
- Expansion Areas to Basins I and J
- Expansion Areas to Delta Waters Rd and Lawndale Rd to the Interceptor

N

Feet

0 2,000 4,000

EXPANSION AREAS ALTERNATIVE ANALYSIS

FIGURE 5.4

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

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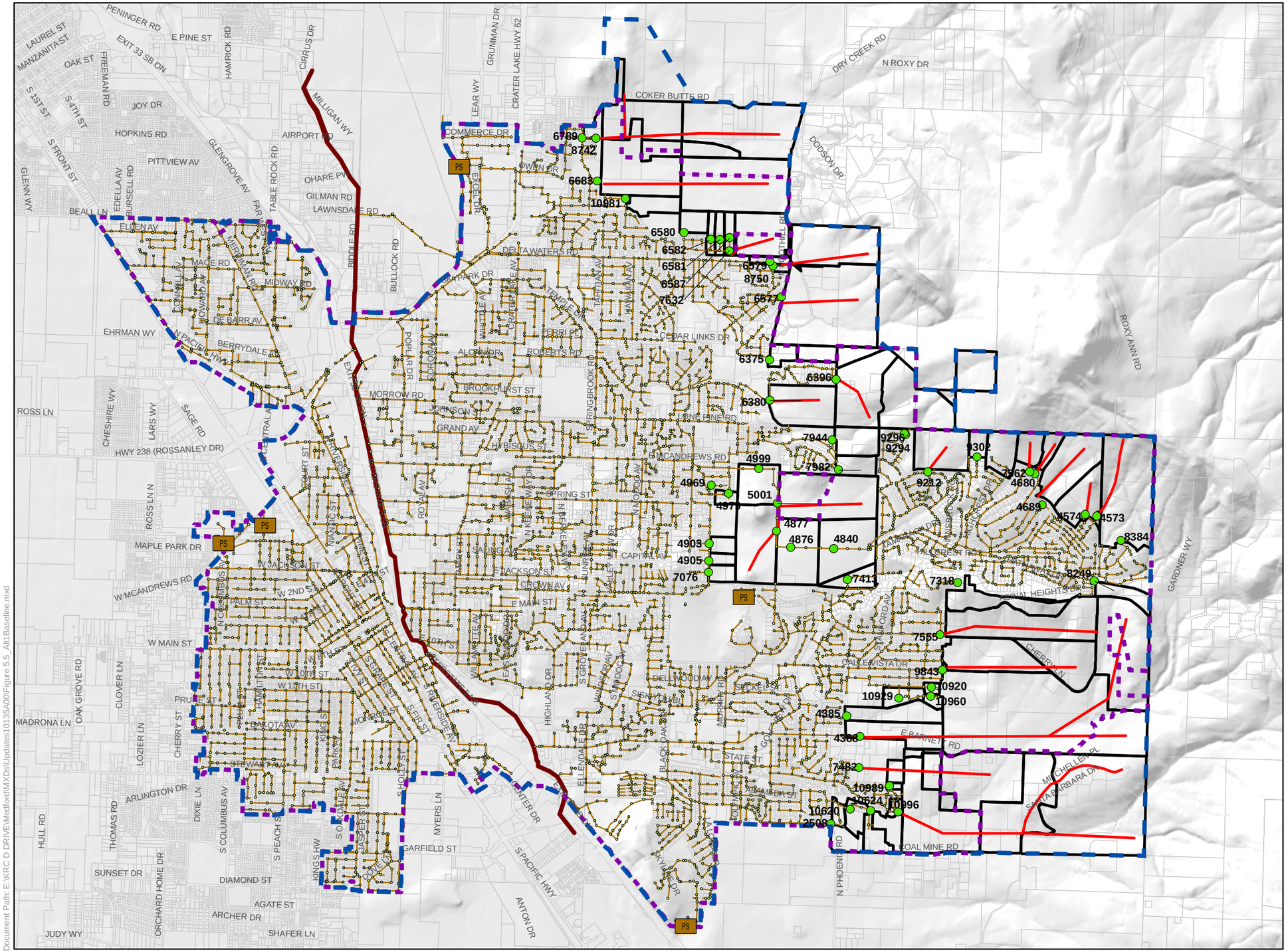

Legend

- Service Area
- 2036 Service Area
- Taxlots
- Contributing Manhole
- Other Manhole
- Pump Station
- Sewer Gravity Interceptor
- Sewer Main
- Proposed Infrastructure
- Growth Areas

Feet
0 4,000

ALTERNATIVE 1 - BASELINE

FIGURE 5.5

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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5.6.1.1 Alternative 1 - Baseline

Alternative 1 - Baseline corresponds to the preliminary flow assumptions developed in Chapter 2 - Basis of Planning and shown in Figure 5.5. Under this alternative, the City would extend its existing collection sewer system out to the east. The proposed gravity sewers would follow natural topography flowing generally from east to west, and would connect to several points in the existing sewer system. Figure 5.5 shows the general locations of proposed infrastructure to connect these growth areas to the current existing system and the assumed connection points in green.

5.6.1.2 Alternative 2 - Juanipero Way Bypass

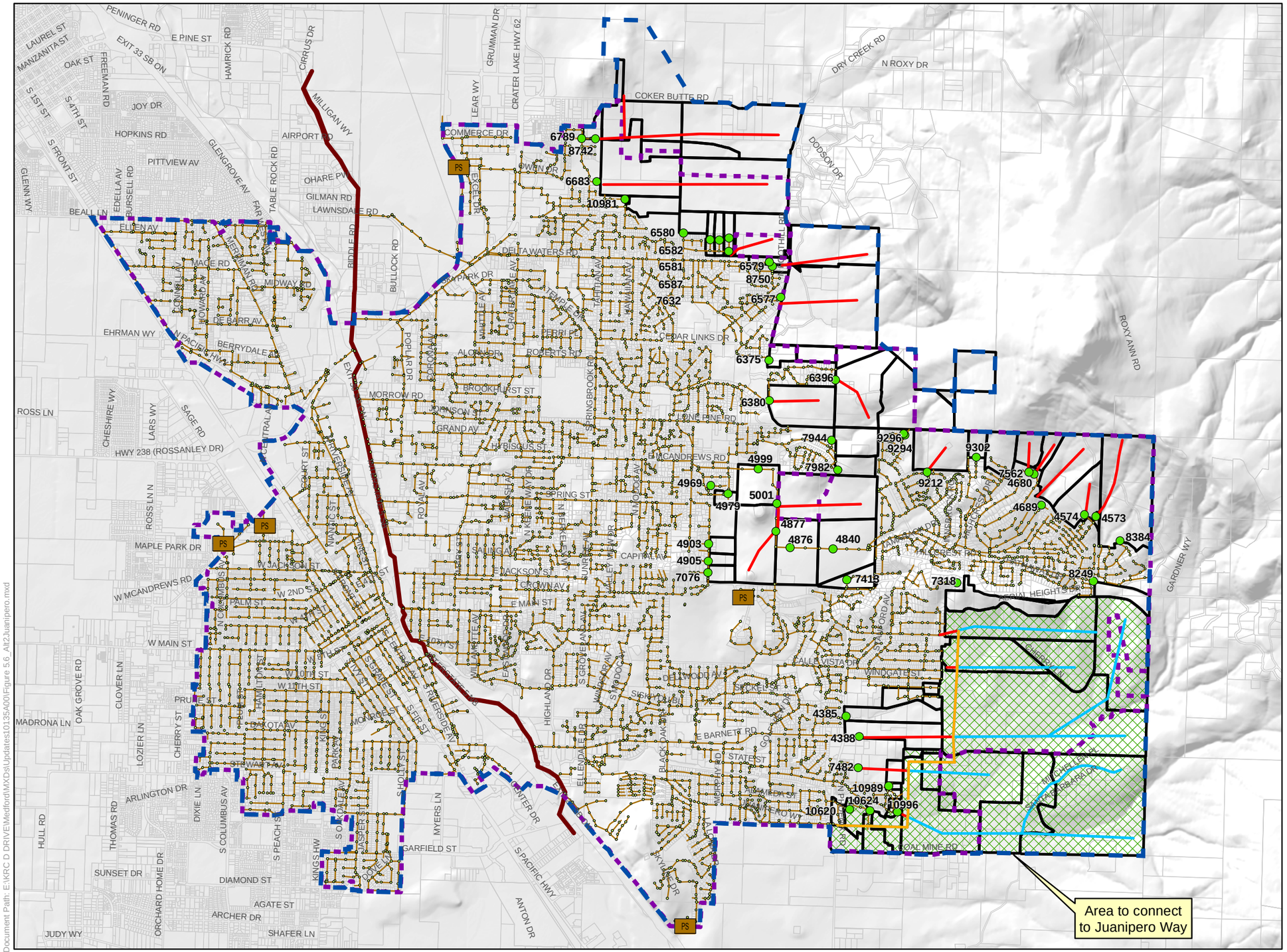
Alternative 2 – Juanipero Way assumes that the expansion areas would connect the same way as Alternative 1, with the exception of the expansion areas located in Basins I and J. The expansion areas highlighted in green on Figure 5.6 would connect by gravity to Juanipero Way, and would ultimately flow to Barnett Rd and the RVSS interceptor through the existing siphon underneath the creek.

This alternative centralized all new expansion areas from Basins I and J to one connection point in the existing system at manhole 11269. This location represents the lowest point of the development area that can still flow by gravity to the existing system. It was anticipated that directing all flow to one sewer trunk reduces the number of capacity improvement projects required under Alternative 1. The grade of a new “regional” sewer trunk east of Phoenix Road that flows from north to south was checked to confirm that the new sewer would be at acceptable slope and reasonable depth. The path for this new "regional" sewer is high-level and will need to be refined and updated as needed during preliminary design based on where development and new streets are expected, soil condition, creek locations, and slope. It is anticipated that this new sewer will need to cross both “Tributary B” and Larson Creek in order to connect to Juanipero Way.

5.6.1.3 Alternative 3 - North Phoenix Road Bypass

Under Alternative 3 – North Phoenix Road Bypass, the expansion areas from Basins I and J that were connected to Juanipero Way under Alternative 2, instead flow south in a new interceptor towards N Phoenix Road and along N Phoenix Road around the golf course to the RVSS interceptor. This configuration would allow new growth to completely bypass the City's existing system, which would minimize impacts to the City's existing collection system. Figure 5.7 presents the proposed system configuration concept for this alternative, and the contributing area to the new sewer on N Phoenix Rd, in green. This alternative would also allow the City to abandon Montcrest Pump Station and connect its tributary area to the new sewer running south of the pump station to the RVSS interceptor.

The new sewer would need to cross under Interstate 5 (I-5) and Bear Creek, which at the selected location has a combined width of approximately 1,000 feet. Crossing would require trenchless technologies and extensive permitting. Additionally, based on topography in the area, crossing the creek might require a siphon.



Legend

- Contributing Manhole
- Other Manhole
- Regional Sewer
- Proposed Infrastructure to Juanipero Way
- Other Proposed Sewers
- Service Area
- 2036 Service Area
- Pump Station
- Sewer Gravity Interceptor
- Sewer Main
- Growth Areas
- Juanipero Way Study Area
- Taxlots

N

0 2,000 4,000 Feet

ALTERNATIVE 2 - JUANIPERO WAY BYPASS

FIGURE 5.6

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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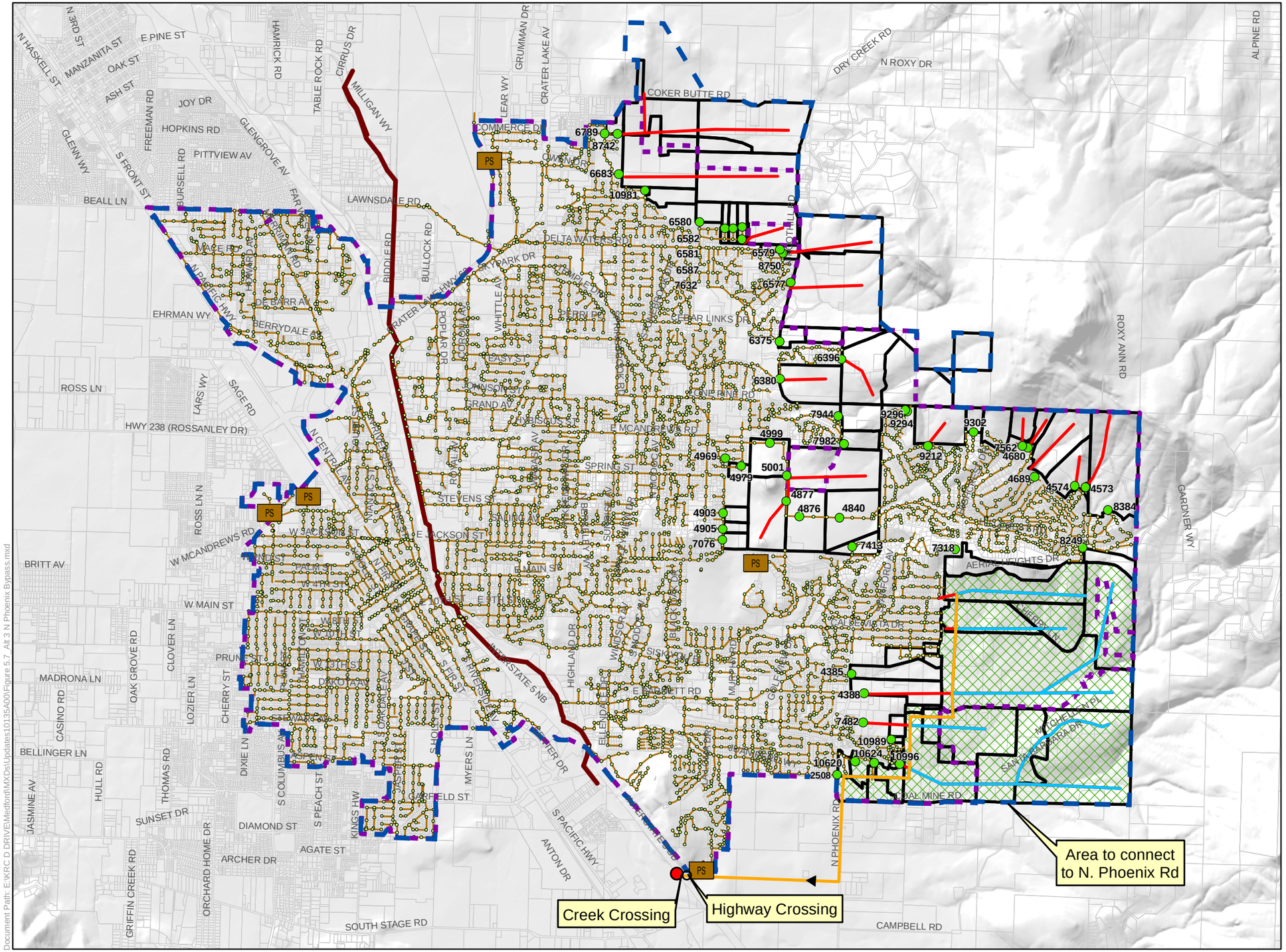

Legend

- Contributing Manhole
- Other Manhole
- Connection to Interceptor
- Regional Sewers
- Proposed Infrastructure to N. Phoenix Rd
- Other Proposed Sewers
- Service Area
- 2036 Service Area
- Pump Station
- Sewer Gravity Interceptor
- Sewer Main
- Area to connect to N. Phoenix Rd
- Growth Areas
- Taxlots

N

Feet

0 2,000 4,000

ALTERNATIVE 3 - NORTH PHOENIX ROAD BYPASS

FIGURE 5.7

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

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5.6.1.4 Alternative 4 - North Phoenix Road with Basin B Bypass

Alternative 4 – North Phoenix Road with Basin B Bypass was an attempt to collect and convey even more of the new development areas away from the City's existing system and towards a regional collector. Under this alternative, the expansion areas located in Basins I and J connect by gravity to N Phoenix Road the same way as in Alternative 3, as illustrated in Figure 5.8. Additionally, part of Basin B (expansion areas highlighted in green on Figure 5.9) flows to a new sewer along N Phoenix Road. A new sewer parallel to the existing infrastructure will capture the flow from the expansion areas in Basin B through the Hillcrest area. Similar to Alternative 3, this alternative allows the City to abandon Montcrest Pump Station and connect that area to the new sewer running south of the pump station to the RVSS interceptor.

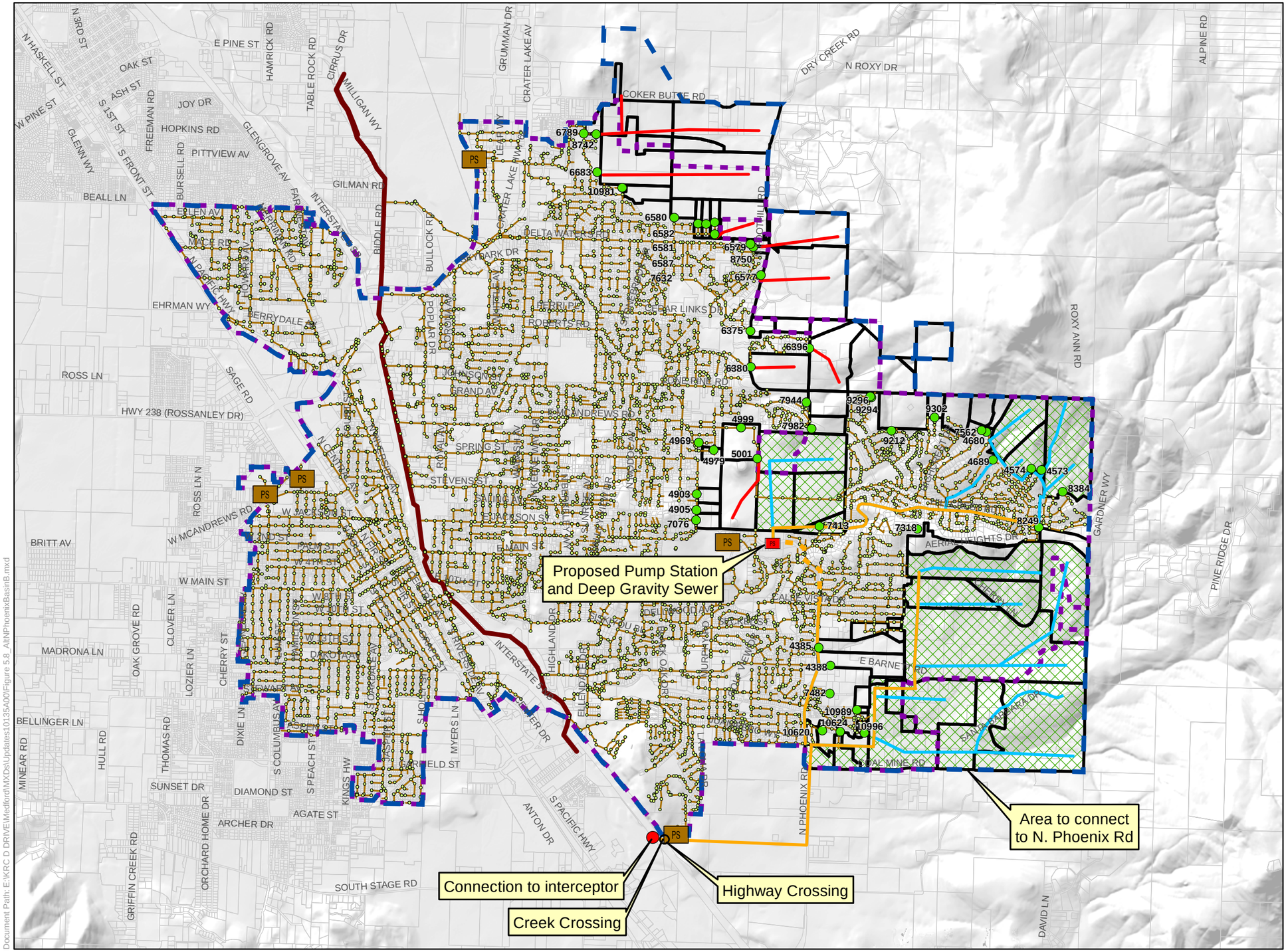
Two options were evaluated to bring Basin B flow south of Hillcrest Rd:

- Flow by gravity to a pump station located at the intersection of Hillcrest Road, Foothill Road, and N Phoenix Road. Flow from this proposed pump station would be pumped along N Phoenix Road to the intersection of N Phoenix Rd with Cherry Lane. Because of the topography in the area, some gravity sewers leading to the pump station would be up to 30 feet deep, which can be challenging and expensive to construct.
- Flow by gravity all the way to the intersection of N Phoenix Rd and Cherry Lane. This would imply several deep sewer sections up to 40 feet deep. This option was still included as part of the cost evaluation in Section 5.6.3; however, it was determined that this option would be too challenging to construct.

Similar to Alternative 3, the Alternative 4 configuration directs new flow away from the City's existing system, thereby minimizing additional deficiencies in the existing City's collection system.

This alternative presents several challenges.

- The new sewer would need to cross the I-5 and Bear Creek, which at the selected location has a combined width of approximately 1,000 feet. Crossing would require trenchless technologies and extensive permitting. Additionally, based on topography in the area, crossing the creek might require a siphon.
- This option requires a potential new pump station that would result in operation and maintenance time and energy cost, and deep sections of sewers up to 30 feet deep.



Legend

- Contributing Manhole
- Other Manhole
- Proposed Pump Station
- Regional Sewers
- Proposed Infrastructure to N. Phoenix Rd
- Other Proposed Sewers
- Proposed Force Main
- Service Area
- 2036 Service Area
- Pump Station
- Sewer Gravity Interceptor
- Sewer Main
- Growth Areas
- Area to connect to N. Phoenix Rd
- Taxlots

Feet
0 2,000 4,000

ALTERNATIVE 4 - NORTH PHOENIX ROAD AND BASIN B BYPASS

FIGURE 5.8

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 5.8_AltNPhoenixBasinB.mxd

5.6.1.5 Alternatives Summary

This section summarizes the concept for each alternative and Table 5.3 summarizes the key components and challenges. The table below only includes the linear foot of proposed new sewers in the expansion areas. "Regional" sewers are the major sewers conveying flows and are shown in orange in Figures 5.5 through 5.8, while the expansion sewers are the smaller sewers collecting sewage in the new expansion areas and are shown in red and light blue in these figures. Necessary upsize of the existing system triggered by the addition of flow for the expansion areas is detailed in the sections below.

Table 5.3 Alternatives Analysis Summary
Sanitary Sewer Master Plan
City of Medford

Alternative ID	"Regional" Sewers Linear Feet (ft)	Expansion Sewers Linear Feet (ft)	Highway/Bear Creek Crossing	Deep Sewer/Pump Station
Alternative 1	0	80,590	No	No
Alternative 2	10,410	76,670	No	No
Alternative 3	24,450	72,100	Yes	No
Alternative 4	41,360	74,230	Yes	Yes

5.6.2 Existing System Implication

Each alternative was run through the hydraulic model. Only the build-out scenario was evaluated to represent the highest anticipated flows. The hydraulic model was then used to develop recommended improvements to the existing system to help understand the impact of each alternative. During the analysis, costs of the proposed alternatives were balanced with costs for upgrading the existing system to mitigate deficiencies caused by the expansion areas. The results are discussed below.

5.6.2.1 Alternative 1 - Baseline

The majority of the impact from Alternative 1 is observed in Basin J along Creek View Drive. Connecting the expansion areas to the existing system under Alternative 1 also exacerbates the existing deficiencies observed along Golf View Drive.

Alternative 1 requires the most improvements to the existing system. Approximately 27,860 feet of pipes would need to be upsized within the existing system to accommodate projected flows from the expansion areas.

5.6.2.2 Alternative 2 - Juanipero Way

Alternative 2 concentrates the build-out flows from the expansion areas in Basins I and J to one single spot in the system.

The deficiencies predicted under Alternative 1 along Creek View Drive are not predicted under Alternative 2. However, the sewers on Juanipero Way and Murphy Road will need to be upsized to accommodate expansion areas flows. The flows ultimately flow to the siphon on Barnett and the regional interceptor. Modeling shows the siphon might be reaching its capacity under build-out conditions, it is recommended that the ultimate capacity of the siphon be verified when growth occurs in the expansion areas.

This scenario does not alleviate deficiencies near N Foothill Rd in Basin B. The same deficiencies and proposed improvements are predicted in Basin B under Alternatives 1, 2, and 3. Approximately 23,000 feet of pipes would need to be upsized within the existing system to accommodate projected flows from the expansion areas.

5.6.2.3 Alternative 3 - N Phoenix Rd Bypass

Alternative 3 allows flow from the expansion areas in Basins I and J to bypass the City's collection system and flow south along N Phoenix Road directly to the regional interceptor.

This alternative predicts similar deficiencies and proposed improvements in Basin B as Alternatives 1 and 2. Similar deficiencies are also predicted in the existing system in Basins I and J, with the exception of Juanipero Way/Murphy Road. This alternative requires more extensive "regional" sewers to convey the flow to the interceptor across the golf course. Approximately 15,500 feet of pipes would need to be upsized within the existing system to accommodate projected flows from the expansion areas.

5.6.2.4 Alternative 4 - N Phoenix Rd and Basin B Bypass

Part of the expansion area in Basin B is captured under Alternative 4 and by-passes the existing system to the RVSS interceptor.

Similar deficiencies and recommended improvements are projected under this alternative as Alternative 3. Redirecting flow from the Basin B expansion areas away from existing sewers and towards a new interceptor decreases the impact to the existing system, and removes some proposed improvements in Basin B that were recommended under previous alternatives. Approximately 8,450 feet of pipe would need to be upsized within the existing system to accommodate projected flows from the expansion areas.

5.6.2.5 Existing System Implication Summary

Table 5.4 summarizes the implication of each alternative presented above for the existing system and a summary of the considerations for each of the four alternatives.

Table 5.4 Existing System Implication Summary
Sanitary Sewer Master Plan
City of Medford

Alternative ID	New Infrastructure (ft)[1]	Existing System Upsize (ft)	Additional Considerations	
			Pros	Cons
Alternative 1	80,590	27,860	- No Pumping	
Alternative 2	87,080	23,000	- No Pumping	
Alternative 3	96,550	15,500	- No pumping; - May eliminate need for Montcrest PS	- Crossing under I-5 & Bear Creek; - Impacts to Interceptor
Alternative 4	115,590	8,450	- May eliminate need for Montcrest PS	- Crossing under I-5 & Bear Creek; - Impacts to Interceptor; - New, large pump station and very deep pipe

Note:
(1) Includes both "Regional" sewers and Expansion sewers from Table 5.3.

5.6.3 Alternatives Cost Comparison

This section summarizes estimated project costs for each alternative. The cost estimates include proposed new infrastructure presented in Figures 5.5 through 5.8, and updates to the existing system to accommodate additional flows from the expansion areas. These costs are planning level estimates to allow comparison between the four different alternatives. Further assumptions on cost development can be found in Chapter 7 - CIP. Table 5.5 summarizes the estimated project costs for the four alternatives.

Table 5.5	Alternatives Analysis Cost Summary Sanitary Sewer Master Plan City of Medford				
Alternative ID	**"Regional Sewer" ($M.)**	**"Expansion Sewers" ($.)**	**Existing System Upsize ($M.)**	**Pump Station ($M.)**	**Total Project Cost ($M.)**
Alternative 1	-	$187,000	$10.9 M	-	$11.1 M
Alternative 2	$2.4 M	$178,000	$8.9 M	-	$11.5 M
Alternative 3	$5.7 M	$168,000	$6.2 M	-	$12.1 M
Alternative 4	$9.6 M	$500,000	$3.0 M	$3.2 M	$16.3 M

Assumptions made specifically for the alternatives analysis are presented below:

- Sections with potential deep sewers (more than 20 feet) were marked-up by 200 percent. The costs of deep sewers depend on specific site conditions and would need to be refined during preliminary design. The 200 percent mark-up on these pipes accounts for the potential construction challenges (soil type, dewatering, and shoring and safety requirements).
- Recommended pipe improvements within the existing sewer system use the "developed area" cost per linear foot. Recommended new expansion sewers in currently vacant areas use the "undeveloped area" cost per linear foot (see Chapter 7 for details on cost).
- It is assumed that the City will assume cost for upsizing existing pipes and any new "regional" expansion sewers. “Regional” expansion sewers are new pipes 12-inch in diameter or larger. The cost estimates in Table 5.5 present the assumptions for regional sewers for each alternative based on flow; however, slope is unknown at this time, and the recommended diameter will need to be verified.
- It is assumed that the City will assume partial cost for the "expansion" sewers. It is assumed that of the planned sewers:
  - 2/3 will be 8-inch in diameter and will be at the charge of the developers.
  - 1/3 will be 12-inch in diameter and the difference in cost between constructing an 8-inch sewer and a 12-inch will be at the charge of the City. The calculated cost difference used was from the City’s Municipal Code 3.835.
  - The cost estimates in Table 5.4 present the assumptions for regional sewers for each alternative based on flow; however, slope and path is unknown at this time, and the recommended diameter will need to be verified.
- The proposed pump station in Alternative 4 would require a total capacity of 1.6 mgd. To meet the City’s pump redundancy and firm capacity standards, three (3) 375-gpm pumps were assumed. Using the cost curves in Chapter 7 indicates an approximate pump station cost of $3.2M. Operation and maintenance costs were not included, as construction costs alone for this alternative are more expensive than other alternatives.

As seen in the table, Alternative 4 results in the highest overall project cost due to the extensive new regional sewers, pump station, and crossing of I-5 and Bear Creek. In general, because of the cost of a regional sewer and the freeway crossing, the analysis shows that bypassing the existing system is more expensive than allowing new development to flow towards the existing system. Based on the review of the alternatives above with City staff, Alternative 1 – Baseline is recommended. This alternative is the most cost-effective alternative and presents the least impact to the existing system. Further refinement of pipe alignments, slopes, and diameter in coordination with development are recommended for new regional sewer pipes in the southeastern development area. The following analysis assumes Alternative 1 as the preferred option to serve the expansion areas.

5.7 RECOMMENDED COLLECTION SYSTEM IMPROVEMENTS

This section presents the proposed sewer improvements on both pipes and pump stations to mitigate existing, 2036 Service Area, and Service Area identified deficiencies and to serve future users. Improvements presented in this section incorporate the assumed future flow distribution for Alternative 1 - Baseline. The improvements are summarized in Table 5.6 and Figure 5.9.

5.7.1 Improvement Assumptions

5.7.1.1 General Assumptions

When an increase in capacity is required, existing sewers can be upgraded or a parallel or relief sewer can be constructed. For the purposes of this SSMP, unless otherwise stated, we assumed that a capacity deficient sewer would be upgraded to a larger diameter. The upgraded pipeline generally follows the same slope as the existing pipeline, with the exception where survey data revealed negative or flat slopes in an existing alignment.

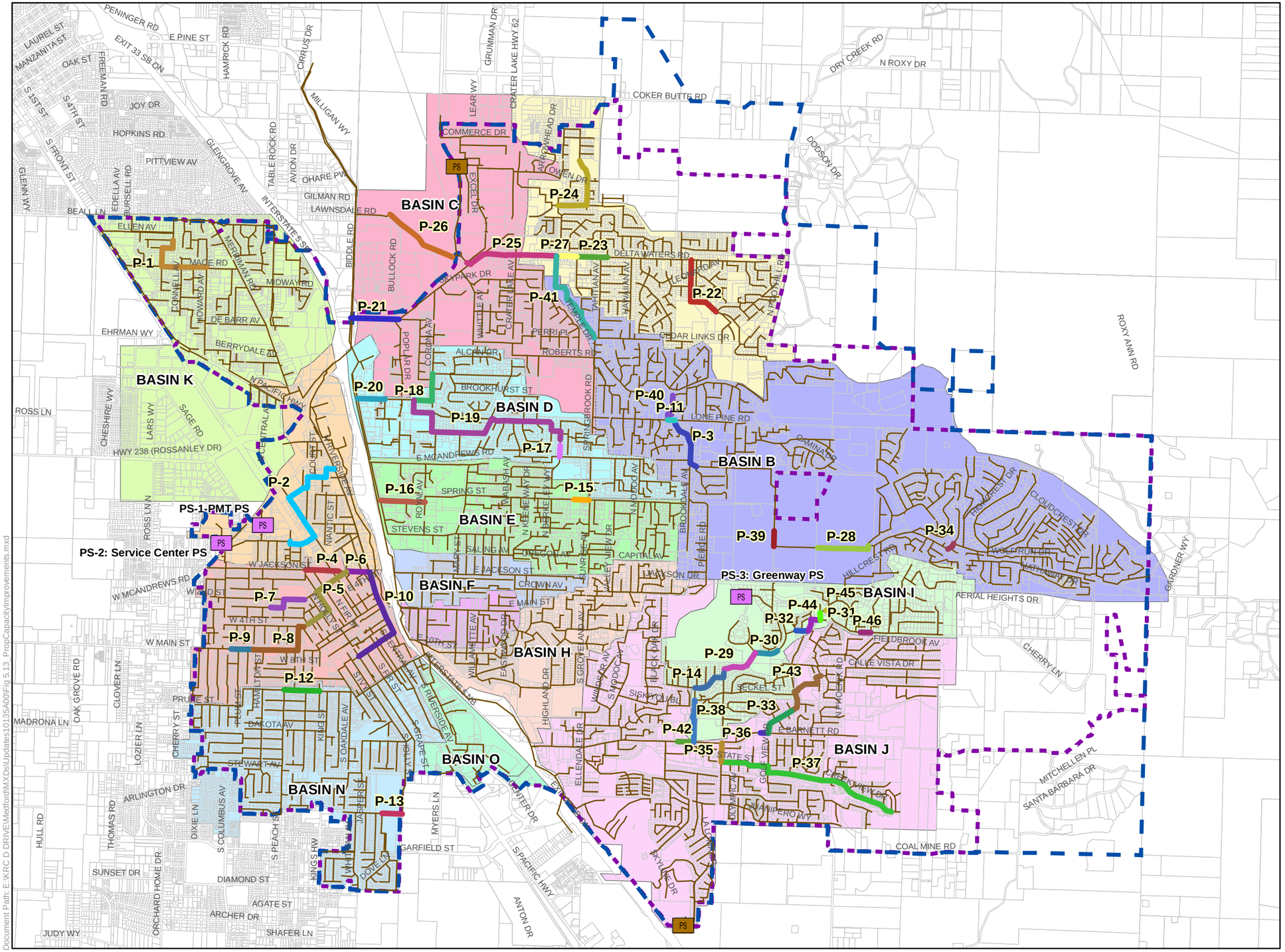
The proposed pipe diameter for each recommended project represents the ultimate diameter for build out conditions. New sewer pipelines were sized to meet the City's design criteria for new pipes presented in Table 5.1.

5.7.1.2 Improvement Project Descriptions

Figure 5.9 and Table 5.6 present the recommended improvement projects. The figure and table should be used together to locate the proposed improvements and to gain details of the improvement (length, diameter, street location, etc.). The improvement identification number links the figure and table. The improvements summarized in Table 5.6 use a cross-referenced number system. The columns used in Table 5.6 refer to the following:

- **Project ID**: Assigned unique identifier associated with each improvement project. This is an alphanumeric number that starts with one letter indicating the type of improvement P= Pipe, PS = Pump Station, G = General, and continues with a number and a letter.

- **Improvement Type**: Gravity pipelines, pump stations, force mains, and jacked steel casings.
- **Description**: Street in which the improvement is proposed.
- **Basin ID**: Sewer basin in which the improvement is proposed.
- **Existing Size:** This is the size of the existing pipeline/facility. It represents the diameter of the existing pipelines (inches), and the total capacity of pump stations (mgd).
- **Proposed Size:** This is the size of the proposed improvement. It represents the diameter of the proposed pipelines (inches), and the total capacity of pump stations (mgd).
- **Length**: Estimated length of the proposed improvement (in feet). It should be noted that the length estimates do not account for re-routing the alignment to avoid unknown conditions.
- **Phase**: Phase in which the improvement is recommended. Improvements are recommended either for Short-Term, Mid-Term, or Long-Term.
- **Existing vs Future Customers**: These columns described whether each improvement is mainly caused by flows from existing customers or future customers.
- **Reasoning:** This section explains the reason why this improvement is proposed and needed (predicted surcharging, flow diversions, known condition issues, inflow, and infiltration issues).



PROPOSED CAPACITY-RELATED IMPROVEMENTS

FIGURE 5.9

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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Table 5.6 Recommended Pipe Capacity Projects
Sanitary Sewer Master Plan
City of Medford

Project ID	Improvement Type	Description	Basin ID	Existing Size (inch)	Proposed Size (inch)	Length (ft)	Phase	Existing vs Future Customers		Reasoning
								Existing (%)	Future (%)	
P-1	Gravity Gravity Gravity	Mace Road between Elliott Avenue and Howard Avenue/Marilee Street, Dan Avenue, and Elliott Avenue between Herman Avenue and Mace Road.	Basin K	 12 15	 15 18	**2,730** 1,486 1,244	Long-Term	75	25	Surcharging above criteria under existing condition. Historical surcharging known to the City; however, staff recently diverted flow and surcharging has not occurred since then. Recommend for continued monitoring; project moved to lower priority.
P-2	Gravity Gravity	Beatty Street, Court Street, North Central Avenue, and East Clark Street between Madrona Street and West Clark Street.	Basin L	 8/10/12	 15	**4,761** 4,761	Short-Term	75	25	Significant surcharging under existing conditions, mostly caused by significant I/I. Basin L should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-3	Gravity Gravity	Brookdale Avenue between E McAndrews Road and Lone Pine Road.	Basin B	 12	 18	**1,762** 1,762	Mid-Term	0	100	Deficiencies in this area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers.
P-4	Gravity Gravity	East Jackson Street between North Holly Street and North Central Avenue.	Basin M	 10/12	 15	**1,109** 1,109	Short-Term	100	0	Significant surcharging under existing conditions, mostly caused by significant I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-5	Gravity Gravity Gravity	East 2nd Street between East Jackson Street and North Grape Street/North Grape Street between East 2nd Street and West 4th Street and along West 4th Street between North Oakdale Avenue and North Grape Street.	Basin M	 12 8/10/12/15	 15 18	**2,820** 844 1,976	Short-Term	100	0	Significant surcharging under existing condition, mostly caused by significant I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-6	Gravity Gravity	East Jackson Street between North Bartlett Street and North Riverside Avenue.	Basin M	 15	 24	**737** 737	Short-Term	100	0	Significant surcharging under existing conditions, mostly caused by I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-7	Gravity Gravity	West 2nd Street, North Peach Street, and Palm Street between Rose Avenue and North Holly Street.	Basin M	 6/8	 12	**1,414** 1,414	Short-Term	100	0	Significant surcharging under existing condition, mostly caused by I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-8	Gravity Gravity	West 4th Street between North Oakdale Avenue and North Orange Street /North Orange Street between West 4th Street and West Main Street and along West Main Street between Ross Court and North Orange Street.	Basin M	 10/12	 15	**2,448** 2,448	Short-Term	100	0	Significant surcharging under existing conditions, mostly caused by I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-9	Gravity Gravity	West Main Street between North Columbus Avenue and Ross Court.	Basin M	 8/10	 12	**754** 754	Short-Term	100	0	Significant surcharging under existing surcharging, mostly caused by I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-10	Gravity Gravity Gravity Gravity	South Riverside Avenue between East Jackson Street and East 9th Street and along East 9th Street between South Riverside Avenue and South Grape Street.	Basin M	 10 10/15 14	 15 18 21	**3,580** 1,397 1,857 326	Short-Term	75	25	Surcharging above criteria under existing conditions. Infill and I/I degradation worsen the issue in the future. High priority for I/I reduction.
P-11	Gravity Gravity	Along Lone Pine Rd between Papago Dr and Inverness Drive	Basin B	 12	 15	250 250	Long-Term	0	100	Deficiencies in this area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers.
P-12	Gravity Gravity	West 11th Street between South Peach Street and Laurel Street.	Basin N	 12	 15	1,181 1,181	Mid-Term	75	25	No surcharging above criteria under existing conditions, however, infill and I/I degradation exacerbate pipe capacity under the 2036 condition.
P-13	Gravity Gravity	Holmes Avenue between Kenyon Street and South Holly Street.	Basin N	 8	 12	669 669	Short-Term	100	0	This is a known issue to City staff and is a high priority project.
P-14	Gravity Gravity	Along Dellwood Ave between Murphy Rd and the intersection of Black Oak Dr and Siskiyou Blvd.	Basin I	 10/8	 12	1,247 1,247	Short-Term	25	75	Surcharging above criteria caused by infill and I/I degradation under 2036 condition. No existing surcharging above criteria.

Table 5.6 Recommended Pipe Capacity Projects
Sanitary Sewer Master Plan
City of Medford

Project ID	Improvement Type	Description	Basin ID	Existing Size (inch)	Proposed Size (inch)	Length (ft)	Phase	Existing vs Future Customers		Reasoning
								Existing (%)	Future (%)	
P-15	Gravity Gravity	Spring Street between North Berkeley Street and Sunrise Avenue.	Basin E	 8	 12	508 508	Short-Term	100	0	Deficiency caused by shallow manhole at this location. Pipe was upsized to prevent surcharging in this area. It is recommended rim elevation be checked in this area before implementing this project.
P-16	Gravity Gravity	Market Street between Biddle Road and Royal Avenue.	Basin E	 10	 15	1,477 1,477	Mid-Term	25	75	Surcharging above criteria caused by infill and I/I degradation under 2036 condition. No existing surcharging above criteria.
P-17	Gravity Gravity	Ramada Avenue between Petunia Street and East McAndrews Road.	Basin D	 8	 12	380 380	Mid-Term	25	75	This area is a flat section of pipe upstream of a much steeper section, causing the HGL to rise, when additional flows are added to the system in the future.
P-18	Gravity Gravity Gravity	Corona Avenue between Roberts Road and Morrow Road and along Morrow Road between Velia Street and Corona Avenue.	Basin D	 10/8 10	 15 18	1,497 1,458 39	Short-Term	50	50	This section of pipe is undersized for existing conditions causing the flow to overflow to Basin C, which causes surcharging in the line along Jubilant Ave. Upsizing Project 18 allows the PWWF to flow to Morrow Road and stay in Basin D, removing the deficiency observed along Jubilant Ave.
P-19	Gravity Gravity Gravity Gravity	Velia Street, Corona Avenue, Grand Avenue, Crater Lake Avenue, and Camellia Avenue between Velia Street and Ramada Avenue	Basin D	 8 8/12 10/12	 12 15 18	6,780 266 4,729 1,785	Short-Term	100	0	This is a known issue to City staff and is a high priority project. City staff observes surcharging regularly in this section of pipe under current conditions.
P-20	Gravity Gravity	Morrow Road between Biddle Road and Poplar Drive.	Basin D	 15	 24	923 923	Short-Term	50	50	This section of pipe is slightly surcharging under current system conditions, however, upsizing Project 20 will be required as soon as Project 19 is implemented upstream, and all bottlenecks removed, allowing the full PWWF to flow downstream.
P-21	Gravity Gravity	Hilton Road between Biddle Road and Crater Lake Highway 62.	Basin C	 16	 21	1,602 1,602	Mid-Term	50	50	This section of pipe is slightly deficient under existing conditions, however, infill and I/I degradation will exacerbate the pipeline, which will require upsizing.
P-22	Gravity Gravity	Bailey Avenue and Saint Augustine Drive between Delta Waters Road and Farmington Avenue.	Basin A1	 8	 12	2,072 2,072	Long-Term	0	100	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition.
P-23	Gravity Gravity	Delta Waters Road between Springbrook Road and Tahitian Avenue.	Basin A1	 15	 18	1,015 1,015	Long-Term	0	100	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 conditions.
P-24	Gravity Gravity Gravity	Webfoot Road, Ford Drive, and Springrook Road between Crater Lake Highway 62 and Springbrook Road.	Basin A2	 8 8/10/12	 12 15	2,512 744 1,768	Mid-Term	0	100	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition.
P-25	Gravity Gravity Gravity	Delta Waters Road between Whitlle Avenue and Blackthorn Drive.	Basin A1/A2	 18 18	 21 24	3,205 244 2,961	Mid-Term	40	60	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
P-26	Gravity Gravity	East of Bullock Road between Terminal Spur Road and Crater Lake Highway 62.	Basin A	 18	 24	2,574 2,574	Short-Term	50	50	This major line is shown as surcharging above criteria under existing condition, and will worsen with additional flows in the future and after upstream projects have been implemented to remove bottleneck and allow the full PWWF to flow to the interceptor.
P-27	Gravity Gravity	Delta Waters Road between Blackthorn Drive and east of Springbrook Road.	Basin A1	 12/15	 21	689 689	Mid-Term	25	75	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.

Table 5.6 Recommended Pipe Capacity Projects
Sanitary Sewer Master Plan
City of Medford

Project ID	Improvement Type	Description	Basin ID	Existing Size (inch)	Proposed Size (inch)	Length (ft)	Phase	Existing vs Future Customers		Reasoning
								Existing (%)	Future (%)	
P-28	Gravity Gravity	North of Hillcrest Road between North Foothill Road and Annettes Way.	Basin B	 10	 15	1,793 1,793	Mid-Term	0	100	Deficiencies in this area anticipated under 2036 conditions after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers.
P-29	Gravity Gravity Gravity	Winter Nell Cr between Murphy Road and South Foothill Road.	Basin I	 8 8	 12 15	1,285 505 780	Short-Term	75	25	Surcharging occurs under existing condition, and pipe capacity is exacerbated by future additional flows. One of the main cause for this area to surcharge above criteria is the pipe slope. This area is relatively flat, which caused the HGL to rise above 3 feet below manhole rim under PWWF.
P-30	Gravity Gravity	Winter Nell Cr between Murphy Road and South Foothill Road.	Basin I	 8	 12	745 745	Mid-Term	50	50	This area is shown as slightly deficient under existing condition and deficiency worsens with the additional of future flows and I/I degradation.
P-31	Gravity Gravity	East of Jack Nicklaus Road.	Basin I	 8	 12	238 238	Short-Term	75	25	Surcharging occurs under existing condition, and pipe capacity is exacerbated by future additional flows. One of the main causes for this area to surcharge above criteria pipe slope. This area is relatively flat, which causes the HGL to rise above 3 feet below manhole rim under PWWF.
P-32	Gravity Gravity	South of Arnold Palmer Way.	Basin I	 8	 15	420 420	Mid-Term	25	75	One of the main causes for this area to surcharge above criteria is pipe slope. This area is relatively flat, which causes the HGL to rise above 3 feet below manhole rim under PWWF.
P-33	Gravity Gravity	Golf View Drive between East Barnett Road and Miller Court.	Basin J	 8/10	 15	1,157 1,157	Short-Term	50	50	This area is shown as slightly deficient under existing condition and deficiency worsens with the addition of future flows from infill, expansion, and I/I degradation.
P-34	Gravity Gravity	Innsbruck Ridget between Eric Court and Murry Hill Court.	Basin B	 8	 12	276 276	Mid-Term	25	75	Deficiencies in this area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. Additionally, this section of pipe is relatively flat, which makes the HGL rise higher in the flat portion of pipe.
P-35	Gravity Gravity	Murphy Road between East Barnett Road and Alameda Street.	Basin J	 15	 18	628 628	Long-Term	0	100	Deficiencies in this area anticipated under 2036 condition after the expansion areas connect to the east of Basins I/J, therefore, this project is almost solely caused by future customers. Expansion areas in Basins I and J are planned to connect to Juanipro Way and ultimately flow in this section of pipes.
P-36	Gravity Gravity	Along Barnett Rd between Murphy Rd and State St.	Basin J	 12	 15	475 475	Mid-Term	25	75	This major trunk is shown as surcharging after upstream projects are implemented and bottlenecks removed. Significant additional flow is anticipated from the upstream area with the connection of the expansion areas, therefore, this trunk will need to be upsized to accommodate these future flows.
P-37	Gravity Gravity	Along Creek View Dr between N Phoenix Rd and the intersection of Barnett Rd and Black Oak Dr.	Basin J	 8	 12	6,347 6,347	Long-Term	0	100	Deficiencies in this area are anticipated future condition after the expansion areas connect to the east of Basins I/J, therefore, this project is almost solely caused by future customers. Expansion areas in Basins I and J are planned to connect to Juanipero Way and ultimately flow in this section of pipes.

Table 5.6 Recommended Pipe Capacity Projects
Sanitary Sewer Master Plan
City of Medford

Project ID	Improvement Type	Description	Basin ID	Existing Size (inch)	Proposed Size (inch)	Length (ft)	Phase	Existing vs Future Customers		Reasoning
								Existing (%)	Future (%)	
P-38	Gravity Gravity	Medical Center Dr between E Barnett Road and Siskiyou Boulevard.	Basin I	 15	 18	1,473 1,473	Mid-Term	50	50	No deficiency is observed under current system condition, however, after implementing all upstream projects and with additional flows from infill and the expansion areas, this area becomes deficient and is recommended to be upsized. It is recommended to monitor this area after some upstream projects are implemented and growth started.
P-39	Gravity Gravity	North Foothill Road.	Basin B	 12	 15	514 514	Long-Term	25	75	Deficiencies in this area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. Relatively flat slope, I/I degradation and infill are also reasons for this project.
P-40	Gravity Gravity	Gene Cameron Way between Aitken Way and Jason Way.	Basin B	 8	 12	941 941	Long-Term	0	100	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition.
P-41	Gravity Gravity Gravity	Springbrook Road between Cedar Links Drive and Delta Waters Road.	Basin B	 18 18	 21 24	3,499 2,490 1,009	Mid-Term	50	50	Deficiencies in this area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is mostly caused by future customers. However, this line is one of the major line in Basin B and is also impacted by infill and I/I degradation.
P-42	Gravity Gravity	East Barnett Road between Black Oak Drive and Medical Center Drive.	Basin J	 18	 21	532 532	Mid-Term	50	50	No deficiency is observed under current system condition, however, after implementing all upstream projects and with additional flows from infill and the expansion areas, this area becomes deficient and is recommended to be upsized. It is recommended to monitor this area after some upstream projects are implemented and growth started.
P-43	Gravity Gravity	Golf View Drive between Miller Court and Seventh Fairway Drive.	Basin J	 8/10	 15	2,051 2,051	Mid-Term	25	75	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
P-44	Gravity Gravity	Arnold Palmer Way and Jack Nicklaus Road.	Basin I	 8	 12	693 693	Mid-Term	25	75	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
P-45	Gravity Gravity	North Phoenix Road and south of Urano Lane.	Basin I	 8	 12	362 362	Mid-Term	25	75	Deficiency in this area is predicted under 2036 condition and is mainly cause by the slope of the pipe. Pipe is relatively flat in this area causing the HGL to rise above 3 feet below manhole rim with additional future flows.
P-46	Gravity Gravity	Old Cherry Lane at Cherry Lane.	Basin I	 8	 12	340 340	Mid-Term	75	25	Deficiency caused by shallow manhole at this location. Pipe will need to be upsized to prevent surcharging in this area. It is recommended that rim elevation be checked in this area before implementing this project.
TOTAL						**74,466**				

5.7.1.3 Project Phasing

All proposed improvement projects are allocated to Short-Term, Mid-Term, and Long-Term phases based on when the model scenarios predict they are required. Detailed project prioritization based on condition of pipes and funding availability is presented in Chapter 7 - CIP and Chapter 8 – Financial Analysis. The three planning phases are described as follows:

- ***Short-Term (2017-2026)***: Proposed facilities that alleviate deficiencies under existing flow conditions.
- ***Mid-Term (2027- 2036):*** Proposed facilities that alleviate deficiencies under the 2036 Service Area flows and proposed facilities to serve growth areas required by 2036.
- ***Long-Term (After 2036***): Proposed facilities that alleviate deficiencies under the Service Area (Urban Reserves) flows and proposed facilities to serve expansion areas required for build-out conditions.

The projects were phased based on the best available information for how the City will develop moving forward. The actual implementation of the improvements serving future users ultimately depends on growth. The phasing presented below are estimates, and will change with the City's planning assumptions or growth projections. Table 5.6 shows all projects allocated to the three planning periods. Figure 5.10 illustrates the recommended phasing for each capacity-related project.

5.7.1.4 Allocation of Project to Existing vs Future Customers

An existing deficiency is one where the existing facility's capacity is insufficient to meet the performance criteria (e.g., pipeline upgrades required to prevent severe surcharging during the design wet weather event) for existing users. If a project was proposed to correct an existing deficiency exclusively, then existing users were assigned 100 percent of the project's benefit, and therefore, 100 percent of the costs.

Part of the SSMP improvements will serve future users, even when an improvement calls for the upgrade of an existing facility. In these cases, an existing sewer or pump station may have sufficient capacity to convey current PWWFs, but as growth continues and more users are added to the system, the increased flow results in capacity deficiencies. These projects, as well as new trunk sewers to extend sewer collection system service to future growth areas, are future improvements. Future users were assigned 100 percent of the future project's benefit and 100 percent of the costs.

In most cases, a project is needed to correct an existing capacity deficiency, but is sized to accommodate additional flows from future development. In these cases, an opinion of benefit to future users based on hydraulic capacity assumptions was used to determine the cost breakdown between existing and future users. The breakdown in cost split between existing and future users is provided in Table 5.5 and Chapter 7 - CIP.

5.7.2 Recommended System Piping Improvements

This section provides detailed descriptions of the recommended improvements. City staff provided descriptions of known structural and I/I issues for these pipe projects. The information is included in the descriptions below, and the full description is included in Appendix H.

- **Project P-1**: This project is located in wastewater Basin K and consists of upsizing approximately 1,486 feet of 12-inch diameter sewer to 15-inch diameter sewer located on Mace Road between Elliott Avenue and Howard Avenue and upsizing approximately 1,244 feet of 15-inch diameter sewer to 18-inch diameter sewer located on Marilee Street, Dan Avenue, and Elliott Avenue between Herman Avenue and Mace Road.

  Surcharging above the criteria under existing conditions is observed in the hydraulic model. A new section of 18" PVC was added on Ellen to take the flow to Bursell. Additionally, an overflow pipe was installed on Howard north of Mace Road to relieve a manhole that used to frequently overflow. There has not been significant surcharging witnessed in this project in recent years. It is recommend for the City to continue monitoring; the project is a lower priority long-term project.

- **Project P-2**: This project is located in wastewater Basin L and consists of upsizing approximately 4,761 feet of 8-inch, 10-inch and 12-inch diameter sewer to 15-inch diameter sewer located along Beatty Street, Court Street, North Central Avenue, and East Clark Street between Madrona Street and West Clark Street. Modeling shows significant surcharging under existing conditions, mostly caused by significant I/I. Basin L should be further investigated to understand causes of I/I. This area is a high priority for I/I reduction.

  As far as maintenance of this section of pipes, staff noticed several deficiencies that would benefit replacement, however, it is recommended that more detailed flow monitoring be performed in this line to determine the cause of inflow and/or infiltration and determine whether this section can be relined or truly needs to be upsized. This project is a short-term project with further monitoring recommended beforehand.

- **Project P-3**: This project is located in Basin B and consists of upsizing approximately 1,762 feet of 12-inch diameter sewer to 18-inch diameter sewer located along Brookdale Avenue between E McAndrews Road and Lone Pine Road. Deficiencies in this area are anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. This project is linked to Project P-2 and is a mid-term project. This project will need to be confirmed after Project P-2 has been addressed.

- **Project P-4**: This project is located in wastewater Basin M and consists of upsizing approximately 1,109 feet of 10 to 12-inch diameter sewer to 15-inch diameter sewer located along East Jackson Street between North Holly Street and North Central Avenue. Modeling shows significant surcharging under existing conditions in this area, mostly caused by significant I/I. Basin M should be further investigated to understand the causes of I/I. This area was determined as a high priority for I/I reduction and was characterized as a short-term project.

- **Project P-5**: This project is located in Basin M and consists of upsizing approximately 1,976 feet of 8-inch, 10-inch, 12-inch, and 15-inch diameter sewer to 18-inch diameter sewer located along East 2nd Street between East Jackson Street and North Grape Street, and upsizing approximately 844 feet of 12-inch diameter sewer to 15-inch diameter sewer located along North Grape Street between East 2nd Street and West 4th Street and along West 4th Street between North Oakdale Avenue and North Grape Street.

  Modeling shows significant surcharging under existing conditions, mostly caused by significant I/I entering the collection system during rainfall events. Basin M should be further investigated to understand the causes of I/I. This area was defined as a high priority for I/I reduction. Per City staff, this project and Projects P-6 through P-9 should be considered high priority as the system experiences drastic surcharging. Project P-5 is a short-term project.

- **Project P-6**: This project is located in Basin M and consists of upsizing approximately 737 feet of 15-inch diameter sewer to 24-inch diameter sewer located along East Jackson Street between North Bartlett Street and North Riverside Avenue. Modeling shows significant surcharging under existing conditions, mostly caused by I/I entering the collection system during rainfall events. Basin M should be further investigated to understand causes of I/I. Project P-6 is a short-term project.

- **Project P-7**: This project is located in Basin M and consists of upsizing approximately 1,619 feet of 6 to 8-inch diameter sewer to 12-inch diameter sewer located along West 2nd Street, North Peach Street, and Palm Street between Rose Avenue and North Holly Street. Significant surcharging under existing condition is observed in the hydraulic model, mostly caused by I/I during rainfall events. Basin M should be further investigated to understand the causes of I/I. Project P-7 is a short-term project.

- **Project P-8**: This project is located in Basin M and consists of upsizing approximately 2,448 feet of 10-inch and 12-inch diameter sewer to 15-inch diameter sewer located along West 4th Street between North Oakdale Avenue and North Orange Street and along North Orange Street between West 4th Street and West Main Street and along West Main Street between Ross Court and North Orange Street. Significant surcharging under existing condition is observed in the hydraulic model, mostly caused by I/I during rainfall events. Basin M should be further investigated to understand the causes of I/I. Project P-8 is a short-term project.

- **Project P-9**: This project is located in Basin M and consists of upsizing approximately 754 feet of 8 and 10-inch diameter sewers to 12-inch in diameter. This project is located along West Main Street between North Columbus Avenue and Ross Court. Significant surcharging under existing condition is observed in the hydraulic model, mostly caused by I/I during rainfall events. Basin M should be further investigated to understand the causes of I/I. Project P-9 is a short-term project.

- **Project P-10**: This project is located in Basin M and consists of upsizing approximately 3,580 feet of 10 to 15-inch diameter sewer to 15, 18, and 21-inch diameter sewer located along South Riverside Avenue between East Jackson Street and East 9th Street and along East 9th Street between South Riverside Avenue and South Grape Street. Surcharging above criteria is observed in the hydraulic model under existing conditions in this area. Additional flow from infill and I/I degradation worsen the issue in the future.
- **Project P-11**: This project is located in Basin B and consists of upsizing approximately 250 feet of 12-inch diameter sewer to 15-inch diameter sewer located along Lone Pine Rd between Papago Drive and Inverness Drive. Deficiencies in this area are anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. Therefore this project was set as a Long-Term Project.
- **Project P-12**: This project is located in Basin N and consists of upsizing approximately 1,181 feet of 12-inch diameter sewer to 15-inch diameter sewer located along West 11th Street between South Peach Street and Laurel Street. No surcharging above criteria is experienced under existing conditions, however, flows from infill and I/I degradation are anticipated to exacerbate pipe capacity under the 2036 condition. This is a predicted issue from additional flows in the future, this project is recommended as a Mid-Term projected. It is recommended City staff monitor this area in the future based on growth in the area.
- **Project P-13**: This project is located in Basin N and consists of upsizing approximately 669 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Holmes Avenue between Kenyon Street and South Holly Street. This is a known issue to City staff and was set as a high priority project for Short-Term phasing.
- **Project P-14**: This project is located in Basin I and consists of upsizing approximately 1,247 feet of 8-inch and 10-inch diameter sewer to 12-inch diameter sewer located along Dellwood Ave between Murphy Rd and the intersection of Black Oak Drive and Siskiyou Boulevard. No surcharging above criteria is experienced under existing conditions, however, flows from infill and I/I degradation are anticipated to cause surcharging under the 2036 condition. This project was set as Short-Term.
- **Project P-15**: This project is located in Basin E and consists of replacing approximately 508 feet of 8-inch pipe with 12-inch pipe due to deficiency caused by a shallow manhole located along Spring Street between North Berkeley Street and Sunrise Avenue. Pipe was upsized to prevent surcharging in this area. It is recommended rim elevation be confirmed in this area before implementing this project.
- **Project P-16**: This project is located in Basin E and consists of replacing approximately 1,477 feet of 10-inch diameter sewer to 15-inch diameter sewer located along Market Street between Biddle Road and Royal Avenue. Surcharging above criteria caused by additional flow from infill and I/I degradation is predicted by the hydraulic model under

2036 condition. No existing surcharging above criteria is shown, therefore, this project was recommended to be implemented under Mid-Term phasing.

- **Project P-17**: This project is located in Basin D and consists of replacing approximately 380 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Ramada Avenue between Petunia Street and East McAndrews Road. This area is a flat section of pipe upstream of a much steeper section, causing the HGL to rise, when additional flows are added to the system in the future. This area should be monitored with growth occurring in the area and was set as a Mid-Term phase project.
- **Project P-18**: This project is located in Basin D and consists of upsizing approximately 1,497 feet of 8-inch and 10-inch diameter sewer to 15-inch and 18-inch diameter sewer located along Corona Avenue between Roberts Road and Morrow Road and along Morrow Road between Velia Street and Corona Avenue. This section of pipe is undersized for existing conditions causing the flow to overflow to Basin C, which causes surcharging in the line along Jubilant Ave. Upsizing Project 18 allows the PWWF to flow to Morrow Road and stay in Basin D, removing the deficiency observed along Jubilant Ave. Per City staff, these sewers experience heavy flows as well as the areas that feed these segments have heavy infiltration. Additionally, the section of pipes along Morrow Road has several severe root intrusions. Based on capacity and condition, this project was set as a high priority to be implemented under Short-Term condition.
- **Project P-19**: This project is located in Basin D and consists of replacing approximately 6,780 feet of 8 to 12-inch diameter sewer to 12-inch, 15-inch, and 18-inch diameter sewer located along Velia Street, Corona Avenue, Grand Avenue, Crater Lake Avenue, and Camellia Avenue between Velia Street and Ramada Avenue. This is a known issue to City staff and is a high priority project. City staff observe surcharging regularly in this section of pipe under current conditions.
- **Project P-20**: This project is located in Basin D and consists of upsizing approximately 923 feet of 15-inch diameter sewer to 24-inch diameter sewer located along Morrow Road between Biddle Road and Poplar Drive. This section of pipe is slightly surcharging under current system conditions, however, upsizing Project 20 will be required as soon as Project 19 is implemented upstream, and all bottlenecks removed, allowing the full PWWF to flow downstream and is recommended to be implemented under the Short-Term phase.
- **Project P-21**: This project is located in Basin C and consists of upsizing approximately 1,602 feet of 16-inch diameter sewer to 21-inch diameter sewer located south of Hilton Road between Biddle Road and Crater Lake Highway 62. This section of pipe is slightly deficient under existing conditions, however, additional flows from infill and I/I degradation will exacerbate the pipeline, which will require upsizing. Per City staff, this section of sewers has several root intrusions and should be upsized. This project is recommended to be implemented under the Mid-Term phase.

- **Project P-22**: This project is located in Basin A1 and consists of upsizing approximately 2,072 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Bailey Avenue and Saint Augustine Drive between Delta Waters Road and Farmington Avenue. The deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition, therefore, this project is recommended in conjuncture with the urban reserve area development and connection to the City's collection system under the Long-Term phase. It is recommended that the City monitor this area when growth starts south of Cedar Links and east of Foothills.
- **Project P-23**: This project is located in Basin A1 and consists of upsizing approximately 1,015 feet of 15-inch diameter sewer to 18-inch diameter sewer located along Delta Waters Road between Springbrook Road and Tahitian Avenue. The deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 conditions, therefore, this project is recommended in conjuncture with the urban reserve area development and connection to the City's collection system under the Long-Term phase.
- **Project P-24**: This project is located in Basin A2 and consists of upsizing approximately 2,512 feet of 8-inch, 10-inch, and 12-inch diameter sewer to 12-inch and 15-inch diameter sewer. This project is located along Webfoot Road, Ford Drive, and Springbrook Road between Crater Lake Highway 62 and Springbrook Road. Similar to Projects P-22 and P-3, the deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 conditions, therefore, this project is recommended in conjuncture with the urban reserve area development and connection to the City's collection system under the Mid-Term phase of this SSMP.
- **Project P-25**: This project is located in Basins A1 and A2 and consists of upsizing approximately 3,205 feet of 18-inch diameter sewer to 21-inch and 24-inch diameter sewer located along Delta Waters Road between Whittle Avenue and Blackthorn Drive. Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation. These sewers need to be monitored by the City for capacity and Project P-25 is recommended in the Mid-Term phase of this SSMP.
- **Project P-26**: This project is located in Basin A and consists of upsizing approximately 2,574 feet of 18-inch diameter sewer to 24-inch diameter sewer located east of Bullock Road between Terminal Spur Road and Crater Lake Highway 62. This major line is shown as surcharging above criteria under existing conditions. It is expected to worsen with additional flows in the future and after upstream projects are implemented to remove bottleneck and allow the full PWWF to flow to the interceptor. This project is recommended under the Short-Term phase.
- **Project P-27**: This project is located in Basin A1 and consists of upsizing approximately 689 feet of 12 and 15-inch diameter sewer to 21-inch diameter sewer located along Delta

Waters Road between Blackthorn Drive and east of Springbrook Road. Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation, and is recommended as a Mid-Term project.

- **Project P-28**: This project is located in Basin B and consists of upsizing approximately 1,793 feet of 10-inch diameter sewer to 15-inch diameter sewer located north of Hillcrest Road between North Foothill Road and Annettes Way. Modeling shows that deficiencies in this area are anticipated under the 2036 conditions after the expansion areas connect to the east of Basin B. This project is therefore almost solely caused by future customers and is recommended under the Mid-Term phase after growth started in the area.
- **Project P-29**: This project is located in Basin I and consists of upsizing approximately 1,285 feet of 8-inch diameter sewer to 12-inch and 15-inch diameter sewer located along Winter Nell Cr between Murphy Road and South Foothill Road. Surcharging occurs under existing condition, and pipe capacity is exacerbated by future additional flows. One of the main causes for this area to surcharge above criteria is pipe slope. This area is relatively flat, which causes the HGL to rise above 2 feet above pipe crown under PWWF. This project is prioritized under the Short-Term.
- **Project P-30**: This project is located in Basin I and consists of upsizing approximately 745 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Winter Nell Cr between Murphy Road and South Foothill Road. This area is shown as slightly deficient under existing condition and it is anticipated that the deficiency worsen with the addition of future flows from infill and I/I degradation. It is recommended that the City monitor this area and implement Project P-30 under the Mid-Term phase.
- **Project P-31**: This project is located in Basin I and consists of upsizing approximately 238 feet of 8-inch diameter sewer to 12-inch diameter sewer located east of Jack Nicklaus Road. Surcharging occurs under existing condition, and pipe capacity is exacerbated by future additional flows. One of the main causes for this area to surcharge above criteria is pipe slope. This area is relatively flat, which causes the HGL to rise above 2 feet above pipe crown under PWWF. Because of existing surcharging in the model, it is recommended that this project be implemented under the Short-Term.
- **Project P-32**: This project is located in Basin I and consists of upsizing approximately 420 feet of 8-inch diameter sewer to 15-inch diameter sewer located south of Arnold Palmer Way. One of the main causes for this area to surcharge above criteria is pipe slope. This area is relatively flat, which causes the HGL to rise above 2 feet above pipe crown under PWWF. Upsize is recommended under the Mid-Term phase.
- **Project P-33**: This project is located in Basin J and consists of upsizing approximately 1,157 feet of 8-inch to 10-inch diameter sewer to 15-inch diameter sewer respectively. This project is located along Golf View Drive between East Barnett Road and Miller Court. This area is shown as slightly deficient under existing condition and deficiency is predicted to worsen with the addition of future flows from infill, expansion, and I/I

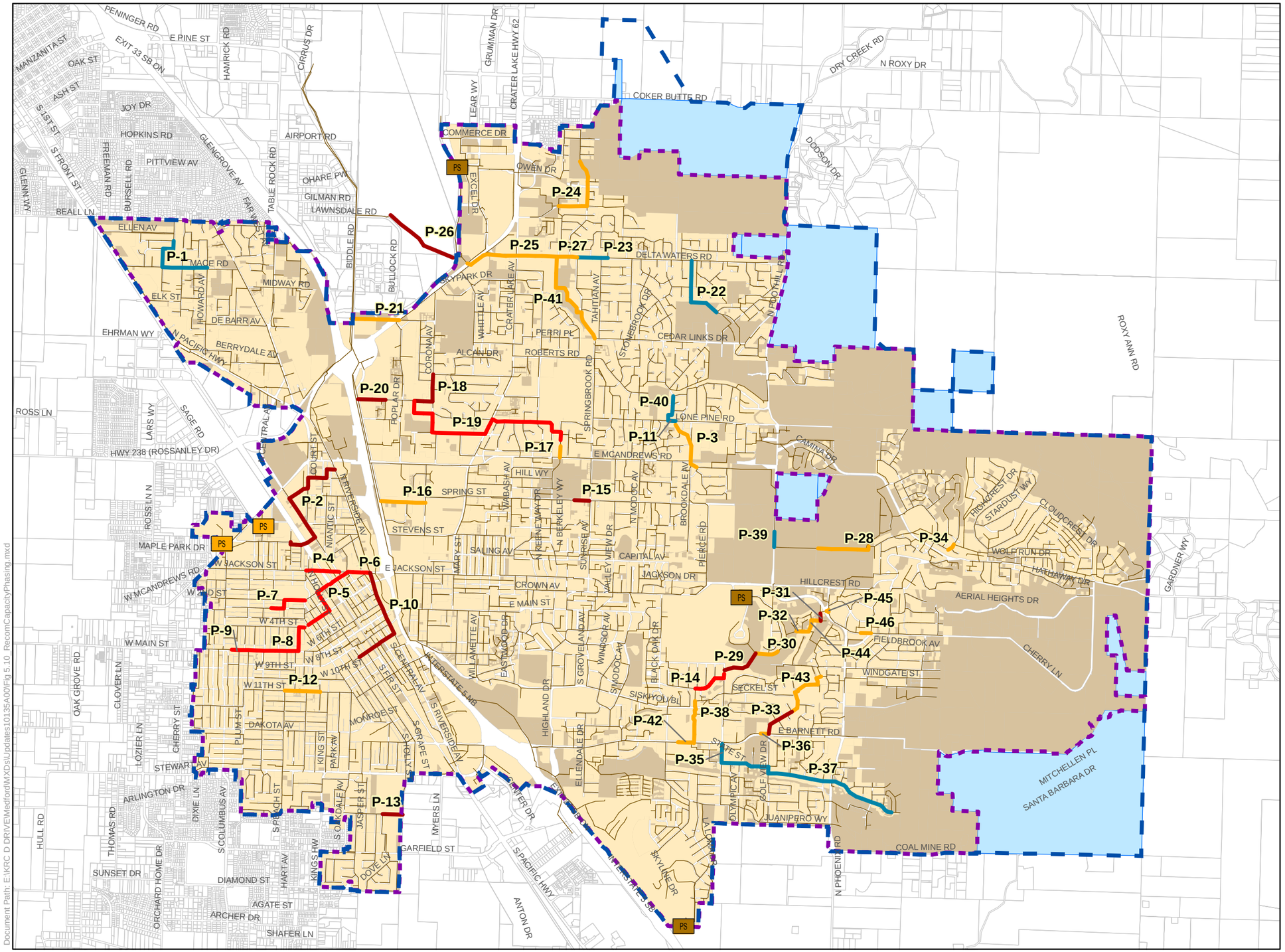
degradation. It is recommended that this area be monitored with the addition of future flows and be implemented under the Short-Term. However, other projects are higher priorities than Project P-33 in the Short-Term.

- **Project P-34**: This project is located in Basin B and consists of upsizing approximately 276 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Innsbruck Ridget between Eric Court and Murry Hill Court. Deficiencies in this area are anticipated under the 2036 condition after the expansion areas connect to the east of Basin B. This project is therefore almost solely caused by future customers and recommended under the Mid-Term phase. Additionally, this section of pipe is relatively flat, which makes the HGL rise higher in the flat portion of pipe with the addition of future flows from the expansion areas.
- **Project P-35**: This project is located in Basin J and consists of upsizing approximately 628 feet of 15-inch diameter sewer to 18-inch diameter sewer. This project is located along Murphy Road between East Barnett Road and Alameda Street. The deficiencies in this area are anticipated under 2036 condition after the expansion areas connect to the east of Basins I/J. This project is therefore almost solely caused by future customers. Expansion areas in Basins I and J are planned to connect to Juanipero Way and ultimately flow in this section of pipes. Growth already started in this area, and Project P-35 is a high priority growth project that should be considered in the near future, considering known active development.
- **Project P-36**: This project is located in Basin A and consists of upsizing approximately 475 feet of 12-inch diameter sewer to 15-inch diameter located along Barnett Rd between Murphy Rd and State St. This major trunk is shown as surcharging after upstream projects are implemented and bottlenecks removed. Significant additional flow is anticipated from the upstream area with the connection of the expansion areas, therefore, this trunk will need to be upsized to accommodate these projected future flows. This project is recommended in the Mid-Term phase. However, this line was built recently and it is recommended that this project be evaluated more thoroughly with field checks for capacity due to its recent construction. Additionally, the 8-inch section upstream on Barnett Rd shows as surcharging, however, without triggering the level criteria identified by the City. It is recommended that the City monitor the sewer line along Barnett as growth occurs in the eastern area.
- **Project P-37**: This project is located in Basin J and consists of upsizing approximately 6,347 feet of 8-inch diameter sewer to 12-inch diameter sewer. This project is located along Creek View Dr between N Phoenix Rd and the intersection of Barnett Rd and Black Oak Dr. Deficiencies in this area are anticipated under 2036 condition after the expansion areas connect to the east of Basins I/J, therefore, this project is almost solely caused by future customers. Expansion areas in Basins I and J are planned to connect to Juanipero Way and ultimately flow in this section of pipes. Growth already started in this area, and Project P-37 is a high priority growth project that should be considered in the near future, considering known active development.

- **Project P-38**: This project is located in Basin I and consists of upsizing approximately 1,473 feet of 15-inch diameter sewer to 18-inch diameter sewer located along West Jackson Street between North Columbus Avenue and Broad Street. No deficiency is observed under current system condition, however, after implementing all upstream projects and with additional flows from infill and the expansion areas, this area becomes deficient and is recommended to be upsized. It is recommended to monitor this area after some upstream projects are implemented and growth started. Upsize is recommended under the Mid-Term phase.
- **Project P-39**: This project is located in Basin B and consists of upsizing approximately 514 feet of 12-inch diameter sewer to 15-inch diameter sewer located along North Foothill Road. Deficiencies in this area are anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. Relatively flat slope, I/I degradation and infill are also reasons triggering this project, which is recommended in the Mid-Term.
- **Project P-40**: This project is located in Basin B and consists of upsizing approximately 941 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Gene Cameron Way between Aitken Way and Jason Way. Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition, therefore, this project is recommended in the Long-Term.
- **Project P-41**: This project is located in Basin B and consists of upsizing approximately 3,499 feet of 18-inch diameter sewer to 21-inch and 24-inch diameter sewer located along Springbrook Road between Cedar Links Drive and Delta Waters Road. Deficiencies in this area are anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is mostly caused by future customers. However, this line is one of the major line in Basin B and is also impacted by infill and I/I degradation. Project P-41 is recommended under the Mid-Term phase when growth occurs in the expansion areas in Basin B.
- **Project P-42**: This project is located in Basin J and consists of upsizing approximately 532 feet of 18-inch diameter sewer to 21-inch diameter sewer located along East Barnett Road between Black Oak Drive and Medical Center Drive. No deficiency is observed under current system condition, however, after implementing all upstream projects and with additional flows from infill and the expansion areas, this area becomes deficient and is recommended to be upsized. It is recommended to monitor this area after some upstream projects are implemented and growth started and implement this project in the Mid-Term.
- **Project P-43**: This project is located in Basin J and consists of upsizing approximately 2,051 feet of 8-inch and 10-inch diameter sewer to15-inch diameter sewer located along Golf View Drive between Miller Court and Seventh Fairway Drive. Deficiencies in this area are predicted for the 2036 condition with the addition of flows from some of

the expansion areas to the east, infill to the existing system, and I/I degradation. Implementation of this project is recommended for the Mid-Term phase.

- **Project P-44**: This project is located in Basin I and consists of upsizing approximately 693 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Arnold Palmer Way and Jack Nicklaus Road. Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation. Implementation of this project is recommended for the Mid-Term phase.
- **Project P-45**: This project is located in Basin I and consists of upsizing approximately 362 feet of 8-inch diameter sewer to 12-inch diameter sewer located along North Phoenix Road and south of Urano Lane. Deficiency in this area is predicted under 2036 conditions and is mainly cause by the slope of the pipe. The section of pipe is relatively flat in this area causing the HGL to rise above 2 feet above pipe crown with additional future flows. This project is anticipated for the Mid-Term phase.
- **Project P-46**: This project is located in Basin I and consists of upsizing approximately 340 feet of 8-inch diameter sewer to 12-inch diameter sewer located along Old Cherry Lane at Cherry Lane. The deficiency is caused by a shallow manhole at this location. This pipe will need to be upsized to prevent surcharging in this area. It is recommended that rim elevation be checked in this area before implementing this project, under the Short-Term.



Legend

- Other Pipelines
- Other Pump Station
- Service Area
- 2036 Service Area

Preliminary Project Phasing

- Short-Term Priority 1
- Short-Term Priority 2
- Mid-Term
- Long-Term
- Mid-Term Pump Station
- Currently Developed and Connected Parcels (Triggers to Short-Term Priorities 1 and 2 Projects)
- 2036 Parcels (Triggers to Mid-Term Projects)
- Urban Reserves (Triggers to Long-Term Projects)
- Taxlots

N

0 2,000 4,000 Feet

RECOMMENDED CAPACITY PROJECTS PHASING

FIGURE 5.10

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON

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5.7.3 Recommended Pump Station Improvements

It is recommended that both PMT and Service Center Pump Stations be upgraded to provide pump redundancy. These stations currently only have one pump, and therefore, the firm capacities are zero. However, it is recommended that the City improve these pump stations redundancy and add a redundant pump with the same capacity as the current pump. Below are the recommended pump station improvements.

- Project PS-1: This project consists of upgrading the PMT Pump Station to make it redundant. The addition of a second pump in the station is recommended. However, the City has the ability to bypass the station when the pump is out of service, therefore, this project was set as a low priority improvement and is recommended in the Long-Term phase.
- Project PS-2: This project consists of upgrading the Service Center Pump Station to make it redundant. The addition of a second pump in the station is recommended. However, the City has the ability to bypass the station when the pump is out of service, therefore, this project was set as a low priority improvement and is recommended in the Long-Term phase.

5.7.4 Proposed Improvements Summary

A total of approximately 74,500 linear feet of pipes ranging from 12-inch to 24-inch are recommended to alleviate capacity deficiencies for the City's three planning conditions (existing, 2036 Service Area, and Service Area). Two out of the five City pump stations will need to be upgraded in the future in order to be redundant. Table 5.7 summarizes all recommended improvement projects by phase. Costs estimates are provided for each project in Chapter 7 – CIP.

Table 5.7 Improvement Projects Summary
Sanitary Sewer Master Plan
City of Medford

Proposed Project	Short-Term	Mid-Term	Long-Term
Existing Pipe Upsize	34,501 ft	22,955 ft	17,009 ft
New Sewer for Expansion Areas	-	16,800(1) ft	9,100 ft (2)
PMT PS		X	
Service Center PS		X	

Notes:
(1) Includes the recommended developer's driven "expansion" sewers located in the 2036 Service Area.
(2) Includes the recommended developer's driven "expansion" sewers located in the Service Area and Urban Reserves.

INFILTRATION & INFLOW REDUCTION PROGRAM

6.1 INTRODUCTION

Infiltration and inflow are known problems for the City's sewer system. The City has investigated causes of these input flows to the sewer system since the 1960's and has actively removed direct connections over time. This chapter summarizes the current inflow and infiltration (I/I) estimate in each basin, reviews options for I/I reduction, and assesses the costs of I/I reduction compared to the recommended capacity improvement projects discussed in Chapter 5 - Capacity Evaluation.

6.2 CURRENT INFLOW AND INFILTRATION

Chapter 2 - Basis of Planning presents the peak flows experienced in each of the City's sewer basins. These flows were developed from the updated hydraulic model (described in Chapter 4 – Hydraulic Model Development), which was calibrated using flow monitoring data over the winter of 2015/2016. Note, the following I/I parameters are calculated based on the hydraulic modeling results for the existing system under the design storm. These parameters are not used as input in the hydraulic model, but only as indicator for I/I and identification of basins and locations to focus on for I/I work.

6.2.1 I/I Evaluation Parameters

Estimated peak flows were used to develop three important parameters for understanding I/I, as follows:

- **Peaking Factor**: Peaking factors are the ratio between peak flow and base sanitary flow and are commonly used for wastewater infrastructure design. These factors are derived by dividing the peak flow by the base sanitary flow for each basin. Due to the prolonged rainy season, wastewater agencies in the northwest typically experience peaking factors from 2 to 10, and in some cases more than 10.

  Systems with Peaking Factor of 3 or less are often considered as performing well. High Peaking Factors are typically signs of direct inflow in the collection system.

- **Peak I/I Rate**: The Peak I/I Rate is the peak flow rate of all non-sanitary flows. Peak I/I Rates are calculated by subtracting the base sanitary flow from the peak flow for each basin. Peak I/I Rates are largely dependent on the contributing area of land and are expressed in terms of gallons per acre per day (gpad). The Peak I/I Rate is calculated by dividing the Peak I/I flow by the total contributing area of land in acres in each basin. Peak I/I Rates can range from 1,000 to over 10,000 gpad in areas in the northwest. High Peak I/I Rates are usually signs of inflow.

  An I/I Flow Factor of 1,500 gpad is commonly used for estimating I/I in areas of new development to reflect improved construction methods and integrity of new materials.

- **R-Values:** R-Values correspond to the total volume of I/I in gallons divided by the total gallons of rainfall that fell within the acreage of the basin area. This is a ratio and is expressed as a percentage. R-Value is described as "the percentage of rainfall that enters the collection system."

  Systems with R-Values less than 5%[1] are often considered as performing well. High R-Value are usually signs for significant infiltration.

These parameters were developed for the City's flow monitoring basins (numbered 1 through 12) and correlate to the City's sewer basins (numbered A through O). Wastewater basins and areas that were not monitored as part of the Temporary Flow Monitoring Program are not included in this analysis; City staff has not observed I/I issues in areas excluded from flow monitoring.

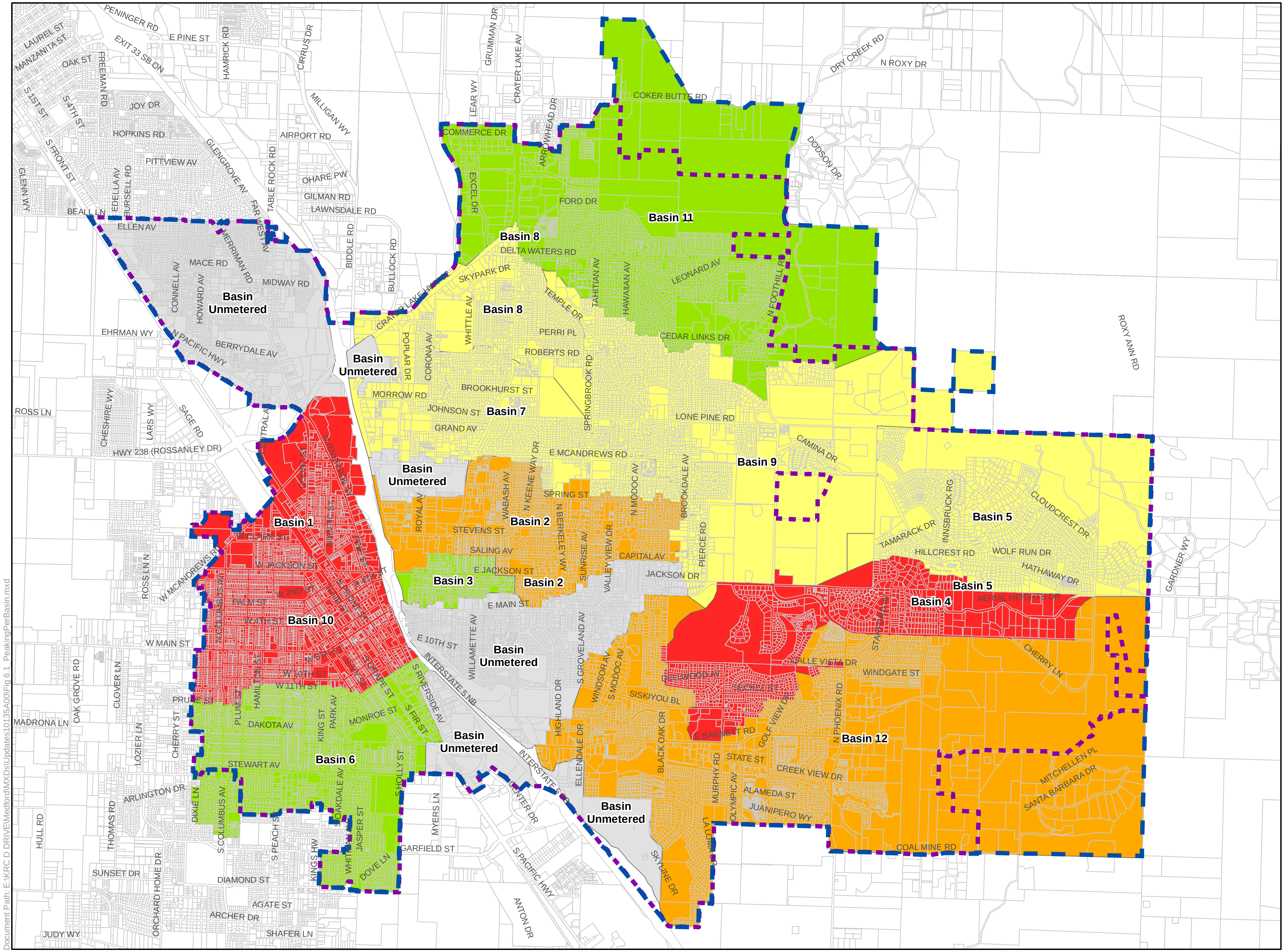
Table 6.1 presents the Peaking Factor, Peak I/I Rate, and R-Value for each basin for the City's design storm. These parameters are also shown for each basin in Figures 6.1, 6.2, and 6.3, respectively. The total sewer has a peaking factor of approximately 5, an I/I Flow Factor of 6,500 gpad, and a R-Value of 7 percent. These results are signs of significant I/I, however, it seems that a large portion of the system is performing relatively well. These higher values are mostly caused by a few basins, mainly located in the downtown area, that seem to perform poorly with high I/I rates.

I/I parameters vary greatly among the basins; Peaking Factors range from 2.7 to 8.1, Peak I/I Rates range from 2,117 to 18,170 gpad, and R-Values range from 1.7% to 21.4%. High I/I is generally located in older areas of the City’s system where clay and concrete pipe still serve as sewer pipes. Basins with the highest I/I values are in the downtown area: Basin 1 (Basin L), Basin 10 (Basin M), and to a lesser extent Basin 6 (Basin N). Note that these values were calculated from model results and each flow monitoring basin was isolated from any upstream areas contributing flow or any diversion in or out of each basin. When subtracting more than one basin or flow decreases the accuracy of the calculated metrics, therefore, these should not be used as design values. However, these are great indicator of I/I severity.

The City performed a study in 1982 in the downtown area using smoke and dye testing, as I/I were known issues in this area in the past. The results from the recent flow monitoring show significantly high inflow, indicating potential cross connections with the stormwater system in these areas.

[1] Keefe, P.N. "Test Basins for I&I Reduction and SSO Elimination", 1998. WEF Wet Weather Specialty Conference, Cleveland.

Table 6.1	2016 I/I Parameters - Design Storm Sanitary Sewer Master Plan City of Medford			
Flow Monitoring Basin ID	**Wastewater Basin ID**	**Peak I/I Rate (gpad)**	**Peaking Factor**	**R-Value (%)**
Basin 1	Basin L	18,170	8.1	21.4%
Basin 2	Basin E	5,801	5.9	6.0%
Basin 3	Basin F	5,749	3.9	4.3%
Basin 4	Basin I	4,329	7.1	5.9%
Basin 5	Upper Basin B	2,221	4.7	2.0%
Basin 6	Basin N	8,842	3.0	9.7%
Basin 7	Basin D	7,745	4.3	8.5%
Basin 8	Basin C	6,848	4.9	7.0%
Basin 9	Lower Basin B	3,839	4.2	4.9%
Basin 10	Basin M	13,597	8.1	19.3%
Basin 11	Basin A	2,117	2.7	1.7%
Basin 12	Basin J	3,280	6.0	4.8%



Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates10135A00\Fig 6.1 PeakingPerBasin.mxd

Legend

- Service Area
- 2036 Service Area
- Taxlots

Peaking Factor

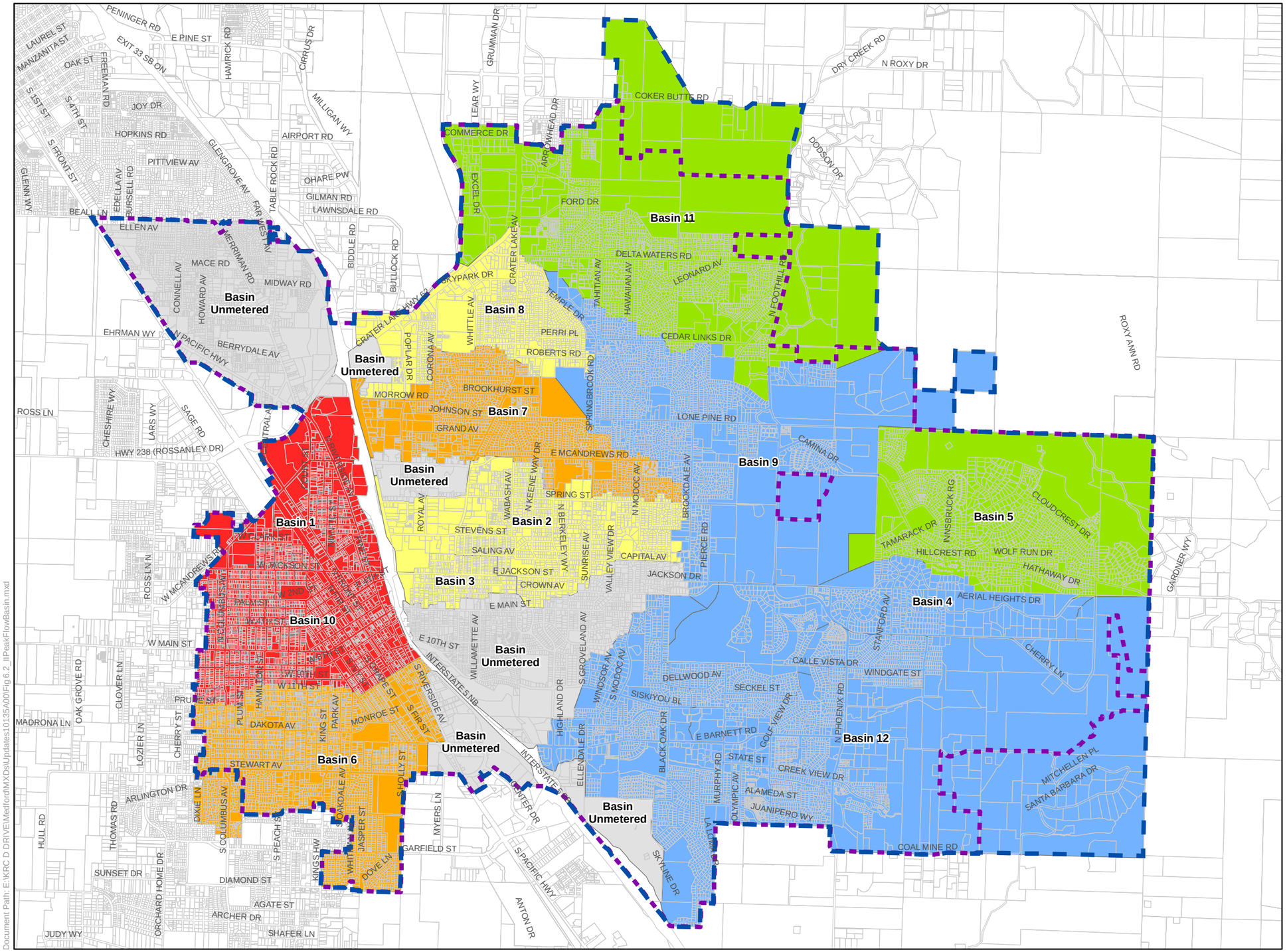
- < 4
- 4-5
- 5-6
- >7
- Unmetered

Feet
0 2,000 4,000

PEAKING FACTORS PER BASIN

FIGURE 6.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN



Legend

- Service Area
- 2036 Service Area
- Taxlots

Peak I/I Rate (gpad)

- 0-3,000
- 3,000-5,000
- 5,000-7,000
- 7,000-10,000
- >10,000
- Unmetered

Feet

0 2,000 4,000

PEAK I/I RATES PER BASIN

FIGURE 6.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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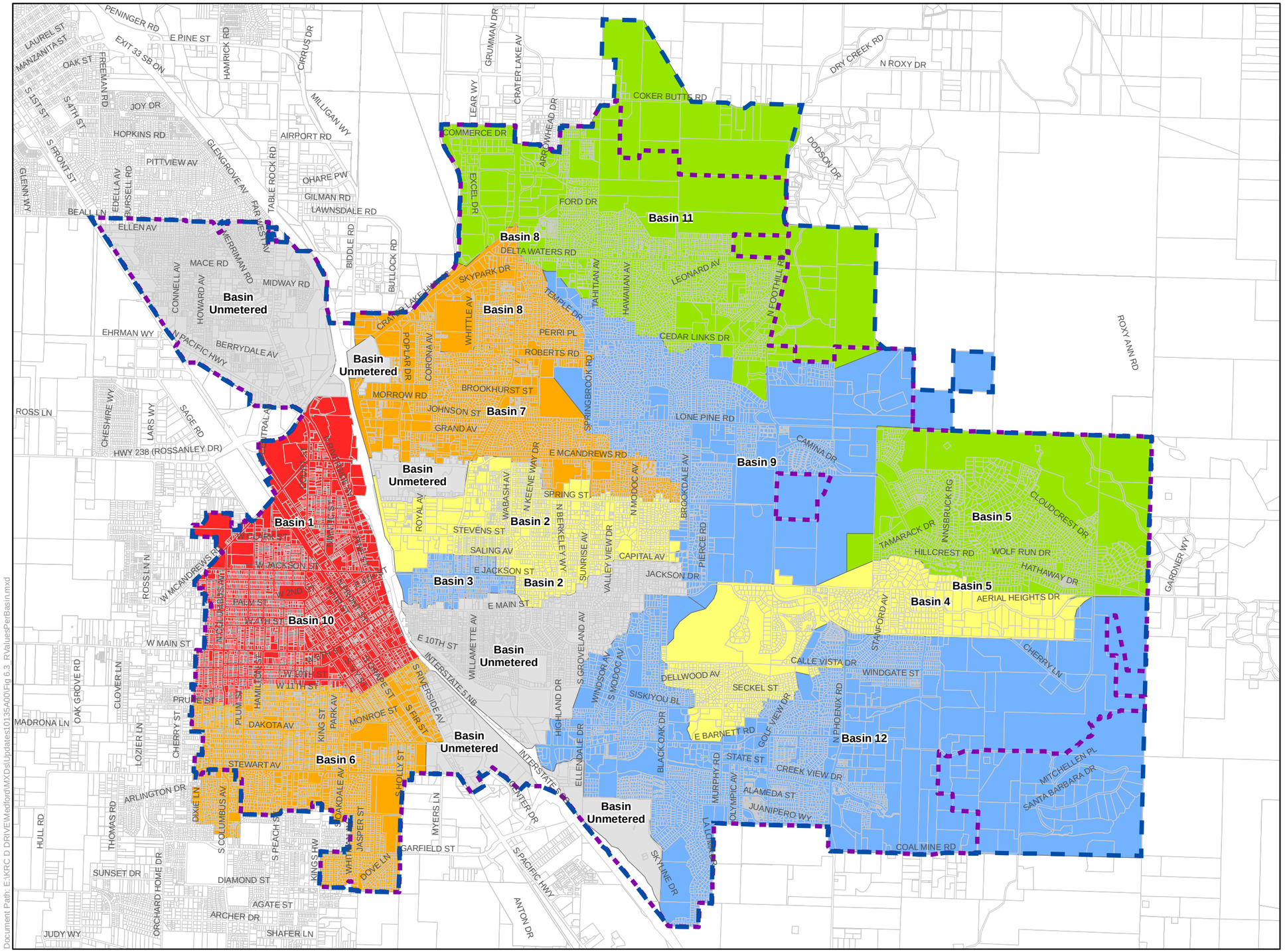

Legend

- Service Area
- 2036 Service Area
- Taxlots

R-Value (%)

- 1% - 2%
- 3% - 5%
- 5% - 6%
- 7% - 10%
- 11% - 22%
- Unmetered

Feet

0 2,000 4,000

R-VALUES PER BASIN

FIGURE 6.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Figures 6.4 through 6.6 show the ranking of each of the City's basins for the Peaking Factor, Peak I/I Rate, and R-Value, respectively

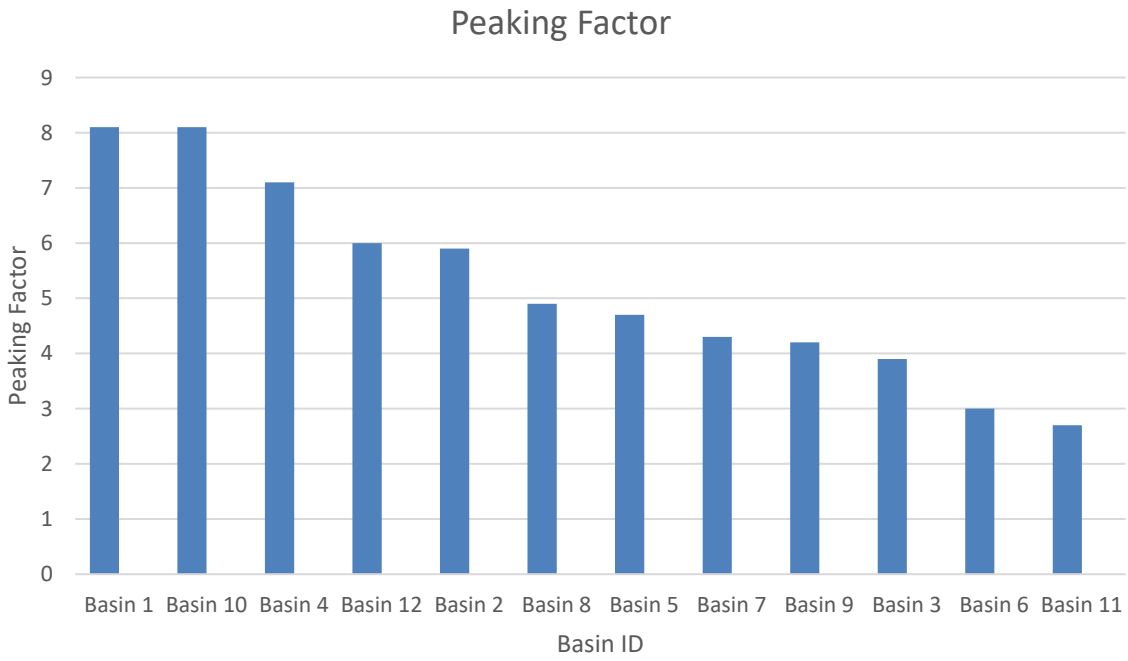

Figure 6.4 Peaking Factors Basin Rankings

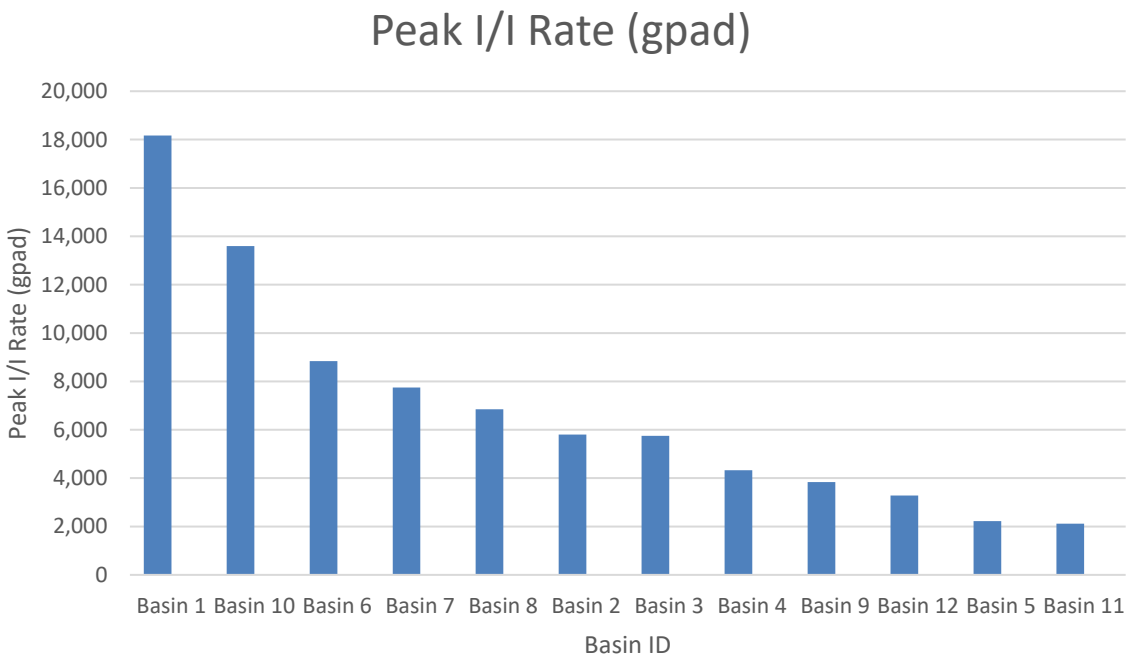

Figure 6.5 Peak I/I Rates Basin Rankings

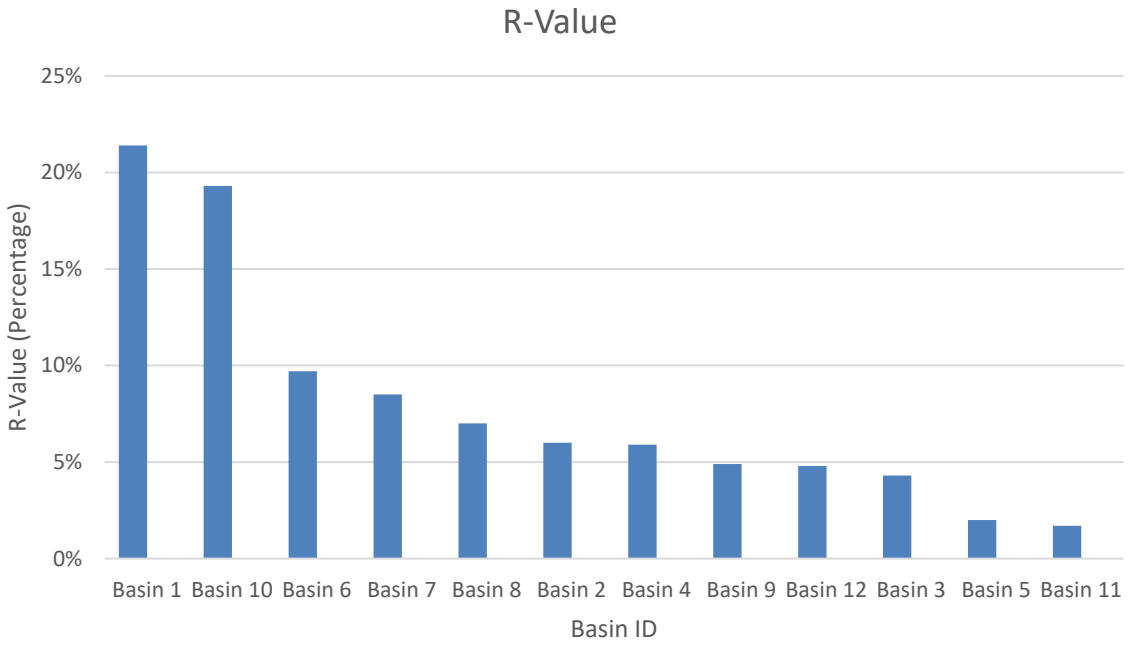

Figure 6.6 R-Values Basin Rankings

6.3 INFLOW AND INFILTRATION REDUCTION METHODS

Reduction of I/I in sewers can be a difficult and costly task to undertake. Identifying specific sources, working with private property owners, developing metrics for tracking the effectiveness of reduction techniques, and balancing the cost against capacity projects are all major challenges.

Many small and large-scale programs for reducing I/I have been conducted over the last few decades as pressure to reduce overflows has increased. One of the best sources of I/I reduction data in the Northwest is a series of studies performed by King County, Washington, which began a Regional I/I Control Program in 1999. The program began with pilot-tests of I/I reduction techniques in nine sample basins. The results of their ongoing study provide useful information to sewer agencies in the Northwest. Some local agencies, such as the City of Portland Bureau of Environmental Services, are relying on the results of the King County program to address I/I in their sewer systems. The following sections describe I/I reduction methods, and some of the latest results from the King County I/I study.

6.3.1 Sanitary Sewer Evaluation Surveys

The first step in reducing I/I is to perform a study of the targeted sewer basins through what is commonly called a Sanitary Sewer Evaluation Survey (SSES). SSES' include isolating the locations and identifying the sources of I/I so that appropriate I/I reduction methods are selected. King County created and employed SSES' as encompassing surveys and data review for employing techniques to identify causes of I/I in specific locations.

After completing nine pilot projects focusing on I/I reduction, King County publicized the following results regarding SSES[2]:

- Sources and volumes of I/I can be identified through comprehensive wet-weather flow monitoring.
- SSES' (specifically CCTV inspections) are most effective when done in the wet-weather season.
- A high percentage of I/I tends to originate in side sewers and laterals.

6.3.1.1 Isolate Location

The first step in an SSES is to isolate areas of high I/I. This effort begins at the basin level, and through flow monitoring, is narrowed down to "mini-basins." Investing in initial flow monitoring at the mini-basin level can greatly decrease rehabilitation costs. This is because additional flow monitoring can identify areas with low I/I, thereby eliminating them from the rehabilitation program.

A recent side-by-side project comparison by ADS Environmental Services, LLC[3] shows that increasing initial flow monitoring to isolate mini-basins to the 10,000 linear foot size provides the optimum return on investment for flow monitoring expenses compared to the cost of rehabilitation.

6.3.1.2 Source Identification

The next step in an SSES is to identify the sources as closely as possible. Inflow and infiltration have many causes such as connected foundation drains, downspouts, leaking pipes, and leaking manholes. Inspection methods to identify I/I sources commonly include the following:

- Smoke testing.
- Flow Isolation (monitoring nightly flows in adjacent manholes to identify sources).
- Mainline closed-circuit television (CCTV) inspection.
- Lateral/side sewer CCTV inspection.
- Visual inspection of manholes.

6.3.2 Reduction Techniques

Once an SSES is completed for a basin, the appropriate reduction techniques can be selected. Common techniques for reducing I/I include the following:

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[2] ***Regional Infiltration and Inflow Control Program Pilot Project Report***, King County, Washington, October 2004, p. 1-8

[3] "Recipe for Successful Measurement of RDII" Webinar by Patrick L. Stevens, ADS Environmental Services, LLC, February 15, 2011

- **Direct Disconnects**: This includes disconnecting roof downspouts, yard drains, foundation drains, stormwater catch basins, and/or any connection to the sewer system causing inflow. Disconnection of these items may require additional provisions for stormwater drainage.
- **Replacement or Repair (R&R) of Pipes**: This includes replacing or repairing public sewer pipes, typically due to poor condition, root intrusion, and disconnected joints. Options for replacing pipes include open-cut trench construction or using trenchless technologies, such as pipe bursting or cured in-place pipe (CIPP). These options need to be assessed for local conditions, such as pipe condition, adjacent utilities, and soil type.
- **Replacement or Repair (R&R) of Manholes**: Several options exist for sealing manholes and preventing infiltration through faulty joints and cracks. Alternatives include grouting, coating, installing a liner, and/or applying an external sealant.
- **Replacement or Repair (R&R) of Laterals and Side Sewers**: This includes replacing or repairing laterals (from house to right-of-way) and side sewers (from right-of-way to public sewer) due to poor condition and the presence of infiltration. Faulty side sewers and laterals are known to be large contributors of I/I. Identifying and repairing multiple faulty laterals and side sewers on private property can be more difficult than repairing a public sewer pipe. Because of their location on private properties, replacing or repairing side sewers involves the cooperation of property owners. Methods for repairing or replacing laterals and side sewers are similar to those described for public pipes. Trenchless technologies, which are less obtrusive than open-cut trenches are effective for replacing laterals and side sewers while minimizing impacts to landscaping and driveways.

6.3.3 Evaluation of Techniques

The effectiveness of employing I/I reduction techniques will vary for each sewer system; it will also largely depend on correctly identifying the major sources of I/I in a particular location. After completing nine pilot projects focusing on I/I reduction, King County publicized the following results regarding I/I reduction techniques:

- I/I can be reduced through sewer rehabilitation.
- Very little I/I reduction will likely result from manhole rehabilitation alone. (***For this reason, replacing or improving manholes is not recommended as a cost-effective method for I/I reduction and is not included in the recommendations that follow***.)
- Success of I/I control projects depends on a high level of cooperation with local agencies and private property owners.
- Rehabilitating sewer mains at the same time that side sewers and laterals are rehabilitated may be done for a relatively small increase in cost.

King County used the results of the Regional I/I Control Program Pilot Project to develop a Benefit/Cost Analysis Report, in which the effectiveness of specific I/I reduction techniques (or combinations thereof) were summarized. Table 6.2 presents the resulting percent I/I reduction for each of these techniques given the percent of the basin rehabilitated. As seen in the table, focusing on private property side sewers with some direct disconnects (Technique 4) resulted in more I/I reduction than rehabilitating public sewers (Technique 3).

Table 6.2 Percent I/I Reduction for Specific Techniques[(1)]
Sanitary Sewer Master Plan
City of Medford

Technique	% Basin Rehabilitated		% I/I Reduction
1. Direct disconnects	4%		10%
2. Replace everything and direct disconnects	95%	Sewer Mains	80%
	95%	Manholes	
	4%	Laterals & Side Sewers Direct Disconnects	
3. Replace public sewers and direct disconnects	50%	Sewer Mains	40%
	50%	Manholes	
	50%	Laterals	
	4%	Direct Disconnects	
4. Replace private property and some laterals and direct disconnects	50%	Laterals & Side Sewers	60%
	45%	Side Sewers only	
	4%	Direct Disconnects	

Notes:
(1) Source: King County Regional I/I Control Program Benefit/Cost Analysis Report, Earth Tech Team, November 2005, p. 3-30.

6.3.3.1 Flow Monitoring

Evaluating the effectiveness of I/I techniques requires flow monitoring data that can show the reduction in peak flows before and after a method is implemented. The quantity of I/I reduced can be compared to the cost of the I/I reduction technique to evaluate its cost-effectiveness. It is best to collect flow-monitoring data for several months in the wet weather period, and for at least one month in the dry weather period, before and after an I/I reduction technique has been implemented. Pre-implementation flow monitoring is commonly done as part of the SSES flow isolation. After implementing an I/I reduction technique, it is recommended that flow monitoring be completed in the wet weather period to quantify reductions and support future I/I reduction efforts.

6.4 INFLOW AND INFILTRATION REDUCTION EVALUATION

High existing infiltration quantities indicate an aging system (including private laterals) in disrepair. An I/I Reduction Program is a critical investment in restoring the condition and increasing the asset value of the City's sewer infrastructure. I/I reduction can also delay or eliminate capacity improvement projects in sewer collectors, interceptors, and at the City's Regional Water Reclamation Facility. However, I/I reduction can be costly and presents challenges with implementation given the overlap onto private property. An I/I Reduction Program was evaluated for the City to compare costs to the improvement projects recommended in Chapter 5 - Capacity Evaluation for alleviating capacity issues.

The following sections describe the recommended basin prioritization, estimated program costs, and comparison to capacity projects.

6.4.1 Basin Prioritization

Chapter 5 – Capacity Evaluation recommended several infrastructure projects to address pipe surcharging anticipated in the hydraulic model assuming no I/I reduction. Under Chapter 5, the model was used to evaluate the worst-case scenario with the assumption that I/I will degrade by a rate of 7 percent per decade[4]. Degradation is the slow change in a sewer collection system that allows an increase in I/I flows. Degradation is due to cracks in the pipe, pulled joints, connections at manholes, construction damage, traffic damage to manholes, and so forth.

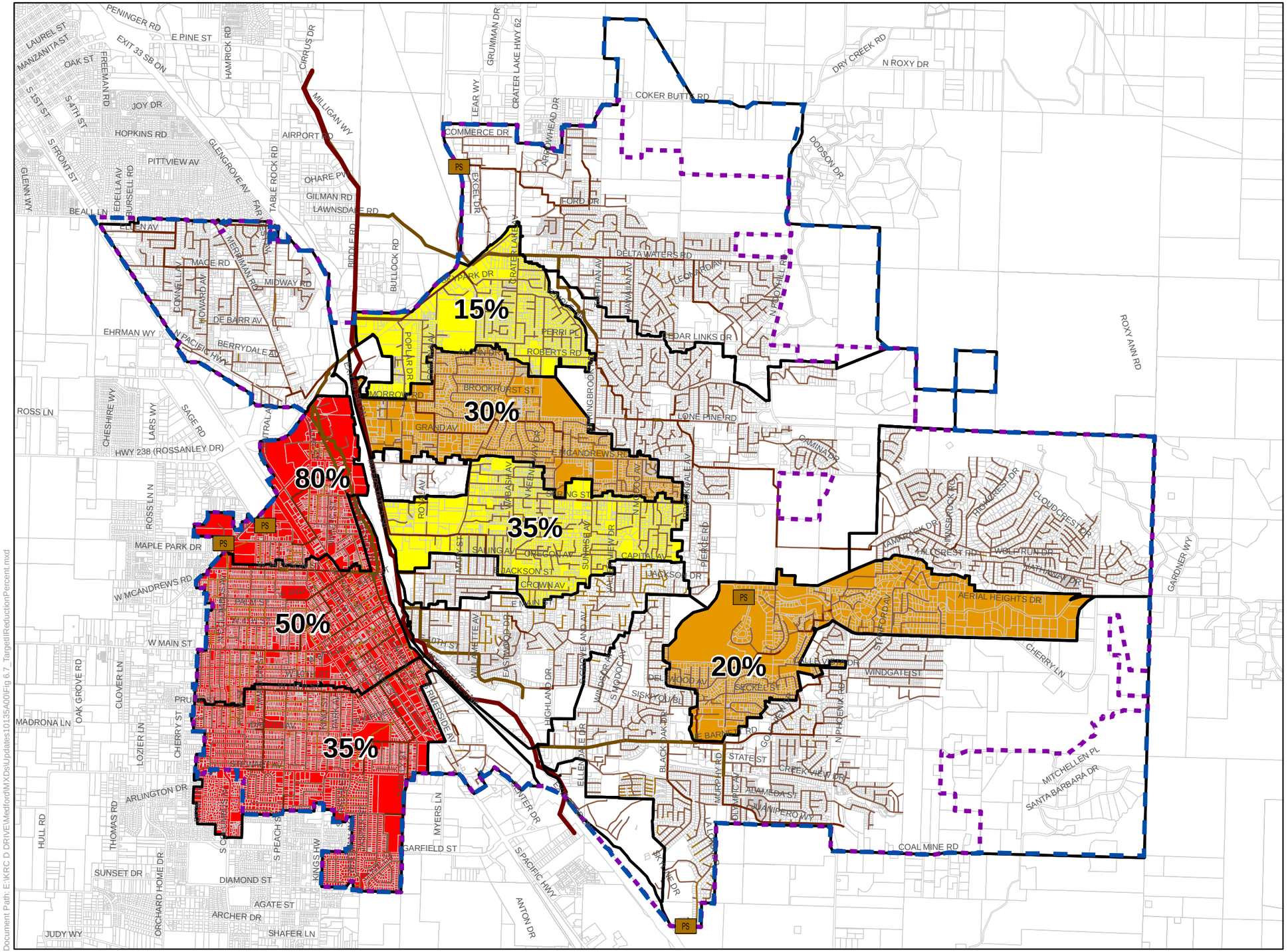
The model was then used to evaluate I/I reduction in specific basins to reduce overall peak flows and to minimize the need for capacity improvement projects. To reduce peak flows and the required infrastructure improvements, the basins were prioritized into three groups, as shown in Table 6.3. I/I reduction in these basins is recommended to address high peak flows, peaking factors, and I/I flow factors, as well as continue to decrease peak flows to the Rogue Valley Sewer (RVSS) interceptor and the City's Regional Water Reclamation Facility. Please note that basins with low I/I parameters and those of little concern for I/I were not included as part of this evaluation.

[4] King County Department of Natural Resources & Parks, Inflow and Infiltration Survey Report, December 2004.

Table 6.3	I/I Reduction Prioritization & Target Sanitary Sewer Master Plan City of Medford	
	Basin	**Target I/I Reduction Percentage**
Priority A	Site 1/Basin L	80%
	Site 6/Basin N	35%
	Site 10/Basin M	50%
Priority B	Site 4/Basin I	20%
	Site 7/Basin D	30%
Priority C	Site 8/Basin C	15%
	Site 2/Basin E	35%

Table 6.3 also presents the target I/I Reduction in terms of percentage of I/I for each basin. These values are the result of several iterations in the hydraulic model to achieve the desired results for reducing peak flows and minimizing capacity improvement projects. It is to be noted that the analysis was performed for the design storm defined in Chapter 2. Figure 6.7 illustrates the location and I/I reduction target values for the basins included in the I/I Reduction Program.

To offset improvement projects in Basin L, a significant amount of I/I will need to be reduced (80 percent), which does not appear realistic. Further evaluation of this basin is recommended to identify major sources of I/I and have a better understanding of the issue. The City's sewer model indicates that reducing I/I by these recommended amounts will reduce system-wide I/I by 10.2 million gallons, or 42 percent of all I/I volume for the design storm.



TARGET I/I REDUCTION PERCENTAGES

FIGURE 6.7

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

6.4.2 Program Cost Estimates

Cost estimates were developed for meeting the target I/I reduction goals for each basin and comparing to costs for the capacity improvement projects identified in Chapter 5 - Capacity Evaluation. The estimates include costs for the sanitary sewer evaluation surveys (to isolate the causes of I/I and select the appropriate I/I reduction technique(s)), implementing I/I reduction techniques, and program administration. Costs are at a planning level (+50/-30 percent of accuracy) and would require further refinement during project implementation. Appendix I presents the detailed assumptions and detailed cost estimates for each basin. Further detail and assumptions on the cost estimating methodology can be found in Chapter 7 - CIP.

The I/I reduction project costs include assumptions for either public sewer main replacement, lateral replacement, side sewer replacement, direct disconnects, or a combination thereof to match the techniques studied by King County. Because it is unknown what technique will be employed at each basin until the SSES is completed for each basin, an average cost for all the methods was used. Thus, the cost for each basin is the average cost of applying each technique for that basin.

6.4.2.1 Assumptions

The following assumptions were used to develop the cost estimates for each basin's I/I reduction program:

- The number of laterals per basin is assumed to be equal to the number of taxlots connected to the sewer in that basin.
- The average length of a lateral is assumed to be 65 feet. The average length of a side sewer is assumed to be 25 feet. (The City does not differentiate between side sewers and laterals; this assumption is for matching the King County approach).
- The percentage of pipes, laterals (from right-of-way to sewer main), side sewers (from building to right-of-way), and direct disconnects to be impacted by Techniques 1 through 4 are applied to the total length of pipes, laterals, and side sewers in each basin multiplied by the percent of basin to be targeted (estimated from I/I reduction targets).
- The total number of feet of pipe to be included in CCTV inspections, smoke testing, and flow isolation is assumed to be 50 percent of the total length of all mains, laterals, and side-sewers to be impacted by the selected technique. This assumption reflects the concept that additional flow monitoring during the SSES will reduce the required amount of physical inspections by 50 percent.
- The number of direct connections is assumed to be two per 1,000 LF of wastewater piping.
- Cured-in-place plastic (CIPP) is assumed to be used for repair and replacement of pipes. Cost estimates were provided by the City from recent projects.

- Temporary flow monitoring assumes two months of flow monitoring using City-owned meters, and paying $300 monthly for data analysis per meter.

6.4.2.2 Unit Costs

Table 6.4 summarizes the estimated unit costs for the SSES, permanent flow monitoring, and I/I reduction projects. The unit costs were multiplied by the quantities of each element assumed for each basin, as shown in Appendix I. The resulting costs are referred to as the Baseline Construction Costs. Baseline Construction Costs were increased by several cost factors to achieve the Total Project Costs, as follows:

- 30 percent construction contingency;
- 50 percent engineering, legal, and administration (ELA) costs, and planning contingency. Program administration includes costs associated with City staff time to oversee the SSES, refine the recommended programs for each basin, evaluate the effectiveness of I/I reduction techniques, and public education/outreach.

Please note that these mark-ups were not applied to the Direct Costs for the SSES.

As noted, some of these costs are from the results of the King County Regional I/I Control Program. These costs have been increased using the ratio of the Engineering News Report (ENR) 20-Cities Construction Cost Index (CCI) for November 2005 (7,628) to the January 2017 (10,532). This index is used to estimate and update cost at the time of the study.

Table 6.4 Unit Cost Estimate Assumptions
Sanitary Sewer Master Plan
City of Medford

Item	Element	Unit Cost
Sanitary Sewer Evaluation Survey(1)	CCTV Inspections by City, with City-owned equipment	$0.50/LF
	Smoke Tests/ Flow Isolation	$1.00/LF
	Temporary Flow Monitoring(1)	$300 Ea/Mo
I/I Reduction Projects	Direct Disconnects(2)	$4,000 Each
	Replace Wastewater Mains(3)	$45/LF
	Replace Laterals(2)	$5,000 Each
	Replace Side Sewers(2)	$5,000 Each
	Replace Laterals & Side Sewers(2)	$10,000 Each

Notes:
(1) Assumes City-owned meters are installed by City staff; costs are for data analysis in-house.
(2) Costs updated from King County Regional I/I Control Program Benefit/Cost Analysis Report, Earth Tech Team, November 2005, p. 3-33.
(3) Costs from recent CIPP bid tab at City of Medford December 2016. Average of pipe sizes; includes mobilization, traffic control, erosion control, pollution control, service reinstatement.
(4) Ea = Each, LF = Linear Foot, Yr = Year, Mo = Month

6.4.2.3 Program Costs

Table 6.5 presents the costs estimated for achieving I/I reduction in the City's basins. As seen in the table below, the recommended I/I Reduction Program requires a significant investment to offset the need for capacity expansion projects. To achieve 42 percent I/I reduction (10.2 MG of I/I volume), an I/I reduction program is anticipated to cost $90.9M.

Table 6.5 I/I Reduction Program Cost Estimates (Average of all Techniques)
Sanitary Sewer Master Plan
City of Medford

Basin	Target Percent Reduction Goal	Total Program Cost
Priority A		
Site 1/Basin L	80%	$10,867,000
Site 6/Basin N	35%	$21,344,000
Site 10/Basin M	50%	$23,054,000
	Total Priority A Basins	**$55,265,000**
Priority B		
Site 4/Basin I	20%	$4,692,000
Site 7/Basin D	30%	$14,204,000
	Total Priority B Basins	**$18,896,000**
Priority C		
Site 8/Basin C	15%	$12,833,000
Site 2/Basin E	35%	$3,870,000
	Total Priority C Basins	**$16,703,000**
	TOTAL PROGRAM	**$90,864,000**

Because the City's policies place ownership and maintenance of sewer laterals (from house to public sewer) on the property owner, costs for improving side sewers/laterals were isolated from the overall program costs to estimate what share of the program costs the City would pay. Private system costs were estimated to be $47.9M (53 percent), and public system costs are estimated to be $43.0M (47 percent) of the overall program cost. This breakdown assumes all program administration costs are still paid for by the City.

6.4.3 Comparison to Capacity Improvement Projects

The I/I Reduction Program evaluation was presented to City staff. The program cost estimate for achieving the level of I/I reduction needed to offset pipe capacity projects is significantly higher than the cost estimates of the pipe capacity projects themselves. Not included in this evaluation are cost estimates for increasing the capacity of the RVSS interceptor (was assumed to not be a City cost), nor increasing capacity at the City's

Regional Water Reclamation Facility (assumed to have adequate capacity for peak flows). Due to the significant cost of the I/I Reduction Program coupled with the added challenges of implementing the program, the City has decided to not implement a system-wide I/I Reduction Program, but instead focus I/I efforts on the downtown basins (L and M) to supplement the recommended capacity projects.

The City plans to investigate already known issues in Basin L with City staff internally. For Basin M, a cost estimate for a targeted I/I Reduction Project was prepared as shown in Table 6.6. This project is much less comprehensive than the Basin M project presented in Table 6.5, and is not assumed to reduce I/I in the basin to the same extent (50%), thus the project costs are significantly less. This project is included as Project G-1 in the recommended capital improvement plan (Chapter 7). The results of this project may influence the requirement for pipe Projects P-4 through P-9, as illustrated in Figure 5.13 in Chapter 5 - Capacity Evaluation.

Table 6.6 Basin M I/I Reduction Project
Sanitary Sewer Master Plan
City of Medford

Item	Unit Costs	Units	Quantity		Cost
Sanitary Sewer Evaluation Survey (SSES)					
CCTV Inspections(1)	$0.50	LF	20,000	$	10,000
Smoke Testing/ Flow Isolation(2)	$0.00	LF	20,000	$	–
Temporary Meter(3)	$600	EA	6	$	4,000
			Total SSES	**$**	**14,000**
I/I Reduction Projects					
Sewer Main Rehab (CIPP)(4)	$45	LF	10,000	$	450,000
Lateral/Side Sewer(5)	$0	EA	–	$	
Direct Disconnects(6)	$4,000	EA	4	$	16,000
			Direct Costs	**$**	**466,000**
Construction Contingency	30%			$	140,000
			Construction Cost	**$**	**606,000**
SUBTOTAL PROGRAM COST				**$**	**620,000**
Program Administration	10%			**$**	**62,000**
TOTAL PROGRAM COST				**$**	**682,000**

Notes:
(1) Assumes City already knows general areas of problems from previous studies and can isolate to 20% of basin. Public mains only.
(2) Assumes smoke testing cost to be paid by RVSS.
(3) City owns meters, so assuming $300/mo for data analysis. Performed by City. Assuming 2 months of use.
(4) Assumes ~10% of basin is rehabilitated
(5) Assumes cost to be paid by property owner.
(6) Assumes cost of redirecting a storm drain connection.

6.5 DEQ COMPLIANCE

The Oregon Department of Environmental Quality (DEQ) Wastewater Facilities Plan guidelines (OAR 340-052) direct sewer utilities to aim for I/I levels according to the United States Environmental Protection Agency (EPA) I/I Analysis and Project Certification. These DEQ guidelines are specific to facility planning when seeking state funding for facility (treatment plant) improvements, but can be interpreted and applied for sewer collection system evaluations. The referenced EPA document (40 CFR 133.103) defines “non-excessive I/I” as 120 gallons per capita per day (gpcd) for dry weather flow, or 275 gpcd for wet weather flow. If I/I exceeds the non-excessive criteria, a cost-benefit evaluation is needed to determine the amount of I/I that is cost effective to remove.

Existing flow conditions under the design storm were evaluated to determine the I/I per capita values. Current population served is estimated at approximately 65,000 customers. Existing “non-excessive I/I” for dry weather flow is estimated at approximately 139 gpcd and 902 gpcd for wet weather. These values show that the current I/I values exceed the non-excessive criteria defined above for the entire system. This is probably caused by the high I/I rates for some of the basins in the collection system, especially the downtown core area. However, the cost-benefit evaluation presented herein demonstrates that identifying and alleviating I/I is cost-prohibitive compared to increasing system capacity to handle the I/I flows.

6.6 SUMMARY

The City has moderately high inflow and infiltration in several basins, particularly the downtown area. However, overall the City’s I/I is not as high as other sewer agencies in the state. High I/I indicates aging infrastructure and results in higher peak flows at the City’s pump stations, the RVSS interceptor, and at the City’s Regional Water Reclamation Facility. Cost estimates were developed for an I/I reduction program that offsets the need for the capacity improvement projects identified in Chapter 5. The cost estimates rely heavily on the estimated I/I reduction through various techniques as published by King County.

Given the assumptions for costs, effectiveness of I/I reduction techniques, and resulting high overall program costs, performing a system-wide I/I reduction program is not recommended at this time. The City plans to continue to investigate I/I issues in the downtown area (Basins L and M). The City also plans to continue annual maintenance projects that improve sewer pipe integrity and result in lower I/I. It is further recommended that the City determine a method to implement its policy for private property owners to maintain their sewer laterals, which are known to be high contributors of I/I.

CAPITAL IMPROVEMENT PLAN

This chapter presents the recommended Capital Improvement Plan (CIP) for the City's sewer collection system. The chapter combines recommended pipeline, pump station, and other general projects identified in previous chapters for meeting the City's service goals for existing and future customers. The CIP consists of the cost estimates and schedule for the recommended improvements, and is organized to assist in developing a financial analysis, presented in Chapter 8.

7.1 COST ESTIMATE ASSUMPTIONS

The cost estimates presented in this CIP are opinions developed from bid tabulations, cost curves, information obtained from previous studies, and Carollo Engineers experience on other projects. The cost estimates presented in the CIP have been prepared for general master planning purposes and for guidance in project evaluation and implementation. Final costs of a project will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors such as preliminary alignment generation, investigation of alternative routings, and detailed utility and topography surveys. Acquisition of property, easements, and right-of-way (ROW) may be required for some of the recommended projects. However, for the purpose of this SSMP, pipeline corridors, or easements are assumed to be in public ROW, and therefore do not require land acquisition. For this reason, land acquisition is not included in the cost estimated.

All costs are using the Engineering News Record Construction Cost Index (ENR CCI) 20-City Average of 10,532 (January 2017). This index corresponds to the time of the costs developed for the SSMP.

The Association for the Advancement of Cost Engineering (AACE) defines an Order of Magnitude Estimate, deemed appropriate for master plan studies, as an approximate estimate made without detailed engineering data (Class 5). It is normally expected that an estimate of this type would be accurate within plus 50 percent to minus 30 percent.

7.1.1 Unit Cost Assumptions

7.1.1.1 <u>Gravity Pipeline Construction Unit Costs</u>

For pipes, Baseline Construction Costs are calculated by multiplying the estimated new pipe length by a proposed unit cost. Sanitary sewer collection system improvements range in size from 10- to 24-inches in diameter, and associated pipeline unit costs are shown in Table 7.1. The unit costs are based on recent bid tabs and represent "typical" field conditions with construction in stable soil at a depth ranging between 10 to 15 feet. Where existing pipes are proposed for replacement, the unit costs assume in-place replacement, either in roadways or in right-of-way (ROW) areas. Sewers deeper than 20 feet were added a 200 percent contingency to account for construction challenges and unknown conditions.

Pipeline costs have been estimated for either construction in existing developed areas, or new construction in undeveloped areas. Construction in undeveloped areas is assumed to be 30 percent less than construction in developed areas due to reduced costs related to utility conflicts, traffic control, construction access, and pavement cutting.

Table 7.1 Gravity Pipeline Construction Unit Costs
Sanitary Sewer System Master Plan
City of Medford

Pipe Size (inches)	Unit Cost - "Developed" Areas ($/LF)	Unit Cost - "Undeveloped" Areas[1] ($/LF)
10	154	108
12	170	119
15	192	134
18	213	149
21	234	164
24	256	179
27	270	189

Note:
(1) "Undeveloped" area costs are 30 percent less than "Developed" areas costs.

7.1.1.2 Force Main Construction Unit Costs

Force main unit costs using used for the CIP are presented in Table 7.2.

Table 7.2 Force Main Construction Unit Costs
Sanitary Sewer System Master Plan
City of Medford

Pipe Size (inches)	Unit Cost ($/LF)	Cost Per Linear Foot ($-inch diameter/foot)
4	144	36.0
6	147	24.5
8	151	18.9
10	156	15.6
12	160	13.3
24	336	14.0

7.1.1.3 Casing Construction Unit Costs

Pipe casings up to 21-inches in diameter were included for evaluating the potential major crossing of Interstate 5 and Bear Creek as part of a new regional sewer (see Chapter 5). Table 7.3 shows the unit costs for pipeline casings. The sizes in this table represent both pipeline diameter and associated casing size.

Table 7.3 Pipeline Casing for Major Crossings Construction Unit Costs Sanitary Sewer System Master Plan City of Medford	
Pipe Size (inches)(1)	**Cost Per Linear Foot ($/LF)**
12/24	988
15/30	1,235
21/42	1,729

Note:
(1) Size represents pipeline diameter and associated casing size.

7.1.1.4 Pump Station Construction Unit Costs

Assumptions were made for adding a single pump to both PMT and Service Center based on Carollo's experience and recent discussion with manufacturers. No new station is planned. These assumptions are rounded planning level costs based on conversation with pump manufacturers. Total Project Costs were estimated at $50,000 each.

7.1.2 Baseline Construction Cost

The Baseline Construction Cost represents construction costs of projects under normal construction conditions and schedules. Baseline Construction Costs were developed using the following formula:

- Pipeline: Calculated by multiplying the estimated length by the unit cost.

7.1.3 Estimated Construction Cost

Since knowledge about site-specific conditions of each proposed project is limited at the current planning stage, a 30 percent contingency was applied to the Baseline Construction Cost to account for unknown construction conditions. The Estimated Construction Cost for each improvement project consists of the Baseline Construction Cost plus 30 percent construction contingency.

7.1.4 Total Project Cost

Total Project Costs include costs associated with engineering, permitting, construction phase professional services, and project administration. Engineering services associated with new facilities include preliminary investigations and reports, foundation explorations, preparation of drawings and specifications during construction, surveying and staking, sampling of testing material, and start-up services. Construction phase professional services cover such items as construction management, engineering services, materials testing, and inspection during construction. Finally, project administration costs cover such items as legal fees, financing expenses, staff time, and interest during construction. The cost of these items can vary, but for the purpose of this study, it is assumed that Total Project Costs are an additional 50 percent of the Estimated Construction Cost.

The construction contingency and total project markups are presented in the following example.

Example:

Baseline Construction Cost	**$1,000,000**
Construction Contingency (30%)	$300,000
Estimated Construction Cost	**$1,300,000**
Engineering Cost + Construction Management + Project Administration	
	$650,000
Total Project Cost	**$1,950,000**

7.2 CAPITAL IMPROVEMENT PLAN

The recommended improvement projects to alleviate deficiencies, meet the City's criteria, and serve new growth for the City under full build-out conditions are summarized in the proposed Capital Improvement Plan, as presented in the following sections. The following sections provide details on pipe, pump station, and general projects. The Capital Improvement Plan with detailed cost estimates can be found in Appendix J.

Additional recommendations that are not capital projects are provided at the end of this chapter.

7.2.1 Project Identifiers

Recommended projects have been assigned a project name associated with the type of project. The following abbreviations were used:

- "P" = Pipeline (includes gravity, force main, or casing).
- "PS" = Pump Station.
- "EXP" = Expansion
- "G" = General.

7.2.2 Project Prioritization

As discussed in Chapter 5, the improvement projects are prioritized based on their urgency to mitigate existing deficiencies and to service anticipated growth. It is recommended that improvements to mitigate existing deficiencies be constructed as soon as possible, in the Short-Term, while improvements necessary for growth be implemented either in the mid- or long-term. Growth capacity projects should be monitored and can be moved sooner or later based on developer's needs. Because the total short-term project list is significantly costly, implementing these projects must be balanced with affordability. Chapter 8 discusses financing options and presents a plan for financing these projects.

The recommended improvements for the future system have a significant total cost that is best distributed based on the order in which the City develops. The timing for implementing these

improvement projects is based on the growth assumptions made for this SSMP and is subject to change depending on development. It is recommended that the City monitor growth and adjust project implementation accordingly.

The Capital Improvement Plan is separated into four phases:

- Short-Term (ST) Priority 1 (2017-2022). Proposed projects recommended to alleviate deficiencies under existing conditions. They commonly have structural deficiencies and high inflow and infiltration (I/I), and were prioritized by City staff due to these known issues. Timing for these projects is planned between 2017 and 2022. These are the high priority projects/programs that the City plans to implement in the next five years.
- Short-Term (ST) Priority 2 (2017-2026). Proposed projects recommended to alleviate deficiencies under existing conditions. Structural deficiencies and high I/I are present, but these projects were not as critical to the City as the Priority 1 projects. Timing for these projects is planned between 2017 and 2026.
- Mid-Term (MT) (2027- 2036). Proposed projects recommended to alleviate deficiencies and serve new development by planning year 2036 (in the Urban Growth Area), and medium priority for I/I reduction. These projects are mostly developer driven and could be implemented earlier or later based on developer's needs. It is recommended that the City monitors these areas and implement these projects as growth occurs.
- Long-Term (LT) (2037-2040). Proposed projects recommended to alleviate deficiencies and serve new development under build-out conditions (in the Urban Reserves), and low priority for I/I reduction. It is recommended that the City monitors these areas and implement these projects as growth occurs. These are estimated based on how the City is expecting to develop in the next 25 years; timing may be adjusted with growth.

7.2.3 Existing Versus Future User Cost Share

The improvements proposed in the CIP either benefit existing users, or are required to service new development and future users. Some of the projects provide benefit to both existing and future users. An opinion of benefit to future users, based on preliminary project information, was assessed for each project as discussed in Chapter 5, and is included in the CIP summary tables below. Projects intended to correct existing deficiencies are allocated to current customers; projects needed due to the increase in flow from future users are allocated to future users.

7.2.4 Pipe Improvement Projects

Chapter 5 - System Analysis identified improvement projects needed to meet capacity requirements and the City's performance criteria under existing and future flow conditions. The Chapter includes detailed project descriptions for each recommended improvement. Pipe projects can be described as either improvement or expansion projects, as discussed below. A summary of pipe improvement projects is presented in Table 7.4. This table identifies the projects, provides a brief description of the project, the estimated cost, recommended

prioritization, and allocation to existing or new customers. Detailed cost tables can be found in Appendix J.

7.2.4.1 Pipeline Improvement Projects

The City's sewer pipelines were evaluated using the updated sewer model for meeting the City's pipe surcharge performance criteria: keeping the water surface two feet or less above pipe crown and no less than 3 feet below the manhole rim during the 5-year design storm. The hydraulic model identified several pipes that could not meet this criteria and was used to develop optimized pipe projects under existing and future conditions. Recommended projects are described in detail in Chapter 5. All projects are sized for system build-out flow conditions.

Table 7.4 presents the final list of recommended pipeline improvement projects. All pipe projects are shown in order of priority as described in Section 7.2.2. A total of 46 pipeline projects were identified to mitigate deficiencies from current customers or potential capacity deficiencies caused by future growth. The total capital cost for these improvement projects is estimated to approximately $30M. Figure 7.1 shows the locations of the projects.

The Short-Term Priority 1 Projects are most critical and warrant some discussion as follows.

- ***Projects P-4 through P-9 - Downtown Basin M.***
  Projects P-4 through P-9 are located in the downtown area in Basin M. Significant I/I is observed and known in this basin. The system still has very significant surcharging in all of these pipes and also experienced a sanitary sewer overflow (SSO) in project P-7 this past January. The first step before implementing these projects is to complete Project G-1 (see Section 7.2.6). Based on the findings from Project G-1, these projects should be implemented or revised accordingly. Current estimated costs for these projects are estimated at $3.6M. It is assumed that based on the findings from Project G-1 (see Section 7.2.6), capital costs will remain the same or decrease if large sources of inflow are identified and removed.

- ***Project P-14 - Along Dellwood Ave between Murphy Rd and the intersection of Black Oak Dr. and Siskiyou Blvd.***
  Project P-14, located in Basin I, should be implemented in the next 5 years. The project entails upsizing 1,247 feet of pipe. This project should mitigate surcharging, which is projected to occur under 2036 conditions. Estimated capital cost is $413,000 dollars.

- ***Project P-19 - Ramada from Petunia north to easement, easement from Ramada to Honeysuckle, Honeysuckle to Camellia, Camellia to CLA, CLA to Grand, Grand to Corona, Corona to Johnson, Johnson to Velia, Velia to Morrow.***
  Project P-19 should be implemented by phase in the next five years. It consists of upsizing approximately 6,780 feet of pipes. There was an SSO in December of 2016 at Camellia and Yucca caused by a combination of heavy rain and restriction from roots. The lines on Grand experience severe root intrusion and roots need to be cut out twice a year which has created severe surface damage that needs addressed. Estimated capital cost for Project P-19 is $2.5M.

Three projects are critical for serving anticipated development and warrant some discussion as follows. It is recommended to monitor these areas of development and adjust project timing as needed.

- ***Project P-24 – Webfoot Road, Ford Drive, and Springbook Road between Crater Lake Highway 62 and Springbook Road.***
  Project P-24 is recommended to serve new development to the northeast of the City. The City is expecting growth in this area in the near future and needs to monitor flow in these pipes. Note, this project is sized to accommodate all existing and future flows in the Service Area. This project is almost solely caused by future customers. Estimated capital cost is $909,000,

- ***Projects P-35 and P-37 - Murphy Road between East Barnett Road and Alameda Street and Creek View Dr between N Phoenix Rd and the intersection of Barnett Rd and Black Oak Dr.***
  Projects P-35 and P-37 are recommended for serving new development to the southeast of the City. Growth has already started in the contributing areas, and projects P-35 and P-37 are critical projects to allow growth to happen in the future. It is highly recommended that the City monitor this area after growth starts to occur and development projects are in place. These projects are almost solely caused by future customers. Estimated capital cost for Projects P-35 and P-37 are $2.4M.

- ***Project P-42 - East Barnett Road between Black Oak Drive and Medical Center Drive***.
  Project P-42 is scheduled for the Mid-term to reflect timing of development; however, it is recommended to monitor this area after upstream projects are implemented and as development continues. Estimated capital cost for this project is $243,000.

7.2.4.2 Pipeline Expansion Projects

As part of this SSMP, the City and Carollo developed potential alternatives to serve the expansion areas to the east of the City's existing collection system. Chapter 5 presents the alternatives analysis, which resulted in selecting Alternative 1. Under this alternative, the City would extend its existing collection sewer system out to the east. The proposed gravity sewers would follow natural topography flowing generally from east to west, and would connect to several points in the existing sewer system. Figure 7.2 presents the proposed plan for serving these areas of growth. Under this alternative, all other areas of expansion flow towards the closest downstream sewer system. A really high-level analysis was performed for these expansion areas, and it is highly recommended that pipe sizing be checked and revised as necessary once path and sewer slopes are known.

Most pipes required to serve development will be constructed and paid for by developers. However, the City will likely bear the cost of major trunk lines and pipe oversizing. These costs are captured in the expansion projects described herein. The expansion projects were divided into three sub-projects with the following two assumptions:

- Pipes over 8-inches: Only a portion of the developer's sewers will be paid for the City per their criteria. Only the general high level sewer paths were determined. It is anticipated that these might substantially vary from these planning level estimates upon development. It is assumed that of the planned sewers:
  - 75 percent will be 8-inch in diameter and will be at the charge of the developers (no costs included in CIP),
  - 25 percent will be 12-inch in diameter and the difference in cost between constructing an 8-inch sewer and a 12-inch will be at the charge of the City (costs included in the CIP). These costs were determined from the City's Municipal Code chapter 3.835 regarding SDC Credits.

Please note, that upgrades of the existing system are needed in concurrence with constructing these sewers and serving future customers in the expansion areas. Projects P-35, P-37, P-42, and P-24 need to be monitored in order to be implemented on time to serve growth without surcharging the existing system.

EXP-1 – Long-Term Expansion Pipes Above 8-inch in Diameter (North)

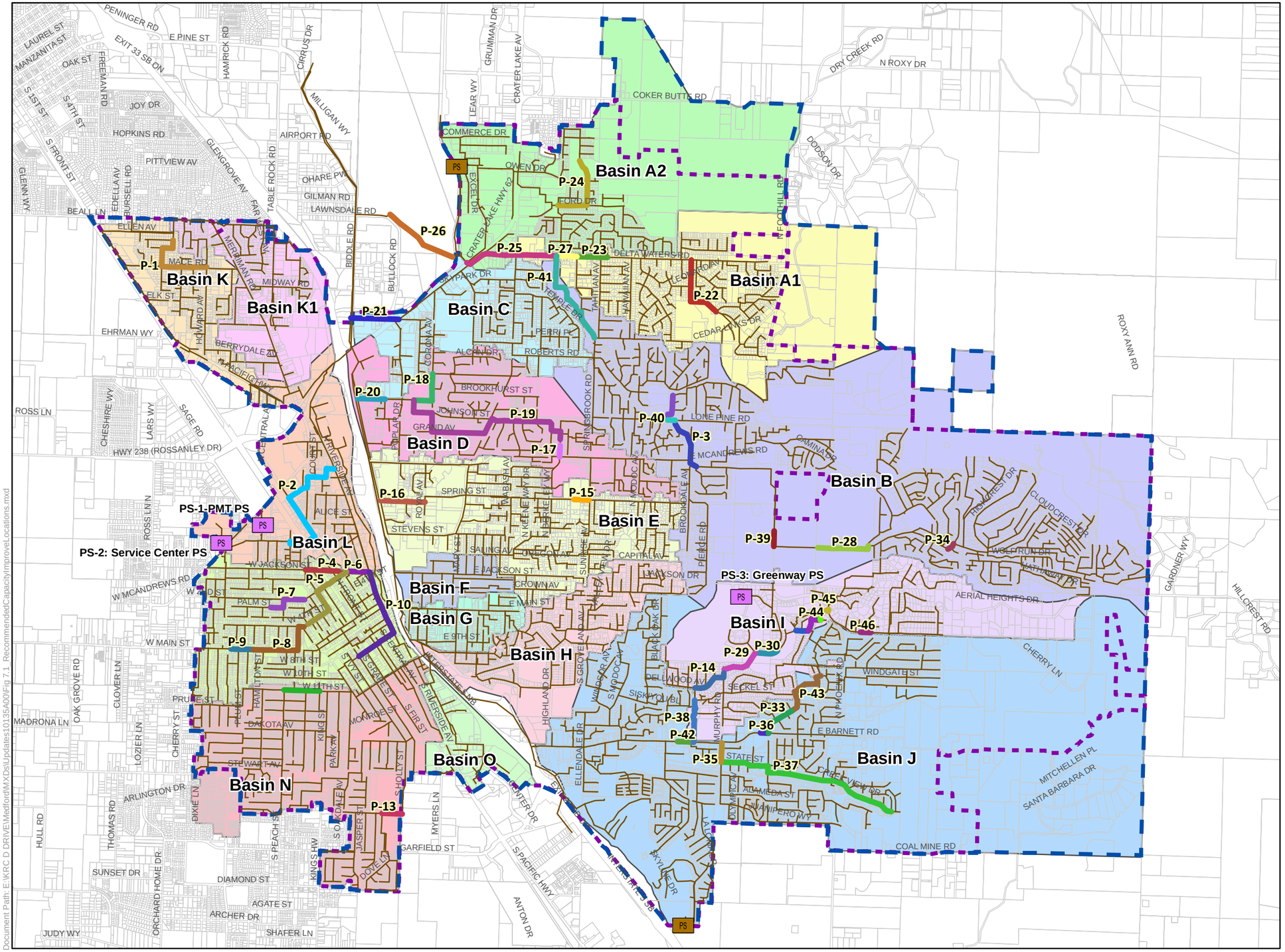
The expansion sewers identified as EXP-1 (over 8-inch) located in the northern part of the City are anticipated to serve development in the Urban Reserves, and would therefore be needed in the Long-Term. The City's cost portion of these pipes is estimated at $25,000.

EXP-2 – Mid-Term Expansion Pipes Above 8-inch in Diameter

As discussed above, a portion of the expansion sewers to the development are anticipated to be 12-inch in diameter. Approximately one third of these sewers is anticipated to serve the expansion areas in the 2036 Service Area, and would therefore be needed in the Mid-Term. The City's cost portion of these pipes is estimated at $100,000.

EXP-3 – Long-Term Expansion Pipes Above 8-inch in Diameter (South)

The remaining of the expansion sewers (over 8-inch) are anticipated to serve development in the Urban Reserves, and would therefore be needed in the Long-Term. The City's cost portion of these pipes is estimated at $25,000.



Legend

- Service Area
- 2036 Service Area
- Taxlots
- Pump Station Improvement
- Other Pump Station
- Other Pipelines
- P-1 Project Number
- Preliminary Improvement Project

Legend

Wastewater Basins

A1	D	H	K1	O
A2	E	I	L	
B	F	J	M	
C	G	K	N	

N

0 2,000 4,000 Feet

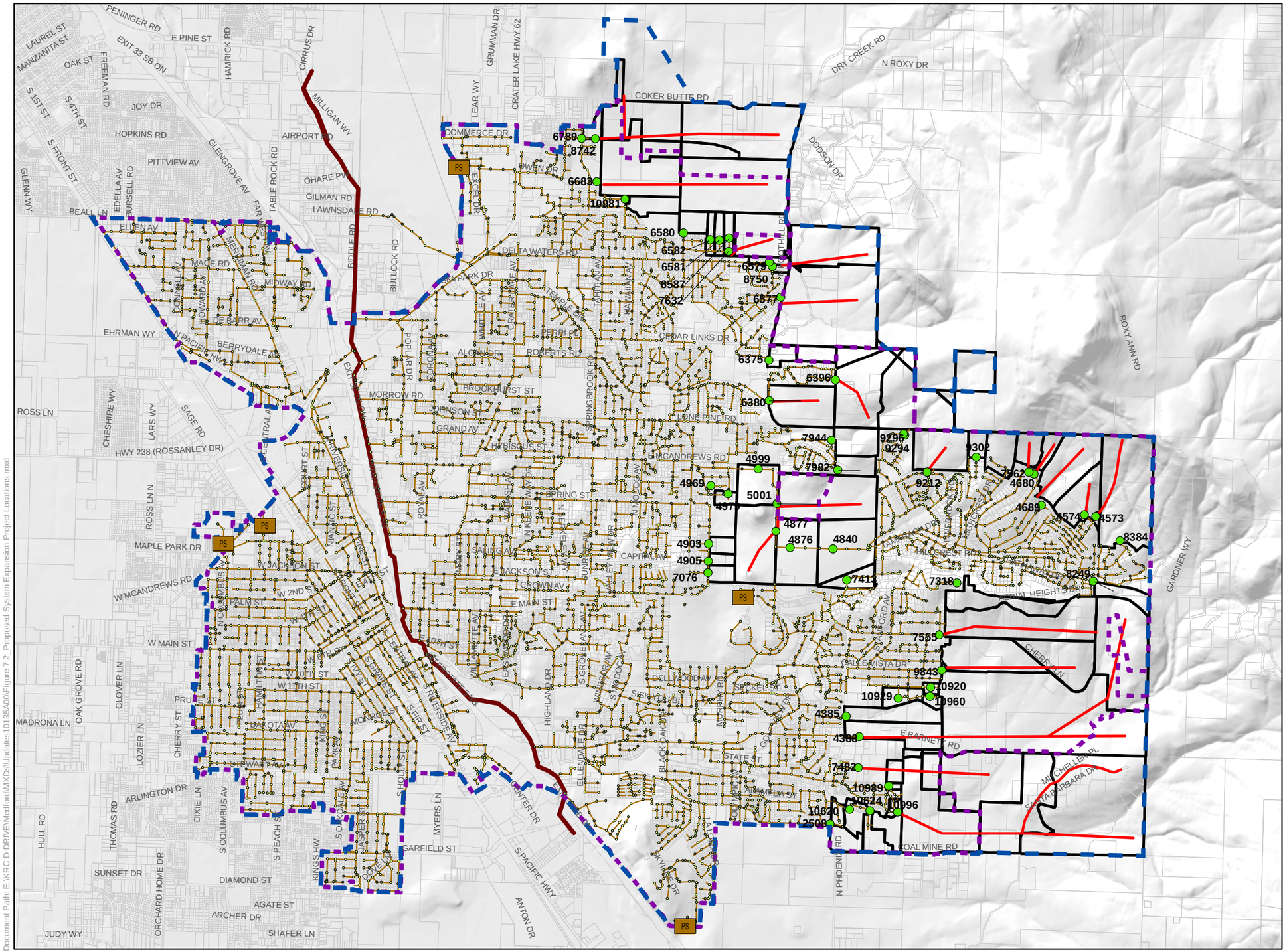
RECOMMENDED CAPACITY IMPROVEMENT PROJECT LOCATIONS

FIGURE 7.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

CITY OF MEDFORD OREGON



Legend

- Service Area
- 2036 Service Area
- Taxlots
- Contributing Manhole
- Other Manhole
- Pump Station
- Sewer Gravity Interceptor
- Sewer Main
- Proposed Infrastructure
- Growth Areas

Feet
0 4,000

PROPOSED SYSTEM EXPANSION PROJECT LOCATIONS

FIGURE 7.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

Document Path: E:\KRC D DRIVE\Medford\MXDs\Updates\10135A00\Figure 7.2_Proposed System Expansion Project Locations.mxd

Table 7.4 Pipe Improvement Projects
Sanitary Sewer System Master Plan
City of Medford

Project ID	Description	Existing Size (inch)	Recommended Size (inch)	Project Cost	Total Short-Term Priority 1 (2017-2021)	Total Short-Term Priority 2 (2017-2026)	Mid-Term (2027-2036)	Long-Term (2037-2040)	Existing vs Future	
									Existing (%)	Future (%)
	PIPE PROJECTS									
P-1	Mace Road between Elliott Avenue and Howard Avenue/Marilee Street, Dan Avenue, and Elliott Avenue between Herman Avenue and Mace Road	12/15	15/18	$ 1,073,000				$ 1,073,000	75	25
P-2	Beatty Street, Court Street, North Central Avenue, and East Clark Street between Madrona Street and West Clark Street	8/10/12	15	$ 1,782,000		$ 1,782,000			75	25
P-3	Brookdale Avenue between E McAndrews Road and Lone Pine Road	12	18	$ 732,000			$ 732,000		0	100
P-4	East Jackson Street between North Holly Street and North Central Avenue	10/12	15	$ 415,000	$ 415,000				100	0
P-5	East 2nd Street between East Jackson Street and North Grape Street/North Grape Street between East 2nd Street and West 4th Street and along West 4th Street between North Oakdale Avenue and North Grape Street	8/10/12/15	15/18	$ 1,137,000	$ 1,137,000				100	0
P-6	East Jackson Street between North Bartlett Street and North Riverside Avenue	15	24	$ 368,000	$ 368,000				100	0
P-7	West 2nd Street, North Peach Street, and Palm Street between Rose Avenue and North Holly Street	6/8	12	$ 469,000	$ 469,000				100	0
P-8	West 4th Street between North Oakdale Avenue and North Orange Street /North Orange Street between West 4th Street and West Main Street and along West Main Street between Ross Court and North Orange Street	10/12	15	$ 917,000	$ 917,000				100	0
P-9	West Main Street between North Columbus Avenue and Ross Court	8/10	12	$ 250,000	$ 250,000				100	0
P-10	South Riverside Avenue between East Jackson Street and East 9th Street and along East 9th Street between South Riverside Avenue and South Grape Street	10/14/15	15/18/21	$ 1,443,000		$ 1,443,000			75	25
P-11	Along Lone Pine Rd between Papago Dr and Inverness Drive	12	15	$ 94,000				$ 94,000	0	100
P-12	West 11th Street between South Peach Street and Laurel Street	12	15	$ 442,000			$ 442,000		75	25
P-13	Holmes Avenue between Kenyon Street and South Holly Street	8	12	$ 222,000		$ 222,000			100	0
P-14	Along Dellwood Ave between Murphy Rd and the intersection of Black Oak Dr and Siskiyou Blvd	8/10	12	$ 413,000	$ 413,000				25	75
P-15	Spring Street between North Berkeley Street and Sunrise Avenue	8	12	$ 168,000		$ 168,000			100	0
P-16	Market Street between Biddle Road and Royal Avenue	10	15	$ 553,000			$ 553,000		25	75
P-17	Ramada Avenue between Petunia Street and East McAndrews Road.	8	12	$ 126,000			$ 126,000		25	75
P-18	Corona Avenue between Roberts Road and Morrow Road and along Morrow Road between Velia Street and Corona Avenue.	8/10	15/18	$ 562,000		$ 562,000			50	50
P-19	Velia Street, Corona Avenue, Grand Avenue, Crater Lake Avenue, and Camellia Avenue between Velia Street and Ramada Avenue	8/10/12	12/15/2018	$ 2,600,000	$ 2,600,000				100	0
P-20	Morrow Road between Biddle Road and Poplar Drive	15	24	$ 461,000		$ 461,000			50	50
P-21	Hilton Road between Biddle Road and Crater Lake Highway 62	16	21	$ 731,000			$ 731,000		50	50
P-22	Bailey Avenue and Saint Augustine Drive between Delta Waters Road and Farmington Avenue	8	12	$ 687,000				$ 687,000	0	100

Table 7.4 Pipe Improvement Projects
Sanitary Sewer System Master Plan
City of Medford

Project ID	Description	Existing Size (inch)	Recommended Size (inch)	Project Cost	Total Short-Term Priority 1 (2017-2021)	Total Short-Term Priority 2 (2017-2026)	Mid-Term (2027-2036)	Long-Term (2037-2040)	Existing vs Future	
									Existing (%)	Future (%)
PIPE PROJECTS										
P-23	Delta Waters Road between Springbrook Road and Tahitian Avenue.	15	18	$ 422,000				$ 422,000	0	100
P-24	Webfoot Road, Ford Drive, and Springbrook Road between Crater Lake Highway 62 and Springbrook Road.	8/10/12	12/15	$ 909,000			$ 909,000		0	100
P-25	Delta Waters Road between Whittle Avenue and Blackthorn Drive.	18	21/24	$ 2,407,000			$ 2,407,000		40	60
P-26	East of Bullock Road between Terminal Spur Road and Crater Lake Highway 62	18	24	$ 1,285,000		$ 1,285,000			50	50
P-27	Delta Waters Road between Blackthorn Drive and east of Springbrook Road	12/15	21	$ 314,000			$ 314,000		25	75
P-28	North of Hillcrest Road between North Foothill Road and Annettes Way	10	15	$ 671,000			$ 671,000		0	100
P-29	Winter Nell Cr between Murphy Road and South Foothill Road	8	12/15	$ 460,000		$ 460,000			75	25
P-30	Winter Nell Cr between Murphy Road and South Foothill Road	8	12	$ 247,000			$ 247,000		50	50
P-31	East of Jack Nicklaus Road	8	12	$ 79,000		$ 79,000			75	25
P-32	South of Arnold Palmer Way	8	15	$ 157,000			$ 157,000		25	75
P-33	Golf View Drive between East Barnett Road and Miller Court.	8/10	15	$ 433,000		$ 433,000			50	50
P-34	Innsbruck Ridget between Eric Court and Murry Hill Court.	8	12	$ 92,000			$ 92,000		25	75
P-35	Murphy Road between East Barnett Road and Alameda Street.	15	18	$ 261,000				$ 261,000	0	100
P-36	Along Barnett Rd between Murphy Rd and State St.	12	15	$ 178,000			$ 178,000		25	75
P-37	Along Creek View Drjve between N Phoenix Road and the intersection of Barnett Road and Black Oak Drive	8	12	$ 2,104,000				$ 2,104,000	0	100
P-38	Medical Center Drive between E Barnett Road and Siskiyou Boulevard	15	18	$ 612,000			$ 612,000		50	50
P-39	North Foothill Road	12	15	$ 192,000				$ 192,000	25	75
P-40	Gene Cameron Way between Aitken Way and Jason Way	8	12	$ 312,000				$ 312,000	0	100
P-41	Springbrook Road between Cedar Links Drive and Delta Waters Road	18	21/24	$ 1,640,000			$ 1,640,000		50	50
P-42	East Barnett Road between Black Oak Drive and Medical Center Drive	18	21	$ 243,000			$ 243,000		50	50
P-43	Golf View Drive between Miller Court and Seventh Fairway Drive	8/10	15	$ 768,000			$ 768,000		25	75
P-44	Arnold Palmer Way and Jack Nicklaus Road	8	12	$ 230,000			$ 230,000		25	75
P-45	North Phoenix Road and south of Urano Lane	8	12	$ 120,000			$ 120,000		25	75
P-46	Old Cherry Lane at Cherry Lane	8	12	$ 113,000			$ 113,000		75	25
Exp-1	Alternative 1 - Long-Term Expansion Sewers (North)			$ 25,000				$ 25,000	0	100
Exp-2	Alternative 2 - Mid-Term Expansion Sewers			$ 100,000			$ 100,000		0	100
Exp-3	Alternative 2 - Long-Term Expansion Sewers (South)			$ 25,000				$ 25,000	0	100
TOTAL PIPE PROJECTS				**$ 30,044,000**	**$ 6,569,000**	**$ 6,895,000**	**$ 11,385,000**	**$ 5,195,000**		

7.2.5 Pump Station Projects

Based on the analysis and the results presented in Chapter 5, two out of five of the City's pump stations are considered deficient per City's redundancy criteria. The total capacity of both PMT Pump Station and Service Center Pump Station can handle build-out peak wet weather flow; however, these stations only have one pump and do not meet DEQ pump station requirements for pump redundancy.

The City has spare pumps for these two stations and also has the ability to bypass these pump stations when pump service is required. Both pumps operate a few hours a week at most. However, it is recommended that the City make these pump stations redundant and add a redundant pump with the same capacity as the current pump. Cost estimates assume installing a new pump in the existing manholes, and include project contingencies.

Table 7.5 summarizes the recommended capacity-related pump station project costs.

Table 7.5 Pump Station Projects
Sanitary Sewer Master Plan
City of Medford

Pump Station Project ID	Project Description	Total Capital Improvement Cost ($)	Recommended Phase
Project PS-1	PMT Pump Station	$50,000	Mid-Term
Project PS-2	Service Center Pump Station	$50,000	Mid-Term

7.2.6 General Projects

Two general projects are included in the Improvement Program: an Inflow and Infiltration (I/I) Reduction Program, and additional Master Plan Updates. These projects are summarized in Section 7.10 and are described in detail in the following sections.

G-1 – Basin M Inflow and Infiltration Reduction

Chapter 6 evaluated a potential I/I Reduction program to offset improvement projects. The City recommend to delay the implementation of a full I/I Reduction Program because of significant implementation costs and perform a targeted I/I program for specific basins. A targeted I/I reduction project is recommended for Basin M. Basin M has known I/I issue from a previous 1982 I/I identification study that can be used to supplement a new recommended study. The Basin M project includes costs for performing a targeted Sanitary Sewer Evaluation Survey (SSES), and estimates for rehabilitating up to 10,000 feet of pipe and removing direct connections (assuming storm drain connections);

The total project cost for this project was estimated at $675,000 and is recommended during Short-Term Priority 1. The results of this project may influence the requirement for pipe Projects P-4 through P-9.

G-2 & G-3 - Master Plan Updates

Projects G-2 and G-3 assumes that the City will update its Wastewater Collection System Master Plan every ten years, beginning in 2027. These updates are estimated to cost $300,000 each.

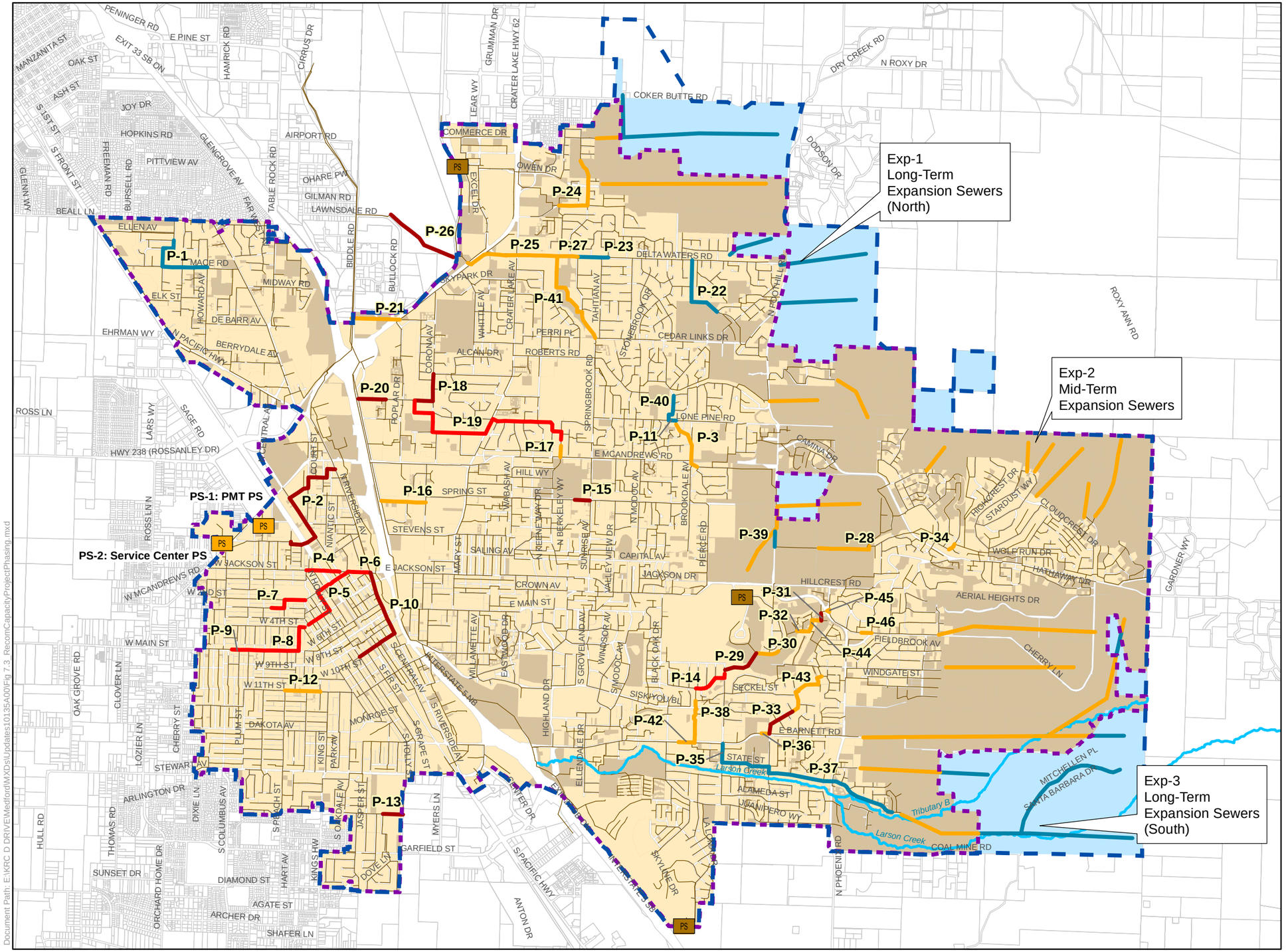
7.3 CIP SUMMARY

The proposed Capital Improvement Plan for the City's SSMP is presented in Table 7.6. The table includes the un-escalated estimated costs for pipe, pump station, and general projects and allocates the projects by phase based on their priority. As seen in the table, the total cost for all recommended improvement projects is $31.4 M. Annually, this can be expressed as approximately $1.3 M per year. The majority of costs are recommended for the Short- and Mid-Terms. Approximately $15.6 M of the total CIP is for future development and may be SDC eligible. Financial only looks at the SDS eligibility in the next 20 years. Figure 7.3 presents the proposed phasing of all CIP projects.

The SSMP is a living document, and will allow for amendment as conditions change. The City has flexibility to respond to opportunities as they present. The City may, as resources and funding permits, update the model to show changes and modifications more frequently. A change log shall be maintained on the City website for all capacity related improvements.

Table 7.6 Capital Improvement Plan
Sanitary Sewer Master Plan
City of Medford

Project ID	Improvement Type	Description	Total Capital Improvement Cost(1)	Total Short-Term Priority 1 (2017-2021)	Total Short-Term Priority 2 (2017-2026)	Mid-Term (2027-2036)	Long-Term (2037 – Build-Out)	SDC Allocation	
								SDC Eligibility (%)	SDC Eligibility ($)
PIPE PROJECTS									
P-1 to P-46	**Gravity**	Improvement and Capacity-Related Pipe Projects	$ 29,894,000	$ 6,569,000	$ 6,895,000	$ 11,285,000	$ 5,145,000	49	$ 14,444,000
Exp-1	**Expansion**	Alternative 2 - "Regional Sewers" to Expansion Areas	$ 25,000	$ –	$ –		$ 25,000	100	$ 25,000
Exp-2	**Expansion**	Alternative 2 - Expansion pipes above 8-inch in diameter. 8-inch pipes are paid for by developers.	$ 100,000	$ –	$ –	$ 100,000	$ –	100	$ 100,000
Exp-3	**Expansion**	Alternative 2 - Expansion pipes above 8-inch in diameter. 8-inch pipes are paid for by developers.	$ 25,000	$ –	$ –	$ –	$ 25,000	100	$ 25,000
TOTAL PIPE PROJECTS			**$ 30,044,000**	**$ 6,569,000**	**$ 6,895,000**	**$ 11,385,000**	**$ 5,195,000**	**54**	**$ 14,594,000**
PUMP STATION PROJECTS									
PS-1	Pump Station	PMT Pump Station - 1024 Summit Ave. (No redundant pump)	$ 50,000	$ –	$ –	$ 50,000	$ –	0	$ –
PS-2	Pump Station	Service Center Pump Station - 821 Columbus Ave. (No redundant pump)	$ 50,000	$ –	$ –	$ 50,000	$ –	0	$ –
TOTAL PUMP STATION PROJECTS			**$ 100,000**	**$ –**	**$ –**	**$ 100,000**	**$ –**		**$ –**
GENERAL PROJECTS									
G-1	General	I/I Reduction Program - Basin M	$ 675,000	$ 675,000	$ –	$ –	$ –	100	$ 675,000
G-2	General	Master Plan Updates	$ 300,000	$ –	$ –	$ 300,000	$ –	50	$ 150,000
G-3	General	Master Plan Updates	$ 300,000	$ –	$ –	$ –	$ 300,000	50	$ 150,000
TOTAL GENERAL PROJECTS			**$ 1,275,000**	**$ 675,000**	**$ –**	**$ 300,000**	**$ 300,000**		**$ 975,000**
TOTAL ($)			**$ 31,419,000**	**$ 7,244,000**	**$ 6,895,000**	**$ 11,785,000**	**$ 5,495,000**		**$ 15,569,000**
Total Annual ($/year)			**$ 1,309,125**	**$ 1,207,333**	**$ 1,723,750**	**$ 1,178,500**	**$ 1,373,750**		



RECOMMENDED CAPACITY PROJECTS PHASING

FIGURE 7.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

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7.4 ADDITIONAL RECOMMENDATIONS

In addition to the capital projects listed above, this Plan identified other recommendations for improving the maintenance and management of the sewer. These include the following:

- Inflow and Infiltration Reduction:
  - Investigate I/I issues in the downtown area (Basins L). City staff may perform this in-house. The flow monitoring shows elevated level of I/I; it is recommended that City staff perform a more detailed evaluation to confirm I/I in Basin L and determine the cause.
  - Investigate and mitigate excessive inflow at the Greenway Pump Station. City staff may perform this in-house.
  - Continue annual maintenance projects that improve sewer pipe integrity and result in lower I/I.
  - Determine a method to implement the City's policy for private property owners to maintain their sewer laterals, which are known to be high contributors of I/I.
- Asset Management Program: Develop an Asset Management Program (AMP): the City has no formal asset management program, though staff employs several tools for tracking condition and improvements. The recommendation for implementing an AMP includes the following initial steps to be taken by the City:
  - Continue to update data, such as pipe material, year installed, and invert elevations, in the City's Geographic Information Systems (GIS) and Computerized Maintenance Management Software.
  - Standardize condition assessments and closed-circuit television (CCTV) reports using the Pipeline Assessment and Certification Program (PACP). This may entail working with non-City contractors performing CCTV inspections. Possibly obtain training for City staff on PACP scoring.
  - Take the Strategic Asset Management Gap (SAM-GAP), a free, online utility self-assessment tool.
- These steps will help the City prepare to implement an AMP. Costs for these recommendations were not developed as they are assumed to be performed by current City staff. In addition to the above steps, the following strategy is recommended for the City to develop and implement an AMP:
  - Assess the City's Current Asset Management Practices.
  - Review Appropriate Asset Management Tools.
  - Identify and Prioritize Gaps in Current Asset Management Practices.
  - Prepare an Asset Management Plan.
  - Implement Asset Management Plan.

- Maintain and Update Fats, Oils, and Grease (FOG) Program: The City requested resurrection of a previous FOG Program. This will reduce operation and maintenance efforts when FOG management is implement and enforced again. The City estimates one Full Time Employee (FTE), with an annual cost of approximately $100,000.

FINANCIAL ANALYSIS

8.1 INTRODUCTION

The purpose of this chapter is to assess the City's ability to fund the capital improvement plan (CIP) outlined in Chapter 7. Financial status of the sewer utility, funding required to finance the scheduled improvements, updating the system development charges (SDC), potential funding sources, and the impacts of sanitary sewer improvements on sewer rates are presented. This Chapter is not intended to replace a complete rate study and cost of service, but provides options that the City can explore more thoroughly. The analysis included the following:

1. A calculation of potential system development charges (SDCs) based on the recommended CIP and incorporation of the potential SDC revenue into the financial model.
2. Development of a financial model incorporating the City's existing financial assets and liabilities, as well as the recommended CIP.
3. A customer rate impact analysis forecasting the impact that the anticipated SDC revenue and implementation of the CIP could have on customer rates under three different scenarios. Those scenarios include:
    a. ***Option 1A:*** This option assumes that the City would not issue debt, and instead fund the City's operating expenses and CIP through rate revenue and system development charges.
    b. ***Option 1B:*** This option is the same scenario as Option 1A in terms of debt issuance and revenue strategy. However, projects required in and for areas of expansion ("EXP" projects) are assumed to be funded by other means as discussed below and are therefore excluded from the CIP, SDC calculation, and Option 1B financial forecast scenarios.
    c. ***Option 2:*** This option assumes that the City would issue debt to fund the CIP and offset user rate impacts. Rate increases would occur every other year and debt would be issued every three years. The EXP projects would be included in this scenario.

The three options were discussed with City staff and revised after receiving comments from the City.

8.2 PAST FINANCIAL PERFORMANCE

8.2.1 Rates

The sanitary sewer rates shown in Table 8.1 are found in the City's municipal code and became effective on March 1, 2013, for single-family residential service and July 1, 2013,

for all other services, respectively. In 2015, 2016, and 2017 rate changes became effective July 15.

Per 4.405 of the City's code, the City's portion of the rate is for the operations and maintenance of the City's sewer collection system. The Regional Rate Committee (RRC) portion of the rate goes towards the operations and maintenance of the Regional Water Reclamation Facility (RWRF).

Table 8.1 Historical Sewer Rates
Sanitary Sewer Master Plan
City of Medford

Customer Class	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
SFR					
City of Medford	$10.01	$10.01	$11.51	$12.32	$13.18
Regional Rate Committee	$5.84	$5.84	$6.31	$6.78	$7.29
Total Bill	$15.85	$15.85	$17.82	$19.10	$20.47
MFR/Non-Residential					
Base Charge					
City of Medford	$13.74	$13.74	$15.80	$16.91	$18.09
Regional Rate Committee	$2.11	$2.11	$2.30	$2.47	$2.65
Gallonage Charge					
City of Medford	$0.57	$0.57	$0.66	$0.70	$0.75
Regional Rate Committee	$0.60	$0.60	$0.67	$0.72	$0.77

8.2.2 Historical Financial Operations

Table 8.2 shows the City's operating revenue since FY 2014. Revenue from sanitary sewer fees is the main source of revenue for the sewer fund, collecting approximately $3.4 million to $4.2 million, an increase of approximately 23% over the last four years.

The City's other sewer fund revenue is also shown in Table 8.2. The most significant amount of revenue received are from system development charges, which have stayed consistent at around $300,000 per year.

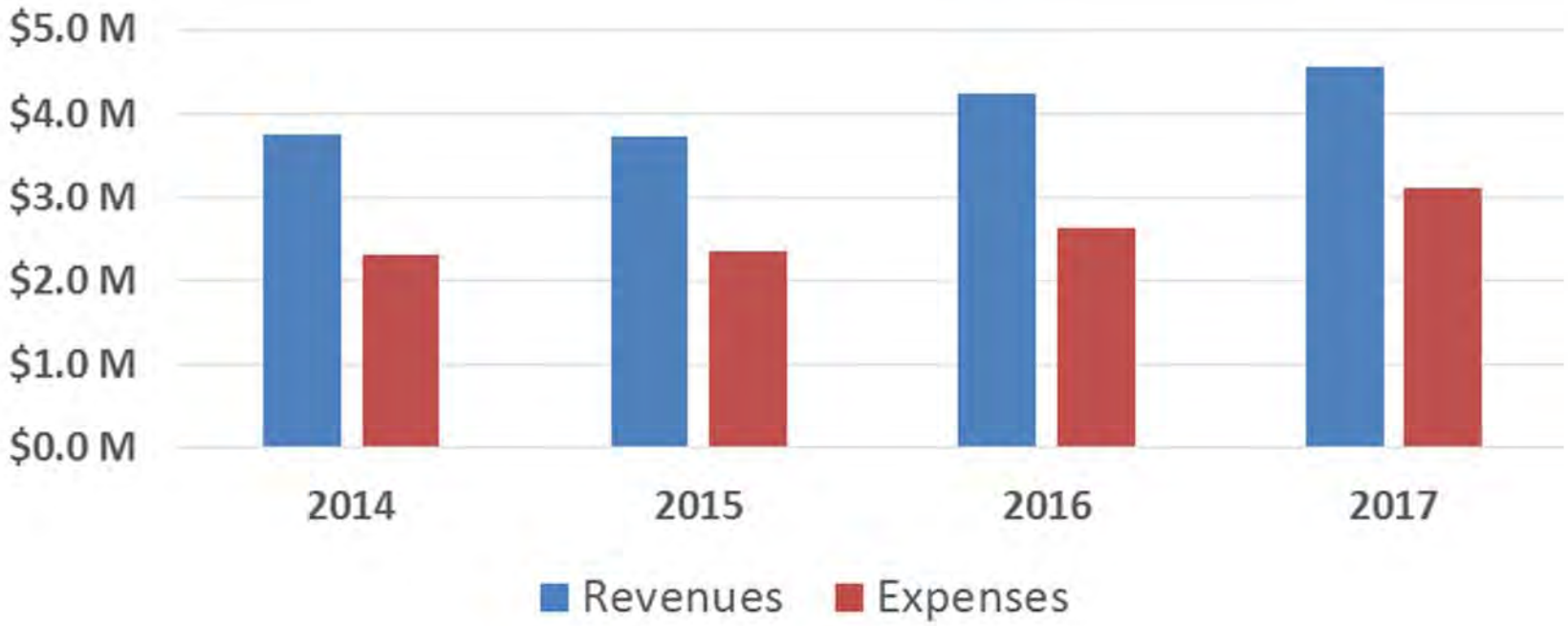
Table 8.2	Historical Operating Revenues Sanitary Sewer Master Plan City of Medford			
Operating Revenues	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**
Revenue, Subject to Rate Increases				
Utility Fees-San Sewer	$3,413,979	$3,384,890	$3,873,811	$4,185,130
Other Revenue				
Grants	$2,312	$0	$0	$0
Pub Impv Plan Review	$26,374	$15,167	$22,333	$30,100
Transfer from General Fund	$0	$0	$0	$0
Miscellaneous Revenue	$3,047	$4,159	$1,246	$9,450
Damage Claims	$142	$265	$0	$320
Interest Income	$14,422	$19,899	$33,172	$34,000
Sale of Property	$0	$21	$1,537	$0
Debt Proceeds	$0	$0	$0	$0
System Development Charges	$280,000	$300,000	$300,000	$300,000
Service to Other Agency	$0	$216	$10,077	$0
Total Revenues	**$3,740,276**	**$3,724,617**	**$4,242,176**	**$4,559,000**

Table 8.3 shows the City's operating expenditures from FY 2014 to FY 2017, broken down by personnel services, materials and supplies, and capital outlay. Capital Outlay includes purchases of vehicles or equipment costing more than $5,000. The City significantly increased their budget for Personnel Svc - Operations in FY 2017 due to increased maintenance of the system's aging sewer pipe.

Table 8.3	Historical Operating Expenditures Sanitary Sewer Master Plan City of Medford			
Operating Expenditures	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**
Personnel Services				
Personnel Svc-Engineering	$319,949	$380,833	$328,138	$558,500
Personnel Svc-Utility Billing Svcs	$0	$0	$103,817	$165,330
Personnel Svc-Operations	$518,861	$495,552	$503,938	$1,029,190
Personnel Svc- Technical Svcs	$16,119	$16,575	$17,176	$24,950
Fringes-Engr	$160,578	$191,458	$179,169	$179,169

Table 8.3 Historical Operating Expenditures Sanitary Sewer Master Plan City of Medford				
Operating Expenditures	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**
Fringes-Util	$0	$0	$61,378	$61,378
Fringes-Ops	$333,519	$164,425	$331,189	$331,189
Fringes - Technical Svcs	$7,958	$8,340	$8,965	$8,965
Total Personnel Services	$1,356,984	$1,257,183	$1,533,770	$2,358,671
Materials & Supplies (M&S)				
M&S-Engineering	$138,232	$285,507	$153,360	$139,200
M&S-Utility Billing Svcs	$0	$0	$101,157	$99,970
M&S-Operations	$630,962	$651,259	$712,676	$510,250
M&S - Technical Svcs	$3,516	$145	$12,489	$1,050
Total M&S	$772,710	$936,911	$979,682	$750,470
Capital Outlay				
Capital Outlay - Engineering	$0	$0	$14,740	$0
Capital Outlay - Operations	$169,744	$151,252	$101,500	$0
Total Expenditures	**$2,299,438**	**$2,345,346**	**$2,629,692**	**$3,109,141**

Given the historical revenue and expenses above, the City has maintained an adequate amount of revenue from sanitary sewer fees to cover their operating expenses, as shown in Figure 8.1. It should be noted that this does not include the capital improvement projects the City completed during that time. Capital expenditures have ranged from approximately $349,000 to $725,000 over the last four years.



HISTORICAL REVENUES AND EXPENSES (CIP NOT INCLUDED)

FIGURE 8.1

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

8.3 OUTSTANDING DEBT

The City's sanitary sewer utility does not have any debt obligations at the time of writing this report.

8.4 SYSTEM DEVELOPMENT CHARGES

System development charges (SDCs) are a method by which agencies can impose charges to offset the costs of new customers connecting to their water, wastewater, or other utility or infrastructure systems. Connection fees are governed by Oregon Revised Statutes (ORS) 223.297 to 223.314, which provides a legal framework for the applicability, assessment, and imposition of SDCs. There are various methods to calculate connection fees; the most appropriate method for any system is dictated by the system's specific characteristics.

ORS 223.299 defines the two types of SDC:

- "Reimbursement fee" means a fee for costs associated with capital improvements already constructed, or under construction when the fee is established, for which the local government determines that available capacity exists.
- "Improvement fee" means a fee for costs associated with capital improvements to be constructed.

Combining these two fees, Carollo calculated the City's projected SDC and is further explained in the following sections.

8.4.1 ERU Methodology

This section describes the methodology used to develop the total number of Equivalent Residential Units (ERUs) for the City's collection system under existing and future conditions. One ERU is defined as the average quantity of sewage beneficially produced by one average, full-time, single-family residence per day.

The number of ERUs for existing conditions was calculated using the following data:

- Total number of currently developed and contributing parcels for each land use designation, obtained from the City's GIS data;
- Total acreage of currently developed and contributing land for each land use designation, obtained from the City's GIS data;
- Wastewater flow factors developed in Chapter 2 – Basis of Planning.

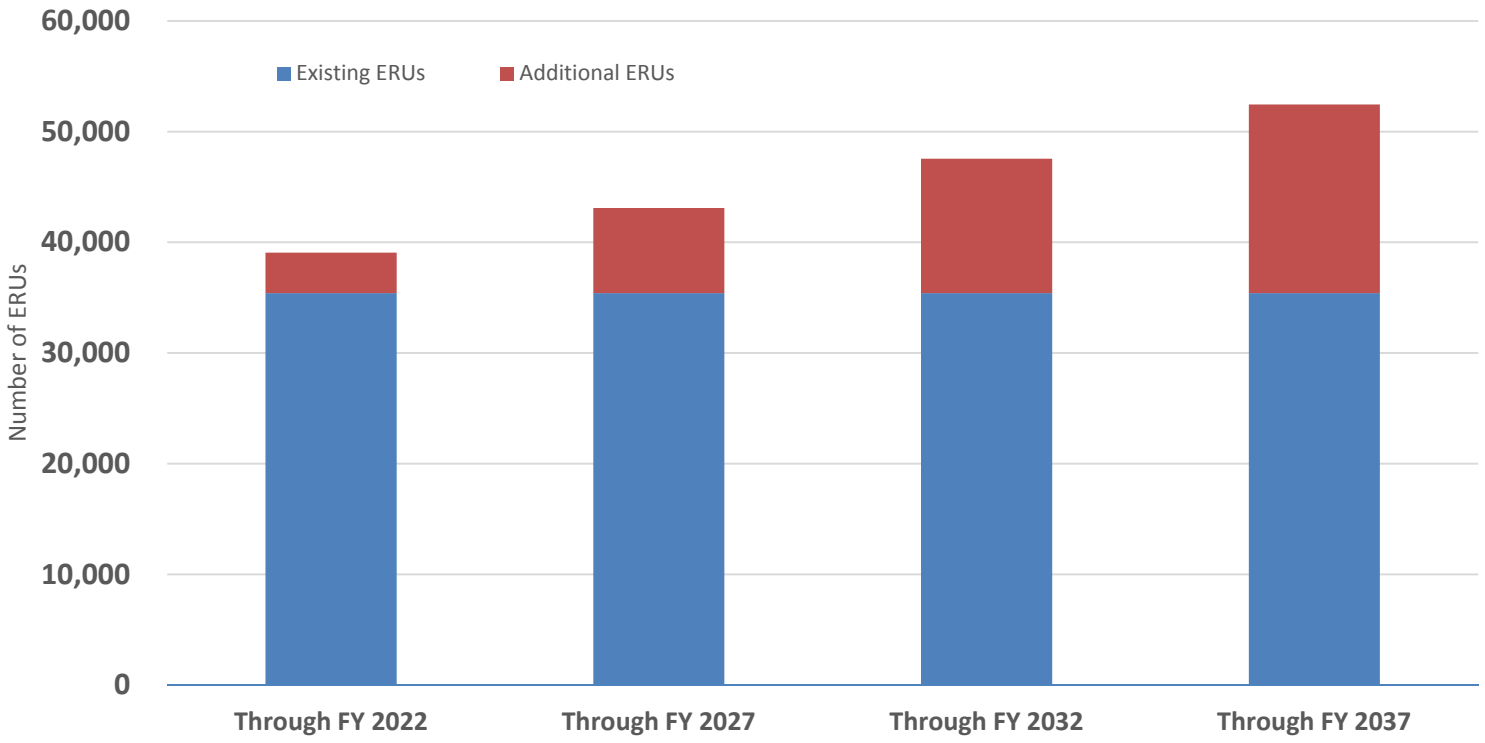
Projected numbers of ERUs were estimated for two future conditions: 2036 Service Area, and Build-out Service Area (including the Urban Reserve Areas). The following assumptions and data were used to estimate the number of future ERUs:

- An assumption was made to estimate the future number of parcels for each land use designation. The vacant parcels to be developed in the future are currently not split in GIS and encompass a large area. In order to estimate the potential number of parcels under 2036 and build-out conditions, the large vacant parcels were divided by the current average acreage per parcel for each land use classification.
- Total acreage of future developed land for each land use designation, obtained from the City's GIS data.
- Wastewater flow factors developed in Chapter 2 – Basis of Planning.

Table 8.4 summarizes the total number of ERUs for existing, 2036, and build-out conditions. Given these projected numbers, Carollo assumed that the annual growth of the City's Sewer Service Area. Figure 8.2 shows the growth of projected ERUs from 2022 to FY 2037.

Table 8.4 Number of ERUs
Sanitary Sewer Master Plan
City of Medford

Planning Condition	Total Number of ERUs
Existing	35,404
2036 Service Area	51,446
Service Area	57,890



PROJECTED EQUIVALENT RESIDENTIAL UNITS (ERUS)

FIGURE 8.2

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

8.4.2 SDC - Reimbursement Component

Utilities often construct infrastructure capacity to meet projected future demands. The purpose of the reimbursement approach is to recover costs that have already been incurred by the City. Existing customers have paid for this system over time through user rates and fees (through direct capital financing or retired debt). The reimbursement approach provides a mechanism to reimburse existing system users for carrying the costs of constructing system capacity that is available to be fulfilled by future users. In this sense, the reimbursement approach estimates the fraction of the existing system that will benefit future users. Note, it was assumed that the future number of ERUs for this analysis only includes the development within the 2036 Service Area, as it was considered a more reliable number than the overall Service Area number. Timing of the development of the Urban Reserves is still uncertain and long-term and it was assumed that the SDC calculations will be revisited by that time.

Replacement costs alone might not be the best estimate of system value, as system assets have a finite lifespan and must be replaced and/or rehabilitated in time. The City adjusts the existing cost basis by deducting straight-line depreciation. Accumulated depreciation is determined by dividing the age of each asset by the projected useful life and reducing the asset value by that percentage. By accounting for accumulated depreciation in the reimbursement fee, the City may recover a proportionate value of capital improvements that will replace depreciated assets or will be undertaken to extend the useful lives of these assets through the future cost component of the SDC.

The reimbursement fee divides the value of the existing system by the total number of users by build out that are expected to benefit from the system in order to calculate the SDC. The formula below represents the calculation of the reimbursement fee.

$$Reimbursement\ Fee = \frac{Value\ of\ the\ Existing\ System}{Total\ Expected\ Users}$$

Table 8.5 shows the calculation of the reimbursement component of the SDC.

Table 8.5 SDC - Reimbursement Component Sanitary Sewer Master Plan City of Medford	
SDC CALCULATION	
Reimbursement Component	
Value of Existing System	
Fixed Asset Value	$34,220,377[1]
Less Depreciation	($16,434,368)[2]
Total Value of Existing System	$17,786,009
ERUs To Be Served	
Existing ERUs	35,405[3]
Future ERUs	16,041[4]
Total, ERUs To Be Served	51,446
Reimbursement Component per ERU	$346

Notes:
(1) Unescalated. Source: "Medford - SS Assets May 2017.xls" provided by the City 05/17/17.
(2) Source: "Medford - SS Assets May 2017.xls" provided by the City 05/17/17.
(3) Source: Existing and Future Land Use analysis.
(4) Source: Existing and Future Land Use analysis; ERUs from 2017 to 2036.

8.4.3 Improvement Component

The improvement component of the SDC calculation recovers the cost in present value (FY 2018) dollars of the City's planned investments that it will undertake to serve future development. Projects included in the City's CIP have two primary purposes – (1) maintain reliability of existing infrastructure; and (2) increase system capacity. For the improvement component, the future system value is segregated between those two purposes. The costs of each project are associated in some percentage to either or both of these purposes. This is achieved by determining the approximate portion of each asset that benefits either existing customers or future users. In the improvement component, the current value of planned capital improvements that will serve future users through the City's defined planning horizon of fiscal year (FY) 2037 is divided by the expected number of future users through FY 2037.

The future cost basis accounts for capacity-related improvements that will be constructed through FY 2037. The costs of these improvements are estimated in present value terms (FY 2018 dollars). Costs are fairly and reasonably spread over all future users by dividing the capacity related CIP value by the total number of future users that are projected to receive water service by FY 2037. The formula below represents the calculation of the improvement fee.

$$Improvement\ Fee = \frac{Capacity\ Related\ CIP}{Expected\ Future\ Users}$$

Table 8.6 and 8.7 show the proposed improvement components of the SDC given Option 1A, which includes all projects in the CIP, and Option 1B, all projects excluding the EXP projects, respectively.

Table 8.6	**Option 1A - SDC Improvement Component Sanitary Sewer Master Plan City of Medford**
SDC CALCULATION	**Option 1A – (EXP Projects)**
Improvement Component	
Total CIP Expenditures	$25,924,000[1]
Growth Related CIP Expenditures	$11,076,750[2]
Percent of CIP Attributable to Growth	42.7%
Future ERUs	16,041
Improvement Component per ERU	**$690.53**

Notes:
(1) Total amount for 20 years (from 2018 to 2037).
(2) Total amount is SDC Eligible through 2037.

Table 8.7	**Option 1B - SDC Improvement Component Sanitary Sewer Master Plan City of Medford**
SDC CALCULATION	**Option 1B - (No EXP Projects)**
Improvement Component	
Total CIP Expenditures	$25,924,000[1]
Growth Related CIP Expenditures	$11,076,750[2]
Less EXP-1 and EXP-2 Projects	($100,000)[3]
	$10,976,750
Percent of CIP Attributable to Growth	42.7%
Future ERUs	16,041
Improvement Component per ERU	**$684.29**

Notes:
(1) Total amount is 20 years (from 2017 to 2036).
(2) Total amount is SDC Eligible through 2036.
(3) No LID includes the EXP-2 Project.

8.4.4 Proposed Charge

8.4.4.1 Option 1A

Table 8.8 shows the total SDC calculation for Option 1A. The proposed SDC is the sum of the reimbursement and improvement components described above, and is approximately

$1,036 per ERU for Option 1A. Compared to the current SDC of $613, this would be an increase of approximately 69 percent, but the City would receive approximately $728,700 in annual revenue. The SDC calculation for Option 1A is the same for Option 2 as this option also includes all CIP projects (but considers different funding sources as described below).

Table 8.8 Calculated SDC for Option 1A
Sanitary Sewer Master Plan
City of Medford

	Option 1A - (EXP Projects)
System Development Charge	
Reimbursement Component	$346
Improvement Component	$691
Total, SDC	**$1,036**(1)
Current SDC fee per ERU (Adopted July 1, 2010)	$613
Percent increase	69%
Estimated future 2018 Revenue from SDCs	$728,700

Notes:
(1) Assumes this SDC will increase approximately 3% each year based on long-term average of the ENR Construction Cost Index.

8.4.4.2 Option 1B

Table 8.9 shows the SDC calculation that would apply for Option 1B. The proposed SDC would be approximately $1,030 per ERU. Compared to the current SDC of $613, this would be an increase of approximately 68 percent, but the City would receive approximately $724,300 in annual revenue.

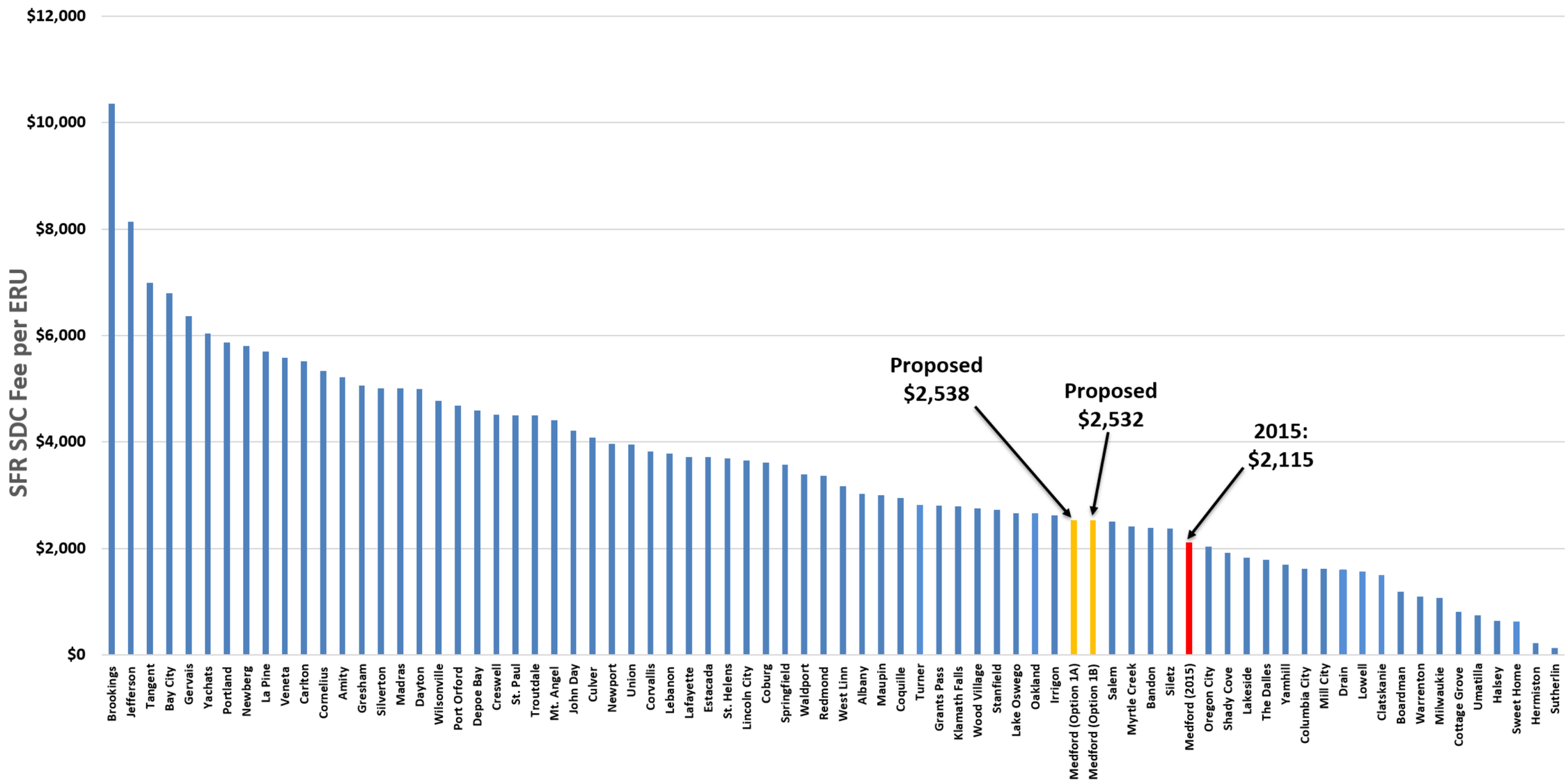
Table 8.9 Calculated SDC for Option 1B
Sanitary Sewer Master Plan
City of Medford

SDC Calculation	Option 1B - (No EXP Projects)
System Development Charge	
Reimbursement Component	$346
Improvement Component	$684
Total, SDC	**$1,030**(1)
Current SDC fee per ERU (Adopted July 1, 2010)	$613
Percent increase	68%
Estimated future 2018 Revenue from SDCs	$724,300

Notes:
(1) Assumes this SDC will increase approximately 3% each year based on long-term average of the ENR Construction Cost Index.

8.4.4.3 SDC Comparison

Figure 8.3 shows the City's current and two proposed SDCs compared with other cities sewer SDCs in the state of Oregon, according to an August 2016 SDC Survey from the League of Oregon Cities. A total of 76 jurisdictions completed the survey. The values include both a reimbursement fee and an improvement fee for the residential SDC. The average SDC from all the participants is approximately $3,406 per ERU. The City's current SDC, which includes the $613 collection SDC and the WWTP SDC of approximately $1,502, is $2,115. The figure also shows the two proposed SDC calculations. If the City approved an increase in their sewer SDC, they would still be below the average among the cities surveyed.



Proposed Options

Current Position

SDC COMPARISON FOR OREGON

FIGURE 8.3

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

8.5 FINANCIAL FORECAST

This section describes the multiple elements found in the financial model, including assumptions, funding sources, proposed CIP, and revenue requirement analysis.

8.5.1 Assumptions

Table 8.10 shows the assumptions that are used in determining financial projections. These assumptions are based on historical and projected data and were discussed with the City. The annual ERU growth rate is based upon the anticipated growth discussed in Chapter 7 and in the SDC analysis. Should the City issue debt, the assumptions of the revenue bonds are also shown below, including the assumption of a debt service coverage ratio (DSCR) of 1.50x. The financial forecast also assumes that the SDC will be escalated annually by three percent based on the long-term average of the ENR Construction Cost Index, which is typically used when projecting SDCs, but can be adjusted to a more conservative approach if necessary.

Table 8.10 Financial Plan Assumptions
Sanitary Sewer Master Plan
City of Medford

Description	Assumption
Budget Year	FY 2018
General Inflation	3.0%
CIP General Inflation	3.0%
Interest Income	1.0%
Reserve Requirement Criteria (Months of O&M)	3
Annual Growth	2.0%
PERS	4.0%
Revenue Bonds	
Annual Interest Rate	2.0%
Repayment Period (Years)	30
Bond Proceeds, as % of Issuance Amount	88%
Capitalized Bond Reserve (% of proceeds)	10%
Cost of Issuance	2.0%
Minimum DSCR	1.50
SDC Annual Escalation	3.0%

8.5.2 Funding Sources

8.5.2.1 System Development Charges

SDC revenue offsets the use of rate revenues as SDC revenue is the first revenue source used to fund the CIP. The financial model assumes the City raises its SDC rate to the

proposed SDC rate(s) in Section 8.4 in order to project the financial impacts of the proposed CIP. This analysis assumes that the SDC will be escalated by three percent annually to reflect increases in construction costs. Using each year's SDC value, and assumed new customers per year consistent with current growth projections, projected annual SDC revenues can be calculated. Table 8.11 presents the results of this calculation. Additionally, Table 8.11 delineates between the reimbursement component and improvement component of the charge. This distinction reflects the restrictions on SDC revenue usage. The improvement component of the charge is available to fund only the capacity related projects while the reimbursement component can be allocated to fund both expansion as well as rehabilitation. Growth is projected to be approximately two percent per year, or approximately 40 percent over the 20-year period.

Table 8.11 System Development Charge Revenue (Option 1A)
Sanitary Sewer Master Plan
City of Medford

	FY 2018	FY 2037	Growth
Reimbursement Portion of Revenue	$243,120	$607,390	40%
Improvement Portion of Revenue	$481,210	$1,202,220	40%
Total SDC Revenue	**$724,330**	**$1,809,610**	**40%**

It is important to note that deviation from the realization of the Plan's growth projections will impact the projected SDC revenues and, therefore, the required rate increases.

8.5.2.2 Debt Financing

Previous evaluations in this Plan identified numerous improvement projects resulting in significant CIP expenditures, which, if solely cash funded, could require continued rate increases, significant use of on-hand reserves, or a combination of the two. Consequently, the City may decide to issue additional debt during the 20-year forecast period to fund CIP projects. The State has a variety of debt financing options. When debt is required, the model assumes the use of municipal bond financing by the City. Additionally, the model assumes that any future debt will require a minimum coverage ratio of 1.5 times (1.5x). The coverage ratio is calculated as the ratio of net annual revenues available for debt service payments to total annual debt service requirements. The City does not currently have a target as they do not have any debt, but agreed that 1.50 is an acceptable target to assume. For the purposes of evaluating an alternative where the City does issue debt, a bond coverage factor of 1.5x is used. This factor allows for fluctuation in revenues due to changes in demand without violating legal requirements. The application of 1.5x as the coverage factor also secures a higher coverage in order to pursue a higher rating. The debt-financing scenario is called "Option 2" in all the analyses described herein. No debt financing was assumed for the revenue requirements analysis.

8.5.2.3 User Rate Revenues

User rates are the primary revenue source for the City's sewer utility. The City implemented rate increases in previous years in order to fund operating expenses and capital improvements. Additionally, rate revenues have increased with the City's customer growth as it occurs. Currently, the City's annual rate revenues in the FY 2018 budget are estimated to total $4.36 million. Adjusting rates to meet the revenue requirements is discussed in Section 8.5.4.

8.5.2.4 Reserves

The City sewer utility has two funds for their reserves. A Sewer Collection Utility Fund (Fund 502), which currently has a balance of $608,930 for FY 2018, is used for operations. The City's policy is to have a minimum 90 day target of reserves for this fund. The Sewer Collection SDC Fund currently has a FY 2018 balance of $308,700 and is used to fund capital projects.

8.5.3 Capital Improvements - Short to Mid-Term

The financial model includes annual expenditures to fund the proposed projects in the CIP developed in Chapter 7. Projects were prioritized in Chapter 7 according to timing recommended by hydraulic modeling and City input on current repair issues. Evaluating funding of long-term CIP expenditures is beyond the scope of this financial analysis, as it is assumed an updated master plan and financial study will be prepared before then. The financial modeling scenarios check that future revenues adequately cover anticipated future expenditures, but the evaluation focuses primarily on the short and mid-term expenditures, representing the 20-year plan. The 20-year unescalated CIP totals approximately $25.0 M in 2018 dollars.

In staying consistent with the City's sewer fund line items, expenditures funding the recommended CIP projects are called CIP – Engineering. An additional line item, CIP - Operations, covers capital expenditures for pipe lining projects that reduce inflow and infiltration. In discussions with City staff, CIP – Operations are projected at $1,068,800 and $836,700 in FY 2018 and FY 2019, respectively. Beyond this time, a value of $500,000 per year was agreed upon with the City.

8.5.4 Revenue Requirement Analysis

The revenue requirement analysis determines the amount of rate revenue needed in a given year to meet a utility's expected financial obligations. At least two separate tests must be met in order for rates to be sufficient:

- **Cash Flow Test**: A utility must generate annual utility revenues adequate to meet general cash needs.
- **Bond Coverage Test**: Annual rate revenues must satisfy debt coverage obligations on the City's outstanding debt.

The cash-flow test identifies projected cash requirements in each given year. Cash requirements include operation and maintenance expenses, debt service payments, policy-driven additions to working capital, miscellaneous capital outlays, replacement funding, and rate-funded capital expenditures. These expenses are compared to total annual projected revenues. Shortfalls are then used to estimate needed rate increases.

The bond coverage test measures the ability of a utility to meet legal and policy-driven revenue obligations. As the utility does not currently have debt, there is not a coverage requirement in place. Therefore it was assumed the bond covenants require that revenue available for debt service, operating and non-operating revenues less expenses, must exceed the annual debt payment by a ratio of 1.5x. This means that the City is obligated to collect rate revenues sufficient to fund annual operation and maintenance expenditures and 150% of its annual debt service payments. The analysis herein was performed using a minimum 1.5x debt service coverage ratio requirement. As the coverage requirement adjusts for future debt issuances, the City would need to revisit the financial model and modify the capital funding strategy as appropriate if using debt funding.

Revenues must be sufficient to satisfy both the cash flow and bond coverage tests. If revenues are found to be deficient through one or both of the tests, then the greater deficiency (shortfall) drives the rate increase. Due to the absence of planned debt-funded CIP expenditures relative to the City's annual revenues, cash flow requirements are expected to be the primary drivers of rate increases.

The revenue requirements analysis also included a check to meet the City's criteria for retaining 90-day reserves.

8.5.4.1 Capital Financing

As noted above, the 20-year unescalated CIP totals approximately $25.0 M in FY 2018 dollars. SDC revenue are the first sources of revenue used to fund capital expenditures. Rate revenue is the next source of revenue utilized. Bond proceeds, when available, are the final source of revenue. For this reason, variability in the projected SDC revenue will have an impact on the use of rate revenue to fund capital projects. If the projected growth and corresponding SDC revenue does not occur as anticipated, the City could experience insufficient reserve balances or could fail to meet debt coverage requirements.

8.5.4.2 Results of Revenue Requirement Analysis

Revenue requirements for Option 1A – No debt are shown in Table 8.12. The table includes the assumption that sewer rates will increase by as shown from FY 2018 through FY 2027 and will not be adjusted in subsequent years. The initial analysis of the impact of the recommended CIP on the City's budget revealed multiple years of negative cash flow due to the timing of recommend CIP projects. Even with annual rate increases, the City will draw down the existing fund balance to as low as approximately $1.2 million. Rates were also developed for Option 1B and Option 2 to meet the revenue requirements test. The results of these scenarios are discussed in Section 8.6 – Financial Plan.

Table 8.12 Impact of Current CIP with Current Funding Sources
Sanitary Sewer Master Plan
City of Medford

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Notes
Utility Fees-San Sewer	$4,358,000	$4,373,000	$4,459,857	$4,548,438	$4,638,780	$4,730,915	$4,824,881	$4,920,713	$5,018,448	$5,118,125	1
Planned Rate increase	5.0%	5.0%	5.0%	4.0%	4.0%	4.0%	4.0%	2.0%	0.0%	0.0%	2
Rate Revenue from Increases	$217,900	$448,300	$702,900	$927,500	$1,169,300	$1,429,500	$1,709,200	$1,876,500	$1,913,700	$1,951,700	3
SDC Revenue (Option 1A)	728,706	765,475	804,099	844,673	887,293	932,064	979,094	1,028,497	1,080,393	1,134,907	4
Non-Rate Revenue	$60,000	$65,000	$65,120	$64,550	$61,180	$53,100	$47,050	$48,550	$47,600	$51,370	5
O&M	($4,377,451)	($4,409,621)	($4,270,991)	($4,378,481)	($4,489,181)	($4,603,201)	($4,720,651)	($4,841,631)	($4,966,251)	($5,094,601)	6
CIP - Engineering	($675,000)	($379,040)	($1,043,395)	($1,568,245)	($2,300,728)	($2,372,648)	($1,914,663)	($2,352,749)	($1,942,592)	($2,004,784)	7
CIP - Operations	($1,068,800)	($836,700)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)	8
Fund Transfers	($270,600)	($274,800)	($274,800)	($274,800)	($274,800)	($274,800)	($274,800)	($274,800)	($274,800)	($274,800)	9
Cash Flow	($1,027,245)	($248,386)	($57,210)	($336,365)	($808,156)	($605,070)	$150,111	($94,920)	$376,498	$381,916	
Ending Fund Balance	3,260,186	3,011,800	2,954,590	2,618,225	1,810,069	1,204,999	1,355,110	1,260,190	1,636,687	2,018,604	

Notes:

(1) Does not include rate increases. Assumes growth of 2.0%.
(2) Option 1A Scenario.
(3) Assumes rate increase is "across the board" to sanitary sewer fee.
(4) Assumes City would implement proposed SDC per Option 1A.
(5) Includes interest income, Public Improvement Plan Review, and miscellaneous revenue.
(6) Includes personnel services, materials and supply, and capital outlay.
(7) Carollo recommended capital improvement projects found in Chapter 7.
(8) City's proposed projects, such as relining of system. Assuming $500,000 per year projected.
(9) Per the City, assuming an annual transfer to General Fund.

8.5.5 Local Improvement Districts (LID)

The concentration of new development on the east side of the City raises a question about the fairness of incorporating sewer expansion projects within the master plan that would only benefit this development. These development-dependent projects add substantial financial risks to the master plan. The City may end up carrying the CIP costs of these improvements for decades depending on the timing and pace of new development.

In response to these concerns, an option was presented to the City to fund new pipe projects that solely serve east-side development separately from the sewer fund. These projects are labeled “EXP” for expansion in the CIP, and total approximately $100,000 in the 20-year forecast. Alternative funding options include local improvement districts (LIDs), in which the City pays for improvement projects and is reimbursed by all benefiting properties within a set time, such as ten years. Reimbursement districts provide a similar solution in which a developer fronts the cost of the improvements and is reimbursed by other benefiting properties.

City officials were skeptical of the use of LIDs given the City’s history with such projects. However, they were open to reimbursement districts, which are development-driven, and impose no burdens or risks on the City or the Sewer Fund. Section 8.4.4.2 presented the results of removing “EXP” projects from the CIP, and subsequently reducing the SDC calculation. Section 8.6.3 explores the impacts on the overall financial plan if reimbursement districts were used to fund the EXP projects.

8.6 FINANCIAL PLAN

Three financial planning scenarios were developed as discussed earlier: Option 1A – No Debt, 1B – No Debt, No EXP Projects, and 2 – Debt Issued. The initial results were presented to City staff and the resulting rate impacts were reviewed. The City provided goals to avoid debt and keep rate increases as consistent as possible to avoid rate shock. The revised and final recommended scenarios are presented below.

8.6.1 CIP Adjustment

The initial financial planning scenarios presented to the City resulted in short duration and higher rate increases. These results were largely due to the front-loaded CIP. The City requested that some CIP projects be shifted to allow a lower, steadier rate increase and steadier ending fund balance. The revised CIP to accommodate lower, more consistent rate increases is shown below in Table 8.13. Several projects are delayed for a year or more to accommodate the lower rate increases. The final financial planning scenarios presented below assume this CIP.

Table 8.13 Revised CIP for Financial Planning
Sanitary Sewer Master Plan
City of Medford

	Short-Term Projects										Mid-Term Projects										
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	Notes
Project ID																					
P-2								$891,000	$891,000												1
P-4			$415,000																		
P-5			$568,500	$568,500																	1
P-6		$368,000																			
P-7					$469,000																
P-8					$458,500	$458,500															1
P-9					$250,000																
P-10						$721,500	$721,500														1
P-13							$222,000														
P-14							$413,000														
P-15							$168,000														
P-18								$562,000													
P-19				$866,667	$866,667	$866,667															2
P-20										$461,000											
P-26									$642,500	$642,500											1
P-29								$460,000													
P-31							$79,000														
P-33										$433,000											
G-1	$675,000																				
P-3																			$366,000	$366,000	1
P-12											$442,000										
P-16											$553,000										
P-17											$126,000										
P-21												$731,000									
P-24																		$454,500	$454,500		1
P-25												$1,203,500	$1,203,500								1
P-27														$314,000							
P-28																$671,000					
P-30																	$247,000				
P-32																	$157,000				
P-34																	$92,000				
P-36														$178,000							
P-38														$612,000							
P-41															$1,640,000						
P-42																$243,000					
P-43																	$768,000				
P-44																	$230,000				
P-45																		$120,000			

Table 8.13 Revised CIP for Financial Planning
Sanitary Sewer Master Plan
City of Medford

	Short-Term Projects										Mid-Term Projects										
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**Notes**
P-46																		$113,000			
PS-1																			$50,000		
PS-2																			$50,000		
G-2																				$300,000	
Exp-2																			$100,000		
Total	$675,000	$368,000	$983,500	$1,435,167	$2,044,167	$2,046,667	$1,603,500	$1,913,000	$1,533,500	$1,536,500	$1,121,000	$1,934,500	$1,203,500	$1,104,000	$1,640,000	$914,000	$1,494,000	$687,500	$1,020,500	$666,000	
ESCALATED (USE IN FINANCIAL PLAN)	CIP Escalation:	3.0%																			
Option 1A (EXP Projects)	$675,000	$379,040	$1,043,395	$1,568,245	$2,300,728	$2,372,648	$1,914,663	$2,352,749	$1,942,592	$2,004,784	$1,506,530	$2,677,800	$1,715,903	$1,621,261	$2,480,647	$1,423,982	$2,397,431	$1,136,333	$1,737,333	$1,167,835	**3**
Option 1B (No EXP Projects)	$675,000	$379,040	$1,043,395	$1,568,245	$2,300,728	$2,372,648	$1,914,663	$2,352,749	$1,942,592	$2,004,784	$1,506,530	$2,677,800	$1,715,903	$1,621,261	$2,480,647	$1,423,982	$2,397,431	$1,136,333	$1,567,090	$1,167,835	**3**

Notes:
(1) Project split into two years.
(2) Per City, divided by 3 years.
(3) Used in Financial Plan.

8.6.2 Option 1A - No Debt

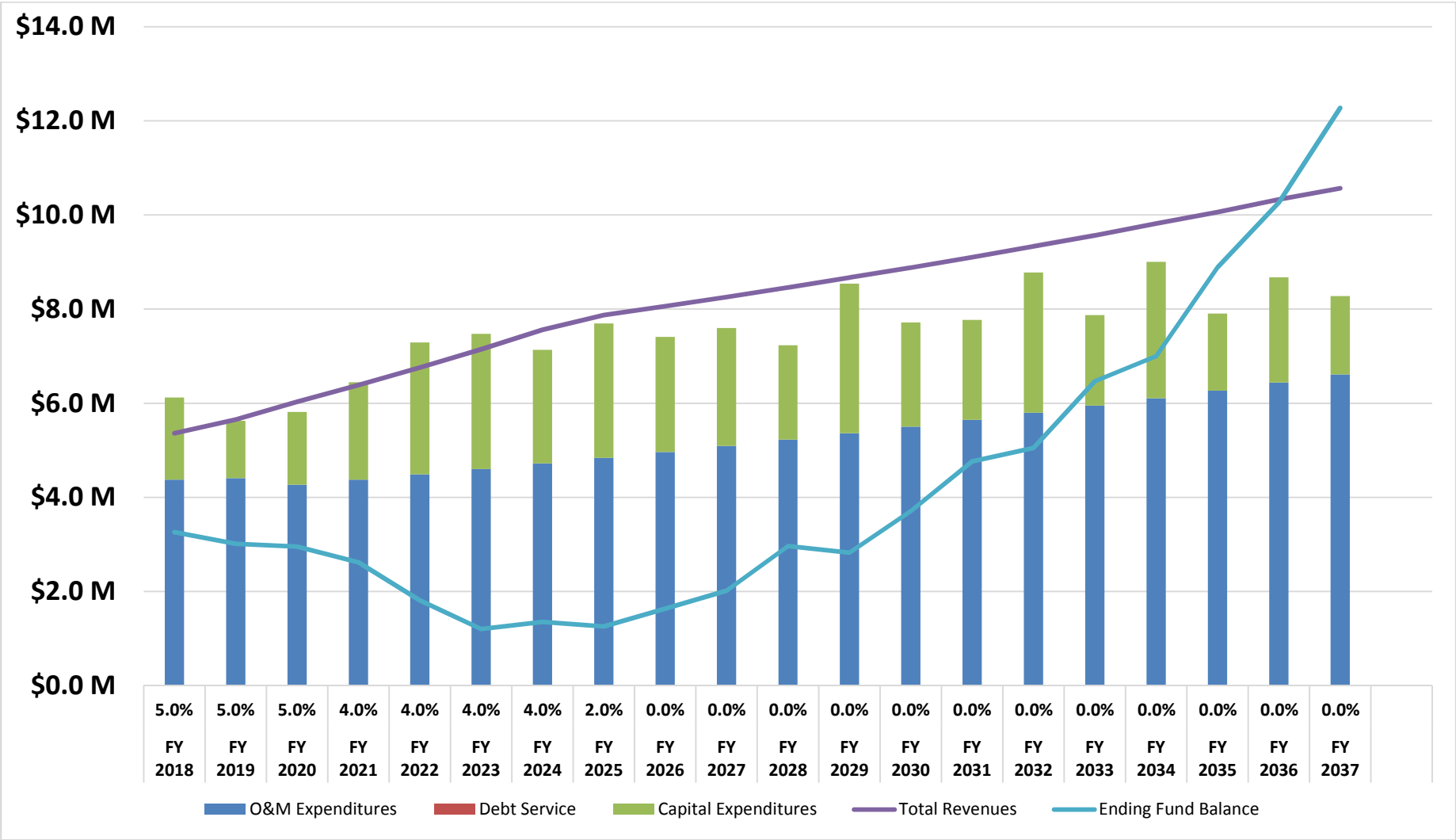
The first option evaluated for the City is to increase rates while maintaining the minimum operational target of 90 days, fund the EXP projects from the sewer fund (as opposed to a reimbursement district), and not issue any debt. After adjusting the timing of CIP projects, the resulting cash flow for this option is shown in Figure 8.4. It is assumed that the first rate increase of five percent in FY 2018 would be implemented January, 2019 while the remaining rate increases would be implemented at the beginning of the fiscal year. When estimating rate increases, it is typical to increase them at a slightly higher rate at the front end of the projections, which allows them to produce more revenue early on and gives the City the option of increasing rates at lower rates thereafter as shown in Figure 8.4. The total revenues remain relatively in line with the amount of O&M and capital expenses. The ending fund balance stays relatively flat with slight dips when larger CIP expenses occur. However, the ending fund balance remains above the City's criteria of having 90 days of O&M expenses in reserves.

By 2029, the reserve balance significantly increases, reaching approximately $12.3 million by 2037. The results beyond the ten-year mark should be taken with caution, as the City will likely revise their CIP and financial strategy beyond that time. The SDC revenue due to annual growth should also be revisited, as this could be lower than proposed if growth is less than currently planned.

8.6.3 Option 1B - No Debt, Excluding EXP Projects

The second option proposed in this analysis is known as Option 1B, which is essentially Option 1A, less the "EXP" projects that were proposed to serve new development on the east side of the City. By excluding these projects, the CIP is reduced in the mid-term, resulting in lower SDCs and commensurate reductions in total SDC revenue, compared to those required by Option 1A. Due to updated costs from the City concerning these projects, it was found that the EXP project in the mid-term totals approximately $100,000 and therefore does not significantly impact the financial projections when compared to Option 1A.

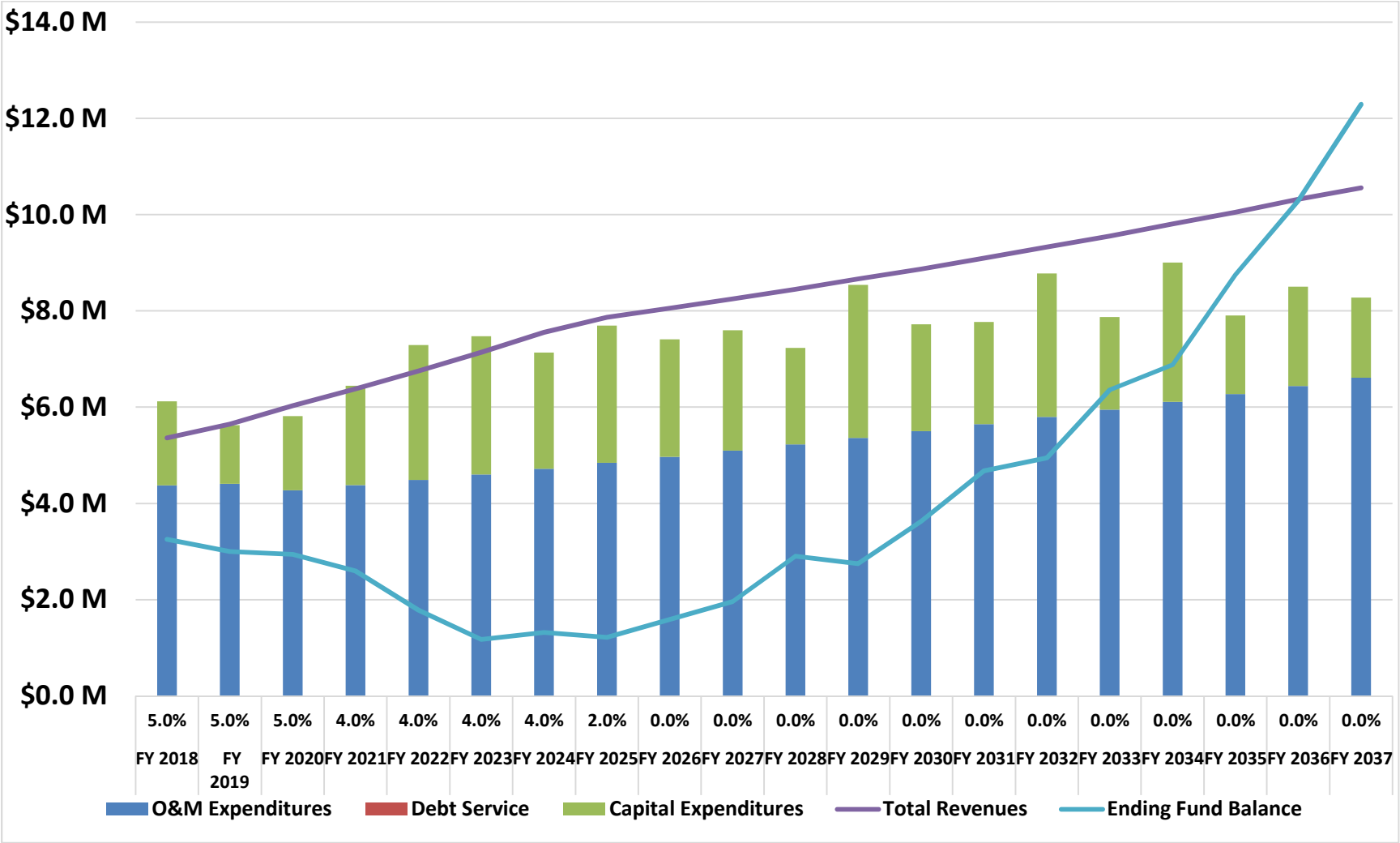
Figure 8.5 shows the 20-year period for Option 1B. Similar to the first option, the ending fund balance initially remains relatively flat with slight dips, reaching a low point of approximately $1.2 million before increasing significantly by FY 2029. The latter portion of the figure should again be taken with caution, as the mid-term assumptions can change significantly.



OPTION 1A:
NO DEBT, INCLUDES EXP PROJECTS

FIGURE 8.4

CITY OF MEDFORD
SEWER SYSTEM MASTER PLAN



OPTION 1B:
NO DEBT, NO EXP PROJECTS

FIGURE 8.5

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo

8.6.4 Option 2 - Debt Issued, Rate Increases

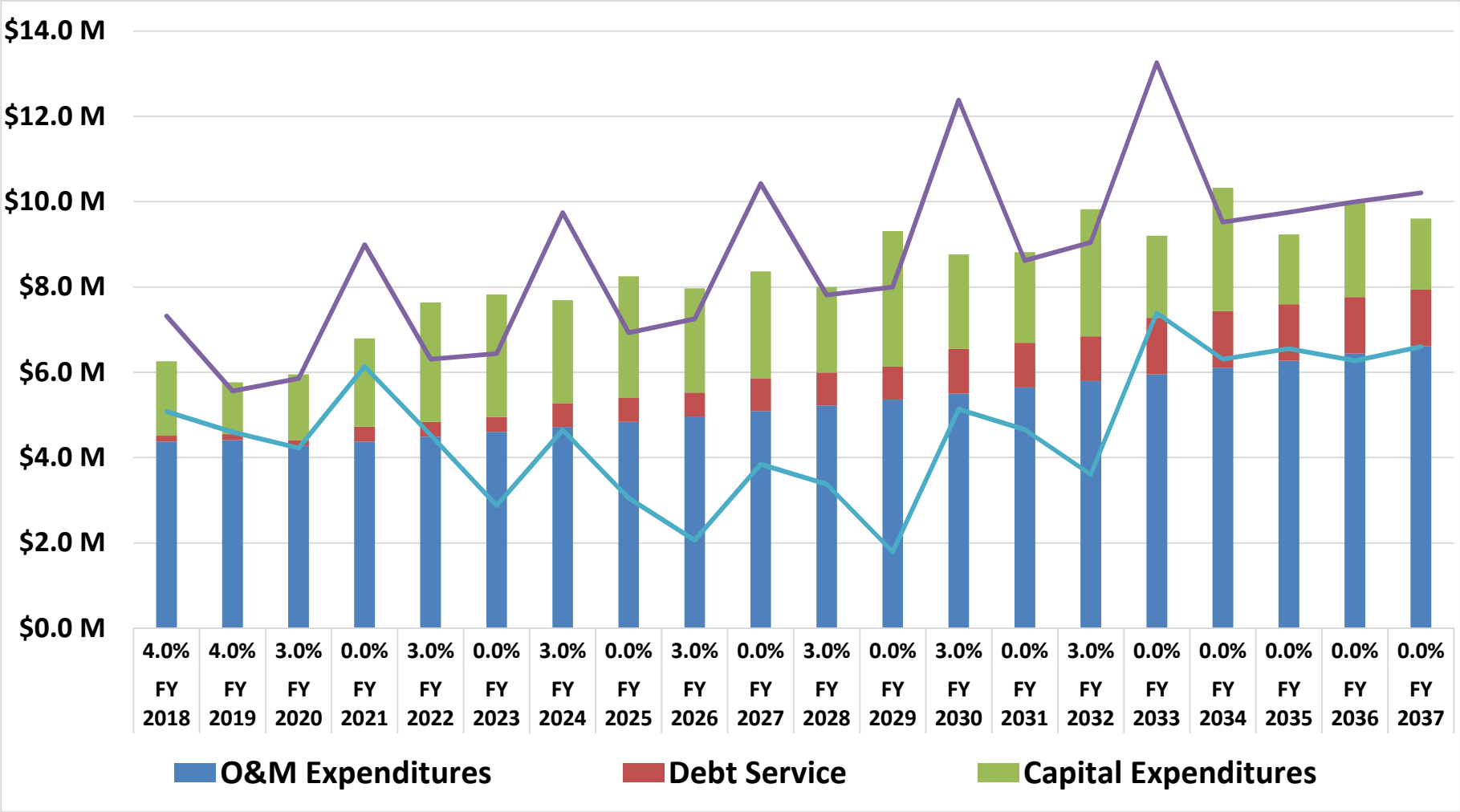
The final option, known as Option 2, proposed in this financial analysis included issuing debt to pay for the proposed capital improvement plan. Given that the City has no debt for the sewer utility, the issuance of debt is a reasonable option and would help reduce the rate revenue increases found in the previous two options. It was assumed that Option 2 would continue to have a rate increase of 4% for FY 2018 and FY 2019, and then 3% rate increases every other year until FY 2032.

As shown in Figure 8.6, the spikes in revenue result in the issuance of debt every three years. The ending fund balance also spikes during the years where debt is issued, then falls to approximately $1.8 million by FY 2029. The annual debt payments can be seen as slowly increasing through the 20-year period. Along with the ending fund balance, the debt service coverage ratio of 1.5x is one of the main driving variables during this analysis.

As with the previous two options, the analysis becomes more unreliable after the 20-year period, since the City could have additional projects and the growth of the City could be different than proposed. This option was given to show how debt issuance could reduce the rate increases to the customer, but the City could also apply annual rate increases to reduce the amount of debt required to pay for the proposed projects. Further analysis is recommended to understand what the appropriate amount of debt that can be issued.

8.6.5 SFR Total Bill

Figure 8.7 shows the impact of the single family residential total bill given the proposed rate increases for each option. The total bill includes both the City portion and the Regional Rate Committee portion. The rate increases are assumed to apply to both portions. As noted previously in the chapter, many assumptions in these options could affect the rate increases beyond the ten-year period, including the assumed growth, SDC revenue, and additional capital improvement projects.

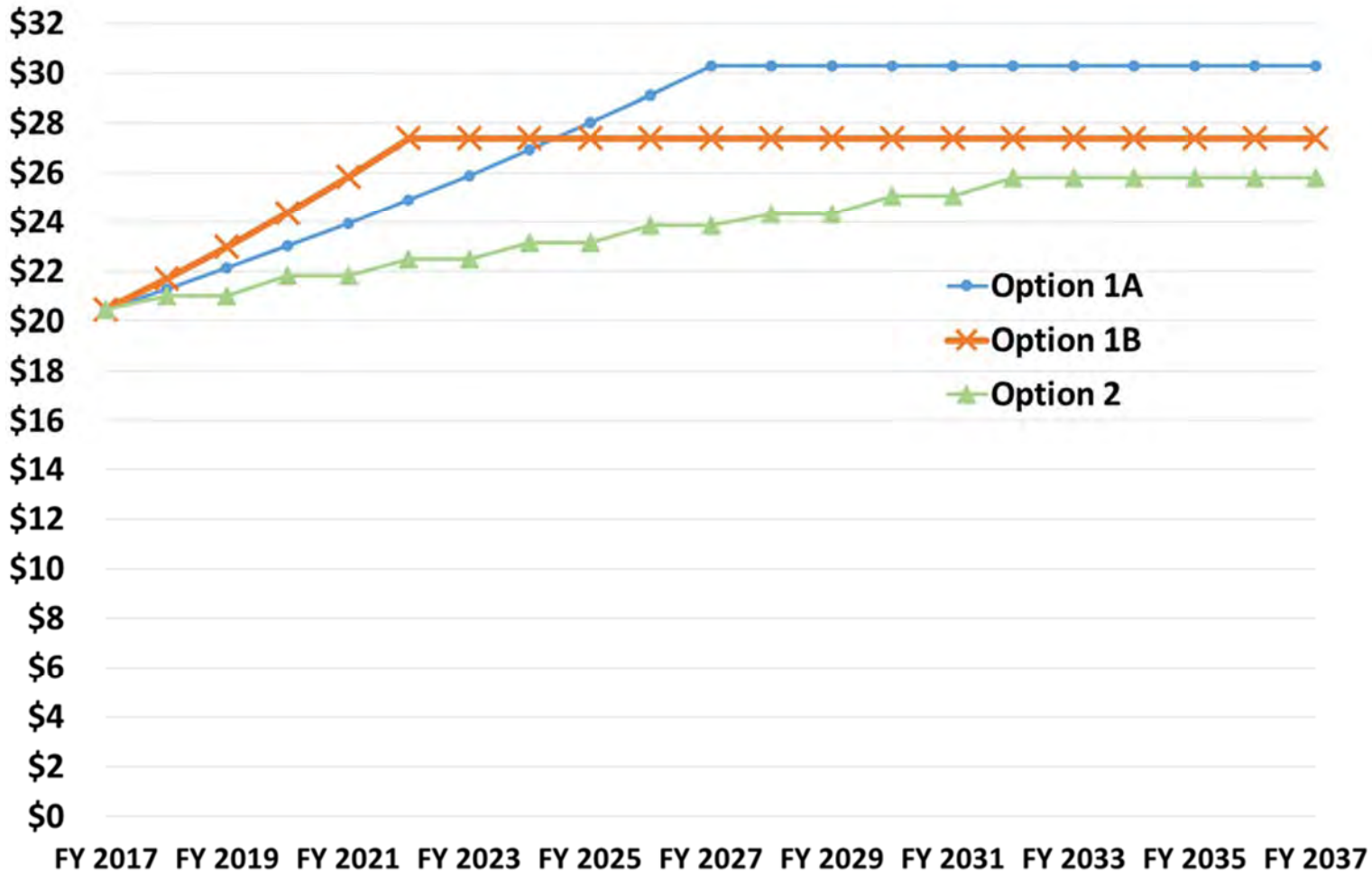


OPTION 2:
DEBT, EXP PROJECTS, SOME RATE INCREASES

FIGURE 8.6

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

carollo



SFR TOTAL BILL

FIGURE 8.7

CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

8.7 SUMMARY

Given historical revenue and expenses, the City has maintained an adequate amount of revenue from sanitary sewer fees to cover their operating and capital expenses, and the City maintains a no-debt policy. The current system development charges are well below the average SDC when compared to other Oregon cities, and are proposed to increase to $1,030 or $1,036 per ERU, depending on funding options for the expansion projects. The proposed increase would increase the City's SDC revenue and, assuming the annual growth continues, would help reduce rate increases beyond FY 2027.

The City's sanitary sewer utility would have sufficient funds for the recommended capital improvement projects provided the City consider reasonable rate increases and, if necessary, issuing debt. The options given in this chapter show a strong analysis in the short-term, as the City is more confident with the priority of the projects and assumed growth. As the analysis goes beyond the ten-year period, the assumptions given in this chapter become more unpredictable as the City's growth and CIP tend to be adjusted. The recommended CIP in Chapter 7 was adjusted to delay some projects in order to maintain lower, more consistent rate increases. This revised CIP to meet funding goals is shown in Table 8.13. It is recommended to conduct a more in-depth rate study and cost of service study in the near future that will help the City understand the financial impacts and the suggestions identified herein.

APPENDIX A – CITY OF MEDFORD COMPREHENSIVE PLAN – LAND USE ELEMENT

CITY OF MEDFORD COMPREHENSIVE PLAN

GENERAL LAND USE PLAN ELEMENT

Prepared by
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Revised by
Medford City Council
January 7, 2016
Ordinance No. 2016-08

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GENERAL LAND USE PLAN (GLUP) MAP

INTRODUCTION

The General Land Use Plan (GLUP) Map graphically represents the present and future land use patterns within the City of Medford, and the future patterns within the Urban Growth Boundary (UGB). Medford's GLUP Map is maintained in a larger sized format and is a part of this element by reference. The purpose of the GLUP Map is to project the probable land uses in the city at the end of the planning period, based on the needs analyses in the other elements of the Medford *Comprehensive Plan*. For example, the "*Housing Element"* provides a close look at residential land needs, while the "*Economic Element"* details commercial and industrial land needs.

To properly administer the GLUP Map, several things must be kept in mind. The first is that the GLUP Map is dynamic. The current projections for land needs are based on past and present trends, and assumptions about the future. However, community needs and priorities tend to change over time, so amendments to the GLUP Map must be possible.

The second is that the GLUP Map is "general". The designations on the GLUP Map are not intended to follow property lines. Interfaces between different designations are purposefully non-site-specific so as to discourage using GLUP Map designations as the sole basis for making decisions on zone change applications. Having the appropriate GLUP Map designation is a prerequisite for a zone change. "Article II" of the Medford *Land Development Code* establishes specific criteria and procedures required for GLUP Map and Zoning Map amendments.

Special Area Plans

In addition to GLUP map designations, some portions of the UGB have more detailed planning provisions in the form of adopted special area plans. The Southeast Plan is an example of an adopted plan that provides more specific land use categories that dictate zoning district options. See the Neighborhoods Element of the Medford Comprehensive Plan for the special area plans and maps.

GLUP MAP DESIGNATIONS

The GLUP Map has 13 different land use designations, as listed below. Permitted land uses, as well as the development standards associated with each zoning district noted, are listed in "Article III" of the *Land Development Code.* The City's SFR-00 (Single-Family Residential – one dwelling unit per existing lot) zone is permitted in all GLUP Map designations because it is considered a holding zone for parcels that are being converted from County to City zoning. These parcels are not eligible for development to urban density or intensity until facility adequacy has been determined through the zone change process. It is the City's intent to have these parcels converted to zoning that is consistent with the following GLUP Map designations as soon as a property owner can show that urban facilities are adequate or will be made adequate to serve the uses permitted by the proposed urban zoning.

1. ***Urban Residential*** This designation permits lower density urban residential uses (one to ten units per gross acre), including standard and small lot detached single-family

dwellings, accessory dwelling units, and mobile home parks. Depending upon the physical development constraints, the permitted zoning districts are SFR-2, SFR-4, SFR-6, and SFR-10 (Single-Family Residential - 2, 4, 6, or 10 dwelling units per gross acre). Such constraints that may affect the ultimate developed density, and, therefore, the most suitable zoning district, include steep slopes, unstable soils, wetlands and/or riparian habitat, woodlands, fire hazards, etc. When a Planned Unit Development (PUD) is approved, the maximum residential density per gross acre can be increased.

2. ***Urban Medium Density Residential*** This designation permits medium density urban residential uses (10 to 15 units per gross acre), including townhouses (rowhouses), duplexes, apartments, mobile home parks, and group quarters. The zoning district permitted in this designation is MFR-15 (Multiple Family Residential - 15 units per gross acre). When a Planned Unit Development (PUD) is approved, the maximum residential density per gross acre can be increased.

3. ***Urban High Density Residential*** This designation permits higher density urban residential uses (15 to 30 units per gross acre), and provides for multiple-family development, including duplexes, apartments, and group quarters. The zoning districts permitted in this designation are MFR-20 and MFR-30 (Multiple-Family Residential - 20 or 30 units per gross acre). In addition, the Southeast Plan authorizes an increase in the maximum permitted density in this designation from 30 to 36 units per acre. When a Planned Unit Development (PUD) is approved, the maximum residential density per gross acre can be increased

4. ***Service Commercial*** This designation permits offices, medical facilities, and other limited service-oriented businesses as well as residential development under certain circumstances. It permits multiple-family dwellings meeting the density standards of the MFR-30 (Multiple-Family Residential - 30 units per gross acre) zoning district. In addition, the Southeast Plan authorizes an increase in the maximum permitted density in this designation from 30 to 36 units per acre. This designation may be located adjacent to residential designations. The corresponding zoning district permitted in this designation is the C-S/P (Service Commercial and Professional Office) zone which is intended to be customer oriented, while limiting the number of retail uses.

5. ***Commercial*** This designation permits the largest spectrum of commercial development as well as residential development under certain circumstances. It permits multiple-family dwellings meeting the density standards of the MFR-30 (Multiple-Family Residential - 30 units per gross acre) zoning district, except for mixed–use (commercial-residential) buildings, which have no maximum density limitation. In addition, the Southeast Plan authorizes an increase in the maximum permitted density in this designation from 30 to 36 units per acre, and a maximum of 60 dwellings per acre in the Southeast Commercial Core Area if in a mixed-use building. The C-N (Neighborhood Commercial), C-C (Community Commercial), C-R (Regional Commercial) and C-H (Heavy Commercial) zoning districts are permitted in this designation

   The most appropriate zoning district for each site designated Commercial shall be determined based on the following:

The C-N zone provides land for the development of small integrated commercial centers servicing the frequent and daily convenience requirements and service needs of adjacent residential neighborhoods. The C-N zone shall be located in commercial designations which are under three acres in size and are within residential neighborhoods.

The C-C zone provides land for the development of commercial facilities servicing the shopping needs of the local community. The C-C zone shall be located on collector and arterial roadways and cohesive, integrated shopping facilities shall be encouraged.

The C-R zone provides land for the development of those service and commercial uses which serve shoppers from the surrounding region as well as from the local community. The C-R zone shall be located in areas served by adequate regional and local street systems to avoid the impact of regional traffic using neighborhood streets.

The C-H zone is primarily intended to accommodate existing heavy commercial development along highways. The C-H zone shall be located near industrial zones and away from zones permitting residential, retail commercial, and general office uses.

6. ***General Industrial*** This designation permits the I-L (Light Industrial) and the I-G (General Industrial) zoning districts. The most appropriate zoning district for each site designated General Industrial shall be determined based on the following:

   The I-L zone is intended for office uses and light manufacturing. The I-L zoning district is suitable for areas near residential and commercial properties.

   The I-G zone provides land for industrial uses in which production and processing activities involve a degree of noise, vibration, air pollution, radiation, glare, and fire and explosive hazards. The I-G zoning district is suitable for areas near the Heavy Commercial and the Heavy Industrial zoning districts due to the higher intensity of uses permitted in this zone.

7. ***Heavy Industrial*** This designation permits uses with a large amount of noise, vibration, air pollution, or other nuisance. It permits the I-G (General Industrial) and I-H (Heavy Industrial) zoning districts. The most appropriate zoning district for each site designated Heavy Industrial shall be determined based on the following:

   The I-G zone provides land for industrial uses in which production and processing activities involve a degree of noise, vibration, air pollution, radiation, glare, and fire and explosive hazards. The I-G zoning district is suitable for areas near the Heavy Commercial and the Heavy Industrial zoning districts due to the higher intensity of uses permitted in this zone.

8. ***Parks and Schools*** This designation depicts existing and proposed public parks and schools. There is no specific zoning district associated with this designation.

9. ***Greenway*** This designation denotes linear parklands, Riparian Corridors, or public or private open space, particularly those along stream corridors and waterways. All zoning districts are consistent with the Greenway designation, provided that property designated as a Greenway is developed and used in compliance with provisions adopted in the Medford *Land Development Code*. The general location of Greenways is depicted on the GLUP Map, with the Greenway designation extending a specified distance from the top-of-bank on each side of the channel, or for a specified width if there is no associated waterway. The width of the Greenway from top-of-bank will be determined by state and federal regulations or the Medford *Land Development Code*, whichever is more restrictive. The size and location of Greenways may be altered when necessary to comply with state and federal regulations governing streams, wetlands, and fish and wildlife habitats. See the description of the Greenway land use designation below for more details.

10. ***City Center*** This designation identifies the regional governmental, financial, and business service center complex in the downtown area. It encompasses the area defined as the "downtown core area" in the *City Center Revitalization Plan*, an urban renewal plan and program for the City of Medford, as well as the area identified in the *Civic Center Plan*. The city center area exhibits tremendous potential for enhancement of its physical and economic linkages between the regional government, finance, and business service functions of the downtown core area, and the civic center. The enhancement of these linkages will further secure Medford's current competitive advantage as a regional service center. The enhancement of the area's physical and economic linkages will require a long-term vision and commitment. Therefore, it is the primary purpose of this land use designation to define a "City Center," and to encourage development to comply with the *City Center Revitalization Plan* and the *Civic Center Plan*.

    There is no specific zoning district associated with this designation. However, the C-B (Central Business) overlay zone, which is intended to provide special standards that recognize the unique and historic character of the downtown, covers most of the area in the City Center designation, although the two are not exactly contiguous.

11. ***Airport*** This designation identifies the area that makes up the Rogue Valley International - Medford Airport and its specifically affected environs. The I-L (Light Industrial) zoning district best accommodates the airport area and its associated uses. The A-A (Airport Approach) overlay zone, which is intended to minimize restrictions on airport operations caused by incompatible development, covers most of the area in the Airport designation, although the two are not exactly contiguous.

12. ***Limited Service Area Overlay*** This overlay designation represents those areas within the Urban Growth Boundary (UGB) that are not presently serviced with adequate public facilities or other services required for development to urban densities. The fundamental objective of distinguishing such areas is to provide development management programs that will eventually facilitate the provision of necessary facilities and services.

13. ***Urban Growth Boundary*** The City of Medford and Jackson County have established an Urban Growth Boundary (UGB), which delineates Medford's urban and urbanizable areas. Following the 1990 UGB amendment there was a total of 17,889 acres (27.95 square miles) within the UGB including that land within the City. The UGB is site specific. Since the GLUP Map does not indicate lot lines, the UGB is also specified on the City of Medford Zoning Map, a map having lot lines, so that the location of specific parcels inside or outside of the UGB can be determined.

GREENWAY GLUP MAP DESIGNATION

The General Land Use Plan designation of Greenway applies to certain stream corridors and waterways in the Southeast Plan Area, and to other locations within the Urban Growth Boundary. The designated Greenways are indicated on the General Land Use Plan (GLUP) Map. This designation denotes linear parklands, Riparian Corridors, or public or private open space, particularly those along stream corridors and waterways. The Environmental Element of the Medford *Comprehensive Plan* and the *Medford Parks, Recreation, and Leisure Services Plan* (1996) identify the location of several existing and potential Greenways for parks, open space, habitat preservation, and recreational purposes. Based upon the *Comprehensive Medford Area Drainage Master Plan* (1996), some Greenways may require limited improvement for all-weather access by vehicles and equipment for storm drainage maintenance and storm observation. As long as the impact on the riparian area is minimized, such improvement can often include facilities for public pedestrian and bicycle circulation, fostering transportation goals simultaneously with storm water management.

Land under the Greenway designation owned by the City may be acquired in a variety of ways, such as: 1) negotiated purchase; 2) eminent domain; 3) benevolent dedication; 4) dedication in lieu of parks systems development charges (SDCs); 5) exaction at the time adjacent lands are approved for development; or, 6) easements or less-than-fee acquisitions. Greenways may also be privately held and maintained. Greenways dedicated to the City, whether in fee-simple or as easements, are usually maintained by the City. The responsibility for improving Greenways to provide access to storm drainage facilities is often on the owners of land adjacent to the Greenway. The improvements needed for storm drainage maintenance and/or for pedestrian and bicycle circulation are usually determined on a case-by-case basis by the approving authority at the time of development approval. Adopting Greenway improvement plans in advance of development is recommended.

Projects within Greenways along waterways should be designed to ensure that disturbance of banks and natural vegetation in the riparian area is minimal, and that disturbed areas are promptly re-vegetated with native vegetation and protected from erosion. The trees, shrubs, and vegetation provide shade to reduce water temperature, woody debris to provide shelter for fish, and roots to prevent bank erosion. The design should ensure that upstream and downstream fish passage is maintained.

The *Greenway* designation serves the following purposes:

A. To preserve and maintain natural waterways consistent with the *Comprehensive Medford Area Drainage Master Plan* (1996) in order to protect adjacent lands from flooding, to provide maintenance for natural storm drainage, and to provide a means for the observation of storm events.
B. To protect, preserve, and enhance natural riparian corridors, wetlands, and open space.
C. To protect and enhance habitat for fish and wildlife species.
D. To facilitate opportunities for outdoor education and recreation.
E. To provide necessary and convenient pedestrian and bicycle circulation.
F. To implement the following documents, incorporated by reference as part of the Medford *Comprehensive Plan:*

Southeast Plan, as amended
Comprehensive Medford Area Drainage Master Plan (1996)
Medford Parks, Recreation, and Leisure Services Plan (1997)
Environmental Element of the Medford Comprehensive Plan, as amended

All zoning districts are consistent with the Greenway designation, provided that property designated as a Greenway is developed and used in compliance with provisions adopted in the Medford *Land Development Code*. The general location of Greenways is depicted on the GLUP Map, with the Greenway designation extending a specified distance from the top-of-bank on each side of the channel, or for a specified width if there is no channel.. The width of the Greenway from top-of-bank will be determined by state and federal regulations or the Medford *Land Development Code*, whichever is more restrictive. The size and location of Greenways may be altered when necessary to comply with state and federal regulations governing streams, wetlands, and fish and wildlife habitats.

Uses permitted within Greenways are usually limited to:

A. Streets, roads, bridges, and paths where necessary for access or crossings, provided these uses are designed and constructed to minimize intrusion into e riparian areas.
B. Drainage facilities, utilities, and irrigation pumps.
C. Water-related and water-dependent uses.
D. Replacement of existing structures with structures in the same location that do not disturb additional riparian area.
E. Interpretive and educational displays, and overlooks, including benches and outdoor furniture.
F. Interpretive and educational displays.
G. Habitat enhancement activities.

Removal of vegetation in Greenways is discouraged, except certain noxious weeds and nonnative plant species. Restoration of Greenways through appropriate planting of native species is often desirable. When feasible, rights-of-way for public streets should be collinear and adjacent to Greenways as long as they do not disturb riparian areas. This allows the Greenways to become visible community assets. When open for public view and access, they are not as likely to become unsafe dumping grounds as often happens when placed at the back of subdivision lots or commercial development.

CONCLUSIONS
GENERAL LAND USE PLAN

1. The General Land Use Plan (GLUP) Map represents Medford's future land use patterns based on anticipated growth and land needs.

2. The GLUP Map is dynamic, and, as such, must be amendable, to guide and reflect the needs and tastes of the city's residents.

3. The GLUP Map is non-site-specific, and is not intended to be the sole basis for making decisions on zone changes. The Zoning Map and the *Land Development Code* more specifically delineate permitted uses and development criteria.

4. The GLUP Map delineates three residential, two commercial, two industrial, a parks and schools, a greenway, a city center, an airport, and a limited service area designation. It also indicates the Urban Growth Boundary (UGB).

5. The SFR-00 (Single-Family Residential – One Unit per existing lot) zone is intended to function as a holding zone in all GLUP map designations until facilities can be shown to be adequate to accommodate a higher intensity or density zoning designation as permitted by the GLUP map designation.

6. To more specifically address the needs and concerns of certain areas of the community, more detailed land use provisions, in the form of special area plans, have been adopted. [See the Neighborhoods Element of the *Medford Comprehensive Plan* for the adopted special area plans and maps.]

GOALS AND POLICIES
GENERAL LAND USE PLAN

Goal 1: To maintain and update the City of Medford General Land Use Plan Map.

Policy 1-A: The City of Medford General Land Use Plan Map shall be reviewed at least every five years, and may be amended whenever it is determined that a change is warranted. Amendment criteria are contained in the *Review and Amendment* section of the *Comprehensive Plan*, and procedural requirements are contained in "Article II" of the *Land Development Code*.

Goal 2: To administer the City of Medford General Land Use Plan Map so as to further the purposes of the Map and the Comprehensive Plan.

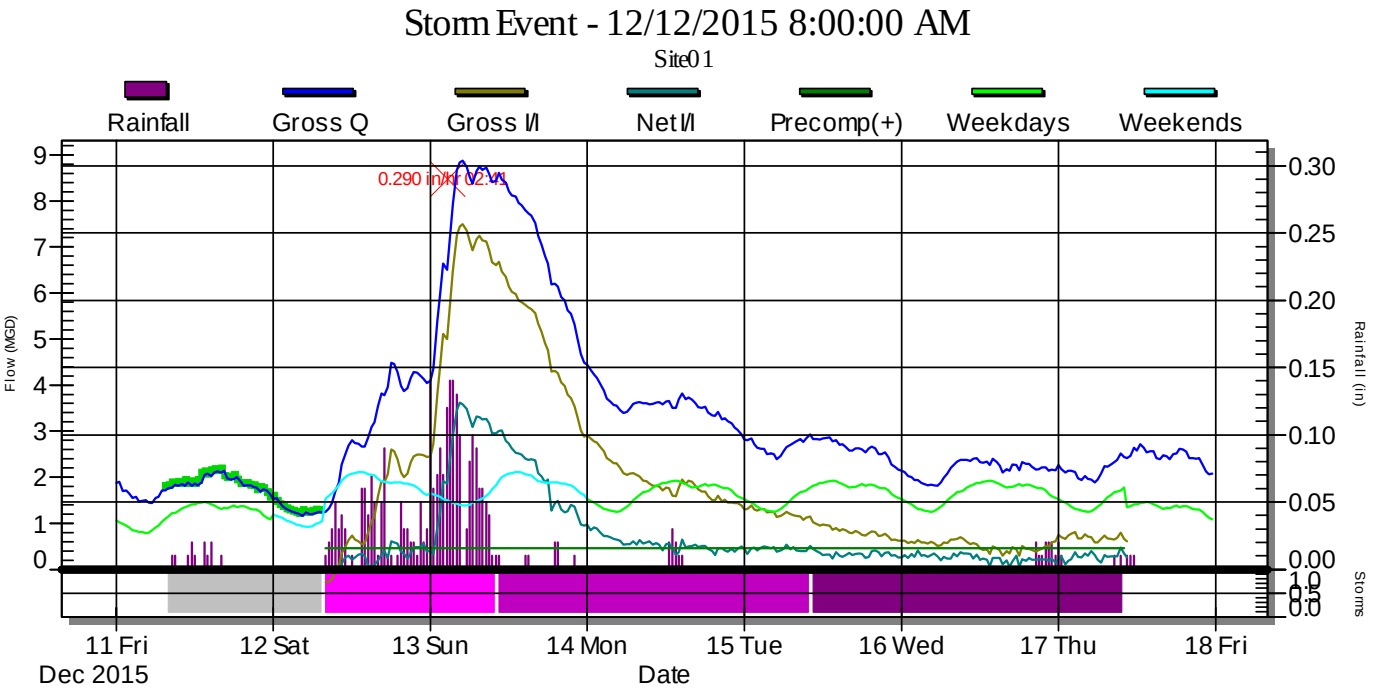
Policy 2-A: The City of Medford General Land Use Plan Map shall not be used as the sole justification for making decisions on zone changes. However, zone changes must be consistent with the General Land Use Plan Map designation.

Policy 2-B: Because the City of Medford General Land Use Plan Map is general and non-site-specific, ambiguities may arise. If it is unclear whether a specific property is in a particular

designation, the Planning Commission shall be requested to interpret the designation boundaries. The Commission shall consider the character of surrounding uses, past interpretations, and applicable goals and policies of the *Comprehensive Plan* when making an interpretation.

APPENDIX B – CITY OF WASTEWATER COLLECTION SYSTEM INFILTRATION AND INFLOW STUDY, (MARCH 2016)

CITY OF MEDFORD, OREGON
WASTEWATER COLLECTION SYSTEM INFILTRATION & INFLOW STUDY



DECEMBER 10, 2015 – FEBRUARY 11, 2016

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A DIVISION OF ADS LLC

March 31, 2016

Rachel Lanigan, P.E.
Carollo Engineers
720 SW Washington St Suite 550
Portland, OR 97205

Medford Sewer Flow Data RDII Evaluation 2015/ 2016

Dear Ms. Lanigan,

Enclosed please find a copy of the subject report. This report contains an evaluation of the sewer flow monitoring data provided for the Rain Dependent Infiltration and Inflow (RDII) and general hydraulic performance evaluation for the period from December 10, 2015 through February 11, 2016.

We would be happy to answer any questions about the report. I can be reached at (714) 379-9778 ext 223. Thank you for choosing ADS products and services to meet your flow monitoring needs.

Sincerely,
ADS Environmental Services, Inc.

Paul S. Mitchell, P.E.
Senior Regional Engineer

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APPENDIX A - Flow Hydrographs, Dry Day Hydrographs,
Storm Hydrographs, Q vs i Diagrams and Scattergraphs

APPENDIX B - Data Report
Tabular Data, Hydrographs and Site Reports

1 BACKGROUND AND SUMMARY

ADS Environmental Services was contracted by the Carollo Engineers to perform an evaluation of sewer flow and rainfall data obtained during the 2015 – 2016 wet weather season for purposes of determining degree of Rain Dependent Infiltration and Inflow (RDII) in the sanitary sewer collection system comprising selected areas of the City of Medford (City) sewer service area. The flow data was also evaluated to discern hydraulic performance at each of these metering locations during the study period which extended from December 10, 2015 through February 11, 2016.

1.1 Project Objectives

The main objective of this flow data evaluation was to identify whether the isolated sub-drainage basins (basins) within the City collection system experience excessive relative wet weather infiltration & inflow (or Rain Dependent I/I – RDII) during rain events. This information is intended to assist the City in more effectively allocating resources to address the impacts of RDII within the collection system.

There were ten (10) primary sanitary sewer drainage basins studied; each identified as Site01, Site02, etc. Each of these flow monitoring locations correspond the numeric basin areas 1, 2, etc.

One (1) rain gauge was in operation during the study period and was used to record rainfall associated with the basins within the City sewer system.

1.2 Project Scope of Work

The scope of work for the I/I study included the following tasks:

- Obtain flow and rain data from the collection system areas;
- Conduct an RDII analysis of the rainfall and flow data using Sli/icer™ software;
- Evaluate depth of flow and hydraulic performance at each flow monitoring site as applicable (i.e. identify the presence of backwater);
- Quantify RDII basin performance and site specific hydraulic performance and make recommendations for further action based on the flow monitoring data collected.

1.3 Report Layout

This report presents three (3) aspects of sewer flow hydraulic performance information for each of the evaluated sewer basins:

- General net flow information for each sewer basin including non-rain period estimates of infiltration (or Base Infiltration - BI);
- Wet weather flow information for each basin including quantification of net volume and peak flows during each evaluated storm event that were in excess of normal dry period flows (i.e. RDII);
- Pipe capacity information in terms of highest %full pipe based on evaluating ratios of observed peak flow depths (d) to the pipe's diameter (D) or d/D.

Chapter 1 of this report presents project background information and a summary of the findings of this study. Chapter 2 outlines the project approach, and flow monitoring/rainfall procedures and data collected. Chapter 3 presents net flow information for each evaluated basin during dry periods, including Base Infiltration (BI) estimates. Chapter 4 presents wet weather data and RDII quantification and results. Chapter 5 presents information regarding hydraulic capacity of the lines in which the flow monitors were installed including d/D data and other related pipe hydraulic performance (e.g. notable backwater conditions). Chapter 6 presents summary conclusions and recommendations regarding future investigation and monitoring work. Appendix B of this report is a flow data report containing details about the means, methods and field procedures used to obtain flow and rainfall data used to generate this RDII report. The flow data report also includes flow and rainfall monitoring site location details with photos as an appendix thereof.

1.4 Basin Flow Analysis

The evaluated areas of the City collection system were delineated into ten (10) primary sewer shed areas or basins with sizes ranging from 25,820 lineal feet (lf) for Basin03 (Site03) to 124,801 lf for Basin06 (Site06). Figure 1.1 is an illustration of the basins as they were delineated for the purposes of this flow analysis. The basins are shown with each associated flow monitoring site depicted as a dot at the basin effluent manhole.

Where a basin received flow from an upstream basin, net flows were obtained by subtracting the gross flow at upstream meter sites from the gross flow at the meter measuring total flows discharged from the basin. For example, Basin01 was isolated by subtracting flows from upstream Site10. Basin09 was isolated by subtracting flows from upstream Site05.

It is important to understand that evaluation of basin flows can provide an indication of general performance of all the sewer mains within the basin. However, follow up field investigation work would be needed to determine which isolated zones or sewer line segments within the basin are allowing the majority of RDII to enter the sewer system.

The flow meters and rain gauge were installed and data collected regularly from these devices by ADS throughout the study period. The net Average Dry Day Flow (ADDF) attributable to each study basin is listed in Table 1.1. Sites comprising gross flow from each basin along with any upstream sites are shown in Table 1.1 and define how net flows (and net associated pipe area/ length) were determined for each basin.

Table 1.1 - Basins Sizes and ADDF

Basin ID	Pipe Diameter (in)	Meters to Determine Net Basin Flow	Net Basin Area (Acres)	Net Basin Pipe (Feet)	Gross ADDF Weekday (MGD	Net ADDF Weekday (MGD)
Site01	8	+Site01 - Site10	396	46665	1.19	0.44
Site02	10	+Site02	579	82486	0.46	0.46
Site03	36	+Site03	169	25820	0.12	0.12
Site04	14	+Site04	800	72053	0.26	0.26
Site05	12	+Site05	1,090	110377	0.18	0.18
Site06	18	+Site06	870	124801	1.93	1.93
Site07	8	+Site07	610	82492	0.74	0.74
Site08	18	+Site08	476	58787	0.45	0.45
Site09	11	+Site09 - Site 05	1,521	118732	0.66	0.48
Site10	12	+Site10	642	106699	0.75	0.75
TOTAL			7,152	828,913		5.81

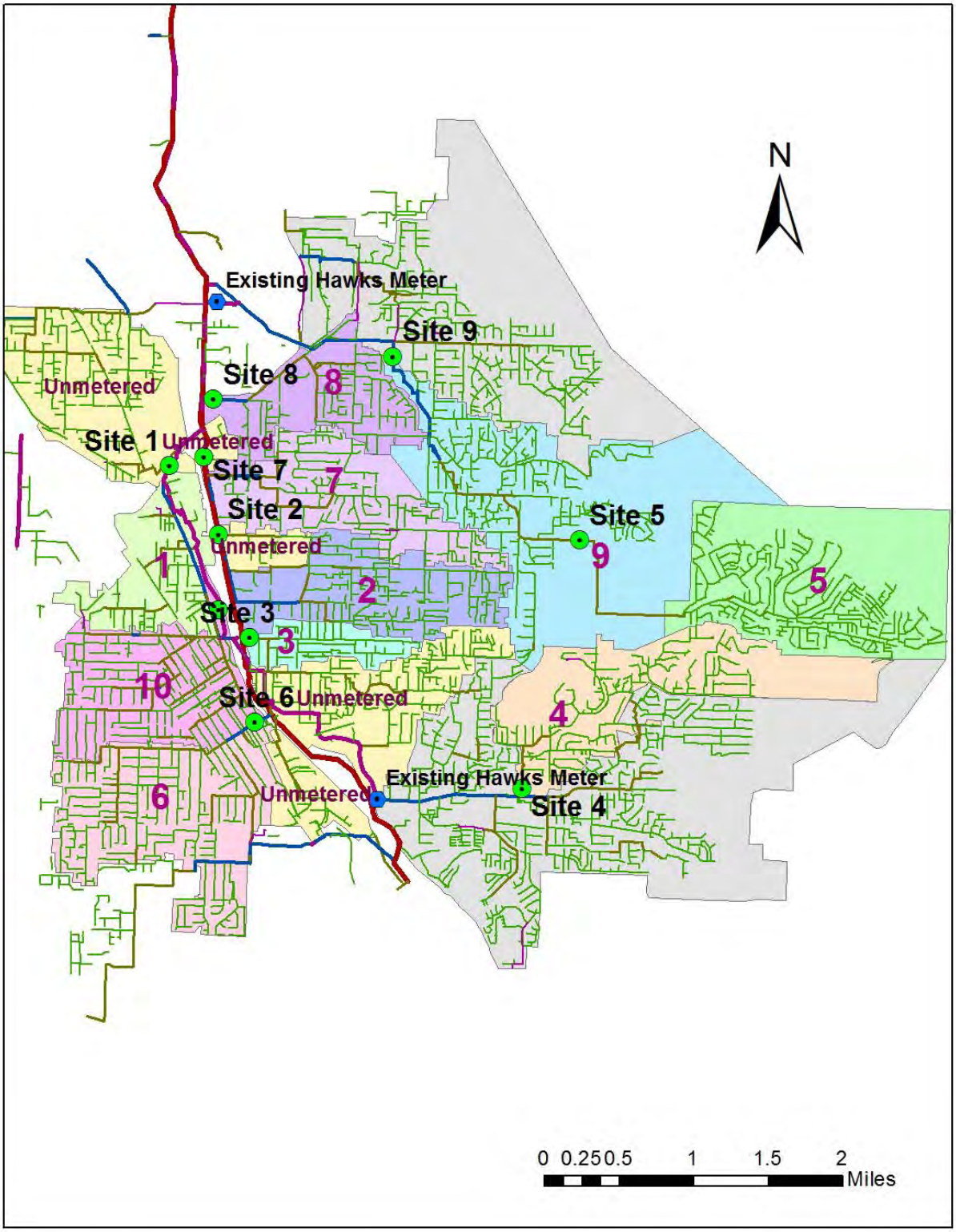


Figure 1.1 – Medford RDII Study Basins 2015/ 2016

1.5 RDII Analysis

An analysis was performed to quantify Rain Dependent Inflow and Infiltration (RDII) produced by each basin in the study. A chart of "normalized" RDII results measured during the two (2) study storms producing the largest responses is summarized in Figure 1.2. The term "normalized" means that the RDII (the volume of flows measured to be above the normal expected dry weather flows) was divided by rainfall volume (inches) and basin size (acres and also feet of pipe) to enable an apples-to-apples comparison of results among basins. The normalized RDII values are in terms of % rainfall ingress (Figure 1.2) and also gallons of RDII per foot of pipe per inch of rain (presented in Chapter 4).

The 4 basins producing about 50% or more of their ADDF as base infiltration (BI) are Basin01, 04, 06 and 08; and these basins generate about 1.8 mgd of BI which is about 63% of the total ADS-metered system BI of about 2.8 mgd. These 4 basins comprise about 38% of the ADS-metered system piping. This total ADS-metered BI accounts for approximately 48% of all the ADDF monitored in this study, further suggesting a large infiltration component of RDII. Additional details regarding base infiltration are provided in Chapter 3.

The three (3) basins generating the highest relative RDII are located on the west side of the system (refer to Figure 4.5). These basins comprise about 34% of system piping metered by ADS, but produce about 55% of all the RDII in the ADS-metered areas. These basins exhibit high relative normalized RDII as well as BI suggesting that inflow and infiltration pathways of RDII likely exist. Site/basin01 exhibits excessive % rain ingress and a high RDII peak factor (>9.0), which may indicate there may also be an inflow component to the RDII.

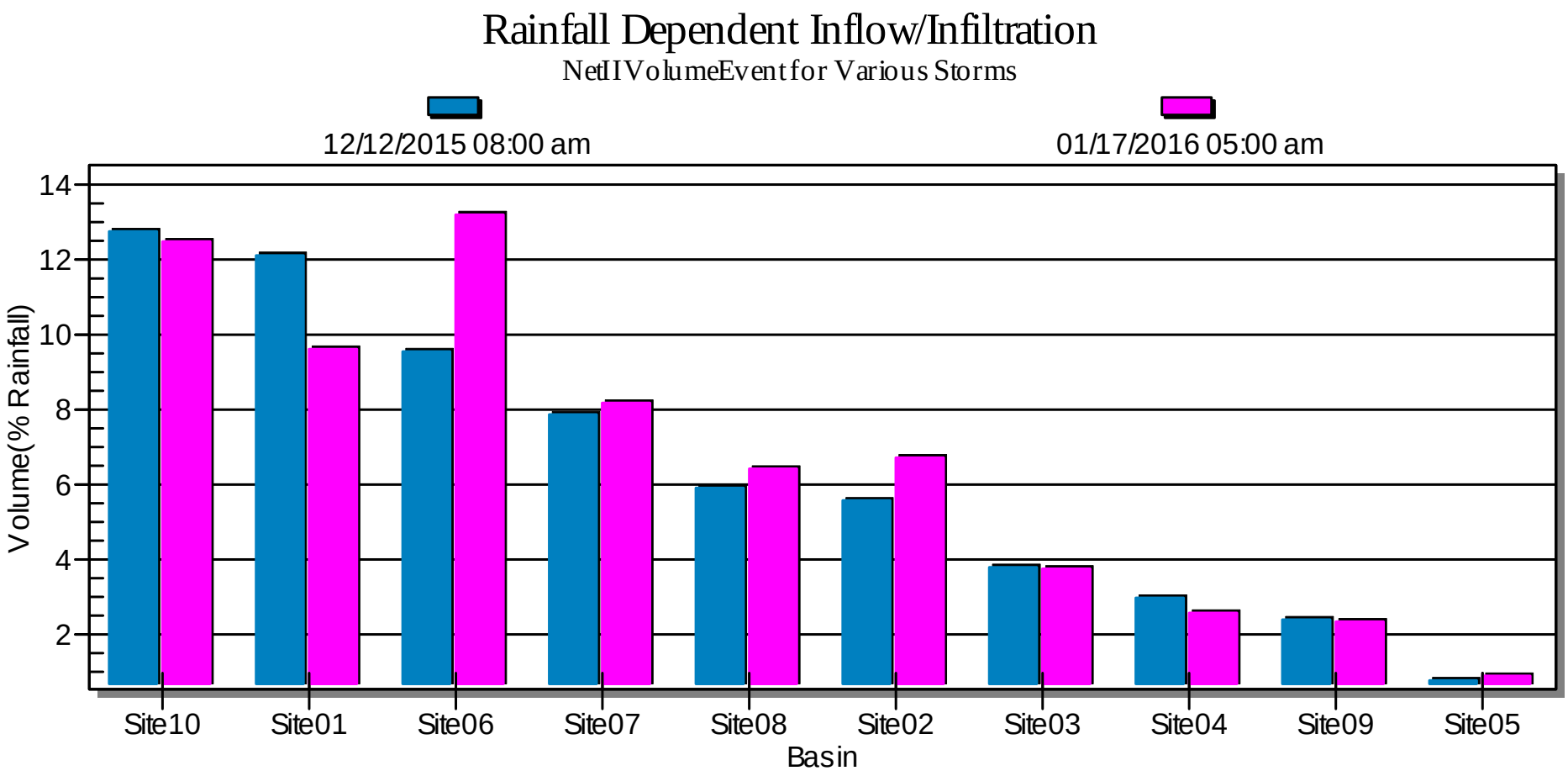


Figure 1.2 - Normalized RDII (% Rainfall Ingress)

1.6 Hydraulic Analysis

A hydraulic analysis was performed at each flow metering location to evaluate the pipeline hydraulic conditions. The basis of this evaluation was to compare the typical peak depth-of-flow (d) during the study to the Diameter (D) of the pipe for normal (dry day) conditions versus maximum hourly depth versus Diameter observed during the study period.

Ratios of d/D were calculated at each site using typical peak and maximum peak conditions. Figure 1.3 summarizes the d/D ratios at each site. d/D ratios of 1 or more indicate surcharged pipe flow conditions. Site08 experienced surcharged conditions during the two largest storm events on December 12, 2015 and January 17, 2016.

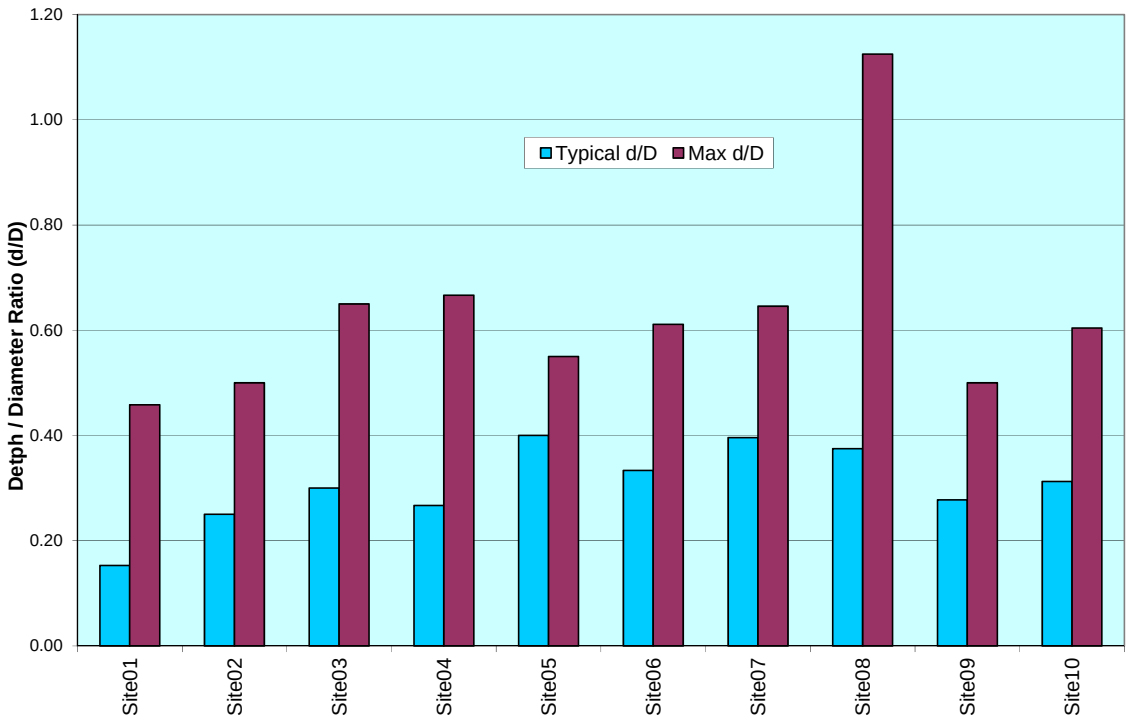


Figure 1.3 - Pipe Flow Depth Performance Summary

1.7 Conclusions and Recommendations

- The flow study successfully captured 4 system stressing rain events, one of which can be considered a 4-year, 24-hour event. Extremely high meter data uptimes were achieved with excellent data quality.

- The three (3) basins (associated with Site01, 06 and 10) generating the highest relative RDII are located in the western part of the system (see Figure 4.5). These western basins produce well in excess of 10% rainfall ingress These basins represent about 34% of the ADS-metered system area, and produce about 55% of the total RDII volume.

- Isolated zones within the basins identified herein to be yielding excess RDII volumes as well as excess Base Infiltration (BI) should be evaluated using night time flow isolations and/or manhole/ line inspections. This includes Basin01, 06 and 10 and may also include Basin02, 07 and 08 as second priority. Manhole/ line inspections can be conducted using high resolution pipe cameras or CCTV to observe manhole defects and line defects (preferably following a storm event so live leaks can be observed). Any areas with elevated RDII and/or BI in conjunction with known pipe defects can then be prioritized for upgrade or rehabilitation.

  Basins identified as having a potential inflow component (Basin01 and 10) may benefit from conducting rainfall simulation survey work such as smoke testing. Such testing should be conducted during dry seasons so soil moisture is less likely to preclude the passage and detection of smoke.

2 PROJECT APPROACH

Rain Dependent Inflow and Infiltration (RDII) is defined as rainwater that enters a sanitary sewer system during or just after a storm event. Inflow is defined as water that directly enters a system through roof leaders, clean-outs, foundation drains, sump pumps, and cellar, yard, and area drains. Infiltration is defined as water that enters a sewer system from the ground through defective pipes (including laterals), pipe joints, damaged lateral connections or manhole walls.

Most collection systems have been designed to convey some quantity of RDII. Although it is not practical to eliminate all RDII from entering a sewer system, removing excessive amounts of RDII can positively impact a collection system in the following ways:

- Increase available collection system capacity;
- Reduce the possibility of sanitary sewer overflows;
- Reduce treatment and transportation costs.

The most cost effective means of identifying, quantifying, and prioritizing RDII entering a collection system is through a comprehensive RDII investigation program comprised of the following major components:

1. Collection system review and basin identification;
2. Simultaneous flow monitoring and rain gauging;
3. Data analysis and ranking of basins against one another based on normalized units often referred to as basin prioritization;
4. Sanitary Sewer Evaluation Surveys (SSES) including smoke testing, manhole inspection, flow isolation, dye water flooding, closed circuit television, etc.

Carollo Engineers conducted the first component of the program and ADS conducted components 2 and 3 of the RDII investigation program (reported herein).

2.1 Basin Identification

The evaluated areas of the City collection system were delineated into ten (10) primary sewer shed areas or basins with sizes ranging from 25,820 lineal feet (lf) for Basin03 (Site03) to 124,801 lf for Basin06 (Site06). Figure 1.1 is an illustration of the basins as they were delineated for the purposes of this flow analysis. The basins are shown with each associated flow monitoring site depicted as a green dot at the basin effluent manhole.

Where a basin received flow from an upstream basin, net flows were obtained by subtracting the gross flow at upstream meter sites from the gross flow at the meter measuring total flows discharged from the basin. For example, Basin01 was isolated by subtracting flows from upstream Site10. Basin09 was isolated by subtracting flows from upstream Site05.

It is important to note that several of the monitored basins also have potential alternate flow paths (or overflow pipes) leading to other adjoining basins. This includes a potential overflow pipe from Basin07 to 08, an overflow pipe from Basin10 to 01, and several possible overflow pipes from Basin06 to 10. The worst performing basins were 01, 06 and 10 (west side), potentially rendering these overflow pipes irrelevant for this study; however, it is possible that one or more of these basins would have been shown to produce even higher relative R-values without such overflow pipes in place. It is also noted that there are also potential flows that could enter Basin02 and 03 via overflow pipes from unmetered areas (effectively increasing the size of these basins if wastewater was to run through these overflow pipes).

Table 2.1 provides a summary of each Site/basin and meters used to determine net basin flow and basin size. Additional information pertaining to equipment used, field procedures and data analysis is included in the Appendix B data report.

Table 2.1 - Basin Sizes and Associated Meter Sites

Basin ID	Pipe Diameter (in)	Meters to Determine Net Basin Flow	Net Basin Area (Acres)	Net Basin Pipe (Feet)	Gross ADDF Weekday (MGD	Net ADDF Weekday (MGD)
Site01	8	+Site01 - Site10	396	46665	1.19	0.44
Site02	10	+Site02	579	82486	0.46	0.46
Site03	36	+Site03	169	25820	0.12	0.12
Site04	14	+Site04	800	72053	0.26	0.26
Site05	12	+Site05	1,090	110377	0.18	0.18
Site06	18	+Site06	870	124801	1.93	1.93
Site07	8	+Site07	610	82492	0.74	0.74
Site08	18	+Site08	476	58787	0.45	0.45
Site09	11	+Site09 - Site05	1,521	118732	0.66	0.48
Site10	12	+Site10	642	106699	0.75	0.75
TOTAL			7,152	828,913		5.81

2.2 Flow Monitoring Equipment

The equipment used for flow monitoring during this study period was ADS model 8000 (Triton+) open-channel flow monitor. Data were retrieved or collected from the monitors, QA checked, and finalized by ADS for use in this evaluation in accordance with ADS' documented procedures. Refer to the Flow Data Report as Appendix B for additional details regarding equipment and field procedures.

2.3 Installation

Typical open channel flow meter installation includes the following steps:

- Site investigation
- Installation of equipment and start-up
- Monitor confirmation and calibration

A typical open channel flow monitor installation is shown in Figure 2.1.

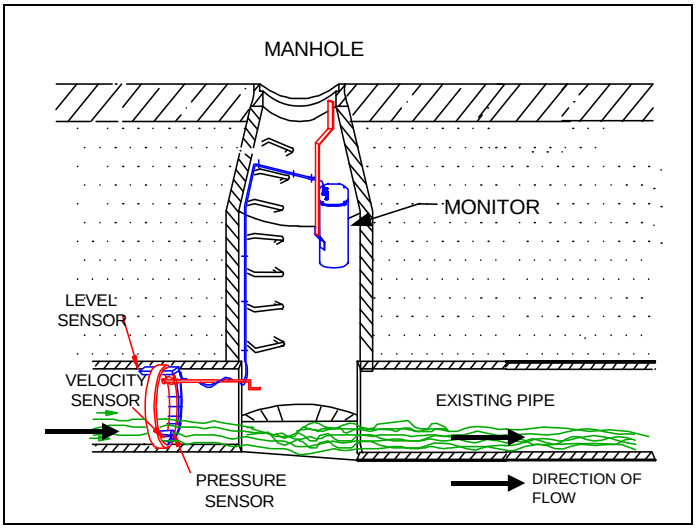


Figure 2.1 - Typical Open Channel Flow Meter Installation

The installation presented in Figure 2.1 is typical of the configuration used in short term and long term flow studies and is customarily used on circular or oval pipes up to approximately 42-inches in diameter or height. In this type of installation, depth and velocity sensors are mounted on an expandable ring and installed upstream of the pipe/manhole connection in the incoming sewer pipe. The installation into the incoming pipe reduces the affects of turbulence caused by the manhole.

2.4 Rain Gauges and Rainfall Data

An important part of an RDII study is the collection and analysis of rainfall data (volume and distribution as applicable). One (1) tipping bucket type rain gauge (Raingage_1) was temporarily set up for this study (location details provided in Appendix B). The rain gauge used has a resolution of 0.01 in of rain (per bucket tip) and rain accumulations were logged on 5-min. intervals throughout the study period. There were four (4) rain events that occurred and were evaluated during the study period. Each of the rain events is summarized in Table 2.2 showing rainfall measured at the rain gauge. The duration shown reflects the period during which the predominant rainfall volume occurred for that event (to the nearest 6 hour interval). The storm events evaluated comprise 6.2 inches of the total study period rainfall.

Table 2.2 – Evaluated Storm Events Summary

Storm	Date	Rainfall (in) Raingage1	Duration (hours)	Storm Type Magnitude, Duration
1	12/12/2015	2.86	24	~4 yr, 24 hour
2	12/18/2015	0.96	24	<2 yr, 24 hour
3	12/21/2015	1.14	24	<2 yr, 24 hour
4	1/17/2016	1.26	12	<2 yr, 12 hour
Total		6.2		

A rainfall accumulation chart was prepared (called a DDF chart) based on Raingage_1 and is depicted in Figure 2.2. This chart was used to compare captured rainfall to historical rainfall statistics for the area as provided by Carollo Engineers (thin color lines on the DDF chart). The two (2) largest storms are plotted on the DDF chart (12/12, and 1/17) to show how they compare to statistical records for the area. Three (3) of the storms captured in this study represent return frequencies of well less than 2 years. Only the earliest storm 1 on 12/12 produced a high enough intensity and volume of rainfall to be classified as a ~4 year, 24 hour event (based on Raingage_1).

Since only 1 rain gauge was deployed to represent rainfall in the study area, there is no relative weighting (among other rain gauges) to consider for each basin.

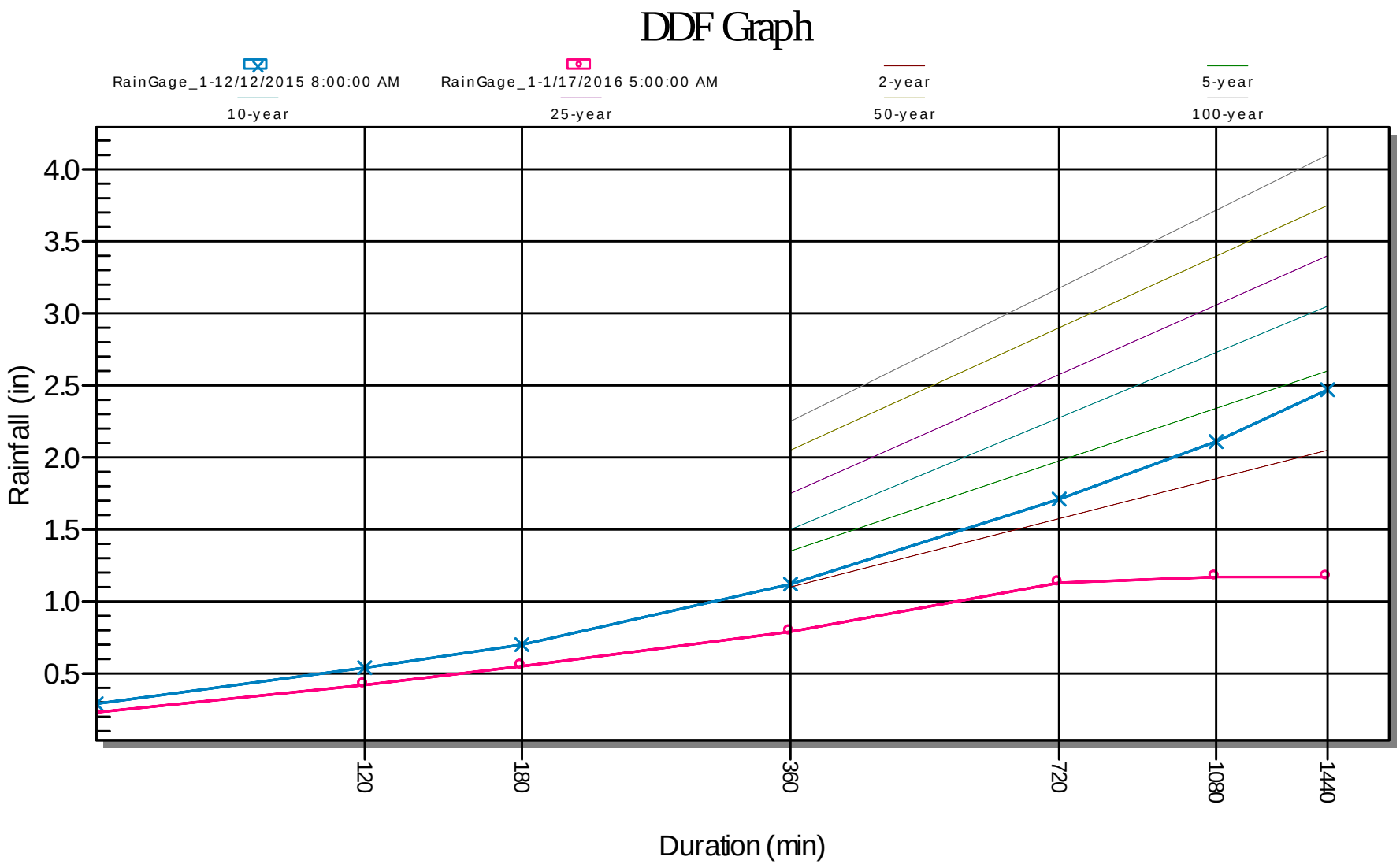


Figure 2.2 – Rainfall Depth Duration Frequency Chart

3 BASIN DRY WEATHER FLOW ANALYSIS

3.1 Net Dry Weather Flows

Net basin flows are those associated only with the basin as monitored by its meter of the same name. For example, for Site/basin01, net flows were obtained by subtracting flows coming into the associated basin from upstream Site10 (Refer to Table 2.1). Dry weather days were defined based on the following set of minimum criteria:

- No rain occurring within the previous 3-day period;
- Selected days must exhibit average-day flows within 85% - 115% of the average-day flows of remaining dry days;
- In addition those dry days that exhibited unusual flow patterns were not used to generate net dry day flow values for a basin.

The net Average Dry Day Flow (ADDF) for each basin is summarized in Table 3.1. The ADDF represented by each basin is based on flow rate data obtained during the lowest flow period (generally between January 4 and 14 and the last week of the study between February 8 to 11). This allowed at least 1 week of recovery form any large rain events.

Additional information regarding tabular and graphical daily flow averages is provided in the flow data report as Appendix B.

3.2 Base Infiltration

Base Infiltration (BI) is the flow that remains after Wastewater Production (WWP) is subtracted from Average Dry Day Flow (ADDF) at a meter site as illustrated in the example in Figure 3.1. WWP is the portion of total flow that is considered to be solely wastewater. Like WWP, the BI value is an estimate.

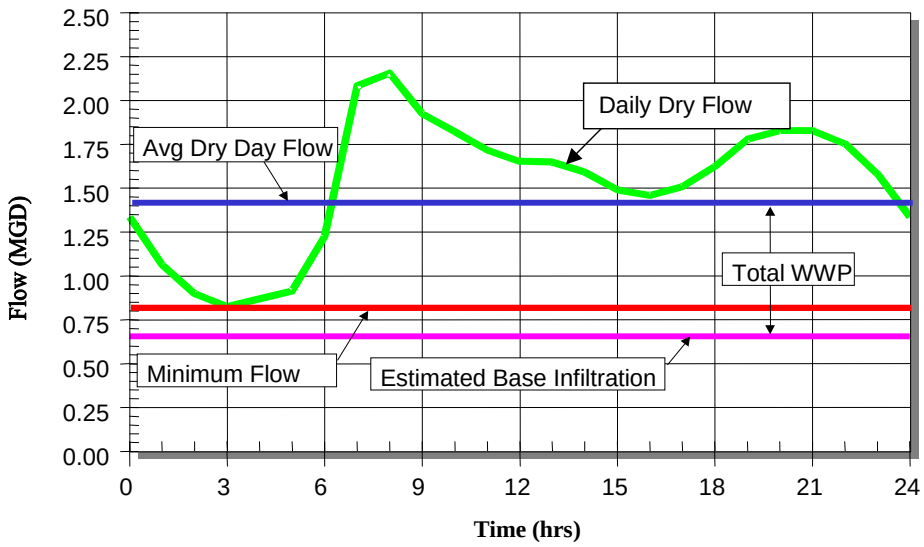


Figure 3.1 Dry Weather Flow Components

Equations 3.1 and 3.2 may be used to estimate Base Infiltration (BI):

$$\mathbf{WWP = (ADDF\text{-}MDF)/x} \quad (3.1)$$

$$\mathbf{BI = ADDF\text{-}\ WWP} \quad (3.2)$$

Where:

WWP = Average Wastewater Production (MGD);

BI = Base Infiltration (MGD);

ADDF = Average Dry Day Flow (MGD);

MDF = Minimum Daily Flow (MGD); and

X = fraction of average daily WWP that is domestic sewage.

This approach estimates WWP based on the difference between average flow and minimum flow. As BI varies over the year, the difference between average and minimum flow (and WWP) is expected to remain constant. This method of estimating is a reasonably reliable means to estimate BI for residential neighborhoods with total sewer

main length on the order of 20,000 LF or less. The reliability of this method decreases as basins contain more mixed use or commercial operations and/or have significantly more than 20,000 LF of pipe.

A refinement to this empirical method, the Stevens/Schutzbach equation, uses a curve fitting technique to increase the reliability of the BI estimation at meters with higher flows and is more tolerant of basins with less stable/ measurable minimum flows. Equation 3.3 is the Stevens/Schutzbach equation and was used to estimate base infiltration in the basins in this study.

$$\mathbf{BI} = \frac{\mathbf{0.4 * MDF}}{\mathbf{1 - 0.6\,(MDF/ADDF)\ \wedge\ ADDF^{0.7}}} \qquad (3.3)$$

Like equations 3.1 and 3.2, equation 3.3 is also dependent on average and minimum flows that occur in traditional residential flow patterns. Reliability of the BI calculation decreases in non-residential basins and in basins where the flow meter measures flow from cycling pump stations for both BI methods. Although there are limitations, Equation 3.3 is considered best for estimating BI using only flow data. Net BI (for a basin) can be determined by subtracting calculated total BI at upstream sites from the calculated total (gross) BI at the downstream meter/basin location.

It is important to understand that when only using flow data, BI can only be estimated and that only through more rigorous means of flow isolations (e.g. assuring there is no wastewater flow at each of the lateral connections in isolated small areas of the system and physically measuring continued flow during the plugging period) can actual BI values be determined.

It is also likely that the ADDF would be lower during extended periods of no rainfall; thus, delivering lower estimates of BI also. The BI estimated herein could be considered representative of sustained BI between successive storm periods during the wet season.

Because the above methods yield estimates, it is recommended that users not exclusively rely on BI or WWP estimates for sewer system design purposes.

Table 3.1 lists the values for estimated net (basin) BI as well as net BI as a percentage of ADDF. BI is calculated based on weekday flows since there are more weekdays to evaluate in determining MDF and ADDF values. The 4 basins producing about 50% or more of their ADDF as base infiltration (BI) are Basin01, 04, 06 and 08; and these basins generate about 1.8 mgd of BI which is about 63% of the total ADS-metered system BI of about 2.8 mgd. These 4 basins comprise about 38% of the ADS-metered system piping. This total ADS-metered BI accounts for approximately 48% of all the ADDF monitored in this study. A color map of BI basin performance is shown in Figure 3.2.

Table 3.1 - Dry Day Flows and Base Infiltration Estimates

Basin/ Meter ID	Upstream Subtractions to Determine Net Basin Flow	Net Basin Area (Acres)	Gross ADDF Weekday (MGD)	Gross BI (MGD)	Net ADDF Weekday (MGD)	Net BI (MGD)	Net BI (% ADDF)
Site01	- Site10	396	1.19	0.51	0.44	0.24	55%
Site02		579	0.46	0.18	0.46	0.18	39%
Site03		169	0.12	0.04	0.12	0.04	36%
Site04		800	0.26	0.14	0.26	0.14	54%
Site05		1,090	0.18	0.06	0.18	0.06	35%
Site06		870	1.93	1.16	1.93	1.16	60%
Site07		610	0.74	0.33	0.74	0.33	44%
Site08		476	0.45	0.22	0.45	0.22	49%
Site09	- Site05	1,521	0.66	0.21	0.48	0.15	30%
Site10		642	0.75	0.27	0.75	0.27	36%
TOTAL		7,152			5.81	2.79	48%

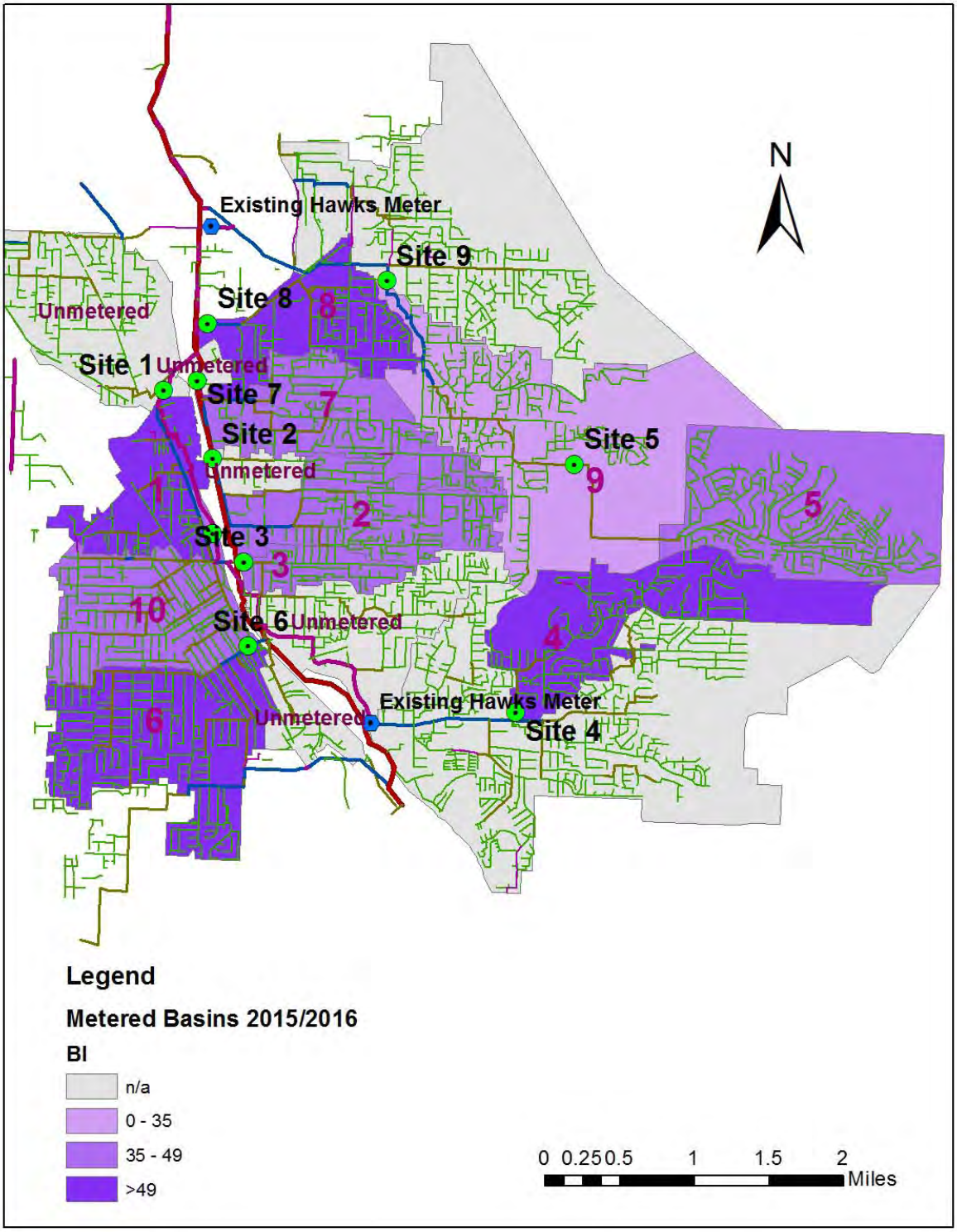


Figure 3.2 – Medford Basins Base Infiltration (BI) as % of Dry Weather Flow

4 WET WEATHER FLOWS & RDII ANALYSIS

An analysis was performed to determine the quantity of Rain Dependent Inflow and Infiltration (RDII) produced by each basin in the study. The analysis involved subtracting each basin's net Average Dry Day Flow (ADDF) from its net Wet Weather Flow (WWF) taking into consideration weekday or weekend flows and accounting for infiltration immediately prior to a storm. Compensation for any pre-storm elevated flows is termed "precompensation". The process of breaking down the hydraulic impact on a basin associated with rainfall is termed decomposition. The decomposition hydrograph for Site/basin01 during the December 12, 2015 storm event is depicted in Figure 4.1.

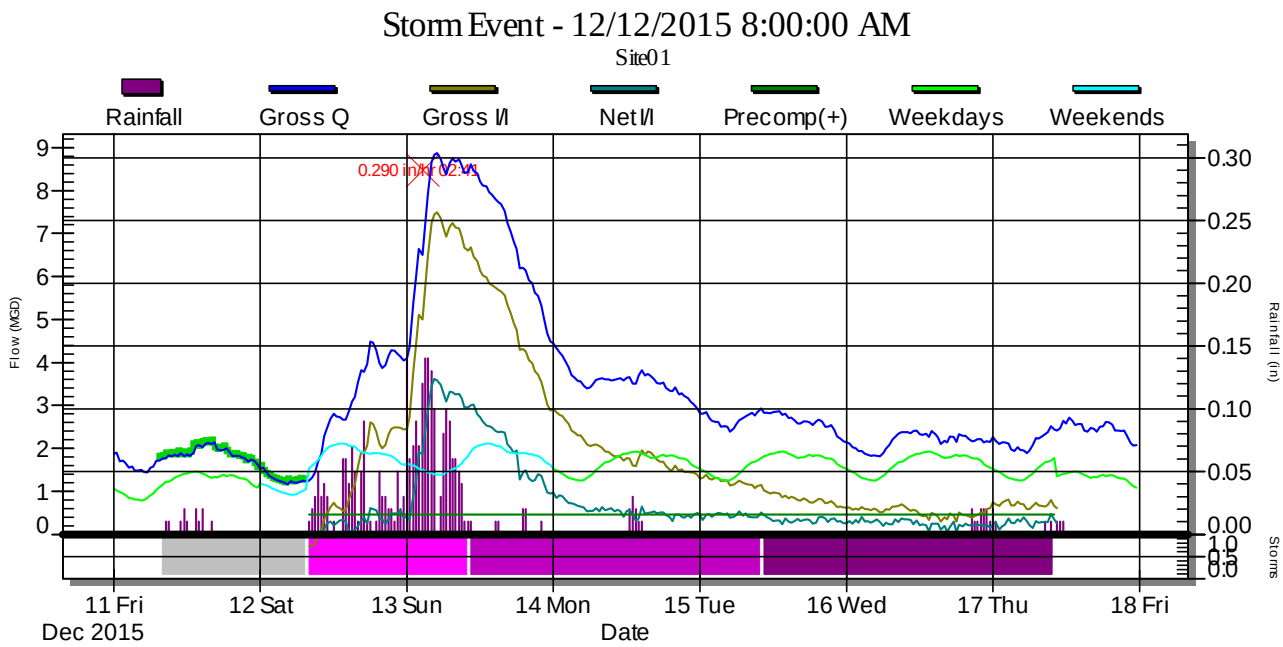


Figure 4.1 – Site/Basin01 Decomposition Hydrograph

The hydrograph in Figure 4.1 shows that Basin01 produced a measurable gross RDII response (shown as "Gross I/I in the figure). The gross RDII includes all upstream flows (including those from meter Site10). The net RDII (shown as "Net I/I" in the figure) depicts RDII flows attributed only to Basin01 by subtracting upstream flows from Site10.

In Figure 4.1, the gray highlighted time period prior to the storm period is the period during which precompensation is determined. The light purple period is the storm period. The two darker purple periods following the storm period are the recovery periods R1 and R2. The entire period including storm and recovery periods is called the Event period. The entire Event period of each storm is used exclusively for evaluation of RDII in this study. Each of these periods is set at 24 hours in duration unless they are extended or reduced due to factors including longer storm period, short duration to subsequent storms, and short duration from previous storms (reduced precompensation

period).

ADS notes that some practitioners attempt to assign RDII responses during early periods of storms or even assign peak RDII rates observed exclusively to the inflow component of RDII. However, ADS has observed that this can be an erroneous assumption. Peak flow responses are often observed after much of the rain has fallen. Furthermore, inflow sources can be delayed (e.g. clogged area drains that are directly connected to the sewer) and infiltration sources can often materialize as very fast responses to rainfall (e.g. flooded sewer trenches that quickly drain into the sewer pipe). Therefore, ADS treats infiltration and inflow as RDII and can be characterized as fast or slow responding. The actual sources can require extensive additional effort to uncover.

The RDII hydrographs for each basin during the evaluated wet weather events are included in Appendix A.

4.1 Net RDII Analysis

Net RDII or raw volume of RDII in millions of gallons (MG) from each basin was determined and summarized in Table 4.1 for the two (2) largest storm event periods. The net RDII volumes in millions of gallons for each basin for each storm event period (storm period plus recovery periods) are summarized in the table. In addition, the net RDII peaks observed from each basin (peak rate in MGD) during each storm event are summarized in the table. It is noted that the total of all peaks in the table is for informational purposes only and will be higher than the total peak that would have been observed at any one location in the system due to varying time of travel and attenuation of peaks across the entire system.

Table 4.1
Summary of Net RDII volume (MG) and peak (MGD) per Storm Event

Basin/ Meter ID	12/12/15		1/17/16	
	RDII (MG)	RDII Peak (MGD)	RDII (MG)	RDII Peak (MGD)
Site01	3.73	3.62	1.30	2.99
Site02	2.51	1.70	1.33	1.38
Site03	0.50	0.53	0.22	0.47
Site04	1.85	1.33	0.71	0.85
Site05	0.65	0.48	0.33	0.37
Site06	6.45	3.02	3.93	2.39
Site07	3.73	2.06	1.71	1.57
Site08	2.18	2.17	1.05	1.61
Site09	2.83	1.75	1.22	1.12
Site10	6.36	3.94	2.74	2.81
TOTAL*	30.8	20.6	14.5	15.6

4.2 Q vs. i diagrams

There is a relationship between rainfall volume (in.) during a storm event and net RDII volume (MG) in each basin. This correlation between net RDII in each basin to rainfall can be depicted graphically and is termed a Q vs. i diagram. The Q vs i diagram can be depicted to represent rainfall only during the storm period (only the light purple banded period shown in Figure 4.1) or for rainfall over the entire storm event (storm plus the two recovery periods – typically covering at least 72 hours). Since the larger RDII responses in the study basins extend well past the storm period, the entire event period was evaluated. The Q vs. i diagram for excess volume response over the entire event period is depicted in Figure 4.2 for Basin06.

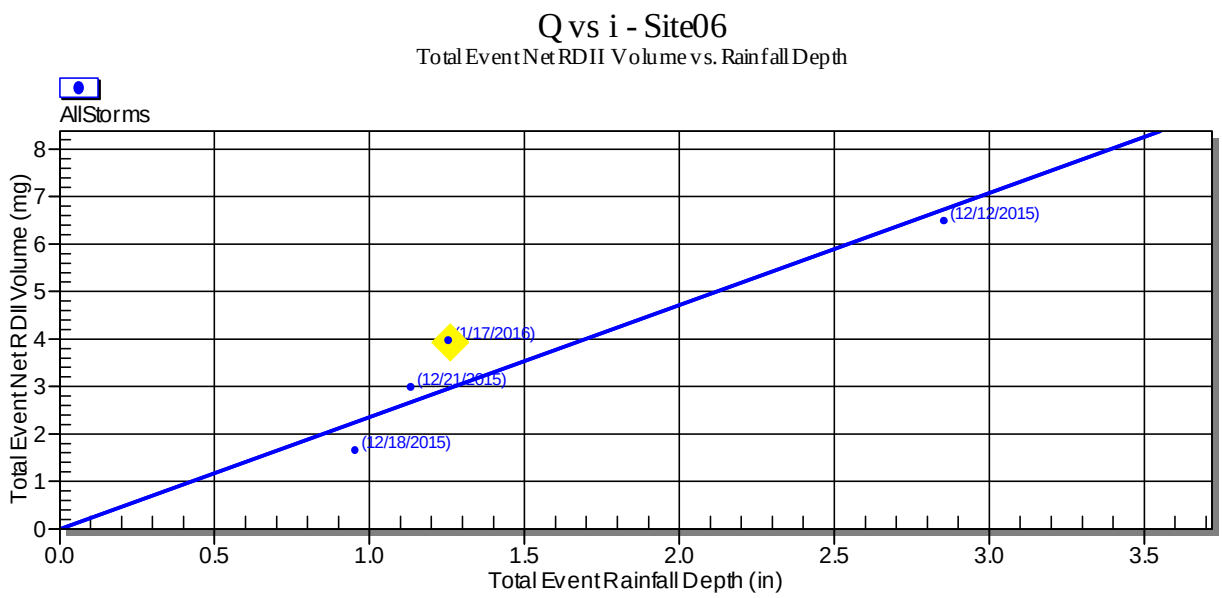


Figure 4.2 - Q vs. i Diagram for Basin06

In nearly all basins in this study, there was a nearly linear relationship of increasing rainfall to increasing RDII volume. However, in some cases the relationship between excess RDII volume and rainfall is less correlated. This response variability can sometimes be explained by antecedent soil moisture conditions (i.e. whether the rain event occurred shortly after a previous event or occurred later in the wet season). In the case of Basin06, the January 17 event response was higher than would have been anticipated based on a linear relationship as can be seen in Figure 4.2. This suggests that this basin is sensitive to antecedent moisture conditions. This is materialized as a higher effective R-value for this basin during the January 17 storm as discussed in section 4.3 below.

Q vs. i diagrams can be a useful tool for determining degree of success of RDII elimination efforts. Q vs. i diagrams for storm event periods are included in Appendix A.

4.3 Normalized RDII Analysis - %Rainfall Ingress

To enable a comparison of RDII between basins of differing sizes, the net RDII volumes for each basin were “normalized”. This means that the volume of RDII was divided by rainfall (inches) and by basin size (in acres or lineal feet (lf) of pipe) to enable an apples-to-apples comparison of results among basins. The normalized RDII value is in units of % rainfall ingress (or R-value) or gallons per foot of pipe per inch of rain depending on the use of basin size units of acres or lf, respectively. A summary of the normalized net RDII in terms of %rainfall ingress in each basin during the 2 largest storm events is provided in Figure 4.3 (sorted from worst to best in terms of storm 1 performance). A sorted summary of normalized net RDII in units of gallons per foot of pipe per inch rain is provided in Figure 4.4. A color map depicting a categorized view of basin RDII performance (in terms of maximum observed %rainfall ingress) is depicted as Figure 4.5.

The elevated normalized RDII in Basin06 during the smaller storm 4 vs larger storm 1 is evident in Figures 4.3 and 4.4. This suggests that this basin is sensitive to antecedent soil moisture conditions (i.e. RDII response is worse for the same amount of rainfall as the wet season progresses).

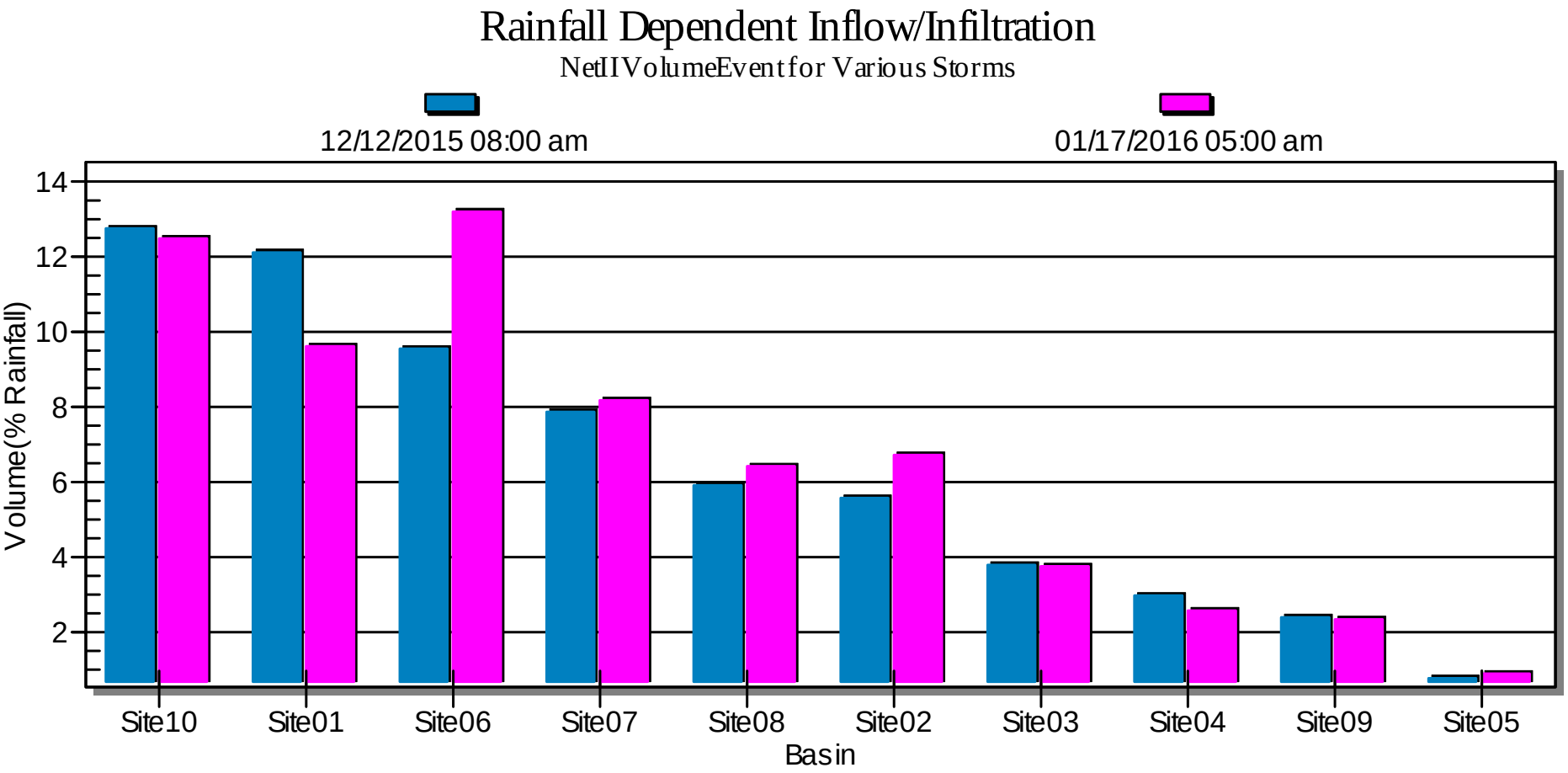


Figure 4.3 - Normalized RDII (% Rainfall Ingress)

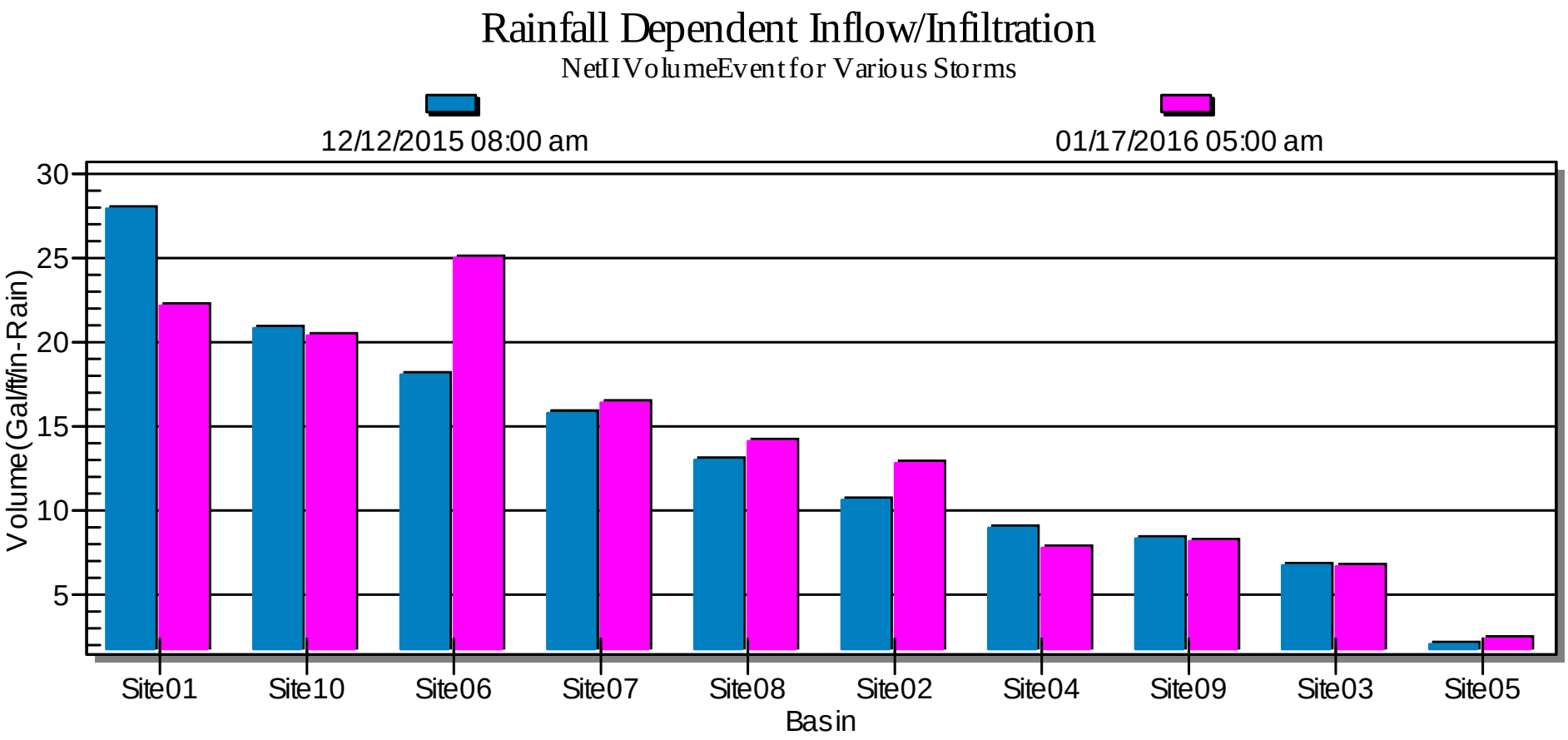


Figure 4.4 - Normalized RDII (Gal / ft / in rain)

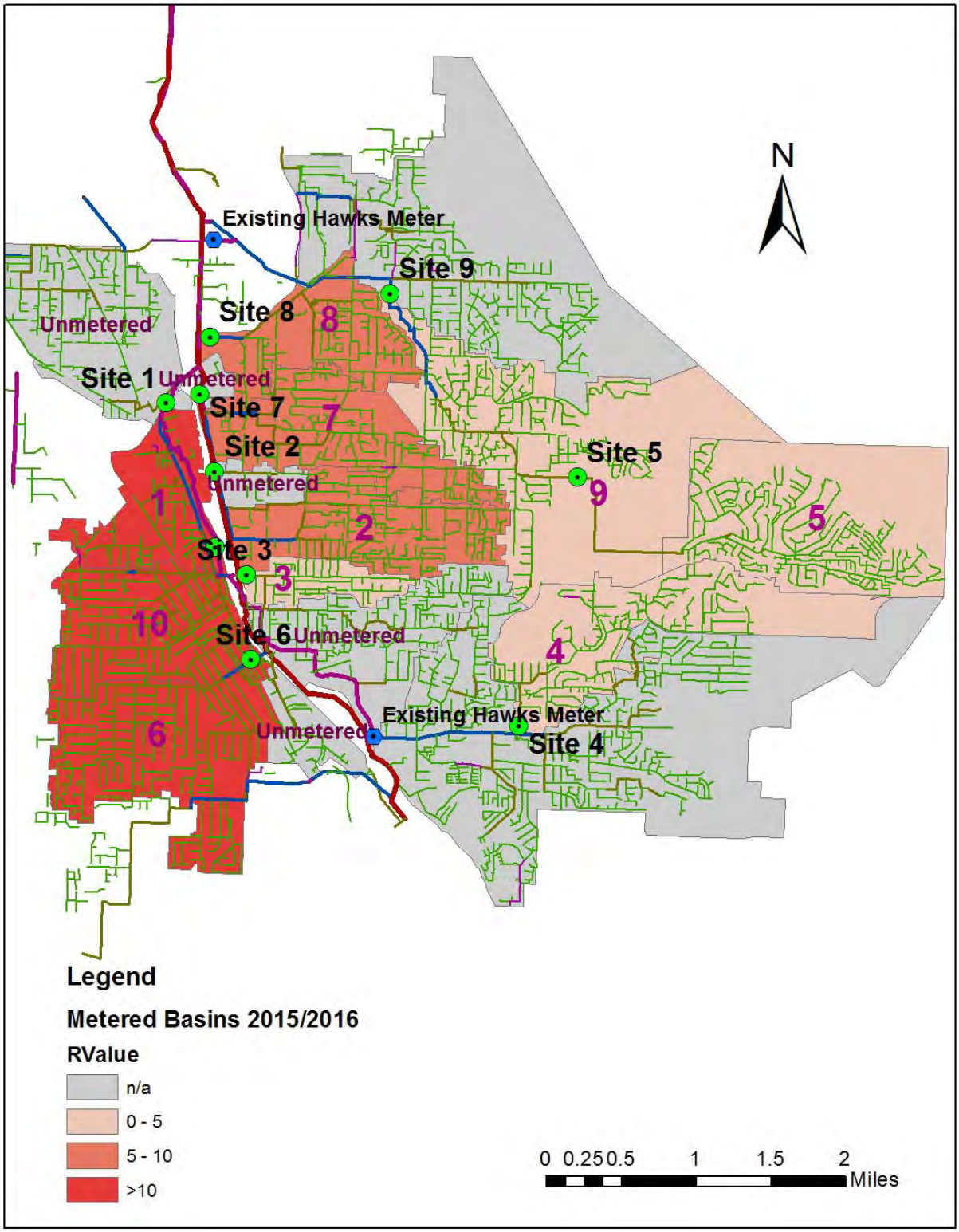


Figure 4.5 – Medford Basins R-Values

Based upon published sewer rehabilitation results from 99 basins worldwide[1], sanitary sewer basins are generally considered to be performing adequately if consistently less than 5% of the rainfall enters the sewer during heavy rain events. Numeric values of percent rainfall ingress can be equated directly to numeric units of gallons per foot of pipe per inch of rain (gal/ft/in-rain as also normalized herein) in basins with typical ratios of about 250 feet of sewer pipe per developed acre. Also, a wastewater generation rate of 5 gallons per foot of pipe is considered a reasonable average for a typical medium density residential area. Therefore, excess wet weather flow (RDII) that adds more than 5 gal/ft/in rain to the system suggests the value, 5, is a reasonable performance benchmark to use when evaluating using these normalized metrics.

The three (3) basins (associated with Site01, 06 and 10) generating the highest relative RDII are located in the western part of the system (see Figure 4.5). These western basins produce well in excess of 10% rainfall ingress. These basins represent about 34% of the ADS-metered system area, and produce about 55% of the total RDII volume.

It is notable that the performance metrics using pipe footage appear worse (higher than benchmark values). This likely indicates that most of the study area is comprised of lower density development (less than 250 feet of sewer pipe per acre).

4.4 Normalized RDII Analysis – Net RDII Peak Factor

Another basin performance parameter evaluated was storm period net RDII flow peak factor. This is defined as the net RDII peak rate plus normal average dry day flow (ADDF) divided by ADDF. This evaluation can be useful in circumstances where RDII volume may be relatively low, but excessive short-term peaks of RDII flow rates are evident during storm events. This allows an alternate prioritization that may highlight basins responsible for creating short-term capacity issues downstream. The disadvantage of this evaluation parameter is that it does not directly account for rainfall (i.e. parameter is not divided by rainfall amount).

RDII peak factors observed during the study period for each basin are listed in Figure 4.6 sorted from highest to lowest. Site/basin01 exhibited the highest peak factor at 9.3. Basin01 and 10 peak factors correlate generally well with those basins yielding the highest normalized RDII while Basin04 was the 3rd highest peak factor, but exhibited the 3rd lowest R-value. This may suggest that there are some inflow sources in Basin04 causing short duration peaks to occur. This may also be true (sources of inflow) for Basin01 and 10.

[1] Keefe, P.N. “Test Basins for I/I Reduction and SSO Elimination”, 1998, WEF Wet Weather Specialty Conference, Cleveland, Ohio.

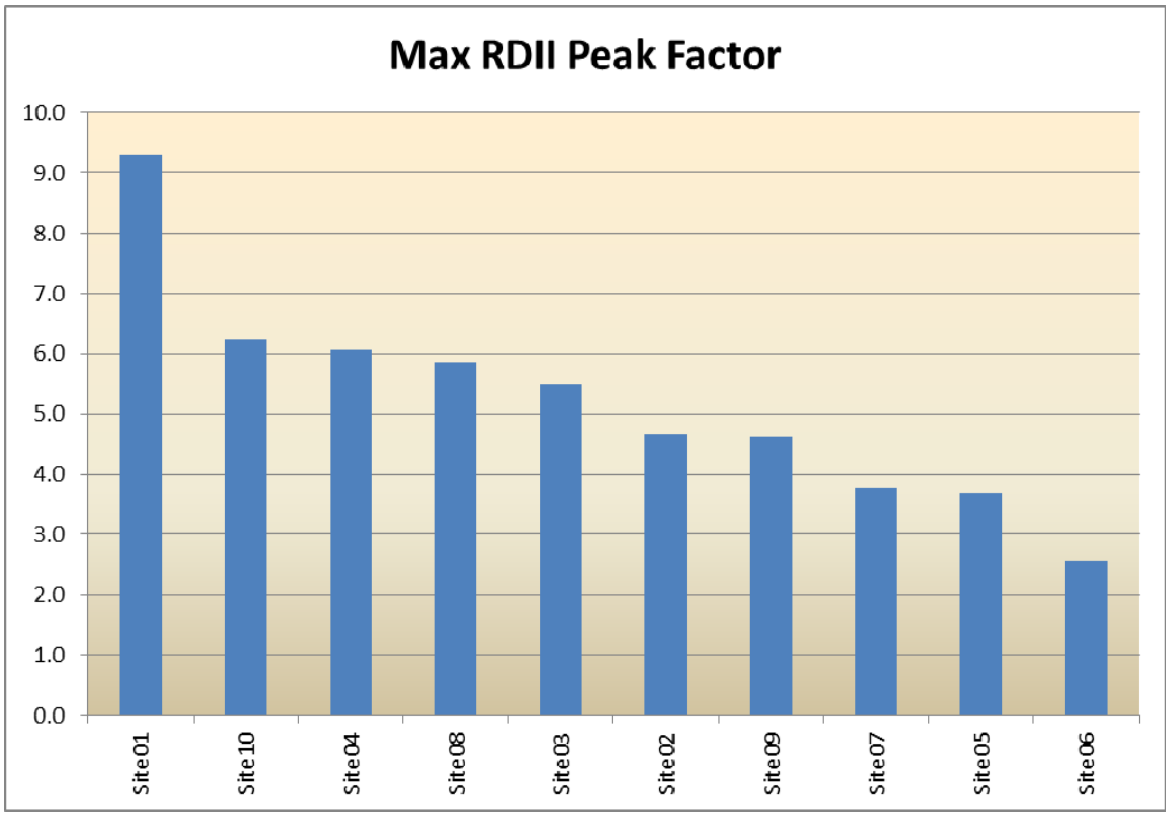


Figure 4.6 – Sorted RDII Peak Factor

Table 4.2 presents a summary of maximum observed values of rain-normalized RDII (as % rain ingress or R-value), base infiltration and RDII peak factor. Values in each of these performance categories have been bold-highlighted in the table where considered excessive. There is a good correlation between R-value and peak factor in Basin01 and 10. This suggests there may be an inflow component to RDII in these basins. The Basin06 R-value (2nd highest) correlates well with BI (highest value). This may reflect a high infiltration component of RDII in this basin.

Table 4.2 Summary of RDII and BI Performance			
Basin/ Meter ID	**Max Net R-value** (%Rain)	**Net Base Infiltration** (%ADDF)	**Maximum Net RDII Peak Factor**
Site01	**12.1**	**55%**	**9.3**
Site02	6.7	39%	4.7
Site03	3.8	36%	5.5
Site04	3.0	**54%**	**6.1**
Site05	1.0	35%	3.7
Site06	**13.2**	**60%**	2.6
Site07	8.2	44%	3.8
Site08	6.4	**49%**	5.9
Site09	2.4	30%	4.6
Site10	**14.2**	36%	**6.2**

5 MONITORING SITE HYDRAULIC ANALYSIS

A hydraulic analysis was performed at each flow-monitoring site using gross flows to evaluate the pipeline hydraulic conditions at the site. The basis of this evaluation was to compare the ratio of depth-of-flow to the diameter (d/D) of the pipe throughout the study period and evaluate the pipes' dynamic hydraulic performance based on depth & velocity scattergraph analyses.

5.1 d/D Ratio Evaluation

Typically, sanitary sewers are conservatively designed to operate at no more than three-quarters full at peak flow.[2] Pipes 15" in diameter and smaller are often designed to flow half full or less. When a d/D ratio exceeds 1.0, the pipe is running full (or is in surcharge) it may indicate that flow in the pipeline or downstream system has exceeded design capacity.

Figure 5.1 depicts a chart of typical dry day hourly peak d/D vs. max hourly d/D values recorded during the study period.

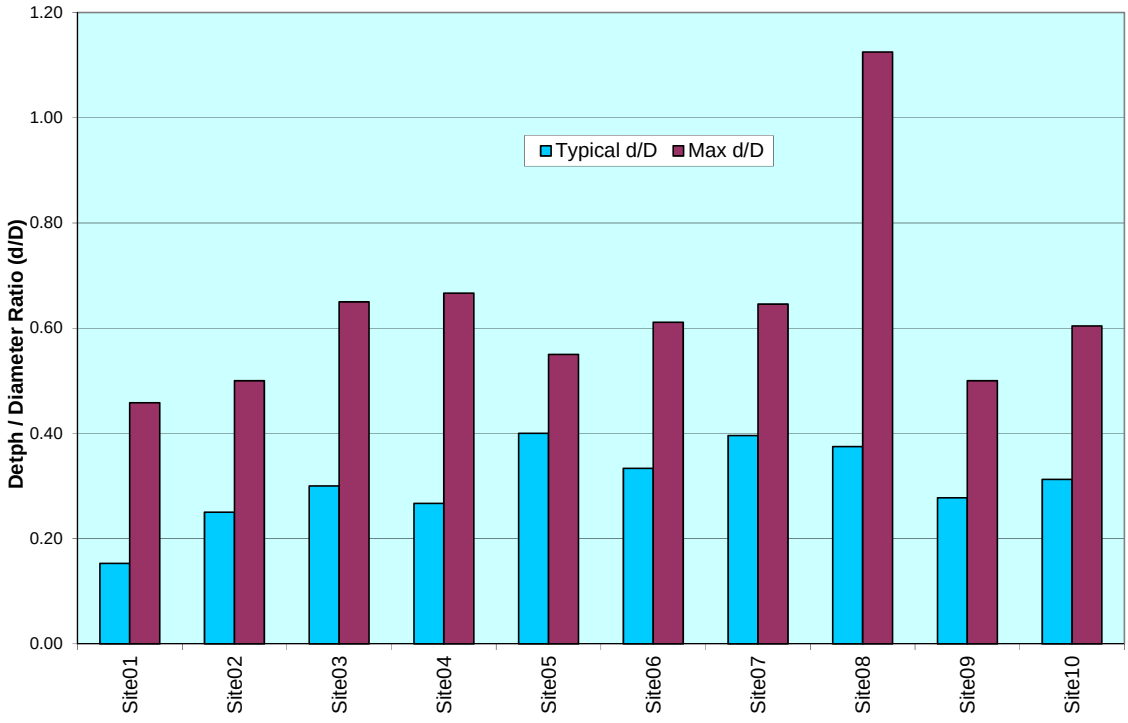


Figure 5.1 – Peak Flow Depth (d) vs. Pipe Diameter (D) Chart

[2] Gravity Sanitary Sewer Design and Construction, 2nd Ed. WEF Manual of Practice FD-5, 2007.

Site08 experienced surcharged conditions during the two largest storm events on December 12, 2015 and January 17, 2016.

5.2 Depth versus Velocity Scattergraph Analysis

The flow data for each basin monitor was reviewed for indications of possible hydraulically anomalous behavior caused by flow restrictions. This included a review of scattergraph plots of velocity versus depth data points that are instructive in identifying hydraulic anomalies such as backwater conditions (i.e. signs of downstream obstructions or restrictions).

The scattergraph for Site01 is depicted in Figure 5.2. In this data plot, the red curve (or pipe curve) depicts the pipe's theoretical flow depth vs. velocity relationship in ideal open channel flow conditions based on the Manning equation fitted to the actual data points collected from the meter (shown as the Lanfear-Coll or LC curve in the figure). The LC curve uses a Hydraulic Coefficient (C-LC) in place of pipe slope and roughness terms in the Manning equation. The C-LC term is then derived based on actual depth and velocity data points. The series of curves extending to the right hand y-axis indicate lines of constant flow rate or Iso-Q lines.

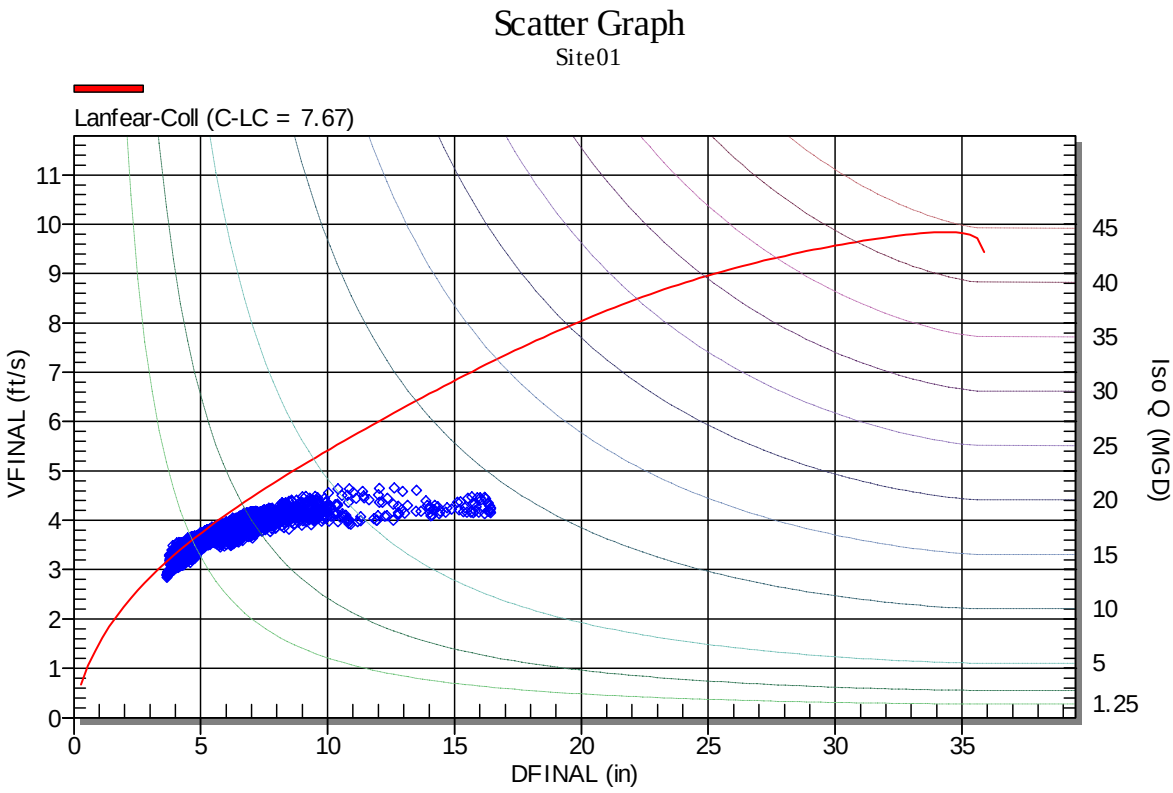


Figure 5.2 – Flow Depth vs. Velocity Scattergraph for Site01

In Figure 5.2, the pipe curve indicates that the pipe would theoretically operate at a velocity ranging from about 0 to nearly 10 ft/s from empty to full-pipe at a flow rate of 0 to nearly 45 mgd over the same span of flow depths.

In backwater conditions, the data will generally depart the expected pipe curve and velocity will stay flat or decrease and follow parallel or nearly parallel to the Iso-Q™ lines. This site shows signs of mild backwater (velocity reaches an apparent maximum of about 4 ft/s regardless of increasing depth) during higher flow periods (> 8 inches depth). This is indicative of a bottleneck (or flow restriction) downstream of the metering point.

Table 5.1 includes a summary of pipe hydraulic performance based on d/D analysis and an examination of each site's scattergraph. The scattergraphs for each of the basin monitoring sites for the study period are included in Appendix A.

Table 5.1 - Hydraulic Performance Summary

Site ID	Pipe Diameter (in)	Typical Peak Depth [1] (in)	Max hourly Peak Depth (in)	Typical d/D [2]	Max hourly d/D [2]	Peak Depth [3] Date/Time	Hydraulic Comments based on scattergraph and hydrograph review
Site01	36	5.5	16.5	0.15	0.46	**12/13/15 9:00 AM**	Mild backwater above 8" depth
Site02	18	4.5	9.0	0.25	0.50	**12/13/15 11:00 AM**	
Site03	10	3.0	6.5	0.30	0.65	**1/17/16 3:00 PM**	
Site04	15	4.0	10.0	0.27	0.67	**12/13/15 4:00 AM**	
Site05	10	4.0	5.5	0.40	0.55	**1/17/16 3:00 PM**	
Site06	18	6.0	11.0	0.33	0.61	**12/13/15 9:00 AM**	
Site07	24	9.5	15.5	0.40	0.65	**12/13/15 11:00 AM**	
Site08	16	6.0	18.0	0.38	**1.13**	**12/13/15 9:00 AM**	Surcharge during Dec 12 and Jan 17 storm periods
Site09	18	5.0	9.0	0.28	0.50	**12/13/15 11:00 AM**	
Site10	24	7.5	14.5	0.31	0.60	**12/13/15 11:00 AM**	

Notes:
1) Typical peak hourly depth data determined from apparent valid data during days not visually affected by rain.
2) Bold highlighted values in typical d/D column are > or = 0.8. Bold highlighted values in Max d/D column are > or = 1.0
3) Bold highlighted values in Peak Depth Date/Time column are those events occuring during rain event.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The flow study successfully captured four (4) system stressing rain events, one of which can be considered a 4-year, 24-hour event. Extremely high meter data uptimes were achieved with excellent data quality.

The three (3) basins (associated with Site01, 06 and 10) generating the highest relative RDII are located in the western part of the system (see Figure 4.5). These western basins produce well in excess of 10% rainfall ingress, which is considered excessive. These basins represent about 34% of the ADS-metered system area, and produce about 55% of the total RDII volume.

Site/basin01 exhibited the highest peak factor at 9.3. Basin01 and 10 peak factors correlate generally well with those basins yielding the highest normalized RDII while Basin04 was the 3rd highest peak factor, but exhibited the 3rd lowest R-value. This may suggest that there are some inflow sources in Basin04 causing short duration peaks to occur. This may also be true (sources of inflow) for Basin01 and 10.

The 4 basins producing about 50% or more of their ADDF as base infiltration (BI) are Basin01, 04, 06 and 08; and these basins generate about 1.8 mgd of BI which is about 63% of the total ADS-metered system BI of about 2.8 mgd. These 4 basins comprise about 38% of the ADS-metered system piping.

Surcharged conditions were observed in the manhole in which flow monitoring was conducted for Site08. None of the other sites monitored experienced surcharged conditions during the study.

6.2 Recommendations

Based on the results of this study, ADS recommends the following:

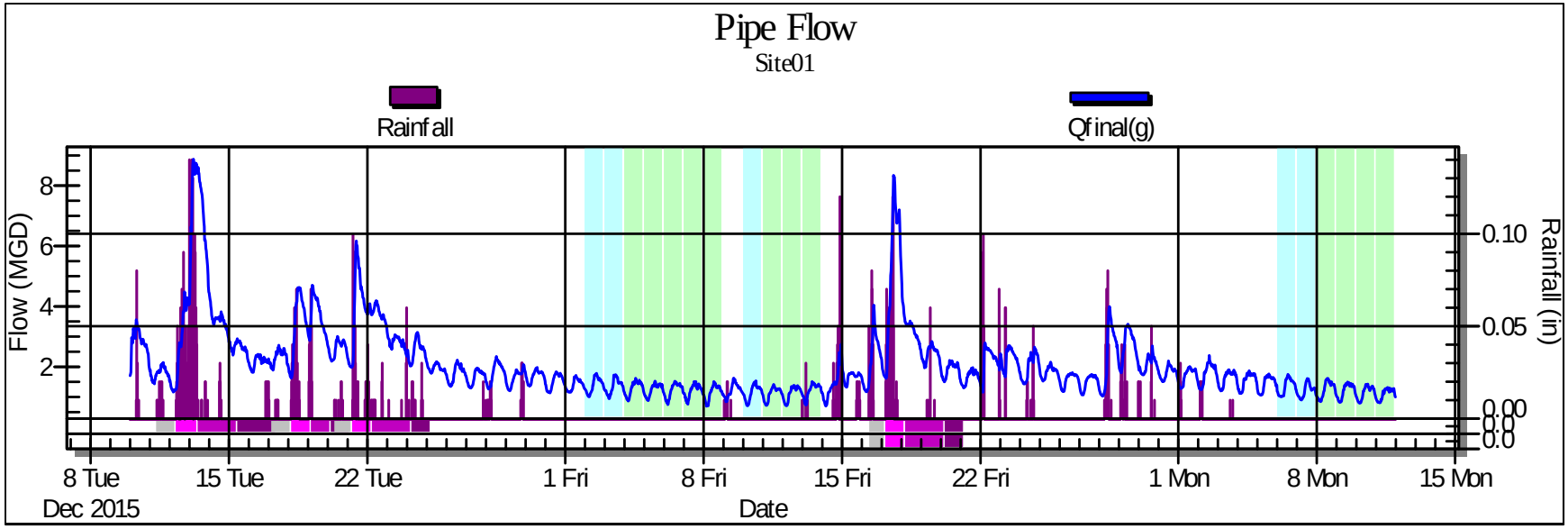
- Isolated zones within the basins identified herein to be yielding excess RDII volumes as well as excess Base Infiltration (BI) should be evaluated using night time flow isolations and/or manhole/ line inspections. This includes Basin01, 06 and 10 and may also include Basin02, 07 and 08 as second priority. Manhole/ line inspections can be conducted using high resolution pipe cameras or CCTV to observe manhole defects and line defects (preferably following a storm event so live leaks can be observed). Any areas with elevated RDII and/or BI in conjunction with known pipe defects can then be prioritized for upgrade or rehabilitation.

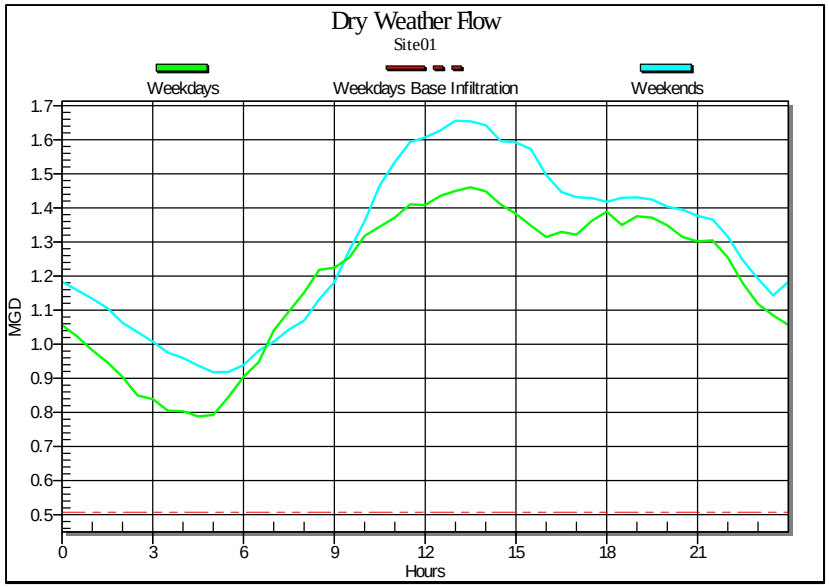
- Basins identified as having a potential inflow component (Basin01 and 10) may benefit from conducting rainfall simulation survey work such as smoke testing. Such testing should be conducted during dry seasons so soil moisture is less likely to preclude the passage and detection of smoke.

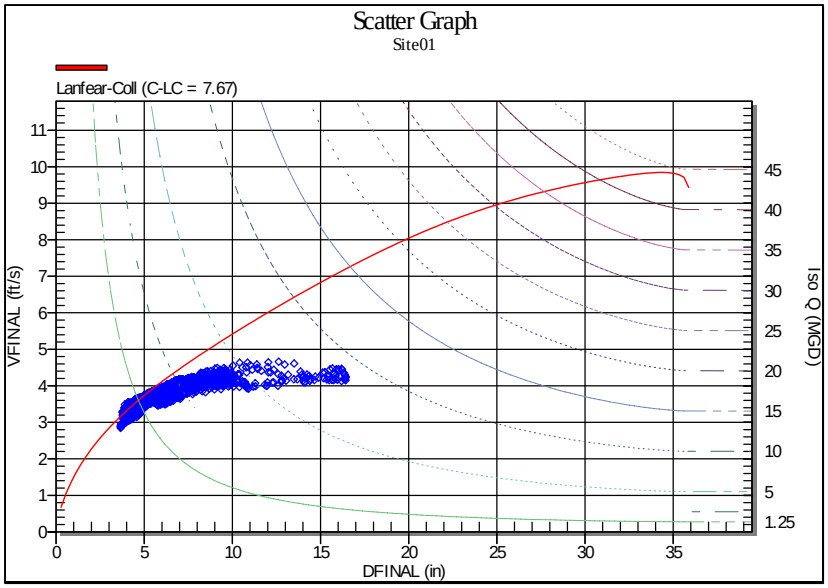
APPENDIX A

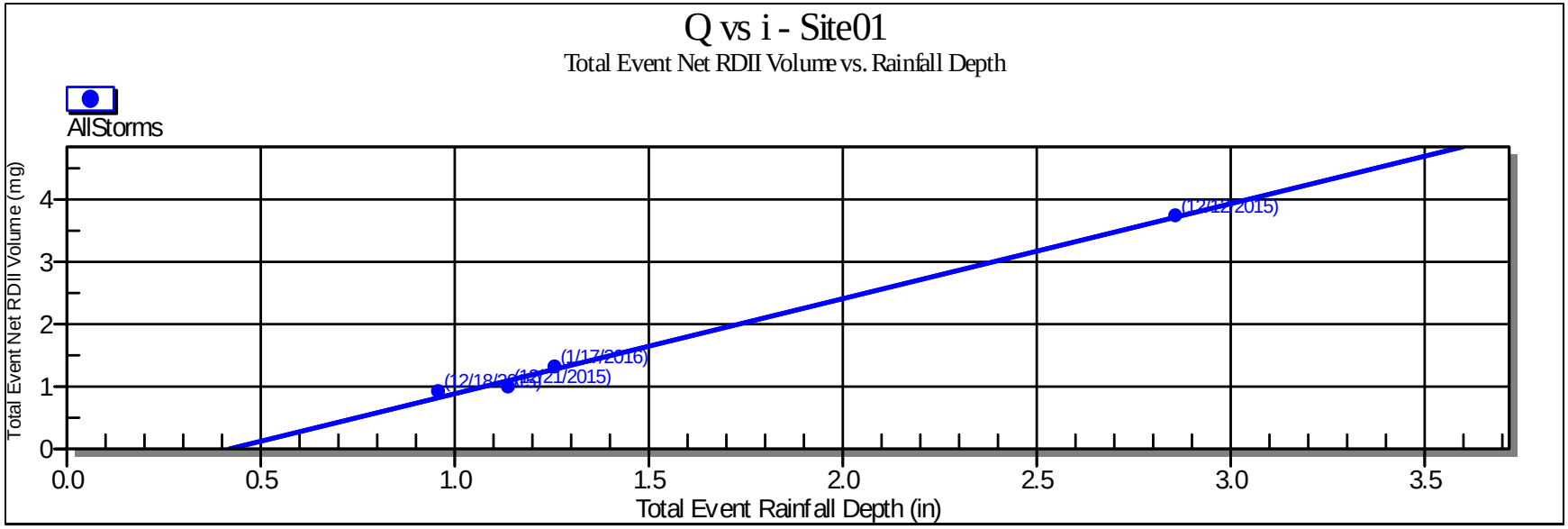
Flow Hydrographs, Dry Day Hydrographs, Scattergraphs,

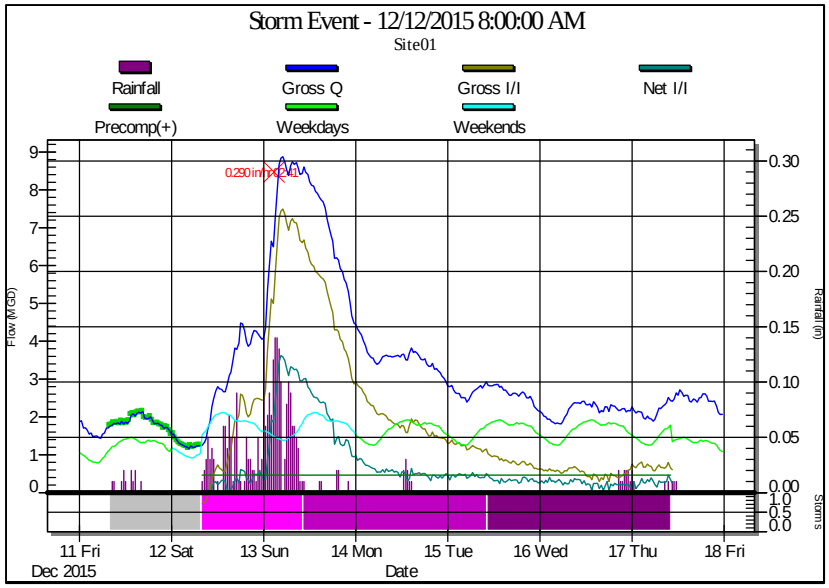
Storm Hydrographs and Q vs i Diagrams

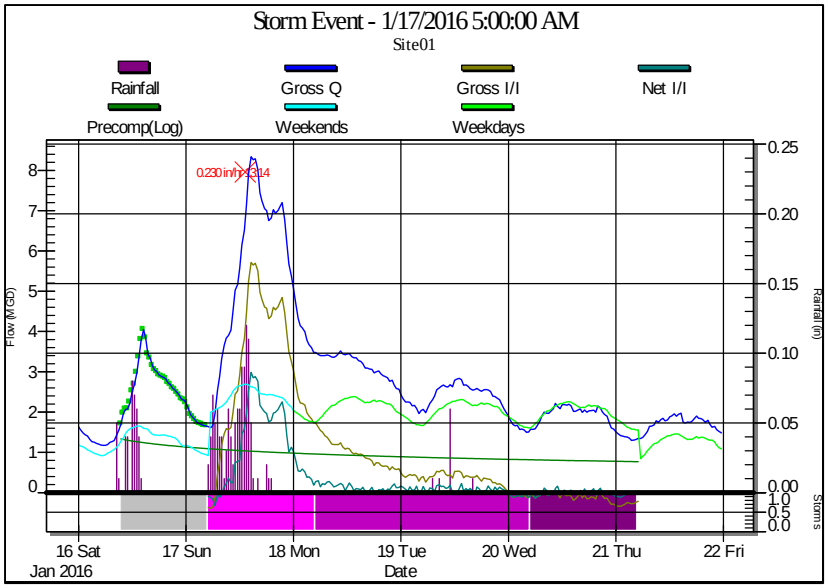

Pipe Flow
Site01
Rainfall
Qfinal(g)
Flow (MGD)
Rainfall (in)
8
6
4
2
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

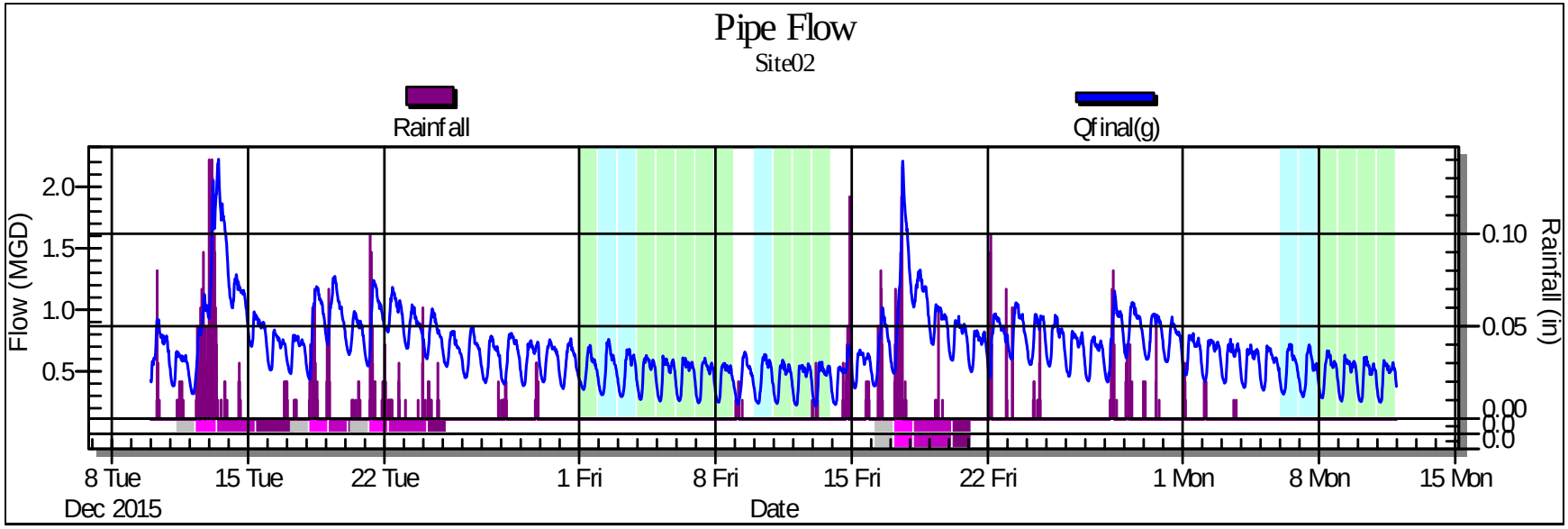

Dry Weather Flow
Site01
Weekdays
Weekdays Base Infiltration
Weekends
MGD
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0
3
6
9
12
15
18
21
Hours

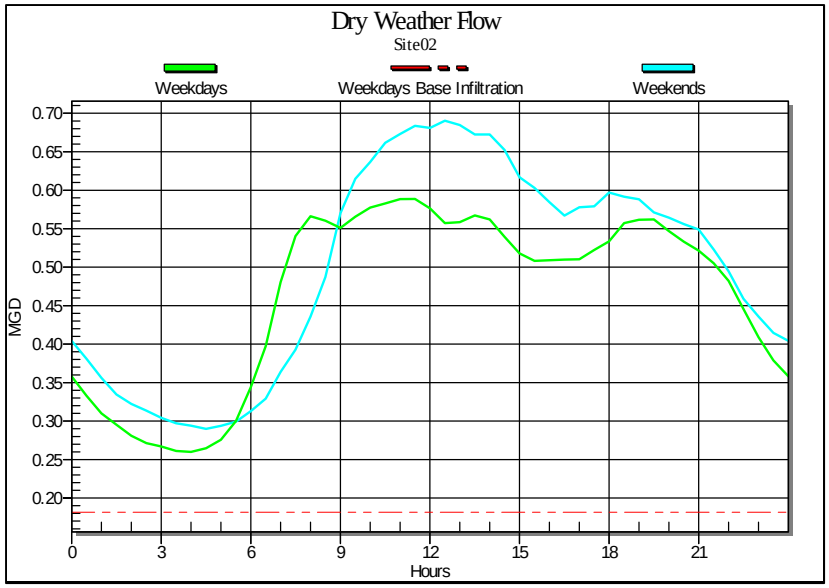

Scatter Graph
Site01
Lanfear-Coll (C-LC = 7.67)
VFINAL (ft/s)
Iso Q (MGD)
11
10
9
8
7
6
5
4
3
2
1
0
45
40
35
30
25
20
15
10
5
1.25
0
5
10
15
20
25
30
35
DFINAL (in)

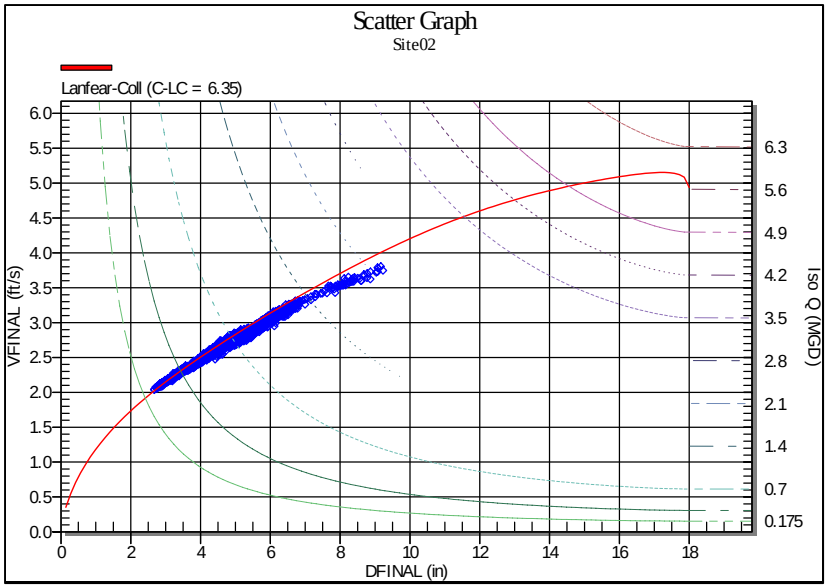

Q vs i - Site01
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/22/2015)
(1/17/2016)
(12/18/2015)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4

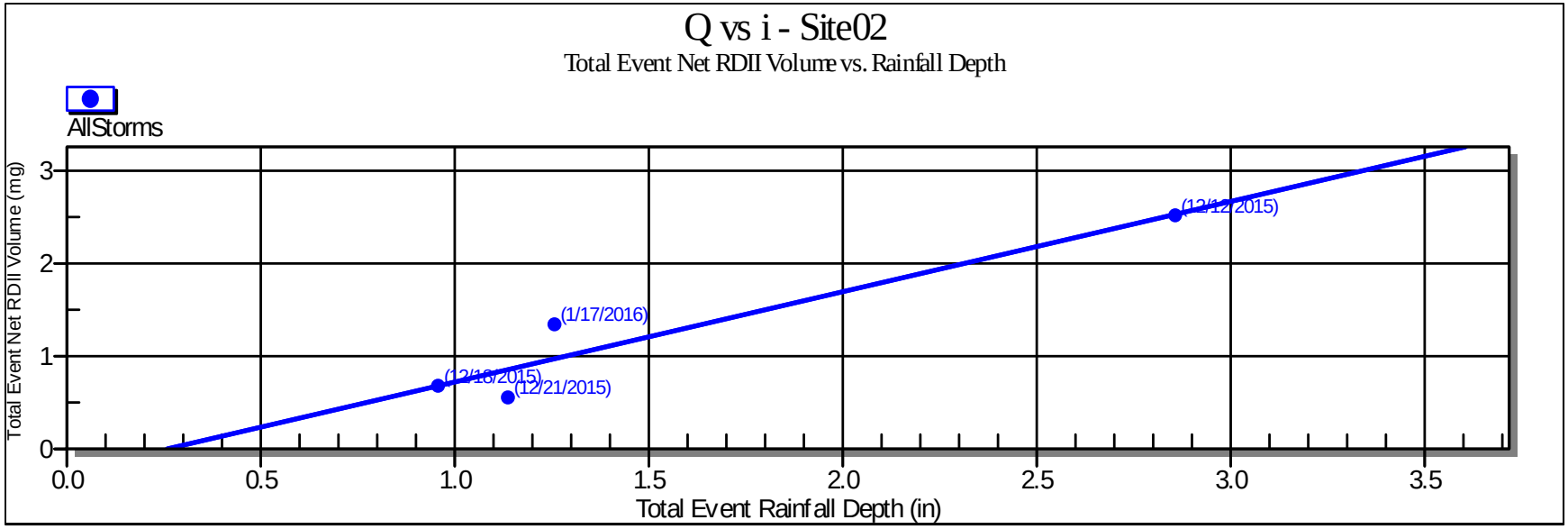

Storm Event - 12/12/2015 8:00:00 AM
Site01
Rainfall
Gross Q
Gross I/I
Net I/I
Precomp(+)
Weekdays
Weekends
Flow (MGD)
Rainfall (in)
Storms
11 Fri
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Dec 2015
Date

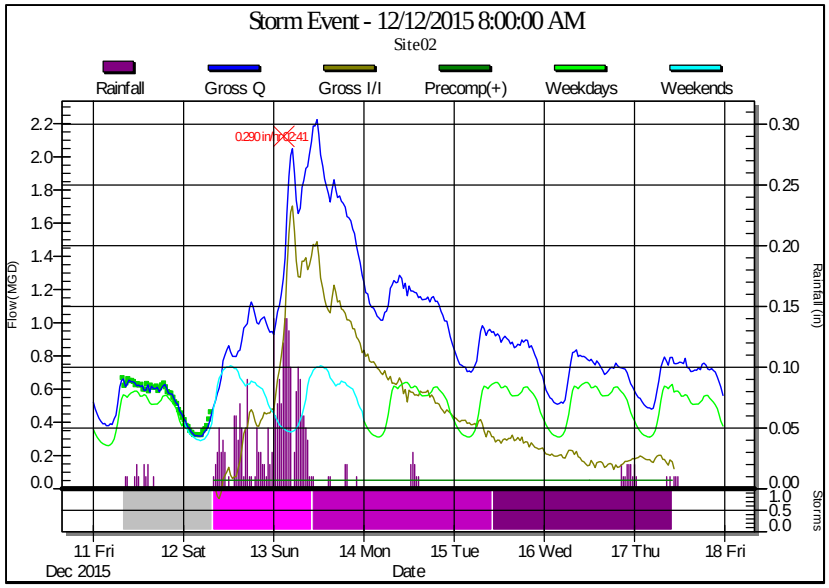

Storm Event - 1/17/2016 5:00:00 AM
Site01
Rainfall
Gross Q
Gross I/I
Net I/I
Precomp(Log)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
16 Sat
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Jan 2016
Date

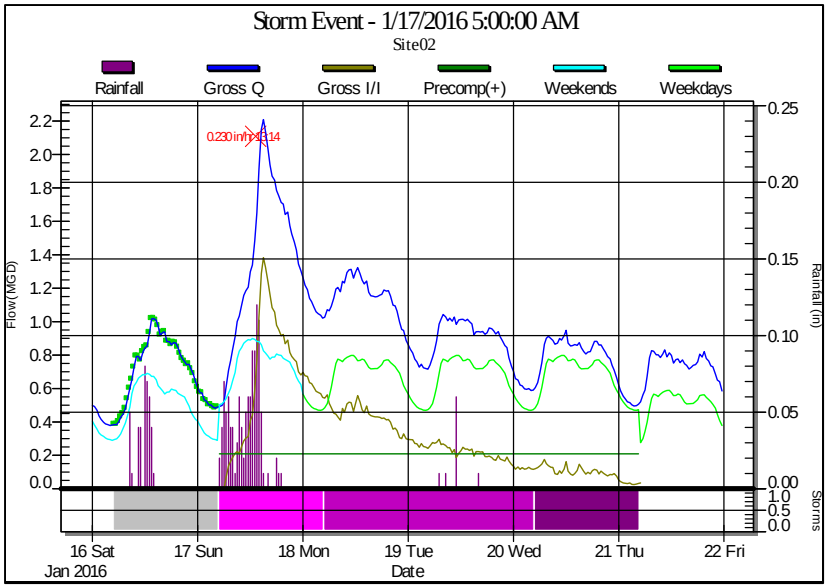

Pipe Flow
Site02
Rainfall
Qfinal(g)
Flow (MGD)
2.0
1.5
1.0
0.5
Rainfall (in)
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

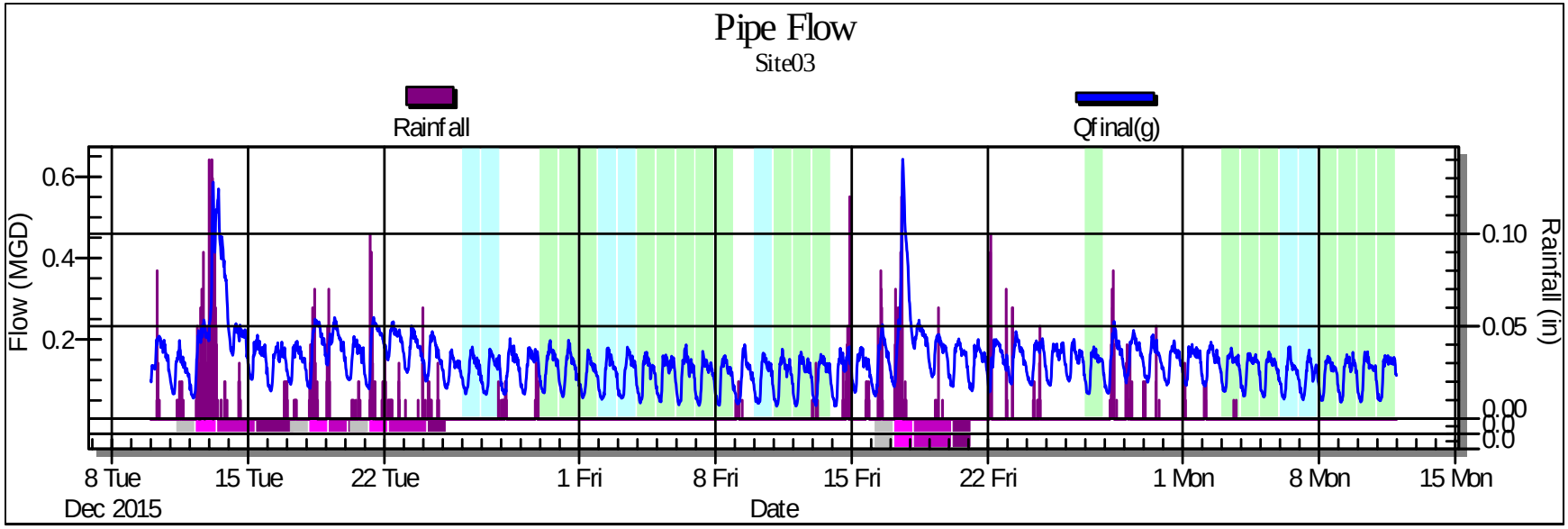

Dry Weather Flow
Site02
Weekdays
Weekdays Base Infiltration
Weekends
MGD
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0
3
6
9
12
15
18
21
Hours

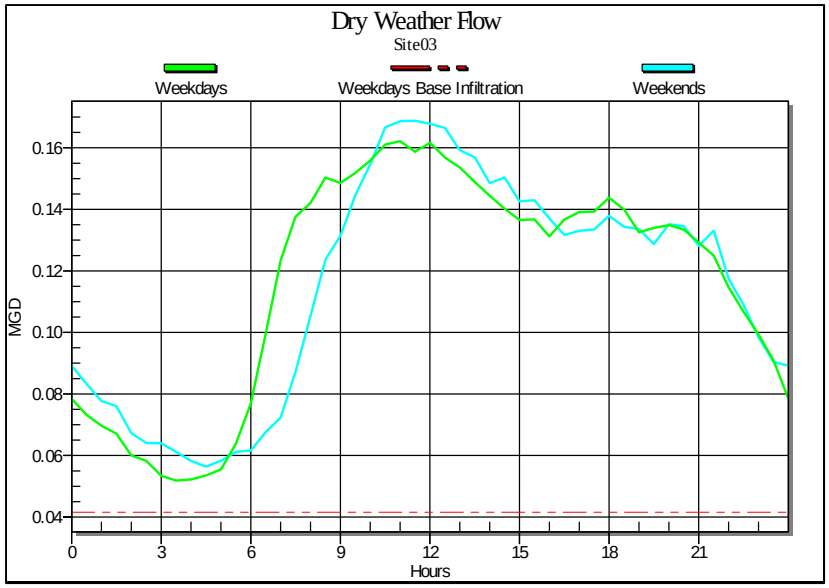

Scatter Graph
Site02
Lanfear-Coll (C-LC = 6.35)
VFINAL (ft/s)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Iso Q (MGD)
6.3
5.6
4.9
4.2
3.5
2.8
2.1
1.4
0.7
0.175
0
2
4
6
8
10
12
14
16
18
DFINAL (in)

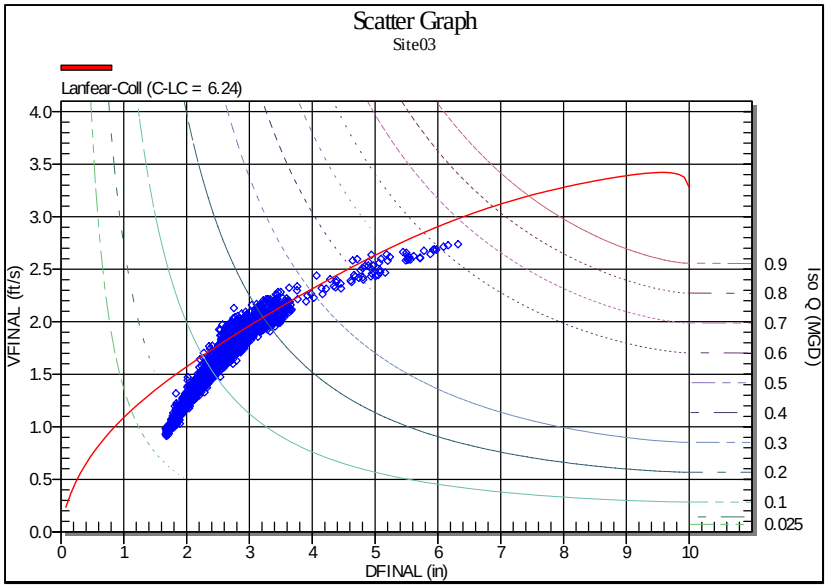

Q vs i - Site02
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
(12/16/2015)
(12/21/2015)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3

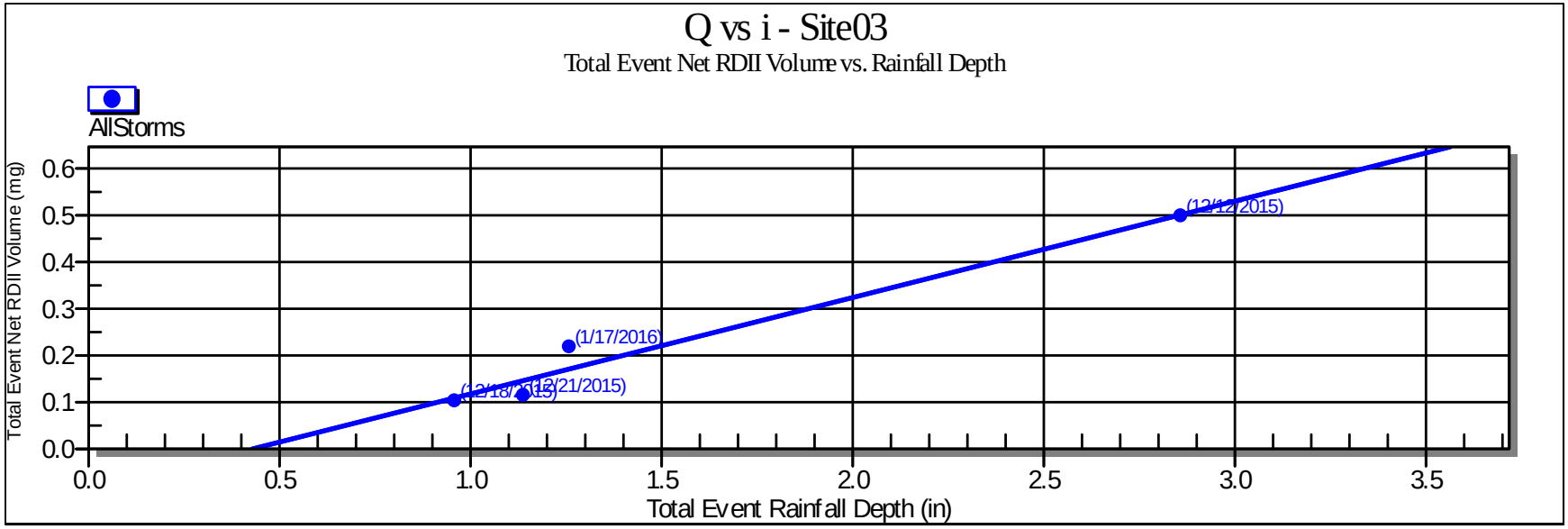

Storm Event - 12/12/2015 8:00:00 AM
Site02
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
Flow (MGD)
Rainfall (in)
Storms
11 Fri
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Dec 2015
Date

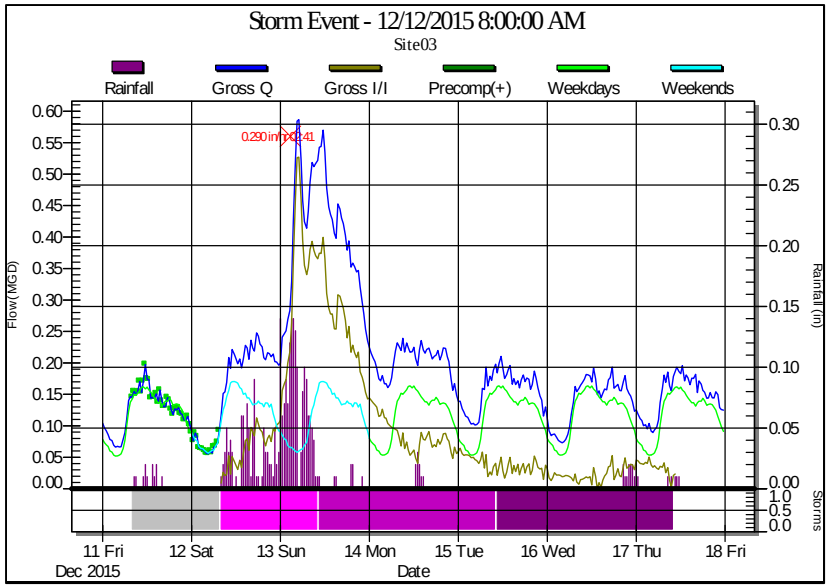

Storm Event - 1/17/2016 5:00:00 AM
Site02
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
16 Sat
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Jan 2016
Date

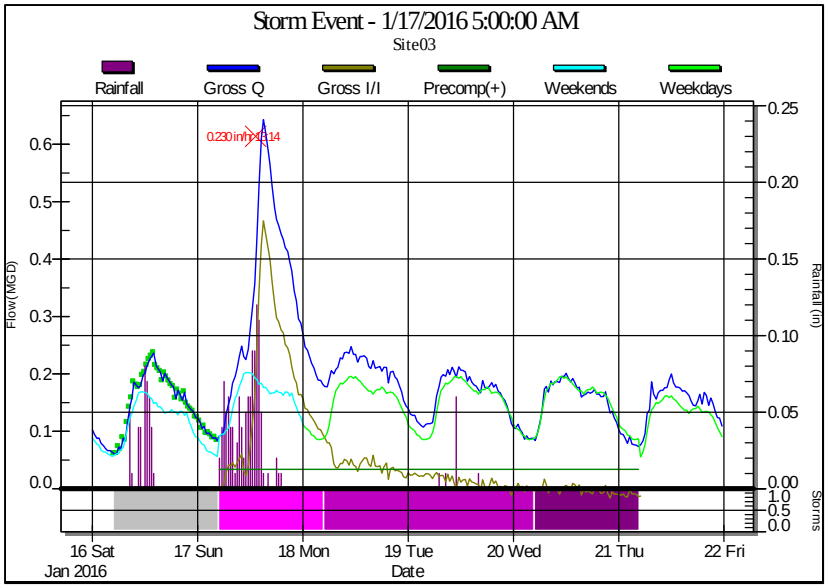

Pipe Flow
Site03
Rainfall
Qfinal(g)
Flow (MGD)
0.6
0.4
0.2
Rainfall (in)
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

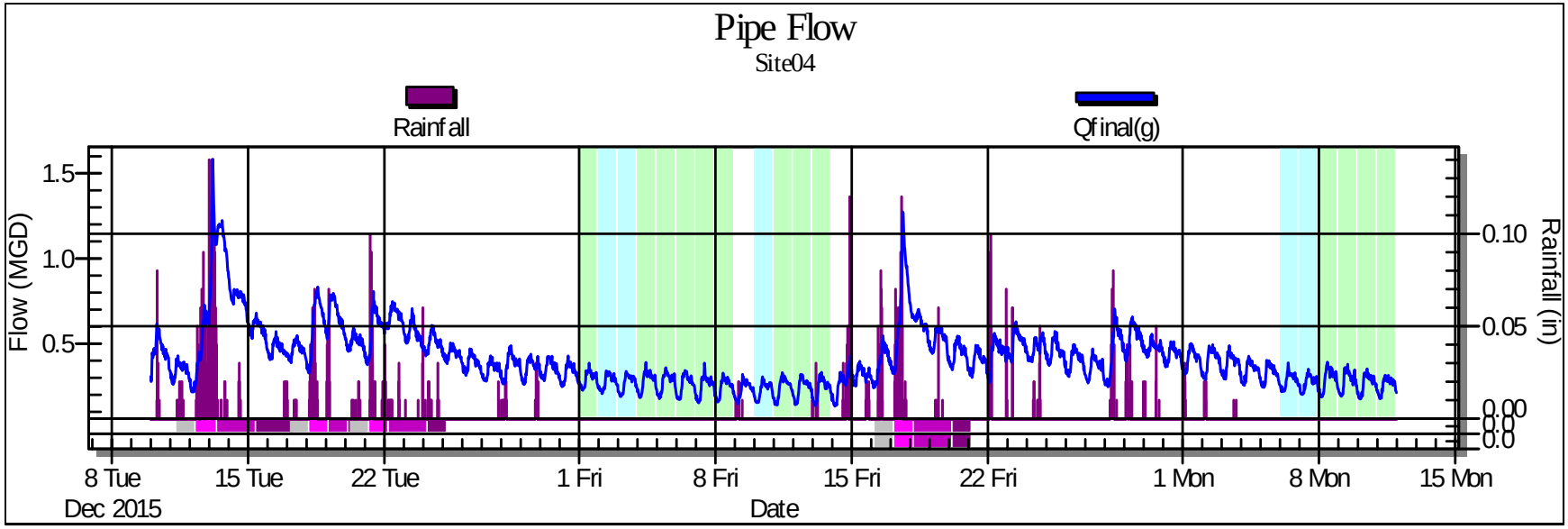

Dry Weather Flow
Site03
Weekdays
Weekdays Base Infiltration
Weekends
MGD
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0
3
6
9
12
15
18
21
Hours

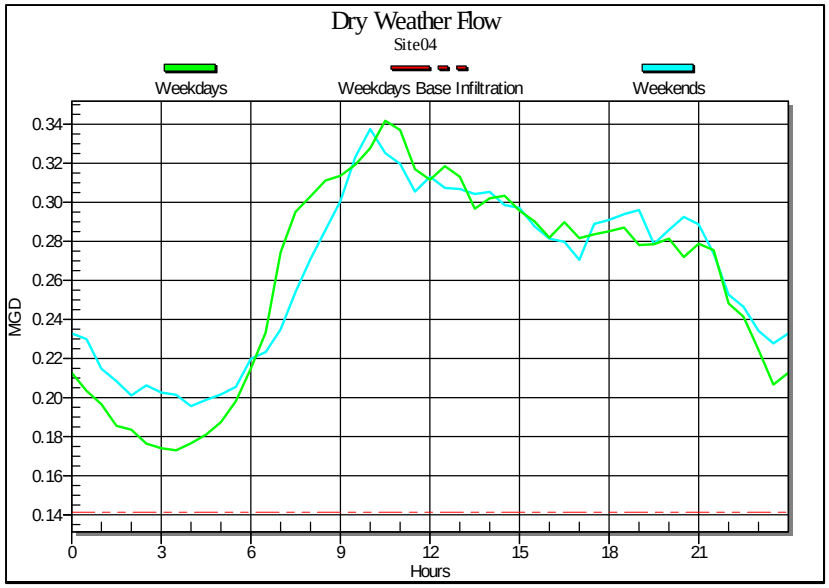

Scatter Graph
Site03
Lanfear-Coll (C-LC = 6.24)
VFINAL (ft/s)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Iso Q (MGD)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.025
0
1
2
3
4
5
6
7
8
9
10
DFINAL (in)

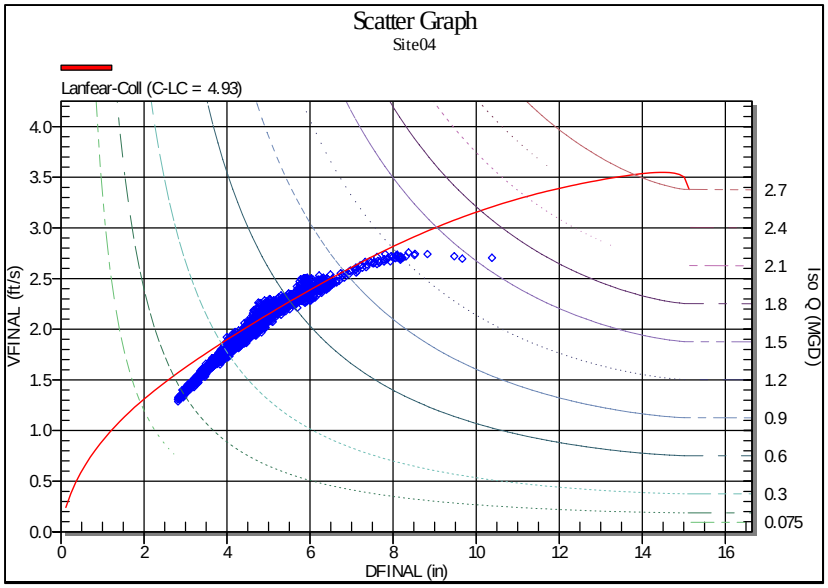

Q vs i - Site03
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
(12/21/2015)

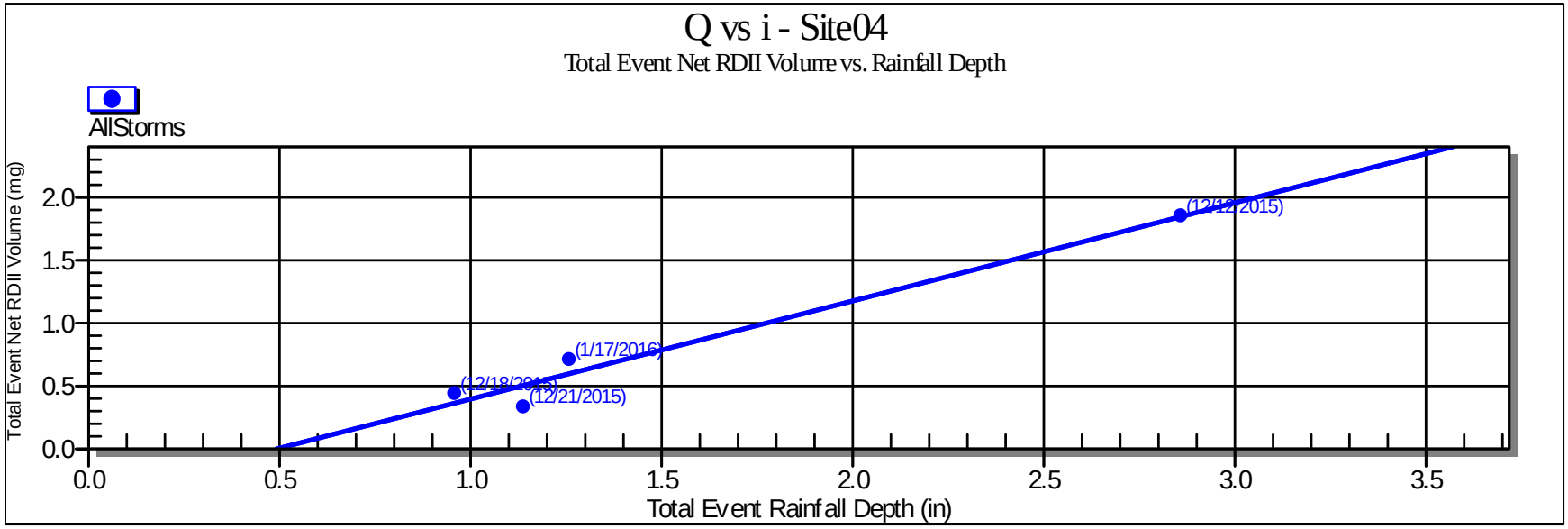

Storm Event - 12/12/2015 8:00:00 AM
Site03
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
Flow (MGD)
Rainfall (in)
Storms
11 Fri
Dec 2015
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Date

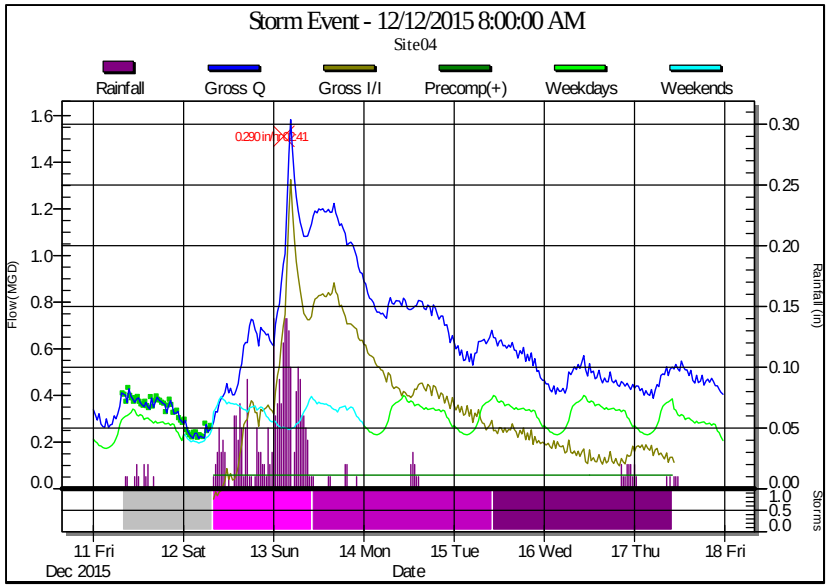

Storm Event - 1/17/2016 5:00:00 AM
Site03
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
16 Sat
Jan 2016
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Date

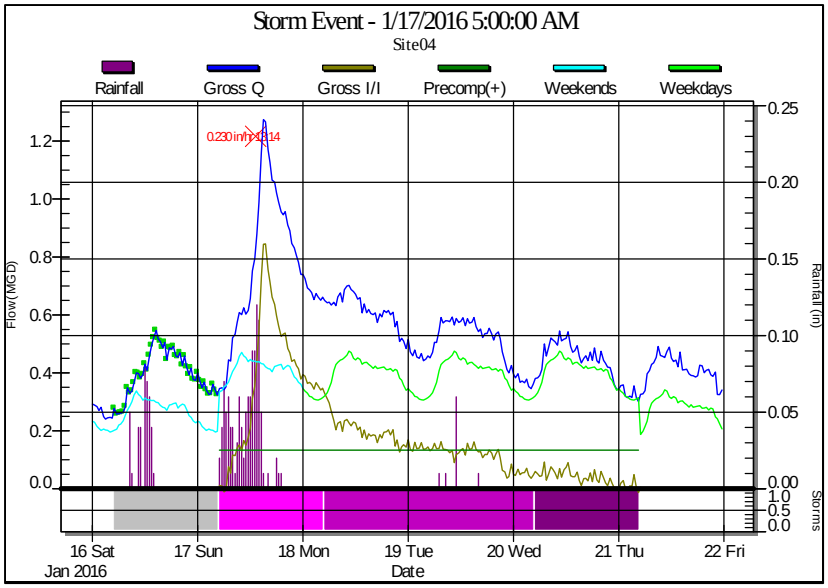

Pipe Flow
Site04
Rainfall
Qfinal(g)
Flow (MGD)
1.5
1.0
0.5
Rainfall (in)
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

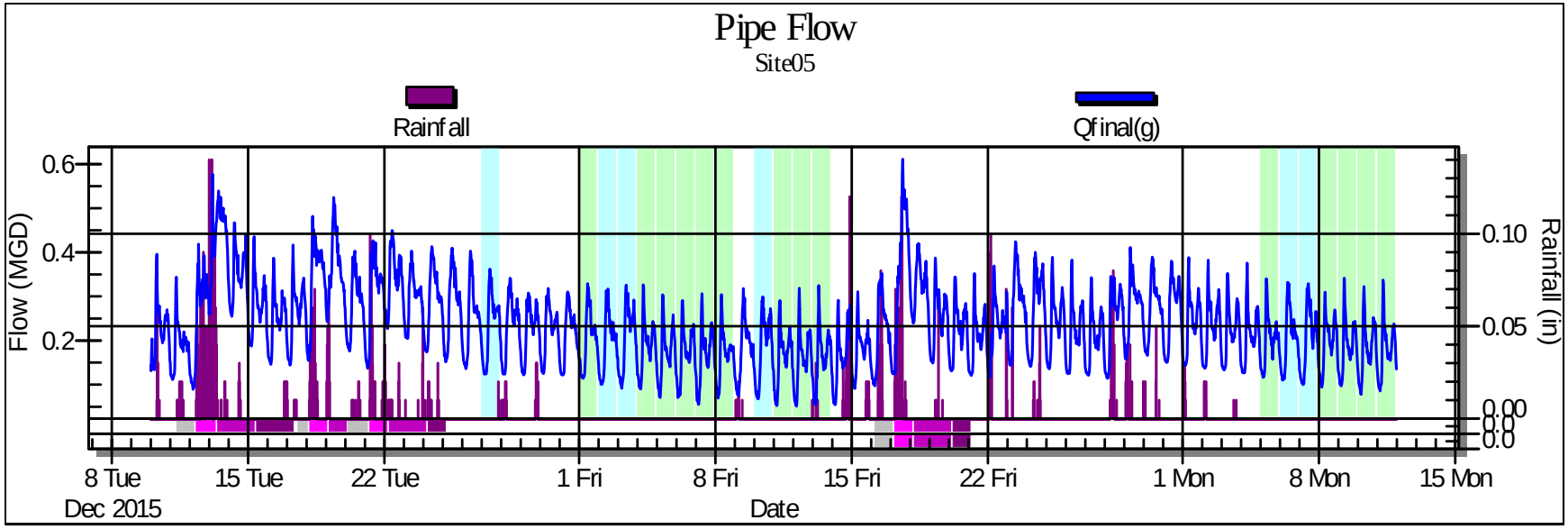

Dry Weather Flow
Site04
Weekdays
Weekdays Base Infiltration
Weekends
MGD
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0
3
6
9
12
15
18
21
Hours

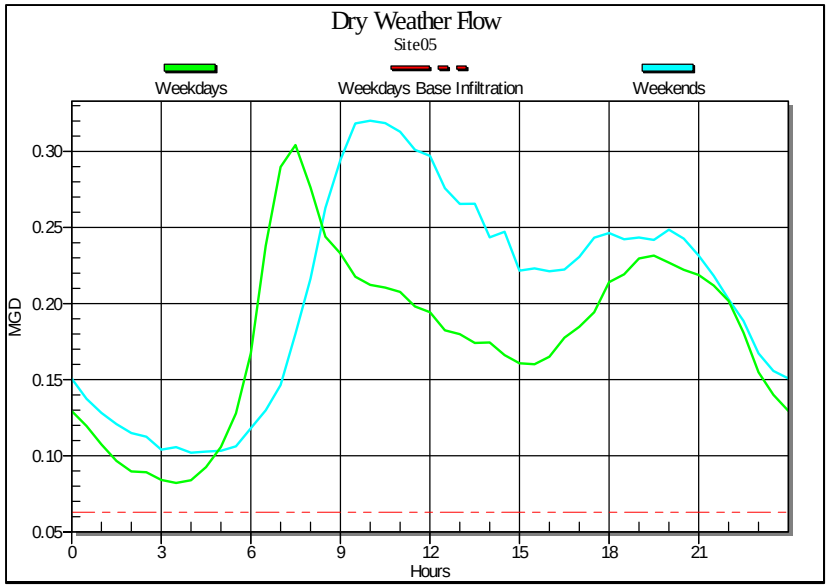

Scatter Graph
Site04
Lanfear-Coll (C-LC = 4.93)
VFINAL (ft/s)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Iso Q (MGD)
2.7
2.4
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.075
0
2
4
6
8
10
12
14
16
DFINAL (in)

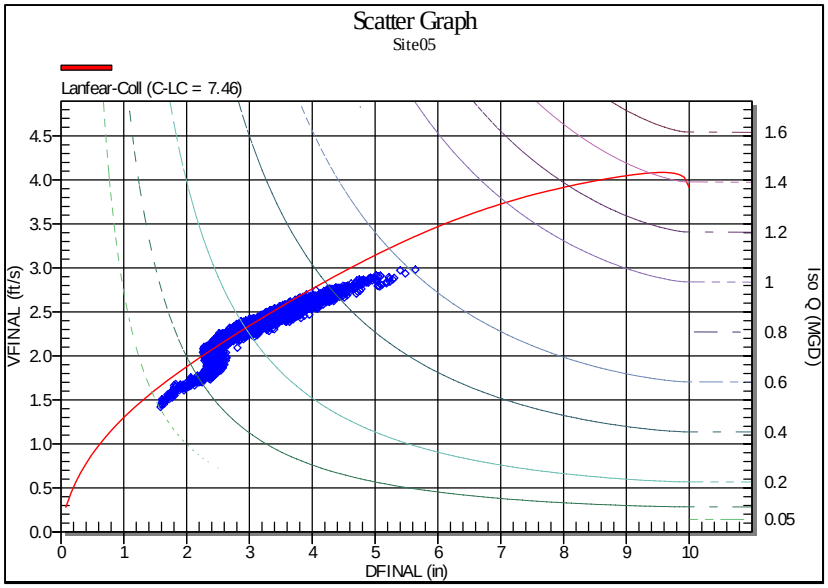

Q vs i - Site04
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
(12/18/2015)
(12/21/2015)

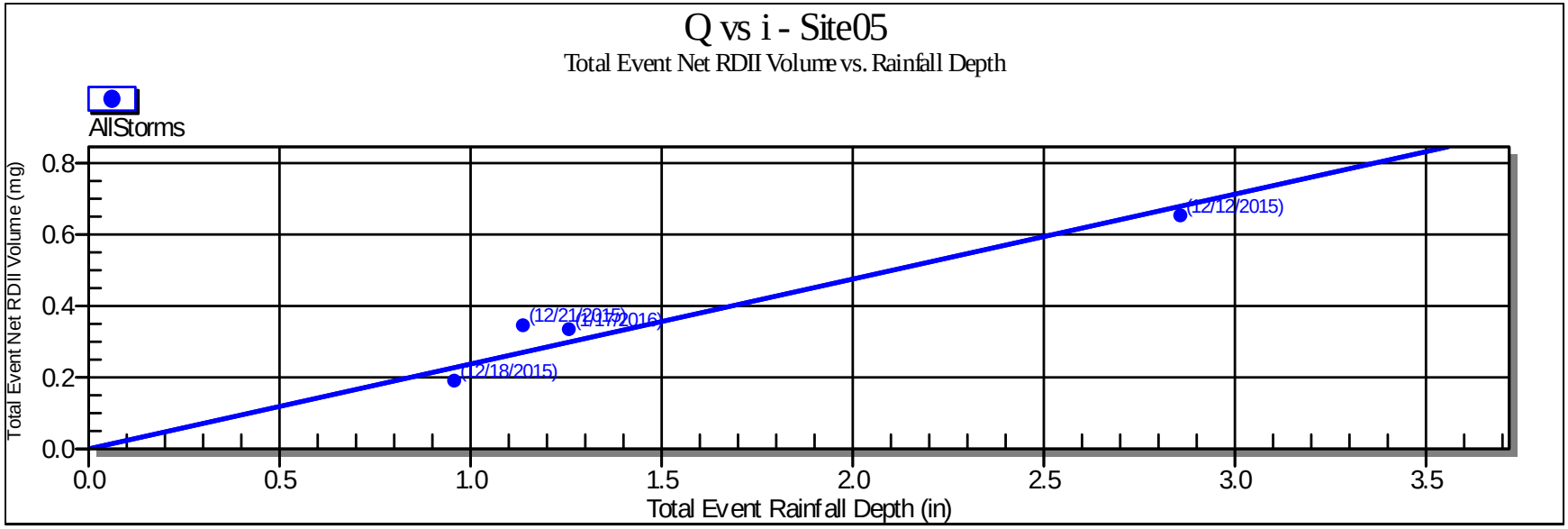

Storm Event - 12/12/2015 8:00:00 AM
Site04
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
Flow (MGD)
Rainfall (in)
Storms
Date
Dec 2015

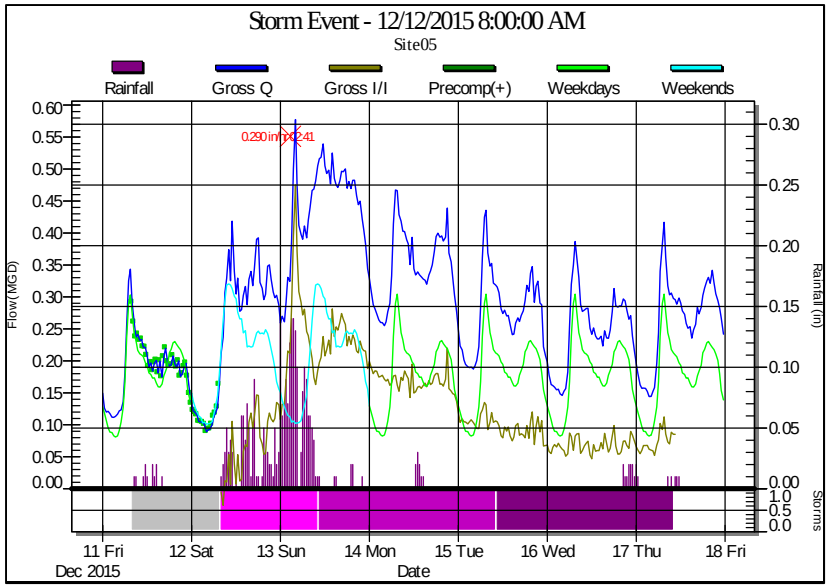

Storm Event - 1/17/2016 5:00:00 AM
Site04
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
Date
Jan 2016

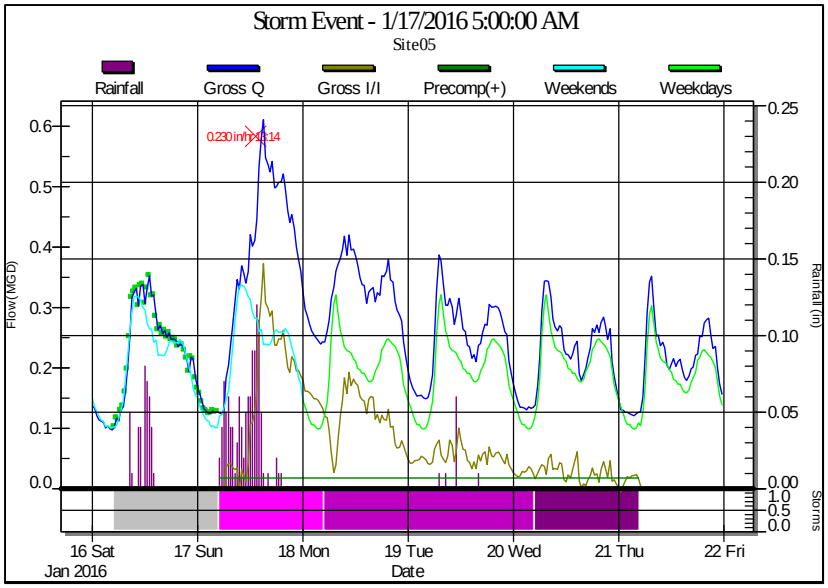

Pipe Flow
Site05
Rainfall
Qfinal(g)
Flow (MGD)
0.6
0.4
0.2
Rainfall (in)
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

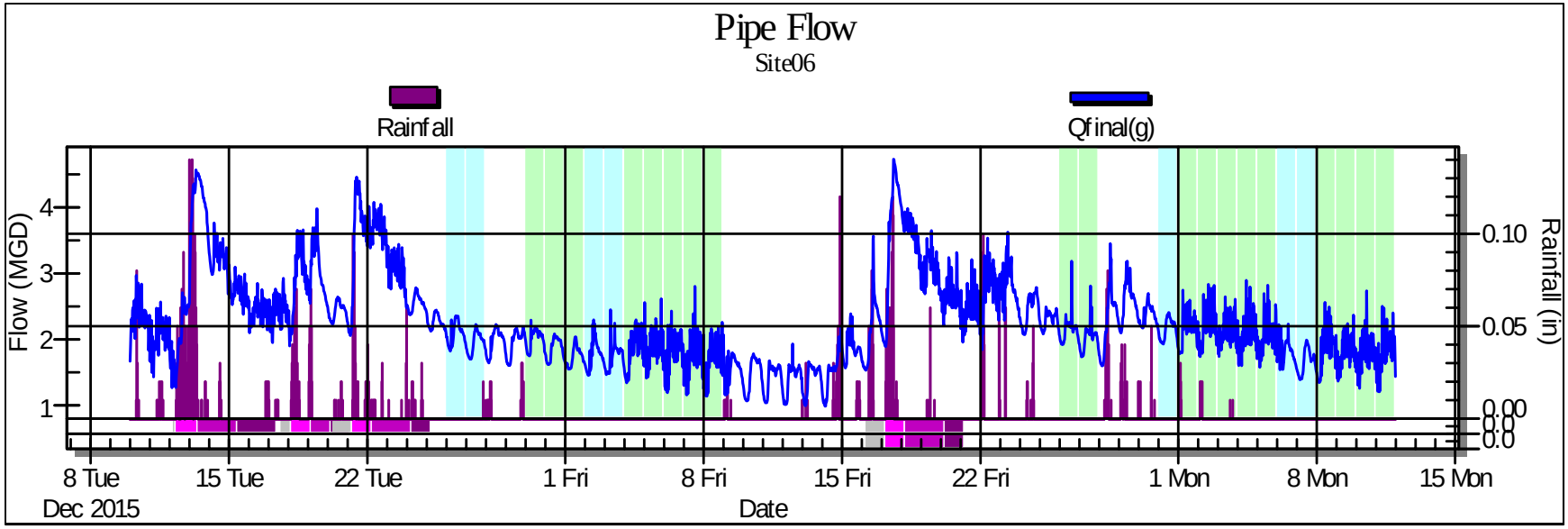

Dry Weather Flow
Site05
Weekdays
Weekdays Base Infiltration
Weekends
MGD
0.30
0.25
0.20
0.15
0.10
0.05
0
3
6
9
12
15
18
21
Hours

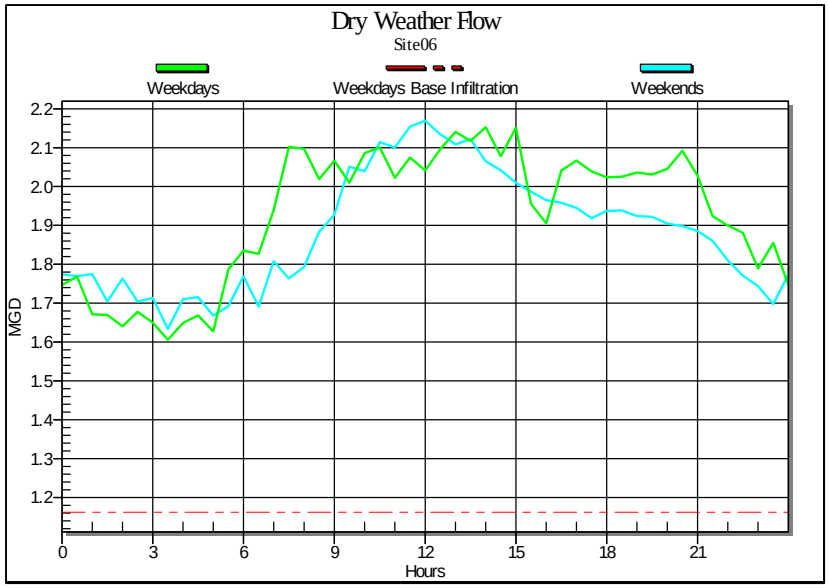

Scatter Graph
Site05
Lanfear-Coll (C-LC = 7.46)
VFINAL (ft/s)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Iso Q (MGD)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0.05
0
1
2
3
4
5
6
7
8
9
10
DFINAL (in)

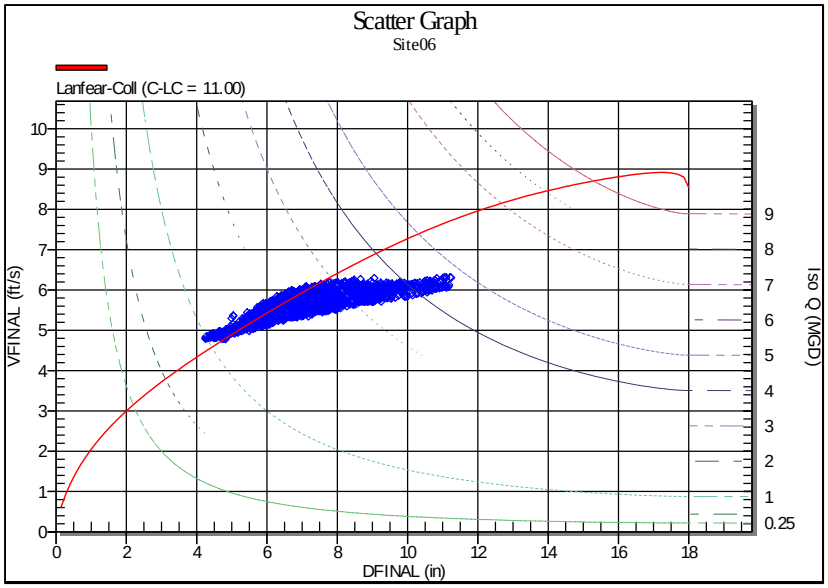

Q vs i - Site05
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(12/21/2015)
(1/17/2016)
(12/18/2015)

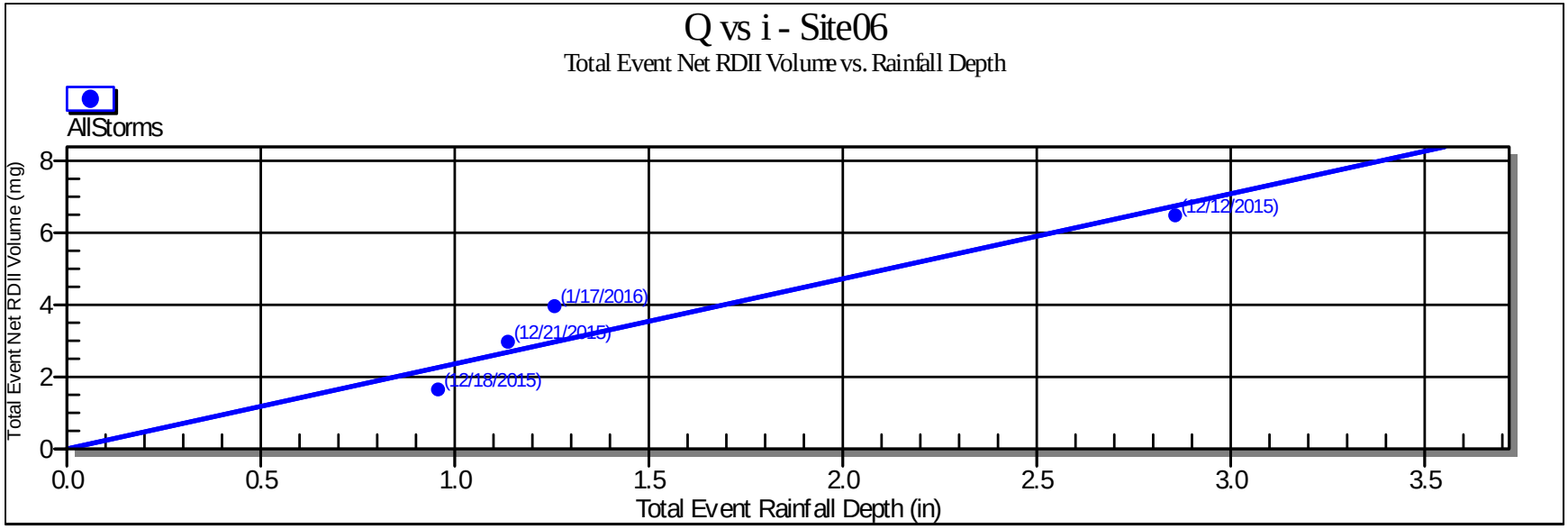

Storm Event - 12/12/2015 8:00:00 AM
Site05
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
Flow (MGD)
Rainfall (in)
Storms
Date
Dec 2015

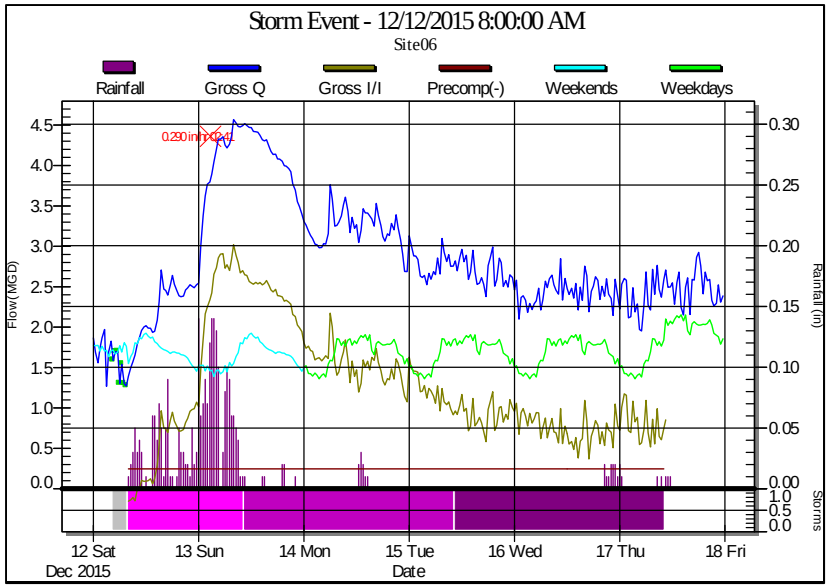

Storm Event - 1/17/2016 5:00:00 AM
Site05
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
Date
Jan 2016

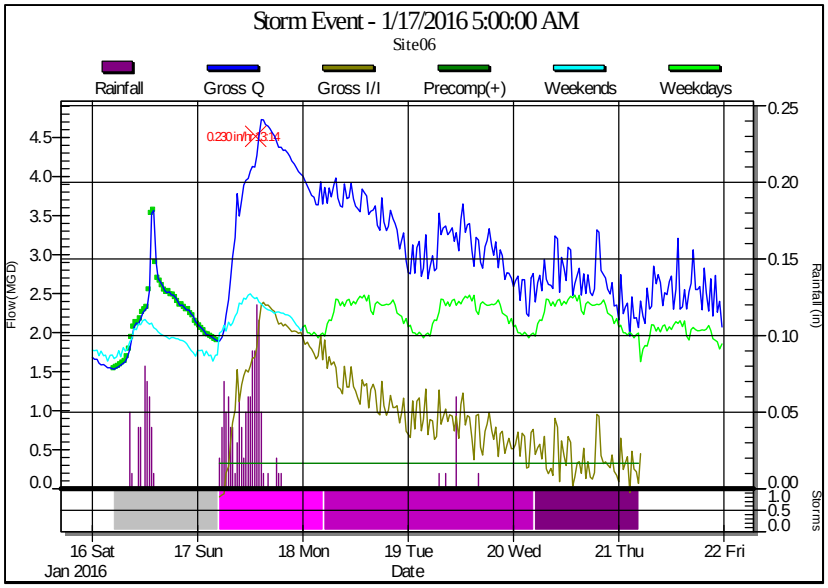

Pipe Flow
Site06
Rainfall
Qfinal(g)
Flow (MGD)
Rainfall (in)
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

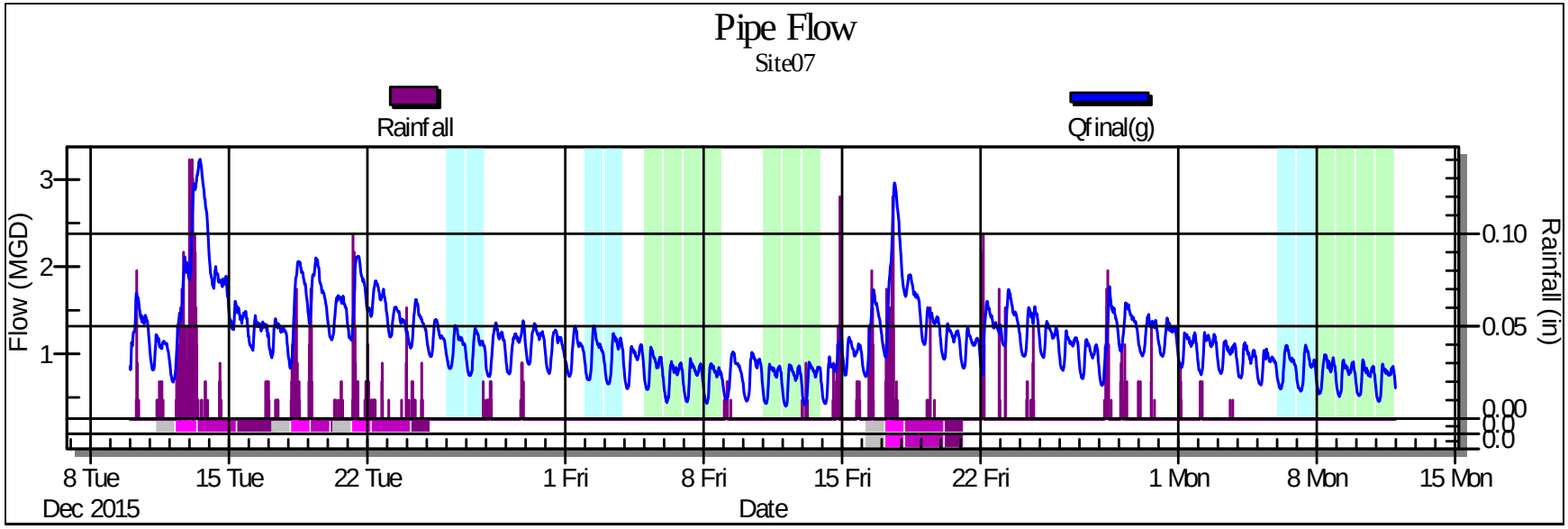

Dry Weather Flow
Site06
Weekdays
Weekdays Base Infiltration
Weekends
MGD
Hours

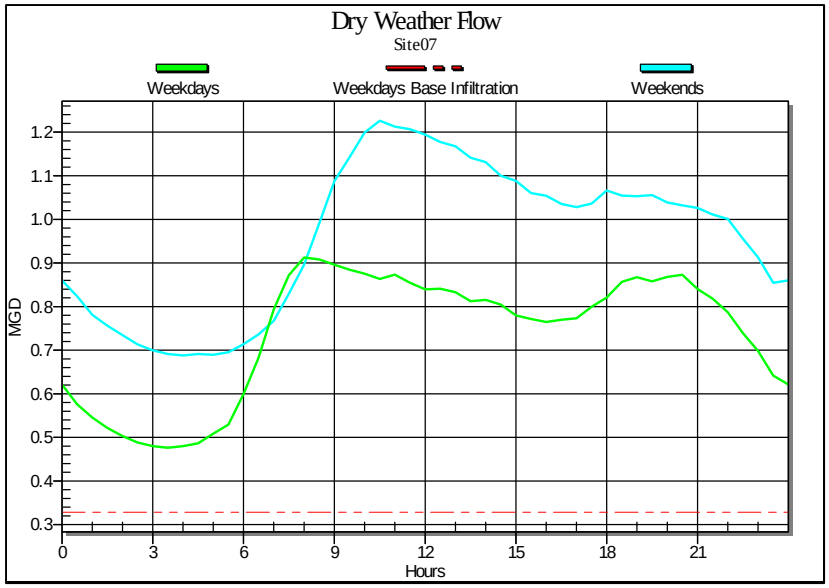

Scatter Graph
Site06
Lanfear-Coll (C-LC = 11.00)
VFINAL (ft/s)
Iso Q (MGD)
DFINAL (in)

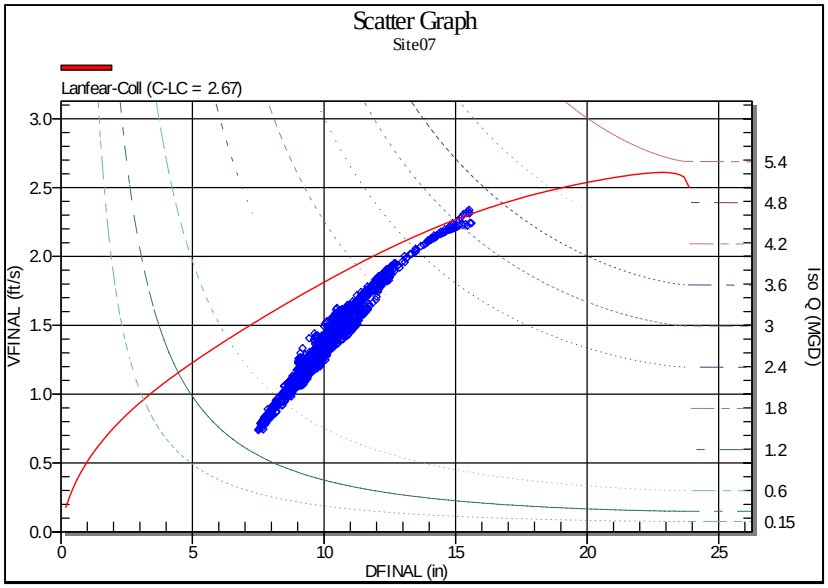

Q vs i - Site06
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
(12/21/2015)
(12/18/2015)

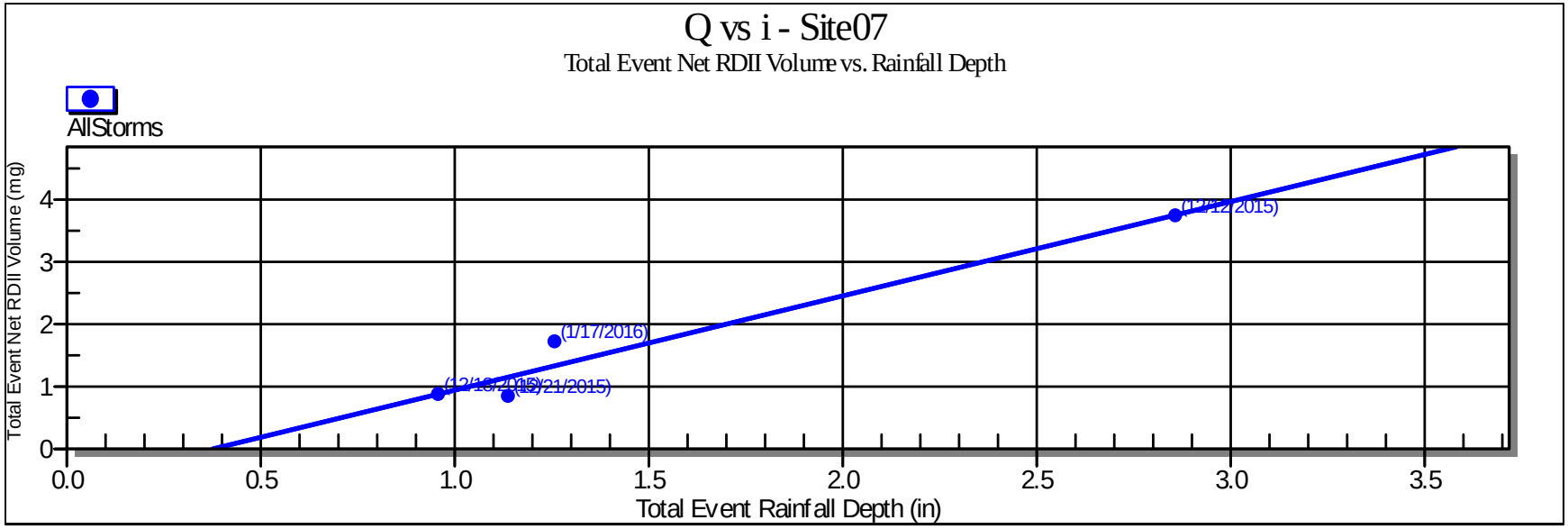

Storm Event - 12/12/2015 8:00:00 AM
Site06
Rainfall
Gross Q
Gross I/I
Precomp(-)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
12 Sat
Dec 2015
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Date

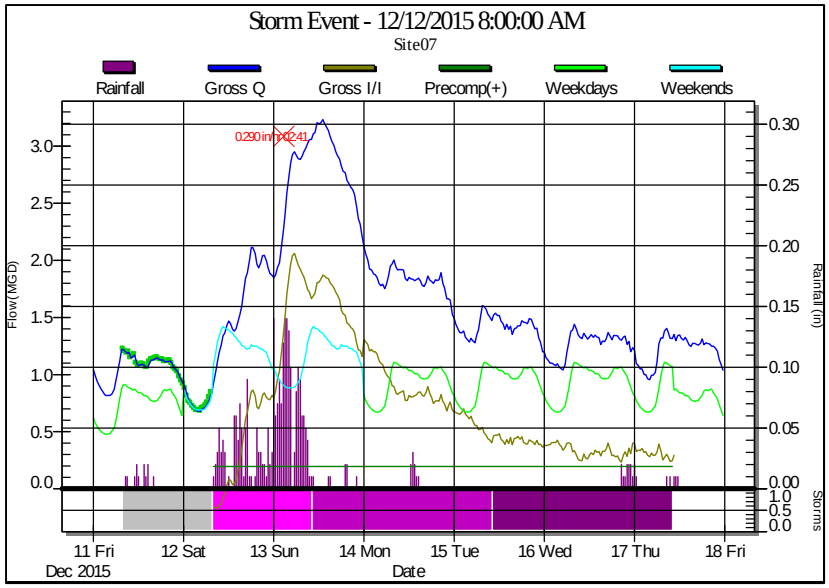

Storm Event - 1/17/2016 5:00:00 AM
Site06
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
16 Sat
Jan 2016
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Date

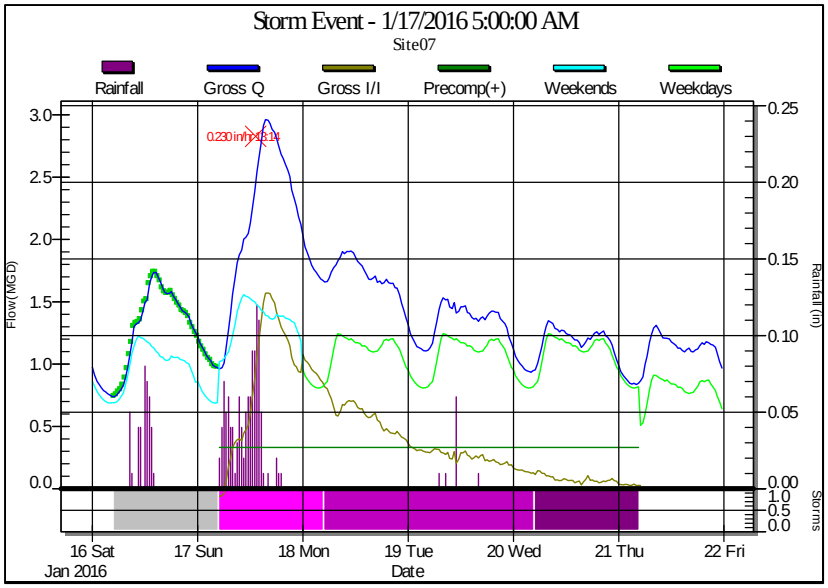

Pipe Flow
Site07
Rainfall
Qfinal(g)
Flow (MGD)
Rainfall (in)
3
2
1
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

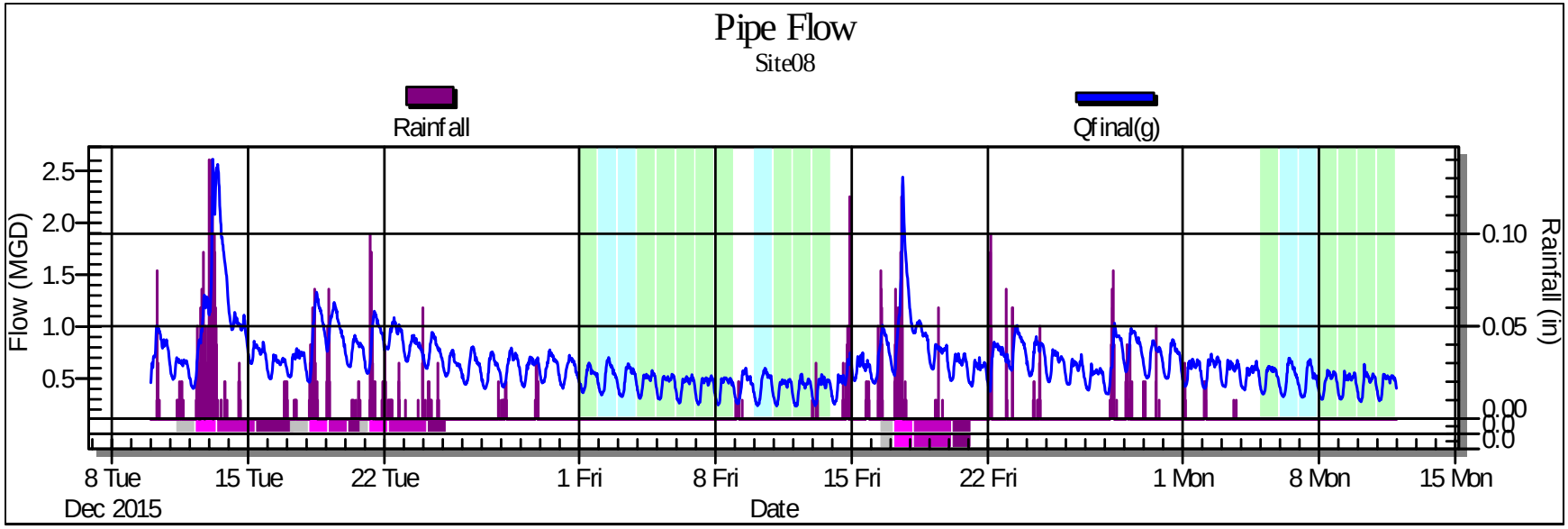

Dry Weather Flow
Site07
Weekdays
Weekdays Base Infiltration
Weekends
MGD
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
3
6
9
12
15
18
21
Hours

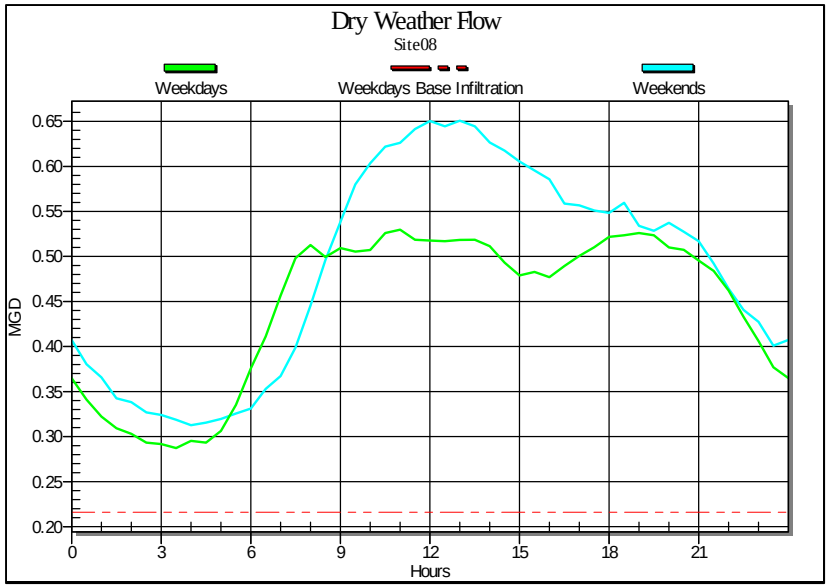

Scatter Graph
Site07
Lanfear-Coll (C-LC = 2.67)
VFINAL (ft/s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25
DFINAL (in)
Iso Q (MGD)
5.4
4.8
4.2
3.6
3
2.4
1.8
1.2
0.6
0.15

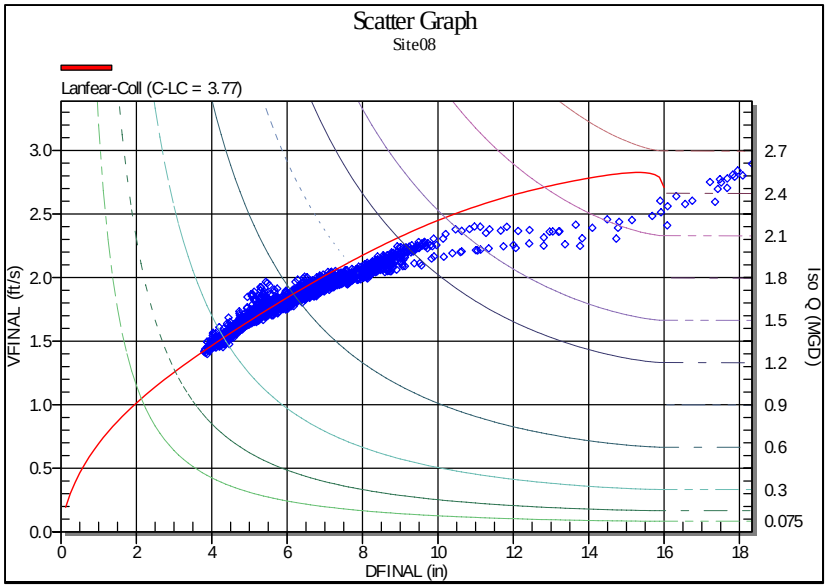

Q vs i - Site07
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4

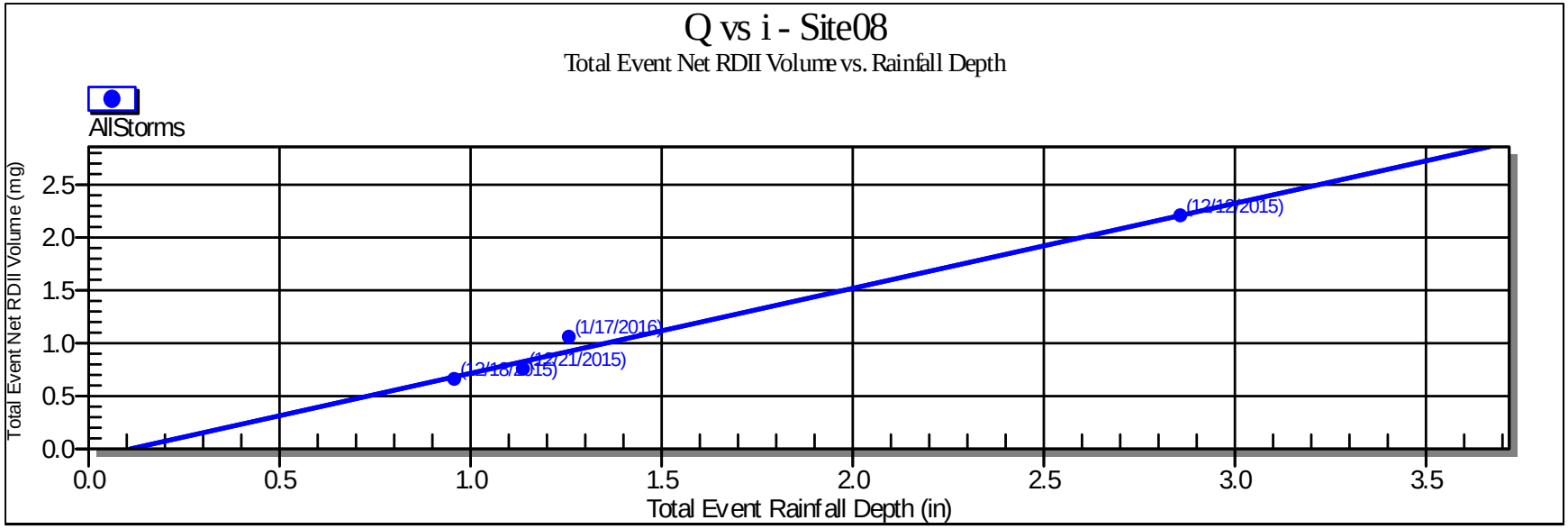

Storm Event - 12/12/2015 8:00:00 AM
Site07
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
0.290 in/hr 02:41
Flow (MGD)
Rainfall (in)
Storms
11 Fri
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Dec 2015
Date

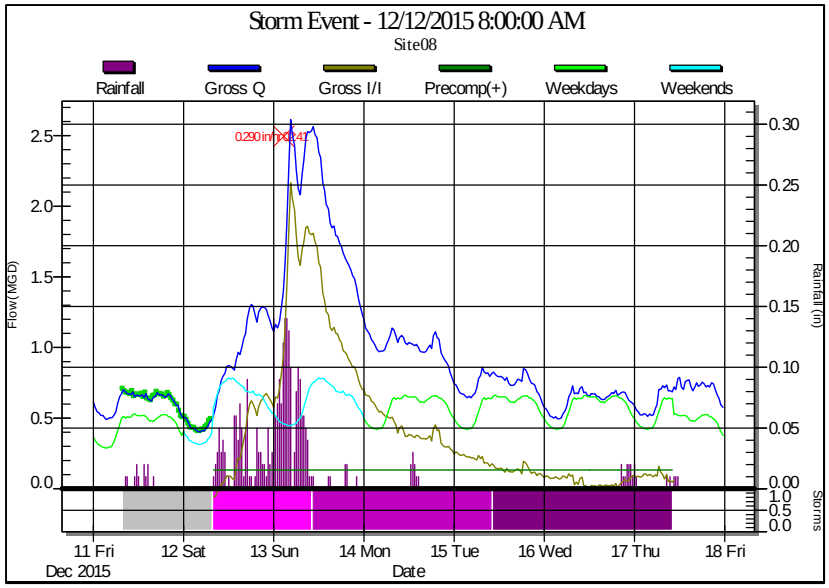

Storm Event - 1/17/2016 5:00:00 AM
Site07
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekends
Weekdays
0.230 in/hr 05:14
Flow (MGD)
Rainfall (in)
Storms
16 Sat
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Jan 2016
Date

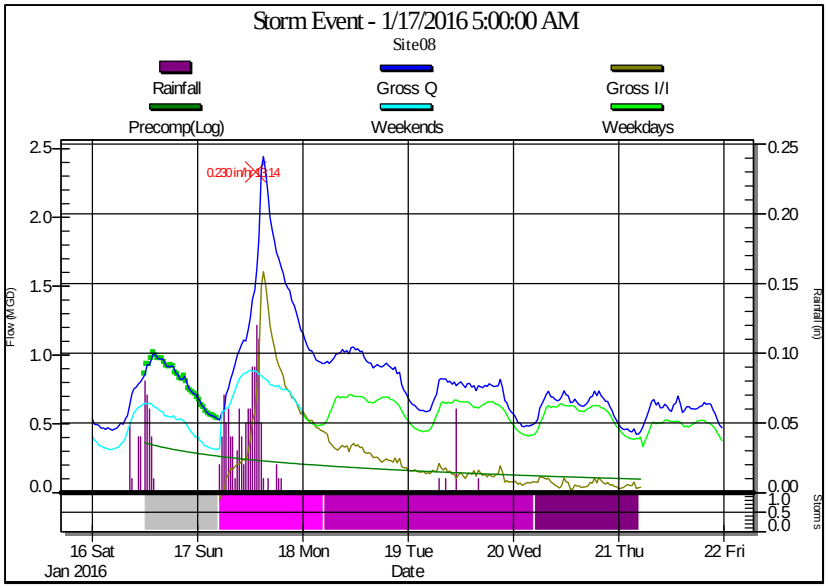

Pipe Flow
Site08
Rainfall
Qfinal(g)
Flow (MGD)
2.5
2.0
1.5
1.0
0.5
Rainfall (in)
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

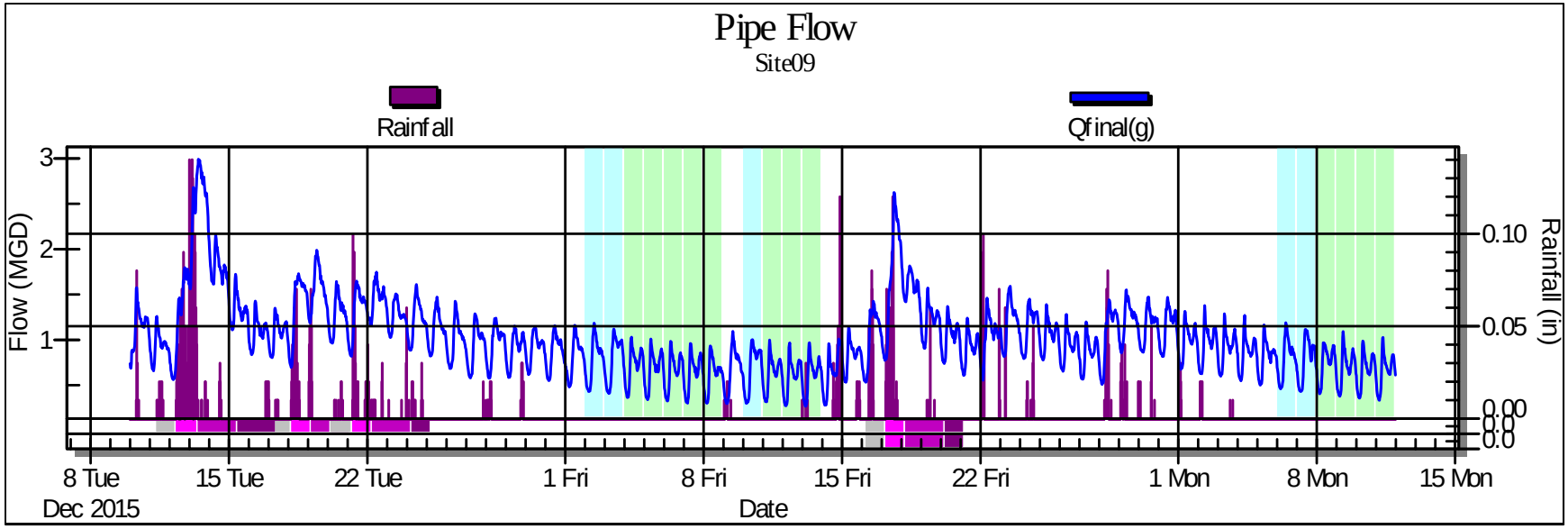

Dry Weather Flow
Site08
Weekdays
Weekdays Base Infiltration
Weekends
MGD
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0
3
6
9
12
15
18
21
Hours

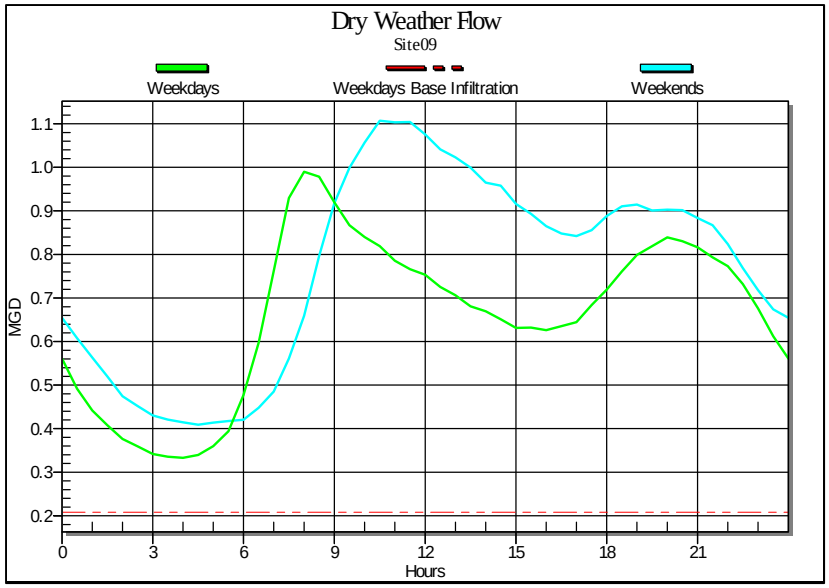

Scatter Graph
Site08
Lanfear-Coll (C-LC = 3.77)
VFINAL (ft/s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Iso Q (MGD)
2.7
2.4
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.075
0
2
4
6
8
10
12
14
16
18
DFINAL (in)

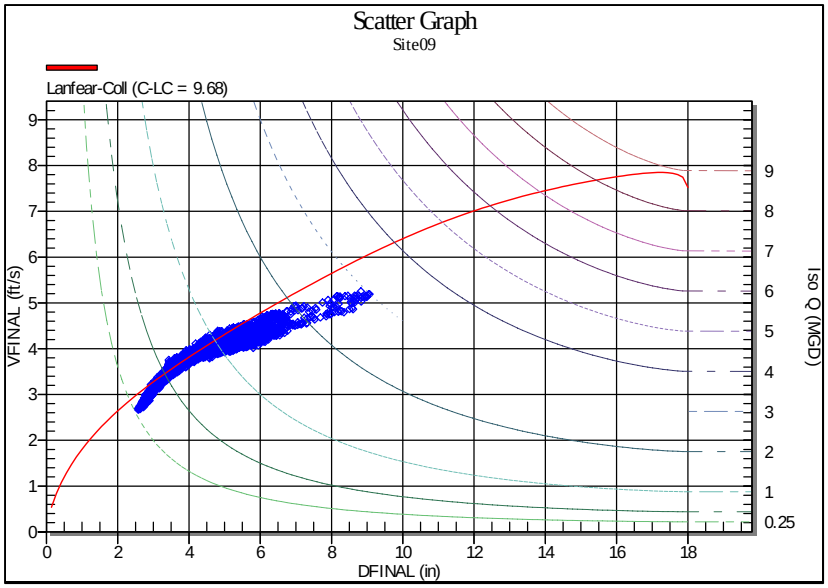

Q vs i - Site08
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
(12/21/2015)
(12/16/2015)

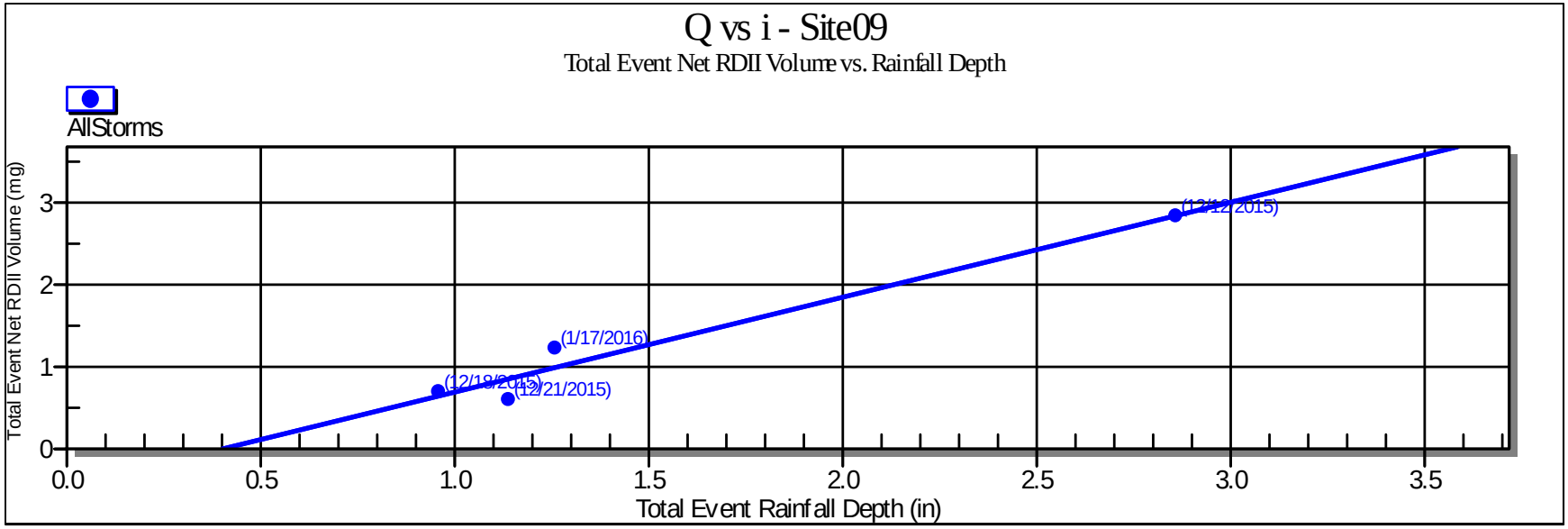

Storm Event - 12/12/2015 8:00:00 AM
Site08
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
Flow (MGD)
Rainfall (in)
Storms
11 Fri
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Dec 2015
Date

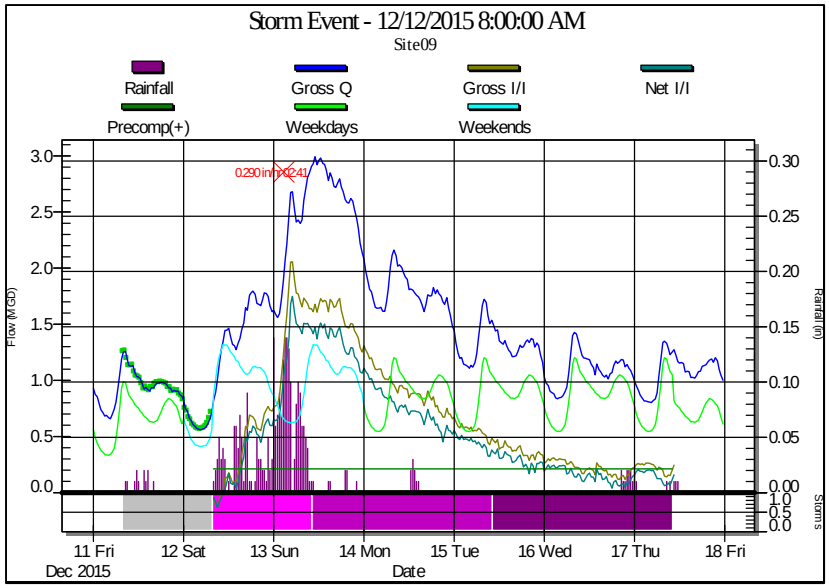

Storm Event - 1/17/2016 5:00:00 AM
Site08
Rainfall
Gross Q
Gross I/I
Precomp(Log)
Weekends
Weekdays
Flow (MGD)
Rainfall (in)
Storms
16 Sat
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Jan 2016
Date

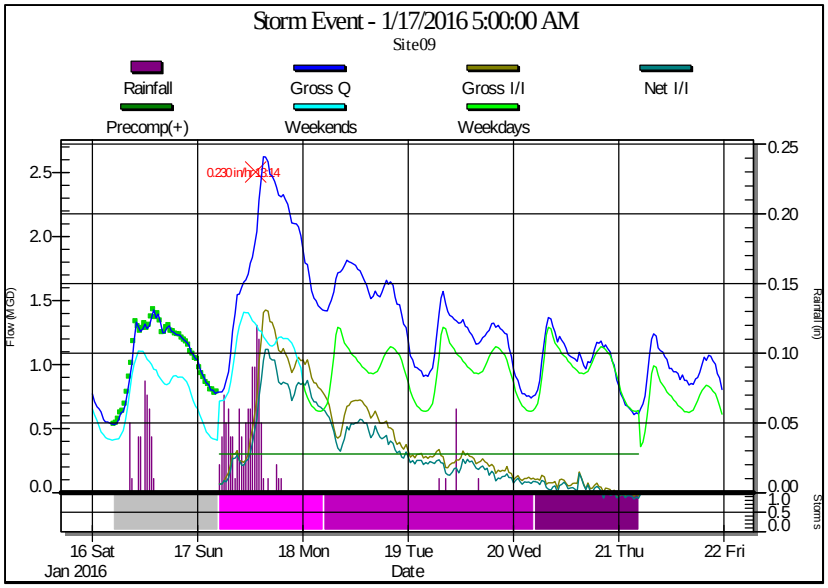

Pipe Flow
Site09
Rainfall
Qfinal(g)
Flow (MGD)
Rainfall (in)
3
2
1
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date

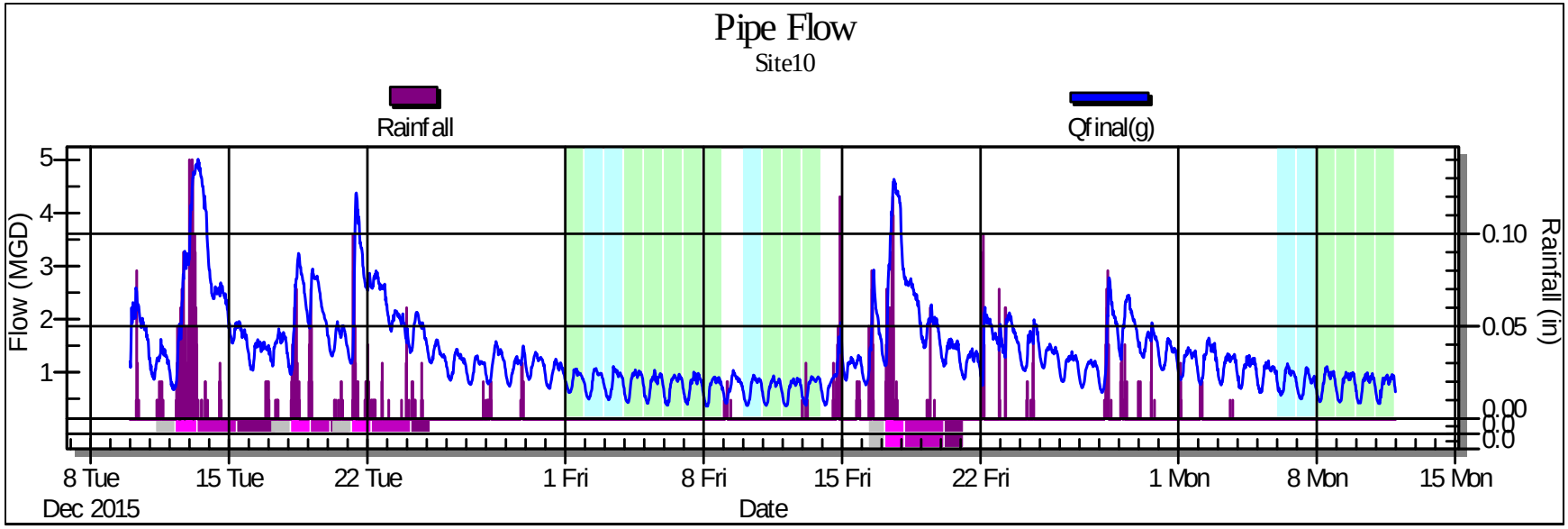

Dry Weather Flow
Site09
Weekdays
Weekdays Base Infiltration
Weekends
MGD
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
3
6
9
12
15
18
21
Hours

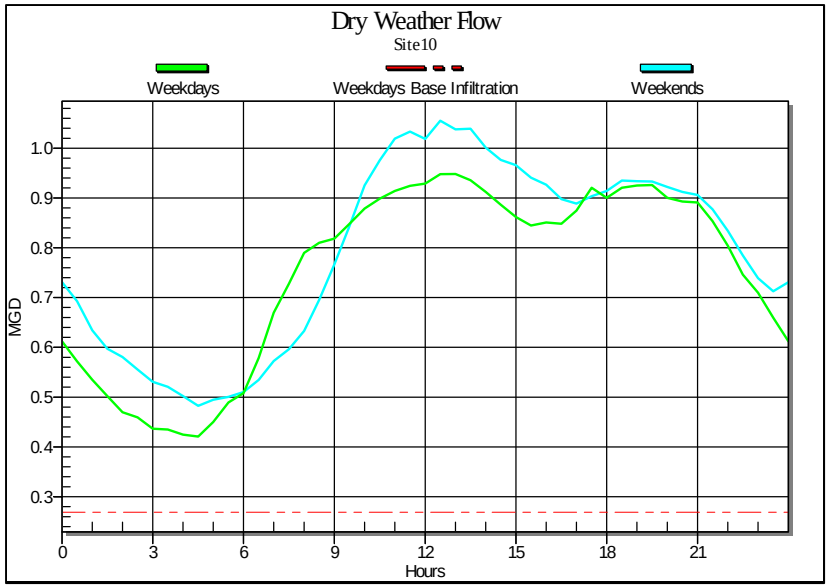

Scatter Graph
Site09
Lanfear-Coll (C-LC = 9.68)
VFINAL (ft/s)
Iso Q (MGD)
9
8
7
6
5
4
3
2
1
0
0.25
0
2
4
6
8
10
12
14
16
18
DFINAL (in)

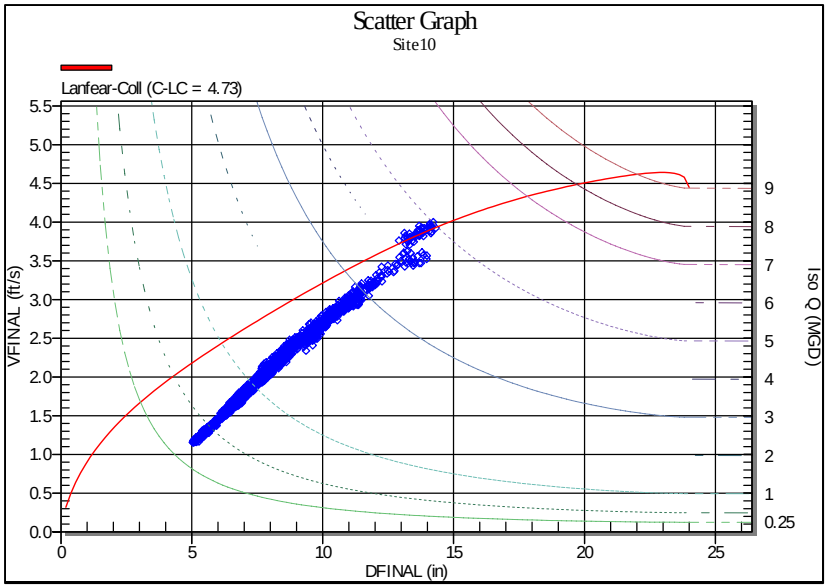

Q vs i - Site09
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(1/17/2016)
(12/19/2015)
(12/21/2015)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3

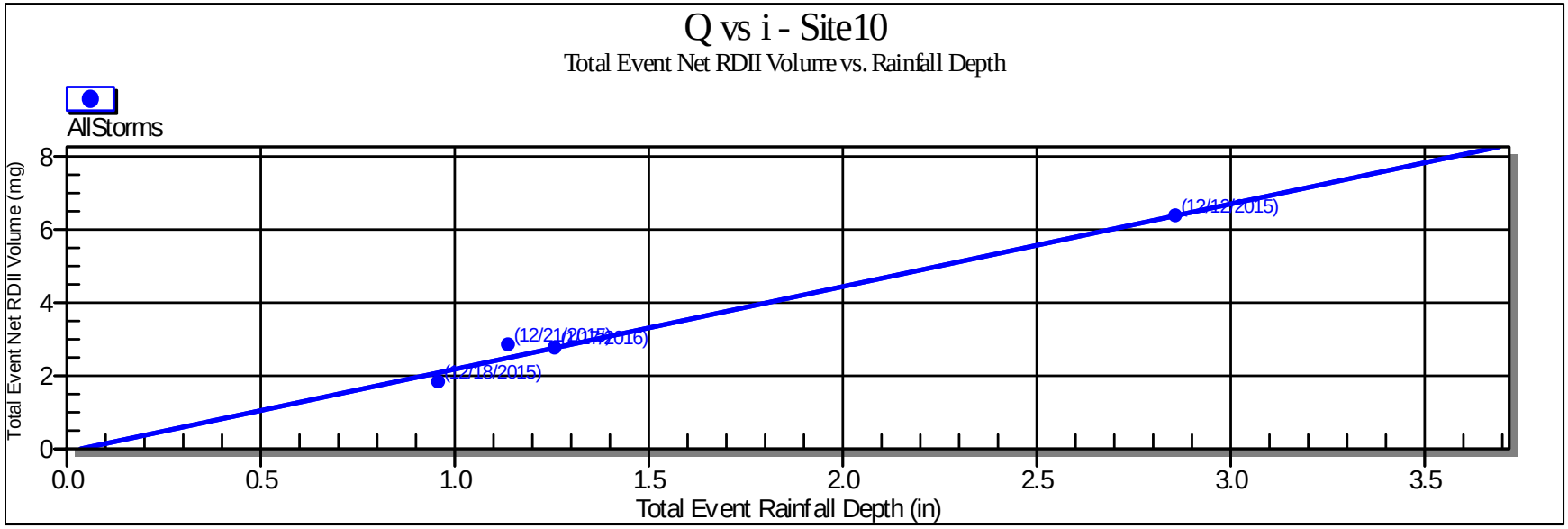

Storm Event - 12/12/2015 8:00:00 AM
Site09
Rainfall
Gross Q
Gross I/I
Net I/I
Precomp(+)
Weekdays
Weekends
0.290 in/hr (0241)
Flow (MGD)
Rainfall (in)
Storms
11 Fri
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Dec 2015
Date

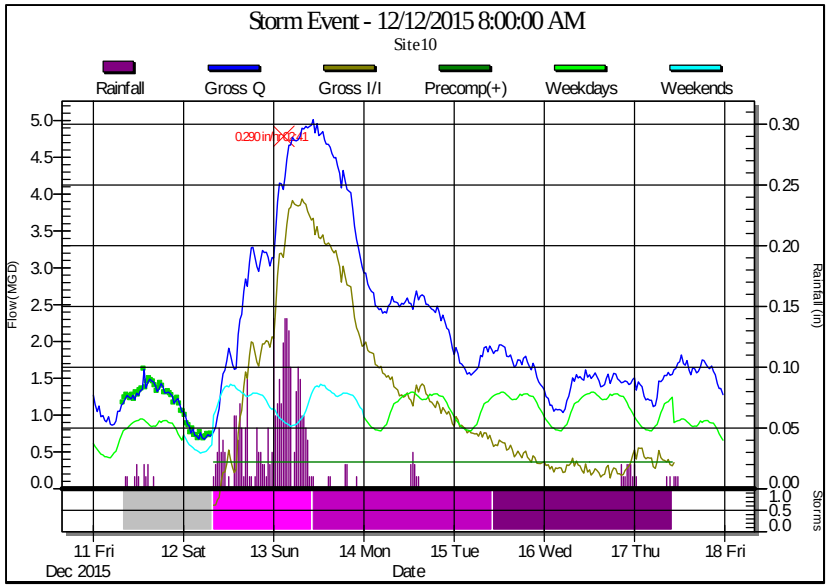

Storm Event - 1/17/2016 5:00:00 AM
Site09
Rainfall
Gross Q
Gross I/I
Net I/I
Precomp(+)
Weekends
Weekdays
0.230 in/hr (0214
Flow (MGD)
Rainfall (in)
Storms
16 Sat
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Jan 2016
Date

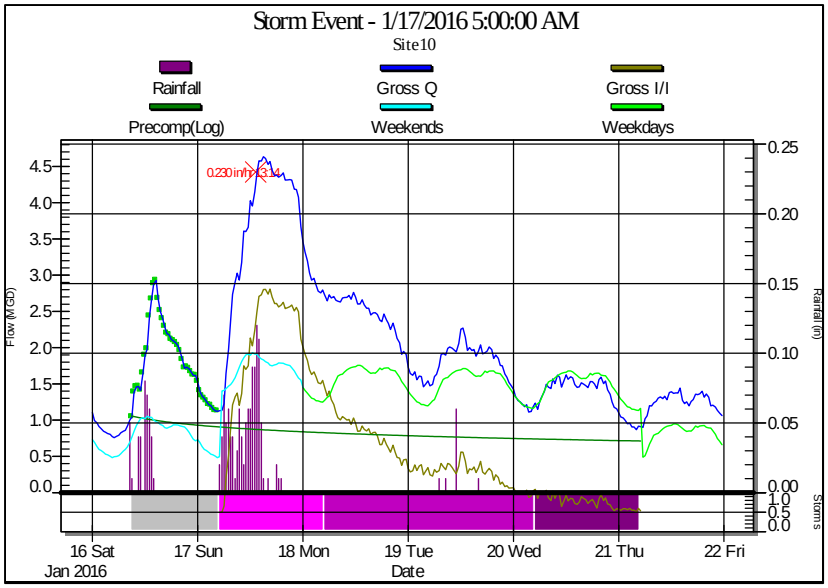

Pipe Flow
Site10
Rainfall
Qfinal(g)
Flow (MGD)
Rainfall (in)
5
4
3
2
1
0.10
0.05
0.00
8 Tue
Dec 2015
15 Tue
22 Tue
1 Fri
8 Fri
15 Fri
22 Fri
1 Mon
8 Mon
15 Mon
Date


Dry Weather Flow
Site10
Weekdays
Weekdays Base Infiltration
Weekends
MGD
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
3
6
9
12
15
18
21
Hours


Scatter Graph
Site10
Lanfear-Coll (C-LC = 4.73)
VFINAL (ft/s)
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25
DFINAL (in)
Iso Q (MGD)
9
8
7
6
5
4
3
2
1
0.25


Q vs i - Site10
Total Event Net RDII Volume vs. Rainfall Depth
AllStorms
Total Event Net RDII Volume (mg)
Total Event Rainfall Depth (in)
(12/12/2015)
(12/21/2015)
(1/17/2016)
(12/18/2015)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
2
4
6
8


Storm Event - 12/12/2015 8:00:00 AM
Site10
Rainfall
Gross Q
Gross I/I
Precomp(+)
Weekdays
Weekends
0.290 in/hr
Flow (MGD)
Rainfall (in)
Storms
11 Fri
12 Sat
13 Sun
14 Mon
15 Tue
16 Wed
17 Thu
18 Fri
Dec 2015
Date


Storm Event - 1/17/2016 5:00:00 AM
Site10
Rainfall
Gross Q
Gross I/I
Precomp(Log)
Weekends
Weekdays
0.230 in/hr
Flow (MGD)
Rainfall (in)
Storms
16 Sat
17 Sun
18 Mon
19 Tue
20 Wed
21 Thu
22 Fri
Jan 2016
Date

APPENDIX B

Data Report (tabular data, hydrographs and site reports)

Site01

Located At: 1970 Crater Lake Hwy (see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 35.88" x 35.88"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The dry weather data plots at the Froude =1 curve indicating critical flow. During rain events the flow goes to subcritical.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were reconstituted to a bestfit curve.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	3.64	2.83	0.68	10%
Maximum	16.54	4.75	9.03	46%
Average	6.18	3.73	2.05	17%

ADS Site Report — Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site01	**Monitor Series:**	Triton+	**Monitor S/N:**	60022
Address/Location:	1970 Crater Lake Hwy (Easement to west of In-N-Out Burger)			**IP Address:**	166.219.173.178
				Manhole #	7390
				GPS Coordinates	42.346237° -122.880441°
Access: Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]	**Pipe Height:** 35.88"
					Pipe Width: 35.88"

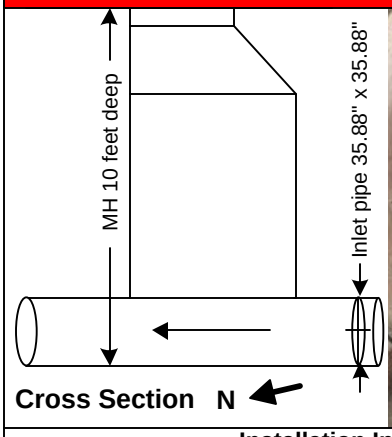
Investigation Information:

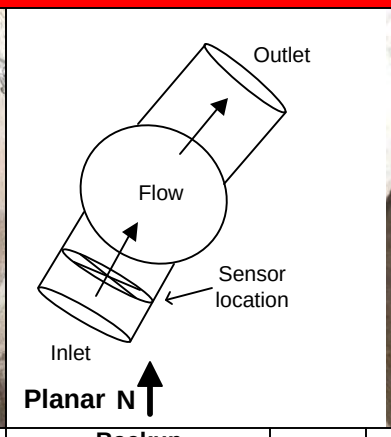
Date/Time of Investigation:	12/08/2015 @ 10:41
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	5.63" +/- 0.25"
Range (Air DOF):	30.13" +/- 0.25"
Peak Velocity:	3.45 fps
Silt:	None

Manhole Information:

Manhole Depth:	10'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [X]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:





Installation Information	
Installation Type:	Standard
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity),
Surcharge Height:	None observed
Rain Guage Zone:	RG1

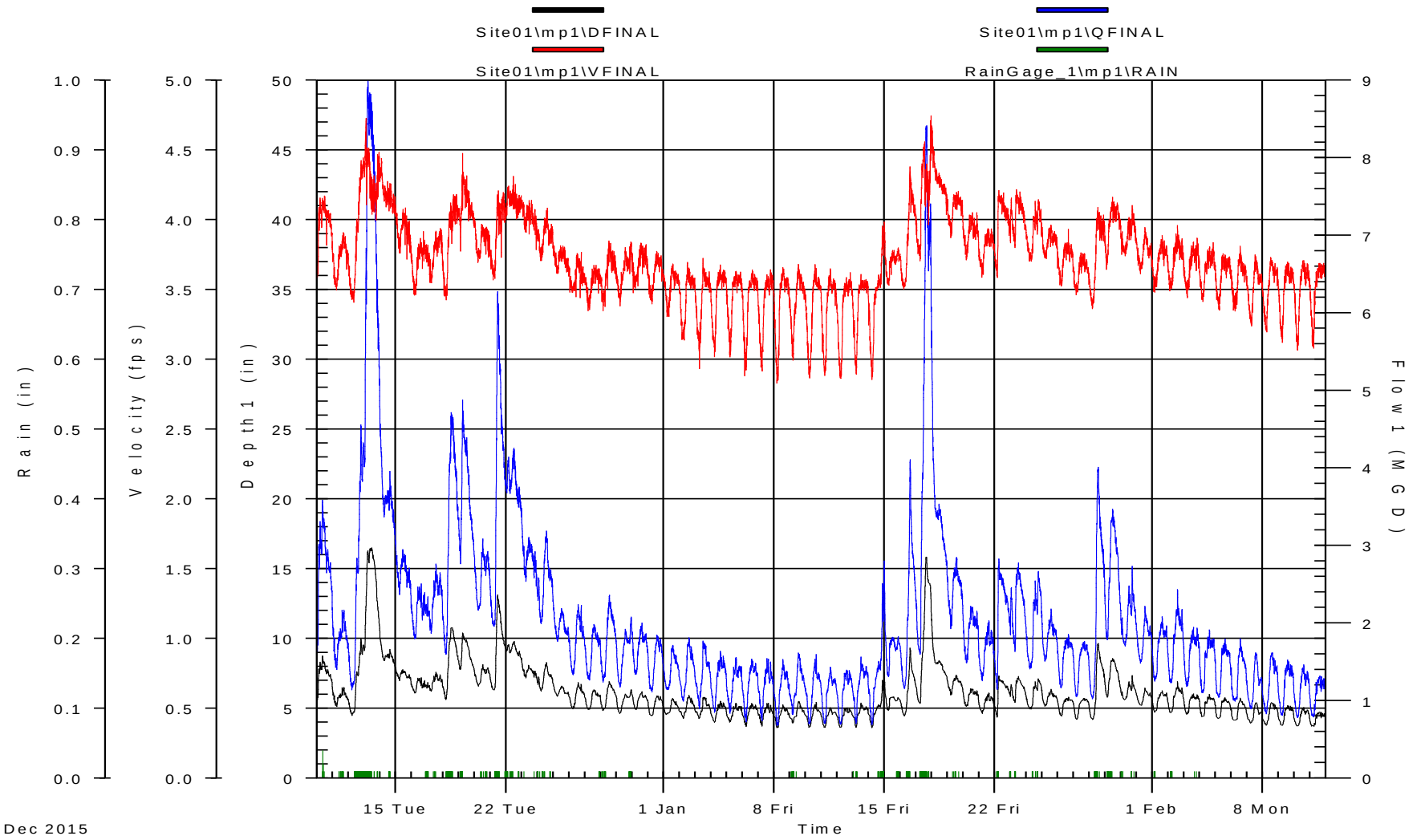
Backup	Yes	No	?	Distance
Trunk	[ ]	[X]	[ ]	
Lift / Pump Station	[ ]	[X]	[ ]	
WWTP	[ ]	[X]	[ ]	
Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

ADS Environmental Services

Pipe Height: 35.88

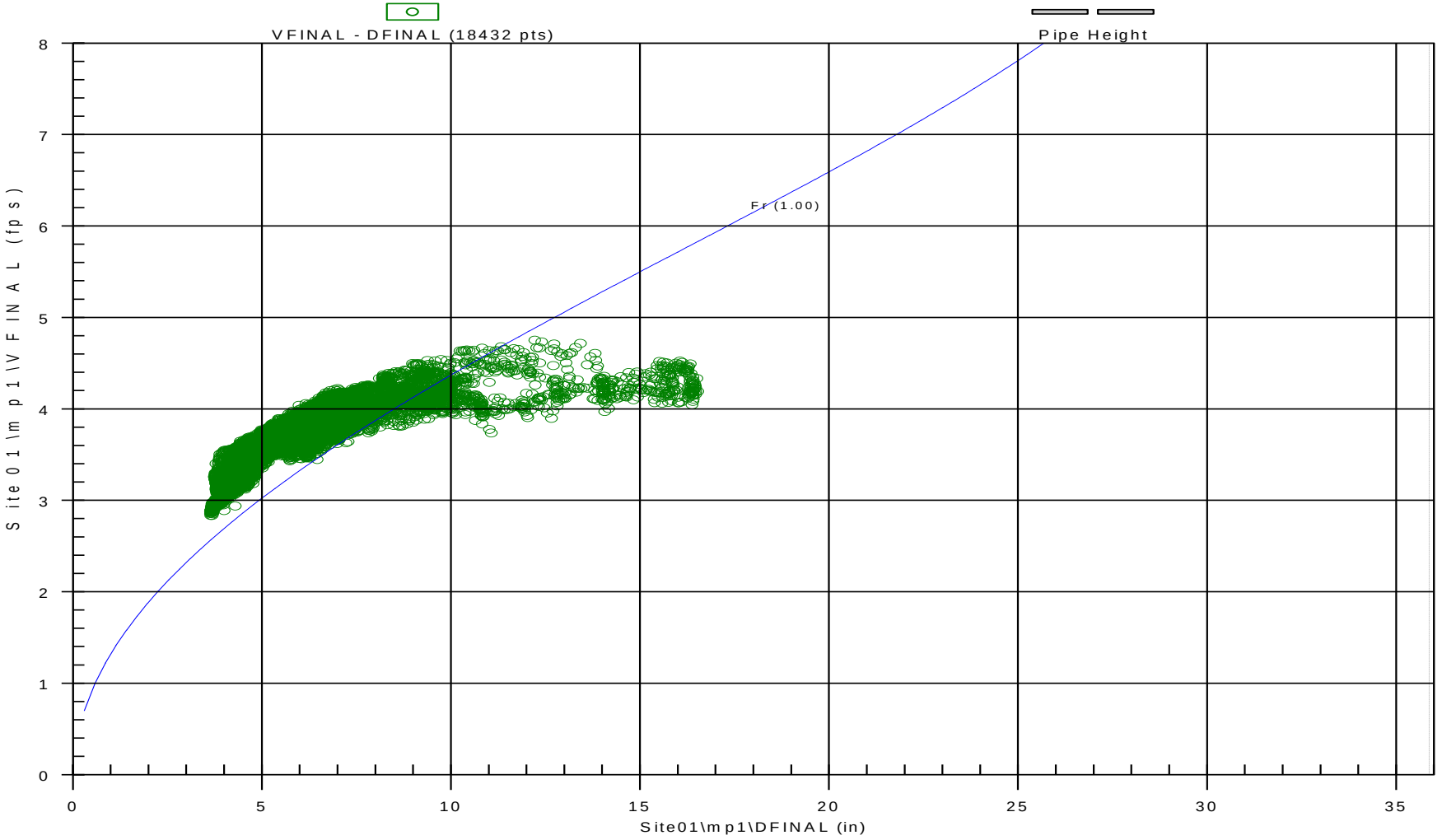


Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 35.88



ADS Environmental Services

	Site01\mp1\DFINAL (inches)					Site01\mp1\VFINAL (feet/sec)					Site01\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:00	5.6	7:55	8.8	7.6	0:00	3.6	10:55	4.2	4.0	0:00	1.644	7:50	3.592	2.813	2.813
12/11/2015	5:45	5.1	16:35	6.5	5.8	5:20	3.5	15:40	3.9	3.7	5:45	1.406	16:35	2.178	1.795	1.795
12/12/2015	4:45	4.5	18:20	10.1	7.0	7:25	3.4	22:00	4.4	3.9	4:45	1.146	18:20	4.565	2.574	2.574
12/13/2015	0:15	9.3	10:35	16.5	14.2	17:40	4.0	2:10	4.7	4.3	0:15	4.060	5:10	9.031	7.199	7.199
12/14/2015	23:55	7.7	0:05	10.0	8.7	23:55	4.0	1:45	4.4	4.2	23:55	2.881	0:05	4.493	3.581	3.581
12/15/2015	23:35	6.6	10:05	7.8	7.4	23:50	3.7	14:10	4.1	3.9	23:50	2.138	10:10	2.955	2.646	2.646
12/16/2015	4:15	6.1	14:20	7.3	6.7	3:55	3.5	17:30	3.9	3.7	5:40	1.802	14:20	2.512	2.166	2.166
12/17/2015	5:30	6.2	12:45	7.6	6.9	5:30	3.6	19:25	3.9	3.8	5:30	1.875	12:45	2.768	2.319	2.319
12/18/2015	3:35	5.7	12:20	10.9	8.7	4:10	3.4	19:45	4.2	3.9	3:35	1.606	11:55	4.723	3.370	3.370
12/19/2015	23:55	7.5	5:20	10.4	9.0	2:00	3.8	5:10	4.5	4.1	23:50	2.713	5:10	4.885	3.682	3.682
12/20/2015	5:15	6.6	11:55	8.2	7.4	4:35	3.7	0:05	4.0	3.9	5:15	2.172	11:50	3.092	2.610	2.610
12/21/2015	5:00	6.3	10:35	13.2	9.5	3:30	3.6	11:35	4.2	3.9	5:00	1.963	10:35	6.282	3.883	3.883
12/22/2015	23:55	8.2	11:45	9.8	9.2	15:30	4.0	10:20	4.3	4.1	23:55	3.220	11:05	4.264	3.805	3.805
12/23/2015	23:55	6.8	0:00	8.2	7.6	21:15	3.8	14:05	4.1	4.0	23:55	2.318	0:00	3.214	2.821	2.821
12/24/2015	4:45	6.3	12:55	8.4	7.2	4:15	3.7	14:00	4.1	3.9	4:40	1.999	12:55	3.201	2.541	2.541
12/25/2015	23:40	5.8	11:50	6.7	6.2	22:45	3.6	10:10	3.8	3.7	23:40	1.742	0:05	2.204	1.959	1.959
12/26/2015	5:20	5.0	13:10	6.9	5.9	16:15	3.4	17:45	3.8	3.6	5:20	1.339	13:05	2.247	1.779	1.779
12/27/2015	6:30	5.0	13:20	6.4	5.7	4:15	3.4	16:10	3.7	3.6	6:30	1.272	13:20	1.989	1.659	1.659
12/28/2015	3:30	4.9	12:40	7.0	6.0	3:05	3.4	11:45	3.9	3.6	3:05	1.244	12:40	2.366	1.816	1.816
12/29/2015	4:35	4.7	21:50	6.4	5.6	5:00	3.4	21:35	3.8	3.6	5:00	1.181	21:50	2.086	1.640	1.640
12/30/2015	5:25	4.9	14:20	6.2	5.7	0:55	3.5	12:45	3.8	3.7	4:15	1.348	14:20	2.013	1.692	1.692
12/31/2015	5:45	4.5	13:35	5.9	5.3	5:35	3.4	12:50	3.8	3.6	5:35	1.119	13:10	1.852	1.510	1.510
ReportAvg					7.4					3.9					2.721	
ReportTotal																59.86

ADS Environmental Services

	Site01\mp1\DFINAL (inches)					Site01\mp1\VFINAL (feet/sec)					Site01\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	3:20	4.6	13:15	5.8	5.1	6:50	3.3	13:25	3.7	3.5	4:25	1.149	13:25	1.728	1.399	1.399
1/2/2016	5:25	4.3	13:55	6.0	5.1	6:30	3.1	11:30	3.7	3.5	5:20	0.992	13:55	1.817	1.393	1.393
1/3/2016	5:15	4.3	13:10	5.8	5.0	5:55	2.9	11:10	3.7	3.4	5:55	0.902	11:10	1.775	1.348	1.348
1/4/2016	4:50	4.0	13:55	5.6	4.9	4:45	3.0	13:45	3.7	3.5	4:45	0.853	13:45	1.648	1.286	1.286
1/5/2016	4:05	4.0	14:00	5.4	4.8	4:05	3.0	13:50	3.6	3.4	4:05	0.843	13:55	1.567	1.239	1.239
1/6/2016	5:00	3.7	13:15	5.4	4.7	2:40	2.9	14:10	3.6	3.4	4:55	0.731	13:15	1.544	1.222	1.222
1/7/2016	5:00	3.8	14:40	5.4	4.7	5:15	2.9	17:45	3.6	3.4	5:00	0.743	12:30	1.550	1.196	1.196
1/8/2016	3:55	3.6	12:45	5.3	4.6	3:50	2.8	12:30	3.7	3.4	3:50	0.684	12:45	1.540	1.151	1.151
1/9/2016	3:25	4.0	12:50	5.6	4.7	4:25	3.0	12:15	3.7	3.4	3:20	0.828	12:50	1.629	1.223	1.223
1/10/2016	5:45	3.7	15:35	5.5	4.6	5:50	2.9	13:50	3.7	3.4	5:35	0.699	15:35	1.602	1.146	1.146
1/11/2016	3:55	3.7	13:00	5.1	4.5	4:35	2.9	12:55	3.7	3.4	3:55	0.711	12:55	1.440	1.115	1.115
1/12/2016	5:00	3.6	13:55	5.1	4.5	4:50	2.9	19:25	3.6	3.4	4:50	0.695	13:55	1.402	1.124	1.124
1/13/2016	4:30	3.7	11:45	5.4	4.7	4:30	2.9	11:50	3.6	3.4	4:30	0.706	11:45	1.569	1.212	1.212
1/14/2016	4:15	3.7	23:10	7.6	5.1	4:20	2.9	23:10	4.0	3.5	4:20	0.693	23:10	2.810	1.405	1.405
1/15/2016	5:40	4.9	0:00	6.6	5.6	6:05	3.5	0:10	3.9	3.7	5:40	1.315	0:00	2.181	1.685	1.685
1/16/2016	6:00	4.5	14:40	9.4	6.4	4:55	3.5	14:15	4.4	3.9	5:55	1.163	14:40	4.115	2.210	2.210
1/17/2016	5:45	5.4	15:15	15.9	10.5	5:30	3.7	22:35	4.8	4.2	5:50	1.601	15:35	8.422	4.832	4.832
1/18/2016	23:50	6.9	0:00	10.6	8.2	21:40	4.0	0:10	4.6	4.3	23:45	2.536	0:00	5.153	3.369	3.369
1/19/2016	23:55	5.9	13:20	7.4	6.8	4:25	3.9	15:55	4.2	4.1	23:55	1.918	13:20	2.856	2.426	2.426
1/20/2016	4:25	5.1	10:40	6.5	5.9	23:30	3.7	19:55	4.1	3.9	4:25	1.489	10:50	2.230	1.899	1.899
1/21/2016	4:30	4.7	14:35	6.2	5.4	3:50	3.6	13:15	3.9	3.8	4:30	1.255	14:30	2.038	1.649	1.649
1/22/2016	3:00	4.4	5:55	7.4	6.4	3:15	3.6	5:45	4.2	4.0	3:15	1.149	5:45	2.835	2.204	2.204
1/23/2016	6:20	5.4	11:30	7.3	6.5	6:15	3.8	8:35	4.2	4.0	6:15	1.640	11:30	2.783	2.272	2.272
1/24/2016	5:05	5.0	17:40	7.2	6.1	3:55	3.7	17:45	4.2	3.9	5:05	1.411	17:40	2.674	2.005	2.005
1/25/2016	4:20	5.2	13:15	6.4	5.8	23:05	3.7	12:30	4.0	3.8	3:45	1.516	13:15	2.188	1.821	1.821
1/26/2016	5:30	4.5	16:00	5.8	5.3	4:55	3.5	15:20	3.9	3.7	4:25	1.172	15:20	1.863	1.579	1.579
1/27/2016	4:35	4.3	16:15	5.8	5.2	3:20	3.5	10:40	3.8	3.6	3:20	1.060	16:10	1.770	1.490	1.490
1/28/2016	4:35	4.2	12:55	9.7	6.8	4:10	3.4	12:30	4.1	3.8	4:35	1.024	12:45	4.017	2.367	2.367
1/29/2016	2:55	5.8	11:00	8.6	7.4	1:35	3.6	10:40	4.2	4.0	3:05	1.791	11:00	3.477	2.702	2.702
1/30/2016	5:55	5.6	16:35	7.4	6.3	6:00	3.7	16:45	4.1	3.9	6:00	1.712	16:35	2.740	2.074	2.074
1/31/2016	5:35	5.2	12:05	6.5	5.8	5:15	3.6	12:05	3.9	3.8	5:15	1.488	12:05	2.225	1.801	1.801
ReportAvg					5.7					3.7					1.801	
ReportTotal																55.85

ADS Environmental Services

	Site01\mp1\DFINAL (inches)					Site01\mp1\VFINAL (feet/sec)					Site01\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	3:10	4.8	14:20	6.3	5.6	3:00	3.5	14:25	3.9	3.7	3:00	1.257	14:20	2.089	1.699	1.699
2/2/2016	4:00	4.7	13:50	7.0	5.8	1:55	3.5	13:35	4.0	3.7	3:45	1.235	13:40	2.440	1.781	1.781
2/3/2016	3:40	4.6	13:55	6.1	5.5	4:30	3.4	19:35	3.9	3.7	4:30	1.186	13:55	1.953	1.616	1.616
2/4/2016	3:45	4.4	14:20	6.0	5.3	4:30	3.4	19:50	3.8	3.6	4:35	1.104	14:20	1.920	1.538	1.538
2/5/2016	3:30	4.3	14:00	5.8	5.1	5:20	3.4	11:05	3.8	3.6	4:20	1.049	14:00	1.801	1.444	1.444
2/6/2016	5:05	4.2	13:15	5.8	4.9	5:15	3.4	13:10	3.8	3.6	5:15	0.999	13:10	1.807	1.345	1.345
2/7/2016	5:45	4.0	12:35	5.5	4.6	6:35	3.2	11:50	3.8	3.5	5:25	0.895	12:35	1.623	1.213	1.213
2/8/2016	4:55	3.8	14:00	5.5	4.7	5:35	3.2	11:25	3.7	3.5	4:55	0.836	14:00	1.624	1.251	1.251
2/9/2016	3:45	3.8	13:25	5.3	4.6	5:25	3.1	13:15	3.7	3.5	5:25	0.816	13:25	1.532	1.206	1.206
2/10/2016	5:50	3.8	13:55	5.1	4.5	4:25	3.1	14:00	3.7	3.5	4:25	0.785	14:00	1.469	1.142	1.142
2/11/2016	5:45	3.7	14:30	4.8	4.3	5:05	3.1	14:20	3.7	3.5	5:00	0.796	14:20	1.326	1.100	1.100
ReportAvg					5.0					3.6					1.394	
ReportTotal																15.34

Site02

Located At: Median at 1010 Biddle Road(see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 18" x 18"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The data plots below the Froude =1 curve indicating subcritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were flagged.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	2.66	2.02	0.21	15%
Maximum	9.33	3.83	2.72	52%
Average	4.80	2.70	0.68	3%

ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site02	**Monitor Series:**	Triton+	**Monitor S/N:**	60064
Address/Location:	In median of Biddle Rd directly west of 1010 Biddle Rd (Wendy's)			**IP Address:**	166.219.173.247
				Manhole #	5646
				GPS Coordinates	42.339935 -122.872379
Access: Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]	**Pipe Height:** 18.00"
					Pipe Width: 18.00"

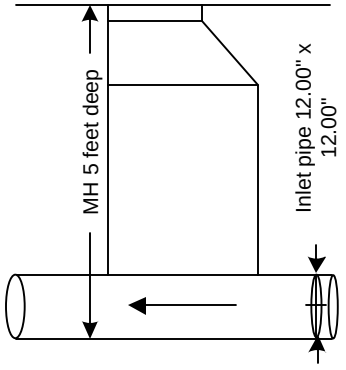
Investigation Information:

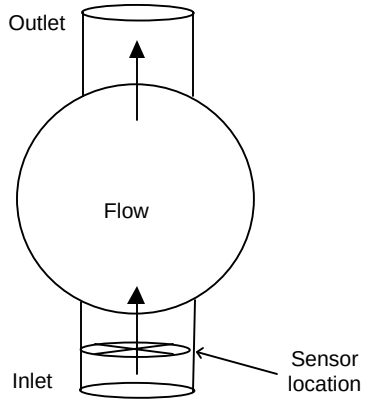
Date/Time of Investigation:	12/09/2015 @ 12:16
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	Drop connection
Depth of Flow:	4.63" +/- 0.25"
Range (Air DOF):	7.37" +/- 0.25"
Peak Velocity:	3.10 fps
Silt:	None

Manhole Information:

Manhole Depth:	5'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [X]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:



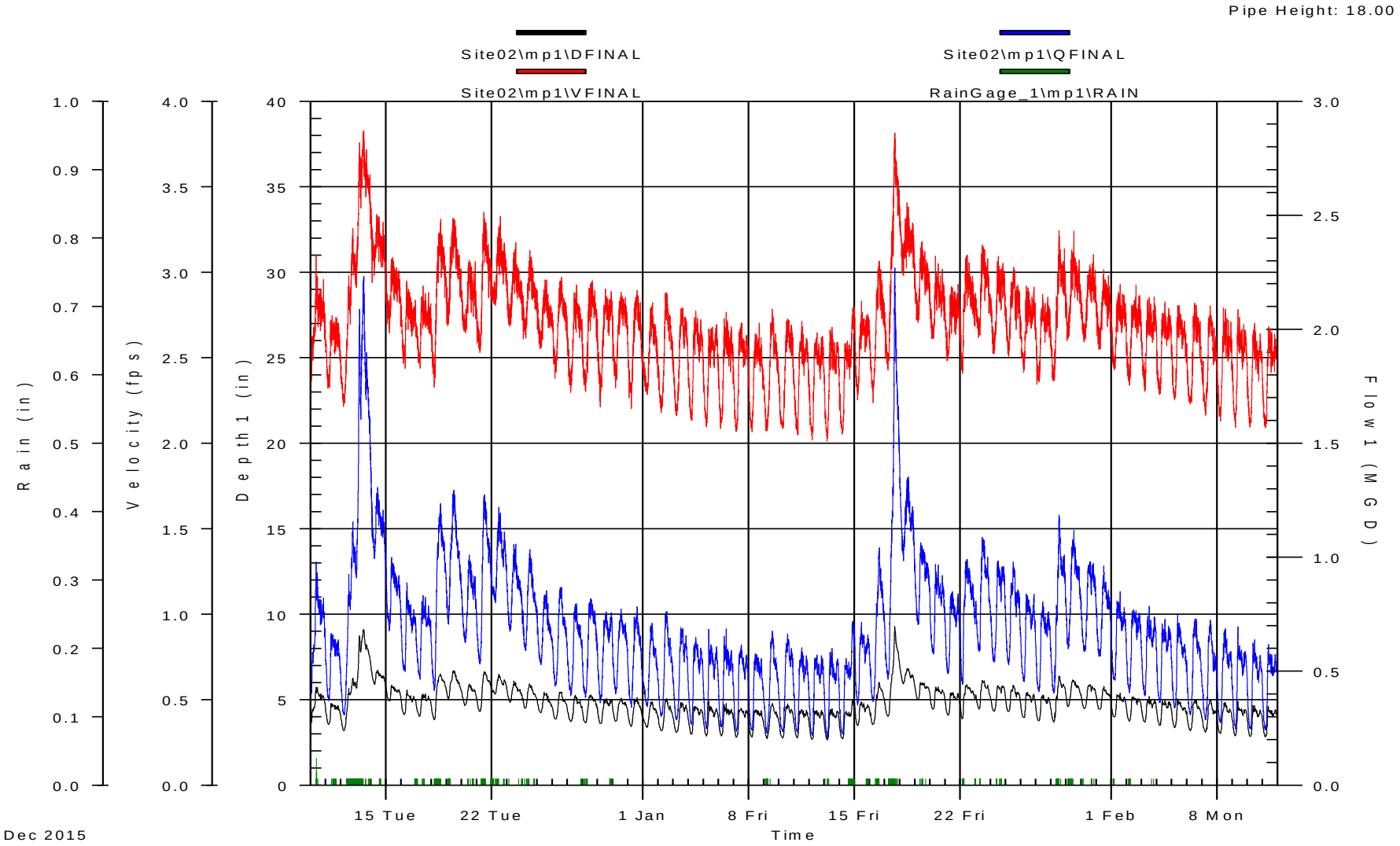


Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[X]	[ ]	
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity)	Lift / Pump Station	[ ]	[X]	[ ]	
Surcharge Height:	Not observed	WWTP	[ ]	[X]	[ ]	
Rain Guage Zone:	RG1	Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

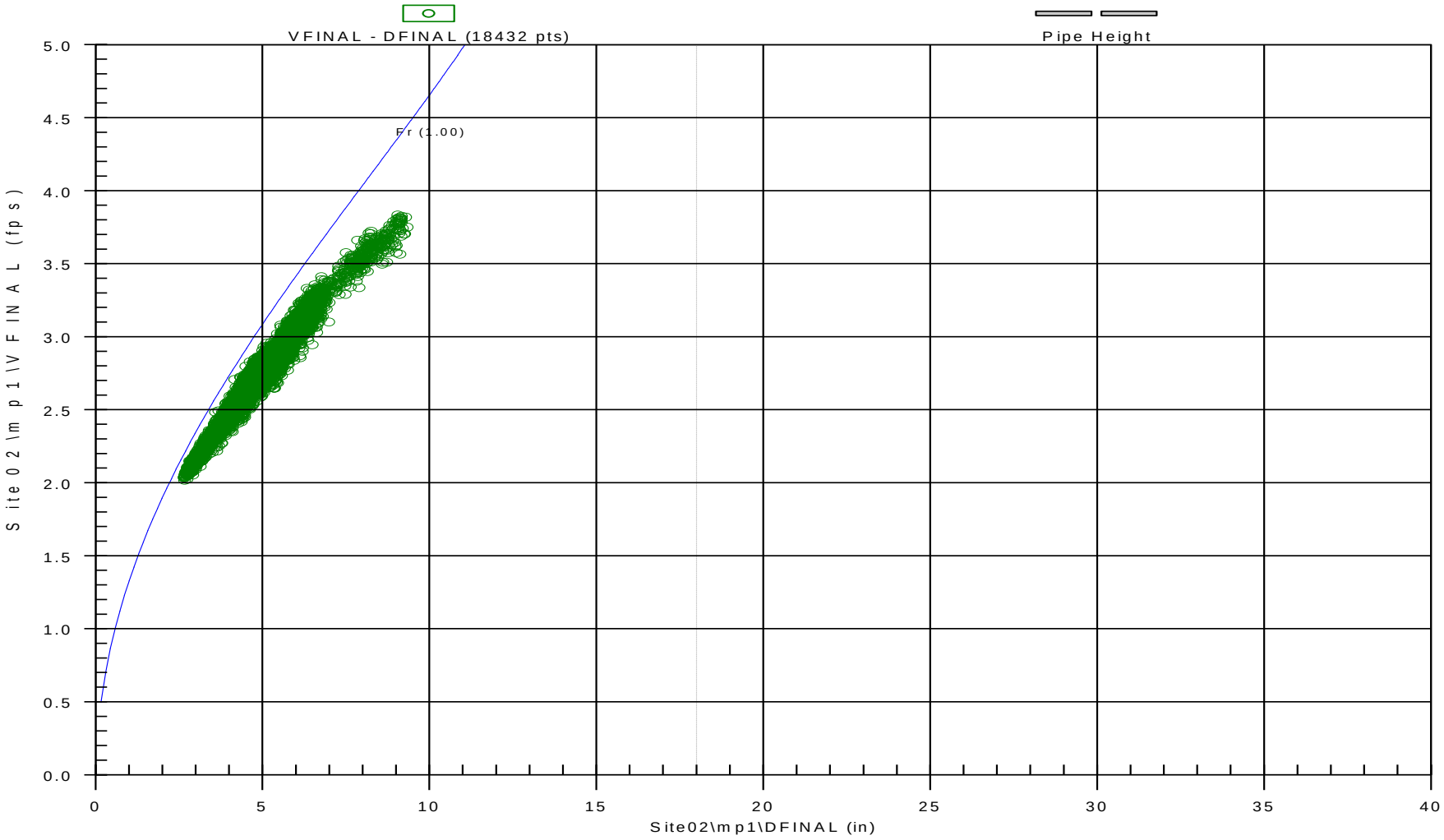
ADS Environmental Services



ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 18.00



ADS Environmental Services

	Site02\mp1\DFINAL (inches)					Site02\mp1\VFINAL (feet/sec)					Site02\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:55	3.7	8:05	5.8	5.0	0:45	2.4	8:00	3.1	2.7	0:50	0.404	8:00	0.982	0.709	0.709
12/11/2015	4:15	3.6	8:10	4.8	4.3	2:40	2.3	9:40	2.8	2.6	4:10	0.374	8:05	0.669	0.548	0.548
12/12/2015	5:10	3.2	18:25	6.3	4.9	3:25	2.2	18:15	3.3	2.7	5:10	0.312	18:15	1.158	0.707	0.707
12/13/2015	0:15	5.7	11:35	9.2	7.9	0:05	2.9	11:20	3.8	3.5	0:05	0.913	11:50	2.236	1.701	1.701
12/14/2015	23:55	5.5	9:50	6.8	6.3	23:25	2.8	8:05	3.3	3.2	23:50	0.851	9:50	1.309	1.129	1.129
12/15/2015	23:55	4.8	8:00	5.9	5.4	4:35	2.7	9:50	3.1	2.9	23:55	0.661	7:55	1.002	0.844	0.844
12/16/2015	3:35	4.2	8:25	5.6	4.9	5:25	2.4	7:55	3.0	2.7	5:25	0.502	8:25	0.891	0.690	0.690
12/17/2015	4:45	4.0	13:45	5.4	4.8	5:00	2.4	10:00	2.9	2.7	5:00	0.468	10:00	0.838	0.672	0.672
12/18/2015	4:30	3.8	13:25	6.5	5.5	3:45	2.3	14:10	3.3	2.9	3:45	0.419	13:25	1.238	0.887	0.887
12/19/2015	2:00	5.0	11:00	6.8	6.0	0:55	2.7	9:10	3.3	3.0	2:20	0.709	11:15	1.298	1.010	1.010
12/20/2015	4:35	4.7	11:30	6.0	5.4	23:50	2.6	11:10	3.1	2.8	4:45	0.629	11:10	1.013	0.812	0.812
12/21/2015	3:35	4.3	11:20	6.7	5.7	4:05	2.5	10:25	3.4	2.9	4:05	0.535	11:15	1.277	0.925	0.925
12/22/2015	4:20	5.4	10:20	6.5	5.9	4:55	2.8	12:30	3.3	3.0	4:55	0.803	10:20	1.223	0.993	0.993
12/23/2015	4:15	4.9	10:15	6.1	5.5	3:45	2.7	13:05	3.2	2.9	3:45	0.677	10:20	1.061	0.858	0.858
12/24/2015	4:45	4.5	11:10	6.0	5.3	1:05	2.6	11:25	3.1	2.9	5:10	0.594	11:25	1.037	0.803	0.803
12/25/2015	4:50	4.3	10:15	5.5	4.8	3:35	2.6	14:10	3.0	2.7	5:20	0.532	14:10	0.857	0.683	0.683
12/26/2015	4:10	3.9	13:50	5.5	4.7	3:25	2.4	13:35	3.0	2.7	3:25	0.438	13:40	0.871	0.652	0.652
12/27/2015	4:35	3.7	11:40	5.3	4.5	4:35	2.3	13:30	2.9	2.6	4:35	0.395	13:30	0.799	0.605	0.605
12/28/2015	4:15	3.7	12:35	5.3	4.6	4:05	2.3	14:50	3.0	2.7	4:10	0.388	12:35	0.821	0.630	0.630
12/29/2015	4:10	3.6	13:05	5.1	4.5	3:20	2.2	11:30	2.9	2.7	3:20	0.365	13:05	0.764	0.604	0.604
12/30/2015	4:10	3.7	12:25	5.1	4.5	3:50	2.3	12:20	2.9	2.7	3:50	0.403	12:25	0.776	0.605	0.605
12/31/2015	4:25	3.5	14:00	5.2	4.3	4:45	2.2	14:00	2.9	2.6	4:45	0.344	14:00	0.787	0.561	0.561
ReportAvg					5.2					2.8					0.801	
ReportTotal																17.63

ADS Environmental Services

	Site02\mp1\DFINAL (inches)					Site02\mp1\VFINAL (feet/sec)					Site02\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	6:00	3.4	13:35	5.0	4.2	6:00	2.3	14:20	2.8	2.5	6:00	0.347	13:40	0.716	0.518	0.518
1/2/2016	4:50	3.2	12:40	5.1	4.2	4:10	2.2	12:25	2.9	2.5	4:15	0.304	12:55	0.766	0.520	0.520
1/3/2016	4:20	3.1	11:05	4.9	4.1	4:50	2.2	14:25	2.8	2.5	4:50	0.289	11:10	0.695	0.501	0.501
1/4/2016	3:45	3.0	11:10	4.7	4.0	4:55	2.1	11:10	2.8	2.5	3:40	0.269	11:10	0.651	0.488	0.488
1/5/2016	4:00	2.9	7:35	5.0	4.0	3:45	2.1	19:40	2.7	2.5	4:00	0.252	7:35	0.687	0.473	0.473
1/6/2016	3:45	2.9	11:25	4.9	4.0	2:20	2.1	11:25	2.8	2.5	3:45	0.258	11:25	0.689	0.470	0.470
1/7/2016	3:30	2.8	11:20	4.6	3.9	3:15	2.1	11:20	2.7	2.4	3:30	0.239	11:20	0.618	0.457	0.457
1/8/2016	4:35	2.9	10:20	4.5	3.8	4:30	2.1	15:45	2.7	2.4	4:35	0.243	9:30	0.579	0.438	0.438
1/9/2016	4:15	2.8	13:00	4.8	3.9	4:20	2.1	12:20	2.8	2.4	4:10	0.230	12:20	0.679	0.451	0.451
1/10/2016	5:10	2.8	12:50	4.8	3.9	5:05	2.1	12:50	2.7	2.4	5:10	0.237	12:50	0.667	0.456	0.456
1/11/2016	4:05	2.8	11:15	4.5	3.8	5:25	2.1	11:20	2.7	2.4	4:25	0.234	11:20	0.606	0.442	0.442
1/12/2016	4:05	2.7	18:40	4.4	3.8	3:45	2.0	11:35	2.7	2.4	4:05	0.222	11:35	0.574	0.436	0.436
1/13/2016	3:50	2.7	11:25	4.5	3.8	3:40	2.0	11:25	2.7	2.4	3:40	0.213	11:25	0.603	0.433	0.433
1/14/2016	4:25	2.7	20:00	5.0	4.0	3:30	2.1	21:35	2.8	2.5	4:25	0.226	20:25	0.722	0.473	0.473
1/15/2016	4:05	3.5	10:15	4.9	4.4	3:55	2.3	10:30	2.8	2.6	3:55	0.355	10:30	0.719	0.559	0.559
1/16/2016	4:05	3.6	14:35	6.1	4.9	4:40	2.2	14:30	3.1	2.7	4:40	0.370	14:30	1.045	0.687	0.687
1/17/2016	4:15	4.0	15:00	9.3	6.4	4:15	2.4	15:05	3.8	3.1	4:15	0.468	15:05	2.272	1.210	1.210
1/18/2016	23:55	5.6	13:00	6.9	6.4	23:35	2.8	10:30	3.4	3.2	23:55	0.876	12:35	1.355	1.152	1.152
1/19/2016	4:40	5.0	8:35	6.1	5.6	4:10	2.7	10:30	3.2	2.9	4:10	0.707	8:35	1.067	0.903	0.903
1/20/2016	4:20	4.5	12:10	5.8	5.2	1:35	2.6	7:50	3.1	2.8	4:15	0.578	7:50	0.972	0.786	0.786
1/21/2016	4:15	4.1	10:45	5.5	4.9	2:15	2.5	19:50	2.9	2.7	3:40	0.492	10:35	0.852	0.698	0.698
1/22/2016	3:15	3.9	9:40	5.9	5.3	2:40	2.4	10:25	3.1	2.8	2:40	0.445	9:40	0.995	0.796	0.796
1/23/2016	5:15	4.5	10:35	6.2	5.4	3:55	2.6	9:55	3.2	2.9	4:55	0.591	9:55	1.091	0.845	0.845
1/24/2016	4:05	4.4	10:35	5.9	5.3	4:40	2.5	11:30	3.1	2.8	4:40	0.544	10:40	0.987	0.790	0.790
1/25/2016	4:10	4.3	11:10	5.9	5.2	4:10	2.5	11:50	3.0	2.8	4:10	0.531	11:10	0.982	0.760	0.760
1/26/2016	3:55	4.0	10:00	5.5	4.9	3:45	2.4	7:50	2.9	2.7	4:00	0.456	20:15	0.841	0.679	0.679
1/27/2016	4:05	3.8	10:00	5.3	4.7	0:40	2.3	9:50	2.9	2.6	4:05	0.414	9:50	0.807	0.633	0.633
1/28/2016	3:40	3.7	11:50	6.5	5.2	4:20	2.4	11:55	3.2	2.8	3:40	0.407	11:55	1.188	0.792	0.792
1/29/2016	2:50	4.6	9:35	6.2	5.5	0:55	2.6	11:30	3.2	2.9	2:40	0.602	11:30	1.122	0.872	0.872
1/30/2016	4:40	4.5	12:00	5.9	5.3	3:45	2.6	18:50	3.1	2.8	4:40	0.590	12:35	0.983	0.813	0.813
1/31/2016	4:10	4.5	11:20	5.8	5.1	3:30	2.6	11:15	3.0	2.8	3:30	0.569	11:15	0.965	0.750	0.750
ReportAvg					4.7					2.7					0.654	
ReportTotal																20.28

ADS Environmental Services

	Site02\mp1\DFINAL (inches)					Site02\mp1\VFINAL (feet/sec)					Site02\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	5:00	4.0	13:05	5.4	4.8	3:45	2.4	13:05	2.9	2.7	5:00	0.463	13:05	0.852	0.663	0.663
2/2/2016	3:50	3.8	8:10	5.2	4.7	3:50	2.3	14:20	2.9	2.7	3:50	0.409	10:20	0.772	0.634	0.634
2/3/2016	4:20	3.7	11:15	5.2	4.6	3:55	2.3	19:10	2.9	2.6	3:55	0.395	11:15	0.790	0.603	0.603
2/4/2016	3:30	3.5	7:55	5.0	4.4	3:20	2.3	12:10	2.8	2.6	4:45	0.366	12:10	0.731	0.570	0.570
2/5/2016	3:35	3.4	8:15	5.1	4.3	3:15	2.3	8:25	2.8	2.6	3:40	0.343	8:25	0.749	0.547	0.547
2/6/2016	4:45	3.2	12:30	5.1	4.2	4:35	2.2	11:00	2.8	2.5	4:45	0.311	11:50	0.732	0.523	0.523
2/7/2016	4:25	3.1	12:15	5.0	4.1	5:00	2.2	11:55	2.8	2.5	4:55	0.290	11:55	0.729	0.498	0.498
2/8/2016	4:35	3.1	10:45	4.9	4.1	4:20	2.1	8:55	2.8	2.5	4:20	0.276	12:05	0.689	0.495	0.495
2/9/2016	4:05	2.9	8:05	4.9	4.0	4:05	2.1	8:10	2.8	2.5	4:05	0.249	8:10	0.698	0.476	0.476
2/10/2016	4:45	2.9	8:05	4.7	3.9	3:25	2.1	10:35	2.7	2.4	4:45	0.250	10:40	0.641	0.457	0.457
2/11/2016	4:05	2.9	8:15	4.6	3.9	3:55	2.1	8:30	2.7	2.4	3:55	0.245	8:30	0.621	0.454	0.454
ReportAvg					4.3					2.5					0.538	
ReportTotal																5.919

Site03

Located At: 542 East Jackson St (see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 10” x 10”
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The data plots below the Froude =1 curve indicating subcritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data “drops” (outside the normal data set) were flagged.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

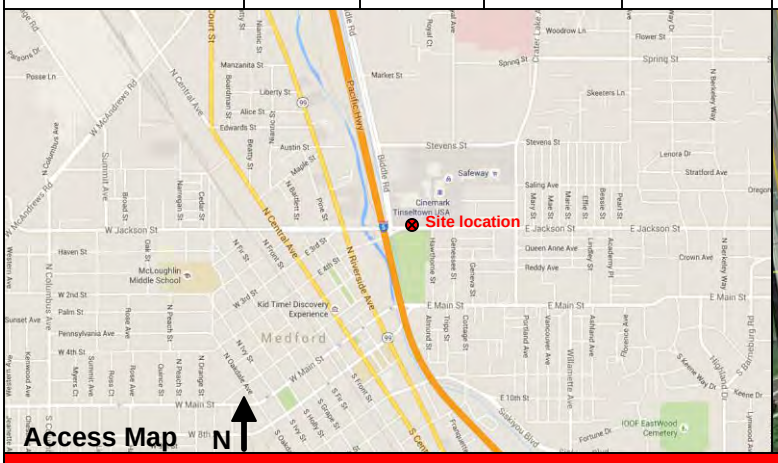
Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	1.64	0.81	0.03	16%
Maximum	6.35	2.78	0.65	64%
Average	2.75	1.76	0.14	28%

ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site03	**Monitor Series:**	Triton+	**Monitor S/N:**	60020
Address/Location:	542 E Jackson Rd			**IP Address:**	166.219.173.182
				Manhole #	3481
				GPS Coordinates	42.331093° -122.868475°
Access: Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]	**Pipe Height:** 10.00"
					Pipe Width: 10.00"



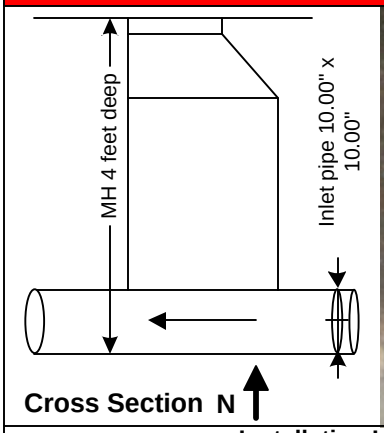
Investigation Information:

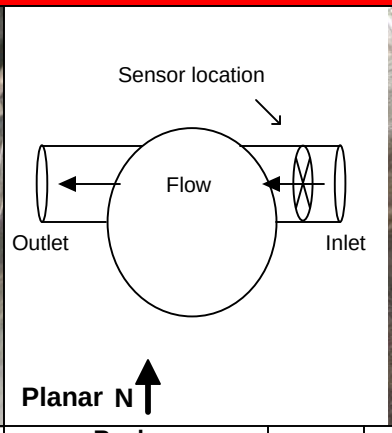
Date/Time of Investigation:	12/09/2015 @ 5:57
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	P/S
Upstream Manhole:	Slight drop in line
Downstream Manhole:	DNI
Depth of Flow:	2.25" +/- 0.25"
Range (Air DOF):	7.25" +/- 0.25"
Peak Velocity:	2.00 fps
Silt:	None

Manhole Information:

Manhole Depth:	4'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [X]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:

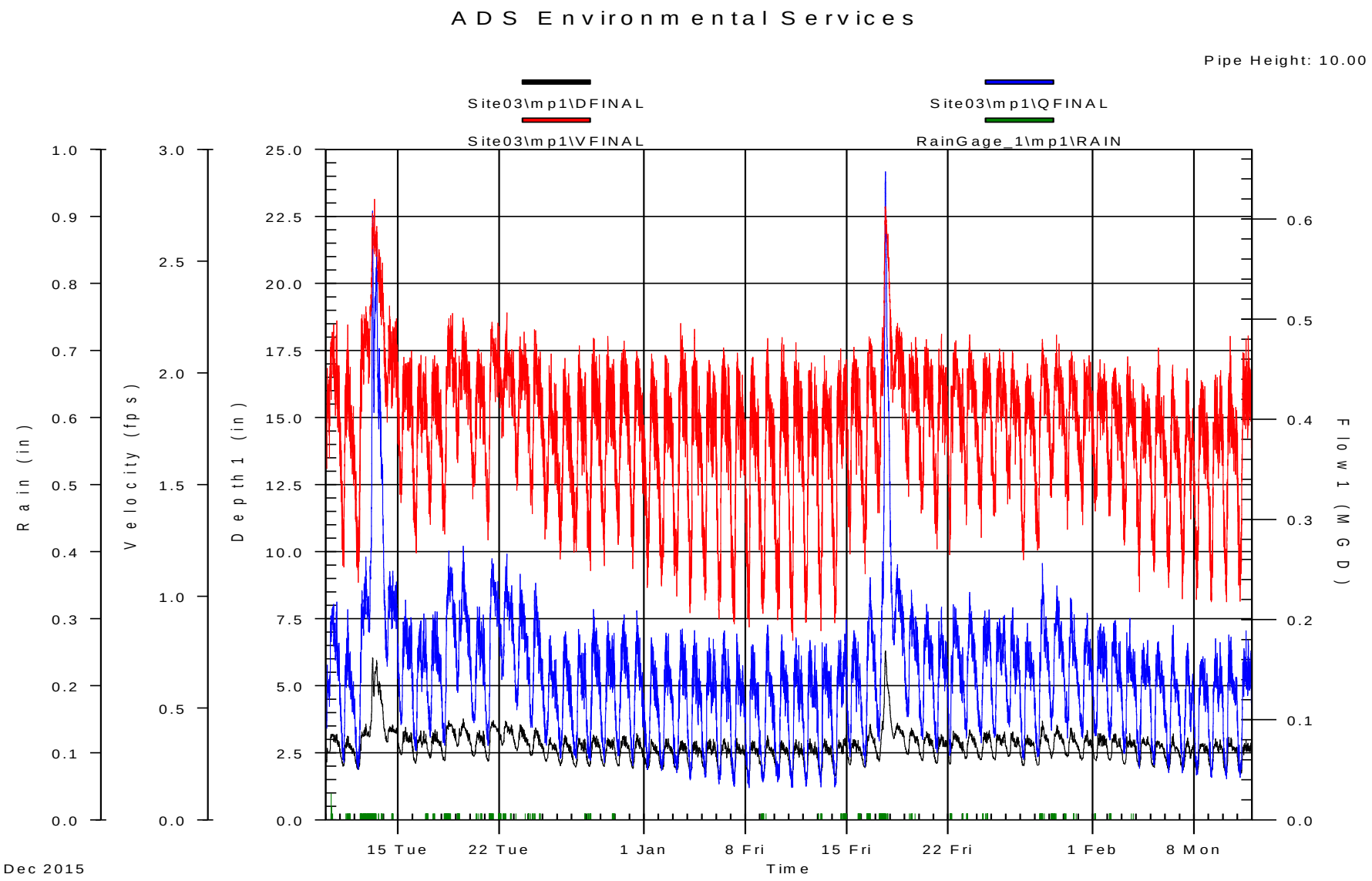




Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[X]	[ ]	
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity), CS5(Ultrasonic)	Lift / Pump Station	[ ]	[X]	[ ]	
Surcharge Height:	None Observed	WWTP	[ ]	[X]	[ ]	
Rain Guage Zone:	RG1	Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

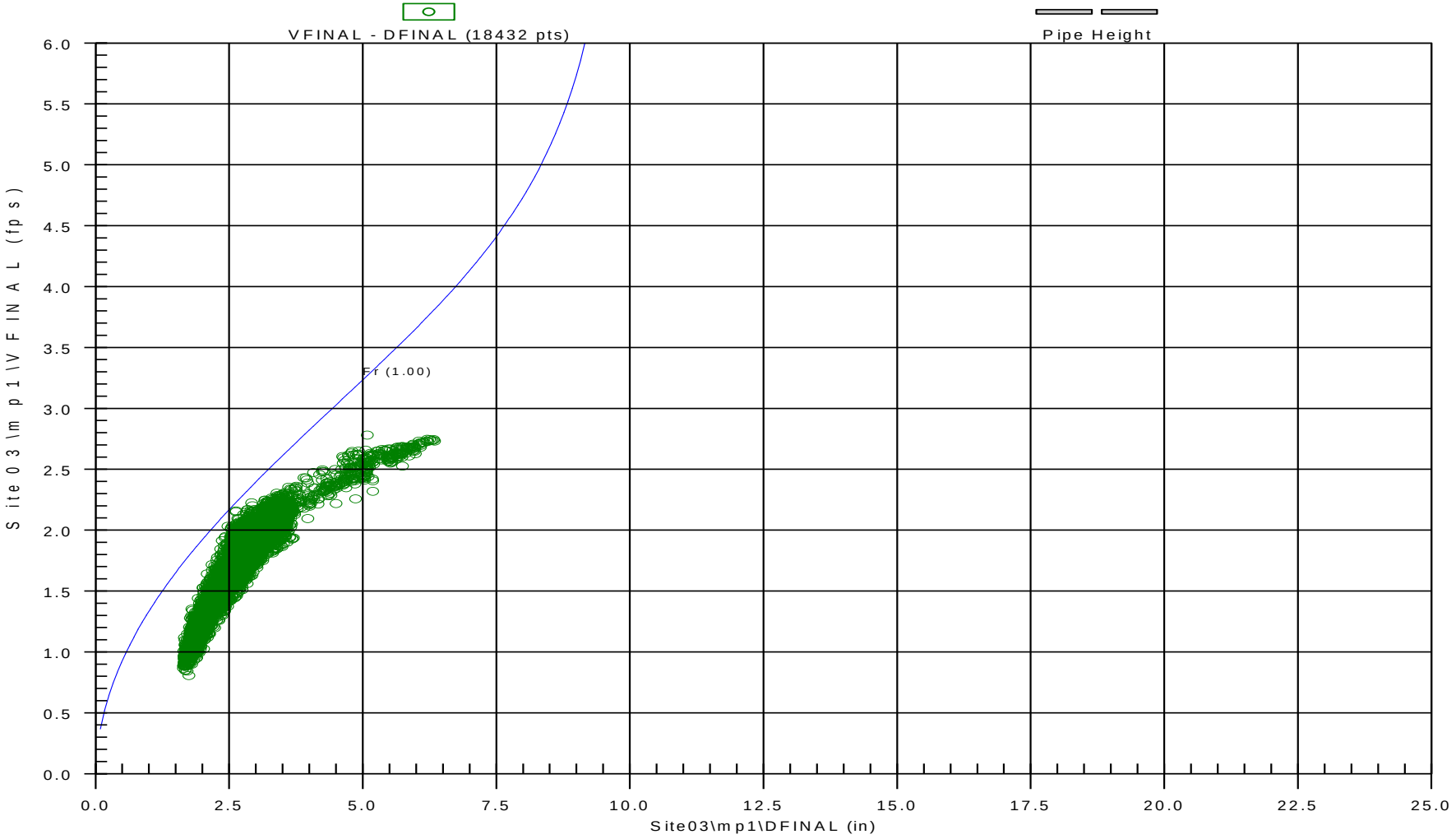
Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)


ADS Environmental Services
Pipe Height: 10.00
Site03\mp1\DFINAL
Site03\mp1\QFINAL
Site03\mp1\VFINAL
RainGage_1\mp1\RAIN
Rain (in)
Velocity (fps)
Depth 1 (in)
Flow 1 (MGD)
Time
15 Tue
22 Tue
1 Jan
8 Fri
15 Fri
22 Fri
1 Feb
8 Mon
Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 10.00



ADS Environmental Services

	Site03\mp1\DFINAL (inches)					Site03\mp1\VFINAL (feet/sec)					Site03\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:35	2.2	10:50	3.2	2.8	23:50	1.5	17:30	2.2	1.9	0:30	0.092	17:30	0.218	0.162	0.162
12/11/2015	4:00	2.0	11:30	3.2	2.6	5:00	1.1	11:35	2.2	1.7	5:00	0.058	11:35	0.211	0.124	0.124
12/12/2015	5:30	1.9	17:35	3.6	2.8	4:55	1.1	17:40	2.3	1.9	5:00	0.051	17:40	0.263	0.160	0.160
12/13/2015	0:00	3.1	5:00	6.1	4.7	0:00	2.0	8:05	2.8	2.5	0:00	0.192	4:55	0.609	0.408	0.408
12/14/2015	23:55	2.8	14:10	3.6	3.3	23:45	1.7	9:00	2.3	2.0	23:45	0.142	14:15	0.249	0.204	0.204
12/15/2015	5:10	2.4	11:40	3.5	2.9	4:05	1.4	21:25	2.1	1.8	4:05	0.096	11:35	0.220	0.157	0.157
12/16/2015	4:10	2.1	12:45	3.3	2.8	5:15	1.2	13:00	2.1	1.7	4:50	0.070	17:50	0.207	0.141	0.141
12/17/2015	4:05	2.3	12:35	3.4	2.8	4:30	1.3	11:40	2.1	1.8	4:30	0.083	12:20	0.209	0.147	0.147
12/18/2015	4:35	2.2	11:25	3.7	3.1	4:30	1.3	17:15	2.3	1.9	4:30	0.075	11:25	0.269	0.182	0.182
12/19/2015	1:30	2.8	11:25	3.8	3.2	1:55	1.6	10:45	2.2	2.0	1:55	0.128	11:25	0.274	0.195	0.195
12/20/2015	4:55	2.4	14:00	3.4	2.9	3:00	1.4	12:25	2.1	1.8	4:45	0.098	10:45	0.214	0.152	0.152
12/21/2015	5:20	2.2	13:15	3.7	3.1	4:05	1.3	11:00	2.2	1.9	4:05	0.075	11:00	0.262	0.184	0.184
12/22/2015	3:50	2.8	9:25	3.7	3.3	3:15	1.7	11:25	2.3	2.0	3:15	0.141	11:25	0.266	0.199	0.199
12/23/2015	4:20	2.6	9:40	3.6	3.0	4:05	1.5	15:55	2.2	1.9	4:05	0.111	9:40	0.246	0.173	0.173
12/24/2015	4:10	2.4	11:25	3.5	2.9	5:25	1.4	9:25	2.2	1.8	5:25	0.093	11:20	0.237	0.158	0.158
12/25/2015	5:05	2.2	11:25	3.1	2.6	2:50	1.3	13:05	2.1	1.7	5:10	0.075	11:25	0.185	0.125	0.125
12/26/2015	4:55	2.0	12:00	3.2	2.6	3:45	1.2	11:40	2.1	1.7	4:30	0.062	12:55	0.189	0.123	0.123
12/27/2015	5:50	2.0	10:15	3.1	2.5	2:55	1.2	11:45	2.1	1.7	6:25	0.062	10:15	0.191	0.122	0.122
12/28/2015	4:30	2.0	11:10	3.2	2.6	6:10	1.1	11:10	2.2	1.7	6:10	0.060	11:10	0.211	0.131	0.131
12/29/2015	5:00	2.0	21:00	3.1	2.6	5:00	1.1	11:00	2.2	1.7	5:00	0.058	11:00	0.199	0.130	0.130
12/30/2015	5:20	2.0	14:05	3.2	2.6	4:10	1.2	14:00	2.1	1.8	3:40	0.064	14:00	0.206	0.134	0.134
12/31/2015	5:00	1.9	11:00	3.3	2.6	4:15	1.1	11:00	2.1	1.7	4:15	0.055	11:00	0.210	0.124	0.124
ReportAvg					2.9					1.8					0.165	
ReportTotal																3.636

ADS Environmental Services

	Site03\mp1\DFINAL (inches)					Site03\mp1\VFINAL (feet/sec)					Site03\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	4:40	1.9	11:10	3.0	2.5	4:20	1.0	11:30	2.1	1.6	4:25	0.051	11:20	0.183	0.112	0.112
1/2/2016	4:25	1.9	13:10	3.1	2.5	3:45	1.0	10:10	2.1	1.6	4:10	0.050	11:15	0.187	0.114	0.114
1/3/2016	4:25	1.9	14:35	3.0	2.5	5:10	1.0	11:50	2.2	1.7	5:10	0.048	14:35	0.191	0.116	0.116
1/4/2016	3:45	1.8	13:55	3.0	2.4	3:10	0.9	10:25	2.2	1.6	3:40	0.041	10:25	0.190	0.112	0.112
1/5/2016	5:20	1.8	12:10	3.0	2.5	3:50	1.0	10:50	2.1	1.6	3:50	0.043	10:50	0.183	0.116	0.116
1/6/2016	3:20	1.7	12:20	3.1	2.4	3:10	0.9	10:40	2.1	1.6	3:10	0.036	12:05	0.190	0.114	0.114
1/7/2016	4:35	1.7	8:40	3.1	2.4	4:40	0.9	9:50	2.1	1.6	4:40	0.034	8:40	0.186	0.107	0.107
1/8/2016	5:10	1.6	11:00	3.0	2.4	5:10	0.9	11:30	2.1	1.6	5:10	0.033	11:00	0.176	0.105	0.105
1/9/2016	5:05	1.7	11:45	3.2	2.4	4:10	0.9	12:00	2.2	1.6	4:10	0.038	12:00	0.195	0.108	0.108
1/10/2016	4:55	1.8	10:50	3.0	2.4	4:40	0.9	11:40	2.2	1.6	4:40	0.038	11:10	0.186	0.106	0.106
1/11/2016	3:45	1.7	10:50	3.0	2.4	5:25	0.8	10:40	2.1	1.6	3:35	0.033	10:40	0.183	0.109	0.109
1/12/2016	3:55	1.7	10:15	3.1	2.4	3:20	0.9	12:15	2.0	1.6	3:55	0.034	10:15	0.180	0.109	0.109
1/13/2016	4:35	1.7	6:10	3.2	2.4	4:15	0.8	10:05	2.1	1.6	4:20	0.033	6:10	0.178	0.111	0.111
1/14/2016	3:20	1.6	22:20	3.2	2.5	3:20	0.9	12:55	2.1	1.7	3:20	0.034	22:20	0.200	0.122	0.122
1/15/2016	5:00	2.1	12:00	3.0	2.6	4:25	1.2	10:55	2.1	1.8	4:25	0.064	10:55	0.190	0.131	0.131
1/16/2016	5:45	2.0	14:05	3.6	2.7	5:40	1.1	12:15	2.2	1.8	5:40	0.054	14:05	0.243	0.144	0.144
1/17/2016	4:55	2.2	15:20	6.3	3.9	2:35	1.4	15:10	2.7	2.1	4:50	0.079	15:10	0.648	0.294	0.294
1/18/2016	23:35	2.7	0:00	3.8	3.3	23:50	1.7	0:05	2.3	2.1	23:50	0.138	0:05	0.276	0.210	0.210
1/19/2016	23:55	2.4	10:25	3.4	2.9	5:40	1.5	17:10	2.2	1.9	23:45	0.103	10:25	0.230	0.165	0.165
1/20/2016	5:05	2.2	11:40	3.3	2.8	2:35	1.4	11:00	2.2	1.8	5:05	0.081	11:40	0.216	0.150	0.150
1/21/2016	5:15	2.1	12:00	3.2	2.7	4:30	1.2	12:00	2.2	1.8	4:30	0.068	12:00	0.213	0.140	0.140
1/22/2016	2:55	2.1	7:35	3.3	2.8	1:55	1.2	12:10	2.1	1.8	1:55	0.065	7:35	0.216	0.153	0.153
1/23/2016	5:35	2.3	10:50	3.4	2.8	5:20	1.3	10:50	2.2	1.8	5:20	0.082	10:50	0.228	0.155	0.155
1/24/2016	4:55	2.3	19:25	3.4	2.8	6:15	1.3	12:00	2.1	1.8	6:15	0.078	19:20	0.211	0.149	0.149
1/25/2016	4:55	2.3	20:45	3.3	2.8	4:00	1.4	12:10	2.1	1.8	4:00	0.083	20:45	0.205	0.150	0.150
1/26/2016	23:45	2.4	10:20	3.3	2.8	2:05	1.4	9:40	2.1	1.8	4:50	0.093	10:20	0.213	0.146	0.146
1/27/2016	3:20	2.0	10:45	3.2	2.7	4:10	1.2	10:40	2.0	1.7	4:10	0.061	10:45	0.197	0.131	0.131
1/28/2016	4:15	2.0	11:35	3.7	2.8	3:30	1.2	11:35	2.2	1.8	3:30	0.064	11:35	0.257	0.153	0.153
1/29/2016	2:45	2.3	11:40	3.6	3.0	2:30	1.4	10:40	2.2	1.9	2:35	0.090	11:45	0.234	0.164	0.164
1/30/2016	5:05	2.4	10:15	3.5	2.8	5:05	1.3	11:45	2.1	1.8	5:05	0.082	10:15	0.222	0.150	0.150
1/31/2016	4:55	2.2	13:50	3.4	2.7	6:10	1.3	16:55	2.1	1.8	6:10	0.082	13:50	0.207	0.144	0.144
ReportAvg					2.7					1.7					0.138	
ReportTotal																4.291

ADS Environmental Services

	Site03\mp1\DFINAL (inches)					Site03\mp1\VFINAL (feet/sec)					Site03\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	4:45	2.2	7:40	3.2	2.8	3:15	1.4	11:00	2.1	1.8	3:15	0.084	11:50	0.197	0.146	0.146
2/2/2016	3:55	2.2	11:25	3.2	2.7	3:40	1.4	12:25	2.0	1.8	3:40	0.080	12:25	0.200	0.141	0.141
2/3/2016	4:25	2.1	12:25	3.3	2.6	3:15	1.2	8:45	2.1	1.7	3:15	0.067	12:25	0.202	0.130	0.130
2/4/2016	4:55	2.0	18:05	3.1	2.6	4:30	1.0	8:55	2.0	1.6	4:30	0.052	18:05	0.180	0.126	0.126
2/5/2016	5:10	2.0	10:10	3.0	2.6	5:00	1.1	12:00	2.1	1.6	4:10	0.056	12:00	0.179	0.120	0.120
2/6/2016	5:05	1.9	12:35	3.2	2.5	5:00	1.0	11:25	2.0	1.6	5:00	0.048	12:35	0.195	0.114	0.114
2/7/2016	4:40	1.9	12:10	3.1	2.5	3:35	1.0	11:30	2.0	1.6	3:35	0.048	12:15	0.177	0.109	0.109
2/8/2016	4:45	1.8	13:35	2.9	2.5	2:55	1.0	11:00	2.0	1.6	2:55	0.045	13:40	0.164	0.112	0.112
2/9/2016	4:00	1.8	10:35	3.1	2.5	3:35	1.0	19:10	2.0	1.6	3:55	0.043	10:40	0.182	0.116	0.116
2/10/2016	4:55	1.8	8:30	3.1	2.5	4:55	1.0	11:00	2.2	1.6	4:55	0.042	8:30	0.185	0.115	0.115
2/11/2016	5:35	1.8	13:00	3.0	2.5	3:10	1.0	16:55	2.2	1.7	3:10	0.043	13:00	0.190	0.119	0.119
ReportAvg					2.6					1.7					0.123	
ReportTotal																1.349

Site04

Located At: parking lot of 491-599 Medical Center Dr.
(see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 15.13" x 15"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The data plots below the Froude =1 curve indicating subcritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were flagged.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

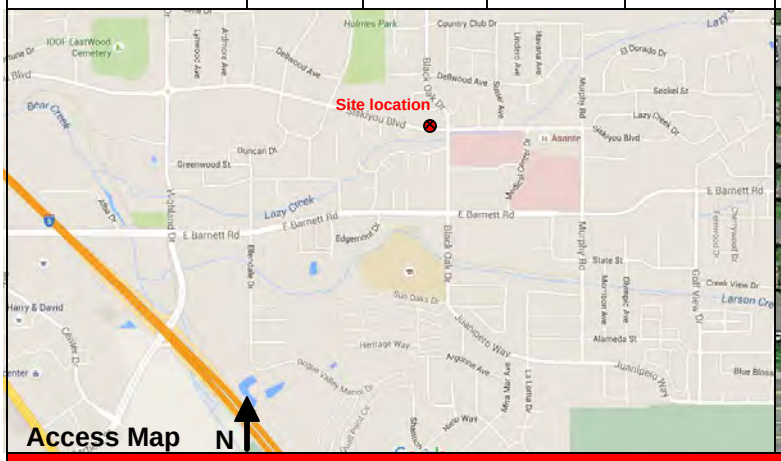
Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	2.78	1.22	0.12	19%
Maximum	10.49	2.77	1.60	69%
Average	4.53	1.96	0.41	30%

ADS Site Report — Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site04	**Monitor Series:**	Triton+	**Monitor S/N:**	60030
Address/Location:	In parking lot north of E. Barnett Rd east of Medical Center Dr. (491-599 Medical Center Dr)			**IP Address:**	166.219.173.181
				Manhole #	4226
				GPS Coordinates	42.317220° -122.832267°
Access:	Drive	**Type of System:**	Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	15.13"
				Pipe Width:	15.00"



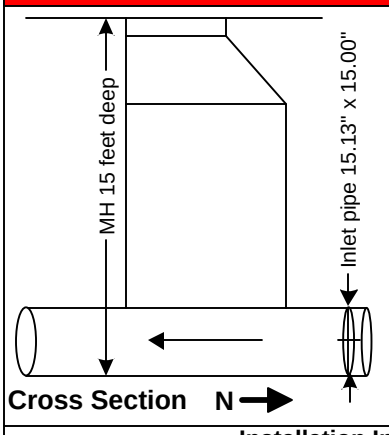
Investigation Information:

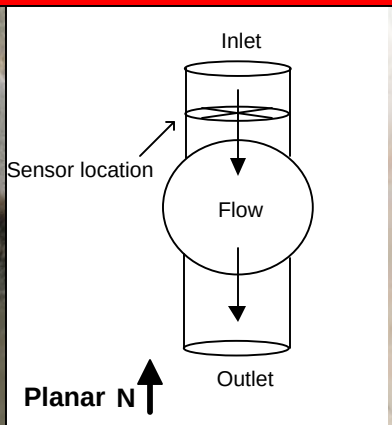
Date/Time of Investigation:	12/08/2015 @ 13:18
Site Hydraulics:	Small waves
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	3.50" +/- 0.25"
Range (Air DOF):	11.63" +/- 0.25"
Peak Velocity:	2.00 fps
Silt:	None

Manhole Information:

Manhole Depth:	15'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [ ]	Industrial [X]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:





Installation Information	
Installation Type:	Standard
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity)
Surcharge Height:	None observed
Rain Guage Zone:	RG1

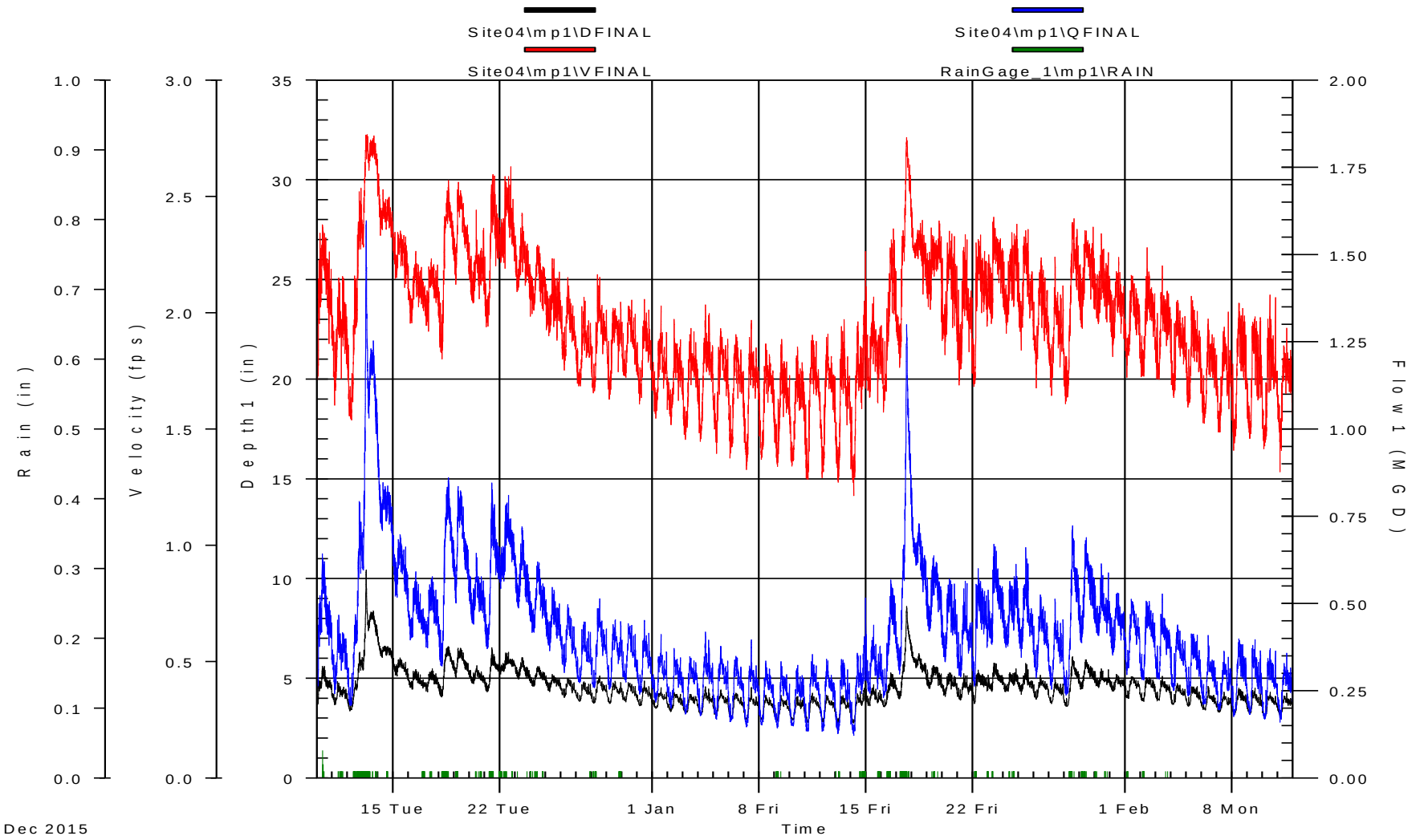
Backup	Yes	No	?	Distance
Trunk	[ ]	[X]	[ ]	
Lift / Pump Station	[ ]	[X]	[ ]	
WWTP	[ ]	[X]	[ ]	
Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

ADS Environmental Services

Pipe Height: 15.13

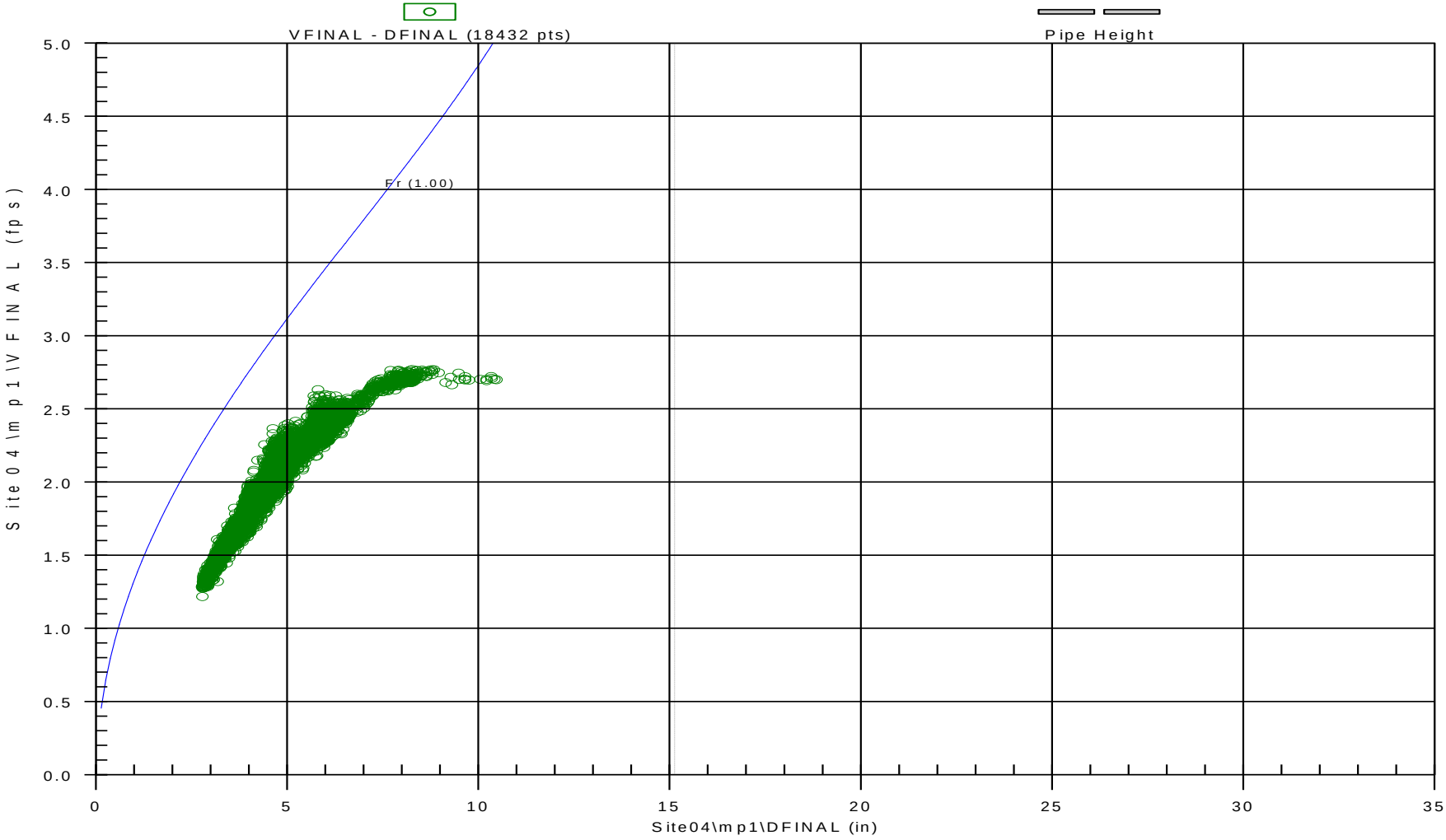


Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 15.13



ADS Environmental Services

	Site04\mp1\DFINAL (inches)					Site04\mp1\VFINAL (feet/sec)					Site04\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:00	3.7	7:30	5.6	4.7	0:00	1.7	7:45	2.4	2.1	0:00	0.263	7:45	0.645	0.458	0.458
12/11/2015	3:00	3.7	7:40	4.9	4.2	2:50	1.6	15:35	2.2	1.9	2:50	0.244	9:40	0.469	0.344	0.344
12/12/2015	3:00	3.4	18:30	6.3	4.6	5:35	1.5	20:30	2.5	2.0	4:20	0.209	17:50	0.794	0.438	0.438
12/13/2015	0:10	5.5	4:45	10.5	7.8	0:20	2.3	6:10	2.8	2.7	0:10	0.598	4:45	1.599	1.105	1.105
12/14/2015	23:25	5.6	0:15	6.9	6.4	23:25	2.3	0:10	2.6	2.4	23:25	0.610	0:10	0.914	0.773	0.773
12/15/2015	23:40	4.9	10:10	6.1	5.5	23:05	2.1	10:15	2.4	2.2	23:50	0.461	10:10	0.699	0.590	0.590
12/16/2015	5:40	4.5	10:40	5.5	4.9	2:20	2.0	10:40	2.3	2.1	2:20	0.398	10:40	0.593	0.468	0.468
12/17/2015	5:15	4.4	12:35	5.5	4.9	6:45	1.9	11:20	2.2	2.1	5:15	0.375	12:35	0.579	0.464	0.464
12/18/2015	3:25	4.1	13:55	6.6	5.5	4:10	1.8	14:15	2.6	2.3	4:10	0.323	14:20	0.863	0.610	0.610
12/19/2015	2:10	5.1	9:10	6.5	5.8	1:45	2.1	5:45	2.6	2.4	2:10	0.503	5:10	0.838	0.667	0.667
12/20/2015	23:55	4.6	11:00	5.7	5.1	23:55	2.0	9:55	2.4	2.2	23:55	0.425	9:55	0.646	0.513	0.513
12/21/2015	3:10	4.3	10:35	6.6	5.3	1:40	1.9	12:15	2.6	2.3	3:15	0.371	10:35	0.848	0.579	0.579
12/22/2015	0:20	5.2	12:40	6.3	5.7	7:25	2.2	16:15	2.6	2.4	0:20	0.545	12:45	0.812	0.660	0.660
12/23/2015	22:50	4.8	10:00	6.1	5.4	22:55	2.0	10:15	2.4	2.2	22:55	0.452	10:15	0.722	0.562	0.562
12/24/2015	3:20	4.6	10:30	5.6	5.1	1:50	2.0	10:30	2.3	2.1	1:50	0.419	10:30	0.621	0.506	0.506
12/25/2015	5:30	4.4	9:30	5.3	4.8	16:50	1.9	9:25	2.2	2.0	5:30	0.367	9:25	0.548	0.440	0.440
12/26/2015	4:35	4.1	9:45	5.0	4.5	4:35	1.8	9:50	2.2	1.9	4:35	0.304	9:50	0.499	0.385	0.385
12/27/2015	4:40	3.9	11:20	4.9	4.3	5:50	1.7	11:35	2.1	1.8	4:40	0.275	11:35	0.449	0.345	0.345
12/28/2015	2:45	3.8	12:10	5.2	4.4	2:05	1.7	8:35	2.2	1.9	4:10	0.261	12:15	0.516	0.373	0.373
12/29/2015	4:00	3.8	12:40	4.9	4.3	3:15	1.6	21:15	2.0	1.9	3:35	0.256	12:40	0.455	0.356	0.356
12/30/2015	5:15	3.9	9:15	4.8	4.3	5:20	1.7	14:30	2.1	1.9	5:15	0.277	9:15	0.444	0.353	0.353
12/31/2015	3:10	3.7	10:25	4.9	4.1	2:45	1.6	10:40	2.1	1.8	3:10	0.242	10:35	0.454	0.324	0.324
ReportAvg					5.1					2.1					0.514	
ReportTotal																11.31

ADS Environmental Services

	Site04\mp1\DFINAL (inches)					Site04\mp1\VFINAL (feet/sec)					Site04\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	4:45	3.5	12:45	4.6	3.9	4:45	1.5	12:40	2.0	1.8	4:45	0.219	12:40	0.413	0.292	0.292
1/2/2016	4:15	3.4	9:20	4.3	3.8	4:40	1.5	9:20	2.0	1.7	4:15	0.202	9:20	0.373	0.277	0.277
1/3/2016	4:00	3.2	10:20	4.3	3.8	3:10	1.5	11:50	1.9	1.7	3:10	0.185	10:15	0.350	0.267	0.267
1/4/2016	3:30	3.2	10:40	4.6	3.8	2:35	1.5	10:40	2.0	1.7	2:35	0.181	10:40	0.420	0.279	0.279
1/5/2016	3:25	3.1	11:05	4.5	3.8	3:55	1.4	10:25	1.9	1.7	3:55	0.170	10:30	0.379	0.271	0.271
1/6/2016	2:30	3.1	10:45	4.3	3.7	1:30	1.4	10:35	1.9	1.7	1:30	0.163	10:35	0.351	0.260	0.260
1/7/2016	3:45	3.0	10:50	4.6	3.7	3:15	1.3	11:05	2.0	1.7	3:15	0.148	10:55	0.399	0.253	0.253
1/8/2016	3:40	3.0	9:45	4.2	3.6	2:50	1.4	9:45	1.9	1.6	3:35	0.153	9:45	0.337	0.242	0.242
1/9/2016	3:40	2.9	9:30	4.2	3.5	4:10	1.3	10:50	1.9	1.6	3:40	0.146	9:30	0.336	0.232	0.232
1/10/2016	4:10	3.0	11:50	4.1	3.5	2:50	1.3	11:45	1.9	1.6	5:10	0.151	11:50	0.325	0.227	0.227
1/11/2016	3:40	2.8	11:05	4.3	3.6	3:15	1.3	11:05	1.9	1.6	4:10	0.136	11:05	0.356	0.241	0.241
1/12/2016	2:30	2.8	9:25	4.2	3.6	2:15	1.3	11:30	1.9	1.6	2:30	0.136	9:25	0.343	0.239	0.239
1/13/2016	2:45	2.8	11:00	4.2	3.5	3:30	1.3	13:10	2.0	1.6	2:45	0.130	8:40	0.342	0.234	0.234
1/14/2016	4:00	2.8	22:45	5.0	3.7	4:00	1.2	22:45	2.3	1.7	4:00	0.124	22:45	0.518	0.264	0.264
1/15/2016	5:35	3.7	11:25	4.7	4.1	17:50	1.6	11:25	2.1	1.8	5:35	0.245	11:25	0.440	0.321	0.321
1/16/2016	4:35	3.6	14:30	5.3	4.3	3:00	1.6	18:40	2.4	2.0	3:00	0.232	14:25	0.569	0.380	0.380
1/17/2016	4:25	4.0	15:20	8.6	5.9	4:25	1.8	15:15	2.8	2.3	4:25	0.300	15:20	1.301	0.694	0.694
1/18/2016	23:40	4.7	0:05	6.4	5.7	17:15	2.1	0:05	2.4	2.3	23:40	0.458	0:05	0.779	0.632	0.632
1/19/2016	3:55	4.5	10:05	5.7	5.1	23:10	1.9	18:35	2.4	2.2	23:10	0.384	10:05	0.639	0.521	0.521
1/20/2016	23:50	4.1	10:50	5.3	4.7	23:50	1.8	10:35	2.4	2.1	23:50	0.317	10:50	0.572	0.440	0.440
1/21/2016	4:25	3.9	9:05	5.3	4.5	1:45	1.7	11:35	2.3	2.0	4:20	0.292	11:35	0.567	0.394	0.394
1/22/2016	1:45	3.8	8:00	5.5	4.7	1:35	1.7	11:40	2.3	2.1	1:45	0.265	8:00	0.602	0.447	0.447
1/23/2016	5:30	4.4	8:55	5.8	5.0	4:50	2.0	8:30	2.4	2.2	5:25	0.385	8:55	0.672	0.508	0.508
1/24/2016	3:35	4.4	19:35	5.5	4.8	4:05	1.9	20:50	2.4	2.1	3:40	0.376	19:35	0.615	0.471	0.471
1/25/2016	3:50	4.2	10:55	5.8	4.8	3:40	1.8	14:20	2.4	2.1	3:50	0.348	10:55	0.663	0.455	0.455
1/26/2016	3:00	4.0	9:40	5.2	4.5	3:25	1.7	11:05	2.2	2.0	3:25	0.289	9:35	0.527	0.399	0.399
1/27/2016	3:30	3.8	9:05	5.0	4.3	3:30	1.6	9:05	2.2	1.9	3:30	0.256	9:05	0.515	0.360	0.360
1/28/2016	4:25	3.6	12:40	6.1	4.8	1:30	1.6	14:40	2.4	2.0	2:30	0.240	12:40	0.725	0.460	0.460
1/29/2016	1:45	4.5	10:15	6.0	5.2	3:40	1.9	20:55	2.4	2.2	2:55	0.388	10:15	0.691	0.536	0.536
1/30/2016	5:40	4.6	9:55	5.5	4.9	5:05	2.0	10:00	2.3	2.1	23:50	0.409	10:00	0.616	0.475	0.475
1/31/2016	23:25	4.2	9:25	5.2	4.7	3:40	1.8	13:00	2.2	2.0	23:45	0.341	11:00	0.532	0.434	0.434
ReportAvg					4.3					1.9					0.371	
ReportTotal																11.51

ADS Environmental Services

	Site04\mp1\DFINAL (inches)					Site04\mp1\VFINAL (feet/sec)					Site04\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	4:50	4.0	9:10	5.1	4.6	2:05	1.7	9:05	2.2	2.0	2:05	0.298	9:05	0.514	0.409	0.409
2/2/2016	4:40	3.9	8:35	5.1	4.5	0:30	1.7	9:55	2.3	2.0	4:50	0.283	8:35	0.509	0.399	0.399
2/3/2016	1:45	3.9	9:50	5.1	4.4	4:50	1.7	9:50	2.2	1.9	4:50	0.286	9:50	0.530	0.381	0.381
2/4/2016	4:20	3.7	9:30	4.8	4.2	3:50	1.6	9:50	2.1	1.9	3:50	0.252	9:50	0.441	0.341	0.341
2/5/2016	3:00	3.6	16:50	4.6	4.1	2:05	1.6	7:35	2.1	1.8	3:00	0.237	7:35	0.415	0.321	0.321
2/6/2016	5:40	3.4	10:00	4.6	3.9	4:05	1.5	10:00	2.0	1.7	2:10	0.213	10:00	0.411	0.283	0.283
2/7/2016	4:00	3.3	11:00	4.4	3.8	4:30	1.5	17:45	2.0	1.7	4:40	0.197	11:05	0.366	0.269	0.269
2/8/2016	3:20	3.2	10:35	4.5	3.9	1:55	1.4	10:20	2.0	1.8	1:55	0.178	10:35	0.401	0.289	0.289
2/9/2016	3:40	3.2	11:45	4.6	3.8	3:30	1.5	11:50	2.0	1.7	3:40	0.184	11:50	0.400	0.279	0.279
2/10/2016	3:30	3.1	11:40	4.3	3.7	1:30	1.4	11:05	2.1	1.7	2:55	0.171	11:40	0.373	0.266	0.266
2/11/2016	4:35	3.1	13:30	4.3	3.7	3:00	1.3	13:35	1.9	1.7	3:00	0.162	13:35	0.360	0.256	0.256
ReportAvg					4.1					1.8					0.318	
ReportTotal																3.493

Site05

Located At: Orchard Interior Road (see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 10" x 10"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates a wave in the flow between 2" to 3". The dry weather data plots at the Froude =1 curve indicating critical flow. During rain events the flow goes to subcritical.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were flagged.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	1.58	1.34	0.05	16%
Maximum	5.74	3.02	0.63	57%
Average	3.19	2.34	0.24	32%

ADS Site Report — Quality Form

Project Name: Medford.MSA.TFM.OR15	**City / State:** Medford, OR	**FM Initials:** DS	
Site Name: Site05	**Monitor Series:** Triton+	**Monitor S/N:**	60057
Address/Location: Orchard Interior Rd		**IP Address:**	166.219.173.245
		Manhole #	4839
		GPS Coordinates	42.334411° -122.814246°
Access: Drive	**Type of System:** Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	10.00"
		Pipe Width:	10.00"

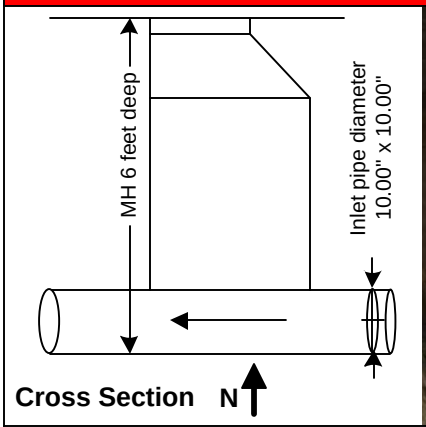
Investigation Information:

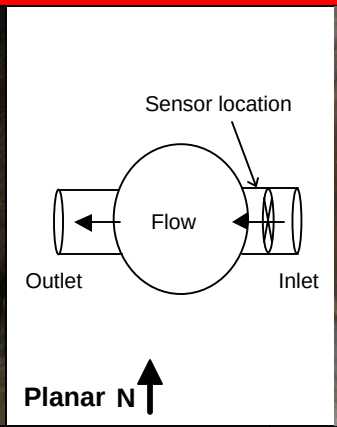
Date/Time of Investigation:	12/09/2015 @ 16:34
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	Small Waves
Depth of Flow:	2.63" +/- 0.25"
Range (Air DOF):	7.38" +/- 0.25"
Peak Velocity:	2.40 fps
Silt:	None

Manhole Information:

Manhole Depth:	6'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [ ]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:





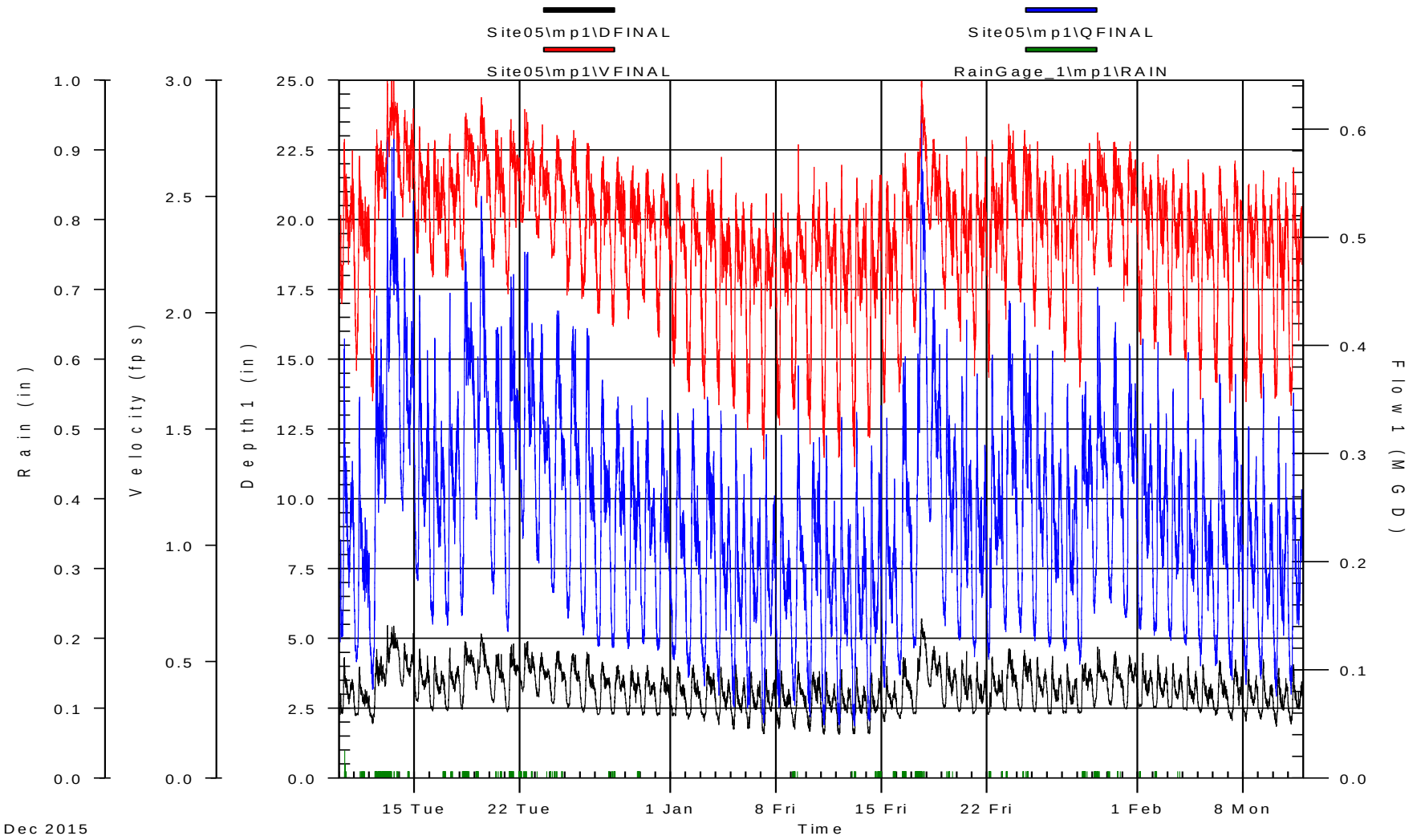
Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[X]	[ ]	
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity), CS5(Ultrasonic)	Lift / Pump Station	[ ]	[X]	[ ]	
Surcharge Height:	None observed	WWTP	[ ]	[X]	[ ]	
Rain Guage Zone:	RG1	Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

ADS Environmental Services

Pipe Height: 10.00

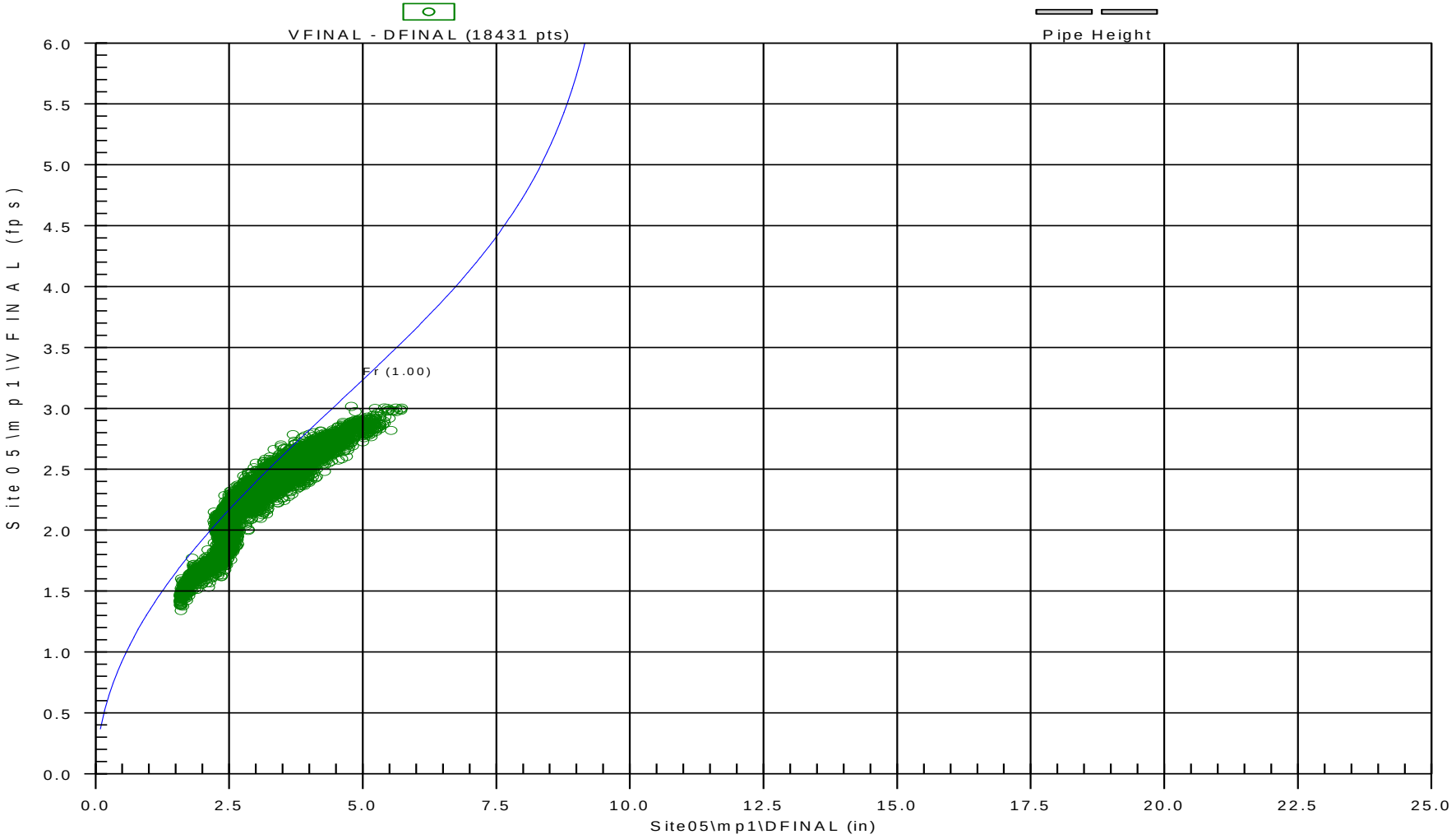


Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 10.00



ADS Environmental Services

	Site05\mp1\DFINAL (inches)					Site05\mp1\VFINAL (feet/sec)					Site05\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:45	2.3	7:40	4.4	3.1	3:40	2.0	7:40	2.7	2.4	0:40	0.126	7:40	0.407	0.223	0.223
12/11/2015	1:15	2.3	7:50	4.0	2.8	2:50	1.8	7:45	2.7	2.3	2:55	0.108	7:50	0.353	0.190	0.190
12/12/2015	4:25	2.0	11:05	4.6	3.3	4:45	1.6	11:10	2.8	2.4	4:35	0.083	11:05	0.446	0.250	0.250
12/13/2015	0:20	3.3	4:15	5.5	4.6	0:35	2.5	10:55	3.0	2.8	0:25	0.255	4:15	0.593	0.442	0.442
12/14/2015	4:20	3.3	21:20	5.2	4.0	4:35	2.4	21:20	2.9	2.7	4:35	0.248	21:20	0.534	0.348	0.348
12/15/2015	4:40	2.8	7:40	4.6	3.5	4:20	2.3	7:25	2.8	2.5	4:20	0.183	7:25	0.447	0.277	0.277
12/16/2015	4:15	2.4	7:35	4.4	3.3	4:15	2.2	7:35	2.7	2.4	4:15	0.143	7:35	0.408	0.247	0.247
12/17/2015	3:45	2.4	7:40	4.7	3.4	3:35	2.2	7:45	2.8	2.5	3:45	0.142	7:40	0.449	0.263	0.263
12/18/2015	2:35	2.5	7:50	4.9	3.9	4:35	2.2	9:15	2.9	2.6	2:35	0.151	7:50	0.490	0.338	0.338
12/19/2015	1:45	3.2	9:25	5.2	4.1	2:05	2.5	9:45	2.9	2.7	1:45	0.240	9:40	0.539	0.365	0.365
12/20/2015	5:00	2.7	13:15	4.5	3.5	5:00	2.2	11:20	2.8	2.5	5:00	0.171	17:35	0.418	0.281	0.281
12/21/2015	3:55	2.4	13:05	4.8	3.6	4:30	2.1	9:05	2.8	2.5	4:30	0.136	13:10	0.466	0.299	0.299
12/22/2015	3:50	3.1	11:30	4.9	3.9	3:50	2.4	7:05	2.9	2.6	3:50	0.222	7:05	0.487	0.340	0.340
12/23/2015	5:25	2.9	9:30	4.5	3.6	5:20	2.3	11:00	2.8	2.5	5:20	0.199	9:30	0.420	0.296	0.296
12/24/2015	4:20	2.7	13:15	4.6	3.6	2:05	2.2	10:20	2.8	2.5	4:20	0.172	10:40	0.433	0.293	0.293
12/25/2015	3:55	2.5	11:50	4.5	3.5	2:10	2.1	13:00	2.8	2.5	3:50	0.149	11:50	0.418	0.277	0.277
12/26/2015	4:35	2.4	10:00	4.5	3.3	1:50	2.1	10:35	2.7	2.4	4:30	0.133	10:35	0.417	0.248	0.248
12/27/2015	3:30	2.3	10:05	4.2	3.2	4:05	2.0	12:00	2.7	2.4	3:55	0.122	10:35	0.369	0.234	0.234
12/28/2015	2:20	2.3	11:35	4.1	3.2	3:50	1.9	11:15	2.7	2.4	2:45	0.121	11:35	0.353	0.234	0.234
12/29/2015	3:30	2.3	9:20	4.1	3.1	4:20	2.0	11:05	2.6	2.4	3:50	0.120	9:20	0.345	0.224	0.224
12/30/2015	4:25	2.3	10:15	4.1	3.1	5:15	2.0	10:05	2.6	2.4	4:25	0.124	10:15	0.352	0.221	0.221
12/31/2015	2:35	2.3	9:45	4.0	3.0	4:35	1.9	10:25	2.6	2.3	2:55	0.119	9:45	0.341	0.212	0.212
ReportAvg					3.5					2.5					0.277	
ReportTotal																6.104

ADS Environmental Services

	Site05\mp1\DFINAL (inches)					Site05\mp1\VFINAL (feet/sec)					Site05\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	6:35	2.2	10:30	4.0	3.0	5:05	1.8	8:45	2.6	2.3	5:05	0.110	10:30	0.338	0.203	0.203
1/2/2016	3:25	2.1	11:40	4.1	2.9	5:00	1.7	11:55	2.6	2.2	3:25	0.094	11:40	0.342	0.197	0.197
1/3/2016	4:50	2.0	9:45	4.1	3.0	5:00	1.6	10:25	2.6	2.2	5:00	0.086	9:45	0.353	0.206	0.206
1/4/2016	4:15	1.9	7:25	4.0	2.8	4:15	1.6	8:20	2.7	2.2	4:15	0.077	7:25	0.340	0.185	0.185
1/5/2016	3:35	1.7	7:05	4.1	2.7	4:10	1.6	7:30	2.5	2.1	4:15	0.066	7:05	0.337	0.173	0.173
1/6/2016	3:05	1.8	7:40	3.8	2.7	2:00	1.5	8:20	2.5	2.1	2:00	0.065	7:40	0.306	0.170	0.170
1/7/2016	3:15	1.6	7:50	3.9	2.7	3:45	1.4	7:45	2.5	2.1	3:45	0.051	7:50	0.318	0.166	0.166
1/8/2016	3:45	1.8	7:45	3.9	2.7	4:35	1.5	7:40	2.5	2.1	3:45	0.066	7:45	0.318	0.166	0.166
1/9/2016	5:05	1.8	10:30	4.2	2.8	3:05	1.6	10:30	2.7	2.1	5:05	0.068	10:30	0.382	0.178	0.178
1/10/2016	4:20	1.7	20:20	3.8	2.8	5:10	1.4	11:45	2.6	2.1	5:10	0.057	20:20	0.316	0.184	0.184
1/11/2016	4:05	1.6	7:40	3.8	2.6	3:50	1.4	7:40	2.6	2.1	3:50	0.050	7:40	0.317	0.162	0.162
1/12/2016	4:25	1.6	7:45	3.9	2.6	3:15	1.4	7:35	2.6	2.1	4:15	0.050	7:45	0.334	0.158	0.158
1/13/2016	3:50	1.6	7:40	4.0	2.6	4:20	1.3	8:00	2.6	2.1	4:20	0.049	7:40	0.339	0.162	0.162
1/14/2016	4:10	1.6	22:20	4.0	2.6	4:10	1.5	22:30	2.6	2.1	4:10	0.053	22:20	0.345	0.166	0.166
1/15/2016	3:30	2.0	7:45	4.0	2.8	2:55	1.6	7:55	2.6	2.2	4:15	0.084	7:45	0.334	0.179	0.179
1/16/2016	4:45	2.1	10:20	4.3	3.1	3:15	1.7	12:55	2.7	2.3	4:45	0.095	12:55	0.390	0.218	0.218
1/17/2016	3:05	2.3	15:20	5.7	3.9	4:30	1.9	14:45	3.0	2.5	2:25	0.121	15:20	0.627	0.345	0.345
1/18/2016	23:55	3.0	10:50	4.7	3.9	23:45	2.3	10:50	2.7	2.5	23:55	0.206	10:50	0.452	0.321	0.321
1/19/2016	4:10	2.5	7:15	4.5	3.4	4:35	2.0	7:15	2.7	2.4	4:35	0.141	7:15	0.416	0.249	0.249
1/20/2016	3:15	2.4	14:30	4.6	3.2	5:00	1.9	14:25	2.8	2.3	3:25	0.128	14:30	0.424	0.223	0.223
1/21/2016	0:45	2.3	7:30	4.2	3.0	3:30	1.7	6:55	2.7	2.3	3:30	0.113	7:30	0.374	0.207	0.207
1/22/2016	1:20	2.3	7:55	4.4	3.2	2:10	1.7	7:15	2.7	2.4	2:10	0.110	8:00	0.392	0.233	0.233
1/23/2016	5:20	2.4	10:55	4.7	3.5	5:10	2.0	10:05	2.8	2.5	5:10	0.136	10:55	0.442	0.277	0.277
1/24/2016	4:55	2.4	10:40	4.6	3.4	4:50	2.0	11:00	2.8	2.5	4:50	0.135	10:40	0.440	0.270	0.270
1/25/2016	4:15	2.4	7:40	4.3	3.2	3:25	1.9	7:45	2.7	2.4	3:25	0.128	7:45	0.401	0.240	0.240
1/26/2016	2:10	2.3	7:35	4.4	3.0	2:55	1.9	7:25	2.7	2.3	3:00	0.122	7:25	0.395	0.217	0.217
1/27/2016	1:10	2.3	7:40	4.1	3.0	3:10	1.8	7:40	2.6	2.3	3:15	0.118	7:40	0.365	0.206	0.206
1/28/2016	4:20	2.3	12:15	4.1	3.3	2:55	1.7	18:35	2.7	2.4	2:55	0.106	12:15	0.367	0.248	0.248
1/29/2016	2:25	2.5	7:40	4.7	3.5	2:25	2.2	7:40	2.8	2.5	2:25	0.153	7:40	0.455	0.279	0.279
1/30/2016	4:55	2.6	11:45	4.6	3.4	2:20	2.2	10:45	2.7	2.5	4:55	0.162	11:45	0.422	0.271	0.271
1/31/2016	5:10	2.5	10:00	4.4	3.4	1:05	2.1	11:25	2.7	2.5	3:55	0.149	10:00	0.402	0.265	0.265
ReportAvg					3.1					2.3					0.217	
ReportTotal																6.722

ADS Environmental Services

	Site05\mp1\DFINAL (inches)					Site05\mp1\VFINAL (feet/sec)					Site05\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	1:10	2.6	7:20	4.5	3.2	4:05	1.9	7:40	2.6	2.4	3:35	0.138	7:20	0.407	0.239	0.239
2/2/2016	5:20	2.5	7:35	4.4	3.2	1:30	1.8	7:35	2.7	2.3	1:30	0.133	7:35	0.404	0.231	0.231
2/3/2016	0:50	2.5	7:50	4.1	3.1	4:00	1.8	7:50	2.6	2.3	4:00	0.128	7:50	0.360	0.220	0.220
2/4/2016	5:25	2.4	7:45	4.4	3.0	4:30	1.8	7:40	2.7	2.3	4:20	0.124	7:45	0.394	0.210	0.210
2/5/2016	3:15	2.4	7:35	4.1	3.0	3:20	1.6	7:00	2.6	2.2	3:20	0.104	7:00	0.352	0.200	0.200
2/6/2016	3:25	2.3	9:45	4.2	3.0	5:35	1.7	9:45	2.6	2.2	3:25	0.104	9:45	0.374	0.206	0.206
2/7/2016	5:35	2.1	11:10	4.3	3.0	2:15	1.6	10:20	2.7	2.2	5:35	0.091	11:10	0.374	0.203	0.203
2/8/2016	3:55	2.1	7:45	3.9	2.9	3:50	1.6	8:20	2.6	2.2	3:50	0.087	7:45	0.326	0.194	0.194
2/9/2016	3:30	2.1	7:25	4.3	2.8	4:00	1.6	7:30	2.6	2.2	3:30	0.092	7:25	0.374	0.186	0.186
2/10/2016	4:05	1.9	7:55	4.0	2.8	2:10	1.6	7:55	2.6	2.2	4:05	0.076	7:55	0.335	0.180	0.180
2/11/2016	3:45	2.0	7:20	4.1	2.8	3:45	1.6	7:20	2.6	2.2	3:45	0.078	7:20	0.357	0.179	0.179
ReportAvg					3.0					2.3					0.204	
ReportTotal																2.248

Site06

Located At: 394 East 12th Street (see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 18" x 18"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern with pump station influence during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The data plots above the Froude =1 curve indicating supercritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized pressure sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were flagged

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

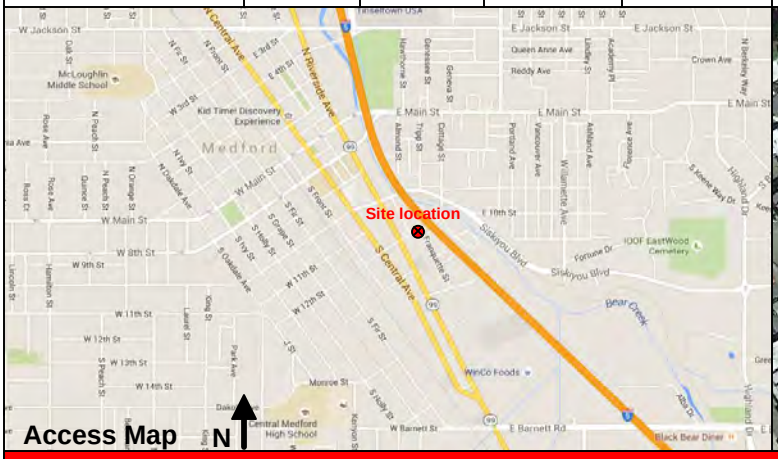
Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	4.23	4.69	0.97	24%
Maximum	11.27	6.39	4.78	63%
Average	6.84	5.57	2.25	38%

ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site06	**Monitor Series:**	Triton+	**Monitor S/N:**	60042
Address/Location:	394 E 12th St			**IP Address:**	166.219.173.194
				Manhole #	3301
				GPS Coordinates	42.323372° -122.866296°
Access: Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]	**Pipe Height:** 18.00"
					Pipe Width: 18.00"



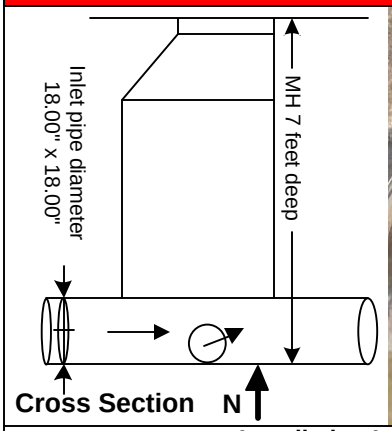
Investigation Information:

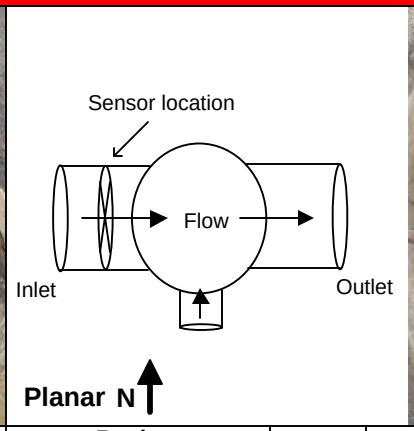
Date/Time of Investigation:	12/09/2015 @ 9:50
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	Industrial Pumping
Upstream Manhole:	Small Waves
Downstream Manhole:	DNI
Depth of Flow:	6.00" +/- 0.25"
Range (Air DOF):	13.00" +/- 0.25"
Peak Velocity:	6.22 fps
Silt:	None

Manhole Information:

Manhole Depth:	7'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [X]	Industrial [X]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:





Installation Information	
Installation Type:	Standard
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity)
Surcharge Height:	None Observed
Rain Guage Zone:	RG1

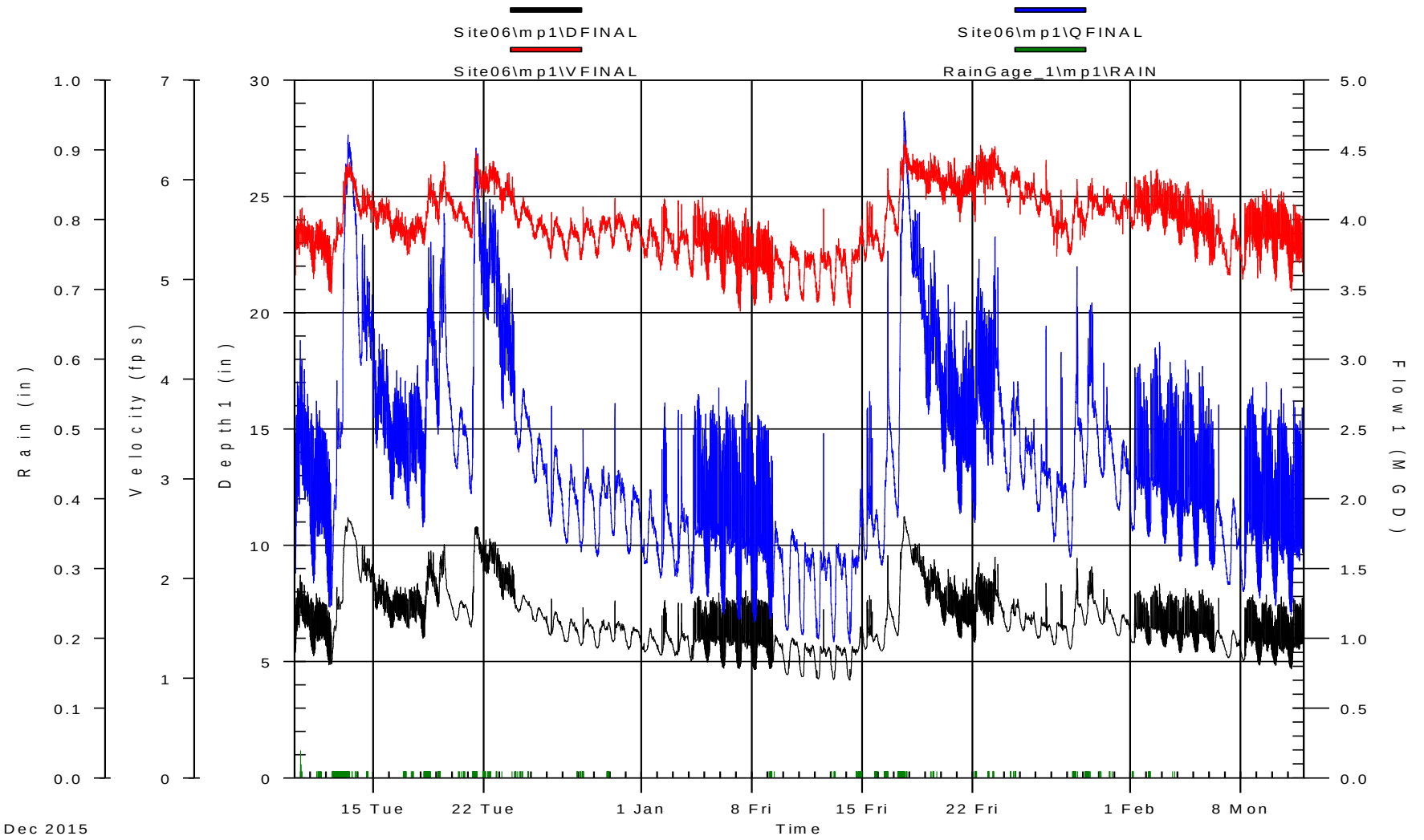
Backup	Yes	No	?	Distance
Trunk	[ ]	[X]	[ ]	
Lift / Pump Station	[ ]	[X]	[ ]	
WWTP	[ ]	[X]	[ ]	
Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

ADS Environmental Services

Pipe Height: 18.00

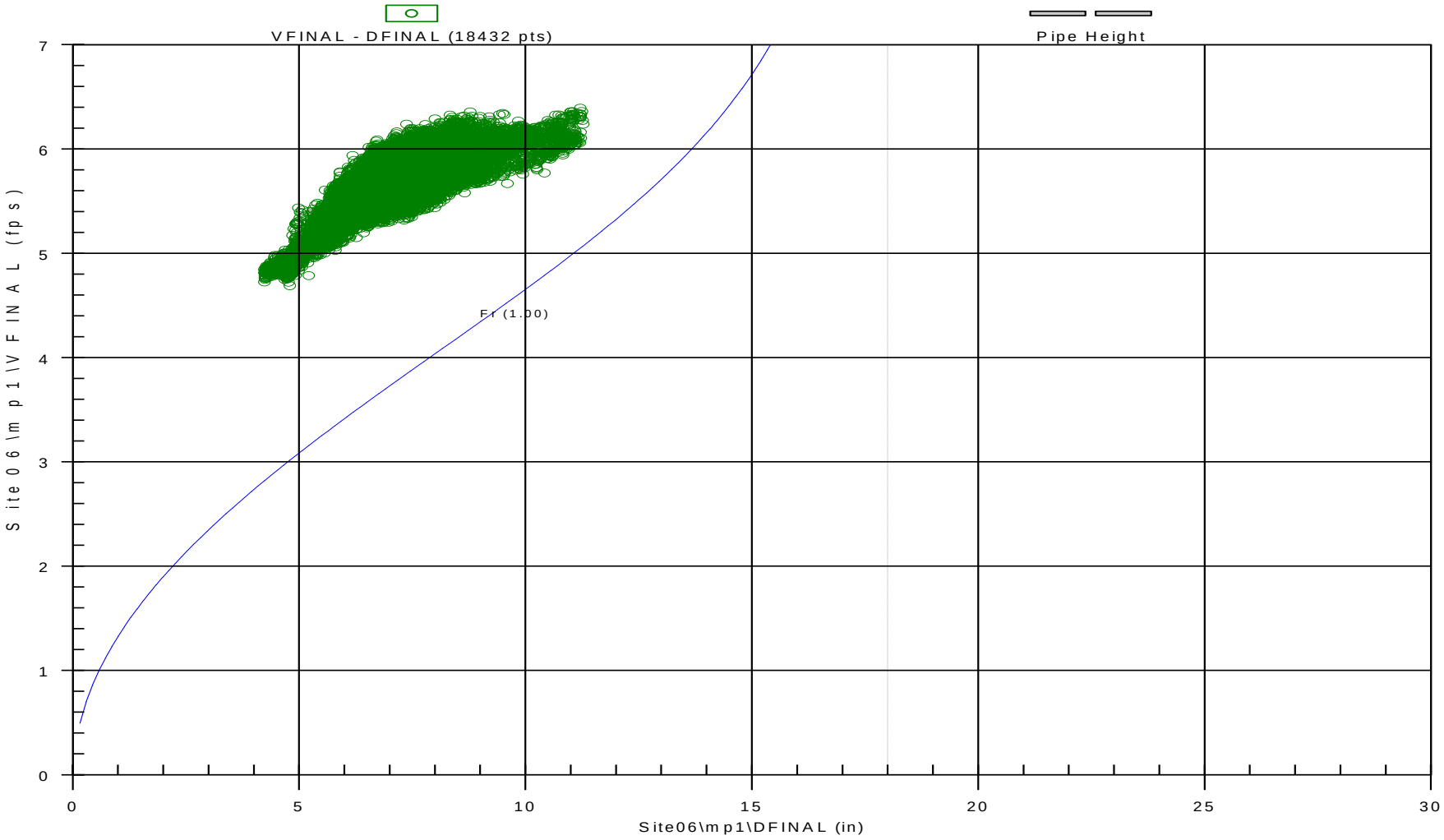


Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 18.00



ADS Environmental Services

	Site06\mp1\DFINAL (inches)					Site06\mp1\VFINAL (feet/sec)					Site06\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:25	5.4	7:50	8.7	7.3	0:20	5.1	10:20	5.7	5.5	0:25	1.471	7:50	3.141	2.360	2.360
12/11/2015	3:50	5.3	8:20	8.0	6.6	3:45	5.0	15:05	5.6	5.4	3:45	1.402	8:20	2.708	2.052	2.052
12/12/2015	4:55	4.9	15:30	8.2	6.5	7:10	4.9	15:40	5.6	5.3	5:00	1.228	15:35	2.853	2.004	2.004
12/13/2015	0:00	7.6	8:15	11.2	10.4	0:05	5.5	10:35	6.2	6.0	0:00	2.508	8:25	4.613	4.086	4.086
12/14/2015	23:45	7.6	6:20	10.0	8.9	19:20	5.6	6:20	6.0	5.7	23:45	2.585	6:20	3.900	3.228	3.228
12/15/2015	22:00	6.9	0:30	8.8	7.9	4:25	5.5	19:05	5.8	5.7	22:00	2.284	0:30	3.223	2.734	2.734
12/16/2015	3:15	6.5	10:40	8.3	7.4	22:30	5.4	10:30	5.7	5.5	3:15	2.004	10:40	2.924	2.433	2.433
12/17/2015	5:20	6.5	18:20	8.4	7.4	2:55	5.3	18:15	5.7	5.5	5:20	1.939	18:15	2.960	2.444	2.444
12/18/2015	2:30	6.0	14:35	9.8	8.1	4:00	5.4	14:35	6.1	5.7	2:30	1.804	14:35	3.844	2.859	2.859
12/19/2015	23:55	7.3	11:00	10.1	8.4	2:30	5.6	10:45	6.2	5.8	1:45	2.469	10:45	4.049	3.070	3.070
12/20/2015	5:45	6.8	13:05	7.7	7.2	23:30	5.5	0:05	5.8	5.7	6:40	2.221	12:00	2.664	2.434	2.434
12/21/2015	4:00	6.5	12:20	10.8	9.1	4:45	5.4	11:00	6.3	5.9	4:00	2.041	11:00	4.518	3.438	3.438
12/22/2015	23:45	8.2	8:15	10.3	9.5	23:40	5.8	13:00	6.2	6.0	23:45	2.966	8:10	4.151	3.686	3.686
12/23/2015	23:30	7.3	0:10	9.3	8.4	23:15	5.6	13:15	6.1	5.9	23:30	2.465	13:20	3.620	3.076	3.076
12/24/2015	4:35	7.1	11:25	7.9	7.5	2:50	5.5	11:20	5.8	5.7	4:30	2.341	11:25	2.796	2.549	2.549
12/25/2015	23:50	6.6	11:30	7.4	7.0	5:05	5.4	15:05	5.7	5.5	23:50	2.073	11:30	2.475	2.261	2.261
12/26/2015	4:55	6.2	6:10	7.7	6.6	4:45	5.2	6:10	5.7	5.5	4:45	1.807	6:10	2.669	2.088	2.088
12/27/2015	4:30	5.9	11:45	6.9	6.3	6:10	5.2	11:35	5.6	5.4	4:30	1.684	11:35	2.255	1.946	1.946
12/28/2015	3:05	5.7	6:20	7.4	6.4	3:30	5.2	6:15	5.7	5.5	3:30	1.624	6:20	2.502	1.973	1.973
12/29/2015	4:40	5.6	13:20	6.8	6.3	3:30	5.2	12:20	5.6	5.5	4:05	1.591	13:20	2.239	1.949	1.949
12/30/2015	4:10	5.9	6:35	7.6	6.4	2:35	5.3	6:35	5.8	5.5	5:05	1.740	6:35	2.689	2.002	2.002
12/31/2015	3:40	5.6	11:05	6.5	6.1	4:45	5.3	11:05	5.7	5.5	3:50	1.610	11:05	2.104	1.857	1.857
ReportAvg					7.5					5.6					2.570	
ReportTotal																56.53

ADS Environmental Services

	Site06\mp1\DFINAL (inches)					Site06\mp1\VFINAL (feet/sec)					Site06\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	4:55	5.4	12:15	6.5	5.8	4:00	5.2	13:40	5.6	5.4	3:50	1.539	12:15	2.072	1.742	1.742
1/2/2016	4:00	5.3	10:45	7.7	5.9	3:50	5.1	9:40	5.8	5.4	3:50	1.438	10:45	2.694	1.765	1.765
1/3/2016	1:55	5.3	7:10	7.6	5.9	5:10	5.1	7:15	5.8	5.4	5:10	1.447	7:10	2.641	1.742	1.742
1/4/2016	2:40	5.1	14:25	7.8	6.0	4:40	5.0	20:25	5.8	5.4	2:40	1.327	13:25	2.755	1.807	1.807
1/5/2016	4:05	5.0	20:45	8.0	6.2	2:55	5.0	20:50	5.7	5.4	4:05	1.304	20:45	2.799	1.903	1.903
1/6/2016	4:25	4.7	8:20	7.8	6.1	4:10	4.9	10:00	5.7	5.3	4:25	1.179	8:20	2.665	1.825	1.825
1/7/2016	4:05	4.7	13:45	8.1	6.0	5:15	4.7	13:45	5.7	5.2	4:00	1.139	13:45	2.853	1.761	1.761
1/8/2016	3:00	4.7	8:00	7.7	5.9	3:00	4.7	9:00	5.6	5.2	3:00	1.122	8:00	2.607	1.720	1.720
1/9/2016	2:15	4.7	0:05	7.4	5.6	2:20	4.8	0:10	5.6	5.1	2:15	1.143	0:05	2.498	1.572	1.572
1/10/2016	5:05	4.5	12:55	6.1	5.4	3:15	4.8	10:40	5.4	5.1	5:05	1.064	12:55	1.791	1.469	1.469
1/11/2016	4:10	4.4	7:55	5.8	5.2	4:50	4.8	8:00	5.3	5.1	4:50	1.031	7:50	1.692	1.416	1.416
1/12/2016	4:25	4.3	12:15	7.3	5.2	2:20	4.8	12:15	5.7	5.1	4:30	1.002	12:15	2.474	1.403	1.403
1/13/2016	3:30	4.2	7:45	5.7	5.2	3:45	4.7	11:05	5.4	5.1	3:45	0.981	11:05	1.683	1.415	1.415
1/14/2016	4:25	4.2	22:40	6.8	5.4	4:25	4.7	22:45	5.6	5.2	4:25	0.968	22:40	2.214	1.508	1.508
1/15/2016	4:15	5.6	10:25	7.9	6.1	3:10	5.2	10:40	5.8	5.4	4:05	1.565	10:20	2.775	1.862	1.862
1/16/2016	5:15	5.5	14:00	9.6	6.6	3:45	5.2	13:55	6.1	5.6	5:15	1.529	14:05	3.780	2.130	2.130
1/17/2016	4:55	6.1	15:10	11.3	9.0	5:05	5.4	15:00	6.4	6.0	5:05	1.872	15:00	4.779	3.471	3.471
1/18/2016	23:55	7.8	13:50	10.1	9.3	23:55	5.9	4:00	6.3	6.1	23:55	2.792	7:35	4.074	3.625	3.625
1/19/2016	23:55	7.1	12:35	9.4	8.2	0:10	5.8	7:15	6.3	6.0	23:55	2.452	12:35	3.783	3.069	3.069
1/20/2016	23:55	6.4	10:05	9.0	7.5	23:55	5.8	19:15	6.2	6.0	23:55	2.113	10:05	3.538	2.685	2.685
1/21/2016	5:40	6.0	13:40	8.6	7.0	3:40	5.6	21:10	6.2	5.9	3:40	1.900	13:35	3.282	2.458	2.458
1/22/2016	2:30	5.9	8:40	9.3	7.6	2:55	5.6	11:10	6.4	6.1	2:30	1.831	8:40	3.722	2.772	2.772
1/23/2016	5:15	6.6	9:05	9.5	7.6	5:35	5.9	9:00	6.3	6.1	5:30	2.251	9:05	3.883	2.818	2.818
1/24/2016	3:45	6.3	19:50	7.7	7.0	23:25	5.7	15:20	6.1	6.0	5:30	2.056	19:50	2.845	2.444	2.444
1/25/2016	23:50	6.3	20:20	7.2	6.7	4:20	5.8	20:20	6.1	5.9	23:50	2.043	20:20	2.576	2.292	2.292
1/26/2016	3:10	6.0	14:45	8.4	6.5	4:00	5.6	14:45	6.2	5.8	3:00	1.911	14:45	3.243	2.146	2.146
1/27/2016	2:25	5.8	13:35	8.3	6.4	7:10	5.2	13:35	5.9	5.6	2:45	1.698	13:35	3.055	2.019	2.019
1/28/2016	3:35	5.6	13:50	9.5	6.9	2:55	5.3	13:50	6.0	5.6	3:30	1.586	13:50	3.668	2.279	2.279
1/29/2016	2:20	6.6	12:25	9.1	7.5	1:25	5.4	12:40	6.0	5.7	1:25	2.086	12:25	3.410	2.586	2.586
1/30/2016	23:55	6.5	6:25	8.1	7.0	21:05	5.6	6:30	5.9	5.8	23:55	2.142	6:30	2.979	2.362	2.362
1/31/2016	23:55	6.0	12:05	7.1	6.6	11:35	5.5	17:10	6.0	5.7	23:55	1.882	12:35	2.430	2.152	2.152
ReportAvg					6.6					5.6					2.136	
ReportTotal																66.22

ADS Environmental Services

	Site06\mp1\DFINAL (inches)					Site06\mp1\VFINAL (feet/sec)					Site06\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	2:10	5.8	13:15	8.1	6.5	2:00	5.5	21:55	6.1	5.7	2:00	1.774	13:20	2.975	2.150	2.150
2/2/2016	2:55	5.7	19:35	8.4	6.6	1:35	5.5	15:50	6.1	5.8	2:45	1.735	19:25	3.126	2.190	2.190
2/3/2016	4:15	5.7	11:30	8.1	6.5	3:20	5.5	11:35	6.0	5.7	3:35	1.686	11:30	2.985	2.126	2.126
2/4/2016	2:35	5.4	10:40	8.2	6.5	2:30	5.4	15:10	6.0	5.6	2:35	1.558	10:40	3.001	2.096	2.096
2/5/2016	5:10	5.4	12:55	8.1	6.5	23:45	5.2	12:55	5.9	5.5	2:40	1.521	12:55	2.955	2.067	2.067
2/6/2016	4:00	5.4	13:30	7.8	6.1	3:45	5.2	2:10	5.8	5.4	4:00	1.495	13:35	2.679	1.831	1.831
2/7/2016	4:05	5.2	11:25	6.4	5.7	6:20	5.1	12:35	5.7	5.3	3:50	1.387	11:35	2.010	1.664	1.664
2/8/2016	3:30	5.1	17:05	7.9	6.0	2:15	5.0	21:25	5.8	5.4	3:10	1.339	17:05	2.802	1.833	1.833
2/9/2016	3:25	4.9	13:55	7.9	6.0	0:45	5.0	20:25	5.9	5.5	4:05	1.294	13:55	2.842	1.827	1.827
2/10/2016	4:35	4.9	12:45	7.8	6.0	4:40	5.0	12:50	5.9	5.5	4:35	1.240	12:45	2.793	1.827	1.827
2/11/2016	3:55	4.7	20:40	7.8	6.1	3:50	4.9	7:45	5.8	5.3	3:55	1.171	7:50	2.707	1.817	1.817
ReportAvg					6.2					5.5					1.948	
ReportTotal																21.43

Site07

Located At: Easement on north side of I-5 exit ramp to Crater Lake Hwy.
(see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 23.88" x 23.88"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The data plots below the Froude =1 curve indicating subcritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized pressure sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were reconstituted to a best-fit curve.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

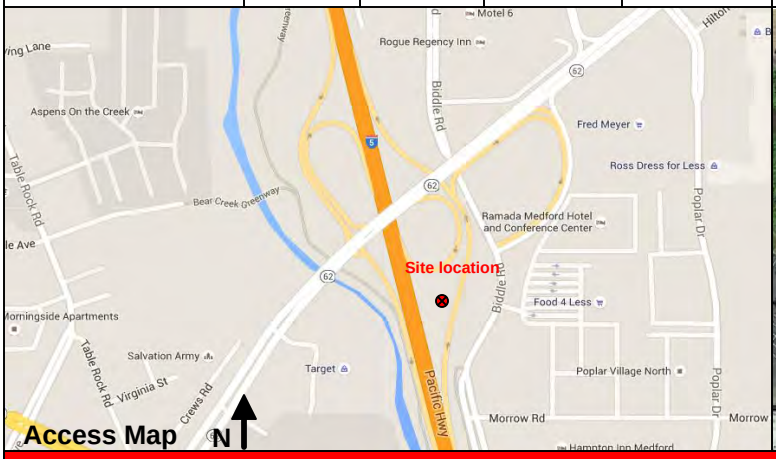
Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	7.49	0.70	0.39	31%
Maximum	15.83	2.35	3.24	66%
Average	10.10	1.38	1.15	42%

ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site07	**Monitor Series:**	Triton+	**Monitor S/N:**	60037
Address/Location:	Easement on north side of I-5 Exit Ramp to Crater Lake HWY			**IP Address:**	166.219.174.22
				Manhole #	5883
				GPS Coordinates	42.348928° -122.875301°
Access:	Drive	**Type of System:**	Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	23.88"
				Pipe Width:	23.88"



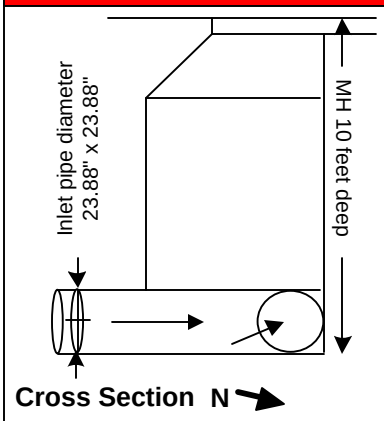
Access Map

Site Map

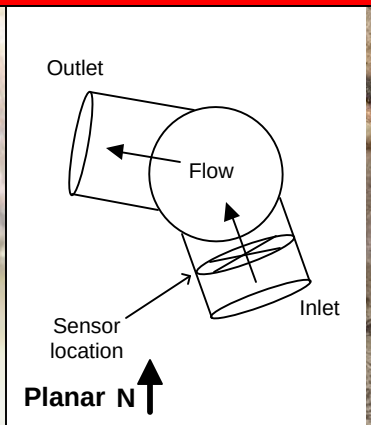
Investigation Information:

Date/Time of Investigation:	12/08/2015 @ 14:56	**Manhole Depth:**	10'			
Site Hydraulics:	Smooth	**Manhole Material / Condition**	Concrete / Good			
Upstream Input: (L/S, P/S)	None	**Pipe Material / Condition:**	Concrete / Good			
Upstream Manhole:	DNI	**Mini System Character:**	Residential [X]	Commercial [X]	Industrial [ ]	Trunk [ ]
Downstream Manhole:	DNI	**Telephone Information:**	Does not apply			
Depth of Flow:	8.50" +/- 0.25"	**Access Pole #:**	Does not apply			
Range (Air DOF):	15.38" +/- 0.25"	**Distance From Manhole:**	Does not apply	Feet		
Peak Velocity:	1.05 fps	**Road Cut Length:**	Does not apply	Feet		
Silt:	0.50"	**Trench Length:**	Does not apply	Feet		

Other Information:



Cross Section

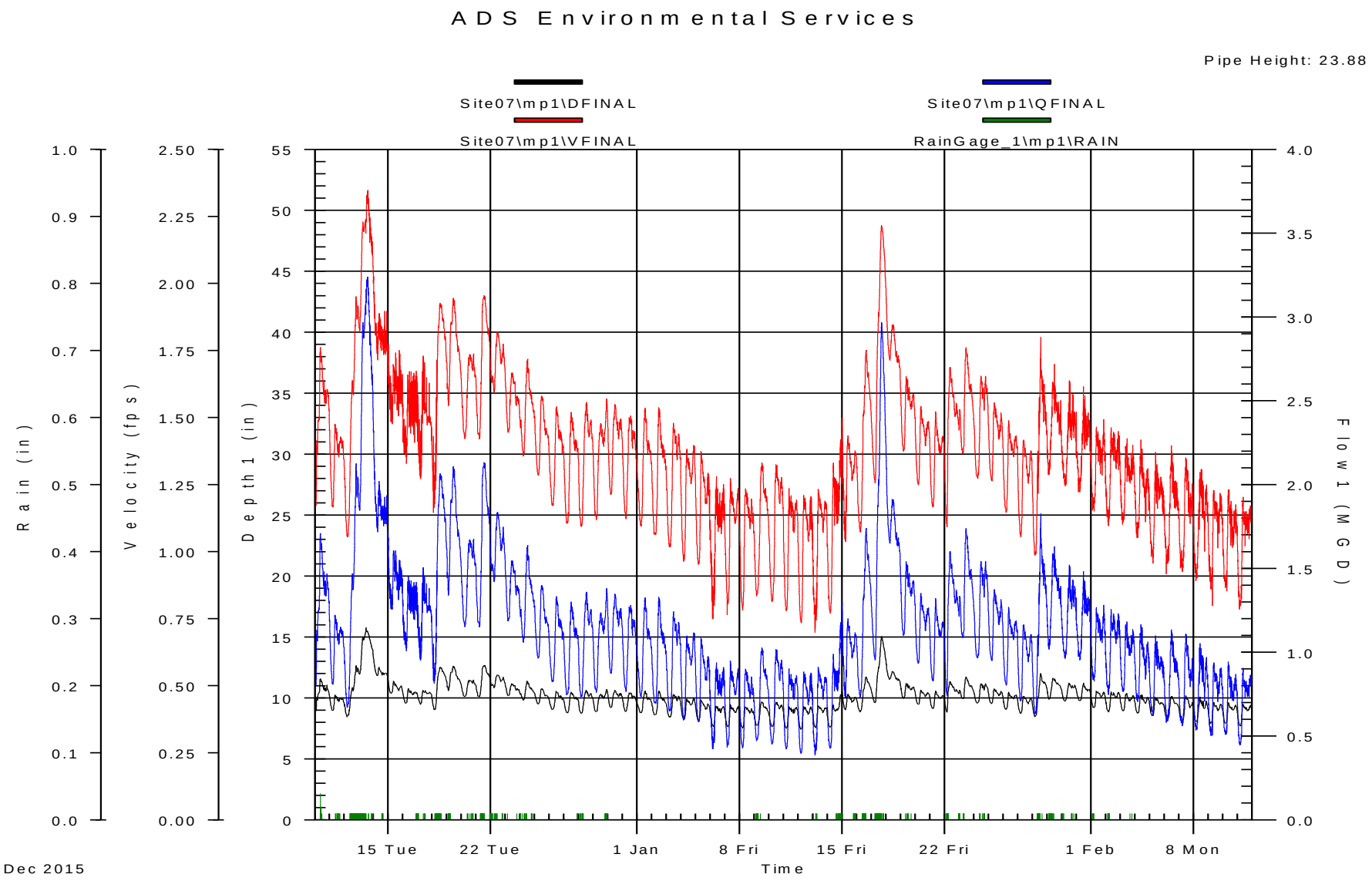


Planar

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[X]	[ ]	
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity)	Lift / Pump Station	[ ]	[X]	[ ]	
Surcharge Height:	None Observed	WWTP	[ ]	[X]	[ ]	
Rain Guage Zone:	RG1	Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

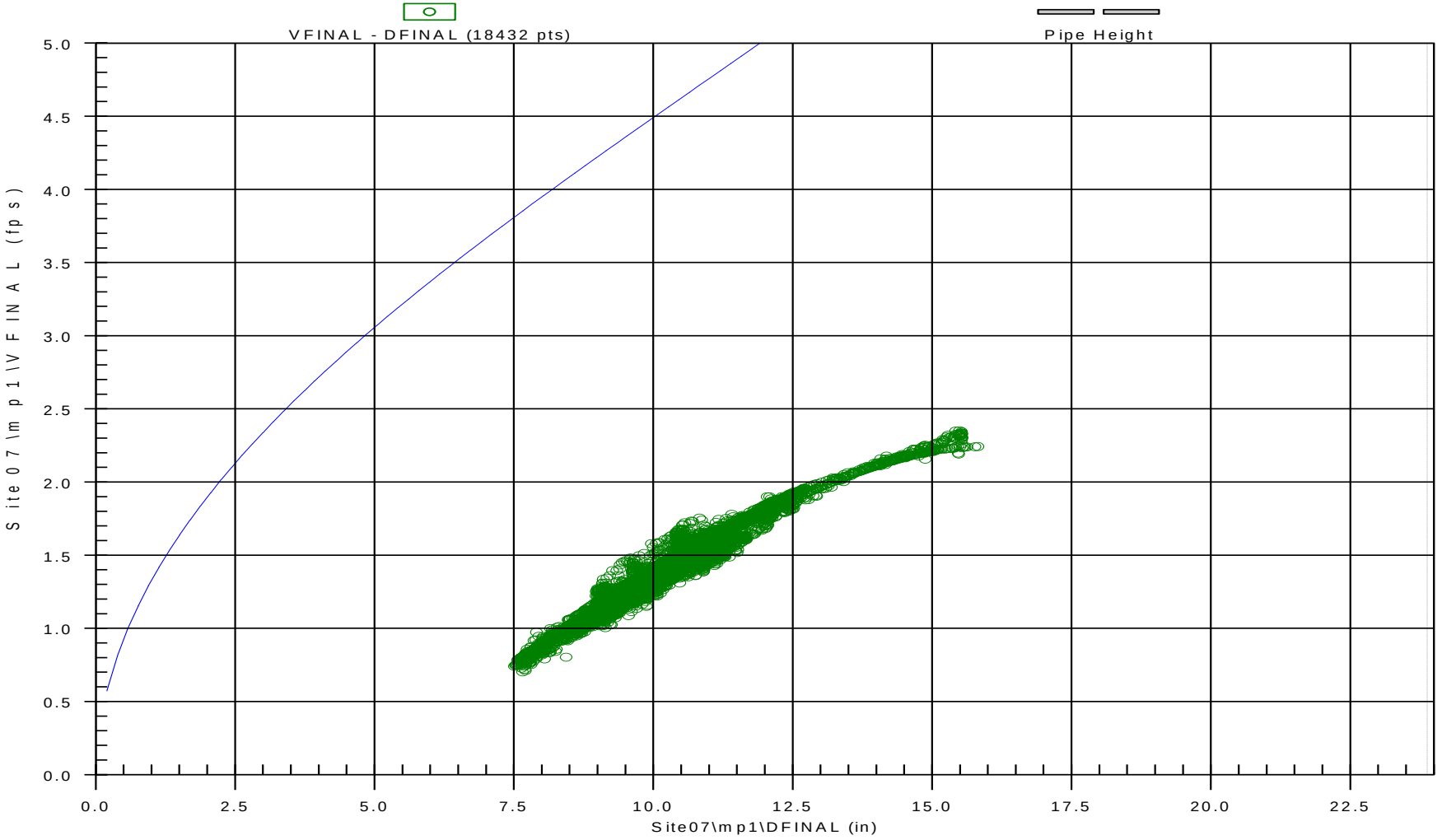
Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)


ADS Environmental Services
Pipe Height: 23.88
Site07\mp1\DFINAL
Site07\mp1\QFINAL
Site07\mp1\VFINAL
RainGage_1\mp1\RAIN
Rain (in)
Velocity (fps)
Depth 1 (in)
Flow 1 (MGD)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
55
50
45
40
35
30
25
20
15
10
5
0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
15 Tue
22 Tue
1 Jan
8 Fri
15 Fri
22 Fri
1 Feb
8 Mon
Time
Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 23.88



ADS Environmental Services

	Site07\mp1\DFINAL (inches)					Site07\mp1\VFINAL (feet/sec)					Site07\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:45	9.0	8:00	11.6	10.6	0:45	1.2	8:00	1.8	1.6	0:45	0.811	8:00	1.714	1.351	1.351
12/11/2015	3:50	9.0	8:25	10.3	9.8	4:45	1.2	8:25	1.5	1.4	3:50	0.813	8:25	1.227	1.049	1.049
12/12/2015	3:45	8.5	18:30	12.7	10.5	4:35	1.1	18:30	2.0	1.5	4:35	0.675	18:30	2.129	1.351	1.351
12/13/2015	0:10	12.0	10:55	15.8	14.4	0:20	1.8	13:25	2.3	2.2	0:20	1.847	13:00	3.243	2.761	2.761
12/14/2015	23:55	11.1	0:00	12.9	12.1	23:50	1.6	0:20	2.0	1.8	23:55	1.494	0:00	2.169	1.844	1.844
12/15/2015	23:55	10.3	7:45	11.5	10.9	23:25	1.4	17:10	1.8	1.6	23:55	1.168	7:50	1.611	1.423	1.423
12/16/2015	4:50	9.6	8:00	10.8	10.3	5:05	1.3	21:10	1.7	1.5	5:05	1.013	8:00	1.457	1.265	1.265
12/17/2015	4:05	9.5	8:25	10.7	10.3	4:10	1.3	8:40	1.7	1.5	4:10	0.953	8:30	1.509	1.213	1.213
12/18/2015	4:00	9.1	12:15	12.6	11.3	1:20	1.1	12:15	1.9	1.7	2:25	0.819	12:15	2.071	1.603	1.603
12/19/2015	1:45	10.7	9:50	12.7	11.7	1:45	1.5	9:50	1.9	1.8	1:45	1.341	9:50	2.113	1.749	1.749
12/20/2015	4:40	10.1	19:05	11.6	11.0	4:40	1.4	19:05	1.7	1.6	4:40	1.157	19:05	1.679	1.463	1.463
12/21/2015	4:30	10.1	12:35	12.7	11.6	4:30	1.4	12:35	2.0	1.7	4:30	1.153	12:35	2.136	1.691	1.691
12/22/2015	4:45	10.9	10:40	12.0	11.5	4:45	1.6	10:40	1.8	1.7	4:45	1.425	10:40	1.839	1.637	1.637
12/23/2015	4:05	10.2	11:05	11.2	10.8	4:05	1.4	11:05	1.7	1.6	4:05	1.191	11:05	1.552	1.378	1.378
12/24/2015	4:45	9.9	11:40	11.5	10.6	4:45	1.4	11:40	1.7	1.5	4:45	1.064	11:40	1.643	1.338	1.338
12/25/2015	5:25	9.6	11:00	10.8	10.2	5:25	1.3	11:00	1.6	1.4	5:25	0.967	11:00	1.403	1.171	1.171
12/26/2015	5:25	9.1	11:05	10.6	9.9	5:25	1.2	11:05	1.5	1.4	5:25	0.828	11:05	1.338	1.080	1.080
12/27/2015	3:30	8.8	11:00	10.6	9.8	3:30	1.1	11:00	1.5	1.3	3:30	0.750	11:00	1.304	1.036	1.036
12/28/2015	4:15	8.8	12:05	10.7	9.9	4:15	1.1	12:05	1.6	1.4	4:15	0.737	12:05	1.363	1.085	1.085
12/29/2015	4:20	8.9	21:10	10.8	9.9	4:20	1.1	21:10	1.6	1.4	4:20	0.764	21:10	1.385	1.092	1.092
12/30/2015	4:40	9.3	10:40	10.7	10.1	4:40	1.2	10:40	1.6	1.4	4:40	0.879	10:40	1.352	1.147	1.147
12/31/2015	4:55	8.9	12:20	10.5	9.8	4:55	1.1	12:20	1.5	1.3	4:55	0.767	12:20	1.284	1.059	1.059
ReportAvg					10.8					1.6					1.399	
ReportTotal																30.79

ADS Environmental Services

	Site07\mp1\DFINAL (inches)					Site07\mp1\VFINAL (feet/sec)					Site07\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	5:50	8.8	12:25	10.6	9.7	5:50	1.1	12:25	1.5	1.3	5:50	0.739	12:25	1.330	1.024	1.024
1/2/2016	6:00	8.7	10:30	10.6	9.6	6:00	1.1	10:30	1.5	1.3	6:00	0.701	10:30	1.333	0.995	0.995
1/3/2016	4:10	8.5	10:50	10.4	9.5	4:10	1.0	10:50	1.5	1.3	4:10	0.653	10:50	1.246	0.971	0.971
1/4/2016	3:35	8.3	20:55	10.0	9.4	3:35	1.0	20:55	1.4	1.2	3:35	0.598	20:55	1.121	0.910	0.910
1/5/2016	3:40	8.2	8:00	9.9	9.1	3:40	1.0	8:00	1.4	1.2	3:40	0.588	8:00	1.089	0.841	0.841
1/6/2016	4:00	7.7	8:05	9.4	8.8	2:35	0.8	9:00	1.3	1.1	3:40	0.428	9:00	0.941	0.733	0.733
1/7/2016	4:15	7.7	8:00	9.5	8.8	2:40	0.8	8:00	1.3	1.1	2:40	0.438	8:00	0.953	0.733	0.733
1/8/2016	4:05	7.6	8:55	9.4	8.7	4:05	0.8	8:55	1.2	1.1	4:05	0.431	8:55	0.903	0.711	0.711
1/9/2016	3:00	7.8	11:45	9.8	8.9	3:00	0.8	11:45	1.3	1.1	3:00	0.476	11:45	1.033	0.765	0.765
1/10/2016	4:10	7.7	10:45	9.7	8.9	4:10	0.8	10:45	1.3	1.1	4:10	0.456	10:45	1.023	0.767	0.767
1/11/2016	3:20	7.6	8:10	9.4	8.7	3:20	0.8	8:10	1.2	1.1	3:20	0.428	8:10	0.907	0.709	0.709
1/12/2016	4:10	7.5	8:10	9.4	8.7	4:10	0.7	8:10	1.2	1.0	4:10	0.398	8:10	0.886	0.690	0.690
1/13/2016	4:05	7.6	8:10	9.5	8.8	3:00	0.7	8:10	1.2	1.1	3:00	0.390	8:10	0.916	0.714	0.714
1/14/2016	3:55	7.6	23:05	10.7	9.0	3:55	0.8	23:05	1.5	1.1	3:55	0.428	23:05	1.304	0.813	0.813
1/15/2016	4:55	9.1	8:55	10.4	9.8	5:00	1.0	8:55	1.4	1.3	5:00	0.733	8:55	1.205	1.017	1.017
1/16/2016	4:55	8.9	14:20	11.8	10.4	4:55	1.1	14:20	1.8	1.4	4:55	0.735	14:20	1.742	1.240	1.240
1/17/2016	5:20	9.6	15:45	15.1	12.4	5:20	1.3	15:45	2.2	1.8	5:20	0.957	15:45	2.974	1.969	1.969
1/18/2016	23:55	10.7	0:00	12.8	11.8	23:55	1.5	0:00	1.9	1.8	23:55	1.351	0:00	2.102	1.735	1.735
1/19/2016	4:10	10.0	8:10	11.3	10.7	4:10	1.4	8:10	1.7	1.5	4:10	1.102	8:10	1.546	1.338	1.338
1/20/2016	4:10	9.5	8:15	10.8	10.2	4:10	1.3	8:15	1.5	1.4	4:10	0.934	8:15	1.356	1.162	1.162
1/21/2016	4:20	9.2	8:25	10.7	10.0	4:20	1.2	8:25	1.5	1.4	4:20	0.831	8:25	1.325	1.083	1.083
1/22/2016	3:05	8.9	8:35	11.4	10.5	3:05	1.1	8:35	1.7	1.5	3:05	0.747	8:35	1.607	1.286	1.286
1/23/2016	5:10	10.0	10:25	11.8	10.9	5:10	1.4	10:25	1.8	1.6	5:10	1.093	10:25	1.744	1.402	1.402
1/24/2016	5:25	9.6	10:55	11.3	10.5	5:25	1.3	10:55	1.7	1.5	5:25	0.966	10:55	1.547	1.285	1.285
1/25/2016	4:50	9.6	8:50	10.8	10.3	4:50	1.3	8:50	1.6	1.4	4:50	0.953	8:50	1.379	1.183	1.183
1/26/2016	4:05	9.1	8:05	10.5	9.9	4:05	1.1	8:05	1.5	1.3	4:05	0.808	8:05	1.275	1.064	1.064
1/27/2016	4:05	8.8	9:05	10.2	9.6	4:05	1.1	9:05	1.4	1.3	4:05	0.710	9:05	1.168	0.972	0.972
1/28/2016	3:40	8.5	12:45	12.1	10.4	3:40	1.0	12:55	1.8	1.4	3:40	0.635	12:55	1.829	1.201	1.201
1/29/2016	2:15	9.9	9:10	11.7	11.0	1:15	1.3	11:00	1.7	1.5	2:15	1.023	11:00	1.635	1.342	1.342
1/30/2016	5:10	9.8	11:05	11.3	10.6	4:45	1.2	11:30	1.6	1.4	4:45	0.967	11:30	1.524	1.232	1.232
1/31/2016	5:40	9.8	10:55	11.3	10.5	4:50	1.2	10:35	1.6	1.4	4:50	0.958	10:35	1.486	1.190	1.190
ReportAvg					9.9					1.3					1.067	
ReportTotal																33.08

ADS Environmental Services

	Site07\mp1\DFINAL (inches)					Site07\mp1\VFINAL (feet/sec)					Site07\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	4:15	9.3	7:50	10.6	10.1	4:10	1.2	20:10	1.5	1.3	4:10	0.832	20:10	1.285	1.080	1.080
2/2/2016	4:00	8.9	8:10	10.6	10.0	3:45	1.1	8:10	1.5	1.3	3:45	0.753	8:10	1.260	1.056	1.056
2/3/2016	4:10	9.0	10:05	10.4	9.8	2:45	1.1	10:15	1.4	1.3	3:55	0.768	10:05	1.185	0.994	0.994
2/4/2016	4:15	8.8	10:55	10.3	9.7	4:05	1.1	9:00	1.4	1.2	4:15	0.708	9:00	1.169	0.935	0.935
2/5/2016	3:20	8.6	8:10	10.1	9.4	4:50	1.0	9:05	1.4	1.2	4:50	0.627	9:05	1.102	0.873	0.873
2/6/2016	4:15	8.3	11:25	10.2	9.3	2:35	0.9	10:40	1.4	1.2	2:35	0.585	10:40	1.138	0.856	0.856
2/7/2016	4:40	8.2	10:30	10.2	9.2	4:35	0.9	10:20	1.4	1.1	4:35	0.565	10:25	1.112	0.826	0.826
2/8/2016	3:15	8.1	9:45	10.1	9.1	2:55	0.9	11:35	1.3	1.1	2:55	0.540	9:45	1.056	0.799	0.799
2/9/2016	3:40	8.0	8:30	9.7	9.0	6:05	0.8	8:40	1.2	1.1	3:45	0.506	8:40	0.942	0.759	0.759
2/10/2016	4:00	8.0	8:05	9.7	8.9	5:55	0.9	9:25	1.2	1.1	3:15	0.513	8:05	0.947	0.735	0.735
2/11/2016	4:10	7.7	8:30	9.6	8.9	2:25	0.8	8:30	1.2	1.0	3:05	0.450	8:30	0.910	0.713	0.713
ReportAvg					9.4					1.2					0.875	
ReportTotal																9.626

Site08

Located At: NE of Motel 6 off of Biddle Rd and I-5 Ramp
(see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 16” x 16”
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates a wave in the flow between 10” to 15”. The site surcharges to 19.2” on December 13th. The weather data plots below the Froude =1 curve indicating subcritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data “drops” (outside the normal data set) were reconstituted to a best-fit curve.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

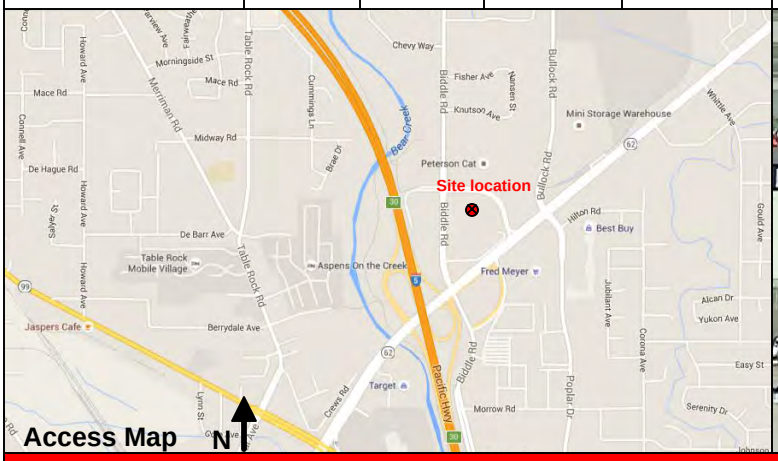
Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	3.78	1.37	0.05	24%
Maximum	19.20	3.22	2.91	100%
Average	6.45	1.86	0.65	40%

ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site08	**Monitor Series:**	Triton+	**Monitor S/N:**	60021
Address/Location:	NE of Motel 6 off Biddle Rd and I-5 ramp			**IP Address:**	166.219.173.177
				Manhole #	7606
				GPS Coordinates	42.354116° -122.873997°
Access:	Drive	**Type of System:**	Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	16.00"
				Pipe Width:	16.00"



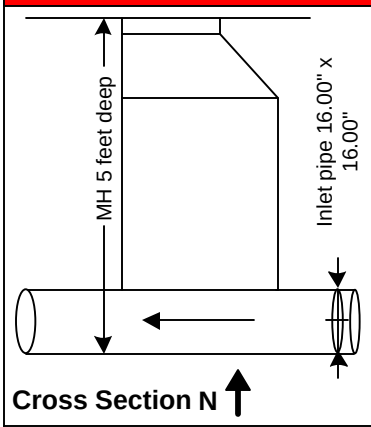
Investigation Information:

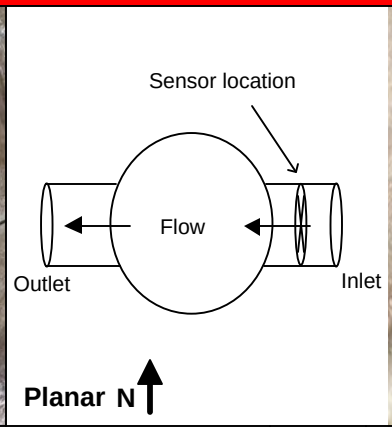
Date/Time of Investigation:	12/08/2015 @ 08:00
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	5.50" +/- 0.25"
Range (Air DOF):	10.50" +/- 0.25"
Peak Velocity:	2.15 fps
Silt:	None

Manhole Information:

Manhole Depth:	5'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [X]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:

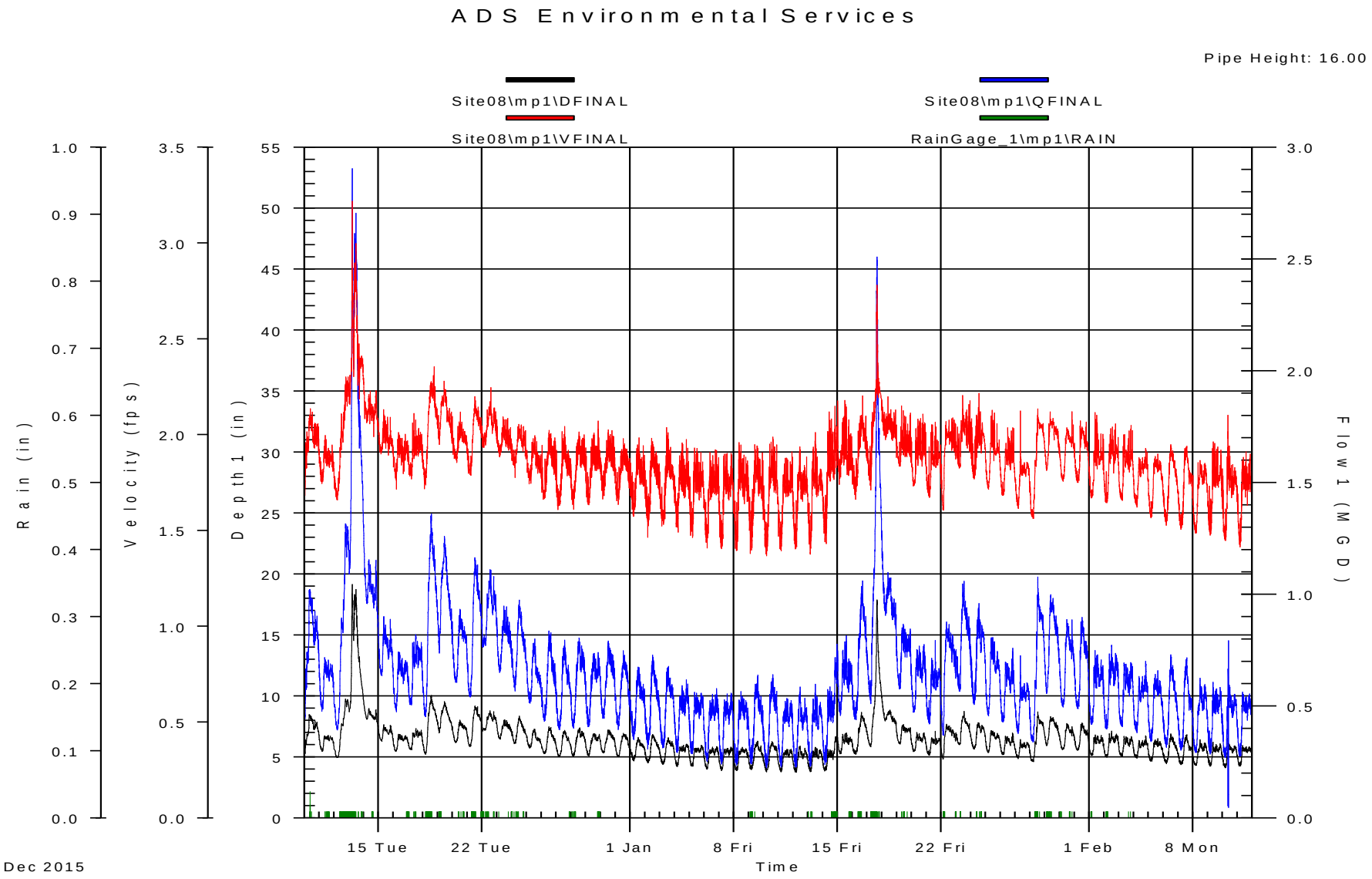




Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[X]	[ ]	
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity)	Lift / Pump Station	[ ]	[X]	[ ]	
Surcharge Height:	1.5 Feet	WWTP	[ ]	[X]	[ ]	
Rain Guage Zone:	RG1	Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

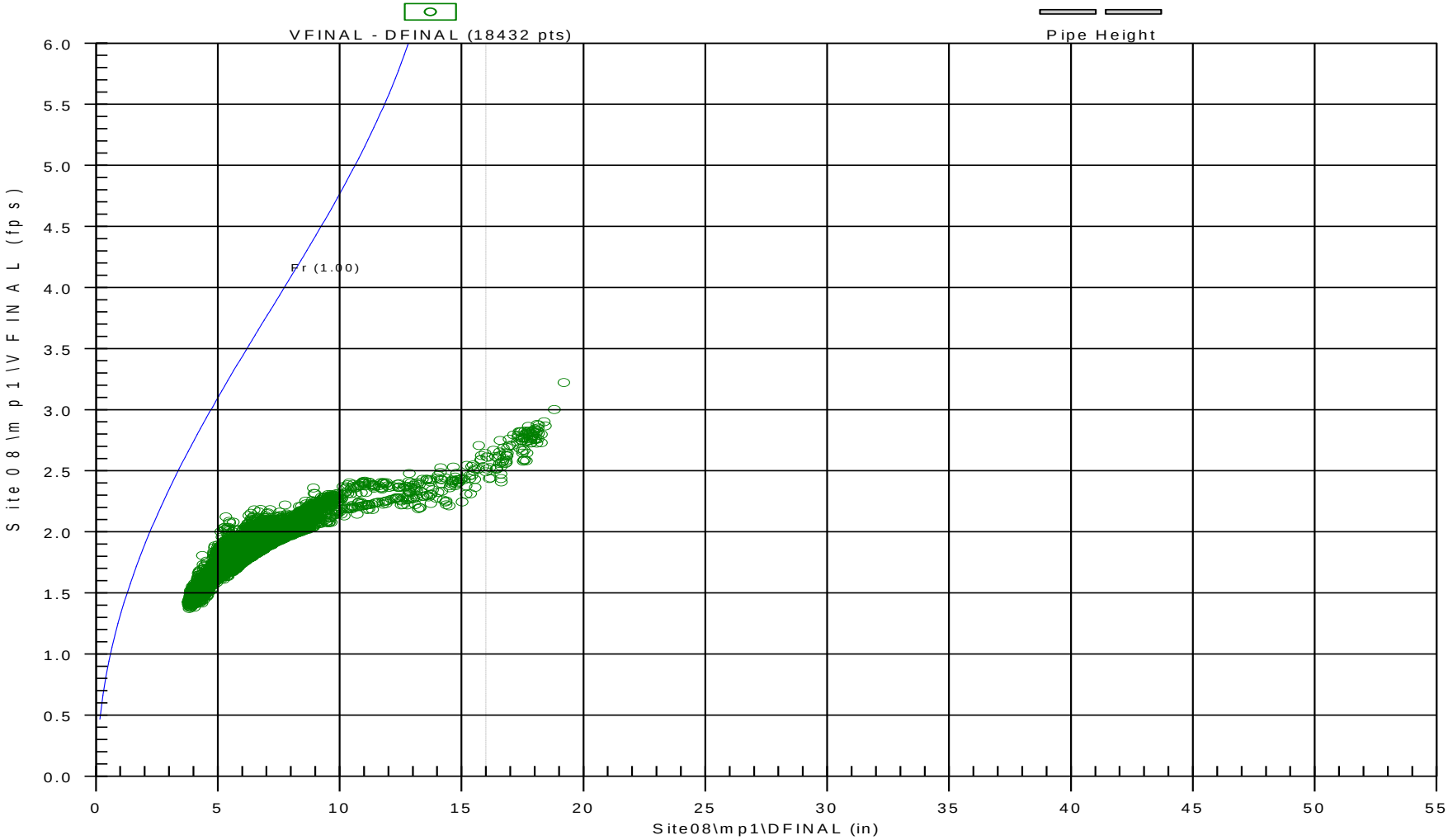
Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)


ADS Environmental Services
Pipe Height: 16.00
Site08\mp1\DFINAL
Site08\mp1\QFINAL
Site08\mp1\VFINAL
RainGage_1\mp1\RAIN
Rain (in)
Velocity (fps)
Depth 1 (in)
Flow 1 (MGD)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
55
50
45
40
35
30
25
20
15
10
5
0
3.0
2.5
2.0
1.5
1.0
0.5
0.0
15 Tue
22 Tue
1 Jan
8 Fri
15 Fri
22 Fri
1 Feb
8 Mon
Time
Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 16.00



ADS Environmental Services

	Site08\mp1\DFINAL (inches)					Site08\mp1\VFINAL (feet/sec)					Site08\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:25	5.3	8:10	8.5	7.4	0:00	1.7	8:55	2.1	2.0	0:25	0.446	8:10	1.025	0.806	0.806
12/11/2015	3:45	5.5	14:10	6.8	6.3	23:40	1.7	8:55	2.0	1.9	3:45	0.480	8:15	0.720	0.614	0.614
12/12/2015	4:10	5.0	18:00	9.8	7.3	4:35	1.7	18:35	2.3	2.0	4:35	0.396	18:00	1.319	0.826	0.826
12/13/2015	0:10	8.7	4:45	19.2	13.4	1:00	2.2	4:45	3.2	2.5	0:00	1.094	4:45	2.908	1.886	1.886
12/14/2015	23:55	7.0	0:00	9.3	8.4	23:50	2.0	19:05	2.2	2.1	23:55	0.759	0:05	1.208	1.018	1.018
12/15/2015	23:50	6.0	7:50	7.7	7.0	23:45	1.8	7:40	2.1	2.0	23:50	0.575	7:50	0.904	0.747	0.747
12/16/2015	4:05	5.5	7:35	6.9	6.3	4:35	1.7	7:50	2.0	1.9	4:35	0.477	7:35	0.745	0.629	0.629
12/17/2015	3:40	5.6	11:55	7.4	6.6	4:50	1.8	8:45	2.1	1.9	4:50	0.508	11:40	0.823	0.669	0.669
12/18/2015	3:30	5.3	13:10	10.1	7.9	1:50	1.7	17:40	2.4	2.1	4:05	0.453	13:10	1.362	0.937	0.937
12/19/2015	2:05	7.0	10:20	9.6	8.3	23:55	1.9	9:45	2.3	2.1	2:05	0.740	10:20	1.262	0.999	0.999
12/20/2015	4:40	6.2	11:35	8.1	7.2	6:05	1.9	12:00	2.1	2.0	6:05	0.609	11:25	0.936	0.768	0.768
12/21/2015	4:05	5.9	11:45	9.2	7.7	5:05	1.8	11:30	2.2	2.0	3:50	0.543	11:30	1.167	0.869	0.869
12/22/2015	0:50	7.2	12:05	8.8	8.0	2:15	1.9	13:35	2.2	2.0	0:35	0.763	12:05	1.113	0.924	0.924
12/23/2015	4:55	6.5	11:55	8.1	7.3	23:35	1.9	9:20	2.1	2.0	3:45	0.653	10:30	0.950	0.792	0.792
12/24/2015	3:30	6.1	11:30	8.4	7.2	4:40	1.8	10:50	2.1	1.9	4:40	0.570	11:30	0.977	0.765	0.765
12/25/2015	4:55	5.8	11:50	7.3	6.4	3:35	1.7	12:30	2.0	1.9	4:55	0.516	12:30	0.804	0.632	0.632
12/26/2015	4:35	5.3	11:30	7.5	6.3	2:30	1.7	12:00	2.0	1.8	4:20	0.435	11:30	0.839	0.616	0.616
12/27/2015	4:55	5.0	13:05	7.2	6.1	2:00	1.6	13:15	2.0	1.8	4:10	0.397	13:15	0.798	0.580	0.580
12/28/2015	3:15	5.1	13:55	7.4	6.3	3:40	1.6	12:10	2.0	1.8	3:40	0.404	12:30	0.808	0.618	0.618
12/29/2015	4:10	5.1	14:05	7.0	6.2	4:10	1.6	19:15	2.1	1.8	4:10	0.408	19:15	0.743	0.595	0.595
12/30/2015	4:55	5.4	12:00	7.3	6.3	2:50	1.7	11:55	2.0	1.8	2:55	0.446	11:55	0.794	0.618	0.618
12/31/2015	4:05	5.0	12:05	7.0	6.1	4:00	1.6	12:05	2.0	1.8	4:05	0.396	12:05	0.751	0.570	0.570
ReportAvg					7.3					2.0					0.794	
ReportTotal																17.48

ADS Environmental Services

	Site08\mp1\DFINAL (inches)					Site08\mp1\VFINAL (feet/sec)					Site08\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	5:20	4.7	12:25	6.7	5.7	4:35	1.6	13:30	2.0	1.8	5:15	0.353	12:15	0.677	0.511	0.511
1/2/2016	3:50	4.6	11:25	6.9	5.7	3:50	1.5	10:15	2.0	1.7	3:50	0.311	11:25	0.731	0.517	0.517
1/3/2016	4:00	4.4	13:10	6.6	5.6	2:35	1.5	10:15	2.0	1.7	4:05	0.316	13:40	0.681	0.491	0.491
1/4/2016	2:45	4.3	18:45	6.1	5.4	4:50	1.5	18:20	2.0	1.7	3:45	0.294	18:20	0.621	0.465	0.465
1/5/2016	3:55	4.3	18:40	6.0	5.3	4:25	1.5	7:25	1.9	1.7	4:35	0.288	7:25	0.565	0.448	0.448
1/6/2016	3:45	4.0	19:20	5.9	5.1	4:10	1.4	17:25	1.9	1.7	4:10	0.255	19:20	0.581	0.428	0.428
1/7/2016	3:30	3.9	18:25	5.9	5.1	3:20	1.4	18:55	1.9	1.7	3:30	0.243	18:55	0.561	0.423	0.423
1/8/2016	4:05	3.9	13:10	5.8	5.1	3:35	1.4	7:30	2.0	1.7	3:35	0.238	11:00	0.568	0.418	0.418
1/9/2016	3:55	4.0	13:50	6.4	5.2	2:00	1.4	9:25	2.0	1.7	3:55	0.244	14:15	0.642	0.435	0.435
1/10/2016	4:25	3.8	13:15	6.3	5.1	4:25	1.4	14:15	2.0	1.7	4:25	0.227	14:15	0.643	0.430	0.430
1/11/2016	3:55	3.8	20:15	5.7	5.0	3:55	1.4	21:40	1.9	1.7	3:55	0.230	13:20	0.538	0.403	0.403
1/12/2016	3:55	3.8	10:40	6.0	4.9	2:50	1.4	10:25	1.9	1.7	3:50	0.230	10:40	0.588	0.403	0.403
1/13/2016	3:25	3.8	11:15	5.8	5.0	3:05	1.4	11:15	2.0	1.7	3:05	0.233	11:15	0.601	0.411	0.411
1/14/2016	2:55	3.8	22:25	7.0	5.2	4:55	1.4	23:35	2.2	1.8	2:55	0.241	22:25	0.780	0.473	0.473
1/15/2016	4:05	5.2	13:40	7.0	6.2	1:55	1.7	11:10	2.2	1.9	4:00	0.461	13:40	0.818	0.607	0.607
1/16/2016	5:40	5.2	14:10	8.7	6.9	4:25	1.7	16:05	2.2	1.9	5:35	0.442	16:05	1.063	0.725	0.725
1/17/2016	5:15	5.9	15:30	17.9	9.8	5:20	1.7	15:30	2.8	2.1	5:20	0.514	15:30	2.512	1.214	1.214
1/18/2016	23:55	6.8	0:00	9.5	8.3	23:00	1.9	9:15	2.2	2.0	23:55	0.703	0:10	1.184	0.964	0.964
1/19/2016	23:40	6.1	10:35	7.7	6.9	23:40	1.8	7:00	2.2	1.9	23:40	0.574	9:35	0.870	0.729	0.729
1/20/2016	2:15	5.5	7:50	7.1	6.3	2:15	1.7	17:55	2.1	1.9	2:15	0.475	19:30	0.779	0.628	0.628
1/21/2016	4:25	5.2	13:50	7.2	6.0	4:25	1.7	13:45	2.1	1.8	4:25	0.423	13:50	0.797	0.573	0.573
1/22/2016	2:55	4.8	7:50	7.7	6.8	2:55	1.6	18:00	2.1	1.9	2:55	0.371	7:50	0.880	0.704	0.704
1/23/2016	5:20	6.0	12:20	8.8	7.3	5:20	1.8	10:15	2.2	2.0	5:20	0.569	12:20	1.062	0.802	0.802
1/24/2016	4:35	5.7	11:30	7.9	6.9	4:35	1.8	12:25	2.2	1.9	4:35	0.510	12:25	0.963	0.721	0.721
1/25/2016	4:00	5.4	8:30	7.2	6.4	4:00	1.7	10:00	2.1	1.9	4:00	0.457	11:05	0.810	0.644	0.644
1/26/2016	3:55	5.2	19:05	7.0	6.1	3:55	1.7	19:25	2.0	1.8	3:55	0.432	19:25	0.762	0.580	0.580
1/27/2016	4:15	4.9	7:40	6.5	5.7	4:15	1.6	7:40	2.1	1.8	4:15	0.378	7:40	0.729	0.519	0.519
1/28/2016	4:20	4.7	12:00	8.8	6.7	4:20	1.6	11:55	2.1	1.9	4:20	0.342	11:55	1.081	0.700	0.700
1/29/2016	2:15	6.0	8:50	8.4	7.3	2:15	1.8	7:50	2.1	2.0	2:15	0.557	8:50	1.001	0.801	0.801
1/30/2016	4:55	5.6	11:00	7.8	6.8	4:55	1.8	19:15	2.1	1.9	4:55	0.498	11:00	0.891	0.700	0.700
1/31/2016	5:05	5.6	11:45	7.8	6.6	5:05	1.8	8:45	2.1	1.9	5:05	0.492	11:45	0.900	0.678	0.678
ReportAvg					6.1					1.8					0.598	
ReportTotal																18.55

ADS Environmental Services

	Site08\mp1\DFINAL (inches)					Site08\mp1\VFINAL (feet/sec)					Site08\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	3:50	5.2	9:20	6.9	6.1	3:50	1.7	8:35	2.1	1.8	3:50	0.420	8:35	0.752	0.580	0.580
2/2/2016	4:00	5.0	11:25	7.2	6.1	4:00	1.6	18:00	2.1	1.8	4:00	0.399	11:25	0.776	0.592	0.592
2/3/2016	4:45	5.1	7:40	6.7	6.0	4:45	1.7	19:10	2.1	1.8	4:45	0.411	18:40	0.698	0.564	0.564
2/4/2016	4:40	4.9	18:40	6.8	5.8	4:40	1.6	18:40	1.9	1.8	4:40	0.381	18:40	0.704	0.530	0.530
2/5/2016	3:15	4.7	14:25	6.6	5.7	3:15	1.6	14:25	1.9	1.8	3:15	0.344	14:25	0.662	0.509	0.509
2/6/2016	4:25	4.5	11:15	6.9	5.7	4:25	1.5	11:15	2.0	1.8	4:25	0.317	11:15	0.733	0.507	0.507
2/7/2016	3:45	4.4	13:15	6.9	5.5	3:45	1.5	13:15	1.9	1.7	3:45	0.306	13:15	0.720	0.487	0.487
2/8/2016	3:35	4.3	10:55	6.5	5.4	3:35	1.5	11:00	1.9	1.7	3:35	0.293	10:55	0.628	0.461	0.461
2/9/2016	3:15	4.3	7:40	6.3	5.3	3:15	1.5	8:30	2.0	1.7	3:15	0.288	7:40	0.610	0.454	0.454
2/10/2016	3:55	4.2	8:15	6.6	5.3	4:30	1.4	8:10	2.1	1.7	8:50	0.049	8:55	0.796	0.443	0.443
2/11/2016	2:50	4.3	7:55	6.0	5.3	3:45	1.4	13:25	1.9	1.7	2:40	0.279	7:55	0.566	0.450	0.450
ReportAvg					5.7					1.8					0.507	
ReportTotal																5.577

Site09

Located At: 2860 North Keene Way Dr (see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 18" x 18"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The data plots above the Froude =1 curve indicating supercritical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic sensor. Drops and pops (outside the normal data set) were flagged. The finalized velocity data "drops" (outside the normal data set) were flagged.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

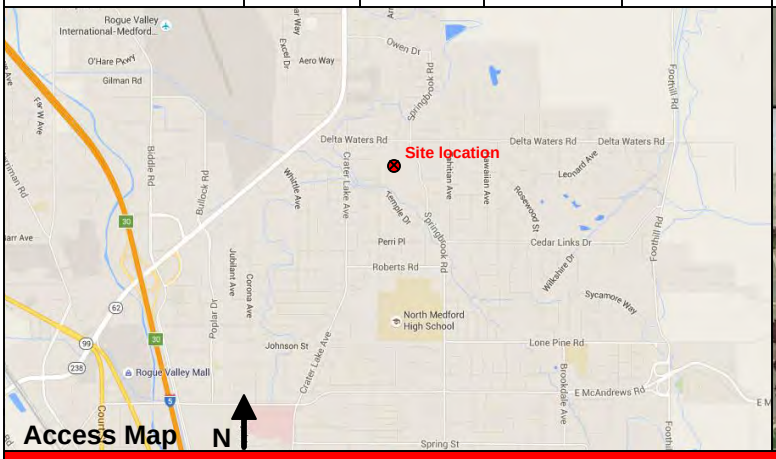
Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	2.56	2.59	0.26	14%
Maximum	9.11	5.29	3.04	51%
Average	4.79	4.00	1.01	27%

ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site09	**Monitor Series:**	Triton+	**Monitor S/N:**	60003
Address/Location:	2860 N Keene Way Dr on East side of school			**IP Address:**	166.219.173.210
				Manhole #	6204
				GPS Coordinates	42.358702° -122.850750°
Access: Drive	**Type of System:**	Sanitary [X]	Storm [ ]	Combined [ ]	**Pipe Height:** 18.00"
					Pipe Width: 18.00"



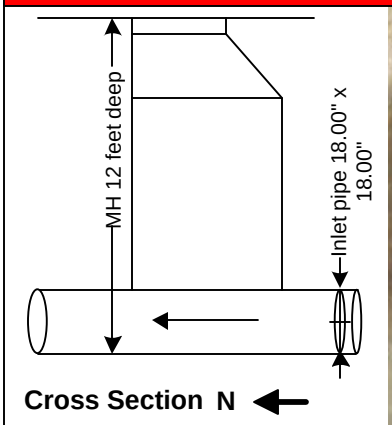
Investigation Information:

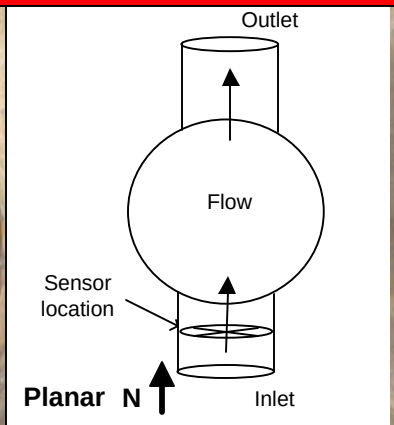
Date/Time of Investigation:	12/09/2015 @ 14:50
Site Hydraulics:	Ripples
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	4.50" +/- 0.25"
Range (Air DOF):	13.50" +/- 0.25"
Peak Velocity:	4.40 fps
Silt:	None

Manhole Information:

Manhole Depth:	12'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [ ]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:





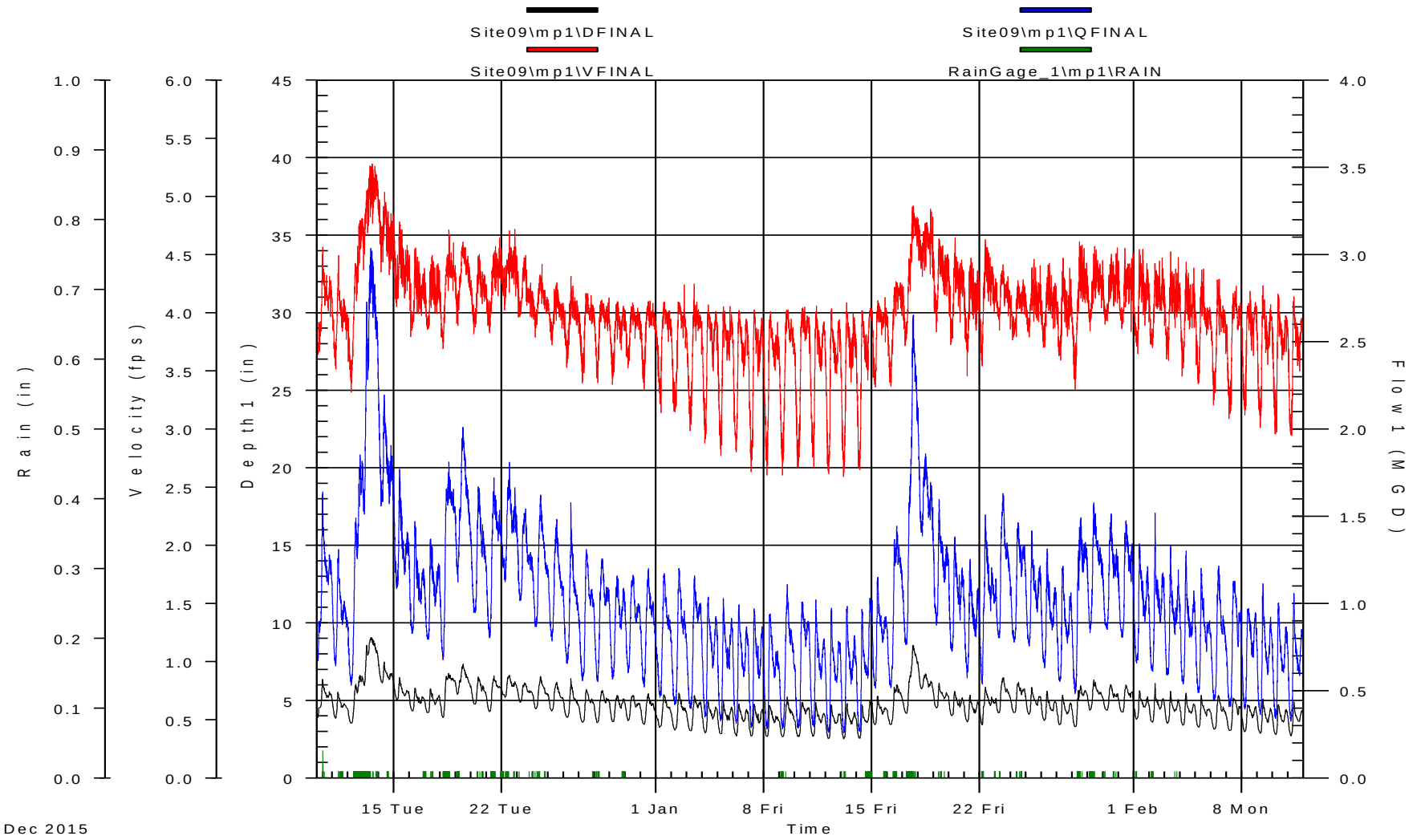
Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[X]	[ ]	
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity),	Lift / Pump Station	[ ]	[X]	[ ]	
Surcharge Height:	None Observed	WWTP	[ ]	[X]	[ ]	
Rain Guage Zone:	RG1	Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

ADS Environmental Services

Pipe Height: 18.00

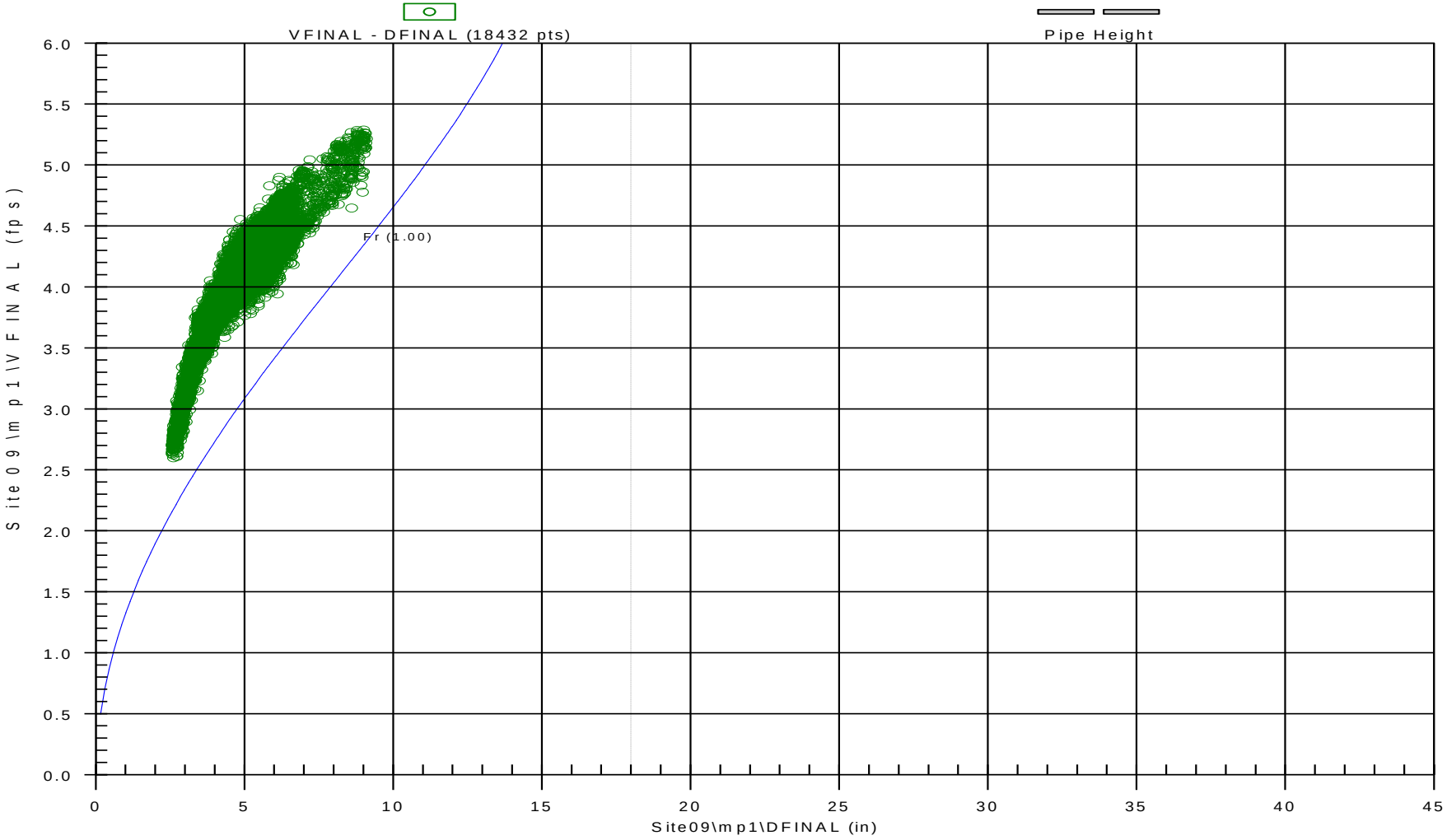


Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 18.00



ADS Environmental Services

	Site09\mp1\DFINAL (inches)					Site09\mp1\VFINAL (feet/sec)					Site09\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	1:10	3.9	7:55	6.4	5.2	1:05	3.6	8:15	4.6	4.1	1:10	0.677	8:15	1.643	1.136	1.136
12/11/2015	4:30	3.9	7:55	5.6	4.7	4:50	3.5	8:55	4.5	4.0	4:50	0.645	8:55	1.314	0.933	0.933
12/12/2015	3:55	3.6	18:35	6.7	5.2	4:30	3.3	21:40	4.8	4.2	4:30	0.536	18:35	1.856	1.202	1.202
12/13/2015	1:05	6.0	11:15	9.1	8.1	1:15	4.5	13:05	5.3	5.0	1:15	1.516	11:05	3.039	2.524	2.524
12/14/2015	23:55	5.8	8:10	7.5	6.6	16:00	4.3	8:50	5.0	4.7	23:55	1.473	8:15	2.200	1.796	1.796
12/15/2015	23:55	5.0	8:05	6.5	5.6	3:25	4.1	8:10	4.8	4.4	23:55	1.090	8:10	1.774	1.327	1.327
12/16/2015	4:45	4.4	7:55	5.9	5.0	1:25	3.8	9:00	4.6	4.2	3:20	0.832	7:55	1.474	1.089	1.089
12/17/2015	4:40	4.2	7:55	5.8	5.0	3:15	3.9	10:50	4.5	4.2	4:40	0.799	8:40	1.374	1.072	1.072
12/18/2015	3:50	3.9	12:20	6.8	5.8	3:45	3.7	12:55	4.7	4.2	3:45	0.682	12:55	1.815	1.369	1.369
12/19/2015	2:15	5.4	11:05	7.4	6.4	2:45	3.9	10:35	4.6	4.3	2:45	1.127	10:35	2.015	1.576	1.576
12/20/2015	5:55	4.8	10:25	6.6	5.6	3:45	3.8	12:20	4.5	4.2	3:45	0.952	10:30	1.675	1.274	1.274
12/21/2015	4:30	4.3	10:55	6.6	5.6	4:05	3.8	19:45	4.6	4.3	4:05	0.808	10:55	1.724	1.303	1.303
12/22/2015	4:55	5.2	11:15	6.7	6.0	3:30	4.0	19:35	4.7	4.4	4:35	1.128	11:10	1.814	1.447	1.447
12/23/2015	4:10	4.9	10:40	6.2	5.6	22:00	4.0	12:15	4.5	4.2	3:20	1.020	12:15	1.547	1.267	1.267
12/24/2015	4:40	4.5	11:40	6.6	5.5	3:15	3.8	13:40	4.4	4.1	5:00	0.872	11:35	1.626	1.223	1.223
12/25/2015	5:30	4.3	12:45	6.2	5.2	5:25	3.7	12:55	4.3	4.0	5:25	0.790	12:45	1.487	1.116	1.116
12/26/2015	5:30	3.9	10:50	6.5	4.9	4:10	3.5	10:55	4.3	4.0	5:10	0.660	10:50	1.581	0.996	0.996
12/27/2015	5:15	3.6	10:45	5.8	4.7	4:25	3.4	10:30	4.2	3.9	5:00	0.562	10:45	1.313	0.940	0.940
12/28/2015	4:05	3.6	11:50	5.7	4.8	4:30	3.4	21:45	4.1	3.9	4:30	0.556	11:45	1.260	0.953	0.953
12/29/2015	3:45	3.7	10:40	5.4	4.6	3:35	3.4	11:05	4.1	3.9	3:35	0.571	10:40	1.162	0.903	0.903
12/30/2015	4:55	3.7	11:30	5.4	4.6	3:40	3.5	10:50	4.1	3.9	3:40	0.607	11:20	1.166	0.911	0.911
12/31/2015	5:00	3.5	11:30	5.5	4.5	4:55	3.3	14:05	4.1	3.9	4:55	0.526	11:30	1.206	0.864	0.864
ReportAvg					5.4					4.2					1.237	
ReportTotal																27.22

ADS Environmental Services

	Site09\mp1\DFINAL (inches)					Site09\mp1\VFINAL (feet/sec)					Site09\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	4:45	3.3	11:35	5.4	4.3	7:05	3.1	12:40	4.1	3.8	5:15	0.467	12:20	1.175	0.813	0.813
1/2/2016	4:45	3.1	11:00	5.5	4.2	5:00	3.2	19:20	4.2	3.7	4:45	0.425	11:00	1.207	0.784	0.784
1/3/2016	5:50	3.1	11:25	5.4	4.2	4:10	3.0	10:35	4.3	3.7	6:00	0.399	11:25	1.163	0.788	0.788
1/4/2016	5:00	2.9	8:15	5.0	4.0	3:25	2.9	8:50	4.1	3.7	3:25	0.354	8:50	1.042	0.713	0.713
1/5/2016	3:55	2.9	8:10	5.0	3.9	4:10	2.8	18:20	4.1	3.6	4:10	0.330	8:10	1.033	0.681	0.681
1/6/2016	4:20	2.8	8:20	4.9	3.8	4:15	2.8	8:40	4.0	3.6	4:20	0.313	8:25	0.997	0.657	0.657
1/7/2016	4:50	2.7	7:55	4.8	3.8	3:30	2.6	8:30	4.0	3.6	3:30	0.292	7:55	0.974	0.641	0.641
1/8/2016	5:00	2.7	8:25	4.7	3.7	4:05	2.6	9:25	4.0	3.5	4:05	0.285	8:55	0.944	0.618	0.618
1/9/2016	4:50	2.7	11:35	5.3	3.9	4:05	2.6	10:55	4.0	3.6	4:05	0.285	11:35	1.113	0.672	0.672
1/10/2016	5:05	2.7	10:30	4.9	3.9	3:40	2.7	14:40	4.1	3.6	5:00	0.291	10:30	1.014	0.688	0.688
1/11/2016	3:25	2.7	8:15	5.0	3.8	4:55	2.7	9:05	4.1	3.6	4:55	0.299	8:15	1.025	0.633	0.633
1/12/2016	3:30	2.6	8:40	4.8	3.6	4:05	2.6	8:35	4.0	3.5	4:05	0.266	8:40	0.977	0.600	0.600
1/13/2016	3:45	2.6	8:50	4.8	3.7	3:25	2.6	8:00	4.1	3.5	3:45	0.262	8:55	0.988	0.614	0.614
1/14/2016	5:05	2.6	20:05	5.0	3.8	4:30	2.7	21:15	4.0	3.6	3:20	0.273	20:05	1.035	0.657	0.657
1/15/2016	4:50	3.5	8:00	5.3	4.3	5:00	3.4	19:50	4.1	3.9	5:00	0.519	8:45	1.155	0.829	0.829
1/16/2016	4:55	3.5	14:05	6.1	4.9	5:00	3.4	13:00	4.3	4.0	5:00	0.521	14:10	1.450	1.018	1.018
1/17/2016	5:40	4.2	15:40	8.6	6.4	3:05	3.7	15:55	4.9	4.4	4:20	0.768	16:00	2.658	1.675	1.675
1/18/2016	23:55	5.4	0:00	7.1	6.2	23:40	4.3	18:50	4.9	4.6	23:40	1.250	0:00	1.952	1.603	1.603
1/19/2016	4:25	4.5	8:05	6.2	5.3	3:40	3.8	8:05	4.6	4.3	3:40	0.881	8:05	1.600	1.212	1.212
1/20/2016	4:25	4.0	8:20	5.7	4.8	2:15	3.7	8:55	4.6	4.2	4:10	0.730	8:25	1.386	1.037	1.037
1/21/2016	3:55	3.6	8:25	5.4	4.4	3:40	3.5	9:30	4.5	4.1	3:40	0.577	8:15	1.257	0.906	0.906
1/22/2016	3:25	3.4	8:10	5.9	4.8	2:55	3.5	8:05	4.6	4.2	3:30	0.542	8:05	1.512	1.044	1.044
1/23/2016	4:50	4.2	12:15	6.5	5.4	5:55	3.9	11:35	4.4	4.2	4:45	0.807	11:35	1.634	1.201	1.201
1/24/2016	4:55	4.2	11:55	6.2	5.3	2:20	3.8	18:45	4.3	4.1	4:55	0.782	11:55	1.467	1.137	1.137
1/25/2016	4:05	4.1	8:05	5.9	4.9	4:30	3.8	11:50	4.5	4.1	4:05	0.760	8:00	1.422	1.049	1.049
1/26/2016	4:25	3.7	8:05	5.6	4.6	4:25	3.7	11:35	4.4	4.1	4:25	0.636	8:15	1.318	0.933	0.933
1/27/2016	4:10	3.4	8:15	5.4	4.4	5:15	3.6	9:00	4.5	4.0	4:00	0.558	9:00	1.218	0.862	0.862
1/28/2016	3:35	3.3	12:20	6.0	4.9	3:55	3.3	10:35	4.6	4.1	3:55	0.489	12:40	1.496	1.064	1.064
1/29/2016	3:40	4.4	9:10	6.4	5.4	2:55	3.9	10:10	4.6	4.2	2:55	0.837	9:05	1.581	1.215	1.215
1/30/2016	6:00	4.4	11:45	6.1	5.2	2:30	3.9	21:25	4.6	4.2	5:45	0.855	11:45	1.518	1.154	1.154
1/31/2016	6:10	4.3	11:45	6.1	5.1	18:55	3.8	9:15	4.6	4.2	6:10	0.810	11:00	1.479	1.137	1.137
ReportAvg					4.5					3.9					0.924	
ReportTotal																28.64

ADS Environmental Services

	Site09\mp1\DFINAL (inches)					Site09\mp1\VFINAL (feet/sec)					Site09\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	2:55	3.8	8:20	5.7	4.7	5:20	3.7	13:00	4.6	4.1	3:25	0.663	7:50	1.346	0.987	0.987
2/2/2016	4:35	3.6	8:20	6.1	4.6	4:20	3.7	19:15	4.5	4.1	4:35	0.615	8:20	1.522	0.958	0.958
2/3/2016	3:45	3.6	8:10	5.6	4.5	5:15	3.6	8:40	4.5	4.1	3:45	0.592	8:40	1.337	0.909	0.909
2/4/2016	3:30	3.4	8:35	5.5	4.4	2:20	3.5	8:45	4.4	4.0	4:10	0.541	8:45	1.305	0.862	0.862
2/5/2016	4:30	3.3	8:10	5.4	4.2	3:25	3.4	11:30	4.4	3.9	3:25	0.494	8:05	1.207	0.807	0.807
2/6/2016	4:45	3.2	11:00	5.4	4.2	3:10	3.2	12:20	4.3	3.8	4:05	0.450	11:35	1.219	0.796	0.796
2/7/2016	4:40	3.1	10:50	5.2	4.2	3:25	3.1	14:35	4.2	3.8	3:25	0.414	10:50	1.133	0.785	0.785
2/8/2016	3:55	3.0	8:10	4.7	4.0	4:15	3.1	12:20	4.2	3.8	4:15	0.399	9:55	0.976	0.742	0.742
2/9/2016	4:35	2.9	8:20	5.1	3.9	4:00	3.0	8:15	4.2	3.7	4:00	0.368	8:15	1.117	0.694	0.694
2/10/2016	4:25	2.8	8:15	4.8	3.8	4:10	3.0	7:35	4.2	3.7	4:10	0.345	8:25	1.008	0.670	0.670
2/11/2016	3:55	2.8	8:20	5.0	3.8	5:10	3.0	8:25	4.1	3.7	4:05	0.328	8:25	1.063	0.658	0.658
ReportAvg					4.2					3.9					0.806	
ReportTotal																8.866

Site10

Located At: 1203 Riverside Road (see attached site report for details)
Monitoring Period: December 10, 2015 – February 11, 2016
Pipe Dimensions: 24" x 24"
Finalized Silt Level: 0 in

Site Data Characteristics: This site is located in a sanitary sewer pipe. The hydrograph indicates a predominantly residential diurnal flow pattern during the monitoring period. The scattergraph indicates normal open channel flow with no hydraulic restrictions. The dry weather data plots below the Froude =1 curve indicating critical flow.

Site Data Bias & Editing: The depth and velocity measurements recorded by the flow monitor were consistent with field confirmations conducted to date and supported the relative accuracy of the flow monitor at this location. The finalized depth data utilized the upward ultrasonic and pressure sensor. Drops and pops (outside the normal data set) were flagged. For the finalized velocity data "drops" (outside the normal data set) were flagged.

Site Data Uptime: The data uptime achieved during the monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate the flow rate for the monitoring period.

Entity	Percentage Uptime Raw	Percentage Uptime Final
Depth (mm)	100%	100%
Velocity (m/s)	100%	100%
Quantity (L/s)	100%	100%

Site Data Summary: The average flow depth, velocity, and quantity data observed during the monitoring period along with observed minimum and maximum data, are provided in the following table. The minimum and maximum rates recorded in the tables are based on 5-minute data intervals.

Item	Depth (in)	Velocity (f/s)	Quantity (mgd)	% Full
Minimum	4.94	1.06	0.34	21%
Maximum	14.49	4.08	5.07	61%
Average	8.11	2.12	1.38	34%

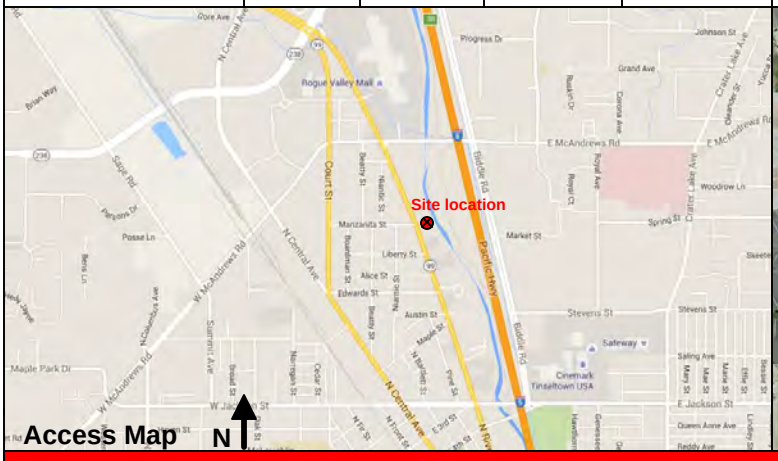
ADS Site Report

Quality Form

Project Name:	Medford.MSA.TFM.OR15	**City / State:**	Medford, OR	**FM Initials:**	DS

Site Name:	Site10	**Monitor Series:**	Triton+
Address/Location:	1203 Riverside Rd (OR99) behind OK Market		
Access:	Drive	**Type of System:**	Sanitary [X] Storm [ ] Combined [ ]

Monitor S/N:	60019
IP Address:	166.219.173.250
Manhole #	7596
GPS Coordinates	42.338585° -122.875273°
Pipe Height:	24.00"
Pipe Width:	24.00"



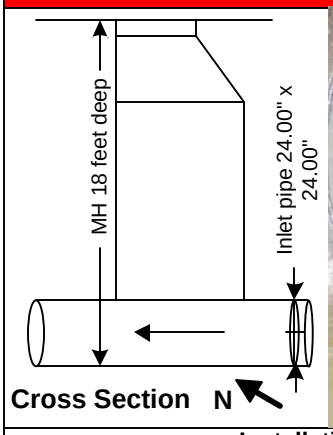
Investigation Information:

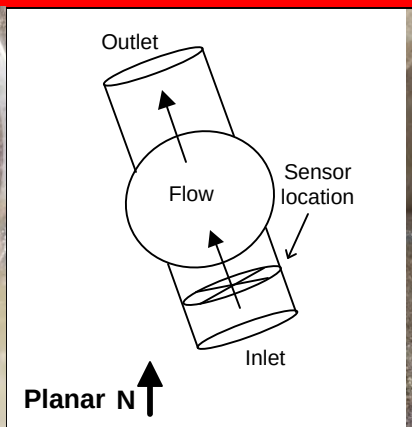
Date/Time of Investigation:	12/09/2015 @ 07:30
Site Hydraulics:	Smooth with Small Standing Waves
Upstream Input: (L/S, P/S)	None
Upstream Manhole:	DNI
Downstream Manhole:	DNI
Depth of Flow:	9.00" +/- 0.25"
Range (Air DOF):	15.00" +/- 0.25"
Peak Velocity:	2.95 fps
Silt:	None

Manhole Information:

Manhole Depth:	18'				
Manhole Material / Condition	Concrete / Good				
Pipe Material / Condition:	Concrete / Good				
Mini System Character:	Residential [X]	Commercial [X]	Industrial [ ]	Trunk [ ]	
Telephone Information:	Does not apply				
Access Pole #:	Does not apply				
Distance From Manhole:	Does not apply	Feet			
Road Cut Length:	Does not apply	Feet			
Trench Length:	Does not apply	Feet			

Other Information:





Installation Information	
Installation Type:	Standard
Sensors Devices:	CS4(Ultrasonic, Pressure, Velocity)
Surcharge Height:	None Observed
Rain Guage Zone:	RG1

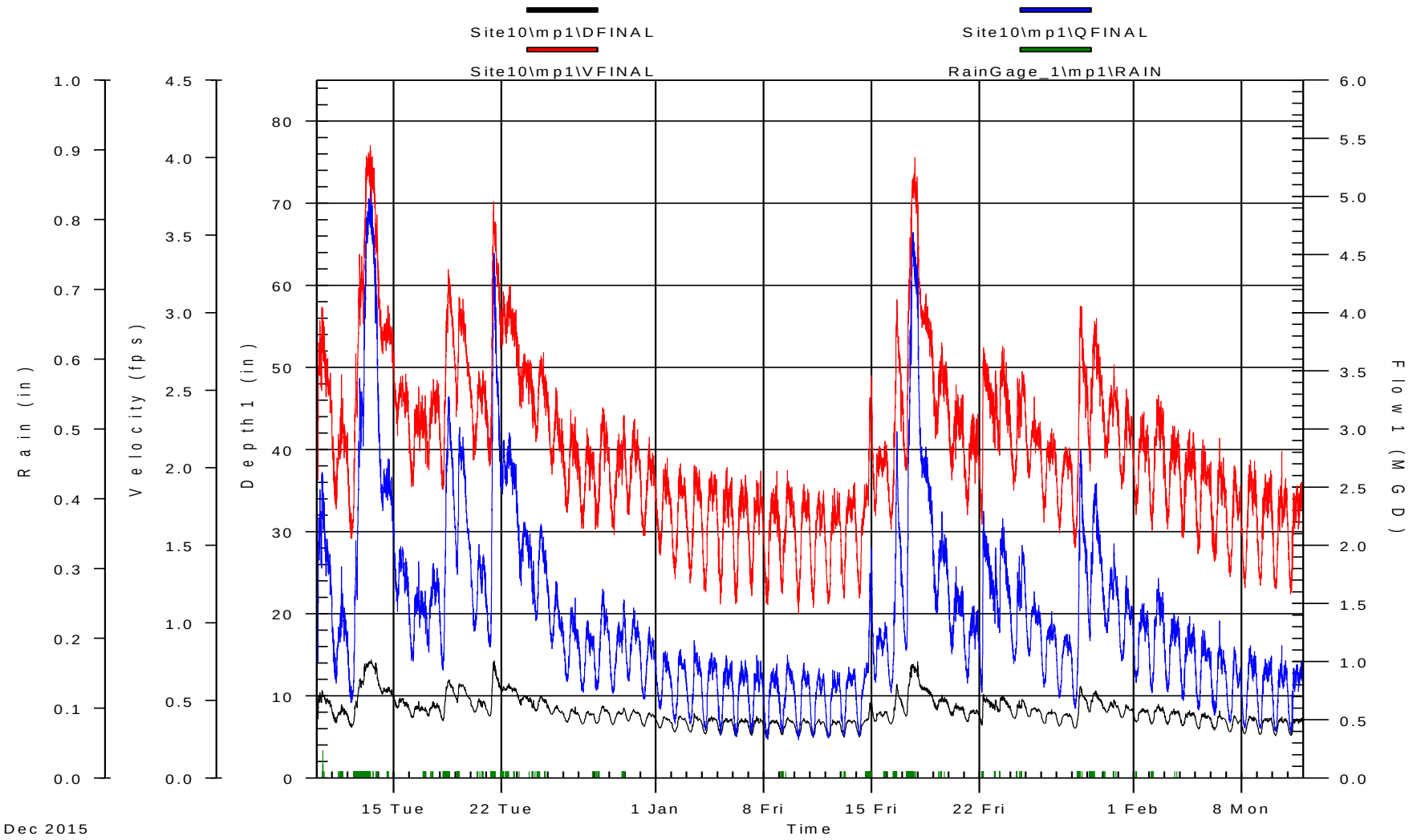
Backup	Yes	No	?	Distance
Trunk	[ ]	[X]	[ ]	
Lift / Pump Station	[ ]	[X]	[ ]	
WWTP	[ ]	[X]	[ ]	
Other	[ ]	[X]	[ ]	

Additional Site Information / Comments:

Pressure (5 PSI, accuracy +/- 0.25% for range of 0.25 – 11.5 ft.)

ADS Environmental Services

Pipe Height: 24.00

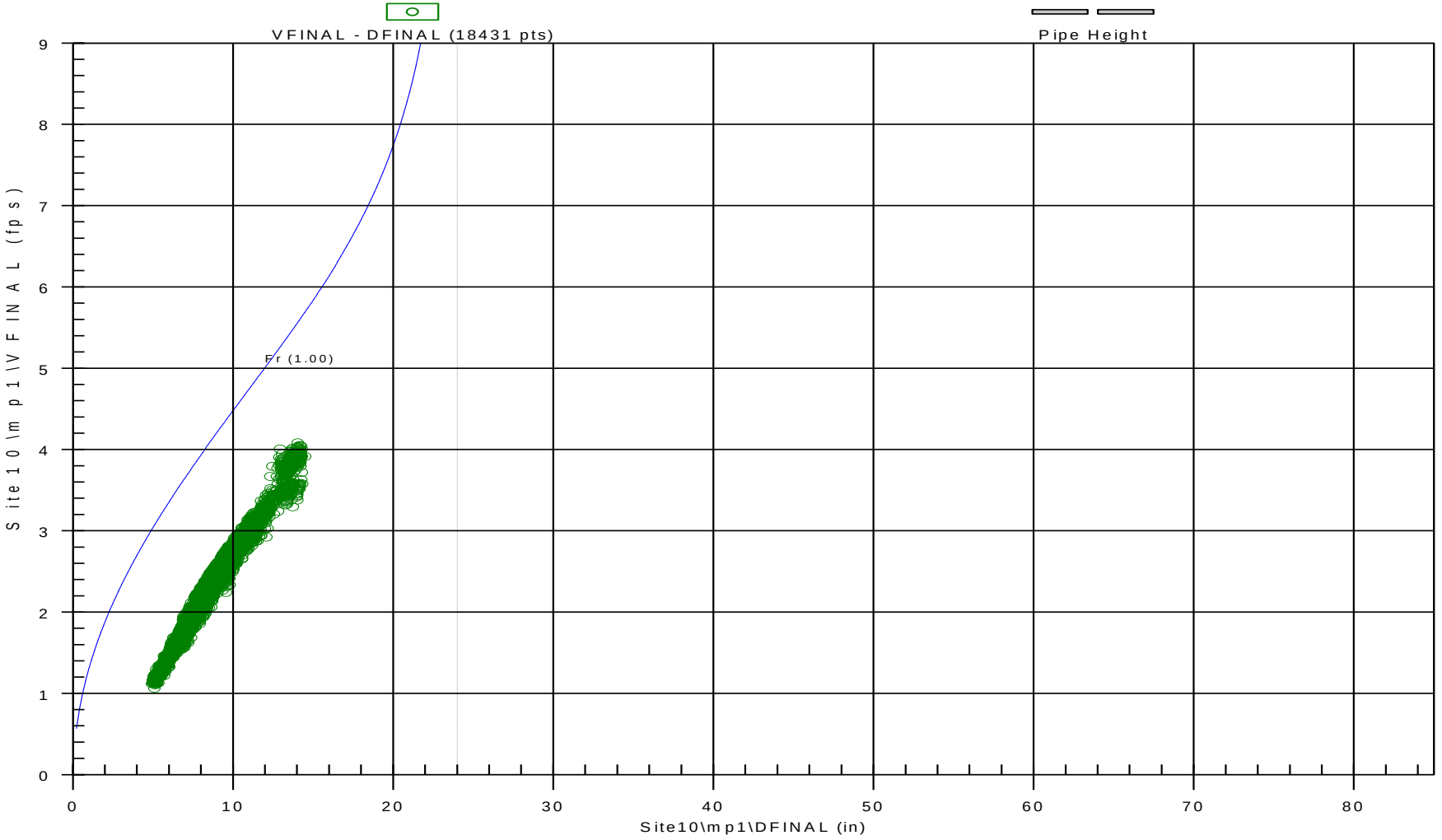


Dec 2015

ADS Environmental Services

12/10/2015 12:00:00 AM - 2/11/2016 11:59:00 PM

Pipe Height: 24.00



ADS Environmental Services

	Site10\mp1\DFINAL (inches)					Site10\mp1\VFINAL (feet/sec)					Site10\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
12/10/2015	0:55	7.3	7:30	10.8	9.4	0:50	1.9	7:05	3.0	2.6	0:50	1.000	7:20	2.636	1.928	1.928
12/11/2015	5:25	6.8	13:30	9.0	7.8	5:25	1.7	13:30	2.6	2.1	5:25	0.823	13:30	1.822	1.208	1.208
12/12/2015	5:40	6.3	18:45	12.2	9.0	5:40	1.5	17:55	3.4	2.4	5:40	0.654	18:05	3.444	1.812	1.812
12/13/2015	23:55	11.3	11:45	14.5	13.5	23:00	3.0	10:15	4.1	3.7	23:55	2.912	10:40	5.072	4.359	4.359
12/14/2015	23:40	9.5	0:10	11.6	10.6	23:55	2.5	0:15	3.1	2.9	23:55	1.873	0:15	2.992	2.491	2.491
12/15/2015	23:45	8.3	8:40	9.8	9.1	23:15	2.1	17:25	2.6	2.4	23:15	1.324	10:00	1.998	1.733	1.733
12/16/2015	4:55	7.4	13:55	9.4	8.3	2:30	1.9	13:55	2.5	2.2	5:00	1.011	13:55	1.866	1.387	1.387
12/17/2015	5:30	7.5	12:30	9.4	8.5	5:30	2.0	12:45	2.6	2.3	5:30	1.087	12:30	1.851	1.508	1.508
12/18/2015	3:55	7.1	13:20	12.1	10.0	3:55	1.9	11:55	3.3	2.7	3:55	0.933	12:50	3.285	2.217	2.217
12/19/2015	23:45	8.8	5:35	11.6	10.5	0:05	2.3	4:55	3.1	2.8	23:35	1.648	5:35	3.020	2.371	2.371
12/20/2015	5:05	8.1	11:35	9.7	8.9	2:50	2.1	17:40	2.6	2.4	3:55	1.267	11:35	2.014	1.637	1.637
12/21/2015	5:05	7.6	11:25	14.3	10.8	4:20	2.0	10:25	3.7	2.9	5:20	1.133	11:25	4.521	2.697	2.697
12/22/2015	23:35	10.2	10:10	11.6	10.9	22:20	2.7	11:25	3.2	3.0	23:20	2.184	10:55	2.975	2.657	2.657
12/23/2015	23:25	8.6	9:40	10.1	9.6	23:40	2.3	1:50	2.8	2.6	23:40	1.496	0:00	2.213	1.972	1.972
12/24/2015	4:20	8.2	11:25	10.1	9.2	4:10	2.2	16:10	2.7	2.5	4:10	1.359	12:20	2.189	1.776	1.776
12/25/2015	23:55	7.7	13:20	8.9	8.2	23:55	1.9	11:20	2.5	2.2	23:55	1.100	11:20	1.696	1.360	1.360
12/26/2015	5:40	6.9	17:25	8.7	7.8	5:10	1.7	10:25	2.4	2.0	5:10	0.834	17:25	1.554	1.160	1.160
12/27/2015	6:10	6.6	12:55	8.2	7.5	6:00	1.6	11:40	2.3	1.9	6:00	0.742	12:55	1.362	1.063	1.063
12/28/2015	3:05	6.7	12:25	8.9	7.8	1:00	1.6	12:15	2.4	2.0	2:50	0.759	12:15	1.629	1.192	1.192
12/29/2015	4:45	6.5	21:30	8.6	7.6	6:20	1.6	21:20	2.3	2.0	4:50	0.731	21:20	1.539	1.103	1.103
12/30/2015	4:10	7.0	12:15	8.4	7.8	4:55	1.7	14:05	2.3	2.0	4:55	0.840	12:15	1.469	1.147	1.147
12/31/2015	5:25	6.4	12:55	8.0	7.3	5:55	1.6	13:05	2.2	1.9	4:35	0.682	13:05	1.305	0.985	0.985
ReportAvg					9.1					2.4					1.807	
ReportTotal																39.76

ADS Environmental Services

	Site10\mp1\DFINAL (inches)					Site10\mp1\VFINAL (feet/sec)					Site10\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
1/1/2016	6:30	6.2	12:35	7.5	6.9	6:25	1.4	16:55	2.1	1.7	6:25	0.596	14:00	1.098	0.855	0.855
1/2/2016	5:05	5.6	13:40	7.7	6.8	5:10	1.3	13:25	2.0	1.7	5:00	0.472	13:40	1.109	0.814	0.814
1/3/2016	5:00	5.7	10:45	8.0	6.8	4:20	1.3	10:50	2.0	1.7	5:05	0.472	10:50	1.188	0.802	0.802
1/4/2016	4:20	5.4	13:20	7.6	6.7	4:45	1.2	13:55	2.0	1.7	4:45	0.416	14:05	1.081	0.798	0.798
1/5/2016	3:40	5.3	12:40	7.4	6.6	3:35	1.1	13:45	2.0	1.7	3:35	0.379	12:45	1.059	0.763	0.763
1/6/2016	4:35	5.1	18:05	7.3	6.5	3:15	1.1	18:35	2.0	1.6	4:35	0.363	18:05	1.017	0.740	0.740
1/7/2016	4:35	5.2	12:10	7.6	6.5	4:25	1.2	18:25	2.0	1.6	4:25	0.387	12:10	1.061	0.733	0.733
1/8/2016	5:15	4.9	18:45	7.2	6.4	5:15	1.1	19:25	2.0	1.6	5:15	0.337	19:25	0.988	0.700	0.700
1/9/2016	4:10	5.3	12:25	7.5	6.6	4:05	1.2	12:00	2.0	1.6	4:05	0.402	12:00	1.063	0.746	0.746
1/10/2016	5:25	5.1	13:30	7.3	6.4	5:25	1.1	13:30	1.9	1.6	5:25	0.335	13:30	0.996	0.689	0.689
1/11/2016	3:40	5.1	13:05	7.2	6.3	4:00	1.1	20:15	1.9	1.6	4:00	0.353	13:05	0.948	0.684	0.684
1/12/2016	4:25	5.0	10:15	7.2	6.3	3:25	1.1	13:00	1.9	1.5	3:25	0.351	10:15	0.934	0.673	0.673
1/13/2016	4:15	5.1	11:25	7.2	6.5	4:15	1.2	20:30	1.9	1.6	4:15	0.364	11:25	0.959	0.729	0.729
1/14/2016	3:50	5.1	22:55	9.7	6.9	3:55	1.2	22:25	2.6	1.7	3:55	0.364	22:55	1.981	0.891	0.891
1/15/2016	5:30	6.9	0:00	8.5	7.7	5:20	1.7	20:10	2.2	2.0	5:20	0.827	0:00	1.391	1.138	1.138
1/16/2016	5:20	6.7	14:25	11.5	8.6	5:20	1.6	14:25	3.1	2.3	5:20	0.739	14:25	2.985	1.568	1.568
1/17/2016	4:40	7.6	22:45	14.3	11.4	4:40	2.0	18:40	4.0	3.1	4:40	1.101	15:40	4.697	3.157	3.157
1/18/2016	23:45	9.3	0:20	12.2	10.8	22:40	2.5	0:00	3.4	2.9	22:40	1.829	0:00	3.523	2.595	2.595
1/19/2016	23:50	8.3	12:35	10.3	9.3	23:55	2.2	12:00	2.8	2.5	23:55	1.369	12:35	2.296	1.814	1.814
1/20/2016	23:55	7.6	10:25	9.2	8.4	3:55	1.9	10:25	2.5	2.2	4:00	1.073	10:25	1.822	1.409	1.409
1/21/2016	4:10	6.9	14:20	8.4	7.8	4:10	1.7	12:50	2.4	2.1	4:10	0.820	14:20	1.487	1.191	1.191
1/22/2016	3:00	6.5	5:25	10.3	8.9	2:45	1.6	5:30	2.8	2.4	3:00	0.736	5:30	2.300	1.655	1.655
1/23/2016	5:55	8.1	9:35	10.1	9.1	6:00	2.1	11:10	2.8	2.4	5:55	1.256	11:10	2.237	1.719	1.719
1/24/2016	6:20	7.3	17:05	9.7	8.5	4:25	1.9	17:20	2.6	2.3	4:25	0.990	17:05	2.007	1.473	1.473
1/25/2016	23:55	7.5	12:40	8.7	8.2	3:50	1.9	12:05	2.5	2.2	4:30	1.053	12:05	1.608	1.326	1.326
1/26/2016	3:55	6.7	15:05	8.4	7.6	3:10	1.7	15:00	2.3	2.0	3:10	0.787	15:05	1.438	1.131	1.131
1/27/2016	3:10	6.4	14:15	8.0	7.3	3:35	1.6	12:40	2.1	1.9	3:35	0.695	14:15	1.242	1.024	1.024
1/28/2016	3:30	6.1	12:45	11.3	8.7	3:10	1.5	11:55	3.0	2.3	4:20	0.604	11:55	2.822	1.618	1.618
1/29/2016	2:30	8.0	12:00	10.7	9.5	2:55	2.0	13:05	3.0	2.6	2:55	1.185	13:05	2.541	1.932	1.932
1/30/2016	4:45	8.1	16:25	9.6	8.7	2:05	2.1	16:15	2.7	2.3	5:45	1.255	16:15	2.019	1.571	1.571
1/31/2016	4:50	7.4	11:50	9.0	8.2	4:10	1.9	11:40	2.5	2.2	4:10	1.012	11:40	1.744	1.322	1.322
ReportAvg					7.8					2.0					1.234	
ReportTotal																38.26

ADS Environmental Services

	Site10\mp1\DFINAL (inches)					Site10\mp1\VFINAL (feet/sec)					Site10\mp1\QFINAL (MGD - Total MG)					
Date	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Time	Min.	Time	Max.	Average	Total
2/1/2016	3:05	6.9	12:00	8.6	7.9	2:50	1.7	14:50	2.4	2.1	2:50	0.827	14:50	1.507	1.208	1.208
2/2/2016	3:20	6.6	13:20	9.1	7.9	3:45	1.6	13:25	2.5	2.1	3:25	0.738	13:25	1.725	1.250	1.250
2/3/2016	4:20	6.6	13:35	8.5	7.7	4:00	1.6	11:55	2.3	2.0	4:20	0.745	13:30	1.422	1.124	1.124
2/4/2016	4:15	6.4	14:00	8.3	7.4	4:20	1.6	14:05	2.3	1.9	4:20	0.672	14:05	1.397	1.048	1.048
2/5/2016	4:10	6.0	13:30	8.1	7.2	3:05	1.5	10:40	2.2	1.8	4:10	0.592	10:40	1.278	0.954	0.954
2/6/2016	4:55	5.9	12:50	8.2	7.0	4:55	1.4	12:50	2.2	1.8	4:55	0.545	12:50	1.357	0.871	0.871
2/7/2016	5:25	5.7	11:30	7.7	6.7	5:00	1.3	11:25	2.0	1.7	5:00	0.482	11:30	1.133	0.780	0.780
2/8/2016	3:40	5.5	12:50	7.6	6.7	4:25	1.2	12:50	2.1	1.7	4:25	0.431	12:50	1.144	0.808	0.808
2/9/2016	4:20	5.4	21:30	7.5	6.7	4:05	1.2	20:10	2.0	1.7	4:20	0.429	21:30	1.055	0.781	0.781
2/10/2016	4:00	5.2	13:30	7.5	6.6	5:00	1.2	13:25	2.1	1.6	4:00	0.403	13:25	1.144	0.750	0.750
2/11/2016	3:35	5.2	21:25	7.4	6.6	3:20	1.2	21:25	1.9	1.6	3:20	0.393	21:25	1.021	0.752	0.752
ReportAvg					7.1					1.8					0.939	
ReportTotal																10.33

RainGage_1	
Total Rainfall	9.70 "

A review of the hydrograph indicates that RG_OV functioned under normal conditions during the period December 10, 2016 through February 10, 2016.

ADS Environmental Services

Pipe Height: 8.00

	RainGage_1\mp1\RAIN (inches)
Date	Total
12/10/2015	0.13
12/11/2015	0.12
12/12/2015	0.94
12/13/2015	1.67
12/14/2015	0.09
12/15/2015	0.00
12/16/2015	0.11
12/17/2015	0.08
12/18/2015	0.54
12/19/2015	0.33
12/20/2015	0.10
12/21/2015	0.66
12/22/2015	0.24
12/23/2015	0.11
12/24/2015	0.13
12/25/2015	0.00
12/26/2015	0.00
12/27/2015	0.04
12/28/2015	0.12
12/29/2015	0.14
12/30/2015	0.00
12/31/2015	0.00
ReportAvg	
ReportTotal	5.55

ADS Environmental Services

Pipe Height: 8.00

	RainGage_1\mp1\RAIN (inches)
Date	Total
1/1/2016	0.00
1/2/2016	0.00
1/3/2016	0.00
1/4/2016	0.00
1/5/2016	0.00
1/6/2016	0.00
1/7/2016	0.00
1/8/2016	0.00
1/9/2016	0.11
1/10/2016	0.00
1/11/2016	0.00
1/12/2016	0.01
1/13/2016	0.06
1/14/2016	0.43
1/15/2016	0.13
1/16/2016	0.40
1/17/2016	1.17
1/18/2016	0.00
1/19/2016	0.09
1/20/2016	0.00
1/21/2016	0.00
1/22/2016	0.46
1/23/2016	0.12
1/24/2016	0.16
1/25/2016	0.00
1/26/2016	0.00
1/27/2016	0.00
1/28/2016	0.44
1/29/2016	0.26
1/30/2016	0.12
1/31/2016	0.00
ReportAvg	
ReportTotal	3.96

ADS Environmental Services

Pipe Height: 8.00

	RainGage_1\mp1\RAIN (inches)
Date	Total
2/1/2016	0.07
2/2/2016	0.10
2/3/2016	0.02
2/4/2016	0.00
2/5/2016	0.00
2/6/2016	0.00
2/7/2016	0.00
2/8/2016	0.00
2/9/2016	0.00
2/10/2016	0.00
2/11/2016	0.00
ReportAvg	
ReportTotal	0.19

APPENDIX C – LAND USE FLOW FACTORS DEVELOPMENT

Table 1 Flow Monitoring Tributary Areas by Land Use
Sanitary Sewer Master Plan
City of Medford

Land Use Classification	Total (acres)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
Airport	47.1							0.2	46.8				
Commercial	539.3	100.4	74.4	4.7			38.5	20.4	49.1	1.1	143.0	42.7	65.0
General Industrial	231.2	20.0	0.0	0.0	0.0	0.0	38.9	0.0	32.9	0.0	31.4	0.0	108.0
Heavy Industrial	20.4	20.4											
Park	112.7	15.7	7.0	3.5		0.0	12.3	11.1	0.1	17.5	5.1	33.2	7.0
School	241.9	8.4	26.2	2.6	0.0	0.0	32.4	35.8	3.9	46.3	18.3	37.7	30.3
Service Commercial	199.6		0.1	32.9	45.5	0.0	8.4	7.4	0.0	0.0	49.8	46.5	8.9
Single Family Residential	3,958.4	44.5	320.9	39.3	378.8	378.7	524.2	298.2	157.4	490.4	175.7	736.3	414.1
Urban High Residential	305.3	11.9	56.3	0.9	0.1	0.0	15.0	64.4	42.0	13.6	35.5	51.0	14.5
Urban Medium Residential	4.8								0.0			1.5	3.3
	5,660.5	221.3	484.9	83.9	424.3	378.7	669.6	437.6	332.4	568.9	458.8	948.9	651.2
Notes:	5,547.8	205.6	477.8	80.4	424.3	378.7	657.3	426.5	332.2	551.4	453.7	915.7	644.1

(1) Acreage and flow from large indutrial customers have been removed for the purpose of this analysis.

Table 2 Wastewater Flow factors by Basin
Sanitary Sewer Master Plan
City of Medford

Land Use Classification	Total (gpad)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
Airport	200							200	200				
Commercial	940	1,000	600	1,100			800	800	800	700	1,350	900	600
General Industrial	1,000	1,400					1,150		1,200		1,500		680
Heavy Industrial	1,600	1,600											
Park		0	0	0	0	0	0	0	0	0	0	0	0
School	700	800	600	800			700	800	600	800	800	600	600
Service Commercial	840		800	1,150	730		800	800			850	800	600
Single Family Residential	500	650	430	800	230	320	680	930	470	605	680	500	210
Urban High Residential	1,800	2,100	1,600	2,200	1,700		1,900	1,750	1,800	1,900	2,100	1,800	1,700
Urban Medium Residential	930								1,000			1,000	900

Table 3 Existing BWP by Flow Monitoring Basin Tributaries and Land Use
Sanitary Sewer Master Plan
City of Medford

Land Use Classification	Total (mgd)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
Airport	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000
Commercial	0.508	0.100	0.045	0.005	0.000	0.000	0.031	0.016	0.039	0.001	0.193	0.038	0.039
General Industrial	0.233	0.028	0.000	0.000	0.000	0.000	0.045	0.000	0.039	0.000	0.047	0.000	0.073
Heavy Industrial	0.033	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Park	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
School	0.171	0.007	0.016	0.002	0.000	0.000	0.023	0.029	0.002	0.037	0.015	0.023	0.018
Service Commercial	0.169	0.000	0.000	0.038	0.033	0.000	0.007	0.006	0.000	0.000	0.042	0.037	0.005
Single Family Residential	1.986	0.029	0.138	0.031	0.087	0.121	0.356	0.277	0.074	0.297	0.119	0.368	0.087
Urban High Residential	0.551	0.025	0.090	0.002	0.000	0.000	0.028	0.113	0.076	0.026	0.075	0.092	0.025
Urban Medium Residential	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003
Total (mgd)	3.663	0.222	0.289	0.078	0.120	0.121	0.490	0.441	0.240	0.360	0.491	0.560	0.251
Measured BWP (mgd)	3.656	0.222	0.288	0.078	0.120	0.120	0.489	0.440	0.240	0.358	0.490	0.560	0.250
% Difference	0.2%	0.0%	0.0%	0.1%	0.4%	1.0%	0.2%	0.2%	0.0%	0.5%	0.2%	-0.1%	0.2%
Flow Isolation													

Notes:
BWP = Baseline Wastewater Production = ADWF (from flow monitoring) - GWI
GWI was estimated based on empirical method.

APPENDIX D – TM NO. 1 – HYDRAULIC MODELING SOFTWARE EVALUATION

This document is released for the purpose of information exchange review and planning only under the authority of Rachel A. Lanigan, January 28, 2016, Oregon 69424

CITY OF MEDFORD

SANITARY SEWER MASTER PLAN

TECHNICAL MEMORANDUM NO. 1

HYDRAULIC MODELING SOFTWARE EVALUATION

DRAFT
January 2016

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CITY OF MEDFORD
SANITARY SEWER MASTER PLAN

TECHNICAL MEMORANDUM
NO. 1
HYDRAULIC MODELING SOFTWARE EVALUATION

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HYDRAULIC MODELING SOFTWARE EVALUATION

1.0 INTRODUCTION

The City of Medford (City) has contracted with Carollo Engineers, Inc. (Carollo) to assist the City in developing its Sanitary Sewer Master Plan (SSMP). As part of this SSMP, a hydraulic computer model of the City's collection system will be developed. The purpose of this technical memorandum (TM) is to compare and evaluate the various modeling software packages available to the City and recommend the modeling software that best meets the City's needs.

In the past decade, improvements have been made to the hydraulic modeling software available on the market. Some examples of the improvements include modifications to the hydraulic routing engine as well as an enhanced graphical user interface (GUI), integrated scenario management, model output reports, and geographic information systems (GIS) compatibility. This technical memorandum presents a summary of the major software vendors, briefly explains software features, compares the advantages and disadvantages of each software program, and provides a recommendation for the software program to be used for preparation of the SSMP. Additionally, Section 8.0 compares maintaining the model in-house versus using the on-call modeling services of a consultant.

Appendix A provides a basic overview of what a sewer system hydraulic model is, as well as an explanation of the different computational methods that are used in the hydraulic models available in the marketplace today.

2.0 RECOMMENDATION SUMMARY

Because the City's collection system includes a number of diversions and surcharging during rainfall events, it is recommended that the City consider using software applications that feature fully dynamic flow routing capabilities for its SSMP. The City owns an in-house license of Autodesk Storm and Sanitary Analysis and intends to keep it for now. Carollo recommends using Innovyze's InfoSWMM software for the new hydraulic model developed as part of the SSMP. In our experience, Innovyzes's InfoSWMM software may be the best choice for the following reasons:

- Superior GIS capabilities.
- Superior or comparable ease of use.
- Excellent scenario manager.
- Best value in terms of features/capabilities to cost.
- Responsive customer service.

3.0 SOFTWARE VENDORS

Many software packages can potentially address the needs of the City, and all vary in their methods of analysis and user friendliness. Sanitary sewer hydraulic modeling software packages from seven (7) major software vendors were evaluated and are listed below in alphabetical order:

- **Autodesk:** Autodesk is a 3D design, engineering, and entertainment company headquartered in San Rafael, CA. In 2009 Autodesk acquired StormNET from BOSS International, which is now called Autodesk Storm and Sanitary Analysis.

- **Bentley Systems, Inc.:** Bentley Systems, Inc. (Bentley) is an engineering and architecture software company with corporate headquarters in Exton, Pennsylvania. Bentley added a suite of water, wastewater, and storm water analysis software through its acquisition of Connecticut based Haestad Methods, Inc. in 2004. The company offers two wastewater collection system software packages: SewerCAD and SewerGEMS.

- **Computational Hydraulics Institute**: Computational Hydraulics International (CHI) is a consulting engineering firm specializing in stormwater management. CHI is headquartered in Ontario, Canada with a US office in New York. The company has been providing the PC-SWMM software package since 1984.

- **Danish Hydraulic Institute**: The Danish Hydraulic Institute (DHI) is an international hydraulic consulting and research institution headquartered in Denmark. Three offices are located in the United States: Portland, Oregon, St. Petersburg, Florida, and Solana Beach, California. The company's MIKE URBAN software application supports two computational engines for urban hydrology and open channel/closed pipe hydraulics: the Environmental Protection Agencies (EPA) open source SWMM5 engine, and DHI's proprietary MOUSE computational engine

- **Environmental Protection Agency (EPA):** The EPA first developed the Storm Water Management Model (SWMM) around 1970, which has undergone several major upgrades since then. The latest version of EPA SWMM, SWMM 5, was released in 2005. The SWMM 5 hydraulic engine is widely used throughout the industry through the EPA's open source SWMM 5 software application. In addition, several third party software vendors use the SWMM 5 hydraulic engine in their modeling software packages.

- **Innovyze:** Innovyze is headquartered in Broomfield, Colorado, and is a leading provider of software products geared towards hydraulics and hydrology. In 2009, Colorado based MWH Soft and British based Wallingford Software merged into a single company (MWH Soft), which in 2011 was renamed Innovyze. Innovyze offers three main sewer system modeling software packages. These are InfoSewer/H_2OMAP Sewer, InfoSWMM/H_2OMAP SWMM, and InfoWorks. The InfoWorks software is not included to this analysis. Its higher costs and capabilities are not aligned with the City's needs.

A comparison of the technical features of the seven software vendors and the modeling software that each vendor offers is presented in Table 1.1. This table allows a side-by-side comparison of similar features in each software package. The features that have the greatest impact on the selection of an appropriate software package are discussed in detail as part of this memo.

Table 1.1 Model Comparison
Sanitary Sewer Master Plan
City of Medford

Technical Characteristics	Innovyze		Bentley		CHI	DHI	EPA	Autodesk
	H_2OMAP Sewer/ InfoSewer(1)	**H_2OMAP SWMM/ InfoSWMM(1)**	**SewerCAD(2)**	**SewerGEMS(5)**	**PCSWMM(4)**	**MIKE URBAN(5)**	**SWMM 5**	**Autodesk Storm and Sanitary Analysis**
Computation Method	Quasi-Dynamic and Steady State	Dynamic Wave and Kinematic Wave	Standard Step	Dynamic Wave and Kinematic Wave	Dynamic Wave and Kinematic Wave	Dynamic Wave	Dynamic Wave and Kinematic Wave	Dynamic Wave and Kinematic Wave
GIS Compatible	Yes	Yes	Yes	Yes	Yes	Yes	No	Limited
Reads shapefiles directly	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Writes to shapefiles directly	Yes	Yes	Yes	Yes	No	No	No	Yes
Tools to fix GIS data topology problems	Yes	Yes	Partial	Yes	Partial	Partial	No	No
Utilizes Standard Database Format	Yes	Yes	Proprietary	Proprietary	Yes	ASCII-based	Yes	ASCII-based
Automatically sizes new mains	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Calculates pipe replacement costs	Yes	Yes	Yes	Yes	No	No	No	No
Calculates loads based on GIS land use	Yes	Yes	via GIS	via GIS	Yes	Yes	No	No
Time step	User Defined	User Defined	User Defined	User Defined	User Defined	User Defined	User Defined	User Defined
Scenario manager	Yes	Yes	Yes	Yes	No	Yes	No	No
Customizable tabular reports	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Graphically compares the results of multiple simulations	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Displays GIS data layers on screen	Yes	Yes	No	Yes	Yes	Yes	No	No
Export tabular data to excel	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Internet Based Model Network/Output Viewer Available	Yes	Yes	No	No	Yes	No	No	No
Single Licenses Cost (2,000 pipe version)	$5,000	$7,000	$7,995	$12,995	$2,999 *$3,999*	$20,250	Free	n/a
Maintenance and Service (Annual Fee)	$800	$1,500	$1,925	$3,120	$999 *$1,299*	$2,370	Free	n/a
Water Modeling Software	Yes	Yes	Yes	Yes	No	Yes	No	No

Notes:

(1) Costs presented are for the standard fixed seat license. Pricing differs for the floating seat licenses and the suite packages.
(2) SewerCAD evaluation is based on the stand-alone version. SewerCAD with AutoCAD is priced at $9,995 for 2000 pipe version with $2,405 annual support and maintenance fee.
(3) Pricing represents a single user license of PCSWMM Standard. Cost in parentheses is for PCSWMM Professional.
(4) Pricing is for MIKE URBAN supporting the MOUSE (and SWMM5) engine. MIKE URBAN supporting MOUSE also supports the EPANET engine, which means that is doubles as a sewer/storm as well as a water distribution system modeling software package.
(5) SewerGEMS includes SewerCAD and all of its capabilities.

4.0 EVALUATION CRITERIA

As a way to evaluate the pros and cons of each software package, several criteria are used for a software evaluation, including:

- Dry and Wet Weather Flow Calculations Methods.
- Hydraulic Flow Routing Calculation Algorithms.
- GIS Interface.
- Scenario Management.
- Customer Service and Support.
- Cost.
- Ease of Use.
- Internet Based Model Network/Output Viewer.
- Ability to Export to City's Modeling Software

Carollo recommends the City select a model that is easy to operate, compatible with GIS software and data sources, has the ability to analyze several scenarios with multiple facility options, and is cost effective. City staff may also find it necessary to use the software vendor's customer service and support to troubleshoot operating issues associated with model use. Each of the criteria listed above is briefly discussed herein.

4.1 Dry and Wet Weather Flow Calculations

Many of the models listed here were first developed not only for sanitary sewers but also for stormwater sewers. Therefore, these models contain modules for hydrologic (or wet weather flow - WWF) calculations as well as hydraulic calculations. When used as sanitary sewer models, the wet weather flow calculations are used to calibrate the infiltration and inflows (I/I) that enter the system as the result of rainfall events, and then apply these I/I characteristics to other rainfall events. Several of the models also have the ability to project dry weather flows (DWF) based on population, land use data, or parcel level water usage. Estimating accurate DWF and WWF is critical because all hydraulic calculations are based on these flows.

4.1.1 <u>Dry Weather Flows</u>

DWFs can be entered directly into a model, as a series of diurnal flows, or can be generated in the model based on population or land use estimates. Most of the models reviewed can accept a time series of diurnal flows. Certain models also have the ability to generate DWFs based on average dry weather flows (ADWFs) that are generated based on a population in a basin (in gallons per capita per day) or based on land use (in gallons per acre per day). Once the ADWF is estimated, a diurnal pattern can be applied to the ADWF.

4.1.2 Wet Weather Flows

WWFs can be generated using a variety of hydrologic techniques typically applied to stormwater runoff in order to approximate I/I in the collection system. Most models generate an I/I hydrograph by converting rainfall into flow based on the area that contributes flows to the collection system. Unlike stormwater, the area contributing to I/I in a sanitary sewer basin cannot be directly measured. Therefore, the area term is really a percent of the total sewer basin area, or “effective area,” that contributes I/I (e.g., 5 percent).

Simple models usually employ a unit hydrograph type algorithm to generate the WWF hydrograph. This usually includes the use of an “effective area” variable that is sometimes referred to as an R-value. An R-value represents the amount of rainfall that enters a sewer basin as a percent of the total rainfall that fell on the basin (and is usually reported as a percentage). This variable, along with a variable that approximates the time of concentration of the basin is applied to the intensity of rainfall during a storm to calculate the I/I hydrograph. Some models include two or more of these types of hydrographs – one for inflow, and one or more for infiltration. If the system being modeled experiences little I/I, these simplistic routines may be all that is warranted.

Complex models employ a more rigorous estimation of WWFs. These models include more variables to better approximate the peak, volume, and shape of the I/I hydrograph by taking into account soil saturation and near surface groundwater interaction. These routines include linear reservoir, non-linear reservoir, and other combinations of algorithms. The more complex models like MIKE URBAN and, PC-SWMMemploy these more complex routines to better approximate I/I hydrographs for collection systems that have significant flow contributions from infiltration and inflow.

4.2 Hydraulic Calculations

There are several differences among sewer models in how hydraulic computations are performed. The most important difference is in how the calculations involve time. There are two primary kinds of hydraulic sewer models:

- **Steady State** models do not account for changes in flow over time, and
- **Dynamic** models involve time in their calculations, most notably in being able to vary flow over time and calculate the associated changes in depth and velocity.

Several other refinements may be used to further differentiate sewer hydraulic models, namely in how they handle changes in flow characteristics over the length of the channel, or spatial changes. Differences in the assumptions in the underlying equations may make an important difference in certain situations, while for others the “simpler is better” dictum may prevail. In other words, it is not always true that complex models are always “better,” it depends on the problem to be solved. Common differences in model calculations are demonstrated in Table 1.2 and Table 1.3.

4.2.1 Terminology

To simulate the flow of water in sewers, the equations describing the depth and velocity of flow through the sewerage network must be solved. Each sewer simulation model solves some form of these equations, known formally as the "1-dimensional Saint Venant equations of open channel flow." The St. Venant equations are comprised of two simultaneous equations: a continuity equation that describes the conservation of mass and a momentum equation that describes the conservation of energy. While some models solve the complete equations with all terms included, other models solve simplifications of the equations to facilitate faster run times or to evaluate specific conditions that do not require the full sophistication of the complete equations.

Technical definitions from the field of open channel hydraulics are helpful to better understand the differences between different model solution techniques and to assist in the model selection process. The terms describe how depth and velocity of open channel flow is computed over the length of the channel over the simulation time period.

Temporal Terms:

Steady State: The flow rate is assumed constant in time at any point along the channel. Flow may change along the length of the channel (i.e., a constant tributary flow rate may be added at a point along the channel, or a diversion may reduce the flow by a constant rate at a certain point along the channel). Steady State model assumptions, the formulas used and the software that employ the specified methods are summarized in Table 1.2.

Table 1.2 Steady State Assumptions and Models
Sanitary Sewer Master Plan
City of Medford

	Spatial Assumptions	Model or Equation
Uniform Flow	Water surface is parallel to slope of pipe invert.	Manning Equation
Varied Flow	Water surface may vary in depth along the length of the pipe or channel.	SewerCAD

Dynamic: In dynamic models, also known as "unsteady state" models, the flow rate may change over time. There are four primary solution schemes to the St. Venant equations listed below and the dynamic routing methods, assumptions, and modeling software for each are summarized in Table 1.3:

1. "Kinematic Wave" assumption, the simplest of the dynamic models,
2. "Diffusion Wave" or "Non inertia" assumption. Both acceleration (inertial) terms are ignored.

3. “Quasi-Dynamic” - Four of five momentum terms are used. Only the local acceleration term is dropped.

4. “Dynamic Wave” - all five terms of the momentum equation are used.

In general, the complexity of the routing equation increases from Kinematic Wave to Dynamic Wave, with Dynamic Wave representing the full solution to the 1-Dimensional St. Venant equation. Kinematic Wave simplification allows for faster computational run times, but is not ideal for flat pipeline slopes (<0.002 ft/ft) and cannot calculate backwater effects as accurately as the Dynamic Wave routing equation. In addition to lacking adequate abilities to calculate backwater, the Kinematic Wave equations approximate flow attenuation by mathematical approximations, instead of wave propagation.

The kinematic wave equation was very popular, but with increases in computing power and improvements in the user interface, the use of the dynamic wave routing equations has become a much more user friendly and accessible software option.

Table 1.3 Dynamic Assumptions and Models
Sanitary Sewer Master Plan
City of Medford

	Assumptions	Model or Equation
Kinematic Wave	Inertia and pressure are ignored, only gravitational and frictional forces are considered. The most simplified dynamic model.	SWMM 5 Option in InfoSWMM Option in SewerGEMS Option in PCSWMM Option in Autodesk Storm and Sanitary Anlaysis
Diffusion Wave	Pressure force term is included along with gravitational and frictional terms. Inertial acceleration terms are not included.	Option in MIKE URBAN
Quasi-Dynamic	One inertial term is included, along with gravity, friction, and pressure. One inertial acceleration term is ignored.	H_2OMAP Sewer/InfoSewer
Dynamic Wave	All five momentum terms are included: gravity, friction, pressure and two inertial acceleration terms. Computationally time-consuming to solve over large sewer networks.	InfoSWMM, H_2OMAP SWMM, SewerGEMS, PCSWMM, SWMM 5, MIKE URBAN Autodesk Storm and Sanitary Analysis

4.3 GIS Interface

Municipalities use GIS software and databases to control, organize, and catalog system data into easy to access and useable formats. For most municipalities, GIS compatibility is an essential element of any infrastructure modeling software. The ability to synchronize system

databases with modeling software can result in significant time saving for City Staff. Software should be able to display GIS data, such as land use, aerial photos, zoning data, parcels, and growth boundaries on the screen in order to allocate flows, and evaluate new facilities based on planning assumptions.

Often, GIS data has topology flaws that need to be corrected before the modeling software can run. Software packages with data diagnostic tools to identify and correct these topology flaws can save time in the model building and updating process.

4.4 Scenario Management

Typically, a planning level hydraulic model serves several purposes. First, the model is used to analyze the existing system and determine where capacity deficiencies and operational problems exist. Second, the model is used to evaluate the system under future flows or land use designations. To be used effectively, the model will need to be able to create and modify multiple scenarios in order to evaluate the effects of infrastructure changes (e.g. new pipelines, pump stations) and increased demands on the collection system. The ability of a model to create and manage what-if scenarios is a necessary component of hydraulic model construction and analysis.

4.5 Customer Service and Support

Operation of a computer model requires a direct relationship with the software vendor in order to troubleshoot any problems that may arise during model operation. Technical service representatives, on-line help, help files and operating manuals all factor into the customer service and support evaluation. Customer support should be fast, responsive and technically qualified to handle the most advanced modeling questions. New and infrequent users usually have many questions regarding the operation of modeling software, and a helpful and responsive customer support department can be an invaluable tool.

An evaluation of customer service and support provided by the software vendors is subjective at best, since the evaluation is influenced by the specific personalities and experiences of both parties. Anecdotal information obtained from other software users is subject to biases as well. However, establishing and maintaining a good working relationship with the vendor can be very helpful to maximize the benefits obtained from the software. Maintaining a good personal relationship with the software vendor is probably the most effective way to obtain extra support and software enhancements when needed.

4.6 Cost

The cost of a software package involves several items. With any software package, the associated costs include a single license or network license fees, support and maintenance fees, and additional add-on modules. Software package costs as of March 2012 are given in the

information matrices (Table 1.1). The cost of the software should be appropriate for the intended use by the City, and the complexity of the City's collection system.

4.7 Ease of Use

In order for a model to be an effective tool for City Staff in planning and development, it must be user friendly and easy to operate. The operating system must be graphically based and intuitive in its operation. Adding facilities to the existing system and creating scenarios for new improvements should be straightforward and intuitive.

4.8 Internet Based Model Network/Output Viewer

In recent years, some of the software vendors have begun to offer internet based applications where the model network and model simulation results can be accessed without having to actually purchase the software license or be trained on how to use the model. This type of functionality is particularly desirable for clients that do not have the available staff resources and/or need to maintain a hydraulic model, but would still like to be able to view hydraulic model output as the need arises.

4.9 Ability to Export to City's Modeling Software

The City maintains a license of the Autodesk Storm and Sanitary Analysis (SSA) in-house. However, this software was not recommended for this SSMP due to very limited GIS integration, and no scenario management capability. The SSA software package allows the import of SWMM 5.0 files and all recommended software applications evaluated have the ability to export SWMM type files. The City will therefore have the ability to import the physical information of the new hydraulic model into their software.

5.0 SCREENING LEVEL EVALUATION

Carollo conducted a preliminary evaluation based on the hydraulic calculations, cost, and ease of use criteria. Table 1.1 displays a comparison between the sanitary sewer modeling software's cost and technical characteristics. Considering the criteria described above, SWMM 5, Autodesk Storm and Sanitary Analysis, MIKE URBAN and, PCSWMMare not recommended for the reasons described below.

SWMM 5 is not recommended since the software lacks the enhanced graphical user interface (GUI) and additional features available through the third party vendors. Some examples of this include a lack of GIS compatibility and the inability to create multiple scenarios within a single model. For SWMM 5, a separate model is needed for each scenario that is created, which greatly complicates the model development and hydraulic analysis process.

The Autodesk Storm and Sanitary Analysis add-on is also not recommended because it does not appear to have scenario management capabilities. Like SWMM 5, a separate model must be created to each scenario, complicating the analysis process.

MIKE URBAN has several nice features; however, priced at $20,250 with a $2,370 maintenance fee, it is the most expensive software package that was evaluated and is therefore not recommended.

PCSWMM is not recommended since the software is much less intuitive when compared to other software packages and requires a good knowledge and frequent use of hydraulic models to operate and maintain. These packages would not be the most logical choice for the City because the new or infrequent user will struggle with the operation, maintenance, and model updates.

6.0 COMPREHENSIVE EVALUATION

After the preliminary evaluation was completed, the remaining software packages, SewerCAD, and SewerGEMS (Bentley); H_2OMAP Sewer/InfoSewer, H_2OMAP SWMM/InfoSWMM (Innovyze) were further evaluated.

6.1 Dry and Wet Weather Flow Calculations

The remaining software packages have varying capabilities of modeling dry and wet weather flows. Both the Innovyze and Bentley programs provide flexibility for developing dry weather flows from a variety of sources, such as geocoded billing records, population, land use, and other GIS based methods. All of the software packages also have the capability to load user-defined hydrographs into the model.

6.2 Hydraulic Calculations

Two of the remaining software applications, SewerCAD and H_2OMAP Sewer/InfoSewer have less robust computational engines. This significantly limits the software’s ability to model complex systems with multiple diversion locations. The City's collection system contains a number of flow diversions (locations where flow from one pipe is split between two outlet pipes) and these structures are represented by developing custom diversion curves which distribute flow between the outlet pipelines. These software packages are therefore not recommended as they are not aligned with the City's collection system needs.

The software applications that feature fully dynamic flow routing capabilities (H_2OMAP SWMM, InfoSWMM, SewerGEMS) are better suited to simulate backwater conditions, or flow diversions. In addition to the increased accuracy associated with the fully dynamic computational engine, these applications do not require the development of diversion curves, which can be difficult to generate accurately. The drawback of models that feature fully dynamic flow routing capabilities

is increased computational time (longer “run” time). However, the City’s hydraulic computer model will be small enough that run times should not be a determining factor in model selection.

6.3 GIS Interface

Most of the data in a collection system model comes from Geographic Information Systems (GIS). These information systems are increasingly becoming the primary repository for spatial infrastructure data. Cities that have had these systems in place have usually been successful in significantly increasing the quality of this data.

Software programs such as H_2OMAP Sewer and H_2OMAP SWMM operate in a stand-alone mode that allows these programs to run very efficiently. These programs can easily read, write, and manipulate GIS data.

InfoSewer and InfoSWMM run from within ESRI’s ArcGIS software program, so every user of these modeling programs must also have a copy of the GIS software. These modeling programs are able to use additional GIS functionality. The hydraulic calculations are identical to the corresponding H_2OMAP Sewer and H_2OMAP SWMM software. This software tends to be selected by users who have experience and like working from within the GIS software.

SewerCAD and SewerGEMS users can work in an AutoCAD, MicroStation, or GIS environment when doing model creation and setup tasks. Modeling simulations are often performed in a stand-alone mode. However, these two programs tend to open, load data, and run much slower than the Innovyze programs.

6.4 Scenario Management

H_2OMAP Sewer, H_2OMAP SWMM, InfoSewer, InfoSWMM, SewerGEMS, and SewerCAD offer sophisticated parent child tree scenario creation and management schemes. This feature allows the user to set up multiple what if scenarios based on a variety of model parameters.

The Innovyze software packages also have a facility manager, which enables the model to display only the facilities that are modeled in that simulation. The Innovyze data set manager is very useful in organizing and controlling what facilities and controls are associated with each scenario. In SewerCAD and SewerGEMS, all facilities are displayed for all scenarios. Therefore, facilities that are not present in a particular scenario must be turned off manually.

6.5 Customer Service and Support

Innovyze customer support has been good with timely and supportive response to issues, such as software bugs and technical problems. Innovyze has shown that they are responsive to clients' needs and are able to quickly provide enhancements when needed. Instructional manuals are adequate. Help files can be limited, so e-mail and telephone support is the best means of quickly obtaining solutions.

SewerCAD and SewerGEMS offers several support and maintenance options. Users have the option to pay an annual fee or pay a price for each service contract. Anecdotal information obtained from other users was less complimentary on timely responses and personal service.

6.6 Cost

It is to be noted that the City intends to continue outside modeling services. The following is a base for future discussion if the City wants to change software and purchase its own license and can be updated as necessary. Costs discussed here are for a 2,000-pipe version unless otherwise noted. The cost to model collection systems with more pipes will often be higher. The cost for all software packages are summarized in Table 1.1 and are prices as of March 2012.

Both InfoSewer and H_2OMAP Sewer have a single license fee of $5,000. Support and maintenance fees cost $800 annually. Network licenses are available, as well as Pro, Suite, and Pro Suite versions of the software for an additional cost (Pro cost has a $6,000 single license fee plus $800 annual maintenance, Suite has a $6,000 single license fee plus $1,000 annually, and Pro Suite has a single license fee of $7,000 plus $1,000 annually).

InfoSWMM and H_2OMAP SWMM are priced at $7,000 for a single license. Support and maintenance fees are $1,200 annually. Network licenses are available, as well as a Suite and Executive Suite version of the software for an additional cost (Suite has an $8,000 single license plus $1,500 annual maintenance fee, Executive Suite has a $9,000 single license fee plus $2,000 annual maintenance fee).

The stand-alone version of SewerCAD is priced at $7,995 with a support and maintenance fee of $1,925. SewerGEMS is priced at $12,995 with an annual support and maintenance fee of $3,120.

6.7 Ease of Use

The ease of use of each package is an important factor in the software selection.

The user interface for the Innovyze programs has many features that help the user to quickly see and identify associated facility data and controls. The attribute browser allows the user to click on a facility and view or edit information in the database. Another advantage is that output results are viewed in the same window as the model input. This feature is useful for analysis when focusing on specific sections of the system, such as new facilities or system upgrades. The user interface has a control center that displays GIS layer information as well as operational data, annotation, and map display operations that create an easy means to manipulate operational data and view output results for the entire system.

SewerCAD and SewerGEMS have many features that also have the disadvantage of unneeded complexity for the new or infrequent user. One drawback of the SewerCAD and SewerGEMS software is that they use a proprietary database. In doing so, external databases, such as Microsoft Excel, cannot be used to view or edit model data or output results.

6.8 Internet Based Model Network/Output Viewer

Of the software vendors selected for comprehensive evaluation, only the Innovyze software packages offer the ability to export the model network and model analysis results to an internet based viewing application. Innovyze uses its “NetView” add on module to export the model network and output results to a “.kml file,” which can be easily viewed by downloading a free copy of the Google Earth program. NetView is available as part of Innovyze’s Executive Suite license at an additional cost of $2,000 for a single license fee and an $800 increase in the annual maintenance fee for the H_2OMAP SWMM/InfoSWMM software package. Even with the Executive Suite license, the H_2OMAP SWMM/InfoSWMM still costs less than Bentley’s comparable program (SewerGEMS)

Depending on the City’s intended model usage, however, purchase of the Executive Suite license may or may not be required in order to see the benefits of this feature. For example, if the City does not plan to have one or more of its staff member routinely update and/or use the model, it may be more practical for the City to use the exported NetView .kml file (which would be exported by Carollo) to view model results. If this is the case, the City could opt to purchase the Base package only (if City staff may occasionally want to run a model scenario) or simply not purchase the software at all, while still having the ability to see peak flows and other model output for any given model element.

6.9 Ability to Export to City's Modeling Software

As stated above, the City's Autodesk SSA software package allows the import of SWMM 5.0 files and all recommended software applications evaluated have the ability to export SWMM type files. The City will therefore have the ability to import the physical information of the new hydraulic model into their software.

7.0 EVALUATION RESULTS

Because the City's collection system includes a number of diversions and surcharging during rainfall events, it is recommended that the City consider software applications that feature fully dynamic flow routing capabilities. Based on these criteria, the City could successfully implement a sanitary sewer-modeling program using either Innovyze (H_2OMAP SWMM, InfoSWMM) or Bentley (SewerGEMS) software programs. In our experience, Innovyzes’s InfoSWMM software may be the best choice for the following reasons:

- Superior GIS capabilities.
- Superior or comparable ease of use.
- Excellent scenario manager.
- Best value in terms of features/capabilities to cost.

- Available NetView module allows for model network and output results to be viewed for free through Google Earth.
- Responsive customer service.

8.0 IN-HOUSE MODELING VS. ON-CALL MODELING SERVICES

In addition to selecting a modeling software, the City must decide whether to have City staff maintain and perform analyses with the sewer model in-house, or hire a consulting firm to perform modeling tasks when needed. Many consulting firms in the wastewater industry maintain licenses to all or most of the software products discussed in this TM. Thus, regardless of which software package is chosen, the City has the option to use on-call modeling services.

If the City decides to maintain and utilize the sewer model in-house, the City will need to buy the software license and pay the annual maintenance fees. However, if the City chooses to enter into an on-call modeling services agreement, the consulting firm buys and maintains the modeling software license. Generally, an on-call modeling contract consists of an hourly fee schedule. If no modeling services are required for the duration of the contract, the City incurs no cost.

If the City chooses to maintain the model in-house, City staff members will need to be trained on using the modeling software. The City would probably want more than one person within the department trained at a given time. Vendor trainings typically cost around $2,000 not including travel expenses. Even with training, it will take a City employee longer to perform modeling tasks than a professional modeler because each time the model is updated and run, which will be infrequently, a City staff member will need to get re-familiarized with the modeling program.

Ultimately, the costs of using and maintaining the sewer model depend on how the City plans to utilize the model in the future. The City may use the model to size developer extensions, consider new service areas, evaluate flooding, and size capital projects. To maintain and update the model and to make model runs to assess the impacts of system changes and growth proposals is estimated to require approximately 120 man-hours per year. The experience in other communities has been that, with this level of required modeling, in-house staff gets busy on other projects, need retraining, and do not make modeling a priority. Consultants are easier to hold accountable to make sure the City is getting responsive service from skilled modelers. Furthermore, if modeling needs are less than a few hundred hours per year, it will likely be less expensive for the City to rely on an on-call modeling contract.

APPENDIX A

SEWER SYSTEM MODELING PAPER

SELECTING THE RIGHT MODEL TO ANALYZE COLLECTION SYSTEM FLOWS AND HYDRAULICS

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ABSTRACT

There are a wide variety of public domain and commercial sewer system models available today. It can be challenging to select a model that meets the goals of a specific project due to the myriad of features now available in most software packages. The purpose of this paper is to provide a guide for selecting a model to analyze flows and hydraulics within a collection system network. A variety of core model features are detailed including dry and wet weather flow estimation, and hydraulics. The computational algorithms that are used in many models, such as the Saint-Venant equations, are also summarized. Other features are discussed that allow for the efficient management of data and the effective display of results. Various model application levels including gross planning, detailed planning, and design are also addressed.

KEY WORDS

Model, Collection System, Flow Estimation, Hydrology, Hydraulics, Infiltration and Inflow, Commercial Software

INTRODUCTION

The purpose of this paper is to provide a guide for selecting a model to analyze flows and hydraulics within a collection system network. There are a wide variety of public domain and commercial models available; some commercial models were developed by private software companies, while others are simply repackaged versions of public domain models and are sold by software companies with value-added support services. Still others are hybrids, they had their genesis as public domain models but subsequently private software companies have made significant additions and improvements. With the many choices on the market today, it can be challenging to select a model that meets the goals of a specific project and budget.

There are a wide variety of features available in most models today, including sophisticated interfaces, database and Geographic Information Systems (GIS) links and several different computational options. This paper cannot hope to cover details of every model, however the fundamental features in most models can be divided into understandable components. This paper will describe these core components of collection system models, delve into the specifics of generating both dry weather flow (DWF) and wet weather flow (WWF), compare the different hydraulic algorithms used to route flows through a pipe network, and include methods to select the right model for an individual system. This paper identifies specific commercial models, but attempts to compare these models based on only the core hydraulic features without taking into account the myriad of other features that may play into the selection of a specific model.

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WHAT IS A MODEL?

A model is a schematic description of a system, theory, or phenomenon that accounts for its known or inferred properties and may be used for further study of its characteristics (dictionary.com). Frequently the most convenient and useful system models are mathematical in nature, and are solved with computer algorithms in software packages. This is what constitutes a "model" for most water resource engineers, and is the working definition for this paper. Every model is a simplification of the real system. The applicability of a given model depends on the degree of simplification that can be applied while still representing the system in a meaningful way to solve a problem. The accuracy and precision required dictates the amount of simplification the model should compromise from reality for a given project (e.g. planning level vs. design level). A model can be as simple as a spreadsheet with calculations for peaking factors of sanitary sewer flows and Manning's equation for calculations of depth and velocity in a single pipe. Or a model can be a complex, fully dynamic model that accurately simulates a sewer network with thousands of basins and pipes in a sophisticated software suite of programs.

Models can be classified in many different ways. Some of the basic classifications are included as applicable to collection system models. This paper deals strictly with sanitary and combined sewer system models, although many of the model traits are also applicable to storm water models. Some common ways of classifying models include:

- *Hydrologic vs. Hydraulic* – a hydrologic model estimates flow quantity over time, while a hydraulic model estimates properties of flow (typically depth and velocity) as it travels through a channel or a network of pipes. For the purposes of this paper, a hydrologic model will also be referred to as a flow estimation model since sewer modeling usually requires estimates of both DWF and WWF.
- *Deterministic vs. Stochastic* – deterministic models produce identical outputs for a given set of inputs while stochastic models produce different outputs for a given set of inputs (Nix, 1994). Stochastic models contain random variables usually defined by a probability density function, are used for probabilistic hydrologic projections, and are sometimes referred to as statistical models. Stochastic models will not be covered in this paper.
- *Lumped vs. Distributed* – these terms are applied to both hydrologic as well as hydraulic models. A lumped hydrologic model assumes that all characteristics are constant over a watershed or sewer basin, while a distributed hydrologic model accounts for spatial variability as a function of position in a watershed (Nix, 1994). In a lumped hydraulic model, the flow is calculated as a function of time alone at a particular location, while in a distributed hydraulic model, routing of flow is calculated as a function of space and time throughout the system (Chow et al, 1988).
- *Static vs. Dynamic* – a static simulation usually refers to a steady-state analysis of a single flow rate (e.g. a peak flow), while a dynamic simulation refers to time-variable flows typically over at least a day's period for sewer related analyses.
- *Single-Event vs. Continuous* – both single-event and continuous refer to a dynamic simulation (i.e. variation in flow characteristics are estimated over time). However for single-

event simulations, one event is analyzed based on some "event definition". This could include an "event" defined as one day of DWF, or a single WWF event based on a minimum dry antecedent period. Continuous simulation refers to an analysis of both wet and dry periods in chronological sequence; the flow response of dry as well as wet periods is simulated. Continuous simulation is commonly used to estimate the probability of peak flows or volumes.

Most modern collection system models are deterministic and contain both hydrologic (or flow estimation) and hydraulic modules. Most models utilize lumped hydrologic processes, while hydraulic calculations can be either lumped or distributed. The majority of models simulate single-event projections, while some are also able to accommodate continuous simulations. For large collection systems, continuous simulation usually requires a more simplified model than single event analyses warrant, in order to reduce model run times.

WHY USE A MODEL?

It is always important to step back and ask if a model is necessary for a specific project. Many times the answer to this question is "yes", even if that model is a spreadsheet with simple calculations. In fact, deciding on the degree of model sophistication required to solve a problem can be most challenging. All to often it is tempting to use the most sophisticated hydraulic model complete with GIS interfaces and a myriad of other features to model every pipe in a collection system. However the cost of this comprehensive modeling is frequently high, and many problems are more aptly, and cost-effectively accommodated using a more simplified model coupled with decision analysis tools (e.g. cost effectiveness models, uncertainty analysis and multiple objective optimization). This is especially true for planning level analyses. Assuming the project warrants analyses beyond what can be done in a spreadsheet, then some reasons to consider more sophisticated modeling software include:

- *Limitations in flow measurement* – Flow measurements should be included in any collection system modeling effort, but there are two major drawbacks to only using flow measurements for analysis of a collection system. First, you can only measure so much. Accurate flow monitoring is expensive, and unless the smallest project is considered, monitoring cannot fully describe the flows and hydraulics in a system. Second, the sewers and flows change over time. For example, service areas grow, pipes get rerouted, and new pipes age and deteriorate thus causing more infiltration and inflow (I/I) to enter the system. All of these factors could cause measured flows to be out of date within a few years.
- *Ability to predict* – one of the main reasons to model a system is to examine "what-if" scenarios once a model is calibrated and accurately predicting results. A model can provide spatial predictions of future DWF (based on changes in land use or population). A model can predict whether an improvement in a section of pipeline will be adequate. Many of today's commercial models allow for scenario management to allow the modeler to test an almost unlimited amount of alternatives.
- *Stakeholder education* – many models today include impressive graphical displays of information in a variety of formats (e.g. graphs, dynamic "movies", maps, etc.). Model output can be directly used to educate stakeholders at all levels within an organization, including board members, managers, engineers, and even operators. It is very useful to verify

model results with field observations from operators. This may also help in the future by demonstrating to operators system performance during unobserved, infrequent events, e.g. where to look for future Sanitary Sewer Overflows (SSOs), effects of major wet weather events on pump station failures, etc.

Assuming a model needs to be used, the real question then is… How detailed should the analysis be to efficiently and accurately solve the problem? To address this issue, the core components of a model will be examined, followed by more detailed descriptions of the flow estimation and hydraulic algorithms of a collection system model.

COMPONENTS OF A MODEL

The basic components of a model include input data, computational algorithms, output data, and a graphical user interface (GUI). Input data are included to describe the physical geometry of the system, define boundary conditions (i.e. at outfalls), and delineate time series that drive the system (e.g. rainfall, flow rates, etc).

The computational algorithms make up the "engine" that drives a model. Unfortunately, like engines in an automobile, model engines can be easily misunderstood and forgotten about when all that is seen is the "shiny exterior." The computational algorithms will be discussed in detail below in the flow estimation and hydraulics sections. Output are the results of the computational algorithms and may include time series (e.g. flow, velocity, depth for given pipes), scatter graphs (i.e. velocity vs. depth), volumes, hydraulic grade lines (HGL's), pipes that surcharge, nodes that overflow, depth to diameter (d/D) ratios of flow in pipes, and other statistics. Model output can be voluminous, so it is important that a model utilize some type of GUI that helps the user manage large quantities of information efficiently.

The purpose of a GUI is to facilitate efficient data input, execute the model runs, and present the results. It is easy to become enamored with all the features in today's models GUI's, and loose sight of what is happening "inside" the model; the computational algorithms that produce the results. Ultimately the decisions that will be made based on model results are inextricably tied to the features that today's model GUI's provide, which makes it is easier than ever to misapply a model to a given project. Typical features that are common to many model GUI's for management of both input and output are:

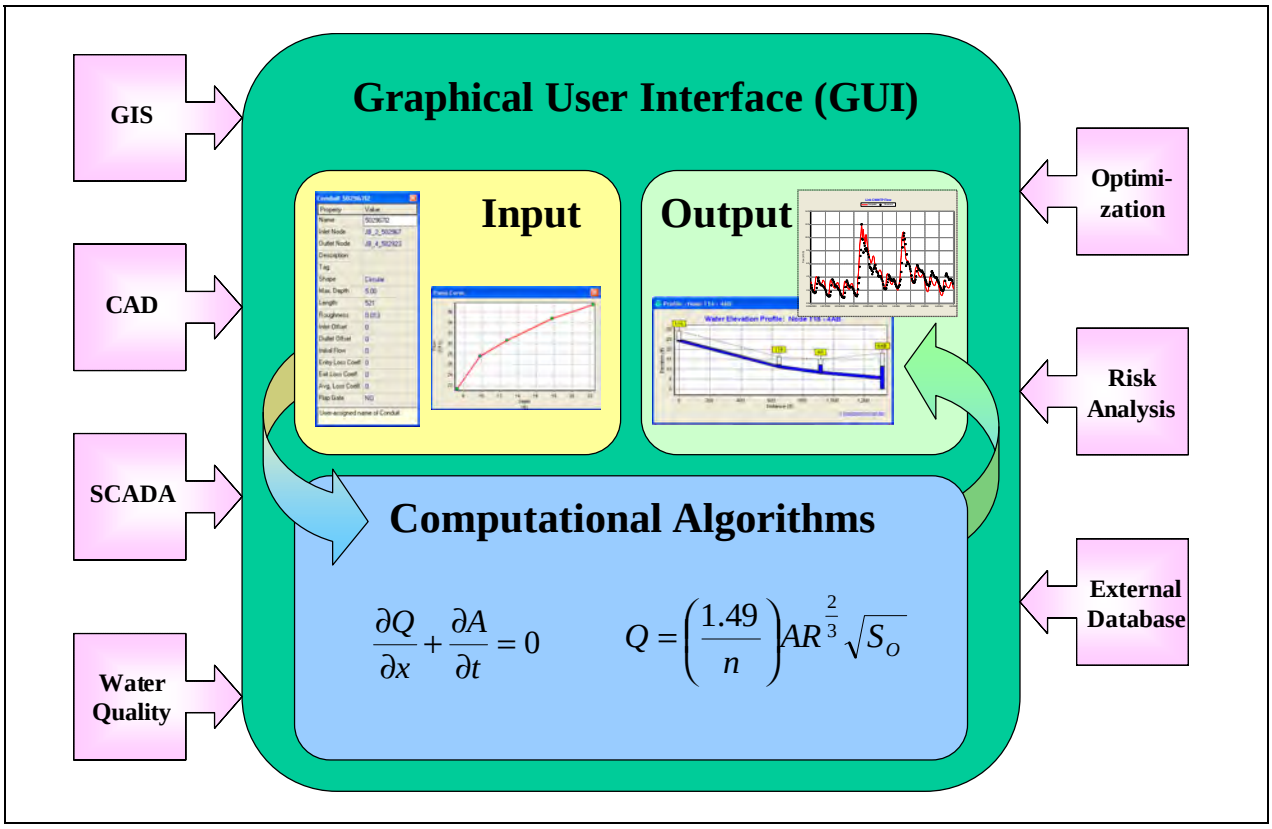
- *Time series database with tabular and graphic capabilities* – used to manage variables (e.g. hydrographs)
- *Spatial database with tabular and mapping capabilities* – used to manage structures and connectivity within the system (e.g. what pipes connect to what junctions)
- *Scenario manager* –manages multiple model runs in a structured format (otherwise model runs need to be managed at a file level by the modeler).
- *Model execution* – allows for starting a run and observing errors.
- *Dynamic displayer* – allows for dynamic display of results in either plan view or profile view. Plan view is typically a map were pipes and nodes change in size or color depending

on certain output variables. A profiler displays a pipeline segment with a varying HGL as it changes throughout the model simulation.

The spatial database feature can either be built into the model, or can be separate Geographic Information System (GIS) software. Many collection system models are moving toward integrating the model with a GIS (e.g. ArcView, ESRI). This provides the advantage of utilizing the graphical and database features of the GIS (without reprogramming them into the model). This structure leverages the many features within GIS and does not require the model to import or export data to a GIS since the data structure is already within the GIS. This feature significantly increases efficiency in inputting data as well as displaying results. The downside of this structure is that the GIS software has to be purchased along with the commercial model.

There are a variety of other model features too numerous to list. However, it's worth noting some linkages that now can be made relatively easily between modeling software and other software to expand the model's capabilities. Certain models now provide linkages to GIS, Computer Aided Design (CAD) software, Supervisory Control And Data Acquisition (SCADA) software, water quality models, optimization and risk analysis software, and external databases. **Figure 1** illustrates a conceptual layout of model components.

Figure 1 – Conceptual Layout of Model Components



FLOW ESTIMATION

Flow estimation is sometimes an overlooked aspect of collection system modeling. However, it is just as important as hydraulics in sizing improvements. If flows are not correctly estimated, the results from the hydraulic calculations will be inappropriate for estimating new or improved pipeline sizes. Flow estimation in a collection system model can be divided into DWF and WWF estimation. DWF is generated by domestic, commercial and industrial wastewater flows throughout a collection system. WWF represents the hydrology of the system and is a factor of the rainfall that enters a collection system either through designed sources, as is the case with combined sewers, or thorough deteriorated facilities or illicit connections, as is the case with sanitary sewers.

Dry Weather Flow

Depending on the complexity of the model, DWF's can either be directly entered into the model or calculated using GIS techniques. A simple approach could consist of calculating an Average Dry Weather Flow (ADWF) for a sewer basin, then applying a peaking factor (typically based on ADWF, sewer basin area, or population) to estimate a peak instantaneous DWF. This single flow value could then be used to calculate the hydraulic capacity required for a pipeline (i.e. steady-state analysis where variability in flow rate is taken into account in the conservativeness of the assumptions underlying ADWF and the peaking factor).

Land use, demographic data (population and employment), and water-use records are typically used to estimate DWF. Population and employment projections may be available as Transportation Analysis Zone (TAZ) data or Census data. Land use information may be available from local planning departments. Water use records may be available from local water agencies (however, water services boundaries may not directly overlap with sewer service boundaries and adjustments must be made). To efficiently utilize this spatial data, especially if it is available at a parcel level, a GIS is a necessity.

Some models, especially those that are integrated with GIS, have the capability of converting this information into Average Dry Weather Flow (ADWF) buy applying unit flow factors (e.g. gallons per capita per day, or gallons per acre per day) directly in the model software. This feature can save significant time and effort especially if multiple years need to be analyzed (e.g. current, buildout, etc.). If a model does not have this capability, the calculations can be done externally in a GIS or a spreadsheet, and then imported into the model. If a dynamic model is used, the ADWF then needs to be converted to a diurnal pattern by applying percentages for each time unit (e.g. every hour). Certain models can also use more than one diurnal pattern to account for day-today changes in the diurnal pattern (e.g. weekday vs. weekend, month by month variations, etc.). This will facilitate a more accurate simulation of DWF patterns over an extended period of time.

DWF's are usually calibrated by adjusting unit flow factors to match modeled volumes to measured volumes and adjusting the diurnal pattern to match the corresponding DWF model hydrograph (e.g. timing, shape, peak flow and minimum flow). Options exist to compare DWF hydrographs graphically, along with goodness-of-fit statistics (e.g. comparison of minimums,

maximums, averages, R^2, etc.). Some modeling software packages calculate and graph these statistics directly. If this feature doesn't exist, then it's the responsibility of the modeler to complete these calculations externally. Automated methods for performing the DWF calibration process are not typically available as a built-in feature in most modeling software. However external optimization software can be used to perform the calibration. In cases where collection systems experience very little I/I, calibration of DWF along with the inclusion of some base I/I may be all that is needed for estimation. However, many systems suffer from significant I/I and require explicit modeling of WWF's.

Wet Weather Flow

Combined sewer systems (CSS's) are designed to accommodate WWF's up to the point of discharging out designed overflow points within the system – or Combined Sewer Overflows (CSO's). In this case WWF may include I/I as well as direct, purposeful stormwater connections. I/I is usually defined as extraneous flows that are not desirable in a sanitary collection system, while CSSs were originally designed to accommodate direct storm water drainage. However, the distinction is blurred, as many sanitary sewers also suffer from excessive I/I that result in SSOs that behave similarly to CSSs. In fact, some coastal systems have experienced wet weather peaking factors (peak wet weather flow divided by average dry weather flow) that approach the peaking factor of some CSS's. Therefore, it is extremely important that WWF be estimated as accurately as possible for analyzing and designing improvements for these types of systems.

I/I is a hydrologic component of both combined and separate sanitary systems. Combined systems are generally dominated by storm water that is in effect the same as sanitary inflow. Separate systems can be dominated by either inflow or infiltration. When portions of a combined sewer system are separated, the storm water contribution is greatly diminished, but infiltration may still be a significant component of flow, and may in turn exhibit characteristics of a sanitary system with significant I/I. In either case (a partially separated combined system or a sanitary system with significant I/I), infiltration can be the most difficult portion of the wet weather hydrograph to model, as well as one of the more challenging components of WWF to remove.

Modeling inflow is usually straightforward because the inflow response is a direct result of the rainfall pattern and the amount of impervious area that is tributary to the sewer system (it behaves very similarly to an urban storm water response to rainfall). Most collection system models adequately model inflow. However, infiltration is much more difficult to model than inflow since it can be an indirect response to rainfall and can be heavily influenced by groundwater conditions, which nearly always introduce a tremendous amount of uncertainty into any hydrologic analysis. Infiltration generally can be categorized in two ways:

- Near surface infiltration
- Groundwater infiltration

Near surface infiltration usually starts a few hours after the beginning a rain event and subsides within generally a day or two as the saturated soils return to normal. Groundwater infiltration is caused by groundwater that raises due to saturated soil conditions to a point where the groundwater table elevation exceeds that of the local collection system. This type of infiltration

can be an issue for coastal communities or those located near lakes and rivers were the groundwater table is normally very close to sewer inverts. Groundwater infiltration will not necessarily influence a sewer system until multiple rainfall events saturate the soils and start to increase the groundwater table, but when it does, it can contribute infiltration that last for weeks or months. Also, certain systems directly adjacent to the ocean or estuaries can experience diurnal groundwater infiltration due to tidal fluctuations that directly affect the water table.

Modeling of WWF generally falls into these categories (Wright and Dent, 2001):

- Rational Method - calculation of an individual peak flow or volume using the simplistic equation Q=CiA, or R-values (which are calculated the same way, but "C" is replaced by an "R")
- Unit Hydrograph – includes SCS curve number methods, the RTK method (triple unit triangular hydrographs), and regression analysis (linear or non-linear)
- Physically based - Non-linear reservoir, multiple non-linear reservoirs (when groundwater is included in the model)

The Rational Method should only be used in the case of calculating inflow for small, highly impervious areas. R-values are easy to calculate but can be applied beyond their accurate limits, and should only be used as a first check to see if sanitary sewer basins suffer from significant I/I. To adequately model wet weather flow hydrographs, a unit hydrograph or physically based method should be applied. These methods are more complex and take more time and experience to apply properly. If groundwater is a significant issue, and if there is the possibility that storage facilities are going to be sized to manage excess I/I, a physically based multiple non-linear reservoir method should be applied. For a more in-depth discussion on modeling wet weather flows, refer to Dent et al (2000) and Wright et al (2000).

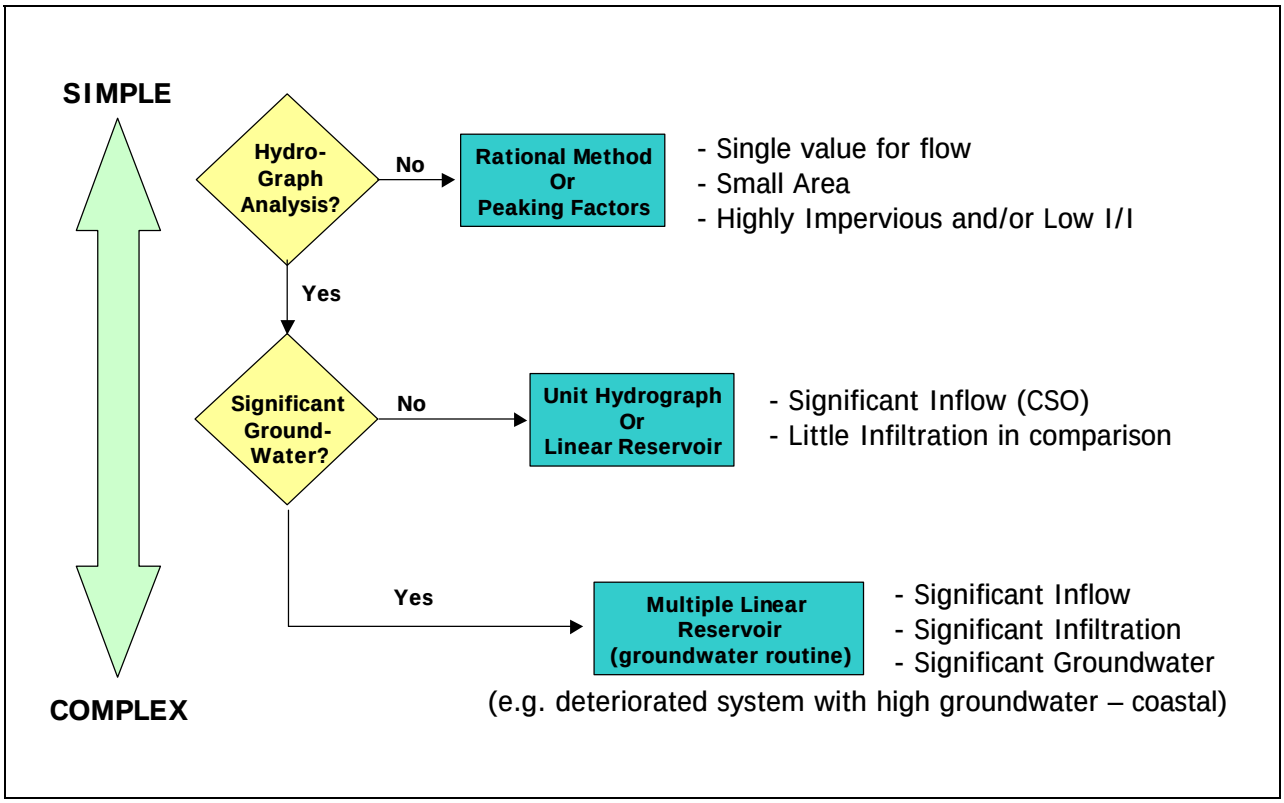
There are usually a variety of wet weather flow estimation options available in most public domain and commercial models, so no specific model or models will be discussed since the topic is too extensive for this paper. However, it is worth noting that automated calibration of WWF's is beginning to be explored in certain commercial collection system models. There also exists the opportunity to link external optimization software to efficiently run iterative calculations for WWF calibration in public domain models (Dent et al, 2004). **Figure 2** illustrates a flowchart to help chose a wet weather flow estimation method.

HYDRAULICS

Hydraulics, and the application of hydraulics, are often misunderstood. Many books are available that explain hydraulic theory and application, but few if any exist that provide a consolidated summary of hydraulic modeling for practical purposes. This explanation of hydraulics hopefully provides this consolidated review.

Due to the wide variety of flow conditions that may exist in an open channel, a complete but sometimes confusing nomenclature has developed to describe the fundamental properties of fluid flow. Yen (2001) provides a simple breakdown of these terms for overland and open-channel flow in terms of variation with time and space.

Figure 2 – Flowchart for Choosing a Wet Weather Flow Estimation Method



Flow variation with time is commonly referred to as either:

- Steady (time invariant), or
- Unsteady (dynamic flow)

A steady state model only uses a single flow within the analysis. A peak flow is a common way to analyze the capacity of a pipe. An unsteady, or dynamic flow model, uses a time series of flows. A hydrograph is commonly used in a dynamic model and can range from several values (e.g. diurnal DWF's over 24 hours) to millions of flow values (e.g. long term continuous simulation). Both steady and unsteady flow will be discussed below as they relate to flow variation in space.

Flow variation in space, or flow along the length of a channel, is referred to as either:

- Uniform, or
- Nonuniform (gradually or rapidly varied)

Uniform flow is the simplest type of open channel flow and the governing equations give unique flow rates as a function of depth. One simple way to envision this type of flow is a pipeline

where the slope of the hydraulic grade line (HGL) is parallel to the slope of the pipe. Under this regime the two forces acting on the flow, gravity and friction, are balanced, and there is no acceleration of the flow in any dimension. Under uniform flow the friction slope is equal to the pipe bed slope (i.e. $S_f = S_0$). By definition, uniform flow must exhibit uniform depth along the length of a pipeline. This depth is commonly referred to as normal depth (Chaudry, 1993).

Steady Flow (Uniform and Nonuniform)

Steady flow models, those where only a single flow is used, are solved for depth and velocity using uniform or nonuniform techniques. When considering flow in time and space, the simplest type of flow is steady uniform flow. The flow rate does not change with time, the depth of flow does not change in space, and the streamlines are all parallel. All acceleration terms are zero, e.g. friction and gravity are in perfect balance. Manning's equation (developed by Robert Manning in 1891) is frequently used to determine the flow rate or velocity for uniform flow because under uniform flow conditions the depth of flow and flow rate are related by a unique rating curve (i.e. the flow rate is a unique function of depth). **Figure 3** illustrates Manning's equation expressed in customary US units.

Figure 3 – Manning's Equation

$$Q = \left(\frac{1.49}{n}\right) A R^{\frac{2}{3}} \sqrt{S_O}$$

where: Q = Flow (cfs)
n = Manning's roughness coefficient (unitless)
A = Area (ft^2)
R = Hydraulic Radius
S_o = Pipe Slope

Manning's equation is an empirical equation (i.e. derived from field and laboratory experimental observations) and is appropriate if the conditions mentioned above for uniform flow exist in the pipeline that is being analyzed. If flow in a sewer pipe approaches a steady uniform condition, then Manning's equation may give reasonable results. However, actual sewer pipelines frequently experience a variety of flow conditions where the uniform flow principle is violated and the more complete nonuniform solution techniques are required.

Nonuniform conditions take into account that a single flow will usually exhibit different depths along a length of pipeline. Nonuniform flow is typically categorized as gradually varied and rapidly varied flow. Rapidly varied flow will not be covered in this paper since sewer flows rarely exhibit this flow condition, and no models covered in this paper solve for this condition. Therefore, from now on, this paper will refer to nonuniform flow only in terms of gradually varied flow.

Gradually varied flow can be either steady or unsteady in time. Steady, gradually varied flow, requires calculations beyond Manning's equation to solve for depth and velocity in a open channel (unsteady gradually varied flow will be addressed in detail later in this paper). The Step Method has been developed to solve the gradually varied flow equation. Numerical integration is necessary because the equations are not generally explicitly soluble (Henderson, 1966). Two common solutions of this method include the Standard and Direct Step Method. These methods can be used to solve for changing depths and velocities for a given flow along the length of an open channel (or pipeline if the flow does not surcharge beyond the crown of the pipe). Two commercial models that utilize the Direct Step Method include SewerCAD and StormCAD both by Haestad Solutions (Bentley Systems).

Unsteady Gradually Varied Flow

The most computationally complex type of one-dimensional open channel flow is unsteady flow, which is, for practical purposes, also nonuniform (Chaudry 1993). Unsteady gradually varied flow can be solved using distributed flow routing models where flow rate and water level are computed as functions of space and time, rather than space alone (such as the Standard Step Method discussed above) or time alone (such as spatially lumped models which are not covered in this paper) – (Chow et al, 1988). Most of the unsteady sewer models on the market today utilize distributed flow routing and solve a form of the Saint-Venant equations. These equations are covered in detail in many publications including, but not limited to, Chow et al (1988), Bedient and Huber (1992), Chaudry (1993), Yen (2001), and Henderson (1966).

The Saint-Venant equations, first developed by Barre de Saint-Venant in 1871, describe one-dimensional unsteady open channel flow where depth and velocity only vary in the longitudinal direction of the channel, the bottom slope of the channel is small, and Manning's equation can be used to describe resistance effects (Chow et al, 1988). So why are these equations so important in distributed flow routing models? One primary reason why these equations are needed are because a wave (a variation in energy in time and space) can are propagated upstream and downstream in unsteady gradually varied flow. Waves cannot be accounted for in the simplified forms of the St. Venant equations that do not consider changes in acceleration over time and space. The Saint-Venant equations generally consist of equations of continuity and momentum and are able to estimate wave celerity (the velocity of a wave along the channel). These partial differential equations are summarized in **Figure 4** (adapted from Chow et al, 1988).

The kinematic wave solution, as shown in Figure 4, balances the gravity and frictional forces and assumes the flow does not accelerate appreciably. The diffusion wave solution is the kinematic solution with the pressure term included which takes into account the change in water pressure with depth along the channel. The Quasi-Dynamic wave solution is the diffusion wave solution with the inclusion of the convective acceleration term which describes the change in momentum due to the change in velocity along the channel. The Fully Dynamic solution includes all terms in the momentum equation including the local acceleration term, which describes the change in momentum due to the change in velocity over time.

Figure 4 – Saint-Venant Equations

Continuity Equation: $$\frac{\partial Q}{\partial x} + \frac{\partial A}{\partial t} = 0$$

Momentum Equation:

$$\frac{1}{A}\frac{\partial Q}{\partial t} + \frac{1}{A}\frac{\partial}{\partial x}\left(\frac{Q^2}{A}\right) + g\frac{\partial y}{\partial x} - g\left(S_o - S_f\right) = 0$$

Local Acceleration	Convective Acceleration	Pressure Force	Gravity & Friction Force

Kinematic Wave

Diffusion Wave

Quasi-Dynamic Wave

Fully Dynamic Wave

where:
Q = Flow
A = Area
t = Time
x = Distance
y = Depth
S_o = Pipe Slope
S_f = Friction Slope (slope of hydraulic grade line)

The Saint Venant equations are partial differential equations that describe one dimensional, unstready, gradually varied flow. Unfortunately they are not amenable to analytical solution methods and therefore must be solved using numerical approximations. A common method for approximating the solution of these equations, although not covered in detail here, is the finite-difference method. This method can employ either an explicit scheme (where unknown values are solved for sequentially) or implicit scheme (where unknowns are solved for simultaneously). The explicit method is iterative and somewhat simpler to implement in a computer program, but can produce unstable results. The implicit method is more complicated from a programming perspective, but generally provides a more stable solution and can provide faster simulation times than the explicit method. Explicit solutions were applied in the past, but implicit methods are more commonly used in today's distributed flow models.

Another mathematical solution issue, which may seem somewhat esoteric, but is necessary to understand because of how certain sewer models are marketed, include the way the equations are

applied to solve for surcharge flow (when flows exceed the crown of a pipe and transition into pressure flow). There are two ways to simulate unsteady surcharged flow in sewer models and include the standard transient flow approach and the hypothetical piezometric open slot approach. The hypothetical piezometric open slot approach, is also known as the Priessmann slot approach. According to Yen (2001), both solution techniques have their own pros and cons and it is not clear whether one method is superior in all cases, regardless of how some commercial software is marketed.

Generally, the more terms of the Saint-Venant equations that are included in the solution, the more computational intensive the model can become and the slower the simulation times become. Excessive run times can still be a problem (even with the computational power of today's computers) if the sewer network becomes large enough. Therefore, some models standard solution routine applies the kinematic wave solution, such as the Hydra software by Pizer, or provides this solution technique as an option, as is the case with the US EPA Storm Water Management Model - SWMM5. This simplification of the Saint-Venant equations will provide very efficient simulation run times. However, the kinematic wave routine does have some significant limitations in that flow is routed only in a downstream direction, only open channel flow (or gravity flow as it is sometimes called) can be simulated (no surcharge), and flow in looped pipes (e.g. cross connections) cannot be directly calculated.

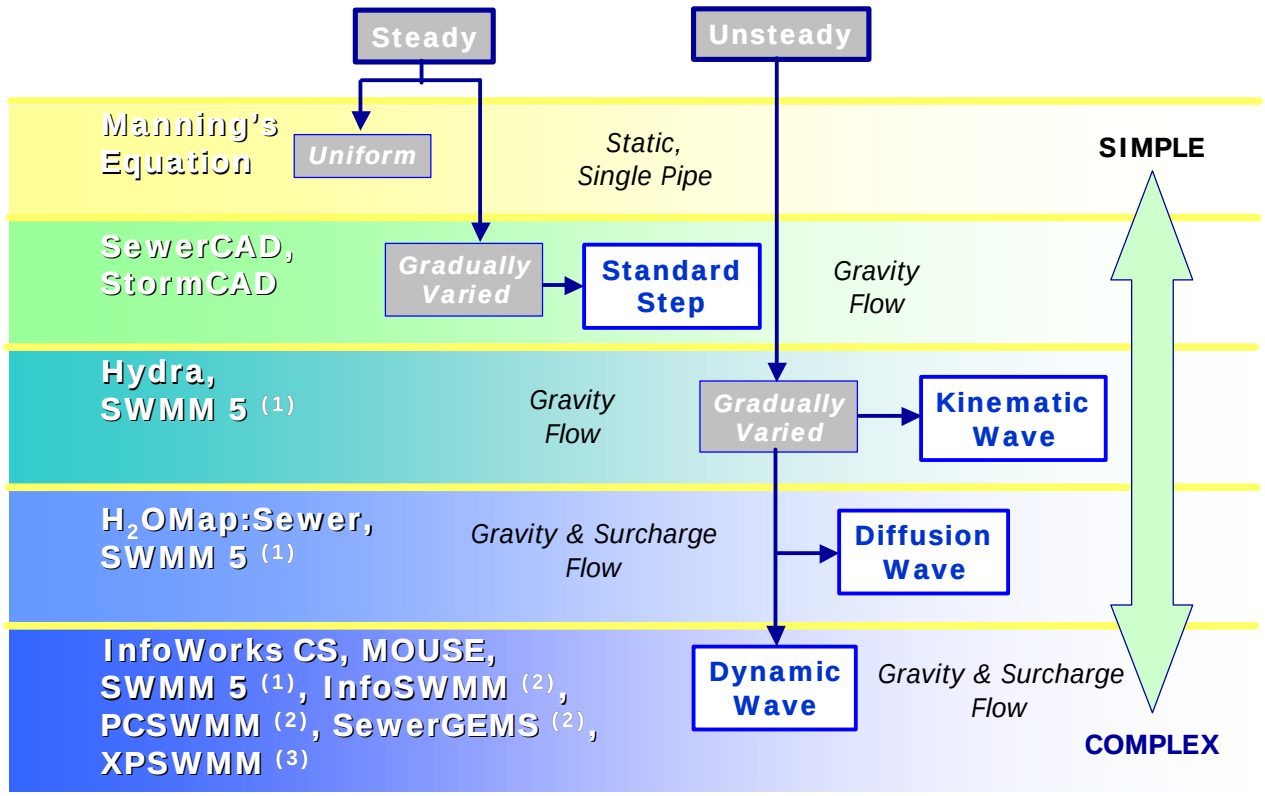
Many distributed flow routing models on the market today include fully dynamic wave solutions as well as options to model only quasi-dynamic or diffusion wave solutions for sewer networks. H2Omap:Sewer (MWH Soft) includes a diffusion wave solution routine. Other models such as SWMM5, MOUSE (Danish Hydraulic Institute – DHI), InfoWorks CS (Wallingford Software), and XPSWMM (XP Software) include fully dynamic wave solutions and may offer options for diffusion and quasi-dynamic wave solutions. PCSWMM (Computational Hydraulic Institute – CHI), InfoSWMM (MWH Soft), and SewerGEMS (Haestad Methods/Bentley Solutions) utilize the SWMM5 engine but provide a more comprehensive GUI than the standard SWMM5 package. **Figure 5** provides a graphical characterization of hydraulic solution methods along with a summary of which models apply which routines.

OTHER MODEL FEATURES

What about the other features that are available in today's public domain or commercial models? The core features of today's models are described above, but it is also necessary to investigate other model features that may influence the choice of selecting one model over another. The following list is by no means comprehensive, but hopefully provides some features that should be investigated before an individual model is chosen or upgraded:

- Who will be the model users (consultant vs. client, full-time vs. part time, experienced with hydrology and hydraulics)
- Cost (both initial purchase as well as yearly service contracts for technical support and upgrades)

Figure 5 – Characterization of Hydraulic Solution Methods



Notes:

(1) SWMM 5 has four solution routine options, which include kinematic wave, diffusion wave, quasi-dynamic wave, and fully dynamic wave. The dynamic wave section of this graphic encompasses both the quasi and fully dynamic wave solutions.

(2) PCSWMM, InfoSWMM and SewerGEMS utilize the SWMM 5 engine.

(3) XPSWMM utilizes a modified SWMM engine.

- Database and Engine structure (ability to work with 3rd party software, ability to easily extract model input/output from model)
- Estimate DWF from population or landuse
- Utilize monitored data for calibration
- Perform automated calibration
- Efficiently complete continuous simulation modeling
- Perform automated pipe sizing (upgrades or parallel pipelines under open channel and surcharge conditions)
- Water quality (i.e. hydrogen sulfide) and sediment transport modeling
- Simulate Real Time Controls (RTC) at pumps, weirs, orifices, etc.
- Link with SCADA software to provide real time modeling capabilities

Many of the options mentioned in the above list can be found in some of the models listed previously in this paper. However, two features that would be extremely helpful in sewer system model, but aren't available (to the authors knowledge) include:

(1) Ability to directly distribute WWF's into unmonitored areas of the system

(2) Ability to analyze capacity of sewer pipes based on a comparison of the HGL to the slope of the sewer pipe

Feature (1) addresses the need to provide a modeler with a mechanism to distribute WWF's throughout sewer basins even when basins are not monitored for flow (which is typically the case). Statistical methods do exist (see Wright et al, 2005) but could be included as an option in software packages.

Feature (2) is related to automated pipe sizing, but seems to be feature that has been overlooked. If a model could illustrate, during a dynamic simulation, which pipes in a network have an HGL equal to, greater than, or less than the slope of the pipe, the modeler would be able to easily identify which pipes need to be upgraded. This is especially true when pipes become surcharged. For example, if a pipe has an HGL slope greater than the slope of the pipe, and portion of the pipe is surcharged, then that pipe has a capacity restriction for the modeled flow and needs be upgraded (e.g. larger diameter or parallel pipeline). Likewise, if a pipe has an HGL slope less than the slope of the pipe, and the pipe is surcharged, the pipe does not represent a restriction (and the restriction is somewhere downstream). This relatively simple feature would provide the modeler with invaluable information to identify deficiencies within a sewer network and help focus capacity improvements.

MODEL APPLICATION

Selection of any model always comes back to what type of project the model is being used for, and what accuracy is needed in the results. Three examples, or levels of sewer system modeling include:

- Gross Planning Level
- Detailed Planning Level
- Design Level

Gross planning level modeling can be accomplished in several ways. One example of gross planning level modeling is the use of hydrologic routines to simulate the overall WWF response of a sewer system. For example, if a municipality wants to identify the I/I response of a sewer system upstream of some critical point (e.g. a pump station or wastewater treatment plant), a model could be constructed by simplifying the entire sewer network upstream of that point into one or more sewer basins. Measured WWF can then be used to calibrate the models I/I response and design flow events can be projected (either using design storms or continuous simulation techniques). This simplified technique, although it does not provide information on the detailed hydraulics of the upstream sewer system, can provide invaluable information regarding the

management of WWF at a pump station or wastewater treatment plant. If a sophisticated model is used to perform this simplified effort (such as SWMM), the model can always be expanded at a later time to include the detailed upstream sewer hydraulics.

Detailed planning level modeling would be considered for existing systems when the flows (both DWF and WWF) are estimated throughout a sewer network, and the flows are routed through the sewer network to a downstream point. This type of modeling is typically performed during master planning projects. In selecting a model for detailed planning level investigations, it is necessary to not only identify the core hydrologic and hydraulic features of a model, but also all the options that might be necessary to provide an efficient analysis of a complex system (see the Other Model Features above). When selecting a model based on core features, the model should simulate what the system is experiencing (i.e. surcharge, looped connections, complex pump stations and forcemains, etc). Also, many times the optional features tend to be the discriminating factors in selecting a model when the core features are very similar (e.g. PCSWMM, InfoSWMM, and SewerGEMS – which all have the same SWMM5 engine, but different GUI's).

Design level models are used to design new facilities, but may not need to be as sophisticated as models used for detailed planning. If new pipes are being designed that do not surcharge, then less sophisticated hydraulic routines may be adequate (e.g. models that utilize the Step Method or the Kinematic wave method). These models are very useful for designing sewers for new developments or even completing detailed planning level modeling if an existing system is not hydraulically complex and any surcharging will be relieved with upsized or paralleled pipelines. However, the results from these types of models are not typically satisfactory for combined sewer systems or sanitary sewer systems that experience extensive I/I (i.e. if surcharging could occur).

CONCLUSIONS

Too simple of a model does not adequately represent reality and can lead to inappropriate decisions. Too complex of a model may be difficult to use (including interpretation of results) and my lead to abandonment. Modeling software packages have a variety of strengths and weaknesses. Each software company has developed its own software package based on its vision, experience, and client base. Therefore, a software package may be stronger for some applications than for others. A model should only be used to assist in informed decision-making. Since all models include some simplification of the actual system, the engineer or operator should make the final decision, not the model.

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APPENDIX E – DRY WEATHER CALIBRATIONS RESULTS

Table 1 Dry Weather Flow Calibration Results
Sanitary Sewer Master Plan
City of Medford

		Weekday Dry Weather Flow						Weekend Dry Weather Flow						Average Dry Weather Flow[4]		
		Measured Data[1]		Modeled Data[2]		Percent Error[3]		Measured Data[1]		Modeled Data[2]		Percent Error[3]				
Meter Number	Pipe Diameter (in)	Avg. Flow (mgd)	Peak Flow (mgd)	Avg. Flow (mgd)	Peak Flow (mgd)	Avg. Flow (%)	Peak Flow (%)	Avg. Flow (mgd)	Peak Flow (mgd)	Avg. Flow (mgd)	Peak Flow (mgd)	Avg. Flow (%)	Peak Flow (%)	Measured ADWF (mgd)	Modeled ADWF (mgd)	Percent Difference (%)
Site 1	33	1.187	1.455	1.229	1.424	3.5%	-2.1%	1.289	1.655	1.306	1.584	1.3%	-4.3%	1.216	1.251	2.9%
Site 2	18	0.464	0.589	0.453	0.605	-2.4%	2.8%	0.500	0.686	0.489	0.689	-2.2%	0.5%	0.474	0.463	-2.3%
Site 3	12	0.117	0.159	0.114	0.148	-1.9%	-6.8%	0.115	0.169	0.113	0.161	-1.9%	-4.6%	0.116	0.114	-1.9%
Site 4	15	0.259	0.334	0.249	0.319	-3.8%	-4.6%	0.265	0.331	0.253	0.313	-4.4%	-5.5%	0.261	0.250	-4.0%
Site 5	10	0.176	0.292	0.173	0.268	-1.6%	-8.4%	0.205	0.318	0.194	0.305	-5.5%	-4.1%	0.184	0.179	-2.8%
Site 6	18	1.862	2.053	1.954	2.033	5.0%	-1.0%	1.832	2.104	1.940	2.058	5.9%	-2.2%	1.853	1.950	5.2%
Site 7	24	0.740	0.910	0.783	0.893	5.9%	-1.9%	0.933	1.182	0.918	1.214	-1.6%	2.7%	0.795	0.822	3.4%
Site 8	16	0.445	0.525	0.452	0.510	1.5%	-2.8%	0.486	0.648	0.486	0.612	-0.2%	-5.5%	0.457	0.461	1.0%
Site 9	18	0.660	0.984	0.667	0.932	1.1%	-5.3%	0.768	1.104	0.760	1.143	-1.0%	3.6%	0.691	0.694	0.4%
Site 10	27	0.751	0.942	0.780	0.910	3.9%	-3.4%	0.791	1.038	0.821	0.976	3.8%	-6.0%	0.763	0.792	3.8%
Site 11	24	0.949	1.270	0.971	1.359	2.3%	7.0%	0.968	1.486	1.050	1.506	8.4%	1.3%	0.954	0.993	4.1%
Site 12	21	0.812	1.182	0.842	1.108	3.6%	-6.2%	0.751	1.132	0.818	1.050	9.0%	-7.3%	0.795	0.835	5.1%

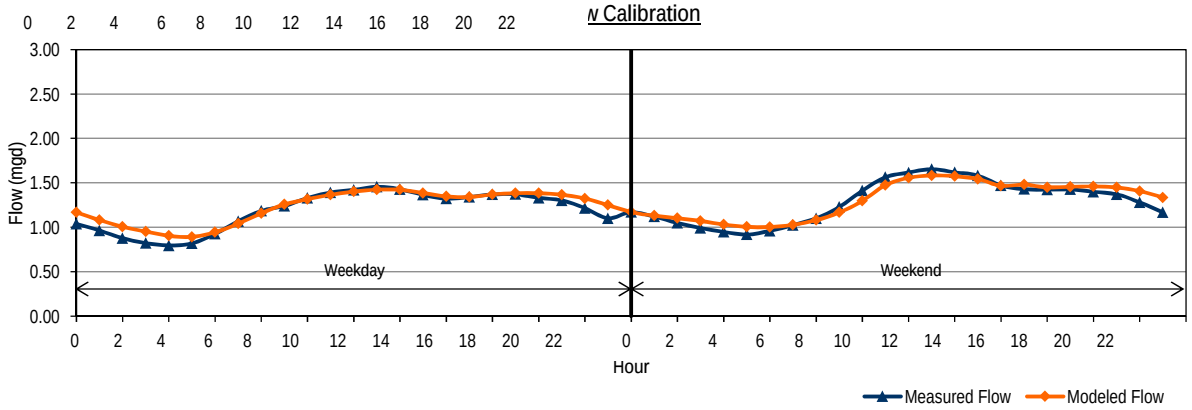
Notes:

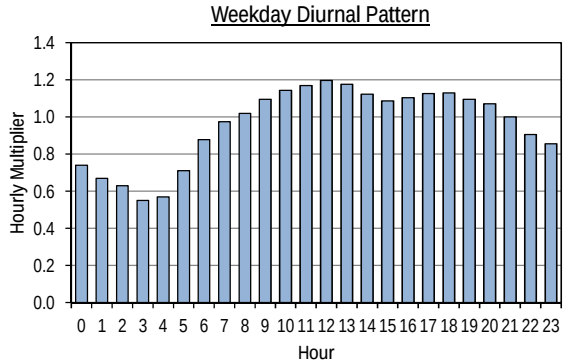
1. Source: City of Medford 2016 Temporary Flow Monitoring Program, ADS.
2. Average flow, level, and velocity are calculated from weekday/weekend dry weather flow monitoring data. Maximum flow values are hourly peaks corresponding to either weekend or weekday confitions, as appropriate.
3. Percent Difference = (Modeled - Measured)/Measured*100.
4. Average Dry Weather Flow = (5*Weekday Dry Weather Flow + 2*Weekend Dry Weather Flow)/7.

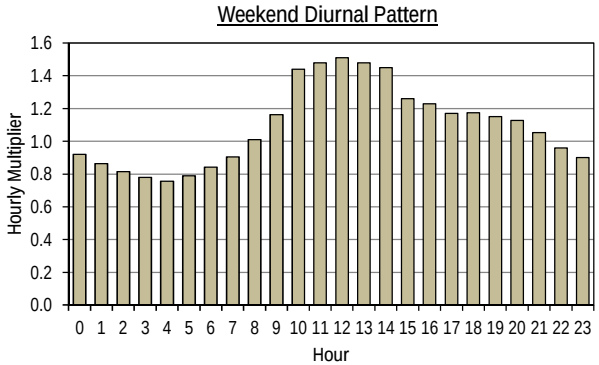
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 1 - 7390 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	1.04	1.17	0.74
	1	0.96	1.08	0.67
	2	0.88	1.01	0.63
	3	0.82	0.95	0.55
	4	0.80	0.91	0.57
	5	0.82	0.89	0.71
	6	0.93	0.95	0.88
	7	1.07	1.04	0.97
	8	1.18	1.16	1.02
	9	1.24	1.26	1.09
	10	1.33	1.32	1.14
	11	1.39	1.37	1.17
	12	1.42	1.40	1.20
	13	1.46	1.42	1.18
	14	1.43	1.42	1.12
	15	1.37	1.39	1.09
	16	1.32	1.35	1.10
	17	1.34	1.34	1.13
	18	1.37	1.37	1.13
	19	1.37	1.39	1.10
	20	1.33	1.38	1.07
	21	1.30	1.37	1.00
	22	1.22	1.33	0.91
	23	1.10	1.25	0.85
Weekend	24	1.17	1.17	0.92
	25	1.12	1.13	0.86
	26	1.05	1.10	0.82
	27	0.99	1.07	0.78
	28	0.95	1.03	0.76
	29	0.92	1.01	0.79
	30	0.96	1.00	0.84
	31	1.03	1.03	0.90
	32	1.10	1.08	1.01
	33	1.23	1.17	1.16
	34	1.41	1.30	1.44
	35	1.56	1.48	1.48
	36	1.62	1.56	1.51
	37	1.65	1.58	1.48
	38	1.62	1.58	1.45
	39	1.58	1.54	1.26
	40	1.47	1.47	1.23
	41	1.43	1.48	1.17
	42	1.42	1.45	1.17
	43	1.43	1.46	1.15
	44	1.40	1.46	1.13
	45	1.37	1.45	1.05
	46	1.28	1.41	1.96
	47	1.17	1.34	0.90
Average				
Weekday		1.187	1.229	0.96
Weekend		1.289	1.306	1.09
ADWF[1]		1.216	1.251	1.00
% Error				
Weekday			3.5%	
Weekend			1.3%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7







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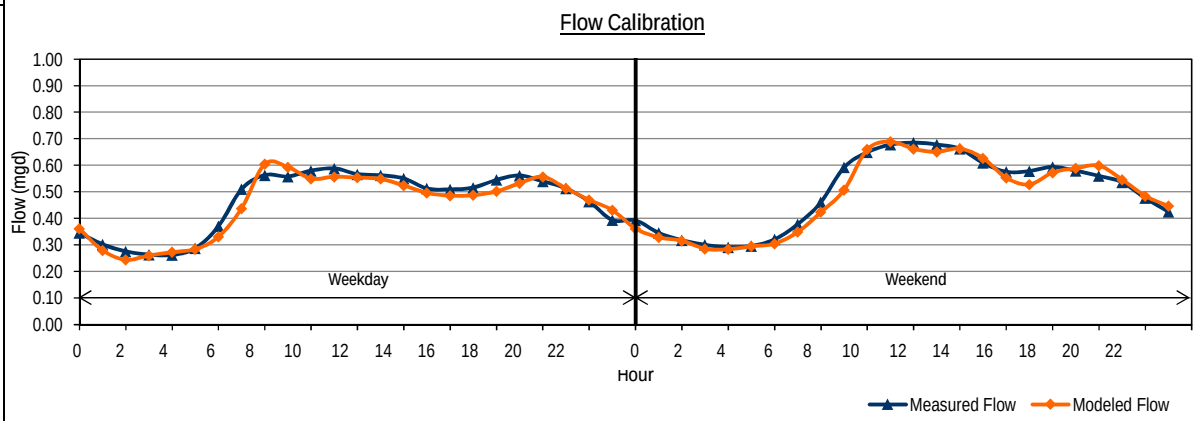
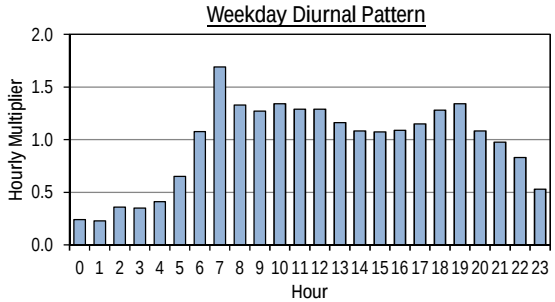
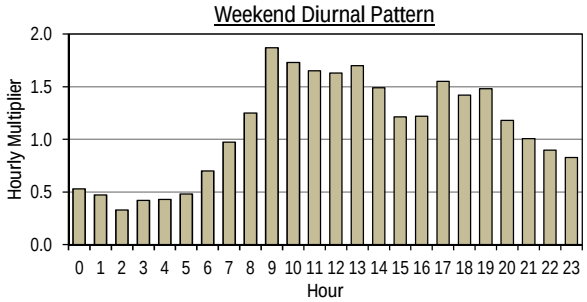
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 2 - 5646 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.35	0.36	0.24
	1	0.30	0.28	0.23
	2	0.28	0.24	0.36
	3	0.26	0.26	0.35
	4	0.26	0.27	0.41
	5	0.29	0.28	0.65
	6	0.37	0.33	1.08
	7	0.51	0.44	1.69
	8	0.56	0.61	1.33
	9	0.56	0.59	1.27
	10	0.58	0.55	1.34
	11	0.59	0.56	1.29
	12	0.57	0.55	1.29
	13	0.56	0.55	1.16
	14	0.55	0.52	1.08
	15	0.51	0.50	1.07
	16	0.51	0.49	1.09
	17	0.52	0.49	1.15
	18	0.55	0.50	1.28
	19	0.56	0.53	1.34
	20	0.54	0.56	1.08
	21	0.51	0.51	0.98
	22	0.46	0.47	0.83
	23	0.39	0.43	0.53
Weekend	24	0.39	0.36	0.53
	25	0.35	0.33	0.47
	26	0.32	0.32	0.33
	27	0.30	0.29	0.42
	28	0.29	0.28	0.43
	29	0.30	0.30	0.48
	30	0.32	0.31	0.70
	31	0.38	0.35	0.97
	32	0.46	0.42	1.25
	33	0.59	0.51	1.87
	34	0.65	0.66	1.73
	35	0.68	0.69	1.65
	36	0.69	0.66	1.63
	37	0.68	0.65	1.70
	38	0.66	0.66	1.49
	39	0.61	0.63	1.21
	40	0.58	0.55	1.22
	41	0.58	0.53	1.55
	42	0.59	0.57	1.42
	43	0.58	0.59	1.48
	44	0.56	0.60	1.18
	45	0.54	0.55	1.01
	46	0.48	0.49	0.90
	47	0.43	0.45	0.83
Average				
Weekday		0.464	0.453	0.96
Weekend		0.500	0.489	1.10
ADWF[1]		0.474	0.463	1.00
% Error				
Weekday			-2.4%	
Weekend			-2.2%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



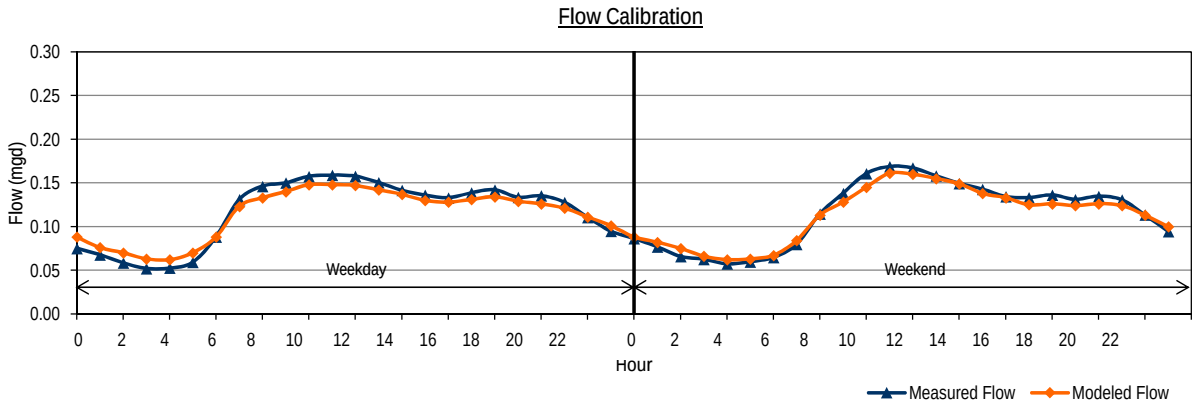


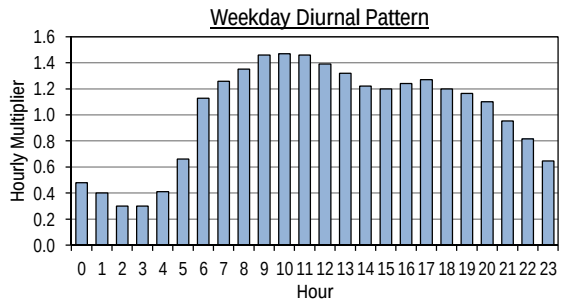


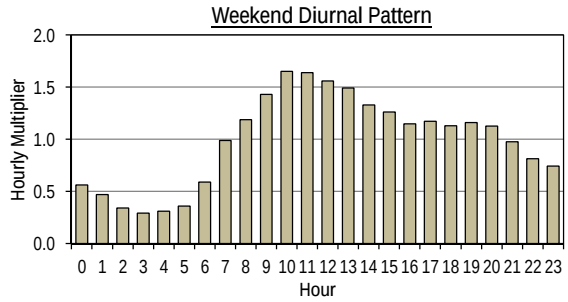
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 3 - 3481 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.08	0.09	0.48
	1	0.07	0.08	0.40
	2	0.06	0.07	0.30
	3	0.05	0.06	0.30
	4	0.05	0.06	0.41
	5	0.06	0.07	0.66
	6	0.09	0.09	1.13
	7	0.13	0.12	1.26
	8	0.15	0.13	1.35
	9	0.15	0.14	1.46
	10	0.16	0.15	1.47
	11	0.16	0.15	1.46
	12	0.16	0.15	1.39
	13	0.15	0.14	1.32
	14	0.14	0.14	1.22
	15	0.14	0.13	1.20
	16	0.13	0.13	1.24
	17	0.14	0.13	1.27
	18	0.14	0.13	1.20
	19	0.13	0.13	1.16
	20	0.14	0.13	1.10
	21	0.13	0.12	0.95
	22	0.11	0.11	0.82
	23	0.09	0.10	0.65
Weekend	24	0.09	0.09	0.56
	25	0.08	0.08	0.47
	26	0.07	0.08	0.34
	27	0.06	0.07	0.29
	28	0.06	0.06	0.31
	29	0.06	0.06	0.36
	30	0.06	0.07	0.59
	31	0.08	0.08	0.99
	32	0.11	0.11	1.19
	33	0.14	0.13	1.43
	34	0.16	0.15	1.65
	35	0.17	0.16	1.64
	36	0.17	0.16	1.56
	37	0.16	0.16	1.49
	38	0.15	0.15	1.33
	39	0.14	0.14	1.26
	40	0.13	0.13	1.15
	41	0.13	0.13	1.17
	42	0.14	0.13	1.13
	43	0.13	0.12	1.16
	44	0.13	0.13	1.13
	45	0.13	0.12	0.98
	46	0.11	0.11	0.81
	47	0.09	0.10	0.74
Average				
Weekday		0.117	0.114	1.01
Weekend		0.115	0.113	0.99
ADWF[1]		0.116	0.114	1.00
% Error				
Weekday			-1.9%	
Weekend			-1.9%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



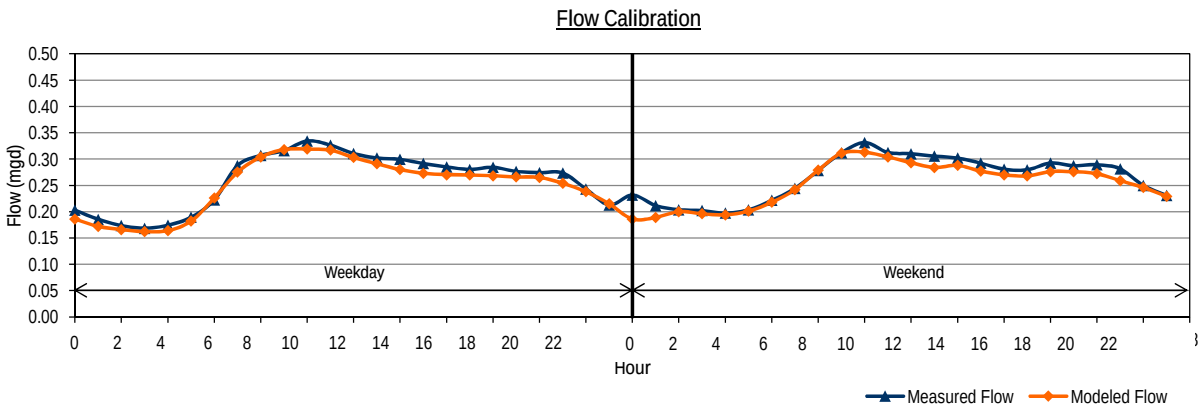


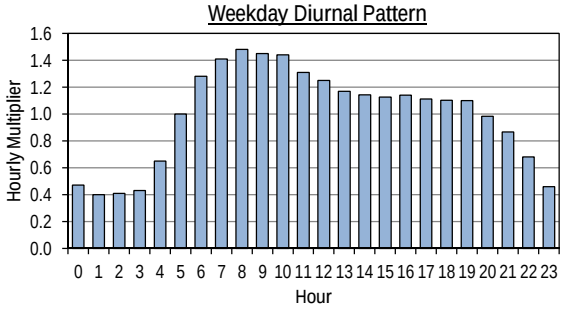


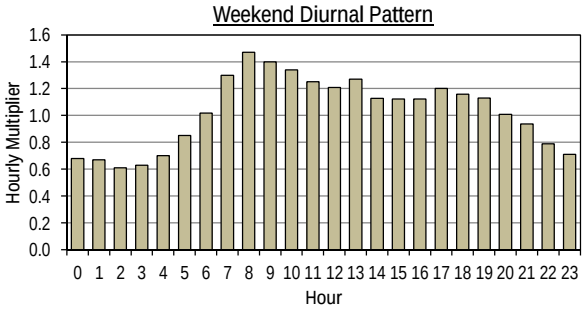
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 4 - 4226 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.20	0.19	0.47
	1	0.19	0.17	0.40
	2	0.17	0.17	0.41
	3	0.17	0.16	0.43
	4	0.17	0.16	0.65
	5	0.19	0.18	1.00
	6	0.22	0.23	1.28
	7	0.29	0.28	1.41
	8	0.31	0.30	1.48
	9	0.32	0.32	1.45
	10	0.33	0.32	1.44
	11	0.33	0.32	1.31
	12	0.31	0.30	1.25
	13	0.30	0.29	1.17
	14	0.30	0.28	1.14
	15	0.29	0.27	1.12
	16	0.29	0.27	1.14
	17	0.28	0.27	1.11
	18	0.28	0.27	1.10
	19	0.28	0.27	1.10
	20	0.27	0.27	0.98
	21	0.27	0.25	0.87
	22	0.24	0.24	0.68
	23	0.21	0.22	0.46
Weekend	24	0.23	0.19	0.68
	25	0.21	0.19	0.67
	26	0.20	0.20	0.61
	27	0.20	0.20	0.63
	28	0.20	0.19	0.70
	29	0.20	0.20	0.85
	30	0.22	0.22	1.02
	31	0.24	0.24	1.30
	32	0.28	0.28	1.47
	33	0.31	0.31	1.40
	34	0.33	0.31	1.34
	35	0.31	0.30	1.25
	36	0.31	0.29	1.21
	37	0.31	0.28	1.27
	38	0.30	0.29	1.13
	39	0.29	0.28	1.12
	40	0.28	0.27	1.12
	41	0.28	0.27	1.20
	42	0.29	0.28	1.16
	43	0.29	0.28	1.13
	44	0.29	0.27	1.01
	45	0.28	0.26	0.94
	46	0.25	0.25	0.79
	47	0.23	0.23	0.71
Average				
Weekday		0.259	0.249	0.99
Weekend		0.265	0.253	1.03
ADWF[1]		0.261	0.250	1.00
% Error				
Weekday			-3.8%	
Weekend			-4.4%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



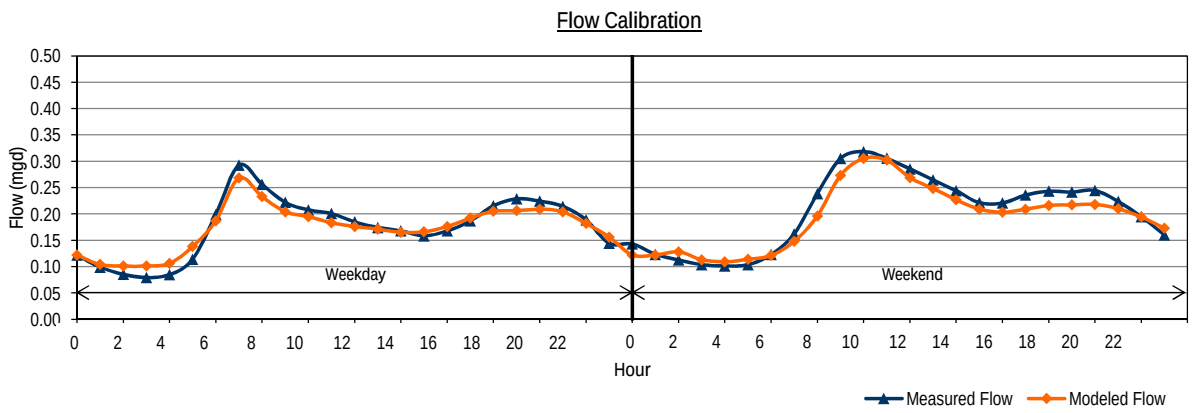


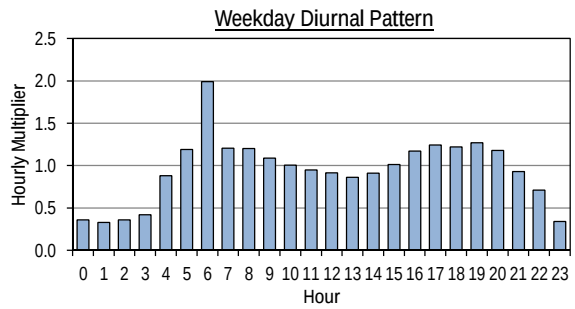


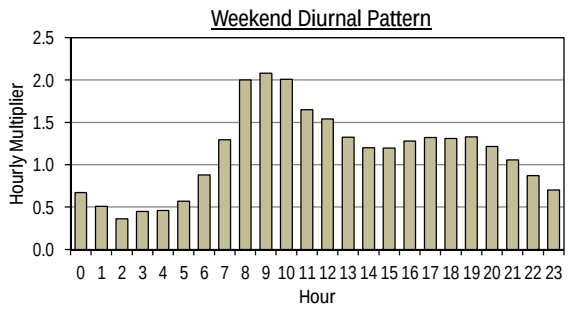
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 5 - 4839 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.12	0.12	0.36
	1	0.10	0.10	0.33
	2	0.09	0.10	0.36
	3	0.08	0.10	0.42
	4	0.08	0.11	0.88
	5	0.11	0.14	1.19
	6	0.20	0.19	1.99
	7	0.29	0.27	1.21
	8	0.26	0.23	1.20
	9	0.22	0.20	1.09
	10	0.21	0.20	1.00
	11	0.20	0.18	0.95
	12	0.18	0.18	0.91
	13	0.17	0.17	0.86
	14	0.17	0.17	0.91
	15	0.16	0.17	1.01
	16	0.17	0.18	1.17
	17	0.19	0.19	1.24
	18	0.22	0.21	1.22
	19	0.23	0.21	1.27
	20	0.22	0.21	1.18
	21	0.21	0.20	0.93
	22	0.19	0.18	0.71
	23	0.14	0.16	0.34
Weekend	24	0.14	0.12	0.67
	25	0.12	0.12	0.51
	26	0.11	0.13	0.36
	27	0.10	0.11	0.45
	28	0.10	0.11	0.46
	29	0.10	0.11	0.57
	30	0.12	0.12	0.88
	31	0.16	0.15	1.30
	32	0.24	0.20	2.00
	33	0.31	0.27	2.08
	34	0.32	0.31	2.01
	35	0.31	0.30	1.65
	36	0.29	0.27	1.54
	37	0.26	0.25	1.33
	38	0.24	0.23	1.20
	39	0.22	0.21	1.20
	40	0.22	0.20	1.28
	41	0.24	0.21	1.32
	42	0.24	0.22	1.31
	43	0.24	0.22	1.33
	44	0.24	0.22	1.22
	45	0.22	0.21	1.06
	46	0.19	0.19	0.87
	47	0.16	0.17	0.70
Average				
Weekday		0.176	0.173	0.95
Weekend		0.205	0.194	1.14
ADWF[1]		0.184	0.179	1.00
% Error				
Weekday			-1.6%	
Weekend			-5.5%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



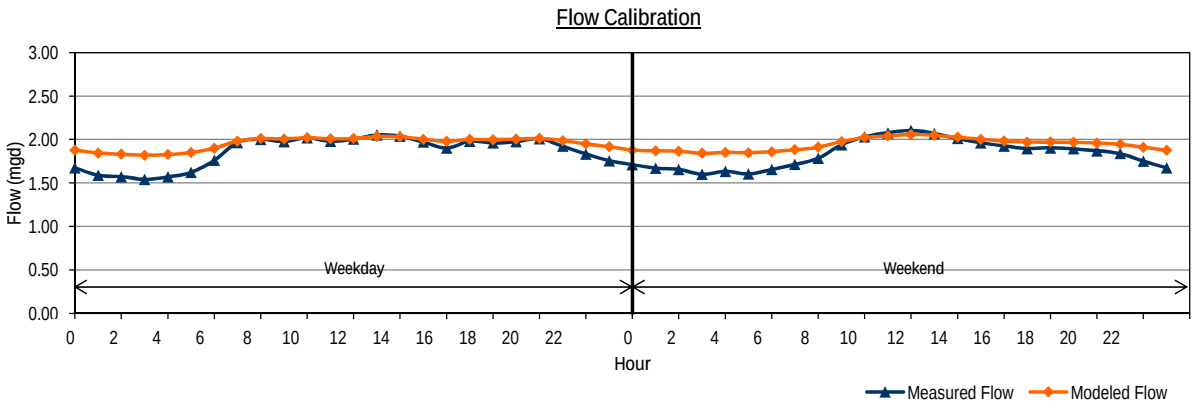


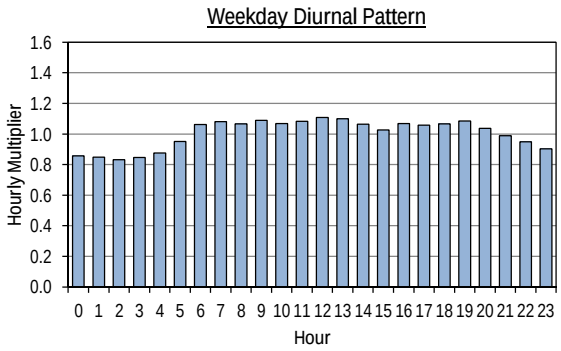


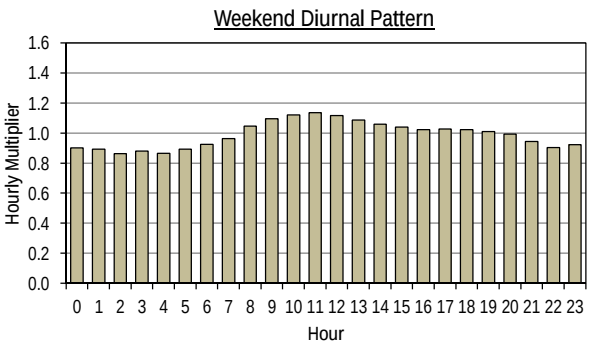
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 6 - 3301 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	1.67	1.88	0.86
	1	1.59	1.85	0.85
	2	1.57	1.83	0.83
	3	1.54	1.82	0.85
	4	1.57	1.83	0.88
	5	1.62	1.85	0.95
	6	1.76	1.90	1.06
	7	1.97	1.98	1.08
	8	2.00	2.01	1.07
	9	1.98	2.01	1.09
	10	2.02	2.02	1.07
	11	1.98	2.01	1.08
	12	2.00	2.01	1.11
	13	2.05	2.03	1.10
	14	2.04	2.03	1.06
	15	1.97	2.00	1.03
	16	1.90	1.98	1.07
	17	1.98	2.00	1.06
	18	1.96	2.00	1.07
	19	1.97	2.00	1.08
	20	2.01	2.01	1.04
	21	1.92	1.99	0.99
	22	1.83	1.95	0.95
	23	1.76	1.92	0.90
Weekend	24	1.71	1.88	0.90
	25	1.67	1.87	0.89
	26	1.66	1.86	0.86
	27	1.60	1.84	0.88
	28	1.63	1.85	0.87
	29	1.60	1.85	0.89
	30	1.65	1.86	0.92
	31	1.71	1.88	0.96
	32	1.78	1.91	1.05
	33	1.94	1.98	1.10
	34	2.03	2.02	1.12
	35	2.08	2.04	1.14
	36	2.10	2.06	1.12
	37	2.07	2.05	1.09
	38	2.01	2.03	1.06
	39	1.96	2.00	1.04
	40	1.93	1.99	1.02
	41	1.90	1.97	1.03
	42	1.90	1.97	1.02
	43	1.89	1.97	1.01
	44	1.87	1.96	0.99
	45	1.84	1.95	0.94
	46	1.75	1.91	0.90
	47	1.67	1.88	0.92
Average				
Weekday		1.862	1.954	1.00
Weekend		1.832	1.940	0.99
ADWF[1]		1.853	1.950	1.00
% Error				
Weekday			5.0%	
Weekend			5.9%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



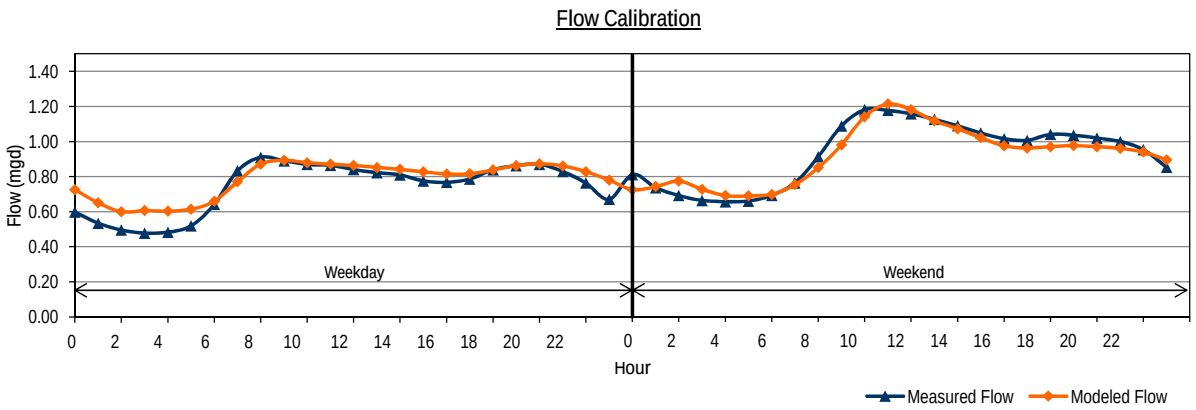


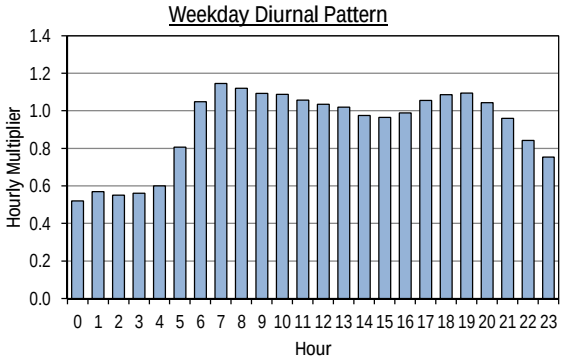


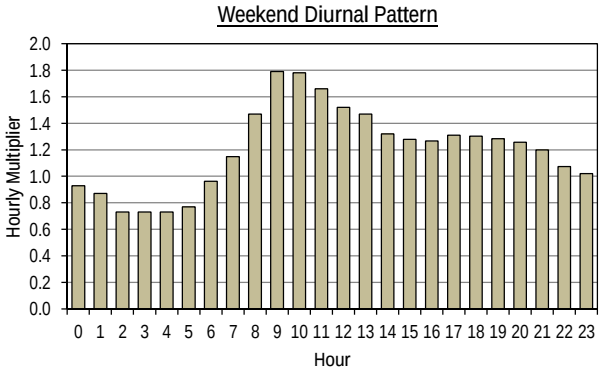
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 7 - 5883 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.60	0.73	0.52
	1	0.53	0.65	0.57
	2	0.50	0.60	0.55
	3	0.48	0.61	0.56
	4	0.48	0.60	0.60
	5	0.52	0.61	0.81
	6	0.64	0.66	1.05
	7	0.83	0.77	1.15
	8	0.91	0.87	1.12
	9	0.89	0.89	1.09
	10	0.87	0.88	1.09
	11	0.86	0.87	1.06
	12	0.84	0.86	1.04
	13	0.82	0.85	1.02
	14	0.81	0.84	0.98
	15	0.78	0.83	0.97
	16	0.77	0.82	0.99
	17	0.79	0.82	1.06
	18	0.84	0.84	1.09
	19	0.86	0.86	1.10
	20	0.87	0.87	1.04
	21	0.83	0.86	0.96
	22	0.76	0.83	0.84
	23	0.67	0.78	0.75
Weekend	24	0.81	0.73	0.93
	25	0.74	0.74	0.87
	26	0.69	0.77	0.73
	27	0.66	0.73	0.73
	28	0.66	0.69	0.73
	29	0.66	0.69	0.77
	30	0.69	0.70	0.96
	31	0.76	0.75	1.15
	32	0.91	0.85	1.47
	33	1.09	0.98	1.79
	34	1.18	1.14	1.78
	35	1.18	1.21	1.66
	36	1.16	1.18	1.52
	37	1.13	1.12	1.47
	38	1.09	1.07	1.32
	39	1.05	1.02	1.28
	40	1.02	0.98	1.27
	41	1.01	0.96	1.31
	42	1.04	0.97	1.30
	43	1.04	0.98	1.28
	44	1.02	0.97	1.26
	45	1.00	0.96	1.20
	46	0.95	0.94	1.07
	47	0.85	0.90	1.02
Average				
Weekday		0.740	0.783	0.92
Weekend		0.933	0.918	1.20
ADWF[1]		0.795	0.822	1.00
% Error				
Weekday			5.9%	
Weekend			-1.6%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



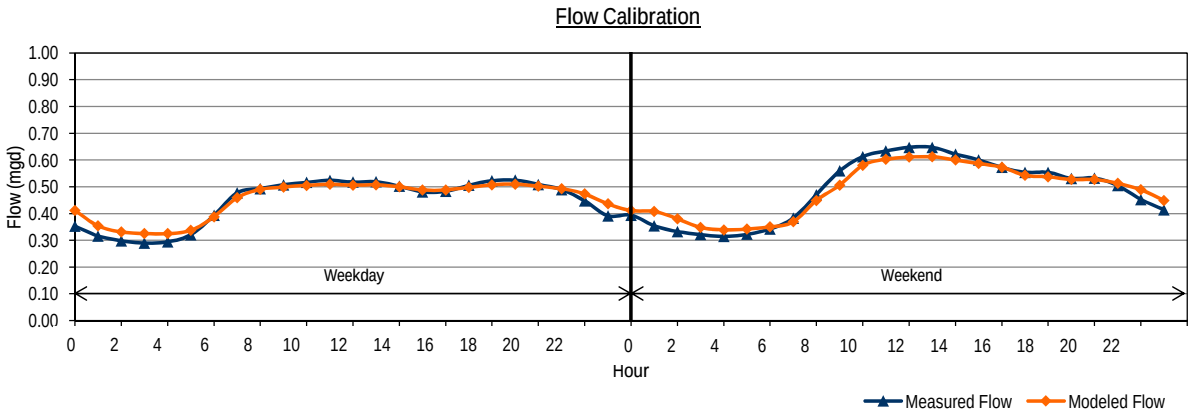


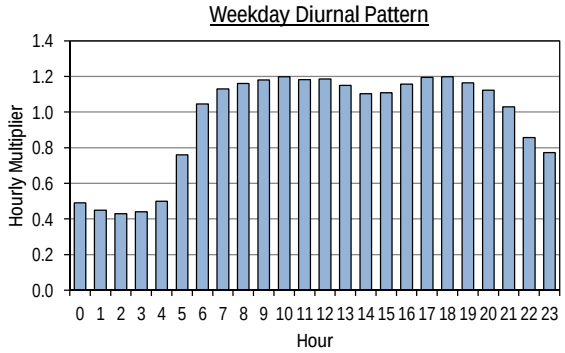


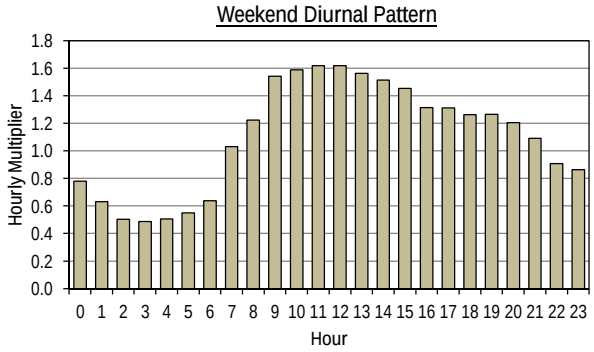
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 8 - 7606 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.35	0.41	0.49
	1	0.32	0.35	0.45
	2	0.30	0.33	0.43
	3	0.29	0.33	0.44
	4	0.29	0.33	0.50
	5	0.32	0.34	0.76
	6	0.39	0.39	1.05
	7	0.48	0.46	1.13
	8	0.49	0.49	1.16
	9	0.51	0.50	1.18
	10	0.52	0.51	1.20
	11	0.52	0.51	1.18
	12	0.52	0.51	1.19
	13	0.52	0.51	1.15
	14	0.50	0.50	1.10
	15	0.48	0.49	1.11
	16	0.48	0.49	1.16
	17	0.51	0.50	1.19
	18	0.52	0.51	1.20
	19	0.52	0.51	1.16
	20	0.51	0.50	1.12
	21	0.49	0.49	1.03
	22	0.45	0.47	0.86
	23	0.39	0.44	0.77
Weekend	24	0.39	0.41	0.78
	25	0.35	0.41	0.63
	26	0.33	0.38	0.50
	27	0.32	0.35	0.49
	28	0.31	0.34	0.51
	29	0.32	0.34	0.55
	30	0.34	0.35	0.64
	31	0.38	0.37	1.03
	32	0.47	0.45	1.22
	33	0.56	0.51	1.54
	34	0.61	0.58	1.59
	35	0.63	0.60	1.62
	36	0.65	0.61	1.62
	37	0.65	0.61	1.56
	38	0.62	0.60	1.51
	39	0.60	0.59	1.45
	40	0.57	0.57	1.31
	41	0.55	0.54	1.31
	42	0.55	0.54	1.26
	43	0.53	0.53	1.27
	44	0.53	0.53	1.20
	45	0.50	0.51	1.09
	46	0.45	0.49	0.91
	47	0.41	0.45	0.86
Average				
Weekday		0.445	0.452	0.96
Weekend		0.486	0.486	1.10
ADWF[1]		0.457	0.461	1.00
% Error				
Weekday			1.5%	
Weekend			-0.2%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



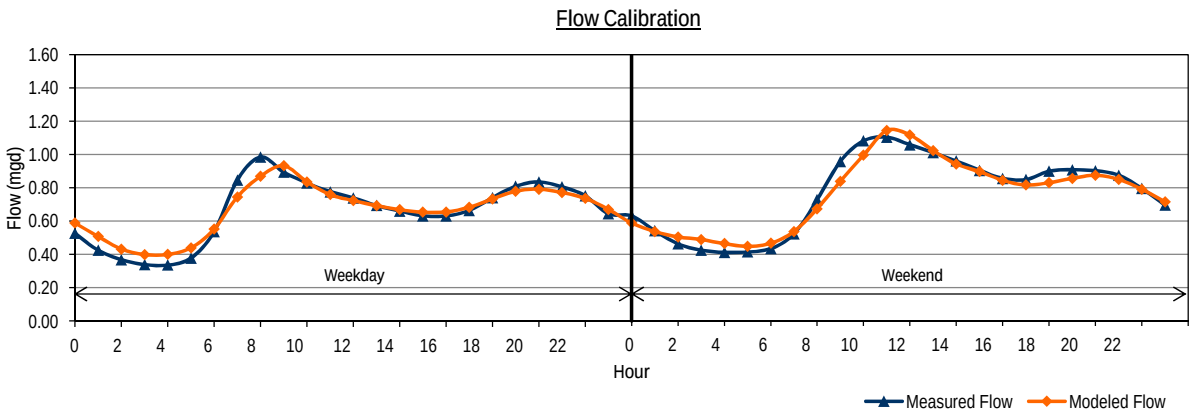


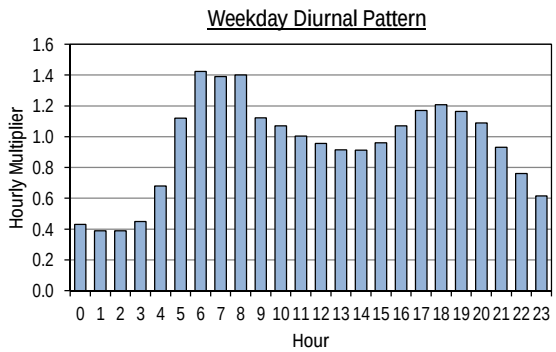


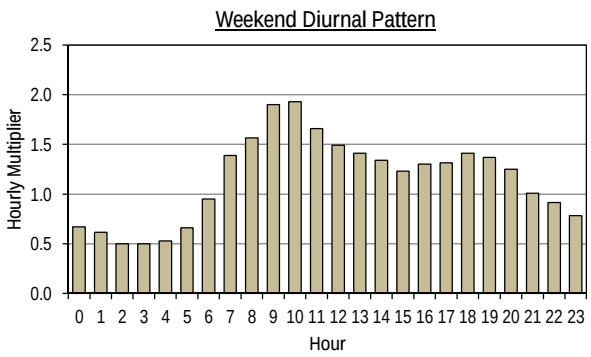
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 9 - 6204 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.53	0.59	0.43
	1	0.42	0.51	0.39
	2	0.37	0.43	0.39
	3	0.34	0.40	0.45
	4	0.34	0.40	0.68
	5	0.38	0.44	1.12
	6	0.54	0.55	1.42
	7	0.85	0.75	1.39
	8	0.98	0.87	1.40
	9	0.89	0.93	1.12
	10	0.83	0.84	1.07
	11	0.78	0.76	1.00
	12	0.74	0.72	0.96
	13	0.69	0.69	0.91
	14	0.66	0.67	0.91
	15	0.63	0.65	0.96
	16	0.63	0.65	1.07
	17	0.66	0.68	1.17
	18	0.74	0.73	1.21
	19	0.81	0.78	1.16
	20	0.83	0.79	1.09
	21	0.80	0.77	0.93
	22	0.75	0.74	0.76
	23	0.64	0.67	0.61
Weekend	24	0.63	0.59	0.67
	25	0.54	0.54	0.62
	26	0.46	0.51	0.50
	27	0.43	0.49	0.50
	28	0.41	0.47	0.53
	29	0.42	0.45	0.66
	30	0.43	0.47	0.95
	31	0.52	0.54	1.39
	32	0.73	0.67	1.57
	33	0.96	0.84	1.90
	34	1.08	1.00	1.93
	35	1.10	1.14	1.66
	36	1.06	1.12	1.49
	37	1.01	1.02	1.41
	38	0.96	0.94	1.34
	39	0.90	0.90	1.23
	40	0.86	0.84	1.30
	41	0.85	0.82	1.31
	42	0.90	0.83	1.41
	43	0.91	0.86	1.37
	44	0.90	0.88	1.25
	45	0.88	0.85	1.01
	46	0.80	0.79	0.91
	47	0.70	0.72	0.78
Average				
Weekday		0.660	0.667	0.94
Weekend		0.768	0.760	1.15
ADWF[1]		0.691	0.694	1.00
% Error				
Weekday			1.1%	
Weekend			-1.0%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



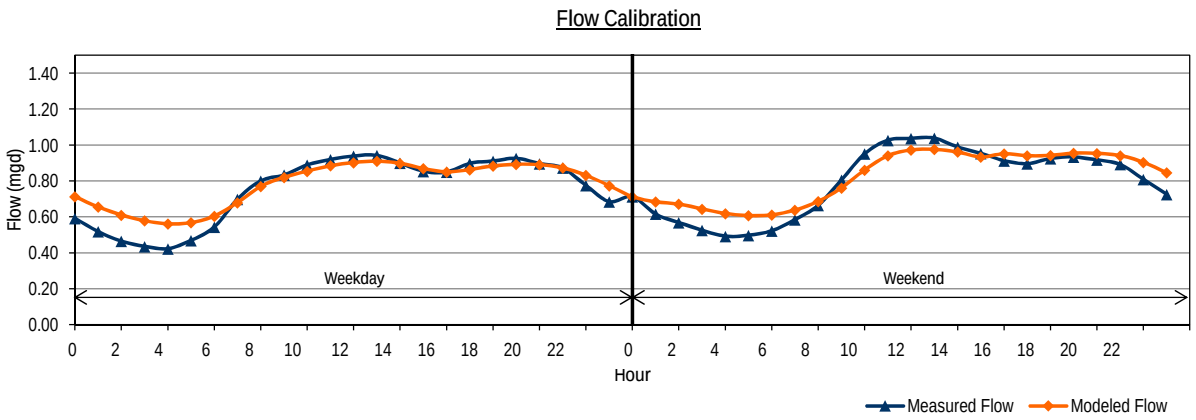


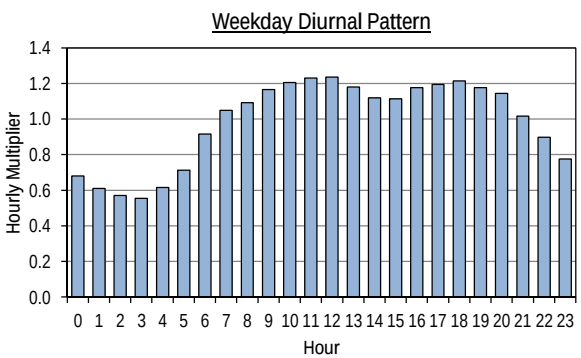


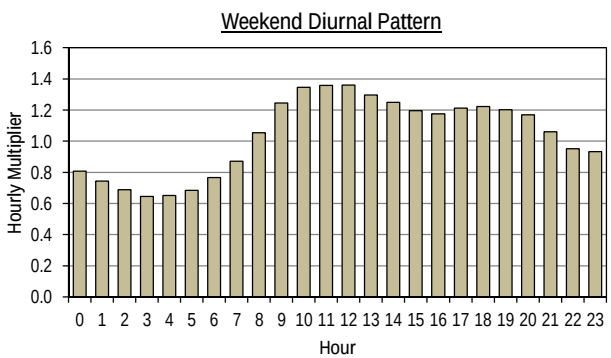
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 10 - 7596 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.59	0.71	0.68
	1	0.52	0.66	0.61
	2	0.46	0.61	0.57
	3	0.44	0.58	0.55
	4	0.42	0.56	0.62
	5	0.47	0.57	0.71
	6	0.54	0.60	0.92
	7	0.70	0.68	1.05
	8	0.80	0.77	1.09
	9	0.83	0.82	1.17
	10	0.89	0.85	1.21
	11	0.92	0.89	1.23
	12	0.94	0.90	1.24
	13	0.94	0.91	1.18
	14	0.90	0.90	1.12
	15	0.85	0.87	1.11
	16	0.85	0.85	1.18
	17	0.90	0.86	1.19
	18	0.91	0.88	1.21
	19	0.93	0.89	1.18
	20	0.90	0.89	1.14
	21	0.87	0.87	1.02
	22	0.78	0.83	0.90
	23	0.68	0.77	0.78
Weekend	24	0.71	0.71	0.81
	25	0.62	0.68	0.74
	26	0.57	0.67	0.69
	27	0.53	0.64	0.65
	28	0.49	0.62	0.65
	29	0.50	0.61	0.68
	30	0.52	0.61	0.77
	31	0.58	0.64	0.87
	32	0.66	0.69	1.06
	33	0.80	0.76	1.25
	34	0.95	0.86	1.35
	35	1.03	0.94	1.36
	36	1.04	0.97	1.36
	37	1.04	0.98	1.30
	38	0.99	0.96	1.25
	39	0.95	0.93	1.20
	40	0.91	0.95	1.17
	41	0.90	0.94	1.21
	42	0.92	0.94	1.22
	43	0.93	0.95	1.20
	44	0.92	0.95	1.17
	45	0.89	0.94	1.06
	46	0.81	0.90	0.95
	47	0.73	0.85	0.93
Average				
Weekday		0.751	0.780	0.99
Weekend		0.791	0.821	1.04
ADWF[1]		0.763	0.792	1.00
% Error				
Weekday			3.9%	
Weekend			3.8%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



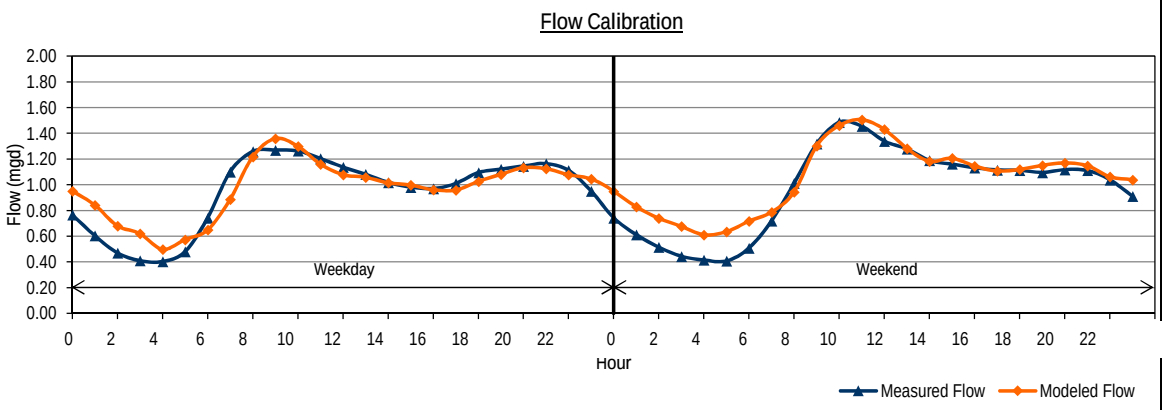


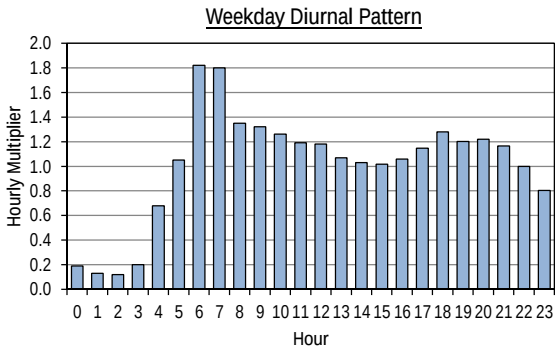


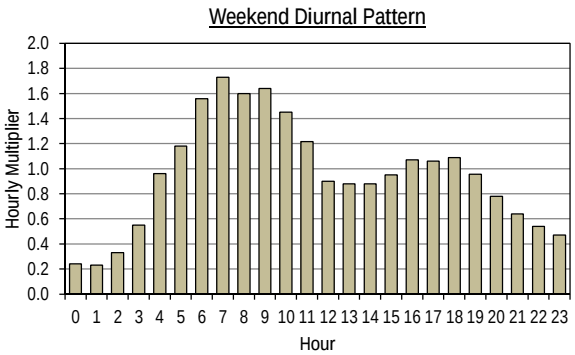
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 11 - 10083 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.77	0.95	0.19
	1	0.60	0.84	0.13
	2	0.47	0.68	0.12
	3	0.41	0.62	0.20
	4	0.40	0.50	0.68
	5	0.48	0.57	1.05
	6	0.74	0.65	1.82
	7	1.10	0.89	1.80
	8	1.26	1.22	1.35
	9	1.27	1.36	1.32
	10	1.26	1.30	1.26
	11	1.20	1.16	1.19
	12	1.14	1.08	1.18
	13	1.08	1.06	1.07
	14	1.02	1.02	1.03
	15	0.98	1.00	1.02
	16	0.97	0.96	1.06
	17	1.01	0.96	1.15
	18	1.09	1.03	1.28
	19	1.12	1.08	1.20
	20	1.15	1.13	1.22
	21	1.16	1.13	1.17
	22	1.11	1.08	1.00
	23	0.95	1.05	0.80
Weekend	24	0.74	0.95	0.24
	25	0.61	0.83	0.23
	26	0.51	0.74	0.33
	27	0.44	0.68	0.55
	28	0.42	0.61	0.96
	29	0.41	0.64	1.18
	30	0.51	0.72	1.56
	31	0.72	0.79	1.73
	32	1.01	0.94	1.60
	33	1.32	1.30	1.64
	34	1.49	1.46	1.45
	35	1.46	1.51	1.22
	36	1.34	1.43	0.90
	37	1.28	1.28	0.88
	38	1.19	1.18	0.88
	39	1.16	1.21	0.95
	40	1.13	1.15	1.07
	41	1.12	1.11	1.06
	42	1.11	1.12	1.09
	43	1.10	1.15	0.95
	44	1.12	1.17	0.78
	45	1.11	1.15	0.64
	46	1.04	1.06	0.54
	47	0.91	1.04	0.47
Average				
Weekday		0.949	0.971	1.01
Weekend		0.968	1.050	0.95
ADWF[1]		0.954	0.993	1.00
% Error				
Weekday			2.3%	
Weekend			8.4%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



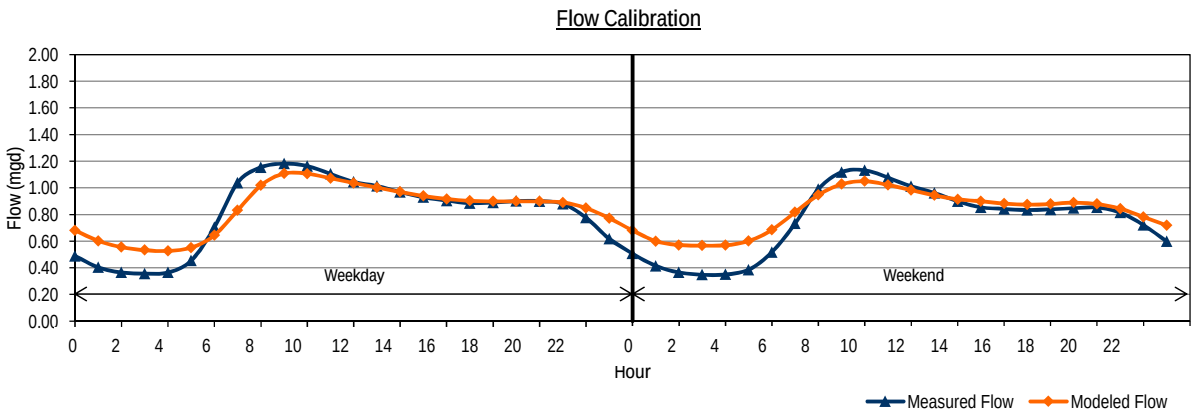


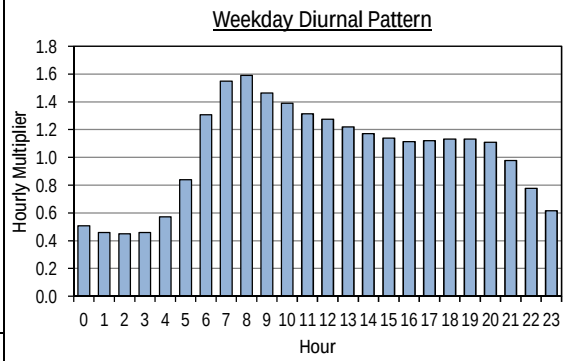


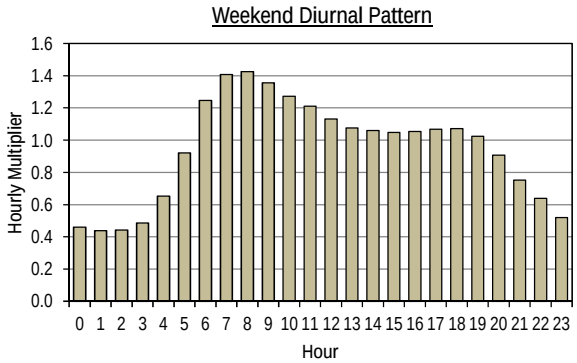
City of Medford
Sanitary Sewer Master Plan
FLOW MONITORING SITE Site 12 - 2865 DRY WEATHER FLOW CALIBRATION

	Hour	Measured Data Flow (mgd)	Modeled Data Flow (mgd)	Diurnal Calibrated Diurnal
Weekday	0	0.49	0.68	0.51
	1	0.40	0.60	0.46
	2	0.37	0.56	0.45
	3	0.36	0.53	0.46
	4	0.37	0.53	0.57
	5	0.45	0.55	0.84
	6	0.71	0.64	1.31
	7	1.04	0.83	1.55
	8	1.15	1.02	1.59
	9	1.18	1.11	1.46
	10	1.16	1.11	1.39
	11	1.10	1.07	1.31
	12	1.04	1.04	1.28
	13	1.01	1.00	1.22
	14	0.97	0.97	1.17
	15	0.93	0.94	1.14
	16	0.90	0.92	1.11
	17	0.89	0.90	1.12
	18	0.89	0.90	1.13
	19	0.90	0.90	1.13
	20	0.90	0.90	1.11
	21	0.88	0.89	0.98
	22	0.78	0.85	0.78
	23	0.62	0.77	0.62
Weekend	24	0.51	0.68	0.46
	25	0.41	0.60	0.44
	26	0.37	0.57	0.44
	27	0.35	0.57	0.49
	28	0.35	0.57	0.65
	29	0.39	0.60	0.92
	30	0.52	0.69	1.25
	31	0.73	0.82	1.41
	32	0.99	0.95	1.42
	33	1.12	1.03	1.36
	34	1.13	1.05	1.27
	35	1.08	1.02	1.21
	36	1.01	0.98	1.13
	37	0.96	0.94	1.07
	38	0.90	0.91	1.06
	39	0.85	0.90	1.05
	40	0.84	0.88	1.05
	41	0.83	0.87	1.07
	42	0.84	0.88	1.07
	43	0.85	0.89	1.02
	44	0.85	0.88	0.91
	45	0.81	0.84	0.75
	46	0.72	0.78	0.64
	47	0.60	0.72	0.52
Average				
Weekday		0.812	0.842	1.03
Weekend		0.751	0.818	0.94
ADWF[1]		0.795	0.835	1.00
% Error				
Weekday			3.6%	
Weekend			9.0%	

Note:
1. ADWF = (5xWeekday Average + 2xWeekend Average)/7



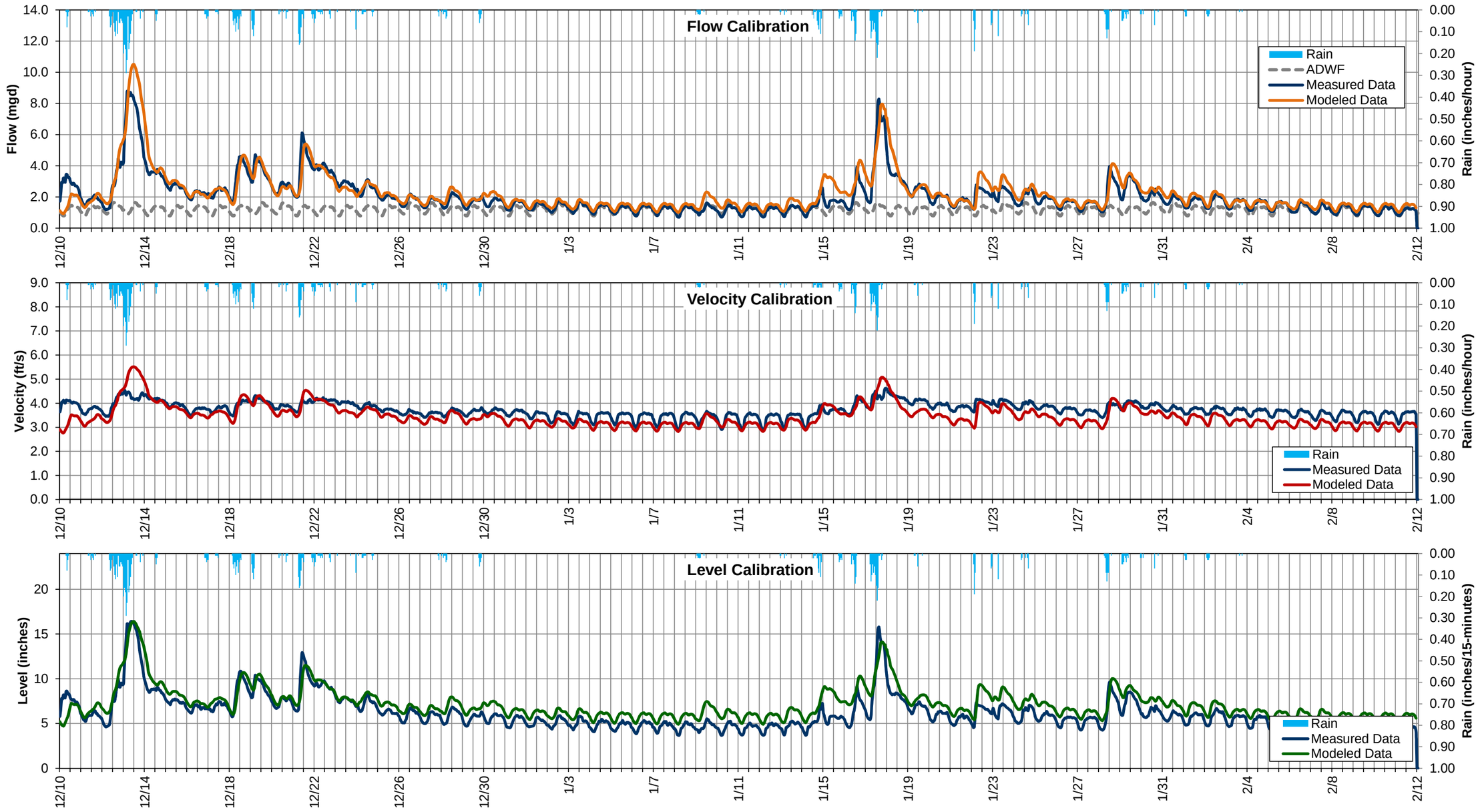




APPENDIX F – WET WEATHER CALIBRATIONS RESULTS

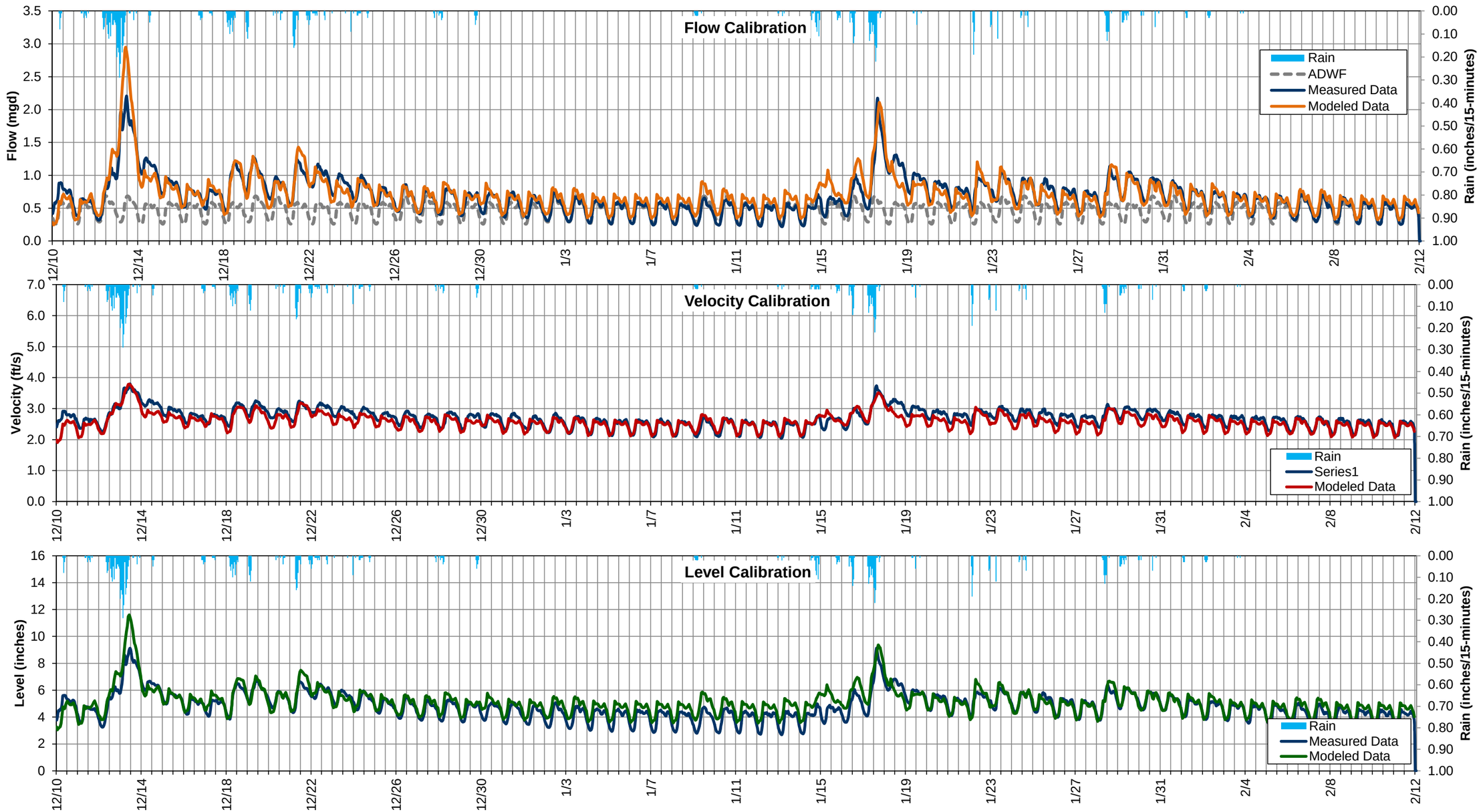
FLOW MONITORING Site 1 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: At the intersection of Crater Lake Highway and N Pacific Highway.
Pipeline diameter: 33"
City Manhole ID: 7390
Model Mahhole ID: 7390
Silt Level at Site: "



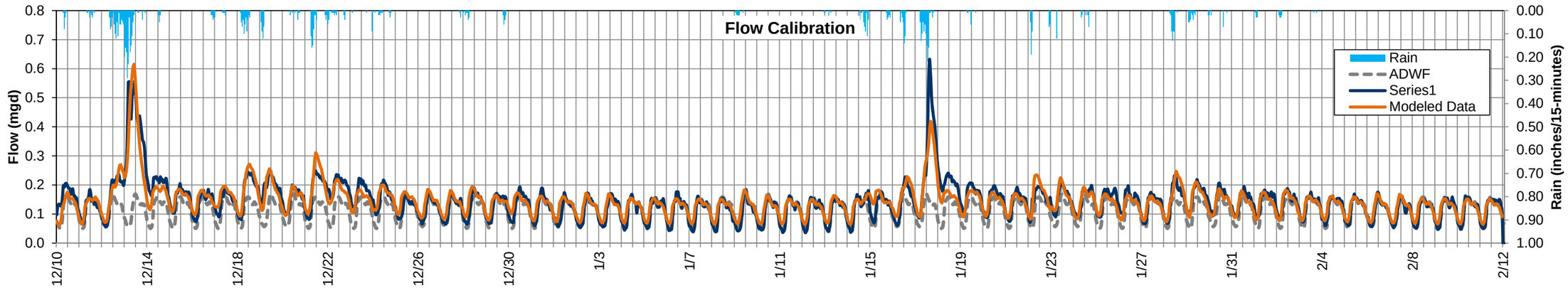
FLOW MONITORING Site 2 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

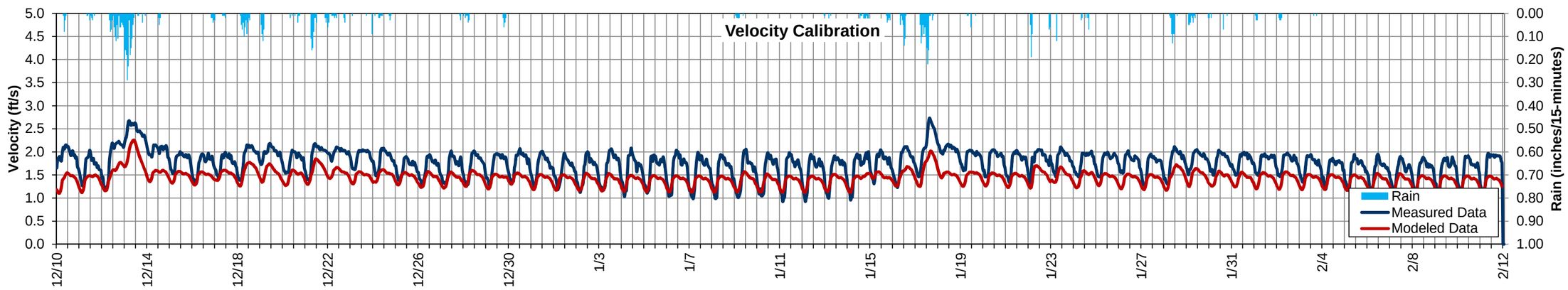
Location: Along Birdie Road, 450 feet south of E McAndrews Road.
Pipeline diameter: 18"
City Manhole ID: 5646
Model Mahhole ID: 5646
Silt Level at Site: "

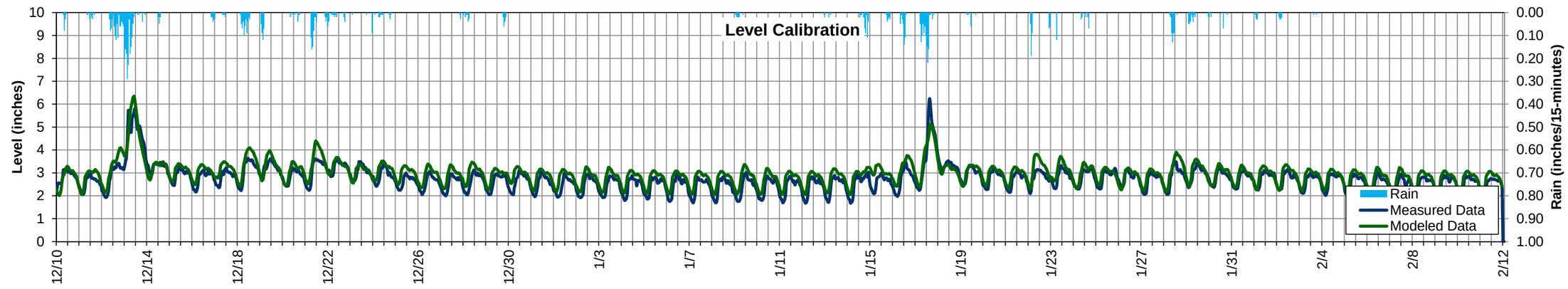


FLOW MONITORING Site 3 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: Along E Jackson Street, 300 feet west of Hawthorne Avenue.
Pipeline diameter: 12"
City Manhole ID: 3481
Model Mahhole ID: 3481
Silt Level at Site: "

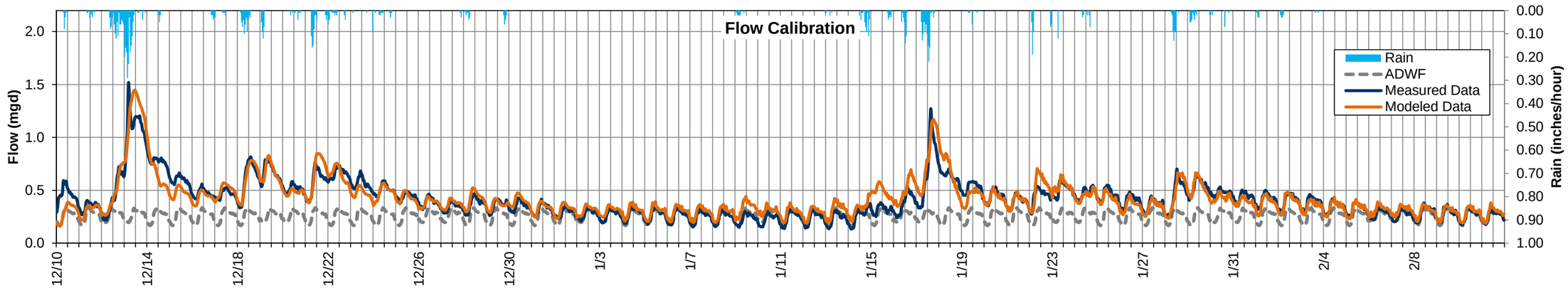


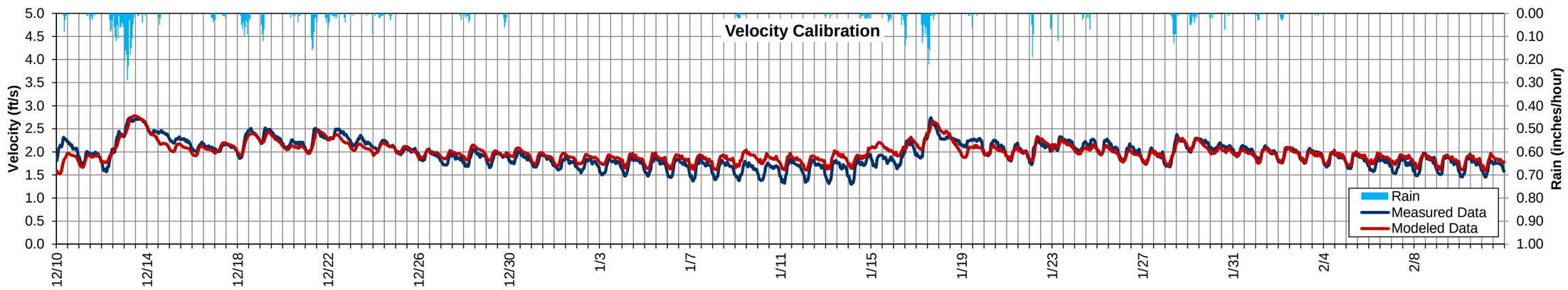


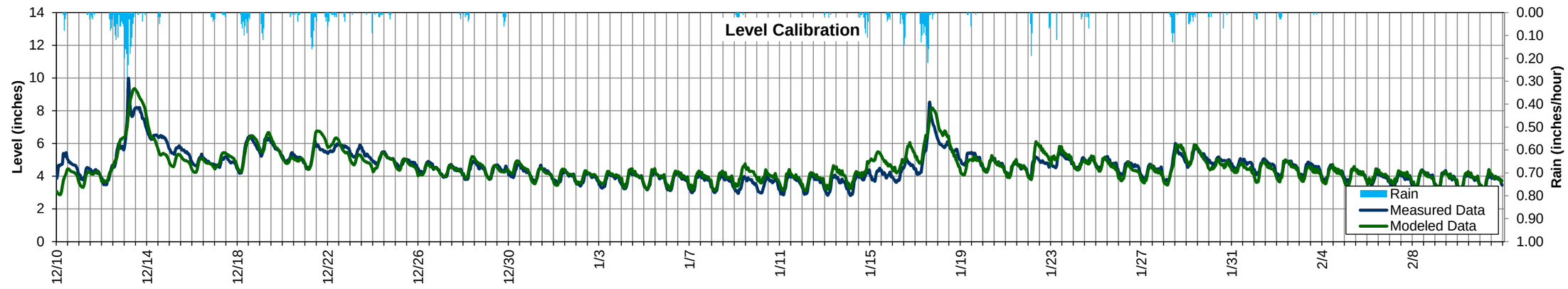


FLOW MONITORING Site 4 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: At the intersection between E Barnett Road and Medical Center Drive.
Pipeline diameter: 15"
City Manhole ID: 4226
Model Mahhole ID: 4226
Silt Level at Site: "

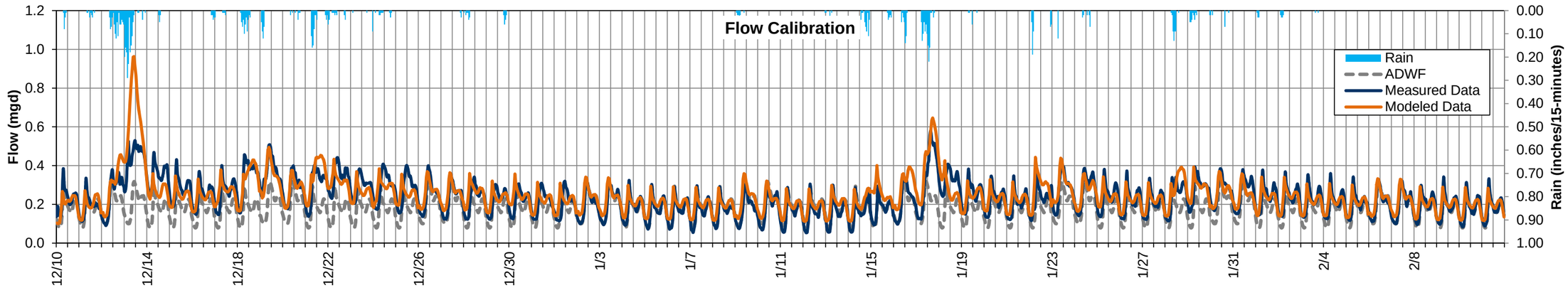


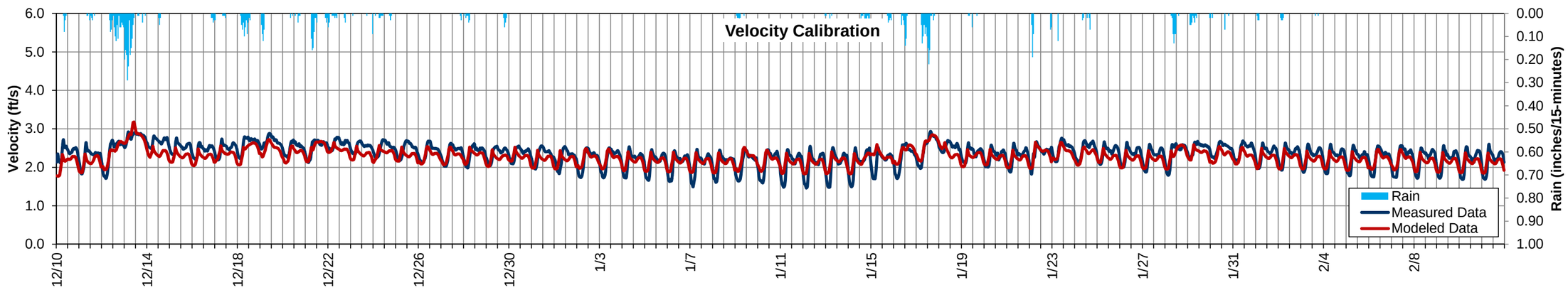


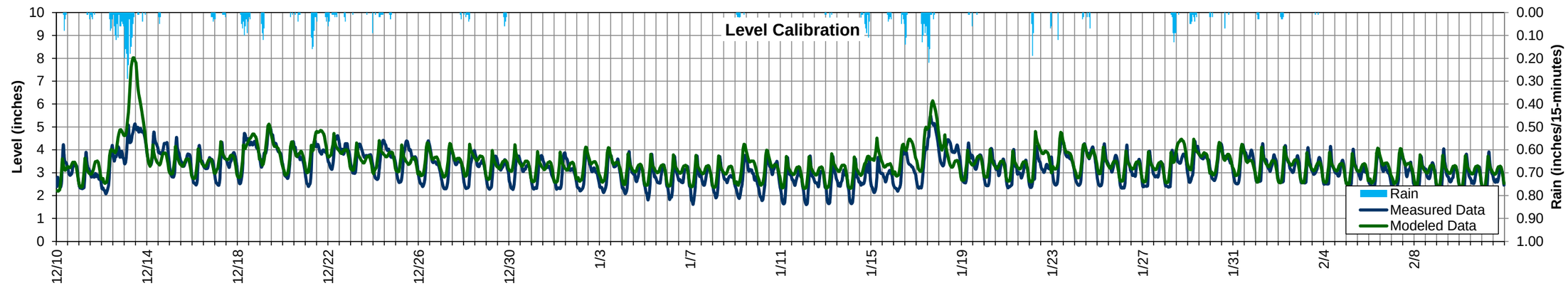


FLOW MONITORING Site 5 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: 2,400 feet east of N Foothill Road and 1,300 feet north of Hillcrest Road.
Pipeline diameter: 10"
City Manhole ID: 4839
Model Mahhole ID: 4839
Silt Level at Site: "

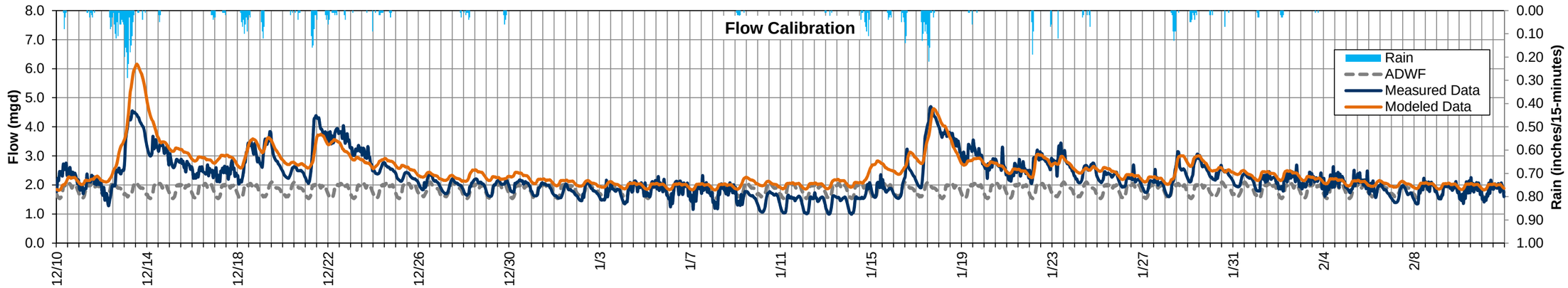


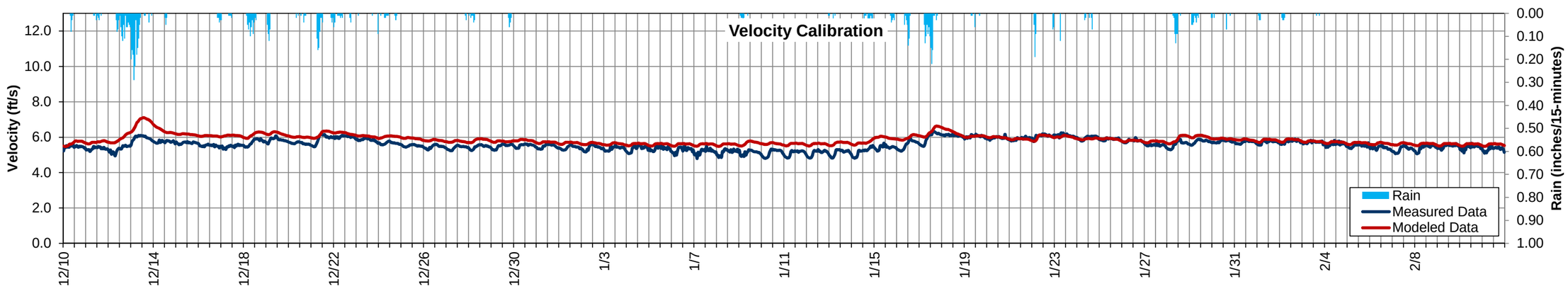


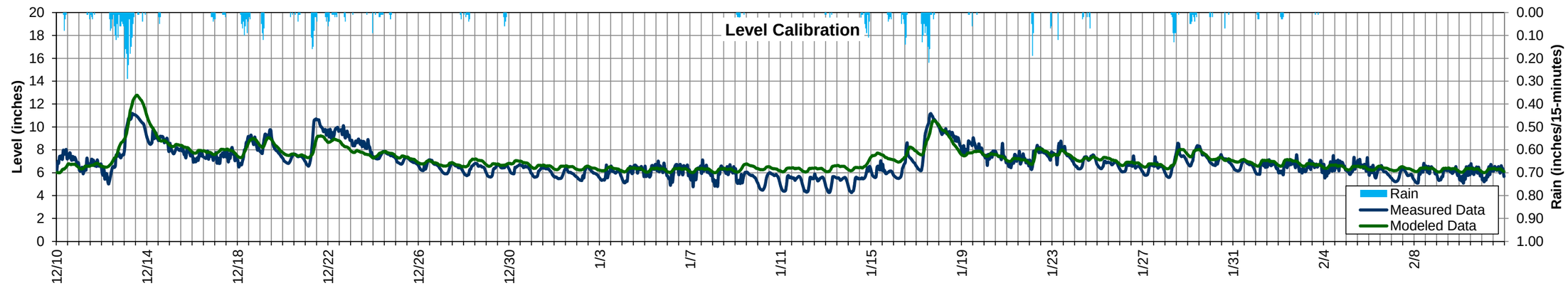


FLOW MONITORING Site 6 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: At the intersection of Franquette Street and E 12th Street.
Pipeline diameter: 18"
City Manhole ID: 3301
Model Mahhole ID: 3301
Silt Level at Site: "

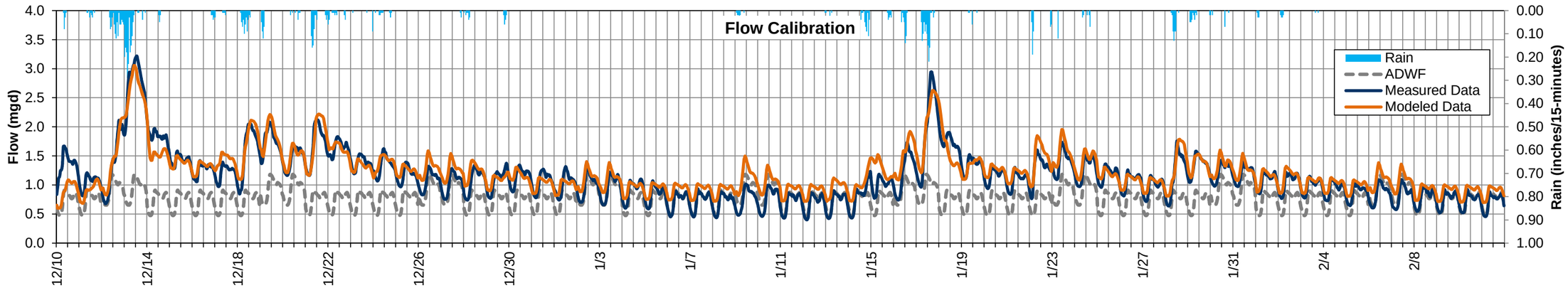


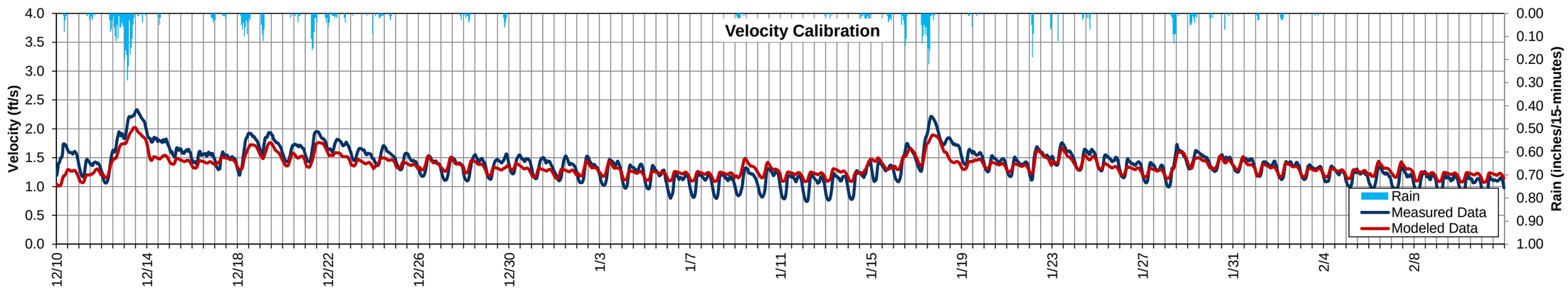


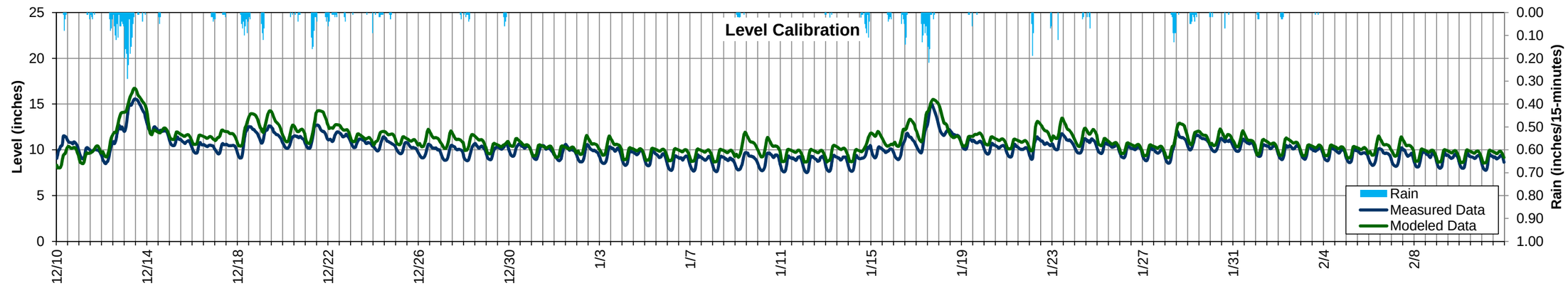


FLOW MONITORING Site 7 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: At the intersection of Crater Lake Highway and Interstate 5.
Pipeline diameter: 24"
City Manhole ID: 5883
Model Mahhole ID: 5883
Silt Level at Site: "

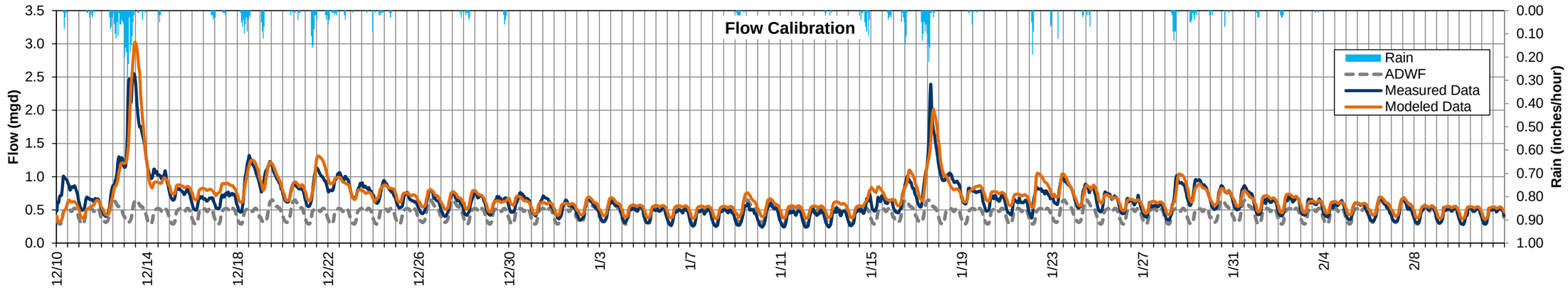


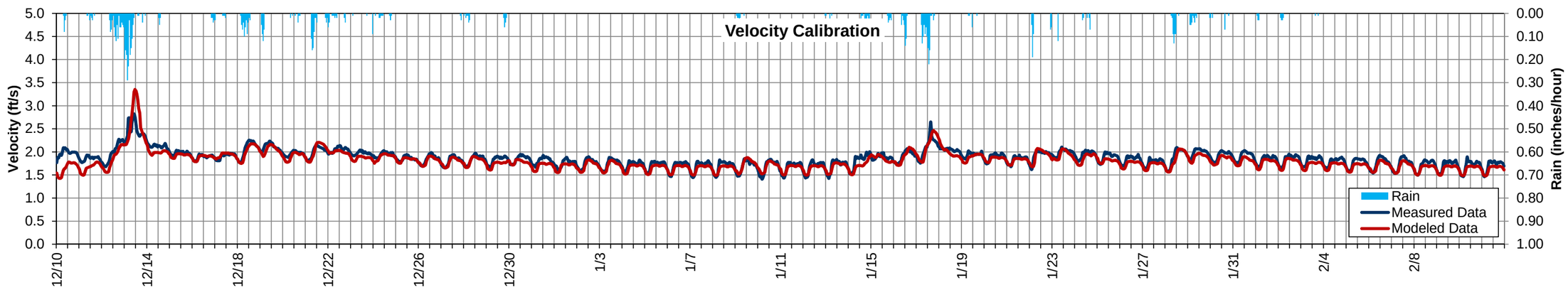


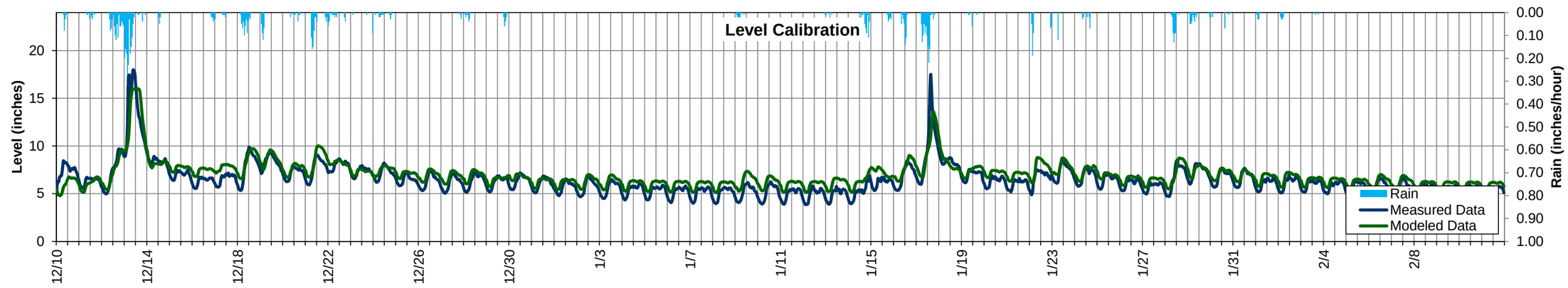


FLOW MONITORING Site 8 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: At the intersection of Hilton Road and Birdie Road.
Pipeline diameter: 16"
City Manhole ID: 7606
Model Mahhole ID: 7606
Silt Level at Site: "

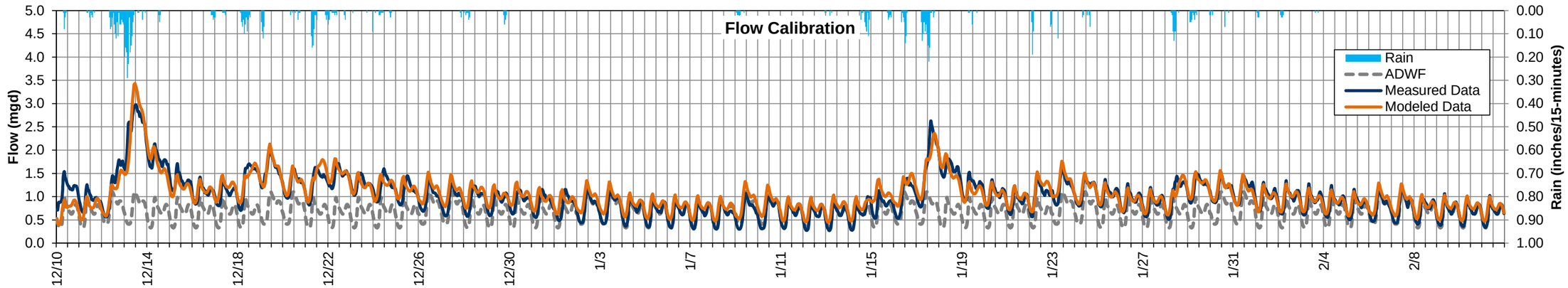


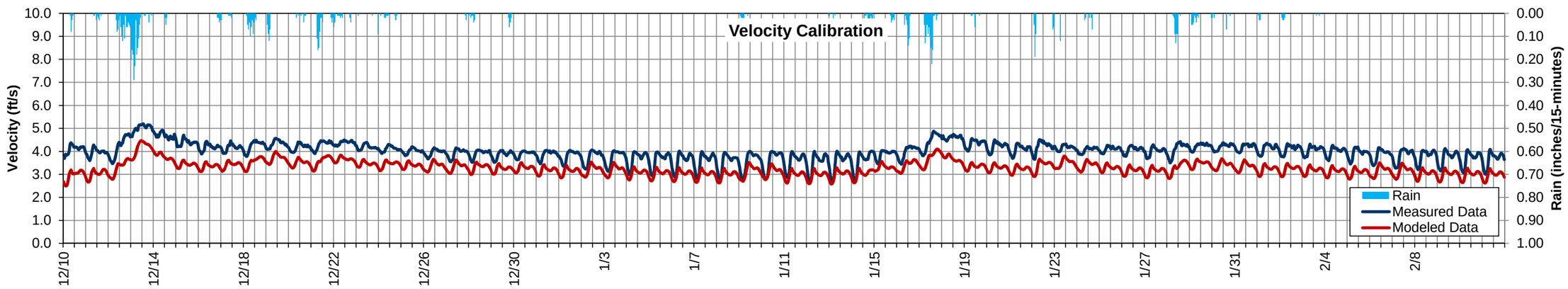


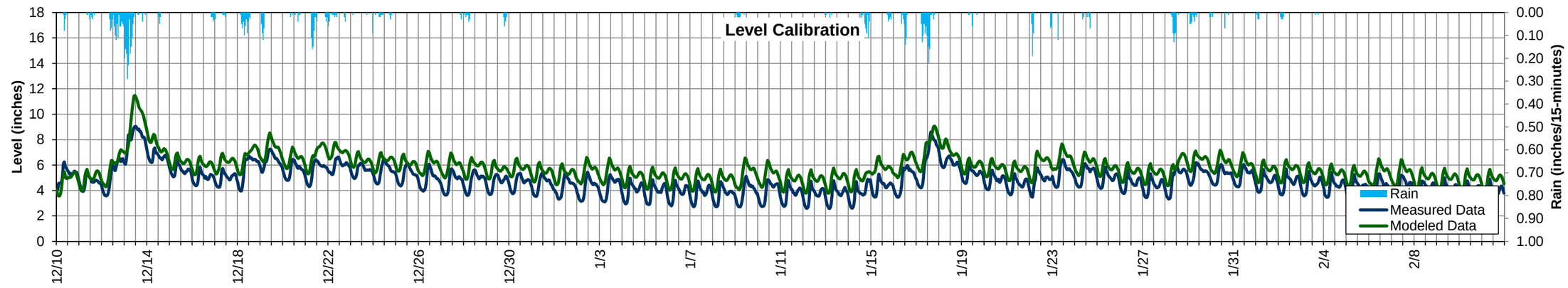


FLOW MONITORING Site 9 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: Along Kennedy School Park.
Pipeline diameter: 18"
City Manhole ID: 6204
Model Mahhole ID: 6204
Silt Level at Site: "

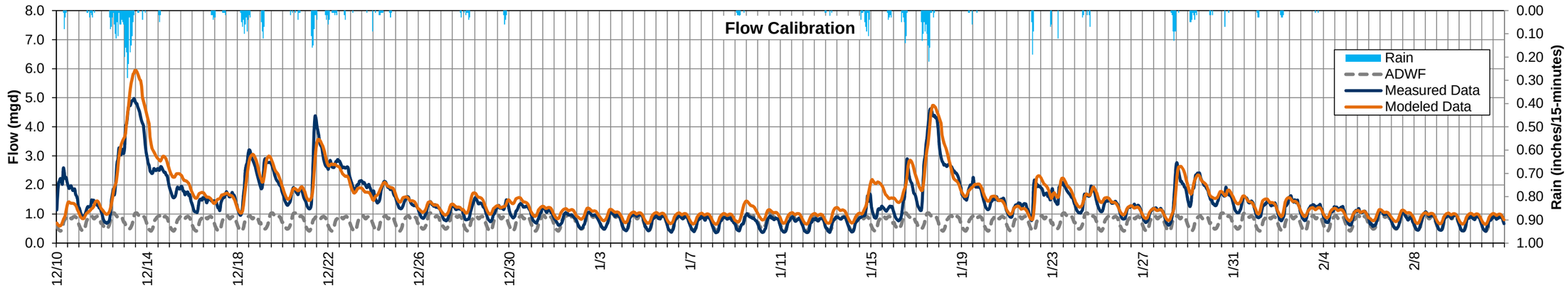


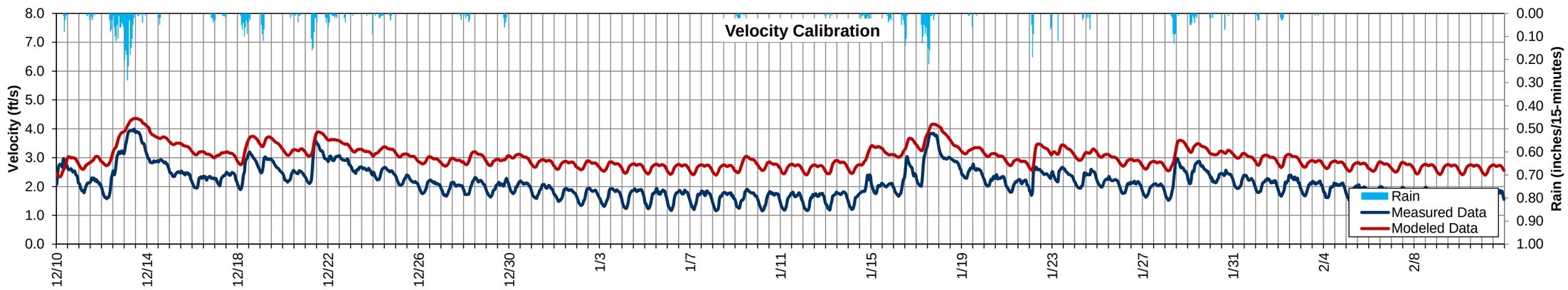


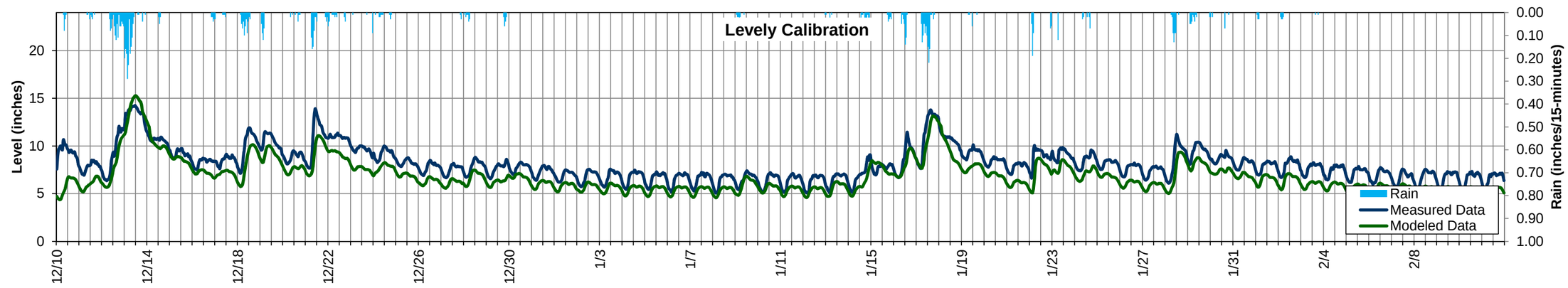


FLOW MONITORING Site 10 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: Along Bear Creek at the intersection of N Riverside Avenue and Manzanita Street.
Pipeline diameter: 24"
City Manhole ID: 7596
Model Mahhole ID: 7596
Silt Level at Site: "

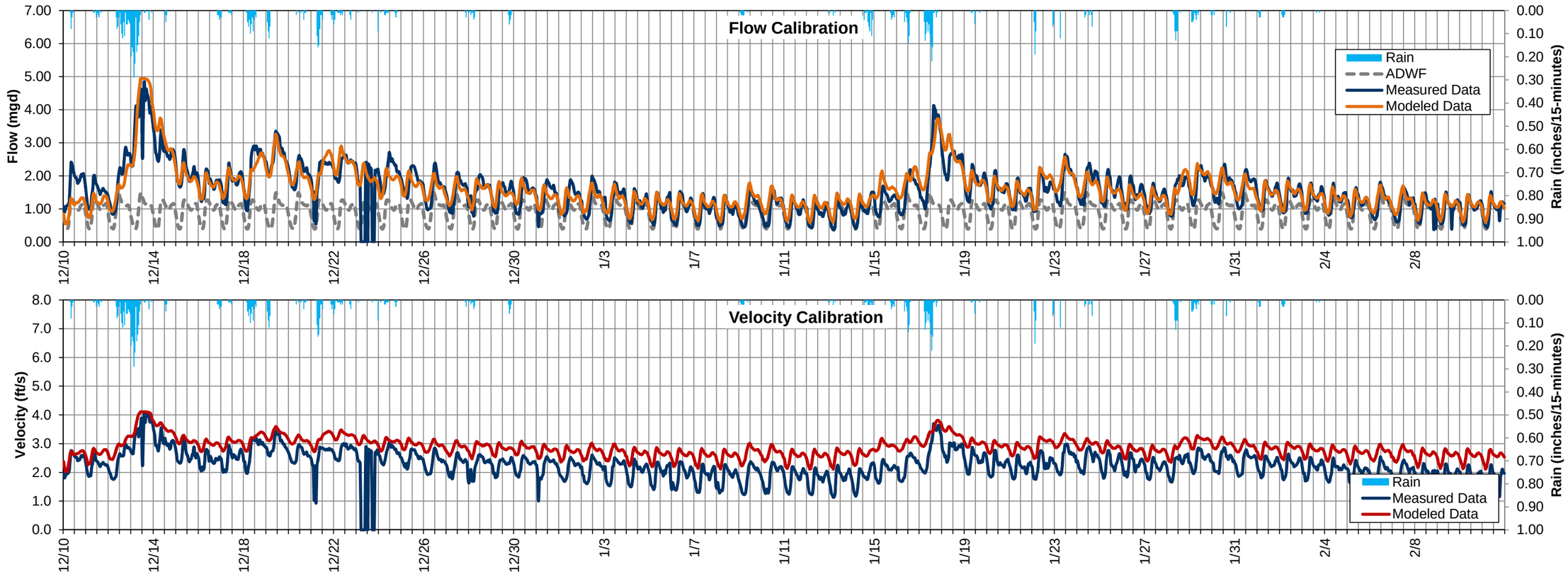






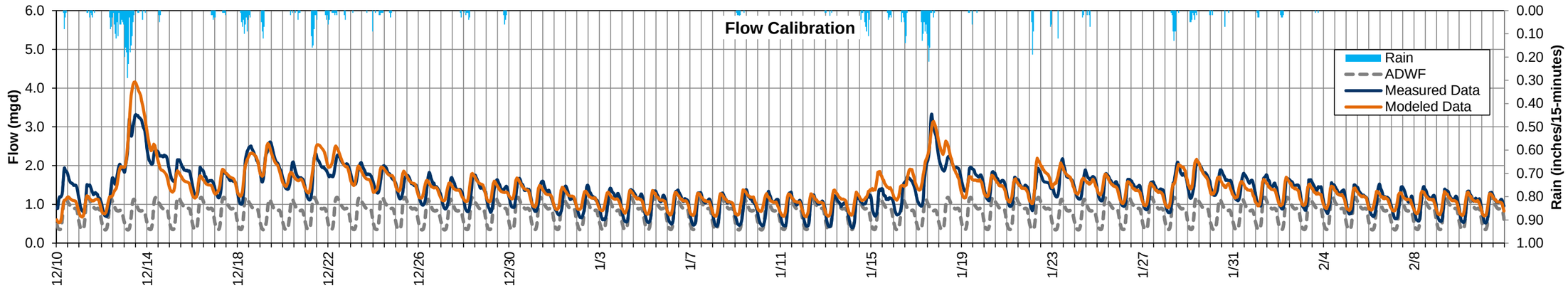
FLOW MONITORING Site 11 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

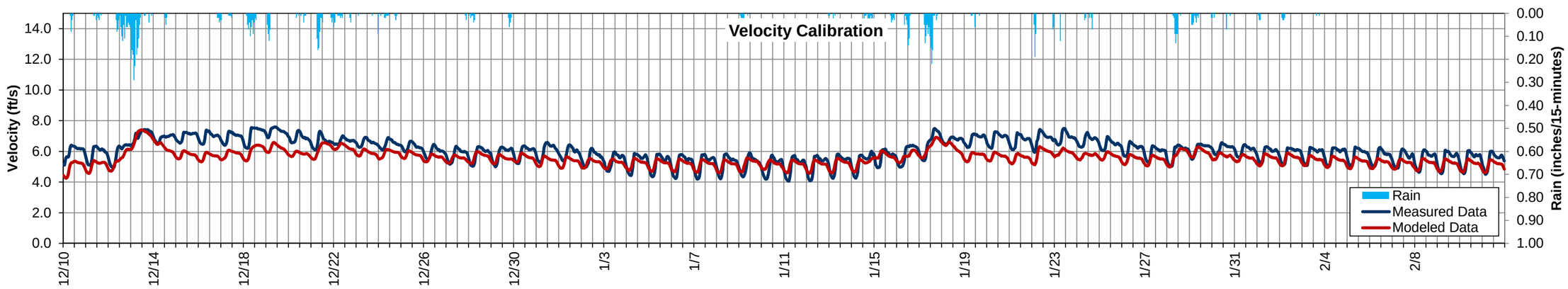
Location: Along Lawnsdale Road, 450 feet east of Birdie Road.
Pipeline diameter: 24"
City Manhole ID: 10083
Model Mahhole ID: 10083
Silt Level at Site: "

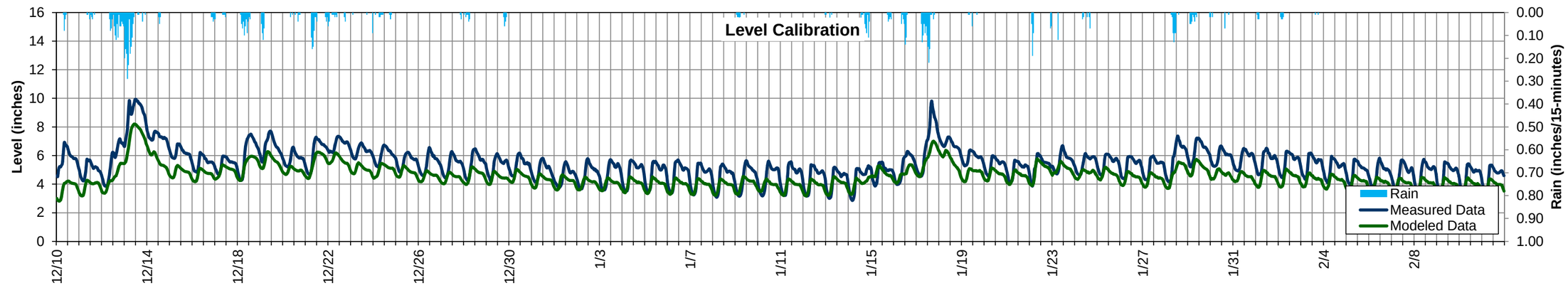


FLOW MONITORING Site 12 WET WEATHER FLOW CALIBRATION
SANITARY SEWER MASTER PLAN
CITY OF MEDFORD

Location: Along E Barnett Road, 100 feet east of Bear Creek.
Pipeline diameter: 21"
City Manhole ID: 2865
Model Mahhole ID: 2865
Silt Level at Site: "







APPENDIX G –DETAILED MODELING RESULTS – BEFORE AND AFTER IMPROVEMENT

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30001	414	15	15			542	1,956	0.28	542	2,097	0.26	6811	0.0	0.0	6904	0.0	0.0
30002	305	8	8			28	310	0.09	28	333	0.08	7642	0.0	0.0	7380	0.0	0.0
30003	311	8	8			126	312	0.40	126	335	0.38	6816	0.0	0.0	6914	0.0	0.0
30004	287	8	27			2	442	0.00	2	474	0.00	6814	0.0	0.0	6933_WETWELL		
30005	530	18	24	26	Existing	3,811	3,541	1.08	3,870	8,171	0.47	6833	0.0	0.0	6885	0.0	0.0
30006	468	8	8			38	307	0.12	38	330	0.12	6837	0.0	0.0	6009	0.0	0.0
30011	173	8	12	24	2036	46	206	0.22	46	220	0.21	6778	0.0	0.0	7635	0.0	0.0
30012	173	15	15			524	1,587	0.33	524	1,700	0.31	7376	0.0	0.0	6811	0.0	0.0
30014	639	18	24	25	2036	2,907	3,394	0.86	2,908	3,637	0.80	7121	0.0	0.0	6831	0.0	0.0
30015	265	8	8			27	382	0.07	27	410	0.07	6617	0.0	0.0	6682	0.0	0.0
30016	156	8	8			85	272	0.31	85	291	0.29	6641	0.0	0.0	6692	0.0	0.0
30017	297	15	18	23	ura	789	1,529	0.52	789	1,638	0.48	6653	0.0	0.0	6717	0.0	0.0
30018	264	10	10			422	1,183	0.36	422	1,267	0.33	6585	0.0	0.0	6647	0.0	0.0
30019	402	8	8			11	1,069	0.01	11	1,147	0.01	6579	0.0	0.0	6591	0.0	0.0
30020	288	8	8			11	363	0.03	11	390	0.03	6538	0.0	0.0	6597	0.0	0.0
30021	250	8	8			9	333	0.03	9	357	0.03	6518	0.0	0.0	6595	0.0	0.0
30022	105	8	8			16	827	0.02	16	888	0.02	6578	0.0	0.0	6531	0.0	0.0
30023	248	8	8			16	267	0.06	16	286	0.06	6531	0.0	0.0	6591	0.0	0.0
30024	141	8	8			28	638	0.04	28	685	0.04	6535	0.0	0.0	6596	0.0	0.0
30025	285	8	8			8	324	0.03	8	347	0.02	7628	0.0	0.0	6603	0.0	0.0
30026	501	8	12	22	ura	172	456	0.38	172	488	0.35	6530	0.0	0.0	7119	0.0	0.0
30027	396	8	8			60	297	0.20	60	319	0.19	6540	0.0	0.0	6601	0.0	0.0
30028	245	8	8			12	333	0.04	12	358	0.03	6522	0.0	0.0	6598	0.0	0.0
30029	225	8	8			6	443	0.01	6	476	0.01	6523	0.0	0.0	6600	0.0	0.0
30030	275	8	8			26	420	0.06	26	451	0.06	6574	0.0	0.0	6545	0.0	0.0
30031	48	8	8			59	424	0.14	59	455	0.13	7370	0.0	0.0	7372	0.0	0.0
30032	265	8	8			25	1,815	0.01	25	1,817	0.01	6404	0.0	0.0	6509	0.0	0.0
30033	394	8	8			71	1,259	0.06	71	1,260	0.06	6403	0.0	0.0	6504	0.0	0.0
30034	306	8	8			15	1,483	0.01	15	1,592	0.01	6389	0.0	0.0	7625	0.0	0.0
30035	285	8	8			50	297	0.17	50	319	0.16	6313	0.0	0.0	6651	0.0	0.0
30036	327	8	8			191	299	0.64	191	320	0.60	6305	0.0	0.0	6649	0.0	0.0
30037	226	6	6			10	257	0.04	10	275	0.04	6266	0.0	0.0	7634	0.0	0.0
30038	229	8	8			13	381	0.03	13	408	0.03	6267	0.0	0.0	6648	0.0	0.0
30039	550	18	21	41	2036	2,036	2,501	0.81	2,037	2,679	0.76	6204	0.0	0.0	6709	0.0	0.0
30040	609	8	8			53	335	0.16	53	360	0.15	6209	0.0	0.0	6710	0.0	0.0
30041	140	8	8			65	1,070	0.06	65	1,072	0.06	6355	0.0	0.0	6193	0.0	0.0
30042	341	8	8			22	658	0.03	22	660	0.03	6161	0.0	0.0	6220	0.0	0.0
30043	143	8	8			1	758	0.00	1	759	0.00	7710	0.0	0.0	6235	0.0	0.0
30044	449	8	8			1	728	0.00	1	730	0.00	6159	0.0	0.0	6222	0.0	0.0
30045	49	8	8			11	378	0.03	11	378	0.03	6157	0.0	0.0	6237	0.0	0.0
30046	40	8	8			1	453	0.00	1	454	0.00	6179	0.0	0.0	6247	0.0	0.0
30047	255	8	8			61	409	0.15	61	410	0.15	6248	0.0	0.0	6169	0.0	0.0
30048	381	8	8			1	272	0.00	1	291	0.00	6434	0.0	0.0	7615	0.0	0.0
30049	257	8	8			25	1,095	0.02	25	1,097	0.02	6458	0.0	0.0	6124	0.0	0.0
30050	255	8	8			6	1,042	0.01	6	1,043	0.01	6019	0.0	0.0	6457	0.0	0.0
30051	138	8	8			6	450	0.01	6	451	0.01	6127	0.0	0.0	6357	0.0	0.0
30052	136	18	18			1,908	3,022	0.63	1,908	3,022	0.63	6112	0.0	0.0	6193	0.0	0.0
30053	57	6	6			0	213	0.00	0	213	0.00	6154	0.0	0.0	6111	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30054	227	12	15	11	ura	1,212	3,073	0.39	1,212	3,073	0.39	6432	0.0	0.0	6135	0.0	0.0
30055	355	8	8			1	1,689	0.00	1	1,691	0.00	6477	0.0	0.0	6138	0.0	0.0
30056	205	8	8			0	1,267	0.00	0	1,269	0.00	6475	0.0	0.0	6047	0.0	0.0
30057	230	8	8			203	883	0.23	203	884	0.23	6474	0.0	0.0	6046	0.0	0.0
30058	330	8	27			62	754	0.08	62	756	0.08	6827	0.0	0.0	5973	0.0	0.0
30059	530	18	24	26	Existing	3,820	3,410	1.12	3,881	7,867	0.49	5974	2.9	0.0	6833	0.0	0.0
30061	305	8	8			24	449	0.05	24	450	0.05	7202	0.0	0.0	5958	0.0	0.0
30062	208	8	8			42	876	0.05	42	876	0.05	7620	0.0	0.0	5962	0.0	0.0
30063	451	8	8			45	539	0.08	45	540	0.08	6201	0.0	0.0	5964	0.0	0.0
30064	264	15	15			1,097	2,222	0.49	1,097	2,222	0.49	6001	0.0	0.0	7356	0.0	0.0
30066	240	8	8			404	399	1.01	111	399	0.28	5853	2.9	0.0	5931	0.0	0.0
30067	516	8	8			192	405	0.47	191	406	0.47	5844	0.0	0.0	5929	0.0	0.0
30068	520	8	8			1	408	0.00	1	408	0.00	7601	0.0	0.0	5958	0.0	0.0
30069	430	8	8			1	590	0.00	1	590	0.00	7099	0.0	0.0	5994	0.0	0.0
30070	340	10	10			263	667	0.39	263	667	0.39	5751	0.0	0.0	6000	0.0	0.0
30071	311	8	8			62	405	0.15	62	406	0.15	6169	0.0	0.0	7351	0.0	0.0
30072	435	8	8			138	612	0.23	138	613	0.23	6168	0.0	0.0	5748	0.0	0.0
30073	482	8	8			634	832	0.76	634	833	0.76	5777	0.0	0.0	5858	1.8	0.0
30075	20	8	8			13	910	0.01	1	912	0.00	5745	0.0	0.0	5867	9.4	0.0
30076	436	8	8			253	450	0.56	253	451	0.56	6170	0.0	0.0	5801	0.0	0.0
30077	200	8	8			34	756	0.05	34	757	0.04	5731	0.0	0.0	5824	2.8	0.0
30078	221	8	8			211	297	0.71	211	297	0.71	5711	0.0	0.0	5791	0.0	0.0
30079	155	8	8			28	297	0.10	28	298	0.10	5792	0.0	0.0	5689	0.0	0.0
30080	275	8	8			85	328	0.26	85	328	0.26	5787	0.0	0.0	5691	0.0	0.0
30081	299	12	18	19	Existing	863	708	1.22	1,308	2,087	0.63	5710	5.3	0.0	5741	0.0	0.0
30082	348	8	8			31	326	0.09	31	327	0.09	5790	0.0	0.0	5687	0.0	0.0
30083	365	8	8			2	406	0.01	2	406	0.01	7346	0.0	0.0	5863	0.0	0.0
30084	481	8	8			44	295	0.15	1	296	0.00	7096	0.0	0.0	5709	3.7	0.0
30085	406	12	18	19	Existing	1,074	731	1.47	1,522	2,156	0.71	5642	4.8	0.0	5839	0.0	0.0
30086	305	12	18	19	Existing	1,073	736	1.46	1,520	2,169	0.70	5741	0.0	0.0	7598	6.3	0.0
30087	610	54	54			15,969	39,472	0.40	16,155	39,472	0.41	5602	0.0	0.0	5836	0.0	0.0
30088	145	8	8			77	386	0.20	77	387	0.20	5645	0.0	0.0	5869	0.0	0.0
30089	192	6	6			1	172	0.00	1	172	0.00	5598	0.0	0.0	7422	0.0	0.0
30090	143	8	8			1	227	0.00	1	227	0.00	5723	0.0	0.0	5610	0.0	0.0
30091	132	8	8			1	624	0.00	1	626	0.00	5722	0.0	0.0	5609	0.0	0.0
30092	405	8	8			4	173	0.02	2	174	0.01	5639	0.0	0.0	5698	0.0	0.0
30093	289	10	10			172	389	0.44	172	388	0.44	5701	0.0	0.0	8942	0.0	0.0
30094	404	18	18			1,867	2,156	0.87	1,867	2,156	0.87	5558	0.0	0.0	5647	0.0	0.0
30095	590	54	54			13,763	35,417	0.39	13,960	35,417	0.39	5547	0.0	0.0	5604	0.0	0.0
30096	504	27	27			3,933	7,608	0.52	5,215	7,608	0.69	7596	0.0	0.0	2021	0.0	0.0
30097	415	8	8			56	361	0.16	56	362	0.16	5675	0.0	0.0	5451	0.0	0.0
30098	288	8	8			0	531	0.00	0	532	0.00	5373	0.0	0.0	6090	0.0	0.0
30099	449	8	8			1	557	0.00	1	558	0.00	5424	0.0	0.0	6045	0.0	0.0
30100	151	8	8			1	879	0.00	1	881	0.00	5365	0.0	0.0	6085	0.0	0.0
30101	465	8	8			19	659	0.03	19	660	0.03	5349	0.0	0.0	6091	0.0	0.0
30102	225	8	8			17	460	0.04	17	461	0.04	5363	0.0	0.0	6097	0.0	0.0
30103	277	8	8			5	406	0.01	5	406	0.01	5356	0.0	0.0	6043	0.0	0.0
30104	425	8	8			306	249	1.23	306	249	1.23	7194	0.0	0.0	5260	0.0	0.0

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30105	56	8	8			37	478	0.08	37	479	0.08	7154	0.0	0.0	5256	0.0	0.0
30106	403	8	8			1	876	0.00	1	878	0.00	6174	0.0	0.0	5270	0.9	0.0
30107	328	8	8			33	444	0.07	32	444	0.07	6176	4.1	0.0	5266	0.9	0.0
30108	310	8	15	19	Existing	535	582	0.92	960	3,110	0.31	5262	0.0	0.0	5677	1.1	0.0
30109	185	8	8			1	993	0.00	1	994	0.00	5678	0.0	0.0	5261	3.6	0.0
30110	508	8	8			1	658	0.00	1	659	0.00	5679	0.0	0.0	7087	0.0	0.0
30111	270	8	8			35	832	0.04	35	833	0.04	5294	0.0	0.0	5707	0.0	0.0
30112	75	8	8			15	356	0.04	15	356	0.04	5418	0.0	0.0	7193	0.0	0.0
30113	370	8	8			180	528	0.34	180	529	0.34	5175	0.0	0.0	5502	0.0	0.0
30114	166	8	8			285	608	0.47	285	609	0.47	5219	0.0	0.0	5519	0.0	0.0
30115	175	8	8			0	1,983	0.00	0	1,985	0.00	5243	0.0	0.0	5528	0.0	0.0
30116	312	8	8			63	836	0.07	63	838	0.07	5197	0.0	0.0	5458	0.0	0.0
30117	182	8	8			355	774	0.46	355	775	0.46	5073	0.0	0.0	5145	2.3	0.0
30118	190	8	8			17	435	0.04	17	435	0.04	5090	0.0	0.0	5144	0.0	0.0
30119	82	8	8			26	485	0.05	26	486	0.05	5050	0.0	0.0	5228	0.0	0.0
30120	415	8	8			11	1,240	0.01	11	1,242	0.01	5049	0.0	0.0	5228	0.0	0.0
30121	58	8	8			38	945	0.04	38	947	0.04	7576	0.0	0.0	5142	0.0	0.0
30122	110	18	18			1,178	5,820	0.20	1,178	5,820	0.20	4951	0.0	0.0	6432	0.0	0.0
30123	200	6	6			1	408	0.00	1	408	0.00	4926	0.0	0.0	5353	0.0	0.0
30124	151	8	8			1	253	0.01	1	254	0.01	4989	0.0	0.0	7336	0.0	0.0
30125	500	12	12			783	2,236	0.35	783	2,236	0.35	4999	0.0	0.0	7572	0.0	0.0
30126	41	8	8			59	1,142	0.05	59	1,143	0.05	5006	0.0	0.0	4985	0.0	0.0
30127	118	8	8			8	392	0.02	8	392	0.02	4932	0.0	0.0	5005	0.0	0.0
30128	312	8	8			1	675	0.00	1	676	0.00	4953	0.0	0.0	5352	0.0	0.0
30129	200	8	8			7	379	0.02	7	380	0.02	4916	0.0	0.0	7730	0.0	0.0
30130	545	8	8			31	943	0.03	31	944	0.03	4888	0.0	0.0	4935	0.0	0.0
30131	188	8	8			133	531	0.25	133	532	0.25	4892	0.0	0.0	4935	0.0	0.0
30132	155	8	8			1	1,720	0.00	1	1,723	0.00	4885	0.0	0.0	5029	0.0	0.0
30133	491	12	12			696	3,994	0.17	696	3,994	0.17	7569	0.0	0.0	5001	0.0	0.0
30134	476	10	15	28	2036	683	1,375	0.50	683	1,374	0.50	4840	0.0	0.0	4874	0.0	0.0
30135	206	8	8			30	282	0.11	30	282	0.11	4867	0.0	0.0	7319	0.0	0.0
30136	360	8	8			17	642	0.03	17	643	0.03	4865	0.0	0.0	7316	0.0	0.0
30137	171	8	8			0	1,082	0.00	0	1,083	0.00	4835	0.0	0.0	4718	0.0	0.0
30138	260	8	8			61	1,771	0.03	61	1,773	0.03	4764	0.0	0.0	4843	0.0	0.0
30140	303	8	8			465	1,025	0.45	465	1,026	0.45	4741	0.0	0.0	4833	0.0	0.0
30141	308	8	8			0	368	0.00	0	369	0.00	7321	0.0	0.0	4696	0.0	0.0
30142	364	8	8			18	1,992	0.01	18	1,995	0.01	4687	0.0	0.0	7151	0.0	0.0
30143	310	8	8			0	1,190	0.00	0	1,191	0.00	4869	0.0	0.0	4698	0.0	0.0
30144	341	8	8			7	1,528	0.00	7	1,530	0.00	7075	0.0	0.0	4685	0.0	0.0
30145	335	8	8			23	1,397	0.02	23	1,399	0.02	4691	0.0	0.0	4859	0.0	0.0
30146	408	8	8			0	1,096	0.00	0	1,097	0.00	7315	0.0	0.0	4620	0.0	0.0
30147	510	8	8			14	1,424	0.01	14	1,426	0.01	4629	0.0	0.0	4723	0.0	0.0
30148	468	8	8			14	1,455	0.01	14	1,457	0.01	7563	0.0	0.0	4629	0.0	0.0
30149	510	8	8			6	1,225	0.01	6	1,226	0.01	4694	0.0	0.0	7312	0.0	0.0
30150	298	8	8			127	1,081	0.12	127	1,083	0.12	4638	0.0	0.0	4772	0.0	0.0
30151	271	8	8			65	742	0.09	65	743	0.09	4670	0.0	0.0	4754	0.0	0.0
30152	321	8	8			13	1,013	0.01	13	1,015	0.01	4666	0.0	0.0	7071	0.0	0.0
30153	210	8	8			22	1,456	0.01	22	1,458	0.01	4637	0.0	0.0	7149	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30154	315	8	8			15	1,382	0.01	15	1,383	0.01	4567	0.0	0.0	4652	0.0	0.0
30155	164	8	8			4	1,340	0.00	4	1,342	0.00	4580	0.0	0.0	4656	0.0	0.0
30156	446	8	8			48	926	0.05	48	927	0.05	4555	0.0	0.0	4661	0.0	0.0
30157	86	8	8			17	827	0.02	17	828	0.02	4652	0.0	0.0	4571	0.0	0.0
30158	158	8	8			17	1,351	0.01	17	1,352	0.01	4571	0.0	0.0	4653	0.0	0.0
30159	140	8	8			93	330	0.28	93	331	0.28	4828	0.0	0.0	4478	0.0	0.0
30160	391	8	8			7	2,115	0.00	7	2,118	0.00	4527	0.0	0.0	4450	0.0	0.0
30161	85	8	8			20	2,055	0.01	20	2,058	0.01	4525	0.0	0.0	4448	0.0	0.0
30162	101	8	8			15	171	0.09	15	171	0.09	4523	0.0	0.0	7552	0.0	0.0
30163	318	8	8			26	1,054	0.03	26	1,056	0.03	4522	0.0	0.0	4444	0.0	0.0
30164	297	8	12	45	2036	531	647	0.82	531	648	0.82	4465	0.0	0.0	4265	6.1	0.0
30165	171	8	8			0	486	0.00	0	487	0.00	4468	0.0	0.0	7299	0.0	0.0
30166	198	8	8			4	792	0.01	4	794	0.01	7062	0.0	0.0	4316	0.0	0.0
30167	93	8	8			5	1,013	0.00	5	1,014	0.00	4467	0.0	0.0	4316	0.0	0.0
30168	188	8	8			31	458	0.07	31	458	0.07	4496	0.0	0.0	4313	0.0	0.0
30169	190	8	8			0	420	0.00	0	420	0.00	4346	0.0	0.0	4494	0.0	0.0
30170	417	8	8			0	757	0.00	0	758	0.00	4337	0.0	0.0	4241	0.0	0.0
30171	227	8	8			1	890	0.00	1	892	0.00	7545	0.0	0.0	9960	0.0	0.0
30172	226	8	8			12	1,706	0.01	12	1,708	0.01	4898	0.0	0.0	4243	0.0	0.0
30175	24	8	8			44	483	0.09	44	483	0.09	4303	0.0	0.0	4038	0.0	0.0
30176	218	8	8			8	840	0.01	8	840	0.01	4039	0.0	0.0	4350	0.0	0.0
30177	117	8	8			8	426	0.02	8	426	0.02	4358	0.0	0.0	7535	0.0	0.0
30178	420	8	8			0	826	0.00	0	826	0.00	4376	0.0	0.0	7140	0.0	0.0
30179	122	8	8			1	1,410	0.00	1	1,413	0.00	4069	0.0	0.0	4379	0.0	0.0
30180	237	8	8			97	578	0.17	97	579	0.17	4059	0.0	0.0	4157	0.0	0.0
30181	170	8	15	29	Existing	382	295	1.29	574	1,578	0.36	4112	0.0	0.0	4162	1.6	0.0
30182	240	8	12	29	Existing	573	1,222	0.47	574	3,603	0.16	7057	0.0	0.0	4112	0.0	0.0
30183	131	8	8			13	588	0.02	13	589	0.02	4056	0.0	0.0	4156	0.0	0.0
30184	384	8	8			30	826	0.04	30	827	0.04	4048	0.0	0.0	4154	0.0	0.0
30185	160	8	8			20	1,445	0.01	20	1,447	0.01	4043	0.0	0.0	4153	0.0	0.0
30186	495	12	12			747	2,698	0.28	747	2,698	0.28	4116	0.0	0.0	4148	0.0	0.0
30187	176	8	8			10	940	0.01	10	941	0.01	4372	0.0	0.0	4105	0.0	0.0
30188	400	8	8			17	840	0.02	17	841	0.02	4055	0.0	0.0	4155	0.0	0.0
30189	481	8	8			5	947	0.01	5	949	0.01	4377	0.0	0.0	4102	0.0	0.0
30190	186	8	8			146	632	0.23	146	633	0.23	4382	0.0	0.0	4071	0.0	0.0
30191	56	8	8			448	294	1.52	448	294	1.52	4315	0.0	0.0	7053	0.0	0.0
30193	218	8	8			26	947	0.03	26	948	0.03	4242	0.0	0.0	3964	0.0	0.0
30194	333	6	6			1	437	0.00	1	437	0.00	5112	0.0	0.0	4010	0.0	0.0
30195	327	8	8			20	1,180	0.02	20	1,181	0.02	5100	0.0	0.0	3911	0.0	0.0
30196	385	6	6			28	363	0.08	28	363	0.08	5041	0.0	0.0	7534	0.0	0.0
30197	338	6	6			1	451	0.00	1	451	0.00	5115	0.0	0.0	8941	0.0	0.0
30198	463	8	8			0	756	0.00	0	758	0.00	4258	0.0	0.0	3946	0.0	0.0
30199	430	8	8			1	1,141	0.00	1	1,142	0.00	5107	0.0	0.0	3909	0.0	0.0
30200	167	8	8			372	806	0.46	372	806	0.46	3958	0.0	0.0	3821	0.0	0.0
30201	35	8	8			47	1,093	0.04	47	1,094	0.04	3959	0.0	0.0	3822	0.0	0.0
30202	278	8	8			1	472	0.00	1	472	0.00	3996	0.0	0.0	3822	0.0	0.0
30203	220	6	6			1	76	0.01	1	76	0.01	3894	0.0	0.0	3917	0.0	0.0
30205	169	8	8			81	811	0.10	81	813	0.10	3816	0.0	0.0	5175	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30206	208	8	8			0	822	0.00	0	823	0.00	3811	0.0	0.0	7083	0.0	0.0
30207	120	6	6			0	266	0.00	0	266	0.00	3790	0.0	0.0	5171	0.0	0.0
30208	40	8	8			1	1,084	0.00	1	1,085	0.00	3802	0.0	0.0	5172	0.0	0.0
30209	290	8	8			290	871	0.33	290	872	0.33	3877	0.0	0.0	3752	0.0	0.0
30210	355	8	8			1	734	0.00	1	735	0.00	7285	0.0	0.0	3753	0.0	0.0
30211	173	8	8			1	973	0.00	1	974	0.00	3986	0.0	0.0	3702	0.0	0.0
30212	85	8	8			1	297	0.00	1	298	0.00	3702	0.0	0.0	4221	0.0	0.0
30213	237	8	8			71	881	0.08	71	882	0.08	3980	0.0	0.0	3703	0.0	0.0
30214	266	8	8			22	740	0.03	22	740	0.03	7533	0.0	0.0	3661	0.0	0.0
30215	240	8	8			209	1,013	0.21	209	1,015	0.21	3673	0.0	0.0	7283	0.0	0.0
30216	285	8	8			42	542	0.08	42	542	0.08	4222	0.0	0.0	7042	0.0	0.0
30218	417	6	6			1	600	0.00	1	600	0.00	3796	0.0	0.0	3597	0.0	0.0
30219	458	8	8			1	1,318	0.00	1	1,320	0.00	3866	0.0	0.0	3599	0.0	0.0
30220	418	6	6			17	683	0.03	17	683	0.03	3798	0.0	0.0	3598	0.0	0.0
30221	142	6	6			175	434	0.40	175	434	0.40	3867	0.0	0.0	3615	0.0	0.0
30222	141	8	8			97	649	0.15	97	650	0.15	3562	0.0	0.0	5482	0.0	0.0
30223	352	6	6			1	736	0.00	1	736	0.00	3795	0.0	0.0	3596	0.0	0.0
30224	175	8	8			1	1,153	0.00	1	1,156	0.00	3872	0.0	0.0	3606	0.0	0.0
30225	75	8	8			1	1,247	0.00	1	1,249	0.00	3840	0.0	0.0	3606	0.0	0.0
30226	149	8	8			6	1,604	0.00	6	1,606	0.00	3607	0.0	0.0	3841	0.0	0.0
30227	78	6	6			1	252	0.00	1	252	0.00	3647	0.0	0.0	3841	0.0	0.0
30228	303	8	8			42	386	0.11	42	386	0.11	3560	0.0	0.0	3472	0.0	0.0
30229	1056	54	54			13,424	36,450	0.37	13,619	36,440	0.37	7747	0.0	0.0	8539	0.0	0.0
30230	214	24	24			3,751	5,833	0.64	5,032	5,833	0.86	3418	0.0	0.0	5577	0.0	0.0
30233	199	12	12			514	1,189	0.43	514	1,189	0.43	3573	0.0	0.0	3478	0.0	0.0
30234	258	8	8			456	434	1.05	0	435	0.00	3413	6.7	0.0	5567	0.0	0.0
30236	465	24	24			1,031	6,404	0.16	1,031	6,404	0.16	3638	0.0	0.0	3405	0.0	0.0
30237	82	54	54			12,183	35,143	0.35	12,391	35,143	0.35	3377	0.0	0.0	3403	0.0	0.0
30239	293	8	8			1	266	0.00	1	267	0.00	3358	0.0	0.0	3504	0.0	0.0
30240	365	8	8			1	301	0.00	1	301	0.00	7030	0.0	0.0	3465	0.0	0.0
30241	366	8	8			53	293	0.18	53	294	0.18	3360	0.0	0.0	7033	2.2	0.0
30242	297	10	15	10	Existing	601	633	0.95	602	1,865	0.32	3310	4.6	0.0	7033	2.2	0.0
30243	300	6	6			1	165	0.00	1	165	0.00	3458	0.0	0.0	3310	4.6	0.0
30245	149	8	8			332	539	0.62	332	540	0.62	3842	0.0	0.0	3259	0.0	0.0
30246	107	6	6			1	1,185	0.00	1	1,185	0.00	3646	0.0	0.0	3259	0.0	0.0
30247	260	8	8			333	336	0.99	333	337	0.99	3260	0.0	0.0	3592	0.0	0.0
30248	335	24	24			649	8,135	0.08	649	8,135	0.08	3242	0.0	0.0	3639	0.0	0.0
30249	228	8	8			10	342	0.03	10	343	0.03	3261	0.0	0.0	3629	0.0	0.0
30250	250	8	8			1	607	0.00	1	608	0.00	7137	0.0	0.0	3257	0.0	0.0
30251	325	24	24			548	6,688	0.08	548	6,688	0.08	7282	0.0	0.0	3258	0.0	0.0
30252	360	8	8			14	343	0.04	14	344	0.04	7506	0.0	0.0	7038	0.0	0.0
30253	148	54	54			7,670	34,794	0.22	7,860	34,794	0.23	3231	0.0	0.0	3377	0.0	0.0
30255	351	8	8			39	340	0.11	39	340	0.11	3253	0.0	0.0	3370	0.0	0.0
30256	689	54	54			7,664	35,267	0.22	7,853	35,267	0.22	3747	0.0	0.0	3226	0.0	0.0
30257	118	15	15			443	1,849	0.24	443	1,849	0.24	3265	0.0	0.0	3298	0.0	0.0
30259	200	8	8			1	299	0.00	1	300	0.00	3149	0.0	0.0	3276	0.0	0.0
30260	300	8	8			3	343	0.01	3	344	0.01	3104	0.0	0.0	3374	0.0	0.0
30261	301	8	8			82	602	0.14	82	603	0.14	3087	0.0	0.0	7268	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30262	287	6	6			91	219	0.41	91	219	0.41	3142	0.0	0.0	3367	0.0	0.0
30263	428	6	6			1	197	0.01	1	197	0.01	7500	0.0	0.0	3338	0.0	0.0
30265	375	10	10			652	694	0.94	653	694	0.94	3006	0.0	0.0	3117	0.0	0.0
30266	69	8	8			19	1,061	0.02	19	1,063	0.02	3689	0.0	0.0	2921	0.0	0.0
30267	377	8	8			81	372	0.22	81	372	0.22	7280	0.0	0.0	2923	0.0	0.0
30268	86	8	8			10	1,081	0.01	10	1,083	0.01	3736	0.0	0.0	2975	0.0	0.0
30270	441	8	8			6	372	0.02	6	372	0.02	3777	0.0	0.0	2880	0.0	0.0
30271	372	21	21			2,385	7,548	0.32	2,581	7,548	0.34	2926	0.0	0.0	2866	0.0	0.0
30272	264	8	8			32	375	0.09	32	375	0.09	2874	0.0	0.0	3165	0.0	0.0
30274	357	8	8			293	1,113	0.26	293	1,114	0.26	2932	0.0	0.0	2882	0.0	0.0
30276	378	54	54			7,663	35,456	0.22	7,853	35,456	0.22	2863	0.0	0.0	3746	0.0	0.0
30278	216	8	8			10	478	0.02	10	478	0.02	2975	0.0	0.0	9229	0.0	0.0
30280	801	42	42			4,656	28,092	0.17	4,656	28,092	0.17	2833	0.0	0.0	2850	0.0	0.0
30281	196	8	8			1	342	0.00	1	342	0.00	7021	0.0	0.0	2807	0.0	0.0
30282	322	8	8			263	532	0.49	263	533	0.49	2826	0.0	0.0	2931	0.0	0.0
30283	372	8	8			0	415	0.00	0	416	0.00	4117	0.0	0.0	2788	0.0	0.0
30284	221	8	8			0	553	0.00	0	554	0.00	4092	0.0	0.0	7252	0.0	0.0
30285	221	8	8			0	642	0.00	0	643	0.00	4093	0.0	0.0	2755	0.0	0.0
30286	220	8	8			0	588	0.00	0	588	0.00	4091	0.0	0.0	2754	0.0	0.0
30287	302	8	8			40	467	0.08	40	468	0.08	2756	0.0	0.0	4119	0.0	0.0
30288	210	8	8			0	978	0.00	0	980	0.00	7293	0.0	0.0	2753	0.0	0.0
30289	180	8	8			11	767	0.01	11	769	0.01	4090	0.0	0.0	2716	0.0	0.0
30290	265	8	8			0	471	0.00	0	472	0.00	2715	0.0	0.0	4088	0.0	0.0
30291	228	8	12	37	ura	139	381	0.36	140	382	0.37	2721	0.0	0.0	2611	0.0	0.0
30292	78	8	8			0	788	0.00	0	788	0.00	4235	0.0	0.0	2606	0.0	0.0
30293	295	15	18	38	2036	890	1,676	0.53	1,086	1,676	0.65	4226	0.0	0.0	2609	0.0	0.0
30294	393	21	21			2,273	4,149	0.55	2,469	4,149	0.59	2608	0.0	0.0	2912	0.0	0.0
30295	99	10	10			4	742	0.01	4	741	0.01	2960	0.0	0.0	2677	0.0	0.0
30296	345	8	8			54	749	0.07	54	749	0.07	2725	0.0	0.0	2616	0.0	0.0
30297	62	8	8			0	1,185	0.00	0	1,187	0.00	4227	0.0	0.0	2639	0.0	0.0
30298	186	8	8			18	715	0.03	18	715	0.03	7491	0.0	0.0	9001	0.0	0.0
30300	307	10	10			13	3,399	0.00	13	3,395	0.00	2816	0.0	0.0	2586	0.0	0.0
30301	415	8	8			1	1,640	0.00	1	1,642	0.00	2814	0.0	0.0	2540	0.0	0.0
30302	385	8	8			6	2,003	0.00	6	2,006	0.00	2817	0.0	0.0	2539	0.0	0.0
30303	240	8	8			0	1,003	0.00	0	1,005	0.00	2544	0.0	0.0	2654	0.0	0.0
30304	385	10	10			31	2,278	0.01	31	2,276	0.01	2538	0.0	0.0	7488	0.0	0.0
30305	224	8	8			8	1,115	0.01	8	1,117	0.01	2587	0.0	0.0	2650	0.0	0.0
30308	150	8	8			10	1,773	0.01	10	1,775	0.01	2827	0.0	0.0	2590	0.0	0.0
30309	150	8	8			10	418	0.02	10	419	0.02	2579	0.0	0.0	2827	0.0	0.0
30310	110	8	8			10	938	0.01	10	939	0.01	2828	0.0	0.0	2579	0.0	0.0
30312	293	8	12	37	ura	62	995	0.06	62	997	0.06	2507	0.0	0.0	2787	0.0	0.0
30313	266	10	10			13	736	0.02	13	735	0.02	2511	0.0	0.0	2781	0.0	0.0
30314	257	8	8			5	997	0.00	5	999	0.00	2512	0.0	0.0	2768	0.0	0.0
30315	231	8	8			13	886	0.01	13	887	0.01	2500	0.0	0.0	2697	0.0	0.0
30319	320	8	8			10	266	0.04	10	267	0.04	2469	0.0	0.0	2462	0.0	0.0
30320	517	54	54			41,292	30,565	1.35	41,976	30,565	1.37	2426	4.2	4.1	2472	0.0	0.0
30323	241	8	8			22	344	0.06	22	344	0.06	2413	0.0	0.0	7481	0.0	0.0
30326	627	54	54			23,675	61,053	0.39	24,333	61,053	0.40	2369	0.0	0.0	2436	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30332	1741	54	54			19,907	20,399	0.98	20,549	20,399	1.01	2314	0.0	0.0	2364	0.0	0.0
30335	440	16	21	21	2036	1,885	1,038	1.82	1,597	1,038	1.54	7606	2.6	3.0	2328	0.0	0.0
30336	428	8	8			198	383	0.52	198	383	0.52	2242	0.0	0.0	2391	0.0	0.0
30337	425	8	8			38	343	0.11	38	344	0.11	2333	0.0	0.0	2240	0.0	0.0
30338	175	8	8			74	335	0.22	74	336	0.22	7173	0.0	0.0	2419	0.0	0.0
30339	418	8	8			13	402	0.03	13	403	0.03	2251	0.0	0.0	7480	0.0	0.0
30340	353	8	8			7	374	0.02	7	375	0.02	2294	0.0	0.0	2413	0.0	0.0
30341	40	8	8			101	728	0.14	101	728	0.14	2336	0.0	0.0	2245	0.0	0.0
30342	130	8	8			64	436	0.15	64	437	0.15	2348	0.0	0.0	2303	0.0	0.0
30343	83	6	6			1	192	0.00	1	192	0.00	2235	0.0	0.0	2420	0.0	0.0
30344	295	8	8			14	290	0.05	14	290	0.05	2344	0.0	0.0	11040	0.0	0.0
30345	428	8	8			281	360	0.78	281	360	0.78	7473	4.4	4.4	2239	4.5	4.5
30348	767	54	54			18,045	34,029	0.53	18,976	34,029	0.56	2144	0.0	0.0	2328	0.0	0.0
30349	293	54	54			18,045	30,506	0.59	18,976	30,506	0.62	5833	0.0	0.0	2144	0.0	0.0
30351	497	8	8			281	581	0.48	281	582	0.48	2150	0.0	0.0	7473	4.4	4.4
30352	227	8	8			23	351	0.07	23	351	0.07	2212	0.0	0.0	2164	0.0	0.0
30353	423	8	8			50	342	0.15	50	342	0.15	2190	0.0	0.0	2162	0.0	0.0
30354	278	10	10			34	534	0.06	34	533	0.06	2200	0.0	0.0	2179	0.0	0.0
30355	311	8	8			3	337	0.01	3	338	0.01	2165	0.0	0.0	2221	0.0	0.0
30356	203	8	8			42	290	0.14	42	290	0.14	2193	0.0	0.0	7472	4.7	4.7
30357	260	8	8			1	336	0.00	1	337	0.00	2121	0.0	0.0	7393	0.0	0.0
30358	286	8	8			6	546	0.01	6	547	0.01	2106	0.0	0.0	7481	0.0	0.0
30359	391	12	15	1	ura	975	758	1.29	974	758	1.28	2289	4.7	4.7	2101	0.0	0.0
30360	360	8	8			9	286	0.03	9	286	0.03	2134	0.0	0.0	7174	0.0	0.0
30361	373	8	8			13	332	0.04	13	333	0.04	2083	0.0	0.0	2116	0.0	0.0
30362	250	8	8			13	343	0.04	13	344	0.04	2192	0.0	0.0	2083	0.0	0.0
30363	272	8	8			33	345	0.09	33	345	0.09	2218	0.0	0.0	2093	0.0	0.0
30367	378	16	16			2,594	3,223	0.80	2,530	3,221	0.79	1998	0.0	0.0	2146	0.0	0.0
30368	301	30	30			4,203	9,714	0.43	5,485	9,714	0.56	1992	0.0	0.0	2182	0.0	0.0
30374	310	8	8			1	678	0.00	1	679	0.00	1869	0.0	0.0	5589	0.0	0.0
30375	321	8	8			67	382	0.17	67	383	0.17	1908	0.0	0.0	5590	0.0	0.0
30376	416	8	8			111	424	0.26	111	424	0.26	2024	3.6	0.0	1872	1.9	0.0
30377	175	10	10			412	828	0.50	398	828	0.48	1968	3.7	0.0	1915	1.9	0.0
30378	468	12	12			569	698	0.82	626	698	0.90	1948	1.7	0.0	7003	2.9	0.0
30379	450	8	8			1	355	0.00	1	356	0.00	1862	0.0	0.0	5551	0.0	0.0
30380	259	8	8			74	469	0.16	74	470	0.16	1925	0.0	0.0	5551	0.0	0.0
30381	434	8	8			528	451	1.17	74	452	0.16	1863	7.9	0.0	5570	8.5	0.0
30382	320	8	8			489	638	0.77	34	639	0.05	5566	8.6	0.0	1863	7.9	0.0
30383	201	6	6			1	291	0.00	1	291	0.00	1865	0.0	0.0	2000	0.0	0.0
30386	156	8	8			279	445	0.63	101	446	0.23	7456	1.0	0.0	1891	0.0	0.0
30387	131	12	12			107	227	0.47	107	227	0.47	1755	0.0	0.0	3507	0.0	0.0
30389	319	8	8			67	178	0.38	67	178	0.37	1775	3.5	0.0	1893	2.7	0.0
30390	120	10	18	5	Existing	675	399	1.69	1,758	1,915	0.92	1821	7.4	0.0	7135	7.2	0.0
30391	447	6	6			0	93	0.00	0	93	0.00	1758	0.0	0.0	3493	0.0	0.0
30392	316	8	8			1	237	0.00	1	237	0.00	1742	0.0	0.0	7512	0.0	0.0
30394	295	8	8			10	280	0.04	1	281	0.00	3514	0.0	0.0	1756	7.9	0.0
30395	446	8	8			84	416	0.20	84	417	0.20	1833	0.0	0.0	3412	0.0	0.0
30396	277	8	8			7	284	0.02	7	284	0.02	3456	0.0	0.0	1834	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30397	319	8	8			2	821	0.00	2	822	0.00	1837	0.0	0.0	3505	0.0	0.0
30398	205	8	8			1	311	0.00	1	311	0.00	7461	0.0	0.0	3515	0.0	0.0
30400	127	10	15	4	Existing	749	449	1.67	919	1,322	0.70	1894	6.8	0.0	1789	3.9	0.0
30401	319	8	8			206	275	0.75	205	275	0.74	6996	2.0	0.0	1779	0.0	0.0
30402	177	8	8			69	250	0.28	30	251	0.12	1710	1.9	0.0	1948	1.7	0.0
30403	327	8	8			115	558	0.21	94	558	0.17	1675	0.0	0.0	7724	4.2	6.5
30404	328	6	6			171	140	1.22	166	140	1.19	1674	4.6	5.8	1957	4.4	6.0
30405	351	10	10			169	548	0.31	169	547	0.31	1718	0.0	0.0	1800	2.6	0.0
30406	92	8	8			26	748	0.03	1	749	0.00	1716	2.0	0.0	1604	4.2	0.0
30407	119	8	8			1	206	0.01	1	206	0.01	1540	0.0	0.0	1838	0.0	0.0
30408	113	8	8			1	313	0.00	1	313	0.00	1513	0.0	0.0	1790	0.0	0.0
30409	95	8	8			81	485	0.17	81	485	0.17	1512	0.0	0.0	1790	0.0	0.0
30410	30	8	8			351	701	0.50	351	703	0.50	1494	0.0	0.0	3328	0.0	0.0
30411	324	8	8			351	363	0.97	351	364	0.97	3328	0.0	0.0	1545	0.0	0.0
30412	137	10	10			353	637	0.55	353	636	0.55	1492	0.0	0.0	3314	0.0	0.0
30413	339	15	15			1,801	2,053	0.88	1,801	2,053	0.88	1546	0.0	0.0	3326	0.0	0.0
30415	377	10	15	8	Existing	540	519	1.04	601	1,530	0.39	1600	0.0	0.0	1496	1.4	0.0
30416	190	8	8			1	383	0.00	1	384	0.00	1660	0.0	0.0	1564	0.0	0.0
30417	280	8	8			17	379	0.05	17	380	0.05	7453	0.0	0.0	1565	0.0	0.0
30418	7	12	12			229	1,047	0.22	229	1,047	0.22	1602	0.0	0.0	1507	0.0	0.0
30419	310	6	6			154	239	0.65	154	239	0.65	1376	0.0	0.0	1530	0.0	0.0
30420	283	8	8			252	572	0.44	252	573	0.44	1382	0.0	0.0	1539	0.0	0.0
30421	198	12	12			492	1,772	0.28	492	1,772	0.28	1384	0.0	0.0	1565	0.0	0.0
30422	252	8	8			16	345	0.05	16	346	0.05	1367	0.0	0.0	3123	0.0	0.0
30423	148	6	6			1	215	0.01	1	215	0.01	1347	0.0	0.0	3121	0.0	0.0
30424	313	6	6			141	108	1.31	141	108	1.31	1370	0.0	0.0	1523	0.0	0.0
30425	83	8	8			56	967	0.06	56	969	0.06	7438	0.0	0.0	1527	0.0	0.0
30426	26	8	8			0	476	0.00	0	476	0.00	1370	0.0	0.0	1528	0.0	0.0
30427	399	12	12			106	1,006	0.10	106	1,006	0.10	1334	0.0	0.0	1437	0.0	0.0
30428	527	8	8			10	472	0.02	10	473	0.02	1332	0.0	0.0	1426	0.0	0.0
30429	275	8	8			115	381	0.30	115	382	0.30	1294	0.0	0.0	1381	0.0	0.0
30430	274	8	8			41	382	0.11	41	383	0.11	1293	0.0	0.0	1380	0.0	0.0
30431	274	8	8			85	382	0.22	85	383	0.22	1292	0.0	0.0	1419	0.0	0.0
30432	288	8	8			1	782	0.00	1	783	0.00	7647	0.0	0.0	1420	0.0	0.0
30433	137	8	8			1	419	0.00	1	420	0.00	1286	0.0	0.0	1395	0.0	0.0
30438	341	8	8			17	338	0.05	17	338	0.05	1166	0.0	0.0	7133	0.0	0.0
30443	329	8	8			60	458	0.13	60	458	0.13	1147	0.0	0.0	3030	0.0	0.0
30444	311	8	8			1	384	0.00	1	385	0.00	3029	0.0	0.0	1162	0.0	0.0
30490	384	8	8			51	374	0.14	51	374	0.14	1111	0.0	0.0	1109	0.0	0.0
30491	61	8	8			66	369	0.18	66	369	0.18	1108	0.0	0.0	1104	0.0	0.0
30492	68	8	8			13	1,725	0.01	13	1,727	0.01	1103	0.0	0.0	1104	0.0	0.0
30493	284	8	8			13	2,259	0.01	13	2,262	0.01	1102	0.0	0.0	1103	0.0	0.0
30494	79	8	8			8	584	0.01	8	585	0.01	1107	0.0	0.0	1108	0.0	0.0
30495	60	6	6			8	764	0.01	8	764	0.01	1106	0.0	0.0	1107	0.0	0.0
30496	139	8	8			78	392	0.20	78	393	0.20	1104	0.0	0.0	1113_WETWELL	0.0	0.0
30514	360	8	8			16	343	0.05	16	344	0.05	1167	0.0	0.0	1166	0.0	0.0
30515	147	8	8			1	424	0.00	1	425	0.00	1176	0.0	0.0	1149	0.0	0.0
30516	134	8	8			36	419	0.09	36	419	0.09	1149	0.0	0.0	1168	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30517	245	8	8			38	423	0.09	38	424	0.09	1168	0.0	0.0	1169	0.0	0.0
30518	240	8	8			39	420	0.09	39	421	0.09	1169	0.0	0.0	1154	0.0	0.0
30519	50	8	8			5	399	0.01	5	399	0.01	1170	0.0	0.0	1147	0.0	0.0
30520	297	8	8			3	568	0.01	3	569	0.01	1171	0.0	0.0	1170	0.0	0.0
30521	365	8	8			1	490	0.00	1	490	0.00	1172	0.0	0.0	1171	0.0	0.0
30522	458	8	8			26	344	0.08	26	344	0.08	1164	0.0	0.0	1165	0.0	0.0
30523	250	8	8			25	518	0.05	25	519	0.05	1173	0.0	0.0	1164	0.0	0.0
30524	50	8	8			23	420	0.05	23	421	0.05	1163	0.0	0.0	1173	0.0	0.0
30525	43	8	8			1	370	0.00	1	370	0.00	1114	0.0	0.0	1163	0.0	0.0
30572	266	8	8			1	484	0.00	1	485	0.00	1177	0.0	0.0	1230	0.0	0.0
30615	280	8	8			24	353	0.07	24	354	0.07	7436	0.0	0.0	1301	0.0	0.0
30616	301	8	8			22	308	0.07	22	308	0.07	1302	0.0	0.0	7436	0.0	0.0
30617	291	8	8			20	364	0.06	20	365	0.06	1305	0.0	0.0	1302	0.0	0.0
30618	144	8	8			55	389	0.14	55	390	0.14	1301	0.0	0.0	1300	0.0	0.0
30619	335	8	8			113	384	0.29	113	385	0.29	1300	0.0	0.0	1294	0.0	0.0
30620	318	8	8			55	383	0.14	55	383	0.14	7211	0.0	0.0	1321	0.0	0.0
30621	237	8	8			19	405	0.05	19	406	0.05	1306	0.0	0.0	1322	0.0	0.0
30622	320	8	8			17	381	0.05	17	382	0.05	1297	0.0	0.0	1298	0.0	0.0
30623	323	8	8			15	383	0.04	15	383	0.04	1307	0.0	0.0	1297	0.0	0.0
30624	252	8	8			3	390	0.01	3	390	0.01	1323	0.0	0.0	1307	0.0	0.0
30625	328	8	8			40	390	0.10	40	390	0.10	1299	0.0	0.0	1293	0.0	0.0
30626	335	8	8			83	381	0.22	83	381	0.22	1296	0.0	0.0	1292	0.0	0.0
30627	322	8	8			58	383	0.15	58	383	0.15	1314	0.0	0.0	7437	0.0	0.0
30628	252	8	8			41	377	0.11	41	378	0.11	1315	0.0	0.0	1314	0.0	0.0
30629	135	12	12			51	1,011	0.05	51	1,011	0.05	1311	0.0	0.0	1334	0.0	0.0
30630	275	8	8			1	383	0.00	1	383	0.00	1325	0.0	0.0	1295	0.0	0.0
30631	175	8	8			19	360	0.05	19	360	0.05	1304	0.0	0.0	1305	0.0	0.0
30632	170	8	8			17	642	0.03	17	642	0.03	1326	0.0	0.0	1304	0.0	0.0
30633	40	8	8			1	642	0.00	1	642	0.00	1248	0.0	0.0	1326	0.0	0.0
30634	195	6	6			1	225	0.01	1	225	0.01	1249	0.0	0.0	1326	0.0	0.0
30635	213	8	8			17	481	0.04	17	481	0.04	1327	0.0	0.0	1306	0.0	0.0
30636	332	8	8			1	542	0.00	1	543	0.00	1312	0.0	0.0	1327	0.0	0.0
30637	165	8	8			40	378	0.10	40	378	0.10	1316	0.0	0.0	1315	0.0	0.0
30638	82	8	8			38	344	0.11	38	344	0.11	1317	0.0	0.0	1316	0.0	0.0
30639	203	8	8			18	344	0.05	18	345	0.05	1313	0.0	0.0	1317	0.0	0.0
30640	215	8	8			17	667	0.03	17	668	0.02	1328	0.0	0.0	1318	0.0	0.0
30641	161	8	8			15	685	0.02	15	686	0.02	1329	0.0	0.0	1328	0.0	0.0
30642	318	8	8			17	608	0.03	17	609	0.03	7383	0.0	0.0	1313	0.0	0.0
30643	161	8	8			15	385	0.04	15	385	0.04	1250	0.0	0.0	7383	0.0	0.0
30644	175	8	8			54	458	0.12	54	459	0.12	1310	0.0	0.0	1334	0.0	0.0
30645	350	8	8			7	473	0.01	7	474	0.01	1331	0.0	0.0	1330	0.0	0.0
30646	404	8	8			5	417	0.01	5	418	0.01	1320	0.0	0.0	1331	0.0	0.0
30647	200	8	8			11	341	0.03	11	342	0.03	1309	0.0	0.0	1310	0.0	0.0
30648	254	8	8			9	581	0.02	9	581	0.02	1308	0.0	0.0	1309	0.0	0.0
30649	355	8	8			8	396	0.02	8	397	0.02	1319	0.0	0.0	1308	0.0	0.0
30650	105	6	6			1	201	0.01	1	201	0.01	1254	0.0	0.0	1319	0.0	0.0
30656	300	8	8			63	700	0.09	63	701	0.09	1374	0.0	0.0	1376	0.0	0.0
30657	94	8	8			62	540	0.11	62	540	0.11	1375	0.0	0.0	1374	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30658	159	8	8			60	539	0.11	60	540	0.11	1373	0.0	0.0	1375	0.0	0.0
30659	336	8	8			33	400	0.08	33	401	0.08	1411	0.0	0.0	7214	0.0	0.0
30660	102	8	8			3	383	0.01	3	384	0.01	1407	0.0	0.0	1411	0.0	0.0
30661	125	6	6			1	176	0.01	1	176	0.01	1343	0.0	0.0	1407	0.0	0.0
30662	350	8	8			5	484	0.01	5	485	0.01	1412	0.0	0.0	1411	0.0	0.0
30663	130	8	8			1	415	0.00	1	415	0.00	1409	0.0	0.0	1412	0.0	0.0
30664	360	8	8			90	491	0.18	90	492	0.18	1377	0.0	0.0	1376	0.0	0.0
30667	236	6	6			3	195	0.02	3	195	0.02	1383	0.0	0.0	1382	0.0	0.0
30668	245	6	6			0	192	0.00	0	192	0.00	1384	0.0	0.0	6985	0.0	0.0
30669	307	8	8			26	540	0.05	26	542	0.05	1378	0.0	0.0	1377	0.0	0.0
30670	300	8	8			25	538	0.05	25	539	0.05	1408	0.0	0.0	1378	0.0	0.0
30671	271	8	8			1	536	0.00	1	537	0.00	1344	0.0	0.0	1408	0.0	0.0
30672	151	8	8			235	481	0.49	235	482	0.49	1415	0.0	0.0	1382	0.0	0.0
30673	163	8	8			234	485	0.48	234	485	0.48	1379	0.0	0.0	1415	0.0	0.0
30674	337	8	8			208	482	0.43	208	483	0.43	1393	0.0	0.0	1379	0.0	0.0
30675	331	8	8			181	501	0.36	181	501	0.36	1394	0.0	0.0	1393	0.0	0.0
30676	147	8	8			134	438	0.31	134	439	0.31	1399	0.0	0.0	6986	0.0	0.0
30677	68	8	8			131	255	0.51	131	255	0.51	7440	0.0	0.0	1399	0.0	0.0
30678	325	8	8			24	417	0.06	24	417	0.06	7164	0.0	0.0	1379	0.0	0.0
30679	323	8	8			1	417	0.00	1	417	0.00	7439	0.0	0.0	7164	0.0	0.0
30680	312	8	8			26	386	0.07	26	387	0.07	1391	0.0	0.0	1393	0.0	0.0
30681	345	8	8			1	378	0.00	1	379	0.00	1390	0.0	0.0	1391	0.0	0.0
30682	318	8	8			22	383	0.06	22	384	0.06	1416	0.0	0.0	1394	0.0	0.0
30683	325	8	8			1	379	0.00	1	380	0.00	1417	0.0	0.0	1416	0.0	0.0
30684	246	6	6			21	215	0.10	21	215	0.10	6987	0.0	0.0	6986	0.0	0.0
30685	32	6	6			3	178	0.02	3	178	0.02	7441	0.0	0.0	6987	0.0	0.0
30686	252	6	6			1	178	0.01	1	178	0.01	1418	0.0	0.0	7441	0.0	0.0
30687	225	8	8			1	343	0.00	1	344	0.00	1345	0.0	0.0	1399	0.0	0.0
30688	316	12	12			467	1,414	0.33	467	1,414	0.33	1381	0.0	0.0	1384	0.0	0.0
30689	335	12	12			280	1,743	0.16	280	1,743	0.16	1419	0.0	0.0	1380	0.0	0.0
30690	198	12	12			176	1,546	0.11	176	1,546	0.11	1420	0.0	0.0	1419	0.0	0.0
30691	155	12	12			165	1,258	0.13	165	1,258	0.13	1437	0.0	0.0	1420	0.0	0.0
30692	196	8	8			59	380	0.16	59	380	0.16	1397	0.0	0.0	1437	0.0	0.0
30693	300	8	8			23	542	0.04	23	543	0.04	1396	0.0	0.0	7213	0.0	0.0
30694	50	8	8			25	589	0.04	25	590	0.04	7213	0.0	0.0	1397	0.0	0.0
30695	122	8	8			33	387	0.08	33	388	0.08	1398	0.0	0.0	1397	0.0	0.0
30696	275	8	8			6	401	0.02	6	401	0.02	1422	0.0	0.0	1421	0.0	0.0
30697	273	8	8			5	383	0.01	5	383	0.01	1423	0.0	0.0	1422	0.0	0.0
30698	64	8	8			1	418	0.00	1	419	0.00	1424	0.0	0.0	1423	0.0	0.0
30699	111	8	8			1	422	0.00	1	422	0.00	1425	0.0	0.0	1423	0.0	0.0
30700	380	8	8			107	461	0.23	107	462	0.23	1400	0.0	0.0	7440	0.0	0.0
30701	365	8	8			89	462	0.19	89	463	0.19	1401	0.0	0.0	1400	0.0	0.0
30702	295	12	12			88	1,585	0.06	88	1,585	0.06	1410	0.0	0.0	1401	0.0	0.0
30703	420	8	8			22	651	0.03	22	652	0.03	1402	0.0	0.0	1403	0.0	0.0
30704	360	8	8			0	336	0.00	0	336	0.00	1401	0.0	0.0	1402	0.0	0.0
30705	150	8	8			1	420	0.00	1	421	0.00	1346	0.0	0.0	1402	0.0	0.0
30706	521	8	8			40	444	0.09	40	445	0.09	1426	0.0	0.0	1410	0.0	0.0
30707	365	8	8			3	483	0.01	3	484	0.01	1353	0.0	0.0	1356	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30708	138	8	8			33	426	0.08	33	426	0.08	1389	0.0	0.0	1385	0.0	0.0
30709	354	8	8			32	481	0.07	32	481	0.07	1356	0.0	0.0	1389	0.0	0.0
30710	334	8	8			35	505	0.07	35	505	0.07	1385	0.0	0.0	1388	0.0	0.0
30711	485	8	8			36	344	0.11	36	344	0.10	1403	0.0	0.0	1387	0.0	0.0
30712	69	8	8			1	476	0.00	1	476	0.00	1352	0.0	0.0	1355	0.0	0.0
30713	231	8	8			3	376	0.01	3	376	0.01	1355	0.0	0.0	1356	0.0	0.0
30714	427	8	8			150	451	0.33	150	452	0.33	1386	0.0	0.0	1364	0.0	0.0
30715	165	8	8			149	383	0.39	149	383	0.39	1427	0.0	0.0	1386	0.0	0.0
30716	135	8	8			82	770	0.11	82	771	0.11	1428	0.0	0.0	1427	0.0	0.0
30717	485	8	8			38	342	0.11	38	342	0.11	1387	0.0	0.0	1427	0.0	0.0
30718	302	8	8			15	507	0.03	15	508	0.03	1366	0.0	0.0	1367	0.0	0.0
30719	245	8	8			13	490	0.03	13	491	0.03	1365	0.0	0.0	1366	0.0	0.0
30720	360	8	8			63	590	0.11	63	591	0.11	1371	0.0	0.0	1370	0.0	0.0
30721	360	8	8			0	510	0.00	0	511	0.00	1376	0.0	0.0	1371	0.0	0.0
30722	224	6	6			31	222	0.14	31	222	0.14	6984	0.0	0.0	1371	0.0	0.0
30723	191	6	6			29	208	0.14	29	208	0.14	1372	0.0	0.0	6984	0.0	0.0
30724	197	6	6			28	206	0.14	28	206	0.14	7212	0.0	0.0	1372	0.0	0.0
30725	220	8	8			5	586	0.01	5	587	0.01	1429	0.0	0.0	1406	0.0	0.0
30726	220	8	8			3	586	0.01	3	587	0.01	1405	0.0	0.0	1429	0.0	0.0
30727	109	8	8			1	569	0.00	1	570	0.00	1430	0.0	0.0	1405	0.0	0.0
30728	194	8	8			42	553	0.08	42	554	0.08	6988	0.0	0.0	7215	0.0	0.0
30729	202	8	8			8	633	0.01	8	634	0.01	1431	0.0	0.0	6988	0.0	0.0
30730	26	8	8			46	353	0.13	46	353	0.13	7384	0.0	0.0	1369	0.0	0.0
30731	212	8	8			44	484	0.09	44	485	0.09	7215	0.0	0.0	7384	0.0	0.0
30732	197	6	6			5	192	0.03	5	192	0.03	1368	0.0	0.0	1369	0.0	0.0
30733	80	6	6			1	205	0.01	1	205	0.01	1350	0.0	0.0	1368	0.0	0.0
30734	200	6	6			1	159	0.01	1	159	0.01	1351	0.0	0.0	1431	0.0	0.0
30735	45	8	8			54	626	0.09	54	627	0.09	1360	0.0	0.0	7438	0.0	0.0
30736	275	6	6			1	215	0.01	1	215	0.01	1359	0.0	0.0	1368	0.0	0.0
30737	238	8	8			53	478	0.11	53	479	0.11	1434	0.0	0.0	1360	0.0	0.0
30738	192	8	8			34	701	0.05	34	702	0.05	1361	0.0	0.0	1434	0.0	0.0
30739	200	8	8			29	526	0.06	29	526	0.06	1358	0.0	0.0	1362	0.0	0.0
30740	185	8	8			28	550	0.05	28	551	0.05	1357	0.0	0.0	1358	0.0	0.0
30741	230	8	8			1	383	0.00	1	384	0.00	1436	0.0	0.0	1357	0.0	0.0
30742	88	8	8			1	311	0.00	1	312	0.00	1341	0.0	0.0	1433	0.0	0.0
30744	58	6	6			26	206	0.12	26	206	0.12	1342	0.0	0.0	7212	0.0	0.0
30745	198	8	8			24	369	0.07	24	370	0.07	1406	0.0	0.0	1342	0.0	0.0
30747	122	8	8			1	431	0.00	1	432	0.00	1541	0.0	0.0	1540	0.0	0.0
30748	90	8	8			1	431	0.00	1	431	0.00	7656	0.0	0.0	1541	0.0	0.0
30749	321	8	8			1	438	0.00	1	438	0.00	1514	0.0	0.0	1513	0.0	0.0
30750	140	8	8			1	343	0.00	1	344	0.00	1542	0.0	0.0	1514	0.0	0.0
30751	140	8	8			81	485	0.17	81	486	0.17	1495	0.0	0.0	1512	0.0	0.0
30752	397	6	6			1	113	0.01	1	113	0.01	7218	0.0	0.0	1495	0.0	0.0
30753	390	8	8			26	444	0.06	26	444	0.06	1497	0.0	0.0	1495	0.0	0.0
30754	400	6	6			26	158	0.16	26	158	0.16	1509	0.0	0.0	1497	0.0	0.0
30755	287	10	10			192	599	0.32	192	598	0.32	7446	0.0	0.0	1517	0.0	0.0
30756	225	6	6			1	131	0.01	1	131	0.01	1510	0.0	0.0	1517	0.0	0.0
30757	150	8	8			1	274	0.00	1	274	0.00	1511	0.0	0.0	1510	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30758	267	10	10			252	603	0.42	252	602	0.42	1517	0.0	0.0	1516	0.0	0.0
30759	291	8	8			252	380	0.66	252	380	0.66	1516	0.0	0.0	1515	0.0	0.0
30760	232	10	10			253	367	0.69	253	367	0.69	1515	0.0	0.0	1493	0.0	0.0
30761	250	10	10			351	565	0.62	351	565	0.62	1493	0.0	0.0	1494	0.0	0.0
30762	148	10	10			352	637	0.55	352	636	0.55	1545	0.0	0.0	1492	0.0	0.0
30763	391	15	15			1,661	2,053	0.81	1,661	2,053	0.81	1547	0.0	0.0	1546	0.0	0.0
30764	261	15	15			1,925	2,249	0.86	1,917	2,249	0.85	1548	0.0	0.0	1547	0.0	0.0
30765	16	12	15	12	2036	5,666	2,190	2.59	5,693	2,190	2.60	1549	0.0	0.0	1548	0.0	0.0
30766	444	12	15	12	2036	1,408	1,068	1.32	1,408	1,068	1.32	1550	7.6	7.6	1549	0.0	0.0
30767	83	10	15	8	Existing	625	614	1.02	703	1,810	0.39	1551	3.7	0.0	1499	3.8	0.0
30768	282	10	15	8	Existing	601	609	0.99	676	1,797	0.38	1552	2.0	0.0	1551	3.7	0.0
30769	397	8	8			75	546	0.14	75	547	0.14	1501	0.0	0.0	1552	2.0	0.0
30770	65	8	8			1	278	0.00	1	279	0.00	1504	0.0	0.0	1501	0.0	0.0
30771	318	8	8			1	286	0.00	1	286	0.00	1553	0.0	0.0	1504	0.0	0.0
30772	315	8	8			1	286	0.00	1	287	0.00	1503	0.0	0.0	1553	0.0	0.0
30773	400	10	15	8	Existing	540	434	1.24	601	1,279	0.47	1496	1.4	0.0	1552	2.0	0.0
30774	252	6	6			1	107	0.01	1	107	0.01	7445	0.0	0.0	1554	0.0	0.0
30775	274	8	8			1	240	0.00	1	240	0.00	1554	0.0	0.0	1555	0.0	0.0
30776	227	8	8			70	241	0.29	70	242	0.29	1555	0.0	0.0	1556	0.0	0.0
30777	100	6	6			1	151	0.00	1	151	0.00	1498	0.0	0.0	1557	0.0	0.0
30778	285	8	8			87	352	0.25	87	353	0.25	1557	0.0	0.0	1506	0.0	0.0
30779	263	8	8			40	324	0.12	40	324	0.12	1505	0.0	0.0	1558	0.0	0.0
30780	276	8	8			85	325	0.26	85	325	0.26	1502	0.0	0.0	1559	0.0	0.0
30781	275	8	8			85	326	0.26	85	326	0.26	1559	0.0	0.0	1506	0.0	0.0
30782	291	8	8			173	326	0.53	173	326	0.53	1506	0.0	0.0	7446	0.0	0.0
30783	363	12	12			785	1,038	0.76	785	1,038	0.76	1507	0.0	0.0	1560	7.1	7.1
30784	348	12	12			790	1,197	0.66	790	1,197	0.66	1560	7.1	7.1	1508	7.4	7.4
30785	339	12	15	12	2036	1,138	1,092	1.04	1,138	1,092	1.04	1508	7.4	7.4	6990	0.0	0.0
30786	233	8	8			1	391	0.00	1	392	0.00	1561	0.0	0.0	6990	0.0	0.0
30787	184	12	12			555	1,676	0.33	555	1,676	0.33	1562	0.0	0.0	1507	0.0	0.0
30788	66	12	12			526	1,682	0.31	526	1,682	0.31	7221	0.0	0.0	1562	0.0	0.0
30789	220	12	12			522	1,663	0.31	522	1,663	0.31	7449	0.0	0.0	1563	0.0	0.0
30790	230	12	12			521	1,961	0.27	521	1,961	0.27	1564	0.0	0.0	7449	0.0	0.0
30791	178	12	12			510	1,728	0.30	510	1,728	0.30	1565	0.0	0.0	1564	0.0	0.0
30792	227	6	6			5	202	0.02	5	202	0.02	1538	0.0	0.0	7220	0.0	0.0
30793	150	6	6			3	203	0.02	3	203	0.02	7447	0.0	0.0	1538	0.0	0.0
30794	236	6	6			1	202	0.01	1	202	0.01	1490	0.0	0.0	7447	0.0	0.0
30795	300	6	6			3	195	0.02	3	195	0.02	1537	0.0	0.0	6992	0.0	0.0
30796	300	6	6			1	195	0.01	1	195	0.01	1491	0.0	0.0	1537	0.0	0.0
30797	355	8	8			329	642	0.51	329	642	0.51	6992	0.0	0.0	1508	7.4	7.4
30798	337	6	6			27	194	0.14	27	194	0.14	7219	0.0	0.0	1535	0.0	0.0
30799	338	6	6			1	193	0.01	1	193	0.01	1536	0.0	0.0	7219	0.0	0.0
30800	330	8	8			210	508	0.41	210	508	0.41	1534	0.0	0.0	1535	0.0	0.0
30801	341	6	6			26	157	0.16	26	157	0.16	1533	0.0	0.0	1534	0.0	0.0
30802	351	6	6			1	152	0.01	1	152	0.01	1532	0.0	0.0	1533	0.0	0.0
30803	190	8	8			182	516	0.35	182	517	0.35	1529	0.0	0.0	1534	0.0	0.0
30804	138	8	8			181	510	0.35	181	510	0.35	1530	0.0	0.0	1529	0.0	0.0
30805	321	6	6			1	159	0.01	1	159	0.01	1531	0.0	0.0	1566	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30806	345	6	6			3	248	0.01	3	248	0.01	1518	0.0	0.0	1548	0.0	0.0
30807	240	6	6			1	237	0.01	1	237	0.01	1519	0.0	0.0	1518	0.0	0.0
30808	355	8	8			185	451	0.41	185	451	0.41	7165	0.0	0.0	1524	0.0	0.0
30809	340	6	6			3	158	0.02	3	158	0.02	1520	0.0	0.0	7165	0.0	0.0
30810	344	6	6			1	159	0.01	1	159	0.01	1567	0.0	0.0	1520	0.0	0.0
30811	361	6	6			24	485	0.05	24	485	0.05	1522	0.0	0.0	1523	0.0	0.0
30812	315	6	6			1	159	0.01	1	159	0.01	1521	0.0	0.0	1522	0.0	0.0
30813	19	8	8			3	482	0.01	3	483	0.01	6991	0.0	0.0	1523	0.0	0.0
30814	270	8	8			1	460	0.00	1	460	0.00	1528	0.0	0.0	6991	0.0	0.0
30815	326	8	8			110	387	0.28	110	388	0.28	1525	0.0	0.0	1546	0.0	0.0
30816	350	8	8			108	372	0.29	108	372	0.29	1568	0.0	0.0	1525	0.0	0.0
30817	337	8	8			59	402	0.15	59	402	0.15	1526	0.0	0.0	1568	0.0	0.0
30818	320	8	8			283	576	0.49	283	577	0.49	1574	0.0	0.0	7220	0.0	0.0
30829	284	8	8			294	301	0.98	294	302	0.97	1604	4.2	0.0	1588	3.2	0.0
30832	310	10	15	8	Existing	551	508	1.09	551	1,496	0.37	1594	0.1	0.0	1600	0.0	0.0
30833	193	10	12	9	Existing	551	407	1.35	551	661	0.83	1590	1.1	0.0	1594	0.1	0.0
30834	305	10	12	9	Existing	467	542	0.86	467	881	0.53	1587	2.3	0.0	1590	1.1	0.0
30835	256	8	12	9	Existing	294	261	1.13	294	770	0.38	1588	3.2	0.0	1587	2.3	0.0
30836	35	8	8			174	349	0.50	172	350	0.49	1586	2.0	0.0	1587	2.3	0.0
30837	440	8	8			172	336	0.51	172	337	0.51	1642	5.7	0.0	1586	2.0	0.0
30838	335	6	6			3	133	0.02	2	133	0.02	1614	0.0	0.0	1642	5.7	0.0
30839	338	6	6			1	145	0.01	1	145	0.01	6994	0.0	0.0	1614	0.0	0.0
30840	137	6	6			1	208	0.01	1	208	0.01	1634	0.0	0.0	6994	0.0	0.0
30841	276	6	6			1	184	0.00	1	184	0.00	7657	0.0	0.0	1615	0.0	0.0
30842	370	6	6			41	174	0.24	41	174	0.24	1641	0.0	0.0	1615	0.0	0.0
30843	310	6	6			40	176	0.23	40	176	0.23	1585	0.0	0.0	1641	0.0	0.0
30844	83	6	6			40	454	0.09	40	454	0.09	1640	0.0	0.0	1585	0.0	0.0
30845	278	6	6			40	242	0.16	40	242	0.16	1639	0.0	0.0	1640	0.0	0.0
30846	228	6	6			83	231	0.36	83	231	0.36	7450	1.8	0.0	1590	1.1	0.0
30847	235	6	6			83	203	0.41	83	203	0.41	1593	4.6	0.0	7450	1.8	0.0
30848	225	6	6			1	205	0.01	1	205	0.01	1591	0.0	0.0	1593	4.6	0.0
30849	223	6	6			1	205	0.00	1	205	0.00	1643	0.0	0.0	1596	0.0	0.0
30850	288	6	6			71	242	0.29	49	242	0.20	1595	3.6	0.0	1600	0.0	0.0
30851	209	6	6			1	219	0.01	1	219	0.01	1592	0.0	0.0	1601	5.6	0.0
30852	175	8	8			1	290	0.00	1	291	0.00	1644	0.0	0.0	1592	0.0	0.0
30853	69	8	8			1	271	0.00	1	271	0.00	1658	0.0	0.0	1644	0.0	0.0
30854	302	12	12			228	1,327	0.17	228	1,327	0.17	1599	0.0	0.0	1602	0.0	0.0
30855	345	12	12			176	1,037	0.17	176	1,037	0.17	1598	0.0	0.0	1599	0.0	0.0
30856	335	8	8			190	309	0.61	190	310	0.61	7451	6.3	0.0	1589	5.7	0.0
30857	300	8	8			63	312	0.20	58	312	0.19	1606	4.1	0.0	1645	2.9	0.0
30858	305	8	8			58	393	0.15	58	394	0.15	1605	0.0	0.0	1606	4.1	0.0
30859	300	8	8			58	438	0.13	58	438	0.13	7222	0.0	0.0	1605	0.0	0.0
30860	274	8	8			58	763	0.08	58	763	0.08	1646	0.0	0.0	7222	0.0	0.0
30861	125	8	8			24	344	0.07	24	344	0.07	1617	0.0	0.0	1646	0.0	0.0
30862	175	8	8			24	278	0.09	24	279	0.09	1584	0.0	0.0	1617	0.0	0.0
30863	300	8	8			75	683	0.11	75	684	0.11	1610	0.0	0.0	7451	6.3	0.0
30864	305	8	8			74	400	0.19	74	400	0.19	1609	0.0	0.0	1610	0.0	0.0
30865	300	8	8			33	494	0.07	33	495	0.07	1608	0.0	0.0	1609	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30866	271	8	8			33	504	0.06	33	505	0.06	1607	0.0	0.0	1608	0.0	0.0
30867	150	8	8			33	548	0.06	33	549	0.06	1626	0.0	0.0	1607	0.0	0.0
30868	270	8	8			103	836	0.12	103	837	0.12	1613	0.0	0.0	1589	5.7	0.0
30869	255	8	8			67	420	0.16	67	421	0.16	1612	0.0	0.0	1613	0.0	0.0
30870	220	8	8			27	458	0.06	27	459	0.06	1619	0.0	0.0	1618	0.0	0.0
30871	330	8	8			26	574	0.05	26	575	0.05	1648	0.0	0.0	1619	0.0	0.0
30872	445	8	8			32	540	0.06	32	541	0.06	1647	0.0	0.0	1626	0.0	0.0
30873	278	8	8			24	310	0.08	24	311	0.08	7166	0.0	0.0	1584	0.0	0.0
30874	307	8	8			1	310	0.00	1	310	0.00	1620	0.0	0.0	7166	0.0	0.0
30875	133	12	12			111	1,886	0.06	111	1,886	0.06	1630	0.0	0.0	1631	0.0	0.0
30876	325	12	12			80	687	0.12	80	687	0.12	6995	0.0	0.0	1630	0.0	0.0
30877	266	8	8			53	342	0.16	53	343	0.16	1625	0.0	0.0	6995	0.0	0.0
30878	231	8	8			1	344	0.00	1	344	0.00	1622	0.0	0.0	1625	0.0	0.0
30879	365	8	8			1	340	0.00	1	340	0.00	7223	0.0	0.0	1629	0.0	0.0
30880	355	8	8			24	590	0.04	24	591	0.04	1628	0.0	0.0	6995	0.0	0.0
30881	380	8	8			1	594	0.00	1	595	0.00	1627	0.0	0.0	1628	0.0	0.0
30882	400	8	8			31	542	0.06	31	543	0.06	1624	0.0	0.0	1625	0.0	0.0
30883	30	8	8			17	383	0.05	17	384	0.05	1649	0.0	0.0	1624	0.0	0.0
30884	219	8	8			14	249	0.06	14	249	0.06	10082	0.0	0.0	1650	0.0	0.0
30885	289	6	6			39	242	0.16	39	242	0.16	1657	0.0	0.0	1639	0.0	0.0
30886	275	12	12			174	1,011	0.17	174	1,011	0.17	1651	0.0	0.0	1598	0.0	0.0
30887	286	12	12			172	1,027	0.17	172	1,027	0.17	1637	0.0	0.0	1651	0.0	0.0
30888	14	12	12			171	1,481	0.12	171	1,481	0.12	1638	0.0	0.0	1637	0.0	0.0
30889	159	12	12			169	1,217	0.14	169	1,217	0.14	1652	0.0	0.0	1638	0.0	0.0
30890	165	12	12			114	2,567	0.04	114	2,567	0.04	1633	0.0	0.0	1652	0.0	0.0
30891	300	12	12			113	2,483	0.05	113	2,483	0.05	1631	0.0	0.0	1633	0.0	0.0
30892	24	6	6			42	230	0.18	42	230	0.18	7452	0.0	0.0	1652	0.0	0.0
30893	348	6	6			40	259	0.16	40	259	0.16	7224	0.0	0.0	7452	0.0	0.0
30894	312	6	6			13	256	0.05	13	256	0.05	1656	0.0	0.0	7224	0.0	0.0
30895	318	6	6			26	251	0.10	26	251	0.10	1632	0.0	0.0	7224	0.0	0.0
30896	320	6	6			12	192	0.06	12	192	0.06	1581	0.0	0.0	1632	0.0	0.0
30897	300	6	6			12	195	0.06	12	195	0.06	1582	0.0	0.0	1632	0.0	0.0
30898	275	8	8			1	447	0.00	1	448	0.00	1635	0.0	0.0	1634	0.0	0.0
30899	275	6	6			1	207	0.00	1	207	0.00	1636	0.0	0.0	1635	0.0	0.0
30900	360	6	6			22	275	0.08	22	275	0.08	1603	0.0	0.0	1653	0.0	0.0
30901	160	6	6			1	252	0.01	1	252	0.01	1580	0.0	0.0	1655	0.0	0.0
30902	285	8	8			16	381	0.04	16	382	0.04	1654	0.0	0.0	7453	0.0	0.0
30904	266	6	6			44	142	0.31	28	142	0.20	1672	4.7	5.8	1674	4.6	5.8
30905	290	6	6			34	142	0.24	24	142	0.17	1671	0.0	0.0	1672	4.7	5.8
30906	215	6	6			42	144	0.29	21	144	0.14	1671	0.0	0.0	1675	0.0	0.0
30907	176	8	8			73	242	0.30	73	242	0.30	1676	0.0	0.0	1675	0.0	0.0
30908	175	8	8			72	240	0.30	72	240	0.30	1690	0.0	0.0	1676	0.0	0.0
30909	420	8	8			38	410	0.09	38	411	0.09	1702	0.0	0.0	1690	0.0	0.0
30910	174	6	6			38	139	0.28	38	139	0.28	7658	0.0	0.0	1702	0.0	0.0
30912	518	8	8			205	274	0.75	205	274	0.75	1677	6.2	0.0	6996	2.0	0.0
30913	428	8	8			205	274	0.75	204	275	0.74	1691	5.9	0.0	1677	6.2	0.0
30914	282	8	8			166	526	0.32	166	526	0.32	7455	0.0	0.0	1703	4.9	0.0
30915	92	8	8			166	520	0.32	166	521	0.32	1704	0.0	0.0	7455	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30916	257	6	6			100	156	0.64	100	156	0.64	1678	6.5	0.0	1705	4.0	0.0
30917	432	6	6			1	231	0.00	1	231	0.00	1706	0.0	0.0	1678	6.5	0.0
30918	220	8	8			34	242	0.14	34	242	0.14	6998	0.0	0.0	1690	0.0	0.0
30919	222	8	8			33	240	0.14	33	240	0.14	1707	0.0	0.0	6998	0.0	0.0
30921	47	6	6			141	205	0.69	141	205	0.69	1673	4.4	5.6	1674	4.6	5.8
30922	275	8	8			38	442	0.08	38	443	0.08	1689	0.0	0.0	1673	4.4	5.6
30923	235	8	8			37	442	0.08	37	442	0.08	1692	0.0	0.0	1689	0.0	0.0
30924	158	8	8			43	253	0.17	30	253	0.12	1708	1.9	0.0	1710	1.9	0.0
30925	64	6	6			1	328	0.00	1	328	0.00	1727	0.0	0.0	1707	0.0	0.0
30926	80	6	6			1	219	0.00	1	219	0.00	1724	0.0	0.0	1707	0.0	0.0
30927	325	6	6			103	239	0.43	103	239	0.43	1670	0.0	0.0	1673	4.4	5.6
30928	317	6	6			54	242	0.22	54	242	0.22	7225	0.0	0.0	1670	0.0	0.0
30929	280	6	6			53	147	0.36	53	147	0.36	1682	0.0	0.0	1681	0.0	0.0
30930	288	6	6			49	218	0.22	49	218	0.22	7454	0.0	0.0	1670	0.0	0.0
30931	198	8	8			165	482	0.34	165	483	0.34	6997	0.0	0.0	1704	0.0	0.0
30932	162	8	8			81	481	0.17	81	482	0.17	1686	0.0	0.0	6997	0.0	0.0
30933	315	8	8			80	556	0.14	80	556	0.14	1711	0.0	0.0	1686	0.0	0.0
30934	300	8	8			80	310	0.26	80	310	0.26	1688	0.0	0.0	1711	0.0	0.0
30935	57	8	8			78	309	0.25	78	309	0.25	1687	0.0	0.0	1688	0.0	0.0
30936	133	8	8			78	331	0.23	78	331	0.23	1698	0.0	0.0	1687	0.0	0.0
30937	215	6	6			1	210	0.00	1	210	0.00	1700	0.0	0.0	1698	0.0	0.0
30938	137	6	6			1	210	0.00	1	210	0.00	1662	0.0	0.0	1700	0.0	0.0
30939	35	8	8			1	428	0.00	1	428	0.00	1712	0.0	0.0	1688	0.0	0.0
30940	170	6	6			2	139	0.02	2	139	0.02	1713	0.0	0.0	1698	0.0	0.0
30941	70	6	6			1	144	0.00	1	144	0.00	1663	0.0	0.0	1713	0.0	0.0
30942	175	6	6			1	145	0.01	1	145	0.01	1714	0.0	0.0	1713	0.0	0.0
30943	175	6	6			1	144	0.01	1	144	0.01	1699	0.0	0.0	1714	0.0	0.0
30944	60	6	6			1	144	0.00	1	144	0.00	1664	0.0	0.0	1699	0.0	0.0
30945	60	6	6			1	144	0.00	1	144	0.00	1665	0.0	0.0	1699	0.0	0.0
30946	180	6	6			1	171	0.00	1	171	0.00	1666	0.0	0.0	1704	0.0	0.0
30948	130	8	8			1	606	0.00	1	607	0.00	1694	0.0	0.0	1695	0.0	0.0
30949	160	8	8			1	356	0.00	1	356	0.00	1695	0.0	0.0	1696	0.0	0.0
30950	90	6	6			1	144	0.00	1	144	0.00	7226	0.0	0.0	1715	0.0	0.0
30951	328	6	6			60	233	0.26	60	233	0.26	7386	0.0	0.0	1678	6.5	0.0
30952	320	6	6			59	165	0.36	59	165	0.36	1667	0.0	0.0	7167	0.0	0.0
30953	373	6	6			1	144	0.00	1	144	0.00	1668	0.0	0.0	1717	0.0	0.0
30954	270	8	8			2	267	0.01	2	267	0.01	1696	0.0	0.0	1697	0.0	0.0
30955	231	8	8			1	311	0.00	1	311	0.00	1719	0.0	0.0	1718	0.0	0.0
30956	372	6	6			1	144	0.00	1	144	0.00	1720	0.0	0.0	1719	0.0	0.0
30957	300	6	6			40	172	0.23	40	172	0.23	1721	0.0	0.0	1679	0.0	0.0
30958	300	6	6			1	172	0.00	1	172	0.00	6999	0.0	0.0	1721	0.0	0.0
30959	210	8	8			49	454	0.11	49	455	0.11	1701	0.0	0.0	1731	0.0	0.0
30960	180	8	8			49	313	0.16	49	314	0.15	1722	0.0	0.0	1701	0.0	0.0
30961	181	8	8			1	310	0.00	1	311	0.00	1715	0.0	0.0	1722	0.0	0.0
30962	20	8	8			1	278	0.00	1	279	0.00	1728	0.0	0.0	1694	0.0	0.0
30963	20	8	8			1	278	0.00	1	279	0.00	1729	0.0	0.0	1694	0.0	0.0
30964	316	8	8			122	290	0.42	122	290	0.42	1679	0.0	0.0	1718	0.0	0.0
30965	94	6	6			19	144	0.13	1	144	0.00	1730	1.9	0.0	1708	1.9	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30966	65	6	6			1	139	0.01	1	139	0.01	10797	0.0	0.0	1684	0.0	0.0
30967	97	6	6			1	147	0.00	1	147	0.00	11203	0.0	0.0	1706	0.0	0.0
30969	72	6	6			12	144	0.08	1	144	0.00	1840	1.3	0.0	1768	0.4	0.0
30970	105	6	6			1	126	0.01	1	126	0.01	1842	0.0	0.0	1734	0.0	0.0
30971	100	8	8			178	465	0.38	0	465	0.00	1826	1.1	0.0	1769	0.9	0.0
30972	339	6	6			178	146	1.22	1	146	0.00	1783	1.8	0.0	7456	1.0	0.0
30973	170	8	8			103	363	0.29	101	363	0.28	1784	3.3	0.0	7456	1.0	0.0
30974	421	8	8			81	265	0.31	76	265	0.29	1782	4.2	0.0	1784	3.3	0.0
30975	284	8	8			81	265	0.30	76	266	0.29	7001	4.8	0.0	1782	4.2	0.0
30976	281	8	8			76	265	0.29	76	266	0.28	1781	0.0	0.0	7001	4.8	0.0
30977	75	8	8			76	318	0.24	76	318	0.24	1780	0.0	0.0	1781	0.0	0.0
30978	138	6	6			1	123	0.01	1	123	0.01	1734	0.0	0.0	1780	0.0	0.0
30979	328	8	8			24	369	0.07	24	369	0.07	1804	0.0	0.0	1780	0.0	0.0
30980	130	8	8			1	369	0.00	1	369	0.00	7659	0.0	0.0	1804	0.0	0.0
30981	159	8	8			1	185	0.00	1	185	0.00	1737	0.0	0.0	1804	0.0	0.0
30982	437	8	12	7	Existing	352	275	1.28	503	810	0.62	7457	1.7	0.0	1777	2.5	0.0
30983	263	8	12	7	Existing	351	273	1.29	503	805	0.62	10798	2.3	0.0	7457	1.7	0.0
30984	360	8	8			193	270	0.71	258	270	0.96	1779	0.0	0.0	7128	2.2	0.0
30985	285	6	12	7	Existing	178	156	1.15	244	985	0.25	1796	1.6	0.0	10798	2.3	0.0
30986	235	6	12	7	Existing	143	129	1.11	201	822	0.24	1805	0.2	0.0	1796	1.6	0.0
30987	175	6	6			26	112	0.23	1	112	0.01	1808	1.8	0.0	1807	3.0	0.0
30988	250	6	6			26	112	0.24	1	112	0.01	1795	3.8	0.0	1808	1.8	0.0
30989	265	6	6			18	113	0.16	1	113	0.01	1809	3.5	0.0	1795	3.8	0.0
30990	183	8	8			137	347	0.39	122	347	0.35	1807	3.0	0.0	1797	1.9	0.0
30991	263	6	6			18	155	0.12	1	155	0.00	1753	3.7	0.0	1796	1.6	0.0
30992	155	8	8			66	391	0.17	60	392	0.15	1798	4.8	0.0	1807	3.0	0.0
30993	286	6	6			60	147	0.41	59	147	0.40	1849	5.5	0.0	1798	4.8	0.0
30994	81	6	6			60	147	0.41	59	147	0.40	1810	5.5	0.0	1849	5.5	0.0
30995	193	6	6			1	156	0.00	1	156	0.00	1811	0.0	0.0	7458	0.0	0.0
30996	197	6	6			1	154	0.00	1	154	0.00	1738	0.0	0.0	1811	0.0	0.0
30997	100	6	6			1	185	0.00	1	185	0.00	1740	0.0	0.0	7458	0.0	0.0
30998	139	20	20			1,051	3,626	0.29	1,130	3,628	0.31	1803	2.9	0.0	1812	2.9	0.0
30999	196	12	15	8	Existing	996	1,122	0.89	1,081	2,033	0.53	1813	1.8	0.0	1803	2.9	0.0
31000	360	10	10			326	533	0.61	326	532	0.61	1799	2.3	0.0	1813	1.8	0.0
31001	457	10	10			218	468	0.47	217	468	0.46	1800	2.6	0.0	7228	2.2	0.0
31002	300	6	6			1	167	0.00	1	167	0.00	1815	0.0	0.0	1800	2.6	0.0
31003	304	6	6			1	174	0.00	1	174	0.00	7168	0.0	0.0	1815	0.0	0.0
31004	319	8	8			59	341	0.17	56	342	0.16	1816	4.8	0.0	7228	2.2	0.0
31005	262	8	8			1	341	0.00	1	342	0.00	7459	0.0	0.0	1816	4.8	0.0
31006	283	8	8			40	353	0.11	1	354	0.00	1817	4.4	0.0	1799	2.3	0.0
31007	287	8	8			1	352	0.00	1	352	0.00	1818	0.0	0.0	1817	4.4	0.0
31008	268	10	15	8	Existing	626	673	0.93	704	1,983	0.36	1819	3.2	0.0	1813	1.8	0.0
31009	266	10	15	8	Existing	626	608	1.03	703	1,792	0.39	7460	3.8	0.0	1819	3.2	0.0
31010	85	6	6			49	251	0.20	48	251	0.19	1802	4.9	0.0	1803	2.9	0.0
31011	317	6	6			47	248	0.19	47	248	0.19	1820	0.0	0.0	1802	4.9	0.0
31013	31	6	6			9	335	0.03	1	335	0.00	1822	8.1	0.0	1821	7.4	0.0
31014	126	10	18	5	Existing	674	644	1.05	1,757	3,090	0.57	1759	7.8	0.0	1821	7.4	0.0
31015	150	15	18	5	Existing	1,538	1,835	0.84	2,176	2,984	0.73	1823	7.7	0.0	1759	7.8	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31017	185	12	18	5	Existing	1,503	1,047	1.44	2,142	3,085	0.69	1773	2.1	0.0	10799	5.1	0.0
31018	144	12	18	5	Existing	1,402	1,230	1.14	2,031	3,626	0.56	1768	0.4	0.0	1773	2.1	0.0
31019	128	12	18	5	Existing	1,401	1,226	1.14	2,031	3,615	0.56	1769	0.9	0.0	1768	0.4	0.0
31020	285	12	12			1,053	1,219	0.86	800	1,219	0.66	1778	1.7	0.0	1769	0.9	0.0
31021	239	6	6			178	145	1.23	0	145	0.00	1826	1.1	0.0	1783	1.8	0.0
31022	380	12	18	5	Existing	590	754	0.78	1,230	2,224	0.55	1771	2.7	0.0	1769	0.9	0.0
31023	358	8	18	5	Existing	572	341	1.68	1,230	2,962	0.42	1827	0.0	0.0	1771	2.7	0.0
31024	381	8	8			63	278	0.22	44	278	0.16	1772	5.0	0.0	1773	2.1	0.0
31025	362	8	8			62	278	0.22	44	278	0.16	1757	5.9	0.0	1772	5.0	0.0
31026	340	8	8			24	280	0.09	1	280	0.00	1756	7.9	0.0	1757	5.9	0.0
31027	380	10	10			692	651	1.06	194	650	0.30	1770	0.2	0.0	1778	1.7	0.0
31028	360	10	10			533	747	0.71	0	747	0.00	1828	1.6	0.0	1770	0.2	0.0
31030	50	12	12			435	881	0.49	210	881	0.24	1763	6.5	0.0	1762	6.5	0.0
31031	133	12	12			865	195	4.43	419	195	2.15	1759	7.8	0.0	1763	6.5	0.0
31032	291	6	6			20	128	0.16	1	128	0.01	1743	4.4	0.0	1797	1.9	0.0
31033	447	8	8			59	340	0.17	1	340	0.00	1830	1.0	0.0	1827	0.0	0.0
31034	292	8	8			1	689	0.00	1	690	0.00	1746	0.0	0.0	1755	0.0	0.0
31035	131	12	12			106	1,169	0.09	106	1,169	0.09	1767	0.0	0.0	1755	0.0	0.0
31036	283	12	15	5	Existing	1,083	1,051	1.03	1,169	1,905	0.61	7227	2.1	0.0	1828	1.6	0.0
31037	145	12	15	5	Existing	1,045	1,046	1.00	1,131	1,897	0.60	1831	2.4	0.0	7227	2.1	0.0
31038	137	12	15	5	Existing	1,044	1,047	1.00	1,131	1,899	0.60	1812	2.9	0.0	1831	2.4	0.0
31039	290	6	6			24	209	0.12	1	209	0.00	1747	5.6	0.0	1831	2.4	0.0
31040	442	6	6			35	148	0.24	1	148	0.00	1748	4.4	0.0	7227	2.1	0.0
31042	142	12	12			4	865	0.00	4	865	0.00	1792	0.0	0.0	1765	0.0	0.0
31043	172	6	6			1	159	0.00	1	159	0.00	1750	0.0	0.0	1793	0.0	0.0
31044	133	10	10			3	523	0.01	3	522	0.01	1791	0.0	0.0	1792	0.0	0.0
31045	11	12	12			2	1,662	0.00	2	1,662	0.00	1754	0.0	0.0	1791	0.0	0.0
31046	145	8	8			1	276	0.01	1	276	0.01	1832	0.0	0.0	1754	0.0	0.0
31047	231	8	8			1	276	0.00	1	277	0.00	7229	0.0	0.0	1832	0.0	0.0
31048	180	6	6			1	144	0.00	1	144	0.00	1751	0.0	0.0	1790	0.0	0.0
31049	278	8	8			84	524	0.16	84	525	0.16	1835	0.0	0.0	1833	0.0	0.0
31050	166	8	8			1	484	0.00	1	484	0.00	10781	0.0	0.0	1754	0.0	0.0
31051	424	8	8			83	351	0.24	83	352	0.24	1790	0.0	0.0	1835	0.0	0.0
31052	189	8	8			1	401	0.00	1	401	0.00	1838	0.0	0.0	1837	0.0	0.0
31053	55	10	10			302	506	0.60	289	505	0.57	1761	6.4	0.0	1762	6.5	0.0
31054	160	10	10			301	322	0.93	288	322	0.89	1788	4.0	0.0	1787	5.7	0.0
31055	96	12	15	4	Existing	535	663	0.81	720	1,202	0.60	1760	6.3	0.0	1762	6.5	0.0
31056	136	12	15	4	Existing	533	659	0.81	720	1,195	0.60	1786	5.5	0.0	1760	6.3	0.0
31057	150	12	15	4	Existing	454	645	0.70	633	1,170	0.54	1789	3.9	0.0	1786	5.5	0.0
31058	8	12	12			315	919	0.34	288	919	0.31	1788	4.0	0.0	1789	3.9	0.0
31060	3	8	8			1	360	0.00	1	360	0.00	1847	0.0	0.0	7461	0.0	0.0
31071	143	6	6			15	308	0.05	1	308	0.00	1886	2.9	0.0	1889	2.8	0.0
31073	241	8	8			312	369	0.84	312	370	0.84	1900	0.0	0.0	1864	0.0	0.0
31074	415	6	6			60	278	0.22	60	278	0.22	1878	0.0	0.0	1900	0.0	0.0
31075	106	6	6			1	331	0.00	1	331	0.00	7660	0.0	0.0	7169	0.0	0.0
31076	40	8	8			251	321	0.78	251	321	0.78	1901	0.0	0.0	1900	0.0	0.0
31077	313	8	8			251	403	0.62	251	404	0.62	1868	0.0	0.0	1901	0.0	0.0
31078	89	8	8			1	402	0.00	1	403	0.00	1940	0.0	0.0	1868	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31080	414	8	8			190	452	0.42	190	453	0.42	1902	0.0	0.0	1868	0.0	0.0
31081	300	8	8			121	453	0.27	121	454	0.27	7230	0.0	0.0	1902	0.0	0.0
31082	245	8	8			120	451	0.27	120	451	0.27	1903	0.0	0.0	7230	0.0	0.0
31083	430	8	8			1	579	0.00	1	580	0.00	7004	0.0	0.0	1903	0.0	0.0
31084	300	8	8			1	449	0.00	1	449	0.00	1904	0.0	0.0	1903	0.0	0.0
31085	350	6	6			59	182	0.32	59	182	0.32	1905	0.0	0.0	1868	0.0	0.0
31086	203	6	6			2	259	0.01	2	259	0.01	7464	0.0	0.0	1906	0.0	0.0
31087	300	6	6			1	266	0.01	1	266	0.01	1876	0.0	0.0	7464	0.0	0.0
31088	104	6	6			1	228	0.00	1	228	0.00	1939	0.0	0.0	1876	0.0	0.0
31089	347	6	6			2	258	0.01	2	258	0.01	1870	0.0	0.0	7002	3.4	0.0
31090	350	6	6			1	256	0.01	1	256	0.01	1907	0.0	0.0	1870	0.0	0.0
31091	128	6	6			1	241	0.00	1	241	0.00	1855	0.0	0.0	1907	0.0	0.0
31092	504	8	15	2	Existing	565	392	1.44	851	2,093	0.41	1880	0.0	0.0	1871	1.0	0.0
31093	308	8	8			25	331	0.08	25	331	0.08	1877	0.0	0.0	1908	0.0	0.0
31094	114	6	6			1	251	0.00	1	251	0.00	1910	0.0	0.0	1877	0.0	0.0
31095	284	6	6			1	149	0.00	1	149	0.00	1856	0.0	0.0	1908	0.0	0.0
31097	45	8	15	2	Existing	642	394	1.63	993	2,106	0.47	1913	1.6	0.0	1872	1.9	0.0
31098	470	8	15	2	Existing	640	402	1.59	992	2,150	0.46	1914	1.2	0.0	1913	1.6	0.0
31099	540	8	15	2	Existing	566	393	1.44	852	2,101	0.41	1871	1.0	0.0	1914	1.2	0.0
31100	146	10	10			469	822	0.57	449	821	0.55	1915	1.9	0.0	1916	0.0	0.0
31101	239	8	8			56	452	0.12	2	453	0.00	1917	2.5	0.0	1915	1.9	0.0
31102	221	8	8			50	452	0.11	1	453	0.00	1887	2.8	0.0	1917	2.5	0.0
31103	235	6	6			35	211	0.17	1	211	0.00	1918	4.7	0.0	1887	2.8	0.0
31104	309	8	8			194	642	0.30	58	643	0.09	1920	2.8	0.0	1919	0.1	0.0
31105	133	10	10			331	781	0.42	449	780	0.58	1916	0.0	0.0	1919	0.1	0.0
31106	325	6	6			135	119	1.13	0	119	0.00	7463	0.0	0.0	7003	2.9	0.0
31108	276	20	20			451	2,518	0.18	627	2,519	0.25	7003	2.9	0.0	1889	2.8	0.0
31109	237	12	12			518	814	0.64	707	814	0.87	1889	2.8	0.0	1890	1.3	0.0
31110	444	12	12			513	783	0.65	708	783	0.90	1890	1.3	0.0	1891	0.0	0.0
31111	143	10	15	4	Existing	656	372	1.76	810	1,097	0.74	1892	0.7	0.0	1893	2.7	0.0
31112	372	6	6			101	133	0.76	1	133	0.01	1921	0.0	0.0	1892	0.7	0.0
31113	156	10	10			478	756	0.63	506	755	0.67	1919	0.1	0.0	1922	1.2	0.0
31114	280	10	10			479	780	0.61	507	778	0.65	1922	1.2	0.0	1874	3.5	0.0
31115	81	10	15	2	Existing	482	785	0.61	664	2,316	0.29	1874	3.5	0.0	1866	4.0	0.0
31118	143	6	6			3	232	0.01	3	232	0.01	1885	0.0	0.0	1850	0.0	0.0
31119	113	6	6			1	217	0.01	1	217	0.01	1851	0.0	0.0	1885	0.0	0.0
31120	58	6	6			1	214	0.00	1	214	0.00	1938	0.0	0.0	1885	0.0	0.0
31121	175	10	15	2	Existing	503	776	0.65	697	2,288	0.30	1866	4.0	0.0	7462	4.3	0.0
31122	175	10	15	2	Existing	503	776	0.65	697	2,288	0.30	7462	4.3	0.0	1898	3.3	0.0
31123	225	10	15	2	Existing	578	778	0.74	787	2,296	0.34	1898	3.3	0.0	1875	2.8	0.0
31124	273	8	8			51	905	0.06	40	906	0.04	1923	4.6	0.0	1898	3.3	0.0
31125	290	6	6			1	296	0.00	1	296	0.00	1896	0.0	0.0	1923	4.6	0.0
31126	286	8	8			40	572	0.07	40	573	0.07	1897	0.0	0.0	1923	4.6	0.0
31127	289	6	6			1	297	0.00	1	297	0.00	1895	0.0	0.0	1897	0.0	0.0
31128	175	8	8			1	576	0.00	1	576	0.00	1924	0.0	0.0	1897	0.0	0.0
31129	595	8	8			62	392	0.16	1	393	0.00	1881	2.0	0.0	1880	0.0	0.0
31130	397	8	8			1	456	0.00	1	457	0.00	1879	0.0	0.0	1904	0.0	0.0
31131	17	6	6			1	217	0.01	1	217	0.01	1937	0.0	0.0	1925	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31132	21	6	6			1	206	0.01	1	206	0.01	1936	0.0	0.0	1925	0.0	0.0
31133	274	8	8			39	664	0.06	39	665	0.06	1927	0.0	0.0	1863	7.9	0.0
31134	6	6	6			1	903	0.00	1	903	0.00	8661	0.0	0.0	1927	0.0	0.0
31135	100	10	15	4	Existing	749	452	1.66	919	1,333	0.69	7465	6.0	0.0	1894	6.8	0.0
31136	274	10	15	4	Existing	747	377	1.98	918	1,112	0.83	1893	2.7	0.0	1928	5.9	0.0
31137	96	8	8			1	444	0.00	1	444	0.00	1861	0.0	0.0	1877	0.0	0.0
31138	260	8	8			1	664	0.00	1	665	0.00	1929	0.0	0.0	1877	0.0	0.0
31140	150	6	6			2	512	0.00	2	512	0.00	1967	0.0	0.0	1966	4.1	0.0
31141	250	6	6			1	188	0.01	1	188	0.01	1946	0.0	0.0	1967	0.0	0.0
31142	280	6	6			1	298	0.00	1	298	0.00	1963	0.0	0.0	1946	0.0	0.0
31143	66	10	10			410	1,051	0.39	403	1,050	0.38	1945	4.0	0.0	1968	3.7	0.0
31144	124	10	10			193	643	0.30	148	642	0.23	1966	4.1	0.0	1945	4.0	0.0
31145	126	10	10			192	822	0.23	145	821	0.18	7387	4.5	0.0	1966	4.1	0.0
31146	192	8	8			223	408	0.55	200	409	0.49	1944	3.0	0.0	1945	4.0	0.0
31147	117	6	6			144	344	0.42	144	344	0.42	1971	0.0	0.0	1965	0.0	0.0
31148	414	6	6			142	353	0.40	142	353	0.40	7466	0.0	0.0	1971	0.0	0.0
31150	475	8	8			181	221	0.82	181	221	0.82	7233	7.0	7.0	1977	10.7	10.7
31151	180	6	6			116	102	1.14	38	102	0.37	1953	0.0	0.0	1954	0.0	1.9
31152	6	8	8			258	844	0.31	56	845	0.07	1954	0.0	1.9	1955	0.0	1.9
31153	35	6	6			338	125	2.70	219	125	1.75	1955	0.0	1.9	1956	0.9	2.2
31155	195	6	6			242	150	1.61	219	150	1.46	1956	0.9	2.2	1957	4.4	6.0
31156	377	10	10			377	408	0.93	440	407	1.08	1957	4.4	6.0	1961	4.9	6.8
31158	390	10	10			410	458	0.90	478	457	1.05	1961	4.9	6.8	7724	4.2	6.5
31160	451	10	10			510	526	0.97	571	525	1.09	7724	4.2	6.5	1948	1.7	0.0
31161	53	8	8			1	449	0.00	1	449	0.00	1972	0.0	0.0	1973	0.0	0.0
31162	45	8	8			173	956	0.18	173	957	0.18	1943	0.0	0.0	1973	0.0	0.0
31163	218	8	8			1	447	0.00	1	447	0.00	7232	0.0	0.0	1943	0.0	0.0
31164	430	8	8			1	337	0.00	1	337	0.00	1949	0.0	0.0	7170	0.0	0.0
31165	250	8	8			14	222	0.06	14	222	0.06	1960	5.4	5.4	7233	7.0	7.0
31166	240	8	8			1	318	0.00	1	319	0.00	1975	0.0	0.0	1952	0.0	0.0
31167	298	8	8			220	438	0.50	248	438	0.57	1959	0.0	0.0	1944	3.0	0.0
31168	40	8	8			119	641	0.19	1	642	0.00	1970	1.0	0.0	1944	3.0	0.0
31169	450	8	8			50	220	0.23	50	220	0.23	7170	0.0	0.0	7005	8.9	8.9
31177	387	16	16			2,590	2,713	0.95	2,526	2,712	0.93	9989	0.0	0.0	2026	0.0	0.0
31178	714	16	16			2,404	2,160	1.11	2,340	2,158	1.08	2016	9.2	9.4	9989	0.0	0.0
31179	259	16	16			2,403	3,169	0.76	2,340	3,167	0.74	2017	0.0	0.0	2016	9.2	9.4
31180	316	16	16			1,226	3,165	0.39	772	3,163	0.24	2003	0.0	0.0	2017	0.0	0.0
31181	129	30	30			4,202	9,187	0.46	5,485	9,187	0.60	1993	0.0	0.0	1992	0.0	0.0
31182	403	30	30			4,156	9,694	0.43	5,438	9,694	0.56	1994	0.0	0.0	1993	0.0	0.0
31183	228	30	30			4,156	8,999	0.46	5,438	8,999	0.60	2018	0.0	0.0	1994	0.0	0.0
31185	68	8	8			36	708	0.05	36	709	0.05	1996	0.0	0.0	1997	0.0	0.0
31186	239	8	8			1	406	0.00	1	407	0.00	1995	0.0	0.0	1996	0.0	0.0
31188	117	30	30			4,024	9,854	0.41	5,306	9,854	0.54	1989	0.0	0.0	2005	0.0	0.0
31189	298	8	8			1	405	0.00	1	406	0.00	1988	0.0	0.0	1989	0.0	0.0
31190	291	8	8			1	401	0.00	1	401	0.00	7235	0.0	0.0	1988	0.0	0.0
31191	41	15	15			2	7,400	0.00	2	7,400	0.00	2025	0.0	0.0	2026	0.0	0.0
31192	203	6	6			1	231	0.00	1	231	0.00	7661	0.0	0.0	2025	0.0	0.0
31195	153	6	6			1	208	0.01	1	208	0.01	2007	0.0	0.0	2008	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31196	92	6	6			3	219	0.01	3	219	0.01	7171	0.0	0.0	2008	0.0	0.0
31197	60	6	6			2	192	0.01	2	192	0.01	2009	0.0	0.0	7171	0.0	0.0
31198	140	6	6			1	195	0.00	1	195	0.00	2035	0.0	0.0	2009	0.0	0.0
31199	240	6	6			1	201	0.00	1	201	0.00	2034	0.0	0.0	2009	0.0	0.0
31200	245	8	8			1	695	0.00	1	696	0.00	2006	0.0	0.0	2008	0.0	0.0
31201	163	6	6			1	248	0.00	1	248	0.00	2033	0.0	0.0	2007	0.0	0.0
31202	178	27	27			4,021	11,938	0.34	5,303	11,938	0.44	8923	0.0	0.0	2020	0.0	0.0
31203	37	27	27			3,933	19,098	0.21	5,215	19,098	0.27	2021	0.0	0.0	8920	0.0	0.0
31204	242	10	10			0	2,217	0.00	0	2,215	0.00	2003	0.0	0.0	2021	0.0	0.0
31205	268	10	15	2	Existing	1,177	997	1.18	1,567	2,938	0.53	2004	10.3	0.0	2017	0.0	0.0
31206	288	10	15	2	Existing	1,137	1,004	1.13	1,527	2,960	0.52	7234	6.0	0.0	2004	10.3	0.0
31207	125	10	15	2	Existing	1,136	597	1.90	1,526	1,760	0.87	2002	4.9	0.0	7234	6.0	0.0
31208	247	10	15	2	Existing	1,042	754	1.38	1,432	2,224	0.64	2022	6.7	0.0	2002	4.9	0.0
31209	240	10	15	2	Existing	1,040	801	1.30	1,430	2,362	0.61	2013	2.7	0.0	2022	6.7	0.0
31210	283	10	15	2	Existing	983	803	1.22	1,373	2,367	0.58	2012	0.2	0.0	2013	2.7	0.0
31212	237	8	8			11	679	0.02	3	680	0.00	2001	0.0	0.0	2002	4.9	0.0
31213	35	8	8			2	622	0.00	2	623	0.00	2000	0.0	0.0	2001	0.0	0.0
31214	133	6	6			1	192	0.00	1	192	0.00	1987	0.0	0.0	2000	0.0	0.0
31217	375	6	6			87	176	0.49	87	176	0.49	7388	2.1	0.0	2014	0.8	0.0
31218	75	12	12			1	1,345	0.00	1	1,345	0.00	2030	0.0	0.0	2025	0.0	0.0
31219	525	6	6			1	383	0.00	1	383	0.00	2032	0.0	0.0	9987	0.0	0.0
31242	229	8	8			63	340	0.18	63	340	0.18	2084	0.0	0.0	2091	0.0	0.0
31243	213	8	8			63	349	0.18	63	349	0.18	2091	0.0	0.0	2092	0.0	0.0
31244	386	8	8			62	344	0.18	62	344	0.18	2093	0.0	0.0	2084	0.0	0.0
31245	62	8	8			28	284	0.10	28	285	0.10	2086	0.0	0.0	2093	0.0	0.0
31246	332	8	8			1	344	0.00	1	345	0.00	2094	0.0	0.0	2085	0.0	0.0
31257	395	8	8			29	308	0.09	29	308	0.09	2124	0.0	0.0	2125	0.0	0.0
31259	217	8	8			162	283	0.57	162	283	0.57	2135	0.0	0.0	2126	0.0	0.0
31260	30	8	8			162	262	0.62	162	263	0.62	2127	0.0	0.0	2135	0.0	0.0
31261	486	8	8			161	342	0.47	161	343	0.47	2128	0.0	0.0	2127	0.0	0.0
31262	447	8	8			120	344	0.35	120	344	0.35	2129	0.0	0.0	2128	0.0	0.0
31263	295	8	8			192	251	0.77	192	251	0.77	2125	0.0	0.0	2136	0.0	0.0
31264	408	8	8			120	343	0.35	120	343	0.35	2130	0.0	0.0	2129	0.0	0.0
31265	505	8	8			81	333	0.24	81	333	0.24	2133	0.0	0.0	2130	0.0	0.0
31267	475	8	8			80	351	0.23	80	351	0.23	7389	0.0	0.0	2133	0.0	0.0
31268	296	8	8			38	660	0.06	38	660	0.06	2137	0.0	0.0	7006	0.0	0.0
31269	275	8	8			26	338	0.08	26	339	0.08	2113	0.0	0.0	2109	0.0	0.0
31270	90	8	8			32	343	0.09	32	344	0.09	2110	0.0	0.0	2109	0.0	0.0
31271	305	8	8			95	338	0.28	95	338	0.28	2131	0.0	0.0	2103	0.0	0.0
31272	120	8	8			71	340	0.21	71	340	0.21	2107	0.0	0.0	2131	0.0	0.0
31273	190	8	8			60	338	0.18	60	339	0.18	2108	0.0	0.0	2107	0.0	0.0
31274	75	8	8			59	493	0.12	59	494	0.12	2109	0.0	0.0	2108	0.0	0.0
31275	148	8	8			18	342	0.05	18	343	0.05	2097	0.0	0.0	2110	0.0	0.0
31276	257	8	8			10	350	0.03	10	351	0.03	2138	0.0	0.0	2107	0.0	0.0
31277	352	8	8			24	342	0.07	24	342	0.07	2114	0.0	0.0	2131	0.0	0.0
31278	355	8	8			115	340	0.34	115	341	0.34	2139	0.0	0.0	2101	0.0	0.0
31280	351	15	18	1	ura	1,367	1,105	1.24	1,366	1,105	1.24	2120	0.0	0.0	7469	0.0	0.0
31281	160	8	8			1	542	0.00	1	543	0.00	2098	0.0	0.0	2106	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31282	68	8	8			1	378	0.00	1	378	0.00	2099	0.0	0.0	2106	0.0	0.0
31283	330	15	18	1	ura	1,366	1,106	1.24	1,365	1,106	1.23	2119	7.2	7.2	2120	0.0	0.0
31284	290	15	18	1	ura	1,365	1,180	1.16	1,365	1,180	1.16	2102	0.0	0.0	2119	7.2	7.2
31285	402	8	8			22	375	0.06	22	375	0.06	2123	0.0	0.0	2102	0.0	0.0
31287	318	8	8			207	253	0.82	207	253	0.82	2140	0.0	0.0	2102	0.0	0.0
31288	319	12	15	1	ura	1,111	749	1.48	1,110	749	1.48	2122	7.1	7.1	2102	0.0	0.0
31289	336	12	15	1	ura	1,110	740	1.50	1,110	740	1.50	2101	0.0	0.0	2122	7.1	7.1
31290	251	8	8			33	347	0.09	33	348	0.09	2104	7.5	7.5	2101	0.0	0.0
31291	29	8	8			28	349	0.08	28	349	0.08	2105	0.0	0.0	2104	7.5	7.5
31292	293	8	8			28	343	0.08	28	343	0.08	7236	0.0	0.0	2105	0.0	0.0
31293	85	6	6			1	326	0.00	1	326	0.00	2100	0.0	0.0	2105	0.0	0.0
31294	32	8	8			26	407	0.06	26	408	0.06	2111	0.0	0.0	2113	0.0	0.0
31295	191	8	8			25	351	0.07	25	351	0.07	2115	0.0	0.0	2112	0.0	0.0
31296	45	8	8			14	388	0.04	14	388	0.04	2116	0.0	0.0	2115	0.0	0.0
31297	350	8	8			8	343	0.02	8	344	0.02	7470	0.0	0.0	2134	0.0	0.0
31298	323	18	18			2,557	4,271	0.60	3,077	4,271	0.72	2147	0.0	0.0	2172	0.0	0.0
31300	323	24	24			3,117	8,527	0.37	3,857	8,527	0.45	2147	0.0	0.0	2172	0.0	0.0
31301	10	12	12			99	715	0.14	99	715	0.14	7008	0.0	0.0	2181	0.0	0.0
31303	175	33	33			7,123	12,153	0.59	8,339	12,153	0.69	2151	0.0	0.0	2171_2	0.0	0.0
31304	341	33	33			7,123	11,133	0.64	8,338	11,133	0.75	2172	0.0	0.0	2151	0.0	0.0
31305	61	8	8			24	310	0.08	24	311	0.08	2164	0.0	0.0	2163	0.0	0.0
31306	240	8	8			122	341	0.36	122	342	0.36	2145	0.0	0.0	2163	0.0	0.0
31307	30	8	8			50	343	0.15	50	344	0.15	2162	0.0	0.0	2145	0.0	0.0
31309	60	8	8			1	350	0.00	1	351	0.00	2189	0.0	0.0	2161	0.0	0.0
31310	83	8	8			70	326	0.21	70	326	0.21	2160	0.0	0.0	2175	0.0	0.0
31311	346	8	8			69	342	0.20	69	343	0.20	2159	0.0	0.0	2160	0.0	0.0
31312	351	8	8			1	342	0.00	1	343	0.00	2158	0.0	0.0	2160	0.0	0.0
31313	231	12	12			35	1,078	0.03	35	1,078	0.03	2176	0.0	0.0	2184	0.0	0.0
31314	122	12	12			35	1,044	0.03	35	1,044	0.03	2177	0.0	0.0	2176	0.0	0.0
31316	245	8	8			1	296	0.00	1	297	0.00	2188	0.0	0.0	2178	0.0	0.0
31317	260	12	12			21	818	0.03	21	818	0.03	2178	0.0	0.0	2184	0.0	0.0
31318	40	12	12			57	876	0.07	57	876	0.07	2184	0.0	0.0	2167	0.0	0.0
31319	23	12	12			58	2,983	0.02	58	2,983	0.02	2157	0.0	0.0	2156	0.0	0.0
31320	176	8	8			1	937	0.00	1	938	0.00	7662	0.0	0.0	2157	0.0	0.0
31321	272	12	12			98	894	0.11	98	894	0.11	2156	0.0	0.0	7008	0.0	0.0
31322	173	8	8			2	345	0.01	2	345	0.01	2180	0.0	0.0	2165	0.0	0.0
31323	150	8	8			1	429	0.00	1	430	0.00	2166	0.0	0.0	2165	0.0	0.0
31324	330	12	12			99	872	0.11	99	872	0.11	2155	0.0	0.0	2154	0.0	0.0
31325	323	12	12			99	872	0.11	99	872	0.11	2181	0.0	0.0	2155	0.0	0.0
31326	73	30	30			4,333	9,528	0.45	5,615	9,528	0.59	2182	0.0	0.0	2146	0.0	0.0
31327	227	12	12			100	894	0.11	100	894	0.11	2148	0.0	0.0	2174	0.0	0.0
31331	383	33	33			6,987	11,378	0.61	8,205	11,378	0.72	2153	0.0	0.0	2152	0.0	0.0
31332	415	33	33			6,987	11,535	0.61	8,204	11,535	0.71	7238	0.0	0.0	2153	0.0	0.0
31333	341	8	8			130	405	0.32	130	406	0.32	2168	0.0	0.0	2182	0.0	0.0
31334	204	8	8			129	404	0.32	129	404	0.32	2169	0.0	0.0	2168	0.0	0.0
31335	205	12	12			100	901	0.11	100	901	0.11	2154	0.0	0.0	2148	0.0	0.0
31336	43	8	8			42	740	0.06	42	741	0.06	7472	4.7	4.7	7471	0.0	0.0
31337	22	8	8			43	347	0.12	43	347	0.12	7471	0.0	0.0	2150	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31338	383	8	8			1	329	0.00	1	330	0.00	2213	0.0	0.0	10000	0.0	0.0
31339	191	8	8			1	342	0.00	1	342	0.00	2205	0.0	0.0	2213	0.0	0.0
31341	355	8	8			315	344	0.91	315	344	0.91	2214	0.0	0.0	2206	0.0	0.0
31343	161	8	8			1	337	0.00	1	337	0.00	2219	0.0	0.0	2204	0.0	0.0
31344	425	8	8			315	343	0.92	315	344	0.92	2206	0.0	0.0	2216	7.3	7.5
31345	120	8	8			1	1,488	0.00	1	1,490	0.00	7663	0.0	0.0	2216	7.3	7.5
31346	375	8	8			1	343	0.00	1	344	0.00	2217	0.0	0.0	7239	0.0	0.0
31347	415	8	8			252	343	0.73	252	344	0.73	2208	0.0	0.0	2207	0.0	0.0
31348	400	8	8			236	344	0.69	236	344	0.69	2211	0.0	0.0	2208	0.0	0.0
31349	69	8	8			235	340	0.69	235	340	0.69	2209	0.0	0.0	2211	0.0	0.0
31350	44	6	6			213	178	1.20	213	178	1.20	2222	0.0	0.0	2209	0.0	0.0
31351	475	8	8			11	343	0.03	11	344	0.03	2202	0.0	0.0	2201	0.0	0.0
31352	335	8	8			8	578	0.01	8	578	0.01	2220	0.0	0.0	2221	0.0	0.0
31353	50	10	10			3	311	0.01	3	310	0.01	7474	0.0	0.0	2200	0.0	0.0
31355	64	8	8			1	263	0.00	1	263	0.00	2199	0.0	0.0	2198	0.0	0.0
31356	105	10	10			1	560	0.00	1	559	0.00	2198	0.0	0.0	2197	0.0	0.0
31357	182	10	10			1	526	0.00	1	525	0.00	2197	0.0	0.0	2196	0.0	0.0
31358	23	10	10			1	649	0.00	1	648	0.00	2196	0.0	0.0	2195	0.0	0.0
31359	61	10	10			2	398	0.01	2	398	0.01	2195	0.0	0.0	2194	0.0	0.0
31360	24	10	10			2	635	0.00	2	634	0.00	2194	0.0	0.0	7474	0.0	0.0
31362	416	8	8			190	378	0.50	190	378	0.50	2241	0.0	0.0	2242	0.0	0.0
31363	436	8	8			175	299	0.58	175	300	0.58	2240	0.0	0.0	11040	0.0	0.0
31364	323	8	8			17	344	0.05	17	344	0.05	2270	0.0	0.0	2240	0.0	0.0
31366	138	8	8			13	340	0.04	13	340	0.04	2259	0.0	0.0	7173	0.0	0.0
31367	135	8	8			60	343	0.18	60	344	0.18	2258	0.0	0.0	7173	0.0	0.0
31368	100	8	8			60	334	0.18	60	335	0.18	7240	0.0	0.0	7009	0.0	0.0
31369	38	8	8			59	305	0.19	59	305	0.19	2257	0.0	0.0	7240	0.0	0.0
31370	114	8	8			6	359	0.02	6	360	0.02	2256	0.0	0.0	2257	0.0	0.0
31371	90	8	8			5	404	0.01	5	405	0.01	7664	0.0	0.0	2256	0.0	0.0
31372	102	8	8			12	269	0.04	12	269	0.04	2252	0.0	0.0	2257	0.0	0.0
31373	362	8	8			6	342	0.02	6	342	0.02	2253	0.0	0.0	2252	0.0	0.0
31374	220	8	8			41	373	0.11	41	374	0.11	2255	0.0	0.0	2257	0.0	0.0
31375	154	8	8			13	406	0.03	13	406	0.03	2284	0.0	0.0	2255	0.0	0.0
31376	374	8	8			28	387	0.07	28	387	0.07	2254	0.0	0.0	2255	0.0	0.0
31377	220	8	8			9	345	0.03	9	345	0.03	2260	0.0	0.0	2261	0.0	0.0
31378	300	8	8			9	751	0.01	9	752	0.01	7475	0.0	0.0	2261	0.0	0.0
31379	119	8	8			1	344	0.00	1	345	0.00	2311	0.0	0.0	7475	0.0	0.0
31380	210	8	8			1	339	0.00	1	340	0.00	2262	0.0	0.0	7475	0.0	0.0
31381	325	8	8			33	271	0.12	34	271	0.13	2264	0.1	0.1	2265	3.3	3.3
31382	371	8	8			62	342	0.18	62	343	0.18	2285	3.9	4.0	2263	2.6	2.6
31385	350	10	10			442	517	0.86	442	517	0.85	2266	5.1	5.1	2265	3.3	3.3
31386	335	10	10			442	521	0.85	441	520	0.85	2269	5.2	5.2	2266	5.1	5.1
31387	20	8	8			116	343	0.34	115	344	0.34	2268	6.0	6.1	2269	5.2	5.2
31388	360	10	10			504	513	0.98	503	513	0.98	2250	3.8	3.8	2249	4.3	4.3
31389	315	10	10			505	523	0.97	503	522	0.96	2249	4.3	4.3	2237	5.0	5.0
31390	35	12	12			907	811	1.12	908	811	1.12	2237	5.0	5.0	2248	4.8	4.8
31391	450	8	8			416	434	0.96	415	435	0.96	2287	0.0	0.0	2237	5.0	5.0
31392	301	8	8			27	342	0.08	27	343	0.08	2247	3.0	3.1	2248	4.8	4.8

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31393	298	8	8			27	344	0.08	26	344	0.08	2246	0.0	0.0	2247	3.0	3.1
31394	418	12	15	1	ura	940	754	1.25	939	754	1.24	2248	4.8	4.8	2288	4.5	4.5
31395	22	12	15	1	ura	947	763	1.24	943	763	1.24	2288	4.5	4.5	2289	4.7	4.7
31396	82	8	8			43	240	0.18	44	240	0.18	2290	4.2	4.2	2289	4.7	4.7
31398	97	8	8			14	408	0.03	14	409	0.03	2293	0.0	0.0	2292	0.0	0.0
31399	200	8	8			7	279	0.02	7	280	0.02	2230	0.0	0.0	2294	0.0	0.0
31400	434	8	8			102	376	0.27	102	377	0.27	7241	0.0	0.0	2267	0.0	0.0
31401	385	8	8			83	377	0.22	83	378	0.22	7476	0.0	0.0	2281	0.0	0.0
31402	238	8	8			37	875	0.04	37	876	0.04	2282	0.0	0.0	7476	0.0	0.0
31403	262	8	8			37	874	0.04	37	876	0.04	2283	0.0	0.0	2282	0.0	0.0
31404	500	8	8			41	343	0.12	41	344	0.12	2295	0.0	0.0	2285	3.9	4.0
31405	60	8	8			40	272	0.15	40	272	0.15	2278	0.0	0.0	2295	0.0	0.0
31406	122	8	8			39	351	0.11	39	351	0.11	2279	0.0	0.0	2278	0.0	0.0
31407	396	8	8			17	342	0.05	17	343	0.05	2274	0.0	0.0	2296	0.0	0.0
31408	396	8	8			10	342	0.03	10	343	0.03	2277	0.0	0.0	2279	0.0	0.0
31409	265	8	8			9	343	0.03	9	344	0.03	2276	0.0	0.0	2277	0.0	0.0
31410	145	8	8			8	355	0.02	8	355	0.02	2275	0.0	0.0	2276	0.0	0.0
31411	450	8	8			396	434	0.91	396	435	0.91	2297	0.0	0.0	2287	0.0	0.0
31412	448	8	8			384	344	1.12	383	344	1.11	2298	6.9	6.9	2297	0.0	0.0
31413	385	8	8			374	345	1.08	373	346	1.08	7242	6.9	6.9	2298	6.9	6.9
31414	40	6	6			8	199	0.04	8	199	0.04	2229	6.6	6.6	7242	6.9	6.9
31415	201	6	6			3	194	0.02	3	194	0.02	2232	0.0	0.0	2229	6.6	6.6
31416	83	8	8			367	347	1.06	366	348	1.05	2238	0.0	0.0	7242	6.9	6.9
31417	375	8	8			1	343	0.00	1	344	0.00	7391	0.0	0.0	2238	0.0	0.0
31418	132	8	8			1	344	0.00	1	344	0.00	2299	0.0	0.0	2293	0.0	0.0
31419	340	8	8			120	340	0.35	120	341	0.35	2301	0.0	0.0	2240	0.0	0.0
31420	13	8	8			119	369	0.32	119	369	0.32	2244	0.0	0.0	2301	0.0	0.0
31421	152	8	8			119	344	0.35	119	344	0.35	2245	0.0	0.0	2244	0.0	0.0
31422	177	8	8			65	381	0.17	65	381	0.17	2303	0.0	0.0	2302	0.0	0.0
31423	515	8	8			39	342	0.11	39	342	0.11	2272	0.0	0.0	2271	0.0	0.0
31424	30	8	8			40	1,430	0.03	40	1,432	0.03	2271	0.0	0.0	2239	4.5	4.5
31425	471	8	8			319	344	0.93	319	344	0.93	2239	4.5	4.5	2243	7.6	7.6
31426	452	8	8			330	342	0.96	329	343	0.96	2243	7.6	7.6	7010	7.1	7.1
31427	464	8	8			358	342	1.05	358	343	1.04	7010	7.1	7.1	2269	5.2	5.2
31431	42	8	8			13	410	0.03	13	410	0.03	2357	0.0	0.0	2344	0.0	0.0
31433	134	8	8			1	338	0.00	1	338	0.00	2332	0.0	0.0	7392	0.0	0.0
31434	86	8	8			1	341	0.00	1	342	0.00	2331	0.0	0.0	2332	0.0	0.0
31435	346	8	8			1	342	0.00	1	343	0.00	7477	0.0	0.0	2331	0.0	0.0
31436	58	8	8			28	342	0.08	28	342	0.08	2346	0.0	0.0	2345	0.0	0.0
31437	117	8	8			28	340	0.08	28	340	0.08	2337	0.0	0.0	2346	0.0	0.0
31438	198	8	8			28	342	0.08	28	343	0.08	2338	0.0	0.0	2337	0.0	0.0
31439	214	8	8			13	344	0.04	13	344	0.04	2342	0.0	0.0	2338	0.0	0.0
31440	75	8	8			13	343	0.04	13	344	0.04	2343	0.0	0.0	2342	0.0	0.0
31441	359	8	8			12	340	0.03	12	340	0.03	2340	0.0	0.0	2343	0.0	0.0
31442	94	8	8			11	345	0.03	11	345	0.03	2341	0.0	0.0	2340	0.0	0.0
31443	230	8	8			74	385	0.19	74	385	0.19	2335	0.0	0.0	2336	0.0	0.0
31444	280	6	6			1	195	0.00	1	195	0.00	2316	0.0	0.0	2336	0.0	0.0
31445	190	8	8			23	305	0.08	23	305	0.08	2349	0.0	0.0	2348	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31446	84	8	8			23	272	0.08	23	272	0.08	2350	0.0	0.0	2349	0.0	0.0
31447	295	8	8			22	279	0.08	22	279	0.08	2347	0.0	0.0	2350	0.0	0.0
31448	102	8	8			1	344	0.00	1	344	0.00	2339	0.0	0.0	2338	0.0	0.0
31449	80	8	8			1	343	0.00	1	344	0.00	2317	0.0	0.0	2339	0.0	0.0
31454	649	54	54			19,924	95,201	0.21	20,568	95,201	0.22	2326	0.0	0.0	2325	0.0	0.0
31455	130	54	54			19,924	122,410	0.16	20,568	122,410	0.17	2325	0.0	0.0	2324	0.0	0.0
31456	230	54	54			19,919	30,796	0.65	20,563	30,796	0.67	2324	0.0	0.0	2323	0.0	0.0
31457	1741	54	54			19,913	22,286	0.89	20,557	22,286	0.92	2323	0.0	0.0	2314	0.0	0.0
31471	473	54	54			23,674	28,117	0.84	24,333	28,117	0.87	2361	0.0	0.0	2369	0.0	0.0
31472	221	54	54			23,674	53,104	0.45	24,332	53,104	0.46	2362	0.0	0.0	2361	0.0	0.0
31474	101	54	54			19,904	30,424	0.65	20,546	30,424	0.68	2364	0.0	0.0	2363	0.0	0.0
31485	236	15	15			145	1,117	0.13	145	1,117	0.13	2421	0.0	0.0	2400	0.0	0.0
31486	87	15	15			144	933	0.15	144	933	0.15	2398	0.0	0.0	2421	0.0	0.0
31487	290	15	15			126	1,035	0.12	126	1,035	0.12	7479	0.0	0.0	2398	0.0	0.0
31488	139	15	15			126	1,043	0.12	126	1,043	0.12	7243	0.0	0.0	7479	0.0	0.0
31489	140	15	15			88	1,249	0.07	88	1,249	0.07	2396	0.0	0.0	7243	0.0	0.0
31490	70	15	15			88	917	0.10	88	917	0.10	2395	0.0	0.0	2396	0.0	0.0
31491	217	15	15			88	1,003	0.09	88	1,003	0.09	2394	0.0	0.0	2395	0.0	0.0
31492	201	15	15			75	1,356	0.06	75	1,356	0.06	7244	0.0	0.0	2394	0.0	0.0
31493	165	8	8			7	416	0.02	7	417	0.02	2393	0.0	0.0	2392	0.0	0.0
31495	392	8	8			22	513	0.04	22	513	0.04	2399	0.0	0.0	2400	0.0	0.0
31496	430	8	8			18	613	0.03	18	615	0.03	2420	0.0	0.0	2399	0.0	0.0
31497	34	8	8			10	263	0.04	8	263	0.03	2414	0.0	0.0	2413	0.0	0.0
31498	277	8	8			9	531	0.02	8	531	0.02	2415	0.0	0.0	2414	0.0	0.0
31499	230	8	8			2	345	0.01	1	345	0.00	2416	0.0	0.0	2415	0.0	0.0
31500	266	8	8			4	349	0.01	4	349	0.01	2402	0.0	0.0	2401	0.0	0.0
31501	184	8	8			4	433	0.01	4	433	0.01	2382	0.0	0.0	2402	0.0	0.0
31502	287	8	8			294	632	0.47	294	633	0.46	2390	0.0	0.0	2422	0.0	0.0
31504	143	15	15			322	1,680	0.19	322	1,680	0.19	2409	0.0	0.0	2423	0.0	0.0
31505	21	15	15			322	2,281	0.14	322	2,281	0.14	2410	0.0	0.0	2409	0.0	0.0
31506	146	15	15			322	1,200	0.27	322	1,200	0.27	2411	0.0	0.0	2410	0.0	0.0
31507	500	8	8			75	343	0.22	75	344	0.22	2412	0.0	0.0	2411	0.0	0.0
31508	266	8	8			74	470	0.16	74	471	0.16	2419	0.0	0.0	2412	0.0	0.0
31509	139	8	8			1	341	0.00	1	342	0.00	2425	0.0	0.0	2411	0.0	0.0
31510	188	8	8			44	483	0.09	44	483	0.09	2405	0.0	0.0	2406	0.0	0.0
31511	132	8	8			44	340	0.13	44	341	0.13	2404	0.0	0.0	2405	0.0	0.0
31512	158	8	8			11	467	0.02	11	467	0.02	2403	0.0	0.0	2404	0.0	0.0
31513	194	8	8			33	374	0.09	33	374	0.09	7129	0.0	0.0	2404	0.0	0.0
31514	110	8	8			5	430	0.01	5	430	0.01	2424	0.0	0.0	7129	0.0	0.0
31515	267	8	8			27	439	0.06	27	440	0.06	2418	0.0	0.0	7129	0.0	0.0
31516	171	8	8			8	415	0.02	8	415	0.02	2417	0.0	0.0	2418	0.0	0.0
31517	502	15	15			181	1,121	0.16	181	1,121	0.16	2401	0.0	0.0	2406	0.0	0.0
31529	721	54	54			24,072	30,660	0.79	24,740	30,660	0.81	2436	0.0	0.0	2434	3.7	3.5
31530	541	54	54			26,669	30,594	0.87	27,201	30,594	0.89	2434	3.7	3.5	2430	7.4	7.3
31531	370	54	54			41,292	30,437	1.36	41,976	30,437	1.38	2428	17.8	17.7	2426	4.2	4.1
31536	25	15	15			1,519	1,420	1.07	1,519	1,420	1.07	2458	0.0	0.0	2445	0.0	0.0
31537	335	18	18			1,519	1,995	0.76	1,519	1,995	0.76	2445	0.0	0.0	2446	0.0	0.0
31538	350	18	18			1,519	2,000	0.76	1,519	2,000	0.76	2446	0.0	0.0	2447	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31539	350	18	18			1,543	2,000	0.77	1,542	2,000	0.77	2447	0.0	0.0	2448	0.0	0.0
31540	350	18	18			1,547	2,000	0.77	1,546	2,000	0.77	2448	0.0	0.0	2449	0.0	0.0
31543	443	15	15			1	803	0.00	1	803	0.00	2444	0.0	0.0	2457	0.0	0.0
31544	350	8	8			94	258	0.36	94	258	0.36	2462	0.0	0.0	2461	0.0	0.0
31546	300	8	8			9	343	0.03	9	344	0.03	2459	0.0	0.0	2460	0.0	0.0
31547	353	8	8			117	271	0.43	117	271	0.43	2460	0.0	0.0	2463	0.0	0.0
31548	92	8	8			1	353	0.00	1	353	0.00	2464	0.0	0.0	7393	0.0	0.0
31549	377	8	8			117	269	0.44	117	269	0.44	2463	0.0	0.0	7245	0.0	0.0
31550	378	8	8			117	270	0.43	117	271	0.43	7245	0.0	0.0	2458	0.0	0.0
31551	417	8	8			18	352	0.05	18	353	0.05	2456	0.0	0.0	2451	0.0	0.0
31552	350	15	15			7	1,190	0.01	7	1,190	0.01	2457	0.0	0.0	2454	0.0	0.0
31553	384	8	8			53	268	0.20	53	269	0.20	2453	0.0	0.0	2454	0.0	0.0
31554	339	8	8			13	482	0.03	13	483	0.03	2465	0.0	0.0	2453	0.0	0.0
31555	339	8	8			6	665	0.01	6	666	0.01	2455	0.0	0.0	2465	0.0	0.0
31556	223	8	8			40	468	0.09	40	469	0.09	2452	0.0	0.0	2453	0.0	0.0
31557	278	8	8			35	340	0.10	35	340	0.10	7481	0.0	0.0	2452	0.0	0.0
31558	232	8	8			10	278	0.04	10	278	0.04	2470	0.0	0.0	2469	0.0	0.0
31559	22	8	8			10	433	0.02	10	433	0.02	2471	0.0	0.0	2470	0.0	0.0
31560	498	8	8			10	344	0.03	10	344	0.03	7174	0.0	0.0	2471	0.0	0.0
31567	660	54	54			41,292	30,537	1.35	41,976	30,537	1.37	2472	0.0	0.0	2473	0.0	0.0
31578	60	8	8			0	1,244	0.00	0	1,247	0.00	2496	0.0	0.0	2497	0.0	0.0
31579	229	8	8			13	717	0.02	13	718	0.02	2498	0.0	0.0	2499	0.0	0.0
31580	121	8	8			13	856	0.01	13	858	0.01	2499	0.0	0.0	2500	0.0	0.0
31581	233	8	8			8	1,052	0.01	8	1,053	0.01	2502	0.0	0.0	2503	0.0	0.0
31584	82	8	8			24	1,194	0.02	24	1,195	0.02	7886	0.0	0.0	2506	0.0	0.0
31585	216	8	8			24	596	0.04	24	597	0.04	2506	0.0	0.0	2507	0.0	0.0
31586	86	8	8			4	1,026	0.00	4	1,027	0.00	2508	0.0	0.0	2512	0.0	0.0
31587	241	8	8			6	515	0.01	6	515	0.01	10627	0.0	0.0	2511	0.0	0.0
31588	308	8	8			0	443	0.00	0	444	0.00	2510	0.0	0.0	2511	0.0	0.0
31589	65	8	8			0	399	0.00	0	400	0.00	2509	0.0	0.0	2510	0.0	0.0
31590	210	8	8			403	369	1.09	466	370	1.26	2581	0.0	11.3	2580	0.0	12.4
31591	105	8	8			404	372	1.09	467	372	1.25	2582	0.0	10.5	2581	0.0	11.3
31592	11	8	8			87	354	0.25	86	355	0.24	2533	0.0	0.0	2582	0.0	10.5
31593	370	8	8			13	1,103	0.01	13	1,104	0.01	2552	0.0	0.0	2533	0.0	0.0
31594	222	8	8			416	370	1.12	483	370	1.30	2583	11.7	10.4	2582	0.0	10.5
31595	118	8	8			7	1,353	0.01	7	1,355	0.01	2549	0.0	0.0	2583	11.7	10.4
31596	136	8	8			432	374	1.16	483	374	1.29	7485	10.0	8.6	2583	11.7	10.4
31597	305	8	8			441	370	1.19	485	371	1.31	2532	0.0	0.0	7485	10.0	8.6
31598	142	8	8			0	818	0.00	0	819	0.00	2548	0.0	0.0	2532	0.0	0.0
31599	303	8	8			1	1,092	0.00	1	1,094	0.00	2584	0.0	0.0	2548	0.0	0.0
31600	450	8	8			543	371	1.46	644	371	1.74	7247	2.9	0.0	2532	0.0	0.0
31601	154	8	8			630	424	1.49	667	424	1.57	2534	0.0	0.0	7247	2.9	0.0
31602	111	6	6			0	549	0.00	233	549	0.42	2515	0.0	0.0	2534	0.0	0.0
31603	278	8	8			1	1,115	0.00	1	1,116	0.00	2545	0.0	0.0	2534	0.0	0.0
31604	224	8	8			1	1,158	0.00	1	1,159	0.00	2569	0.0	0.0	2587	0.0	0.0
31605	91	6	6			0	736	0.00	0	736	0.00	2521	0.0	0.0	2569	0.0	0.0
31606	101	8	8			1	1,053	0.00	1	1,054	0.00	2568	0.0	0.0	7484	0.0	0.0
31607	96	8	8			1	982	0.00	1	983	0.00	2567	0.0	0.0	2568	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31608	115	8	8			0	1,131	0.00	0	1,133	0.00	7725	0.0	0.0	2567	0.0	0.0
31609	182	6	6			0	544	0.00	0	544	0.00	2520	0.0	0.0	7725	0.0	0.0
31610	126	8	8			0	1,373	0.00	0	1,375	0.00	2518	0.0	0.0	7725	0.0	0.0
31611	250	6	6			13	623	0.02	13	623	0.02	2519	0.0	0.0	2552	0.0	0.0
31612	71	6	6			6	805	0.01	6	805	0.01	2599	0.0	0.0	2550	0.0	0.0
31613	190	8	8			37	1,124	0.03	37	1,125	0.03	2557	0.0	0.0	2558	0.0	0.0
31614	129	8	8			37	1,369	0.03	37	1,372	0.03	7246	0.0	0.0	2557	0.0	0.0
31615	265	8	8			37	1,445	0.03	37	1,447	0.03	2556	0.0	0.0	7246	0.0	0.0
31616	120	8	8			17	1,788	0.01	17	1,790	0.01	2541	0.0	0.0	2543	0.0	0.0
31617	335	8	8			9	1,583	0.01	9	1,585	0.01	2585	0.0	0.0	2541	0.0	0.0
31618	275	8	8			8	1,851	0.00	8	1,853	0.00	2540	0.0	0.0	2541	0.0	0.0
31619	30	8	8			6	1,073	0.01	6	1,074	0.01	2539	0.0	0.0	2540	0.0	0.0
31620	155	8	8			0	1,567	0.00	0	1,569	0.00	2542	0.0	0.0	2544	0.0	0.0
31621	120	8	8			35	1,070	0.03	35	1,072	0.03	2565	0.0	0.0	2562	0.0	0.0
31622	145	8	8			35	1,573	0.02	35	1,575	0.02	2564	0.0	0.0	2565	0.0	0.0
31623	320	8	8			35	1,594	0.02	35	1,597	0.02	2596	0.0	0.0	2564	0.0	0.0
31624	42	8	8			35	1,018	0.03	35	1,019	0.03	2563	0.0	0.0	2596	0.0	0.0
31625	120	8	8			1	1,188	0.00	1	1,190	0.00	2553	0.0	0.0	2563	0.0	0.0
31626	309	8	8			1	931	0.00	1	932	0.00	2554	0.0	0.0	2553	0.0	0.0
31627	260	8	8			1	1,640	0.00	1	1,642	0.00	2591	0.0	0.0	2554	0.0	0.0
31630	308	8	8			11	1,219	0.01	11	1,221	0.01	2555	0.0	0.0	2556	0.0	0.0
31631	70	8	8			11	1,981	0.01	11	1,983	0.01	7130	0.0	0.0	2555	0.0	0.0
31632	177	8	8			11	1,961	0.01	11	1,964	0.01	7131	0.0	0.0	7130	0.0	0.0
31634	144	8	8			11	418	0.03	11	419	0.03	2589	0.0	0.0	7131	0.0	0.0
31635	138	8	8			10	410	0.03	10	410	0.03	2590	0.0	0.0	2589	0.0	0.0
31636	86	8	8			0	1,636	0.00	0	1,638	0.00	2592	0.0	0.0	2591	0.0	0.0
31637	400	8	8			0	421	0.00	0	422	0.00	2594	0.0	0.0	2593	0.0	0.0
31638	168	8	8			1,958	1,352	1.45	2,076	1,353	1.53	2560	0.0	0.0	2561	0.0	0.0
31639	226	8	8			37	1,186	0.03	37	1,188	0.03	2559	0.0	0.0	2560	0.0	0.0
31640	115	8	8			37	1,028	0.04	37	1,030	0.04	2558	0.0	0.0	2559	0.0	0.0
31641	343	8	8			1,874	415	4.52	1,658	415	3.99	2561	0.0	0.0	7483	0.0	0.0
31642	132	8	8			36	1,692	0.02	36	1,694	0.02	2574	0.0	0.0	2535	0.0	0.0
31643	296	8	8			16	371	0.04	16	372	0.04	2595	0.0	0.0	2535	0.0	0.0
31644	137	8	8			15	372	0.04	15	373	0.04	7175	0.0	0.0	2595	0.0	0.0
31645	102	6	6			0	574	0.00	0	574	0.00	2526	0.0	0.0	7175	0.0	0.0
31646	140	8	8			0	1,356	0.00	0	1,358	0.00	2598	0.0	0.0	2574	0.0	0.0
31647	124	8	8			35	1,496	0.02	35	1,498	0.02	2575	0.0	0.0	2574	0.0	0.0
31648	267	8	8			35	470	0.08	35	471	0.08	2576	0.0	0.0	2575	0.0	0.0
31649	125	8	8			35	372	0.10	35	372	0.10	2562	0.0	0.0	2576	0.0	0.0
31650	97	8	8			15	368	0.04	15	368	0.04	2571	0.0	0.0	7175	0.0	0.0
31651	134	8	8			10	854	0.01	10	855	0.01	2578	0.0	0.0	2573	0.0	0.0
31652	327	8	8			3	1,008	0.00	3	1,009	0.00	2577	0.0	0.0	2578	0.0	0.0
31653	84	8	8			0	1,042	0.00	0	1,043	0.00	7394	0.0	0.0	2536	0.0	0.0
31654	118	6	6			0	479	0.00	0	479	0.00	2529	0.0	0.0	7394	0.0	0.0
31655	67	8	8			4	373	0.01	4	374	0.01	2546	0.0	0.0	2536	0.0	0.0
31656	156	8	8			4	1,017	0.00	4	1,018	0.00	2597	0.0	0.0	2546	0.0	0.0
31657	103	8	8			1,371	413	3.32	1,497	414	3.62	7483	0.0	0.0	2534	0.0	0.0
31662	68	8	8			0	609	0.00	0	610	0.00	2600	0.0	0.0	2614	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31663	144	8	8			0	774	0.00	0	775	0.00	2649	0.0	0.0	2690	0.0	0.0
31665	167	15	18	35	ura	304	1,397	0.22	304	1,397	0.22	7487	0.0	0.0	2606	0.0	0.0
31666	300	8	8			19	885	0.02	19	886	0.02	7017	0.0	0.0	7487	0.0	0.0
31667	315	8	8			0	722	0.00	0	722	0.00	2610	0.0	0.0	7017	0.0	0.0
31668	68	8	8			0	1,127	0.00	0	1,128	0.00	2695	0.0	0.0	2610	0.0	0.0
31669	143	15	18	35	ura	286	1,415	0.20	286	1,415	0.20	2631	0.0	0.0	7487	0.0	0.0
31670	318	15	18	35	ura	286	1,398	0.20	286	1,398	0.20	2607	0.0	0.0	2631	0.0	0.0
31671	302	8	12	37	ura	148	585	0.25	148	586	0.25	2630	0.0	0.0	2607	0.0	0.0
31672	290	8	8			0	453	0.00	0	453	0.00	2629	0.0	0.0	2630	0.0	0.0
31673	282	8	12	37	ura	140	781	0.18	140	782	0.18	2611	0.0	0.0	2630	0.0	0.0
31674	287	8	8			0	415	0.00	0	415	0.00	2618	0.0	0.0	2611	0.0	0.0
31675	443	15	15			138	1,400	0.10	138	1,400	0.10	2624	0.0	0.0	2607	0.0	0.0
31676	278	8	8			30	662	0.05	30	663	0.05	2627	0.0	0.0	2624	0.0	0.0
31677	283	8	8			22	690	0.03	22	691	0.03	2671	0.0	0.0	2628	0.0	0.0
31678	210	8	8			6	369	0.02	6	370	0.02	2615	0.0	0.0	2671	0.0	0.0
31679	272	12	12			108	1,087	0.10	108	1,087	0.10	2625	0.0	0.0	2624	0.0	0.0
31680	425	8	8			7	773	0.01	7	774	0.01	2623	0.0	0.0	2635	0.0	0.0
31681	246	6	6			7	379	0.02	7	379	0.02	2602	0.0	0.0	2623	0.0	0.0
31682	333	8	8			395	419	0.94	440	419	1.05	2634	0.0	0.0	2635	0.0	0.0
31683	270	8	8			7	923	0.01	7	924	0.01	2672	0.0	0.0	2634	0.0	0.0
31684	461	18	18			1,063	3,253	0.33	1,063	3,253	0.33	2606	0.0	0.0	10152	0.0	0.0
31685	260	8	8			0	415	0.00	0	416	0.00	2601	0.0	0.0	2636	0.0	0.0
31686	170	8	8			8	653	0.01	8	654	0.01	2636	0.0	0.0	2673	0.0	0.0
31687	210	8	8			8	628	0.01	8	629	0.01	2670	0.0	0.0	2636	0.0	0.0
31688	237	6	6			0	376	0.00	0	376	0.00	7669	0.0	0.0	2670	0.0	0.0
31689	380	8	8			0	399	0.00	0	399	0.00	2633	0.0	0.0	2670	0.0	0.0
31690	250	6	6			0	286	0.00	0	286	0.00	2632	0.0	0.0	2633	0.0	0.0
31691	400	21	21			1,972	6,481	0.30	2,166	6,481	0.33	2639	0.0	0.0	2608	0.0	0.0
31692	382	18	21	42	2036	1,971	3,832	0.51	2,165	3,832	0.57	2675	0.0	0.0	2639	0.0	0.0
31693	84	18	21	42	2036	1,947	3,980	0.49	2,142	3,980	0.54	2609	0.0	0.0	10151	0.0	0.0
31694	472	18	18			1,063	4,258	0.25	1,063	4,258	0.25	7250	0.0	0.0	2609	0.0	0.0
31697	340	15	15			404	1,394	0.29	467	1,394	0.34	2666	0.0	0.0	2608	0.0	0.0
31698	75	15	15			406	1,987	0.20	467	1,987	0.24	2638	0.0	0.0	2666	0.0	0.0
31699	158	8	8			17	374	0.05	17	374	0.05	2678	0.0	0.0	2638	0.0	0.0
31700	310	8	8			17	588	0.03	17	588	0.03	2679	0.0	0.0	2678	0.0	0.0
31701	141	8	8			0	719	0.00	0	719	0.00	2603	0.0	0.0	2679	0.0	0.0
31702	219	15	15			403	1,182	0.34	460	1,182	0.39	2667	0.0	0.0	2638	0.0	0.0
31703	275	8	8			394	695	0.57	443	697	0.64	2619	0.0	0.0	2668	0.0	0.0
31704	550	8	8			394	595	0.66	440	596	0.74	2637	0.0	0.0	2619	0.0	0.0
31705	265	8	8			394	456	0.86	440	457	0.96	2635	0.0	0.0	2637	0.0	0.0
31706	288	12	12			88	1,090	0.08	88	1,090	0.08	2620	0.0	0.0	2668	0.0	0.0
31707	274	8	8			11	655	0.02	11	656	0.02	7248	0.0	0.0	2620	0.0	0.0
31708	263	8	8			6	699	0.01	6	700	0.01	2621	0.0	0.0	7248	0.0	0.0
31709	235	8	8			6	523	0.01	6	524	0.01	2622	0.0	0.0	2621	0.0	0.0
31710	230	8	8			6	401	0.02	6	401	0.02	2641	0.0	0.0	2622	0.0	0.0
31711	245	8	8			4	538	0.01	4	538	0.01	2676	0.0	0.0	7248	0.0	0.0
31712	49	10	10			4	699	0.01	4	698	0.01	2677	0.0	0.0	2696	0.0	0.0
31713	252	8	8			6	397	0.02	6	397	0.02	2691	0.0	0.0	2641	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31714	244	8	8			4	738	0.01	4	738	0.01	2640	0.0	0.0	2676	0.0	0.0
31715	282	12	12			73	4,208	0.02	73	4,208	0.02	2665	0.0	0.0	2696	0.0	0.0
31716	401	8	8			16	1,747	0.01	16	1,749	0.01	2663	0.0	0.0	2664	0.0	0.0
31717	113	8	8			16	2,061	0.01	16	2,064	0.01	2681	0.0	0.0	2663	0.0	0.0
31718	83	8	8			16	1,507	0.01	16	1,509	0.01	2680	0.0	0.0	2681	0.0	0.0
31719	127	8	8			8	1,381	0.01	8	1,383	0.01	2683	0.0	0.0	2680	0.0	0.0
31720	205	8	8			7	1,366	0.01	7	1,367	0.01	7395	0.0	0.0	2680	0.0	0.0
31721	238	8	8			0	1,180	0.00	0	1,181	0.00	2652	0.0	0.0	7395	0.0	0.0
31722	184	8	8			1	1,752	0.00	1	1,755	0.00	2669	0.0	0.0	7395	0.0	0.0
31723	160	6	6			0	542	0.00	0	542	0.00	2604	0.0	0.0	2669	0.0	0.0
31724	380	12	12			46	1,719	0.03	46	1,719	0.03	2661	0.0	0.0	2660	0.0	0.0
31725	35	15	15			46	5,415	0.01	46	5,415	0.01	7176	0.0	0.0	2661	0.0	0.0
31726	159	10	10			46	2,373	0.02	46	2,371	0.02	2656	0.0	0.0	7176	0.0	0.0
31727	259	8	8			0	693	0.00	0	694	0.00	2657	0.0	0.0	2656	0.0	0.0
31728	248	8	8			0	883	0.00	0	884	0.00	2658	0.0	0.0	2657	0.0	0.0
31729	146	8	8			0	1,870	0.00	0	1,872	0.00	2682	0.0	0.0	2658	0.0	0.0
31730	172	10	10			45	2,386	0.02	45	2,384	0.02	2662	0.0	0.0	2656	0.0	0.0
31731	245	8	8			1	822	0.00	1	824	0.00	7016	0.0	0.0	2662	0.0	0.0
31732	122	8	8			0	1,275	0.00	0	1,277	0.00	2654	0.0	0.0	2692	0.0	0.0
31733	210	8	8			1	1,499	0.00	1	1,501	0.00	2655	0.0	0.0	2692	0.0	0.0
31734	350	10	10			31	1,846	0.02	31	1,844	0.02	7488	0.0	0.0	2662	0.0	0.0
31735	312	8	8			401	424	0.95	449	424	1.06	2642	0.0	0.0	2634	0.0	0.0
31736	261	8	8			0	689	0.00	0	690	0.00	2687	0.0	0.0	2642	0.0	0.0
31737	300	8	8			401	624	0.64	447	626	0.71	2651	0.0	0.0	2642	0.0	0.0
31738	135	8	8			0	1,043	0.00	0	1,044	0.00	7015	0.0	0.0	2651	0.0	0.0
31739	498	8	8			8	1,072	0.01	8	1,073	0.01	2650	0.0	0.0	2651	0.0	0.0
31740	170	8	8			401	377	1.06	447	378	1.18	7489	0.0	0.0	2651	0.0	0.0
31741	95	8	8			22	381	0.06	33	382	0.09	2686	0.0	0.0	7489	0.0	0.0
31742	270	8	8			403	945	0.43	453	946	0.48	2685	0.0	0.0	7489	0.0	0.0
31743	252	8	8			403	946	0.43	452	947	0.48	2684	0.0	0.0	2685	0.0	0.0
31744	352	12	12			108	1,097	0.10	108	1,097	0.10	2646	0.0	0.0	2625	0.0	0.0
31745	30	12	12			108	2,388	0.05	108	2,388	0.05	2647	0.0	0.0	2646	0.0	0.0
31746	303	12	12			40	839	0.05	40	839	0.05	7249	0.0	0.0	2647	0.0	0.0
31747	303	8	8			34	369	0.09	34	370	0.09	2689	0.0	0.0	7249	0.0	0.0
31748	484	8	8			0	510	0.00	0	511	0.00	2690	0.0	0.0	2689	0.0	0.0
31749	309	8	8			34	677	0.05	34	678	0.05	2614	0.0	0.0	2689	0.0	0.0
31750	267	8	8			0	988	0.00	0	990	0.00	2617	0.0	0.0	2614	0.0	0.0
31751	149	8	8			33	720	0.05	33	722	0.05	7649	0.0	0.0	2614	0.0	0.0
31752	59	8	8			0	1,168	0.00	0	1,169	0.00	2694	0.0	0.0	2613	0.0	0.0
31753	380	8	8			55	972	0.06	55	973	0.06	2688	0.0	0.0	2647	0.0	0.0
31754	205	8	8			54	1,095	0.05	54	1,097	0.05	2616	0.0	0.0	2688	0.0	0.0
31755	290	8	8			8	535	0.02	8	535	0.02	2648	0.0	0.0	2626	0.0	0.0
31756	302	8	8			6	1,064	0.01	6	1,065	0.01	7486	0.0	0.0	2615	0.0	0.0
31758	60	8	8			13	1,038	0.01	13	1,039	0.01	2697	0.0	0.0	2787	0.0	0.0
31759	287	8	12	37	ura	127	736	0.17	127	737	0.17	2719	0.0	0.0	8944	0.0	0.0
31760	305	8	12	37	ura	127	388	0.33	127	388	0.33	7018	0.0	0.0	2718	0.0	0.0
31761	19	8	8			22	1,568	0.01	22	1,570	0.01	2735	0.0	0.0	7018	0.0	0.0
31762	450	8	8			0	372	0.00	0	372	0.00	2788	0.0	0.0	2735	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31763	215	8	12	37	ura	104	458	0.23	104	459	0.23	2782	0.0	0.0	7018	0.0	0.0
31764	285	8	12	37	ura	90	1,100	0.08	90	1,101	0.08	2783	0.0	0.0	2782	0.0	0.0
31765	441	8	12	37	ura	85	726	0.12	85	727	0.12	2784	0.0	0.0	2783	0.0	0.0
31766	278	8	8			22	1,015	0.02	22	1,017	0.02	2738	0.0	0.0	2735	0.0	0.0
31767	196	8	8			13	368	0.04	13	369	0.04	7490	0.0	0.0	2738	0.0	0.0
31768	249	8	8			13	378	0.03	13	378	0.03	2755	0.0	0.0	2736	0.0	0.0
31769	251	8	8			6	789	0.01	6	790	0.01	7252	0.0	0.0	2755	0.0	0.0
31770	257	8	8			0	1,216	0.00	0	1,218	0.00	2740	0.0	0.0	7490	0.0	0.0
31771	110	8	8			0	380	0.00	0	381	0.00	2700	0.0	0.0	2740	0.0	0.0
31772	193	8	8			0	385	0.00	0	386	0.00	2701	0.0	0.0	2740	0.0	0.0
31773	92	8	8			1	474	0.00	1	475	0.00	2728	0.0	0.0	2757	0.0	0.0
31774	280	8	8			0	922	0.00	0	924	0.00	2729	0.0	0.0	2728	0.0	0.0
31775	409	8	8			0	769	0.00	0	769	0.00	2730	0.0	0.0	2729	0.0	0.0
31776	95	8	8			5	381	0.01	5	382	0.01	2727	0.0	0.0	2757	0.0	0.0
31777	244	8	8			5	849	0.01	5	851	0.01	2722	0.0	0.0	2727	0.0	0.0
31778	303	8	8			5	792	0.01	5	793	0.01	2732	0.0	0.0	2722	0.0	0.0
31779	301	8	8			0	719	0.00	0	719	0.00	2731	0.0	0.0	2732	0.0	0.0
31780	109	8	8			54	765	0.07	54	767	0.07	7177	0.0	0.0	2726	0.0	0.0
31781	223	8	8			54	738	0.07	54	740	0.07	2724	0.0	0.0	7177	0.0	0.0
31782	288	8	8			53	678	0.08	53	678	0.08	2775	0.0	0.0	2776	0.0	0.0
31783	351	8	8			41	681	0.06	41	683	0.06	2777	0.0	0.0	2775	0.0	0.0
31784	287	8	8			13	527	0.02	13	528	0.02	2761	0.0	0.0	2775	0.0	0.0
31785	379	8	8			0	755	0.00	0	756	0.00	7396	0.0	0.0	2761	0.0	0.0
31786	145	8	8			18	713	0.03	18	713	0.03	2758	0.0	0.0	7491	0.0	0.0
31787	208	8	8			18	708	0.03	18	709	0.03	7397	0.0	0.0	2758	0.0	0.0
31788	157	8	8			17	889	0.02	17	890	0.02	2723	0.0	0.0	7397	0.0	0.0
31789	302	8	8			15	727	0.02	15	728	0.02	2762	0.0	0.0	2723	0.0	0.0
31790	319	8	8			10	814	0.01	10	815	0.01	2764	0.0	0.0	2762	0.0	0.0
31791	118	8	8			0	490	0.00	0	490	0.00	2702	0.0	0.0	2763	0.0	0.0
31792	59	8	8			0	765	0.00	0	766	0.00	2763	0.0	0.0	2764	0.0	0.0
31793	111	8	8			0	624	0.00	0	624	0.00	2703	0.0	0.0	2765	0.0	0.0
31794	401	8	8			0	414	0.00	0	415	0.00	7020	0.0	0.0	2762	0.0	0.0
31795	162	8	8			0	986	0.00	0	988	0.00	2704	0.0	0.0	7020	0.0	0.0
31796	271	8	8			10	844	0.01	10	846	0.01	2766	0.0	0.0	2765	0.0	0.0
31797	229	8	8			0	719	0.00	0	720	0.00	2760	0.0	0.0	2766	0.0	0.0
31798	373	8	8			5	660	0.01	5	661	0.01	2767	0.0	0.0	2766	0.0	0.0
31799	352	8	8			5	890	0.01	5	891	0.01	2768	0.0	0.0	2767	0.0	0.0
31800	367	8	8			0	733	0.00	0	734	0.00	2759	0.0	0.0	7396	0.0	0.0
31801	388	10	10			37	715	0.05	37	715	0.05	2779	0.0	0.0	2778	0.0	0.0
31802	137	8	8			0	789	0.00	0	790	0.00	2706	0.0	0.0	2759	0.0	0.0
31803	309	10	10			30	730	0.04	30	729	0.04	2780	0.0	0.0	2779	0.0	0.0
31804	324	10	10			18	1,599	0.01	18	1,598	0.01	7253	0.0	0.0	2780	0.0	0.0
31805	158	8	8			13	929	0.01	13	931	0.01	7492	0.0	0.0	7253	0.0	0.0
31806	51	10	10			13	775	0.02	13	774	0.02	2781	0.0	0.0	7492	0.0	0.0
31807	322	8	8			12	424	0.03	12	425	0.03	2772	0.0	0.0	2780	0.0	0.0
31808	205	8	8			11	892	0.01	11	893	0.01	2773	0.0	0.0	2772	0.0	0.0
31809	270	8	8			0	847	0.00	0	847	0.00	2769	0.0	0.0	2772	0.0	0.0
31810	58	8	8			0	690	0.00	0	691	0.00	2770	0.0	0.0	2769	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31811	76	8	8			0	603	0.00	0	603	0.00	2707	0.0	0.0	2770	0.0	0.0
31812	280	8	8			0	533	0.00	0	533	0.00	2771	0.0	0.0	2773	0.0	0.0
31813	191	8	8			3	567	0.01	3	568	0.01	2774	0.0	0.0	2773	0.0	0.0
31814	281	8	8			0	859	0.00	0	860	0.00	2789	0.0	0.0	7178	0.0	0.0
31815	150	8	8			0	429	0.00	0	430	0.00	2709	0.0	0.0	2789	0.0	0.0
31816	282	8	8			0	691	0.00	0	692	0.00	7251	0.0	0.0	2730	0.0	0.0
31817	405	8	12	37	ura	81	725	0.11	81	726	0.11	2786	0.0	0.0	2785	0.0	0.0
31818	378	8	12	37	ura	74	772	0.10	74	774	0.10	2787	0.0	0.0	2786	0.0	0.0
31819	211	8	8			5	761	0.01	5	762	0.01	2741	0.0	0.0	2784	0.0	0.0
31820	218	8	8			0	1,053	0.00	0	1,055	0.00	2710	0.0	0.0	2741	0.0	0.0
31821	290	8	8			0	718	0.00	0	719	0.00	2733	0.0	0.0	2754	0.0	0.0
31822	207	8	8			33	434	0.08	33	435	0.08	2753	0.0	0.0	2756	0.0	0.0
31823	276	8	8			12	436	0.03	12	437	0.03	2716	0.0	0.0	2753	0.0	0.0
31824	31	8	8			0	409	0.00	0	409	0.00	2791	0.0	0.0	2716	0.0	0.0
31825	77	8	8			14	540	0.03	14	540	0.03	2747	0.0	0.0	2717	0.0	0.0
31826	132	8	8			14	415	0.03	14	416	0.03	2748	0.0	0.0	2747	0.0	0.0
31827	75	8	8			14	413	0.03	14	413	0.03	7019	0.0	0.0	2748	0.0	0.0
31828	71	8	8			14	834	0.02	14	835	0.02	2746	0.0	0.0	7019	0.0	0.0
31829	306	8	8			13	376	0.04	13	376	0.04	2745	0.0	0.0	2746	0.0	0.0
31830	48	8	8			1	543	0.00	1	544	0.00	2744	0.0	0.0	2745	0.0	0.0
31831	336	8	8			0	365	0.00	0	366	0.00	2743	0.0	0.0	2744	0.0	0.0
31832	125	8	8			0	1,025	0.00	0	1,026	0.00	2742	0.0	0.0	2743	0.0	0.0
31833	144	8	8			0	1,200	0.00	0	1,201	0.00	2712	0.0	0.0	2742	0.0	0.0
31834	457	8	8			0	860	0.00	0	862	0.00	2752	0.0	0.0	2745	0.0	0.0
31835	253	8	8			0	443	0.00	0	444	0.00	2751	0.0	0.0	2752	0.0	0.0
31836	123	8	8			0	431	0.00	0	431	0.00	2713	0.0	0.0	2751	0.0	0.0
31837	98	8	8			0	653	0.00	0	653	0.00	2749	0.0	0.0	2717	0.0	0.0
31838	264	8	8			0	542	0.00	0	543	0.00	2750	0.0	0.0	2749	0.0	0.0
31839	103	6	6			0	302	0.00	0	302	0.00	2714	0.0	0.0	2750	0.0	0.0
31840	328	8	8			14	452	0.03	14	453	0.03	2757	0.0	0.0	2782	0.0	0.0
31841	230	6	6			1	252	0.01	1	252	0.01	2817	0.0	0.0	2818	0.0	0.0
31842	155	8	8			0	1,753	0.00	0	1,755	0.00	2820	0.0	0.0	2819	0.0	0.0
31843	28	10	10			13	3,579	0.00	13	3,575	0.00	2815	0.0	0.0	2816	0.0	0.0
31844	182	8	8			1	1,266	0.00	1	1,267	0.00	2808	0.0	0.0	2809	0.0	0.0
31845	169	8	8			1	835	0.00	1	835	0.00	2807	0.0	0.0	2808	0.0	0.0
31846	141	8	8			1	1,200	0.00	1	1,201	0.00	2809	0.0	0.0	2810	0.0	0.0
31847	185	8	8			165	893	0.18	165	894	0.18	2810	0.0	0.0	2811	0.0	0.0
31848	273	8	8			165	1,684	0.10	165	1,686	0.10	2811	0.0	0.0	2822	0.0	0.0
31849	135	8	8			1	1,719	0.00	1	1,722	0.00	2812	0.0	0.0	2822	0.0	0.0
31850	363	8	8			1	853	0.00	1	854	0.00	2813	0.0	0.0	2812	0.0	0.0
31851	85	8	8			1	1,650	0.00	1	1,652	0.00	2823	0.0	0.0	2813	0.0	0.0
31852	184	8	8			167	635	0.26	167	635	0.26	2822	0.0	0.0	2824	0.0	0.0
31853	170	8	8			262	931	0.28	262	932	0.28	2825	0.0	0.0	2826	0.0	0.0
31854	82	8	8			10	974	0.01	10	975	0.01	2829	0.0	0.0	2828	0.0	0.0
31855	193	8	8			10	1,785	0.01	10	1,788	0.01	2830	0.0	0.0	2829	0.0	0.0
31856	90	6	6			1	838	0.00	1	838	0.00	2818	0.0	0.0	2797	0.0	0.0
31857	32	8	8			1	1,776	0.00	1	1,778	0.00	2797	0.0	0.0	2814	0.0	0.0
31858	468	8	8			46	625	0.07	46	626	0.07	2831	0.0	0.0	2824	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31869	360	21	21			2,696	7,801	0.35	2,893	7,801	0.37	2866	0.0	0.0	2878	0.0	0.0
31870	277	21	21			2,720	7,663	0.35	2,918	7,663	0.38	2867	0.0	0.0	2868	0.0	0.0
31871	420	21	21			2,744	8,490	0.32	2,942	8,490	0.35	2880	0.0	0.0	2865	0.0	0.0
31872	56	8	8			26	351	0.07	26	351	0.07	3765	0.0	0.0	2881	0.0	0.0
31873	347	8	8			294	586	0.50	294	587	0.50	2872	0.0	0.0	7493	0.0	0.0
31874	337	8	8			294	343	0.86	294	344	0.85	2882	0.0	0.0	2872	0.0	0.0
31875	57	8	8			322	1,528	0.21	322	1,530	0.21	7493	0.0	0.0	2851	0.0	0.0
31878	244	8	8			26	292	0.09	26	292	0.09	2879	0.0	0.0	2878	0.0	0.0
31879	6	8	8			26	758	0.03	26	760	0.03	2879	0.0	0.0	2881	0.0	0.0
31890	301	42	42			4,656	32,405	0.14	4,656	32,405	0.14	2850	0.0	0.0	7745	0.0	0.0
31891	414	42	42			4,656	37,004	0.13	4,656	37,004	0.13	7745	0.0	0.0	2851	0.0	0.0
31892	359	48	48			4,923	29,073	0.17	4,923	29,073	0.17	2851	0.0	0.0	2852	0.0	0.0
31893	213	48	48			4,922	28,629	0.17	4,922	28,629	0.17	2852	0.0	0.0	9624	0.0	0.0
31894	313	48	48			4,937	38,738	0.13	4,937	38,738	0.13	9624	0.0	0.0	2854	0.0	0.0
31895	421	48	48			4,937	28,799	0.17	4,937	28,799	0.17	2854	0.0	0.0	2855	0.0	0.0
31896	174	54	54			4,938	34,768	0.14	4,938	34,768	0.14	2855	0.0	0.0	2856	0.0	0.0
31897	137	54	54			4,938	35,369	0.14	4,938	35,369	0.14	2857	0.0	0.0	2858	0.0	0.0
31898	277	54	54			4,938	35,575	0.14	4,943	35,575	0.14	2858	0.0	0.0	2859	0.0	0.0
31899	19	15	15			2,745	10,939	0.25	2,942	10,939	0.27	2861	0.0	0.0	2860	0.0	0.0
31901	74	15	15			2,744	7,710	0.36	2,942	7,710	0.38	2865	0.0	0.0	2862	0.0	0.0
31902	148	8	8			733	685	1.07	784	686	1.14	2862	0.0	0.0	2861	0.0	0.0
31903	44	15	15			2,745	6,185	0.44	2,943	6,185	0.48	2860	0.0	0.0	2859	0.0	0.0
31904	314	54	54			7,663	29,044	0.26	7,852	29,044	0.27	2859	0.0	0.0	2863	0.0	0.0
31911	124	8	8			12	1,073	0.01	12	1,074	0.01	2920	0.0	0.0	2924	0.0	0.0
31912	320	8	8			0	749	0.00	0	750	0.00	2947	0.0	0.0	7254	0.0	0.0
31913	150	8	8			0	760	0.00	0	761	0.00	2910	0.0	0.0	2947	0.0	0.0
31914	175	8	8			0	417	0.00	0	417	0.00	2911	0.0	0.0	2910	0.0	0.0
31915	87	21	21			2,292	5,224	0.44	2,488	5,224	0.48	2921	0.0	0.0	2922	0.0	0.0
31916	314	21	21			2,273	10,704	0.21	2,469	10,704	0.23	2948	0.0	0.0	2921	0.0	0.0
31917	351	21	21			2,273	9,539	0.24	2,469	9,539	0.26	2912	0.0	0.0	2908	0.0	0.0
31918	125	21	21			2,385	7,735	0.31	2,581	7,735	0.33	7495	0.0	0.0	2926	0.0	0.0
31920	175	21	21			2,384	10,321	0.23	2,581	10,321	0.25	2924	0.0	0.0	2925	0.0	0.0
31921	88	21	21			2,372	10,324	0.23	2,569	10,324	0.25	2923	0.0	0.0	2924	0.0	0.0
31922	545	8	8			12	1,256	0.01	12	1,257	0.01	2946	0.0	0.0	2944	0.0	0.0
31923	110	8	8			1	307	0.00	1	307	0.00	2909	0.0	0.0	2946	0.0	0.0
31924	107	8	8			63	533	0.12	63	533	0.12	2949	0.0	0.0	8522	0.0	0.0
31925	70	8	8			44	511	0.09	44	512	0.09	7132	0.0	0.0	2949	0.0	0.0
31926	148	8	8			44	522	0.09	44	523	0.08	2950	0.0	0.0	7132	0.0	0.0
31927	330	8	8			44	482	0.09	44	483	0.09	2927	0.0	0.0	2950	0.0	0.0
31928	178	8	8			23	447	0.05	23	447	0.05	2951	0.0	0.0	2927	0.0	0.0
31929	79	8	8			23	499	0.05	23	500	0.05	2952	0.0	0.0	2951	0.0	0.0
31930	110	8	8			23	501	0.05	23	502	0.05	2953	0.0	0.0	2952	0.0	0.0
31931	285	8	8			9	442	0.02	9	442	0.02	2954	0.0	0.0	2953	0.0	0.0
31932	249	8	8			9	873	0.01	9	874	0.01	2955	0.0	0.0	2954	0.0	0.0
31933	269	8	8			9	872	0.01	9	874	0.01	2956	0.0	0.0	2955	0.0	0.0
31934	371	8	8			22	449	0.05	22	450	0.05	7023	0.0	0.0	2928	0.0	0.0
31935	455	8	8			22	805	0.03	22	806	0.03	2957	0.0	0.0	7023	0.0	0.0
31936	47	8	8			22	2,120	0.01	22	2,123	0.01	2980	0.0	0.0	2957	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31937	450	8	8			0	518	0.00	0	519	0.00	7494	0.0	0.0	2909	0.0	0.0
31938	57	8	8			0	419	0.00	0	419	0.00	2983	0.0	0.0	7494	0.0	0.0
31939	303	8	8			0	374	0.00	0	375	0.00	2945	0.0	0.0	2909	0.0	0.0
31940	357	8	8			30	1,040	0.03	30	1,041	0.03	2933	0.0	0.0	2932	0.0	0.0
31941	314	8	8			1	1,078	0.00	1	1,080	0.00	2934	0.0	0.0	2933	0.0	0.0
31942	294	8	8			263	528	0.50	263	529	0.50	2931	0.0	0.0	2932	0.0	0.0
31943	444	8	8			45	1,074	0.04	45	1,076	0.04	2940	0.0	0.0	2958	0.0	0.0
31944	297	8	8			1	1,579	0.00	1	1,581	0.00	2942	0.0	0.0	2941	0.0	0.0
31945	183	8	8			3	1,267	0.00	3	1,269	0.00	2943	0.0	0.0	2959	0.0	0.0
31946	210	8	8			3	1,506	0.00	3	1,508	0.00	7022	0.0	0.0	2943	0.0	0.0
31947	238	8	8			3	1,537	0.00	3	1,539	0.00	7255	0.0	0.0	7022	0.0	0.0
31948	144	8	8			0	1,681	0.00	0	1,683	0.00	2982	0.0	0.0	7022	0.0	0.0
31949	36	6	6			0	1,073	0.00	0	1,073	0.00	7672	0.0	0.0	7256	0.0	0.0
31950	230	6	6			1	931	0.00	1	931	0.00	2914	0.0	0.0	2915	0.0	0.0
31951	287	6	6			1	907	0.00	1	907	0.00	2939	0.0	0.0	2914	0.0	0.0
31952	90	8	8			21	734	0.03	21	735	0.03	2961	0.0	0.0	2980	0.0	0.0
31953	128	8	8			15	1,102	0.01	15	1,103	0.01	2919	0.0	0.0	2961	0.0	0.0
31954	116	8	8			9	1,246	0.01	9	1,247	0.01	2918	0.0	0.0	2919	0.0	0.0
31955	98	8	8			9	1,293	0.01	9	1,294	0.01	2917	0.0	0.0	2918	0.0	0.0
31956	125	8	8			5	1,271	0.00	5	1,272	0.00	2916	0.0	0.0	2917	0.0	0.0
31957	110	8	8			4	1,279	0.00	4	1,281	0.00	2935	0.0	0.0	2916	0.0	0.0
31958	127	8	8			1	1,429	0.00	1	1,431	0.00	2936	0.0	0.0	2935	0.0	0.0
31959	250	6	6			0	209	0.00	0	209	0.00	2894	0.0	0.0	2961	0.0	0.0
31960	197	8	8			6	810	0.01	6	812	0.01	2962	0.0	0.0	2961	0.0	0.0
31961	308	8	8			6	374	0.02	6	375	0.02	2963	0.0	0.0	2962	0.0	0.0
31962	128	8	8			1	1,551	0.00	1	1,553	0.00	2964	0.0	0.0	2963	0.0	0.0
31963	148	8	8			1	1,426	0.00	1	1,428	0.00	2965	0.0	0.0	2964	0.0	0.0
31964	106	8	8			1	1,836	0.00	1	1,838	0.00	2966	0.0	0.0	2913	0.0	0.0
31965	130	8	8			0	1,877	0.00	0	1,880	0.00	2938	0.0	0.0	2966	0.0	0.0
31966	226	6	6			0	873	0.00	0	873	0.00	2895	0.0	0.0	2938	0.0	0.0
31967	238	6	6			0	829	0.00	0	829	0.00	2967	0.0	0.0	2913	0.0	0.0
31968	238	6	6			0	717	0.00	0	717	0.00	2897	0.0	0.0	2965	0.0	0.0
31969	76	8	8			0	953	0.00	0	955	0.00	2937	0.0	0.0	2936	0.0	0.0
31970	145	6	6			0	735	0.00	0	735	0.00	2899	0.0	0.0	2937	0.0	0.0
31971	260	8	8			0	929	0.00	0	931	0.00	7496	0.0	0.0	2935	0.0	0.0
31972	107	6	6			0	464	0.00	0	464	0.00	2900	0.0	0.0	2935	0.0	0.0
31973	109	6	6			0	462	0.00	0	462	0.00	2901	0.0	0.0	2916	0.0	0.0
31974	159	6	6			0	375	0.00	0	375	0.00	2902	0.0	0.0	2936	0.0	0.0
31975	175	8	8			0	1,398	0.00	0	1,400	0.00	2968	0.0	0.0	2919	0.0	0.0
31976	194	6	6			0	209	0.00	0	209	0.00	2903	0.0	0.0	2968	0.0	0.0
31977	101	8	8			0	838	0.00	0	838	0.00	2969	0.0	0.0	2917	0.0	0.0
31978	179	6	6			0	570	0.00	0	570	0.00	2904	0.0	0.0	2969	0.0	0.0
31979	100	8	8			3	1,053	0.00	3	1,054	0.00	2970	0.0	0.0	2917	0.0	0.0
31980	331	8	8			1	374	0.00	1	374	0.00	2971	0.0	0.0	2970	0.0	0.0
31981	99	8	8			1	1,417	0.00	1	1,419	0.00	2972	0.0	0.0	2971	0.0	0.0
31982	103	8	8			1	1,083	0.00	1	1,085	0.00	2973	0.0	0.0	2972	0.0	0.0
31983	185	6	6			0	335	0.00	0	335	0.00	2906	0.0	0.0	2973	0.0	0.0
31984	98	8	8			0	840	0.00	0	840	0.00	2974	0.0	0.0	2973	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31985	220	6	6			0	390	0.00	0	390	0.00	2907	0.0	0.0	2974	0.0	0.0
31986	312	8	8			0	624	0.00	0	625	0.00	2976	0.0	0.0	2919	0.0	0.0
31987	30	8	8			1	1,273	0.00	1	1,274	0.00	2981	0.0	0.0	2934	0.0	0.0
31992	255	8	8			1	347	0.00	1	347	0.00	2995	0.0	0.0	3036	0.0	0.0
31993	282	8	12	13	Existing	651	383	1.70	652	1,131	0.58	3055	5.0	0.0	3006	0.0	0.0
31994	299	8	12	13	Existing	649	396	1.64	651	1,166	0.56	3056	2.7	0.0	3055	5.0	0.0
31995	88	8	12	13	Existing	647	421	1.54	649	1,241	0.52	3013	1.6	0.0	3056	2.7	0.0
31996	335	8	8			191	592	0.32	191	594	0.32	3021	0.0	0.0	3013	1.6	0.0
31997	302	8	8			152	343	0.44	152	344	0.44	3057	0.0	0.0	7497	0.0	0.0
31998	365	8	8			3	726	0.00	3	728	0.00	3009	0.0	0.0	3019	0.0	0.0
31999	195	8	8			1	585	0.00	1	586	0.00	3058	0.0	0.0	3009	0.0	0.0
32000	300	8	8			151	340	0.44	151	340	0.44	7726	0.0	0.0	3057	0.0	0.0
32001	122	8	8			3	347	0.01	3	348	0.01	7499	0.0	0.0	7726	0.0	0.0
32002	180	8	8			1	338	0.00	1	339	0.00	7673	0.0	0.0	7499	0.0	0.0
32003	74	8	8			146	340	0.43	146	340	0.43	3043	0.0	0.0	7726	0.0	0.0
32004	205	8	8			415	367	1.13	416	368	1.13	3014	1.5	0.0	3013	1.6	0.0
32005	334	8	8			318	569	0.56	317	569	0.56	3016	1.7	0.0	3014	1.5	0.0
32006	335	8	8			265	406	0.65	265	407	0.65	3015	3.9	0.0	3016	1.7	0.0
32007	410	8	8			25	344	0.07	16	344	0.05	3017	5.7	0.0	3015	3.9	0.0
32008	340	8	8			219	434	0.51	219	435	0.50	3026	5.3	0.0	3015	3.9	0.0
32009	297	8	8			217	627	0.35	217	628	0.35	3027	0.0	0.0	3026	5.3	0.0
32010	320	8	8			193	542	0.36	193	542	0.36	3028	0.0	0.0	3027	0.0	0.0
32011	320	8	8			192	545	0.35	192	546	0.35	3036	0.0	0.0	3028	0.0	0.0
32012	40	8	8			189	285	0.66	189	285	0.66	3037	0.0	0.0	3036	0.0	0.0
32013	350	8	8			19	343	0.05	19	344	0.05	7133	0.0	0.0	3037	0.0	0.0
32014	300	8	8			35	594	0.06	28	595	0.05	7024	0.0	0.0	3016	1.7	0.0
32015	325	8	8			26	544	0.05	26	544	0.05	3024	0.0	0.0	7024	0.0	0.0
32016	323	8	8			3	542	0.01	3	543	0.01	3025	0.0	0.0	3024	0.0	0.0
32017	310	8	8			1	542	0.00	1	543	0.00	3040	0.0	0.0	3025	0.0	0.0
32018	208	8	8			83	594	0.14	74	594	0.13	7399	3.9	0.0	10153	1.5	0.0
32019	266	8	8			50	565	0.09	50	565	0.09	3023	0.0	0.0	3022	0.0	0.0
32020	372	8	8			49	567	0.09	49	567	0.09	3041	0.0	0.0	3023	0.0	0.0
32021	35	8	8			47	467	0.10	47	468	0.10	3042	0.0	0.0	3041	0.0	0.0
32023	465	8	8			10	413	0.02	10	414	0.02	3059	0.0	0.0	3042	0.0	0.0
32024	390	8	8			1	581	0.00	1	581	0.00	3031	0.0	0.0	3063	0.0	0.0
32025	113	8	8			3	725	0.00	3	726	0.00	7259	0.0	0.0	3033	0.0	0.0
32026	357	8	8			1	452	0.00	1	453	0.00	3032	0.0	0.0	7259	0.0	0.0
32027	175	6	6			1	233	0.01	1	233	0.01	2996	0.0	0.0	3061	0.0	0.0
32028	115	8	8			1	715	0.00	1	716	0.00	2997	0.0	0.0	3061	0.0	0.0
32029	338	8	8			62	179	0.34	62	180	0.34	3030	0.0	0.0	3035	0.0	0.0
32030	284	8	8			67	344	0.19	67	344	0.19	3063	0.0	0.0	3035	0.0	0.0
32031	140	8	8			46	389	0.12	46	390	0.12	3034	0.0	0.0	3063	0.0	0.0
32032	91	8	8			44	402	0.11	44	403	0.11	3033	0.0	0.0	3034	0.0	0.0
32033	120	8	8			22	428	0.05	22	429	0.05	3060	0.0	0.0	3033	0.0	0.0
32034	225	8	8			35	384	0.09	35	385	0.09	3039	0.0	0.0	3042	0.0	0.0
32035	406	8	8			16	386	0.04	16	387	0.04	7498	0.0	0.0	3039	0.0	0.0
32037	178	8	8			17	364	0.05	17	364	0.05	7025	0.0	0.0	3038	0.0	0.0
32039	220	8	8			15	713	0.02	15	714	0.02	3045	0.0	0.0	3046	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32040	58	8	8			13	528	0.02	13	529	0.02	2998	0.0	0.0	3045	0.0	0.0
32041	99	8	8			19	545	0.03	19	546	0.03	3047	0.0	0.0	3048	0.0	0.0
32042	102	8	8			17	563	0.03	17	564	0.03	2999	0.0	0.0	3047	0.0	0.0
32043	417	8	8			57	518	0.11	57	519	0.11	3048	0.0	0.0	3051	0.0	0.0
32044	247	8	8			37	394	0.09	37	394	0.09	3046	0.0	0.0	3048	0.0	0.0
32045	187	8	8			20	452	0.04	20	453	0.04	3044	0.0	0.0	3046	0.0	0.0
32046	306	8	8			19	643	0.03	19	644	0.03	3010	0.0	0.0	3044	0.0	0.0
32047	332	8	8			17	298	0.06	17	298	0.06	7258	0.0	0.0	3010	0.0	0.0
32048	204	8	8			26	769	0.03	26	770	0.03	3062	0.0	0.0	3051	0.0	0.0
32049	456	8	8			24	596	0.04	24	597	0.04	3050	0.0	0.0	3062	0.0	0.0
32050	330	8	8			1	347	0.00	1	347	0.00	3049	0.0	0.0	3050	0.0	0.0
32051	407	8	8			26	488	0.05	26	489	0.05	3053	0.0	0.0	7260	0.0	0.0
32052	354	8	8			24	676	0.04	24	677	0.04	3054	0.0	0.0	3053	0.0	0.0
32053	237	8	8			22	899	0.02	22	899	0.02	3012	0.0	0.0	3054	0.0	0.0
32054	407	8	8			19	381	0.05	19	381	0.05	3011	0.0	0.0	3012	0.0	0.0
32055	148	8	8			1	378	0.00	1	378	0.00	3000	0.0	0.0	3011	0.0	0.0
32065	240	15	15			1,358	2,613	0.52	1,360	2,613	0.52	3130	0.0	0.0	3111	0.0	0.0
32066	183	8	8			1	415	0.00	1	415	0.00	7674	0.0	0.0	3104	0.0	0.0
32067	287	12	12			549	1,167	0.47	549	1,167	0.47	3103	0.0	0.0	3105	0.0	0.0
32068	298	12	12			514	1,127	0.46	514	1,127	0.46	7261	0.0	0.0	3103	0.0	0.0
32069	287	12	12			459	1,144	0.40	459	1,144	0.40	3131	0.0	0.0	7261	0.0	0.0
32070	15	15	15			551	1,674	0.33	551	1,674	0.33	3105	0.0	0.0	3130	0.0	0.0
32071	306	10	10			805	944	0.85	807	943	0.86	3107	0.0	0.0	3106	0.0	0.0
32072	395	10	10			774	908	0.85	776	908	0.85	7262	0.0	0.0	3107	0.0	0.0
32073	237	10	10			772	691	1.12	774	690	1.12	3114	6.4	6.4	7262	0.0	0.0
32074	250	8	8			33	623	0.05	33	624	0.05	3102	0.0	0.0	3103	0.0	0.0
32075	250	8	8			31	564	0.06	31	565	0.06	3101	0.0	0.0	3102	0.0	0.0
32076	250	8	8			30	469	0.06	30	469	0.06	3100	0.0	0.0	3101	0.0	0.0
32077	225	8	8			1	470	0.00	1	471	0.00	7179	0.0	0.0	3100	0.0	0.0
32078	350	8	8			58	540	0.11	58	540	0.11	7263	0.0	0.0	3109	0.0	0.0
32079	300	8	8			1	382	0.00	1	383	0.00	3108	0.0	0.0	7263	0.0	0.0
32080	250	8	8			53	488	0.11	53	488	0.11	3096	0.0	0.0	7261	0.0	0.0
32081	255	8	8			52	483	0.11	52	483	0.11	3097	0.0	0.0	3096	0.0	0.0
32082	230	8	8			30	488	0.06	30	488	0.06	3099	0.0	0.0	3097	0.0	0.0
32083	46	8	8			28	486	0.06	28	487	0.06	3098	0.0	0.0	3099	0.0	0.0
32084	134	8	8			27	492	0.06	27	492	0.06	3132	0.0	0.0	3098	0.0	0.0
32085	230	8	8			1	433	0.00	1	434	0.00	7027	0.0	0.0	3132	0.0	0.0
32086	202	8	8			3	400	0.01	3	401	0.01	3133	0.0	0.0	3132	0.0	0.0
32087	298	12	12			432	1,153	0.37	432	1,153	0.37	3095	0.0	0.0	3131	0.0	0.0
32088	271	12	12			399	1,153	0.35	399	1,153	0.35	3089	0.0	0.0	3095	0.0	0.0
32089	12	12	12			398	1,131	0.35	398	1,131	0.35	3090	0.0	0.0	3089	0.0	0.0
32090	300	12	12			382	1,526	0.25	382	1,526	0.25	3134	0.0	0.0	3090	0.0	0.0
32091	273	12	12			381	1,509	0.25	381	1,509	0.25	3091	0.0	0.0	3134	0.0	0.0
32092	28	8	8			117	340	0.34	117	340	0.34	3081	0.0	0.0	3082	0.0	0.0
32093	425	8	8			259	394	0.66	259	395	0.66	3083	0.0	0.0	3082	0.0	0.0
32094	249	8	8			6	583	0.01	6	583	0.01	3136	0.0	0.0	3095	0.0	0.0
32095	250	8	8			5	467	0.01	5	467	0.01	3094	0.0	0.0	3136	0.0	0.0
32096	250	8	8			3	453	0.01	3	454	0.01	3093	0.0	0.0	3094	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32097	200	8	8			1	453	0.00	1	454	0.00	3092	0.0	0.0	3093	0.0	0.0
32098	211	8	8			1	397	0.00	1	397	0.00	7502	0.0	0.0	3133	0.0	0.0
32099	250	8	8			24	423	0.06	24	424	0.06	3138	0.0	0.0	3137	0.0	0.0
32100	200	8	8			22	425	0.05	22	426	0.05	7400	0.0	0.0	3138	0.0	0.0
32101	300	8	8			81	358	0.22	81	359	0.22	3088	0.0	0.0	3087	0.0	0.0
32103	205	6	6			3	303	0.01	3	303	0.01	3086	0.0	0.0	10540	0.0	0.0
32104	312	6	6			1	226	0.01	1	226	0.01	3071	0.0	0.0	3086	0.0	0.0
32105	338	8	8			33	488	0.07	33	488	0.07	3085	0.0	0.0	3139	0.0	0.0
32106	237	8	8			3	509	0.01	3	510	0.01	3084	0.0	0.0	3085	0.0	0.0
32107	300	6	6			1	252	0.01	1	252	0.01	3144	0.0	0.0	3085	0.0	0.0
32108	207	8	8			258	344	0.75	258	344	0.75	3126	0.0	0.0	3083	0.0	0.0
32109	214	8	8			67	346	0.19	67	347	0.19	3125	0.0	0.0	3126	0.0	0.0
32110	53	8	8			16	224	0.07	16	224	0.07	3122	0.0	0.0	3124	0.0	0.0
32111	251	8	8			11	536	0.02	11	537	0.02	3120	0.0	0.0	3121	0.0	0.0
32112	285	8	8			86	343	0.25	86	344	0.25	3128	0.0	0.0	3081	0.0	0.0
32113	150	8	8			81	349	0.23	81	349	0.23	3129	0.0	0.0	3128	0.0	0.0
32114	275	8	8			55	343	0.16	55	344	0.16	3112	0.0	0.0	3129	0.0	0.0
32115	250	8	8			52	453	0.11	52	454	0.11	7026	0.0	0.0	3112	0.0	0.0
32116	250	8	8			27	427	0.06	27	428	0.06	7501	0.0	0.0	7026	0.0	0.0
32117	297	8	8			22	472	0.05	22	473	0.05	3119	0.0	0.0	7501	0.0	0.0
32118	250	8	8			21	473	0.04	21	474	0.04	3074	0.0	0.0	3119	0.0	0.0
32119	294	8	8			3	408	0.01	3	408	0.01	3118	0.0	0.0	7026	0.0	0.0
32120	251	6	6			1	207	0.01	1	207	0.01	3140	0.0	0.0	3118	0.0	0.0
32121	408	8	8			1	342	0.00	1	342	0.00	3113	0.0	0.0	3112	0.0	0.0
32122	191	8	8			3	342	0.01	3	342	0.01	3127	0.0	0.0	3128	0.0	0.0
32123	89	6	6			1	160	0.01	1	160	0.01	3075	0.0	0.0	3127	0.0	0.0
32124	120	8	8			49	340	0.14	49	340	0.14	3123	0.0	0.0	3124	0.0	0.0
32125	147	6	6			1	178	0.01	1	178	0.01	3076	0.0	0.0	3120	0.0	0.0
32126	235	10	10			658	694	0.95	659	693	0.95	3115	0.0	0.0	3114	6.4	6.4
32127	210	10	10			655	685	0.96	657	685	0.96	3116	0.0	0.0	3115	0.0	0.0
32128	12	15	15			1,360	2,511	0.54	1,362	2,511	0.54	3111	0.0	0.0	3080	0.0	0.0
32129	380	10	10			653	690	0.95	656	689	0.95	3117	0.0	0.0	3116	0.0	0.0
32130	35	6	6			1	233	0.01	1	233	0.01	3141	0.0	0.0	3084	0.0	0.0
32133	382	8	8			214	348	0.61	214	348	0.61	3177	0.0	0.0	3158	0.0	0.0
32134	223	8	8			139	174	0.80	139	174	0.80	3178	0.0	0.0	3177	0.0	0.0
32138	220	8	8			74	665	0.11	74	666	0.11	3179	0.0	0.0	7503	0.0	0.0
32139	82	8	8			73	424	0.17	73	424	0.17	3180	0.0	0.0	3179	0.0	0.0
32140	184	8	8			1	722	0.00	1	723	0.00	3193	0.0	0.0	7503	0.0	0.0
32141	299	6	6			1	252	0.00	1	252	0.00	3148	0.0	0.0	3193	0.0	0.0
32142	295	8	8			138	402	0.34	138	403	0.34	3194	0.0	0.0	3176	0.0	0.0
32143	107	8	8			53	410	0.13	53	410	0.13	7401	0.0	0.0	3194	0.0	0.0
32144	83	8	8			48	638	0.08	48	640	0.07	7402	0.0	0.0	7401	0.0	0.0
32145	147	8	8			1	419	0.00	1	420	0.00	3195	0.0	0.0	7402	0.0	0.0
32146	295	8	8			1	420	0.00	1	421	0.00	3173	0.0	0.0	3195	0.0	0.0
32147	95	8	8			5	405	0.01	5	406	0.01	3174	0.0	0.0	7401	0.0	0.0
32148	217	8	8			3	344	0.01	3	344	0.01	3172	0.0	0.0	7264	0.0	0.0
32149	300	8	8			33	357	0.09	33	358	0.09	3196	0.0	0.0	3194	0.0	0.0
32150	300	8	8			33	313	0.10	33	314	0.10	3168	0.0	0.0	3196	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32151	225	8	8			33	383	0.09	33	383	0.09	3165	0.0	0.0	3168	0.0	0.0
32152	143	8	8			3	345	0.01	3	346	0.01	3197	0.0	0.0	3172	0.0	0.0
32153	44	8	8			1	601	0.00	1	601	0.00	3171	0.0	0.0	3197	0.0	0.0
32154	73	8	8			1	632	0.00	1	633	0.00	3163	0.0	0.0	3197	0.0	0.0
32155	135	6	6			1	310	0.00	1	310	0.00	3169	0.0	0.0	3163	0.0	0.0
32156	71	8	8			1	542	0.00	1	543	0.00	3170	0.0	0.0	3169	0.0	0.0
32157	310	8	8			1	383	0.00	1	384	0.00	3185	0.0	0.0	3184	0.0	0.0
32158	225	8	8			11	383	0.03	11	383	0.03	3183	0.0	0.0	3184	0.0	0.0
32159	189	8	8			51	425	0.12	51	426	0.12	3184	0.0	0.0	3187	0.0	0.0
32160	326	8	8			1	329	0.00	1	329	0.00	3198	0.0	0.0	3187	0.0	0.0
32161	173	8	8			72	369	0.19	72	369	0.19	3200	0.0	0.0	3199	0.0	0.0
32162	38	8	8			72	440	0.16	72	440	0.16	3201	0.0	0.0	3200	0.0	0.0
32163	66	8	8			71	390	0.18	71	390	0.18	3187	0.0	0.0	3201	0.0	0.0
32164	75	8	8			1	420	0.00	1	421	0.00	3217	0.0	0.0	3183	0.0	0.0
32165	186	8	8			10	460	0.02	10	461	0.02	3182	0.0	0.0	3183	0.0	0.0
32166	10	8	8			73	924	0.08	73	925	0.08	3147	0.0	0.0	3180	0.0	0.0
32167	88	8	8			1	1,020	0.00	1	1,022	0.00	3186	0.0	0.0	3187	0.0	0.0
32168	73	8	8			1	386	0.00	1	387	0.00	3150	0.0	0.0	3186	0.0	0.0
32169	300	8	8			10	503	0.02	10	503	0.02	3181	0.0	0.0	3182	0.0	0.0
32170	136	8	8			1	979	0.00	1	981	0.00	3202	0.0	0.0	3171	0.0	0.0
32171	189	8	8			1	226	0.00	1	227	0.00	3204	0.0	0.0	3202	0.0	0.0
32187	214	10	10			215	570	0.38	215	570	0.38	3158	0.0	0.0	10181	0.0	0.0
32190	212	54	54			7,670	35,347	0.22	7,860	35,347	0.22	3222	0.0	0.0	3231	0.0	0.0
32191	97	8	8			333	340	0.98	333	340	0.98	3259	0.0	0.0	3260	0.0	0.0
32192	290	8	8			7	380	0.02	7	380	0.02	3243	0.0	0.0	3249	0.0	0.0
32193	252	8	8			6	611	0.01	6	612	0.01	7676	0.0	0.0	3243	0.0	0.0
32194	361	8	8			19	344	0.06	19	344	0.06	3249	0.0	0.0	7265	0.0	0.0
32195	31	8	8			20	338	0.06	20	338	0.06	7265	0.0	0.0	3242	0.0	0.0
32196	168	6	6			1	178	0.00	1	178	0.00	3218	0.0	0.0	7265	0.0	0.0
32197	331	8	8			0	342	0.00	0	343	0.00	3242	0.0	0.0	7505	0.0	0.0
32198	360	24	24			620	7,200	0.09	620	7,200	0.09	3262	0.0	0.0	3242	0.0	0.0
32199	300	8	8			22	361	0.06	22	362	0.06	3263	0.0	0.0	3262	0.0	0.0
32200	340	8	8			22	399	0.06	22	399	0.06	3264	0.0	0.0	3263	0.0	0.0
32201	33	24	24			588	7,070	0.08	588	7,070	0.08	3240	0.0	0.0	3262	0.0	0.0
32202	117	24	24			578	7,741	0.07	578	7,741	0.07	3241	0.0	0.0	3240	0.0	0.0
32203	160	24	24			578	6,716	0.09	578	6,716	0.09	3236	0.0	0.0	3241	0.0	0.0
32204	237	8	8			1	273	0.00	1	273	0.00	3284	0.0	0.0	3240	0.0	0.0
32205	150	8	8			1	381	0.00	1	381	0.00	3237	0.0	0.0	3238	0.0	0.0
32206	98	24	24			561	7,467	0.08	561	7,467	0.08	3239	0.0	0.0	3238	0.0	0.0
32207	425	24	24			560	7,138	0.08	560	7,138	0.08	3258	0.0	0.0	3239	0.0	0.0
32208	375	8	8			13	342	0.04	13	342	0.04	7505	0.0	0.0	7506	0.0	0.0
32209	140	8	8			1	349	0.00	1	349	0.00	7266	0.0	0.0	3265	0.0	0.0
32210	141	15	15			442	3,165	0.14	442	3,165	0.14	3266	0.0	0.0	3265	0.0	0.0
32211	336	10	10			434	933	0.47	434	931	0.47	3247	0.0	0.0	3248	0.0	0.0
32212	136	10	10			433	839	0.52	433	838	0.52	3233	0.0	0.0	3247	0.0	0.0
32213	37	10	10			433	1,108	0.39	433	1,107	0.39	3267	0.0	0.0	3233	0.0	0.0
32214	221	10	10			413	751	0.55	413	751	0.55	3232	0.0	0.0	3267	0.0	0.0
32215	40	10	10			413	746	0.55	413	745	0.55	3268	0.0	0.0	3232	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32217	33	10	10			375	342	1.10	375	342	1.10	3271	0.0	0.0	3270	0.0	0.0
32218	158	8	8			1	345	0.00	1	346	0.00	3251	0.0	0.0	3252	0.0	0.0
32219	287	10	10			374	544	0.69	374	544	0.69	3272	0.0	0.0	3271	0.0	0.0
32220	240	8	8			2	350	0.01	2	351	0.01	3250	0.0	0.0	3272	0.0	0.0
32222	80	10	10			351	467	0.75	351	466	0.75	7028	0.0	0.0	3272	0.0	0.0
32223	286	10	10			344	514	0.67	344	513	0.67	3234	0.0	0.0	7028	0.0	0.0
32224	278	8	8			6	783	0.01	6	784	0.01	3254	0.0	0.0	3253	0.0	0.0
32225	293	8	8			5	457	0.01	5	458	0.01	3275	0.0	0.0	3254	0.0	0.0
32226	12	8	8			3	586	0.01	3	587	0.01	3276	0.0	0.0	3275	0.0	0.0
32228	264	54	54			7,669	36,033	0.21	7,859	36,033	0.22	3223	0.0	0.0	3222	0.0	0.0
32229	1472	54	54			7,665	34,584	0.22	7,854	34,584	0.23	3224	0.0	0.0	3223	0.0	0.0
32230	306	54	54			7,665	40,365	0.19	7,854	40,365	0.19	3225	0.0	0.0	3224	0.0	0.0
32231	648	54	54			7,664	35,360	0.22	7,853	35,360	0.22	3226	0.0	0.0	3225	0.0	0.0
32237	12	15	15			1,996	2,763	0.72	1,996	2,763	0.72	3324	0.0	0.0	3323	0.0	0.0
32238	140	6	6			0	247	0.00	0	247	0.00	3296	0.0	0.0	3289	0.0	0.0
32239	407	8	8			1	285	0.00	1	285	0.00	3289	0.0	0.0	3358	0.0	0.0
32241	52	18	18			4,205	6,539	0.64	4,208	6,539	0.64	3346	6.2	6.2	3299	0.0	0.0
32242	240	18	18			4,205	5,758	0.73	4,208	5,758	0.73	3301	0.0	0.0	3346	6.2	6.2
32243	275	8	8			2	435	0.00	2	435	0.00	3300	0.0	0.0	3301	0.0	0.0
32244	93	8	8			1	432	0.00	1	433	0.00	3348	0.0	0.0	3300	0.0	0.0
32245	13	8	8			1	583	0.00	1	583	0.00	11024	0.0	0.0	3300	0.0	0.0
32246	177	8	8			0	562	0.00	0	563	0.00	3349	0.0	0.0	11024	0.0	0.0
32247	295	8	8			3	589	0.01	3	590	0.01	3350	0.0	0.0	3349	0.0	0.0
32248	263	8	8			1	371	0.00	1	372	0.00	7677	0.0	0.0	3350	0.0	0.0
32249	271	8	8			5	556	0.01	5	557	0.01	3349	0.0	0.0	3347	0.0	0.0
32250	214	18	18			4,159	5,014	0.83	4,163	5,014	0.83	3302	0.0	0.0	3347	0.0	0.0
32251	125	18	18			4,158	3,452	1.20	4,161	3,452	1.21	3295	0.0	0.0	3302	0.0	0.0
32253	157	18	18			4,134	3,428	1.21	4,137	3,428	1.21	3304	6.4	6.4	3295	0.0	0.0
32254	460	6	6			3	181	0.02	3	181	0.02	3356	0.0	0.0	3295	0.0	0.0
32255	270	6	6			1	181	0.01	1	181	0.01	3291	0.0	0.0	3356	0.0	0.0
32256	400	8	8			138	413	0.33	138	414	0.33	3355	0.0	0.0	3304	6.4	6.4
32257	404	8	8			99	415	0.24	99	416	0.24	3345	0.0	0.0	3355	0.0	0.0
32258	116	8	8			97	413	0.24	97	413	0.24	3315	0.0	0.0	3345	0.0	0.0
32259	455	12	12			25	1,089	0.02	28	1,089	0.03	3353	0.0	0.0	3354	6.1	6.1
32260	15	12	12			26	1,092	0.02	28	1,092	0.03	3352	0.0	0.0	3353	0.0	0.0
32261	40	8	8			3	343	0.01	3	344	0.01	3351	0.0	0.0	3352	0.0	0.0
32262	274	8	8			1	344	0.00	1	344	0.00	7269	0.0	0.0	3351	0.0	0.0
32263	127	18	18			3,994	3,500	1.14	3,998	3,500	1.14	3296	0.0	0.0	3304	6.4	6.4
32264	242	8	8			1	861	0.00	1	863	0.00	3287	0.0	0.0	3375	0.0	0.0
32265	145	18	18			3,988	3,299	1.21	3,992	3,299	1.21	3305	0.0	0.0	3296	0.0	0.0
32266	450	12	12			31	1,069	0.03	33	1,069	0.03	3352	0.0	0.0	3305	0.0	0.0
32267	10	18	18			4,127	8,168	0.51	4,136	8,168	0.51	3354	6.1	6.1	3305	0.0	0.0
32268	363	8	8			1	342	0.00	1	342	0.00	7267	0.0	0.0	7030	0.0	0.0
32269	361	8	8			0	651	0.00	0	652	0.00	3305	0.0	0.0	7267	0.0	0.0
32270	192	18	18			3,984	4,488	0.89	3,987	4,488	0.89	3307	6.8	6.8	3354	6.1	6.1
32271	183	18	18			3,979	3,913	1.02	3,983	3,913	1.02	3297	0.0	0.0	3307	6.8	6.8
32272	250	8	8			14	365	0.04	14	365	0.04	3317	0.0	0.0	3297	0.0	0.0
32273	83	10	10			11	610	0.02	11	610	0.02	3288	0.0	0.0	7180	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32274	217	8	8			10	383	0.03	10	383	0.03	3316	0.0	0.0	3288	0.0	0.0
32275	340	8	8			0	369	0.00	0	370	0.00	3297	0.0	0.0	3308	0.0	0.0
32276	285	18	18			3,963	3,960	1.00	3,967	3,960	1.00	3319	6.0	6.0	3297	0.0	0.0
32277	13	15	15			1,731	3,009	0.58	1,730	3,009	0.57	3320	6.4	6.4	3319	6.0	6.0
32278	475	15	15			1,729	1,858	0.93	1,725	1,858	0.93	3318	8.0	7.9	3320	6.4	6.4
32279	275	15	15			2,193	2,576	0.85	2,190	2,576	0.85	7510	0.0	0.0	3319	6.0	6.0
32280	336	8	8			144	536	0.27	144	537	0.27	3321	0.0	0.0	7510	0.0	0.0
32281	15	8	8			0	371	0.00	0	371	0.00	7510	0.0	0.0	3361	0.0	0.0
32283	366	8	8			65	251	0.26	65	251	0.26	3363	0.0	0.0	3314	0.0	0.0
32284	362	8	8			1	317	0.00	1	318	0.00	3325	0.0	0.0	3363	0.0	0.0
32285	360	8	8			0	347	0.00	0	347	0.00	3362	0.0	0.0	3325	0.0	0.0
32286	280	15	15			2,043	2,588	0.79	2,043	2,588	0.79	3362	0.0	0.0	7510	0.0	0.0
32287	154	15	15			2,000	2,506	0.80	2,000	2,506	0.80	3322	0.0	0.0	3362	0.0	0.0
32288	189	6	6			1	178	0.01	1	178	0.01	3292	0.0	0.0	3322	0.0	0.0
32289	120	15	15			1,997	2,539	0.79	1,997	2,539	0.79	3323	0.0	0.0	3322	0.0	0.0
32290	201	15	15			1,960	2,076	0.94	1,960	2,076	0.94	7029	0.0	0.0	3324	0.0	0.0
32291	57	15	15			1,959	1,583	1.24	1,959	1,583	1.24	7134	0.0	0.0	7029	0.0	0.0
32292	45	15	15			1,803	1,617	1.11	1,803	1,617	1.11	3326	0.0	0.0	7134	0.0	0.0
32293	447	8	8			1	362	0.00	1	362	0.00	3327	0.0	0.0	3328	0.0	0.0
32294	367	8	8			44	313	0.14	44	313	0.14	3313	0.0	0.0	3311	7.3	0.0
32295	338	8	8			1	257	0.00	1	258	0.00	3361	0.0	0.0	3312	0.0	0.0
32296	265	10	10			526	640	0.82	526	640	0.82	3311	7.3	0.0	3310	4.6	0.0
32297	362	8	8			3	343	0.01	3	343	0.01	3309	0.0	0.0	3310	4.6	0.0
32298	244	8	8			1	338	0.00	1	338	0.00	3293	0.0	0.0	10780	0.0	0.0
32299	400	8	8			116	501	0.23	116	502	0.23	3329	0.0	0.0	3364	0.0	0.0
32300	300	8	8			84	494	0.17	84	495	0.17	7268	0.0	0.0	3329	0.0	0.0
32301	112	8	8			3	423	0.01	3	423	0.01	3342	0.0	0.0	3331	0.0	0.0
32302	208	8	8			1	420	0.00	1	421	0.00	3343	0.0	0.0	3342	0.0	0.0
32303	277	8	8			32	420	0.08	32	420	0.08	3331	0.0	0.0	3330	0.0	0.0
32304	217	8	8			1	383	0.00	1	383	0.00	3333	0.0	0.0	3337	0.0	0.0
32305	182	8	8			1	408	0.00	1	408	0.00	3336	0.0	0.0	3337	0.0	0.0
32306	304	8	8			11	415	0.03	11	415	0.03	7508	0.0	0.0	3362	0.0	0.0
32307	245	8	8			10	420	0.02	10	421	0.02	3365	0.0	0.0	7508	0.0	0.0
32308	245	8	8			8	420	0.02	8	421	0.02	3334	0.0	0.0	3365	0.0	0.0
32309	242	8	8			6	387	0.02	6	388	0.02	3335	0.0	0.0	3334	0.0	0.0
32310	86	8	8			5	417	0.01	5	418	0.01	3337	0.0	0.0	3335	0.0	0.0
32311	438	8	8			107	383	0.28	107	383	0.28	3339	0.0	0.0	3321	0.0	0.0
32312	272	8	8			106	453	0.23	106	454	0.23	3366	0.0	0.0	3339	0.0	0.0
32313	286	6	6			92	226	0.41	92	226	0.41	3367	0.0	0.0	3368	0.0	0.0
32314	350	8	8			40	343	0.12	40	344	0.12	3370	0.0	0.0	3369	0.0	0.0
32315	295	8	8			8	383	0.02	8	383	0.02	7270	0.0	0.0	3316	0.0	0.0
32316	295	8	8			5	381	0.01	5	382	0.01	3371	0.0	0.0	7509	0.0	0.0
32317	275	8	8			3	384	0.01	3	385	0.01	3372	0.0	0.0	3371	0.0	0.0
32318	225	8	8			1	383	0.00	1	383	0.00	7031	0.0	0.0	3372	0.0	0.0
32319	430	15	15			1,663	1,729	0.96	1,669	1,729	0.97	3381	8.6	8.5	3318	8.0	7.9
32320	440	15	15			1,424	1,930	0.74	1,426	1,930	0.74	3373	0.0	0.0	3341	0.0	0.0
32321	274	8	8			103	451	0.23	103	452	0.23	3340	0.0	0.0	3366	0.0	0.0
32322	301	8	8			5	342	0.01	5	343	0.01	3374	0.0	0.0	3340	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32323	130	6	6			97	197	0.49	97	197	0.49	3338	0.0	0.0	3340	0.0	0.0
32324	156	6	6			94	135	0.70	94	135	0.70	3368	0.0	0.0	3338	0.0	0.0
32326	18	6	6			5	222	0.02	5	222	0.02	3294	0.0	0.0	3296	0.0	0.0
32327	227	8	8			3	485	0.01	3	486	0.01	3375	0.0	0.0	3294	0.0	0.0
32329	85	8	8			0	567	0.00	0	568	0.00	7134	0.0	0.0	3327	0.0	0.0
32331	304	6	6			1	110	0.01	1	110	0.01	3487	0.0	0.0	3389	0.0	0.0
32332	365	10	15	10	Existing	826	630	1.31	828	1,858	0.45	3384	4.5	0.0	3385	0.0	0.0
32333	172	10	15	10	Existing	826	584	1.41	828	1,723	0.48	3502	4.1	0.0	3384	4.5	0.0
32334	26	10	15	10	Existing	826	496	1.67	828	1,461	0.57	3385	0.0	0.0	3468	0.0	0.0
32335	303	8	8			1	340	0.00	1	341	0.00	3387	0.0	0.0	3388	0.0	0.0
32336	185	8	8			1	329	0.00	1	329	0.00	3388	0.0	0.0	3386	0.0	0.0
32337	112	8	8			37	710	0.05	37	711	0.05	3389	0.0	0.0	7036	8.9	0.0
32340	207	8	8			1	576	0.00	1	577	0.00	3461	0.0	0.0	3393	0.0	0.0
32341	230	8	8			107	540	0.20	107	540	0.20	3393	0.0	0.0	3392	0.0	0.0
32342	121	8	8			108	548	0.20	108	549	0.20	3392	0.0	0.0	3390	0.0	0.0
32344	37	8	8			108	517	0.21	108	518	0.21	3390	0.0	0.0	3466	0.0	0.0
32347	90	8	8			1	271	0.01	1	272	0.01	7272	0.0	0.0	3446	0.0	0.0
32348	68	6	6			1	151	0.00	1	151	0.00	3521	0.0	0.0	3460	0.0	0.0
32349	283	6	6			1	144	0.00	1	144	0.00	3520	0.0	0.0	3506	0.0	0.0
32357	9	18	18			517	42,279	0.01	517	42,279	0.01	7513	0.0	0.0	3411	0.0	0.0
32358	127	54	54			12,990	35,026	0.37	13,183	35,026	0.38	3410	0.0	0.0	3411	0.0	0.0
32359	140	54	54			13,422	34,988	0.38	13,618	34,988	0.39	3411	0.0	0.0	7747	0.0	0.0
32360	319	6	6			1	201	0.00	1	201	0.00	7181	0.0	0.0	3455	0.0	0.0
32361	315	6	6			1	201	0.00	1	201	0.00	3454	0.0	0.0	7181	0.0	0.0
32362	150	10	10			143	363	0.39	143	363	0.39	7034	0.0	0.0	3420	0.0	0.0
32363	170	10	10			143	533	0.27	143	532	0.27	3472	0.0	0.0	7034	0.0	0.0
32364	150	10	10			101	655	0.15	101	654	0.15	3471	0.0	0.0	3472	0.0	0.0
32365	345	10	10			80	596	0.13	80	595	0.13	3480	0.0	0.0	3471	0.0	0.0
32366	371	10	10			79	610	0.13	79	610	0.13	3478	0.0	0.0	3480	0.0	0.0
32367	333	12	12			353	965	0.37	353	965	0.37	3420	0.0	0.0	3419	0.0	0.0
32368	272	12	12			399	598	0.67	399	598	0.67	3481	0.0	0.0	3402	0.0	0.0
32369	328	12	12			399	1,047	0.38	399	1,047	0.38	7274	0.0	0.0	3481	0.0	0.0
32370	93	12	12			435	642	0.68	435	642	0.68	3478	0.0	0.0	3477	0.0	0.0
32371	31	12	12			477	2,316	0.21	477	2,316	0.21	3477	0.0	0.0	3475	0.0	0.0
32372	270	8	8			37	388	0.09	37	388	0.09	3423	0.0	0.0	3475	0.0	0.0
32373	52	24	24			516	4,453	0.12	516	4,453	0.12	3475	0.0	0.0	3482	0.0	0.0
32374	510	24	24			516	4,359	0.12	516	4,359	0.12	3482	0.0	0.0	7513	0.0	0.0
32375	247	8	8			1	327	0.00	1	328	0.00	3483	0.0	0.0	3423	0.0	0.0
32376	500	24	24			1	5,561	0.00	1	5,561	0.00	3473	0.0	0.0	3476	0.0	0.0
32377	521	24	24			1	5,556	0.00	1	5,556	0.00	3470	0.0	0.0	3473	0.0	0.0
32378	295	24	24			1	4,541	0.00	1	4,541	0.00	3484	0.0	0.0	3470	0.0	0.0
32379	376	8	8			36	533	0.07	36	535	0.07	3422	0.0	0.0	3423	0.0	0.0
32380	269	6	6			40	242	0.16	40	242	0.16	3485	0.0	0.0	7273	0.0	0.0
32381	165	8	8			40	485	0.08	40	486	0.08	7273	0.0	0.0	3486	0.0	0.0
32382	217	8	8			43	299	0.14	43	299	0.14	3469	0.0	0.0	3486	0.0	0.0
32383	67	8	8			1	897	0.00	1	898	0.00	7678	0.0	0.0	3469	0.0	0.0
32384	326	14	21	10	Existing	1,640	1,639	1.00	1,645	4,833	0.34	3438	0.0	0.0	3417	0.0	0.0
32386	209	14	18	10	Existing	1,458	1,300	1.12	1,463	2,542	0.58	3444	5.4	0.0	3440	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32387	240	14	18	10	Existing	1,158	1,303	0.89	1,159	2,546	0.46	3452	7.1	0.0	3424	5.8	0.0
32388	144	15	18	10	Existing	1,158	1,288	0.90	1,159	2,093	0.55	3451	4.7	0.0	3452	7.1	0.0
32389	184	15	18	10	Existing	1,113	1,737	0.64	1,116	2,824	0.40	3453	0.0	0.0	3451	4.7	0.0
32390	357	15	18	10	Existing	910	1,557	0.58	913	2,532	0.36	3468	0.0	0.0	3453	0.0	0.0
32391	463	12	12			84	881	0.10	84	881	0.10	3486	0.0	0.0	3468	0.0	0.0
32393	113	8	8			76	249	0.31	73	249	0.29	3488	8.3	0.0	7511	7.3	0.0
32394	237	6	6			1	257	0.00	1	257	0.00	3490	0.0	0.0	3489	0.0	0.0
32395	288	6	6			1	145	0.00	1	145	0.00	3491	0.0	0.0	3490	0.0	0.0
32396	279	6	6			1	153	0.00	1	153	0.00	3395	0.0	0.0	3426	0.0	0.0
32398	151	10	10			181	1,339	0.13	181	1,338	0.13	7271	0.0	0.0	10106	7.4	0.0
32399	110	10	10			122	560	0.22	122	559	0.22	3492	0.0	0.0	7271	0.0	0.0
32400	288	10	10			122	733	0.17	122	732	0.17	3437	0.0	0.0	3492	0.0	0.0
32401	272	10	10			81	278	0.29	81	278	0.29	3435	0.0	0.0	3437	0.0	0.0
32402	143	8	8			79	304	0.26	79	304	0.26	3436	0.0	0.0	3435	0.0	0.0
32403	323	6	6			1	89	0.01	1	89	0.01	3493	0.0	0.0	3435	0.0	0.0
32404	350	8	8			1	248	0.00	1	249	0.00	7512	0.0	0.0	3436	0.0	0.0
32406	330	6	6			1	235	0.00	1	235	0.00	3396	0.0	0.0	3435	0.0	0.0
32407	371	8	8			1	302	0.00	1	302	0.00	3465	0.0	0.0	3466	0.0	0.0
32408	210	8	8			115	263	0.44	115	264	0.43	3450	4.3	0.0	3453	0.0	0.0
32409	126	8	8			115	269	0.43	114	269	0.42	7035	0.0	0.0	3450	4.3	0.0
32410	145	8	8			113	269	0.42	113	269	0.42	3494	0.0	0.0	3449	0.0	0.0
32411	140	8	8			110	434	0.25	110	435	0.25	3466	0.0	0.0	3494	0.0	0.0
32413	461	8	8			43	553	0.08	43	553	0.08	3495	0.0	0.0	3451	4.7	0.0
32414	305	8	8			3	596	0.00	3	597	0.00	3496	0.0	0.0	3424	5.8	0.0
32415	280	8	8			2	458	0.00	2	458	0.00	3497	0.0	0.0	3496	0.0	0.0
32416	116	8	8			2	453	0.00	2	454	0.00	3498	0.0	0.0	3497	0.0	0.0
32417	24	8	8			1	450	0.00	1	451	0.00	3499	0.0	0.0	3498	0.0	0.0
32418	86	8	8			1	443	0.00	1	444	0.00	3500	0.0	0.0	3499	0.0	0.0
32419	28	8	8			1	456	0.00	1	457	0.00	3501	0.0	0.0	3445	0.0	0.0
32420	174	10	15	10	Existing	695	565	1.23	697	1,666	0.42	3503	3.4	0.0	3464	0.0	0.0
32421	363	10	15	10	Existing	695	578	1.20	697	1,704	0.41	7033	2.2	0.0	3503	3.4	0.0
32423	73	8	8			2	283	0.01	2	283	0.01	3459	0.0	0.0	3457	0.0	0.0
32424	270	8	8			6	288	0.02	6	288	0.02	3505	0.0	0.0	3456	0.0	0.0
32425	140	6	6			2	308	0.01	2	308	0.01	3460	0.0	0.0	3459	0.0	0.0
32426	30	6	6			1	144	0.01	1	144	0.01	3506	0.0	0.0	3460	0.0	0.0
32427	188	6	6			1	102	0.01	1	102	0.01	3398	0.0	0.0	3506	0.0	0.0
32428	209	12	12			249	876	0.28	249	876	0.28	7275	0.0	0.0	3443	0.0	0.0
32429	224	12	12			108	742	0.15	108	742	0.15	3507	0.0	0.0	7275	0.0	0.0
32430	360	8	8			0	256	0.00	0	256	0.00	3436	0.0	0.0	3441	0.0	0.0
32431	308	10	10			251	604	0.41	251	603	0.42	3508	0.0	0.0	3444	5.4	0.0
32432	285	10	10			251	519	0.48	251	518	0.48	7032	0.0	0.0	3508	0.0	0.0
32433	270	12	12			250	1,583	0.16	250	1,583	0.16	3443	0.0	0.0	7032	0.0	0.0
32434	25	8	8			1	306	0.00	1	306	0.00	3441	0.0	0.0	3443	0.0	0.0
32435	134	15	24	6	Existing	1,988	1,653	1.20	3,263	5,790	0.56	3416	8.7	0.0	7036	8.9	0.0
32436	336	15	24	6	Existing	1,988	1,666	1.19	3,263	5,833	0.56	3415	7.5	0.0	3416	8.7	0.0
32437	36	15	15			1,320	1,619	0.82	1,430	1,619	0.88	3413	6.7	0.0	3414	6.6	0.0
32438	27	8	8			76	465	0.16	74	465	0.16	7511	7.3	0.0	7135	7.2	0.0
32439	371	8	8			86	459	0.19	86	459	0.19	3430	0.0	0.0	3431	0.0	0.0

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32440	44	8	8			1	728	0.00	1	729	0.00	3510	0.0	0.0	3430	0.0	0.0
32441	116	8	8			1	388	0.00	1	389	0.00	3429	0.0	0.0	3511	0.0	0.0
32442	197	8	8			1	217	0.00	1	218	0.00	3512	0.0	0.0	3429	0.0	0.0
32443	117	24	24			3,663	8,528	0.43	4,944	8,528	0.58	3417	0.0	0.0	3433	0.0	0.0
32444	175	6	6			3	131	0.02	3	131	0.02	3448	0.0	0.0	3494	0.0	0.0
32445	85	6	6			1	129	0.01	1	129	0.01	7403	0.0	0.0	3448	0.0	0.0
32446	143	8	8			2	838	0.00	2	838	0.00	3447	0.0	0.0	3448	0.0	0.0
32447	54	8	8			1	732	0.00	1	733	0.00	3446	0.0	0.0	3447	0.0	0.0
32448	55	8	8			1	285	0.00	1	285	0.00	3462	0.0	0.0	3463	0.0	0.0
32449	46	8	8			1	195	0.00	1	195	0.00	3463	0.0	0.0	7272	0.0	0.0
32450	365	8	8			1	384	0.00	1	385	0.00	3474	0.0	0.0	7514	0.0	0.0
32451	371	8	8			42	372	0.11	42	373	0.11	7514	0.0	0.0	3477	0.0	0.0
32452	283	8	8			1	384	0.00	1	385	0.00	3399	0.0	0.0	3474	0.0	0.0
32453	87	6	6			1	205	0.00	1	205	0.00	7516	0.0	0.0	3516	0.0	0.0
32454	59	6	6			1	205	0.00	1	205	0.00	3516	0.0	0.0	3440	0.0	0.0
32455	340	8	8			85	438	0.19	85	439	0.19	3412	0.0	0.0	3513	0.0	0.0
32456	46	8	8			1	283	0.00	1	283	0.00	3515	0.0	0.0	3505	0.0	0.0
32457	200	6	6			1	160	0.00	1	160	0.00	3400	0.0	0.0	3464	0.0	0.0
32458	46	6	6			1	128	0.01	1	128	0.01	3522	0.0	0.0	3448	0.0	0.0
32460	292	6	6			1	149	0.00	1	149	0.00	3394	0.0	0.0	3437	0.0	0.0
32461	53	6	6			1	360	0.00	1	360	0.00	3426	0.0	0.0	3437	0.0	0.0
32462	21	12	12			400	5,374	0.07	400	5,374	0.07	3402	0.0	0.0	8539	0.0	0.0
32463	194	54	54			12,989	35,283	0.37	13,183	35,283	0.37	3408	0.0	0.0	3409	0.0	0.0
32464	722	54	54			12,988	35,983	0.36	13,182	35,983	0.37	3407	0.0	0.0	3408	0.0	0.0
32465	193	54	54			12,988	35,374	0.37	13,182	35,374	0.37	3406	0.0	0.0	3407	0.0	0.0
32466	213	54	54			12,988	35,264	0.37	13,181	35,264	0.37	3404	0.0	0.0	3406	0.0	0.0
32467	178	24	24			1,032	25,472	0.04	1,032	25,472	0.04	3405	0.0	0.0	3404	0.0	0.0
32468	250	54	54			12,184	35,305	0.35	12,391	35,305	0.35	3403	0.0	0.0	3404	0.0	0.0
32487	348	8	8			29	386	0.08	29	387	0.08	7277	0.0	0.0	3560	0.0	0.0
32488	297	6	6			1	369	0.00	1	369	0.00	10163	0.0	0.0	3560	0.0	0.0
32489	295	6	6			17	265	0.07	17	265	0.07	3610	0.0	0.0	3609	0.0	0.0
32490	298	8	8			59	447	0.13	59	447	0.13	3561	0.0	0.0	3562	0.0	0.0
32491	291	8	8			8	329	0.03	8	330	0.03	3576	0.0	0.0	3561	0.0	0.0
32492	290	8	8			1	626	0.00	1	626	0.00	3577	0.0	0.0	3576	0.0	0.0
32493	405	8	8			50	351	0.14	50	352	0.14	3563	0.0	0.0	3561	0.0	0.0
32494	240	8	8			39	430	0.09	39	431	0.09	3567	0.0	0.0	3563	0.0	0.0
32495	255	8	8			38	431	0.09	38	431	0.09	3570	0.0	0.0	3567	0.0	0.0
32496	304	8	8			17	1,063	0.02	17	1,064	0.02	3557	0.0	0.0	3570	0.0	0.0
32497	88	8	8			16	894	0.02	16	895	0.02	3554	0.0	0.0	3557	0.0	0.0
32498	54	8	8			16	1,198	0.01	16	1,199	0.01	3555	0.0	0.0	3554	0.0	0.0
32499	88	8	8			1	387	0.00	1	388	0.00	7517	0.0	0.0	3571	0.0	0.0
32500	35	6	6			1	529	0.00	1	529	0.00	3596	0.0	0.0	7517	0.0	0.0
32501	403	8	8			22	442	0.05	22	442	0.05	3611	0.0	0.0	3562	0.0	0.0
32502	497	8	8			22	321	0.07	22	321	0.07	3565	0.0	0.0	3611	0.0	0.0
32503	303	8	8			1	1,163	0.00	1	1,165	0.00	3566	0.0	0.0	3565	0.0	0.0
32504	335	8	8			1	1,368	0.00	1	1,369	0.00	3595	0.0	0.0	3566	0.0	0.0
32505	137	8	8			1	1,734	0.00	1	1,736	0.00	3547	0.0	0.0	3595	0.0	0.0
32506	252	8	8			15	982	0.02	15	983	0.02	3571	0.0	0.0	3555	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32507	151	8	8			11	744	0.01	11	744	0.01	3564	0.0	0.0	3563	0.0	0.0
32508	200	8	8			1	531	0.00	1	532	0.00	7519	0.0	0.0	3564	0.0	0.0
32509	260	8	8			1	425	0.00	1	426	0.00	3568	0.0	0.0	3564	0.0	0.0
32510	237	8	8			1	445	0.00	1	446	0.00	3559	0.0	0.0	3568	0.0	0.0
32511	285	6	6			15	149	0.10	15	149	0.10	3597	0.0	0.0	3598	0.0	0.0
32512	353	8	8			21	636	0.03	21	637	0.03	3588	0.0	0.0	3589	0.0	0.0
32513	266	12	12			400	866	0.46	400	866	0.46	3574	0.0	0.0	3573	0.0	0.0
32514	196	12	12			376	831	0.45	376	831	0.45	3612	0.0	0.0	3575	0.0	0.0
32515	148	12	12			376	1,274	0.30	376	1,274	0.30	3578	0.0	0.0	3612	0.0	0.0
32516	372	12	12			375	1,178	0.32	375	1,178	0.32	3586	0.0	0.0	3578	0.0	0.0
32517	361	8	8			282	443	0.64	282	444	0.64	3558	0.0	0.0	3586	0.0	0.0
32518	320	8	8			232	912	0.25	232	913	0.25	3590	0.0	0.0	3558	0.0	0.0
32519	332	8	8			178	1,190	0.15	178	1,192	0.15	3613	0.0	0.0	3590	0.0	0.0
32520	227	8	8			177	1,081	0.16	177	1,082	0.16	3599	0.0	0.0	3613	0.0	0.0
32521	145	6	6			19	553	0.04	19	553	0.04	3587	0.0	0.0	3558	0.0	0.0
32522	170	6	6			19	500	0.04	19	500	0.04	3556	0.0	0.0	3587	0.0	0.0
32523	182	6	6			1	522	0.00	1	522	0.00	3614	0.0	0.0	3556	0.0	0.0
32524	145	6	6			1	341	0.00	1	341	0.00	7182	0.0	0.0	3614	0.0	0.0
32525	270	6	6			1	844	0.00	1	844	0.00	3548	0.0	0.0	7182	0.0	0.0
32526	144	6	6			176	553	0.32	176	553	0.32	3615	0.0	0.0	3599	0.0	0.0
32527	144	10	10			0	2,078	0.00	0	2,075	0.00	3615	0.0	0.0	3599	0.0	0.0
32528	144	6	6			1	538	0.00	1	538	0.00	3600	0.0	0.0	3615	0.0	0.0
32529	265	6	6			1	646	0.00	1	646	0.00	3601	0.0	0.0	3600	0.0	0.0
32530	100	8	8			1	927	0.00	1	928	0.00	3606	0.0	0.0	3605	0.0	0.0
32531	125	8	8			1	1,049	0.00	1	1,050	0.00	3604	0.0	0.0	3607	0.0	0.0
32532	97	8	8			6	1,153	0.00	6	1,155	0.00	3605	0.0	0.0	3607	0.0	0.0
32533	170	8	8			4	1,921	0.00	4	1,924	0.00	3616	0.0	0.0	3605	0.0	0.0
32534	200	8	8			2	619	0.00	2	619	0.00	3617	0.0	0.0	3616	0.0	0.0
32535	88	6	6			1	356	0.00	1	356	0.00	3619	0.0	0.0	3618	0.0	0.0
32536	127	6	6			1	357	0.00	1	357	0.00	3620	0.0	0.0	3619	0.0	0.0
32537	44	6	6			1	759	0.00	1	759	0.00	3550	0.0	0.0	3620	0.0	0.0
32538	24	8	8			1	597	0.00	1	597	0.00	7520	0.0	0.0	3616	0.0	0.0
32539	82	8	8			1	1,544	0.00	1	1,547	0.00	3603	0.0	0.0	7520	0.0	0.0
32540	47	6	6			1	450	0.00	1	450	0.00	3602	0.0	0.0	3603	0.0	0.0
32541	375	6	6			17	288	0.06	17	288	0.06	3621	0.0	0.0	3556	0.0	0.0
32542	175	6	6			1	741	0.00	1	741	0.00	3645	0.0	0.0	3621	0.0	0.0
32543	170	6	6			44	173	0.25	44	173	0.25	3623	0.0	0.0	3622	0.0	0.0
32544	163	6	6			43	176	0.24	43	176	0.24	7276	0.0	0.0	3623	0.0	0.0
32545	194	6	6			24	233	0.10	24	233	0.10	3584	0.0	0.0	7276	0.0	0.0
32546	206	6	6			1	735	0.00	1	735	0.00	3624	0.0	0.0	3584	0.0	0.0
32547	158	6	6			1	765	0.00	1	765	0.00	3625	0.0	0.0	3624	0.0	0.0
32548	405	6	6			1	469	0.00	1	469	0.00	3585	0.0	0.0	3584	0.0	0.0
32549	300	6	6			19	161	0.12	19	161	0.12	3627	0.0	0.0	7276	0.0	0.0
32552	353	8	8			70	340	0.21	70	341	0.21	3582	0.0	0.0	3628	0.0	0.0
32553	365	8	8			0	350	0.00	0	351	0.00	3629	0.0	0.0	3622	0.0	0.0
32554	145	6	6			1	252	0.00	1	252	0.00	3630	0.0	0.0	3623	0.0	0.0
32555	271	6	6			1	159	0.00	1	159	0.00	3631	0.0	0.0	3584	0.0	0.0
32556	310	24	24			990	5,738	0.17	990	5,738	0.17	3632	0.0	0.0	3629	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32557	411	8	8			340	643	0.53	340	644	0.53	3593	0.0	0.0	3632	0.0	0.0
32558	206	8	8			340	426	0.80	340	426	0.80	3592	0.0	0.0	3593	0.0	0.0
32559	126	8	8			1	1,643	0.00	1	1,645	0.00	3591	0.0	0.0	3592	0.0	0.0
32560	340	6	6			82	113	0.72	82	113	0.72	3579	0.0	0.0	3594	0.0	0.0
32561	300	6	6			1	113	0.01	1	113	0.01	3633	0.0	0.0	3579	0.0	0.0
32562	325	6	6			0	113	0.00	0	113	0.00	3634	0.0	0.0	3633	0.0	0.0
32563	367	8	8			0	340	0.00	0	340	0.00	7038	0.0	0.0	3634	0.0	0.0
32564	320	8	8			1	343	0.00	1	344	0.00	3635	0.0	0.0	3578	0.0	0.0
32565	331	8	8			1	342	0.00	1	343	0.00	7278	0.0	0.0	3635	0.0	0.0
32566	401	6	6			1	164	0.00	1	164	0.00	3581	0.0	0.0	3575	0.0	0.0
32567	303	8	8			1	356	0.00	1	356	0.00	3580	0.0	0.0	7183	0.0	0.0
32568	320	8	8			1	422	0.00	1	423	0.00	7037	0.0	0.0	3580	0.0	0.0
32569	109	8	8			1	382	0.00	1	382	0.00	3636	0.0	0.0	7037	0.0	0.0
32570	370	8	8			85	367	0.23	85	367	0.23	3637	0.0	0.0	3573	0.0	0.0
32573	92	6	6			1	252	0.00	1	252	0.00	3552	0.0	0.0	3594	0.0	0.0
32574	548	24	24			1,014	6,747	0.15	1,014	6,747	0.15	7038	0.0	0.0	3638	0.0	0.0
32575	65	6	6			1	156	0.00	1	156	0.00	3553	0.0	0.0	3597	0.0	0.0
32576	142	10	10			0	1,716	0.00	0	1,714	0.00	3867	0.0	0.0	3615	0.0	0.0
32577	32	6	6			1	201	0.00	1	201	0.00	3649	0.0	0.0	7517	0.0	0.0
32578	35	24	24			649	10,008	0.06	649	10,008	0.06	3639	0.0	0.0	3632	0.0	0.0
32582	329	8	8			71	1,223	0.06	71	1,224	0.06	7279	0.0	0.0	3666	0.0	0.0
32583	321	8	8			71	942	0.08	71	944	0.08	3666	0.0	0.0	3665	0.0	0.0
32584	222	8	8			81	882	0.09	81	883	0.09	3665	0.0	0.0	3663	0.0	0.0
32585	214	8	8			81	862	0.09	81	863	0.09	3663	0.0	0.0	3672	0.0	0.0
32586	351	10	10			58	476	0.12	58	475	0.12	3681	0.0	0.0	3672	0.0	0.0
32587	168	8	8			10	572	0.02	10	572	0.02	3682	0.0	0.0	3704	0.0	0.0
32588	332	8	8			48	378	0.13	48	378	0.13	3685	0.0	0.0	3704	0.0	0.0
32589	15	10	10			48	2,351	0.02	48	2,349	0.02	7404	0.0	0.0	3685	0.0	0.0
32590	55	8	8			6	354	0.02	6	355	0.02	3686	0.0	0.0	7404	0.0	0.0
32591	305	8	8			6	374	0.01	6	375	0.01	3687	0.0	0.0	3686	0.0	0.0
32592	100	8	8			1	376	0.00	1	376	0.00	3705	0.0	0.0	3687	0.0	0.0
32593	130	8	8			0	1,310	0.00	0	1,311	0.00	3707	0.0	0.0	3706	0.0	0.0
32594	148	8	8			0	876	0.00	0	877	0.00	7679	0.0	0.0	3707	0.0	0.0
32595	185	10	10			42	1,653	0.03	42	1,651	0.03	3684	0.0	0.0	7404	0.0	0.0
32597	315	8	8			1	1,245	0.00	1	1,247	0.00	3708	0.0	0.0	3683	0.0	0.0
32598	347	10	10			35	672	0.05	35	671	0.05	3709	0.0	0.0	3683	0.0	0.0
32599	91	6	6			0	273	0.00	0	273	0.00	3651	0.0	0.0	3709	0.0	0.0
32600	242	8	8			1	1,159	0.00	1	1,160	0.00	3710	0.0	0.0	3709	0.0	0.0
32601	116	8	8			0	1,315	0.00	0	1,317	0.00	3711	0.0	0.0	3710	0.0	0.0
32602	143	8	8			0	417	0.00	0	417	0.00	3652	0.0	0.0	3711	0.0	0.0
32603	25	8	8			28	976	0.03	28	978	0.03	3713	0.0	0.0	3712	0.0	0.0
32604	430	8	8			0	890	0.00	0	890	0.00	3714	0.0	0.0	3713	0.0	0.0
32605	350	8	8			22	973	0.02	22	974	0.02	3661	0.0	0.0	3713	0.0	0.0
32606	440	8	8			0	713	0.00	0	713	0.00	3660	0.0	0.0	3661	0.0	0.0
32607	156	6	6			0	513	0.00	0	513	0.00	3653	0.0	0.0	7521	0.0	0.0
32608	331	6	6			1	541	0.00	1	541	0.00	3654	0.0	0.0	3715	0.0	0.0
32609	259	8	8			3	971	0.00	3	972	0.00	3715	0.0	0.0	3716	0.0	0.0
32610	248	8	8			6	951	0.01	6	953	0.01	3716	0.0	0.0	3717	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32612	375	8	8			6	801	0.01	6	801	0.01	3717	0.0	0.0	3701	0.0	0.0
32613	238	8	8			13	662	0.02	13	663	0.02	3701	0.0	0.0	3671	0.0	0.0
32614	219	8	8			13	537	0.02	13	538	0.02	3671	0.0	0.0	3670	0.0	0.0
32615	251	8	8			34	785	0.04	34	786	0.04	3670	0.0	0.0	3718	0.0	0.0
32616	148	8	8			47	368	0.13	47	368	0.13	3718	0.0	0.0	3719	0.0	0.0
32617	313	8	8			0	867	0.00	0	869	0.00	3669	0.0	0.0	3670	0.0	0.0
32618	259	8	8			14	1,156	0.01	14	1,157	0.01	7281	0.0	0.0	3668	0.0	0.0
32619	171	8	8			0	800	0.00	0	801	0.00	3739	0.0	0.0	7281	0.0	0.0
32620	190	8	8			0	415	0.00	0	416	0.00	3738	0.0	0.0	7281	0.0	0.0
32621	353	8	8			0	1,308	0.00	0	1,309	0.00	3667	0.0	0.0	7281	0.0	0.0
32623	319	8	8			0	743	0.00	0	744	0.00	3664	0.0	0.0	3665	0.0	0.0
32624	164	8	8			47	373	0.13	47	373	0.13	3719	0.0	0.0	3677	0.0	0.0
32625	273	8	8			48	344	0.14	48	345	0.14	3677	0.0	0.0	3678	0.0	0.0
32626	107	8	8			48	341	0.14	48	341	0.14	3678	0.0	0.0	3679	0.0	0.0
32627	200	8	8			144	1,015	0.14	144	1,017	0.14	3680	0.0	0.0	3679	0.0	0.0
32628	363	8	8			144	877	0.16	144	878	0.16	3672	0.0	0.0	3680	0.0	0.0
32629	314	8	8			200	398	0.50	200	399	0.50	3679	0.0	0.0	7522	0.0	0.0
32630	322	8	8			209	673	0.31	209	674	0.31	3674	0.0	0.0	3721	0.0	0.0
32631	277	8	8			209	483	0.43	209	483	0.43	3721	0.0	0.0	3673	0.0	0.0
32632	321	8	8			9	371	0.02	9	372	0.02	3722	0.0	0.0	3674	0.0	0.0
32633	229	8	8			9	1,044	0.01	9	1,045	0.01	3723	0.0	0.0	3722	0.0	0.0
32634	45	8	8			8	420	0.02	8	421	0.02	7040	0.0	0.0	3723	0.0	0.0
32635	223	8	8			0	1,057	0.00	0	1,058	0.00	3675	0.0	0.0	7040	0.0	0.0
32636	229	8	8			0	847	0.00	0	849	0.00	3676	0.0	0.0	3675	0.0	0.0
32637	118	8	8			0	771	0.00	0	772	0.00	3722	0.0	0.0	7280	0.0	0.0
32638	110	8	8			69	354	0.20	69	355	0.20	3691	0.0	0.0	3690	0.0	0.0
32639	127	8	8			0	376	0.00	0	376	0.00	3724	0.0	0.0	3691	0.0	0.0
32640	80	8	8			69	389	0.18	69	389	0.18	7524	0.0	0.0	3691	0.0	0.0
32641	120	8	8			0	483	0.00	0	483	0.00	7041	0.0	0.0	3726	0.0	0.0
32642	440	8	8			4	447	0.01	4	448	0.01	3726	0.0	0.0	3727	0.0	0.0
32643	60	8	8			0	1,038	0.00	0	1,039	0.00	3655	0.0	0.0	3727	0.0	0.0
32645	320	8	8			4	955	0.00	4	956	0.00	3727	0.0	0.0	3688	0.0	0.0
32646	272	8	8			6	840	0.01	6	840	0.01	3728	0.0	0.0	3688	0.0	0.0
32647	117	8	8			10	444	0.02	10	445	0.02	3688	0.0	0.0	3729	0.0	0.0
32648	108	8	8			10	445	0.02	10	446	0.02	3729	0.0	0.0	3697	0.0	0.0
32649	377	8	8			52	456	0.11	52	456	0.11	3659	0.0	0.0	3697	0.0	0.0
32650	263	8	8			0	372	0.00	0	372	0.00	3698	0.0	0.0	3659	0.0	0.0
32651	288	8	8			52	549	0.09	52	551	0.09	7042	0.0	0.0	3659	0.0	0.0
32652	163	8	8			1	371	0.00	1	372	0.00	3700	0.0	0.0	7042	0.0	0.0
32653	92	8	8			0	347	0.00	0	347	0.00	3699	0.0	0.0	3700	0.0	0.0
32654	142	8	8			0	372	0.00	0	373	0.00	7405	0.0	0.0	3700	0.0	0.0
32656	137	6	6			0	299	0.00	0	299	0.00	3657	0.0	0.0	7405	0.0	0.0
32657	41	8	8			62	485	0.13	62	486	0.13	3697	0.0	0.0	7136	0.0	0.0
32658	182	8	8			5	702	0.01	5	703	0.01	7523	0.0	0.0	7136	0.0	0.0
32659	164	8	8			67	497	0.13	67	497	0.13	7136	0.0	0.0	3696	0.0	0.0
32660	254	6	6			0	274	0.00	0	274	0.00	3658	0.0	0.0	3724	0.0	0.0
32662	156	8	8			1	413	0.00	1	413	0.00	3694	0.0	0.0	3730	0.0	0.0
32663	162	8	8			1	418	0.00	1	419	0.00	3695	0.0	0.0	3694	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32664	28	6	6			0	969	0.00	0	969	0.00	3734	0.0	0.0	3654	0.0	0.0
32665	23	8	8			1	388	0.00	1	388	0.00	9124	0.0	0.0	3695	0.0	0.0
32666	215	10	10			34	1,218	0.03	34	1,217	0.03	3712	0.0	0.0	3732	0.0	0.0
32669	101	12	12			373	1,136	0.33	373	1,136	0.33	3755	0.0	0.0	3757	0.0	0.0
32670	282	8	8			311	660	0.47	311	660	0.47	3756	0.0	0.0	3755	0.0	0.0
32671	395	8	8			310	894	0.35	310	896	0.35	3752	0.0	0.0	3756	0.0	0.0
32672	264	8	8			1	510	0.00	1	510	0.00	3770	0.0	0.0	3752	0.0	0.0
32673	237	8	8			61	1,142	0.05	61	1,144	0.05	3772	0.0	0.0	3755	0.0	0.0
32674	200	8	8			61	985	0.06	61	987	0.06	3749	0.0	0.0	3772	0.0	0.0
32675	350	8	8			28	343	0.08	28	344	0.08	3769	0.0	0.0	3749	0.0	0.0
32676	354	8	8			1	643	0.00	1	644	0.00	3753	0.0	0.0	3769	0.0	0.0
32677	181	8	8			32	570	0.06	32	571	0.06	3750	0.0	0.0	3768	0.0	0.0
32678	276	8	8			32	383	0.08	32	384	0.08	3767	0.0	0.0	3750	0.0	0.0
32679	250	8	8			5	488	0.01	5	488	0.01	3754	0.0	0.0	3767	0.0	0.0
32680	250	8	8			4	694	0.01	4	696	0.01	3766	0.0	0.0	3754	0.0	0.0
32681	142	24	24			539	5,652	0.10	539	5,652	0.10	3758	0.0	0.0	7282	0.0	0.0
32682	140	24	24			538	6,535	0.08	538	6,535	0.08	3748	0.0	0.0	3758	0.0	0.0
32683	255	10	10			430	2,466	0.17	430	2,463	0.17	3773	0.0	0.0	3748	0.0	0.0
32684	300	10	10			429	1,122	0.38	429	1,120	0.38	3774	0.0	0.0	3773	0.0	0.0
32685	300	12	12			429	1,131	0.38	429	1,131	0.38	3771	0.0	0.0	3774	0.0	0.0
32686	295	8	8			9	545	0.02	9	546	0.02	3759	0.0	0.0	7282	0.0	0.0
32687	165	8	8			1	378	0.00	1	378	0.00	3760	0.0	0.0	3759	0.0	0.0
32688	100	8	8			1	1,537	0.00	1	1,539	0.00	3751	0.0	0.0	7137	0.0	0.0
32689	330	24	24			81	4,541	0.02	81	4,541	0.02	3761	0.0	0.0	3748	0.0	0.0
32692	239	8	8			26	322	0.08	26	323	0.08	3764	0.0	0.0	3765	0.0	0.0
32693	289	8	8			229	655	0.35	229	656	0.35	7283	0.0	0.0	3781	0.0	0.0
32694	349	8	8			0	588	0.00	0	588	0.00	3779	0.0	0.0	3764	0.0	0.0
32695	115	8	8			0	1,502	0.00	0	1,504	0.00	3780	0.0	0.0	3764	0.0	0.0
32696	250	8	8			1	372	0.00	1	372	0.00	3778	0.0	0.0	3764	0.0	0.0
32697	37	8	8			0	1,143	0.00	0	1,145	0.00	3782	0.0	0.0	7525	0.0	0.0
32698	135	6	6			0	331	0.00	0	331	0.00	7526	0.0	0.0	3782	0.0	0.0
32699	506	54	54			7,664	49,787	0.15	7,853	49,787	0.16	3746	0.0	0.0	3747	0.0	0.0
32703	530	6	6			0	544	0.00	0	544	0.00	3886	0.0	0.0	3813	0.0	0.0
32704	117	8	8			57	1,124	0.05	57	1,126	0.05	3813	0.0	0.0	3812	0.0	0.0
32705	190	8	8			56	1,128	0.05	56	1,130	0.05	3814	0.0	0.0	3813	0.0	0.0
32706	114	8	8			55	1,338	0.04	55	1,340	0.04	3846	0.0	0.0	3814	0.0	0.0
32707	171	8	8			34	1,176	0.03	34	1,178	0.03	3808	0.0	0.0	3847	0.0	0.0
32708	73	8	8			22	1,382	0.02	22	1,383	0.02	3809	0.0	0.0	3808	0.0	0.0
32709	159	8	8			22	1,406	0.02	22	1,408	0.02	3848	0.0	0.0	3809	0.0	0.0
32710	213	8	8			1	1,618	0.00	1	1,620	0.00	3849	0.0	0.0	3848	0.0	0.0
32711	197	8	8			1	2,028	0.00	1	2,031	0.00	3850	0.0	0.0	3849	0.0	0.0
32712	280	6	6			81	492	0.16	81	492	0.16	3845	0.0	0.0	3816	0.0	0.0
32714	253	8	8			0	416	0.00	0	417	0.00	7185	0.0	0.0	3846	0.0	0.0
32715	286	6	6			1	243	0.00	1	243	0.00	3815	0.0	0.0	3814	0.0	0.0
32716	170	6	6			0	544	0.00	0	544	0.00	3851	0.0	0.0	3815	0.0	0.0
32718	264	8	8			150	542	0.28	150	543	0.28	3801	0.0	0.0	3832	0.0	0.0
32719	343	8	8			1	1,250	0.00	1	1,251	0.00	3852	0.0	0.0	3802	0.0	0.0
32720	175	8	8			1	2,269	0.00	1	2,272	0.00	3791	0.0	0.0	3852	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32721	180	6	6			1	168	0.00	1	168	0.00	3792	0.0	0.0	3803	0.0	0.0
32722	67	6	6			1	351	0.00	1	351	0.00	3793	0.0	0.0	3803	0.0	0.0
32723	155	6	6			1	550	0.00	1	550	0.00	3803	0.0	0.0	3853	0.0	0.0
32724	280	6	6			2	390	0.01	2	390	0.01	3853	0.0	0.0	3854	0.0	0.0
32725	139	6	6			19	540	0.03	19	540	0.03	3854	0.0	0.0	3855	0.0	0.0
32726	187	6	6			19	390	0.05	19	390	0.05	3855	0.0	0.0	3804	0.0	0.0
32727	165	8	8			20	927	0.02	20	928	0.02	3805	0.0	0.0	3856	0.0	0.0
32728	187	8	8			21	385	0.05	21	385	0.05	3856	0.0	0.0	3806	0.0	0.0
32729	191	8	8			21	385	0.05	21	385	0.05	3806	0.0	0.0	7529	0.0	0.0
32730	222	8	8			22	966	0.02	22	967	0.02	7529	0.0	0.0	3857	0.0	0.0
32731	250	8	8			22	638	0.03	22	638	0.03	3857	0.0	0.0	3858	0.0	0.0
32732	167	6	6			1	433	0.00	1	433	0.00	7286	0.0	0.0	3810	0.0	0.0
32733	272	6	6			31	311	0.10	31	311	0.10	3860	0.0	0.0	3829	0.0	0.0
32734	163	6	6			30	367	0.08	30	367	0.08	3810	0.0	0.0	3860	0.0	0.0
32735	182	6	6			1	522	0.00	1	522	0.00	7527	0.0	0.0	7286	0.0	0.0
32736	375	6	6			1	316	0.00	1	316	0.00	3794	0.0	0.0	7527	0.0	0.0
32737	423	6	6			36	470	0.08	36	470	0.08	3807	0.0	0.0	3861	0.0	0.0
32738	200	6	6			1	292	0.00	1	292	0.00	3863	0.0	0.0	3862	0.0	0.0
32739	295	6	6			1	419	0.00	1	419	0.00	3865	0.0	0.0	3864	0.0	0.0
32741	165	12	12			174	981	0.18	174	981	0.18	3868	0.0	0.0	3867	0.0	0.0
32742	290	6	6			1	467	0.00	1	467	0.00	7043	0.0	0.0	3830	0.0	0.0
32743	137	12	12			140	985	0.14	140	985	0.14	3818	0.0	0.0	3868	0.0	0.0
32744	138	12	12			140	963	0.15	140	963	0.15	3869	0.0	0.0	3818	0.0	0.0
32745	246	12	12			139	1,149	0.12	139	1,149	0.12	3870	0.0	0.0	3869	0.0	0.0
32746	121	8	8			297	1,117	0.27	297	1,119	0.27	3870	0.0	0.0	3839	0.0	0.0
32747	339	8	8			297	1,123	0.26	297	1,124	0.26	3839	0.0	0.0	3838	0.0	0.0
32748	60	8	8			312	1,275	0.24	312	1,276	0.24	3838	0.0	0.0	3837	0.0	0.0
32749	121	8	8			1	1,659	0.00	1	1,661	0.00	3871	0.0	0.0	3837	0.0	0.0
32750	138	8	8			313	903	0.35	313	905	0.35	3837	0.0	0.0	3836	0.0	0.0
32751	99	8	8			313	835	0.37	313	837	0.37	3836	0.0	0.0	3835	0.0	0.0
32752	130	8	8			314	536	0.59	314	537	0.58	3843	0.0	0.0	3842	0.0	0.0
32753	271	8	8			17	1,347	0.01	17	1,349	0.01	3841	0.0	0.0	3842	0.0	0.0
32754	128	12	12			435	748	0.58	435	748	0.58	3831	0.0	0.0	3870	0.0	0.0
32755	128	12	12			415	812	0.51	415	812	0.51	3832	0.0	0.0	3831	0.0	0.0
32756	140	8	8			28	467	0.06	28	468	0.06	3833	0.0	0.0	3801	0.0	0.0
32757	199	8	8			28	388	0.07	28	389	0.07	7184	0.0	0.0	3833	0.0	0.0
32758	135	8	8			28	374	0.07	28	374	0.07	3834	0.0	0.0	7184	0.0	0.0
32759	135	8	8			3	483	0.01	3	483	0.01	3874	0.0	0.0	3834	0.0	0.0
32760	67	8	8			3	538	0.01	3	539	0.01	3875	0.0	0.0	3874	0.0	0.0
32761	32	8	8			3	1,159	0.00	3	1,160	0.00	7046	0.0	0.0	3875	0.0	0.0
32762	350	8	8			100	783	0.13	100	783	0.13	3878	0.0	0.0	3879	0.0	0.0
32763	170	8	8			121	1,109	0.11	121	1,110	0.11	3879	0.0	0.0	3801	0.0	0.0
32764	185	10	10			265	1,127	0.24	265	1,126	0.24	7044	0.0	0.0	3832	0.0	0.0
32765	182	10	10			265	1,008	0.26	265	1,006	0.26	3830	0.0	0.0	7044	0.0	0.0
32766	376	10	10			250	1,544	0.16	250	1,542	0.16	3829	0.0	0.0	3830	0.0	0.0
32767	155	10	10			219	790	0.28	219	789	0.28	3819	0.0	0.0	3859	0.0	0.0
32768	191	6	6			36	419	0.09	36	419	0.09	3861	0.0	0.0	3819	0.0	0.0
32769	316	10	10			182	931	0.20	182	930	0.20	3880	0.0	0.0	3820	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32770	55	10	10			446	928	0.48	446	927	0.48	3881	0.0	0.0	3880	0.0	0.0
32771	153	10	10			445	1,700	0.26	445	1,698	0.26	3858	0.0	0.0	3881	0.0	0.0
32772	185	8	8			398	803	0.50	398	805	0.49	3821	0.0	0.0	7284	0.0	0.0
32773	276	8	8			265	885	0.30	265	886	0.30	3880	0.0	0.0	3823	0.0	0.0
32774	195	8	8			336	850	0.40	336	851	0.39	3823	0.0	0.0	3825	0.0	0.0
32775	225	8	8			1	544	0.00	1	544	0.00	3824	0.0	0.0	3825	0.0	0.0
32776	180	8	8			1	799	0.00	1	801	0.00	3799	0.0	0.0	3824	0.0	0.0
32777	174	8	8			337	530	0.64	337	531	0.63	3825	0.0	0.0	3826	0.0	0.0
32778	205	8	8			290	728	0.40	290	728	0.40	7528	0.0	0.0	3877	0.0	0.0
32779	186	8	8			389	529	0.73	389	530	0.73	3826	0.0	0.0	3827	0.0	0.0
32780	430	8	8			99	443	0.22	100	444	0.23	3827	0.0	0.0	3878	0.0	0.0
32781	261	8	8			48	760	0.06	48	760	0.06	3882	0.0	0.0	3823	0.0	0.0
32782	301	8	8			47	851	0.06	47	851	0.06	3883	0.0	0.0	3882	0.0	0.0
32783	180	8	8			47	1,072	0.04	47	1,073	0.04	3822	0.0	0.0	3883	0.0	0.0
32784	235	8	8			1	801	0.00	1	802	0.00	3844	0.0	0.0	7285	0.0	0.0
32785	265	8	8			3	1,210	0.00	3	1,212	0.00	7045	0.0	0.0	7287	0.0	0.0
32787	76	6	6			1	607	0.00	1	607	0.00	3895	0.0	0.0	3804	0.0	0.0
32788	110	6	6			1	465	0.00	1	465	0.00	3889	0.0	0.0	3853	0.0	0.0
32790	196	6	6			1	672	0.00	1	672	0.00	3893	0.0	0.0	3865	0.0	0.0
32791	95	6	6			1	195	0.00	1	195	0.00	3892	0.0	0.0	3807	0.0	0.0
32792	187	6	6			1	292	0.00	1	292	0.00	3891	0.0	0.0	3860	0.0	0.0
32793	126	6	6			1	438	0.00	1	438	0.00	3890	0.0	0.0	7043	0.0	0.0
32794	413	6	6			1	423	0.00	1	423	0.00	3884	0.0	0.0	3867	0.0	0.0
32796	169	8	8			1	389	0.00	1	390	0.00	3998	0.0	0.0	3928	0.0	0.0
32797	130	6	6			1	311	0.00	1	311	0.00	3999	0.0	0.0	3975	0.0	0.0
32798	97	6	6			1	179	0.00	1	179	0.00	7682	0.0	0.0	3913	0.0	0.0
32799	159	6	6			27	432	0.06	27	432	0.06	7288	0.0	0.0	7531	0.0	0.0
32800	105	6	6			1	361	0.00	1	361	0.00	4013	0.0	0.0	4014	0.0	0.0
32801	90	6	6			1	366	0.00	1	366	0.00	4012	0.0	0.0	7288	0.0	0.0
32802	200	6	6			1	461	0.00	1	461	0.00	4011	0.0	0.0	7288	0.0	0.0
32803	206	6	6			1	167	0.01	1	167	0.01	3913	0.0	0.0	4013	0.0	0.0
32804	60	8	8			245	657	0.37	245	658	0.37	7531	0.0	0.0	3960	0.0	0.0
32805	231	8	8			217	615	0.35	217	616	0.35	3961	0.0	0.0	7531	0.0	0.0
32806	296	8	8			217	564	0.38	217	565	0.38	3962	0.0	0.0	3961	0.0	0.0
32807	160	8	8			217	1,016	0.21	217	1,017	0.21	3916	0.0	0.0	3962	0.0	0.0
32808	139	8	8			183	638	0.29	183	638	0.29	3915	0.0	0.0	3916	0.0	0.0
32809	153	8	8			172	948	0.18	172	949	0.18	3954	0.0	0.0	3914	0.0	0.0
32810	131	8	8			171	1,338	0.13	171	1,340	0.13	3963	0.0	0.0	3954	0.0	0.0
32811	73	8	8			117	762	0.15	117	762	0.15	8481	0.0	0.0	8500	0.0	0.0
32812	47	8	8			117	1,609	0.07	117	1,611	0.07	3953	0.0	0.0	8481	0.0	0.0
32813	130	8	8			117	1,608	0.07	117	1,610	0.07	3952	0.0	0.0	3953	0.0	0.0
32814	171	6	6			37	607	0.06	37	607	0.06	3950	0.0	0.0	3951	0.0	0.0
32815	304	6	6			36	224	0.16	36	224	0.16	3949	0.0	0.0	3950	0.0	0.0
32816	306	8	8			36	799	0.05	36	800	0.05	3964	0.0	0.0	3949	0.0	0.0
32817	138	8	8			15	808	0.02	15	809	0.02	3965	5.7	5.7	3916	0.0	0.0
32818	139	6	6			1	458	0.00	1	458	0.00	4010	0.0	0.0	3965	5.7	5.7
32819	21	8	8			33	1,859	0.02	33	1,861	0.02	3966	0.0	0.0	3916	0.0	0.0
32820	304	8	8			20	1,165	0.02	20	1,166	0.02	3911	0.0	0.0	3966	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32821	65	8	8			1	1,176	0.00	1	1,177	0.00	3899	0.0	0.0	3910	0.0	0.0
32822	162	8	8			247	949	0.26	247	951	0.26	3967	0.0	0.0	3920	0.0	0.0
32823	164	8	8			247	944	0.26	247	944	0.26	3968	0.0	0.0	3967	0.0	0.0
32824	31	6	6			1	540	0.00	1	540	0.00	3917	0.0	0.0	3968	0.0	0.0
32826	163	8	8			304	688	0.44	304	689	0.44	3970	0.0	0.0	3924	0.0	0.0
32827	79	8	8			303	889	0.34	303	890	0.34	3919	0.0	0.0	3970	0.0	0.0
32828	128	8	8			302	716	0.42	302	717	0.42	3920	0.0	0.0	3919	0.0	0.0
32829	48	8	8			30	926	0.03	30	928	0.03	3921	0.0	0.0	3920	0.0	0.0
32830	231	8	8			30	932	0.03	30	933	0.03	3971	0.0	0.0	3921	0.0	0.0
32831	94	8	8			1	933	0.00	1	934	0.00	7049	0.0	0.0	3971	0.0	0.0
32832	90	8	8			29	962	0.03	29	963	0.03	3972	0.0	0.0	3971	0.0	0.0
32833	220	8	8			28	923	0.03	28	924	0.03	7290	0.0	0.0	3972	0.0	0.0
32834	278	8	8			1	1,094	0.00	1	1,095	0.00	3973	0.0	0.0	7290	0.0	0.0
32835	78	6	6			1	535	0.00	1	535	0.00	4009	0.0	0.0	3974	0.0	0.0
32836	242	6	6			22	383	0.06	22	383	0.06	3975	0.0	0.0	3924	0.0	0.0
32837	246	6	6			21	441	0.05	21	441	0.05	3923	0.0	0.0	3975	0.0	0.0
32838	170	6	6			1	576	0.00	1	576	0.00	3976	0.0	0.0	3923	0.0	0.0
32839	424	8	8			19	883	0.02	19	885	0.02	3909	0.0	0.0	3955	0.0	0.0
32840	350	6	6			1	174	0.01	1	174	0.01	3977	0.0	0.0	3963	0.0	0.0
32841	194	6	6			1	646	0.00	1	646	0.00	4008	0.0	0.0	3977	0.0	0.0
32842	165	6	6			28	425	0.07	28	425	0.07	3908	0.0	0.0	3952	0.0	0.0
32843	17	6	6			28	335	0.09	28	335	0.09	7534	0.0	0.0	3908	0.0	0.0
32844	275	6	6			27	449	0.06	27	449	0.06	7406	0.0	0.0	3951	0.0	0.0
32845	216	6	6			27	691	0.04	27	691	0.04	3907	0.0	0.0	7406	0.0	0.0
32846	258	6	6			26	392	0.07	26	392	0.07	7407	0.0	0.0	3907	0.0	0.0
32847	183	6	6			19	801	0.02	19	801	0.02	3978	0.0	0.0	3906	0.0	0.0
32848	200	6	6			0	311	0.00	0	311	0.00	4007	0.0	0.0	3979	0.0	0.0
32849	102	6	6			0	628	0.00	0	628	0.00	4006	0.0	0.0	3979	0.0	0.0
32850	220	8	8			1	1,215	0.00	1	1,217	0.00	3979	0.0	0.0	3944	0.0	0.0
32851	292	8	8			26	1,012	0.03	26	1,013	0.03	3926	0.0	0.0	3958	0.0	0.0
32852	313	8	8			25	917	0.03	25	918	0.03	3928	0.0	0.0	3927	0.0	0.0
32853	248	8	8			24	536	0.05	24	537	0.05	3931	0.0	0.0	3928	0.0	0.0
32854	27	10	10			1	1,466	0.00	1	1,465	0.00	3930	0.0	0.0	3931	0.0	0.0
32855	335	10	10			1	524	0.00	1	523	0.00	3898	0.0	0.0	3930	0.0	0.0
32856	458	8	8			60	415	0.14	60	416	0.14	3981	0.0	0.0	3980	0.0	0.0
32857	240	8	8			60	417	0.14	60	418	0.14	3932	0.0	0.0	3981	0.0	0.0
32858	266	8	8			60	767	0.08	60	769	0.08	3933	0.0	0.0	3932	0.0	0.0
32859	171	8	8			59	755	0.08	59	756	0.08	3934	0.0	0.0	3933	0.0	0.0
32860	280	10	10			59	631	0.09	59	630	0.09	3937	0.0	0.0	3934	0.0	0.0
32861	64	10	10			51	639	0.08	51	638	0.08	7139	0.0	0.0	3937	0.0	0.0
32862	60	10	10			51	631	0.08	51	630	0.08	3938	0.0	0.0	7139	0.0	0.0
32863	168	10	10			51	615	0.08	51	615	0.08	3982	0.0	0.0	3938	0.0	0.0
32864	226	10	10			50	708	0.07	50	708	0.07	7050	0.0	0.0	3982	0.0	0.0
32865	166	8	8			37	586	0.06	37	587	0.06	3984	0.0	0.0	3983	0.0	0.0
32866	103	8	8			0	1,218	0.00	0	1,219	0.00	4005	0.0	0.0	3984	0.0	0.0
32867	311	8	8			15	829	0.02	15	830	0.02	3956	0.0	0.0	7533	0.0	0.0
32868	432	8	8			1	1,008	0.00	1	1,010	0.00	3985	0.0	0.0	3956	0.0	0.0
32869	428	8	8			1	983	0.00	1	984	0.00	7048	0.0	0.0	7533	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32870	163	8	8			5	918	0.01	5	919	0.01	7047	0.0	0.0	3939	0.0	0.0
32871	365	8	8			0	850	0.00	0	851	0.00	3942	0.0	0.0	7047	0.0	0.0
32872	297	8	8			0	328	0.00	0	329	0.00	3987	0.0	0.0	3986	0.0	0.0
32873	108	8	8			4	1,111	0.00	4	1,113	0.00	7138	0.0	0.0	7047	0.0	0.0
32874	220	8	8			0	929	0.00	0	931	0.00	4004	0.0	0.0	3988	0.0	0.0
32875	40	8	8			4	1,413	0.00	4	1,415	0.00	3940	0.0	0.0	7138	0.0	0.0
32876	355	8	8			4	415	0.01	4	415	0.01	3989	0.0	0.0	3940	0.0	0.0
32878	315	8	8			0	1,154	0.00	0	1,156	0.00	3905	0.0	0.0	3989	0.0	0.0
32879	303	8	8			28	990	0.03	28	991	0.03	3945	0.0	0.0	3905	0.0	0.0
32880	280	8	8			22	1,088	0.02	22	1,089	0.02	3957	0.0	0.0	3959	0.0	0.0
32881	292	8	8			22	1,077	0.02	22	1,078	0.02	3990	0.0	0.0	3957	0.0	0.0
32882	165	8	8			1	925	0.00	1	926	0.00	3900	0.0	0.0	3990	0.0	0.0
32883	192	8	8			1	951	0.00	1	952	0.00	3901	0.0	0.0	3990	0.0	0.0
32885	167	8	8			1	958	0.00	1	958	0.00	3903	0.0	0.0	3959	0.0	0.0
32886	169	6	6			16	369	0.04	16	369	0.04	3929	0.0	0.0	3931	0.0	0.0
32887	382	6	6			1	280	0.00	1	280	0.00	3922	0.0	0.0	3929	0.0	0.0
32889	179	6	6			15	178	0.09	15	178	0.09	3991	0.0	0.0	3929	0.0	0.0
32890	181	8	8			0	890	0.00	0	891	0.00	7532	0.0	0.0	3938	0.0	0.0
32891	168	8	8			0	1,052	0.00	0	1,053	0.00	3936	0.0	0.0	7532	0.0	0.0
32892	392	8	8			14	1,153	0.01	14	1,154	0.01	3992	0.0	0.0	3983	0.0	0.0
32893	198	8	8			1	928	0.00	1	929	0.00	3993	0.0	0.0	3992	0.0	0.0
32894	95	8	8			1	1,219	0.00	1	1,222	0.00	3994	0.0	0.0	3993	0.0	0.0
32895	114	8	8			1	1,260	0.00	1	1,262	0.00	3995	0.0	0.0	3994	0.0	0.0
32896	149	6	6			1	187	0.00	1	187	0.00	4001	0.0	0.0	3977	0.0	0.0
32897	120	8	8			1	768	0.00	1	769	0.00	3944	0.0	0.0	3995	0.0	0.0
32898	121	8	8			0	684	0.00	0	685	0.00	3943	0.0	0.0	3944	0.0	0.0
32899	98	8	8			27	1,162	0.02	27	1,164	0.02	3946	0.0	0.0	3945	0.0	0.0
32900	150	8	8			27	1,242	0.02	27	1,243	0.02	3947	0.0	0.0	3946	0.0	0.0
32901	201	8	8			27	1,692	0.02	27	1,694	0.02	7289	0.0	0.0	3947	0.0	0.0
32902	261	8	8			0	1,441	0.00	0	1,443	0.00	3948	0.0	0.0	7289	0.0	0.0
32903	185	8	8			347	681	0.51	347	683	0.51	3925	0.0	0.0	3958	0.0	0.0
32904	319	8	8			346	683	0.51	346	684	0.51	3924	0.0	0.0	3925	0.0	0.0
32906	246	10	15	33	Existing	650	419	1.55	649	1,235	0.53	4096	6.5	0.0	4095	3.2	0.0
32907	311	8	15	33	Existing	631	601	1.05	631	3,211	0.20	4114	4.7	0.0	4018	0.0	0.0
32908	55	8	15	33	Existing	631	971	0.65	631	5,188	0.12	4018	0.0	0.0	4097	0.0	0.0
32909	123	8	8			8	1,744	0.00	8	1,747	0.00	7535	0.0	0.0	4120	0.0	0.0
32910	301	10	10			448	623	0.72	448	622	0.72	7053	0.0	0.0	4071	0.0	0.0
32911	56	8	8			8	873	0.01	8	874	0.01	4120	0.0	0.0	4039	0.0	0.0
32912	170	10	15	43	2036	593	606	0.98	593	606	0.98	4071	0.0	0.0	4072	0.0	0.0
32913	108	10	15	43	2036	593	423	1.40	593	422	1.40	4073	0.0	0.0	4074	0.0	0.0
32914	65	10	10			2	793	0.00	2	792	0.00	7054	0.0	0.0	4074	0.0	0.0
32915	271	8	8			0	1,401	0.00	0	1,402	0.00	4106	0.0	0.0	7054	0.0	0.0
32916	85	10	15	43	2036	594	578	1.03	594	577	1.03	4074	0.0	0.0	4075	0.0	0.0
32917	319	10	15	43	2036	594	669	0.89	594	669	0.89	4075	0.0	0.0	4107	0.0	0.0
32918	270	10	15	43	2036	613	667	0.92	613	667	0.92	4107	0.0	0.0	4083	0.0	0.0
32919	120	10	15	43	2036	613	674	0.91	613	673	0.91	4109	0.0	0.0	4108	0.0	0.0
32920	333	10	15	43	2036	613	663	0.92	613	663	0.92	4108	0.0	0.0	4081	0.0	0.0
32921	146	8	15	43	2036	613	1,004	0.61	613	1,006	0.61	4081	0.0	0.0	4080	4.5	4.5

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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32922	113	8	15	43	2036	620	478	1.30	620	479	1.29	4080	4.5	4.5	7537	0.0	0.0
32923	302	8	8			24	378	0.06	6	378	0.02	4078	4.3	0.0	4079	3.3	0.0
32924	282	8	8			7	977	0.01	7	978	0.01	4077	0.0	0.0	4080	4.5	4.5
32925	276	8	8			4	902	0.00	4	903	0.00	4076	0.0	0.0	4077	0.0	0.0
32926	150	8	8			0	1,069	0.00	0	1,070	0.00	4068	0.0	0.0	4069	0.0	0.0
32927	350	8	8			0	665	0.00	0	666	0.00	4020	0.0	0.0	4082	0.0	0.0
32928	250	8	8			10	615	0.02	10	615	0.02	4085	0.0	0.0	4086	0.0	0.0
32929	71	8	8			9	697	0.01	9	698	0.01	4084	0.0	0.0	4085	0.0	0.0
32930	264	8	8			44	733	0.06	44	734	0.06	4038	0.0	0.0	7052	0.0	0.0
32931	311	8	8			44	265	0.16	44	265	0.16	7052	0.0	0.0	4066	0.0	0.0
32932	130	8	8			50	222	0.23	50	222	0.23	4066	0.0	0.0	4067	0.0	0.0
32933	180	8	8			20	526	0.04	20	526	0.04	4086	0.0	0.0	4067	0.0	0.0
32934	120	8	8			70	301	0.23	70	301	0.23	4067	0.0	0.0	4065	0.0	0.0
32935	155	8	8			10	697	0.01	10	697	0.01	4063	0.0	0.0	4064	0.0	0.0
32936	115	8	8			81	362	0.22	81	362	0.22	4064	0.0	0.0	4110	0.0	0.0
32937	41	8	8			81	352	0.23	81	353	0.23	4110	0.0	0.0	4111	0.0	0.0
32938	154	8	8			81	420	0.19	81	421	0.19	4111	0.0	0.0	4061	0.0	0.0
32939	102	8	8			0	768	0.00	0	769	0.00	4060	0.0	0.0	4061	0.0	0.0
32940	55	8	8			82	766	0.11	82	767	0.11	4061	0.0	0.0	4062	0.0	0.0
32941	83	8	8			82	565	0.14	82	566	0.14	4062	0.0	0.0	7536	0.0	0.0
32942	246	8	8			1	627	0.00	1	628	0.00	4057	0.0	0.0	4056	0.0	0.0
32943	78	8	8			0	328	0.00	0	328	0.00	4058	0.0	0.0	4057	0.0	0.0
32944	389	8	8			16	791	0.02	16	792	0.02	4054	0.0	0.0	4055	0.0	0.0
32945	141	8	8			1	664	0.00	1	665	0.00	4052	0.0	0.0	4053	0.0	0.0
32946	251	8	8			1	791	0.00	1	792	0.00	4082	0.0	0.0	4052	0.0	0.0
32953	297	8	8			29	1,150	0.03	29	1,151	0.03	4049	0.0	0.0	4048	0.0	0.0
32954	238	8	8			6	508	0.01	6	509	0.01	4051	0.0	0.0	7051	0.0	0.0
32955	152	8	8			6	515	0.01	6	516	0.01	4050	0.0	0.0	4051	0.0	0.0
32956	59	6	6			0	286	0.00	0	286	0.00	4021	0.0	0.0	4050	0.0	0.0
32957	232	6	6			19	237	0.08	19	237	0.08	4022	0.0	0.0	4044	0.0	0.0
32958	225	8	8			6	481	0.01	6	482	0.01	7051	0.0	0.0	7291	4.9	0.0
32959	109	8	8			13	270	0.05	3	270	0.01	4113	1.6	0.0	4047	1.7	0.0
32960	130	8	8			13	268	0.05	3	268	0.01	4046	3.1	0.0	4113	1.6	0.0
32961	119	6	6			4	209	0.02	3	209	0.01	4045	0.0	0.0	4046	3.1	0.0
32963	250	8	8			32	271	0.12	9	271	0.03	4047	1.7	0.0	4096	6.5	0.0
32964	64	8	15	33	Existing	632	900	0.70	631	4,809	0.13	4097	0.0	0.0	4096	6.5	0.0
32965	166	8	15	33	Existing	626	395	1.59	626	2,111	0.30	4079	3.3	0.0	4114	4.7	0.0
32966	377	8	8			0	710	0.00	0	710	0.00	4101	0.0	0.0	4097	0.0	0.0
32967	315	10	15	33	Existing	649	412	1.58	649	1,213	0.53	4095	3.2	0.0	4094	0.0	0.0
32968	475	12	15	36	2036	739	1,731	0.43	738	1,731	0.43	4094	0.0	0.0	9000	0.0	0.0
32969	250	6	6			3	207	0.02	3	207	0.02	4025	0.0	0.0	4077	0.0	0.0
32970	210	8	8			0	1,111	0.00	0	1,113	0.00	7140	0.0	0.0	7186	0.0	0.0
32971	214	10	10			13	1,501	0.01	13	1,500	0.01	4042	0.0	0.0	4105	0.0	0.0
32972	258	12	12			23	2,114	0.01	23	2,114	0.01	4105	0.0	0.0	4104	0.0	0.0
32973	286	8	8			1	1,347	0.00	1	1,349	0.00	4026	0.0	0.0	4104	0.0	0.0
32974	242	12	12			23	1,199	0.02	23	1,199	0.02	4104	0.0	0.0	7539	0.0	0.0
32975	162	12	12			23	1,217	0.02	23	1,217	0.02	7539	0.0	0.0	4103	0.0	0.0
32976	113	6	6			5	406	0.01	5	406	0.01	4027	0.0	0.0	4041	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32977	195	8	8			5	969	0.01	5	970	0.01	4041	0.0	0.0	4040	0.0	0.0
32978	151	8	8			5	370	0.01	5	371	0.01	4098	0.0	0.0	4099	0.0	0.0
32979	231	8	8			5	1,469	0.00	5	1,470	0.00	4099	0.0	0.0	4100	0.0	0.0
32980	202	6	6			5	384	0.01	5	384	0.01	4028	0.0	0.0	4100	0.0	0.0
32981	172	8	8			10	435	0.02	10	435	0.02	4100	0.0	0.0	4118	0.0	0.0
32982	480	15	15			85	1,405	0.06	85	1,405	0.06	4118	0.0	0.0	7294	0.0	0.0
32983	95	8	8			40	809	0.05	40	810	0.05	4119	0.0	0.0	4118	0.0	0.0
32984	448	12	12			35	2,590	0.01	35	2,590	0.01	4103	0.0	0.0	4118	0.0	0.0
32985	445	8	8			5	903	0.01	5	904	0.01	4102	0.0	0.0	4103	0.0	0.0
32986	70	8	8			0	588	0.00	0	588	0.00	4129	0.0	0.0	4102	0.0	0.0
32987	50	8	8			11	415	0.03	11	416	0.03	4089	0.0	0.0	4090	0.0	0.0
32988	98	6	6			0	299	0.00	0	299	0.00	4029	0.0	0.0	4090	0.0	0.0
32989	328	8	8			11	853	0.01	11	854	0.01	4088	0.0	0.0	4089	0.0	0.0
32990	190	12	12			747	1,777	0.42	746	1,777	0.42	4115	0.0	0.0	4116	0.0	0.0
32997	33	6	6			0	400	0.00	0	400	0.00	7683	0.0	0.0	7293	0.0	0.0
32998	35	6	6			0	386	0.00	0	386	0.00	4037	0.0	0.0	7293	0.0	0.0
33004	70	15	18	38	2036	889	1,149	0.77	1,085	1,149	0.94	7142	0.0	0.0	4232	0.0	0.0
33005	308	8	8			1	573	0.00	1	574	0.00	4166	0.0	0.0	7540	0.0	0.0
33006	362	8	8			0	819	0.00	0	821	0.00	4167	0.0	0.0	4166	0.0	0.0
33007	440	10	12	14	Existing	403	971	0.42	601	1,579	0.38	4205	0.0	0.0	7540	0.0	0.0
33008	375	8	8			0	787	0.00	0	788	0.00	4165	0.0	0.0	4205	0.0	0.0
33011	145	8	12	14	Existing	378	619	0.61	575	1,827	0.31	4149	0.0	0.0	4163	0.0	0.0
33012	43	8	8			0	321	0.00	0	321	0.00	4206	0.0	0.0	4149	0.0	0.0
33013	204	8	8			0	313	0.00	0	313	0.00	4234	0.0	0.0	4206	0.0	0.0
33014	130	8	8			377	1,119	0.34	574	1,120	0.51	4164	0.0	0.0	4149	0.0	0.0
33015	313	8	15	29	Existing	377	386	0.98	574	2,063	0.28	4208	4.5	0.0	4164	0.0	0.0
33017	297	8	15	29	Existing	381	299	1.28	574	1,597	0.36	4162	1.6	0.0	4208	4.5	0.0
33018	123	8	8			1	297	0.00	1	297	0.00	4197	0.0	0.0	4204	0.0	0.0
33019	80	6	6			0	176	0.00	0	176	0.00	4139	0.0	0.0	4197	0.0	0.0
33020	118	6	6			0	275	0.00	0	275	0.00	7684	0.0	0.0	4197	0.0	0.0
33021	178	8	8			299	328	0.91	299	329	0.91	7055	0.0	0.0	4204	0.0	0.0
33022	192	6	6			0	193	0.00	0	193	0.00	4140	0.0	0.0	7055	0.0	0.0
33023	108	8	8			1	821	0.00	1	822	0.00	4193	0.0	0.0	4192	0.0	0.0
33024	335	8	8			0	545	0.00	0	546	0.00	4194	0.0	0.0	4193	0.0	0.0
33025	108	8	8			258	565	0.46	258	566	0.46	4196	0.0	0.0	4192	0.0	0.0
33026	213	8	8			258	483	0.53	258	484	0.53	4152	0.0	0.0	4195	0.0	0.0
33027	154	8	8			51	301	0.17	51	301	0.17	4182	0.0	0.0	4184	0.0	0.0
33028	126	8	8			31	305	0.10	31	306	0.10	4181	0.0	0.0	4182	0.0	0.0
33029	87	8	8			31	294	0.10	31	294	0.10	4180	0.0	0.0	4181	0.0	0.0
33030	389	8	8			30	776	0.04	30	776	0.04	4154	0.0	0.0	4180	0.0	0.0
33031	416	8	8			0	297	0.00	0	297	0.00	7056	0.0	0.0	4152	0.0	0.0
33032	271	8	8			178	292	0.61	178	293	0.61	4159	0.0	0.0	4152	0.0	0.0
33033	350	8	8			99	297	0.33	99	298	0.33	4160	0.0	0.0	4159	0.0	0.0
33034	230	8	8			98	490	0.20	98	491	0.20	4157	0.0	0.0	4161	0.0	0.0
33035	309	8	8			50	644	0.08	50	645	0.08	4158	0.0	0.0	4159	0.0	0.0
33036	185	8	8			13	307	0.04	13	308	0.04	7542	0.0	0.0	4158	0.0	0.0
33037	159	8	8			36	769	0.05	36	769	0.05	4155	0.0	0.0	4158	0.0	0.0
33038	62	10	12	14	Existing	440	1,812	0.24	638	2,947	0.22	4169	0.0	0.0	4170	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33039	290	10	12	14	Existing	424	979	0.43	621	1,593	0.39	7540	0.0	0.0	4169	0.0	0.0
33040	345	8	8			16	705	0.02	16	706	0.02	4209	0.0	0.0	4169	0.0	0.0
33041	365	8	8			0	898	0.00	0	899	0.00	4168	0.0	0.0	4209	0.0	0.0
33042	237	8	8			54	301	0.18	54	301	0.18	4171	0.0	0.0	4170	0.0	0.0
33043	335	8	8			38	297	0.13	38	298	0.13	4176	0.0	0.0	4171	0.0	0.0
33044	190	8	8			1	540	0.00	1	541	0.00	7141	0.0	0.0	4150	0.0	0.0
33045	490	8	8			0	665	0.00	0	665	0.00	4147	0.0	0.0	7141	0.0	0.0
33046	401	8	8			9	778	0.01	9	780	0.01	4212	0.0	0.0	4150	0.0	0.0
33047	269	8	8			28	958	0.03	28	960	0.03	7295	0.0	0.0	4176	0.0	0.0
33048	138	8	8			27	297	0.09	27	297	0.09	4210	0.0	0.0	4175	0.0	0.0
33049	233	8	8			1	148	0.01	1	148	0.01	4211	0.0	0.0	4210	0.0	0.0
33050	200	8	8			1	297	0.00	1	298	0.00	4221	0.0	0.0	4177	0.0	0.0
33051	425	8	8			16	837	0.02	16	838	0.02	4173	0.0	0.0	4171	0.0	0.0
33052	209	8	8			0	577	0.00	0	578	0.00	4174	0.0	0.0	4173	0.0	0.0
33053	260	8	8			1	743	0.00	1	744	0.00	4172	0.0	0.0	4173	0.0	0.0
33054	26	8	8			6	998	0.01	6	999	0.01	4214	0.0	0.0	4213	0.0	0.0
33055	127	8	8			6	998	0.01	6	999	0.01	4215	0.0	0.0	4214	0.0	0.0
33056	275	8	8			12	755	0.02	12	756	0.02	4198	0.0	0.0	4213	0.0	0.0
33057	156	8	8			12	756	0.02	12	757	0.02	4201	0.0	0.0	4198	0.0	0.0
33058	304	8	8			0	415	0.00	0	416	0.00	4203	0.0	0.0	4202	0.0	0.0
33059	175	8	8			0	806	0.00	0	807	0.00	4217	0.0	0.0	4203	0.0	0.0
33060	125	8	8			0	816	0.00	0	817	0.00	4200	0.0	0.0	4217	0.0	0.0
33061	315	8	8			6	775	0.01	6	776	0.01	4199	0.0	0.0	4201	0.0	0.0
33062	380	8	8			0	383	0.00	0	383	0.00	7296	0.0	0.0	4199	0.0	0.0
33063	157	8	8			0	1,100	0.00	0	1,101	0.00	4142	0.0	0.0	7296	0.0	0.0
33064	76	15	18	38	2036	795	1,321	0.60	992	1,321	0.75	4219	0.0	0.0	4220	0.0	0.0
33065	107	15	18	38	2036	795	1,718	0.46	992	1,718	0.58	4218	0.0	0.0	4219	0.0	0.0
33066	222	8	8			300	285	1.05	300	286	1.05	4204	0.0	0.0	4218	0.0	0.0
33067	410	15	15			495	1,241	0.40	692	1,241	0.56	4170	0.0	0.0	4218	0.0	0.0
33068	131	8	8			0	914	0.00	0	915	0.00	4223	0.0	0.0	4222	0.0	0.0
33069	270	8	8			17	658	0.03	17	658	0.03	4213	0.0	0.0	4222	0.0	0.0
33070	323	15	18	38	2036	890	1,398	0.64	1,086	1,398	0.78	4225	0.0	0.0	4226	0.0	0.0
33071	86	15	18	38	2036	889	1,170	0.76	1,085	1,170	0.93	4232	0.0	0.0	4186	0.0	0.0
33072	48	15	18	38	2036	888	1,183	0.75	1,085	1,183	0.92	7297	0.0	0.0	7142	0.0	0.0
33073	50	15	18	38	2036	826	1,777	0.47	1,023	1,777	0.58	4190	0.0	0.0	7297	0.0	0.0
33074	130	15	18	38	2036	797	1,227	0.65	993	1,227	0.81	4224	0.0	0.0	4190	0.0	0.0
33075	51	15	18	38	2036	796	1,219	0.65	993	1,219	0.81	7543	0.0	0.0	4224	0.0	0.0
33076	103	15	18	38	2036	796	1,238	0.64	992	1,238	0.80	4220	0.0	0.0	7543	0.0	0.0
33077	301	8	8			29	460	0.06	29	461	0.06	4151	0.0	0.0	4190	0.0	0.0
33078	81	8	8			0	744	0.00	0	745	0.00	4145	0.0	0.0	4227	0.0	0.0
33079	414	12	12			758	2,693	0.28	758	2,693	0.28	4148	0.0	0.0	4228	0.0	0.0
33080	338	8	8			0	160	0.00	0	160	0.00	4236	0.0	0.0	4148	0.0	0.0
33081	413	8	8			28	594	0.05	28	594	0.05	4191	0.0	0.0	4151	0.0	0.0
33083	235	8	8			21	892	0.02	21	894	0.02	4179	0.0	0.0	4182	0.0	0.0
33084	242	8	8			20	896	0.02	20	897	0.02	4153	0.0	0.0	4179	0.0	0.0
33085	133	8	8			1	285	0.00	1	285	0.00	4230	0.0	0.0	4183	0.0	0.0
33086	371	8	8			26	827	0.03	26	828	0.03	4229	0.0	0.0	4183	0.0	0.0
33087	235	8	8			1	956	0.00	1	957	0.00	7408	0.0	0.0	4229	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33097	172	8	8			1	1,206	0.00	1	1,208	0.00	4241	0.0	0.0	4251	0.0	0.0
33098	229	8	8			1	303	0.00	1	303	0.00	4251	0.0	0.0	9959	0.0	0.0
33103	200	8	8			1	2,053	0.00	1	2,056	0.00	4247	0.0	0.0	4248	0.0	0.0
33104	200	8	8			0	1,456	0.00	0	1,458	0.00	4246	0.0	0.0	4247	0.0	0.0
33105	100	6	6			1	733	0.00	1	733	0.00	4256	0.0	0.0	4255	0.0	0.0
33106	127	6	6			1	853	0.00	1	853	0.00	4255	0.0	0.0	7298	0.0	0.0
33107	228	8	8			12	1,669	0.01	12	1,672	0.01	4243	0.0	0.0	4242	0.0	0.0
33109	430	8	8			0	666	0.00	0	667	0.00	7544	0.0	0.0	4259	0.0	0.0
33110	350	8	8			276	299	0.93	276	299	0.93	4259	0.0	0.0	4260	0.0	0.0
33111	165	8	8			276	295	0.94	276	295	0.94	4260	0.0	0.0	4261	0.0	0.0
33112	68	8	8			0	342	0.00	0	342	0.00	4263	0.0	0.0	4296	0.0	0.0
33113	210	8	8			1	735	0.00	1	735	0.00	7190	0.0	0.0	4296	0.0	0.0
33114	50	10	10			542	787	0.69	542	786	0.69	4266	2.3	0.0	4294	1.6	0.0
33115	208	10	10			531	759	0.70	531	758	0.70	4265	6.1	0.0	4266	2.3	0.0
33118	238	8	12	31	Existing	542	408	1.33	542	1,202	0.45	4294	1.6	0.0	4332	0.0	0.0
33119	281	8	8			11	659	0.02	11	660	0.02	4286	0.0	0.0	4266	2.3	0.0
33120	185	8	8			1	674	0.00	1	675	0.00	4318	0.0	0.0	4309	0.0	0.0
33121	100	8	8			1	297	0.00	1	298	0.00	4319	0.0	0.0	4318	0.0	0.0
33122	250	8	12	44	2036	553	610	0.91	553	612	0.90	4302	0.0	0.0	4310	0.0	0.0
33123	145	8	12	44	2036	553	615	0.90	553	615	0.90	4317	0.0	0.0	4302	0.0	0.0
33124	205	8	8			10	485	0.02	10	485	0.02	4333	0.0	0.0	4317	0.0	0.0
33125	70	6	6			0	345	0.00	0	345	0.00	4271	0.0	0.0	4333	0.0	0.0
33126	194	8	15	32	2036	160	257	0.62	160	258	0.62	4309	0.0	0.0	4308	0.0	0.0
33127	226	8	15	32	2036	159	308	0.52	159	308	0.52	4310	0.0	0.0	4309	0.0	0.0
33128	153	8	8			394	894	0.44	394	895	0.44	4310	0.0	0.0	4311	0.0	0.0
33129	158	8	8			3	610	0.00	3	611	0.00	4289	0.0	0.0	4308	0.0	0.0
33130	52	8	8			1	608	0.00	1	609	0.00	4322	0.0	0.0	4289	0.0	0.0
33131	53	8	8			0	329	0.00	0	330	0.00	4267	0.0	0.0	4322	0.0	0.0
33132	125	6	6			0	182	0.00	0	182	0.00	4272	0.0	0.0	4322	0.0	0.0
33133	57	8	8			1	570	0.00	1	571	0.00	4321	0.0	0.0	4320	0.0	0.0
33134	36	8	8			1	705	0.00	1	706	0.00	4335	0.0	0.0	4321	0.0	0.0
33135	67	6	6			0	223	0.00	0	223	0.00	4273	0.0	0.0	4336	0.0	0.0
33136	285	8	8			2	394	0.01	2	394	0.01	4328	0.0	0.0	4300	0.0	0.0
33137	200	8	8			58	364	0.16	58	365	0.16	4299	0.0	0.0	4300	0.0	0.0
33138	131	8	8			61	591	0.10	61	592	0.10	4301	0.0	0.0	4290	0.0	0.0
33139	97	8	8			61	730	0.08	61	731	0.08	4300	0.0	0.0	4301	0.0	0.0
33141	230	8	8			22	727	0.03	22	728	0.03	4298	0.0	0.0	4299	0.0	0.0
33142	445	8	8			1	726	0.00	1	726	0.00	4295	0.0	0.0	4298	0.0	0.0
33143	320	8	8			15	726	0.02	15	726	0.02	4296	0.0	0.0	4297	0.0	0.0
33144	215	8	8			72	301	0.24	72	301	0.24	4326	0.0	0.0	4325	0.0	0.0
33146	282	8	8			72	442	0.16	72	443	0.16	4329	0.0	0.0	4327	0.0	0.0
33147	280	8	8			1	1,319	0.00	1	1,322	0.00	4330	0.0	0.0	4329	0.0	0.0
33148	450	8	8			72	297	0.24	72	298	0.24	4290	0.0	0.0	4329	0.0	0.0
33150	210	8	8			1	992	0.00	1	993	0.00	4323	0.0	0.0	4325	0.0	0.0
33152	265	8	12	29	Existing	572	447	1.28	573	1,319	0.43	4339	1.3	0.0	7057	0.0	0.0
33153	425	8	8			293	1,118	0.26	293	1,119	0.26	7143	0.0	0.0	4339	1.3	0.0
33154	330	8	8			12	357	0.03	12	357	0.03	4331	0.0	0.0	7547	0.0	0.0
33155	201	8	8			13	742	0.02	13	742	0.02	7547	0.0	0.0	7143	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33156	435	8	12	30	2036	281	300	0.94	280	300	0.93	4324	0.0	0.0	4339	1.3	0.0
33157	310	8	12	30	2036	176	318	0.55	176	319	0.55	7301	0.0	0.0	4324	0.0	0.0
33158	300	8	8			176	956	0.18	176	956	0.18	7409	0.0	0.0	7301	0.0	0.0
33159	235	8	8			170	708	0.24	170	708	0.24	4340	0.0	0.0	7409	0.0	0.0
33160	105	8	8			170	708	0.24	170	709	0.24	4341	0.0	0.0	4340	0.0	0.0
33161	314	8	8			1	590	0.00	1	590	0.00	4342	0.0	0.0	4341	0.0	0.0
33162	161	8	8			0	586	0.00	0	587	0.00	4343	0.0	0.0	4342	0.0	0.0
33164	353	8	8			169	708	0.24	169	709	0.24	4308	0.0	0.0	4341	0.0	0.0
33165	297	10	10			394	737	0.54	394	736	0.54	4312	0.0	0.0	4306	0.0	0.0
33166	293	8	8			394	567	0.70	394	568	0.69	4311	0.0	0.0	4312	0.0	0.0
33167	172	10	10			442	670	0.66	442	669	0.66	4314	0.0	0.0	7546	0.0	0.0
33168	112	10	10			442	683	0.65	442	682	0.65	4344	0.0	0.0	4314	0.0	0.0
33169	258	10	10			442	586	0.75	442	585	0.75	4306	0.0	0.0	4344	0.0	0.0
33170	145	8	8			16	1,465	0.01	16	1,467	0.01	4307	0.0	0.0	4306	0.0	0.0
33171	130	8	8			10	815	0.01	10	816	0.01	7300	0.0	0.0	4345	0.0	0.0
33172	105	8	8			10	480	0.02	10	481	0.02	4316	0.0	0.0	7300	0.0	0.0
33173	277	8	8			31	682	0.05	31	683	0.05	4313	0.0	0.0	4306	0.0	0.0
33174	162	8	8			0	408	0.00	0	408	0.00	4347	0.0	0.0	4346	0.0	0.0
33175	106	6	6			1	157	0.00	1	157	0.00	4277	0.0	0.0	7546	0.0	0.0
33177	276	8	8			43	799	0.05	43	800	0.05	4348	0.0	0.0	4303	0.0	0.0
33178	325	8	8			21	881	0.02	21	883	0.02	4304	0.0	0.0	4348	0.0	0.0
33179	210	8	8			9	691	0.01	9	692	0.01	4350	0.0	0.0	4349	0.0	0.0
33180	298	8	12	44	2036	542	692	0.78	542	693	0.78	4332	0.0	0.0	4317	0.0	0.0
33192	178	8	8			6	1,145	0.00	6	1,147	0.00	7058	0.0	0.0	7548	0.0	0.0
33193	378	8	8			60	1,107	0.05	60	1,108	0.05	7548	0.0	0.0	4354	0.0	0.0
33194	316	8	8			63	644	0.10	63	644	0.10	4354	0.0	0.0	4355	0.0	0.0
33195	316	8	8			63	888	0.07	63	889	0.07	4355	0.0	0.0	7727	0.0	0.0
33196	467	8	8			38	1,074	0.04	38	1,076	0.04	4356	0.0	0.0	4357	0.0	0.0
33197	235	8	8			52	872	0.06	52	873	0.06	4357	0.0	0.0	7727	0.0	0.0
33198	40	8	8			115	360	0.32	115	360	0.32	7727	0.0	0.0	7549	0.0	0.0
33199	196	8	8			5	478	0.01	5	479	0.01	4386	0.0	0.0	4377	0.0	0.0
33200	122	8	8			5	752	0.01	5	753	0.01	4387	0.0	0.0	4386	0.0	0.0
33201	296	8	8			4	1,106	0.00	4	1,108	0.00	4388	0.0	0.0	4387	0.0	0.0
33202	403	8	8			10	971	0.01	10	972	0.01	4371	0.0	0.0	4372	0.0	0.0
33203	260	10	10			6	1,478	0.00	6	1,476	0.00	4375	0.0	0.0	4373	0.0	0.0
33204	88	10	10			6	1,135	0.00	6	1,135	0.00	4374	0.0	0.0	4375	0.0	0.0
33205	172	10	10			1	1,871	0.00	1	1,869	0.00	4385	0.0	0.0	4374	0.0	0.0
33206	235	8	8			1	1,180	0.00	1	1,181	0.00	4366	0.0	0.0	4358	0.0	0.0
33207	19	8	8			0	449	0.00	0	449	0.00	4389	0.0	0.0	4366	0.0	0.0
33208	278	8	8			1	1,174	0.00	1	1,176	0.00	4362	0.0	0.0	4383	0.0	0.0
33209	51	8	8			13	368	0.04	13	369	0.04	4383	0.0	0.0	4382	0.0	0.0
33210	44	8	8			132	451	0.29	132	452	0.29	4378	0.0	0.0	4382	0.0	0.0
33211	132	8	8			132	524	0.25	132	525	0.25	7059	0.0	0.0	4378	0.0	0.0
33212	51	8	8			132	564	0.23	132	565	0.23	4381	0.0	0.0	7059	0.0	0.0
33213	344	8	8			121	1,074	0.11	121	1,075	0.11	4359	0.0	0.0	4381	0.0	0.0
33214	182	8	8			0	760	0.00	0	762	0.00	4360	0.0	0.0	4367	0.0	0.0
33215	66	8	8			0	802	0.00	0	803	0.00	4361	0.0	0.0	4360	0.0	0.0
33216	186	8	8			120	997	0.12	120	998	0.12	4364	0.0	0.0	4367	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33217	98	8	8			115	967	0.12	115	967	0.12	7549	0.0	0.0	4364	0.0	0.0
33218	402	8	8			6	1,276	0.00	6	1,277	0.00	4365	0.0	0.0	4364	0.0	0.0
33219	249	8	8			11	547	0.02	11	548	0.02	4380	0.0	0.0	4381	0.0	0.0
33220	230	8	8			0	1,137	0.00	0	1,138	0.00	4368	0.0	0.0	4380	0.0	0.0
33221	66	8	8			1	1,119	0.00	1	1,120	0.00	4379	0.0	0.0	4380	0.0	0.0
33222	243	8	8			1	1,176	0.00	1	1,177	0.00	4391	0.0	0.0	4392	0.0	0.0
33223	135	8	8			6	1,315	0.00	6	1,317	0.00	4393	0.0	0.0	4394	0.0	0.0
33224	308	8	8			12	1,533	0.01	12	1,535	0.01	7060	0.0	0.0	4394	0.0	0.0
33225	142	8	8			17	1,277	0.01	17	1,278	0.01	4394	0.0	0.0	4390	0.0	0.0
33226	269	8	8			17	456	0.04	17	456	0.04	4390	0.0	0.0	7303	0.0	0.0
33227	131	8	8			26	370	0.07	26	371	0.07	7303	0.0	0.0	4399	0.0	0.0
33228	476	8	8			10	1,315	0.01	10	1,317	0.01	4395	0.0	0.0	4396	0.0	0.0
33229	437	8	8			10	1,163	0.01	10	1,165	0.01	4396	0.0	0.0	4397	0.0	0.0
33230	223	8	8			21	372	0.06	21	372	0.06	4397	0.0	0.0	4398	0.0	0.0
33231	235	8	8			0	491	0.00	0	492	0.00	4400	0.0	0.0	4399	0.0	0.0
33232	186	8	8			33	493	0.07	33	494	0.07	4399	0.0	0.0	7728	0.0	0.0
33233	170	8	8			33	1,863	0.02	33	1,865	0.02	7728	0.0	0.0	4398	0.0	0.0
33234	305	8	8			55	1,347	0.04	55	1,349	0.04	4398	0.0	0.0	4418	0.0	0.0
33235	488	8	8			1	995	0.00	1	997	0.00	7144	0.0	0.0	4402	0.0	0.0
33236	186	8	8			5	1,678	0.00	5	1,681	0.00	4402	0.0	0.0	4403	0.0	0.0
33237	186	8	8			6	892	0.01	6	892	0.01	4403	0.0	0.0	4411	0.0	0.0
33238	170	8	8			0	1,379	0.00	0	1,381	0.00	4404	0.0	0.0	4405	0.0	0.0
33239	450	8	8			1	1,228	0.00	1	1,229	0.00	4405	0.0	0.0	4406	0.0	0.0
33240	353	8	8			1	1,224	0.00	1	1,225	0.00	4407	0.0	0.0	4408	0.0	0.0
33241	306	8	8			1	1,260	0.00	1	1,261	0.00	4408	0.0	0.0	4409	0.0	0.0
33242	479	8	8			1	1,054	0.00	1	1,056	0.00	4409	0.0	0.0	4411	0.0	0.0
33243	18	8	8			19	758	0.02	19	760	0.02	4412	0.0	0.0	7064	0.0	0.0
33244	130	8	8			6	489	0.01	6	490	0.01	4411	0.0	0.0	4412	0.0	0.0
33245	234	8	8			12	719	0.02	12	721	0.02	4415	0.0	0.0	4410	0.0	0.0
33246	231	8	8			12	1,044	0.01	12	1,045	0.01	4410	0.0	0.0	4414	0.0	0.0
33247	161	8	8			12	831	0.01	12	832	0.01	4414	0.0	0.0	4413	0.0	0.0
33248	49	8	8			13	1,018	0.01	13	1,019	0.01	4413	0.0	0.0	4412	0.0	0.0
33249	146	8	8			55	831	0.07	55	832	0.07	7551	0.0	0.0	7548	0.0	0.0
33250	195	8	8			0	1,190	0.00	0	1,192	0.00	4419	0.0	0.0	4354	0.0	0.0
33251	110	8	8			13	301	0.04	13	301	0.04	4498	0.0	0.0	4466	0.0	0.0
33254	54	8	8			19	2,137	0.01	19	2,140	0.01	4450	0.0	0.0	4449	0.0	0.0
33255	310	8	8			19	1,203	0.02	19	1,204	0.02	4449	0.0	0.0	7145	0.0	0.0
33256	125	8	8			40	1,537	0.03	40	1,539	0.03	4448	0.0	0.0	4447	0.0	0.0
33257	110	8	8			40	2,069	0.02	40	2,072	0.02	4447	0.0	0.0	4446	0.0	0.0
33258	80	8	8			40	1,817	0.02	40	1,820	0.02	4446	0.0	0.0	4427	0.0	0.0
33259	89	8	8			41	1,749	0.02	41	1,751	0.02	4427	0.0	0.0	7304	0.0	0.0
33260	163	8	8			62	342	0.18	62	342	0.18	7304	0.0	0.0	4428	0.0	0.0
33261	50	8	8			76	297	0.25	76	298	0.25	4469	0.0	0.0	4470	0.0	0.0
33262	270	8	8			170	1,032	0.16	170	1,033	0.16	4470	0.0	0.0	4471	0.0	0.0
33263	90	8	8			244	940	0.26	244	942	0.26	4471	0.0	0.0	4472	0.0	0.0
33264	200	8	8			244	294	0.83	244	294	0.83	4472	0.0	0.0	7306	0.0	0.0
33265	295	8	8			245	934	0.26	245	935	0.26	7306	0.0	0.0	4473	2.1	2.1
33266	340	8	12	46	2036	295	297	1.00	295	297	1.00	4473	2.1	2.1	4474	0.0	0.0

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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33267	278	8	8			27	1,897	0.01	27	1,899	0.01	7552	0.0	0.0	4475	0.0	0.0
33268	367	8	8			28	1,244	0.02	28	1,247	0.02	4475	0.0	0.0	7061	0.0	0.0
33269	325	8	8			54	1,609	0.03	54	1,611	0.03	7061	0.0	0.0	4471	0.0	0.0
33270	446	8	8			0	1,586	0.00	0	1,588	0.00	4476	0.0	0.0	4445	0.0	0.0
33271	165	8	8			94	1,310	0.07	94	1,311	0.07	4477	0.0	0.0	4470	0.0	0.0
33272	225	8	8			94	1,267	0.07	94	1,269	0.07	4429	0.0	0.0	4477	0.0	0.0
33273	300	8	8			94	1,218	0.08	94	1,219	0.08	4443	0.0	0.0	4429	0.0	0.0
33274	203	8	8			50	1,085	0.05	50	1,086	0.05	4479	0.0	0.0	4473	2.1	2.1
33275	80	8	8			1	1,013	0.00	1	1,014	0.00	7554	0.0	0.0	4479	0.0	0.0
33276	170	8	8			0	1,881	0.00	0	1,883	0.00	4480	0.0	0.0	7554	0.0	0.0
33277	183	8	8			28	1,460	0.02	28	1,462	0.02	4454	0.0	0.0	4479	0.0	0.0
33278	120	8	8			28	1,902	0.01	28	1,905	0.01	4453	0.0	0.0	4454	0.0	0.0
33279	147	8	8			1	930	0.00	1	931	0.00	4481	0.0	0.0	4453	0.0	0.0
33280	75	8	8			1	1,795	0.00	1	1,797	0.00	7063	0.0	0.0	4481	0.0	0.0
33281	211	8	8			1	1,546	0.00	1	1,548	0.00	4440	0.0	0.0	7063	0.0	0.0
33282	370	8	8			1	819	0.00	1	821	0.00	4441	0.0	0.0	4440	0.0	0.0
33283	80	6	6			1	692	0.00	1	692	0.00	7687	0.0	0.0	4437	0.0	0.0
33284	144	8	8			1	1,208	0.00	1	1,210	0.00	4483	0.0	0.0	4482	0.0	0.0
33285	190	8	8			1	1,158	0.00	1	1,159	0.00	4435	0.0	0.0	4483	0.0	0.0
33286	280	8	8			1	794	0.00	1	796	0.00	4436	0.0	0.0	4435	0.0	0.0
33287	135	8	8			1	1,433	0.00	1	1,435	0.00	4420	0.0	0.0	4436	0.0	0.0
33288	230	8	8			112	650	0.17	112	651	0.17	4434	0.0	0.0	4482	0.0	0.0
33289	115	8	8			134	297	0.45	134	298	0.45	4485	0.0	0.0	4484	0.0	0.0
33290	60	8	8			113	291	0.39	113	292	0.39	4482	0.0	0.0	4485	0.0	0.0
33291	315	8	8			160	1,026	0.16	160	1,028	0.16	4432	0.0	0.0	4466	0.0	0.0
33292	155	8	8			25	1,321	0.02	25	1,323	0.02	4431	0.0	0.0	4432	0.0	0.0
33293	250	8	8			25	1,722	0.01	25	1,724	0.01	4430	0.0	0.0	4431	0.0	0.0
33294	125	8	8			24	1,757	0.01	24	1,760	0.01	4486	0.0	0.0	4430	0.0	0.0
33295	45	8	8			24	1,608	0.02	24	1,610	0.02	4487	0.0	0.0	4486	0.0	0.0
33296	160	8	8			24	871	0.03	24	872	0.03	4488	0.0	0.0	4487	0.0	0.0
33297	155	8	8			8	756	0.01	8	756	0.01	4489	0.0	0.0	4488	0.0	0.0
33298	95	8	8			8	929	0.01	8	931	0.01	4439	0.0	0.0	4489	0.0	0.0
33299	200	8	8			319	578	0.55	319	578	0.55	4463	0.0	0.0	4464	0.0	0.0
33300	209	8	8			319	1,054	0.30	319	1,056	0.30	7305	0.0	0.0	4463	0.0	0.0
33301	256	8	8			319	804	0.40	319	806	0.40	4461	0.0	0.0	7305	0.0	0.0
33302	164	8	8			318	899	0.35	318	901	0.35	4462	0.0	0.0	4461	0.0	0.0
33303	243	8	8			1	1,177	0.00	1	1,178	0.00	4452	0.0	0.0	4462	0.0	0.0
33304	157	8	8			0	1,783	0.00	0	1,786	0.00	4451	0.0	0.0	4452	0.0	0.0
33305	196	8	8			317	1,345	0.24	317	1,347	0.24	4460	0.0	0.0	4462	0.0	0.0
33306	177	8	8			297	1,117	0.27	297	1,119	0.26	4490	0.0	0.0	4460	0.0	0.0
33307	163	8	8			295	949	0.31	295	951	0.31	4474	0.0	0.0	4490	0.0	0.0
33308	190	8	8			1	1,274	0.00	1	1,276	0.00	4491	0.0	0.0	4490	0.0	0.0
33309	230	8	8			0	76	0.00	0	76	0.00	7410	0.0	0.0	4492	0.0	0.0
33310	109	8	8			4	1,284	0.00	4	1,286	0.00	7553	0.0	0.0	7062	0.0	0.0
33311	117	8	8			0	1,519	0.00	0	1,521	0.00	4421	0.0	0.0	7553	0.0	0.0
33312	264	8	8			1	1,133	0.00	1	1,134	0.00	4422	0.0	0.0	7553	0.0	0.0
33313	229	8	8			5	1,168	0.00	5	1,169	0.00	4458	0.0	0.0	4467	0.0	0.0
33314	42	8	8			5	811	0.01	5	812	0.01	4459	0.0	0.0	4458	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33315	124	8	8			5	883	0.01	5	884	0.01	4493	0.0	0.0	4459	0.0	0.0
33316	185	8	8			0	403	0.00	0	403	0.00	4424	0.0	0.0	4493	0.0	0.0
33317	452	8	8			1	977	0.00	1	978	0.00	4457	0.0	0.0	4468	0.0	0.0
33318	175	8	8			19	444	0.04	19	444	0.04	4494	0.0	0.0	4496	0.0	0.0
33319	216	8	8			19	1,180	0.02	19	1,181	0.02	4456	0.0	0.0	4455	0.0	0.0
33320	236	8	8			0	885	0.00	0	886	0.00	4497	0.0	0.0	4495	0.0	0.0
33322	150	8	8			210	384	0.55	210	384	0.55	4466	0.0	0.0	4465	0.0	0.0
33323	65	8	12	45	2036	319	292	1.10	319	292	1.10	4464	0.0	0.0	4465	0.0	0.0
33324	74	8	8			26	1,766	0.01	26	1,768	0.01	4444	0.0	0.0	7061	0.0	0.0
33325	250	8	8			1	1,040	0.00	1	1,042	0.00	4425	0.0	0.0	4498	0.0	0.0
33326	35	8	8			19	1,572	0.01	19	1,574	0.01	4495	0.0	0.0	4456	0.0	0.0
33327	81	8	8			7	1,817	0.00	7	1,819	0.00	4506	0.0	0.0	4515	0.0	0.0
33328	454	8	8			1	947	0.00	1	948	0.00	4508	0.0	0.0	4504	0.0	0.0
33329	287	8	8			1	1,394	0.00	1	1,396	0.00	7307	0.0	0.0	4507	0.0	0.0
33330	181	8	8			1	344	0.00	1	345	0.00	4507	0.0	0.0	4524	0.0	0.0
33331	77	8	8			0	1,834	0.00	0	1,837	0.00	4509	0.0	0.0	4510	0.0	0.0
33332	132	8	8			1	1,245	0.00	1	1,247	0.00	4510	0.0	0.0	4511	0.0	0.0
33333	376	8	8			6	1,595	0.00	6	1,597	0.00	4511	0.0	0.0	4512	0.0	0.0
33334	263	8	8			6	1,900	0.00	6	1,903	0.00	4512	0.0	0.0	4513	0.0	0.0
33335	129	8	8			6	1,070	0.01	6	1,072	0.01	4513	0.0	0.0	7555	0.0	0.0
33336	163	8	8			1	1,616	0.00	1	1,618	0.00	4502	0.0	0.0	7555	0.0	0.0
33337	352	8	8			8	1,662	0.00	8	1,664	0.00	7555	0.0	0.0	4514	0.0	0.0
33338	226	8	8			8	873	0.01	8	874	0.01	4514	0.0	0.0	4503	0.0	0.0
33339	209	8	8			8	1,778	0.00	8	1,781	0.00	4528	0.0	0.0	4525	0.0	0.0
33340	343	8	8			14	1,052	0.01	14	1,053	0.01	4524	0.0	0.0	4523	0.0	0.0
33341	329	8	8			17	1,058	0.02	17	1,059	0.02	4503	0.0	0.0	4522	0.0	0.0
33342	192	8	8			7	1,884	0.00	7	1,887	0.00	4515	0.0	0.0	4527	0.0	0.0
33343	240	8	8			3	1,912	0.00	3	1,915	0.00	8362	0.0	0.0	4534	0.0	0.0
33344	198	8	8			7	1,197	0.01	7	1,198	0.01	4531	0.0	0.0	4535	0.0	0.0
33346	55	8	8			15	667	0.02	15	667	0.02	4535	0.0	0.0	4536	0.0	0.0
33347	256	8	8			15	1,397	0.01	15	1,399	0.01	4536	0.0	0.0	4538	0.0	0.0
33348	163	8	8			1	1,537	0.00	1	1,539	0.00	4539	0.0	0.0	4540	0.0	0.0
33349	348	8	8			4	1,273	0.00	4	1,274	0.00	4540	0.0	0.0	4541	0.0	0.0
33350	131	8	8			5	1,520	0.00	5	1,522	0.00	4541	0.0	0.0	7308	0.0	0.0
33352	412	8	8			5	1,183	0.00	5	1,185	0.00	4532	0.0	0.0	4538	0.0	0.0
33353	184	8	8			19	1,214	0.02	19	1,215	0.02	4538	0.0	0.0	4546	0.0	0.0
33355	475	8	8			3	1,378	0.00	3	1,381	0.00	4543	0.0	0.0	4544	0.0	0.0
33356	108	8	8			7	1,151	0.01	7	1,153	0.01	4544	0.0	0.0	7308	0.0	0.0
33357	229	8	8			12	1,085	0.01	12	1,087	0.01	7308	0.0	0.0	4545	0.0	0.0
33358	60	8	8			12	1,214	0.01	12	1,215	0.01	4545	0.0	0.0	4546	0.0	0.0
33359	127	8	8			0	1,381	0.00	0	1,383	0.00	4573	0.0	0.0	4572	0.0	0.0
33360	101	8	8			0	1,304	0.00	0	1,306	0.00	4572	0.0	0.0	4551	0.0	0.0
33361	375	8	8			0	1,526	0.00	0	1,528	0.00	4574	0.0	0.0	4551	0.0	0.0
33362	207	8	8			0	1,548	0.00	0	1,550	0.00	4551	0.0	0.0	4575	0.0	0.0
33363	55	8	8			1	1,627	0.00	1	1,629	0.00	4575	0.0	0.0	4576	0.0	0.0
33364	151	8	8			4	3,008	0.00	4	3,012	0.00	4576	0.0	0.0	4577	0.0	0.0
33365	66	8	8			4	2,019	0.00	4	2,022	0.00	4577	0.0	0.0	4553	0.0	0.0
33366	138	8	8			5	3,067	0.00	5	3,071	0.00	4553	0.0	0.0	7066	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33367	251	8	8			1	450	0.00	1	451	0.00	4578	0.0	0.0	7066	0.0	0.0
33368	159	8	8			1	3,047	0.00	1	3,051	0.00	4564	0.0	0.0	4578	0.0	0.0
33369	170	8	8			0	2,717	0.00	0	2,721	0.00	4579	0.0	0.0	4552	0.0	0.0
33370	67	8	8			6	2,285	0.00	6	2,288	0.00	7556	0.0	0.0	4569	0.0	0.0
33371	96	8	8			6	2,568	0.00	6	2,572	0.00	4569	0.0	0.0	4570	0.0	0.0
33372	175	8	8			8	331	0.03	8	331	0.03	4570	0.0	0.0	4568	0.0	0.0
33373	194	8	8			0	674	0.00	0	676	0.00	7557	0.0	0.0	4571	0.0	0.0
33374	284	8	8			3	338	0.01	3	338	0.01	4566	0.0	0.0	4567	0.0	0.0
33375	245	8	8			0	325	0.00	0	326	0.00	4565	0.0	0.0	4566	0.0	0.0
33376	379	8	8			0	437	0.00	0	438	0.00	4558	0.0	0.0	4570	0.0	0.0
33377	115	8	8			4	1,012	0.00	4	1,013	0.00	7310	0.0	0.0	4580	0.0	0.0
33378	84	8	8			0	1,026	0.00	0	1,028	0.00	7688	0.0	0.0	7310	0.0	0.0
33379	271	8	8			4	1,177	0.00	4	1,178	0.00	4557	0.0	0.0	7309	0.0	0.0
33380	25	8	8			0	470	0.00	0	471	0.00	4550	0.0	0.0	7189	0.0	0.0
33381	326	8	8			0	1,690	0.00	0	1,692	0.00	4563	0.0	0.0	7065	0.0	0.0
33382	167	8	8			3	1,049	0.00	3	1,051	0.00	7065	0.0	0.0	4562	0.0	0.0
33383	144	8	8			3	1,477	0.00	3	1,479	0.00	4562	0.0	0.0	4559	0.0	0.0
33384	335	8	8			3	876	0.00	3	878	0.00	4559	0.0	0.0	4556	0.0	0.0
33385	362	8	8			4	1,397	0.00	4	1,398	0.00	7309	0.0	0.0	4556	0.0	0.0
33386	150	8	8			7	940	0.01	7	942	0.01	4556	0.0	0.0	4555	0.0	0.0
33388	79	8	8			31	286	0.11	31	287	0.11	4561	0.0	0.0	4560	0.0	0.0
33389	165	8	8			3	896	0.00	3	897	0.00	8248	0.0	0.0	8260	0.0	0.0
33390	118	8	8			0	865	0.00	0	866	0.00	4548	0.0	0.0	4582	0.0	0.0
33391	294	8	8			0	837	0.00	0	838	0.00	4549	0.0	0.0	7557	0.0	0.0
33392	202	8	8			5	763	0.01	5	763	0.01	4589	0.0	0.0	4590	0.0	0.0
33393	75	8	8			2	1,549	0.00	2	1,551	0.00	4584	0.0	0.0	4585	0.0	0.0
33394	260	8	8			2	2,107	0.00	2	2,110	0.00	4585	0.0	0.0	4586	0.0	0.0
33395	159	8	8			2	1,882	0.00	2	1,884	0.00	4586	0.0	0.0	4588	0.0	0.0
33396	89	8	8			2	1,133	0.00	2	1,135	0.00	4588	0.0	0.0	4590	0.0	0.0
33397	52	8	8			5	548	0.01	5	549	0.01	8281	0.0	0.0	4589	0.0	0.0
33398	168	8	8			10	1,454	0.01	10	1,456	0.01	4590	0.0	0.0	7558	0.0	0.0
33400	109	8	8			26	488	0.05	26	488	0.05	7558	0.0	0.0	4583	0.0	0.0
33401	298	8	8			0	565	0.00	0	566	0.00	7311	0.0	0.0	4596	0.0	0.0
33402	297	8	8			0	460	0.00	0	461	0.00	4593	0.0	0.0	4594	0.0	0.0
33403	95	8	8			1	935	0.00	1	936	0.00	4594	0.0	0.0	4595	0.0	0.0
33404	85	8	8			2	1,303	0.00	2	1,305	0.00	4595	0.0	0.0	4596	0.0	0.0
33405	110	8	8			3	383	0.01	3	384	0.01	4602	0.0	0.0	4603	0.0	0.0
33406	170	8	8			0	383	0.00	0	384	0.00	4600	0.0	0.0	4601	0.0	0.0
33407	315	8	8			0	786	0.00	0	788	0.00	4597	0.0	0.0	4599	0.0	0.0
33408	135	8	8			2	1,138	0.00	2	1,140	0.00	4598	0.0	0.0	4599	0.0	0.0
33409	283	8	8			9	1,138	0.01	9	1,139	0.01	4599	0.0	0.0	4601	0.0	0.0
33410	293	8	8			12	978	0.01	12	979	0.01	4601	0.0	0.0	4603	0.0	0.0
33411	134	8	8			15	1,048	0.01	15	1,049	0.01	4603	0.0	0.0	4604	0.0	0.0
33412	240	8	8			15	383	0.04	15	384	0.04	4604	0.0	0.0	4605	0.0	0.0
33413	349	8	8			41	383	0.11	41	383	0.11	4605	0.0	0.0	4606	0.0	0.0
33414	300	8	8			41	1,015	0.04	41	1,017	0.04	4606	0.0	0.0	4607	0.0	0.0
33415	50	8	8			41	1,015	0.04	41	1,017	0.04	4607	0.0	0.0	4608	0.0	0.0
33417	370	8	8			5	1,318	0.00	5	1,319	0.00	4662	0.0	0.0	4643	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33418	164	8	8			20	947	0.02	20	949	0.02	4646	0.0	0.0	4645	0.0	0.0
33419	360	8	8			10	1,719	0.01	10	1,722	0.01	4621	0.0	0.0	4647	0.0	0.0
33420	249	8	8			1	2,332	0.00	1	2,335	0.00	4609	0.0	0.0	4621	0.0	0.0
33421	172	8	8			7	901	0.01	7	903	0.01	7559	0.0	0.0	4621	0.0	0.0
33422	140	8	8			3	2,405	0.00	3	2,408	0.00	7067	0.0	0.0	4623	0.0	0.0
33423	118	8	8			0	409	0.00	0	409	0.00	4624	0.0	0.0	7067	0.0	0.0
33424	127	8	8			0	1,044	0.00	0	1,045	0.00	4625	0.0	0.0	4624	0.0	0.0
33425	155	8	8			1	1,996	0.00	1	1,999	0.00	4611	0.0	0.0	4625	0.0	0.0
33426	93	8	8			0	1,320	0.00	0	1,322	0.00	4622	0.0	0.0	4623	0.0	0.0
33427	259	8	8			0	783	0.00	0	784	0.00	4630	0.0	0.0	4622	0.0	0.0
33428	357	8	8			0	1,301	0.00	0	1,303	0.00	4650	0.0	0.0	7559	0.0	0.0
33429	173	8	8			0	799	0.00	0	800	0.00	4610	0.0	0.0	7067	0.0	0.0
33430	147	8	8			0	895	0.00	0	896	0.00	4648	0.0	0.0	4647	0.0	0.0
33431	211	8	8			1	1,772	0.00	1	1,774	0.00	4649	0.0	0.0	4648	0.0	0.0
33432	91	8	8			0	2,060	0.00	0	2,063	0.00	4615	0.0	0.0	4649	0.0	0.0
33433	210	8	8			0	749	0.00	0	749	0.00	7689	0.0	0.0	4663	0.0	0.0
33434	160	8	8			94	1,288	0.07	94	1,289	0.07	4644	0.0	0.0	4645	0.0	0.0
33435	465	8	8			56	1,010	0.06	56	1,011	0.05	7069	0.0	0.0	4674	0.0	0.0
33436	363	8	8			56	882	0.06	56	883	0.06	4673	0.0	0.0	7069	0.0	0.0
33437	370	8	8			39	1,210	0.03	39	1,212	0.03	7313	0.0	0.0	4644	0.0	0.0
33438	216	8	8			30	865	0.03	30	867	0.03	4657	0.0	0.0	4655	0.0	0.0
33439	139	8	8			30	563	0.05	30	564	0.05	7561	0.0	0.0	4657	0.0	0.0
33440	135	8	8			30	1,537	0.02	30	1,539	0.02	4656	0.0	0.0	7561	0.0	0.0
33441	173	8	8			23	715	0.03	23	715	0.03	4653	0.0	0.0	4656	0.0	0.0
33442	386	8	8			3	828	0.00	3	829	0.00	4664	0.0	0.0	4653	0.0	0.0
33443	302	8	8			2	811	0.00	2	812	0.00	4651	0.0	0.0	4652	0.0	0.0
33444	134	8	8			0	812	0.00	0	813	0.00	4612	0.0	0.0	4651	0.0	0.0
33445	160	8	8			0	1,115	0.00	0	1,116	0.00	4665	0.0	0.0	7313	0.0	0.0
33446	208	8	8			1	1,293	0.00	1	1,294	0.00	4654	0.0	0.0	4665	0.0	0.0
33447	164	8	8			0	1,257	0.00	0	1,259	0.00	4678	0.0	0.0	4654	0.0	0.0
33448	111	8	8			0	998	0.00	0	999	0.00	4616	0.0	0.0	4654	0.0	0.0
33449	128	8	8			0	674	0.00	0	676	0.00	4633	0.0	0.0	4632	0.0	0.0
33450	242	8	8			0	614	0.00	0	615	0.00	4617	0.0	0.0	7147	0.0	0.0
33451	197	8	8			126	933	0.14	126	934	0.14	4639	0.0	0.0	4638	0.0	0.0
33452	65	8	8			117	737	0.16	117	738	0.16	4667	0.0	0.0	4639	0.0	0.0
33453	93	8	8			117	1,022	0.11	117	1,024	0.11	4641	0.0	0.0	4640	0.0	0.0
33454	321	8	8			115	801	0.14	115	802	0.14	4645	0.0	0.0	4642	0.0	0.0
33455	437	8	8			5	1,114	0.00	5	1,115	0.00	4643	0.0	0.0	7314	0.0	0.0
33456	344	8	8			22	994	0.02	22	994	0.02	4636	0.0	0.0	4637	0.0	0.0
33457	475	8	8			22	1,256	0.02	22	1,258	0.02	4668	0.0	0.0	4636	0.0	0.0
33458	93	8	8			1	1,170	0.00	1	1,172	0.00	7560	0.0	0.0	4668	0.0	0.0
33459	427	8	8			1	1,278	0.00	1	1,280	0.00	4620	0.0	0.0	7560	0.0	0.0
33460	197	8	8			7	1,990	0.00	7	1,992	0.00	4626	0.0	0.0	4668	0.0	0.0
33461	68	8	8			7	403	0.02	7	403	0.02	4669	0.0	0.0	4626	0.0	0.0
33462	237	8	8			6	1,567	0.00	6	1,570	0.00	7312	0.0	0.0	4669	0.0	0.0
33463	205	8	8			13	1,863	0.01	13	1,865	0.01	4634	0.0	0.0	4666	0.0	0.0
33464	306	8	8			3	1,508	0.00	3	1,509	0.00	4627	0.0	0.0	4635	0.0	0.0
33465	252	8	8			3	1,460	0.00	3	1,462	0.00	4628	0.0	0.0	4627	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33466	343	8	8			8	2,072	0.00	8	2,075	0.00	4618	0.0	0.0	4670	0.0	0.0
33467	357	8	8			8	1,606	0.01	8	1,608	0.01	4671	0.0	0.0	4618	0.0	0.0
33468	65	8	8			0	612	0.00	0	613	0.00	4613	0.0	0.0	4671	0.0	0.0
33469	107	8	8			8	1,169	0.01	8	1,170	0.01	4672	0.0	0.0	4671	0.0	0.0
33471	86	8	8			56	356	0.16	56	356	0.16	7068	0.0	0.0	4658	0.0	0.0
33472	202	8	8			56	1,119	0.05	56	1,121	0.05	4659	0.0	0.0	7068	0.0	0.0
33473	137	8	8			0	270	0.00	0	271	0.00	4614	0.0	0.0	4659	0.0	0.0
33474	160	8	8			49	343	0.14	49	344	0.14	4660	0.0	0.0	4659	0.0	0.0
33475	88	8	8			48	301	0.16	48	301	0.16	4661	0.0	0.0	4660	0.0	0.0
33476	365	8	8			7	1,923	0.00	7	1,926	0.00	4679	0.0	0.0	4699	0.0	0.0
33477	227	8	8			0	542	0.00	0	543	0.00	7562	0.0	0.0	4679	0.0	0.0
33478	104	8	8			5	865	0.01	5	865	0.01	4680	0.0	0.0	4681	0.0	0.0
33479	214	8	8			5	1,138	0.00	5	1,140	0.00	4681	0.0	0.0	4682	0.0	0.0
33480	221	8	8			7	1,763	0.00	7	1,765	0.00	4682	0.0	0.0	4683	0.0	0.0
33481	396	8	8			7	1,747	0.00	7	1,749	0.00	4683	0.0	0.0	7148	0.0	0.0
33482	232	8	8			11	1,186	0.01	11	1,188	0.01	4696	0.0	0.0	4688	0.0	0.0
33483	96	8	8			11	1,859	0.01	11	1,861	0.01	4688	0.0	0.0	7411	0.0	0.0
33484	284	8	8			11	1,813	0.01	11	1,815	0.01	4697	0.0	0.0	4686	0.0	0.0
33485	171	8	8			1	1,280	0.00	1	1,282	0.00	4698	0.0	0.0	4687	0.0	0.0
33486	78	8	8			7	1,028	0.01	7	1,029	0.01	4685	0.0	0.0	4686	0.0	0.0
33487	303	8	8			13	1,503	0.01	13	1,506	0.01	4693	0.0	0.0	4692	0.0	0.0
33488	376	8	8			7	1,755	0.00	7	1,757	0.00	4699	0.0	0.0	4693	0.0	0.0
33489	160	8	8			0	2,021	0.00	0	2,024	0.00	7690	0.0	0.0	4699	0.0	0.0
33490	343	8	8			8	1,178	0.01	8	1,180	0.01	4695	0.0	0.0	7563	0.0	0.0
33491	385	8	8			8	1,236	0.01	8	1,238	0.01	7148	0.0	0.0	4695	0.0	0.0
33493	130	8	8			0	13	0.00	0	13	0.00	4690	0.0	0.0	7315	0.0	0.0
33494	193	8	8			1	1,640	0.00	1	1,642	0.00	4689	0.0	0.0	4690	0.0	0.0
33495	235	8	8			1	1,365	0.00	1	1,367	0.00	4684	0.0	0.0	4689	0.0	0.0
33496	230	8	8			31	1,376	0.02	31	1,378	0.02	4725	0.0	0.0	4724	0.0	0.0
33497	116	8	8			56	1,131	0.05	56	1,132	0.05	4724	0.0	0.0	4755	0.0	0.0
33498	300	8	8			25	1,282	0.02	25	1,283	0.02	4723	0.0	0.0	4724	0.0	0.0
33499	349	8	8			56	1,435	0.04	56	1,438	0.04	4755	0.0	0.0	4756	0.0	0.0
33500	402	8	8			66	809	0.08	66	810	0.08	4757	0.0	0.0	4759	0.0	0.0
33501	53	8	8			66	1,473	0.04	66	1,475	0.04	4759	0.0	0.0	4758	0.0	0.0
33502	39	8	8			112	1,475	0.08	112	1,476	0.08	4758	0.0	0.0	4772	0.0	0.0
33503	280	8	8			2	1,250	0.00	2	1,251	0.00	4773	0.0	0.0	7071	0.0	0.0
33504	345	8	8			245	1,317	0.19	245	1,319	0.19	4731	0.0	0.0	7317	0.0	0.0
33505	198	8	8			337	819	0.41	337	819	0.41	7317	0.0	0.0	4753	0.0	0.0
33506	350	8	8			58	1,535	0.04	58	1,537	0.04	4752	0.0	0.0	4774	0.0	0.0
33507	239	8	8			48	1,683	0.03	48	1,685	0.03	4729	0.0	0.0	4751	0.0	0.0
33508	227	8	8			48	1,052	0.05	48	1,053	0.05	4728	0.0	0.0	4729	0.0	0.0
33509	35	8	8			17	527	0.03	17	528	0.03	4730	0.0	0.0	4728	0.0	0.0
33510	97	8	8			17	531	0.03	17	532	0.03	7316	0.0	0.0	4730	0.0	0.0
33511	88	8	12	34	2036	406	476	0.85	406	476	0.85	4749	0.0	0.0	4775	0.0	0.0
33512	70	8	12	34	2036	407	628	0.65	407	629	0.65	4775	0.0	0.0	4745	0.0	0.0
33513	118	8	12	34	2036	407	604	0.67	407	605	0.67	4745	0.0	0.0	4748	0.0	0.0
33514	167	8	8			0	1,633	0.00	0	1,635	0.00	4750	0.0	0.0	4745	0.0	0.0
33515	148	8	8			1	1,438	0.00	1	1,440	0.00	4701	0.0	0.0	4750	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33516	259	8	8			3	1,594	0.00	3	1,597	0.00	4760	0.0	0.0	4749	0.0	0.0
33517	122	8	8			3	1,909	0.00	3	1,912	0.00	7565	0.0	0.0	4760	0.0	0.0
33518	253	8	8			3	1,810	0.00	3	1,813	0.00	4721	0.0	0.0	7565	0.0	0.0
33520	95	8	8			5	2,147	0.00	5	2,150	0.00	4794	0.0	0.0	4715	0.0	0.0
33521	105	8	8			5	2,038	0.00	5	2,041	0.00	4715	0.0	0.0	4716	0.0	0.0
33522	100	8	8			11	1,267	0.01	11	1,269	0.01	4716	0.0	0.0	4732	0.0	0.0
33523	260	8	8			11	1,899	0.01	11	1,901	0.01	4732	0.0	0.0	4754	0.0	0.0
33524	152	8	8			76	512	0.15	76	513	0.15	4754	0.0	0.0	4793	0.0	0.0
33525	91	8	8			0	1,482	0.00	0	1,484	0.00	4713	0.0	0.0	4733	0.0	0.0
33526	75	8	8			0	642	0.00	0	643	0.00	4712	0.0	0.0	4733	0.0	0.0
33527	152	8	8			2	1,734	0.00	2	1,737	0.00	4733	0.0	0.0	4734	0.0	0.0
33528	111	8	8			0	1,428	0.00	0	1,430	0.00	4711	0.0	0.0	4734	0.0	0.0
33529	74	8	8			2	1,589	0.00	2	1,591	0.00	4734	0.0	0.0	4735	0.0	0.0
33530	148	8	8			0	829	0.00	0	830	0.00	4710	0.0	0.0	4735	0.0	0.0
33531	163	8	8			7	1,431	0.00	7	1,433	0.00	4735	0.0	0.0	4736	0.0	0.0
33532	85	8	8			0	712	0.00	0	713	0.00	4709	0.0	0.0	4736	0.0	0.0
33533	220	8	8			8	713	0.01	8	714	0.01	4736	0.0	0.0	4793	0.0	0.0
33534	219	8	8			84	1,224	0.07	84	1,225	0.07	4793	0.0	0.0	4791	0.0	0.0
33535	55	6	6			0	850	0.00	0	850	0.00	4708	0.0	0.0	4792	0.0	0.0
33536	364	8	8			0	298	0.00	0	298	0.00	4792	0.0	0.0	4791	0.0	0.0
33537	100	8	8			84	730	0.12	84	731	0.12	4791	0.0	0.0	7317	0.0	0.0
33538	275	6	6			0	793	0.00	0	793	0.00	7318	0.0	0.0	4790	0.0	0.0
33539	225	8	8			1	866	0.00	1	867	0.00	4770	0.0	0.0	4771	0.0	0.0
33540	150	8	8			26	1,742	0.01	26	1,745	0.01	4771	0.0	0.0	4769	0.0	0.0
33541	59	8	8			26	1,117	0.02	26	1,119	0.02	4769	0.0	0.0	7072	0.0	0.0
33542	198	8	8			26	1,074	0.02	26	1,075	0.02	7072	0.0	0.0	4768	0.0	0.0
33543	174	8	8			26	1,331	0.02	26	1,332	0.02	4768	0.0	0.0	4767	0.0	0.0
33544	493	8	8			27	1,679	0.02	27	1,681	0.02	4767	0.0	0.0	4766	0.0	0.0
33545	93	8	8			48	1,884	0.03	48	1,887	0.03	4766	0.0	0.0	4765	0.0	0.0
33548	40	8	8			3	2,232	0.00	3	2,235	0.00	4737	0.0	0.0	4738	0.0	0.0
33549	140	8	8			0	1,407	0.00	0	1,409	0.00	4705	0.0	0.0	4739	0.0	0.0
33550	77	8	8			4	1,888	0.00	4	1,890	0.00	4739	0.0	0.0	4740	0.0	0.0
33551	122	8	8			4	1,994	0.00	4	1,997	0.00	4740	0.0	0.0	4787	0.0	0.0
33552	290	8	8			0	1,864	0.00	0	1,866	0.00	7566	0.0	0.0	4788	0.0	0.0
33553	218	8	8			417	1,205	0.35	417	1,207	0.35	4748	0.0	0.0	4789	0.0	0.0
33554	128	8	8			0	338	0.00	0	338	0.00	4704	0.0	0.0	4789	0.0	0.0
33555	319	8	8			417	1,232	0.34	417	1,233	0.34	4789	0.0	0.0	4747	0.0	0.0
33556	200	8	8			1	1,584	0.00	1	1,586	0.00	4788	0.0	0.0	4714	0.0	0.0
33557	147	8	8			10	822	0.01	10	824	0.01	4787	0.0	0.0	4714	0.0	0.0
33558	254	8	8			11	453	0.02	11	453	0.02	4714	0.0	0.0	4747	0.0	0.0
33559	256	8	8			428	1,253	0.34	428	1,254	0.34	4747	0.0	0.0	4743	0.0	0.0
33560	275	8	8			1	1,381	0.00	1	1,383	0.00	4786	0.0	0.0	4785	0.0	0.0
33561	185	8	8			10	1,040	0.01	10	1,042	0.01	4785	0.0	0.0	4717	0.0	0.0
33562	203	8	8			1	1,400	0.00	1	1,402	0.00	7070	0.0	0.0	4718	0.0	0.0
33563	148	8	8			0	1,074	0.00	0	1,076	0.00	4703	0.0	0.0	7070	0.0	0.0
33564	114	8	8			1	1,819	0.00	1	1,822	0.00	4702	0.0	0.0	7564	0.0	0.0
33565	265	8	8			0	687	0.00	0	688	0.00	7564	0.0	0.0	4784	0.0	0.0
33566	136	8	8			0	403	0.00	0	403	0.00	4744	0.0	0.0	4743	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33567	260	8	8			428	1,238	0.35	428	1,240	0.35	4743	0.0	0.0	4742	0.0	0.0
33568	189	10	10			36	581	0.06	36	581	0.06	4783	0.0	0.0	4741	0.0	0.0
33569	56	10	10			15	1,081	0.01	15	1,079	0.01	4719	0.0	0.0	4783	0.0	0.0
33570	46	10	10			15	1,096	0.01	15	1,094	0.01	4782	0.0	0.0	4719	0.0	0.0
33571	198	8	8			15	1,108	0.01	15	1,109	0.01	4781	0.0	0.0	4782	0.0	0.0
33572	242	8	8			15	1,253	0.01	15	1,256	0.01	4779	0.0	0.0	4781	0.0	0.0
33573	289	8	8			0	752	0.00	0	753	0.00	4780	0.0	0.0	4779	0.0	0.0
33574	180	8	8			9	1,642	0.01	9	1,644	0.01	4746	0.0	0.0	4779	0.0	0.0
33575	97	8	8			0	1,350	0.00	0	1,352	0.00	4778	0.0	0.0	4722	0.0	0.0
33576	312	8	8			0	647	0.00	0	648	0.00	4722	0.0	0.0	7412	0.0	0.0
33577	78	8	8			0	319	0.00	0	319	0.00	7412	0.0	0.0	4746	0.0	0.0
33578	220	8	8			9	1,384	0.01	9	1,386	0.01	4777	0.0	0.0	4746	0.0	0.0
33579	175	8	8			30	1,283	0.02	30	1,285	0.02	7319	0.0	0.0	4727	0.0	0.0
33580	313	8	8			15	1,681	0.01	15	1,683	0.01	7071	0.0	0.0	7149	0.0	0.0
33581	75	8	8			46	1,432	0.03	46	1,434	0.03	7149	0.0	0.0	4758	0.0	0.0
33582	255	8	8			2	540	0.00	2	541	0.00	4776	0.0	0.0	4762	0.0	0.0
33583	227	8	8			8	776	0.01	8	777	0.01	4762	0.0	0.0	4761	0.0	0.0
33584	321	8	8			3	757	0.00	3	758	0.00	4720	0.0	0.0	4721	0.0	0.0
33585	311	8	8			82	983	0.08	82	984	0.08	7073	0.0	0.0	4800	0.0	0.0
33586	91	8	8			82	631	0.13	82	631	0.13	4800	0.0	0.0	4801	0.0	0.0
33587	77	10	15	28	2036	504	336	1.50	504	336	1.50	4836	0.0	0.0	4802	0.0	0.0
33588	283	10	15	28	2036	585	578	1.01	585	577	1.01	4802	0.0	0.0	4838	6.6	6.6
33589	1	8	8			0	542	0.00	0	543	0.00	4803	0.0	0.0	4826	0.0	0.0
33590	65	8	8			86	420	0.20	86	421	0.20	4809	0.0	0.0	4434	0.0	0.0
33591	354	8	8			38	1,269	0.03	38	1,271	0.03	4810	0.0	0.0	4805	0.0	0.0
33592	354	8	8			39	1,085	0.04	39	1,087	0.04	4805	0.0	0.0	4806	0.0	0.0
33593	100	8	8			39	1,106	0.04	39	1,107	0.04	4806	0.0	0.0	4807	0.0	0.0
33594	54	8	8			39	665	0.06	39	665	0.06	4807	0.0	0.0	4808	0.0	0.0
33595	94	8	8			40	662	0.06	40	663	0.06	4808	0.0	0.0	7413	0.0	0.0
33596	234	8	8			86	665	0.13	86	665	0.13	7413	0.0	0.0	4809	0.0	0.0
33597	112	8	8			38	1,203	0.03	38	1,204	0.03	4826	0.0	0.0	4810	0.0	0.0
33598	400	8	8			1	1,397	0.00	1	1,399	0.00	4811	0.0	0.0	4831	0.0	0.0
33599	187	8	8			8	2,113	0.00	8	2,116	0.00	4827	0.0	0.0	4825	0.0	0.0
33600	201	8	8			9	1,453	0.01	9	1,456	0.01	4824	0.0	0.0	4812	0.0	0.0
33601	243	8	8			38	1,101	0.03	38	1,102	0.03	4812	0.0	0.0	4826	0.0	0.0
33603	181	8	8			1	1,506	0.00	1	1,508	0.00	4817	0.0	0.0	4819	0.0	0.0
33604	302	8	8			13	1,716	0.01	13	1,718	0.01	4819	0.0	0.0	7320	0.0	0.0
33605	144	8	8			0	553	0.00	0	554	0.00	4822	0.0	0.0	4818	0.0	0.0
33606	227	8	8			1	1,023	0.00	1	1,024	0.00	4818	0.0	0.0	4820	0.0	0.0
33607	119	8	8			1	2,039	0.00	1	2,042	0.00	4820	0.0	0.0	4819	0.0	0.0
33609	108	8	8			1	2,334	0.00	1	2,338	0.00	4814	0.0	0.0	4815	0.0	0.0
33610	87	8	8			1	2,315	0.00	1	2,319	0.00	4815	0.0	0.0	4823	0.0	0.0
33611	67	8	8			0	1,499	0.00	0	1,501	0.00	4823	0.0	0.0	4822	0.0	0.0
33612	438	10	15	28	2036	585	1,009	0.58	585	1,008	0.58	4839	0.0	0.0	4840	0.0	0.0
33613	400	10	15	28	2036	585	572	1.02	585	571	1.02	4838	6.6	6.6	4839	0.0	0.0
33614	119	10	15	28	2036	504	658	0.77	504	658	0.77	7568	0.0	0.0	4836	0.0	0.0
33615	185	8	8			504	1,264	0.40	504	1,265	0.40	4831	0.0	0.0	7568	0.0	0.0
33616	262	8	8			491	1,110	0.44	491	1,111	0.44	4830	0.0	0.0	7320	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33617	208	8	8			490	1,101	0.45	490	1,103	0.44	4821	0.0	0.0	4830	0.0	0.0
33618	60	8	8			19	1,342	0.01	19	1,343	0.01	4837	0.0	0.0	4821	0.0	0.0
33619	134	8	8			19	1,557	0.01	19	1,559	0.01	4832	0.0	0.0	4837	0.0	0.0
33620	214	8	8			19	1,049	0.02	19	1,051	0.02	4834	0.0	0.0	4832	0.0	0.0
33621	323	8	8			465	1,031	0.45	465	1,032	0.45	4833	0.0	0.0	4821	0.0	0.0
33622	163	8	8			1	1,848	0.00	1	1,851	0.00	4816	0.0	0.0	4835	0.0	0.0
33623	40	8	8			0	297	0.00	0	298	0.00	4845	0.0	0.0	4841	0.0	0.0
33624	320	8	8			93	1,191	0.08	93	1,192	0.08	4829	0.0	0.0	4828	0.0	0.0
33625	201	8	8			92	340	0.27	92	340	0.27	4842	0.0	0.0	4829	0.0	0.0
33626	257	8	8			1	644	0.00	1	645	0.00	4844	0.0	0.0	4843	0.0	0.0
33628	62	12	12			1	4,781	0.00	1	4,781	0.00	7820	0.0	0.0	4827	0.0	0.0
33629	466	8	8			30	1,650	0.02	30	1,652	0.02	4852	0.0	0.0	4867	0.0	0.0
33630	210	8	8			24	1,611	0.01	24	1,613	0.01	4856	0.0	0.0	4852	0.0	0.0
33631	205	8	8			24	1,388	0.02	24	1,390	0.02	4857	0.0	0.0	4856	0.0	0.0
33632	58	8	8			24	998	0.02	24	999	0.02	7151	0.0	0.0	4857	0.0	0.0
33633	60	8	8			0	1,386	0.00	0	1,388	0.00	4858	0.0	0.0	4857	0.0	0.0
33634	241	8	8			0	1,134	0.00	0	1,135	0.00	4868	0.0	0.0	4852	0.0	0.0
33635	289	8	8			0	1,083	0.00	0	1,085	0.00	4855	0.0	0.0	4868	0.0	0.0
33636	430	8	8			10	339	0.03	10	340	0.03	4863	0.0	0.0	4864	0.0	0.0
33637	253	8	8			10	301	0.03	10	302	0.03	4862	0.0	0.0	4863	0.0	0.0
33638	137	8	8			0	1,394	0.00	0	1,397	0.00	4853	0.0	0.0	4862	0.0	0.0
33639	205	8	8			1	2,501	0.00	1	2,504	0.00	4861	0.0	0.0	4862	0.0	0.0
33640	135	8	8			1	2,008	0.00	1	2,010	0.00	9301	0.0	0.0	4861	0.0	0.0
33641	298	8	8			17	2,037	0.01	17	2,040	0.01	4866	0.0	0.0	4865	0.0	0.0
33642	208	8	8			0	376	0.00	0	376	0.00	4870	0.0	0.0	7075	0.0	0.0
33643	100	8	8			0	1,805	0.00	0	1,808	0.00	4871	0.0	0.0	7321	0.0	0.0
33644	47	8	8			0	542	0.00	0	543	0.00	4872	0.0	0.0	7190	0.0	0.0
33646	500	10	10			683	2,267	0.30	683	2,264	0.30	4875	0.0	0.0	4876	0.0	0.0
33647	474	10	10			683	1,876	0.36	683	1,874	0.36	4874	0.0	0.0	4875	0.0	0.0
33648	514	12	15	39	ura	691	1,281	0.54	692	1,281	0.54	7322	0.0	0.0	4877	0.0	0.0
33649	478	10	10			691	2,382	0.29	691	2,379	0.29	4876	0.0	0.0	7322	0.0	0.0
33651	417	8	8			133	391	0.34	133	391	0.34	4891	0.0	0.0	4892	0.0	0.0
33652	115	8	8			133	524	0.25	133	525	0.25	4890	0.0	0.0	4891	0.0	0.0
33653	475	8	8			120	1,180	0.10	120	1,182	0.10	4889	0.0	0.0	4890	0.0	0.0
33654	343	8	8			68	1,114	0.06	68	1,115	0.06	4903	0.0	0.0	7323	0.0	0.0
33655	230	8	8			51	1,154	0.04	51	1,156	0.04	4904	0.0	0.0	4903	0.0	0.0
33657	87	8	8			42	1,720	0.02	42	1,722	0.02	7076	0.0	0.0	4905	0.0	0.0
33659	108	8	8			13	1,451	0.01	13	1,453	0.01	4906	0.0	0.0	7076	0.0	0.0
33660	216	8	8			13	1,951	0.01	13	1,954	0.01	4907	0.0	0.0	4906	0.0	0.0
33661	128	8	8			1	2,182	0.00	1	2,185	0.00	4908	0.0	0.0	4907	0.0	0.0
33662	155	8	8			0	1,974	0.00	0	1,976	0.00	7570	0.0	0.0	4908	0.0	0.0
33663	186	6	6			28	447	0.06	28	447	0.06	4882	0.0	0.0	7076	0.0	0.0
33664	343	8	8			10	1,142	0.01	10	1,144	0.01	4909	0.0	0.0	11202	0.0	0.0
33665	468	8	8			1	512	0.00	1	513	0.00	4886	0.0	0.0	4893	0.0	0.0
33666	429	8	8			31	415	0.08	31	415	0.08	4895	0.0	0.0	4893	0.0	0.0
33667	200	6	6			1	597	0.00	1	597	0.00	4894	0.0	0.0	4895	0.0	0.0
33668	31	8	8			31	528	0.06	31	528	0.06	4896	0.0	0.0	4895	0.0	0.0
33669	225	8	8			0	758	0.00	0	760	0.00	7692	0.0	0.0	4897	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33670	246	8	8			8	681	0.01	8	681	0.01	4910	0.0	0.0	4897	0.0	0.0
33671	60	8	8			0	415	0.00	0	416	0.00	4880	0.0	0.0	4910	0.0	0.0
33672	85	8	8			8	967	0.01	8	968	0.01	4911	0.0	0.0	4910	0.0	0.0
33674	110	8	8			0	1,278	0.00	0	1,280	0.00	4915	0.0	0.0	4911	0.0	0.0
33675	327	8	8			1	1,347	0.00	1	1,349	0.00	4884	0.0	0.0	4904	0.0	0.0
33676	133	8	8			9	963	0.01	9	964	0.01	4883	0.0	0.0	4902	0.0	0.0
33677	330	8	8			31	1,349	0.02	31	1,350	0.02	4887	0.0	0.0	4888	0.0	0.0
33678	390	8	8			31	1,604	0.02	31	1,606	0.02	4900	0.0	0.0	4887	0.0	0.0
33679	428	8	8			0	1,015	0.00	0	1,016	0.00	4899	0.0	0.0	4900	0.0	0.0
33680	103	8	8			7	357	0.02	7	358	0.02	4940	0.0	0.0	4916	0.0	0.0
33681	299	8	8			8	453	0.02	8	453	0.02	4994	0.0	0.0	7571	0.0	0.0
33682	282	8	8			68	1,533	0.04	68	1,535	0.04	4942	0.0	0.0	7571	0.0	0.0
33683	332	8	8			76	1,194	0.06	76	1,195	0.06	7571	0.0	0.0	4937	0.0	0.0
33684	239	8	8			8	1,746	0.00	8	1,748	0.00	4943	0.0	0.0	4937	0.0	0.0
33685	65	8	8			88	1,960	0.05	88	1,963	0.04	4937	0.0	0.0	4918	0.0	0.0
33686	273	8	8			88	1,042	0.08	88	1,043	0.08	4918	0.0	0.0	4984	0.0	0.0
33688	163	8	8			8	1,178	0.01	8	1,179	0.01	7693	0.0	0.0	4941	0.0	0.0
33689	405	8	8			8	1,512	0.01	8	1,514	0.01	4941	0.0	0.0	4942	0.0	0.0
33690	41	8	8			8	609	0.01	8	610	0.01	4944	0.0	0.0	4943	0.0	0.0
33692	324	8	8			89	653	0.14	89	653	0.14	4984	0.0	0.0	4936	0.0	0.0
33693	489	8	8			89	657	0.14	89	658	0.14	4936	0.0	0.0	4938	0.0	0.0
33694	154	8	8			8	1,302	0.01	8	1,304	0.01	4945	0.0	0.0	4944	0.0	0.0
33695	176	8	8			7	1,324	0.01	7	1,326	0.01	4946	0.0	0.0	4945	0.0	0.0
33696	333	8	8			1	1,204	0.00	1	1,206	0.00	4948	0.0	0.0	4946	0.0	0.0
33697	158	8	8			0	1,170	0.00	0	1,172	0.00	4919	0.0	0.0	4947	0.0	0.0
33698	216	8	8			59	617	0.10	59	617	0.10	4985	0.0	0.0	4942	0.0	0.0
33699	184	8	8			0	1,205	0.00	0	1,207	0.00	4920	0.0	0.0	4945	0.0	0.0
33700	70	8	8			0	563	0.00	0	564	0.00	4987	0.0	0.0	4986	0.0	0.0
33701	523	12	18	3	2036	1,162	1,400	0.83	1,162	1,400	0.83	4933	0.0	0.0	4952	0.0	0.0
33702	372	12	18	3	2036	1,163	1,278	0.91	1,163	1,278	0.91	4952	0.0	0.0	7574	0.0	0.0
33703	267	12	18	3	2036	1,163	1,463	0.79	1,163	1,463	0.79	7574	0.0	0.0	4950	0.0	0.0
33704	11	8	8			4	432	0.01	3	433	0.01	4949	0.0	0.0	4950	0.0	0.0
33705	127	8	8			1	483	0.00	1	483	0.00	7324	0.0	0.0	4949	0.0	0.0
33706	96	8	8			0	490	0.00	0	490	0.00	4921	0.0	0.0	7324	0.0	0.0
33707	82	12	18	3	2036	1,142	2,209	0.52	1,142	2,209	0.52	4963	0.0	0.0	4933	0.0	0.0
33708	500	8	8			22	463	0.05	22	464	0.05	4959	0.0	0.0	4933	0.0	0.0
33709	124	8	8			22	460	0.05	22	461	0.05	4934	0.0	0.0	4959	0.0	0.0
33710	118	8	8			0	988	0.00	0	989	0.00	4922	0.0	0.0	4953	0.0	0.0
33711	204	8	8			0	710	0.00	0	710	0.00	4923	0.0	0.0	4953	0.0	0.0
33712	273	12	18	3	2036	1,163	1,914	0.61	1,163	1,914	0.61	4950	0.0	0.0	4951	0.0	0.0
33713	155	8	8			134	431	0.31	134	431	0.31	4938	0.0	0.0	4972	0.0	0.0
33714	505	12	12			911	2,726	0.33	911	2,726	0.33	4972	0.0	0.0	4964	0.0	0.0
33715	245	12	18	3	2036	969	2,646	0.37	969	2,646	0.37	4964	0.0	0.0	4963	0.0	0.0
33716	57	8	8			47	465	0.10	47	466	0.10	7414	0.0	0.0	4964	0.0	0.0
33717	78	8	8			47	447	0.10	47	448	0.10	4965	0.0	0.0	7414	0.0	0.0
33718	192	8	8			46	467	0.10	46	468	0.10	4966	0.0	0.0	4965	0.0	0.0
33719	258	8	8			38	680	0.06	38	681	0.06	4988	0.0	0.0	4967	0.0	0.0
33720	189	8	8			38	921	0.04	38	922	0.04	7573	0.0	0.0	4988	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33721	118	12	12			190	2,385	0.08	190	2,385	0.08	4961	0.0	0.0	4963	0.0	0.0
33722	25	10	10			190	2,703	0.07	190	2,700	0.07	4962	0.0	0.0	4961	0.0	0.0
33723	78	8	8			190	1,210	0.16	190	1,212	0.16	4960	0.0	0.0	4962	0.0	0.0
33724	274	8	8			0	724	0.00	0	726	0.00	4954	0.0	0.0	4960	0.0	0.0
33725	497	8	8			178	1,112	0.16	178	1,113	0.16	4956	0.0	0.0	4960	0.0	0.0
33726	58	8	8			178	748	0.24	178	749	0.24	4955	0.0	0.0	4956	0.0	0.0
33727	555	8	8			171	961	0.18	171	963	0.18	4935	0.0	0.0	4955	0.0	0.0
33728	282	8	8			8	1,152	0.01	8	1,153	0.01	4970	0.0	0.0	4967	0.0	0.0
33729	180	8	8			6	814	0.01	6	815	0.01	4969	0.0	0.0	7573	0.0	0.0
33730	84	8	8			9	542	0.02	9	542	0.02	4968	0.0	0.0	7573	0.0	0.0
33731	114	8	8			8	465	0.02	8	466	0.02	4982	0.0	0.0	4968	0.0	0.0
33732	171	8	8			0	1,074	0.00	0	1,076	0.00	4924	0.0	0.0	7077	0.0	0.0
33733	148	8	8			1	1,056	0.00	1	1,057	0.00	4957	0.0	0.0	4958	0.0	0.0
33734	116	8	8			0	941	0.00	0	942	0.00	7191	0.0	0.0	4957	0.0	0.0
33735	177	8	8			0	494	0.00	0	494	0.00	4925	0.0	0.0	4957	0.0	0.0
33736	175	8	8			0	1,177	0.00	0	1,179	0.00	4927	0.0	0.0	4955	0.0	0.0
33737	507	12	12			789	3,050	0.26	789	3,050	0.26	4973	0.0	0.0	4972	0.0	0.0
33738	177	8	8			1	423	0.00	1	424	0.00	4974	0.0	0.0	4973	0.0	0.0
33739	110	8	8			1	804	0.00	1	805	0.00	4975	0.0	0.0	4974	0.0	0.0
33740	419	8	8			0	760	0.00	0	762	0.00	4977	0.0	0.0	4975	0.0	0.0
33741	412	8	8			8	1,264	0.01	8	1,265	0.01	4980	0.0	0.0	4981	0.0	0.0
33742	118	8	8			8	1,088	0.01	8	1,090	0.01	4978	0.0	0.0	4980	0.0	0.0
33743	70	8	8			8	1,188	0.01	8	1,189	0.01	4979	0.0	0.0	4978	0.0	0.0
33744	180	8	8			0	931	0.00	0	933	0.00	4929	0.0	0.0	4979	0.0	0.0
33745	96	8	8			8	937	0.01	8	938	0.01	4981	0.0	0.0	4982	0.0	0.0
33746	299	8	8			6	981	0.01	6	982	0.01	7325	0.0	0.0	4969	0.0	0.0
33747	193	8	8			0	1,346	0.00	0	1,348	0.00	4930	0.0	0.0	7325	0.0	0.0
33748	284	8	8			8	1,006	0.01	8	1,008	0.01	4976	0.0	0.0	4970	0.0	0.0
33749	190	8	8			0	987	0.00	0	988	0.00	4931	0.0	0.0	4976	0.0	0.0
33751	256	8	8			22	1,276	0.02	22	1,277	0.02	7900	0.0	0.0	4996	0.0	0.0
33752	450	8	8			39	1,326	0.03	39	1,328	0.03	4997	0.0	0.0	7326	0.0	0.0
33753	96	8	8			59	494	0.12	59	494	0.12	5007	0.0	0.0	5006	0.0	0.0
33754	91	8	8			58	1,063	0.05	58	1,064	0.05	5004	0.0	0.0	5007	0.0	0.0
33755	17	8	8			51	1,077	0.05	51	1,078	0.05	5003	0.0	0.0	5004	0.0	0.0
33756	164	8	8			51	433	0.12	51	434	0.12	7326	0.0	0.0	5003	0.0	0.0
33761	515	12	12			778	2,601	0.30	778	2,601	0.30	5000	0.0	0.0	4998	0.0	0.0
33762	217	12	12			778	2,192	0.36	778	2,192	0.36	7078	0.0	0.0	5000	0.0	0.0
33763	492	12	12			778	3,919	0.20	778	3,919	0.20	5001	0.0	0.0	7078	0.0	0.0
33765	485	8	8			33	870	0.04	33	871	0.04	5028	0.0	0.0	5077	0.0	0.0
33766	259	8	8			112	432	0.26	112	433	0.26	5078	0.0	0.0	5077	0.0	0.0
33767	57	8	8			111	738	0.15	111	740	0.15	5079	0.0	0.0	5078	0.0	0.0
33768	156	8	8			111	706	0.16	111	707	0.16	5057	0.0	0.0	5079	0.0	0.0
33769	342	8	8			110	694	0.16	110	696	0.16	5058	0.0	0.0	5057	0.0	0.0
33770	154	8	8			1	886	0.00	1	887	0.00	5056	0.0	0.0	5058	0.0	0.0
33771	159	8	8			0	1,752	0.00	0	1,754	0.00	5027	0.0	0.0	5056	0.0	0.0
33772	68	8	8			110	797	0.14	110	798	0.14	5059	0.0	0.0	5058	0.0	0.0
33773	91	8	8			0	729	0.00	0	730	0.00	7695	0.0	0.0	5059	0.0	0.0
33774	32	8	8			109	1,039	0.10	109	1,040	0.10	5080	0.0	0.0	7329	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33775	12	8	8			108	1,200	0.09	108	1,201	0.09	7152	0.0	0.0	5080	0.0	0.0
33776	296	8	8			44	1,029	0.04	44	1,031	0.04	7415	0.0	0.0	7152	0.0	0.0
33777	127	8	8			65	585	0.11	65	586	0.11	5055	0.0	0.0	7152	0.0	0.0
33778	310	8	8			39	851	0.05	39	852	0.05	7575	0.0	0.0	5055	0.0	0.0
33779	401	8	8			14	1,238	0.01	14	1,239	0.01	5029	0.0	0.0	7575	0.0	0.0
33780	170	6	6			1	563	0.00	1	563	0.00	5013	0.0	0.0	7328	0.0	0.0
33781	74	8	8			25	891	0.03	25	892	0.03	7328	0.0	0.0	5055	0.0	0.0
33782	455	8	8			13	1,358	0.01	13	1,360	0.01	5032	0.0	0.0	7328	0.0	0.0
33784	124	8	8			43	1,532	0.03	43	1,534	0.03	5053	0.0	0.0	7415	0.0	0.0
33785	226	8	8			1	1,340	0.00	1	1,342	0.00	5035	0.0	0.0	5054	0.0	0.0
33786	269	8	8			1	1,495	0.00	1	1,497	0.00	5052	0.0	0.0	5054	0.0	0.0
33787	140	8	8			1	1,799	0.00	1	1,801	0.00	5034	0.0	0.0	5052	0.0	0.0
33788	108	8	8			184	848	0.22	184	849	0.22	5081	0.0	0.0	7081	0.0	0.0
33789	204	8	8			185	675	0.27	185	676	0.27	7081	0.0	0.0	5082	0.0	0.0
33790	148	8	8			1	801	0.00	1	802	0.00	5062	0.0	0.0	7081	0.0	0.0
33791	87	8	8			1	891	0.00	1	892	0.00	5061	0.0	0.0	5062	0.0	0.0
33792	248	8	8			1	944	0.00	1	945	0.00	5060	0.0	0.0	5061	0.0	0.0
33793	360	6	6			1	490	0.00	1	490	0.00	5083	0.0	0.0	5082	0.0	0.0
33794	212	8	8			219	740	0.30	219	741	0.30	5082	0.0	0.0	5063	0.0	0.0
33795	503	8	8			1	1,127	0.00	1	1,128	0.00	5064	0.0	0.0	5063	0.0	0.0
33796	180	6	6			0	265	0.00	0	265	0.00	5016	0.0	0.0	5064	0.0	0.0
33797	307	8	8			1	1,372	0.00	1	1,373	0.00	5084	0.0	0.0	5064	0.0	0.0
33798	88	8	8			1	1,932	0.00	1	1,935	0.00	5065	0.0	0.0	5084	0.0	0.0
33799	313	8	8			1	1,665	0.00	1	1,667	0.00	7577	0.0	0.0	5065	0.0	0.0
33800	300	8	8			0	1,514	0.00	0	1,516	0.00	7578	0.0	0.0	5070	0.0	0.0
33801	501	8	8			242	369	0.65	242	370	0.65	5085	0.0	0.0	5072	0.0	0.0
33802	413	8	8			51	816	0.06	51	817	0.06	5071	0.0	0.0	5072	0.0	0.0
33803	525	8	8			1	663	0.00	1	664	0.00	5070	0.0	0.0	5071	0.0	0.0
33804	217	8	8			24	964	0.02	24	965	0.02	5069	0.0	0.0	5071	0.0	0.0
33805	305	8	8			24	1,471	0.02	24	1,473	0.02	7080	0.0	0.0	5069	0.0	0.0
33806	200	8	8			1	1,133	0.00	1	1,135	0.00	5068	0.0	0.0	7080	0.0	0.0
33807	348	8	8			0	373	0.00	0	373	0.00	5067	0.0	0.0	5068	0.0	0.0
33808	215	8	8			0	1,747	0.00	0	1,749	0.00	5066	0.0	0.0	7080	0.0	0.0
33809	218	8	8			292	270	1.08	292	270	1.08	5072	0.0	0.0	5086	0.0	0.0
33810	261	8	8			293	371	0.79	293	372	0.79	5086	0.0	0.0	5087	0.0	0.0
33811	16	8	8			294	749	0.39	294	750	0.39	5074	0.0	0.0	5073	0.0	0.0
33812	310	8	8			60	1,066	0.06	60	1,067	0.06	5088	0.0	0.0	5073	0.0	0.0
33813	270	8	8			1	1,066	0.00	1	1,067	0.00	5089	0.0	0.0	5088	0.0	0.0
33814	211	8	8			0	362	0.00	0	363	0.00	5017	0.0	0.0	5075	0.0	0.0
33815	72	8	8			17	979	0.02	17	981	0.02	5091	0.0	0.0	5090	0.0	0.0
33816	486	8	8			0	1,168	0.00	0	1,169	0.00	5076	0.0	0.0	5091	0.0	0.0
33817	359	8	8			8	981	0.01	8	982	0.01	5092	0.0	0.0	5051	0.0	0.0
33818	350	8	8			8	1,481	0.01	8	1,483	0.01	5093	0.0	0.0	5092	0.0	0.0
33819	117	8	8			0	643	0.00	0	644	0.00	5019	0.0	0.0	5094	0.0	0.0
33820	135	8	8			8	398	0.02	8	399	0.02	5051	0.0	0.0	5050	0.0	0.0
33821	340	8	8			10	1,605	0.01	10	1,607	0.01	5048	0.0	0.0	5049	0.0	0.0
33822	121	8	8			1	2,111	0.00	1	2,114	0.00	7079	0.0	0.0	5048	0.0	0.0
33823	297	8	8			10	1,583	0.01	10	1,585	0.01	5095	0.0	0.0	7576	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33824	300	8	8			10	1,636	0.01	10	1,639	0.01	5047	0.0	0.0	5095	0.0	0.0
33825	100	8	8			0	1,806	0.00	0	1,808	0.00	5122	0.0	0.0	5047	0.0	0.0
33826	170	8	8			27	496	0.05	27	497	0.05	7327	0.0	0.0	7576	0.0	0.0
33827	305	8	8			9	694	0.01	9	694	0.01	5046	0.0	0.0	7327	0.0	0.0
33828	190	8	8			8	1,539	0.01	8	1,541	0.01	5045	0.0	0.0	5046	0.0	0.0
33829	406	8	8			0	899	0.00	0	899	0.00	5121	0.0	0.0	5096	0.0	0.0
33830	193	8	8			7	1,501	0.00	7	1,503	0.00	5097	0.0	0.0	5045	0.0	0.0
33831	124	8	8			7	993	0.01	7	994	0.01	5098	0.0	0.0	5097	0.0	0.0
33832	113	8	8			7	988	0.01	7	989	0.01	5099	0.0	0.0	5098	0.0	0.0
33833	141	8	8			0	423	0.00	0	424	0.00	5119	0.0	0.0	5046	0.0	0.0
33834	185	8	8			19	963	0.02	19	965	0.02	5101	0.0	0.0	5100	0.0	0.0
33835	250	8	8			1	1,382	0.00	1	1,383	0.00	5102	0.0	0.0	5101	0.0	0.0
33836	190	8	8			1	924	0.00	1	925	0.00	5103	0.0	0.0	5102	0.0	0.0
33837	234	8	8			13	1,561	0.01	13	1,563	0.01	5104	0.0	0.0	5029	0.0	0.0
33838	133	6	6			13	871	0.01	13	871	0.01	5030	0.0	0.0	5104	0.0	0.0
33839	165	6	6			0	788	0.00	0	788	0.00	5020	0.0	0.0	5030	0.0	0.0
33840	115	8	8			1	1,842	0.00	1	1,844	0.00	5031	0.0	0.0	5032	0.0	0.0
33841	143	6	6			1	1,179	0.00	1	1,179	0.00	5021	0.0	0.0	5031	0.0	0.0
33842	182	8	8			1	455	0.00	1	456	0.00	5105	0.0	0.0	5032	0.0	0.0
33844	200	8	8			1	1,817	0.00	1	1,819	0.00	5036	0.0	0.0	5035	0.0	0.0
33845	105	8	8			0	1,698	0.00	0	1,701	0.00	5037	0.0	0.0	5036	0.0	0.0
33846	167	6	6			0	211	0.00	0	211	0.00	5022	0.0	0.0	5033	0.0	0.0
33847	385	6	6			13	490	0.03	13	490	0.03	5040	0.0	0.0	5041	0.0	0.0
33848	76	6	6			1	533	0.00	1	533	0.00	5117	0.0	0.0	5040	0.0	0.0
33849	165	6	6			1	416	0.00	1	416	0.00	5108	0.0	0.0	5040	0.0	0.0
33850	75	6	6			1	225	0.01	1	225	0.01	5109	0.0	0.0	5108	0.0	0.0
33851	165	6	6			1	624	0.00	1	624	0.00	5039	0.0	0.0	5109	0.0	0.0
33852	82	6	6			1	292	0.00	1	292	0.00	5038	0.0	0.0	5039	0.0	0.0
33853	239	6	6			1	382	0.00	1	382	0.00	5023	0.0	0.0	5042	0.0	0.0
33854	238	6	6			1	349	0.00	1	349	0.00	5024	0.0	0.0	5043	0.0	0.0
33855	215	8	8			1	1,114	0.00	1	1,115	0.00	5044	0.0	0.0	5043	0.0	0.0
33856	165	6	6			1	504	0.00	1	504	0.00	5025	0.0	0.0	5044	0.0	0.0
33857	308	6	6			1	428	0.00	1	428	0.00	5026	0.0	0.0	5110	0.0	0.0
33858	32	6	6			0	216	0.00	0	216	0.00	5114	0.0	0.0	5030	0.0	0.0
33861	396	8	8			442	863	0.51	442	864	0.51	5181	0.0	0.0	5158	0.0	0.0
33862	352	8	8			442	953	0.46	442	955	0.46	5182	0.0	0.0	5181	0.0	0.0
33863	508	8	12	15	Existing	410	372	1.10	410	1,095	0.37	5145	2.3	0.0	5182	0.0	0.0
33864	403	8	8			54	1,596	0.03	54	1,598	0.03	5146	0.0	0.0	5145	2.3	0.0
33865	409	8	8			54	371	0.15	54	372	0.15	5231	0.0	0.0	5146	0.0	0.0
33866	175	8	8			1	1,500	0.00	1	1,502	0.00	5126	0.0	0.0	5231	0.0	0.0
33867	230	8	8			30	369	0.08	30	370	0.08	5144	0.0	0.0	5231	0.0	0.0
33868	73	8	8			1	963	0.00	1	965	0.00	5148	0.0	0.0	5144	0.0	0.0
33869	165	6	6			1	824	0.00	1	824	0.00	5128	0.0	0.0	5149	0.0	0.0
33870	78	8	8			1	584	0.00	1	585	0.00	5149	0.0	0.0	5148	0.0	0.0
33871	462	8	8			23	888	0.03	23	889	0.03	5160	0.0	0.0	5158	0.0	0.0
33872	370	8	8			22	1,188	0.02	22	1,190	0.02	5159	0.0	0.0	5160	0.0	0.0
33873	178	8	8			32	825	0.04	32	826	0.04	7580	0.0	0.0	7082	0.0	0.0
33874	175	8	8			0	861	0.00	0	863	0.00	5173	0.0	0.0	7580	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33875	254	8	8			1	2,124	0.00	1	2,126	0.00	5130	0.0	0.0	5183	0.0	0.0
33876	447	8	8			465	1,083	0.43	465	1,084	0.43	5158	0.0	0.0	5153	0.0	0.0
33877	50	8	8			559	695	0.80	559	697	0.80	5152	0.0	0.0	8987	0.0	0.0
33878	311	8	8			79	408	0.19	79	408	0.19	5154	0.0	0.0	5153	0.0	0.0
33879	105	8	8			0	473	0.00	0	474	0.00	5201	0.0	0.0	5154	0.0	0.0
33880	353	8	8			1	1,223	0.00	1	1,224	0.00	7579	0.0	0.0	5154	0.0	0.0
33881	155	8	8			65	967	0.07	65	969	0.07	5202	0.0	0.0	5154	0.0	0.0
33882	119	8	8			1	1,720	0.00	1	1,722	0.00	5137	0.0	0.0	5202	0.0	0.0
33883	65	8	8			64	399	0.16	64	400	0.16	5203	0.0	0.0	5202	0.0	0.0
33884	160	8	8			63	1,159	0.05	63	1,160	0.05	5156	0.0	0.0	5203	0.0	0.0
33885	78	8	8			1	2,477	0.00	1	2,481	0.00	5157	0.0	0.0	5156	0.0	0.0
33886	167	8	8			1	928	0.00	1	930	0.00	5132	0.0	0.0	5157	0.0	0.0
33887	41	6	6			0	824	0.00	0	824	0.00	5131	0.0	0.0	5132	0.0	0.0
33888	36	8	8			63	563	0.11	63	563	0.11	5155	0.0	0.0	5156	0.0	0.0
33889	165	8	8			1	1,440	0.00	1	1,442	0.00	5133	0.0	0.0	5155	0.0	0.0
33890	44	8	8			1	1,415	0.00	1	1,417	0.00	5134	0.0	0.0	8641	0.0	0.0
33891	57	8	8			1	419	0.00	1	419	0.00	5135	0.0	0.0	5134	0.0	0.0
33892	100	6	6			0	686	0.00	0	686	0.00	7696	0.0	0.0	5135	0.0	0.0
33893	262	8	8			1	370	0.00	1	371	0.00	5191	0.0	0.0	7580	0.0	0.0
33894	126	8	8			15	1,034	0.01	15	1,035	0.01	5185	0.0	0.0	5184	0.0	0.0
33895	69	8	8			8	988	0.01	8	990	0.01	5186	0.0	0.0	5185	0.0	0.0
33896	184	8	8			8	1,245	0.01	8	1,247	0.01	5187	0.0	0.0	5186	0.0	0.0
33897	165	8	8			0	743	0.00	0	744	0.00	5188	0.0	0.0	5187	0.0	0.0
33898	120	8	8			1	1,287	0.00	1	1,289	0.00	5189	0.0	0.0	5187	0.0	0.0
33899	236	8	8			0	1,340	0.00	0	1,342	0.00	5190	0.0	0.0	5189	0.0	0.0
33900	297	8	8			6	715	0.01	6	716	0.01	7084	0.0	0.0	5200	0.0	0.0
33901	251	8	8			6	1,394	0.00	6	1,397	0.00	5150	0.0	0.0	7084	0.0	0.0
33902	271	8	8			19	593	0.03	19	594	0.03	5199	0.0	0.0	5198	0.0	0.0
33903	270	8	8			20	836	0.02	20	838	0.02	5198	0.0	0.0	5197	0.0	0.0
33904	282	8	8			42	369	0.11	42	369	0.11	5194	0.0	0.0	5197	0.0	0.0
33905	335	8	8			1	1,296	0.00	1	1,298	0.00	5193	0.0	0.0	5194	0.0	0.0
33906	85	8	8			1	724	0.00	1	725	0.00	7416	0.0	0.0	5193	0.0	0.0
33907	145	8	8			1	1,165	0.00	1	1,167	0.00	5192	0.0	0.0	7416	0.0	0.0
33908	145	8	8			1	1,803	0.00	1	1,806	0.00	5136	0.0	0.0	5192	0.0	0.0
33909	368	8	8			15	809	0.02	15	810	0.02	5196	0.0	0.0	5195	0.0	0.0
33910	275	8	8			0	1,661	0.00	0	1,663	0.00	7581	0.0	0.0	5196	0.0	0.0
33911	244	8	8			0	875	0.00	0	876	0.00	5204	0.0	0.0	5196	0.0	0.0
33912	115	8	8			1	1,297	0.00	1	1,299	0.00	5217	0.0	0.0	5219	0.0	0.0
33913	284	8	8			1	1,328	0.00	1	1,331	0.00	7333	0.0	0.0	5217	0.0	0.0
33914	238	8	8			0	1,401	0.00	0	1,402	0.00	5218	0.0	0.0	7333	0.0	0.0
33915	144	8	8			265	422	0.63	265	422	0.63	5180	0.0	0.0	5220	0.0	0.0
33916	297	8	8			228	875	0.26	228	876	0.26	5212	0.0	0.0	5180	0.0	0.0
33917	155	6	6			0	533	0.00	0	533	0.00	5239	0.0	0.0	5213	0.0	0.0
33918	69	8	8			228	1,154	0.20	228	1,156	0.20	5214	0.0	0.0	5213	0.0	0.0
33919	225	8	8			16	1,151	0.01	16	1,153	0.01	7085	0.0	0.0	5214	0.0	0.0
33920	132	8	8			1	1,536	0.00	1	1,538	0.00	5215	0.0	0.0	7085	0.0	0.0
33921	165	8	8			0	1,002	0.00	0	1,003	0.00	5234	0.0	0.0	5215	0.0	0.0
33922	326	8	8			1	1,143	0.00	1	1,144	0.00	7192	0.0	0.0	7085	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33923	126	8	8			1	1,471	0.00	1	1,473	0.00	5216	0.0	0.0	7192	0.0	0.0
33924	87	8	8			0	891	0.00	0	892	0.00	5244	0.0	0.0	5216	0.0	0.0
33925	140	8	8			211	1,298	0.16	211	1,299	0.16	5211	0.0	0.0	5214	0.0	0.0
33926	160	8	8			22	1,143	0.02	22	1,144	0.02	5178	0.0	0.0	5211	0.0	0.0
33927	196	8	8			1	677	0.00	1	678	0.00	5206	0.0	0.0	7332	0.0	0.0
33928	147	8	8			1	1,005	0.00	1	1,006	0.00	5205	0.0	0.0	5206	0.0	0.0
33929	179	8	8			190	1,145	0.17	190	1,147	0.17	5210	0.0	0.0	5211	0.0	0.0
33930	177	8	8			1	375	0.00	1	375	0.00	5208	0.0	0.0	5209	0.0	0.0
33933	242	8	8			1	1,708	0.00	1	1,710	0.00	5207	0.0	0.0	5208	0.0	0.0
33934	75	8	8			0	678	0.00	0	679	0.00	5237	0.0	0.0	5207	0.0	0.0
33935	213	8	8			35	1,154	0.03	35	1,156	0.03	7582	0.0	0.0	5180	0.0	0.0
33936	265	8	8			35	1,158	0.03	35	1,160	0.03	5179	0.0	0.0	7582	0.0	0.0
33937	103	8	8			15	1,550	0.01	15	1,552	0.01	5184	0.0	0.0	5179	0.0	0.0
33938	300	8	8			40	1,270	0.03	40	1,272	0.03	5176	0.0	0.0	7083	0.0	0.0
33939	375	8	8			40	1,255	0.03	40	1,257	0.03	5177	0.0	0.0	5176	0.0	0.0
33940	257	8	8			2	1,282	0.00	2	1,283	0.00	5169	0.0	0.0	5177	0.0	0.0
33941	400	8	8			2	1,122	0.00	2	1,124	0.00	5171	0.0	0.0	5169	0.0	0.0
33942	226	8	8			1	737	0.00	1	738	0.00	5172	0.0	0.0	5171	0.0	0.0
33943	305	8	8			37	697	0.05	37	698	0.05	5222	0.0	0.0	5166	0.0	0.0
33944	360	8	8			23	1,146	0.02	23	1,147	0.02	5170	0.0	0.0	5222	0.0	0.0
33945	28	8	8			23	1,524	0.02	23	1,526	0.02	5223	0.0	0.0	5170	0.0	0.0
33946	317	8	8			22	1,080	0.02	22	1,081	0.02	5224	0.0	0.0	5223	0.0	0.0
33947	138	8	8			0	1,317	0.00	0	1,319	0.00	5238	0.0	0.0	5223	0.0	0.0
33948	163	8	8			22	765	0.03	22	766	0.03	5165	0.0	0.0	5166	0.0	0.0
33949	235	6	6			0	324	0.00	0	324	0.00	5141	0.0	0.0	5165	0.0	0.0
33950	171	8	8			1	1,417	0.00	1	1,419	0.00	5164	0.0	0.0	5165	0.0	0.0
33951	230	6	6			1	1,021	0.00	1	1,021	0.00	5221	0.0	0.0	5164	0.0	0.0
33952	103	6	6			0	503	0.00	0	503	0.00	5242	0.0	0.0	5221	0.0	0.0
33953	198	8	8			113	1,453	0.08	113	1,455	0.08	5225	0.0	0.0	5166	0.0	0.0
33954	218	8	8			113	1,157	0.10	113	1,159	0.10	5168	0.0	0.0	5225	0.0	0.0
33955	120	8	8			1	465	0.00	1	465	0.00	5167	0.0	0.0	5168	0.0	0.0
33956	117	8	8			1	1,756	0.00	1	1,758	0.00	5229	0.0	0.0	5226	0.0	0.0
33958	115	8	8			1	1,656	0.00	1	1,658	0.00	5230	0.0	0.0	5229	0.0	0.0
33959	173	6	6			0	669	0.00	0	669	0.00	5233	0.0	0.0	5230	0.0	0.0
33960	373	8	8			92	933	0.10	92	935	0.10	7331	0.0	0.0	5168	0.0	0.0
33961	63	8	8			92	1,272	0.07	92	1,274	0.07	5143	0.0	0.0	7331	0.0	0.0
33962	123	8	8			91	1,058	0.09	91	1,060	0.09	5227	0.0	0.0	5143	0.0	0.0
33963	196	6	6			1	239	0.00	1	239	0.00	7086	0.0	0.0	5227	0.0	0.0
33964	148	8	8			75	706	0.11	75	708	0.11	5142	0.0	0.0	5227	0.0	0.0
33965	155	8	8			37	389	0.09	37	390	0.09	5228	0.0	0.0	5142	0.0	0.0
33967	216	8	8			1	592	0.00	1	593	0.00	5274	0.0	0.0	5275	0.0	0.0
33968	195	8	8			1	592	0.00	1	592	0.00	5275	0.0	0.0	5276	0.0	0.0
33969	268	8	8			67	713	0.09	67	715	0.09	5276	0.0	0.0	5277	0.0	0.0
33970	226	8	8			68	887	0.08	68	888	0.08	5277	0.0	0.0	5278	0.0	0.0
33971	202	8	8			69	1,094	0.06	69	1,095	0.06	5278	0.0	0.0	5279	1.6	0.0
33972	138	8	8			71	294	0.24	69	294	0.24	5279	1.6	0.0	5280	1.3	0.0
33973	322	8	15	19	Existing	553	467	1.19	638	2,493	0.26	5280	1.3	0.0	5273	0.0	0.0
33974	201	8	15	19	Existing	520	365	1.43	640	1,949	0.33	5273	0.0	0.0	5272	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33975	254	8	8			1	808	0.00	1	809	0.00	5309	0.0	0.0	5273	0.0	0.0
33976	86	8	12	19	Existing	493	296	1.67	567	872	0.65	5281	0.0	0.0	5280	1.3	0.0
33977	180	8	12	19	Existing	399	488	0.82	417	1,439	0.29	5288	0.0	0.0	5281	0.0	0.0
33978	205	8	8			416	1,015	0.41	416	1,017	0.41	5289	0.0	0.0	5288	0.0	0.0
33979	380	8	12	17	Existing	415	297	1.40	415	874	0.48	5290	4.3	0.0	5289	0.0	0.0
33980	105	8	8			17	669	0.03	17	670	0.03	5291	0.0	0.0	5290	4.3	0.0
33981	148	8	8			17	638	0.03	17	638	0.03	5301	0.0	0.0	5291	0.0	0.0
33982	70	8	8			381	480	0.79	381	481	0.79	7585	3.1	0.0	5290	4.3	0.0
33983	456	8	8			350	797	0.44	350	798	0.44	5260	0.0	0.0	5285	0.0	0.0
33984	150	8	8			19	217	0.09	1	217	0.00	7697	4.5	0.0	5283	4.1	0.0
33985	95	8	8			131	409	0.32	128	410	0.31	5282	4.2	0.0	5283	4.1	0.0
33986	250	8	8			1	470	0.00	1	471	0.00	5286	0.0	0.0	5287	0.0	0.0
33987	127	8	8			103	309	0.33	101	310	0.33	5316	8.1	0.0	5282	4.2	0.0
33988	30	8	8			102	543	0.19	101	544	0.19	5317	0.0	0.0	5316	8.1	0.0
33989	127	8	8			101	660	0.15	101	660	0.15	5318	0.0	0.0	5317	0.0	0.0
33990	20	8	8			2	526	0.00	2	526	0.00	7088	0.0	0.0	5318	0.0	0.0
33991	131	8	8			1	1,027	0.00	1	1,028	0.00	5284	0.0	0.0	7088	0.0	0.0
33992	188	6	6			1	251	0.00	1	251	0.00	5248	0.0	0.0	5284	0.0	0.0
33993	135	8	8			97	572	0.17	97	573	0.17	5319	0.0	0.0	5318	0.0	0.0
33994	502	8	8			38	727	0.05	38	728	0.05	5256	0.0	0.0	5319	0.0	0.0
33995	131	8	8			1	299	0.00	1	299	0.00	5251	0.0	0.0	5308	0.0	0.0
33996	438	8	15	19	Existing	460	390	1.18	674	2,087	0.32	5271	0.0	0.0	5270	0.9	0.0
33997	134	8	8			34	665	0.05	31	666	0.05	7583	0.0	0.0	5270	0.9	0.0
33998	185	8	8			30	698	0.04	30	699	0.04	5269	0.0	0.0	7583	0.0	0.0
33999	228	8	15	19	Existing	501	587	0.85	730	3,135	0.23	5270	0.9	0.0	5267	0.0	0.0
34000	214	8	15	19	Existing	450	298	1.51	731	1,593	0.46	5267	0.0	0.0	5266	0.9	0.0
34001	29	8	15	19	Existing	468	326	1.43	763	1,746	0.44	5266	0.9	0.0	5265	1.3	0.0
34002	200	8	8			53	835	0.06	53	835	0.06	5264	0.0	0.0	5265	1.3	0.0
34003	105	8	8			53	431	0.12	53	431	0.12	7417	0.0	0.0	5264	0.0	0.0
34004	210	8	8			1	297	0.00	1	298	0.00	5263	0.0	0.0	7417	0.0	0.0
34005	368	8	8			51	440	0.12	51	440	0.12	5304	0.0	0.0	7417	0.0	0.0
34006	126	8	8			50	546	0.09	50	547	0.09	5303	0.0	0.0	5304	0.0	0.0
34007	340	8	8			1	721	0.00	1	722	0.00	5302	0.0	0.0	5303	0.0	0.0
34008	303	8	15	19	Existing	514	533	0.96	817	2,851	0.29	5265	1.3	0.0	5262	0.0	0.0
34009	400	8	8			143	455	0.31	143	456	0.31	5261	3.6	0.0	5262	0.0	0.0
34010	500	8	8			98	624	0.16	98	624	0.16	5305	0.0	0.0	5261	3.6	0.0
34011	102	8	8			38	608	0.06	38	610	0.06	7087	0.0	0.0	5305	0.0	0.0
34012	465	8	8			2	654	0.00	2	655	0.00	5306	0.0	0.0	7087	0.0	0.0
34013	303	8	8			2	955	0.00	2	956	0.00	5307	0.0	0.0	5306	0.0	0.0
34014	173	8	8			1	1,099	0.00	1	1,101	0.00	5308	0.0	0.0	5307	0.0	0.0
34015	208	8	8			33	690	0.05	33	691	0.05	5299	0.0	0.0	7087	0.0	0.0
34016	170	8	8			1	798	0.00	1	799	0.00	5321	0.0	0.0	5299	0.0	0.0
34017	430	8	8			3	664	0.01	3	665	0.01	5300	0.0	0.0	5299	0.0	0.0
34018	53	8	8			2	769	0.00	2	771	0.00	5327	0.0	0.0	5300	0.0	0.0
34019	270	8	8			1	1,103	0.00	1	1,105	0.00	5322	0.0	0.0	5327	0.0	0.0
34020	143	8	8			1	926	0.00	1	927	0.00	5298	0.0	0.0	5300	0.0	0.0
34021	265	8	8			1	1,065	0.00	1	1,067	0.00	5252	0.0	0.0	5298	0.0	0.0
34022	200	8	8			17	825	0.02	17	826	0.02	5297	0.0	0.0	5301	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34023	320	8	8			1	1,017	0.00	1	1,018	0.00	5253	0.0	0.0	5297	0.0	0.0
34024	460	8	8			0	1,735	0.00	0	1,738	0.00	7584	0.0	0.0	5296	0.0	0.0
34025	494	8	8			1	925	0.00	1	926	0.00	5296	0.0	0.0	5295	0.0	0.0
34026	279	8	8			1	594	0.00	1	594	0.00	7418	0.0	0.0	5294	0.0	0.0
34027	335	8	8			33	878	0.04	33	880	0.04	5323	0.0	0.0	5294	0.0	0.0
34028	345	8	8			22	1,487	0.01	22	1,489	0.01	5293	0.0	0.0	5323	0.0	0.0
34029	265	8	8			0	1,874	0.00	0	1,876	0.00	5292	0.0	0.0	5293	0.0	0.0
34030	316	8	8			12	508	0.02	12	508	0.02	5313	0.0	0.0	5323	0.0	0.0
34031	160	8	8			0	961	0.00	0	963	0.00	5254	0.0	0.0	5313	0.0	0.0
34032	290	8	8			10	1,855	0.01	10	1,857	0.01	5311	0.0	0.0	5312	0.0	0.0
34033	198	8	8			13	1,144	0.01	13	1,146	0.01	5315	0.0	0.0	5314	0.0	0.0
34034	242	8	8			28	386	0.07	28	386	0.07	5258	0.0	0.0	5259	0.0	0.0
34035	270	8	8			27	685	0.04	27	686	0.04	5257	0.0	0.0	5258	0.0	0.0
34036	181	8	8			3	879	0.00	3	881	0.00	5255	0.0	0.0	7193	0.0	0.0
34037	500	8	8			381	549	0.69	381	550	0.69	5285	0.0	0.0	7585	3.1	0.0
34038	465	8	8			58	449	0.13	58	450	0.13	7589	0.0	0.0	5417	0.0	0.0
34039	25	8	8			0	480	0.00	0	481	0.00	5441	0.0	0.0	7586	0.0	0.0
34040	17	8	8			1	301	0.00	1	302	0.00	5442	0.0	0.0	5385	0.0	0.0
34041	85	8	8			62	417	0.15	62	418	0.15	5376	0.0	0.0	5375	0.0	0.0
34042	136	8	8			62	408	0.15	62	408	0.15	5374	0.0	0.0	5376	0.0	0.0
34043	242	8	8			61	597	0.10	61	598	0.10	5372	0.0	0.0	5374	0.0	0.0
34044	143	8	8			28	592	0.05	28	593	0.05	5371	0.0	0.0	5372	0.0	0.0
34045	250	8	8			12	908	0.01	12	909	0.01	5368	0.0	0.0	5372	0.0	0.0
34046	207	8	8			12	808	0.01	12	809	0.01	5379	0.0	0.0	5368	0.0	0.0
34047	55	8	8			1	1,937	0.00	1	1,940	0.00	5425	0.0	0.0	5424	0.0	0.0
34048	105	8	8			0	1,084	0.00	0	1,085	0.00	7698	0.0	0.0	5425	0.0	0.0
34049	165	8	8			1	315	0.00	1	316	0.00	5377	0.0	0.0	5379	0.0	0.0
34050	51	8	8			0	401	0.00	0	402	0.00	11240	0.0	0.0	5377	0.0	0.0
34051	128	8	8			26	401	0.07	26	401	0.07	7337	0.0	0.0	7587	0.0	0.0
34052	103	8	8			1	419	0.00	1	419	0.00	5352	0.0	0.0	7337	0.0	0.0
34053	196	8	8			1	444	0.00	1	444	0.00	5378	0.0	0.0	5379	0.0	0.0
34054	190	8	8			0	1,180	0.00	0	1,181	0.00	5426	0.0	0.0	5378	0.0	0.0
34055	123	8	8			0	409	0.00	0	409	0.00	5405	0.0	0.0	5404	0.0	0.0
34056	133	8	8			0	1,613	0.00	0	1,615	0.00	5329	0.0	0.0	7337	0.0	0.0
34057	166	8	8			0	556	0.00	0	557	0.00	5380	0.0	0.0	5368	0.0	0.0
34058	112	8	8			1	1,032	0.00	1	1,033	0.00	5366	0.0	0.0	5365	0.0	0.0
34059	122	8	8			0	394	0.00	0	394	0.00	7699	0.0	0.0	5366	0.0	0.0
34060	66	8	8			1	1,273	0.00	1	1,274	0.00	5364	0.0	0.0	5349	0.0	0.0
34061	483	8	8			1	1,255	0.00	1	1,257	0.00	5387	0.0	0.0	5364	0.0	0.0
34062	223	8	8			0	526	0.00	0	526	0.00	5386	0.0	0.0	5387	0.0	0.0
34063	80	8	8			18	453	0.04	18	454	0.04	5427	0.0	0.0	5349	0.0	0.0
34064	178	8	8			7	453	0.02	7	454	0.02	7340	0.0	0.0	5427	0.0	0.0
34065	20	8	8			7	497	0.01	7	497	0.01	5429	0.0	0.0	5428	0.0	0.0
34066	104	8	8			6	453	0.01	6	454	0.01	5367	0.0	0.0	5429	0.0	0.0
34067	236	8	8			6	1,278	0.00	6	1,279	0.00	5384	0.0	0.0	5383	0.0	0.0
34068	92	8	8			0	1,281	0.00	0	1,283	0.00	5330	0.0	0.0	5384	0.0	0.0
34069	118	8	8			0	426	0.00	0	426	0.00	5331	0.0	0.0	5383	0.0	0.0
34070	140	8	8			1	1,232	0.00	1	1,234	0.00	5382	0.0	0.0	5429	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34071	100	8	8			0	1,073	0.00	0	1,074	0.00	5381	0.0	0.0	5382	0.0	0.0
34072	105	8	8			28	415	0.07	28	415	0.07	5369	0.0	0.0	5370	0.0	0.0
34073	251	8	8			27	443	0.06	27	444	0.06	7587	0.0	0.0	5369	0.0	0.0
34074	315	8	8			201	918	0.22	201	919	0.22	5402	0.0	0.0	5394	0.0	0.0
34075	35	8	8			200	754	0.27	200	755	0.26	5403	0.0	0.0	5402	0.0	0.0
34076	201	8	8			145	697	0.21	145	697	0.21	5385	0.0	0.0	5403	0.0	0.0
34077	276	8	8			144	405	0.36	144	406	0.36	11279	0.0	0.0	5385	0.0	0.0
34078	66	8	8			17	402	0.04	17	403	0.04	7586	0.0	0.0	5363	0.0	0.0
34079	136	8	8			16	636	0.03	16	637	0.03	7155	0.0	0.0	7586	0.0	0.0
34080	335	8	8			1	553	0.00	1	554	0.00	5362	0.0	0.0	7155	0.0	0.0
34081	63	8	8			1	676	0.00	1	676	0.00	5388	0.0	0.0	5362	0.0	0.0
34082	71	8	8			0	263	0.00	0	264	0.00	5332	0.0	0.0	5388	0.0	0.0
34083	240	8	8			1	769	0.00	1	771	0.00	7089	0.0	0.0	5388	0.0	0.0
34084	77	8	8			0	763	0.00	0	764	0.00	5333	0.0	0.0	7089	0.0	0.0
34086	185	8	8			3	700	0.00	3	701	0.00	5358	0.0	0.0	5390	0.0	0.0
34087	88	8	8			2	636	0.00	2	637	0.00	5360	0.0	0.0	5359	0.0	0.0
34088	73	8	8			37	326	0.11	37	326	0.11	7338	0.0	0.0	7154	0.0	0.0
34089	124	8	8			36	474	0.08	36	474	0.08	5390	0.0	0.0	7338	0.0	0.0
34090	24	8	8			1	1,289	0.00	1	1,291	0.00	5389	0.0	0.0	5390	0.0	0.0
34091	260	8	8			1	1,130	0.00	1	1,131	0.00	5430	0.0	0.0	5389	0.0	0.0
34092	350	8	8			109	562	0.19	109	563	0.19	5414	0.0	0.0	11279	0.0	0.0
34093	380	8	8			108	349	0.31	108	349	0.31	5415	0.0	0.0	5414	0.0	0.0
34094	423	8	8			13	316	0.04	13	316	0.04	5422	0.0	0.0	5415	0.0	0.0
34095	140	8	8			12	356	0.03	12	356	0.03	7590	0.0	0.0	5422	0.0	0.0
34096	200	6	6			1	169	0.00	1	169	0.00	5335	0.0	0.0	7590	0.0	0.0
34097	50	8	8			10	470	0.02	10	471	0.02	5431	0.0	0.0	7590	0.0	0.0
34098	80	6	6			10	366	0.03	10	366	0.03	5432	0.0	0.0	5431	0.0	0.0
34099	198	6	6			1	245	0.00	1	245	0.00	5336	0.0	0.0	5432	0.0	0.0
34100	261	8	8			88	651	0.14	88	651	0.14	5417	0.0	0.0	5415	0.0	0.0
34102	304	8	8			39	603	0.06	39	603	0.06	5354	0.0	0.0	7589	0.0	0.0
34103	150	8	8			3	762	0.00	3	763	0.00	7336	0.0	0.0	5353	0.0	0.0
34104	70	8	8			1	787	0.00	1	788	0.00	5355	0.0	0.0	7336	0.0	0.0
34105	117	6	6			1	267	0.00	1	267	0.00	5337	0.0	0.0	5355	0.0	0.0
34106	220	8	8			30	733	0.04	30	734	0.04	5416	0.0	0.0	5417	0.0	0.0
34107	123	6	6			1	429	0.00	1	429	0.00	5434	0.0	0.0	7589	0.0	0.0
34108	275	8	8			44	665	0.07	44	666	0.07	5397	0.0	0.0	5395	0.0	0.0
34109	94	8	8			44	660	0.07	44	660	0.07	5396	0.0	0.0	5397	0.0	0.0
34110	110	8	8			2	902	0.00	2	903	0.00	7588	0.0	0.0	5396	0.0	0.0
34111	254	8	8			1	860	0.00	1	861	0.00	5338	0.0	0.0	7588	0.0	0.0
34112	201	8	8			1	1,029	0.00	1	1,031	0.00	5391	0.0	0.0	7588	0.0	0.0
34113	188	8	8			1	1,078	0.00	1	1,079	0.00	5339	0.0	0.0	5391	0.0	0.0
34114	115	8	8			1	1,389	0.00	1	1,390	0.00	5340	0.0	0.0	5418	0.0	0.0
34115	77	8	8			9	1,163	0.01	9	1,164	0.01	5392	0.0	0.0	5393	0.0	0.0
34116	160	8	8			1	1,772	0.00	1	1,774	0.00	5341	0.0	0.0	5392	0.0	0.0
34117	187	8	8			54	300	0.18	54	300	0.18	5401	0.0	0.0	5403	0.0	0.0
34118	105	8	8			2	297	0.01	2	298	0.01	5400	0.0	0.0	5401	0.0	0.0
34119	275	8	8			2	297	0.01	2	298	0.01	5399	0.0	0.0	5400	0.0	0.0
34120	130	8	8			1	1,319	0.00	1	1,320	0.00	7090	0.0	0.0	5399	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34121	258	8	8			1	176	0.00	1	176	0.00	10701	0.0	0.0	7090	0.0	0.0
34122	151	8	8			41	324	0.13	41	325	0.13	5435	0.0	0.0	5396	0.0	0.0
34123	145	8	8			38	297	0.13	38	298	0.13	5398	0.0	0.0	5436	0.0	0.0
34124	230	8	8			3	291	0.01	3	291	0.01	5420	0.0	0.0	5398	0.0	0.0
34125	269	8	8			2	688	0.00	2	688	0.00	5421	0.0	0.0	5420	0.0	0.0
34126	218	8	8			1	326	0.00	1	326	0.00	5343	0.0	0.0	5421	0.0	0.0
34127	88	8	8			1	903	0.00	1	905	0.00	5344	0.0	0.0	5421	0.0	0.0
34128	230	8	8			1	679	0.00	1	680	0.00	5419	0.0	0.0	5435	0.0	0.0
34129	76	8	8			1	417	0.00	1	418	0.00	5345	0.0	0.0	5419	0.0	0.0
34130	140	8	8			11	323	0.03	11	323	0.03	5413	0.0	0.0	7091	0.0	0.0
34131	122	8	8			35	413	0.08	35	413	0.08	7091	0.0	0.0	11279	0.0	0.0
34132	128	8	8			6	306	0.02	6	306	0.02	5412	0.0	0.0	5413	0.0	0.0
34133	7	8	8			1	562	0.00	1	563	0.00	7339	0.0	0.0	7091	0.0	0.0
34134	130	8	8			4	565	0.01	4	566	0.01	5407	0.0	0.0	5406	0.0	0.0
34135	75	8	8			1	562	0.00	1	563	0.00	5346	0.0	0.0	5407	0.0	0.0
34136	125	8	8			6	352	0.02	6	352	0.02	5437	0.0	0.0	5412	0.0	0.0
34137	32	8	8			5	470	0.01	5	471	0.01	5438	0.0	0.0	5437	0.0	0.0
34138	75	8	8			3	902	0.00	3	903	0.00	5409	0.0	0.0	5410	0.0	0.0
34140	170	8	8			1	320	0.00	1	321	0.00	5348	0.0	0.0	5410	0.0	0.0
34145	280	8	8			1	1,022	0.00	1	1,024	0.00	5529	0.0	0.0	5492	0.0	0.0
34146	280	8	8			24	579	0.04	24	580	0.04	5492	0.0	0.0	5493	0.0	0.0
34147	298	8	8			169	342	0.49	169	343	0.49	5495	0.0	0.0	5494	0.0	0.0
34148	375	8	8			156	263	0.59	156	263	0.59	5482	0.0	0.0	5495	0.0	0.0
34149	130	8	8			58	647	0.09	58	649	0.09	5496	0.0	0.0	5482	0.0	0.0
34150	285	8	8			35	384	0.09	35	385	0.09	5493	0.0	0.0	5497	0.0	0.0
34151	345	8	8			18	362	0.05	18	362	0.05	5480	0.0	0.0	5481	0.0	0.0
34152	330	8	8			1	365	0.00	1	365	0.00	5483	0.0	0.0	5480	0.0	0.0
34153	200	8	8			1	613	0.00	1	614	0.00	7701	0.0	0.0	5483	0.0	0.0
34154	302	6	6			11	200	0.06	11	200	0.06	5498	0.0	0.0	5496	0.0	0.0
34155	300	6	6			10	201	0.05	10	201	0.05	5499	0.0	0.0	5498	0.0	0.0
34156	301	6	6			12	201	0.06	12	201	0.06	5500	0.0	0.0	5497	0.0	0.0
34157	300	6	6			11	200	0.06	11	200	0.06	7343	0.0	0.0	5500	0.0	0.0
34160	303	8	8			1	394	0.00	1	394	0.00	7093	0.0	0.0	5490	0.0	0.0
34161	306	8	8			1	429	0.00	1	430	0.00	5488	0.0	0.0	5529	0.0	0.0
34162	306	8	8			1	429	0.00	1	430	0.00	5489	0.0	0.0	5488	0.0	0.0
34163	155	8	8			181	1,249	0.14	181	1,250	0.14	5502	0.0	0.0	5503	0.0	0.0
34164	155	6	6			23	238	0.10	23	238	0.10	5445	0.0	0.0	7342	0.0	0.0
34165	268	8	8			1	933	0.00	1	934	0.00	5524	0.0	0.0	7342	0.0	0.0
34166	160	6	6			0	211	0.00	0	211	0.00	5446	0.0	0.0	5524	0.0	0.0
34167	160	6	6			0	431	0.00	0	431	0.00	5447	0.0	0.0	5524	0.0	0.0
34168	253	8	8			0	369	0.00	0	370	0.00	5448	0.0	0.0	5479	0.0	0.0
34169	23	8	8			1	1,219	0.00	1	1,222	0.00	5525	0.0	0.0	5479	0.0	0.0
34170	187	8	8			0	374	0.00	0	375	0.00	5455	0.0	0.0	5525	0.0	0.0
34171	279	8	8			0	294	0.00	0	294	0.00	5486	0.0	0.0	5516	0.0	0.0
34172	225	8	8			0	399	0.00	0	400	0.00	5459	0.0	0.0	5526	0.0	0.0
34173	293	8	8			1	687	0.00	1	688	0.00	5527	0.0	0.0	5519	0.0	0.0
34174	301	8	8			1	1,235	0.00	1	1,238	0.00	5528	0.0	0.0	5527	0.0	0.0
34175	81	8	8			1	379	0.00	1	380	0.00	5534	0.0	0.0	5489	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34176	280	8	8			24	702	0.03	24	703	0.03	7342	0.0	0.0	5523	0.0	0.0
34177	145	8	8			25	546	0.05	25	547	0.05	5523	0.0	0.0	5477	0.0	0.0
34178	25	8	8			26	372	0.07	26	372	0.07	7092	0.0	0.0	5476	0.0	0.0
34179	46	8	8			26	367	0.07	26	368	0.07	5476	0.0	0.0	5475	0.0	0.0
34180	34	8	8			26	514	0.05	26	515	0.05	5475	0.0	0.0	5474	0.0	0.0
34181	262	8	8			26	359	0.07	26	360	0.07	5474	0.0	0.0	5510	0.0	0.0
34182	98	8	8			63	939	0.07	63	940	0.07	5458	0.0	0.0	7344	0.0	0.0
34183	240	8	8			64	881	0.07	64	883	0.07	7344	0.0	0.0	5522	0.0	0.0
34184	116	8	8			65	1,045	0.06	65	1,047	0.06	5522	0.0	0.0	5521	0.0	0.0
34185	250	8	8			78	415	0.19	78	416	0.19	5521	0.0	0.0	5473	0.0	0.0
34186	116	8	8			78	488	0.16	78	489	0.16	5473	0.0	0.0	5472	0.0	0.0
34187	105	8	8			78	944	0.08	78	945	0.08	5472	0.0	0.0	7156	0.0	0.0
34188	350	8	8			589	1,097	0.54	589	1,099	0.54	5456	0.0	0.0	5471	0.0	0.0
34189	62	10	10			572	716	0.80	572	715	0.80	5470	0.0	0.0	5456	0.0	0.0
34190	477	10	10			572	748	0.77	572	747	0.77	5454	0.0	0.0	5470	0.0	0.0
34191	450	8	8			0	533	0.00	0	533	0.00	5457	0.0	0.0	5469	0.0	0.0
34192	15	6	6			1	820	0.00	1	820	0.00	5520	0.0	0.0	7343	0.0	0.0
34193	282	8	8			301	1,040	0.29	301	1,042	0.29	5519	0.0	0.0	5518	0.0	0.0
34194	427	8	8			181	635	0.29	181	635	0.29	5487	0.0	0.0	5518	0.0	0.0
34195	280	8	8			496	808	0.61	496	810	0.61	5518	0.0	0.0	5504	0.0	0.0
34197	280	10	10			497	1,708	0.29	497	1,707	0.29	5504	0.0	0.0	5515	0.0	0.0
34198	305	8	8			13	292	0.04	13	292	0.04	5516	0.0	0.0	5535	0.0	0.0
34199	322	15	15			497	1,238	0.40	497	1,238	0.40	5515	0.0	0.0	5514	0.0	0.0
34200	331	15	15			509	598	0.85	509	598	0.85	5514	0.0	0.0	5453	0.0	0.0
34201	176	8	8			10	371	0.03	10	371	0.03	5513	0.0	0.0	5478	0.0	0.0
34202	202	8	8			24	419	0.06	24	420	0.06	5535	0.0	0.0	5478	0.0	0.0
34203	82	8	8			35	194	0.18	35	195	0.18	5478	0.0	0.0	5453	0.0	0.0
34204	321	8	8			79	966	0.08	79	967	0.08	7156	0.0	0.0	5512	0.0	0.0
34205	96	10	10			440	585	0.75	439	585	0.75	5463	0.0	0.0	8982	0.0	4.8
34206	176	10	10			435	1,205	0.36	435	1,203	0.36	5465	0.0	0.0	5464	0.0	0.0
34207	175	10	10			435	1,490	0.29	435	1,488	0.29	5451	0.0	0.0	5465	0.0	0.0
34208	450	8	8			619	1,189	0.52	619	1,190	0.52	5471	0.0	0.0	5451	0.0	0.0
34209	181	8	8			102	967	0.11	102	968	0.11	5512	0.0	0.0	5511	0.0	0.0
34210	444	10	10			344	603	0.57	344	602	0.57	5511	0.0	0.0	7591	0.0	0.0
34211	151	10	10			344	549	0.63	344	548	0.63	7591	0.0	0.0	5450	0.0	0.0
34212	128	8	8			27	503	0.05	27	504	0.05	5510	0.0	0.0	5509	0.0	0.0
34213	148	8	8			27	603	0.04	27	604	0.04	5509	0.0	0.0	5508	0.0	0.0
34214	301	8	8			28	970	0.03	28	972	0.03	5508	0.0	0.0	5450	0.0	0.0
34215	172	10	10			433	635	0.68	433	634	0.68	5450	0.0	0.0	5506	0.0	0.0
34216	302	8	8			0	293	0.00	0	293	0.00	5507	0.0	0.0	7592	0.0	0.0
34217	302	8	8			13	529	0.02	13	530	0.02	7592	0.0	0.0	5449	0.0	0.0
34218	483	8	8			0	372	0.00	0	372	0.00	7593	0.0	0.0	5467	0.0	0.0
34219	280	8	8			0	588	0.00	0	588	0.00	5505	0.0	0.0	7419	0.0	0.0
34220	303	8	8			15	453	0.03	15	453	0.03	7419	0.0	0.0	5466	0.0	0.0
34221	354	8	8			13	425	0.03	13	425	0.03	5484	0.0	0.0	5460	0.0	0.0
34222	275	15	15			570	1,405	0.41	570	1,405	0.41	5460	0.0	0.0	5466	0.0	0.0
34223	90	15	15			585	1,405	0.42	585	1,405	0.42	5466	0.0	0.0	7341	0.0	0.0
34224	108	18	18			1,040	2,026	0.51	1,040	2,026	0.51	5467	0.0	0.0	5468	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34225	360	18	18			1,040	1,941	0.54	1,041	1,941	0.54	5468	0.0	0.0	5461	0.0	0.0
34226	291	8	8			0	588	0.00	0	588	0.00	7094	0.0	0.0	5461	0.0	0.0
34227	105	6	6			1	167	0.00	1	167	0.00	5536	0.0	0.0	5481	0.0	0.0
34228	423	8	8			19	397	0.05	19	397	0.05	5481	0.0	0.0	5537	0.0	0.0
34229	24	8	8			19	415	0.05	19	416	0.05	5537	0.0	0.0	5494	0.0	0.0
34237	438	12	12			1	478	0.00	1	478	0.00	5544	0.0	0.0	5576	0.0	0.0
34238	212	8	8			1	415	0.00	1	416	0.00	5563	0.0	0.0	5564	0.0	0.0
34239	241	8	8			1	415	0.00	1	415	0.00	5562	0.0	0.0	5563	0.0	0.0
34240	177	8	8			1	412	0.00	1	413	0.00	5580	0.0	0.0	5562	0.0	0.0
34241	65	8	8			0	443	0.00	0	444	0.00	7702	0.0	0.0	5580	0.0	0.0
34242	385	18	18			1,151	2,178	0.53	1,151	2,178	0.53	7595	0.0	0.0	5581	0.0	0.0
34243	370	18	18			1,150	4,576	0.25	1,151	4,576	0.25	7195	0.0	0.0	7595	0.0	0.0
34244	276	18	18			1,065	4,550	0.23	1,065	4,550	0.23	5579	0.0	0.0	7195	0.0	0.0
34245	179	18	18			1,065	4,597	0.23	1,065	4,597	0.23	5565	0.0	0.0	5579	0.0	0.0
34246	375	18	18			1,065	2,238	0.48	1,065	2,238	0.48	7594	0.0	0.0	5565	0.0	0.0
34247	70	18	18			1,064	2,025	0.53	1,064	2,025	0.53	5552	0.0	0.0	7594	0.0	0.0
34248	450	8	8			0	369	0.00	0	370	0.00	5553	0.0	0.0	7594	0.0	0.0
34249	436	10	15	16	2036	656	564	1.16	656	563	1.16	5559	3.7	3.5	5557	0.0	0.0
34250	427	10	15	16	2036	656	563	1.17	656	562	1.17	5560	3.9	3.9	5559	3.7	3.5
34251	302	10	15	16	2036	581	578	1.00	580	578	1.00	7345	8.0	8.0	5560	3.9	3.9
34252	312	10	15	16	2036	581	582	1.00	579	581	1.00	5555	0.0	0.0	7345	8.0	8.0
34253	243	6	6			1	261	0.01	1	261	0.01	5569	0.0	0.0	5568	0.0	0.0
34254	250	8	8			39	599	0.06	39	599	0.06	5582	0.0	0.0	5570	8.5	0.0
34255	229	6	6			0	335	0.00	0	335	0.00	5551	0.0	0.0	5570	8.5	0.0
34256	365	8	8			44	382	0.11	44	382	0.11	5561	0.0	0.0	5560	3.9	3.9
34257	422	8	8			0	371	0.00	0	372	0.00	5554	0.0	0.0	5555	0.0	0.0
34258	205	10	10			578	653	0.89	578	652	0.89	5556	3.6	3.6	5555	0.0	0.0
34259	355	18	18			1,187	2,219	0.53	1,187	2,219	0.53	5583	0.0	0.0	5557	0.0	0.0
34260	400	18	18			1,186	1,945	0.61	1,186	1,945	0.61	5564	0.0	0.0	5583	0.0	0.0
34261	189	6	6			1	230	0.00	1	230	0.00	5546	0.0	0.0	5569	0.0	0.0
34262	711	24	24			3,933	5,829	0.67	5,214	5,829	0.89	5594	0.0	0.0	7596	0.0	0.0
34263	545	24	24			3,932	5,828	0.67	5,214	5,828	0.89	7420	0.0	0.0	5594	0.0	0.0
34264	331	24	24			3,856	5,825	0.66	5,138	5,825	0.88	5584	0.0	0.0	7420	0.0	0.0
34265	292	24	24			3,856	5,853	0.66	5,138	5,853	0.88	5585	0.0	0.0	5584	0.0	0.0
34266	264	24	24			3,856	5,833	0.66	5,137	5,833	0.88	5586	0.0	0.0	5585	0.0	0.0
34267	558	24	24			3,751	5,833	0.64	5,033	5,833	0.86	5577	0.0	0.0	5586	0.0	0.0
34268	258	8	8			456	638	0.71	1	640	0.00	5567	0.0	0.0	5566	8.6	0.0
34269	446	12	12			2	566	0.00	2	566	0.00	5574	0.0	0.0	5572	0.0	0.0
34270	399	12	12			1	567	0.00	1	567	0.00	5576	0.0	0.0	5574	0.0	0.0
34271	75	16	16			633	3,323	0.19	178	3,321	0.05	5573	0.0	0.0	5571	0.0	0.0
34272	605	16	16			22	3,056	0.01	22	3,053	0.01	5575	0.0	0.0	5573	0.0	0.0
34273	358	16	16			731	2,996	0.24	276	2,994	0.09	5571	0.0	0.0	5587	0.0	0.0
34274	405	12	12			3	963	0.00	3	963	0.00	5572	0.0	0.0	5587	0.0	0.0
34275	207	16	16			801	3,188	0.25	347	3,186	0.11	5587	0.0	0.0	5588	0.0	0.0
34276	116	8	8			1	689	0.00	1	690	0.00	5589	0.0	0.0	5588	0.0	0.0
34277	42	18	18			1,867	2,229	0.84	1,867	2,229	0.84	5557	0.0	0.0	5558	0.0	0.0
34278	352	54	54			13,763	105,410	0.13	13,959	105,410	0.13	5549	0.0	0.0	5548	0.0	0.0
34279	1423	54	54			13,763	35,252	0.39	13,959	35,252	0.40	5548	0.0	0.0	5547	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34281	221	8	8			1	297	0.00	1	297	0.00	5614	0.0	0.0	5633	0.0	0.0
34282	410	8	8			1	322	0.00	1	322	0.00	5632	0.0	0.0	7421	0.0	0.0
34283	242	8	8			53	242	0.22	53	242	0.22	7095	0.0	0.0	5629	0.0	0.0
34284	218	8	8			20	188	0.11	20	189	0.11	5633	0.0	0.0	7095	0.0	0.0
34285	370	8	8			32	281	0.11	32	281	0.11	5634	0.0	0.0	7095	0.0	0.0
34286	260	8	8			31	281	0.11	31	281	0.11	7157	0.0	0.0	5634	0.0	0.0
34287	140	8	8			1	294	0.00	1	295	0.00	5631	0.0	0.0	7157	0.0	0.0
34288	147	8	8			1	470	0.00	1	471	0.00	7703	0.0	0.0	5636	0.0	0.0
34289	220	8	8			54	226	0.24	54	226	0.24	5629	0.0	0.0	7347	0.0	0.0
34290	45	8	8			56	358	0.16	56	358	0.16	7347	0.0	0.0	5637	0.0	0.0
34291	106	8	8			56	250	0.23	56	251	0.22	5637	0.0	0.0	5628	0.0	0.0
34292	430	8	8			1	462	0.00	1	463	0.00	5638	0.0	0.0	5629	0.0	0.0
34293	405	8	8			1	240	0.00	1	240	0.00	5630	0.0	0.0	5639	0.0	0.0
34294	335	8	8			1	272	0.00	1	272	0.00	5641	0.0	0.0	5640	0.0	0.0
34295	305	12	18	19	Existing	1,075	736	1.46	1,521	2,169	0.70	7598	6.3	0.0	5642	4.8	0.0
34296	33	8	8			1	283	0.00	1	284	0.00	5660	0.0	0.0	7346	0.0	0.0
34297	29	8	8			1	302	0.00	1	303	0.00	5659	0.0	0.0	7346	0.0	0.0
34298	250	8	8			57	251	0.23	57	251	0.23	5628	0.0	0.0	5627	0.0	0.0
34299	55	8	8			113	253	0.45	113	254	0.45	5627	0.0	0.0	5626	0.0	0.0
34300	80	8	8			1	235	0.00	1	235	0.00	5643	0.0	0.0	5626	0.0	0.0
34301	500	8	8			115	235	0.49	115	235	0.49	5626	0.0	0.0	5625	0.0	0.0
34302	455	18	18			117	2,150	0.05	117	2,150	0.05	5624	0.0	0.0	5616	0.0	0.0
34303	153	18	18			117	2,643	0.04	117	2,643	0.04	5625	0.0	0.0	5624	0.0	0.0
34304	368	18	18			1	2,777	0.00	1	2,777	0.00	5623	0.0	0.0	5606	0.0	0.0
34305	139	8	8			75	345	0.22	75	346	0.22	7421	0.0	0.0	5617	0.0	0.0
34306	195	8	8			76	391	0.20	76	392	0.20	5617	0.0	0.0	5645	0.0	0.0
34307	458	18	18			1,867	2,981	0.63	1,867	2,981	0.63	5646	0.0	0.0	5653	0.0	0.0
34308	455	18	18			1,867	2,557	0.73	1,867	2,557	0.73	5647	0.0	0.0	5646	0.0	0.0
34309	485	10	10			398	376	1.06	398	376	1.06	7597	0.0	0.0	5653	0.0	0.0
34310	445	10	10			297	378	0.78	297	378	0.78	5622	0.0	0.0	7597	0.0	0.0
34311	73	10	10			297	564	0.53	297	563	0.53	5607	0.0	0.0	5622	0.0	0.0
34312	357	10	10			267	333	0.80	267	333	0.80	5618	0.0	0.0	5607	0.0	0.0
34313	388	10	10			267	383	0.70	267	383	0.70	5648	0.0	0.0	5618	0.0	0.0
34314	286	8	8			74	342	0.22	74	343	0.22	5612	0.0	0.0	5613	0.0	0.0
34315	143	8	8			2	529	0.00	2	530	0.00	5609	0.0	0.0	5612	0.0	0.0
34316	162	8	8			1	490	0.00	1	490	0.00	5610	0.0	0.0	5609	0.0	0.0
34317	403	8	8			28	382	0.07	28	383	0.07	5621	0.0	0.0	5607	0.0	0.0
34318	322	8	8			2	373	0.01	2	373	0.01	5619	0.0	0.0	5612	0.0	0.0
34319	123	8	8			1	346	0.00	1	347	0.00	5649	0.0	0.0	5619	0.0	0.0
34320	117	8	8			1	333	0.00	1	333	0.00	5651	0.0	0.0	5650	0.0	0.0
34321	155	6	6			1	207	0.00	1	207	0.00	5601	0.0	0.0	5651	0.0	0.0
34322	464	8	8			1	345	0.00	1	346	0.00	5611	0.0	0.0	5612	0.0	0.0
34323	25	8	8			1	391	0.00	1	392	0.00	5656	0.0	0.0	5611	0.0	0.0
34324	57	8	8			1	329	0.00	1	330	0.00	5652	0.0	0.0	5620	0.0	0.0
34327	100	8	8			1	364	0.00	1	365	0.00	5640	0.0	0.0	5639	0.0	0.0
34328	20	8	8			75	601	0.12	75	601	0.12	5613	0.0	0.0	8942	0.0	0.0
34332	57	18	18			2,213	11,559	0.19	2,213	11,559	0.19	5653	0.0	0.0	5608	0.0	0.0
34333	715	54	54			13,764	48,736	0.28	13,960	48,736	0.29	5604	0.0	0.0	5608	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34334	718	54	54			15,968	46,583	0.34	16,154	46,583	0.35	5608	0.0	0.0	5603	0.0	0.0
34335	610	54	54			15,969	70,575	0.23	16,155	70,575	0.23	5603	0.0	0.0	5602	0.0	0.0
34338	384	8	8			160	582	0.28	160	583	0.28	5691	0.0	0.0	5690	0.0	0.0
34339	136	12	18	19	Existing	815	713	1.14	1,251	2,102	0.59	5697	3.2	0.0	5709	3.7	0.0
34340	405	10	15	19	Existing	751	1,026	0.73	1,190	3,025	0.39	5696	0.0	0.0	5697	3.2	0.0
34341	405	10	15	19	Existing	750	933	0.80	1,189	2,753	0.43	5695	0.0	0.0	5696	0.0	0.0
34342	420	10	15	19	Existing	583	933	0.63	1,023	2,753	0.37	5694	0.0	0.0	5695	0.0	0.0
34343	400	8	8			1	292	0.00	1	292	0.00	5700	0.0	0.0	5698	0.0	0.0
34344	350	8	8			166	390	0.43	166	390	0.43	5693	0.0	0.0	5695	0.0	0.0
34345	300	8	8			51	307	0.17	51	308	0.16	7350	0.0	0.0	5693	0.0	0.0
34346	100	8	8			50	504	0.10	50	505	0.10	5692	0.0	0.0	7350	0.0	0.0
34347	455	8	8			49	460	0.11	49	460	0.11	5703	0.0	0.0	5692	0.0	0.0
34348	162	8	8			32	528	0.06	32	528	0.06	5688	0.0	0.0	5712	0.0	0.0
34349	135	8	8			1	472	0.00	1	472	0.00	7600	0.0	0.0	5712	0.0	0.0
34350	102	8	8			1	494	0.00	1	495	0.00	5713	0.0	0.0	7600	0.0	0.0
34351	250	8	8			31	699	0.04	31	700	0.04	5687	0.0	0.0	5688	0.0	0.0
34352	393	10	15	19	Existing	583	449	1.30	1,022	1,324	0.77	5686	14.1	0.0	5694	0.0	0.0
34353	250	10	15	19	Existing	584	520	1.12	1,022	1,533	0.67	7599	9.5	0.0	5686	14.1	0.0
34354	297	10	15	19	Existing	582	512	1.14	1,021	1,508	0.68	5672	0.0	0.0	7599	9.5	0.0
34355	178	8	15	19	Existing	581	297	1.96	1,020	1,587	0.64	5673	0.0	0.0	5672	0.0	0.0
34356	312	8	8			3	414	0.01	3	415	0.01	5684	0.0	0.0	5703	0.0	0.0
34357	213	8	8			1	410	0.00	1	410	0.00	5685	0.0	0.0	5684	0.0	0.0
34358	435	8	8			1	302	0.00	1	303	0.00	5716	0.0	0.0	5715	0.0	0.0
34359	78	8	8			1	958	0.00	1	960	0.00	5683	0.0	0.0	5715	0.0	0.0
34360	282	8	8			1	1,231	0.00	1	1,233	0.00	5717	0.0	0.0	5683	0.0	0.0
34361	210	8	8			36	1,121	0.03	36	1,122	0.03	5676	0.0	0.0	5677	1.1	0.0
34362	265	8	8			35	941	0.04	35	942	0.04	5682	0.0	0.0	5676	0.0	0.0
34363	186	8	8			1	574	0.00	1	574	0.00	5681	0.0	0.0	5682	0.0	0.0
34364	170	8	8			1	865	0.00	1	866	0.00	7348	0.0	0.0	5678	0.0	0.0
34365	70	8	8			1	1,506	0.00	1	1,508	0.00	5730	0.0	0.0	5679	0.0	0.0
34366	208	8	8			172	342	0.50	172	343	0.50	7158	0.0	0.0	5699	0.0	0.0
34367	92	8	8			171	1,057	0.16	171	1,058	0.16	5718	0.0	0.0	7158	0.0	0.0
34368	357	8	8			101	351	0.29	101	352	0.29	5721	0.0	0.0	5720	0.0	0.0
34369	10	8	8			101	2,649	0.04	101	2,652	0.04	5720	0.0	0.0	5719	0.0	0.0
34370	365	8	8			20	370	0.05	20	371	0.05	5674	0.0	0.0	5675	0.0	0.0
34371	66	8	8			1	369	0.00	1	369	0.00	7349	0.0	0.0	5674	0.0	0.0
34372	135	8	8			0	382	0.00	0	383	0.00	5702	0.0	0.0	7349	0.0	0.0
34373	46	8	8			1	697	0.00	1	698	0.00	5729	0.0	0.0	5723	0.0	0.0
34374	234	8	8			101	419	0.24	101	420	0.24	5705	0.0	0.0	5721	0.0	0.0
34375	141	8	8			25	737	0.03	25	738	0.03	5704	0.0	0.0	5705	0.0	0.0
34376	220	8	8			25	1,172	0.02	25	1,173	0.02	5662	0.0	0.0	5704	0.0	0.0
34377	335	8	8			19	372	0.05	19	372	0.05	5724	0.0	0.0	5674	0.0	0.0
34378	69	8	8			79	806	0.10	79	808	0.10	5725	0.0	0.0	5724	0.0	0.0
34379	425	8	8			59	633	0.09	59	634	0.09	5726	0.0	0.0	5725	0.0	0.0
34380	187	8	8			47	675	0.07	47	676	0.07	5708	0.0	0.0	5726	0.0	0.0
34381	213	8	8			0	1,088	0.00	0	1,090	0.00	5665	0.0	0.0	5708	0.0	0.0
34382	266	8	8			60	643	0.09	60	644	0.09	5724	0.0	0.0	5705	0.0	0.0
34389	100	8	8			33	504	0.06	33	505	0.06	5733	0.0	0.0	5732	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34390	149	8	8			33	506	0.07	33	507	0.07	5732	0.0	0.0	5731	0.0	0.0
34392	81	8	8			1	356	0.00	1	356	0.00	5752	0.0	0.0	5751	0.0	0.0
34393	468	8	8			261	683	0.38	261	684	0.38	5750	0.0	0.0	5751	0.0	0.0
34394	473	8	8			221	406	0.54	221	407	0.54	5794	0.0	0.0	5750	0.0	0.0
34396	373	8	8			220	606	0.36	220	606	0.36	7351	0.0	0.0	5794	0.0	0.0
34397	400	8	8			158	406	0.39	158	406	0.39	5748	0.0	0.0	7351	0.0	0.0
34398	62	8	8			1	267	0.00	1	267	0.00	5753	0.0	0.0	5754	0.0	0.0
34399	140	8	8			26	344	0.08	26	344	0.08	5795	0.0	0.0	5754	0.0	0.0
34400	200	6	6			11	218	0.05	11	218	0.05	7705	0.0	0.0	5795	0.0	0.0
34401	260	8	8			15	470	0.03	15	471	0.03	5796	0.0	0.0	5795	0.0	0.0
34402	190	6	6			14	309	0.04	14	309	0.04	5736	0.0	0.0	5796	0.0	0.0
34403	133	8	8			28	251	0.11	28	251	0.11	5754	0.0	0.0	5760	0.0	0.0
34404	253	8	8			78	313	0.25	78	313	0.25	5766	0.0	0.0	5760	0.0	0.0
34405	265	8	8			1	397	0.00	1	397	0.00	5759	0.0	0.0	5760	0.0	0.0
34406	180	8	8			24	364	0.06	24	365	0.06	5765	0.0	0.0	5766	0.0	0.0
34407	200	8	8			54	457	0.12	54	458	0.12	5764	0.0	0.0	5766	0.0	0.0
34408	277	8	8			19	415	0.05	19	416	0.05	7097	0.0	0.0	5764	0.0	0.0
34409	270	8	8			33	365	0.09	33	366	0.09	5762	0.0	0.0	5763	0.0	0.0
34410	400	8	8			288	297	0.97	288	298	0.97	5770	0.0	0.0	5775	5.5	5.5
34411	410	8	8			287	294	0.98	287	294	0.98	7352	0.0	0.0	5770	0.0	0.0
34412	445	8	8			286	576	0.50	286	576	0.50	5746	0.0	0.0	7352	0.0	0.0
34414	304	8	8			107	303	0.35	107	303	0.35	5760	0.0	0.0	5756	0.0	0.0
34415	334	8	8			108	304	0.35	108	305	0.35	5756	0.0	0.0	5757	0.0	0.0
34416	270	8	8			108	317	0.34	108	317	0.34	5757	0.0	0.0	5797	0.0	0.0
34417	241	8	8			1	446	0.00	1	447	0.00	5798	0.0	0.0	5797	0.0	0.0
34418	255	8	8			1	437	0.00	1	438	0.00	5758	0.0	0.0	5798	0.0	0.0
34419	125	8	8			169	210	0.80	169	210	0.80	7602	0.0	0.0	5755	0.0	0.0
34420	35	8	8			169	210	0.80	169	210	0.80	5755	0.0	0.0	5776	0.0	0.0
34421	360	8	8			288	794	0.36	288	796	0.36	7603	0.0	0.0	5776	0.0	0.0
34422	79	8	8			175	579	0.30	175	580	0.30	5773	0.0	0.0	5776	0.0	0.0
34423	115	8	8			633	874	0.72	633	875	0.72	5776	0.0	0.0	5777	0.0	0.0
34424	223	6	6			1	179	0.00	1	179	0.00	5737	0.0	0.0	5778	0.0	0.0
34425	216	8	8			1	333	0.00	1	333	0.00	7353	0.0	0.0	5745	0.0	0.0
34426	103	8	8			212	297	0.71	212	297	0.71	5791	0.0	0.0	5741	0.0	0.0
34427	136	8	8			1	297	0.00	1	297	0.00	5783	0.0	0.0	5782	0.0	0.0
34428	230	8	8			1	296	0.00	1	296	0.00	5782	0.0	0.0	5792	0.0	0.0
34429	210	8	8			2	781	0.00	2	782	0.00	5799	0.0	0.0	5787	0.0	0.0
34430	79	8	8			1	299	0.00	1	299	0.00	7736	0.0	0.0	5799	0.0	0.0
34431	180	8	8			1	793	0.00	1	794	0.00	5788	0.0	0.0	5799	0.0	0.0
34432	415	8	8			1	297	0.00	1	298	0.00	5781	0.0	0.0	5780	0.0	0.0
34433	140	8	8			42	269	0.16	42	270	0.16	5779	0.0	0.0	7098	0.0	0.0
34434	160	8	8			43	340	0.13	43	341	0.13	7098	0.0	0.0	5800	0.0	0.0
34435	310	8	8			2	705	0.00	2	706	0.00	5771	0.0	0.0	5742	0.0	0.0
34436	194	8	8			46	402	0.11	46	403	0.11	5742	0.0	0.0	5772	0.0	0.0
34437	116	8	8			47	209	0.22	47	210	0.22	5772	0.0	0.0	5743	0.0	0.0
34438	500	8	8			27	648	0.04	27	649	0.04	5774	0.0	0.0	5743	0.0	0.0
34439	253	8	8			174	292	0.60	174	293	0.59	5743	0.0	0.0	5773	0.0	0.0
34440	300	8	8			254	297	0.86	254	298	0.85	5749	0.0	0.0	5746	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34441	300	8	8			254	333	0.76	254	334	0.76	5744	0.0	0.0	5749	0.0	0.0
34442	125	8	8			253	364	0.70	253	365	0.70	5801	0.0	0.0	5744	0.0	0.0
34443	83	6	6			1	208	0.00	1	208	0.00	5822	0.0	0.0	5769	0.0	0.0
34444	90	8	8			1	297	0.00	1	298	0.00	5821	0.0	0.0	5769	0.0	0.0
34445	500	8	8			1	444	0.00	1	444	0.00	5802	0.0	0.0	5771	0.0	0.0
34446	485	8	8			1	510	0.00	1	510	0.00	5767	0.0	0.0	5802	0.0	0.0
34447	148	8	8			36	299	0.12	36	300	0.12	5786	0.0	0.0	5787	0.0	0.0
34448	235	8	8			1	566	0.00	1	567	0.00	5803	0.0	0.0	5786	0.0	0.0
34449	45	8	8			1	1,865	0.00	1	1,868	0.00	5804	0.0	0.0	5803	0.0	0.0
34450	220	8	8			34	317	0.11	34	317	0.11	5785	0.0	0.0	5786	0.0	0.0
34451	280	8	8			33	569	0.06	33	569	0.06	7196	0.0	0.0	5785	0.0	0.0
34452	140	8	8			1	692	0.00	1	692	0.00	5784	0.0	0.0	7196	0.0	0.0
34453	235	8	8			1	749	0.00	1	750	0.00	5789	0.0	0.0	5790	0.0	0.0
34454	75	8	8			29	297	0.10	29	298	0.10	5805	0.0	0.0	5790	0.0	0.0
34455	444	8	8			4	484	0.01	4	485	0.01	5806	0.0	0.0	5805	0.0	0.0
34456	500	8	8			31	126	0.25	26	126	0.20	5856	2.6	0.0	5824	2.8	0.0
34457	500	8	8			69	199	0.35	60	199	0.30	5824	2.8	0.0	5858	1.8	0.0
34458	320	8	8			2	508	0.00	3	509	0.01	5857	0.0	0.0	5825	0.0	0.0
34460	100	8	8			111	374	0.30	111	374	0.30	5878	0.0	0.0	5847	0.0	0.0
34462	239	8	8			351	402	0.87	57	403	0.14	5852	2.8	0.0	5853	2.9	0.0
34463	200	8	8			17	403	0.04	17	403	0.04	5851	0.0	0.0	5879	0.0	0.0
34464	158	8	8			335	415	0.81	38	415	0.09	5850	0.0	0.0	5879	0.0	0.0
34465	202	8	8			335	408	0.82	38	409	0.09	5849	0.0	0.0	5850	0.0	0.0
34466	200	6	6			13	188	0.07	13	188	0.07	5832	0.0	0.0	5849	0.0	0.0
34467	280	8	8			322	402	0.80	24	402	0.06	5848	0.0	0.0	5849	0.0	0.0
34468	223	6	6			22	188	0.12	22	188	0.12	5831	0.0	0.0	5848	0.0	0.0
34469	372	8	8			1	403	0.00	1	403	0.00	5880	0.0	0.0	5852	2.8	0.0
34470	242	8	8			1	1,272	0.00	1	1,274	0.00	5855	0.0	0.0	5854	0.0	0.0
34471	203	8	8			1	454	0.00	1	455	0.00	5829	0.0	0.0	5844	0.0	0.0
34472	504	8	8			141	350	0.40	141	350	0.40	5845	0.0	0.0	5844	0.0	0.0
34473	138	8	8			3	549	0.01	3	549	0.01	5875	0.0	0.0	5846	0.0	0.0
34474	88	8	8			2	622	0.00	2	624	0.00	5874	0.0	0.0	5875	0.0	0.0
34475	260	8	8			1	417	0.00	1	417	0.00	5876	0.0	0.0	5874	0.0	0.0
34476	87	8	8			1	461	0.00	1	462	0.00	5873	0.0	0.0	5874	0.0	0.0
34477	200	6	6			1	231	0.00	1	231	0.00	5830	0.0	0.0	5875	0.0	0.0
34478	32	8	8			1	439	0.00	1	440	0.00	5892	0.0	0.0	5846	0.0	0.0
34479	499	8	8			112	406	0.28	112	406	0.28	5847	0.0	0.0	5846	0.0	0.0
34480	378	8	8			1	405	0.00	1	406	0.00	5877	0.0	0.0	5878	0.0	0.0
34483	84	8	8			104	360	0.29	104	360	0.29	5841	0.0	0.0	5834	0.0	0.0
34486	274	10	10			49	623	0.08	49	622	0.08	5882	0.0	0.0	5841	0.0	0.0
34487	259	8	8			83	299	0.28	81	300	0.27	5884	6.9	0.0	5837	5.8	0.0
34488	51	8	8			82	309	0.27	81	309	0.26	5869	0.0	0.0	5884	6.9	0.0
34490	65	8	8			1	297	0.00	1	298	0.00	5895	0.0	0.0	7422	0.0	0.0
34491	562	24	24			1,952	5,392	0.36	2,698	5,392	0.50	5872	0.0	0.0	7100	0.0	0.0
34494	475	15	21	20	Existing	1,833	1,124	1.63	2,578	2,756	0.94	7355	6.0	0.0	5872	0.0	0.0
34500	268	10	15	18	Existing	503	386	1.30	769	1,138	0.68	5827	9.4	0.0	5866	9.1	0.0
34501	30	8	15	18	Existing	503	210	2.39	769	1,124	0.68	5867	9.4	0.0	5827	9.4	0.0
34503	360	8	8			298	404	0.74	1	405	0.00	5859	0.0	0.0	7604	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34504	257	8	8			299	408	0.73	1	408	0.00	7604	0.0	0.0	5848	0.0	0.0
34505	203	8	8			82	417	0.20	82	418	0.20	5861	0.0	0.0	5878	0.0	0.0
34506	40	8	8			1	453	0.00	1	454	0.00	5891	0.0	0.0	5861	0.0	0.0
34507	163	8	8			81	385	0.21	81	386	0.21	5862	0.0	0.0	5861	0.0	0.0
34508	62	8	8			1	401	0.00	1	401	0.00	5893	0.0	0.0	5863	0.0	0.0
34509	25	8	8			1	515	0.00	1	516	0.00	5894	0.0	0.0	5863	0.0	0.0
34510	280	54	54			18,044	48,916	0.37	18,976	48,916	0.39	5834	0.0	0.0	5826	0.0	0.0
34512	549	54	54			15,969	84,821	0.19	16,155	84,821	0.19	5836	0.0	0.0	5835	0.0	0.0
34520	37	8	8			6	459	0.01	6	460	0.01	5925	0.0	0.0	7356	0.0	0.0
34521	211	15	15			1,103	3,531	0.31	1,103	3,531	0.31	7356	0.0	0.0	5909	0.0	0.0
34522	218	8	8			6	465	0.01	6	466	0.01	5900	0.0	0.0	5925	0.0	0.0
34523	208	8	8			5	415	0.01	5	415	0.01	5908	0.0	0.0	5900	0.0	0.0
34524	460	15	15			1,104	2,831	0.39	1,104	2,831	0.39	5909	0.0	0.0	5910	0.0	0.0
34525	93	15	15			1,105	10,981	0.10	1,105	10,981	0.10	5910	0.0	0.0	5926	11.0	0.0
34526	355	15	15			1,141	1,667	0.68	1,144	1,667	0.69	7197	9.2	10.3	5927	8.0	9.1
34527	7	8	8			363	685	0.53	275	686	0.40	5928	7.8	8.9	5927	8.0	9.1
34528	148	8	8			274	405	0.68	272	406	0.67	5911	8.1	0.0	5928	7.8	8.9
34529	283	8	8			273	405	0.67	271	406	0.67	5929	0.0	0.0	5911	8.1	0.0
34530	360	8	8			431	481	0.90	138	482	0.29	5930	4.3	0.0	5927	8.0	9.1
34531	173	8	8			409	480	0.85	115	481	0.24	5905	4.0	0.0	5930	4.3	0.0
34532	183	8	8			408	510	0.80	115	511	0.22	5906	7.9	0.0	5905	4.0	0.0
34533	302	8	8			407	410	0.99	113	411	0.28	5931	0.0	0.0	5906	7.9	0.0
34534	91	8	8			1	1,310	0.00	1	1,313	0.00	7706	0.0	0.0	7102	0.0	0.0
34535	460	8	8			1	408	0.00	1	408	0.00	5907	0.0	0.0	5908	0.0	0.0
34550	812	16	21	21	2036	1,884	1,278	1.47	1,597	1,276	1.25	5936	3.0	3.9	7606	2.6	3.0
34551	350	16	21	21	2036	1,838	1,269	1.45	1,557	1,267	1.23	5927	8.0	9.1	5936	3.0	3.9
34558	156	8	8			1	1,315	0.00	1	1,317	0.00	5949	0.0	0.0	5971	0.0	0.0
34559	128	8	8			1	405	0.00	1	405	0.00	5959	0.0	0.0	5960	0.0	0.0
34560	438	8	8			20	573	0.04	20	574	0.04	5960	0.0	0.0	5984	0.0	0.0
34561	74	8	8			2	408	0.01	2	408	0.01	5986	0.0	0.0	7358	0.0	0.0
34562	258	8	8			1	455	0.00	1	456	0.00	7609	0.0	0.0	5986	0.0	0.0
34563	150	8	8			1	468	0.00	1	469	0.00	7707	0.0	0.0	7609	0.0	0.0
34564	199	8	8			1	454	0.00	1	455	0.00	5985	0.0	0.0	7358	0.0	0.0
34565	258	8	8			1	455	0.00	1	456	0.00	5987	0.0	0.0	5985	0.0	0.0
34566	142	8	8			33	450	0.07	33	451	0.07	6002	0.0	0.0	5992	0.0	0.0
34567	37	8	8			33	408	0.08	33	408	0.08	6003	0.0	0.0	6002	0.0	0.0
34568	108	8	8			4	458	0.01	4	458	0.01	7358	0.0	0.0	6003	0.0	0.0
34569	260	8	8			35	493	0.07	35	494	0.07	5992	0.0	0.0	5991	0.0	0.0
34570	90	8	8			1	492	0.00	1	492	0.00	5993	0.0	0.0	5992	0.0	0.0
34571	280	8	8			138	568	0.24	138	569	0.24	5996	0.0	0.0	5998	0.0	0.0
34572	260	8	8			91	711	0.13	91	712	0.13	5995	0.0	0.0	5996	0.0	0.0
34573	197	8	8			21	657	0.03	21	658	0.03	5990	0.0	0.0	5995	0.0	0.0
34574	233	8	8			18	699	0.03	18	700	0.03	5989	0.0	0.0	5990	0.0	0.0
34575	430	8	8			46	574	0.08	46	574	0.08	5994	0.0	0.0	5996	0.0	0.0
34576	192	8	8			2	555	0.00	2	556	0.00	6004	0.0	0.0	5990	0.0	0.0
34577	82	8	8			1	592	0.00	1	593	0.00	5988	0.0	0.0	6004	0.0	0.0
34578	195	8	8			1	578	0.00	1	580	0.00	5951	0.0	0.0	5988	0.0	0.0
34579	363	8	8			354	703	0.50	354	704	0.50	6005	0.0	0.0	5961	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34580	93	8	8			350	631	0.56	350	631	0.55	7357	0.0	0.0	6005	0.0	0.0
34581	85	8	8			312	695	0.45	312	697	0.45	6006	0.0	0.0	7357	0.0	0.0
34582	528	8	8			26	1,014	0.03	26	1,015	0.03	5965	0.0	0.0	6006	0.0	0.0
34583	436	8	8			25	400	0.06	25	401	0.06	5958	0.0	0.0	5965	0.0	0.0
34584	420	10	10			481	547	0.88	481	547	0.88	5971	0.0	0.0	5969	0.0	0.0
34586	245	8	8			1	397	0.00	1	397	0.00	5952	0.0	0.0	5996	0.0	0.0
34587	242	8	8			1	399	0.00	1	400	0.00	5953	0.0	0.0	5995	0.0	0.0
34588	340	10	10			403	800	0.50	403	799	0.51	5997	0.0	0.0	5984	0.0	0.0
34589	270	10	10			403	875	0.46	403	874	0.46	5998	0.0	0.0	5997	0.0	0.0
34590	330	10	10			264	1,061	0.25	264	1,060	0.25	5999	0.0	0.0	5998	0.0	0.0
34591	217	8	8			38	450	0.08	38	451	0.08	7610	0.0	0.0	7357	0.0	0.0
34592	258	8	8			37	469	0.08	37	469	0.08	5968	0.0	0.0	7610	0.0	0.0
34593	172	8	8			36	741	0.05	36	742	0.05	7608	0.0	0.0	5968	0.0	0.0
34594	218	8	8			16	686	0.02	16	688	0.02	5967	0.0	0.0	7608	0.0	0.0
34595	145	6	6			1	247	0.00	1	247	0.00	5954	0.0	0.0	5967	0.0	0.0
34596	288	8	8			19	455	0.04	19	456	0.04	6007	0.0	0.0	7608	0.0	0.0
34597	316	8	8			61	560	0.11	61	560	0.11	5982	0.0	0.0	6001	0.0	0.0
34598	232	8	8			2	641	0.00	2	642	0.00	5981	0.0	0.0	5982	0.0	0.0
34599	258	8	8			1	883	0.00	1	885	0.00	5983	0.0	0.0	5981	0.0	0.0
34600	210	6	6			1	230	0.00	1	230	0.00	5955	0.0	0.0	5983	0.0	0.0
34601	450	15	15			1,020	2,812	0.36	1,020	2,812	0.36	5980	0.0	0.0	6001	0.0	0.0
34602	410	15	15			1,020	1,485	0.69	1,020	1,485	0.69	5956	0.0	0.0	5980	0.0	0.0
34603	315	8	8			63	717	0.09	63	718	0.09	5976	0.0	0.0	5956	0.0	0.0
34605	275	12	12			956	1,419	0.67	956	1,419	0.67	5979	0.0	0.0	5956	0.0	0.0
34606	241	12	12			956	1,367	0.70	956	1,367	0.70	5978	0.0	0.0	5979	0.0	0.0
34607	340	10	10			424	1,784	0.24	424	1,782	0.24	5984	0.0	0.0	5978	0.0	0.0
34608	111	10	10			531	748	0.71	531	747	0.71	5977	0.0	0.0	5978	0.0	0.0
34611	298	8	8			38	670	0.06	38	719	0.05	6009	0.0	0.0	6008	0.0	0.0
34612	321	8	8			58	903	0.06	58	904	0.06	5964	0.0	0.0	5962	0.0	0.0
34613	350	8	8			1	406	0.00	1	406	0.00	5963	0.0	0.0	5964	0.0	0.0
34614	331	8	8			3	405	0.01	3	406	0.01	6010	0.0	0.0	6005	0.0	0.0
34615	8	8	8			1	507	0.00	1	508	0.00	6012	0.0	0.0	6010	0.0	0.0
34616	256	8	8			17	697	0.02	17	697	0.02	5950	0.0	0.0	5989	0.0	0.0
34619	208	18	18			1,907	8,726	0.22	1,907	8,726	0.22	6117	0.0	0.0	6042	0.0	0.0
34621	209	8	8			232	392	0.59	232	392	0.59	6048	0.0	0.0	6117	0.0	0.0
34623	155	8	8			0	670	0.00	0	719	0.00	7708	0.0	0.0	7615	0.0	0.0
34624	270	8	8			10	1,190	0.01	10	1,192	0.01	6072	0.0	0.0	6075	0.0	0.0
34625	91	8	8			10	440	0.02	10	441	0.02	6075	0.0	0.0	6076	0.0	0.0
34626	248	8	8			1	1,717	0.00	1	1,719	0.00	6016	0.0	0.0	6076	0.0	0.0
34627	173	8	8			11	1,826	0.01	11	1,829	0.01	6074	0.0	0.0	6076	0.0	0.0
34628	94	8	8			11	1,621	0.01	11	1,623	0.01	6073	0.0	0.0	6074	0.0	0.0
34629	167	8	8			0	1,578	0.00	0	1,580	0.00	6017	0.0	0.0	6073	0.0	0.0
34630	277	8	8			0	1,767	0.00	0	1,770	0.00	6084	0.0	0.0	6083	0.0	0.0
34631	304	8	8			1	1,539	0.00	1	1,541	0.00	6083	0.0	0.0	6082	0.0	0.0
34632	209	8	8			1	887	0.00	1	888	0.00	6082	0.0	0.0	7613	0.0	0.0
34633	279	8	8			83	956	0.09	83	957	0.09	7612	0.0	0.0	6079	0.0	0.0
34634	224	8	8			0	1,422	0.00	0	1,423	0.00	6081	0.0	0.0	7105	0.0	0.0
34635	178	8	8			1	1,410	0.00	1	1,412	0.00	7105	0.0	0.0	6079	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34636	316	8	8			92	967	0.10	92	969	0.10	6079	0.0	0.0	7198	0.0	0.0
34637	163	8	8			125	912	0.14	125	913	0.14	7198	0.0	0.0	6121	0.0	0.0
34638	35	8	8			125	1,278	0.10	125	1,280	0.10	6121	0.0	0.0	6122	0.0	0.0
34639	283	8	8			32	956	0.03	32	958	0.03	6078	0.0	0.0	7198	0.0	0.0
34640	180	8	8			11	1,151	0.01	11	1,153	0.01	6018	0.0	0.0	6078	0.0	0.0
34641	297	8	8			22	564	0.04	22	565	0.04	6077	0.0	0.0	6078	0.0	0.0
34642	482	8	8			10	1,306	0.01	10	1,308	0.01	6123	0.0	0.0	6073	0.0	0.0
34643	210	8	8			73	456	0.16	73	456	0.16	6124	0.0	0.0	6080	0.0	0.0
34644	46	8	8			125	605	0.21	125	606	0.21	6122	0.0	0.0	6126	0.0	0.0
34645	40	8	8			1	442	0.00	1	442	0.00	6071	0.0	0.0	7424	0.0	0.0
34646	124	8	8			126	1,062	0.12	126	1,063	0.12	6126	0.0	0.0	7424	0.0	0.0
34647	245	8	8			0	944	0.00	0	945	0.00	6020	0.0	0.0	6071	0.0	0.0
34648	222	8	8			23	860	0.03	23	862	0.03	6069	0.0	0.0	6068	0.0	0.0
34649	88	8	8			17	1,059	0.02	17	1,060	0.02	6070	0.0	0.0	6069	0.0	0.0
34650	288	8	8			17	410	0.04	17	411	0.04	7359	0.0	0.0	6070	0.0	0.0
34651	122	8	8			0	1,113	0.00	0	1,115	0.00	6021	0.0	0.0	6070	0.0	0.0
34652	178	8	8			13	1,152	0.01	13	1,154	0.01	7104	0.0	0.0	7359	0.0	0.0
34653	277	8	8			13	544	0.02	13	545	0.02	6066	0.0	0.0	7104	0.0	0.0
34654	230	8	8			0	969	0.00	0	970	0.00	6022	0.0	0.0	6058	0.0	0.0
34655	129	8	8			6	411	0.01	6	411	0.01	6065	0.0	0.0	6066	0.0	0.0
34656	264	8	8			7	818	0.01	7	819	0.01	6064	0.0	0.0	6066	0.0	0.0
34657	172	8	8			0	403	0.00	0	403	0.00	6024	0.0	0.0	6064	0.0	0.0
34658	200	8	8			0	1,199	0.00	0	1,201	0.00	6025	0.0	0.0	6064	0.0	0.0
34659	127	8	8			6	1,183	0.01	6	1,184	0.01	6063	0.0	0.0	6127	0.0	0.0
34660	53	18	18			1,908	2,025	0.94	1,908	2,025	0.94	6111	0.0	0.0	6112	0.0	0.0
34661	45	18	18			1,908	3,217	0.59	1,908	3,217	0.59	6110	0.0	0.0	6111	0.0	0.0
34662	270	18	18			1,907	2,956	0.65	1,907	2,956	0.65	6042	0.0	0.0	6110	0.0	0.0
34663	216	6	6			0	483	0.00	0	483	0.00	6027	0.0	0.0	6042	0.0	0.0
34664	215	18	18			1,694	8,774	0.19	1,694	8,774	0.19	7361	0.0	0.0	6117	0.0	0.0
34665	15	18	18			1,610	8,981	0.18	1,610	8,970	0.18	6116	0.0	0.0	10883	0.0	0.0
34666	78	18	18			1,610	2,524	0.64	1,610	2,524	0.64	6114	0.0	0.0	6116	0.0	0.0
34667	395	8	8			88	926	0.10	88	927	0.10	7108	0.0	0.0	6113	0.0	0.0
34668	530	18	18			799	3,655	0.22	799	3,655	0.22	6129	0.0	0.0	6128	0.0	0.0
34669	120	15	15			1,609	1,877	0.86	1,609	1,877	0.86	6107	0.0	0.0	6129	0.0	0.0
34670	92	8	8			229	401	0.57	229	401	0.57	6049	0.0	0.0	6048	0.0	0.0
34671	150	8	8			229	617	0.37	229	618	0.37	6050	0.0	0.0	6049	0.0	0.0
34672	183	8	8			0	1,272	0.00	0	1,274	0.00	6028	0.0	0.0	6050	0.0	0.0
34673	138	8	8			228	578	0.40	228	578	0.39	6051	0.0	0.0	6050	0.0	0.0
34674	184	8	8			223	599	0.37	223	601	0.37	6052	0.0	0.0	6051	0.0	0.0
34675	280	8	8			223	755	0.30	223	756	0.30	6053	0.0	0.0	6052	0.0	0.0
34676	157	8	8			215	742	0.29	215	742	0.29	6054	0.0	0.0	6053	0.0	0.0
34677	232	8	8			192	842	0.23	192	843	0.23	6067	0.0	0.0	6054	0.0	0.0
34678	50	8	8			24	641	0.04	24	642	0.04	6055	0.0	0.0	6054	0.0	0.0
34679	163	8	8			24	538	0.04	24	539	0.04	6056	0.0	0.0	6055	0.0	0.0
34680	209	8	8			24	443	0.05	24	444	0.05	6057	0.0	0.0	6056	0.0	0.0
34681	90	8	8			16	623	0.03	16	624	0.03	6059	0.0	0.0	6057	0.0	0.0
34682	102	8	8			1	1,043	0.00	1	1,044	0.00	6058	0.0	0.0	6059	0.0	0.0
34683	136	8	8			16	695	0.02	16	697	0.02	6060	0.0	0.0	6059	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34684	173	8	8			15	910	0.02	15	912	0.02	6061	0.0	0.0	6060	0.0	0.0
34685	309	8	8			1	1,693	0.00	1	1,695	0.00	7200	0.0	0.0	6062	0.0	0.0
34686	175	8	8			1	860	0.00	1	861	0.00	7611	0.0	0.0	6061	0.0	0.0
34687	103	8	8			0	404	0.00	0	405	0.00	6030	0.0	0.0	7611	0.0	0.0
34688	345	8	8			7	617	0.01	7	618	0.01	6120	0.0	0.0	6119	0.0	0.0
34689	280	8	8			7	403	0.02	7	404	0.02	6043	0.0	0.0	6120	0.0	0.0
34690	528	8	8			0	736	0.00	0	737	0.00	6130	0.0	0.0	6043	0.0	0.0
34691	196	6	6			0	417	0.00	0	417	0.00	6105	0.0	0.0	6106	0.0	0.0
34692	46	8	8			23	1,666	0.01	23	1,668	0.01	6106	0.0	0.0	6107	0.0	0.0
34693	394	8	8			1	1,094	0.00	1	1,095	0.00	7107	0.0	0.0	6106	0.0	0.0
34694	372	8	8			0	705	0.00	0	706	0.00	6103	0.0	0.0	6104	0.0	0.0
34695	128	15	15			1,588	3,493	0.45	1,588	3,493	0.45	6108	0.0	0.0	6107	0.0	0.0
34696	133	15	15			1,588	3,131	0.51	1,588	3,131	0.51	6131	0.0	0.0	6108	0.0	0.0
34697	50	15	15			1,588	5,083	0.31	1,588	5,083	0.31	6132	0.0	0.0	6131	0.0	0.0
34698	179	8	8			14	808	0.02	14	808	0.02	6101	0.0	0.0	7614	0.0	0.0
34699	350	8	8			14	1,522	0.01	14	1,524	0.01	6102	0.0	0.0	6101	0.0	0.0
34700	82	8	8			13	1,381	0.01	13	1,383	0.01	6031	0.0	0.0	6102	0.0	0.0
34701	230	15	15			1,574	3,195	0.49	1,574	3,195	0.49	6100	0.0	0.0	7614	0.0	0.0
34702	104	15	15			1,574	3,831	0.41	1,574	3,831	0.41	6099	0.0	0.0	6100	0.0	0.0
34703	362	15	15			1,574	3,222	0.49	1,574	3,222	0.49	6098	0.0	0.0	6099	0.0	0.0
34704	155	8	8			0	1,208	0.00	0	1,210	0.00	6032	0.0	0.0	6098	0.0	0.0
34705	200	15	15			1,558	3,260	0.48	1,558	3,260	0.48	6134	0.0	0.0	6133	0.0	0.0
34707	150	8	8			8	415	0.02	8	416	0.02	6095	0.0	0.0	6133	0.0	0.0
34708	270	8	8			0	396	0.00	0	397	0.00	6034	0.0	0.0	6095	0.0	0.0
34709	188	8	8			0	911	0.00	0	913	0.00	6035	0.0	0.0	6094	0.0	0.0
34710	263	8	8			155	661	0.23	155	663	0.23	6093	0.0	0.0	6094	0.0	0.0
34711	133	8	8			160	746	0.22	160	747	0.21	6094	0.0	0.0	7199	0.0	0.0
34712	140	8	8			160	840	0.19	160	840	0.19	7199	0.0	0.0	6067	0.0	0.0
34713	152	8	8			1	372	0.00	1	372	0.00	6109	0.0	0.0	6108	0.0	0.0
34714	400	8	8			17	1,231	0.01	17	1,232	0.01	6097	0.0	0.0	9726	0.0	0.0
34715	392	18	18			1,528	5,493	0.28	1,529	5,493	0.28	6091	0.0	0.0	9726	0.0	0.0
34716	229	8	8			131	402	0.33	131	402	0.33	7424	0.0	0.0	6093	0.0	0.0
34717	87	8	8			1	1,304	0.00	1	1,306	0.00	7360	0.0	0.0	6093	0.0	0.0
34718	205	8	8			0	1,176	0.00	0	1,178	0.00	6036	0.0	0.0	7360	0.0	0.0
34719	223	8	8			18	1,252	0.01	18	1,253	0.01	7106	0.0	0.0	6092	0.0	0.0
34720	65	8	8			1	1,689	0.00	1	1,691	0.00	6040	0.0	0.0	7106	0.0	0.0
34721	105	8	8			0	1,328	0.00	0	1,329	0.00	6037	0.0	0.0	6040	0.0	0.0
34722	224	8	8			1	538	0.00	1	539	0.00	6087	0.0	0.0	6091	0.0	0.0
34723	136	8	8			0	381	0.00	0	381	0.00	6038	0.0	0.0	6087	0.0	0.0
34724	101	8	8			1	331	0.00	1	332	0.00	6086	0.0	0.0	6087	0.0	0.0
34725	76	8	8			0	389	0.00	0	390	0.00	6039	0.0	0.0	6086	0.0	0.0
34726	112	18	18			1,495	6,140	0.24	1,495	6,140	0.24	6045	0.0	0.0	6044	0.0	0.0
34727	76	21	21			1,487	3,734	0.40	1,488	3,734	0.40	6090	0.0	0.0	6045	0.0	0.0
34729	23	12	15	11	ura	5,779	2,229	2.59	6,374	2,229	2.86	6135	0.0	0.0	6088	0.0	0.0
34730	195	8	12	40	ura	234	540	0.43	234	540	0.43	6136	0.0	0.0	6088	0.0	0.0
34731	115	8	12	40	ura	220	397	0.56	220	397	0.55	6137	0.0	0.0	6136	0.0	0.0
34732	155	8	12	40	ura	220	402	0.55	220	403	0.55	6138	0.0	0.0	6137	0.0	0.0
34733	256	8	12	40	ura	203	406	0.50	203	407	0.50	6046	0.0	0.0	6047	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34736	233	8	8			1	1,262	0.00	1	1,263	0.00	6041	0.0	0.0	6110	0.0	0.0
34743	400	8	8			63	406	0.16	63	406	0.16	7616	0.0	0.0	6164	0.0	0.0
34744	400	8	8			20	406	0.05	20	406	0.05	6158	0.0	0.0	7616	0.0	0.0
34745	400	8	8			19	310	0.06	19	311	0.06	7362	0.0	0.0	6158	0.0	0.0
34747	70	8	8			138	413	0.33	138	413	0.33	6167	0.0	0.0	6168	0.0	0.0
34748	332	8	8			108	403	0.27	108	403	0.27	6166	0.0	0.0	6167	0.0	0.0
34749	50	8	8			107	385	0.28	107	385	0.28	6156	0.0	0.0	6166	0.0	0.0
34750	358	8	8			106	403	0.26	106	404	0.26	6164	0.0	0.0	6156	0.0	0.0
34751	360	8	8			29	447	0.07	29	447	0.07	6165	0.0	0.0	6167	0.0	0.0
34752	238	6	6			28	235	0.12	28	235	0.12	6152	0.0	0.0	6165	0.0	0.0
34753	147	8	8			1	658	0.00	1	659	0.00	6153	0.0	0.0	6177	0.0	0.0
34754	306	8	8			1	479	0.00	1	480	0.00	6162	0.0	0.0	6163	0.0	0.0
34755	229	8	8			190	510	0.37	190	510	0.37	6171	0.0	0.0	6170	0.0	0.0
34756	173	8	8			189	507	0.37	189	508	0.37	6172	0.0	0.0	6171	0.0	0.0
34757	53	8	8			1	500	0.00	1	501	0.00	6178	0.0	0.0	7617	0.0	0.0
34758	217	6	6			1	170	0.00	1	170	0.00	6155	0.0	0.0	6171	0.0	0.0
34759	261	8	8			1	630	0.00	1	631	0.00	6175	0.0	0.0	6176	4.1	0.0
34761	426	8	8			24	731	0.03	24	783	0.03	6207	0.0	0.0	6209	0.0	0.0
34762	300	8	8			0	743	0.00	0	797	0.00	6206	0.0	0.0	7363	0.0	0.0
34763	510	8	8			0	465	0.00	0	499	0.00	6250	0.0	0.0	7363	0.0	0.0
34764	332	8	8			0	683	0.00	0	733	0.00	7711	0.0	0.0	6250	0.0	0.0
34765	321	8	8			0	697	0.00	0	699	0.00	6210	0.0	0.0	6211	0.0	0.0
34766	253	8	8			1	443	0.00	1	476	0.00	6208	0.0	0.0	6209	0.0	0.0
34767	225	8	8			1	445	0.00	1	478	0.00	8752	0.0	0.0	6208	0.0	0.0
34768	339	8	8			1	972	0.00	1	974	0.00	6211	0.0	0.0	6191	0.0	0.0
34769	485	18	21	41	2036	2,036	3,047	0.67	2,036	3,047	0.67	6205	0.0	0.0	6204	0.0	0.0
34770	14	8	8			1	1,356	0.00	1	1,454	0.00	7363	0.0	0.0	6207	0.0	0.0
34771	295	18	21	41	2036	2,036	3,464	0.59	2,036	3,464	0.59	7201	0.0	0.0	6205	0.0	0.0
34772	175	18	21	41	2036	2,036	3,720	0.55	2,036	3,720	0.55	6252	0.0	0.0	7201	0.0	0.0
34773	240	18	21	41	2036	2,036	3,052	0.67	2,036	3,052	0.67	6212	0.0	0.0	6252	0.0	0.0
34774	80	18	21	41	2036	2,035	3,940	0.52	2,035	3,940	0.52	6213	0.0	0.0	6212	0.0	0.0
34775	465	8	8			12	636	0.02	12	637	0.02	6202	0.0	0.0	6201	0.0	0.0
34776	525	8	8			11	399	0.03	11	399	0.03	6203	0.0	0.0	6202	0.0	0.0
34777	121	6	6			1	188	0.00	1	188	0.00	6180	0.0	0.0	6203	0.0	0.0
34778	90	8	8			1	400	0.00	1	400	0.00	6197	0.0	0.0	6198	0.0	0.0
34779	205	8	8			2	403	0.01	2	403	0.01	6198	0.0	0.0	6192	0.0	0.0
34780	338	8	8			1	687	0.00	1	688	0.00	6200	0.0	0.0	6199	0.0	0.0
34781	58	8	8			1	846	0.00	1	847	0.00	6199	0.0	0.0	6192	0.0	0.0
34782	154	8	8			41	600	0.07	41	601	0.07	6192	0.0	0.0	7620	0.0	0.0
34783	112	8	8			208	406	0.51	208	407	0.51	6241	0.0	0.0	6242	0.0	0.0
34784	202	8	8			208	646	0.32	208	647	0.32	6240	0.0	0.0	6241	0.0	0.0
34785	149	8	8			126	478	0.26	126	479	0.26	6234	0.0	0.0	6240	0.0	0.0
34786	165	8	8			1	412	0.00	1	412	0.00	6181	0.0	0.0	6233	0.0	0.0
34787	202	8	8			125	477	0.26	125	478	0.26	7426	0.0	0.0	6233	0.0	0.0
34788	122	8	8			96	446	0.21	96	447	0.21	7619	0.0	0.0	7426	0.0	0.0
34789	178	8	8			21	797	0.03	21	798	0.03	6231	0.0	0.0	7619	0.0	0.0
34790	335	8	8			20	858	0.02	20	859	0.02	6230	0.0	0.0	6231	0.0	0.0
34791	130	8	8			74	470	0.16	74	471	0.16	6232	0.0	0.0	7619	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34792	456	8	8			81	817	0.10	81	817	0.10	7364	0.0	0.0	6240	0.0	0.0
34793	500	8	8			80	926	0.09	80	928	0.09	6239	0.0	0.0	7364	0.0	0.0
34794	353	8	8			79	431	0.18	79	432	0.18	6237	0.0	0.0	6239	0.0	0.0
34795	215	8	8			38	885	0.04	38	886	0.04	7109	0.0	0.0	6242	0.0	0.0
34796	248	8	8			1	1,018	0.00	1	1,019	0.00	6245	0.0	0.0	6244	0.0	0.0
34797	155	8	8			1	349	0.00	1	350	0.00	6183	0.0	0.0	6247	0.0	0.0
34798	112	8	8			1	799	0.00	1	800	0.00	6238	0.0	0.0	6247	0.0	0.0
34799	268	8	8			1	438	0.00	1	438	0.00	6184	0.0	0.0	7109	0.0	0.0
34800	264	8	8			1	683	0.00	1	684	0.00	6185	0.0	0.0	6244	0.0	0.0
34801	330	8	8			1	455	0.00	1	456	0.00	6249	0.0	0.0	7202	0.0	0.0
34802	323	8	8			3	493	0.01	3	494	0.01	6247	0.0	0.0	6248	0.0	0.0
34803	155	8	8			67	663	0.10	67	665	0.10	6236	0.0	0.0	6237	0.0	0.0
34804	151	8	8			67	417	0.16	67	418	0.16	6235	0.0	0.0	6236	0.0	0.0
34805	143	8	8			39	536	0.07	39	537	0.07	6219	0.0	0.0	6235	0.0	0.0
34806	249	8	8			1	354	0.00	1	355	0.00	6186	0.0	0.0	6235	0.0	0.0
34807	267	8	8			26	679	0.04	26	681	0.04	6222	0.0	0.0	6223	0.0	0.0
34808	98	8	8			29	394	0.07	29	394	0.07	6224	0.0	0.0	6225	0.0	0.0
34809	135	8	8			49	406	0.12	49	406	0.12	6225	0.0	0.0	6227	0.0	0.0
34810	135	8	8			1	676	0.00	1	676	0.00	6187	0.0	0.0	6227	0.0	0.0
34811	212	8	8			1	681	0.00	1	681	0.00	6188	0.0	0.0	6253	0.0	0.0
34812	161	8	8			38	357	0.11	38	358	0.11	6220	0.0	0.0	6219	0.0	0.0
34813	221	8	8			72	488	0.15	72	488	0.15	6228	0.0	0.0	6254	0.0	0.0
34814	134	8	8			73	460	0.16	73	460	0.16	6254	0.0	0.0	6255	0.0	0.0
34815	73	8	8			74	456	0.16	74	457	0.16	6255	0.0	0.0	6232	0.0	0.0
34816	46	8	8			50	423	0.12	50	423	0.12	6227	0.0	0.0	6226	0.0	0.0
34817	93	8	8			51	479	0.11	51	480	0.11	6226	0.0	0.0	6256	0.0	0.0
34818	130	8	8			51	542	0.09	51	543	0.09	6256	0.0	0.0	6228	0.0	0.0
34819	345	18	21	41	2036	2,003	3,030	0.66	2,003	3,030	0.66	6214	0.0	0.0	6213	0.0	0.0
34820	150	18	21	41	2036	2,003	4,434	0.45	2,003	4,434	0.45	6259	0.0	0.0	6214	0.0	0.0
34821	170	18	21	41	2036	2,003	3,082	0.65	2,003	3,082	0.65	6194	0.0	0.0	6259	0.0	0.0
34822	130	18	24	41	2036	1,982	3,848	0.52	1,982	3,848	0.52	6193	0.0	0.0	6195	0.0	0.0
34823	149	18	24	41	2036	1,992	2,993	0.67	1,992	2,993	0.67	6257	0.0	0.0	6194	0.0	0.0
34824	118	18	24	41	2036	1,983	3,162	0.63	1,983	3,162	0.63	6217	0.0	0.0	6257	0.0	0.0
34825	317	18	24	41	2036	1,982	2,969	0.67	1,983	2,969	0.67	7110	0.0	0.0	6217	0.0	0.0
34826	197	8	8			0	1,371	0.00	0	1,373	0.00	6258	0.0	0.0	6216	0.0	0.0
34827	109	8	8			1	1,567	0.00	1	1,569	0.00	6216	0.0	0.0	6191	0.0	0.0
34828	94	18	18			12	8,329	0.00	12	8,329	0.00	6191	0.0	0.0	6194	0.0	0.0
34829	307	8	8			16	313	0.05	16	313	0.05	6221	0.0	0.0	6220	0.0	0.0
34830	200	8	8			1	688	0.00	1	688	0.00	6190	0.0	0.0	6222	0.0	0.0
34831	302	8	8			28	331	0.09	28	356	0.08	6309	0.0	0.0	6306	0.0	0.0
34832	112	6	6			0	276	0.00	0	297	0.00	7712	0.0	0.0	6310	0.0	0.0
34833	304	8	8			8	374	0.02	8	401	0.02	6308	0.0	0.0	6307	0.0	0.0
34834	359	8	8			16	426	0.04	16	457	0.03	6316	0.0	0.0	7365	0.0	0.0
34835	365	8	8			16	387	0.04	16	415	0.04	6317	0.0	0.0	6316	0.0	0.0
34836	133	6	6			0	181	0.00	0	194	0.00	6260	0.0	0.0	6317	0.0	0.0
34837	318	8	8			0	353	0.00	0	378	0.00	6314	0.0	0.0	6315	0.0	0.0
34838	390	8	8			0	297	0.00	0	319	0.00	6318	0.0	0.0	6284	0.0	0.0
34839	302	8	8			10	364	0.03	10	390	0.03	7427	0.0	0.0	6326	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34840	103	6	6			0	169	0.00	0	181	0.00	6261	0.0	0.0	7427	0.0	0.0
34841	310	8	8			13	1,775	0.01	13	1,778	0.01	6323	0.0	0.0	6324	0.0	0.0
34842	170	8	8			13	1,310	0.01	13	1,313	0.01	6322	0.0	0.0	6323	0.0	0.0
34843	130	8	8			13	1,038	0.01	13	1,040	0.01	6321	0.0	0.0	6322	0.0	0.0
34844	459	8	8			14	1,106	0.01	14	1,108	0.01	6319	0.0	0.0	6320	0.0	0.0
34845	360	8	8			34	1,110	0.03	34	1,112	0.03	7113	0.0	0.0	6355	0.0	0.0
34846	365	8	8			33	1,110	0.03	33	1,111	0.03	6356	0.0	0.0	7113	0.0	0.0
34847	96	8	8			28	1,384	0.02	28	1,385	0.02	6357	0.0	0.0	6356	0.0	0.0
34848	214	8	8			21	1,461	0.01	21	1,463	0.01	6358	0.0	0.0	6357	0.0	0.0
34849	269	8	8			15	332	0.05	15	356	0.04	6311	0.0	0.0	6310	0.0	0.0
34850	115	6	6			0	215	0.00	0	231	0.00	6263	0.0	0.0	6311	0.0	0.0
34851	288	8	8			48	296	0.16	48	317	0.15	6307	0.0	0.0	6306	0.0	0.0
34852	287	8	8			24	806	0.03	24	865	0.03	6315	0.0	0.0	7365	0.0	0.0
34853	281	8	8			10	983	0.01	10	1,054	0.01	6326	0.0	0.0	6315	0.0	0.0
34854	152	8	8			0	970	0.00	0	1,041	0.00	6265	0.0	0.0	6326	0.0	0.0
34855	182	6	6			0	501	0.00	0	501	0.00	7713	0.0	0.0	6325	0.0	0.0
34856	275	8	8			32	1,452	0.02	32	1,453	0.02	6320	0.0	0.0	6355	0.0	0.0
34857	307	8	8			17	408	0.04	17	408	0.04	6324	0.0	0.0	6320	0.0	0.0
34858	215	8	8			1	403	0.00	1	403	0.00	6325	0.0	0.0	6324	0.0	0.0
34859	457	8	8			10	1,008	0.01	10	1,082	0.01	7111	0.0	0.0	6327	0.0	0.0
34860	452	8	8			26	297	0.09	26	319	0.08	6312	0.0	0.0	6313	0.0	0.0
34861	410	8	8			26	297	0.09	26	319	0.08	6284	0.0	0.0	6312	0.0	0.0
34862	315	8	8			16	955	0.02	16	1,024	0.02	6283	0.0	0.0	7729	0.0	0.0
34863	276	8	8			1	731	0.00	1	785	0.00	6329	0.0	0.0	6283	0.0	0.0
34864	150	8	8			0	617	0.00	0	661	0.00	6328	0.0	0.0	6283	0.0	0.0
34865	295	8	8			6	1,307	0.00	6	1,308	0.00	6363	0.0	0.0	6356	0.0	0.0
34866	515	8	8			10	573	0.02	10	574	0.02	6330	0.0	0.0	6358	0.0	0.0
34867	112	8	8			191	288	0.66	191	309	0.62	6304	0.0	0.0	6305	0.0	0.0
34868	230	8	8			174	297	0.59	174	319	0.55	6285	0.0	0.0	6304	0.0	0.0
34869	79	8	8			51	290	0.18	51	311	0.17	6299	0.0	0.0	6300	0.0	0.0
34870	243	8	8			44	305	0.14	44	326	0.13	6353	0.0	0.0	6299	0.0	0.0
34871	207	8	8			44	380	0.12	44	407	0.11	6286	0.0	0.0	6354	0.0	0.0
34872	118	8	8			0	433	0.00	0	465	0.00	6297	0.0	0.0	6286	0.0	0.0
34873	76	6	6			0	251	0.00	0	268	0.00	6268	0.0	0.0	6297	0.0	0.0
34874	110	8	8			0	317	0.00	0	340	0.00	6303	0.0	0.0	6304	0.0	0.0
34875	128	8	8			1	424	0.00	1	455	0.00	6302	0.0	0.0	6285	0.0	0.0
34876	46	8	8			0	277	0.00	0	297	0.00	6301	0.0	0.0	6302	0.0	0.0
34877	181	6	6			0	169	0.00	0	181	0.00	6270	0.0	0.0	6299	0.0	0.0
34878	157	8	8			0	298	0.00	0	319	0.00	6298	0.0	0.0	6286	0.0	0.0
34879	133	6	6			0	157	0.00	0	169	0.00	6271	0.0	0.0	6298	0.0	0.0
34880	143	6	6			0	170	0.00	0	183	0.00	6272	0.0	0.0	6353	0.0	0.0
34881	406	8	8			112	299	0.37	112	321	0.35	6294	0.0	0.0	6285	0.0	0.0
34882	253	8	8			24	790	0.03	24	847	0.03	6347	0.0	0.0	6294	0.0	0.0
34883	240	8	8			24	743	0.03	24	797	0.03	7622	0.0	0.0	6347	0.0	0.0
34884	274	8	8			24	479	0.05	24	515	0.05	6287	0.0	0.0	6346	0.0	0.0
34885	60	8	8			0	450	0.00	0	483	0.00	6273	0.0	0.0	6346	0.0	0.0
34886	124	8	8			0	418	0.00	0	449	0.00	6274	0.0	0.0	6287	0.0	0.0
34887	186	8	8			9	648	0.01	9	695	0.01	6333	0.0	0.0	6288	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34888	172	8	8			9	661	0.01	9	709	0.01	6289	0.0	0.0	6333	0.0	0.0
34889	165	8	8			9	1,092	0.01	9	1,172	0.01	6290	0.0	0.0	6289	0.0	0.0
34890	105	8	8			0	1,047	0.00	0	1,123	0.00	6334	0.0	0.0	6290	0.0	0.0
34891	165	8	8			10	1,321	0.01	10	1,323	0.01	6359	0.0	0.0	6358	0.0	0.0
34892	255	8	8			10	1,164	0.01	10	1,165	0.01	6360	0.0	0.0	6359	0.0	0.0
34893	198	8	8			1	1,669	0.00	1	1,672	0.00	6362	0.0	0.0	6361	0.0	0.0
34894	170	8	8			0	411	0.00	0	412	0.00	6365	0.0	0.0	6359	0.0	0.0
34895	108	8	8			0	378	0.00	0	406	0.00	6335	0.0	0.0	6289	0.0	0.0
34896	172	8	8			0	594	0.00	0	638	0.00	6336	0.0	0.0	6335	0.0	0.0
34897	157	8	8			0	972	0.00	0	1,042	0.00	6366	0.0	0.0	6290	0.0	0.0
34898	163	8	8			0	885	0.00	0	950	0.00	6275	0.0	0.0	6366	0.0	0.0
34899	153	8	8			1	744	0.00	1	798	0.00	6344	0.0	0.0	6349	0.0	0.0
34900	172	8	8			0	849	0.00	0	911	0.00	6345	0.0	0.0	6344	0.0	0.0
34901	320	8	8			4	644	0.01	4	690	0.01	6342	0.0	0.0	6348	0.0	0.0
34902	84	6	6			0	413	0.00	0	442	0.00	6276	0.0	0.0	6342	0.0	0.0
34903	287	8	8			49	690	0.07	49	740	0.07	6343	0.0	0.0	6349	0.0	0.0
34904	303	8	8			49	610	0.08	49	654	0.08	6296	0.0	0.0	6343	0.0	0.0
34905	132	8	8			17	1,208	0.01	17	1,296	0.01	6341	0.0	0.0	6296	0.0	0.0
34906	403	8	8			17	1,019	0.02	17	1,093	0.02	6291	0.0	0.0	6340	0.0	0.0
34907	90	8	8			17	1,153	0.01	17	1,236	0.01	6367	0.0	0.0	6291	0.0	0.0
34908	224	6	6			0	342	0.00	0	367	0.00	6278	0.0	0.0	6291	0.0	0.0
34909	166	8	8			0	877	0.00	0	941	0.00	6331	0.0	0.0	6288	0.0	0.0
34910	164	8	8			0	335	0.00	0	359	0.00	6332	0.0	0.0	6288	0.0	0.0
34911	180	8	8			1	917	0.00	1	983	0.00	6368	0.0	0.0	6344	0.0	0.0
34912	230	8	8			1	815	0.00	0	874	0.00	6369	0.0	0.0	6368	0.0	0.0
34913	300	8	8			16	756	0.02	16	810	0.02	6292	0.0	0.0	6296	0.0	0.0
34914	198	8	8			8	1,067	0.01	8	1,144	0.01	6337	0.0	0.0	6338	0.0	0.0
34915	145	8	8			8	1,192	0.01	8	1,278	0.01	7366	0.0	0.0	6292	0.0	0.0
34916	148	8	8			8	976	0.01	8	1,047	0.01	6339	0.0	0.0	7366	0.0	0.0
34917	227	8	8			28	296	0.10	28	317	0.09	6293	0.0	0.0	6286	0.0	0.0
34918	253	8	8			17	297	0.06	17	319	0.05	6295	0.0	0.0	6293	0.0	0.0
34919	175	8	8			17	299	0.06	17	322	0.05	6348	0.0	0.0	6295	0.0	0.0
34920	78	6	6			0	176	0.00	0	189	0.00	6279	0.0	0.0	6348	0.0	0.0
34921	93	6	6			0	320	0.00	0	343	0.00	6280	0.0	0.0	6295	0.0	0.0
34922	155	8	8			16	364	0.04	16	391	0.04	7112	0.0	0.0	6296	0.0	0.0
34923	144	8	8			74	476	0.15	74	511	0.14	6352	0.0	0.0	6294	0.0	0.0
34924	248	8	8			74	369	0.20	74	396	0.19	6351	0.0	0.0	6352	0.0	0.0
34925	303	8	8			63	821	0.08	63	881	0.07	6349	0.0	0.0	6351	0.0	0.0
34926	148	8	8			0	299	0.00	0	321	0.00	7159	0.0	0.0	6294	0.0	0.0
34927	55	6	6			0	169	0.00	0	181	0.00	6282	0.0	0.0	6327	0.0	0.0
34928	25	8	8			0	470	0.00	0	504	0.00	6375	0.0	0.0	6376	0.0	0.0
34929	112	8	8			0	472	0.00	0	506	0.00	6376	0.0	0.0	6377	0.0	0.0
34930	213	8	8			1	1,789	0.00	1	1,919	0.00	6374	0.0	0.0	6378	0.0	0.0
34931	71	8	8			3	1,354	0.00	3	1,453	0.00	6378	0.0	0.0	6405	0.0	0.0
34932	356	8	8			12	532	0.02	12	533	0.02	6390	0.0	0.0	7203	0.0	0.0
34933	117	8	8			12	1,311	0.01	12	1,313	0.01	7203	0.0	0.0	6391	0.0	0.0
34934	162	8	8			13	1,415	0.01	13	1,417	0.01	6391	0.0	0.0	6392	0.0	0.0
34935	308	8	8			13	1,954	0.01	13	1,957	0.01	6392	0.0	0.0	6393	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34936	225	8	8			15	1,450	0.01	15	1,452	0.01	6394	0.0	0.0	6388	0.0	0.0
34937	298	8	8			15	2,090	0.01	15	2,092	0.01	7623	0.0	0.0	6394	0.0	0.0
34938	143	8	8			15	1,610	0.01	15	1,612	0.01	7115	0.0	0.0	7623	0.0	0.0
34939	129	8	8			15	798	0.02	15	799	0.02	7160	0.0	0.0	7115	0.0	0.0
34940	274	8	8			1	1,450	0.00	1	1,452	0.00	6395	0.0	0.0	6379	0.0	0.0
34941	422	8	8			0	2,090	0.00	0	2,092	0.00	6396	0.0	0.0	6395	0.0	0.0
34942	205	8	8			13	2,401	0.01	13	2,405	0.01	6393	0.0	0.0	6397	0.0	0.0
34943	91	8	8			16	1,344	0.01	16	1,347	0.01	6397	0.0	0.0	6398	0.0	0.0
34944	77	8	8			16	2,435	0.01	16	2,438	0.01	6398	0.0	0.0	6385	0.0	0.0
34945	37	8	8			35	3,396	0.01	35	3,401	0.01	6385	0.0	0.0	7367	0.0	0.0
34946	218	8	8			19	2,200	0.01	19	2,203	0.01	6387	0.0	0.0	6385	0.0	0.0
34947	182	8	8			19	2,049	0.01	19	2,051	0.01	6388	0.0	0.0	6387	0.0	0.0
34948	269	8	8			35	2,219	0.02	35	2,222	0.02	7367	0.0	0.0	6386	0.0	0.0
34949	64	8	8			35	1,883	0.02	35	1,885	0.02	6386	0.0	0.0	7624	0.0	0.0
34950	212	8	8			36	2,102	0.02	36	2,105	0.02	7624	0.0	0.0	6383	0.0	0.0
34951	60	8	8			36	2,644	0.01	36	2,647	0.01	6383	0.0	0.0	6384	0.0	0.0
34952	189	8	8			37	1,065	0.03	37	1,067	0.03	6400	0.0	0.0	7114	0.0	0.0
34953	49	8	8			54	2,435	0.02	54	2,438	0.02	7114	0.0	0.0	6406	0.0	0.0
34954	106	8	8			1	1,501	0.00	1	1,503	0.00	6401	0.0	0.0	7114	0.0	0.0
34955	91	8	8			0	2,529	0.00	0	2,533	0.00	7715	0.0	0.0	6401	0.0	0.0
34956	355	8	8			54	403	0.13	54	403	0.13	6402	0.0	0.0	6380	0.0	0.0
34957	140	8	8			60	2,069	0.03	60	2,072	0.03	6380	0.0	0.0	6382	0.0	0.0
34958	66	8	8			0	2,798	0.00	0	2,801	0.00	6381	0.0	0.0	6382	0.0	0.0
34959	393	8	8			71	1,527	0.05	71	1,528	0.05	6382	0.0	0.0	6403	0.0	0.0
34960	250	8	8			1	1,106	0.00	1	1,186	0.00	6405	0.0	0.0	6389	0.0	0.0
34961	300	8	8			1	677	0.00	1	726	0.00	8084	0.0	0.0	6389	0.0	0.0
34962	400	8	8			1	1,503	0.00	1	1,506	0.00	6410	0.0	0.0	6411	0.0	0.0
34963	374	8	8			19	537	0.04	19	538	0.04	6411	0.0	0.0	6412	0.0	0.0
34964	146	8	8			19	1,437	0.01	19	1,439	0.01	6412	0.0	0.0	6409	0.0	0.0
34965	157	8	8			202	608	0.33	202	608	0.33	6413	0.0	0.0	6501	0.0	0.0
34967	202	8	8			6	545	0.01	6	546	0.01	6447	0.0	0.0	6446	0.0	0.0
34968	290	8	8			5	472	0.01	5	507	0.01	6498	0.0	0.0	7370	0.0	0.0
34969	74	8	8			2	563	0.00	2	603	0.00	6441	0.0	0.0	6498	0.0	0.0
34970	85	8	8			2	331	0.01	2	354	0.01	6442	0.0	0.0	6441	0.0	0.0
34971	348	8	8			2	1,180	0.00	2	1,265	0.00	6440	0.0	0.0	6442	0.0	0.0
34972	136	8	8			53	914	0.06	53	981	0.05	6497	0.0	0.0	7370	0.0	0.0
34973	108	8	8			15	1,010	0.01	15	1,083	0.01	6439	0.0	0.0	6497	0.0	0.0
34974	133	8	8			15	1,197	0.01	15	1,284	0.01	7625	0.0	0.0	6439	0.0	0.0
34975	354	8	8			0	451	0.00	0	483	0.00	6488	0.0	0.0	6434	0.0	0.0
34976	225	8	8			1	1,530	0.00	1	1,641	0.00	6454	0.0	0.0	6434	0.0	0.0
34977	200	8	8			0	338	0.00	0	362	0.00	7716	0.0	0.0	6454	0.0	0.0
34978	243	8	8			25	1,431	0.02	25	1,433	0.02	6457	0.0	0.0	6458	0.0	0.0
34979	205	8	8			18	1,399	0.01	18	1,401	0.01	6456	0.0	0.0	6457	0.0	0.0
34980	352	8	8			10	1,389	0.01	10	1,390	0.01	6451	0.0	0.0	6456	0.0	0.0
34981	79	8	8			1	1,163	0.00	1	1,165	0.00	6452	0.0	0.0	6451	0.0	0.0
34982	110	8	8			1	1,698	0.00	1	1,700	0.00	7368	0.0	0.0	6452	0.0	0.0
34983	301	8	8			0	806	0.00	0	806	0.00	6453	0.0	0.0	7368	0.0	0.0
34984	222	8	8			0	1,015	0.00	0	1,017	0.00	6417	0.0	0.0	6451	0.0	0.0

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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34985	387	8	8			7	1,802	0.00	7	1,805	0.00	7118	0.0	0.0	6455	0.0	0.0
34986	400	8	8			19	987	0.02	19	988	0.02	6493	0.0	0.0	6494	0.0	0.0
34987	221	8	8			19	402	0.05	19	403	0.05	6492	0.0	0.0	6493	0.0	0.0
34988	321	8	8			18	406	0.04	18	407	0.04	6491	0.0	0.0	6492	0.0	0.0
34989	370	8	8			12	413	0.03	12	413	0.03	6490	0.0	0.0	6491	0.0	0.0
34990	176	8	8			12	392	0.03	12	393	0.03	6443	0.0	0.0	6490	0.0	0.0
34991	181	8	8			11	892	0.01	11	892	0.01	6444	0.0	0.0	6443	0.0	0.0
34992	214	8	8			0	1,224	0.00	0	1,226	0.00	6414	0.0	0.0	6444	0.0	0.0
34993	161	8	8			11	1,752	0.01	11	1,755	0.01	6489	0.0	0.0	6444	0.0	0.0
34994	135	8	8			6	1,657	0.00	6	1,659	0.00	6446	0.0	0.0	6491	0.0	0.0
34995	72	8	8			0	925	0.00	0	926	0.00	6445	0.0	0.0	6446	0.0	0.0
34996	124	8	8			1	1,122	0.00	1	1,124	0.00	6448	0.0	0.0	6494	0.0	0.0
34997	214	8	8			1	1,852	0.00	1	1,854	0.00	6449	0.0	0.0	6495	0.0	0.0
34998	190	8	8			9	1,079	0.01	9	1,081	0.01	6496	0.0	0.0	6460	0.0	0.0
34999	175	8	8			9	1,157	0.01	9	1,159	0.01	6450	0.0	0.0	6496	0.0	0.0
35000	56	8	8			8	1,382	0.01	8	1,384	0.01	6418	0.0	0.0	6450	0.0	0.0
35001	80	8	8			41	1,075	0.04	41	1,076	0.04	6500	0.0	0.0	6499	0.0	0.0
35002	290	8	8			41	753	0.05	41	754	0.05	6460	0.0	0.0	6500	0.0	0.0
35003	245	8	8			203	874	0.23	203	875	0.23	6473	0.0	0.0	6474	0.0	0.0
35004	200	8	8			203	406	0.50	203	406	0.50	6459	0.0	0.0	6473	0.0	0.0
35005	146	8	8			202	981	0.21	202	983	0.21	6501	0.0	0.0	6459	0.0	0.0
35006	132	8	8			183	639	0.29	183	640	0.29	6461	0.0	0.0	6409	0.0	0.0
35007	135	8	8			147	1,002	0.15	147	1,003	0.15	6463	0.0	0.0	6462	0.0	0.0
35008	230	8	8			137	1,074	0.13	137	1,075	0.13	6464	0.0	0.0	6463	0.0	0.0
35009	165	8	8			0	551	0.00	0	552	0.00	6420	0.0	0.0	6464	0.0	0.0
35010	375	8	8			1	1,365	0.00	1	1,366	0.00	6478	0.0	0.0	6473	0.0	0.0
35011	119	8	8			0	1,067	0.00	0	1,069	0.00	7627	0.0	0.0	6477	0.0	0.0
35012	238	12	12			38	4,463	0.01	38	4,463	0.01	7204	0.0	0.0	6432	0.0	0.0
35013	115	12	12			38	4,444	0.01	38	4,444	0.01	6437	0.0	0.0	7204	0.0	0.0
35014	353	8	8			38	1,543	0.02	38	1,545	0.02	6438	0.0	0.0	6437	0.0	0.0
35015	306	8	8			38	1,417	0.03	38	1,419	0.03	6487	0.0	0.0	6438	0.0	0.0
35016	323	8	8			8	1,287	0.01	8	1,288	0.01	6486	0.0	0.0	6487	0.0	0.0
35017	284	8	8			35	963	0.04	35	965	0.04	6502	0.0	0.0	6462	0.0	0.0
35018	170	8	8			35	1,043	0.03	35	1,044	0.03	6471	0.0	0.0	6502	0.0	0.0
35019	283	8	8			26	1,061	0.02	26	1,063	0.02	6472	0.0	0.0	6471	0.0	0.0
35020	370	8	8			1	1,405	0.00	1	1,407	0.00	7369	0.0	0.0	6472	0.0	0.0
35021	153	8	8			25	1,813	0.01	25	1,815	0.01	6481	0.0	0.0	6482	0.0	0.0
35022	88	8	8			3	1,937	0.00	3	1,940	0.00	6483	0.0	0.0	6481	0.0	0.0
35023	104	8	8			0	444	0.00	0	445	0.00	6423	0.0	0.0	6483	0.0	0.0
35024	143	8	8			1	1,314	0.00	1	1,315	0.00	7117	0.0	0.0	6482	0.0	0.0
35025	147	8	8			0	1,560	0.00	0	1,563	0.00	6419	0.0	0.0	7117	0.0	0.0
35026	251	8	8			8	1,402	0.01	8	1,404	0.01	6435	0.0	0.0	6471	0.0	0.0
35027	180	8	8			0	585	0.00	0	586	0.00	6476	0.0	0.0	7204	0.0	0.0
35028	361	8	8			8	1,205	0.01	8	1,207	0.01	7730	0.0	0.0	6486	0.0	0.0
35029	173	8	8			136	1,040	0.13	136	1,041	0.13	6466	0.0	0.0	6465	0.0	0.0
35030	151	8	8			130	976	0.13	130	977	0.13	6467	0.0	0.0	6466	0.0	0.0
35031	178	8	8			130	1,562	0.08	130	1,564	0.08	6468	0.0	0.0	6467	0.0	0.0
35032	62	8	8			110	772	0.14	110	774	0.14	6469	0.0	0.0	6468	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35033	106	8	8			109	710	0.15	109	711	0.15	6433	0.0	0.0	6469	0.0	0.0
35034	208	8	8			72	1,142	0.06	72	1,144	0.06	6504	0.0	0.0	6503	0.0	0.0
35035	250	8	8			8	1,360	0.01	8	1,363	0.01	6421	0.0	0.0	6435	0.0	0.0
35036	393	8	8			6	1,270	0.00	6	1,272	0.00	6480	0.0	0.0	6466	0.0	0.0
35037	274	8	8			1	406	0.00	1	407	0.00	7116	0.0	0.0	6469	0.0	0.0
35038	480	8	8			0	1,596	0.00	0	1,598	0.00	6479	0.0	0.0	7116	0.0	0.0
35039	112	8	8			3	958	0.00	3	959	0.00	6484	0.0	0.0	6483	0.0	0.0
35040	92	8	8			3	1,338	0.00	3	1,339	0.00	6485	0.0	0.0	6484	0.0	0.0
35041	151	8	8			2	1,381	0.00	2	1,383	0.00	6422	0.0	0.0	6485	0.0	0.0
35042	179	8	8			38	1,251	0.03	38	1,252	0.03	6470	0.0	0.0	6433	0.0	0.0
35043	259	8	8			37	569	0.06	37	569	0.06	6506	0.0	0.0	6470	0.0	0.0
35044	232	8	8			25	1,291	0.02	25	1,292	0.02	6507	0.0	0.0	6506	0.0	0.0
35045	225	8	8			25	1,490	0.02	25	1,492	0.02	6508	0.0	0.0	6507	0.0	0.0
35046	215	8	8			25	1,643	0.02	25	1,645	0.02	6509	0.0	0.0	6508	0.0	0.0
35047	207	8	8			12	1,427	0.01	12	1,429	0.01	7205	0.0	0.0	6506	0.0	0.0
35049	300	8	8			10	921	0.01	10	988	0.01	6532	0.0	0.0	6543	0.0	0.0
35050	185	8	8			0	864	0.00	0	927	0.00	7717	0.0	0.0	6532	0.0	0.0
35051	236	8	8			1	956	0.00	1	1,026	0.00	6513	0.0	0.0	6533	0.0	0.0
35052	69	8	8			26	591	0.04	26	634	0.04	6545	0.0	0.0	6549	0.0	0.0
35054	173	8	8			49	701	0.07	49	751	0.07	6550	0.0	0.0	6551	0.0	0.0
35058	30	8	8			0	665	0.00	0	713	0.00	6553	0.0	0.0	6554	0.0	0.0
35059	175	8	8			0	647	0.00	0	694	0.00	6554	0.0	0.0	6555	0.0	0.0
35060	135	8	8			0	677	0.00	0	726	0.00	6514	0.0	0.0	6534	0.0	0.0
35061	97	8	8			10	651	0.01	10	699	0.01	6544	0.0	0.0	7629	0.0	0.0
35062	178	8	8			10	631	0.02	10	676	0.01	6534	0.0	0.0	6544	0.0	0.0
35063	248	8	8			15	331	0.04	15	355	0.04	6546	0.0	0.0	7629	0.0	0.0
35064	131	8	8			10	786	0.01	10	843	0.01	6527	0.0	0.0	6526	0.0	0.0
35065	127	8	8			11	968	0.01	11	1,038	0.01	6526	0.0	0.0	6516	0.0	0.0
35066	98	8	8			11	816	0.01	11	875	0.01	6516	0.0	0.0	6537	0.0	0.0
35067	252	8	8			11	757	0.01	11	812	0.01	6537	0.0	0.0	6538	0.0	0.0
35068	185	8	8			28	829	0.03	28	890	0.03	6517	0.0	0.0	6536	0.0	0.0
35069	351	8	8			28	588	0.05	28	631	0.05	6536	0.0	0.0	6535	0.0	0.0
35070	235	8	8			25	699	0.04	25	750	0.03	7629	0.0	0.0	6543	0.0	0.0
35071	210	8	8			35	562	0.06	35	603	0.06	6543	0.0	0.0	6542	0.0	0.0
35072	139	8	8			35	757	0.05	35	812	0.04	6542	0.0	0.0	6541	0.0	0.0
35073	196	8	8			35	509	0.07	35	547	0.06	6541	0.0	0.0	6540	0.0	0.0
35074	473	8	8			12	548	0.02	12	588	0.02	6539	0.0	0.0	6540	0.0	0.0
35075	145	8	8			12	333	0.04	12	358	0.03	6528	0.0	0.0	6539	0.0	0.0
35076	145	8	8			0	647	0.00	0	694	0.00	6519	0.0	0.0	6528	0.0	0.0
35077	335	8	8			12	385	0.03	12	413	0.03	6547	0.0	0.0	6528	0.0	0.0
35078	313	8	8			0	564	0.00	0	605	0.00	6548	0.0	0.0	7429	0.0	0.0
35079	308	8	8			0	826	0.00	0	886	0.00	6529	0.0	0.0	7429	0.0	0.0
35080	155	8	8			8	597	0.01	8	640	0.01	6525	0.0	0.0	6524	0.0	0.0
35081	243	8	8			8	496	0.02	8	532	0.01	6524	0.0	0.0	7371	0.0	0.0
35082	76	8	8			8	497	0.02	8	533	0.02	7371	0.0	0.0	7628	0.0	0.0
35083	100	8	12	22	ura	167	665	0.25	167	713	0.23	6529	0.0	0.0	6530	0.0	0.0
35086	396	8	8			59	456	0.13	59	489	0.12	7372	0.0	0.0	6556	0.0	0.0
35087	142	8	8			26	775	0.03	26	832	0.03	6576	0.0	0.0	6574	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35088	76	8	8			26	745	0.03	26	799	0.03	6575	0.0	0.0	6576	0.0	0.0
35089	547	8	8			1	940	0.00	1	1,009	0.00	6577	0.0	0.0	6575	0.0	0.0
35090	200	8	8			25	1,185	0.02	25	1,272	0.02	6570	0.0	0.0	6575	0.0	0.0
35091	220	8	8			25	951	0.03	25	1,020	0.02	6569	0.0	0.0	6570	0.0	0.0
35092	190	8	8			16	1,099	0.01	16	1,178	0.01	6564	0.0	0.0	6568	0.0	0.0
35093	143	8	8			10	939	0.01	10	1,007	0.01	6571	0.0	0.0	6572	0.0	0.0
35094	102	8	8			0	630	0.00	0	676	0.00	7718	0.0	0.0	6571	0.0	0.0
35095	179	8	8			9	298	0.03	9	320	0.03	6567	0.0	0.0	6568	0.0	0.0
35096	167	8	8			8	298	0.03	8	319	0.03	6566	0.0	0.0	6567	0.0	0.0
35097	250	8	8			8	1,088	0.01	8	1,167	0.01	6563	0.0	0.0	6566	0.0	0.0
35098	189	8	8			12	684	0.02	12	734	0.02	6558	0.0	0.0	6573	0.0	0.0
35099	302	8	8			12	574	0.02	12	616	0.02	6573	0.0	0.0	6578	0.0	0.0
35100	421	8	8			4	1,034	0.00	4	1,110	0.00	6559	0.0	0.0	6578	0.0	0.0
35101	213	8	8			0	190	0.00	0	204	0.00	6560	0.0	0.0	6573	0.0	0.0
35102	400	8	8			66	297	0.22	66	319	0.21	6586	0.0	0.0	6585	0.0	0.0
35103	261	8	8			24	240	0.10	24	258	0.09	7631	0.0	0.0	6586	0.0	0.0
35104	300	8	8			13	607	0.02	13	651	0.02	6589	0.0	0.0	7631	0.0	0.0
35105	300	8	8			13	622	0.02	13	667	0.02	6588	0.0	0.0	6589	0.0	0.0
35106	183	8	8			0	460	0.00	0	493	0.00	6583	0.0	0.0	6588	0.0	0.0
35107	238	8	8			0	350	0.00	0	376	0.00	6580	0.0	0.0	7631	0.0	0.0
35108	445	8	8			33	807	0.04	33	865	0.04	6590	0.0	0.0	6586	0.0	0.0
35109	450	8	8			33	678	0.05	33	727	0.05	6593	0.0	0.0	6590	0.0	0.0
35110	298	8	8			24	801	0.03	24	860	0.03	7373	0.0	0.0	6593	0.0	0.0
35111	439	8	8			12	297	0.04	12	319	0.04	6587	0.0	0.0	7632	0.0	0.0
35112	370	8	8			11	591	0.02	11	634	0.02	6581	0.0	0.0	7373	0.0	0.0
35113	371	8	8			10	526	0.02	10	565	0.02	6582	0.0	0.0	6593	0.0	0.0
35114	231	10	10			334	903	0.37	334	967	0.35	6602	0.0	0.0	6603	0.0	0.0
35115	172	10	10			163	1,516	0.11	163	1,623	0.10	6601	0.0	0.0	7119	0.0	0.0
35116	151	10	10			102	1,591	0.06	102	1,703	0.06	6600	0.0	0.0	6601	0.0	0.0
35117	83	10	10			97	1,594	0.06	97	1,706	0.06	6599	0.0	0.0	6600	0.0	0.0
35118	208	8	8			97	843	0.11	97	905	0.11	6598	0.0	0.0	6599	0.0	0.0
35119	129	8	8			85	863	0.10	85	926	0.09	6595	0.0	0.0	6594	0.0	0.0
35120	150	8	8			76	687	0.11	76	737	0.10	6596	0.0	0.0	6595	0.0	0.0
35121	221	8	8			48	813	0.06	48	872	0.05	6592	0.0	0.0	6596	0.0	0.0
35122	400	8	8			48	871	0.06	48	934	0.05	6597	0.0	0.0	6592	0.0	0.0
35123	290	8	8			27	940	0.03	27	1,009	0.03	6591	0.0	0.0	6597	0.0	0.0
35124	330	8	8			14	470	0.03	14	504	0.03	6604	0.0	0.0	6605	0.0	0.0
35126	229	8	8			14	460	0.03	14	493	0.03	6606	0.0	0.0	7374	0.0	0.0
35127	85	8	8			28	554	0.05	28	594	0.05	6632	0.0	0.0	6633	0.0	0.0
35128	172	8	8			0	378	0.00	0	405	0.00	6627	0.0	0.0	7161	0.0	0.0
35129	158	8	8			16	376	0.04	16	403	0.04	7161	0.0	0.0	7120	0.0	0.0
35130	431	8	8			65	362	0.18	65	388	0.17	6639	0.0	0.0	7120	0.0	0.0
35131	283	8	8			80	319	0.25	80	342	0.23	7120	0.0	0.0	6626	0.0	0.0
35132	263	8	8			81	480	0.17	81	515	0.16	6626	0.0	0.0	6625	0.0	0.0
35133	359	8	8			81	555	0.15	81	595	0.14	6625	0.0	0.0	6624	0.0	0.0
35135	112	8	8			27	281	0.10	27	301	0.09	6619	0.0	0.0	6618	0.0	0.0
35136	290	8	8			1	302	0.00	1	324	0.00	6620	0.0	0.0	6619	0.0	0.0
35137	271	8	8			1	294	0.00	1	315	0.00	7633	0.0	0.0	6621	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35138	118	8	8			0	419	0.00	0	450	0.00	6614	0.0	0.0	6617	0.0	0.0
35139	76	8	8			0	295	0.00	0	317	0.00	6622	0.0	0.0	7633	0.0	0.0
35140	100	8	8			0	364	0.00	0	391	0.00	6612	0.0	0.0	6622	0.0	0.0
35141	176	6	6			0	267	0.00	0	286	0.00	6613	0.0	0.0	7633	0.0	0.0
35142	135	8	8			20	202	0.10	20	217	0.09	6642	0.0	0.0	6641	0.0	0.0
35143	121	8	8			20	427	0.05	20	458	0.04	6645	0.0	0.0	6642	0.0	0.0
35144	269	8	8			0	480	0.00	0	515	0.00	7375	0.0	0.0	6645	0.0	0.0
35145	331	8	8			0	305	0.00	0	327	0.00	6646	0.0	0.0	7162	0.0	0.0
35146	445	8	8			0	508	0.00	0	545	0.00	6644	0.0	0.0	6645	0.0	0.0
35147	368	8	8			59	471	0.13	59	505	0.12	7431	0.0	0.0	6641	0.0	0.0
35148	65	8	8			59	391	0.15	59	419	0.14	6640	0.0	0.0	7431	0.0	0.0
35149	377	8	8			65	447	0.14	65	480	0.13	6638	0.0	0.0	6639	0.0	0.0
35150	340	8	8			53	448	0.12	53	481	0.11	6654	0.0	0.0	6638	0.0	0.0
35151	174	8	8			58	385	0.15	58	413	0.14	6655	0.0	0.0	6640	0.0	0.0
35152	45	8	8			0	351	0.00	0	376	0.00	6667	0.0	0.0	6655	0.0	0.0
35153	100	8	8			58	453	0.13	58	486	0.12	6656	0.0	0.0	6655	0.0	0.0
35154	349	8	8			0	434	0.00	0	466	0.00	6634	0.0	0.0	6635	0.0	0.0
35155	67	8	8			0	422	0.00	0	453	0.00	6607	0.0	0.0	6634	0.0	0.0
35156	285	8	8			43	516	0.08	43	553	0.08	6637	0.0	0.0	6635	0.0	0.0
35157	403	8	8			42	386	0.11	42	415	0.10	6633	0.0	0.0	6637	0.0	0.0
35158	196	15	18	23	ura	692	538	1.29	692	577	1.20	6652	0.0	0.0	6653	0.0	0.0
35159	18	15	18	23	ura	692	3,078	0.22	709	3,297	0.22	7162	0.0	0.0	6652	0.0	0.0
35160	472	15	15			691	3,051	0.23	691	3,269	0.21	6657	0.0	0.0	7162	0.0	0.0
35161	331	15	15			691	2,800	0.25	691	3,000	0.23	6651	0.0	0.0	6657	0.0	0.0
35162	158	15	15			641	2,799	0.23	641	2,999	0.21	6650	0.0	0.0	6651	0.0	0.0
35163	148	15	15			641	1,678	0.38	641	1,798	0.36	6649	0.0	0.0	6650	0.0	0.0
35164	127	15	15			449	2,731	0.16	449	2,926	0.15	6665	0.0	0.0	6649	0.0	0.0
35165	139	8	8			1	282	0.00	1	303	0.00	6658	0.0	0.0	6632	0.0	0.0
35166	61	8	8			1	330	0.00	1	353	0.00	6659	0.0	0.0	6658	0.0	0.0
35167	147	8	8			0	288	0.00	0	308	0.00	6660	0.0	0.0	6659	0.0	0.0
35168	84	8	8			1	199	0.00	1	213	0.00	6661	0.0	0.0	6658	0.0	0.0
35169	150	8	8			0	563	0.00	0	603	0.00	6609	0.0	0.0	6661	0.0	0.0
35170	141	8	8			0	319	0.00	0	342	0.00	6662	0.0	0.0	6661	0.0	0.0
35171	93	8	8			0	362	0.00	0	388	0.00	6610	0.0	0.0	6662	0.0	0.0
35172	98	8	8			27	914	0.03	27	981	0.03	6630	0.0	0.0	6629	0.0	0.0
35173	362	8	8			12	376	0.03	12	403	0.03	6631	0.0	0.0	6630	0.0	0.0
35174	141	8	8			15	485	0.03	15	520	0.03	6664	0.0	0.0	6663	0.0	0.0
35175	74	8	8			15	638	0.02	15	684	0.02	7374	0.0	0.0	6664	0.0	0.0
35176	363	8	8			0	316	0.00	0	339	0.00	6628	0.0	0.0	7374	0.0	0.0
35177	225	8	8			6	288	0.02	6	308	0.02	6611	0.0	0.0	6665	0.0	0.0
35178	60	15	15			422	3,128	0.13	422	3,352	0.13	6647	0.0	0.0	6648	0.0	0.0
35179	168	8	8			15	574	0.03	15	615	0.02	6663	0.0	0.0	6630	0.0	0.0
35180	65	8	8			0	420	0.00	0	451	0.00	6666	0.0	0.0	6664	0.0	0.0
35182	102	8	8			0	706	0.00	0	758	0.00	7719	0.0	0.0	6683	0.0	0.0
35183	145	8	8			0	617	0.00	0	663	0.00	6670	0.0	0.0	6688	0.0	0.0
35184	225	8	15	24	2036	73	297	0.25	73	319	0.23	6686	0.0	0.0	6688	0.0	0.0
35185	260	8	15	24	2036	47	253	0.18	47	271	0.17	6684	0.0	0.0	6686	0.0	0.0
35186	330	8	15	24	2036	47	256	0.18	47	275	0.17	7635	0.0	0.0	6684	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35187	250	8	8			1	540	0.00	1	579	0.00	6683	0.0	0.0	7635	0.0	0.0
35188	220	8	8			0	601	0.00	0	645	0.00	6685	0.0	0.0	6684	0.0	0.0
35189	130	8	8			0	505	0.00	0	542	0.00	6668	0.0	0.0	6685	0.0	0.0
35194	150	8	8			266	243	1.09	266	260	1.02	6701	0.0	0.0	7122	0.0	0.0
35195	272	8	8			47	364	0.13	47	390	0.12	8788	0.0	0.0	6727	0.0	0.0
35196	75	8	8			242	515	0.47	242	553	0.44	6727	0.0	0.0	6701	0.0	0.0
35197	406	8	8			24	404	0.06	24	433	0.05	6699	0.0	0.0	6700	0.0	0.0
35198	404	8	8			0	468	0.00	0	502	0.00	6689	0.0	0.0	6699	0.0	0.0
35199	174	8	8			0	369	0.00	0	395	0.00	6671	0.0	0.0	6689	0.0	0.0
35200	336	15	15			524	969	0.54	524	1,039	0.50	6697	0.0	0.0	7376	0.0	0.0
35201	273	15	15			524	962	0.55	524	1,031	0.51	6698	0.0	0.0	6697	0.0	0.0
35202	213	15	15			524	974	0.54	524	1,044	0.50	6720	0.0	0.0	6698	0.0	0.0
35203	203	15	15			477	966	0.49	477	1,035	0.46	6721	0.0	0.0	6720	0.0	0.0
35204	258	15	15			477	965	0.49	477	1,033	0.46	6695	0.0	0.0	6721	0.0	0.0
35206	262	18	24	25	2036	2,907	3,349	0.87	2,908	3,588	0.81	6705	0.0	0.0	7121	0.0	0.0
35207	485	18	24	25	2036	2,860	3,335	0.86	2,861	3,573	0.80	6709	0.0	0.0	6707	0.0	0.0
35208	365	8	8			0	297	0.00	0	319	0.00	6706	0.0	0.0	6680	0.0	0.0
35209	222	6	6			0	169	0.00	0	181	0.00	6672	0.0	0.0	6706	0.0	0.0
35210	110	8	8			196	401	0.49	196	430	0.46	7207	0.0	0.0	6727	0.0	0.0
35211	260	8	8			133	405	0.33	133	435	0.31	6702	0.0	0.0	7207	0.0	0.0
35212	420	8	8			132	376	0.35	132	403	0.33	6680	0.0	0.0	6702	0.0	0.0
35213	234	6	6			0	173	0.00	0	185	0.00	6679	0.0	0.0	6708	0.0	0.0
35214	497	8	8			47	376	0.12	47	403	0.12	7377	0.0	0.0	7207	0.0	0.0
35215	245	6	6			0	312	0.00	0	334	0.00	6676	0.0	0.0	6722	0.0	0.0
35216	242	8	8			28	372	0.07	28	400	0.07	6690	0.0	0.0	6722	0.0	0.0
35217	251	8	8			27	358	0.08	27	385	0.07	6682	0.0	0.0	6690	0.0	0.0
35218	332	8	8			1	319	0.00	1	342	0.00	6703	0.0	0.0	6722	0.0	0.0
35219	143	8	8			0	236	0.00	0	253	0.00	6704	0.0	0.0	6703	0.0	0.0
35220	157	8	8			0	374	0.00	0	401	0.00	6674	0.0	0.0	6704	0.0	0.0
35221	352	8	8			0	398	0.00	0	426	0.00	6723	0.0	0.0	6702	0.0	0.0
35222	286	8	8			106	297	0.36	106	318	0.33	6711	0.0	0.0	6680	0.0	0.0
35223	216	8	8			106	292	0.36	106	313	0.34	6712	0.0	0.0	6711	0.0	0.0
35224	72	8	8			0	701	0.00	0	752	0.00	6678	0.0	0.0	6712	0.0	0.0
35225	310	8	8			105	299	0.35	105	320	0.33	6681	0.0	0.0	6712	0.0	0.0
35226	379	8	8			86	297	0.29	86	318	0.27	6715	0.0	0.0	6681	0.0	0.0
35227	67	8	8			86	299	0.29	86	320	0.27	6714	0.0	0.0	6715	0.0	0.0
35228	133	8	8			86	276	0.31	86	297	0.29	6713	0.0	0.0	6714	0.0	0.0
35229	155	8	8			86	278	0.31	86	298	0.29	7636	0.0	0.0	6713	0.0	0.0
35230	177	6	6			85	127	0.67	85	136	0.63	6691	0.0	0.0	7636	0.0	0.0
35231	136	8	8			85	276	0.31	85	297	0.29	6692	0.0	0.0	6691	0.0	0.0
35232	191	6	6			0	232	0.00	0	249	0.00	6673	0.0	0.0	7636	0.0	0.0
35233	512	15	21	27	2036	842	1,122	0.75	842	1,201	0.70	7637	0.0	0.0	6709	0.0	0.0
35234	459	15	18	23	ura	789	2,346	0.34	789	2,513	0.31	6716	0.0	0.0	6710	0.0	0.0
35235	45	15	18	23	ura	789	2,369	0.33	789	2,538	0.31	6717	0.0	0.0	6716	0.0	0.0
35236	188	6	6			0	60	0.00	0	64	0.00	6677	0.0	0.0	6681	0.0	0.0
35238	94	8	8			0	394	0.00	0	423	0.00	6728	0.0	0.0	6683	0.0	0.0
35240	51	8	8			0	335	0.00	0	360	0.00	6730	0.0	0.0	6741	0.0	0.0
35241	131	8	8			0	1,049	0.00	0	1,126	0.00	6732	0.0	0.0	6733	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35242	129	8	8			0	738	0.00	0	792	0.00	6733	0.0	0.0	7638	0.0	0.0
35243	138	8	8			24	333	0.07	24	357	0.07	7638	0.0	0.0	6734	0.0	0.0
35244	206	8	8			25	399	0.06	25	428	0.06	6734	0.0	0.0	6740	0.0	0.0
35245	156	8	8			1	363	0.00	1	390	0.00	6736	0.0	0.0	6739	0.0	0.0
35246	199	8	8			10	497	0.02	10	533	0.02	9920	0.0	0.0	6738	0.0	0.0
35247	240	8	8			10	311	0.03	10	333	0.03	6738	0.0	0.0	6739	0.0	0.0
35248	350	8	8			34	297	0.11	34	319	0.11	6739	0.0	0.0	6740	0.0	0.0
35249	260	8	8			59	297	0.20	59	319	0.19	6740	0.0	0.0	6741	0.0	0.0
35250	279	8	8			59	298	0.20	59	319	0.18	6741	0.0	0.0	6904	0.0	0.0
35256	269	8	8			0	492	0.00	0	527	0.00	6795	0.0	0.0	6794	0.0	0.0
35266	269	8	8			26	332	0.08	26	356	0.07	6776	0.0	0.0	6789	0.0	0.0
35267	270	8	8			26	373	0.07	26	400	0.07	6788	0.0	0.0	6776	0.0	0.0
35268	277	8	8			0	435	0.00	0	467	0.00	6796	0.0	0.0	6788	0.0	0.0
35269	209	8	12	24	2036	46	278	0.17	46	298	0.15	6779	0.0	0.0	6778	0.0	0.0
35270	139	8	12	24	2036	46	279	0.16	46	299	0.15	6780	0.0	0.0	6779	0.0	0.0
35271	201	8	8			36	518	0.07	36	556	0.07	6791	0.0	0.0	8747	0.0	0.0
35272	329	8	8			28	603	0.05	28	647	0.04	6789	0.0	0.0	8740	0.0	0.0
35273	262	8	8			13	360	0.03	13	387	0.03	6792	0.0	0.0	6788	0.0	0.0
35274	111	8	8			13	315	0.04	13	338	0.04	6765	0.0	0.0	6792	0.0	0.0
35275	155	8	8			7	320	0.02	7	344	0.02	6793	0.0	0.0	6765	0.0	0.0
35276	315	8	8			6	319	0.02	6	342	0.02	6764	0.0	0.0	6765	0.0	0.0
35290	350	8	8			0	470	0.00	0	504	0.00	6835	0.0	0.0	6834	0.0	0.0
35291	385	8	8			83	557	0.15	83	597	0.14	6815	0.0	0.0	6816	0.0	0.0
35292	247	8	8			83	296	0.28	83	317	0.26	7379	0.0	0.0	6815	0.0	0.0
35293	136	8	8			50	494	0.10	50	530	0.09	6821	0.0	0.0	7379	0.0	0.0
35294	41	8	8			0	275	0.00	0	294	0.00	6868	0.0	0.0	7379	0.0	0.0
35295	35	8	8			0	251	0.00	0	269	0.00	6867	0.0	0.0	7379	0.0	0.0
35296	162	8	8			50	508	0.10	50	544	0.09	6822	0.0	0.0	6821	0.0	0.0
35297	81	8	8			0	498	0.00	0	535	0.00	6823	0.0	0.0	6822	0.0	0.0
35298	118	8	8			0	452	0.00	0	485	0.00	7432	0.0	0.0	6823	0.0	0.0
35299	24	8	8			0	333	0.00	0	357	0.00	6866	0.0	0.0	6822	0.0	0.0
35300	196	8	8			49	514	0.10	49	551	0.09	6825	0.0	0.0	6822	0.0	0.0
35301	196	8	8			27	535	0.05	27	574	0.05	7124	0.0	0.0	6825	0.0	0.0
35302	68	8	8			0	255	0.00	0	274	0.00	6824	0.0	0.0	7124	0.0	0.0
35303	25	8	8			1	312	0.00	1	335	0.00	6865	0.0	0.0	6816	0.0	0.0
35304	302	8	8			1	330	0.00	1	354	0.00	6813	0.0	0.0	6814	0.0	0.0
35305	356	8	8			1	410	0.00	1	440	0.00	7123	0.0	0.0	6813	0.0	0.0
35306	404	8	8			1	340	0.00	1	365	0.00	6817	0.0	0.0	7123	0.0	0.0
35307	260	8	8			1	318	0.00	1	341	0.00	6818	0.0	0.0	6817	0.0	0.0
35308	234	15	15			1,283	4,424	0.29	1,307	4,740	0.28	6819	0.0	0.0	6820	0.0	0.0
35309	26	8	8			0	319	0.00	0	342	0.00	6864	0.0	0.0	7641	0.0	0.0
35310	288	8	8			1	333	0.00	1	357	0.00	6826	0.0	0.0	7641	0.0	0.0
35311	28	8	8			0	308	0.00	0	330	0.00	6863	0.0	0.0	6826	0.0	0.0
35312	41	8	8			0	328	0.00	0	352	0.00	6862	0.0	0.0	6826	0.0	0.0
35313	354	8	8			18	400	0.05	18	401	0.05	6832	0.0	0.0	6839	0.0	0.0
35314	279	8	8			17	403	0.04	17	403	0.04	6809	0.0	0.0	6832	0.0	0.0
35315	391	8	8			17	397	0.04	17	397	0.04	6812	0.0	0.0	6809	0.0	0.0
35316	70	18	24	25	2036	2,907	3,203	0.91	2,908	3,431	0.85	6831	0.0	0.0	6830	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35317	190	18	24	25	2036	2,907	4,337	0.67	2,908	4,647	0.63	6830	0.0	0.0	6840	0.0	0.0
35318	36	8	8			0	293	0.00	0	315	0.00	6861	0.0	0.0	6840	0.0	0.0
35319	249	8	8			36	430	0.08	36	431	0.08	6829	0.0	0.0	6827	0.0	0.0
35320	283	8	8			2	387	0.01	2	388	0.01	6841	0.0	0.0	6829	0.0	0.0
35321	175	8	8			1	460	0.00	1	460	0.00	6838	0.0	0.0	6842	0.0	0.0
35322	139	18	24	25	2036	2,937	2,961	0.99	2,938	3,173	0.93	6843	0.0	0.0	6828	0.0	0.0
35323	433	18	24	25	2036	2,908	3,023	0.96	2,908	3,239	0.90	6840	0.0	0.0	6843	0.0	0.0
35324	370	8	8			19	408	0.05	19	408	0.05	6839	0.0	0.0	6827	0.0	0.0
35325	12	8	8			0	303	0.00	0	326	0.00	6859	0.0	0.0	6814	0.0	0.0
35326	12	8	8			0	303	0.00	0	326	0.00	6858	0.0	0.0	6814	0.0	0.0
35327	16	8	8			0	333	0.00	0	357	0.00	6857	0.0	0.0	6813	0.0	0.0
35328	16	8	8			0	333	0.00	0	357	0.00	6856	0.0	0.0	6813	0.0	0.0
35329	13	8	8			0	345	0.00	0	370	0.00	6855	0.0	0.0	7123	0.0	0.0
35330	15	8	27			0	343	0.00	0	368	0.00	6854	0.0	0.0	7123	0.0	0.0
35331	13	8	27			0	319	0.00	0	342	0.00	6853	0.0	0.0	6817	0.0	0.0
35332	12	8	27			0	359	0.00	0	385	0.00	6851	0.0	0.0	6818	0.0	0.0
35343	366	18	24	26	Existing	3,809	3,535	1.08	3,860	8,158	0.47	6874	0.0	0.0	6882	0.0	0.0
35344	384	18	24	26	Existing	3,809	3,539	1.08	3,861	8,165	0.47	6875	0.0	0.0	6874	0.0	0.0
35345	376	18	24	26	Existing	3,809	3,539	1.08	3,863	8,165	0.47	6873	0.0	0.0	6875	0.0	0.0
35360	127	8	8			29	387	0.08	29	415	0.07	6905	0.0	0.0	7433	0.0	0.0
35361	324	10	10			133	457	0.29	133	489	0.27	6895	0.0	0.0	6894	0.0	0.0
35362	367	10	10			133	431	0.31	133	462	0.29	6894	0.0	0.0	6893	0.0	0.0
35366	14	8	8			0	397	0.00	0	426	0.00	6930	0.0	0.0	6919	0.0	0.0
35367	14	8	8			0	333	0.00	0	357	0.00	6931	0.0	0.0	7208	0.0	0.0
35368	12	8	8			1	303	0.00	1	326	0.00	6932	0.0	0.0	6912	0.0	0.0
35369	143	15	15			610	1,558	0.39	610	1,669	0.37	6904	0.0	0.0	7380	0.0	0.0
35370	398	18	18			678	1,419	0.48	678	1,520	0.45	6919	0.0	0.0	6914	0.0	0.0
35371	406	18	18			638	1,390	0.46	638	1,490	0.43	7208	0.0	0.0	6919	0.0	0.0
35372	385	18	18			638	1,413	0.45	638	1,513	0.42	6921	0.0	0.0	7208	0.0	0.0
35373	80	18	18			638	2,374	0.27	638	2,543	0.25	7380	0.0	0.0	6921	0.0	0.0
35374	92	18	18			803	1,413	0.57	803	1,514	0.53	6914	0.0	0.0	6913	0.0	0.0
35375	530	8	8			28	289	0.10	28	310	0.09	6923	0.0	0.0	6922	0.0	0.0
35376	230	8	8			0	759	0.00	0	815	0.00	7645	0.0	0.0	6923	0.0	0.0
35377	175	8	8			34	297	0.11	34	319	0.11	6918	0.0	0.0	7644	0.0	0.0
35378	114	8	8			0	521	0.00	0	559	0.00	6917	0.0	0.0	6924	0.0	0.0
35379	163	6	6			0	247	0.00	0	264	0.00	7723	0.0	0.0	6917	0.0	0.0
35380	472	8	8			0	297	0.00	0	318	0.00	6916	0.0	0.0	6924	0.0	0.0
35382	506	8	8			27	281	0.10	27	301	0.09	6907	0.0	0.0	6906	0.0	0.0
35383	502	8	8			27	297	0.09	27	318	0.09	6925	0.0	0.0	6907	0.0	0.0
35384	266	8	8			0	301	0.00	0	323	0.00	6908	0.0	0.0	6926	0.0	0.0
35385	268	8	8			0	296	0.00	0	317	0.00	6927	0.0	0.0	6908	0.0	0.0
35386	39	18	18			828	1,731	0.48	828	1,855	0.45	7125	0.0	0.0	6933_WETWELL	0.0	0.0
35387	35	18	18			827	1,827	0.45	827	1,958	0.42	6911	0.0	0.0	6910	0.0	0.0
35389	305	18	18			804	1,404	0.57	804	1,504	0.53	6913	0.0	0.0	6912	0.0	0.0
35390	47	8	8			1	369	0.00	1	396	0.00	6915	0.0	0.0	6913	0.0	0.0
35391	120	8	8			0	297	0.00	0	319	0.00	6936	0.0	0.0	6915	0.0	0.0
35409	120	8	8			17	1,373	0.01	17	1,473	0.01	7615	0.0	0.0	6367	0.0	0.0
35410	255	18	18			1,041	1,892	0.55	1,041	1,892	0.55	5461	0.0	0.0	5552	0.0	0.0

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Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35411	235	8	8			0	2,237	0.00	0	2,240	0.00	4706	0.0	0.0	4844	0.0	0.0
35412	246	8	8			0	533	0.00	0	533	0.00	7292	0.0	0.0	4350	0.0	0.0
35413	128	6	6			8	757	0.01	8	757	0.01	5110	0.0	0.0	3978	0.0	0.0
35414	355	8	8			0	1,432	0.00	0	1,433	0.00	3997	0.0	0.0	3667	0.0	0.0
35415	263	6	6			1	221	0.00	1	221	0.00	3357	0.0	0.0	3485	0.0	0.0
35419	390	8	8			74	390	0.19	74	391	0.19	2302	0.0	0.0	2335	0.0	0.0
35420	384	8	8			63	339	0.19	63	340	0.19	2092	0.0	0.0	7389	0.0	0.0
35422	209	8	8			1	337	0.00	1	337	0.00	1739	0.0	0.0	1717	0.0	0.0
35423	190	6	6			1	240	0.01	1	240	0.01	1348	0.0	0.0	3120	0.0	0.0
35424	285	8	8			57	824	0.07	57	825	0.07	1109	0.0	0.0	1108	0.0	0.0
35428	180	8	8			38	379	0.10	38	380	0.10	1298	0.0	0.0	1299	0.0	0.0
35429	117	8	8			1	648	0.00	1	649	0.00	1354	0.0	0.0	1353	0.0	0.0
35430	400	6	6			26	274	0.10	26	274	0.10	1500	0.0	0.0	1551	3.7	0.0
35431	250	12	12			524	1,677	0.31	524	1,677	0.31	1563	0.0	0.0	7221	0.0	0.0
35432	326	8	8			187	456	0.41	187	456	0.41	1524	0.0	0.0	1547	0.0	0.0
35433	14	8	8			101	754	0.13	101	756	0.13	1834	0.0	0.0	1767	0.0	0.0
35434	89	10	15	2	Existing	779	789	0.99	1,167	2,326	0.50	1911	1.4	0.0	1912	1.3	0.0
35435	99	6	6			1	266	0.00	1	266	0.00	1884	0.0	0.0	1883	0.0	0.0
35436	129	27	27			4,022	10,021	0.40	5,304	10,021	0.53	1990	0.0	0.0	1989	0.0	0.0
35437	162	8	8			146	344	0.42	146	344	0.42	2163	0.0	0.0	2150	0.0	0.0
35438	127	33	33			6,986	10,532	0.66	8,203	10,532	0.78	2146	0.0	0.0	7390	0.0	0.0
35439	195	8	8			18	341	0.05	18	341	0.05	2296	0.0	0.0	2280	0.0	0.0
35440	430	8	8			47	422	0.11	47	423	0.11	2273	0.0	0.0	7476	0.0	0.0
35441	162	8	8			1	344	0.00	1	344	0.00	2315	0.0	0.0	2343	0.0	0.0
35442	263	15	15			235	1,213	0.19	235	1,213	0.19	2406	0.0	0.0	2411	0.0	0.0
35443	564	54	54			26,711	30,647	0.87	27,194	30,647	0.89	2430	7.4	7.3	2428	17.8	17.7
35445	32	21	21			2,292	10,283	0.22	2,488	10,283	0.24	2922	0.0	0.0	2923	0.0	0.0
35446	436	8	8			1	813	0.00	1	815	0.00	2941	0.0	0.0	2940	0.0	0.0
35448	225	8	8			168	349	0.48	168	349	0.48	3035	0.0	0.0	3037	0.0	0.0
35449	298	8	8			144	344	0.42	144	344	0.42	3052	0.0	0.0	3043	0.0	0.0
35450	300	10	10			806	933	0.86	808	932	0.87	3106	0.0	0.0	3130	0.0	0.0
35453	176	8	8			1	342	0.00	1	342	0.00	3245	0.0	0.0	3233	0.0	0.0
35454	315	6	6			1	132	0.01	1	132	0.01	3455	0.0	0.0	3419	0.0	0.0
35455	361	6	6			1	197	0.00	1	197	0.00	3421	0.0	0.0	3422	0.0	0.0
35456	120	6	6			1	172	0.00	1	172	0.00	10104	0.0	0.0	3492	0.0	0.0
35457	12	10	10			825	4,522	0.18	827	4,517	0.18	3464	0.0	0.0	3502	4.1	0.0
35459	335	8	8			33	967	0.03	33	969	0.03	3598	0.0	0.0	3589	0.0	0.0
35460	375	24	24			1,000	5,744	0.17	1,000	5,744	0.17	3629	0.0	0.0	7038	0.0	0.0
35461	33	10	10			42	765	0.05	42	764	0.05	3683	0.0	0.0	3684	0.0	0.0
35462	60	8	8			69	485	0.14	69	486	0.14	3690	0.0	0.0	7280	0.0	0.0
35464	140	8	8			1	1,891	0.00	1	1,893	0.00	3797	0.0	0.0	3796	0.0	0.0
35465	200	8	8			1	1,017	0.00	1	1,018	0.00	7530	0.0	0.0	3876	0.0	0.0
35466	255	6	6			1	281	0.00	1	281	0.00	3828	0.0	0.0	3827	0.0	0.0
35467	170	6	6			2	431	0.00	2	431	0.00	4014	0.0	0.0	7288	0.0	0.0
35468	305	8	8			10	836	0.01	10	838	0.01	7187	0.0	0.0	4086	0.0	0.0
35469	69	8	8			1	463	0.00	1	464	0.00	4053	0.0	0.0	4054	0.0	0.0
35470	227	6	6			0	256	0.00	0	256	0.00	4024	0.0	0.0	4101	0.0	0.0
35471	70	8	8			0	588	0.00	0	588	0.00	4130	0.0	0.0	4103	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35472	170	8	8			27	728	0.04	27	729	0.04	4175	0.0	0.0	7295	0.0	0.0
35473	158	8	8			1	1,601	0.00	1	1,603	0.00	7550	0.0	0.0	4383	0.0	0.0
35474	320	8	8			94	1,234	0.08	94	1,235	0.08	4442	0.0	0.0	4443	0.0	0.0
35475	95	8	8			0	539	0.00	0	540	0.00	4423	0.0	0.0	4493	0.0	0.0
35477	277	8	8			0	1,035	0.00	0	1,037	0.00	5015	0.0	0.0	5060	0.0	0.0
35478	57	8	8			0	348	0.00	0	349	0.00	5120	0.0	0.0	5099	0.0	0.0
35479	206	6	6			1	695	0.00	1	695	0.00	5043	0.0	0.0	5042	0.0	0.0
35480	421	8	8			17	1,265	0.01	17	1,267	0.01	5183	0.0	0.0	7580	0.0	0.0
35481	298	6	6			0	545	0.00	0	545	0.00	5235	0.0	0.0	5220	0.0	0.0
35482	86	8	15	19	Existing	468	328	1.42	640	1,756	0.36	5272	0.0	0.0	5271	0.0	0.0
35483	274	6	6			1	397	0.00	1	397	0.00	5250	0.0	0.0	5256	0.0	0.0
35484	334	8	8			28	297	0.10	28	297	0.10	5259	0.0	0.0	5260	0.0	0.0
35485	220	8	8			11	372	0.03	11	372	0.03	5452	0.0	0.0	5535	0.0	0.0
35486	279	10	10			433	599	0.72	433	598	0.72	5506	0.0	0.0	7341	0.0	0.0
35487	170	54	54			13,763	43,871	0.31	13,959	43,871	0.32	5550	0.0	0.0	5549	0.0	0.0
35488	205	8	8			1	697	0.00	1	698	0.00	5823	0.0	0.0	5796	0.0	0.0
35489	274	8	8			168	207	0.81	168	207	0.81	5797	0.0	0.0	7602	0.0	0.0
35490	445	8	8			26	315	0.08	26	315	0.08	5769	0.0	0.0	5768	0.0	0.0
35491	292	8	8			353	401	0.88	56	401	0.14	5879	0.0	0.0	5852	2.8	0.0
35492	139	18	18			1,610	2,756	0.58	1,610	2,756	0.58	6128	0.0	0.0	6114	0.0	0.0
35493	360	8	8			8	759	0.01	8	760	0.01	6119	0.0	0.0	7108	0.0	0.0
35494	147	8	8			0	748	0.00	0	749	0.00	6033	0.0	0.0	6095	0.0	0.0
35495	161	21	21			1,487	3,747	0.40	1,487	3,747	0.40	6089	0.0	0.0	6090	0.0	0.0
35496	289	8	8			40	506	0.08	40	542	0.07	7365	0.0	0.0	6307	0.0	0.0
35497	130	8	8			44	285	0.15	44	306	0.14	6354	0.0	0.0	6353	0.0	0.0
35498	220	8	8			10	1,275	0.01	10	1,277	0.01	6361	0.0	0.0	6360	0.0	0.0
35499	66	8	8			0	906	0.00	0	972	0.00	7714	0.0	0.0	8760	0.0	0.0
35500	298	8	27			85	846	0.10	85	907	0.09	6594	0.0	0.0	6598	0.0	0.0
35501	90	8	8			1	297	0.00	1	319	0.00	6621	0.0	0.0	6620	0.0	0.0
35502	363	8	8			0	374	0.00	0	401	0.00	6636	0.0	0.0	6637	0.0	0.0
35503	528	15	15			434	2,678	0.16	434	2,870	0.15	6648	0.0	0.0	7634	0.0	0.0
35504	279	18	24	26	Existing	3,809	3,537	1.08	3,865	8,160	0.47	6885	0.0	0.0	6873	0.0	0.0
35505	295	8	8			61	274	0.22	61	294	0.21	6906	0.0	0.0	7433	0.0	0.0
35506	218	8	8			10	297	0.04	10	319	0.03	6572	0.0	0.0	6527	0.0	0.0
35507	515	18	24	25	2036	2,937	3,320	0.88	2,938	3,557	0.83	6828	0.0	0.0	5957	0.0	0.0
35508	102	8	8			62	381	0.16	62	381	0.16	5375	0.0	0.0	6089	0.0	0.0
35509	87	8	8			10	1,301	0.01	10	1,303	0.01	4717	0.0	0.0	7074	0.0	0.0
35510	352	8	8			46	1,101	0.04	46	1,103	0.04	2958	0.0	0.0	2831	0.0	0.0
35511	275	12	12			24	1,128	0.02	24	1,128	0.02	1295	0.0	0.0	1384	0.0	0.0
35512	323	8	8			60	383	0.16	60	383	0.16	7437	0.0	0.0	1324	0.0	0.0
35513	223	8	8			1	486	0.00	1	487	0.00	1413	0.0	0.0	1412	0.0	0.0
35514	212	8	8			157	496	0.32	157	497	0.32	6986	0.0	0.0	1394	0.0	0.0
35515	333	8	8			37	406	0.09	37	406	0.09	1388	0.0	0.0	1428	0.0	0.0
35516	190	8	8			31	422	0.07	31	422	0.07	1362	0.0	0.0	1363	0.0	0.0
35517	334	8	8			170	506	0.34	170	506	0.34	1523	0.0	0.0	7165	0.0	0.0
35518	143	8	8			294	315	0.93	293	315	0.93	1589	5.7	0.0	1604	4.2	0.0
35519	300	8	8			90	328	0.27	85	328	0.26	1645	2.9	0.0	7451	6.3	0.0
35520	340	8	8			13	542	0.02	13	543	0.02	1623	0.0	0.0	1624	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35521	350	6	6			24	224	0.11	24	224	0.11	1653	0.0	0.0	1599	0.0	0.0
35522	255	6	6			101	157	0.64	100	157	0.64	1705	4.0	0.0	1680	2.2	0.0
35523	122	8	8			1	441	0.00	1	441	0.00	1685	0.0	0.0	1712	0.0	0.0
35525	205	10	10			427	499	0.86	606	499	1.21	1777	2.5	0.0	1778	1.7	0.0
35526	290	10	10			275	440	0.62	274	440	0.62	7228	2.2	0.0	1799	2.3	0.0
35527	314	6	6			1	331	0.00	1	331	0.00	1758	0.0	0.0	1823	7.7	0.0
35529	133	6	6			1	216	0.00	1	216	0.00	1935	0.0	0.0	1851	0.0	0.0
35530	99	6	6			117	103	1.14	21	103	0.20	1976	0.0	0.7	1953	0.0	0.0
35531	360	8	8			8	386	0.02	1	386	0.00	1952	0.0	0.0	1957	4.4	6.0
35532	239	10	10			1	799	0.00	1	799	0.00	7467	0.0	0.0	2003	0.0	0.0
35533	43	8	8			1	917	0.00	1	919	0.00	2085	0.0	0.0	2086	0.0	0.0
35534	270	8	8			14	343	0.04	14	344	0.04	2132	0.0	0.0	2110	0.0	0.0
35536	327	8	8			22	344	0.06	22	345	0.06	2201	0.0	0.0	2209	0.0	0.0
35537	69	8	8			60	351	0.17	60	352	0.17	7009	0.0	0.0	2258	0.0	0.0
35538	68	8	8			10	322	0.03	10	323	0.03	7665	0.0	0.0	2341	0.0	0.0
35540	243	15	15			167	1,176	0.14	167	1,176	0.14	2400	0.0	0.0	2401	0.0	0.0
35542	35	8	8			6	580	0.01	6	581	0.01	7667	0.0	0.0	2455	0.0	0.0
35543	233	8	8			8	1,089	0.01	8	1,090	0.01	7482	0.0	0.0	2502	0.0	0.0
35544	165	6	6			0	426	0.00	0	426	0.00	2516	0.0	0.0	2584	0.0	0.0
35545	302	10	10			14	2,686	0.01	14	2,683	0.01	2586	0.0	0.0	2566	0.0	0.0
35546	370	8	8			0	415	0.00	0	416	0.00	2593	0.0	0.0	2592	0.0	0.0
35547	437	8	8			0	604	0.00	0	605	0.00	2613	0.0	0.0	2600	0.0	0.0
35548	300	8	8			7	567	0.01	7	569	0.01	2645	0.0	0.0	2672	0.0	0.0
35549	360	12	12			405	1,081	0.37	460	1,081	0.43	2668	0.0	0.0	2667	0.0	0.0
35550	287	8	8			0	1,296	0.00	0	1,297	0.00	2653	0.0	0.0	2655	0.0	0.0
35551	330	8	8			0	608	0.00	0	608	0.00	2643	0.0	0.0	2686	0.0	0.0
35552	227	8	8			13	392	0.03	13	392	0.03	2736	0.0	0.0	7490	0.0	0.0
35553	372	8	8			10	846	0.01	10	847	0.01	2765	0.0	0.0	2764	0.0	0.0
35554	196	8	8			0	1,075	0.00	0	1,076	0.00	2705	0.0	0.0	2778	0.0	0.0
35555	190	8	8			0	415	0.00	0	416	0.00	2711	0.0	0.0	7019	0.0	0.0
35556	174	21	21			2,721	4,709	0.58	2,918	4,709	0.62	2868	0.0	0.0	2880	0.0	0.0
35557	176	8	8			12	1,074	0.01	12	1,075	0.01	7254	0.0	0.0	2920	0.0	0.0
35558	450	8	8			0	456	0.00	0	456	0.00	2930	0.0	0.0	2945	0.0	0.0
35559	258	10	10			4	747	0.01	4	747	0.01	2915	0.0	0.0	2960	0.0	0.0
35560	49	8	8			183	347	0.53	183	347	0.53	7497	0.0	0.0	3019	0.0	0.0
35561	160	8	8			85	606	0.14	85	607	0.14	3051	0.0	0.0	3052	0.0	0.0
35562	364	8	8			59	483	0.12	59	483	0.12	3109	0.0	0.0	3110	0.0	0.0
35563	250	8	8			25	424	0.06	25	425	0.06	3137	0.0	0.0	3131	0.0	0.0
35564	291	8	8			139	559	0.25	139	560	0.25	3176	0.0	0.0	3178	0.0	0.0
35565	297	8	8			1	344	0.00	1	345	0.00	3252	0.0	0.0	3271	0.0	0.0
35566	21	18	18			4,201	5,728	0.73	4,204	5,728	0.73	7507	0.0	0.0	3301	0.0	0.0
35567	243	8	8			0	356	0.00	0	357	0.00	3345	0.0	0.0	7269	0.0	0.0
35569	280	8	8			1	417	0.00	1	418	0.00	3332	0.0	0.0	3331	0.0	0.0
35570	290	8	8			33	410	0.08	33	411	0.08	3330	0.0	0.0	3324	0.0	0.0
35571	254	8	8			1	260	0.01	1	260	0.01	3504	0.0	0.0	3464	0.0	0.0
35572	55	24	24			3,663	32,628	0.11	4,944	32,628	0.15	3433	0.0	0.0	3418	0.0	0.0
35573	293	8	8			12	344	0.03	12	344	0.03	3608	0.0	0.0	7277	0.0	0.0
35574	119	8	8			1	542	0.00	1	543	0.00	3618	0.0	0.0	3617	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35575	414	8	8			0	342	0.00	0	343	0.00	3634	0.0	0.0	7278	0.0	0.0
35576	237	8	8			14	1,017	0.01	14	1,018	0.01	3668	0.0	0.0	3670	0.0	0.0
35577	100	8	8			19	415	0.05	19	416	0.05	3725	0.0	0.0	3689	0.0	0.0
35578	236	8	8			67	460	0.14	67	461	0.14	3696	0.0	0.0	3693	0.0	0.0
35579	133	10	10			428	1,972	0.22	428	1,969	0.22	3757	0.0	0.0	3771	0.0	0.0
35580	312	8	8			57	487	0.12	57	488	0.12	3812	0.0	0.0	3845	0.0	0.0
35581	137	8	8			182	963	0.19	182	963	0.19	3914	0.0	0.0	3915	0.0	0.0
35582	255	6	6			1	417	0.00	1	417	0.00	3974	0.0	0.0	3973	0.0	0.0
35583	146	8	8			25	1,455	0.02	25	1,457	0.02	3927	0.0	0.0	3926	0.0	0.0
35584	199	8	8			0	360	0.00	0	361	0.00	3988	0.0	0.0	7138	0.0	0.0
35585	150	8	8			0	1,185	0.00	0	1,186	0.00	3935	0.0	0.0	3936	0.0	0.0
35586	53	8	8			259	581	0.45	259	582	0.45	4192	0.0	0.0	7055	0.0	0.0
35587	24	8	8			1	813	0.00	1	815	0.00	4202	0.0	0.0	4201	0.0	0.0
35588	134	15	18	38	2036	889	1,424	0.62	1,086	1,424	0.76	4186	0.0	0.0	4225	0.0	0.0
35590	191	6	6			0	171	0.00	0	171	0.00	7686	0.0	0.0	4319	0.0	0.0
35591	417	8	8			14	1,078	0.01	14	1,080	0.01	4338	0.0	0.0	4296	0.0	0.0
35592	274	10	10			442	783	0.57	442	782	0.57	7546	0.0	0.0	4315	0.0	0.0
35593	225	8	8			0	1,100	0.00	0	1,101	0.00	4384	0.0	0.0	4366	0.0	0.0
35594	267	8	8			0	876	0.00	0	878	0.00	4369	0.0	0.0	4359	0.0	0.0
35595	108	8	8			12	719	0.02	12	721	0.02	4406	0.0	0.0	4415	0.0	0.0
35596	110	8	8			94	448	0.21	94	449	0.21	4478	0.0	0.0	4442	0.0	0.0
35597	380	8	8			25	1,170	0.02	25	1,172	0.02	4433	0.0	0.0	4434	0.0	0.0
35598	244	8	8			19	820	0.02	19	821	0.02	4455	0.0	0.0	4494	0.0	0.0
35599	60	8	8			0	2,006	0.00	0	2,008	0.00	4505	0.0	0.0	4506	0.0	0.0
35600	135	8	8			31	750	0.04	31	751	0.04	4546	0.0	0.0	4561	0.0	0.0
35601	69	8	8			0	403	0.00	0	403	0.00	4552	0.0	0.0	4564	0.0	0.0
35603	13	8	8			2	336	0.01	2	337	0.01	4596	0.0	0.0	4598	0.0	0.0
35604	142	8	8			56	340	0.16	56	341	0.16	4674	0.0	0.0	4644	0.0	0.0
35605	65	8	8			117	1,313	0.09	117	1,315	0.09	4642	0.0	0.0	4641	0.0	0.0
35606	222	8	8			56	333	0.17	56	334	0.17	4658	0.0	0.0	4673	0.0	0.0
35607	440	8	8			13	1,315	0.01	13	1,317	0.01	4692	0.0	0.0	4691	0.0	0.0
35608	265	8	8			398	1,313	0.30	398	1,315	0.30	4774	0.0	0.0	4749	0.0	0.0
35609	130	8	8			4	1,295	0.00	4	1,297	0.00	4738	0.0	0.0	4739	0.0	0.0
35610	277	8	8			428	937	0.46	428	938	0.46	4742	0.0	0.0	4741	0.0	0.0
35611	66	8	8			82	654	0.13	82	655	0.13	4801	0.0	0.0	4802	0.0	0.0
35612	135	8	8			19	1,236	0.02	19	1,238	0.02	7074	0.0	0.0	4834	0.0	0.0
35613	286	8	8			17	333	0.05	17	334	0.05	4864	0.0	0.0	4866	0.0	0.0
35614	350	8	8			51	1,405	0.04	51	1,407	0.04	4905	0.0	0.0	4904	0.0	0.0
35615	260	8	8			9	1,363	0.01	9	1,365	0.01	4902	0.0	0.0	4905	0.0	0.0
35616	166	8	8			1	635	0.00	1	636	0.00	4986	0.0	0.0	4939	0.0	0.0
35617	90	8	8			46	676	0.07	46	676	0.07	4967	0.0	0.0	4966	0.0	0.0
35618	186	8	8			1	660	0.00	1	660	0.00	4990	0.0	0.0	4989	0.0	0.0
35619	260	8	8			8	1,730	0.00	8	1,732	0.00	5005	0.0	0.0	5004	0.0	0.0
35620	171	8	8			293	1,358	0.22	293	1,360	0.22	5087	0.0	0.0	5074	0.0	0.0
35621	110	8	8			558	908	0.61	558	910	0.61	5153	0.0	0.0	5152	0.0	0.0
35622	138	8	8			228	1,150	0.20	228	1,151	0.20	5213	0.0	0.0	5212	0.0	0.0
35623	219	8	8			171	1,053	0.16	171	1,055	0.16	5166	0.0	0.0	5209	0.0	0.0
35624	102	8	8			1	524	0.00	1	525	0.00	7335	0.0	0.0	5302	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35625	80	8	8			28	565	0.05	28	565	0.05	5370	0.0	0.0	5371	0.0	0.0
35626	141	8	8			6	404	0.02	6	404	0.02	5383	0.0	0.0	5367	0.0	0.0
35627	98	8	8			1	604	0.00	1	606	0.00	5361	0.0	0.0	5360	0.0	0.0
35628	195	6	6			29	363	0.08	29	363	0.08	5433	0.0	0.0	5416	0.0	0.0
35629	73	8	8			39	361	0.11	39	361	0.11	5436	0.0	0.0	5435	0.0	0.0
35630	280	8	8			47	388	0.12	47	388	0.12	5497	0.0	0.0	5496	0.0	0.0
35631	304	8	8			1	393	0.00	1	394	0.00	5490	0.0	0.0	5492	0.0	0.0
35632	289	15	15			556	2,728	0.20	556	2,728	0.20	5449	0.0	0.0	5460	0.0	0.0
35633	85	18	18			1,151	2,073	0.56	1,151	2,073	0.56	5581	0.0	0.0	5564	0.0	0.0
35634	320	8	8			1	297	0.00	1	298	0.00	5635	0.0	0.0	5631	0.0	0.0
35635	272	18	18			1	1,787	0.00	1	1,787	0.00	5606	0.0	0.0	5625	0.0	0.0
35636	330	8	8			210	296	0.71	210	297	0.71	5689	0.0	0.0	5711	0.0	0.0
35637	495	8	8			45	303	0.15	35	303	0.12	5698	0.0	0.0	5697	3.2	0.0
35638	308	8	8			101	1,056	0.10	101	1,058	0.10	5719	0.0	0.0	5718	0.0	0.0
35639	405	8	8			288	295	0.97	288	296	0.97	5775	5.5	5.5	7603	0.0	0.0
35640	128	8	8			117	401	0.29	117	401	0.29	5846	0.0	0.0	5845	0.0	0.0
35641	53	8	8			2	281	0.01	2	282	0.01	7422	0.0	0.0	5868	0.0	0.0
35642	170	8	8			3	488	0.01	3	488	0.01	5863	0.0	0.0	7101	7.6	0.0
35643	193	8	8			1	923	0.00	1	924	0.00	7102	0.0	0.0	5931	0.0	0.0
35644	18	8	8			8	453	0.02	1	454	0.00	5944	0.0	0.0	5929	0.0	0.0
35645	105	8	8			1	451	0.00	1	451	0.00	6014	0.0	0.0	5993	0.0	0.0
35646	415	8	8			15	629	0.02	15	630	0.02	5966	0.0	0.0	5967	0.0	0.0
35647	151	8	8			1	1,794	0.00	1	1,797	0.00	6015	0.0	0.0	6072	0.0	0.0
35648	145	8	8			21	455	0.05	21	456	0.05	6076	0.0	0.0	6077	0.0	0.0
35649	247	18	18			1,496	4,595	0.33	1,496	4,595	0.33	6085	0.0	0.0	6091	0.0	0.0
35650	317	8	8			1	422	0.00	1	422	0.00	6173	0.0	0.0	7617	0.0	0.0
35651	310	8	8			1	1,030	0.00	1	1,031	0.00	6196	0.0	0.0	6197	0.0	0.0
35652	236	8	8			36	910	0.04	36	910	0.04	6244	0.0	0.0	7109	0.0	0.0
35653	371	8	8			21	978	0.02	21	980	0.02	6229	0.0	0.0	6228	0.0	0.0
35654	310	8	8			8	300	0.03	8	322	0.03	6338	0.0	0.0	6292	0.0	0.0
35655	202	8	8			15	1,276	0.01	15	1,278	0.01	6379	0.0	0.0	7160	0.0	0.0
35656	29	8	8			202	641	0.32	202	642	0.31	6409	0.0	0.0	6413	0.0	0.0
35657	365	8	8			8	1,210	0.01	8	1,212	0.01	6455	0.0	0.0	6456	0.0	0.0
35658	176	8	8			1	1,260	0.00	1	1,262	0.00	6495	0.0	0.0	6448	0.0	0.0
35659	156	8	8			26	1,176	0.02	26	1,178	0.02	6482	0.0	0.0	6472	0.0	0.0
35660	138	8	8			11	1,914	0.01	11	1,916	0.01	6505	0.0	0.0	7205	0.0	0.0
35661	160	8	8			0	335	0.00	0	359	0.00	6515	0.0	0.0	6546	0.0	0.0
35662	34	8	8			25	470	0.05	25	504	0.05	6568	0.0	0.0	6569	0.0	0.0
35663	220	8	8			0	672	0.00	0	722	0.00	6669	0.0	0.0	6686	0.0	0.0
35664	280	8	8			0	259	0.00	0	278	0.00	6693	0.0	0.0	6694	0.0	0.0
35665	250	6	6			0	239	0.00	0	256	0.00	6675	0.0	0.0	6703	0.0	0.0
35666	149	8	8			1	918	0.00	1	985	0.00	6735	0.0	0.0	6736	0.0	0.0
35667	223	8	12	24	2036`	46	278	0.17	46	298	0.15	6781	0.0	0.0	6780	0.0	0.0
35668	130	8	8			0	470	0.00	0	504	0.00	6836	0.0	0.0	6835	0.0	0.0
35669	144	8	8			27	333	0.08	27	357	0.08	7641	0.0	0.0	7124	0.0	0.0
35670	186	8	8			33	297	0.11	33	318	0.10	6924	0.0	0.0	6918	0.0	0.0
35672	329	8	8			1	1,504	0.00	1	1,614	0.00	6405	0.0	0.0	6440	0.0	0.0
35673	213	8	8			47	860	0.05	47	862	0.05	6499	0.0	0.0	6125	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35674	224	8	8			1	640	0.00	1	641	0.00	6177	0.0	0.0	5746	0.0	0.0
35675	460	18	18			119	3,503	0.03	119	3,503	0.03	5644	0.0	0.0	5872	0.0	0.0
35676	563	8	8			13	372	0.04	13	372	0.04	5314	0.0	0.0	5706	0.0	0.0
35677	390	8	8			1	397	0.00	1	397	0.00	5404	0.0	0.0	4934	0.0	0.0
35678	308	8	8			2	761	0.00	2	762	0.00	7147	0.0	0.0	4568	0.0	0.0
35679	123	8	8			24	1,110	0.02	24	1,112	0.02	4841	0.0	0.0	4437	0.0	0.0
35680	253	10	10			6	886	0.01	6	885	0.01	4373	0.0	0.0	4042	0.0	0.0
35681	179	6	6			1	408	0.00	1	408	0.00	3862	0.0	0.0	3918	0.0	0.0
35682	350	10	10			211	706	0.30	211	705	0.30	5494	0.0	0.0	3420	0.0	0.0
35683	70	8	8			0	383	0.00	0	384	0.00	3593	0.0	0.0	3244	0.0	0.0
35684	208	8	8			8	1,849	0.00	8	1,851	0.00	2959	0.0	0.0	2683	0.0	0.0
35685	300	8	8			9	1,476	0.01	9	1,478	0.01	2819	0.0	0.0	2585	0.0	0.0
35686	300	8	8			19	350	0.05	19	351	0.05	2261	0.0	0.0	2418	0.0	0.0
35687	533	6	6			1	143	0.00	1	143	0.00	1930	0.0	0.0	1786	5.5	0.0
35688	266	10	15	8	Existing	625	612	1.02	703	1,804	0.39	1499	3.8	0.0	7460	3.8	0.0
35689	272	8	8			54	342	0.16	54	342	0.16	1165	0.0	0.0	1147	0.0	0.0
35690	173	8	8			56	485	0.12	56	485	0.12	1321	0.0	0.0	1300	0.0	0.0
35691	145	8	8			18	688	0.03	18	688	0.03	1318	0.0	0.0	1317	0.0	0.0
35692	333	12	12			342	1,429	0.24	342	1,429	0.24	1380	0.0	0.0	1381	0.0	0.0
35693	250	8	8			3	401	0.01	3	402	0.01	1395	0.0	0.0	1396	0.0	0.0
35694	233	8	8			5	565	0.01	5	566	0.01	1432	0.0	0.0	1431	0.0	0.0
35695	371	6	6			1	121	0.01	1	121	0.01	7448	0.0	0.0	7446	0.0	0.0
35696	289	8	8			71	239	0.30	71	240	0.30	1556	0.0	0.0	1557	0.0	0.0
35697	333	8	8			308	606	0.51	308	607	0.51	7220	0.0	0.0	6992	0.0	0.0
35698	220	6	6			1	206	0.00	1	206	0.00	1596	0.0	0.0	1591	0.0	0.0
35699	300	8	8			28	312	0.09	28	312	0.09	1611	0.0	0.0	1612	0.0	0.0
35700	320	8	8			167	284	0.59	167	285	0.59	1703	4.9	0.0	1691	5.9	0.0
35701	294	6	6			53	184	0.29	53	184	0.29	1681	0.0	0.0	7225	0.0	0.0
35702	327	6	6			58	159	0.37	58	159	0.37	1717	0.0	0.0	1680	2.2	0.0
35703	325	6	6			1	147	0.01	1	147	0.01	7458	0.0	0.0	1810	5.5	0.0
35704	252	8	8			40	278	0.14	1	278	0.00	1774	4.6	0.0	1775	3.5	0.0
35705	439	8	8			42	295	0.14	1	296	0.00	1829	2.8	0.0	1828	1.6	0.0
35706	7	10	10			748	1,627	0.46	919	1,625	0.57	1928	5.9	0.0	7465	6.0	0.0
35707	241	6	6			59	255	0.23	59	255	0.23	1906	0.0	0.0	1905	0.0	0.0
35708	297	8	8			136	890	0.15	1	891	0.00	7463	0.0	0.0	1920	2.8	0.0
35709	305	8	8			1	449	0.00	1	450	0.00	1926	0.0	0.0	1925	0.0	0.0
35710	328	8	8			1	405	0.00	1	406	0.00	1991	0.0	0.0	1993	0.0	0.0
35711	38	8	8			206	292	0.71	206	292	0.71	2136	0.0	0.0	2140	0.0	0.0
35712	140	8	8			26	389	0.07	26	390	0.07	2112	0.0	0.0	2111	0.0	0.0
35713	262	10	10			35	540	0.06	35	540	0.06	2179	0.0	0.0	2177	0.0	0.0
35714	438	8	8			338	344	0.98	338	344	0.98	2204	0.0	0.0	2203	6.6	6.6
35715	182	10	10			447	515	0.87	447	515	0.87	2265	3.3	3.3	2263	2.6	2.6
35716	190	8	8			33	377	0.09	35	378	0.09	2291	5.8	5.8	2290	4.2	4.2
35717	177	8	8			1	376	0.00	1	376	0.00	2300	0.0	0.0	2293	0.0	0.0
35718	225	8	8			8	345	0.02	8	345	0.02	2392	0.0	0.0	2394	0.0	0.0
35719	415	8	8			8	352	0.02	8	353	0.02	7393	0.0	0.0	2456	0.0	0.0
35720	250	6	6			7	540	0.01	7	540	0.01	2550	0.0	0.0	2551	0.0	0.0
35722	58	8	8			10	385	0.03	10	386	0.03	2572	0.0	0.0	2571	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35723	67	8	8			16	1,575	0.01	16	1,577	0.01	2664	0.0	0.0	2665	0.0	0.0
35724	43	8	12	37	ura	135	608	0.22	135	608	0.22	2734	0.0	0.0	2720	0.0	0.0
35725	308	8	8			54	741	0.07	54	742	0.07	2726	0.0	0.0	2725	0.0	0.0
35726	113	8	8			0	371	0.00	0	372	0.00	2708	0.0	0.0	7178	0.0	0.0
35727	379	8	8			213	1,427	0.15	213	1,429	0.15	2824	0.0	0.0	2825	0.0	0.0
35728	155	8	8			1	1,285	0.00	1	1,286	0.00	2913	0.0	0.0	2965	0.0	0.0
35729	178	6	6			0	215	0.00	0	215	0.00	2905	0.0	0.0	2972	0.0	0.0
35730	335	8	8			72	565	0.13	72	565	0.13	3022	0.0	0.0	7399	3.9	0.0
35731	248	12	12			379	831	0.46	379	831	0.46	3135	0.0	0.0	3091	0.0	0.0
35732	174	8	8			15	462	0.03	15	463	0.03	3121	0.0	0.0	3122	0.0	0.0
35733	138	8	8			4	340	0.01	4	340	0.01	7264	0.0	0.0	3174	0.0	0.0
35734	279	8	8			1	344	0.00	1	344	0.00	3189	0.0	0.0	3198	0.0	0.0
35735	300	8	8			1	402	0.00	1	403	0.00	3257	0.0	0.0	3264	0.0	0.0
35736	366	8	8			1	294	0.00	1	294	0.00	3308	0.0	0.0	3360	0.0	0.0
35737	360	8	8			1	316	0.00	1	317	0.00	3312	0.0	0.0	3313	0.0	0.0
35738	323	8	8			42	344	0.12	42	344	0.12	3369	0.0	0.0	3315	0.0	0.0
35739	7	12	12			399	1,183	0.34	399	1,183	0.34	3419	0.0	0.0	7274	0.0	0.0
35740	381	14	18	10	Existing	1,640	1,362	1.20	1,644	2,662	0.62	10106	7.4	0.0	3438	0.0	0.0
35741	132	8	8			113	260	0.43	113	260	0.43	3449	0.0	0.0	7035	0.0	0.0
35742	92	15	24	6	Existing	2,024	1,666	1.22	3,299	5,833	0.57	7036	8.9	0.0	3417	0.0	0.0
35743	185	8	8			142	422	0.34	142	422	0.34	3513	0.0	0.0	7275	0.0	0.0
35744	186	8	8			1	1,207	0.00	1	1,208	0.00	3569	0.0	0.0	3559	0.0	0.0
35745	224	6	6			1	276	0.00	1	276	0.00	3626	0.0	0.0	3645	0.0	0.0
35746	282	8	8			71	1,020	0.07	71	1,022	0.07	3703	0.0	0.0	7279	0.0	0.0
35748	200	6	6			1	539	0.00	1	539	0.00	3789	0.0	0.0	3808	0.0	0.0
35749	161	8	8			20	1,303	0.02	20	1,304	0.02	3804	0.0	0.0	3805	0.0	0.0
35750	120	8	8			313	898	0.35	313	899	0.35	3835	0.0	0.0	3843	0.0	0.0
35751	112	10	10			183	766	0.24	182	765	0.24	3820	0.0	0.0	3819	0.0	0.0
35752	118	6	6			0	345	0.00	0	345	0.00	3787	0.0	0.0	3850	0.0	0.0
35753	334	8	8			10	1,138	0.01	10	1,139	0.01	3910	0.0	0.0	3914	0.0	0.0
35754	39	8	8			50	1,085	0.05	50	1,087	0.05	3983	0.0	0.0	7050	0.0	0.0
35756	49	10	15	43	2036	613	590	1.04	613	589	1.04	4083	0.0	0.0	4109	0.0	0.0
35757	344	8	8			0	1,156	0.00	0	1,157	0.00	7538	0.0	0.0	4084	0.0	0.0
35758	127	8	8			20	781	0.03	20	781	0.03	4044	0.0	0.0	4043	0.0	0.0
35759	480	15	15			90	1,405	0.06	90	1,405	0.06	7294	0.0	0.0	4094	0.0	0.0
35761	238	8	8			98	495	0.20	98	496	0.20	4161	0.0	0.0	4160	0.0	0.0
35762	89	8	8			0	290	0.00	0	291	0.00	4231	0.0	0.0	4230	0.0	0.0
35763	117	8	8			10	317	0.03	10	317	0.03	4345	0.0	0.0	4307	0.0	0.0
35764	176	8	8			1	1,522	0.00	1	1,523	0.00	4401	0.0	0.0	4400	0.0	0.0
35765	190	8	8			19	1,009	0.02	19	1,010	0.02	7145	0.0	0.0	4448	0.0	0.0
35766	285	8	8			8	1,569	0.00	8	1,571	0.00	4504	0.0	0.0	4528	0.0	0.0
35767	206	8	8			2	971	0.00	2	972	0.00	4542	0.0	0.0	4543	0.0	0.0
35768	269	8	8			0	1,965	0.00	0	1,967	0.00	7189	0.0	0.0	4563	0.0	0.0
35769	40	8	8			26	542	0.05	26	543	0.05	4583	0.0	0.0	4605	0.0	0.0
35770	240	8	8			5	1,212	0.00	5	1,214	0.00	7146	0.0	0.0	4662	0.0	0.0
35771	195	8	8			11	2,189	0.01	11	2,192	0.01	7411	0.0	0.0	4697	0.0	0.0
35772	154	8	8			56	1,303	0.04	56	1,305	0.04	4756	0.0	0.0	4757	0.0	0.0
35773	225	8	8			5	1,982	0.00	5	1,984	0.00	4795	0.0	0.0	4794	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35774	182	6	6			1	581	0.00	1	581	0.00	4707	0.0	0.0	4791	0.0	0.0
35775	101	8	8			1	1,323	0.00	1	1,325	0.00	4718	0.0	0.0	4717	0.0	0.0
35776	52	8	8			31	530	0.06	31	531	0.06	4727	0.0	0.0	4728	0.0	0.0
35777	400	8	8			2	2,040	0.00	2	2,042	0.00	7567	0.0	0.0	4812	0.0	0.0
35778	99	8	8			8	1,225	0.01	8	1,227	0.01	4897	0.0	0.0	4896	0.0	0.0
35779	249	8	8			1	1,163	0.00	1	1,165	0.00	7077	0.0	0.0	4982	0.0	0.0
35780	500	12	12			783	3,274	0.24	783	3,274	0.24	7572	0.0	0.0	4973	0.0	0.0
35781	140	8	8			109	860	0.13	109	861	0.13	7329	0.0	0.0	5059	0.0	0.0
35783	115	8	8			7	1,815	0.00	7	1,817	0.00	5094	0.0	0.0	5093	0.0	0.0
35784	154	8	8			1	2,134	0.00	1	2,137	0.00	5106	0.0	0.0	5105	0.0	0.0
35785	250	6	6			1	792	0.00	1	792	0.00	5127	0.0	0.0	5148	0.0	0.0
35786	172	8	8			46	1,265	0.04	46	1,266	0.04	5161	0.0	0.0	8641	0.0	0.0
35787	20	8	8			40	1,092	0.04	40	1,093	0.04	5195	0.0	0.0	5194	0.0	0.0
35788	24	8	8			0	657	0.00	0	658	0.00	5236	0.0	0.0	5205	0.0	0.0
35789	175	8	8			1	1,124	0.00	1	1,126	0.00	5226	0.0	0.0	5167	0.0	0.0
35790	261	6	6			1	573	0.00	1	573	0.00	5240	0.0	0.0	7086	0.0	0.0
35791	260	8	8			131	488	0.27	130	488	0.27	5283	4.1	0.0	5281	0.0	0.0
35792	191	8	8			1	261	0.00	1	262	0.00	5320	0.0	0.0	5322	0.0	0.0
35793	275	8	8			5	692	0.01	5	693	0.01	5406	0.0	0.0	5413	0.0	0.0
35794	378	8	8			14	399	0.03	14	399	0.03	5526	0.0	0.0	5518	0.0	0.0
35795	100	8	8			1	670	0.00	1	671	0.00	5469	0.0	0.0	5456	0.0	0.0
35796	120	10	10			435	583	0.75	435	583	0.75	5464	0.0	0.0	5463	0.0	0.0
35797	300	8	8			38	474	0.08	38	474	0.08	5568	0.0	0.0	5582	0.0	0.0
35798	264	8	8			598	342	1.75	143	342	0.42	5570	8.5	0.0	5573	0.0	0.0
35799	155	8	8			1	343	0.00	1	344	0.00	5620	0.0	0.0	5621	0.0	0.0
35800	250	8	15	19	Existing	558	297	1.88	997	1,589	0.63	5677	1.1	0.0	5673	0.0	0.0
35801	238	8	8			46	638	0.07	46	638	0.07	5707	0.0	0.0	5708	0.0	0.0
35802	80	8	8			42	302	0.14	42	302	0.14	5780	0.0	0.0	5779	0.0	0.0
35803	277	8	8			32	685	0.05	32	686	0.05	5778	0.0	0.0	5838	0.0	0.0
35804	480	8	8			55	462	0.12	55	463	0.12	5842	0.0	0.0	5841	0.0	0.0
35805	59	10	15	18	Existing	460	333	1.38	696	981	0.71	5860	6.1	0.0	5838	0.0	0.0
35808	302	10	10			481	341	1.41	481	341	1.41	5969	0.0	0.0	5977	0.0	0.0
35809	63	8	8			73	412	0.18	73	413	0.18	6080	0.0	0.0	7612	0.0	0.0
35810	106	8	8			5	1,719	0.00	5	1,721	0.00	6023	0.0	0.0	6065	0.0	0.0
35811	121	8	8			0	958	0.00	0	959	0.00	6029	0.0	0.0	6052	0.0	0.0
35812	150	8	8			1	1,481	0.00	1	1,483	0.00	6104	0.0	0.0	7107	0.0	0.0
35813	67	8	8			0	350	0.00	0	351	0.00	7709	0.0	0.0	6109	0.0	0.0
35814	182	6	6			28	372	0.07	28	372	0.07	6182	0.0	0.0	7426	0.0	0.0
35815	51	8	8			27	401	0.07	27	402	0.07	6223	0.0	0.0	6224	0.0	0.0
35816	295	18	24	41	2036	1,982	2,883	0.69	1,982	2,883	0.69	6195	0.0	0.0	7110	0.0	0.0
35817	415	8	8			10	298	0.03	10	320	0.03	6327	0.0	0.0	7729	0.0	0.0
35818	395	8	8			10	867	0.01	10	930	0.01	7621	0.0	0.0	7427	0.0	0.0
35819	152	8	8			24	738	0.03	24	792	0.03	6346	0.0	0.0	7622	0.0	0.0
35820	56	6	6			0	170	0.00	0	182	0.00	6277	0.0	0.0	6342	0.0	0.0
35821	113	8	8			0	300	0.00	0	322	0.00	6281	0.0	0.0	7159	0.0	0.0
35822	65	8	8			36	2,189	0.02	36	2,192	0.02	6399	0.0	0.0	6400	0.0	0.0
35823	105	8	8			182	1,185	0.15	182	1,188	0.15	6462	0.0	0.0	6461	0.0	0.0
35824	141	8	8			72	592	0.12	72	592	0.12	6503	0.0	0.0	6433	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35825	335	8	12	22	ura	161	334	0.48	161	358	0.45	7430	0.0	0.0	6529	0.0	0.0
35826	331	8	8			12	719	0.02	12	772	0.02	7632	0.0	0.0	7373	0.0	0.0
35827	78	8	8			14	297	0.05	14	318	0.04	6605	0.0	0.0	6606	0.0	0.0
35828	111	8	8			0	509	0.00	0	546	0.00	6616	0.0	0.0	7375	0.0	0.0
35829	132	8	8			0	298	0.00	0	319	0.00	6608	0.0	0.0	6660	0.0	0.0
35830	60	8	8			0	616	0.00	0	661	0.00	6708	0.0	0.0	6680	0.0	0.0
35832	405	8	8			1	84	0.02	1	85	0.02	6842	0.0	0.0	6841	0.0	0.0
35833	14	8	8			0	333	0.00	0	357	0.00	6852	0.0	0.0	6817	0.0	0.0
35834	159	8	8			229	228	1.00	229	228	1.00	3781	0.0	0.0	9229	0.0	0.0
35835	94	10	15	2	Existing	778	786	0.99	1,167	2,317	0.50	1912	1.3	0.0	2014	0.8	0.0
35836	320	8	8			30	328	0.09	30	328	0.09	1629	0.0	0.0	1630	0.0	0.0
35837	180	6	6			8	183	0.05	1	183	0.00	1752	8.1	0.0	1787	5.7	0.0
35838	280	10	10			190	822	0.23	144	821	0.18	1965	0.0	0.0	7387	4.5	0.0
35839	231	6	6			27	163	0.17	1	163	0.00	2015	1.9	0.0	7388	2.1	0.0
35841	201	8	8			13	728	0.02	13	730	0.02	2497	0.0	0.0	2498	0.0	0.0
35842	40	8	8			30	1,010	0.03	30	1,010	0.03	2628	0.0	0.0	2627	0.0	0.0
35843	364	10	10			37	717	0.05	37	717	0.05	2778	0.0	0.0	2777	0.0	0.0
35844	254	8	8			0	824	0.00	0	826	0.00	2754	0.0	0.0	7252	0.0	0.0
35845	135	8	8			1	1,572	0.00	1	1,574	0.00	7398	0.0	0.0	2942	0.0	0.0
35846	115	8	8			188	388	0.48	188	389	0.48	3019	0.0	0.0	3020	0.0	0.0
35847	86	6	6			3	169	0.02	3	169	0.02	3073	0.0	0.0	7501	0.0	0.0
35849	44	10	10			34	622	0.05	34	622	0.05	3732	0.0	0.0	3709	0.0	0.0
35850	195	8	8			36	557	0.06	36	558	0.06	3905	0.0	0.0	3984	0.0	0.0
35851	500	8	8			79	441	0.18	79	442	0.18	4184	0.0	0.0	4152	0.0	0.0
35852	93	8	8			1	297	0.00	1	297	0.00	4177	0.0	0.0	4211	0.0	0.0
35853	288	8	8			0	367	0.00	0	367	0.00	4334	0.0	0.0	4333	0.0	0.0
35854	80	8	8			120	561	0.21	120	562	0.21	4367	0.0	0.0	4359	0.0	0.0
35855	160	8	8			135	315	0.43	135	316	0.43	4484	0.0	0.0	4432	0.0	0.0
35856	420	8	8			117	715	0.16	117	716	0.16	4640	0.0	0.0	4667	0.0	0.0
35857	55	8	8			0	1,099	0.00	0	1,100	0.00	7691	0.0	0.0	4841	0.0	0.0
35858	242	8	8			0	1,208	0.00	0	1,210	0.00	4850	0.0	0.0	4858	0.0	0.0
35859	372	8	8			12	1,724	0.01	12	1,726	0.01	4901	0.0	0.0	4903	0.0	0.0
35860	150	8	8			1	1,309	0.00	1	1,310	0.00	4947	0.0	0.0	4948	0.0	0.0
35861	200	8	8			4	1,058	0.00	4	1,060	0.00	5423	0.0	0.0	5379	0.0	0.0
35862	125	8	8			7	1,224	0.01	7	1,225	0.01	5428	0.0	0.0	7340	0.0	0.0
35863	104	8	8			2	1,015	0.00	2	1,016	0.00	5359	0.0	0.0	5358	0.0	0.0
35864	152	8	8			4	295	0.01	4	296	0.01	5353	0.0	0.0	5354	0.0	0.0
35865	255	6	6			1	193	0.00	1	193	0.00	5615	0.0	0.0	7421	0.0	0.0
35867	360	8	8			1	479	0.00	1	480	0.00	6163	0.0	0.0	6156	0.0	0.0
35868	222	8	8			1	1,273	0.00	1	1,275	0.00	6416	0.0	0.0	7368	0.0	0.0
35869	116	8	8			0	1,664	0.00	0	1,666	0.00	6415	0.0	0.0	6448	0.0	0.0
35870	145	8	8			0	342	0.00	0	367	0.00	6565	0.0	0.0	6566	0.0	0.0
35872	324	10	10			133	399	0.33	133	427	0.31	7433	0.0	0.0	6895	0.0	0.0
35873	257	8	8			34	293	0.12	34	315	0.11	7644	0.0	0.0	6906	0.0	0.0
35874	480	8	8			277	299	0.93	277	299	0.93	4261	0.0	0.0	7143	0.0	0.0
35875	240	8	8			4	692	0.01	4	692	0.01	7287	0.0	0.0	3766	0.0	0.0
35876	498	8	8			10	408	0.03	10	409	0.03	1230	0.0	0.0	1149	0.0	0.0
35877	20	8	8			0	2,193	0.00	0	2,197	0.00	1112	0.0	0.0	1102	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35878	255	8	8			58	493	0.12	58	494	0.12	7214	0.0	0.0	1373	0.0	0.0
35879	290	8	8			1	343	0.00	1	344	0.00	1404	0.0	0.0	1403	0.0	0.0
35880	178	8	8			52	692	0.08	52	693	0.08	1369	0.0	0.0	1370	0.0	0.0
35881	253	8	8			2	297	0.01	2	298	0.01	1489	0.0	0.0	1549	0.0	0.0
35882	382	12	15	12	2036	1,141	1,172	0.97	1,142	1,172	0.97	6990	0.0	0.0	1550	7.6	7.6
35883	355	6	6			25	158	0.16	25	158	0.16	1566	0.0	0.0	1530	0.0	0.0
35884	225	6	6			58	161	0.36	58	161	0.36	1527	0.0	0.0	1526	0.0	0.0
35885	210	8	8			50	293	0.17	50	294	0.17	1731	0.0	0.0	1697	0.0	0.0
35886	375	10	15	2	Existing	781	808	0.97	1,167	2,381	0.49	1872	1.9	0.0	1911	1.4	0.0
35887	362	8	8			140	549	0.26	158	549	0.29	1873	0.0	0.0	1874	3.5	0.0
35888	460	6	6			172	132	1.30	172	132	1.30	1958	0.0	0.0	1943	0.0	0.0
35889	290	27	27			4,022	8,520	0.47	5,303	8,520	0.62	2020	0.0	0.0	1990	0.0	0.0
35890	332	8	8			14	343	0.04	14	344	0.04	2117	0.0	0.0	2136	0.0	0.0
35891	76	33	33			6,986	10,546	0.66	8,203	10,546	0.78	7390	0.0	0.0	7238	0.0	0.0
35892	498	8	8			12	344	0.03	12	344	0.03	2210	0.0	0.0	2209	0.0	0.0
35893	340	8	8			18	487	0.04	18	488	0.04	2280	0.0	0.0	2279	0.0	0.0
35894	23	8	8			29	759	0.04	29	760	0.04	2345	0.0	0.0	7392	0.0	0.0
35895	18	8	8			296	495	0.60	296	496	0.60	2422	0.0	0.0	2423	0.0	0.0
35897	234	6	6			4	520	0.01	4	520	0.01	2547	0.0	0.0	2597	0.0	0.0
35898	370	12	12			46	1,737	0.03	46	1,737	0.03	2660	0.0	0.0	2665	0.0	0.0
35899	301	21	21			2,273	10,714	0.21	2,469	10,714	0.23	2908	0.0	0.0	2948	0.0	0.0
35900	275	8	8			10	543	0.02	10	544	0.02	3061	0.0	0.0	3060	0.0	0.0
35901	353	8	8			18	332	0.05	18	332	0.05	3038	0.0	0.0	3039	0.0	0.0
35902	136	8	8			60	389	0.16	60	390	0.16	3110	0.0	0.0	3080	0.0	0.0
35903	140	8	8			1	399	0.00	1	400	0.00	3205	0.0	0.0	3204	0.0	0.0
35904	358	10	10			442	1,056	0.42	442	1,055	0.42	3248	0.0	0.0	3266	0.0	0.0
35906	80	15	15			461	1,890	0.24	461	1,890	0.24	3298	0.0	0.0	3299	0.0	0.0
35907	445	15	15			1,478	1,706	0.87	1,486	1,706	0.87	3341	0.0	0.0	3381	8.6	8.5
35909	187	24	24			1	25,104	0.00	1	25,104	0.00	3479	0.0	0.0	3484	0.0	0.0
35910	123	8	8			74	364	0.20	73	365	0.20	3489	0.0	0.0	3488	8.3	0.0
35911	33	8	8			1	441	0.00	1	441	0.00	3445	0.0	0.0	3500	0.0	0.0
35912	292	6	6			17	267	0.06	17	267	0.06	3609	0.0	0.0	7277	0.0	0.0
35913	175	8	8			53	501	0.11	53	501	0.11	3589	0.0	0.0	3590	0.0	0.0
35914	185	6	6			1	262	0.00	1	262	0.00	3549	0.0	0.0	3601	0.0	0.0
35915	50	8	8			1	1,703	0.00	1	1,706	0.00	7518	0.0	0.0	3591	0.0	0.0
35916	200	8	8			0	374	0.00	0	374	0.00	3706	0.0	0.0	3705	0.0	0.0
35917	74	8	8			0	483	0.00	0	483	0.00	7521	0.0	0.0	3660	0.0	0.0
35918	232	8	8			200	1,013	0.20	200	1,015	0.20	7522	0.0	0.0	3674	0.0	0.0
35919	159	8	8			2	849	0.00	2	850	0.00	3692	0.0	0.0	3693	0.0	0.0
35920	293	6	6			26	252	0.10	26	252	0.10	3864	0.0	0.0	3821	0.0	0.0
35921	265	8	8			1	1,001	0.00	1	1,002	0.00	3876	0.0	0.0	7046	0.0	0.0
35922	23	8	8			290	1,160	0.25	290	1,161	0.25	3827	0.0	0.0	7528	0.0	0.0
35923	322	6	6			1	255	0.00	1	255	0.00	3912	0.0	0.0	3913	0.0	0.0
35924	146	8	8			246	949	0.26	246	951	0.26	3960	0.0	0.0	3968	0.0	0.0
35925	468	8	8			82	576	0.14	82	576	0.14	7536	0.0	0.0	4059	0.0	0.0
35926	176	6	6			4	460	0.01	4	460	0.01	4023	0.0	0.0	4114	4.7	0.0
35927	131	8	8			5	363	0.01	5	363	0.01	4040	0.0	0.0	4098	0.0	0.0
35928	180	8	8			10	596	0.02	10	597	0.02	4150	0.0	0.0	4176	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35929	301	8	8			14	964	0.01	14	965	0.01	7298	0.0	0.0	4242	0.0	0.0
35930	100	8	8			1	556	0.00	1	557	0.00	4336	0.0	0.0	4335	0.0	0.0
35931	136	8	8			103	1,113	0.09	103	1,115	0.09	4325	0.0	0.0	4324	0.0	0.0
35932	377	8	8			62	1,250	0.05	62	1,252	0.05	4428	0.0	0.0	4469	0.0	0.0
35933	157	8	8			7	1,926	0.00	7	1,928	0.00	4623	0.0	0.0	7559	0.0	0.0
35934	367	8	8			49	1,774	0.03	49	1,776	0.03	4765	0.0	0.0	4764	0.0	0.0
35935	32	8	8			183	1,148	0.16	183	1,149	0.16	5077	0.0	0.0	5081	0.0	0.0
35936	291	8	8			222	371	0.60	222	372	0.60	5063	0.0	0.0	5085	0.0	0.0
35937	169	8	8			1	830	0.00	1	831	0.00	5096	0.0	0.0	5045	0.0	0.0
35938	189	6	6			2	624	0.00	2	624	0.00	5042	0.0	0.0	5041	0.0	0.0
35939	52	8	8			265	415	0.64	265	416	0.64	5220	0.0	0.0	5219	0.0	0.0
35940	237	8	8			1	1,147	0.00	1	1,149	0.00	5310	0.0	0.0	5309	0.0	0.0
35941	310	8	8			1	540	0.00	1	542	0.00	5249	0.0	0.0	7088	0.0	0.0
35942	132	8	8			1	1,050	0.00	1	1,051	0.00	5268	0.0	0.0	5269	0.0	0.0
35943	322	8	8			11	1,213	0.01	11	1,215	0.01	5312	0.0	0.0	5313	0.0	0.0
35944	17	6	6			0	331	0.00	0	331	0.00	5533	0.0	0.0	5513	0.0	0.0
35945	190	8	8			10	1,222	0.01	10	1,223	0.01	5479	0.0	0.0	5452	0.0	0.0
35946	279	15	15			544	3,661	0.15	544	3,661	0.15	5453	0.0	0.0	5449	0.0	0.0
35947	272	18	18			1,019	2,054	0.50	1,019	2,054	0.50	7341	0.0	0.0	5467	0.0	0.0
35948	334	12	18	19	Existing	808	703	1.15	1,252	2,074	0.60	5709	3.7	0.0	5710	5.3	0.0
35949	490	8	8			35	1,059	0.03	35	1,060	0.03	5727	0.0	0.0	5675	0.0	0.0
35950	218	8	8			33	343	0.10	33	343	0.10	5761	0.0	0.0	5762	0.0	0.0
35951	500	8	8			26	420	0.06	26	421	0.06	5768	0.0	0.0	5774	0.0	0.0
35952	245	8	8			1	397	0.00	1	397	0.00	5886	0.0	0.0	5862	0.0	0.0
35953	29	8	8			101	816	0.12	101	817	0.12	5962	0.0	0.0	5961	0.0	0.0
35954	350	8	8			89	1,163	0.08	89	1,164	0.08	6113	0.0	0.0	6115	0.0	0.0
35955	74	8	8			1	913	0.00	1	914	0.00	6062	0.0	0.0	6061	0.0	0.0
35956	118	15	15			1,565	2,992	0.52	1,565	2,992	0.52	6133	0.0	0.0	6098	0.0	0.0
35957	162	18	18			1,495	6,374	0.23	1,495	6,374	0.23	6044	0.0	0.0	6085	0.0	0.0
35959	87	6	6			0	140	0.00	0	151	0.00	6264	0.0	0.0	6311	0.0	0.0
35960	125	8	8			58	470	0.12	58	504	0.11	6300	0.0	0.0	6285	0.0	0.0
35961	315	8	8			54	610	0.09	54	610	0.09	6406	0.0	0.0	6402	0.0	0.0
35962	180	8	8			27	297	0.09	27	319	0.08	6618	0.0	0.0	6617	0.0	0.0
35963	152	8	8			58	387	0.15	58	415	0.14	6635	0.0	0.0	6656	0.0	0.0
35964	405	15	15			444	2,747	0.16	444	2,943	0.15	7634	0.0	0.0	6665	0.0	0.0
35965	249	8	8			0	346	0.00	0	372	0.00	6794	0.0	0.0	6796	0.0	0.0
35966	117	8	8			0	328	0.00	0	352	0.00	6762	0.0	0.0	6764	0.0	0.0
35967	340	8	8			15	472	0.03	15	506	0.03	6810	0.0	0.0	7642	0.0	0.0
35969	220	8	8			0	297	0.00	0	319	0.00	8440	0.0	0.0	6916	0.0	0.0
35970	322	8	8			11	453	0.02	11	487	0.02	7429	0.0	0.0	6293	0.0	0.0
35971	352	8	8			15	404	0.04	15	405	0.04	6160	0.0	0.0	6221	0.0	0.0
35972	55	8	8			10	329	0.03	10	330	0.03	5393	0.0	0.0	5257	0.0	0.0
35973	17	8	8			33	806	0.04	33	808	0.04	4893	0.0	0.0	5028	0.0	0.0
35974	212	8	8			5	1,492	0.00	5	1,494	0.00	4582	0.0	0.0	4659	0.0	0.0
35976	293	8	8			1	310	0.00	1	310	0.00	1597	0.0	0.0	1505	0.0	0.0
35977	288	6	6			48	213	0.22	48	213	0.22	1684	0.0	0.0	7454	0.0	0.0
35978	325	33	33			7,124	10,936	0.65	8,339	10,936	0.76	2171_2	0.0	0.0	7172	0.0	0.0
35979	170	10	10			503	528	0.95	503	527	0.95	2263	2.6	2.6	2250	3.8	3.8

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35980	135	8	8			1	349	0.00	1	350	0.00	2231	0.0	0.0	2276	0.0	0.0
35981	120	8	8			17	1,185	0.01	17	1,187	0.01	2543	0.0	0.0	2538	0.0	0.0
35982	106	8	8			10	892	0.01	10	893	0.01	2573	0.0	0.0	2572	0.0	0.0
35983	98	8	8			3	844	0.00	3	845	0.00	7178	0.0	0.0	2774	0.0	0.0
35984	246	21	21			2,720	7,751	0.35	2,918	7,751	0.38	2878	0.0	0.0	2867	0.0	0.0
35985	175	15	24	6	Existing	1,990	1,680	1.18	3,262	5,883	0.55	3414	6.6	0.0	3415	7.5	0.0
35986	120	8	8			1	1,003	0.00	1	1,005	0.00	7525	0.0	0.0	3778	0.0	0.0
35987	117	10	15	43	2036	593	690	0.86	593	689	0.86	4072	0.0	0.0	4073	0.0	0.0
35988	310	10	12	14	Existing	403	967	0.42	600	1,572	0.38	4163	0.0	0.0	4205	0.0	0.0
35989	186	8	8			10	1,435	0.01	10	1,438	0.01	4647	0.0	0.0	4663	0.0	0.0
35990	223	8	8			9	2,328	0.00	9	2,331	0.00	4761	0.0	0.0	4777	0.0	0.0
35991	295	6	6			14	560	0.02	14	560	0.02	5129	0.0	0.0	7082	0.0	0.0
35992	185	8	8			21	703	0.03	21	704	0.03	7332	0.0	0.0	5178	0.0	0.0
35993	70	8	8			2	178	0.01	2	178	0.01	5408	0.0	0.0	5409	0.0	0.0
35994	80	8	8			25	735	0.03	25	735	0.03	5477	0.0	0.0	7092	0.0	0.0
35995	272	8	8			97	440	0.22	97	440	0.22	5551	0.0	0.0	5571	0.0	0.0
35996	594	16	16			1	3,056	0.00	1	3,054	0.00	5578	0.0	0.0	5575	0.0	0.0
35997	330	8	8			22	660	0.03	22	660	0.03	5714	0.0	0.0	5673	0.0	0.0
35998	320	8	8			25	508	0.05	25	509	0.05	5825	0.0	0.0	5856	2.6	0.0
35999	239	8	8			10	1,553	0.01	10	1,555	0.01	7613	0.0	0.0	7612	0.0	0.0
36000	74	8	8			0	309	0.00	0	332	0.00	6269	0.0	0.0	6301	0.0	0.0
36001	158	8	8			0	1,567	0.00	0	1,569	0.00	6364	0.0	0.0	6362	0.0	0.0
36002	210	8	8			1	854	0.00	0	917	0.00	6350	0.0	0.0	6351	0.0	0.0
36003	184	8	8			6	915	0.01	6	917	0.01	7626	0.0	0.0	6499	0.0	0.0
36004	168	8	8			0	463	0.00	0	497	0.00	6584	0.0	0.0	6589	0.0	0.0
36005	228	18	24	25	2036	2,860	3,325	0.86	2,861	3,563	0.80	6707	0.0	0.0	6705	0.0	0.0
36006	517	8	8			286	406	0.70	286	407	0.70	6243	0.0	0.0	6006	0.0	0.0
36010	177	12	21	27	2036	842	608	1.39	843	651	1.30	6710	0.0	0.0	7637	0.0	0.0
36011	170	8	8			21	333	0.06	21	333	0.06	5793	0.0	0.0	5690	0.0	0.0
36012	358	8	8			0	518	0.00	0	519	0.00	4370	0.0	0.0	4068	0.0	0.0
36013	80	12	12			758	1,937	0.39	758	1,937	0.39	4228	0.0	0.0	2606	0.0	0.0
36014	273	15	18	1	ura	1,380	1,110	1.24	1,379	1,110	1.24	7469	0.0	0.0	2451	0.0	0.0
36015	265	8	8			159	277	0.57	159	278	0.57	1680	2.2	0.0	1806	0.0	0.0
36016	176	8	8			81	383	0.21	81	384	0.21	1324	0.0	0.0	1296	0.0	0.0
36017	230	8	8			3	556	0.01	3	556	0.01	1433	0.0	0.0	1432	0.0	0.0
36018	351	8	8			104	340	0.31	104	340	0.31	1615	0.0	0.0	1642	5.7	0.0
36019	330	8	8			28	321	0.09	28	322	0.09	1618	0.0	0.0	1611	0.0	0.0
36020	320	6	6			59	199	0.30	59	199	0.30	7167	0.0	0.0	7386	0.0	0.0
36021	200	6	6			17	144	0.12	1	144	0.00	1814	0.6	0.0	1812	2.9	0.0
36022	240	6	6			1	277	0.01	1	277	0.01	7169	0.0	0.0	1878	0.0	0.0
36023	308	10	15	2	Existing	577	775	0.74	788	2,285	0.34	1875	2.8	0.0	1880	0.0	0.0
36024	382	8	8			1	381	0.00	1	382	0.00	2118	0.0	0.0	2120	0.0	0.0
36027	237	15	15			1,408	1,530	0.92	1,407	1,530	0.92	2451	0.0	0.0	2458	0.0	0.0
36028	77	8	8			1	1,113	0.00	1	1,115	0.00	7484	0.0	0.0	2569	0.0	0.0
36029	12	12	12			77	4,857	0.02	77	4,857	0.02	2696	0.0	0.0	2620	0.0	0.0
36030	406	8	8			4	1,384	0.00	4	1,386	0.00	7256	0.0	0.0	2959	0.0	0.0
36031	240	12	12			377	1,314	0.29	377	1,314	0.29	3082	0.0	0.0	3135	0.0	0.0
36032	179	8	8			66	342	0.19	66	342	0.19	3124	0.0	0.0	3125	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36033	192	8	8			74	381	0.19	74	382	0.19	7503	0.0	0.0	3177	0.0	0.0
36035	232	8	8			13	361	0.03	13	362	0.03	7180	0.0	0.0	3317	0.0	0.0
36036	349	8	8			154	476	0.32	154	477	0.32	3364	0.0	0.0	7134	0.0	0.0
36037	136	8	8			1	465	0.00	1	465	0.00	3511	0.0	0.0	3510	0.0	0.0
36038	121	8	8			88	1,156	0.08	88	1,158	0.08	3951	0.0	0.0	3952	0.0	0.0
36039	102	8	8			6	1,716	0.00	6	1,719	0.00	4392	0.0	0.0	4393	0.0	0.0
36040	80	8	8			3	1,330	0.00	3	1,331	0.00	4534	0.0	0.0	4531	0.0	0.0
36041	186	8	8			15	988	0.02	15	989	0.02	4592	0.0	0.0	7558	0.0	0.0
36042	170	8	8			18	1,979	0.01	18	1,982	0.01	4686	0.0	0.0	4687	0.0	0.0
36043	287	8	8			337	1,333	0.25	337	1,335	0.25	4753	0.0	0.0	4774	0.0	0.0
36044	70	8	8			3	590	0.01	3	592	0.01	4799	0.0	0.0	4737	0.0	0.0
36045	153	8	8			8	1,210	0.01	8	1,211	0.01	4825	0.0	0.0	4824	0.0	0.0
36046	382	8	8			1	1,217	0.00	1	1,219	0.00	4958	0.0	0.0	4934	0.0	0.0
36047	201	8	8			39	1,613	0.02	39	1,615	0.02	4996	0.0	0.0	4997	0.0	0.0
36049	57	8	8			1	311	0.00	1	312	0.00	5597	0.0	0.0	5617	0.0	0.0
36050	395	10	15	18	Existing	466	326	1.43	728	963	0.76	5838	0.0	0.0	5867	9.4	0.0
36051	182	8	8			126	478	0.26	126	478	0.26	6233	0.0	0.0	6234	0.0	0.0
36052	359	8	8			1	586	0.00	1	587	0.00	6246	0.0	0.0	6245	0.0	0.0
36053	175	8	8			1	485	0.00	1	485	0.00	6189	0.0	0.0	6220	0.0	0.0
36054	170	8	8			36	2,084	0.02	36	2,087	0.02	6384	0.0	0.0	6399	0.0	0.0
36055	213	8	8			0	1,242	0.00	0	1,244	0.00	6436	0.0	0.0	7730	0.0	0.0
36056	478	8	8			0	283	0.00	0	303	0.00	7721	0.0	0.0	6837	0.0	0.0
36057	321	6	6			13	365	0.03	13	365	0.03	7039	0.0	0.0	5495	0.0	0.0
36059	225	8	8			3	362	0.01	3	362	0.01	1162	0.0	0.0	1163	0.0	0.0
36060	235	6	6			1	195	0.01	1	195	0.01	6985	0.0	0.0	1383	0.0	0.0
36061	53	8	8			16	358	0.04	16	358	0.04	1650	0.0	0.0	1649	0.0	0.0
36062	165	6	6			3	252	0.01	3	252	0.01	1655	0.0	0.0	1603	0.0	0.0
36063	194	6	12	7	Existing	143	128	1.12	200	813	0.25	1806	0.0	0.0	1805	0.2	0.0
36064	185	10	10			302	415	0.73	289	415	0.70	1787	5.7	0.0	1761	6.4	0.0
36065	215	8	8			51	213	0.24	51	213	0.24	7005	8.9	8.9	1977	10.7	10.7
36068	335	8	8			7	1,033	0.01	7	1,035	0.01	2551	0.0	0.0	2549	0.0	0.0
36069	208	8	8			8	525	0.02	8	526	0.02	2626	0.0	0.0	2628	0.0	0.0
36070	295	8	8			0	635	0.00	0	636	0.00	2644	0.0	0.0	2687	0.0	0.0
36071	301	8	8			0	774	0.00	0	776	0.00	2739	0.0	0.0	7252	0.0	0.0
36072	355	8	8			22	435	0.05	22	436	0.05	2717	0.0	0.0	2753	0.0	0.0
36073	360	8	8			13	2,338	0.01	13	2,341	0.01	2821	0.0	0.0	2815	0.0	0.0
36074	65	54	54			4,938	34,619	0.14	4,938	34,619	0.14	2856	0.0	0.0	2857	0.0	0.0
36075	240	6	6			0	563	0.00	0	563	0.00	2898	0.0	0.0	2964	0.0	0.0
36076	184	8	8			33	894	0.04	33	895	0.04	3768	0.0	0.0	3749	0.0	0.0
36077	176	8	8			34	1,052	0.03	34	1,053	0.03	3847	0.0	0.0	3846	0.0	0.0
36078	132	6	6			19	271	0.07	19	271	0.07	3906	0.0	0.0	7407	0.0	0.0
36079	156	8	8			5	1,128	0.00	5	1,130	0.00	3939	0.0	0.0	3956	0.0	0.0
36080	343	6	6			1	516	0.00	1	516	0.00	3904	0.0	0.0	3991	0.0	0.0
36081	240	8	8			258	569	0.45	258	569	0.45	4195	0.0	0.0	4196	0.0	0.0
36082	252	8	8			0	832	0.00	0	833	0.00	4216	0.0	0.0	4215	0.0	0.0
36083	367	8	8			28	301	0.09	28	302	0.09	4183	0.0	0.0	4184	0.0	0.0
36084	163	8	8			1	565	0.00	1	566	0.00	4320	0.0	0.0	4289	0.0	0.0
36085	128	8	8			9	612	0.01	9	613	0.01	4349	0.0	0.0	4304	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36086	210	8	8			0	1,277	0.00	0	1,279	0.00	7302	0.0	0.0	4370	0.0	0.0
36087	105	8	8			55	1,241	0.04	55	1,243	0.04	4418	0.0	0.0	7551	0.0	0.0
36088	429	8	8			25	1,365	0.02	25	1,367	0.02	4437	0.0	0.0	4433	0.0	0.0
36089	93	8	8			1	944	0.00	1	946	0.00	4492	0.0	0.0	4491	0.0	0.0
36090	25	8	8			19	831	0.02	19	832	0.02	7064	0.0	0.0	4495	0.0	0.0
36091	149	8	8			10	1,936	0.01	10	1,939	0.01	4568	0.0	0.0	4567	0.0	0.0
36092	328	8	8			30	1,160	0.03	30	1,162	0.03	4655	0.0	0.0	7313	0.0	0.0
36093	377	8	8			5	898	0.01	5	899	0.01	7314	0.0	0.0	4639	0.0	0.0
36094	161	8	8			3	930	0.00	3	931	0.00	4635	0.0	0.0	4634	0.0	0.0
36095	170	8	8			92	1,340	0.07	92	1,341	0.07	4843	0.0	0.0	4842	0.0	0.0
36096	442	12	12			695	2,022	0.34	696	2,022	0.34	4877	0.0	0.0	7569	0.0	0.0
36099	353	8	8			1	1,272	0.00	1	1,274	0.00	4939	0.0	0.0	4952	0.0	0.0
36100	495	12	12			778	2,247	0.35	779	2,247	0.35	4998	0.0	0.0	4999	0.0	0.0
36101	378	8	8			53	1,210	0.04	53	1,211	0.04	7083	0.0	0.0	5175	0.0	0.0
36102	400	8	8			305	580	0.53	305	581	0.53	5394	0.0	0.0	7194	0.0	0.0
36103	77	8	8			1	375	0.00	1	376	0.00	5334	0.0	0.0	5361	0.0	0.0
36104	321	8	8			103	749	0.14	103	751	0.14	5395	0.0	0.0	5394	0.0	0.0
36105	92	8	8			1	444	0.00	1	444	0.00	5636	0.0	0.0	7347	0.0	0.0
36106	240	8	8			1	1,144	0.00	1	1,146	0.00	5680	0.0	0.0	5681	0.0	0.0
36107	453	8	8			13	526	0.02	13	526	0.02	5854	0.0	0.0	5853	2.9	0.0
36108	377	15	15			1,143	1,674	0.68	1,140	1,674	0.68	5926	11.0	0.0	7197	9.2	10.3
36110	361	8	8			69	497	0.14	69	498	0.14	5991	0.0	0.0	5995	0.0	0.0
36111	350	10	10			263	658	0.40	263	657	0.40	6000	0.0	0.0	5999	0.0	0.0
36112	260	8	8			188	500	0.38	188	501	0.38	7617	0.0	0.0	6172	0.0	0.0
36113	349	8	8			31	909	0.03	31	910	0.03	6494	0.0	0.0	6460	0.0	0.0
36114	171	8	8			0	331	0.00	0	356	0.00	6533	0.0	0.0	6532	0.0	0.0
36115	312	8	8			10	333	0.03	10	357	0.03	6555	0.0	0.0	6534	0.0	0.0
36116	91	8	8			24	457	0.05	24	490	0.05	6700	0.0	0.0	6701	0.0	0.0
36117	257	8	8			1	301	0.00	1	322	0.00	6926	0.0	0.0	6925	0.0	0.0
36118	323	8	8			53	358	0.15	53	359	0.15	1322	0.0	0.0	7211	0.0	0.0
36119	179	8	8			33	419	0.08	33	420	0.08	1363	0.0	0.0	1361	0.0	0.0
36120	236	8	8			35	415	0.08	1	416	0.00	10240	4.8	0.0	2022	6.7	0.0
36123	138	8	8			1	1,272	0.00	1	1,274	0.00	2692	0.0	0.0	7016	0.0	0.0
36124	79	8	8			54	844	0.06	54	845	0.06	2776	0.0	0.0	2724	0.0	0.0
36125	87	8	8			22	463	0.05	22	463	0.05	2928	0.0	0.0	2927	0.0	0.0
36126	335	8	8			190	376	0.50	189	376	0.50	3020	0.0	0.0	3021	0.0	0.0
36127	150	6	6			1	160	0.01	1	160	0.01	3072	0.0	0.0	3129	0.0	0.0
36128	157	18	18			4,199	5,006	0.84	4,203	5,006	0.84	3347	0.0	0.0	7507	0.0	0.0
36129	93	8	8			1	610	0.00	1	610	0.00	3386	0.0	0.0	3389	0.0	0.0
36130	55	6	6			1	481	0.00	1	481	0.00	3551	0.0	0.0	3602	0.0	0.0
36131	159	8	8			85	378	0.22	85	378	0.22	7183	0.0	0.0	3637	0.0	0.0
36133	171	8	8			1	992	0.00	1	994	0.00	3918	0.0	0.0	3919	0.0	0.0
36134	350	8	8			72	754	0.10	72	755	0.10	4327	0.0	0.0	4326	0.0	0.0
36135	130	8	8			6	754	0.01	6	755	0.01	7299	0.0	0.0	4307	0.0	0.0
36136	199	8	8			1	928	0.00	1	929	0.00	4445	0.0	0.0	4427	0.0	0.0
36137	211	8	8			1	883	0.00	1	885	0.00	5075	0.0	0.0	5089	0.0	0.0
36138	141	8	8			1	571	0.00	1	572	0.00	7334	0.0	0.0	5263	0.0	0.0
36139	237	8	8			17	688	0.02	17	688	0.02	7193	0.0	0.0	5257	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36141	152	8	12	22	ura	156	730	0.21	156	783	0.20	8081	0.0	0.0	7430	0.0	0.0
36143	196	6	6			38	178	0.21	38	178	0.21	11066	0.0	0.0	1438	0.0	0.0
36144	85	8	8			1	481	0.00	1	481	0.00	11069	0.0	0.0	1701	0.0	0.0
36168	122	54	54			12,989	34,832	0.37	13,183	34,832	0.38	3409	0.0	0.0	3410	0.0	0.0
36171	200	54	54			18,044	46,285	0.39	18,976	46,285	0.41	5826	0.0	0.0	5833	0.0	0.0
36172	293	8	8			76	296	0.26	76	317	0.24	6306	0.0	0.0	6653	0.0	0.0
36173	285	8	8			19	303	0.06	19	304	0.06	6118	0.0	0.0	7362	0.0	0.0
36174	400	8	8			24	758	0.03	24	759	0.03	5734	0.0	0.0	5825	0.0	0.0
36175	450	10	10			578	581	0.99	578	581	1.00	5462	4.3	4.3	5556	3.6	3.6
36176	500	10	10			572	1,053	0.54	572	1,051	0.54	5200	0.0	0.0	5454	0.0	0.0
36177	380	8	8			23	1,534	0.01	23	1,536	0.01	4859	0.0	0.0	4725	0.0	0.0
36178	315	8	8			2	731	0.00	2	731	0.00	4632	0.0	0.0	4567	0.0	0.0
36179	254	6	6			1	477	0.00	1	477	0.00	3800	0.0	0.0	3960	0.0	0.0
36180	340	15	15			1,422	2,545	0.56	1,424	2,545	0.56	3080	0.0	0.0	3373	0.0	0.0
36181	278	8	8			1	343	0.00	1	343	0.00	7239	0.0	0.0	2086	0.0	0.0
36182	450	8	8			151	383	0.39	151	384	0.39	1364	0.0	0.0	3126	0.0	0.0
36183	375	12	12			46	1,556	0.03	46	1,556	0.03	1154	0.0	0.0	1410	0.0	0.0
36184	268	8	8			51	1,377	0.04	51	1,379	0.04	2535	0.0	0.0	1111	0.0	0.0
36185	193	8	8			26	340	0.08	26	341	0.08	1330	0.0	0.0	1310	0.0	0.0
36186	48	8	8			1	422	0.00	1	422	0.00	1339	0.0	0.0	1323	0.0	0.0
36187	153	8	8			8	351	0.02	8	351	0.02	1421	0.0	0.0	1398	0.0	0.0
36189	247	8	8			40	327	0.12	40	328	0.12	1558	0.0	0.0	1502	0.0	0.0
36190	351	8	8			238	562	0.42	238	563	0.42	1535	0.0	0.0	1550	7.6	7.6
36191	38	8	8			282	1,815	0.16	282	1,817	0.16	1539	0.0	0.0	1574	0.0	0.0
36192	176	6	6			12	76	0.16	2	76	0.03	1601	5.6	0.0	1595	3.6	0.0
36193	165	6	6			1	323	0.00	1	323	0.00	1683	0.0	0.0	1684	0.0	0.0
36194	255	8	8			81	269	0.30	81	269	0.30	1697	0.0	0.0	1679	0.0	0.0
36195	130	12	18	5	Existing	1,505	1,087	1.38	2,144	3,205	0.67	1824	7.1	0.0	1823	7.7	0.0
36196	285	12	12			4	847	0.00	4	847	0.00	1765	0.0	0.0	1767	0.0	0.0
36198	83	10	15	4	Existing	745	351	2.12	809	1,034	0.78	1891	0.0	0.0	1892	0.7	0.0
36200	290	6	6			5	229	0.02	5	229	0.02	2008	0.0	0.0	9988	0.0	0.0
36201	116	12	12			126	1,393	0.09	126	1,393	0.09	2174	0.0	0.0	2147	0.0	0.0
36202	296	12	12			57	550	0.10	57	550	0.10	2167	0.0	0.0	2157	0.0	0.0
36203	450	8	8			353	343	1.03	353	344	1.03	2216	7.3	7.5	2204	0.0	0.0
36204	310	8	8			11	343	0.03	11	344	0.03	2221	0.0	0.0	2201	0.0	0.0
36205	346	8	8			104	330	0.32	105	331	0.32	2267	0.0	0.0	2268	6.0	6.1
36206	400	8	8			84	375	0.22	84	375	0.22	2281	0.0	0.0	7241	0.0	0.0
36207	300	6	6			1	276	0.00	1	276	0.00	2233	0.0	0.0	2245	0.0	0.0
36209	317	10	10			14	2,338	0.01	14	2,335	0.01	2566	0.0	0.0	2538	0.0	0.0
36211	164	8	8			5	672	0.01	5	672	0.01	2536	0.0	0.0	2578	0.0	0.0
36212	345	8	12	37	ura	81	688	0.12	81	689	0.12	2785	0.0	0.0	2784	0.0	0.0
36213	11	8	8			0	772	0.00	0	774	0.00	2979	0.0	0.0	7023	0.0	0.0
36214	237	6	6			0	878	0.00	0	878	0.00	2896	0.0	0.0	2966	0.0	0.0
36215	257	8	8			39	586	0.07	39	587	0.07	7260	0.0	0.0	3052	0.0	0.0
36216	36	8	8			1	383	0.00	1	384	0.00	3064	0.0	0.0	3012	0.0	0.0
36218	3	8	8			72	542	0.13	72	543	0.13	3199	0.0	0.0	3147	0.0	0.0
36219	222	24	24			578	6,983	0.08	578	6,983	0.08	3238	0.0	0.0	3236	0.0	0.0
36220	364	8	8			2	341	0.01	2	342	0.01	3306	0.0	0.0	3309	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36221	280	8	8			6	381	0.02	6	381	0.02	7509	0.0	0.0	7270	0.0	0.0
36222	29	24	24			2	5,656	0.00	2	5,656	0.00	3476	0.0	0.0	3475	0.0	0.0
36223	177	14	18	10	Existing	1,208	1,301	0.93	1,211	2,543	0.48	3424	5.8	0.0	3444	5.4	0.0
36224	305	6	6			1	144	0.00	1	144	0.00	3401	0.0	0.0	7035	0.0	0.0
36225	34	10	18	5	Existing	749	411	1.82	1,831	1,971	0.93	7135	7.2	0.0	3414	6.6	0.0
36226	270	8	8			1	312	0.00	1	312	0.00	3517	0.0	0.0	3461	0.0	0.0
36228	364	12	12			400	899	0.45	400	899	0.45	3575	0.0	0.0	3574	0.0	0.0
36230	303	10	10			58	474	0.12	58	474	0.12	3704	0.0	0.0	3681	0.0	0.0
36231	335	8	8			0	526	0.00	0	526	0.00	3720	0.0	0.0	3663	0.0	0.0
36232	185	8	8			69	410	0.17	69	410	0.17	3693	0.0	0.0	7524	0.0	0.0
36233	175	8	8			0	1,209	0.00	0	1,210	0.00	3763	0.0	0.0	3782	0.0	0.0
36234	320	10	10			219	2,303	0.10	219	2,301	0.10	3859	0.0	0.0	3829	0.0	0.0
36235	230	8	8			1	383	0.00	1	384	0.00	3873	0.0	0.0	3831	0.0	0.0
36236	187	8	8			399	540	0.74	399	540	0.74	7284	0.0	0.0	3858	0.0	0.0
36237	221	8	15	43	2036	620	838	0.74	620	840	0.74	7537	0.0	0.0	4079	3.3	0.0
36238	65	8	8			70	292	0.24	70	292	0.24	4065	0.0	0.0	4064	0.0	0.0
36239	263	8	8			20	266	0.08	6	267	0.02	7291	4.9	0.0	4047	1.7	0.0
36240	167	8	8			6	1,719	0.00	6	1,722	0.00	7186	0.0	0.0	4042	0.0	0.0
36241	152	8	8			13	293	0.05	13	293	0.05	4156	0.0	0.0	7542	0.0	0.0
36242	70	8	8			1	2,017	0.00	1	2,020	0.00	4248	0.0	0.0	4249	0.0	0.0
36243	15	8	8			6	1,337	0.00	6	1,339	0.00	7066	0.0	0.0	7556	0.0	0.0
36244	315	8	8			20	1,184	0.02	20	1,186	0.02	4663	0.0	0.0	4646	0.0	0.0
36245	38	8	8			239	763	0.31	239	764	0.31	4772	0.0	0.0	4731	0.0	0.0
36246	119	6	6			1	695	0.00	1	695	0.00	4790	0.0	0.0	4770	0.0	0.0
36247	74	8	8			0	1,339	0.00	0	1,340	0.00	4784	0.0	0.0	4744	0.0	0.0
36248	145	8	8			0	621	0.00	0	622	0.00	7150	0.0	0.0	4761	0.0	0.0
36249	260	8	8			43	1,119	0.04	43	1,121	0.04	5054	0.0	0.0	5053	0.0	0.0
36250	195	8	8			1	1,301	0.00	1	1,303	0.00	5123	0.0	0.0	7079	0.0	0.0
36251	65	8	8			1	1,810	0.00	1	1,813	0.00	5033	0.0	0.0	5034	0.0	0.0
36252	170	8	8			46	843	0.05	46	844	0.05	7082	0.0	0.0	5161	0.0	0.0
36253	210	8	8			6	1,490	0.00	6	1,492	0.00	5174	0.0	0.0	5185	0.0	0.0
36254	244	8	8			1	1,747	0.00	1	1,750	0.00	5151	0.0	0.0	7416	0.0	0.0
36255	415	8	8			190	1,053	0.18	190	1,055	0.18	5209	0.0	0.0	5210	0.0	0.0
36257	341	8	8			26	410	0.06	26	410	0.06	5287	0.0	0.0	5282	4.2	0.0
36258	92	8	8			1	775	0.00	1	776	0.00	5295	0.0	0.0	7418	0.0	0.0
36259	80	8	8			4	297	0.01	4	298	0.01	5410	0.0	0.0	5438	0.0	0.0
36260	55	8	8			1	634	0.00	1	635	0.00	5347	0.0	0.0	5408	0.0	0.0
36261	39	6	6			0	200	0.00	0	200	0.00	5444	0.0	0.0	5523	0.0	0.0
36262	233	8	8			181	636	0.28	181	637	0.28	5503	0.0	0.0	5487	0.0	0.0
36263	302	8	8			242	553	0.44	242	553	0.44	5451	0.0	0.0	5511	0.0	0.0
36264	278	8	8			0	397	0.00	0	398	0.00	5485	0.0	0.0	5484	0.0	0.0
36265	185	6	6			0	253	0.00	0	253	0.00	5545	0.0	0.0	5561	0.0	0.0
36266	54	6	6			67	517	0.13	67	517	0.13	5590	0.0	0.0	5587	0.0	0.0
36267	476	8	8			1	342	0.00	1	343	0.00	5650	0.0	0.0	5649	0.0	0.0
36268	397	8	8			182	447	0.41	182	447	0.41	5690	0.0	0.0	5689	0.0	0.0
36269	180	8	8			2	1,067	0.00	2	1,068	0.00	5715	0.0	0.0	5684	0.0	0.0
36270	410	8	8			13	745	0.02	13	746	0.02	5706	0.0	0.0	5727	0.0	0.0
36271	200	8	8			33	690	0.05	33	690	0.05	5763	0.0	0.0	5764	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36272	171	8	8			43	356	0.12	43	356	0.12	5800	0.0	0.0	5742	0.0	0.0
36275	42	8	8			47	828	0.06	47	828	0.06	6125	0.0	0.0	6124	0.0	0.0
36276	102	8	8			6	898	0.01	6	899	0.01	6026	0.0	0.0	6063	0.0	0.0
36277	247	8	8			23	605	0.04	23	606	0.04	6068	0.0	0.0	6067	0.0	0.0
36278	169	15	15			1,588	3,910	0.41	1,588	3,910	0.41	7614	0.0	0.0	6132	0.0	0.0
36279	247	8	8			19	806	0.02	19	806	0.02	6092	0.0	0.0	6093	0.0	0.0
36280	220	8	12	40	ura	219	403	0.54	219	403	0.54	6047	0.0	0.0	6138	0.0	0.0
36281	150	8	8			1	796	0.00	1	797	0.00	6253	0.0	0.0	6224	0.0	0.0
36282	418	8	8			16	420	0.04	16	451	0.04	6310	0.0	0.0	6309	0.0	0.0
36283	140	6	6			13	236	0.05	13	236	0.05	6262	0.0	0.0	6321	0.0	0.0
36284	280	8	8			26	944	0.03	26	1,013	0.03	7729	0.0	0.0	6284	0.0	0.0
36285	203	8	8			23	330	0.07	23	354	0.06	6288	0.0	0.0	6287	0.0	0.0
36286	138	8	8			17	1,005	0.02	17	1,078	0.02	6340	0.0	0.0	6341	0.0	0.0
36287	15	8	8			1	2,113	0.00	1	2,267	0.00	6377	0.0	0.0	6374	0.0	0.0
36288	75	8	8			136	915	0.15	136	917	0.15	6465	0.0	0.0	6464	0.0	0.0
36289	90	10	10			334	1,657	0.20	334	1,774	0.19	7119	0.0	0.0	6602	0.0	0.0
36290	263	8	8			0	370	0.00	0	397	0.00	6615	0.0	0.0	6627	0.0	0.0
36291	277	8	8			0	275	0.00	0	295	0.00	6643	0.0	0.0	6644	0.0	0.0
36292	203	8	8			27	155	0.17	27	166	0.16	6629	0.0	0.0	6632	0.0	0.0
36293	189	8	8			47	360	0.13	47	387	0.12	6722	0.0	0.0	7377	0.0	0.0
36294	164	8	8			0	318	0.00	0	341	0.00	6763	0.0	0.0	6764	0.0	0.0
36295	400	8	8			15	256	0.06	15	274	0.06	6834	0.0	0.0	6810	0.0	0.0
36296	16	8	8			0	333	0.00	0	357	0.00	6850	0.0	0.0	6818	0.0	0.0
36380	107	8	8			19	520	0.04	19	558	0.03	7780	0.0	0.0	6497	0.0	0.0
36381	205	8	8			1	756	0.00	1	810	0.00	8085	0.0	0.0	7780	0.0	0.0
36382	418	8	8			13	174	0.08	13	174	0.08	7480	0.0	0.0	7786	0.0	0.0
36383	418	8	8			17	299	0.06	17	299	0.06	7786	0.0	0.0	2397	0.0	0.0
36384	266	8	8			3	742	0.00	3	743	0.00	7787	0.0	0.0	7786	0.0	0.0
36385	146	8	8			1	667	0.00	1	668	0.00	7785	0.0	0.0	7787	0.0	0.0
36386	222	18	18			452	2,148	0.21	452	2,148	0.21	7788	0.0	0.0	7789	0.0	0.0
36387	316	18	18			358	1,801	0.20	358	1,801	0.20	7788	0.0	0.0	7790	0.0	0.0
36388	172	18	18			810	3,703	0.22	810	3,703	0.22	6129	0.0	0.0	7788	0.0	0.0
36389	113	18	18			452	2,161	0.21	452	2,161	0.21	7789	0.0	0.0	7790	0.0	0.0
36390	22	18	18			810	5,444	0.15	810	5,444	0.15	7790	0.0	0.0	6128	0.0	0.0
36391	202	8	8			47	996	0.05	47	997	0.05	7800	0.0	0.0	7801	0.0	0.0
36392	221	8	8			47	934	0.05	47	935	0.05	7799	0.0	0.0	7800	0.0	0.0
36393	227	8	8			82	1,135	0.07	82	1,136	0.07	7791	0.0	0.0	7073	0.0	0.0
36394	70	8	8			82	1,335	0.06	82	1,336	0.06	7792	0.0	0.0	7791	0.0	0.0
36395	114	8	8			81	594	0.14	81	595	0.14	7793	0.0	0.0	7792	0.0	0.0
36396	183	8	8			81	1,169	0.07	81	1,171	0.07	7794	0.0	0.0	7793	0.0	0.0
36397	132	8	8			81	1,547	0.05	81	1,549	0.05	7796	0.0	0.0	7795	0.0	0.0
36398	116	8	8			81	1,224	0.07	81	1,226	0.07	7797	0.0	0.0	7796	0.0	0.0
36399	102	8	8			81	1,165	0.07	81	1,167	0.07	7798	0.0	0.0	7797	0.0	0.0
36400	110	8	8			81	1,157	0.07	81	1,158	0.07	7801	0.0	0.0	7798	0.0	0.0
36401	88	8	8			33	1,051	0.03	33	1,052	0.03	7802	0.0	0.0	7801	0.0	0.0
36402	297	8	8			33	965	0.03	33	967	0.03	7803	0.0	0.0	7802	0.0	0.0
36403	295	8	8			33	945	0.03	33	947	0.03	7806	0.0	0.0	7803	0.0	0.0
36404	297	8	8			33	613	0.05	33	615	0.05	7807	0.0	0.0	7806	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36405	71	8	8			33	477	0.07	33	478	0.07	7808	0.0	0.0	7807	0.0	0.0
36406	86	8	8			33	1,952	0.02	33	1,955	0.02	7809	0.0	0.0	7808	0.0	0.0
36407	194	8	8			33	917	0.04	33	919	0.04	7805	0.0	0.0	7809	0.0	0.0
36408	159	8	8			33	951	0.03	33	953	0.03	7810	0.0	0.0	7805	0.0	0.0
36409	108	8	8			81	1,156	0.07	81	1,158	0.07	7795	0.0	0.0	7794	0.0	0.0
36440	44	8	8			0	1,574	0.00	0	1,576	0.00	7821	0.0	0.0	7820	0.0	0.0
36500	66	8	8			3	915	0.00	3	916	0.00	7887	0.0	0.0	7888	0.0	0.0
36501	160	8	8			3	712	0.00	3	713	0.00	7881	0.0	0.0	7887	0.0	0.0
36502	92	8	8			0	959	0.00	0	960	0.00	7880	0.0	0.0	7881	0.0	0.0
36503	102	8	8			0	624	0.00	0	625	0.00	7882	0.0	0.0	7881	0.0	0.0
36504	49	8	8			0	881	0.00	0	882	0.00	7889	0.0	0.0	7880	0.0	0.0
36505	84	8	8			0	2,024	0.00	0	2,027	0.00	7883	0.0	0.0	7882	0.0	0.0
36506	144	8	8			0	1,138	0.00	0	1,140	0.00	7884	0.0	0.0	7885	0.0	0.0
36507	18	8	8			0	619	0.00	0	620	0.00	7885	0.0	0.0	7886	0.0	0.0
36508	218	8	8			24	1,046	0.02	24	1,047	0.02	2504	0.0	0.0	7886	0.0	0.0
36520	112	8	12	37	ura	34	867	0.04	34	869	0.04	7901	0.0	0.0	2507	0.0	0.0
36540	192	8	12	37	ura	33	777	0.04	33	778	0.04	7888	0.0	0.0	7901	0.0	0.0
36541	126	8	12	37	ura	31	643	0.05	31	644	0.05	7902	0.0	0.0	7888	0.0	0.0
36543	87	8	12	37	ura	30	601	0.05	30	602	0.05	7903	0.0	0.0	7902	0.0	0.0
36544	104	8	12	37	ura	30	662	0.05	30	663	0.05	7904	0.0	0.0	7903	0.0	0.0
36545	130	8	12	37	ura	16	813	0.02	16	815	0.02	7905	0.0	0.0	7904	0.0	0.0
36546	253	8	12	37	ura	13	710	0.02	13	712	0.02	7906	0.0	0.0	7905	0.0	0.0
36547	197	8	12	37	ura	13	708	0.02	13	709	0.02	7907	0.0	0.0	7906	0.0	0.0
36548	323	8	12	37	ura	13	757	0.02	13	758	0.02	7908	0.0	0.0	7907	0.0	0.0
36549	311	8	12	37	ura	7	893	0.01	7	894	0.01	9680	0.0	0.0	7908	0.0	0.0
36550	245	8	8			15	655	0.02	15	656	0.02	7910	0.0	0.0	7904	0.0	0.0
36551	292	8	8			4	830	0.01	4	831	0.01	7911	0.0	0.0	7910	0.0	0.0
36552	106	8	8			3	1,002	0.00	3	1,003	0.00	7912	0.0	0.0	7911	0.0	0.0
36553	196	8	8			3	1,199	0.00	3	1,200	0.00	7913	0.0	0.0	7912	0.0	0.0
36554	400	8	8			1	1,269	0.00	1	1,272	0.00	7914	0.0	0.0	7913	0.0	0.0
36555	10	8	8			0	1,523	0.00	0	1,524	0.00	7915	0.0	0.0	7914	0.0	0.0
36556	54	8	8			0	375	0.00	0	376	0.00	7916	0.0	0.0	7910	0.0	0.0
36557	97	8	8			0	1,133	0.00	0	1,134	0.00	7917	0.0	0.0	7916	0.0	0.0
36558	224	8	8			0	853	0.00	0	854	0.00	7918	0.0	0.0	7911	0.0	0.0
36559	147	8	8			0	477	0.00	0	478	0.00	7919	0.0	0.0	7913	0.0	0.0
36560	98	8	8			1	785	0.00	1	786	0.00	7920	0.0	0.0	7908	0.0	0.0
36561	144	8	8			1	899	0.00	1	900	0.00	7921	0.0	0.0	7920	0.0	0.0
36562	132	8	8			0	673	0.00	0	674	0.00	7922	0.0	0.0	7921	0.0	0.0
36563	402	8	8			1	1,163	0.00	1	1,165	0.00	7923	0.0	0.0	7921	0.0	0.0
36564	52	8	8			1	431	0.00	1	432	0.00	9687	0.0	0.0	7923	0.0	0.0
36580	132	8	8			1	2,345	0.00	1	2,348	0.00	7945	0.0	0.0	7944	0.0	0.0
36581	435	8	8			1	1,862	0.00	1	1,865	0.00	7944	0.0	0.0	7943	0.0	0.0
36582	81	8	8			1	1,294	0.00	1	1,296	0.00	7943	0.0	0.0	7942	0.0	0.0
36583	136	8	8			10	756	0.01	10	757	0.01	7942	0.0	0.0	7941	0.0	0.0
36584	326	8	8			10	210	0.05	10	210	0.05	7941	0.0	0.0	7940	0.0	0.0
36585	342	8	8			17	1,504	0.01	17	1,506	0.01	7940	0.0	0.0	7946	0.0	0.0
36587	73	8	8			13	1,486	0.01	13	1,488	0.01	7949	0.0	0.0	7950	0.0	0.0
36588	153	8	8			13	1,287	0.01	13	1,288	0.01	7950	0.0	0.0	7951	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36589	43	8	8			14	1,053	0.01	14	1,054	0.01	7951	0.0	0.0	7952	0.0	0.0
36590	167	8	8			17	2,047	0.01	17	2,049	0.01	7952	0.0	0.0	7953	0.0	0.0
36591	112	8	8			17	1,228	0.01	17	1,230	0.01	7953	0.0	0.0	7954	0.0	0.0
36592	138	8	8			21	565	0.04	21	565	0.04	7954	0.0	0.0	7900	0.0	0.0
36593	122	8	8			13	2,163	0.01	13	2,166	0.01	7960	0.0	0.0	7949	0.0	0.0
36594	152	8	8			13	2,528	0.00	13	2,532	0.00	7961	0.0	0.0	7960	0.0	0.0
36595	236	8	8			12	2,265	0.01	12	2,268	0.01	7962	0.0	0.0	7961	0.0	0.0
36596	174	8	8			8	1,822	0.00	8	1,824	0.00	7965	0.0	0.0	7962	0.0	0.0
36597	125	8	8			1	1,785	0.00	1	1,788	0.00	7966	0.0	0.0	7965	0.0	0.0
36598	297	8	8			1	2,296	0.00	1	2,299	0.00	7978	0.0	0.0	7966	0.0	0.0
36599	262	8	8			1	2,303	0.00	1	2,307	0.00	7967	0.0	0.0	7965	0.0	0.0
36600	147	8	8			1	2,464	0.00	1	2,467	0.00	7968	0.0	0.0	7967	0.0	0.0
36601	97	8	8			1	2,459	0.00	1	2,462	0.00	7980	0.0	0.0	7968	0.0	0.0
36602	146	8	8			4	1,757	0.00	4	1,760	0.00	7963	0.0	0.0	7962	0.0	0.0
36603	159	8	8			4	676	0.01	4	677	0.01	7964	0.0	0.0	7963	0.0	0.0
36604	278	8	8			4	1,697	0.00	4	1,699	0.00	7974	0.0	0.0	7964	0.0	0.0
36605	119	8	8			0	1,361	0.00	0	1,363	0.00	7979	0.0	0.0	7969	0.0	0.0
36606	118	8	8			1	2,784	0.00	1	2,788	0.00	7969	0.0	0.0	7970	0.0	0.0
36607	156	8	8			1	1,330	0.00	1	1,332	0.00	7970	0.0	0.0	7971	0.0	0.0
36608	226	8	8			8	517	0.01	8	517	0.01	7971	0.0	0.0	7981	0.0	0.0
36610	364	8	8			3	1,428	0.00	3	1,429	0.00	7957	0.0	0.0	7952	0.0	0.0
36611	75	8	8			2	2,390	0.00	2	2,394	0.00	7958	0.0	0.0	7957	0.0	0.0
36612	88	8	8			2	2,464	0.00	2	2,467	0.00	7959	0.0	0.0	7958	0.0	0.0
36613	129	8	8			2	1,376	0.00	2	1,378	0.00	7975	0.0	0.0	7959	0.0	0.0
36614	291	8	8			1	2,599	0.00	1	2,603	0.00	7956	0.0	0.0	7951	0.0	0.0
36616	122	8	8			0	1,409	0.00	0	1,411	0.00	7977	0.0	0.0	7956	0.0	0.0
36617	235	8	8			1	1,467	0.00	1	1,469	0.00	7976	0.0	0.0	7956	0.0	0.0
36618	463	8	8			8	2,124	0.00	8	2,127	0.00	7947	0.0	0.0	7942	0.0	0.0
36619	113	8	8			8	1,861	0.00	8	1,863	0.00	7948	0.0	0.0	7947	0.0	0.0
36620	225	8	8			1	2,194	0.00	1	2,197	0.00	7984	0.0	0.0	7948	0.0	0.0
36621	151	8	8			8	717	0.01	8	718	0.01	7983	0.0	0.0	7948	0.0	0.0
36622	235	8	8			1	2,124	0.00	1	2,126	0.00	7985	0.0	0.0	7944	0.0	0.0
36623	211	8	8			4	473	0.01	4	474	0.01	7982	0.0	0.0	7986	0.0	0.0
36624	82	8	8			7	381	0.02	7	382	0.02	7986	0.0	0.0	7971	0.0	0.0
36640	333	8	8			72	386	0.19	72	415	0.17	8061	0.0	0.0	8014	0.0	0.0
36641	204	8	8			72	754	0.10	72	809	0.09	8014	0.0	0.0	8015	0.0	0.0
36642	88	8	8			88	538	0.16	88	576	0.15	8015	0.0	0.0	8016	0.0	0.0
36643	224	8	8			88	653	0.13	88	701	0.12	8016	0.0	0.0	8017	0.0	0.0
36644	207	8	8			67	724	0.09	67	776	0.09	8019	0.0	0.0	8017	0.0	0.0
36645	284	8	8			62	857	0.07	62	919	0.07	8020	0.0	0.0	8019	0.0	0.0
36646	177	8	8			62	597	0.10	62	641	0.10	8021	0.0	0.0	8020	0.0	0.0
36647	300	8	8			59	557	0.11	59	597	0.10	8023	0.0	0.0	8021	0.0	0.0
36648	276	8	8			0	581	0.00	0	623	0.00	8022	0.0	0.0	8021	0.0	0.0
36649	480	8	12	22	ura	154	576	0.27	154	617	0.25	8017	0.0	0.0	8018	0.0	0.0
36650	132	8	8			50	617	0.08	50	661	0.08	6551	0.0	0.0	8061	0.0	0.0
36651	42	8	8			22	1,059	0.02	22	1,136	0.02	6552	0.0	0.0	8061	0.0	0.0
36652	115	8	8			59	362	0.16	59	388	0.15	6556	0.0	0.0	8023	0.0	0.0
36654	217	8	8			26	1,113	0.02	26	1,194	0.02	6549	0.0	0.0	8040	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36655	64	8	8			36	695	0.05	36	746	0.05	8040	0.0	0.0	6550	0.0	0.0
36656	306	8	8			10	790	0.01	10	848	0.01	8041	0.0	0.0	8040	0.0	0.0
36657	431	8	8			6	628	0.01	6	674	0.01	8042	0.0	0.0	8055	0.0	0.0
36658	307	8	8			6	949	0.01	6	1,018	0.01	8049	0.0	0.0	8042	0.0	0.0
36659	304	8	8			11	831	0.01	11	892	0.01	8058	0.0	0.0	8055	0.0	0.0
36660	343	8	8			11	811	0.01	11	870	0.01	8052	0.0	0.0	8058	0.0	0.0
36661	54	8	8			5	870	0.01	5	934	0.01	8046	0.0	0.0	8049	0.0	0.0
36662	137	8	8			5	788	0.01	5	846	0.01	8043	0.0	0.0	8046	0.0	0.0
36663	163	8	8			22	466	0.05	22	500	0.04	8055	0.0	0.0	6552	0.0	0.0
36664	142	8	8			0	951	0.00	0	1,019	0.00	8063	0.0	0.0	8064	0.0	0.0
36665	236	8	8			1	960	0.00	1	1,031	0.00	8062	0.0	0.0	8064	0.0	0.0
36666	332	8	8			10	1,160	0.01	10	1,245	0.01	8064	0.0	0.0	8066	0.0	0.0
36667	201	8	8			10	508	0.02	10	545	0.02	8066	0.0	0.0	8041	0.0	0.0
36680	81	8	8			0	331	0.00	0	354	0.00	8080	0.0	0.0	8058	0.0	0.0
36681	504	8	12	22	ura	156	585	0.27	156	627	0.25	8018	0.0	0.0	8081	0.0	0.0
36682	137	8	8			0	470	0.00	0	504	0.00	8083	0.0	0.0	8084	0.0	0.0
36683	175	8	8			1	1,546	0.00	1	1,658	0.00	8082	0.0	0.0	8083	0.0	0.0
36684	43	8	8			1	792	0.00	1	849	0.00	8086	0.0	0.0	8085	0.0	0.0
36685	297	8	8			1	949	0.00	1	1,018	0.00	8087	0.0	0.0	8086	0.0	0.0
36700	145	8	8			0	331	0.00	0	356	0.00	8100	0.0	0.0	8046	0.0	0.0
36720	212	8	8			1	1,522	0.00	1	1,524	0.00	8120	0.0	0.0	4391	0.0	0.0
36721	271	8	8			5	1,500	0.00	5	1,502	0.00	8122	0.0	0.0	7060	0.0	0.0
36722	262	8	8			4	1,625	0.00	4	1,627	0.00	8123	0.0	0.0	8122	0.0	0.0
36723	85	8	8			4	683	0.01	4	685	0.01	9822	0.0	0.0	8123	0.0	0.0
36724	158	8	8			0	831	0.00	0	832	0.00	8121	0.0	0.0	8122	0.0	0.0
36725	221	8	8			0	897	0.00	0	899	0.00	8125	0.0	0.0	8123	0.0	0.0
36726	143	8	8			0	679	0.00	0	680	0.00	8126	0.0	0.0	8125	0.0	0.0
36727	71	8	8			0	1,550	0.00	0	1,552	0.00	8124	0.0	0.0	8126	0.0	0.0
36741	210	8	8			0	908	0.00	0	910	0.00	8140	0.0	0.0	8148	0.0	0.0
36742	160	8	8			6	894	0.01	6	895	0.01	8186	0.0	0.0	8158	0.0	0.0
36743	344	8	8			6	1,253	0.00	6	1,255	0.00	8141	0.0	0.0	8186	0.0	0.0
36744	315	8	8			6	1,024	0.01	6	1,026	0.01	8148	0.0	0.0	8141	0.0	0.0
36745	263	8	8			5	303	0.02	5	303	0.02	8161	0.0	0.0	8148	0.0	0.0
36746	320	8	8			5	1,217	0.00	5	1,219	0.00	8143	0.0	0.0	8142	0.0	0.0
36747	500	8	8			6	1,190	0.00	6	1,192	0.00	8142	0.0	0.0	8156	0.0	0.0
36748	326	8	8			6	1,201	0.00	6	1,203	0.00	8156	0.0	0.0	7058	0.0	0.0
36750	500	8	8			20	1,131	0.02	20	1,133	0.02	8158	0.0	0.0	8162	0.0	0.0
36751	67	8	8			20	642	0.03	20	643	0.03	8162	0.0	0.0	4356	0.0	0.0
36760	373	8	8			1	1,492	0.00	1	1,494	0.00	8181	0.0	0.0	4395	0.0	0.0
36761	186	8	8			0	1,223	0.00	0	1,224	0.00	8183	0.0	0.0	8182	0.0	0.0
36762	307	8	8			5	1,489	0.00	5	1,491	0.00	8182	0.0	0.0	8184	0.0	0.0
36763	486	8	8			5	1,172	0.00	5	1,173	0.00	8184	0.0	0.0	8143	0.0	0.0
36780	221	8	8			18	2,731	0.01	18	2,734	0.01	8700	0.0	0.0	4996	0.0	0.0
36781	151	8	8			17	825	0.02	17	826	0.02	7946	0.0	0.0	8700	0.0	0.0
36782	1	8	8			1	1,283	0.00	1	1,284	0.00	4996	0.0	0.0	8222	0.0	0.0
36800	412	8	8			1	1,246	0.00	1	1,247	0.00	8246	0.0	0.0	8245	0.0	0.0
36801	246	8	8			0	628	0.00	0	629	0.00	8245	0.0	0.0	8244	0.0	0.0
36802	291	8	8			2	927	0.00	2	928	0.00	8244	0.0	0.0	8243	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36803	149	8	8			2	1,714	0.00	2	1,716	0.00	8243	0.0	0.0	8242	0.0	0.0
36804	264	8	8			1	1,319	0.00	1	1,322	0.00	8247	0.0	0.0	8242	0.0	0.0
36805	137	8	8			3	1,422	0.00	3	1,424	0.00	8242	0.0	0.0	8241	0.0	0.0
36806	161	8	8			3	956	0.00	3	958	0.00	8241	0.0	0.0	8240	0.0	0.0
36807	119	8	8			0	944	0.00	0	945	0.00	8250	0.0	0.0	8249	0.0	0.0
36808	251	8	8			3	1,405	0.00	3	1,407	0.00	8249	0.0	0.0	8248	0.0	0.0
36820	152	8	8			31	1,245	0.03	31	1,247	0.03	4560	0.0	0.0	8260	0.0	0.0
36821	304	8	8			34	1,245	0.03	34	1,247	0.03	8260	0.0	0.0	4555	0.0	0.0
36823	316	8	8			8	1,065	0.01	8	1,066	0.01	8261	0.0	0.0	8262	0.0	0.0
36824	150	8	8			7	1,168	0.01	7	1,169	0.01	8240	0.0	0.0	8261	0.0	0.0
36825	200	8	8			8	1,001	0.01	8	1,001	0.01	8262	0.0	0.0	8263	0.0	0.0
36826	350	8	8			8	1,192	0.01	8	1,194	0.01	8263	0.0	0.0	8264	0.0	0.0
36827	348	8	8			15	1,169	0.01	15	1,170	0.01	8264	0.0	0.0	8265	0.0	0.0
36828	223	8	8			15	1,285	0.01	15	1,288	0.01	8265	0.0	0.0	4592	0.0	0.0
36840	108	8	8			6	1,389	0.00	6	1,391	0.00	8280	0.0	0.0	8264	0.0	0.0
36841	175	8	8			5	1,926	0.00	5	1,928	0.00	8283	0.0	0.0	8282	0.0	0.0
36842	105	8	8			5	1,958	0.00	5	1,960	0.00	8282	0.0	0.0	8281	0.0	0.0
36843	77	8	8			5	1,085	0.00	5	1,087	0.00	8288	0.0	0.0	8283	0.0	0.0
36844	108	8	8			5	940	0.01	5	941	0.01	8287	0.0	0.0	8288	0.0	0.0
36845	130	8	8			5	1,603	0.00	5	1,606	0.00	8284	0.0	0.0	8287	0.0	0.0
36846	196	8	8			3	665	0.01	3	665	0.01	8286	0.0	0.0	8285	0.0	0.0
36847	185	8	8			3	857	0.00	3	858	0.00	8285	0.0	0.0	8284	0.0	0.0
36848	104	8	8			0	858	0.00	0	859	0.00	8289	0.0	0.0	8290	0.0	0.0
36849	196	8	8			3	1,771	0.00	3	1,774	0.00	8290	0.0	0.0	8286	0.0	0.0
36850	350	8	8			0	738	0.00	0	739	0.00	8291	0.0	0.0	8289	0.0	0.0
36851	252	8	8			1	1,085	0.00	1	1,087	0.00	8292	0.0	0.0	8293	0.0	0.0
36852	51	8	8			0	1,226	0.00	0	1,227	0.00	8293	0.0	0.0	8262	0.0	0.0
36853	313	8	8			1	1,340	0.00	1	1,341	0.00	8294	0.0	0.0	8295	0.0	0.0
36854	90	8	8			0	383	0.00	0	384	0.00	8295	0.0	0.0	8296	0.0	0.0
36855	51	8	8			1	1,074	0.00	1	1,076	0.00	8296	0.0	0.0	8261	0.0	0.0
36856	143	8	8			0	1,437	0.00	0	1,439	0.00	8297	0.0	0.0	8298	0.0	0.0
36857	173	8	8			1	1,687	0.00	1	1,689	0.00	8298	0.0	0.0	8296	0.0	0.0
36858	219	8	8			0	940	0.00	0	941	0.00	8299	0.0	0.0	8300	0.0	0.0
36859	137	8	8			0	1,494	0.00	0	1,497	0.00	8300	0.0	0.0	8280	0.0	0.0
36860	77	8	8			0	542	0.00	0	543	0.00	8320	0.0	0.0	8321	0.0	0.0
36861	156	8	8			0	342	0.00	0	342	0.00	8321	0.0	0.0	8323	0.0	0.0
36862	383	8	8			0	417	0.00	0	417	0.00	8323	0.0	0.0	4672	0.0	0.0
36863	325	8	8			6	2,100	0.00	6	2,103	0.00	8331	0.0	0.0	8332	0.0	0.0
36864	107	8	8			6	1,009	0.01	6	1,010	0.01	8332	0.0	0.0	8333	0.0	0.0
36865	380	8	8			6	1,428	0.00	6	1,431	0.00	8333	0.0	0.0	8328	0.0	0.0
36866	41	8	8			10	1,187	0.01	10	1,188	0.01	8328	0.0	0.0	8329	0.0	0.0
36867	130	8	8			10	1,551	0.01	10	1,553	0.01	8329	0.0	0.0	8330	0.0	0.0
36868	134	8	8			1	1,669	0.00	1	1,672	0.00	8324	0.0	0.0	8325	0.0	0.0
36869	99	8	8			3	851	0.00	3	853	0.00	8325	0.0	0.0	8326	0.0	0.0
36870	250	8	8			3	1,772	0.00	3	1,774	0.00	8326	0.0	0.0	8327	0.0	0.0
36871	37	8	8			3	1,360	0.00	3	1,361	0.00	8327	0.0	0.0	8328	0.0	0.0
36880	191	6	6			1	1,097	0.00	1	1,097	0.00	8344	0.0	0.0	4764	0.0	0.0
36900	168	8	8			1	1,613	0.00	1	1,615	0.00	8361	0.0	0.0	8362	0.0	0.0

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City of Medford

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36901	81	8	8			0	1,265	0.00	0	1,267	0.00	8360	0.0	0.0	8361	0.0	0.0
36902	522	8	8			3	1,845	0.00	3	1,848	0.00	8363	0.0	0.0	8364	0.0	0.0
36903	434	8	8			7	1,597	0.00	7	1,599	0.00	8364	0.0	0.0	4535	0.0	0.0
36905	215	8	8			0	542	0.00	0	543	0.00	8365	0.0	0.0	8366	0.0	0.0
36906	245	8	8			3	1,050	0.00	3	1,051	0.00	8366	0.0	0.0	8364	0.0	0.0
36907	92	8	8			0	1,804	0.00	0	1,807	0.00	8377	0.0	0.0	8378	0.0	0.0
36908	235	8	8			1	1,713	0.00	1	1,715	0.00	8378	0.0	0.0	8363	0.0	0.0
36909	118	8	8			2	1,631	0.00	2	1,633	0.00	8381	0.0	0.0	8380	0.0	0.0
36910	142	8	8			2	1,437	0.00	2	1,439	0.00	8380	0.0	0.0	8363	0.0	0.0
36914	119	8	8			0	1,512	0.00	0	1,514	0.00	8376	0.0	0.0	8375	0.0	0.0
36915	201	8	8			1	1,330	0.00	1	1,331	0.00	8375	0.0	0.0	8374	0.0	0.0
36916	70	8	8			1	2,134	0.00	1	2,137	0.00	8374	0.0	0.0	8373	0.0	0.0
36917	100	8	8			1	1,838	0.00	1	1,840	0.00	8373	0.0	0.0	8372	0.0	0.0
36918	209	8	8			1	1,445	0.00	1	1,447	0.00	8372	0.0	0.0	8371	0.0	0.0
36919	361	8	8			1	1,309	0.00	1	1,311	0.00	8371	0.0	0.0	8370	0.0	0.0
36922	171	8	8			1	1,805	0.00	1	1,807	0.00	8367	0.0	0.0	8368	0.0	0.0
36923	481	8	8			1	1,491	0.00	1	1,492	0.00	8368	0.0	0.0	8369	0.0	0.0
36924	218	8	8			2	1,478	0.00	2	1,481	0.00	8369	0.0	0.0	4542	0.0	0.0
36925	119	8	8			1	385	0.00	1	385	0.00	8370	0.0	0.0	8369	0.0	0.0
36926	115	8	8			0	1,131	0.00	0	1,133	0.00	8382	0.0	0.0	8362	0.0	0.0
36927	365	8	8			1	1,804	0.00	1	1,807	0.00	8383	0.0	0.0	4532	0.0	0.0
36930	23	8	8			0	2,113	0.00	0	2,115	0.00	8384	0.0	0.0	8377	0.0	0.0
36940	273	8	8			24	344	0.07	24	344	0.07	7011	0.0	0.0	2114	0.0	0.0
37012	240	6	6			3,217	506	6.36	17,110	506	33.84	2588	0.0	0.0	2561	0.0	0.0
37026	639	6	6			19,402	506	38.38	19,683	506	38.93	2570	0.0	0.0	2588	0.0	0.0
37030	685	6	6			285	402	0.71	228	402	0.57	JCT-18	0.0	0.0	1955	0.0	1.9
37031	31	6	6			371	1,170	0.32	440	1,170	0.38	JCT-16	0.0	0.0	1959	0.0	0.0
37032	339	6	6			39,783	506	78.69	54,838	506	108.47	1105	0.0	0.0	1110	0.0	0.0
37033	150	6	6			81,654	506	161.51	71,779	506	141.98	JCT-12	0.0	0.0	1105	0.0	0.0
37034	656	6	6			19,872	506	39.31	41,558	506	82.20	1110	0.0	0.0	2570	0.0	0.0
37035	341	4	4			1	242	0.00	1	242	0.00	9958	0.0	0.0	4295	0.0	0.0
37037	2538	12	12			2,002	1,635	1.22	1,988	1,635	1.22	JCT-14	0.0	0.0	6819	0.0	0.0
37060	398	12	15	24	2036	171	598	0.29	171	640	0.27	8461	0.0	0.0	8460	0.0	0.0
37062	369	10	15	24	2036	178	637	0.28	178	681	0.26	8460	0.0	0.0	8450	0.0	0.0
37063	213	15	15			458	1,588	0.29	458	1,701	0.27	8450	0.0	0.0	8451	0.0	0.0
37080	186	8	15	24	2036	171	331	0.52	171	355	0.48	6688	0.0	0.0	8461	0.0	0.0
37082	96	15	15			476	1,581	0.30	476	1,694	0.28	8451	0.0	0.0	8442	0.0	0.0
37084	216	15	15			476	967	0.49	477	1,036	0.46	8442	0.0	0.0	6695	0.0	0.0
37085	240	12	12			266	917	0.29	266	982	0.27	7122	0.0	0.0	8450	0.0	0.0
37087	388	8	8			14	306	0.05	14	329	0.04	8445	0.0	0.0	8444	0.0	0.0
37088	261	8	8			15	347	0.04	15	372	0.04	8444	0.0	0.0	8450	0.0	0.0
37089	255	8	8			1	306	0.00	1	328	0.00	8446	0.0	0.0	8445	0.0	0.0
37090	297	8	8			1	303	0.00	1	326	0.00	8449	0.0	0.0	8445	0.0	0.0
37091	254	8	8			0	438	0.00	0	469	0.00	8447	0.0	0.0	8448	0.0	0.0
37092	269	8	8			0	235	0.00	0	251	0.00	8448	0.0	0.0	8449	0.0	0.0
37093	416	8	8			1	349	0.00	1	375	0.00	8453	0.0	0.0	8452	0.0	0.0
37094	107	8	8			19	372	0.05	19	399	0.05	8452	0.0	0.0	8451	0.0	0.0
37095	131	8	8			0	315	0.00	0	338	0.00	8454	0.0	0.0	8453	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37096	263	8	8			0	353	0.00	0	378	0.00	8455	0.0	0.0	8454	0.0	0.0
37100	9	8	8			30	3,433	0.01	30	3,438	0.01	3955	0.0	0.0	8500	0.0	0.0
37122	158	8	8			12	251	0.05	12	252	0.05	2944	0.0	0.0	8522	0.0	0.0
37123	365	8	8			74	252	0.29	74	252	0.29	8522	0.0	0.0	2866	0.0	0.0
37140	75	6	6			1	268	0.00	1	268	0.00	8540	0.0	0.0	3906	0.0	0.0
37200	170	8	8			0	913	0.00	0	979	0.00	8601	0.0	0.0	8087	0.0	0.0
37220	156	8	8			0	777	0.00	0	833	0.00	8620	0.0	0.0	6790	0.0	0.0
37240	306	30	30			4,117	9,634	0.43	5,399	9,634	0.56	2005	0.0	0.0	8722	0.0	0.0
37242	100	30	30			4,117	9,730	0.42	5,399	9,730	0.55	8722	0.0	0.0	8721	0.0	0.0
37243	165	30	30			4,118	7,762	0.53	5,400	7,762	0.70	8721	0.0	0.0	8720	0.0	0.0
37244	175	8	8			37	530	0.07	37	530	0.07	1997	0.0	0.0	8720	0.0	0.0
37245	84	30	30			4,156	7,122	0.58	5,438	7,122	0.76	8720	0.0	0.0	2018	0.0	0.0
37280	65	8	8			36	678	0.05	36	727	0.05	8740	0.0	0.0	6791	0.0	0.0
37282	143	8	8			0	197	0.00	0	211	0.00	8742	0.0	0.0	8741	0.0	0.0
37283	285	8	8			1	899	0.00	1	964	0.00	6795	0.0	0.0	6789	0.0	0.0
37284	140	8	8			0	871	0.00	0	934	0.00	8744	0.0	0.0	8743	0.0	0.0
37285	138	8	8			0	506	0.00	0	543	0.00	8746	0.0	0.0	8745	0.0	0.0
37286	316	8	8			0	642	0.00	0	689	0.00	8745	0.0	0.0	8747	0.0	0.0
37288	238	8	8			45	519	0.09	45	558	0.08	8747	0.0	0.0	6781	0.0	0.0
37289	232	8	8			0	419	0.00	0	449	0.00	8748	0.0	0.0	8446	0.0	0.0
37290	91	8	8			0	467	0.00	0	501	0.00	8749	0.0	0.0	8446	0.0	0.0
37291	174	8	8			4	362	0.01	4	388	0.01	8750	0.0	0.0	6559	0.0	0.0
37292	25	8	8			0	451	0.00	0	484	0.00	6251	0.0	0.0	8752	0.0	0.0
37293	175	8	8			0	295	0.00	0	317	0.00	8751	0.0	0.0	8752	0.0	0.0
37294	22	8	8			1	413	0.00	1	443	0.00	6551	0.0	0.0	8753	0.0	0.0
37295	66	8	8			1	338	0.00	1	362	0.00	8754	0.0	0.0	8753	0.0	0.0
37296	138	8	8			0	320	0.00	0	344	0.00	8755	0.0	0.0	8754	0.0	0.0
37297	91	8	8			0	1,209	0.00	0	1,297	0.00	8756	0.0	0.0	8755	0.0	0.0
37300	218	8	8			1	906	0.00	1	972	0.00	8760	0.0	0.0	6368	0.0	0.0
37320	88	8	8			0	301	0.00	0	322	0.00	8793	0.0	0.0	8780	0.0	0.0
37321	191	8	8			0	299	0.00	0	320	0.00	8780	0.0	0.0	8781	0.0	0.0
37322	167	8	8			1	329	0.00	1	353	0.00	8781	0.0	0.0	8782	0.0	0.0
37323	119	8	8			1	334	0.00	1	358	0.00	8782	0.0	0.0	8783	0.0	0.0
37324	205	8	8			0	667	0.00	0	715	0.00	8784	0.0	0.0	8783	0.0	0.0
37325	189	8	8			1	324	0.00	1	348	0.00	8783	0.0	0.0	8785	0.0	0.0
37326	151	8	8			0	388	0.00	0	417	0.00	8786	0.0	0.0	8785	0.0	0.0
37327	229	8	8			31	306	0.10	31	328	0.10	8785	0.0	0.0	8787	0.0	0.0
37328	111	8	8			32	315	0.10	32	338	0.09	8787	0.0	0.0	8788	0.0	0.0
37329	8	8	8			15	864	0.02	15	926	0.02	6694	0.0	0.0	8788	0.0	0.0
37330	33	8	8			1	259	0.00	1	278	0.00	8789	0.0	0.0	8787	0.0	0.0
37331	213	8	8			1	432	0.00	1	464	0.00	8790	0.0	0.0	8789	0.0	0.0
37332	171	8	8			0	455	0.00	0	488	0.00	8791	0.0	0.0	8790	0.0	0.0
37333	176	8	8			0	476	0.00	0	510	0.00	8792	0.0	0.0	8791	0.0	0.0
37334	154	8	8			58	1,913	0.03	58	1,915	0.03	4751	0.0	0.0	4752	0.0	0.0
37340	182	8	8			1	1,898	0.00	1	1,901	0.00	8800	0.0	0.0	5906	7.9	0.0
37460	114	8	8			1	485	0.00	1	485	0.00	3244	0.0	0.0	3243	0.0	0.0
37480	77	27	27			3,934	5,920	0.66	5,216	5,920	0.88	8920	0.0	0.0	8921	0.0	0.0
37481	134	27	27			3,935	5,851	0.67	5,217	5,851	0.89	8921	0.0	0.0	8922	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37482	183	27	27			3,935	5,824	0.68	5,217	5,824	0.90	8922	0.0	0.0	8923	0.0	0.0
37500	60	6	6			10	519	0.02	10	519	0.02	8941	0.0	0.0	3978	0.0	0.0
37501	236	8	8			172	348	0.50	172	348	0.50	5699	0.0	0.0	5701	0.0	0.0
37502	7	8	8			0	588	0.00	0	588	0.00	8943	0.0	0.0	7418	0.0	0.0
37503	78	8	12	37	ura	135	813	0.17	135	813	0.17	8944	0.0	0.0	2734	0.0	0.0
37504	296	8	8			1	371	0.00	1	372	0.00	8945	0.0	0.0	8944	0.0	0.0
37505	215	8	8			1	455	0.00	1	456	0.00	8946	0.0	0.0	8945	0.0	0.0
37506	111	8	8			1	374	0.00	1	374	0.00	8947	0.0	0.0	8946	0.0	0.0
37507	147	8	8			3	485	0.01	3	485	0.01	8949	0.0	0.0	2507	0.0	0.0
37508	87	8	8			0	373	0.00	0	373	0.00	8948	0.0	0.0	8949	0.0	0.0
37509	56	8	8			8	1,352	0.01	8	1,353	0.01	8951	0.0	0.0	8950	0.0	0.0
37510	173	8	8			3	871	0.00	3	872	0.00	8952	0.0	0.0	8951	0.0	0.0
37511	152	8	8			6	372	0.01	6	373	0.01	8954	0.0	0.0	8951	0.0	0.0
37512	139	8	8			3	719	0.00	3	719	0.00	8953	0.0	0.0	8952	0.0	0.0
37513	117	8	8			6	372	0.01	6	373	0.01	8955	0.0	0.0	8954	0.0	0.0
37514	69	8	8			6	367	0.02	6	368	0.02	8956	0.0	0.0	8955	0.0	0.0
37515	84	8	8			0	374	0.00	0	374	0.00	8961	0.0	0.0	8956	0.0	0.0
37516	84	8	8			0	777	0.00	0	778	0.00	8962	0.0	0.0	8961	0.0	0.0
37517	53	8	8			5	895	0.01	5	897	0.01	8957	0.0	0.0	8956	0.0	0.0
37518	121	8	8			5	831	0.01	5	832	0.01	8958	0.0	0.0	8957	0.0	0.0
37519	169	8	8			5	1,018	0.00	5	1,019	0.00	8959	0.0	0.0	8958	0.0	0.0
37520	72	8	8			5	475	0.01	5	476	0.01	8960	0.0	0.0	8959	0.0	0.0
37521	92	8	8			0	363	0.00	0	363	0.00	8979	0.0	0.0	2720	0.0	0.0
37524	160	8	8			1	588	0.00	1	588	0.00	8979	0.0	0.0	8978	5.7	5.7
37531	350	10	10			442	583	0.76	444	583	0.76	8982	0.0	4.8	5462	4.3	4.3
37532	87	8	8			0	718	0.00	0	719	0.00	8983	0.0	0.0	8984	0.0	0.0
37533	99	8	8			1	417	0.00	1	418	0.00	8984	0.0	0.0	7344	0.0	0.0
37534	62	8	8			0	747	0.00	0	747	0.00	8985	0.0	0.0	7344	0.0	0.0
37535	142	8	8			0	697	0.00	0	699	0.00	8986	0.0	0.0	5458	0.0	0.0
37536	411	8	8			565	694	0.81	565	695	0.81	8987	0.0	0.0	5200	0.0	0.0
37537	80	8	8			1	415	0.00	1	416	0.00	8988	0.0	0.0	5152	0.0	0.0
37538	9	8	8			0	831	0.00	0	832	0.00	8989	0.0	0.0	4886	0.0	0.0
37539	59	8	8			0	367	0.00	0	367	0.00	8990	0.0	0.0	5191	0.0	0.0
37540	199	8	8			17	2,092	0.01	17	2,094	0.01	7153	0.0	0.0	5183	0.0	0.0
37541	229	8	8			16	1,926	0.01	16	1,929	0.01	5163	0.0	0.0	7153	0.0	0.0
37542	148	8	8			1	1,694	0.00	1	1,697	0.00	7330	0.0	0.0	5147	0.0	0.0
37543	160	8	8			1	1,587	0.00	1	1,589	0.00	5147	0.0	0.0	5126	0.0	0.0
37544	91	8	8			0	729	0.00	0	730	0.00	8991	0.0	0.0	5147	0.0	0.0
37560	203	12	12			739	2,358	0.31	738	2,358	0.31	9000	0.0	0.0	4115	0.0	0.0
37561	20	8	8			0	766	0.00	0	767	0.00	4087	0.0	0.0	4088	0.0	0.0
37562	46	8	8			31	740	0.04	31	741	0.04	9001	0.0	0.0	7649	0.0	0.0
37563	82	8	8			8	1,139	0.01	8	1,141	0.01	8950	0.0	0.0	9001	0.0	0.0
37564	268	8	8			3	369	0.01	3	370	0.01	9002	0.0	0.0	2723	0.0	0.0
37565	302	8	8			3	414	0.01	3	415	0.01	9003	0.0	0.0	9002	0.0	0.0
37566	114	8	8			3	1,046	0.00	3	1,047	0.00	9004	0.0	0.0	9003	0.0	0.0
37580	77	8	8			1	531	0.00	1	532	0.00	3730	0.0	0.0	9020	0.0	0.0
37581	332	8	8			18	547	0.03	18	547	0.03	9020	0.0	0.0	3725	0.0	0.0
37600	379	8	8			4	148	0.03	4	148	0.03	10117	0.0	0.0	9001	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37660	356	18	18			804	484	1.66	804	519	1.55	6912	0.0	0.0	6902	0.0	0.0
37661	356	18	18			827	1,606	0.51	827	1,721	0.48	6902	0.0	0.0	6911	0.0	0.0
37662	300	8	8			0	321	0.00	0	344	0.00	7640	0.0	0.0	6806	0.0	0.0
37663	300	8	8			12	321	0.04	12	344	0.03	6806	0.0	0.0	6807	0.0	0.0
37664	267	8	8			12	300	0.04	12	322	0.04	6807	0.0	0.0	9100	0.0	0.0
37665	105	8	8			23	634	0.04	23	681	0.03	9100	0.0	0.0	6903	0.0	0.0
37666	227	8	8			23	449	0.05	23	481	0.05	6903	0.0	0.0	6902	0.0	0.0
37667	175	8	8			0	588	0.00	0	631	0.00	9651	0.0	0.0	7640	0.0	0.0
37700	64	8	8			0	588	0.00	0	588	0.00	9120	0.0	0.0	9121	0.0	0.0
37701	123	8	8			0	588	0.00	0	588	0.00	9125	0.0	0.0	9121	0.0	0.0
37702	84	8	8			0	374	0.00	0	374	0.00	9121	0.0	0.0	9122	0.0	0.0
37703	139	8	8			1	373	0.00	1	374	0.00	9122	0.0	0.0	9123	0.0	0.0
37704	37	8	8			1	216	0.00	1	216	0.00	9123	0.0	0.0	9124	0.0	0.0
37720	53	8	8			3	1,155	0.00	3	1,156	0.00	9192	0.0	0.0	9193	0.0	0.0
37721	163	8	8			3	1,697	0.00	3	1,700	0.00	9196	0.0	0.0	9161	0.0	0.0
37722	76	8	8			3	1,334	0.00	3	1,336	0.00	9195	0.0	0.0	9196	0.0	0.0
37723	173	8	8			3	848	0.00	3	849	0.00	9194	0.0	0.0	9195	0.0	0.0
37724	86	8	8			3	460	0.01	3	461	0.01	9193	0.0	0.0	9194	0.0	0.0
37725	267	8	8			17	362	0.05	17	363	0.05	9186	0.0	0.0	7810	0.0	0.0
37726	318	8	8			17	343	0.05	17	343	0.05	9190	0.0	0.0	9186	0.0	0.0
37727	258	8	8			0	588	0.00	0	589	0.00	9171	0.0	0.0	9169	0.0	0.0
37728	99	8	8			0	1,319	0.00	0	1,322	0.00	9183	0.0	0.0	9184	0.0	0.0
37729	324	8	8			10	1,585	0.01	10	1,587	0.01	9300	0.0	0.0	9142	0.0	0.0
37730	146	8	8			6	2,410	0.00	6	2,413	0.00	9170	0.0	0.0	9169	0.0	0.0
37733	105	8	8			15	343	0.04	15	344	0.04	9163	0.0	0.0	9162	0.0	0.0
37734	99	8	8			15	344	0.04	15	345	0.04	9164	0.0	0.0	9163	0.0	0.0
37735	33	8	8			0	340	0.00	0	341	0.00	10660	0.0	0.0	7799	0.0	0.0
37738	92	8	8			4	1,167	0.00	4	1,168	0.00	9158	0.0	0.0	9159	0.0	0.0
37739	316	8	8			3	1,166	0.00	3	1,167	0.00	9157	0.0	0.0	9158	0.0	0.0
37740	139	8	8			47	1,033	0.05	47	1,035	0.04	9159	0.0	0.0	7799	0.0	0.0
37741	242	8	8			36	1,467	0.02	36	1,469	0.02	9160	0.0	0.0	9159	0.0	0.0
37742	167	8	8			15	1,228	0.01	15	1,230	0.01	9162	0.0	0.0	9160	0.0	0.0
37743	213	8	8			21	1,214	0.02	21	1,215	0.02	9161	0.0	0.0	9160	0.0	0.0
37744	193	8	8			17	1,453	0.01	17	1,455	0.01	9173	0.0	0.0	9161	0.0	0.0
37745	142	8	8			15	344	0.04	15	344	0.04	9165	0.0	0.0	9164	0.0	0.0
37746	179	8	8			0	665	0.00	0	666	0.00	9166	0.0	0.0	9165	0.0	0.0
37747	263	8	8			1	1,276	0.00	1	1,277	0.00	9167	0.0	0.0	9166	0.0	0.0
37748	74	8	8			7	535	0.01	7	535	0.01	9168	0.0	0.0	9165	0.0	0.0
37749	209	8	8			7	1,466	0.00	7	1,468	0.00	9169	0.0	0.0	9168	0.0	0.0
37750	129	8	8			4	344	0.01	4	345	0.01	9187	0.0	0.0	9176	0.0	0.0
37751	30	8	8			4	343	0.01	4	344	0.01	9188	0.0	0.0	9187	0.0	0.0
37752	111	8	8			4	611	0.01	4	612	0.01	9189	0.0	0.0	9188	0.0	0.0
37753	69	8	8			13	1,101	0.01	13	1,102	0.01	9174	0.0	0.0	9173	0.0	0.0
37754	184	8	8			13	1,689	0.01	13	1,691	0.01	9175	0.0	0.0	9174	0.0	0.0
37755	31	8	8			13	826	0.02	13	828	0.02	9176	0.0	0.0	9175	0.0	0.0
37756	194	8	8			9	344	0.03	9	344	0.03	9177	0.0	0.0	9176	0.0	0.0
37757	89	8	8			9	340	0.03	9	340	0.03	9179	0.0	0.0	9177	0.0	0.0
37758	118	8	8			9	815	0.01	9	815	0.01	9180	0.0	0.0	9179	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37759	297	8	8			4	1,413	0.00	4	1,414	0.00	9184	0.0	0.0	9173	0.0	0.0
37760	160	8	8			0	1,203	0.00	0	1,206	0.00	9185	0.0	0.0	9184	0.0	0.0
37761	336	8	8			3	968	0.00	3	969	0.00	9156	0.0	0.0	9157	0.0	0.0
37762	175	8	8			3	1,074	0.00	3	1,076	0.00	9155	0.0	0.0	9156	0.0	0.0
37763	84	8	8			3	1,259	0.00	3	1,260	0.00	9154	0.0	0.0	9155	0.0	0.0
37764	232	8	8			3	1,763	0.00	3	1,765	0.00	9150	0.0	0.0	9154	0.0	0.0
37765	55	8	8			6	1,148	0.00	6	1,149	0.00	9147	0.0	0.0	9146	0.0	0.0
37766	135	8	8			6	1,851	0.00	6	1,853	0.00	9320	0.0	0.0	9147	0.0	0.0
37767	79	8	8			17	345	0.05	17	346	0.05	9191	0.0	0.0	9190	0.0	0.0
37768	327	8	8			17	1,341	0.01	17	1,343	0.01	9141	0.0	0.0	9191	0.0	0.0
37769	100	8	8			17	343	0.05	17	344	0.05	9142	0.0	0.0	9141	0.0	0.0
37770	89	8	8			6	364	0.02	6	364	0.02	9143	0.0	0.0	9142	0.0	0.0
37771	168	8	8			6	342	0.02	6	343	0.02	9144	0.0	0.0	9143	0.0	0.0
37772	90	8	8			6	1,141	0.00	6	1,142	0.00	9146	0.0	0.0	9144	0.0	0.0
37773	176	8	8			1	1,351	0.00	1	1,352	0.00	9153	0.0	0.0	9146	0.0	0.0
37774	103	8	8			0	944	0.00	0	945	0.00	9152	0.0	0.0	9153	0.0	0.0
37775	143	8	8			0	765	0.00	0	765	0.00	9151	0.0	0.0	9152	0.0	0.0
37776	331	8	8			1	1,469	0.00	1	1,471	0.00	9182	0.0	0.0	9183	0.0	0.0
37777	242	8	8			3	1,806	0.00	3	1,808	0.00	9149	0.0	0.0	9150	0.0	0.0
37778	198	8	8			9	1,272	0.01	9	1,274	0.01	9181	0.0	0.0	9180	0.0	0.0
37779	110	8	8			0	1,321	0.00	0	1,322	0.00	9197	0.0	0.0	9198	0.0	0.0
37780	72	8	8			0	592	0.00	0	592	0.00	9198	0.0	0.0	9199	0.0	0.0
37781	149	8	8			13	369	0.03	13	370	0.03	9201	0.0	0.0	9204	0.0	0.0
37782	297	8	8			0	372	0.00	0	372	0.00	9202	0.0	0.0	9201	0.0	0.0
37783	120	8	8			0	372	0.00	0	372	0.00	9203	0.0	0.0	9202	0.0	0.0
37784	338	8	8			8	606	0.01	8	606	0.01	9200	0.0	0.0	9201	0.0	0.0
37785	72	8	8			0	490	0.00	0	490	0.00	9199	0.0	0.0	9200	0.0	0.0
37786	275	8	8			13	817	0.02	13	819	0.02	9204	0.0	0.0	7283	0.0	0.0
37787	55	8	8			0	354	0.00	0	355	0.00	9205	0.0	0.0	9206	0.0	0.0
37788	211	8	8			0	373	0.00	0	374	0.00	9206	0.0	0.0	9207	0.0	0.0
37789	128	8	8			0	770	0.00	0	772	0.00	9208	0.0	0.0	9207	0.0	0.0
37790	169	8	8			1	415	0.00	1	415	0.00	9207	0.0	0.0	9209	0.0	0.0
37791	14	8	8			1	521	0.00	1	522	0.00	9209	0.0	0.0	9210	0.0	0.0
37792	54	8	8			10	763	0.01	10	764	0.01	9210	0.0	0.0	3736	0.0	0.0
37793	305	8	8			3	1,221	0.00	3	1,222	0.00	9222	0.0	0.0	9181	0.0	0.0
37794	71	8	8			6	1,141	0.00	6	1,142	0.00	9218	0.0	0.0	9219	0.0	0.0
37795	125	8	8			0	638	0.00	0	639	0.00	9211	0.0	0.0	9212	0.0	0.0
37796	86	8	8			2	817	0.00	2	818	0.00	9216	0.0	0.0	9217	0.0	0.0
37798	167	8	8			1	1,706	0.00	1	1,708	0.00	9215	0.0	0.0	9213	0.0	0.0
37799	167	8	8			0	1,072	0.00	0	1,073	0.00	9220	0.0	0.0	9215	0.0	0.0
37800	204	8	8			3	1,566	0.00	3	1,568	0.00	9221	0.0	0.0	9149	0.0	0.0
37801	103	8	8			0	969	0.00	0	971	0.00	9220	0.0	0.0	9221	0.0	0.0
37802	94	8	8			6	930	0.01	6	931	0.01	9219	0.0	0.0	9181	0.0	0.0
37803	85	8	8			6	1,214	0.00	6	1,215	0.00	9217	0.0	0.0	9218	0.0	0.0
37804	78	8	8			3	1,504	0.00	3	1,506	0.00	9214	0.0	0.0	9217	0.0	0.0
37805	56	8	8			3	348	0.01	3	348	0.01	9213	0.0	0.0	9214	0.0	0.0
37806	47	8	8			0	1,306	0.00	0	1,308	0.00	9212	0.0	0.0	9213	0.0	0.0
37810	413	8	8			0	1,199	0.00	0	1,200	0.00	9231	0.0	0.0	9233	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37811	209	8	8			0	547	0.00	0	549	0.00	9232	0.0	0.0	9231	0.0	0.0
37813	169	8	8			1	1,722	0.00	1	1,724	0.00	9233	0.0	0.0	7792	0.0	0.0
37820	157	8	8			0	1,165	0.00	0	1,166	0.00	9230	0.0	0.0	9240	0.0	0.0
37821	400	8	8			0	1,164	0.00	0	1,165	0.00	9240	0.0	0.0	9231	0.0	0.0
37841	116	8	8			2	342	0.01	2	342	0.01	9260	0.0	0.0	9216	0.0	0.0
37842	142	8	8			0	1,440	0.00	0	1,442	0.00	9261	0.0	0.0	9260	0.0	0.0
37843	238	8	8			1	1,005	0.00	1	1,006	0.00	9264	0.0	0.0	9260	0.0	0.0
37844	55	8	8			0	542	0.00	0	543	0.00	9265	0.0	0.0	9264	0.0	0.0
37845	150	8	8			0	1,090	0.00	0	1,091	0.00	9266	0.0	0.0	9265	0.0	0.0
37846	87	8	8			3	1,485	0.00	3	1,487	0.00	10373	0.0	0.0	9267	0.0	0.0
37847	246	8	8			3	1,041	0.00	3	1,042	0.00	9267	0.0	0.0	9268	0.0	0.0
37848	148	8	8			3	1,926	0.00	3	1,928	0.00	10355	0.0	0.0	9268	0.0	0.0
37849	98	8	8			6	695	0.01	6	696	0.01	9268	0.0	0.0	9276	0.0	0.0
37850	91	8	8			6	765	0.01	6	766	0.01	9276	0.0	0.0	9269	0.0	0.0
37851	224	8	8			6	1,774	0.00	6	1,776	0.00	9269	0.0	0.0	9170	0.0	0.0
37852	95	8	8			1	343	0.00	1	344	0.00	9270	0.0	0.0	9170	0.0	0.0
37853	147	8	8			1	344	0.00	1	344	0.00	9271	0.0	0.0	9270	0.0	0.0
37854	112	8	8			0	344	0.00	0	344	0.00	9272	0.0	0.0	9271	0.0	0.0
37855	83	8	8			0	744	0.00	0	744	0.00	9273	0.0	0.0	9272	0.0	0.0
37856	103	8	8			0	1,447	0.00	0	1,449	0.00	9274	0.0	0.0	9273	0.0	0.0
37857	77	8	8			0	1,721	0.00	0	1,723	0.00	9275	0.0	0.0	9274	0.0	0.0
37858	363	8	8			1	1,736	0.00	1	1,738	0.00	9294	0.0	0.0	9293	0.0	0.0
37859	95	8	8			0	1,792	0.00	0	1,794	0.00	9293	0.0	0.0	9292	0.0	0.0
37860	98	8	8			0	1,835	0.00	0	1,838	0.00	9292	0.0	0.0	9291	0.0	0.0
37861	203	8	8			0	1,044	0.00	0	1,046	0.00	9286	0.0	0.0	9287	0.0	0.0
37862	141	8	8			0	1,169	0.00	0	1,170	0.00	9291	0.0	0.0	9289	0.0	0.0
37863	204	8	8			7	344	0.02	7	344	0.02	9289	0.0	0.0	9290	0.0	0.0
37864	69	8	8			0	333	0.00	0	333	0.00	9288	0.0	0.0	9289	0.0	0.0
37865	41	8	8			0	599	0.00	0	600	0.00	9287	0.0	0.0	9288	0.0	0.0
37866	144	8	8			0	874	0.00	0	876	0.00	9278	0.0	0.0	9281	0.0	0.0
37867	171	8	8			0	1,099	0.00	0	1,100	0.00	9282	0.0	0.0	9297	0.0	0.0
37868	70	8	8			0	337	0.00	0	338	0.00	9297	0.0	0.0	9299	0.0	0.0
37869	161	8	8			0	342	0.00	0	342	0.00	9299	0.0	0.0	9300	0.0	0.0
37870	239	8	8			1	2,101	0.00	1	2,103	0.00	9277	0.0	0.0	9296	0.0	0.0
37871	134	8	8			1	2,092	0.00	1	2,095	0.00	9296	0.0	0.0	9295	0.0	0.0
37872	122	8	8			1	1,999	0.00	1	2,001	0.00	9295	0.0	0.0	9285	0.0	0.0
37873	197	8	8			1	1,425	0.00	1	1,427	0.00	9285	0.0	0.0	9284	0.0	0.0
37874	136	8	8			1	1,923	0.00	1	1,926	0.00	9284	0.0	0.0	9283	0.0	0.0
37875	194	8	8			5	1,935	0.00	5	1,938	0.00	9283	0.0	0.0	9281	0.0	0.0
37876	160	8	8			6	1,783	0.00	6	1,785	0.00	9281	0.0	0.0	9320	0.0	0.0
37877	294	8	8			7	1,762	0.00	7	1,764	0.00	9290	0.0	0.0	9300	0.0	0.0
37878	147	8	8			0	876	0.00	0	877	0.00	9279	0.0	0.0	9320	0.0	0.0
37879	196	8	8			1	1,070	0.00	1	1,072	0.00	9304	0.0	0.0	9301	0.0	0.0
37882	97	8	8			1	1,955	0.00	1	1,958	0.00	9303	0.0	0.0	9304	0.0	0.0
37883	174	8	8			1	1,470	0.00	1	1,472	0.00	9302	0.0	0.0	9303	0.0	0.0
37884	211	8	8			0	344	0.00	0	344	0.00	9305	0.0	0.0	4853	0.0	0.0
37885	308	8	8			1	2,067	0.00	1	2,069	0.00	4854	0.0	0.0	9305	0.0	0.0
37886	323	8	8			1	853	0.00	1	854	0.00	9340	0.0	0.0	9341	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37887	213	8	8			1	815	0.00	1	816	0.00	9341	0.0	0.0	4291	0.0	0.0
37888	227	8	8			1	860	0.00	1	860	0.00	4291	0.0	0.0	9342	0.0	0.0
37889	224	8	8			22	801	0.03	22	803	0.03	9342	0.0	0.0	4292	0.0	0.0
37920	56	8	8			22	332	0.07	22	333	0.07	4292	0.0	0.0	4348	0.0	0.0
37921	106	8	8			0	547	0.00	0	547	0.00	9343	0.0	0.0	9344	0.0	0.0
37922	57	8	8			1	457	0.00	1	458	0.00	9344	0.0	0.0	9345	0.0	0.0
37923	74	8	8			1	453	0.00	1	454	0.00	9345	0.0	0.0	9346	0.0	0.0
37924	100	8	8			1	410	0.00	1	411	0.00	9346	0.0	0.0	9348	0.0	0.0
37925	98	8	8			1	410	0.00	1	410	0.00	9348	0.0	0.0	9349	0.0	0.0
37926	129	8	8			1	411	0.00	1	411	0.00	9349	0.0	0.0	5369	0.0	0.0
37927	132	8	8			0	619	0.00	0	619	0.00	9347	0.0	0.0	9346	0.0	0.0
37940	122	8	8			0	1,184	0.00	0	1,186	0.00	9360	0.0	0.0	9361	0.0	0.0
37941	97	8	8			0	496	0.00	0	497	0.00	9361	0.0	0.0	9362	0.0	0.0
37942	71	8	8			0	490	0.00	0	491	0.00	9362	0.0	0.0	9363	0.0	0.0
37943	119	8	8			3	909	0.00	3	910	0.00	9363	0.0	0.0	9364	0.0	0.0
37944	80	8	8			3	924	0.00	3	925	0.00	9364	0.0	0.0	9365	0.0	0.0
37945	115	8	8			3	895	0.00	3	896	0.00	9365	0.0	0.0	9366	0.0	0.0
37946	175	8	8			3	956	0.00	3	958	0.00	9366	0.0	0.0	9367	0.0	0.0
37947	133	8	8			3	805	0.00	3	806	0.00	9367	0.0	0.0	9368	0.0	0.0
37948	101	8	8			3	1,246	0.00	3	1,247	0.00	9368	0.0	0.0	9370	0.0	0.0
37949	86	8	8			4	341	0.01	4	342	0.01	9370	0.0	0.0	9369	0.0	0.0
37950	116	8	8			6	456	0.01	6	457	0.01	9369	0.0	0.0	4731	0.0	0.0
37960	359	8	8			0	365	0.00	0	392	0.00	9400	0.0	0.0	9401	0.0	0.0
37961	110	8	8			0	988	0.00	0	1,060	0.00	9401	0.0	0.0	9402	0.0	0.0
37962	55	8	8			1	503	0.00	1	540	0.00	9402	0.0	0.0	9403	0.0	0.0
37963	153	8	8			1	1,254	0.00	1	1,345	0.00	9403	0.0	0.0	9404	0.0	0.0
37964	145	8	8			1	1,110	0.00	1	1,191	0.00	9404	0.0	0.0	6735	0.0	0.0
38003	209	8	8			18	1,324	0.01	18	1,326	0.01	9440	0.0	0.0	4356	0.0	0.0
38007	241	8	8			18	501	0.04	18	501	0.04	9441	0.0	0.0	9440	0.0	0.0
38020	280	8	8			1	542	0.00	1	542	0.00	9460	0.0	0.0	3637	0.0	0.0
38040	287	8	8			22	326	0.07	22	327	0.07	9480	0.0	0.0	9481	0.0	0.0
38041	115	8	8			1	538	0.00	1	538	0.00	9482	0.0	0.0	9481	0.0	0.0
38042	449	8	8			22	342	0.07	22	342	0.07	9481	0.0	0.0	9486	0.0	0.0
38043	256	8	8			46	342	0.13	46	343	0.13	9486	0.0	0.0	9488	0.0	0.0
38044	27	8	8			1	347	0.00	1	347	0.00	9489	0.0	0.0	9483	0.0	0.0
38045	139	8	8			22	341	0.07	22	342	0.07	9483	0.0	0.0	9484	0.0	0.0
38046	66	8	8			23	340	0.07	23	341	0.07	9484	0.0	0.0	9485	0.0	0.0
38047	126	8	8			23	321	0.07	23	321	0.07	9485	0.0	0.0	9486	0.0	0.0
38048	97	8	8			1	540	0.00	1	540	0.00	9490	0.0	0.0	9488	0.0	0.0
38049	469	8	8			47	342	0.14	47	343	0.14	9488	0.0	0.0	9491	0.0	0.0
38051	37	8	8			66	399	0.17	66	399	0.17	9491	0.0	0.0	9492	0.0	0.0
38052	499	8	8			67	392	0.17	67	392	0.17	9492	0.0	0.0	9493	0.0	0.0
38053	120	8	8			17	340	0.05	17	340	0.05	9494	0.0	0.0	9493	0.0	0.0
38054	418	8	8			84	342	0.25	84	342	0.25	9493	0.0	0.0	9495	0.0	0.0
38055	155	8	8			198	380	0.52	198	381	0.52	2391	0.0	0.0	9495	0.0	0.0
38056	270	8	8			292	382	0.76	292	383	0.76	9495	0.0	0.0	2390	0.0	0.0
38057	317	8	8			17	339	0.05	17	340	0.05	9496	0.0	0.0	9494	0.0	0.0
38058	26	8	8			1	1,218	0.00	1	1,220	0.00	9497	0.0	0.0	9483	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38059	326	8	8			31	190	0.16	31	190	0.16	7392	0.0	0.0	9498	0.0	0.0
38060	326	8	8			37	285	0.13	37	285	0.13	9498	0.0	0.0	2333	0.0	0.0
38061	242	8	8			6	518	0.01	6	519	0.01	9499	0.0	0.0	9498	0.0	0.0
38080	265	10	10			456	731	0.62	456	731	0.62	5961	0.0	0.0	9500	0.0	0.0
38082	70	10	10			466	637	0.73	466	636	0.73	5972	0.0	0.0	9501	0.0	0.0
38083	378	10	10			479	671	0.71	479	670	0.72	9501	0.0	0.0	5971	0.0	0.0
38084	65	10	10			465	721	0.64	465	720	0.65	9500	0.0	0.0	5970	0.0	0.0
38085	96	10	10			465	702	0.66	465	701	0.66	5970	0.0	0.0	5972	0.0	0.0
38086	245	8	8			1	1,140	0.00	1	1,142	0.00	9502	0.0	0.0	9501	0.0	0.0
38087	130	8	8			1	641	0.00	1	642	0.00	9503	0.0	0.0	9502	0.0	0.0
38088	100	8	8			8	906	0.01	8	908	0.01	9504	0.0	0.0	9500	0.0	0.0
38100	85	8	8			1	2,231	0.00	1	2,234	0.00	9520	0.0	0.0	9521	0.0	0.0
38101	194	8	8			1	1,940	0.00	1	1,942	0.00	9521	0.0	0.0	9523	0.0	0.0
38102	138	8	8			1	1,874	0.00	1	1,876	0.00	9523	0.0	0.0	9522	0.0	0.0
38103	65	8	8			1	1,323	0.00	1	1,324	0.00	9522	0.0	0.0	9524	0.0	0.0
38104	318	8	8			3	1,386	0.00	3	1,388	0.00	9524	0.0	0.0	9532	0.0	0.0
38105	150	8	8			1	1,982	0.00	1	1,985	0.00	9525	0.0	0.0	9526	0.0	0.0
38106	292	8	8			1	2,090	0.00	1	2,092	0.00	9526	0.0	0.0	9527	0.0	0.0
38107	277	8	8			1	2,097	0.00	1	2,100	0.00	9527	0.0	0.0	9528	0.0	0.0
38108	97	8	8			1	1,056	0.00	1	1,057	0.00	9528	0.0	0.0	4799	0.0	0.0
38109	115	8	8			1	2,649	0.00	1	2,652	0.00	9529	0.0	0.0	9520	0.0	0.0
38111	48	8	8			0	2,578	0.00	0	2,582	0.00	9531	0.0	0.0	9530	0.0	0.0
38112	60	8	8			0	2,090	0.00	0	2,092	0.00	9530	0.0	0.0	9523	0.0	0.0
38113	87	8	8			3	1,028	0.00	3	1,028	0.00	9532	0.0	0.0	9533	0.0	0.0
38114	183	8	8			3	1,133	0.00	3	1,134	0.00	9533	0.0	0.0	4799	0.0	0.0
38115	50	8	8			41	1,395	0.03	41	1,397	0.03	4608	0.0	0.0	8330	0.0	0.0
38116	250	8	8			55	820	0.07	55	821	0.07	8330	0.0	0.0	4670	0.0	0.0
38120	431	8	8			8	1,688	0.00	8	1,690	0.00	7981	0.0	0.0	7983	0.0	0.0
38121	197	8	8			1	765	0.00	1	767	0.00	9604	0.0	0.0	9582	0.0	0.0
38122	148	8	8			1	1,854	0.00	1	1,856	0.00	9581	0.0	0.0	9582	0.0	0.0
38123	201	8	8			1	799	0.00	1	800	0.00	9582	0.0	0.0	9583	0.0	0.0
38124	143	8	8			4	1,119	0.00	4	1,121	0.00	9583	0.0	0.0	9584	0.0	0.0
38125	190	8	8			4	1,433	0.00	4	1,435	0.00	9584	0.0	0.0	9585	0.0	0.0
38126	128	8	8			6	1,117	0.00	6	1,119	0.00	9585	0.0	0.0	7326	0.0	0.0
38127	49	8	8			1	906	0.00	1	908	0.00	9586	0.0	0.0	9585	0.0	0.0
38128	112	8	8			1	1,423	0.00	1	1,424	0.00	9587	0.0	0.0	9586	0.0	0.0
38129	183	8	8			0	1,444	0.00	0	1,447	0.00	9589	0.0	0.0	9588	0.0	0.0
38130	17	8	8			1	492	0.00	1	492	0.00	9588	0.0	0.0	9587	0.0	0.0
38140	129	8	8			0	1,939	0.00	0	1,941	0.00	9600	0.0	0.0	9601	0.0	0.0
38141	55	8	8			1	773	0.00	1	774	0.00	9601	0.0	0.0	9602	0.0	0.0
38142	180	8	8			1	770	0.00	1	772	0.00	9602	0.0	0.0	9603	0.0	0.0
38143	104	8	8			1	2,208	0.00	1	2,210	0.00	9603	0.0	0.0	9604	0.0	0.0
38144	101	8	8			0	423	0.00	0	424	0.00	9606	0.0	0.0	9601	0.0	0.0
38145	43	8	8			0	1,201	0.00	0	1,203	0.00	9605	0.0	0.0	9601	0.0	0.0
38160	135	8	8			1	423	0.00	1	424	0.00	9620	0.0	0.0	9621	0.0	0.0
38161	154	8	8			19	591	0.03	19	592	0.03	9623	0.0	0.0	9624	0.0	0.0
38162	347	8	8			18	1,037	0.02	18	1,038	0.02	9622	0.0	0.0	9623	0.0	0.0
38163	196	8	8			1	288	0.00	1	288	0.00	9621	0.0	0.0	9622	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38180	402	8	8			3	765	0.00	3	765	0.00	10929	0.0	0.0	9642	0.0	0.0
38181	338	8	8			1	1,402	0.00	1	1,403	0.00	9640	0.0	0.0	9642	0.0	0.0
38182	50	8	8			0	372	0.00	0	372	0.00	9645	0.0	0.0	9643	0.0	0.0
38183	330	8	8			8	866	0.01	8	867	0.01	9642	0.0	0.0	9643	0.0	0.0
38184	160	8	8			8	715	0.01	8	716	0.01	9643	0.0	0.0	9644	0.0	0.0
38185	259	8	27			8	682	0.01	8	683	0.01	9644	0.0	0.0	9441	0.0	0.0
38187	210	8	8			0	372	0.00	0	372	0.00	9641	0.0	0.0	8148	0.0	0.0
38189	210	8	8			1	919	0.00	1	921	0.00	7188	0.0	0.0	4492	0.0	0.0
38200	157	8	8			1	1,635	0.00	1	1,637	0.00	9660	0.0	0.0	4512	0.0	0.0
38220	216	8	8			0	1,008	0.00	0	1,010	0.00	9684	0.0	0.0	9683	0.0	0.0
38221	86	8	8			0	1,188	0.00	0	1,189	0.00	9683	0.0	0.0	9681	0.0	0.0
38222	65	8	12	37	ura	1	1,192	0.00	1	1,193	0.00	9685	0.0	0.0	9682	0.0	0.0
38223	156	8	12	37	ura	1	617	0.00	1	618	0.00	9682	0.0	0.0	9681	0.0	0.0
38224	87	8	12	37	ura	7	715	0.01	7	717	0.01	9681	0.0	0.0	9680	0.0	0.0
38225	94	8	8			0	712	0.00	0	713	0.00	9686	0.0	0.0	9687	0.0	0.0
38240	127	8	8			0	726	0.00	0	727	0.00	10991	0.0	0.0	9687	0.0	0.0
38241	1031	54	54			19,903	14,017	1.42	20,544	14,017	1.47	2363	0.0	0.0	9703	0.0	0.0
38242	1031	54	54			23,674	18,233	1.30	24,332	18,233	1.33	9703	0.0	0.0	2362	0.0	0.0
38243	431	24	24		Existing	3,810	7,210	0.53	3,857	7,764	0.50	10083	0.0	0.0	9703	0.0	0.0
38244	248	8	8			1	1,050	0.00	1	1,051	0.00	10920	0.0	0.0	9706	0.0	0.0
38245	475	8	8			1	699	0.00	1	700	0.00	9706	0.0	0.0	9640	0.0	0.0
38246	229	8	8			1	1,178	0.00	1	1,180	0.00	10923	0.0	0.0	9705	0.0	0.0
38247	194	8	8			1	1,281	0.00	1	1,283	0.00	9705	0.0	0.0	8161	0.0	0.0
38260	74	8	8			0	1,000	0.00	0	1,001	0.00	9720	0.0	0.0	9721	0.0	0.0
38261	54	8	8			1	1,128	0.00	1	1,129	0.00	9721	0.0	0.0	9722	0.0	0.0
38262	347	8	8			1	1,303	0.00	1	1,305	0.00	9722	0.0	0.0	9723	0.0	0.0
38263	199	8	8			1	1,033	0.00	1	1,034	0.00	9723	0.0	0.0	9724	0.0	0.0
38264	50	8	8			14	536	0.03	14	537	0.03	9724	0.0	0.0	9726	0.0	0.0
38265	115	24	24			1,557	4,334	0.36	1,558	4,334	0.36	9726	0.0	0.0	6134	0.0	0.0
38266	80	8	8			0	621	0.00	0	622	0.00	9729	0.0	0.0	9727	0.0	0.0
38267	261	8	8			1	780	0.00	1	781	0.00	9727	0.0	0.0	9730	0.0	0.0
38268	187	8	8			3	773	0.00	3	774	0.00	9730	0.0	0.0	9731	0.0	0.0
38270	220	8	8			1	394	0.00	1	394	0.00	5357	0.0	0.0	9731	0.0	0.0
38271	38	8	8			4	403	0.01	4	403	0.01	9731	0.0	0.0	5356	0.0	0.0
38272	220	12	12			27	2,633	0.01	27	2,633	0.01	9732	0.0	0.0	4882	0.0	0.0
38273	108	8	8			1	1,462	0.00	1	1,464	0.00	4250	0.0	0.0	9732	0.0	0.0
38274	348	8	8			1	1,363	0.00	1	1,364	0.00	9734	0.0	0.0	4250	0.0	0.0
38275	194	8	8			0	1,224	0.00	0	1,226	0.00	4254	0.0	0.0	9734	0.0	0.0
38276	41	8	8			1	2,438	0.00	1	2,441	0.00	4249	0.0	0.0	4250	0.0	0.0
38280	63	12	12			481	634	0.76	481	634	0.76	3314	0.0	0.0	9741	0.0	0.0
38281	279	12	12			483	627	0.77	481	627	0.77	9741	0.0	0.0	9740	0.0	0.0
38282	244	6	6			1	195	0.00	1	195	0.00	3359	0.0	0.0	9740	0.0	0.0
38283	63	12	12			482	1,247	0.39	482	1,247	0.39	9740	0.0	0.0	3311	7.3	0.0
38300	37	8	8			1	542	0.00	1	543	0.00	9760	0.0	0.0	2112	0.0	0.0
38301	7	8	8			10	820	0.01	10	822	0.01	9761	0.0	0.0	7237	0.0	0.0
38302	303	8	8			10	463	0.02	10	463	0.02	9762	0.0	0.0	9761	0.0	0.0
38303	182	8	8			1	392	0.00	1	392	0.00	9763	0.0	0.0	2103	0.0	0.0
38304	84	8	8			1	345	0.00	1	346	0.00	9764	0.0	0.0	9765	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38305	39	8	8			28	460	0.06	28	460	0.06	9765	0.0	0.0	9766	0.0	0.0
38306	98	8	8			28	342	0.08	28	342	0.08	9766	0.0	0.0	9767	0.0	0.0
38307	35	8	8			28	343	0.08	28	344	0.08	9767	0.0	0.0	2124	0.0	0.0
38320	100	8	8			16	402	0.04	16	403	0.04	9780	0.0	0.0	9782	0.0	0.0
38321	298	8	8			15	860	0.02	15	862	0.02	9781	0.0	0.0	9780	0.0	0.0
38340	235	8	8			1	2,139	0.00	1	2,142	0.00	9803	0.0	0.0	9801	0.0	0.0
38341	192	8	8			1	1,956	0.00	1	1,958	0.00	9801	0.0	0.0	9800	0.0	0.0
38342	133	8	8			1	2,366	0.00	1	2,369	0.00	9802	0.0	0.0	9801	0.0	0.0
38343	125	8	8			1	1,182	0.00	1	1,184	0.00	9800	0.0	0.0	6390	0.0	0.0
38380	105	8	8			0	1,327	0.00	0	1,329	0.00	9823	0.0	0.0	9820	0.0	0.0
38381	100	8	8			0	703	0.00	0	703	0.00	9820	0.0	0.0	9821	0.0	0.0
38382	265	8	8			1	1,220	0.00	1	1,222	0.00	9821	0.0	0.0	9822	0.0	0.0
38400	290	8	8			1	1,167	0.00	1	1,168	0.00	9842	0.0	0.0	9841	0.0	0.0
38401	212	8	8			0	1,157	0.00	0	1,158	0.00	9841	0.0	0.0	9840	0.0	0.0
38402	88	8	8			0	1,060	0.00	0	1,061	0.00	9840	0.0	0.0	8182	0.0	0.0
38403	208	8	8			0	1,042	0.00	0	1,044	0.00	9843	0.0	0.0	9844	0.0	0.0
38404	365	8	8			0	1,452	0.00	0	1,454	0.00	9844	0.0	0.0	9845	0.0	0.0
38405	35	8	8			0	1,803	0.00	0	1,805	0.00	9845	0.0	0.0	8184	0.0	0.0
38420	105	8	8			1	287	0.00	1	287	0.00	9860	0.0	0.0	9861	0.0	0.0
38421	181	8	8			1	271	0.01	1	271	0.01	9861	0.0	0.0	9862	0.0	0.0
38422	126	8	8			4	310	0.01	4	311	0.01	9862	0.0	0.0	9863	0.0	0.0
38441	233	8	8			1	1,797	0.00	1	1,799	0.00	9880	0.0	0.0	4984	0.0	0.0
38461	310	6	6			1	105	0.01	1	105	0.01	9900	0.0	0.0	3547	0.0	0.0
38480	166	8	8			10	225	0.05	10	241	0.04	9921	0.0	0.0	9920	0.0	0.0
38481	48	8	8			1	823	0.00	1	883	0.00	9922	0.0	0.0	9921	0.0	0.0
38483	264	8	8			1	562	0.00	1	603	0.00	9923	0.0	0.0	9922	0.0	0.0
38484	181	8	8			0	504	0.00	0	541	0.00	9925	0.0	0.0	9923	0.0	0.0
38485	254	8	8			1	979	0.00	1	1,051	0.00	9924	0.0	0.0	9923	0.0	0.0
38486	316	8	8			1	528	0.00	1	566	0.00	9926	0.0	0.0	6789	0.0	0.0
38487	10	8	8			0	333	0.00	0	357	0.00	9927	0.0	0.0	9926	0.0	0.0
38488	35	8	8			1	356	0.00	1	381	0.00	9926	0.0	0.0	8741	0.0	0.0
38490	2	8	8			0	105	0.00	0	113	0.00	8742	0.0	0.0	9929	0.0	0.0
38491	313	8	8			0	557	0.00	0	597	0.00	8743	0.0	0.0	8740	0.0	0.0
38492	497	8	8			0	411	0.00	0	441	0.00	6790	0.0	0.0	9930	0.0	0.0
38494	199	8	8			10	149	0.07	10	160	0.06	9930	0.0	0.0	6904	0.0	0.0
38495	371	8	8			1	1,283	0.00	1	1,285	0.00	5938	0.0	0.0	9931	0.0	0.0
38496	44	8	8			11	1,283	0.01	11	1,284	0.01	9931	0.0	0.0	5854	0.0	0.0
38497	44	8	8			10	547	0.02	10	547	0.02	9932	0.0	0.0	9931	0.0	0.0
38498	149	8	8			9	407	0.02	9	408	0.02	9933	0.0	0.0	9932	0.0	0.0
38499	149	8	8			8	478	0.02	8	479	0.02	9934	0.0	0.0	9933	0.0	0.0
38500	109	8	8			297	668	0.44	0	669	0.00	9940	0.0	0.0	5859	0.0	0.0
38501	202	10	15	18	Existing	694	328	2.11	694	968	0.72	5858	1.8	0.0	9940	0.0	0.0
38502	248	10	15	18	Existing	461	333	1.38	695	983	0.71	9940	0.0	0.0	5860	6.1	0.0
38503	288	8	8			1	290	0.00	1	291	0.00	9941	0.0	0.0	5617	0.0	0.0
38504	57	8	8			6	373	0.02	6	374	0.02	9942	0.0	0.0	8987	0.0	0.0
38505	163	8	8			6	506	0.01	6	507	0.01	9943	0.0	0.0	9942	0.0	0.0
38506	141	8	8			5	1,439	0.00	5	1,441	0.00	9944	0.0	0.0	9943	0.0	0.0
38507	330	8	8			1	588	0.00	1	588	0.00	9945	0.0	0.0	9944	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38508	100	8	8			0	372	0.00	0	372	0.00	9946	0.0	0.0	9945	0.0	0.0
38509	207	8	8			1	826	0.00	1	828	0.00	9947	0.0	0.0	9948	0.0	0.0
38510	102	8	8			1	298	0.00	1	299	0.00	9948	0.0	0.0	9863	0.0	0.0
38511	329	8	8			6	262	0.02	6	262	0.02	9863	0.0	0.0	9951	0.0	0.0
38512	279	8	8			1	1,058	0.00	1	1,059	0.00	9949	0.0	0.0	9950	0.0	0.0
38513	77	8	8			1	815	0.00	1	815	0.00	9950	0.0	0.0	9951	0.0	0.0
38514	241	8	8			10	285	0.03	10	286	0.03	9951	0.0	0.0	9953	0.0	0.0
38515	106	8	8			10	987	0.01	10	988	0.01	9953	0.0	0.0	9954	0.0	0.0
38516	376	8	8			1	1,032	0.00	1	1,033	0.00	9952	0.0	0.0	9954	0.0	0.0
38517	147	8	8			12	1,274	0.01	12	1,276	0.01	9954	0.0	0.0	9955	0.0	0.0
38518	127	8	8			12	817	0.01	12	817	0.01	9955	0.0	0.0	9956	0.0	0.0
38519	180	8	8			16	575	0.03	16	576	0.03	9956	0.0	0.0	5290	4.3	0.0
38520	205	4	4			0	176	0.00	0	176	0.00	JCT-10	0.0	0.0	9958	0.0	0.0
38521	37	8	8			19	322	0.06	19	322	0.06	9959	0.0	0.0	9957	0.0	0.0
38522	139	8	8			1	341	0.00	1	342	0.00	9960	0.0	0.0	9959	0.0	0.0
38523	227	8	8			1	410	0.00	1	411	0.00	9962	0.0	0.0	4498	0.0	0.0
38524	215	8	8			1	1,114	0.00	1	1,115	0.00	9963	0.0	0.0	9962	0.0	0.0
38525	393	8	8			0	579	0.00	0	580	0.00	9964	0.0	0.0	9963	0.0	0.0
38540	81	8	8			8	1,167	0.01	8	1,168	0.01	2503	0.0	0.0	9980	0.0	0.0
38541	136	8	8			24	1,309	0.02	24	1,310	0.02	9980	0.0	0.0	2504	0.0	0.0
38542	169	8	8			17	586	0.03	17	587	0.03	9982	0.0	0.0	9980	0.0	0.0
38543	67	8	8			0	588	0.00	0	588	0.00	9981	0.0	0.0	9982	0.0	0.0
38544	223	8	8			0	1,018	0.00	0	1,019	0.00	9983	0.0	0.0	9982	0.0	0.0
38545	414	8	8			1	340	0.00	1	340	0.00	9984	0.0	0.0	9985	0.0	0.0
38546	249	10	10			1	616	0.00	1	615	0.00	9985	0.0	0.0	9986	0.0	0.0
38547	154	10	10			132	607	0.22	132	606	0.22	9986	0.0	0.0	9987	0.0	0.0
38548	312	10	10			133	287	0.46	133	287	0.46	9987	0.0	0.0	9988	0.0	0.0
38549	179	10	10			185	810	0.23	185	810	0.23	9988	0.0	0.0	9989	0.0	0.0
38550	260	8	8			6	336	0.02	6	337	0.02	2215	0.0	0.0	9990	0.0	0.0
38551	195	8	8			15	330	0.05	15	330	0.05	9990	0.0	0.0	2214	0.0	0.0
38552	253	6	6			8	280	0.03	8	280	0.03	9991	0.0	0.0	9990	0.0	0.0
38553	219	8	8			284	340	0.84	284	340	0.83	2207	0.0	0.0	9992	0.0	0.0
38554	93	8	8			301	342	0.88	301	342	0.88	9992	0.0	0.0	2214	0.0	0.0
38555	252	8	8			19	343	0.06	19	344	0.06	9998	0.0	0.0	9992	0.0	0.0
38556	137	8	8			19	353	0.05	19	353	0.05	9996	0.0	0.0	9998	0.0	0.0
38557	135	8	8			19	385	0.05	19	385	0.05	9997	0.0	0.0	9996	0.0	0.0
38558	400	8	8			48	542	0.09	48	543	0.09	9999	0.0	0.0	10000	0.0	0.0
38559	67	8	8			49	257	0.19	49	257	0.19	10000	0.0	0.0	2190	0.0	0.0
38560	412	8	8			40	349	0.11	40	349	0.11	2334	0.0	0.0	10001	0.0	0.0
38561	68	8	8			40	294	0.14	40	294	0.14	10001	0.0	0.0	2348	0.0	0.0
38562	86	8	8			1	336	0.00	1	336	0.00	10002	0.0	0.0	10001	0.0	0.0
38563	72	8	8			1	469	0.00	1	470	0.00	10003	0.0	0.0	10002	0.0	0.0
38564	262	8	8			70	343	0.20	70	344	0.20	2175	0.0	0.0	2161	0.0	0.0
38565	113	8	8			71	342	0.21	71	343	0.21	2161	0.0	0.0	2145	0.0	0.0
38566	80	8	8			339	343	0.99	338	344	0.98	2203	6.6	6.6	10005	0.0	0.0
38567	356	8	8			366	342	1.07	366	343	1.07	10005	0.0	0.0	2238	0.0	0.0
38568	350	8	8			1	444	0.00	1	445	0.00	10006	0.0	0.0	10005	0.0	0.0
38569	395	8	8			10	331	0.03	10	331	0.03	7237	0.0	0.0	10007	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38570	89	8	8			22	385	0.06	22	386	0.06	10007	0.0	0.0	2123	0.0	0.0
38571	250	8	8			10	343	0.03	10	344	0.03	10009	0.0	0.0	10007	0.0	0.0
38572	189	8	8			38	265	0.14	38	265	0.14	7006	0.0	0.0	10010	0.0	0.0
38573	213	8	8			39	276	0.14	39	276	0.14	10010	0.0	0.0	2130	0.0	0.0
38575	246	8	8			1	346	0.00	1	347	0.00	2313	0.0	0.0	9782	0.0	0.0
38576	77	8	8			17	339	0.05	17	339	0.05	9782	0.0	0.0	2270	0.0	0.0
38578	96	8	8			6	943	0.01	6	944	0.01	10014	0.0	0.0	2253	0.0	0.0
38581	65	8	8			17	431	0.04	17	431	0.04	2397	0.0	0.0	10016	0.0	0.0
38582	350	8	8			31	429	0.07	31	430	0.07	10016	0.0	0.0	7243	0.0	0.0
38583	248	8	8			13	924	0.01	13	926	0.01	10015	0.0	0.0	10016	0.0	0.0
38584	95	8	8			1	1,217	0.00	1	1,218	0.00	2246	0.0	0.0	2416	0.0	0.0
38585	198	15	15			67	1,147	0.06	67	1,147	0.06	2454	0.0	0.0	10018	0.0	0.0
38586	176	15	15			74	977	0.08	74	977	0.08	10018	0.0	0.0	7244	0.0	0.0
38587	142	8	8			7	542	0.01	7	543	0.01	10017	0.0	0.0	10018	0.0	0.0
38588	109	8	8			96	341	0.28	96	341	0.28	2103	0.0	0.0	10020	0.0	0.0
38589	251	8	8			103	341	0.30	103	341	0.30	10020	0.0	0.0	2139	0.0	0.0
38590	170	8	8			1	383	0.00	1	384	0.00	10019	0.0	0.0	10020	0.0	0.0
38600	167	8	8			163	218	0.75	163	218	0.75	2126	0.0	0.0	10040	0.0	0.0
38601	203	8	8			163	295	0.55	163	295	0.55	10040	0.0	0.0	2125	0.0	0.0
38606	245	18	18			1,547	2,333	0.66	1,547	2,333	0.66	2449	0.0	0.0	10045	0.0	0.0
38607	245	18	18			1,547	1,086	1.42	1,547	1,086	1.42	10045	0.0	0.0	2450	0.0	0.0
38608	38	8	27			108	249	0.43	108	249	0.43	2461	0.0	0.0	10046	0.0	0.0
38609	312	8	27			108	288	0.37	108	288	0.37	10046	0.0	0.0	2460	0.0	0.0
38611	35	8	27			0	1,769	0.00	0	1,771	0.00	10046	0.0	0.0	2449	0.0	0.0
38621	70	8	8			33	476	0.07	33	477	0.07	10060	0.0	0.0	2291	5.8	5.8
38622	63	8	8			14	432	0.03	14	433	0.03	2292	0.0	0.0	10064	0.0	0.0
38623	249	8	27			15	569	0.03	15	569	0.03	10064	0.0	0.0	10060	0.0	0.0
38625	201	8	8			6	429	0.01	6	430	0.01	10061	0.0	0.0	10062	0.0	0.0
38626	123	8	8			6	385	0.02	6	385	0.02	10062	0.0	0.0	10060	0.0	0.0
38627	103	8	8			7	597	0.01	7	599	0.01	10063	0.0	0.0	10060	0.0	0.0
38629	56	8	8			1	437	0.00	1	438	0.00	10068	0.0	0.0	1685	0.0	0.0
38640	135	8	8			1	415	0.00	1	416	0.00	10080	0.0	0.0	1698	0.0	0.0
38641	202	8	8			1	352	0.00	1	352	0.00	10081	0.0	0.0	1285	0.0	0.0
38642	303	8	8			13	343	0.04	13	343	0.04	1285	0.0	0.0	10082	0.0	0.0
38645	426	24	24		Existing	3,810	6,808	0.56	3,857	7,294	0.53	10084	0.0	0.0	10083	0.0	0.0
38646	177	24	24		Existing	3,810	6,810	0.56	3,857	7,297	0.53	10085	0.0	0.0	10084	0.0	0.0
38647	132	24	24		Existing	3,810	6,851	0.56	3,857	7,340	0.53	10086	0.0	0.0	10085	0.0	0.0
38648	22	24	24			40	6,765	0.01	42	7,248	0.01	10087	0.0	0.0	10086	0.0	0.0
38649	7	24	24			20	6,652	0.00	22	7,127	0.00	10089	0.0	0.0	10087	0.0	0.0
38650	109	18	24	26	Existing	3,809	3,544	1.07	3,860	8,178	0.47	6882	0.0	0.0	10086	0.0	0.0
38652	103	10	10			413	833	0.50	413	833	0.50	3269	0.0	0.0	3268	0.0	0.0
38660	374	8	8			0	647	0.00	0	647	0.00	10101	0.0	0.0	10100	0.0	0.0
38661	500	21	21			2,384	7,333	0.33	2,581	7,333	0.35	2925	0.0	0.0	10100	0.0	0.0
38662	234	21	21			2,384	10,036	0.24	2,581	10,036	0.26	10100	0.0	0.0	7495	0.0	0.0
38663	279	12	15	5	Existing	635	1,038	0.61	1,219	1,882	0.65	1828	1.6	0.0	1827	0.0	0.0
38665	188	8	8			16	654	0.02	16	655	0.02	10107	0.0	0.0	2671	0.0	0.0
38666	104	8	8			16	374	0.04	16	374	0.04	10108	0.0	0.0	10107	0.0	0.0
38667	260	8	8			0	814	0.00	0	815	0.00	10109	0.0	0.0	10108	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38668	29	8	8			16	378	0.04	16	378	0.04	10110	0.0	0.0	10108	0.0	0.0
38669	147	8	8			15	372	0.04	15	373	0.04	10111	0.0	0.0	10110	0.0	0.0
38670	35	8	8			15	794	0.02	15	796	0.02	10112	0.0	0.0	10111	0.0	0.0
38671	262	8	8			15	556	0.03	15	557	0.03	10113	0.0	0.0	10112	0.0	0.0
38672	120	8	8			0	907	0.00	0	908	0.00	10114	0.0	0.0	10113	0.0	0.0
38673	248	8	8			0	989	0.00	0	990	0.00	10115	0.0	0.0	10114	0.0	0.0
38680	70	8	8			0	367	0.00	0	367	0.00	10120	0.0	0.0	4564	0.0	0.0
38700	27	8	8			0	452	0.00	0	453	0.00	10141	0.0	0.0	2930	0.0	0.0
38701	193	8	8			1	371	0.00	1	372	0.00	10142	0.0	0.0	2949	0.0	0.0
38702	166	8	8			0	374	0.00	0	374	0.00	10144	0.0	0.0	10142	0.0	0.0
38703	254	8	8			0	589	0.00	0	590	0.00	10145	0.0	0.0	10144	0.0	0.0
38704	89	8	8			1	591	0.00	1	592	0.00	10143	0.0	0.0	10142	0.0	0.0
38705	75	8	8			0	588	0.00	0	588	0.00	10147	0.0	0.0	10146	0.0	0.0
38706	165	8	8			0	588	0.00	0	588	0.00	10146	0.0	0.0	10143	0.0	0.0
38707	128	8	8			0	588	0.00	0	588	0.00	10148	0.0	0.0	10143	0.0	0.0
38708	25	8	8			0	455	0.00	0	456	0.00	10149	0.0	0.0	2954	0.0	0.0
38709	45	8	8			0	455	0.00	0	456	0.00	10150	0.0	0.0	10149	0.0	0.0
38710	66	18	21	42	2036	1,971	3,976	0.50	2,165	3,976	0.54	10151	0.0	0.0	2675	0.0	0.0
38711	76	18	18			1,063	3,564	0.30	1,063	3,564	0.30	10152	0.0	0.0	7250	0.0	0.0
38713	63	8	8			103	596	0.17	97	597	0.16	10153	1.5	0.0	3014	1.5	0.0
38714	188	8	8			0	470	0.00	0	471	0.00	10154	0.0	0.0	4332	0.0	0.0
38730	304	12	12			267	642	0.42	267	642	0.42	10180	0.0	0.0	3235	0.0	0.0
38731	44	12	12			267	1,181	0.23	267	1,181	0.23	3164	0.0	0.0	10180	0.0	0.0
38740	114	8	8			3	305	0.01	3	305	0.01	3274	0.0	0.0	3234	0.0	0.0
38741	107	12	12			267	1,071	0.25	267	1,071	0.25	3235	0.0	0.0	3234	0.0	0.0
38742	97	10	10			267	556	0.48	267	556	0.48	10181	0.0	0.0	3164	0.0	0.0
38745	105	8	8			1	542	0.00	1	543	0.00	10183	0.0	0.0	10184	0.0	0.0
38746	89	8	8			1	617	0.00	1	617	0.00	10184	0.0	0.0	10182	0.0	0.0
38747	73	8	8			1	790	0.00	1	792	0.00	10182	0.0	0.0	3274	0.0	0.0
38760	85	6	6			28	442	0.06	15	442	0.03	1882	0.0	0.0	10200	4.0	0.0
38761	194	6	6			50	438	0.11	32	438	0.07	10200	4.0	0.0	1866	4.0	0.0
38764	180	8	8			1	708	0.00	1	710	0.00	10201	0.0	0.0	10200	4.0	0.0
38765	70	6	6			1	280	0.00	1	280	0.00	1883	0.0	0.0	1850	0.0	0.0
38766	217	6	6			15	260	0.06	15	260	0.06	1850	0.0	0.0	1882	0.0	0.0
38768	91	6	6			1	133	0.01	1	133	0.01	10220	0.0	0.0	1958	0.0	0.0
38769	445	16	16			803	3,093	0.26	349	3,091	0.11	5588	0.0	0.0	10221	0.0	0.0
38770	313	16	16			804	3,095	0.26	349	3,093	0.11	10221	0.0	0.0	1864	0.0	0.0
38771	260	16	16			2,592	2,537	1.02	2,528	2,535	1.00	2026	0.0	0.0	10222	0.0	0.0
38772	251	16	16			2,593	2,569	1.01	2,529	2,567	0.99	10222	0.0	0.0	1998	0.0	0.0
38774	126	8	8			1	324	0.00	1	324	0.00	10226	0.0	0.0	3250	0.0	0.0
38775	33	8	8			1	412	0.00	1	412	0.00	10223	0.0	0.0	10224	0.0	0.0
38776	327	8	8			1	374	0.00	1	375	0.00	10224	0.0	0.0	10225	0.0	0.0
38777	33	8	8			1	353	0.00	1	353	0.00	10225	0.0	0.0	10226	0.0	0.0
38778	278	8	8			1	535	0.00	1	535	0.00	10228	0.0	0.0	10227	0.0	0.0
38779	313	10	10			399	539	0.74	399	538	0.74	3270	0.0	0.0	10227	0.0	0.0
38780	87	10	10			413	538	0.77	413	537	0.77	10227	0.0	0.0	3269	0.0	0.0
38800	102	8	8			34	370	0.09	1	371	0.00	1999	4.8	0.0	10240	4.8	0.0
38802	156	12	15	2	Existing	946	1,133	0.84	1,333	2,053	0.65	2014	0.8	0.0	10241	0.6	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38803	336	6	6			40	186	0.21	38	186	0.21	7002	3.4	0.0	10241	0.6	0.0
38805	73	12	15	2	Existing	987	1,149	0.86	1,372	2,084	0.66	10241	0.6	0.0	2012	0.2	0.0
38806	5	10	10			26	735	0.03	6	734	0.01	2014	0.8	0.0	10242	0.7	0.0
38809	5	10	10			22	900	0.02	6	899	0.01	10243	0.2	0.0	2012	0.2	0.0
38820	222	33	33			7,018	8,579	0.82	8,235	8,579	0.96	2152	0.0	0.0	2149	0.0	0.0
38822	130	33	33			7,018	16,913	0.41	8,235	16,913	0.49	2149	0.0	0.0	10260	0.0	0.0
38823	84	18	18			2,598	2,301	1.13	3,066	2,301	1.33	7007	0.0	0.0	2147	0.0	0.0
38824	84	21	21			3,101	3,470	0.89	3,744	3,470	1.08	7007	0.0	0.0	2147	0.0	0.0
38825	84	12	12			1,319	781	1.69	1,425	781	1.83	7007	0.0	0.0	2147	0.0	0.0
38840	13	33	33			7,019	20,819	0.34	8,235	20,819	0.40	10260	0.0	0.0	7007	0.0	0.0
38861	33	16	16			1,167	3,542	0.33	712	3,540	0.20	1864	0.0	0.0	10282	0.0	0.0
38863	347	16	16			1,167	3,399	0.34	713	3,397	0.21	10282	0.0	0.0	10283	0.0	0.0
38864	257	16	16			1,168	3,444	0.34	713	3,442	0.21	10283	0.0	0.0	2003	0.0	0.0
38883	28	18	18			827	1,892	0.44	827	2,026	0.41	6910	0.0	0.0	7125	0.0	0.0
38920	563	8	8			83	392	0.21	83	393	0.21	3594	0.0	0.0	7183	0.0	0.0
38940	70	8	8			0	608	0.00	0	609	0.00	10340	0.0	0.0	10341	0.0	0.0
38941	72	8	8			0	535	0.00	0	535	0.00	10341	0.0	0.0	10342	0.0	0.0
38942	118	8	8			0	889	0.00	0	890	0.00	10342	0.0	0.0	10343	0.0	0.0
38943	110	8	8			1	1,590	0.00	1	1,592	0.00	10343	0.0	0.0	10344	0.0	0.0
38944	100	8	8			1	1,868	0.00	1	1,871	0.00	10344	0.0	0.0	10345	0.0	0.0
38945	49	8	8			1	1,959	0.00	1	1,962	0.00	10345	0.0	0.0	10346	0.0	0.0
38946	57	8	8			1	1,239	0.00	1	1,240	0.00	10346	0.0	0.0	10347	0.0	0.0
38947	62	8	8			2	838	0.00	2	839	0.00	10347	0.0	0.0	10348	0.0	0.0
38948	97	8	8			2	1,167	0.00	2	1,169	0.00	10348	0.0	0.0	10349	0.0	0.0
38949	193	8	8			2	1,578	0.00	2	1,580	0.00	10349	0.0	0.0	4776	0.0	0.0
38950	122	8	8			1	1,366	0.00	1	1,367	0.00	10354	0.0	0.0	10355	0.0	0.0
38951	207	8	8			2	554	0.00	2	555	0.00	10360	0.0	0.0	10355	0.0	0.0
38952	165	8	8			2	2,369	0.00	2	2,372	0.00	10359	0.0	0.0	10360	0.0	0.0
38953	314	8	8			2	1,014	0.00	2	1,015	0.00	10358	0.0	0.0	10359	0.0	0.0
38954	131	8	8			2	1,337	0.00	2	1,338	0.00	10357	0.0	0.0	10358	0.0	0.0
38955	156	8	8			2	974	0.00	2	976	0.00	10356	0.0	0.0	10357	0.0	0.0
38956	113	8	8			2	2,113	0.00	2	2,115	0.00	10364	0.0	0.0	10365	0.0	0.0
38957	45	8	8			2	2,022	0.00	2	2,024	0.00	10365	0.0	0.0	10366	0.0	0.0
38958	50	8	8			2	2,045	0.00	2	2,048	0.00	10366	0.0	0.0	10367	0.0	0.0
38959	47	8	8			2	2,082	0.00	2	2,085	0.00	10367	0.0	0.0	10368	0.0	0.0
38960	54	8	8			2	2,325	0.00	2	2,328	0.00	10368	0.0	0.0	10369	0.0	0.0
38961	63	8	8			2	2,062	0.00	2	2,065	0.00	10369	0.0	0.0	10371	0.0	0.0
38962	109	8	8			2	2,058	0.00	2	2,060	0.00	10371	0.0	0.0	10372	0.0	0.0
38963	75	8	8			2	2,067	0.00	2	2,069	0.00	10372	0.0	0.0	10373	0.0	0.0
38964	69	8	8			0	554	0.00	0	555	0.00	10361	0.0	0.0	10363	0.0	0.0
38965	56	8	8			0	970	0.00	0	972	0.00	10363	0.0	0.0	10371	0.0	0.0
38966	54	8	8			0	1,214	0.00	0	1,215	0.00	10350	0.0	0.0	10351	0.0	0.0
38967	58	8	8			0	542	0.00	0	543	0.00	10351	0.0	0.0	10352	0.0	0.0
38968	61	8	8			0	496	0.00	0	497	0.00	10352	0.0	0.0	10353	0.0	0.0
38969	136	8	8			0	997	0.00	0	998	0.00	10353	0.0	0.0	4720	0.0	0.0
38981	105	8	8			285	406	0.70	285	406	0.70	6242	0.0	0.0	6243	0.0	0.0
38982	139	8	8			75	603	0.12	75	604	0.12	5712	0.0	0.0	5691	0.0	0.0
39041	8	8	8			93	332	0.28	93	333	0.28	10460	0.0	0.0	3586	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39042	323	8	8			70	340	0.21	70	340	0.21	3628	0.0	0.0	10462	0.0	0.0
39043	351	8	8			92	87	1.06	92	87	1.06	10462	0.0	0.0	10460	0.0	0.0
39044	15	8	8			44	343	0.13	44	344	0.13	3622	0.0	0.0	10463	0.0	0.0
39045	363	8	8			69	335	0.21	69	336	0.21	10463	0.0	0.0	3582	0.0	0.0
39046	236	24	24			1,994	1,811	1.10	2,740	1,811	1.51	7100	0.0	0.0	10464	0.0	0.0
39047	236	24	24			1,994	2,545	0.78	2,740	2,545	1.08	10464	0.0	0.0	5883	0.0	0.0
39048	297	8	8			1	388	0.00	1	389	0.00	10465	0.0	0.0	10466	0.0	0.0
39049	300	8	8			11	397	0.03	11	398	0.03	10466	0.0	0.0	5493	0.0	0.0
39060	44	8	12	37	ura	127	415	0.31	127	416	0.31	2718	0.0	0.0	2719	0.0	0.0
39061	136	8	12	37	ura	139	631	0.22	139	632	0.22	2720	0.0	0.0	2721	0.0	0.0
39062	133	8	8			403	420	0.96	452	421	1.07	2580	0.0	12.4	2537	0.0	8.4
39063	162	8	8			403	428	0.94	452	428	1.06	2537	0.0	8.4	2684	0.0	0.0
39064	155	6	6			60	148	0.41	1	148	0.00	10481	2.0	0.0	10480	0.7	0.0
39065	155	8	8			145	213	0.68	123	213	0.58	1797	1.9	0.0	10480	0.7	0.0
39066	125	8	8			147	213	0.69	124	213	0.58	10480	0.7	0.0	1770	0.2	0.0
39080	10	12	12			1	1,517	0.00	1	1,517	0.00	10500	0.0	0.0	1154	0.0	0.0
39100	286	8	8			1	342	0.00	1	343	0.00	3583	0.0	0.0	10520	0.0	0.0
39101	229	8	8			18	353	0.05	18	353	0.05	10520	0.0	0.0	3627	0.0	0.0
39102	10	21	21			1,671	3,376	0.49	2,398	3,376	0.71	10523	5.7	0.0	5837	5.8	0.0
39103	545	21	21			1,657	3,412	0.49	2,397	3,412	0.70	10521	7.8	0.0	10523	5.7	0.0
39104	15	8	8			17	1,386	0.01	4	1,388	0.00	7101	7.6	0.0	10521	7.8	0.0
39105	14	21	21			1,590	6,989	0.23	2,335	6,989	0.33	5839	0.0	0.0	10522	0.0	0.0
39106	407	21	21			1,594	3,101	0.51	2,335	3,101	0.75	10522	0.0	0.0	10521	7.8	0.0
39107	256	10	15	18	Existing	504	388	1.30	770	1,143	0.67	5866	9.1	0.0	5865	8.8	0.0
39108	39	10	18	18	Existing	505	386	1.31	771	1,851	0.42	5865	8.8	0.0	5839	0.0	0.0
39120	76	8	8			34	513	0.07	34	514	0.07	3139	0.0	0.0	10540	0.0	0.0
39121	226	8	8			39	513	0.08	39	513	0.08	10540	0.0	0.0	3088	0.0	0.0
39160	15	24	24			1,995	2,542	0.78	2,741	2,542	1.08	5883	0.0	0.0	10580	0.0	0.0
39180	948	54	54			15,969	45,866	0.35	16,155	45,866	0.35	5835	0.0	0.0	10580	0.0	0.0
39181	948	54	54			17,963	42,616	0.42	18,895	42,616	0.44	10580	0.0	0.0	5834	0.0	0.0
39182	68	8	8			8	390	0.02	8	391	0.02	10602	0.0	0.0	10601	0.0	0.0
39183	181	8	8			8	403	0.02	8	403	0.02	10601	0.0	0.0	10600	0.0	0.0
39185	212	8	8			24	393	0.06	24	394	0.06	10600	0.0	0.0	10151	0.0	0.0
39186	223	8	8			8	212	0.04	8	213	0.04	2673	0.0	0.0	10602	0.0	0.0
39200	131	8	8			0	588	0.00	0	588	0.00	10628	0.0	0.0	10620	0.0	0.0
39201	149	8	8			1	414	0.00	1	415	0.00	10621	0.0	0.0	10620	0.0	0.0
39202	323	8	8			0	415	0.00	0	415	0.00	10626	0.0	0.0	10621	0.0	0.0
39203	143	8	8			0	758	0.00	0	759	0.00	10629	0.0	0.0	10626	0.0	0.0
39204	143	8	8			0	417	0.00	0	417	0.00	10630	0.0	0.0	10626	0.0	0.0
39208	329	8	8			3	587	0.00	3	588	0.00	10620	0.0	0.0	10622	0.0	0.0
39209	324	8	8			3	871	0.00	3	872	0.00	10622	0.0	0.0	10623	0.0	0.0
39210	174	8	8			3	415	0.01	3	416	0.01	10623	0.0	0.0	10624	0.0	0.0
39211	155	8	8			4	1,233	0.00	4	1,235	0.00	10624	0.0	0.0	10625	0.0	0.0
39220	219	18	18			117	2,706	0.04	117	2,706	0.04	5616	0.0	0.0	10680	0.0	0.0
39221	232	18	18			118	2,709	0.04	118	2,709	0.04	10680	0.0	0.0	5644	0.0	0.0
39222	140	15	21	20	Existing	1,833	1,103	1.66	2,577	2,707	0.95	5837	5.8	0.0	10681	0.0	0.0
39223	308	15	21	20	Existing	1,832	1,109	1.65	2,578	2,720	0.95	10681	0.0	0.0	7355	6.0	0.0
39224	144	8	8			1	367	0.00	1	368	0.00	10682	0.0	0.0	10681	0.0	0.0

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39225	203	8	8			1	295	0.00	1	295	0.00	5747	0.0	0.0	10683	0.0	0.0
39226	317	8	8			30	294	0.10	30	294	0.10	10683	0.0	0.0	5746	0.0	0.0
39227	423	8	8			1	574	0.00	1	576	0.00	10684	0.0	0.0	10683	0.0	0.0
39231	79	8	8			1	374	0.00	1	374	0.00	10685	0.0	0.0	10686	0.0	0.0
39232	114	8	8			3	368	0.01	3	369	0.01	10686	0.0	0.0	10687	0.0	0.0
39233	53	8	8			3	408	0.01	3	409	0.01	10687	0.0	0.0	5806	0.0	0.0
39262	139	8	8			2	299	0.01	2	299	0.01	5868	0.0	0.0	10720	0.0	0.0
39263	111	8	8			4	296	0.01	3	297	0.01	10720	0.0	0.0	5869	0.0	0.0
39280	138	8	8			2	358	0.01	2	358	0.01	10741	0.0	0.0	10686	0.0	0.0
39281	103	8	8			1	328	0.00	1	328	0.00	10740	0.0	0.0	10741	0.0	0.0
39282	89	8	8			1	315	0.00	1	315	0.00	10742	0.0	0.0	10741	0.0	0.0
39300	37	8	8			1	332	0.00	1	333	0.00	10780	0.0	0.0	3306	0.0	0.0
39303	18	6	6			1	1,449	0.00	1	1,449	0.00	1793	0.0	0.0	1792	0.0	0.0
39306	204	6	6			1	251	0.00	1	251	0.00	10785	0.0	0.0	1820	0.0	0.0
39310	181	8	8			1	291	0.00	1	292	0.00	10787	0.0	0.0	1832	0.0	0.0
39312	86	8	8			1	319	0.00	1	319	0.00	10788	0.0	0.0	10787	0.0	0.0
39317	155	8	8			1	441	0.00	1	441	0.00	10793	0.0	0.0	10794	0.0	0.0
39318	146	8	8			1	278	0.00	1	278	0.00	10794	0.0	0.0	10795	0.0	0.0
39319	61	8	8			36	282	0.13	36	283	0.13	10795	0.0	0.0	10796	0.0	0.0
39320	77	8	8			37	275	0.13	37	276	0.13	10796	0.0	0.0	1692	0.0	0.0
39321	15	8	8			194	278	0.70	258	279	0.93	7128	2.2	0.0	10798	2.3	0.0
39322	149	8	8			87	319	0.27	87	319	0.27	3431	0.0	0.0	3509	0.0	0.0
39323	214	8	8			87	304	0.29	87	305	0.28	3509	0.0	0.0	3418	0.0	0.0
39324	11	8	8			3	420	0.01	3	421	0.01	3505	0.0	0.0	3457	0.0	0.0
39328	64	12	18	5	Existing	1,505	1,077	1.40	2,144	3,176	0.68	10800	5.9	0.0	1824	7.1	0.0
39330	33	12	18	5	Existing	1,503	1,037	1.45	2,143	3,056	0.70	10799	5.1	0.0	10801	6.2	0.0
39331	99	12	18	5	Existing	1,504	826	1.82	2,143	2,435	0.88	10801	6.2	0.0	10802	5.4	0.0
39332	25	12	18	5	Existing	1,506	1,162	1.30	2,144	3,426	0.63	10802	5.4	0.0	10800	5.9	0.0
39340	73	8	8			1	572	0.00	1	573	0.00	10820	0.0	0.0	1686	0.0	0.0
39360	337	6	6			28	253	0.11	28	253	0.11	1709	0.0	0.0	10840	1.8	0.0
39361	337	6	6			30	49	0.61	29	49	0.60	10840	1.8	0.0	1708	1.9	0.0
39362	40	6	6			1	162	0.00	1	162	0.00	10841	0.0	0.0	1592	0.0	0.0
39363	56	6	6			17	150	0.12	16	150	0.11	7218	0.0	0.0	11102	0.0	0.0
39364	51	6	6			1	181	0.00	1	181	0.00	10842	0.0	0.0	10780	0.0	0.0
39365	100	6	6			1	144	0.00	1	144	0.00	10843	0.0	0.0	10842	0.0	0.0
39380	80	10	10			1	565	0.00	1	565	0.00	10860	0.0	0.0	3495	0.0	0.0
39381	35	6	6			1	155	0.00	1	155	0.00	10861	0.0	0.0	7448	0.0	0.0
39400	14	8	8			98	604	0.16	98	605	0.16	6115	0.0	0.0	10883	0.0	0.0
39401	234	8	8			1	683	0.00	1	684	0.00	10881	0.0	0.0	6118	0.0	0.0
39420	9	12	12			853	750	1.14	715	750	0.95	1762	6.5	0.0	10900	6.5	0.0
39421	245	15	15			1,696	1,621	1.05	1,430	1,621	0.88	10900	6.5	0.0	3413	6.7	0.0
39422	9	12	12			853	750	1.14	715	750	0.95	1762	6.5	0.0	10900	6.5	0.0
39423	50	12	12			435	881	0.49	210	881	0.24	1763	6.5	0.0	1762	6.5	0.0
39426	255	8	8			1	220	0.01	1	220	0.01	1414	0.0	0.0	1438	0.0	0.0
39427	255	8	8			42	416	0.10	42	417	0.10	1438	0.0	0.0	1377	0.0	0.0
39440	289	8	8			0	904	0.00	0	906	0.00	10921	0.0	0.0	10920	0.0	0.0
39441	385	8	8			1	1,139	0.00	1	1,140	0.00	10922	0.0	0.0	10923	0.0	0.0
39443	173	8	8			1	562	0.00	1	563	0.00	10925	0.0	0.0	10926	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39444	307	8	8			1	851	0.00	1	852	0.00	10926	0.0	0.0	10927	0.0	0.0
39445	100	8	8			1	447	0.00	1	448	0.00	10927	0.0	0.0	10928	0.0	0.0
39446	113	8	8			1	631	0.00	1	631	0.00	10928	0.0	0.0	10930	0.0	0.0
39447	231	8	8			1	702	0.00	1	703	0.00	10930	0.0	0.0	10929	0.0	0.0
39460	180	8	8			1	468	0.00	1	469	0.00	10940	0.0	0.0	3295	0.0	0.0
39461	330	8	8			1	321	0.00	1	322	0.00	10941	0.0	0.0	7678	0.0	0.0
39480	267	8	8			1	1,103	0.00	1	1,104	0.00	10924	0.0	0.0	10960	0.0	0.0
39481	255	8	8			1	831	0.00	1	832	0.00	10960	0.0	0.0	10925	0.0	0.0
39488	223	8	8			36	567	0.06	36	568	0.06	4297	0.0	0.0	10968	0.0	0.0
39489	52	8	8			36	565	0.06	36	565	0.06	10968	0.0	0.0	4299	0.0	0.0
39500	125	8	8			0	303	0.00	0	325	0.00	10984	0.0	0.0	10985	0.0	0.0
39501	261	8	8			1	316	0.00	1	339	0.00	10985	0.0	0.0	10987	0.0	0.0
39502	231	8	8			99	322	0.31	99	345	0.29	10987	0.0	0.0	10988	0.0	0.0
39503	123	8	8			0	331	0.00	0	355	0.00	10983	0.0	0.0	10981	0.0	0.0
39504	488	8	8			1	578	0.00	1	620	0.00	10981	0.0	0.0	10986	0.0	0.0
39505	193	8	8			1	495	0.00	1	531	0.00	10986	0.0	0.0	10985	0.0	0.0
39506	102	8	8			0	774	0.00	0	830	0.00	10982	0.0	0.0	10981	0.0	0.0
39507	31	8	8			0	470	0.00	0	504	0.00	10980	0.0	0.0	6626	0.0	0.0
39508	75	8	8			81	551	0.15	81	591	0.14	6624	0.0	0.0	10987	0.0	0.0
39511	365	8	8			99	641	0.15	99	688	0.14	10988	0.0	0.0	6688	0.0	0.0
39512	161	8	8			0	1,262	0.00	0	1,264	0.00	10990	0.0	0.0	10989	0.0	0.0
39513	97	8	8			0	1,356	0.00	0	1,358	0.00	10989	0.0	0.0	7914	0.0	0.0
39514	218	8	8			1	1,719	0.00	1	1,721	0.00	10998	0.0	0.0	10994	0.0	0.0
39515	105	8	8			0	1,064	0.00	0	1,065	0.00	10994	0.0	0.0	10993	0.0	0.0
39516	193	8	8			0	742	0.00	0	743	0.00	10993	0.0	0.0	10992	0.0	0.0
39517	103	8	8			0	1,302	0.00	0	1,303	0.00	10992	0.0	0.0	10991	0.0	0.0
39518	155	8	8			0	852	0.00	0	853	0.00	10994	0.0	0.0	10995	0.0	0.0
39519	362	8	8			0	685	0.00	0	686	0.00	10995	0.0	0.0	10996	0.0	0.0
39520	156	8	8			0	1,019	0.00	0	1,020	0.00	10999	0.0	0.0	10996	0.0	0.0
39521	136	8	8			1	1,113	0.00	1	1,114	0.00	10996	0.0	0.0	10997	0.0	0.0
39522	137	8	12	37	ura	1	1,052	0.00	1	1,053	0.00	10997	0.0	0.0	9685	0.0	0.0
39523	139	8	8			0	575	0.00	0	576	0.00	11001	0.0	0.0	11000	0.0	0.0
39524	366	8	8			0	719	0.00	0	720	0.00	11000	0.0	0.0	10997	0.0	0.0
39540	177	18	18			2,172	7,058	0.31	2,070	7,058	0.29	6088	0.0	0.0	11021	0.0	0.0
39541	105	18	18			1,537	7,049	0.22	1,541	7,049	0.22	11021	0.0	0.0	11020	0.0	0.0
39542	45	18	18			1,429	3,524	0.41	1,429	3,524	0.41	11020	0.0	0.0	6089	0.0	0.0
39543	181	6	6			1	189	0.00	1	189	0.00	11022	0.0	0.0	11023	0.0	0.0
39544	144	6	6			1	205	0.00	1	205	0.00	11023	0.0	0.0	11024	0.0	0.0
39560	15	8	8			189	313	0.60	189	314	0.60	11040	0.0	0.0	2241	0.0	0.0
39581	210	8	8			0	497	0.00	0	497	0.00	11080	0.0	0.0	10928	0.0	0.0
39620	235	8	8			9	641	0.01	9	642	0.01	11140	0.0	0.0	11141	0.0	0.0
39621	390	8	8			1	130	0.01	1	130	0.01	7425	0.0	0.0	11141	0.0	0.0
39622	390	8	8			10	360	0.03	10	360	0.03	11141	0.0	0.0	6157	0.0	0.0
39640	96	8	8			0	1,025	0.00	0	1,026	0.00	11160	0.0	0.0	2508	0.0	0.0
39660	30	8	8			1	370	0.00	1	371	0.00	11181	0.0	0.0	5963	0.0	0.0
39680	228	8	8			68	753	0.09	68	754	0.09	7323	0.0	0.0	11202	0.0	0.0
39681	217	8	8			120	728	0.16	120	729	0.16	11202	0.0	0.0	4889	0.0	0.0
39720	298	8	8			0	122	0.00	0	131	0.00	6920	0.0	0.0	7645	0.0	0.0

Appendix G.1 - Existing Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Down-stream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39721	390	8	8			29	334	0.09	29	358	0.08	6922	0.0	0.0	11260	0.0	0.0
39722	74	8	8			29	333	0.09	29	357	0.08	11260	0.0	0.0	6905	0.0	0.0
39723	400	8	8			10	240	0.04	10	240	0.04	11261	8.2	8.2	5845	0.0	0.0
39724	35	8	8			1	460	0.00	1	460	0.00	11262	0.0	0.0	5977	0.0	0.0
39725	159	15	15			1,040	2,210	0.47	1,056	2,368	0.45	6820	0.0	0.0	11263	0.0	0.0
39727	11	24	24			4,527	81,911	0.06	4,535	81,911	0.06	3299	0.0	0.0	3377	0.0	0.0
39728	454	10	10			4	447	0.01	4	447	0.01	10625	0.0	0.0	11266	0.0	0.0
39729	454	10	10			6	343	0.02	6	342	0.02	11266	0.0	0.0	10627	0.0	0.0
39730	361	8	8			0	503	0.00	0	504	0.00	11265	0.0	0.0	11266	0.0	0.0
39733	193	8	8			0	456	0.00	0	456	0.00	11267	0.0	0.0	11265	0.0	0.0
39734	72	8	8			0	588	0.00	0	588	0.00	11268	0.0	0.0	11267	0.0	0.0
39735	323	8	8			0	539	0.00	0	540	0.00	11269	0.0	0.0	11160	0.0	0.0
39736	85	8	8			3	603	0.01	3	647	0.01	11270	0.0	0.0	6342	0.0	0.0
39737	157	8	8			0	778	0.00	0	835	0.00	11271	0.0	0.0	11270	0.0	0.0
39738	419	8	8			3	382	0.01	3	410	0.01	11272	0.0	0.0	8019	0.0	0.0
39739	127	8	8			3	298	0.01	3	319	0.01	11273	0.0	0.0	11272	0.0	0.0
39740	201	8	8			3	617	0.00	3	662	0.00	11274	0.0	0.0	11273	0.0	0.0
39741	339	8	8			1	833	0.00	1	893	0.00	11275	0.0	0.0	11274	0.0	0.0
39742	251	8	8			0	421	0.00	0	451	0.00	11276	0.0	0.0	11273	0.0	0.0
39743	477	8	8			0	393	0.00	0	422	0.00	11277	0.0	0.0	11276	0.0	0.0
39744	83	8	8			1	926	0.00	1	928	0.00	11278	0.0	0.0	2246	0.0	0.0
39866	284	21	21			2,973	6,910	0.43	2,974	7,403	0.40	6008	0.0	0.0	11414	0.0	0.0
39867	156	24	24			3,045	5,542	0.55	2,974	5,542	0.54	11414	0.0	0.0	11413	0.0	0.0
39868	143	24	24			3,891	5,551	0.70	3,897	5,947	0.66	11413	0.0	0.0	5974	2.9	0.0
39869	166	15	15			993	2,215	0.45	998	2,374	0.42	11263	0.0	0.0	11413	0.0	0.0
39873	395	8	8			63	406	0.15	63	406	0.15	5973	0.0	0.0	5976	0.0	0.0
39874	6	8	8			0	188	0.00	0	189	0.00	11675	0.0	0.0	5976	0.0	0.0
39875	9	18	21	25	2036	2,937	4,718	0.62	2,938	5,056	0.58	5957	0.0	0.0	11417	0.0	0.0
39876	118	18	21	25	2036	2,937	4,832	0.61	2,938	5,177	0.57	11417	0.0	0.0	6008	0.0	0.0
39912	77	8	8			0	1,175	0.00	0	1,177	0.00	11472	0.0	0.0	11414	0.0	0.0
39913	43	8	8			0	452	0.00	0	453	0.00	11473	0.0	0.0	11472	0.0	0.0
33616_1	262	8	8			503	1,040	0.48	503	1,041	0.48	7320	0.0	0.0	4831	0.0	0.0
35834_1	287	8	8			240	456	0.53	240	457	0.52	9229	0.0	0.0	2866	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30001	414	15	15			957	1,956	0.49	967	2,097	0.46	6811	0.0	0.0	6904	0.0	0.0
30002	305	8	8			31	310	0.10	31	333	0.09	7642	0.0	0.0	7380	0.0	0.0
30003	311	8	8			132	312	0.42	132	335	0.39	6816	0.0	0.0	6914	0.0	0.0
30004	287	8	8			2	442	0.00	2	474	0.00	6814	0.0	0.0	6933_WETWELL	0.0	0.0
30005	530	18	24	26	Existing	3,939	3,541	1.11	6,218	8,171	0.76	6833	1.3	0.0	6885	3.3	0.0
30006	468	8	8			44	307	0.14	44	330	0.13	6837	0.0	0.0	6009	0.0	0.0
30011	173	8	12	24	2036	90	206	0.44	76	649	0.12	6778	0.3	0.0	7635	1.8	0.0
30012	173	15	15			937	1,587	0.59	945	1,700	0.56	7376	0.0	0.0	6811	0.0	0.0
30014	639	18	24	25	2036	3,691	3,394	1.09	4,798	7,833	0.61	7121	5.7	0.0	6831	6.9	0.0
30015	265	8	8			28	382	0.07	28	410	0.07	6617	0.0	0.0	6682	0.0	0.0
30016	156	8	8			99	272	0.37	99	291	0.34	6641	0.0	0.0	6692	0.0	0.0
30017	297	15	18	23	ura	1,056	1,529	0.69	1,054	2,665	0.40	6653	4.4	0.0	6717	2.9	0.0
30018	264	10	10			660	1,183	0.56	660	1,268	0.52	6585	0.0	0.0	6647	0.0	0.0
30019	402	8	8			14	1,069	0.01	14	1,147	0.01	6579	0.0	0.0	6591	0.0	0.0
30020	288	8	8			12	363	0.03	12	390	0.03	6538	0.0	0.0	6597	0.0	0.0
30021	250	8	8			9	333	0.03	9	357	0.03	6518	0.0	0.0	6595	0.0	0.0
30022	105	8	8			17	827	0.02	17	888	0.02	6578	0.0	0.0	6531	0.0	0.0
30023	248	8	8			17	267	0.07	17	286	0.06	6531	0.0	0.0	6591	0.0	0.0
30024	141	8	8			31	638	0.05	31	685	0.04	6535	0.0	0.0	6596	0.0	0.0
30025	285	8	8			8	324	0.03	8	347	0.02	7628	0.0	0.0	6603	0.0	0.0
30026	501	8	12	22	ura	256	456	0.56	256	1,438	0.18	6530	0.0	0.0	7119	0.0	0.0
30027	396	8	8			65	297	0.22	65	319	0.20	6540	0.0	0.0	6601	0.0	0.0
30028	245	8	8			13	333	0.04	13	358	0.03	6522	0.0	0.0	6598	0.0	0.0
30029	225	8	8			6	443	0.01	6	476	0.01	6523	0.0	0.0	6600	0.0	0.0
30030	275	8	8			27	420	0.06	27	451	0.06	6574	0.0	0.0	6545	0.0	0.0
30031	48	8	8			100	424	0.24	100	455	0.22	7370	0.0	0.0	7372	0.0	0.0
30032	265	8	8			28	1,815	0.02	28	1,817	0.02	6404	0.0	0.0	6509	0.0	0.0
30033	394	8	8			331	1,259	0.26	331	1,260	0.26	6403	0.0	0.0	6504	0.0	0.0
30034	306	8	8			29	1,483	0.02	29	1,592	0.02	6389	0.0	0.0	7625	0.0	0.0
30035	285	8	8			53	297	0.18	53	319	0.17	6313	0.0	0.0	6651	0.0	0.0
30036	327	8	8			217	299	0.73	217	320	0.68	6305	0.0	0.0	6649	0.0	0.0
30037	226	6	6			12	257	0.05	12	275	0.04	6266	0.0	0.0	7634	0.0	0.0
30038	229	8	8			13	381	0.03	13	408	0.03	6267	0.0	0.0	6648	0.0	0.0
30039	550	18	21	41	2036	3,226	2,501	1.29	3,696	4,042	0.91	6204	3.5	0.0	6709	0.0	0.0
30040	609	8	8			67	335	0.20	58	360	0.16	6209	4.6	0.0	6710	1.7	0.0
30041	140	8	8			72	1,070	0.07	72	1,072	0.07	6355	0.0	0.0	6193	0.0	0.0
30042	341	8	8			24	658	0.04	24	660	0.04	6161	0.0	0.0	6220	0.0	0.0
30043	143	8	8			1	758	0.00	1	759	0.00	7710	0.0	0.0	6235	0.0	0.0
30044	449	8	8			1	728	0.00	1	730	0.00	6159	0.0	0.0	6222	0.0	0.0
30045	49	8	8			13	378	0.03	13	378	0.03	6157	0.0	0.0	6237	0.0	0.0
30046	40	8	8			1	453	0.00	1	454	0.00	6179	0.0	0.0	6247	0.0	0.0
30047	255	8	8			68	409	0.17	68	410	0.17	6248	0.0	0.0	6169	0.0	0.0
30048	381	8	8			1	272	0.00	1	291	0.00	6434	0.0	0.0	7615	0.0	0.0
30049	257	8	8			27	1,095	0.02	27	1,097	0.02	6458	0.0	0.0	6124	0.0	0.0
30050	255	8	8			7	1,042	0.01	7	1,043	0.01	6019	0.0	0.0	6457	0.0	0.0
30051	138	8	8			7	450	0.02	7	451	0.02	6127	0.0	0.0	6357	0.0	0.0
30052	136	18	18			3,053	3,022	1.01	3,513	3,022	1.16	6112	2.8	0.0	6193	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30053	57	6	6			20	213	0.09	0	213	0.00	6154	2.5	0.0	6111	2.1	0.0
30054	227	12	15	11	ura	1,957	3,073	0.64	2,465	5,572	0.44	6432	0.0	0.0	6135	0.0	0.0
30055	355	8	8			1	1,689	0.00	1	1,691	0.00	6477	0.0	0.0	6138	7.6	0.0
30056	205	8	8			0	1,267	0.00	0	1,269	0.00	6475	0.0	0.0	6047	4.2	0.0
30057	230	8	8			476	883	0.54	476	884	0.54	6474	0.0	0.0	6046	3.0	0.0
30058	330	8	8			71	754	0.09	71	756	0.09	6827	0.0	0.0	5973	0.0	0.0
30059	530	18	24	26	Existing	3,946	3,410	1.16	6,232	8,160	0.76	5974	0.0	0.0	6833	1.3	0.0
30061	305	8	8			26	449	0.06	26	450	0.06	7202	0.0	0.0	5958	0.0	0.0
30062	208	8	8			47	876	0.05	47	876	0.05	7620	0.0	0.0	5962	0.0	0.0
30063	451	8	8			51	539	0.09	51	540	0.09	6201	0.0	0.0	5964	0.0	0.0
30064	264	15	15			1,255	2,222	0.56	1,255	2,222	0.56	6001	0.0	0.0	7356	0.0	0.0
30066	240	8	8			465	399	1.16	124	399	0.31	5853	0.3	0.0	5931	1.8	0.0
30067	516	8	8			229	405	0.57	226	406	0.56	5844	0.0	0.0	5929	3.8	0.0
30068	520	8	8			1	408	0.00	1	408	0.00	7601	0.0	0.0	5958	0.0	0.0
30069	430	8	8			1	590	0.00	1	590	0.00	7099	0.0	0.0	5994	0.0	0.0
30070	340	10	10			298	667	0.45	298	667	0.45	5751	0.0	0.0	6000	0.0	0.0
30071	311	8	8			69	405	0.17	69	406	0.17	6169	0.0	0.0	7351	0.0	0.0
30072	435	8	8			160	612	0.26	160	613	0.26	6168	0.0	0.0	5748	0.0	0.0
30073	482	8	8			706	832	0.85	706	833	0.85	5777	0.0	0.0	5858	0.6	0.0
30075	20	8	8			13	910	0.01	1	912	0.00	5745	0.0	0.0	5867	8.6	0.0
30076	436	8	8			283	450	0.63	283	451	0.63	6170	0.0	0.0	5801	0.0	0.0
30077	200	8	8			38	756	0.05	38	757	0.05	5731	0.0	0.0	5824	1.5	0.0
30078	221	8	8			243	297	0.82	243	297	0.82	5711	0.0	0.0	5791	0.0	0.0
30079	155	8	8			31	297	0.11	31	298	0.10	5792	0.0	0.0	5689	0.0	0.0
30080	275	8	8			93	328	0.28	93	328	0.28	5787	0.0	0.0	5691	0.0	0.0
30081	299	12	18	19	Existing	858	708	1.21	1,494	2,087	0.72	5710	5.2	0.0	5741	0.0	0.0
30082	348	8	8			44	326	0.14	44	327	0.14	5790	0.0	0.0	5687	0.0	0.0
30083	365	8	8			2	406	0.01	2	406	0.01	7346	0.0	0.0	5863	0.0	0.0
30084	481	8	8			58	295	0.20	1	296	0.00	7096	0.0	0.0	5709	3.6	0.0
30085	406	12	18	19	Existing	1,090	731	1.49	1,740	2,156	0.81	5642	4.7	0.0	5839	0.0	0.0
30086	305	12	18	19	Existing	1,088	736	1.48	1,738	2,169	0.80	5741	0.0	0.0	7598	6.2	0.0
30087	610	54	54			18,283	39,472	0.46	19,207	39,472	0.49	5602	0.0	0.0	5836	0.0	0.0
30088	145	8	8			85	386	0.22	85	387	0.22	5645	0.0	0.0	5869	6.7	0.0
30089	192	6	6			1	172	0.00	1	172	0.00	5598	0.0	0.0	7422	0.0	0.0
30090	143	8	8			1	227	0.00	1	227	0.00	5723	0.0	0.0	5610	0.0	0.0
30091	132	8	8			1	624	0.00	1	626	0.00	5722	0.0	0.0	5609	0.0	0.0
30092	405	8	8			4	173	0.02	2	174	0.01	5639	0.0	0.0	5698	3.0	0.0
30093	289	10	10			183	389	0.47	183	388	0.47	5701	0.0	0.0	8942	0.0	0.0
30094	404	18	18			2,144	2,156	0.99	2,144	2,156	0.99	5558	0.0	0.0	5647	0.0	0.0
30095	590	54	54			15,790	35,417	0.45	16,715	35,417	0.47	5547	0.0	0.0	5604	0.0	0.0
30096	504	27	27			4,197	7,608	0.55	6,178	7,608	0.81	7596	0.0	0.0	2021	0.0	0.0
30097	415	8	8			67	361	0.18	67	362	0.18	5675	0.0	0.0	5451	0.0	0.0
30098	288	8	8			0	531	0.00	0	532	0.00	5373	0.0	0.0	6090	0.0	0.0
30099	449	8	8			1	557	0.00	1	558	0.00	5424	0.0	0.0	6045	0.0	0.0
30100	151	8	8			1	879	0.00	1	881	0.00	5365	0.0	0.0	6085	0.0	0.0
30101	465	8	8			20	659	0.03	20	660	0.03	5349	0.0	0.0	6091	0.0	0.0
30102	225	8	8			18	460	0.04	18	461	0.04	5363	0.0	0.0	6097	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30103	277	8	8			5	406	0.01	5	406	0.01	5356	0.0	0.0	6043	0.0	0.0
30104	425	8	8			343	249	1.38	343	249	1.38	7194	4.6	4.6	5260	0.0	0.0
30105	56	8	8			40	478	0.08	40	479	0.08	7154	0.0	0.0	5256	0.0	0.0
30106	403	8	8			1	876	0.00	1	878	0.00	6174	0.0	0.0	5270	0.9	0.0
30107	328	8	8			36	444	0.08	35	444	0.08	6176	4.0	0.0	5266	0.8	0.0
30108	310	8	15	19	Existing	537	582	0.92	1,110	3,110	0.36	5262	0.0	0.0	5677	1.0	0.0
30109	185	8	8			1	993	0.00	1	994	0.00	5678	0.0	0.0	5261	3.5	0.0
30110	508	8	8			1	658	0.00	1	659	0.00	5679	0.0	0.0	7087	0.0	0.0
30111	270	8	8			40	832	0.05	40	833	0.05	5294	0.0	0.0	5707	0.0	0.0
30112	75	8	8			16	356	0.04	16	356	0.04	5418	0.0	0.0	7193	0.0	0.0
30113	370	8	8			205	528	0.39	205	529	0.39	5175	0.0	0.0	5502	0.0	0.0
30114	166	8	8			326	608	0.54	326	609	0.54	5219	0.0	0.0	5519	0.0	0.0
30115	175	8	8			0	1,983	0.00	0	1,985	0.00	5243	0.0	0.0	5528	0.0	0.0
30116	312	8	8			70	836	0.08	70	838	0.08	5197	0.0	0.0	5458	0.0	0.0
30117	182	8	8			401	774	0.52	401	775	0.52	5073	0.0	0.0	5145	1.5	0.0
30118	190	8	8			20	435	0.05	20	435	0.05	5090	0.0	0.0	5144	0.0	0.0
30119	82	8	8			34	485	0.07	34	486	0.07	5050	0.0	0.0	5228	0.0	0.0
30120	415	8	8			13	1,240	0.01	13	1,242	0.01	5049	0.0	0.0	5228	0.0	0.0
30121	58	8	8			42	945	0.04	42	947	0.04	7576	0.0	0.0	5142	0.0	0.0
30122	110	18	18			1,916	5,820	0.33	2,429	5,820	0.42	4951	0.0	0.0	6432	0.0	0.0
30123	200	6	6			1	408	0.00	1	408	0.00	4926	0.0	0.0	5353	0.0	0.0
30124	151	8	8			1	253	0.01	1	254	0.01	4989	0.0	0.0	7336	0.0	0.0
30125	500	12	12			1,520	2,236	0.68	1,858	2,236	0.83	4999	0.0	0.0	7572	0.0	0.0
30126	41	8	8			195	1,142	0.17	195	1,143	0.17	5006	0.0	0.0	4985	0.0	0.0
30127	118	8	8			9	392	0.02	9	392	0.02	4932	0.0	0.0	5005	0.0	0.0
30128	312	8	8			1	675	0.00	1	676	0.00	4953	0.0	0.0	5352	0.0	0.0
30129	200	8	8			8	379	0.02	8	380	0.02	4916	0.0	0.0	7730	0.0	0.0
30130	545	8	8			36	943	0.04	36	944	0.04	4888	0.0	0.0	4935	0.0	0.0
30131	188	8	8			172	531	0.32	172	532	0.32	4892	0.0	0.0	4935	0.0	0.0
30132	155	8	8			1	1,720	0.00	0	1,723	0.00	4885	0.0	0.0	5029	0.0	0.0
30133	491	12	12			1,205	3,994	0.30	1,579	3,994	0.40	7569	0.0	0.0	5001	0.0	0.0
30134	476	10	15	28	2036	913	1,375	0.66	1,317	4,053	0.32	4840	0.0	0.0	4874	0.0	0.0
30135	206	8	8			34	282	0.12	34	282	0.12	4867	0.0	0.0	7319	0.0	0.0
30136	360	8	8			19	642	0.03	19	643	0.03	4865	0.0	0.0	7316	0.0	0.0
30137	171	8	8			0	1,082	0.00	0	1,083	0.00	4835	0.0	0.0	4718	0.0	0.0
30138	260	8	8			87	1,771	0.05	87	1,773	0.05	4764	0.0	0.0	4843	0.0	0.0
30140	303	8	8			937	1,025	0.91	937	1,026	0.91	4741	0.0	0.0	4833	0.0	0.0
30141	308	8	8			0	368	0.00	0	369	0.00	7321	0.0	0.0	4696	0.0	0.0
30142	364	8	8			21	1,992	0.01	21	1,995	0.01	4687	0.0	0.0	7151	0.0	0.0
30143	310	8	8			0	1,190	0.00	0	1,191	0.00	4869	0.0	0.0	4698	0.0	0.0
30144	341	8	8			8	1,528	0.01	8	1,530	0.01	7075	0.0	0.0	4685	0.0	0.0
30145	335	8	8			169	1,397	0.12	169	1,399	0.12	4691	0.0	0.0	4859	0.0	0.0
30146	408	8	8			18	1,096	0.02	18	1,097	0.02	7315	0.0	0.0	4620	0.0	0.0
30147	510	8	8			19	1,424	0.01	19	1,426	0.01	4629	0.0	0.0	4723	0.0	0.0
30148	468	8	8			19	1,455	0.01	19	1,457	0.01	7563	0.0	0.0	4629	0.0	0.0
30149	510	8	8			7	1,225	0.01	7	1,226	0.01	4694	0.0	0.0	7312	0.0	0.0
30150	298	8	8			398	1,081	0.37	398	1,083	0.37	4638	0.0	0.0	4772	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30151	271	8	8			88	742	0.12	88	743	0.12	4670	0.0	0.0	4754	0.0	0.0
30152	321	8	8			14	1,013	0.01	14	1,015	0.01	4666	0.0	0.0	7071	0.0	0.0
30153	210	8	8			42	1,456	0.03	42	1,458	0.03	4637	0.0	0.0	7149	0.0	0.0
30154	315	8	8			56	1,382	0.04	56	1,383	0.04	4567	0.0	0.0	4652	0.0	0.0
30155	164	8	8			5	1,340	0.00	5	1,342	0.00	4580	0.0	0.0	4656	0.0	0.0
30156	446	8	8			275	926	0.30	275	927	0.30	4555	0.0	0.0	4661	0.0	0.0
30157	86	8	8			57	827	0.07	57	828	0.07	4652	0.0	0.0	4571	0.0	0.0
30158	158	8	8			58	1,351	0.04	58	1,352	0.04	4571	0.0	0.0	4653	0.0	0.0
30159	140	8	8			122	330	0.37	122	331	0.37	4828	0.0	0.0	4478	0.0	0.0
30160	391	8	8			12	2,115	0.01	12	2,118	0.01	4527	0.0	0.0	4450	0.0	0.0
30161	85	8	8			24	2,055	0.01	24	2,058	0.01	4525	0.0	0.0	4448	0.0	0.0
30162	101	8	8			17	171	0.10	17	171	0.10	4523	0.0	0.0	7552	0.0	0.0
30163	318	8	8			263	1,054	0.25	263	1,056	0.25	4522	0.0	0.0	4444	0.0	0.0
30164	297	8	12	45	2036	702	647	1.08	889	1,908	0.47	4465	1.9	0.0	4265	3.9	6.2
30165	171	8	8			0	486	0.00	0	487	0.00	4468	0.0	0.0	7299	0.0	0.0
30166	198	8	8			6	792	0.01	6	794	0.01	7062	0.0	0.0	4316	0.0	0.0
30167	93	8	8			6	1,013	0.01	6	1,014	0.01	4467	0.0	0.0	4316	0.0	0.0
30168	188	8	8			35	458	0.08	35	458	0.08	4496	0.0	0.0	4313	0.0	0.0
30169	190	8	8			0	420	0.00	0	420	0.00	4346	0.0	0.0	4494	0.0	0.0
30170	417	8	8			0	757	0.00	0	758	0.00	4337	0.0	0.0	4241	0.0	0.0
30171	227	8	8			1	890	0.00	1	892	0.00	7545	0.0	0.0	9960	0.0	0.0
30172	226	8	8			13	1,706	0.01	13	1,708	0.01	4898	0.0	0.0	4243	0.0	0.0
30175	24	8	8			49	483	0.10	49	483	0.10	4303	0.0	0.0	4038	0.0	0.0
30176	218	8	8			9	840	0.01	9	840	0.01	4039	0.0	0.0	4350	0.0	0.0
30177	117	8	8			8	426	0.02	8	426	0.02	4358	0.0	0.0	7535	0.0	0.0
30178	420	8	8			0	826	0.00	0	826	0.00	4376	0.0	0.0	7140	0.0	0.0
30179	122	8	8			1	1,410	0.00	1	1,413	0.00	4069	0.0	0.0	4379	0.0	0.0
30180	237	8	8			115	578	0.20	115	579	0.20	4059	0.0	0.0	4157	0.0	0.0
30181	170	8	15	29	Existing	376	295	1.28	919	1,578	0.58	4112	0.0	0.0	4162	1.6	0.0
30182	240	8	12	29	Existing	650	1,222	0.53	919	3,603	0.25	7057	0.0	0.0	4112	0.0	0.0
30183	131	8	8			14	588	0.02	14	589	0.02	4056	0.0	0.0	4156	0.0	0.0
30184	384	8	8			35	826	0.04	35	827	0.04	4048	0.0	0.0	4154	0.0	0.0
30185	160	8	8			22	1,445	0.02	22	1,447	0.02	4043	0.0	0.0	4153	0.0	0.0
30186	495	12	12			1,600	2,698	0.59	2,015	2,698	0.75	4116	0.0	0.0	4148	0.0	0.0
30187	176	8	8			14	940	0.01	14	941	0.01	4372	0.0	0.0	4105	0.0	0.0
30188	400	8	8			18	840	0.02	18	841	0.02	4055	0.0	0.0	4155	0.0	0.0
30189	481	8	8			642	947	0.68	642	949	0.68	4377	0.0	0.0	4102	0.0	0.0
30190	186	8	8			538	632	0.85	538	633	0.85	4382	2.9	0.0	4071	2.3	0.0
30191	56	8	8			540	294	1.84	610	294	2.07	4315	3.8	8.2	7053	1.8	0.0
30193	218	8	8			28	947	0.03	28	948	0.03	4242	0.0	0.0	3964	0.0	0.0
30194	333	6	6			1	437	0.00	1	437	0.00	5112	0.0	0.0	4010	0.0	0.0
30195	327	8	8			20	1,180	0.02	20	1,181	0.02	5100	0.0	0.0	3911	0.0	0.0
30196	385	6	6			28	363	0.08	28	363	0.08	5041	0.0	0.0	7534	0.0	0.0
30197	338	6	6			1	451	0.00	1	451	0.00	5115	0.0	0.0	8941	0.0	0.0
30198	463	8	8			0	756	0.00	0	758	0.00	4258	0.0	0.0	3946	0.0	0.0
30199	430	8	8			1	1,141	0.00	1	1,142	0.00	5107	0.0	0.0	3909	0.0	0.0
30200	167	8	8			376	806	0.47	376	806	0.47	3958	0.0	0.0	3821	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30201	35	8	8			47	1,093	0.04	47	1,094	0.04	3959	0.0	0.0	3822	0.0	0.0
30202	278	8	8			1	472	0.00	1	472	0.00	3996	0.0	0.0	3822	0.0	0.0
30203	220	6	6			1	76	0.01	1	76	0.01	3894	0.0	0.0	3917	0.0	0.0
30205	169	8	8			92	811	0.11	92	813	0.11	3816	0.0	0.0	5175	0.0	0.0
30206	208	8	8			0	822	0.00	0	823	0.00	3811	0.0	0.0	7083	0.0	0.0
30207	120	6	6			0	266	0.00	0	266	0.00	3790	0.0	0.0	5171	0.0	0.0
30208	40	8	8			1	1,084	0.00	1	1,085	0.00	3802	0.0	0.0	5172	0.0	0.0
30209	290	8	8			292	871	0.34	293	872	0.34	3877	0.0	0.0	3752	0.0	0.0
30210	355	8	8			1	734	0.00	1	735	0.00	7285	0.0	0.0	3753	0.0	0.0
30211	173	8	8			1	973	0.00	1	974	0.00	3986	0.0	0.0	3702	0.0	0.0
30212	85	8	8			1	297	0.00	1	298	0.00	3702	0.0	0.0	4221	0.0	0.0
30213	237	8	8			79	881	0.09	79	882	0.09	3980	0.0	0.0	3703	0.0	0.0
30214	266	8	8			24	740	0.03	24	740	0.03	7533	0.0	0.0	3661	0.0	0.0
30215	240	8	8			234	1,013	0.23	234	1,015	0.23	3673	0.0	0.0	7283	0.0	0.0
30216	285	8	8			47	542	0.09	47	542	0.09	4222	0.0	0.0	7042	0.0	0.0
30218	417	6	6			1	600	0.00	1	600	0.00	3796	0.0	0.0	3597	0.0	0.0
30219	458	8	8			1	1,318	0.00	1	1,320	0.00	3866	0.0	0.0	3599	0.0	0.0
30220	418	6	6			17	683	0.03	17	683	0.03	3798	0.0	0.0	3598	0.0	0.0
30221	142	6	6			177	434	0.41	177	434	0.41	3867	0.0	0.0	3615	0.0	0.0
30222	141	8	8			106	649	0.16	106	650	0.16	3562	0.0	0.0	5482	0.0	0.0
30223	352	6	6			1	736	0.00	1	736	0.00	3795	0.0	0.0	3596	0.0	0.0
30224	175	8	8			1	1,153	0.00	1	1,156	0.00	3872	0.0	0.0	3606	0.0	0.0
30225	75	8	8			1	1,247	0.00	1	1,249	0.00	3840	0.0	0.0	3606	0.0	0.0
30226	149	8	8			6	1,604	0.00	6	1,606	0.00	3607	0.0	0.0	3841	0.0	0.0
30227	78	6	6			1	252	0.00	1	252	0.00	3647	0.0	0.0	3841	0.0	0.0
30228	303	8	8			45	386	0.12	45	386	0.12	3560	0.0	0.0	3472	0.0	0.0
30229	1056	54	54			15,417	36,450	0.42	16,343	36,450	0.45	7747	0.0	0.0	8539	0.0	0.0
30230	214	24	24			3,988	5,833	0.68	5,976	5,833	1.02	3418	0.0	0.0	5577	0.0	0.0
30233	199	12	12			525	1,189	0.44	525	1,189	0.44	3573	0.0	0.0	3478	0.0	0.0
30234	258	8	8			495	434	1.14	0	435	0.00	3413	6.6	0.0	5567	8.5	0.0
30236	465	24	24			1,076	6,404	0.17	1,077	6,404	0.17	3638	0.0	0.0	3405	0.0	0.0
30237	82	54	54			14,101	35,143	0.40	15,032	35,143	0.43	3377	0.0	0.0	3403	0.0	0.0
30239	293	8	8			24	266	0.09	1	267	0.00	3358	0.0	0.0	3504	2.3	0.0
30240	365	8	8			1	301	0.00	1	301	0.00	7030	0.0	0.0	3465	0.0	0.0
30241	366	8	8			70	293	0.24	60	294	0.20	3360	1.9	0.0	7033	0.0	0.0
30242	297	10	15	10	Existing	803	633	1.27	897	1,865	0.48	3310	1.1	0.0	7033	0.0	0.0
30243	300	6	6			17	165	0.11	1	165	0.00	3458	1.7	0.0	3310	1.1	0.0
30245	149	8	8			340	539	0.63	340	540	0.63	3842	0.0	0.0	3259	0.0	0.0
30246	107	6	6			1	1,185	0.00	1	1,185	0.00	3646	0.0	0.0	3259	0.0	0.0
30247	260	8	8			342	336	1.02	342	337	1.01	3260	0.0	0.0	3592	0.0	0.0
30248	335	24	24			678	8,135	0.08	678	8,135	0.08	3242	0.0	0.0	3639	0.0	0.0
30249	228	8	8			10	342	0.03	10	343	0.03	3261	0.0	0.0	3629	0.0	0.0
30250	250	8	8			1	607	0.00	1	608	0.00	7137	0.0	0.0	3257	0.0	0.0
30251	325	24	24			559	6,688	0.08	560	6,688	0.08	7282	0.0	0.0	3258	0.0	0.0
30252	360	8	8			14	343	0.04	14	344	0.04	7506	0.0	0.0	7038	0.0	0.0
30253	148	54	54			9,253	34,794	0.27	10,194	34,794	0.29	3231	0.0	0.0	3377	0.0	0.0
30255	351	8	8			42	340	0.12	42	340	0.12	3253	0.0	0.0	3370	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30256	689	54	54			9,247	35,267	0.26	10,188	35,267	0.29	3747	0.0	0.0	3226	0.0	0.0
30257	118	15	15			462	1,849	0.25	462	1,849	0.25	3265	0.0	0.0	3298	0.0	0.0
30259	200	8	8			1	299	0.00	1	300	0.00	3149	0.0	0.0	3276	0.0	0.0
30260	300	8	8			3	343	0.01	3	344	0.01	3104	0.0	0.0	3374	0.0	0.0
30261	301	8	8			90	602	0.15	90	603	0.15	3087	0.0	0.0	7268	0.0	0.0
30262	287	6	6			102	219	0.47	102	219	0.47	3142	0.0	0.0	3367	0.0	0.0
30263	428	6	6			1	197	0.01	1	197	0.01	7500	0.0	0.0	3338	0.0	0.0
30265	375	10	10			699	694	1.01	722	694	1.04	3006	0.0	0.0	3117	8.5	8.1
30266	69	8	8			21	1,061	0.02	21	1,063	0.02	3689	0.0	0.0	2921	0.0	0.0
30267	377	8	8			93	372	0.25	93	372	0.25	7280	0.0	0.0	2923	0.0	0.0
30268	86	8	8			13	1,081	0.01	13	1,083	0.01	3736	0.0	0.0	2975	0.0	0.0
30270	441	8	8			7	372	0.02	7	372	0.02	3777	0.0	0.0	2880	0.0	0.0
30271	372	21	21			3,860	7,548	0.51	4,814	7,548	0.64	2926	0.0	0.0	2866	0.0	0.0
30272	264	8	8			33	375	0.09	33	375	0.09	2874	0.0	0.0	3165	0.0	0.0
30274	357	8	8			299	1,113	0.27	299	1,114	0.27	2932	0.0	0.0	2882	0.0	0.0
30276	378	54	54			9,247	35,456	0.26	10,187	35,456	0.29	2863	0.0	0.0	3746	0.0	0.0
30278	216	8	8			13	478	0.03	13	478	0.03	2975	0.0	0.0	9229	0.0	0.0
30280	801	42	42			4,656	28,092	0.17	4,656	28,092	0.17	2833	0.0	0.0	2850	0.0	0.0
30281	196	8	8			1	342	0.00	1	342	0.00	7021	0.0	0.0	2807	0.0	0.0
30282	322	8	8			267	532	0.50	267	533	0.50	2826	0.0	0.0	2931	0.0	0.0
30283	372	8	8			0	415	0.00	0	416	0.00	4117	0.0	0.0	2788	0.0	0.0
30284	221	8	8			0	553	0.00	0	554	0.00	4092	0.0	0.0	7252	0.0	0.0
30285	221	8	8			0	642	0.00	0	643	0.00	4093	0.0	0.0	2755	0.0	0.0
30286	220	8	8			0	588	0.00	0	588	0.00	4091	0.0	0.0	2754	0.0	0.0
30287	302	8	8			47	467	0.10	47	468	0.10	2756	0.0	0.0	4119	0.0	0.0
30288	210	8	8			0	978	0.00	0	980	0.00	7293	0.0	0.0	2753	0.0	0.0
30289	180	8	8			13	767	0.02	13	769	0.02	4090	0.0	0.0	2716	0.0	0.0
30290	265	8	8			0	471	0.00	0	472	0.00	2715	0.0	0.0	4088	0.0	0.0
30291	228	8	12	37	ura	511	381	1.34	515	1,124	0.46	2721	6.2	0.0	2611	0.0	0.0
30292	78	8	8			0	788	0.00	0	788	0.00	4235	0.0	0.0	2606	0.0	0.0
30293	295	15	18	38	2036	956	1,676	0.57	1,498	2,726	0.55	4226	0.0	0.0	2609	0.0	0.0
30294	393	21	21			3,735	4,149	0.90	4,687	4,149	1.13	2608	0.0	0.0	2912	0.0	0.0
30295	99	10	10			8	742	0.01	8	741	0.01	2960	0.0	0.0	2677	0.0	0.0
30296	345	8	8			133	749	0.18	133	749	0.18	2725	0.0	0.0	2616	0.0	0.0
30297	62	8	8			0	1,185	0.00	0	1,187	0.00	4227	0.0	0.0	2639	0.0	0.0
30298	186	8	8			44	715	0.06	44	715	0.06	7491	0.0	0.0	9001	0.0	0.0
30300	307	10	10			16	3,399	0.00	16	3,395	0.00	2816	0.0	0.0	2586	0.0	0.0
30301	415	8	8			1	1,640	0.00	1	1,642	0.00	2814	0.0	0.0	2540	0.0	0.0
30302	385	8	8			6	2,003	0.00	6	2,006	0.00	2817	0.0	0.0	2539	0.0	0.0
30303	240	8	8			0	1,003	0.00	0	1,005	0.00	2544	0.0	0.0	2654	0.0	0.0
30304	385	10	10			35	2,278	0.02	35	2,276	0.02	2538	0.0	0.0	7488	0.0	0.0
30305	224	8	8			9	1,115	0.01	9	1,117	0.01	2587	0.0	0.0	2650	0.0	0.0
30308	150	8	8			12	1,773	0.01	12	1,775	0.01	2827	0.0	0.0	2590	0.0	0.0
30309	150	8	8			12	418	0.03	12	419	0.03	2579	0.0	0.0	2827	0.0	0.0
30310	110	8	8			12	938	0.01	12	939	0.01	2828	0.0	0.0	2579	0.0	0.0
30312	293	8	12	37	ura	397	995	0.40	397	2,934	0.14	2507	0.0	0.0	2787	0.0	0.0
30313	266	10	10			88	736	0.12	88	735	0.12	2511	0.0	0.0	2781	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30314	257	8	8			28	997	0.03	28	999	0.03	2512	0.0	0.0	2768	0.0	0.0
30315	231	8	8			14	886	0.02	14	887	0.02	2500	0.0	0.0	2697	0.0	0.0
30319	320	8	8			13	266	0.05	13	267	0.05	2469	0.0	0.0	2462	0.0	0.0
30320	517	54	54			44,178	30,565	1.45	47,990	30,565	1.57	2426	3.8	0.0	2472	0.0	0.0
30323	241	8	8			63	344	0.18	22	344	0.06	2413	0.0	0.0	7481	0.0	0.0
30326	627	54	54			26,815	61,053	0.44	30,381	61,053	0.50	2369	0.0	0.0	2436	6.6	0.0
30332	1741	54	54			22,615	20,399	1.11	24,203	20,399	1.19	2314	0.0	0.0	2364	0.0	0.0
30335	440	16	21	21	2036	2,176	1,038	2.10	1,849	2,144	0.86	7606	2.1	0.0	2328	0.0	0.0
30336	428	8	8			216	383	0.56	216	383	0.56	2242	0.0	0.0	2391	0.0	0.0
30337	425	8	8			40	343	0.12	40	344	0.12	2333	0.0	0.0	2240	0.0	0.0
30338	175	8	8			76	335	0.23	76	336	0.23	7173	0.0	0.0	2419	0.0	0.0
30339	418	8	8			13	402	0.03	13	403	0.03	2251	0.0	0.0	7480	0.0	0.0
30340	353	8	8			8	374	0.02	7	375	0.02	2294	0.0	0.0	2413	0.0	0.0
30341	40	8	8			113	728	0.16	113	728	0.16	2336	0.0	0.0	2245	0.0	0.0
30342	130	8	8			65	436	0.15	65	437	0.15	2348	0.0	0.0	2303	0.0	0.0
30343	83	6	6			1	192	0.00	1	192	0.00	2235	0.0	0.0	2420	0.0	0.0
30344	295	8	8			14	290	0.05	14	290	0.05	2344	0.0	0.0	11040	0.0	0.0
30345	428	8	8			301	360	0.84	301	360	0.84	7473	3.3	0.0	2239	3.5	0.0
30348	767	54	54			20,453	34,029	0.60	22,374	34,029	0.66	2144	0.0	0.0	2328	0.0	0.0
30349	293	54	54			20,453	30,506	0.67	22,374	30,506	0.73	5833	0.0	0.0	2144	0.0	0.0
30351	497	8	8			301	581	0.52	301	582	0.52	2150	0.0	0.0	7473	3.3	0.0
30352	227	8	8			29	351	0.08	29	351	0.08	2212	0.0	0.0	2164	0.0	0.0
30353	423	8	8			57	342	0.17	57	342	0.17	2190	0.0	0.0	2162	0.0	0.0
30354	278	10	10			34	534	0.06	34	533	0.06	2200	0.0	0.0	2179	0.0	0.0
30355	311	8	8			6	337	0.02	6	338	0.02	2165	0.0	0.0	2221	0.0	0.0
30356	203	8	8			42	290	0.14	42	290	0.14	2193	0.0	0.0	7472	4.7	0.0
30357	260	8	8			1	336	0.00	1	337	0.00	2121	0.0	0.0	7393	0.0	0.0
30358	286	8	8			6	546	0.01	6	547	0.01	2106	0.0	0.0	7481	0.0	0.0
30359	391	12	15	1	ura	983	758	1.30	1,054	1,376	0.77	2289	4.6	0.0	2101	0.0	0.0
30360	360	8	8			12	286	0.04	12	286	0.04	2134	0.0	0.0	7174	0.0	0.0
30361	373	8	8			13	332	0.04	13	333	0.04	2083	0.0	0.0	2116	0.0	0.0
30362	250	8	8			13	343	0.04	13	344	0.04	2192	0.0	0.0	2083	0.0	0.0
30363	272	8	8			34	345	0.10	34	345	0.10	2218	0.0	0.0	2093	0.0	0.0
30367	378	16	16			2,772	3,223	0.86	2,928	3,223	0.91	1998	0.0	0.0	2146	0.0	0.0
30368	301	30	30			4,535	9,714	0.47	6,510	9,714	0.67	1992	0.0	0.0	2182	0.0	0.0
30374	310	8	8			1	678	0.00	1	679	0.00	1869	0.0	0.0	5589	0.0	0.0
30375	321	8	8			76	382	0.20	76	383	0.20	1908	0.0	0.0	5590	0.0	0.0
30376	416	8	8			153	424	0.36	152	424	0.36	2024	2.7	0.0	1872	1.0	0.0
30377	175	10	10			467	828	0.56	460	828	0.56	1968	3.8	0.0	1915	2.0	0.0
30378	468	12	12			613	698	0.88	670	698	0.96	1948	1.3	0.0	7003	2.7	0.0
30379	450	8	8			1	355	0.00	1	356	0.00	1862	0.0	0.0	5551	0.0	0.0
30380	259	8	8			88	469	0.19	88	470	0.19	1925	0.0	0.0	5551	0.0	0.0
30381	434	8	8			552	451	1.22	85	452	0.19	1863	7.4	0.0	5570	8.2	0.0
30382	320	8	8			514	638	0.81	38	639	0.06	5566	7.9	0.0	1863	7.4	0.0
30383	201	6	6			1	291	0.00	1	291	0.00	1865	0.0	0.0	2000	0.0	0.0
30386	156	8	8			294	445	0.66	114	446	0.26	7456	0.9	0.0	1891	0.0	0.0
30387	131	12	12			131	227	0.58	131	227	0.58	1755	0.0	0.0	3507	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30389	319	8	8			77	178	0.43	76	178	0.43	1775	3.4	0.0	1893	2.6	0.0
30390	120	10	18	5	Existing	681	399	1.70	2,007	1,915	1.05	1821	7.2	0.0	7135	7.0	0.0
30391	447	6	6			0	93	0.00	0	93	0.00	1758	0.0	0.0	3493	0.0	0.0
30392	316	8	8			1	237	0.00	1	237	0.00	1742	0.0	0.0	7512	0.0	0.0
30394	295	8	8			19	280	0.07	1	281	0.00	3514	8.7	0.0	1756	7.6	0.0
30395	446	8	8			106	416	0.26	106	417	0.26	1833	0.0	0.0	3412	0.0	0.0
30396	277	8	8			7	284	0.02	7	284	0.02	3456	0.0	0.0	1834	0.0	0.0
30397	319	8	8			2	821	0.00	2	822	0.00	1837	0.0	0.0	3505	0.0	0.0
30398	205	8	8			1	311	0.00	1	311	0.00	7461	0.0	0.0	3515	0.0	0.0
30400	127	10	15	4	Existing	751	449	1.67	1,001	1,322	0.76	1894	6.6	0.0	1789	3.7	0.0
30401	319	8	8			231	275	0.84	231	275	0.84	6996	1.8	0.0	1779	0.0	0.0
30402	177	8	8			88	250	0.35	34	251	0.14	1710	1.6	0.0	1948	1.3	0.0
30403	327	8	8			165	558	0.30	116	558	0.21	1675	0.0	0.0	7724	3.5	6.1
30404	328	6	6			156	140	1.12	181	140	1.30	1674	4.6	4.9	1957	4.0	5.5
30405	351	10	10			191	548	0.35	191	547	0.35	1718	3.4	0.0	1800	1.6	0.0
30406	92	8	8			49	748	0.06	1	749	0.00	1716	0.3	0.0	1604	2.5	0.0
30407	119	8	8			1	206	0.01	1	206	0.01	1540	0.0	0.0	1838	0.0	0.0
30408	113	8	8			1	313	0.00	1	313	0.00	1513	0.0	0.0	1790	0.0	0.0
30409	95	8	8			103	485	0.21	103	485	0.21	1512	0.0	0.0	1790	0.0	0.0
30410	30	8	8			419	701	0.60	419	703	0.60	1494	3.9	0.0	3328	4.0	7.4
30411	324	8	8			424	363	1.17	428	364	1.18	3328	4.0	7.4	1545	5.3	0.0
30412	137	10	10			424	637	0.67	428	636	0.67	1492	5.1	0.0	3314	3.8	0.0
30413	339	15	15			2,016	2,053	0.98	1,981	2,053	0.96	1546	0.0	0.0	3326	5.8	6.4
30415	377	10	15	8	Existing	556	519	1.07	693	1,530	0.45	1600	0.0	0.0	1496	1.2	0.0
30416	190	8	8			1	383	0.00	1	384	0.00	1660	0.0	0.0	1564	0.0	0.0
30417	280	8	8			19	379	0.05	19	380	0.05	7453	0.0	0.0	1565	0.0	0.0
30418	7	12	12			254	1,047	0.24	251	1,047	0.24	1602	4.4	0.0	1507	4.3	0.0
30419	310	6	6			169	239	0.71	169	239	0.71	1376	0.0	0.0	1530	0.0	0.0
30420	283	8	8			277	572	0.48	277	573	0.48	1382	0.0	0.0	1539	0.0	0.0
30421	198	12	12			538	1,772	0.30	538	1,772	0.30	1384	0.0	0.0	1565	0.0	0.0
30422	252	8	8			18	345	0.05	18	346	0.05	1367	0.0	0.0	3123	0.0	0.0
30423	148	6	6			1	215	0.01	1	215	0.01	1347	0.0	0.0	3121	0.0	0.0
30424	313	6	6			156	108	1.45	156	108	1.45	1370	0.0	0.0	1523	0.0	0.0
30425	83	8	8			61	967	0.06	61	969	0.06	7438	0.0	0.0	1527	0.0	0.0
30426	26	8	8			0	476	0.00	0	476	0.00	1370	0.0	0.0	1528	0.0	0.0
30427	399	12	12			115	1,006	0.11	115	1,006	0.11	1334	0.0	0.0	1437	0.0	0.0
30428	527	8	8			11	472	0.02	11	473	0.02	1332	0.0	0.0	1426	0.0	0.0
30429	275	8	8			126	381	0.33	126	382	0.33	1294	0.0	0.0	1381	0.0	0.0
30430	274	8	8			45	382	0.12	45	383	0.12	1293	0.0	0.0	1380	0.0	0.0
30431	274	8	8			93	382	0.24	93	383	0.24	1292	0.0	0.0	1419	0.0	0.0
30432	288	8	8			1	782	0.00	1	783	0.00	7647	0.0	0.0	1420	0.0	0.0
30433	137	8	8			1	419	0.00	1	420	0.00	1286	0.0	0.0	1395	0.0	0.0
30438	341	8	8			19	338	0.06	19	338	0.06	1166	0.0	0.0	7133	0.0	0.0
30443	329	8	8			66	458	0.14	66	458	0.14	1147	0.0	0.0	3030	0.0	0.0
30444	311	8	8			1	384	0.00	1	385	0.00	3029	0.0	0.0	1162	0.0	0.0
30490	384	8	8			57	374	0.15	57	374	0.15	1111	0.0	0.0	1109	0.0	0.0
30491	61	8	8			67	369	0.18	67	369	0.18	1108	0.0	0.0	1104	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30492	68	8	8			14	1,725	0.01	14	1,727	0.01	1103	0.0	0.0	1104	0.0	0.0
30493	284	8	8			14	2,259	0.01	14	2,262	0.01	1102	0.0	0.0	1103	0.0	0.0
30494	79	8	8			10	584	0.02	10	585	0.02	1107	0.0	0.0	1108	0.0	0.0
30495	60	6	6			10	764	0.01	10	764	0.01	1106	0.0	0.0	1107	0.0	0.0
30496	139	8	8			81	392	0.21	81	393	0.20	1104	0.0	0.0	1113_WETWELL	0.0	0.0
30514	360	8	8			17	343	0.05	17	344	0.05	1167	0.0	0.0	1166	0.0	0.0
30515	147	8	8			1	424	0.00	1	425	0.00	1176	0.0	0.0	1149	0.0	0.0
30516	134	8	8			40	419	0.09	40	419	0.09	1149	0.0	0.0	1168	0.0	0.0
30517	245	8	8			41	423	0.10	41	424	0.10	1168	0.0	0.0	1169	0.0	0.0
30518	240	8	8			42	420	0.10	42	421	0.10	1169	0.0	0.0	1154	0.0	0.0
30519	50	8	8			5	399	0.01	5	399	0.01	1170	0.0	0.0	1147	0.0	0.0
30520	297	8	8			3	568	0.01	3	569	0.01	1171	0.0	0.0	1170	0.0	0.0
30521	365	8	8			1	490	0.00	1	490	0.00	1172	0.0	0.0	1171	0.0	0.0
30522	458	8	8			28	344	0.08	28	344	0.08	1164	0.0	0.0	1165	0.0	0.0
30523	250	8	8			27	518	0.05	27	519	0.05	1173	0.0	0.0	1164	0.0	0.0
30524	50	8	8			25	420	0.06	25	421	0.06	1163	0.0	0.0	1173	0.0	0.0
30525	43	8	8			1	370	0.00	1	370	0.00	1114	0.0	0.0	1163	0.0	0.0
30572	266	8	8			1	484	0.00	1	485	0.00	1177	0.0	0.0	1230	0.0	0.0
30615	280	8	8			25	353	0.07	25	354	0.07	7436	0.0	0.0	1301	0.0	0.0
30616	301	8	8			24	308	0.08	24	308	0.08	1302	0.0	0.0	7436	0.0	0.0
30617	291	8	8			22	364	0.06	22	365	0.06	1305	0.0	0.0	1302	0.0	0.0
30618	144	8	8			60	389	0.16	60	390	0.16	1301	0.0	0.0	1300	0.0	0.0
30619	335	8	8			124	384	0.32	124	385	0.32	1300	0.0	0.0	1294	0.0	0.0
30620	318	8	8			60	383	0.16	60	383	0.16	7211	0.0	0.0	1321	0.0	0.0
30621	237	8	8			20	405	0.05	20	406	0.05	1306	0.0	0.0	1322	0.0	0.0
30622	320	8	8			19	381	0.05	19	382	0.05	1297	0.0	0.0	1298	0.0	0.0
30623	323	8	8			17	383	0.04	17	383	0.04	1307	0.0	0.0	1297	0.0	0.0
30624	252	8	8			3	390	0.01	3	390	0.01	1323	0.0	0.0	1307	0.0	0.0
30625	328	8	8			43	390	0.11	43	390	0.11	1299	0.0	0.0	1293	0.0	0.0
30626	335	8	8			92	381	0.24	92	381	0.24	1296	0.0	0.0	1292	0.0	0.0
30627	322	8	8			65	383	0.17	65	383	0.17	1314	0.0	0.0	7437	0.0	0.0
30628	252	8	8			45	377	0.12	45	378	0.12	1315	0.0	0.0	1314	0.0	0.0
30629	135	12	12			55	1,011	0.05	55	1,011	0.05	1311	0.0	0.0	1334	0.0	0.0
30630	275	8	8			1	383	0.00	1	383	0.00	1325	0.0	0.0	1295	0.0	0.0
30631	175	8	8			20	360	0.06	20	360	0.06	1304	0.0	0.0	1305	0.0	0.0
30632	170	8	8			19	642	0.03	19	642	0.03	1326	0.0	0.0	1304	0.0	0.0
30633	40	8	8			1	642	0.00	1	642	0.00	1248	0.0	0.0	1326	0.0	0.0
30634	195	6	6			1	225	0.01	1	225	0.01	1249	0.0	0.0	1326	0.0	0.0
30635	213	8	8			19	481	0.04	19	481	0.04	1327	0.0	0.0	1306	0.0	0.0
30636	332	8	8			1	542	0.00	1	543	0.00	1312	0.0	0.0	1327	0.0	0.0
30637	165	8	8			43	378	0.11	43	378	0.11	1316	0.0	0.0	1315	0.0	0.0
30638	82	8	8			42	344	0.12	42	344	0.12	1317	0.0	0.0	1316	0.0	0.0
30639	203	8	8			20	344	0.06	20	345	0.06	1313	0.0	0.0	1317	0.0	0.0
30640	215	8	8			19	667	0.03	19	668	0.03	1328	0.0	0.0	1318	0.0	0.0
30641	161	8	8			17	685	0.03	17	686	0.03	1329	0.0	0.0	1328	0.0	0.0
30642	318	8	8			18	608	0.03	18	609	0.03	7383	0.0	0.0	1313	0.0	0.0
30643	161	8	8			17	385	0.04	17	385	0.04	1250	0.0	0.0	7383	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30644	175	8	8			60	458	0.13	60	459	0.13	1310	0.0	0.0	1334	0.0	0.0
30645	350	8	8			7	473	0.01	7	474	0.01	1331	0.0	0.0	1330	0.0	0.0
30646	404	8	8			6	417	0.01	6	418	0.01	1320	0.0	0.0	1331	0.0	0.0
30647	200	8	8			12	341	0.03	12	342	0.03	1309	0.0	0.0	1310	0.0	0.0
30648	254	8	8			10	581	0.02	10	581	0.02	1308	0.0	0.0	1309	0.0	0.0
30649	355	8	8			8	396	0.02	8	397	0.02	1319	0.0	0.0	1308	0.0	0.0
30650	105	6	6			1	201	0.01	1	201	0.01	1254	0.0	0.0	1319	0.0	0.0
30656	300	8	8			69	700	0.10	69	701	0.10	1374	0.0	0.0	1376	0.0	0.0
30657	94	8	8			68	540	0.13	68	540	0.13	1375	0.0	0.0	1374	0.0	0.0
30658	159	8	8			67	539	0.12	67	540	0.12	1373	0.0	0.0	1375	0.0	0.0
30659	336	8	8			36	400	0.09	36	401	0.09	1411	0.0	0.0	7214	0.0	0.0
30660	102	8	8			3	383	0.01	3	384	0.01	1407	0.0	0.0	1411	0.0	0.0
30661	125	6	6			1	176	0.01	1	176	0.01	1343	0.0	0.0	1407	0.0	0.0
30662	350	8	8			5	484	0.01	5	485	0.01	1412	0.0	0.0	1411	0.0	0.0
30663	130	8	8			1	415	0.00	1	415	0.00	1409	0.0	0.0	1412	0.0	0.0
30664	360	8	8			99	491	0.20	99	492	0.20	1377	0.0	0.0	1376	0.0	0.0
30667	236	6	6			3	195	0.02	3	195	0.02	1383	0.0	0.0	1382	0.0	0.0
30668	245	6	6			0	192	0.00	0	192	0.00	1384	0.0	0.0	6985	0.0	0.0
30669	307	8	8			29	540	0.05	29	542	0.05	1378	0.0	0.0	1377	0.0	0.0
30670	300	8	8			27	538	0.05	27	539	0.05	1408	0.0	0.0	1378	0.0	0.0
30671	271	8	8			1	536	0.00	1	537	0.00	1344	0.0	0.0	1408	0.0	0.0
30672	151	8	8			259	481	0.54	259	482	0.54	1415	0.0	0.0	1382	0.0	0.0
30673	163	8	8			257	485	0.53	257	485	0.53	1379	0.0	0.0	1415	0.0	0.0
30674	337	8	8			228	482	0.47	228	483	0.47	1393	0.0	0.0	1379	0.0	0.0
30675	331	8	8			199	501	0.40	199	501	0.40	1394	0.0	0.0	1393	0.0	0.0
30676	147	8	8			148	438	0.34	148	439	0.34	1399	0.0	0.0	6986	0.0	0.0
30677	68	8	8			144	255	0.57	144	255	0.57	7440	0.0	0.0	1399	0.0	0.0
30678	325	8	8			27	417	0.07	27	417	0.06	7164	0.0	0.0	1379	0.0	0.0
30679	323	8	8			1	417	0.00	1	417	0.00	7439	0.0	0.0	7164	0.0	0.0
30680	312	8	8			28	386	0.07	28	387	0.07	1391	0.0	0.0	1393	0.0	0.0
30681	345	8	8			1	378	0.00	1	379	0.00	1390	0.0	0.0	1391	0.0	0.0
30682	318	8	8			25	383	0.07	25	384	0.07	1416	0.0	0.0	1394	0.0	0.0
30683	325	8	8			1	379	0.00	1	380	0.00	1417	0.0	0.0	1416	0.0	0.0
30684	246	6	6			23	215	0.11	23	215	0.11	6987	0.0	0.0	6986	0.0	0.0
30685	32	6	6			3	178	0.02	3	178	0.02	7441	0.0	0.0	6987	0.0	0.0
30686	252	6	6			1	178	0.01	1	178	0.01	1418	0.0	0.0	7441	0.0	0.0
30687	225	8	8			1	343	0.00	1	344	0.00	1345	0.0	0.0	1399	0.0	0.0
30688	316	12	12			510	1,414	0.36	510	1,414	0.36	1381	0.0	0.0	1384	0.0	0.0
30689	335	12	12			305	1,743	0.17	305	1,743	0.17	1419	0.0	0.0	1380	0.0	0.0
30690	198	12	12			191	1,546	0.12	191	1,546	0.12	1420	0.0	0.0	1419	0.0	0.0
30691	155	12	12			178	1,258	0.14	178	1,258	0.14	1437	0.0	0.0	1420	0.0	0.0
30692	196	8	8			64	380	0.17	64	380	0.17	1397	0.0	0.0	1437	0.0	0.0
30693	300	8	8			26	542	0.05	26	543	0.05	1396	0.0	0.0	7213	0.0	0.0
30694	50	8	8			27	589	0.05	27	590	0.05	7213	0.0	0.0	1397	0.0	0.0
30695	122	8	8			35	387	0.09	35	388	0.09	1398	0.0	0.0	1397	0.0	0.0
30696	275	8	8			6	401	0.02	6	401	0.02	1422	0.0	0.0	1421	0.0	0.0
30697	273	8	8			5	383	0.01	5	383	0.01	1423	0.0	0.0	1422	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30698	64	8	8			1	418	0.00	1	419	0.00	1424	0.0	0.0	1423	0.0	0.0
30699	111	8	8			1	422	0.00	1	422	0.00	1425	0.0	0.0	1423	0.0	0.0
30700	380	8	8			117	461	0.25	117	462	0.25	1400	0.0	0.0	7440	0.0	0.0
30701	365	8	8			97	462	0.21	97	463	0.21	1401	0.0	0.0	1400	0.0	0.0
30702	295	12	12			96	1,585	0.06	96	1,585	0.06	1410	0.0	0.0	1401	0.0	0.0
30703	420	8	8			24	651	0.04	24	652	0.04	1402	0.0	0.0	1403	0.0	0.0
30704	360	8	8			1	336	0.00	1	336	0.00	1401	0.0	0.0	1402	0.0	0.0
30705	150	8	8			1	420	0.00	1	421	0.00	1346	0.0	0.0	1402	0.0	0.0
30706	521	8	8			45	444	0.10	45	445	0.10	1426	0.0	0.0	1410	0.0	0.0
30707	365	8	8			3	483	0.01	3	484	0.01	1353	0.0	0.0	1356	0.0	0.0
30708	138	8	8			37	426	0.09	37	426	0.09	1389	0.0	0.0	1385	0.0	0.0
30709	354	8	8			35	481	0.07	35	481	0.07	1356	0.0	0.0	1389	0.0	0.0
30710	334	8	8			38	505	0.08	38	505	0.08	1385	0.0	0.0	1388	0.0	0.0
30711	485	8	8			41	344	0.12	41	344	0.12	1403	0.0	0.0	1387	0.0	0.0
30712	69	8	8			1	476	0.00	1	476	0.00	1352	0.0	0.0	1355	0.0	0.0
30713	231	8	8			3	376	0.01	3	376	0.01	1355	0.0	0.0	1356	0.0	0.0
30714	427	8	8			167	451	0.37	167	452	0.37	1386	0.0	0.0	1364	0.0	0.0
30715	165	8	8			166	383	0.43	166	383	0.43	1427	0.0	0.0	1386	0.0	0.0
30716	135	8	8			91	770	0.12	91	771	0.12	1428	0.0	0.0	1427	0.0	0.0
30717	485	8	8			42	342	0.12	42	342	0.12	1387	0.0	0.0	1427	0.0	0.0
30718	302	8	8			17	507	0.03	17	508	0.03	1366	0.0	0.0	1367	0.0	0.0
30719	245	8	8			15	490	0.03	15	491	0.03	1365	0.0	0.0	1366	0.0	0.0
30720	360	8	8			69	590	0.12	69	591	0.12	1371	0.0	0.0	1370	0.0	0.0
30721	360	8	8			1	510	0.00	1	511	0.00	1376	0.0	0.0	1371	0.0	0.0
30722	224	6	6			33	222	0.15	33	222	0.15	6984	0.0	0.0	1371	0.0	0.0
30723	191	6	6			31	208	0.15	31	208	0.15	1372	0.0	0.0	6984	0.0	0.0
30724	197	6	6			30	206	0.15	30	206	0.15	7212	0.0	0.0	1372	0.0	0.0
30725	220	8	8			5	586	0.01	5	587	0.01	1429	0.0	0.0	1406	0.0	0.0
30726	220	8	8			3	586	0.01	3	587	0.01	1405	0.0	0.0	1429	0.0	0.0
30727	109	8	8			1	569	0.00	1	570	0.00	1430	0.0	0.0	1405	0.0	0.0
30728	194	8	8			47	553	0.09	47	554	0.09	6988	0.0	0.0	7215	0.0	0.0
30729	202	8	8			8	633	0.01	8	634	0.01	1431	0.0	0.0	6988	0.0	0.0
30730	26	8	8			51	353	0.14	51	353	0.14	7384	0.0	0.0	1369	0.0	0.0
30731	212	8	8			49	484	0.10	49	485	0.10	7215	0.0	0.0	7384	0.0	0.0
30732	197	6	6			5	192	0.03	5	192	0.03	1368	0.0	0.0	1369	0.0	0.0
30733	80	6	6			1	205	0.01	1	205	0.01	1350	0.0	0.0	1368	0.0	0.0
30734	200	6	6			1	159	0.01	1	159	0.01	1351	0.0	0.0	1431	0.0	0.0
30735	45	8	8			60	626	0.10	60	627	0.10	1360	0.0	0.0	7438	0.0	0.0
30736	275	6	6			1	215	0.01	1	215	0.01	1359	0.0	0.0	1368	0.0	0.0
30737	238	8	8			58	478	0.12	58	479	0.12	1434	0.0	0.0	1360	0.0	0.0
30738	192	8	8			38	701	0.05	38	702	0.05	1361	0.0	0.0	1434	0.0	0.0
30739	200	8	8			33	526	0.06	33	526	0.06	1358	0.0	0.0	1362	0.0	0.0
30740	185	8	8			31	550	0.06	31	551	0.06	1357	0.0	0.0	1358	0.0	0.0
30741	230	8	8			1	383	0.00	1	384	0.00	1436	0.0	0.0	1357	0.0	0.0
30742	88	8	8			1	311	0.00	1	312	0.00	1341	0.0	0.0	1433	0.0	0.0
30744	58	6	6			28	206	0.14	28	206	0.14	1342	0.0	0.0	7212	0.0	0.0
30745	198	8	8			26	369	0.07	26	370	0.07	1406	0.0	0.0	1342	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30747	122	8	8			1	431	0.00	1	432	0.00	1541	0.0	0.0	1540	0.0	0.0
30748	90	8	8			1	431	0.00	1	431	0.00	7656	0.0	0.0	1541	0.0	0.0
30749	321	8	8			1	438	0.00	1	438	0.00	1514	0.0	0.0	1513	0.0	0.0
30750	140	8	8			1	343	0.00	1	344	0.00	1542	0.0	0.0	1514	0.0	0.0
30751	140	8	8			103	485	0.21	103	486	0.21	1495	0.0	0.0	1512	0.0	0.0
30752	397	6	6			1	113	0.01	1	113	0.01	7218	0.0	0.0	1495	0.0	0.0
30753	390	8	8			31	444	0.07	31	444	0.07	1497	0.0	0.0	1495	0.0	0.0
30754	400	6	6			31	158	0.19	31	158	0.19	1509	0.0	0.0	1497	0.0	0.0
30755	287	10	10			219	599	0.37	219	598	0.37	7446	0.0	0.0	1517	0.0	0.0
30756	225	6	6			1	131	0.01	1	131	0.01	1510	0.0	0.0	1517	0.0	0.0
30757	150	8	8			1	274	0.00	1	274	0.00	1511	0.0	0.0	1510	0.0	0.0
30758	267	10	10			291	603	0.48	291	602	0.48	1517	0.0	0.0	1516	7.0	0.0
30759	291	8	8			292	380	0.77	292	380	0.77	1516	7.0	0.0	1515	5.8	0.0
30760	232	10	10			292	367	0.79	292	367	0.80	1515	5.8	0.0	1493	5.0	0.0
30761	250	10	10			420	565	0.74	424	565	0.75	1493	5.0	0.0	1494	3.9	0.0
30762	148	10	10			424	637	0.67	428	636	0.67	1545	5.3	0.0	1492	5.1	0.0
30763	391	15	15			1,828	2,053	0.89	1,827	2,053	0.89	1547	0.0	0.0	1546	0.0	0.0
30764	261	15	15			1,810	2,249	0.81	1,965	2,249	0.87	1548	0.0	0.0	1547	0.0	0.0
30765	16	12	15	12	2036	6,626	2,190	3.03	5,982	3,970	1.51	1549	0.0	0.0	1548	0.0	0.0
30766	444	12	15	12	2036	1,547	1,068	1.45	1,547	1,936	0.80	1550	6.9	0.0	1549	0.0	0.0
30767	83	10	15	8	Existing	640	614	1.04	808	1,810	0.45	1551	3.4	0.0	1499	3.4	0.0
30768	282	10	15	8	Existing	620	609	1.02	778	1,797	0.43	1552	1.6	0.0	1551	3.4	0.0
30769	397	8	8			84	546	0.15	84	547	0.15	1501	0.0	0.0	1552	1.6	0.0
30770	65	8	8			1	278	0.00	1	279	0.00	1504	0.0	0.0	1501	0.0	0.0
30771	318	8	8			1	286	0.00	1	286	0.00	1553	0.0	0.0	1504	0.0	0.0
30772	315	8	8			1	286	0.00	1	287	0.00	1503	0.0	0.0	1553	0.0	0.0
30773	400	10	15	8	Existing	558	434	1.28	694	1,279	0.54	1496	1.2	0.0	1552	1.6	0.0
30774	252	6	6			1	107	0.01	1	107	0.01	7445	0.0	0.0	1554	0.0	0.0
30775	274	8	8			1	240	0.00	1	240	0.00	1554	0.0	0.0	1555	0.0	0.0
30776	227	8	8			78	241	0.33	78	242	0.32	1555	0.0	0.0	1556	0.0	0.0
30777	100	6	6			1	151	0.00	1	151	0.00	1498	0.0	0.0	1557	0.0	0.0
30778	285	8	8			97	352	0.28	97	353	0.28	1557	0.0	0.0	1506	0.0	0.0
30779	263	8	8			47	324	0.15	47	324	0.15	1505	0.0	0.0	1558	0.0	0.0
30780	276	8	8			99	325	0.31	99	325	0.31	1502	0.0	0.0	1559	0.0	0.0
30781	275	8	8			99	326	0.30	99	326	0.30	1559	0.0	0.0	1506	0.0	0.0
30782	291	8	8			197	326	0.61	197	326	0.60	1506	0.0	0.0	7446	0.0	0.0
30783	363	12	12			861	1,038	0.83	860	1,038	0.83	1507	4.3	0.0	1560	5.5	0.0
30784	348	12	12			863	1,197	0.72	861	1,197	0.72	1560	5.5	0.0	1508	5.9	0.0
30785	339	12	15	12	2036	1,249	1,092	1.14	1,248	1,979	0.63	1508	5.9	0.0	6990	6.0	0.0
30786	233	8	8			2	391	0.01	1	392	0.00	1561	0.0	0.0	6990	6.0	0.0
30787	184	12	12			607	1,676	0.36	607	1,676	0.36	1562	0.0	0.0	1507	4.3	0.0
30788	66	12	12			574	1,682	0.34	574	1,682	0.34	7221	0.0	0.0	1562	0.0	0.0
30789	220	12	12			571	1,663	0.34	571	1,663	0.34	7449	0.0	0.0	1563	0.0	0.0
30790	230	12	12			569	1,961	0.29	569	1,961	0.29	1564	0.0	0.0	7449	0.0	0.0
30791	178	12	12			558	1,728	0.32	558	1,728	0.32	1565	0.0	0.0	1564	0.0	0.0
30792	227	6	6			5	202	0.02	5	202	0.02	1538	0.0	0.0	7220	0.0	0.0
30793	150	6	6			3	203	0.02	3	203	0.02	7447	0.0	0.0	1538	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30794	236	6	6			1	202	0.01	1	202	0.01	1490	0.0	0.0	7447	0.0	0.0
30795	300	6	6			3	195	0.02	3	195	0.02	1537	0.0	0.0	6992	0.0	0.0
30796	300	6	6			1	195	0.01	1	195	0.01	1491	0.0	0.0	1537	0.0	0.0
30797	355	8	8			362	642	0.56	362	642	0.56	6992	0.0	0.0	1508	5.9	0.0
30798	337	6	6			30	194	0.15	30	194	0.15	7219	0.0	0.0	1535	0.0	0.0
30799	338	6	6			1	193	0.01	1	193	0.01	1536	0.0	0.0	7219	0.0	0.0
30800	330	8	8			231	508	0.45	231	508	0.45	1534	0.0	0.0	1535	0.0	0.0
30801	341	6	6			28	157	0.18	28	157	0.18	1533	0.0	0.0	1534	0.0	0.0
30802	351	6	6			1	152	0.01	1	152	0.01	1532	0.0	0.0	1533	0.0	0.0
30803	190	8	8			201	516	0.39	201	517	0.39	1529	0.0	0.0	1534	0.0	0.0
30804	138	8	8			199	510	0.39	199	510	0.39	1530	0.0	0.0	1529	0.0	0.0
30805	321	6	6			1	159	0.01	1	159	0.01	1531	0.0	0.0	1566	0.0	0.0
30806	345	6	6			3	248	0.01	3	248	0.01	1518	0.0	0.0	1548	0.0	0.0
30807	240	6	6			1	237	0.01	1	237	0.01	1519	0.0	0.0	1518	0.0	0.0
30808	355	8	8			203	451	0.45	203	451	0.45	7165	0.0	0.0	1524	0.0	0.0
30809	340	6	6			3	158	0.02	3	158	0.02	1520	0.0	0.0	7165	0.0	0.0
30810	344	6	6			1	159	0.01	1	159	0.01	1567	0.0	0.0	1520	0.0	0.0
30811	361	6	6			27	485	0.06	27	485	0.06	1522	0.0	0.0	1523	0.0	0.0
30812	315	6	6			1	159	0.01	1	159	0.01	1521	0.0	0.0	1522	0.0	0.0
30813	19	8	8			3	482	0.01	3	483	0.01	6991	0.0	0.0	1523	0.0	0.0
30814	270	8	8			1	460	0.00	1	460	0.00	1528	0.0	0.0	6991	0.0	0.0
30815	326	8	8			121	387	0.31	121	388	0.31	1525	0.0	0.0	1546	0.0	0.0
30816	350	8	8			119	372	0.32	119	372	0.32	1568	0.0	0.0	1525	0.0	0.0
30817	337	8	8			65	402	0.16	65	402	0.16	1526	0.0	0.0	1568	0.0	0.0
30818	320	8	8			312	576	0.54	312	577	0.54	1574	0.0	0.0	7220	0.0	0.0
30829	284	8	8			343	301	1.14	342	302	1.13	1604	2.5	0.0	1588	2.0	0.0
30832	310	10	15	8	Existing	578	508	1.14	638	1,496	0.43	1594	0.0	0.0	1600	0.0	0.0
30833	193	10	12	9	Existing	637	407	1.56	637	661	0.96	1590	0.7	0.0	1594	0.0	0.0
30834	305	10	12	9	Existing	541	542	1.00	542	881	0.62	1587	1.5	0.0	1590	0.7	0.0
30835	256	8	12	9	Existing	343	261	1.31	343	770	0.45	1588	2.0	0.0	1587	1.5	0.0
30836	35	8	8			199	349	0.57	198	350	0.57	1586	1.2	0.0	1587	1.5	0.0
30837	440	8	8			198	336	0.59	197	337	0.59	1642	4.6	0.0	1586	1.2	0.0
30838	335	6	6			6	133	0.04	2	133	0.02	1614	0.0	0.0	1642	4.6	0.0
30839	338	6	6			1	145	0.01	1	145	0.01	6994	0.0	0.0	1614	0.0	0.0
30840	137	6	6			1	208	0.01	1	208	0.01	1634	0.0	0.0	6994	0.0	0.0
30841	276	6	6			1	184	0.00	1	184	0.00	7657	0.0	0.0	1615	7.5	0.0
30842	370	6	6			46	174	0.26	46	174	0.26	1641	0.0	0.0	1615	7.5	0.0
30843	310	6	6			45	176	0.26	45	176	0.26	1585	0.0	0.0	1641	0.0	0.0
30844	83	6	6			45	454	0.10	45	454	0.10	1640	0.0	0.0	1585	0.0	0.0
30845	278	6	6			44	242	0.18	44	242	0.18	1639	0.0	0.0	1640	0.0	0.0
30846	228	6	6			95	231	0.41	95	231	0.41	7450	1.3	0.0	1590	0.7	0.0
30847	235	6	6			95	203	0.47	95	203	0.47	1593	3.9	0.0	7450	1.3	0.0
30848	225	6	6			1	205	0.01	1	205	0.01	1591	0.0	0.0	1593	3.9	0.0
30849	223	6	6			1	205	0.00	1	205	0.00	1643	0.0	0.0	1596	0.0	0.0
30850	288	6	6			60	242	0.25	56	242	0.23	1595	3.5	0.0	1600	0.0	0.0
30851	209	6	6			1	219	0.01	1	219	0.01	1592	0.0	0.0	1601	5.5	0.0
30852	175	8	8			1	290	0.00	1	291	0.00	1644	0.0	0.0	1592	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30853	69	8	8			1	271	0.00	1	271	0.00	1658	0.0	0.0	1644	0.0	0.0
30854	302	12	12			250	1,327	0.19	250	1,327	0.19	1599	0.0	0.0	1602	4.4	0.0
30855	345	12	12			192	1,037	0.19	192	1,037	0.19	1598	0.0	0.0	1599	0.0	0.0
30856	335	8	8			222	309	0.72	222	310	0.72	7451	4.2	0.0	1589	3.8	9.9
30857	300	8	8			71	312	0.23	68	312	0.22	1606	1.9	0.0	1645	0.8	0.0
30858	305	8	8			70	393	0.18	67	394	0.17	1605	5.1	0.0	1606	1.9	0.0
30859	300	8	8			67	438	0.15	67	438	0.15	7222	0.0	0.0	1605	5.1	0.0
30860	274	8	8			67	763	0.09	67	763	0.09	1646	0.0	0.0	7222	0.0	0.0
30861	125	8	8			28	344	0.08	28	344	0.08	1617	0.0	0.0	1646	0.0	0.0
30862	175	8	8			27	278	0.10	27	279	0.10	1584	0.0	0.0	1617	0.0	0.0
30863	300	8	8			86	683	0.13	86	684	0.13	1610	0.0	0.0	7451	4.2	0.0
30864	305	8	8			86	400	0.22	86	400	0.22	1609	0.0	0.0	1610	0.0	0.0
30865	300	8	8			38	494	0.08	38	495	0.08	1608	0.0	0.0	1609	0.0	0.0
30866	271	8	8			37	504	0.07	37	505	0.07	1607	0.0	0.0	1608	0.0	0.0
30867	150	8	8			37	548	0.07	37	549	0.07	1626	0.0	0.0	1607	0.0	0.0
30868	270	8	8			120	836	0.14	120	837	0.14	1613	0.0	0.0	1589	3.8	9.9
30869	255	8	8			77	420	0.18	77	421	0.18	1612	0.0	0.0	1613	0.0	0.0
30870	220	8	8			31	458	0.07	31	459	0.07	1619	0.0	0.0	1618	0.0	0.0
30871	330	8	8			30	574	0.05	30	575	0.05	1648	0.0	0.0	1619	0.0	0.0
30872	445	8	8			36	540	0.07	36	541	0.07	1647	0.0	0.0	1626	0.0	0.0
30873	278	8	8			26	310	0.09	26	311	0.08	7166	0.0	0.0	1584	0.0	0.0
30874	307	8	8			1	310	0.00	1	310	0.00	1620	0.0	0.0	7166	0.0	0.0
30875	133	12	12			122	1,886	0.06	122	1,886	0.06	1630	0.0	0.0	1631	0.0	0.0
30876	325	12	12			88	687	0.13	88	687	0.13	6995	0.0	0.0	1630	0.0	0.0
30877	266	8	8			59	342	0.17	59	343	0.17	1625	0.0	0.0	6995	0.0	0.0
30878	231	8	8			1	344	0.00	1	344	0.00	1622	0.0	0.0	1625	0.0	0.0
30879	365	8	8			1	340	0.00	1	340	0.00	7223	0.0	0.0	1629	0.0	0.0
30880	355	8	8			27	590	0.05	27	591	0.05	1628	0.0	0.0	6995	0.0	0.0
30881	380	8	8			1	594	0.00	1	595	0.00	1627	0.0	0.0	1628	0.0	0.0
30882	400	8	8			34	542	0.06	34	543	0.06	1624	0.0	0.0	1625	0.0	0.0
30883	30	8	8			19	383	0.05	19	384	0.05	1649	0.0	0.0	1624	0.0	0.0
30884	219	8	8			15	249	0.06	15	249	0.06	10082	0.0	0.0	1650	0.0	0.0
30885	289	6	6			44	242	0.18	44	242	0.18	1657	0.0	0.0	1639	0.0	0.0
30886	275	12	12			191	1,011	0.19	191	1,011	0.19	1651	0.0	0.0	1598	0.0	0.0
30887	286	12	12			189	1,027	0.18	189	1,027	0.18	1637	0.0	0.0	1651	0.0	0.0
30888	14	12	12			188	1,481	0.13	188	1,481	0.13	1638	0.0	0.0	1637	0.0	0.0
30889	159	12	12			186	1,217	0.15	186	1,217	0.15	1652	0.0	0.0	1638	0.0	0.0
30890	165	12	12			125	2,567	0.05	125	2,567	0.05	1633	0.0	0.0	1652	0.0	0.0
30891	300	12	12			124	2,483	0.05	124	2,483	0.05	1631	0.0	0.0	1633	0.0	0.0
30892	24	6	6			47	230	0.20	47	230	0.20	7452	0.0	0.0	1652	0.0	0.0
30893	348	6	6			44	259	0.17	44	259	0.17	7224	0.0	0.0	7452	0.0	0.0
30894	312	6	6			15	256	0.06	15	256	0.06	1656	0.0	0.0	7224	0.0	0.0
30895	318	6	6			28	251	0.11	28	251	0.11	1632	0.0	0.0	7224	0.0	0.0
30896	320	6	6			13	192	0.07	13	192	0.07	1581	0.0	0.0	1632	0.0	0.0
30897	300	6	6			13	195	0.07	13	195	0.07	1582	0.0	0.0	1632	0.0	0.0
30898	275	8	8			1	447	0.00	1	448	0.00	1635	0.0	0.0	1634	0.0	0.0
30899	275	6	6			1	207	0.00	1	207	0.00	1636	0.0	0.0	1635	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30900	360	6	6			24	275	0.09	24	275	0.09	1603	0.0	0.0	1653	0.0	0.0
30901	160	6	6			1	252	0.01	1	252	0.01	1580	0.0	0.0	1655	0.0	0.0
30902	285	8	8			18	381	0.05	18	382	0.05	1654	0.0	0.0	7453	0.0	0.0
30904	266	6	6			31	142	0.22	39	142	0.27	1672	4.7	4.9	1674	4.6	4.9
30905	290	6	6			31	142	0.22	26	142	0.19	1671	0.0	0.0	1672	4.7	4.9
30906	215	6	6			83	144	0.57	34	144	0.24	1671	0.0	0.0	1675	0.0	0.0
30907	176	8	8			82	242	0.34	82	242	0.34	1676	0.0	0.0	1675	0.0	0.0
30908	175	8	8			82	240	0.34	82	240	0.34	1690	0.0	0.0	1676	0.0	0.0
30909	420	8	8			43	410	0.10	43	411	0.10	1702	0.0	0.0	1690	0.0	0.0
30910	174	6	6			43	139	0.31	43	139	0.31	7658	0.0	0.0	1702	0.0	0.0
30912	518	8	8			231	274	0.84	231	274	0.84	1677	5.7	0.0	6996	1.8	0.0
30913	428	8	8			230	274	0.84	230	275	0.84	1691	5.2	0.0	1677	5.7	0.0
30914	282	8	8			187	526	0.36	187	526	0.35	7455	0.0	0.0	1703	4.0	0.0
30915	92	8	8			186	520	0.36	186	521	0.36	1704	0.0	0.0	7455	0.0	0.0
30916	257	6	6			113	156	0.72	113	156	0.72	1678	6.1	0.0	1705	3.8	0.0
30917	432	6	6			1	231	0.00	1	231	0.00	1706	0.0	0.0	1678	6.1	0.0
30918	220	8	8			38	242	0.16	38	242	0.16	6998	0.0	0.0	1690	0.0	0.0
30919	222	8	8			38	240	0.16	38	240	0.16	1707	0.0	0.0	6998	0.0	0.0
30921	47	6	6			161	205	0.79	161	205	0.79	1673	4.4	4.7	1674	4.6	4.9
30922	275	8	8			43	442	0.10	42	443	0.10	1689	0.0	0.0	1673	4.4	4.7
30923	235	8	8			42	442	0.09	42	442	0.09	1692	0.0	0.0	1689	0.0	0.0
30924	158	8	8			41	253	0.16	33	253	0.13	1708	1.6	0.0	1710	1.6	0.0
30925	64	6	6			1	328	0.00	1	328	0.00	1727	0.0	0.0	1707	0.0	0.0
30926	80	6	6			1	219	0.00	1	219	0.00	1724	0.0	0.0	1707	0.0	0.0
30927	325	6	6			118	239	0.49	118	239	0.49	1670	0.0	0.0	1673	4.4	4.7
30928	317	6	6			63	242	0.26	63	242	0.26	7225	0.0	0.0	1670	0.0	0.0
30929	280	6	6			63	147	0.43	63	147	0.43	1682	0.0	0.0	1681	0.0	0.0
30930	288	6	6			55	218	0.25	55	218	0.25	7454	0.0	0.0	1670	0.0	0.0
30931	198	8	8			185	482	0.38	185	483	0.38	6997	0.0	0.0	1704	0.0	0.0
30932	162	8	8			90	481	0.19	90	482	0.19	1686	0.0	0.0	6997	0.0	0.0
30933	315	8	8			90	556	0.16	90	556	0.16	1711	0.0	0.0	1686	0.0	0.0
30934	300	8	8			89	310	0.29	89	310	0.29	1688	0.0	0.0	1711	0.0	0.0
30935	57	8	8			88	309	0.28	88	309	0.28	1687	0.0	0.0	1688	0.0	0.0
30936	133	8	8			88	331	0.26	88	331	0.26	1698	0.0	0.0	1687	0.0	0.0
30937	215	6	6			1	210	0.00	1	210	0.00	1700	0.0	0.0	1698	0.0	0.0
30938	137	6	6			1	210	0.00	1	210	0.00	1662	0.0	0.0	1700	0.0	0.0
30939	35	8	8			1	428	0.00	1	428	0.00	1712	0.0	0.0	1688	0.0	0.0
30940	170	6	6			2	139	0.02	2	139	0.02	1713	0.0	0.0	1698	0.0	0.0
30941	70	6	6			1	144	0.00	1	144	0.00	1663	0.0	0.0	1713	0.0	0.0
30942	175	6	6			1	145	0.01	1	145	0.01	1714	0.0	0.0	1713	0.0	0.0
30943	175	6	6			1	144	0.01	1	144	0.01	1699	0.0	0.0	1714	0.0	0.0
30944	60	6	6			1	144	0.00	1	144	0.00	1664	0.0	0.0	1699	0.0	0.0
30945	60	6	6			1	144	0.00	1	144	0.00	1665	0.0	0.0	1699	0.0	0.0
30946	180	6	6			1	171	0.00	1	171	0.00	1666	0.0	0.0	1704	0.0	0.0
30948	130	8	8			1	606	0.00	1	607	0.00	1694	0.0	0.0	1695	0.0	0.0
30949	160	8	8			1	356	0.00	1	356	0.00	1695	0.0	0.0	1696	0.0	0.0
30950	90	6	6			1	144	0.00	1	144	0.00	7226	0.0	0.0	1715	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30951	328	6	6			67	233	0.29	67	233	0.29	7386	0.0	0.0	1678	6.1	0.0
30952	320	6	6			67	165	0.41	67	165	0.41	1667	0.0	0.0	7167	0.0	0.0
30953	373	6	6			1	144	0.00	1	144	0.00	1668	0.0	0.0	1717	0.0	0.0
30954	270	8	8			2	267	0.01	2	267	0.01	1696	0.0	0.0	1697	0.0	0.0
30955	231	8	8			1	311	0.00	1	311	0.00	1719	0.0	0.0	1718	3.4	0.0
30956	372	6	6			1	144	0.00	1	144	0.00	1720	0.0	0.0	1719	0.0	0.0
30957	300	6	6			45	172	0.26	45	172	0.26	1721	0.0	0.0	1679	0.0	0.0
30958	300	6	6			1	172	0.00	1	172	0.00	6999	0.0	0.0	1721	0.0	0.0
30959	210	8	8			56	454	0.12	56	455	0.12	1701	0.0	0.0	1731	0.0	0.0
30960	180	8	8			55	313	0.18	55	314	0.17	1722	0.0	0.0	1701	0.0	0.0
30961	181	8	8			1	310	0.00	1	311	0.00	1715	0.0	0.0	1722	0.0	0.0
30962	20	8	8			1	278	0.00	1	279	0.00	1728	0.0	0.0	1694	0.0	0.0
30963	20	8	8			1	278	0.00	1	279	0.00	1729	0.0	0.0	1694	0.0	0.0
30964	316	8	8			137	290	0.47	137	290	0.47	1679	0.0	0.0	1718	3.4	0.0
30965	94	6	6			31	144	0.21	1	144	0.00	1730	1.6	0.0	1708	1.6	0.0
30966	65	6	6			1	139	0.01	1	139	0.01	10797	0.0	0.0	1684	0.0	0.0
30967	97	6	6			1	147	0.00	1	147	0.00	11203	0.0	0.0	1706	0.0	0.0
30969	72	6	6			10	144	0.07	1	144	0.00	1840	1.0	7.1	1768	0.1	0.0
30970	105	6	6			1	126	0.01	1	126	0.01	1842	0.0	0.0	1734	0.0	0.0
30971	100	8	8			190	465	0.41	0	465	0.00	1826	0.8	0.0	1769	0.7	0.0
30972	339	6	6			180	146	1.23	1	146	0.00	1783	1.7	0.0	7456	0.9	0.0
30973	170	8	8			114	363	0.31	113	363	0.31	1784	3.2	0.0	7456	0.9	0.0
30974	421	8	8			87	265	0.33	86	265	0.32	1782	4.0	0.0	1784	3.2	0.0
30975	284	8	8			87	265	0.33	86	266	0.32	7001	4.6	0.0	1782	4.0	0.0
30976	281	8	8			85	265	0.32	85	266	0.32	1781	0.0	0.0	7001	4.6	0.0
30977	75	8	8			85	318	0.27	85	318	0.27	1780	0.0	0.0	1781	0.0	0.0
30978	138	6	6			1	123	0.01	1	123	0.01	1734	0.0	0.0	1780	0.0	0.0
30979	328	8	8			27	369	0.07	27	369	0.07	1804	0.0	0.0	1780	0.0	0.0
30980	130	8	8			1	369	0.00	1	369	0.00	7659	0.0	0.0	1804	0.0	0.0
30981	159	8	8			1	185	0.00	1	185	0.00	1737	0.0	0.0	1804	0.0	0.0
30982	437	8	12	7	Existing	344	275	1.25	567	810	0.70	7457	1.6	0.0	1777	2.2	7.2
30983	263	8	12	7	Existing	344	273	1.26	567	805	0.70	10798	2.2	0.0	7457	1.6	0.0
30984	360	8	8			193	270	0.71	291	270	1.08	1779	0.0	0.0	7128	2.2	0.0
30985	285	6	12	7	Existing	176	156	1.13	275	985	0.28	1796	1.5	0.0	10798	2.2	0.0
30986	235	6	12	7	Existing	141	129	1.09	226	822	0.28	1805	0.2	0.0	1796	1.5	0.0
30987	175	6	6			37	112	0.33	1	112	0.01	1808	1.5	0.0	1807	2.7	0.0
30988	250	6	6			38	112	0.34	1	112	0.01	1795	3.4	0.0	1808	1.5	0.0
30989	265	6	6			23	113	0.20	1	113	0.01	1809	3.1	0.0	1795	3.4	0.0
30990	183	8	8			138	347	0.40	138	347	0.40	1807	2.7	0.0	1797	1.6	0.0
30991	263	6	6			21	155	0.13	1	155	0.00	1753	3.6	0.0	1796	1.5	0.0
30992	155	8	8			69	391	0.18	67	392	0.17	1798	4.4	0.0	1807	2.7	0.0
30993	286	6	6			67	147	0.46	67	147	0.45	1849	5.1	0.0	1798	4.4	0.0
30994	81	6	6			67	147	0.46	67	147	0.45	1810	5.1	0.0	1849	5.1	0.0
30995	193	6	6			1	156	0.00	1	156	0.00	1811	0.0	0.0	7458	0.0	0.0
30996	197	6	6			1	154	0.00	1	154	0.00	1738	0.0	0.0	1811	0.0	0.0
30997	100	6	6			1	185	0.00	1	185	0.00	1740	0.0	0.0	7458	0.0	0.0
30998	139	20	20			1,094	3,626	0.30	1,293	3,628	0.36	1803	2.4	0.0	1812	2.4	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30999	196	12	15	8	Existing	1,031	1,122	0.92	1,235	2,033	0.61	1813	1.2	0.0	1803	2.4	0.0
31000	360	10	10			368	533	0.69	367	532	0.69	1799	1.5	0.0	1813	1.2	0.0
31001	457	10	10			246	468	0.53	245	468	0.52	1800	1.6	0.0	7228	1.3	0.0
31002	300	6	6			6	167	0.03	1	167	0.00	1815	0.0	0.0	1800	1.6	0.0
31003	304	6	6			1	174	0.00	1	174	0.00	7168	0.0	0.0	1815	0.0	0.0
31004	319	8	8			65	341	0.19	63	342	0.18	1816	3.9	0.0	7228	1.3	0.0
31005	262	8	8			3	341	0.01	1	342	0.00	7459	0.0	0.0	1816	3.9	0.0
31006	283	8	8			72	353	0.20	1	354	0.00	1817	3.6	0.0	1799	1.5	0.0
31007	287	8	8			10	352	0.03	1	352	0.00	1818	6.3	0.0	1817	3.6	0.0
31008	268	10	15	8	Existing	633	673	0.94	809	1,983	0.41	1819	2.6	0.0	1813	1.2	0.0
31009	266	10	15	8	Existing	649	608	1.07	808	1,792	0.45	7460	3.3	0.0	1819	2.6	0.0
31010	85	6	6			58	251	0.23	58	251	0.23	1802	4.3	0.0	1803	2.4	0.0
31011	317	6	6			57	248	0.23	57	248	0.23	1820	0.0	0.0	1802	4.3	0.0
31013	31	6	6			8	335	0.02	1	335	0.00	1822	7.9	0.0	1821	7.2	0.0
31014	126	10	18	5	Existing	679	644	1.05	2,006	3,090	0.65	1759	7.7	0.0	1821	7.2	0.0
31015	150	15	18	5	Existing	1,553	1,835	0.85	2,491	2,984	0.83	1823	7.6	0.0	1759	7.7	0.0
31017	185	12	18	5	Existing	1,513	1,047	1.45	2,454	3,085	0.80	1773	1.8	0.0	10799	4.9	0.0
31018	144	12	18	5	Existing	1,397	1,230	1.14	2,319	3,626	0.64	1768	0.1	0.0	1773	1.8	0.0
31019	128	12	18	5	Existing	1,396	1,226	1.14	2,318	3,615	0.64	1769	0.7	0.0	1768	0.1	0.0
31020	285	12	12			1,056	1,219	0.87	901	1,219	0.74	1778	1.4	0.0	1769	0.7	0.0
31021	239	6	6			179	145	1.23	0	145	0.00	1826	0.8	0.0	1783	1.7	0.0
31022	380	12	18	5	Existing	590	754	0.78	1,416	2,224	0.64	1771	2.5	0.0	1769	0.7	0.0
31023	358	8	18	5	Existing	573	341	1.68	1,415	2,962	0.48	1827	0.0	0.0	1771	2.5	0.0
31024	381	8	8			75	278	0.27	59	278	0.21	1772	4.7	0.0	1773	1.8	0.0
31025	362	8	8			74	278	0.27	58	278	0.21	1757	5.4	0.0	1772	4.7	0.0
31026	340	8	8			44	280	0.16	1	280	0.00	1756	7.6	0.0	1757	5.4	0.0
31027	380	10	10			695	651	1.07	219	650	0.34	1770	0.0	0.0	1778	1.4	0.0
31028	360	10	10			535	747	0.72	0	747	0.00	1828	1.5	0.0	1770	0.0	0.0
31030	50	12	12			440	881	0.50	243	881	0.28	1763	6.4	0.0	1762	6.3	0.0
31031	133	12	12			874	195	4.48	485	195	2.49	1759	7.7	0.0	1763	6.4	0.0
31032	291	6	6			26	128	0.20	1	128	0.01	1743	4.1	0.0	1797	1.6	0.0
31033	447	8	8			47	340	0.14	1	340	0.00	1830	1.0	0.0	1827	0.0	0.0
31034	292	8	8			1	689	0.00	1	690	0.00	1746	0.0	0.0	1755	0.0	0.0
31035	131	12	12			131	1,169	0.11	131	1,169	0.11	1767	0.0	0.0	1755	0.0	0.0
31036	283	12	15	5	Existing	1,136	1,051	1.08	1,340	1,905	0.70	7227	1.8	0.0	1828	1.5	0.0
31037	145	12	15	5	Existing	1,090	1,046	1.04	1,294	1,897	0.68	1831	2.0	0.0	7227	1.8	0.0
31038	137	12	15	5	Existing	1,090	1,047	1.04	1,294	1,899	0.68	1812	2.4	0.0	1831	2.0	0.0
31039	290	6	6			36	209	0.17	1	209	0.00	1747	5.1	0.0	1831	2.0	0.0
31040	442	6	6			49	148	0.33	1	148	0.00	1748	4.0	0.0	7227	1.8	0.0
31042	142	12	12			4	865	0.00	4	865	0.00	1792	0.0	0.0	1765	0.0	0.0
31043	172	6	6			1	159	0.00	1	159	0.00	1750	0.0	0.0	1793	0.0	0.0
31044	133	10	10			3	523	0.01	3	522	0.01	1791	0.0	0.0	1792	0.0	0.0
31045	11	12	12			2	1,662	0.00	2	1,662	0.00	1754	0.0	0.0	1791	0.0	0.0
31046	145	8	8			1	276	0.01	1	276	0.01	1832	0.0	0.0	1754	0.0	0.0
31047	231	8	8			1	276	0.00	1	277	0.00	7229	0.0	0.0	1832	0.0	0.0
31048	180	6	6			1	144	0.00	1	144	0.00	1751	0.0	0.0	1790	0.0	0.0
31049	278	8	8			106	524	0.20	106	525	0.20	1835	0.0	0.0	1833	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31050	166	8	8			1	484	0.00	1	484	0.00	10781	0.0	0.0	1754	0.0	0.0
31051	424	8	8			106	351	0.30	106	352	0.30	1790	0.0	0.0	1835	0.0	0.0
31052	189	8	8			1	401	0.00	1	401	0.00	1838	0.0	0.0	1837	0.0	0.0
31053	55	10	10			303	506	0.60	313	505	0.62	1761	6.3	8.2	1762	6.3	0.0
31054	160	10	10			303	322	0.94	311	322	0.97	1788	3.8	0.0	1787	5.5	0.0
31055	96	12	15	4	Existing	539	663	0.81	790	1,202	0.66	1760	6.1	0.0	1762	6.3	0.0
31056	136	12	15	4	Existing	537	659	0.81	790	1,195	0.66	1786	5.4	0.0	1760	6.1	0.0
31057	150	12	15	4	Existing	453	645	0.70	691	1,170	0.59	1789	3.7	0.0	1786	5.4	0.0
31058	8	12	12			325	919	0.35	311	919	0.34	1788	3.8	0.0	1789	3.7	0.0
31060	3	8	8			1	360	0.00	1	360	0.00	1847	0.0	0.0	7461	0.0	0.0
31071	143	6	6			20	308	0.07	1	308	0.00	1886	2.8	0.0	1889	2.6	0.0
31073	241	8	8			356	369	0.96	356	370	0.96	1900	0.0	0.0	1864	0.0	0.0
31074	415	6	6			69	278	0.25	69	278	0.25	1878	0.0	0.0	1900	0.0	0.0
31075	106	6	6			1	331	0.00	1	331	0.00	7660	0.0	0.0	7169	0.0	0.0
31076	40	8	8			285	321	0.89	285	321	0.89	1901	0.0	0.0	1900	0.0	0.0
31077	313	8	8			285	403	0.71	285	404	0.70	1868	0.0	0.0	1901	0.0	0.0
31078	89	8	8			1	402	0.00	1	403	0.00	1940	0.0	0.0	1868	0.0	0.0
31080	414	8	8			216	452	0.48	216	453	0.48	1902	0.0	0.0	1868	0.0	0.0
31081	300	8	8			137	453	0.30	137	454	0.30	7230	0.0	0.0	1902	0.0	0.0
31082	245	8	8			136	451	0.30	136	451	0.30	1903	0.0	0.0	7230	0.0	0.0
31083	430	8	8			1	579	0.00	1	580	0.00	7004	0.0	0.0	1903	0.0	0.0
31084	300	8	8			1	449	0.00	1	449	0.00	1904	0.0	0.0	1903	0.0	0.0
31085	350	6	6			67	182	0.37	67	182	0.37	1905	0.0	0.0	1868	0.0	0.0
31086	203	6	6			2	259	0.01	2	259	0.01	7464	0.0	0.0	1906	0.0	0.0
31087	300	6	6			1	266	0.01	1	266	0.01	1876	0.0	0.0	7464	0.0	0.0
31088	104	6	6			1	228	0.00	1	228	0.00	1939	0.0	0.0	1876	0.0	0.0
31089	347	6	6			2	258	0.01	2	258	0.01	1870	0.0	0.0	7002	3.2	0.0
31090	350	6	6			1	256	0.01	1	256	0.01	1907	0.0	0.0	1870	0.0	0.0
31091	128	6	6			1	241	0.00	1	241	0.00	1855	0.0	0.0	1907	0.0	0.0
31092	504	8	15	2	Existing	558	392	1.42	985	2,093	0.47	1880	0.0	0.0	1871	0.7	0.0
31093	308	8	8			28	331	0.09	28	331	0.09	1877	0.0	0.0	1908	0.0	0.0
31094	114	6	6			1	251	0.00	1	251	0.00	1910	0.0	0.0	1877	0.0	0.0
31095	284	6	6			1	149	0.00	1	149	0.00	1856	0.0	0.0	1908	0.0	0.0
31097	45	8	15	2	Existing	642	394	1.63	1,147	2,106	0.54	1913	0.8	0.0	1872	1.0	0.0
31098	470	8	15	2	Existing	640	402	1.59	1,147	2,150	0.53	1914	0.6	0.0	1913	0.8	0.0
31099	540	8	15	2	Existing	558	393	1.42	986	2,101	0.47	1871	0.7	0.0	1914	0.6	0.0
31100	146	10	10			538	822	0.65	518	821	0.63	1915	2.0	0.0	1916	0.0	0.0
31101	239	8	8			103	452	0.23	2	453	0.00	1917	2.8	0.0	1915	2.0	0.0
31102	221	8	8			94	452	0.21	1	453	0.00	1887	2.8	0.0	1917	2.8	0.0
31103	235	6	6			42	211	0.20	1	211	0.00	1918	5.3	0.0	1887	2.8	0.0
31104	309	8	8			210	642	0.33	66	643	0.10	1920	2.7	0.0	1919	0.1	0.0
31105	133	10	10			345	781	0.44	517	780	0.66	1916	0.0	0.0	1919	0.1	0.0
31106	325	6	6			143	119	1.20	0	119	0.00	7463	0.0	0.0	7003	2.7	0.0
31108	276	20	20			472	2,518	0.19	671	2,519	0.27	7003	2.7	0.0	1889	2.6	0.0
31109	237	12	12			564	814	0.69	761	814	0.94	1889	2.6	0.0	1890	1.1	0.0
31110	444	12	12			561	783	0.72	761	783	0.97	1890	1.1	0.0	1891	0.0	0.0
31111	143	10	15	4	Existing	653	372	1.76	877	1,097	0.80	1892	0.7	0.0	1893	2.6	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31112	372	6	6			103	133	0.77	1	133	0.01	1921	0.0	0.0	1892	0.7	0.0
31113	156	10	10			481	756	0.64	582	756	0.77	1919	0.1	0.0	1922	1.2	0.0
31114	280	10	10			480	780	0.62	582	780	0.75	1922	1.2	0.0	1874	3.5	0.0
31115	81	10	15	2	Existing	501	785	0.64	774	2,316	0.33	1874	3.5	0.0	1866	4.0	0.0
31118	143	6	6			3	232	0.01	3	232	0.01	1885	0.0	0.0	1850	0.0	0.0
31119	113	6	6			1	217	0.01	1	217	0.01	1851	0.0	0.0	1885	0.0	0.0
31120	58	6	6			1	214	0.00	1	214	0.00	1938	0.0	0.0	1885	0.0	0.0
31121	175	10	15	2	Existing	505	776	0.65	810	2,288	0.35	1866	4.0	0.0	7462	4.3	0.0
31122	175	10	15	2	Existing	506	776	0.65	810	2,288	0.35	7462	4.3	0.0	1898	3.2	0.0
31123	225	10	15	2	Existing	583	778	0.75	912	2,296	0.40	1898	3.2	0.0	1875	2.8	0.0
31124	273	8	8			98	905	0.11	46	906	0.05	1923	4.6	0.0	1898	3.2	0.0
31125	290	6	6			1	296	0.00	1	296	0.00	1896	0.0	0.0	1923	4.6	0.0
31126	286	8	8			44	572	0.08	44	573	0.08	1897	0.0	0.0	1923	4.6	0.0
31127	289	6	6			1	297	0.00	1	297	0.00	1895	0.0	0.0	1897	0.0	0.0
31128	175	8	8			1	576	0.00	1	576	0.00	1924	0.0	0.0	1897	0.0	0.0
31129	595	8	8			67	392	0.17	1	393	0.00	1881	2.0	0.0	1880	0.0	0.0
31130	397	8	8			1	456	0.00	1	457	0.00	1879	0.0	0.0	1904	0.0	0.0
31131	17	6	6			1	217	0.01	1	217	0.01	1937	0.0	0.0	1925	0.0	0.0
31132	21	6	6			1	206	0.01	1	206	0.01	1936	0.0	0.0	1925	0.0	0.0
31133	274	8	8			47	664	0.07	46	665	0.07	1927	0.0	0.0	1863	7.4	0.0
31134	6	6	6			1	903	0.00	1	903	0.00	8661	0.0	0.0	1927	0.0	0.0
31135	100	10	15	4	Existing	751	452	1.66	1,001	1,333	0.75	7465	5.8	0.0	1894	6.6	0.0
31136	274	10	15	4	Existing	750	377	1.99	1,001	1,112	0.90	1893	2.6	0.0	1928	5.8	0.0
31137	96	8	8			1	444	0.00	1	444	0.00	1861	0.0	0.0	1877	0.0	0.0
31138	260	8	8			1	664	0.00	1	665	0.00	1929	0.0	0.0	1877	0.0	0.0
31140	150	6	6			2	512	0.00	2	512	0.00	1967	0.0	0.0	1966	4.2	0.0
31141	250	6	6			1	188	0.01	1	188	0.01	1946	0.0	0.0	1967	0.0	0.0
31142	280	6	6			1	298	0.00	1	298	0.00	1963	0.0	0.0	1946	0.0	0.0
31143	66	10	10			466	1,051	0.44	465	1,050	0.44	1945	4.1	0.0	1968	3.8	0.0
31144	124	10	10			199	643	0.31	166	642	0.26	1966	4.2	0.0	1945	4.1	0.0
31145	126	10	10			198	822	0.24	164	821	0.20	7387	3.9	0.0	1966	4.2	0.0
31146	192	8	8			232	408	0.57	234	409	0.57	1944	2.9	0.0	1945	4.1	0.0
31147	117	6	6			163	344	0.47	163	344	0.47	1971	0.0	0.0	1965	6.0	0.0
31148	414	6	6			160	353	0.45	160	353	0.45	7466	0.0	0.0	1971	0.0	0.0
31150	475	8	8			203	221	0.92	202	221	0.92	7233	6.5	6.5	1977	10.3	10.3
31151	180	6	6			138	102	1.35	103	102	1.01	1953	0.0	0.0	1954	1.2	0.0
31152	6	8	8			139	844	0.16	283	845	0.34	1954	1.2	0.0	1955	1.2	0.0
31153	35	6	6			187	125	1.49	390	125	3.12	1955	1.2	0.0	1956	1.3	0.0
31155	195	6	6			187	150	1.25	245	150	1.63	1956	1.3	0.0	1957	4.0	5.5
31156	377	10	10			383	408	0.94	442	407	1.09	1957	4.0	5.5	1961	4.4	6.3
31158	390	10	10			415	458	0.91	492	457	1.08	1961	4.4	6.3	7724	3.5	6.1
31160	451	10	10			551	526	1.05	608	525	1.16	7724	3.5	6.1	1948	1.3	0.0
31161	53	8	8			1	449	0.00	1	449	0.00	1972	0.0	0.0	1973	0.0	0.0
31162	45	8	8			203	956	0.21	203	957	0.21	1943	0.0	0.0	1973	0.0	0.0
31163	218	8	8			1	447	0.00	1	447	0.00	7232	0.0	0.0	1943	0.0	0.0
31164	430	8	8			1	337	0.00	1	337	0.00	1949	0.0	0.0	7170	8.4	8.4
31165	250	8	8			21	222	0.09	19	222	0.09	1960	4.8	4.9	7233	6.5	6.5

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31166	240	8	8			1	318	0.00	1	319	0.00	1975	0.0	0.0	1952	0.0	0.0
31167	298	8	8			241	438	0.55	288	438	0.66	1959	0.0	0.0	1944	2.9	0.0
31168	40	8	8			117	641	0.18	1	642	0.00	1970	1.2	0.0	1944	2.9	0.0
31169	450	8	8			58	220	0.26	58	220	0.26	7170	8.4	8.4	7005	8.6	8.6
31177	387	16	16			2,769	2,713	1.02	2,924	2,713	1.08	9989	0.0	9.5	2026	0.0	0.0
31178	714	16	16			2,547	2,160	1.18	2,704	2,160	1.25	2016	9.0	7.8	9989	0.0	9.5
31179	259	16	16			2,547	3,169	0.80	2,703	3,169	0.85	2017	0.0	4.7	2016	9.0	7.8
31180	316	16	16			1,349	3,165	0.43	887	3,163	0.28	2003	0.0	0.0	2017	0.0	4.7
31181	129	30	30			4,534	9,187	0.49	6,509	9,187	0.71	1993	0.0	0.0	1992	0.0	0.0
31182	403	30	30			4,481	9,694	0.46	6,458	9,694	0.67	1994	0.0	0.0	1993	0.0	0.0
31183	228	30	30			4,481	8,999	0.50	6,457	8,999	0.72	2018	0.0	0.0	1994	0.0	0.0
31185	68	8	8			41	708	0.06	41	709	0.06	1996	0.0	0.0	1997	0.0	0.0
31186	239	8	8			1	406	0.00	1	407	0.00	1995	0.0	0.0	1996	0.0	0.0
31188	117	30	30			4,302	9,854	0.44	6,281	9,854	0.64	1989	0.0	0.0	2005	0.0	0.0
31189	298	8	8			1	405	0.00	1	406	0.00	1988	0.0	0.0	1989	0.0	0.0
31190	291	8	8			1	401	0.00	1	401	0.00	7235	0.0	0.0	1988	0.0	0.0
31191	41	15	15			2	7,400	0.00	2	7,400	0.00	2025	0.0	0.0	2026	0.0	0.0
31192	203	6	6			1	231	0.00	1	231	0.00	7661	0.0	0.0	2025	0.0	0.0
31195	153	6	6			1	208	0.01	1	208	0.01	2007	0.0	0.0	2008	0.0	0.0
31196	92	6	6			3	219	0.01	3	219	0.01	7171	0.0	0.0	2008	0.0	0.0
31197	60	6	6			2	192	0.01	2	192	0.01	2009	0.0	0.0	7171	0.0	0.0
31198	140	6	6			1	195	0.00	1	195	0.00	2035	0.0	0.0	2009	0.0	0.0
31199	240	6	6			1	201	0.00	1	201	0.00	2034	0.0	0.0	2009	0.0	0.0
31200	245	8	8			1	695	0.00	1	696	0.00	2006	0.0	0.0	2008	0.0	0.0
31201	163	6	6			1	248	0.00	1	248	0.00	2033	0.0	0.0	2007	0.0	0.0
31202	178	27	27			4,299	11,938	0.36	6,278	11,938	0.53	8923	0.0	0.0	2020	0.0	0.0
31203	37	27	27			4,198	19,098	0.22	6,179	19,098	0.32	2021	0.0	0.0	8920	0.0	0.0
31204	242	10	10			0	2,217	0.00	0	2,215	0.00	2003	0.0	0.0	2021	0.0	0.0
31205	268	10	15	2	Existing	1,198	997	1.20	1,823	2,938	0.62	2004	10.2	0.0	2017	0.0	4.7
31206	288	10	15	2	Existing	1,152	1,004	1.15	1,777	2,960	0.60	7234	5.8	0.0	2004	10.2	0.0
31207	125	10	15	2	Existing	1,151	597	1.93	1,776	1,760	1.01	2002	4.7	0.0	7234	5.8	0.0
31208	247	10	15	2	Existing	1,065	754	1.41	1,669	2,224	0.75	2022	6.5	0.0	2002	4.7	0.0
31209	240	10	15	2	Existing	1,063	801	1.33	1,667	2,362	0.71	2013	2.5	0.0	2022	6.5	0.0
31210	283	10	15	2	Existing	1,004	803	1.25	1,601	2,367	0.68	2012	0.0	0.0	2013	2.5	0.0
31212	237	8	8			28	679	0.04	3	680	0.00	2001	0.0	0.0	2002	4.7	0.0
31213	35	8	8			2	622	0.00	2	623	0.00	2000	0.0	0.0	2001	0.0	0.0
31214	133	6	6			1	192	0.00	1	192	0.00	1987	0.0	0.0	2000	0.0	0.0
31217	375	6	6			97	176	0.55	97	176	0.55	7388	1.5	0.0	2014	0.4	0.0
31218	75	12	12			1	1,345	0.00	1	1,345	0.00	2030	0.0	0.0	2025	0.0	0.0
31219	525	6	6			1	383	0.00	1	383	0.00	2032	0.0	0.0	9987	0.0	0.0
31242	229	8	8			72	340	0.21	72	340	0.21	2084	0.0	0.0	2091	0.0	0.0
31243	213	8	8			72	349	0.21	72	349	0.21	2091	0.0	0.0	2092	0.0	0.0
31244	386	8	8			72	344	0.21	72	344	0.21	2093	0.0	0.0	2084	0.0	0.0
31245	62	8	8			37	284	0.13	37	285	0.13	2086	0.0	0.0	2093	0.0	0.0
31246	332	8	8			1	344	0.00	1	345	0.00	2094	0.0	0.0	2085	0.0	0.0
31257	395	8	8			29	308	0.09	29	308	0.09	2124	0.0	0.0	2125	0.0	0.0
31259	217	8	8			172	283	0.61	172	283	0.61	2135	0.0	0.0	2126	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31260	30	8	8			172	262	0.66	172	263	0.65	2127	0.0	0.0	2135	0.0	0.0
31261	486	8	8			172	342	0.50	172	343	0.50	2128	0.0	0.0	2127	0.0	0.0
31262	447	8	8			131	344	0.38	131	344	0.38	2129	0.0	0.0	2128	0.0	0.0
31263	295	8	8			203	251	0.81	202	251	0.81	2125	0.0	0.0	2136	0.0	0.0
31264	408	8	8			130	343	0.38	130	343	0.38	2130	0.0	0.0	2129	0.0	0.0
31265	505	8	8			90	333	0.27	90	333	0.27	2133	0.0	0.0	2130	0.0	0.0
31267	475	8	8			90	351	0.25	90	351	0.25	7389	0.0	0.0	2133	0.0	0.0
31268	296	8	8			39	660	0.06	39	660	0.06	2137	0.0	0.0	7006	0.0	0.0
31269	275	8	8			29	338	0.09	29	339	0.09	2113	0.0	0.0	2109	0.0	0.0
31270	90	8	8			33	343	0.10	33	344	0.10	2110	0.0	0.0	2109	0.0	0.0
31271	305	8	8			101	338	0.30	101	338	0.30	2131	0.0	0.0	2103	0.0	0.0
31272	120	8	8			75	340	0.22	75	340	0.22	2107	0.0	0.0	2131	0.0	0.0
31273	190	8	8			63	338	0.19	63	339	0.19	2108	0.0	0.0	2107	0.0	0.0
31274	75	8	8			63	493	0.13	63	494	0.13	2109	0.0	0.0	2108	0.0	0.0
31275	148	8	8			19	342	0.05	19	343	0.05	2097	0.0	0.0	2110	0.0	0.0
31276	257	8	8			11	350	0.03	11	351	0.03	2138	0.0	0.0	2107	0.0	0.0
31277	352	8	8			25	342	0.07	25	342	0.07	2114	0.0	0.0	2131	0.0	0.0
31278	355	8	8			120	340	0.35	120	341	0.35	2139	0.0	0.0	2101	0.0	0.0
31280	351	15	18	1	ura	1,389	1,105	1.26	1,477	1,797	0.82	2120	6.0	0.0	7469	0.0	0.0
31281	160	8	8			1	542	0.00	1	543	0.00	2098	0.0	0.0	2106	0.0	0.0
31282	68	8	8			1	378	0.00	1	378	0.00	2099	0.0	0.0	2106	0.0	0.0
31283	330	15	18	1	ura	1,388	1,106	1.26	1,476	1,798	0.82	2119	7.1	0.0	2120	6.0	0.0
31284	290	15	18	1	ura	1,388	1,180	1.18	1,476	1,918	0.77	2102	0.0	0.0	2119	7.1	0.0
31285	402	8	8			22	375	0.06	22	375	0.06	2123	0.0	0.0	2102	0.0	0.0
31287	318	8	8			215	253	0.85	217	253	0.86	2140	0.0	0.0	2102	0.0	0.0
31288	319	12	15	1	ura	1,117	749	1.49	1,202	1,358	0.88	2122	7.0	0.0	2102	0.0	0.0
31289	336	12	15	1	ura	1,116	740	1.51	1,202	1,342	0.90	2101	0.0	0.0	2122	7.0	0.0
31290	251	8	8			31	347	0.09	28	348	0.08	2104	7.3	0.0	2101	0.0	0.0
31291	29	8	8			27	349	0.08	27	349	0.08	2105	0.0	0.0	2104	7.3	0.0
31292	293	8	8			27	343	0.08	26	343	0.08	7236	0.0	0.0	2105	0.0	0.0
31293	85	6	6			1	326	0.00	1	326	0.00	2100	0.0	0.0	2105	0.0	0.0
31294	32	8	8			29	407	0.07	29	408	0.07	2111	0.0	0.0	2113	0.0	0.0
31295	191	8	8			28	351	0.08	28	351	0.08	2115	0.0	0.0	2112	0.0	0.0
31296	45	8	8			14	388	0.04	14	388	0.04	2116	0.0	0.0	2115	0.0	0.0
31297	350	8	8			11	343	0.03	11	344	0.03	7470	0.0	0.0	2134	0.0	0.0
31298	323	18	18			2,790	4,271	0.65	3,679	4,271	0.86	2147	0.0	0.0	2172	0.0	0.0
31300	323	24	24			3,440	8,527	0.40	4,803	8,527	0.56	2147	0.0	0.0	2172	0.0	0.0
31301	10	12	12			103	715	0.14	103	715	0.14	7008	0.0	0.0	2181	0.0	0.0
31303	175	33	33			7,672	12,153	0.63	9,774	12,153	0.80	2151	0.0	0.0	2171_2	0.0	0.0
31304	341	33	33			7,672	11,133	0.69	9,774	11,133	0.88	2172	0.0	0.0	2151	0.0	0.0
31305	61	8	8			29	310	0.09	29	311	0.09	2164	0.0	0.0	2163	0.0	0.0
31306	240	8	8			131	341	0.38	131	342	0.38	2145	0.0	0.0	2163	0.0	0.0
31307	30	8	8			58	343	0.17	58	344	0.17	2162	0.0	0.0	2145	0.0	0.0
31309	60	8	8			1	350	0.00	1	351	0.00	2189	0.0	0.0	2161	0.0	0.0
31310	83	8	8			72	326	0.22	72	326	0.22	2160	0.0	0.0	2175	0.0	0.0
31311	346	8	8			71	342	0.21	71	343	0.21	2159	0.0	0.0	2160	0.0	0.0
31312	351	8	8			1	342	0.00	1	343	0.00	2158	0.0	0.0	2160	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31313	231	12	12			35	1,078	0.03	35	1,078	0.03	2176	0.0	0.0	2184	0.0	0.0
31314	122	12	12			35	1,044	0.03	35	1,044	0.03	2177	0.0	0.0	2176	0.0	0.0
31316	245	8	8			1	296	0.00	1	297	0.00	2188	0.0	0.0	2178	0.0	0.0
31317	260	12	12			21	818	0.03	21	818	0.03	2178	0.0	0.0	2184	0.0	0.0
31318	40	12	12			57	876	0.07	57	876	0.07	2184	0.0	0.0	2167	0.0	0.0
31319	23	12	12			58	2,983	0.02	58	2,983	0.02	2157	0.0	0.0	2156	0.0	0.0
31320	176	8	8			1	937	0.00	1	938	0.00	7662	0.0	0.0	2157	0.0	0.0
31321	272	12	12			102	894	0.11	102	894	0.11	2156	0.0	0.0	7008	0.0	0.0
31322	173	8	8			5	345	0.01	5	345	0.01	2180	0.0	0.0	2165	0.0	0.0
31323	150	8	8			1	429	0.00	1	430	0.00	2166	0.0	0.0	2165	0.0	0.0
31324	330	12	12			103	872	0.12	103	872	0.12	2155	0.0	0.0	2154	0.0	0.0
31325	323	12	12			103	872	0.12	103	872	0.12	2181	0.0	0.0	2155	0.0	0.0
31326	73	30	30			4,681	9,528	0.49	6,655	9,528	0.70	2182	0.0	0.0	2146	0.0	0.0
31327	227	12	12			104	894	0.12	104	894	0.12	2148	0.0	0.0	2174	0.0	0.0
31331	383	33	33			7,525	11,378	0.66	9,641	11,378	0.85	2153	0.0	0.0	2152	0.0	0.0
31332	415	33	33			7,524	11,535	0.65	9,641	11,535	0.84	7238	0.0	0.0	2153	0.0	0.0
31333	341	8	8			146	405	0.36	146	406	0.36	2168	0.0	0.0	2182	0.0	0.0
31334	204	8	8			145	404	0.36	145	404	0.36	2169	0.0	0.0	2168	0.0	0.0
31335	205	12	12			104	901	0.12	104	901	0.12	2154	0.0	0.0	2148	0.0	0.0
31336	43	8	8			42	740	0.06	42	524	0.08	7472	4.7	0.0	7471	0.0	0.0
31337	22	8	8			43	347	0.12	43	347	0.12	7471	0.0	0.0	2150	0.0	0.0
31338	383	8	8			1	329	0.00	1	330	0.00	2213	0.0	0.0	10000	0.0	0.0
31339	191	8	8			1	342	0.00	1	342	0.00	2205	0.0	0.0	2213	0.0	0.0
31341	355	8	8			337	344	0.98	336	344	0.98	2214	6.0	6.0	2206	5.1	5.1
31343	161	8	8			1	337	0.00	1	337	0.00	2219	0.0	0.0	2204	0.0	0.0
31344	425	8	8			321	343	0.94	322	344	0.94	2206	5.1	5.1	2216	6.5	6.5
31345	120	8	8			1	1,488	0.00	1	1,490	0.00	7663	0.0	0.0	2216	6.5	6.5
31346	375	8	8			1	343	0.00	1	344	0.00	2217	0.0	0.0	7239	0.0	0.0
31347	415	8	8			256	343	0.75	256	344	0.75	2208	0.0	0.0	2207	7.1	7.1
31348	400	8	8			239	344	0.69	239	344	0.69	2211	0.0	0.0	2208	0.0	0.0
31349	69	8	8			239	340	0.70	239	340	0.70	2209	0.0	0.0	2211	0.0	0.0
31350	44	6	6			213	178	1.20	213	178	1.20	2222	0.0	0.0	2209	0.0	0.0
31351	475	8	8			11	343	0.03	11	344	0.03	2202	0.0	0.0	2201	0.0	0.0
31352	335	8	8			8	578	0.01	8	578	0.01	2220	0.0	0.0	2221	0.0	0.0
31353	50	10	10			3	311	0.01	3	310	0.01	7474	0.0	0.0	2200	0.0	0.0
31355	64	8	8			1	263	0.00	1	263	0.00	2199	0.0	0.0	2198	0.0	0.0
31356	105	10	10			1	560	0.00	1	559	0.00	2198	0.0	0.0	2197	0.0	0.0
31357	182	10	10			1	526	0.00	1	525	0.00	2197	0.0	0.0	2196	0.0	0.0
31358	23	10	10			1	649	0.00	1	648	0.00	2196	0.0	0.0	2195	0.0	0.0
31359	61	10	10			2	398	0.01	2	398	0.01	2195	0.0	0.0	2194	0.0	0.0
31360	24	10	10			2	635	0.00	2	634	0.00	2194	0.0	0.0	7474	0.0	0.0
31362	416	8	8			207	378	0.55	207	378	0.55	2241	0.0	0.0	2242	0.0	0.0
31363	436	8	8			192	299	0.64	192	300	0.64	2240	0.0	0.0	11040	0.0	0.0
31364	323	8	8			20	344	0.06	20	344	0.06	2270	0.0	0.0	2240	0.0	0.0
31366	138	8	8			13	340	0.04	13	340	0.04	2259	0.0	0.0	7173	0.0	0.0
31367	135	8	8			62	343	0.18	62	344	0.18	2258	0.0	0.0	7173	0.0	0.0
31368	100	8	8			61	334	0.18	61	335	0.18	7240	0.0	0.0	7009	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31369	38	8	8			60	305	0.20	60	305	0.20	2257	0.0	0.0	7240	0.0	0.0
31370	114	8	8			6	359	0.02	6	360	0.02	2256	0.0	0.0	2257	0.0	0.0
31371	90	8	8			6	404	0.01	6	405	0.01	7664	0.0	0.0	2256	0.0	0.0
31372	102	8	8			13	269	0.05	13	269	0.05	2252	0.0	0.0	2257	0.0	0.0
31373	362	8	8			6	342	0.02	6	342	0.02	2253	0.0	0.0	2252	0.0	0.0
31374	220	8	8			42	373	0.11	42	374	0.11	2255	0.0	0.0	2257	0.0	0.0
31375	154	8	8			14	406	0.03	14	406	0.03	2284	0.0	0.0	2255	0.0	0.0
31376	374	8	8			28	387	0.07	28	387	0.07	2254	0.0	0.0	2255	0.0	0.0
31377	220	8	8			9	345	0.03	9	345	0.03	2260	0.0	0.0	2261	0.0	0.0
31378	300	8	8			9	751	0.01	9	752	0.01	7475	0.0	0.0	2261	0.0	0.0
31379	119	8	8			1	344	0.00	1	345	0.00	2311	0.0	0.0	7475	0.0	0.0
31380	210	8	8			1	339	0.00	1	340	0.00	2262	0.0	0.0	7475	0.0	0.0
31381	325	8	8			32	271	0.12	3	271	0.01	2264	0.0	0.0	2265	3.2	0.0
31382	371	8	8			67	342	0.19	48	343	0.14	2285	3.8	0.0	2263	2.5	0.0
31385	350	10	10			474	517	0.92	482	517	0.93	2266	4.9	0.0	2265	3.2	0.0
31386	335	10	10			473	521	0.91	482	520	0.93	2269	4.9	0.0	2266	4.9	0.0
31387	20	8	8			115	343	0.34	114	344	0.33	2268	5.7	0.0	2269	4.9	0.0
31388	360	10	10			507	513	0.99	547	513	1.07	2250	3.7	0.0	2249	4.2	0.0
31389	315	10	10			508	523	0.97	547	522	1.05	2249	4.2	0.0	2237	4.9	0.0
31390	35	12	12			938	811	1.16	979	811	1.21	2237	4.9	0.0	2248	4.7	0.0
31391	450	8	8			440	434	1.01	434	435	1.00	2287	0.0	0.0	2237	4.9	0.0
31392	301	8	8			41	342	0.12	1	343	0.00	2247	3.0	0.0	2248	4.7	0.0
31393	298	8	8			41	344	0.12	1	344	0.00	2246	0.0	0.0	2247	3.0	0.0
31394	418	12	15	1	ura	951	754	1.26	1,015	1,367	0.74	2248	4.7	0.0	2288	4.3	0.0
31395	22	12	15	1	ura	957	763	1.26	1,015	1,382	0.73	2288	4.3	0.0	2289	4.6	0.0
31396	82	8	8			47	240	0.19	39	240	0.16	2290	4.0	0.0	2289	4.6	0.0
31398	97	8	8			14	408	0.03	14	409	0.03	2293	0.0	0.0	2292	0.0	0.0
31399	200	8	8			7	279	0.02	7	280	0.02	2230	0.0	0.0	2294	0.0	0.0
31400	434	8	8			105	376	0.28	101	377	0.27	7241	0.0	0.0	2267	4.9	0.0
31401	385	8	8			84	377	0.22	84	378	0.22	7476	0.0	0.0	2281	0.0	0.0
31402	238	8	8			37	875	0.04	37	876	0.04	2282	0.0	0.0	7476	0.0	0.0
31403	262	8	8			37	874	0.04	37	876	0.04	2283	0.0	0.0	2282	0.0	0.0
31404	500	8	8			40	343	0.12	40	344	0.12	2295	0.0	0.0	2285	3.8	0.0
31405	60	8	8			40	272	0.15	40	272	0.15	2278	0.0	0.0	2295	0.0	0.0
31406	122	8	8			39	351	0.11	39	351	0.11	2279	0.0	0.0	2278	0.0	0.0
31407	396	8	8			17	342	0.05	17	343	0.05	2274	0.0	0.0	2296	0.0	0.0
31408	396	8	8			10	342	0.03	10	343	0.03	2277	0.0	0.0	2279	0.0	0.0
31409	265	8	8			9	343	0.03	9	344	0.03	2276	0.0	0.0	2277	0.0	0.0
31410	145	8	8			8	355	0.02	8	355	0.02	2275	0.0	0.0	2276	0.0	0.0
31411	450	8	8			422	434	0.97	422	435	0.97	2297	0.0	0.0	2287	0.0	0.0
31412	448	8	8			409	344	1.19	409	344	1.19	2298	6.6	6.6	2297	0.0	0.0
31413	385	8	8			399	345	1.15	399	346	1.15	7242	6.4	6.4	2298	6.6	6.6
31414	40	6	6			19	199	0.09	19	199	0.10	2229	6.1	6.1	7242	6.4	6.4
31415	201	6	6			6	194	0.03	6	194	0.03	2232	0.0	0.0	2229	6.1	6.1
31416	83	8	8			390	347	1.12	390	348	1.12	2238	0.0	0.0	7242	6.4	6.4
31417	375	8	8			1	343	0.00	1	344	0.00	7391	0.0	0.0	2238	0.0	0.0
31418	132	8	8			1	344	0.00	1	344	0.00	2299	0.0	0.0	2293	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31419	340	8	8			132	340	0.39	132	341	0.39	2301	0.0	0.0	2240	0.0	0.0
31420	13	8	8			131	369	0.36	131	369	0.36	2244	0.0	0.0	2301	0.0	0.0
31421	152	8	8			131	344	0.38	131	344	0.38	2245	0.0	0.0	2244	0.0	0.0
31422	177	8	8			66	381	0.17	66	381	0.17	2303	0.0	0.0	2302	0.0	0.0
31423	515	8	8			42	342	0.12	39	342	0.11	2272	0.0	0.0	2271	0.0	0.0
31424	30	8	8			48	1,430	0.03	40	1,432	0.03	2271	0.0	0.0	2239	3.5	0.0
31425	471	8	8			339	344	0.99	340	344	0.99	2239	3.5	0.0	2243	6.8	9.2
31426	452	8	8			353	342	1.03	353	343	1.03	2243	6.8	9.2	7010	6.5	9.0
31427	464	8	8			369	342	1.08	367	343	1.07	7010	6.5	9.0	2269	4.9	0.0
31431	42	8	8			13	410	0.03	13	410	0.03	2357	0.0	0.0	2344	0.0	0.0
31433	134	8	8			1	338	0.00	1	338	0.00	2332	0.0	0.0	7392	0.0	0.0
31434	86	8	8			1	341	0.00	1	342	0.00	2331	0.0	0.0	2332	0.0	0.0
31435	346	8	8			1	342	0.00	1	343	0.00	7477	0.0	0.0	2331	0.0	0.0
31436	58	8	8			28	342	0.08	28	342	0.08	2346	0.0	0.0	2345	0.0	0.0
31437	117	8	8			28	340	0.08	28	340	0.08	2337	0.0	0.0	2346	0.0	0.0
31438	198	8	8			28	342	0.08	28	343	0.08	2338	0.0	0.0	2337	0.0	0.0
31439	214	8	8			13	344	0.04	13	344	0.04	2342	0.0	0.0	2338	0.0	0.0
31440	75	8	8			13	343	0.04	13	344	0.04	2343	0.0	0.0	2342	0.0	0.0
31441	359	8	8			12	340	0.03	12	340	0.03	2340	0.0	0.0	2343	0.0	0.0
31442	94	8	8			11	345	0.03	11	345	0.03	2341	0.0	0.0	2340	0.0	0.0
31443	230	8	8			76	385	0.20	76	385	0.20	2335	0.0	0.0	2336	0.0	0.0
31444	280	6	6			1	195	0.00	1	195	0.00	2316	0.0	0.0	2336	0.0	0.0
31445	190	8	8			24	305	0.08	24	305	0.08	2349	0.0	0.0	2348	0.0	0.0
31446	84	8	8			24	272	0.09	24	272	0.09	2350	0.0	0.0	2349	0.0	0.0
31447	295	8	8			24	279	0.08	24	279	0.08	2347	0.0	0.0	2350	0.0	0.0
31448	102	8	8			1	344	0.00	1	344	0.00	2339	0.0	0.0	2338	0.0	0.0
31449	80	8	8			1	343	0.00	1	344	0.00	2317	0.0	0.0	2339	0.0	0.0
31454	649	54	54			22,617	95,201	0.24	24,208	95,201	0.25	2326	0.0	0.0	2325	0.0	0.0
31455	130	54	54			22,617	122,410	0.18	24,208	122,410	0.20	2325	0.0	0.0	2324	0.0	0.0
31456	230	54	54			22,615	30,796	0.73	24,208	30,796	0.79	2324	0.0	0.0	2323	0.0	0.0
31457	1741	54	54			22,615	22,286	1.01	24,208	22,286	1.09	2323	0.0	0.0	2314	0.0	0.0
31471	473	54	54			26,514	28,117	0.94	30,381	28,117	1.08	2361	0.0	0.0	2369	0.0	0.0
31472	221	54	54			26,513	53,104	0.50	30,380	53,104	0.57	2362	0.0	0.0	2361	0.0	0.0
31474	101	54	54			22,615	30,424	0.74	24,202	30,424	0.80	2364	0.0	0.0	2363	0.0	0.0
31485	236	15	15			185	1,117	0.17	147	1,117	0.13	2421	0.0	0.0	2400	0.0	0.0
31486	87	15	15			184	933	0.20	147	933	0.16	2398	0.0	0.0	2421	0.0	0.0
31487	290	15	15			167	1,035	0.16	128	1,035	0.12	7479	0.0	0.0	2398	0.0	0.0
31488	139	15	15			167	1,043	0.16	128	1,043	0.12	7243	0.0	0.0	7479	0.0	0.0
31489	140	15	15			128	1,249	0.10	88	1,249	0.07	2396	0.0	0.0	7243	0.0	0.0
31490	70	15	15			128	917	0.14	88	917	0.10	2395	0.0	0.0	2396	0.0	0.0
31491	217	15	15			127	1,003	0.13	88	1,003	0.09	2394	0.0	0.0	2395	0.0	0.0
31492	201	15	15			115	1,356	0.08	75	1,356	0.06	7244	0.0	0.0	2394	0.0	0.0
31493	165	8	8			7	416	0.02	7	417	0.02	2393	0.0	0.0	2392	0.0	0.0
31495	392	8	8			22	513	0.04	22	513	0.04	2399	0.0	0.0	2400	0.0	0.0
31496	430	8	8			18	613	0.03	18	615	0.03	2420	0.0	0.0	2399	0.0	0.0
31497	34	8	8			50	263	0.19	8	263	0.03	2414	0.0	0.0	2413	0.0	0.0
31498	277	8	8			49	531	0.09	8	531	0.02	2415	0.0	0.0	2414	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31499	230	8	8			42	345	0.12	1	345	0.00	2416	0.0	0.0	2415	0.0	0.0
31500	266	8	8			4	349	0.01	4	349	0.01	2402	0.0	0.0	2401	0.0	0.0
31501	184	8	8			4	433	0.01	4	433	0.01	2382	0.0	0.0	2402	0.0	0.0
31502	287	8	8			332	632	0.53	332	633	0.52	2390	0.0	0.0	2422	0.0	0.0
31504	143	15	15			359	1,680	0.21	325	1,680	0.19	2409	0.0	0.0	2423	0.0	0.0
31505	21	15	15			358	2,281	0.16	325	2,281	0.14	2410	0.0	0.0	2409	0.0	0.0
31506	146	15	15			358	1,200	0.30	324	1,200	0.27	2411	0.0	0.0	2410	0.0	0.0
31507	500	8	8			76	343	0.22	76	344	0.22	2412	0.0	0.0	2411	0.0	0.0
31508	266	8	8			76	470	0.16	76	471	0.16	2419	0.0	0.0	2412	0.0	0.0
31509	139	8	8			1	341	0.00	1	342	0.00	2425	0.0	0.0	2411	0.0	0.0
31510	188	8	8			44	483	0.09	44	483	0.09	2405	0.0	0.0	2406	0.0	0.0
31511	132	8	8			44	340	0.13	44	341	0.13	2404	0.0	0.0	2405	0.0	0.0
31512	158	8	8			11	467	0.02	11	467	0.02	2403	0.0	0.0	2404	0.0	0.0
31513	194	8	8			33	374	0.09	33	374	0.09	7129	0.0	0.0	2404	0.0	0.0
31514	110	8	8			5	430	0.01	5	430	0.01	2424	0.0	0.0	7129	0.0	0.0
31515	267	8	8			27	439	0.06	27	440	0.06	2418	0.0	0.0	7129	0.0	0.0
31516	171	8	8			8	415	0.02	8	415	0.02	2417	0.0	0.0	2418	0.0	0.0
31517	502	15	15			219	1,121	0.20	182	1,121	0.16	2401	0.0	0.0	2406	0.0	0.0
31529	721	54	54			26,740	30,660	0.87	30,381	30,660	0.99	2436	6.6	0.0	2434	2.9	0.0
31530	541	54	54			29,251	30,594	0.96	32,939	30,594	1.08	2434	2.9	0.0	2430	6.8	0.0
31531	370	54	54			44,178	30,437	1.45	47,992	30,437	1.58	2428	17.3	0.0	2426	3.8	0.0
31536	25	15	15			1,549	1,420	1.09	1,640	1,420	1.15	2458	0.0	0.0	2445	0.0	0.0
31537	335	18	18			1,549	1,995	0.78	1,640	1,995	0.82	2445	0.0	0.0	2446	0.0	0.0
31538	350	18	18			1,550	2,000	0.78	1,640	2,000	0.82	2446	0.0	0.0	2447	0.0	0.0
31539	350	18	18			1,576	2,000	0.79	1,667	2,000	0.83	2447	0.0	0.0	2448	0.0	0.0
31540	350	18	18			1,581	2,000	0.79	1,672	2,000	0.84	2448	0.0	0.0	2449	0.0	0.0
31543	443	15	15			1	803	0.00	1	803	0.00	2444	0.0	0.0	2457	0.0	0.0
31544	350	8	8			97	258	0.38	97	258	0.38	2462	0.0	0.0	2461	0.0	0.0
31546	300	8	8			9	343	0.03	9	344	0.03	2459	0.0	0.0	2460	0.0	0.0
31547	353	8	8			120	271	0.44	120	271	0.44	2460	0.0	0.0	2463	0.0	0.0
31548	92	8	8			1	353	0.00	1	353	0.00	2464	0.0	0.0	7393	0.0	0.0
31549	377	8	8			121	269	0.45	121	269	0.45	2463	0.0	0.0	7245	0.0	0.0
31550	378	8	8			121	270	0.45	121	271	0.45	7245	0.0	0.0	2458	0.0	0.0
31551	417	8	8			18	352	0.05	18	353	0.05	2456	0.0	0.0	2451	0.0	0.0
31552	350	15	15			8	1,190	0.01	8	1,190	0.01	2457	0.0	0.0	2454	0.0	0.0
31553	384	8	8			94	268	0.35	53	269	0.20	2453	0.0	0.0	2454	0.0	0.0
31554	339	8	8			13	482	0.03	13	483	0.03	2465	0.0	0.0	2453	0.0	0.0
31555	339	8	8			6	665	0.01	6	666	0.01	2455	0.0	0.0	2465	0.0	0.0
31556	223	8	8			81	468	0.17	40	469	0.09	2452	0.0	0.0	2453	0.0	0.0
31557	278	8	8			76	340	0.22	35	340	0.10	7481	0.0	0.0	2452	0.0	0.0
31558	232	8	8			13	278	0.05	13	278	0.05	2470	0.0	0.0	2469	0.0	0.0
31559	22	8	8			13	433	0.03	13	433	0.03	2471	0.0	0.0	2470	0.0	0.0
31560	498	8	8			12	344	0.03	12	344	0.03	7174	0.0	0.0	2471	0.0	0.0
31567	660	54	54			44,178	30,537	1.45	47,988	30,537	1.57	2472	0.0	0.0	2473	0.0	0.0
31578	60	8	8			0	1,244	0.00	0	1,247	0.00	2496	0.0	0.0	2497	0.0	0.0
31579	229	8	8			13	717	0.02	13	718	0.02	2498	0.0	0.0	2499	0.0	0.0
31580	121	8	8			14	856	0.02	14	858	0.02	2499	0.0	0.0	2500	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31581	233	8	8			77	1,052	0.07	77	1,053	0.07	2502	0.0	0.0	2503	0.0	0.0
31584	82	8	8			147	1,194	0.12	147	1,195	0.12	7886	0.0	0.0	2506	0.0	0.0
31585	216	8	8			147	596	0.25	147	597	0.25	2506	0.0	0.0	2507	0.0	0.0
31586	86	8	8			28	1,026	0.03	28	1,027	0.03	2508	0.0	0.0	2512	0.0	0.0
31587	241	8	8			80	515	0.16	80	515	0.15	10627	0.0	0.0	2511	0.0	0.0
31588	308	8	8			0	443	0.00	0	444	0.00	2510	0.0	0.0	2511	0.0	0.0
31589	65	8	8			0	399	0.00	0	400	0.00	2509	0.0	0.0	2510	0.0	0.0
31590	210	8	8			436	369	1.18	402	370	1.09	2581	11.9	0.0	2580	0.0	0.0
31591	105	8	8			435	372	1.17	408	372	1.10	2582	11.2	0.0	2581	11.9	0.0
31592	11	8	8			90	354	0.25	89	355	0.25	2533	0.0	0.0	2582	11.2	0.0
31593	370	8	8			15	1,103	0.01	15	1,104	0.01	2552	0.0	0.0	2533	0.0	0.0
31594	222	8	8			456	370	1.23	410	370	1.11	2583	11.2	0.0	2582	11.2	0.0
31595	118	8	8			8	1,353	0.01	8	1,355	0.01	2549	0.0	0.0	2583	11.2	0.0
31596	136	8	8			460	374	1.23	424	374	1.13	7485	9.4	10.2	2583	11.2	0.0
31597	305	8	8			463	370	1.25	429	371	1.16	2532	0.0	0.0	7485	9.4	10.2
31598	142	8	8			0	818	0.00	0	819	0.00	2548	0.0	0.0	2532	0.0	0.0
31599	303	8	8			1	1,092	0.00	1	1,094	0.00	2584	0.0	0.0	2548	0.0	0.0
31600	450	8	8			590	371	1.59	516	371	1.39	7247	1.5	3.6	2532	0.0	0.0
31601	154	8	8			591	424	1.40	616	424	1.45	2534	0.0	0.0	7247	1.5	3.6
31602	111	6	6			0	549	0.00	0	549	0.00	2515	0.0	0.0	2534	0.0	0.0
31603	278	8	8			1	1,115	0.00	1	1,116	0.00	2545	0.0	0.0	2534	0.0	0.0
31604	224	8	8			1	1,158	0.00	1	1,159	0.00	2569	0.0	0.0	2587	0.0	0.0
31605	91	6	6			0	736	0.00	0	736	0.00	2521	0.0	0.0	2569	0.0	0.0
31606	101	8	8			1	1,053	0.00	1	1,054	0.00	2568	0.0	0.0	7484	0.0	0.0
31607	96	8	8			1	982	0.00	1	983	0.00	2567	0.0	0.0	2568	0.0	0.0
31608	115	8	8			0	1,131	0.00	0	1,133	0.00	7725	0.0	0.0	2567	0.0	0.0
31609	182	6	6			0	544	0.00	0	544	0.00	2520	0.0	0.0	7725	0.0	0.0
31610	126	8	8			0	1,373	0.00	0	1,375	0.00	2518	0.0	0.0	7725	0.0	0.0
31611	250	6	6			15	623	0.02	15	623	0.02	2519	0.0	0.0	2552	0.0	0.0
31612	71	6	6			8	805	0.01	8	805	0.01	2599	0.0	0.0	2550	0.0	0.0
31613	190	8	8			42	1,124	0.04	42	1,125	0.04	2557	0.0	0.0	2558	0.0	0.0
31614	129	8	8			42	1,369	0.03	42	1,372	0.03	7246	0.0	0.0	2557	0.0	0.0
31615	265	8	8			42	1,445	0.03	42	1,447	0.03	2556	0.0	0.0	7246	0.0	0.0
31616	120	8	8			19	1,788	0.01	19	1,790	0.01	2541	0.0	0.0	2543	0.0	0.0
31617	335	8	8			10	1,583	0.01	10	1,585	0.01	2585	0.0	0.0	2541	0.0	0.0
31618	275	8	8			8	1,851	0.00	8	1,853	0.00	2540	0.0	0.0	2541	0.0	0.0
31619	30	8	8			7	1,073	0.01	7	1,074	0.01	2539	0.0	0.0	2540	0.0	0.0
31620	155	8	8			0	1,567	0.00	0	1,569	0.00	2542	0.0	0.0	2544	0.0	0.0
31621	120	8	8			39	1,070	0.04	39	1,072	0.04	2565	0.0	0.0	2562	0.0	0.0
31622	145	8	8			39	1,573	0.02	39	1,575	0.02	2564	0.0	0.0	2565	0.0	0.0
31623	320	8	8			39	1,594	0.02	39	1,597	0.02	2596	0.0	0.0	2564	0.0	0.0
31624	42	8	8			39	1,018	0.04	39	1,019	0.04	2563	0.0	0.0	2596	0.0	0.0
31625	120	8	8			1	1,188	0.00	1	1,190	0.00	2553	0.0	0.0	2563	0.0	0.0
31626	309	8	8			1	931	0.00	1	932	0.00	2554	0.0	0.0	2553	0.0	0.0
31627	260	8	8			1	1,640	0.00	1	1,642	0.00	2591	0.0	0.0	2554	0.0	0.0
31630	308	8	8			13	1,219	0.01	13	1,221	0.01	2555	0.0	0.0	2556	0.0	0.0
31631	70	8	8			13	1,981	0.01	13	1,983	0.01	7130	0.0	0.0	2555	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31632	177	8	8			13	1,961	0.01	13	1,964	0.01	7131	0.0	0.0	7130	0.0	0.0
31634	144	8	8			13	418	0.03	13	419	0.03	2589	0.0	0.0	7131	0.0	0.0
31635	138	8	8			13	410	0.03	13	410	0.03	2590	0.0	0.0	2589	0.0	0.0
31636	86	8	8			0	1,636	0.00	0	1,638	0.00	2592	0.0	0.0	2591	0.0	0.0
31637	400	8	8			0	421	0.00	0	422	0.00	2594	0.0	0.0	2593	0.0	0.0
31638	168	8	8			1,519	1,352	1.12	719	1,353	0.53	2560	0.0	0.0	2561	0.0	0.0
31639	226	8	8			42	1,186	0.04	42	1,188	0.04	2559	0.0	0.0	2560	0.0	0.0
31640	115	8	8			42	1,028	0.04	42	1,030	0.04	2558	0.0	0.0	2559	0.0	0.0
31641	343	8	8			1,360	415	3.28	1,377	415	3.32	2561	0.0	0.0	7483	3.0	0.0
31642	132	8	8			40	1,692	0.02	40	1,694	0.02	2574	0.0	0.0	2535	0.0	0.0
31643	296	8	8			17	371	0.05	17	372	0.05	2595	0.0	0.0	2535	0.0	0.0
31644	137	8	8			17	372	0.05	17	373	0.05	7175	0.0	0.0	2595	0.0	0.0
31645	102	6	6			0	574	0.00	0	574	0.00	2526	0.0	0.0	7175	0.0	0.0
31646	140	8	8			0	1,356	0.00	0	1,358	0.00	2598	0.0	0.0	2574	0.0	0.0
31647	124	8	8			40	1,496	0.03	40	1,498	0.03	2575	0.0	0.0	2574	0.0	0.0
31648	267	8	8			39	470	0.08	39	471	0.08	2576	0.0	0.0	2575	0.0	0.0
31649	125	8	8			39	372	0.10	39	372	0.10	2562	0.0	0.0	2576	0.0	0.0
31650	97	8	8			17	368	0.05	17	368	0.05	2571	0.0	0.0	7175	0.0	0.0
31651	134	8	8			12	854	0.01	12	855	0.01	2578	0.0	0.0	2573	0.0	0.0
31652	327	8	8			4	1,008	0.00	4	1,009	0.00	2577	0.0	0.0	2578	0.0	0.0
31653	84	8	8			0	1,042	0.00	0	1,043	0.00	7394	0.0	0.0	2536	0.0	0.0
31654	118	6	6			0	479	0.00	0	479	0.00	2529	0.0	0.0	7394	0.0	0.0
31655	67	8	8			5	373	0.01	5	374	0.01	2546	0.0	0.0	2536	0.0	0.0
31656	156	8	8			5	1,017	0.00	5	1,018	0.00	2597	0.0	0.0	2546	0.0	0.0
31657	103	8	8			1,321	413	3.20	1,262	414	3.05	7483	3.0	0.0	2534	0.0	0.0
31662	68	8	8			0	609	0.00	0	610	0.00	2600	0.0	0.0	2614	0.0	0.0
31663	144	8	8			0	774	0.00	0	775	0.00	2649	0.0	0.0	2690	0.0	0.0
31665	167	15	18	35	ura	802	1,397	0.57	806	2,270	0.35	7487	0.0	0.0	2606	0.0	0.0
31666	300	8	8			20	885	0.02	20	886	0.02	7017	0.0	0.0	7487	0.0	0.0
31667	315	8	8			0	722	0.00	0	722	0.00	2610	0.0	0.0	7017	0.0	0.0
31668	68	8	8			0	1,127	0.00	0	1,128	0.00	2695	0.0	0.0	2610	0.0	0.0
31669	143	15	18	35	ura	783	1,415	0.55	785	2,300	0.34	2631	0.0	0.0	7487	0.0	0.0
31670	318	15	18	35	ura	783	1,398	0.56	785	2,274	0.35	2607	0.0	0.0	2631	0.0	0.0
31671	302	8	12	37	ura	521	585	0.89	524	1,726	0.30	2630	0.0	0.0	2607	0.0	0.0
31672	290	8	8			0	453	0.00	0	453	0.00	2629	0.0	0.0	2630	0.0	0.0
31673	282	8	12	37	ura	511	781	0.65	515	2,302	0.22	2611	0.0	0.0	2630	0.0	0.0
31674	287	8	8			0	415	0.00	0	415	0.00	2618	0.0	0.0	2611	0.0	0.0
31675	443	15	15			262	1,400	0.19	262	1,400	0.19	2624	0.0	0.0	2607	0.0	0.0
31676	278	8	8			47	662	0.07	47	663	0.07	2627	0.0	0.0	2624	0.0	0.0
31677	283	8	8			37	690	0.05	37	691	0.05	2671	0.0	0.0	2628	0.0	0.0
31678	210	8	8			6	369	0.02	6	370	0.02	2615	0.0	0.0	2671	0.0	0.0
31679	272	12	12			219	1,087	0.20	219	1,087	0.20	2625	0.0	0.0	2624	0.0	0.0
31680	425	8	8			10	773	0.01	10	774	0.01	2623	0.0	0.0	2635	0.0	0.0
31681	246	6	6			10	379	0.03	10	379	0.03	2602	0.0	0.0	2623	0.0	0.0
31682	333	8	8			419	419	1.00	395	419	0.94	2634	0.0	0.0	2635	0.0	0.0
31683	270	8	8			8	923	0.01	8	924	0.01	2672	0.0	0.0	2634	0.0	0.0
31684	461	18	18			2,410	3,253	0.74	2,831	3,253	0.87	2606	0.0	0.0	10152	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31685	260	8	8			0	415	0.00	0	416	0.00	2601	0.0	0.0	2636	0.0	0.0
31686	170	8	8			12	653	0.02	12	654	0.02	2636	0.0	0.0	2673	0.0	0.0
31687	210	8	8			11	628	0.02	11	629	0.02	2670	0.0	0.0	2636	0.0	0.0
31688	237	6	6			0	376	0.00	0	376	0.00	7669	0.0	0.0	2670	0.0	0.0
31689	380	8	8			0	399	0.00	0	399	0.00	2633	0.0	0.0	2670	0.0	0.0
31690	250	6	6			0	286	0.00	0	286	0.00	2632	0.0	0.0	2633	0.0	0.0
31691	400	21	21			3,392	6,481	0.52	4,350	6,481	0.67	2639	0.0	0.0	2608	0.0	0.0
31692	382	18	21	42	2036	3,392	3,832	0.89	4,350	5,780	0.75	2675	0.0	0.0	2639	0.0	0.0
31693	84	18	21	42	2036	3,363	3,980	0.84	4,321	6,003	0.72	2609	0.0	0.0	10151	0.0	0.0
31694	472	18	18			2,410	4,258	0.57	2,831	4,258	0.66	7250	0.0	0.0	2609	0.0	0.0
31697	340	15	15			445	1,394	0.32	418	1,394	0.30	2666	0.0	0.0	2608	0.0	0.0
31698	75	15	15			446	1,987	0.22	420	1,987	0.21	2638	0.0	0.0	2666	0.0	0.0
31699	158	8	8			19	374	0.05	19	374	0.05	2678	0.0	0.0	2638	0.0	0.0
31700	310	8	8			19	588	0.03	19	588	0.03	2679	0.0	0.0	2678	0.0	0.0
31701	141	8	8			0	719	0.00	0	719	0.00	2603	0.0	0.0	2679	0.0	0.0
31702	219	15	15			441	1,182	0.37	416	1,182	0.35	2667	0.0	0.0	2638	0.0	0.0
31703	275	8	8			425	695	0.61	399	697	0.57	2619	0.0	0.0	2668	0.0	0.0
31704	550	8	8			421	595	0.71	397	596	0.67	2637	0.0	0.0	2619	0.0	0.0
31705	265	8	8			422	456	0.92	397	457	0.87	2635	0.0	0.0	2637	0.0	0.0
31706	288	12	12			102	1,090	0.09	102	1,090	0.09	2620	0.0	0.0	2668	0.0	0.0
31707	274	8	8			13	655	0.02	13	656	0.02	7248	0.0	0.0	2620	0.0	0.0
31708	263	8	8			8	699	0.01	8	700	0.01	2621	0.0	0.0	7248	0.0	0.0
31709	235	8	8			7	523	0.01	7	524	0.01	2622	0.0	0.0	2621	0.0	0.0
31710	230	8	8			7	401	0.02	7	401	0.02	2641	0.0	0.0	2622	0.0	0.0
31711	245	8	8			5	538	0.01	5	538	0.01	2676	0.0	0.0	7248	0.0	0.0
31712	49	10	10			8	699	0.01	8	698	0.01	2677	0.0	0.0	2696	0.0	0.0
31713	252	8	8			7	397	0.02	7	397	0.02	2691	0.0	0.0	2641	0.0	0.0
31714	244	8	8			5	738	0.01	5	738	0.01	2640	0.0	0.0	2676	0.0	0.0
31715	282	12	12			83	4,208	0.02	83	4,208	0.02	2665	0.0	0.0	2696	0.0	0.0
31716	401	8	8			18	1,747	0.01	18	1,749	0.01	2663	0.0	0.0	2664	0.0	0.0
31717	113	8	8			18	2,061	0.01	18	2,064	0.01	2681	0.0	0.0	2663	0.0	0.0
31718	83	8	8			17	1,507	0.01	17	1,509	0.01	2680	0.0	0.0	2681	0.0	0.0
31719	127	8	8			10	1,381	0.01	10	1,383	0.01	2683	0.0	0.0	2680	0.0	0.0
31720	205	8	8			8	1,366	0.01	8	1,367	0.01	7395	0.0	0.0	2680	0.0	0.0
31721	238	8	8			0	1,180	0.00	0	1,181	0.00	2652	0.0	0.0	7395	0.0	0.0
31722	184	8	8			1	1,752	0.00	1	1,755	0.00	2669	0.0	0.0	7395	0.0	0.0
31723	160	6	6			0	542	0.00	0	542	0.00	2604	0.0	0.0	2669	0.0	0.0
31724	380	12	12			53	1,719	0.03	53	1,719	0.03	2661	0.0	0.0	2660	0.0	0.0
31725	35	15	15			52	5,415	0.01	52	5,415	0.01	7176	0.0	0.0	2661	0.0	0.0
31726	159	10	10			52	2,373	0.02	52	2,371	0.02	2656	0.0	0.0	7176	0.0	0.0
31727	259	8	8			0	693	0.00	0	694	0.00	2657	0.0	0.0	2656	0.0	0.0
31728	248	8	8			0	883	0.00	0	884	0.00	2658	0.0	0.0	2657	0.0	0.0
31729	146	8	8			0	1,870	0.00	0	1,872	0.00	2682	0.0	0.0	2658	0.0	0.0
31730	172	10	10			52	2,386	0.02	52	2,384	0.02	2662	0.0	0.0	2656	0.0	0.0
31731	245	8	8			1	822	0.00	1	824	0.00	7016	0.0	0.0	2662	0.0	0.0
31732	122	8	8			0	1,275	0.00	0	1,277	0.00	2654	0.0	0.0	2692	0.0	0.0
31733	210	8	8			1	1,499	0.00	1	1,501	0.00	2655	0.0	0.0	2692	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31734	350	10	10			35	1,846	0.02	35	1,844	0.02	7488	0.0	0.0	2662	0.0	0.0
31735	312	8	8			421	424	0.99	401	424	0.95	2642	0.0	0.0	2634	0.0	0.0
31736	261	8	8			0	689	0.00	0	690	0.00	2687	0.0	0.0	2642	0.0	0.0
31737	300	8	8			419	624	0.67	400	626	0.64	2651	0.0	0.0	2642	0.0	0.0
31738	135	8	8			0	1,043	0.00	0	1,044	0.00	7015	0.0	0.0	2651	0.0	0.0
31739	498	8	8			9	1,072	0.01	9	1,073	0.01	2650	0.0	0.0	2651	0.0	0.0
31740	170	8	8			417	377	1.11	400	378	1.06	7489	0.0	0.0	2651	0.0	0.0
31741	95	8	8			27	381	0.07	26	382	0.07	2686	0.0	0.0	7489	0.0	0.0
31742	270	8	8			426	945	0.45	402	946	0.43	2685	0.0	0.0	7489	0.0	0.0
31743	252	8	8			426	946	0.45	402	947	0.42	2684	0.0	0.0	2685	0.0	0.0
31744	352	12	12			219	1,097	0.20	219	1,097	0.20	2646	0.0	0.0	2625	0.0	0.0
31745	30	12	12			219	2,388	0.09	219	2,388	0.09	2647	0.0	0.0	2646	0.0	0.0
31746	303	12	12			72	839	0.09	72	839	0.09	7249	0.0	0.0	2647	0.0	0.0
31747	303	8	8			64	369	0.17	64	370	0.17	2689	0.0	0.0	7249	0.0	0.0
31748	484	8	8			0	510	0.00	0	511	0.00	2690	0.0	0.0	2689	0.0	0.0
31749	309	8	8			64	677	0.09	64	678	0.09	2614	0.0	0.0	2689	0.0	0.0
31750	267	8	8			0	988	0.00	0	990	0.00	2617	0.0	0.0	2614	0.0	0.0
31751	149	8	8			63	720	0.09	63	722	0.09	7649	0.0	0.0	2614	0.0	0.0
31752	59	8	8			0	1,168	0.00	0	1,169	0.00	2694	0.0	0.0	2613	0.0	0.0
31753	380	8	8			133	972	0.14	133	973	0.14	2688	0.0	0.0	2647	0.0	0.0
31754	205	8	8			133	1,095	0.12	133	1,097	0.12	2616	0.0	0.0	2688	0.0	0.0
31755	290	8	8			10	535	0.02	10	535	0.02	2648	0.0	0.0	2626	0.0	0.0
31756	302	8	8			6	1,064	0.01	6	1,065	0.01	7486	0.0	0.0	2615	0.0	0.0
31758	60	8	8			14	1,038	0.01	14	1,039	0.01	2697	0.0	0.0	2787	0.0	0.0
31759	287	8	12	37	ura	471	736	0.64	472	2,169	0.22	2719	0.0	0.0	8944	0.0	0.0
31760	305	8	12	37	ura	470	388	1.21	472	1,144	0.41	7018	12.6	0.0	2718	0.0	0.0
31761	19	8	8			27	1,568	0.02	27	1,570	0.02	2735	0.0	0.0	7018	12.6	0.0
31762	450	8	8			0	372	0.00	0	372	0.00	2788	0.0	0.0	2735	0.0	0.0
31763	215	8	12	37	ura	444	458	0.97	445	1,352	0.33	2782	0.0	0.0	7018	12.6	0.0
31764	285	8	12	37	ura	428	1,100	0.39	428	3,243	0.13	2783	0.0	0.0	2782	0.0	0.0
31765	441	8	12	37	ura	423	726	0.58	423	2,140	0.20	2784	0.0	0.0	2783	0.0	0.0
31766	278	8	8			27	1,015	0.03	27	1,017	0.03	2738	0.0	0.0	2735	0.0	0.0
31767	196	8	8			17	368	0.05	17	369	0.05	7490	0.0	0.0	2738	0.0	0.0
31768	249	8	8			16	378	0.04	16	378	0.04	2755	0.0	0.0	2736	0.0	0.0
31769	251	8	8			7	789	0.01	7	790	0.01	7252	0.0	0.0	2755	0.0	0.0
31770	257	8	8			0	1,216	0.00	0	1,218	0.00	2740	0.0	0.0	7490	0.0	0.0
31771	110	8	8			0	380	0.00	0	381	0.00	2700	0.0	0.0	2740	0.0	0.0
31772	193	8	8			0	385	0.00	0	386	0.00	2701	0.0	0.0	2740	0.0	0.0
31773	92	8	8			1	474	0.00	1	475	0.00	2728	0.0	0.0	2757	0.0	0.0
31774	280	8	8			0	922	0.00	0	924	0.00	2729	0.0	0.0	2728	0.0	0.0
31775	409	8	8			0	769	0.00	0	769	0.00	2730	0.0	0.0	2729	0.0	0.0
31776	95	8	8			6	381	0.01	6	382	0.01	2727	0.0	0.0	2757	0.0	0.0
31777	244	8	8			6	849	0.01	6	851	0.01	2722	0.0	0.0	2727	0.0	0.0
31778	303	8	8			6	792	0.01	6	793	0.01	2732	0.0	0.0	2722	0.0	0.0
31779	301	8	8			0	719	0.00	0	719	0.00	2731	0.0	0.0	2732	0.0	0.0
31780	109	8	8			133	765	0.17	133	767	0.17	7177	0.0	0.0	2726	0.0	0.0
31781	223	8	8			132	738	0.18	132	740	0.18	2724	0.0	0.0	7177	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31782	288	8	8			132	678	0.19	132	678	0.19	2775	0.0	0.0	2776	0.0	0.0
31783	351	8	8			118	681	0.17	118	683	0.17	2777	0.0	0.0	2775	0.0	0.0
31784	287	8	8			14	527	0.03	14	528	0.03	2761	0.0	0.0	2775	0.0	0.0
31785	379	8	8			0	755	0.00	0	756	0.00	7396	0.0	0.0	2761	0.0	0.0
31786	145	8	8			44	713	0.06	44	713	0.06	2758	0.0	0.0	7491	0.0	0.0
31787	208	8	8			44	708	0.06	44	709	0.06	7397	0.0	0.0	2758	0.0	0.0
31788	157	8	8			44	889	0.05	44	890	0.05	2723	0.0	0.0	7397	0.0	0.0
31789	302	8	8			41	727	0.06	41	728	0.06	2762	0.0	0.0	2723	0.0	0.0
31790	319	8	8			35	814	0.04	35	815	0.04	2764	0.0	0.0	2762	0.0	0.0
31791	118	8	8			0	490	0.00	0	490	0.00	2702	0.0	0.0	2763	0.0	0.0
31792	59	8	8			0	765	0.00	0	766	0.00	2763	0.0	0.0	2764	0.0	0.0
31793	111	8	8			0	624	0.00	0	624	0.00	2703	0.0	0.0	2765	0.0	0.0
31794	401	8	8			0	414	0.00	0	415	0.00	7020	0.0	0.0	2762	0.0	0.0
31795	162	8	8			0	986	0.00	0	988	0.00	2704	0.0	0.0	7020	0.0	0.0
31796	271	8	8			35	844	0.04	35	846	0.04	2766	0.0	0.0	2765	0.0	0.0
31797	229	8	8			0	719	0.00	0	720	0.00	2760	0.0	0.0	2766	0.0	0.0
31798	373	8	8			30	660	0.05	30	661	0.05	2767	0.0	0.0	2766	0.0	0.0
31799	352	8	8			30	890	0.03	30	891	0.03	2768	0.0	0.0	2767	0.0	0.0
31800	367	8	8			0	733	0.00	0	734	0.00	2759	0.0	0.0	7396	0.0	0.0
31801	388	10	10			113	715	0.16	113	715	0.16	2779	0.0	0.0	2778	0.0	0.0
31802	137	8	8			0	789	0.00	0	790	0.00	2706	0.0	0.0	2759	0.0	0.0
31803	309	10	10			106	730	0.14	106	729	0.14	2780	0.0	0.0	2779	0.0	0.0
31804	324	10	10			93	1,599	0.06	93	1,598	0.06	7253	0.0	0.0	2780	0.0	0.0
31805	158	8	8			88	929	0.09	88	931	0.09	7492	0.0	0.0	7253	0.0	0.0
31806	51	10	10			88	775	0.11	88	774	0.11	2781	0.0	0.0	7492	0.0	0.0
31807	322	8	8			13	424	0.03	13	425	0.03	2772	0.0	0.0	2780	0.0	0.0
31808	205	8	8			13	892	0.01	13	893	0.01	2773	0.0	0.0	2772	0.0	0.0
31809	270	8	8			0	847	0.00	0	847	0.00	2769	0.0	0.0	2772	0.0	0.0
31810	58	8	8			0	690	0.00	0	691	0.00	2770	0.0	0.0	2769	0.0	0.0
31811	76	8	8			0	603	0.00	0	603	0.00	2707	0.0	0.0	2770	0.0	0.0
31812	280	8	8			0	533	0.00	0	533	0.00	2771	0.0	0.0	2773	0.0	0.0
31813	191	8	8			4	567	0.01	4	568	0.01	2774	0.0	0.0	2773	0.0	0.0
31814	281	8	8			0	859	0.00	0	860	0.00	2789	0.0	0.0	7178	0.0	0.0
31815	150	8	8			0	429	0.00	0	430	0.00	2709	0.0	0.0	2789	0.0	0.0
31816	282	8	8			0	691	0.00	0	692	0.00	7251	0.0	0.0	2730	0.0	0.0
31817	405	8	12	37	ura	417	725	0.58	417	2,138	0.20	2786	0.0	0.0	2785	0.0	0.0
31818	378	8	12	37	ura	410	772	0.53	410	2,277	0.18	2787	0.0	0.0	2786	0.0	0.0
31819	211	8	8			5	761	0.01	5	762	0.01	2741	0.0	0.0	2784	0.0	0.0
31820	218	8	8			0	1,053	0.00	0	1,055	0.00	2710	0.0	0.0	2741	0.0	0.0
31821	290	8	8			0	718	0.00	0	719	0.00	2733	0.0	0.0	2754	0.0	0.0
31822	207	8	8			40	434	0.09	40	435	0.09	2753	0.0	0.0	2756	0.0	0.0
31823	276	8	8			13	436	0.03	13	437	0.03	2716	0.0	0.0	2753	0.0	0.0
31824	31	8	8			0	409	0.00	0	409	0.00	2791	0.0	0.0	2716	0.0	0.0
31825	77	8	8			15	540	0.03	15	540	0.03	2747	0.0	0.0	2717	0.0	0.0
31826	132	8	8			15	415	0.04	15	416	0.04	2748	0.0	0.0	2747	0.0	0.0
31827	75	8	8			15	413	0.04	15	413	0.04	7019	0.0	0.0	2748	0.0	0.0
31828	71	8	8			15	834	0.02	15	835	0.02	2746	0.0	0.0	7019	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31829	306	8	8			15	376	0.04	15	376	0.04	2745	0.0	0.0	2746	0.0	0.0
31830	48	8	8			1	543	0.00	1	544	0.00	2744	0.0	0.0	2745	0.0	0.0
31831	336	8	8			0	365	0.00	0	366	0.00	2743	0.0	0.0	2744	0.0	0.0
31832	125	8	8			0	1,025	0.00	0	1,026	0.00	2742	0.0	0.0	2743	0.0	0.0
31833	144	8	8			0	1,200	0.00	0	1,201	0.00	2712	0.0	0.0	2742	0.0	0.0
31834	457	8	8			0	860	0.00	0	862	0.00	2752	0.0	0.0	2745	0.0	0.0
31835	253	8	8			0	443	0.00	0	444	0.00	2751	0.0	0.0	2752	0.0	0.0
31836	123	8	8			0	431	0.00	0	431	0.00	2713	0.0	0.0	2751	0.0	0.0
31837	98	8	8			0	653	0.00	0	653	0.00	2749	0.0	0.0	2717	0.0	0.0
31838	264	8	8			0	542	0.00	0	543	0.00	2750	0.0	0.0	2749	0.0	0.0
31839	103	6	6			0	302	0.00	0	302	0.00	2714	0.0	0.0	2750	0.0	0.0
31840	328	8	8			17	452	0.04	17	453	0.04	2757	0.0	0.0	2782	0.0	0.0
31841	230	6	6			1	252	0.01	1	252	0.01	2817	0.0	0.0	2818	0.0	0.0
31842	155	8	8			0	1,753	0.00	0	1,755	0.00	2820	0.0	0.0	2819	0.0	0.0
31843	28	10	10			16	3,579	0.00	16	3,575	0.00	2815	0.0	0.0	2816	0.0	0.0
31844	182	8	8			1	1,266	0.00	1	1,267	0.00	2808	0.0	0.0	2809	0.0	0.0
31845	169	8	8			1	835	0.00	1	835	0.00	2807	0.0	0.0	2808	0.0	0.0
31846	141	8	8			1	1,200	0.00	1	1,201	0.00	2809	0.0	0.0	2810	0.0	0.0
31847	185	8	8			169	893	0.19	169	894	0.19	2810	0.0	0.0	2811	0.0	0.0
31848	273	8	8			170	1,684	0.10	170	1,686	0.10	2811	0.0	0.0	2822	0.0	0.0
31849	135	8	8			1	1,719	0.00	1	1,722	0.00	2812	0.0	0.0	2822	0.0	0.0
31850	363	8	8			1	853	0.00	1	854	0.00	2813	0.0	0.0	2812	0.0	0.0
31851	85	8	8			1	1,650	0.00	1	1,652	0.00	2823	0.0	0.0	2813	0.0	0.0
31852	184	8	8			172	635	0.27	172	635	0.27	2822	0.0	0.0	2824	0.0	0.0
31853	170	8	8			267	931	0.29	267	932	0.29	2825	0.0	0.0	2826	0.0	0.0
31854	82	8	8			12	974	0.01	12	975	0.01	2829	0.0	0.0	2828	0.0	0.0
31855	193	8	8			12	1,785	0.01	12	1,788	0.01	2830	0.0	0.0	2829	0.0	0.0
31856	90	6	6			1	838	0.00	1	838	0.00	2818	0.0	0.0	2797	0.0	0.0
31857	32	8	8			1	1,776	0.00	1	1,778	0.00	2797	0.0	0.0	2814	0.0	0.0
31858	468	8	8			46	625	0.07	46	626	0.07	2831	0.0	0.0	2824	0.0	0.0
31869	360	21	21			4,228	7,801	0.54	5,183	7,801	0.66	2866	0.0	0.0	2878	0.0	0.0
31870	277	21	21			4,258	7,663	0.56	5,213	7,663	0.68	2867	0.0	0.0	2868	0.0	0.0
31871	420	21	21			4,289	8,490	0.51	5,231	8,490	0.62	2880	0.0	0.0	2865	0.0	5.4
31872	56	8	8			31	351	0.09	31	351	0.09	3765	0.0	0.0	2881	0.0	0.0
31873	347	8	8			299	586	0.51	299	587	0.51	2872	0.0	0.0	7493	0.0	0.0
31874	337	8	8			299	343	0.87	299	344	0.87	2882	0.0	0.0	2872	0.0	0.0
31875	57	8	8			327	1,528	0.21	327	1,530	0.21	7493	0.0	0.0	2851	0.0	0.0
31878	244	8	8			32	292	0.11	32	292	0.11	2879	0.0	0.0	2878	0.0	0.0
31879	6	8	8			31	758	0.04	31	760	0.04	2879	0.0	0.0	2881	0.0	0.0
31890	301	42	42			4,656	32,405	0.14	4,656	32,405	0.14	2850	0.0	0.0	7745	0.0	0.0
31891	414	42	42			4,656	37,004	0.13	4,656	37,004	0.13	7745	0.0	0.0	2851	0.0	0.0
31892	359	48	48			4,928	29,073	0.17	4,928	29,073	0.17	2851	0.0	0.0	2852	0.0	0.0
31893	213	48	48			4,928	28,629	0.17	4,928	28,629	0.17	2852	0.0	0.0	9624	0.0	0.0
31894	313	48	48			4,960	38,738	0.13	4,960	38,738	0.13	9624	0.0	0.0	2854	0.0	0.0
31895	421	48	48			4,960	28,799	0.17	4,960	28,799	0.17	2854	0.0	0.0	2855	0.0	0.0
31896	174	54	54			4,960	34,768	0.14	4,960	34,768	0.14	2855	0.0	0.0	2856	0.0	0.0
31897	137	54	54			4,960	35,369	0.14	4,960	35,369	0.14	2857	0.0	0.0	2858	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31898	277	54	54			4,960	35,575	0.14	4,959	35,575	0.14	2858	0.0	0.0	2859	0.0	0.0
31899	19	15	15			4,290	10,939	0.39	5,232	10,939	0.48	2861	0.0	0.0	2860	0.0	0.0
31901	74	15	15			4,289	7,710	0.56	5,231	7,710	0.68	2865	0.0	5.4	2862	8.6	5.7
31902	148	8	8			1,116	685	1.63	1,353	686	1.97	2862	8.6	5.7	2861	0.0	0.0
31903	44	15	15			4,290	6,185	0.69	5,232	6,185	0.85	2860	0.0	0.0	2859	0.0	0.0
31904	314	54	54			9,246	29,044	0.32	10,186	29,044	0.35	2859	0.0	0.0	2863	0.0	0.0
31911	124	8	8			13	1,073	0.01	13	1,074	0.01	2920	0.0	0.0	2924	0.0	0.0
31912	320	8	8			0	749	0.00	0	750	0.00	2947	0.0	0.0	7254	0.0	0.0
31913	150	8	8			0	760	0.00	0	761	0.00	2910	0.0	0.0	2947	0.0	0.0
31914	175	8	8			0	417	0.00	0	417	0.00	2911	0.0	0.0	2910	0.0	0.0
31915	87	21	21			3,756	5,224	0.72	4,708	5,224	0.90	2921	0.0	0.0	2922	0.0	0.0
31916	314	21	21			3,735	10,704	0.35	4,687	10,704	0.44	2948	0.0	0.0	2921	0.0	0.0
31917	351	21	21			3,735	9,539	0.39	4,687	9,539	0.49	2912	0.0	0.0	2908	0.0	0.0
31918	125	21	21			3,860	7,735	0.50	4,814	7,735	0.62	7495	0.0	0.0	2926	0.0	0.0
31920	175	21	21			3,860	10,321	0.37	4,813	10,321	0.47	2924	0.0	0.0	2925	0.0	0.0
31921	88	21	21			3,847	10,324	0.37	4,800	10,324	0.46	2923	0.0	0.0	2924	0.0	0.0
31922	545	8	8			13	1,256	0.01	13	1,257	0.01	2946	0.0	0.0	2944	0.0	0.0
31923	110	8	8			1	307	0.00	1	307	0.00	2909	0.0	0.0	2946	0.0	0.0
31924	107	8	8			100	533	0.19	100	533	0.19	2949	0.0	0.0	8522	0.0	0.0
31925	70	8	8			81	511	0.16	81	512	0.16	7132	0.0	0.0	2949	0.0	0.0
31926	148	8	8			81	522	0.16	81	523	0.16	2950	0.0	0.0	7132	0.0	0.0
31927	330	8	8			81	482	0.17	81	483	0.17	2927	0.0	0.0	2950	0.0	0.0
31928	178	8	8			45	447	0.10	45	447	0.10	2951	0.0	0.0	2927	0.0	0.0
31929	79	8	8			44	499	0.09	44	500	0.09	2952	0.0	0.0	2951	0.0	0.0
31930	110	8	8			44	501	0.09	44	502	0.09	2953	0.0	0.0	2952	0.0	0.0
31931	285	8	8			13	442	0.03	13	442	0.03	2954	0.0	0.0	2953	0.0	0.0
31932	249	8	8			13	873	0.02	13	874	0.02	2955	0.0	0.0	2954	0.0	0.0
31933	269	8	8			13	872	0.02	13	874	0.02	2956	0.0	0.0	2955	0.0	0.0
31934	371	8	8			35	449	0.08	35	450	0.08	7023	0.0	0.0	2928	0.0	0.0
31935	455	8	8			27	805	0.03	27	806	0.03	2957	0.0	0.0	7023	0.0	0.0
31936	47	8	8			27	2,120	0.01	27	2,123	0.01	2980	0.0	0.0	2957	0.0	0.0
31937	450	8	8			0	518	0.00	0	519	0.00	7494	0.0	0.0	2909	0.0	0.0
31938	57	8	8			0	419	0.00	0	419	0.00	2983	0.0	0.0	7494	0.0	0.0
31939	303	8	8			0	374	0.00	0	375	0.00	2945	0.0	0.0	2909	0.0	0.0
31940	357	8	8			30	1,040	0.03	30	1,041	0.03	2933	0.0	0.0	2932	0.0	0.0
31941	314	8	8			1	1,078	0.00	1	1,080	0.00	2934	0.0	0.0	2933	0.0	0.0
31942	294	8	8			268	528	0.51	268	529	0.51	2931	0.0	0.0	2932	0.0	0.0
31943	444	8	8			45	1,074	0.04	45	1,076	0.04	2940	0.0	0.0	2958	0.0	0.0
31944	297	8	8			1	1,579	0.00	1	1,581	0.00	2942	0.0	0.0	2941	0.0	0.0
31945	183	8	8			4	1,267	0.00	4	1,269	0.00	2943	0.0	0.0	2959	0.0	0.0
31946	210	8	8			4	1,506	0.00	4	1,508	0.00	7022	0.0	0.0	2943	0.0	0.0
31947	238	8	8			4	1,537	0.00	4	1,539	0.00	7255	0.0	0.0	7022	0.0	0.0
31948	144	8	8			0	1,681	0.00	0	1,683	0.00	2982	0.0	0.0	7022	0.0	0.0
31949	36	6	6			0	1,073	0.00	0	1,073	0.00	7672	0.0	0.0	7256	0.0	0.0
31950	230	6	6			1	931	0.00	1	931	0.00	2914	0.0	0.0	2915	0.0	0.0
31951	287	6	6			1	907	0.00	1	907	0.00	2939	0.0	0.0	2914	0.0	0.0
31952	90	8	8			27	734	0.04	27	735	0.04	2961	0.0	0.0	2980	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31953	128	8	8			20	1,102	0.02	20	1,103	0.02	2919	0.0	0.0	2961	0.0	0.0
31954	116	8	8			10	1,246	0.01	10	1,247	0.01	2918	0.0	0.0	2919	0.0	0.0
31955	98	8	8			10	1,293	0.01	10	1,294	0.01	2917	0.0	0.0	2918	0.0	0.0
31956	125	8	8			5	1,271	0.00	5	1,272	0.00	2916	0.0	0.0	2917	0.0	0.0
31957	110	8	8			5	1,279	0.00	5	1,281	0.00	2935	0.0	0.0	2916	0.0	0.0
31958	127	8	8			1	1,429	0.00	1	1,431	0.00	2936	0.0	0.0	2935	0.0	0.0
31959	250	6	6			0	209	0.00	0	209	0.00	2894	0.0	0.0	2961	0.0	0.0
31960	197	8	8			7	810	0.01	7	812	0.01	2962	0.0	0.0	2961	0.0	0.0
31961	308	8	8			7	374	0.02	7	375	0.02	2963	0.0	0.0	2962	0.0	0.0
31962	128	8	8			1	1,551	0.00	1	1,553	0.00	2964	0.0	0.0	2963	0.0	0.0
31963	148	8	8			1	1,426	0.00	1	1,428	0.00	2965	0.0	0.0	2964	0.0	0.0
31964	106	8	8			1	1,836	0.00	1	1,838	0.00	2966	0.0	0.0	2913	0.0	0.0
31965	130	8	8			0	1,877	0.00	0	1,880	0.00	2938	0.0	0.0	2966	0.0	0.0
31966	226	6	6			0	873	0.00	0	873	0.00	2895	0.0	0.0	2938	0.0	0.0
31967	238	6	6			0	829	0.00	0	829	0.00	2967	0.0	0.0	2913	0.0	0.0
31968	238	6	6			0	717	0.00	0	717	0.00	2897	0.0	0.0	2965	0.0	0.0
31969	76	8	8			0	953	0.00	0	955	0.00	2937	0.0	0.0	2936	0.0	0.0
31970	145	6	6			0	735	0.00	0	735	0.00	2899	0.0	0.0	2937	0.0	0.0
31971	260	8	8			0	929	0.00	0	931	0.00	7496	0.0	0.0	2935	0.0	0.0
31972	107	6	6			0	464	0.00	0	464	0.00	2900	0.0	0.0	2935	0.0	0.0
31973	109	6	6			0	462	0.00	0	462	0.00	2901	0.0	0.0	2916	0.0	0.0
31974	159	6	6			0	375	0.00	0	375	0.00	2902	0.0	0.0	2936	0.0	0.0
31975	175	8	8			0	1,398	0.00	0	1,400	0.00	2968	0.0	0.0	2919	0.0	0.0
31976	194	6	6			0	209	0.00	0	209	0.00	2903	0.0	0.0	2968	0.0	0.0
31977	101	8	8			0	838	0.00	0	838	0.00	2969	0.0	0.0	2917	0.0	0.0
31978	179	6	6			0	570	0.00	0	570	0.00	2904	0.0	0.0	2969	0.0	0.0
31979	100	8	8			4	1,053	0.00	4	1,054	0.00	2970	0.0	0.0	2917	0.0	0.0
31980	331	8	8			1	374	0.00	1	374	0.00	2971	0.0	0.0	2970	0.0	0.0
31981	99	8	8			1	1,417	0.00	1	1,419	0.00	2972	0.0	0.0	2971	0.0	0.0
31982	103	8	8			1	1,083	0.00	1	1,085	0.00	2973	0.0	0.0	2972	0.0	0.0
31983	185	6	6			0	335	0.00	0	335	0.00	2906	0.0	0.0	2973	0.0	0.0
31984	98	8	8			0	840	0.00	0	840	0.00	2974	0.0	0.0	2973	0.0	0.0
31985	220	6	6			0	390	0.00	0	390	0.00	2907	0.0	0.0	2974	0.0	0.0
31986	312	8	8			0	624	0.00	0	625	0.00	2976	0.0	0.0	2919	0.0	0.0
31987	30	8	8			1	1,273	0.00	1	1,274	0.00	2981	0.0	0.0	2934	0.0	0.0
31992	255	8	8			1	347	0.00	1	347	0.00	2995	0.0	0.0	3036	0.0	0.0
31993	282	8	12	13	Existing	697	383	1.82	720	1,131	0.64	3055	4.4	0.0	3006	0.0	0.0
31994	299	8	12	13	Existing	695	396	1.76	719	1,166	0.62	3056	1.5	0.0	3055	4.4	0.0
31995	88	8	12	13	Existing	694	421	1.65	717	1,241	0.58	3013	0.2	0.0	3056	1.5	0.0
31996	335	8	8			213	592	0.36	213	594	0.36	3021	3.1	0.0	3013	0.2	0.0
31997	302	8	8			168	343	0.49	168	344	0.49	3057	0.0	0.0	7497	0.0	0.0
31998	365	8	8			3	726	0.00	3	728	0.00	3009	0.0	0.0	3019	0.0	0.0
31999	195	8	8			1	585	0.00	1	586	0.00	3058	0.0	0.0	3009	0.0	0.0
32000	300	8	8			166	340	0.49	166	340	0.49	7726	0.0	0.0	3057	0.0	0.0
32001	122	8	8			3	347	0.01	3	348	0.01	7499	0.0	0.0	7726	0.0	0.0
32002	180	8	8			1	338	0.00	1	339	0.00	7673	0.0	0.0	7499	0.0	0.0
32003	74	8	8			162	340	0.48	162	340	0.48	3043	0.0	0.0	7726	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32004	205	8	8			445	367	1.21	457	368	1.24	3014	0.0	0.0	3013	0.2	0.0
32005	334	8	8			349	569	0.61	349	569	0.61	3016	0.0	0.0	3014	0.0	0.0
32006	335	8	8			291	406	0.72	291	407	0.72	3015	2.0	0.0	3016	0.0	0.0
32007	410	8	8			26	344	0.07	18	344	0.05	3017	3.8	0.0	3015	2.0	0.0
32008	340	8	8			240	434	0.55	240	435	0.55	3026	3.3	0.0	3015	2.0	0.0
32009	297	8	8			239	627	0.38	238	628	0.38	3027	0.0	0.0	3026	3.3	0.0
32010	320	8	8			212	542	0.39	212	542	0.39	3028	0.0	0.0	3027	0.0	0.0
32011	320	8	8			210	545	0.38	210	546	0.38	3036	0.0	0.0	3028	0.0	0.0
32012	40	8	8			207	285	0.73	207	285	0.73	3037	0.0	0.0	3036	0.0	0.0
32013	350	8	8			21	343	0.06	21	344	0.06	7133	0.0	0.0	3037	0.0	0.0
32014	300	8	8			38	594	0.06	31	595	0.05	7024	2.6	0.0	3016	0.0	0.0
32015	325	8	8			29	544	0.05	29	544	0.05	3024	0.0	0.0	7024	2.6	0.0
32016	323	8	8			3	542	0.01	3	543	0.01	3025	0.0	0.0	3024	0.0	0.0
32017	310	8	8			1	542	0.00	1	543	0.00	3040	0.0	0.0	3025	0.0	0.0
32018	208	8	8			83	594	0.14	81	594	0.14	7399	2.3	0.0	10153	0.0	0.0
32019	266	8	8			55	565	0.10	55	565	0.10	3023	0.0	0.0	3022	0.0	0.0
32020	372	8	8			53	567	0.09	53	567	0.09	3041	0.0	0.0	3023	0.0	0.0
32021	35	8	8			51	467	0.11	51	468	0.11	3042	0.0	0.0	3041	0.0	0.0
32023	465	8	8			11	413	0.03	11	414	0.03	3059	0.0	0.0	3042	0.0	0.0
32024	390	8	8			1	581	0.00	1	581	0.00	3031	0.0	0.0	3063	0.0	0.0
32025	113	8	8			3	725	0.00	3	726	0.00	7259	0.0	0.0	3033	0.0	0.0
32026	357	8	8			1	452	0.00	1	453	0.00	3032	0.0	0.0	7259	0.0	0.0
32027	175	6	6			1	233	0.01	1	233	0.01	2996	0.0	0.0	3061	0.0	0.0
32028	115	8	8			1	715	0.00	1	716	0.00	2997	0.0	0.0	3061	0.0	0.0
32029	338	8	8			67	179	0.38	67	180	0.37	3030	0.0	0.0	3035	0.0	0.0
32030	284	8	8			73	344	0.21	73	344	0.21	3063	0.0	0.0	3035	0.0	0.0
32031	140	8	8			50	389	0.13	50	390	0.13	3034	0.0	0.0	3063	0.0	0.0
32032	91	8	8			49	402	0.12	49	403	0.12	3033	0.0	0.0	3034	0.0	0.0
32033	120	8	8			24	428	0.06	24	429	0.06	3060	0.0	0.0	3033	0.0	0.0
32034	225	8	8			39	384	0.10	39	385	0.10	3039	0.0	0.0	3042	0.0	0.0
32035	406	8	8			17	386	0.04	17	387	0.04	7498	0.0	0.0	3039	0.0	0.0
32037	178	8	8			18	364	0.05	18	364	0.05	7025	0.0	0.0	3038	0.0	0.0
32039	220	8	8			16	713	0.02	16	714	0.02	3045	0.0	0.0	3046	0.0	0.0
32040	58	8	8			15	528	0.03	15	529	0.03	2998	0.0	0.0	3045	0.0	0.0
32041	99	8	8			21	545	0.04	21	546	0.04	3047	0.0	0.0	3048	0.0	0.0
32042	102	8	8			19	563	0.03	19	564	0.03	2999	0.0	0.0	3047	0.0	0.0
32043	417	8	8			62	518	0.12	62	519	0.12	3048	0.0	0.0	3051	0.0	0.0
32044	247	8	8			40	394	0.10	40	394	0.10	3046	0.0	0.0	3048	0.0	0.0
32045	187	8	8			22	452	0.05	22	453	0.05	3044	0.0	0.0	3046	0.0	0.0
32046	306	8	8			21	643	0.03	21	644	0.03	3010	0.0	0.0	3044	0.0	0.0
32047	332	8	8			19	298	0.06	19	298	0.06	7258	0.0	0.0	3010	0.0	0.0
32048	204	8	8			28	769	0.04	28	770	0.04	3062	0.0	0.0	3051	0.0	0.0
32049	456	8	8			27	596	0.05	27	597	0.05	3050	0.0	0.0	3062	0.0	0.0
32050	330	8	8			1	347	0.00	1	347	0.00	3049	0.0	0.0	3050	0.0	0.0
32051	407	8	8			30	488	0.06	30	489	0.06	3053	0.0	0.0	7260	0.0	0.0
32052	354	8	8			28	676	0.04	28	677	0.04	3054	0.0	0.0	3053	0.0	0.0
32053	237	8	8			26	899	0.03	26	899	0.03	3012	0.0	0.0	3054	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32054	407	8	8			24	381	0.06	24	381	0.06	3011	0.0	0.0	3012	0.0	0.0
32055	148	8	8			1	378	0.00	1	378	0.00	3000	0.0	0.0	3011	0.0	0.0
32065	240	15	15			1,479	2,613	0.57	1,503	2,613	0.58	3130	0.0	0.0	3111	0.0	0.0
32066	183	8	8			1	415	0.00	1	415	0.00	7674	0.0	0.0	3104	0.0	0.0
32067	287	12	12			606	1,167	0.52	606	1,167	0.52	3103	0.0	0.0	3105	0.0	0.0
32068	298	12	12			567	1,127	0.50	567	1,127	0.50	7261	0.0	0.0	3103	0.0	0.0
32069	287	12	12			507	1,144	0.44	507	1,144	0.44	3131	0.0	0.0	7261	0.0	0.0
32070	15	15	15			607	1,674	0.36	607	1,674	0.36	3105	0.0	0.0	3130	0.0	0.0
32071	306	10	10			869	944	0.92	893	944	0.95	3107	0.0	0.0	3106	0.0	0.0
32072	395	10	10			835	908	0.92	858	908	0.94	7262	0.0	0.0	3107	0.0	0.0
32073	237	10	10			833	691	1.21	856	691	1.24	3114	6.2	6.1	7262	0.0	0.0
32074	250	8	8			36	623	0.06	36	624	0.06	3102	0.0	0.0	3103	0.0	0.0
32075	250	8	8			35	564	0.06	35	565	0.06	3101	0.0	0.0	3102	0.0	0.0
32076	250	8	8			33	469	0.07	33	469	0.07	3100	0.0	0.0	3101	0.0	0.0
32077	225	8	8			1	470	0.00	1	471	0.00	7179	0.0	0.0	3100	0.0	0.0
32078	350	8	8			71	540	0.13	71	540	0.13	7263	0.0	0.0	3109	0.0	0.0
32079	300	8	8			1	382	0.00	1	383	0.00	3108	0.0	0.0	7263	0.0	0.0
32080	250	8	8			59	488	0.12	59	488	0.12	3096	0.0	0.0	7261	0.0	0.0
32081	255	8	8			57	483	0.12	57	483	0.12	3097	0.0	0.0	3096	0.0	0.0
32082	230	8	8			33	488	0.07	33	488	0.07	3099	0.0	0.0	3097	0.0	0.0
32083	46	8	8			31	486	0.06	31	487	0.06	3098	0.0	0.0	3099	0.0	0.0
32084	134	8	8			29	492	0.06	29	492	0.06	3132	0.0	0.0	3098	0.0	0.0
32085	230	8	8			1	433	0.00	1	434	0.00	7027	0.0	0.0	3132	0.0	0.0
32086	202	8	8			3	400	0.01	3	401	0.01	3133	0.0	0.0	3132	0.0	0.0
32087	298	12	12			478	1,153	0.41	478	1,153	0.41	3095	0.0	0.0	3131	0.0	0.0
32088	271	12	12			442	1,153	0.38	442	1,153	0.38	3089	0.0	0.0	3095	0.0	0.0
32089	12	12	12			440	1,131	0.39	440	1,131	0.39	3090	0.0	0.0	3089	0.0	0.0
32090	300	12	12			423	1,526	0.28	423	1,526	0.28	3134	0.0	0.0	3090	0.0	0.0
32091	273	12	12			422	1,509	0.28	422	1,509	0.28	3091	0.0	0.0	3134	0.0	0.0
32092	28	8	8			128	340	0.38	128	340	0.38	3081	0.0	0.0	3082	0.0	0.0
32093	425	8	8			289	394	0.73	289	395	0.73	3083	0.0	0.0	3082	0.0	0.0
32094	249	8	8			6	583	0.01	6	583	0.01	3136	0.0	0.0	3095	0.0	0.0
32095	250	8	8			5	467	0.01	5	467	0.01	3094	0.0	0.0	3136	0.0	0.0
32096	250	8	8			3	453	0.01	3	454	0.01	3093	0.0	0.0	3094	0.0	0.0
32097	200	8	8			1	453	0.00	1	454	0.00	3092	0.0	0.0	3093	0.0	0.0
32098	211	8	8			1	397	0.00	1	397	0.00	7502	0.0	0.0	3133	0.0	0.0
32099	250	8	8			26	423	0.06	26	424	0.06	3138	0.0	0.0	3137	0.0	0.0
32100	200	8	8			24	425	0.06	24	426	0.06	7400	0.0	0.0	3138	0.0	0.0
32101	300	8	8			89	358	0.25	89	359	0.25	3088	0.0	0.0	3087	0.0	0.0
32103	205	6	6			3	303	0.01	3	303	0.01	3086	0.0	0.0	10540	0.0	0.0
32104	312	6	6			1	226	0.01	1	226	0.01	3071	0.0	0.0	3086	0.0	0.0
32105	338	8	8			35	488	0.07	35	488	0.07	3085	0.0	0.0	3139	0.0	0.0
32106	237	8	8			3	509	0.01	3	510	0.01	3084	0.0	0.0	3085	0.0	0.0
32107	300	6	6			1	252	0.01	1	252	0.01	3144	0.0	0.0	3085	0.0	0.0
32108	207	8	8			288	344	0.84	288	344	0.84	3126	0.0	0.0	3083	0.0	0.0
32109	214	8	8			75	346	0.22	75	347	0.22	3125	0.0	0.0	3126	0.0	0.0
32110	53	8	8			17	224	0.07	17	224	0.07	3122	0.0	0.0	3124	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32111	251	8	8			12	536	0.02	12	537	0.02	3120	0.0	0.0	3121	0.0	0.0
32112	285	8	8			94	343	0.27	94	344	0.27	3128	0.0	0.0	3081	0.0	0.0
32113	150	8	8			90	349	0.26	90	349	0.26	3129	0.0	0.0	3128	0.0	0.0
32114	275	8	8			60	343	0.17	60	344	0.17	3112	0.0	0.0	3129	0.0	0.0
32115	250	8	8			56	453	0.12	56	454	0.12	7026	0.0	0.0	3112	0.0	0.0
32116	250	8	8			29	427	0.07	29	428	0.07	7501	0.0	0.0	7026	0.0	0.0
32117	297	8	8			25	472	0.05	25	473	0.05	3119	0.0	0.0	7501	0.0	0.0
32118	250	8	8			24	473	0.05	24	474	0.05	3074	0.0	0.0	3119	0.0	0.0
32119	294	8	8			3	408	0.01	3	408	0.01	3118	0.0	0.0	7026	0.0	0.0
32120	251	6	6			1	207	0.01	1	207	0.01	3140	0.0	0.0	3118	0.0	0.0
32121	408	8	8			1	342	0.00	1	342	0.00	3113	0.0	0.0	3112	0.0	0.0
32122	191	8	8			3	342	0.01	3	342	0.01	3127	0.0	0.0	3128	0.0	0.0
32123	89	6	6			1	160	0.01	1	160	0.01	3075	0.0	0.0	3127	0.0	0.0
32124	120	8	8			56	340	0.16	56	340	0.16	3123	0.0	0.0	3124	0.0	0.0
32125	147	6	6			1	178	0.01	1	178	0.01	3076	0.0	0.0	3120	0.0	0.0
32126	235	10	10			703	694	1.01	727	694	1.05	3115	6.8	6.7	3114	6.2	6.1
32127	210	10	10			702	685	1.02	726	685	1.06	3116	7.7	7.5	3115	6.8	6.7
32128	12	15	15			1,481	2,511	0.59	1,505	2,511	0.60	3111	0.0	0.0	3080	0.0	0.0
32129	380	10	10			700	690	1.02	724	690	1.05	3117	8.5	8.1	3116	7.7	7.5
32130	35	6	6			1	233	0.01	1	233	0.01	3141	0.0	0.0	3084	0.0	0.0
32133	382	8	8			227	348	0.65	227	348	0.65	3177	0.0	0.0	3158	0.0	0.0
32134	223	8	8			141	174	0.81	141	174	0.81	3178	0.0	0.0	3177	0.0	0.0
32138	220	8	8			85	665	0.13	85	666	0.13	3179	0.0	0.0	7503	0.0	0.0
32139	82	8	8			85	424	0.20	85	424	0.20	3180	0.0	0.0	3179	0.0	0.0
32140	184	8	8			1	722	0.00	1	723	0.00	3193	0.0	0.0	7503	0.0	0.0
32141	299	6	6			1	252	0.00	1	252	0.00	3148	0.0	0.0	3193	0.0	0.0
32142	295	8	8			140	402	0.35	140	403	0.35	3194	0.0	0.0	3176	0.0	0.0
32143	107	8	8			53	410	0.13	53	410	0.13	7401	0.0	0.0	3194	0.0	0.0
32144	83	8	8			48	638	0.08	48	640	0.07	7402	0.0	0.0	7401	0.0	0.0
32145	147	8	8			1	419	0.00	1	420	0.00	3195	0.0	0.0	7402	0.0	0.0
32146	295	8	8			1	420	0.00	1	421	0.00	3173	0.0	0.0	3195	0.0	0.0
32147	95	8	8			5	405	0.01	5	406	0.01	3174	0.0	0.0	7401	0.0	0.0
32148	217	8	8			3	344	0.01	3	344	0.01	3172	0.0	0.0	7264	0.0	0.0
32149	300	8	8			35	357	0.10	35	358	0.10	3196	0.0	0.0	3194	0.0	0.0
32150	300	8	8			35	313	0.11	35	314	0.11	3168	0.0	0.0	3196	0.0	0.0
32151	225	8	8			34	383	0.09	34	383	0.09	3165	0.0	0.0	3168	0.0	0.0
32152	143	8	8			3	345	0.01	3	346	0.01	3197	0.0	0.0	3172	0.0	0.0
32153	44	8	8			1	601	0.00	1	601	0.00	3171	0.0	0.0	3197	0.0	0.0
32154	73	8	8			1	632	0.00	1	633	0.00	3163	0.0	0.0	3197	0.0	0.0
32155	135	6	6			1	310	0.00	1	310	0.00	3169	0.0	0.0	3163	0.0	0.0
32156	71	8	8			1	542	0.00	1	543	0.00	3170	0.0	0.0	3169	0.0	0.0
32157	310	8	8			1	383	0.00	1	384	0.00	3185	0.0	0.0	3184	0.0	0.0
32158	225	8	8			14	383	0.04	14	383	0.04	3183	0.0	0.0	3184	0.0	0.0
32159	189	8	8			63	425	0.15	63	426	0.15	3184	0.0	0.0	3187	0.0	0.0
32160	326	8	8			1	329	0.00	1	329	0.00	3198	0.0	0.0	3187	0.0	0.0
32161	173	8	8			83	369	0.23	83	369	0.23	3200	0.0	0.0	3199	0.0	0.0
32162	38	8	8			83	440	0.19	83	440	0.19	3201	0.0	0.0	3200	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32163	66	8	8			83	390	0.21	83	390	0.21	3187	0.0	0.0	3201	0.0	0.0
32164	75	8	8			1	420	0.00	1	421	0.00	3217	0.0	0.0	3183	0.0	0.0
32165	186	8	8			13	460	0.03	13	461	0.03	3182	0.0	0.0	3183	0.0	0.0
32166	10	8	8			84	924	0.09	84	925	0.09	3147	0.0	0.0	3180	0.0	0.0
32167	88	8	8			1	1,020	0.00	1	1,022	0.00	3186	0.0	0.0	3187	0.0	0.0
32168	73	8	8			1	386	0.00	1	387	0.00	3150	0.0	0.0	3186	0.0	0.0
32169	300	8	8			13	503	0.02	13	503	0.02	3181	0.0	0.0	3182	0.0	0.0
32170	136	8	8			1	979	0.00	1	981	0.00	3202	0.0	0.0	3171	0.0	0.0
32171	189	8	8			1	226	0.00	1	227	0.00	3204	0.0	0.0	3202	0.0	0.0
32187	214	10	10			228	570	0.40	228	570	0.40	3158	0.0	0.0	10181	0.0	0.0
32190	212	54	54			9,253	35,347	0.26	10,194	35,347	0.29	3222	0.0	0.0	3231	0.0	0.0
32191	97	8	8			341	340	1.00	341	340	1.00	3259	0.0	0.0	3260	0.0	0.0
32192	290	8	8			8	380	0.02	8	380	0.02	3243	0.0	0.0	3249	0.0	0.0
32193	252	8	8			7	611	0.01	7	612	0.01	7676	0.0	0.0	3243	0.0	0.0
32194	361	8	8			20	344	0.06	20	344	0.06	3249	0.0	0.0	7265	0.0	0.0
32195	31	8	8			21	338	0.06	21	338	0.06	7265	0.0	0.0	3242	0.0	0.0
32196	168	6	6			1	178	0.00	1	178	0.00	3218	0.0	0.0	7265	0.0	0.0
32197	331	8	8			0	342	0.00	0	343	0.00	3242	0.0	0.0	7505	0.0	0.0
32198	360	24	24			647	7,200	0.09	647	7,200	0.09	3262	0.0	0.0	3242	0.0	0.0
32199	300	8	8			22	361	0.06	22	362	0.06	3263	0.0	0.0	3262	0.0	0.0
32200	340	8	8			22	399	0.06	22	399	0.06	3264	0.0	0.0	3263	0.0	0.0
32201	33	24	24			615	7,070	0.09	616	7,070	0.09	3240	0.0	0.0	3262	0.0	0.0
32202	117	24	24			590	7,741	0.08	590	7,741	0.08	3241	0.0	0.0	3240	0.0	0.0
32203	160	24	24			590	6,716	0.09	590	6,716	0.09	3236	0.0	0.0	3241	0.0	0.0
32204	237	8	8			1	273	0.00	1	273	0.00	3284	0.0	0.0	3240	0.0	0.0
32205	150	8	8			1	381	0.00	1	381	0.00	3237	0.0	0.0	3238	0.0	0.0
32206	98	24	24			572	7,467	0.08	572	7,467	0.08	3239	0.0	0.0	3238	0.0	0.0
32207	425	24	24			572	7,138	0.08	572	7,138	0.08	3258	0.0	0.0	3239	0.0	0.0
32208	375	8	8			14	342	0.04	14	342	0.04	7505	0.0	0.0	7506	0.0	0.0
32209	140	8	8			1	349	0.00	1	349	0.00	7266	0.0	0.0	3265	0.0	0.0
32210	141	15	15			460	3,165	0.15	460	3,165	0.15	3266	0.0	0.0	3265	0.0	0.0
32211	336	10	10			452	933	0.48	452	931	0.49	3247	0.0	0.0	3248	0.0	0.0
32212	136	10	10			451	839	0.54	451	838	0.54	3233	0.0	0.0	3247	0.0	0.0
32213	37	10	10			451	1,108	0.41	451	1,107	0.41	3267	0.0	0.0	3233	0.0	0.0
32214	221	10	10			432	751	0.57	432	751	0.58	3232	0.0	0.0	3267	0.0	0.0
32215	40	10	10			431	746	0.58	431	745	0.58	3268	0.0	0.0	3232	0.0	0.0
32217	33	10	10			390	342	1.14	390	342	1.14	3271	0.0	0.0	3270	0.0	0.0
32218	158	8	8			1	345	0.00	1	346	0.00	3251	0.0	0.0	3252	0.0	0.0
32219	287	10	10			388	544	0.71	388	544	0.71	3272	0.0	0.0	3271	0.0	0.0
32220	240	8	8			2	350	0.01	2	351	0.01	3250	0.0	0.0	3272	0.0	0.0
32222	80	10	10			366	467	0.78	366	466	0.79	7028	0.0	0.0	3272	0.0	0.0
32223	286	10	10			357	514	0.69	357	513	0.70	3234	0.0	0.0	7028	0.0	0.0
32224	278	8	8			6	783	0.01	6	784	0.01	3254	0.0	0.0	3253	0.0	0.0
32225	293	8	8			5	457	0.01	5	458	0.01	3275	0.0	0.0	3254	0.0	0.0
32226	12	8	8			3	586	0.01	3	587	0.01	3276	0.0	0.0	3275	0.0	0.0
32228	264	54	54			9,253	36,033	0.26	10,193	36,033	0.28	3223	0.0	0.0	3222	0.0	0.0
32229	1472	54	54			9,248	34,584	0.27	10,188	34,584	0.29	3224	0.0	0.0	3223	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32230	306	54	54			9,248	40,365	0.23	10,188	40,365	0.25	3225	0.0	0.0	3224	0.0	0.0
32231	648	54	54			9,247	35,360	0.26	10,188	35,360	0.29	3226	0.0	0.0	3225	0.0	0.0
32237	12	15	15			2,181	2,763	0.79	2,178	2,763	0.79	3324	0.0	0.0	3323	5.9	6.3
32238	140	6	6			0	247	0.00	0	247	0.00	3296	0.0	0.0	3289	0.0	0.0
32239	407	8	8			1	285	0.00	1	285	0.00	3289	0.0	0.0	3358	0.0	0.0
32241	52	18	18			4,519	6,539	0.69	4,457	6,539	0.68	3346	5.9	5.9	3299	0.0	0.0
32242	240	18	18			4,518	5,758	0.78	4,456	5,758	0.77	3301	0.0	0.0	3346	5.9	5.9
32243	275	8	8			2	435	0.00	2	435	0.00	3300	0.0	0.0	3301	0.0	0.0
32244	93	8	8			1	432	0.00	1	433	0.00	3348	0.0	0.0	3300	0.0	0.0
32245	13	8	8			1	583	0.00	1	583	0.00	11024	0.0	0.0	3300	0.0	0.0
32246	177	8	8			0	562	0.00	0	563	0.00	3349	0.0	0.0	11024	0.0	0.0
32247	295	8	8			3	589	0.01	3	590	0.01	3350	0.0	0.0	3349	0.0	0.0
32248	263	8	8			1	371	0.00	1	372	0.00	7677	0.0	0.0	3350	0.0	0.0
32249	271	8	8			5	556	0.01	5	557	0.01	3349	0.0	0.0	3347	0.0	0.0
32250	214	18	18			4,467	5,014	0.89	4,406	5,014	0.88	3302	0.0	0.0	3347	0.0	0.0
32251	125	18	18			4,466	3,452	1.29	4,404	3,452	1.28	3295	0.0	0.0	3302	0.0	0.0
32253	157	18	18			4,440	3,428	1.30	4,378	3,428	1.28	3304	6.0	6.1	3295	0.0	0.0
32254	460	6	6			3	181	0.02	3	181	0.02	3356	0.0	0.0	3295	0.0	0.0
32255	270	6	6			1	181	0.01	1	181	0.01	3291	0.0	0.0	3356	0.0	0.0
32256	400	8	8			155	413	0.37	155	414	0.37	3355	0.0	0.0	3304	6.0	6.1
32257	404	8	8			110	415	0.26	110	416	0.26	3345	0.0	0.0	3355	0.0	0.0
32258	116	8	8			108	413	0.26	108	413	0.26	3315	0.0	0.0	3345	0.0	0.0
32259	455	12	12			153	1,089	0.14	142	1,089	0.13	3353	0.0	0.0	3354	5.5	5.6
32260	15	12	12			153	1,092	0.14	142	1,092	0.13	3352	0.0	0.0	3353	0.0	0.0
32261	40	8	8			8	343	0.02	8	344	0.02	3351	0.0	0.0	3352	0.0	0.0
32262	274	8	8			1	344	0.00	1	344	0.00	7269	0.0	0.0	3351	0.0	0.0
32263	127	18	18			4,283	3,500	1.22	4,222	3,500	1.21	3296	0.0	0.0	3304	6.0	6.1
32264	242	8	8			1	861	0.00	1	863	0.00	3287	0.0	0.0	3375	0.0	0.0
32265	145	18	18			4,277	3,299	1.30	4,215	3,299	1.28	3305	0.0	0.0	3296	0.0	0.0
32266	450	12	12			158	1,069	0.15	147	1,069	0.14	3352	0.0	0.0	3305	0.0	0.0
32267	10	18	18			4,165	8,168	0.51	4,165	8,168	0.51	3354	5.5	5.6	3305	0.0	0.0
32268	363	8	8			1	342	0.00	1	342	0.00	7267	0.0	0.0	7030	0.0	0.0
32269	361	8	8			0	651	0.00	0	652	0.00	3305	0.0	0.0	7267	0.0	0.0
32270	192	18	18			4,274	4,488	0.95	4,210	4,488	0.94	3307	5.9	6.1	3354	5.5	5.6
32271	183	18	18			4,270	3,913	1.09	4,207	3,913	1.08	3297	0.0	0.0	3307	5.9	6.1
32272	250	8	8			14	365	0.04	14	365	0.04	3317	0.0	0.0	3297	0.0	0.0
32273	83	10	10			11	610	0.02	11	610	0.02	3288	0.0	0.0	7180	0.0	0.0
32274	217	8	8			10	383	0.03	10	383	0.03	3316	0.0	0.0	3288	0.0	0.0
32275	340	8	8			0	369	0.00	0	370	0.00	3297	0.0	0.0	3308	0.0	0.0
32276	285	18	18			4,254	3,960	1.07	4,190	3,960	1.06	3319	4.7	5.0	3297	0.0	0.0
32277	13	15	15			1,890	3,009	0.63	1,906	3,009	0.63	3320	5.0	5.3	3319	4.7	5.0
32278	475	15	15			1,886	1,858	1.02	1,903	1,858	1.02	3318	6.3	6.5	3320	5.0	5.3
32279	275	15	15			2,295	2,576	0.89	2,260	2,576	0.88	7510	6.3	0.0	3319	4.7	5.0
32280	336	8	8			160	536	0.30	160	537	0.30	3321	0.0	0.0	7510	6.3	0.0
32281	15	8	8			85	371	0.23	156	371	0.42	7510	6.3	0.0	3361	6.1	0.0
32283	366	8	8			156	251	0.62	110	251	0.44	3363	5.2	0.0	3314	3.8	0.0
32284	362	8	8			87	317	0.27	30	318	0.09	3325	7.0	0.0	3363	5.2	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32285	360	8	8			86	347	0.25	29	347	0.08	3362	0.0	0.0	3325	7.0	0.0
32286	280	15	15			2,184	2,588	0.84	2,211	2,588	0.85	3362	0.0	0.0	7510	6.3	0.0
32287	154	15	15			2,185	2,506	0.87	2,190	2,506	0.87	3322	6.2	6.6	3362	0.0	0.0
32288	189	6	6			2	178	0.01	2	178	0.01	3292	0.0	0.0	3322	6.2	6.6
32289	120	15	15			2,184	2,539	0.86	2,187	2,539	0.86	3323	5.9	6.3	3322	6.2	6.6
32290	201	15	15			2,140	2,076	1.03	2,142	2,076	1.03	7029	6.1	0.0	3324	0.0	0.0
32291	57	15	15			2,139	1,583	1.35	2,140	1,583	1.35	7134	0.0	0.0	7029	6.1	0.0
32292	45	15	15			2,017	1,617	1.25	1,983	1,617	1.23	3326	5.8	6.4	7134	0.0	0.0
32293	447	8	8			51	362	0.14	19	362	0.05	3327	5.8	0.0	3328	4.0	7.4
32294	367	8	8			138	313	0.44	206	313	0.66	3313	3.2	0.0	3311	2.8	6.7
32295	338	8	8			97	257	0.38	156	258	0.60	3361	6.1	0.0	3312	4.6	0.0
32296	265	10	10			717	640	1.12	810	640	1.27	3311	2.8	6.7	3310	1.1	0.0
32297	362	8	8			64	343	0.19	3	343	0.01	3309	1.6	0.0	3310	1.1	0.0
32298	244	8	8			1	338	0.00	1	338	0.00	3293	0.0	0.0	10780	0.0	0.0
32299	400	8	8			128	501	0.25	128	502	0.25	3329	0.0	0.0	3364	0.0	0.0
32300	300	8	8			92	494	0.19	92	495	0.19	7268	0.0	0.0	3329	0.0	0.0
32301	112	8	8			3	423	0.01	3	423	0.01	3342	0.0	0.0	3331	0.0	0.0
32302	208	8	8			1	420	0.00	1	421	0.00	3343	0.0	0.0	3342	0.0	0.0
32303	277	8	8			35	420	0.08	35	420	0.08	3331	0.0	0.0	3330	0.0	0.0
32304	217	8	8			1	383	0.00	1	383	0.00	3333	0.0	0.0	3337	0.0	0.0
32305	182	8	8			1	408	0.00	1	408	0.00	3336	0.0	0.0	3337	0.0	0.0
32306	304	8	8			11	415	0.03	11	415	0.03	7508	0.0	0.0	3362	0.0	0.0
32307	245	8	8			10	420	0.02	10	421	0.02	3365	0.0	0.0	7508	0.0	0.0
32308	245	8	8			8	420	0.02	8	421	0.02	3334	0.0	0.0	3365	0.0	0.0
32309	242	8	8			6	387	0.02	6	388	0.02	3335	0.0	0.0	3334	0.0	0.0
32310	86	8	8			5	417	0.01	5	418	0.01	3337	0.0	0.0	3335	0.0	0.0
32311	438	8	8			118	383	0.31	118	383	0.31	3339	0.0	0.0	3321	0.0	0.0
32312	272	8	8			116	453	0.26	116	454	0.26	3366	0.0	0.0	3339	0.0	0.0
32313	286	6	6			103	226	0.46	103	226	0.46	3367	0.0	0.0	3368	0.0	0.0
32314	350	8	8			44	343	0.13	44	344	0.13	3370	0.0	0.0	3369	0.0	0.0
32315	295	8	8			8	383	0.02	8	383	0.02	7270	0.0	0.0	3316	0.0	0.0
32316	295	8	8			5	381	0.01	5	382	0.01	3371	0.0	0.0	7509	0.0	0.0
32317	275	8	8			3	384	0.01	3	385	0.01	3372	0.0	0.0	3371	0.0	0.0
32318	225	8	8			1	383	0.00	1	383	0.00	7031	0.0	0.0	3372	0.0	0.0
32319	430	15	15			1,819	1,729	1.05	1,834	1,729	1.06	3381	6.6	6.8	3318	6.3	6.5
32320	440	15	15			1,563	1,930	0.81	1,585	1,930	0.82	3373	6.5	6.7	3341	5.8	6.0
32321	274	8	8			115	451	0.25	115	452	0.25	3340	0.0	0.0	3366	0.0	0.0
32322	301	8	8			5	342	0.01	5	343	0.01	3374	0.0	0.0	3340	0.0	0.0
32323	130	6	6			108	197	0.55	108	197	0.55	3338	0.0	0.0	3340	0.0	0.0
32324	156	6	6			105	135	0.77	105	135	0.77	3368	0.0	0.0	3338	0.0	0.0
32326	18	6	6			5	222	0.02	5	222	0.02	3294	0.0	0.0	3296	0.0	0.0
32327	227	8	8			3	485	0.01	3	486	0.01	3375	0.0	0.0	3294	0.0	0.0
32329	85	8	8			51	567	0.09	19	568	0.03	7134	0.0	0.0	3327	5.8	0.0
32331	304	6	6			1	110	0.01	1	110	0.01	3487	0.0	0.0	3389	0.0	0.0
32332	365	10	15	10	Existing	906	630	1.44	1,165	1,858	0.63	3384	1.9	0.0	3385	0.9	0.0
32333	172	10	15	10	Existing	905	584	1.55	1,165	1,723	0.68	3502	1.2	0.0	3384	1.9	0.0
32334	26	10	15	10	Existing	909	496	1.83	1,166	1,461	0.80	3385	0.9	0.0	3468	1.3	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32335	303	8	8			1	340	0.00	1	341	0.00	3387	0.0	0.0	3388	0.0	0.0
32336	185	8	8			1	329	0.00	1	329	0.00	3388	0.0	0.0	3386	0.0	0.0
32337	112	8	8			41	710	0.06	41	711	0.06	3389	0.0	0.0	7036	8.8	0.0
32340	207	8	8			1	576	0.00	1	577	0.00	3461	0.0	0.0	3393	0.0	0.0
32341	230	8	8			132	540	0.24	132	540	0.24	3393	0.0	0.0	3392	0.0	0.0
32342	121	8	8			133	548	0.24	133	549	0.24	3392	0.0	0.0	3390	11.1	0.0
32344	37	8	8			133	517	0.26	133	518	0.26	3390	11.1	0.0	3466	11.1	0.0
32347	90	8	8			1	271	0.01	1	272	0.01	7272	0.0	0.0	3446	0.0	0.0
32348	68	6	6			1	151	0.00	1	151	0.00	3521	0.0	0.0	3460	0.0	0.0
32349	283	6	6			1	144	0.00	1	144	0.00	3520	0.0	0.0	3506	0.0	0.0
32357	9	18	18			524	42,279	0.01	524	42,279	0.01	7513	0.0	0.0	3411	0.0	0.0
32358	127	54	54			14,971	35,026	0.43	15,900	35,026	0.45	3410	0.0	0.0	3411	0.0	0.0
32359	140	54	54			15,415	34,988	0.44	16,341	34,988	0.47	3411	0.0	0.0	7747	0.0	0.0
32360	319	6	6			1	201	0.00	1	201	0.00	7181	0.0	0.0	3455	0.0	0.0
32361	315	6	6			1	201	0.00	1	201	0.00	3454	0.0	0.0	7181	0.0	0.0
32362	150	10	10			153	363	0.42	153	363	0.42	7034	0.0	0.0	3420	0.0	0.0
32363	170	10	10			152	533	0.29	152	532	0.29	3472	0.0	0.0	7034	0.0	0.0
32364	150	10	10			107	655	0.16	107	654	0.16	3471	0.0	0.0	3472	0.0	0.0
32365	345	10	10			84	596	0.14	84	595	0.14	3480	0.0	0.0	3471	0.0	0.0
32366	371	10	10			83	610	0.14	83	610	0.14	3478	0.0	0.0	3480	0.0	0.0
32367	333	12	12			383	965	0.40	383	965	0.40	3420	0.0	0.0	3419	0.0	0.0
32368	272	12	12			433	598	0.72	433	598	0.72	3481	0.0	0.0	3402	0.0	0.0
32369	328	12	12			433	1,047	0.41	433	1,047	0.41	7274	0.0	0.0	3481	0.0	0.0
32370	93	12	12			442	642	0.69	442	642	0.69	3478	0.0	0.0	3477	0.0	0.0
32371	31	12	12			485	2,316	0.21	485	2,316	0.21	3477	0.0	0.0	3475	0.0	0.0
32372	270	8	8			37	388	0.09	37	388	0.09	3423	0.0	0.0	3475	0.0	0.0
32373	52	24	24			524	4,453	0.12	524	4,453	0.12	3475	0.0	0.0	3482	0.0	0.0
32374	510	24	24			524	4,359	0.12	524	4,359	0.12	3482	0.0	0.0	7513	0.0	0.0
32375	247	8	8			1	327	0.00	1	328	0.00	3483	0.0	0.0	3423	0.0	0.0
32376	500	24	24			1	5,561	0.00	1	5,561	0.00	3473	0.0	0.0	3476	0.0	0.0
32377	521	24	24			1	5,556	0.00	1	5,556	0.00	3470	0.0	0.0	3473	0.0	0.0
32378	295	24	24			1	4,541	0.00	1	4,541	0.00	3484	0.0	0.0	3470	0.0	0.0
32379	376	8	8			36	533	0.07	36	535	0.07	3422	0.0	0.0	3423	0.0	0.0
32380	269	6	6			44	242	0.18	44	242	0.18	3485	0.0	0.0	7273	0.0	0.0
32381	165	8	8			45	485	0.09	45	486	0.09	7273	0.0	0.0	3486	0.0	0.0
32382	217	8	8			49	299	0.16	49	299	0.16	3469	0.0	0.0	3486	0.0	0.0
32383	67	8	8			1	897	0.00	1	898	0.00	7678	0.0	0.0	3469	0.0	0.0
32384	326	14	21	10	Existing	1,825	1,639	1.11	2,145	4,833	0.44	3438	8.3	0.0	3417	0.0	0.0
32386	209	14	18	10	Existing	1,605	1,300	1.23	1,926	2,542	0.76	3444	3.3	0.0	3440	3.1	0.0
32387	240	14	18	10	Existing	1,255	1,303	0.96	1,556	2,546	0.61	3452	4.7	0.0	3424	3.6	0.0
32388	144	15	18	10	Existing	1,256	1,288	0.98	1,555	2,093	0.74	3451	2.3	0.0	3452	4.7	0.0
32389	184	15	18	10	Existing	1,208	1,737	0.70	1,503	2,824	0.53	3453	0.0	0.0	3451	2.3	0.0
32390	357	15	18	10	Existing	990	1,557	0.64	1,258	2,532	0.50	3468	1.3	0.0	3453	0.0	0.0
32391	463	12	12			95	881	0.11	94	881	0.11	3486	0.0	0.0	3468	1.3	0.0
32393	113	8	8			85	249	0.34	83	249	0.33	3488	8.2	0.0	7511	7.1	0.0
32394	237	6	6			1	257	0.00	1	257	0.00	3490	0.0	0.0	3489	10.3	0.0
32395	288	6	6			1	145	0.00	1	145	0.00	3491	0.0	0.0	3490	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32396	279	6	6			1	153	0.00	1	153	0.00	3395	0.0	0.0	3426	0.0	0.0
32398	151	10	10			219	1,339	0.16	219	1,338	0.16	7271	0.0	0.0	10106	5.7	0.0
32399	110	10	10			147	560	0.26	147	559	0.26	3492	0.0	0.0	7271	0.0	0.0
32400	288	10	10			147	733	0.20	147	732	0.20	3437	0.0	0.0	3492	0.0	0.0
32401	272	10	10			97	278	0.35	97	278	0.35	3435	0.0	0.0	3437	0.0	0.0
32402	143	8	8			95	304	0.31	95	304	0.31	3436	0.0	0.0	3435	0.0	0.0
32403	323	6	6			1	89	0.01	1	89	0.01	3493	0.0	0.0	3435	0.0	0.0
32404	350	8	8			1	248	0.00	1	249	0.00	7512	0.0	0.0	3436	0.0	0.0
32406	330	6	6			1	235	0.00	1	235	0.00	3396	0.0	0.0	3435	0.0	0.0
32407	371	8	8			1	302	0.00	1	302	0.00	3465	0.0	0.0	3466	11.1	0.0
32408	210	8	8			151	263	0.57	140	264	0.53	3450	1.7	4.5	3453	0.0	0.0
32409	126	8	8			150	269	0.56	139	269	0.52	7035	4.1	0.0	3450	1.7	4.5
32410	145	8	8			140	269	0.52	138	269	0.51	3494	9.2	0.0	3449	7.5	0.0
32411	140	8	8			135	434	0.31	135	435	0.31	3466	11.1	0.0	3494	9.2	0.0
32413	461	8	8			53	553	0.10	53	553	0.10	3495	0.0	0.0	3451	2.3	0.0
32414	305	8	8			3	596	0.00	3	597	0.00	3496	0.0	0.0	3424	3.6	0.0
32415	280	8	8			2	458	0.00	2	458	0.00	3497	0.0	0.0	3496	0.0	0.0
32416	116	8	8			2	453	0.00	2	454	0.00	3498	0.0	0.0	3497	0.0	0.0
32417	24	8	8			1	450	0.00	1	451	0.00	3499	0.0	0.0	3498	0.0	0.0
32418	86	8	8			1	443	0.00	1	444	0.00	3500	0.0	0.0	3499	0.0	0.0
32419	28	8	8			1	456	0.00	1	457	0.00	3501	0.0	0.0	3445	0.0	0.0
32420	174	10	15	10	Existing	776	565	1.37	1,008	1,666	0.60	3503	1.4	0.0	3464	1.5	0.0
32421	363	10	15	10	Existing	775	578	1.34	1,008	1,704	0.59	7033	0.0	0.0	3503	1.4	0.0
32423	73	8	8			2	283	0.01	2	283	0.01	3459	0.0	0.0	3457	0.0	0.0
32424	270	8	8			6	288	0.02	6	288	0.02	3505	0.0	0.0	3456	0.0	0.0
32425	140	6	6			2	308	0.01	2	308	0.01	3460	0.0	0.0	3459	0.0	0.0
32426	30	6	6			1	144	0.01	1	144	0.01	3506	0.0	0.0	3460	0.0	0.0
32427	188	6	6			1	102	0.01	1	102	0.01	3398	0.0	0.0	3506	0.0	0.0
32428	209	12	12			311	876	0.36	311	876	0.36	7275	0.0	0.0	3443	0.0	0.0
32429	224	12	12			132	742	0.18	132	742	0.18	3507	0.0	0.0	7275	0.0	0.0
32430	360	8	8			0	256	0.00	0	256	0.00	3436	0.0	0.0	3441	0.0	0.0
32431	308	10	10			313	604	0.52	313	603	0.52	3508	5.7	0.0	3444	3.3	0.0
32432	285	10	10			313	519	0.60	313	518	0.60	7032	9.5	0.0	3508	5.7	0.0
32433	270	12	12			312	1,583	0.20	312	1,583	0.20	3443	0.0	0.0	7032	9.5	0.0
32434	25	8	8			1	306	0.00	1	306	0.00	3441	0.0	0.0	3443	0.0	0.0
32435	134	15	24	6	Existing	2,006	1,653	1.21	3,680	5,790	0.64	3416	8.7	0.0	7036	8.8	0.0
32436	336	15	24	6	Existing	2,006	1,666	1.20	3,680	5,833	0.63	3415	7.4	0.0	3416	8.7	0.0
32437	36	15	15			1,316	1,619	0.81	1,589	1,619	0.98	3413	6.6	0.0	3414	6.5	0.0
32438	27	8	8			84	465	0.18	83	465	0.18	7511	7.1	0.0	7135	7.0	0.0
32439	371	8	8			116	459	0.25	116	459	0.25	3430	0.0	0.0	3431	0.0	0.0
32440	44	8	8			1	728	0.00	1	729	0.00	3510	0.0	0.0	3430	0.0	0.0
32441	116	8	8			1	388	0.00	1	389	0.00	3429	0.0	0.0	3511	0.0	0.0
32442	197	8	8			1	217	0.00	1	218	0.00	3512	0.0	0.0	3429	0.0	0.0
32443	117	24	24			3,872	8,528	0.45	5,861	8,528	0.69	3417	0.0	0.0	3433	0.0	0.0
32444	175	6	6			19	131	0.14	3	131	0.02	3448	10.7	0.0	3494	9.2	0.0
32445	85	6	6			8	129	0.06	1	129	0.01	7403	9.3	0.0	3448	10.7	0.0
32446	143	8	8			2	838	0.00	2	838	0.00	3447	0.0	0.0	3448	10.7	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32447	54	8	8			1	732	0.00	1	733	0.00	3446	0.0	0.0	3447	0.0	0.0
32448	55	8	8			1	285	0.00	1	285	0.00	3462	0.0	0.0	3463	0.0	0.0
32449	46	8	8			1	195	0.00	1	195	0.00	3463	0.0	0.0	7272	0.0	0.0
32450	365	8	8			1	384	0.00	1	385	0.00	3474	0.0	0.0	7514	0.0	0.0
32451	371	8	8			42	372	0.11	42	373	0.11	7514	0.0	0.0	3477	0.0	0.0
32452	283	8	8			1	384	0.00	1	385	0.00	3399	0.0	0.0	3474	0.0	0.0
32453	87	6	6			15	205	0.07	1	205	0.00	7516	5.7	0.0	3516	4.4	0.0
32454	59	6	6			34	205	0.17	1	205	0.00	3516	4.4	0.0	3440	3.1	0.0
32455	340	8	8			107	438	0.24	107	439	0.24	3412	0.0	0.0	3513	0.0	0.0
32456	46	8	8			1	283	0.00	1	283	0.00	3515	0.0	0.0	3505	0.0	0.0
32457	200	6	6			21	160	0.13	1	160	0.00	3400	2.2	0.0	3464	1.5	0.0
32458	46	6	6			6	128	0.04	1	128	0.01	3522	10.0	0.0	3448	10.7	0.0
32460	292	6	6			1	149	0.00	1	149	0.00	3394	0.0	0.0	3437	0.0	0.0
32461	53	6	6			1	360	0.00	1	360	0.00	3426	0.0	0.0	3437	0.0	0.0
32462	21	12	12			433	5,374	0.08	433	5,374	0.08	3402	0.0	0.0	8539	0.0	0.0
32463	194	54	54			14,970	35,283	0.42	15,899	35,283	0.45	3408	0.0	0.0	3409	0.0	0.0
32464	722	54	54			14,969	35,983	0.42	15,899	35,983	0.44	3407	0.0	0.0	3408	0.0	0.0
32465	193	54	54			14,969	35,374	0.42	15,898	35,374	0.45	3406	0.0	0.0	3407	0.0	0.0
32466	213	54	54			14,969	35,264	0.42	15,898	35,264	0.45	3404	0.0	0.0	3406	0.0	0.0
32467	178	24	24			1,077	25,472	0.04	1,077	25,472	0.04	3405	0.0	0.0	3404	0.0	0.0
32468	250	54	54			14,102	35,305	0.40	15,032	35,305	0.43	3403	0.0	0.0	3404	0.0	0.0
32487	348	8	8			31	386	0.08	31	387	0.08	7277	0.0	0.0	3560	0.0	0.0
32488	297	6	6			1	369	0.00	1	369	0.00	10163	0.0	0.0	3560	0.0	0.0
32489	295	6	6			19	265	0.07	19	265	0.07	3610	0.0	0.0	3609	0.0	0.0
32490	298	8	8			64	447	0.14	64	447	0.14	3561	0.0	0.0	3562	0.0	0.0
32491	291	8	8			9	329	0.03	9	330	0.03	3576	0.0	0.0	3561	0.0	0.0
32492	290	8	8			1	626	0.00	1	626	0.00	3577	0.0	0.0	3576	0.0	0.0
32493	405	8	8			54	351	0.15	54	352	0.15	3563	0.0	0.0	3561	0.0	0.0
32494	240	8	8			42	430	0.10	42	431	0.10	3567	0.0	0.0	3563	0.0	0.0
32495	255	8	8			42	431	0.10	42	431	0.10	3570	0.0	0.0	3567	0.0	0.0
32496	304	8	8			18	1,063	0.02	18	1,064	0.02	3557	0.0	0.0	3570	0.0	0.0
32497	88	8	8			17	894	0.02	17	895	0.02	3554	0.0	0.0	3557	0.0	0.0
32498	54	8	8			17	1,198	0.01	17	1,199	0.01	3555	0.0	0.0	3554	0.0	0.0
32499	88	8	8			1	387	0.00	1	388	0.00	7517	0.0	0.0	3571	0.0	0.0
32500	35	6	6			1	529	0.00	1	529	0.00	3596	0.0	0.0	7517	0.0	0.0
32501	403	8	8			24	442	0.06	24	442	0.05	3611	0.0	0.0	3562	0.0	0.0
32502	497	8	8			24	321	0.07	24	321	0.07	3565	0.0	0.0	3611	0.0	0.0
32503	303	8	8			1	1,163	0.00	1	1,165	0.00	3566	0.0	0.0	3565	0.0	0.0
32504	335	8	8			1	1,368	0.00	1	1,369	0.00	3595	0.0	0.0	3566	0.0	0.0
32505	137	8	8			1	1,734	0.00	1	1,736	0.00	3547	0.0	0.0	3595	0.0	0.0
32506	252	8	8			17	982	0.02	17	983	0.02	3571	0.0	0.0	3555	0.0	0.0
32507	151	8	8			12	744	0.02	12	744	0.02	3564	0.0	0.0	3563	0.0	0.0
32508	200	8	8			1	531	0.00	1	532	0.00	7519	0.0	0.0	3564	0.0	0.0
32509	260	8	8			1	425	0.00	1	426	0.00	3568	0.0	0.0	3564	0.0	0.0
32510	237	8	8			1	445	0.00	1	446	0.00	3559	0.0	0.0	3568	0.0	0.0
32511	285	6	6			15	149	0.10	15	149	0.10	3597	0.0	0.0	3598	0.0	0.0
32512	353	8	8			21	636	0.03	21	637	0.03	3588	0.0	0.0	3589	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32513	266	12	12			405	866	0.47	405	866	0.47	3574	0.0	0.0	3573	0.0	0.0
32514	196	12	12			381	831	0.46	381	831	0.46	3612	0.0	0.0	3575	0.0	0.0
32515	148	12	12			381	1,274	0.30	381	1,274	0.30	3578	0.0	0.0	3612	0.0	0.0
32516	372	12	12			379	1,178	0.32	379	1,178	0.32	3586	0.0	0.0	3578	0.0	0.0
32517	361	8	8			285	443	0.64	285	444	0.64	3558	0.0	0.0	3586	0.0	0.0
32518	320	8	8			234	912	0.26	234	913	0.26	3590	0.0	0.0	3558	0.0	0.0
32519	332	8	8			180	1,190	0.15	180	1,192	0.15	3613	0.0	0.0	3590	0.0	0.0
32520	227	8	8			179	1,081	0.17	179	1,082	0.17	3599	0.0	0.0	3613	0.0	0.0
32521	145	6	6			21	553	0.04	21	553	0.04	3587	0.0	0.0	3558	0.0	0.0
32522	170	6	6			20	500	0.04	20	500	0.04	3556	0.0	0.0	3587	0.0	0.0
32523	182	6	6			1	522	0.00	1	522	0.00	3614	0.0	0.0	3556	0.0	0.0
32524	145	6	6			1	341	0.00	1	341	0.00	7182	0.0	0.0	3614	0.0	0.0
32525	270	6	6			1	844	0.00	1	844	0.00	3548	0.0	0.0	7182	0.0	0.0
32526	144	6	6			178	553	0.32	178	553	0.32	3615	0.0	0.0	3599	0.0	0.0
32527	144	10	10			0	2,078	0.00	0	2,075	0.00	3615	0.0	0.0	3599	0.0	0.0
32528	144	6	6			1	538	0.00	1	538	0.00	3600	0.0	0.0	3615	0.0	0.0
32529	265	6	6			1	646	0.00	1	646	0.00	3601	0.0	0.0	3600	0.0	0.0
32530	100	8	8			1	927	0.00	1	928	0.00	3606	0.0	0.0	3605	0.0	0.0
32531	125	8	8			1	1,049	0.00	1	1,050	0.00	3604	0.0	0.0	3607	0.0	0.0
32532	97	8	8			6	1,153	0.00	6	1,155	0.00	3605	0.0	0.0	3607	0.0	0.0
32533	170	8	8			4	1,921	0.00	4	1,924	0.00	3616	0.0	0.0	3605	0.0	0.0
32534	200	8	8			2	619	0.00	2	619	0.00	3617	0.0	0.0	3616	0.0	0.0
32535	88	6	6			1	356	0.00	1	356	0.00	3619	0.0	0.0	3618	0.0	0.0
32536	127	6	6			1	357	0.00	1	357	0.00	3620	0.0	0.0	3619	0.0	0.0
32537	44	6	6			1	759	0.00	1	759	0.00	3550	0.0	0.0	3620	0.0	0.0
32538	24	8	8			1	597	0.00	1	597	0.00	7520	0.0	0.0	3616	0.0	0.0
32539	82	8	8			1	1,544	0.00	1	1,547	0.00	3603	0.0	0.0	7520	0.0	0.0
32540	47	6	6			1	450	0.00	1	450	0.00	3602	0.0	0.0	3603	0.0	0.0
32541	375	6	6			19	288	0.07	19	288	0.07	3621	0.0	0.0	3556	0.0	0.0
32542	175	6	6			1	741	0.00	1	741	0.00	3645	0.0	0.0	3621	0.0	0.0
32543	170	6	6			44	173	0.25	44	173	0.25	3623	0.0	0.0	3622	0.0	0.0
32544	163	6	6			43	176	0.24	43	176	0.24	7276	0.0	0.0	3623	0.0	0.0
32545	194	6	6			24	233	0.10	24	233	0.10	3584	0.0	0.0	7276	0.0	0.0
32546	206	6	6			1	735	0.00	1	735	0.00	3624	0.0	0.0	3584	0.0	0.0
32547	158	6	6			1	765	0.00	1	765	0.00	3625	0.0	0.0	3624	0.0	0.0
32548	405	6	6			1	469	0.00	1	469	0.00	3585	0.0	0.0	3584	0.0	0.0
32549	300	6	6			19	161	0.12	19	161	0.12	3627	0.0	0.0	7276	0.0	0.0
32552	353	8	8			70	340	0.21	70	341	0.21	3582	0.0	0.0	3628	0.0	0.0
32553	365	8	8			0	350	0.00	0	351	0.00	3629	0.0	0.0	3622	0.0	0.0
32554	145	6	6			1	252	0.00	1	252	0.00	3630	0.0	0.0	3623	0.0	0.0
32555	271	6	6			1	159	0.00	1	159	0.00	3631	0.0	0.0	3584	0.0	0.0
32556	310	24	24			1,031	5,738	0.18	1,032	5,738	0.18	3632	0.0	0.0	3629	0.0	0.0
32557	411	8	8			353	643	0.55	353	644	0.55	3593	0.0	0.0	3632	0.0	0.0
32558	206	8	8			353	426	0.83	353	426	0.83	3592	0.0	0.0	3593	0.0	0.0
32559	126	8	8			1	1,643	0.00	1	1,645	0.00	3591	0.0	0.0	3592	0.0	0.0
32560	340	6	6			89	113	0.79	89	113	0.79	3579	0.0	0.0	3594	0.0	0.0
32561	300	6	6			1	113	0.01	1	113	0.01	3633	0.0	0.0	3579	0.0	0.0

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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32562	325	6	6			0	113	0.00	0	113	0.00	3634	0.0	0.0	3633	0.0	0.0
32563	367	8	8			0	340	0.00	0	340	0.00	7038	0.0	0.0	3634	0.0	0.0
32564	320	8	8			1	343	0.00	1	344	0.00	3635	0.0	0.0	3578	0.0	0.0
32565	331	8	8			1	342	0.00	1	343	0.00	7278	0.0	0.0	3635	0.0	0.0
32566	401	6	6			1	164	0.00	1	164	0.00	3581	0.0	0.0	3575	0.0	0.0
32567	303	8	8			1	356	0.00	1	356	0.00	3580	0.0	0.0	7183	0.0	0.0
32568	320	8	8			1	422	0.00	1	423	0.00	7037	0.0	0.0	3580	0.0	0.0
32569	109	8	8			1	382	0.00	1	382	0.00	3636	0.0	0.0	7037	0.0	0.0
32570	370	8	8			92	367	0.25	92	367	0.25	3637	0.0	0.0	3573	0.0	0.0
32573	92	6	6			1	252	0.00	1	252	0.00	3552	0.0	0.0	3594	0.0	0.0
32574	548	24	24			1,056	6,747	0.16	1,056	6,747	0.16	7038	0.0	0.0	3638	0.0	0.0
32575	65	6	6			1	156	0.00	1	156	0.00	3553	0.0	0.0	3597	0.0	0.0
32576	142	10	10			0	1,716	0.00	0	1,714	0.00	3867	0.0	0.0	3615	0.0	0.0
32577	32	6	6			1	201	0.00	1	201	0.00	3649	0.0	0.0	7517	0.0	0.0
32578	35	24	24			678	10,008	0.07	678	10,008	0.07	3639	0.0	0.0	3632	0.0	0.0
32582	329	8	8			79	1,223	0.06	79	1,224	0.06	7279	0.0	0.0	3666	0.0	0.0
32583	321	8	8			79	942	0.08	79	944	0.08	3666	0.0	0.0	3665	0.0	0.0
32584	222	8	8			90	882	0.10	90	883	0.10	3665	0.0	0.0	3663	0.0	0.0
32585	214	8	8			90	862	0.10	90	863	0.10	3663	0.0	0.0	3672	0.0	0.0
32586	351	10	10			66	476	0.14	66	475	0.14	3681	0.0	0.0	3672	0.0	0.0
32587	168	8	8			13	572	0.02	13	572	0.02	3682	0.0	0.0	3704	0.0	0.0
32588	332	8	8			53	378	0.14	53	378	0.14	3685	0.0	0.0	3704	0.0	0.0
32589	15	10	10			53	2,351	0.02	53	2,349	0.02	7404	0.0	0.0	3685	0.0	0.0
32590	55	8	8			6	354	0.02	6	355	0.02	3686	0.0	0.0	7404	0.0	0.0
32591	305	8	8			6	374	0.02	6	375	0.02	3687	0.0	0.0	3686	0.0	0.0
32592	100	8	8			1	376	0.00	1	376	0.00	3705	0.0	0.0	3687	0.0	0.0
32593	130	8	8			0	1,310	0.00	0	1,311	0.00	3707	0.0	0.0	3706	0.0	0.0
32594	148	8	8			0	876	0.00	0	877	0.00	7679	0.0	0.0	3707	0.0	0.0
32595	185	10	10			47	1,653	0.03	47	1,651	0.03	3684	0.0	0.0	7404	0.0	0.0
32597	315	8	8			1	1,245	0.00	1	1,247	0.00	3708	0.0	0.0	3683	0.0	0.0
32598	347	10	10			39	672	0.06	39	671	0.06	3709	0.0	0.0	3683	0.0	0.0
32599	91	6	6			0	273	0.00	0	273	0.00	3651	0.0	0.0	3709	0.0	0.0
32600	242	8	8			1	1,159	0.00	1	1,160	0.00	3710	0.0	0.0	3709	0.0	0.0
32601	116	8	8			0	1,315	0.00	0	1,317	0.00	3711	0.0	0.0	3710	0.0	0.0
32602	143	8	8			0	417	0.00	0	417	0.00	3652	0.0	0.0	3711	0.0	0.0
32603	25	8	8			32	976	0.03	32	978	0.03	3713	0.0	0.0	3712	0.0	0.0
32604	430	8	8			0	890	0.00	0	890	0.00	3714	0.0	0.0	3713	0.0	0.0
32605	350	8	8			24	973	0.02	24	974	0.02	3661	0.0	0.0	3713	0.0	0.0
32606	440	8	8			0	713	0.00	0	713	0.00	3660	0.0	0.0	3661	0.0	0.0
32607	156	6	6			0	513	0.00	0	513	0.00	3653	0.0	0.0	7521	0.0	0.0
32608	331	6	6			1	541	0.00	1	541	0.00	3654	0.0	0.0	3715	0.0	0.0
32609	259	8	8			3	971	0.00	3	972	0.00	3715	0.0	0.0	3716	0.0	0.0
32610	248	8	8			7	951	0.01	7	953	0.01	3716	0.0	0.0	3717	0.0	0.0
32612	375	8	8			7	801	0.01	7	801	0.01	3717	0.0	0.0	3701	0.0	0.0
32613	238	8	8			14	662	0.02	14	663	0.02	3701	0.0	0.0	3671	0.0	0.0
32614	219	8	8			14	537	0.03	14	538	0.03	3671	0.0	0.0	3670	0.0	0.0
32615	251	8	8			38	785	0.05	38	786	0.05	3670	0.0	0.0	3718	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32616	148	8	8			53	368	0.14	53	368	0.14	3718	0.0	0.0	3719	0.0	0.0
32617	313	8	8			0	867	0.00	0	869	0.00	3669	0.0	0.0	3670	0.0	0.0
32618	259	8	8			16	1,156	0.01	16	1,157	0.01	7281	0.0	0.0	3668	0.0	0.0
32619	171	8	8			0	800	0.00	0	801	0.00	3739	0.0	0.0	7281	0.0	0.0
32620	190	8	8			0	415	0.00	0	416	0.00	3738	0.0	0.0	7281	0.0	0.0
32621	353	8	8			0	1,308	0.00	0	1,309	0.00	3667	0.0	0.0	7281	0.0	0.0
32623	319	8	8			0	743	0.00	0	744	0.00	3664	0.0	0.0	3665	0.0	0.0
32624	164	8	8			53	373	0.14	53	373	0.14	3719	0.0	0.0	3677	0.0	0.0
32625	273	8	8			53	344	0.16	53	345	0.15	3677	0.0	0.0	3678	0.0	0.0
32626	107	8	8			53	341	0.16	53	341	0.16	3678	0.0	0.0	3679	0.0	0.0
32627	200	8	8			162	1,015	0.16	162	1,017	0.16	3680	0.0	0.0	3679	0.0	0.0
32628	363	8	8			162	877	0.18	162	878	0.18	3672	0.0	0.0	3680	0.0	0.0
32629	314	8	8			224	398	0.56	224	399	0.56	3679	0.0	0.0	7522	0.0	0.0
32630	322	8	8			234	673	0.35	234	674	0.35	3674	0.0	0.0	3721	0.0	0.0
32631	277	8	8			234	483	0.48	234	483	0.48	3721	0.0	0.0	3673	0.0	0.0
32632	321	8	8			10	371	0.03	10	372	0.03	3722	0.0	0.0	3674	0.0	0.0
32633	229	8	8			10	1,044	0.01	10	1,045	0.01	3723	0.0	0.0	3722	0.0	0.0
32634	45	8	8			10	420	0.02	10	421	0.02	7040	0.0	0.0	3723	0.0	0.0
32635	223	8	8			0	1,057	0.00	0	1,058	0.00	3675	0.0	0.0	7040	0.0	0.0
32636	229	8	8			0	847	0.00	0	849	0.00	3676	0.0	0.0	3675	0.0	0.0
32637	118	8	8			0	771	0.00	0	772	0.00	3722	0.0	0.0	7280	0.0	0.0
32638	110	8	8			79	354	0.22	79	355	0.22	3691	0.0	0.0	3690	0.0	0.0
32639	127	8	8			0	376	0.00	0	376	0.00	3724	0.0	0.0	3691	0.0	0.0
32640	80	8	8			79	389	0.20	79	389	0.20	7524	0.0	0.0	3691	0.0	0.0
32641	120	8	8			0	483	0.00	0	483	0.00	7041	0.0	0.0	3726	0.0	0.0
32642	440	8	8			4	447	0.01	4	448	0.01	3726	0.0	0.0	3727	0.0	0.0
32643	60	8	8			0	1,038	0.00	0	1,039	0.00	3655	0.0	0.0	3727	0.0	0.0
32645	320	8	8			4	955	0.00	4	956	0.00	3727	0.0	0.0	3688	0.0	0.0
32646	272	8	8			6	840	0.01	6	840	0.01	3728	0.0	0.0	3688	0.0	0.0
32647	117	8	8			10	444	0.02	10	445	0.02	3688	0.0	0.0	3729	0.0	0.0
32648	108	8	8			10	445	0.02	10	446	0.02	3729	0.0	0.0	3697	0.0	0.0
32649	377	8	8			58	456	0.13	58	456	0.13	3659	0.0	0.0	3697	0.0	0.0
32650	263	8	8			0	372	0.00	0	372	0.00	3698	0.0	0.0	3659	0.0	0.0
32651	288	8	8			58	549	0.11	58	551	0.11	7042	0.0	0.0	3659	0.0	0.0
32652	163	8	8			1	371	0.00	1	372	0.00	3700	0.0	0.0	7042	0.0	0.0
32653	92	8	8			0	347	0.00	0	347	0.00	3699	0.0	0.0	3700	0.0	0.0
32654	142	8	8			0	372	0.00	0	373	0.00	7405	0.0	0.0	3700	0.0	0.0
32656	137	6	6			0	299	0.00	0	299	0.00	3657	0.0	0.0	7405	0.0	0.0
32657	41	8	8			69	485	0.14	69	486	0.14	3697	0.0	0.0	7136	0.0	0.0
32658	182	8	8			7	702	0.01	7	703	0.01	7523	0.0	0.0	7136	0.0	0.0
32659	164	8	8			76	497	0.15	76	497	0.15	7136	0.0	0.0	3696	0.0	0.0
32660	254	6	6			0	274	0.00	0	274	0.00	3658	0.0	0.0	3724	0.0	0.0
32662	156	8	8			1	413	0.00	1	413	0.00	3694	0.0	0.0	3730	0.0	0.0
32663	162	8	8			1	418	0.00	1	419	0.00	3695	0.0	0.0	3694	0.0	0.0
32664	28	6	6			0	969	0.00	0	969	0.00	3734	0.0	0.0	3654	0.0	0.0
32665	23	8	8			1	388	0.00	1	388	0.00	9124	0.0	0.0	3695	0.0	0.0
32666	215	10	10			38	1,218	0.03	38	1,217	0.03	3712	0.0	0.0	3732	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32669	101	12	12			375	1,136	0.33	375	1,136	0.33	3755	0.0	0.0	3757	0.0	0.0
32670	282	8	8			313	660	0.47	313	660	0.47	3756	0.0	0.0	3755	0.0	0.0
32671	395	8	8			313	894	0.35	313	896	0.35	3752	0.0	0.0	3756	0.0	0.0
32672	264	8	8			1	510	0.00	1	510	0.00	3770	0.0	0.0	3752	0.0	0.0
32673	237	8	8			61	1,142	0.05	61	1,144	0.05	3772	0.0	0.0	3755	0.0	0.0
32674	200	8	8			61	985	0.06	61	987	0.06	3749	0.0	0.0	3772	0.0	0.0
32675	350	8	8			28	343	0.08	28	344	0.08	3769	0.0	0.0	3749	0.0	0.0
32676	354	8	8			1	643	0.00	1	644	0.00	3753	0.0	0.0	3769	0.0	0.0
32677	181	8	8			32	570	0.06	32	571	0.06	3750	0.0	0.0	3768	0.0	0.0
32678	276	8	8			32	383	0.08	32	384	0.08	3767	0.0	0.0	3750	0.0	0.0
32679	250	8	8			5	488	0.01	5	488	0.01	3754	0.0	0.0	3767	0.0	0.0
32680	250	8	8			4	694	0.01	4	696	0.01	3766	0.0	0.0	3754	0.0	0.0
32681	142	24	24			550	5,652	0.10	550	5,652	0.10	3758	0.0	0.0	7282	0.0	0.0
32682	140	24	24			550	6,535	0.08	550	6,535	0.08	3748	0.0	0.0	3758	0.0	0.0
32683	255	10	10			432	2,466	0.18	432	2,463	0.18	3773	0.0	0.0	3748	0.0	0.0
32684	300	10	10			431	1,122	0.38	431	1,120	0.38	3774	0.0	0.0	3773	0.0	0.0
32685	300	12	12			431	1,131	0.38	431	1,131	0.38	3771	0.0	0.0	3774	0.0	0.0
32686	295	8	8			9	545	0.02	9	546	0.02	3759	0.0	0.0	7282	0.0	0.0
32687	165	8	8			1	378	0.00	1	378	0.00	3760	0.0	0.0	3759	0.0	0.0
32688	100	8	8			1	1,537	0.00	1	1,539	0.00	3751	0.0	0.0	7137	0.0	0.0
32689	330	24	24			90	4,541	0.02	90	4,541	0.02	3761	0.0	0.0	3748	0.0	0.0
32692	239	8	8			31	322	0.10	31	323	0.10	3764	0.0	0.0	3765	0.0	0.0
32693	289	8	8			257	655	0.39	257	656	0.39	7283	0.0	0.0	3781	0.0	0.0
32694	349	8	8			0	588	0.00	0	588	0.00	3779	0.0	0.0	3764	0.0	0.0
32695	115	8	8			0	1,502	0.00	0	1,504	0.00	3780	0.0	0.0	3764	0.0	0.0
32696	250	8	8			1	372	0.00	1	372	0.00	3778	0.0	0.0	3764	0.0	0.0
32697	37	8	8			0	1,143	0.00	0	1,145	0.00	3782	0.0	0.0	7525	0.0	0.0
32698	135	6	6			0	331	0.00	0	331	0.00	7526	0.0	0.0	3782	0.0	0.0
32699	506	54	54			9,247	49,787	0.19	10,187	49,787	0.20	3746	0.0	0.0	3747	0.0	0.0
32703	530	6	6			0	544	0.00	0	544	0.00	3886	0.0	0.0	3813	0.0	0.0
32704	117	8	8			64	1,124	0.06	64	1,126	0.06	3813	0.0	0.0	3812	0.0	0.0
32705	190	8	8			63	1,128	0.06	63	1,130	0.06	3814	0.0	0.0	3813	0.0	0.0
32706	114	8	8			63	1,338	0.05	63	1,340	0.05	3846	0.0	0.0	3814	0.0	0.0
32707	171	8	8			39	1,176	0.03	39	1,178	0.03	3808	0.0	0.0	3847	0.0	0.0
32708	73	8	8			25	1,382	0.02	25	1,383	0.02	3809	0.0	0.0	3808	0.0	0.0
32709	159	8	8			25	1,406	0.02	25	1,408	0.02	3848	0.0	0.0	3809	0.0	0.0
32710	213	8	8			1	1,618	0.00	1	1,620	0.00	3849	0.0	0.0	3848	0.0	0.0
32711	197	8	8			1	2,028	0.00	1	2,031	0.00	3850	0.0	0.0	3849	0.0	0.0
32712	280	6	6			92	492	0.19	92	492	0.19	3845	0.0	0.0	3816	0.0	0.0
32714	253	8	8			0	416	0.00	0	417	0.00	7185	0.0	0.0	3846	0.0	0.0
32715	286	6	6			1	243	0.00	1	243	0.00	3815	0.0	0.0	3814	0.0	0.0
32716	170	6	6			0	544	0.00	0	544	0.00	3851	0.0	0.0	3815	0.0	0.0
32718	264	8	8			151	542	0.28	151	543	0.28	3801	0.0	0.0	3832	0.0	0.0
32719	343	8	8			1	1,250	0.00	1	1,251	0.00	3852	0.0	0.0	3802	0.0	0.0
32720	175	8	8			1	2,269	0.00	1	2,272	0.00	3791	0.0	0.0	3852	0.0	0.0
32721	180	6	6			1	168	0.00	1	168	0.00	3792	0.0	0.0	3803	0.0	0.0
32722	67	6	6			1	351	0.00	1	351	0.00	3793	0.0	0.0	3803	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32723	155	6	6			1	550	0.00	1	550	0.00	3803	0.0	0.0	3853	0.0	0.0
32724	280	6	6			2	390	0.01	2	390	0.01	3853	0.0	0.0	3854	0.0	0.0
32725	139	6	6			19	540	0.03	19	540	0.03	3854	0.0	0.0	3855	0.0	0.0
32726	187	6	6			19	390	0.05	19	390	0.05	3855	0.0	0.0	3804	0.0	0.0
32727	165	8	8			21	927	0.02	21	928	0.02	3805	0.0	0.0	3856	0.0	0.0
32728	187	8	8			21	385	0.05	21	385	0.05	3856	0.0	0.0	3806	0.0	0.0
32729	191	8	8			22	385	0.06	22	385	0.06	3806	0.0	0.0	7529	0.0	0.0
32730	222	8	8			22	966	0.02	22	967	0.02	7529	0.0	0.0	3857	0.0	0.0
32731	250	8	8			22	638	0.03	22	638	0.03	3857	0.0	0.0	3858	0.0	0.0
32732	167	6	6			1	433	0.00	1	433	0.00	7286	0.0	0.0	3810	0.0	0.0
32733	272	6	6			31	311	0.10	31	311	0.10	3860	0.0	0.0	3829	0.0	0.0
32734	163	6	6			30	367	0.08	30	367	0.08	3810	0.0	0.0	3860	0.0	0.0
32735	182	6	6			1	522	0.00	1	522	0.00	7527	0.0	0.0	7286	0.0	0.0
32736	375	6	6			1	316	0.00	1	316	0.00	3794	0.0	0.0	7527	0.0	0.0
32737	423	6	6			36	470	0.08	36	470	0.08	3807	0.0	0.0	3861	0.0	0.0
32738	200	6	6			1	292	0.00	1	292	0.00	3863	0.0	0.0	3862	0.0	0.0
32739	295	6	6			1	419	0.00	1	419	0.00	3865	0.0	0.0	3864	0.0	0.0
32741	165	12	12			176	981	0.18	176	981	0.18	3868	0.0	0.0	3867	0.0	0.0
32742	290	6	6			1	467	0.00	1	467	0.00	7043	0.0	0.0	3830	0.0	0.0
32743	137	12	12			140	985	0.14	140	985	0.14	3818	0.0	0.0	3868	0.0	0.0
32744	138	12	12			140	963	0.15	140	963	0.15	3869	0.0	0.0	3818	0.0	0.0
32745	246	12	12			140	1,149	0.12	140	1,149	0.12	3870	0.0	0.0	3869	0.0	0.0
32746	121	8	8			299	1,117	0.27	299	1,119	0.27	3870	0.0	0.0	3839	0.0	0.0
32747	339	8	8			299	1,123	0.27	299	1,124	0.27	3839	0.0	0.0	3838	0.0	0.0
32748	60	8	8			315	1,275	0.25	315	1,276	0.25	3838	0.0	0.0	3837	0.0	0.0
32749	121	8	8			1	1,659	0.00	1	1,661	0.00	3871	0.0	0.0	3837	0.0	0.0
32750	138	8	8			316	903	0.35	316	905	0.35	3837	0.0	0.0	3836	0.0	0.0
32751	99	8	8			316	835	0.38	316	837	0.38	3836	0.0	0.0	3835	0.0	0.0
32752	130	8	8			317	536	0.59	317	537	0.59	3843	0.0	0.0	3842	0.0	0.0
32753	271	8	8			23	1,347	0.02	23	1,349	0.02	3841	0.0	0.0	3842	0.0	0.0
32754	128	12	12			438	748	0.59	438	748	0.59	3831	0.0	0.0	3870	0.0	0.0
32755	128	12	12			417	812	0.51	417	812	0.51	3832	0.0	0.0	3831	0.0	0.0
32756	140	8	8			28	467	0.06	28	468	0.06	3833	0.0	0.0	3801	0.0	0.0
32757	199	8	8			28	388	0.07	28	389	0.07	7184	0.0	0.0	3833	0.0	0.0
32758	135	8	8			28	374	0.07	28	374	0.07	3834	0.0	0.0	7184	0.0	0.0
32759	135	8	8			3	483	0.01	3	483	0.01	3874	0.0	0.0	3834	0.0	0.0
32760	67	8	8			3	538	0.01	3	539	0.01	3875	0.0	0.0	3874	0.0	0.0
32761	32	8	8			3	1,159	0.00	3	1,160	0.00	7046	0.0	0.0	3875	0.0	0.0
32762	350	8	8			101	783	0.13	101	783	0.13	3878	0.0	0.0	3879	0.0	0.0
32763	170	8	8			122	1,109	0.11	122	1,110	0.11	3879	0.0	0.0	3801	0.0	0.0
32764	185	10	10			267	1,127	0.24	267	1,126	0.24	7044	0.0	0.0	3832	0.0	0.0
32765	182	10	10			267	1,008	0.26	267	1,006	0.27	3830	0.0	0.0	7044	0.0	0.0
32766	376	10	10			252	1,544	0.16	252	1,542	0.16	3829	0.0	0.0	3830	0.0	0.0
32767	155	10	10			221	790	0.28	220	789	0.28	3819	0.0	0.0	3859	0.0	0.0
32768	191	6	6			36	419	0.09	36	419	0.09	3861	0.0	0.0	3819	0.0	0.0
32769	316	10	10			183	931	0.20	183	930	0.20	3880	0.0	0.0	3820	0.0	0.0
32770	55	10	10			450	928	0.48	450	927	0.49	3881	0.0	0.0	3880	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32771	153	10	10			449	1,700	0.26	449	1,698	0.26	3858	0.0	0.0	3881	0.0	0.0
32772	185	8	8			402	803	0.50	402	805	0.50	3821	0.0	0.0	7284	0.0	0.0
32773	276	8	8			267	885	0.30	267	886	0.30	3880	0.0	0.0	3823	0.0	0.0
32774	195	8	8			339	850	0.40	339	851	0.40	3823	0.0	0.0	3825	0.0	0.0
32775	225	8	8			1	544	0.00	1	544	0.00	3824	0.0	0.0	3825	0.0	0.0
32776	180	8	8			1	799	0.00	1	801	0.00	3799	0.0	0.0	3824	0.0	0.0
32777	174	8	8			340	530	0.64	340	531	0.64	3825	0.0	0.0	3826	0.0	0.0
32778	205	8	8			292	728	0.40	292	728	0.40	7528	0.0	0.0	3877	0.0	0.0
32779	186	8	8			392	529	0.74	392	530	0.74	3826	0.0	0.0	3827	0.0	0.0
32780	430	8	8			101	443	0.23	101	444	0.23	3827	0.0	0.0	3878	0.0	0.0
32781	261	8	8			49	760	0.06	49	760	0.06	3882	0.0	0.0	3823	0.0	0.0
32782	301	8	8			48	851	0.06	48	851	0.06	3883	0.0	0.0	3882	0.0	0.0
32783	180	8	8			48	1,072	0.04	48	1,073	0.04	3822	0.0	0.0	3883	0.0	0.0
32784	235	8	8			1	801	0.00	1	802	0.00	3844	0.0	0.0	7285	0.0	0.0
32785	265	8	8			3	1,210	0.00	3	1,212	0.00	7045	0.0	0.0	7287	0.0	0.0
32787	76	6	6			1	607	0.00	1	607	0.00	3895	0.0	0.0	3804	0.0	0.0
32788	110	6	6			1	465	0.00	1	465	0.00	3889	0.0	0.0	3853	0.0	0.0
32790	196	6	6			1	672	0.00	1	672	0.00	3893	0.0	0.0	3865	0.0	0.0
32791	95	6	6			1	195	0.00	1	195	0.00	3892	0.0	0.0	3807	0.0	0.0
32792	187	6	6			1	292	0.00	1	292	0.00	3891	0.0	0.0	3860	0.0	0.0
32793	126	6	6			1	438	0.00	1	438	0.00	3890	0.0	0.0	7043	0.0	0.0
32794	413	6	6			1	423	0.00	1	423	0.00	3884	0.0	0.0	3867	0.0	0.0
32796	169	8	8			1	389	0.00	1	390	0.00	3998	0.0	0.0	3928	0.0	0.0
32797	130	6	6			1	311	0.00	1	311	0.00	3999	0.0	0.0	3975	0.0	0.0
32798	97	6	6			1	179	0.00	1	179	0.00	7682	0.0	0.0	3913	0.0	0.0
32799	159	6	6			27	432	0.06	27	432	0.06	7288	0.0	0.0	7531	0.0	0.0
32800	105	6	6			1	361	0.00	1	361	0.00	4013	0.0	0.0	4014	0.0	0.0
32801	90	6	6			1	366	0.00	1	366	0.00	4012	0.0	0.0	7288	0.0	0.0
32802	200	6	6			1	461	0.00	1	461	0.00	4011	0.0	0.0	7288	0.0	0.0
32803	206	6	6			1	167	0.01	1	167	0.01	3913	0.0	0.0	4013	0.0	0.0
32804	60	8	8			249	657	0.38	249	658	0.38	7531	0.0	0.0	3960	0.0	0.0
32805	231	8	8			221	615	0.36	221	616	0.36	3961	0.0	0.0	7531	0.0	0.0
32806	296	8	8			221	564	0.39	221	565	0.39	3962	0.0	0.0	3961	0.0	0.0
32807	160	8	8			220	1,016	0.22	220	1,017	0.22	3916	0.0	0.0	3962	0.0	0.0
32808	139	8	8			185	638	0.29	185	638	0.29	3915	0.0	0.0	3916	0.0	0.0
32809	153	8	8			174	948	0.18	174	949	0.18	3954	0.0	0.0	3914	0.0	0.0
32810	131	8	8			173	1,338	0.13	173	1,340	0.13	3963	0.0	0.0	3954	0.0	0.0
32811	73	8	8			119	762	0.16	119	763	0.16	8481	0.0	0.0	8500	0.0	0.0
32812	47	8	8			119	1,609	0.07	119	1,611	0.07	3953	0.0	0.0	8481	0.0	0.0
32813	130	8	8			119	1,608	0.07	119	1,610	0.07	3952	0.0	0.0	3953	0.0	0.0
32814	171	6	6			39	607	0.06	39	607	0.06	3950	0.0	0.0	3951	0.0	0.0
32815	304	6	6			38	224	0.17	38	224	0.17	3949	0.0	0.0	3950	0.0	0.0
32816	306	8	8			38	799	0.05	38	800	0.05	3964	0.0	0.0	3949	0.0	0.0
32817	138	8	8			16	808	0.02	16	809	0.02	3965	5.7	5.7	3916	0.0	0.0
32818	139	6	6			1	458	0.00	1	458	0.00	4010	0.0	0.0	3965	5.7	5.7
32819	21	8	8			33	1,859	0.02	33	1,861	0.02	3966	0.0	0.0	3916	0.0	0.0
32820	304	8	8			21	1,165	0.02	21	1,166	0.02	3911	0.0	0.0	3966	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32821	65	8	8			1	1,176	0.00	1	1,177	0.00	3899	0.0	0.0	3910	0.0	0.0
32822	162	8	8			251	949	0.26	251	951	0.26	3967	0.0	0.0	3920	0.0	0.0
32823	164	8	8			251	944	0.27	251	944	0.27	3968	0.0	0.0	3967	0.0	0.0
32824	31	6	6			1	540	0.00	1	540	0.00	3917	0.0	0.0	3968	0.0	0.0
32826	163	8	8			308	688	0.45	308	689	0.45	3970	0.0	0.0	3924	0.0	0.0
32827	79	8	8			308	889	0.35	308	890	0.35	3919	0.0	0.0	3970	0.0	0.0
32828	128	8	8			306	716	0.43	306	717	0.43	3920	0.0	0.0	3919	0.0	0.0
32829	48	8	8			31	926	0.03	31	928	0.03	3921	0.0	0.0	3920	0.0	0.0
32830	231	8	8			30	932	0.03	30	933	0.03	3971	0.0	0.0	3921	0.0	0.0
32831	94	8	8			1	933	0.00	1	934	0.00	7049	0.0	0.0	3971	0.0	0.0
32832	90	8	8			29	962	0.03	29	963	0.03	3972	0.0	0.0	3971	0.0	0.0
32833	220	8	8			28	923	0.03	28	924	0.03	7290	0.0	0.0	3972	0.0	0.0
32834	278	8	8			1	1,094	0.00	1	1,095	0.00	3973	0.0	0.0	7290	0.0	0.0
32835	78	6	6			1	535	0.00	1	535	0.00	4009	0.0	0.0	3974	0.0	0.0
32836	242	6	6			22	383	0.06	22	383	0.06	3975	0.0	0.0	3924	0.0	0.0
32837	246	6	6			21	441	0.05	21	441	0.05	3923	0.0	0.0	3975	0.0	0.0
32838	170	6	6			1	576	0.00	1	576	0.00	3976	0.0	0.0	3923	0.0	0.0
32839	424	8	8			19	883	0.02	19	885	0.02	3909	0.0	0.0	3955	0.0	0.0
32840	350	6	6			1	174	0.01	1	174	0.01	3977	0.0	0.0	3963	0.0	0.0
32841	194	6	6			1	646	0.00	1	646	0.00	4008	0.0	0.0	3977	0.0	0.0
32842	165	6	6			28	425	0.07	28	425	0.07	3908	0.0	0.0	3952	0.0	0.0
32843	17	6	6			28	335	0.09	28	335	0.09	7534	0.0	0.0	3908	0.0	0.0
32844	275	6	6			27	449	0.06	27	449	0.06	7406	0.0	0.0	3951	0.0	0.0
32845	216	6	6			27	691	0.04	27	691	0.04	3907	0.0	0.0	7406	0.0	0.0
32846	258	6	6			26	392	0.07	26	392	0.07	7407	0.0	0.0	3907	0.0	0.0
32847	183	6	6			19	801	0.02	19	801	0.02	3978	0.0	0.0	3906	0.0	0.0
32848	200	6	6			0	311	0.00	0	311	0.00	4007	0.0	0.0	3979	0.0	0.0
32849	102	6	6			0	628	0.00	0	628	0.00	4006	0.0	0.0	3979	0.0	0.0
32850	220	8	8			1	1,215	0.00	1	1,217	0.00	3979	0.0	0.0	3944	0.0	0.0
32851	292	8	8			26	1,012	0.03	26	1,013	0.03	3926	0.0	0.0	3958	0.0	0.0
32852	313	8	8			25	917	0.03	25	918	0.03	3928	0.0	0.0	3927	0.0	0.0
32853	248	8	8			24	536	0.05	24	537	0.05	3931	0.0	0.0	3928	0.0	0.0
32854	27	10	10			1	1,466	0.00	1	1,465	0.00	3930	0.0	0.0	3931	0.0	0.0
32855	335	10	10			1	524	0.00	1	523	0.00	3898	0.0	0.0	3930	0.0	0.0
32856	458	8	8			67	415	0.16	67	416	0.16	3981	0.0	0.0	3980	0.0	0.0
32857	240	8	8			66	417	0.16	66	418	0.16	3932	0.0	0.0	3981	0.0	0.0
32858	266	8	8			66	767	0.09	66	769	0.09	3933	0.0	0.0	3932	0.0	0.0
32859	171	8	8			66	755	0.09	66	756	0.09	3934	0.0	0.0	3933	0.0	0.0
32860	280	10	10			66	631	0.10	66	630	0.10	3937	0.0	0.0	3934	0.0	0.0
32861	64	10	10			57	639	0.09	57	638	0.09	7139	0.0	0.0	3937	0.0	0.0
32862	60	10	10			56	631	0.09	56	630	0.09	3938	0.0	0.0	7139	0.0	0.0
32863	168	10	10			56	615	0.09	56	615	0.09	3982	0.0	0.0	3938	0.0	0.0
32864	226	10	10			56	708	0.08	56	708	0.08	7050	0.0	0.0	3982	0.0	0.0
32865	166	8	8			41	586	0.07	41	587	0.07	3984	0.0	0.0	3983	0.0	0.0
32866	103	8	8			0	1,218	0.00	0	1,219	0.00	4005	0.0	0.0	3984	0.0	0.0
32867	311	8	8			17	829	0.02	17	830	0.02	3956	0.0	0.0	7533	0.0	0.0
32868	432	8	8			1	1,008	0.00	1	1,010	0.00	3985	0.0	0.0	3956	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32869	428	8	8			1	983	0.00	1	984	0.00	7048	0.0	0.0	7533	0.0	0.0
32870	163	8	8			5	918	0.01	5	919	0.01	7047	0.0	0.0	3939	0.0	0.0
32871	365	8	8			0	850	0.00	0	851	0.00	3942	0.0	0.0	7047	0.0	0.0
32872	297	8	8			0	328	0.00	0	329	0.00	3987	0.0	0.0	3986	0.0	0.0
32873	108	8	8			5	1,111	0.00	5	1,113	0.00	7138	0.0	0.0	7047	0.0	0.0
32874	220	8	8			0	929	0.00	0	931	0.00	4004	0.0	0.0	3988	0.0	0.0
32875	40	8	8			5	1,413	0.00	5	1,415	0.00	3940	0.0	0.0	7138	0.0	0.0
32876	355	8	8			4	415	0.01	4	415	0.01	3989	0.0	0.0	3940	0.0	0.0
32878	315	8	8			0	1,154	0.00	0	1,156	0.00	3905	0.0	0.0	3989	0.0	0.0
32879	303	8	8			31	990	0.03	31	991	0.03	3945	0.0	0.0	3905	0.0	0.0
32880	280	8	8			22	1,088	0.02	22	1,089	0.02	3957	0.0	0.0	3959	0.0	0.0
32881	292	8	8			22	1,077	0.02	22	1,078	0.02	3990	0.0	0.0	3957	0.0	0.0
32882	165	8	8			1	925	0.00	1	926	0.00	3900	0.0	0.0	3990	0.0	0.0
32883	192	8	8			1	951	0.00	1	952	0.00	3901	0.0	0.0	3990	0.0	0.0
32885	167	8	8			1	958	0.00	1	958	0.00	3903	0.0	0.0	3959	0.0	0.0
32886	169	6	6			16	369	0.04	16	369	0.04	3929	0.0	0.0	3931	0.0	0.0
32887	382	6	6			1	280	0.00	1	280	0.00	3922	0.0	0.0	3929	0.0	0.0
32889	179	6	6			15	178	0.09	15	178	0.09	3991	0.0	0.0	3929	0.0	0.0
32890	181	8	8			0	890	0.00	0	891	0.00	7532	0.0	0.0	3938	0.0	0.0
32891	168	8	8			0	1,052	0.00	0	1,053	0.00	3936	0.0	0.0	7532	0.0	0.0
32892	392	8	8			15	1,153	0.01	15	1,154	0.01	3992	0.0	0.0	3983	0.0	0.0
32893	198	8	8			1	928	0.00	1	929	0.00	3993	0.0	0.0	3992	0.0	0.0
32894	95	8	8			1	1,219	0.00	1	1,222	0.00	3994	0.0	0.0	3993	0.0	0.0
32895	114	8	8			1	1,260	0.00	1	1,262	0.00	3995	0.0	0.0	3994	0.0	0.0
32896	149	6	6			1	187	0.00	1	187	0.00	4001	0.0	0.0	3977	0.0	0.0
32897	120	8	8			1	768	0.00	1	769	0.00	3944	0.0	0.0	3995	0.0	0.0
32898	121	8	8			0	684	0.00	0	685	0.00	3943	0.0	0.0	3944	0.0	0.0
32899	98	8	8			31	1,162	0.03	31	1,164	0.03	3946	0.0	0.0	3945	0.0	0.0
32900	150	8	8			30	1,242	0.02	30	1,243	0.02	3947	0.0	0.0	3946	0.0	0.0
32901	201	8	8			30	1,692	0.02	30	1,694	0.02	7289	0.0	0.0	3947	0.0	0.0
32902	261	8	8			0	1,441	0.00	0	1,443	0.00	3948	0.0	0.0	7289	0.0	0.0
32903	185	8	8			350	681	0.51	350	683	0.51	3925	0.0	0.0	3958	0.0	0.0
32904	319	8	8			349	683	0.51	349	684	0.51	3924	0.0	0.0	3925	0.0	0.0
32906	246	10	15	33	Existing	790	419	1.89	1,206	1,235	0.98	4096	5.6	0.0	4095	2.7	0.0
32907	311	8	15	33	Existing	769	601	1.28	1,187	3,211	0.37	4114	3.0	0.0	4018	5.2	0.0
32908	55	8	15	33	Existing	808	971	0.83	1,187	5,188	0.23	4018	5.2	0.0	4097	0.0	0.0
32909	123	8	8			8	1,744	0.00	8	1,747	0.00	7535	0.0	0.0	4120	0.0	0.0
32910	301	10	10			540	623	0.87	610	622	0.98	7053	1.8	0.0	4071	2.3	0.0
32911	56	8	8			9	873	0.01	9	874	0.01	4120	0.0	0.0	4039	0.0	0.0
32912	170	10	15	43	2036	1,056	606	1.74	1,145	1,787	0.64	4071	2.3	0.0	4072	0.0	0.0
32913	108	10	15	43	2036	745	423	1.76	1,145	1,246	0.92	4073	1.3	0.0	4074	2.8	0.0
32914	65	10	10			72	793	0.09	8	792	0.01	7054	2.7	0.0	4074	2.8	0.0
32915	271	8	8			0	1,401	0.00	0	1,402	0.00	4106	0.0	0.0	7054	2.7	0.0
32916	85	10	15	43	2036	744	578	1.29	1,146	1,703	0.67	4074	2.8	0.0	4075	4.5	0.0
32917	319	10	15	43	2036	744	669	1.11	1,146	1,974	0.58	4075	4.5	0.0	4107	2.8	0.0
32918	270	10	15	43	2036	754	667	1.13	1,167	1,968	0.59	4107	2.8	0.0	4083	6.6	0.0
32919	120	10	15	43	2036	754	674	1.12	1,167	1,987	0.59	4109	7.4	0.0	4108	1.8	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32920	333	10	15	43	2036	754	663	1.14	1,167	1,955	0.60	4108	1.8	0.0	4081	3.2	0.0
32921	146	8	15	43	2036	754	1,004	0.75	1,167	5,367	0.22	4081	3.2	0.0	4080	0.9	0.0
32922	113	8	15	43	2036	758	478	1.58	1,175	2,559	0.46	4080	0.9	0.0	7537	2.2	0.0
32923	302	8	8			74	378	0.20	7	378	0.02	4078	1.7	0.0	4079	0.7	0.0
32924	282	8	8			8	977	0.01	8	978	0.01	4077	0.0	0.0	4080	0.9	0.0
32925	276	8	8			4	902	0.00	4	903	0.00	4076	0.0	0.0	4077	0.0	0.0
32926	150	8	8			0	1,069	0.00	0	1,070	0.00	4068	0.0	0.0	4069	0.0	0.0
32927	350	8	8			0	665	0.00	0	666	0.00	4020	0.0	0.0	4082	0.0	0.0
32928	250	8	8			11	615	0.02	11	615	0.02	4085	0.0	0.0	4086	0.0	0.0
32929	71	8	8			11	697	0.02	11	698	0.02	4084	0.0	0.0	4085	0.0	0.0
32930	264	8	8			50	733	0.07	50	734	0.07	4038	0.0	0.0	7052	0.0	0.0
32931	311	8	8			50	265	0.19	50	265	0.19	7052	0.0	0.0	4066	0.0	0.0
32932	130	8	8			62	222	0.28	62	222	0.28	4066	0.0	0.0	4067	0.0	0.0
32933	180	8	8			23	526	0.04	23	526	0.04	4086	0.0	0.0	4067	0.0	0.0
32934	120	8	8			85	301	0.28	85	301	0.28	4067	0.0	0.0	4065	0.0	0.0
32935	155	8	8			11	697	0.02	11	697	0.02	4063	0.0	0.0	4064	0.0	0.0
32936	115	8	8			97	362	0.27	97	362	0.27	4064	0.0	0.0	4110	0.0	0.0
32937	41	8	8			97	352	0.27	97	353	0.27	4110	0.0	0.0	4111	0.0	0.0
32938	154	8	8			97	420	0.23	97	421	0.23	4111	0.0	0.0	4061	0.0	0.0
32939	102	8	8			0	768	0.00	0	769	0.00	4060	0.0	0.0	4061	0.0	0.0
32940	55	8	8			97	766	0.13	97	767	0.13	4061	0.0	0.0	4062	0.0	0.0
32941	83	8	8			98	565	0.17	98	566	0.17	4062	0.0	0.0	7536	0.0	0.0
32942	246	8	8			1	627	0.00	1	628	0.00	4057	0.0	0.0	4056	0.0	0.0
32943	78	8	8			0	328	0.00	0	328	0.00	4058	0.0	0.0	4057	0.0	0.0
32944	389	8	8			18	791	0.02	18	792	0.02	4054	0.0	0.0	4055	0.0	0.0
32945	141	8	8			1	664	0.00	1	665	0.00	4052	0.0	0.0	4053	0.0	0.0
32946	251	8	8			1	791	0.00	1	792	0.00	4082	0.0	0.0	4052	0.0	0.0
32953	297	8	8			35	1,150	0.03	35	1,151	0.03	4049	0.0	0.0	4048	0.0	0.0
32954	238	8	8			6	508	0.01	6	509	0.01	4051	0.0	0.0	7051	0.0	0.0
32955	152	8	8			6	515	0.01	6	516	0.01	4050	0.0	0.0	4051	0.0	0.0
32956	59	6	6			0	286	0.00	0	286	0.00	4021	0.0	0.0	4050	0.0	0.0
32957	232	6	6			22	237	0.09	22	237	0.09	4022	0.0	0.0	4044	0.0	0.0
32958	225	8	8			8	481	0.02	7	482	0.01	7051	0.0	0.0	7291	3.9	0.0
32959	109	8	8			44	270	0.16	6	270	0.02	4113	0.7	0.0	4047	0.8	0.0
32960	130	8	8			33	268	0.12	3	268	0.01	4046	2.2	0.0	4113	0.7	0.0
32961	119	6	6			22	209	0.10	3	209	0.02	4045	7.6	0.0	4046	2.2	0.0
32963	250	8	8			72	271	0.26	17	271	0.06	4047	0.8	0.0	4096	5.6	0.0
32964	64	8	15	33	Existing	770	900	0.86	1,187	4,809	0.25	4097	0.0	0.0	4096	5.6	0.0
32965	166	8	15	33	Existing	765	395	1.93	1,182	2,111	0.56	4079	0.7	0.0	4114	3.0	0.0
32966	377	8	8			0	710	0.00	0	710	0.00	4101	0.0	0.0	4097	0.0	0.0
32967	315	10	15	33	Existing	790	412	1.92	1,206	1,213	0.99	4095	2.7	0.0	4094	0.0	0.0
32968	475	12	15	36	2036	1,578	1,731	0.91	1,994	3,138	0.64	4094	0.0	0.0	9000	0.0	0.0
32969	250	6	6			3	207	0.02	3	207	0.02	4025	0.0	0.0	4077	0.0	0.0
32970	210	8	8			0	1,111	0.00	0	1,113	0.00	7140	0.0	0.0	7186	0.0	0.0
32971	214	10	10			66	1,501	0.04	66	1,500	0.04	4042	0.0	0.0	4105	0.0	0.0
32972	258	12	12			79	2,114	0.04	79	2,114	0.04	4105	0.0	0.0	4104	0.0	0.0
32973	286	8	8			1	1,347	0.00	1	1,349	0.00	4026	0.0	0.0	4104	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32974	242	12	12			79	1,199	0.07	79	1,199	0.07	4104	0.0	0.0	7539	0.0	0.0
32975	162	12	12			79	1,217	0.07	79	1,217	0.07	7539	0.0	0.0	4103	0.0	0.0
32976	113	6	6			5	406	0.01	5	406	0.01	4027	0.0	0.0	4041	0.0	0.0
32977	195	8	8			6	969	0.01	6	970	0.01	4041	0.0	0.0	4040	0.0	0.0
32978	151	8	8			6	370	0.02	6	371	0.01	4098	0.0	0.0	4099	0.0	0.0
32979	231	8	8			6	1,469	0.00	6	1,470	0.00	4099	0.0	0.0	4100	0.0	0.0
32980	202	6	6			6	384	0.01	6	384	0.01	4028	0.0	0.0	4100	0.0	0.0
32981	172	8	8			11	435	0.03	11	435	0.03	4100	0.0	0.0	4118	0.0	0.0
32982	480	15	15			786	1,405	0.56	786	1,405	0.56	4118	0.0	0.0	7294	0.0	0.0
32983	95	8	8			47	809	0.06	47	810	0.06	4119	0.0	0.0	4118	0.0	0.0
32984	448	12	12			729	2,590	0.28	729	2,590	0.28	4103	0.0	0.0	4118	0.0	0.0
32985	445	8	8			642	903	0.71	642	904	0.71	4102	0.0	0.0	4103	0.0	0.0
32986	70	8	8			0	588	0.00	0	588	0.00	4129	0.0	0.0	4102	0.0	0.0
32987	50	8	8			13	415	0.03	13	416	0.03	4089	0.0	0.0	4090	0.0	0.0
32988	98	6	6			0	299	0.00	0	299	0.00	4029	0.0	0.0	4090	0.0	0.0
32989	328	8	8			13	853	0.01	13	854	0.01	4088	0.0	0.0	4089	0.0	0.0
32990	190	12	12			1,600	1,777	0.90	2,015	1,777	1.13	4115	0.0	0.0	4116	0.0	0.0
32997	33	6	6			0	400	0.00	0	400	0.00	7683	0.0	0.0	7293	0.0	0.0
32998	35	6	6			0	386	0.00	0	386	0.00	4037	0.0	0.0	7293	0.0	0.0
33004	70	15	18	38	2036	955	1,149	0.83	1,497	1,869	0.80	7142	0.0	0.0	4232	0.0	0.0
33005	308	8	8			1	573	0.00	1	574	0.00	4166	0.0	0.0	7540	0.0	0.0
33006	362	8	8			0	819	0.00	0	821	0.00	4167	0.0	0.0	4166	0.0	0.0
33007	440	10	12	14	Existing	407	971	0.42	949	1,579	0.60	4205	0.0	0.0	7540	0.0	0.0
33008	375	8	8			0	787	0.00	0	788	0.00	4165	0.0	0.0	4205	0.0	0.0
33011	145	8	12	14	Existing	378	619	0.61	920	1,827	0.50	4149	0.0	0.0	4163	0.0	0.0
33012	43	8	8			0	321	0.00	0	321	0.00	4206	0.0	0.0	4149	0.0	0.0
33013	204	8	8			0	313	0.00	0	313	0.00	4234	0.0	0.0	4206	0.0	0.0
33014	130	8	8			377	1,119	0.34	920	1,120	0.82	4164	0.0	0.0	4149	0.0	0.0
33015	313	8	15	29	Existing	377	386	0.98	919	2,063	0.45	4208	4.7	0.0	4164	0.0	0.0
33017	297	8	15	29	Existing	377	299	1.26	919	1,597	0.58	4162	1.6	0.0	4208	4.7	0.0
33018	123	8	8			1	297	0.00	1	297	0.00	4197	0.0	0.0	4204	0.0	0.0
33019	80	6	6			0	176	0.00	0	176	0.00	4139	0.0	0.0	4197	0.0	0.0
33020	118	6	6			0	275	0.00	0	275	0.00	7684	0.0	0.0	4197	0.0	0.0
33021	178	8	8			342	328	1.04	342	329	1.04	7055	0.0	0.0	4204	0.0	0.0
33022	192	6	6			0	193	0.00	0	193	0.00	4140	0.0	0.0	7055	0.0	0.0
33023	108	8	8			1	821	0.00	1	822	0.00	4193	0.0	0.0	4192	0.0	0.0
33024	335	8	8			0	545	0.00	0	546	0.00	4194	0.0	0.0	4193	0.0	0.0
33025	108	8	8			296	565	0.52	296	566	0.52	4196	0.0	0.0	4192	0.0	0.0
33026	213	8	8			295	483	0.61	295	484	0.61	4152	0.0	0.0	4195	0.0	0.0
33027	154	8	8			59	301	0.20	59	301	0.20	4182	0.0	0.0	4184	0.0	0.0
33028	126	8	8			35	305	0.12	35	306	0.12	4181	0.0	0.0	4182	0.0	0.0
33029	87	8	8			35	294	0.12	35	294	0.12	4180	0.0	0.0	4181	0.0	0.0
33030	389	8	8			35	776	0.05	35	776	0.05	4154	0.0	0.0	4180	0.0	0.0
33031	416	8	8			0	297	0.00	0	297	0.00	7056	0.0	0.0	4152	0.0	0.0
33032	271	8	8			205	292	0.70	205	293	0.70	4159	0.0	0.0	4152	0.0	0.0
33033	350	8	8			116	297	0.39	116	298	0.39	4160	0.0	0.0	4159	0.0	0.0
33034	230	8	8			115	490	0.24	115	491	0.23	4157	0.0	0.0	4161	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33035	309	8	8			56	644	0.09	56	645	0.09	4158	0.0	0.0	4159	0.0	0.0
33036	185	8	8			15	307	0.05	15	308	0.05	7542	0.0	0.0	4158	0.0	0.0
33037	159	8	8			40	769	0.05	40	769	0.05	4155	0.0	0.0	4158	0.0	0.0
33038	62	10	12	14	Existing	448	1,812	0.25	990	2,947	0.34	4169	0.0	0.0	4170	0.0	0.0
33039	290	10	12	14	Existing	429	979	0.44	972	1,593	0.61	7540	0.0	0.0	4169	0.0	0.0
33040	345	8	8			18	705	0.03	18	706	0.03	4209	0.0	0.0	4169	0.0	0.0
33041	365	8	8			0	898	0.00	0	899	0.00	4168	0.0	0.0	4209	0.0	0.0
33042	237	8	8			61	301	0.20	61	301	0.20	4171	0.0	0.0	4170	0.0	0.0
33043	335	8	8			42	297	0.14	42	298	0.14	4176	0.0	0.0	4171	0.0	0.0
33044	190	8	8			1	540	0.00	1	541	0.00	7141	0.0	0.0	4150	0.0	0.0
33045	490	8	8			0	665	0.00	0	665	0.00	4147	0.0	0.0	7141	0.0	0.0
33046	401	8	8			10	778	0.01	10	780	0.01	4212	0.0	0.0	4150	0.0	0.0
33047	269	8	8			31	958	0.03	31	960	0.03	7295	0.0	0.0	4176	0.0	0.0
33048	138	8	8			31	297	0.10	31	297	0.10	4210	0.0	0.0	4175	0.0	0.0
33049	233	8	8			1	148	0.01	1	148	0.01	4211	0.0	0.0	4210	0.0	0.0
33050	200	8	8			1	297	0.00	1	298	0.00	4221	0.0	0.0	4177	0.0	0.0
33051	425	8	8			18	837	0.02	18	838	0.02	4173	0.0	0.0	4171	0.0	0.0
33052	209	8	8			0	577	0.00	0	578	0.00	4174	0.0	0.0	4173	0.0	0.0
33053	260	8	8			1	743	0.00	1	744	0.00	4172	0.0	0.0	4173	0.0	0.0
33054	26	8	8			6	998	0.01	6	999	0.01	4214	0.0	0.0	4213	0.0	0.0
33055	127	8	8			6	998	0.01	6	999	0.01	4215	0.0	0.0	4214	0.0	0.0
33056	275	8	8			13	755	0.02	13	756	0.02	4198	0.0	0.0	4213	0.0	0.0
33057	156	8	8			13	756	0.02	13	757	0.02	4201	0.0	0.0	4198	0.0	0.0
33058	304	8	8			0	415	0.00	0	416	0.00	4203	0.0	0.0	4202	0.0	0.0
33059	175	8	8			0	806	0.00	0	807	0.00	4217	0.0	0.0	4203	0.0	0.0
33060	125	8	8			0	816	0.00	0	817	0.00	4200	0.0	0.0	4217	0.0	0.0
33061	315	8	8			7	775	0.01	7	776	0.01	4199	0.0	0.0	4201	0.0	0.0
33062	380	8	8			0	383	0.00	0	383	0.00	7296	0.0	0.0	4199	0.0	0.0
33063	157	8	8			0	1,100	0.00	0	1,101	0.00	4142	0.0	0.0	7296	0.0	0.0
33064	76	15	18	38	2036	852	1,321	0.65	1,395	2,148	0.65	4219	0.0	0.0	4220	0.0	0.0
33065	107	15	18	38	2036	852	1,718	0.50	1,394	2,793	0.50	4218	0.0	0.0	4219	0.0	0.0
33066	222	8	8			343	285	1.20	343	286	1.20	4204	0.0	0.0	4218	0.0	0.0
33067	410	15	15			509	1,241	0.41	1,051	1,241	0.85	4170	0.0	0.0	4218	0.0	0.0
33068	131	8	8			0	914	0.00	0	915	0.00	4223	0.0	0.0	4222	0.0	0.0
33069	270	8	8			19	658	0.03	19	658	0.03	4213	0.0	0.0	4222	0.0	0.0
33070	323	15	18	38	2036	956	1,398	0.68	1,498	2,274	0.66	4225	0.0	0.0	4226	0.0	0.0
33071	86	15	18	38	2036	955	1,170	0.82	1,497	1,902	0.79	4232	0.0	0.0	4186	0.0	0.0
33072	48	15	18	38	2036	954	1,183	0.81	1,497	1,925	0.78	7297	0.0	0.0	7142	0.0	0.0
33073	50	15	18	38	2036	887	1,777	0.50	1,430	2,890	0.49	4190	0.0	0.0	7297	0.0	0.0
33074	130	15	18	38	2036	853	1,227	0.70	1,396	1,995	0.70	4224	0.0	0.0	4190	0.0	0.0
33075	51	15	18	38	2036	853	1,219	0.70	1,396	1,982	0.70	7543	0.0	0.0	4224	0.0	0.0
33076	103	15	18	38	2036	853	1,238	0.69	1,395	2,013	0.69	4220	0.0	0.0	7543	0.0	0.0
33077	301	8	8			33	460	0.07	33	461	0.07	4151	0.0	0.0	4190	0.0	0.0
33078	81	8	8			0	744	0.00	0	745	0.00	4145	0.0	0.0	4227	0.0	0.0
33079	414	12	12			1,613	2,693	0.60	2,027	2,693	0.75	4148	0.0	0.0	4228	0.0	0.0
33080	338	8	8			0	160	0.00	0	160	0.00	4236	0.0	0.0	4148	0.0	0.0
33081	413	8	8			33	594	0.05	33	594	0.05	4191	0.0	0.0	4151	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33083	235	8	8			23	892	0.03	23	894	0.03	4179	0.0	0.0	4182	0.0	0.0
33084	242	8	8			23	896	0.03	23	897	0.03	4153	0.0	0.0	4179	0.0	0.0
33085	133	8	8			1	285	0.00	1	285	0.00	4230	0.0	0.0	4183	0.0	0.0
33086	371	8	8			29	827	0.04	29	828	0.04	4229	0.0	0.0	4183	0.0	0.0
33087	235	8	8			1	956	0.00	1	957	0.00	7408	0.0	0.0	4229	0.0	0.0
33097	172	8	8			1	1,206	0.00	1	1,208	0.00	4241	0.0	0.0	4251	0.0	0.0
33098	229	8	8			1	303	0.00	1	303	0.00	4251	0.0	0.0	9959	0.0	0.0
33103	200	8	8			1	2,053	0.00	1	2,056	0.00	4247	0.0	0.0	4248	0.0	0.0
33104	200	8	8			0	1,456	0.00	0	1,458	0.00	4246	0.0	0.0	4247	0.0	0.0
33105	100	6	6			1	733	0.00	1	733	0.00	4256	0.0	0.0	4255	0.0	0.0
33106	127	6	6			1	853	0.00	1	853	0.00	4255	0.0	0.0	7298	0.0	0.0
33107	228	8	8			14	1,669	0.01	14	1,672	0.01	4243	0.0	0.0	4242	0.0	0.0
33109	430	8	8			0	666	0.00	0	667	0.00	7544	0.0	0.0	4259	2.1	2.1
33110	350	8	8			310	299	1.04	310	299	1.04	4259	2.1	2.1	4260	5.5	5.5
33111	165	8	8			310	295	1.05	310	295	1.05	4260	5.5	5.5	4261	1.8	1.8
33112	68	8	8			0	342	0.00	0	342	0.00	4263	0.0	0.0	4296	0.0	0.0
33113	210	8	8			13	735	0.02	13	735	0.02	7190	0.0	0.0	4296	0.0	0.0
33114	50	10	10			721	787	0.92	907	786	1.15	4266	0.6	0.0	4294	0.0	0.0
33115	208	10	10			703	759	0.93	889	758	1.17	4265	3.9	6.2	4266	0.6	0.0
33118	238	8	12	31	Existing	681	408	1.67	907	1,202	0.75	4294	0.0	0.0	4332	0.5	0.0
33119	281	8	8			17	659	0.03	17	660	0.03	4286	0.0	0.0	4266	0.6	0.0
33120	185	8	8			1	674	0.00	1	675	0.00	4318	0.0	0.0	4309	0.0	0.0
33121	100	8	8			1	297	0.00	1	298	0.00	4319	0.0	0.0	4318	0.0	0.0
33122	250	8	12	44	2036	669	610	1.10	919	1,801	0.51	4302	1.9	0.0	4310	0.0	0.0
33123	145	8	12	44	2036	670	615	1.09	919	1,813	0.51	4317	0.0	0.0	4302	1.9	0.0
33124	205	8	8			11	485	0.02	11	485	0.02	4333	0.0	0.0	4317	0.0	0.0
33125	70	6	6			0	345	0.00	0	345	0.00	4271	0.0	0.0	4333	0.0	0.0
33126	194	8	15	32	2036	190	257	0.74	376	1,374	0.27	4309	0.0	0.0	4308	0.0	0.0
33127	226	8	15	32	2036	190	308	0.62	375	1,647	0.23	4310	0.0	0.0	4309	0.0	0.0
33128	153	8	8			480	894	0.54	544	895	0.61	4310	0.0	0.0	4311	4.5	0.0
33129	158	8	8			3	610	0.00	3	611	0.00	4289	0.0	0.0	4308	0.0	0.0
33130	52	8	8			1	608	0.00	1	609	0.00	4322	0.0	0.0	4289	0.0	0.0
33131	53	8	8			0	329	0.00	0	330	0.00	4267	0.0	0.0	4322	0.0	0.0
33132	125	6	6			0	182	0.00	0	182	0.00	4272	0.0	0.0	4322	0.0	0.0
33133	57	8	8			1	570	0.00	1	571	0.00	4321	0.0	0.0	4320	0.0	0.0
33134	36	8	8			1	705	0.00	1	706	0.00	4335	0.0	0.0	4321	0.0	0.0
33135	67	6	6			0	223	0.00	0	223	0.00	4273	0.0	0.0	4336	0.0	0.0
33136	285	8	8			3	394	0.01	3	394	0.01	4328	0.0	0.0	4300	0.0	0.0
33137	200	8	8			104	364	0.29	104	365	0.29	4299	0.0	0.0	4300	0.0	0.0
33138	131	8	8			107	591	0.18	107	592	0.18	4301	0.0	0.0	4290	0.0	0.0
33139	97	8	8			107	730	0.15	107	731	0.15	4300	0.0	0.0	4301	0.0	0.0
33141	230	8	8			25	727	0.03	25	728	0.03	4298	0.0	0.0	4299	0.0	0.0
33142	445	8	8			1	726	0.00	1	726	0.00	4295	0.0	0.0	4298	0.0	0.0
33143	320	8	8			29	726	0.04	29	726	0.04	4296	0.0	0.0	4297	0.0	0.0
33144	215	8	8			122	301	0.40	122	301	0.40	4326	0.0	0.0	4325	0.0	0.0
33146	282	8	8			121	442	0.27	121	443	0.27	4329	0.0	0.0	4327	0.0	0.0
33147	280	8	8			1	1,319	0.00	1	1,322	0.00	4330	0.0	0.0	4329	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33148	450	8	8			121	297	0.41	121	298	0.41	4290	0.0	0.0	4329	0.0	0.0
33150	210	8	8			1	992	0.00	1	993	0.00	4323	0.0	0.0	4325	0.0	0.0
33152	265	8	12	29	Existing	650	447	1.45	919	1,319	0.70	4339	0.0	0.0	7057	0.0	0.0
33153	425	8	8			356	1,118	0.32	356	1,119	0.32	7143	0.0	0.0	4339	0.0	0.0
33154	330	8	8			38	357	0.11	38	357	0.11	4331	0.0	0.0	7547	0.0	0.0
33155	201	8	8			38	742	0.05	38	742	0.05	7547	0.0	0.0	7143	0.0	0.0
33156	435	8	12	30	2036	375	300	1.25	563	884	0.64	4324	0.0	0.0	4339	0.0	0.0
33157	310	8	12	30	2036	228	318	0.72	406	938	0.43	7301	1.1	0.0	4324	0.0	0.0
33158	300	8	8			218	956	0.23	406	956	0.42	7409	0.0	0.0	7301	1.1	0.0
33159	235	8	8			203	708	0.29	391	708	0.55	4340	0.0	0.0	7409	0.0	0.0
33160	105	8	8			203	708	0.29	390	709	0.55	4341	0.0	0.0	4340	0.0	0.0
33161	314	8	8			1	590	0.00	1	590	0.00	4342	0.0	0.0	4341	0.0	0.0
33162	161	8	8			0	586	0.00	0	587	0.00	4343	0.0	0.0	4342	0.0	0.0
33164	353	8	8			203	708	0.29	390	709	0.55	4308	0.0	0.0	4341	0.0	0.0
33165	297	10	10			481	737	0.65	545	736	0.74	4312	0.0	0.0	4306	5.5	0.0
33166	293	8	8			480	567	0.85	544	568	0.96	4311	4.5	0.0	4312	0.0	0.0
33167	172	10	10			532	670	0.79	599	669	0.89	4314	4.5	0.0	7546	4.5	0.0
33168	112	10	10			532	683	0.78	599	682	0.88	4344	3.9	0.0	4314	4.5	0.0
33169	258	10	10			532	586	0.91	599	585	1.02	4306	5.5	0.0	4344	3.9	0.0
33170	145	8	8			19	1,465	0.01	19	1,467	0.01	4307	0.0	0.0	4306	5.5	0.0
33171	130	8	8			12	815	0.01	12	816	0.01	7300	0.0	0.0	4345	0.0	0.0
33172	105	8	8			12	480	0.02	12	481	0.02	4316	0.0	0.0	7300	0.0	0.0
33173	277	8	8			44	682	0.06	35	683	0.05	4313	0.0	0.0	4306	5.5	0.0
33174	162	8	8			0	408	0.00	0	408	0.00	4347	0.0	0.0	4346	0.0	0.0
33175	106	6	6			25	157	0.16	1	157	0.00	4277	2.4	0.0	7546	4.5	0.0
33177	276	8	8			49	799	0.06	49	800	0.06	4348	0.0	0.0	4303	0.0	0.0
33178	325	8	8			23	881	0.03	23	883	0.03	4304	0.0	0.0	4348	0.0	0.0
33179	210	8	8			10	691	0.01	10	692	0.01	4350	0.0	0.0	4349	0.0	0.0
33180	298	8	12	44	2036	662	692	0.96	908	2,040	0.44	4332	0.5	0.0	4317	0.0	0.0
33192	178	8	8			313	1,145	0.27	313	1,147	0.27	7058	0.0	0.0	7548	0.0	0.0
33193	378	8	8			376	1,107	0.34	376	1,108	0.34	7548	0.0	0.0	4354	0.0	0.0
33194	316	8	8			379	644	0.59	379	644	0.59	4354	0.0	0.0	4355	0.0	0.0
33195	316	8	8			379	888	0.43	379	889	0.43	4355	0.0	0.0	7727	0.0	0.0
33196	467	8	8			101	1,074	0.09	101	1,076	0.09	4356	0.0	0.0	4357	0.0	0.0
33197	235	8	8			117	872	0.13	117	873	0.13	4357	0.0	0.0	7727	0.0	0.0
33198	40	8	8			493	360	1.37	493	360	1.37	7727	0.0	0.0	7549	0.0	0.0
33199	196	8	8			642	478	1.34	642	479	1.34	4386	8.1	8.1	4377	0.0	0.0
33200	122	8	8			642	752	0.85	642	753	0.85	4387	8.2	8.2	4386	8.1	8.1
33201	296	8	8			642	1,106	0.58	642	1,108	0.58	4388	0.0	0.0	4387	8.2	8.2
33202	403	8	8			13	971	0.01	13	972	0.01	4371	0.0	0.0	4372	0.0	0.0
33203	260	10	10			58	1,478	0.04	58	1,476	0.04	4375	0.0	0.0	4373	0.0	0.0
33204	88	10	10			58	1,135	0.05	58	1,135	0.05	4374	0.0	0.0	4375	0.0	0.0
33205	172	10	10			53	1,871	0.03	53	1,869	0.03	4385	0.0	0.0	4374	0.0	0.0
33206	235	8	8			1	1,180	0.00	1	1,181	0.00	4366	0.0	0.0	4358	0.0	0.0
33207	19	8	8			0	449	0.00	0	449	0.00	4389	0.0	0.0	4366	0.0	0.0
33208	278	8	8			1	1,174	0.00	1	1,176	0.00	4362	0.0	0.0	4383	2.9	0.0
33209	51	8	8			57	368	0.15	15	369	0.04	4383	2.9	0.0	4382	2.9	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33210	44	8	8			524	451	1.16	523	452	1.16	4378	2.4	0.0	4382	2.9	0.0
33211	132	8	8			523	524	1.00	523	525	1.00	7059	3.1	0.0	4378	2.4	0.0
33212	51	8	8			524	564	0.93	523	565	0.93	4381	2.6	0.0	7059	3.1	0.0
33213	344	8	8			510	1,074	0.48	510	1,075	0.47	4359	0.0	0.0	4381	2.6	0.0
33214	182	8	8			0	760	0.00	0	762	0.00	4360	0.0	0.0	4367	0.0	0.0
33215	66	8	8			0	802	0.00	0	803	0.00	4361	0.0	0.0	4360	0.0	0.0
33216	186	8	8			510	997	0.51	510	998	0.51	4364	0.0	0.0	4367	0.0	0.0
33217	98	8	8			493	967	0.51	493	967	0.51	7549	0.0	0.0	4364	0.0	0.0
33218	402	8	8			19	1,276	0.02	19	1,277	0.02	4365	0.0	0.0	4364	0.0	0.0
33219	249	8	8			42	547	0.08	13	548	0.02	4380	5.7	0.0	4381	2.6	0.0
33220	230	8	8			0	1,137	0.00	0	1,138	0.00	4368	0.0	0.0	4380	5.7	0.0
33221	66	8	8			6	1,119	0.01	1	1,120	0.00	4379	0.0	0.0	4380	5.7	0.0
33222	243	8	8			1	1,176	0.00	1	1,177	0.00	4391	0.0	0.0	4392	0.0	0.0
33223	135	8	8			7	1,315	0.01	7	1,317	0.01	4393	0.0	0.0	4394	0.0	0.0
33224	308	8	8			17	1,533	0.01	17	1,535	0.01	7060	0.0	0.0	4394	0.0	0.0
33225	142	8	8			24	1,277	0.02	24	1,278	0.02	4394	0.0	0.0	4390	0.0	0.0
33226	269	8	8			24	456	0.05	24	456	0.05	4390	0.0	0.0	7303	0.0	0.0
33227	131	8	8			34	370	0.09	34	371	0.09	7303	0.0	0.0	4399	0.0	0.0
33228	476	8	8			11	1,315	0.01	11	1,317	0.01	4395	0.0	0.0	4396	0.0	0.0
33229	437	8	8			11	1,163	0.01	11	1,165	0.01	4396	0.0	0.0	4397	0.0	0.0
33230	223	8	8			24	372	0.06	24	372	0.06	4397	0.0	0.0	4398	0.0	0.0
33231	235	8	8			0	491	0.00	0	492	0.00	4400	0.0	0.0	4399	0.0	0.0
33232	186	8	8			42	493	0.08	42	494	0.08	4399	0.0	0.0	7728	0.0	0.0
33233	170	8	8			42	1,863	0.02	42	1,865	0.02	7728	0.0	0.0	4398	0.0	0.0
33234	305	8	8			65	1,347	0.05	65	1,349	0.05	4398	0.0	0.0	4418	0.0	0.0
33235	488	8	8			1	995	0.00	1	997	0.00	7144	0.0	0.0	4402	0.0	0.0
33236	186	8	8			6	1,678	0.00	6	1,681	0.00	4402	0.0	0.0	4403	0.0	0.0
33237	186	8	8			6	892	0.01	6	892	0.01	4403	0.0	0.0	4411	0.0	0.0
33238	170	8	8			0	1,379	0.00	0	1,381	0.00	4404	0.0	0.0	4405	0.0	0.0
33239	450	8	8			1	1,228	0.00	1	1,229	0.00	4405	0.0	0.0	4406	0.0	0.0
33240	353	8	8			1	1,224	0.00	1	1,225	0.00	4407	0.0	0.0	4408	0.0	0.0
33241	306	8	8			1	1,260	0.00	1	1,261	0.00	4408	0.0	0.0	4409	0.0	0.0
33242	479	8	8			1	1,054	0.00	1	1,056	0.00	4409	0.0	0.0	4411	0.0	0.0
33243	18	8	8			21	758	0.03	21	760	0.03	4412	0.0	0.0	7064	0.0	0.0
33244	130	8	8			7	489	0.01	7	490	0.01	4411	0.0	0.0	4412	0.0	0.0
33245	234	8	8			13	719	0.02	13	721	0.02	4415	0.0	0.0	4410	0.0	0.0
33246	231	8	8			13	1,044	0.01	13	1,045	0.01	4410	0.0	0.0	4414	0.0	0.0
33247	161	8	8			13	831	0.02	13	832	0.02	4414	0.0	0.0	4413	0.0	0.0
33248	49	8	8			14	1,018	0.01	14	1,019	0.01	4413	0.0	0.0	4412	0.0	0.0
33249	146	8	8			65	831	0.08	65	832	0.08	7551	0.0	0.0	7548	0.0	0.0
33250	195	8	8			0	1,190	0.00	0	1,192	0.00	4419	0.0	0.0	4354	0.0	0.0
33251	110	8	8			27	301	0.09	14	301	0.05	4498	3.3	0.0	4466	1.8	0.0
33254	54	8	8			25	2,137	0.01	25	2,140	0.01	4450	0.0	0.0	4449	0.0	0.0
33255	310	8	8			26	1,203	0.02	26	1,204	0.02	4449	0.0	0.0	7145	0.0	0.0
33256	125	8	8			51	1,537	0.03	51	1,539	0.03	4448	0.0	0.0	4447	0.0	0.0
33257	110	8	8			51	2,069	0.02	51	2,072	0.02	4447	0.0	0.0	4446	0.0	0.0
33258	80	8	8			51	1,817	0.03	51	1,820	0.03	4446	0.0	0.0	4427	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33259	89	8	8			52	1,749	0.03	52	1,751	0.03	4427	0.0	0.0	7304	0.0	0.0
33260	163	8	8			76	342	0.22	76	342	0.22	7304	0.0	0.0	4428	0.0	0.0
33261	50	8	8			91	297	0.31	91	298	0.31	4469	0.0	0.0	4470	0.0	0.0
33262	270	8	8			215	1,032	0.21	215	1,033	0.21	4470	0.0	0.0	4471	0.0	0.0
33263	90	8	8			529	940	0.56	529	942	0.56	4471	0.0	0.0	4472	6.2	6.2
33264	200	8	8			530	294	1.80	530	294	1.80	4472	6.2	6.2	7306	0.0	0.0
33265	295	8	8			530	934	0.57	530	935	0.57	7306	0.0	0.0	4473	0.0	0.0
33266	340	8	12	46	2036	451	297	1.52	586	874	0.67	4473	0.0	0.0	4474	0.0	0.0
33267	278	8	8			31	1,897	0.02	31	1,899	0.02	7552	0.0	0.0	4475	0.0	0.0
33268	367	8	8			31	1,244	0.03	31	1,247	0.03	4475	0.0	0.0	7061	0.0	0.0
33269	325	8	8			293	1,609	0.18	293	1,611	0.18	7061	0.0	0.0	4471	0.0	0.0
33270	446	8	8			0	1,586	0.00	0	1,588	0.00	4476	0.0	0.0	4445	0.0	0.0
33271	165	8	8			124	1,310	0.09	124	1,311	0.09	4477	0.0	0.0	4470	0.0	0.0
33272	225	8	8			124	1,267	0.10	124	1,269	0.10	4429	0.0	0.0	4477	0.0	0.0
33273	300	8	8			123	1,218	0.10	123	1,219	0.10	4443	0.0	0.0	4429	0.0	0.0
33274	203	8	8			56	1,085	0.05	56	1,086	0.05	4479	0.0	0.0	4473	0.0	0.0
33275	80	8	8			1	1,013	0.00	1	1,014	0.00	7554	0.0	0.0	4479	0.0	0.0
33276	170	8	8			0	1,881	0.00	0	1,883	0.00	4480	0.0	0.0	7554	0.0	0.0
33277	183	8	8			31	1,460	0.02	31	1,462	0.02	4454	0.0	0.0	4479	0.0	0.0
33278	120	8	8			31	1,902	0.02	31	1,905	0.02	4453	0.0	0.0	4454	0.0	0.0
33279	147	8	8			1	930	0.00	1	931	0.00	4481	0.0	0.0	4453	0.0	0.0
33280	75	8	8			1	1,795	0.00	1	1,797	0.00	7063	0.0	0.0	4481	0.0	0.0
33281	211	8	8			1	1,546	0.00	1	1,548	0.00	4440	0.0	0.0	7063	0.0	0.0
33282	370	8	8			1	819	0.00	1	821	0.00	4441	0.0	0.0	4440	0.0	0.0
33283	80	6	6			1	692	0.00	1	692	0.00	7687	0.0	0.0	4437	0.0	0.0
33284	144	8	8			1	1,208	0.00	1	1,210	0.00	4483	0.0	0.0	4482	0.0	0.0
33285	190	8	8			1	1,158	0.00	1	1,159	0.00	4435	0.0	0.0	4483	0.0	0.0
33286	280	8	8			1	794	0.00	1	796	0.00	4436	0.0	0.0	4435	0.0	0.0
33287	135	8	8			1	1,433	0.00	1	1,435	0.00	4420	0.0	0.0	4436	0.0	0.0
33288	230	8	8			163	650	0.25	163	651	0.25	4434	0.0	0.0	4482	0.0	0.0
33289	115	8	8			188	297	0.63	188	298	0.63	4485	0.0	0.0	4484	0.0	0.0
33290	60	8	8			165	291	0.57	165	292	0.56	4482	0.0	0.0	4485	0.0	0.0
33291	315	8	8			217	1,026	0.21	217	1,028	0.21	4432	0.0	0.0	4466	1.8	0.0
33292	155	8	8			28	1,321	0.02	28	1,323	0.02	4431	0.0	0.0	4432	0.0	0.0
33293	250	8	8			28	1,722	0.02	28	1,724	0.02	4430	0.0	0.0	4431	0.0	0.0
33294	125	8	8			28	1,757	0.02	28	1,760	0.02	4486	0.0	0.0	4430	0.0	0.0
33295	45	8	8			28	1,608	0.02	28	1,610	0.02	4487	0.0	0.0	4486	0.0	0.0
33296	160	8	8			28	871	0.03	28	872	0.03	4488	0.0	0.0	4487	0.0	0.0
33297	155	8	8			9	756	0.01	9	756	0.01	4489	0.0	0.0	4488	0.0	0.0
33298	95	8	8			9	929	0.01	9	931	0.01	4439	0.0	0.0	4489	0.0	0.0
33299	200	8	8			477	578	0.83	613	578	1.06	4463	5.4	0.0	4464	0.0	0.0
33300	209	8	8			477	1,054	0.45	613	1,056	0.58	7305	0.0	0.0	4463	5.4	0.0
33301	256	8	8			476	804	0.59	613	806	0.76	4461	0.0	0.0	7305	0.0	0.0
33302	164	8	8			476	899	0.53	612	901	0.68	4462	0.0	0.0	4461	0.0	0.0
33303	243	8	8			1	1,177	0.00	1	1,178	0.00	4452	0.0	0.0	4462	0.0	0.0
33304	157	8	8			0	1,783	0.00	0	1,786	0.00	4451	0.0	0.0	4452	0.0	0.0
33305	196	8	8			476	1,345	0.35	611	1,347	0.45	4460	0.0	0.0	4462	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33306	177	8	8			453	1,117	0.41	588	1,119	0.53	4490	0.0	0.0	4460	0.0	0.0
33307	163	8	8			451	949	0.48	587	951	0.62	4474	0.0	0.0	4490	0.0	0.0
33308	190	8	8			1	1,274	0.00	1	1,276	0.00	4491	0.0	0.0	4490	0.0	0.0
33309	230	8	8			0	76	0.00	0	76	0.00	7410	0.0	0.0	4492	0.0	0.0
33310	109	8	8			6	1,284	0.00	6	1,286	0.00	7553	0.0	0.0	7062	0.0	0.0
33311	117	8	8			0	1,519	0.00	0	1,521	0.00	4421	0.0	0.0	7553	0.0	0.0
33312	264	8	8			1	1,133	0.00	1	1,134	0.00	4422	0.0	0.0	7553	0.0	0.0
33313	229	8	8			6	1,168	0.00	6	1,169	0.00	4458	0.0	0.0	4467	0.0	0.0
33314	42	8	8			6	811	0.01	6	812	0.01	4459	0.0	0.0	4458	0.0	0.0
33315	124	8	8			6	883	0.01	6	884	0.01	4493	0.0	0.0	4459	0.0	0.0
33316	185	8	8			0	403	0.00	0	403	0.00	4424	0.0	0.0	4493	0.0	0.0
33317	452	8	8			1	977	0.00	1	978	0.00	4457	0.0	0.0	4468	0.0	0.0
33318	175	8	8			22	444	0.05	22	444	0.05	4494	0.0	0.0	4496	0.0	0.0
33319	216	8	8			21	1,180	0.02	21	1,181	0.02	4456	0.0	0.0	4455	0.0	0.0
33320	236	8	8			0	885	0.00	0	886	0.00	4497	0.0	0.0	4495	0.0	0.0
33322	150	8	8			276	384	0.72	275	384	0.72	4466	1.8	0.0	4465	1.9	0.0
33323	65	8	12	45	2036	474	292	1.63	613	860	0.71	4464	0.0	0.0	4465	1.9	0.0
33324	74	8	8			263	1,766	0.15	263	1,768	0.15	4444	0.0	0.0	7061	0.0	0.0
33325	250	8	8			1	1,040	0.00	1	1,042	0.00	4425	0.0	0.0	4498	3.3	0.0
33326	35	8	8			21	1,572	0.01	21	1,574	0.01	4495	0.0	0.0	4456	0.0	0.0
33327	81	8	8			11	1,817	0.01	11	1,819	0.01	4506	0.0	0.0	4515	0.0	0.0
33328	454	8	8			1	947	0.00	1	948	0.00	4508	0.0	0.0	4504	0.0	0.0
33329	287	8	8			1	1,394	0.00	1	1,396	0.00	7307	0.0	0.0	4507	0.0	0.0
33330	181	8	8			1	344	0.00	1	345	0.00	4507	0.0	0.0	4524	0.0	0.0
33331	77	8	8			0	1,834	0.00	0	1,837	0.00	4509	0.0	0.0	4510	0.0	0.0
33332	132	8	8			1	1,245	0.00	1	1,247	0.00	4510	0.0	0.0	4511	0.0	0.0
33333	376	8	8			10	1,595	0.01	10	1,597	0.01	4511	0.0	0.0	4512	0.0	0.0
33334	263	8	8			10	1,900	0.01	10	1,903	0.01	4512	0.0	0.0	4513	0.0	0.0
33335	129	8	8			11	1,070	0.01	11	1,072	0.01	4513	0.0	0.0	7555	0.0	0.0
33336	163	8	8			1	1,616	0.00	1	1,618	0.00	4502	0.0	0.0	7555	0.0	0.0
33337	352	8	8			242	1,662	0.15	242	1,664	0.15	7555	0.0	0.0	4514	0.0	0.0
33338	226	8	8			242	873	0.28	242	874	0.28	4514	0.0	0.0	4503	0.0	0.0
33339	209	8	8			10	1,778	0.01	10	1,781	0.01	4528	0.0	0.0	4525	0.0	0.0
33340	343	8	8			16	1,052	0.02	16	1,053	0.02	4524	0.0	0.0	4523	0.0	0.0
33341	329	8	8			253	1,058	0.24	253	1,059	0.24	4503	0.0	0.0	4522	0.0	0.0
33342	192	8	8			11	1,884	0.01	11	1,887	0.01	4515	0.0	0.0	4527	0.0	0.0
33343	240	8	8			3	1,912	0.00	3	1,915	0.00	8362	0.0	0.0	4534	0.0	0.0
33344	198	8	8			8	1,197	0.01	8	1,198	0.01	4531	0.0	0.0	4535	0.0	0.0
33346	55	8	8			210	667	0.31	210	667	0.31	4535	0.0	0.0	4536	0.0	0.0
33347	256	8	8			210	1,397	0.15	210	1,399	0.15	4536	0.0	0.0	4538	0.0	0.0
33348	163	8	8			1	1,537	0.00	1	1,539	0.00	4539	0.0	0.0	4540	0.0	0.0
33349	348	8	8			6	1,273	0.00	6	1,274	0.00	4540	0.0	0.0	4541	0.0	0.0
33350	131	8	8			6	1,520	0.00	6	1,522	0.00	4541	0.0	0.0	7308	0.0	0.0
33352	412	8	8			7	1,183	0.01	7	1,185	0.01	4532	0.0	0.0	4538	0.0	0.0
33353	184	8	8			216	1,214	0.18	216	1,215	0.18	4538	0.0	0.0	4546	0.0	0.0
33355	475	8	8			25	1,378	0.02	25	1,381	0.02	4543	0.0	0.0	4544	0.0	0.0
33356	108	8	8			31	1,151	0.03	31	1,153	0.03	4544	0.0	0.0	7308	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33357	229	8	8			38	1,085	0.03	38	1,087	0.03	7308	0.0	0.0	4545	0.0	0.0
33358	60	8	8			38	1,214	0.03	38	1,215	0.03	4545	0.0	0.0	4546	0.0	0.0
33359	127	8	8			2	1,381	0.00	2	1,383	0.00	4573	0.0	0.0	4572	0.0	0.0
33360	101	8	8			2	1,304	0.00	2	1,306	0.00	4572	0.0	0.0	4551	0.0	0.0
33361	375	8	8			40	1,526	0.03	40	1,528	0.03	4574	0.0	0.0	4551	0.0	0.0
33362	207	8	8			41	1,548	0.03	41	1,550	0.03	4551	0.0	0.0	4575	0.0	0.0
33363	55	8	8			42	1,627	0.03	42	1,629	0.03	4575	0.0	0.0	4576	0.0	0.0
33364	151	8	8			47	3,008	0.02	47	3,012	0.02	4576	0.0	0.0	4577	0.0	0.0
33365	66	8	8			48	2,019	0.02	48	2,022	0.02	4577	0.0	0.0	4553	0.0	0.0
33366	138	8	8			48	3,067	0.02	48	3,071	0.02	4553	0.0	0.0	7066	0.0	0.0
33367	251	8	8			2	450	0.00	2	451	0.00	4578	0.0	0.0	7066	0.0	0.0
33368	159	8	8			2	3,047	0.00	2	3,051	0.00	4564	0.0	0.0	4578	0.0	0.0
33369	170	8	8			0	2,717	0.00	0	2,721	0.00	4579	0.0	0.0	4552	0.0	0.0
33370	67	8	8			49	2,285	0.02	49	2,288	0.02	7556	0.0	0.0	4569	0.0	0.0
33371	96	8	8			49	2,568	0.02	49	2,572	0.02	4569	0.0	0.0	4570	0.0	0.0
33372	175	8	8			51	331	0.16	51	331	0.16	4570	0.0	0.0	4568	0.0	0.0
33373	194	8	8			0	674	0.00	0	676	0.00	7557	0.0	0.0	4571	0.0	0.0
33374	284	8	8			3	338	0.01	3	338	0.01	4566	0.0	0.0	4567	0.0	0.0
33375	245	8	8			0	325	0.00	0	326	0.00	4565	0.0	0.0	4566	0.0	0.0
33376	379	8	8			0	437	0.00	0	438	0.00	4558	0.0	0.0	4570	0.0	0.0
33377	115	8	8			5	1,012	0.00	5	1,013	0.00	7310	0.0	0.0	4580	0.0	0.0
33378	84	8	8			0	1,026	0.00	0	1,028	0.00	7688	0.0	0.0	7310	0.0	0.0
33379	271	8	8			5	1,177	0.00	5	1,178	0.00	4557	0.0	0.0	7309	0.0	0.0
33380	25	8	8			0	470	0.00	0	471	0.00	4550	0.0	0.0	7189	0.0	0.0
33381	326	8	8			0	1,690	0.00	0	1,692	0.00	4563	0.0	0.0	7065	0.0	0.0
33382	167	8	8			3	1,049	0.00	3	1,051	0.00	7065	0.0	0.0	4562	0.0	0.0
33383	144	8	8			3	1,477	0.00	3	1,479	0.00	4562	0.0	0.0	4559	0.0	0.0
33384	335	8	8			3	876	0.00	3	878	0.00	4559	0.0	0.0	4556	0.0	0.0
33385	362	8	8			5	1,397	0.00	5	1,398	0.00	7309	0.0	0.0	4556	0.0	0.0
33386	150	8	8			8	940	0.01	8	942	0.01	4556	0.0	0.0	4555	0.0	0.0
33388	79	8	8			253	286	0.89	253	287	0.88	4561	0.0	0.0	4560	0.0	0.0
33389	165	8	8			6	896	0.01	6	897	0.01	8248	0.0	0.0	8260	0.0	0.0
33390	118	8	8			0	865	0.00	0	866	0.00	4548	0.0	0.0	4582	0.0	0.0
33391	294	8	8			0	837	0.00	0	838	0.00	4549	0.0	0.0	7557	0.0	0.0
33392	202	8	8			13	763	0.02	13	763	0.02	4589	0.0	0.0	4590	0.0	0.0
33393	75	8	8			3	1,549	0.00	3	1,551	0.00	4584	0.0	0.0	4585	0.0	0.0
33394	260	8	8			3	2,107	0.00	3	2,110	0.00	4585	0.0	0.0	4586	0.0	0.0
33395	159	8	8			3	1,882	0.00	3	1,884	0.00	4586	0.0	0.0	4588	0.0	0.0
33396	89	8	8			3	1,133	0.00	3	1,135	0.00	4588	0.0	0.0	4590	0.0	0.0
33397	52	8	8			13	548	0.02	13	549	0.02	8281	0.0	0.0	4589	0.0	0.0
33398	168	8	8			21	1,454	0.01	21	1,456	0.01	4590	0.0	0.0	7558	0.0	0.0
33400	109	8	8			43	488	0.09	43	488	0.09	7558	0.0	0.0	4583	0.0	0.0
33401	298	8	8			0	565	0.00	0	566	0.00	7311	0.0	0.0	4596	0.0	0.0
33402	297	8	8			0	460	0.00	0	461	0.00	4593	0.0	0.0	4594	0.0	0.0
33403	95	8	8			2	935	0.00	2	936	0.00	4594	0.0	0.0	4595	0.0	0.0
33404	85	8	8			2	1,303	0.00	2	1,305	0.00	4595	0.0	0.0	4596	0.0	0.0
33405	110	8	8			3	383	0.01	3	384	0.01	4602	0.0	0.0	4603	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33406	170	8	8			0	383	0.00	0	384	0.00	4600	0.0	0.0	4601	0.0	0.0
33407	315	8	8			0	786	0.00	0	788	0.00	4597	0.0	0.0	4599	0.0	0.0
33408	135	8	8			2	1,138	0.00	2	1,140	0.00	4598	0.0	0.0	4599	0.0	0.0
33409	283	8	8			10	1,138	0.01	10	1,139	0.01	4599	0.0	0.0	4601	0.0	0.0
33410	293	8	8			13	978	0.01	13	979	0.01	4601	0.0	0.0	4603	0.0	0.0
33411	134	8	8			17	1,048	0.02	17	1,049	0.02	4603	0.0	0.0	4604	0.0	0.0
33412	240	8	8			17	383	0.04	17	384	0.04	4604	0.0	0.0	4605	0.0	0.0
33413	349	8	8			60	383	0.16	60	383	0.16	4605	0.0	0.0	4606	0.0	0.0
33414	300	8	8			60	1,015	0.06	60	1,017	0.06	4606	0.0	0.0	4607	0.0	0.0
33415	50	8	8			60	1,015	0.06	60	1,017	0.06	4607	0.0	0.0	4608	0.0	0.0
33417	370	8	8			6	1,318	0.00	6	1,319	0.00	4662	0.0	0.0	4643	0.0	0.0
33418	164	8	8			23	947	0.02	23	949	0.02	4646	0.0	0.0	4645	0.0	0.0
33419	360	8	8			11	1,719	0.01	11	1,722	0.01	4621	0.0	0.0	4647	0.0	0.0
33420	249	8	8			1	2,332	0.00	1	2,335	0.00	4609	0.0	0.0	4621	0.0	0.0
33421	172	8	8			8	901	0.01	8	903	0.01	7559	0.0	0.0	4621	0.0	0.0
33422	140	8	8			3	2,405	0.00	3	2,408	0.00	7067	0.0	0.0	4623	0.0	0.0
33423	118	8	8			0	409	0.00	0	409	0.00	4624	0.0	0.0	7067	0.0	0.0
33424	127	8	8			0	1,044	0.00	0	1,045	0.00	4625	0.0	0.0	4624	0.0	0.0
33425	155	8	8			1	1,996	0.00	1	1,999	0.00	4611	0.0	0.0	4625	0.0	0.0
33426	93	8	8			0	1,320	0.00	0	1,322	0.00	4622	0.0	0.0	4623	0.0	0.0
33427	259	8	8			0	783	0.00	0	784	0.00	4630	0.0	0.0	4622	0.0	0.0
33428	357	8	8			0	1,301	0.00	0	1,303	0.00	4650	0.0	0.0	7559	0.0	0.0
33429	173	8	8			0	799	0.00	0	800	0.00	4610	0.0	0.0	7067	0.0	0.0
33430	147	8	8			0	895	0.00	0	896	0.00	4648	0.0	0.0	4647	0.0	0.0
33431	211	8	8			1	1,772	0.00	1	1,774	0.00	4649	0.0	0.0	4648	0.0	0.0
33432	91	8	8			0	2,060	0.00	0	2,063	0.00	4615	0.0	0.0	4649	0.0	0.0
33433	210	8	8			0	749	0.00	0	749	0.00	7689	0.0	0.0	4663	0.0	0.0
33434	160	8	8			363	1,288	0.28	363	1,289	0.28	4644	0.0	0.0	4645	0.0	0.0
33435	465	8	8			285	1,010	0.28	285	1,011	0.28	7069	0.0	0.0	4674	0.0	0.0
33436	363	8	8			285	882	0.32	285	883	0.32	4673	0.0	0.0	7069	0.0	0.0
33437	370	8	8			77	1,210	0.06	77	1,212	0.06	7313	0.0	0.0	4644	0.0	0.0
33438	216	8	8			67	865	0.08	67	867	0.08	4657	0.0	0.0	4655	0.0	0.0
33439	139	8	8			67	563	0.12	67	564	0.12	7561	0.0	0.0	4657	0.0	0.0
33440	135	8	8			67	1,537	0.04	67	1,539	0.04	4656	0.0	0.0	7561	0.0	0.0
33441	173	8	8			60	715	0.08	60	715	0.08	4653	0.0	0.0	4656	0.0	0.0
33442	386	8	8			3	828	0.00	3	829	0.00	4664	0.0	0.0	4653	0.0	0.0
33443	302	8	8			2	811	0.00	2	812	0.00	4651	0.0	0.0	4652	0.0	0.0
33444	134	8	8			0	812	0.00	0	813	0.00	4612	0.0	0.0	4651	0.0	0.0
33445	160	8	8			0	1,115	0.00	0	1,116	0.00	4665	0.0	0.0	7313	0.0	0.0
33446	208	8	8			1	1,293	0.00	1	1,294	0.00	4654	0.0	0.0	4665	0.0	0.0
33447	164	8	8			0	1,257	0.00	0	1,259	0.00	4678	0.0	0.0	4654	0.0	0.0
33448	111	8	8			0	998	0.00	0	999	0.00	4616	0.0	0.0	4654	0.0	0.0
33449	128	8	8			0	674	0.00	0	676	0.00	4633	0.0	0.0	4632	0.0	0.0
33450	242	8	8			0	614	0.00	0	615	0.00	4617	0.0	0.0	7147	0.0	0.0
33451	197	8	8			398	933	0.43	398	934	0.43	4639	0.0	0.0	4638	0.0	0.0
33452	65	8	8			388	737	0.53	388	738	0.53	4667	0.0	0.0	4639	0.0	0.0
33453	93	8	8			388	1,022	0.38	388	1,024	0.38	4641	0.0	0.0	4640	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33454	321	8	8			385	801	0.48	385	802	0.48	4645	0.0	0.0	4642	0.0	0.0
33455	437	8	8			6	1,114	0.00	6	1,115	0.00	4643	0.0	0.0	7314	0.0	0.0
33456	344	8	8			42	994	0.04	42	994	0.04	4636	0.0	0.0	4637	0.0	0.0
33457	475	8	8			42	1,256	0.03	42	1,258	0.03	4668	0.0	0.0	4636	0.0	0.0
33458	93	8	8			19	1,170	0.02	19	1,172	0.02	7560	0.0	0.0	4668	0.0	0.0
33459	427	8	8			19	1,278	0.01	19	1,280	0.01	4620	0.0	0.0	7560	0.0	0.0
33460	197	8	8			8	1,990	0.00	8	1,992	0.00	4626	0.0	0.0	4668	0.0	0.0
33461	68	8	8			7	403	0.02	7	403	0.02	4669	0.0	0.0	4626	0.0	0.0
33462	237	8	8			7	1,567	0.00	7	1,570	0.00	7312	0.0	0.0	4669	0.0	0.0
33463	205	8	8			14	1,863	0.01	14	1,865	0.01	4634	0.0	0.0	4666	0.0	0.0
33464	306	8	8			3	1,508	0.00	3	1,509	0.00	4627	0.0	0.0	4635	0.0	0.0
33465	252	8	8			3	1,460	0.00	3	1,462	0.00	4628	0.0	0.0	4627	0.0	0.0
33466	343	8	8			10	2,072	0.00	10	2,075	0.00	4618	0.0	0.0	4670	0.0	0.0
33467	357	8	8			10	1,606	0.01	10	1,608	0.01	4671	0.0	0.0	4618	0.0	0.0
33468	65	8	8			0	612	0.00	0	613	0.00	4613	0.0	0.0	4671	0.0	0.0
33469	107	8	8			10	1,169	0.01	10	1,170	0.01	4672	0.0	0.0	4671	0.0	0.0
33471	86	8	8			285	356	0.80	285	356	0.80	7068	0.0	0.0	4658	0.0	0.0
33472	202	8	8			285	1,119	0.25	285	1,121	0.25	4659	0.0	0.0	7068	0.0	0.0
33473	137	8	8			0	270	0.00	0	271	0.00	4614	0.0	0.0	4659	0.0	0.0
33474	160	8	8			275	343	0.80	275	344	0.80	4660	0.0	0.0	4659	0.0	0.0
33475	88	8	8			275	301	0.91	275	301	0.91	4661	0.0	0.0	4660	0.0	0.0
33476	365	8	8			158	1,923	0.08	158	1,926	0.08	4679	0.0	0.0	4699	0.0	0.0
33477	227	8	8			152	542	0.28	152	543	0.28	7562	0.0	0.0	4679	0.0	0.0
33478	104	8	8			8	865	0.01	8	865	0.01	4680	0.0	0.0	4681	0.0	0.0
33479	214	8	8			8	1,138	0.01	8	1,140	0.01	4681	0.0	0.0	4682	0.0	0.0
33480	221	8	8			12	1,763	0.01	12	1,765	0.01	4682	0.0	0.0	4683	0.0	0.0
33481	396	8	8			12	1,747	0.01	12	1,749	0.01	4683	0.0	0.0	7148	0.0	0.0
33482	232	8	8			12	1,186	0.01	12	1,188	0.01	4696	0.0	0.0	4688	0.0	0.0
33483	96	8	8			13	1,859	0.01	13	1,861	0.01	4688	0.0	0.0	7411	0.0	0.0
33484	284	8	8			13	1,813	0.01	13	1,815	0.01	4697	0.0	0.0	4686	0.0	0.0
33485	171	8	8			1	1,280	0.00	1	1,282	0.00	4698	0.0	0.0	4687	0.0	0.0
33486	78	8	8			8	1,028	0.01	8	1,029	0.01	4685	0.0	0.0	4686	0.0	0.0
33487	303	8	8			163	1,503	0.11	163	1,506	0.11	4693	0.0	0.0	4692	0.0	0.0
33488	376	8	8			158	1,755	0.09	158	1,757	0.09	4699	0.0	0.0	4693	0.0	0.0
33489	160	8	8			0	2,021	0.00	0	2,024	0.00	7690	0.0	0.0	4699	0.0	0.0
33490	343	8	8			12	1,178	0.01	12	1,180	0.01	4695	0.0	0.0	7563	0.0	0.0
33491	385	8	8			12	1,236	0.01	12	1,238	0.01	7148	0.0	0.0	4695	0.0	0.0
33493	130	8	8			18	13	1.37	18	13	1.37	4690	0.0	0.0	7315	0.0	0.0
33494	193	8	8			18	1,640	0.01	18	1,642	0.01	4689	0.0	0.0	4690	0.0	0.0
33495	235	8	8			1	1,365	0.00	1	1,367	0.00	4684	0.0	0.0	4689	0.0	0.0
33496	230	8	8			174	1,376	0.13	174	1,378	0.13	4725	0.0	0.0	4724	0.0	0.0
33497	116	8	8			194	1,131	0.17	194	1,132	0.17	4724	0.0	0.0	4755	0.0	0.0
33498	300	8	8			32	1,282	0.02	32	1,283	0.02	4723	0.0	0.0	4724	0.0	0.0
33499	349	8	8			194	1,435	0.14	194	1,438	0.14	4755	0.0	0.0	4756	0.0	0.0
33500	402	8	8			201	809	0.25	201	810	0.25	4757	0.0	0.0	4759	0.0	0.0
33501	53	8	8			201	1,473	0.14	201	1,475	0.14	4759	0.0	0.0	4758	0.0	0.0
33502	39	8	8			253	1,475	0.17	253	1,476	0.17	4758	0.0	0.0	4772	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33503	280	8	8			2	1,250	0.00	2	1,251	0.00	4773	0.0	0.0	7071	0.0	0.0
33504	345	8	8			662	1,317	0.50	662	1,319	0.50	4731	0.0	0.0	7317	0.0	0.0
33505	198	8	8			780	819	0.95	781	819	0.95	7317	0.0	0.0	4753	0.0	0.0
33506	350	8	8			65	1,535	0.04	65	1,537	0.04	4752	0.0	0.0	4774	0.0	0.0
33507	239	8	8			53	1,683	0.03	53	1,685	0.03	4729	0.0	0.0	4751	0.0	0.0
33508	227	8	8			53	1,052	0.05	53	1,053	0.05	4728	0.0	0.0	4729	0.0	0.0
33509	35	8	8			19	527	0.04	19	528	0.04	4730	0.0	0.0	4728	0.0	0.0
33510	97	8	8			19	531	0.04	19	532	0.04	7316	0.0	0.0	4730	0.0	0.0
33511	88	8	12	34	2036	860	476	1.81	860	1,401	0.61	4749	1.1	0.0	4775	4.8	0.0
33512	70	8	12	34	2036	860	628	1.37	860	1,852	0.46	4775	4.8	0.0	4745	7.8	0.0
33513	118	8	12	34	2036	860	604	1.42	861	1,782	0.48	4745	7.8	0.0	4748	0.0	0.0
33514	167	8	8			0	1,633	0.00	0	1,635	0.00	4750	0.0	0.0	4745	7.8	0.0
33515	148	8	8			1	1,438	0.00	1	1,440	0.00	4701	0.0	0.0	4750	0.0	0.0
33516	259	8	8			6	1,594	0.00	6	1,597	0.00	4760	0.0	0.0	4749	1.1	0.0
33517	122	8	8			6	1,909	0.00	6	1,912	0.00	7565	0.0	0.0	4760	0.0	0.0
33518	253	8	8			6	1,810	0.00	6	1,813	0.00	4721	0.0	0.0	7565	0.0	0.0
33520	95	8	8			7	2,147	0.00	7	2,150	0.00	4794	0.0	0.0	4715	0.0	0.0
33521	105	8	8			7	2,038	0.00	7	2,041	0.00	4715	0.0	0.0	4716	0.0	0.0
33522	100	8	8			13	1,267	0.01	13	1,269	0.01	4716	0.0	0.0	4732	0.0	0.0
33523	260	8	8			14	1,899	0.01	14	1,901	0.01	4732	0.0	0.0	4754	0.0	0.0
33524	152	8	8			101	512	0.20	101	513	0.20	4754	0.0	0.0	4793	0.0	0.0
33525	91	8	8			0	1,482	0.00	0	1,484	0.00	4713	0.0	0.0	4733	0.0	0.0
33526	75	8	8			0	642	0.00	0	643	0.00	4712	0.0	0.0	4733	0.0	0.0
33527	152	8	8			2	1,734	0.00	2	1,737	0.00	4733	0.0	0.0	4734	0.0	0.0
33528	111	8	8			0	1,428	0.00	0	1,430	0.00	4711	0.0	0.0	4734	0.0	0.0
33529	74	8	8			3	1,589	0.00	3	1,591	0.00	4734	0.0	0.0	4735	0.0	0.0
33530	148	8	8			0	829	0.00	0	830	0.00	4710	0.0	0.0	4735	0.0	0.0
33531	163	8	8			8	1,431	0.01	8	1,433	0.01	4735	0.0	0.0	4736	0.0	0.0
33532	85	8	8			0	712	0.00	0	713	0.00	4709	0.0	0.0	4736	0.0	0.0
33533	220	8	8			8	713	0.01	8	714	0.01	4736	0.0	0.0	4793	0.0	0.0
33534	219	8	8			110	1,224	0.09	110	1,225	0.09	4793	0.0	0.0	4791	0.0	0.0
33535	55	6	6			0	850	0.00	0	850	0.00	4708	0.0	0.0	4792	0.0	0.0
33536	364	8	8			0	298	0.00	0	298	0.00	4792	0.0	0.0	4791	0.0	0.0
33537	100	8	8			110	730	0.15	110	731	0.15	4791	0.0	0.0	7317	0.0	0.0
33538	275	6	6			19	793	0.02	19	793	0.02	7318	0.0	0.0	4790	0.0	0.0
33539	225	8	8			20	866	0.02	20	867	0.02	4770	0.0	0.0	4771	0.0	0.0
33540	150	8	8			47	1,742	0.03	47	1,745	0.03	4771	0.0	0.0	4769	0.0	0.0
33541	59	8	8			47	1,117	0.04	47	1,119	0.04	4769	0.0	0.0	7072	0.0	0.0
33542	198	8	8			47	1,074	0.04	47	1,075	0.04	7072	0.0	0.0	4768	0.0	0.0
33543	174	8	8			48	1,331	0.04	48	1,332	0.04	4768	0.0	0.0	4767	0.0	0.0
33544	493	8	8			48	1,679	0.03	48	1,681	0.03	4767	0.0	0.0	4766	0.0	0.0
33545	93	8	8			72	1,884	0.04	72	1,887	0.04	4766	0.0	0.0	4765	0.0	0.0
33548	40	8	8			13	2,232	0.01	13	2,235	0.01	4737	0.0	0.0	4738	0.0	0.0
33549	140	8	8			0	1,407	0.00	0	1,409	0.00	4705	0.0	0.0	4739	0.0	0.0
33550	77	8	8			13	1,888	0.01	13	1,890	0.01	4739	0.0	0.0	4740	0.0	0.0
33551	122	8	8			13	1,994	0.01	13	1,997	0.01	4740	0.0	0.0	4787	0.0	0.0
33552	290	8	8			0	1,864	0.00	0	1,866	0.00	7566	0.0	0.0	4788	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33553	218	8	8			872	1,205	0.72	872	1,207	0.72	4748	0.0	0.0	4789	0.0	0.0
33554	128	8	8			0	338	0.00	0	338	0.00	4704	0.0	0.0	4789	0.0	0.0
33555	319	8	8			872	1,232	0.71	873	1,233	0.71	4789	0.0	0.0	4747	0.0	0.0
33556	200	8	8			1	1,584	0.00	1	1,586	0.00	4788	0.0	0.0	4714	0.0	0.0
33557	147	8	8			19	822	0.02	19	824	0.02	4787	0.0	0.0	4714	0.0	0.0
33558	254	8	8			19	453	0.04	19	453	0.04	4714	0.0	0.0	4747	0.0	0.0
33559	256	8	8			892	1,253	0.71	892	1,254	0.71	4747	0.0	0.0	4743	0.0	0.0
33560	275	8	8			1	1,381	0.00	1	1,383	0.00	4786	0.0	0.0	4785	0.0	0.0
33561	185	8	8			11	1,040	0.01	11	1,042	0.01	4785	0.0	0.0	4717	0.0	0.0
33562	203	8	8			1	1,400	0.00	1	1,402	0.00	7070	0.0	0.0	4718	0.0	0.0
33563	148	8	8			0	1,074	0.00	0	1,076	0.00	4703	0.0	0.0	7070	0.0	0.0
33564	114	8	8			1	1,819	0.00	1	1,822	0.00	4702	0.0	0.0	7564	0.0	0.0
33565	265	8	8			0	687	0.00	0	688	0.00	7564	0.0	0.0	4784	0.0	0.0
33566	136	8	8			0	403	0.00	0	403	0.00	4744	0.0	0.0	4743	0.0	0.0
33567	260	8	8			892	1,238	0.72	892	1,240	0.72	4743	0.0	0.0	4742	0.0	0.0
33568	189	10	10			44	581	0.08	44	581	0.08	4783	0.0	0.0	4741	0.0	0.0
33569	56	10	10			22	1,081	0.02	22	1,079	0.02	4719	0.0	0.0	4783	0.0	0.0
33570	46	10	10			22	1,096	0.02	22	1,094	0.02	4782	0.0	0.0	4719	0.0	0.0
33571	198	8	8			22	1,108	0.02	22	1,109	0.02	4781	0.0	0.0	4782	0.0	0.0
33572	242	8	8			22	1,253	0.02	22	1,256	0.02	4779	0.0	0.0	4781	0.0	0.0
33573	289	8	8			0	752	0.00	0	753	0.00	4780	0.0	0.0	4779	0.0	0.0
33574	180	8	8			15	1,642	0.01	15	1,644	0.01	4746	0.0	0.0	4779	0.0	0.0
33575	97	8	8			0	1,350	0.00	0	1,352	0.00	4778	0.0	0.0	4722	0.0	0.0
33576	312	8	8			0	647	0.00	0	648	0.00	4722	0.0	0.0	7412	0.0	0.0
33577	78	8	8			0	319	0.00	0	319	0.00	7412	0.0	0.0	4746	0.0	0.0
33578	220	8	8			15	1,384	0.01	15	1,386	0.01	4777	0.0	0.0	4746	0.0	0.0
33579	175	8	8			34	1,283	0.03	34	1,285	0.03	7319	0.0	0.0	4727	0.0	0.0
33580	313	8	8			16	1,681	0.01	16	1,683	0.01	7071	0.0	0.0	7149	0.0	0.0
33581	75	8	8			69	1,432	0.05	69	1,434	0.05	7149	0.0	0.0	4758	0.0	0.0
33582	255	8	8			9	540	0.02	9	541	0.02	4776	0.0	0.0	4762	0.0	0.0
33583	227	8	8			15	776	0.02	15	777	0.02	4762	0.0	0.0	4761	0.0	0.0
33584	321	8	8			6	757	0.01	6	758	0.01	4720	0.0	0.0	4721	0.0	0.0
33585	311	8	8			153	983	0.16	153	984	0.16	7073	0.0	0.0	4800	0.0	0.0
33586	91	8	8			153	631	0.24	153	631	0.24	4800	0.0	0.0	4801	1.0	0.0
33587	77	10	15	28	2036	983	336	2.93	983	992	0.99	4836	1.2	0.0	4802	0.0	0.0
33588	283	10	15	28	2036	737	578	1.28	1,137	1,703	0.67	4802	0.0	0.0	4838	5.3	0.0
33589	1	8	8			0	542	0.00	0	543	0.00	4803	0.0	0.0	4826	0.0	0.0
33590	65	8	8			134	420	0.32	134	421	0.32	4809	0.0	0.0	4434	0.0	0.0
33591	354	8	8			45	1,269	0.04	45	1,271	0.04	4810	0.0	0.0	4805	0.0	0.0
33592	354	8	8			45	1,085	0.04	45	1,087	0.04	4805	0.0	0.0	4806	0.0	0.0
33593	100	8	8			46	1,106	0.04	46	1,107	0.04	4806	0.0	0.0	4807	0.0	0.0
33594	54	8	8			46	665	0.07	46	665	0.07	4807	0.0	0.0	4808	0.0	0.0
33595	94	8	8			47	662	0.07	47	663	0.07	4808	0.0	0.0	7413	0.0	0.0
33596	234	8	8			134	665	0.20	134	665	0.20	7413	0.0	0.0	4809	0.0	0.0
33597	112	8	8			45	1,203	0.04	45	1,204	0.04	4826	0.0	0.0	4810	0.0	0.0
33598	400	8	8			1	1,397	0.00	1	1,399	0.00	4811	0.0	0.0	4831	0.0	0.0
33599	187	8	8			11	2,113	0.01	11	2,116	0.01	4827	0.0	0.0	4825	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33600	201	8	8			12	1,453	0.01	12	1,456	0.01	4824	0.0	0.0	4812	0.0	0.0
33601	243	8	8			44	1,101	0.04	44	1,102	0.04	4812	0.0	0.0	4826	0.0	0.0
33603	181	8	8			1	1,506	0.00	1	1,508	0.00	4817	0.0	0.0	4819	0.0	0.0
33604	302	8	8			15	1,716	0.01	15	1,718	0.01	4819	0.0	0.0	7320	0.0	0.0
33605	144	8	8			0	553	0.00	0	554	0.00	4822	0.0	0.0	4818	0.0	0.0
33606	227	8	8			1	1,023	0.00	1	1,024	0.00	4818	0.0	0.0	4820	0.0	0.0
33607	119	8	8			1	2,039	0.00	1	2,042	0.00	4820	0.0	0.0	4819	0.0	0.0
33609	108	8	8			1	2,334	0.00	1	2,338	0.00	4814	0.0	0.0	4815	0.0	0.0
33610	87	8	8			1	2,315	0.00	1	2,319	0.00	4815	0.0	0.0	4823	0.0	0.0
33611	67	8	8			0	1,499	0.00	0	1,501	0.00	4823	0.0	0.0	4822	0.0	0.0
33612	438	10	15	28	2036	759	1,009	0.75	1,165	2,975	0.39	4839	0.0	0.0	4840	0.0	0.0
33613	400	10	15	28	2036	759	572	1.33	1,165	1,685	0.69	4838	5.3	0.0	4839	0.0	0.0
33614	119	10	15	28	2036	983	658	1.49	983	1,941	0.51	7568	0.5	0.0	4836	1.2	0.0
33615	185	8	8			983	1,264	0.78	983	1,265	0.78	4831	0.0	0.0	7568	0.5	0.0
33616	262	8	8			969	1,110	0.87	969	1,111	0.87	4830	0.0	0.0	7320	0.0	0.0
33616_1	262	8	8			983	1,040	0.95	983	1,041	0.94	7320	0.0	0.0	4831	0.0	0.0
33617	208	8	8			969	1,101	0.88	969	1,103	0.88	4821	0.0	0.0	4830	0.0	0.0
33618	60	8	8			21	1,342	0.02	21	1,343	0.02	4837	0.0	0.0	4821	0.0	0.0
33619	134	8	8			21	1,557	0.01	21	1,559	0.01	4832	0.0	0.0	4837	0.0	0.0
33620	214	8	8			21	1,049	0.02	21	1,051	0.02	4834	0.0	0.0	4832	0.0	0.0
33621	323	8	8			937	1,031	0.91	938	1,032	0.91	4833	0.0	0.0	4821	0.0	0.0
33622	163	8	8			1	1,848	0.00	1	1,851	0.00	4816	0.0	0.0	4835	0.0	0.0
33623	40	8	8			0	297	0.00	0	298	0.00	4845	0.0	0.0	4841	0.0	0.0
33624	320	8	8			122	1,191	0.10	122	1,192	0.10	4829	0.0	0.0	4828	0.0	0.0
33625	201	8	8			122	340	0.36	122	340	0.36	4842	0.0	0.0	4829	0.0	0.0
33626	257	8	8			1	644	0.00	1	645	0.00	4844	0.0	0.0	4843	0.0	0.0
33628	62	12	12			1	4,781	0.00	1	4,781	0.00	7820	0.0	0.0	4827	0.0	0.0
33629	466	8	8			34	1,650	0.02	34	1,652	0.02	4852	0.0	0.0	4867	0.0	0.0
33630	210	8	8			27	1,611	0.02	27	1,613	0.02	4856	0.0	0.0	4852	0.0	0.0
33631	205	8	8			27	1,388	0.02	27	1,390	0.02	4857	0.0	0.0	4856	0.0	0.0
33632	58	8	8			26	998	0.03	26	999	0.03	7151	0.0	0.0	4857	0.0	0.0
33633	60	8	8			0	1,386	0.00	0	1,388	0.00	4858	0.0	0.0	4857	0.0	0.0
33634	241	8	8			0	1,134	0.00	0	1,135	0.00	4868	0.0	0.0	4852	0.0	0.0
33635	289	8	8			0	1,083	0.00	0	1,085	0.00	4855	0.0	0.0	4868	0.0	0.0
33636	430	8	8			11	339	0.03	11	340	0.03	4863	0.0	0.0	4864	0.0	0.0
33637	253	8	8			11	301	0.04	11	302	0.04	4862	0.0	0.0	4863	0.0	0.0
33638	137	8	8			0	1,394	0.00	0	1,397	0.00	4853	0.0	0.0	4862	0.0	0.0
33639	205	8	8			1	2,501	0.00	1	2,504	0.00	4861	0.0	0.0	4862	0.0	0.0
33640	135	8	8			1	2,008	0.00	1	2,010	0.00	9301	0.0	0.0	4861	0.0	0.0
33641	298	8	8			19	2,037	0.01	19	2,040	0.01	4866	0.0	0.0	4865	0.0	0.0
33642	208	8	8			0	376	0.00	0	376	0.00	4870	0.0	0.0	7075	0.0	0.0
33643	100	8	8			0	1,805	0.00	0	1,808	0.00	4871	0.0	0.0	7321	0.0	0.0
33644	47	8	8			0	542	0.00	0	543	0.00	4872	0.0	0.0	7190	0.0	0.0
33646	500	10	10			913	2,267	0.40	1,317	2,264	0.58	4875	0.0	0.0	4876	0.0	0.0
33647	474	10	10			913	1,876	0.49	1,317	1,874	0.70	4874	0.0	0.0	4875	0.0	0.0
33648	514	12	15	39	ura	1,102	1,281	0.86	1,484	2,322	0.64	7322	0.0	0.0	4877	0.0	0.0
33649	478	10	10			1,102	2,382	0.46	1,484	2,379	0.62	4876	0.0	0.0	7322	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33651	417	8	8			172	391	0.44	172	391	0.44	4891	0.0	0.0	4892	0.0	0.0
33652	115	8	8			172	524	0.33	172	525	0.33	4890	0.0	0.0	4891	0.0	0.0
33653	475	8	8			158	1,180	0.13	158	1,182	0.13	4889	0.0	0.0	4890	0.0	0.0
33654	343	8	8			101	1,114	0.09	101	1,115	0.09	4903	0.0	0.0	7323	0.0	0.0
33655	230	8	8			76	1,154	0.07	76	1,156	0.07	4904	0.0	0.0	4903	0.0	0.0
33657	87	8	8			65	1,720	0.04	65	1,722	0.04	7076	0.0	0.0	4905	0.0	0.0
33659	108	8	8			15	1,451	0.01	15	1,453	0.01	4906	0.0	0.0	7076	0.0	0.0
33660	216	8	8			15	1,951	0.01	15	1,954	0.01	4907	0.0	0.0	4906	0.0	0.0
33661	128	8	8			1	2,182	0.00	1	2,185	0.00	4908	0.0	0.0	4907	0.0	0.0
33662	155	8	8			0	1,974	0.00	0	1,976	0.00	7570	0.0	0.0	4908	0.0	0.0
33663	186	6	6			31	447	0.07	31	447	0.07	4882	0.0	0.0	7076	0.0	0.0
33664	343	8	8			12	1,142	0.01	12	1,144	0.01	4909	0.0	0.0	11202	0.0	0.0
33665	468	8	8			1	512	0.00	1	513	0.00	4886	0.0	0.0	4893	0.0	0.0
33666	429	8	8			35	415	0.09	35	415	0.09	4895	0.0	0.0	4893	0.0	0.0
33667	200	6	6			1	597	0.00	1	597	0.00	4894	0.0	0.0	4895	0.0	0.0
33668	31	8	8			35	528	0.07	35	528	0.07	4896	0.0	0.0	4895	0.0	0.0
33669	225	8	8			0	758	0.00	0	760	0.00	7692	0.0	0.0	4897	0.0	0.0
33670	246	8	8			9	681	0.01	9	681	0.01	4910	0.0	0.0	4897	0.0	0.0
33671	60	8	8			0	415	0.00	0	416	0.00	4880	0.0	0.0	4910	0.0	0.0
33672	85	8	8			8	967	0.01	8	968	0.01	4911	0.0	0.0	4910	0.0	0.0
33674	110	8	8			0	1,278	0.00	0	1,280	0.00	4915	0.0	0.0	4911	0.0	0.0
33675	327	8	8			1	1,347	0.00	1	1,349	0.00	4884	0.0	0.0	4904	0.0	0.0
33676	133	8	8			10	963	0.01	10	964	0.01	4883	0.0	0.0	4902	0.0	0.0
33677	330	8	8			36	1,349	0.03	36	1,350	0.03	4887	0.0	0.0	4888	0.0	0.0
33678	390	8	8			36	1,604	0.02	36	1,606	0.02	4900	0.0	0.0	4887	0.0	0.0
33679	428	8	8			0	1,015	0.00	0	1,016	0.00	4899	0.0	0.0	4900	0.0	0.0
33680	103	8	8			8	357	0.02	8	358	0.02	4940	0.0	0.0	4916	0.0	0.0
33681	299	8	8			8	453	0.02	8	453	0.02	4994	0.0	0.0	7571	0.0	0.0
33682	282	8	8			205	1,533	0.13	205	1,535	0.13	4942	0.0	0.0	7571	0.0	0.0
33683	332	8	8			213	1,194	0.18	213	1,195	0.18	7571	0.0	0.0	4937	0.0	0.0
33684	239	8	8			8	1,746	0.00	8	1,748	0.00	4943	0.0	0.0	4937	0.0	0.0
33685	65	8	8			227	1,960	0.12	227	1,963	0.12	4937	0.0	0.0	4918	0.0	0.0
33686	273	8	8			227	1,042	0.22	227	1,043	0.22	4918	0.0	0.0	4984	0.0	0.0
33688	163	8	8			9	1,178	0.01	9	1,179	0.01	7693	0.0	0.0	4941	0.0	0.0
33689	405	8	8			9	1,512	0.01	9	1,514	0.01	4941	0.0	0.0	4942	0.0	0.0
33690	41	8	8			8	609	0.01	8	610	0.01	4944	0.0	0.0	4943	0.0	0.0
33692	324	8	8			228	653	0.35	228	653	0.35	4984	0.0	0.0	4936	0.0	0.0
33693	489	8	8			228	657	0.35	228	658	0.35	4936	0.0	0.0	4938	0.0	0.0
33694	154	8	8			8	1,302	0.01	8	1,304	0.01	4945	0.0	0.0	4944	0.0	0.0
33695	176	8	8			8	1,324	0.01	8	1,326	0.01	4946	0.0	0.0	4945	0.0	0.0
33696	333	8	8			1	1,204	0.00	1	1,206	0.00	4948	0.0	0.0	4946	0.0	0.0
33697	158	8	8			0	1,170	0.00	0	1,172	0.00	4919	0.0	0.0	4947	0.0	0.0
33698	216	8	8			195	617	0.32	195	617	0.32	4985	0.0	0.0	4942	0.0	0.0
33699	184	8	8			0	1,205	0.00	0	1,207	0.00	4920	0.0	0.0	4945	0.0	0.0
33700	70	8	8			0	563	0.00	0	564	0.00	4987	0.0	0.0	4986	0.0	0.0
33701	523	12	18	3	2036	1,899	1,400	1.36	2,411	4,128	0.58	4933	0.1	0.0	4952	1.4	0.0
33702	372	12	18	3	2036	1,899	1,278	1.49	2,412	3,767	0.64	4952	1.4	0.0	7574	8.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33703	267	12	18	3	2036	1,899	1,463	1.30	2,412	4,313	0.56	7574	8.0	0.0	4950	5.3	0.0
33704	11	8	8			91	432	0.21	2	433	0.00	4949	4.2	0.0	4950	5.3	0.0
33705	127	8	8			34	483	0.07	1	483	0.00	7324	0.0	0.0	4949	4.2	0.0
33706	96	8	8			0	490	0.00	0	490	0.00	4921	0.0	0.0	7324	0.0	0.0
33707	82	12	18	3	2036	1,921	2,209	0.87	2,390	6,513	0.37	4963	0.0	0.0	4933	0.1	0.0
33708	500	8	8			88	463	0.19	24	464	0.05	4959	3.6	0.0	4933	0.1	0.0
33709	124	8	8			88	460	0.19	24	461	0.05	4934	0.0	0.0	4959	3.6	0.0
33710	118	8	8			0	988	0.00	0	989	0.00	4922	0.0	0.0	4953	0.0	0.0
33711	204	8	8			0	710	0.00	0	710	0.00	4923	0.0	0.0	4953	0.0	0.0
33712	273	12	18	3	2036	1,899	1,914	0.99	2,413	5,643	0.43	4950	5.3	0.0	4951	0.0	0.0
33713	155	8	8			277	431	0.64	277	431	0.64	4938	0.0	0.0	4972	0.0	0.0
33714	505	12	12			1,808	2,726	0.66	2,113	2,726	0.78	4972	0.0	0.0	4964	3.1	0.0
33715	245	12	18	3	2036	1,876	2,646	0.71	2,176	7,800	0.28	4964	3.1	0.0	4963	0.0	0.0
33716	57	8	8			110	465	0.24	51	466	0.11	7414	3.9	0.0	4964	3.1	0.0
33717	78	8	8			72	447	0.16	50	448	0.11	4965	3.2	0.0	7414	3.9	0.0
33718	192	8	8			53	467	0.11	50	468	0.11	4966	0.0	0.0	4965	3.2	0.0
33719	258	8	8			41	680	0.06	41	681	0.06	4988	0.0	0.0	4967	0.0	0.0
33720	189	8	8			41	921	0.04	41	922	0.04	7573	0.0	0.0	4988	0.0	0.0
33721	118	12	12			267	2,385	0.11	238	2,385	0.10	4961	2.6	0.0	4963	0.0	0.0
33722	25	10	10			265	2,703	0.10	238	2,700	0.09	4962	3.0	0.0	4961	2.6	0.0
33723	78	8	8			237	1,210	0.20	237	1,212	0.20	4960	0.0	0.0	4962	3.0	0.0
33724	274	8	8			0	724	0.00	0	726	0.00	4954	0.0	0.0	4960	0.0	0.0
33725	497	8	8			225	1,112	0.20	225	1,113	0.20	4956	0.0	0.0	4960	0.0	0.0
33726	58	8	8			224	748	0.30	224	749	0.30	4955	0.0	0.0	4956	0.0	0.0
33727	555	8	8			215	961	0.22	215	963	0.22	4935	0.0	0.0	4955	0.0	0.0
33728	282	8	8			8	1,152	0.01	8	1,153	0.01	4970	0.0	0.0	4967	0.0	0.0
33729	180	8	8			6	814	0.01	6	815	0.01	4969	0.0	0.0	7573	0.0	0.0
33730	84	8	8			10	542	0.02	10	542	0.02	4968	0.0	0.0	7573	0.0	0.0
33731	114	8	8			9	465	0.02	9	466	0.02	4982	0.0	0.0	4968	0.0	0.0
33732	171	8	8			0	1,074	0.00	0	1,076	0.00	4924	0.0	0.0	7077	0.0	0.0
33733	148	8	8			1	1,056	0.00	1	1,057	0.00	4957	0.0	0.0	4958	0.0	0.0
33734	116	8	8			0	941	0.00	0	942	0.00	7191	0.0	0.0	4957	0.0	0.0
33735	177	8	8			0	494	0.00	0	494	0.00	4925	0.0	0.0	4957	0.0	0.0
33736	175	8	8			0	1,177	0.00	0	1,179	0.00	4927	0.0	0.0	4955	0.0	0.0
33737	507	12	12			1,533	3,050	0.50	1,868	3,050	0.61	4973	0.0	0.0	4972	0.0	0.0
33738	177	8	8			1	423	0.00	1	424	0.00	4974	0.0	0.0	4973	0.0	0.0
33739	110	8	8			1	804	0.00	1	805	0.00	4975	0.0	0.0	4974	0.0	0.0
33740	419	8	8			0	760	0.00	0	762	0.00	4977	0.0	0.0	4975	0.0	0.0
33741	412	8	8			8	1,264	0.01	8	1,265	0.01	4980	0.0	0.0	4981	0.0	0.0
33742	118	8	8			8	1,088	0.01	8	1,090	0.01	4978	0.0	0.0	4980	0.0	0.0
33743	70	8	8			8	1,188	0.01	8	1,189	0.01	4979	0.0	0.0	4978	0.0	0.0
33744	180	8	8			0	931	0.00	0	933	0.00	4929	0.0	0.0	4979	0.0	0.0
33745	96	8	8			9	937	0.01	9	938	0.01	4981	0.0	0.0	4982	0.0	0.0
33746	299	8	8			6	981	0.01	6	982	0.01	7325	0.0	0.0	4969	0.0	0.0
33747	193	8	8			0	1,346	0.00	0	1,348	0.00	4930	0.0	0.0	7325	0.0	0.0
33748	284	8	8			8	1,006	0.01	8	1,008	0.01	4976	0.0	0.0	4970	0.0	0.0
33749	190	8	8			0	987	0.00	0	988	0.00	4931	0.0	0.0	4976	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33751	256	8	8			46	1,276	0.04	46	1,277	0.04	7900	0.0	0.0	4996	0.0	0.0
33752	450	8	8			152	1,326	0.11	152	1,328	0.11	4997	0.0	0.0	7326	0.0	0.0
33753	96	8	8			195	494	0.40	195	494	0.39	5007	0.0	0.0	5006	0.0	0.0
33754	91	8	8			194	1,063	0.18	194	1,064	0.18	5004	0.0	0.0	5007	0.0	0.0
33755	17	8	8			185	1,077	0.17	185	1,078	0.17	5003	0.0	0.0	5004	0.0	0.0
33756	164	8	8			185	433	0.43	185	434	0.43	7326	0.0	0.0	5003	0.0	0.0
33761	515	12	12			1,466	2,601	0.56	1,792	2,601	0.69	5000	0.0	0.0	4998	0.0	0.0
33762	217	12	12			1,466	2,192	0.67	1,792	2,192	0.82	7078	0.0	0.0	5000	0.0	0.0
33763	492	12	12			1,465	3,919	0.37	1,792	3,919	0.46	5001	0.0	0.0	7078	0.0	0.0
33765	485	8	8			37	870	0.04	37	871	0.04	5028	0.0	0.0	5077	0.0	0.0
33766	259	8	8			126	432	0.29	126	433	0.29	5078	0.0	0.0	5077	0.0	0.0
33767	57	8	8			126	738	0.17	126	740	0.17	5079	0.0	0.0	5078	0.0	0.0
33768	156	8	8			125	706	0.18	125	707	0.18	5057	0.0	0.0	5079	0.0	0.0
33769	342	8	8			125	694	0.18	125	696	0.18	5058	0.0	0.0	5057	0.0	0.0
33770	154	8	8			1	886	0.00	1	887	0.00	5056	0.0	0.0	5058	0.0	0.0
33771	159	8	8			0	1,752	0.00	0	1,754	0.00	5027	0.0	0.0	5056	0.0	0.0
33772	68	8	8			124	797	0.16	124	798	0.16	5059	0.0	0.0	5058	0.0	0.0
33773	91	8	8			0	729	0.00	0	730	0.00	7695	0.0	0.0	5059	0.0	0.0
33774	32	8	8			123	1,039	0.12	123	1,040	0.12	5080	0.0	0.0	7329	0.0	0.0
33775	12	8	8			123	1,200	0.10	123	1,201	0.10	7152	0.0	0.0	5080	0.0	0.0
33776	296	8	8			49	1,029	0.05	49	1,031	0.05	7415	0.0	0.0	7152	0.0	0.0
33777	127	8	8			73	585	0.12	73	586	0.12	5055	0.0	0.0	7152	0.0	0.0
33778	310	8	8			44	851	0.05	44	852	0.05	7575	0.0	0.0	5055	0.0	0.0
33779	401	8	8			15	1,238	0.01	15	1,239	0.01	5029	0.0	0.0	7575	0.0	0.0
33780	170	6	6			1	563	0.00	1	563	0.00	5013	0.0	0.0	7328	0.0	0.0
33781	74	8	8			28	891	0.03	28	892	0.03	7328	0.0	0.0	5055	0.0	0.0
33782	455	8	8			15	1,358	0.01	15	1,360	0.01	5032	0.0	0.0	7328	0.0	0.0
33784	124	8	8			49	1,532	0.03	49	1,534	0.03	5053	0.0	0.0	7415	0.0	0.0
33785	226	8	8			1	1,340	0.00	1	1,342	0.00	5035	0.0	0.0	5054	0.0	0.0
33786	269	8	8			1	1,495	0.00	1	1,497	0.00	5052	0.0	0.0	5054	0.0	0.0
33787	140	8	8			1	1,799	0.00	1	1,801	0.00	5034	0.0	0.0	5052	0.0	0.0
33788	108	8	8			208	848	0.24	208	849	0.24	5081	0.0	0.0	7081	0.0	0.0
33789	204	8	8			209	675	0.31	209	676	0.31	7081	0.0	0.0	5082	0.0	0.0
33790	148	8	8			1	801	0.00	1	802	0.00	5062	0.0	0.0	7081	0.0	0.0
33791	87	8	8			1	891	0.00	1	892	0.00	5061	0.0	0.0	5062	0.0	0.0
33792	248	8	8			1	944	0.00	1	945	0.00	5060	0.0	0.0	5061	0.0	0.0
33793	360	6	6			1	490	0.00	1	490	0.00	5083	0.0	0.0	5082	0.0	0.0
33794	212	8	8			248	740	0.34	248	741	0.33	5082	0.0	0.0	5063	0.0	0.0
33795	503	8	8			1	1,127	0.00	1	1,128	0.00	5064	0.0	0.0	5063	0.0	0.0
33796	180	6	6			0	265	0.00	0	265	0.00	5016	0.0	0.0	5064	0.0	0.0
33797	307	8	8			1	1,372	0.00	1	1,373	0.00	5084	0.0	0.0	5064	0.0	0.0
33798	88	8	8			1	1,932	0.00	1	1,935	0.00	5065	0.0	0.0	5084	0.0	0.0
33799	313	8	8			1	1,665	0.00	1	1,667	0.00	7577	0.0	0.0	5065	0.0	0.0
33800	300	8	8			0	1,514	0.00	0	1,516	0.00	7578	0.0	0.0	5070	0.0	0.0
33801	501	8	8			273	369	0.74	273	370	0.74	5085	0.0	0.0	5072	0.0	0.0
33802	413	8	8			57	816	0.07	57	817	0.07	5071	0.0	0.0	5072	0.0	0.0
33803	525	8	8			1	663	0.00	1	664	0.00	5070	0.0	0.0	5071	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33804	217	8	8			26	964	0.03	26	965	0.03	5069	0.0	0.0	5071	0.0	0.0
33805	305	8	8			26	1,471	0.02	26	1,473	0.02	7080	0.0	0.0	5069	0.0	0.0
33806	200	8	8			1	1,133	0.00	1	1,135	0.00	5068	0.0	0.0	7080	0.0	0.0
33807	348	8	8			0	373	0.00	0	373	0.00	5067	0.0	0.0	5068	0.0	0.0
33808	215	8	8			0	1,747	0.00	0	1,749	0.00	5066	0.0	0.0	7080	0.0	0.0
33809	218	8	8			330	270	1.22	330	270	1.22	5072	0.0	0.0	5086	0.0	0.0
33810	261	8	8			331	371	0.89	331	372	0.89	5086	0.0	0.0	5087	0.0	0.0
33811	16	8	8			331	749	0.44	331	750	0.44	5074	0.0	0.0	5073	0.0	0.0
33812	310	8	8			70	1,066	0.07	70	1,067	0.07	5088	0.0	0.0	5073	0.0	0.0
33813	270	8	8			1	1,066	0.00	1	1,067	0.00	5089	0.0	0.0	5088	0.0	0.0
33814	211	8	8			0	362	0.00	0	363	0.00	5017	0.0	0.0	5075	0.0	0.0
33815	72	8	8			19	979	0.02	19	981	0.02	5091	0.0	0.0	5090	0.0	0.0
33816	486	8	8			0	1,168	0.00	0	1,169	0.00	5076	0.0	0.0	5091	0.0	0.0
33817	359	8	8			15	981	0.01	15	982	0.01	5092	0.0	0.0	5051	0.0	0.0
33818	350	8	8			14	1,481	0.01	14	1,483	0.01	5093	0.0	0.0	5092	0.0	0.0
33819	117	8	8			0	643	0.00	0	644	0.00	5019	0.0	0.0	5094	0.0	0.0
33820	135	8	8			15	398	0.04	15	399	0.04	5051	0.0	0.0	5050	0.0	0.0
33821	340	8	8			12	1,605	0.01	12	1,607	0.01	5048	0.0	0.0	5049	0.0	0.0
33822	121	8	8			1	2,111	0.00	1	2,114	0.00	7079	0.0	0.0	5048	0.0	0.0
33823	297	8	8			12	1,583	0.01	12	1,585	0.01	5095	0.0	0.0	7576	0.0	0.0
33824	300	8	8			11	1,636	0.01	11	1,639	0.01	5047	0.0	0.0	5095	0.0	0.0
33825	100	8	8			0	1,806	0.00	0	1,808	0.00	5122	0.0	0.0	5047	0.0	0.0
33826	170	8	8			31	496	0.06	31	497	0.06	7327	0.0	0.0	7576	0.0	0.0
33827	305	8	8			10	694	0.01	10	694	0.01	5046	0.0	0.0	7327	0.0	0.0
33828	190	8	8			9	1,539	0.01	9	1,541	0.01	5045	0.0	0.0	5046	0.0	0.0
33829	406	8	8			0	899	0.00	0	899	0.00	5121	0.0	0.0	5096	0.0	0.0
33830	193	8	8			8	1,501	0.01	8	1,503	0.01	5097	0.0	0.0	5045	0.0	0.0
33831	124	8	8			8	993	0.01	8	994	0.01	5098	0.0	0.0	5097	0.0	0.0
33832	113	8	8			8	988	0.01	8	989	0.01	5099	0.0	0.0	5098	0.0	0.0
33833	141	8	8			0	423	0.00	0	424	0.00	5119	0.0	0.0	5046	0.0	0.0
33834	185	8	8			20	963	0.02	20	965	0.02	5101	0.0	0.0	5100	0.0	0.0
33835	250	8	8			1	1,382	0.00	1	1,383	0.00	5102	0.0	0.0	5101	0.0	0.0
33836	190	8	8			1	924	0.00	1	925	0.00	5103	0.0	0.0	5102	0.0	0.0
33837	234	8	8			15	1,561	0.01	15	1,563	0.01	5104	0.0	0.0	5029	0.0	0.0
33838	133	6	6			15	871	0.02	15	871	0.02	5030	0.0	0.0	5104	0.0	0.0
33839	165	6	6			0	788	0.00	0	788	0.00	5020	0.0	0.0	5030	0.0	0.0
33840	115	8	8			1	1,842	0.00	1	1,844	0.00	5031	0.0	0.0	5032	0.0	0.0
33841	143	6	6			1	1,179	0.00	1	1,179	0.00	5021	0.0	0.0	5031	0.0	0.0
33842	182	8	8			1	455	0.00	1	456	0.00	5105	0.0	0.0	5032	0.0	0.0
33844	200	8	8			1	1,817	0.00	1	1,819	0.00	5036	0.0	0.0	5035	0.0	0.0
33845	105	8	8			0	1,698	0.00	0	1,701	0.00	5037	0.0	0.0	5036	0.0	0.0
33846	167	6	6			0	211	0.00	0	211	0.00	5022	0.0	0.0	5033	0.0	0.0
33847	385	6	6			13	490	0.03	13	490	0.03	5040	0.0	0.0	5041	0.0	0.0
33848	76	6	6			1	533	0.00	1	533	0.00	5117	0.0	0.0	5040	0.0	0.0
33849	165	6	6			1	416	0.00	1	416	0.00	5108	0.0	0.0	5040	0.0	0.0
33850	75	6	6			1	225	0.01	1	225	0.01	5109	0.0	0.0	5108	0.0	0.0
33851	165	6	6			1	624	0.00	1	624	0.00	5039	0.0	0.0	5109	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33852	82	6	6			1	292	0.00	1	292	0.00	5038	0.0	0.0	5039	0.0	0.0
33853	239	6	6			1	382	0.00	1	382	0.00	5023	0.0	0.0	5042	0.0	0.0
33854	238	6	6			1	349	0.00	1	349	0.00	5024	0.0	0.0	5043	0.0	0.0
33855	215	8	8			1	1,114	0.00	1	1,115	0.00	5044	0.0	0.0	5043	0.0	0.0
33856	165	6	6			1	504	0.00	1	504	0.00	5025	0.0	0.0	5044	0.0	0.0
33857	308	6	6			1	428	0.00	1	428	0.00	5026	0.0	0.0	5110	0.0	0.0
33858	32	6	6			0	216	0.00	0	216	0.00	5114	0.0	0.0	5030	0.0	0.0
33861	396	8	8			509	863	0.59	509	864	0.59	5181	0.0	0.0	5158	0.0	0.0
33862	352	8	8			508	953	0.53	508	955	0.53	5182	0.0	0.0	5181	0.0	0.0
33863	508	8	12	15	Existing	463	372	1.25	463	1,095	0.42	5145	1.5	0.0	5182	0.0	0.0
33864	403	8	8			62	1,596	0.04	62	1,598	0.04	5146	0.0	0.0	5145	1.5	0.0
33865	409	8	8			61	371	0.16	61	372	0.16	5231	0.0	0.0	5146	0.0	0.0
33866	175	8	8			1	1,500	0.00	1	1,502	0.00	5126	0.0	0.0	5231	0.0	0.0
33867	230	8	8			33	369	0.09	33	370	0.09	5144	0.0	0.0	5231	0.0	0.0
33868	73	8	8			1	963	0.00	1	965	0.00	5148	0.0	0.0	5144	0.0	0.0
33869	165	6	6			1	824	0.00	1	824	0.00	5128	0.0	0.0	5149	0.0	0.0
33870	78	8	8			1	584	0.00	1	585	0.00	5149	0.0	0.0	5148	0.0	0.0
33871	462	8	8			26	888	0.03	26	889	0.03	5160	0.0	0.0	5158	0.0	0.0
33872	370	8	8			26	1,188	0.02	26	1,190	0.02	5159	0.0	0.0	5160	0.0	0.0
33873	178	8	8			36	825	0.04	36	826	0.04	7580	0.0	0.0	7082	0.0	0.0
33874	175	8	8			0	861	0.00	0	863	0.00	5173	0.0	0.0	7580	0.0	0.0
33875	254	8	8			1	2,124	0.00	1	2,126	0.00	5130	0.0	0.0	5183	0.0	0.0
33876	447	8	8			535	1,083	0.49	535	1,084	0.49	5158	0.0	0.0	5153	0.0	0.0
33877	50	8	8			641	695	0.92	641	697	0.92	5152	0.0	0.0	8987	0.0	0.0
33878	311	8	8			90	408	0.22	90	408	0.22	5154	0.0	0.0	5153	0.0	0.0
33879	105	8	8			0	473	0.00	0	474	0.00	5201	0.0	0.0	5154	0.0	0.0
33880	353	8	8			1	1,223	0.00	1	1,224	0.00	7579	0.0	0.0	5154	0.0	0.0
33881	155	8	8			73	967	0.08	73	969	0.08	5202	0.0	0.0	5154	0.0	0.0
33882	119	8	8			1	1,720	0.00	1	1,722	0.00	5137	0.0	0.0	5202	0.0	0.0
33883	65	8	8			72	399	0.18	72	400	0.18	5203	0.0	0.0	5202	0.0	0.0
33884	160	8	8			72	1,159	0.06	72	1,160	0.06	5156	0.0	0.0	5203	0.0	0.0
33885	78	8	8			1	2,477	0.00	1	2,481	0.00	5157	0.0	0.0	5156	0.0	0.0
33886	167	8	8			1	928	0.00	1	930	0.00	5132	0.0	0.0	5157	0.0	0.0
33887	41	6	6			0	824	0.00	0	824	0.00	5131	0.0	0.0	5132	0.0	0.0
33888	36	8	8			71	563	0.13	71	563	0.13	5155	0.0	0.0	5156	0.0	0.0
33889	165	8	8			1	1,440	0.00	1	1,442	0.00	5133	0.0	0.0	5155	0.0	0.0
33890	44	8	8			1	1,415	0.00	1	1,417	0.00	5134	0.0	0.0	8641	0.0	0.0
33891	57	8	8			1	419	0.00	1	419	0.00	5135	0.0	0.0	5134	0.0	0.0
33892	100	6	6			0	686	0.00	0	686	0.00	7696	0.0	0.0	5135	0.0	0.0
33893	262	8	8			1	370	0.00	1	371	0.00	5191	0.0	0.0	7580	0.0	0.0
33894	126	8	8			17	1,034	0.02	17	1,035	0.02	5185	0.0	0.0	5184	0.0	0.0
33895	69	8	8			10	988	0.01	10	990	0.01	5186	0.0	0.0	5185	0.0	0.0
33896	184	8	8			10	1,245	0.01	10	1,247	0.01	5187	0.0	0.0	5186	0.0	0.0
33897	165	8	8			0	743	0.00	0	744	0.00	5188	0.0	0.0	5187	0.0	0.0
33898	120	8	8			1	1,287	0.00	1	1,289	0.00	5189	0.0	0.0	5187	0.0	0.0
33899	236	8	8			0	1,340	0.00	0	1,342	0.00	5190	0.0	0.0	5189	0.0	0.0
33900	297	8	8			7	715	0.01	7	716	0.01	7084	0.0	0.0	5200	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33901	251	8	8			7	1,394	0.00	7	1,397	0.00	5150	0.0	0.0	7084	0.0	0.0
33902	271	8	8			22	593	0.04	22	594	0.04	5199	0.0	0.0	5198	0.0	0.0
33903	270	8	8			22	836	0.03	22	838	0.03	5198	0.0	0.0	5197	0.0	0.0
33904	282	8	8			47	369	0.13	47	369	0.13	5194	0.0	0.0	5197	0.0	0.0
33905	335	8	8			1	1,296	0.00	1	1,298	0.00	5193	0.0	0.0	5194	0.0	0.0
33906	85	8	8			1	724	0.00	1	725	0.00	7416	0.0	0.0	5193	0.0	0.0
33907	145	8	8			1	1,165	0.00	1	1,167	0.00	5192	0.0	0.0	7416	0.0	0.0
33908	145	8	8			1	1,803	0.00	1	1,806	0.00	5136	0.0	0.0	5192	0.0	0.0
33909	368	8	8			17	809	0.02	17	810	0.02	5196	0.0	0.0	5195	0.0	0.0
33910	275	8	8			0	1,661	0.00	0	1,663	0.00	7581	0.0	0.0	5196	0.0	0.0
33911	244	8	8			0	875	0.00	0	876	0.00	5204	0.0	0.0	5196	0.0	0.0
33912	115	8	8			1	1,297	0.00	1	1,299	0.00	5217	0.0	0.0	5219	0.0	0.0
33913	284	8	8			1	1,328	0.00	1	1,331	0.00	7333	0.0	0.0	5217	0.0	0.0
33914	238	8	8			0	1,401	0.00	0	1,402	0.00	5218	0.0	0.0	7333	0.0	0.0
33915	144	8	8			304	422	0.72	304	422	0.72	5180	0.0	0.0	5220	0.0	0.0
33916	297	8	8			263	875	0.30	263	876	0.30	5212	0.0	0.0	5180	0.0	0.0
33917	155	6	6			0	533	0.00	0	533	0.00	5239	0.0	0.0	5213	0.0	0.0
33918	69	8	8			263	1,154	0.23	263	1,156	0.23	5214	0.0	0.0	5213	0.0	0.0
33919	225	8	8			18	1,151	0.02	18	1,153	0.02	7085	0.0	0.0	5214	0.0	0.0
33920	132	8	8			1	1,536	0.00	1	1,538	0.00	5215	0.0	0.0	7085	0.0	0.0
33921	165	8	8			0	1,002	0.00	0	1,003	0.00	5234	0.0	0.0	5215	0.0	0.0
33922	326	8	8			1	1,143	0.00	1	1,144	0.00	7192	0.0	0.0	7085	0.0	0.0
33923	126	8	8			1	1,471	0.00	1	1,473	0.00	5216	0.0	0.0	7192	0.0	0.0
33924	87	8	8			0	891	0.00	0	892	0.00	5244	0.0	0.0	5216	0.0	0.0
33925	140	8	8			244	1,298	0.19	244	1,299	0.19	5211	0.0	0.0	5214	0.0	0.0
33926	160	8	8			24	1,143	0.02	24	1,144	0.02	5178	0.0	0.0	5211	0.0	0.0
33927	196	8	8			1	677	0.00	1	678	0.00	5206	0.0	0.0	7332	0.0	0.0
33928	147	8	8			1	1,005	0.00	1	1,006	0.00	5205	0.0	0.0	5206	0.0	0.0
33929	179	8	8			219	1,145	0.19	219	1,147	0.19	5210	0.0	0.0	5211	0.0	0.0
33930	177	8	8			1	375	0.00	1	375	0.00	5208	0.0	0.0	5209	0.0	0.0
33933	242	8	8			1	1,708	0.00	1	1,710	0.00	5207	0.0	0.0	5208	0.0	0.0
33934	75	8	8			0	678	0.00	0	679	0.00	5237	0.0	0.0	5207	0.0	0.0
33935	213	8	8			41	1,154	0.04	41	1,156	0.04	7582	0.0	0.0	5180	0.0	0.0
33936	265	8	8			40	1,158	0.03	40	1,160	0.03	5179	0.0	0.0	7582	0.0	0.0
33937	103	8	8			17	1,550	0.01	17	1,552	0.01	5184	0.0	0.0	5179	0.0	0.0
33938	300	8	8			46	1,270	0.04	46	1,272	0.04	5176	0.0	0.0	7083	0.0	0.0
33939	375	8	8			46	1,255	0.04	46	1,257	0.04	5177	0.0	0.0	5176	0.0	0.0
33940	257	8	8			2	1,282	0.00	2	1,283	0.00	5169	0.0	0.0	5177	0.0	0.0
33941	400	8	8			2	1,122	0.00	2	1,124	0.00	5171	0.0	0.0	5169	0.0	0.0
33942	226	8	8			1	737	0.00	1	738	0.00	5172	0.0	0.0	5171	0.0	0.0
33943	305	8	8			42	697	0.06	42	698	0.06	5222	0.0	0.0	5166	0.0	0.0
33944	360	8	8			26	1,146	0.02	26	1,147	0.02	5170	0.0	0.0	5222	0.0	0.0
33945	28	8	8			26	1,524	0.02	26	1,526	0.02	5223	0.0	0.0	5170	0.0	0.0
33946	317	8	8			26	1,080	0.02	26	1,081	0.02	5224	0.0	0.0	5223	0.0	0.0
33947	138	8	8			0	1,317	0.00	0	1,319	0.00	5238	0.0	0.0	5223	0.0	0.0
33948	163	8	8			24	765	0.03	24	766	0.03	5165	0.0	0.0	5166	0.0	0.0
33949	235	6	6			0	324	0.00	0	324	0.00	5141	0.0	0.0	5165	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33950	171	8	8			1	1,417	0.00	1	1,419	0.00	5164	0.0	0.0	5165	0.0	0.0
33951	230	6	6			1	1,021	0.00	1	1,021	0.00	5221	0.0	0.0	5164	0.0	0.0
33952	103	6	6			0	503	0.00	0	503	0.00	5242	0.0	0.0	5221	0.0	0.0
33953	198	8	8			132	1,453	0.09	132	1,455	0.09	5225	0.0	0.0	5166	0.0	0.0
33954	218	8	8			132	1,157	0.11	132	1,159	0.11	5168	0.0	0.0	5225	0.0	0.0
33955	120	8	8			1	465	0.00	1	465	0.00	5167	0.0	0.0	5168	0.0	0.0
33956	117	8	8			1	1,756	0.00	1	1,758	0.00	5229	0.0	0.0	5226	0.0	0.0
33958	115	8	8			1	1,656	0.00	1	1,658	0.00	5230	0.0	0.0	5229	0.0	0.0
33959	173	6	6			0	669	0.00	0	669	0.00	5233	0.0	0.0	5230	0.0	0.0
33960	373	8	8			108	933	0.12	108	935	0.12	7331	0.0	0.0	5168	0.0	0.0
33961	63	8	8			108	1,272	0.09	108	1,274	0.09	5143	0.0	0.0	7331	0.0	0.0
33962	123	8	8			108	1,058	0.10	108	1,060	0.10	5227	0.0	0.0	5143	0.0	0.0
33963	196	6	6			1	239	0.00	1	239	0.00	7086	0.0	0.0	5227	0.0	0.0
33964	148	8	8			90	706	0.13	90	708	0.13	5142	0.0	0.0	5227	0.0	0.0
33965	155	8	8			47	389	0.12	47	390	0.12	5228	0.0	0.0	5142	0.0	0.0
33967	216	8	8			1	592	0.00	1	593	0.00	5274	0.0	0.0	5275	0.0	0.0
33968	195	8	8			1	592	0.00	1	592	0.00	5275	0.0	0.0	5276	0.0	0.0
33969	268	8	8			75	713	0.11	75	715	0.10	5276	0.0	0.0	5277	0.0	0.0
33970	226	8	8			76	887	0.09	76	888	0.09	5277	0.0	0.0	5278	0.0	0.0
33971	202	8	8			76	1,094	0.07	76	1,095	0.07	5278	0.0	0.0	5279	1.6	0.0
33972	138	8	8			79	294	0.27	77	294	0.26	5279	1.6	0.0	5280	1.3	0.0
33973	322	8	15	19	Existing	555	467	1.19	754	2,493	0.30	5280	1.3	0.0	5273	0.0	0.0
33974	201	8	15	19	Existing	520	365	1.43	756	1,949	0.39	5273	0.0	0.0	5272	0.0	0.0
33975	254	8	8			1	808	0.00	1	809	0.00	5309	0.0	0.0	5273	0.0	0.0
33976	86	8	12	19	Existing	497	296	1.68	676	872	0.78	5281	0.0	0.0	5280	1.3	0.0
33977	180	8	12	19	Existing	399	488	0.82	511	1,439	0.36	5288	0.0	0.0	5281	0.0	0.0
33978	205	8	8			508	1,015	0.50	510	1,015	0.50	5289	0.0	0.0	5288	0.0	0.0
33979	380	8	12	17	Existing	507	297	1.71	510	874	0.58	5290	2.7	0.0	5289	0.0	0.0
33980	105	8	8			36	669	0.05	19	670	0.03	5291	0.0	0.0	5290	2.7	0.0
33981	148	8	8			19	638	0.03	19	638	0.03	5301	0.0	0.0	5291	0.0	0.0
33982	70	8	8			446	480	0.93	439	480	0.91	7585	1.4	0.0	5290	2.7	0.0
33983	456	8	8			403	797	0.51	403	798	0.50	5260	0.0	0.0	5285	0.0	0.0
33984	150	8	8			28	217	0.13	1	217	0.00	7697	4.5	0.0	5283	4.0	0.0
33985	95	8	8			145	409	0.35	141	410	0.34	5282	4.2	0.0	5283	4.0	0.0
33986	250	8	8			1	470	0.00	1	471	0.00	5286	0.0	0.0	5287	0.0	0.0
33987	127	8	8			114	309	0.37	111	310	0.36	5316	8.0	0.0	5282	4.2	0.0
33988	30	8	8			112	543	0.21	110	544	0.20	5317	0.0	0.0	5316	8.0	0.0
33989	127	8	8			110	660	0.17	110	660	0.17	5318	0.0	0.0	5317	0.0	0.0
33990	20	8	8			2	526	0.00	2	526	0.00	7088	0.0	0.0	5318	0.0	0.0
33991	131	8	8			1	1,027	0.00	1	1,028	0.00	5284	0.0	0.0	7088	0.0	0.0
33992	188	6	6			1	251	0.00	1	251	0.00	5248	0.0	0.0	5284	0.0	0.0
33993	135	8	8			107	572	0.19	107	573	0.19	5319	0.0	0.0	5318	0.0	0.0
33994	502	8	8			42	727	0.06	42	728	0.06	5256	0.0	0.0	5319	0.0	0.0
33995	131	8	8			1	299	0.00	1	299	0.00	5251	0.0	0.0	5308	0.0	0.0
33996	438	8	15	19	Existing	460	390	1.18	794	2,087	0.38	5271	0.0	0.0	5270	0.9	0.0
33997	134	8	8			34	665	0.05	34	666	0.05	7583	0.0	0.0	5270	0.9	0.0
33998	185	8	8			33	698	0.05	33	699	0.05	5269	0.0	0.0	7583	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33999	228	8	15	19	Existing	505	587	0.86	856	3,135	0.27	5270	0.9	0.0	5267	0.0	0.0
34000	214	8	15	19	Existing	453	298	1.52	857	1,593	0.54	5267	0.0	0.0	5266	0.8	0.0
34001	29	8	15	19	Existing	471	326	1.44	892	1,746	0.51	5266	0.8	0.0	5265	1.2	0.0
34002	200	8	8			58	835	0.07	58	835	0.07	5264	0.0	0.0	5265	1.2	0.0
34003	105	8	8			58	431	0.13	58	431	0.13	7417	0.0	0.0	5264	0.0	0.0
34004	210	8	8			1	297	0.00	1	298	0.00	5263	0.0	0.0	7417	0.0	0.0
34005	368	8	8			56	440	0.13	56	440	0.13	5304	0.0	0.0	7417	0.0	0.0
34006	126	8	8			56	546	0.10	56	547	0.10	5303	0.0	0.0	5304	0.0	0.0
34007	340	8	8			1	721	0.00	1	722	0.00	5302	0.0	0.0	5303	0.0	0.0
34008	303	8	15	19	Existing	517	533	0.97	952	2,851	0.33	5265	1.2	0.0	5262	0.0	0.0
34009	400	8	8			158	455	0.35	158	456	0.35	5261	3.5	0.0	5262	0.0	0.0
34010	500	8	8			108	624	0.17	108	624	0.17	5305	0.0	0.0	5261	3.5	0.0
34011	102	8	8			41	608	0.07	41	610	0.07	7087	0.0	0.0	5305	0.0	0.0
34012	465	8	8			2	654	0.00	2	655	0.00	5306	0.0	0.0	7087	0.0	0.0
34013	303	8	8			2	955	0.00	2	956	0.00	5307	0.0	0.0	5306	0.0	0.0
34014	173	8	8			1	1,099	0.00	1	1,101	0.00	5308	0.0	0.0	5307	0.0	0.0
34015	208	8	8			37	690	0.05	37	691	0.05	5299	0.0	0.0	7087	0.0	0.0
34016	170	8	8			1	798	0.00	1	799	0.00	5321	0.0	0.0	5299	0.0	0.0
34017	430	8	8			3	664	0.01	3	665	0.01	5300	0.0	0.0	5299	0.0	0.0
34018	53	8	8			2	769	0.00	2	771	0.00	5327	0.0	0.0	5300	0.0	0.0
34019	270	8	8			1	1,103	0.00	1	1,105	0.00	5322	0.0	0.0	5327	0.0	0.0
34020	143	8	8			1	926	0.00	1	927	0.00	5298	0.0	0.0	5300	0.0	0.0
34021	265	8	8			1	1,065	0.00	1	1,067	0.00	5252	0.0	0.0	5298	0.0	0.0
34022	200	8	8			18	825	0.02	18	826	0.02	5297	0.0	0.0	5301	0.0	0.0
34023	320	8	8			1	1,017	0.00	1	1,018	0.00	5253	0.0	0.0	5297	0.0	0.0
34024	460	8	8			0	1,735	0.00	0	1,738	0.00	7584	0.0	0.0	5296	0.0	0.0
34025	494	8	8			1	925	0.00	1	926	0.00	5296	0.0	0.0	5295	0.0	0.0
34026	279	8	8			1	594	0.00	1	594	0.00	7418	0.0	0.0	5294	0.0	0.0
34027	335	8	8			38	878	0.04	38	880	0.04	5323	0.0	0.0	5294	0.0	0.0
34028	345	8	8			24	1,487	0.02	24	1,489	0.02	5293	0.0	0.0	5323	0.0	0.0
34029	265	8	8			0	1,874	0.00	0	1,876	0.00	5292	0.0	0.0	5293	0.0	0.0
34030	316	8	8			13	508	0.03	13	508	0.03	5313	0.0	0.0	5323	0.0	0.0
34031	160	8	8			0	961	0.00	0	963	0.00	5254	0.0	0.0	5313	0.0	0.0
34032	290	8	8			13	1,855	0.01	13	1,857	0.01	5311	0.0	0.0	5312	0.0	0.0
34033	198	8	8			15	1,144	0.01	15	1,146	0.01	5315	0.0	0.0	5314	0.0	0.0
34034	242	8	8			30	386	0.08	30	386	0.08	5258	0.0	0.0	5259	0.0	0.0
34035	270	8	8			30	685	0.04	30	686	0.04	5257	0.0	0.0	5258	0.0	0.0
34036	181	8	8			3	879	0.00	3	881	0.00	5255	0.0	0.0	7193	0.0	0.0
34037	500	8	8			445	549	0.81	439	550	0.80	5285	0.0	0.0	7585	1.4	0.0
34038	465	8	8			63	449	0.14	63	450	0.14	7589	0.0	0.0	5417	0.0	0.0
34039	25	8	8			0	480	0.00	0	481	0.00	5441	0.0	0.0	7586	0.0	0.0
34040	17	8	8			1	301	0.00	1	302	0.00	5442	0.0	0.0	5385	0.0	0.0
34041	85	8	8			69	417	0.16	69	418	0.16	5376	0.0	0.0	5375	0.0	0.0
34042	136	8	8			69	408	0.17	69	408	0.17	5374	0.0	0.0	5376	0.0	0.0
34043	242	8	8			68	597	0.11	68	598	0.11	5372	0.0	0.0	5374	0.0	0.0
34044	143	8	8			31	592	0.05	31	593	0.05	5371	0.0	0.0	5372	0.0	0.0
34045	250	8	8			13	908	0.01	13	909	0.01	5368	0.0	0.0	5372	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34046	207	8	8			13	808	0.02	13	809	0.02	5379	0.0	0.0	5368	0.0	0.0
34047	55	8	8			1	1,937	0.00	1	1,940	0.00	5425	0.0	0.0	5424	0.0	0.0
34048	105	8	8			0	1,084	0.00	0	1,085	0.00	7698	0.0	0.0	5425	0.0	0.0
34049	165	8	8			1	315	0.00	1	316	0.00	5377	0.0	0.0	5379	0.0	0.0
34050	51	8	8			0	401	0.00	0	402	0.00	11240	0.0	0.0	5377	0.0	0.0
34051	128	8	8			29	401	0.07	29	401	0.07	7337	0.0	0.0	7587	0.0	0.0
34052	103	8	8			1	419	0.00	1	419	0.00	5352	0.0	0.0	7337	0.0	0.0
34053	196	8	8			1	444	0.00	1	444	0.00	5378	0.0	0.0	5379	0.0	0.0
34054	190	8	8			0	1,180	0.00	0	1,181	0.00	5426	0.0	0.0	5378	0.0	0.0
34055	123	8	8			51	409	0.12	0	409	0.00	5405	2.2	0.0	5404	2.2	0.0
34056	133	8	8			0	1,613	0.00	0	1,615	0.00	5329	0.0	0.0	7337	0.0	0.0
34057	166	8	8			0	556	0.00	0	557	0.00	5380	0.0	0.0	5368	0.0	0.0
34058	112	8	8			1	1,032	0.00	1	1,033	0.00	5366	0.0	0.0	5365	0.0	0.0
34059	122	8	8			0	394	0.00	0	394	0.00	7699	0.0	0.0	5366	0.0	0.0
34060	66	8	8			1	1,273	0.00	1	1,274	0.00	5364	0.0	0.0	5349	0.0	0.0
34061	483	8	8			1	1,255	0.00	1	1,257	0.00	5387	0.0	0.0	5364	0.0	0.0
34062	223	8	8			0	526	0.00	0	526	0.00	5386	0.0	0.0	5387	0.0	0.0
34063	80	8	8			19	453	0.04	19	454	0.04	5427	0.0	0.0	5349	0.0	0.0
34064	178	8	8			8	453	0.02	8	454	0.02	7340	0.0	0.0	5427	0.0	0.0
34065	20	8	8			7	497	0.01	7	497	0.01	5429	0.0	0.0	5428	0.0	0.0
34066	104	8	8			7	453	0.02	7	454	0.02	5367	0.0	0.0	5429	0.0	0.0
34067	236	8	8			6	1,278	0.00	6	1,279	0.00	5384	0.0	0.0	5383	0.0	0.0
34068	92	8	8			0	1,281	0.00	0	1,283	0.00	5330	0.0	0.0	5384	0.0	0.0
34069	118	8	8			0	426	0.00	0	426	0.00	5331	0.0	0.0	5383	0.0	0.0
34070	140	8	8			1	1,232	0.00	1	1,234	0.00	5382	0.0	0.0	5429	0.0	0.0
34071	100	8	8			0	1,073	0.00	0	1,074	0.00	5381	0.0	0.0	5382	0.0	0.0
34072	105	8	8			31	415	0.07	31	415	0.07	5369	0.0	0.0	5370	0.0	0.0
34073	251	8	8			29	443	0.07	29	444	0.07	7587	0.0	0.0	5369	0.0	0.0
34074	315	8	8			228	918	0.25	228	919	0.25	5402	0.0	0.0	5394	0.0	0.0
34075	35	8	8			227	754	0.30	227	755	0.30	5403	0.0	0.0	5402	0.0	0.0
34076	201	8	8			167	697	0.24	167	697	0.24	5385	0.0	0.0	5403	0.0	0.0
34077	276	8	8			166	405	0.41	166	406	0.41	11279	0.0	0.0	5385	0.0	0.0
34078	66	8	8			18	402	0.04	18	403	0.04	7586	0.0	0.0	5363	0.0	0.0
34079	136	8	8			18	636	0.03	18	637	0.03	7155	0.0	0.0	7586	0.0	0.0
34080	335	8	8			1	553	0.00	1	554	0.00	5362	0.0	0.0	7155	0.0	0.0
34081	63	8	8			1	676	0.00	1	676	0.00	5388	0.0	0.0	5362	0.0	0.0
34082	71	8	8			0	263	0.00	0	264	0.00	5332	0.0	0.0	5388	0.0	0.0
34083	240	8	8			1	769	0.00	1	771	0.00	7089	0.0	0.0	5388	0.0	0.0
34084	77	8	8			0	763	0.00	0	764	0.00	5333	0.0	0.0	7089	0.0	0.0
34086	185	8	8			3	700	0.00	3	701	0.00	5358	0.0	0.0	5390	0.0	0.0
34087	88	8	8			2	636	0.00	2	637	0.00	5360	0.0	0.0	5359	0.0	0.0
34088	73	8	8			40	326	0.12	40	326	0.12	7338	0.0	0.0	7154	0.0	0.0
34089	124	8	8			40	474	0.08	40	474	0.08	5390	0.0	0.0	7338	0.0	0.0
34090	24	8	8			1	1,289	0.00	1	1,291	0.00	5389	0.0	0.0	5390	0.0	0.0
34091	260	8	8			1	1,130	0.00	1	1,131	0.00	5430	0.0	0.0	5389	0.0	0.0
34092	350	8	8			119	562	0.21	119	563	0.21	5414	0.0	0.0	11279	0.0	0.0
34093	380	8	8			119	349	0.34	119	349	0.34	5415	0.0	0.0	5414	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34094	423	8	8			13	316	0.04	13	316	0.04	5422	0.0	0.0	5415	0.0	0.0
34095	140	8	8			13	356	0.04	13	356	0.04	7590	0.0	0.0	5422	0.0	0.0
34096	200	6	6			1	169	0.00	1	169	0.00	5335	0.0	0.0	7590	0.0	0.0
34097	50	8	8			12	470	0.03	12	471	0.03	5431	0.0	0.0	7590	0.0	0.0
34098	80	6	6			11	366	0.03	11	366	0.03	5432	0.0	0.0	5431	0.0	0.0
34099	198	6	6			1	245	0.00	1	245	0.00	5336	0.0	0.0	5432	0.0	0.0
34100	261	8	8			97	651	0.15	97	651	0.15	5417	0.0	0.0	5415	0.0	0.0
34102	304	8	8			42	603	0.07	42	603	0.07	5354	0.0	0.0	7589	0.0	0.0
34103	150	8	8			3	762	0.00	3	763	0.00	7336	0.0	0.0	5353	0.0	0.0
34104	70	8	8			1	787	0.00	1	788	0.00	5355	0.0	0.0	7336	0.0	0.0
34105	117	6	6			1	267	0.00	1	267	0.00	5337	0.0	0.0	5355	0.0	0.0
34106	220	8	8			33	733	0.04	33	734	0.04	5416	0.0	0.0	5417	0.0	0.0
34107	123	6	6			1	429	0.00	1	429	0.00	5434	0.0	0.0	7589	0.0	0.0
34108	275	8	8			49	665	0.07	49	666	0.07	5397	0.0	0.0	5395	0.0	0.0
34109	94	8	8			48	660	0.07	48	660	0.07	5396	0.0	0.0	5397	0.0	0.0
34110	110	8	8			2	902	0.00	2	903	0.00	7588	0.0	0.0	5396	0.0	0.0
34111	254	8	8			1	860	0.00	1	861	0.00	5338	0.0	0.0	7588	0.0	0.0
34112	201	8	8			1	1,029	0.00	1	1,031	0.00	5391	0.0	0.0	7588	0.0	0.0
34113	188	8	8			1	1,078	0.00	1	1,079	0.00	5339	0.0	0.0	5391	0.0	0.0
34114	115	8	8			1	1,389	0.00	1	1,390	0.00	5340	0.0	0.0	5418	0.0	0.0
34115	77	8	8			10	1,163	0.01	10	1,164	0.01	5392	0.0	0.0	5393	0.0	0.0
34116	160	8	8			1	1,772	0.00	1	1,774	0.00	5341	0.0	0.0	5392	0.0	0.0
34117	187	8	8			60	300	0.20	60	300	0.20	5401	0.0	0.0	5403	0.0	0.0
34118	105	8	8			2	297	0.01	2	298	0.01	5400	0.0	0.0	5401	0.0	0.0
34119	275	8	8			2	297	0.01	2	298	0.01	5399	0.0	0.0	5400	0.0	0.0
34120	130	8	8			1	1,319	0.00	1	1,320	0.00	7090	0.0	0.0	5399	0.0	0.0
34121	258	8	8			1	176	0.00	1	176	0.00	10701	0.0	0.0	7090	0.0	0.0
34122	151	8	8			44	324	0.14	44	325	0.14	5435	0.0	0.0	5396	0.0	0.0
34123	145	8	8			42	297	0.14	42	298	0.14	5398	0.0	0.0	5436	0.0	0.0
34124	230	8	8			3	291	0.01	3	291	0.01	5420	0.0	0.0	5398	0.0	0.0
34125	269	8	8			2	688	0.00	2	688	0.00	5421	0.0	0.0	5420	0.0	0.0
34126	218	8	8			1	326	0.00	1	326	0.00	5343	0.0	0.0	5421	0.0	0.0
34127	88	8	8			1	903	0.00	1	905	0.00	5344	0.0	0.0	5421	0.0	0.0
34128	230	8	8			1	679	0.00	1	680	0.00	5419	0.0	0.0	5435	0.0	0.0
34129	76	8	8			1	417	0.00	1	418	0.00	5345	0.0	0.0	5419	0.0	0.0
34130	140	8	8			14	323	0.04	14	323	0.04	5413	0.0	0.0	7091	0.0	0.0
34131	122	8	8			46	413	0.11	46	413	0.11	7091	0.0	0.0	11279	0.0	0.0
34132	128	8	8			6	306	0.02	6	306	0.02	5412	0.0	0.0	5413	0.0	0.0
34133	7	8	8			1	562	0.00	1	563	0.00	7339	0.0	0.0	7091	0.0	0.0
34134	130	8	8			6	565	0.01	6	566	0.01	5407	0.0	0.0	5406	0.0	0.0
34135	75	8	8			1	562	0.00	1	563	0.00	5346	0.0	0.0	5407	0.0	0.0
34136	125	8	8			6	352	0.02	6	352	0.02	5437	0.0	0.0	5412	0.0	0.0
34137	32	8	8			5	470	0.01	5	471	0.01	5438	0.0	0.0	5437	0.0	0.0
34138	75	8	8			3	902	0.00	3	903	0.00	5409	0.0	0.0	5410	0.0	0.0
34140	170	8	8			1	320	0.00	1	321	0.00	5348	0.0	0.0	5410	0.0	0.0
34145	280	8	8			1	1,022	0.00	1	1,024	0.00	5529	0.0	0.0	5492	0.0	0.0
34146	280	8	8			26	579	0.05	26	580	0.05	5492	0.0	0.0	5493	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34147	298	8	8			185	342	0.54	185	343	0.54	5495	0.0	0.0	5494	0.0	0.0
34148	375	8	8			171	263	0.65	171	263	0.65	5482	0.0	0.0	5495	0.0	0.0
34149	130	8	8			65	647	0.10	65	649	0.10	5496	0.0	0.0	5482	0.0	0.0
34150	285	8	8			39	384	0.10	39	385	0.10	5493	0.0	0.0	5497	0.0	0.0
34151	345	8	8			20	362	0.06	20	362	0.06	5480	0.0	0.0	5481	0.0	0.0
34152	330	8	8			1	365	0.00	1	365	0.00	5483	0.0	0.0	5480	0.0	0.0
34153	200	8	8			1	613	0.00	1	614	0.00	7701	0.0	0.0	5483	0.0	0.0
34154	302	6	6			12	200	0.06	12	200	0.06	5498	0.0	0.0	5496	0.0	0.0
34155	300	6	6			12	201	0.06	12	201	0.06	5499	0.0	0.0	5498	0.0	0.0
34156	301	6	6			13	201	0.06	13	201	0.06	5500	0.0	0.0	5497	0.0	0.0
34157	300	6	6			13	200	0.06	13	200	0.06	7343	0.0	0.0	5500	0.0	0.0
34160	303	8	8			1	394	0.00	1	394	0.00	7093	0.0	0.0	5490	0.0	0.0
34161	306	8	8			1	429	0.00	1	430	0.00	5488	0.0	0.0	5529	0.0	0.0
34162	306	8	8			1	429	0.00	1	430	0.00	5489	0.0	0.0	5488	0.0	0.0
34163	155	8	8			205	1,249	0.16	205	1,250	0.16	5502	0.0	0.0	5503	0.0	0.0
34164	155	6	6			28	238	0.12	28	238	0.12	5445	0.0	0.0	7342	0.0	0.0
34165	268	8	8			1	933	0.00	1	934	0.00	5524	0.0	0.0	7342	0.0	0.0
34166	160	6	6			0	211	0.00	0	211	0.00	5446	0.0	0.0	5524	0.0	0.0
34167	160	6	6			0	431	0.00	0	431	0.00	5447	0.0	0.0	5524	0.0	0.0
34168	253	8	8			0	369	0.00	0	370	0.00	5448	0.0	0.0	5479	0.0	0.0
34169	23	8	8			1	1,219	0.00	1	1,222	0.00	5525	0.0	0.0	5479	0.0	0.0
34170	187	8	8			0	374	0.00	0	375	0.00	5455	0.0	0.0	5525	0.0	0.0
34171	279	8	8			0	294	0.00	0	294	0.00	5486	0.0	0.0	5516	0.0	0.0
34172	225	8	8			0	399	0.00	0	400	0.00	5459	0.0	0.0	5526	0.0	0.0
34173	293	8	8			1	687	0.00	1	688	0.00	5527	0.0	0.0	5519	0.0	0.0
34174	301	8	8			1	1,235	0.00	1	1,238	0.00	5528	0.0	0.0	5527	0.0	0.0
34175	81	8	8			1	379	0.00	1	380	0.00	5534	0.0	0.0	5489	0.0	0.0
34176	280	8	8			28	702	0.04	28	703	0.04	7342	0.0	0.0	5523	0.0	0.0
34177	145	8	8			29	546	0.05	29	547	0.05	5523	0.0	0.0	5477	0.0	0.0
34178	25	8	8			30	372	0.08	30	372	0.08	7092	0.0	0.0	5476	0.0	0.0
34179	46	8	8			31	367	0.08	31	368	0.08	5476	0.0	0.0	5475	0.0	0.0
34180	34	8	8			31	514	0.06	31	515	0.06	5475	0.0	0.0	5474	0.0	0.0
34181	262	8	8			31	359	0.09	31	360	0.08	5474	0.0	0.0	5510	0.0	0.0
34182	98	8	8			71	939	0.08	71	940	0.08	5458	0.0	0.0	7344	0.0	0.0
34183	240	8	8			72	881	0.08	72	883	0.08	7344	0.0	0.0	5522	0.0	0.0
34184	116	8	8			72	1,045	0.07	72	1,047	0.07	5522	0.0	0.0	5521	0.0	0.0
34185	250	8	8			89	415	0.21	89	416	0.21	5521	0.0	0.0	5473	0.0	0.0
34186	116	8	8			89	488	0.18	89	489	0.18	5473	0.0	0.0	5472	0.0	0.0
34187	105	8	8			89	944	0.09	89	945	0.09	5472	0.0	0.0	7156	0.0	0.0
34188	350	8	8			681	1,097	0.62	681	1,099	0.62	5456	0.0	0.0	5471	0.0	0.0
34189	62	10	10			663	716	0.93	663	715	0.93	5470	0.0	0.0	5456	0.0	0.0
34190	477	10	10			662	748	0.88	662	747	0.89	5454	0.0	0.0	5470	0.0	0.0
34191	450	8	8			0	533	0.00	0	533	0.00	5457	0.0	0.0	5469	0.0	0.0
34192	15	6	6			1	820	0.00	1	820	0.00	5520	0.0	0.0	7343	0.0	0.0
34193	282	8	8			345	1,040	0.33	345	1,042	0.33	5519	0.0	0.0	5518	0.0	0.0
34194	427	8	8			206	635	0.32	206	635	0.32	5487	0.0	0.0	5518	0.0	0.0
34195	280	8	8			567	808	0.70	567	810	0.70	5518	0.0	0.0	5504	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34197	280	10	10			567	1,708	0.33	567	1,707	0.33	5504	0.0	0.0	5515	0.0	0.0
34198	305	8	8			15	292	0.05	15	292	0.05	5516	0.0	0.0	5535	0.0	0.0
34199	322	15	15			567	1,238	0.46	567	1,238	0.46	5515	0.0	0.0	5514	0.0	0.0
34200	331	15	15			581	598	0.97	581	598	0.97	5514	0.0	0.0	5453	0.0	0.0
34201	176	8	8			13	371	0.03	13	371	0.03	5513	0.0	0.0	5478	0.0	0.0
34202	202	8	8			26	419	0.06	26	420	0.06	5535	0.0	0.0	5478	0.0	0.0
34203	82	8	8			40	194	0.20	40	195	0.20	5478	0.0	0.0	5453	0.0	0.0
34204	321	8	8			90	966	0.09	90	967	0.09	7156	0.0	0.0	5512	0.0	0.0
34205	96	10	10			514	585	0.88	507	585	0.87	5463	2.5	0.0	8982	2.2	0.0
34206	176	10	10			506	1,205	0.42	506	1,203	0.42	5465	0.0	0.0	5464	0.0	0.0
34207	175	10	10			506	1,490	0.34	506	1,488	0.34	5451	0.0	0.0	5465	0.0	0.0
34208	450	8	8			718	1,189	0.60	718	1,190	0.60	5471	0.0	0.0	5451	0.0	0.0
34209	181	8	8			115	967	0.12	115	968	0.12	5512	0.0	0.0	5511	0.0	0.0
34210	444	10	10			393	603	0.65	393	602	0.65	5511	0.0	0.0	7591	0.0	0.0
34211	151	10	10			394	549	0.72	394	548	0.72	7591	0.0	0.0	5450	0.0	0.0
34212	128	8	8			31	503	0.06	31	504	0.06	5510	0.0	0.0	5509	0.0	0.0
34213	148	8	8			31	603	0.05	31	604	0.05	5509	0.0	0.0	5508	0.0	0.0
34214	301	8	8			32	970	0.03	32	972	0.03	5508	0.0	0.0	5450	0.0	0.0
34215	172	10	10			495	635	0.78	495	634	0.78	5450	0.0	0.0	5506	0.0	0.0
34216	302	8	8			0	293	0.00	0	293	0.00	5507	0.0	0.0	7592	0.0	0.0
34217	302	8	8			14	529	0.03	14	530	0.03	7592	0.0	0.0	5449	0.0	0.0
34218	483	8	8			0	372	0.00	0	372	0.00	7593	0.0	0.0	5467	0.0	0.0
34219	280	8	8			0	588	0.00	0	588	0.00	5505	0.0	0.0	7419	0.0	0.0
34220	303	8	8			17	453	0.04	17	453	0.04	7419	0.0	0.0	5466	0.0	0.0
34221	354	8	8			15	425	0.03	15	425	0.03	5484	0.0	0.0	5460	0.0	0.0
34222	275	15	15			650	1,405	0.46	650	1,405	0.46	5460	0.0	0.0	5466	0.0	0.0
34223	90	15	15			667	1,405	0.48	667	1,405	0.48	5466	0.0	0.0	7341	0.0	0.0
34224	108	18	18			1,187	2,026	0.59	1,188	2,026	0.59	5467	0.0	0.0	5468	0.0	0.0
34225	360	18	18			1,188	1,941	0.61	1,188	1,941	0.61	5468	0.0	0.0	5461	0.0	0.0
34226	291	8	8			0	588	0.00	0	588	0.00	7094	0.0	0.0	5461	0.0	0.0
34227	105	6	6			1	167	0.00	1	167	0.00	5536	0.0	0.0	5481	0.0	0.0
34228	423	8	8			22	397	0.05	22	397	0.05	5481	0.0	0.0	5537	0.0	0.0
34229	24	8	8			22	415	0.05	22	416	0.05	5537	0.0	0.0	5494	0.0	0.0
34237	438	12	12			1	478	0.00	1	478	0.00	5544	0.0	0.0	5576	0.0	0.0
34238	212	8	8			1	415	0.00	1	416	0.00	5563	0.0	0.0	5564	0.0	0.0
34239	241	8	8			1	415	0.00	1	415	0.00	5562	0.0	0.0	5563	0.0	0.0
34240	177	8	8			1	412	0.00	1	413	0.00	5580	0.0	0.0	5562	0.0	0.0
34241	65	8	8			0	443	0.00	0	444	0.00	7702	0.0	0.0	5580	0.0	0.0
34242	385	18	18			1,316	2,178	0.60	1,316	2,178	0.60	7595	0.0	0.0	5581	0.0	0.0
34243	370	18	18			1,315	4,576	0.29	1,316	4,576	0.29	7195	0.0	0.0	7595	0.0	0.0
34244	276	18	18			1,215	4,550	0.27	1,215	4,550	0.27	5579	0.0	0.0	7195	0.0	0.0
34245	179	18	18			1,215	4,597	0.26	1,215	4,597	0.26	5565	0.0	0.0	5579	0.0	0.0
34246	375	18	18			1,214	2,238	0.54	1,215	2,238	0.54	7594	0.0	0.0	5565	0.0	0.0
34247	70	18	18			1,214	2,025	0.60	1,214	2,025	0.60	5552	0.0	0.0	7594	0.0	0.0
34248	450	8	8			1	369	0.00	1	370	0.00	5553	0.0	0.0	7594	0.0	0.0
34249	436	10	15	16	2036	757	564	1.34	757	1,662	0.46	5559	3.1	0.0	5557	0.0	0.0
34250	427	10	15	16	2036	756	563	1.34	756	1,658	0.46	5560	2.8	0.0	5559	3.1	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34251	302	10	15	16	2036	672	578	1.16	672	1,705	0.39	7345	6.6	0.0	5560	2.8	0.0
34252	312	10	15	16	2036	672	582	1.15	672	1,715	0.39	5555	4.2	0.0	7345	6.6	0.0
34253	243	6	6			1	261	0.01	1	261	0.01	5569	0.0	0.0	5568	0.0	0.0
34254	250	8	8			44	599	0.07	44	599	0.07	5582	0.0	0.0	5570	8.2	0.0
34255	229	6	6			0	335	0.00	0	335	0.00	5551	0.0	0.0	5570	8.2	0.0
34256	365	8	8			49	382	0.13	49	382	0.13	5561	4.4	0.0	5560	2.8	0.0
34257	422	8	8			1	371	0.00	0	372	0.00	5554	0.0	0.0	5555	4.2	0.0
34258	205	10	10			670	653	1.03	671	653	1.03	5556	1.7	0.0	5555	4.2	0.0
34259	355	18	18			1,358	2,219	0.61	1,358	2,219	0.61	5583	0.0	0.0	5557	0.0	0.0
34260	400	18	18			1,357	1,945	0.70	1,358	1,945	0.70	5564	0.0	0.0	5583	0.0	0.0
34261	189	6	6			1	230	0.00	1	230	0.00	5546	0.0	0.0	5569	0.0	0.0
34262	711	24	24			4,197	5,829	0.72	6,178	5,829	1.06	5594	0.0	0.0	7596	0.0	0.0
34263	545	24	24			4,197	5,828	0.72	6,178	5,828	1.06	7420	0.0	0.0	5594	0.0	0.0
34264	331	24	24			4,107	5,825	0.71	6,092	5,825	1.05	5584	0.0	0.0	7420	0.0	0.0
34265	292	24	24			4,107	5,853	0.70	6,091	5,853	1.04	5585	0.0	0.0	5584	0.0	0.0
34266	264	24	24			4,106	5,833	0.70	6,091	5,833	1.04	5586	0.0	0.0	5585	0.0	0.0
34267	558	24	24			3,988	5,833	0.68	5,976	5,833	1.02	5577	0.0	0.0	5586	0.0	0.0
34268	258	8	8			485	638	0.76	1	640	0.00	5567	8.5	0.0	5566	7.9	0.0
34269	446	12	12			2	566	0.00	2	566	0.00	5574	0.0	0.0	5572	0.0	0.0
34270	399	12	12			1	567	0.00	1	567	0.00	5576	0.0	0.0	5574	0.0	0.0
34271	75	16	16			670	3,323	0.20	204	3,321	0.06	5573	0.0	0.0	5571	0.0	0.0
34272	605	16	16			24	3,056	0.01	24	3,053	0.01	5575	0.0	0.0	5573	0.0	0.0
34273	358	16	16			785	2,996	0.26	319	2,994	0.11	5571	0.0	0.0	5587	0.0	0.0
34274	405	12	12			3	963	0.00	3	963	0.00	5572	0.0	0.0	5587	0.0	0.0
34275	207	16	16			865	3,188	0.27	399	3,186	0.13	5587	0.0	0.0	5588	0.0	0.0
34276	116	8	8			1	689	0.00	1	690	0.00	5589	0.0	0.0	5588	0.0	0.0
34277	42	18	18			2,144	2,229	0.96	2,144	2,229	0.96	5557	0.0	0.0	5558	0.0	0.0
34278	352	54	54			15,790	105,410	0.15	16,714	105,410	0.16	5549	0.0	0.0	5548	0.0	0.0
34279	1423	54	54			15,790	35,252	0.45	16,715	35,252	0.47	5548	0.0	0.0	5547	0.0	0.0
34281	221	8	8			1	297	0.00	1	297	0.00	5614	0.0	0.0	5633	0.0	0.0
34282	410	8	8			1	322	0.00	1	322	0.00	5632	0.0	0.0	7421	0.0	0.0
34283	242	8	8			62	242	0.26	62	242	0.26	7095	0.0	0.0	5629	0.0	0.0
34284	218	8	8			22	188	0.11	22	189	0.11	5633	0.0	0.0	7095	0.0	0.0
34285	370	8	8			40	281	0.14	40	281	0.14	5634	0.0	0.0	7095	0.0	0.0
34286	260	8	8			39	281	0.14	39	281	0.14	7157	0.0	0.0	5634	0.0	0.0
34287	140	8	8			1	294	0.00	1	295	0.00	5631	0.0	0.0	7157	0.0	0.0
34288	147	8	8			1	470	0.00	1	471	0.00	7703	0.0	0.0	5636	0.0	0.0
34289	220	8	8			63	226	0.28	63	226	0.28	5629	0.0	0.0	7347	0.0	0.0
34290	45	8	8			65	358	0.18	65	358	0.18	7347	0.0	0.0	5637	0.0	0.0
34291	106	8	8			66	250	0.26	66	251	0.26	5637	0.0	0.0	5628	0.0	0.0
34292	430	8	8			1	462	0.00	1	463	0.00	5638	0.0	0.0	5629	0.0	0.0
34293	405	8	8			1	240	0.00	1	240	0.00	5630	0.0	0.0	5639	0.0	0.0
34294	335	8	8			1	272	0.00	1	272	0.00	5641	0.0	0.0	5640	0.0	0.0
34295	305	12	18	19	Existing	1,089	736	1.48	1,739	2,169	0.80	7598	6.2	0.0	5642	4.7	0.0
34296	33	8	8			1	283	0.00	1	284	0.00	5660	0.0	0.0	7346	0.0	0.0
34297	29	8	8			1	302	0.00	1	303	0.00	5659	0.0	0.0	7346	0.0	0.0
34298	250	8	8			67	251	0.27	67	251	0.27	5628	0.0	0.0	5627	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34299	55	8	8			129	253	0.51	129	254	0.51	5627	0.0	0.0	5626	0.0	0.0
34300	80	8	8			1	235	0.00	1	235	0.00	5643	0.0	0.0	5626	0.0	0.0
34301	500	8	8			131	235	0.56	131	235	0.55	5626	0.0	0.0	5625	0.0	0.0
34302	455	18	18			133	2,150	0.06	133	2,150	0.06	5624	0.0	0.0	5616	0.0	0.0
34303	153	18	18			132	2,643	0.05	132	2,643	0.05	5625	0.0	0.0	5624	0.0	0.0
34304	368	18	18			1	2,777	0.00	1	2,777	0.00	5623	0.0	0.0	5606	0.0	0.0
34305	139	8	8			82	345	0.24	82	346	0.24	7421	0.0	0.0	5617	0.0	0.0
34306	195	8	8			84	391	0.21	84	392	0.21	5617	0.0	0.0	5645	0.0	0.0
34307	458	18	18			2,144	2,981	0.72	2,145	2,981	0.72	5646	0.0	0.0	5653	0.0	0.0
34308	455	18	18			2,144	2,557	0.84	2,145	2,557	0.84	5647	0.0	0.0	5646	0.0	0.0
34309	485	10	10			415	376	1.10	415	376	1.10	7597	0.0	0.0	5653	0.0	0.0
34310	445	10	10			313	378	0.83	313	378	0.83	5622	0.0	0.0	7597	0.0	0.0
34311	73	10	10			313	564	0.55	313	563	0.55	5607	0.0	0.0	5622	0.0	0.0
34312	357	10	10			282	333	0.85	282	333	0.85	5618	0.0	0.0	5607	0.0	0.0
34313	388	10	10			282	383	0.74	282	383	0.74	5648	0.0	0.0	5618	0.0	0.0
34314	286	8	8			78	342	0.23	78	343	0.23	5612	0.0	0.0	5613	0.0	0.0
34315	143	8	8			2	529	0.00	2	530	0.00	5609	0.0	0.0	5612	0.0	0.0
34316	162	8	8			1	490	0.00	1	490	0.00	5610	0.0	0.0	5609	0.0	0.0
34317	403	8	8			30	382	0.08	30	383	0.08	5621	0.0	0.0	5607	0.0	0.0
34318	322	8	8			2	373	0.01	2	373	0.01	5619	0.0	0.0	5612	0.0	0.0
34319	123	8	8			1	346	0.00	1	347	0.00	5649	0.0	0.0	5619	0.0	0.0
34320	117	8	8			1	333	0.00	1	333	0.00	5651	0.0	0.0	5650	0.0	0.0
34321	155	6	6			1	207	0.00	1	207	0.00	5601	0.0	0.0	5651	0.0	0.0
34322	464	8	8			1	345	0.00	1	346	0.00	5611	0.0	0.0	5612	0.0	0.0
34323	25	8	8			1	391	0.00	1	392	0.00	5656	0.0	0.0	5611	0.0	0.0
34324	57	8	8			1	329	0.00	1	330	0.00	5652	0.0	0.0	5620	0.0	0.0
34327	100	8	8			1	364	0.00	1	365	0.00	5640	0.0	0.0	5639	0.0	0.0
34328	20	8	8			79	601	0.13	79	601	0.13	5613	0.0	0.0	8942	0.0	0.0
34332	57	18	18			2,508	11,559	0.22	2,508	11,559	0.22	5653	0.0	0.0	5608	0.0	0.0
34333	715	54	54			15,790	48,736	0.32	16,715	48,736	0.34	5604	0.0	0.0	5608	0.0	0.0
34334	718	54	54			18,282	46,583	0.39	19,206	46,583	0.41	5608	0.0	0.0	5603	0.0	0.0
34335	610	54	54			18,283	70,575	0.26	19,206	70,575	0.27	5603	0.0	0.0	5602	0.0	0.0
34338	384	8	8			188	582	0.32	188	583	0.32	5691	0.0	0.0	5690	0.0	0.0
34339	136	12	18	19	Existing	840	713	1.18	1,431	2,102	0.68	5697	3.1	0.0	5709	3.6	0.0
34340	405	10	15	19	Existing	772	1,026	0.75	1,363	3,025	0.45	5696	0.0	0.0	5697	3.1	0.0
34341	405	10	15	19	Existing	772	933	0.83	1,363	2,753	0.49	5695	0.0	0.0	5696	0.0	0.0
34342	420	10	15	19	Existing	587	933	0.63	1,178	2,753	0.43	5694	0.0	0.0	5695	0.0	0.0
34343	400	8	8			1	292	0.00	1	292	0.00	5700	0.0	0.0	5698	3.0	0.0
34344	350	8	8			184	390	0.47	184	390	0.47	5693	0.0	0.0	5695	0.0	0.0
34345	300	8	8			56	307	0.18	56	308	0.18	7350	0.0	0.0	5693	0.0	0.0
34346	100	8	8			55	504	0.11	55	505	0.11	5692	0.0	0.0	7350	0.0	0.0
34347	455	8	8			54	460	0.12	54	460	0.12	5703	0.0	0.0	5692	0.0	0.0
34348	162	8	8			46	528	0.09	46	528	0.09	5688	0.0	0.0	5712	0.0	0.0
34349	135	8	8			1	472	0.00	1	472	0.00	7600	0.0	0.0	5712	0.0	0.0
34350	102	8	8			1	494	0.00	1	495	0.00	5713	0.0	0.0	7600	0.0	0.0
34351	250	8	8			45	699	0.06	45	700	0.06	5687	0.0	0.0	5688	0.0	0.0
34352	393	10	15	19	Existing	586	449	1.31	1,177	1,324	0.89	5686	14.0	0.0	5694	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34353	250	10	15	19	Existing	586	520	1.13	1,176	1,533	0.77	7599	9.5	0.0	5686	14.0	0.0
34354	297	10	15	19	Existing	585	512	1.14	1,176	1,508	0.78	5672	0.0	0.0	7599	9.5	0.0
34355	178	8	15	19	Existing	585	297	1.97	1,176	1,587	0.74	5673	0.0	0.0	5672	0.0	0.0
34356	312	8	8			3	414	0.01	3	415	0.01	5684	0.0	0.0	5703	0.0	0.0
34357	213	8	8			1	410	0.00	1	410	0.00	5685	0.0	0.0	5684	0.0	0.0
34358	435	8	8			1	302	0.00	1	303	0.00	5716	0.0	0.0	5715	0.0	0.0
34359	78	8	8			1	958	0.00	1	960	0.00	5683	0.0	0.0	5715	0.0	0.0
34360	282	8	8			1	1,231	0.00	1	1,233	0.00	5717	0.0	0.0	5683	0.0	0.0
34361	210	8	8			40	1,121	0.04	40	1,122	0.04	5676	0.0	0.0	5677	1.0	0.0
34362	265	8	8			39	941	0.04	39	942	0.04	5682	0.0	0.0	5676	0.0	0.0
34363	186	8	8			1	574	0.00	1	574	0.00	5681	0.0	0.0	5682	0.0	0.0
34364	170	8	8			1	865	0.00	1	866	0.00	7348	0.0	0.0	5678	0.0	0.0
34365	70	8	8			1	1,506	0.00	1	1,508	0.00	5730	0.0	0.0	5679	0.0	0.0
34366	208	8	8			182	342	0.53	182	343	0.53	7158	0.0	0.0	5699	0.0	0.0
34367	92	8	8			181	1,057	0.17	181	1,058	0.17	5718	0.0	0.0	7158	0.0	0.0
34368	357	8	8			111	351	0.32	111	352	0.32	5721	0.0	0.0	5720	0.0	0.0
34369	10	8	8			112	2,649	0.04	112	2,652	0.04	5720	0.0	0.0	5719	0.0	0.0
34370	365	8	8			24	370	0.07	24	371	0.07	5674	0.0	0.0	5675	0.0	0.0
34371	66	8	8			1	369	0.00	1	369	0.00	7349	0.0	0.0	5674	0.0	0.0
34372	135	8	8			0	382	0.00	0	383	0.00	5702	0.0	0.0	7349	0.0	0.0
34373	46	8	8			1	697	0.00	1	698	0.00	5729	0.0	0.0	5723	0.0	0.0
34374	234	8	8			111	419	0.26	111	420	0.26	5705	0.0	0.0	5721	0.0	0.0
34375	141	8	8			25	737	0.03	25	738	0.03	5704	0.0	0.0	5705	0.0	0.0
34376	220	8	8			25	1,172	0.02	25	1,173	0.02	5662	0.0	0.0	5704	0.0	0.0
34377	335	8	8			24	372	0.06	24	372	0.06	5724	0.0	0.0	5674	0.0	0.0
34378	69	8	8			92	806	0.11	92	808	0.11	5725	0.0	0.0	5724	0.0	0.0
34379	425	8	8			69	633	0.11	69	634	0.11	5726	0.0	0.0	5725	0.0	0.0
34380	187	8	8			53	675	0.08	53	676	0.08	5708	0.0	0.0	5726	0.0	0.0
34381	213	8	8			0	1,088	0.00	0	1,090	0.00	5665	0.0	0.0	5708	0.0	0.0
34382	266	8	8			69	643	0.11	69	644	0.11	5724	0.0	0.0	5705	0.0	0.0
34389	100	8	8			37	504	0.07	37	505	0.07	5733	0.0	0.0	5732	0.0	0.0
34390	149	8	8			37	506	0.07	37	507	0.07	5732	0.0	0.0	5731	0.0	0.0
34392	81	8	8			1	356	0.00	1	356	0.00	5752	0.0	0.0	5751	0.0	0.0
34393	468	8	8			297	683	0.43	297	684	0.43	5750	0.0	0.0	5751	0.0	0.0
34394	473	8	8			251	406	0.62	251	407	0.62	5794	0.0	0.0	5750	0.0	0.0
34396	373	8	8			251	606	0.41	251	606	0.41	7351	0.0	0.0	5794	0.0	0.0
34397	400	8	8			181	406	0.45	181	406	0.45	5748	0.0	0.0	7351	0.0	0.0
34398	62	8	8			1	267	0.00	1	267	0.00	5753	0.0	0.0	5754	0.0	0.0
34399	140	8	8			29	344	0.08	29	344	0.08	5795	0.0	0.0	5754	0.0	0.0
34400	200	6	6			12	218	0.05	12	218	0.05	7705	0.0	0.0	5795	0.0	0.0
34401	260	8	8			17	470	0.04	17	471	0.04	5796	0.0	0.0	5795	0.0	0.0
34402	190	6	6			15	309	0.05	15	309	0.05	5736	0.0	0.0	5796	0.0	0.0
34403	133	8	8			31	251	0.12	31	251	0.12	5754	0.0	0.0	5760	0.0	0.0
34404	253	8	8			87	313	0.28	87	313	0.28	5766	0.0	0.0	5760	0.0	0.0
34405	265	8	8			1	397	0.00	1	397	0.00	5759	0.0	0.0	5760	0.0	0.0
34406	180	8	8			26	364	0.07	26	365	0.07	5765	0.0	0.0	5766	0.0	0.0
34407	200	8	8			60	457	0.13	60	458	0.13	5764	0.0	0.0	5766	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34408	277	8	8			22	415	0.05	22	416	0.05	7097	0.0	0.0	5764	0.0	0.0
34409	270	8	8			38	365	0.10	38	366	0.10	5762	0.0	0.0	5763	0.0	0.0
34410	400	8	8			324	297	1.09	324	298	1.09	5770	5.9	5.9	5775	5.0	5.0
34411	410	8	8			323	294	1.10	323	294	1.10	7352	4.7	4.7	5770	5.9	5.9
34412	445	8	8			322	576	0.56	322	576	0.56	5746	0.0	0.0	7352	4.7	4.7
34414	304	8	8			119	303	0.39	119	303	0.39	5760	0.0	0.0	5756	0.0	0.0
34415	334	8	8			119	304	0.39	119	305	0.39	5756	0.0	0.0	5757	0.0	0.0
34416	270	8	8			120	317	0.38	120	317	0.38	5757	0.0	0.0	5797	0.0	0.0
34417	241	8	8			1	446	0.00	1	447	0.00	5798	0.0	0.0	5797	0.0	0.0
34418	255	8	8			1	437	0.00	1	438	0.00	5758	0.0	0.0	5798	0.0	0.0
34419	125	8	8			186	210	0.88	186	210	0.88	7602	0.0	0.0	5755	0.0	0.0
34420	35	8	8			187	210	0.89	187	210	0.89	5755	0.0	0.0	5776	0.0	0.0
34421	360	8	8			324	794	0.41	324	796	0.41	7603	0.0	0.0	5776	0.0	0.0
34422	79	8	8			193	579	0.33	193	580	0.33	5773	0.0	0.0	5776	0.0	0.0
34423	115	8	8			705	874	0.81	705	875	0.81	5776	0.0	0.0	5777	0.0	0.0
34424	223	6	6			1	179	0.00	1	179	0.00	5737	0.0	0.0	5778	0.0	0.0
34425	216	8	8			1	333	0.00	1	333	0.00	7353	0.0	0.0	5745	0.0	0.0
34426	103	8	8			244	297	0.82	244	297	0.82	5791	0.0	0.0	5741	0.0	0.0
34427	136	8	8			1	297	0.00	1	297	0.00	5783	0.0	0.0	5782	0.0	0.0
34428	230	8	8			1	296	0.00	1	296	0.00	5782	0.0	0.0	5792	0.0	0.0
34429	210	8	8			2	781	0.00	2	782	0.00	5799	0.0	0.0	5787	0.0	0.0
34430	79	8	8			1	299	0.00	1	299	0.00	7736	0.0	0.0	5799	0.0	0.0
34431	180	8	8			1	793	0.00	1	794	0.00	5788	0.0	0.0	5799	0.0	0.0
34432	415	8	8			1	297	0.00	1	298	0.00	5781	0.0	0.0	5780	0.0	0.0
34433	140	8	8			47	269	0.17	47	270	0.17	5779	0.0	0.0	7098	0.0	0.0
34434	160	8	8			47	340	0.14	47	341	0.14	7098	0.0	0.0	5800	0.0	0.0
34435	310	8	8			2	705	0.00	2	706	0.00	5771	0.0	0.0	5742	0.0	0.0
34436	194	8	8			50	402	0.12	50	403	0.12	5742	0.0	0.0	5772	0.0	0.0
34437	116	8	8			51	209	0.24	51	210	0.24	5772	0.0	0.0	5743	0.0	0.0
34438	500	8	8			30	648	0.05	30	649	0.05	5774	0.0	0.0	5743	0.0	0.0
34439	253	8	8			192	292	0.66	192	293	0.66	5743	0.0	0.0	5773	0.0	0.0
34440	300	8	8			285	297	0.96	285	298	0.96	5749	0.0	0.0	5746	0.0	0.0
34441	300	8	8			284	333	0.85	284	334	0.85	5744	0.0	0.0	5749	0.0	0.0
34442	125	8	8			283	364	0.78	283	365	0.78	5801	0.0	0.0	5744	0.0	0.0
34443	83	6	6			1	208	0.00	1	208	0.00	5822	0.0	0.0	5769	0.0	0.0
34444	90	8	8			1	297	0.00	1	298	0.00	5821	0.0	0.0	5769	0.0	0.0
34445	500	8	8			1	444	0.00	1	444	0.00	5802	0.0	0.0	5771	0.0	0.0
34446	485	8	8			1	510	0.00	1	510	0.00	5767	0.0	0.0	5802	0.0	0.0
34447	148	8	8			40	299	0.13	40	300	0.13	5786	0.0	0.0	5787	0.0	0.0
34448	235	8	8			1	566	0.00	1	567	0.00	5803	0.0	0.0	5786	0.0	0.0
34449	45	8	8			1	1,865	0.00	1	1,868	0.00	5804	0.0	0.0	5803	0.0	0.0
34450	220	8	8			38	317	0.12	38	317	0.12	5785	0.0	0.0	5786	0.0	0.0
34451	280	8	8			37	569	0.06	37	569	0.06	7196	0.0	0.0	5785	0.0	0.0
34452	140	8	8			1	692	0.00	1	692	0.00	5784	0.0	0.0	7196	0.0	0.0
34453	235	8	8			1	749	0.00	1	750	0.00	5789	0.0	0.0	5790	0.0	0.0
34454	75	8	8			43	297	0.14	43	298	0.14	5805	0.0	0.0	5790	0.0	0.0
34455	444	8	8			4	484	0.01	4	485	0.01	5806	0.0	0.0	5805	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34456	500	8	8			31	126	0.24	28	126	0.22	5856	1.5	0.0	5824	1.5	0.0
34457	500	8	8			66	199	0.33	66	199	0.33	5824	1.5	0.0	5858	0.6	0.0
34458	320	8	8			3	508	0.01	2	509	0.00	5857	0.0	0.0	5825	0.0	0.0
34460	100	8	8			131	374	0.35	131	374	0.35	5878	0.0	0.0	5847	0.0	0.0
34462	239	8	8			408	402	1.02	63	403	0.16	5852	0.0	0.0	5853	0.3	0.0
34463	200	8	8			35	403	0.09	19	403	0.05	5851	1.7	0.0	5879	0.2	0.0
34464	158	8	8			399	415	0.96	42	415	0.10	5850	0.8	0.0	5879	0.2	0.0
34465	202	8	8			397	408	0.97	42	409	0.10	5849	0.6	0.0	5850	0.8	0.0
34466	200	6	6			26	188	0.14	15	188	0.08	5832	2.3	0.0	5849	0.6	0.0
34467	280	8	8			383	402	0.95	26	402	0.07	5848	1.1	0.0	5849	0.6	0.0
34468	223	6	6			40	188	0.21	24	188	0.13	5831	1.8	0.0	5848	1.1	0.0
34469	372	8	8			26	403	0.06	1	403	0.00	5880	5.6	0.0	5852	0.0	0.0
34470	242	8	8			1	1,272	0.00	1	1,274	0.00	5855	0.0	0.0	5854	4.5	0.0
34471	203	8	8			1	454	0.00	1	455	0.00	5829	0.0	0.0	5844	0.0	0.0
34472	504	8	8			169	350	0.48	169	350	0.48	5845	0.0	0.0	5844	0.0	0.0
34473	138	8	8			3	549	0.01	3	549	0.01	5875	0.0	0.0	5846	0.0	0.0
34474	88	8	8			2	622	0.00	2	624	0.00	5874	0.0	0.0	5875	0.0	0.0
34475	260	8	8			1	417	0.00	1	417	0.00	5876	0.0	0.0	5874	0.0	0.0
34476	87	8	8			1	461	0.00	1	462	0.00	5873	0.0	0.0	5874	0.0	0.0
34477	200	6	6			1	231	0.00	1	231	0.00	5830	0.0	0.0	5875	0.0	0.0
34478	32	8	8			1	439	0.00	1	440	0.00	5892	0.0	0.0	5846	0.0	0.0
34479	499	8	8			132	406	0.33	132	406	0.32	5847	0.0	0.0	5846	0.0	0.0
34480	378	8	8			1	405	0.00	1	406	0.00	5877	0.0	0.0	5878	0.0	0.0
34483	84	8	8			104	360	0.29	104	360	0.29	5841	0.0	0.0	5834	0.0	0.0
34486	274	10	10			49	623	0.08	49	622	0.08	5882	0.0	0.0	5841	0.0	0.0
34487	259	8	8			92	299	0.31	89	300	0.30	5884	6.5	0.0	5837	5.4	0.0
34488	51	8	8			92	309	0.30	88	309	0.29	5869	6.7	0.0	5884	6.5	0.0
34490	65	8	8			1	297	0.00	1	298	0.00	5895	0.0	0.0	7422	0.0	0.0
34491	562	24	24			2,041	5,392	0.38	3,049	5,392	0.57	5872	0.0	0.0	7100	0.0	0.0
34494	475	15	21	20	Existing	1,906	1,124	1.70	2,914	2,756	1.06	7355	5.8	0.0	5872	0.0	0.0
34500	268	10	15	18	Existing	506	386	1.31	855	1,138	0.75	5827	8.8	0.0	5866	8.5	0.0
34501	30	8	15	18	Existing	506	210	2.40	854	1,124	0.76	5867	8.6	0.0	5827	8.8	0.0
34503	360	8	8			357	404	0.88	1	405	0.00	5859	1.8	0.0	7604	0.7	0.0
34504	257	8	8			358	408	0.88	1	408	0.00	7604	0.7	0.0	5848	1.1	0.0
34505	203	8	8			90	417	0.21	90	418	0.21	5861	0.0	0.0	5878	0.0	0.0
34506	40	8	8			1	453	0.00	1	454	0.00	5891	0.0	0.0	5861	0.0	0.0
34507	163	8	8			88	385	0.23	88	386	0.23	5862	0.0	0.0	5861	0.0	0.0
34508	62	8	8			1	401	0.00	1	401	0.00	5893	0.0	0.0	5863	0.0	0.0
34509	25	8	8			1	515	0.00	1	516	0.00	5894	0.0	0.0	5863	0.0	0.0
34510	280	54	54			20,452	48,916	0.42	22,373	48,916	0.46	5834	0.0	0.0	5826	0.0	0.0
34512	549	54	54			18,283	84,821	0.22	19,207	84,821	0.23	5836	0.0	0.0	5835	0.0	0.0
34520	37	8	8			6	459	0.01	6	460	0.01	5925	0.0	0.0	7356	0.0	0.0
34521	211	15	15			1,262	3,531	0.36	1,262	3,531	0.36	7356	0.0	0.0	5909	0.0	0.0
34522	218	8	8			6	465	0.01	6	466	0.01	5900	0.0	0.0	5925	0.0	0.0
34523	208	8	8			5	415	0.01	5	415	0.01	5908	0.0	0.0	5900	0.0	0.0
34524	460	15	15			1,263	2,831	0.45	1,263	2,831	0.45	5909	0.0	0.0	5910	0.0	0.0
34525	93	15	15			1,263	10,981	0.12	1,263	10,981	0.12	5910	0.0	0.0	5926	9.5	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34526	355	15	15			1,303	1,667	0.78	1,302	1,667	0.78	7197	7.8	0.0	5927	6.7	0.0
34527	7	8	8			317	685	0.46	316	686	0.46	5928	6.6	0.0	5927	6.7	0.0
34528	148	8	8			317	405	0.78	315	406	0.78	5911	6.7	0.0	5928	6.6	0.0
34529	283	8	8			316	405	0.78	315	406	0.78	5929	3.8	0.0	5911	6.7	0.0
34530	360	8	8			496	481	1.03	159	482	0.33	5930	2.6	0.0	5927	6.7	0.0
34531	173	8	8			468	480	0.98	128	481	0.27	5905	2.1	0.0	5930	2.6	0.0
34532	183	8	8			467	510	0.92	127	511	0.25	5906	5.8	0.0	5905	2.1	0.0
34533	302	8	8			466	410	1.14	126	411	0.31	5931	1.8	0.0	5906	5.8	0.0
34534	91	8	8			1	1,310	0.00	1	1,313	0.00	7706	0.0	0.0	7102	0.0	0.0
34535	460	8	8			1	408	0.00	1	408	0.00	5907	0.0	0.0	5908	0.0	0.0
34550	812	16	21	21	2036	2,175	1,278	1.70	1,849	2,638	0.70	5936	2.0	0.0	7606	2.1	0.0
34551	350	16	21	21	2036	2,104	1,269	1.66	1,778	2,619	0.68	5927	6.7	0.0	5936	2.0	0.0
34558	156	8	8			1	1,315	0.00	1	1,317	0.00	5949	0.0	0.0	5971	0.0	0.0
34559	128	8	8			1	405	0.00	1	405	0.00	5959	0.0	0.0	5960	0.0	0.0
34560	438	8	8			25	573	0.04	25	574	0.04	5960	0.0	0.0	5984	0.0	0.0
34561	74	8	8			2	408	0.01	2	408	0.01	5986	0.0	0.0	7358	0.0	0.0
34562	258	8	8			1	455	0.00	1	456	0.00	7609	0.0	0.0	5986	0.0	0.0
34563	150	8	8			1	468	0.00	1	469	0.00	7707	0.0	0.0	7609	0.0	0.0
34564	199	8	8			1	454	0.00	1	455	0.00	5985	0.0	0.0	7358	0.0	0.0
34565	258	8	8			1	455	0.00	1	456	0.00	5987	0.0	0.0	5985	0.0	0.0
34566	142	8	8			37	450	0.08	37	451	0.08	6002	0.0	0.0	5992	0.0	0.0
34567	37	8	8			36	408	0.09	36	408	0.09	6003	0.0	0.0	6002	0.0	0.0
34568	108	8	8			4	458	0.01	4	458	0.01	7358	0.0	0.0	6003	0.0	0.0
34569	260	8	8			39	493	0.08	39	494	0.08	5992	0.0	0.0	5991	0.0	0.0
34570	90	8	8			1	492	0.00	1	492	0.00	5993	0.0	0.0	5992	0.0	0.0
34571	280	8	8			153	568	0.27	153	569	0.27	5996	0.0	0.0	5998	0.0	0.0
34572	260	8	8			101	711	0.14	101	712	0.14	5995	0.0	0.0	5996	0.0	0.0
34573	197	8	8			23	657	0.03	23	658	0.03	5990	0.0	0.0	5995	0.0	0.0
34574	233	8	8			20	699	0.03	20	700	0.03	5989	0.0	0.0	5990	0.0	0.0
34575	430	8	8			51	574	0.09	51	574	0.09	5994	0.0	0.0	5996	0.0	0.0
34576	192	8	8			2	555	0.00	2	556	0.00	6004	0.0	0.0	5990	0.0	0.0
34577	82	8	8			1	592	0.00	1	593	0.00	5988	0.0	0.0	6004	0.0	0.0
34578	195	8	8			1	578	0.00	1	580	0.00	5951	0.0	0.0	5988	0.0	0.0
34579	363	8	8			396	703	0.56	396	704	0.56	6005	0.0	0.0	5961	0.0	0.0
34580	93	8	8			391	631	0.62	391	631	0.62	7357	0.0	0.0	6005	0.0	0.0
34581	85	8	8			349	695	0.50	349	697	0.50	6006	0.0	0.0	7357	0.0	0.0
34582	528	8	8			28	1,014	0.03	28	1,015	0.03	5965	0.0	0.0	6006	0.0	0.0
34583	436	8	8			28	400	0.07	28	401	0.07	5958	0.0	0.0	5965	0.0	0.0
34584	420	10	10			550	547	1.01	550	547	1.01	5971	0.0	0.0	5969	7.1	7.1
34586	245	8	8			1	397	0.00	1	397	0.00	5952	0.0	0.0	5996	0.0	0.0
34587	242	8	8			1	399	0.00	1	400	0.00	5953	0.0	0.0	5995	0.0	0.0
34588	340	10	10			454	800	0.57	454	799	0.57	5997	0.0	0.0	5984	0.0	0.0
34589	270	10	10			453	875	0.52	453	874	0.52	5998	0.0	0.0	5997	0.0	0.0
34590	330	10	10			299	1,061	0.28	299	1,060	0.28	5999	0.0	0.0	5998	0.0	0.0
34591	217	8	8			42	450	0.09	42	451	0.09	7610	0.0	0.0	7357	0.0	0.0
34592	258	8	8			41	469	0.09	41	469	0.09	5968	0.0	0.0	7610	0.0	0.0
34593	172	8	8			40	741	0.05	40	742	0.05	7608	0.0	0.0	5968	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34594	218	8	8			17	686	0.03	17	688	0.03	5967	0.0	0.0	7608	0.0	0.0
34595	145	6	6			1	247	0.00	1	247	0.00	5954	0.0	0.0	5967	0.0	0.0
34596	288	8	8			22	455	0.05	22	456	0.05	6007	0.0	0.0	7608	0.0	0.0
34597	316	8	8			72	560	0.13	72	560	0.13	5982	0.0	0.0	6001	0.0	0.0
34598	232	8	8			2	641	0.00	2	642	0.00	5981	0.0	0.0	5982	0.0	0.0
34599	258	8	8			1	883	0.00	1	885	0.00	5983	0.0	0.0	5981	0.0	0.0
34600	210	6	6			1	230	0.00	1	230	0.00	5955	0.0	0.0	5983	0.0	0.0
34601	450	15	15			1,162	2,812	0.41	1,162	2,812	0.41	5980	0.0	0.0	6001	0.0	0.0
34602	410	15	15			1,161	1,485	0.78	1,161	1,485	0.78	5956	0.0	0.0	5980	0.0	0.0
34603	315	8	8			72	717	0.10	72	718	0.10	5976	0.0	0.0	5956	0.0	0.0
34605	275	12	12			1,089	1,419	0.77	1,089	1,419	0.77	5979	0.0	0.0	5956	0.0	0.0
34606	241	12	12			1,088	1,367	0.80	1,088	1,367	0.80	5978	0.0	0.0	5979	0.0	0.0
34607	340	10	10			480	1,784	0.27	480	1,782	0.27	5984	0.0	0.0	5978	0.0	0.0
34608	111	10	10			608	748	0.81	608	747	0.81	5977	0.0	0.0	5978	0.0	0.0
34611	298	8	8			44	670	0.07	44	701	0.06	6009	0.0	0.0	6008	0.0	0.0
34612	321	8	8			72	903	0.08	72	904	0.08	5964	0.0	0.0	5962	0.0	0.0
34613	350	8	8			1	406	0.00	1	406	0.00	5963	0.0	0.0	5964	0.0	0.0
34614	331	8	8			3	405	0.01	3	406	0.01	6010	0.0	0.0	6005	0.0	0.0
34615	8	8	8			1	507	0.00	1	508	0.00	6012	0.0	0.0	6010	0.0	0.0
34616	256	8	8			19	697	0.03	19	697	0.03	5950	0.0	0.0	5989	0.0	0.0
34619	208	18	18			3,051	8,726	0.35	3,511	8,726	0.40	6117	0.0	0.0	6042	4.0	0.0
34621	209	8	8			278	392	0.71	278	392	0.71	6048	0.0	0.0	6117	0.0	0.0
34623	155	8	8			0	670	0.00	0	719	0.00	7708	0.0	0.0	7615	0.0	0.0
34624	270	8	8			10	1,190	0.01	10	1,192	0.01	6072	0.0	0.0	6075	0.0	0.0
34625	91	8	8			10	440	0.02	10	441	0.02	6075	0.0	0.0	6076	0.0	0.0
34626	248	8	8			1	1,717	0.00	1	1,719	0.00	6016	0.0	0.0	6076	0.0	0.0
34627	173	8	8			13	1,826	0.01	13	1,829	0.01	6074	0.0	0.0	6076	0.0	0.0
34628	94	8	8			12	1,621	0.01	12	1,623	0.01	6073	0.0	0.0	6074	0.0	0.0
34629	167	8	8			0	1,578	0.00	0	1,580	0.00	6017	0.0	0.0	6073	0.0	0.0
34630	277	8	8			0	1,767	0.00	0	1,770	0.00	6084	0.0	0.0	6083	0.0	0.0
34631	304	8	8			1	1,539	0.00	1	1,541	0.00	6083	0.0	0.0	6082	0.0	0.0
34632	209	8	8			1	887	0.00	1	888	0.00	6082	0.0	0.0	7613	0.0	0.0
34633	279	8	8			106	956	0.11	106	957	0.11	7612	0.0	0.0	6079	0.0	0.0
34634	224	8	8			0	1,422	0.00	0	1,423	0.00	6081	0.0	0.0	7105	0.0	0.0
34635	178	8	8			1	1,410	0.00	1	1,412	0.00	7105	0.0	0.0	6079	0.0	0.0
34636	316	8	8			116	967	0.12	116	969	0.12	6079	0.0	0.0	7198	0.0	0.0
34637	163	8	8			151	912	0.17	151	913	0.17	7198	0.0	0.0	6121	0.0	0.0
34638	35	8	8			152	1,278	0.12	152	1,280	0.12	6121	0.0	0.0	6122	0.0	0.0
34639	283	8	8			35	956	0.04	35	958	0.04	6078	0.0	0.0	7198	0.0	0.0
34640	180	8	8			12	1,151	0.01	12	1,153	0.01	6018	0.0	0.0	6078	0.0	0.0
34641	297	8	8			24	564	0.04	24	565	0.04	6077	0.0	0.0	6078	0.0	0.0
34642	482	8	8			12	1,306	0.01	12	1,308	0.01	6123	0.0	0.0	6073	0.0	0.0
34643	210	8	8			94	456	0.21	94	456	0.21	6124	0.0	0.0	6080	0.0	0.0
34644	46	8	8			152	605	0.25	152	606	0.25	6122	0.0	0.0	6126	0.0	0.0
34645	40	8	8			1	442	0.00	1	442	0.00	6071	0.0	0.0	7424	0.0	0.0
34646	124	8	8			152	1,062	0.14	152	1,063	0.14	6126	0.0	0.0	7424	0.0	0.0
34647	245	8	8			0	944	0.00	0	945	0.00	6020	0.0	0.0	6071	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34648	222	8	8			24	860	0.03	24	862	0.03	6069	0.0	0.0	6068	0.0	0.0
34649	88	8	8			19	1,059	0.02	19	1,060	0.02	6070	0.0	0.0	6069	0.0	0.0
34650	288	8	8			18	410	0.04	18	411	0.04	7359	0.0	0.0	6070	0.0	0.0
34651	122	8	8			0	1,113	0.00	0	1,115	0.00	6021	0.0	0.0	6070	0.0	0.0
34652	178	8	8			14	1,152	0.01	14	1,154	0.01	7104	0.0	0.0	7359	0.0	0.0
34653	277	8	8			14	544	0.03	14	545	0.03	6066	0.0	0.0	7104	0.0	0.0
34654	230	8	8			0	969	0.00	0	970	0.00	6022	0.0	0.0	6058	0.0	0.0
34655	129	8	8			6	411	0.01	6	411	0.01	6065	0.0	0.0	6066	0.0	0.0
34656	264	8	8			8	818	0.01	8	819	0.01	6064	0.0	0.0	6066	0.0	0.0
34657	172	8	8			0	403	0.00	0	403	0.00	6024	0.0	0.0	6064	0.0	0.0
34658	200	8	8			0	1,199	0.00	0	1,201	0.00	6025	0.0	0.0	6064	0.0	0.0
34659	127	8	8			7	1,183	0.01	7	1,184	0.01	6063	0.0	0.0	6127	0.0	0.0
34660	53	18	18			3,063	2,025	1.51	3,513	2,025	1.73	6111	2.1	0.0	6112	2.8	0.0
34661	45	18	18			3,059	3,217	0.95	3,512	3,217	1.09	6110	1.4	5.5	6111	2.1	0.0
34662	270	18	18			3,056	2,956	1.03	3,512	2,956	1.19	6042	4.0	0.0	6110	1.4	5.5
34663	216	6	6			0	483	0.00	0	483	0.00	6027	0.0	0.0	6042	4.0	0.0
34664	215	18	18			2,785	8,774	0.32	3,236	8,774	0.37	7361	0.0	0.0	6117	0.0	0.0
34665	15	18	18			2,680	8,981	0.30	3,130	8,981	0.35	6116	0.0	0.0	10883	0.0	0.0
34666	78	18	18			2,679	2,524	1.06	3,130	2,524	1.24	6114	0.0	0.0	6116	0.0	0.0
34667	395	8	8			97	926	0.10	97	927	0.10	7108	0.0	0.0	6113	0.0	0.0
34668	530	18	18			1,331	3,655	0.36	1,554	3,655	0.43	6129	0.0	0.0	6128	0.0	0.0
34669	120	15	15			2,678	1,877	1.43	3,129	1,877	1.67	6107	8.1	7.7	6129	0.0	0.0
34670	92	8	8			274	401	0.68	274	401	0.68	6049	0.0	0.0	6048	0.0	0.0
34671	150	8	8			274	617	0.44	274	618	0.44	6050	0.0	0.0	6049	0.0	0.0
34672	183	8	8			0	1,272	0.00	0	1,274	0.00	6028	0.0	0.0	6050	0.0	0.0
34673	138	8	8			274	578	0.47	274	578	0.47	6051	0.0	0.0	6050	0.0	0.0
34674	184	8	8			268	599	0.45	268	601	0.45	6052	0.0	0.0	6051	0.0	0.0
34675	280	8	8			268	755	0.36	268	756	0.35	6053	0.0	0.0	6052	0.0	0.0
34676	157	8	8			260	742	0.35	260	742	0.35	6054	0.0	0.0	6053	0.0	0.0
34677	232	8	8			233	842	0.28	233	843	0.28	6067	0.0	0.0	6054	0.0	0.0
34678	50	8	8			26	641	0.04	26	642	0.04	6055	0.0	0.0	6054	0.0	0.0
34679	163	8	8			26	538	0.05	26	539	0.05	6056	0.0	0.0	6055	0.0	0.0
34680	209	8	8			26	443	0.06	26	444	0.06	6057	0.0	0.0	6056	0.0	0.0
34681	90	8	8			18	623	0.03	18	624	0.03	6059	0.0	0.0	6057	0.0	0.0
34682	102	8	8			1	1,043	0.00	1	1,044	0.00	6058	0.0	0.0	6059	0.0	0.0
34683	136	8	8			17	695	0.02	17	697	0.02	6060	0.0	0.0	6059	0.0	0.0
34684	173	8	8			17	910	0.02	17	912	0.02	6061	0.0	0.0	6060	0.0	0.0
34685	309	8	8			1	1,693	0.00	1	1,695	0.00	7200	0.0	0.0	6062	0.0	0.0
34686	175	8	8			1	860	0.00	1	861	0.00	7611	0.0	0.0	6061	0.0	0.0
34687	103	8	8			0	404	0.00	0	405	0.00	6030	0.0	0.0	7611	0.0	0.0
34688	345	8	8			9	617	0.01	9	618	0.01	6120	0.0	0.0	6119	0.0	0.0
34689	280	8	8			8	403	0.02	8	404	0.02	6043	0.0	0.0	6120	0.0	0.0
34690	528	8	8			0	736	0.00	0	737	0.00	6130	0.0	0.0	6043	0.0	0.0
34691	196	6	6			0	417	0.00	0	417	0.00	6105	0.0	0.0	6106	0.0	0.0
34692	46	8	8			25	1,666	0.02	25	1,668	0.01	6106	0.0	0.0	6107	8.1	7.7
34693	394	8	8			1	1,094	0.00	1	1,095	0.00	7107	0.0	0.0	6106	0.0	0.0
34694	372	8	8			0	705	0.00	0	706	0.00	6103	0.0	0.0	6104	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34695	128	15	15			2,654	3,493	0.76	3,104	3,493	0.89	6108	0.0	6.0	6107	8.1	7.7
34696	133	15	15			2,655	3,131	0.85	3,104	3,131	0.99	6131	0.0	0.0	6108	0.0	6.0
34697	50	15	15			2,655	5,083	0.52	3,163	5,083	0.62	6132	0.0	0.0	6131	0.0	0.0
34698	179	8	8			15	808	0.02	15	808	0.02	6101	0.0	0.0	7614	0.0	0.0
34699	350	8	8			15	1,522	0.01	15	1,524	0.01	6102	0.0	0.0	6101	0.0	0.0
34700	82	8	8			15	1,381	0.01	15	1,383	0.01	6031	0.0	0.0	6102	0.0	0.0
34701	230	15	15			2,640	3,195	0.83	3,090	3,195	0.97	6100	0.0	0.0	7614	0.0	0.0
34702	104	15	15			2,640	3,831	0.69	3,090	3,831	0.81	6099	0.0	0.0	6100	0.0	0.0
34703	362	15	15			2,640	3,222	0.82	3,089	3,222	0.96	6098	0.0	0.0	6099	0.0	0.0
34704	155	8	8			0	1,208	0.00	0	1,210	0.00	6032	0.0	0.0	6098	0.0	0.0
34705	200	15	15			2,620	3,260	0.80	3,069	3,260	0.94	6134	0.0	0.0	6133	0.0	0.0
34707	150	8	8			8	415	0.02	15	416	0.04	6095	0.0	0.0	6133	0.0	0.0
34708	270	8	8			0	396	0.00	0	397	0.00	6034	0.0	0.0	6095	0.0	0.0
34709	188	8	8			0	911	0.00	0	913	0.00	6035	0.0	0.0	6094	0.0	0.0
34710	263	8	8			190	661	0.29	190	663	0.29	6093	0.0	0.0	6094	0.0	0.0
34711	133	8	8			200	746	0.27	200	747	0.27	6094	0.0	0.0	7199	0.0	0.0
34712	140	8	8			200	840	0.24	200	840	0.24	7199	0.0	0.0	6067	0.0	0.0
34713	152	8	8			5	372	0.01	49	372	0.13	6109	0.0	5.3	6108	0.0	6.0
34714	400	8	8			19	1,231	0.02	19	1,232	0.02	6097	0.0	0.0	9726	0.0	0.0
34715	392	18	18			2,586	5,493	0.47	3,037	5,493	0.55	6091	0.0	0.0	9726	0.0	0.0
34716	229	8	8			158	402	0.39	158	402	0.39	7424	0.0	0.0	6093	0.0	0.0
34717	87	8	8			1	1,304	0.00	1	1,306	0.00	7360	0.0	0.0	6093	0.0	0.0
34718	205	8	8			0	1,176	0.00	0	1,178	0.00	6036	0.0	0.0	7360	0.0	0.0
34719	223	8	8			26	1,252	0.02	26	1,253	0.02	7106	0.0	0.0	6092	0.0	0.0
34720	65	8	8			1	1,689	0.00	1	1,691	0.00	6040	0.0	0.0	7106	0.0	0.0
34721	105	8	8			0	1,328	0.00	0	1,329	0.00	6037	0.0	0.0	6040	0.0	0.0
34722	224	8	8			1	538	0.00	1	539	0.00	6087	0.0	0.0	6091	0.0	0.0
34723	136	8	8			0	381	0.00	0	381	0.00	6038	0.0	0.0	6087	0.0	0.0
34724	101	8	8			1	331	0.00	1	332	0.00	6086	0.0	0.0	6087	0.0	0.0
34725	76	8	8			0	389	0.00	0	390	0.00	6039	0.0	0.0	6086	0.0	0.0
34726	112	18	18			2,547	6,140	0.41	3,001	6,140	0.49	6045	0.0	0.0	6044	0.0	0.0
34727	76	21	21			2,538	3,734	0.68	2,992	3,734	0.80	6090	0.0	0.0	6045	0.0	0.0
34729	23	12	15	11	ura	1,958	2,229	0.88	2,465	4,042	0.61	6135	0.0	0.0	6088	0.0	0.0
34730	195	8	12	40	ura	510	540	0.95	510	1,590	0.32	6136	0.0	0.0	6088	0.0	0.0
34731	115	8	12	40	ura	495	397	1.25	495	1,169	0.42	6137	8.3	0.0	6136	0.0	0.0
34732	155	8	12	40	ura	495	402	1.23	494	1,185	0.42	6138	7.6	0.0	6137	8.3	0.0
34733	256	8	12	40	ura	476	406	1.17	476	1,199	0.40	6046	3.0	0.0	6047	4.2	0.0
34736	233	8	8			1	1,262	0.00	1	1,263	0.00	6041	0.0	0.0	6110	1.4	5.5
34743	400	8	8			72	406	0.18	72	406	0.18	7616	0.0	0.0	6164	0.0	0.0
34744	400	8	8			23	406	0.06	23	406	0.06	6158	0.0	0.0	7616	0.0	0.0
34745	400	8	8			22	310	0.07	22	311	0.07	7362	0.0	0.0	6158	0.0	0.0
34747	70	8	8			159	413	0.39	159	413	0.38	6167	0.0	0.0	6168	0.0	0.0
34748	332	8	8			120	403	0.30	120	403	0.30	6166	0.0	0.0	6167	0.0	0.0
34749	50	8	8			119	385	0.31	119	385	0.31	6156	0.0	0.0	6166	0.0	0.0
34750	358	8	8			118	403	0.29	118	404	0.29	6164	0.0	0.0	6156	0.0	0.0
34751	360	8	8			38	447	0.09	38	447	0.09	6165	0.0	0.0	6167	0.0	0.0
34752	238	6	6			38	235	0.16	38	235	0.16	6152	0.0	0.0	6165	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34753	147	8	8			1	658	0.00	1	659	0.00	6153	0.0	0.0	6177	0.0	0.0
34754	306	8	8			1	479	0.00	1	480	0.00	6162	0.0	0.0	6163	0.0	0.0
34755	229	8	8			209	510	0.41	209	510	0.41	6171	0.0	0.0	6170	0.0	0.0
34756	173	8	8			208	507	0.41	208	508	0.41	6172	0.0	0.0	6171	0.0	0.0
34757	53	8	8			1	500	0.00	1	501	0.00	6178	0.0	0.0	7617	0.0	0.0
34758	217	6	6			1	170	0.00	1	170	0.00	6155	0.0	0.0	6171	0.0	0.0
34759	261	8	8			1	630	0.00	1	631	0.00	6175	0.0	0.0	6176	4.0	0.0
34761	426	8	8			25	731	0.03	25	783	0.03	6207	0.0	0.0	6209	4.6	0.0
34762	300	8	8			0	743	0.00	0	797	0.00	6206	0.0	0.0	7363	0.0	0.0
34763	510	8	8			0	465	0.00	0	499	0.00	6250	0.0	0.0	7363	0.0	0.0
34764	332	8	8			0	683	0.00	0	733	0.00	7711	0.0	0.0	6250	0.0	0.0
34765	321	8	8			0	697	0.00	0	699	0.00	6210	0.0	0.0	6211	0.0	0.0
34766	253	8	8			1	443	0.00	1	476	0.00	6208	0.0	0.0	6209	4.6	0.0
34767	225	8	8			1	445	0.00	1	478	0.00	8752	0.0	0.0	6208	0.0	0.0
34768	339	8	8			1	972	0.00	1	974	0.00	6211	0.0	0.0	6191	0.0	0.0
34769	485	18	21	41	2036	3,227	3,047	1.06	3,696	4,596	0.80	6205	4.6	0.0	6204	3.5	0.0
34770	14	8	8			1	1,356	0.00	1	1,454	0.00	7363	0.0	0.0	6207	0.0	0.0
34771	295	18	21	41	2036	3,227	3,464	0.93	3,696	5,225	0.71	7201	7.8	0.0	6205	4.6	0.0
34772	175	18	21	41	2036	3,227	3,720	0.87	3,696	5,611	0.66	6252	7.2	0.0	7201	7.8	0.0
34773	240	18	21	41	2036	3,228	3,052	1.06	3,696	4,603	0.80	6212	5.5	0.0	6252	7.2	0.0
34774	80	18	21	41	2036	3,228	3,940	0.82	3,695	5,943	0.62	6213	5.9	0.0	6212	5.5	0.0
34775	465	8	8			13	636	0.02	13	637	0.02	6202	0.0	0.0	6201	0.0	0.0
34776	525	8	8			13	399	0.03	13	399	0.03	6203	0.0	0.0	6202	0.0	0.0
34777	121	6	6			1	188	0.00	1	188	0.00	6180	0.0	0.0	6203	0.0	0.0
34778	90	8	8			1	400	0.00	1	400	0.00	6197	0.0	0.0	6198	0.0	0.0
34779	205	8	8			2	403	0.01	2	403	0.01	6198	0.0	0.0	6192	0.0	0.0
34780	338	8	8			1	687	0.00	1	688	0.00	6200	0.0	0.0	6199	0.0	0.0
34781	58	8	8			1	846	0.00	1	847	0.00	6199	0.0	0.0	6192	0.0	0.0
34782	154	8	8			47	600	0.08	47	601	0.08	6192	0.0	0.0	7620	0.0	0.0
34783	112	8	8			233	406	0.57	233	407	0.57	6241	0.0	0.0	6242	0.0	0.0
34784	202	8	8			232	646	0.36	232	647	0.36	6240	0.0	0.0	6241	0.0	0.0
34785	149	8	8			142	478	0.30	142	479	0.30	6234	0.0	0.0	6240	0.0	0.0
34786	165	8	8			1	412	0.00	1	412	0.00	6181	0.0	0.0	6233	0.0	0.0
34787	202	8	8			140	477	0.29	140	478	0.29	7426	0.0	0.0	6233	0.0	0.0
34788	122	8	8			108	446	0.24	108	447	0.24	7619	0.0	0.0	7426	0.0	0.0
34789	178	8	8			24	797	0.03	24	798	0.03	6231	0.0	0.0	7619	0.0	0.0
34790	335	8	8			23	858	0.03	23	859	0.03	6230	0.0	0.0	6231	0.0	0.0
34791	130	8	8			83	470	0.18	83	471	0.18	6232	0.0	0.0	7619	0.0	0.0
34792	456	8	8			90	817	0.11	90	817	0.11	7364	0.0	0.0	6240	0.0	0.0
34793	500	8	8			89	926	0.10	89	928	0.10	6239	0.0	0.0	7364	0.0	0.0
34794	353	8	8			88	431	0.20	88	432	0.20	6237	0.0	0.0	6239	0.0	0.0
34795	215	8	8			42	885	0.05	42	886	0.05	7109	0.0	0.0	6242	0.0	0.0
34796	248	8	8			1	1,018	0.00	1	1,019	0.00	6245	0.0	0.0	6244	0.0	0.0
34797	155	8	8			1	349	0.00	1	350	0.00	6183	0.0	0.0	6247	0.0	0.0
34798	112	8	8			1	799	0.00	1	800	0.00	6238	0.0	0.0	6247	0.0	0.0
34799	268	8	8			1	438	0.00	1	438	0.00	6184	0.0	0.0	7109	0.0	0.0
34800	264	8	8			1	683	0.00	1	684	0.00	6185	0.0	0.0	6244	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34801	330	8	8			1	455	0.00	1	456	0.00	6249	0.0	0.0	7202	0.0	0.0
34802	323	8	8			3	493	0.01	3	494	0.01	6247	0.0	0.0	6248	0.0	0.0
34803	155	8	8			75	663	0.11	75	665	0.11	6236	0.0	0.0	6237	0.0	0.0
34804	151	8	8			74	417	0.18	74	418	0.18	6235	0.0	0.0	6236	0.0	0.0
34805	143	8	8			44	536	0.08	44	537	0.08	6219	0.0	0.0	6235	0.0	0.0
34806	249	8	8			1	354	0.00	1	355	0.00	6186	0.0	0.0	6235	0.0	0.0
34807	267	8	8			29	679	0.04	29	681	0.04	6222	0.0	0.0	6223	0.0	0.0
34808	98	8	8			32	394	0.08	32	394	0.08	6224	0.0	0.0	6225	0.0	0.0
34809	135	8	8			54	406	0.13	54	406	0.13	6225	0.0	0.0	6227	0.0	0.0
34810	135	8	8			1	676	0.00	1	676	0.00	6187	0.0	0.0	6227	0.0	0.0
34811	212	8	8			1	681	0.00	1	681	0.00	6188	0.0	0.0	6253	0.0	0.0
34812	161	8	8			43	357	0.12	43	358	0.12	6220	0.0	0.0	6219	0.0	0.0
34813	221	8	8			81	488	0.17	81	488	0.17	6228	0.0	0.0	6254	0.0	0.0
34814	134	8	8			82	460	0.18	82	460	0.18	6254	0.0	0.0	6255	0.0	0.0
34815	73	8	8			83	456	0.18	83	457	0.18	6255	0.0	0.0	6232	0.0	0.0
34816	46	8	8			56	423	0.13	56	423	0.13	6227	0.0	0.0	6226	0.0	0.0
34817	93	8	8			56	479	0.12	56	480	0.12	6226	0.0	0.0	6256	0.0	0.0
34818	130	8	8			57	542	0.10	57	543	0.10	6256	0.0	0.0	6228	0.0	0.0
34819	345	18	21	41	2036	3,165	3,030	1.04	3,628	4,570	0.79	6214	6.2	0.0	6213	5.9	0.0
34820	150	18	21	41	2036	3,167	4,434	0.71	3,628	6,689	0.54	6259	0.4	0.0	6214	6.2	0.0
34821	170	18	21	41	2036	3,164	3,082	1.03	3,628	4,649	0.78	6194	0.0	0.0	6259	0.4	0.0
34822	130	18	24	41	2036	3,136	3,848	0.82	3,600	8,287	0.43	6193	0.0	0.0	6195	2.4	0.0
34823	149	18	24	41	2036	3,150	2,993	1.05	3,615	6,447	0.56	6257	3.8	0.0	6194	0.0	0.0
34824	118	18	24	41	2036	3,140	3,162	0.99	3,601	6,810	0.53	6217	2.4	0.0	6257	3.8	0.0
34825	317	18	24	41	2036	3,137	2,969	1.06	3,600	6,394	0.56	7110	2.2	0.0	6217	2.4	0.0
34826	197	8	8			0	1,371	0.00	0	1,373	0.00	6258	0.0	0.0	6216	0.0	0.0
34827	109	8	8			1	1,567	0.00	1	1,569	0.00	6216	0.0	0.0	6191	0.0	0.0
34828	94	18	18			13	8,329	0.00	13	8,329	0.00	6191	0.0	0.0	6194	0.0	0.0
34829	307	8	8			17	313	0.06	17	313	0.06	6221	0.0	0.0	6220	0.0	0.0
34830	200	8	8			1	688	0.00	1	688	0.00	6190	0.0	0.0	6222	0.0	0.0
34831	302	8	8			30	331	0.09	30	356	0.08	6309	0.0	0.0	6306	0.0	0.0
34832	112	6	6			0	276	0.00	0	297	0.00	7712	0.0	0.0	6310	0.0	0.0
34833	304	8	8			8	374	0.02	8	401	0.02	6308	0.0	0.0	6307	0.0	0.0
34834	359	8	8			17	426	0.04	17	457	0.04	6316	0.0	0.0	7365	0.0	0.0
34835	365	8	8			17	387	0.04	17	415	0.04	6317	0.0	0.0	6316	0.0	0.0
34836	133	6	6			0	181	0.00	0	194	0.00	6260	0.0	0.0	6317	0.0	0.0
34837	318	8	8			0	353	0.00	0	378	0.00	6314	0.0	0.0	6315	0.0	0.0
34838	390	8	8			0	297	0.00	0	319	0.00	6318	0.0	0.0	6284	0.0	0.0
34839	302	8	8			11	364	0.03	11	390	0.03	7427	0.0	0.0	6326	0.0	0.0
34840	103	6	6			0	169	0.00	0	181	0.00	6261	0.0	0.0	7427	0.0	0.0
34841	310	8	8			15	1,775	0.01	15	1,778	0.01	6323	0.0	0.0	6324	0.0	0.0
34842	170	8	8			15	1,310	0.01	15	1,313	0.01	6322	0.0	0.0	6323	0.0	0.0
34843	130	8	8			14	1,038	0.01	14	1,040	0.01	6321	0.0	0.0	6322	0.0	0.0
34844	459	8	8			15	1,106	0.01	15	1,108	0.01	6319	0.0	0.0	6320	0.0	0.0
34845	360	8	8			37	1,110	0.03	37	1,112	0.03	7113	0.0	0.0	6355	0.0	0.0
34846	365	8	8			37	1,110	0.03	37	1,111	0.03	6356	0.0	0.0	7113	0.0	0.0
34847	96	8	8			30	1,384	0.02	30	1,385	0.02	6357	0.0	0.0	6356	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34848	214	8	8			23	1,461	0.02	23	1,463	0.02	6358	0.0	0.0	6357	0.0	0.0
34849	269	8	8			16	332	0.05	16	356	0.04	6311	0.0	0.0	6310	0.0	0.0
34850	115	6	6			0	215	0.00	0	231	0.00	6263	0.0	0.0	6311	0.0	0.0
34851	288	8	8			51	296	0.17	51	317	0.16	6307	0.0	0.0	6306	0.0	0.0
34852	287	8	8			25	806	0.03	25	865	0.03	6315	0.0	0.0	7365	0.0	0.0
34853	281	8	8			11	983	0.01	11	1,054	0.01	6326	0.0	0.0	6315	0.0	0.0
34854	152	8	8			0	970	0.00	0	1,041	0.00	6265	0.0	0.0	6326	0.0	0.0
34855	182	6	6			0	501	0.00	0	501	0.00	7713	0.0	0.0	6325	0.0	0.0
34856	275	8	8			35	1,452	0.02	35	1,453	0.02	6320	0.0	0.0	6355	0.0	0.0
34857	307	8	8			19	408	0.05	19	408	0.05	6324	0.0	0.0	6320	0.0	0.0
34858	215	8	8			1	403	0.00	1	403	0.00	6325	0.0	0.0	6324	0.0	0.0
34859	457	8	8			10	1,008	0.01	10	1,082	0.01	7111	0.0	0.0	6327	0.0	0.0
34860	452	8	8			28	297	0.09	28	319	0.09	6312	0.0	0.0	6313	0.0	0.0
34861	410	8	8			28	297	0.09	28	319	0.09	6284	0.0	0.0	6312	0.0	0.0
34862	315	8	8			17	955	0.02	17	1,024	0.02	6283	0.0	0.0	7729	0.0	0.0
34863	276	8	8			1	731	0.00	0	785	0.00	6329	0.0	0.0	6283	0.0	0.0
34864	150	8	8			0	617	0.00	0	661	0.00	6328	0.0	0.0	6283	0.0	0.0
34865	295	8	8			6	1,307	0.00	6	1,308	0.00	6363	0.0	0.0	6356	0.0	0.0
34866	515	8	8			11	573	0.02	11	574	0.02	6330	0.0	0.0	6358	0.0	0.0
34867	112	8	8			217	288	0.75	217	309	0.70	6304	0.0	0.0	6305	0.0	0.0
34868	230	8	8			200	297	0.67	200	319	0.63	6285	0.0	0.0	6304	0.0	0.0
34869	79	8	8			72	290	0.25	72	311	0.23	6299	0.0	0.0	6300	0.0	0.0
34870	243	8	8			65	305	0.21	65	326	0.20	6353	0.0	0.0	6299	0.0	0.0
34871	207	8	8			65	380	0.17	65	407	0.16	6286	0.0	0.0	6354	0.0	0.0
34872	118	8	8			0	433	0.00	0	465	0.00	6297	0.0	0.0	6286	0.0	0.0
34873	76	6	6			0	251	0.00	0	268	0.00	6268	0.0	0.0	6297	0.0	0.0
34874	110	8	8			0	317	0.00	0	340	0.00	6303	0.0	0.0	6304	0.0	0.0
34875	128	8	8			1	424	0.00	1	455	0.00	6302	0.0	0.0	6285	0.0	0.0
34876	46	8	8			0	277	0.00	0	297	0.00	6301	0.0	0.0	6302	0.0	0.0
34877	181	6	6			0	169	0.00	0	181	0.00	6270	0.0	0.0	6299	0.0	0.0
34878	157	8	8			0	298	0.00	0	319	0.00	6298	0.0	0.0	6286	0.0	0.0
34879	133	6	6			0	157	0.00	0	169	0.00	6271	0.0	0.0	6298	0.0	0.0
34880	143	6	6			0	170	0.00	0	183	0.00	6272	0.0	0.0	6353	0.0	0.0
34881	406	8	8			117	299	0.39	117	321	0.37	6294	0.0	0.0	6285	0.0	0.0
34882	253	8	8			25	790	0.03	25	847	0.03	6347	0.0	0.0	6294	0.0	0.0
34883	240	8	8			25	743	0.03	25	797	0.03	7622	0.0	0.0	6347	0.0	0.0
34884	274	8	8			24	479	0.05	24	515	0.05	6287	0.0	0.0	6346	0.0	0.0
34885	60	8	8			0	450	0.00	0	483	0.00	6273	0.0	0.0	6346	0.0	0.0
34886	124	8	8			0	418	0.00	0	449	0.00	6274	0.0	0.0	6287	0.0	0.0
34887	186	8	8			10	648	0.02	10	695	0.01	6333	0.0	0.0	6288	0.0	0.0
34888	172	8	8			10	661	0.01	10	709	0.01	6289	0.0	0.0	6333	0.0	0.0
34889	165	8	8			9	1,092	0.01	9	1,172	0.01	6290	0.0	0.0	6289	0.0	0.0
34890	105	8	8			0	1,047	0.00	0	1,123	0.00	6334	0.0	0.0	6290	0.0	0.0
34891	165	8	8			11	1,321	0.01	11	1,323	0.01	6359	0.0	0.0	6358	0.0	0.0
34892	255	8	8			11	1,164	0.01	11	1,165	0.01	6360	0.0	0.0	6359	0.0	0.0
34893	198	8	8			1	1,669	0.00	1	1,672	0.00	6362	0.0	0.0	6361	0.0	0.0
34894	170	8	8			0	411	0.00	0	412	0.00	6365	0.0	0.0	6359	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34895	108	8	8			0	378	0.00	0	406	0.00	6335	0.0	0.0	6289	0.0	0.0
34896	172	8	8			0	594	0.00	0	638	0.00	6336	0.0	0.0	6335	0.0	0.0
34897	157	8	8			0	972	0.00	0	1,042	0.00	6366	0.0	0.0	6290	0.0	0.0
34898	163	8	8			0	885	0.00	0	950	0.00	6275	0.0	0.0	6366	0.0	0.0
34899	153	8	8			1	744	0.00	1	798	0.00	6344	0.0	0.0	6349	0.0	0.0
34900	172	8	8			0	849	0.00	0	911	0.00	6345	0.0	0.0	6344	0.0	0.0
34901	320	8	8			24	644	0.04	24	690	0.04	6342	0.0	0.0	6348	0.0	0.0
34902	84	6	6			0	413	0.00	0	442	0.00	6276	0.0	0.0	6342	0.0	0.0
34903	287	8	8			51	690	0.07	51	740	0.07	6343	0.0	0.0	6349	0.0	0.0
34904	303	8	8			51	610	0.08	51	654	0.08	6296	0.0	0.0	6343	0.0	0.0
34905	132	8	8			18	1,208	0.01	18	1,296	0.01	6341	0.0	0.0	6296	0.0	0.0
34906	403	8	8			17	1,019	0.02	17	1,093	0.02	6291	0.0	0.0	6340	0.0	0.0
34907	90	8	8			17	1,153	0.02	17	1,236	0.01	6367	0.0	0.0	6291	0.0	0.0
34908	224	6	6			0	342	0.00	0	367	0.00	6278	0.0	0.0	6291	0.0	0.0
34909	166	8	8			0	877	0.00	0	941	0.00	6331	0.0	0.0	6288	0.0	0.0
34910	164	8	8			0	335	0.00	0	359	0.00	6332	0.0	0.0	6288	0.0	0.0
34911	180	8	8			1	917	0.00	1	983	0.00	6368	0.0	0.0	6344	0.0	0.0
34912	230	8	8			1	815	0.00	1	874	0.00	6369	0.0	0.0	6368	0.0	0.0
34913	300	8	8			17	756	0.02	17	810	0.02	6292	0.0	0.0	6296	0.0	0.0
34914	198	8	8			8	1,067	0.01	8	1,144	0.01	6337	0.0	0.0	6338	0.0	0.0
34915	145	8	8			8	1,192	0.01	8	1,278	0.01	7366	0.0	0.0	6292	0.0	0.0
34916	148	8	8			8	976	0.01	8	1,047	0.01	6339	0.0	0.0	7366	0.0	0.0
34917	227	8	8			49	296	0.17	49	317	0.16	6293	0.0	0.0	6286	0.0	0.0
34918	253	8	8			38	297	0.13	38	319	0.12	6295	0.0	0.0	6293	0.0	0.0
34919	175	8	8			38	299	0.13	38	322	0.12	6348	0.0	0.0	6295	0.0	0.0
34920	78	6	6			0	176	0.00	0	189	0.00	6279	0.0	0.0	6348	0.0	0.0
34921	93	6	6			0	320	0.00	0	343	0.00	6280	0.0	0.0	6295	0.0	0.0
34922	155	8	8			17	364	0.05	17	391	0.04	7112	0.0	0.0	6296	0.0	0.0
34923	144	8	8			78	476	0.16	78	511	0.15	6352	0.0	0.0	6294	0.0	0.0
34924	248	8	8			78	369	0.21	78	396	0.20	6351	0.0	0.0	6352	0.0	0.0
34925	303	8	8			65	821	0.08	65	881	0.07	6349	0.0	0.0	6351	0.0	0.0
34926	148	8	8			0	299	0.00	0	321	0.00	7159	0.0	0.0	6294	0.0	0.0
34927	55	6	6			0	169	0.00	0	181	0.00	6282	0.0	0.0	6327	0.0	0.0
34928	25	8	8			23	470	0.05	23	504	0.05	6375	0.0	0.0	6376	0.0	0.0
34929	112	8	8			24	472	0.05	24	506	0.05	6376	0.0	0.0	6377	0.0	0.0
34930	213	8	8			24	1,789	0.01	24	1,919	0.01	6374	0.0	0.0	6378	0.0	0.0
34931	71	8	8			35	1,354	0.03	35	1,453	0.02	6378	0.0	0.0	6405	0.0	0.0
34932	356	8	8			26	532	0.05	26	533	0.05	6390	0.0	0.0	7203	0.0	0.0
34933	117	8	8			27	1,311	0.02	27	1,313	0.02	7203	0.0	0.0	6391	0.0	0.0
34934	162	8	8			27	1,415	0.02	27	1,417	0.02	6391	0.0	0.0	6392	0.0	0.0
34935	308	8	8			27	1,954	0.01	27	1,957	0.01	6392	0.0	0.0	6393	0.0	0.0
34936	225	8	8			175	1,450	0.12	175	1,452	0.12	6394	0.0	0.0	6388	0.0	0.0
34937	298	8	8			175	2,090	0.08	175	2,092	0.08	7623	0.0	0.0	6394	0.0	0.0
34938	143	8	8			175	1,610	0.11	175	1,612	0.11	7115	0.0	0.0	7623	0.0	0.0
34939	129	8	8			175	798	0.22	175	799	0.22	7160	0.0	0.0	7115	0.0	0.0
34940	274	8	8			160	1,450	0.11	160	1,452	0.11	6395	0.0	0.0	6379	0.0	0.0
34941	422	8	8			160	2,090	0.08	160	2,092	0.08	6396	0.0	0.0	6395	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34942	205	8	8			28	2,401	0.01	28	2,405	0.01	6393	0.0	0.0	6397	0.0	0.0
34943	91	8	8			35	1,344	0.03	35	1,347	0.03	6397	0.0	0.0	6398	0.0	0.0
34944	77	8	8			35	2,435	0.01	35	2,438	0.01	6398	0.0	0.0	6385	0.0	0.0
34945	37	8	8			217	3,396	0.06	217	3,401	0.06	6385	0.0	0.0	7367	0.0	0.0
34946	218	8	8			183	2,200	0.08	183	2,203	0.08	6387	0.0	0.0	6385	0.0	0.0
34947	182	8	8			183	2,049	0.09	183	2,051	0.09	6388	0.0	0.0	6387	0.0	0.0
34948	269	8	8			217	2,219	0.10	217	2,222	0.10	7367	0.0	0.0	6386	0.0	0.0
34949	64	8	8			217	1,883	0.12	217	1,885	0.12	6386	0.0	0.0	7624	0.0	0.0
34950	212	8	8			217	2,102	0.10	217	2,105	0.10	7624	0.0	0.0	6383	0.0	0.0
34951	60	8	8			218	2,644	0.08	218	2,647	0.08	6383	0.0	0.0	6384	0.0	0.0
34952	189	8	8			218	1,065	0.20	218	1,067	0.20	6400	0.0	0.0	7114	0.0	0.0
34953	49	8	8			238	2,435	0.10	238	2,438	0.10	7114	0.0	0.0	6406	0.0	0.0
34954	106	8	8			1	1,501	0.00	1	1,503	0.00	6401	0.0	0.0	7114	0.0	0.0
34955	91	8	8			0	2,529	0.00	1	2,533	0.00	7715	0.0	0.0	6401	0.0	0.0
34956	355	8	8			238	403	0.59	238	403	0.59	6402	0.0	0.0	6380	0.0	0.0
34957	140	8	8			319	2,069	0.15	319	2,072	0.15	6380	0.0	0.0	6382	0.0	0.0
34958	66	8	8			0	2,798	0.00	0	2,801	0.00	6381	0.0	0.0	6382	0.0	0.0
34959	393	8	8			331	1,527	0.22	331	1,528	0.22	6382	0.0	0.0	6403	0.0	0.0
34960	250	8	8			15	1,106	0.01	15	1,186	0.01	6405	0.0	0.0	6389	0.0	0.0
34961	300	8	8			1	677	0.00	1	726	0.00	8084	0.0	0.0	6389	0.0	0.0
34962	400	8	8			1	1,503	0.00	1	1,506	0.00	6410	0.0	0.0	6411	0.0	0.0
34963	374	8	8			21	537	0.04	21	538	0.04	6411	0.0	0.0	6412	0.0	0.0
34964	146	8	8			22	1,437	0.01	22	1,439	0.01	6412	0.0	0.0	6409	0.0	0.0
34965	157	8	8			475	608	0.78	475	608	0.78	6413	0.0	0.0	6501	0.0	0.0
34967	202	8	8			7	545	0.01	7	546	0.01	6447	0.0	0.0	6446	0.0	0.0
34968	290	8	8			31	472	0.06	31	507	0.06	6498	0.0	0.0	7370	0.0	0.0
34969	74	8	8			26	563	0.05	26	603	0.04	6441	0.0	0.0	6498	0.0	0.0
34970	85	8	8			26	331	0.08	26	354	0.07	6442	0.0	0.0	6441	0.0	0.0
34971	348	8	8			21	1,180	0.02	21	1,265	0.02	6440	0.0	0.0	6442	0.0	0.0
34972	136	8	8			70	914	0.08	70	981	0.07	6497	0.0	0.0	7370	0.0	0.0
34973	108	8	8			29	1,010	0.03	29	1,083	0.03	6439	0.0	0.0	6497	0.0	0.0
34974	133	8	8			29	1,197	0.02	29	1,284	0.02	7625	0.0	0.0	6439	0.0	0.0
34975	354	8	8			0	451	0.00	0	483	0.00	6488	0.0	0.0	6434	0.0	0.0
34976	225	8	8			1	1,530	0.00	1	1,641	0.00	6454	0.0	0.0	6434	0.0	0.0
34977	200	8	8			0	338	0.00	0	362	0.00	7716	0.0	0.0	6454	0.0	0.0
34978	243	8	8			27	1,431	0.02	27	1,433	0.02	6457	0.0	0.0	6458	0.0	0.0
34979	205	8	8			19	1,399	0.01	19	1,401	0.01	6456	0.0	0.0	6457	0.0	0.0
34980	352	8	8			12	1,389	0.01	12	1,390	0.01	6451	0.0	0.0	6456	0.0	0.0
34981	79	8	8			1	1,163	0.00	1	1,165	0.00	6452	0.0	0.0	6451	0.0	0.0
34982	110	8	8			1	1,698	0.00	1	1,700	0.00	7368	0.0	0.0	6452	0.0	0.0
34983	301	8	8			0	806	0.00	0	806	0.00	6453	0.0	0.0	7368	0.0	0.0
34984	222	8	8			0	1,015	0.00	0	1,017	0.00	6417	0.0	0.0	6451	0.0	0.0
34985	387	8	8			8	1,802	0.00	8	1,805	0.00	7118	0.0	0.0	6455	0.0	0.0
34986	400	8	8			35	987	0.04	35	988	0.04	6493	0.0	0.0	6494	0.0	0.0
34987	221	8	8			35	402	0.09	35	403	0.09	6492	0.0	0.0	6493	0.0	0.0
34988	321	8	8			27	406	0.07	27	407	0.07	6491	0.0	0.0	6492	0.0	0.0
34989	370	8	8			16	413	0.04	16	413	0.04	6490	0.0	0.0	6491	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34990	176	8	8			13	392	0.03	13	393	0.03	6443	0.0	0.0	6490	0.0	0.0
34991	181	8	8			13	892	0.01	13	892	0.01	6444	0.0	0.0	6443	0.0	0.0
34992	214	8	8			0	1,224	0.00	0	1,226	0.00	6414	0.0	0.0	6444	0.0	0.0
34993	161	8	8			13	1,752	0.01	13	1,755	0.01	6489	0.0	0.0	6444	0.0	0.0
34994	135	8	8			7	1,657	0.00	7	1,659	0.00	6446	0.0	0.0	6491	0.0	0.0
34995	72	8	8			0	925	0.00	0	926	0.00	6445	0.0	0.0	6446	0.0	0.0
34996	124	8	8			1	1,122	0.00	1	1,124	0.00	6448	0.0	0.0	6494	0.0	0.0
34997	214	8	8			1	1,852	0.00	1	1,854	0.00	6449	0.0	0.0	6495	0.0	0.0
34998	190	8	8			10	1,079	0.01	10	1,081	0.01	6496	0.0	0.0	6460	0.0	0.0
34999	175	8	8			10	1,157	0.01	10	1,159	0.01	6450	0.0	0.0	6496	0.0	0.0
35000	56	8	8			9	1,382	0.01	9	1,384	0.01	6418	0.0	0.0	6450	0.0	0.0
35001	80	8	8			60	1,075	0.06	60	1,076	0.06	6500	0.0	0.0	6499	0.0	0.0
35002	290	8	8			59	753	0.08	59	754	0.08	6460	0.0	0.0	6500	0.0	0.0
35003	245	8	8			476	874	0.54	476	875	0.54	6473	0.0	0.0	6474	0.0	0.0
35004	200	8	8			475	406	1.17	475	406	1.17	6459	3.2	3.2	6473	0.0	0.0
35005	146	8	8			475	981	0.48	475	983	0.48	6501	0.0	0.0	6459	3.2	3.2
35006	132	8	8			453	639	0.71	453	640	0.71	6461	0.0	0.0	6409	0.0	0.0
35007	135	8	8			415	1,002	0.41	415	1,003	0.41	6463	0.0	0.0	6462	0.0	0.0
35008	230	8	8			403	1,074	0.38	403	1,075	0.38	6464	0.0	0.0	6463	0.0	0.0
35009	165	8	8			0	551	0.00	0	552	0.00	6420	0.0	0.0	6464	0.0	0.0
35010	375	8	8			1	1,365	0.00	1	1,366	0.00	6478	0.0	0.0	6473	0.0	0.0
35011	119	8	8			0	1,067	0.00	0	1,069	0.00	7627	0.0	0.0	6477	0.0	0.0
35012	238	12	12			41	4,463	0.01	41	4,463	0.01	7204	0.0	0.0	6432	0.0	0.0
35013	115	12	12			40	4,444	0.01	40	4,444	0.01	6437	0.0	0.0	7204	0.0	0.0
35014	353	8	8			40	1,543	0.03	40	1,545	0.03	6438	0.0	0.0	6437	0.0	0.0
35015	306	8	8			40	1,417	0.03	40	1,419	0.03	6487	0.0	0.0	6438	0.0	0.0
35016	323	8	8			8	1,287	0.01	8	1,288	0.01	6486	0.0	0.0	6487	0.0	0.0
35017	284	8	8			38	963	0.04	38	965	0.04	6502	0.0	0.0	6462	0.0	0.0
35018	170	8	8			38	1,043	0.04	38	1,044	0.04	6471	0.0	0.0	6502	0.0	0.0
35019	283	8	8			28	1,061	0.03	28	1,063	0.03	6472	0.0	0.0	6471	0.0	0.0
35020	370	8	8			1	1,405	0.00	1	1,407	0.00	7369	0.0	0.0	6472	0.0	0.0
35021	153	8	8			27	1,813	0.01	27	1,815	0.01	6481	0.0	0.0	6482	0.0	0.0
35022	88	8	8			3	1,937	0.00	3	1,940	0.00	6483	0.0	0.0	6481	0.0	0.0
35023	104	8	8			0	444	0.00	0	445	0.00	6423	0.0	0.0	6483	0.0	0.0
35024	143	8	8			1	1,314	0.00	1	1,315	0.00	7117	0.0	0.0	6482	0.0	0.0
35025	147	8	8			0	1,560	0.00	0	1,563	0.00	6419	0.0	0.0	7117	0.0	0.0
35026	251	8	8			9	1,402	0.01	9	1,404	0.01	6435	0.0	0.0	6471	0.0	0.0
35027	180	8	8			0	585	0.00	0	586	0.00	6476	0.0	0.0	7204	0.0	0.0
35028	361	8	8			8	1,205	0.01	8	1,207	0.01	7730	0.0	0.0	6486	0.0	0.0
35029	173	8	8			403	1,040	0.39	403	1,041	0.39	6466	0.0	0.0	6465	0.0	0.0
35030	151	8	8			397	976	0.41	397	977	0.41	6467	0.0	0.0	6466	0.0	0.0
35031	178	8	8			396	1,562	0.25	396	1,564	0.25	6468	0.0	0.0	6467	0.0	0.0
35032	62	8	8			374	772	0.48	374	774	0.48	6469	0.0	0.0	6468	0.0	0.0
35033	106	8	8			374	710	0.53	374	711	0.53	6433	0.0	0.0	6469	0.0	0.0
35034	208	8	8			332	1,142	0.29	332	1,144	0.29	6504	0.0	0.0	6503	0.0	0.0
35035	250	8	8			9	1,360	0.01	9	1,363	0.01	6421	0.0	0.0	6435	0.0	0.0
35036	393	8	8			7	1,270	0.01	7	1,272	0.01	6480	0.0	0.0	6466	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35037	274	8	8			1	406	0.00	1	407	0.00	7116	0.0	0.0	6469	0.0	0.0
35038	480	8	8			0	1,596	0.00	0	1,598	0.00	6479	0.0	0.0	7116	0.0	0.0
35039	112	8	8			3	958	0.00	3	959	0.00	6484	0.0	0.0	6483	0.0	0.0
35040	92	8	8			3	1,338	0.00	3	1,339	0.00	6485	0.0	0.0	6484	0.0	0.0
35041	151	8	8			2	1,381	0.00	2	1,383	0.00	6422	0.0	0.0	6485	0.0	0.0
35042	179	8	8			42	1,251	0.03	42	1,252	0.03	6470	0.0	0.0	6433	0.0	0.0
35043	259	8	8			41	569	0.07	41	569	0.07	6506	0.0	0.0	6470	0.0	0.0
35044	232	8	8			28	1,291	0.02	28	1,292	0.02	6507	0.0	0.0	6506	0.0	0.0
35045	225	8	8			28	1,490	0.02	28	1,492	0.02	6508	0.0	0.0	6507	0.0	0.0
35046	215	8	8			28	1,643	0.02	28	1,645	0.02	6509	0.0	0.0	6508	0.0	0.0
35047	207	8	8			13	1,427	0.01	13	1,429	0.01	7205	0.0	0.0	6506	0.0	0.0
35049	300	8	8			10	921	0.01	10	988	0.01	6532	0.0	0.0	6543	0.0	0.0
35050	185	8	8			0	864	0.00	0	927	0.00	7717	0.0	0.0	6532	0.0	0.0
35051	236	8	8			1	956	0.00	1	1,026	0.00	6513	0.0	0.0	6533	0.0	0.0
35052	69	8	8			27	591	0.05	27	634	0.04	6545	0.0	0.0	6549	0.0	0.0
35054	173	8	8			55	701	0.08	55	751	0.07	6550	0.0	0.0	6551	0.0	0.0
35058	30	8	8			0	665	0.00	0	713	0.00	6553	0.0	0.0	6554	0.0	0.0
35059	175	8	8			0	647	0.00	0	694	0.00	6554	0.0	0.0	6555	0.0	0.0
35060	135	8	8			0	677	0.00	0	726	0.00	6514	0.0	0.0	6534	0.0	0.0
35061	97	8	8			13	651	0.02	13	699	0.02	6544	0.0	0.0	7629	0.0	0.0
35062	178	8	8			13	631	0.02	13	676	0.02	6534	0.0	0.0	6544	0.0	0.0
35063	248	8	8			15	331	0.05	15	355	0.04	6546	0.0	0.0	7629	0.0	0.0
35064	131	8	8			11	786	0.01	11	843	0.01	6527	0.0	0.0	6526	0.0	0.0
35065	127	8	8			11	968	0.01	11	1,038	0.01	6526	0.0	0.0	6516	0.0	0.0
35066	98	8	8			12	816	0.01	12	875	0.01	6516	0.0	0.0	6537	0.0	0.0
35067	252	8	8			12	757	0.02	12	812	0.01	6537	0.0	0.0	6538	0.0	0.0
35068	185	8	8			31	829	0.04	31	890	0.03	6517	0.0	0.0	6536	0.0	0.0
35069	351	8	8			31	588	0.05	31	631	0.05	6536	0.0	0.0	6535	0.0	0.0
35070	235	8	8			28	699	0.04	28	750	0.04	7629	0.0	0.0	6543	0.0	0.0
35071	210	8	8			38	562	0.07	38	603	0.06	6543	0.0	0.0	6542	0.0	0.0
35072	139	8	8			38	757	0.05	38	812	0.05	6542	0.0	0.0	6541	0.0	0.0
35073	196	8	8			38	509	0.08	38	547	0.07	6541	0.0	0.0	6540	0.0	0.0
35074	473	8	8			13	548	0.02	13	588	0.02	6539	0.0	0.0	6540	0.0	0.0
35075	145	8	8			13	333	0.04	13	358	0.03	6528	0.0	0.0	6539	0.0	0.0
35076	145	8	8			0	647	0.00	0	694	0.00	6519	0.0	0.0	6528	0.0	0.0
35077	335	8	8			13	385	0.03	13	413	0.03	6547	0.0	0.0	6528	0.0	0.0
35078	313	8	8			0	564	0.00	0	605	0.00	6548	0.0	0.0	7429	0.0	0.0
35079	308	8	8			0	826	0.00	0	886	0.00	6529	0.0	0.0	7429	0.0	0.0
35080	155	8	8			8	597	0.01	8	640	0.01	6525	0.0	0.0	6524	0.0	0.0
35081	243	8	8			8	496	0.02	8	532	0.02	6524	0.0	0.0	7371	0.0	0.0
35082	76	8	8			8	497	0.02	8	533	0.02	7371	0.0	0.0	7628	0.0	0.0
35083	100	8	12	22	ura	250	665	0.38	250	2,100	0.12	6529	0.0	0.0	6530	0.0	0.0
35086	396	8	8			100	456	0.22	100	489	0.20	7372	0.0	0.0	6556	0.0	0.0
35087	142	8	8			27	775	0.03	27	832	0.03	6576	0.0	0.0	6574	0.0	0.0
35088	76	8	8			26	745	0.04	26	799	0.03	6575	0.0	0.0	6576	0.0	0.0
35089	547	8	8			1	940	0.00	1	1,009	0.00	6577	0.0	0.0	6575	0.0	0.0
35090	200	8	8			26	1,185	0.02	26	1,272	0.02	6570	0.0	0.0	6575	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35091	220	8	8			26	951	0.03	26	1,020	0.03	6569	0.0	0.0	6570	0.0	0.0
35092	190	8	8			17	1,099	0.02	17	1,178	0.01	6564	0.0	0.0	6568	0.0	0.0
35093	143	8	8			11	939	0.01	11	1,007	0.01	6571	0.0	0.0	6572	0.0	0.0
35094	102	8	8			0	630	0.00	0	676	0.00	7718	0.0	0.0	6571	0.0	0.0
35095	179	8	8			9	298	0.03	9	320	0.03	6567	0.0	0.0	6568	0.0	0.0
35096	167	8	8			9	298	0.03	9	319	0.03	6566	0.0	0.0	6567	0.0	0.0
35097	250	8	8			9	1,088	0.01	9	1,167	0.01	6563	0.0	0.0	6566	0.0	0.0
35098	189	8	8			13	684	0.02	13	734	0.02	6558	0.0	0.0	6573	0.0	0.0
35099	302	8	8			13	574	0.02	13	616	0.02	6573	0.0	0.0	6578	0.0	0.0
35100	421	8	8			5	1,034	0.00	5	1,110	0.00	6559	0.0	0.0	6578	0.0	0.0
35101	213	8	8			0	190	0.00	0	204	0.00	6560	0.0	0.0	6573	0.0	0.0
35102	400	8	8			214	297	0.72	214	319	0.67	6586	0.0	0.0	6585	0.0	0.0
35103	261	8	8			88	240	0.36	88	258	0.34	7631	0.0	0.0	6586	0.0	0.0
35104	300	8	8			14	607	0.02	14	651	0.02	6589	0.0	0.0	7631	0.0	0.0
35105	300	8	8			14	622	0.02	14	667	0.02	6588	0.0	0.0	6589	0.0	0.0
35106	183	8	8			0	460	0.00	0	493	0.00	6583	0.0	0.0	6588	0.0	0.0
35107	238	8	8			68	350	0.19	68	376	0.18	6580	0.0	0.0	7631	0.0	0.0
35108	445	8	8			118	807	0.15	118	865	0.14	6590	0.0	0.0	6586	0.0	0.0
35109	450	8	8			118	678	0.17	118	727	0.16	6593	0.0	0.0	6590	0.0	0.0
35110	298	8	8			108	801	0.13	108	860	0.13	7373	0.0	0.0	6593	0.0	0.0
35111	439	8	8			13	297	0.04	13	319	0.04	6587	0.0	0.0	7632	0.0	0.0
35112	370	8	8			12	591	0.02	12	634	0.02	6581	0.0	0.0	7373	0.0	0.0
35113	371	8	8			10	526	0.02	10	565	0.02	6582	0.0	0.0	6593	0.0	0.0
35114	231	10	10			427	903	0.47	427	967	0.44	6602	0.0	0.0	6603	0.0	0.0
35115	172	10	10			176	1,516	0.12	176	1,623	0.11	6601	0.0	0.0	7119	0.0	0.0
35116	151	10	10			111	1,591	0.07	111	1,703	0.07	6600	0.0	0.0	6601	0.0	0.0
35117	83	10	10			106	1,594	0.07	106	1,706	0.06	6599	0.0	0.0	6600	0.0	0.0
35118	208	8	8			105	843	0.12	105	905	0.12	6598	0.0	0.0	6599	0.0	0.0
35119	129	8	8			93	863	0.11	93	926	0.10	6595	0.0	0.0	6594	0.0	0.0
35120	150	8	8			83	687	0.12	83	737	0.11	6596	0.0	0.0	6595	0.0	0.0
35121	221	8	8			53	813	0.06	53	872	0.06	6592	0.0	0.0	6596	0.0	0.0
35122	400	8	8			53	871	0.06	53	934	0.06	6597	0.0	0.0	6592	0.0	0.0
35123	290	8	8			31	940	0.03	31	1,009	0.03	6591	0.0	0.0	6597	0.0	0.0
35124	330	8	8			15	470	0.03	15	504	0.03	6604	0.0	0.0	6605	0.0	0.0
35126	229	8	8			15	460	0.03	15	493	0.03	6606	0.0	0.0	7374	0.0	0.0
35127	85	8	8			35	554	0.06	35	594	0.06	6632	0.0	0.0	6633	0.0	0.0
35128	172	8	8			0	378	0.00	0	405	0.00	6627	0.0	0.0	7161	0.0	0.0
35129	158	8	8			17	376	0.04	17	403	0.04	7161	0.0	0.0	7120	0.0	0.0
35130	431	8	8			70	362	0.19	70	388	0.18	6639	0.0	0.0	7120	0.0	0.0
35131	283	8	8			87	319	0.27	87	342	0.25	7120	0.0	0.0	6626	0.0	0.0
35132	263	8	8			87	480	0.18	87	515	0.17	6626	0.0	0.0	6625	0.0	0.0
35133	359	8	8			87	555	0.16	87	595	0.15	6625	0.0	0.0	6624	0.0	0.0
35135	112	8	8			28	281	0.10	28	301	0.09	6619	0.0	0.0	6618	0.0	0.0
35136	290	8	8			1	302	0.00	1	324	0.00	6620	0.0	0.0	6619	0.0	0.0
35137	271	8	8			1	294	0.00	1	315	0.00	7633	0.0	0.0	6621	0.0	0.0
35138	118	8	8			0	419	0.00	0	450	0.00	6614	0.0	0.0	6617	0.0	0.0
35139	76	8	8			0	295	0.00	0	317	0.00	6622	0.0	0.0	7633	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35140	100	8	8			0	364	0.00	0	391	0.00	6612	0.0	0.0	6622	0.0	0.0
35141	176	6	6			0	267	0.00	0	286	0.00	6613	0.0	0.0	7633	0.0	0.0
35142	135	8	8			21	202	0.10	21	217	0.10	6642	0.0	0.0	6641	0.0	0.0
35143	121	8	8			21	427	0.05	21	458	0.05	6645	0.0	0.0	6642	0.0	0.0
35144	269	8	8			0	480	0.00	0	515	0.00	7375	0.0	0.0	6645	0.0	0.0
35145	331	8	8			0	305	0.00	0	327	0.00	6646	0.0	0.0	7162	0.0	0.0
35146	445	8	8			0	508	0.00	0	545	0.00	6644	0.0	0.0	6645	0.0	0.0
35147	368	8	8			72	471	0.15	72	505	0.14	7431	0.0	0.0	6641	0.0	0.0
35148	65	8	8			72	391	0.18	72	419	0.17	6640	0.0	0.0	7431	0.0	0.0
35149	377	8	8			70	447	0.16	70	480	0.15	6638	0.0	0.0	6639	0.0	0.0
35150	340	8	8			58	448	0.13	58	481	0.12	6654	0.0	0.0	6638	0.0	0.0
35151	174	8	8			72	385	0.19	72	413	0.17	6655	0.0	0.0	6640	0.0	0.0
35152	45	8	8			0	351	0.00	0	376	0.00	6667	0.0	0.0	6655	0.0	0.0
35153	100	8	8			71	453	0.16	71	486	0.15	6656	0.0	0.0	6655	0.0	0.0
35154	349	8	8			0	434	0.00	0	466	0.00	6634	0.0	0.0	6635	0.0	0.0
35155	67	8	8			0	422	0.00	0	453	0.00	6607	0.0	0.0	6634	0.0	0.0
35156	285	8	8			55	516	0.11	55	553	0.10	6637	0.0	0.0	6635	0.0	0.0
35157	403	8	8			55	386	0.14	54	415	0.13	6633	0.0	0.0	6637	0.0	0.0
35158	196	15	18	23	ura	953	538	1.77	954	938	1.02	6652	5.9	0.0	6653	4.4	0.0
35159	18	15	18	23	ura	953	3,078	0.31	954	5,362	0.18	7162	0.0	0.0	6652	5.9	0.0
35160	472	15	15			954	3,051	0.31	954	3,269	0.29	6657	0.0	0.0	7162	0.0	0.0
35161	331	15	15			954	2,800	0.34	954	3,000	0.32	6651	0.0	0.0	6657	0.0	0.0
35162	158	15	15			903	2,799	0.32	903	2,999	0.30	6650	0.0	0.0	6651	0.0	0.0
35163	148	15	15			903	1,678	0.54	903	1,798	0.50	6649	0.0	0.0	6650	0.0	0.0
35164	127	15	15			690	2,731	0.25	690	2,926	0.24	6665	0.0	0.0	6649	0.0	0.0
35165	139	8	8			1	282	0.00	1	303	0.00	6658	0.0	0.0	6632	0.0	0.0
35166	61	8	8			1	330	0.00	1	353	0.00	6659	0.0	0.0	6658	0.0	0.0
35167	147	8	8			0	288	0.00	0	308	0.00	6660	0.0	0.0	6659	0.0	0.0
35168	84	8	8			1	199	0.00	1	213	0.00	6661	0.0	0.0	6658	0.0	0.0
35169	150	8	8			0	563	0.00	0	603	0.00	6609	0.0	0.0	6661	0.0	0.0
35170	141	8	8			0	319	0.00	0	342	0.00	6662	0.0	0.0	6661	0.0	0.0
35171	93	8	8			0	362	0.00	0	388	0.00	6610	0.0	0.0	6662	0.0	0.0
35172	98	8	8			34	914	0.04	34	981	0.03	6630	0.0	0.0	6629	0.0	0.0
35173	362	8	8			19	376	0.05	19	403	0.05	6631	0.0	0.0	6630	0.0	0.0
35174	141	8	8			15	485	0.03	15	520	0.03	6664	0.0	0.0	6663	0.0	0.0
35175	74	8	8			15	638	0.02	15	684	0.02	7374	0.0	0.0	6664	0.0	0.0
35176	363	8	8			0	316	0.00	0	339	0.00	6628	0.0	0.0	7374	0.0	0.0
35177	225	8	8			6	288	0.02	6	308	0.02	6611	0.0	0.0	6665	0.0	0.0
35178	60	15	15			660	3,128	0.21	660	3,352	0.20	6647	0.0	0.0	6648	0.0	0.0
35179	168	8	8			15	574	0.03	15	615	0.02	6663	0.0	0.0	6630	0.0	0.0
35180	65	8	8			0	420	0.00	0	451	0.00	6666	0.0	0.0	6664	0.0	0.0
35182	102	8	8			0	706	0.00	0	758	0.00	7719	0.0	0.0	6683	0.0	0.0
35183	145	8	8			0	617	0.00	0	663	0.00	6670	0.0	0.0	6688	0.0	0.0
35184	225	8	15	24	2036	392	297	1.32	393	1,703	0.23	6686	5.9	0.0	6688	0.0	0.0
35185	260	8	15	24	2036	367	253	1.45	369	1,446	0.26	6684	3.1	0.0	6686	5.9	0.0
35186	330	8	15	24	2036	367	256	1.43	368	1,467	0.25	7635	1.8	0.0	6684	3.1	0.0
35187	250	8	8			315	540	0.58	315	579	0.54	6683	0.0	0.0	7635	1.8	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35188	220	8	8			0	601	0.00	0	645	0.00	6685	0.0	0.0	6684	3.1	0.0
35189	130	8	8			0	505	0.00	0	542	0.00	6668	0.0	0.0	6685	0.0	0.0
35194	150	8	8			306	243	1.26	306	260	1.18	6701	0.0	0.0	7122	0.0	0.0
35195	272	8	8			68	364	0.19	68	390	0.17	8788	0.0	0.0	6727	0.0	0.0
35196	75	8	8			282	515	0.55	282	553	0.51	6727	0.0	0.0	6701	0.0	0.0
35197	406	8	8			25	404	0.06	25	433	0.06	6699	0.0	0.0	6700	0.0	0.0
35198	404	8	8			0	468	0.00	0	502	0.00	6689	0.0	0.0	6699	0.0	0.0
35199	174	8	8			0	369	0.00	0	395	0.00	6671	0.0	0.0	6689	0.0	0.0
35200	336	15	15			936	969	0.97	945	1,039	0.91	6697	0.0	0.0	7376	0.0	0.0
35201	273	15	15			936	962	0.97	945	1,031	0.92	6698	0.0	0.0	6697	0.0	0.0
35202	213	15	15			936	974	0.96	945	1,044	0.91	6720	0.0	0.0	6698	0.0	0.0
35203	203	15	15			854	966	0.88	861	1,035	0.83	6721	0.0	0.0	6720	0.0	0.0
35204	258	15	15			854	965	0.89	861	1,033	0.83	6695	0.0	0.0	6721	0.0	0.0
35206	262	18	24	25	2036	3,694	3,349	1.10	4,797	7,728	0.62	6705	4.0	0.0	7121	5.7	0.0
35207	485	18	24	25	2036	3,651	3,335	1.09	4,749	7,694	0.62	6709	0.0	0.0	6707	3.7	0.0
35208	365	8	8			0	297	0.00	0	319	0.00	6706	0.0	0.0	6680	0.0	0.0
35209	222	6	6			0	169	0.00	0	181	0.00	6672	0.0	0.0	6706	0.0	0.0
35210	110	8	8			215	401	0.54	215	430	0.50	7207	0.0	0.0	6727	0.0	0.0
35211	260	8	8			149	405	0.37	149	435	0.34	6702	0.0	0.0	7207	0.0	0.0
35212	420	8	8			148	376	0.39	148	403	0.37	6680	0.0	0.0	6702	0.0	0.0
35213	234	6	6			0	173	0.00	0	185	0.00	6679	0.0	0.0	6708	0.0	0.0
35214	497	8	8			49	376	0.13	49	403	0.12	7377	0.0	0.0	7207	0.0	0.0
35215	245	6	6			0	312	0.00	0	334	0.00	6676	0.0	0.0	6722	0.0	0.0
35216	242	8	8			29	372	0.08	28	400	0.07	6690	0.0	0.0	6722	0.0	0.0
35217	251	8	8			28	358	0.08	28	385	0.07	6682	0.0	0.0	6690	0.0	0.0
35218	332	8	8			1	319	0.00	1	342	0.00	6703	0.0	0.0	6722	0.0	0.0
35219	143	8	8			0	236	0.00	0	253	0.00	6704	0.0	0.0	6703	0.0	0.0
35220	157	8	8			0	374	0.00	0	401	0.00	6674	0.0	0.0	6704	0.0	0.0
35221	352	8	8			0	398	0.00	0	426	0.00	6723	0.0	0.0	6702	0.0	0.0
35222	286	8	8			120	297	0.41	120	318	0.38	6711	0.0	0.0	6680	0.0	0.0
35223	216	8	8			120	292	0.41	120	313	0.38	6712	0.0	0.0	6711	0.0	0.0
35224	72	8	8			0	701	0.00	0	752	0.00	6678	0.0	0.0	6712	0.0	0.0
35225	310	8	8			119	299	0.40	119	320	0.37	6681	0.0	0.0	6712	0.0	0.0
35226	379	8	8			100	297	0.34	100	318	0.31	6715	0.0	0.0	6681	0.0	0.0
35227	67	8	8			100	299	0.33	100	320	0.31	6714	0.0	0.0	6715	0.0	0.0
35228	133	8	8			100	276	0.36	100	297	0.34	6713	0.0	0.0	6714	0.0	0.0
35229	155	8	8			100	278	0.36	100	298	0.34	7636	0.0	0.0	6713	0.0	0.0
35230	177	6	6			99	127	0.78	99	136	0.73	6691	0.0	0.0	7636	0.0	0.0
35231	136	8	8			99	276	0.36	99	297	0.33	6692	0.0	0.0	6691	0.0	0.0
35232	191	6	6			0	232	0.00	0	249	0.00	6673	0.0	0.0	7636	0.0	0.0
35233	512	15	21	27	2036	1,110	1,122	0.99	1,110	2,947	0.38	7637	0.9	0.0	6709	0.0	0.0
35234	459	15	18	23	ura	1,053	2,346	0.45	1,054	4,087	0.26	6716	2.8	0.0	6710	1.7	0.0
35235	45	15	18	23	ura	1,056	2,369	0.45	1,054	4,128	0.26	6717	2.9	0.0	6716	2.8	0.0
35236	188	6	6			0	60	0.00	0	64	0.00	6677	0.0	0.0	6681	0.0	0.0
35238	94	8	8			0	394	0.00	0	423	0.00	6728	0.0	0.0	6683	0.0	0.0
35240	51	8	8			0	335	0.00	0	360	0.00	6730	0.0	0.0	6741	0.0	0.0
35241	131	8	8			0	1,049	0.00	0	1,126	0.00	6732	0.0	0.0	6733	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35242	129	8	8			0	738	0.00	0	792	0.00	6733	0.0	0.0	7638	0.0	0.0
35243	138	8	8			29	333	0.09	29	357	0.08	7638	0.0	0.0	6734	0.0	0.0
35244	206	8	8			29	399	0.07	29	428	0.07	6734	0.0	0.0	6740	0.0	0.0
35245	156	8	8			1	363	0.00	1	390	0.00	6736	0.0	0.0	6739	0.0	0.0
35246	199	8	8			11	497	0.02	11	533	0.02	9920	0.0	0.0	6738	0.0	0.0
35247	240	8	8			12	311	0.04	12	333	0.04	6738	0.0	0.0	6739	0.0	0.0
35248	350	8	8			40	297	0.13	40	319	0.12	6739	0.0	0.0	6740	0.0	0.0
35249	260	8	8			69	297	0.23	69	319	0.22	6740	0.0	0.0	6741	0.0	0.0
35250	279	8	8			69	298	0.23	69	319	0.22	6741	0.0	0.0	6904	0.0	0.0
35256	269	8	8			0	492	0.00	0	527	0.00	6795	0.0	0.0	6794	0.0	0.0
35266	269	8	8			28	332	0.08	28	356	0.08	6776	0.0	0.0	6789	0.0	0.0
35267	270	8	8			28	373	0.07	28	400	0.07	6788	0.0	0.0	6776	0.0	0.0
35268	277	8	8			0	435	0.00	0	467	0.00	6796	0.0	0.0	6788	0.0	0.0
35269	209	8	12	24	2036	90	278	0.33	76	878	0.09	6779	1.1	0.0	6778	0.3	0.0
35270	139	8	12	24	2036	74	279	0.26	56	882	0.06	6780	3.0	0.0	6779	1.1	0.0
35271	201	8	8			44	518	0.08	44	555	0.08	6791	0.0	0.0	8747	0.0	0.0
35272	329	8	8			37	603	0.06	37	647	0.06	6789	0.0	0.0	8740	0.0	0.0
35273	262	8	8			13	360	0.04	13	387	0.03	6792	0.0	0.0	6788	0.0	0.0
35274	111	8	8			13	315	0.04	13	338	0.04	6765	0.0	0.0	6792	0.0	0.0
35275	155	8	8			7	320	0.02	7	344	0.02	6793	0.0	0.0	6765	0.0	0.0
35276	315	8	8			6	319	0.02	6	342	0.02	6764	0.0	0.0	6765	0.0	0.0
35290	350	8	8			0	470	0.00	0	504	0.00	6835	0.0	0.0	6834	0.0	0.0
35291	385	8	8			88	557	0.16	88	597	0.15	6815	0.0	0.0	6816	0.0	0.0
35292	247	8	8			88	296	0.30	88	317	0.28	7379	0.0	0.0	6815	0.0	0.0
35293	136	8	8			53	494	0.11	53	530	0.10	6821	0.0	0.0	7379	0.0	0.0
35294	41	8	8			0	275	0.00	0	294	0.00	6868	0.0	0.0	7379	0.0	0.0
35295	35	8	8			0	251	0.00	0	269	0.00	6867	0.0	0.0	7379	0.0	0.0
35296	162	8	8			53	508	0.10	53	544	0.10	6822	0.0	0.0	6821	0.0	0.0
35297	81	8	8			0	498	0.00	0	535	0.00	6823	0.0	0.0	6822	0.0	0.0
35298	118	8	8			0	452	0.00	0	485	0.00	7432	0.0	0.0	6823	0.0	0.0
35299	24	8	8			0	333	0.00	0	357	0.00	6866	0.0	0.0	6822	0.0	0.0
35300	196	8	8			52	514	0.10	52	551	0.09	6825	0.0	0.0	6822	0.0	0.0
35301	196	8	8			28	535	0.05	28	574	0.05	7124	0.0	0.0	6825	0.0	0.0
35302	68	8	8			0	255	0.00	0	274	0.00	6824	0.0	0.0	7124	0.0	0.0
35303	25	8	8			1	312	0.00	1	335	0.00	6865	0.0	0.0	6816	0.0	0.0
35304	302	8	8			1	330	0.00	1	354	0.00	6813	0.0	0.0	6814	0.0	0.0
35305	356	8	8			1	410	0.00	1	440	0.00	7123	0.0	0.0	6813	0.0	0.0
35306	404	8	8			1	340	0.00	1	365	0.00	6817	0.0	0.0	7123	0.0	0.0
35307	260	8	8			1	318	0.00	1	341	0.00	6818	0.0	0.0	6817	0.0	0.0
35308	234	15	15			1,749	4,424	0.40	1,772	4,740	0.37	6819	0.0	0.0	6820	2.0	0.0
35309	26	8	8			0	319	0.00	0	342	0.00	6864	0.0	0.0	7641	0.0	0.0
35310	288	8	8			1	333	0.00	1	357	0.00	6826	0.0	0.0	7641	0.0	0.0
35311	28	8	8			0	308	0.00	0	330	0.00	6863	0.0	0.0	6826	0.0	0.0
35312	41	8	8			0	328	0.00	0	352	0.00	6862	0.0	0.0	6826	0.0	0.0
35313	354	8	8			20	400	0.05	20	401	0.05	6832	0.0	0.0	6839	0.0	0.0
35314	279	8	8			19	403	0.05	19	403	0.05	6809	0.0	0.0	6832	0.0	0.0
35315	391	8	8			19	397	0.05	19	397	0.05	6812	0.0	0.0	6809	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35316	70	18	24	25	2036	3,697	3,203	1.15	4,798	7,390	0.65	6831	6.9	0.0	6830	7.1	0.0
35317	190	18	24	25	2036	3,694	4,337	0.85	4,798	10,006	0.48	6830	7.1	0.0	6840	6.6	0.0
35318	36	8	8			38	293	0.13	0	315	0.00	6861	6.4	0.0	6840	6.6	0.0
35319	249	8	8			40	430	0.09	40	431	0.09	6829	0.0	0.0	6827	0.0	0.0
35320	283	8	8			2	387	0.01	2	388	0.01	6841	0.0	0.0	6829	0.0	0.0
35321	175	8	8			1	460	0.00	1	460	0.00	6838	0.0	0.0	6842	0.0	0.0
35322	139	18	24	25	2036	3,728	2,961	1.26	4,829	6,833	0.71	6843	5.5	0.0	6828	5.6	0.0
35323	433	18	24	25	2036	3,692	3,023	1.22	4,798	6,976	0.69	6840	6.6	0.0	6843	5.5	0.0
35324	370	8	8			21	408	0.05	21	408	0.05	6839	0.0	0.0	6827	0.0	0.0
35325	12	8	8			0	303	0.00	0	326	0.00	6859	0.0	0.0	6814	0.0	0.0
35326	12	8	8			0	303	0.00	0	326	0.00	6858	0.0	0.0	6814	0.0	0.0
35327	16	8	8			0	333	0.00	0	357	0.00	6857	0.0	0.0	6813	0.0	0.0
35328	16	8	8			0	333	0.00	0	357	0.00	6856	0.0	0.0	6813	0.0	0.0
35329	13	8	8			0	345	0.00	0	370	0.00	6855	0.0	0.0	7123	0.0	0.0
35330	15	8	8			0	343	0.00	0	368	0.00	6854	0.0	0.0	7123	0.0	0.0
35331	13	8	8			0	319	0.00	0	342	0.00	6853	0.0	0.0	6817	0.0	0.0
35332	12	8	8			0	359	0.00	0	385	0.00	6851	0.0	0.0	6818	0.0	0.0
35343	366	18	24	26	Existing	3,896	3,535	1.10	6,205	8,158	0.76	6874	3.9	0.0	6882	0.0	0.0
35344	384	18	24	26	Existing	3,903	3,539	1.10	6,206	8,165	0.76	6875	0.4	0.0	6874	3.9	0.0
35345	376	18	24	26	Existing	3,928	3,539	1.11	6,208	8,165	0.76	6873	1.0	0.0	6875	0.4	0.0
35360	127	8	8			33	387	0.09	33	415	0.08	6905	0.0	0.0	7433	0.0	0.0
35361	324	10	10			157	457	0.34	157	489	0.32	6895	0.0	0.0	6894	0.0	0.0
35362	367	10	10			157	431	0.36	157	462	0.34	6894	0.0	0.0	6893	0.0	0.0
35366	14	8	8			0	397	0.00	0	426	0.00	6930	0.0	0.0	6919	0.0	0.0
35367	14	8	8			0	333	0.00	0	357	0.00	6931	0.0	0.0	7208	0.0	0.0
35368	12	8	8			1	303	0.00	1	326	0.00	6932	0.0	0.0	6912	0.0	0.0
35369	143	15	15			1,040	1,558	0.67	1,051	1,669	0.63	6904	0.0	0.0	7380	0.0	0.0
35370	398	18	18			1,111	1,419	0.78	1,124	1,520	0.74	6919	0.0	0.0	6914	0.0	0.0
35371	406	18	18			1,071	1,390	0.77	1,082	1,490	0.73	7208	0.0	0.0	6919	0.0	0.0
35372	385	18	18			1,071	1,413	0.76	1,082	1,513	0.72	6921	0.0	0.0	7208	0.0	0.0
35373	80	18	18			1,070	2,374	0.45	1,082	2,543	0.43	7380	0.0	0.0	6921	0.0	0.0
35374	92	18	18			1,240	1,413	0.88	1,256	1,514	0.83	6914	0.0	0.0	6913	0.0	0.0
35375	530	8	8			33	289	0.11	33	310	0.11	6923	0.0	0.0	6922	0.0	0.0
35376	230	8	8			0	759	0.00	0	815	0.00	7645	0.0	0.0	6923	0.0	0.0
35377	175	8	8			37	297	0.12	37	319	0.12	6918	0.0	0.0	7644	0.0	0.0
35378	114	8	8			0	521	0.00	0	559	0.00	6917	0.0	0.0	6924	0.0	0.0
35379	163	6	6			0	247	0.00	0	264	0.00	7723	0.0	0.0	6917	0.0	0.0
35380	472	8	8			0	297	0.00	0	318	0.00	6916	0.0	0.0	6924	0.0	0.0
35382	506	8	8			31	281	0.11	31	301	0.10	6907	0.0	0.0	6906	0.0	0.0
35383	502	8	8			31	297	0.10	31	318	0.10	6925	0.0	0.0	6907	0.0	0.0
35384	266	8	8			0	301	0.00	0	323	0.00	6908	0.0	0.0	6926	0.0	0.0
35385	268	8	8			0	296	0.00	0	317	0.00	6927	0.0	0.0	6908	0.0	0.0
35386	39	18	18			1,283	1,731	0.74	1,300	1,855	0.70	7125	0.0	0.0	6933_WETWELL	0.0	0.0
35387	35	18	18			1,283	1,827	0.70	1,300	1,958	0.66	6911	0.0	0.0	6910	0.0	0.0
35389	305	18	18			1,240	1,404	0.88	1,256	1,504	0.84	6913	0.0	0.0	6912	0.0	0.0
35390	47	8	8			2	369	0.01	2	396	0.01	6915	0.0	0.0	6913	0.0	0.0
35391	120	8	8			0	297	0.00	0	319	0.00	6936	0.0	0.0	6915	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35409	120	8	8			17	1,373	0.01	17	1,473	0.01	7615	0.0	0.0	6367	0.0	0.0
35410	255	18	18			1,188	1,892	0.63	1,188	1,892	0.63	5461	0.0	0.0	5552	0.0	0.0
35411	235	8	8			0	2,237	0.00	0	2,240	0.00	4706	0.0	0.0	4844	0.0	0.0
35412	246	8	8			0	533	0.00	0	533	0.00	7292	0.0	0.0	4350	0.0	0.0
35413	128	6	6			8	757	0.01	8	757	0.01	5110	0.0	0.0	3978	0.0	0.0
35414	355	8	8			0	1,432	0.00	0	1,433	0.00	3997	0.0	0.0	3667	0.0	0.0
35415	263	6	6			1	221	0.00	1	221	0.00	3357	0.0	0.0	3485	0.0	0.0
35419	390	8	8			76	390	0.19	76	391	0.19	2302	0.0	0.0	2335	0.0	0.0
35420	384	8	8			72	339	0.21	72	340	0.21	2092	0.0	0.0	7389	0.0	0.0
35422	209	8	8			1	337	0.00	1	337	0.00	1739	0.0	0.0	1717	0.0	0.0
35423	190	6	6			1	240	0.01	1	240	0.01	1348	0.0	0.0	3120	0.0	0.0
35424	285	8	8			57	824	0.07	57	825	0.07	1109	0.0	0.0	1108	0.0	0.0
35428	180	8	8			42	379	0.11	42	380	0.11	1298	0.0	0.0	1299	0.0	0.0
35429	117	8	8			1	648	0.00	1	649	0.00	1354	0.0	0.0	1353	0.0	0.0
35430	400	6	6			29	274	0.11	29	274	0.11	1500	0.0	0.0	1551	3.4	0.0
35431	250	12	12			573	1,677	0.34	573	1,677	0.34	1563	0.0	0.0	7221	0.0	0.0
35432	326	8	8			205	456	0.45	205	456	0.45	1524	0.0	0.0	1547	0.0	0.0
35433	14	8	8			126	754	0.17	126	756	0.17	1834	0.0	0.0	1767	0.0	0.0
35434	89	10	15	2	Existing	829	789	1.05	1,370	2,326	0.59	1911	0.8	0.0	1912	0.7	0.0
35435	99	6	6			1	266	0.00	1	266	0.00	1884	0.0	0.0	1883	0.0	0.0
35436	129	27	27			4,300	10,021	0.43	6,280	10,021	0.63	1990	0.0	0.0	1989	0.0	0.0
35437	162	8	8			160	344	0.47	160	344	0.47	2163	0.0	0.0	2150	0.0	0.0
35438	127	33	33			7,524	10,532	0.71	9,640	10,532	0.92	2146	0.0	0.0	7390	0.0	0.0
35439	195	8	8			18	341	0.05	18	341	0.05	2296	0.0	0.0	2280	0.0	0.0
35440	430	8	8			47	422	0.11	47	423	0.11	2273	0.0	0.0	7476	0.0	0.0
35441	162	8	8			1	344	0.00	1	344	0.00	2315	0.0	0.0	2343	0.0	0.0
35442	263	15	15			272	1,213	0.22	236	1,213	0.19	2406	0.0	0.0	2411	0.0	0.0
35443	564	54	54			29,276	30,647	0.96	33,034	30,647	1.08	2430	6.8	0.0	2428	17.3	0.0
35445	32	21	21			3,756	10,283	0.37	4,708	10,283	0.46	2922	0.0	0.0	2923	0.0	0.0
35446	436	8	8			1	813	0.00	1	815	0.00	2941	0.0	0.0	2940	0.0	0.0
35448	225	8	8			185	349	0.53	185	349	0.53	3035	0.0	0.0	3037	0.0	0.0
35449	298	8	8			160	344	0.46	160	344	0.46	3052	0.0	0.0	3043	0.0	0.0
35450	300	10	10			871	933	0.93	894	933	0.96	3106	0.0	0.0	3130	0.0	0.0
35453	176	8	8			1	342	0.00	1	342	0.00	3245	0.0	0.0	3233	0.0	0.0
35454	315	6	6			1	132	0.01	1	132	0.01	3455	0.0	0.0	3419	0.0	0.0
35455	361	6	6			1	197	0.00	1	197	0.00	3421	0.0	0.0	3422	0.0	0.0
35456	120	6	6			1	172	0.00	1	172	0.00	10104	0.0	0.0	3492	0.0	0.0
35457	12	10	10			905	4,522	0.20	1,165	4,517	0.26	3464	1.5	0.0	3502	1.2	0.0
35459	335	8	8			33	967	0.03	33	969	0.03	3598	0.0	0.0	3589	0.0	0.0
35460	375	24	24			1,041	5,744	0.18	1,042	5,744	0.18	3629	0.0	0.0	7038	0.0	0.0
35461	33	10	10			47	765	0.06	47	764	0.06	3683	0.0	0.0	3684	0.0	0.0
35462	60	8	8			79	485	0.16	79	486	0.16	3690	0.0	0.0	7280	0.0	0.0
35464	140	8	8			1	1,891	0.00	1	1,893	0.00	3797	0.0	0.0	3796	0.0	0.0
35465	200	8	8			1	1,017	0.00	1	1,018	0.00	7530	0.0	0.0	3876	0.0	0.0
35466	255	6	6			1	281	0.00	1	281	0.00	3828	0.0	0.0	3827	0.0	0.0
35467	170	6	6			2	431	0.00	2	431	0.00	4014	0.0	0.0	7288	0.0	0.0
35468	305	8	8			11	836	0.01	11	838	0.01	7187	0.0	0.0	4086	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35469	69	8	8			1	463	0.00	1	464	0.00	4053	0.0	0.0	4054	0.0	0.0
35470	227	6	6			0	256	0.00	0	256	0.00	4024	0.0	0.0	4101	0.0	0.0
35471	70	8	8			0	588	0.00	0	588	0.00	4130	0.0	0.0	4103	0.0	0.0
35472	170	8	8			31	728	0.04	31	729	0.04	4175	0.0	0.0	7295	0.0	0.0
35473	158	8	8			1	1,601	0.00	1	1,603	0.00	7550	0.0	0.0	4383	2.9	0.0
35474	320	8	8			123	1,234	0.10	123	1,235	0.10	4442	0.0	0.0	4443	0.0	0.0
35475	95	8	8			0	539	0.00	0	540	0.00	4423	0.0	0.0	4493	0.0	0.0
35477	277	8	8			0	1,035	0.00	0	1,037	0.00	5015	0.0	0.0	5060	0.0	0.0
35478	57	8	8			0	348	0.00	0	349	0.00	5120	0.0	0.0	5099	0.0	0.0
35479	206	6	6			1	695	0.00	1	695	0.00	5043	0.0	0.0	5042	0.0	0.0
35480	421	8	8			19	1,265	0.02	19	1,267	0.02	5183	0.0	0.0	7580	0.0	0.0
35481	298	6	6			0	545	0.00	0	545	0.00	5235	0.0	0.0	5220	0.0	0.0
35482	86	8	15	19	Existing	468	328	1.42	757	1,756	0.43	5272	0.0	0.0	5271	0.0	0.0
35483	274	6	6			1	397	0.00	1	397	0.00	5250	0.0	0.0	5256	0.0	0.0
35484	334	8	8			31	297	0.10	31	297	0.10	5259	0.0	0.0	5260	0.0	0.0
35485	220	8	8			12	372	0.03	12	372	0.03	5452	0.0	0.0	5535	0.0	0.0
35486	279	10	10			495	599	0.83	495	598	0.83	5506	0.0	0.0	7341	0.0	0.0
35487	170	54	54			15,789	43,871	0.36	16,714	43,871	0.38	5550	0.0	0.0	5549	0.0	0.0
35488	205	8	8			1	697	0.00	1	698	0.00	5823	0.0	0.0	5796	0.0	0.0
35489	274	8	8			185	207	0.90	185	207	0.90	5797	0.0	0.0	7602	0.0	0.0
35490	445	8	8			28	315	0.09	28	315	0.09	5769	0.0	0.0	5768	0.0	0.0
35491	292	8	8			418	401	1.04	62	401	0.15	5879	0.2	0.0	5852	0.0	0.0
35492	139	18	18			2,679	2,756	0.97	3,130	2,756	1.14	6128	0.0	0.0	6114	0.0	0.0
35493	360	8	8			9	759	0.01	9	760	0.01	6119	0.0	0.0	7108	0.0	0.0
35494	147	8	8			0	748	0.00	0	749	0.00	6033	0.0	0.0	6095	0.0	0.0
35495	161	21	21			2,538	3,747	0.68	2,992	3,747	0.80	6089	0.0	0.0	6090	0.0	0.0
35496	289	8	8			42	506	0.08	42	542	0.08	7365	0.0	0.0	6307	0.0	0.0
35497	130	8	8			65	285	0.23	65	306	0.21	6354	0.0	0.0	6353	0.0	0.0
35498	220	8	8			11	1,275	0.01	11	1,277	0.01	6361	0.0	0.0	6360	0.0	0.0
35499	66	8	8			0	906	0.00	0	972	0.00	7714	0.0	0.0	8760	0.0	0.0
35500	298	8	8			93	846	0.11	93	907	0.10	6594	0.0	0.0	6598	0.0	0.0
35501	90	8	8			1	297	0.00	1	319	0.00	6621	0.0	0.0	6620	0.0	0.0
35502	363	8	8			0	374	0.00	0	401	0.00	6636	0.0	0.0	6637	0.0	0.0
35503	528	15	15			673	2,678	0.25	673	2,870	0.23	6648	0.0	0.0	7634	0.0	0.0
35504	279	18	24	26	Existing	3,934	3,537	1.11	6,211	8,160	0.76	6885	3.3	0.0	6873	1.0	0.0
35505	295	8	8			67	274	0.25	67	294	0.23	6906	0.0	0.0	7433	0.0	0.0
35506	218	8	8			11	297	0.04	11	319	0.03	6572	0.0	0.0	6527	0.0	0.0
35507	515	18	24	25	2036	3,724	3,320	1.12	4,829	7,661	0.63	6828	5.6	0.0	5957	0.0	0.0
35508	102	8	8			69	381	0.18	69	381	0.18	5375	0.0	0.0	6089	0.0	0.0
35509	87	8	8			12	1,301	0.01	12	1,303	0.01	4717	0.0	0.0	7074	0.0	0.0
35510	352	8	8			46	1,101	0.04	46	1,103	0.04	2958	0.0	0.0	2831	0.0	0.0
35511	275	12	12			26	1,128	0.02	26	1,128	0.02	1295	0.0	0.0	1384	0.0	0.0
35512	323	8	8			66	383	0.17	66	383	0.17	7437	0.0	0.0	1324	0.0	0.0
35513	223	8	8			1	486	0.00	1	487	0.00	1413	0.0	0.0	1412	0.0	0.0
35514	212	8	8			172	496	0.35	172	497	0.35	6986	0.0	0.0	1394	0.0	0.0
35515	333	8	8			40	406	0.10	40	406	0.10	1388	0.0	0.0	1428	0.0	0.0
35516	190	8	8			34	422	0.08	34	422	0.08	1362	0.0	0.0	1363	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35517	334	8	8			187	506	0.37	187	506	0.37	1523	0.0	0.0	7165	0.0	0.0
35518	143	8	8			342	315	1.09	342	315	1.08	1589	3.8	9.9	1604	2.5	0.0
35519	300	8	8			101	328	0.31	99	328	0.30	1645	0.8	0.0	7451	4.2	0.0
35520	340	8	8			14	542	0.03	14	543	0.03	1623	0.0	0.0	1624	0.0	0.0
35521	350	6	6			26	224	0.11	26	224	0.11	1653	0.0	0.0	1599	0.0	0.0
35522	255	6	6			113	157	0.72	113	157	0.72	1705	3.8	0.0	1680	2.0	0.0
35523	122	8	8			1	441	0.00	1	441	0.00	1685	0.0	0.0	1712	0.0	0.0
35525	205	10	10			429	499	0.86	683	499	1.37	1777	2.2	7.2	1778	1.4	0.0
35526	290	10	10			310	440	0.71	309	440	0.70	7228	1.3	0.0	1799	1.5	0.0
35527	314	6	6			1	331	0.00	1	331	0.00	1758	0.0	0.0	1823	7.6	0.0
35529	133	6	6			1	216	0.00	1	216	0.00	1935	0.0	0.0	1851	0.0	0.0
35530	99	6	6			38	103	0.37	77	103	0.75	1976	0.6	0.0	1953	0.0	0.0
35531	360	8	8			8	386	0.02	1	386	0.00	1952	0.0	0.0	1957	4.0	5.5
35532	239	10	10			1	799	0.00	1	799	0.00	7467	0.0	0.0	2003	0.0	0.0
35533	43	8	8			1	917	0.00	1	919	0.00	2085	0.0	0.0	2086	0.0	0.0
35534	270	8	8			14	343	0.04	14	344	0.04	2132	0.0	0.0	2110	0.0	0.0
35536	327	8	8			25	344	0.07	25	345	0.07	2201	0.0	0.0	2209	0.0	0.0
35537	69	8	8			61	351	0.17	61	352	0.17	7009	0.0	0.0	2258	0.0	0.0
35538	68	8	8			10	322	0.03	10	323	0.03	7665	0.0	0.0	2341	0.0	0.0
35540	243	15	15			207	1,176	0.18	169	1,176	0.14	2400	0.0	0.0	2401	0.0	0.0
35542	35	8	8			6	580	0.01	6	581	0.01	7667	0.0	0.0	2455	0.0	0.0
35543	233	8	8			77	1,089	0.07	77	1,090	0.07	7482	0.0	0.0	2502	0.0	0.0
35544	165	6	6			0	426	0.00	0	426	0.00	2516	0.0	0.0	2584	0.0	0.0
35545	302	10	10			16	2,686	0.01	16	2,683	0.01	2586	0.0	0.0	2566	0.0	0.0
35546	370	8	8			0	415	0.00	0	416	0.00	2593	0.0	0.0	2592	0.0	0.0
35547	437	8	8			0	604	0.00	0	605	0.00	2613	0.0	0.0	2600	0.0	0.0
35548	300	8	8			8	567	0.01	8	569	0.01	2645	0.0	0.0	2672	0.0	0.0
35549	360	12	12			442	1,081	0.41	417	1,081	0.39	2668	0.0	0.0	2667	0.0	0.0
35550	287	8	8			0	1,296	0.00	0	1,297	0.00	2653	0.0	0.0	2655	0.0	0.0
35551	330	8	8			0	608	0.00	0	608	0.00	2643	0.0	0.0	2686	0.0	0.0
35552	227	8	8			17	392	0.04	17	392	0.04	2736	0.0	0.0	7490	0.0	0.0
35553	372	8	8			35	846	0.04	35	847	0.04	2765	0.0	0.0	2764	0.0	0.0
35554	196	8	8			0	1,075	0.00	0	1,076	0.00	2705	0.0	0.0	2778	0.0	0.0
35555	190	8	8			0	415	0.00	0	416	0.00	2711	0.0	0.0	7019	0.0	0.0
35556	174	21	21			4,258	4,709	0.90	5,208	4,709	1.11	2868	0.0	0.0	2880	0.0	0.0
35557	176	8	8			13	1,074	0.01	13	1,075	0.01	7254	0.0	0.0	2920	0.0	0.0
35558	450	8	8			0	456	0.00	0	456	0.00	2930	0.0	0.0	2945	0.0	0.0
35559	258	10	10			8	747	0.01	8	747	0.01	2915	0.0	0.0	2960	0.0	0.0
35560	49	8	8			205	347	0.59	205	347	0.59	7497	0.0	0.0	3019	0.0	0.0
35561	160	8	8			92	606	0.15	92	607	0.15	3051	0.0	0.0	3052	0.0	0.0
35562	364	8	8			72	483	0.15	72	483	0.15	3109	0.0	0.0	3110	0.0	0.0
35563	250	8	8			28	424	0.07	28	425	0.07	3137	0.0	0.0	3131	0.0	0.0
35564	291	8	8			140	559	0.25	140	560	0.25	3176	0.0	0.0	3178	0.0	0.0
35565	297	8	8			1	344	0.00	1	345	0.00	3252	0.0	0.0	3271	0.0	0.0
35566	21	18	18			4,515	5,728	0.79	4,453	5,728	0.78	7507	0.0	0.0	3301	0.0	0.0
35567	243	8	8			0	356	0.00	0	357	0.00	3345	0.0	0.0	7269	0.0	0.0
35569	280	8	8			1	417	0.00	1	418	0.00	3332	0.0	0.0	3331	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35570	290	8	8			37	410	0.09	37	411	0.09	3330	0.0	0.0	3324	0.0	0.0
35571	254	8	8			38	260	0.15	1	260	0.01	3504	2.3	0.0	3464	1.5	0.0
35572	55	24	24			3,872	32,628	0.12	5,861	32,628	0.18	3433	0.0	0.0	3418	0.0	0.0
35573	293	8	8			12	344	0.03	12	344	0.03	3608	0.0	0.0	7277	0.0	0.0
35574	119	8	8			1	542	0.00	1	543	0.00	3618	0.0	0.0	3617	0.0	0.0
35575	414	8	8			0	342	0.00	0	343	0.00	3634	0.0	0.0	7278	0.0	0.0
35576	237	8	8			16	1,017	0.02	16	1,018	0.02	3668	0.0	0.0	3670	0.0	0.0
35577	100	8	8			21	415	0.05	21	416	0.05	3725	0.0	0.0	3689	0.0	0.0
35578	236	8	8			76	460	0.16	76	461	0.16	3696	0.0	0.0	3693	0.0	0.0
35579	133	10	10			431	1,972	0.22	431	1,969	0.22	3757	0.0	0.0	3771	0.0	0.0
35580	312	8	8			64	487	0.13	64	488	0.13	3812	0.0	0.0	3845	0.0	0.0
35581	137	8	8			185	963	0.19	185	963	0.19	3914	0.0	0.0	3915	0.0	0.0
35582	255	6	6			1	417	0.00	1	417	0.00	3974	0.0	0.0	3973	0.0	0.0
35583	146	8	8			25	1,455	0.02	25	1,457	0.02	3927	0.0	0.0	3926	0.0	0.0
35584	199	8	8			0	360	0.00	0	361	0.00	3988	0.0	0.0	7138	0.0	0.0
35585	150	8	8			0	1,185	0.00	0	1,186	0.00	3935	0.0	0.0	3936	0.0	0.0
35586	53	8	8			297	581	0.51	297	582	0.51	4192	0.0	0.0	7055	0.0	0.0
35587	24	8	8			1	813	0.00	1	815	0.00	4202	0.0	0.0	4201	0.0	0.0
35588	134	15	18	38	2036	956	1,424	0.67	1,498	2,315	0.65	4186	0.0	0.0	4225	0.0	0.0
35590	191	6	6			0	171	0.00	0	171	0.00	7686	0.0	0.0	4319	0.0	0.0
35591	417	8	8			15	1,078	0.01	15	1,080	0.01	4338	0.0	0.0	4296	0.0	0.0
35592	274	10	10			532	783	0.68	599	782	0.77	7546	4.5	0.0	4315	3.8	8.2
35593	225	8	8			0	1,100	0.00	0	1,101	0.00	4384	0.0	0.0	4366	0.0	0.0
35594	267	8	8			0	876	0.00	0	878	0.00	4369	0.0	0.0	4359	0.0	0.0
35595	108	8	8			13	719	0.02	13	721	0.02	4406	0.0	0.0	4415	0.0	0.0
35596	110	8	8			122	448	0.27	122	449	0.27	4478	0.0	0.0	4442	0.0	0.0
35597	380	8	8			29	1,170	0.02	29	1,172	0.02	4433	0.0	0.0	4434	0.0	0.0
35598	244	8	8			22	820	0.03	22	821	0.03	4455	0.0	0.0	4494	0.0	0.0
35599	60	8	8			0	2,006	0.00	0	2,008	0.00	4505	0.0	0.0	4506	0.0	0.0
35600	135	8	8			253	750	0.34	253	751	0.34	4546	0.0	0.0	4561	0.0	0.0
35601	69	8	8			0	403	0.00	0	403	0.00	4552	0.0	0.0	4564	0.0	0.0
35603	13	8	8			2	336	0.01	2	337	0.01	4596	0.0	0.0	4598	0.0	0.0
35604	142	8	8			285	340	0.84	285	341	0.84	4674	0.0	0.0	4644	0.0	0.0
35605	65	8	8			388	1,313	0.30	388	1,315	0.29	4642	0.0	0.0	4641	0.0	0.0
35606	222	8	8			285	333	0.85	285	334	0.85	4658	0.0	0.0	4673	0.0	0.0
35607	440	8	8			163	1,315	0.12	163	1,317	0.12	4692	0.0	0.0	4691	0.0	0.0
35608	265	8	8			849	1,313	0.65	849	1,315	0.65	4774	0.0	0.0	4749	1.1	0.0
35609	130	8	8			13	1,295	0.01	13	1,297	0.01	4738	0.0	0.0	4739	0.0	0.0
35610	277	8	8			892	937	0.95	892	938	0.95	4742	0.0	0.0	4741	0.0	0.0
35611	66	8	8			153	654	0.23	153	655	0.23	4801	1.0	0.0	4802	0.0	0.0
35612	135	8	8			21	1,236	0.02	21	1,238	0.02	7074	0.0	0.0	4834	0.0	0.0
35613	286	8	8			19	333	0.06	19	334	0.06	4864	0.0	0.0	4866	0.0	0.0
35614	350	8	8			76	1,405	0.05	76	1,407	0.05	4905	0.0	0.0	4904	0.0	0.0
35615	260	8	8			10	1,363	0.01	10	1,365	0.01	4902	0.0	0.0	4905	0.0	0.0
35616	166	8	8			1	635	0.00	1	636	0.00	4986	0.0	0.0	4939	0.0	0.0
35617	90	8	8			50	676	0.07	50	676	0.07	4967	0.0	0.0	4966	0.0	0.0
35618	186	8	8			1	660	0.00	1	660	0.00	4990	0.0	0.0	4989	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35619	260	8	8			9	1,730	0.01	9	1,732	0.01	5005	0.0	0.0	5004	0.0	0.0
35620	171	8	8			331	1,358	0.24	331	1,360	0.24	5087	0.0	0.0	5074	0.0	0.0
35621	110	8	8			640	908	0.70	640	910	0.70	5153	0.0	0.0	5152	0.0	0.0
35622	138	8	8			263	1,150	0.23	263	1,151	0.23	5213	0.0	0.0	5212	0.0	0.0
35623	219	8	8			199	1,053	0.19	199	1,055	0.19	5166	0.0	0.0	5209	0.0	0.0
35624	102	8	8			1	524	0.00	1	525	0.00	7335	0.0	0.0	5302	0.0	0.0
35625	80	8	8			31	565	0.05	31	565	0.05	5370	0.0	0.0	5371	0.0	0.0
35626	141	8	8			6	404	0.02	6	404	0.02	5383	0.0	0.0	5367	0.0	0.0
35627	98	8	8			1	604	0.00	1	606	0.00	5361	0.0	0.0	5360	0.0	0.0
35628	195	6	6			32	363	0.09	32	363	0.09	5433	0.0	0.0	5416	0.0	0.0
35629	73	8	8			43	361	0.12	43	361	0.12	5436	0.0	0.0	5435	0.0	0.0
35630	280	8	8			52	388	0.13	52	388	0.13	5497	0.0	0.0	5496	0.0	0.0
35631	304	8	8			1	393	0.00	1	394	0.00	5490	0.0	0.0	5492	0.0	0.0
35632	289	15	15			635	2,728	0.23	635	2,728	0.23	5449	0.0	0.0	5460	0.0	0.0
35633	85	18	18			1,316	2,073	0.63	1,316	2,073	0.63	5581	0.0	0.0	5564	0.0	0.0
35634	320	8	8			1	297	0.00	1	298	0.00	5635	0.0	0.0	5631	0.0	0.0
35635	272	18	18			1	1,787	0.00	1	1,787	0.00	5606	0.0	0.0	5625	0.0	0.0
35636	330	8	8			243	296	0.82	243	297	0.82	5689	0.0	0.0	5711	0.0	0.0
35637	495	8	8			53	303	0.18	40	303	0.13	5698	3.0	0.0	5697	3.1	0.0
35638	308	8	8			112	1,056	0.11	112	1,058	0.11	5719	0.0	0.0	5718	0.0	0.0
35639	405	8	8			324	295	1.10	324	296	1.10	5775	5.0	5.0	7603	0.0	0.0
35640	128	8	8			137	401	0.34	137	401	0.34	5846	0.0	0.0	5845	0.0	0.0
35641	53	8	8			2	281	0.01	2	282	0.01	7422	0.0	0.0	5868	0.0	0.0
35642	170	8	8			3	488	0.01	3	488	0.01	5863	0.0	0.0	7101	7.2	0.0
35643	193	8	8			1	923	0.00	1	924	0.00	7102	0.0	0.0	5931	1.8	0.0
35644	18	8	8			31	453	0.07	2	454	0.00	5944	3.8	0.0	5929	3.8	0.0
35645	105	8	8			1	451	0.00	1	451	0.00	6014	0.0	0.0	5993	0.0	0.0
35646	415	8	8			16	629	0.03	16	630	0.03	5966	0.0	0.0	5967	0.0	0.0
35647	151	8	8			1	1,794	0.00	1	1,797	0.00	6015	0.0	0.0	6072	0.0	0.0
35648	145	8	8			23	455	0.05	23	456	0.05	6076	0.0	0.0	6077	0.0	0.0
35649	247	18	18			2,548	4,595	0.55	3,001	4,595	0.65	6085	0.0	0.0	6091	0.0	0.0
35650	317	8	8			1	422	0.00	1	422	0.00	6173	0.0	0.0	7617	0.0	0.0
35651	310	8	8			1	1,030	0.00	1	1,031	0.00	6196	0.0	0.0	6197	0.0	0.0
35652	236	8	8			42	910	0.05	42	910	0.05	6244	0.0	0.0	7109	0.0	0.0
35653	371	8	8			24	978	0.02	24	980	0.02	6229	0.0	0.0	6228	0.0	0.0
35654	310	8	8			8	300	0.03	8	322	0.03	6338	0.0	0.0	6292	0.0	0.0
35655	202	8	8			175	1,276	0.14	175	1,278	0.14	6379	0.0	0.0	7160	0.0	0.0
35656	29	8	8			475	641	0.74	475	642	0.74	6409	0.0	0.0	6413	0.0	0.0
35657	365	8	8			8	1,210	0.01	8	1,212	0.01	6455	0.0	0.0	6456	0.0	0.0
35658	176	8	8			1	1,260	0.00	1	1,262	0.00	6495	0.0	0.0	6448	0.0	0.0
35659	156	8	8			28	1,176	0.02	28	1,178	0.02	6482	0.0	0.0	6472	0.0	0.0
35660	138	8	8			13	1,914	0.01	13	1,916	0.01	6505	0.0	0.0	7205	0.0	0.0
35661	160	8	8			0	335	0.00	0	359	0.00	6515	0.0	0.0	6546	0.0	0.0
35662	34	8	8			26	470	0.06	26	504	0.05	6568	0.0	0.0	6569	0.0	0.0
35663	220	8	8			0	672	0.00	0	722	0.00	6669	0.0	0.0	6686	5.9	0.0
35664	280	8	8			0	259	0.00	0	278	0.00	6693	0.0	0.0	6694	0.0	0.0
35665	250	6	6			0	239	0.00	0	256	0.00	6675	0.0	0.0	6703	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35666	149	8	8			1	918	0.00	1	985	0.00	6735	0.0	0.0	6736	0.0	0.0
35667	223	8	12	24	2036	73	278	0.26	56	878	0.06	6781	0.0	0.0	6780	3.0	0.0
35668	130	8	8			0	470	0.00	0	504	0.00	6836	0.0	0.0	6835	0.0	0.0
35669	144	8	8			28	333	0.09	28	357	0.08	7641	0.0	0.0	7124	0.0	0.0
35670	186	8	8			37	297	0.12	37	318	0.12	6924	0.0	0.0	6918	0.0	0.0
35672	329	8	8			20	1,504	0.01	20	1,614	0.01	6405	0.0	0.0	6440	0.0	0.0
35673	213	8	8			67	860	0.08	67	862	0.08	6499	0.0	0.0	6125	0.0	0.0
35674	224	8	8			1	640	0.00	1	641	0.00	6177	0.0	0.0	5746	0.0	0.0
35675	460	18	18			135	3,503	0.04	135	3,503	0.04	5644	0.0	0.0	5872	0.0	0.0
35676	563	8	8			15	372	0.04	15	372	0.04	5314	0.0	0.0	5706	0.0	0.0
35677	390	8	8			76	397	0.19	1	397	0.00	5404	2.2	0.0	4934	0.0	0.0
35678	308	8	8			2	761	0.00	2	762	0.00	7147	0.0	0.0	4568	0.0	0.0
35679	123	8	8			28	1,110	0.03	28	1,112	0.02	4841	0.0	0.0	4437	0.0	0.0
35680	253	10	10			58	886	0.07	58	885	0.07	4373	0.0	0.0	4042	0.0	0.0
35681	179	6	6			1	408	0.00	1	408	0.00	3862	0.0	0.0	3918	0.0	0.0
35682	350	10	10			232	706	0.33	232	705	0.33	5494	0.0	0.0	3420	0.0	0.0
35683	70	8	8			0	383	0.00	0	384	0.00	3593	0.0	0.0	3244	0.0	0.0
35684	208	8	8			9	1,849	0.00	9	1,851	0.00	2959	0.0	0.0	2683	0.0	0.0
35685	300	8	8			10	1,476	0.01	10	1,478	0.01	2819	0.0	0.0	2585	0.0	0.0
35686	300	8	8			19	350	0.05	19	351	0.05	2261	0.0	0.0	2418	0.0	0.0
35687	533	6	6			1	143	0.00	1	143	0.00	1930	0.0	0.0	1786	5.4	0.0
35688	266	10	15	8	Existing	639	612	1.04	808	1,804	0.45	1499	3.4	0.0	7460	3.3	0.0
35689	272	8	8			60	342	0.17	60	342	0.17	1165	0.0	0.0	1147	0.0	0.0
35690	173	8	8			62	485	0.13	62	485	0.13	1321	0.0	0.0	1300	0.0	0.0
35691	145	8	8			20	688	0.03	20	688	0.03	1318	0.0	0.0	1317	0.0	0.0
35692	333	12	12			373	1,429	0.26	373	1,429	0.26	1380	0.0	0.0	1381	0.0	0.0
35693	250	8	8			3	401	0.01	3	402	0.01	1395	0.0	0.0	1396	0.0	0.0
35694	233	8	8			5	565	0.01	5	566	0.01	1432	0.0	0.0	1431	0.0	0.0
35695	371	6	6			1	121	0.01	1	121	0.01	7448	0.0	0.0	7446	0.0	0.0
35696	289	8	8			79	239	0.33	79	240	0.33	1556	0.0	0.0	1557	0.0	0.0
35697	333	8	8			338	606	0.56	338	607	0.56	7220	0.0	0.0	6992	0.0	0.0
35698	220	6	6			1	206	0.00	1	206	0.00	1596	0.0	0.0	1591	0.0	0.0
35699	300	8	8			31	312	0.10	31	312	0.10	1611	0.0	0.0	1612	0.0	0.0
35700	320	8	8			188	284	0.66	188	285	0.66	1703	4.0	0.0	1691	5.2	0.0
35701	294	6	6			63	184	0.34	63	184	0.34	1681	0.0	0.0	7225	0.0	0.0
35702	327	6	6			66	159	0.41	66	159	0.41	1717	0.0	0.0	1680	2.0	0.0
35703	325	6	6			3	147	0.02	1	147	0.01	7458	0.0	0.0	1810	5.1	0.0
35704	252	8	8			50	278	0.18	1	278	0.00	1774	4.4	0.0	1775	3.4	0.0
35705	439	8	8			65	295	0.22	1	296	0.00	1829	2.6	0.0	1828	1.5	0.0
35706	7	10	10			751	1,627	0.46	1,001	1,625	0.62	1928	5.8	0.0	7465	5.8	0.0
35707	241	6	6			67	255	0.26	67	255	0.26	1906	0.0	0.0	1905	0.0	0.0
35708	297	8	8			144	890	0.16	1	891	0.00	7463	0.0	0.0	1920	2.7	0.0
35709	305	8	8			1	449	0.00	1	450	0.00	1926	0.0	0.0	1925	0.0	0.0
35710	328	8	8			1	405	0.00	1	406	0.00	1991	0.0	0.0	1993	0.0	0.0
35711	38	8	8			216	292	0.74	217	292	0.74	2136	0.0	0.0	2140	0.0	0.0
35712	140	8	8			28	389	0.07	28	390	0.07	2112	0.0	0.0	2111	0.0	0.0
35713	262	10	10			35	540	0.06	35	540	0.06	2179	0.0	0.0	2177	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35714	438	8	8			342	344	0.99	342	344	0.99	2204	0.0	0.0	2203	5.8	5.8
35715	182	10	10			465	515	0.90	486	515	0.94	2265	3.2	0.0	2263	2.5	0.0
35716	190	8	8			33	377	0.09	31	378	0.08	2291	5.6	0.0	2290	4.0	0.0
35717	177	8	8			1	376	0.00	1	376	0.00	2300	0.0	0.0	2293	0.0	0.0
35718	225	8	8			8	345	0.02	8	345	0.02	2392	0.0	0.0	2394	0.0	0.0
35719	415	8	8			8	352	0.02	8	353	0.02	7393	0.0	0.0	2456	0.0	0.0
35720	250	6	6			8	540	0.01	8	540	0.01	2550	0.0	0.0	2551	0.0	0.0
35722	58	8	8			12	385	0.03	12	386	0.03	2572	0.0	0.0	2571	0.0	0.0
35723	67	8	8			18	1,575	0.01	18	1,577	0.01	2664	0.0	0.0	2665	0.0	0.0
35724	43	8	12	37	ura	501	608	0.83	503	1,792	0.28	2734	0.0	0.0	2720	0.0	0.0
35725	308	8	8			133	741	0.18	133	742	0.18	2726	0.0	0.0	2725	0.0	0.0
35726	113	8	8			0	371	0.00	0	372	0.00	2708	0.0	0.0	7178	0.0	0.0
35727	379	8	8			218	1,427	0.15	218	1,429	0.15	2824	0.0	0.0	2825	0.0	0.0
35728	155	8	8			1	1,285	0.00	1	1,286	0.00	2913	0.0	0.0	2965	0.0	0.0
35729	178	6	6			0	215	0.00	0	215	0.00	2905	0.0	0.0	2972	0.0	0.0
35730	335	8	8			80	565	0.14	80	565	0.14	3022	0.0	0.0	7399	2.3	0.0
35731	248	12	12			420	831	0.51	420	831	0.51	3135	0.0	0.0	3091	0.0	0.0
35732	174	8	8			15	462	0.03	15	463	0.03	3121	0.0	0.0	3122	0.0	0.0
35733	138	8	8			4	340	0.01	4	340	0.01	7264	0.0	0.0	3174	0.0	0.0
35734	279	8	8			1	344	0.00	1	344	0.00	3189	0.0	0.0	3198	0.0	0.0
35735	300	8	8			1	402	0.00	1	403	0.00	3257	0.0	0.0	3264	0.0	0.0
35736	366	8	8			35	294	0.12	1	294	0.00	3308	0.0	0.0	3360	1.9	0.0
35737	360	8	8			98	316	0.31	156	317	0.49	3312	4.6	0.0	3313	3.2	0.0
35738	323	8	8			46	344	0.13	46	344	0.13	3369	0.0	0.0	3315	0.0	0.0
35739	7	12	12			433	1,183	0.37	432	1,183	0.37	3419	0.0	0.0	7274	0.0	0.0
35740	381	14	18	10	Existing	1,824	1,362	1.34	2,145	2,662	0.81	10106	5.7	0.0	3438	8.3	0.0
35741	132	8	8			140	260	0.54	138	260	0.53	3449	7.5	0.0	7035	4.1	0.0
35742	92	15	24	6	Existing	2,047	1,666	1.23	3,721	5,833	0.64	7036	8.8	0.0	3417	0.0	0.0
35743	185	8	8			179	422	0.43	179	422	0.43	3513	0.0	0.0	7275	0.0	0.0
35744	186	8	8			1	1,207	0.00	1	1,208	0.00	3569	0.0	0.0	3559	0.0	0.0
35745	224	6	6			1	276	0.00	1	276	0.00	3626	0.0	0.0	3645	0.0	0.0
35746	282	8	8			79	1,020	0.08	79	1,022	0.08	3703	0.0	0.0	7279	0.0	0.0
35748	200	6	6			1	539	0.00	1	539	0.00	3789	0.0	0.0	3808	0.0	0.0
35749	161	8	8			20	1,303	0.02	20	1,304	0.02	3804	0.0	0.0	3805	0.0	0.0
35750	120	8	8			317	898	0.35	317	899	0.35	3835	0.0	0.0	3843	0.0	0.0
35751	112	10	10			184	766	0.24	184	765	0.24	3820	0.0	0.0	3819	0.0	0.0
35752	118	6	6			0	345	0.00	0	345	0.00	3787	0.0	0.0	3850	0.0	0.0
35753	334	8	8			11	1,138	0.01	11	1,139	0.01	3910	0.0	0.0	3914	0.0	0.0
35754	39	8	8			56	1,085	0.05	56	1,087	0.05	3983	0.0	0.0	7050	0.0	0.0
35756	49	10	15	43	2036	754	590	1.28	1,167	1,738	0.67	4083	6.6	0.0	4109	7.4	0.0
35757	344	8	8			0	1,156	0.00	0	1,157	0.00	7538	0.0	0.0	4084	0.0	0.0
35758	127	8	8			22	781	0.03	22	781	0.03	4044	0.0	0.0	4043	0.0	0.0
35759	480	15	15			791	1,405	0.56	791	1,405	0.56	7294	0.0	0.0	4094	0.0	0.0
35761	238	8	8			116	495	0.23	116	496	0.23	4161	0.0	0.0	4160	0.0	0.0
35762	89	8	8			0	290	0.00	0	291	0.00	4231	0.0	0.0	4230	0.0	0.0
35763	117	8	8			12	317	0.04	12	317	0.04	4345	0.0	0.0	4307	0.0	0.0
35764	176	8	8			1	1,522	0.00	1	1,523	0.00	4401	0.0	0.0	4400	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35765	190	8	8			26	1,009	0.03	26	1,010	0.03	7145	0.0	0.0	4448	0.0	0.0
35766	285	8	8			10	1,569	0.01	10	1,571	0.01	4504	0.0	0.0	4528	0.0	0.0
35767	206	8	8			25	971	0.03	25	972	0.03	4542	0.0	0.0	4543	0.0	0.0
35768	269	8	8			0	1,965	0.00	0	1,967	0.00	7189	0.0	0.0	4563	0.0	0.0
35769	40	8	8			43	542	0.08	43	543	0.08	4583	0.0	0.0	4605	0.0	0.0
35770	240	8	8			6	1,212	0.00	6	1,214	0.00	7146	0.0	0.0	4662	0.0	0.0
35771	195	8	8			13	2,189	0.01	13	2,192	0.01	7411	0.0	0.0	4697	0.0	0.0
35772	154	8	8			194	1,303	0.15	194	1,305	0.15	4756	0.0	0.0	4757	0.0	0.0
35773	225	8	8			7	1,982	0.00	7	1,984	0.00	4795	0.0	0.0	4794	0.0	0.0
35774	182	6	6			1	581	0.00	1	581	0.00	4707	0.0	0.0	4791	0.0	0.0
35775	101	8	8			1	1,323	0.00	1	1,325	0.00	4718	0.0	0.0	4717	0.0	0.0
35776	52	8	8			34	530	0.06	34	531	0.06	4727	0.0	0.0	4728	0.0	0.0
35777	400	8	8			2	2,040	0.00	1	2,042	0.00	7567	0.0	0.0	4812	0.0	0.0
35778	99	8	8			10	1,225	0.01	10	1,227	0.01	4897	0.0	0.0	4896	0.0	0.0
35779	249	8	8			1	1,163	0.00	1	1,165	0.00	7077	0.0	0.0	4982	0.0	0.0
35780	500	12	12			1,520	3,274	0.46	1,858	3,274	0.57	7572	0.0	0.0	4973	0.0	0.0
35781	140	8	8			124	860	0.14	124	861	0.14	7329	0.0	0.0	5059	0.0	0.0
35783	115	8	8			14	1,815	0.01	14	1,817	0.01	5094	0.0	0.0	5093	0.0	0.0
35784	154	8	8			1	2,134	0.00	1	2,137	0.00	5106	0.0	0.0	5105	0.0	0.0
35785	250	6	6			1	792	0.00	1	792	0.00	5127	0.0	0.0	5148	0.0	0.0
35786	172	8	8			53	1,265	0.04	53	1,266	0.04	5161	0.0	0.0	8641	0.0	0.0
35787	20	8	8			46	1,092	0.04	46	1,093	0.04	5195	0.0	0.0	5194	0.0	0.0
35788	24	8	8			0	657	0.00	0	658	0.00	5236	0.0	0.0	5205	0.0	0.0
35789	175	8	8			1	1,124	0.00	1	1,126	0.00	5226	0.0	0.0	5167	0.0	0.0
35790	261	6	6			1	573	0.00	1	573	0.00	5240	0.0	0.0	7086	0.0	0.0
35791	260	8	8			143	488	0.29	142	488	0.29	5283	4.0	0.0	5281	0.0	0.0
35792	191	8	8			1	261	0.00	1	262	0.00	5320	0.0	0.0	5322	0.0	0.0
35793	275	8	8			7	692	0.01	7	693	0.01	5406	0.0	0.0	5413	0.0	0.0
35794	378	8	8			15	399	0.04	15	399	0.04	5526	0.0	0.0	5518	0.0	0.0
35795	100	8	8			1	670	0.00	1	671	0.00	5469	0.0	0.0	5456	0.0	0.0
35796	120	10	10			514	583	0.88	507	583	0.87	5464	0.0	0.0	5463	2.5	0.0
35797	300	8	8			44	474	0.09	44	474	0.09	5568	0.0	0.0	5582	0.0	0.0
35798	264	8	8			631	342	1.85	165	342	0.48	5570	8.2	0.0	5573	0.0	0.0
35799	155	8	8			1	343	0.00	1	344	0.00	5620	0.0	0.0	5621	0.0	0.0
35800	250	8	15	19	Existing	559	297	1.88	1,150	1,589	0.72	5677	1.0	0.0	5673	0.0	0.0
35801	238	8	8			52	638	0.08	52	638	0.08	5707	0.0	0.0	5708	0.0	0.0
35802	80	8	8			46	302	0.15	46	302	0.15	5780	0.0	0.0	5779	0.0	0.0
35803	277	8	8			35	685	0.05	35	686	0.05	5778	0.0	0.0	5838	0.0	0.0
35804	480	8	8			56	462	0.12	56	463	0.12	5842	0.0	0.0	5841	0.0	0.0
35805	59	10	15	18	Existing	463	333	1.39	774	981	0.79	5860	5.3	0.0	5838	0.0	0.0
35808	302	10	10			551	341	1.62	551	341	1.62	5969	7.1	7.1	5977	0.0	0.0
35809	63	8	8			94	412	0.23	94	413	0.23	6080	0.0	0.0	7612	0.0	0.0
35810	106	8	8			6	1,719	0.00	6	1,721	0.00	6023	0.0	0.0	6065	0.0	0.0
35811	121	8	8			0	958	0.00	0	959	0.00	6029	0.0	0.0	6052	0.0	0.0
35812	150	8	8			1	1,481	0.00	1	1,483	0.00	6104	0.0	0.0	7107	0.0	0.0
35813	67	8	8			1	350	0.00	45	351	0.13	7709	0.0	5.1	6109	0.0	5.3
35814	182	6	6			32	372	0.09	32	372	0.09	6182	0.0	0.0	7426	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35815	51	8	8			30	401	0.07	30	402	0.07	6223	0.0	0.0	6224	0.0	0.0
35816	295	18	24	41	2036	3,137	2,883	1.09	3,600	6,210	0.58	6195	2.4	0.0	7110	2.2	0.0
35817	415	8	8			10	298	0.03	10	320	0.03	6327	0.0	0.0	7729	0.0	0.0
35818	395	8	8			10	867	0.01	10	930	0.01	7621	0.0	0.0	7427	0.0	0.0
35819	152	8	8			25	738	0.03	25	792	0.03	6346	0.0	0.0	7622	0.0	0.0
35820	56	6	6			0	170	0.00	0	182	0.00	6277	0.0	0.0	6342	0.0	0.0
35821	113	8	8			0	300	0.00	0	322	0.00	6281	0.0	0.0	7159	0.0	0.0
35822	65	8	8			218	2,189	0.10	218	2,192	0.10	6399	0.0	0.0	6400	0.0	0.0
35823	105	8	8			453	1,185	0.38	453	1,188	0.38	6462	0.0	0.0	6461	0.0	0.0
35824	141	8	8			332	592	0.56	332	592	0.56	6503	0.0	0.0	6433	0.0	0.0
35825	335	8	12	22	ura	244	334	0.73	244	1,055	0.23	7430	0.0	0.0	6529	0.0	0.0
35826	331	8	8			97	719	0.14	97	772	0.13	7632	0.0	0.0	7373	0.0	0.0
35827	78	8	8			15	297	0.05	15	318	0.05	6605	0.0	0.0	6606	0.0	0.0
35828	111	8	8			0	509	0.00	0	546	0.00	6616	0.0	0.0	7375	0.0	0.0
35829	132	8	8			0	298	0.00	0	319	0.00	6608	0.0	0.0	6660	0.0	0.0
35830	60	8	8			0	616	0.00	0	661	0.00	6708	0.0	0.0	6680	0.0	0.0
35832	405	8	8			1	84	0.02	1	85	0.02	6842	0.0	0.0	6841	0.0	0.0
35833	14	8	8			0	333	0.00	0	357	0.00	6852	0.0	0.0	6817	0.0	0.0
35834	159	8	8			257	228	1.12	257	228	1.12	3781	0.0	0.0	9229	0.0	0.0
35834_1	287	8	8			270	456	0.59	270	457	0.59	9229	0.0	0.0	2866	0.0	0.0
35835	94	10	15	2	Existing	831	786	1.06	1,371	2,317	0.59	1912	0.7	0.0	2014	0.4	0.0
35836	320	8	8			33	328	0.10	33	328	0.10	1629	0.0	0.0	1630	0.0	0.0
35837	180	6	6			12	183	0.06	1	183	0.00	1752	8.0	0.0	1787	5.5	0.0
35838	280	10	10			197	822	0.24	163	821	0.20	1965	6.0	0.0	7387	3.9	0.0
35839	231	6	6			37	163	0.23	1	163	0.00	2015	1.3	0.0	7388	1.5	0.0
35841	201	8	8			13	728	0.02	13	730	0.02	2497	0.0	0.0	2498	0.0	0.0
35842	40	8	8			47	1,010	0.05	47	1,010	0.05	2628	0.0	0.0	2627	0.0	0.0
35843	364	10	10			114	717	0.16	114	717	0.16	2778	0.0	0.0	2777	0.0	0.0
35844	254	8	8			0	824	0.00	0	826	0.00	2754	0.0	0.0	7252	0.0	0.0
35845	135	8	8			1	1,572	0.00	1	1,574	0.00	7398	0.0	0.0	2942	0.0	0.0
35846	115	8	8			210	388	0.54	210	389	0.54	3019	0.0	0.0	3020	6.9	0.0
35847	86	6	6			3	169	0.02	3	169	0.02	3073	0.0	0.0	7501	0.0	0.0
35849	44	10	10			38	622	0.06	38	622	0.06	3732	0.0	0.0	3709	0.0	0.0
35850	195	8	8			40	557	0.07	40	558	0.07	3905	0.0	0.0	3984	0.0	0.0
35851	500	8	8			90	441	0.20	90	442	0.20	4184	0.0	0.0	4152	0.0	0.0
35852	93	8	8			1	297	0.00	1	297	0.00	4177	0.0	0.0	4211	0.0	0.0
35853	288	8	8			0	367	0.00	0	367	0.00	4334	0.0	0.0	4333	0.0	0.0
35854	80	8	8			510	561	0.91	510	562	0.91	4367	0.0	0.0	4359	0.0	0.0
35855	160	8	8			188	315	0.60	188	316	0.60	4484	0.0	0.0	4432	0.0	0.0
35856	420	8	8			388	715	0.54	388	716	0.54	4640	0.0	0.0	4667	0.0	0.0
35857	55	8	8			0	1,099	0.00	0	1,100	0.00	7691	0.0	0.0	4841	0.0	0.0
35858	242	8	8			0	1,208	0.00	0	1,210	0.00	4850	0.0	0.0	4858	0.0	0.0
35859	372	8	8			13	1,724	0.01	13	1,726	0.01	4901	0.0	0.0	4903	0.0	0.0
35860	150	8	8			1	1,309	0.00	1	1,310	0.00	4947	0.0	0.0	4948	0.0	0.0
35861	200	8	8			5	1,058	0.00	5	1,060	0.00	5423	0.0	0.0	5379	0.0	0.0
35862	125	8	8			8	1,224	0.01	8	1,225	0.01	5428	0.0	0.0	7340	0.0	0.0
35863	104	8	8			2	1,015	0.00	2	1,016	0.00	5359	0.0	0.0	5358	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35864	152	8	8			4	295	0.01	4	296	0.01	5353	0.0	0.0	5354	0.0	0.0
35865	255	6	6			1	193	0.00	1	193	0.00	5615	0.0	0.0	7421	0.0	0.0
35867	360	8	8			1	479	0.00	1	480	0.00	6163	0.0	0.0	6156	0.0	0.0
35868	222	8	8			1	1,273	0.00	1	1,275	0.00	6416	0.0	0.0	7368	0.0	0.0
35869	116	8	8			0	1,664	0.00	0	1,666	0.00	6415	0.0	0.0	6448	0.0	0.0
35870	145	8	8			0	342	0.00	0	367	0.00	6565	0.0	0.0	6566	0.0	0.0
35872	324	10	10			156	399	0.39	156	427	0.37	7433	0.0	0.0	6895	0.0	0.0
35873	257	8	8			37	293	0.13	37	315	0.12	7644	0.0	0.0	6906	0.0	0.0
35874	480	8	8			310	299	1.04	310	299	1.04	4261	1.8	1.8	7143	0.0	0.0
35875	240	8	8			4	692	0.01	4	692	0.01	7287	0.0	0.0	3766	0.0	0.0
35876	498	8	8			11	408	0.03	11	409	0.03	1230	0.0	0.0	1149	0.0	0.0
35877	20	8	8			0	2,193	0.00	0	2,197	0.00	1112	0.0	0.0	1102	0.0	0.0
35878	255	8	8			65	493	0.13	65	494	0.13	7214	0.0	0.0	1373	0.0	0.0
35879	290	8	8			1	343	0.00	1	344	0.00	1404	0.0	0.0	1403	0.0	0.0
35880	178	8	8			57	692	0.08	57	693	0.08	1369	0.0	0.0	1370	0.0	0.0
35881	253	8	8			2	297	0.01	2	298	0.01	1489	0.0	0.0	1549	0.0	0.0
35882	382	12	15	12	2036	1,251	1,172	1.07	1,251	2,124	0.59	6990	6.0	0.0	1550	6.9	0.0
35883	355	6	6			28	158	0.18	28	158	0.18	1566	0.0	0.0	1530	0.0	0.0
35884	225	6	6			63	161	0.39	63	161	0.39	1527	0.0	0.0	1526	0.0	0.0
35885	210	8	8			56	293	0.19	56	294	0.19	1731	0.0	0.0	1697	0.0	0.0
35886	375	10	15	2	Existing	828	808	1.02	1,369	2,381	0.58	1872	1.0	0.0	1911	0.8	0.0
35887	362	8	8			158	549	0.29	192	549	0.35	1873	0.0	0.0	1874	3.5	0.0
35888	460	6	6			201	132	1.53	201	132	1.53	1958	0.0	0.0	1943	0.0	0.0
35889	290	27	27			4,299	8,520	0.50	6,279	8,520	0.74	2020	0.0	0.0	1990	0.0	0.0
35890	332	8	8			14	343	0.04	14	344	0.04	2117	0.0	0.0	2136	0.0	0.0
35891	76	33	33			7,524	10,546	0.71	9,640	10,546	0.91	7390	0.0	0.0	7238	0.0	0.0
35892	498	8	8			13	344	0.04	13	344	0.04	2210	0.0	0.0	2209	0.0	0.0
35893	340	8	8			18	487	0.04	18	488	0.04	2280	0.0	0.0	2279	0.0	0.0
35894	23	8	8			29	759	0.04	29	760	0.04	2345	0.0	0.0	7392	0.0	0.0
35895	18	8	8			334	495	0.67	334	496	0.67	2422	0.0	0.0	2423	0.0	0.0
35897	234	6	6			5	520	0.01	5	520	0.01	2547	0.0	0.0	2597	0.0	0.0
35898	370	12	12			53	1,737	0.03	53	1,737	0.03	2660	0.0	0.0	2665	0.0	0.0
35899	301	21	21			3,735	10,714	0.35	4,687	10,714	0.44	2908	0.0	0.0	2948	0.0	0.0
35900	275	8	8			11	543	0.02	11	544	0.02	3061	0.0	0.0	3060	0.0	0.0
35901	353	8	8			20	332	0.06	20	332	0.06	3038	0.0	0.0	3039	0.0	0.0
35902	136	8	8			74	389	0.19	74	390	0.19	3110	0.0	0.0	3080	0.0	0.0
35903	140	8	8			1	399	0.00	1	400	0.00	3205	0.0	0.0	3204	0.0	0.0
35904	358	10	10			460	1,056	0.44	460	1,055	0.44	3248	0.0	0.0	3266	0.0	0.0
35906	80	15	15			481	1,890	0.25	481	1,890	0.25	3298	0.0	0.0	3299	0.0	0.0
35907	445	15	15			1,628	1,706	0.95	1,651	1,706	0.97	3341	5.8	6.0	3381	6.6	6.8
35909	187	24	24			1	25,104	0.00	1	25,104	0.00	3479	0.0	0.0	3484	0.0	0.0
35910	123	8	8			85	364	0.23	82	365	0.22	3489	10.3	0.0	3488	8.2	0.0
35911	33	8	8			1	441	0.00	1	441	0.00	3445	0.0	0.0	3500	0.0	0.0
35912	292	6	6			19	267	0.07	19	267	0.07	3609	0.0	0.0	7277	0.0	0.0
35913	175	8	8			53	501	0.11	53	501	0.11	3589	0.0	0.0	3590	0.0	0.0
35914	185	6	6			1	262	0.00	1	262	0.00	3549	0.0	0.0	3601	0.0	0.0
35915	50	8	8			1	1,703	0.00	1	1,706	0.00	7518	0.0	0.0	3591	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35916	200	8	8			0	374	0.00	0	374	0.00	3706	0.0	0.0	3705	0.0	0.0
35917	74	8	8			0	483	0.00	0	483	0.00	7521	0.0	0.0	3660	0.0	0.0
35918	232	8	8			224	1,013	0.22	224	1,015	0.22	7522	0.0	0.0	3674	0.0	0.0
35919	159	8	8			3	849	0.00	3	850	0.00	3692	0.0	0.0	3693	0.0	0.0
35920	293	6	6			26	252	0.10	26	252	0.10	3864	0.0	0.0	3821	0.0	0.0
35921	265	8	8			1	1,001	0.00	1	1,002	0.00	3876	0.0	0.0	7046	0.0	0.0
35922	23	8	8			292	1,160	0.25	292	1,161	0.25	3827	0.0	0.0	7528	0.0	0.0
35923	322	6	6			1	255	0.00	1	255	0.00	3912	0.0	0.0	3913	0.0	0.0
35924	146	8	8			249	949	0.26	249	951	0.26	3960	0.0	0.0	3968	0.0	0.0
35925	468	8	8			98	576	0.17	98	576	0.17	7536	0.0	0.0	4059	0.0	0.0
35926	176	6	6			5	460	0.01	5	460	0.01	4023	0.0	0.0	4114	3.0	0.0
35927	131	8	8			6	363	0.02	6	363	0.02	4040	0.0	0.0	4098	0.0	0.0
35928	180	8	8			11	596	0.02	11	597	0.02	4150	0.0	0.0	4176	0.0	0.0
35929	301	8	8			14	964	0.01	14	965	0.01	7298	0.0	0.0	4242	0.0	0.0
35930	100	8	8			1	556	0.00	1	557	0.00	4336	0.0	0.0	4335	0.0	0.0
35931	136	8	8			156	1,113	0.14	156	1,115	0.14	4325	0.0	0.0	4324	0.0	0.0
35932	377	8	8			76	1,250	0.06	76	1,252	0.06	4428	0.0	0.0	4469	0.0	0.0
35933	157	8	8			8	1,926	0.00	8	1,928	0.00	4623	0.0	0.0	7559	0.0	0.0
35934	367	8	8			72	1,774	0.04	72	1,776	0.04	4765	0.0	0.0	4764	0.0	0.0
35935	32	8	8			207	1,148	0.18	207	1,149	0.18	5077	0.0	0.0	5081	0.0	0.0
35936	291	8	8			249	371	0.67	249	372	0.67	5063	0.0	0.0	5085	0.0	0.0
35937	169	8	8			1	830	0.00	1	831	0.00	5096	0.0	0.0	5045	0.0	0.0
35938	189	6	6			2	624	0.00	2	624	0.00	5042	0.0	0.0	5041	0.0	0.0
35939	52	8	8			305	415	0.73	305	416	0.73	5220	0.0	0.0	5219	0.0	0.0
35940	237	8	8			1	1,147	0.00	1	1,149	0.00	5310	0.0	0.0	5309	0.0	0.0
35941	310	8	8			1	540	0.00	1	542	0.00	5249	0.0	0.0	7088	0.0	0.0
35942	132	8	8			1	1,050	0.00	1	1,051	0.00	5268	0.0	0.0	5269	0.0	0.0
35943	322	8	8			13	1,213	0.01	13	1,215	0.01	5312	0.0	0.0	5313	0.0	0.0
35944	17	6	6			0	331	0.00	0	331	0.00	5533	0.0	0.0	5513	0.0	0.0
35945	190	8	8			12	1,222	0.01	12	1,223	0.01	5479	0.0	0.0	5452	0.0	0.0
35946	279	15	15			621	3,661	0.17	621	3,661	0.17	5453	0.0	0.0	5449	0.0	0.0
35947	272	18	18			1,163	2,054	0.57	1,163	2,054	0.57	7341	0.0	0.0	5467	0.0	0.0
35948	334	12	18	19	Existing	806	703	1.15	1,432	2,074	0.69	5709	3.6	0.0	5710	5.2	0.0
35949	490	8	8			42	1,059	0.04	42	1,060	0.04	5727	0.0	0.0	5675	0.0	0.0
35950	218	8	8			37	343	0.11	37	343	0.11	5761	0.0	0.0	5762	0.0	0.0
35951	500	8	8			29	420	0.07	29	421	0.07	5768	0.0	0.0	5774	0.0	0.0
35952	245	8	8			1	397	0.00	1	397	0.00	5886	0.0	0.0	5862	0.0	0.0
35953	29	8	8			120	816	0.15	120	817	0.15	5962	0.0	0.0	5961	0.0	0.0
35954	350	8	8			97	1,163	0.08	97	1,164	0.08	6113	0.0	0.0	6115	0.0	4.8
35955	74	8	8			1	913	0.00	1	914	0.00	6062	0.0	0.0	6061	0.0	0.0
35956	118	15	15			2,628	2,992	0.88	3,078	2,992	1.03	6133	0.0	0.0	6098	0.0	0.0
35957	162	18	18			2,547	6,374	0.40	3,001	6,374	0.47	6044	0.0	0.0	6085	0.0	0.0
35959	87	6	6			0	140	0.00	0	151	0.00	6264	0.0	0.0	6311	0.0	0.0
35960	125	8	8			79	470	0.17	79	504	0.16	6300	0.0	0.0	6285	0.0	0.0
35961	315	8	8			238	610	0.39	238	610	0.39	6406	0.0	0.0	6402	0.0	0.0
35962	180	8	8			28	297	0.10	28	319	0.09	6618	0.0	0.0	6617	0.0	0.0
35963	152	8	8			71	387	0.18	71	415	0.17	6635	0.0	0.0	6656	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35964	405	15	15			685	2,747	0.25	685	2,943	0.23	7634	0.0	0.0	6665	0.0	0.0
35965	249	8	8			0	346	0.00	0	372	0.00	6794	0.0	0.0	6796	0.0	0.0
35966	117	8	8			0	328	0.00	0	352	0.00	6762	0.0	0.0	6764	0.0	0.0
35967	340	8	8			17	472	0.04	17	506	0.03	6810	0.0	0.0	7642	0.0	0.0
35969	220	8	8			0	297	0.00	0	319	0.00	8440	0.0	0.0	6916	0.0	0.0
35970	322	8	8			12	453	0.03	12	487	0.02	7429	0.0	0.0	6293	0.0	0.0
35971	352	8	8			17	404	0.04	17	405	0.04	6160	0.0	0.0	6221	0.0	0.0
35972	55	8	8			11	329	0.03	11	330	0.03	5393	0.0	0.0	5257	0.0	0.0
35973	17	8	8			36	806	0.04	36	808	0.04	4893	0.0	0.0	5028	0.0	0.0
35974	212	8	8			6	1,492	0.00	6	1,494	0.00	4582	0.0	0.0	4659	0.0	0.0
35976	293	8	8			1	310	0.00	1	310	0.00	1597	0.0	0.0	1505	0.0	0.0
35977	288	6	6			54	213	0.25	54	213	0.25	1684	0.0	0.0	7454	0.0	0.0
35978	325	33	33			7,672	10,936	0.70	9,775	10,936	0.89	2171_2	0.0	0.0	7172	0.0	0.0
35979	170	10	10			506	528	0.96	546	527	1.04	2263	2.5	0.0	2250	3.7	0.0
35980	135	8	8			1	349	0.00	1	350	0.00	2231	0.0	0.0	2276	0.0	0.0
35981	120	8	8			19	1,185	0.02	19	1,187	0.02	2543	0.0	0.0	2538	0.0	0.0
35982	106	8	8			12	892	0.01	12	893	0.01	2573	0.0	0.0	2572	0.0	0.0
35983	98	8	8			4	844	0.00	4	845	0.00	7178	0.0	0.0	2774	0.0	0.0
35984	246	21	21			4,258	7,751	0.55	5,213	7,751	0.67	2878	0.0	0.0	2867	0.0	0.0
35985	175	15	24	6	Existing	2,006	1,680	1.19	3,679	5,883	0.63	3414	6.5	0.0	3415	7.4	0.0
35986	120	8	8			1	1,003	0.00	1	1,005	0.00	7525	0.0	0.0	3778	0.0	0.0
35987	117	10	15	43	2036	747	690	1.08	1,145	2,033	0.56	4072	0.0	0.0	4073	1.3	0.0
35988	310	10	12	14	Existing	406	967	0.42	949	1,572	0.60	4163	0.0	0.0	4205	0.0	0.0
35989	186	8	8			11	1,435	0.01	11	1,438	0.01	4647	0.0	0.0	4663	0.0	0.0
35990	223	8	8			15	2,328	0.01	15	2,331	0.01	4761	0.0	0.0	4777	0.0	0.0
35991	295	6	6			15	560	0.03	15	560	0.03	5129	0.0	0.0	7082	0.0	0.0
35992	185	8	8			24	703	0.03	24	704	0.03	7332	0.0	0.0	5178	0.0	0.0
35993	70	8	8			3	178	0.02	3	178	0.02	5408	0.0	0.0	5409	0.0	0.0
35994	80	8	8			30	735	0.04	30	735	0.04	5477	0.0	0.0	7092	0.0	0.0
35995	272	8	8			115	440	0.26	115	440	0.26	5551	0.0	0.0	5571	0.0	0.0
35996	594	16	16			1	3,056	0.00	1	3,054	0.00	5578	0.0	0.0	5575	0.0	0.0
35997	330	8	8			25	660	0.04	25	660	0.04	5714	0.0	0.0	5673	0.0	0.0
35998	320	8	8			27	508	0.05	27	509	0.05	5825	0.0	0.0	5856	1.5	0.0
35999	239	8	8			11	1,553	0.01	11	1,555	0.01	7613	0.0	0.0	7612	0.0	0.0
36000	74	8	8			0	309	0.00	0	332	0.00	6269	0.0	0.0	6301	0.0	0.0
36001	158	8	8			0	1,567	0.00	0	1,569	0.00	6364	0.0	0.0	6362	0.0	0.0
36002	210	8	8			1	854	0.00	0	917	0.00	6350	0.0	0.0	6351	0.0	0.0
36003	184	8	8			7	915	0.01	7	917	0.01	7626	0.0	0.0	6499	0.0	0.0
36004	168	8	8			0	463	0.00	0	497	0.00	6584	0.0	0.0	6589	0.0	0.0
36005	228	18	24	25	2036	3,653	3,325	1.10	4,749	7,673	0.62	6707	3.7	0.0	6705	4.0	0.0
36006	517	8	8			320	406	0.79	320	407	0.79	6243	0.0	0.0	6006	0.0	0.0
36010	177	12	21	27	2036	1,110	608	1.83	1,110	2,894	0.38	6710	1.7	0.0	7637	0.9	0.0
36011	170	8	8			23	333	0.07	23	333	0.07	5793	0.0	0.0	5690	0.0	0.0
36012	358	8	8			0	518	0.00	0	519	0.00	4370	0.0	0.0	4068	0.0	0.0
36013	80	12	12			1,613	1,937	0.83	2,051	1,937	1.06	4228	0.0	0.0	2606	0.0	0.0
36014	273	15	18	1	ura	1,402	1,110	1.26	1,491	1,805	0.83	7469	0.0	0.0	2451	0.0	0.0
36015	265	8	8			180	277	0.65	180	278	0.65	1680	2.0	0.0	1806	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36016	176	8	8			90	383	0.23	90	384	0.23	1324	0.0	0.0	1296	0.0	0.0
36017	230	8	8			3	556	0.01	3	556	0.01	1433	0.0	0.0	1432	0.0	0.0
36018	351	8	8			119	340	0.35	119	340	0.35	1615	7.5	0.0	1642	4.6	0.0
36019	330	8	8			31	321	0.10	31	322	0.10	1618	0.0	0.0	1611	0.0	0.0
36020	320	6	6			67	199	0.33	67	199	0.33	7167	0.0	0.0	7386	0.0	0.0
36021	200	6	6			28	144	0.19	1	144	0.00	1814	0.0	0.0	1812	2.4	0.0
36022	240	6	6			1	277	0.01	1	277	0.01	7169	0.0	0.0	1878	0.0	0.0
36023	308	10	15	2	Existing	583	775	0.75	913	2,285	0.40	1875	2.8	0.0	1880	0.0	0.0
36024	382	8	8			1	381	0.00	1	382	0.00	2118	0.0	0.0	2120	6.0	0.0
36027	237	15	15			1,431	1,530	0.94	1,519	1,530	0.99	2451	0.0	0.0	2458	0.0	0.0
36028	77	8	8			1	1,113	0.00	1	1,115	0.00	7484	0.0	0.0	2569	0.0	0.0
36029	12	12	12			90	4,857	0.02	90	4,857	0.02	2696	0.0	0.0	2620	0.0	0.0
36030	406	8	8			5	1,384	0.00	5	1,386	0.00	7256	0.0	0.0	2959	0.0	0.0
36031	240	12	12			418	1,314	0.32	418	1,314	0.32	3082	0.0	0.0	3135	0.0	0.0
36032	179	8	8			74	342	0.22	74	342	0.22	3124	0.0	0.0	3125	0.0	0.0
36033	192	8	8			86	381	0.23	86	382	0.23	7503	0.0	0.0	3177	0.0	0.0
36035	232	8	8			13	361	0.03	13	362	0.03	7180	0.0	0.0	3317	0.0	0.0
36036	349	8	8			172	476	0.36	172	477	0.36	3364	0.0	0.0	7134	0.0	0.0
36037	136	8	8			1	465	0.00	1	465	0.00	3511	0.0	0.0	3510	0.0	0.0
36038	121	8	8			90	1,156	0.08	90	1,158	0.08	3951	0.0	0.0	3952	0.0	0.0
36039	102	8	8			7	1,716	0.00	7	1,719	0.00	4392	0.0	0.0	4393	0.0	0.0
36040	80	8	8			3	1,330	0.00	3	1,331	0.00	4534	0.0	0.0	4531	0.0	0.0
36041	186	8	8			22	988	0.02	22	989	0.02	4592	0.0	0.0	7558	0.0	0.0
36042	170	8	8			20	1,979	0.01	20	1,982	0.01	4686	0.0	0.0	4687	0.0	0.0
36043	287	8	8			780	1,333	0.59	781	1,335	0.58	4753	0.0	0.0	4774	0.0	0.0
36044	70	8	8			13	590	0.02	13	592	0.02	4799	0.0	0.0	4737	0.0	0.0
36045	153	8	8			12	1,210	0.01	12	1,211	0.01	4825	0.0	0.0	4824	0.0	0.0
36046	382	8	8			1	1,217	0.00	1	1,219	0.00	4958	0.0	0.0	4934	0.0	0.0
36047	201	8	8			151	1,613	0.09	151	1,615	0.09	4996	0.0	0.0	4997	0.0	0.0
36049	57	8	8			1	311	0.00	1	312	0.00	5597	0.0	0.0	5617	0.0	0.0
36050	395	10	15	18	Existing	467	326	1.43	810	963	0.84	5838	0.0	0.0	5867	8.6	0.0
36051	182	8	8			141	478	0.30	141	478	0.29	6233	0.0	0.0	6234	0.0	0.0
36052	359	8	8			1	586	0.00	1	587	0.00	6246	0.0	0.0	6245	0.0	0.0
36053	175	8	8			1	485	0.00	1	485	0.00	6189	0.0	0.0	6220	0.0	0.0
36054	170	8	8			218	2,084	0.10	218	2,087	0.10	6384	0.0	0.0	6399	0.0	0.0
36055	213	8	8			0	1,242	0.00	0	1,244	0.00	6436	0.0	0.0	7730	0.0	0.0
36056	478	8	8			0	283	0.00	0	303	0.00	7721	0.0	0.0	6837	0.0	0.0
36057	321	6	6			14	365	0.04	14	365	0.04	7039	0.0	0.0	5495	0.0	0.0
36059	225	8	8			3	362	0.01	3	362	0.01	1162	0.0	0.0	1163	0.0	0.0
36060	235	6	6			1	195	0.01	1	195	0.01	6985	0.0	0.0	1383	0.0	0.0
36061	53	8	8			17	358	0.05	17	358	0.05	1650	0.0	0.0	1649	0.0	0.0
36062	165	6	6			3	252	0.01	3	252	0.01	1655	0.0	0.0	1603	0.0	0.0
36063	194	6	12	7	Existing	140	128	1.10	226	813	0.28	1806	0.0	0.0	1805	0.2	0.0
36064	185	10	10			303	415	0.73	312	415	0.75	1787	5.5	0.0	1761	6.3	8.2
36065	215	8	8			59	213	0.28	59	213	0.28	7005	8.6	8.6	1977	10.3	10.3
36068	335	8	8			8	1,033	0.01	8	1,035	0.01	2551	0.0	0.0	2549	0.0	0.0
36069	208	8	8			10	525	0.02	10	526	0.02	2626	0.0	0.0	2628	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36070	295	8	8			0	635	0.00	0	636	0.00	2644	0.0	0.0	2687	0.0	0.0
36071	301	8	8			0	774	0.00	0	776	0.00	2739	0.0	0.0	7252	0.0	0.0
36072	355	8	8			27	435	0.06	27	436	0.06	2717	0.0	0.0	2753	0.0	0.0
36073	360	8	8			16	2,338	0.01	16	2,341	0.01	2821	0.0	0.0	2815	0.0	0.0
36074	65	54	54			4,960	34,619	0.14	4,960	34,619	0.14	2856	0.0	0.0	2857	0.0	0.0
36075	240	6	6			0	563	0.00	0	563	0.00	2898	0.0	0.0	2964	0.0	0.0
36076	184	8	8			33	894	0.04	33	895	0.04	3768	0.0	0.0	3749	0.0	0.0
36077	176	8	8			39	1,052	0.04	39	1,053	0.04	3847	0.0	0.0	3846	0.0	0.0
36078	132	6	6			19	271	0.07	19	271	0.07	3906	0.0	0.0	7407	0.0	0.0
36079	156	8	8			6	1,128	0.00	6	1,130	0.00	3939	0.0	0.0	3956	0.0	0.0
36080	343	6	6			1	516	0.00	1	516	0.00	3904	0.0	0.0	3991	0.0	0.0
36081	240	8	8			295	569	0.52	295	569	0.52	4195	0.0	0.0	4196	0.0	0.0
36082	252	8	8			0	832	0.00	0	833	0.00	4216	0.0	0.0	4215	0.0	0.0
36083	367	8	8			30	301	0.10	30	302	0.10	4183	0.0	0.0	4184	0.0	0.0
36084	163	8	8			1	565	0.00	1	566	0.00	4320	0.0	0.0	4289	0.0	0.0
36085	128	8	8			10	612	0.02	10	613	0.02	4349	0.0	0.0	4304	0.0	0.0
36086	210	8	8			0	1,277	0.00	0	1,279	0.00	7302	0.0	0.0	4370	0.0	0.0
36087	105	8	8			65	1,241	0.05	65	1,243	0.05	4418	0.0	0.0	7551	0.0	0.0
36088	429	8	8			28	1,365	0.02	28	1,367	0.02	4437	0.0	0.0	4433	0.0	0.0
36089	93	8	8			1	944	0.00	1	946	0.00	4492	0.0	0.0	4491	0.0	0.0
36090	25	8	8			21	831	0.03	21	832	0.03	7064	0.0	0.0	4495	0.0	0.0
36091	149	8	8			53	1,936	0.03	53	1,939	0.03	4568	0.0	0.0	4567	0.0	0.0
36092	328	8	8			68	1,160	0.06	68	1,162	0.06	4655	0.0	0.0	7313	0.0	0.0
36093	377	8	8			6	898	0.01	6	899	0.01	7314	0.0	0.0	4639	0.0	0.0
36094	161	8	8			3	930	0.00	3	931	0.00	4635	0.0	0.0	4634	0.0	0.0
36095	170	8	8			122	1,340	0.09	122	1,341	0.09	4843	0.0	0.0	4842	0.0	0.0
36096	442	12	12			1,205	2,022	0.60	1,578	2,022	0.78	4877	0.0	0.0	7569	0.0	0.0
36099	353	8	8			1	1,272	0.00	1	1,274	0.00	4939	0.0	0.0	4952	1.4	0.0
36100	495	12	12			1,466	2,247	0.65	1,793	2,247	0.80	4998	0.0	0.0	4999	0.0	0.0
36101	378	8	8			60	1,210	0.05	60	1,211	0.05	7083	0.0	0.0	5175	0.0	0.0
36102	400	8	8			342	580	0.59	342	581	0.59	5394	0.0	0.0	7194	4.6	4.6
36103	77	8	8			1	375	0.00	1	376	0.00	5334	0.0	0.0	5361	0.0	0.0
36104	321	8	8			114	749	0.15	114	751	0.15	5395	0.0	0.0	5394	0.0	0.0
36105	92	8	8			1	444	0.00	1	444	0.00	5636	0.0	0.0	7347	0.0	0.0
36106	240	8	8			1	1,144	0.00	1	1,146	0.00	5680	0.0	0.0	5681	0.0	0.0
36107	453	8	8			49	526	0.09	14	526	0.03	5854	4.5	0.0	5853	0.3	0.0
36108	377	15	15			1,303	1,674	0.78	1,302	1,674	0.78	5926	9.5	0.0	7197	7.8	0.0
36110	361	8	8			76	497	0.15	76	498	0.15	5991	0.0	0.0	5995	0.0	0.0
36111	350	10	10			299	658	0.45	299	657	0.45	6000	0.0	0.0	5999	0.0	0.0
36112	260	8	8			207	500	0.41	207	501	0.41	7617	0.0	0.0	6172	0.0	0.0
36113	349	8	8			49	909	0.05	49	910	0.05	6494	0.0	0.0	6460	0.0	0.0
36114	171	8	8			0	331	0.00	0	356	0.00	6533	0.0	0.0	6532	0.0	0.0
36115	312	8	8			13	333	0.04	13	357	0.04	6555	0.0	0.0	6534	0.0	0.0
36116	91	8	8			25	457	0.05	25	490	0.05	6700	0.0	0.0	6701	0.0	0.0
36117	257	8	8			1	301	0.00	1	322	0.00	6926	0.0	0.0	6925	0.0	0.0
36118	323	8	8			59	358	0.16	59	359	0.16	1322	0.0	0.0	7211	0.0	0.0
36119	179	8	8			35	419	0.08	35	420	0.08	1363	0.0	0.0	1361	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36120	236	8	8			51	415	0.12	1	416	0.00	10240	4.6	0.0	2022	6.5	0.0
36123	138	8	8			1	1,272	0.00	1	1,274	0.00	2692	0.0	0.0	7016	0.0	0.0
36124	79	8	8			132	844	0.16	132	845	0.16	2776	0.0	0.0	2724	0.0	0.0
36125	87	8	8			36	463	0.08	36	463	0.08	2928	0.0	0.0	2927	0.0	0.0
36126	335	8	8			212	376	0.56	211	376	0.56	3020	6.9	0.0	3021	3.1	0.0
36127	150	6	6			1	160	0.01	1	160	0.01	3072	0.0	0.0	3129	0.0	0.0
36128	157	18	18			4,513	5,006	0.90	4,451	5,006	0.89	3347	0.0	0.0	7507	0.0	0.0
36129	93	8	8			1	610	0.00	1	610	0.00	3386	0.0	0.0	3389	0.0	0.0
36130	55	6	6			1	481	0.00	1	481	0.00	3551	0.0	0.0	3602	0.0	0.0
36131	159	8	8			91	378	0.24	91	378	0.24	7183	0.0	0.0	3637	0.0	0.0
36133	171	8	8			1	992	0.00	1	994	0.00	3918	0.0	0.0	3919	0.0	0.0
36134	350	8	8			122	754	0.16	122	755	0.16	4327	0.0	0.0	4326	0.0	0.0
36135	130	8	8			7	754	0.01	7	755	0.01	7299	0.0	0.0	4307	0.0	0.0
36136	199	8	8			1	928	0.00	1	929	0.00	4445	0.0	0.0	4427	0.0	0.0
36137	211	8	8			1	883	0.00	1	885	0.00	5075	0.0	0.0	5089	0.0	0.0
36138	141	8	8			1	571	0.00	1	572	0.00	7334	0.0	0.0	5263	0.0	0.0
36139	237	8	8			18	688	0.03	18	688	0.03	7193	0.0	0.0	5257	0.0	0.0
36141	152	8	12	22	ura	240	730	0.33	240	2,304	0.10	8081	0.0	0.0	7430	0.0	0.0
36143	196	6	6			43	178	0.24	43	178	0.24	11066	0.0	0.0	1438	0.0	0.0
36144	85	8	8			1	481	0.00	1	481	0.00	11069	0.0	0.0	1701	0.0	0.0
36168	122	54	54			14,970	34,832	0.43	15,899	34,832	0.46	3409	0.0	0.0	3410	0.0	0.0
36171	200	54	54			20,453	46,285	0.44	22,374	46,285	0.48	5826	0.0	0.0	5833	0.0	0.0
36172	293	8	8			81	296	0.27	81	317	0.25	6306	0.0	0.0	6653	4.4	0.0
36173	285	8	8			22	303	0.07	22	304	0.07	6118	0.0	0.0	7362	0.0	0.0
36174	400	8	8			26	758	0.03	26	759	0.03	5734	0.0	0.0	5825	0.0	0.0
36175	450	10	10			670	581	1.15	670	581	1.15	5462	2.0	4.7	5556	1.7	0.0
36176	500	10	10			662	1,053	0.63	662	1,051	0.63	5200	0.0	0.0	5454	0.0	0.0
36177	380	8	8			169	1,534	0.11	169	1,536	0.11	4859	0.0	0.0	4725	0.0	0.0
36178	315	8	8			2	731	0.00	2	731	0.00	4632	0.0	0.0	4567	0.0	0.0
36179	254	6	6			1	477	0.00	1	477	0.00	3800	0.0	0.0	3960	0.0	0.0
36180	340	15	15			1,561	2,545	0.61	1,584	2,545	0.62	3080	0.0	0.0	3373	6.5	6.7
36181	278	8	8			1	343	0.00	1	343	0.00	7239	0.0	0.0	2086	0.0	0.0
36182	450	8	8			169	383	0.44	169	384	0.44	1364	0.0	0.0	3126	0.0	0.0
36183	375	12	12			49	1,556	0.03	49	1,556	0.03	1154	0.0	0.0	1410	0.0	0.0
36184	268	8	8			57	1,377	0.04	57	1,379	0.04	2535	0.0	0.0	1111	0.0	0.0
36185	193	8	8			28	340	0.08	28	341	0.08	1330	0.0	0.0	1310	0.0	0.0
36186	48	8	8			1	422	0.00	1	422	0.00	1339	0.0	0.0	1323	0.0	0.0
36187	153	8	8			8	351	0.02	8	351	0.02	1421	0.0	0.0	1398	0.0	0.0
36189	247	8	8			47	327	0.14	47	328	0.14	1558	0.0	0.0	1502	0.0	0.0
36190	351	8	8			262	562	0.47	262	563	0.46	1535	0.0	0.0	1550	6.9	0.0
36191	38	8	8			310	1,815	0.17	310	1,817	0.17	1539	0.0	0.0	1574	0.0	0.0
36192	176	6	6			23	76	0.30	2	76	0.03	1601	5.5	0.0	1595	3.5	0.0
36193	165	6	6			1	323	0.00	1	323	0.00	1683	0.0	0.0	1684	0.0	0.0
36194	255	8	8			91	269	0.34	91	269	0.34	1697	0.0	0.0	1679	0.0	0.0
36195	130	12	18	5	Existing	1,515	1,087	1.39	2,456	3,205	0.77	1824	6.9	0.0	1823	7.6	0.0
36196	285	12	12			4	847	0.00	4	847	0.00	1765	0.0	0.0	1767	0.0	0.0
36198	83	10	15	4	Existing	748	351	2.13	876	1,034	0.85	1891	0.0	0.0	1892	0.7	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36200	290	6	6			5	229	0.02	5	229	0.02	2008	0.0	0.0	9988	0.0	0.0
36201	116	12	12			130	1,393	0.09	130	1,393	0.09	2174	0.0	0.0	2147	0.0	0.0
36202	296	12	12			57	550	0.10	57	550	0.10	2167	0.0	0.0	2157	0.0	0.0
36203	450	8	8			353	343	1.03	353	344	1.03	2216	6.5	6.5	2204	0.0	0.0
36204	310	8	8			14	343	0.04	14	344	0.04	2221	0.0	0.0	2201	0.0	0.0
36205	346	8	8			105	330	0.32	102	331	0.31	2267	4.9	0.0	2268	5.7	0.0
36206	400	8	8			84	375	0.22	84	375	0.22	2281	0.0	0.0	7241	0.0	0.0
36207	300	6	6			1	276	0.00	1	276	0.00	2233	0.0	0.0	2245	0.0	0.0
36209	317	10	10			16	2,338	0.01	16	2,335	0.01	2566	0.0	0.0	2538	0.0	0.0
36211	164	8	8			5	672	0.01	5	672	0.01	2536	0.0	0.0	2578	0.0	0.0
36212	345	8	12	37	ura	418	688	0.61	418	2,028	0.21	2785	0.0	0.0	2784	0.0	0.0
36213	11	8	8			0	772	0.00	0	774	0.00	2979	0.0	0.0	7023	0.0	0.0
36214	237	6	6			0	878	0.00	0	878	0.00	2896	0.0	0.0	2966	0.0	0.0
36215	257	8	8			45	586	0.08	45	587	0.08	7260	0.0	0.0	3052	0.0	0.0
36216	36	8	8			1	383	0.00	1	384	0.00	3064	0.0	0.0	3012	0.0	0.0
36218	3	8	8			84	542	0.15	84	543	0.15	3199	0.0	0.0	3147	0.0	0.0
36219	222	24	24			589	6,983	0.08	590	6,983	0.08	3238	0.0	0.0	3236	0.0	0.0
36220	364	8	8			18	341	0.05	2	342	0.01	3306	0.0	0.0	3309	1.6	0.0
36221	280	8	8			6	381	0.02	6	381	0.02	7509	0.0	0.0	7270	0.0	0.0
36222	29	24	24			2	5,656	0.00	2	5,656	0.00	3476	0.0	0.0	3475	0.0	0.0
36223	177	14	18	10	Existing	1,313	1,301	1.01	1,619	2,543	0.64	3424	3.6	0.0	3444	3.3	0.0
36224	305	6	6			10	144	0.07	1	144	0.00	3401	5.5	0.0	7035	4.1	0.0
36225	34	10	18	5	Existing	764	411	1.86	2,090	1,971	1.06	7135	7.0	0.0	3414	6.5	0.0
36226	270	8	8			1	312	0.00	1	312	0.00	3517	0.0	0.0	3461	0.0	0.0
36228	364	12	12			405	899	0.45	405	899	0.45	3575	0.0	0.0	3574	0.0	0.0
36230	303	10	10			66	474	0.14	66	474	0.14	3704	0.0	0.0	3681	0.0	0.0
36231	335	8	8			0	526	0.00	0	526	0.00	3720	0.0	0.0	3663	0.0	0.0
36232	185	8	8			78	410	0.19	78	410	0.19	3693	0.0	0.0	7524	0.0	0.0
36233	175	8	8			0	1,209	0.00	0	1,210	0.00	3763	0.0	0.0	3782	0.0	0.0
36234	320	10	10			221	2,303	0.10	221	2,301	0.10	3859	0.0	0.0	3829	0.0	0.0
36235	230	8	8			1	383	0.00	1	384	0.00	3873	0.0	0.0	3831	0.0	0.0
36236	187	8	8			402	540	0.75	402	540	0.74	7284	0.0	0.0	3858	0.0	0.0
36237	221	8	15	43	2036	758	838	0.90	1,175	4,483	0.26	7537	2.2	0.0	4079	0.7	0.0
36238	65	8	8			85	292	0.29	85	292	0.29	4065	0.0	0.0	4064	0.0	0.0
36239	263	8	8			40	266	0.15	7	267	0.03	7291	3.9	0.0	4047	0.8	0.0
36240	167	8	8			8	1,719	0.00	8	1,722	0.00	7186	0.0	0.0	4042	0.0	0.0
36241	152	8	8			15	293	0.05	15	293	0.05	4156	0.0	0.0	7542	0.0	0.0
36242	70	8	8			1	2,017	0.00	1	2,020	0.00	4248	0.0	0.0	4249	0.0	0.0
36243	15	8	8			49	1,337	0.04	49	1,339	0.04	7066	0.0	0.0	7556	0.0	0.0
36244	315	8	8			23	1,184	0.02	23	1,186	0.02	4663	0.0	0.0	4646	0.0	0.0
36245	38	8	8			651	763	0.85	651	764	0.85	4772	0.0	0.0	4731	0.0	0.0
36246	119	6	6			19	695	0.03	19	695	0.03	4790	0.0	0.0	4770	0.0	0.0
36247	74	8	8			0	1,339	0.00	0	1,340	0.00	4784	0.0	0.0	4744	0.0	0.0
36248	145	8	8			0	621	0.00	0	622	0.00	7150	0.0	0.0	4761	0.0	0.0
36249	260	8	8			49	1,119	0.04	49	1,121	0.04	5054	0.0	0.0	5053	0.0	0.0
36250	195	8	8			1	1,301	0.00	1	1,303	0.00	5123	0.0	0.0	7079	0.0	0.0
36251	65	8	8			1	1,810	0.00	1	1,813	0.00	5033	0.0	0.0	5034	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36252	170	8	8			52	843	0.06	52	844	0.06	7082	0.0	0.0	5161	0.0	0.0
36253	210	8	8			7	1,490	0.00	7	1,492	0.00	5174	0.0	0.0	5185	0.0	0.0
36254	244	8	8			1	1,747	0.00	1	1,750	0.00	5151	0.0	0.0	7416	0.0	0.0
36255	415	8	8			219	1,053	0.21	219	1,055	0.21	5209	0.0	0.0	5210	0.0	0.0
36257	341	8	8			29	410	0.07	29	410	0.07	5287	0.0	0.0	5282	4.2	0.0
36258	92	8	8			1	775	0.00	1	776	0.00	5295	0.0	0.0	7418	0.0	0.0
36259	80	8	8			4	297	0.01	4	298	0.01	5410	0.0	0.0	5438	0.0	0.0
36260	55	8	8			1	634	0.00	1	635	0.00	5347	0.0	0.0	5408	0.0	0.0
36261	39	6	6			0	200	0.00	0	200	0.00	5444	0.0	0.0	5523	0.0	0.0
36262	233	8	8			205	636	0.32	205	637	0.32	5503	0.0	0.0	5487	0.0	0.0
36263	302	8	8			278	553	0.50	278	553	0.50	5451	0.0	0.0	5511	0.0	0.0
36264	278	8	8			0	397	0.00	0	398	0.00	5485	0.0	0.0	5484	0.0	0.0
36265	185	6	6			1	253	0.00	0	253	0.00	5545	0.0	0.0	5561	4.4	0.0
36266	54	6	6			76	517	0.15	76	517	0.15	5590	0.0	0.0	5587	0.0	0.0
36267	476	8	8			1	342	0.00	1	343	0.00	5650	0.0	0.0	5649	0.0	0.0
36268	397	8	8			211	447	0.47	211	447	0.47	5690	0.0	0.0	5689	0.0	0.0
36269	180	8	8			2	1,067	0.00	2	1,068	0.00	5715	0.0	0.0	5684	0.0	0.0
36270	410	8	8			15	745	0.02	15	746	0.02	5706	0.0	0.0	5727	0.0	0.0
36271	200	8	8			38	690	0.06	38	690	0.06	5763	0.0	0.0	5764	0.0	0.0
36272	171	8	8			48	356	0.13	48	356	0.13	5800	0.0	0.0	5742	0.0	0.0
36275	42	8	8			67	828	0.08	67	828	0.08	6125	0.0	0.0	6124	0.0	0.0
36276	102	8	8			7	898	0.01	7	899	0.01	6026	0.0	0.0	6063	0.0	0.0
36277	247	8	8			25	605	0.04	25	606	0.04	6068	0.0	0.0	6067	0.0	0.0
36278	169	15	15			2,655	3,910	0.68	3,104	3,910	0.79	7614	0.0	0.0	6132	0.0	0.0
36279	247	8	8			26	806	0.03	26	806	0.03	6092	0.0	0.0	6093	0.0	0.0
36280	220	8	12	40	ura	494	403	1.23	494	1,188	0.42	6047	4.2	0.0	6138	7.6	0.0
36281	150	8	8			1	796	0.00	1	797	0.00	6253	0.0	0.0	6224	0.0	0.0
36282	418	8	8			17	420	0.04	17	451	0.04	6310	0.0	0.0	6309	0.0	0.0
36283	140	6	6			14	236	0.06	14	236	0.06	6262	0.0	0.0	6321	0.0	0.0
36284	280	8	8			28	944	0.03	28	1,013	0.03	7729	0.0	0.0	6284	0.0	0.0
36285	203	8	8			24	330	0.07	24	354	0.07	6288	0.0	0.0	6287	0.0	0.0
36286	138	8	8			18	1,005	0.02	18	1,078	0.02	6340	0.0	0.0	6341	0.0	0.0
36287	15	8	8			24	2,113	0.01	24	2,267	0.01	6377	0.0	0.0	6374	0.0	0.0
36288	75	8	8			403	915	0.44	403	917	0.44	6465	0.0	0.0	6464	0.0	0.0
36289	90	10	10			427	1,657	0.26	427	1,774	0.24	7119	0.0	0.0	6602	0.0	0.0
36290	263	8	8			0	370	0.00	0	397	0.00	6615	0.0	0.0	6627	0.0	0.0
36291	277	8	8			0	275	0.00	0	295	0.00	6643	0.0	0.0	6644	0.0	0.0
36292	203	8	8			34	155	0.22	34	166	0.21	6629	0.0	0.0	6632	0.0	0.0
36293	189	8	8			49	360	0.13	49	387	0.13	6722	0.0	0.0	7377	0.0	0.0
36294	164	8	8			0	318	0.00	0	341	0.00	6763	0.0	0.0	6764	0.0	0.0
36295	400	8	8			17	256	0.07	17	274	0.06	6834	0.0	0.0	6810	0.0	0.0
36296	16	8	8			0	333	0.00	0	357	0.00	6850	0.0	0.0	6818	0.0	0.0
36380	107	8	8			20	520	0.04	20	558	0.04	7780	0.0	0.0	6497	0.0	0.0
36381	205	8	8			1	756	0.00	1	810	0.00	8085	0.0	0.0	7780	0.0	0.0
36382	418	8	8			13	174	0.08	13	174	0.08	7480	0.0	0.0	7786	0.0	0.0
36383	418	8	8			18	299	0.06	18	299	0.06	7786	0.0	0.0	2397	0.0	0.0
36384	266	8	8			4	742	0.01	4	743	0.01	7787	0.0	0.0	7786	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36385	146	8	8			1	667	0.00	1	668	0.00	7785	0.0	0.0	7787	0.0	0.0
36386	222	18	18			749	2,148	0.35	872	2,148	0.41	7788	0.0	0.0	7789	0.0	0.0
36387	316	18	18			600	1,801	0.33	703	1,801	0.39	7788	0.0	0.0	7790	0.0	0.0
36388	172	18	18			1,349	3,703	0.36	1,575	3,703	0.43	6129	0.0	0.0	7788	0.0	0.0
36389	113	18	18			749	2,161	0.35	873	2,161	0.40	7789	0.0	0.0	7790	0.0	0.0
36390	22	18	18			5,692	5,444	1.05	8,010	5,444	1.47	7790	0.0	0.0	6128	0.0	0.0
36391	202	8	8			89	996	0.09	89	997	0.09	7800	0.0	0.0	7801	0.0	0.0
36392	221	8	8			89	934	0.10	89	935	0.10	7799	0.0	0.0	7800	0.0	0.0
36393	227	8	8			153	1,135	0.14	153	1,136	0.14	7791	0.0	0.0	7073	0.0	0.0
36394	70	8	8			153	1,335	0.11	153	1,336	0.11	7792	0.0	0.0	7791	0.0	0.0
36395	114	8	8			132	594	0.22	132	595	0.22	7793	0.0	0.0	7792	0.0	0.0
36396	183	8	8			132	1,169	0.11	132	1,171	0.11	7794	0.0	0.0	7793	0.0	0.0
36397	132	8	8			131	1,547	0.08	131	1,549	0.08	7796	0.0	0.0	7795	0.0	0.0
36398	116	8	8			131	1,224	0.11	131	1,226	0.11	7797	0.0	0.0	7796	0.0	0.0
36399	102	8	8			131	1,165	0.11	131	1,167	0.11	7798	0.0	0.0	7797	0.0	0.0
36400	110	8	8			131	1,157	0.11	131	1,158	0.11	7801	0.0	0.0	7798	0.0	0.0
36401	88	8	8			42	1,051	0.04	42	1,052	0.04	7802	0.0	0.0	7801	0.0	0.0
36402	297	8	8			41	965	0.04	41	967	0.04	7803	0.0	0.0	7802	0.0	0.0
36403	295	8	8			41	945	0.04	41	947	0.04	7806	0.0	0.0	7803	0.0	0.0
36404	297	8	8			41	613	0.07	41	615	0.07	7807	0.0	0.0	7806	0.0	0.0
36405	71	8	8			41	477	0.09	41	478	0.09	7808	0.0	0.0	7807	0.0	0.0
36406	86	8	8			41	1,952	0.02	41	1,955	0.02	7809	0.0	0.0	7808	0.0	0.0
36407	194	8	8			41	917	0.04	41	919	0.04	7805	0.0	0.0	7809	0.0	0.0
36408	159	8	8			41	951	0.04	41	953	0.04	7810	0.0	0.0	7805	0.0	0.0
36409	108	8	8			132	1,156	0.11	131	1,158	0.11	7795	0.0	0.0	7794	0.0	0.0
36440	44	8	8			0	1,574	0.00	0	1,576	0.00	7821	0.0	0.0	7820	0.0	0.0
36500	66	8	8			6	915	0.01	6	916	0.01	7887	0.0	0.0	7888	0.0	0.0
36501	160	8	8			5	712	0.01	5	713	0.01	7881	0.0	0.0	7887	0.0	0.0
36502	92	8	8			0	959	0.00	0	960	0.00	7880	0.0	0.0	7881	0.0	0.0
36503	102	8	8			0	624	0.00	0	625	0.00	7882	0.0	0.0	7881	0.0	0.0
36504	49	8	8			0	881	0.00	0	882	0.00	7889	0.0	0.0	7880	0.0	0.0
36505	84	8	8			0	2,024	0.00	0	2,027	0.00	7883	0.0	0.0	7882	0.0	0.0
36506	144	8	8			0	1,138	0.00	0	1,140	0.00	7884	0.0	0.0	7885	0.0	0.0
36507	18	8	8			0	619	0.00	0	620	0.00	7885	0.0	0.0	7886	0.0	0.0
36508	218	8	8			146	1,046	0.14	146	1,047	0.14	2504	0.0	0.0	7886	0.0	0.0
36520	112	8	12	37	ura	246	867	0.28	246	2,557	0.10	7901	0.0	0.0	2507	0.0	0.0
36540	192	8	12	37	ura	246	777	0.32	246	2,292	0.11	7888	0.0	0.0	7901	0.0	0.0
36541	126	8	12	37	ura	240	643	0.37	240	1,897	0.13	7902	0.0	0.0	7888	0.0	0.0
36543	87	8	12	37	ura	240	601	0.40	240	1,772	0.14	7903	0.0	0.0	7902	0.0	0.0
36544	104	8	12	37	ura	240	662	0.36	240	1,952	0.12	7904	0.0	0.0	7903	0.0	0.0
36545	130	8	12	37	ura	211	813	0.26	211	2,398	0.09	7905	0.0	0.0	7904	0.0	0.0
36546	253	8	12	37	ura	206	710	0.29	206	2,095	0.10	7906	0.0	0.0	7905	0.0	0.0
36547	197	8	12	37	ura	206	708	0.29	206	2,088	0.10	7907	0.0	0.0	7906	0.0	0.0
36548	323	8	12	37	ura	206	757	0.27	206	2,232	0.09	7908	0.0	0.0	7907	0.0	0.0
36549	311	8	12	37	ura	194	893	0.22	194	2,633	0.07	9680	0.0	0.0	7908	0.0	0.0
36550	245	8	8			31	655	0.05	31	656	0.05	7910	0.0	0.0	7904	0.0	0.0
36551	292	8	8			19	830	0.02	19	831	0.02	7911	0.0	0.0	7910	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36552	106	8	8			19	1,002	0.02	19	1,003	0.02	7912	0.0	0.0	7911	0.0	0.0
36553	196	8	8			19	1,199	0.02	19	1,200	0.02	7913	0.0	0.0	7912	0.0	0.0
36554	400	8	8			10	1,269	0.01	10	1,272	0.01	7914	0.0	0.0	7913	0.0	0.0
36555	10	8	8			0	1,523	0.00	0	1,524	0.00	7915	0.0	0.0	7914	0.0	0.0
36556	54	8	8			0	375	0.00	0	376	0.00	7916	0.0	0.0	7910	0.0	0.0
36557	97	8	8			0	1,133	0.00	0	1,134	0.00	7917	0.0	0.0	7916	0.0	0.0
36558	224	8	8			0	853	0.00	0	854	0.00	7918	0.0	0.0	7911	0.0	0.0
36559	147	8	8			0	477	0.00	0	478	0.00	7919	0.0	0.0	7913	0.0	0.0
36560	98	8	8			1	785	0.00	1	786	0.00	7920	0.0	0.0	7908	0.0	0.0
36561	144	8	8			1	899	0.00	1	900	0.00	7921	0.0	0.0	7920	0.0	0.0
36562	132	8	8			0	673	0.00	0	674	0.00	7922	0.0	0.0	7921	0.0	0.0
36563	402	8	8			1	1,163	0.00	1	1,165	0.00	7923	0.0	0.0	7921	0.0	0.0
36564	52	8	8			1	431	0.00	1	432	0.00	9687	0.0	0.0	7923	0.0	0.0
36580	132	8	8			1	2,345	0.00	1	2,348	0.00	7945	0.0	0.0	7944	0.0	0.0
36581	435	8	8			57	1,862	0.03	57	1,865	0.03	7944	0.0	0.0	7943	0.0	0.0
36582	81	8	8			57	1,294	0.04	57	1,296	0.04	7943	0.0	0.0	7942	0.0	0.0
36583	136	8	8			76	756	0.10	76	757	0.10	7942	0.0	0.0	7941	0.0	0.0
36584	326	8	8			76	210	0.36	76	210	0.36	7941	0.0	0.0	7940	0.0	0.0
36585	342	8	8			106	1,504	0.07	106	1,506	0.07	7940	0.0	0.0	7946	0.0	0.0
36587	73	8	8			26	1,486	0.02	26	1,488	0.02	7949	0.0	0.0	7950	0.0	0.0
36588	153	8	8			26	1,287	0.02	26	1,288	0.02	7950	0.0	0.0	7951	0.0	0.0
36589	43	8	8			27	1,053	0.03	27	1,054	0.03	7951	0.0	0.0	7952	0.0	0.0
36590	167	8	8			35	2,047	0.02	35	2,049	0.02	7952	0.0	0.0	7953	0.0	0.0
36591	112	8	8			35	1,228	0.03	35	1,230	0.03	7953	0.0	0.0	7954	0.0	0.0
36592	138	8	8			46	565	0.08	46	565	0.08	7954	0.0	0.0	7900	0.0	0.0
36593	122	8	8			26	2,163	0.01	26	2,166	0.01	7960	0.0	0.0	7949	0.0	0.0
36594	152	8	8			26	2,528	0.01	26	2,532	0.01	7961	0.0	0.0	7960	0.0	0.0
36595	236	8	8			17	2,265	0.01	17	2,268	0.01	7962	0.0	0.0	7961	0.0	0.0
36596	174	8	8			10	1,822	0.01	10	1,824	0.01	7965	0.0	0.0	7962	0.0	0.0
36597	125	8	8			1	1,785	0.00	1	1,788	0.00	7966	0.0	0.0	7965	0.0	0.0
36598	297	8	8			1	2,296	0.00	1	2,299	0.00	7978	0.0	0.0	7966	0.0	0.0
36599	262	8	8			1	2,303	0.00	1	2,307	0.00	7967	0.0	0.0	7965	0.0	0.0
36600	147	8	8			1	2,464	0.00	1	2,467	0.00	7968	0.0	0.0	7967	0.0	0.0
36601	97	8	8			1	2,459	0.00	0	2,462	0.00	7980	0.0	0.0	7968	0.0	0.0
36602	146	8	8			7	1,757	0.00	7	1,760	0.00	7963	0.0	0.0	7962	0.0	0.0
36603	159	8	8			7	676	0.01	7	677	0.01	7964	0.0	0.0	7963	0.0	0.0
36604	278	8	8			7	1,697	0.00	7	1,699	0.00	7974	0.0	0.0	7964	0.0	0.0
36605	119	8	8			0	1,361	0.00	0	1,363	0.00	7979	0.0	0.0	7969	0.0	0.0
36606	118	8	8			1	2,784	0.00	1	2,788	0.00	7969	0.0	0.0	7970	0.0	0.0
36607	156	8	8			1	1,330	0.00	1	1,332	0.00	7970	0.0	0.0	7971	0.0	0.0
36608	226	8	8			19	517	0.04	19	517	0.04	7971	0.0	0.0	7981	0.0	0.0
36610	364	8	8			8	1,428	0.01	8	1,429	0.01	7957	0.0	0.0	7952	0.0	0.0
36611	75	8	8			8	2,390	0.00	8	2,394	0.00	7958	0.0	0.0	7957	0.0	0.0
36612	88	8	8			8	2,464	0.00	8	2,467	0.00	7959	0.0	0.0	7958	0.0	0.0
36613	129	8	8			8	1,376	0.01	8	1,378	0.01	7975	0.0	0.0	7959	0.0	0.0
36614	291	8	8			1	2,599	0.00	1	2,603	0.00	7956	0.0	0.0	7951	0.0	0.0
36616	122	8	8			0	1,409	0.00	0	1,411	0.00	7977	0.0	0.0	7956	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36617	235	8	8			1	1,467	0.00	1	1,469	0.00	7976	0.0	0.0	7956	0.0	0.0
36618	463	8	8			20	2,124	0.01	20	2,127	0.01	7947	0.0	0.0	7942	0.0	0.0
36619	113	8	8			20	1,861	0.01	20	1,863	0.01	7948	0.0	0.0	7947	0.0	0.0
36620	225	8	8			1	2,194	0.00	1	2,197	0.00	7984	0.0	0.0	7948	0.0	0.0
36621	151	8	8			19	717	0.03	19	718	0.03	7983	0.0	0.0	7948	0.0	0.0
36622	235	8	8			1	2,124	0.00	1	2,126	0.00	7985	0.0	0.0	7944	0.0	0.0
36623	211	8	8			9	473	0.02	9	474	0.02	7982	0.0	0.0	7986	0.0	0.0
36624	82	8	8			19	381	0.05	19	382	0.05	7986	0.0	0.0	7971	0.0	0.0
36640	333	8	8			80	386	0.21	80	414	0.19	8061	0.0	0.0	8014	0.0	0.0
36641	204	8	8			80	754	0.11	80	808	0.10	8014	0.0	0.0	8015	0.0	0.0
36642	88	8	8			97	538	0.18	97	576	0.17	8015	0.0	0.0	8016	0.0	0.0
36643	224	8	8			97	653	0.15	97	699	0.14	8016	0.0	0.0	8017	0.0	0.0
36644	207	8	8			126	724	0.17	126	776	0.16	8019	0.0	0.0	8017	0.0	0.0
36645	284	8	8			108	857	0.13	108	919	0.12	8020	0.0	0.0	8019	0.0	0.0
36646	177	8	8			108	597	0.18	108	641	0.17	8021	0.0	0.0	8020	0.0	0.0
36647	300	8	8			105	557	0.19	105	597	0.18	8023	0.0	0.0	8021	0.0	0.0
36648	276	8	8			0	581	0.00	0	623	0.00	8022	0.0	0.0	8021	0.0	0.0
36649	480	8	12	22	ura	220	576	0.38	220	1,819	0.12	8017	0.0	0.0	8018	0.0	0.0
36650	132	8	8			56	617	0.09	56	661	0.08	6551	0.0	0.0	8061	0.0	0.0
36651	42	8	8			24	1,059	0.02	24	1,136	0.02	6552	0.0	0.0	8061	0.0	0.0
36652	115	8	8			104	362	0.29	104	388	0.27	6556	0.0	0.0	8023	0.0	0.0
36654	217	8	8			27	1,113	0.02	27	1,194	0.02	6549	0.0	0.0	8040	0.0	0.0
36655	64	8	8			38	695	0.05	38	746	0.05	8040	0.0	0.0	6550	0.0	0.0
36656	306	8	8			11	790	0.01	11	848	0.01	8041	0.0	0.0	8040	0.0	0.0
36657	431	8	8			6	628	0.01	6	674	0.01	8042	0.0	0.0	8055	0.0	0.0
36658	307	8	8			6	949	0.01	6	1,018	0.01	8049	0.0	0.0	8042	0.0	0.0
36659	304	8	8			13	831	0.02	13	892	0.01	8058	0.0	0.0	8055	0.0	0.0
36660	343	8	8			12	811	0.01	12	870	0.01	8052	0.0	0.0	8058	0.0	0.0
36661	54	8	8			6	870	0.01	6	934	0.01	8046	0.0	0.0	8049	0.0	0.0
36662	137	8	8			6	788	0.01	6	846	0.01	8043	0.0	0.0	8046	0.0	0.0
36663	163	8	8			24	466	0.05	24	500	0.05	8055	0.0	0.0	6552	0.0	0.0
36664	142	8	8			0	951	0.00	0	1,019	0.00	8063	0.0	0.0	8064	0.0	0.0
36665	236	8	8			1	960	0.00	1	1,031	0.00	8062	0.0	0.0	8064	0.0	0.0
36666	332	8	8			10	1,160	0.01	10	1,245	0.01	8064	0.0	0.0	8066	0.0	0.0
36667	201	8	8			10	508	0.02	10	545	0.02	8066	0.0	0.0	8041	0.0	0.0
36680	81	8	8			0	331	0.00	0	354	0.00	8080	0.0	0.0	8058	0.0	0.0
36681	504	8	12	22	ura	240	585	0.41	240	1,846	0.13	8018	0.0	0.0	8081	0.0	0.0
36682	137	8	8			0	470	0.00	0	504	0.00	8083	0.0	0.0	8084	0.0	0.0
36683	175	8	8			1	1,546	0.00	1	1,658	0.00	8082	0.0	0.0	8083	0.0	0.0
36684	43	8	8			1	792	0.00	1	849	0.00	8086	0.0	0.0	8085	0.0	0.0
36685	297	8	8			1	949	0.00	1	1,018	0.00	8087	0.0	0.0	8086	0.0	0.0
36700	145	8	8			0	331	0.00	0	356	0.00	8100	0.0	0.0	8046	0.0	0.0
36720	212	8	8			1	1,522	0.00	1	1,524	0.00	8120	0.0	0.0	4391	0.0	0.0
36721	271	8	8			9	1,500	0.01	9	1,502	0.01	8122	0.0	0.0	7060	0.0	0.0
36722	262	8	8			9	1,625	0.01	9	1,627	0.01	8123	0.0	0.0	8122	0.0	0.0
36723	85	8	8			8	683	0.01	8	685	0.01	9822	0.0	0.0	8123	0.0	0.0
36724	158	8	8			0	831	0.00	0	832	0.00	8121	0.0	0.0	8122	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36725	221	8	8			0	897	0.00	0	899	0.00	8125	0.0	0.0	8123	0.0	0.0
36726	143	8	8			0	679	0.00	0	680	0.00	8126	0.0	0.0	8125	0.0	0.0
36727	71	8	8			0	1,550	0.00	0	1,552	0.00	8124	0.0	0.0	8126	0.0	0.0
36741	210	8	8			0	908	0.00	0	910	0.00	8140	0.0	0.0	8148	0.0	0.0
36742	160	8	8			10	894	0.01	10	895	0.01	8186	0.0	0.0	8158	0.0	0.0
36743	344	8	8			10	1,253	0.01	10	1,255	0.01	8141	0.0	0.0	8186	0.0	0.0
36744	315	8	8			10	1,024	0.01	10	1,026	0.01	8148	0.0	0.0	8141	0.0	0.0
36745	263	8	8			10	303	0.03	10	303	0.03	8161	0.0	0.0	8148	0.0	0.0
36746	320	8	8			313	1,217	0.26	313	1,219	0.26	8143	0.0	0.0	8142	0.0	0.0
36747	500	8	8			313	1,190	0.26	313	1,192	0.26	8142	0.0	0.0	8156	0.0	0.0
36748	326	8	8			313	1,201	0.26	313	1,203	0.26	8156	0.0	0.0	7058	0.0	0.0
36750	500	8	8			26	1,131	0.02	26	1,133	0.02	8158	0.0	0.0	8162	0.0	0.0
36751	67	8	8			26	642	0.04	26	643	0.04	8162	0.0	0.0	4356	0.0	0.0
36760	373	8	8			1	1,492	0.00	1	1,494	0.00	8181	0.0	0.0	4395	0.0	0.0
36761	186	8	8			0	1,223	0.00	0	1,224	0.00	8183	0.0	0.0	8182	0.0	0.0
36762	307	8	8			9	1,489	0.01	9	1,491	0.01	8182	0.0	0.0	8184	0.0	0.0
36763	486	8	8			313	1,172	0.27	313	1,173	0.27	8184	0.0	0.0	8143	0.0	0.0
36780	221	8	8			106	2,731	0.04	106	2,734	0.04	8700	0.0	0.0	4996	0.0	0.0
36781	151	8	8			106	825	0.13	106	826	0.13	7946	0.0	0.0	8700	0.0	0.0
36782	1	8	8			0	1,283	0.00	0	1,284	0.00	4996	0.0	0.0	8222	0.0	0.0
36800	412	8	8			1	1,246	0.00	1	1,247	0.00	8246	0.0	0.0	8245	0.0	0.0
36801	246	8	8			0	628	0.00	0	629	0.00	8245	0.0	0.0	8244	0.0	0.0
36802	291	8	8			3	927	0.00	3	928	0.00	8244	0.0	0.0	8243	0.0	0.0
36803	149	8	8			3	1,714	0.00	3	1,716	0.00	8243	0.0	0.0	8242	0.0	0.0
36804	264	8	8			1	1,319	0.00	1	1,322	0.00	8247	0.0	0.0	8242	0.0	0.0
36805	137	8	8			8	1,422	0.01	8	1,424	0.01	8242	0.0	0.0	8241	0.0	0.0
36806	161	8	8			8	956	0.01	8	958	0.01	8241	0.0	0.0	8240	0.0	0.0
36807	119	8	8			0	944	0.00	0	945	0.00	8250	0.0	0.0	8249	0.0	0.0
36808	251	8	8			6	1,405	0.00	6	1,407	0.00	8249	0.0	0.0	8248	0.0	0.0
36820	152	8	8			253	1,245	0.20	253	1,247	0.20	4560	0.0	0.0	8260	0.0	0.0
36821	304	8	8			259	1,245	0.21	259	1,247	0.21	8260	0.0	0.0	4555	0.0	0.0
36823	316	8	8			14	1,065	0.01	14	1,066	0.01	8261	0.0	0.0	8262	0.0	0.0
36824	150	8	8			13	1,168	0.01	13	1,169	0.01	8240	0.0	0.0	8261	0.0	0.0
36825	200	8	8			14	1,001	0.01	14	1,001	0.01	8262	0.0	0.0	8263	0.0	0.0
36826	350	8	8			14	1,192	0.01	14	1,194	0.01	8263	0.0	0.0	8264	0.0	0.0
36827	348	8	8			22	1,169	0.02	22	1,170	0.02	8264	0.0	0.0	8265	0.0	0.0
36828	223	8	8			22	1,285	0.02	22	1,288	0.02	8265	0.0	0.0	4592	0.0	0.0
36840	108	8	8			8	1,389	0.01	8	1,391	0.01	8280	0.0	0.0	8264	0.0	0.0
36841	175	8	8			13	1,926	0.01	13	1,928	0.01	8283	0.0	0.0	8282	0.0	0.0
36842	105	8	8			13	1,958	0.01	13	1,960	0.01	8282	0.0	0.0	8281	0.0	0.0
36843	77	8	8			13	1,085	0.01	13	1,087	0.01	8288	0.0	0.0	8283	0.0	0.0
36844	108	8	8			13	940	0.01	13	941	0.01	8287	0.0	0.0	8288	0.0	0.0
36845	130	8	8			13	1,603	0.01	13	1,606	0.01	8284	0.0	0.0	8287	0.0	0.0
36846	196	8	8			6	665	0.01	6	665	0.01	8286	0.0	0.0	8285	0.0	0.0
36847	185	8	8			6	857	0.01	6	858	0.01	8285	0.0	0.0	8284	0.0	0.0
36848	104	8	8			0	858	0.00	0	859	0.00	8289	0.0	0.0	8290	0.0	0.0
36849	196	8	8			5	1,771	0.00	5	1,774	0.00	8290	0.0	0.0	8286	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36850	350	8	8			0	738	0.00	0	739	0.00	8291	0.0	0.0	8289	0.0	0.0
36851	252	8	8			1	1,085	0.00	1	1,087	0.00	8292	0.0	0.0	8293	0.0	0.0
36852	51	8	8			0	1,226	0.00	0	1,227	0.00	8293	0.0	0.0	8262	0.0	0.0
36853	313	8	8			1	1,340	0.00	1	1,341	0.00	8294	0.0	0.0	8295	0.0	0.0
36854	90	8	8			0	383	0.00	0	384	0.00	8295	0.0	0.0	8296	0.0	0.0
36855	51	8	8			1	1,074	0.00	1	1,076	0.00	8296	0.0	0.0	8261	0.0	0.0
36856	143	8	8			0	1,437	0.00	0	1,439	0.00	8297	0.0	0.0	8298	0.0	0.0
36857	173	8	8			1	1,687	0.00	1	1,689	0.00	8298	0.0	0.0	8296	0.0	0.0
36858	219	8	8			0	940	0.00	0	941	0.00	8299	0.0	0.0	8300	0.0	0.0
36859	137	8	8			0	1,494	0.00	0	1,497	0.00	8300	0.0	0.0	8280	0.0	0.0
36860	77	8	8			0	542	0.00	0	543	0.00	8320	0.0	0.0	8321	0.0	0.0
36861	156	8	8			0	342	0.00	0	342	0.00	8321	0.0	0.0	8323	0.0	0.0
36862	383	8	8			0	417	0.00	0	417	0.00	8323	0.0	0.0	4672	0.0	0.0
36863	325	8	8			7	2,100	0.00	7	2,103	0.00	8331	0.0	0.0	8332	0.0	0.0
36864	107	8	8			7	1,009	0.01	7	1,010	0.01	8332	0.0	0.0	8333	0.0	0.0
36865	380	8	8			7	1,428	0.00	7	1,431	0.00	8333	0.0	0.0	8328	0.0	0.0
36866	41	8	8			12	1,187	0.01	12	1,188	0.01	8328	0.0	0.0	8329	0.0	0.0
36867	130	8	8			12	1,551	0.01	12	1,553	0.01	8329	0.0	0.0	8330	0.0	0.0
36868	134	8	8			1	1,669	0.00	1	1,672	0.00	8324	0.0	0.0	8325	0.0	0.0
36869	99	8	8			4	851	0.00	4	853	0.00	8325	0.0	0.0	8326	0.0	0.0
36870	250	8	8			4	1,772	0.00	4	1,774	0.00	8326	0.0	0.0	8327	0.0	0.0
36871	37	8	8			4	1,360	0.00	4	1,361	0.00	8327	0.0	0.0	8328	0.0	0.0
36880	191	6	6			1	1,097	0.00	1	1,097	0.00	8344	0.0	0.0	4764	0.0	0.0
36900	168	8	8			1	1,613	0.00	1	1,615	0.00	8361	0.0	0.0	8362	0.0	0.0
36901	81	8	8			0	1,265	0.00	0	1,267	0.00	8360	0.0	0.0	8361	0.0	0.0
36902	522	8	8			197	1,845	0.11	197	1,848	0.11	8363	0.0	0.0	8364	0.0	0.0
36903	434	8	8			201	1,597	0.13	201	1,599	0.13	8364	0.0	0.0	4535	0.0	0.0
36905	215	8	8			0	542	0.00	0	543	0.00	8365	0.0	0.0	8366	0.0	0.0
36906	245	8	8			4	1,050	0.00	4	1,051	0.00	8366	0.0	0.0	8364	0.0	0.0
36907	92	8	8			188	1,804	0.10	188	1,807	0.10	8377	0.0	0.0	8378	0.0	0.0
36908	235	8	8			188	1,713	0.11	188	1,715	0.11	8378	0.0	0.0	8363	0.0	0.0
36909	118	8	8			8	1,631	0.01	8	1,633	0.01	8381	0.0	0.0	8380	0.0	0.0
36910	142	8	8			8	1,437	0.01	8	1,439	0.01	8380	0.0	0.0	8363	0.0	0.0
36914	119	8	8			0	1,512	0.00	0	1,514	0.00	8376	0.0	0.0	8375	0.0	0.0
36915	201	8	8			3	1,330	0.00	3	1,331	0.00	8375	0.0	0.0	8374	0.0	0.0
36916	70	8	8			3	2,134	0.00	3	2,137	0.00	8374	0.0	0.0	8373	0.0	0.0
36917	100	8	8			3	1,838	0.00	3	1,840	0.00	8373	0.0	0.0	8372	0.0	0.0
36918	209	8	8			3	1,445	0.00	3	1,447	0.00	8372	0.0	0.0	8371	0.0	0.0
36919	361	8	8			12	1,309	0.01	12	1,311	0.01	8371	0.0	0.0	8370	0.0	0.0
36922	171	8	8			1	1,805	0.00	1	1,807	0.00	8367	0.0	0.0	8368	0.0	0.0
36923	481	8	8			1	1,491	0.00	1	1,492	0.00	8368	0.0	0.0	8369	0.0	0.0
36924	218	8	8			25	1,478	0.02	25	1,481	0.02	8369	0.0	0.0	4542	0.0	0.0
36925	119	8	8			12	385	0.03	12	385	0.03	8370	0.0	0.0	8369	0.0	0.0
36926	115	8	8			0	1,131	0.00	0	1,133	0.00	8382	0.0	0.0	8362	0.0	0.0
36927	365	8	8			1	1,804	0.00	1	1,807	0.00	8383	0.0	0.0	4532	0.0	0.0
36930	23	8	8			188	2,113	0.09	188	2,115	0.09	8384	0.0	0.0	8377	0.0	0.0
36940	273	8	8			25	344	0.07	25	344	0.07	7011	0.0	0.0	2114	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37012	240	6	6			2,712	506	5.36	10,562	506	20.89	2588	0.0	0.0	2561	0.0	0.0
37026	639	6	6			3,733	506	7.38	14,588	506	28.85	2570	0.0	0.0	2588	0.0	0.0
37030	685	6	6			258	402	0.64	285	402	0.71	JCT-18	0.0	0.0	1955	1.2	0.0
37031	31	6	6			501	1,170	0.43	677	1,170	0.58	JCT-16	0.0	0.0	1959	0.0	0.0
37032	339	6	6			36,451	506	72.10	27,332	506	54.06	1105	0.0	0.0	1110	0.0	0.0
37033	150	6	6			53,589	506	106.00	80,844	506	159.91	JCT-12	0.0	0.0	1105	0.0	0.0
37034	656	6	6			24,031	506	47.53	12,207	506	24.15	1110	0.0	0.0	2570	0.0	0.0
37035	341	4	4			1	242	0.00	1	242	0.00	9958	0.0	0.0	4295	0.0	0.0
37037	2538	12	12			2,094	1,635	1.28	2,077	1,635	1.27	JCT-14	0.0	0.0	6819	0.0	0.0
37060	398	12	15	24	2036	503	598	0.84	509	1,161	0.44	8461	0.0	0.0	8460	0.0	0.0
37062	369	10	15	24	2036	512	637	0.80	518	2,012	0.26	8460	0.0	0.0	8450	0.0	0.0
37063	213	15	15			833	1,588	0.52	840	1,701	0.49	8450	0.0	0.0	8451	0.0	0.0
37080	186	8	15	24	2036	503	331	1.52	509	1,894	0.27	6688	0.0	0.0	8461	0.0	0.0
37082	96	15	15			853	1,581	0.54	861	1,694	0.51	8451	0.0	0.0	8442	0.0	0.0
37084	216	15	15			854	967	0.88	861	1,036	0.83	8442	0.0	0.0	6695	0.0	0.0
37085	240	12	12			306	917	0.33	306	982	0.31	7122	0.0	0.0	8450	0.0	0.0
37087	388	8	8			16	306	0.05	16	329	0.05	8445	0.0	0.0	8444	0.0	0.0
37088	261	8	8			16	347	0.05	16	372	0.04	8444	0.0	0.0	8450	0.0	0.0
37089	255	8	8			1	306	0.00	1	328	0.00	8446	0.0	0.0	8445	0.0	0.0
37090	297	8	8			1	303	0.00	1	326	0.00	8449	0.0	0.0	8445	0.0	0.0
37091	254	8	8			0	438	0.00	0	469	0.00	8447	0.0	0.0	8448	0.0	0.0
37092	269	8	8			0	235	0.00	0	251	0.00	8448	0.0	0.0	8449	0.0	0.0
37093	416	8	8			1	349	0.00	1	375	0.00	8453	0.0	0.0	8452	0.0	0.0
37094	107	8	8			21	372	0.06	21	399	0.05	8452	0.0	0.0	8451	0.0	0.0
37095	131	8	8			0	315	0.00	0	338	0.00	8454	0.0	0.0	8453	0.0	0.0
37096	263	8	8			0	353	0.00	0	378	0.00	8455	0.0	0.0	8454	0.0	0.0
37100	9	8	8			30	3,433	0.01	30	3,438	0.01	3955	0.0	0.0	8500	0.0	0.0
37122	158	8	8			13	251	0.05	13	252	0.05	2944	0.0	0.0	8522	0.0	0.0
37123	365	8	8			113	252	0.45	113	252	0.45	8522	0.0	0.0	2866	0.0	0.0
37140	75	6	6			1	268	0.00	1	268	0.00	8540	0.0	0.0	3906	0.0	0.0
37200	170	8	8			0	913	0.00	0	979	0.00	8601	0.0	0.0	8087	0.0	0.0
37220	156	8	8			0	777	0.00	0	833	0.00	8620	0.0	0.0	6790	0.0	0.0
37240	306	30	30			4,437	9,634	0.46	6,413	9,634	0.67	2005	0.0	0.0	8722	0.0	0.0
37242	100	30	30			4,438	9,730	0.46	6,414	9,730	0.66	8722	0.0	0.0	8721	0.0	0.0
37243	165	30	30			4,438	7,762	0.57	6,415	7,762	0.83	8721	0.0	0.0	8720	0.0	0.0
37244	175	8	8			42	530	0.08	42	531	0.08	1997	0.0	0.0	8720	0.0	0.0
37245	84	30	30			4,481	7,122	0.63	6,456	7,122	0.91	8720	0.0	0.0	2018	0.0	0.0
37280	65	8	8			44	678	0.06	44	726	0.06	8740	0.0	0.0	6791	0.0	0.0
37282	143	8	8			0	197	0.00	0	211	0.00	8742	0.0	0.0	8741	0.0	0.0
37283	285	8	8			1	899	0.00	1	964	0.00	6795	0.0	0.0	6789	0.0	0.0
37284	140	8	8			0	871	0.00	0	934	0.00	8744	0.0	0.0	8743	0.0	0.0
37285	138	8	8			0	506	0.00	0	543	0.00	8746	0.0	0.0	8745	0.0	0.0
37286	316	8	8			0	642	0.00	0	689	0.00	8745	0.0	0.0	8747	0.0	0.0
37288	238	8	8			56	519	0.11	56	557	0.10	8747	0.0	0.0	6781	0.0	0.0
37289	232	8	8			0	419	0.00	0	449	0.00	8748	0.0	0.0	8446	0.0	0.0
37290	91	8	8			0	467	0.00	0	501	0.00	8749	0.0	0.0	8446	0.0	0.0
37291	174	8	8			5	362	0.01	5	388	0.01	8750	0.0	0.0	6559	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37292	25	8	8			0	451	0.00	0	484	0.00	6251	0.0	0.0	8752	0.0	0.0
37293	175	8	8			0	295	0.00	0	317	0.00	8751	0.0	0.0	8752	0.0	0.0
37294	22	8	8			1	413	0.00	1	443	0.00	6551	0.0	0.0	8753	0.0	0.0
37295	66	8	8			1	338	0.00	1	362	0.00	8754	0.0	0.0	8753	0.0	0.0
37296	138	8	8			0	320	0.00	0	344	0.00	8755	0.0	0.0	8754	0.0	0.0
37297	91	8	8			0	1,209	0.00	0	1,297	0.00	8756	0.0	0.0	8755	0.0	0.0
37300	218	8	8			1	906	0.00	1	972	0.00	8760	0.0	0.0	6368	0.0	0.0
37320	88	8	8			0	301	0.00	0	322	0.00	8793	0.0	0.0	8780	0.0	0.0
37321	191	8	8			0	299	0.00	0	320	0.00	8780	0.0	0.0	8781	0.0	0.0
37322	167	8	8			1	329	0.00	1	353	0.00	8781	0.0	0.0	8782	0.0	0.0
37323	119	8	8			1	334	0.00	1	358	0.00	8782	0.0	0.0	8783	0.0	0.0
37324	205	8	8			0	667	0.00	0	715	0.00	8784	0.0	0.0	8783	0.0	0.0
37325	189	8	8			1	324	0.00	1	348	0.00	8783	0.0	0.0	8785	0.0	0.0
37326	151	8	8			0	388	0.00	0	417	0.00	8786	0.0	0.0	8785	0.0	0.0
37327	229	8	8			46	306	0.15	46	328	0.14	8785	0.0	0.0	8787	0.0	0.0
37328	111	8	8			47	315	0.15	47	338	0.14	8787	0.0	0.0	8788	0.0	0.0
37329	8	8	8			22	864	0.02	22	926	0.02	6694	0.0	0.0	8788	0.0	0.0
37330	33	8	8			1	259	0.01	1	278	0.01	8789	0.0	0.0	8787	0.0	0.0
37331	213	8	8			1	432	0.00	1	464	0.00	8790	0.0	0.0	8789	0.0	0.0
37332	171	8	8			0	455	0.00	0	488	0.00	8791	0.0	0.0	8790	0.0	0.0
37333	176	8	8			0	476	0.00	0	510	0.00	8792	0.0	0.0	8791	0.0	0.0
37334	154	8	8			65	1,913	0.03	65	1,915	0.03	4751	0.0	0.0	4752	0.0	0.0
37340	182	8	8			1	1,898	0.00	1	1,901	0.00	8800	0.0	0.0	5906	5.8	0.0
37460	114	8	8			1	485	0.00	1	485	0.00	3244	0.0	0.0	3243	0.0	0.0
37480	77	27	27			4,198	5,920	0.71	6,179	5,920	1.04	8920	0.0	0.0	8921	0.0	0.0
37481	134	27	27			4,199	5,851	0.72	6,180	5,851	1.06	8921	0.0	0.0	8922	0.0	0.0
37482	183	27	27			4,199	5,824	0.72	6,181	5,824	1.06	8922	0.0	0.0	8923	0.0	0.0
37500	60	6	6			10	519	0.02	10	519	0.02	8941	0.0	0.0	3978	0.0	0.0
37501	236	8	8			183	348	0.52	183	348	0.52	5699	0.0	0.0	5701	0.0	0.0
37502	7	8	8			0	588	0.00	0	588	0.00	8943	0.0	0.0	7418	0.0	0.0
37503	78	8	12	37	ura	501	813	0.62	503	2,394	0.21	8944	0.0	0.0	2734	0.0	0.0
37504	296	8	8			19	371	0.05	19	372	0.05	8945	0.0	0.0	8944	0.0	0.0
37505	215	8	8			19	455	0.04	19	456	0.04	8946	0.0	0.0	8945	0.0	0.0
37506	111	8	8			19	374	0.05	19	374	0.05	8947	0.0	0.0	8946	0.0	0.0
37507	147	8	8			6	485	0.01	6	485	0.01	8949	0.0	0.0	2507	0.0	0.0
37508	87	8	8			0	373	0.00	0	373	0.00	8948	0.0	0.0	8949	0.0	0.0
37509	56	8	8			10	1,352	0.01	10	1,353	0.01	8951	0.0	0.0	8950	0.0	0.0
37510	173	8	8			3	871	0.00	3	872	0.00	8952	0.0	0.0	8951	0.0	0.0
37511	152	8	8			6	372	0.02	6	373	0.02	8954	0.0	0.0	8951	0.0	0.0
37512	139	8	8			3	719	0.00	3	719	0.00	8953	0.0	0.0	8952	0.0	0.0
37513	117	8	8			6	372	0.01	6	373	0.01	8955	0.0	0.0	8954	0.0	0.0
37514	69	8	8			6	367	0.02	6	368	0.02	8956	0.0	0.0	8955	0.0	0.0
37515	84	8	8			0	374	0.00	0	374	0.00	8961	0.0	0.0	8956	0.0	0.0
37516	84	8	8			0	777	0.00	0	778	0.00	8962	0.0	0.0	8961	0.0	0.0
37517	53	8	8			6	895	0.01	6	897	0.01	8957	0.0	0.0	8956	0.0	0.0
37518	121	8	8			6	831	0.01	6	832	0.01	8958	0.0	0.0	8957	0.0	0.0
37519	169	8	8			6	1,018	0.01	6	1,019	0.01	8959	0.0	0.0	8958	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37520	72	8	8			5	475	0.01	5	476	0.01	8960	0.0	0.0	8959	0.0	0.0
37521	92	8	8			3	363	0.01	0	363	0.00	8979	0.0	0.0	2720	0.0	0.0
37524	160	8	8			1	588	0.00	1	588	0.00	8979	0.0	0.0	8978	5.7	5.7
37531	350	10	10			515	583	0.88	507	583	0.87	8982	2.2	0.0	5462	2.0	4.7
37532	87	8	8			0	718	0.00	0	719	0.00	8983	0.0	0.0	8984	0.0	0.0
37533	99	8	8			1	417	0.00	1	418	0.00	8984	0.0	0.0	7344	0.0	0.0
37534	62	8	8			0	747	0.00	0	747	0.00	8985	0.0	0.0	7344	0.0	0.0
37535	142	8	8			0	697	0.00	0	699	0.00	8986	0.0	0.0	5458	0.0	0.0
37536	411	8	8			654	694	0.94	654	695	0.94	8987	0.0	0.0	5200	0.0	0.0
37537	80	8	8			1	415	0.00	1	416	0.00	8988	0.0	0.0	5152	0.0	0.0
37538	9	8	8			0	831	0.00	0	832	0.00	8989	0.0	0.0	4886	0.0	0.0
37539	59	8	8			0	367	0.00	0	367	0.00	8990	0.0	0.0	5191	0.0	0.0
37540	199	8	8			19	2,092	0.01	19	2,094	0.01	7153	0.0	0.0	5183	0.0	0.0
37541	229	8	8			19	1,926	0.01	19	1,929	0.01	5163	0.0	0.0	7153	0.0	0.0
37542	148	8	8			1	1,694	0.00	1	1,697	0.00	7330	0.0	0.0	5147	0.0	0.0
37543	160	8	8			1	1,587	0.00	1	1,589	0.00	5147	0.0	0.0	5126	0.0	0.0
37544	91	8	8			0	729	0.00	0	730	0.00	8991	0.0	0.0	5147	0.0	0.0
37560	203	12	12			1,578	2,358	0.67	1,994	2,358	0.85	9000	0.0	0.0	4115	0.0	0.0
37561	20	8	8			0	766	0.00	0	767	0.00	4087	0.0	0.0	4088	0.0	0.0
37562	46	8	8			60	740	0.08	60	741	0.08	9001	0.0	0.0	7649	0.0	0.0
37563	82	8	8			10	1,139	0.01	10	1,141	0.01	8950	0.0	0.0	9001	0.0	0.0
37564	268	8	8			3	369	0.01	3	370	0.01	9002	0.0	0.0	2723	0.0	0.0
37565	302	8	8			3	414	0.01	3	415	0.01	9003	0.0	0.0	9002	0.0	0.0
37566	114	8	8			3	1,046	0.00	3	1,047	0.00	9004	0.0	0.0	9003	0.0	0.0
37580	77	8	8			1	531	0.00	1	532	0.00	3730	0.0	0.0	9020	0.0	0.0
37581	332	8	8			21	547	0.04	21	547	0.04	9020	0.0	0.0	3725	0.0	0.0
37600	379	8	8			6	148	0.04	6	148	0.04	10117	0.0	0.0	9001	0.0	0.0
37660	356	18	18			1,240	484	2.56	1,256	519	2.42	6912	0.0	0.0	6902	0.0	0.0
37661	356	18	18			1,283	1,606	0.80	1,300	1,721	0.76	6902	0.0	0.0	6911	0.0	0.0
37662	300	8	8			15	321	0.05	15	344	0.04	7640	0.0	0.0	6806	0.0	0.0
37663	300	8	8			30	321	0.09	30	344	0.09	6806	0.0	0.0	6807	0.0	0.0
37664	267	8	8			31	300	0.10	31	322	0.09	6807	0.0	0.0	9100	0.0	0.0
37665	105	8	8			43	634	0.07	43	681	0.06	9100	0.0	0.0	6903	0.0	0.0
37666	227	8	8			43	449	0.10	43	481	0.09	6903	0.0	0.0	6902	0.0	0.0
37667	175	8	8			15	588	0.03	15	631	0.02	9651	0.0	0.0	7640	0.0	0.0
37700	64	8	8			0	588	0.00	0	588	0.00	9120	0.0	0.0	9121	0.0	0.0
37701	123	8	8			0	588	0.00	0	588	0.00	9125	0.0	0.0	9121	0.0	0.0
37702	84	8	8			0	374	0.00	0	374	0.00	9121	0.0	0.0	9122	0.0	0.0
37703	139	8	8			1	373	0.00	1	374	0.00	9122	0.0	0.0	9123	0.0	0.0
37704	37	8	8			1	216	0.00	1	216	0.00	9123	0.0	0.0	9124	0.0	0.0
37720	53	8	8			4	1,155	0.00	4	1,156	0.00	9192	0.0	0.0	9193	0.0	0.0
37721	163	8	8			5	1,697	0.00	5	1,700	0.00	9196	0.0	0.0	9161	0.0	0.0
37722	76	8	8			4	1,334	0.00	4	1,336	0.00	9195	0.0	0.0	9196	0.0	0.0
37723	173	8	8			4	848	0.00	4	849	0.00	9194	0.0	0.0	9195	0.0	0.0
37724	86	8	8			4	460	0.01	4	461	0.01	9193	0.0	0.0	9194	0.0	0.0
37725	267	8	8			24	362	0.07	24	363	0.07	9186	0.0	0.0	7810	0.0	0.0
37726	318	8	8			24	343	0.07	24	343	0.07	9190	0.0	0.0	9186	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37727	258	8	8			0	588	0.00	0	589	0.00	9171	0.0	0.0	9169	0.0	0.0
37728	99	8	8			0	1,319	0.00	0	1,322	0.00	9183	0.0	0.0	9184	0.0	0.0
37729	324	8	8			16	1,585	0.01	16	1,587	0.01	9300	0.0	0.0	9142	0.0	0.0
37730	146	8	8			13	2,410	0.01	13	2,413	0.01	9170	0.0	0.0	9169	0.0	0.0
37733	105	8	8			28	343	0.08	28	344	0.08	9163	0.0	0.0	9162	0.0	0.0
37734	99	8	8			28	344	0.08	28	345	0.08	9164	0.0	0.0	9163	0.0	0.0
37735	33	8	8			0	340	0.00	0	341	0.00	10660	0.0	0.0	7799	0.0	0.0
37738	92	8	8			5	1,167	0.00	5	1,168	0.00	9158	0.0	0.0	9159	0.0	0.0
37739	316	8	8			5	1,166	0.00	5	1,167	0.00	9157	0.0	0.0	9158	0.0	0.0
37740	139	8	8			89	1,033	0.09	89	1,035	0.09	9159	0.0	0.0	7799	0.0	0.0
37741	242	8	8			73	1,467	0.05	73	1,469	0.05	9160	0.0	0.0	9159	0.0	0.0
37742	167	8	8			28	1,228	0.02	28	1,230	0.02	9162	0.0	0.0	9160	0.0	0.0
37743	213	8	8			45	1,214	0.04	45	1,215	0.04	9161	0.0	0.0	9160	0.0	0.0
37744	193	8	8			41	1,453	0.03	41	1,455	0.03	9173	0.0	0.0	9161	0.0	0.0
37745	142	8	8			28	344	0.08	28	344	0.08	9165	0.0	0.0	9164	0.0	0.0
37746	179	8	8			0	665	0.00	0	666	0.00	9166	0.0	0.0	9165	0.0	0.0
37747	263	8	8			1	1,276	0.00	1	1,277	0.00	9167	0.0	0.0	9166	0.0	0.0
37748	74	8	8			13	535	0.02	13	535	0.02	9168	0.0	0.0	9165	0.0	0.0
37749	209	8	8			13	1,466	0.01	13	1,468	0.01	9169	0.0	0.0	9168	0.0	0.0
37750	129	8	8			6	344	0.02	6	345	0.02	9187	0.0	0.0	9176	0.0	0.0
37751	30	8	8			6	343	0.02	6	344	0.02	9188	0.0	0.0	9187	0.0	0.0
37752	111	8	8			6	611	0.01	6	612	0.01	9189	0.0	0.0	9188	0.0	0.0
37753	69	8	8			38	1,101	0.03	38	1,102	0.03	9174	0.0	0.0	9173	0.0	0.0
37754	184	8	8			38	1,689	0.02	38	1,691	0.02	9175	0.0	0.0	9174	0.0	0.0
37755	31	8	8			38	826	0.05	38	828	0.05	9176	0.0	0.0	9175	0.0	0.0
37756	194	8	8			33	344	0.10	33	344	0.10	9177	0.0	0.0	9176	0.0	0.0
37757	89	8	8			33	340	0.10	33	340	0.10	9179	0.0	0.0	9177	0.0	0.0
37758	118	8	8			33	815	0.04	33	815	0.04	9180	0.0	0.0	9179	0.0	0.0
37759	297	8	8			5	1,413	0.00	5	1,414	0.00	9184	0.0	0.0	9173	0.0	0.0
37760	160	8	8			0	1,203	0.00	0	1,206	0.00	9185	0.0	0.0	9184	0.0	0.0
37761	336	8	8			5	968	0.01	5	969	0.01	9156	0.0	0.0	9157	0.0	0.0
37762	175	8	8			5	1,074	0.00	5	1,076	0.00	9155	0.0	0.0	9156	0.0	0.0
37763	84	8	8			5	1,259	0.00	5	1,260	0.00	9154	0.0	0.0	9155	0.0	0.0
37764	232	8	8			5	1,763	0.00	5	1,765	0.00	9150	0.0	0.0	9154	0.0	0.0
37765	55	8	8			6	1,148	0.01	6	1,149	0.01	9147	0.0	0.0	9146	0.0	0.0
37766	135	8	8			6	1,851	0.00	6	1,853	0.00	9320	0.0	0.0	9147	0.0	0.0
37767	79	8	8			23	345	0.07	23	346	0.07	9191	0.0	0.0	9190	0.0	0.0
37768	327	8	8			23	1,341	0.02	23	1,343	0.02	9141	0.0	0.0	9191	0.0	0.0
37769	100	8	8			23	343	0.07	23	344	0.07	9142	0.0	0.0	9141	0.0	0.0
37770	89	8	8			7	364	0.02	7	364	0.02	9143	0.0	0.0	9142	0.0	0.0
37771	168	8	8			7	342	0.02	7	343	0.02	9144	0.0	0.0	9143	0.0	0.0
37772	90	8	8			7	1,141	0.01	7	1,142	0.01	9146	0.0	0.0	9144	0.0	0.0
37773	176	8	8			1	1,351	0.00	1	1,352	0.00	9153	0.0	0.0	9146	0.0	0.0
37774	103	8	8			0	944	0.00	0	945	0.00	9152	0.0	0.0	9153	0.0	0.0
37775	143	8	8			0	765	0.00	0	765	0.00	9151	0.0	0.0	9152	0.0	0.0
37776	331	8	8			1	1,469	0.00	1	1,471	0.00	9182	0.0	0.0	9183	0.0	0.0
37777	242	8	8			5	1,806	0.00	5	1,808	0.00	9149	0.0	0.0	9150	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37778	198	8	8			33	1,272	0.03	33	1,274	0.03	9181	0.0	0.0	9180	0.0	0.0
37779	110	8	8			0	1,321	0.00	0	1,322	0.00	9197	0.0	0.0	9198	0.0	0.0
37780	72	8	8			0	592	0.00	0	592	0.00	9198	0.0	0.0	9199	0.0	0.0
37781	149	8	8			14	369	0.04	14	370	0.04	9201	0.0	0.0	9204	0.0	0.0
37782	297	8	8			0	372	0.00	0	372	0.00	9202	0.0	0.0	9201	0.0	0.0
37783	120	8	8			0	372	0.00	0	372	0.00	9203	0.0	0.0	9202	0.0	0.0
37784	338	8	8			9	606	0.01	9	606	0.01	9200	0.0	0.0	9201	0.0	0.0
37785	72	8	8			0	490	0.00	0	490	0.00	9199	0.0	0.0	9200	0.0	0.0
37786	275	8	8			14	817	0.02	14	819	0.02	9204	0.0	0.0	7283	0.0	0.0
37787	55	8	8			0	354	0.00	0	355	0.00	9205	0.0	0.0	9206	0.0	0.0
37788	211	8	8			0	373	0.00	0	374	0.00	9206	0.0	0.0	9207	0.0	0.0
37789	128	8	8			0	770	0.00	0	772	0.00	9208	0.0	0.0	9207	0.0	0.0
37790	169	8	8			1	415	0.00	1	415	0.00	9207	0.0	0.0	9209	0.0	0.0
37791	14	8	8			1	521	0.00	1	522	0.00	9209	0.0	0.0	9210	0.0	0.0
37792	54	8	8			13	763	0.02	13	764	0.02	9210	0.0	0.0	3736	0.0	0.0
37793	305	8	8			4	1,221	0.00	4	1,222	0.00	9222	0.0	0.0	9181	0.0	0.0
37794	71	8	8			30	1,141	0.03	30	1,142	0.03	9218	0.0	0.0	9219	0.0	0.0
37795	125	8	8			0	638	0.00	0	639	0.00	9211	0.0	0.0	9212	0.0	0.0
37796	86	8	8			3	817	0.00	3	818	0.00	9216	0.0	0.0	9217	0.0	0.0
37798	167	8	8			1	1,706	0.00	1	1,708	0.00	9215	0.0	0.0	9213	0.0	0.0
37799	167	8	8			0	1,072	0.00	0	1,073	0.00	9220	0.0	0.0	9215	0.0	0.0
37800	204	8	8			4	1,566	0.00	4	1,568	0.00	9221	0.0	0.0	9149	0.0	0.0
37801	103	8	8			0	969	0.00	0	971	0.00	9220	0.0	0.0	9221	0.0	0.0
37802	94	8	8			30	930	0.03	30	931	0.03	9219	0.0	0.0	9181	0.0	0.0
37803	85	8	8			30	1,214	0.02	30	1,215	0.02	9217	0.0	0.0	9218	0.0	0.0
37804	78	8	8			28	1,504	0.02	28	1,506	0.02	9214	0.0	0.0	9217	0.0	0.0
37805	56	8	8			28	348	0.08	28	348	0.08	9213	0.0	0.0	9214	0.0	0.0
37806	47	8	8			24	1,306	0.02	24	1,308	0.02	9212	0.0	0.0	9213	0.0	0.0
37810	413	8	8			21	1,199	0.02	21	1,200	0.02	9231	0.0	0.0	9233	0.0	0.0
37811	209	8	8			0	547	0.00	0	549	0.00	9232	0.0	0.0	9231	0.0	0.0
37813	169	8	8			27	1,722	0.02	27	1,724	0.02	9233	0.0	0.0	7792	0.0	0.0
37820	157	8	8			21	1,165	0.02	21	1,166	0.02	9230	0.0	0.0	9240	0.0	0.0
37821	400	8	8			21	1,164	0.02	21	1,165	0.02	9240	0.0	0.0	9231	0.0	0.0
37841	116	8	8			3	342	0.01	3	342	0.01	9260	0.0	0.0	9216	0.0	0.0
37842	142	8	8			0	1,440	0.00	0	1,442	0.00	9261	0.0	0.0	9260	0.0	0.0
37843	238	8	8			3	1,005	0.00	3	1,006	0.00	9264	0.0	0.0	9260	0.0	0.0
37844	55	8	8			0	542	0.00	0	543	0.00	9265	0.0	0.0	9264	0.0	0.0
37845	150	8	8			0	1,090	0.00	0	1,091	0.00	9266	0.0	0.0	9265	0.0	0.0
37846	87	8	8			6	1,485	0.00	6	1,487	0.00	10373	0.0	0.0	9267	0.0	0.0
37847	246	8	8			6	1,041	0.01	6	1,042	0.01	9267	0.0	0.0	9268	0.0	0.0
37848	148	8	8			7	1,926	0.00	7	1,928	0.00	10355	0.0	0.0	9268	0.0	0.0
37849	98	8	8			13	695	0.02	13	696	0.02	9268	0.0	0.0	9276	0.0	0.0
37850	91	8	8			13	765	0.02	13	766	0.02	9276	0.0	0.0	9269	0.0	0.0
37851	224	8	8			13	1,774	0.01	13	1,776	0.01	9269	0.0	0.0	9170	0.0	0.0
37852	95	8	8			1	343	0.00	1	344	0.00	9270	0.0	0.0	9170	0.0	0.0
37853	147	8	8			1	344	0.00	1	344	0.00	9271	0.0	0.0	9270	0.0	0.0
37854	112	8	8			0	344	0.00	0	344	0.00	9272	0.0	0.0	9271	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37855	83	8	8			0	744	0.00	0	744	0.00	9273	0.0	0.0	9272	0.0	0.0
37856	103	8	8			0	1,447	0.00	0	1,449	0.00	9274	0.0	0.0	9273	0.0	0.0
37857	77	8	8			0	1,721	0.00	0	1,723	0.00	9275	0.0	0.0	9274	0.0	0.0
37858	363	8	8			1	1,736	0.00	1	1,738	0.00	9294	0.0	0.0	9293	0.0	0.0
37859	95	8	8			1	1,792	0.00	1	1,794	0.00	9293	0.0	0.0	9292	0.0	0.0
37860	98	8	8			1	1,835	0.00	1	1,838	0.00	9292	0.0	0.0	9291	0.0	0.0
37861	203	8	8			0	1,044	0.00	0	1,046	0.00	9286	0.0	0.0	9287	0.0	0.0
37862	141	8	8			0	1,169	0.00	0	1,170	0.00	9291	0.0	0.0	9289	0.0	0.0
37863	204	8	8			10	344	0.03	10	344	0.03	9289	0.0	0.0	9290	0.0	0.0
37864	69	8	8			0	333	0.00	0	333	0.00	9288	0.0	0.0	9289	0.0	0.0
37865	41	8	8			0	599	0.00	0	600	0.00	9287	0.0	0.0	9288	0.0	0.0
37866	144	8	8			0	874	0.00	0	876	0.00	9278	0.0	0.0	9281	0.0	0.0
37867	171	8	8			0	1,099	0.00	0	1,100	0.00	9282	0.0	0.0	9297	0.0	0.0
37868	70	8	8			0	337	0.00	0	338	0.00	9297	0.0	0.0	9299	0.0	0.0
37869	161	8	8			0	342	0.00	0	342	0.00	9299	0.0	0.0	9300	0.0	0.0
37870	239	8	8			1	2,101	0.00	1	2,103	0.00	9277	0.0	0.0	9296	0.0	0.0
37871	134	8	8			1	2,092	0.00	1	2,095	0.00	9296	0.0	0.0	9295	0.0	0.0
37872	122	8	8			1	1,999	0.00	1	2,001	0.00	9295	0.0	0.0	9285	0.0	0.0
37873	197	8	8			1	1,425	0.00	1	1,427	0.00	9285	0.0	0.0	9284	0.0	0.0
37874	136	8	8			1	1,923	0.00	1	1,926	0.00	9284	0.0	0.0	9283	0.0	0.0
37875	194	8	8			6	1,935	0.00	6	1,938	0.00	9283	0.0	0.0	9281	0.0	0.0
37876	160	8	8			6	1,783	0.00	6	1,785	0.00	9281	0.0	0.0	9320	0.0	0.0
37877	294	8	8			10	1,762	0.01	10	1,764	0.01	9290	0.0	0.0	9300	0.0	0.0
37878	147	8	8			0	876	0.00	0	877	0.00	9279	0.0	0.0	9320	0.0	0.0
37879	196	8	8			1	1,070	0.00	1	1,072	0.00	9304	0.0	0.0	9301	0.0	0.0
37882	97	8	8			1	1,955	0.00	1	1,958	0.00	9303	0.0	0.0	9304	0.0	0.0
37883	174	8	8			1	1,470	0.00	1	1,472	0.00	9302	0.0	0.0	9303	0.0	0.0
37884	211	8	8			0	344	0.00	0	344	0.00	9305	0.0	0.0	4853	0.0	0.0
37885	308	8	8			1	2,067	0.00	1	2,069	0.00	4854	0.0	0.0	9305	0.0	0.0
37886	323	8	8			1	853	0.00	1	854	0.00	9340	0.0	0.0	9341	0.0	0.0
37887	213	8	8			1	815	0.00	1	816	0.00	9341	0.0	0.0	4291	0.0	0.0
37888	227	8	8			1	860	0.00	1	860	0.00	4291	0.0	0.0	9342	0.0	0.0
37889	224	8	8			26	801	0.03	26	803	0.03	9342	0.0	0.0	4292	0.0	0.0
37920	56	8	8			26	332	0.08	26	333	0.08	4292	0.0	0.0	4348	0.0	0.0
37921	106	8	8			0	547	0.00	0	547	0.00	9343	0.0	0.0	9344	0.0	0.0
37922	57	8	8			1	457	0.00	1	458	0.00	9344	0.0	0.0	9345	0.0	0.0
37923	74	8	8			1	453	0.00	1	454	0.00	9345	0.0	0.0	9346	0.0	0.0
37924	100	8	8			1	410	0.00	1	411	0.00	9346	0.0	0.0	9348	0.0	0.0
37925	98	8	8			1	410	0.00	1	410	0.00	9348	0.0	0.0	9349	0.0	0.0
37926	129	8	8			1	411	0.00	1	411	0.00	9349	0.0	0.0	5369	0.0	0.0
37927	132	8	8			0	619	0.00	0	619	0.00	9347	0.0	0.0	9346	0.0	0.0
37940	122	8	8			0	1,184	0.00	0	1,186	0.00	9360	0.0	0.0	9361	0.0	0.0
37941	97	8	8			0	496	0.00	0	497	0.00	9361	0.0	0.0	9362	0.0	0.0
37942	71	8	8			0	490	0.00	0	491	0.00	9362	0.0	0.0	9363	0.0	0.0
37943	119	8	8			6	909	0.01	6	910	0.01	9363	0.0	0.0	9364	0.0	0.0
37944	80	8	8			6	924	0.01	6	925	0.01	9364	0.0	0.0	9365	0.0	0.0
37945	115	8	8			6	895	0.01	6	896	0.01	9365	0.0	0.0	9366	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37946	175	8	8			6	956	0.01	6	958	0.01	9366	0.0	0.0	9367	0.0	0.0
37947	133	8	8			6	805	0.01	6	806	0.01	9367	0.0	0.0	9368	0.0	0.0
37948	101	8	8			6	1,246	0.00	6	1,247	0.00	9368	0.0	0.0	9370	0.0	0.0
37949	86	8	8			6	341	0.02	6	342	0.02	9370	0.0	0.0	9369	0.0	0.0
37950	116	8	8			11	456	0.02	11	457	0.02	9369	0.0	0.0	4731	0.0	0.0
37960	359	8	8			0	365	0.00	0	392	0.00	9400	0.0	0.0	9401	0.0	0.0
37961	110	8	8			0	988	0.00	0	1,060	0.00	9401	0.0	0.0	9402	0.0	0.0
37962	55	8	8			1	503	0.00	1	540	0.00	9402	0.0	0.0	9403	0.0	0.0
37963	153	8	8			1	1,254	0.00	1	1,345	0.00	9403	0.0	0.0	9404	0.0	0.0
37964	145	8	8			1	1,110	0.00	1	1,191	0.00	9404	0.0	0.0	6735	0.0	0.0
38003	209	8	8			76	1,324	0.06	76	1,326	0.06	9440	0.0	0.0	4356	0.0	0.0
38007	241	8	8			76	501	0.15	76	501	0.15	9441	0.0	0.0	9440	0.0	0.0
38020	280	8	8			1	542	0.00	1	542	0.00	9460	0.0	0.0	3637	0.0	0.0
38040	287	8	8			25	326	0.08	25	327	0.08	9480	0.0	0.0	9481	0.0	0.0
38041	115	8	8			1	538	0.00	1	538	0.00	9482	0.0	0.0	9481	0.0	0.0
38042	449	8	8			26	342	0.08	26	342	0.08	9481	0.0	0.0	9486	0.0	0.0
38043	256	8	8			50	342	0.15	50	343	0.15	9486	0.0	0.0	9488	0.0	0.0
38044	27	8	8			1	347	0.00	1	347	0.00	9489	0.0	0.0	9483	0.0	0.0
38045	139	8	8			22	341	0.07	22	342	0.07	9483	0.0	0.0	9484	0.0	0.0
38046	66	8	8			23	340	0.07	23	341	0.07	9484	0.0	0.0	9485	0.0	0.0
38047	126	8	8			24	321	0.07	24	321	0.07	9485	0.0	0.0	9486	0.0	0.0
38048	97	8	8			1	540	0.00	1	540	0.00	9490	0.0	0.0	9488	0.0	0.0
38049	469	8	8			58	342	0.17	58	343	0.17	9488	0.0	0.0	9491	0.0	0.0
38051	37	8	8			79	399	0.20	79	399	0.20	9491	0.0	0.0	9492	0.0	0.0
38052	499	8	8			80	392	0.20	80	392	0.20	9492	0.0	0.0	9493	0.0	0.0
38053	120	8	8			17	340	0.05	17	340	0.05	9494	0.0	0.0	9493	0.0	0.0
38054	418	8	8			97	342	0.28	97	342	0.28	9493	0.0	0.0	9495	0.0	0.0
38055	155	8	8			216	380	0.57	216	381	0.57	2391	0.0	0.0	9495	0.0	0.0
38056	270	8	8			330	382	0.86	330	383	0.86	9495	0.0	0.0	2390	0.0	0.0
38057	317	8	8			17	339	0.05	17	340	0.05	9496	0.0	0.0	9494	0.0	0.0
38058	26	8	8			1	1,218	0.00	1	1,220	0.00	9497	0.0	0.0	9483	0.0	0.0
38059	326	8	8			31	190	0.16	31	190	0.16	7392	0.0	0.0	9498	0.0	0.0
38060	326	8	8			40	285	0.14	40	285	0.14	9498	0.0	0.0	2333	0.0	0.0
38061	242	8	8			8	518	0.02	8	519	0.02	9499	0.0	0.0	9498	0.0	0.0
38080	265	10	10			516	731	0.71	516	731	0.71	5961	0.0	0.0	9500	0.0	0.0
38082	70	10	10			529	637	0.83	529	636	0.83	5972	0.0	0.0	9501	0.0	0.0
38083	378	10	10			549	671	0.82	549	670	0.82	9501	0.0	0.0	5971	0.0	0.0
38084	65	10	10			528	721	0.73	528	720	0.73	9500	0.0	0.0	5970	0.0	0.0
38085	96	10	10			528	702	0.75	528	701	0.75	5970	0.0	0.0	5972	0.0	0.0
38086	245	8	8			1	1,140	0.00	1	1,142	0.00	9502	0.0	0.0	9501	0.0	0.0
38087	130	8	8			1	641	0.00	1	642	0.00	9503	0.0	0.0	9502	0.0	0.0
38088	100	8	8			10	906	0.01	10	908	0.01	9504	0.0	0.0	9500	0.0	0.0
38100	85	8	8			1	2,231	0.00	1	2,234	0.00	9520	0.0	0.0	9521	0.0	0.0
38101	194	8	8			1	1,940	0.00	1	1,942	0.00	9521	0.0	0.0	9523	0.0	0.0
38102	138	8	8			1	1,874	0.00	1	1,876	0.00	9523	0.0	0.0	9522	0.0	0.0
38103	65	8	8			1	1,323	0.00	1	1,324	0.00	9522	0.0	0.0	9524	0.0	0.0
38104	318	8	8			3	1,386	0.00	3	1,388	0.00	9524	0.0	0.0	9532	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38105	150	8	8			1	1,982	0.00	1	1,985	0.00	9525	0.0	0.0	9526	0.0	0.0
38106	292	8	8			1	2,090	0.00	1	2,092	0.00	9526	0.0	0.0	9527	0.0	0.0
38107	277	8	8			1	2,097	0.00	1	2,100	0.00	9527	0.0	0.0	9528	0.0	0.0
38108	97	8	8			10	1,056	0.01	10	1,057	0.01	9528	0.0	0.0	4799	0.0	0.0
38109	115	8	8			1	2,649	0.00	1	2,652	0.00	9529	0.0	0.0	9520	0.0	0.0
38111	48	8	8			0	2,578	0.00	0	2,582	0.00	9531	0.0	0.0	9530	0.0	0.0
38112	60	8	8			0	2,090	0.00	0	2,092	0.00	9530	0.0	0.0	9523	0.0	0.0
38113	87	8	8			3	1,028	0.00	3	1,028	0.00	9532	0.0	0.0	9533	0.0	0.0
38114	183	8	8			3	1,133	0.00	3	1,134	0.00	9533	0.0	0.0	4799	0.0	0.0
38115	50	8	8			60	1,395	0.04	60	1,397	0.04	4608	0.0	0.0	8330	0.0	0.0
38116	250	8	8			76	820	0.09	76	821	0.09	8330	0.0	0.0	4670	0.0	0.0
38120	431	8	8			19	1,688	0.01	19	1,690	0.01	7981	0.0	0.0	7983	0.0	0.0
38121	197	8	8			1	765	0.00	1	767	0.00	9604	0.0	0.0	9582	0.0	0.0
38122	148	8	8			1	1,854	0.00	1	1,856	0.00	9581	0.0	0.0	9582	0.0	0.0
38123	201	8	8			1	799	0.00	1	800	0.00	9582	0.0	0.0	9583	0.0	0.0
38124	143	8	8			11	1,119	0.01	11	1,121	0.01	9583	0.0	0.0	9584	0.0	0.0
38125	190	8	8			11	1,433	0.01	11	1,435	0.01	9584	0.0	0.0	9585	0.0	0.0
38126	128	8	8			12	1,117	0.01	12	1,119	0.01	9585	0.0	0.0	7326	0.0	0.0
38127	49	8	8			1	906	0.00	1	908	0.00	9586	0.0	0.0	9585	0.0	0.0
38128	112	8	8			1	1,423	0.00	1	1,424	0.00	9587	0.0	0.0	9586	0.0	0.0
38129	183	8	8			0	1,444	0.00	0	1,447	0.00	9589	0.0	0.0	9588	0.0	0.0
38130	17	8	8			1	492	0.00	1	492	0.00	9588	0.0	0.0	9587	0.0	0.0
38140	129	8	8			0	1,939	0.00	0	1,941	0.00	9600	0.0	0.0	9601	0.0	0.0
38141	55	8	8			1	773	0.00	1	774	0.00	9601	0.0	0.0	9602	0.0	0.0
38142	180	8	8			1	770	0.00	1	772	0.00	9602	0.0	0.0	9603	0.0	0.0
38143	104	8	8			1	2,208	0.00	1	2,210	0.00	9603	0.0	0.0	9604	0.0	0.0
38144	101	8	8			0	423	0.00	0	424	0.00	9606	0.0	0.0	9601	0.0	0.0
38145	43	8	8			0	1,201	0.00	0	1,203	0.00	9605	0.0	0.0	9601	0.0	0.0
38160	135	8	8			1	423	0.00	1	424	0.00	9620	0.0	0.0	9621	0.0	0.0
38161	154	8	8			35	591	0.06	35	592	0.06	9623	0.0	0.0	9624	0.0	0.0
38162	347	8	8			35	1,037	0.03	35	1,038	0.03	9622	0.0	0.0	9623	0.0	0.0
38163	196	8	8			1	288	0.00	1	288	0.00	9621	0.0	0.0	9622	0.0	0.0
38180	402	8	8			30	765	0.04	30	765	0.04	10929	0.0	0.0	9642	0.0	0.0
38181	338	8	8			14	1,402	0.01	14	1,403	0.01	9640	0.0	0.0	9642	0.0	0.0
38182	50	8	8			0	372	0.00	0	372	0.00	9645	0.0	0.0	9643	0.0	0.0
38183	330	8	8			47	866	0.05	47	867	0.05	9642	0.0	0.0	9643	0.0	0.0
38184	160	8	8			47	715	0.07	47	716	0.07	9643	0.0	0.0	9644	0.0	0.0
38185	259	8	8			48	682	0.07	48	683	0.07	9644	0.0	0.0	9441	0.0	0.0
38187	210	8	8			0	372	0.00	0	372	0.00	9641	0.0	0.0	8148	0.0	0.0
38189	210	8	8			1	919	0.00	1	921	0.00	7188	0.0	0.0	4492	0.0	0.0
38200	157	8	8			1	1,635	0.00	1	1,637	0.00	9660	0.0	0.0	4512	0.0	0.0
38220	216	8	8			0	1,008	0.00	0	1,010	0.00	9684	0.0	0.0	9683	0.0	0.0
38221	86	8	8			0	1,188	0.00	0	1,189	0.00	9683	0.0	0.0	9681	0.0	0.0
38222	65	8	12	37	ura	187	1,192	0.16	187	3,513	0.05	9685	0.0	0.0	9682	0.0	0.0
38223	156	8	12	37	ura	187	617	0.30	187	1,819	0.10	9682	0.0	0.0	9681	0.0	0.0
38224	87	8	12	37	ura	194	715	0.27	194	2,110	0.09	9681	0.0	0.0	9680	0.0	0.0
38225	94	8	8			0	712	0.00	0	713	0.00	9686	0.0	0.0	9687	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38240	127	8	8			0	726	0.00	0	727	0.00	10991	0.0	0.0	9687	0.0	0.0
38241	1031	54	54			22,615	14,017	1.61	24,201	14,017	1.73	2363	0.0	0.0	9703	0.0	0.0
38242	1031	54	54			26,511	18,233	1.45	30,380	18,233	1.67	9703	0.0	0.0	2362	0.0	0.0
38243	431	24	24		Existing	3,896	7,210	0.54	6,201	7,764	0.80	10083	0.0	0.0	9703	0.0	0.0
38244	248	8	8			14	1,050	0.01	14	1,051	0.01	10920	0.0	0.0	9706	0.0	0.0
38245	475	8	8			14	699	0.02	14	700	0.02	9706	0.0	0.0	9640	0.0	0.0
38246	229	8	8			1	1,178	0.00	1	1,180	0.00	10923	0.0	0.0	9705	0.0	0.0
38247	194	8	8			1	1,281	0.00	1	1,283	0.00	9705	0.0	0.0	8161	0.0	0.0
38260	74	8	8			0	1,000	0.00	0	1,001	0.00	9720	0.0	0.0	9721	0.0	0.0
38261	54	8	8			1	1,128	0.00	1	1,129	0.00	9721	0.0	0.0	9722	0.0	0.0
38262	347	8	8			1	1,303	0.00	1	1,305	0.00	9722	0.0	0.0	9723	0.0	0.0
38263	199	8	8			1	1,033	0.00	1	1,034	0.00	9723	0.0	0.0	9724	0.0	0.0
38264	50	8	8			16	536	0.03	15	537	0.03	9724	0.0	0.0	9726	0.0	0.0
38265	115	24	24			2,619	4,334	0.60	3,069	4,334	0.71	9726	0.0	0.0	6134	0.0	0.0
38266	80	8	8			0	621	0.00	0	622	0.00	9729	0.0	0.0	9727	0.0	0.0
38267	261	8	8			1	780	0.00	1	781	0.00	9727	0.0	0.0	9730	0.0	0.0
38268	187	8	8			3	773	0.00	3	774	0.00	9730	0.0	0.0	9731	0.0	0.0
38270	220	8	8			1	394	0.00	1	394	0.00	5357	0.0	0.0	9731	0.0	0.0
38271	38	8	8			4	403	0.01	4	403	0.01	9731	0.0	0.0	5356	0.0	0.0
38272	220	12	12			31	2,633	0.01	31	2,633	0.01	9732	0.0	0.0	4882	0.0	0.0
38273	108	8	8			1	1,462	0.00	1	1,464	0.00	4250	0.0	0.0	9732	0.0	0.0
38274	348	8	8			1	1,363	0.00	1	1,364	0.00	9734	0.0	0.0	4250	0.0	0.0
38275	194	8	8			0	1,224	0.00	0	1,226	0.00	4254	0.0	0.0	9734	0.0	0.0
38276	41	8	8			1	2,438	0.00	1	2,441	0.00	4249	0.0	0.0	4250	0.0	0.0
38280	63	12	12			647	634	1.02	604	634	0.95	3314	3.8	0.0	9741	3.9	0.0
38281	279	12	12			647	627	1.03	603	627	0.96	9741	3.9	0.0	9740	2.5	6.5
38282	244	6	6			28	195	0.14	1	195	0.00	3359	2.5	0.0	9740	2.5	6.5
38283	63	12	12			649	1,247	0.52	604	1,247	0.48	9740	2.5	6.5	3311	2.8	6.7
38300	37	8	8			1	542	0.00	1	543	0.00	9760	0.0	0.0	2112	0.0	0.0
38301	7	8	8			10	820	0.01	10	822	0.01	9761	0.0	0.0	7237	0.0	0.0
38302	303	8	8			10	463	0.02	10	463	0.02	9762	0.0	0.0	9761	0.0	0.0
38303	182	8	8			1	392	0.00	1	392	0.00	9763	0.0	0.0	2103	0.0	0.0
38304	84	8	8			1	345	0.00	1	346	0.00	9764	0.0	0.0	9765	0.0	0.0
38305	39	8	8			28	460	0.06	28	460	0.06	9765	0.0	0.0	9766	0.0	0.0
38306	98	8	8			28	342	0.08	28	342	0.08	9766	0.0	0.0	9767	0.0	0.0
38307	35	8	8			28	343	0.08	28	344	0.08	9767	0.0	0.0	2124	0.0	0.0
38320	100	8	8			19	402	0.05	19	403	0.05	9780	0.0	0.0	9782	0.0	0.0
38321	298	8	8			19	860	0.02	19	862	0.02	9781	0.0	0.0	9780	0.0	0.0
38340	235	8	8			1	2,139	0.00	1	2,142	0.00	9803	0.0	0.0	9801	0.0	0.0
38341	192	8	8			13	1,956	0.01	13	1,958	0.01	9801	0.0	0.0	9800	0.0	0.0
38342	133	8	8			12	2,366	0.00	12	2,369	0.00	9802	0.0	0.0	9801	0.0	0.0
38343	125	8	8			13	1,182	0.01	13	1,184	0.01	9800	0.0	0.0	6390	0.0	0.0
38380	105	8	8			0	1,327	0.00	0	1,329	0.00	9823	0.0	0.0	9820	0.0	0.0
38381	100	8	8			0	703	0.00	0	703	0.00	9820	0.0	0.0	9821	0.0	0.0
38382	265	8	8			1	1,220	0.00	1	1,222	0.00	9821	0.0	0.0	9822	0.0	0.0
38400	290	8	8			1	1,167	0.00	1	1,168	0.00	9842	0.0	0.0	9841	0.0	0.0
38401	212	8	8			0	1,157	0.00	0	1,158	0.00	9841	0.0	0.0	9840	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38402	88	8	8			0	1,060	0.00	0	1,061	0.00	9840	0.0	0.0	8182	0.0	0.0
38403	208	8	8			303	1,042	0.29	303	1,044	0.29	9843	0.0	0.0	9844	0.0	0.0
38404	365	8	8			303	1,452	0.21	303	1,454	0.21	9844	0.0	0.0	9845	0.0	0.0
38405	35	8	8			303	1,803	0.17	303	1,805	0.17	9845	0.0	0.0	8184	0.0	0.0
38420	105	8	8			1	287	0.00	1	287	0.00	9860	0.0	0.0	9861	0.0	0.0
38421	181	8	8			1	271	0.01	1	271	0.01	9861	0.0	0.0	9862	0.0	0.0
38422	126	8	8			19	310	0.06	19	311	0.06	9862	0.0	0.0	9863	0.0	0.0
38441	233	8	8			1	1,797	0.00	1	1,799	0.00	9880	0.0	0.0	4984	0.0	0.0
38461	310	6	6			1	105	0.01	1	105	0.01	9900	0.0	0.0	3547	0.0	0.0
38480	166	8	8			11	225	0.05	11	241	0.05	9921	0.0	0.0	9920	0.0	0.0
38481	48	8	8			1	823	0.00	1	883	0.00	9922	0.0	0.0	9921	0.0	0.0
38483	264	8	8			1	562	0.00	1	603	0.00	9923	0.0	0.0	9922	0.0	0.0
38484	181	8	8			0	504	0.00	0	541	0.00	9925	0.0	0.0	9923	0.0	0.0
38485	254	8	8			1	979	0.00	1	1,051	0.00	9924	0.0	0.0	9923	0.0	0.0
38486	316	8	8			1	528	0.00	1	566	0.00	9926	0.0	0.0	6789	0.0	0.0
38487	10	8	8			0	333	0.00	0	357	0.00	9927	0.0	0.0	9926	0.0	0.0
38488	35	8	8			1	356	0.00	1	381	0.00	9926	0.0	0.0	8741	0.0	0.0
38490	2	8	8			0	105	0.00	0	113	0.00	8742	0.0	0.0	9929	0.0	0.0
38491	313	8	8			0	557	0.00	0	597	0.00	8743	0.0	0.0	8740	0.0	0.0
38492	497	8	8			0	411	0.00	0	441	0.00	6790	0.0	0.0	9930	0.0	0.0
38494	199	8	8			17	149	0.11	17	160	0.10	9930	0.0	0.0	6904	0.0	0.0
38495	371	8	8			1	1,283	0.00	1	1,285	0.00	5938	0.0	0.0	9931	0.0	0.0
38496	44	8	8			13	1,283	0.01	13	1,284	0.01	9931	0.0	0.0	5854	4.5	0.0
38497	44	8	8			11	547	0.02	11	547	0.02	9932	0.0	0.0	9931	0.0	0.0
38498	149	8	8			10	407	0.03	10	408	0.03	9933	0.0	0.0	9932	0.0	0.0
38499	149	8	8			10	478	0.02	10	479	0.02	9934	0.0	0.0	9933	0.0	0.0
38500	109	8	8			356	668	0.53	0	669	0.00	9940	3.4	0.0	5859	1.8	0.0
38501	202	10	15	18	Existing	772	328	2.35	772	968	0.80	5858	0.6	0.0	9940	3.4	0.0
38502	248	10	15	18	Existing	463	333	1.39	773	983	0.79	9940	3.4	0.0	5860	5.3	0.0
38503	288	8	8			1	290	0.00	1	291	0.00	9941	0.0	0.0	5617	0.0	0.0
38504	57	8	8			13	373	0.04	13	374	0.04	9942	0.0	0.0	8987	0.0	0.0
38505	163	8	8			13	506	0.02	13	507	0.02	9943	0.0	0.0	9942	0.0	0.0
38506	141	8	8			13	1,439	0.01	13	1,441	0.01	9944	0.0	0.0	9943	0.0	0.0
38507	330	8	8			1	588	0.00	1	588	0.00	9945	0.0	0.0	9944	0.0	0.0
38508	100	8	8			0	372	0.00	0	372	0.00	9946	0.0	0.0	9945	0.0	0.0
38509	207	8	8			1	826	0.00	1	828	0.00	9947	0.0	0.0	9948	0.0	0.0
38510	102	8	8			1	298	0.00	1	299	0.00	9948	0.0	0.0	9863	0.0	0.0
38511	329	8	8			20	262	0.08	20	262	0.08	9863	0.0	0.0	9951	0.0	0.0
38512	279	8	8			1	1,058	0.00	1	1,059	0.00	9949	0.0	0.0	9950	0.0	0.0
38513	77	8	8			1	815	0.00	1	815	0.00	9950	0.0	0.0	9951	0.0	0.0
38514	241	8	8			33	285	0.11	33	286	0.11	9951	0.0	0.0	9953	0.0	0.0
38515	106	8	8			33	987	0.03	33	988	0.03	9953	0.0	0.0	9954	0.0	0.0
38516	376	8	8			1	1,032	0.00	1	1,033	0.00	9952	0.0	0.0	9954	0.0	0.0
38517	147	8	8			35	1,274	0.03	35	1,276	0.03	9954	0.0	0.0	9955	0.0	0.0
38518	127	8	8			35	817	0.04	35	817	0.04	9955	0.0	0.0	9956	0.0	0.0
38519	180	8	8			58	575	0.10	51	576	0.09	9956	0.0	0.0	5290	2.7	0.0
38520	205	4	4			0	176	0.00	0	176	0.00	JCT-10	0.0	0.0	9958	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38521	37	8	8			22	322	0.07	22	322	0.07	9959	0.0	0.0	9957	0.0	0.0
38522	139	8	8			1	341	0.00	1	342	0.00	9960	0.0	0.0	9959	0.0	0.0
38523	227	8	8			3	410	0.01	1	411	0.00	9962	0.0	0.0	4498	3.3	0.0
38524	215	8	8			1	1,114	0.00	1	1,115	0.00	9963	0.0	0.0	9962	0.0	0.0
38525	393	8	8			0	579	0.00	0	580	0.00	9964	0.0	0.0	9963	0.0	0.0
38540	81	8	8			77	1,167	0.07	77	1,168	0.07	2503	0.0	0.0	9980	0.0	0.0
38541	136	8	8			146	1,309	0.11	146	1,310	0.11	9980	0.0	0.0	2504	0.0	0.0
38542	169	8	8			72	586	0.12	72	587	0.12	9982	0.0	0.0	9980	0.0	0.0
38543	67	8	8			0	588	0.00	0	588	0.00	9981	0.0	0.0	9982	0.0	0.0
38544	223	8	8			0	1,018	0.00	0	1,019	0.00	9983	0.0	0.0	9982	0.0	0.0
38545	414	8	8			1	340	0.00	1	340	0.00	9984	0.0	0.0	9985	0.0	0.0
38546	249	10	10			1	616	0.00	1	615	0.00	9985	0.0	0.0	9986	0.0	0.0
38547	154	10	10			161	607	0.27	161	606	0.27	9986	0.0	0.0	9987	0.0	0.0
38548	312	10	10			163	287	0.57	169	287	0.59	9987	0.0	0.0	9988	0.0	0.0
38549	179	10	10			221	810	0.27	229	810	0.28	9988	0.0	0.0	9989	0.0	9.5
38550	260	8	8			9	336	0.03	9	337	0.03	2215	0.0	0.0	9990	0.0	0.0
38551	195	8	8			26	330	0.08	24	330	0.07	9990	0.0	0.0	2214	6.0	6.0
38552	253	6	6			13	280	0.04	13	280	0.04	9991	0.0	0.0	9990	0.0	0.0
38553	219	8	8			288	340	0.85	288	340	0.85	2207	7.1	7.1	9992	0.0	0.0
38554	93	8	8			304	342	0.89	306	342	0.89	9992	0.0	0.0	2214	6.0	6.0
38555	252	8	8			22	343	0.06	22	344	0.06	9998	0.0	0.0	9992	0.0	0.0
38556	137	8	8			21	353	0.06	21	353	0.06	9996	0.0	0.0	9998	0.0	0.0
38557	135	8	8			20	385	0.05	20	385	0.05	9997	0.0	0.0	9996	0.0	0.0
38558	400	8	8			56	542	0.10	56	543	0.10	9999	0.0	0.0	10000	0.0	0.0
38559	67	8	8			57	257	0.22	57	257	0.22	10000	0.0	0.0	2190	0.0	0.0
38560	412	8	8			40	349	0.11	40	349	0.11	2334	0.0	0.0	10001	0.0	0.0
38561	68	8	8			41	294	0.14	41	294	0.14	10001	0.0	0.0	2348	0.0	0.0
38562	86	8	8			1	336	0.00	1	336	0.00	10002	0.0	0.0	10001	0.0	0.0
38563	72	8	8			1	469	0.00	1	470	0.00	10003	0.0	0.0	10002	0.0	0.0
38564	262	8	8			72	343	0.21	72	344	0.21	2175	0.0	0.0	2161	0.0	0.0
38565	113	8	8			73	342	0.21	73	343	0.21	2161	0.0	0.0	2145	0.0	0.0
38566	80	8	8			343	343	1.00	344	344	1.00	2203	5.8	5.8	10005	5.6	0.0
38567	356	8	8			390	342	1.14	389	343	1.13	10005	5.6	0.0	2238	0.0	0.0
38568	350	8	8			1	444	0.00	1	445	0.00	10006	0.0	0.0	10005	5.6	0.0
38569	395	8	8			10	331	0.03	10	331	0.03	7237	0.0	0.0	10007	0.0	0.0
38570	89	8	8			22	385	0.06	22	386	0.06	10007	0.0	0.0	2123	0.0	0.0
38571	250	8	8			10	343	0.03	10	344	0.03	10009	0.0	0.0	10007	0.0	0.0
38572	189	8	8			40	265	0.15	40	265	0.15	7006	0.0	0.0	10010	0.0	0.0
38573	213	8	8			40	276	0.14	40	276	0.14	10010	0.0	0.0	2130	0.0	0.0
38575	246	8	8			1	346	0.00	1	347	0.00	2313	0.0	0.0	9782	0.0	0.0
38576	77	8	8			20	339	0.06	20	339	0.06	9782	0.0	0.0	2270	0.0	0.0
38578	96	8	8			6	943	0.01	6	944	0.01	10014	0.0	0.0	2253	0.0	0.0
38581	65	8	8			18	431	0.04	18	431	0.04	2397	0.0	0.0	10016	0.0	0.0
38582	350	8	8			31	429	0.07	31	430	0.07	10016	0.0	0.0	7243	0.0	0.0
38583	248	8	8			13	924	0.01	13	926	0.01	10015	0.0	0.0	10016	0.0	0.0
38584	95	8	8			42	1,217	0.03	0	1,218	0.00	2246	0.0	0.0	2416	0.0	0.0
38585	198	15	15			107	1,147	0.09	67	1,147	0.06	2454	0.0	0.0	10018	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38586	176	15	15			115	977	0.12	74	977	0.08	10018	0.0	0.0	7244	0.0	0.0
38587	142	8	8			7	542	0.01	7	543	0.01	10017	0.0	0.0	10018	0.0	0.0
38588	109	8	8			101	341	0.30	101	341	0.30	2103	0.0	0.0	10020	0.0	0.0
38589	251	8	8			109	341	0.32	109	341	0.32	10020	0.0	0.0	2139	0.0	0.0
38590	170	8	8			1	383	0.00	1	384	0.00	10019	0.0	0.0	10020	0.0	0.0
38600	167	8	8			172	218	0.79	172	218	0.79	2126	0.0	0.0	10040	0.0	0.0
38601	203	8	8			173	295	0.59	173	295	0.59	10040	0.0	0.0	2125	0.0	0.0
38606	245	18	18			1,581	2,333	0.68	1,672	2,333	0.72	2449	0.0	0.0	10045	0.0	0.0
38607	245	18	18			1,581	1,086	1.46	1,672	1,086	1.54	10045	0.0	0.0	2450	0.0	0.0
38608	38	8	8			111	249	0.45	111	249	0.45	2461	0.0	0.0	10046	0.0	0.0
38609	312	8	8			111	288	0.39	111	288	0.39	10046	0.0	0.0	2460	0.0	0.0
38611	35	8	8			0	1,769	0.00	0	1,771	0.00	10046	0.0	0.0	2449	0.0	0.0
38621	70	8	8			31	476	0.07	30	477	0.06	10060	0.0	0.0	2291	5.6	0.0
38622	63	8	8			15	432	0.03	15	433	0.03	2292	0.0	0.0	10064	0.0	0.0
38623	249	8	8			15	569	0.03	15	569	0.03	10064	0.0	0.0	10060	0.0	0.0
38625	201	8	8			6	429	0.01	6	430	0.01	10061	0.0	0.0	10062	0.0	0.0
38626	123	8	8			6	385	0.02	6	385	0.02	10062	0.0	0.0	10060	0.0	0.0
38627	103	8	8			8	597	0.01	8	599	0.01	10063	0.0	0.0	10060	0.0	0.0
38629	56	8	8			1	437	0.00	1	438	0.00	10068	0.0	0.0	1685	0.0	0.0
38640	135	8	8			1	415	0.00	1	416	0.00	10080	0.0	0.0	1698	0.0	0.0
38641	202	8	8			1	352	0.00	1	352	0.00	10081	0.0	0.0	1285	0.0	0.0
38642	303	8	8			14	343	0.04	14	343	0.04	1285	0.0	0.0	10082	0.0	0.0
38645	426	24	24		Existing	3,895	6,808	0.57	6,202	7,294	0.85	10084	0.0	0.0	10083	0.0	0.0
38646	177	24	24		Existing	3,896	6,810	0.57	6,202	7,297	0.85	10085	0.0	0.0	10084	0.0	0.0
38647	132	24	24		Existing	3,896	6,851	0.57	6,202	7,340	0.84	10086	0.0	0.0	10085	0.0	0.0
38648	22	24	24			86	6,765	0.01	130	7,248	0.02	10087	0.0	0.0	10086	0.0	0.0
38649	7	24	24			43	6,652	0.01	66	7,127	0.01	10089	0.0	0.0	10087	0.0	0.0
38650	109	18	24	26	Existing	3,894	3,544	1.10	6,204	8,178	0.76	6882	0.0	0.0	10086	0.0	0.0
38652	103	10	10			431	833	0.52	431	833	0.52	3269	0.0	0.0	3268	0.0	0.0
38660	374	8	8			0	647	0.00	0	647	0.00	10101	0.0	0.0	10100	0.0	0.0
38661	500	21	21			3,860	7,333	0.53	4,813	7,333	0.66	2925	0.0	0.0	10100	0.0	0.0
38662	234	21	21			3,860	10,036	0.38	4,814	10,036	0.48	10100	0.0	0.0	7495	0.0	0.0
38663	279	12	15	5	Existing	711	1,038	0.69	1,403	1,882	0.75	1828	1.5	0.0	1827	0.0	0.0
38665	188	8	8			31	654	0.05	31	655	0.05	10107	0.0	0.0	2671	0.0	0.0
38666	104	8	8			31	374	0.08	31	374	0.08	10108	0.0	0.0	10107	0.0	0.0
38667	260	8	8			0	814	0.00	0	815	0.00	10109	0.0	0.0	10108	0.0	0.0
38668	29	8	8			31	378	0.08	31	378	0.08	10110	0.0	0.0	10108	0.0	0.0
38669	147	8	8			31	372	0.08	31	373	0.08	10111	0.0	0.0	10110	0.0	0.0
38670	35	8	8			31	794	0.04	31	796	0.04	10112	0.0	0.0	10111	0.0	0.0
38671	262	8	8			30	556	0.05	30	557	0.05	10113	0.0	0.0	10112	0.0	0.0
38672	120	8	8			0	907	0.00	0	908	0.00	10114	0.0	0.0	10113	0.0	0.0
38673	248	8	8			0	989	0.00	0	990	0.00	10115	0.0	0.0	10114	0.0	0.0
38680	70	8	8			0	367	0.00	0	367	0.00	10120	0.0	0.0	4564	0.0	0.0
38700	27	8	8			0	452	0.00	0	453	0.00	10141	0.0	0.0	2930	0.0	0.0
38701	193	8	8			1	371	0.00	1	372	0.00	10142	0.0	0.0	2949	0.0	0.0
38702	166	8	8			0	374	0.00	0	374	0.00	10144	0.0	0.0	10142	0.0	0.0
38703	254	8	8			0	589	0.00	0	590	0.00	10145	0.0	0.0	10144	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38704	89	8	8			1	591	0.00	1	592	0.00	10143	0.0	0.0	10142	0.0	0.0
38705	75	8	8			0	588	0.00	0	588	0.00	10147	0.0	0.0	10146	0.0	0.0
38706	165	8	8			0	588	0.00	0	588	0.00	10146	0.0	0.0	10143	0.0	0.0
38707	128	8	8			0	588	0.00	0	588	0.00	10148	0.0	0.0	10143	0.0	0.0
38708	25	8	8			0	455	0.00	0	456	0.00	10149	0.0	0.0	2954	0.0	0.0
38709	45	8	8			0	455	0.00	0	456	0.00	10150	0.0	0.0	10149	0.0	0.0
38710	66	18	21	42	2036	3,392	3,976	0.85	4,350	5,998	0.73	10151	0.0	0.0	2675	0.0	0.0
38711	76	18	18			2,410	3,564	0.68	2,831	3,564	0.79	10152	0.0	0.0	7250	0.0	0.0
38713	63	8	8			108	596	0.18	106	597	0.18	10153	0.0	0.0	3014	0.0	0.0
38714	188	8	8			0	470	0.00	0	471	0.00	10154	0.0	0.0	4332	0.5	0.0
38730	304	12	12			281	642	0.44	281	642	0.44	10180	0.0	0.0	3235	0.0	0.0
38731	44	12	12			280	1,181	0.24	280	1,181	0.24	3164	0.0	0.0	10180	0.0	0.0
38740	114	8	8			3	305	0.01	3	305	0.01	3274	0.0	0.0	3234	0.0	0.0
38741	107	12	12			281	1,071	0.26	281	1,071	0.26	3235	0.0	0.0	3234	0.0	0.0
38742	97	10	10			280	556	0.50	280	556	0.50	10181	0.0	0.0	3164	0.0	0.0
38745	105	8	8			1	542	0.00	1	543	0.00	10183	0.0	0.0	10184	0.0	0.0
38746	89	8	8			1	617	0.00	1	617	0.00	10184	0.0	0.0	10182	0.0	0.0
38747	73	8	8			1	790	0.00	1	792	0.00	10182	0.0	0.0	3274	0.0	0.0
38760	85	6	6			40	442	0.09	17	442	0.04	1882	0.0	0.0	10200	3.5	0.0
38761	194	6	6			95	438	0.22	35	438	0.08	10200	3.5	0.0	1866	4.0	0.0
38764	180	8	8			1	708	0.00	1	710	0.00	10201	0.0	0.0	10200	3.5	0.0
38765	70	6	6			1	280	0.00	1	280	0.00	1883	0.0	0.0	1850	0.0	0.0
38766	217	6	6			16	260	0.06	16	260	0.06	1850	0.0	0.0	1882	0.0	0.0
38768	91	6	6			1	133	0.01	1	133	0.01	10220	0.0	0.0	1958	0.0	0.0
38769	445	16	16			867	3,093	0.28	401	3,091	0.13	5588	0.0	0.0	10221	0.0	0.0
38770	313	16	16			868	3,095	0.28	401	3,093	0.13	10221	0.0	0.0	1864	0.0	0.0
38771	260	16	16			2,772	2,537	1.09	2,926	2,537	1.15	2026	0.0	0.0	10222	0.0	10.1
38772	251	16	16			2,772	2,569	1.08	2,927	2,569	1.14	10222	0.0	10.1	1998	0.0	0.0
38774	126	8	8			1	324	0.00	1	324	0.00	10226	0.0	0.0	3250	0.0	0.0
38775	33	8	8			1	412	0.00	1	412	0.00	10223	0.0	0.0	10224	0.0	0.0
38776	327	8	8			1	374	0.00	1	375	0.00	10224	0.0	0.0	10225	0.0	0.0
38777	33	8	8			1	353	0.00	1	353	0.00	10225	0.0	0.0	10226	0.0	0.0
38778	278	8	8			1	535	0.00	1	535	0.00	10228	0.0	0.0	10227	0.0	0.0
38779	313	10	10			415	539	0.77	415	538	0.77	3270	0.0	0.0	10227	0.0	0.0
38780	87	10	10			431	538	0.80	431	537	0.80	10227	0.0	0.0	3269	0.0	0.0
38800	102	8	8			49	370	0.13	1	371	0.00	1999	4.6	0.0	10240	4.6	0.0
38802	156	12	15	2	Existing	1,010	1,133	0.89	1,556	2,053	0.76	2014	0.4	0.0	10241	0.3	0.0
38803	336	6	6			44	186	0.24	44	186	0.24	7002	3.2	0.0	10241	0.3	0.0
38805	73	12	15	2	Existing	1,054	1,149	0.92	1,600	2,084	0.77	10241	0.3	0.0	2012	0.0	0.0
38806	5	10	10			26	735	0.04	10	734	0.01	2014	0.4	0.0	10242	0.3	4.8
38809	5	10	10			22	900	0.02	11	899	0.01	10243	0.0	0.0	2012	0.0	0.0
38820	222	33	33			7,558	8,579	0.88	9,671	8,579	1.13	2152	0.0	0.0	2149	0.0	0.0
38822	130	33	33			7,558	16,913	0.45	9,671	16,913	0.57	2149	0.0	0.0	10260	0.0	0.0
38823	84	18	18			2,804	2,301	1.22	3,612	2,301	1.57	7007	0.0	0.0	2147	0.0	0.0
38824	84	21	21			3,378	3,470	0.97	4,624	3,470	1.33	7007	0.0	0.0	2147	0.0	0.0
38825	84	12	12			1,376	781	1.76	1,436	781	1.84	7007	0.0	0.0	2147	0.0	0.0
38840	13	33	33			7,559	20,819	0.36	9,672	20,819	0.46	10260	0.0	0.0	7007	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38861	33	16	16			1,282	3,542	0.36	816	3,540	0.23	1864	0.0	0.0	10282	0.0	0.0
38863	347	16	16			1,283	3,399	0.38	817	3,397	0.24	10282	0.0	0.0	10283	0.0	0.0
38864	257	16	16			1,283	3,444	0.37	817	3,442	0.24	10283	0.0	0.0	2003	0.0	0.0
38883	28	18	18			1,283	1,892	0.68	1,300	2,026	0.64	6910	0.0	0.0	7125	0.0	0.0
38920	563	8	8			90	392	0.23	90	393	0.23	3594	0.0	0.0	7183	0.0	0.0
38940	70	8	8			0	608	0.00	0	609	0.00	10340	0.0	0.0	10341	0.0	0.0
38941	72	8	8			0	535	0.00	0	535	0.00	10341	0.0	0.0	10342	0.0	0.0
38942	118	8	8			0	889	0.00	0	890	0.00	10342	0.0	0.0	10343	0.0	0.0
38943	110	8	8			8	1,590	0.01	8	1,592	0.01	10343	0.0	0.0	10344	0.0	0.0
38944	100	8	8			8	1,868	0.00	8	1,871	0.00	10344	0.0	0.0	10345	0.0	0.0
38945	49	8	8			8	1,959	0.00	8	1,962	0.00	10345	0.0	0.0	10346	0.0	0.0
38946	57	8	8			8	1,239	0.01	8	1,240	0.01	10346	0.0	0.0	10347	0.0	0.0
38947	62	8	8			8	838	0.01	8	839	0.01	10347	0.0	0.0	10348	0.0	0.0
38948	97	8	8			9	1,167	0.01	9	1,169	0.01	10348	0.0	0.0	10349	0.0	0.0
38949	193	8	8			9	1,578	0.01	9	1,580	0.01	10349	0.0	0.0	4776	0.0	0.0
38950	122	8	8			3	1,366	0.00	3	1,367	0.00	10354	0.0	0.0	10355	0.0	0.0
38951	207	8	8			4	554	0.01	4	555	0.01	10360	0.0	0.0	10355	0.0	0.0
38952	165	8	8			4	2,369	0.00	4	2,372	0.00	10359	0.0	0.0	10360	0.0	0.0
38953	314	8	8			3	1,014	0.00	3	1,015	0.00	10358	0.0	0.0	10359	0.0	0.0
38954	131	8	8			3	1,337	0.00	3	1,338	0.00	10357	0.0	0.0	10358	0.0	0.0
38955	156	8	8			3	974	0.00	3	976	0.00	10356	0.0	0.0	10357	0.0	0.0
38956	113	8	8			5	2,113	0.00	5	2,115	0.00	10364	0.0	0.0	10365	0.0	0.0
38957	45	8	8			5	2,022	0.00	5	2,024	0.00	10365	0.0	0.0	10366	0.0	0.0
38958	50	8	8			5	2,045	0.00	5	2,048	0.00	10366	0.0	0.0	10367	0.0	0.0
38959	47	8	8			5	2,082	0.00	5	2,085	0.00	10367	0.0	0.0	10368	0.0	0.0
38960	54	8	8			5	2,325	0.00	5	2,328	0.00	10368	0.0	0.0	10369	0.0	0.0
38961	63	8	8			5	2,062	0.00	5	2,065	0.00	10369	0.0	0.0	10371	0.0	0.0
38962	109	8	8			6	2,058	0.00	6	2,060	0.00	10371	0.0	0.0	10372	0.0	0.0
38963	75	8	8			6	2,067	0.00	6	2,069	0.00	10372	0.0	0.0	10373	0.0	0.0
38964	69	8	8			0	554	0.00	0	555	0.00	10361	0.0	0.0	10363	0.0	0.0
38965	56	8	8			0	970	0.00	0	972	0.00	10363	0.0	0.0	10371	0.0	0.0
38966	54	8	8			0	1,214	0.00	0	1,215	0.00	10350	0.0	0.0	10351	0.0	0.0
38967	58	8	8			0	542	0.00	0	543	0.00	10351	0.0	0.0	10352	0.0	0.0
38968	61	8	8			0	496	0.00	0	497	0.00	10352	0.0	0.0	10353	0.0	0.0
38969	136	8	8			0	997	0.00	0	998	0.00	10353	0.0	0.0	4720	0.0	0.0
38981	105	8	8			319	406	0.79	319	406	0.79	6242	0.0	0.0	6243	0.0	0.0
38982	139	8	8			94	603	0.16	94	604	0.16	5712	0.0	0.0	5691	0.0	0.0
39041	8	8	8			93	332	0.28	93	333	0.28	10460	0.0	0.0	3586	0.0	0.0
39042	323	8	8			71	340	0.21	71	340	0.21	3628	0.0	0.0	10462	0.0	0.0
39043	351	8	8			93	87	1.07	93	87	1.07	10462	0.0	0.0	10460	0.0	0.0
39044	15	8	8			44	343	0.13	44	344	0.13	3622	0.0	0.0	10463	0.0	0.0
39045	363	8	8			69	335	0.21	69	336	0.21	10463	0.0	0.0	3582	0.0	0.0
39046	236	24	24			2,088	1,811	1.15	3,096	1,811	1.71	7100	0.0	0.0	10464	0.0	0.0
39047	236	24	24			2,089	2,545	0.82	3,097	2,545	1.22	10464	0.0	0.0	5883	0.0	0.0
39048	297	8	8			1	388	0.00	1	389	0.00	10465	0.0	0.0	10466	0.0	0.0
39049	300	8	8			12	397	0.03	12	398	0.03	10466	0.0	0.0	5493	0.0	0.0
39060	44	8	12	37	ura	470	415	1.13	472	1,225	0.38	2718	0.0	0.0	2719	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39061	136	8	12	37	ura	510	631	0.81	514	1,861	0.28	2720	0.0	0.0	2721	6.2	0.0
39062	133	8	8			434	420	1.03	402	421	0.96	2580	0.0	0.0	2537	8.6	0.0
39063	162	8	8			426	428	1.00	401	428	0.94	2537	8.6	0.0	2684	0.0	0.0
39064	155	6	6			53	148	0.36	1	148	0.00	10481	1.7	0.0	10480	0.4	0.0
39065	155	8	8			140	213	0.66	139	213	0.65	1797	1.6	0.0	10480	0.4	0.0
39066	125	8	8			144	213	0.68	140	213	0.66	10480	0.4	0.0	1770	0.0	0.0
39080	10	12	12			1	1,517	0.00	1	1,517	0.00	10500	0.0	0.0	1154	0.0	0.0
39100	286	8	8			1	342	0.00	1	343	0.00	3583	0.0	0.0	10520	0.0	0.0
39101	229	8	8			18	353	0.05	18	353	0.05	10520	0.0	0.0	3627	0.0	0.0
39102	10	21	21			1,728	3,376	0.51	2,713	3,376	0.80	10523	5.3	0.0	5837	5.4	0.0
39103	545	21	21			1,713	3,412	0.50	2,712	3,412	0.79	10521	7.3	0.0	10523	5.3	0.0
39104	15	8	8			26	1,386	0.02	4	1,388	0.00	7101	7.2	0.0	10521	7.3	0.0
39105	14	21	21			1,638	6,989	0.23	2,643	6,989	0.38	5839	0.0	0.0	10522	7.5	0.0
39106	407	21	21			1,640	3,101	0.53	2,644	3,101	0.85	10522	7.5	0.0	10521	7.3	0.0
39107	256	10	15	18	Existing	506	388	1.31	856	1,143	0.75	5866	8.5	0.0	5865	8.3	0.0
39108	39	10	18	18	Existing	506	386	1.31	856	1,851	0.46	5865	8.3	0.0	5839	0.0	0.0
39120	76	8	8			38	513	0.07	38	514	0.07	3139	0.0	0.0	10540	0.0	0.0
39121	226	8	8			42	513	0.08	42	513	0.08	10540	0.0	0.0	3088	0.0	0.0
39160	15	24	24			2,090	2,542	0.82	3,097	2,542	1.22	5883	0.0	0.0	10580	0.0	0.0
39180	948	54	54			18,283	45,866	0.40	19,207	45,866	0.42	5835	0.0	0.0	10580	0.0	0.0
39181	948	54	54			20,371	42,616	0.48	22,292	42,616	0.52	10580	0.0	0.0	5834	0.0	0.0
39182	68	8	8			12	390	0.03	12	391	0.03	10602	0.0	0.0	10601	0.0	0.0
39183	181	8	8			12	403	0.03	12	403	0.03	10601	0.0	0.0	10600	0.0	0.0
39185	212	8	8			30	393	0.08	30	394	0.08	10600	0.0	0.0	10151	0.0	0.0
39186	223	8	8			12	212	0.06	12	213	0.06	2673	0.0	0.0	10602	0.0	0.0
39200	131	8	8			0	588	0.00	0	588	0.00	10628	0.0	0.0	10620	0.0	0.0
39201	149	8	8			1	414	0.00	1	415	0.00	10621	0.0	0.0	10620	0.0	0.0
39202	323	8	8			0	415	0.00	0	415	0.00	10626	0.0	0.0	10621	0.0	0.0
39203	143	8	8			0	758	0.00	0	759	0.00	10629	0.0	0.0	10626	0.0	0.0
39204	143	8	8			0	417	0.00	0	417	0.00	10630	0.0	0.0	10626	0.0	0.0
39208	329	8	8			39	587	0.07	39	588	0.07	10620	0.0	0.0	10622	0.0	0.0
39209	324	8	8			39	871	0.04	39	872	0.04	10622	0.0	0.0	10623	0.0	0.0
39210	174	8	8			40	415	0.10	40	416	0.10	10623	0.0	0.0	10624	0.0	0.0
39211	155	8	8			69	1,233	0.06	69	1,235	0.06	10624	0.0	0.0	10625	0.0	0.0
39220	219	18	18			133	2,706	0.05	133	2,706	0.05	5616	0.0	0.0	10680	0.0	0.0
39221	232	18	18			134	2,709	0.05	134	2,709	0.05	10680	0.0	0.0	5644	0.0	0.0
39222	140	15	21	20	Existing	1,907	1,103	1.73	2,913	2,707	1.08	5837	5.4	0.0	10681	0.0	0.0
39223	308	15	21	20	Existing	1,906	1,109	1.72	2,913	2,720	1.07	10681	0.0	0.0	7355	5.8	0.0
39224	144	8	8			1	367	0.00	1	368	0.00	10682	0.0	0.0	10681	0.0	0.0
39225	203	8	8			1	295	0.00	1	295	0.00	5747	0.0	0.0	10683	0.0	0.0
39226	317	8	8			36	294	0.12	36	294	0.12	10683	0.0	0.0	5746	0.0	0.0
39227	423	8	8			1	574	0.00	1	576	0.00	10684	0.0	0.0	10683	0.0	0.0
39231	79	8	8			1	374	0.00	1	374	0.00	10685	0.0	0.0	10686	0.0	0.0
39232	114	8	8			3	368	0.01	3	369	0.01	10686	0.0	0.0	10687	0.0	0.0
39233	53	8	8			3	408	0.01	3	409	0.01	10687	0.0	0.0	5806	0.0	0.0
39262	139	8	8			2	299	0.01	2	299	0.01	5868	0.0	0.0	10720	0.0	0.0
39263	111	8	8			8	296	0.03	3	297	0.01	10720	0.0	0.0	5869	6.7	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39280	138	8	8			2	358	0.01	2	358	0.01	10741	0.0	0.0	10686	0.0	0.0
39281	103	8	8			1	328	0.00	1	328	0.00	10740	0.0	0.0	10741	0.0	0.0
39282	89	8	8			1	315	0.00	1	315	0.00	10742	0.0	0.0	10741	0.0	0.0
39300	37	8	8			10	332	0.03	1	333	0.00	10780	0.0	0.0	3306	0.0	0.0
39303	18	6	6			1	1,449	0.00	1	1,449	0.00	1793	0.0	0.0	1792	0.0	0.0
39306	204	6	6			1	251	0.00	1	251	0.00	10785	0.0	0.0	1820	0.0	0.0
39310	181	8	8			1	291	0.00	1	292	0.00	10787	0.0	0.0	1832	0.0	0.0
39312	86	8	8			1	319	0.00	1	319	0.00	10788	0.0	0.0	10787	0.0	0.0
39317	155	8	8			1	441	0.00	1	441	0.00	10793	0.0	0.0	10794	0.0	0.0
39318	146	8	8			1	278	0.00	1	278	0.00	10794	0.0	0.0	10795	0.0	0.0
39319	61	8	8			41	282	0.15	41	283	0.14	10795	0.0	0.0	10796	0.0	0.0
39320	77	8	8			41	275	0.15	41	276	0.15	10796	0.0	0.0	1692	0.0	0.0
39321	15	8	8			192	278	0.69	291	279	1.04	7128	2.2	0.0	10798	2.2	0.0
39322	149	8	8			116	319	0.36	116	319	0.36	3431	0.0	0.0	3509	0.0	19.6
39323	214	8	8			117	304	0.38	117	305	0.38	3509	0.0	19.6	3418	0.0	0.0
39324	11	8	8			3	420	0.01	3	421	0.01	3505	0.0	0.0	3457	0.0	0.0
39328	64	12	18	5	Existing	1,516	1,077	1.41	2,456	3,176	0.77	10800	5.7	0.0	1824	6.9	0.0
39330	33	12	18	5	Existing	1,515	1,037	1.46	2,455	3,056	0.80	10799	4.9	0.0	10801	5.9	0.0
39331	99	12	18	5	Existing	1,516	826	1.84	2,456	2,435	1.01	10801	5.9	0.0	10802	5.2	0.0
39332	25	12	18	5	Existing	1,516	1,162	1.30	2,456	3,426	0.72	10802	5.2	0.0	10800	5.7	0.0
39340	73	8	8			1	572	0.00	1	573	0.00	10820	0.0	0.0	1686	0.0	0.0
39360	337	6	6			33	253	0.13	33	253	0.13	1709	0.0	0.0	10840	1.6	0.0
39361	337	6	6			34	49	0.70	33	49	0.67	10840	1.6	0.0	1708	1.6	0.0
39362	40	6	6			1	162	0.00	1	162	0.00	10841	0.0	0.0	1592	0.0	0.0
39363	56	6	6			1	150	0.00	15	150	0.10	7218	0.0	0.0	11102	0.0	0.0
39364	51	6	6			1	181	0.00	1	181	0.00	10842	0.0	0.0	10780	0.0	0.0
39365	100	6	6			1	144	0.00	1	144	0.00	10843	0.0	0.0	10842	0.0	0.0
39380	80	10	10			1	565	0.00	1	565	0.00	10860	0.0	0.0	3495	0.0	0.0
39381	35	6	6			1	155	0.00	1	155	0.00	10861	0.0	0.0	7448	0.0	0.0
39400	14	8	8			188	604	0.31	213	605	0.35	6115	0.0	4.8	10883	0.0	0.0
39401	234	8	8			1	683	0.00	1	684	0.00	10881	0.0	0.0	6118	0.0	0.0
39420	9	12	12			862	750	1.15	794	750	1.06	1762	6.3	0.0	10900	6.3	0.0
39421	245	15	15			1,710	1,621	1.06	1,588	1,621	0.98	10900	6.3	0.0	3413	6.6	0.0
39422	9	12	12			862	750	1.15	794	750	1.06	1762	6.3	0.0	10900	6.3	0.0
39423	50	12	12			440	881	0.50	243	881	0.28	1763	6.4	0.0	1762	6.3	0.0
39426	255	8	8			1	220	0.01	1	220	0.01	1414	0.0	0.0	1438	0.0	0.0
39427	255	8	8			46	416	0.11	46	417	0.11	1438	0.0	0.0	1377	0.0	0.0
39440	289	8	8			0	904	0.00	0	906	0.00	10921	0.0	0.0	10920	0.0	0.0
39441	385	8	8			1	1,139	0.00	1	1,140	0.00	10922	0.0	0.0	10923	0.0	0.0
39443	173	8	8			16	562	0.03	16	563	0.03	10925	0.0	0.0	10926	0.0	0.0
39444	307	8	8			16	851	0.02	16	852	0.02	10926	0.0	0.0	10927	0.0	0.0
39445	100	8	8			16	447	0.04	16	448	0.04	10927	0.0	0.0	10928	0.0	0.0
39446	113	8	8			17	631	0.03	17	631	0.03	10928	0.0	0.0	10930	0.0	0.0
39447	231	8	8			17	702	0.02	17	703	0.02	10930	0.0	0.0	10929	0.0	0.0
39460	180	8	8			1	468	0.00	1	469	0.00	10940	0.0	0.0	3295	0.0	0.0
39461	330	8	8			1	321	0.00	1	322	0.00	10941	0.0	0.0	7678	0.0	0.0
39480	267	8	8			1	1,103	0.00	1	1,104	0.00	10924	0.0	0.0	10960	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39481	255	8	8			16	831	0.02	16	832	0.02	10960	0.0	0.0	10925	0.0	0.0
39488	223	8	8			78	567	0.14	78	568	0.14	4297	0.0	0.0	10968	0.0	0.0
39489	52	8	8			79	565	0.14	79	565	0.14	10968	0.0	0.0	4299	0.0	0.0
39500	125	8	8			0	303	0.00	0	325	0.00	10984	0.0	0.0	10985	0.0	0.0
39501	261	8	8			16	316	0.05	16	339	0.05	10985	0.0	0.0	10987	0.0	0.0
39502	231	8	8			119	322	0.37	119	345	0.34	10987	0.0	0.0	10988	0.0	0.0
39503	123	8	8			0	331	0.00	0	355	0.00	10983	0.0	0.0	10981	0.0	0.0
39504	488	8	8			15	578	0.03	15	620	0.02	10981	0.0	0.0	10986	0.0	0.0
39505	193	8	8			15	495	0.03	15	531	0.03	10986	0.0	0.0	10985	0.0	0.0
39506	102	8	8			0	774	0.00	0	830	0.00	10982	0.0	0.0	10981	0.0	0.0
39507	31	8	8			0	470	0.00	0	504	0.00	10980	0.0	0.0	6626	0.0	0.0
39508	75	8	8			87	551	0.16	87	591	0.15	6624	0.0	0.0	10987	0.0	0.0
39511	365	8	8			119	641	0.19	119	688	0.17	10988	0.0	0.0	6688	0.0	0.0
39512	161	8	8			0	1,262	0.00	0	1,264	0.00	10990	0.0	0.0	10989	0.0	0.0
39513	97	8	8			10	1,356	0.01	10	1,358	0.01	10989	0.0	0.0	7914	0.0	0.0
39514	218	8	8			1	1,719	0.00	1	1,721	0.00	10998	0.0	0.0	10994	0.0	0.0
39515	105	8	8			0	1,064	0.00	0	1,065	0.00	10994	0.0	0.0	10993	0.0	0.0
39516	193	8	8			0	742	0.00	0	743	0.00	10993	0.0	0.0	10992	0.0	0.0
39517	103	8	8			0	1,302	0.00	0	1,303	0.00	10992	0.0	0.0	10991	0.0	0.0
39518	155	8	8			0	852	0.00	0	853	0.00	10994	0.0	0.0	10995	0.0	0.0
39519	362	8	8			0	685	0.00	0	686	0.00	10995	0.0	0.0	10996	0.0	0.0
39520	156	8	8			0	1,019	0.00	0	1,020	0.00	10999	0.0	0.0	10996	0.0	0.0
39521	136	8	8			186	1,113	0.17	186	1,114	0.17	10996	0.0	0.0	10997	0.0	0.0
39522	137	8	12	37	ura	187	1,052	0.18	187	3,102	0.06	10997	0.0	0.0	9685	0.0	0.0
39523	139	8	8			0	575	0.00	0	576	0.00	11001	0.0	0.0	11000	0.0	0.0
39524	366	8	8			0	719	0.00	0	720	0.00	11000	0.0	0.0	10997	0.0	0.0
39540	177	18	18			2,468	7,058	0.35	2,928	7,058	0.41	6088	0.0	0.0	11021	0.0	0.0
39541	105	18	18			2,468	7,049	0.35	2,928	7,049	0.42	11021	0.0	0.0	11020	0.0	0.0
39542	45	18	18			2,468	3,524	0.70	2,928	3,524	0.83	11020	0.0	0.0	6089	0.0	0.0
39543	181	6	6			1	189	0.00	1	189	0.00	11022	0.0	0.0	11023	0.0	0.0
39544	144	6	6			1	205	0.00	1	205	0.00	11023	0.0	0.0	11024	0.0	0.0
39560	15	8	8			206	313	0.66	206	314	0.66	11040	0.0	0.0	2241	0.0	0.0
39581	210	8	8			0	497	0.00	0	497	0.00	11080	0.0	0.0	10928	0.0	0.0
39620	235	8	8			10	641	0.02	10	642	0.02	11140	0.0	0.0	11141	0.0	0.0
39621	390	8	8			1	130	0.01	1	130	0.01	7425	0.0	0.0	11141	0.0	0.0
39622	390	8	8			12	360	0.03	12	360	0.03	11141	0.0	0.0	6157	0.0	0.0
39640	96	8	8			0	1,025	0.00	0	1,026	0.00	11160	0.0	0.0	2508	0.0	0.0
39660	30	8	8			1	370	0.00	1	371	0.00	11181	0.0	0.0	5963	0.0	0.0
39680	228	8	8			101	753	0.13	101	754	0.13	7323	0.0	0.0	11202	0.0	0.0
39681	217	8	8			158	728	0.22	158	729	0.22	11202	0.0	0.0	4889	0.0	0.0
39720	298	8	8			0	122	0.00	0	131	0.00	6920	0.0	0.0	7645	0.0	0.0
39721	390	8	8			33	334	0.10	33	358	0.09	6922	0.0	0.0	11260	0.0	0.0
39722	74	8	8			33	333	0.10	33	357	0.09	11260	0.0	0.0	6905	0.0	0.0
39723	400	8	8			14	240	0.06	14	240	0.06	11261	8.1	8.1	5845	0.0	0.0
39724	35	8	8			1	460	0.00	1	460	0.00	11262	0.0	0.0	5977	0.0	0.0
39725	159	15	15			1,740	2,210	0.79	1,558	2,368	0.66	6820	2.0	0.0	11263	0.0	0.0
39727	11	24	24			4,868	81,911	0.06	4,838	81,911	0.06	3299	0.0	0.0	3377	0.0	0.0

Appendix G.2 - Planning Year 2036 Condition Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39728	454	10	10			69	447	0.16	69	447	0.16	10625	0.0	0.0	11266	0.0	0.0
39729	454	10	10			79	343	0.23	79	342	0.23	11266	0.0	0.0	10627	0.0	0.0
39730	361	8	8			1	503	0.00	1	504	0.00	11265	0.0	0.0	11266	0.0	0.0
39733	193	8	8			0	456	0.00	0	456	0.00	11267	0.0	0.0	11265	0.0	0.0
39734	72	8	8			0	588	0.00	0	588	0.00	11268	0.0	0.0	11267	0.0	0.0
39735	323	8	8			0	539	0.00	0	540	0.00	11269	0.0	0.0	11160	0.0	0.0
39736	85	8	8			24	603	0.04	24	647	0.04	11270	0.0	0.0	6342	0.0	0.0
39737	157	8	8			0	778	0.00	0	835	0.00	11271	0.0	0.0	11270	0.0	0.0
39738	419	8	8			10	382	0.03	10	410	0.03	11272	0.0	0.0	8019	0.0	0.0
39739	127	8	8			10	298	0.03	10	319	0.03	11273	0.0	0.0	11272	0.0	0.0
39740	201	8	8			10	617	0.02	10	662	0.01	11274	0.0	0.0	11273	0.0	0.0
39741	339	8	8			1	833	0.00	1	893	0.00	11275	0.0	0.0	11274	0.0	0.0
39742	251	8	8			0	421	0.00	0	451	0.00	11276	0.0	0.0	11273	0.0	0.0
39743	477	8	8			0	393	0.00	0	422	0.00	11277	0.0	0.0	11276	0.0	0.0
39744	83	8	8			1	926	0.00	1	928	0.00	11278	0.0	0.0	2246	0.0	0.0
39866	284	21	21			3,886	6,910	0.56	4,869	7,403	0.66	6008	0.0	0.0	11414	7.1	0.0
39867	156	24	24			3,885	5,542	0.70	4,924	3,882	1.27	11414	7.1	0.0	11413	1.0	0.0
39868	143	24	24			5,441	5,551	0.98	6,247	4,165	1.50	11413	1.0	0.0	5974	0.0	0.0
39869	166	15	15			1,752	2,215	0.79	1,525	2,374	0.64	11263	0.0	0.0	11413	1.0	0.0
39873	395	8	8			71	406	0.17	71	406	0.17	5973	0.0	0.0	5976	0.0	0.0
39874	6	8	8			0	188	0.00	0	188	0.00	11675	0.0	0.0	5976	0.0	0.0
39875	9	18	21	25	2036	3,723	4,718	0.79	4,829	12,227	0.39	5957	0.0	0.0	11417	0.0	0.0
39876	118	18	21	25	2036	3,763	4,832	0.78	4,829	7,681	0.63	11417	0.0	0.0	6008	0.0	0.0
39912	77	8	8			0	1,175	0.00	0	1,175	0.00	11472	0.0	0.0	11414	7.1	0.0
39913	43	8	8			0	452	0.00	0	452	0.00	11473	0.0	0.0	11472	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
Sanitary Sewer Master Plan
City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30001	414	15	15			984	1,956	0.50	1,389	2,097	0.66	6811	0.0	0.0	6904	0.0	0.0
30002	305	8	8			31	310	0.10	31	333	0.09	7642	0.0	0.0	7380	0.0	0.0
30003	311	8	8			133	312	0.43	133	335	0.40	6816	0.0	0.0	6914	0.0	0.0
30004	287	8	8			2	442	0.00	2	474	0.00	6814	0.0	0.0	6933_WETWELL	0.0	0.0
30005	530	18	24	26	Existing	3,942	3,541	1.11	7,460	8,171	0.91	6833	1.3	0.0	6885	3.4	0.0
30006	468	8	8			44	307	0.14	44	330	0.13	6837	0.0	0.0	6009	0.0	0.0
30011	173	8	12	24	2036	200	206	0.97	453	649	0.70	6778	0.0	0.0	7635	1.4	0.0
30012	173	15	15			963	1,587	0.61	1,368	1,700	0.80	7376	0.0	0.0	6811	0.0	0.0
30014	639	18	24	25	2036	3,691	3,394	1.09	5,614	7,833	0.72	7121	5.7	0.0	6831	6.9	0.0
30015	265	8	8			29	382	0.08	29	410	0.07	6617	0.0	0.0	6682	0.0	0.0
30016	156	8	8			101	272	0.37	101	291	0.35	6641	0.0	0.0	6692	0.0	0.0
30017	297	15	18	23	ura	1,594	1,529	1.04	1,594	2,665	0.60	6653	0.8	0.0	6717	0.0	0.0
30018	264	10	10			1,022	1,183	0.86	1,197	1,268	0.94	6585	0.0	0.0	6647	0.0	0.0
30019	402	8	8			169	1,069	0.16	169	1,147	0.15	6579	0.0	0.0	6591	0.0	0.0
30020	288	8	8			12	363	0.03	12	390	0.03	6538	0.0	0.0	6597	0.0	0.0
30021	250	8	8			10	333	0.03	10	357	0.03	6518	0.0	0.0	6595	0.0	0.0
30022	105	8	8			18	827	0.02	18	888	0.02	6578	0.0	0.0	6531	0.0	0.0
30023	248	8	8			18	267	0.07	18	286	0.06	6531	0.0	0.0	6591	0.0	0.0
30024	141	8	8			31	638	0.05	31	685	0.05	6535	0.0	0.0	6596	0.0	0.0
30025	285	8	8			8	324	0.03	8	347	0.02	7628	0.0	0.0	6603	0.0	0.0
30026	501	8	12	22	ura	485	456	1.06	661	1,438	0.46	6530	3.0	0.0	7119	0.0	0.0
30027	396	8	8			66	297	0.22	66	319	0.21	6540	0.0	0.0	6601	0.0	0.0
30028	245	8	8			13	333	0.04	13	358	0.03	6522	0.0	0.0	6598	0.0	0.0
30029	225	8	8			6	443	0.01	6	476	0.01	6523	0.0	0.0	6600	0.0	0.0
30030	275	8	8			421	420	1.00	422	451	0.93	6574	0.0	0.0	6545	0.0	0.0
30031	48	8	8			113	424	0.27	113	455	0.25	7370	0.0	0.0	7372	0.0	0.0
30032	265	8	8			28	1,815	0.02	28	1,817	0.02	6404	0.0	0.0	6509	0.0	0.0
30033	394	8	8			364	1,259	0.29	364	1,260	0.29	6403	0.0	0.0	6504	0.0	0.0
30034	306	8	8			35	1,483	0.02	35	1,592	0.02	6389	0.0	0.0	7625	0.0	0.0
30035	285	8	8			53	297	0.18	53	319	0.17	6313	0.0	0.0	6651	0.0	0.0
30036	327	8	8			390	299	1.31	220	320	0.69	6305	6.4	0.0	6649	0.0	0.0
30037	226	6	6			12	257	0.05	12	275	0.04	6266	0.0	0.0	7634	0.0	0.0
30038	229	8	8			14	381	0.04	14	408	0.03	6267	0.0	0.0	6648	0.0	0.0
30039	550	18	21	41	2036	3,265	2,501	1.31	3,908	4,042	0.97	6204	3.4	0.0	6709	0.0	0.0
30040	609	8	8			134	335	0.40	58	360	0.16	6209	2.9	0.0	6710	0.0	0.0
30041	140	8	8			73	1,070	0.07	73	1,072	0.07	6355	0.0	0.0	6193	0.0	0.0
30042	341	8	8			25	658	0.04	25	660	0.04	6161	0.0	0.0	6220	0.0	0.0
30043	143	8	8			1	758	0.00	1	759	0.00	7710	0.0	0.0	6235	0.0	0.0
30044	449	8	8			1	728	0.00	1	730	0.00	6159	0.0	0.0	6222	0.0	0.0
30045	49	8	8			13	378	0.03	13	378	0.03	6157	0.0	0.0	6237	0.0	0.0
30046	40	8	8			1	453	0.00	1	454	0.00	6179	0.0	0.0	6247	0.0	0.0
30047	255	8	8			70	409	0.17	70	410	0.17	6248	0.0	0.0	6169	0.0	0.0
30048	381	8	8			1	272	0.00	1	291	0.00	6434	0.0	0.0	7615	0.0	0.0
30049	257	8	8			28	1,095	0.03	28	1,097	0.03	6458	0.0	0.0	6124	0.0	0.0
30050	255	8	8			8	1,042	0.01	8	1,043	0.01	6019	0.0	0.0	6457	0.0	0.0
30051	138	8	8			7	450	0.02	7	451	0.02	6127	0.0	0.0	6357	0.0	0.0
30052	136	18	18			3,092	3,022	1.02	3,740	3,022	1.24	6112	2.5	6.9	6193	0.0	0.0
30053	57	6	6			16	213	0.08	2	213	0.01	6154	2.2	0.0	6111	1.8	0.0
30054	227	12	15	11	ura	1,958	3,073	0.64	2,657	5,572	0.48	6432	0.0	0.0	6135	0.0	0.0
30055	355	8	8			1	1,689	0.00	1	1,691	0.00	6477	0.0	0.0	6138	7.4	0.0
30056	205	8	8			0	1,267	0.00	0	1,269	0.00	6475	0.0	0.0	6047	3.8	0.0
30057	230	8	8			511	883	0.58	511	884	0.58	6474	0.0	0.0	6046	2.4	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30058	330	8	8			72	754	0.10	72	756	0.10	6827	0.0	0.0	5973	0.0	0.0
30059	530	18	24	26	Existing	3,945	3,410	1.16	7,466	7,867	0.95	5974	0.0	0.0	6833	1.3	0.0
30061	305	8	8			27	449	0.06	27	450	0.06	7202	0.0	0.0	5958	0.0	0.0
30062	208	8	8			49	876	0.06	49	876	0.06	7620	0.0	0.0	5962	0.0	0.0
30063	451	8	8			52	539	0.10	52	540	0.10	6201	0.0	0.0	5964	0.0	0.0
30064	264	15	15			1,290	2,222	0.58	1,290	2,222	0.58	6001	0.0	0.0	7356	0.0	0.0
30066	240	8	8			465	399	1.17	128	399	0.32	5853	0.2	0.0	5931	1.8	0.0
30067	516	8	8			231	405	0.57	231	406	0.57	5844	3.3	0.0	5929	3.6	0.0
30068	520	8	8			1	408	0.00	1	408	0.00	7601	0.0	0.0	5958	0.0	0.0
30069	430	8	8			1	590	0.00	1	590	0.00	7099	0.0	0.0	5994	0.0	0.0
30070	340	10	10			307	667	0.46	307	667	0.46	5751	0.0	0.0	6000	0.0	0.0
30071	311	8	8			71	405	0.17	71	406	0.17	6169	0.0	0.0	7351	0.0	0.0
30072	435	8	8			164	612	0.27	164	613	0.27	6168	0.0	0.0	5748	0.0	0.0
30073	482	8	8			730	832	0.88	730	833	0.88	5777	0.0	0.0	5858	0.0	0.0
30075	20	8	8			12	910	0.01	1	912	0.00	5745	0.0	0.0	5867	8.3	0.0
30076	436	8	8			293	450	0.65	293	451	0.65	6170	0.0	0.0	5801	0.0	0.0
30077	200	8	8			39	756	0.05	39	757	0.05	5731	0.0	0.0	5824	1.0	0.0
30078	221	8	8			251	297	0.85	251	297	0.85	5711	0.0	0.0	5791	0.0	0.0
30079	155	8	8			32	297	0.11	32	298	0.11	5792	0.0	0.0	5689	0.0	0.0
30080	275	8	8			97	328	0.29	97	328	0.29	5787	0.0	0.0	5691	0.0	0.0
30081	299	12	18	19	Existing	857	708	1.21	1,544	2,087	0.74	5710	5.2	0.0	5741	0.0	0.0
30082	348	8	8			45	326	0.14	45	327	0.14	5790	0.0	0.0	5687	0.0	0.0
30083	365	8	8			2	406	0.01	2	406	0.01	7346	0.0	0.0	5863	0.0	0.0
30084	481	8	8			74	295	0.25	1	296	0.00	7096	0.0	0.0	5709	3.6	0.0
30085	406	12	18	19	Existing	1,095	731	1.50	1,798	2,156	0.83	5642	4.7	0.0	5839	0.0	0.0
30086	305	12	18	19	Existing	1,094	736	1.49	1,797	2,169	0.83	5741	0.0	0.0	7598	6.2	0.0
30087	610	54	54			18,347	39,472	0.46	19,680	39,472	0.50	5602	0.0	0.0	5836	0.0	0.0
30088	145	8	8			88	386	0.23	88	387	0.23	5645	0.0	0.0	5869	6.5	0.0
30089	192	6	6			1	172	0.00	1	172	0.00	5598	0.0	0.0	7422	0.0	0.0
30090	143	8	8			1	227	0.00	1	227	0.00	5723	0.0	0.0	5610	0.0	0.0
30091	132	8	8			1	624	0.00	1	626	0.00	5722	0.0	0.0	5609	0.0	0.0
30092	405	8	8			5	173	0.03	2	174	0.01	5639	0.0	0.0	5698	3.0	0.0
30093	289	10	10			183	389	0.47	183	388	0.47	5701	0.0	0.0	8942	0.0	0.0
30094	404	18	18			2,176	2,156	1.01	2,176	2,156	1.01	5558	0.0	0.0	5647	0.0	0.0
30095	590	54	54			15,819	35,417	0.45	17,149	35,417	0.48	5547	0.0	0.0	5604	0.0	0.0
30096	504	27	27			4,219	7,608	0.55	6,460	7,608	0.85	7596	0.0	0.0	2021	0.0	0.0
30097	415	8	8			67	361	0.19	67	362	0.19	5675	0.0	0.0	5451	0.0	0.0
30098	288	8	8			0	531	0.00	0	532	0.00	5373	0.0	0.0	6090	0.0	0.0
30099	449	8	8			1	557	0.00	1	558	0.00	5424	0.0	0.0	6045	0.0	0.0
30100	151	8	8			1	879	0.00	1	881	0.00	5365	0.0	0.0	6085	0.0	0.0
30101	465	8	8			21	659	0.03	21	660	0.03	5349	0.0	0.0	6091	0.0	0.0
30102	225	8	8			19	460	0.04	19	461	0.04	5363	0.0	0.0	6097	0.0	0.0
30103	277	8	8			5	406	0.01	5	406	0.01	5356	0.0	0.0	6043	0.0	0.0
30104	425	8	8			354	249	1.42	354	249	1.42	7194	4.5	4.5	5260	0.0	0.0
30105	56	8	8			42	478	0.09	42	479	0.09	7154	0.0	0.0	5256	0.0	0.0
30106	403	8	8			1	876	0.00	1	878	0.00	6174	0.0	0.0	5270	0.8	0.0
30107	328	8	8			37	444	0.08	37	444	0.08	6176	4.0	0.0	5266	0.8	0.0
30108	310	8	15	19	Existing	537	582	0.92	1,146	3,110	0.37	5262	0.0	0.0	5677	1.0	0.0
30109	185	8	8			1	993	0.00	1	994	0.00	5678	0.0	0.0	5261	3.5	0.0
30110	508	8	8			1	658	0.00	1	659	0.00	5679	0.0	0.0	7087	0.0	0.0
30111	270	8	8			41	832	0.05	41	833	0.05	5294	0.0	0.0	5707	0.0	0.0
30112	75	8	8			16	356	0.04	16	356	0.04	5418	0.0	0.0	7193	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30113	370	8	8			208	528	0.39	208	529	0.39	5175	0.0	0.0	5502	0.0	0.0
30114	166	8	8			332	608	0.55	332	609	0.55	5219	0.0	0.0	5519	0.0	0.0
30115	175	8	8			0	1,983	0.00	0	1,985	0.00	5243	0.0	0.0	5528	0.0	0.0
30116	312	8	8			72	836	0.09	72	838	0.09	5197	0.0	0.0	5458	0.0	0.0
30117	182	8	8			408	774	0.53	408	775	0.53	5073	0.0	0.0	5145	1.4	0.0
30118	190	8	8			20	435	0.05	20	435	0.05	5090	0.0	0.0	5144	0.0	0.0
30119	82	8	8			35	485	0.07	35	486	0.07	5050	0.0	0.0	5228	0.0	0.0
30120	415	8	8			13	1,240	0.01	13	1,242	0.01	5049	0.0	0.0	5228	0.0	0.0
30121	58	8	8			43	945	0.05	43	947	0.05	7576	0.0	0.0	5142	0.0	0.0
30122	110	18	18			1,917	5,820	0.33	2,619	5,820	0.45	4951	0.0	0.0	6432	0.0	0.0
30123	200	6	6			1	408	0.00	1	408	0.00	4926	0.0	0.0	5353	0.0	0.0
30124	151	8	8			1	253	0.01	1	254	0.01	4989	0.0	0.0	7336	0.0	0.0
30125	500	12	12			1,535	2,236	0.69	1,969	2,236	0.88	4999	0.0	0.0	7572	0.0	0.0
30126	41	8	8			267	1,142	0.23	267	1,143	0.23	5006	0.0	0.0	4985	0.0	0.0
30127	118	8	8			9	392	0.02	9	392	0.02	4932	0.0	0.0	5005	0.0	0.0
30128	312	8	8			1	675	0.00	1	676	0.00	4953	0.0	0.0	5352	0.0	0.0
30129	200	8	8			8	379	0.02	8	380	0.02	4916	0.0	0.0	7730	0.0	0.0
30130	545	8	8			37	943	0.04	37	944	0.04	4888	0.0	0.0	4935	0.0	0.0
30131	188	8	8			175	531	0.33	175	532	0.33	4892	0.0	0.0	4935	0.0	0.0
30132	155	8	8			0	1,720	0.00	0	1,723	0.00	4885	0.0	0.0	5029	0.0	0.0
30133	491	12	12			1,217	3,994	0.30	1,687	3,994	0.42	7569	0.0	0.0	5001	0.0	0.0
30134	476	10	15	28	2036	921	1,375	0.67	1,424	4,053	0.35	4840	0.0	0.0	4874	0.0	0.0
30135	206	8	8			35	282	0.13	35	282	0.13	4867	0.0	0.0	7319	0.0	0.0
30136	360	8	8			20	642	0.03	20	643	0.03	4865	0.0	0.0	7316	0.0	0.0
30137	171	8	8			0	1,082	0.00	0	1,083	0.00	4835	0.0	0.0	4718	0.0	0.0
30138	260	8	8			89	1,771	0.05	89	1,773	0.05	4764	0.0	0.0	4843	0.0	0.0
30140	303	8	8			976	1,025	0.95	976	1,026	0.95	4741	0.0	0.0	4833	0.0	0.0
30141	308	8	8			0	368	0.00	0	369	0.00	7321	0.0	0.0	4696	0.0	0.0
30142	364	8	8			22	1,992	0.01	22	1,995	0.01	4687	0.0	0.0	7151	0.0	0.0
30143	310	8	8			0	1,190	0.00	0	1,191	0.00	4869	0.0	0.0	4698	0.0	0.0
30144	341	8	8			8	1,528	0.01	8	1,530	0.01	7075	0.0	0.0	4685	0.0	0.0
30145	335	8	8			170	1,397	0.12	170	1,399	0.12	4691	0.0	0.0	4859	0.0	0.0
30146	408	8	8			18	1,096	0.02	18	1,097	0.02	7315	0.0	0.0	4620	0.0	0.0
30147	510	8	8			20	1,424	0.01	20	1,426	0.01	4629	0.0	0.0	4723	0.0	0.0
30148	468	8	8			20	1,455	0.01	20	1,457	0.01	7563	0.0	0.0	4629	0.0	0.0
30149	510	8	8			8	1,225	0.01	8	1,226	0.01	4694	0.0	0.0	7312	0.0	0.0
30150	298	8	8			419	1,081	0.39	419	1,083	0.39	4638	0.0	0.0	4772	0.0	0.0
30151	271	8	8			92	742	0.12	92	743	0.12	4670	0.0	0.0	4754	0.0	0.0
30152	321	8	8			15	1,013	0.01	15	1,015	0.01	4666	0.0	0.0	7071	0.0	0.0
30153	210	8	8			42	1,456	0.03	42	1,458	0.03	4637	0.0	0.0	7149	0.0	0.0
30154	315	8	8			56	1,382	0.04	56	1,383	0.04	4567	0.0	0.0	4652	0.0	0.0
30155	164	8	8			5	1,340	0.00	5	1,342	0.00	4580	0.0	0.0	4656	0.0	0.0
30156	446	8	8			292	926	0.32	292	927	0.32	4555	0.0	0.0	4661	0.0	0.0
30157	86	8	8			58	827	0.07	58	828	0.07	4652	0.0	0.0	4571	0.0	0.0
30158	158	8	8			58	1,351	0.04	58	1,352	0.04	4571	0.0	0.0	4653	0.0	0.0
30159	140	8	8			126	330	0.38	126	331	0.38	4828	0.0	0.0	4478	0.0	0.0
30160	391	8	8			12	2,115	0.01	12	2,118	0.01	4527	0.0	0.0	4450	0.0	0.0
30161	85	8	8			25	2,055	0.01	25	2,058	0.01	4525	0.0	0.0	4448	0.0	0.0
30162	101	8	8			17	171	0.10	17	171	0.10	4523	0.0	0.0	7552	0.0	0.0
30163	318	8	8			263	1,054	0.25	263	1,056	0.25	4522	0.0	0.0	4444	0.0	0.0
30164	297	8	12	45	2036	703	647	1.09	908	1,908	0.48	4465	1.8	0.0	4265	3.9	5.9
30165	171	8	8			0	449	0.00	0	487	0.00	4468	0.0	0.0	7299	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30166	198	8	8			6	731	0.01	6	794	0.01	7062	0.0	0.0	4316	0.0	0.0
30167	93	8	8			6	935	0.01	6	1,014	0.01	4467	0.0	0.0	4316	0.0	0.0
30168	188	8	8			36	422	0.09	36	458	0.08	4496	0.0	0.0	4313	0.0	0.0
30169	190	8	8			0	388	0.00	0	420	0.00	4346	0.0	0.0	4494	0.0	0.0
30170	417	8	8			0	757	0.00	0	758	0.00	4337	0.0	0.0	4241	0.0	0.0
30171	227	8	8			1	890	0.00	1	892	0.00	7545	0.0	0.0	9960	0.0	0.0
30172	226	8	8			13	1,706	0.01	13	1,708	0.01	4898	0.0	0.0	4243	0.0	0.0
30175	24	8	8			51	483	0.11	51	483	0.10	4303	0.0	0.0	4038	0.0	0.0
30176	218	8	8			9	840	0.01	9	840	0.01	4039	0.0	0.0	4350	0.0	0.0
30177	117	8	8			8	426	0.02	8	426	0.02	4358	0.0	0.0	7535	0.0	0.0
30178	420	8	8			0	762	0.00	0	826	0.00	4376	0.0	0.0	7140	0.0	0.0
30179	122	8	8			1	1,302	0.00	1	1,413	0.00	4069	0.0	0.0	4379	9.6	0.0
30180	237	8	8			119	578	0.21	119	579	0.21	4059	0.0	0.0	4157	0.0	0.0
30181	170	8	15	29	Existing	376	295	1.28	943	1,578	0.60	4112	0.0	0.0	4162	1.6	0.0
30182	240	8	12	29	Existing	650	1,222	0.53	943	3,603	0.26	7057	0.0	0.0	4112	0.0	0.0
30183	131	8	8			15	588	0.02	15	589	0.02	4056	0.0	0.0	4156	0.0	0.0
30184	384	8	8			36	826	0.04	36	827	0.04	4048	0.0	0.0	4154	0.0	0.0
30185	160	8	8			23	1,445	0.02	23	1,447	0.02	4043	0.0	0.0	4153	0.0	0.0
30186	495	12	12			1,395	2,490	0.56	1,849	2,698	0.69	4116	0.0	0.0	4148	0.0	0.0
30187	176	8	8			14	867	0.02	14	941	0.01	4372	0.0	0.0	4105	0.0	0.0
30188	400	8	8			19	840	0.02	19	841	0.02	4055	0.0	0.0	4155	0.0	0.0
30189	481	8	8			491	874	0.56	491	949	0.52	4377	0.0	0.0	4102	0.0	0.0
30190	186	8	8			572	583	0.98	570	633	0.90	4382	2.2	0.0	4071	2.1	0.0
30191	56	8	8			499	272	1.84	623	294	2.12	4315	3.6	8.2	7053	1.6	0.0
30193	218	8	8			28	947	0.03	28	948	0.03	4242	0.0	0.0	3964	0.0	0.0
30194	333	6	6			1	437	0.00	1	437	0.00	5112	0.0	0.0	4010	0.0	0.0
30195	327	8	8			20	1,180	0.02	20	1,181	0.02	5100	0.0	0.0	3911	0.0	0.0
30196	385	6	6			28	363	0.08	28	363	0.08	5041	0.0	0.0	7534	0.0	0.0
30197	338	6	6			1	451	0.00	1	451	0.00	5115	0.0	0.0	8941	0.0	0.0
30198	463	8	8			0	698	0.00	0	758	0.00	4258	0.0	0.0	3946	0.0	0.0
30199	430	8	8			1	1,141	0.00	1	1,142	0.00	5107	0.0	0.0	3909	0.0	0.0
30200	167	8	8			376	806	0.47	376	806	0.47	3958	0.0	0.0	3821	0.0	0.0
30201	35	8	8			47	1,093	0.04	47	1,094	0.04	3959	0.0	0.0	3822	0.0	0.0
30202	278	8	8			1	472	0.00	1	472	0.00	3996	0.0	0.0	3822	0.0	0.0
30203	220	6	6			1	76	0.01	1	76	0.01	3894	0.0	0.0	3917	0.0	0.0
30205	169	8	8			93	811	0.11	93	813	0.11	3816	0.0	0.0	5175	0.0	0.0
30206	208	8	8			0	822	0.00	0	823	0.00	3811	0.0	0.0	7083	0.0	0.0
30207	120	6	6			0	266	0.00	0	266	0.00	3790	0.0	0.0	5171	0.0	0.0
30208	40	8	8			1	1,084	0.00	1	1,085	0.00	3802	0.0	0.0	5172	0.0	0.0
30209	290	8	8			292	871	0.34	293	872	0.34	3877	0.0	0.0	3752	0.0	0.0
30210	355	8	8			1	734	0.00	1	735	0.00	7285	0.0	0.0	3753	0.0	0.0
30211	173	8	8			1	973	0.00	1	974	0.00	3986	0.0	0.0	3702	0.0	0.0
30212	85	8	8			1	297	0.00	1	298	0.00	3702	0.0	0.0	4221	0.0	0.0
30213	237	8	8			81	813	0.10	81	882	0.09	3980	0.0	0.0	3703	0.0	0.0
30214	266	8	8			25	683	0.04	25	740	0.03	7533	0.0	0.0	3661	0.0	0.0
30215	240	8	8			242	935	0.26	242	1,015	0.24	3673	0.0	0.0	7283	0.0	0.0
30216	285	8	8			49	500	0.10	49	542	0.09	4222	0.0	0.0	7042	0.0	0.0
30218	417	6	6			1	600	0.00	1	600	0.00	3796	0.0	0.0	3597	0.0	0.0
30219	458	8	8			1	1,318	0.00	1	1,320	0.00	3866	0.0	0.0	3599	0.0	0.0
30220	418	6	6			17	683	0.03	17	683	0.03	3798	0.0	0.0	3598	0.0	0.0
30221	142	6	6			177	434	0.41	177	434	0.41	3867	0.0	0.0	3615	0.0	0.0
30222	141	8	8			108	649	0.17	108	650	0.17	3562	0.0	0.0	5482	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30223	352	6	6			1	736	0.00	1	736	0.00	3795	0.0	0.0	3596	0.0	0.0
30224	175	8	8			1	1,153	0.00	1	1,156	0.00	3872	0.0	0.0	3606	0.0	0.0
30225	75	8	8			1	1,247	0.00	1	1,249	0.00	3840	0.0	0.0	3606	0.0	0.0
30226	149	8	8			6	1,604	0.00	6	1,606	0.00	3607	0.0	0.0	3841	0.0	0.0
30227	78	6	6			1	252	0.00	1	252	0.00	3647	0.0	0.0	3841	0.0	0.0
30228	303	8	8			46	386	0.12	46	386	0.12	3560	0.0	0.0	3472	0.0	0.0
30229	1056	54	54			15,438	36,450	0.42	16,768	36,450	0.46	7747	0.0	0.0	8539	0.0	0.0
30230	214	24	24			4,004	5,833	0.69	6,251	5,833	1.07	3418	0.0	17.1	5577	0.0	9.6
30233	199	12	12			525	1,189	0.44	525	1,189	0.44	3573	0.0	0.0	3478	0.0	0.0
30234	258	8	8			494	434	1.14	0	435	0.00	3413	6.5	0.0	5567	8.5	0.0
30236	465	24	24			1,076	6,404	0.17	1,077	6,404	0.17	3638	0.0	0.0	3405	0.0	0.0
30237	82	54	54			14,130	35,143	0.40	15,465	35,143	0.44	3377	0.0	0.0	3403	0.0	0.0
30239	293	8	8			20	266	0.08	1	267	0.00	3358	3.9	0.0	3504	2.3	0.0
30240	365	8	8			1	301	0.00	1	301	0.00	7030	0.0	0.0	3465	0.0	0.0
30241	366	8	8			111	293	0.38	62	294	0.21	3360	1.7	0.0	7033	0.0	0.0
30242	297	10	15	10	Existing	832	633	1.32	1,028	1,865	0.55	3310	0.9	0.0	7033	0.0	0.0
30243	300	6	6			18	165	0.11	1	165	0.00	3458	1.5	0.0	3310	0.9	0.0
30245	149	8	8			340	539	0.63	340	540	0.63	3842	0.0	0.0	3259	0.0	0.0
30246	107	6	6			1	1,185	0.00	1	1,185	0.00	3646	0.0	0.0	3259	0.0	0.0
30247	260	8	8			342	336	1.02	342	337	1.01	3260	0.0	0.0	3592	0.0	0.0
30248	335	24	24			678	8,135	0.08	678	8,135	0.08	3242	0.0	0.0	3639	0.0	0.0
30249	228	8	8			10	342	0.03	10	343	0.03	3261	0.0	0.0	3629	0.0	0.0
30250	250	8	8			1	607	0.00	1	608	0.00	7137	0.0	0.0	3257	0.0	0.0
30251	325	24	24			559	6,688	0.08	559	6,688	0.08	7282	0.0	0.0	3258	0.0	0.0
30252	360	8	8			14	343	0.04	14	344	0.04	7506	0.0	0.0	7038	0.0	0.0
30253	148	54	54			9,190	34,794	0.26	10,600	34,794	0.30	3231	0.0	0.0	3377	0.0	0.0
30255	351	8	8			44	340	0.13	44	340	0.13	3253	0.0	0.0	3370	0.0	0.0
30256	689	54	54			9,183	35,267	0.26	10,593	35,267	0.30	3747	0.0	0.0	3226	0.0	0.0
30257	118	15	15			462	1,849	0.25	462	1,849	0.25	3265	0.0	0.0	3298	0.0	0.0
30259	200	8	8			1	299	0.00	1	300	0.00	3149	0.0	0.0	3276	0.0	0.0
30260	300	8	8			3	343	0.01	3	344	0.01	3104	0.0	0.0	3374	0.0	0.0
30261	301	8	8			93	602	0.15	93	603	0.15	3087	0.0	0.0	7268	0.0	0.0
30262	287	6	6			106	219	0.48	106	219	0.48	3142	0.0	0.0	3367	0.0	0.0
30263	428	6	6			1	197	0.01	1	197	0.01	7500	0.0	0.0	3338	0.0	0.0
30265	375	10	10			700	694	1.01	745	694	1.07	3006	0.0	0.0	3117	8.5	7.7
30266	69	8	8			22	980	0.02	22	1,063	0.02	3689	0.0	0.0	2921	0.0	0.0
30267	377	8	8			96	343	0.28	96	372	0.26	7280	0.0	0.0	2923	0.0	0.0
30268	86	8	8			14	998	0.01	14	1,083	0.01	3736	0.0	0.0	2975	0.0	0.0
30270	441	8	8			8	342	0.02	55	372	0.15	3777	0.0	4.5	2880	0.0	4.4
30271	372	21	21			3,806	6,967	0.55	5,228	7,548	0.69	2926	0.0	0.0	2866	0.0	0.0
30272	264	8	8			33	375	0.09	33	375	0.09	2874	0.0	0.0	3165	0.0	0.0
30274	357	8	8			299	1,113	0.27	299	1,114	0.27	2932	0.0	0.0	2882	0.0	0.0
30276	378	54	54			9,182	35,456	0.26	10,592	35,456	0.30	2863	0.0	0.0	3746	0.0	0.0
30278	216	8	8			14	441	0.03	14	478	0.03	2975	0.0	0.0	9229	0.0	0.0
30280	801	42	42			4,656	28,092	0.17	4,656	28,092	0.17	2833	0.0	0.0	2850	0.0	0.0
30281	196	8	8			1	342	0.00	1	342	0.00	7021	0.0	0.0	2807	0.0	0.0
30282	322	8	8			267	532	0.50	267	533	0.50	2826	0.0	0.0	2931	0.0	0.0
30283	372	8	8			0	383	0.00	0	416	0.00	4117	0.0	0.0	2788	0.0	0.0
30284	221	8	8			0	511	0.00	0	554	0.00	4092	0.0	0.0	7252	0.0	0.0
30285	221	8	8			0	593	0.00	0	643	0.00	4093	0.0	0.0	2755	0.0	0.0
30286	220	8	8			0	542	0.00	0	588	0.00	4091	0.0	0.0	2754	0.0	0.0
30287	302	8	8			49	431	0.11	49	468	0.10	2756	0.0	0.0	4119	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30288	210	8	8			0	903	0.00	0	980	0.00	7293	0.0	0.0	2753	0.0	0.0
30289	180	8	8			13	708	0.02	13	769	0.02	4090	0.0	0.0	2716	0.0	0.0
30290	265	8	8			0	435	0.00	0	472	0.00	2715	0.0	0.0	4088	0.0	0.0
30291	228	8	12	37	ura	694	352	1.97	1,092	1,124	0.97	2721	3.5	0.0	2611	3.1	0.0
30292	78	8	8			0	726	0.00	0	788	0.00	4235	0.0	0.0	2606	0.0	0.0
30293	295	15	18	38	2036	973	1,547	0.63	1,540	2,726	0.56	4226	0.0	0.0	2609	0.0	0.0
30294	393	21	21			3,674	3,831	0.96	5,098	4,149	1.23	2608	0.0	0.0	2912	0.0	0.0
30295	99	10	10			8	685	0.01	8	741	0.01	2960	0.0	0.0	2677	0.0	0.0
30296	345	8	8			135	691	0.19	135	749	0.18	2725	0.0	0.0	2616	0.0	0.0
30297	62	8	8			0	1,094	0.00	0	1,187	0.00	4227	0.0	0.0	2639	0.0	0.0
30298	186	8	8			45	660	0.07	45	715	0.06	7491	0.0	0.0	9001	0.0	0.0
30300	307	10	10			17	3,137	0.01	17	3,395	0.00	2816	0.0	0.0	2586	0.0	0.0
30301	415	8	8			1	1,513	0.00	1	1,642	0.00	2814	0.0	0.0	2540	0.0	0.0
30302	385	8	8			7	1,849	0.00	7	2,006	0.00	2817	0.0	0.0	2539	0.0	0.0
30303	240	8	8			0	926	0.00	0	1,005	0.00	2544	0.0	0.0	2654	0.0	0.0
30304	385	10	10			37	2,103	0.02	37	2,276	0.02	2538	0.0	0.0	7488	0.0	0.0
30305	224	8	8			10	1,029	0.01	10	1,117	0.01	2587	0.0	0.0	2650	0.0	0.0
30308	150	8	8			13	1,637	0.01	13	1,775	0.01	2827	0.0	0.0	2590	0.0	0.0
30309	150	8	8			13	386	0.03	13	419	0.03	2579	0.0	0.0	2827	0.0	0.0
30310	110	8	8			13	865	0.01	13	939	0.01	2828	0.0	0.0	2579	0.0	0.0
30312	293	8	12	37	ura	861	919	0.94	966	2,934	0.33	2507	2.1	0.0	2787	0.0	0.0
30313	266	10	10			88	679	0.13	88	735	0.12	2511	0.0	0.0	2781	0.0	0.0
30314	257	8	8			28	921	0.03	28	999	0.03	2512	0.0	0.0	2768	0.0	0.0
30315	231	8	8			14	818	0.02	14	887	0.02	2500	0.0	0.0	2697	0.8	0.0
30319	320	8	8			13	266	0.05	13	267	0.05	2469	0.0	0.0	2462	0.0	0.0
30320	517	54	54			44,328	30,565	1.45	49,849	30,565	1.63	2426	3.8	2.8	2472	0.0	2.3
30323	241	8	8			63	344	0.18	22	344	0.06	2413	0.0	0.0	7481	0.0	0.0
30326	627	54	54			27,042	61,053	0.44	32,495	61,053	0.53	2369	0.0	6.6	2436	6.6	4.5
30332	1741	54	54			22,756	20,399	1.12	24,803	20,399	1.22	2314	0.0	8.1	2364	0.0	8.1
30335	440	16	21	21	2036	2,219	1,038	2.14	1,899	2,144	0.89	7606	2.1	0.0	2328	0.0	0.0
30336	428	8	8			216	383	0.56	216	383	0.56	2242	0.0	0.0	2391	0.0	0.0
30337	425	8	8			40	343	0.12	40	344	0.12	2333	0.0	0.0	2240	0.0	0.0
30338	175	8	8			76	335	0.23	76	336	0.23	7173	0.0	0.0	2419	0.0	0.0
30339	418	8	8			13	402	0.03	13	403	0.03	2251	0.0	0.0	7480	0.0	0.0
30340	353	8	8			8	374	0.02	7	375	0.02	2294	0.0	0.0	2413	0.0	0.0
30341	40	8	8			113	728	0.16	113	728	0.16	2336	0.0	0.0	2245	0.0	0.0
30342	130	8	8			65	436	0.15	65	437	0.15	2348	0.0	0.0	2303	0.0	0.0
30343	83	6	6			1	192	0.00	1	192	0.00	2235	0.0	0.0	2420	0.0	0.0
30344	295	8	8			14	290	0.05	14	290	0.05	2344	0.0	0.0	11040	0.0	0.0
30345	428	8	8			323	360	0.90	301	360	0.84	7473	2.1	0.0	2239	2.4	0.0
30348	767	54	54			20,556	34,029	0.60	22,961	34,029	0.67	2144	0.0	0.0	2328	0.0	0.0
30349	293	54	54			20,556	30,506	0.67	22,960	30,506	0.75	5833	0.0	0.0	2144	0.0	0.0
30351	497	8	8			301	581	0.52	301	582	0.52	2150	0.0	0.0	7473	2.1	0.0
30352	227	8	8			29	351	0.08	29	351	0.08	2212	0.0	0.0	2164	0.0	0.0
30353	423	8	8			57	342	0.17	57	342	0.17	2190	0.0	0.0	2162	0.0	0.0
30354	278	10	10			34	534	0.06	34	533	0.06	2200	0.0	0.0	2179	0.0	0.0
30355	311	8	8			6	337	0.02	6	338	0.02	2165	0.0	0.0	2221	0.0	0.0
30356	203	8	8			42	290	0.14	42	290	0.14	2193	0.0	0.0	7472	4.7	4.7
30357	260	8	8			1	336	0.00	1	337	0.00	2121	0.0	0.0	7393	0.0	0.0
30358	286	8	8			6	546	0.01	6	547	0.01	2106	0.0	0.0	7481	0.0	0.0
30359	391	12	15	1	ura	983	758	1.30	1,054	1,376	0.77	2289	4.6	0.0	2101	0.0	0.0
30360	360	8	8			12	286	0.04	12	286	0.04	2134	0.0	0.0	7174	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30361	373	8	8			13	332	0.04	13	333	0.04	2083	0.0	0.0	2116	0.0	0.0
30362	250	8	8			13	343	0.04	13	344	0.04	2192	0.0	0.0	2083	0.0	0.0
30363	272	8	8			34	345	0.10	34	345	0.10	2218	0.0	0.0	2093	0.0	0.0
30367	378	16	16			2,812	3,223	0.87	3,015	3,223	0.94	1998	0.0	0.0	2146	0.0	0.0
30368	301	30	30			4,567	9,714	0.47	6,801	9,714	0.70	1992	0.0	0.0	2182	0.0	0.0
30374	310	8	8			1	678	0.00	1	679	0.00	1869	0.0	0.0	5589	0.0	0.0
30375	321	8	8			78	382	0.21	78	383	0.21	1908	0.0	0.0	5590	0.0	0.0
30376	416	8	8			156	424	0.37	156	424	0.37	2024	2.9	0.0	1872	1.2	0.0
30377	175	10	10			511	828	0.62	466	828	0.56	1968	3.4	0.0	1915	1.8	0.0
30378	468	12	12			626	698	0.90	683	698	0.98	1948	1.2	0.0	7003	2.6	0.0
30379	450	8	8			1	355	0.00	1	356	0.00	1862	0.0	0.0	5551	0.0	0.0
30380	259	8	8			92	469	0.20	92	470	0.19	1925	0.0	0.0	5551	0.0	0.0
30381	434	8	8			553	451	1.22	88	452	0.19	1863	7.3	0.0	5570	8.2	0.0
30382	320	8	8			515	638	0.81	40	639	0.06	5566	7.9	0.0	1863	7.3	0.0
30383	201	6	6			1	291	0.00	1	291	0.00	1865	0.0	0.0	2000	0.0	0.0
30386	156	8	8			297	445	0.67	118	446	0.26	7456	0.9	0.0	1891	0.0	0.0
30387	131	12	12			135	227	0.59	135	227	0.59	1755	0.0	0.0	3507	0.0	0.0
30389	319	8	8			79	178	0.45	78	178	0.44	1775	3.4	0.0	1893	2.6	0.0
30390	120	10	18	5	Existing	682	399	1.71	2,070	1,915	1.08	1821	7.2	0.0	7135	7.0	0.0
30391	447	6	6			0	93	0.00	0	93	0.00	1758	0.0	0.0	3493	0.0	0.0
30392	316	8	8			1	237	0.00	1	237	0.00	1742	0.0	0.0	7512	0.0	0.0
30394	295	8	8			19	280	0.07	1	281	0.00	3514	8.6	0.0	1756	7.5	0.0
30395	446	8	8			109	416	0.26	109	417	0.26	1833	0.0	0.0	3412	0.0	0.0
30396	277	8	8			7	284	0.02	7	284	0.02	3456	0.0	0.0	1834	0.0	0.0
30397	319	8	8			2	821	0.00	2	822	0.00	1837	0.0	0.0	3505	0.0	0.0
30398	205	8	8			1	311	0.00	1	311	0.00	7461	0.0	0.0	3515	0.0	0.0
30400	127	10	15	4	Existing	753	449	1.68	1,026	1,322	0.78	1894	6.6	0.0	1789	3.7	0.0
30401	319	8	8			238	275	0.87	238	275	0.87	6996	1.7	0.0	1779	0.0	3.7
30402	177	8	8			78	250	0.31	35	251	0.14	1710	1.5	0.0	1948	1.2	0.0
30403	327	8	8			178	558	0.32	127	558	0.23	1675	0.0	0.0	7724	3.3	6.0
30404	328	6	6			169	140	1.21	181	140	1.29	1674	4.5	4.9	1957	3.8	5.3
30405	351	10	10			199	548	0.36	197	547	0.36	1718	3.2	0.0	1800	1.4	0.0
30406	92	8	8			58	748	0.08	1	749	0.00	1716	0.0	0.0	1604	2.2	0.0
30407	119	8	8			1	206	0.01	1	206	0.01	1540	0.0	0.0	1838	0.0	0.0
30408	113	8	8			1	313	0.00	1	313	0.00	1513	0.0	0.0	1790	0.0	0.0
30409	95	8	8			106	485	0.22	106	485	0.22	1512	0.0	0.0	1790	0.0	0.0
30410	30	8	8			431	701	0.61	433	703	0.62	1494	3.3	5.1	3328	3.4	5.2
30411	324	8	8			429	363	1.18	508	364	1.40	3328	3.4	5.2	1545	4.8	7.8
30412	137	10	10			431	637	0.68	509	636	0.80	1492	4.6	7.8	3314	3.4	6.8
30413	339	15	15			2,061	2,053	1.00	2,044	2,053	1.00	1546	0.0	0.0	3326	5.1	6.2
30415	377	10	15	8	Existing	559	519	1.08	715	1,530	0.47	1600	0.0	0.0	1496	1.2	0.0
30416	190	8	8			1	383	0.00	1	384	0.00	1660	0.0	0.0	1564	0.0	0.0
30417	280	8	8			20	379	0.05	20	380	0.05	7453	0.0	0.0	1565	0.0	0.0
30418	7	12	12			268	1,047	0.26	260	1,047	0.25	1602	3.8	0.0	1507	3.8	0.0
30419	310	6	6			175	239	0.73	175	239	0.73	1376	0.0	0.0	1530	0.0	0.0
30420	283	8	8			286	572	0.50	286	573	0.50	1382	0.0	0.0	1539	0.0	0.0
30421	198	12	12			553	1,772	0.31	553	1,772	0.31	1384	0.0	0.0	1565	0.0	0.0
30422	252	8	8			19	345	0.05	19	346	0.05	1367	0.0	0.0	3123	0.0	0.0
30423	148	6	6			1	215	0.01	1	215	0.01	1347	0.0	0.0	3121	0.0	0.0
30424	313	6	6			161	108	1.50	161	108	1.50	1370	0.0	0.0	1523	0.0	0.0
30425	83	8	8			63	967	0.07	63	969	0.07	7438	0.0	0.0	1527	0.0	0.0
30426	26	8	8			0	476	0.00	0	476	0.00	1370	0.0	0.0	1528	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30427	399	12	12			117	1,006	0.12	117	1,006	0.12	1334	0.0	0.0	1437	0.0	0.0
30428	527	8	8			11	472	0.02	11	473	0.02	1332	0.0	0.0	1426	0.0	0.0
30429	275	8	8			130	381	0.34	130	382	0.34	1294	0.0	0.0	1381	0.0	0.0
30430	274	8	8			47	382	0.12	47	383	0.12	1293	0.0	0.0	1380	0.0	0.0
30431	274	8	8			96	382	0.25	96	383	0.25	1292	0.0	0.0	1419	0.0	0.0
30432	288	8	8			1	782	0.00	1	783	0.00	7647	0.0	0.0	1420	0.0	0.0
30433	137	8	8			1	419	0.00	1	420	0.00	1286	0.0	0.0	1395	0.0	0.0
30438	341	8	8			19	338	0.06	19	338	0.06	1166	0.0	0.0	7133	0.0	0.0
30443	329	8	8			68	458	0.15	68	458	0.15	1147	0.0	0.0	3030	0.0	0.0
30444	311	8	8			1	384	0.00	1	385	0.00	3029	0.0	0.0	1162	0.0	0.0
30490	384	8	8			59	344	0.17	59	374	0.16	1111	0.0	0.0	1109	0.0	0.0
30491	61	8	8			72	340	0.21	72	369	0.20	1108	0.0	0.0	1104	0.0	0.0
30492	68	8	8			14	1,592	0.01	14	1,727	0.01	1103	0.0	0.0	1104	0.0	0.0
30493	284	8	8			14	2,085	0.01	14	2,262	0.01	1102	0.0	0.0	1103	0.0	0.0
30494	79	8	8			10	539	0.02	10	585	0.02	1107	0.0	0.0	1108	0.0	0.0
30495	60	6	6			10	705	0.01	10	764	0.01	1106	0.0	0.0	1107	0.0	0.0
30496	139	8	8			86	363	0.24	86	393	0.22	1104	0.0	0.0	1113_WETWELL	0.0	0.0
30514	360	8	8			18	343	0.05	18	344	0.05	1167	0.0	0.0	1166	0.0	0.0
30515	147	8	8			1	424	0.00	1	425	0.00	1176	0.0	0.0	1149	0.0	0.0
30516	134	8	8			41	419	0.10	41	419	0.10	1149	0.0	0.0	1168	0.0	0.0
30517	245	8	8			42	423	0.10	42	424	0.10	1168	0.0	0.0	1169	0.0	0.0
30518	240	8	8			44	420	0.10	44	421	0.10	1169	0.0	0.0	1154	0.0	0.0
30519	50	8	8			5	399	0.01	5	399	0.01	1170	0.0	0.0	1147	0.0	0.0
30520	297	8	8			3	568	0.01	3	569	0.01	1171	0.0	0.0	1170	0.0	0.0
30521	365	8	8			1	490	0.00	1	490	0.00	1172	0.0	0.0	1171	0.0	0.0
30522	458	8	8			29	344	0.08	29	344	0.08	1164	0.0	0.0	1165	0.0	0.0
30523	250	8	8			28	518	0.05	28	519	0.05	1173	0.0	0.0	1164	0.0	0.0
30524	50	8	8			26	420	0.06	26	421	0.06	1163	0.0	0.0	1173	0.0	0.0
30525	43	8	8			1	370	0.00	1	370	0.00	1114	0.0	0.0	1163	0.0	0.0
30572	266	8	8			1	484	0.00	1	485	0.00	1177	0.0	0.0	1230	0.0	0.0
30615	280	8	8			26	353	0.07	26	354	0.07	7436	0.0	0.0	1301	0.0	0.0
30616	301	8	8			24	308	0.08	24	308	0.08	1302	0.0	0.0	7436	0.0	0.0
30617	291	8	8			22	364	0.06	22	365	0.06	1305	0.0	0.0	1302	0.0	0.0
30618	144	8	8			62	389	0.16	62	390	0.16	1301	0.0	0.0	1300	0.0	0.0
30619	335	8	8			128	384	0.33	128	385	0.33	1300	0.0	0.0	1294	0.0	0.0
30620	318	8	8			63	383	0.16	63	383	0.16	7211	0.0	0.0	1321	0.0	0.0
30621	237	8	8			21	405	0.05	21	406	0.05	1306	0.0	0.0	1322	0.0	0.0
30622	320	8	8			19	381	0.05	19	382	0.05	1297	0.0	0.0	1298	0.0	0.0
30623	323	8	8			17	383	0.05	17	383	0.05	1307	0.0	0.0	1297	0.0	0.0
30624	252	8	8			3	390	0.01	3	390	0.01	1323	0.0	0.0	1307	0.0	0.0
30625	328	8	8			44	390	0.11	44	390	0.11	1299	0.0	0.0	1293	0.0	0.0
30626	335	8	8			94	381	0.25	94	381	0.25	1296	0.0	0.0	1292	0.0	0.0
30627	322	8	8			66	383	0.17	66	383	0.17	1314	0.0	0.0	7437	0.0	0.0
30628	252	8	8			47	377	0.12	47	378	0.12	1315	0.0	0.0	1314	0.0	0.0
30629	135	12	12			56	1,011	0.05	56	1,011	0.05	1311	0.0	0.0	1334	0.0	0.0
30630	275	8	8			1	383	0.00	1	383	0.00	1325	0.0	0.0	1295	0.0	0.0
30631	175	8	8			21	360	0.06	21	360	0.06	1304	0.0	0.0	1305	0.0	0.0
30632	170	8	8			19	642	0.03	19	642	0.03	1326	0.0	0.0	1304	0.0	0.0
30633	40	8	8			1	642	0.00	1	642	0.00	1248	0.0	0.0	1326	0.0	0.0
30634	195	6	6			1	225	0.01	1	225	0.01	1249	0.0	0.0	1326	0.0	0.0
30635	213	8	8			19	481	0.04	19	481	0.04	1327	0.0	0.0	1306	0.0	0.0
30636	332	8	8			1	542	0.00	1	543	0.00	1312	0.0	0.0	1327	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30637	165	8	8			44	378	0.12	44	378	0.12	1316	0.0	0.0	1315	0.0	0.0
30638	82	8	8			43	344	0.13	43	344	0.13	1317	0.0	0.0	1316	0.0	0.0
30639	203	8	8			20	344	0.06	20	345	0.06	1313	0.0	0.0	1317	0.0	0.0
30640	215	8	8			19	667	0.03	19	668	0.03	1328	0.0	0.0	1318	0.0	0.0
30641	161	8	8			18	685	0.03	18	686	0.03	1329	0.0	0.0	1328	0.0	0.0
30642	318	8	8			19	608	0.03	19	609	0.03	7383	0.0	0.0	1313	0.0	0.0
30643	161	8	8			17	385	0.05	17	385	0.05	1250	0.0	0.0	7383	0.0	0.0
30644	175	8	8			61	458	0.13	61	459	0.13	1310	0.0	0.0	1334	0.0	0.0
30645	350	8	8			7	473	0.01	7	474	0.01	1331	0.0	0.0	1330	0.0	0.0
30646	404	8	8			6	417	0.01	6	418	0.01	1320	0.0	0.0	1331	0.0	0.0
30647	200	8	8			12	341	0.03	12	342	0.03	1309	0.0	0.0	1310	0.0	0.0
30648	254	8	8			10	581	0.02	10	581	0.02	1308	0.0	0.0	1309	0.0	0.0
30649	355	8	8			8	396	0.02	8	397	0.02	1319	0.0	0.0	1308	0.0	0.0
30650	105	6	6			1	201	0.01	1	201	0.01	1254	0.0	0.0	1319	0.0	0.0
30656	300	8	8			72	700	0.10	72	701	0.10	1374	0.0	0.0	1376	0.0	0.0
30657	94	8	8			70	540	0.13	70	540	0.13	1375	0.0	0.0	1374	0.0	0.0
30658	159	8	8			69	539	0.13	69	540	0.13	1373	0.0	0.0	1375	0.0	0.0
30659	336	8	8			37	400	0.09	37	401	0.09	1411	0.0	0.0	7214	0.0	0.0
30660	102	8	8			3	383	0.01	3	384	0.01	1407	0.0	0.0	1411	0.0	0.0
30661	125	6	6			1	176	0.01	1	176	0.01	1343	0.0	0.0	1407	0.0	0.0
30662	350	8	8			5	484	0.01	5	485	0.01	1412	0.0	0.0	1411	0.0	0.0
30663	130	8	8			1	415	0.00	1	415	0.00	1409	0.0	0.0	1412	0.0	0.0
30664	360	8	8			103	491	0.21	103	492	0.21	1377	0.0	0.0	1376	0.0	0.0
30667	236	6	6			3	195	0.02	3	195	0.02	1383	0.0	0.0	1382	0.0	0.0
30668	245	6	6			0	192	0.00	0	192	0.00	1384	0.0	0.0	6985	0.0	0.0
30669	307	8	8			30	540	0.06	30	542	0.06	1378	0.0	0.0	1377	0.0	0.0
30670	300	8	8			28	538	0.05	28	539	0.05	1408	0.0	0.0	1378	0.0	0.0
30671	271	8	8			1	536	0.00	1	537	0.00	1344	0.0	0.0	1408	0.0	0.0
30672	151	8	8			267	481	0.55	267	482	0.55	1415	0.0	0.0	1382	0.0	0.0
30673	163	8	8			265	485	0.55	265	485	0.55	1379	0.0	0.0	1415	0.0	0.0
30674	337	8	8			236	482	0.49	236	483	0.49	1393	0.0	0.0	1379	0.0	0.0
30675	331	8	8			205	501	0.41	205	501	0.41	1394	0.0	0.0	1393	0.0	0.0
30676	147	8	8			153	438	0.35	153	439	0.35	1399	0.0	0.0	6986	0.0	0.0
30677	68	8	8			149	255	0.59	149	255	0.59	7440	0.0	0.0	1399	0.0	0.0
30678	325	8	8			28	417	0.07	28	417	0.07	7164	0.0	0.0	1379	0.0	0.0
30679	323	8	8			1	417	0.00	1	417	0.00	7439	0.0	0.0	7164	0.0	0.0
30680	312	8	8			29	386	0.08	29	387	0.08	1391	0.0	0.0	1393	0.0	0.0
30681	345	8	8			1	378	0.00	1	379	0.00	1390	0.0	0.0	1391	0.0	0.0
30682	318	8	8			26	383	0.07	26	384	0.07	1416	0.0	0.0	1394	0.0	0.0
30683	325	8	8			1	379	0.00	1	380	0.00	1417	0.0	0.0	1416	0.0	0.0
30684	246	6	6			24	215	0.11	24	215	0.11	6987	0.0	0.0	6986	0.0	0.0
30685	32	6	6			3	178	0.02	3	178	0.02	7441	0.0	0.0	6987	0.0	0.0
30686	252	6	6			1	178	0.01	1	178	0.01	1418	0.0	0.0	7441	0.0	0.0
30687	225	8	8			1	343	0.00	1	344	0.00	1345	0.0	0.0	1399	0.0	0.0
30688	316	12	12			525	1,414	0.37	525	1,414	0.37	1381	0.0	0.0	1384	0.0	0.0
30689	335	12	12			313	1,743	0.18	313	1,743	0.18	1419	0.0	0.0	1380	0.0	0.0
30690	198	12	12			196	1,546	0.13	196	1,546	0.13	1420	0.0	0.0	1419	0.0	0.0
30691	155	12	12			183	1,258	0.15	183	1,258	0.15	1437	0.0	0.0	1420	0.0	0.0
30692	196	8	8			66	380	0.17	66	380	0.17	1397	0.0	0.0	1437	0.0	0.0
30693	300	8	8			26	542	0.05	26	543	0.05	1396	0.0	0.0	7213	0.0	0.0
30694	50	8	8			28	589	0.05	28	590	0.05	7213	0.0	0.0	1397	0.0	0.0
30695	122	8	8			36	387	0.09	36	388	0.09	1398	0.0	0.0	1397	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30696	275	8	8			6	401	0.02	6	401	0.02	1422	0.0	0.0	1421	0.0	0.0
30697	273	8	8			5	383	0.01	5	383	0.01	1423	0.0	0.0	1422	0.0	0.0
30698	64	8	8			1	418	0.00	1	419	0.00	1424	0.0	0.0	1423	0.0	0.0
30699	111	8	8			1	422	0.00	1	422	0.00	1425	0.0	0.0	1423	0.0	0.0
30700	380	8	8			122	461	0.26	122	462	0.26	1400	0.0	0.0	7440	0.0	0.0
30701	365	8	8			100	462	0.22	100	463	0.22	1401	0.0	0.0	1400	0.0	0.0
30702	295	12	12			99	1,585	0.06	99	1,585	0.06	1410	0.0	0.0	1401	0.0	0.0
30703	420	8	8			26	651	0.04	26	652	0.04	1402	0.0	0.0	1403	0.0	0.0
30704	360	8	8			1	336	0.00	1	336	0.00	1401	0.0	0.0	1402	0.0	0.0
30705	150	8	8			1	420	0.00	1	421	0.00	1346	0.0	0.0	1402	0.0	0.0
30706	521	8	8			47	444	0.10	47	445	0.10	1426	0.0	0.0	1410	0.0	0.0
30707	365	8	8			3	483	0.01	3	484	0.01	1353	0.0	0.0	1356	0.0	0.0
30708	138	8	8			38	426	0.09	38	426	0.09	1389	0.0	0.0	1385	0.0	0.0
30709	354	8	8			36	481	0.08	36	481	0.08	1356	0.0	0.0	1389	0.0	0.0
30710	334	8	8			40	505	0.08	40	505	0.08	1385	0.0	0.0	1388	0.0	0.0
30711	485	8	8			42	344	0.12	42	344	0.12	1403	0.0	0.0	1387	0.0	0.0
30712	69	8	8			1	476	0.00	1	476	0.00	1352	0.0	0.0	1355	0.0	0.0
30713	231	8	8			3	376	0.01	3	376	0.01	1355	0.0	0.0	1356	0.0	0.0
30714	427	8	8			174	451	0.38	174	452	0.38	1386	0.0	0.0	1364	0.0	0.0
30715	165	8	8			172	383	0.45	172	383	0.45	1427	0.0	0.0	1386	0.0	0.0
30716	135	8	8			94	770	0.12	94	771	0.12	1428	0.0	0.0	1427	0.0	0.0
30717	485	8	8			44	342	0.13	44	342	0.13	1387	0.0	0.0	1427	0.0	0.0
30718	302	8	8			17	507	0.03	17	508	0.03	1366	0.0	0.0	1367	0.0	0.0
30719	245	8	8			15	490	0.03	15	491	0.03	1365	0.0	0.0	1366	0.0	0.0
30720	360	8	8			72	590	0.12	72	591	0.12	1371	0.0	0.0	1370	0.0	0.0
30721	360	8	8			1	510	0.00	1	511	0.00	1376	0.0	0.0	1371	0.0	0.0
30722	224	6	6			34	222	0.15	34	222	0.15	6984	0.0	0.0	1371	0.0	0.0
30723	191	6	6			32	208	0.15	32	208	0.15	1372	0.0	0.0	6984	0.0	0.0
30724	197	6	6			31	206	0.15	31	206	0.15	7212	0.0	0.0	1372	0.0	0.0
30725	220	8	8			5	586	0.01	5	587	0.01	1429	0.0	0.0	1406	0.0	0.0
30726	220	8	8			3	586	0.01	3	587	0.01	1405	0.0	0.0	1429	0.0	0.0
30727	109	8	8			1	569	0.00	1	570	0.00	1430	0.0	0.0	1405	0.0	0.0
30728	194	8	8			49	553	0.09	49	554	0.09	6988	0.0	0.0	7215	0.0	0.0
30729	202	8	8			8	633	0.01	8	634	0.01	1431	0.0	0.0	6988	0.0	0.0
30730	26	8	8			52	353	0.15	52	353	0.15	7384	0.0	0.0	1369	0.0	0.0
30731	212	8	8			51	484	0.10	51	485	0.10	7215	0.0	0.0	7384	0.0	0.0
30732	197	6	6			5	192	0.03	5	192	0.03	1368	0.0	0.0	1369	0.0	0.0
30733	80	6	6			1	205	0.01	1	205	0.01	1350	0.0	0.0	1368	0.0	0.0
30734	200	6	6			1	159	0.01	1	159	0.01	1351	0.0	0.0	1431	0.0	0.0
30735	45	8	8			62	626	0.10	62	627	0.10	1360	0.0	0.0	7438	0.0	0.0
30736	275	6	6			1	215	0.01	1	215	0.01	1359	0.0	0.0	1368	0.0	0.0
30737	238	8	8			60	478	0.12	60	479	0.12	1434	0.0	0.0	1360	0.0	0.0
30738	192	8	8			38	701	0.05	38	702	0.05	1361	0.0	0.0	1434	0.0	0.0
30739	200	8	8			34	526	0.06	34	526	0.06	1358	0.0	0.0	1362	0.0	0.0
30740	185	8	8			32	550	0.06	32	551	0.06	1357	0.0	0.0	1358	0.0	0.0
30741	230	8	8			1	383	0.00	1	384	0.00	1436	0.0	0.0	1357	0.0	0.0
30742	88	8	8			1	311	0.00	1	312	0.00	1341	0.0	0.0	1433	0.0	0.0
30744	58	6	6			29	206	0.14	29	206	0.14	1342	0.0	0.0	7212	0.0	0.0
30745	198	8	8			28	369	0.08	28	370	0.08	1406	0.0	0.0	1342	0.0	0.0
30747	122	8	8			1	431	0.00	1	432	0.00	1541	0.0	0.0	1540	0.0	0.0
30748	90	8	8			1	431	0.00	1	431	0.00	7656	0.0	0.0	1541	0.0	0.0
30749	321	8	8			1	438	0.00	1	438	0.00	1514	0.0	0.0	1513	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30750	140	8	8			1	343	0.00	1	344	0.00	1542	0.0	0.0	1514	0.0	0.0
30751	140	8	8			106	485	0.22	106	486	0.22	1495	0.0	0.0	1512	0.0	0.0
30752	397	6	6			1	113	0.01	1	113	0.01	7218	0.0	0.0	1495	0.0	0.0
30753	390	8	8			32	444	0.07	32	444	0.07	1497	0.0	0.0	1495	0.0	0.0
30754	400	6	6			31	158	0.20	31	158	0.20	1509	0.0	0.0	1497	0.0	0.0
30755	287	10	10			225	599	0.38	225	598	0.38	7446	0.0	0.0	1517	7.3	0.0
30756	225	6	6			5	131	0.04	1	131	0.01	1510	0.0	0.0	1517	7.3	0.0
30757	150	8	8			1	274	0.00	1	274	0.00	1511	0.0	0.0	1510	0.0	0.0
30758	267	10	10			300	603	0.50	300	602	0.50	1517	7.3	0.0	1516	6.1	7.9
30759	291	8	8			300	380	0.79	300	380	0.79	1516	6.1	7.9	1515	5.0	6.8
30760	232	10	10			301	367	0.82	301	367	0.82	1515	5.0	6.8	1493	4.3	6.1
30761	250	10	10			431	565	0.76	433	565	0.77	1493	4.3	6.1	1494	3.3	5.1
30762	148	10	10			430	637	0.68	509	636	0.80	1545	4.8	7.8	1492	4.6	7.8
30763	391	15	15			1,900	2,053	0.93	1,884	2,053	0.92	1547	0.0	0.0	1546	0.0	0.0
30764	261	15	15			1,997	2,249	0.89	2,256	2,249	1.00	1548	0.0	0.0	1547	0.0	0.0
30765	16	12	15	12	2036	7,631	2,190	3.48	5,753	3,970	1.45	1549	0.0	0.0	1548	0.0	0.0
30766	444	12	15	12	2036	1,605	1,068	1.50	1,595	1,936	0.82	1550	6.7	0.0	1549	0.0	0.0
30767	83	10	15	8	Existing	644	614	1.05	832	1,810	0.46	1551	3.3	0.0	1499	3.3	0.0
30768	282	10	15	8	Existing	624	609	1.03	801	1,797	0.45	1552	1.6	0.0	1551	3.3	0.0
30769	397	8	8			87	546	0.16	87	547	0.16	1501	0.0	0.0	1552	1.6	0.0
30770	65	8	8			1	278	0.00	1	279	0.00	1504	0.0	0.0	1501	0.0	0.0
30771	318	8	8			1	286	0.00	1	286	0.00	1553	0.0	0.0	1504	0.0	0.0
30772	315	8	8			1	286	0.00	1	287	0.00	1503	0.0	0.0	1553	0.0	0.0
30773	400	10	15	8	Existing	560	434	1.29	715	1,279	0.56	1496	1.2	0.0	1552	1.6	0.0
30774	252	6	6			1	107	0.01	1	107	0.01	7445	0.0	0.0	1554	0.0	0.0
30775	274	8	8			1	240	0.00	1	240	0.00	1554	0.0	0.0	1555	0.0	0.0
30776	227	8	8			81	241	0.34	81	242	0.34	1555	0.0	0.0	1556	0.0	0.0
30777	100	6	6			1	151	0.00	1	151	0.00	1498	0.0	0.0	1557	0.0	0.0
30778	285	8	8			100	352	0.28	100	353	0.28	1557	0.0	0.0	1506	0.0	0.0
30779	263	8	8			49	324	0.15	49	324	0.15	1505	0.0	0.0	1558	0.0	0.0
30780	276	8	8			102	325	0.31	102	325	0.31	1502	0.0	0.0	1559	0.0	0.0
30781	275	8	8			103	326	0.32	103	326	0.32	1559	0.0	0.0	1506	0.0	0.0
30782	291	8	8			203	326	0.62	203	326	0.62	1506	0.0	0.0	7446	0.0	0.0
30783	363	12	12			893	1,038	0.86	885	1,038	0.85	1507	3.8	0.0	1560	5.0	0.0
30784	348	12	12			894	1,197	0.75	888	1,197	0.74	1560	5.0	0.0	1508	5.5	0.0
30785	339	12	15	12	2036	1,294	1,092	1.19	1,287	1,979	0.65	1508	5.5	0.0	6990	5.6	0.0
30786	233	8	8			6	391	0.01	1	392	0.00	1561	0.0	0.0	6990	5.6	0.0
30787	184	12	12			628	1,676	0.38	625	1,676	0.37	1562	0.0	0.0	1507	3.8	0.0
30788	66	12	12			591	1,682	0.35	591	1,682	0.35	7221	0.0	0.0	1562	0.0	0.0
30789	220	12	12			588	1,663	0.35	588	1,663	0.35	7449	0.0	0.0	1563	0.0	0.0
30790	230	12	12			586	1,961	0.30	586	1,961	0.30	1564	0.0	0.0	7449	0.0	0.0
30791	178	12	12			575	1,728	0.33	575	1,728	0.33	1565	0.0	0.0	1564	0.0	0.0
30792	227	6	6			5	202	0.02	5	202	0.02	1538	0.0	0.0	7220	0.0	0.0
30793	150	6	6			3	203	0.02	3	203	0.02	7447	0.0	0.0	1538	0.0	0.0
30794	236	6	6			1	202	0.01	1	202	0.01	1490	0.0	0.0	7447	0.0	0.0
30795	300	6	6			3	195	0.02	3	195	0.02	1537	0.0	0.0	6992	0.0	0.0
30796	300	6	6			1	195	0.01	1	195	0.01	1491	0.0	0.0	1537	0.0	0.0
30797	355	8	8			374	642	0.58	373	642	0.58	6992	0.0	0.0	1508	5.5	0.0
30798	337	6	6			31	194	0.16	31	194	0.16	7219	0.0	0.0	1535	0.0	0.0
30799	338	6	6			1	193	0.01	1	193	0.01	1536	0.0	0.0	7219	0.0	0.0
30800	330	8	8			238	508	0.47	238	508	0.47	1534	0.0	0.0	1535	0.0	0.0
30801	341	6	6			30	157	0.19	30	157	0.19	1533	0.0	0.0	1534	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30802	351	6	6			1	152	0.01	1	152	0.01	1532	0.0	0.0	1533	0.0	0.0
30803	190	8	8			206	516	0.40	206	517	0.40	1529	0.0	0.0	1534	0.0	0.0
30804	138	8	8			205	510	0.40	205	510	0.40	1530	0.0	0.0	1529	0.0	0.0
30805	321	6	6			1	159	0.01	1	159	0.01	1531	0.0	0.0	1566	0.0	0.0
30806	345	6	6			3	248	0.01	3	248	0.01	1518	0.0	0.0	1548	0.0	0.0
30807	240	6	6			1	237	0.01	1	237	0.01	1519	0.0	0.0	1518	0.0	0.0
30808	355	8	8			210	451	0.47	210	451	0.47	7165	0.0	0.0	1524	0.0	0.0
30809	340	6	6			3	158	0.02	3	158	0.02	1520	0.0	0.0	7165	0.0	0.0
30810	344	6	6			1	159	0.01	1	159	0.01	1567	0.0	0.0	1520	0.0	0.0
30811	361	6	6			28	485	0.06	28	485	0.06	1522	0.0	0.0	1523	0.0	0.0
30812	315	6	6			1	159	0.01	1	159	0.01	1521	0.0	0.0	1522	0.0	0.0
30813	19	8	8			3	482	0.01	3	483	0.01	6991	0.0	0.0	1523	0.0	0.0
30814	270	8	8			1	460	0.00	1	460	0.00	1528	0.0	0.0	6991	0.0	0.0
30815	326	8	8			126	387	0.32	125	388	0.32	1525	0.0	0.0	1546	0.0	0.0
30816	350	8	8			124	372	0.33	124	372	0.33	1568	0.0	0.0	1525	0.0	0.0
30817	337	8	8			66	402	0.16	66	402	0.16	1526	0.0	0.0	1568	0.0	0.0
30818	320	8	8			322	576	0.56	322	577	0.56	1574	0.0	0.0	7220	0.0	0.0
30829	284	8	8			352	301	1.17	353	302	1.17	1604	2.2	0.0	1588	1.8	0.0
30832	310	10	15	8	Existing	578	508	1.14	657	1,496	0.44	1594	0.0	0.0	1600	0.0	0.0
30833	193	10	12	9	Existing	654	407	1.61	656	661	0.99	1590	0.6	0.0	1594	0.0	0.0
30834	305	10	12	9	Existing	556	542	1.03	558	881	0.63	1587	1.4	0.0	1590	0.6	0.0
30835	256	8	12	9	Existing	352	261	1.35	353	770	0.46	1588	1.8	0.0	1587	1.4	0.0
30836	35	8	8			204	349	0.58	204	350	0.58	1586	1.0	0.0	1587	1.4	0.0
30837	440	8	8			203	336	0.61	203	337	0.60	1642	4.4	0.0	1586	1.0	0.0
30838	335	6	6			8	133	0.06	2	133	0.02	1614	0.0	0.0	1642	4.4	0.0
30839	338	6	6			1	145	0.01	1	145	0.01	6994	0.0	0.0	1614	0.0	0.0
30840	137	6	6			1	208	0.01	1	208	0.01	1634	0.0	0.0	6994	0.0	0.0
30841	276	6	6			1	184	0.00	1	184	0.00	7657	0.0	0.0	1615	7.3	0.0
30842	370	6	6			47	174	0.27	47	174	0.27	1641	0.0	0.0	1615	7.3	0.0
30843	310	6	6			47	176	0.26	47	176	0.26	1585	0.0	0.0	1641	0.0	0.0
30844	83	6	6			47	454	0.10	47	454	0.10	1640	0.0	0.0	1585	0.0	0.0
30845	278	6	6			46	242	0.19	46	242	0.19	1639	0.0	0.0	1640	0.0	0.0
30846	228	6	6			98	231	0.42	98	231	0.42	7450	1.2	0.0	1590	0.6	0.0
30847	235	6	6			98	203	0.48	98	203	0.48	1593	3.8	0.0	7450	1.2	0.0
30848	225	6	6			1	205	0.01	1	205	0.01	1591	0.0	0.0	1593	3.8	0.0
30849	223	6	6			1	205	0.00	1	205	0.00	1643	0.0	0.0	1596	0.0	0.0
30850	288	6	6			68	242	0.28	57	242	0.23	1595	3.4	0.0	1600	0.0	0.0
30851	209	6	6			1	219	0.01	1	219	0.01	1592	0.0	0.0	1601	5.4	0.0
30852	175	8	8			1	290	0.00	1	291	0.00	1644	0.0	0.0	1592	0.0	0.0
30853	69	8	8			1	271	0.00	1	271	0.00	1658	0.0	0.0	1644	0.0	0.0
30854	302	12	12			264	1,327	0.20	258	1,327	0.19	1599	0.0	0.0	1602	3.8	0.0
30855	345	12	12			198	1,037	0.19	198	1,037	0.19	1598	0.0	0.0	1599	0.0	0.0
30856	335	8	8			228	309	0.74	228	310	0.74	7451	3.8	0.0	1589	3.4	9.8
30857	300	8	8			75	312	0.24	69	312	0.22	1606	1.5	0.0	1645	0.3	0.0
30858	305	8	8			74	393	0.19	69	394	0.18	1605	4.6	0.0	1606	1.5	0.0
30859	300	8	8			69	438	0.16	69	438	0.16	7222	0.0	0.0	1605	4.6	0.0
30860	274	8	8			69	763	0.09	69	763	0.09	1646	0.0	0.0	7222	0.0	0.0
30861	125	8	8			28	344	0.08	28	344	0.08	1617	0.0	0.0	1646	0.0	0.0
30862	175	8	8			28	278	0.10	28	279	0.10	1584	0.0	0.0	1617	0.0	0.0
30863	300	8	8			89	683	0.13	89	684	0.13	1610	0.0	0.0	7451	3.8	0.0
30864	305	8	8			89	400	0.22	89	400	0.22	1609	0.0	0.0	1610	0.0	0.0
30865	300	8	8			39	494	0.08	39	495	0.08	1608	0.0	0.0	1609	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30866	271	8	8			38	504	0.08	38	505	0.08	1607	0.0	0.0	1608	0.0	0.0
30867	150	8	8			38	548	0.07	38	549	0.07	1626	0.0	0.0	1607	0.0	0.0
30868	270	8	8			124	836	0.15	124	837	0.15	1613	0.0	0.0	1589	3.4	9.8
30869	255	8	8			80	420	0.19	80	421	0.19	1612	0.0	0.0	1613	0.0	0.0
30870	220	8	8			31	458	0.07	31	459	0.07	1619	0.0	0.0	1618	0.0	0.0
30871	330	8	8			31	574	0.05	31	575	0.05	1648	0.0	0.0	1619	0.0	0.0
30872	445	8	8			38	540	0.07	38	541	0.07	1647	0.0	0.0	1626	0.0	0.0
30873	278	8	8			28	310	0.09	28	311	0.09	7166	0.0	0.0	1584	0.0	0.0
30874	307	8	8			1	310	0.00	1	310	0.00	1620	0.0	0.0	7166	0.0	0.0
30875	133	12	12			126	1,886	0.07	126	1,886	0.07	1630	0.0	0.0	1631	0.0	0.0
30876	325	12	12			90	687	0.13	90	687	0.13	6995	0.0	0.0	1630	0.0	0.0
30877	266	8	8			60	342	0.18	60	343	0.18	1625	0.0	0.0	6995	0.0	0.0
30878	231	8	8			1	344	0.00	1	344	0.00	1622	0.0	0.0	1625	0.0	0.0
30879	365	8	8			1	340	0.00	1	340	0.00	7223	0.0	0.0	1629	0.0	0.0
30880	355	8	8			28	590	0.05	28	591	0.05	1628	0.0	0.0	6995	0.0	0.0
30881	380	8	8			1	594	0.00	1	595	0.00	1627	0.0	0.0	1628	0.0	0.0
30882	400	8	8			35	542	0.06	35	543	0.06	1624	0.0	0.0	1625	0.0	0.0
30883	30	8	8			19	383	0.05	19	384	0.05	1649	0.0	0.0	1624	0.0	0.0
30884	219	8	8			16	249	0.06	16	249	0.06	10082	0.0	0.0	1650	0.0	0.0
30885	289	6	6			46	242	0.19	46	242	0.19	1657	0.0	0.0	1639	0.0	0.0
30886	275	12	12			197	1,011	0.19	197	1,011	0.19	1651	0.0	0.0	1598	0.0	0.0
30887	286	12	12			195	1,027	0.19	195	1,027	0.19	1637	0.0	0.0	1651	0.0	0.0
30888	14	12	12			194	1,481	0.13	194	1,481	0.13	1638	0.0	0.0	1637	0.0	0.0
30889	159	12	12			192	1,217	0.16	192	1,217	0.16	1652	0.0	0.0	1638	0.0	0.0
30890	165	12	12			129	2,567	0.05	129	2,567	0.05	1633	0.0	0.0	1652	0.0	0.0
30891	300	12	12			128	2,483	0.05	128	2,483	0.05	1631	0.0	0.0	1633	0.0	0.0
30892	24	6	6			48	230	0.21	48	230	0.21	7452	0.0	0.0	1652	0.0	0.0
30893	348	6	6			46	259	0.18	46	259	0.18	7224	0.0	0.0	7452	0.0	0.0
30894	312	6	6			15	256	0.06	15	256	0.06	1656	0.0	0.0	7224	0.0	0.0
30895	318	6	6			29	251	0.12	29	251	0.12	1632	0.0	0.0	7224	0.0	0.0
30896	320	6	6			14	192	0.07	14	192	0.07	1581	0.0	0.0	1632	0.0	0.0
30897	300	6	6			14	195	0.07	14	195	0.07	1582	0.0	0.0	1632	0.0	0.0
30898	275	8	8			1	447	0.00	1	448	0.00	1635	0.0	0.0	1634	0.0	0.0
30899	275	6	6			1	207	0.00	1	207	0.00	1636	0.0	0.0	1635	0.0	0.0
30900	360	6	6			25	275	0.09	25	275	0.09	1603	0.0	0.0	1653	0.0	0.0
30901	160	6	6			1	252	0.01	1	252	0.01	1580	0.0	0.0	1655	0.0	0.0
30902	285	8	8			19	381	0.05	19	382	0.05	1654	0.0	0.0	7453	0.0	0.0
30904	266	6	6			44	142	0.31	40	142	0.28	1672	4.6	4.8	1674	4.5	4.9
30905	290	6	6			40	142	0.28	27	142	0.19	1671	0.0	0.0	1672	4.6	4.8
30906	215	6	6			92	144	0.64	42	144	0.29	1671	0.0	0.0	1675	0.0	0.0
30907	176	8	8			85	242	0.35	85	242	0.35	1676	0.0	0.0	1675	0.0	0.0
30908	175	8	8			84	240	0.35	84	240	0.35	1690	0.0	0.0	1676	0.0	0.0
30909	420	8	8			44	410	0.11	44	411	0.11	1702	0.0	0.0	1690	0.0	0.0
30910	174	6	6			44	139	0.32	44	139	0.32	7658	0.0	0.0	1702	0.0	0.0
30912	518	8	8			238	274	0.87	238	274	0.87	1677	5.6	0.0	6996	1.7	0.0
30913	428	8	8			238	274	0.87	238	275	0.86	1691	5.0	0.0	1677	5.6	0.0
30914	282	8	8			192	526	0.37	192	526	0.37	7455	0.0	0.0	1703	3.8	0.0
30915	92	8	8			192	520	0.37	192	521	0.37	1704	0.0	0.0	7455	0.0	0.0
30916	257	6	6			117	156	0.75	117	156	0.75	1678	5.8	0.0	1705	3.5	0.0
30917	432	6	6			1	231	0.00	1	231	0.00	1706	0.0	0.0	1678	5.8	0.0
30918	220	8	8			40	242	0.16	40	242	0.16	6998	0.0	0.0	1690	0.0	0.0
30919	222	8	8			39	240	0.16	39	240	0.16	1707	0.0	0.0	6998	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30921	47	6	6			166	205	0.81	166	205	0.81	1673	4.3	4.6	1674	4.5	4.9
30922	275	8	8			45	442	0.10	43	443	0.10	1689	0.0	0.0	1673	4.3	4.6
30923	235	8	8			43	442	0.10	43	442	0.10	1692	0.0	0.0	1689	0.0	0.0
30924	158	8	8			44	253	0.17	35	253	0.14	1708	1.5	0.0	1710	1.5	0.0
30925	64	6	6			1	328	0.00	1	328	0.00	1727	0.0	0.0	1707	0.0	0.0
30926	80	6	6			1	219	0.00	1	219	0.00	1724	0.0	0.0	1707	0.0	0.0
30927	325	6	6			122	239	0.51	122	239	0.51	1670	0.0	0.0	1673	4.3	4.6
30928	317	6	6			65	242	0.27	65	242	0.27	7225	0.0	0.0	1670	0.0	0.0
30929	280	6	6			64	147	0.44	64	147	0.44	1682	0.0	0.0	1681	0.0	0.0
30930	288	6	6			57	218	0.26	57	218	0.26	7454	0.0	0.0	1670	0.0	0.0
30931	198	8	8			192	482	0.40	192	483	0.40	6997	0.0	0.0	1704	0.0	0.0
30932	162	8	8			93	481	0.19	93	482	0.19	1686	0.0	0.0	6997	0.0	0.0
30933	315	8	8			92	556	0.17	92	556	0.17	1711	0.0	0.0	1686	0.0	0.0
30934	300	8	8			92	310	0.30	92	310	0.30	1688	0.0	0.0	1711	0.0	0.0
30935	57	8	8			90	309	0.29	90	309	0.29	1687	0.0	0.0	1688	0.0	0.0
30936	133	8	8			90	331	0.27	90	331	0.27	1698	0.0	0.0	1687	0.0	0.0
30937	215	6	6			1	210	0.00	1	210	0.00	1700	0.0	0.0	1698	0.0	0.0
30938	137	6	6			1	210	0.00	1	210	0.00	1662	0.0	0.0	1700	0.0	0.0
30939	35	8	8			1	428	0.00	1	428	0.00	1712	0.0	0.0	1688	0.0	0.0
30940	170	6	6			2	139	0.02	2	139	0.02	1713	0.0	0.0	1698	0.0	0.0
30941	70	6	6			1	144	0.00	1	144	0.00	1663	0.0	0.0	1713	0.0	0.0
30942	175	6	6			1	145	0.01	1	145	0.01	1714	0.0	0.0	1713	0.0	0.0
30943	175	6	6			1	144	0.01	1	144	0.01	1699	0.0	0.0	1714	0.0	0.0
30944	60	6	6			1	144	0.00	1	144	0.00	1664	0.0	0.0	1699	0.0	0.0
30945	60	6	6			1	144	0.00	1	144	0.00	1665	0.0	0.0	1699	0.0	0.0
30946	180	6	6			1	171	0.00	1	171	0.00	1666	0.0	0.0	1704	0.0	0.0
30948	130	8	8			1	606	0.00	1	607	0.00	1694	0.0	0.0	1695	0.0	0.0
30949	160	8	8			1	356	0.00	1	356	0.00	1695	0.0	0.0	1696	0.0	0.0
30950	90	6	6			1	144	0.00	1	144	0.00	7226	0.0	0.0	1715	0.0	0.0
30951	328	6	6			69	233	0.30	69	233	0.30	7386	0.0	0.0	1678	5.8	0.0
30952	320	6	6			69	165	0.42	69	165	0.42	1667	0.0	0.0	7167	0.0	0.0
30953	373	6	6			1	144	0.00	1	144	0.00	1668	0.0	0.0	1717	0.0	0.0
30954	270	8	8			2	267	0.01	2	267	0.01	1696	0.0	0.0	1697	0.0	0.0
30955	231	8	8			3	311	0.01	1	311	0.00	1719	0.0	0.0	1718	3.2	0.0
30956	372	6	6			1	144	0.00	1	144	0.00	1720	0.0	0.0	1719	0.0	0.0
30957	300	6	6			47	172	0.27	47	172	0.27	1721	0.0	0.0	1679	0.0	0.0
30958	300	6	6			1	172	0.00	1	172	0.00	6999	0.0	0.0	1721	0.0	0.0
30959	210	8	8			57	454	0.13	57	455	0.13	1701	0.0	0.0	1731	0.0	0.0
30960	180	8	8			56	313	0.18	56	314	0.18	1722	0.0	0.0	1701	0.0	0.0
30961	181	8	8			1	310	0.00	1	311	0.00	1715	0.0	0.0	1722	0.0	0.0
30962	20	8	8			1	278	0.00	1	279	0.00	1728	0.0	0.0	1694	0.0	0.0
30963	20	8	8			1	278	0.00	1	279	0.00	1729	0.0	0.0	1694	0.0	0.0
30964	316	8	8			141	290	0.49	141	290	0.49	1679	0.0	0.0	1718	3.2	0.0
30965	94	6	6			45	144	0.31	1	144	0.00	1730	1.5	0.0	1708	1.5	0.0
30966	65	6	6			1	139	0.01	1	139	0.01	10797	0.0	0.0	1684	0.0	0.0
30967	97	6	6			1	147	0.00	1	147	0.00	11203	0.0	0.0	1706	0.0	0.0
30969	72	6	6			10	144	0.07	1	144	0.00	1840	1.0	7.1	1768	0.1	0.0
30970	105	6	6			1	126	0.01	1	126	0.01	1842	0.0	0.0	1734	0.0	0.0
30971	100	8	8			194	465	0.42	0	465	0.00	1826	0.8	0.0	1769	0.6	0.0
30972	339	6	6			180	146	1.23	1	146	0.00	1783	1.6	0.0	7456	0.9	0.0
30973	170	8	8			117	363	0.32	117	363	0.32	1784	3.2	0.0	7456	0.9	0.0
30974	421	8	8			90	265	0.34	89	265	0.34	1782	4.0	0.0	1784	3.2	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
30975	284	8	8			90	265	0.34	89	266	0.33	7001	4.6	0.0	1782	4.0	0.0
30976	281	8	8			88	265	0.33	88	266	0.33	1781	0.0	0.0	7001	4.6	0.0
30977	75	8	8			88	318	0.28	88	318	0.28	1780	0.0	0.0	1781	0.0	0.0
30978	138	6	6			1	123	0.01	1	123	0.01	1734	0.0	0.0	1780	0.0	0.0
30979	328	8	8			28	369	0.08	28	369	0.08	1804	0.0	0.0	1780	0.0	0.0
30980	130	8	8			1	369	0.00	1	369	0.00	7659	0.0	0.0	1804	0.0	0.0
30981	159	8	8			1	185	0.00	1	185	0.00	1737	0.0	0.0	1804	0.0	0.0
30982	437	8	12	7	Existing	351	275	1.28	585	810	0.72	7457	1.6	0.0	1777	2.2	7.1
30983	263	8	12	7	Existing	349	273	1.28	585	805	0.73	10798	2.2	0.0	7457	1.6	0.0
30984	360	8	8			190	270	0.70	300	270	1.11	1779	0.0	3.7	7128	2.2	0.0
30985	285	6	12	7	Existing	176	156	1.13	284	985	0.29	1796	1.5	0.0	10798	2.2	0.0
30986	235	6	12	7	Existing	140	129	1.09	234	822	0.28	1805	0.1	0.0	1796	1.5	0.0
30987	175	6	6			40	112	0.36	1	112	0.01	1808	1.5	0.0	1807	2.7	0.0
30988	250	6	6			40	112	0.36	1	112	0.01	1795	3.4	0.0	1808	1.5	0.0
30989	265	6	6			31	113	0.28	1	113	0.01	1809	3.2	0.0	1795	3.4	0.0
30990	183	8	8			142	347	0.41	142	347	0.41	1807	2.7	0.0	1797	1.6	0.0
30991	263	6	6			22	155	0.14	1	155	0.00	1753	3.6	0.0	1796	1.5	0.0
30992	155	8	8			70	391	0.18	69	392	0.18	1798	4.4	0.0	1807	2.7	0.0
30993	286	6	6			69	147	0.47	69	147	0.47	1849	5.1	0.0	1798	4.4	0.0
30994	81	6	6			69	147	0.47	69	147	0.47	1810	5.0	0.0	1849	5.1	0.0
30995	193	6	6			1	156	0.00	1	156	0.00	1811	0.0	0.0	7458	0.0	0.0
30996	197	6	6			1	154	0.00	1	154	0.00	1738	0.0	0.0	1811	0.0	0.0
30997	100	6	6			1	185	0.00	1	185	0.00	1740	0.0	0.0	7458	0.0	0.0
30998	139	20	20			1,109	3,626	0.31	1,333	3,628	0.37	1803	2.3	0.0	1812	2.3	0.0
30999	196	12	15	8	Existing	1,043	1,122	0.93	1,273	2,033	0.63	1813	1.1	0.0	1803	2.3	0.0
31000	360	10	10			380	533	0.71	379	532	0.71	1799	1.4	0.0	1813	1.1	0.0
31001	457	10	10			253	468	0.54	253	468	0.54	1800	1.4	0.0	7228	1.2	0.0
31002	300	6	6			8	167	0.05	1	167	0.00	1815	2.5	0.0	1800	1.4	0.0
31003	304	6	6			1	174	0.00	1	174	0.00	7168	0.0	0.0	1815	2.5	0.0
31004	319	8	8			67	341	0.20	65	342	0.19	1816	3.8	0.0	7228	1.2	0.0
31005	262	8	8			5	341	0.01	1	342	0.00	7459	0.0	0.0	1816	3.8	0.0
31006	283	8	8			81	353	0.23	1	354	0.00	1817	3.5	0.0	1799	1.4	0.0
31007	287	8	8			11	352	0.03	1	352	0.00	1818	6.1	0.0	1817	3.5	0.0
31008	268	10	15	8	Existing	632	673	0.94	833	1,983	0.42	1819	2.5	0.0	1813	1.1	0.0
31009	266	10	15	8	Existing	650	608	1.07	833	1,792	0.46	7460	3.2	0.0	1819	2.5	0.0
31010	85	6	6			60	251	0.24	59	251	0.23	1802	4.3	0.0	1803	2.3	0.0
31011	317	6	6			59	248	0.24	59	248	0.24	1820	0.0	0.0	1802	4.3	0.0
31013	31	6	6			8	335	0.02	1	335	0.00	1822	7.9	0.0	1821	7.2	0.0
31014	126	10	18	5	Existing	679	644	1.05	2,069	3,090	0.67	1759	7.6	0.0	1821	7.2	0.0
31015	150	15	18	5	Existing	1,554	1,835	0.85	2,568	2,984	0.86	1823	7.5	0.0	1759	7.6	0.0
31017	185	12	18	5	Existing	1,514	1,047	1.45	2,530	3,085	0.82	1773	1.7	0.0	10799	4.8	0.0
31018	144	12	18	5	Existing	1,397	1,230	1.14	2,390	3,626	0.66	1768	0.1	0.0	1773	1.7	0.0
31019	128	12	18	5	Existing	1,395	1,226	1.14	2,390	3,615	0.66	1769	0.6	0.0	1768	0.1	0.0
31020	285	12	12			1,056	1,219	0.87	930	1,219	0.76	1778	1.4	0.0	1769	0.6	0.0
31021	239	6	6			180	145	1.24	0	145	0.00	1826	0.8	0.0	1783	1.6	0.0
31022	380	12	18	5	Existing	588	754	0.78	1,459	2,224	0.66	1771	2.5	0.0	1769	0.6	0.0
31023	358	8	18	5	Existing	573	341	1.68	1,458	2,962	0.49	1827	0.0	0.0	1771	2.5	0.0
31024	381	8	8			76	278	0.27	60	278	0.22	1772	4.7	0.0	1773	1.7	0.0
31025	362	8	8			76	278	0.27	60	278	0.21	1757	5.5	0.0	1772	4.7	0.0
31026	340	8	8			35	280	0.13	1	280	0.00	1756	7.5	0.0	1757	5.5	0.0
31027	380	10	10			696	651	1.07	225	650	0.35	1770	0.0	0.0	1778	1.4	0.0
31028	360	10	10			535	747	0.72	0	747	0.00	1828	1.5	0.0	1770	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31030	50	12	12			441	881	0.50	249	881	0.28	1763	6.3	0.0	1762	6.3	0.0
31031	133	12	12			875	195	4.48	499	195	2.56	1759	7.6	0.0	1763	6.3	0.0
31032	291	6	6			28	128	0.22	1	128	0.01	1743	4.1	0.0	1797	1.6	0.0
31033	447	8	8			49	340	0.14	1	340	0.00	1830	1.0	0.0	1827	0.0	0.0
31034	292	8	8			1	689	0.00	1	690	0.00	1746	0.0	0.0	1755	0.0	0.0
31035	131	12	12			134	1,169	0.11	134	1,169	0.11	1767	0.0	0.0	1755	0.0	0.0
31036	283	12	15	5	Existing	1,144	1,051	1.09	1,381	1,905	0.73	7227	1.7	0.0	1828	1.5	0.0
31037	145	12	15	5	Existing	1,098	1,046	1.05	1,334	1,897	0.70	1831	1.9	0.0	7227	1.7	0.0
31038	137	12	15	5	Existing	1,097	1,047	1.05	1,333	1,899	0.70	1812	2.3	0.0	1831	1.9	0.0
31039	290	6	6			42	209	0.20	1	209	0.00	1747	5.1	0.0	1831	1.9	0.0
31040	442	6	6			56	148	0.38	1	148	0.00	1748	4.0	0.0	7227	1.7	0.0
31042	142	12	12			4	865	0.00	4	865	0.00	1792	0.0	0.0	1765	0.0	0.0
31043	172	6	6			1	159	0.00	1	159	0.00	1750	0.0	0.0	1793	0.0	0.0
31044	133	10	10			3	523	0.01	3	522	0.01	1791	0.0	0.0	1792	0.0	0.0
31045	11	12	12			2	1,662	0.00	2	1,662	0.00	1754	0.0	0.0	1791	0.0	0.0
31046	145	8	8			1	276	0.01	1	276	0.01	1832	0.0	0.0	1754	0.0	0.0
31047	231	8	8			1	276	0.00	1	277	0.00	7229	0.0	0.0	1832	0.0	0.0
31048	180	6	6			1	144	0.00	1	144	0.00	1751	0.0	0.0	1790	0.0	0.0
31049	278	8	8			109	524	0.21	109	525	0.21	1835	0.0	0.0	1833	0.0	0.0
31050	166	8	8			1	484	0.00	1	484	0.00	10781	0.0	0.0	1754	0.0	0.0
31051	424	8	8			108	351	0.31	108	352	0.31	1790	0.0	0.0	1835	0.0	0.0
31052	189	8	8			1	401	0.00	1	401	0.00	1838	0.0	0.0	1837	0.0	0.0
31053	55	10	10			304	506	0.60	317	505	0.63	1761	6.2	8.1	1762	6.3	0.0
31054	160	10	10			307	322	0.95	316	322	0.98	1788	3.8	0.0	1787	5.5	0.0
31055	96	12	15	4	Existing	543	663	0.82	812	1,202	0.68	1760	6.1	0.0	1762	6.3	0.0
31056	136	12	15	4	Existing	540	659	0.82	811	1,195	0.68	1786	5.3	0.0	1760	6.1	0.0
31057	150	12	15	4	Existing	456	645	0.71	710	1,170	0.61	1789	3.7	0.0	1786	5.3	0.0
31058	8	12	12			320	919	0.35	316	919	0.34	1788	3.8	0.0	1789	3.7	0.0
31060	3	8	8			1	360	0.00	1	360	0.00	1847	0.0	0.0	7461	0.0	0.0
31071	143	6	6			31	308	0.10	1	308	0.00	1886	2.7	0.0	1889	2.5	0.0
31073	241	8	8			368	369	1.00	368	370	0.99	1900	0.0	0.0	1864	0.0	0.0
31074	415	6	6			72	278	0.26	72	278	0.26	1878	0.0	0.0	1900	0.0	0.0
31075	106	6	6			1	331	0.00	1	331	0.00	7660	0.0	0.0	7169	0.0	0.0
31076	40	8	8			295	321	0.92	295	321	0.92	1901	0.0	0.0	1900	0.0	0.0
31077	313	8	8			294	403	0.73	294	404	0.73	1868	0.0	0.0	1901	0.0	0.0
31078	89	8	8			1	402	0.00	1	403	0.00	1940	0.0	0.0	1868	0.0	0.0
31080	414	8	8			224	452	0.49	224	453	0.49	1902	0.0	0.0	1868	0.0	0.0
31081	300	8	8			141	453	0.31	141	454	0.31	7230	0.0	0.0	1902	0.0	0.0
31082	245	8	8			140	451	0.31	140	451	0.31	1903	0.0	0.0	7230	0.0	0.0
31083	430	8	8			1	579	0.00	1	580	0.00	7004	0.0	0.0	1903	0.0	0.0
31084	300	8	8			1	449	0.00	1	449	0.00	1904	0.0	0.0	1903	0.0	0.0
31085	350	6	6			70	182	0.39	70	182	0.39	1905	0.0	0.0	1868	0.0	0.0
31086	203	6	6			2	259	0.01	2	259	0.01	7464	0.0	0.0	1906	0.0	0.0
31087	300	6	6			1	266	0.01	1	266	0.01	1876	0.0	0.0	7464	0.0	0.0
31088	104	6	6			1	228	0.00	1	228	0.00	1939	0.0	0.0	1876	0.0	0.0
31089	347	6	6			3	258	0.01	2	258	0.01	1870	0.0	0.0	7002	2.9	0.0
31090	350	6	6			1	256	0.01	1	256	0.01	1907	0.0	0.0	1870	0.0	0.0
31091	128	6	6			1	241	0.00	1	241	0.00	1855	0.0	0.0	1907	0.0	0.0
31092	504	8	15	2	Existing	557	392	1.42	1,015	2,093	0.49	1880	0.0	0.0	1871	0.7	0.0
31093	308	8	8			30	331	0.09	30	331	0.09	1877	0.0	0.0	1908	0.0	0.0
31094	114	6	6			1	251	0.00	1	251	0.00	1910	0.0	0.0	1877	0.0	0.0
31095	284	6	6			1	149	0.00	1	149	0.00	1856	0.0	0.0	1908	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31097	45	8	15	2	Existing	644	394	1.64	1,182	2,106	0.56	1913	1.0	0.0	1872	1.2	0.0
31098	470	8	15	2	Existing	643	402	1.60	1,182	2,150	0.55	1914	0.6	0.0	1913	1.0	0.0
31099	540	8	15	2	Existing	558	393	1.42	1,015	2,101	0.48	1871	0.7	0.0	1914	0.6	0.0
31100	146	10	10			583	822	0.71	529	821	0.64	1915	1.8	0.0	1916	0.0	0.0
31101	239	8	8			107	452	0.24	2	453	0.00	1917	2.4	0.0	1915	1.8	0.0
31102	221	8	8			101	452	0.22	1	453	0.00	1887	1.9	0.0	1917	2.4	0.0
31103	235	6	6			49	211	0.23	1	211	0.00	1918	5.0	0.0	1887	1.9	0.0
31104	309	8	8			214	642	0.33	68	643	0.11	1920	2.7	0.0	1919	0.0	0.0
31105	133	10	10			348	781	0.45	529	780	0.68	1916	0.0	0.0	1919	0.0	0.0
31106	325	6	6			145	119	1.22	0	119	0.00	7463	0.0	0.0	7003	2.6	0.0
31108	276	20	20			482	2,518	0.19	684	2,519	0.27	7003	2.6	0.0	1889	2.5	0.0
31109	237	12	12			576	814	0.71	777	814	0.95	1889	2.5	0.0	1890	1.1	0.0
31110	444	12	12			574	783	0.73	778	783	0.99	1890	1.1	0.0	1891	0.0	0.0
31111	143	10	15	4	Existing	656	372	1.76	897	1,097	0.82	1892	0.6	0.0	1893	2.6	0.0
31112	372	6	6			103	133	0.78	1	133	0.01	1921	0.0	0.0	1892	0.6	0.0
31113	156	10	10			480	756	0.63	597	756	0.79	1919	0.0	0.0	1922	1.1	0.0
31114	280	10	10			480	780	0.62	598	780	0.77	1922	1.1	0.0	1874	3.4	0.0
31115	81	10	15	2	Existing	498	785	0.63	796	2,316	0.34	1874	3.4	0.0	1866	4.0	0.0
31118	143	6	6			3	232	0.01	3	232	0.01	1885	0.0	0.0	1850	0.0	0.0
31119	113	6	6			1	217	0.01	1	217	0.01	1851	0.0	0.0	1885	0.0	0.0
31120	58	6	6			1	214	0.00	1	214	0.00	1938	0.0	0.0	1885	0.0	0.0
31121	175	10	15	2	Existing	513	776	0.66	833	2,288	0.36	1866	4.0	0.0	7462	4.2	0.0
31122	175	10	15	2	Existing	516	776	0.67	833	2,288	0.36	7462	4.2	0.0	1898	3.2	0.0
31123	225	10	15	2	Existing	585	778	0.75	939	2,296	0.41	1898	3.2	0.0	1875	2.8	0.0
31124	273	8	8			69	905	0.08	47	906	0.05	1923	4.5	0.0	1898	3.2	0.0
31125	290	6	6			1	296	0.00	1	296	0.00	1896	0.0	0.0	1923	4.5	0.0
31126	286	8	8			46	572	0.08	46	573	0.08	1897	0.0	0.0	1923	4.5	0.0
31127	289	6	6			1	297	0.00	1	297	0.00	1895	0.0	0.0	1897	0.0	0.0
31128	175	8	8			1	576	0.00	1	576	0.00	1924	0.0	0.0	1897	0.0	0.0
31129	595	8	8			67	392	0.17	1	393	0.00	1881	1.8	0.0	1880	0.0	0.0
31130	397	8	8			1	456	0.00	1	457	0.00	1879	0.0	0.0	1904	0.0	0.0
31131	17	6	6			1	217	0.01	1	217	0.01	1937	0.0	0.0	1925	0.0	0.0
31132	21	6	6			1	206	0.01	1	206	0.01	1936	0.0	0.0	1925	0.0	0.0
31133	274	8	8			48	664	0.07	47	665	0.07	1927	0.0	0.0	1863	7.3	0.0
31134	6	6	6			1	903	0.00	1	903	0.00	8661	0.0	0.0	1927	0.0	0.0
31135	100	10	15	4	Existing	753	452	1.67	1,025	1,333	0.77	7465	5.8	0.0	1894	6.6	0.0
31136	274	10	15	4	Existing	753	377	2.00	1,024	1,112	0.92	1893	2.6	0.0	1928	5.7	0.0
31137	96	8	8			1	444	0.00	1	444	0.00	1861	0.0	0.0	1877	0.0	0.0
31138	260	8	8			1	664	0.00	1	665	0.00	1929	0.0	0.0	1877	0.0	0.0
31140	150	6	6			2	512	0.00	2	512	0.00	1967	0.0	0.0	1966	2.2	0.0
31141	250	6	6			1	188	0.01	1	188	0.01	1946	0.0	0.0	1967	0.0	0.0
31142	280	6	6			1	298	0.00	1	298	0.00	1963	0.0	0.0	1946	0.0	0.0
31143	66	10	10			507	1,051	0.48	467	1,050	0.45	1945	3.4	0.0	1968	3.4	0.0
31144	124	10	10			215	643	0.33	172	642	0.27	1966	2.2	0.0	1945	3.4	0.0
31145	126	10	10			202	822	0.25	169	821	0.21	7387	1.6	0.0	1966	2.2	0.0
31146	192	8	8			286	408	0.70	229	409	0.56	1944	1.2	0.0	1945	3.4	0.0
31147	117	6	6			168	344	0.49	168	344	0.49	1971	0.0	0.0	1965	5.6	0.0
31148	414	6	6			166	353	0.47	166	353	0.47	7466	0.0	0.0	1971	0.0	0.0
31150	475	8	8			208	221	0.94	208	221	0.94	7233	6.3	6.3	1977	10.2	10.2
31151	180	6	6			149	102	1.46	103	102	1.01	1953	0.0	0.0	1954	0.0	0.0
31152	6	8	8			253	844	0.30	258	845	0.30	1954	0.0	0.0	1955	0.0	0.0
31153	35	6	6			372	125	2.98	398	125	3.18	1955	0.0	0.0	1956	0.5	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31155	195	6	6			233	150	1.55	248	150	1.65	1956	0.5	0.0	1957	3.8	5.3
31156	377	10	10			390	408	0.96	446	407	1.10	1957	3.8	5.3	1961	4.2	6.2
31158	390	10	10			420	458	0.92	492	457	1.08	1961	4.2	6.2	7724	3.3	6.0
31160	451	10	10			561	526	1.07	619	525	1.18	7724	3.3	6.0	1948	1.2	0.0
31161	53	8	8			1	449	0.00	1	449	0.00	1972	0.0	0.0	1973	0.0	0.0
31162	45	8	8			210	956	0.22	210	957	0.22	1943	0.0	0.0	1973	0.0	0.0
31163	218	8	8			1	447	0.00	1	447	0.00	7232	0.0	0.0	1943	0.0	0.0
31164	430	8	8			1	337	0.00	1	337	0.00	1949	0.0	0.0	7170	8.3	8.3
31165	250	8	8			26	222	0.12	24	222	0.11	1960	4.7	4.7	7233	6.3	6.3
31166	240	8	8			1	318	0.00	1	319	0.00	1975	0.0	0.0	1952	4.6	0.0
31167	298	8	8			273	438	0.62	276	438	0.63	1959	0.0	0.0	1944	1.2	0.0
31168	40	8	8			224	641	0.35	1	642	0.00	1970	0.5	0.0	1944	1.2	0.0
31169	450	8	8			60	220	0.27	60	220	0.27	7170	8.3	8.3	7005	8.4	8.4
31177	387	16	16			2,808	2,713	1.03	3,012	2,713	1.11	9989	0.0	9.2	2026	0.0	0.0
31178	714	16	16			2,579	2,160	1.19	2,785	2,160	1.29	2016	9.0	7.3	9989	0.0	9.2
31179	259	16	16			2,579	3,169	0.81	2,785	3,169	0.88	2017	0.0	4.2	2016	9.0	7.3
31180	316	16	16			1,378	3,165	0.44	913	3,163	0.29	2003	0.0	0.0	2017	0.0	4.2
31181	129	30	30			4,567	9,187	0.50	6,800	9,187	0.74	1993	0.0	0.0	1992	0.0	0.0
31182	403	30	30			4,513	9,694	0.47	6,747	9,694	0.70	1994	0.0	0.0	1993	0.0	0.0
31183	228	30	30			4,512	8,999	0.50	6,747	8,999	0.75	2018	0.0	0.0	1994	0.0	0.0
31185	68	8	8			42	708	0.06	42	709	0.06	1996	0.0	0.0	1997	0.0	0.0
31186	239	8	8			1	406	0.00	1	407	0.00	1995	0.0	0.0	1996	0.0	0.0
31188	117	30	30			4,328	9,854	0.44	6,566	9,854	0.67	1989	0.0	0.0	2005	0.0	0.0
31189	298	8	8			1	405	0.00	1	406	0.00	1988	0.0	0.0	1989	0.0	0.0
31190	291	8	8			1	401	0.00	1	401	0.00	7235	0.0	0.0	1988	0.0	0.0
31191	41	15	15			2	7,400	0.00	2	7,400	0.00	2025	0.0	0.0	2026	0.0	0.0
31192	203	6	6			1	231	0.00	1	231	0.00	7661	0.0	0.0	2025	0.0	0.0
31195	153	6	6			1	208	0.01	1	208	0.01	2007	0.0	0.0	2008	0.0	0.0
31196	92	6	6			3	219	0.01	3	219	0.01	7171	0.0	0.0	2008	0.0	0.0
31197	60	6	6			2	192	0.01	2	192	0.01	2009	0.0	0.0	7171	0.0	0.0
31198	140	6	6			1	195	0.00	1	195	0.00	2035	0.0	0.0	2009	0.0	0.0
31199	240	6	6			1	201	0.00	1	201	0.00	2034	0.0	0.0	2009	0.0	0.0
31200	245	8	8			1	695	0.00	1	696	0.00	2006	0.0	0.0	2008	0.0	0.0
31201	163	6	6			1	248	0.00	1	248	0.00	2033	0.0	0.0	2007	0.0	0.0
31202	178	27	27			4,324	11,938	0.36	6,563	11,938	0.55	8923	0.0	0.0	2020	0.0	0.0
31203	37	27	27			4,220	19,098	0.22	6,460	19,098	0.34	2021	0.0	0.0	8920	0.0	0.0
31204	242	10	10			0	2,217	0.00	6	2,215	0.00	2003	0.0	0.0	2021	0.0	0.0
31205	268	10	15	2	Existing	1,201	997	1.20	1,878	2,938	0.64	2004	10.2	0.0	2017	0.0	4.2
31206	288	10	15	2	Existing	1,154	1,004	1.15	1,832	2,960	0.62	7234	5.8	0.0	2004	10.2	0.0
31207	125	10	15	2	Existing	1,153	597	1.93	1,831	1,760	1.04	2002	4.7	0.0	7234	5.8	0.0
31208	247	10	15	2	Existing	1,061	754	1.41	1,720	2,224	0.77	2022	6.5	0.0	2002	4.7	0.0
31209	240	10	15	2	Existing	1,059	801	1.32	1,718	2,362	0.73	2013	2.5	0.0	2022	6.5	0.0
31210	283	10	15	2	Existing	999	803	1.24	1,650	2,367	0.70	2012	0.0	0.0	2013	2.5	0.0
31212	237	8	8			24	679	0.03	3	680	0.00	2001	0.0	0.0	2002	4.7	0.0
31213	35	8	8			3	622	0.01	2	623	0.00	2000	0.0	0.0	2001	0.0	0.0
31214	133	6	6			1	192	0.00	1	192	0.00	1987	0.0	0.0	2000	0.0	0.0
31217	375	6	6			100	176	0.57	99	176	0.57	7388	1.6	0.0	2014	0.5	0.0
31218	75	12	12			1	1,345	0.00	1	1,345	0.00	2030	0.0	0.0	2025	0.0	0.0
31219	525	6	6			1	383	0.00	1	383	0.00	2032	0.0	0.0	9987	0.0	0.0
31242	229	8	8			72	340	0.21	72	340	0.21	2084	0.0	0.0	2091	0.0	0.0
31243	213	8	8			72	349	0.21	72	349	0.21	2091	0.0	0.0	2092	0.0	0.0
31244	386	8	8			72	344	0.21	72	344	0.21	2093	0.0	0.0	2084	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31245	62	8	8			37	284	0.13	37	285	0.13	2086	0.0	0.0	2093	0.0	0.0
31246	332	8	8			1	344	0.00	1	345	0.00	2094	0.0	0.0	2085	0.0	0.0
31257	395	8	8			29	308	0.09	29	308	0.09	2124	0.0	0.0	2125	0.0	0.0
31259	217	8	8			172	283	0.61	172	283	0.61	2135	0.0	0.0	2126	0.0	0.0
31260	30	8	8			172	262	0.66	172	263	0.65	2127	0.0	0.0	2135	0.0	0.0
31261	486	8	8			172	342	0.50	172	343	0.50	2128	0.0	0.0	2127	0.0	0.0
31262	447	8	8			131	344	0.38	131	344	0.38	2129	0.0	0.0	2128	0.0	0.0
31263	295	8	8			203	251	0.81	202	251	0.81	2125	0.0	0.0	2136	0.0	0.0
31264	408	8	8			130	343	0.38	130	343	0.38	2130	0.0	0.0	2129	0.0	0.0
31265	505	8	8			90	333	0.27	90	333	0.27	2133	0.0	0.0	2130	0.0	0.0
31267	475	8	8			90	351	0.25	90	351	0.25	7389	0.0	0.0	2133	0.0	0.0
31268	296	8	8			39	660	0.06	39	660	0.06	2137	0.0	0.0	7006	0.0	0.0
31269	275	8	8			29	338	0.09	29	339	0.09	2113	0.0	0.0	2109	0.0	0.0
31270	90	8	8			33	343	0.10	33	344	0.10	2110	0.0	0.0	2109	0.0	0.0
31271	305	8	8			101	338	0.30	101	338	0.30	2131	0.0	0.0	2103	0.0	0.0
31272	120	8	8			75	340	0.22	75	340	0.22	2107	0.0	0.0	2131	0.0	0.0
31273	190	8	8			63	338	0.19	63	339	0.19	2108	0.0	0.0	2107	0.0	0.0
31274	75	8	8			63	493	0.13	63	494	0.13	2109	0.0	0.0	2108	0.0	0.0
31275	148	8	8			19	342	0.05	19	343	0.05	2097	0.0	0.0	2110	0.0	0.0
31276	257	8	8			11	350	0.03	11	351	0.03	2138	0.0	0.0	2107	0.0	0.0
31277	352	8	8			25	342	0.07	25	342	0.07	2114	0.0	0.0	2131	0.0	0.0
31278	355	8	8			120	340	0.35	120	341	0.35	2139	0.0	0.0	2101	0.0	0.0
31280	351	15	18	1	ura	1,389	1,105	1.26	1,477	1,797	0.82	2120	6.0	0.0	7469	0.0	0.0
31281	160	8	8			1	542	0.00	1	543	0.00	2098	0.0	0.0	2106	0.0	0.0
31282	68	8	8			1	378	0.00	1	378	0.00	2099	0.0	0.0	2106	0.0	0.0
31283	330	15	18	1	ura	1,388	1,106	1.26	1,476	1,798	0.82	2119	7.1	0.0	2120	6.0	0.0
31284	290	15	18	1	ura	1,388	1,180	1.18	1,476	1,918	0.77	2102	0.0	0.0	2119	7.1	0.0
31285	402	8	8			22	375	0.06	22	375	0.06	2123	0.0	0.0	2102	0.0	0.0
31287	318	8	8			215	253	0.85	217	253	0.86	2140	0.0	0.0	2102	0.0	0.0
31288	319	12	15	1	ura	1,117	749	1.49	1,202	1,358	0.88	2122	7.0	0.0	2102	0.0	0.0
31289	336	12	15	1	ura	1,116	740	1.51	1,202	1,342	0.90	2101	0.0	0.0	2122	7.0	0.0
31290	251	8	8			31	347	0.09	28	348	0.08	2104	7.3	0.0	2101	0.0	0.0
31291	29	8	8			27	349	0.08	27	349	0.08	2105	0.0	0.0	2104	7.3	0.0
31292	293	8	8			27	343	0.08	26	343	0.08	7236	0.0	0.0	2105	0.0	0.0
31293	85	6	6			1	326	0.00	1	326	0.00	2100	0.0	0.0	2105	0.0	0.0
31294	32	8	8			29	407	0.07	29	408	0.07	2111	0.0	0.0	2113	0.0	0.0
31295	191	8	8			28	351	0.08	28	351	0.08	2115	0.0	0.0	2112	0.0	0.0
31296	45	8	8			14	388	0.04	14	388	0.04	2116	0.0	0.0	2115	0.0	0.0
31297	350	8	8			11	343	0.03	11	344	0.03	7470	0.0	0.0	2134	0.0	0.0
31298	323	18	18			2,824	4,271	0.66	3,824	4,271	0.90	2147	0.0	0.0	2172	0.0	0.0
31300	323	24	24			3,488	8,527	0.41	5,053	8,527	0.59	2147	0.0	0.0	2172	0.0	0.0
31301	10	12	12			103	715	0.14	103	715	0.14	7008	0.0	0.0	2181	0.0	0.0
31303	175	33	33			7,751	12,153	0.64	10,160	12,153	0.84	2151	0.0	0.0	2171_2	0.0	0.0
31304	341	33	33			7,751	11,133	0.70	10,160	11,133	0.91	2172	0.0	0.0	2151	0.0	0.0
31305	61	8	8			29	310	0.09	29	311	0.09	2164	0.0	0.0	2163	0.0	0.0
31306	240	8	8			131	341	0.38	131	342	0.38	2145	0.0	0.0	2163	0.0	0.0
31307	30	8	8			58	343	0.17	58	344	0.17	2162	0.0	0.0	2145	0.0	0.0
31309	60	8	8			1	350	0.00	1	351	0.00	2189	0.0	0.0	2161	0.0	0.0
31310	83	8	8			72	326	0.22	72	326	0.22	2160	0.0	0.0	2175	0.0	0.0
31311	346	8	8			71	342	0.21	71	343	0.21	2159	0.0	0.0	2160	0.0	0.0
31312	351	8	8			1	342	0.00	1	343	0.00	2158	0.0	0.0	2160	0.0	0.0
31313	231	12	12			35	1,078	0.03	35	1,078	0.03	2176	0.0	0.0	2184	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31314	122	12	12			35	1,044	0.03	35	1,044	0.03	2177	0.0	0.0	2176	0.0	0.0
31316	245	8	8			1	296	0.00	1	297	0.00	2188	0.0	0.0	2178	0.0	0.0
31317	260	12	12			21	818	0.03	21	818	0.03	2178	0.0	0.0	2184	0.0	0.0
31318	40	12	12			57	876	0.07	57	876	0.07	2184	0.0	0.0	2167	0.0	0.0
31319	23	12	12			58	2,983	0.02	58	2,983	0.02	2157	0.0	0.0	2156	0.0	0.0
31320	176	8	8			1	937	0.00	1	938	0.00	7662	0.0	0.0	2157	0.0	0.0
31321	272	12	12			102	894	0.11	102	894	0.11	2156	0.0	0.0	7008	0.0	0.0
31322	173	8	8			5	345	0.01	5	345	0.01	2180	0.0	0.0	2165	0.0	0.0
31323	150	8	8			1	429	0.00	1	430	0.00	2166	0.0	0.0	2165	0.0	0.0
31324	330	12	12			103	872	0.12	103	872	0.12	2155	0.0	0.0	2154	0.0	0.0
31325	323	12	12			103	872	0.12	103	872	0.12	2181	0.0	0.0	2155	0.0	0.0
31326	73	30	30			4,719	9,528	0.50	6,949	9,528	0.73	2182	0.0	0.0	2146	0.0	0.0
31327	227	12	12			104	894	0.12	104	894	0.12	2148	0.0	0.0	2174	0.0	0.0
31331	383	33	33			7,604	11,378	0.67	10,031	11,378	0.88	2153	0.0	0.0	2152	0.0	0.0
31332	415	33	33			7,603	11,535	0.66	10,031	11,535	0.87	7238	0.0	0.0	2153	0.0	0.0
31333	341	8	8			151	405	0.37	151	406	0.37	2168	0.0	0.0	2182	0.0	0.0
31334	204	8	8			150	404	0.37	150	404	0.37	2169	0.0	0.0	2168	0.0	0.0
31335	205	12	12			104	901	0.12	104	901	0.12	2154	0.0	0.0	2148	0.0	0.0
31336	43	8	8			42	740	0.06	42	741	0.06	7472	4.7	4.7	7471	0.0	0.0
31337	22	8	8			43	347	0.12	43	347	0.12	7471	0.0	0.0	2150	0.0	0.0
31338	383	8	8			1	329	0.00	1	330	0.00	2213	0.0	0.0	10000	0.0	0.0
31339	191	8	8			1	342	0.00	1	342	0.00	2205	0.0	0.0	2213	0.0	0.0
31341	355	8	8			336	344	0.98	336	344	0.98	2214	6.0	6.0	2206	5.1	5.1
31343	161	8	8			1	337	0.00	1	337	0.00	2219	0.0	0.0	2204	0.0	0.0
31344	425	8	8			321	343	0.94	322	344	0.94	2206	5.1	5.1	2216	6.5	6.5
31345	120	8	8			1	1,488	0.00	1	1,490	0.00	7663	0.0	0.0	2216	6.5	6.5
31346	375	8	8			1	343	0.00	1	344	0.00	2217	0.0	0.0	7239	0.0	0.0
31347	415	8	8			256	343	0.75	256	344	0.75	2208	0.0	0.0	2207	7.1	7.1
31348	400	8	8			239	344	0.69	239	344	0.69	2211	0.0	0.0	2208	0.0	0.0
31349	69	8	8			239	340	0.70	239	340	0.70	2209	0.0	0.0	2211	0.0	0.0
31350	44	6	6			213	178	1.20	213	178	1.20	2222	0.0	0.0	2209	0.0	0.0
31351	475	8	8			11	343	0.03	11	344	0.03	2202	0.0	0.0	2201	0.0	0.0
31352	335	8	8			8	578	0.01	8	578	0.01	2220	0.0	0.0	2221	0.0	0.0
31353	50	10	10			3	311	0.01	3	310	0.01	7474	0.0	0.0	2200	0.0	0.0
31355	64	8	8			1	263	0.00	1	263	0.00	2199	0.0	0.0	2198	0.0	0.0
31356	105	10	10			1	560	0.00	1	559	0.00	2198	0.0	0.0	2197	0.0	0.0
31357	182	10	10			1	526	0.00	1	525	0.00	2197	0.0	0.0	2196	0.0	0.0
31358	23	10	10			1	649	0.00	1	648	0.00	2196	0.0	0.0	2195	0.0	0.0
31359	61	10	10			2	398	0.01	2	398	0.01	2195	0.0	0.0	2194	0.0	0.0
31360	24	10	10			2	635	0.00	2	634	0.00	2194	0.0	0.0	7474	0.0	0.0
31362	416	8	8			207	378	0.55	207	378	0.55	2241	0.0	0.0	2242	0.0	0.0
31363	436	8	8			192	299	0.64	192	300	0.64	2240	0.0	0.0	11040	0.0	0.0
31364	323	8	8			20	344	0.06	20	344	0.06	2270	0.0	0.0	2240	0.0	0.0
31366	138	8	8			13	340	0.04	13	340	0.04	2259	0.0	0.0	7173	0.0	0.0
31367	135	8	8			62	343	0.18	62	344	0.18	2258	0.0	0.0	7173	0.0	0.0
31368	100	8	8			61	334	0.18	61	335	0.18	7240	0.0	0.0	7009	0.0	0.0
31369	38	8	8			60	305	0.20	60	305	0.20	2257	0.0	0.0	7240	0.0	0.0
31370	114	8	8			6	359	0.02	6	360	0.02	2256	0.0	0.0	2257	0.0	0.0
31371	90	8	8			6	404	0.01	6	405	0.01	7664	0.0	0.0	2256	0.0	0.0
31372	102	8	8			13	269	0.05	13	269	0.05	2252	0.0	0.0	2257	0.0	0.0
31373	362	8	8			6	342	0.02	6	342	0.02	2253	0.0	0.0	2252	0.0	0.0
31374	220	8	8			42	373	0.11	42	374	0.11	2255	0.0	0.0	2257	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31375	154	8	8			14	406	0.03	14	406	0.03	2284	0.0	0.0	2255	0.0	0.0
31376	374	8	8			28	387	0.07	28	387	0.07	2254	0.0	0.0	2255	0.0	0.0
31377	220	8	8			9	345	0.03	9	345	0.03	2260	0.0	0.0	2261	0.0	0.0
31378	300	8	8			9	751	0.01	9	752	0.01	7475	0.0	0.0	2261	0.0	0.0
31379	119	8	8			1	344	0.00	1	345	0.00	2311	0.0	0.0	7475	0.0	0.0
31380	210	8	8			1	339	0.00	1	340	0.00	2262	0.0	0.0	7475	0.0	0.0
31381	325	8	8			33	271	0.12	3	271	0.01	2264	0.0	0.0	2265	3.2	0.0
31382	371	8	8			67	342	0.20	48	343	0.14	2285	3.8	0.0	2263	2.5	0.0
31385	350	10	10			474	517	0.92	482	517	0.93	2266	4.9	0.0	2265	3.2	0.0
31386	335	10	10			474	521	0.91	482	520	0.93	2269	4.9	0.0	2266	4.9	0.0
31387	20	8	8			115	343	0.34	114	344	0.33	2268	5.7	0.0	2269	4.9	0.0
31388	360	10	10			511	513	1.00	547	513	1.07	2250	3.7	0.0	2249	4.2	0.0
31389	315	10	10			512	523	0.98	547	522	1.05	2249	4.2	0.0	2237	4.9	0.0
31390	35	12	12			938	811	1.16	979	811	1.21	2237	4.9	0.0	2248	4.7	0.0
31391	450	8	8			440	434	1.01	434	435	1.00	2287	0.0	0.0	2237	4.9	0.0
31392	301	8	8			41	342	0.12	1	343	0.00	2247	3.0	0.0	2248	4.7	0.0
31393	298	8	8			41	344	0.12	1	344	0.00	2246	0.0	0.0	2247	3.0	0.0
31394	418	12	15	1	ura	952	754	1.26	1,015	1,367	0.74	2248	4.7	0.0	2288	4.3	0.0
31395	22	12	15	1	ura	953	763	1.25	1,015	1,382	0.73	2288	4.3	0.0	2289	4.6	0.0
31396	82	8	8			47	240	0.19	39	240	0.16	2290	4.0	0.0	2289	4.6	0.0
31398	97	8	8			14	408	0.03	14	409	0.03	2293	0.0	0.0	2292	0.0	0.0
31399	200	8	8			7	279	0.02	7	280	0.02	2230	0.0	0.0	2294	0.0	0.0
31400	434	8	8			105	376	0.28	101	377	0.27	7241	0.0	0.0	2267	4.9	0.0
31401	385	8	8			84	377	0.22	84	378	0.22	7476	0.0	0.0	2281	0.0	0.0
31402	238	8	8			37	875	0.04	37	876	0.04	2282	0.0	0.0	7476	0.0	0.0
31403	262	8	8			37	874	0.04	37	876	0.04	2283	0.0	0.0	2282	0.0	0.0
31404	500	8	8			40	343	0.12	40	344	0.12	2295	0.0	0.0	2285	3.8	0.0
31405	60	8	8			40	272	0.15	40	272	0.15	2278	0.0	0.0	2295	0.0	0.0
31406	122	8	8			39	351	0.11	39	351	0.11	2279	0.0	0.0	2278	0.0	0.0
31407	396	8	8			17	342	0.05	17	343	0.05	2274	0.0	0.0	2296	0.0	0.0
31408	396	8	8			10	342	0.03	10	343	0.03	2277	0.0	0.0	2279	0.0	0.0
31409	265	8	8			9	343	0.03	9	344	0.03	2276	0.0	0.0	2277	0.0	0.0
31410	145	8	8			8	355	0.02	8	355	0.02	2275	0.0	0.0	2276	0.0	0.0
31411	450	8	8			422	434	0.97	422	435	0.97	2297	0.0	0.0	2287	0.0	0.0
31412	448	8	8			409	344	1.19	409	344	1.19	2298	6.6	6.6	2297	0.0	0.0
31413	385	8	8			399	345	1.15	399	346	1.15	7242	6.4	6.4	2298	6.6	6.6
31414	40	6	6			19	199	0.09	19	199	0.10	2229	6.1	6.1	7242	6.4	6.4
31415	201	6	6			6	194	0.03	6	194	0.03	2232	0.0	0.0	2229	6.1	6.1
31416	83	8	8			391	347	1.13	390	348	1.12	2238	0.0	0.0	7242	6.4	6.4
31417	375	8	8			1	343	0.00	1	344	0.00	7391	0.0	0.0	2238	0.0	0.0
31418	132	8	8			1	344	0.00	1	344	0.00	2299	0.0	0.0	2293	0.0	0.0
31419	340	8	8			132	340	0.39	132	341	0.39	2301	0.0	0.0	2240	0.0	0.0
31420	13	8	8			131	369	0.36	131	369	0.36	2244	0.0	0.0	2301	0.0	0.0
31421	152	8	8			131	344	0.38	131	344	0.38	2245	0.0	0.0	2244	0.0	0.0
31422	177	8	8			66	381	0.17	66	381	0.17	2303	0.0	0.0	2302	0.0	0.0
31423	515	8	8			41	342	0.12	39	342	0.11	2272	0.0	0.0	2271	0.0	0.0
31424	30	8	8			49	1,430	0.03	40	1,432	0.03	2271	0.0	0.0	2239	2.4	0.0
31425	471	8	8			339	344	0.99	340	344	0.99	2239	2.4	0.0	2243	6.1	9.2
31426	452	8	8			354	342	1.03	353	343	1.03	2243	6.1	9.2	7010	6.3	9.0
31427	464	8	8			376	342	1.10	367	343	1.07	7010	6.3	9.0	2269	4.9	0.0
31431	42	8	8			13	410	0.03	13	410	0.03	2357	0.0	0.0	2344	0.0	0.0
31433	134	8	8			1	338	0.00	1	338	0.00	2332	0.0	0.0	7392	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31434	86	8	8			1	341	0.00	1	342	0.00	2331	0.0	0.0	2332	0.0	0.0
31435	346	8	8			1	342	0.00	1	343	0.00	7477	0.0	0.0	2331	0.0	0.0
31436	58	8	8			28	342	0.08	28	342	0.08	2346	0.0	0.0	2345	0.0	0.0
31437	117	8	8			28	340	0.08	28	340	0.08	2337	0.0	0.0	2346	0.0	0.0
31438	198	8	8			28	342	0.08	28	343	0.08	2338	0.0	0.0	2337	0.0	0.0
31439	214	8	8			13	344	0.04	13	344	0.04	2342	0.0	0.0	2338	0.0	0.0
31440	75	8	8			13	343	0.04	13	344	0.04	2343	0.0	0.0	2342	0.0	0.0
31441	359	8	8			12	340	0.03	12	340	0.03	2340	0.0	0.0	2343	0.0	0.0
31442	94	8	8			11	345	0.03	11	345	0.03	2341	0.0	0.0	2340	0.0	0.0
31443	230	8	8			76	385	0.20	76	385	0.20	2335	0.0	0.0	2336	0.0	0.0
31444	280	6	6			1	195	0.00	1	195	0.00	2316	0.0	0.0	2336	0.0	0.0
31445	190	8	8			24	305	0.08	24	305	0.08	2349	0.0	0.0	2348	0.0	0.0
31446	84	8	8			24	272	0.09	24	272	0.09	2350	0.0	0.0	2349	0.0	0.0
31447	295	8	8			24	279	0.08	24	279	0.08	2347	0.0	0.0	2350	0.0	0.0
31448	102	8	8			1	344	0.00	1	344	0.00	2339	0.0	0.0	2338	0.0	0.0
31449	80	8	8			1	343	0.00	1	344	0.00	2317	0.0	0.0	2339	0.0	0.0
31454	649	54	54			22,757	95,201	0.24	24,847	95,201	0.26	2326	0.0	0.0	2325	0.0	0.0
31455	130	54	54			22,758	122,410	0.19	24,803	122,410	0.20	2325	0.0	0.0	2324	0.0	10.2
31456	230	54	54			22,757	30,796	0.74	24,834	30,796	0.81	2324	0.0	10.2	2323	0.0	9.5
31457	1741	54	54			22,756	22,286	1.02	24,803	22,286	1.11	2323	0.0	9.5	2314	0.0	8.1
31471	473	54	54			26,658	28,117	0.95	32,624	28,117	1.16	2361	0.0	10.4	2369	0.0	6.6
31472	221	54	54			26,656	53,104	0.50	32,688	53,104	0.62	2362	0.0	8.4	2361	0.0	10.4
31474	101	54	54			22,757	30,424	0.75	24,835	30,424	0.82	2364	0.0	8.1	2363	0.0	8.2
31485	236	15	15			185	1,117	0.17	147	1,117	0.13	2421	0.0	0.0	2400	0.0	0.0
31486	87	15	15			185	933	0.20	147	933	0.16	2398	0.0	0.0	2421	0.0	0.0
31487	290	15	15			167	1,035	0.16	128	1,035	0.12	7479	0.0	0.0	2398	0.0	0.0
31488	139	15	15			167	1,043	0.16	128	1,043	0.12	7243	0.0	0.0	7479	0.0	0.0
31489	140	15	15			128	1,249	0.10	88	1,249	0.07	2396	0.0	0.0	7243	0.0	0.0
31490	70	15	15			128	917	0.14	88	917	0.10	2395	0.0	0.0	2396	0.0	0.0
31491	217	15	15			127	1,003	0.13	88	1,003	0.09	2394	0.0	0.0	2395	0.0	0.0
31492	201	15	15			115	1,356	0.08	75	1,356	0.06	7244	0.0	0.0	2394	0.0	0.0
31493	165	8	8			7	416	0.02	7	417	0.02	2393	0.0	0.0	2392	0.0	0.0
31495	392	8	8			22	513	0.04	22	513	0.04	2399	0.0	0.0	2400	0.0	0.0
31496	430	8	8			18	613	0.03	18	615	0.03	2420	0.0	0.0	2399	0.0	0.0
31497	34	8	8			50	263	0.19	8	263	0.03	2414	0.0	0.0	2413	0.0	0.0
31498	277	8	8			49	531	0.09	8	531	0.02	2415	0.0	0.0	2414	0.0	0.0
31499	230	8	8			42	345	0.12	1	345	0.00	2416	0.0	0.0	2415	0.0	0.0
31500	266	8	8			4	349	0.01	4	349	0.01	2402	0.0	0.0	2401	0.0	0.0
31501	184	8	8			4	433	0.01	4	433	0.01	2382	0.0	0.0	2402	0.0	0.0
31502	287	8	8			332	632	0.53	332	633	0.52	2390	0.0	0.0	2422	0.0	0.0
31504	143	15	15			359	1,680	0.21	325	1,680	0.19	2409	0.0	0.0	2423	0.0	0.0
31505	21	15	15			359	2,281	0.16	325	2,281	0.14	2410	0.0	0.0	2409	0.0	0.0
31506	146	15	15			358	1,200	0.30	324	1,200	0.27	2411	0.0	0.0	2410	0.0	0.0
31507	500	8	8			76	343	0.22	76	344	0.22	2412	0.0	0.0	2411	0.0	0.0
31508	266	8	8			76	470	0.16	76	471	0.16	2419	0.0	0.0	2412	0.0	0.0
31509	139	8	8			1	341	0.00	1	342	0.00	2425	0.0	0.0	2411	0.0	0.0
31510	188	8	8			44	483	0.09	44	483	0.09	2405	0.0	0.0	2406	0.0	0.0
31511	132	8	8			44	340	0.13	44	341	0.13	2404	0.0	0.0	2405	0.0	0.0
31512	158	8	8			11	467	0.02	11	467	0.02	2403	0.0	0.0	2404	0.0	0.0
31513	194	8	8			33	374	0.09	33	374	0.09	7129	0.0	0.0	2404	0.0	0.0
31514	110	8	8			5	430	0.01	5	430	0.01	2424	0.0	0.0	7129	0.0	0.0
31515	267	8	8			27	439	0.06	27	440	0.06	2418	0.0	0.0	7129	0.0	0.0

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31516	171	8	8			8	415	0.02	8	415	0.02	2417	0.0	0.0	2418	0.0	0.0
31517	502	15	15			219	1,121	0.20	182	1,121	0.16	2401	0.0	0.0	2406	0.0	0.0
31529	721	54	54			26,915	30,660	0.88	32,482	30,660	1.06	2436	6.6	4.5	2434	2.9	1.1
31530	541	54	54			29,403	30,594	0.96	34,929	30,594	1.14	2434	2.9	1.1	2430	6.8	5.3
31531	370	54	54			44,328	30,437	1.46	49,866	30,437	1.64	2428	17.3	16.0	2426	3.8	2.8
31536	25	15	15			1,549	1,420	1.09	1,640	1,420	1.15	2458	0.0	0.0	2445	0.0	0.0
31537	335	18	18			1,549	1,995	0.78	1,640	1,995	0.82	2445	0.0	0.0	2446	0.0	0.0
31538	350	18	18			1,550	2,000	0.78	1,640	2,000	0.82	2446	0.0	0.0	2447	0.0	0.0
31539	350	18	18			1,576	2,000	0.79	1,667	2,000	0.83	2447	0.0	0.0	2448	0.0	0.0
31540	350	18	18			1,581	2,000	0.79	1,672	2,000	0.84	2448	0.0	0.0	2449	0.0	0.0
31543	443	15	15			1	803	0.00	1	803	0.00	2444	0.0	0.0	2457	0.0	0.0
31544	350	8	8			97	258	0.38	97	258	0.38	2462	0.0	0.0	2461	0.0	0.0
31546	300	8	8			9	343	0.03	9	344	0.03	2459	0.0	0.0	2460	0.0	0.0
31547	353	8	8			120	271	0.44	120	271	0.44	2460	0.0	0.0	2463	0.0	0.0
31548	92	8	8			1	353	0.00	1	353	0.00	2464	0.0	0.0	7393	0.0	0.0
31549	377	8	8			121	269	0.45	121	269	0.45	2463	0.0	0.0	7245	0.0	0.0
31550	378	8	8			121	270	0.45	121	271	0.45	7245	0.0	0.0	2458	0.0	0.0
31551	417	8	8			18	352	0.05	18	353	0.05	2456	0.0	0.0	2451	0.0	0.0
31552	350	15	15			8	1,190	0.01	8	1,190	0.01	2457	0.0	0.0	2454	0.0	0.0
31553	384	8	8			94	268	0.35	53	269	0.20	2453	0.0	0.0	2454	0.0	0.0
31554	339	8	8			13	482	0.03	13	483	0.03	2465	0.0	0.0	2453	0.0	0.0
31555	339	8	8			6	665	0.01	6	666	0.01	2455	0.0	0.0	2465	0.0	0.0
31556	223	8	8			81	468	0.17	40	469	0.09	2452	0.0	0.0	2453	0.0	0.0
31557	278	8	8			76	340	0.22	35	340	0.10	7481	0.0	0.0	2452	0.0	0.0
31558	232	8	8			13	278	0.05	13	278	0.05	2470	0.0	0.0	2469	0.0	0.0
31559	22	8	8			13	433	0.03	13	433	0.03	2471	0.0	0.0	2470	0.0	0.0
31560	498	8	8			12	344	0.03	12	344	0.03	7174	0.0	0.0	2471	0.0	0.0
31567	660	54	54			44,328	30,537	1.45	49,843	30,537	1.63	2472	0.0	2.3	2473	0.0	0.0
31578	60	8	8			0	1,149	0.00	0	1,247	0.00	2496	0.0	0.0	2497	0.0	0.0
31579	229	8	8			14	662	0.02	14	718	0.02	2498	0.0	0.0	2499	0.0	0.0
31580	121	8	8			14	790	0.02	14	858	0.02	2499	0.0	0.0	2500	0.0	0.0
31581	233	8	8			292	972	0.30	292	1,053	0.28	2502	0.0	0.0	2503	0.0	0.0
31584	82	8	8			364	1,101	0.33	365	1,195	0.31	7886	0.0	0.0	2506	9.2	0.0
31585	216	8	8			364	550	0.66	365	597	0.61	2506	9.2	0.0	2507	2.1	0.0
31586	86	8	8			28	947	0.03	28	1,027	0.03	2508	0.0	0.0	2512	0.0	0.0
31587	241	8	8			80	475	0.17	80	515	0.15	10627	0.0	0.0	2511	0.0	0.0
31588	308	8	8			0	409	0.00	0	444	0.00	2510	0.0	0.0	2511	0.0	0.0
31589	65	8	8			0	369	0.00	0	400	0.00	2509	0.0	0.0	2510	0.0	0.0
31590	210	8	8			365	341	1.07	401	370	1.08	2581	0.0	0.0	2580	0.0	0.0
31591	105	8	8			369	343	1.07	403	372	1.08	2582	0.0	0.0	2581	0.0	0.0
31592	11	8	8			67	327	0.20	49	355	0.14	2533	0.0	0.0	2582	0.0	0.0
31593	370	8	8			15	1,018	0.02	15	1,104	0.01	2552	0.0	0.0	2533	0.0	0.0
31594	222	8	8			372	342	1.09	411	370	1.11	2583	0.0	0.0	2582	0.0	0.0
31595	118	8	8			8	1,249	0.01	8	1,355	0.01	2549	0.0	0.0	2583	0.0	0.0
31596	136	8	8			377	345	1.09	424	374	1.13	7485	0.0	10.1	2583	0.0	0.0
31597	305	8	8			381	342	1.12	435	371	1.17	2532	0.0	0.0	7485	0.0	10.1
31598	142	8	8			0	755	0.00	0	819	0.00	2548	0.0	0.0	2532	0.0	0.0
31599	303	8	8			1	1,008	0.00	1	1,094	0.00	2584	0.0	0.0	2548	0.0	0.0
31600	450	8	8			428	342	1.25	518	371	1.40	7247	4.0	3.3	2532	0.0	0.0
31601	154	8	8			540	391	1.38	646	424	1.52	2534	0.0	0.0	7247	4.0	3.3
31602	111	6	6			0	506	0.00	0	549	0.00	2515	0.0	0.0	2534	0.0	0.0
31603	278	8	8			1	1,029	0.00	1	1,116	0.00	2545	0.0	0.0	2534	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31604	224	8	8			1	1,069	0.00	1	1,159	0.00	2569	0.0	0.0	2587	0.0	0.0
31605	91	6	6			0	680	0.00	0	736	0.00	2521	0.0	0.0	2569	0.0	0.0
31606	101	8	8			1	972	0.00	1	1,054	0.00	2568	0.0	0.0	7484	0.0	0.0
31607	96	8	8			1	906	0.00	1	983	0.00	2567	0.0	0.0	2568	0.0	0.0
31608	115	8	8			0	1,044	0.00	0	1,133	0.00	7725	0.0	0.0	2567	0.0	0.0
31609	182	6	6			0	502	0.00	0	544	0.00	2520	0.0	0.0	7725	0.0	0.0
31610	126	8	8			0	1,267	0.00	0	1,375	0.00	2518	0.0	0.0	7725	0.0	0.0
31611	250	6	6			15	575	0.03	15	623	0.02	2519	0.0	0.0	2552	0.0	0.0
31612	71	6	6			8	743	0.01	8	805	0.01	2599	0.0	0.0	2550	0.0	0.0
31613	190	8	8			43	1,037	0.04	43	1,125	0.04	2557	0.0	0.0	2558	0.0	0.0
31614	129	8	8			43	1,265	0.03	43	1,372	0.03	7246	0.0	0.0	2557	0.0	0.0
31615	265	8	8			43	1,334	0.03	43	1,447	0.03	2556	0.0	0.0	7246	0.0	0.0
31616	120	8	8			19	1,650	0.01	19	1,790	0.01	2541	0.0	0.0	2543	0.0	0.0
31617	335	8	8			11	1,460	0.01	11	1,585	0.01	2585	0.0	0.0	2541	0.0	0.0
31618	275	8	8			8	1,708	0.00	8	1,853	0.00	2540	0.0	0.0	2541	0.0	0.0
31619	30	8	8			7	990	0.01	7	1,074	0.01	2539	0.0	0.0	2540	0.0	0.0
31620	155	8	8			0	1,447	0.00	0	1,569	0.00	2542	0.0	0.0	2544	0.0	0.0
31621	120	8	8			40	988	0.04	40	1,072	0.04	2565	0.0	0.0	2562	0.0	0.0
31622	145	8	8			40	1,451	0.03	40	1,575	0.03	2564	0.0	0.0	2565	0.0	0.0
31623	320	8	8			40	1,472	0.03	40	1,597	0.03	2596	0.0	0.0	2564	0.0	0.0
31624	42	8	8			40	940	0.04	40	1,019	0.04	2563	0.0	0.0	2596	0.0	0.0
31625	120	8	8			1	1,097	0.00	1	1,190	0.00	2553	0.0	0.0	2563	0.0	0.0
31626	309	8	8			1	859	0.00	1	932	0.00	2554	0.0	0.0	2553	0.0	0.0
31627	260	8	8			1	1,514	0.00	1	1,642	0.00	2591	0.0	0.0	2554	0.0	0.0
31630	308	8	8			13	1,126	0.01	13	1,221	0.01	2555	0.0	0.0	2556	0.0	0.0
31631	70	8	8			13	1,828	0.01	13	1,983	0.01	7130	0.0	0.0	2555	0.0	0.0
31632	177	8	8			13	1,810	0.01	13	1,964	0.01	7131	0.0	0.0	7130	0.0	0.0
31634	144	8	8			13	386	0.03	13	419	0.03	2589	0.0	0.0	7131	0.0	0.0
31635	138	8	8			13	378	0.03	13	410	0.03	2590	0.0	0.0	2589	0.0	0.0
31636	86	8	8			0	1,510	0.00	0	1,638	0.00	2592	0.0	0.0	2591	0.0	0.0
31637	400	8	8			0	388	0.00	0	422	0.00	2594	0.0	0.0	2593	0.0	0.0
31638	168	8	8			1,376	1,248	1.10	1,708	1,353	1.26	2560	0.0	0.0	2561	0.0	0.0
31639	226	8	8			43	1,094	0.04	43	1,188	0.04	2559	0.0	0.0	2560	0.0	0.0
31640	115	8	8			43	949	0.05	43	1,030	0.04	2558	0.0	0.0	2559	0.0	0.0
31641	343	8	8			1,770	383	4.63	1,896	415	4.57	2561	0.0	0.0	7483	6.9	2.8
31642	132	8	8			41	1,562	0.03	41	1,694	0.02	2574	0.0	0.0	2535	0.0	0.0
31643	296	8	8			18	342	0.05	18	372	0.05	2595	0.0	0.0	2535	0.0	0.0
31644	137	8	8			18	344	0.05	18	373	0.05	7175	0.0	0.0	2595	0.0	0.0
31645	102	6	6			0	531	0.00	0	574	0.00	2526	0.0	0.0	7175	0.0	0.0
31646	140	8	8			0	1,252	0.00	0	1,358	0.00	2598	0.0	0.0	2574	0.0	0.0
31647	124	8	8			40	1,381	0.03	40	1,498	0.03	2575	0.0	0.0	2574	0.0	0.0
31648	267	8	8			40	434	0.09	40	471	0.09	2576	0.0	0.0	2575	0.0	0.0
31649	125	8	8			40	343	0.12	40	372	0.11	2562	0.0	0.0	2576	0.0	0.0
31650	97	8	8			17	340	0.05	17	368	0.05	2571	0.0	0.0	7175	0.0	0.0
31651	134	8	8			12	788	0.01	12	855	0.01	2578	0.0	0.0	2573	0.0	0.0
31652	327	8	8			4	931	0.00	4	1,009	0.00	2577	0.0	0.0	2578	0.0	0.0
31653	84	8	8			0	962	0.00	0	1,043	0.00	7394	0.0	0.0	2536	0.0	0.0
31654	118	6	6			0	442	0.00	0	479	0.00	2529	0.0	0.0	7394	0.0	0.0
31655	67	8	8			5	344	0.01	5	374	0.01	2546	0.0	0.0	2536	0.0	0.0
31656	156	8	8			5	939	0.01	5	1,018	0.00	2597	0.0	0.0	2546	0.0	0.0
31657	103	8	8			1,030	382	2.70	1,578	414	3.81	7483	6.9	2.8	2534	0.0	0.0
31662	68	8	8			0	562	0.00	0	610	0.00	2600	0.0	0.0	2614	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31663	144	8	8			0	715	0.00	0	775	0.00	2649	0.0	0.0	2690	0.0	0.0
31665	167	15	18	35	ura	978	1,289	0.76	1,378	2,270	0.61	7487	0.0	0.0	2606	0.0	0.0
31666	300	8	8			21	817	0.03	21	886	0.02	7017	0.0	0.0	7487	0.0	0.0
31667	315	8	8			0	666	0.00	0	722	0.00	2610	0.0	0.0	7017	0.0	0.0
31668	68	8	8			0	1,040	0.00	0	1,128	0.00	2695	0.0	0.0	2610	0.0	0.0
31669	143	15	18	35	ura	958	1,306	0.73	1,358	2,300	0.59	2631	0.0	0.0	7487	0.0	0.0
31670	318	15	18	35	ura	958	1,290	0.74	1,359	2,274	0.60	2607	0.0	0.0	2631	0.0	0.0
31671	302	8	12	37	ura	695	540	1.29	1,103	1,726	0.64	2630	3.6	0.0	2607	0.0	0.0
31672	290	8	8			32	417	0.08	0	453	0.00	2629	0.0	0.0	2630	3.6	0.0
31673	282	8	12	37	ura	685	721	0.95	1,092	2,302	0.47	2611	3.1	0.0	2630	3.6	0.0
31674	287	8	8			5	383	0.01	0	415	0.00	2618	0.0	0.0	2611	3.1	0.0
31675	443	15	15			267	1,292	0.21	267	1,400	0.19	2624	0.0	0.0	2607	0.0	0.0
31676	278	8	8			47	611	0.08	47	663	0.07	2627	0.0	0.0	2624	0.0	0.0
31677	283	8	8			38	637	0.06	38	691	0.05	2671	0.0	0.0	2628	0.0	0.0
31678	210	8	8			6	341	0.02	6	370	0.02	2615	0.0	0.0	2671	0.0	0.0
31679	272	12	12			223	1,003	0.22	223	1,087	0.21	2625	0.0	0.0	2624	0.0	0.0
31680	425	8	8			10	713	0.01	10	774	0.01	2623	0.0	0.0	2635	0.0	0.0
31681	246	6	6			10	350	0.03	10	379	0.03	2602	0.0	0.0	2623	0.0	0.0
31682	333	8	8			346	386	0.90	384	419	0.92	2634	0.0	0.0	2635	0.0	0.0
31683	270	8	8			8	852	0.01	8	924	0.01	2672	0.0	0.0	2634	0.0	0.0
31684	461	18	18			2,380	3,003	0.79	3,183	3,253	0.98	2606	0.0	0.0	10152	0.0	0.0
31685	260	8	8			0	383	0.00	0	416	0.00	2601	0.0	0.0	2636	0.0	0.0
31686	170	8	8			12	603	0.02	12	654	0.02	2636	0.0	0.0	2673	0.0	0.0
31687	210	8	8			12	580	0.02	12	629	0.02	2670	0.0	0.0	2636	0.0	0.0
31688	237	6	6			0	347	0.00	0	376	0.00	7669	0.0	0.0	2670	0.0	0.0
31689	380	8	8			0	368	0.00	0	399	0.00	2633	0.0	0.0	2670	0.0	0.0
31690	250	6	6			0	264	0.00	0	286	0.00	2632	0.0	0.0	2633	0.0	0.0
31691	400	21	21			3,321	5,982	0.56	4,747	6,481	0.73	2639	0.0	0.0	2608	0.0	0.0
31692	382	18	21	42	2036	3,320	3,537	0.94	4,746	5,780	0.82	2675	0.0	0.0	2639	0.0	0.0
31693	84	18	21	42	2036	3,290	3,674	0.90	4,716	6,003	0.79	2609	0.0	0.0	10151	0.0	0.0
31694	472	18	18			2,380	3,931	0.61	3,183	4,258	0.75	7250	0.0	0.0	2609	0.0	0.0
31697	340	15	15			363	1,287	0.28	393	1,394	0.28	2666	0.0	6.4	2608	0.0	0.0
31698	75	15	15			363	1,834	0.20	397	1,987	0.20	2638	0.0	0.0	2666	0.0	6.4
31699	158	8	8			19	345	0.06	19	374	0.05	2678	0.0	0.0	2638	0.0	0.0
31700	310	8	8			19	542	0.04	19	588	0.03	2679	0.0	0.0	2678	0.0	0.0
31701	141	8	8			0	663	0.00	0	719	0.00	2603	0.0	0.0	2679	0.0	0.0
31702	219	15	15			359	1,091	0.33	394	1,182	0.33	2667	0.0	0.0	2638	0.0	0.0
31703	275	8	8			347	642	0.54	384	697	0.55	2619	0.0	0.0	2668	0.0	0.0
31704	550	8	8			346	549	0.63	383	596	0.64	2637	0.0	0.0	2619	0.0	0.0
31705	265	8	8			347	422	0.82	383	457	0.84	2635	0.0	0.0	2637	0.0	0.0
31706	288	12	12			106	1,006	0.10	106	1,090	0.10	2620	0.0	0.0	2668	0.0	0.0
31707	274	8	8			13	604	0.02	13	656	0.02	7248	0.0	0.0	2620	0.0	0.0
31708	263	8	8			8	645	0.01	8	700	0.01	2621	0.0	0.0	7248	0.0	0.0
31709	235	8	8			8	483	0.02	8	524	0.01	2622	0.0	0.0	2621	0.0	0.0
31710	230	8	8			8	370	0.02	8	401	0.02	2641	0.0	0.0	2622	0.0	0.0
31711	245	8	8			5	496	0.01	5	538	0.01	2676	0.0	0.0	7248	0.0	0.0
31712	49	10	10			8	645	0.01	8	698	0.01	2677	0.0	0.0	2696	0.0	0.0
31713	252	8	8			7	367	0.02	7	397	0.02	2691	0.0	0.0	2641	0.0	0.0
31714	244	8	8			5	681	0.01	5	738	0.01	2640	0.0	0.0	2676	0.0	0.0
31715	282	12	12			85	3,884	0.02	85	4,208	0.02	2665	0.0	0.0	2696	0.0	0.0
31716	401	8	8			19	1,613	0.01	19	1,749	0.01	2663	0.0	0.0	2664	0.0	0.0
31717	113	8	8			18	1,903	0.01	18	2,064	0.01	2681	0.0	0.0	2663	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31718	83	8	8			18	1,392	0.01	18	1,509	0.01	2680	0.0	0.0	2681	0.0	0.0
31719	127	8	8			10	1,274	0.01	10	1,383	0.01	2683	0.0	0.0	2680	0.0	0.0
31720	205	8	8			8	1,260	0.01	8	1,367	0.01	7395	0.0	0.0	2680	0.0	0.0
31721	238	8	8			0	1,089	0.00	0	1,181	0.00	2652	0.0	0.0	7395	0.0	0.0
31722	184	8	8			1	1,617	0.00	1	1,755	0.00	2669	0.0	0.0	7395	0.0	0.0
31723	160	6	6			0	500	0.00	0	542	0.00	2604	0.0	0.0	2669	0.0	0.0
31724	380	12	12			54	1,587	0.03	54	1,719	0.03	2661	0.0	0.0	2660	0.0	0.0
31725	35	15	15			54	4,999	0.01	54	5,415	0.01	7176	0.0	0.0	2661	0.0	0.0
31726	159	10	10			54	2,190	0.02	54	2,371	0.02	2656	0.0	0.0	7176	0.0	0.0
31727	259	8	8			0	640	0.00	0	694	0.00	2657	0.0	0.0	2656	0.0	0.0
31728	248	8	8			0	815	0.00	0	884	0.00	2658	0.0	0.0	2657	0.0	0.0
31729	146	8	8			0	1,726	0.00	0	1,872	0.00	2682	0.0	0.0	2658	0.0	0.0
31730	172	10	10			53	2,203	0.02	53	2,384	0.02	2662	0.0	0.0	2656	0.0	0.0
31731	245	8	8			1	759	0.00	1	824	0.00	7016	0.0	0.0	2662	0.0	0.0
31732	122	8	8			0	1,177	0.00	0	1,277	0.00	2654	0.0	0.0	2692	0.0	0.0
31733	210	8	8			1	1,384	0.00	1	1,501	0.00	2655	0.0	0.0	2692	0.0	0.0
31734	350	10	10			37	1,703	0.02	37	1,844	0.02	7488	0.0	0.0	2662	0.0	0.0
31735	312	8	8			356	391	0.91	394	424	0.93	2642	0.0	0.0	2634	0.0	0.0
31736	261	8	8			0	636	0.00	0	690	0.00	2687	0.0	0.0	2642	0.0	0.0
31737	300	8	8			355	576	0.62	393	626	0.63	2651	0.0	0.0	2642	0.0	0.0
31738	135	8	8			0	963	0.00	0	1,044	0.00	7015	0.0	0.0	2651	0.0	0.0
31739	498	8	8			10	990	0.01	10	1,073	0.01	2650	0.0	0.0	2651	0.0	0.0
31740	170	8	8			356	348	1.02	394	378	1.04	7489	0.0	0.0	2651	0.0	0.0
31741	95	8	8			19	352	0.05	22	382	0.06	2686	0.0	0.0	7489	0.0	0.0
31742	270	8	8			363	872	0.42	400	946	0.42	2685	0.0	0.0	7489	0.0	0.0
31743	252	8	8			363	873	0.42	400	947	0.42	2684	0.0	0.0	2685	0.0	0.0
31744	352	12	12			223	1,012	0.22	223	1,097	0.20	2646	0.0	0.0	2625	0.0	0.0
31745	30	12	12			223	2,204	0.10	223	2,388	0.09	2647	0.0	0.0	2646	0.0	0.0
31746	303	12	12			73	774	0.09	73	839	0.09	7249	0.0	0.0	2647	0.0	0.0
31747	303	8	8			65	342	0.19	65	370	0.18	2689	0.0	0.0	7249	0.0	0.0
31748	484	8	8			0	471	0.00	0	511	0.00	2690	0.0	0.0	2689	0.0	0.0
31749	309	8	8			65	625	0.10	65	678	0.10	2614	0.0	0.0	2689	0.0	0.0
31750	267	8	8			1	913	0.00	0	990	0.00	2617	0.0	0.0	2614	0.0	0.0
31751	149	8	8			64	665	0.10	64	722	0.09	7649	0.0	0.0	2614	0.0	0.0
31752	59	8	8			0	1,078	0.00	0	1,169	0.00	2694	0.0	0.0	2613	0.0	0.0
31753	380	8	8			135	897	0.15	135	973	0.14	2688	0.0	0.0	2647	0.0	0.0
31754	205	8	8			135	1,011	0.13	135	1,097	0.12	2616	0.0	0.0	2688	0.0	0.0
31755	290	8	8			10	494	0.02	10	535	0.02	2648	0.0	0.0	2626	0.0	0.0
31756	302	8	8			6	982	0.01	6	1,065	0.01	7486	0.0	0.0	2615	0.0	0.0
31758	60	8	8			192	958	0.20	14	1,039	0.01	2697	0.8	0.0	2787	0.0	0.0
31759	287	8	12	37	ura	651	679	0.96	1,043	2,169	0.48	2719	2.8	0.0	8944	3.9	0.0
31760	305	8	12	37	ura	658	358	1.84	1,043	1,144	0.91	7018	6.6	0.0	2718	3.6	0.0
31761	19	8	8			147	1,448	0.10	28	1,570	0.02	2735	0.0	0.0	7018	6.6	0.0
31762	450	8	8			0	343	0.00	0	372	0.00	2788	0.0	0.0	2735	0.0	0.0
31763	215	8	12	37	ura	748	424	1.77	1,015	1,352	0.75	2782	0.0	0.0	7018	6.6	0.0
31764	285	8	12	37	ura	767	1,015	0.76	999	3,243	0.31	2783	0.0	0.0	2782	0.0	0.0
31765	441	8	12	37	ura	761	670	1.14	993	2,140	0.46	2784	3.7	0.0	2783	0.0	0.0
31766	278	8	8			28	938	0.03	28	1,017	0.03	2738	0.0	0.0	2735	0.0	0.0
31767	196	8	8			17	340	0.05	17	369	0.05	7490	0.0	0.0	2738	0.0	0.0
31768	249	8	8			17	349	0.05	17	378	0.04	2755	0.0	0.0	2736	0.0	0.0
31769	251	8	8			7	728	0.01	7	790	0.01	7252	0.0	0.0	2755	0.0	0.0
31770	257	8	8			0	1,123	0.00	0	1,218	0.00	2740	0.0	0.0	7490	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31771	110	8	8			0	351	0.00	0	381	0.00	2700	0.0	0.0	2740	0.0	0.0
31772	193	8	8			0	356	0.00	0	386	0.00	2701	0.0	0.0	2740	0.0	0.0
31773	92	8	8			109	438	0.25	1	475	0.00	2728	1.4	0.0	2757	0.0	0.0
31774	280	8	8			0	851	0.00	0	924	0.00	2729	0.0	0.0	2728	1.4	0.0
31775	409	8	8			0	710	0.00	0	769	0.00	2730	0.0	0.0	2729	0.0	0.0
31776	95	8	8			67	352	0.19	6	382	0.01	2727	1.5	0.0	2757	0.0	0.0
31777	244	8	8			67	784	0.09	6	851	0.01	2722	0.0	0.0	2727	1.5	0.0
31778	303	8	8			6	731	0.01	6	793	0.01	2732	0.0	0.0	2722	0.0	0.0
31779	301	8	8			0	663	0.00	0	719	0.00	2731	0.0	0.0	2732	0.0	0.0
31780	109	8	8			134	707	0.19	134	767	0.17	7177	0.0	0.0	2726	0.0	0.0
31781	223	8	8			134	681	0.20	134	740	0.18	2724	0.0	0.0	7177	0.0	0.0
31782	288	8	8			134	626	0.21	134	678	0.20	2775	0.0	0.0	2776	0.0	0.0
31783	351	8	8			119	629	0.19	119	683	0.17	2777	0.0	0.0	2775	0.0	0.0
31784	287	8	8			15	487	0.03	15	528	0.03	2761	0.0	0.0	2775	0.0	0.0
31785	379	8	8			0	697	0.00	0	756	0.00	7396	0.0	0.0	2761	0.0	0.0
31786	145	8	8			45	658	0.07	45	713	0.06	2758	0.0	0.0	7491	0.0	0.0
31787	208	8	8			45	653	0.07	45	709	0.06	7397	0.0	0.0	2758	0.0	0.0
31788	157	8	8			45	820	0.06	45	890	0.05	2723	0.0	0.0	7397	0.0	0.0
31789	302	8	8			41	671	0.06	41	728	0.06	2762	0.0	0.0	2723	0.0	0.0
31790	319	8	8			36	751	0.05	36	815	0.04	2764	0.0	0.0	2762	0.0	0.0
31791	118	8	8			0	452	0.00	0	490	0.00	2702	0.0	0.0	2763	0.0	0.0
31792	59	8	8			0	706	0.00	0	766	0.00	2763	0.0	0.0	2764	0.0	0.0
31793	111	8	8			0	576	0.00	0	624	0.00	2703	0.0	0.0	2765	0.0	0.0
31794	401	8	8			0	382	0.00	0	415	0.00	7020	0.0	0.0	2762	0.0	0.0
31795	162	8	8			0	910	0.00	0	988	0.00	2704	0.0	0.0	7020	0.0	0.0
31796	271	8	8			35	780	0.05	35	846	0.04	2766	0.0	0.0	2765	0.0	0.0
31797	229	8	8			0	664	0.00	0	720	0.00	2760	0.0	0.0	2766	0.0	0.0
31798	373	8	8			30	610	0.05	30	661	0.05	2767	0.0	0.0	2766	0.0	0.0
31799	352	8	8			30	822	0.04	30	891	0.03	2768	0.0	0.0	2767	0.0	0.0
31800	367	8	8			0	676	0.00	0	734	0.00	2759	0.0	0.0	7396	0.0	0.0
31801	388	10	10			115	660	0.17	115	715	0.16	2779	0.0	0.0	2778	0.0	0.0
31802	137	8	8			0	728	0.00	0	790	0.00	2706	0.0	0.0	2759	0.0	0.0
31803	309	10	10			106	674	0.16	106	729	0.15	2780	0.0	0.0	2779	0.0	0.0
31804	324	10	10			94	1,476	0.06	94	1,598	0.06	7253	0.0	0.0	2780	0.0	0.0
31805	158	8	8			88	858	0.10	88	931	0.09	7492	0.0	0.0	7253	0.0	0.0
31806	51	10	10			88	715	0.12	88	774	0.11	2781	0.0	0.0	7492	0.0	0.0
31807	322	8	8			13	392	0.03	13	425	0.03	2772	0.0	0.0	2780	0.0	0.0
31808	205	8	8			13	823	0.02	13	893	0.01	2773	0.0	0.0	2772	0.0	0.0
31809	270	8	8			0	781	0.00	0	847	0.00	2769	0.0	0.0	2772	0.0	0.0
31810	58	8	8			0	637	0.00	0	691	0.00	2770	0.0	0.0	2769	0.0	0.0
31811	76	8	8			0	556	0.00	0	603	0.00	2707	0.0	0.0	2770	0.0	0.0
31812	280	8	8			0	492	0.00	0	533	0.00	2771	0.0	0.0	2773	0.0	0.0
31813	191	8	8			4	524	0.01	4	568	0.01	2774	0.0	0.0	2773	0.0	0.0
31814	281	8	8			0	792	0.00	0	860	0.00	2789	0.0	0.0	7178	0.0	0.0
31815	150	8	8			0	396	0.00	0	430	0.00	2709	0.0	0.0	2789	0.0	0.0
31816	282	8	8			0	638	0.00	0	692	0.00	7251	0.0	0.0	2730	0.0	0.0
31817	405	8	12	37	ura	765	669	1.14	988	2,138	0.46	2786	0.5	0.0	2785	1.7	0.0
31818	378	8	12	37	ura	769	713	1.08	981	2,277	0.43	2787	0.0	0.0	2786	0.5	0.0
31819	211	8	8			6	703	0.01	6	762	0.01	2741	0.0	0.0	2784	3.7	0.0
31820	218	8	8			0	972	0.00	0	1,055	0.00	2710	0.0	0.0	2741	0.0	0.0
31821	290	8	8			0	663	0.00	0	719	0.00	2733	0.0	0.0	2754	0.0	0.0
31822	207	8	8			42	401	0.10	42	435	0.10	2753	0.0	0.0	2756	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31823	276	8	8			13	403	0.03	13	437	0.03	2716	0.0	0.0	2753	0.0	0.0
31824	31	8	8			0	377	0.00	0	409	0.00	2791	0.0	0.0	2716	0.0	0.0
31825	77	8	8			16	499	0.03	16	540	0.03	2747	0.0	0.0	2717	0.0	0.0
31826	132	8	8			16	383	0.04	16	416	0.04	2748	0.0	0.0	2747	0.0	0.0
31827	75	8	8			16	381	0.04	16	413	0.04	7019	0.0	0.0	2748	0.0	0.0
31828	71	8	8			16	770	0.02	16	835	0.02	2746	0.0	0.0	7019	0.0	0.0
31829	306	8	8			15	347	0.04	15	376	0.04	2745	0.0	0.0	2746	0.0	0.0
31830	48	8	8			1	501	0.00	1	544	0.00	2744	0.0	0.0	2745	0.0	0.0
31831	336	8	8			0	338	0.00	0	366	0.00	2743	0.0	0.0	2744	0.0	0.0
31832	125	8	8			0	946	0.00	0	1,026	0.00	2742	0.0	0.0	2743	0.0	0.0
31833	144	8	8			0	1,108	0.00	0	1,201	0.00	2712	0.0	0.0	2742	0.0	0.0
31834	457	8	8			0	794	0.00	0	862	0.00	2752	0.0	0.0	2745	0.0	0.0
31835	253	8	8			0	409	0.00	0	444	0.00	2751	0.0	0.0	2752	0.0	0.0
31836	123	8	8			0	397	0.00	0	431	0.00	2713	0.0	0.0	2751	0.0	0.0
31837	98	8	8			0	603	0.00	0	653	0.00	2749	0.0	0.0	2717	0.0	0.0
31838	264	8	8			0	501	0.00	0	543	0.00	2750	0.0	0.0	2749	0.0	0.0
31839	103	6	6			0	278	0.00	0	302	0.00	2714	0.0	0.0	2750	0.0	0.0
31840	328	8	8			160	417	0.38	17	453	0.04	2757	0.0	0.0	2782	0.0	0.0
31841	230	6	6			1	233	0.01	1	252	0.01	2817	0.0	0.0	2818	0.0	0.0
31842	155	8	8			0	1,618	0.00	0	1,755	0.00	2820	0.0	0.0	2819	0.0	0.0
31843	28	10	10			17	3,303	0.01	17	3,575	0.00	2815	0.0	0.0	2816	0.0	0.0
31844	182	8	8			1	1,266	0.00	1	1,267	0.00	2808	0.0	0.0	2809	0.0	0.0
31845	169	8	8			1	835	0.00	1	835	0.00	2807	0.0	0.0	2808	0.0	0.0
31846	141	8	8			1	1,200	0.00	1	1,201	0.00	2809	0.0	0.0	2810	0.0	0.0
31847	185	8	8			169	893	0.19	169	894	0.19	2810	0.0	0.0	2811	0.0	0.0
31848	273	8	8			170	1,684	0.10	170	1,686	0.10	2811	0.0	0.0	2822	0.0	0.0
31849	135	8	8			1	1,719	0.00	1	1,722	0.00	2812	0.0	0.0	2822	0.0	0.0
31850	363	8	8			1	853	0.00	1	854	0.00	2813	0.0	0.0	2812	0.0	0.0
31851	85	8	8			1	1,650	0.00	1	1,652	0.00	2823	0.0	0.0	2813	0.0	0.0
31852	184	8	8			172	635	0.27	172	635	0.27	2822	0.0	0.0	2824	0.0	0.0
31853	170	8	8			267	931	0.29	267	932	0.29	2825	0.0	0.0	2826	0.0	0.0
31854	82	8	8			13	899	0.01	13	975	0.01	2829	0.0	0.0	2828	0.0	0.0
31855	193	8	8			12	1,649	0.01	12	1,788	0.01	2830	0.0	0.0	2829	0.0	0.0
31856	90	6	6			1	774	0.00	1	838	0.00	2818	0.0	0.0	2797	0.0	0.0
31857	32	8	8			1	1,639	0.00	1	1,778	0.00	2797	0.0	0.0	2814	0.0	0.0
31858	468	8	8			46	625	0.07	46	626	0.07	2831	0.0	0.0	2824	0.0	0.0
31869	360	21	21			4,190	7,200	0.58	5,607	7,801	0.72	2866	0.0	0.0	2878	0.0	0.0
31870	277	21	21			4,221	7,074	0.60	5,612	7,663	0.73	2867	0.0	4.9	2868	0.0	3.9
31871	420	21	21			4,253	7,837	0.54	5,642	8,490	0.66	2880	0.0	4.4	2865	0.0	3.6
31872	56	8	8			32	324	0.10	38	351	0.11	3765	0.0	0.0	2881	0.0	4.7
31873	347	8	8			299	586	0.51	299	587	0.51	2872	0.0	0.0	7493	0.0	0.0
31874	337	8	8			299	343	0.87	299	344	0.87	2882	0.0	0.0	2872	0.0	0.0
31875	57	8	8			327	1,528	0.21	327	1,530	0.21	7493	0.0	0.0	2851	0.0	0.0
31878	244	8	8			33	269	0.12	62	292	0.21	2879	0.0	4.7	2878	0.0	0.0
31879	6	8	8			32	700	0.05	49	760	0.06	2879	0.0	4.7	2881	0.0	4.7
31890	301	42	42			4,656	32,405	0.14	4,656	32,405	0.14	2850	0.0	0.0	7745	0.0	0.0
31891	414	42	42			4,656	37,004	0.13	4,656	37,004	0.13	7745	0.0	0.0	2851	0.0	0.0
31892	359	48	48			4,928	29,073	0.17	4,928	29,073	0.17	2851	0.0	0.0	2852	0.0	0.0
31893	213	48	48			4,928	28,629	0.17	4,928	28,629	0.17	2852	0.0	0.0	9624	0.0	0.0
31894	313	48	48			4,960	38,738	0.13	4,960	38,738	0.13	9624	0.0	0.0	2854	0.0	0.0
31895	421	48	48			4,960	28,799	0.17	4,960	28,799	0.17	2854	0.0	0.0	2855	0.0	0.0
31896	174	54	54			4,960	34,768	0.14	4,960	34,768	0.14	2855	0.0	0.0	2856	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31897	137	54	54			4,960	35,369	0.14	4,963	35,369	0.14	2857	0.0	0.0	2858	0.0	0.0
31898	277	54	54			4,960	35,575	0.14	4,985	35,575	0.14	2858	0.0	0.0	2859	0.0	0.0
31899	19	15	15			4,251	10,939	0.39	5,642	10,939	0.52	2861	0.0	0.0	2860	0.0	7.4
31901	74	15	15			4,251	7,117	0.60	5,642	7,710	0.73	2865	0.0	3.6	2862	8.7	4.2
31902	148	8	8			1,107	685	1.62	1,457	686	2.12	2862	8.7	4.2	2861	0.0	0.0
31903	44	15	15			4,252	6,185	0.69	5,917	6,185	0.96	2860	0.0	7.4	2859	0.0	0.0
31904	314	54	54			9,181	29,044	0.32	10,592	29,044	0.36	2859	0.0	0.0	2863	0.0	0.0
31911	124	8	8			14	990	0.01	14	1,074	0.01	2920	0.0	0.0	2924	0.0	0.0
31912	320	8	8			0	692	0.00	0	750	0.00	2947	0.0	0.0	7254	0.0	0.0
31913	150	8	8			0	701	0.00	0	761	0.00	2910	0.0	0.0	2947	0.0	0.0
31914	175	8	8			0	385	0.00	0	417	0.00	2911	0.0	0.0	2910	0.0	0.0
31915	87	21	21			3,695	4,822	0.77	5,119	5,224	0.98	2921	0.0	0.0	2922	0.0	0.0
31916	314	21	21			3,674	9,881	0.37	5,099	10,704	0.48	2948	0.0	0.0	2921	0.0	0.0
31917	351	21	21			3,674	8,806	0.42	5,099	9,539	0.53	2912	0.0	0.0	2908	0.0	0.0
31918	125	21	21			3,806	7,140	0.53	5,228	7,735	0.68	7495	0.0	0.0	2926	0.0	0.0
31920	175	21	21			3,805	9,527	0.40	5,228	10,321	0.51	2924	0.0	0.0	2925	0.0	0.0
31921	88	21	21			3,791	9,530	0.40	5,215	10,324	0.51	2923	0.0	0.0	2924	0.0	0.0
31922	545	8	8			13	1,159	0.01	13	1,257	0.01	2946	0.0	0.0	2944	0.0	0.0
31923	110	8	8			1	283	0.00	1	307	0.00	2909	0.0	0.0	2946	0.0	0.0
31924	107	8	8			101	492	0.21	101	533	0.19	2949	0.0	0.0	8522	0.0	0.0
31925	70	8	8			82	472	0.17	82	512	0.16	7132	0.0	0.0	2949	0.0	0.0
31926	148	8	8			82	482	0.17	82	523	0.16	2950	0.0	0.0	7132	0.0	0.0
31927	330	8	8			82	445	0.18	82	483	0.17	2927	0.0	0.0	2950	0.0	0.0
31928	178	8	8			45	413	0.11	45	447	0.10	2951	0.0	0.0	2927	0.0	0.0
31929	79	8	8			45	460	0.10	45	500	0.09	2952	0.0	0.0	2951	0.0	0.0
31930	110	8	8			45	463	0.10	45	502	0.09	2953	0.0	0.0	2952	0.0	0.0
31931	285	8	8			14	408	0.03	14	442	0.03	2954	0.0	0.0	2953	0.0	0.0
31932	249	8	8			13	806	0.02	13	874	0.02	2955	0.0	0.0	2954	0.0	0.0
31933	269	8	8			13	806	0.02	13	874	0.02	2956	0.0	0.0	2955	0.0	0.0
31934	371	8	8			36	415	0.09	36	450	0.08	7023	0.0	0.0	2928	0.0	0.0
31935	455	8	8			28	743	0.04	28	806	0.03	2957	0.0	0.0	7023	0.0	0.0
31936	47	8	8			28	1,957	0.01	28	2,123	0.01	2980	0.0	0.0	2957	0.0	0.0
31937	450	8	8			0	478	0.00	0	519	0.00	7494	0.0	0.0	2909	0.0	0.0
31938	57	8	8			0	387	0.00	0	419	0.00	2983	0.0	0.0	7494	0.0	0.0
31939	303	8	8			0	346	0.00	0	375	0.00	2945	0.0	0.0	2909	0.0	0.0
31940	357	8	8			30	1,040	0.03	30	1,041	0.03	2933	0.0	0.0	2932	0.0	0.0
31941	314	8	8			1	1,078	0.00	1	1,080	0.00	2934	0.0	0.0	2933	0.0	0.0
31942	294	8	8			268	528	0.51	268	529	0.51	2931	0.0	0.0	2932	0.0	0.0
31943	444	8	8			45	1,074	0.04	45	1,076	0.04	2940	0.0	0.0	2958	0.0	0.0
31944	297	8	8			1	1,579	0.00	1	1,581	0.00	2942	0.0	0.0	2941	0.0	0.0
31945	183	8	8			4	1,169	0.00	4	1,269	0.00	2943	0.0	0.0	2959	0.0	0.0
31946	210	8	8			4	1,390	0.00	4	1,508	0.00	7022	0.0	0.0	2943	0.0	0.0
31947	238	8	8			4	1,419	0.00	4	1,539	0.00	7255	0.0	0.0	7022	0.0	0.0
31948	144	8	8			0	1,551	0.00	0	1,683	0.00	2982	0.0	0.0	7022	0.0	0.0
31949	36	6	6			0	990	0.00	0	1,073	0.00	7672	0.0	0.0	7256	0.0	0.0
31950	230	6	6			1	859	0.00	1	931	0.00	2914	0.0	0.0	2915	0.0	0.0
31951	287	6	6			1	837	0.00	1	907	0.00	2939	0.0	0.0	2914	0.0	0.0
31952	90	8	8			28	677	0.04	28	735	0.04	2961	0.0	0.0	2980	0.0	0.0
31953	128	8	8			20	1,017	0.02	20	1,103	0.02	2919	0.0	0.0	2961	0.0	0.0
31954	116	8	8			10	1,150	0.01	10	1,247	0.01	2918	0.0	0.0	2919	0.0	0.0
31955	98	8	8			10	1,194	0.01	10	1,294	0.01	2917	0.0	0.0	2918	0.0	0.0
31956	125	8	8			5	1,173	0.00	5	1,272	0.00	2916	0.0	0.0	2917	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
31957	110	8	8			5	1,181	0.00	5	1,281	0.00	2935	0.0	0.0	2916	0.0	0.0
31958	127	8	8			1	1,319	0.00	1	1,431	0.00	2936	0.0	0.0	2935	0.0	0.0
31959	250	6	6			0	193	0.00	0	209	0.00	2894	0.0	0.0	2961	0.0	0.0
31960	197	8	8			7	749	0.01	7	812	0.01	2962	0.0	0.0	2961	0.0	0.0
31961	308	8	8			7	346	0.02	7	375	0.02	2963	0.0	0.0	2962	0.0	0.0
31962	128	8	8			1	1,432	0.00	1	1,553	0.00	2964	0.0	0.0	2963	0.0	0.0
31963	148	8	8			1	1,316	0.00	1	1,428	0.00	2965	0.0	0.0	2964	0.0	0.0
31964	106	8	8			1	1,694	0.00	1	1,838	0.00	2966	0.0	0.0	2913	0.0	0.0
31965	130	8	8			0	1,733	0.00	0	1,880	0.00	2938	0.0	0.0	2966	0.0	0.0
31966	226	6	6			0	806	0.00	0	873	0.00	2895	0.0	0.0	2938	0.0	0.0
31967	238	6	6			0	765	0.00	0	829	0.00	2967	0.0	0.0	2913	0.0	0.0
31968	238	6	6			0	662	0.00	0	717	0.00	2897	0.0	0.0	2965	0.0	0.0
31969	76	8	8			0	880	0.00	0	955	0.00	2937	0.0	0.0	2936	0.0	0.0
31970	145	6	6			0	678	0.00	0	735	0.00	2899	0.0	0.0	2937	0.0	0.0
31971	260	8	8			0	858	0.00	0	931	0.00	7496	0.0	0.0	2935	0.0	0.0
31972	107	6	6			0	428	0.00	0	464	0.00	2900	0.0	0.0	2935	0.0	0.0
31973	109	6	6			0	426	0.00	0	462	0.00	2901	0.0	0.0	2916	0.0	0.0
31974	159	6	6			0	346	0.00	0	375	0.00	2902	0.0	0.0	2936	0.0	0.0
31975	175	8	8			0	1,290	0.00	0	1,400	0.00	2968	0.0	0.0	2919	0.0	0.0
31976	194	6	6			0	193	0.00	0	209	0.00	2903	0.0	0.0	2968	0.0	0.0
31977	101	8	8			0	773	0.00	0	838	0.00	2969	0.0	0.0	2917	0.0	0.0
31978	179	6	6			0	526	0.00	0	570	0.00	2904	0.0	0.0	2969	0.0	0.0
31979	100	8	8			4	972	0.00	4	1,054	0.00	2970	0.0	0.0	2917	0.0	0.0
31980	331	8	8			1	345	0.00	1	374	0.00	2971	0.0	0.0	2970	0.0	0.0
31981	99	8	8			1	1,308	0.00	1	1,419	0.00	2972	0.0	0.0	2971	0.0	0.0
31982	103	8	8			1	1,000	0.00	1	1,085	0.00	2973	0.0	0.0	2972	0.0	0.0
31983	185	6	6			0	310	0.00	0	335	0.00	2906	0.0	0.0	2973	0.0	0.0
31984	98	8	8			0	775	0.00	0	840	0.00	2974	0.0	0.0	2973	0.0	0.0
31985	220	6	6			0	360	0.00	0	390	0.00	2907	0.0	0.0	2974	0.0	0.0
31986	312	8	8			0	576	0.00	0	625	0.00	2976	0.0	0.0	2919	0.0	0.0
31987	30	8	8			1	1,273	0.00	1	1,274	0.00	2981	0.0	0.0	2934	0.0	0.0
31992	255	8	8			1	347	0.00	1	347	0.00	2995	0.0	0.0	3036	0.0	0.0
31993	282	8	12	13	Existing	698	383	1.82	744	1,131	0.66	3055	4.4	0.0	3006	0.0	0.0
31994	299	8	12	13	Existing	697	396	1.76	742	1,166	0.64	3056	1.5	0.0	3055	4.4	0.0
31995	88	8	12	13	Existing	695	421	1.65	740	1,241	0.60	3013	0.2	0.0	3056	1.5	0.0
31996	335	8	8			219	592	0.37	219	594	0.37	3021	3.0	0.0	3013	0.2	0.0
31997	302	8	8			173	343	0.50	173	344	0.50	3057	0.0	0.0	7497	0.0	0.0
31998	365	8	8			3	726	0.00	3	728	0.00	3009	0.0	0.0	3019	0.0	0.0
31999	195	8	8			1	585	0.00	1	586	0.00	3058	0.0	0.0	3009	0.0	0.0
32000	300	8	8			172	340	0.50	172	340	0.50	7726	0.0	0.0	3057	0.0	0.0
32001	122	8	8			3	347	0.01	3	348	0.01	7499	0.0	0.0	7726	0.0	0.0
32002	180	8	8			1	338	0.00	1	339	0.00	7673	0.0	0.0	7499	0.0	0.0
32003	74	8	8			167	340	0.49	167	340	0.49	3043	0.0	0.0	7726	0.0	0.0
32004	205	8	8			443	367	1.21	472	368	1.28	3014	0.0	0.0	3013	0.2	0.0
32005	334	8	8			349	569	0.61	360	569	0.63	3016	0.0	0.0	3014	0.0	0.0
32006	335	8	8			301	406	0.74	301	407	0.74	3015	1.9	0.0	3016	0.0	0.0
32007	410	8	8			26	344	0.08	19	344	0.05	3017	3.7	0.0	3015	1.9	0.0
32008	340	8	8			249	434	0.57	248	435	0.57	3026	3.2	0.0	3015	1.9	0.0
32009	297	8	8			247	627	0.39	246	628	0.39	3027	0.0	0.0	3026	3.2	0.0
32010	320	8	8			218	542	0.40	218	542	0.40	3028	0.0	0.0	3027	0.0	0.0
32011	320	8	8			217	545	0.40	217	546	0.40	3036	0.0	0.0	3028	0.0	0.0
32012	40	8	8			213	285	0.75	213	285	0.75	3037	0.0	0.0	3036	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32013	350	8	8			22	343	0.06	22	344	0.06	7133	0.0	0.0	3037	0.0	0.0
32014	300	8	8			38	594	0.06	32	595	0.05	7024	2.6	0.0	3016	0.0	0.0
32015	325	8	8			31	544	0.06	31	544	0.06	3024	0.0	0.0	7024	2.6	0.0
32016	323	8	8			3	542	0.01	3	543	0.01	3025	0.0	0.0	3024	0.0	0.0
32017	310	8	8			1	542	0.00	1	543	0.00	3040	0.0	0.0	3025	0.0	0.0
32018	208	8	8			85	594	0.14	84	594	0.14	7399	2.3	0.0	10153	0.0	0.0
32019	266	8	8			56	565	0.10	56	565	0.10	3023	0.0	0.0	3022	0.0	0.0
32020	372	8	8			55	567	0.10	55	567	0.10	3041	0.0	0.0	3023	0.0	0.0
32021	35	8	8			53	467	0.11	53	468	0.11	3042	0.0	0.0	3041	0.0	0.0
32023	465	8	8			11	413	0.03	11	414	0.03	3059	0.0	0.0	3042	0.0	0.0
32024	390	8	8			1	581	0.00	1	581	0.00	3031	0.0	0.0	3063	0.0	0.0
32025	113	8	8			3	725	0.00	3	726	0.00	7259	0.0	0.0	3033	0.0	0.0
32026	357	8	8			1	452	0.00	1	453	0.00	3032	0.0	0.0	7259	0.0	0.0
32027	175	6	6			1	233	0.01	1	233	0.01	2996	0.0	0.0	3061	0.0	0.0
32028	115	8	8			1	715	0.00	1	716	0.00	2997	0.0	0.0	3061	0.0	0.0
32029	338	8	8			69	179	0.39	69	180	0.39	3030	0.0	0.0	3035	0.0	0.0
32030	284	8	8			75	344	0.22	75	344	0.22	3063	0.0	0.0	3035	0.0	0.0
32031	140	8	8			52	389	0.13	52	390	0.13	3034	0.0	0.0	3063	0.0	0.0
32032	91	8	8			50	402	0.12	50	403	0.12	3033	0.0	0.0	3034	0.0	0.0
32033	120	8	8			25	428	0.06	25	429	0.06	3060	0.0	0.0	3033	0.0	0.0
32034	225	8	8			40	384	0.10	40	385	0.10	3039	0.0	0.0	3042	0.0	0.0
32035	406	8	8			18	386	0.05	18	387	0.05	7498	0.0	0.0	3039	0.0	0.0
32037	178	8	8			19	364	0.05	19	364	0.05	7025	0.0	0.0	3038	0.0	0.0
32039	220	8	8			17	713	0.02	17	714	0.02	3045	0.0	0.0	3046	0.0	0.0
32040	58	8	8			15	528	0.03	15	529	0.03	2998	0.0	0.0	3045	0.0	0.0
32041	99	8	8			22	545	0.04	22	546	0.04	3047	0.0	0.0	3048	0.0	0.0
32042	102	8	8			19	563	0.03	19	564	0.03	2999	0.0	0.0	3047	0.0	0.0
32043	417	8	8			64	518	0.12	64	519	0.12	3048	0.0	0.0	3051	0.0	0.0
32044	247	8	8			41	394	0.10	41	394	0.10	3046	0.0	0.0	3048	0.0	0.0
32045	187	8	8			23	452	0.05	23	453	0.05	3044	0.0	0.0	3046	0.0	0.0
32046	306	8	8			22	643	0.03	22	644	0.03	3010	0.0	0.0	3044	0.0	0.0
32047	332	8	8			19	298	0.07	19	298	0.07	7258	0.0	0.0	3010	0.0	0.0
32048	204	8	8			29	769	0.04	29	770	0.04	3062	0.0	0.0	3051	0.0	0.0
32049	456	8	8			28	596	0.05	28	597	0.05	3050	0.0	0.0	3062	0.0	0.0
32050	330	8	8			1	347	0.00	1	347	0.00	3049	0.0	0.0	3050	0.0	0.0
32051	407	8	8			31	488	0.06	31	489	0.06	3053	0.0	0.0	7260	0.0	0.0
32052	354	8	8			29	676	0.04	29	677	0.04	3054	0.0	0.0	3053	0.0	0.0
32053	237	8	8			27	899	0.03	27	899	0.03	3012	0.0	0.0	3054	0.0	0.0
32054	407	8	8			24	381	0.06	24	381	0.06	3011	0.0	0.0	3012	0.0	0.0
32055	148	8	8			1	378	0.00	1	378	0.00	3000	0.0	0.0	3011	0.0	0.0
32065	240	15	15			1,506	2,613	0.58	1,552	2,613	0.59	3130	0.0	0.0	3111	7.0	7.1
32066	183	8	8			1	415	0.00	1	415	0.00	7674	0.0	0.0	3104	0.0	0.0
32067	287	12	12			625	1,167	0.54	625	1,167	0.54	3103	0.0	0.0	3105	0.0	0.0
32068	298	12	12			585	1,127	0.52	585	1,127	0.52	7261	0.0	0.0	3103	0.0	0.0
32069	287	12	12			524	1,144	0.46	524	1,144	0.46	3131	0.0	0.0	7261	0.0	0.0
32070	15	15	15			626	1,674	0.37	626	1,674	0.37	3105	0.0	0.0	3130	0.0	0.0
32071	306	10	10			877	944	0.93	923	944	0.98	3107	0.0	0.0	3106	0.0	0.0
32072	395	10	10			841	908	0.93	886	908	0.98	7262	0.0	0.0	3107	0.0	0.0
32073	237	10	10			839	691	1.21	885	691	1.28	3114	6.2	6.0	7262	0.0	0.0
32074	250	8	8			38	623	0.06	38	624	0.06	3102	0.0	0.0	3103	0.0	0.0
32075	250	8	8			36	564	0.06	36	565	0.06	3101	0.0	0.0	3102	0.0	0.0
32076	250	8	8			35	469	0.07	35	469	0.07	3100	0.0	0.0	3101	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32077	225	8	8			1	470	0.00	1	471	0.00	7179	0.0	0.0	3100	0.0	0.0
32078	350	8	8			73	540	0.14	73	540	0.13	7263	0.0	0.0	3109	0.0	0.0
32079	300	8	8			1	382	0.00	1	383	0.00	3108	0.0	0.0	7263	0.0	0.0
32080	250	8	8			60	488	0.12	60	488	0.12	3096	0.0	0.0	7261	0.0	0.0
32081	255	8	8			59	483	0.12	59	483	0.12	3097	0.0	0.0	3096	0.0	0.0
32082	230	8	8			33	488	0.07	33	488	0.07	3099	0.0	0.0	3097	0.0	0.0
32083	46	8	8			32	486	0.07	32	487	0.07	3098	0.0	0.0	3099	0.0	0.0
32084	134	8	8			31	492	0.06	31	492	0.06	3132	0.0	0.0	3098	0.0	0.0
32085	230	8	8			1	433	0.00	1	434	0.00	7027	0.0	0.0	3132	0.0	0.0
32086	202	8	8			3	400	0.01	3	401	0.01	3133	0.0	0.0	3132	0.0	0.0
32087	298	12	12			493	1,153	0.43	493	1,153	0.43	3095	0.0	0.0	3131	0.0	0.0
32088	271	12	12			456	1,153	0.40	456	1,153	0.40	3089	0.0	0.0	3095	0.0	0.0
32089	12	12	12			455	1,131	0.40	455	1,131	0.40	3090	0.0	0.0	3089	0.0	0.0
32090	300	12	12			437	1,526	0.29	437	1,526	0.29	3134	0.0	0.0	3090	0.0	0.0
32091	273	12	12			435	1,509	0.29	435	1,509	0.29	3091	0.0	0.0	3134	0.0	0.0
32092	28	8	8			132	340	0.39	132	340	0.39	3081	0.0	0.0	3082	0.0	0.0
32093	425	8	8			299	394	0.76	299	395	0.76	3083	0.0	0.0	3082	0.0	0.0
32094	249	8	8			6	583	0.01	6	583	0.01	3136	0.0	0.0	3095	0.0	0.0
32095	250	8	8			5	467	0.01	5	467	0.01	3094	0.0	0.0	3136	0.0	0.0
32096	250	8	8			3	453	0.01	3	454	0.01	3093	0.0	0.0	3094	0.0	0.0
32097	200	8	8			1	453	0.00	1	454	0.00	3092	0.0	0.0	3093	0.0	0.0
32098	211	8	8			1	397	0.00	1	397	0.00	7502	0.0	0.0	3133	0.0	0.0
32099	250	8	8			27	423	0.06	27	424	0.06	3138	0.0	0.0	3137	0.0	0.0
32100	200	8	8			26	425	0.06	26	426	0.06	7400	0.0	0.0	3138	0.0	0.0
32101	300	8	8			92	358	0.26	92	359	0.26	3088	0.0	0.0	3087	0.0	0.0
32103	205	6	6			3	303	0.01	3	303	0.01	3086	0.0	0.0	10540	0.0	0.0
32104	312	6	6			1	226	0.01	1	226	0.01	3071	0.0	0.0	3086	0.0	0.0
32105	338	8	8			37	488	0.08	37	488	0.08	3085	0.0	0.0	3139	0.0	0.0
32106	237	8	8			3	509	0.01	3	510	0.01	3084	0.0	0.0	3085	0.0	0.0
32107	300	6	6			1	252	0.01	1	252	0.01	3144	0.0	0.0	3085	0.0	0.0
32108	207	8	8			297	344	0.86	297	344	0.86	3126	0.0	0.0	3083	0.0	0.0
32109	214	8	8			77	346	0.22	77	347	0.22	3125	0.0	0.0	3126	0.0	0.0
32110	53	8	8			17	224	0.07	17	224	0.07	3122	0.0	0.0	3124	0.0	0.0
32111	251	8	8			13	536	0.02	13	537	0.02	3120	0.0	0.0	3121	0.0	0.0
32112	285	8	8			97	343	0.28	97	344	0.28	3128	0.0	0.0	3081	0.0	0.0
32113	150	8	8			92	349	0.26	92	349	0.26	3129	0.0	0.0	3128	0.0	0.0
32114	275	8	8			62	343	0.18	62	344	0.18	3112	0.0	0.0	3129	0.0	0.0
32115	250	8	8			58	453	0.13	58	454	0.13	7026	0.0	0.0	3112	0.0	0.0
32116	250	8	8			31	427	0.07	31	428	0.07	7501	0.0	0.0	7026	0.0	0.0
32117	297	8	8			26	472	0.05	26	473	0.05	3119	0.0	0.0	7501	0.0	0.0
32118	250	8	8			24	473	0.05	24	474	0.05	3074	0.0	0.0	3119	0.0	0.0
32119	294	8	8			3	408	0.01	3	408	0.01	3118	0.0	0.0	7026	0.0	0.0
32120	251	6	6			1	207	0.01	1	207	0.01	3140	0.0	0.0	3118	0.0	0.0
32121	408	8	8			1	342	0.00	1	342	0.00	3113	0.0	0.0	3112	0.0	0.0
32122	191	8	8			3	342	0.01	3	342	0.01	3127	0.0	0.0	3128	0.0	0.0
32123	89	6	6			1	160	0.01	1	160	0.01	3075	0.0	0.0	3127	0.0	0.0
32124	120	8	8			57	340	0.17	57	340	0.17	3123	0.0	0.0	3124	0.0	0.0
32125	147	6	6			1	178	0.01	1	178	0.01	3076	0.0	0.0	3120	0.0	0.0
32126	235	10	10			705	694	1.02	750	694	1.08	3115	6.8	6.5	3114	6.2	6.0
32127	210	10	10			703	685	1.03	749	685	1.09	3116	7.7	7.2	3115	6.8	6.5
32128	12	15	15			1,538	2,511	0.61	1,588	2,511	0.63	3111	7.0	7.1	3080	0.0	0.0
32129	380	10	10			701	690	1.02	747	690	1.08	3117	8.5	7.7	3116	7.7	7.2

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32130	35	6	6			1	233	0.01	1	233	0.01	3141	0.0	0.0	3084	0.0	0.0
32133	382	8	8			227	348	0.65	227	348	0.65	3177	0.0	0.0	3158	0.0	0.0
32134	223	8	8			141	174	0.81	141	174	0.81	3178	0.0	0.0	3177	0.0	0.0
32138	220	8	8			85	665	0.13	85	666	0.13	3179	0.0	0.0	7503	0.0	0.0
32139	82	8	8			85	424	0.20	85	424	0.20	3180	0.0	0.0	3179	0.0	0.0
32140	184	8	8			1	722	0.00	1	723	0.00	3193	0.0	0.0	7503	0.0	0.0
32141	299	6	6			1	252	0.00	1	252	0.00	3148	0.0	0.0	3193	0.0	0.0
32142	295	8	8			140	402	0.35	140	403	0.35	3194	0.0	0.0	3176	0.0	0.0
32143	107	8	8			53	410	0.13	53	410	0.13	7401	0.0	0.0	3194	0.0	0.0
32144	83	8	8			48	638	0.08	48	640	0.07	7402	0.0	0.0	7401	0.0	0.0
32145	147	8	8			1	419	0.00	1	420	0.00	3195	0.0	0.0	7402	0.0	0.0
32146	295	8	8			1	420	0.00	1	421	0.00	3173	0.0	0.0	3195	0.0	0.0
32147	95	8	8			5	405	0.01	5	406	0.01	3174	0.0	0.0	7401	0.0	0.0
32148	217	8	8			3	344	0.01	3	344	0.01	3172	0.0	0.0	7264	0.0	0.0
32149	300	8	8			35	357	0.10	35	358	0.10	3196	0.0	0.0	3194	0.0	0.0
32150	300	8	8			35	313	0.11	35	314	0.11	3168	0.0	0.0	3196	0.0	0.0
32151	225	8	8			34	383	0.09	34	383	0.09	3165	0.0	0.0	3168	0.0	0.0
32152	143	8	8			3	345	0.01	3	346	0.01	3197	0.0	0.0	3172	0.0	0.0
32153	44	8	8			1	601	0.00	1	601	0.00	3171	0.0	0.0	3197	0.0	0.0
32154	73	8	8			1	632	0.00	1	633	0.00	3163	0.0	0.0	3197	0.0	0.0
32155	135	6	6			1	310	0.00	1	310	0.00	3169	0.0	0.0	3163	0.0	0.0
32156	71	8	8			1	542	0.00	1	543	0.00	3170	0.0	0.0	3169	0.0	0.0
32157	310	8	8			1	383	0.00	1	384	0.00	3185	0.0	0.0	3184	0.0	0.0
32158	225	8	8			14	383	0.04	14	383	0.04	3183	0.0	0.0	3184	0.0	0.0
32159	189	8	8			63	425	0.15	63	426	0.15	3184	0.0	0.0	3187	0.0	0.0
32160	326	8	8			1	329	0.00	1	329	0.00	3198	0.0	0.0	3187	0.0	0.0
32161	173	8	8			83	369	0.23	83	369	0.23	3200	0.0	0.0	3199	0.0	0.0
32162	38	8	8			83	440	0.19	83	440	0.19	3201	0.0	0.0	3200	0.0	0.0
32163	66	8	8			83	390	0.21	83	390	0.21	3187	0.0	0.0	3201	0.0	0.0
32164	75	8	8			1	420	0.00	1	421	0.00	3217	0.0	0.0	3183	0.0	0.0
32165	186	8	8			13	460	0.03	13	461	0.03	3182	0.0	0.0	3183	0.0	0.0
32166	10	8	8			84	924	0.09	84	925	0.09	3147	0.0	0.0	3180	0.0	0.0
32167	88	8	8			1	1,020	0.00	1	1,022	0.00	3186	0.0	0.0	3187	0.0	0.0
32168	73	8	8			1	386	0.00	1	387	0.00	3150	0.0	0.0	3186	0.0	0.0
32169	300	8	8			13	503	0.02	13	503	0.02	3181	0.0	0.0	3182	0.0	0.0
32170	136	8	8			1	979	0.00	1	981	0.00	3202	0.0	0.0	3171	0.0	0.0
32171	189	8	8			1	226	0.00	1	227	0.00	3204	0.0	0.0	3202	0.0	0.0
32187	214	10	10			228	570	0.40	228	570	0.40	3158	0.0	0.0	10181	0.0	0.0
32190	212	54	54			9,190	35,347	0.26	10,599	35,347	0.30	3222	0.0	0.0	3231	0.0	0.0
32191	97	8	8			341	340	1.00	341	340	1.00	3259	0.0	0.0	3260	0.0	0.0
32192	290	8	8			8	380	0.02	8	380	0.02	3243	0.0	0.0	3249	0.0	0.0
32193	252	8	8			7	611	0.01	7	612	0.01	7676	0.0	0.0	3243	0.0	0.0
32194	361	8	8			20	344	0.06	20	344	0.06	3249	0.0	0.0	7265	0.0	0.0
32195	31	8	8			21	338	0.06	21	338	0.06	7265	0.0	0.0	3242	0.0	0.0
32196	168	6	6			1	178	0.00	1	178	0.00	3218	0.0	0.0	7265	0.0	0.0
32197	331	8	8			0	342	0.00	0	343	0.00	3242	0.0	0.0	7505	0.0	0.0
32198	360	24	24			647	7,200	0.09	647	7,200	0.09	3262	0.0	0.0	3242	0.0	0.0
32199	300	8	8			22	361	0.06	22	362	0.06	3263	0.0	0.0	3262	0.0	0.0
32200	340	8	8			22	399	0.06	22	399	0.06	3264	0.0	0.0	3263	0.0	0.0
32201	33	24	24			615	7,070	0.09	616	7,070	0.09	3240	0.0	0.0	3262	0.0	0.0
32202	117	24	24			590	7,741	0.08	590	7,741	0.08	3241	0.0	0.0	3240	0.0	0.0
32203	160	24	24			590	6,716	0.09	590	6,716	0.09	3236	0.0	0.0	3241	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32204	237	8	8			1	273	0.00	1	273	0.00	3284	0.0	0.0	3240	0.0	0.0
32205	150	8	8			1	381	0.00	1	381	0.00	3237	0.0	0.0	3238	0.0	0.0
32206	98	24	24			572	7,467	0.08	572	7,467	0.08	3239	0.0	0.0	3238	0.0	0.0
32207	425	24	24			572	7,138	0.08	572	7,138	0.08	3258	0.0	0.0	3239	0.0	0.0
32208	375	8	8			14	342	0.04	14	342	0.04	7505	0.0	0.0	7506	0.0	0.0
32209	140	8	8			1	349	0.00	1	349	0.00	7266	0.0	0.0	3265	0.0	0.0
32210	141	15	15			460	3,165	0.15	460	3,165	0.15	3266	0.0	0.0	3265	0.0	0.0
32211	336	10	10			452	933	0.48	452	931	0.49	3247	0.0	0.0	3248	0.0	0.0
32212	136	10	10			451	839	0.54	451	838	0.54	3233	0.0	0.0	3247	0.0	0.0
32213	37	10	10			451	1,108	0.41	451	1,107	0.41	3267	0.0	0.0	3233	0.0	0.0
32214	221	10	10			432	751	0.57	432	751	0.58	3232	0.0	0.0	3267	0.0	0.0
32215	40	10	10			431	746	0.58	431	745	0.58	3268	0.0	0.0	3232	0.0	0.0
32217	33	10	10			390	342	1.14	390	342	1.14	3271	0.0	0.0	3270	0.0	0.0
32218	158	8	8			1	345	0.00	1	346	0.00	3251	0.0	0.0	3252	0.0	0.0
32219	287	10	10			388	544	0.71	388	544	0.71	3272	0.0	0.0	3271	0.0	0.0
32220	240	8	8			2	350	0.01	2	351	0.01	3250	0.0	0.0	3272	0.0	0.0
32222	80	10	10			366	467	0.78	366	466	0.79	7028	0.0	0.0	3272	0.0	0.0
32223	286	10	10			357	514	0.69	357	513	0.70	3234	0.0	0.0	7028	0.0	0.0
32224	278	8	8			6	783	0.01	6	784	0.01	3254	0.0	0.0	3253	0.0	0.0
32225	293	8	8			5	457	0.01	5	458	0.01	3275	0.0	0.0	3254	0.0	0.0
32226	12	8	8			3	586	0.01	3	587	0.01	3276	0.0	0.0	3275	0.0	0.0
32228	264	54	54			9,189	36,033	0.26	10,599	36,033	0.29	3223	0.0	0.0	3222	0.0	0.0
32229	1472	54	54			9,184	34,584	0.27	10,594	34,584	0.31	3224	0.0	0.0	3223	0.0	0.0
32230	306	54	54			9,183	40,365	0.23	10,594	40,365	0.26	3225	0.0	0.0	3224	0.0	0.0
32231	648	54	54			9,183	35,360	0.26	10,593	35,360	0.30	3226	0.0	0.0	3225	0.0	0.0
32237	12	15	15			2,245	2,763	0.81	2,181	2,763	0.79	3324	0.0	0.0	3323	5.4	6.3
32238	140	6	6			0	247	0.00	0	247	0.00	3296	0.0	0.0	3289	0.0	0.0
32239	407	8	8			1	285	0.00	1	285	0.00	3289	0.0	0.0	3358	3.9	0.0
32241	52	18	18			4,576	6,539	0.70	4,481	6,539	0.69	3346	5.8	5.9	3299	0.0	0.0
32242	240	18	18			4,576	5,758	0.79	4,481	5,758	0.78	3301	0.0	0.0	3346	5.8	5.9
32243	275	8	8			2	435	0.00	2	435	0.00	3300	0.0	0.0	3301	0.0	0.0
32244	93	8	8			1	432	0.00	1	433	0.00	3348	0.0	0.0	3300	0.0	0.0
32245	13	8	8			1	583	0.00	1	583	0.00	11024	0.0	0.0	3300	0.0	0.0
32246	177	8	8			0	562	0.00	0	563	0.00	3349	0.0	0.0	11024	0.0	0.0
32247	295	8	8			3	589	0.01	3	590	0.01	3350	0.0	0.0	3349	0.0	0.0
32248	263	8	8			1	371	0.00	1	372	0.00	7677	0.0	0.0	3350	0.0	0.0
32249	271	8	8			5	556	0.01	5	557	0.01	3349	0.0	0.0	3347	0.0	0.0
32250	214	18	18			4,524	5,014	0.90	4,428	5,014	0.88	3302	0.0	0.0	3347	0.0	0.0
32251	125	18	18			4,522	3,452	1.31	4,427	3,452	1.28	3295	0.0	0.0	3302	0.0	0.0
32253	157	18	18			4,495	3,428	1.31	4,400	3,428	1.28	3304	6.0	6.1	3295	0.0	0.0
32254	460	6	6			3	181	0.02	3	181	0.02	3356	0.0	0.0	3295	0.0	0.0
32255	270	6	6			1	181	0.01	1	181	0.01	3291	0.0	0.0	3356	0.0	0.0
32256	400	8	8			160	413	0.39	160	414	0.39	3355	0.0	0.0	3304	6.0	6.1
32257	404	8	8			114	415	0.27	114	416	0.27	3345	0.0	0.0	3355	0.0	0.0
32258	116	8	8			113	413	0.27	113	413	0.27	3315	0.0	0.0	3345	0.0	0.0
32259	455	12	12			158	1,089	0.14	145	1,089	0.13	3353	0.0	0.0	3354	5.3	5.6
32260	15	12	12			157	1,092	0.14	146	1,092	0.13	3352	0.0	0.0	3353	0.0	0.0
32261	40	8	8			8	343	0.02	8	344	0.02	3351	7.0	0.0	3352	0.0	0.0
32262	274	8	8			1	344	0.00	1	344	0.00	7269	0.0	0.0	3351	7.0	0.0
32263	127	18	18			4,333	3,500	1.24	4,239	3,500	1.21	3296	0.0	0.0	3304	6.0	6.1
32264	242	8	8			1	861	0.00	1	863	0.00	3287	0.0	0.0	3375	0.0	0.0
32265	145	18	18			4,327	3,299	1.31	4,233	3,299	1.28	3305	0.0	0.0	3296	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32266	450	12	12			163	1,069	0.15	151	1,069	0.14	3352	0.0	0.0	3305	0.0	0.0
32267	10	18	18			4,188	8,168	0.51	4,194	8,168	0.51	3354	5.3	5.6	3305	0.0	0.0
32268	363	8	8			1	342	0.00	1	342	0.00	7267	0.0	0.0	7030	0.0	0.0
32269	361	8	8			0	651	0.00	0	652	0.00	3305	0.0	0.0	7267	0.0	0.0
32270	192	18	18			4,321	4,488	0.96	4,227	4,488	0.94	3307	5.8	6.0	3354	5.3	5.6
32271	183	18	18			4,318	3,913	1.10	4,224	3,913	1.08	3297	0.0	0.0	3307	5.8	6.0
32272	250	8	8			15	365	0.04	14	365	0.04	3317	0.0	0.0	3297	0.0	0.0
32273	83	10	10			11	610	0.02	11	610	0.02	3288	0.0	0.0	7180	0.0	0.0
32274	217	8	8			10	383	0.03	10	383	0.03	3316	0.0	0.0	3288	0.0	0.0
32275	340	8	8			51	369	0.14	0	370	0.00	3297	0.0	0.0	3308	0.0	0.0
32276	285	18	18			4,353	3,960	1.10	4,208	3,960	1.06	3319	4.4	4.9	3297	0.0	0.0
32277	13	15	15			1,916	3,009	0.64	1,956	3,009	0.65	3320	4.7	5.2	3319	4.4	4.9
32278	475	15	15			1,913	1,858	1.03	1,951	1,858	1.05	3318	5.9	6.3	3320	4.7	5.2
32279	275	15	15			2,356	2,576	0.91	2,258	2,576	0.88	7510	5.9	0.0	3319	4.4	4.9
32280	336	8	8			165	536	0.31	165	537	0.31	3321	0.0	0.0	7510	5.9	0.0
32281	15	8	8			91	371	0.25	188	371	0.51	7510	5.9	0.0	3361	5.7	0.0
32283	366	8	8			162	251	0.64	122	251	0.48	3363	4.8	0.0	3314	3.4	6.8
32284	362	8	8			94	317	0.30	38	318	0.12	3325	6.6	0.0	3363	4.8	0.0
32285	360	8	8			93	347	0.27	38	347	0.11	3362	5.6	0.0	3325	6.6	0.0
32286	280	15	15			2,213	2,588	0.86	2,212	2,588	0.85	3362	5.6	0.0	7510	5.9	0.0
32287	154	15	15			2,250	2,506	0.90	2,190	2,506	0.87	3322	5.7	6.5	3362	5.6	0.0
32288	189	6	6			6	178	0.03	2	178	0.01	3292	7.7	0.0	3322	5.7	6.5
32289	120	15	15			2,249	2,539	0.89	2,188	2,539	0.86	3323	5.4	6.3	3322	5.7	6.5
32290	201	15	15			2,203	2,076	1.06	2,152	2,076	1.04	7029	5.5	0.0	3324	0.0	0.0
32291	57	15	15			2,208	1,583	1.39	2,156	1,583	1.36	7134	5.4	0.0	7029	5.5	0.0
32292	45	15	15			2,065	1,617	1.28	2,046	1,617	1.26	3326	5.1	6.2	7134	5.4	0.0
32293	447	8	8			74	362	0.20	103	362	0.28	3327	5.2	0.0	3328	3.4	5.2
32294	367	8	8			146	313	0.47	239	313	0.76	3313	2.8	5.3	3311	2.4	5.8
32295	338	8	8			105	257	0.41	188	258	0.73	3361	5.7	0.0	3312	4.2	0.0
32296	265	10	10			743	640	1.16	939	640	1.47	3311	2.4	5.8	3310	0.9	0.0
32297	362	8	8			58	343	0.17	3	343	0.01	3309	1.3	0.0	3310	0.9	0.0
32298	244	8	8			1	338	0.00	1	338	0.00	3293	0.0	0.0	10780	0.0	0.0
32299	400	8	8			133	501	0.26	133	502	0.26	3329	0.0	0.0	3364	0.0	0.0
32300	300	8	8			95	494	0.19	95	495	0.19	7268	0.0	0.0	3329	0.0	0.0
32301	112	8	8			3	423	0.01	3	423	0.01	3342	0.0	0.0	3331	0.0	0.0
32302	208	8	8			1	420	0.00	1	421	0.00	3343	0.0	0.0	3342	0.0	0.0
32303	277	8	8			36	420	0.09	36	420	0.09	3331	0.0	0.0	3330	0.0	0.0
32304	217	8	8			1	383	0.00	1	383	0.00	3333	0.0	0.0	3337	0.0	0.0
32305	182	8	8			1	408	0.00	1	408	0.00	3336	0.0	0.0	3337	0.0	0.0
32306	304	8	8			11	415	0.03	11	415	0.03	7508	0.0	0.0	3362	5.6	0.0
32307	245	8	8			10	420	0.02	10	421	0.02	3365	0.0	0.0	7508	0.0	0.0
32308	245	8	8			8	420	0.02	8	421	0.02	3334	0.0	0.0	3365	0.0	0.0
32309	242	8	8			6	387	0.02	6	388	0.02	3335	0.0	0.0	3334	0.0	0.0
32310	86	8	8			5	417	0.01	5	418	0.01	3337	0.0	0.0	3335	0.0	0.0
32311	438	8	8			122	383	0.32	122	383	0.32	3339	0.0	0.0	3321	0.0	0.0
32312	272	8	8			120	453	0.26	120	454	0.26	3366	0.0	0.0	3339	0.0	0.0
32313	286	6	6			108	226	0.48	108	226	0.48	3367	0.0	0.0	3368	0.0	0.0
32314	350	8	8			45	343	0.13	45	344	0.13	3370	0.0	0.0	3369	0.0	0.0
32315	295	8	8			8	383	0.02	8	383	0.02	7270	0.0	0.0	3316	0.0	0.0
32316	295	8	8			5	381	0.01	5	382	0.01	3371	0.0	0.0	7509	0.0	0.0
32317	275	8	8			3	384	0.01	3	385	0.01	3372	0.0	0.0	3371	0.0	0.0
32318	225	8	8			1	383	0.00	1	383	0.00	7031	0.0	0.0	3372	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32319	430	15	15			1,842	1,729	1.07	1,881	1,729	1.09	3381	6.1	6.5	3318	5.9	6.3
32320	440	15	15			1,593	1,930	0.83	1,635	1,930	0.85	3373	6.0	6.2	3341	5.3	5.6
32321	274	8	8			119	451	0.26	119	452	0.26	3340	0.0	0.0	3366	0.0	0.0
32322	301	8	8			5	342	0.01	5	343	0.01	3374	0.0	0.0	3340	0.0	0.0
32323	130	6	6			113	197	0.57	113	197	0.57	3338	0.0	0.0	3340	0.0	0.0
32324	156	6	6			109	135	0.81	109	135	0.81	3368	0.0	0.0	3338	0.0	0.0
32326	18	6	6			5	222	0.02	5	222	0.02	3294	0.0	0.0	3296	0.0	0.0
32327	227	8	8			3	485	0.01	3	486	0.01	3375	0.0	0.0	3294	0.0	0.0
32329	85	8	8			73	567	0.13	96	568	0.17	7134	5.4	0.0	3327	5.2	0.0
32331	304	6	6			1	110	0.01	1	110	0.01	3487	0.0	0.0	3389	0.0	0.0
32332	365	10	15	10	Existing	911	630	1.45	1,301	1,858	0.70	3384	1.9	0.0	3385	0.9	0.0
32333	172	10	15	10	Existing	910	584	1.56	1,300	1,723	0.75	3502	1.2	0.0	3384	1.9	0.0
32334	26	10	15	10	Existing	911	496	1.84	1,301	1,461	0.89	3385	0.9	0.0	3468	1.3	0.0
32335	303	8	8			1	340	0.00	1	341	0.00	3387	0.0	0.0	3388	0.0	0.0
32336	185	8	8			1	329	0.00	1	329	0.00	3388	0.0	0.0	3386	0.0	0.0
32337	112	8	8			42	710	0.06	42	711	0.06	3389	0.0	0.0	7036	8.8	0.0
32340	207	8	8			1	576	0.00	1	577	0.00	3461	0.0	0.0	3393	0.0	0.0
32341	230	8	8			136	540	0.25	136	540	0.25	3393	0.0	0.0	3392	0.0	0.0
32342	121	8	8			136	548	0.25	136	549	0.25	3392	0.0	0.0	3390	11.1	0.0
32344	37	8	8			137	517	0.26	137	518	0.26	3390	11.1	0.0	3466	11.1	0.0
32347	90	8	8			1	271	0.01	1	272	0.01	7272	0.0	0.0	3446	0.0	0.0
32348	68	6	6			1	151	0.00	1	151	0.00	3521	0.0	0.0	3460	0.0	0.0
32349	283	6	6			1	144	0.00	1	144	0.00	3520	0.0	0.0	3506	0.0	0.0
32357	9	18	18			524	42,279	0.01	524	42,279	0.01	7513	0.0	0.0	3411	0.0	0.0
32358	127	54	54			14,990	35,026	0.43	16,331	35,026	0.47	3410	0.0	0.0	3411	0.0	0.0
32359	140	54	54			15,435	34,988	0.44	16,767	34,988	0.48	3411	0.0	0.0	7747	0.0	0.0
32360	319	6	6			1	201	0.00	1	201	0.00	7181	0.0	0.0	3455	0.0	0.0
32361	315	6	6			1	201	0.00	1	201	0.00	3454	0.0	0.0	7181	0.0	0.0
32362	150	10	10			154	363	0.42	154	363	0.43	7034	0.0	0.0	3420	0.0	0.0
32363	170	10	10			153	533	0.29	153	532	0.29	3472	0.0	0.0	7034	0.0	0.0
32364	150	10	10			108	655	0.16	108	654	0.16	3471	0.0	0.0	3472	0.0	0.0
32365	345	10	10			84	596	0.14	84	595	0.14	3480	0.0	0.0	3471	0.0	0.0
32366	371	10	10			83	610	0.14	83	610	0.14	3478	0.0	0.0	3480	0.0	0.0
32367	333	12	12			390	965	0.40	390	965	0.40	3420	0.0	0.0	3419	0.0	0.0
32368	272	12	12			441	598	0.74	441	598	0.74	3481	0.0	0.0	3402	0.0	0.0
32369	328	12	12			440	1,047	0.42	440	1,047	0.42	7274	0.0	0.0	3481	0.0	0.0
32370	93	12	12			442	642	0.69	442	642	0.69	3478	0.0	0.0	3477	0.0	0.0
32371	31	12	12			485	2,316	0.21	485	2,316	0.21	3477	0.0	0.0	3475	0.0	0.0
32372	270	8	8			37	388	0.09	37	388	0.09	3423	0.0	0.0	3475	0.0	0.0
32373	52	24	24			524	4,453	0.12	524	4,453	0.12	3475	0.0	0.0	3482	0.0	0.0
32374	510	24	24			524	4,359	0.12	524	4,359	0.12	3482	0.0	0.0	7513	0.0	0.0
32375	247	8	8			1	327	0.00	1	328	0.00	3483	0.0	0.0	3423	0.0	0.0
32376	500	24	24			1	5,561	0.00	1	5,561	0.00	3473	0.0	0.0	3476	0.0	0.0
32377	521	24	24			1	5,556	0.00	1	5,556	0.00	3470	0.0	0.0	3473	0.0	0.0
32378	295	24	24			1	4,541	0.00	1	4,541	0.00	3484	0.0	0.0	3470	0.0	0.0
32379	376	8	8			36	533	0.07	36	535	0.07	3422	0.0	0.0	3423	0.0	0.0
32380	269	6	6			46	242	0.19	46	242	0.19	3485	0.0	0.0	7273	0.0	0.0
32381	165	8	8			47	485	0.10	47	486	0.10	7273	0.0	0.0	3486	0.0	0.0
32382	217	8	8			50	299	0.17	50	299	0.17	3469	0.0	0.0	3486	0.0	0.0
32383	67	8	8			1	897	0.00	1	898	0.00	7678	0.0	0.0	3469	0.0	0.0
32384	326	14	21	10	Existing	1,831	1,639	1.12	2,312	4,833	0.48	3438	8.3	0.0	3417	0.0	0.0
32386	209	14	18	10	Existing	1,604	1,300	1.23	2,088	2,542	0.82	3444	3.2	0.0	3440	3.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32387	240	14	18	10	Existing	1,257	1,303	0.96	1,702	2,546	0.67	3452	4.7	0.0	3424	3.6	0.0
32388	144	15	18	10	Existing	1,260	1,288	0.98	1,702	2,093	0.81	3451	2.3	0.0	3452	4.7	0.0
32389	184	15	18	10	Existing	1,209	1,737	0.70	1,647	2,824	0.58	3453	0.0	0.0	3451	2.3	0.0
32390	357	15	18	10	Existing	999	1,557	0.64	1,395	2,532	0.55	3468	1.3	0.0	3453	0.0	0.0
32391	463	12	12			97	881	0.11	97	881	0.11	3486	0.0	0.0	3468	1.3	0.0
32393	113	8	8			88	249	0.35	85	249	0.34	3488	8.1	0.0	7511	7.1	0.0
32394	237	6	6			1	257	0.00	1	257	0.00	3490	0.0	0.0	3489	10.2	0.0
32395	288	6	6			1	145	0.00	1	145	0.00	3491	0.0	0.0	3490	0.0	0.0
32396	279	6	6			1	153	0.00	1	153	0.00	3395	0.0	0.0	3426	0.0	0.0
32398	151	10	10			226	1,339	0.17	226	1,338	0.17	7271	0.0	0.0	10106	5.6	0.0
32399	110	10	10			151	560	0.27	151	559	0.27	3492	0.0	0.0	7271	0.0	0.0
32400	288	10	10			151	733	0.21	151	732	0.21	3437	0.0	0.0	3492	0.0	0.0
32401	272	10	10			99	278	0.36	99	278	0.36	3435	0.0	0.0	3437	0.0	0.0
32402	143	8	8			98	304	0.32	98	304	0.32	3436	0.0	0.0	3435	0.0	0.0
32403	323	6	6			1	89	0.01	1	89	0.01	3493	0.0	0.0	3435	0.0	0.0
32404	350	8	8			1	248	0.00	1	249	0.00	7512	0.0	0.0	3436	0.0	0.0
32406	330	6	6			1	235	0.00	1	235	0.00	3396	0.0	0.0	3435	0.0	0.0
32407	371	8	8			1	302	0.00	1	302	0.00	3465	0.0	0.0	3466	11.1	0.0
32408	210	8	8			144	263	0.55	143	264	0.54	3450	1.7	4.5	3453	0.0	0.0
32409	126	8	8			144	269	0.53	143	269	0.53	7035	4.1	0.0	3450	1.7	4.5
32410	145	8	8			142	269	0.53	142	269	0.53	3494	9.2	0.0	3449	7.5	0.0
32411	140	8	8			140	434	0.32	138	435	0.32	3466	11.1	0.0	3494	9.2	0.0
32413	461	8	8			56	553	0.10	56	553	0.10	3495	0.0	0.0	3451	2.3	0.0
32414	305	8	8			3	596	0.00	3	597	0.00	3496	0.0	0.0	3424	3.6	0.0
32415	280	8	8			2	458	0.00	2	458	0.00	3497	0.0	0.0	3496	0.0	0.0
32416	116	8	8			2	453	0.00	2	454	0.00	3498	0.0	0.0	3497	0.0	0.0
32417	24	8	8			1	450	0.00	1	451	0.00	3499	0.0	0.0	3498	0.0	0.0
32418	86	8	8			1	443	0.00	1	444	0.00	3500	0.0	0.0	3499	0.0	0.0
32419	28	8	8			1	456	0.00	1	457	0.00	3501	0.0	0.0	3445	0.0	0.0
32420	174	10	15	10	Existing	789	565	1.40	1,141	1,666	0.68	3503	1.4	0.0	3464	1.5	0.0
32421	363	10	15	10	Existing	788	578	1.36	1,140	1,704	0.67	7033	0.0	0.0	3503	1.4	0.0
32423	73	8	8			2	283	0.01	2	283	0.01	3459	0.0	0.0	3457	0.0	0.0
32424	270	8	8			6	288	0.02	6	288	0.02	3505	0.0	0.0	3456	0.0	0.0
32425	140	6	6			2	308	0.01	2	308	0.01	3460	0.0	0.0	3459	0.0	0.0
32426	30	6	6			1	144	0.01	1	144	0.01	3506	0.0	0.0	3460	0.0	0.0
32427	188	6	6			1	102	0.01	1	102	0.01	3398	0.0	0.0	3506	0.0	0.0
32428	209	12	12			319	876	0.36	319	876	0.36	7275	0.0	0.0	3443	0.0	0.0
32429	224	12	12			135	742	0.18	135	742	0.18	3507	0.0	0.0	7275	0.0	0.0
32430	360	8	8			0	256	0.00	0	256	0.00	3436	0.0	0.0	3441	0.0	0.0
32431	308	10	10			321	604	0.53	321	603	0.53	3508	5.6	0.0	3444	3.2	0.0
32432	285	10	10			321	519	0.62	321	518	0.62	7032	9.4	0.0	3508	5.6	0.0
32433	270	12	12			320	1,583	0.20	320	1,583	0.20	3443	0.0	0.0	7032	9.4	0.0
32434	25	8	8			1	306	0.00	1	306	0.00	3441	0.0	0.0	3443	0.0	0.0
32435	134	15	24	6	Existing	2,013	1,653	1.22	3,786	5,790	0.65	3416	8.6	0.0	7036	8.8	0.0
32436	336	15	24	6	Existing	2,012	1,666	1.21	3,785	5,833	0.65	3415	7.4	0.0	3416	8.6	0.0
32437	36	15	15			1,315	1,619	0.81	1,629	1,619	1.01	3413	6.5	0.0	3414	6.4	0.0
32438	27	8	8			87	465	0.19	85	465	0.18	7511	7.1	0.0	7135	7.0	0.0
32439	371	8	8			119	459	0.26	119	459	0.26	3430	0.0	0.0	3431	0.0	9.1
32440	44	8	8			1	728	0.00	1	729	0.00	3510	0.0	0.0	3430	0.0	0.0
32441	116	8	8			1	388	0.00	1	389	0.00	3429	0.0	0.0	3511	0.0	0.0
32442	197	8	8			1	217	0.00	1	218	0.00	3512	0.0	0.0	3429	0.0	0.0
32443	117	24	24			3,885	8,528	0.46	6,134	8,528	0.72	3417	0.0	0.0	3433	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32444	175	6	6			24	131	0.19	3	131	0.02	3448	10.6	0.0	3494	9.2	0.0
32445	85	6	6			6	129	0.05	1	129	0.01	7403	9.2	0.0	3448	10.6	0.0
32446	143	8	8			2	838	0.00	2	838	0.00	3447	0.0	0.0	3448	10.6	0.0
32447	54	8	8			1	732	0.00	1	733	0.00	3446	0.0	0.0	3447	0.0	0.0
32448	55	8	8			1	285	0.00	1	285	0.00	3462	0.0	0.0	3463	0.0	0.0
32449	46	8	8			1	195	0.00	1	195	0.00	3463	0.0	0.0	7272	0.0	0.0
32450	365	8	8			1	384	0.00	1	385	0.00	3474	0.0	0.0	7514	0.0	0.0
32451	371	8	8			42	372	0.11	42	373	0.11	7514	0.0	0.0	3477	0.0	0.0
32452	283	8	8			1	384	0.00	1	385	0.00	3399	0.0	0.0	3474	0.0	0.0
32453	87	6	6			17	205	0.08	1	205	0.00	7516	5.7	0.0	3516	4.3	0.0
32454	59	6	6			33	205	0.16	1	205	0.00	3516	4.3	0.0	3440	3.0	0.0
32455	340	8	8			110	438	0.25	110	439	0.25	3412	0.0	0.0	3513	0.0	0.0
32456	46	8	8			1	283	0.00	1	283	0.00	3515	0.0	0.0	3505	0.0	0.0
32457	200	6	6			28	160	0.18	1	160	0.00	3400	2.1	0.0	3464	1.5	0.0
32458	46	6	6			6	128	0.04	1	128	0.01	3522	9.9	0.0	3448	10.6	0.0
32460	292	6	6			1	149	0.00	1	149	0.00	3394	0.0	0.0	3437	0.0	0.0
32461	53	6	6			1	360	0.00	1	360	0.00	3426	0.0	0.0	3437	0.0	0.0
32462	21	12	12			441	5,374	0.08	441	5,374	0.08	3402	0.0	0.0	8539	0.0	0.0
32463	194	54	54			14,989	35,283	0.42	16,330	35,283	0.46	3408	0.0	0.0	3409	0.0	0.0
32464	722	54	54			14,989	35,983	0.42	16,330	35,983	0.45	3407	0.0	0.0	3408	0.0	0.0
32465	193	54	54			14,988	35,374	0.42	16,329	35,374	0.46	3406	0.0	0.0	3407	0.0	0.0
32466	213	54	54			14,988	35,264	0.43	16,329	35,264	0.46	3404	0.0	0.0	3406	0.0	0.0
32467	178	24	24			1,077	25,472	0.04	1,077	25,472	0.04	3405	0.0	0.0	3404	0.0	0.0
32468	250	54	54			14,131	35,305	0.40	15,466	35,305	0.44	3403	0.0	0.0	3404	0.0	0.0
32487	348	8	8			31	386	0.08	31	387	0.08	7277	0.0	0.0	3560	0.0	0.0
32488	297	6	6			1	369	0.00	1	369	0.00	10163	0.0	0.0	3560	0.0	0.0
32489	295	6	6			19	265	0.07	19	265	0.07	3610	0.0	0.0	3609	0.0	0.0
32490	298	8	8			65	447	0.15	65	447	0.15	3561	0.0	0.0	3562	0.0	0.0
32491	291	8	8			10	329	0.03	10	330	0.03	3576	0.0	0.0	3561	0.0	0.0
32492	290	8	8			1	626	0.00	1	626	0.00	3577	0.0	0.0	3576	0.0	0.0
32493	405	8	8			56	351	0.16	56	352	0.16	3563	0.0	0.0	3561	0.0	0.0
32494	240	8	8			43	430	0.10	43	431	0.10	3567	0.0	0.0	3563	0.0	0.0
32495	255	8	8			43	431	0.10	43	431	0.10	3570	0.0	0.0	3567	0.0	0.0
32496	304	8	8			18	1,063	0.02	18	1,064	0.02	3557	0.0	0.0	3570	0.0	0.0
32497	88	8	8			18	894	0.02	18	895	0.02	3554	0.0	0.0	3557	0.0	0.0
32498	54	8	8			17	1,198	0.01	17	1,199	0.01	3555	0.0	0.0	3554	0.0	0.0
32499	88	8	8			1	387	0.00	1	388	0.00	7517	0.0	0.0	3571	0.0	0.0
32500	35	6	6			1	529	0.00	1	529	0.00	3596	0.0	0.0	7517	0.0	0.0
32501	403	8	8			25	442	0.06	25	442	0.06	3611	0.0	0.0	3562	0.0	0.0
32502	497	8	8			24	321	0.08	24	321	0.08	3565	0.0	0.0	3611	0.0	0.0
32503	303	8	8			1	1,163	0.00	1	1,165	0.00	3566	0.0	0.0	3565	0.0	0.0
32504	335	8	8			1	1,368	0.00	1	1,369	0.00	3595	0.0	0.0	3566	0.0	0.0
32505	137	8	8			1	1,734	0.00	1	1,736	0.00	3547	0.0	0.0	3595	0.0	0.0
32506	252	8	8			17	982	0.02	17	983	0.02	3571	0.0	0.0	3555	0.0	0.0
32507	151	8	8			12	744	0.02	12	744	0.02	3564	0.0	0.0	3563	0.0	0.0
32508	200	8	8			1	531	0.00	1	532	0.00	7519	0.0	0.0	3564	0.0	0.0
32509	260	8	8			1	425	0.00	1	426	0.00	3568	0.0	0.0	3564	0.0	0.0
32510	237	8	8			1	445	0.00	1	446	0.00	3559	0.0	0.0	3568	0.0	0.0
32511	285	6	6			15	149	0.10	15	149	0.10	3597	0.0	0.0	3598	0.0	0.0
32512	353	8	8			21	636	0.03	21	637	0.03	3588	0.0	0.0	3589	0.0	0.0
32513	266	12	12			405	866	0.47	405	866	0.47	3574	0.0	0.0	3573	0.0	0.0
32514	196	12	12			381	831	0.46	381	831	0.46	3612	0.0	0.0	3575	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32515	148	12	12			381	1,274	0.30	381	1,274	0.30	3578	0.0	0.0	3612	0.0	0.0
32516	372	12	12			379	1,178	0.32	379	1,178	0.32	3586	0.0	0.0	3578	0.0	0.0
32517	361	8	8			285	443	0.64	285	444	0.64	3558	0.0	0.0	3586	0.0	0.0
32518	320	8	8			234	912	0.26	234	913	0.26	3590	0.0	0.0	3558	0.0	0.0
32519	332	8	8			180	1,190	0.15	180	1,192	0.15	3613	0.0	0.0	3590	0.0	0.0
32520	227	8	8			179	1,081	0.17	179	1,082	0.17	3599	0.0	0.0	3613	0.0	0.0
32521	145	6	6			21	553	0.04	21	553	0.04	3587	0.0	0.0	3558	0.0	0.0
32522	170	6	6			20	500	0.04	20	500	0.04	3556	0.0	0.0	3587	0.0	0.0
32523	182	6	6			1	522	0.00	1	522	0.00	3614	0.0	0.0	3556	0.0	0.0
32524	145	6	6			1	341	0.00	1	341	0.00	7182	0.0	0.0	3614	0.0	0.0
32525	270	6	6			1	844	0.00	1	844	0.00	3548	0.0	0.0	7182	0.0	0.0
32526	144	6	6			178	553	0.32	178	553	0.32	3615	0.0	0.0	3599	0.0	0.0
32527	144	10	10			0	2,078	0.00	0	2,075	0.00	3615	0.0	0.0	3599	0.0	0.0
32528	144	6	6			1	538	0.00	1	538	0.00	3600	0.0	0.0	3615	0.0	0.0
32529	265	6	6			1	646	0.00	1	646	0.00	3601	0.0	0.0	3600	0.0	0.0
32530	100	8	8			1	927	0.00	1	928	0.00	3606	0.0	0.0	3605	0.0	0.0
32531	125	8	8			1	1,049	0.00	1	1,050	0.00	3604	0.0	0.0	3607	0.0	0.0
32532	97	8	8			6	1,153	0.00	6	1,155	0.00	3605	0.0	0.0	3607	0.0	0.0
32533	170	8	8			4	1,921	0.00	4	1,924	0.00	3616	0.0	0.0	3605	0.0	0.0
32534	200	8	8			2	619	0.00	2	619	0.00	3617	0.0	0.0	3616	0.0	0.0
32535	88	6	6			1	356	0.00	1	356	0.00	3619	0.0	0.0	3618	0.0	0.0
32536	127	6	6			1	357	0.00	1	357	0.00	3620	0.0	0.0	3619	0.0	0.0
32537	44	6	6			1	759	0.00	1	759	0.00	3550	0.0	0.0	3620	0.0	0.0
32538	24	8	8			1	597	0.00	1	597	0.00	7520	0.0	0.0	3616	0.0	0.0
32539	82	8	8			1	1,544	0.00	1	1,547	0.00	3603	0.0	0.0	7520	0.0	0.0
32540	47	6	6			1	450	0.00	1	450	0.00	3602	0.0	0.0	3603	0.0	0.0
32541	375	6	6			19	288	0.07	19	288	0.07	3621	0.0	0.0	3556	0.0	0.0
32542	175	6	6			1	741	0.00	1	741	0.00	3645	0.0	0.0	3621	0.0	0.0
32543	170	6	6			44	173	0.25	44	173	0.25	3623	0.0	0.0	3622	0.0	0.0
32544	163	6	6			43	176	0.24	43	176	0.24	7276	0.0	0.0	3623	0.0	0.0
32545	194	6	6			24	233	0.10	24	233	0.10	3584	0.0	0.0	7276	0.0	0.0
32546	206	6	6			1	735	0.00	1	735	0.00	3624	0.0	0.0	3584	0.0	0.0
32547	158	6	6			1	765	0.00	1	765	0.00	3625	0.0	0.0	3624	0.0	0.0
32548	405	6	6			1	469	0.00	1	469	0.00	3585	0.0	0.0	3584	0.0	0.0
32549	300	6	6			19	161	0.12	19	161	0.12	3627	0.0	0.0	7276	0.0	0.0
32552	353	8	8			70	340	0.21	70	341	0.21	3582	0.0	0.0	3628	0.0	0.0
32553	365	8	8			0	350	0.00	0	351	0.00	3629	0.0	0.0	3622	0.0	0.0
32554	145	6	6			1	252	0.00	1	252	0.00	3630	0.0	0.0	3623	0.0	0.0
32555	271	6	6			1	159	0.00	1	159	0.00	3631	0.0	0.0	3584	0.0	0.0
32556	310	24	24			1,031	5,738	0.18	1,031	5,738	0.18	3632	0.0	0.0	3629	0.0	0.0
32557	411	8	8			353	643	0.55	353	644	0.55	3593	0.0	0.0	3632	0.0	0.0
32558	206	8	8			353	426	0.83	353	426	0.83	3592	0.0	0.0	3593	0.0	0.0
32559	126	8	8			1	1,643	0.00	1	1,645	0.00	3591	0.0	0.0	3592	0.0	0.0
32560	340	6	6			89	113	0.79	89	113	0.79	3579	0.0	0.0	3594	0.0	0.0
32561	300	6	6			1	113	0.01	1	113	0.01	3633	0.0	0.0	3579	0.0	0.0
32562	325	6	6			0	113	0.00	0	113	0.00	3634	0.0	0.0	3633	0.0	0.0
32563	367	8	8			0	340	0.00	0	340	0.00	7038	0.0	0.0	3634	0.0	0.0
32564	320	8	8			1	343	0.00	1	344	0.00	3635	0.0	0.0	3578	0.0	0.0
32565	331	8	8			1	342	0.00	1	343	0.00	7278	0.0	0.0	3635	0.0	0.0
32566	401	6	6			1	164	0.00	1	164	0.00	3581	0.0	0.0	3575	0.0	0.0
32567	303	8	8			1	356	0.00	1	356	0.00	3580	0.0	0.0	7183	0.0	0.0
32568	320	8	8			1	422	0.00	1	423	0.00	7037	0.0	0.0	3580	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32569	109	8	8			1	382	0.00	1	382	0.00	3636	0.0	0.0	7037	0.0	0.0
32570	370	8	8			92	367	0.25	92	367	0.25	3637	0.0	0.0	3573	0.0	0.0
32573	92	6	6			1	252	0.00	1	252	0.00	3552	0.0	0.0	3594	0.0	0.0
32574	548	24	24			1,056	6,747	0.16	1,056	6,747	0.16	7038	0.0	0.0	3638	0.0	0.0
32575	65	6	6			1	156	0.00	1	156	0.00	3553	0.0	0.0	3597	0.0	0.0
32576	142	10	10			0	1,716	0.00	0	1,714	0.00	3867	0.0	0.0	3615	0.0	0.0
32577	32	6	6			1	201	0.00	1	201	0.00	3649	0.0	0.0	7517	0.0	0.0
32578	35	24	24			678	10,008	0.07	678	10,008	0.07	3639	0.0	0.0	3632	0.0	0.0
32582	329	8	8			81	1,129	0.07	81	1,224	0.07	7279	0.0	0.0	3666	0.0	0.0
32583	321	8	8			82	870	0.09	82	944	0.09	3666	0.0	0.0	3665	0.0	0.0
32584	222	8	8			93	814	0.11	93	883	0.11	3665	0.0	0.0	3663	0.0	0.0
32585	214	8	8			93	795	0.12	93	863	0.11	3663	0.0	0.0	3672	0.0	0.0
32586	351	10	10			68	439	0.16	68	475	0.14	3681	0.0	0.0	3672	0.0	0.0
32587	168	8	8			13	528	0.02	13	572	0.02	3682	0.0	0.0	3704	0.0	0.0
32588	332	8	8			56	349	0.16	56	378	0.15	3685	0.0	0.0	3704	0.0	0.0
32589	15	10	10			56	2,171	0.03	56	2,349	0.02	7404	0.0	0.0	3685	0.0	0.0
32590	55	8	8			7	327	0.02	7	355	0.02	3686	0.0	0.0	7404	0.0	0.0
32591	305	8	8			7	346	0.02	7	375	0.02	3687	0.0	0.0	3686	0.0	0.0
32592	100	8	8			1	347	0.00	1	376	0.00	3705	0.0	0.0	3687	0.0	0.0
32593	130	8	8			0	1,209	0.00	0	1,311	0.00	3707	0.0	0.0	3706	0.0	0.0
32594	148	8	8			0	809	0.00	0	877	0.00	7679	0.0	0.0	3707	0.0	0.0
32595	185	10	10			49	1,526	0.03	49	1,651	0.03	3684	0.0	0.0	7404	0.0	0.0
32597	315	8	8			1	1,149	0.00	1	1,247	0.00	3708	0.0	0.0	3683	0.0	0.0
32598	347	10	10			40	620	0.06	40	671	0.06	3709	0.0	0.0	3683	0.0	0.0
32599	91	6	6			0	252	0.00	0	273	0.00	3651	0.0	0.0	3709	0.0	0.0
32600	242	8	8			1	1,070	0.00	1	1,160	0.00	3710	0.0	0.0	3709	0.0	0.0
32601	116	8	8			0	1,214	0.00	0	1,317	0.00	3711	0.0	0.0	3710	0.0	0.0
32602	143	8	8			0	385	0.00	0	417	0.00	3652	0.0	0.0	3711	0.0	0.0
32603	25	8	8			33	901	0.04	33	978	0.03	3713	0.0	0.0	3712	0.0	0.0
32604	430	8	8			0	821	0.00	0	890	0.00	3714	0.0	0.0	3713	0.0	0.0
32605	350	8	8			26	898	0.03	26	974	0.03	3661	0.0	0.0	3713	0.0	0.0
32606	440	8	8			0	658	0.00	0	713	0.00	3660	0.0	0.0	3661	0.0	0.0
32607	156	6	6			0	473	0.00	0	513	0.00	3653	0.0	0.0	7521	0.0	0.0
32608	331	6	6			1	499	0.00	1	541	0.00	3654	0.0	0.0	3715	0.0	0.0
32609	259	8	8			3	897	0.00	3	972	0.00	3715	0.0	0.0	3716	0.0	0.0
32610	248	8	8			7	878	0.01	7	953	0.01	3716	0.0	0.0	3717	0.0	0.0
32612	375	8	8			7	739	0.01	7	801	0.01	3717	0.0	0.0	3701	0.0	0.0
32613	238	8	8			15	611	0.02	15	663	0.02	3701	0.0	0.0	3671	0.0	0.0
32614	219	8	8			15	496	0.03	15	538	0.03	3671	0.0	0.0	3670	0.0	0.0
32615	251	8	8			40	725	0.05	40	786	0.05	3670	0.0	0.0	3718	0.0	0.0
32616	148	8	8			55	340	0.16	55	368	0.15	3718	0.0	0.0	3719	0.0	0.0
32617	313	8	8			0	801	0.00	1	869	0.00	3669	0.0	0.0	3670	0.0	0.0
32618	259	8	8			17	1,067	0.02	17	1,157	0.01	7281	0.0	0.0	3668	0.0	0.0
32619	171	8	8			0	738	0.00	0	801	0.00	3739	0.0	0.0	7281	0.0	0.0
32620	190	8	8			0	383	0.00	0	416	0.00	3738	0.0	0.0	7281	0.0	0.0
32621	353	8	8			0	1,207	0.00	0	1,309	0.00	3667	0.0	0.0	7281	0.0	0.0
32623	319	8	8			0	686	0.00	0	744	0.00	3664	0.0	0.0	3665	0.0	0.0
32624	164	8	8			55	344	0.16	55	373	0.15	3719	0.0	0.0	3677	0.0	0.0
32625	273	8	8			55	318	0.17	55	345	0.16	3677	0.0	0.0	3678	0.0	0.0
32626	107	8	8			55	315	0.17	55	341	0.16	3678	0.0	0.0	3679	0.0	0.0
32627	200	8	8			167	938	0.18	167	1,017	0.16	3680	0.0	0.0	3679	0.0	0.0
32628	363	8	8			167	810	0.21	167	878	0.19	3672	0.0	0.0	3680	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32629	314	8	8			231	367	0.63	231	399	0.58	3679	0.0	0.0	7522	0.0	0.0
32630	322	8	8			242	621	0.39	242	674	0.36	3674	0.0	0.0	3721	0.0	0.0
32631	277	8	8			242	446	0.54	242	483	0.50	3721	0.0	0.0	3673	0.0	0.0
32632	321	8	8			10	342	0.03	10	372	0.03	3722	0.0	0.0	3674	0.0	0.0
32633	229	8	8			10	963	0.01	10	1,045	0.01	3723	0.0	0.0	3722	0.0	0.0
32634	45	8	8			10	388	0.03	10	421	0.02	7040	0.0	0.0	3723	0.0	0.0
32635	223	8	8			0	976	0.00	0	1,058	0.00	3675	0.0	0.0	7040	0.0	0.0
32636	229	8	8			0	782	0.00	0	849	0.00	3676	0.0	0.0	3675	0.0	0.0
32637	118	8	8			0	711	0.00	0	772	0.00	3722	0.0	0.0	7280	0.0	0.0
32638	110	8	8			82	327	0.25	82	355	0.23	3691	0.0	0.0	3690	0.0	0.0
32639	127	8	8			0	347	0.00	0	376	0.00	3724	0.0	0.0	3691	0.0	0.0
32640	80	8	8			81	359	0.23	81	389	0.21	7524	0.0	0.0	3691	0.0	0.0
32641	120	8	8			0	446	0.00	0	483	0.00	7041	0.0	0.0	3726	0.0	0.0
32642	440	8	8			4	413	0.01	4	448	0.01	3726	0.0	0.0	3727	0.0	0.0
32643	60	8	8			0	958	0.00	0	1,039	0.00	3655	0.0	0.0	3727	0.0	0.0
32645	320	8	8			5	881	0.01	5	956	0.01	3727	0.0	0.0	3688	0.0	0.0
32646	272	8	8			6	775	0.01	6	840	0.01	3728	0.0	0.0	3688	0.0	0.0
32647	117	8	8			11	410	0.03	11	445	0.02	3688	0.0	0.0	3729	0.0	0.0
32648	108	8	8			11	411	0.03	11	446	0.02	3729	0.0	0.0	3697	0.0	0.0
32649	377	8	8			60	421	0.14	60	456	0.13	3659	0.0	0.0	3697	0.0	0.0
32650	263	8	8			0	342	0.00	0	372	0.00	3698	0.0	0.0	3659	0.0	0.0
32651	288	8	8			60	508	0.12	60	551	0.11	7042	0.0	0.0	3659	0.0	0.0
32652	163	8	8			1	342	0.00	1	372	0.00	3700	0.0	0.0	7042	0.0	0.0
32653	92	8	8			0	320	0.00	0	347	0.00	3699	0.0	0.0	3700	0.0	0.0
32654	142	8	8			0	344	0.00	0	373	0.00	7405	0.0	0.0	3700	0.0	0.0
32656	137	6	6			0	276	0.00	0	299	0.00	3657	0.0	0.0	7405	0.0	0.0
32657	41	8	8			72	448	0.16	72	486	0.15	3697	0.0	0.0	7136	0.0	0.0
32658	182	8	8			7	649	0.01	7	703	0.01	7523	0.0	0.0	7136	0.0	0.0
32659	164	8	8			78	458	0.17	78	497	0.16	7136	0.0	0.0	3696	0.0	0.0
32660	254	6	6			0	253	0.00	0	274	0.00	3658	0.0	0.0	3724	0.0	0.0
32662	156	8	8			1	381	0.00	1	413	0.00	3694	0.0	0.0	3730	0.0	0.0
32663	162	8	8			1	386	0.00	1	419	0.00	3695	0.0	0.0	3694	0.0	0.0
32664	28	6	6			0	894	0.00	0	969	0.00	3734	0.0	0.0	3654	0.0	0.0
32665	23	8	8			1	358	0.00	1	388	0.00	9124	0.0	0.0	3695	0.0	0.0
32666	215	10	10			40	1,124	0.04	40	1,217	0.03	3712	0.0	0.0	3732	0.0	0.0
32669	101	12	12			375	1,136	0.33	375	1,136	0.33	3755	0.0	0.0	3757	0.0	0.0
32670	282	8	8			313	660	0.47	313	660	0.47	3756	0.0	0.0	3755	0.0	0.0
32671	395	8	8			313	894	0.35	313	896	0.35	3752	0.0	0.0	3756	0.0	0.0
32672	264	8	8			1	510	0.00	1	510	0.00	3770	0.0	0.0	3752	0.0	0.0
32673	237	8	8			61	1,142	0.05	61	1,144	0.05	3772	0.0	0.0	3755	0.0	0.0
32674	200	8	8			61	985	0.06	61	987	0.06	3749	0.0	0.0	3772	0.0	0.0
32675	350	8	8			28	343	0.08	28	344	0.08	3769	0.0	0.0	3749	0.0	0.0
32676	354	8	8			1	643	0.00	1	644	0.00	3753	0.0	0.0	3769	0.0	0.0
32677	181	8	8			32	570	0.06	32	571	0.06	3750	0.0	0.0	3768	0.0	0.0
32678	276	8	8			32	383	0.08	32	384	0.08	3767	0.0	0.0	3750	0.0	0.0
32679	250	8	8			5	488	0.01	5	488	0.01	3754	0.0	0.0	3767	0.0	0.0
32680	250	8	8			4	694	0.01	4	696	0.01	3766	0.0	0.0	3754	0.0	0.0
32681	142	24	24			550	5,652	0.10	550	5,652	0.10	3758	0.0	0.0	7282	0.0	0.0
32682	140	24	24			550	6,535	0.08	550	6,535	0.08	3748	0.0	0.0	3758	0.0	0.0
32683	255	10	10			432	2,466	0.18	432	2,463	0.18	3773	0.0	0.0	3748	0.0	0.0
32684	300	10	10			431	1,122	0.38	431	1,120	0.38	3774	0.0	0.0	3773	0.0	0.0
32685	300	12	12			431	1,131	0.38	431	1,131	0.38	3771	0.0	0.0	3774	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32686	295	8	8			9	545	0.02	9	546	0.02	3759	0.0	0.0	7282	0.0	0.0
32687	165	8	8			1	378	0.00	1	378	0.00	3760	0.0	0.0	3759	0.0	0.0
32688	100	8	8			1	1,537	0.00	1	1,539	0.00	3751	0.0	0.0	7137	0.0	0.0
32689	330	24	24			90	4,541	0.02	90	4,541	0.02	3761	0.0	0.0	3748	0.0	0.0
32692	239	8	8			32	298	0.11	32	323	0.10	3764	0.0	0.0	3765	0.0	0.0
32693	289	8	8			265	605	0.44	265	656	0.40	7283	0.0	0.0	3781	0.0	0.0
32694	349	8	8			0	542	0.00	0	588	0.00	3779	0.0	0.0	3764	0.0	0.0
32695	115	8	8			0	1,387	0.00	0	1,504	0.00	3780	0.0	0.0	3764	0.0	0.0
32696	250	8	8			1	343	0.00	1	372	0.00	3778	0.0	0.0	3764	0.0	0.0
32697	37	8	8			0	1,056	0.00	0	1,145	0.00	3782	0.0	0.0	7525	0.0	0.0
32698	135	6	6			0	306	0.00	0	331	0.00	7526	0.0	0.0	3782	0.0	0.0
32699	506	54	54			9,182	49,787	0.18	10,593	49,787	0.21	3746	0.0	0.0	3747	0.0	0.0
32703	530	6	6			0	544	0.00	0	544	0.00	3886	0.0	0.0	3813	0.0	0.0
32704	117	8	8			65	1,124	0.06	65	1,126	0.06	3813	0.0	0.0	3812	0.0	0.0
32705	190	8	8			65	1,128	0.06	65	1,130	0.06	3814	0.0	0.0	3813	0.0	0.0
32706	114	8	8			63	1,338	0.05	63	1,340	0.05	3846	0.0	0.0	3814	0.0	0.0
32707	171	8	8			40	1,176	0.03	40	1,178	0.03	3808	0.0	0.0	3847	0.0	0.0
32708	73	8	8			26	1,382	0.02	26	1,383	0.02	3809	0.0	0.0	3808	0.0	0.0
32709	159	8	8			25	1,406	0.02	25	1,408	0.02	3848	0.0	0.0	3809	0.0	0.0
32710	213	8	8			1	1,618	0.00	1	1,620	0.00	3849	0.0	0.0	3848	0.0	0.0
32711	197	8	8			1	2,028	0.00	1	2,031	0.00	3850	0.0	0.0	3849	0.0	0.0
32712	280	6	6			93	492	0.19	93	492	0.19	3845	0.0	0.0	3816	0.0	0.0
32714	253	8	8			0	416	0.00	0	417	0.00	7185	0.0	0.0	3846	0.0	0.0
32715	286	6	6			1	243	0.00	1	243	0.00	3815	0.0	0.0	3814	0.0	0.0
32716	170	6	6			0	544	0.00	0	544	0.00	3851	0.0	0.0	3815	0.0	0.0
32718	264	8	8			151	542	0.28	151	543	0.28	3801	0.0	0.0	3832	0.0	0.0
32719	343	8	8			1	1,250	0.00	1	1,251	0.00	3852	0.0	0.0	3802	0.0	0.0
32720	175	8	8			1	2,269	0.00	1	2,272	0.00	3791	0.0	0.0	3852	0.0	0.0
32721	180	6	6			1	168	0.00	1	168	0.00	3792	0.0	0.0	3803	0.0	0.0
32722	67	6	6			1	351	0.00	1	351	0.00	3793	0.0	0.0	3803	0.0	0.0
32723	155	6	6			1	550	0.00	1	550	0.00	3803	0.0	0.0	3853	0.0	0.0
32724	280	6	6			2	390	0.01	2	390	0.01	3853	0.0	0.0	3854	0.0	0.0
32725	139	6	6			19	540	0.03	19	540	0.03	3854	0.0	0.0	3855	0.0	0.0
32726	187	6	6			19	390	0.05	19	390	0.05	3855	0.0	0.0	3804	0.0	0.0
32727	165	8	8			21	927	0.02	21	928	0.02	3805	0.0	0.0	3856	0.0	0.0
32728	187	8	8			21	385	0.05	21	385	0.05	3856	0.0	0.0	3806	0.0	0.0
32729	191	8	8			22	385	0.06	22	385	0.06	3806	0.0	0.0	7529	0.0	0.0
32730	222	8	8			22	966	0.02	22	967	0.02	7529	0.0	0.0	3857	0.0	0.0
32731	250	8	8			22	638	0.03	22	638	0.03	3857	0.0	0.0	3858	0.0	0.0
32732	167	6	6			1	433	0.00	1	433	0.00	7286	0.0	0.0	3810	0.0	0.0
32733	272	6	6			31	311	0.10	31	311	0.10	3860	0.0	0.0	3829	0.0	0.0
32734	163	6	6			30	367	0.08	30	367	0.08	3810	0.0	0.0	3860	0.0	0.0
32735	182	6	6			1	522	0.00	1	522	0.00	7527	0.0	0.0	7286	0.0	0.0
32736	375	6	6			1	316	0.00	1	316	0.00	3794	0.0	0.0	7527	0.0	0.0
32737	423	6	6			36	470	0.08	36	470	0.08	3807	0.0	0.0	3861	0.0	0.0
32738	200	6	6			1	292	0.00	1	292	0.00	3863	0.0	0.0	3862	0.0	0.0
32739	295	6	6			1	419	0.00	1	419	0.00	3865	0.0	0.0	3864	0.0	0.0
32741	165	12	12			176	981	0.18	176	981	0.18	3868	0.0	0.0	3867	0.0	0.0
32742	290	6	6			1	467	0.00	1	467	0.00	7043	0.0	0.0	3830	0.0	0.0
32743	137	12	12			140	985	0.14	140	985	0.14	3818	0.0	0.0	3868	0.0	0.0
32744	138	12	12			140	963	0.15	140	963	0.15	3869	0.0	0.0	3818	0.0	0.0
32745	246	12	12			140	1,149	0.12	140	1,149	0.12	3870	0.0	0.0	3869	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32746	121	8	8			299	1,117	0.27	299	1,119	0.27	3870	0.0	0.0	3839	0.0	0.0
32747	339	8	8			299	1,123	0.27	299	1,124	0.27	3839	0.0	0.0	3838	0.0	0.0
32748	60	8	8			315	1,275	0.25	315	1,276	0.25	3838	0.0	0.0	3837	0.0	0.0
32749	121	8	8			1	1,659	0.00	1	1,661	0.00	3871	0.0	0.0	3837	0.0	0.0
32750	138	8	8			316	903	0.35	316	905	0.35	3837	0.0	0.0	3836	0.0	0.0
32751	99	8	8			316	835	0.38	316	837	0.38	3836	0.0	0.0	3835	0.0	0.0
32752	130	8	8			317	536	0.59	317	537	0.59	3843	0.0	0.0	3842	0.0	0.0
32753	271	8	8			23	1,347	0.02	23	1,349	0.02	3841	0.0	0.0	3842	0.0	0.0
32754	128	12	12			438	748	0.59	438	748	0.59	3831	0.0	0.0	3870	0.0	0.0
32755	128	12	12			417	812	0.51	417	812	0.51	3832	0.0	0.0	3831	0.0	0.0
32756	140	8	8			28	467	0.06	28	468	0.06	3833	0.0	0.0	3801	0.0	0.0
32757	199	8	8			28	388	0.07	28	389	0.07	7184	0.0	0.0	3833	0.0	0.0
32758	135	8	8			28	374	0.07	28	374	0.07	3834	0.0	0.0	7184	0.0	0.0
32759	135	8	8			3	483	0.01	3	483	0.01	3874	0.0	0.0	3834	0.0	0.0
32760	67	8	8			3	538	0.01	3	539	0.01	3875	0.0	0.0	3874	0.0	0.0
32761	32	8	8			3	1,159	0.00	3	1,160	0.00	7046	0.0	0.0	3875	0.0	0.0
32762	350	8	8			101	783	0.13	101	783	0.13	3878	0.0	0.0	3879	0.0	0.0
32763	170	8	8			122	1,109	0.11	122	1,110	0.11	3879	0.0	0.0	3801	0.0	0.0
32764	185	10	10			267	1,127	0.24	267	1,126	0.24	7044	0.0	0.0	3832	0.0	0.0
32765	182	10	10			267	1,008	0.26	267	1,006	0.27	3830	0.0	0.0	7044	0.0	0.0
32766	376	10	10			252	1,544	0.16	252	1,542	0.16	3829	0.0	0.0	3830	0.0	0.0
32767	155	10	10			221	790	0.28	220	789	0.28	3819	0.0	0.0	3859	0.0	0.0
32768	191	6	6			36	419	0.09	36	419	0.09	3861	0.0	0.0	3819	0.0	0.0
32769	316	10	10			183	931	0.20	183	930	0.20	3880	0.0	0.0	3820	0.0	0.0
32770	55	10	10			450	928	0.48	450	927	0.49	3881	0.0	0.0	3880	0.0	0.0
32771	153	10	10			449	1,700	0.26	449	1,698	0.26	3858	0.0	0.0	3881	0.0	0.0
32772	185	8	8			402	803	0.50	402	805	0.50	3821	0.0	0.0	7284	0.0	0.0
32773	276	8	8			267	885	0.30	267	886	0.30	3880	0.0	0.0	3823	0.0	0.0
32774	195	8	8			339	850	0.40	339	851	0.40	3823	0.0	0.0	3825	0.0	0.0
32775	225	8	8			1	544	0.00	1	544	0.00	3824	0.0	0.0	3825	0.0	0.0
32776	180	8	8			1	799	0.00	1	801	0.00	3799	0.0	0.0	3824	0.0	0.0
32777	174	8	8			340	530	0.64	340	531	0.64	3825	0.0	0.0	3826	0.0	0.0
32778	205	8	8			292	728	0.40	292	728	0.40	7528	0.0	0.0	3877	0.0	0.0
32779	186	8	8			392	529	0.74	392	530	0.74	3826	0.0	0.0	3827	0.0	0.0
32780	430	8	8			101	443	0.23	101	444	0.23	3827	0.0	0.0	3878	0.0	0.0
32781	261	8	8			49	760	0.06	49	760	0.06	3882	0.0	0.0	3823	0.0	0.0
32782	301	8	8			48	851	0.06	48	851	0.06	3883	0.0	0.0	3882	0.0	0.0
32783	180	8	8			48	1,072	0.04	48	1,073	0.04	3822	0.0	0.0	3883	0.0	0.0
32784	235	8	8			1	801	0.00	1	802	0.00	3844	0.0	0.0	7285	0.0	0.0
32785	265	8	8			3	1,210	0.00	3	1,212	0.00	7045	0.0	0.0	7287	0.0	0.0
32787	76	6	6			1	607	0.00	1	607	0.00	3895	0.0	0.0	3804	0.0	0.0
32788	110	6	6			1	465	0.00	1	465	0.00	3889	0.0	0.0	3853	0.0	0.0
32790	196	6	6			1	672	0.00	1	672	0.00	3893	0.0	0.0	3865	0.0	0.0
32791	95	6	6			1	195	0.00	1	195	0.00	3892	0.0	0.0	3807	0.0	0.0
32792	187	6	6			1	292	0.00	1	292	0.00	3891	0.0	0.0	3860	0.0	0.0
32793	126	6	6			1	438	0.00	1	438	0.00	3890	0.0	0.0	7043	0.0	0.0
32794	413	6	6			1	423	0.00	1	423	0.00	3884	0.0	0.0	3867	0.0	0.0
32796	169	8	8			1	389	0.00	1	390	0.00	3998	0.0	0.0	3928	0.0	0.0
32797	130	6	6			1	311	0.00	1	311	0.00	3999	0.0	0.0	3975	0.0	0.0
32798	97	6	6			1	179	0.00	1	179	0.00	7682	0.0	0.0	3913	0.0	0.0
32799	159	6	6			27	432	0.06	27	432	0.06	7288	0.0	0.0	7531	0.0	0.0
32800	105	6	6			1	361	0.00	1	361	0.00	4013	0.0	0.0	4014	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32801	90	6	6			1	366	0.00	1	366	0.00	4012	0.0	0.0	7288	0.0	0.0
32802	200	6	6			1	461	0.00	1	461	0.00	4011	0.0	0.0	7288	0.0	0.0
32803	206	6	6			1	167	0.01	1	167	0.01	3913	0.0	0.0	4013	0.0	0.0
32804	60	8	8			249	657	0.38	249	658	0.38	7531	0.0	0.0	3960	0.0	0.0
32805	231	8	8			221	615	0.36	221	616	0.36	3961	0.0	0.0	7531	0.0	0.0
32806	296	8	8			221	564	0.39	221	565	0.39	3962	0.0	0.0	3961	0.0	0.0
32807	160	8	8			220	1,016	0.22	220	1,017	0.22	3916	0.0	0.0	3962	0.0	0.0
32808	139	8	8			185	638	0.29	185	638	0.29	3915	0.0	0.0	3916	0.0	0.0
32809	153	8	8			174	948	0.18	174	949	0.18	3954	0.0	0.0	3914	0.0	0.0
32810	131	8	8			173	1,338	0.13	173	1,340	0.13	3963	0.0	0.0	3954	0.0	0.0
32811	73	8	8			119	762	0.16	119	763	0.16	8481	0.0	0.0	8500	0.0	0.0
32812	47	8	8			119	1,609	0.07	119	1,611	0.07	3953	0.0	0.0	8481	0.0	0.0
32813	130	8	8			119	1,608	0.07	119	1,610	0.07	3952	0.0	0.0	3953	0.0	0.0
32814	171	6	6			39	607	0.06	39	607	0.06	3950	0.0	0.0	3951	0.0	0.0
32815	304	6	6			38	224	0.17	38	224	0.17	3949	0.0	0.0	3950	0.0	0.0
32816	306	8	8			38	799	0.05	38	800	0.05	3964	0.0	0.0	3949	0.0	0.0
32817	138	8	8			16	808	0.02	16	809	0.02	3965	5.7	5.7	3916	0.0	0.0
32818	139	6	6			1	458	0.00	1	458	0.00	4010	0.0	0.0	3965	5.7	5.7
32819	21	8	8			33	1,859	0.02	33	1,861	0.02	3966	0.0	0.0	3916	0.0	0.0
32820	304	8	8			21	1,165	0.02	21	1,166	0.02	3911	0.0	0.0	3966	0.0	0.0
32821	65	8	8			1	1,176	0.00	1	1,177	0.00	3899	0.0	0.0	3910	0.0	0.0
32822	162	8	8			251	949	0.26	251	951	0.26	3967	0.0	0.0	3920	0.0	0.0
32823	164	8	8			251	944	0.27	251	944	0.27	3968	0.0	0.0	3967	0.0	0.0
32824	31	6	6			1	540	0.00	1	540	0.00	3917	0.0	0.0	3968	0.0	0.0
32826	163	8	8			308	688	0.45	308	689	0.45	3970	0.0	0.0	3924	0.0	0.0
32827	79	8	8			308	889	0.35	308	890	0.35	3919	0.0	0.0	3970	0.0	0.0
32828	128	8	8			306	716	0.43	306	717	0.43	3920	0.0	0.0	3919	0.0	0.0
32829	48	8	8			31	926	0.03	31	928	0.03	3921	0.0	0.0	3920	0.0	0.0
32830	231	8	8			30	932	0.03	30	933	0.03	3971	0.0	0.0	3921	0.0	0.0
32831	94	8	8			1	933	0.00	1	934	0.00	7049	0.0	0.0	3971	0.0	0.0
32832	90	8	8			29	962	0.03	29	963	0.03	3972	0.0	0.0	3971	0.0	0.0
32833	220	8	8			28	923	0.03	28	924	0.03	7290	0.0	0.0	3972	0.0	0.0
32834	278	8	8			1	1,094	0.00	1	1,095	0.00	3973	0.0	0.0	7290	0.0	0.0
32835	78	6	6			1	535	0.00	1	535	0.00	4009	0.0	0.0	3974	0.0	0.0
32836	242	6	6			22	383	0.06	22	383	0.06	3975	0.0	0.0	3924	0.0	0.0
32837	246	6	6			21	441	0.05	21	441	0.05	3923	0.0	0.0	3975	0.0	0.0
32838	170	6	6			1	576	0.00	1	576	0.00	3976	0.0	0.0	3923	0.0	0.0
32839	424	8	8			19	883	0.02	19	885	0.02	3909	0.0	0.0	3955	0.0	0.0
32840	350	6	6			1	174	0.01	1	174	0.01	3977	0.0	0.0	3963	0.0	0.0
32841	194	6	6			1	646	0.00	1	646	0.00	4008	0.0	0.0	3977	0.0	0.0
32842	165	6	6			28	425	0.07	28	425	0.07	3908	0.0	0.0	3952	0.0	0.0
32843	17	6	6			28	335	0.09	28	335	0.09	7534	0.0	0.0	3908	0.0	0.0
32844	275	6	6			27	449	0.06	27	449	0.06	7406	0.0	0.0	3951	0.0	0.0
32845	216	6	6			27	691	0.04	27	691	0.04	3907	0.0	0.0	7406	0.0	0.0
32846	258	6	6			26	392	0.07	26	392	0.07	7407	0.0	0.0	3907	0.0	0.0
32847	183	6	6			19	801	0.02	19	801	0.02	3978	0.0	0.0	3906	0.0	0.0
32848	200	6	6			0	288	0.00	0	311	0.00	4007	0.0	0.0	3979	0.0	0.0
32849	102	6	6			0	579	0.00	0	628	0.00	4006	0.0	0.0	3979	0.0	0.0
32850	220	8	8			1	1,122	0.00	1	1,217	0.00	3979	0.0	0.0	3944	0.0	0.0
32851	292	8	8			26	1,012	0.03	26	1,013	0.03	3926	0.0	0.0	3958	0.0	0.0
32852	313	8	8			25	917	0.03	25	918	0.03	3928	0.0	0.0	3927	0.0	0.0
32853	248	8	8			24	536	0.05	24	537	0.05	3931	0.0	0.0	3928	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32854	27	10	10			1	1,466	0.00	1	1,465	0.00	3930	0.0	0.0	3931	0.0	0.0
32855	335	10	10			1	524	0.00	1	523	0.00	3898	0.0	0.0	3930	0.0	0.0
32856	458	8	8			69	383	0.18	69	416	0.17	3981	0.0	0.0	3980	0.0	0.0
32857	240	8	8			68	385	0.18	68	418	0.16	3932	0.0	0.0	3981	0.0	0.0
32858	266	8	8			68	708	0.10	68	769	0.09	3933	0.0	0.0	3932	0.0	0.0
32859	171	8	8			68	697	0.10	68	756	0.09	3934	0.0	0.0	3933	0.0	0.0
32860	280	10	10			68	582	0.12	68	630	0.11	3937	0.0	0.0	3934	0.0	0.0
32861	64	10	10			58	590	0.10	58	638	0.09	7139	0.0	0.0	3937	0.0	0.0
32862	60	10	10			58	582	0.10	58	630	0.09	3938	0.0	0.0	7139	0.0	0.0
32863	168	10	10			58	568	0.10	58	615	0.09	3982	0.0	0.0	3938	0.0	0.0
32864	226	10	10			58	654	0.09	58	708	0.08	7050	0.0	0.0	3982	0.0	0.0
32865	166	8	8			42	541	0.08	42	587	0.07	3984	0.0	0.0	3983	0.0	0.0
32866	103	8	8			0	1,124	0.00	0	1,219	0.00	4005	0.0	0.0	3984	0.0	0.0
32867	311	8	8			17	765	0.02	17	830	0.02	3956	0.0	0.0	7533	0.0	0.0
32868	432	8	8			1	931	0.00	1	1,010	0.00	3985	0.0	0.0	3956	0.0	0.0
32869	428	8	8			1	907	0.00	1	984	0.00	7048	0.0	0.0	7533	0.0	0.0
32870	163	8	8			6	848	0.01	6	919	0.01	7047	0.0	0.0	3939	0.0	0.0
32871	365	8	8			0	785	0.00	0	851	0.00	3942	0.0	0.0	7047	0.0	0.0
32872	297	8	8			0	328	0.00	0	329	0.00	3987	0.0	0.0	3986	0.0	0.0
32873	108	8	8			5	1,026	0.00	5	1,113	0.00	7138	0.0	0.0	7047	0.0	0.0
32874	220	8	8			0	858	0.00	0	931	0.00	4004	0.0	0.0	3988	0.0	0.0
32875	40	8	8			5	1,304	0.00	5	1,415	0.00	3940	0.0	0.0	7138	0.0	0.0
32876	355	8	8			5	383	0.01	5	415	0.01	3989	0.0	0.0	3940	0.0	0.0
32878	315	8	8			0	1,065	0.00	0	1,156	0.00	3905	0.0	0.0	3989	0.0	0.0
32879	303	8	8			31	913	0.03	31	991	0.03	3945	0.0	0.0	3905	0.0	0.0
32880	280	8	8			22	1,088	0.02	22	1,089	0.02	3957	0.0	0.0	3959	0.0	0.0
32881	292	8	8			22	1,077	0.02	22	1,078	0.02	3990	0.0	0.0	3957	0.0	0.0
32882	165	8	8			1	925	0.00	1	926	0.00	3900	0.0	0.0	3990	0.0	0.0
32883	192	8	8			1	951	0.00	1	952	0.00	3901	0.0	0.0	3990	0.0	0.0
32885	167	8	8			1	958	0.00	1	958	0.00	3903	0.0	0.0	3959	0.0	0.0
32886	169	6	6			16	369	0.04	16	369	0.04	3929	0.0	0.0	3931	0.0	0.0
32887	382	6	6			1	280	0.00	1	280	0.00	3922	0.0	0.0	3929	0.0	0.0
32889	179	6	6			15	178	0.09	15	178	0.09	3991	0.0	0.0	3929	0.0	0.0
32890	181	8	8			0	822	0.00	0	891	0.00	7532	0.0	0.0	3938	0.0	0.0
32891	168	8	8			0	971	0.00	0	1,053	0.00	3936	0.0	0.0	7532	0.0	0.0
32892	392	8	8			15	1,064	0.01	15	1,154	0.01	3992	0.0	0.0	3983	0.0	0.0
32893	198	8	8			1	857	0.00	1	929	0.00	3993	0.0	0.0	3992	0.0	0.0
32894	95	8	8			1	1,126	0.00	1	1,222	0.00	3994	0.0	0.0	3993	0.0	0.0
32895	114	8	8			1	1,163	0.00	1	1,262	0.00	3995	0.0	0.0	3994	0.0	0.0
32896	149	6	6			1	187	0.00	1	187	0.00	4001	0.0	0.0	3977	0.0	0.0
32897	120	8	8			1	709	0.00	1	769	0.00	3944	0.0	0.0	3995	0.0	0.0
32898	121	8	8			0	631	0.00	0	685	0.00	3943	0.0	0.0	3944	0.0	0.0
32899	98	8	8			31	1,073	0.03	31	1,164	0.03	3946	0.0	0.0	3945	0.0	0.0
32900	150	8	8			31	1,146	0.03	31	1,243	0.03	3947	0.0	0.0	3946	0.0	0.0
32901	201	8	8			31	1,561	0.02	31	1,694	0.02	7289	0.0	0.0	3947	0.0	0.0
32902	261	8	8			0	1,330	0.00	0	1,443	0.00	3948	0.0	0.0	7289	0.0	0.0
32903	185	8	8			350	681	0.51	350	683	0.51	3925	0.0	0.0	3958	0.0	0.0
32904	319	8	8			349	683	0.51	349	684	0.51	3924	0.0	0.0	3925	0.0	0.0
32906	246	10	15	33	Existing	733	387	1.89	1,251	1,235	1.01	4096	5.5	0.0	4095	2.6	0.0
32907	311	8	15	33	Existing	713	554	1.29	1,232	3,211	0.38	4114	3.0	0.0	4018	6.3	0.0
32908	55	8	15	33	Existing	711	896	0.79	1,233	5,188	0.24	4018	6.3	0.0	4097	0.0	0.0
32909	123	8	8			9	1,744	0.01	9	1,747	0.01	7535	0.0	0.0	4120	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32910	301	10	10			499	575	0.87	623	622	1.00	7053	1.6	0.0	4071	2.1	0.0
32911	56	8	8			9	873	0.01	9	874	0.01	4120	0.0	0.0	4039	0.0	0.0
32912	170	10	15	43	2036	1,038	559	1.86	1,190	1,787	0.67	4071	2.1	0.0	4072	0.0	0.0
32913	108	10	15	43	2036	695	390	1.78	1,190	1,246	0.95	4073	1.3	0.0	4074	2.8	0.0
32914	65	10	10			92	732	0.13	8	792	0.01	7054	2.7	0.0	4074	2.8	0.0
32915	271	8	8			0	1,293	0.00	0	1,402	0.00	4106	0.0	0.0	7054	2.7	0.0
32916	85	10	15	43	2036	693	533	1.30	1,190	1,703	0.70	4074	2.8	0.0	4075	4.5	0.0
32917	319	10	15	43	2036	692	618	1.12	1,190	1,974	0.60	4075	4.5	0.0	4107	2.8	0.0
32918	270	10	15	43	2036	701	616	1.14	1,212	1,968	0.62	4107	2.8	0.0	4083	6.6	0.0
32919	120	10	15	43	2036	701	622	1.13	1,212	1,987	0.61	4109	7.3	0.0	4108	1.8	0.0
32920	333	10	15	43	2036	701	612	1.15	1,212	1,955	0.62	4108	1.8	0.0	4081	3.2	0.0
32921	146	8	15	43	2036	701	926	0.76	1,212	5,367	0.23	4081	3.2	0.0	4080	0.8	0.0
32922	113	8	15	43	2036	705	442	1.60	1,220	2,559	0.48	4080	0.8	0.0	7537	2.2	0.0
32923	302	8	8			47	349	0.13	7	378	0.02	4078	1.7	0.0	4079	0.6	0.0
32924	282	8	8			8	902	0.01	8	978	0.01	4077	0.0	0.0	4080	0.8	0.0
32925	276	8	8			5	833	0.01	5	903	0.01	4076	0.0	0.0	4077	0.0	0.0
32926	150	8	8			0	987	0.00	0	1,070	0.00	4068	0.0	0.0	4069	0.0	0.0
32927	350	8	8			0	665	0.00	0	666	0.00	4020	0.0	0.0	4082	0.0	0.0
32928	250	8	8			11	615	0.02	11	615	0.02	4085	0.0	0.0	4086	0.0	0.0
32929	71	8	8			11	697	0.02	11	698	0.02	4084	0.0	0.0	4085	0.0	0.0
32930	264	8	8			51	733	0.07	51	734	0.07	4038	0.0	0.0	7052	0.0	0.0
32931	311	8	8			51	265	0.19	51	265	0.19	7052	0.0	0.0	4066	0.0	0.0
32932	130	8	8			63	222	0.28	63	222	0.28	4066	0.0	0.0	4067	0.0	0.0
32933	180	8	8			24	526	0.04	24	526	0.04	4086	0.0	0.0	4067	0.0	0.0
32934	120	8	8			87	301	0.29	87	301	0.29	4067	0.0	0.0	4065	0.0	0.0
32935	155	8	8			12	697	0.02	12	697	0.02	4063	0.0	0.0	4064	0.0	0.0
32936	115	8	8			99	362	0.27	99	362	0.27	4064	0.0	0.0	4110	0.0	0.0
32937	41	8	8			99	352	0.28	99	353	0.28	4110	0.0	0.0	4111	0.0	0.0
32938	154	8	8			99	420	0.24	99	421	0.24	4111	0.0	0.0	4061	0.0	0.0
32939	102	8	8			0	768	0.00	0	769	0.00	4060	0.0	0.0	4061	0.0	0.0
32940	55	8	8			100	766	0.13	100	767	0.13	4061	0.0	0.0	4062	0.0	0.0
32941	83	8	8			101	565	0.18	101	566	0.18	4062	0.0	0.0	7536	0.0	0.0
32942	246	8	8			1	627	0.00	1	628	0.00	4057	0.0	0.0	4056	0.0	0.0
32943	78	8	8			0	328	0.00	0	328	0.00	4058	0.0	0.0	4057	0.0	0.0
32944	389	8	8			19	791	0.02	19	792	0.02	4054	0.0	0.0	4055	0.0	0.0
32945	141	8	8			1	664	0.00	1	665	0.00	4052	0.0	0.0	4053	0.0	0.0
32946	251	8	8			1	791	0.00	1	792	0.00	4082	0.0	0.0	4052	0.0	0.0
32953	297	8	8			35	1,150	0.03	35	1,151	0.03	4049	0.0	0.0	4048	0.0	0.0
32954	238	8	8			7	469	0.01	7	509	0.01	4051	0.0	0.0	7051	0.0	0.0
32955	152	8	8			7	476	0.01	7	516	0.01	4050	0.0	0.0	4051	0.0	0.0
32956	59	6	6			0	265	0.00	0	286	0.00	4021	0.0	0.0	4050	0.0	0.0
32957	232	6	6			23	237	0.10	23	237	0.10	4022	0.0	0.0	4044	0.0	0.0
32958	225	8	8			10	444	0.02	7	482	0.01	7051	0.0	0.0	7291	3.8	0.0
32959	109	8	8			38	249	0.15	6	270	0.02	4113	0.6	0.0	4047	0.7	0.0
32960	130	8	8			27	247	0.11	3	268	0.01	4046	2.0	0.0	4113	0.6	0.0
32961	119	6	6			18	193	0.09	3	209	0.02	4045	7.5	0.0	4046	2.0	0.0
32963	250	8	8			62	250	0.25	19	271	0.07	4047	0.7	0.0	4096	5.5	0.0
32964	64	8	15	33	Existing	712	831	0.86	1,233	4,809	0.26	4097	0.0	0.0	4096	5.5	0.0
32965	166	8	15	33	Existing	709	365	1.94	1,228	2,111	0.58	4079	0.6	0.0	4114	3.0	0.0
32966	377	8	8			0	655	0.00	0	710	0.00	4101	0.0	0.0	4097	0.0	0.0
32967	315	10	15	33	Existing	732	380	1.93	1,251	1,213	1.03	4095	2.6	0.0	4094	0.0	0.0
32968	475	12	15	36	2036	1,369	1,597	0.86	1,828	3,138	0.58	4094	0.0	0.0	9000	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
32969	250	6	6			3	191	0.02	3	207	0.02	4025	0.0	0.0	4077	0.0	0.0
32970	210	8	8			0	1,025	0.00	0	1,113	0.00	7140	0.0	0.0	7186	0.0	0.0
32971	214	10	10			66	1,386	0.05	66	1,500	0.04	4042	0.0	0.0	4105	0.0	0.0
32972	258	12	12			80	1,951	0.04	80	2,114	0.04	4105	0.0	0.0	4104	0.0	0.0
32973	286	8	8			1	1,243	0.00	1	1,349	0.00	4026	0.0	0.0	4104	0.0	0.0
32974	242	12	12			80	1,107	0.07	80	1,199	0.07	4104	0.0	0.0	7539	0.0	0.0
32975	162	12	12			80	1,124	0.07	80	1,217	0.07	7539	0.0	0.0	4103	0.0	0.0
32976	113	6	6			6	374	0.01	6	406	0.01	4027	0.0	0.0	4041	0.0	0.0
32977	195	8	8			6	894	0.01	6	970	0.01	4041	0.0	0.0	4040	0.0	0.0
32978	151	8	8			6	342	0.02	6	371	0.01	4098	0.0	0.0	4099	0.0	0.0
32979	231	8	8			6	1,356	0.00	6	1,470	0.00	4099	0.0	0.0	4100	0.0	0.0
32980	202	6	6			6	354	0.02	6	384	0.01	4028	0.0	0.0	4100	0.0	0.0
32981	172	8	8			12	401	0.03	12	435	0.03	4100	0.0	0.0	4118	0.0	0.0
32982	480	15	15			633	1,297	0.49	633	1,405	0.45	4118	0.0	0.0	7294	0.0	0.0
32983	95	8	8			49	747	0.07	49	810	0.06	4119	0.0	0.0	4118	0.0	0.0
32984	448	12	12			574	2,390	0.24	574	2,590	0.22	4103	0.0	0.0	4118	0.0	0.0
32985	445	8	8			491	833	0.59	491	904	0.54	4102	0.0	0.0	4103	0.0	0.0
32986	70	8	8			0	542	0.00	0	588	0.00	4129	0.0	0.0	4102	0.0	0.0
32987	50	8	8			13	383	0.03	13	416	0.03	4089	0.0	0.0	4090	0.0	0.0
32988	98	6	6			0	276	0.00	0	299	0.00	4029	0.0	0.0	4090	0.0	0.0
32989	328	8	8			13	788	0.02	13	854	0.01	4088	0.0	0.0	4089	0.0	0.0
32990	190	12	12			1,395	1,641	0.85	1,849	1,777	1.04	4115	0.0	0.0	4116	0.0	0.0
32997	33	6	6			0	369	0.00	0	400	0.00	7683	0.0	0.0	7293	0.0	0.0
32998	35	6	6			0	356	0.00	0	386	0.00	4037	0.0	0.0	7293	0.0	0.0
33004	70	15	18	38	2036	972	1,149	0.85	1,539	1,869	0.82	7142	0.0	0.0	4232	0.0	0.0
33005	308	8	8			1	573	0.00	1	574	0.00	4166	0.0	0.0	7540	0.0	0.0
33006	362	8	8			0	819	0.00	0	821	0.00	4167	0.0	0.0	4166	0.0	0.0
33007	440	10	12	14	Existing	408	971	0.42	974	1,579	0.62	4205	0.0	0.0	7540	0.0	0.0
33008	375	8	8			0	787	0.00	0	788	0.00	4165	0.0	0.0	4205	0.0	0.0
33011	145	8	12	14	Existing	378	619	0.61	944	1,827	0.52	4149	0.0	0.0	4163	0.0	0.0
33012	43	8	8			0	321	0.00	0	321	0.00	4206	0.0	0.0	4149	0.0	0.0
33013	204	8	8			0	313	0.00	0	313	0.00	4234	0.0	0.0	4206	0.0	0.0
33014	130	8	8			377	1,119	0.34	944	1,120	0.84	4164	0.0	0.0	4149	0.0	0.0
33015	313	8	15	29	Existing	377	386	0.98	944	2,063	0.46	4208	4.7	0.0	4164	0.0	0.0
33017	297	8	15	29	Existing	377	299	1.26	944	1,597	0.59	4162	1.6	0.0	4208	4.7	0.0
33018	123	8	8			1	297	0.00	1	297	0.00	4197	0.0	0.0	4204	7.2	0.0
33019	80	6	6			0	176	0.00	0	176	0.00	4139	0.0	0.0	4197	0.0	0.0
33020	118	6	6			0	275	0.00	0	275	0.00	7684	0.0	0.0	4197	0.0	0.0
33021	178	8	8			352	328	1.07	352	329	1.07	7055	0.0	0.0	4204	7.2	0.0
33022	192	6	6			0	193	0.00	0	193	0.00	4140	0.0	0.0	7055	0.0	0.0
33023	108	8	8			1	821	0.00	1	822	0.00	4193	0.0	0.0	4192	0.0	0.0
33024	335	8	8			0	545	0.00	0	546	0.00	4194	0.0	0.0	4193	0.0	0.0
33025	108	8	8			304	565	0.54	304	566	0.54	4196	0.0	0.0	4192	0.0	0.0
33026	213	8	8			304	483	0.63	304	484	0.63	4152	0.0	0.0	4195	0.0	0.0
33027	154	8	8			61	301	0.20	61	301	0.20	4182	0.0	0.0	4184	0.0	0.0
33028	126	8	8			37	305	0.12	37	306	0.12	4181	0.0	0.0	4182	0.0	0.0
33029	87	8	8			37	294	0.13	37	294	0.13	4180	0.0	0.0	4181	0.0	0.0
33030	389	8	8			36	776	0.05	36	776	0.05	4154	0.0	0.0	4180	0.0	0.0
33031	416	8	8			0	297	0.00	0	297	0.00	7056	0.0	0.0	4152	0.0	0.0
33032	271	8	8			211	292	0.72	211	293	0.72	4159	0.0	0.0	4152	0.0	0.0
33033	350	8	8			119	297	0.40	119	298	0.40	4160	0.0	0.0	4159	0.0	0.0
33034	230	8	8			119	490	0.24	119	491	0.24	4157	0.0	0.0	4161	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33035	309	8	8			58	644	0.09	58	645	0.09	4158	0.0	0.0	4159	0.0	0.0
33036	185	8	8			15	307	0.05	15	308	0.05	7542	0.0	0.0	4158	0.0	0.0
33037	159	8	8			42	769	0.05	42	769	0.05	4155	0.0	0.0	4158	0.0	0.0
33038	62	10	12	14	Existing	450	1,812	0.25	1,017	2,947	0.35	4169	0.0	0.0	4170	0.0	0.0
33039	290	10	12	14	Existing	431	979	0.44	998	1,593	0.63	7540	0.0	0.0	4169	0.0	0.0
33040	345	8	8			19	705	0.03	19	706	0.03	4209	0.0	0.0	4169	0.0	0.0
33041	365	8	8			0	898	0.00	0	899	0.00	4168	0.0	0.0	4209	0.0	0.0
33042	237	8	8			63	301	0.21	63	301	0.21	4171	0.0	0.0	4170	0.0	0.0
33043	335	8	8			44	297	0.15	44	298	0.15	4176	0.0	0.0	4171	0.0	0.0
33044	190	8	8			1	540	0.00	1	541	0.00	7141	0.0	0.0	4150	0.0	0.0
33045	490	8	8			0	665	0.00	0	665	0.00	4147	0.0	0.0	7141	0.0	0.0
33046	401	8	8			10	778	0.01	10	780	0.01	4212	0.0	0.0	4150	0.0	0.0
33047	269	8	8			32	958	0.03	32	960	0.03	7295	0.0	0.0	4176	0.0	0.0
33048	138	8	8			31	297	0.11	31	297	0.11	4210	0.0	0.0	4175	0.0	0.0
33049	233	8	8			1	148	0.01	1	148	0.01	4211	0.0	0.0	4210	0.0	0.0
33050	200	8	8			1	297	0.00	1	298	0.00	4221	0.0	0.0	4177	0.0	0.0
33051	425	8	8			19	837	0.02	19	838	0.02	4173	0.0	0.0	4171	0.0	0.0
33052	209	8	8			0	577	0.00	0	578	0.00	4174	0.0	0.0	4173	0.0	0.0
33053	260	8	8			1	743	0.00	1	744	0.00	4172	0.0	0.0	4173	0.0	0.0
33054	26	8	8			6	922	0.01	6	999	0.01	4214	0.0	0.0	4213	0.0	0.0
33055	127	8	8			6	921	0.01	6	999	0.01	4215	0.0	0.0	4214	0.0	0.0
33056	275	8	8			14	697	0.02	14	756	0.02	4198	0.0	0.0	4213	0.0	0.0
33057	156	8	8			13	697	0.02	13	757	0.02	4201	0.0	0.0	4198	0.0	0.0
33058	304	8	8			0	383	0.00	0	416	0.00	4203	0.0	0.0	4202	0.0	0.0
33059	175	8	8			0	744	0.00	0	807	0.00	4217	0.0	0.0	4203	0.0	0.0
33060	125	8	8			0	753	0.00	0	817	0.00	4200	0.0	0.0	4217	0.0	0.0
33061	315	8	8			7	715	0.01	7	776	0.01	4199	0.0	0.0	4201	0.0	0.0
33062	380	8	8			0	353	0.00	0	383	0.00	7296	0.0	0.0	4199	0.0	0.0
33063	157	8	8			0	1,015	0.00	0	1,101	0.00	4142	0.0	0.0	7296	0.0	0.0
33064	76	15	18	38	2036	867	1,321	0.66	1,434	2,148	0.67	4219	0.0	0.0	4220	0.0	0.0
33065	107	15	18	38	2036	867	1,718	0.50	1,433	2,793	0.51	4218	0.0	0.0	4219	0.0	0.0
33066	222	8	8			353	285	1.24	353	286	1.24	4204	7.2	0.0	4218	0.0	0.0
33067	410	15	15			513	1,241	0.41	1,080	1,241	0.87	4170	0.0	0.0	4218	0.0	0.0
33068	131	8	8			0	844	0.00	0	915	0.00	4223	0.0	0.0	4222	0.0	0.0
33069	270	8	8			20	607	0.03	20	658	0.03	4213	0.0	0.0	4222	0.0	0.0
33070	323	15	18	38	2036	973	1,398	0.70	1,540	2,274	0.68	4225	0.0	0.0	4226	0.0	0.0
33071	86	15	18	38	2036	972	1,170	0.83	1,539	1,902	0.81	4232	0.0	0.0	4186	0.0	0.0
33072	48	15	18	38	2036	972	1,183	0.82	1,538	1,925	0.80	7297	0.0	0.0	7142	0.0	0.0
33073	50	15	18	38	2036	903	1,777	0.51	1,469	2,890	0.51	4190	0.0	0.0	7297	0.0	0.0
33074	130	15	18	38	2036	868	1,227	0.71	1,435	1,995	0.72	4224	0.0	0.0	4190	0.0	0.0
33075	51	15	18	38	2036	867	1,219	0.71	1,434	1,982	0.72	7543	0.0	0.0	4224	0.0	0.0
33076	103	15	18	38	2036	867	1,238	0.70	1,434	2,013	0.71	4220	0.0	0.0	7543	0.0	0.0
33077	301	8	8			34	460	0.07	34	461	0.07	4151	0.0	0.0	4190	0.0	0.0
33078	81	8	8			0	688	0.00	0	745	0.00	4145	0.0	0.0	4227	0.0	0.0
33079	414	12	12			1,409	2,485	0.57	1,862	2,693	0.69	4148	0.0	0.0	4228	0.0	0.0
33080	338	8	8			0	147	0.00	0	160	0.00	4236	0.0	0.0	4148	0.0	0.0
33081	413	8	8			34	594	0.06	34	594	0.06	4191	0.0	0.0	4151	0.0	0.0
33083	235	8	8			24	892	0.03	24	894	0.03	4179	0.0	0.0	4182	0.0	0.0
33084	242	8	8			24	896	0.03	24	897	0.03	4153	0.0	0.0	4179	0.0	0.0
33085	133	8	8			1	285	0.00	1	285	0.00	4230	0.0	0.0	4183	0.0	0.0
33086	371	8	8			30	827	0.04	30	828	0.04	4229	0.0	0.0	4183	0.0	0.0
33087	235	8	8			1	956	0.00	1	957	0.00	7408	0.0	0.0	4229	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33097	172	8	8			1	1,206	0.00	1	1,208	0.00	4241	0.0	0.0	4251	0.0	0.0
33098	229	8	8			1	303	0.00	1	303	0.00	4251	0.0	0.0	9959	0.0	0.0
33103	200	8	8			1	2,053	0.00	1	2,056	0.00	4247	0.0	0.0	4248	0.0	0.0
33104	200	8	8			0	1,456	0.00	0	1,458	0.00	4246	0.0	0.0	4247	0.0	0.0
33105	100	6	6			1	733	0.00	1	733	0.00	4256	0.0	0.0	4255	0.0	0.0
33106	127	6	6			1	853	0.00	1	853	0.00	4255	0.0	0.0	7298	0.0	0.0
33107	228	8	8			14	1,669	0.01	14	1,672	0.01	4243	0.0	0.0	4242	0.0	0.0
33109	430	8	8			0	666	0.00	0	667	0.00	7544	0.0	0.0	4259	1.8	1.8
33110	350	8	8			320	299	1.07	320	299	1.07	4259	1.8	1.8	4260	5.3	5.3
33111	165	8	8			321	295	1.09	321	295	1.09	4260	5.3	5.3	4261	1.7	1.6
33112	68	8	8			0	342	0.00	0	342	0.00	4263	0.0	0.0	4296	0.0	0.0
33113	210	8	8			13	735	0.02	13	735	0.02	7190	0.0	0.0	4296	0.0	0.0
33114	50	10	10			722	787	0.92	926	786	1.18	4266	0.6	0.0	4294	0.0	0.0
33115	208	10	10			703	759	0.93	908	758	1.20	4265	3.9	5.9	4266	0.6	0.0
33118	238	8	12	31	Existing	682	408	1.67	926	1,202	0.77	4294	0.0	0.0	4332	0.8	0.0
33119	281	8	8			18	659	0.03	18	660	0.03	4286	0.0	0.0	4266	0.6	0.0
33120	185	8	8			1	674	0.00	1	675	0.00	4318	0.0	0.0	4309	0.0	0.0
33121	100	8	8			1	297	0.00	1	298	0.00	4319	0.0	0.0	4318	0.0	0.0
33122	250	8	12	44	2036	669	610	1.10	940	1,801	0.52	4302	1.6	0.0	4310	0.0	0.0
33123	145	8	12	44	2036	671	615	1.09	939	1,813	0.52	4317	0.0	0.0	4302	1.6	0.0
33124	205	8	8			11	485	0.02	11	485	0.02	4333	0.0	0.0	4317	0.0	0.0
33125	70	6	6			0	345	0.00	0	345	0.00	4271	0.0	0.0	4333	0.0	0.0
33126	194	8	15	32	2036	201	257	0.78	385	1,374	0.28	4309	0.0	0.0	4308	0.0	0.0
33127	226	8	15	32	2036	201	308	0.65	384	1,647	0.23	4310	0.0	0.0	4309	0.0	0.0
33128	153	8	8			467	825	0.57	556	895	0.62	4310	0.0	0.0	4311	4.3	0.0
33129	158	8	8			3	610	0.00	3	611	0.00	4289	0.0	0.0	4308	0.0	0.0
33130	52	8	8			1	608	0.00	1	609	0.00	4322	0.0	0.0	4289	0.0	0.0
33131	53	8	8			0	329	0.00	0	330	0.00	4267	0.0	0.0	4322	0.0	0.0
33132	125	6	6			0	182	0.00	0	182	0.00	4272	0.0	0.0	4322	0.0	0.0
33133	57	8	8			1	570	0.00	1	571	0.00	4321	0.0	0.0	4320	0.0	0.0
33134	36	8	8			1	705	0.00	1	706	0.00	4335	0.0	0.0	4321	0.0	0.0
33135	67	6	6			0	223	0.00	0	223	0.00	4273	0.0	0.0	4336	0.0	0.0
33136	285	8	8			3	394	0.01	3	394	0.01	4328	0.0	0.0	4300	0.0	0.0
33137	200	8	8			106	364	0.29	106	365	0.29	4299	0.0	0.0	4300	0.0	0.0
33138	131	8	8			109	591	0.18	109	592	0.18	4301	0.0	0.0	4290	0.0	0.0
33139	97	8	8			109	730	0.15	109	731	0.15	4300	0.0	0.0	4301	0.0	0.0
33141	230	8	8			26	727	0.04	26	728	0.04	4298	0.0	0.0	4299	0.0	0.0
33142	445	8	8			1	726	0.00	1	726	0.00	4295	0.0	0.0	4298	0.0	0.0
33143	320	8	8			29	726	0.04	29	726	0.04	4296	0.0	0.0	4297	0.0	0.0
33144	215	8	8			124	301	0.41	124	301	0.41	4326	0.0	0.0	4325	0.0	0.0
33146	282	8	8			124	442	0.28	124	443	0.28	4329	0.0	0.0	4327	0.0	0.0
33147	280	8	8			1	1,319	0.00	1	1,322	0.00	4330	0.0	0.0	4329	0.0	0.0
33148	450	8	8			123	297	0.41	123	298	0.41	4290	0.0	0.0	4329	0.0	0.0
33150	210	8	8			1	992	0.00	1	993	0.00	4323	0.0	0.0	4325	0.0	0.0
33152	265	8	12	29	Existing	650	447	1.45	942	1,319	0.71	4339	0.0	0.0	7057	0.0	0.0
33153	425	8	8			367	1,118	0.33	367	1,119	0.33	7143	0.0	0.0	4339	0.0	0.0
33154	330	8	8			38	357	0.11	38	357	0.11	4331	0.0	0.0	7547	0.0	0.0
33155	201	8	8			38	742	0.05	38	742	0.05	7547	0.0	0.0	7143	0.0	0.0
33156	435	8	12	30	2036	390	300	1.30	575	884	0.65	4324	0.0	0.0	4339	0.0	0.0
33157	310	8	12	30	2036	240	318	0.75	415	938	0.44	7301	0.8	0.0	4324	0.0	0.0
33158	300	8	8			230	956	0.24	415	956	0.43	7409	0.0	0.0	7301	0.8	0.0
33159	235	8	8			215	708	0.30	400	708	0.56	4340	0.0	0.0	7409	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33160	105	8	8			215	708	0.30	399	709	0.56	4341	0.0	0.0	4340	0.0	0.0
33161	314	8	8			1	590	0.00	1	590	0.00	4342	0.0	0.0	4341	0.0	0.0
33162	161	8	8			0	586	0.00	0	587	0.00	4343	0.0	0.0	4342	0.0	0.0
33164	353	8	8			214	708	0.30	399	709	0.56	4308	0.0	0.0	4341	0.0	0.0
33165	297	10	10			446	680	0.66	556	736	0.76	4312	0.0	0.0	4306	5.4	0.0
33166	293	8	8			467	524	0.89	556	568	0.98	4311	4.3	0.0	4312	0.0	0.0
33167	172	10	10			490	618	0.79	612	669	0.91	4314	4.4	0.0	7546	4.4	0.0
33168	112	10	10			492	631	0.78	612	682	0.90	4344	3.8	0.0	4314	4.4	0.0
33169	258	10	10			491	541	0.91	612	585	1.05	4306	5.4	0.0	4344	3.8	0.0
33170	145	8	8			19	1,353	0.01	19	1,467	0.01	4307	0.0	0.0	4306	5.4	0.0
33171	130	8	8			12	752	0.02	12	816	0.01	7300	0.0	0.0	4345	0.0	0.0
33172	105	8	8			12	443	0.03	12	481	0.02	4316	0.0	0.0	7300	0.0	0.0
33173	277	8	8			39	629	0.06	36	683	0.05	4313	0.0	0.0	4306	5.4	0.0
33174	162	8	8			0	376	0.00	0	408	0.00	4347	0.0	0.0	4346	0.0	0.0
33175	106	6	6			29	144	0.20	1	157	0.00	4277	2.3	0.0	7546	4.4	0.0
33177	276	8	8			51	799	0.06	51	800	0.06	4348	0.0	0.0	4303	0.0	0.0
33178	325	8	8			24	881	0.03	24	883	0.03	4304	0.0	0.0	4348	0.0	0.0
33179	210	8	8			10	691	0.01	10	692	0.01	4350	0.0	0.0	4349	0.0	0.0
33180	298	8	12	44	2036	662	692	0.96	927	2,040	0.45	4332	0.8	0.0	4317	0.0	0.0
33192	178	8	8			340	1,058	0.32	340	1,147	0.30	7058	0.0	0.0	7548	0.0	0.0
33193	378	8	8			406	1,022	0.40	406	1,108	0.37	7548	0.0	0.0	4354	0.0	0.0
33194	316	8	8			408	594	0.69	408	644	0.63	4354	0.0	0.0	4355	0.0	0.0
33195	316	8	8			408	819	0.50	408	889	0.46	4355	0.0	0.0	7727	0.0	0.0
33196	467	8	8			103	992	0.10	103	1,076	0.10	4356	0.0	0.0	4357	0.0	0.0
33197	235	8	8			119	805	0.15	119	873	0.14	4357	0.0	0.0	7727	0.0	0.0
33198	40	8	8			524	332	1.58	524	360	1.45	7727	0.0	0.0	7549	0.0	0.0
33199	196	8	8			491	442	1.11	491	479	1.02	4386	9.0	9.3	4377	0.0	0.0
33200	122	8	8			491	694	0.71	491	753	0.65	4387	0.0	0.0	4386	9.0	9.3
33201	296	8	8			491	1,021	0.48	491	1,108	0.44	4388	0.0	0.0	4387	0.0	0.0
33202	403	8	8			14	897	0.02	14	972	0.01	4371	0.0	0.0	4372	0.0	0.0
33203	260	10	10			58	1,364	0.04	58	1,476	0.04	4375	0.0	0.0	4373	0.0	0.0
33204	88	10	10			58	1,049	0.06	58	1,135	0.05	4374	0.0	0.0	4375	0.0	0.0
33205	172	10	10			53	1,726	0.03	53	1,869	0.03	4385	0.0	0.0	4374	0.0	0.0
33206	235	8	8			1	1,180	0.00	1	1,181	0.00	4366	0.0	0.0	4358	0.0	0.0
33207	19	8	8			0	449	0.00	0	449	0.00	4389	0.0	0.0	4366	0.0	0.0
33208	278	8	8			1	1,084	0.00	1	1,176	0.00	4362	0.0	0.0	4383	2.2	0.0
33209	51	8	8			74	340	0.22	16	369	0.04	4383	2.2	0.0	4382	2.2	0.0
33210	44	8	8			558	417	1.34	556	452	1.23	4378	1.6	0.0	4382	2.2	0.0
33211	132	8	8			557	484	1.15	556	525	1.06	7059	1.9	0.0	4378	1.6	0.0
33212	51	8	8			557	521	1.07	556	565	0.98	4381	1.2	0.0	7059	1.9	0.0
33213	344	8	8			544	991	0.55	544	1,075	0.51	4359	0.0	0.0	4381	1.2	0.0
33214	182	8	8			0	702	0.00	0	762	0.00	4360	0.0	0.0	4367	6.0	6.1
33215	66	8	8			0	740	0.00	0	803	0.00	4361	0.0	0.0	4360	0.0	0.0
33216	186	8	8			543	920	0.59	543	998	0.54	4364	0.0	0.0	4367	6.0	6.1
33217	98	8	8			524	892	0.59	524	967	0.54	7549	0.0	0.0	4364	0.0	0.0
33218	402	8	8			19	1,177	0.02	19	1,277	0.02	4365	0.0	0.0	4364	0.0	0.0
33219	249	8	8			56	505	0.11	13	548	0.02	4380	4.3	0.0	4381	1.2	0.0
33220	230	8	8			0	1,049	0.00	0	1,138	0.00	4368	0.0	0.0	4380	4.3	0.0
33221	66	8	8			38	1,033	0.04	1	1,120	0.00	4379	9.6	0.0	4380	4.3	0.0
33222	243	8	8			1	1,085	0.00	1	1,177	0.00	4391	0.0	0.0	4392	0.0	0.0
33223	135	8	8			7	1,214	0.01	7	1,317	0.01	4393	0.0	0.0	4394	0.0	0.0
33224	308	8	8			17	1,415	0.01	17	1,535	0.01	7060	0.0	0.0	4394	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33225	142	8	8			24	1,178	0.02	24	1,278	0.02	4394	0.0	0.0	4390	0.0	0.0
33226	269	8	8			25	421	0.06	25	456	0.05	4390	0.0	0.0	7303	0.0	0.0
33227	131	8	8			35	342	0.10	35	371	0.09	7303	0.0	0.0	4399	0.0	0.0
33228	476	8	8			11	1,214	0.01	11	1,317	0.01	4395	0.0	0.0	4396	0.0	0.0
33229	437	8	8			11	1,074	0.01	11	1,165	0.01	4396	0.0	0.0	4397	0.0	0.0
33230	223	8	8			24	342	0.07	24	372	0.07	4397	0.0	0.0	4398	0.0	0.0
33231	235	8	8			0	453	0.00	0	492	0.00	4400	0.0	0.0	4399	0.0	0.0
33232	186	8	8			43	455	0.09	43	494	0.09	4399	0.0	0.0	7728	0.0	0.0
33233	170	8	8			43	1,719	0.03	43	1,865	0.02	7728	0.0	0.0	4398	0.0	0.0
33234	305	8	8			67	1,244	0.05	67	1,349	0.05	4398	0.0	0.0	4418	0.0	0.0
33235	488	8	8			1	919	0.00	1	997	0.00	7144	0.0	0.0	4402	0.0	0.0
33236	186	8	8			6	1,549	0.00	6	1,681	0.00	4402	0.0	0.0	4403	0.0	0.0
33237	186	8	8			6	823	0.01	6	892	0.01	4403	0.0	0.0	4411	0.0	0.0
33238	170	8	8			0	1,273	0.00	0	1,381	0.00	4404	0.0	0.0	4405	0.0	0.0
33239	450	8	8			1	1,133	0.00	1	1,229	0.00	4405	0.0	0.0	4406	0.0	0.0
33240	353	8	8			1	1,129	0.00	1	1,225	0.00	4407	0.0	0.0	4408	0.0	0.0
33241	306	8	8			1	1,163	0.00	1	1,261	0.00	4408	0.0	0.0	4409	0.0	0.0
33242	479	8	8			1	973	0.00	1	1,056	0.00	4409	0.0	0.0	4411	0.0	0.0
33243	18	8	8			22	700	0.03	22	760	0.03	4412	0.0	0.0	7064	0.0	0.0
33244	130	8	8			7	451	0.02	7	490	0.01	4411	0.0	0.0	4412	0.0	0.0
33245	234	8	8			14	665	0.02	14	721	0.02	4415	0.0	0.0	4410	0.0	0.0
33246	231	8	8			14	964	0.01	14	1,045	0.01	4410	0.0	0.0	4414	0.0	0.0
33247	161	8	8			14	767	0.02	14	832	0.02	4414	0.0	0.0	4413	0.0	0.0
33248	49	8	8			14	940	0.01	14	1,019	0.01	4413	0.0	0.0	4412	0.0	0.0
33249	146	8	8			67	767	0.09	67	832	0.08	7551	0.0	0.0	7548	0.0	0.0
33250	195	8	8			0	1,099	0.00	0	1,192	0.00	4419	0.0	0.0	4354	0.0	0.0
33251	110	8	8			25	301	0.08	15	301	0.05	4498	3.3	0.0	4466	1.8	0.0
33254	54	8	8			26	2,137	0.01	26	2,140	0.01	4450	0.0	0.0	4449	0.0	0.0
33255	310	8	8			26	1,203	0.02	26	1,204	0.02	4449	0.0	0.0	7145	0.0	0.0
33256	125	8	8			52	1,537	0.03	52	1,539	0.03	4448	0.0	0.0	4447	0.0	0.0
33257	110	8	8			52	2,069	0.03	52	2,072	0.03	4447	0.0	0.0	4446	0.0	0.0
33258	80	8	8			53	1,817	0.03	53	1,820	0.03	4446	0.0	0.0	4427	0.0	0.0
33259	89	8	8			53	1,749	0.03	53	1,751	0.03	4427	0.0	0.0	7304	0.0	0.0
33260	163	8	8			78	342	0.23	78	342	0.23	7304	0.0	0.0	4428	0.0	0.0
33261	50	8	8			94	297	0.32	94	298	0.31	4469	0.0	0.0	4470	0.0	0.0
33262	270	8	8			222	1,032	0.21	222	1,033	0.21	4470	0.0	0.0	4471	0.0	0.0
33263	90	8	8			538	940	0.57	538	942	0.57	4471	0.0	0.0	4472	6.1	6.1
33264	200	8	8			538	294	1.83	538	294	1.83	4472	6.1	6.1	7306	0.0	0.0
33265	295	8	8			539	934	0.58	539	935	0.58	7306	0.0	0.0	4473	0.0	0.0
33266	340	8	12	46	2036	451	297	1.52	597	874	0.68	4473	0.0	0.0	4474	0.0	0.0
33267	278	8	8			32	1,897	0.02	32	1,899	0.02	7552	0.0	0.0	4475	0.0	0.0
33268	367	8	8			32	1,244	0.03	32	1,247	0.03	4475	0.0	0.0	7061	0.0	0.0
33269	325	8	8			295	1,609	0.18	295	1,611	0.18	7061	0.0	0.0	4471	0.0	0.0
33270	446	8	8			0	1,586	0.00	0	1,588	0.00	4476	0.0	0.0	4445	0.0	0.0
33271	165	8	8			127	1,310	0.10	127	1,311	0.10	4477	0.0	0.0	4470	0.0	0.0
33272	225	8	8			126	1,267	0.10	126	1,269	0.10	4429	0.0	0.0	4477	0.0	0.0
33273	300	8	8			126	1,218	0.10	126	1,219	0.10	4443	0.0	0.0	4429	0.0	0.0
33274	203	8	8			58	1,085	0.05	58	1,086	0.05	4479	0.0	0.0	4473	0.0	0.0
33275	80	8	8			1	1,013	0.00	1	1,014	0.00	7554	0.0	0.0	4479	0.0	0.0
33276	170	8	8			0	1,881	0.00	0	1,883	0.00	4480	0.0	0.0	7554	0.0	0.0
33277	183	8	8			32	1,460	0.02	32	1,462	0.02	4454	0.0	0.0	4479	0.0	0.0
33278	120	8	8			32	1,902	0.02	32	1,905	0.02	4453	0.0	0.0	4454	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33279	147	8	8			1	930	0.00	1	931	0.00	4481	0.0	0.0	4453	0.0	0.0
33280	75	8	8			1	1,795	0.00	1	1,797	0.00	7063	0.0	0.0	4481	0.0	0.0
33281	211	8	8			1	1,546	0.00	1	1,548	0.00	4440	0.0	0.0	7063	0.0	0.0
33282	370	8	8			1	819	0.00	1	821	0.00	4441	0.0	0.0	4440	0.0	0.0
33283	80	6	6			1	692	0.00	1	692	0.00	7687	0.0	0.0	4437	0.0	0.0
33284	144	8	8			1	1,208	0.00	1	1,210	0.00	4483	0.0	0.0	4482	0.0	0.0
33285	190	8	8			1	1,158	0.00	1	1,159	0.00	4435	0.0	0.0	4483	0.0	0.0
33286	280	8	8			1	794	0.00	1	796	0.00	4436	0.0	0.0	4435	0.0	0.0
33287	135	8	8			1	1,433	0.00	1	1,435	0.00	4420	0.0	0.0	4436	0.0	0.0
33288	230	8	8			167	650	0.26	167	651	0.26	4434	0.0	0.0	4482	0.0	0.0
33289	115	8	8			193	297	0.65	193	298	0.65	4485	0.0	0.0	4484	0.0	0.0
33290	60	8	8			169	291	0.58	169	292	0.58	4482	0.0	0.0	4485	0.0	0.0
33291	315	8	8			224	1,026	0.22	224	1,028	0.22	4432	0.0	0.0	4466	1.8	0.0
33292	155	8	8			30	1,321	0.02	30	1,323	0.02	4431	0.0	0.0	4432	0.0	0.0
33293	250	8	8			29	1,722	0.02	29	1,724	0.02	4430	0.0	0.0	4431	0.0	0.0
33294	125	8	8			29	1,757	0.02	29	1,760	0.02	4486	0.0	0.0	4430	0.0	0.0
33295	45	8	8			28	1,608	0.02	28	1,610	0.02	4487	0.0	0.0	4486	0.0	0.0
33296	160	8	8			28	871	0.03	28	872	0.03	4488	0.0	0.0	4487	0.0	0.0
33297	155	8	8			10	756	0.01	10	756	0.01	4489	0.0	0.0	4488	0.0	0.0
33298	95	8	8			9	929	0.01	9	931	0.01	4439	0.0	0.0	4489	0.0	0.0
33299	200	8	8			478	578	0.83	624	578	1.08	4463	5.4	8.1	4464	0.0	0.0
33300	209	8	8			478	1,054	0.45	624	1,056	0.59	7305	0.0	0.0	4463	5.4	8.1
33301	256	8	8			478	804	0.59	624	806	0.77	4461	0.0	0.0	7305	0.0	0.0
33302	164	8	8			477	899	0.53	624	901	0.69	4462	0.0	0.0	4461	0.0	0.0
33303	243	8	8			1	1,177	0.00	1	1,178	0.00	4452	0.0	0.0	4462	0.0	0.0
33304	157	8	8			0	1,783	0.00	0	1,786	0.00	4451	0.0	0.0	4452	0.0	0.0
33305	196	8	8			476	1,345	0.35	622	1,347	0.46	4460	0.0	0.0	4462	0.0	0.0
33306	177	8	8			453	1,117	0.41	599	1,119	0.53	4490	0.0	0.0	4460	0.0	0.0
33307	163	8	8			451	949	0.48	597	951	0.63	4474	0.0	0.0	4490	0.0	0.0
33308	190	8	8			1	1,274	0.00	1	1,276	0.00	4491	0.0	0.0	4490	0.0	0.0
33309	230	8	8			0	76	0.00	0	76	0.00	7410	0.0	0.0	4492	0.0	0.0
33310	109	8	8			6	1,185	0.01	6	1,286	0.00	7553	0.0	0.0	7062	0.0	0.0
33311	117	8	8			0	1,402	0.00	0	1,521	0.00	4421	0.0	0.0	7553	0.0	0.0
33312	264	8	8			1	1,045	0.00	1	1,134	0.00	4422	0.0	0.0	7553	0.0	0.0
33313	229	8	8			6	1,078	0.01	6	1,169	0.00	4458	0.0	0.0	4467	0.0	0.0
33314	42	8	8			6	749	0.01	6	812	0.01	4459	0.0	0.0	4458	0.0	0.0
33315	124	8	8			6	815	0.01	6	884	0.01	4493	0.0	0.0	4459	0.0	0.0
33316	185	8	8			0	372	0.00	0	403	0.00	4424	0.0	0.0	4493	0.0	0.0
33317	452	8	8			1	902	0.00	1	978	0.00	4457	0.0	0.0	4468	0.0	0.0
33318	175	8	8			22	410	0.05	22	444	0.05	4494	0.0	0.0	4496	0.0	0.0
33319	216	8	8			22	1,089	0.02	22	1,181	0.02	4456	0.0	0.0	4455	0.0	0.0
33320	236	8	8			0	817	0.00	0	886	0.00	4497	0.0	0.0	4495	0.0	0.0
33322	150	8	8			283	384	0.74	283	384	0.74	4466	1.8	0.0	4465	1.8	0.0
33323	65	8	12	45	2036	474	292	1.62	624	860	0.73	4464	0.0	0.0	4465	1.8	0.0
33324	74	8	8			264	1,766	0.15	264	1,768	0.15	4444	0.0	0.0	7061	0.0	0.0
33325	250	8	8			1	1,040	0.00	1	1,042	0.00	4425	0.0	0.0	4498	3.3	0.0
33326	35	8	8			22	1,451	0.01	22	1,574	0.01	4495	0.0	0.0	4456	0.0	0.0
33327	81	8	8			11	1,817	0.01	11	1,819	0.01	4506	0.0	0.0	4515	0.0	0.0
33328	454	8	8			1	947	0.00	1	948	0.00	4508	0.0	0.0	4504	0.0	0.0
33329	287	8	8			1	1,394	0.00	1	1,396	0.00	7307	0.0	0.0	4507	0.0	0.0
33330	181	8	8			1	344	0.00	1	345	0.00	4507	0.0	0.0	4524	0.0	0.0
33331	77	8	8			0	1,834	0.00	0	1,837	0.00	4509	0.0	0.0	4510	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33332	132	8	8			1	1,245	0.00	1	1,247	0.00	4510	0.0	0.0	4511	0.0	0.0
33333	376	8	8			10	1,595	0.01	10	1,597	0.01	4511	0.0	0.0	4512	0.0	0.0
33334	263	8	8			10	1,900	0.01	10	1,903	0.01	4512	0.0	0.0	4513	0.0	0.0
33335	129	8	8			11	1,070	0.01	11	1,072	0.01	4513	0.0	0.0	7555	0.0	0.0
33336	163	8	8			1	1,616	0.00	1	1,618	0.00	4502	0.0	0.0	7555	0.0	0.0
33337	352	8	8			242	1,662	0.15	242	1,664	0.15	7555	0.0	0.0	4514	0.0	0.0
33338	226	8	8			242	873	0.28	242	874	0.28	4514	0.0	0.0	4503	0.0	0.0
33339	209	8	8			10	1,778	0.01	10	1,781	0.01	4528	0.0	0.0	4525	0.0	0.0
33340	343	8	8			17	1,052	0.02	17	1,053	0.02	4524	0.0	0.0	4523	0.0	0.0
33341	329	8	8			254	1,058	0.24	254	1,059	0.24	4503	0.0	0.0	4522	0.0	0.0
33342	192	8	8			12	1,884	0.01	12	1,887	0.01	4515	0.0	0.0	4527	0.0	0.0
33343	240	8	8			3	1,912	0.00	3	1,915	0.00	8362	0.0	0.0	4534	0.0	0.0
33344	198	8	8			8	1,197	0.01	8	1,198	0.01	4531	0.0	0.0	4535	0.0	0.0
33346	55	8	8			210	667	0.32	210	667	0.32	4535	0.0	0.0	4536	0.0	0.0
33347	256	8	8			210	1,397	0.15	210	1,399	0.15	4536	0.0	0.0	4538	0.0	0.0
33348	163	8	8			1	1,537	0.00	1	1,539	0.00	4539	0.0	0.0	4540	0.0	0.0
33349	348	8	8			6	1,273	0.00	6	1,274	0.00	4540	0.0	0.0	4541	0.0	0.0
33350	131	8	8			6	1,520	0.00	6	1,522	0.00	4541	0.0	0.0	7308	0.0	0.0
33352	412	8	8			7	1,183	0.01	7	1,185	0.01	4532	0.0	0.0	4538	0.0	0.0
33353	184	8	8			217	1,214	0.18	217	1,215	0.18	4538	0.0	0.0	4546	0.0	0.0
33355	475	8	8			26	1,378	0.02	26	1,381	0.02	4543	0.0	0.0	4544	0.0	0.0
33356	108	8	8			32	1,151	0.03	32	1,153	0.03	4544	0.0	0.0	7308	0.0	0.0
33357	229	8	8			38	1,085	0.03	38	1,087	0.03	7308	0.0	0.0	4545	0.0	0.0
33358	60	8	8			38	1,214	0.03	38	1,215	0.03	4545	0.0	0.0	4546	0.0	0.0
33359	127	8	8			2	1,381	0.00	2	1,383	0.00	4573	0.0	0.0	4572	0.0	0.0
33360	101	8	8			2	1,304	0.00	2	1,306	0.00	4572	0.0	0.0	4551	0.0	0.0
33361	375	8	8			40	1,526	0.03	40	1,528	0.03	4574	0.0	0.0	4551	0.0	0.0
33362	207	8	8			41	1,548	0.03	41	1,550	0.03	4551	0.0	0.0	4575	0.0	0.0
33363	55	8	8			42	1,627	0.03	42	1,629	0.03	4575	0.0	0.0	4576	0.0	0.0
33364	151	8	8			48	3,008	0.02	48	3,012	0.02	4576	0.0	0.0	4577	0.0	0.0
33365	66	8	8			48	2,019	0.02	48	2,022	0.02	4577	0.0	0.0	4553	0.0	0.0
33366	138	8	8			48	3,067	0.02	48	3,071	0.02	4553	0.0	0.0	7066	0.0	0.0
33367	251	8	8			2	450	0.00	2	451	0.00	4578	0.0	0.0	7066	0.0	0.0
33368	159	8	8			2	3,047	0.00	2	3,051	0.00	4564	0.0	0.0	4578	0.0	0.0
33369	170	8	8			0	2,717	0.00	0	2,721	0.00	4579	0.0	0.0	4552	0.0	0.0
33370	67	8	8			49	2,285	0.02	49	2,288	0.02	7556	0.0	0.0	4569	0.0	0.0
33371	96	8	8			49	2,568	0.02	49	2,572	0.02	4569	0.0	0.0	4570	0.0	0.0
33372	175	8	8			51	331	0.16	51	331	0.16	4570	0.0	0.0	4568	0.0	0.0
33373	194	8	8			0	674	0.00	0	676	0.00	7557	0.0	0.0	4571	0.0	0.0
33374	284	8	8			3	338	0.01	3	338	0.01	4566	0.0	0.0	4567	0.0	0.0
33375	245	8	8			0	325	0.00	0	326	0.00	4565	0.0	0.0	4566	0.0	0.0
33376	379	8	8			0	437	0.00	0	438	0.00	4558	0.0	0.0	4570	0.0	0.0
33377	115	8	8			5	1,012	0.00	5	1,013	0.00	7310	0.0	0.0	4580	0.0	0.0
33378	84	8	8			0	1,026	0.00	0	1,028	0.00	7688	0.0	0.0	7310	0.0	0.0
33379	271	8	8			5	1,177	0.00	5	1,178	0.00	4557	0.0	0.0	7309	0.0	0.0
33380	25	8	8			0	470	0.00	0	471	0.00	4550	0.0	0.0	7189	0.0	0.0
33381	326	8	8			0	1,690	0.00	0	1,692	0.00	4563	0.0	0.0	7065	0.0	0.0
33382	167	8	8			3	1,049	0.00	3	1,051	0.00	7065	0.0	0.0	4562	0.0	0.0
33383	144	8	8			3	1,477	0.00	3	1,479	0.00	4562	0.0	0.0	4559	0.0	0.0
33384	335	8	8			3	876	0.00	3	878	0.00	4559	0.0	0.0	4556	0.0	0.0
33385	362	8	8			5	1,397	0.00	5	1,398	0.00	7309	0.0	0.0	4556	0.0	0.0
33386	150	8	8			8	940	0.01	8	942	0.01	4556	0.0	0.0	4555	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33388	79	8	8			255	286	0.89	255	287	0.89	4561	0.0	0.0	4560	0.0	0.0
33389	165	8	8			28	896	0.03	28	897	0.03	8248	0.0	0.0	8260	0.0	0.0
33390	118	8	8			0	865	0.00	0	866	0.00	4548	0.0	0.0	4582	0.0	0.0
33391	294	8	8			0	837	0.00	0	838	0.00	4549	0.0	0.0	7557	0.0	0.0
33392	202	8	8			13	763	0.02	13	763	0.02	4589	0.0	0.0	4590	0.0	0.0
33393	75	8	8			3	1,549	0.00	3	1,551	0.00	4584	0.0	0.0	4585	0.0	0.0
33394	260	8	8			3	2,107	0.00	3	2,110	0.00	4585	0.0	0.0	4586	0.0	0.0
33395	159	8	8			3	1,882	0.00	3	1,884	0.00	4586	0.0	0.0	4588	0.0	0.0
33396	89	8	8			3	1,133	0.00	3	1,135	0.00	4588	0.0	0.0	4590	0.0	0.0
33397	52	8	8			13	548	0.02	13	549	0.02	8281	0.0	0.0	4589	0.0	0.0
33398	168	8	8			22	1,454	0.01	22	1,456	0.01	4590	0.0	0.0	7558	0.0	0.0
33400	109	8	8			44	488	0.09	44	488	0.09	7558	0.0	0.0	4583	0.0	0.0
33401	298	8	8			0	565	0.00	0	566	0.00	7311	0.0	0.0	4596	0.0	0.0
33402	297	8	8			0	460	0.00	0	461	0.00	4593	0.0	0.0	4594	0.0	0.0
33403	95	8	8			2	935	0.00	2	936	0.00	4594	0.0	0.0	4595	0.0	0.0
33404	85	8	8			2	1,303	0.00	2	1,305	0.00	4595	0.0	0.0	4596	0.0	0.0
33405	110	8	8			4	383	0.01	4	384	0.01	4602	0.0	0.0	4603	0.0	0.0
33406	170	8	8			0	383	0.00	0	384	0.00	4600	0.0	0.0	4601	0.0	0.0
33407	315	8	8			0	786	0.00	0	788	0.00	4597	0.0	0.0	4599	0.0	0.0
33408	135	8	8			2	1,138	0.00	2	1,140	0.00	4598	0.0	0.0	4599	0.0	0.0
33409	283	8	8			10	1,138	0.01	10	1,139	0.01	4599	0.0	0.0	4601	0.0	0.0
33410	293	8	8			13	978	0.01	13	979	0.01	4601	0.0	0.0	4603	0.0	0.0
33411	134	8	8			17	1,048	0.02	17	1,049	0.02	4603	0.0	0.0	4604	0.0	0.0
33412	240	8	8			17	383	0.05	17	384	0.05	4604	0.0	0.0	4605	0.0	0.0
33413	349	8	8			62	383	0.16	62	383	0.16	4605	0.0	0.0	4606	0.0	0.0
33414	300	8	8			62	1,015	0.06	62	1,017	0.06	4606	0.0	0.0	4607	0.0	0.0
33415	50	8	8			62	1,015	0.06	62	1,017	0.06	4607	0.0	0.0	4608	0.0	0.0
33417	370	8	8			6	1,318	0.00	6	1,319	0.00	4662	0.0	0.0	4643	0.0	0.0
33418	164	8	8			24	947	0.02	24	949	0.02	4646	0.0	0.0	4645	0.0	0.0
33419	360	8	8			12	1,719	0.01	12	1,722	0.01	4621	0.0	0.0	4647	0.0	0.0
33420	249	8	8			1	2,332	0.00	1	2,335	0.00	4609	0.0	0.0	4621	0.0	0.0
33421	172	8	8			8	901	0.01	8	903	0.01	7559	0.0	0.0	4621	0.0	0.0
33422	140	8	8			3	2,405	0.00	3	2,408	0.00	7067	0.0	0.0	4623	0.0	0.0
33423	118	8	8			0	409	0.00	0	409	0.00	4624	0.0	0.0	7067	0.0	0.0
33424	127	8	8			0	1,044	0.00	0	1,045	0.00	4625	0.0	0.0	4624	0.0	0.0
33425	155	8	8			1	1,996	0.00	1	1,999	0.00	4611	0.0	0.0	4625	0.0	0.0
33426	93	8	8			0	1,320	0.00	0	1,322	0.00	4622	0.0	0.0	4623	0.0	0.0
33427	259	8	8			0	783	0.00	0	784	0.00	4630	0.0	0.0	4622	0.0	0.0
33428	357	8	8			0	1,301	0.00	0	1,303	0.00	4650	0.0	0.0	7559	0.0	0.0
33429	173	8	8			0	799	0.00	0	800	0.00	4610	0.0	0.0	7067	0.0	0.0
33430	147	8	8			0	895	0.00	0	896	0.00	4648	0.0	0.0	4647	0.0	0.0
33431	211	8	8			1	1,772	0.00	1	1,774	0.00	4649	0.0	0.0	4648	0.0	0.0
33432	91	8	8			0	2,060	0.00	0	2,063	0.00	4615	0.0	0.0	4649	0.0	0.0
33433	210	8	8			0	749	0.00	0	749	0.00	7689	0.0	0.0	4663	0.0	0.0
33434	160	8	8			382	1,288	0.30	382	1,289	0.30	4644	0.0	0.0	4645	0.0	0.0
33435	465	8	8			303	1,010	0.30	303	1,011	0.30	7069	0.0	0.0	4674	0.0	0.0
33436	363	8	8			303	882	0.34	303	883	0.34	4673	0.0	0.0	7069	0.0	0.0
33437	370	8	8			79	1,210	0.07	79	1,212	0.07	7313	0.0	0.0	4644	0.0	0.0
33438	216	8	8			69	865	0.08	69	867	0.08	4657	0.0	0.0	4655	0.0	0.0
33439	139	8	8			69	563	0.12	69	564	0.12	7561	0.0	0.0	4657	0.0	0.0
33440	135	8	8			69	1,537	0.04	69	1,539	0.04	4656	0.0	0.0	7561	0.0	0.0
33441	173	8	8			61	715	0.09	61	715	0.09	4653	0.0	0.0	4656	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33442	386	8	8			3	828	0.00	3	829	0.00	4664	0.0	0.0	4653	0.0	0.0
33443	302	8	8			2	811	0.00	2	812	0.00	4651	0.0	0.0	4652	0.0	0.0
33444	134	8	8			0	812	0.00	0	813	0.00	4612	0.0	0.0	4651	0.0	0.0
33445	160	8	8			0	1,115	0.00	0	1,116	0.00	4665	0.0	0.0	7313	0.0	0.0
33446	208	8	8			1	1,293	0.00	1	1,294	0.00	4654	0.0	0.0	4665	0.0	0.0
33447	164	8	8			0	1,257	0.00	0	1,259	0.00	4678	0.0	0.0	4654	0.0	0.0
33448	111	8	8			0	998	0.00	0	999	0.00	4616	0.0	0.0	4654	0.0	0.0
33449	128	8	8			0	674	0.00	0	676	0.00	4633	0.0	0.0	4632	0.0	0.0
33450	242	8	8			0	614	0.00	0	615	0.00	4617	0.0	0.0	7147	0.0	0.0
33451	197	8	8			419	933	0.45	419	934	0.45	4639	0.0	0.0	4638	0.0	0.0
33452	65	8	8			409	737	0.56	409	738	0.55	4667	0.0	0.0	4639	0.0	0.0
33453	93	8	8			408	1,022	0.40	408	1,024	0.40	4641	0.0	0.0	4640	0.0	0.0
33454	321	8	8			406	801	0.51	406	802	0.51	4645	0.0	0.0	4642	0.0	0.0
33455	437	8	8			6	1,114	0.00	6	1,115	0.00	4643	0.0	0.0	7314	0.0	0.0
33456	344	8	8			42	994	0.04	42	994	0.04	4636	0.0	0.0	4637	0.0	0.0
33457	475	8	8			42	1,256	0.03	42	1,258	0.03	4668	0.0	0.0	4636	0.0	0.0
33458	93	8	8			19	1,170	0.02	19	1,172	0.02	7560	0.0	0.0	4668	0.0	0.0
33459	427	8	8			19	1,278	0.01	19	1,280	0.01	4620	0.0	0.0	7560	0.0	0.0
33460	197	8	8			8	1,990	0.00	8	1,992	0.00	4626	0.0	0.0	4668	0.0	0.0
33461	68	8	8			8	403	0.02	8	403	0.02	4669	0.0	0.0	4626	0.0	0.0
33462	237	8	8			8	1,567	0.00	8	1,570	0.00	7312	0.0	0.0	4669	0.0	0.0
33463	205	8	8			15	1,863	0.01	15	1,865	0.01	4634	0.0	0.0	4666	0.0	0.0
33464	306	8	8			4	1,508	0.00	4	1,509	0.00	4627	0.0	0.0	4635	0.0	0.0
33465	252	8	8			3	1,460	0.00	3	1,462	0.00	4628	0.0	0.0	4627	0.0	0.0
33466	343	8	8			10	2,072	0.01	10	2,075	0.01	4618	0.0	0.0	4670	0.0	0.0
33467	357	8	8			10	1,606	0.01	10	1,608	0.01	4671	0.0	0.0	4618	0.0	0.0
33468	65	8	8			0	612	0.00	0	613	0.00	4613	0.0	0.0	4671	0.0	0.0
33469	107	8	8			10	1,169	0.01	10	1,170	0.01	4672	0.0	0.0	4671	0.0	0.0
33471	86	8	8			302	356	0.85	302	356	0.85	7068	0.0	0.0	4658	0.0	0.0
33472	202	8	8			302	1,119	0.27	302	1,121	0.27	4659	0.0	0.0	7068	0.0	0.0
33473	137	8	8			0	270	0.00	0	271	0.00	4614	0.0	0.0	4659	0.0	0.0
33474	160	8	8			292	343	0.85	292	344	0.85	4660	0.0	0.0	4659	0.0	0.0
33475	88	8	8			292	301	0.97	292	301	0.97	4661	0.0	0.0	4660	0.0	0.0
33476	365	8	8			158	1,923	0.08	158	1,926	0.08	4679	0.0	0.0	4699	0.0	0.0
33477	227	8	8			152	542	0.28	152	543	0.28	7562	0.0	0.0	4679	0.0	0.0
33478	104	8	8			8	865	0.01	8	865	0.01	4680	0.0	0.0	4681	0.0	0.0
33479	214	8	8			8	1,138	0.01	8	1,140	0.01	4681	0.0	0.0	4682	0.0	0.0
33480	221	8	8			12	1,763	0.01	12	1,765	0.01	4682	0.0	0.0	4683	0.0	0.0
33481	396	8	8			13	1,747	0.01	13	1,749	0.01	4683	0.0	0.0	7148	0.0	0.0
33482	232	8	8			13	1,186	0.01	13	1,188	0.01	4696	0.0	0.0	4688	0.0	0.0
33483	96	8	8			13	1,859	0.01	13	1,861	0.01	4688	0.0	0.0	7411	0.0	0.0
33484	284	8	8			13	1,813	0.01	13	1,815	0.01	4697	0.0	0.0	4686	0.0	0.0
33485	171	8	8			1	1,280	0.00	1	1,282	0.00	4698	0.0	0.0	4687	0.0	0.0
33486	78	8	8			8	1,028	0.01	8	1,029	0.01	4685	0.0	0.0	4686	0.0	0.0
33487	303	8	8			164	1,503	0.11	164	1,506	0.11	4693	0.0	0.0	4692	0.0	0.0
33488	376	8	8			158	1,755	0.09	158	1,757	0.09	4699	0.0	0.0	4693	0.0	0.0
33489	160	8	8			0	2,021	0.00	0	2,024	0.00	7690	0.0	0.0	4699	0.0	0.0
33490	343	8	8			13	1,178	0.01	13	1,180	0.01	4695	0.0	0.0	7563	0.0	0.0
33491	385	8	8			13	1,236	0.01	13	1,238	0.01	7148	0.0	0.0	4695	0.0	0.0
33493	130	8	8			18	13	1.37	18	13	1.37	4690	0.0	0.0	7315	0.0	0.0
33494	193	8	8			18	1,640	0.01	18	1,642	0.01	4689	0.0	0.0	4690	0.0	0.0
33495	235	8	8			1	1,365	0.00	1	1,367	0.00	4684	0.0	0.0	4689	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33496	230	8	8			175	1,376	0.13	175	1,378	0.13	4725	0.0	0.0	4724	0.0	0.0
33497	116	8	8			195	1,131	0.17	195	1,132	0.17	4724	0.0	0.0	4755	0.0	0.0
33498	300	8	8			33	1,282	0.03	33	1,283	0.03	4723	0.0	0.0	4724	0.0	0.0
33499	349	8	8			195	1,435	0.14	195	1,438	0.14	4755	0.0	0.0	4756	0.0	0.0
33500	402	8	8			202	809	0.25	202	810	0.25	4757	0.0	0.0	4759	0.0	0.0
33501	53	8	8			202	1,473	0.14	202	1,475	0.14	4759	0.0	0.0	4758	0.0	0.0
33502	39	8	8			258	1,475	0.18	258	1,476	0.17	4758	0.0	0.0	4772	0.0	0.0
33503	280	8	8			2	1,250	0.00	2	1,251	0.00	4773	0.0	0.0	7071	0.0	0.0
33504	345	8	8			689	1,317	0.52	689	1,319	0.52	4731	0.0	0.0	7317	4.0	3.6
33505	198	8	8			813	819	0.99	813	819	0.99	7317	4.0	3.6	4753	0.0	0.0
33506	350	8	8			67	1,535	0.04	67	1,537	0.04	4752	0.0	0.0	4774	0.0	0.0
33507	239	8	8			56	1,683	0.03	56	1,685	0.03	4729	0.0	0.0	4751	0.0	0.0
33508	227	8	8			56	1,052	0.05	56	1,053	0.05	4728	0.0	0.0	4729	0.0	0.0
33509	35	8	8			20	527	0.04	20	528	0.04	4730	0.0	0.0	4728	0.0	0.0
33510	97	8	8			20	531	0.04	20	532	0.04	7316	0.0	0.0	4730	0.0	0.0
33511	88	8	12	34	2036	897	476	1.88	897	1,401	0.64	4749	0.3	0.0	4775	4.2	0.0
33512	70	8	12	34	2036	897	628	1.43	897	1,852	0.48	4775	4.2	0.0	4745	7.4	0.0
33513	118	8	12	34	2036	897	604	1.48	897	1,782	0.50	4745	7.4	0.0	4748	0.0	0.0
33514	167	8	8			0	1,633	0.00	0	1,635	0.00	4750	0.0	0.0	4745	7.4	0.0
33515	148	8	8			1	1,438	0.00	1	1,440	0.00	4701	0.0	0.0	4750	0.0	0.0
33516	259	8	8			7	1,594	0.00	7	1,597	0.00	4760	0.0	0.0	4749	0.3	0.0
33517	122	8	8			7	1,909	0.00	7	1,912	0.00	7565	0.0	0.0	4760	0.0	0.0
33518	253	8	8			6	1,810	0.00	6	1,813	0.00	4721	0.0	0.0	7565	0.0	0.0
33520	95	8	8			8	2,147	0.00	8	2,150	0.00	4794	0.0	0.0	4715	0.0	0.0
33521	105	8	8			8	2,038	0.00	8	2,041	0.00	4715	0.0	0.0	4716	0.0	0.0
33522	100	8	8			14	1,267	0.01	14	1,269	0.01	4716	0.0	0.0	4732	0.0	0.0
33523	260	8	8			14	1,899	0.01	14	1,901	0.01	4732	0.0	0.0	4754	0.0	0.0
33524	152	8	8			106	512	0.21	106	513	0.21	4754	0.0	0.0	4793	0.0	0.0
33525	91	8	8			0	1,482	0.00	0	1,484	0.00	4713	0.0	0.0	4733	0.0	0.0
33526	75	8	8			0	642	0.00	0	643	0.00	4712	0.0	0.0	4733	0.0	0.0
33527	152	8	8			3	1,734	0.00	3	1,737	0.00	4733	0.0	0.0	4734	0.0	0.0
33528	111	8	8			0	1,428	0.00	0	1,430	0.00	4711	0.0	0.0	4734	0.0	0.0
33529	74	8	8			3	1,589	0.00	3	1,591	0.00	4734	0.0	0.0	4735	0.0	0.0
33530	148	8	8			0	829	0.00	0	830	0.00	4710	0.0	0.0	4735	0.0	0.0
33531	163	8	8			8	1,431	0.01	8	1,433	0.01	4735	0.0	0.0	4736	0.0	0.0
33532	85	8	8			0	712	0.00	0	713	0.00	4709	0.0	0.0	4736	0.0	0.0
33533	220	8	8			8	713	0.01	8	714	0.01	4736	0.0	0.0	4793	0.0	0.0
33534	219	8	8			114	1,224	0.09	114	1,225	0.09	4793	0.0	0.0	4791	0.0	0.0
33535	55	6	6			0	850	0.00	0	850	0.00	4708	0.0	0.0	4792	0.0	0.0
33536	364	8	8			0	298	0.00	0	298	0.00	4792	0.0	0.0	4791	0.0	0.0
33537	100	8	8			115	730	0.16	115	731	0.16	4791	0.0	0.0	7317	4.0	3.6
33538	275	6	6			19	793	0.02	19	793	0.02	7318	0.0	0.0	4790	0.0	0.0
33539	225	8	8			20	866	0.02	20	867	0.02	4770	0.0	0.0	4771	0.0	0.0
33540	150	8	8			48	1,742	0.03	48	1,745	0.03	4771	0.0	0.0	4769	0.0	0.0
33541	59	8	8			48	1,117	0.04	48	1,119	0.04	4769	0.0	0.0	7072	0.0	0.0
33542	198	8	8			49	1,074	0.05	49	1,075	0.05	7072	0.0	0.0	4768	0.0	0.0
33543	174	8	8			49	1,331	0.04	49	1,332	0.04	4768	0.0	0.0	4767	0.0	0.0
33544	493	8	8			49	1,679	0.03	49	1,681	0.03	4767	0.0	0.0	4766	0.0	0.0
33545	93	8	8			74	1,884	0.04	74	1,887	0.04	4766	0.0	0.0	4765	0.0	0.0
33548	40	8	8			13	2,232	0.01	13	2,235	0.01	4737	0.0	0.0	4738	0.0	0.0
33549	140	8	8			0	1,407	0.00	0	1,409	0.00	4705	0.0	0.0	4739	0.0	0.0
33550	77	8	8			13	1,888	0.01	13	1,890	0.01	4739	0.0	0.0	4740	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33551	122	8	8			13	1,994	0.01	13	1,997	0.01	4740	0.0	0.0	4787	0.0	0.0
33552	290	8	8			0	1,864	0.00	0	1,866	0.00	7566	0.0	0.0	4788	0.0	0.0
33553	218	8	8			909	1,205	0.75	909	1,207	0.75	4748	0.0	0.0	4789	0.0	0.0
33554	128	8	8			0	338	0.00	0	338	0.00	4704	0.0	0.0	4789	0.0	0.0
33555	319	8	8			909	1,232	0.74	909	1,233	0.74	4789	0.0	0.0	4747	0.0	0.0
33556	200	8	8			1	1,584	0.00	1	1,586	0.00	4788	0.0	0.0	4714	0.0	0.0
33557	147	8	8			19	822	0.02	19	824	0.02	4787	0.0	0.0	4714	0.0	0.0
33558	254	8	8			20	453	0.04	20	453	0.04	4714	0.0	0.0	4747	0.0	0.0
33559	256	8	8			929	1,253	0.74	929	1,254	0.74	4747	0.0	0.0	4743	0.0	0.0
33560	275	8	8			1	1,381	0.00	1	1,383	0.00	4786	0.0	0.0	4785	0.0	0.0
33561	185	8	8			12	1,040	0.01	12	1,042	0.01	4785	0.0	0.0	4717	0.0	0.0
33562	203	8	8			1	1,400	0.00	1	1,402	0.00	7070	0.0	0.0	4718	0.0	0.0
33563	148	8	8			0	1,074	0.00	0	1,076	0.00	4703	0.0	0.0	7070	0.0	0.0
33564	114	8	8			1	1,819	0.00	1	1,822	0.00	4702	0.0	0.0	7564	0.0	0.0
33565	265	8	8			0	687	0.00	0	688	0.00	7564	0.0	0.0	4784	0.0	0.0
33566	136	8	8			0	403	0.00	0	403	0.00	4744	0.0	0.0	4743	0.0	0.0
33567	260	8	8			930	1,238	0.75	929	1,240	0.75	4743	0.0	0.0	4742	0.0	0.0
33568	189	10	10			47	581	0.08	47	581	0.08	4783	0.0	0.0	4741	0.0	0.0
33569	56	10	10			22	1,081	0.02	22	1,079	0.02	4719	0.0	0.0	4783	0.0	0.0
33570	46	10	10			22	1,096	0.02	22	1,094	0.02	4782	0.0	0.0	4719	0.0	0.0
33571	198	8	8			22	1,108	0.02	22	1,109	0.02	4781	0.0	0.0	4782	0.0	0.0
33572	242	8	8			22	1,253	0.02	22	1,256	0.02	4779	0.0	0.0	4781	0.0	0.0
33573	289	8	8			0	752	0.00	0	753	0.00	4780	0.0	0.0	4779	0.0	0.0
33574	180	8	8			15	1,642	0.01	15	1,644	0.01	4746	0.0	0.0	4779	0.0	0.0
33575	97	8	8			0	1,350	0.00	0	1,352	0.00	4778	0.0	0.0	4722	0.0	0.0
33576	312	8	8			0	647	0.00	0	648	0.00	4722	0.0	0.0	7412	0.0	0.0
33577	78	8	8			0	319	0.00	0	319	0.00	7412	0.0	0.0	4746	0.0	0.0
33578	220	8	8			15	1,384	0.01	15	1,386	0.01	4777	0.0	0.0	4746	0.0	0.0
33579	175	8	8			35	1,283	0.03	35	1,285	0.03	7319	0.0	0.0	4727	0.0	0.0
33580	313	8	8			17	1,681	0.01	17	1,683	0.01	7071	0.0	0.0	7149	0.0	0.0
33581	75	8	8			71	1,432	0.05	71	1,434	0.05	7149	0.0	0.0	4758	0.0	0.0
33582	255	8	8			9	540	0.02	9	541	0.02	4776	0.0	0.0	4762	0.0	0.0
33583	227	8	8			15	776	0.02	15	777	0.02	4762	0.0	0.0	4761	0.0	0.0
33584	321	8	8			6	757	0.01	6	758	0.01	4720	0.0	0.0	4721	0.0	0.0
33585	311	8	8			205	983	0.21	205	984	0.21	7073	0.0	0.0	4800	0.0	0.0
33586	91	8	8			205	631	0.32	205	631	0.32	4800	0.0	0.0	4801	1.0	0.0
33587	77	10	15	28	2036	1,025	336	3.05	1,025	992	1.03	4836	1.1	0.0	4802	0.0	0.0
33588	283	10	15	28	2036	732	578	1.27	1,230	1,703	0.72	4802	0.0	0.0	4838	5.2	0.0
33589	1	8	8			0	542	0.00	0	543	0.00	4803	0.0	0.0	4826	0.0	0.0
33590	65	8	8			138	420	0.33	138	421	0.33	4809	0.0	0.0	4434	0.0	0.0
33591	354	8	8			47	1,269	0.04	47	1,271	0.04	4810	0.0	0.0	4805	0.0	0.0
33592	354	8	8			47	1,085	0.04	47	1,087	0.04	4805	0.0	0.0	4806	0.0	0.0
33593	100	8	8			47	1,106	0.04	47	1,107	0.04	4806	0.0	0.0	4807	0.0	0.0
33594	54	8	8			47	665	0.07	47	665	0.07	4807	0.0	0.0	4808	0.0	0.0
33595	94	8	8			48	662	0.07	48	663	0.07	4808	0.0	0.0	7413	0.0	0.0
33596	234	8	8			137	665	0.21	137	665	0.21	7413	0.0	0.0	4809	0.0	0.0
33597	112	8	8			47	1,203	0.04	47	1,204	0.04	4826	0.0	0.0	4810	0.0	0.0
33598	400	8	8			1	1,397	0.00	1	1,399	0.00	4811	0.0	0.0	4831	0.0	0.0
33599	187	8	8			12	2,113	0.01	12	2,116	0.01	4827	0.0	0.0	4825	0.0	0.0
33600	201	8	8			13	1,453	0.01	13	1,456	0.01	4824	0.0	0.0	4812	0.0	0.0
33601	243	8	8			46	1,101	0.04	46	1,102	0.04	4812	0.0	0.0	4826	0.0	0.0
33603	181	8	8			1	1,506	0.00	1	1,508	0.00	4817	0.0	0.0	4819	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33604	302	8	8			15	1,716	0.01	15	1,718	0.01	4819	0.0	0.0	7320	0.0	0.0
33605	144	8	8			0	553	0.00	0	554	0.00	4822	0.0	0.0	4818	0.0	0.0
33606	227	8	8			1	1,023	0.00	1	1,024	0.00	4818	0.0	0.0	4820	0.0	0.0
33607	119	8	8			1	2,039	0.00	1	2,042	0.00	4820	0.0	0.0	4819	0.0	0.0
33609	108	8	8			1	2,334	0.00	1	2,338	0.00	4814	0.0	0.0	4815	0.0	0.0
33610	87	8	8			1	2,315	0.00	1	2,319	0.00	4815	0.0	0.0	4823	0.0	0.0
33611	67	8	8			0	1,499	0.00	0	1,501	0.00	4823	0.0	0.0	4822	0.0	0.0
33612	438	10	15	28	2036	765	1,009	0.76	1,267	2,975	0.43	4839	0.0	0.0	4840	0.0	0.0
33613	400	10	15	28	2036	765	572	1.34	1,267	1,685	0.75	4838	5.2	0.0	4839	0.0	0.0
33614	119	10	15	28	2036	1,025	658	1.56	1,024	1,941	0.53	7568	0.3	0.0	4836	1.1	0.0
33615	185	8	8			1,025	1,264	0.81	1,024	1,265	0.81	4831	0.0	0.0	7568	0.3	0.0
33616	262	8	8			1,010	1,110	0.91	1,009	1,111	0.91	4830	0.0	0.0	7320	0.0	0.0
33616_1	262	8	8			1,024	1,040	0.99	1,024	1,041	0.98	7320	0.0	0.0	4831	0.0	0.0
33617	208	8	8			1,010	1,101	0.92	1,009	1,103	0.91	4821	0.0	0.0	4830	0.0	0.0
33618	60	8	8			22	1,342	0.02	22	1,343	0.02	4837	0.0	0.0	4821	0.0	0.0
33619	134	8	8			22	1,557	0.01	22	1,559	0.01	4832	0.0	0.0	4837	0.0	0.0
33620	214	8	8			22	1,049	0.02	22	1,051	0.02	4834	0.0	0.0	4832	0.0	0.0
33621	323	8	8			976	1,031	0.95	976	1,032	0.95	4833	0.0	0.0	4821	0.0	0.0
33622	163	8	8			1	1,848	0.00	1	1,851	0.00	4816	0.0	0.0	4835	0.0	0.0
33623	40	8	8			0	297	0.00	0	298	0.00	4845	0.0	0.0	4841	0.0	0.0
33624	320	8	8			125	1,191	0.10	125	1,192	0.10	4829	0.0	0.0	4828	0.0	0.0
33625	201	8	8			125	340	0.37	125	340	0.37	4842	0.0	0.0	4829	0.0	0.0
33626	257	8	8			1	644	0.00	1	645	0.00	4844	0.0	0.0	4843	0.0	0.0
33628	62	12	12			1	4,781	0.00	1	4,781	0.00	7820	0.0	0.0	4827	0.0	0.0
33629	466	8	8			35	1,650	0.02	35	1,652	0.02	4852	0.0	0.0	4867	0.0	0.0
33630	210	8	8			28	1,611	0.02	28	1,613	0.02	4856	0.0	0.0	4852	0.0	0.0
33631	205	8	8			28	1,388	0.02	28	1,390	0.02	4857	0.0	0.0	4856	0.0	0.0
33632	58	8	8			28	998	0.03	28	999	0.03	7151	0.0	0.0	4857	0.0	0.0
33633	60	8	8			0	1,386	0.00	0	1,388	0.00	4858	0.0	0.0	4857	0.0	0.0
33634	241	8	8			0	1,134	0.00	0	1,135	0.00	4868	0.0	0.0	4852	0.0	0.0
33635	289	8	8			0	1,083	0.00	0	1,085	0.00	4855	0.0	0.0	4868	0.0	0.0
33636	430	8	8			12	339	0.03	12	340	0.03	4863	0.0	0.0	4864	0.0	0.0
33637	253	8	8			12	301	0.04	12	302	0.04	4862	0.0	0.0	4863	0.0	0.0
33638	137	8	8			0	1,394	0.00	0	1,397	0.00	4853	0.0	0.0	4862	0.0	0.0
33639	205	8	8			1	2,501	0.00	1	2,504	0.00	4861	0.0	0.0	4862	0.0	0.0
33640	135	8	8			1	2,008	0.00	1	2,010	0.00	9301	0.0	0.0	4861	0.0	0.0
33641	298	8	8			20	2,037	0.01	20	2,040	0.01	4866	0.0	0.0	4865	0.0	0.0
33642	208	8	8			0	376	0.00	0	376	0.00	4870	0.0	0.0	7075	0.0	0.0
33643	100	8	8			0	1,805	0.00	0	1,808	0.00	4871	0.0	0.0	7321	0.0	0.0
33644	47	8	8			0	542	0.00	0	543	0.00	4872	0.0	0.0	7190	0.0	0.0
33646	500	10	10			921	2,267	0.41	1,424	2,264	0.63	4875	0.0	0.0	4876	0.0	0.0
33647	474	10	10			921	1,876	0.49	1,424	1,874	0.76	4874	0.0	0.0	4875	0.0	0.0
33648	514	12	15	39	ura	1,114	1,281	0.87	1,592	2,322	0.69	7322	0.0	0.0	4877	0.0	0.0
33649	478	10	10			1,114	2,382	0.47	1,592	2,379	0.67	4876	0.0	0.0	7322	0.0	0.0
33651	417	8	8			175	391	0.45	175	391	0.45	4891	0.0	0.0	4892	0.0	0.0
33652	115	8	8			175	524	0.33	175	525	0.33	4890	0.0	0.0	4891	0.0	0.0
33653	475	8	8			161	1,180	0.14	161	1,182	0.14	4889	0.0	0.0	4890	0.0	0.0
33654	343	8	8			103	1,114	0.09	103	1,115	0.09	4903	0.0	0.0	7323	0.0	0.0
33655	230	8	8			77	1,154	0.07	77	1,156	0.07	4904	0.0	0.0	4903	0.0	0.0
33657	87	8	8			67	1,720	0.04	67	1,722	0.04	7076	0.0	0.0	4905	0.0	0.0
33659	108	8	8			16	1,451	0.01	16	1,453	0.01	4906	0.0	0.0	7076	0.0	0.0
33660	216	8	8			15	1,951	0.01	15	1,954	0.01	4907	0.0	0.0	4906	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33661	128	8	8			1	2,182	0.00	1	2,185	0.00	4908	0.0	0.0	4907	0.0	0.0
33662	155	8	8			0	1,974	0.00	0	1,976	0.00	7570	0.0	0.0	4908	0.0	0.0
33663	186	6	6			31	447	0.07	31	447	0.07	4882	0.0	0.0	7076	0.0	0.0
33664	343	8	8			12	1,142	0.01	12	1,144	0.01	4909	0.0	0.0	11202	0.0	0.0
33665	468	8	8			1	512	0.00	1	513	0.00	4886	0.0	0.0	4893	0.0	0.0
33666	429	8	8			36	415	0.09	36	415	0.09	4895	0.0	0.0	4893	0.0	0.0
33667	200	6	6			1	597	0.00	1	597	0.00	4894	0.0	0.0	4895	0.0	0.0
33668	31	8	8			35	528	0.07	35	528	0.07	4896	0.0	0.0	4895	0.0	0.0
33669	225	8	8			0	758	0.00	0	760	0.00	7692	0.0	0.0	4897	0.0	0.0
33670	246	8	8			9	681	0.01	9	681	0.01	4910	0.0	0.0	4897	0.0	0.0
33671	60	8	8			0	415	0.00	0	416	0.00	4880	0.0	0.0	4910	0.0	0.0
33672	85	8	8			8	967	0.01	8	968	0.01	4911	0.0	0.0	4910	0.0	0.0
33674	110	8	8			0	1,278	0.00	0	1,280	0.00	4915	0.0	0.0	4911	0.0	0.0
33675	327	8	8			1	1,347	0.00	1	1,349	0.00	4884	0.0	0.0	4904	0.0	0.0
33676	133	8	8			10	963	0.01	10	964	0.01	4883	0.0	0.0	4902	0.0	0.0
33677	330	8	8			37	1,349	0.03	37	1,350	0.03	4887	0.0	0.0	4888	0.0	0.0
33678	390	8	8			37	1,604	0.02	37	1,606	0.02	4900	0.0	0.0	4887	0.0	0.0
33679	428	8	8			0	1,015	0.00	0	1,016	0.00	4899	0.0	0.0	4900	0.0	0.0
33680	103	8	8			8	357	0.02	8	358	0.02	4940	0.0	0.0	4916	0.0	0.0
33681	299	8	8			8	453	0.02	8	453	0.02	4994	0.0	0.0	7571	0.0	0.0
33682	282	8	8			276	1,533	0.18	276	1,535	0.18	4942	0.0	0.0	7571	0.0	0.0
33683	332	8	8			285	1,194	0.24	285	1,195	0.24	7571	0.0	0.0	4937	0.0	0.0
33684	239	8	8			8	1,746	0.00	8	1,748	0.00	4943	0.0	0.0	4937	0.0	0.0
33685	65	8	8			299	1,960	0.15	299	1,963	0.15	4937	0.0	0.0	4918	0.0	0.0
33686	273	8	8			299	1,042	0.29	299	1,043	0.29	4918	0.0	0.0	4984	0.0	0.0
33688	163	8	8			9	1,178	0.01	9	1,179	0.01	7693	0.0	0.0	4941	0.0	0.0
33689	405	8	8			10	1,512	0.01	10	1,514	0.01	4941	0.0	0.0	4942	0.0	0.0
33690	41	8	8			8	609	0.01	8	610	0.01	4944	0.0	0.0	4943	0.0	0.0
33692	324	8	8			300	653	0.46	300	653	0.46	4984	0.0	0.0	4936	0.0	0.0
33693	489	8	8			300	657	0.46	300	658	0.46	4936	0.0	0.0	4938	0.0	0.0
33694	154	8	8			8	1,302	0.01	8	1,304	0.01	4945	0.0	0.0	4944	0.0	0.0
33695	176	8	8			8	1,324	0.01	8	1,326	0.01	4946	0.0	0.0	4945	0.0	0.0
33696	333	8	8			1	1,204	0.00	1	1,206	0.00	4948	0.0	0.0	4946	0.0	0.0
33697	158	8	8			0	1,170	0.00	0	1,172	0.00	4919	0.0	0.0	4947	0.0	0.0
33698	216	8	8			267	617	0.43	267	617	0.43	4985	0.0	0.0	4942	0.0	0.0
33699	184	8	8			0	1,205	0.00	0	1,207	0.00	4920	0.0	0.0	4945	0.0	0.0
33700	70	8	8			0	563	0.00	0	564	0.00	4987	0.0	0.0	4986	0.0	0.0
33701	523	12	18	3	2036	1,899	1,400	1.36	2,601	4,128	0.63	4933	0.1	0.0	4952	1.4	0.0
33702	372	12	18	3	2036	1,899	1,278	1.49	2,602	3,767	0.69	4952	1.4	0.0	7574	8.0	0.0
33703	267	12	18	3	2036	1,899	1,463	1.30	2,602	4,313	0.60	7574	8.0	0.0	4950	5.3	0.0
33704	11	8	8			84	432	0.19	3	433	0.01	4949	4.2	0.0	4950	5.3	0.0
33705	127	8	8			28	483	0.06	1	483	0.00	7324	0.0	0.0	4949	4.2	0.0
33706	96	8	8			0	490	0.00	0	490	0.00	4921	0.0	0.0	7324	0.0	0.0
33707	82	12	18	3	2036	1,918	2,209	0.87	2,579	6,513	0.40	4963	0.0	0.0	4933	0.1	0.0
33708	500	8	8			128	463	0.28	24	464	0.05	4959	3.6	0.0	4933	0.1	0.0
33709	124	8	8			131	460	0.29	24	461	0.05	4934	0.0	0.0	4959	3.6	0.0
33710	118	8	8			0	988	0.00	0	989	0.00	4922	0.0	0.0	4953	0.0	0.0
33711	204	8	8			0	710	0.00	0	710	0.00	4923	0.0	0.0	4953	0.0	0.0
33712	273	12	18	3	2036	1,899	1,914	0.99	2,603	5,643	0.46	4950	5.3	0.0	4951	0.0	0.0
33713	155	8	8			350	431	0.81	350	431	0.81	4938	0.0	0.0	4972	0.0	0.0
33714	505	12	12			1,897	2,726	0.70	2,297	2,726	0.84	4972	0.0	0.0	4964	2.6	0.0
33715	245	12	18	3	2036	1,966	2,646	0.74	2,361	7,800	0.30	4964	2.6	0.0	4963	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33716	57	8	8			109	465	0.23	51	466	0.11	7414	3.6	0.0	4964	2.6	0.0
33717	78	8	8			69	447	0.16	51	448	0.11	4965	2.3	0.0	7414	3.6	0.0
33718	192	8	8			67	467	0.14	51	468	0.11	4966	0.0	0.0	4965	2.3	0.0
33719	258	8	8			42	680	0.06	42	681	0.06	4988	0.0	0.0	4967	0.0	0.0
33720	189	8	8			42	921	0.05	42	922	0.05	7573	0.0	0.0	4988	0.0	0.0
33721	118	12	12			272	2,385	0.11	242	2,385	0.10	4961	2.5	0.0	4963	0.0	0.0
33722	25	10	10			269	2,703	0.10	242	2,700	0.09	4962	2.7	0.0	4961	2.5	0.0
33723	78	8	8			241	1,210	0.20	241	1,212	0.20	4960	0.0	0.0	4962	2.7	0.0
33724	274	8	8			0	724	0.00	0	726	0.00	4954	0.0	0.0	4960	0.0	0.0
33725	497	8	8			228	1,112	0.21	228	1,113	0.21	4956	0.0	0.0	4960	0.0	0.0
33726	58	8	8			228	748	0.31	228	749	0.30	4955	0.0	0.0	4956	0.0	0.0
33727	555	8	8			219	961	0.23	219	963	0.23	4935	0.0	0.0	4955	0.0	0.0
33728	282	8	8			9	1,152	0.01	9	1,153	0.01	4970	0.0	0.0	4967	0.0	0.0
33729	180	8	8			6	814	0.01	6	815	0.01	4969	0.0	0.0	7573	0.0	0.0
33730	84	8	8			10	542	0.02	10	542	0.02	4968	0.0	0.0	7573	0.0	0.0
33731	114	8	8			10	465	0.02	10	466	0.02	4982	0.0	0.0	4968	0.0	0.0
33732	171	8	8			0	1,074	0.00	0	1,076	0.00	4924	0.0	0.0	7077	0.0	0.0
33733	148	8	8			1	1,056	0.00	1	1,057	0.00	4957	0.0	0.0	4958	0.0	0.0
33734	116	8	8			0	941	0.00	0	942	0.00	7191	0.0	0.0	4957	0.0	0.0
33735	177	8	8			0	494	0.00	0	494	0.00	4925	0.0	0.0	4957	0.0	0.0
33736	175	8	8			0	1,177	0.00	0	1,179	0.00	4927	0.0	0.0	4955	0.0	0.0
33737	507	12	12			1,548	3,050	0.51	1,979	3,050	0.65	4973	0.0	0.0	4972	0.0	0.0
33738	177	8	8			1	423	0.00	1	424	0.00	4974	0.0	0.0	4973	0.0	0.0
33739	110	8	8			1	804	0.00	1	805	0.00	4975	0.0	0.0	4974	0.0	0.0
33740	419	8	8			0	760	0.00	0	762	0.00	4977	0.0	0.0	4975	0.0	0.0
33741	412	8	8			9	1,264	0.01	9	1,265	0.01	4980	0.0	0.0	4981	0.0	0.0
33742	118	8	8			8	1,088	0.01	8	1,090	0.01	4978	0.0	0.0	4980	0.0	0.0
33743	70	8	8			8	1,188	0.01	8	1,189	0.01	4979	0.0	0.0	4978	0.0	0.0
33744	180	8	8			0	931	0.00	0	933	0.00	4929	0.0	0.0	4979	0.0	0.0
33745	96	8	8			9	937	0.01	9	938	0.01	4981	0.0	0.0	4982	0.0	0.0
33746	299	8	8			6	981	0.01	6	982	0.01	7325	0.0	0.0	4969	0.0	0.0
33747	193	8	8			0	1,346	0.00	0	1,348	0.00	4930	0.0	0.0	7325	0.0	0.0
33748	284	8	8			8	1,006	0.01	8	1,008	0.01	4976	0.0	0.0	4970	0.0	0.0
33749	190	8	8			0	987	0.00	0	988	0.00	4931	0.0	0.0	4976	0.0	0.0
33751	256	8	8			47	1,276	0.04	47	1,277	0.04	7900	0.0	0.0	4996	0.0	0.0
33752	450	8	8			223	1,326	0.17	223	1,328	0.17	4997	0.0	0.0	7326	0.0	0.0
33753	96	8	8			267	494	0.54	267	494	0.54	5007	0.0	0.0	5006	0.0	0.0
33754	91	8	8			267	1,063	0.25	267	1,064	0.25	5004	0.0	0.0	5007	0.0	0.0
33755	17	8	8			257	1,077	0.24	257	1,078	0.24	5003	0.0	0.0	5004	0.0	0.0
33756	164	8	8			257	433	0.59	257	434	0.59	7326	0.0	0.0	5003	0.0	0.0
33761	515	12	12			1,481	2,601	0.57	1,903	2,601	0.73	5000	0.0	0.0	4998	0.0	0.0
33762	217	12	12			1,481	2,192	0.68	1,903	2,192	0.87	7078	0.0	0.0	5000	0.0	0.0
33763	492	12	12			1,481	3,919	0.38	1,903	3,919	0.49	5001	0.0	0.0	7078	0.0	0.0
33765	485	8	8			37	870	0.04	37	871	0.04	5028	0.0	0.0	5077	0.0	0.0
33766	259	8	8			128	432	0.30	128	433	0.30	5078	0.0	0.0	5077	0.0	0.0
33767	57	8	8			128	738	0.17	128	740	0.17	5079	0.0	0.0	5078	0.0	0.0
33768	156	8	8			127	706	0.18	127	707	0.18	5057	0.0	0.0	5079	0.0	0.0
33769	342	8	8			127	694	0.18	127	696	0.18	5058	0.0	0.0	5057	0.0	0.0
33770	154	8	8			1	886	0.00	1	887	0.00	5056	0.0	0.0	5058	0.0	0.0
33771	159	8	8			0	1,752	0.00	0	1,754	0.00	5027	0.0	0.0	5056	0.0	0.0
33772	68	8	8			126	797	0.16	126	798	0.16	5059	0.0	0.0	5058	0.0	0.0
33773	91	8	8			0	729	0.00	0	730	0.00	7695	0.0	0.0	5059	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33774	32	8	8			125	1,039	0.12	125	1,040	0.12	5080	0.0	0.0	7329	0.0	0.0
33775	12	8	8			125	1,200	0.10	125	1,201	0.10	7152	0.0	0.0	5080	0.0	0.0
33776	296	8	8			51	1,029	0.05	51	1,031	0.05	7415	0.0	0.0	7152	0.0	0.0
33777	127	8	8			74	585	0.13	74	586	0.13	5055	0.0	0.0	7152	0.0	0.0
33778	310	8	8			45	851	0.05	45	852	0.05	7575	0.0	0.0	5055	0.0	0.0
33779	401	8	8			15	1,238	0.01	15	1,239	0.01	5029	0.0	0.0	7575	0.0	0.0
33780	170	6	6			1	563	0.00	1	563	0.00	5013	0.0	0.0	7328	0.0	0.0
33781	74	8	8			28	891	0.03	28	892	0.03	7328	0.0	0.0	5055	0.0	0.0
33782	455	8	8			15	1,358	0.01	15	1,360	0.01	5032	0.0	0.0	7328	0.0	0.0
33784	124	8	8			50	1,532	0.03	50	1,534	0.03	5053	0.0	0.0	7415	0.0	0.0
33785	226	8	8			1	1,340	0.00	1	1,342	0.00	5035	0.0	0.0	5054	0.0	0.0
33786	269	8	8			1	1,495	0.00	1	1,497	0.00	5052	0.0	0.0	5054	0.0	0.0
33787	140	8	8			1	1,799	0.00	1	1,801	0.00	5034	0.0	0.0	5052	0.0	0.0
33788	108	8	8			210	848	0.25	210	849	0.25	5081	0.0	0.0	7081	0.0	0.0
33789	204	8	8			213	675	0.31	213	676	0.31	7081	0.0	0.0	5082	0.0	0.0
33790	148	8	8			1	801	0.00	1	802	0.00	5062	0.0	0.0	7081	0.0	0.0
33791	87	8	8			1	891	0.00	1	892	0.00	5061	0.0	0.0	5062	0.0	0.0
33792	248	8	8			1	944	0.00	1	945	0.00	5060	0.0	0.0	5061	0.0	0.0
33793	360	6	6			1	490	0.00	1	490	0.00	5083	0.0	0.0	5082	0.0	0.0
33794	212	8	8			251	740	0.34	251	741	0.34	5082	0.0	0.0	5063	0.0	0.0
33795	503	8	8			1	1,127	0.00	1	1,128	0.00	5064	0.0	0.0	5063	0.0	0.0
33796	180	6	6			0	265	0.00	0	265	0.00	5016	0.0	0.0	5064	0.0	0.0
33797	307	8	8			1	1,372	0.00	1	1,373	0.00	5084	0.0	0.0	5064	0.0	0.0
33798	88	8	8			1	1,932	0.00	1	1,935	0.00	5065	0.0	0.0	5084	0.0	0.0
33799	313	8	8			1	1,665	0.00	1	1,667	0.00	7577	0.0	0.0	5065	0.0	0.0
33800	300	8	8			0	1,514	0.00	0	1,516	0.00	7578	0.0	0.0	5070	0.0	0.0
33801	501	8	8			277	369	0.75	277	370	0.75	5085	0.0	0.0	5072	0.0	0.0
33802	413	8	8			58	816	0.07	58	817	0.07	5071	0.0	0.0	5072	0.0	0.0
33803	525	8	8			1	663	0.00	1	664	0.00	5070	0.0	0.0	5071	0.0	0.0
33804	217	8	8			27	964	0.03	27	965	0.03	5069	0.0	0.0	5071	0.0	0.0
33805	305	8	8			27	1,471	0.02	27	1,473	0.02	7080	0.0	0.0	5069	0.0	0.0
33806	200	8	8			1	1,133	0.00	1	1,135	0.00	5068	0.0	0.0	7080	0.0	0.0
33807	348	8	8			0	373	0.00	0	373	0.00	5067	0.0	0.0	5068	0.0	0.0
33808	215	8	8			0	1,747	0.00	0	1,749	0.00	5066	0.0	0.0	7080	0.0	0.0
33809	218	8	8			335	270	1.24	335	270	1.24	5072	0.0	0.0	5086	0.0	0.0
33810	261	8	8			335	371	0.90	335	372	0.90	5086	0.0	0.0	5087	0.0	0.0
33811	16	8	8			336	749	0.45	336	750	0.45	5074	0.0	0.0	5073	0.0	0.0
33812	310	8	8			72	1,066	0.07	72	1,067	0.07	5088	0.0	0.0	5073	0.0	0.0
33813	270	8	8			1	1,066	0.00	1	1,067	0.00	5089	0.0	0.0	5088	0.0	0.0
33814	211	8	8			0	362	0.00	0	363	0.00	5017	0.0	0.0	5075	0.0	0.0
33815	72	8	8			20	979	0.02	20	981	0.02	5091	0.0	0.0	5090	0.0	0.0
33816	486	8	8			0	1,168	0.00	0	1,169	0.00	5076	0.0	0.0	5091	0.0	0.0
33817	359	8	8			15	981	0.01	15	982	0.01	5092	0.0	0.0	5051	0.0	0.0
33818	350	8	8			14	1,481	0.01	14	1,483	0.01	5093	0.0	0.0	5092	0.0	0.0
33819	117	8	8			0	643	0.00	0	644	0.00	5019	0.0	0.0	5094	0.0	0.0
33820	135	8	8			15	398	0.04	15	399	0.04	5051	0.0	0.0	5050	0.0	0.0
33821	340	8	8			12	1,605	0.01	12	1,607	0.01	5048	0.0	0.0	5049	0.0	0.0
33822	121	8	8			1	2,111	0.00	1	2,114	0.00	7079	0.0	0.0	5048	0.0	0.0
33823	297	8	8			12	1,583	0.01	12	1,585	0.01	5095	0.0	0.0	7576	0.0	0.0
33824	300	8	8			12	1,636	0.01	12	1,639	0.01	5047	0.0	0.0	5095	0.0	0.0
33825	100	8	8			0	1,806	0.00	0	1,808	0.00	5122	0.0	0.0	5047	0.0	0.0
33826	170	8	8			31	496	0.06	31	497	0.06	7327	0.0	0.0	7576	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33827	305	8	8			10	694	0.01	10	694	0.01	5046	0.0	0.0	7327	0.0	0.0
33828	190	8	8			9	1,539	0.01	9	1,541	0.01	5045	0.0	0.0	5046	0.0	0.0
33829	406	8	8			0	899	0.00	0	899	0.00	5121	0.0	0.0	5096	0.0	0.0
33830	193	8	8			8	1,501	0.01	8	1,503	0.01	5097	0.0	0.0	5045	0.0	0.0
33831	124	8	8			8	993	0.01	8	994	0.01	5098	0.0	0.0	5097	0.0	0.0
33832	113	8	8			8	988	0.01	8	989	0.01	5099	0.0	0.0	5098	0.0	0.0
33833	141	8	8			0	423	0.00	0	424	0.00	5119	0.0	0.0	5046	0.0	0.0
33834	185	8	8			20	963	0.02	20	965	0.02	5101	0.0	0.0	5100	0.0	0.0
33835	250	8	8			1	1,382	0.00	1	1,383	0.00	5102	0.0	0.0	5101	0.0	0.0
33836	190	8	8			1	924	0.00	1	925	0.00	5103	0.0	0.0	5102	0.0	0.0
33837	234	8	8			15	1,561	0.01	15	1,563	0.01	5104	0.0	0.0	5029	0.0	0.0
33838	133	6	6			15	871	0.02	15	871	0.02	5030	0.0	0.0	5104	0.0	0.0
33839	165	6	6			0	788	0.00	0	788	0.00	5020	0.0	0.0	5030	0.0	0.0
33840	115	8	8			1	1,842	0.00	1	1,844	0.00	5031	0.0	0.0	5032	0.0	0.0
33841	143	6	6			1	1,179	0.00	1	1,179	0.00	5021	0.0	0.0	5031	0.0	0.0
33842	182	8	8			1	455	0.00	1	456	0.00	5105	0.0	0.0	5032	0.0	0.0
33844	200	8	8			1	1,817	0.00	1	1,819	0.00	5036	0.0	0.0	5035	0.0	0.0
33845	105	8	8			0	1,698	0.00	0	1,701	0.00	5037	0.0	0.0	5036	0.0	0.0
33846	167	6	6			0	211	0.00	0	211	0.00	5022	0.0	0.0	5033	0.0	0.0
33847	385	6	6			13	490	0.03	13	490	0.03	5040	0.0	0.0	5041	0.0	0.0
33848	76	6	6			1	533	0.00	1	533	0.00	5117	0.0	0.0	5040	0.0	0.0
33849	165	6	6			1	416	0.00	1	416	0.00	5108	0.0	0.0	5040	0.0	0.0
33850	75	6	6			1	225	0.01	1	225	0.01	5109	0.0	0.0	5108	0.0	0.0
33851	165	6	6			1	624	0.00	1	624	0.00	5039	0.0	0.0	5109	0.0	0.0
33852	82	6	6			1	292	0.00	1	292	0.00	5038	0.0	0.0	5039	0.0	0.0
33853	239	6	6			1	382	0.00	1	382	0.00	5023	0.0	0.0	5042	0.0	0.0
33854	238	6	6			1	349	0.00	1	349	0.00	5024	0.0	0.0	5043	0.0	0.0
33855	215	8	8			1	1,114	0.00	1	1,115	0.00	5044	0.0	0.0	5043	0.0	0.0
33856	165	6	6			1	504	0.00	1	504	0.00	5025	0.0	0.0	5044	0.0	0.0
33857	308	6	6			1	428	0.00	1	428	0.00	5026	0.0	0.0	5110	0.0	0.0
33858	32	6	6			0	216	0.00	0	216	0.00	5114	0.0	0.0	5030	0.0	0.0
33861	396	8	8			517	863	0.60	517	864	0.60	5181	0.0	0.0	5158	0.0	0.0
33862	352	8	8			517	953	0.54	517	955	0.54	5182	0.0	0.0	5181	0.0	0.0
33863	508	8	12	15	Existing	471	372	1.27	471	1,095	0.43	5145	1.4	0.0	5182	0.0	0.0
33864	403	8	8			63	1,596	0.04	63	1,598	0.04	5146	0.0	0.0	5145	1.4	0.0
33865	409	8	8			63	371	0.17	63	372	0.17	5231	0.0	0.0	5146	0.0	0.0
33866	175	8	8			1	1,500	0.00	1	1,502	0.00	5126	0.0	0.0	5231	0.0	0.0
33867	230	8	8			34	369	0.09	34	370	0.09	5144	0.0	0.0	5231	0.0	0.0
33868	73	8	8			1	963	0.00	1	965	0.00	5148	0.0	0.0	5144	0.0	0.0
33869	165	6	6			1	824	0.00	1	824	0.00	5128	0.0	0.0	5149	0.0	0.0
33870	78	8	8			1	584	0.00	1	585	0.00	5149	0.0	0.0	5148	0.0	0.0
33871	462	8	8			26	888	0.03	26	889	0.03	5160	0.0	0.0	5158	0.0	0.0
33872	370	8	8			26	1,188	0.02	26	1,190	0.02	5159	0.0	0.0	5160	0.0	0.0
33873	178	8	8			37	825	0.04	37	826	0.04	7580	0.0	0.0	7082	0.0	0.0
33874	175	8	8			0	861	0.00	0	863	0.00	5173	0.0	0.0	7580	0.0	0.0
33875	254	8	8			1	2,124	0.00	1	2,126	0.00	5130	0.0	0.0	5183	0.0	0.0
33876	447	8	8			543	1,083	0.50	544	1,084	0.50	5158	0.0	0.0	5153	0.0	0.0
33877	50	8	8			651	695	0.94	651	697	0.94	5152	0.0	0.0	8987	0.0	0.0
33878	311	8	8			91	408	0.22	91	408	0.22	5154	0.0	0.0	5153	0.0	0.0
33879	105	8	8			0	473	0.00	0	474	0.00	5201	0.0	0.0	5154	0.0	0.0
33880	353	8	8			1	1,223	0.00	1	1,224	0.00	7579	0.0	0.0	5154	0.0	0.0
33881	155	8	8			74	967	0.08	74	969	0.08	5202	0.0	0.0	5154	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33882	119	8	8			1	1,720	0.00	1	1,722	0.00	5137	0.0	0.0	5202	0.0	0.0
33883	65	8	8			73	399	0.18	73	400	0.18	5203	0.0	0.0	5202	0.0	0.0
33884	160	8	8			73	1,159	0.06	73	1,160	0.06	5156	0.0	0.0	5203	0.0	0.0
33885	78	8	8			1	2,477	0.00	1	2,481	0.00	5157	0.0	0.0	5156	0.0	0.0
33886	167	8	8			1	928	0.00	1	930	0.00	5132	0.0	0.0	5157	0.0	0.0
33887	41	6	6			0	824	0.00	0	824	0.00	5131	0.0	0.0	5132	0.0	0.0
33888	36	8	8			72	563	0.13	72	563	0.13	5155	0.0	0.0	5156	0.0	0.0
33889	165	8	8			1	1,440	0.00	1	1,442	0.00	5133	0.0	0.0	5155	0.0	0.0
33890	44	8	8			1	1,415	0.00	1	1,417	0.00	5134	0.0	0.0	8641	0.0	0.0
33891	57	8	8			1	419	0.00	1	419	0.00	5135	0.0	0.0	5134	0.0	0.0
33892	100	6	6			0	686	0.00	0	686	0.00	7696	0.0	0.0	5135	0.0	0.0
33893	262	8	8			1	370	0.00	1	371	0.00	5191	0.0	0.0	7580	0.0	0.0
33894	126	8	8			17	1,034	0.02	17	1,035	0.02	5185	0.0	0.0	5184	0.0	0.0
33895	69	8	8			10	988	0.01	10	990	0.01	5186	0.0	0.0	5185	0.0	0.0
33896	184	8	8			10	1,245	0.01	10	1,247	0.01	5187	0.0	0.0	5186	0.0	0.0
33897	165	8	8			0	743	0.00	0	744	0.00	5188	0.0	0.0	5187	0.0	0.0
33898	120	8	8			1	1,287	0.00	1	1,289	0.00	5189	0.0	0.0	5187	0.0	0.0
33899	236	8	8			0	1,340	0.00	0	1,342	0.00	5190	0.0	0.0	5189	0.0	0.0
33900	297	8	8			7	715	0.01	7	716	0.01	7084	0.0	0.0	5200	0.0	0.0
33901	251	8	8			7	1,394	0.00	7	1,397	0.00	5150	0.0	0.0	7084	0.0	0.0
33902	271	8	8			23	593	0.04	23	594	0.04	5199	0.0	0.0	5198	0.0	0.0
33903	270	8	8			23	836	0.03	23	838	0.03	5198	0.0	0.0	5197	0.0	0.0
33904	282	8	8			48	369	0.13	48	369	0.13	5194	0.0	0.0	5197	0.0	0.0
33905	335	8	8			1	1,296	0.00	1	1,298	0.00	5193	0.0	0.0	5194	0.0	0.0
33906	85	8	8			1	724	0.00	1	725	0.00	7416	0.0	0.0	5193	0.0	0.0
33907	145	8	8			1	1,165	0.00	1	1,167	0.00	5192	0.0	0.0	7416	0.0	0.0
33908	145	8	8			1	1,803	0.00	1	1,806	0.00	5136	0.0	0.0	5192	0.0	0.0
33909	368	8	8			17	809	0.02	17	810	0.02	5196	0.0	0.0	5195	0.0	0.0
33910	275	8	8			0	1,661	0.00	0	1,663	0.00	7581	0.0	0.0	5196	0.0	0.0
33911	244	8	8			0	875	0.00	0	876	0.00	5204	0.0	0.0	5196	0.0	0.0
33912	115	8	8			1	1,297	0.00	1	1,299	0.00	5217	0.0	0.0	5219	0.0	0.0
33913	284	8	8			1	1,328	0.00	1	1,331	0.00	7333	0.0	0.0	5217	0.0	0.0
33914	238	8	8			0	1,401	0.00	0	1,402	0.00	5218	0.0	0.0	7333	0.0	0.0
33915	144	8	8			309	422	0.73	309	422	0.73	5180	0.0	0.0	5220	0.0	0.0
33916	297	8	8			267	875	0.31	267	876	0.31	5212	0.0	0.0	5180	0.0	0.0
33917	155	6	6			0	533	0.00	0	533	0.00	5239	0.0	0.0	5213	0.0	0.0
33918	69	8	8			267	1,154	0.23	267	1,156	0.23	5214	0.0	0.0	5213	0.0	0.0
33919	225	8	8			19	1,151	0.02	19	1,153	0.02	7085	0.0	0.0	5214	0.0	0.0
33920	132	8	8			1	1,536	0.00	1	1,538	0.00	5215	0.0	0.0	7085	0.0	0.0
33921	165	8	8			0	1,002	0.00	0	1,003	0.00	5234	0.0	0.0	5215	0.0	0.0
33922	326	8	8			1	1,143	0.00	1	1,144	0.00	7192	0.0	0.0	7085	0.0	0.0
33923	126	8	8			1	1,471	0.00	1	1,473	0.00	5216	0.0	0.0	7192	0.0	0.0
33924	87	8	8			0	891	0.00	0	892	0.00	5244	0.0	0.0	5216	0.0	0.0
33925	140	8	8			248	1,298	0.19	248	1,299	0.19	5211	0.0	0.0	5214	0.0	0.0
33926	160	8	8			24	1,143	0.02	24	1,144	0.02	5178	0.0	0.0	5211	0.0	0.0
33927	196	8	8			1	677	0.00	1	678	0.00	5206	0.0	0.0	7332	0.0	0.0
33928	147	8	8			1	1,005	0.00	1	1,006	0.00	5205	0.0	0.0	5206	0.0	0.0
33929	179	8	8			223	1,145	0.19	223	1,147	0.19	5210	0.0	0.0	5211	0.0	0.0
33930	177	8	8			1	375	0.00	1	375	0.00	5208	0.0	0.0	5209	0.0	0.0
33933	242	8	8			1	1,708	0.00	1	1,710	0.00	5207	0.0	0.0	5208	0.0	0.0
33934	75	8	8			0	678	0.00	0	679	0.00	5237	0.0	0.0	5207	0.0	0.0
33935	213	8	8			42	1,154	0.04	42	1,156	0.04	7582	0.0	0.0	5180	0.0	0.0

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33936	265	8	8			41	1,158	0.04	41	1,160	0.04	5179	0.0	0.0	7582	0.0	0.0
33937	103	8	8			17	1,550	0.01	17	1,552	0.01	5184	0.0	0.0	5179	0.0	0.0
33938	300	8	8			47	1,270	0.04	47	1,272	0.04	5176	0.0	0.0	7083	0.0	0.0
33939	375	8	8			47	1,255	0.04	47	1,257	0.04	5177	0.0	0.0	5176	0.0	0.0
33940	257	8	8			2	1,282	0.00	2	1,283	0.00	5169	0.0	0.0	5177	0.0	0.0
33941	400	8	8			2	1,122	0.00	2	1,124	0.00	5171	0.0	0.0	5169	0.0	0.0
33942	226	8	8			1	737	0.00	1	738	0.00	5172	0.0	0.0	5171	0.0	0.0
33943	305	8	8			43	697	0.06	43	698	0.06	5222	0.0	0.0	5166	0.0	0.0
33944	360	8	8			26	1,146	0.02	26	1,147	0.02	5170	0.0	0.0	5222	0.0	0.0
33945	28	8	8			26	1,524	0.02	26	1,526	0.02	5223	0.0	0.0	5170	0.0	0.0
33946	317	8	8			26	1,080	0.02	26	1,081	0.02	5224	0.0	0.0	5223	0.0	0.0
33947	138	8	8			0	1,317	0.00	0	1,319	0.00	5238	0.0	0.0	5223	0.0	0.0
33948	163	8	8			24	765	0.03	24	766	0.03	5165	0.0	0.0	5166	0.0	0.0
33949	235	6	6			0	324	0.00	0	324	0.00	5141	0.0	0.0	5165	0.0	0.0
33950	171	8	8			1	1,417	0.00	1	1,419	0.00	5164	0.0	0.0	5165	0.0	0.0
33951	230	6	6			1	1,021	0.00	1	1,021	0.00	5221	0.0	0.0	5164	0.0	0.0
33952	103	6	6			0	503	0.00	0	503	0.00	5242	0.0	0.0	5221	0.0	0.0
33953	198	8	8			134	1,453	0.09	134	1,455	0.09	5225	0.0	0.0	5166	0.0	0.0
33954	218	8	8			134	1,157	0.12	134	1,159	0.12	5168	0.0	0.0	5225	0.0	0.0
33955	120	8	8			1	465	0.00	1	465	0.00	5167	0.0	0.0	5168	0.0	0.0
33956	117	8	8			1	1,756	0.00	1	1,758	0.00	5229	0.0	0.0	5226	0.0	0.0
33958	115	8	8			1	1,656	0.00	1	1,658	0.00	5230	0.0	0.0	5229	0.0	0.0
33959	173	6	6			0	669	0.00	0	669	0.00	5233	0.0	0.0	5230	0.0	0.0
33960	373	8	8			110	933	0.12	110	935	0.12	7331	0.0	0.0	5168	0.0	0.0
33961	63	8	8			110	1,272	0.09	110	1,274	0.09	5143	0.0	0.0	7331	0.0	0.0
33962	123	8	8			110	1,058	0.10	110	1,060	0.10	5227	0.0	0.0	5143	0.0	0.0
33963	196	6	6			1	239	0.00	1	239	0.00	7086	0.0	0.0	5227	0.0	0.0
33964	148	8	8			91	706	0.13	91	708	0.13	5142	0.0	0.0	5227	0.0	0.0
33965	155	8	8			47	389	0.12	47	390	0.12	5228	0.0	0.0	5142	0.0	0.0
33967	216	8	8			1	592	0.00	1	593	0.00	5274	0.0	0.0	5275	0.0	0.0
33968	195	8	8			1	592	0.00	1	592	0.00	5275	0.0	0.0	5276	0.0	0.0
33969	268	8	8			78	713	0.11	78	715	0.11	5276	0.0	0.0	5277	0.0	0.0
33970	226	8	8			79	887	0.09	79	888	0.09	5277	0.0	0.0	5278	0.0	0.0
33971	202	8	8			79	1,094	0.07	79	1,095	0.07	5278	0.0	0.0	5279	1.6	0.0
33972	138	8	8			81	294	0.27	80	294	0.27	5279	1.6	0.0	5280	1.3	0.0
33973	322	8	15	19	Existing	555	467	1.19	778	2,493	0.31	5280	1.3	0.0	5273	0.0	0.0
33974	201	8	15	19	Existing	520	365	1.43	780	1,949	0.40	5273	0.0	0.0	5272	0.0	0.0
33975	254	8	8			1	808	0.00	1	809	0.00	5309	0.0	0.0	5273	0.0	0.0
33976	86	8	12	19	Existing	498	296	1.68	697	872	0.80	5281	0.0	0.0	5280	1.3	0.0
33977	180	8	12	19	Existing	399	488	0.82	526	1,439	0.37	5288	0.0	0.0	5281	0.0	0.0
33978	205	8	8			524	1,015	0.52	526	1,015	0.52	5289	0.0	0.0	5288	0.0	0.0
33979	380	8	12	17	Existing	524	297	1.77	525	874	0.60	5290	2.4	0.0	5289	0.0	0.0
33980	105	8	8			36	669	0.05	20	670	0.03	5291	5.9	0.0	5290	2.4	0.0
33981	148	8	8			19	638	0.03	19	638	0.03	5301	0.0	0.0	5291	5.9	0.0
33982	70	8	8			453	480	0.95	453	480	0.95	7585	1.0	0.0	5290	2.4	0.0
33983	456	8	8			415	797	0.52	415	798	0.52	5260	0.0	0.0	5285	3.0	0.0
33984	150	8	8			33	217	0.15	1	217	0.00	7697	4.4	0.0	5283	4.0	0.0
33985	95	8	8			150	409	0.37	145	410	0.35	5282	4.2	0.0	5283	4.0	0.0
33986	250	8	8			1	470	0.00	1	471	0.00	5286	0.0	0.0	5287	0.0	0.0
33987	127	8	8			119	309	0.38	115	310	0.37	5316	8.0	0.0	5282	4.2	0.0
33988	30	8	8			115	543	0.21	115	544	0.21	5317	0.0	0.0	5316	8.0	0.0
33989	127	8	8			114	660	0.17	114	660	0.17	5318	0.0	0.0	5317	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
33990	20	8	8			2	526	0.00	2	526	0.00	7088	0.0	0.0	5318	0.0	0.0
33991	131	8	8			1	1,027	0.00	1	1,028	0.00	5284	0.0	0.0	7088	0.0	0.0
33992	188	6	6			1	251	0.00	1	251	0.00	5248	0.0	0.0	5284	0.0	0.0
33993	135	8	8			111	572	0.19	111	573	0.19	5319	0.0	0.0	5318	0.0	0.0
33994	502	8	8			43	727	0.06	43	728	0.06	5256	0.0	0.0	5319	0.0	0.0
33995	131	8	8			1	299	0.00	1	299	0.00	5251	0.0	0.0	5308	0.0	0.0
33996	438	8	15	19	Existing	459	390	1.18	819	2,087	0.39	5271	0.0	0.0	5270	0.8	0.0
33997	134	8	8			35	665	0.05	35	666	0.05	7583	3.2	0.0	5270	0.8	0.0
33998	185	8	8			35	698	0.05	35	699	0.05	5269	0.0	0.0	7583	3.2	0.0
33999	228	8	15	19	Existing	506	587	0.86	884	3,135	0.28	5270	0.8	0.0	5267	0.0	0.0
34000	214	8	15	19	Existing	453	298	1.52	884	1,593	0.55	5267	0.0	0.0	5266	0.8	0.0
34001	29	8	15	19	Existing	470	326	1.44	922	1,746	0.53	5266	0.8	0.0	5265	1.2	0.0
34002	200	8	8			60	835	0.07	60	835	0.07	5264	0.0	0.0	5265	1.2	0.0
34003	105	8	8			60	431	0.14	60	431	0.14	7417	0.0	0.0	5264	0.0	0.0
34004	210	8	8			1	297	0.00	1	298	0.00	5263	0.0	0.0	7417	0.0	0.0
34005	368	8	8			58	440	0.13	58	440	0.13	5304	0.0	0.0	7417	0.0	0.0
34006	126	8	8			58	546	0.11	58	547	0.11	5303	0.0	0.0	5304	0.0	0.0
34007	340	8	8			1	721	0.00	1	722	0.00	5302	0.0	0.0	5303	0.0	0.0
34008	303	8	15	19	Existing	518	533	0.97	983	2,851	0.34	5265	1.2	0.0	5262	0.0	0.0
34009	400	8	8			163	455	0.36	163	456	0.36	5261	3.5	0.0	5262	0.0	0.0
34010	500	8	8			112	624	0.18	112	624	0.18	5305	0.0	0.0	5261	3.5	0.0
34011	102	8	8			42	608	0.07	42	610	0.07	7087	0.0	0.0	5305	0.0	0.0
34012	465	8	8			2	654	0.00	2	655	0.00	5306	0.0	0.0	7087	0.0	0.0
34013	303	8	8			2	955	0.00	2	956	0.00	5307	0.0	0.0	5306	0.0	0.0
34014	173	8	8			1	1,099	0.00	1	1,101	0.00	5308	0.0	0.0	5307	0.0	0.0
34015	208	8	8			38	690	0.05	38	691	0.05	5299	0.0	0.0	7087	0.0	0.0
34016	170	8	8			1	798	0.00	1	799	0.00	5321	0.0	0.0	5299	0.0	0.0
34017	430	8	8			3	664	0.01	3	665	0.01	5300	0.0	0.0	5299	0.0	0.0
34018	53	8	8			2	769	0.00	2	771	0.00	5327	0.0	0.0	5300	0.0	0.0
34019	270	8	8			1	1,103	0.00	1	1,105	0.00	5322	0.0	0.0	5327	0.0	0.0
34020	143	8	8			1	926	0.00	1	927	0.00	5298	0.0	0.0	5300	0.0	0.0
34021	265	8	8			1	1,065	0.00	1	1,067	0.00	5252	0.0	0.0	5298	0.0	0.0
34022	200	8	8			19	825	0.02	19	826	0.02	5297	0.0	0.0	5301	0.0	0.0
34023	320	8	8			1	1,017	0.00	1	1,018	0.00	5253	0.0	0.0	5297	0.0	0.0
34024	460	8	8			0	1,735	0.00	0	1,738	0.00	7584	0.0	0.0	5296	0.0	0.0
34025	494	8	8			1	925	0.00	1	926	0.00	5296	0.0	0.0	5295	0.0	0.0
34026	279	8	8			1	594	0.00	1	594	0.00	7418	0.0	0.0	5294	0.0	0.0
34027	335	8	8			39	878	0.04	39	880	0.04	5323	0.0	0.0	5294	0.0	0.0
34028	345	8	8			25	1,487	0.02	25	1,489	0.02	5293	0.0	0.0	5323	0.0	0.0
34029	265	8	8			0	1,874	0.00	0	1,876	0.00	5292	0.0	0.0	5293	0.0	0.0
34030	316	8	8			14	508	0.03	14	508	0.03	5313	0.0	0.0	5323	0.0	0.0
34031	160	8	8			0	961	0.00	0	963	0.00	5254	0.0	0.0	5313	0.0	0.0
34032	290	8	8			13	1,855	0.01	13	1,857	0.01	5311	0.0	0.0	5312	0.0	0.0
34033	198	8	8			15	1,144	0.01	15	1,146	0.01	5315	0.0	0.0	5314	0.0	0.0
34034	242	8	8			31	386	0.08	31	386	0.08	5258	0.0	0.0	5259	0.0	0.0
34035	270	8	8			31	685	0.04	31	686	0.04	5257	0.0	0.0	5258	0.0	0.0
34036	181	8	8			3	879	0.00	3	881	0.00	5255	0.0	0.0	7193	0.0	0.0
34037	500	8	8			453	549	0.82	453	550	0.82	5285	3.0	0.0	7585	1.0	0.0
34038	465	8	8			65	449	0.15	65	450	0.15	7589	0.0	0.0	5417	0.0	0.0
34039	25	8	8			0	480	0.00	0	481	0.00	5441	0.0	0.0	7586	0.0	0.0
34040	17	8	8			1	301	0.00	1	302	0.00	5442	0.0	0.0	5385	0.0	0.0
34041	85	8	8			70	417	0.17	70	418	0.17	5376	0.0	0.0	5375	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34042	136	8	8			69	408	0.17	69	408	0.17	5374	0.0	0.0	5376	0.0	0.0
34043	242	8	8			69	597	0.12	69	598	0.12	5372	0.0	0.0	5374	0.0	0.0
34044	143	8	8			32	592	0.05	32	593	0.05	5371	0.0	0.0	5372	0.0	0.0
34045	250	8	8			13	908	0.01	13	909	0.01	5368	0.0	0.0	5372	0.0	0.0
34046	207	8	8			13	808	0.02	13	809	0.02	5379	0.0	0.0	5368	0.0	0.0
34047	55	8	8			1	1,937	0.00	1	1,940	0.00	5425	0.0	0.0	5424	0.0	0.0
34048	105	8	8			0	1,084	0.00	0	1,085	0.00	7698	0.0	0.0	5425	0.0	0.0
34049	165	8	8			1	315	0.00	1	316	0.00	5377	0.0	0.0	5379	0.0	0.0
34050	51	8	8			0	401	0.00	0	402	0.00	11240	0.0	0.0	5377	0.0	0.0
34051	128	8	8			30	401	0.07	30	401	0.07	7337	0.0	0.0	7587	0.0	0.0
34052	103	8	8			1	419	0.00	1	419	0.00	5352	0.0	0.0	7337	0.0	0.0
34053	196	8	8			1	444	0.00	1	444	0.00	5378	0.0	0.0	5379	0.0	0.0
34054	190	8	8			0	1,180	0.00	0	1,181	0.00	5426	0.0	0.0	5378	0.0	0.0
34055	123	8	8			27	409	0.07	0	409	0.00	5405	2.2	0.0	5404	2.2	0.0
34056	133	8	8			0	1,613	0.00	0	1,615	0.00	5329	0.0	0.0	7337	0.0	0.0
34057	166	8	8			0	556	0.00	0	557	0.00	5380	0.0	0.0	5368	0.0	0.0
34058	112	8	8			1	1,032	0.00	1	1,033	0.00	5366	0.0	0.0	5365	0.0	0.0
34059	122	8	8			0	394	0.00	0	394	0.00	7699	0.0	0.0	5366	0.0	0.0
34060	66	8	8			1	1,273	0.00	1	1,274	0.00	5364	0.0	0.0	5349	0.0	0.0
34061	483	8	8			1	1,255	0.00	1	1,257	0.00	5387	0.0	0.0	5364	0.0	0.0
34062	223	8	8			0	526	0.00	0	526	0.00	5386	0.0	0.0	5387	0.0	0.0
34063	80	8	8			20	453	0.04	20	454	0.04	5427	0.0	0.0	5349	0.0	0.0
34064	178	8	8			8	453	0.02	8	454	0.02	7340	0.0	0.0	5427	0.0	0.0
34065	20	8	8			7	497	0.01	7	497	0.01	5429	0.0	0.0	5428	0.0	0.0
34066	104	8	8			7	453	0.02	7	454	0.02	5367	0.0	0.0	5429	0.0	0.0
34067	236	8	8			6	1,278	0.00	6	1,279	0.00	5384	0.0	0.0	5383	0.0	0.0
34068	92	8	8			0	1,281	0.00	0	1,283	0.00	5330	0.0	0.0	5384	0.0	0.0
34069	118	8	8			0	426	0.00	0	426	0.00	5331	0.0	0.0	5383	0.0	0.0
34070	140	8	8			1	1,232	0.00	1	1,234	0.00	5382	0.0	0.0	5429	0.0	0.0
34071	100	8	8			0	1,073	0.00	0	1,074	0.00	5381	0.0	0.0	5382	0.0	0.0
34072	105	8	8			31	415	0.08	31	415	0.08	5369	0.0	0.0	5370	0.0	0.0
34073	251	8	8			30	443	0.07	30	444	0.07	7587	0.0	0.0	5369	0.0	0.0
34074	315	8	8			235	918	0.26	235	919	0.26	5402	0.0	0.0	5394	0.0	0.0
34075	35	8	8			235	754	0.31	235	755	0.31	5403	0.0	0.0	5402	0.0	0.0
34076	201	8	8			172	697	0.25	172	697	0.25	5385	0.0	0.0	5403	0.0	0.0
34077	276	8	8			171	405	0.42	171	406	0.42	11279	0.0	0.0	5385	0.0	0.0
34078	66	8	8			19	402	0.05	19	403	0.05	7586	0.0	0.0	5363	0.0	0.0
34079	136	8	8			18	636	0.03	18	637	0.03	7155	0.0	0.0	7586	0.0	0.0
34080	335	8	8			1	553	0.00	1	554	0.00	5362	0.0	0.0	7155	0.0	0.0
34081	63	8	8			1	676	0.00	1	676	0.00	5388	0.0	0.0	5362	0.0	0.0
34082	71	8	8			0	263	0.00	0	264	0.00	5332	0.0	0.0	5388	0.0	0.0
34083	240	8	8			1	769	0.00	1	771	0.00	7089	0.0	0.0	5388	0.0	0.0
34084	77	8	8			0	763	0.00	0	764	0.00	5333	0.0	0.0	7089	0.0	0.0
34086	185	8	8			3	700	0.00	3	701	0.00	5358	0.0	0.0	5390	0.0	0.0
34087	88	8	8			2	636	0.00	2	637	0.00	5360	0.0	0.0	5359	0.0	0.0
34088	73	8	8			41	326	0.13	41	326	0.13	7338	0.0	0.0	7154	0.0	0.0
34089	124	8	8			41	474	0.09	41	474	0.09	5390	0.0	0.0	7338	0.0	0.0
34090	24	8	8			1	1,289	0.00	1	1,291	0.00	5389	0.0	0.0	5390	0.0	0.0
34091	260	8	8			1	1,130	0.00	1	1,131	0.00	5430	0.0	0.0	5389	0.0	0.0
34092	350	8	8			123	562	0.22	123	563	0.22	5414	0.0	0.0	11279	0.0	0.0
34093	380	8	8			123	349	0.35	123	349	0.35	5415	0.0	0.0	5414	0.0	0.0
34094	423	8	8			14	316	0.04	14	316	0.04	5422	0.0	0.0	5415	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34095	140	8	8			13	356	0.04	13	356	0.04	7590	0.0	0.0	5422	0.0	0.0
34096	200	6	6			1	169	0.00	1	169	0.00	5335	0.0	0.0	7590	0.0	0.0
34097	50	8	8			12	470	0.03	12	471	0.03	5431	0.0	0.0	7590	0.0	0.0
34098	80	6	6			11	366	0.03	11	366	0.03	5432	0.0	0.0	5431	0.0	0.0
34099	198	6	6			1	245	0.00	1	245	0.00	5336	0.0	0.0	5432	0.0	0.0
34100	261	8	8			100	651	0.15	100	651	0.15	5417	0.0	0.0	5415	0.0	0.0
34102	304	8	8			44	603	0.07	44	603	0.07	5354	0.0	0.0	7589	0.0	0.0
34103	150	8	8			3	762	0.00	3	763	0.00	7336	0.0	0.0	5353	0.0	0.0
34104	70	8	8			1	787	0.00	1	788	0.00	5355	0.0	0.0	7336	0.0	0.0
34105	117	6	6			1	267	0.00	1	267	0.00	5337	0.0	0.0	5355	0.0	0.0
34106	220	8	8			34	733	0.05	34	734	0.05	5416	0.0	0.0	5417	0.0	0.0
34107	123	6	6			1	429	0.00	1	429	0.00	5434	0.0	0.0	7589	0.0	0.0
34108	275	8	8			50	665	0.08	50	666	0.08	5397	0.0	0.0	5395	0.0	0.0
34109	94	8	8			49	660	0.07	49	660	0.07	5396	0.0	0.0	5397	0.0	0.0
34110	110	8	8			2	902	0.00	2	903	0.00	7588	0.0	0.0	5396	0.0	0.0
34111	254	8	8			1	860	0.00	1	861	0.00	5338	0.0	0.0	7588	0.0	0.0
34112	201	8	8			1	1,029	0.00	1	1,031	0.00	5391	0.0	0.0	7588	0.0	0.0
34113	188	8	8			1	1,078	0.00	1	1,079	0.00	5339	0.0	0.0	5391	0.0	0.0
34114	115	8	8			1	1,389	0.00	1	1,390	0.00	5340	0.0	0.0	5418	0.0	0.0
34115	77	8	8			10	1,163	0.01	10	1,164	0.01	5392	0.0	0.0	5393	0.0	0.0
34116	160	8	8			1	1,772	0.00	1	1,774	0.00	5341	0.0	0.0	5392	0.0	0.0
34117	187	8	8			62	300	0.21	62	300	0.21	5401	0.0	0.0	5403	0.0	0.0
34118	105	8	8			2	297	0.01	2	298	0.01	5400	0.0	0.0	5401	0.0	0.0
34119	275	8	8			2	297	0.01	2	298	0.01	5399	0.0	0.0	5400	0.0	0.0
34120	130	8	8			1	1,319	0.00	1	1,320	0.00	7090	0.0	0.0	5399	0.0	0.0
34121	258	8	8			1	176	0.00	1	176	0.00	10701	0.0	0.0	7090	0.0	0.0
34122	151	8	8			46	324	0.14	46	325	0.14	5435	0.0	0.0	5396	0.0	0.0
34123	145	8	8			44	297	0.15	44	298	0.15	5398	0.0	0.0	5436	0.0	0.0
34124	230	8	8			3	291	0.01	3	291	0.01	5420	0.0	0.0	5398	0.0	0.0
34125	269	8	8			2	688	0.00	2	688	0.00	5421	0.0	0.0	5420	0.0	0.0
34126	218	8	8			1	326	0.00	1	326	0.00	5343	0.0	0.0	5421	0.0	0.0
34127	88	8	8			1	903	0.00	1	905	0.00	5344	0.0	0.0	5421	0.0	0.0
34128	230	8	8			1	679	0.00	1	680	0.00	5419	0.0	0.0	5435	0.0	0.0
34129	76	8	8			1	417	0.00	1	418	0.00	5345	0.0	0.0	5419	0.0	0.0
34130	140	8	8			14	323	0.04	14	323	0.04	5413	0.0	0.0	7091	0.0	0.0
34131	122	8	8			47	413	0.11	47	413	0.11	7091	0.0	0.0	11279	0.0	0.0
34132	128	8	8			6	306	0.02	6	306	0.02	5412	0.0	0.0	5413	0.0	0.0
34133	7	8	8			1	562	0.00	1	563	0.00	7339	0.0	0.0	7091	0.0	0.0
34134	130	8	8			6	565	0.01	6	566	0.01	5407	0.0	0.0	5406	0.0	0.0
34135	75	8	8			1	562	0.00	1	563	0.00	5346	0.0	0.0	5407	0.0	0.0
34136	125	8	8			6	352	0.02	6	352	0.02	5437	0.0	0.0	5412	0.0	0.0
34137	32	8	8			5	470	0.01	5	471	0.01	5438	0.0	0.0	5437	0.0	0.0
34138	75	8	8			3	902	0.00	3	903	0.00	5409	0.0	0.0	5410	0.0	0.0
34140	170	8	8			1	320	0.00	1	321	0.00	5348	0.0	0.0	5410	0.0	0.0
34145	280	8	8			1	1,022	0.00	1	1,024	0.00	5529	0.0	0.0	5492	0.0	0.0
34146	280	8	8			27	579	0.05	27	580	0.05	5492	0.0	0.0	5493	0.0	0.0
34147	298	8	8			190	342	0.55	190	343	0.55	5495	0.0	0.0	5494	0.0	0.0
34148	375	8	8			174	263	0.66	174	263	0.66	5482	0.0	0.0	5495	0.0	0.0
34149	130	8	8			66	647	0.10	66	649	0.10	5496	0.0	0.0	5482	0.0	0.0
34150	285	8	8			40	384	0.10	40	385	0.10	5493	0.0	0.0	5497	0.0	0.0
34151	345	8	8			21	362	0.06	21	362	0.06	5480	0.0	0.0	5481	0.0	0.0
34152	330	8	8			1	365	0.00	1	365	0.00	5483	0.0	0.0	5480	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34153	200	8	8			1	613	0.00	1	614	0.00	7701	0.0	0.0	5483	0.0	0.0
34154	302	6	6			13	200	0.06	13	200	0.06	5498	0.0	0.0	5496	0.0	0.0
34155	300	6	6			12	201	0.06	12	201	0.06	5499	0.0	0.0	5498	0.0	0.0
34156	301	6	6			13	201	0.07	13	201	0.07	5500	0.0	0.0	5497	0.0	0.0
34157	300	6	6			13	200	0.06	13	200	0.06	7343	0.0	0.0	5500	0.0	0.0
34160	303	8	8			1	394	0.00	1	394	0.00	7093	0.0	0.0	5490	0.0	0.0
34161	306	8	8			1	429	0.00	1	430	0.00	5488	0.0	0.0	5529	0.0	0.0
34162	306	8	8			1	429	0.00	1	430	0.00	5489	0.0	0.0	5488	0.0	0.0
34163	155	8	8			208	1,249	0.17	208	1,250	0.17	5502	0.0	0.0	5503	0.0	0.0
34164	155	6	6			28	238	0.12	28	238	0.12	5445	0.0	0.0	7342	0.0	0.0
34165	268	8	8			1	933	0.00	1	934	0.00	5524	0.0	0.0	7342	0.0	0.0
34166	160	6	6			0	211	0.00	0	211	0.00	5446	0.0	0.0	5524	0.0	0.0
34167	160	6	6			0	431	0.00	0	431	0.00	5447	0.0	0.0	5524	0.0	0.0
34168	253	8	8			0	369	0.00	0	370	0.00	5448	0.0	0.0	5479	0.0	0.0
34169	23	8	8			1	1,219	0.00	1	1,222	0.00	5525	0.0	0.0	5479	0.0	0.0
34170	187	8	8			0	374	0.00	0	375	0.00	5455	0.0	0.0	5525	0.0	0.0
34171	279	8	8			0	294	0.00	0	294	0.00	5486	0.0	0.0	5516	0.0	0.0
34172	225	8	8			0	399	0.00	0	400	0.00	5459	0.0	0.0	5526	0.0	0.0
34173	293	8	8			1	687	0.00	1	688	0.00	5527	0.0	0.0	5519	0.0	0.0
34174	301	8	8			1	1,235	0.00	1	1,238	0.00	5528	0.0	0.0	5527	0.0	0.0
34175	81	8	8			1	379	0.00	1	380	0.00	5534	0.0	0.0	5489	0.0	0.0
34176	280	8	8			29	702	0.04	29	703	0.04	7342	0.0	0.0	5523	0.0	0.0
34177	145	8	8			30	546	0.05	30	547	0.05	5523	0.0	0.0	5477	0.0	0.0
34178	25	8	8			31	372	0.08	31	372	0.08	7092	0.0	0.0	5476	0.0	0.0
34179	46	8	8			31	367	0.08	31	368	0.08	5476	0.0	0.0	5475	0.0	0.0
34180	34	8	8			31	514	0.06	31	515	0.06	5475	0.0	0.0	5474	0.0	0.0
34181	262	8	8			31	359	0.09	31	360	0.09	5474	0.0	0.0	5510	0.0	0.0
34182	98	8	8			72	939	0.08	72	940	0.08	5458	0.0	0.0	7344	0.0	0.0
34183	240	8	8			74	881	0.08	74	883	0.08	7344	0.0	0.0	5522	0.0	0.0
34184	116	8	8			74	1,045	0.07	74	1,047	0.07	5522	0.0	0.0	5521	0.0	0.0
34185	250	8	8			90	415	0.22	90	416	0.22	5521	0.0	0.0	5473	0.0	0.0
34186	116	8	8			90	488	0.18	90	489	0.18	5473	0.0	0.0	5472	0.0	0.0
34187	105	8	8			90	944	0.10	90	945	0.10	5472	0.0	0.0	7156	0.0	0.0
34188	350	8	8			692	1,097	0.63	692	1,099	0.63	5456	0.0	0.0	5471	0.0	0.0
34189	62	10	10			672	716	0.94	672	715	0.94	5470	0.0	0.0	5456	0.0	0.0
34190	477	10	10			672	748	0.90	672	747	0.90	5454	0.0	0.0	5470	0.0	0.0
34191	450	8	8			0	533	0.00	0	533	0.00	5457	0.0	0.0	5469	0.0	0.0
34192	15	6	6			1	820	0.00	1	820	0.00	5520	0.0	0.0	7343	0.0	0.0
34193	282	8	8			351	1,040	0.34	351	1,042	0.34	5519	0.0	0.0	5518	0.0	0.0
34194	427	8	8			209	635	0.33	209	635	0.33	5487	0.0	0.0	5518	0.0	0.0
34195	280	8	8			576	808	0.71	576	810	0.71	5518	0.0	0.0	5504	0.0	0.0
34197	280	10	10			576	1,708	0.34	576	1,707	0.34	5504	0.0	0.0	5515	0.0	0.0
34198	305	8	8			15	292	0.05	15	292	0.05	5516	0.0	0.0	5535	0.0	0.0
34199	322	15	15			576	1,238	0.47	576	1,238	0.47	5515	0.0	0.0	5514	0.0	0.0
34200	331	15	15			590	598	0.99	590	598	0.99	5514	0.0	0.0	5453	0.0	0.0
34201	176	8	8			13	371	0.03	13	371	0.03	5513	0.0	0.0	5478	0.0	0.0
34202	202	8	8			27	419	0.06	27	420	0.06	5535	0.0	0.0	5478	0.0	0.0
34203	82	8	8			40	194	0.21	40	195	0.21	5478	0.0	0.0	5453	0.0	0.0
34204	321	8	8			91	966	0.09	91	967	0.09	7156	0.0	0.0	5512	0.0	0.0
34205	96	10	10			524	585	0.89	515	585	0.88	5463	2.2	0.0	8982	1.8	0.0
34206	176	10	10			515	1,205	0.43	515	1,203	0.43	5465	0.0	0.0	5464	0.0	0.0
34207	175	10	10			515	1,490	0.35	514	1,488	0.35	5451	0.0	0.0	5465	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34208	450	8	8			729	1,189	0.61	729	1,190	0.61	5471	0.0	0.0	5451	0.0	0.0
34209	181	8	8			116	967	0.12	116	968	0.12	5512	0.0	0.0	5511	0.0	0.0
34210	444	10	10			399	603	0.66	399	602	0.66	5511	0.0	0.0	7591	0.0	0.0
34211	151	10	10			399	549	0.73	399	548	0.73	7591	0.0	0.0	5450	0.0	0.0
34212	128	8	8			32	503	0.06	32	504	0.06	5510	0.0	0.0	5509	0.0	0.0
34213	148	8	8			32	603	0.05	32	604	0.05	5509	0.0	0.0	5508	0.0	0.0
34214	301	8	8			32	970	0.03	32	972	0.03	5508	0.0	0.0	5450	0.0	0.0
34215	172	10	10			502	635	0.79	502	634	0.79	5450	0.0	0.0	5506	0.0	0.0
34216	302	8	8			0	293	0.00	0	293	0.00	5507	0.0	0.0	7592	0.0	0.0
34217	302	8	8			15	529	0.03	15	530	0.03	7592	0.0	0.0	5449	0.0	0.0
34218	483	8	8			0	372	0.00	0	372	0.00	7593	0.0	0.0	5467	0.0	0.0
34219	280	8	8			0	588	0.00	0	588	0.00	5505	0.0	0.0	7419	0.0	0.0
34220	303	8	8			17	453	0.04	17	453	0.04	7419	0.0	0.0	5466	0.0	0.0
34221	354	8	8			15	425	0.04	15	425	0.04	5484	0.0	0.0	5460	0.0	0.0
34222	275	15	15			660	1,405	0.47	660	1,405	0.47	5460	0.0	0.0	5466	0.0	0.0
34223	90	15	15			678	1,405	0.48	678	1,405	0.48	5466	0.0	0.0	7341	0.0	0.0
34224	108	18	18			1,205	2,026	0.59	1,206	2,026	0.59	5467	0.0	0.0	5468	0.0	0.0
34225	360	18	18			1,206	1,941	0.62	1,206	1,941	0.62	5468	0.0	0.0	5461	0.0	0.0
34226	291	8	8			0	588	0.00	0	588	0.00	7094	0.0	0.0	5461	0.0	0.0
34227	105	6	6			1	167	0.00	1	167	0.00	5536	0.0	0.0	5481	0.0	0.0
34228	423	8	8			22	397	0.05	22	397	0.05	5481	0.0	0.0	5537	0.0	0.0
34229	24	8	8			22	415	0.05	22	416	0.05	5537	0.0	0.0	5494	0.0	0.0
34237	438	12	12			1	478	0.00	1	478	0.00	5544	0.0	0.0	5576	0.0	0.0
34238	212	8	8			1	415	0.00	1	416	0.00	5563	0.0	0.0	5564	0.0	0.0
34239	241	8	8			1	415	0.00	1	415	0.00	5562	0.0	0.0	5563	0.0	0.0
34240	177	8	8			1	412	0.00	1	413	0.00	5580	0.0	0.0	5562	0.0	0.0
34241	65	8	8			0	443	0.00	0	444	0.00	7702	0.0	0.0	5580	0.0	0.0
34242	385	18	18			1,336	2,178	0.61	1,336	2,178	0.61	7595	0.0	0.0	5581	0.0	0.0
34243	370	18	18			1,335	4,576	0.29	1,335	4,576	0.29	7195	0.0	0.0	7595	0.0	0.0
34244	276	18	18			1,233	4,550	0.27	1,233	4,550	0.27	5579	0.0	0.0	7195	0.0	0.0
34245	179	18	18			1,233	4,597	0.27	1,233	4,597	0.27	5565	0.0	0.0	5579	0.0	0.0
34246	375	18	18			1,233	2,238	0.55	1,233	2,238	0.55	7594	0.0	0.0	5565	0.0	0.0
34247	70	18	18			1,232	2,025	0.61	1,232	2,025	0.61	5552	0.0	0.0	7594	0.0	0.0
34248	450	8	8			1	369	0.00	1	370	0.00	5553	0.0	0.0	7594	0.0	0.0
34249	436	10	15	16	2036	768	564	1.36	768	1,662	0.46	5559	3.1	0.0	5557	0.0	0.0
34250	427	10	15	16	2036	767	563	1.36	767	1,658	0.46	5560	2.7	0.0	5559	3.1	0.0
34251	302	10	15	16	2036	683	578	1.18	682	1,705	0.40	7345	6.5	0.0	5560	2.7	0.0
34252	312	10	15	16	2036	682	582	1.17	681	1,715	0.40	5555	4.0	0.0	7345	6.5	0.0
34253	243	6	6			1	261	0.01	1	261	0.01	5569	0.0	0.0	5568	0.0	0.0
34254	250	8	8			46	599	0.08	46	599	0.08	5582	0.0	0.0	5570	8.2	0.0
34255	229	6	6			0	335	0.00	0	335	0.00	5551	0.0	0.0	5570	8.2	0.0
34256	365	8	8			49	382	0.13	49	382	0.13	5561	4.3	0.0	5560	2.7	0.0
34257	422	8	8			1	371	0.00	0	372	0.00	5554	0.0	0.0	5555	4.0	0.0
34258	205	10	10			681	653	1.04	681	653	1.04	5556	1.4	0.0	5555	4.0	0.0
34259	355	18	18			1,378	2,219	0.62	1,378	2,219	0.62	5583	0.0	0.0	5557	0.0	0.0
34260	400	18	18			1,378	1,945	0.71	1,378	1,945	0.71	5564	0.0	0.0	5583	0.0	0.0
34261	189	6	6			1	230	0.00	1	230	0.00	5546	0.0	0.0	5569	0.0	0.0
34262	711	24	24			4,219	5,829	0.72	6,460	5,829	1.11	5594	0.0	10.5	7596	0.0	0.0
34263	545	24	24			4,219	5,828	0.72	6,460	5,828	1.11	7420	0.0	7.4	5594	0.0	10.5
34264	331	24	24			4,127	5,825	0.71	6,374	5,825	1.09	5584	0.0	5.1	7420	0.0	7.4
34265	292	24	24			4,126	5,853	0.70	6,371	5,853	1.09	5585	0.0	6.3	5584	0.0	5.1
34266	264	24	24			4,126	5,833	0.71	6,371	5,833	1.09	5586	0.0	5.9	5585	0.0	6.3

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34267	558	24	24			4,005	5,833	0.69	6,253	5,833	1.07	5577	0.0	9.6	5586	0.0	5.9
34268	258	8	8			486	638	0.76	1	640	0.00	5567	8.5	0.0	5566	7.9	0.0
34269	446	12	12			2	566	0.00	2	566	0.00	5574	0.0	0.0	5572	0.0	0.0
34270	399	12	12			1	567	0.00	1	567	0.00	5576	0.0	0.0	5574	0.0	0.0
34271	75	16	16			676	3,323	0.20	211	3,321	0.06	5573	0.0	0.0	5571	0.0	0.0
34272	605	16	16			26	3,056	0.01	26	3,053	0.01	5575	0.0	0.0	5573	0.0	0.0
34273	358	16	16			795	2,996	0.27	330	2,994	0.11	5571	0.0	0.0	5587	0.0	0.0
34274	405	12	12			3	963	0.00	3	963	0.00	5572	0.0	0.0	5587	0.0	0.0
34275	207	16	16			877	3,188	0.28	413	3,186	0.13	5587	0.0	0.0	5588	0.0	0.0
34276	116	8	8			1	689	0.00	1	690	0.00	5589	0.0	0.0	5588	0.0	0.0
34277	42	18	18			2,176	2,229	0.98	2,176	2,229	0.98	5557	0.0	0.0	5558	0.0	0.0
34278	352	54	54			15,819	105,410	0.15	17,148	105,410	0.16	5549	0.0	0.0	5548	0.0	0.0
34279	1423	54	54			15,819	35,252	0.45	17,148	35,252	0.49	5548	0.0	0.0	5547	0.0	0.0
34281	221	8	8			1	297	0.00	1	297	0.00	5614	0.0	0.0	5633	0.0	0.0
34282	410	8	8			1	322	0.00	1	322	0.00	5632	0.0	0.0	7421	0.0	0.0
34283	242	8	8			64	242	0.26	64	242	0.26	7095	0.0	0.0	5629	0.0	0.0
34284	218	8	8			23	188	0.12	23	189	0.12	5633	0.0	0.0	7095	0.0	0.0
34285	370	8	8			41	281	0.15	41	281	0.15	5634	0.0	0.0	7095	0.0	0.0
34286	260	8	8			40	281	0.14	40	281	0.14	7157	0.0	0.0	5634	0.0	0.0
34287	140	8	8			1	294	0.00	1	295	0.00	5631	0.0	0.0	7157	0.0	0.0
34288	147	8	8			1	470	0.00	1	471	0.00	7703	0.0	0.0	5636	0.0	0.0
34289	220	8	8			65	226	0.29	65	226	0.29	5629	0.0	0.0	7347	0.0	0.0
34290	45	8	8			67	358	0.19	67	358	0.19	7347	0.0	0.0	5637	0.0	0.0
34291	106	8	8			68	250	0.27	68	251	0.27	5637	0.0	0.0	5628	0.0	0.0
34292	430	8	8			1	462	0.00	1	463	0.00	5638	0.0	0.0	5629	0.0	0.0
34293	405	8	8			1	240	0.00	1	240	0.00	5630	0.0	0.0	5639	0.0	0.0
34294	335	8	8			1	272	0.00	1	272	0.00	5641	0.0	0.0	5640	0.0	0.0
34295	305	12	18	19	Existing	1,094	736	1.49	1,797	2,169	0.83	7598	6.2	0.0	5642	4.7	0.0
34296	33	8	8			1	283	0.00	1	284	0.00	5660	0.0	0.0	7346	0.0	0.0
34297	29	8	8			1	302	0.00	1	303	0.00	5659	0.0	0.0	7346	0.0	0.0
34298	250	8	8			69	251	0.27	69	251	0.27	5628	0.0	0.0	5627	0.0	0.0
34299	55	8	8			133	253	0.53	133	254	0.52	5627	0.0	0.0	5626	0.0	0.0
34300	80	8	8			1	235	0.00	1	235	0.00	5643	0.0	0.0	5626	0.0	0.0
34301	500	8	8			135	235	0.57	135	235	0.57	5626	0.0	0.0	5625	0.0	0.0
34302	455	18	18			137	2,150	0.06	137	2,150	0.06	5624	0.0	0.0	5616	0.0	0.0
34303	153	18	18			136	2,643	0.05	136	2,643	0.05	5625	0.0	0.0	5624	0.0	0.0
34304	368	18	18			1	2,777	0.00	1	2,777	0.00	5623	0.0	0.0	5606	0.0	0.0
34305	139	8	8			85	345	0.25	85	346	0.24	7421	0.0	0.0	5617	0.0	0.0
34306	195	8	8			87	391	0.22	87	392	0.22	5617	0.0	0.0	5645	0.0	0.0
34307	458	18	18			2,177	2,981	0.73	2,177	2,981	0.73	5646	0.0	0.0	5653	0.0	0.0
34308	455	18	18			2,177	2,557	0.85	2,177	2,557	0.85	5647	0.0	0.0	5646	0.0	0.0
34309	485	10	10			415	376	1.10	415	376	1.11	7597	0.0	0.0	5653	0.0	0.0
34310	445	10	10			314	378	0.83	314	378	0.83	5622	0.0	0.0	7597	0.0	0.0
34311	73	10	10			313	564	0.56	313	563	0.56	5607	0.0	0.0	5622	0.0	0.0
34312	357	10	10			283	333	0.85	283	333	0.85	5618	0.0	0.0	5607	0.0	0.0
34313	388	10	10			283	383	0.74	283	383	0.74	5648	0.0	0.0	5618	0.0	0.0
34314	286	8	8			78	342	0.23	78	343	0.23	5612	0.0	0.0	5613	0.0	0.0
34315	143	8	8			2	529	0.00	2	530	0.00	5609	0.0	0.0	5612	0.0	0.0
34316	162	8	8			1	490	0.00	1	490	0.00	5610	0.0	0.0	5609	0.0	0.0
34317	403	8	8			30	382	0.08	30	383	0.08	5621	0.0	0.0	5607	0.0	0.0
34318	322	8	8			2	373	0.01	2	373	0.01	5619	0.0	0.0	5612	0.0	0.0
34319	123	8	8			1	346	0.00	1	347	0.00	5649	0.0	0.0	5619	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34320	117	8	8			1	333	0.00	1	333	0.00	5651	0.0	0.0	5650	0.0	0.0
34321	155	6	6			1	207	0.00	1	207	0.00	5601	0.0	0.0	5651	0.0	0.0
34322	464	8	8			1	345	0.00	1	346	0.00	5611	0.0	0.0	5612	0.0	0.0
34323	25	8	8			1	391	0.00	1	392	0.00	5656	0.0	0.0	5611	0.0	0.0
34324	57	8	8			1	329	0.00	1	330	0.00	5652	0.0	0.0	5620	0.0	0.0
34327	100	8	8			1	364	0.00	1	365	0.00	5640	0.0	0.0	5639	0.0	0.0
34328	20	8	8			79	601	0.13	79	601	0.13	5613	0.0	0.0	8942	0.0	0.0
34332	57	18	18			2,541	11,559	0.22	2,541	11,559	0.22	5653	0.0	0.0	5608	0.0	0.0
34333	715	54	54			15,819	48,736	0.32	17,149	48,736	0.35	5604	0.0	0.0	5608	0.0	0.0
34334	718	54	54			18,346	46,583	0.39	19,679	46,583	0.42	5608	0.0	0.0	5603	0.0	0.0
34335	610	54	54			18,347	70,575	0.26	19,679	70,575	0.28	5603	0.0	0.0	5602	0.0	0.0
34338	384	8	8			194	582	0.33	194	583	0.33	5691	0.0	0.0	5690	0.0	0.0
34339	136	12	18	19	Existing	850	713	1.19	1,478	2,102	0.70	5697	3.1	0.0	5709	3.6	0.0
34340	405	10	15	19	Existing	781	1,026	0.76	1,409	3,025	0.47	5696	0.0	0.0	5697	3.1	0.0
34341	405	10	15	19	Existing	780	933	0.84	1,408	2,753	0.51	5695	0.0	0.0	5696	0.0	0.0
34342	420	10	15	19	Existing	588	933	0.63	1,217	2,753	0.44	5694	0.0	0.0	5695	0.0	0.0
34343	400	8	8			1	292	0.00	1	292	0.00	5700	0.0	0.0	5698	3.0	0.0
34344	350	8	8			191	390	0.49	191	390	0.49	5693	0.0	0.0	5695	0.0	0.0
34345	300	8	8			58	307	0.19	58	308	0.19	7350	0.0	0.0	5693	0.0	0.0
34346	100	8	8			57	504	0.11	57	505	0.11	5692	0.0	0.0	7350	0.0	0.0
34347	455	8	8			56	460	0.12	56	460	0.12	5703	0.0	0.0	5692	0.0	0.0
34348	162	8	8			47	528	0.09	47	528	0.09	5688	0.0	0.0	5712	0.0	0.0
34349	135	8	8			1	472	0.00	1	472	0.00	7600	0.0	0.0	5712	0.0	0.0
34350	102	8	8			1	494	0.00	1	495	0.00	5713	0.0	0.0	7600	0.0	0.0
34351	250	8	8			46	699	0.07	46	700	0.07	5687	0.0	0.0	5688	0.0	0.0
34352	393	10	15	19	Existing	588	449	1.31	1,216	1,324	0.92	5686	14.0	0.0	5694	0.0	0.0
34353	250	10	15	19	Existing	588	520	1.13	1,215	1,533	0.79	7599	9.5	0.0	5686	14.0	0.0
34354	297	10	15	19	Existing	586	512	1.15	1,215	1,508	0.81	5672	0.0	0.0	7599	9.5	0.0
34355	178	8	15	19	Existing	585	297	1.97	1,215	1,587	0.77	5673	0.0	0.0	5672	0.0	0.0
34356	312	8	8			3	414	0.01	3	415	0.01	5684	0.0	0.0	5703	0.0	0.0
34357	213	8	8			1	410	0.00	1	410	0.00	5685	0.0	0.0	5684	0.0	0.0
34358	435	8	8			1	302	0.00	1	303	0.00	5716	0.0	0.0	5715	0.0	0.0
34359	78	8	8			1	958	0.00	1	960	0.00	5683	0.0	0.0	5715	0.0	0.0
34360	282	8	8			1	1,231	0.00	1	1,233	0.00	5717	0.0	0.0	5683	0.0	0.0
34361	210	8	8			41	1,121	0.04	41	1,122	0.04	5676	0.0	0.0	5677	1.0	0.0
34362	265	8	8			40	941	0.04	40	942	0.04	5682	0.0	0.0	5676	0.0	0.0
34363	186	8	8			1	574	0.00	1	574	0.00	5681	0.0	0.0	5682	0.0	0.0
34364	170	8	8			1	865	0.00	1	866	0.00	7348	0.0	0.0	5678	0.0	0.0
34365	70	8	8			1	1,506	0.00	1	1,508	0.00	5730	0.0	0.0	5679	0.0	0.0
34366	208	8	8			183	342	0.53	183	343	0.53	7158	0.0	0.0	5699	0.0	0.0
34367	92	8	8			183	1,057	0.17	183	1,058	0.17	5718	0.0	0.0	7158	0.0	0.0
34368	357	8	8			113	351	0.32	113	352	0.32	5721	0.0	0.0	5720	0.0	0.0
34369	10	8	8			113	2,649	0.04	113	2,652	0.04	5720	0.0	0.0	5719	0.0	0.0
34370	365	8	8			25	370	0.07	25	371	0.07	5674	0.0	0.0	5675	0.0	0.0
34371	66	8	8			1	369	0.00	1	369	0.00	7349	0.0	0.0	5674	0.0	0.0
34372	135	8	8			0	382	0.00	0	383	0.00	5702	0.0	0.0	7349	0.0	0.0
34373	46	8	8			1	697	0.00	1	698	0.00	5729	0.0	0.0	5723	0.0	0.0
34374	234	8	8			112	419	0.27	112	420	0.27	5705	0.0	0.0	5721	0.0	0.0
34375	141	8	8			25	737	0.03	25	738	0.03	5704	0.0	0.0	5705	0.0	0.0
34376	220	8	8			25	1,172	0.02	25	1,173	0.02	5662	0.0	0.0	5704	0.0	0.0
34377	335	8	8			24	372	0.07	24	372	0.07	5724	0.0	0.0	5674	0.0	0.0
34378	69	8	8			94	806	0.12	94	808	0.12	5725	0.0	0.0	5724	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34379	425	8	8			71	633	0.11	71	634	0.11	5726	0.0	0.0	5725	0.0	0.0
34380	187	8	8			53	675	0.08	53	676	0.08	5708	0.0	0.0	5726	0.0	0.0
34381	213	8	8			0	1,088	0.00	0	1,090	0.00	5665	0.0	0.0	5708	0.0	0.0
34382	266	8	8			70	643	0.11	70	644	0.11	5724	0.0	0.0	5705	0.0	0.0
34389	100	8	8			38	504	0.08	38	505	0.08	5733	0.0	0.0	5732	0.0	0.0
34390	149	8	8			38	506	0.08	38	507	0.08	5732	0.0	0.0	5731	0.0	0.0
34392	81	8	8			1	356	0.00	1	356	0.00	5752	0.0	0.0	5751	0.0	0.0
34393	468	8	8			306	683	0.45	306	684	0.45	5750	0.0	0.0	5751	0.0	0.0
34394	473	8	8			258	406	0.64	258	407	0.63	5794	0.0	0.0	5750	0.0	0.0
34396	373	8	8			258	606	0.43	258	606	0.42	7351	0.0	0.0	5794	0.0	0.0
34397	400	8	8			186	406	0.46	186	406	0.46	5748	0.0	0.0	7351	0.0	0.0
34398	62	8	8			1	267	0.00	1	267	0.00	5753	0.0	0.0	5754	0.0	0.0
34399	140	8	8			31	344	0.09	31	344	0.09	5795	0.0	0.0	5754	0.0	0.0
34400	200	6	6			13	218	0.06	13	218	0.06	7705	0.0	0.0	5795	0.0	0.0
34401	260	8	8			17	470	0.04	17	471	0.04	5796	0.0	0.0	5795	0.0	0.0
34402	190	6	6			16	309	0.05	16	309	0.05	5736	0.0	0.0	5796	0.0	0.0
34403	133	8	8			31	251	0.12	31	251	0.12	5754	0.0	0.0	5760	0.0	0.0
34404	253	8	8			90	313	0.29	90	313	0.29	5766	0.0	0.0	5760	0.0	0.0
34405	265	8	8			1	397	0.00	1	397	0.00	5759	0.0	0.0	5760	0.0	0.0
34406	180	8	8			27	364	0.07	27	365	0.07	5765	0.0	0.0	5766	0.0	0.0
34407	200	8	8			63	457	0.14	63	458	0.14	5764	0.0	0.0	5766	0.0	0.0
34408	277	8	8			23	415	0.06	23	416	0.06	7097	0.0	0.0	5764	0.0	0.0
34409	270	8	8			39	365	0.11	39	366	0.11	5762	0.0	0.0	5763	0.0	0.0
34410	400	8	8			335	297	1.13	335	298	1.12	5770	5.6	5.6	5775	4.9	4.9
34411	410	8	8			334	294	1.14	334	294	1.14	7352	4.3	4.3	5770	5.6	5.6
34412	445	8	8			333	576	0.58	333	576	0.58	5746	0.0	0.0	7352	4.3	4.3
34414	304	8	8			123	303	0.41	123	303	0.41	5760	0.0	0.0	5756	0.0	0.0
34415	334	8	8			124	304	0.41	124	305	0.41	5756	0.0	0.0	5757	0.0	0.0
34416	270	8	8			124	317	0.39	124	317	0.39	5757	0.0	0.0	5797	0.0	0.0
34417	241	8	8			1	446	0.00	1	447	0.00	5798	0.0	0.0	5797	0.0	0.0
34418	255	8	8			1	437	0.00	1	438	0.00	5758	0.0	0.0	5798	0.0	0.0
34419	125	8	8			192	210	0.91	192	210	0.91	7602	0.0	0.0	5755	0.0	0.0
34420	35	8	8			193	210	0.92	193	210	0.92	5755	0.0	0.0	5776	0.0	0.0
34421	360	8	8			335	794	0.42	335	796	0.42	7603	0.0	0.0	5776	0.0	0.0
34422	79	8	8			200	579	0.35	200	580	0.34	5773	0.0	0.0	5776	0.0	0.0
34423	115	8	8			730	874	0.84	730	875	0.83	5776	0.0	0.0	5777	0.0	0.0
34424	223	6	6			1	179	0.00	1	179	0.00	5737	0.0	0.0	5778	0.0	0.0
34425	216	8	8			1	333	0.00	1	333	0.00	7353	0.0	0.0	5745	0.0	0.0
34426	103	8	8			252	297	0.85	252	297	0.85	5791	0.0	0.0	5741	0.0	0.0
34427	136	8	8			1	297	0.00	1	297	0.00	5783	0.0	0.0	5782	0.0	0.0
34428	230	8	8			1	296	0.00	1	296	0.00	5782	0.0	0.0	5792	0.0	0.0
34429	210	8	8			2	781	0.00	2	782	0.00	5799	0.0	0.0	5787	0.0	0.0
34430	79	8	8			1	299	0.00	1	299	0.00	7736	0.0	0.0	5799	0.0	0.0
34431	180	8	8			1	793	0.00	1	794	0.00	5788	0.0	0.0	5799	0.0	0.0
34432	415	8	8			1	297	0.00	1	298	0.00	5781	0.0	0.0	5780	0.0	0.0
34433	140	8	8			48	269	0.18	48	270	0.18	5779	0.0	0.0	7098	0.0	0.0
34434	160	8	8			49	340	0.14	49	341	0.14	7098	0.0	0.0	5800	0.0	0.0
34435	310	8	8			2	705	0.00	2	706	0.00	5771	0.0	0.0	5742	0.0	0.0
34436	194	8	8			52	402	0.13	52	403	0.13	5742	0.0	0.0	5772	0.0	0.0
34437	116	8	8			53	209	0.25	53	210	0.25	5772	0.0	0.0	5743	0.0	0.0
34438	500	8	8			31	648	0.05	31	649	0.05	5774	0.0	0.0	5743	0.0	0.0
34439	253	8	8			199	292	0.68	199	293	0.68	5743	0.0	0.0	5773	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34440	300	8	8			294	297	0.99	294	298	0.99	5749	0.0	0.0	5746	0.0	0.0
34441	300	8	8			294	333	0.88	294	334	0.88	5744	0.0	0.0	5749	0.0	0.0
34442	125	8	8			293	364	0.81	293	365	0.80	5801	0.0	0.0	5744	0.0	0.0
34443	83	6	6			1	208	0.00	1	208	0.00	5822	0.0	0.0	5769	0.0	0.0
34444	90	8	8			1	297	0.00	1	298	0.00	5821	0.0	0.0	5769	0.0	0.0
34445	500	8	8			1	444	0.00	1	444	0.00	5802	0.0	0.0	5771	0.0	0.0
34446	485	8	8			1	510	0.00	1	510	0.00	5767	0.0	0.0	5802	0.0	0.0
34447	148	8	8			41	299	0.14	41	300	0.14	5786	0.0	0.0	5787	0.0	0.0
34448	235	8	8			1	566	0.00	1	567	0.00	5803	0.0	0.0	5786	0.0	0.0
34449	45	8	8			1	1,865	0.00	1	1,868	0.00	5804	0.0	0.0	5803	0.0	0.0
34450	220	8	8			39	317	0.12	39	317	0.12	5785	0.0	0.0	5786	0.0	0.0
34451	280	8	8			38	569	0.07	38	569	0.07	7196	0.0	0.0	5785	0.0	0.0
34452	140	8	8			1	692	0.00	1	692	0.00	5784	0.0	0.0	7196	0.0	0.0
34453	235	8	8			1	749	0.00	1	750	0.00	5789	0.0	0.0	5790	0.0	0.0
34454	75	8	8			44	297	0.15	44	298	0.15	5805	0.0	0.0	5790	0.0	0.0
34455	444	8	8			4	484	0.01	4	485	0.01	5806	0.0	0.0	5805	0.0	0.0
34456	500	8	8			37	126	0.29	28	126	0.23	5856	1.0	0.0	5824	1.0	0.0
34457	500	8	8			76	199	0.38	69	199	0.35	5824	1.0	0.0	5858	0.0	0.0
34458	320	8	8			4	508	0.01	3	509	0.01	5857	0.0	0.0	5825	0.0	0.0
34460	100	8	8			135	374	0.36	135	374	0.36	5878	0.0	0.0	5847	0.0	0.0
34462	239	8	8			412	402	1.02	65	403	0.16	5852	0.0	0.0	5853	0.2	0.0
34463	200	8	8			41	403	0.10	19	403	0.05	5851	1.7	0.0	5879	0.1	0.0
34464	158	8	8			412	415	0.99	44	415	0.11	5850	0.6	0.0	5879	0.1	0.0
34465	202	8	8			411	408	1.01	43	409	0.11	5849	0.4	0.0	5850	0.6	0.0
34466	200	6	6			26	188	0.14	15	188	0.08	5832	2.2	0.0	5849	0.4	0.0
34467	280	8	8			396	402	0.98	27	402	0.07	5848	0.8	0.0	5849	0.4	0.0
34468	223	6	6			34	188	0.18	26	188	0.14	5831	1.6	0.0	5848	0.8	0.0
34469	372	8	8			38	403	0.09	1	403	0.00	5880	5.2	0.0	5852	0.0	0.0
34470	242	8	8			1	1,272	0.00	1	1,274	0.00	5855	0.0	0.0	5854	4.5	0.0
34471	203	8	8			1	454	0.00	1	455	0.00	5829	0.0	0.0	5844	3.3	0.0
34472	504	8	8			173	350	0.49	173	350	0.49	5845	0.0	0.0	5844	3.3	0.0
34473	138	8	8			3	549	0.01	3	549	0.01	5875	0.0	0.0	5846	0.0	0.0
34474	88	8	8			2	622	0.00	2	624	0.00	5874	0.0	0.0	5875	0.0	0.0
34475	260	8	8			1	417	0.00	1	417	0.00	5876	0.0	0.0	5874	0.0	0.0
34476	87	8	8			1	461	0.00	1	462	0.00	5873	0.0	0.0	5874	0.0	0.0
34477	200	6	6			1	231	0.00	1	231	0.00	5830	0.0	0.0	5875	0.0	0.0
34478	32	8	8			1	439	0.00	1	440	0.00	5892	0.0	0.0	5846	0.0	0.0
34479	499	8	8			135	406	0.33	135	406	0.33	5847	0.0	0.0	5846	0.0	0.0
34480	378	8	8			1	405	0.00	1	406	0.00	5877	0.0	0.0	5878	0.0	0.0
34483	84	8	8			104	360	0.29	104	360	0.29	5841	0.0	0.0	5834	0.0	0.0
34486	274	10	10			49	623	0.08	49	622	0.08	5882	0.0	0.0	5841	0.0	0.0
34487	259	8	8			94	299	0.32	92	300	0.31	5884	6.3	0.0	5837	5.3	0.0
34488	51	8	8			94	309	0.31	91	309	0.29	5869	6.5	0.0	5884	6.3	0.0
34490	65	8	8			1	297	0.00	1	298	0.00	5895	0.0	0.0	7422	0.0	0.0
34491	562	24	24			2,077	5,392	0.39	3,152	5,392	0.58	5872	0.0	0.0	7100	0.0	0.0
34494	475	15	21	20	Existing	1,938	1,124	1.72	3,013	2,756	1.09	7355	5.7	0.0	5872	0.0	0.0
34500	268	10	15	18	Existing	513	386	1.33	885	1,138	0.78	5827	8.5	0.0	5866	8.2	0.0
34501	30	8	15	18	Existing	513	210	2.44	885	1,124	0.79	5867	8.3	0.0	5827	8.5	0.0
34503	360	8	8			369	404	0.91	1	405	0.00	5859	1.4	0.0	7604	0.4	0.0
34504	257	8	8			370	408	0.91	1	408	0.00	7604	0.4	0.0	5848	0.8	0.0
34505	203	8	8			92	417	0.22	92	418	0.22	5861	0.0	0.0	5878	0.0	0.0
34506	40	8	8			1	453	0.00	1	454	0.00	5891	0.0	0.0	5861	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34507	163	8	8			91	385	0.24	91	386	0.24	5862	0.0	0.0	5861	0.0	0.0
34508	62	8	8			1	401	0.00	1	401	0.00	5893	0.0	0.0	5863	0.0	0.0
34509	25	8	8			1	515	0.00	1	516	0.00	5894	0.0	0.0	5863	0.0	0.0
34510	280	54	54			20,555	48,916	0.42	22,960	48,916	0.47	5834	0.0	0.0	5826	0.0	0.0
34512	549	54	54			18,347	84,821	0.22	19,680	84,821	0.23	5836	0.0	0.0	5835	0.0	0.0
34520	37	8	8			7	459	0.02	7	460	0.02	5925	0.0	0.0	7356	0.0	0.0
34521	211	15	15			1,297	3,531	0.37	1,297	3,531	0.37	7356	0.0	0.0	5909	0.0	0.0
34522	218	8	8			6	465	0.01	6	466	0.01	5900	0.0	0.0	5925	0.0	0.0
34523	208	8	8			6	415	0.01	6	415	0.01	5908	0.0	0.0	5900	0.0	0.0
34524	460	15	15			1,297	2,831	0.46	1,297	2,831	0.46	5909	0.0	0.0	5910	0.0	0.0
34525	93	15	15			1,298	10,981	0.12	1,298	10,981	0.12	5910	0.0	0.0	5926	9.2	0.0
34526	355	15	15			1,339	1,667	0.80	1,338	1,667	0.80	7197	7.6	0.0	5927	6.5	0.0
34527	7	8	8			325	685	0.47	324	686	0.47	5928	6.4	0.0	5927	6.5	0.0
34528	148	8	8			324	405	0.80	324	406	0.80	5911	6.5	0.0	5928	6.4	0.0
34529	283	8	8			324	405	0.80	323	406	0.80	5929	3.6	0.0	5911	6.5	0.0
34530	360	8	8			496	481	1.03	163	482	0.34	5930	2.4	0.0	5927	6.5	0.0
34531	173	8	8			469	480	0.98	132	481	0.27	5905	2.0	0.0	5930	2.4	0.0
34532	183	8	8			468	510	0.92	131	511	0.26	5906	5.7	0.0	5905	2.0	0.0
34533	302	8	8			467	410	1.14	130	411	0.32	5931	1.8	0.0	5906	5.7	0.0
34534	91	8	8			1	1,310	0.00	1	1,313	0.00	7706	0.0	0.0	7102	0.0	0.0
34535	460	8	8			1	408	0.00	1	408	0.00	5907	0.0	0.0	5908	0.0	0.0
34550	812	16	21	21	2036	2,217	1,278	1.74	1,899	2,638	0.72	5936	1.9	0.0	7606	2.1	0.0
34551	350	16	21	21	2036	2,145	1,269	1.69	1,827	2,619	0.70	5927	6.5	0.0	5936	1.9	0.0
34558	156	8	8			1	1,315	0.00	1	1,317	0.00	5949	0.0	0.0	5971	0.0	0.0
34559	128	8	8			1	405	0.00	1	405	0.00	5959	0.0	0.0	5960	0.0	0.0
34560	438	8	8			25	573	0.04	25	574	0.04	5960	0.0	0.0	5984	0.0	0.0
34561	74	8	8			2	408	0.01	2	408	0.01	5986	0.0	0.0	7358	0.0	0.0
34562	258	8	8			1	455	0.00	1	456	0.00	7609	0.0	0.0	5986	0.0	0.0
34563	150	8	8			1	468	0.00	1	469	0.00	7707	0.0	0.0	7609	0.0	0.0
34564	199	8	8			1	454	0.00	1	455	0.00	5985	0.0	0.0	7358	0.0	0.0
34565	258	8	8			1	455	0.00	1	456	0.00	5987	0.0	0.0	5985	0.0	0.0
34566	142	8	8			38	450	0.08	38	451	0.08	6002	0.0	0.0	5992	0.0	0.0
34567	37	8	8			37	408	0.09	37	408	0.09	6003	0.0	0.0	6002	0.0	0.0
34568	108	8	8			4	458	0.01	4	458	0.01	7358	0.0	0.0	6003	0.0	0.0
34569	260	8	8			40	493	0.08	40	494	0.08	5992	0.0	0.0	5991	0.0	0.0
34570	90	8	8			1	492	0.00	1	492	0.00	5993	0.0	0.0	5992	0.0	0.0
34571	280	8	8			158	568	0.28	158	569	0.28	5996	0.0	0.0	5998	0.0	0.0
34572	260	8	8			103	711	0.15	103	712	0.15	5995	0.0	0.0	5996	0.0	0.0
34573	197	8	8			24	657	0.04	24	658	0.04	5990	0.0	0.0	5995	0.0	0.0
34574	233	8	8			21	699	0.03	21	700	0.03	5989	0.0	0.0	5990	0.0	0.0
34575	430	8	8			53	574	0.09	53	574	0.09	5994	0.0	0.0	5996	0.0	0.0
34576	192	8	8			2	555	0.00	2	556	0.00	6004	0.0	0.0	5990	0.0	0.0
34577	82	8	8			1	592	0.00	1	593	0.00	5988	0.0	0.0	6004	0.0	0.0
34578	195	8	8			1	578	0.00	1	580	0.00	5951	0.0	0.0	5988	0.0	0.0
34579	363	8	8			407	703	0.58	407	704	0.58	6005	0.0	0.0	5961	0.0	0.0
34580	93	8	8			403	631	0.64	403	631	0.64	7357	0.0	0.0	6005	0.0	0.0
34581	85	8	8			359	695	0.52	359	697	0.52	6006	0.0	0.0	7357	0.0	0.0
34582	528	8	8			29	1,014	0.03	29	1,015	0.03	5965	0.0	0.0	6006	0.0	0.0
34583	436	8	8			28	400	0.07	28	401	0.07	5958	0.0	0.0	5965	0.0	0.0
34584	420	10	10			565	547	1.03	565	547	1.03	5971	0.0	0.0	5969	7.1	7.1
34586	245	8	8			1	397	0.00	1	397	0.00	5952	0.0	0.0	5996	0.0	0.0
34587	242	8	8			1	399	0.00	1	400	0.00	5953	0.0	0.0	5995	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34588	340	10	10			467	800	0.58	467	799	0.59	5997	0.0	0.0	5984	0.0	0.0
34589	270	10	10			467	875	0.53	467	874	0.53	5998	0.0	0.0	5997	0.0	0.0
34590	330	10	10			308	1,061	0.29	308	1,060	0.29	5999	0.0	0.0	5998	0.0	0.0
34591	217	8	8			43	450	0.10	43	451	0.10	7610	0.0	0.0	7357	0.0	0.0
34592	258	8	8			42	469	0.09	42	469	0.09	5968	0.0	0.0	7610	0.0	0.0
34593	172	8	8			42	741	0.06	42	742	0.06	7608	0.0	0.0	5968	0.0	0.0
34594	218	8	8			18	686	0.03	18	688	0.03	5967	0.0	0.0	7608	0.0	0.0
34595	145	6	6			1	247	0.00	1	247	0.00	5954	0.0	0.0	5967	0.0	0.0
34596	288	8	8			23	455	0.05	23	456	0.05	6007	0.0	0.0	7608	0.0	0.0
34597	316	8	8			74	560	0.13	74	560	0.13	5982	0.0	0.0	6001	0.0	0.0
34598	232	8	8			2	641	0.00	2	642	0.00	5981	0.0	0.0	5982	0.0	0.0
34599	258	8	8			1	883	0.00	1	885	0.00	5983	0.0	0.0	5981	0.0	0.0
34600	210	6	6			1	230	0.00	1	230	0.00	5955	0.0	0.0	5983	0.0	0.0
34601	450	15	15			1,194	2,812	0.42	1,194	2,812	0.42	5980	0.0	0.0	6001	0.0	0.0
34602	410	15	15			1,193	1,485	0.80	1,193	1,485	0.80	5956	0.0	0.0	5980	0.0	0.0
34603	315	8	8			74	717	0.10	74	718	0.10	5976	0.0	0.0	5956	0.0	0.0
34605	275	12	12			1,119	1,419	0.79	1,119	1,419	0.79	5979	0.0	0.0	5956	0.0	0.0
34606	241	12	12			1,119	1,367	0.82	1,119	1,367	0.82	5978	0.0	0.0	5979	0.0	0.0
34607	340	10	10			493	1,784	0.28	493	1,782	0.28	5984	0.0	0.0	5978	0.0	0.0
34608	111	10	10			625	748	0.84	625	747	0.84	5977	0.0	0.0	5978	0.0	0.0
34611	298	8	8			44	670	0.07	44	719	0.06	6009	0.0	0.0	6008	0.0	0.0
34612	321	8	8			74	903	0.08	74	904	0.08	5964	0.0	0.0	5962	0.0	0.0
34613	350	8	8			1	406	0.00	1	406	0.00	5963	0.0	0.0	5964	0.0	0.0
34614	331	8	8			3	405	0.01	3	406	0.01	6010	0.0	0.0	6005	0.0	0.0
34615	8	8	8			1	507	0.00	1	508	0.00	6012	0.0	0.0	6010	0.0	0.0
34616	256	8	8			20	697	0.03	20	697	0.03	5950	0.0	0.0	5989	0.0	0.0
34619	208	18	18			3,089	8,726	0.35	3,738	8,726	0.43	6117	0.0	0.0	6042	3.6	0.0
34621	209	8	8			283	392	0.72	283	392	0.72	6048	0.0	0.0	6117	0.0	0.0
34623	155	8	8			0	670	0.00	0	719	0.00	7708	0.0	0.0	7615	0.0	0.0
34624	270	8	8			10	1,190	0.01	10	1,192	0.01	6072	0.0	0.0	6075	0.0	0.0
34625	91	8	8			11	440	0.03	11	441	0.03	6075	0.0	0.0	6076	0.0	0.0
34626	248	8	8			1	1,717	0.00	1	1,719	0.00	6016	0.0	0.0	6076	0.0	0.0
34627	173	8	8			13	1,826	0.01	13	1,829	0.01	6074	0.0	0.0	6076	0.0	0.0
34628	94	8	8			13	1,621	0.01	13	1,623	0.01	6073	0.0	0.0	6074	0.0	0.0
34629	167	8	8			0	1,578	0.00	0	1,580	0.00	6017	0.0	0.0	6073	0.0	0.0
34630	277	8	8			0	1,767	0.00	0	1,770	0.00	6084	0.0	0.0	6083	0.0	0.0
34631	304	8	8			1	1,539	0.00	1	1,541	0.00	6083	0.0	0.0	6082	0.0	0.0
34632	209	8	8			1	887	0.00	1	888	0.00	6082	0.0	0.0	7613	0.0	0.0
34633	279	8	8			108	956	0.11	108	957	0.11	7612	0.0	0.0	6079	0.0	0.0
34634	224	8	8			0	1,422	0.00	0	1,423	0.00	6081	0.0	0.0	7105	0.0	0.0
34635	178	8	8			1	1,410	0.00	1	1,412	0.00	7105	0.0	0.0	6079	0.0	0.0
34636	316	8	8			118	967	0.12	118	969	0.12	6079	0.0	0.0	7198	0.0	0.0
34637	163	8	8			154	912	0.17	154	913	0.17	7198	0.0	0.0	6121	0.0	0.0
34638	35	8	8			154	1,278	0.12	154	1,280	0.12	6121	0.0	0.0	6122	0.0	0.0
34639	283	8	8			36	956	0.04	36	958	0.04	6078	0.0	0.0	7198	0.0	0.0
34640	180	8	8			12	1,151	0.01	12	1,153	0.01	6018	0.0	0.0	6078	0.0	0.0
34641	297	8	8			24	564	0.04	24	565	0.04	6077	0.0	0.0	6078	0.0	0.0
34642	482	8	8			12	1,306	0.01	12	1,308	0.01	6123	0.0	0.0	6073	0.0	0.0
34643	210	8	8			96	456	0.21	96	456	0.21	6124	0.0	0.0	6080	0.0	0.0
34644	46	8	8			155	605	0.26	155	606	0.26	6122	0.0	0.0	6126	0.0	0.0
34645	40	8	8			1	442	0.00	1	442	0.00	6071	0.0	0.0	7424	0.0	0.0
34646	124	8	8			155	1,062	0.15	155	1,063	0.15	6126	0.0	0.0	7424	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34647	245	8	8			0	944	0.00	0	945	0.00	6020	0.0	0.0	6071	0.0	0.0
34648	222	8	8			25	860	0.03	25	862	0.03	6069	0.0	0.0	6068	0.0	0.0
34649	88	8	8			19	1,059	0.02	19	1,060	0.02	6070	0.0	0.0	6069	0.0	0.0
34650	288	8	8			19	410	0.05	19	411	0.05	7359	0.0	0.0	6070	0.0	0.0
34651	122	8	8			0	1,113	0.00	0	1,115	0.00	6021	0.0	0.0	6070	0.0	0.0
34652	178	8	8			14	1,152	0.01	14	1,154	0.01	7104	0.0	0.0	7359	0.0	0.0
34653	277	8	8			14	544	0.03	14	545	0.03	6066	0.0	0.0	7104	0.0	0.0
34654	230	8	8			0	969	0.00	0	970	0.00	6022	0.0	0.0	6058	0.0	0.0
34655	129	8	8			6	411	0.02	6	411	0.02	6065	0.0	0.0	6066	0.0	0.0
34656	264	8	8			8	818	0.01	8	819	0.01	6064	0.0	0.0	6066	0.0	0.0
34657	172	8	8			0	403	0.00	0	403	0.00	6024	0.0	0.0	6064	0.0	0.0
34658	200	8	8			0	1,199	0.00	0	1,201	0.00	6025	0.0	0.0	6064	0.0	0.0
34659	127	8	8			7	1,183	0.01	7	1,184	0.01	6063	0.0	0.0	6127	0.0	0.0
34660	53	18	18			3,099	2,025	1.53	3,740	2,025	1.85	6111	1.8	0.0	6112	2.5	6.9
34661	45	18	18			3,099	3,217	0.96	3,739	3,217	1.16	6110	1.1	5.3	6111	1.8	0.0
34662	270	18	18			3,094	2,956	1.05	3,739	2,956	1.26	6042	3.6	0.0	6110	1.1	5.3
34663	216	6	6			0	483	0.00	0	483	0.00	6027	0.0	0.0	6042	3.6	0.0
34664	215	18	18			2,828	8,774	0.32	3,483	8,774	0.40	7361	0.0	0.0	6117	0.0	0.0
34665	15	18	18			2,721	8,981	0.30	3,389	8,981	0.38	6116	0.0	0.0	10883	0.0	0.0
34666	78	18	18			2,721	2,524	1.08	3,388	2,524	1.34	6114	0.0	0.0	6116	0.0	0.0
34667	395	8	8			98	926	0.11	98	927	0.11	7108	0.0	0.0	6113	0.0	0.0
34668	530	18	18			1,351	3,655	0.37	1,683	3,655	0.46	6129	0.0	0.0	6128	0.0	0.0
34669	120	15	15			2,719	1,877	1.45	3,388	1,877	1.80	6107	8.1	7.4	6129	0.0	0.0
34670	92	8	8			280	401	0.70	280	401	0.70	6049	0.0	0.0	6048	0.0	0.0
34671	150	8	8			279	617	0.45	279	618	0.45	6050	0.0	0.0	6049	0.0	0.0
34672	183	8	8			0	1,272	0.00	0	1,274	0.00	6028	0.0	0.0	6050	0.0	0.0
34673	138	8	8			279	578	0.48	279	578	0.48	6051	0.0	0.0	6050	0.0	0.0
34674	184	8	8			273	599	0.46	273	601	0.45	6052	0.0	0.0	6051	0.0	0.0
34675	280	8	8			273	755	0.36	273	756	0.36	6053	0.0	0.0	6052	0.0	0.0
34676	157	8	8			264	742	0.36	264	742	0.36	6054	0.0	0.0	6053	0.0	0.0
34677	232	8	8			238	842	0.28	238	843	0.28	6067	0.0	0.0	6054	0.0	0.0
34678	50	8	8			26	641	0.04	26	642	0.04	6055	0.0	0.0	6054	0.0	0.0
34679	163	8	8			26	538	0.05	26	539	0.05	6056	0.0	0.0	6055	0.0	0.0
34680	209	8	8			26	443	0.06	26	444	0.06	6057	0.0	0.0	6056	0.0	0.0
34681	90	8	8			18	623	0.03	18	624	0.03	6059	0.0	0.0	6057	0.0	0.0
34682	102	8	8			1	1,043	0.00	1	1,044	0.00	6058	0.0	0.0	6059	0.0	0.0
34683	136	8	8			17	695	0.02	17	697	0.02	6060	0.0	0.0	6059	0.0	0.0
34684	173	8	8			17	910	0.02	17	912	0.02	6061	0.0	0.0	6060	0.0	0.0
34685	309	8	8			1	1,693	0.00	1	1,695	0.00	7200	0.0	0.0	6062	0.0	0.0
34686	175	8	8			1	860	0.00	1	861	0.00	7611	0.0	0.0	6061	0.0	0.0
34687	103	8	8			0	404	0.00	0	405	0.00	6030	0.0	0.0	7611	0.0	0.0
34688	345	8	8			9	617	0.01	9	618	0.01	6120	0.0	0.0	6119	0.0	0.0
34689	280	8	8			8	403	0.02	8	404	0.02	6043	0.0	0.0	6120	0.0	0.0
34690	528	8	8			0	736	0.00	0	737	0.00	6130	0.0	0.0	6043	0.0	0.0
34691	196	6	6			0	417	0.00	0	417	0.00	6105	0.0	0.0	6106	0.0	0.0
34692	46	8	8			26	1,666	0.02	26	1,668	0.02	6106	0.0	0.0	6107	8.1	7.4
34693	394	8	8			1	1,094	0.00	1	1,095	0.00	7107	0.0	0.0	6106	0.0	0.0
34694	372	8	8			0	705	0.00	0	706	0.00	6103	0.0	0.0	6104	0.0	0.0
34695	128	15	15			2,694	3,493	0.77	3,364	3,493	0.96	6108	0.0	5.6	6107	8.1	7.4
34696	133	15	15			2,696	3,131	0.86	3,363	3,131	1.07	6131	0.0	6.5	6108	0.0	5.6
34697	50	15	15			2,696	5,083	0.53	3,363	5,083	0.66	6132	0.0	0.0	6131	0.0	6.5
34698	179	8	8			15	808	0.02	15	808	0.02	6101	0.0	0.0	7614	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34699	350	8	8			15	1,522	0.01	15	1,524	0.01	6102	0.0	0.0	6101	0.0	0.0
34700	82	8	8			15	1,381	0.01	15	1,383	0.01	6031	0.0	0.0	6102	0.0	0.0
34701	230	15	15			2,680	3,195	0.84	3,349	3,195	1.05	6100	0.0	0.0	7614	0.0	0.0
34702	104	15	15			2,680	3,831	0.70	3,349	3,831	0.87	6099	0.0	0.0	6100	0.0	0.0
34703	362	15	15			2,680	3,222	0.83	3,349	3,222	1.04	6098	0.0	0.0	6099	0.0	0.0
34704	155	8	8			0	1,208	0.00	0	1,210	0.00	6032	0.0	0.0	6098	0.0	0.0
34705	200	15	15			2,660	3,260	0.82	3,387	3,260	1.04	6134	0.0	0.0	6133	0.0	0.0
34707	150	8	8			9	415	0.02	44	416	0.11	6095	0.0	0.0	6133	0.0	0.0
34708	270	8	8			0	396	0.00	0	397	0.00	6034	0.0	0.0	6095	0.0	0.0
34709	188	8	8			0	911	0.00	0	913	0.00	6035	0.0	0.0	6094	0.0	0.0
34710	263	8	8			194	661	0.29	194	663	0.29	6093	0.0	0.0	6094	0.0	0.0
34711	133	8	8			203	746	0.27	203	747	0.27	6094	0.0	0.0	7199	0.0	0.0
34712	140	8	8			203	840	0.24	203	840	0.24	7199	0.0	0.0	6067	0.0	0.0
34713	152	8	8			5	372	0.01	64	372	0.17	6109	0.0	4.9	6108	0.0	5.6
34714	400	8	8			19	1,231	0.02	19	1,232	0.02	6097	0.0	0.0	9726	0.0	0.0
34715	392	18	18			2,625	5,493	0.48	3,298	5,493	0.60	6091	0.0	0.0	9726	0.0	0.0
34716	229	8	8			161	402	0.40	161	402	0.40	7424	0.0	0.0	6093	0.0	0.0
34717	87	8	8			1	1,304	0.00	1	1,306	0.00	7360	0.0	0.0	6093	0.0	0.0
34718	205	8	8			0	1,176	0.00	0	1,178	0.00	6036	0.0	0.0	7360	0.0	0.0
34719	223	8	8			27	1,252	0.02	27	1,253	0.02	7106	0.0	0.0	6092	0.0	0.0
34720	65	8	8			1	1,689	0.00	1	1,691	0.00	6040	0.0	0.0	7106	0.0	0.0
34721	105	8	8			0	1,328	0.00	0	1,329	0.00	6037	0.0	0.0	6040	0.0	0.0
34722	224	8	8			1	538	0.00	1	539	0.00	6087	0.0	0.0	6091	0.0	0.0
34723	136	8	8			0	381	0.00	0	381	0.00	6038	0.0	0.0	6087	0.0	0.0
34724	101	8	8			1	331	0.00	1	332	0.00	6086	0.0	0.0	6087	0.0	0.0
34725	76	8	8			0	389	0.00	0	390	0.00	6039	0.0	0.0	6086	0.0	0.0
34726	112	18	18			2,585	6,140	0.42	3,260	6,140	0.53	6045	0.0	0.0	6044	0.0	0.0
34727	76	21	21			2,576	3,734	0.69	3,252	3,734	0.87	6090	0.0	0.0	6045	0.0	0.0
34729	23	12	15	11	ura	1,958	2,229	0.88	2,657	4,042	0.66	6135	0.0	0.0	6088	0.0	0.0
34730	195	8	12	40	ura	546	540	1.01	546	1,590	0.34	6136	0.0	0.0	6088	0.0	0.0
34731	115	8	12	40	ura	531	397	1.34	531	1,169	0.45	6137	8.2	0.0	6136	0.0	0.0
34732	155	8	12	40	ura	530	402	1.32	530	1,185	0.45	6138	7.4	0.0	6137	8.2	0.0
34733	256	8	12	40	ura	511	406	1.26	511	1,199	0.43	6046	2.4	0.0	6047	3.8	0.0
34736	233	8	8			1	1,262	0.00	1	1,263	0.00	6041	0.0	0.0	6110	1.1	5.3
34743	400	8	8			74	406	0.18	74	406	0.18	7616	0.0	0.0	6164	0.0	0.0
34744	400	8	8			24	406	0.06	24	406	0.06	6158	0.0	0.0	7616	0.0	0.0
34745	400	8	8			23	310	0.07	23	311	0.07	7362	0.0	0.0	6158	0.0	0.0
34747	70	8	8			163	413	0.40	163	413	0.39	6167	0.0	0.0	6168	0.0	0.0
34748	332	8	8			124	403	0.31	124	403	0.31	6166	0.0	0.0	6167	0.0	0.0
34749	50	8	8			123	385	0.32	123	385	0.32	6156	0.0	0.0	6166	0.0	0.0
34750	358	8	8			122	403	0.30	122	404	0.30	6164	0.0	0.0	6156	0.0	0.0
34751	360	8	8			39	447	0.09	39	447	0.09	6165	0.0	0.0	6167	0.0	0.0
34752	238	6	6			38	235	0.16	38	235	0.16	6152	0.0	0.0	6165	0.0	0.0
34753	147	8	8			1	658	0.00	1	659	0.00	6153	0.0	0.0	6177	0.0	0.0
34754	306	8	8			1	479	0.00	1	480	0.00	6162	0.0	0.0	6163	0.0	0.0
34755	229	8	8			217	510	0.43	217	510	0.42	6171	0.0	0.0	6170	0.0	0.0
34756	173	8	8			215	507	0.42	215	508	0.42	6172	0.0	0.0	6171	0.0	0.0
34757	53	8	8			1	500	0.00	1	501	0.00	6178	0.0	0.0	7617	0.0	0.0
34758	217	6	6			1	170	0.00	1	170	0.00	6155	0.0	0.0	6171	0.0	0.0
34759	261	8	8			1	630	0.00	1	631	0.00	6175	0.0	0.0	6176	4.0	0.0
34761	426	8	8			26	731	0.04	26	783	0.03	6207	0.0	0.0	6209	2.9	0.0
34762	300	8	8			0	743	0.00	0	797	0.00	6206	0.0	0.0	7363	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34763	510	8	8			0	465	0.00	0	499	0.00	6250	0.0	0.0	7363	0.0	0.0
34764	332	8	8			0	683	0.00	0	733	0.00	7711	0.0	0.0	6250	0.0	0.0
34765	321	8	8			0	697	0.00	0	699	0.00	6210	0.0	0.0	6211	0.0	0.0
34766	253	8	8			36	443	0.08	1	476	0.00	6208	3.9	0.0	6209	2.9	0.0
34767	225	8	8			1	445	0.00	1	478	0.00	8752	0.0	0.0	6208	3.9	0.0
34768	339	8	8			1	972	0.00	1	974	0.00	6211	0.0	0.0	6191	0.0	0.0
34769	485	18	21	41	2036	3,265	3,047	1.07	3,908	4,596	0.85	6205	4.5	0.0	6204	3.4	0.0
34770	14	8	8			1	1,356	0.00	1	1,454	0.00	7363	0.0	0.0	6207	0.0	0.0
34771	295	18	21	41	2036	3,265	3,464	0.94	3,908	5,225	0.75	7201	7.6	0.0	6205	4.5	0.0
34772	175	18	21	41	2036	3,264	3,720	0.88	3,908	5,611	0.70	6252	7.1	0.0	7201	7.6	0.0
34773	240	18	21	41	2036	3,267	3,052	1.07	3,908	4,603	0.85	6212	5.3	0.0	6252	7.1	0.0
34774	80	18	21	41	2036	3,265	3,940	0.83	3,907	5,943	0.66	6213	5.7	0.0	6212	5.3	0.0
34775	465	8	8			14	636	0.02	14	637	0.02	6202	0.0	0.0	6201	0.0	0.0
34776	525	8	8			13	399	0.03	13	399	0.03	6203	0.0	0.0	6202	0.0	0.0
34777	121	6	6			1	188	0.00	1	188	0.00	6180	0.0	0.0	6203	0.0	0.0
34778	90	8	8			1	400	0.00	1	400	0.00	6197	0.0	0.0	6198	0.0	0.0
34779	205	8	8			2	403	0.01	2	403	0.01	6198	0.0	0.0	6192	0.0	0.0
34780	338	8	8			1	687	0.00	1	688	0.00	6200	0.0	0.0	6199	0.0	0.0
34781	58	8	8			1	846	0.00	1	847	0.00	6199	0.0	0.0	6192	0.0	0.0
34782	154	8	8			48	600	0.08	48	601	0.08	6192	0.0	0.0	7620	0.0	0.0
34783	112	8	8			240	406	0.59	240	407	0.59	6241	0.0	0.0	6242	0.0	0.0
34784	202	8	8			239	646	0.37	239	647	0.37	6240	0.0	0.0	6241	0.0	0.0
34785	149	8	8			146	478	0.30	146	479	0.30	6234	0.0	0.0	6240	0.0	0.0
34786	165	8	8			1	412	0.00	1	412	0.00	6181	0.0	0.0	6233	0.0	0.0
34787	202	8	8			144	477	0.30	144	478	0.30	7426	0.0	0.0	6233	0.0	0.0
34788	122	8	8			110	446	0.25	110	447	0.25	7619	0.0	0.0	7426	0.0	0.0
34789	178	8	8			24	797	0.03	24	798	0.03	6231	0.0	0.0	7619	0.0	0.0
34790	335	8	8			24	858	0.03	24	859	0.03	6230	0.0	0.0	6231	0.0	0.0
34791	130	8	8			85	470	0.18	85	471	0.18	6232	0.0	0.0	7619	0.0	0.0
34792	456	8	8			92	817	0.11	92	817	0.11	7364	0.0	0.0	6240	0.0	0.0
34793	500	8	8			92	926	0.10	92	928	0.10	6239	0.0	0.0	7364	0.0	0.0
34794	353	8	8			91	431	0.21	91	432	0.21	6237	0.0	0.0	6239	0.0	0.0
34795	215	8	8			44	885	0.05	44	886	0.05	7109	0.0	0.0	6242	0.0	0.0
34796	248	8	8			1	1,018	0.00	1	1,019	0.00	6245	0.0	0.0	6244	0.0	0.0
34797	155	8	8			1	349	0.00	1	350	0.00	6183	0.0	0.0	6247	0.0	0.0
34798	112	8	8			1	799	0.00	1	800	0.00	6238	0.0	0.0	6247	0.0	0.0
34799	268	8	8			1	438	0.00	1	438	0.00	6184	0.0	0.0	7109	0.0	0.0
34800	264	8	8			1	683	0.00	1	684	0.00	6185	0.0	0.0	6244	0.0	0.0
34801	330	8	8			1	455	0.00	1	456	0.00	6249	0.0	0.0	7202	0.0	0.0
34802	323	8	8			3	493	0.01	3	494	0.01	6247	0.0	0.0	6248	0.0	0.0
34803	155	8	8			77	663	0.12	77	665	0.12	6236	0.0	0.0	6237	0.0	0.0
34804	151	8	8			76	417	0.18	76	418	0.18	6235	0.0	0.0	6236	0.0	0.0
34805	143	8	8			45	536	0.08	45	537	0.08	6219	0.0	0.0	6235	0.0	0.0
34806	249	8	8			1	354	0.00	1	355	0.00	6186	0.0	0.0	6235	0.0	0.0
34807	267	8	8			31	679	0.04	31	681	0.04	6222	0.0	0.0	6223	0.0	0.0
34808	98	8	8			33	394	0.08	33	394	0.08	6224	0.0	0.0	6225	0.0	0.0
34809	135	8	8			56	406	0.14	56	406	0.14	6225	0.0	0.0	6227	0.0	0.0
34810	135	8	8			1	676	0.00	1	676	0.00	6187	0.0	0.0	6227	0.0	0.0
34811	212	8	8			1	681	0.00	1	681	0.00	6188	0.0	0.0	6253	0.0	0.0
34812	161	8	8			44	357	0.12	44	358	0.12	6220	0.0	0.0	6219	0.0	0.0
34813	221	8	8			84	488	0.17	84	488	0.17	6228	0.0	0.0	6254	0.0	0.0
34814	134	8	8			84	460	0.18	84	460	0.18	6254	0.0	0.0	6255	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34815	73	8	8			85	456	0.19	85	457	0.19	6255	0.0	0.0	6232	0.0	0.0
34816	46	8	8			57	423	0.13	57	423	0.13	6227	0.0	0.0	6226	0.0	0.0
34817	93	8	8			58	479	0.12	58	480	0.12	6226	0.0	0.0	6256	0.0	0.0
34818	130	8	8			58	542	0.11	58	543	0.11	6256	0.0	0.0	6228	0.0	0.0
34819	345	18	21	41	2036	3,204	3,030	1.06	3,851	4,570	0.84	6214	6.0	0.0	6213	5.7	0.0
34820	150	18	21	41	2036	3,205	4,434	0.72	3,851	6,689	0.58	6259	0.2	0.0	6214	6.0	0.0
34821	170	18	21	41	2036	3,201	3,082	1.04	3,850	4,649	0.83	6194	0.0	0.0	6259	0.2	0.0
34822	130	18	24	41	2036	3,173	3,848	0.82	3,824	8,287	0.46	6193	0.0	0.0	6195	2.1	0.0
34823	149	18	24	41	2036	3,188	2,993	1.06	3,838	6,447	0.60	6257	3.5	0.0	6194	0.0	0.0
34824	118	18	24	41	2036	3,177	3,162	1.00	3,824	6,810	0.56	6217	2.1	0.0	6257	3.5	0.0
34825	317	18	24	41	2036	3,175	2,969	1.07	3,824	6,394	0.60	7110	1.9	0.0	6217	2.1	0.0
34826	197	8	8			0	1,371	0.00	0	1,373	0.00	6258	0.0	0.0	6216	0.0	0.0
34827	109	8	8			1	1,567	0.00	1	1,569	0.00	6216	0.0	0.0	6191	0.0	0.0
34828	94	18	18			13	8,329	0.00	13	8,329	0.00	6191	0.0	0.0	6194	0.0	0.0
34829	307	8	8			18	313	0.06	18	313	0.06	6221	0.0	0.0	6220	0.0	0.0
34830	200	8	8			1	688	0.00	1	688	0.00	6190	0.0	0.0	6222	0.0	0.0
34831	302	8	8			48	331	0.14	31	356	0.09	6309	4.7	0.0	6306	2.7	0.0
34832	112	6	6			0	276	0.00	0	297	0.00	7712	0.0	0.0	6310	0.0	0.0
34833	304	8	8			13	374	0.04	9	401	0.02	6308	0.0	0.0	6307	5.2	0.0
34834	359	8	8			17	426	0.04	17	457	0.04	6316	0.0	0.0	7365	0.0	0.0
34835	365	8	8			17	387	0.04	17	415	0.04	6317	0.0	0.0	6316	0.0	0.0
34836	133	6	6			0	181	0.00	0	194	0.00	6260	0.0	0.0	6317	0.0	0.0
34837	318	8	8			0	353	0.00	0	378	0.00	6314	0.0	0.0	6315	0.0	0.0
34838	390	8	8			0	297	0.00	0	319	0.00	6318	0.0	0.0	6284	0.0	0.0
34839	302	8	8			11	364	0.03	11	390	0.03	7427	0.0	0.0	6326	0.0	0.0
34840	103	6	6			0	169	0.00	0	181	0.00	6261	0.0	0.0	7427	0.0	0.0
34841	310	8	8			15	1,775	0.01	15	1,778	0.01	6323	0.0	0.0	6324	0.0	0.0
34842	170	8	8			15	1,310	0.01	15	1,313	0.01	6322	0.0	0.0	6323	0.0	0.0
34843	130	8	8			15	1,038	0.01	15	1,040	0.01	6321	0.0	0.0	6322	0.0	0.0
34844	459	8	8			16	1,106	0.01	16	1,108	0.01	6319	0.0	0.0	6320	0.0	0.0
34845	360	8	8			38	1,110	0.03	38	1,112	0.03	7113	0.0	0.0	6355	0.0	0.0
34846	365	8	8			38	1,110	0.03	38	1,111	0.03	6356	0.0	0.0	7113	0.0	0.0
34847	96	8	8			31	1,384	0.02	31	1,385	0.02	6357	0.0	0.0	6356	0.0	0.0
34848	214	8	8			23	1,461	0.02	23	1,463	0.02	6358	0.0	0.0	6357	0.0	0.0
34849	269	8	8			17	332	0.05	17	356	0.05	6311	0.0	0.0	6310	0.0	0.0
34850	115	6	6			0	215	0.00	0	231	0.00	6263	0.0	0.0	6311	0.0	0.0
34851	288	8	8			56	296	0.19	51	317	0.16	6307	5.2	0.0	6306	2.7	0.0
34852	287	8	8			25	806	0.03	25	865	0.03	6315	0.0	0.0	7365	0.0	0.0
34853	281	8	8			11	983	0.01	11	1,054	0.01	6326	0.0	0.0	6315	0.0	0.0
34854	152	8	8			0	970	0.00	0	1,041	0.00	6265	0.0	0.0	6326	0.0	0.0
34855	182	6	6			0	501	0.00	0	501	0.00	7713	0.0	0.0	6325	0.0	0.0
34856	275	8	8			35	1,452	0.02	35	1,453	0.02	6320	0.0	0.0	6355	0.0	0.0
34857	307	8	8			19	408	0.05	19	408	0.05	6324	0.0	0.0	6320	0.0	0.0
34858	215	8	8			1	403	0.00	1	403	0.00	6325	0.0	0.0	6324	0.0	0.0
34859	457	8	8			10	1,008	0.01	10	1,082	0.01	7111	0.0	0.0	6327	0.0	0.0
34860	452	8	8			28	297	0.10	28	319	0.09	6312	0.0	0.0	6313	0.0	0.0
34861	410	8	8			28	297	0.10	28	319	0.09	6284	0.0	0.0	6312	0.0	0.0
34862	315	8	8			17	955	0.02	17	1,024	0.02	6283	0.0	0.0	7729	0.0	0.0
34863	276	8	8			1	731	0.00	1	785	0.00	6329	0.0	0.0	6283	0.0	0.0
34864	150	8	8			0	617	0.00	0	661	0.00	6328	0.0	0.0	6283	0.0	0.0
34865	295	8	8			7	1,307	0.01	7	1,308	0.01	6363	0.0	0.0	6356	0.0	0.0
34866	515	8	8			11	573	0.02	11	574	0.02	6330	0.0	0.0	6358	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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City of Medford

						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34867	112	8	8			390	288	1.35	220	309	0.71	6304	5.9	0.0	6305	6.4	0.0
34868	230	8	8			372	297	1.25	202	319	0.63	6285	0.0	0.0	6304	5.9	0.0
34869	79	8	8			248	290	0.86	74	311	0.24	6299	0.0	0.0	6300	0.0	0.0
34870	243	8	8			241	305	0.79	66	326	0.20	6353	0.0	0.0	6299	0.0	0.0
34871	207	8	8			241	380	0.63	66	407	0.16	6286	0.0	0.0	6354	0.0	0.0
34872	118	8	8			0	433	0.00	0	465	0.00	6297	0.0	0.0	6286	0.0	0.0
34873	76	6	6			0	251	0.00	0	268	0.00	6268	0.0	0.0	6297	0.0	0.0
34874	110	8	8			7	317	0.02	0	340	0.00	6303	4.3	0.0	6304	5.9	0.0
34875	128	8	8			1	424	0.00	1	455	0.00	6302	0.0	0.0	6285	0.0	0.0
34876	46	8	8			0	277	0.00	0	297	0.00	6301	0.0	0.0	6302	0.0	0.0
34877	181	6	6			0	169	0.00	0	181	0.00	6270	0.0	0.0	6299	0.0	0.0
34878	157	8	8			0	298	0.00	0	319	0.00	6298	0.0	0.0	6286	0.0	0.0
34879	133	6	6			0	157	0.00	0	169	0.00	6271	0.0	0.0	6298	0.0	0.0
34880	143	6	6			0	170	0.00	0	183	0.00	6272	0.0	0.0	6353	0.0	0.0
34881	406	8	8			119	299	0.40	119	321	0.37	6294	0.0	0.0	6285	0.0	0.0
34882	253	8	8			26	790	0.03	26	847	0.03	6347	0.0	0.0	6294	0.0	0.0
34883	240	8	8			25	743	0.03	25	797	0.03	7622	0.0	0.0	6347	0.0	0.0
34884	274	8	8			25	479	0.05	25	515	0.05	6287	0.0	0.0	6346	0.0	0.0
34885	60	8	8			0	450	0.00	0	483	0.00	6273	0.0	0.0	6346	0.0	0.0
34886	124	8	8			0	418	0.00	0	449	0.00	6274	0.0	0.0	6287	0.0	0.0
34887	186	8	8			10	648	0.02	10	695	0.01	6333	0.0	0.0	6288	0.0	0.0
34888	172	8	8			10	661	0.01	10	709	0.01	6289	0.0	0.0	6333	0.0	0.0
34889	165	8	8			9	1,092	0.01	9	1,172	0.01	6290	0.0	0.0	6289	0.0	0.0
34890	105	8	8			0	1,047	0.00	0	1,123	0.00	6334	0.0	0.0	6290	0.0	0.0
34891	165	8	8			12	1,321	0.01	12	1,323	0.01	6359	0.0	0.0	6358	0.0	0.0
34892	255	8	8			11	1,164	0.01	11	1,165	0.01	6360	0.0	0.0	6359	0.0	0.0
34893	198	8	8			1	1,669	0.00	1	1,672	0.00	6362	0.0	0.0	6361	0.0	0.0
34894	170	8	8			0	411	0.00	0	412	0.00	6365	0.0	0.0	6359	0.0	0.0
34895	108	8	8			0	378	0.00	0	406	0.00	6335	0.0	0.0	6289	0.0	0.0
34896	172	8	8			0	594	0.00	0	638	0.00	6336	0.0	0.0	6335	0.0	0.0
34897	157	8	8			0	972	0.00	0	1,042	0.00	6366	0.0	0.0	6290	0.0	0.0
34898	163	8	8			0	885	0.00	0	950	0.00	6275	0.0	0.0	6366	0.0	0.0
34899	153	8	8			1	744	0.00	1	798	0.00	6344	0.0	0.0	6349	0.0	0.0
34900	172	8	8			0	849	0.00	0	911	0.00	6345	0.0	0.0	6344	0.0	0.0
34901	320	8	8			24	644	0.04	24	690	0.04	6342	0.0	0.0	6348	0.0	0.0
34902	84	6	6			0	413	0.00	0	442	0.00	6276	0.0	0.0	6342	0.0	0.0
34903	287	8	8			52	690	0.08	52	740	0.07	6343	0.0	0.0	6349	0.0	0.0
34904	303	8	8			52	610	0.09	52	654	0.08	6296	0.0	0.0	6343	0.0	0.0
34905	132	8	8			18	1,208	0.01	18	1,296	0.01	6341	0.0	0.0	6296	0.0	0.0
34906	403	8	8			18	1,019	0.02	18	1,093	0.02	6291	0.0	0.0	6340	0.0	0.0
34907	90	8	8			17	1,153	0.02	17	1,236	0.01	6367	0.0	0.0	6291	0.0	0.0
34908	224	6	6			0	342	0.00	0	367	0.00	6278	0.0	0.0	6291	0.0	0.0
34909	166	8	8			0	877	0.00	0	941	0.00	6331	0.0	0.0	6288	0.0	0.0
34910	164	8	8			0	335	0.00	0	359	0.00	6332	0.0	0.0	6288	0.0	0.0
34911	180	8	8			1	917	0.00	1	983	0.00	6368	0.0	0.0	6344	0.0	0.0
34912	230	8	8			0	815	0.00	0	874	0.00	6369	0.0	0.0	6368	0.0	0.0
34913	300	8	8			17	756	0.02	17	810	0.02	6292	0.0	0.0	6296	0.0	0.0
34914	198	8	8			8	1,067	0.01	8	1,144	0.01	6337	0.0	0.0	6338	0.0	0.0
34915	145	8	8			8	1,192	0.01	8	1,278	0.01	7366	0.0	0.0	6292	0.0	0.0
34916	148	8	8			8	976	0.01	8	1,047	0.01	6339	0.0	0.0	7366	0.0	0.0
34917	227	8	8			225	296	0.76	50	317	0.16	6293	0.0	0.0	6286	0.0	0.0
34918	253	8	8			38	297	0.13	38	319	0.12	6295	0.0	0.0	6293	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34919	175	8	8			38	299	0.13	38	322	0.12	6348	0.0	0.0	6295	0.0	0.0
34920	78	6	6			0	176	0.00	0	189	0.00	6279	0.0	0.0	6348	0.0	0.0
34921	93	6	6			0	320	0.00	0	343	0.00	6280	0.0	0.0	6295	0.0	0.0
34922	155	8	8			17	364	0.05	17	391	0.04	7112	0.0	0.0	6296	0.0	0.0
34923	144	8	8			78	476	0.16	78	511	0.15	6352	0.0	0.0	6294	0.0	0.0
34924	248	8	8			78	369	0.21	78	396	0.20	6351	0.0	0.0	6352	0.0	0.0
34925	303	8	8			67	821	0.08	67	881	0.08	6349	0.0	0.0	6351	0.0	0.0
34926	148	8	8			0	299	0.00	0	321	0.00	7159	0.0	0.0	6294	0.0	0.0
34927	55	6	6			0	169	0.00	0	181	0.00	6282	0.0	0.0	6327	0.0	0.0
34928	25	8	8			37	470	0.08	37	504	0.07	6375	0.0	0.0	6376	0.0	0.0
34929	112	8	8			37	472	0.08	37	506	0.07	6376	0.0	0.0	6377	0.0	0.0
34930	213	8	8			37	1,789	0.02	37	1,919	0.02	6374	0.0	0.0	6378	0.0	0.0
34931	71	8	8			49	1,354	0.04	49	1,453	0.03	6378	0.0	0.0	6405	0.0	0.0
34932	356	8	8			27	532	0.05	27	533	0.05	6390	0.0	0.0	7203	0.0	0.0
34933	117	8	8			27	1,311	0.02	27	1,313	0.02	7203	0.0	0.0	6391	0.0	0.0
34934	162	8	8			27	1,415	0.02	27	1,417	0.02	6391	0.0	0.0	6392	0.0	0.0
34935	308	8	8			28	1,954	0.01	28	1,957	0.01	6392	0.0	0.0	6393	0.0	0.0
34936	225	8	8			176	1,450	0.12	176	1,452	0.12	6394	0.0	0.0	6388	0.0	0.0
34937	298	8	8			176	2,090	0.08	176	2,092	0.08	7623	0.0	0.0	6394	0.0	0.0
34938	143	8	8			176	1,610	0.11	176	1,612	0.11	7115	0.0	0.0	7623	0.0	0.0
34939	129	8	8			176	798	0.22	176	799	0.22	7160	0.0	0.0	7115	0.0	0.0
34940	274	8	8			160	1,450	0.11	160	1,452	0.11	6395	0.0	0.0	6379	0.0	0.0
34941	422	8	8			160	2,090	0.08	160	2,092	0.08	6396	0.0	0.0	6395	0.0	0.0
34942	205	8	8			28	2,401	0.01	28	2,405	0.01	6393	0.0	0.0	6397	0.0	0.0
34943	91	8	8			35	1,344	0.03	35	1,347	0.03	6397	0.0	0.0	6398	0.0	0.0
34944	77	8	8			35	2,435	0.01	35	2,438	0.01	6398	0.0	0.0	6385	0.0	0.0
34945	37	8	8			218	3,396	0.06	218	3,401	0.06	6385	0.0	0.0	7367	0.0	0.0
34946	218	8	8			183	2,200	0.08	183	2,203	0.08	6387	0.0	0.0	6385	0.0	0.0
34947	182	8	8			183	2,049	0.09	183	2,051	0.09	6388	0.0	0.0	6387	0.0	0.0
34948	269	8	8			218	2,219	0.10	218	2,222	0.10	7367	0.0	0.0	6386	0.0	0.0
34949	64	8	8			219	1,883	0.12	219	1,885	0.12	6386	0.0	0.0	7624	0.0	0.0
34950	212	8	8			219	2,102	0.10	219	2,105	0.10	7624	0.0	0.0	6383	0.0	0.0
34951	60	8	8			219	2,644	0.08	219	2,647	0.08	6383	0.0	0.0	6384	0.0	0.0
34952	189	8	8			219	1,065	0.21	219	1,067	0.21	6400	0.0	0.0	7114	0.0	0.0
34953	49	8	8			239	2,435	0.10	239	2,438	0.10	7114	0.0	0.0	6406	0.0	0.0
34954	106	8	8			1	1,501	0.00	1	1,503	0.00	6401	0.0	0.0	7114	0.0	0.0
34955	91	8	8			0	2,529	0.00	0	2,533	0.00	7715	0.0	0.0	6401	0.0	0.0
34956	355	8	8			239	403	0.59	239	403	0.59	6402	0.0	0.0	6380	0.0	0.0
34957	140	8	8			352	2,069	0.17	352	2,072	0.17	6380	0.0	0.0	6382	0.0	0.0
34958	66	8	8			0	2,798	0.00	0	2,801	0.00	6381	0.0	0.0	6382	0.0	0.0
34959	393	8	8			364	1,527	0.24	364	1,528	0.24	6382	0.0	0.0	6403	0.0	0.0
34960	250	8	8			21	1,106	0.02	21	1,186	0.02	6405	0.0	0.0	6389	0.0	0.0
34961	300	8	8			1	677	0.00	1	726	0.00	8084	0.0	0.0	6389	0.0	0.0
34962	400	8	8			1	1,503	0.00	1	1,506	0.00	6410	0.0	0.0	6411	0.0	0.0
34963	374	8	8			22	537	0.04	22	538	0.04	6411	0.0	0.0	6412	0.0	0.0
34964	146	8	8			22	1,437	0.01	22	1,439	0.01	6412	0.0	0.0	6409	0.0	0.0
34965	157	8	8			510	608	0.84	510	608	0.84	6413	0.0	0.0	6501	0.0	0.0
34967	202	8	8			7	545	0.01	7	546	0.01	6447	0.0	0.0	6446	0.0	0.0
34968	290	8	8			38	472	0.08	38	507	0.08	6498	0.0	0.0	7370	0.0	0.0
34969	74	8	8			34	563	0.06	34	603	0.06	6441	0.0	0.0	6498	0.0	0.0
34970	85	8	8			34	331	0.10	34	354	0.10	6442	0.0	0.0	6441	0.0	0.0
34971	348	8	8			28	1,180	0.02	28	1,265	0.02	6440	0.0	0.0	6442	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
34972	136	8	8			76	914	0.08	76	981	0.08	6497	0.0	0.0	7370	0.0	0.0
34973	108	8	8			35	1,010	0.03	35	1,083	0.03	6439	0.0	0.0	6497	0.0	0.0
34974	133	8	8			35	1,197	0.03	35	1,284	0.03	7625	0.0	0.0	6439	0.0	0.0
34975	354	8	8			0	451	0.00	0	483	0.00	6488	0.0	0.0	6434	0.0	0.0
34976	225	8	8			1	1,530	0.00	1	1,641	0.00	6454	0.0	0.0	6434	0.0	0.0
34977	200	8	8			0	338	0.00	0	362	0.00	7716	0.0	0.0	6454	0.0	0.0
34978	243	8	8			28	1,431	0.02	28	1,433	0.02	6457	0.0	0.0	6458	0.0	0.0
34979	205	8	8			20	1,399	0.01	20	1,401	0.01	6456	0.0	0.0	6457	0.0	0.0
34980	352	8	8			12	1,389	0.01	12	1,390	0.01	6451	0.0	0.0	6456	0.0	0.0
34981	79	8	8			1	1,163	0.00	1	1,165	0.00	6452	0.0	0.0	6451	0.0	0.0
34982	110	8	8			1	1,698	0.00	1	1,700	0.00	7368	0.0	0.0	6452	0.0	0.0
34983	301	8	8			0	806	0.00	0	806	0.00	6453	0.0	0.0	7368	0.0	0.0
34984	222	8	8			0	1,015	0.00	0	1,017	0.00	6417	0.0	0.0	6451	0.0	0.0
34985	387	8	8			8	1,802	0.00	8	1,805	0.00	7118	0.0	0.0	6455	0.0	0.0
34986	400	8	8			36	987	0.04	36	988	0.04	6493	0.0	0.0	6494	0.0	0.0
34987	221	8	8			35	402	0.09	35	403	0.09	6492	0.0	0.0	6493	0.0	0.0
34988	321	8	8			28	406	0.07	28	407	0.07	6491	0.0	0.0	6492	0.0	0.0
34989	370	8	8			17	413	0.04	17	413	0.04	6490	0.0	0.0	6491	0.0	0.0
34990	176	8	8			13	392	0.03	13	393	0.03	6443	0.0	0.0	6490	0.0	0.0
34991	181	8	8			13	892	0.01	13	892	0.01	6444	0.0	0.0	6443	0.0	0.0
34992	214	8	8			0	1,224	0.00	0	1,226	0.00	6414	0.0	0.0	6444	0.0	0.0
34993	161	8	8			13	1,752	0.01	13	1,755	0.01	6489	0.0	0.0	6444	0.0	0.0
34994	135	8	8			7	1,657	0.00	7	1,659	0.00	6446	0.0	0.0	6491	0.0	0.0
34995	72	8	8			0	925	0.00	0	926	0.00	6445	0.0	0.0	6446	0.0	0.0
34996	124	8	8			1	1,122	0.00	1	1,124	0.00	6448	0.0	0.0	6494	0.0	0.0
34997	214	8	8			1	1,852	0.00	1	1,854	0.00	6449	0.0	0.0	6495	0.0	0.0
34998	190	8	8			10	1,079	0.01	10	1,081	0.01	6496	0.0	0.0	6460	0.0	0.0
34999	175	8	8			10	1,157	0.01	10	1,159	0.01	6450	0.0	0.0	6496	0.0	0.0
35000	56	8	8			10	1,382	0.01	10	1,384	0.01	6418	0.0	0.0	6450	0.0	0.0
35001	80	8	8			60	1,075	0.06	60	1,076	0.06	6500	0.0	0.0	6499	0.0	0.0
35002	290	8	8			60	753	0.08	60	754	0.08	6460	0.0	0.0	6500	0.0	0.0
35003	245	8	8			510	874	0.58	510	875	0.58	6473	0.0	0.0	6474	0.0	0.0
35004	200	8	8			510	406	1.26	510	406	1.26	6459	3.1	3.1	6473	0.0	0.0
35005	146	8	8			510	981	0.52	510	983	0.52	6501	0.0	0.0	6459	3.1	3.1
35006	132	8	8			488	639	0.76	488	640	0.76	6461	0.0	0.0	6409	0.0	0.0
35007	135	8	8			449	1,002	0.45	449	1,003	0.45	6463	0.0	0.0	6462	0.0	0.0
35008	230	8	8			438	1,074	0.41	438	1,075	0.41	6464	0.0	0.0	6463	0.0	0.0
35009	165	8	8			0	551	0.00	0	552	0.00	6420	0.0	0.0	6464	0.0	0.0
35010	375	8	8			1	1,365	0.00	1	1,366	0.00	6478	0.0	0.0	6473	0.0	0.0
35011	119	8	8			0	1,067	0.00	0	1,069	0.00	7627	0.0	0.0	6477	0.0	0.0
35012	238	12	12			42	4,463	0.01	42	4,463	0.01	7204	0.0	0.0	6432	0.0	0.0
35013	115	12	12			42	4,444	0.01	42	4,444	0.01	6437	0.0	0.0	7204	0.0	0.0
35014	353	8	8			41	1,543	0.03	41	1,545	0.03	6438	0.0	0.0	6437	0.0	0.0
35015	306	8	8			41	1,417	0.03	41	1,419	0.03	6487	0.0	0.0	6438	0.0	0.0
35016	323	8	8			8	1,287	0.01	8	1,288	0.01	6486	0.0	0.0	6487	0.0	0.0
35017	284	8	8			38	963	0.04	38	965	0.04	6502	0.0	0.0	6462	0.0	0.0
35018	170	8	8			38	1,043	0.04	38	1,044	0.04	6471	0.0	0.0	6502	0.0	0.0
35019	283	8	8			28	1,061	0.03	28	1,063	0.03	6472	0.0	0.0	6471	0.0	0.0
35020	370	8	8			1	1,405	0.00	1	1,407	0.00	7369	0.0	0.0	6472	0.0	0.0
35021	153	8	8			28	1,813	0.02	28	1,815	0.02	6481	0.0	0.0	6482	0.0	0.0
35022	88	8	8			3	1,937	0.00	3	1,940	0.00	6483	0.0	0.0	6481	0.0	0.0
35023	104	8	8			0	444	0.00	0	445	0.00	6423	0.0	0.0	6483	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35024	143	8	8			1	1,314	0.00	1	1,315	0.00	7117	0.0	0.0	6482	0.0	0.0
35025	147	8	8			0	1,560	0.00	0	1,563	0.00	6419	0.0	0.0	7117	0.0	0.0
35026	251	8	8			10	1,402	0.01	10	1,404	0.01	6435	0.0	0.0	6471	0.0	0.0
35027	180	8	8			0	585	0.00	0	586	0.00	6476	0.0	0.0	7204	0.0	0.0
35028	361	8	8			8	1,205	0.01	8	1,207	0.01	7730	0.0	0.0	6486	0.0	0.0
35029	173	8	8			437	1,040	0.42	437	1,041	0.42	6466	0.0	0.0	6465	0.0	0.0
35030	151	8	8			430	976	0.44	430	977	0.44	6467	0.0	0.0	6466	0.0	0.0
35031	178	8	8			430	1,562	0.28	430	1,564	0.27	6468	0.0	0.0	6467	0.0	0.0
35032	62	8	8			407	772	0.53	407	774	0.53	6469	0.0	0.0	6468	0.0	0.0
35033	106	8	8			407	710	0.57	407	711	0.57	6433	0.0	0.0	6469	0.0	0.0
35034	208	8	8			364	1,142	0.32	364	1,144	0.32	6504	0.0	0.0	6503	0.0	0.0
35035	250	8	8			9	1,360	0.01	9	1,363	0.01	6421	0.0	0.0	6435	0.0	0.0
35036	393	8	8			7	1,270	0.01	7	1,272	0.01	6480	0.0	0.0	6466	0.0	0.0
35037	274	8	8			1	406	0.00	1	407	0.00	7116	0.0	0.0	6469	0.0	0.0
35038	480	8	8			0	1,596	0.00	0	1,598	0.00	6479	0.0	0.0	7116	0.0	0.0
35039	112	8	8			3	958	0.00	3	959	0.00	6484	0.0	0.0	6483	0.0	0.0
35040	92	8	8			3	1,338	0.00	3	1,339	0.00	6485	0.0	0.0	6484	0.0	0.0
35041	151	8	8			2	1,381	0.00	2	1,383	0.00	6422	0.0	0.0	6485	0.0	0.0
35042	179	8	8			42	1,251	0.03	42	1,252	0.03	6470	0.0	0.0	6433	0.0	0.0
35043	259	8	8			42	569	0.07	42	569	0.07	6506	0.0	0.0	6470	0.0	0.0
35044	232	8	8			29	1,291	0.02	29	1,292	0.02	6507	0.0	0.0	6506	0.0	0.0
35045	225	8	8			29	1,490	0.02	29	1,492	0.02	6508	0.0	0.0	6507	0.0	0.0
35046	215	8	8			28	1,643	0.02	28	1,645	0.02	6509	0.0	0.0	6508	0.0	0.0
35047	207	8	8			13	1,427	0.01	13	1,429	0.01	7205	0.0	0.0	6506	0.0	0.0
35049	300	8	8			10	921	0.01	10	988	0.01	6532	0.0	0.0	6543	0.0	0.0
35050	185	8	8			0	864	0.00	0	927	0.00	7717	0.0	0.0	6532	0.0	0.0
35051	236	8	8			1	956	0.00	1	1,026	0.00	6513	0.0	0.0	6533	0.0	0.0
35052	69	8	8			422	591	0.71	422	634	0.66	6545	0.0	0.0	6549	0.0	0.0
35054	173	8	8			447	701	0.64	447	751	0.59	6550	0.0	0.0	6551	0.0	0.0
35058	30	8	8			0	665	0.00	0	713	0.00	6553	0.0	0.0	6554	0.0	0.0
35059	175	8	8			0	647	0.00	0	694	0.00	6554	0.0	0.0	6555	0.0	0.0
35060	135	8	8			0	677	0.00	0	726	0.00	6514	0.0	0.0	6534	0.0	0.0
35061	97	8	8			13	651	0.02	13	699	0.02	6544	0.0	0.0	7629	0.0	0.0
35062	178	8	8			13	631	0.02	13	676	0.02	6534	0.0	0.0	6544	0.0	0.0
35063	248	8	8			16	331	0.05	16	355	0.05	6546	0.0	0.0	7629	0.0	0.0
35064	131	8	8			12	786	0.02	12	843	0.01	6527	0.0	0.0	6526	0.0	0.0
35065	127	8	8			12	968	0.01	12	1,038	0.01	6526	0.0	0.0	6516	0.0	0.0
35066	98	8	8			12	816	0.01	12	875	0.01	6516	0.0	0.0	6537	0.0	0.0
35067	252	8	8			12	757	0.02	12	812	0.01	6537	0.0	0.0	6538	0.0	0.0
35068	185	8	8			31	829	0.04	31	890	0.04	6517	0.0	0.0	6536	0.0	0.0
35069	351	8	8			31	588	0.05	31	631	0.05	6536	0.0	0.0	6535	0.0	0.0
35070	235	8	8			28	699	0.04	28	750	0.04	7629	0.0	0.0	6543	0.0	0.0
35071	210	8	8			39	562	0.07	39	603	0.06	6543	0.0	0.0	6542	0.0	0.0
35072	139	8	8			39	757	0.05	39	812	0.05	6542	0.0	0.0	6541	0.0	0.0
35073	196	8	8			39	509	0.08	39	547	0.07	6541	0.0	0.0	6540	0.0	0.0
35074	473	8	8			13	548	0.02	13	588	0.02	6539	0.0	0.0	6540	0.0	0.0
35075	145	8	8			13	333	0.04	13	358	0.03	6528	0.0	0.0	6539	0.0	0.0
35076	145	8	8			0	647	0.00	0	694	0.00	6519	0.0	0.0	6528	0.0	0.0
35077	335	8	8			13	385	0.03	13	413	0.03	6547	0.0	0.0	6528	0.0	0.0
35078	313	8	8			0	564	0.00	0	605	0.00	6548	0.0	0.0	7429	0.0	0.0
35079	308	8	8			176	826	0.21	0	886	0.00	6529	0.0	0.0	7429	0.0	0.0
35080	155	8	8			8	597	0.01	8	640	0.01	6525	0.0	0.0	6524	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35081	243	8	8			8	496	0.02	8	532	0.02	6524	0.0	0.0	7371	0.0	0.0
35082	76	8	8			8	497	0.02	8	533	0.02	7371	0.0	0.0	7628	0.0	0.0
35083	100	8	12	22	ura	480	665	0.72	656	2,100	0.31	6529	0.0	0.0	6530	3.0	0.0
35086	396	8	8			113	456	0.25	113	489	0.23	7372	0.0	0.0	6556	0.0	0.0
35087	142	8	8			422	775	0.54	422	832	0.51	6576	0.0	0.0	6574	0.0	0.0
35088	76	8	8			422	745	0.57	422	799	0.53	6575	0.0	0.0	6576	0.0	0.0
35089	547	8	8			406	940	0.43	406	1,009	0.40	6577	0.0	0.0	6575	0.0	0.0
35090	200	8	8			27	1,185	0.02	27	1,272	0.02	6570	0.0	0.0	6575	0.0	0.0
35091	220	8	8			26	951	0.03	26	1,020	0.03	6569	0.0	0.0	6570	0.0	0.0
35092	190	8	8			17	1,099	0.02	17	1,178	0.01	6564	0.0	0.0	6568	0.0	0.0
35093	143	8	8			11	939	0.01	11	1,007	0.01	6571	0.0	0.0	6572	0.0	0.0
35094	102	8	8			0	630	0.00	0	676	0.00	7718	0.0	0.0	6571	0.0	0.0
35095	179	8	8			9	298	0.03	9	320	0.03	6567	0.0	0.0	6568	0.0	0.0
35096	167	8	8			9	298	0.03	9	319	0.03	6566	0.0	0.0	6567	0.0	0.0
35097	250	8	8			9	1,088	0.01	9	1,167	0.01	6563	0.0	0.0	6566	0.0	0.0
35098	189	8	8			13	684	0.02	13	734	0.02	6558	0.0	0.0	6573	0.0	0.0
35099	302	8	8			13	574	0.02	13	616	0.02	6573	0.0	0.0	6578	0.0	0.0
35100	421	8	8			5	1,034	0.00	5	1,110	0.00	6559	0.0	0.0	6578	0.0	0.0
35101	213	8	8			0	190	0.00	0	204	0.00	6560	0.0	0.0	6573	0.0	0.0
35102	400	8	8			195	297	0.66	195	319	0.61	6586	0.0	0.0	6585	0.0	0.0
35103	261	8	8			88	240	0.36	88	258	0.34	7631	0.0	0.0	6586	0.0	0.0
35104	300	8	8			15	607	0.02	15	651	0.02	6589	0.0	0.0	7631	0.0	0.0
35105	300	8	8			14	622	0.02	14	667	0.02	6588	0.0	0.0	6589	0.0	0.0
35106	183	8	8			0	460	0.00	0	493	0.00	6583	0.0	0.0	6588	0.0	0.0
35107	238	8	8			68	350	0.19	68	376	0.18	6580	0.0	0.0	7631	0.0	0.0
35108	445	8	8			99	807	0.12	99	865	0.11	6590	0.0	0.0	6586	0.0	0.0
35109	450	8	8			99	678	0.15	99	727	0.14	6593	0.0	0.0	6590	0.0	0.0
35110	298	8	8			89	801	0.11	89	860	0.10	7373	0.0	0.0	6593	0.0	0.0
35111	439	8	8			13	297	0.04	13	319	0.04	6587	0.0	0.0	7632	0.0	0.0
35112	370	8	8			12	591	0.02	12	634	0.02	6581	0.0	0.0	7373	0.0	0.0
35113	371	8	8			11	526	0.02	11	565	0.02	6582	0.0	0.0	6593	0.0	0.0
35114	231	10	10			810	903	0.90	985	967	1.02	6602	0.0	6.4	6603	0.0	0.0
35115	172	10	10			326	1,516	0.21	326	1,623	0.20	6601	0.0	0.0	7119	0.0	0.0
35116	151	10	10			262	1,591	0.16	262	1,703	0.15	6600	0.0	0.0	6601	0.0	0.0
35117	83	10	10			256	1,594	0.16	256	1,706	0.15	6599	0.0	0.0	6600	0.0	0.0
35118	208	8	8			256	843	0.30	256	905	0.28	6598	0.0	0.0	6599	0.0	0.0
35119	129	8	8			244	863	0.28	244	926	0.26	6595	0.0	0.0	6594	0.0	0.0
35120	150	8	8			235	687	0.34	235	737	0.32	6596	0.0	0.0	6595	0.0	0.0
35121	221	8	8			206	813	0.25	206	872	0.24	6592	0.0	0.0	6596	0.0	0.0
35122	400	8	8			206	871	0.24	206	934	0.22	6597	0.0	0.0	6592	0.0	0.0
35123	290	8	8			185	940	0.20	185	1,009	0.18	6591	0.0	0.0	6597	0.0	0.0
35124	330	8	8			15	470	0.03	15	504	0.03	6604	0.0	0.0	6605	0.0	0.0
35126	229	8	8			15	460	0.03	15	493	0.03	6606	0.0	0.0	7374	0.0	0.0
35127	85	8	8			35	554	0.06	35	594	0.06	6632	0.0	0.0	6633	0.0	0.0
35128	172	8	8			0	378	0.00	0	405	0.00	6627	0.0	0.0	7161	0.0	0.0
35129	158	8	8			17	376	0.04	17	403	0.04	7161	0.0	0.0	7120	0.0	0.0
35130	431	8	8			72	362	0.20	72	388	0.18	6639	0.0	0.0	7120	0.0	0.0
35131	283	8	8			88	319	0.27	88	342	0.26	7120	0.0	0.0	6626	0.0	0.0
35132	263	8	8			88	480	0.18	88	515	0.17	6626	0.0	0.0	6625	0.0	0.0
35133	359	8	8			88	555	0.16	88	595	0.15	6625	0.0	0.0	6624	0.0	0.0
35135	112	8	8			28	281	0.10	28	301	0.09	6619	0.0	0.0	6618	0.0	0.0
35136	290	8	8			1	302	0.00	1	324	0.00	6620	0.0	0.0	6619	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35137	271	8	8			1	294	0.00	1	315	0.00	7633	0.0	0.0	6621	0.0	0.0
35138	118	8	8			0	419	0.00	0	450	0.00	6614	0.0	0.0	6617	0.0	0.0
35139	76	8	8			0	295	0.00	0	317	0.00	6622	0.0	0.0	7633	0.0	0.0
35140	100	8	8			0	364	0.00	0	391	0.00	6612	0.0	0.0	6622	0.0	0.0
35141	176	6	6			0	267	0.00	0	286	0.00	6613	0.0	0.0	7633	0.0	0.0
35142	135	8	8			22	202	0.11	22	217	0.10	6642	0.0	0.0	6641	0.0	0.0
35143	121	8	8			22	427	0.05	22	458	0.05	6645	0.0	0.0	6642	0.0	0.0
35144	269	8	8			0	480	0.00	0	515	0.00	7375	0.0	0.0	6645	0.0	0.0
35145	331	8	8			15	305	0.05	0	327	0.00	6646	1.3	0.0	7162	2.1	0.0
35146	445	8	8			0	508	0.00	0	545	0.00	6644	0.0	0.0	6645	0.0	0.0
35147	368	8	8			72	471	0.15	72	505	0.14	7431	0.0	0.0	6641	0.0	0.0
35148	65	8	8			72	391	0.18	72	419	0.17	6640	0.0	0.0	7431	0.0	0.0
35149	377	8	8			72	447	0.16	72	480	0.15	6638	0.0	0.0	6639	0.0	0.0
35150	340	8	8			58	448	0.13	58	481	0.12	6654	0.0	0.0	6638	0.0	0.0
35151	174	8	8			72	385	0.19	72	413	0.17	6655	0.0	0.0	6640	0.0	0.0
35152	45	8	8			0	351	0.00	0	376	0.00	6667	0.0	0.0	6655	0.0	0.0
35153	100	8	8			72	453	0.16	72	486	0.15	6656	0.0	0.0	6655	0.0	0.0
35154	349	8	8			0	434	0.00	0	466	0.00	6634	0.0	0.0	6635	0.0	0.0
35155	67	8	8			0	422	0.00	0	453	0.00	6607	0.0	0.0	6634	0.0	0.0
35156	285	8	8			56	516	0.11	56	553	0.10	6637	0.0	0.0	6635	0.0	0.0
35157	403	8	8			55	386	0.14	55	415	0.13	6633	0.0	0.0	6637	0.0	0.0
35158	196	15	18	23	ura	1,494	538	2.78	1,494	938	1.59	6652	1.9	0.0	6653	0.8	0.0
35159	18	15	18	23	ura	1,498	3,078	0.49	1,493	5,362	0.28	7162	2.1	0.0	6652	1.9	0.0
35160	472	15	15			1,493	3,051	0.49	1,493	3,269	0.46	6657	0.0	0.0	7162	2.1	0.0
35161	331	15	15			1,493	2,800	0.53	1,493	3,000	0.50	6651	0.0	0.0	6657	0.0	0.0
35162	158	15	15			1,441	2,799	0.51	1,442	2,999	0.48	6650	0.0	0.0	6651	0.0	0.0
35163	148	15	15			1,441	1,678	0.86	1,442	1,798	0.80	6649	0.0	0.0	6650	0.0	0.0
35164	127	15	15			1,052	2,731	0.39	1,227	2,926	0.42	6665	0.0	0.0	6649	0.0	0.0
35165	139	8	8			1	282	0.00	1	303	0.00	6658	0.0	0.0	6632	0.0	0.0
35166	61	8	8			1	330	0.00	1	353	0.00	6659	0.0	0.0	6658	0.0	0.0
35167	147	8	8			0	288	0.00	0	308	0.00	6660	0.0	0.0	6659	0.0	0.0
35168	84	8	8			1	199	0.00	1	213	0.00	6661	0.0	0.0	6658	0.0	0.0
35169	150	8	8			0	563	0.00	0	603	0.00	6609	0.0	0.0	6661	0.0	0.0
35170	141	8	8			0	319	0.00	0	342	0.00	6662	0.0	0.0	6661	0.0	0.0
35171	93	8	8			0	362	0.00	0	388	0.00	6610	0.0	0.0	6662	0.0	0.0
35172	98	8	8			35	914	0.04	35	981	0.04	6630	0.0	0.0	6629	0.0	0.0
35173	362	8	8			19	376	0.05	19	403	0.05	6631	0.0	0.0	6630	0.0	0.0
35174	141	8	8			15	485	0.03	15	520	0.03	6664	0.0	0.0	6663	0.0	0.0
35175	74	8	8			15	638	0.02	15	684	0.02	7374	0.0	0.0	6664	0.0	0.0
35176	363	8	8			0	316	0.00	0	339	0.00	6628	0.0	0.0	7374	0.0	0.0
35177	225	8	8			6	288	0.02	6	308	0.02	6611	0.0	0.0	6665	0.0	0.0
35178	60	15	15			1,022	3,128	0.33	1,197	3,352	0.36	6647	0.0	0.0	6648	0.0	0.0
35179	168	8	8			15	574	0.03	15	615	0.02	6663	0.0	0.0	6630	0.0	0.0
35180	65	8	8			0	420	0.00	0	451	0.00	6666	0.0	0.0	6664	0.0	0.0
35182	102	8	8			0	706	0.00	0	758	0.00	7719	0.0	0.0	6683	2.4	0.0
35183	145	8	8			0	617	0.00	0	663	0.00	6670	0.0	0.0	6688	0.0	0.0
35184	225	8	15	24	2036	405	297	1.36	851	1,703	0.50	6686	5.7	0.0	6688	0.0	0.0
35185	260	8	15	24	2036	415	253	1.64	834	1,446	0.58	6684	2.8	0.0	6686	5.7	0.0
35186	330	8	15	24	2036	416	256	1.62	833	1,467	0.57	7635	1.4	0.0	6684	2.8	0.0
35187	250	8	8			402	540	0.74	401	579	0.69	6683	2.4	0.0	7635	1.4	0.0
35188	220	8	8			0	601	0.00	0	645	0.00	6685	0.0	0.0	6684	2.8	0.0
35189	130	8	8			0	505	0.00	0	542	0.00	6668	0.0	0.0	6685	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35194	150	8	8			310	243	1.27	310	260	1.19	6701	0.0	0.0	7122	0.0	0.0
35195	272	8	8			69	364	0.19	69	390	0.18	8788	0.0	0.0	6727	0.0	0.0
35196	75	8	8			285	515	0.55	285	553	0.52	6727	0.0	0.0	6701	0.0	0.0
35197	406	8	8			25	404	0.06	25	433	0.06	6699	0.0	0.0	6700	0.0	0.0
35198	404	8	8			0	468	0.00	0	502	0.00	6689	0.0	0.0	6699	0.0	0.0
35199	174	8	8			0	369	0.00	0	395	0.00	6671	0.0	0.0	6689	0.0	0.0
35200	336	15	15			963	969	0.99	1,368	1,039	1.32	6697	0.0	0.0	7376	0.0	0.0
35201	273	15	15			963	962	1.00	1,368	1,031	1.33	6698	0.0	0.0	6697	0.0	0.0
35202	213	15	15			963	974	0.99	1,368	1,044	1.31	6720	0.0	0.0	6698	0.0	0.0
35203	203	15	15			878	966	0.91	1,293	1,035	1.25	6721	0.0	0.0	6720	0.0	0.0
35204	258	15	15			878	965	0.91	1,292	1,033	1.25	6695	0.0	0.0	6721	0.0	0.0
35206	262	18	24	25	2036	3,693	3,349	1.10	5,613	7,728	0.73	6705	4.0	0.0	7121	5.7	0.0
35207	485	18	24	25	2036	3,658	3,335	1.10	5,565	7,694	0.72	6709	0.0	0.0	6707	3.7	0.0
35208	365	8	8			0	297	0.00	0	319	0.00	6706	0.0	0.0	6680	0.0	0.0
35209	222	6	6			0	169	0.00	0	181	0.00	6672	0.0	0.0	6706	0.0	0.0
35210	110	8	8			217	401	0.54	217	430	0.51	7207	0.0	0.0	6727	0.0	0.0
35211	260	8	8			150	405	0.37	150	435	0.35	6702	0.0	0.0	7207	0.0	0.0
35212	420	8	8			150	376	0.40	150	403	0.37	6680	0.0	0.0	6702	0.0	0.0
35213	234	6	6			0	173	0.00	0	185	0.00	6679	0.0	0.0	6708	0.0	0.0
35214	497	8	8			49	376	0.13	49	403	0.12	7377	0.0	0.0	7207	0.0	0.0
35215	245	6	6			0	312	0.00	0	334	0.00	6676	0.0	0.0	6722	0.0	0.0
35216	242	8	8			29	372	0.08	29	400	0.07	6690	0.0	0.0	6722	0.0	0.0
35217	251	8	8			29	358	0.08	29	385	0.08	6682	0.0	0.0	6690	0.0	0.0
35218	332	8	8			1	319	0.00	1	342	0.00	6703	0.0	0.0	6722	0.0	0.0
35219	143	8	8			0	236	0.00	0	253	0.00	6704	0.0	0.0	6703	0.0	0.0
35220	157	8	8			0	374	0.00	0	401	0.00	6674	0.0	0.0	6704	0.0	0.0
35221	352	8	8			0	398	0.00	0	426	0.00	6723	0.0	0.0	6702	0.0	0.0
35222	286	8	8			122	297	0.41	122	318	0.38	6711	0.0	0.0	6680	0.0	0.0
35223	216	8	8			122	292	0.42	122	313	0.39	6712	0.0	0.0	6711	0.0	0.0
35224	72	8	8			0	701	0.00	0	752	0.00	6678	0.0	0.0	6712	0.0	0.0
35225	310	8	8			121	299	0.40	121	320	0.38	6681	0.0	0.0	6712	0.0	0.0
35226	379	8	8			101	297	0.34	101	318	0.32	6715	0.0	0.0	6681	0.0	0.0
35227	67	8	8			101	299	0.34	101	320	0.32	6714	0.0	0.0	6715	0.0	0.0
35228	133	8	8			101	276	0.37	101	297	0.34	6713	0.0	0.0	6714	0.0	0.0
35229	155	8	8			101	278	0.36	101	298	0.34	7636	0.0	0.0	6713	0.0	0.0
35230	177	6	6			101	127	0.79	101	136	0.74	6691	0.0	0.0	7636	0.0	0.0
35231	136	8	8			101	276	0.36	101	297	0.34	6692	0.0	0.0	6691	0.0	0.0
35232	191	6	6			0	232	0.00	0	249	0.00	6673	0.0	0.0	7636	0.0	0.0
35233	512	15	21	27	2036	1,491	1,122	1.33	1,651	2,947	0.56	7637	0.1	0.0	6709	0.0	0.0
35234	459	15	18	23	ura	1,595	2,346	0.68	1,594	4,087	0.39	6716	0.0	0.0	6710	0.0	0.0
35235	45	15	18	23	ura	1,600	2,369	0.68	1,594	4,128	0.39	6717	0.0	0.0	6716	0.0	0.0
35236	188	6	6			0	60	0.00	0	64	0.00	6677	0.0	0.0	6681	0.0	0.0
35238	94	8	8			45	394	0.11	0	423	0.00	6728	2.9	0.0	6683	2.4	0.0
35240	51	8	8			0	335	0.00	0	360	0.00	6730	0.0	0.0	6741	0.0	0.0
35241	131	8	8			0	1,049	0.00	0	1,126	0.00	6732	0.0	0.0	6733	0.0	0.0
35242	129	8	8			0	738	0.00	0	792	0.00	6733	0.0	0.0	7638	0.0	0.0
35243	138	8	8			30	333	0.09	30	357	0.08	7638	0.0	0.0	6734	0.0	0.0
35244	206	8	8			30	399	0.07	30	428	0.07	6734	0.0	0.0	6740	0.0	0.0
35245	156	8	8			1	363	0.00	1	390	0.00	6736	0.0	0.0	6739	0.0	0.0
35246	199	8	8			12	497	0.02	12	533	0.02	9920	0.0	0.0	6738	0.0	0.0
35247	240	8	8			12	311	0.04	12	333	0.04	6738	0.0	0.0	6739	0.0	0.0
35248	350	8	8			40	297	0.13	40	319	0.12	6739	0.0	0.0	6740	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35249	260	8	8			69	297	0.23	69	319	0.22	6740	0.0	0.0	6741	0.0	0.0
35250	279	8	8			70	298	0.24	70	319	0.22	6741	0.0	0.0	6904	0.0	0.0
35256	269	8	8			0	492	0.00	0	527	0.00	6795	0.0	0.0	6794	0.0	0.0
35266	269	8	8			28	332	0.09	29	356	0.08	6776	0.0	0.0	6789	0.0	0.0
35267	270	8	8			28	373	0.07	28	400	0.07	6788	0.0	0.0	6776	0.0	0.0
35268	277	8	8			0	435	0.00	0	467	0.00	6796	0.0	0.0	6788	0.0	0.0
35269	209	8	12	24	2036	297	278	1.07	453	878	0.52	6779	0.0	0.0	6778	0.0	0.0
35270	139	8	12	24	2036	433	279	1.55	433	882	0.49	6780	0.7	0.0	6779	0.0	0.0
35271	201	8	8			422	518	0.81	422	555	0.76	6791	6.8	0.0	8747	2.9	0.0
35272	329	8	8			415	603	0.69	415	647	0.64	6789	0.0	0.0	8740	7.0	0.0
35273	262	8	8			13	360	0.04	13	387	0.03	6792	0.0	0.0	6788	0.0	0.0
35274	111	8	8			13	315	0.04	13	338	0.04	6765	0.0	0.0	6792	0.0	0.0
35275	155	8	8			7	320	0.02	7	344	0.02	6793	0.0	0.0	6765	0.0	0.0
35276	315	8	8			6	319	0.02	6	342	0.02	6764	0.0	0.0	6765	0.0	0.0
35290	350	8	8			0	470	0.00	0	504	0.00	6835	0.0	0.0	6834	0.0	0.0
35291	385	8	8			89	557	0.16	89	597	0.15	6815	0.0	0.0	6816	0.0	0.0
35292	247	8	8			88	296	0.30	88	317	0.28	7379	0.0	0.0	6815	0.0	0.0
35293	136	8	8			53	494	0.11	53	530	0.10	6821	0.0	0.0	7379	0.0	0.0
35294	41	8	8			0	275	0.00	0	294	0.00	6868	0.0	0.0	7379	0.0	0.0
35295	35	8	8			0	251	0.00	0	269	0.00	6867	0.0	0.0	7379	0.0	0.0
35296	162	8	8			53	508	0.10	53	544	0.10	6822	0.0	0.0	6821	0.0	0.0
35297	81	8	8			0	498	0.00	0	535	0.00	6823	0.0	0.0	6822	0.0	0.0
35298	118	8	8			0	452	0.00	0	485	0.00	7432	0.0	0.0	6823	0.0	0.0
35299	24	8	8			0	333	0.00	0	357	0.00	6866	0.0	0.0	6822	0.0	0.0
35300	196	8	8			53	514	0.10	53	551	0.10	6825	0.0	0.0	6822	0.0	0.0
35301	196	8	8			28	535	0.05	28	574	0.05	7124	0.0	0.0	6825	0.0	0.0
35302	68	8	8			0	255	0.00	0	274	0.00	6824	0.0	0.0	7124	0.0	0.0
35303	25	8	8			1	312	0.00	1	335	0.00	6865	0.0	0.0	6816	0.0	0.0
35304	302	8	8			1	330	0.00	1	354	0.00	6813	0.0	0.0	6814	0.0	0.0
35305	356	8	8			1	410	0.00	1	440	0.00	7123	0.0	0.0	6813	0.0	0.0
35306	404	8	8			1	340	0.00	1	365	0.00	6817	0.0	0.0	7123	0.0	0.0
35307	260	8	8			1	318	0.00	1	341	0.00	6818	0.0	0.0	6817	0.0	0.0
35308	234	15	15			1,764	4,424	0.40	2,054	4,740	0.43	6819	0.0	0.0	6820	0.0	0.0
35309	26	8	8			0	319	0.00	0	342	0.00	6864	0.0	0.0	7641	0.0	0.0
35310	288	8	8			1	333	0.00	1	357	0.00	6826	0.0	0.0	7641	0.0	0.0
35311	28	8	8			0	308	0.00	0	330	0.00	6863	0.0	0.0	6826	0.0	0.0
35312	41	8	8			0	328	0.00	0	352	0.00	6862	0.0	0.0	6826	0.0	0.0
35313	354	8	8			21	400	0.05	21	401	0.05	6832	0.0	0.0	6839	0.0	0.0
35314	279	8	8			20	403	0.05	20	403	0.05	6809	0.0	0.0	6832	0.0	0.0
35315	391	8	8			19	397	0.05	19	397	0.05	6812	0.0	0.0	6809	0.0	0.0
35316	70	18	24	25	2036	3,697	3,203	1.15	5,614	7,390	0.76	6831	6.9	0.0	6830	7.1	0.0
35317	190	18	24	25	2036	3,693	4,337	0.85	5,614	10,006	0.56	6830	7.1	0.0	6840	6.6	0.0
35318	36	8	8			55	293	0.19	0	315	0.00	6861	6.4	0.0	6840	6.6	0.0
35319	249	8	8			42	430	0.10	42	431	0.10	6829	0.0	0.0	6827	0.0	0.0
35320	283	8	8			2	387	0.01	2	388	0.01	6841	0.0	0.0	6829	0.0	0.0
35321	175	8	8			1	460	0.00	1	460	0.00	6838	0.0	0.0	6842	0.0	0.0
35322	139	18	24	25	2036	3,729	2,961	1.26	5,645	6,833	0.83	6843	5.5	0.0	6828	5.6	0.0
35323	433	18	24	25	2036	3,692	3,023	1.22	5,614	6,976	0.80	6840	6.6	0.0	6843	5.5	0.0
35324	370	8	8			22	408	0.05	22	408	0.05	6839	0.0	0.0	6827	0.0	0.0
35325	12	8	8			0	303	0.00	0	326	0.00	6859	0.0	0.0	6814	0.0	0.0
35326	12	8	8			0	303	0.00	0	326	0.00	6858	0.0	0.0	6814	0.0	0.0
35327	16	8	8			0	333	0.00	0	357	0.00	6857	0.0	0.0	6813	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35328	16	8	8			0	333	0.00	0	357	0.00	6856	0.0	0.0	6813	0.0	0.0
35329	13	8	8			0	345	0.00	0	370	0.00	6855	0.0	0.0	7123	0.0	0.0
35330	15	8	8			0	343	0.00	0	368	0.00	6854	0.0	0.0	7123	0.0	0.0
35331	13	8	8			0	319	0.00	0	342	0.00	6853	0.0	0.0	6817	0.0	0.0
35332	12	8	8			0	359	0.00	0	385	0.00	6851	0.0	0.0	6818	0.0	0.0
35343	366	18	24	26	Existing	3,897	3,535	1.10	7,456	8,158	0.91	6874	3.9	0.0	6882	0.0	0.0
35344	384	18	24	26	Existing	3,905	3,539	1.10	7,456	8,165	0.91	6875	0.4	0.0	6874	3.9	0.0
35345	376	18	24	26	Existing	3,937	3,539	1.11	7,457	8,165	0.91	6873	1.0	0.0	6875	0.4	0.0
35360	127	8	8			33	387	0.09	33	415	0.08	6905	0.0	0.0	7433	0.0	0.0
35361	324	10	10			158	457	0.35	158	489	0.32	6895	0.0	0.0	6894	0.0	0.0
35362	367	10	10			158	431	0.37	158	462	0.34	6894	0.0	0.0	6893	0.0	0.0
35366	14	8	8			0	397	0.00	0	426	0.00	6930	0.0	0.0	6919	0.0	0.0
35367	14	8	8			0	333	0.00	1	357	0.00	6931	0.0	0.0	7208	0.0	0.0
35368	12	8	8			1	303	0.00	3	326	0.01	6932	0.0	0.0	6912	0.0	0.0
35369	143	15	15			1,069	1,558	0.69	1,470	1,669	0.88	6904	0.0	0.0	7380	0.0	0.0
35370	398	18	18			1,143	1,419	0.81	1,540	1,520	1.01	6919	0.0	0.0	6914	0.0	0.0
35371	406	18	18			1,101	1,390	0.79	1,499	1,490	1.01	7208	0.0	0.0	6919	0.0	0.0
35372	385	18	18			1,101	1,413	0.78	1,499	1,513	0.99	6921	0.0	0.0	7208	0.0	0.0
35373	80	18	18			1,101	2,374	0.46	1,499	2,543	0.59	7380	0.0	0.0	6921	0.0	0.0
35374	92	18	18			1,277	1,413	0.90	1,667	1,514	1.10	6914	0.0	0.0	6913	0.0	0.0
35375	530	8	8			33	289	0.12	33	310	0.11	6923	0.0	0.0	6922	0.0	0.0
35376	230	8	8			0	759	0.00	0	815	0.00	7645	0.0	0.0	6923	0.0	0.0
35377	175	8	8			38	297	0.13	38	319	0.12	6918	0.0	0.0	7644	0.0	0.0
35378	114	8	8			0	521	0.00	0	559	0.00	6917	0.0	0.0	6924	0.0	0.0
35379	163	6	6			0	247	0.00	0	264	0.00	7723	0.0	0.0	6917	0.0	0.0
35380	472	8	8			0	297	0.00	0	318	0.00	6916	0.0	0.0	6924	0.0	0.0
35382	506	8	8			31	281	0.11	31	301	0.10	6907	0.0	0.0	6906	0.0	0.0
35383	502	8	8			31	297	0.10	31	318	0.10	6925	0.0	0.0	6907	0.0	0.0
35384	266	8	8			0	301	0.00	0	323	0.00	6908	0.0	0.0	6926	0.0	0.0
35385	268	8	8			0	296	0.00	0	317	0.00	6927	0.0	0.0	6908	0.0	0.0
35386	39	18	18			1,322	1,731	0.76	1,706	1,855	0.92	7125	0.0	0.0	6933_WETWELL	0.0	0.0
35387	35	18	18			1,322	1,827	0.72	1,706	1,958	0.87	6911	0.0	0.0	6910	0.0	0.0
35389	305	18	18			1,277	1,404	0.91	1,667	1,504	1.11	6913	0.0	0.0	6912	0.0	0.0
35390	47	8	8			2	369	0.01	5	396	0.01	6915	0.0	5.3	6913	0.0	0.0
35391	120	8	8			0	297	0.00	3	319	0.01	6936	0.0	0.0	6915	0.0	5.3
35409	120	8	8			17	1,373	0.01	17	1,473	0.01	7615	0.0	0.0	6367	0.0	0.0
35410	255	18	18			1,206	1,892	0.64	1,206	1,892	0.64	5461	0.0	0.0	5552	0.0	0.0
35411	235	8	8			0	2,237	0.00	0	2,240	0.00	4706	0.0	0.0	4844	0.0	0.0
35412	246	8	8			0	533	0.00	0	533	0.00	7292	0.0	0.0	4350	0.0	0.0
35413	128	6	6			8	757	0.01	8	757	0.01	5110	0.0	0.0	3978	0.0	0.0
35414	355	8	8			0	1,322	0.00	0	1,433	0.00	3997	0.0	0.0	3667	0.0	0.0
35415	263	6	6			1	221	0.00	1	221	0.00	3357	0.0	0.0	3485	0.0	0.0
35419	390	8	8			76	390	0.19	76	391	0.19	2302	0.0	0.0	2335	0.0	0.0
35420	384	8	8			72	339	0.21	72	340	0.21	2092	0.0	0.0	7389	0.0	0.0
35422	209	8	8			1	337	0.00	1	337	0.00	1739	0.0	0.0	1717	0.0	0.0
35423	190	6	6			1	240	0.01	1	240	0.01	1348	0.0	0.0	3120	0.0	0.0
35424	285	8	8			62	760	0.08	62	825	0.07	1109	0.0	0.0	1108	0.0	0.0
35428	180	8	8			43	379	0.11	43	380	0.11	1298	0.0	0.0	1299	0.0	0.0
35429	117	8	8			1	648	0.00	1	649	0.00	1354	0.0	0.0	1353	0.0	0.0
35430	400	6	6			31	274	0.11	31	274	0.11	1500	0.0	0.0	1551	3.3	0.0
35431	250	12	12			590	1,677	0.35	590	1,677	0.35	1563	0.0	0.0	7221	0.0	0.0
35432	326	8	8			212	456	0.46	212	456	0.46	1524	0.0	0.0	1547	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35433	14	8	8			129	754	0.17	129	756	0.17	1834	0.0	0.0	1767	0.0	0.0
35434	89	10	15	2	Existing	838	789	1.06	1,411	2,326	0.61	1911	1.0	0.0	1912	0.9	0.0
35435	99	6	6			1	266	0.00	1	266	0.00	1884	0.0	0.0	1883	0.0	0.0
35436	129	27	27			4,326	10,021	0.43	6,565	10,021	0.66	1990	0.0	0.0	1989	0.0	0.0
35437	162	8	8			160	344	0.47	160	344	0.47	2163	0.0	0.0	2150	0.0	0.0
35438	127	33	33			7,603	10,532	0.72	10,030	10,532	0.95	2146	0.0	0.0	7390	0.0	0.0
35439	195	8	8			18	341	0.05	18	341	0.05	2296	0.0	0.0	2280	0.0	0.0
35440	430	8	8			47	422	0.11	47	423	0.11	2273	0.0	0.0	7476	0.0	0.0
35441	162	8	8			1	344	0.00	1	344	0.00	2315	0.0	0.0	2343	0.0	0.0
35442	263	15	15			272	1,213	0.22	236	1,213	0.19	2406	0.0	0.0	2411	0.0	0.0
35443	564	54	54			29,420	30,647	0.96	34,926	30,647	1.14	2430	6.8	5.3	2428	17.3	16.0
35445	32	21	21			3,695	9,492	0.39	5,119	10,283	0.50	2922	0.0	0.0	2923	0.0	0.0
35446	436	8	8			1	813	0.00	1	815	0.00	2941	0.0	0.0	2940	0.0	0.0
35448	225	8	8			190	349	0.55	190	349	0.54	3035	0.0	0.0	3037	0.0	0.0
35449	298	8	8			165	344	0.48	165	344	0.48	3052	0.0	0.0	3043	0.0	0.0
35450	300	10	10			878	933	0.94	924	933	0.99	3106	0.0	0.0	3130	0.0	0.0
35453	176	8	8			1	342	0.00	1	342	0.00	3245	0.0	0.0	3233	0.0	0.0
35454	315	6	6			1	132	0.01	1	132	0.01	3455	0.0	0.0	3419	0.0	0.0
35455	361	6	6			1	197	0.00	1	197	0.00	3421	0.0	0.0	3422	0.0	0.0
35456	120	6	6			1	172	0.00	1	172	0.00	10104	0.0	0.0	3492	0.0	0.0
35457	12	10	10			910	4,522	0.20	1,300	4,517	0.29	3464	1.5	0.0	3502	1.2	0.0
35459	335	8	8			33	967	0.03	33	969	0.03	3598	0.0	0.0	3589	0.0	0.0
35460	375	24	24			1,041	5,744	0.18	1,042	5,744	0.18	3629	0.0	0.0	7038	0.0	0.0
35461	33	10	10			49	706	0.07	49	764	0.06	3683	0.0	0.0	3684	0.0	0.0
35462	60	8	8			82	449	0.18	82	486	0.17	3690	0.0	0.0	7280	0.0	0.0
35464	140	8	8			1	1,891	0.00	1	1,893	0.00	3797	0.0	0.0	3796	0.0	0.0
35465	200	8	8			1	1,017	0.00	1	1,018	0.00	7530	0.0	0.0	3876	0.0	0.0
35466	255	6	6			1	281	0.00	1	281	0.00	3828	0.0	0.0	3827	0.0	0.0
35467	170	6	6			2	431	0.00	2	431	0.00	4014	0.0	0.0	7288	0.0	0.0
35468	305	8	8			12	836	0.01	12	838	0.01	7187	0.0	0.0	4086	0.0	0.0
35469	69	8	8			1	463	0.00	1	464	0.00	4053	0.0	0.0	4054	0.0	0.0
35470	227	6	6			0	236	0.00	0	256	0.00	4024	0.0	0.0	4101	0.0	0.0
35471	70	8	8			0	542	0.00	0	588	0.00	4130	0.0	0.0	4103	0.0	0.0
35472	170	8	8			31	728	0.04	31	729	0.04	4175	0.0	0.0	7295	0.0	0.0
35473	158	8	8			1	1,477	0.00	1	1,603	0.00	7550	0.0	0.0	4383	2.2	0.0
35474	320	8	8			126	1,234	0.10	126	1,235	0.10	4442	0.0	0.0	4443	0.0	0.0
35475	95	8	8			0	498	0.00	0	540	0.00	4423	0.0	0.0	4493	0.0	0.0
35477	277	8	8			0	1,035	0.00	0	1,037	0.00	5015	0.0	0.0	5060	0.0	0.0
35478	57	8	8			0	348	0.00	0	349	0.00	5120	0.0	0.0	5099	0.0	0.0
35479	206	6	6			1	695	0.00	1	695	0.00	5043	0.0	0.0	5042	0.0	0.0
35480	421	8	8			20	1,265	0.02	20	1,267	0.02	5183	0.0	0.0	7580	0.0	0.0
35481	298	6	6			0	545	0.00	0	545	0.00	5235	0.0	0.0	5220	0.0	0.0
35482	86	8	15	19	Existing	468	328	1.42	781	1,756	0.44	5272	0.0	0.0	5271	0.0	0.0
35483	274	6	6			1	397	0.00	1	397	0.00	5250	0.0	0.0	5256	0.0	0.0
35484	334	8	8			32	297	0.11	32	297	0.11	5259	0.0	0.0	5260	0.0	0.0
35485	220	8	8			13	372	0.03	13	372	0.03	5452	0.0	0.0	5535	0.0	0.0
35486	279	10	10			502	599	0.84	502	598	0.84	5506	0.0	0.0	7341	0.0	0.0
35487	170	54	54			15,818	43,871	0.36	17,147	43,871	0.39	5550	0.0	0.0	5549	0.0	0.0
35488	205	8	8			1	697	0.00	1	698	0.00	5823	0.0	0.0	5796	0.0	0.0
35489	274	8	8			192	207	0.93	192	207	0.93	5797	0.0	0.0	7602	0.0	0.0
35490	445	8	8			30	315	0.09	30	315	0.09	5769	0.0	0.0	5768	0.0	0.0
35491	292	8	8			433	401	1.08	64	401	0.16	5879	0.1	0.0	5852	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35492	139	18	18			2,720	2,756	0.99	3,388	2,756	1.23	6128	0.0	0.0	6114	0.0	0.0
35493	360	8	8			9	759	0.01	9	760	0.01	6119	0.0	0.0	7108	0.0	0.0
35494	147	8	8			0	748	0.00	0	749	0.00	6033	0.0	0.0	6095	0.0	0.0
35495	161	21	21			2,576	3,747	0.69	3,251	3,747	0.87	6089	0.0	0.0	6090	0.0	0.0
35496	289	8	8			42	506	0.08	42	542	0.08	7365	0.0	0.0	6307	5.2	0.0
35497	130	8	8			241	285	0.84	66	306	0.22	6354	0.0	0.0	6353	0.0	0.0
35498	220	8	8			11	1,275	0.01	11	1,277	0.01	6361	0.0	0.0	6360	0.0	0.0
35499	66	8	8			0	906	0.00	0	972	0.00	7714	0.0	0.0	8760	0.0	0.0
35500	298	8	8			244	846	0.29	244	907	0.27	6594	0.0	0.0	6598	0.0	0.0
35501	90	8	8			1	297	0.00	1	319	0.00	6621	0.0	0.0	6620	0.0	0.0
35502	363	8	8			0	374	0.00	0	401	0.00	6636	0.0	0.0	6637	0.0	0.0
35503	528	15	15			1,035	2,678	0.39	1,210	2,870	0.42	6648	0.0	0.0	7634	0.0	0.0
35504	279	18	24	26	Existing	3,936	3,537	1.11	7,458	8,160	0.91	6885	3.4	0.0	6873	1.0	0.0
35505	295	8	8			68	274	0.25	68	294	0.23	6906	0.0	0.0	7433	0.0	0.0
35506	218	8	8			11	297	0.04	11	319	0.03	6572	0.0	0.0	6527	0.0	0.0
35507	515	18	24	25	2036	3,725	3,320	1.12	5,645	7,661	0.74	6828	5.6	0.0	5957	0.0	0.0
35508	102	8	8			70	381	0.18	70	381	0.18	5375	0.0	0.0	6089	0.0	0.0
35509	87	8	8			12	1,301	0.01	12	1,303	0.01	4717	0.0	0.0	7074	0.0	0.0
35510	352	8	8			46	1,101	0.04	46	1,103	0.04	2958	0.0	0.0	2831	0.0	0.0
35511	275	12	12			27	1,128	0.02	27	1,128	0.02	1295	0.0	0.0	1384	0.0	0.0
35512	323	8	8			68	383	0.18	68	383	0.18	7437	0.0	0.0	1324	0.0	0.0
35513	223	8	8			1	486	0.00	1	487	0.00	1413	0.0	0.0	1412	0.0	0.0
35514	212	8	8			178	496	0.36	178	497	0.36	6986	0.0	0.0	1394	0.0	0.0
35515	333	8	8			41	406	0.10	41	406	0.10	1388	0.0	0.0	1428	0.0	0.0
35516	190	8	8			35	422	0.08	35	422	0.08	1362	0.0	0.0	1363	0.0	0.0
35517	334	8	8			194	506	0.38	194	506	0.38	1523	0.0	0.0	7165	0.0	0.0
35518	143	8	8			353	315	1.12	353	315	1.12	1589	3.4	9.8	1604	2.2	0.0
35519	300	8	8			104	328	0.32	103	328	0.31	1645	0.3	0.0	7451	3.8	0.0
35520	340	8	8			14	542	0.03	14	543	0.03	1623	0.0	0.0	1624	0.0	0.0
35521	350	6	6			26	224	0.12	26	224	0.12	1653	0.0	0.0	1599	0.0	0.0
35522	255	6	6			117	157	0.74	117	157	0.74	1705	3.5	0.0	1680	2.0	0.0
35523	122	8	8			1	441	0.00	1	441	0.00	1685	0.0	0.0	1712	0.0	0.0
35525	205	10	10			435	499	0.87	705	499	1.41	1777	2.2	7.1	1778	1.4	0.0
35526	290	10	10			319	440	0.72	319	440	0.73	7228	1.2	0.0	1799	1.4	0.0
35527	314	6	6			1	331	0.00	1	331	0.00	1758	0.0	0.0	1823	7.5	0.0
35529	133	6	6			1	216	0.00	1	216	0.00	1935	0.0	0.0	1851	0.0	0.0
35530	99	6	6			117	103	1.14	79	103	0.77	1976	0.0	0.0	1953	0.0	0.0
35531	360	8	8			10	386	0.03	1	386	0.00	1952	4.6	0.0	1957	3.8	5.3
35532	239	10	10			1	799	0.00	1	799	0.00	7467	0.0	0.0	2003	0.0	0.0
35533	43	8	8			1	917	0.00	1	919	0.00	2085	0.0	0.0	2086	0.0	0.0
35534	270	8	8			14	343	0.04	14	344	0.04	2132	0.0	0.0	2110	0.0	0.0
35536	327	8	8			25	344	0.07	25	345	0.07	2201	0.0	0.0	2209	0.0	0.0
35537	69	8	8			61	351	0.17	61	352	0.17	7009	0.0	0.0	2258	0.0	0.0
35538	68	8	8			10	322	0.03	10	323	0.03	7665	0.0	0.0	2341	0.0	0.0
35540	243	15	15			207	1,176	0.18	169	1,176	0.14	2400	0.0	0.0	2401	0.0	0.0
35542	35	8	8			6	580	0.01	6	581	0.01	7667	0.0	0.0	2455	0.0	0.0
35543	233	8	8			292	1,006	0.29	292	1,090	0.27	7482	0.0	0.0	2502	0.0	0.0
35544	165	6	6			0	393	0.00	0	426	0.00	2516	0.0	0.0	2584	0.0	0.0
35545	302	10	10			17	2,479	0.01	17	2,683	0.01	2586	0.0	0.0	2566	0.0	0.0
35546	370	8	8			0	383	0.00	0	416	0.00	2593	0.0	0.0	2592	0.0	0.0
35547	437	8	8			0	558	0.00	0	605	0.00	2613	0.0	0.0	2600	0.0	0.0
35548	300	8	8			8	524	0.02	8	569	0.01	2645	0.0	0.0	2672	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35549	360	12	12			360	997	0.36	396	1,081	0.37	2668	0.0	0.0	2667	0.0	0.0
35550	287	8	8			0	1,196	0.00	0	1,297	0.00	2653	0.0	0.0	2655	0.0	0.0
35551	330	8	8			0	561	0.00	0	608	0.00	2643	0.0	0.0	2686	0.0	0.0
35552	227	8	8			17	362	0.05	17	392	0.04	2736	0.0	0.0	7490	0.0	0.0
35553	372	8	8			35	781	0.05	35	847	0.04	2765	0.0	0.0	2764	0.0	0.0
35554	196	8	8			0	992	0.00	0	1,076	0.00	2705	0.0	0.0	2778	0.0	0.0
35555	190	8	8			0	383	0.00	0	416	0.00	2711	0.0	0.0	7019	0.0	0.0
35556	174	21	21			4,222	4,347	0.97	5,612	4,709	1.19	2868	0.0	3.9	2880	0.0	4.4
35557	176	8	8			14	991	0.01	14	1,075	0.01	7254	0.0	0.0	2920	0.0	0.0
35558	450	8	8			0	421	0.00	0	456	0.00	2930	0.0	0.0	2945	0.0	0.0
35559	258	10	10			8	690	0.01	8	747	0.01	2915	0.0	0.0	2960	0.0	0.0
35560	49	8	8			211	347	0.61	211	347	0.61	7497	0.0	0.0	3019	0.0	0.0
35561	160	8	8			95	606	0.16	95	607	0.16	3051	0.0	0.0	3052	0.0	0.0
35562	364	8	8			74	483	0.15	74	483	0.15	3109	0.0	0.0	3110	0.0	0.0
35563	250	8	8			28	424	0.07	28	425	0.07	3137	0.0	0.0	3131	0.0	0.0
35564	291	8	8			140	559	0.25	140	560	0.25	3176	0.0	0.0	3178	0.0	0.0
35565	297	8	8			1	344	0.00	1	345	0.00	3252	0.0	0.0	3271	0.0	0.0
35566	21	18	18			4,572	5,728	0.80	4,477	5,728	0.78	7507	0.0	0.0	3301	0.0	0.0
35567	243	8	8			0	356	0.00	0	357	0.00	3345	0.0	0.0	7269	0.0	0.0
35569	280	8	8			1	417	0.00	1	418	0.00	3332	0.0	0.0	3331	0.0	0.0
35570	290	8	8			38	410	0.09	38	411	0.09	3330	0.0	0.0	3324	0.0	0.0
35571	254	8	8			47	260	0.18	1	260	0.01	3504	2.3	0.0	3464	1.5	0.0
35572	55	24	24			3,885	32,628	0.12	6,134	32,628	0.19	3433	0.0	0.0	3418	0.0	17.1
35573	293	8	8			12	344	0.03	12	344	0.03	3608	0.0	0.0	7277	0.0	0.0
35574	119	8	8			1	542	0.00	1	543	0.00	3618	0.0	0.0	3617	0.0	0.0
35575	414	8	8			0	342	0.00	0	343	0.00	3634	0.0	0.0	7278	0.0	0.0
35576	237	8	8			17	938	0.02	17	1,018	0.02	3668	0.0	0.0	3670	0.0	0.0
35577	100	8	8			22	383	0.06	22	416	0.05	3725	0.0	0.0	3689	0.0	0.0
35578	236	8	8			78	425	0.18	78	461	0.17	3696	0.0	0.0	3693	0.0	0.0
35579	133	10	10			431	1,972	0.22	431	1,969	0.22	3757	0.0	0.0	3771	0.0	0.0
35580	312	8	8			65	487	0.13	65	488	0.13	3812	0.0	0.0	3845	0.0	0.0
35581	137	8	8			185	963	0.19	185	963	0.19	3914	0.0	0.0	3915	0.0	0.0
35582	255	6	6			1	417	0.00	1	417	0.00	3974	0.0	0.0	3973	0.0	0.0
35583	146	8	8			25	1,455	0.02	25	1,457	0.02	3927	0.0	0.0	3926	0.0	0.0
35584	199	8	8			0	333	0.00	0	361	0.00	3988	0.0	0.0	7138	0.0	0.0
35585	150	8	8			0	1,093	0.00	0	1,186	0.00	3935	0.0	0.0	3936	0.0	0.0
35586	53	8	8			306	581	0.53	306	582	0.53	4192	0.0	0.0	7055	0.0	0.0
35587	24	8	8			1	751	0.00	1	815	0.00	4202	0.0	0.0	4201	0.0	0.0
35588	134	15	18	38	2036	973	1,424	0.68	1,539	2,315	0.66	4186	0.0	0.0	4225	0.0	0.0
35590	191	6	6			0	171	0.00	0	171	0.00	7686	0.0	0.0	4319	0.0	0.0
35591	417	8	8			16	1,078	0.01	16	1,080	0.01	4338	0.0	0.0	4296	0.0	0.0
35592	274	10	10			490	723	0.68	612	782	0.78	7546	4.4	0.0	4315	3.6	8.2
35593	225	8	8			0	1,100	0.00	0	1,101	0.00	4384	0.0	0.0	4366	0.0	0.0
35594	267	8	8			0	809	0.00	0	878	0.00	4369	0.0	0.0	4359	0.0	0.0
35595	108	8	8			14	665	0.02	14	721	0.02	4406	0.0	0.0	4415	0.0	0.0
35596	110	8	8			126	448	0.28	126	449	0.28	4478	0.0	0.0	4442	0.0	0.0
35597	380	8	8			30	1,170	0.03	30	1,172	0.03	4433	0.0	0.0	4434	0.0	0.0
35598	244	8	8			22	757	0.03	22	821	0.03	4455	0.0	0.0	4494	0.0	0.0
35599	60	8	8			0	2,006	0.00	0	2,008	0.00	4505	0.0	0.0	4506	0.0	0.0
35600	135	8	8			255	750	0.34	255	751	0.34	4546	0.0	0.0	4561	0.0	0.0
35601	69	8	8			0	403	0.00	0	403	0.00	4552	0.0	0.0	4564	0.0	0.0
35603	13	8	8			2	336	0.01	2	337	0.01	4596	0.0	0.0	4598	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35604	142	8	8			303	340	0.89	303	341	0.89	4674	0.0	0.0	4644	0.0	0.0
35605	65	8	8			408	1,313	0.31	408	1,315	0.31	4642	0.0	0.0	4641	0.0	0.0
35606	222	8	8			303	333	0.91	303	334	0.91	4658	0.0	0.0	4673	0.0	0.0
35607	440	8	8			164	1,315	0.12	164	1,317	0.12	4692	0.0	0.0	4691	0.0	0.0
35608	265	8	8			884	1,313	0.67	884	1,315	0.67	4774	0.0	0.0	4749	0.3	0.0
35609	130	8	8			13	1,295	0.01	13	1,297	0.01	4738	0.0	0.0	4739	0.0	0.0
35610	277	8	8			930	937	0.99	930	938	0.99	4742	0.0	0.0	4741	0.0	0.0
35611	66	8	8			205	654	0.31	205	655	0.31	4801	1.0	0.0	4802	0.0	0.0
35612	135	8	8			22	1,236	0.02	22	1,238	0.02	7074	0.0	0.0	4834	0.0	0.0
35613	286	8	8			19	333	0.06	19	334	0.06	4864	0.0	0.0	4866	0.0	0.0
35614	350	8	8			77	1,405	0.05	77	1,407	0.05	4905	0.0	0.0	4904	0.0	0.0
35615	260	8	8			10	1,363	0.01	10	1,365	0.01	4902	0.0	0.0	4905	0.0	0.0
35616	166	8	8			1	635	0.00	1	636	0.00	4986	0.0	0.0	4939	0.0	0.0
35617	90	8	8			51	676	0.08	51	676	0.07	4967	0.0	0.0	4966	0.0	0.0
35618	186	8	8			1	660	0.00	1	660	0.00	4990	0.0	0.0	4989	0.0	0.0
35619	260	8	8			10	1,730	0.01	10	1,732	0.01	5005	0.0	0.0	5004	0.0	0.0
35620	171	8	8			336	1,358	0.25	336	1,360	0.25	5087	0.0	0.0	5074	0.0	0.0
35621	110	8	8			651	908	0.72	651	910	0.72	5153	0.0	0.0	5152	0.0	0.0
35622	138	8	8			267	1,150	0.23	267	1,151	0.23	5213	0.0	0.0	5212	0.0	0.0
35623	219	8	8			201	1,053	0.19	201	1,055	0.19	5166	0.0	0.0	5209	0.0	0.0
35624	102	8	8			1	524	0.00	1	525	0.00	7335	0.0	0.0	5302	0.0	0.0
35625	80	8	8			31	565	0.06	31	565	0.06	5370	0.0	0.0	5371	0.0	0.0
35626	141	8	8			6	404	0.02	6	404	0.02	5383	0.0	0.0	5367	0.0	0.0
35627	98	8	8			1	604	0.00	1	606	0.00	5361	0.0	0.0	5360	0.0	0.0
35628	195	6	6			33	363	0.09	33	363	0.09	5433	0.0	0.0	5416	0.0	0.0
35629	73	8	8			44	361	0.12	44	361	0.12	5436	0.0	0.0	5435	0.0	0.0
35630	280	8	8			53	388	0.14	53	388	0.14	5497	0.0	0.0	5496	0.0	0.0
35631	304	8	8			1	393	0.00	1	394	0.00	5490	0.0	0.0	5492	0.0	0.0
35632	289	15	15			645	2,728	0.24	645	2,728	0.24	5449	0.0	0.0	5460	0.0	0.0
35633	85	18	18			1,336	2,073	0.64	1,336	2,073	0.64	5581	0.0	0.0	5564	0.0	0.0
35634	320	8	8			1	297	0.00	1	298	0.00	5635	0.0	0.0	5631	0.0	0.0
35635	272	18	18			1	1,787	0.00	1	1,787	0.00	5606	0.0	0.0	5625	0.0	0.0
35636	330	8	8			251	296	0.85	251	297	0.85	5689	0.0	0.0	5711	0.0	0.0
35637	495	8	8			52	303	0.17	41	303	0.14	5698	3.0	0.0	5697	3.1	0.0
35638	308	8	8			113	1,056	0.11	113	1,058	0.11	5719	0.0	0.0	5718	0.0	0.0
35639	405	8	8			335	295	1.14	335	296	1.13	5775	4.9	4.9	7603	0.0	0.0
35640	128	8	8			140	401	0.35	140	401	0.35	5846	0.0	0.0	5845	0.0	0.0
35641	53	8	8			2	281	0.01	2	282	0.01	7422	0.0	0.0	5868	0.0	0.0
35642	170	8	8			3	488	0.01	3	488	0.01	5863	0.0	0.0	7101	7.0	0.0
35643	193	8	8			1	923	0.00	1	924	0.00	7102	0.0	0.0	5931	1.8	0.0
35644	18	8	8			33	453	0.07	2	454	0.00	5944	3.6	0.0	5929	3.6	0.0
35645	105	8	8			1	451	0.00	1	451	0.00	6014	0.0	0.0	5993	0.0	0.0
35646	415	8	8			17	629	0.03	17	630	0.03	5966	0.0	0.0	5967	0.0	0.0
35647	151	8	8			1	1,794	0.00	1	1,797	0.00	6015	0.0	0.0	6072	0.0	0.0
35648	145	8	8			24	455	0.05	24	456	0.05	6076	0.0	0.0	6077	0.0	0.0
35649	247	18	18			2,586	4,595	0.56	3,262	4,595	0.71	6085	0.0	0.0	6091	0.0	0.0
35650	317	8	8			1	422	0.00	1	422	0.00	6173	0.0	0.0	7617	0.0	0.0
35651	310	8	8			1	1,030	0.00	1	1,031	0.00	6196	0.0	0.0	6197	0.0	0.0
35652	236	8	8			42	910	0.05	42	910	0.05	6244	0.0	0.0	7109	0.0	0.0
35653	371	8	8			25	978	0.03	25	980	0.03	6229	0.0	0.0	6228	0.0	0.0
35654	310	8	8			8	300	0.03	8	322	0.03	6338	0.0	0.0	6292	0.0	0.0
35655	202	8	8			175	1,276	0.14	175	1,278	0.14	6379	0.0	0.0	7160	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35656	29	8	8			510	641	0.80	510	642	0.79	6409	0.0	0.0	6413	0.0	0.0
35657	365	8	8			8	1,210	0.01	8	1,212	0.01	6455	0.0	0.0	6456	0.0	0.0
35658	176	8	8			1	1,260	0.00	1	1,262	0.00	6495	0.0	0.0	6448	0.0	0.0
35659	156	8	8			28	1,176	0.02	28	1,178	0.02	6482	0.0	0.0	6472	0.0	0.0
35660	138	8	8			13	1,914	0.01	13	1,916	0.01	6505	0.0	0.0	7205	0.0	0.0
35661	160	8	8			0	335	0.00	0	359	0.00	6515	0.0	0.0	6546	0.0	0.0
35662	34	8	8			26	470	0.06	26	504	0.05	6568	0.0	0.0	6569	0.0	0.0
35663	220	8	8			0	672	0.00	0	722	0.00	6669	0.0	0.0	6686	5.7	0.0
35664	280	8	8			0	259	0.00	0	278	0.00	6693	0.0	0.0	6694	0.0	0.0
35665	250	6	6			0	239	0.00	0	256	0.00	6675	0.0	0.0	6703	0.0	0.0
35666	149	8	8			1	918	0.00	1	985	0.00	6735	0.0	0.0	6736	0.0	0.0
35667	223	8	12	24	2036	433	278	1.56	433	878	0.49	6781	2.3	0.0	6780	0.7	0.0
35668	130	8	8			0	470	0.00	0	504	0.00	6836	0.0	0.0	6835	0.0	0.0
35669	144	8	8			28	333	0.09	28	357	0.08	7641	0.0	0.0	7124	0.0	0.0
35670	186	8	8			37	297	0.12	37	318	0.12	6924	0.0	0.0	6918	0.0	0.0
35672	329	8	8			28	1,504	0.02	28	1,614	0.02	6405	0.0	0.0	6440	0.0	0.0
35673	213	8	8			67	860	0.08	67	862	0.08	6499	0.0	0.0	6125	0.0	0.0
35674	224	8	8			1	640	0.00	1	641	0.00	6177	0.0	0.0	5746	0.0	0.0
35675	460	18	18			139	3,503	0.04	139	3,503	0.04	5644	0.0	0.0	5872	0.0	0.0
35676	563	8	8			15	372	0.04	15	372	0.04	5314	0.0	0.0	5706	0.0	0.0
35677	390	8	8			30	397	0.08	1	397	0.00	5404	2.2	0.0	4934	0.0	0.0
35678	308	8	8			2	761	0.00	2	762	0.00	7147	0.0	0.0	4568	0.0	0.0
35679	123	8	8			29	1,110	0.03	29	1,112	0.03	4841	0.0	0.0	4437	0.0	0.0
35680	253	10	10			58	818	0.07	58	885	0.07	4373	0.0	0.0	4042	0.0	0.0
35681	179	6	6			1	408	0.00	1	408	0.00	3862	0.0	0.0	3918	0.0	0.0
35682	350	10	10			237	706	0.34	237	705	0.34	5494	0.0	0.0	3420	0.0	0.0
35683	70	8	8			0	383	0.00	0	384	0.00	3593	0.0	0.0	3244	0.0	0.0
35684	208	8	8			10	1,707	0.01	10	1,851	0.01	2959	0.0	0.0	2683	0.0	0.0
35685	300	8	8			10	1,363	0.01	10	1,478	0.01	2819	0.0	0.0	2585	0.0	0.0
35686	300	8	8			19	350	0.05	19	351	0.05	2261	0.0	0.0	2418	0.0	0.0
35687	533	6	6			1	143	0.00	1	143	0.00	1930	0.0	0.0	1786	5.3	0.0
35688	266	10	15	8	Existing	642	612	1.05	833	1,804	0.46	1499	3.3	0.0	7460	3.2	0.0
35689	272	8	8			62	342	0.18	62	342	0.18	1165	0.0	0.0	1147	0.0	0.0
35690	173	8	8			65	485	0.13	65	485	0.13	1321	0.0	0.0	1300	0.0	0.0
35691	145	8	8			21	688	0.03	21	688	0.03	1318	0.0	0.0	1317	0.0	0.0
35692	333	12	12			383	1,429	0.27	383	1,429	0.27	1380	0.0	0.0	1381	0.0	0.0
35693	250	8	8			3	401	0.01	3	402	0.01	1395	0.0	0.0	1396	0.0	0.0
35694	233	8	8			5	565	0.01	5	566	0.01	1432	0.0	0.0	1431	0.0	0.0
35695	371	6	6			1	121	0.01	1	121	0.01	7448	0.0	0.0	7446	0.0	0.0
35696	289	8	8			81	239	0.34	81	240	0.34	1556	0.0	0.0	1557	0.0	0.0
35697	333	8	8			349	606	0.58	349	607	0.58	7220	0.0	0.0	6992	0.0	0.0
35698	220	6	6			1	206	0.00	1	206	0.00	1596	0.0	0.0	1591	0.0	0.0
35699	300	8	8			33	312	0.10	33	312	0.10	1611	0.0	0.0	1612	0.0	0.0
35700	320	8	8			193	284	0.68	193	285	0.68	1703	3.8	0.0	1691	5.0	0.0
35701	294	6	6			65	184	0.35	65	184	0.35	1681	0.0	0.0	7225	0.0	0.0
35702	327	6	6			68	159	0.43	68	159	0.43	1717	0.0	0.0	1680	2.0	0.0
35703	325	6	6			6	147	0.04	1	147	0.01	7458	0.0	0.0	1810	5.0	0.0
35704	252	8	8			38	278	0.14	1	278	0.00	1774	4.4	0.0	1775	3.4	0.0
35705	439	8	8			66	295	0.22	1	296	0.00	1829	2.6	0.0	1828	1.5	0.0
35706	7	10	10			753	1,627	0.46	1,025	1,625	0.63	1928	5.7	0.0	7465	5.8	0.0
35707	241	6	6			69	255	0.27	69	255	0.27	1906	0.0	0.0	1905	0.0	0.0
35708	297	8	8			146	890	0.16	1	891	0.00	7463	0.0	0.0	1920	2.7	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35709	305	8	8			1	449	0.00	1	450	0.00	1926	0.0	0.0	1925	0.0	0.0
35710	328	8	8			1	405	0.00	1	406	0.00	1991	0.0	0.0	1993	0.0	0.0
35711	38	8	8			216	292	0.74	217	292	0.74	2136	0.0	0.0	2140	0.0	0.0
35712	140	8	8			28	389	0.07	28	390	0.07	2112	0.0	0.0	2111	0.0	0.0
35713	262	10	10			35	540	0.06	35	540	0.06	2179	0.0	0.0	2177	0.0	0.0
35714	438	8	8			342	344	0.99	342	344	0.99	2204	0.0	0.0	2203	5.8	5.8
35715	182	10	10			465	515	0.90	486	515	0.94	2265	3.2	0.0	2263	2.5	0.0
35716	190	8	8			33	377	0.09	31	378	0.08	2291	5.6	0.0	2290	4.0	0.0
35717	177	8	8			1	376	0.00	1	376	0.00	2300	0.0	0.0	2293	0.0	0.0
35718	225	8	8			8	345	0.02	8	345	0.02	2392	0.0	0.0	2394	0.0	0.0
35719	415	8	8			8	352	0.02	8	353	0.02	7393	0.0	0.0	2456	0.0	0.0
35720	250	6	6			8	499	0.02	8	540	0.01	2550	0.0	0.0	2551	0.0	0.0
35722	58	8	8			13	356	0.04	13	386	0.03	2572	0.0	0.0	2571	0.0	0.0
35723	67	8	8			19	1,453	0.01	19	1,577	0.01	2664	0.0	0.0	2665	0.0	0.0
35724	43	8	12	37	ura	683	561	1.22	1,080	1,792	0.60	2734	3.8	0.0	2720	4.1	0.0
35725	308	8	8			134	684	0.20	134	742	0.18	2726	0.0	0.0	2725	0.0	0.0
35726	113	8	8			0	342	0.00	0	372	0.00	2708	0.0	0.0	7178	0.0	0.0
35727	379	8	8			218	1,427	0.15	218	1,429	0.15	2824	0.0	0.0	2825	0.0	0.0
35728	155	8	8			1	1,186	0.00	1	1,286	0.00	2913	0.0	0.0	2965	0.0	0.0
35729	178	6	6			0	199	0.00	0	215	0.00	2905	0.0	0.0	2972	0.0	0.0
35730	335	8	8			82	565	0.15	82	565	0.14	3022	0.0	0.0	7399	2.3	0.0
35731	248	12	12			433	831	0.52	433	831	0.52	3135	0.0	0.0	3091	0.0	0.0
35732	174	8	8			15	462	0.03	15	463	0.03	3121	0.0	0.0	3122	0.0	0.0
35733	138	8	8			4	340	0.01	4	340	0.01	7264	0.0	0.0	3174	0.0	0.0
35734	279	8	8			1	344	0.00	1	344	0.00	3189	0.0	0.0	3198	0.0	0.0
35735	300	8	8			1	402	0.00	1	403	0.00	3257	0.0	0.0	3264	0.0	0.0
35736	366	8	8			53	294	0.18	1	294	0.00	3308	0.0	0.0	3360	1.7	0.0
35737	360	8	8			106	316	0.33	189	317	0.60	3312	4.2	0.0	3313	2.8	5.3
35738	323	8	8			47	344	0.14	47	344	0.14	3369	0.0	0.0	3315	0.0	0.0
35739	7	12	12			440	1,183	0.37	440	1,183	0.37	3419	0.0	0.0	7274	0.0	0.0
35740	381	14	18	10	Existing	1,831	1,362	1.34	2,312	2,662	0.87	10106	5.6	0.0	3438	8.3	0.0
35741	132	8	8			142	260	0.55	142	260	0.55	3449	7.5	0.0	7035	4.1	0.0
35742	92	15	24	6	Existing	2,055	1,666	1.23	3,827	5,833	0.66	7036	8.8	0.0	3417	0.0	0.0
35743	185	8	8			184	422	0.44	184	422	0.44	3513	0.0	0.0	7275	0.0	0.0
35744	186	8	8			1	1,207	0.00	1	1,208	0.00	3569	0.0	0.0	3559	0.0	0.0
35745	224	6	6			1	276	0.00	1	276	0.00	3626	0.0	0.0	3645	0.0	0.0
35746	282	8	8			81	942	0.09	81	1,022	0.08	3703	0.0	0.0	7279	0.0	0.0
35748	200	6	6			1	539	0.00	1	539	0.00	3789	0.0	0.0	3808	0.0	0.0
35749	161	8	8			20	1,303	0.02	20	1,304	0.02	3804	0.0	0.0	3805	0.0	0.0
35750	120	8	8			317	898	0.35	317	899	0.35	3835	0.0	0.0	3843	0.0	0.0
35751	112	10	10			184	766	0.24	184	765	0.24	3820	0.0	0.0	3819	0.0	0.0
35752	118	6	6			0	345	0.00	0	345	0.00	3787	0.0	0.0	3850	0.0	0.0
35753	334	8	8			11	1,138	0.01	11	1,139	0.01	3910	0.0	0.0	3914	0.0	0.0
35754	39	8	8			58	1,002	0.06	58	1,087	0.05	3983	0.0	0.0	7050	0.0	0.0
35756	49	10	15	43	2036	701	544	1.29	1,212	1,738	0.70	4083	6.6	0.0	4109	7.3	0.0
35757	344	8	8			0	1,156	0.00	0	1,157	0.00	7538	0.0	0.0	4084	0.0	0.0
35758	127	8	8			23	781	0.03	23	781	0.03	4044	0.0	0.0	4043	0.0	0.0
35759	480	15	15			638	1,297	0.49	638	1,405	0.45	7294	0.0	0.0	4094	0.0	0.0
35761	238	8	8			119	495	0.24	119	496	0.24	4161	0.0	0.0	4160	0.0	0.0
35762	89	8	8			0	290	0.00	0	291	0.00	4231	0.0	0.0	4230	0.0	0.0
35763	117	8	8			13	292	0.04	13	317	0.04	4345	0.0	0.0	4307	0.0	0.0
35764	176	8	8			1	1,404	0.00	1	1,523	0.00	4401	0.0	0.0	4400	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35765	190	8	8			26	1,009	0.03	26	1,010	0.03	7145	0.0	0.0	4448	0.0	0.0
35766	285	8	8			10	1,569	0.01	10	1,571	0.01	4504	0.0	0.0	4528	0.0	0.0
35767	206	8	8			26	971	0.03	26	972	0.03	4542	0.0	0.0	4543	0.0	0.0
35768	269	8	8			0	1,965	0.00	0	1,967	0.00	7189	0.0	0.0	4563	0.0	0.0
35769	40	8	8			44	542	0.08	44	543	0.08	4583	0.0	0.0	4605	0.0	0.0
35770	240	8	8			6	1,212	0.00	6	1,214	0.00	7146	0.0	0.0	4662	0.0	0.0
35771	195	8	8			13	2,189	0.01	13	2,192	0.01	7411	0.0	0.0	4697	0.0	0.0
35772	154	8	8			195	1,303	0.15	195	1,305	0.15	4756	0.0	0.0	4757	0.0	0.0
35773	225	8	8			7	1,982	0.00	7	1,984	0.00	4795	0.0	0.0	4794	0.0	0.0
35774	182	6	6			1	581	0.00	1	581	0.00	4707	0.0	0.0	4791	0.0	0.0
35775	101	8	8			1	1,323	0.00	1	1,325	0.00	4718	0.0	0.0	4717	0.0	0.0
35776	52	8	8			35	530	0.07	35	531	0.07	4727	0.0	0.0	4728	0.0	0.0
35777	400	8	8			2	2,040	0.00	2	2,042	0.00	7567	0.0	0.0	4812	0.0	0.0
35778	99	8	8			10	1,225	0.01	10	1,227	0.01	4897	0.0	0.0	4896	0.0	0.0
35779	249	8	8			1	1,163	0.00	1	1,165	0.00	7077	0.0	0.0	4982	0.0	0.0
35780	500	12	12			1,535	3,274	0.47	1,969	3,274	0.60	7572	0.0	0.0	4973	0.0	0.0
35781	140	8	8			126	860	0.15	126	861	0.15	7329	0.0	0.0	5059	0.0	0.0
35783	115	8	8			14	1,815	0.01	14	1,817	0.01	5094	0.0	0.0	5093	0.0	0.0
35784	154	8	8			1	2,134	0.00	1	2,137	0.00	5106	0.0	0.0	5105	0.0	0.0
35785	250	6	6			1	792	0.00	1	792	0.00	5127	0.0	0.0	5148	0.0	0.0
35786	172	8	8			53	1,265	0.04	53	1,266	0.04	5161	0.0	0.0	8641	0.0	0.0
35787	20	8	8			47	1,092	0.04	47	1,093	0.04	5195	0.0	0.0	5194	0.0	0.0
35788	24	8	8			0	657	0.00	0	658	0.00	5236	0.0	0.0	5205	0.0	0.0
35789	175	8	8			1	1,124	0.00	1	1,126	0.00	5226	0.0	0.0	5167	0.0	0.0
35790	261	6	6			1	573	0.00	1	573	0.00	5240	0.0	0.0	7086	0.0	0.0
35791	260	8	8			148	488	0.30	147	488	0.30	5283	4.0	0.0	5281	0.0	0.0
35792	191	8	8			1	261	0.00	1	262	0.00	5320	0.0	0.0	5322	0.0	0.0
35793	275	8	8			7	692	0.01	7	693	0.01	5406	0.0	0.0	5413	0.0	0.0
35794	378	8	8			16	399	0.04	16	399	0.04	5526	0.0	0.0	5518	0.0	0.0
35795	100	8	8			1	670	0.00	1	671	0.00	5469	0.0	0.0	5456	0.0	0.0
35796	120	10	10			524	583	0.90	515	583	0.88	5464	0.0	0.0	5463	2.2	0.0
35797	300	8	8			45	474	0.10	45	474	0.10	5568	0.0	0.0	5582	0.0	0.0
35798	264	8	8			635	342	1.86	170	342	0.50	5570	8.2	0.0	5573	0.0	0.0
35799	155	8	8			1	343	0.00	1	344	0.00	5620	0.0	0.0	5621	0.0	0.0
35800	250	8	15	19	Existing	559	297	1.88	1,188	1,589	0.75	5677	1.0	0.0	5673	0.0	0.0
35801	238	8	8			53	638	0.08	53	638	0.08	5707	0.0	0.0	5708	0.0	0.0
35802	80	8	8			48	302	0.16	48	302	0.16	5780	0.0	0.0	5779	0.0	0.0
35803	277	8	8			37	685	0.05	37	686	0.05	5778	0.0	0.0	5838	0.0	0.0
35804	480	8	8			56	462	0.12	56	463	0.12	5842	0.0	0.0	5841	0.0	0.0
35805	59	10	15	18	Existing	458	333	1.38	801	981	0.82	5860	4.9	0.0	5838	0.0	0.0
35808	302	10	10			566	341	1.66	566	341	1.66	5969	7.1	7.1	5977	0.0	0.0
35809	63	8	8			96	412	0.23	96	413	0.23	6080	0.0	0.0	7612	0.0	0.0
35810	106	8	8			6	1,719	0.00	6	1,721	0.00	6023	0.0	0.0	6065	0.0	0.0
35811	121	8	8			0	958	0.00	0	959	0.00	6029	0.0	0.0	6052	0.0	0.0
35812	150	8	8			1	1,481	0.00	1	1,483	0.00	6104	0.0	0.0	7107	0.0	0.0
35813	67	8	8			2	350	0.01	61	351	0.17	7709	0.0	4.8	6109	0.0	4.9
35814	182	6	6			33	372	0.09	33	372	0.09	6182	0.0	0.0	7426	0.0	0.0
35815	51	8	8			31	401	0.08	31	402	0.08	6223	0.0	0.0	6224	0.0	0.0
35816	295	18	24	41	2036	3,174	2,883	1.10	3,824	6,210	0.62	6195	2.1	0.0	7110	1.9	0.0
35817	415	8	8			10	298	0.03	10	320	0.03	6327	0.0	0.0	7729	0.0	0.0
35818	395	8	8			10	867	0.01	10	930	0.01	7621	0.0	0.0	7427	0.0	0.0
35819	152	8	8			25	738	0.03	25	792	0.03	6346	0.0	0.0	7622	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35820	56	6	6			0	170	0.00	0	182	0.00	6277	0.0	0.0	6342	0.0	0.0
35821	113	8	8			0	300	0.00	0	322	0.00	6281	0.0	0.0	7159	0.0	0.0
35822	65	8	8			219	2,189	0.10	219	2,192	0.10	6399	0.0	0.0	6400	0.0	0.0
35823	105	8	8			488	1,185	0.41	488	1,188	0.41	6462	0.0	0.0	6461	0.0	0.0
35824	141	8	8			364	592	0.62	364	592	0.61	6503	0.0	0.0	6433	0.0	0.0
35825	335	8	12	22	ura	650	334	1.95	651	1,055	0.62	7430	0.6	0.0	6529	0.0	0.0
35826	331	8	8			77	719	0.11	77	772	0.10	7632	0.0	0.0	7373	0.0	0.0
35827	78	8	8			15	297	0.05	15	318	0.05	6605	0.0	0.0	6606	0.0	0.0
35828	111	8	8			0	509	0.00	0	546	0.00	6616	0.0	0.0	7375	0.0	0.0
35829	132	8	8			0	298	0.00	0	319	0.00	6608	0.0	0.0	6660	0.0	0.0
35830	60	8	8			0	616	0.00	0	661	0.00	6708	0.0	0.0	6680	0.0	0.0
35832	405	8	8			1	84	0.02	1	85	0.02	6842	0.0	0.0	6841	0.0	0.0
35833	14	8	8			0	333	0.00	0	357	0.00	6852	0.0	0.0	6817	0.0	0.0
35834	159	8	8			265	211	1.26	265	228	1.16	3781	0.0	0.0	9229	0.0	0.0
35834_1	287	8	8			278	421	0.66	278	457	0.61	9229	0.0	0.0	2866	0.0	0.0
35835	94	10	15	2	Existing	838	786	1.07	1,412	2,317	0.61	1912	0.9	0.0	2014	0.5	0.0
35836	320	8	8			34	328	0.10	34	328	0.10	1629	0.0	0.0	1630	0.0	0.0
35837	180	6	6			11	183	0.06	1	183	0.00	1752	7.9	0.0	1787	5.5	0.0
35838	280	10	10			201	822	0.25	169	821	0.21	1965	5.6	0.0	7387	1.6	0.0
35839	231	6	6			59	163	0.36	1	163	0.00	2015	1.5	0.0	7388	1.6	0.0
35841	201	8	8			14	672	0.02	14	730	0.02	2497	0.0	0.0	2498	0.0	0.0
35842	40	8	8			47	932	0.05	47	1,010	0.05	2628	0.0	0.0	2627	0.0	0.0
35843	364	10	10			115	662	0.17	115	717	0.16	2778	0.0	0.0	2777	0.0	0.0
35844	254	8	8			0	761	0.00	0	826	0.00	2754	0.0	0.0	7252	0.0	0.0
35845	135	8	8			1	1,572	0.00	1	1,574	0.00	7398	0.0	0.0	2942	0.0	0.0
35846	115	8	8			217	388	0.56	216	389	0.56	3019	0.0	0.0	3020	6.8	0.0
35847	86	6	6			3	169	0.02	3	169	0.02	3073	0.0	0.0	7501	0.0	0.0
35849	44	10	10			40	574	0.07	40	622	0.06	3732	0.0	0.0	3709	0.0	0.0
35850	195	8	8			42	514	0.08	42	558	0.07	3905	0.0	0.0	3984	0.0	0.0
35851	500	8	8			92	441	0.21	92	442	0.21	4184	0.0	0.0	4152	0.0	0.0
35852	93	8	8			1	297	0.00	1	297	0.00	4177	0.0	0.0	4211	0.0	0.0
35853	288	8	8			0	367	0.00	0	367	0.00	4334	0.0	0.0	4333	0.0	0.0
35854	80	8	8			544	518	1.05	544	562	0.97	4367	6.0	6.1	4359	0.0	0.0
35855	160	8	8			194	315	0.61	194	316	0.61	4484	0.0	0.0	4432	0.0	0.0
35856	420	8	8			408	715	0.57	408	716	0.57	4640	0.0	0.0	4667	0.0	0.0
35857	55	8	8			0	1,099	0.00	0	1,100	0.00	7691	0.0	0.0	4841	0.0	0.0
35858	242	8	8			0	1,208	0.00	0	1,210	0.00	4850	0.0	0.0	4858	0.0	0.0
35859	372	8	8			14	1,724	0.01	14	1,726	0.01	4901	0.0	0.0	4903	0.0	0.0
35860	150	8	8			1	1,309	0.00	1	1,310	0.00	4947	0.0	0.0	4948	0.0	0.0
35861	200	8	8			5	1,058	0.00	5	1,060	0.00	5423	0.0	0.0	5379	0.0	0.0
35862	125	8	8			8	1,224	0.01	8	1,225	0.01	5428	0.0	0.0	7340	0.0	0.0
35863	104	8	8			2	1,015	0.00	2	1,016	0.00	5359	0.0	0.0	5358	0.0	0.0
35864	152	8	8			4	295	0.01	4	296	0.01	5353	0.0	0.0	5354	0.0	0.0
35865	255	6	6			1	193	0.00	1	193	0.00	5615	0.0	0.0	7421	0.0	0.0
35867	360	8	8			1	479	0.00	1	480	0.00	6163	0.0	0.0	6156	0.0	0.0
35868	222	8	8			1	1,273	0.00	1	1,275	0.00	6416	0.0	0.0	7368	0.0	0.0
35869	116	8	8			0	1,664	0.00	0	1,666	0.00	6415	0.0	0.0	6448	0.0	0.0
35870	145	8	8			0	342	0.00	0	367	0.00	6565	0.0	0.0	6566	0.0	0.0
35872	324	10	10			158	399	0.40	158	427	0.37	7433	0.0	0.0	6895	0.0	0.0
35873	257	8	8			38	293	0.13	38	315	0.12	7644	0.0	0.0	6906	0.0	0.0
35874	480	8	8			321	299	1.07	321	299	1.07	4261	1.7	1.6	7143	0.0	0.0
35875	240	8	8			4	692	0.01	4	692	0.01	7287	0.0	0.0	3766	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35876	498	8	8			12	408	0.03	12	409	0.03	1230	0.0	0.0	1149	0.0	0.0
35877	20	8	8			0	2,024	0.00	0	2,197	0.00	1112	0.0	0.0	1102	0.0	0.0
35878	255	8	8			67	493	0.14	67	494	0.14	7214	0.0	0.0	1373	0.0	0.0
35879	290	8	8			1	343	0.00	1	344	0.00	1404	0.0	0.0	1403	0.0	0.0
35880	178	8	8			58	692	0.08	58	693	0.08	1369	0.0	0.0	1370	0.0	0.0
35881	253	8	8			2	297	0.01	2	298	0.01	1489	0.0	0.0	1549	0.0	0.0
35882	382	12	15	12	2036	1,301	1,172	1.11	1,290	2,124	0.61	6990	5.6	0.0	1550	6.7	0.0
35883	355	6	6			28	158	0.18	28	158	0.18	1566	0.0	0.0	1530	0.0	0.0
35884	225	6	6			65	161	0.40	65	161	0.40	1527	0.0	0.0	1526	0.0	0.0
35885	210	8	8			58	293	0.20	58	294	0.20	1731	0.0	0.0	1697	0.0	0.0
35886	375	10	15	2	Existing	835	808	1.03	1,410	2,381	0.59	1872	1.2	0.0	1911	1.0	0.0
35887	362	8	8			162	549	0.29	197	549	0.36	1873	0.0	0.0	1874	3.4	0.0
35888	460	6	6			208	132	1.58	208	132	1.58	1958	0.0	0.0	1943	0.0	0.0
35889	290	27	27			4,325	8,520	0.51	6,564	8,520	0.77	2020	0.0	0.0	1990	0.0	0.0
35890	332	8	8			14	343	0.04	14	344	0.04	2117	0.0	0.0	2136	0.0	0.0
35891	76	33	33			7,603	10,546	0.72	10,030	10,546	0.95	7390	0.0	0.0	7238	0.0	0.0
35892	498	8	8			13	344	0.04	13	344	0.04	2210	0.0	0.0	2209	0.0	0.0
35893	340	8	8			18	487	0.04	18	488	0.04	2280	0.0	0.0	2279	0.0	0.0
35894	23	8	8			29	759	0.04	29	760	0.04	2345	0.0	0.0	7392	0.0	0.0
35895	18	8	8			334	495	0.67	334	496	0.67	2422	0.0	0.0	2423	0.0	0.0
35897	234	6	6			5	480	0.01	5	520	0.01	2547	0.0	0.0	2597	0.0	0.0
35898	370	12	12			54	1,603	0.03	54	1,737	0.03	2660	0.0	0.0	2665	0.0	0.0
35899	301	21	21			3,674	9,890	0.37	5,099	10,714	0.48	2908	0.0	0.0	2948	0.0	0.0
35900	275	8	8			11	543	0.02	11	544	0.02	3061	0.0	0.0	3060	0.0	0.0
35901	353	8	8			21	332	0.06	21	332	0.06	3038	0.0	0.0	3039	0.0	0.0
35902	136	8	8			76	389	0.19	76	390	0.19	3110	0.0	0.0	3080	0.0	0.0
35903	140	8	8			1	399	0.00	1	400	0.00	3205	0.0	0.0	3204	0.0	0.0
35904	358	10	10			460	1,056	0.44	460	1,055	0.44	3248	0.0	0.0	3266	0.0	0.0
35906	80	15	15			481	1,890	0.25	481	1,890	0.25	3298	0.0	0.0	3299	0.0	0.0
35907	445	15	15			1,661	1,706	0.97	1,703	1,706	1.00	3341	5.3	5.6	3381	6.1	6.5
35909	187	24	24			1	25,104	0.00	1	25,104	0.00	3479	0.0	0.0	3484	0.0	0.0
35910	123	8	8			87	364	0.24	85	365	0.23	3489	10.2	0.0	3488	8.1	0.0
35911	33	8	8			1	441	0.00	1	441	0.00	3445	0.0	0.0	3500	0.0	0.0
35912	292	6	6			19	267	0.07	19	267	0.07	3609	0.0	0.0	7277	0.0	0.0
35913	175	8	8			53	501	0.11	53	501	0.11	3589	0.0	0.0	3590	0.0	0.0
35914	185	6	6			1	262	0.00	1	262	0.00	3549	0.0	0.0	3601	0.0	0.0
35915	50	8	8			1	1,703	0.00	1	1,706	0.00	7518	0.0	0.0	3591	0.0	0.0
35916	200	8	8			0	345	0.00	0	374	0.00	3706	0.0	0.0	3705	0.0	0.0
35917	74	8	8			0	446	0.00	0	483	0.00	7521	0.0	0.0	3660	0.0	0.0
35918	232	8	8			231	935	0.25	231	1,015	0.23	7522	0.0	0.0	3674	0.0	0.0
35919	159	8	8			3	784	0.00	3	850	0.00	3692	0.0	0.0	3693	0.0	0.0
35920	293	6	6			26	252	0.10	26	252	0.10	3864	0.0	0.0	3821	0.0	0.0
35921	265	8	8			1	1,001	0.00	1	1,002	0.00	3876	0.0	0.0	7046	0.0	0.0
35922	23	8	8			292	1,160	0.25	292	1,161	0.25	3827	0.0	0.0	7528	0.0	0.0
35923	322	6	6			1	255	0.00	1	255	0.00	3912	0.0	0.0	3913	0.0	0.0
35924	146	8	8			249	949	0.26	249	951	0.26	3960	0.0	0.0	3968	0.0	0.0
35925	468	8	8			101	576	0.17	101	576	0.17	7536	0.0	0.0	4059	0.0	0.0
35926	176	6	6			5	424	0.01	5	460	0.01	4023	0.0	0.0	4114	3.0	0.0
35927	131	8	8			6	335	0.02	6	363	0.02	4040	0.0	0.0	4098	0.0	0.0
35928	180	8	8			12	596	0.02	12	597	0.02	4150	0.0	0.0	4176	0.0	0.0
35929	301	8	8			14	964	0.01	14	965	0.01	7298	0.0	0.0	4242	0.0	0.0
35930	100	8	8			1	556	0.00	1	557	0.00	4336	0.0	0.0	4335	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35931	136	8	8			160	1,113	0.14	160	1,115	0.14	4325	0.0	0.0	4324	0.0	0.0
35932	377	8	8			78	1,250	0.06	78	1,252	0.06	4428	0.0	0.0	4469	0.0	0.0
35933	157	8	8			8	1,926	0.00	8	1,928	0.00	4623	0.0	0.0	7559	0.0	0.0
35934	367	8	8			74	1,774	0.04	74	1,776	0.04	4765	0.0	0.0	4764	0.0	0.0
35935	32	8	8			210	1,148	0.18	210	1,149	0.18	5077	0.0	0.0	5081	0.0	0.0
35936	291	8	8			253	371	0.68	253	372	0.68	5063	0.0	0.0	5085	0.0	0.0
35937	169	8	8			1	830	0.00	1	831	0.00	5096	0.0	0.0	5045	0.0	0.0
35938	189	6	6			2	624	0.00	2	624	0.00	5042	0.0	0.0	5041	0.0	0.0
35939	52	8	8			310	415	0.75	310	416	0.74	5220	0.0	0.0	5219	0.0	0.0
35940	237	8	8			1	1,147	0.00	1	1,149	0.00	5310	0.0	0.0	5309	0.0	0.0
35941	310	8	8			1	540	0.00	1	542	0.00	5249	0.0	0.0	7088	0.0	0.0
35942	132	8	8			1	1,050	0.00	1	1,051	0.00	5268	0.0	0.0	5269	0.0	0.0
35943	322	8	8			13	1,213	0.01	13	1,215	0.01	5312	0.0	0.0	5313	0.0	0.0
35944	17	6	6			0	331	0.00	0	331	0.00	5533	0.0	0.0	5513	0.0	0.0
35945	190	8	8			12	1,222	0.01	12	1,223	0.01	5479	0.0	0.0	5452	0.0	0.0
35946	279	15	15			631	3,661	0.17	631	3,661	0.17	5453	0.0	0.0	5449	0.0	0.0
35947	272	18	18			1,180	2,054	0.57	1,181	2,054	0.57	7341	0.0	0.0	5467	0.0	0.0
35948	334	12	18	19	Existing	806	703	1.15	1,480	2,074	0.71	5709	3.6	0.0	5710	5.2	0.0
35949	490	8	8			42	1,059	0.04	42	1,060	0.04	5727	0.0	0.0	5675	0.0	0.0
35950	218	8	8			38	343	0.11	38	343	0.11	5761	0.0	0.0	5762	0.0	0.0
35951	500	8	8			30	420	0.07	30	421	0.07	5768	0.0	0.0	5774	0.0	0.0
35952	245	8	8			1	397	0.00	1	397	0.00	5886	0.0	0.0	5862	0.0	0.0
35953	29	8	8			123	816	0.15	123	817	0.15	5962	0.0	0.0	5961	0.0	0.0
35954	350	8	8			98	1,163	0.08	98	1,164	0.08	6113	0.0	0.0	6115	0.0	4.7
35955	74	8	8			1	913	0.00	1	914	0.00	6062	0.0	0.0	6061	0.0	0.0
35956	118	15	15			2,668	2,992	0.89	3,338	2,992	1.12	6133	0.0	0.0	6098	0.0	0.0
35957	162	18	18			2,585	6,374	0.41	3,261	6,374	0.51	6044	0.0	0.0	6085	0.0	0.0
35959	87	6	6			0	140	0.00	0	151	0.00	6264	0.0	0.0	6311	0.0	0.0
35960	125	8	8			255	470	0.54	81	504	0.16	6300	0.0	0.0	6285	0.0	0.0
35961	315	8	8			239	610	0.39	239	610	0.39	6406	0.0	0.0	6402	0.0	0.0
35962	180	8	8			28	297	0.10	28	319	0.09	6618	0.0	0.0	6617	0.0	0.0
35963	152	8	8			72	387	0.18	72	415	0.17	6635	0.0	0.0	6656	0.0	0.0
35964	405	15	15			1,046	2,747	0.38	1,221	2,943	0.41	7634	0.0	0.0	6665	0.0	0.0
35965	249	8	8			0	346	0.00	0	372	0.00	6794	0.0	0.0	6796	0.0	0.0
35966	117	8	8			0	328	0.00	0	352	0.00	6762	0.0	0.0	6764	0.0	0.0
35967	340	8	8			17	472	0.04	17	506	0.03	6810	0.0	0.0	7642	0.0	0.0
35969	220	8	8			0	297	0.00	0	319	0.00	8440	0.0	0.0	6916	0.0	0.0
35970	322	8	8			188	453	0.41	12	487	0.02	7429	0.0	0.0	6293	0.0	0.0
35971	352	8	8			17	404	0.04	17	405	0.04	6160	0.0	0.0	6221	0.0	0.0
35972	55	8	8			11	329	0.03	11	330	0.03	5393	0.0	0.0	5257	0.0	0.0
35973	17	8	8			37	806	0.05	37	808	0.05	4893	0.0	0.0	5028	0.0	0.0
35974	212	8	8			6	1,492	0.00	6	1,494	0.00	4582	0.0	0.0	4659	0.0	0.0
35976	293	8	8			1	310	0.00	1	310	0.00	1597	0.0	0.0	1505	0.0	0.0
35977	288	6	6			56	213	0.26	56	213	0.26	1684	0.0	0.0	7454	0.0	0.0
35978	325	33	33			7,751	10,936	0.71	10,160	10,936	0.93	2171_2	0.0	0.0	7172	0.0	0.0
35979	170	10	10			510	528	0.97	546	527	1.04	2263	2.5	0.0	2250	3.7	0.0
35980	135	8	8			1	349	0.00	1	350	0.00	2231	0.0	0.0	2276	0.0	0.0
35981	120	8	8			19	1,094	0.02	19	1,187	0.02	2543	0.0	0.0	2538	0.0	0.0
35982	106	8	8			13	823	0.02	13	893	0.01	2573	0.0	0.0	2572	0.0	0.0
35983	98	8	8			4	778	0.01	4	845	0.00	7178	0.0	0.0	2774	0.0	0.0
35984	246	21	21			4,221	7,155	0.59	5,610	7,751	0.72	2878	0.0	0.0	2867	0.0	4.9
35985	175	15	24	6	Existing	2,011	1,680	1.20	3,785	5,883	0.64	3414	6.4	0.0	3415	7.4	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
35986	120	8	8			1	926	0.00	1	1,005	0.00	7525	0.0	0.0	3778	0.0	0.0
35987	117	10	15	43	2036	697	636	1.10	1,190	2,033	0.59	4072	0.0	0.0	4073	1.3	0.0
35988	310	10	12	14	Existing	407	967	0.42	974	1,572	0.62	4163	0.0	0.0	4205	0.0	0.0
35989	186	8	8			12	1,435	0.01	12	1,438	0.01	4647	0.0	0.0	4663	0.0	0.0
35990	223	8	8			15	2,328	0.01	15	2,331	0.01	4761	0.0	0.0	4777	0.0	0.0
35991	295	6	6			16	560	0.03	16	560	0.03	5129	0.0	0.0	7082	0.0	0.0
35992	185	8	8			24	703	0.03	24	704	0.03	7332	0.0	0.0	5178	0.0	0.0
35993	70	8	8			3	178	0.02	3	178	0.02	5408	0.0	0.0	5409	0.0	0.0
35994	80	8	8			30	735	0.04	30	735	0.04	5477	0.0	0.0	7092	0.0	0.0
35995	272	8	8			118	440	0.27	118	440	0.27	5551	0.0	0.0	5571	0.0	0.0
35996	594	16	16			1	3,056	0.00	1	3,054	0.00	5578	0.0	0.0	5575	0.0	0.0
35997	330	8	8			26	660	0.04	26	660	0.04	5714	0.0	0.0	5673	0.0	0.0
35998	320	8	8			36	508	0.07	28	509	0.06	5825	0.0	0.0	5856	1.0	0.0
35999	239	8	8			12	1,553	0.01	12	1,555	0.01	7613	0.0	0.0	7612	0.0	0.0
36000	74	8	8			0	309	0.00	0	332	0.00	6269	0.0	0.0	6301	0.0	0.0
36001	158	8	8			0	1,567	0.00	0	1,569	0.00	6364	0.0	0.0	6362	0.0	0.0
36002	210	8	8			0	854	0.00	0	917	0.00	6350	0.0	0.0	6351	0.0	0.0
36003	184	8	8			7	915	0.01	7	917	0.01	7626	0.0	0.0	6499	0.0	0.0
36004	168	8	8			0	463	0.00	0	497	0.00	6584	0.0	0.0	6589	0.0	0.0
36005	228	18	24	25	2036	3,663	3,325	1.10	5,565	7,673	0.73	6707	3.7	0.0	6705	4.0	0.0
36006	517	8	8			329	406	0.81	329	407	0.81	6243	0.0	0.0	6006	0.0	0.0
36010	177	12	21	27	2036	1,491	608	2.45	1,651	2,894	0.57	6710	0.0	0.0	7637	0.1	0.0
36011	170	8	8			24	333	0.07	24	333	0.07	5793	0.0	0.0	5690	0.0	0.0
36012	358	8	8			0	478	0.00	0	519	0.00	4370	0.0	0.0	4068	0.0	0.0
36013	80	12	12			1,409	1,788	0.79	1,862	1,937	0.96	4228	0.0	0.0	2606	0.0	0.0
36014	273	15	18	1	ura	1,402	1,110	1.26	1,491	1,805	0.83	7469	0.0	0.0	2451	0.0	0.0
36015	265	8	8			185	277	0.67	185	278	0.67	1680	2.0	0.0	1806	0.0	0.0
36016	176	8	8			92	383	0.24	92	384	0.24	1324	0.0	0.0	1296	0.0	0.0
36017	230	8	8			3	556	0.01	3	556	0.01	1433	0.0	0.0	1432	0.0	0.0
36018	351	8	8			123	340	0.36	122	340	0.36	1615	7.3	0.0	1642	4.4	0.0
36019	330	8	8			32	321	0.10	32	322	0.10	1618	0.0	0.0	1611	0.0	0.0
36020	320	6	6			69	199	0.35	69	199	0.35	7167	0.0	0.0	7386	0.0	0.0
36021	200	6	6			28	144	0.19	1	144	0.00	1814	0.0	0.0	1812	2.3	0.0
36022	240	6	6			1	277	0.01	1	277	0.01	7169	0.0	0.0	1878	0.0	0.0
36023	308	10	15	2	Existing	585	775	0.75	940	2,285	0.41	1875	2.8	0.0	1880	0.0	0.0
36024	382	8	8			1	381	0.00	1	382	0.00	2118	0.0	0.0	2120	6.0	0.0
36027	237	15	15			1,431	1,530	0.94	1,519	1,530	0.99	2451	0.0	0.0	2458	0.0	0.0
36028	77	8	8			1	1,027	0.00	1	1,115	0.00	7484	0.0	0.0	2569	0.0	0.0
36029	12	12	12			93	4,483	0.02	93	4,857	0.02	2696	0.0	0.0	2620	0.0	0.0
36030	406	8	8			5	1,278	0.00	5	1,386	0.00	7256	0.0	0.0	2959	0.0	0.0
36031	240	12	12			432	1,314	0.33	432	1,314	0.33	3082	0.0	0.0	3135	0.0	0.0
36032	179	8	8			76	342	0.22	76	342	0.22	3124	0.0	0.0	3125	0.0	0.0
36033	192	8	8			86	381	0.23	86	382	0.23	7503	0.0	0.0	3177	0.0	0.0
36035	232	8	8			13	361	0.03	13	362	0.03	7180	0.0	0.0	3317	0.0	0.0
36036	349	8	8			178	476	0.37	178	477	0.37	3364	0.0	0.0	7134	5.4	0.0
36037	136	8	8			1	465	0.00	1	465	0.00	3511	0.0	0.0	3510	0.0	0.0
36038	121	8	8			90	1,156	0.08	90	1,158	0.08	3951	0.0	0.0	3952	0.0	0.0
36039	102	8	8			7	1,584	0.00	7	1,719	0.00	4392	0.0	0.0	4393	0.0	0.0
36040	80	8	8			3	1,330	0.00	3	1,331	0.00	4534	0.0	0.0	4531	0.0	0.0
36041	186	8	8			23	988	0.02	23	989	0.02	4592	0.0	0.0	7558	0.0	0.0
36042	170	8	8			22	1,979	0.01	22	1,982	0.01	4686	0.0	0.0	4687	0.0	0.0
36043	287	8	8			813	1,333	0.61	813	1,335	0.61	4753	0.0	0.0	4774	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36044	70	8	8			13	590	0.02	13	592	0.02	4799	0.0	0.0	4737	0.0	0.0
36045	153	8	8			12	1,210	0.01	12	1,211	0.01	4825	0.0	0.0	4824	0.0	0.0
36046	382	8	8			1	1,217	0.00	1	1,219	0.00	4958	0.0	0.0	4934	0.0	0.0
36047	201	8	8			223	1,613	0.14	223	1,615	0.14	4996	0.0	0.0	4997	0.0	0.0
36049	57	8	8			1	311	0.00	1	312	0.00	5597	0.0	0.0	5617	0.0	0.0
36050	395	10	15	18	Existing	467	326	1.43	838	963	0.87	5838	0.0	0.0	5867	8.3	0.0
36051	182	8	8			145	478	0.30	145	478	0.30	6233	0.0	0.0	6234	0.0	0.0
36052	359	8	8			1	586	0.00	1	587	0.00	6246	0.0	0.0	6245	0.0	0.0
36053	175	8	8			1	485	0.00	1	485	0.00	6189	0.0	0.0	6220	0.0	0.0
36054	170	8	8			219	2,084	0.10	219	2,087	0.10	6384	0.0	0.0	6399	0.0	0.0
36055	213	8	8			0	1,242	0.00	0	1,244	0.00	6436	0.0	0.0	7730	0.0	0.0
36056	478	8	8			0	283	0.00	0	303	0.00	7721	0.0	0.0	6837	0.0	0.0
36057	321	6	6			15	365	0.04	15	365	0.04	7039	0.0	0.0	5495	0.0	0.0
36059	225	8	8			3	362	0.01	3	362	0.01	1162	0.0	0.0	1163	0.0	0.0
36060	235	6	6			1	195	0.01	1	195	0.01	6985	0.0	0.0	1383	0.0	0.0
36061	53	8	8			17	358	0.05	17	358	0.05	1650	0.0	0.0	1649	0.0	0.0
36062	165	6	6			3	252	0.01	3	252	0.01	1655	0.0	0.0	1603	0.0	0.0
36063	194	6	12	7	Existing	140	128	1.09	233	813	0.29	1806	0.0	0.0	1805	0.1	0.0
36064	185	10	10			303	415	0.73	317	415	0.76	1787	5.5	0.0	1761	6.2	8.1
36065	215	8	8			60	213	0.28	61	213	0.29	7005	8.4	8.4	1977	10.2	10.2
36068	335	8	8			8	954	0.01	8	1,035	0.01	2551	0.0	0.0	2549	0.0	0.0
36069	208	8	8			10	485	0.02	10	526	0.02	2626	0.0	0.0	2628	0.0	0.0
36070	295	8	8			0	587	0.00	0	636	0.00	2644	0.0	0.0	2687	0.0	0.0
36071	301	8	8			0	715	0.00	0	776	0.00	2739	0.0	0.0	7252	0.0	0.0
36072	355	8	8			28	402	0.07	28	436	0.06	2717	0.0	0.0	2753	0.0	0.0
36073	360	8	8			17	2,158	0.01	17	2,341	0.01	2821	0.0	0.0	2815	0.0	0.0
36074	65	54	54			4,960	34,619	0.14	4,960	34,619	0.14	2856	0.0	0.0	2857	0.0	0.0
36075	240	6	6			0	519	0.00	0	563	0.00	2898	0.0	0.0	2964	0.0	0.0
36076	184	8	8			33	894	0.04	33	895	0.04	3768	0.0	0.0	3749	0.0	0.0
36077	176	8	8			40	1,052	0.04	40	1,053	0.04	3847	0.0	0.0	3846	0.0	0.0
36078	132	6	6			19	271	0.07	19	271	0.07	3906	0.0	0.0	7407	0.0	0.0
36079	156	8	8			6	1,042	0.01	6	1,130	0.00	3939	0.0	0.0	3956	0.0	0.0
36080	343	6	6			1	516	0.00	1	516	0.00	3904	0.0	0.0	3991	0.0	0.0
36081	240	8	8			304	569	0.53	304	569	0.53	4195	0.0	0.0	4196	0.0	0.0
36082	252	8	8			0	768	0.00	0	833	0.00	4216	0.0	0.0	4215	0.0	0.0
36083	367	8	8			31	301	0.10	31	302	0.10	4183	0.0	0.0	4184	0.0	0.0
36084	163	8	8			1	565	0.00	1	566	0.00	4320	0.0	0.0	4289	0.0	0.0
36085	128	8	8			10	612	0.02	10	613	0.02	4349	0.0	0.0	4304	0.0	0.0
36086	210	8	8			0	1,179	0.00	0	1,279	0.00	7302	0.0	0.0	4370	0.0	0.0
36087	105	8	8			67	1,146	0.06	67	1,243	0.05	4418	0.0	0.0	7551	0.0	0.0
36088	429	8	8			30	1,365	0.02	30	1,367	0.02	4437	0.0	0.0	4433	0.0	0.0
36089	93	8	8			1	944	0.00	1	946	0.00	4492	0.0	0.0	4491	0.0	0.0
36090	25	8	8			22	767	0.03	22	832	0.03	7064	0.0	0.0	4495	0.0	0.0
36091	149	8	8			53	1,936	0.03	53	1,939	0.03	4568	0.0	0.0	4567	0.0	0.0
36092	328	8	8			69	1,160	0.06	69	1,162	0.06	4655	0.0	0.0	7313	0.0	0.0
36093	377	8	8			6	898	0.01	6	899	0.01	7314	0.0	0.0	4639	0.0	0.0
36094	161	8	8			4	930	0.00	4	931	0.00	4635	0.0	0.0	4634	0.0	0.0
36095	170	8	8			125	1,340	0.09	125	1,341	0.09	4843	0.0	0.0	4842	0.0	0.0
36096	442	12	12			1,217	2,022	0.60	1,686	2,022	0.83	4877	0.0	0.0	7569	0.0	0.0
36099	353	8	8			1	1,272	0.00	1	1,274	0.00	4939	0.0	0.0	4952	1.4	0.0
36100	495	12	12			1,481	2,247	0.66	1,903	2,247	0.85	4998	0.0	0.0	4999	0.0	0.0
36101	378	8	8			60	1,210	0.05	60	1,211	0.05	7083	0.0	0.0	5175	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36102	400	8	8			353	580	0.61	353	581	0.61	5394	0.0	0.0	7194	4.5	4.5
36103	77	8	8			1	375	0.00	1	376	0.00	5334	0.0	0.0	5361	0.0	0.0
36104	321	8	8			117	749	0.16	117	751	0.16	5395	0.0	0.0	5394	0.0	0.0
36105	92	8	8			1	444	0.00	1	444	0.00	5636	0.0	0.0	7347	0.0	0.0
36106	240	8	8			1	1,144	0.00	1	1,146	0.00	5680	0.0	0.0	5681	0.0	0.0
36107	453	8	8			46	526	0.09	14	526	0.03	5854	4.5	0.0	5853	0.2	0.0
36108	377	15	15			1,339	1,674	0.80	1,338	1,674	0.80	5926	9.2	0.0	7197	7.6	0.0
36110	361	8	8			78	497	0.16	78	498	0.16	5991	0.0	0.0	5995	0.0	0.0
36111	350	10	10			308	658	0.47	308	657	0.47	6000	0.0	0.0	5999	0.0	0.0
36112	260	8	8			215	500	0.43	215	501	0.43	7617	0.0	0.0	6172	0.0	0.0
36113	349	8	8			50	909	0.06	50	910	0.05	6494	0.0	0.0	6460	0.0	0.0
36114	171	8	8			0	331	0.00	0	356	0.00	6533	0.0	0.0	6532	0.0	0.0
36115	312	8	8			13	333	0.04	13	357	0.04	6555	0.0	0.0	6534	0.0	0.0
36116	91	8	8			26	457	0.06	26	490	0.05	6700	0.0	0.0	6701	0.0	0.0
36117	257	8	8			1	301	0.00	1	322	0.00	6926	0.0	0.0	6925	0.0	0.0
36118	323	8	8			61	358	0.17	61	359	0.17	1322	0.0	0.0	7211	0.0	0.0
36119	179	8	8			37	419	0.09	37	420	0.09	1363	0.0	0.0	1361	0.0	0.0
36120	236	8	8			58	415	0.14	1	416	0.00	10240	4.5	0.0	2022	6.5	0.0
36123	138	8	8			1	1,174	0.00	1	1,274	0.00	2692	0.0	0.0	7016	0.0	0.0
36124	79	8	8			134	779	0.17	134	845	0.16	2776	0.0	0.0	2724	0.0	0.0
36125	87	8	8			36	427	0.08	36	463	0.08	2928	0.0	0.0	2927	0.0	0.0
36126	335	8	8			218	376	0.58	218	376	0.58	3020	6.8	0.0	3021	3.0	0.0
36127	150	6	6			1	160	0.01	1	160	0.01	3072	0.0	0.0	3129	0.0	0.0
36128	157	18	18			4,571	5,006	0.91	4,476	5,006	0.89	3347	0.0	0.0	7507	0.0	0.0
36129	93	8	8			1	610	0.00	1	610	0.00	3386	0.0	0.0	3389	0.0	0.0
36130	55	6	6			1	481	0.00	1	481	0.00	3551	0.0	0.0	3602	0.0	0.0
36131	159	8	8			91	378	0.24	91	378	0.24	7183	0.0	0.0	3637	0.0	0.0
36133	171	8	8			1	992	0.00	1	994	0.00	3918	0.0	0.0	3919	0.0	0.0
36134	350	8	8			124	754	0.16	124	755	0.16	4327	0.0	0.0	4326	0.0	0.0
36135	130	8	8			8	696	0.01	8	755	0.01	7299	0.0	0.0	4307	0.0	0.0
36136	199	8	8			1	928	0.00	1	929	0.00	4445	0.0	0.0	4427	0.0	0.0
36137	211	8	8			1	883	0.00	1	885	0.00	5075	0.0	0.0	5089	0.0	0.0
36138	141	8	8			1	571	0.00	1	572	0.00	7334	0.0	0.0	5263	0.0	0.0
36139	237	8	8			19	688	0.03	19	688	0.03	7193	0.0	0.0	5257	0.0	0.0
36141	152	8	12	22	ura	645	730	0.88	646	2,304	0.28	8081	1.7	0.0	7430	0.6	0.0
36143	196	6	6			44	178	0.25	44	178	0.25	11066	0.0	0.0	1438	0.0	0.0
36144	85	8	8			1	481	0.00	1	481	0.00	11069	0.0	0.0	1701	0.0	0.0
36168	122	54	54			14,990	34,832	0.43	16,331	34,832	0.47	3409	0.0	0.0	3410	0.0	0.0
36171	200	54	54			20,555	46,285	0.44	22,960	46,285	0.50	5826	0.0	0.0	5833	0.0	0.0
36172	293	8	8			98	296	0.33	81	317	0.26	6306	2.7	0.0	6653	0.8	0.0
36173	285	8	8			22	303	0.07	22	304	0.07	6118	0.0	0.0	7362	0.0	0.0
36174	400	8	8			27	758	0.04	27	759	0.04	5734	0.0	0.0	5825	0.0	0.0
36175	450	10	10			681	581	1.17	681	581	1.17	5462	1.7	4.7	5556	1.4	0.0
36176	500	10	10			672	1,053	0.64	672	1,051	0.64	5200	0.0	0.0	5454	0.0	0.0
36177	380	8	8			170	1,534	0.11	170	1,536	0.11	4859	0.0	0.0	4725	0.0	0.0
36178	315	8	8			2	731	0.00	2	731	0.00	4632	0.0	0.0	4567	0.0	0.0
36179	254	6	6			1	477	0.00	1	477	0.00	3800	0.0	0.0	3960	0.0	0.0
36180	340	15	15			1,592	2,545	0.63	1,633	2,545	0.64	3080	0.0	0.0	3373	6.0	6.2
36181	278	8	8			1	343	0.00	1	343	0.00	7239	0.0	0.0	2086	0.0	0.0
36182	450	8	8			175	383	0.46	175	384	0.46	1364	0.0	0.0	3126	0.0	0.0
36183	375	12	12			51	1,556	0.03	51	1,556	0.03	1154	0.0	0.0	1410	0.0	0.0
36184	268	8	8			59	1,272	0.05	59	1,379	0.04	2535	0.0	0.0	1111	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36185	193	8	8			29	340	0.09	29	341	0.09	1330	0.0	0.0	1310	0.0	0.0
36186	48	8	8			1	422	0.00	1	422	0.00	1339	0.0	0.0	1323	0.0	0.0
36187	153	8	8			8	351	0.02	8	351	0.02	1421	0.0	0.0	1398	0.0	0.0
36189	247	8	8			49	327	0.15	49	328	0.15	1558	0.0	0.0	1502	0.0	0.0
36190	351	8	8			270	562	0.48	270	563	0.48	1535	0.0	0.0	1550	6.7	0.0
36191	38	8	8			320	1,815	0.18	320	1,817	0.18	1539	0.0	0.0	1574	0.0	0.0
36192	176	6	6			25	76	0.33	2	76	0.03	1601	5.4	0.0	1595	3.4	0.0
36193	165	6	6			1	323	0.00	1	323	0.00	1683	0.0	0.0	1684	0.0	0.0
36194	255	8	8			94	269	0.35	94	269	0.35	1697	0.0	0.0	1679	0.0	0.0
36195	130	12	18	5	Existing	1,516	1,087	1.39	2,532	3,205	0.79	1824	6.9	0.0	1823	7.5	0.0
36196	285	12	12			4	847	0.00	4	847	0.00	1765	0.0	0.0	1767	0.0	0.0
36198	83	10	15	4	Existing	750	351	2.14	896	1,034	0.87	1891	0.0	0.0	1892	0.6	0.0
36200	290	6	6			5	229	0.02	5	229	0.02	2008	0.0	0.0	9988	0.0	0.0
36201	116	12	12			130	1,393	0.09	130	1,393	0.09	2174	0.0	0.0	2147	0.0	0.0
36202	296	12	12			57	550	0.10	57	550	0.10	2167	0.0	0.0	2157	0.0	0.0
36203	450	8	8			353	343	1.03	353	344	1.03	2216	6.5	6.5	2204	0.0	0.0
36204	310	8	8			14	343	0.04	14	344	0.04	2221	0.0	0.0	2201	0.0	0.0
36205	346	8	8			105	330	0.32	102	331	0.31	2267	4.9	0.0	2268	5.7	0.0
36206	400	8	8			84	375	0.22	84	375	0.22	2281	0.0	0.0	7241	0.0	0.0
36207	300	6	6			1	276	0.00	1	276	0.00	2233	0.0	0.0	2245	0.0	0.0
36209	317	10	10			17	2,158	0.01	17	2,335	0.01	2566	0.0	0.0	2538	0.0	0.0
36211	164	8	8			6	619	0.01	6	672	0.01	2536	0.0	0.0	2578	0.0	0.0
36212	345	8	12	37	ura	765	635	1.20	988	2,028	0.49	2785	1.7	0.0	2784	3.7	0.0
36213	11	8	8			0	713	0.00	0	774	0.00	2979	0.0	0.0	7023	0.0	0.0
36214	237	6	6			0	810	0.00	0	878	0.00	2896	0.0	0.0	2966	0.0	0.0
36215	257	8	8			46	586	0.08	46	587	0.08	7260	0.0	0.0	3052	0.0	0.0
36216	36	8	8			1	383	0.00	1	384	0.00	3064	0.0	0.0	3012	0.0	0.0
36218	3	8	8			84	542	0.15	84	543	0.15	3199	0.0	0.0	3147	0.0	0.0
36219	222	24	24			589	6,983	0.08	590	6,983	0.08	3238	0.0	0.0	3236	0.0	0.0
36220	364	8	8			22	341	0.06	2	342	0.01	3306	4.4	0.0	3309	1.3	0.0
36221	280	8	8			6	381	0.02	6	381	0.02	7509	0.0	0.0	7270	0.0	0.0
36222	29	24	24			2	5,656	0.00	2	5,656	0.00	3476	0.0	0.0	3475	0.0	0.0
36223	177	14	18	10	Existing	1,314	1,301	1.01	1,767	2,543	0.69	3424	3.6	0.0	3444	3.2	0.0
36224	305	6	6			10	144	0.07	1	144	0.00	3401	5.5	0.0	7035	4.1	0.0
36225	34	10	18	5	Existing	767	411	1.86	2,156	1,971	1.09	7135	7.0	0.0	3414	6.4	0.0
36226	270	8	8			1	312	0.00	1	312	0.00	3517	0.0	0.0	3461	0.0	0.0
36228	364	12	12			405	899	0.45	405	899	0.45	3575	0.0	0.0	3574	0.0	0.0
36230	303	10	10			68	438	0.16	68	474	0.14	3704	0.0	0.0	3681	0.0	0.0
36231	335	8	8			0	485	0.00	0	526	0.00	3720	0.0	0.0	3663	0.0	0.0
36232	185	8	8			81	378	0.21	81	410	0.20	3693	0.0	0.0	7524	0.0	0.0
36233	175	8	8			0	1,116	0.00	0	1,210	0.00	3763	0.0	0.0	3782	0.0	0.0
36234	320	10	10			221	2,303	0.10	221	2,301	0.10	3859	0.0	0.0	3829	0.0	0.0
36235	230	8	8			1	383	0.00	1	384	0.00	3873	0.0	0.0	3831	0.0	0.0
36236	187	8	8			402	540	0.75	402	540	0.74	7284	0.0	0.0	3858	0.0	0.0
36237	221	8	15	43	2036	706	774	0.91	1,220	4,483	0.27	7537	2.2	0.0	4079	0.6	0.0
36238	65	8	8			88	292	0.30	88	292	0.30	4065	0.0	0.0	4064	0.0	0.0
36239	263	8	8			33	246	0.14	7	267	0.03	7291	3.8	0.0	4047	0.7	0.0
36240	167	8	8			8	1,588	0.00	8	1,722	0.00	7186	0.0	0.0	4042	0.0	0.0
36241	152	8	8			15	293	0.05	15	293	0.05	4156	0.0	0.0	7542	0.0	0.0
36242	70	8	8			1	2,017	0.00	1	2,020	0.00	4248	0.0	0.0	4249	0.0	0.0
36243	15	8	8			49	1,337	0.04	49	1,339	0.04	7066	0.0	0.0	7556	0.0	0.0
36244	315	8	8			24	1,184	0.02	24	1,186	0.02	4663	0.0	0.0	4646	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36245	38	8	8			678	763	0.89	678	764	0.89	4772	0.0	0.0	4731	0.0	0.0
36246	119	6	6			19	695	0.03	19	695	0.03	4790	0.0	0.0	4770	0.0	0.0
36247	74	8	8			0	1,339	0.00	0	1,340	0.00	4784	0.0	0.0	4744	0.0	0.0
36248	145	8	8			0	621	0.00	0	622	0.00	7150	0.0	0.0	4761	0.0	0.0
36249	260	8	8			50	1,119	0.04	50	1,121	0.04	5054	0.0	0.0	5053	0.0	0.0
36250	195	8	8			1	1,301	0.00	1	1,303	0.00	5123	0.0	0.0	7079	0.0	0.0
36251	65	8	8			1	1,810	0.00	1	1,813	0.00	5033	0.0	0.0	5034	0.0	0.0
36252	170	8	8			53	843	0.06	53	844	0.06	7082	0.0	0.0	5161	0.0	0.0
36253	210	8	8			7	1,490	0.00	7	1,492	0.00	5174	0.0	0.0	5185	0.0	0.0
36254	244	8	8			1	1,747	0.00	1	1,750	0.00	5151	0.0	0.0	7416	0.0	0.0
36255	415	8	8			222	1,053	0.21	222	1,055	0.21	5209	0.0	0.0	5210	0.0	0.0
36257	341	8	8			31	410	0.07	30	410	0.07	5287	0.0	0.0	5282	4.2	0.0
36258	92	8	8			1	775	0.00	1	776	0.00	5295	0.0	0.0	7418	0.0	0.0
36259	80	8	8			4	297	0.01	4	298	0.01	5410	0.0	0.0	5438	0.0	0.0
36260	55	8	8			1	634	0.00	1	635	0.00	5347	0.0	0.0	5408	0.0	0.0
36261	39	6	6			0	200	0.00	0	200	0.00	5444	0.0	0.0	5523	0.0	0.0
36262	233	8	8			208	636	0.33	208	637	0.33	5503	0.0	0.0	5487	0.0	0.0
36263	302	8	8			283	553	0.51	283	553	0.51	5451	0.0	0.0	5511	0.0	0.0
36264	278	8	8			0	397	0.00	0	398	0.00	5485	0.0	0.0	5484	0.0	0.0
36265	185	6	6			1	253	0.00	0	253	0.00	5545	0.0	0.0	5561	4.3	0.0
36266	54	6	6			79	517	0.15	79	517	0.15	5590	0.0	0.0	5587	0.0	0.0
36267	476	8	8			1	342	0.00	1	343	0.00	5650	0.0	0.0	5649	0.0	0.0
36268	397	8	8			218	447	0.49	218	447	0.49	5690	0.0	0.0	5689	0.0	0.0
36269	180	8	8			2	1,067	0.00	2	1,068	0.00	5715	0.0	0.0	5684	0.0	0.0
36270	410	8	8			15	745	0.02	15	746	0.02	5706	0.0	0.0	5727	0.0	0.0
36271	200	8	8			40	690	0.06	40	690	0.06	5763	0.0	0.0	5764	0.0	0.0
36272	171	8	8			49	356	0.14	49	356	0.14	5800	0.0	0.0	5742	0.0	0.0
36275	42	8	8			67	828	0.08	67	828	0.08	6125	0.0	0.0	6124	0.0	0.0
36276	102	8	8			7	898	0.01	7	899	0.01	6026	0.0	0.0	6063	0.0	0.0
36277	247	8	8			25	605	0.04	25	606	0.04	6068	0.0	0.0	6067	0.0	0.0
36278	169	15	15			2,695	3,910	0.69	3,363	3,910	0.86	7614	0.0	0.0	6132	0.0	0.0
36279	247	8	8			27	806	0.03	27	806	0.03	6092	0.0	0.0	6093	0.0	0.0
36280	220	8	12	40	ura	530	403	1.32	530	1,188	0.45	6047	3.8	0.0	6138	7.4	0.0
36281	150	8	8			1	796	0.00	1	797	0.00	6253	0.0	0.0	6224	0.0	0.0
36282	418	8	8			17	420	0.04	17	451	0.04	6310	0.0	0.0	6309	4.7	0.0
36283	140	6	6			14	236	0.06	14	236	0.06	6262	0.0	0.0	6321	0.0	0.0
36284	280	8	8			28	944	0.03	28	1,013	0.03	7729	0.0	0.0	6284	0.0	0.0
36285	203	8	8			25	330	0.08	25	354	0.07	6288	0.0	0.0	6287	0.0	0.0
36286	138	8	8			18	1,005	0.02	18	1,078	0.02	6340	0.0	0.0	6341	0.0	0.0
36287	15	8	8			37	2,113	0.02	37	2,267	0.02	6377	0.0	0.0	6374	0.0	0.0
36288	75	8	8			437	915	0.48	437	917	0.48	6465	0.0	0.0	6464	0.0	0.0
36289	90	10	10			810	1,657	0.49	985	1,774	0.56	7119	0.0	0.0	6602	0.0	6.4
36290	263	8	8			0	370	0.00	0	397	0.00	6615	0.0	0.0	6627	0.0	0.0
36291	277	8	8			0	275	0.00	0	295	0.00	6643	0.0	0.0	6644	0.0	0.0
36292	203	8	8			35	155	0.22	35	166	0.21	6629	0.0	0.0	6632	0.0	0.0
36293	189	8	8			49	360	0.14	49	387	0.13	6722	0.0	0.0	7377	0.0	0.0
36294	164	8	8			0	318	0.00	0	341	0.00	6763	0.0	0.0	6764	0.0	0.0
36295	400	8	8			17	256	0.07	17	274	0.06	6834	0.0	0.0	6810	0.0	0.0
36296	16	8	8			0	333	0.00	0	357	0.00	6850	0.0	0.0	6818	0.0	0.0
36380	107	8	8			20	520	0.04	20	558	0.04	7780	0.0	0.0	6497	0.0	0.0
36381	205	8	8			1	756	0.00	1	810	0.00	8085	0.0	0.0	7780	0.0	0.0
36382	418	8	8			13	174	0.08	13	174	0.08	7480	0.0	0.0	7786	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36383	418	8	8			18	299	0.06	18	299	0.06	7786	0.0	0.0	2397	0.0	0.0
36384	266	8	8			4	742	0.01	4	743	0.01	7787	0.0	0.0	7786	0.0	0.0
36385	146	8	8			1	667	0.00	1	668	0.00	7785	0.0	0.0	7787	0.0	0.0
36386	222	18	18			760	2,148	0.35	943	2,148	0.44	7788	0.0	0.0	7789	0.0	0.0
36387	316	18	18			610	1,801	0.34	762	1,801	0.42	7788	0.0	0.0	7790	0.0	0.0
36388	172	18	18			1,369	3,703	0.37	1,705	3,703	0.46	6129	0.0	0.0	7788	0.0	0.0
36389	113	18	18			760	2,161	0.35	944	2,161	0.44	7789	0.0	0.0	7790	0.0	0.0
36390	22	18	18			1,369	5,444	0.25	1,706	5,444	0.31	7790	0.0	0.0	6128	0.0	0.0
36391	202	8	8			92	996	0.09	92	997	0.09	7800	0.0	0.0	7801	0.0	0.0
36392	221	8	8			91	934	0.10	91	935	0.10	7799	0.0	0.0	7800	0.0	0.0
36393	227	8	8			205	1,135	0.18	205	1,136	0.18	7791	0.0	0.0	7073	0.0	0.0
36394	70	8	8			205	1,335	0.15	205	1,336	0.15	7792	0.0	0.0	7791	0.0	0.0
36395	114	8	8			183	594	0.31	183	595	0.31	7793	0.0	0.0	7792	0.0	0.0
36396	183	8	8			183	1,169	0.16	183	1,171	0.16	7794	0.0	0.0	7793	0.0	0.0
36397	132	8	8			183	1,547	0.12	183	1,549	0.12	7796	0.0	0.0	7795	0.0	0.0
36398	116	8	8			183	1,224	0.15	183	1,226	0.15	7797	0.0	0.0	7796	0.0	0.0
36399	102	8	8			183	1,165	0.16	183	1,167	0.16	7798	0.0	0.0	7797	0.0	0.0
36400	110	8	8			183	1,157	0.16	183	1,158	0.16	7801	0.0	0.0	7798	0.0	0.0
36401	88	8	8			90	1,051	0.09	90	1,052	0.09	7802	0.0	0.0	7801	0.0	0.0
36402	297	8	8			90	965	0.09	90	967	0.09	7803	0.0	0.0	7802	0.0	0.0
36403	295	8	8			90	945	0.10	90	947	0.10	7806	0.0	0.0	7803	0.0	0.0
36404	297	8	8			90	613	0.15	90	615	0.15	7807	0.0	0.0	7806	0.0	0.0
36405	71	8	8			90	477	0.19	90	478	0.19	7808	0.0	0.0	7807	0.0	0.0
36406	86	8	8			90	1,952	0.05	90	1,955	0.05	7809	0.0	0.0	7808	0.0	0.0
36407	194	8	8			90	917	0.10	90	919	0.10	7805	0.0	0.0	7809	0.0	0.0
36408	159	8	8			90	951	0.09	90	953	0.09	7810	0.0	0.0	7805	0.0	0.0
36409	108	8	8			183	1,156	0.16	183	1,158	0.16	7795	0.0	0.0	7794	0.0	0.0
36440	44	8	8			0	1,574	0.00	0	1,576	0.00	7821	0.0	0.0	7820	0.0	0.0
36500	66	8	8			24	844	0.03	6	916	0.01	7887	0.0	0.0	7888	6.4	0.0
36501	160	8	8			6	658	0.01	6	713	0.01	7881	0.0	0.0	7887	0.0	0.0
36502	92	8	8			0	885	0.00	0	960	0.00	7880	0.0	0.0	7881	0.0	0.0
36503	102	8	8			0	576	0.00	0	625	0.00	7882	0.0	0.0	7881	0.0	0.0
36504	49	8	8			0	813	0.00	0	882	0.00	7889	0.0	0.0	7880	0.0	0.0
36505	84	8	8			0	1,869	0.00	0	2,027	0.00	7883	0.0	0.0	7882	0.0	0.0
36506	144	8	8			0	1,051	0.00	0	1,140	0.00	7884	0.0	0.0	7885	0.0	0.0
36507	18	8	8			6	572	0.01	4	620	0.01	7885	0.0	0.0	7886	0.0	0.0
36508	218	8	8			364	965	0.38	364	1,047	0.35	2504	0.0	0.0	7886	0.0	0.0
36520	112	8	12	37	ura	588	801	0.73	597	2,557	0.23	7901	1.3	0.0	2507	2.1	0.0
36540	192	8	12	37	ura	588	717	0.82	597	2,292	0.26	7888	6.4	0.0	7901	1.3	0.0
36541	126	8	12	37	ura	585	594	0.98	591	1,897	0.31	7902	7.3	0.0	7888	6.4	0.0
36543	87	8	12	37	ura	585	555	1.05	591	1,772	0.33	7903	7.0	0.0	7902	7.3	0.0
36544	104	8	12	37	ura	585	611	0.96	591	1,952	0.30	7904	0.0	0.0	7903	7.0	0.0
36545	130	8	12	37	ura	559	751	0.74	559	2,398	0.23	7905	0.0	0.0	7904	0.0	0.0
36546	253	8	12	37	ura	555	656	0.85	555	2,095	0.26	7906	0.0	0.0	7905	0.0	0.0
36547	197	8	12	37	ura	554	653	0.85	554	2,088	0.27	7907	0.0	0.0	7906	0.0	0.0
36548	323	8	12	37	ura	554	699	0.79	554	2,232	0.25	7908	0.0	0.0	7907	0.0	0.0
36549	311	8	12	37	ura	540	824	0.66	540	2,633	0.21	9680	0.0	0.0	7908	0.0	0.0
36550	245	8	8			31	604	0.05	31	656	0.05	7910	0.0	0.0	7904	0.0	0.0
36551	292	8	8			19	766	0.03	19	831	0.02	7911	0.0	0.0	7910	0.0	0.0
36552	106	8	8			19	925	0.02	19	1,003	0.02	7912	0.0	0.0	7911	0.0	0.0
36553	196	8	8			19	1,106	0.02	19	1,200	0.02	7913	0.0	0.0	7912	0.0	0.0
36554	400	8	8			10	1,172	0.01	10	1,272	0.01	7914	0.0	0.0	7913	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36555	10	8	8			0	1,406	0.00	0	1,524	0.00	7915	0.0	0.0	7914	0.0	0.0
36556	54	8	8			0	347	0.00	0	376	0.00	7916	0.0	0.0	7910	0.0	0.0
36557	97	8	8			0	1,045	0.00	0	1,134	0.00	7917	0.0	0.0	7916	0.0	0.0
36558	224	8	8			0	788	0.00	0	854	0.00	7918	0.0	0.0	7911	0.0	0.0
36559	147	8	8			0	440	0.00	0	478	0.00	7919	0.0	0.0	7913	0.0	0.0
36560	98	8	8			1	725	0.00	1	786	0.00	7920	0.0	0.0	7908	0.0	0.0
36561	144	8	8			1	830	0.00	1	900	0.00	7921	0.0	0.0	7920	0.0	0.0
36562	132	8	8			0	621	0.00	0	674	0.00	7922	0.0	0.0	7921	0.0	0.0
36563	402	8	8			1	1,074	0.00	1	1,165	0.00	7923	0.0	0.0	7921	0.0	0.0
36564	52	8	8			1	398	0.00	1	432	0.00	9687	0.0	0.0	7923	0.0	0.0
36580	132	8	8			1	2,345	0.00	1	2,348	0.00	7945	0.0	0.0	7944	0.0	0.0
36581	435	8	8			133	1,862	0.07	133	1,865	0.07	7944	0.0	0.0	7943	0.0	0.0
36582	81	8	8			133	1,294	0.10	133	1,296	0.10	7943	0.0	0.0	7942	0.0	0.0
36583	136	8	8			150	756	0.20	150	757	0.20	7942	0.0	0.0	7941	0.0	0.0
36584	326	8	8			150	210	0.72	150	210	0.71	7941	0.0	0.0	7940	0.0	0.0
36585	342	8	8			176	1,504	0.12	176	1,506	0.12	7940	0.0	0.0	7946	0.0	0.0
36587	73	8	8			26	1,486	0.02	26	1,488	0.02	7949	0.0	0.0	7950	0.0	0.0
36588	153	8	8			26	1,287	0.02	26	1,288	0.02	7950	0.0	0.0	7951	0.0	0.0
36589	43	8	8			27	1,053	0.03	27	1,054	0.03	7951	0.0	0.0	7952	0.0	0.0
36590	167	8	8			35	2,047	0.02	35	2,049	0.02	7952	0.0	0.0	7953	0.0	0.0
36591	112	8	8			35	1,228	0.03	35	1,230	0.03	7953	0.0	0.0	7954	0.0	0.0
36592	138	8	8			47	565	0.08	47	565	0.08	7954	0.0	0.0	7900	0.0	0.0
36593	122	8	8			26	2,163	0.01	26	2,166	0.01	7960	0.0	0.0	7949	0.0	0.0
36594	152	8	8			26	2,528	0.01	26	2,532	0.01	7961	0.0	0.0	7960	0.0	0.0
36595	236	8	8			17	2,265	0.01	17	2,268	0.01	7962	0.0	0.0	7961	0.0	0.0
36596	174	8	8			10	1,822	0.01	10	1,824	0.01	7965	0.0	0.0	7962	0.0	0.0
36597	125	8	8			1	1,785	0.00	1	1,788	0.00	7966	0.0	0.0	7965	0.0	0.0
36598	297	8	8			1	2,296	0.00	1	2,299	0.00	7978	0.0	0.0	7966	0.0	0.0
36599	262	8	8			1	2,303	0.00	1	2,307	0.00	7967	0.0	0.0	7965	0.0	0.0
36600	147	8	8			1	2,464	0.00	1	2,467	0.00	7968	0.0	0.0	7967	0.0	0.0
36601	97	8	8			1	2,459	0.00	1	2,462	0.00	7980	0.0	0.0	7968	0.0	0.0
36602	146	8	8			7	1,757	0.00	7	1,760	0.00	7963	0.0	0.0	7962	0.0	0.0
36603	159	8	8			7	676	0.01	7	677	0.01	7964	0.0	0.0	7963	0.0	0.0
36604	278	8	8			7	1,697	0.00	7	1,699	0.00	7974	0.0	0.0	7964	0.0	0.0
36605	119	8	8			0	1,361	0.00	0	1,363	0.00	7979	0.0	0.0	7969	0.0	0.0
36606	118	8	8			1	2,784	0.00	1	2,788	0.00	7969	0.0	0.0	7970	0.0	0.0
36607	156	8	8			1	1,330	0.00	1	1,332	0.00	7970	0.0	0.0	7971	0.0	0.0
36608	226	8	8			15	517	0.03	15	517	0.03	7971	0.0	0.0	7981	0.0	0.0
36610	364	8	8			8	1,428	0.01	8	1,429	0.01	7957	0.0	0.0	7952	0.0	0.0
36611	75	8	8			8	2,390	0.00	8	2,394	0.00	7958	0.0	0.0	7957	0.0	0.0
36612	88	8	8			8	2,464	0.00	8	2,467	0.00	7959	0.0	0.0	7958	0.0	0.0
36613	129	8	8			8	1,376	0.01	8	1,378	0.01	7975	0.0	0.0	7959	0.0	0.0
36614	291	8	8			1	2,599	0.00	1	2,603	0.00	7956	0.0	0.0	7951	0.0	0.0
36616	122	8	8			0	1,409	0.00	0	1,411	0.00	7977	0.0	0.0	7956	0.0	0.0
36617	235	8	8			1	1,467	0.00	1	1,469	0.00	7976	0.0	0.0	7956	0.0	0.0
36618	463	8	8			17	2,124	0.01	17	2,127	0.01	7947	0.0	0.0	7942	0.0	0.0
36619	113	8	8			16	1,861	0.01	16	1,863	0.01	7948	0.0	0.0	7947	0.0	0.0
36620	225	8	8			1	2,194	0.00	1	2,197	0.00	7984	0.0	0.0	7948	0.0	0.0
36621	151	8	8			16	717	0.02	16	718	0.02	7983	0.0	0.0	7948	0.0	0.0
36622	235	8	8			1	2,124	0.00	1	2,126	0.00	7985	0.0	0.0	7944	0.0	0.0
36623	211	8	8			8	473	0.02	8	474	0.02	7982	0.0	0.0	7986	0.0	0.0
36624	82	8	8			15	381	0.04	15	382	0.04	7986	0.0	0.0	7971	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36640	333	8	8			470	386	1.22	470	414	1.14	8061	6.2	6.6	8014	0.0	0.0
36641	204	8	8			469	754	0.62	470	808	0.58	8014	0.0	0.0	8015	2.8	0.0
36642	88	8	8			486	538	0.90	487	576	0.85	8015	2.8	0.0	8016	2.1	0.0
36643	224	8	8			486	653	0.74	487	699	0.70	8016	2.1	0.0	8017	0.1	0.0
36644	207	8	8			169	724	0.23	140	776	0.18	8019	5.2	0.0	8017	0.1	0.0
36645	284	8	8			122	857	0.14	122	919	0.13	8020	0.0	0.0	8019	5.2	0.0
36646	177	8	8			122	597	0.20	122	641	0.19	8021	0.0	0.0	8020	0.0	0.0
36647	300	8	8			119	557	0.21	119	597	0.20	8023	0.0	0.0	8021	0.0	0.0
36648	276	8	8			0	581	0.00	0	623	0.00	8022	0.0	0.0	8021	0.0	0.0
36649	480	8	12	22	ura	625	576	1.09	626	1,819	0.34	8017	0.1	0.0	8018	0.7	0.0
36650	132	8	8			447	617	0.73	447	661	0.68	6551	0.0	0.0	8061	6.2	6.6
36651	42	8	8			24	1,059	0.02	24	1,136	0.02	6552	0.0	0.0	8061	6.2	6.6
36652	115	8	8			118	362	0.33	118	388	0.30	6556	0.0	0.0	8023	0.0	0.0
36654	217	8	8			422	1,113	0.38	422	1,194	0.35	6549	0.0	0.0	8040	0.0	0.0
36655	64	8	8			431	695	0.62	431	746	0.58	8040	0.0	0.0	6550	0.0	0.0
36656	306	8	8			11	790	0.01	11	848	0.01	8041	0.0	0.0	8040	0.0	0.0
36657	431	8	8			6	628	0.01	6	674	0.01	8042	0.0	0.0	8055	0.0	0.0
36658	307	8	8			6	949	0.01	6	1,018	0.01	8049	0.0	0.0	8042	0.0	0.0
36659	304	8	8			13	831	0.02	13	892	0.01	8058	0.0	0.0	8055	0.0	0.0
36660	343	8	8			12	811	0.01	12	870	0.01	8052	0.0	0.0	8058	0.0	0.0
36661	54	8	8			6	870	0.01	6	934	0.01	8046	0.0	0.0	8049	0.0	0.0
36662	137	8	8			6	788	0.01	6	846	0.01	8043	0.0	0.0	8046	0.0	0.0
36663	163	8	8			24	466	0.05	24	500	0.05	8055	0.0	0.0	6552	0.0	0.0
36664	142	8	8			0	951	0.00	0	1,019	0.00	8063	0.0	0.0	8064	0.0	0.0
36665	236	8	8			1	960	0.00	1	1,031	0.00	8062	0.0	0.0	8064	0.0	0.0
36666	332	8	8			10	1,160	0.01	10	1,245	0.01	8064	0.0	0.0	8066	0.0	0.0
36667	201	8	8			11	508	0.02	11	545	0.02	8066	0.0	0.0	8041	0.0	0.0
36680	81	8	8			0	331	0.00	0	354	0.00	8080	0.0	0.0	8058	0.0	0.0
36681	504	8	12	22	ura	645	585	1.10	646	1,846	0.35	8018	0.7	0.0	8081	1.7	0.0
36682	137	8	8			0	470	0.00	0	504	0.00	8083	0.0	0.0	8084	0.0	0.0
36683	175	8	8			1	1,546	0.00	1	1,658	0.00	8082	0.0	0.0	8083	0.0	0.0
36684	43	8	8			1	792	0.00	1	849	0.00	8086	0.0	0.0	8085	0.0	0.0
36685	297	8	8			1	949	0.00	1	1,018	0.00	8087	0.0	0.0	8086	0.0	0.0
36700	145	8	8			0	331	0.00	0	356	0.00	8100	0.0	0.0	8046	0.0	0.0
36720	212	8	8			1	1,405	0.00	1	1,524	0.00	8120	0.0	0.0	4391	0.0	0.0
36721	271	8	8			9	1,385	0.01	9	1,502	0.01	8122	0.0	0.0	7060	0.0	0.0
36722	262	8	8			9	1,500	0.01	9	1,627	0.01	8123	0.0	0.0	8122	0.0	0.0
36723	85	8	8			8	631	0.01	8	685	0.01	9822	0.0	0.0	8123	0.0	0.0
36724	158	8	8			0	767	0.00	0	832	0.00	8121	0.0	0.0	8122	0.0	0.0
36725	221	8	8			0	828	0.00	0	899	0.00	8125	0.0	0.0	8123	0.0	0.0
36726	143	8	8			0	627	0.00	0	680	0.00	8126	0.0	0.0	8125	0.0	0.0
36727	71	8	8			0	1,431	0.00	0	1,552	0.00	8124	0.0	0.0	8126	0.0	0.0
36741	210	8	8			0	839	0.00	0	910	0.00	8140	0.0	0.0	8148	0.0	0.0
36742	160	8	8			10	825	0.01	10	895	0.01	8186	0.0	0.0	8158	0.0	0.0
36743	344	8	8			10	1,157	0.01	10	1,255	0.01	8141	0.0	0.0	8186	0.0	0.0
36744	315	8	8			10	946	0.01	10	1,026	0.01	8148	0.0	0.0	8141	0.0	0.0
36745	263	8	8			10	280	0.04	10	303	0.03	8161	0.0	0.0	8148	0.0	0.0
36746	320	8	8			339	1,124	0.30	339	1,219	0.28	8143	0.0	0.0	8142	0.0	0.0
36747	500	8	8			340	1,099	0.31	340	1,192	0.28	8142	0.0	0.0	8156	0.0	0.0
36748	326	8	8			340	1,109	0.31	340	1,203	0.28	8156	0.0	0.0	7058	0.0	0.0
36750	500	8	8			27	1,044	0.03	27	1,133	0.02	8158	0.0	0.0	8162	0.0	0.0
36751	67	8	8			28	592	0.05	28	643	0.04	8162	0.0	0.0	4356	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36760	373	8	8			1	1,377	0.00	1	1,494	0.00	8181	0.0	0.0	4395	0.0	0.0
36761	186	8	8			0	1,129	0.00	0	1,224	0.00	8183	0.0	0.0	8182	0.0	0.0
36762	307	8	8			10	1,374	0.01	10	1,491	0.01	8182	0.0	0.0	8184	0.0	0.0
36763	486	8	8			339	1,081	0.31	339	1,173	0.29	8184	0.0	0.0	8143	0.0	0.0
36780	221	8	8			177	2,731	0.06	177	2,734	0.06	8700	0.0	0.0	4996	0.0	0.0
36781	151	8	8			177	825	0.21	177	826	0.21	7946	0.0	0.0	8700	0.0	0.0
36782	1	8	8			0	1,283	0.00	0	1,284	0.00	4996	0.0	0.0	8222	0.0	0.0
36800	412	8	8			1	1,246	0.00	1	1,247	0.00	8246	0.0	0.0	8245	0.0	0.0
36801	246	8	8			0	628	0.00	0	629	0.00	8245	0.0	0.0	8244	0.0	0.0
36802	291	8	8			3	927	0.00	3	928	0.00	8244	0.0	0.0	8243	0.0	0.0
36803	149	8	8			3	1,714	0.00	3	1,716	0.00	8243	0.0	0.0	8242	0.0	0.0
36804	264	8	8			1	1,319	0.00	1	1,322	0.00	8247	0.0	0.0	8242	0.0	0.0
36805	137	8	8			8	1,422	0.01	8	1,424	0.01	8242	0.0	0.0	8241	0.0	0.0
36806	161	8	8			8	956	0.01	8	958	0.01	8241	0.0	0.0	8240	0.0	0.0
36807	119	8	8			0	944	0.00	0	945	0.00	8250	0.0	0.0	8249	0.0	0.0
36808	251	8	8			28	1,405	0.02	28	1,407	0.02	8249	0.0	0.0	8248	0.0	0.0
36820	152	8	8			255	1,245	0.20	255	1,247	0.20	4560	0.0	0.0	8260	0.0	0.0
36821	304	8	8			276	1,245	0.22	276	1,247	0.22	8260	0.0	0.0	4555	0.0	0.0
36823	316	8	8			14	1,065	0.01	14	1,066	0.01	8261	0.0	0.0	8262	0.0	0.0
36824	150	8	8			13	1,168	0.01	13	1,169	0.01	8240	0.0	0.0	8261	0.0	0.0
36825	200	8	8			15	1,001	0.01	15	1,001	0.01	8262	0.0	0.0	8263	0.0	0.0
36826	350	8	8			15	1,192	0.01	15	1,194	0.01	8263	0.0	0.0	8264	0.0	0.0
36827	348	8	8			23	1,169	0.02	23	1,170	0.02	8264	0.0	0.0	8265	0.0	0.0
36828	223	8	8			23	1,285	0.02	23	1,288	0.02	8265	0.0	0.0	4592	0.0	0.0
36840	108	8	8			8	1,389	0.01	8	1,391	0.01	8280	0.0	0.0	8264	0.0	0.0
36841	175	8	8			13	1,926	0.01	13	1,928	0.01	8283	0.0	0.0	8282	0.0	0.0
36842	105	8	8			13	1,958	0.01	13	1,960	0.01	8282	0.0	0.0	8281	0.0	0.0
36843	77	8	8			13	1,085	0.01	13	1,087	0.01	8288	0.0	0.0	8283	0.0	0.0
36844	108	8	8			13	940	0.01	13	941	0.01	8287	0.0	0.0	8288	0.0	0.0
36845	130	8	8			13	1,603	0.01	13	1,606	0.01	8284	0.0	0.0	8287	0.0	0.0
36846	196	8	8			6	665	0.01	6	665	0.01	8286	0.0	0.0	8285	0.0	0.0
36847	185	8	8			6	857	0.01	6	858	0.01	8285	0.0	0.0	8284	0.0	0.0
36848	104	8	8			0	858	0.00	0	859	0.00	8289	0.0	0.0	8290	0.0	0.0
36849	196	8	8			5	1,771	0.00	5	1,774	0.00	8290	0.0	0.0	8286	0.0	0.0
36850	350	8	8			0	738	0.00	0	739	0.00	8291	0.0	0.0	8289	0.0	0.0
36851	252	8	8			1	1,085	0.00	1	1,087	0.00	8292	0.0	0.0	8293	0.0	0.0
36852	51	8	8			0	1,226	0.00	0	1,227	0.00	8293	0.0	0.0	8262	0.0	0.0
36853	313	8	8			1	1,340	0.00	1	1,341	0.00	8294	0.0	0.0	8295	0.0	0.0
36854	90	8	8			0	383	0.00	0	384	0.00	8295	0.0	0.0	8296	0.0	0.0
36855	51	8	8			1	1,074	0.00	1	1,076	0.00	8296	0.0	0.0	8261	0.0	0.0
36856	143	8	8			0	1,437	0.00	0	1,439	0.00	8297	0.0	0.0	8298	0.0	0.0
36857	173	8	8			1	1,687	0.00	1	1,689	0.00	8298	0.0	0.0	8296	0.0	0.0
36858	219	8	8			0	940	0.00	0	941	0.00	8299	0.0	0.0	8300	0.0	0.0
36859	137	8	8			0	1,494	0.00	0	1,497	0.00	8300	0.0	0.0	8280	0.0	0.0
36860	77	8	8			0	542	0.00	0	543	0.00	8320	0.0	0.0	8321	0.0	0.0
36861	156	8	8			0	342	0.00	0	342	0.00	8321	0.0	0.0	8323	0.0	0.0
36862	383	8	8			0	417	0.00	0	417	0.00	8323	0.0	0.0	4672	0.0	0.0
36863	325	8	8			8	2,100	0.00	8	2,103	0.00	8331	0.0	0.0	8332	0.0	0.0
36864	107	8	8			8	1,009	0.01	8	1,010	0.01	8332	0.0	0.0	8333	0.0	0.0
36865	380	8	8			8	1,428	0.01	8	1,431	0.01	8333	0.0	0.0	8328	0.0	0.0
36866	41	8	8			12	1,187	0.01	12	1,188	0.01	8328	0.0	0.0	8329	0.0	0.0
36867	130	8	8			12	1,551	0.01	12	1,553	0.01	8329	0.0	0.0	8330	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
36868	134	8	8			1	1,669	0.00	1	1,672	0.00	8324	0.0	0.0	8325	0.0	0.0
36869	99	8	8			4	851	0.00	4	853	0.00	8325	0.0	0.0	8326	0.0	0.0
36870	250	8	8			4	1,772	0.00	4	1,774	0.00	8326	0.0	0.0	8327	0.0	0.0
36871	37	8	8			4	1,360	0.00	4	1,361	0.00	8327	0.0	0.0	8328	0.0	0.0
36880	191	6	6			1	1,097	0.00	1	1,097	0.00	8344	0.0	0.0	4764	0.0	0.0
36900	168	8	8			1	1,613	0.00	1	1,615	0.00	8361	0.0	0.0	8362	0.0	0.0
36901	81	8	8			0	1,265	0.00	0	1,267	0.00	8360	0.0	0.0	8361	0.0	0.0
36902	522	8	8			197	1,845	0.11	197	1,848	0.11	8363	0.0	0.0	8364	0.0	0.0
36903	434	8	8			201	1,597	0.13	201	1,599	0.13	8364	0.0	0.0	4535	0.0	0.0
36905	215	8	8			0	542	0.00	0	543	0.00	8365	0.0	0.0	8366	0.0	0.0
36906	245	8	8			4	1,050	0.00	4	1,051	0.00	8366	0.0	0.0	8364	0.0	0.0
36907	92	8	8			188	1,804	0.10	188	1,807	0.10	8377	0.0	0.0	8378	0.0	0.0
36908	235	8	8			188	1,713	0.11	188	1,715	0.11	8378	0.0	0.0	8363	0.0	0.0
36909	118	8	8			8	1,631	0.01	8	1,633	0.01	8381	0.0	0.0	8380	0.0	0.0
36910	142	8	8			8	1,437	0.01	8	1,439	0.01	8380	0.0	0.0	8363	0.0	0.0
36914	119	8	8			0	1,512	0.00	0	1,514	0.00	8376	0.0	0.0	8375	0.0	0.0
36915	201	8	8			3	1,330	0.00	3	1,331	0.00	8375	0.0	0.0	8374	0.0	0.0
36916	70	8	8			3	2,134	0.00	3	2,137	0.00	8374	0.0	0.0	8373	0.0	0.0
36917	100	8	8			3	1,838	0.00	3	1,840	0.00	8373	0.0	0.0	8372	0.0	0.0
36918	209	8	8			3	1,445	0.00	3	1,447	0.00	8372	0.0	0.0	8371	0.0	0.0
36919	361	8	8			12	1,309	0.01	12	1,311	0.01	8371	0.0	0.0	8370	0.0	0.0
36922	171	8	8			1	1,805	0.00	1	1,807	0.00	8367	0.0	0.0	8368	0.0	0.0
36923	481	8	8			1	1,491	0.00	1	1,492	0.00	8368	0.0	0.0	8369	0.0	0.0
36924	218	8	8			25	1,478	0.02	25	1,481	0.02	8369	0.0	0.0	4542	0.0	0.0
36925	119	8	8			12	385	0.03	12	385	0.03	8370	0.0	0.0	8369	0.0	0.0
36926	115	8	8			0	1,131	0.00	0	1,133	0.00	8382	0.0	0.0	8362	0.0	0.0
36927	365	8	8			1	1,804	0.00	1	1,807	0.00	8383	0.0	0.0	4532	0.0	0.0
36930	23	8	8			188	2,113	0.09	188	2,115	0.09	8384	0.0	0.0	8377	0.0	0.0
36940	273	8	8			25	344	0.07	25	344	0.07	7011	0.0	0.0	2114	0.0	0.0
37012	240	6	6			2,761	506	5.46	3,020	506	5.97	2588	0.0	0.0	2561	0.0	0.0
37026	639	6	6			9,235	506	18.27	34,119	506	67.49	2570	0.0	0.0	2588	0.0	0.0
37030	685	6	6			287	402	0.71	285	402	0.71	JCT-18	0.0	0.0	1955	0.0	0.0
37031	31	6	6			703	1,170	0.60	413	1,170	0.35	JCT-16	0.0	0.0	1959	0.0	0.0
37032	339	6	6			47,204	506	93.37	20,419	506	40.39	1105	0.0	0.0	1110	0.0	0.0
37033	150	6	6			70,822	506	140.09	55,994	506	110.76	JCT-12	0.0	0.0	1105	0.0	0.0
37034	656	6	6			19,789	506	39.14	26,709	506	52.83	1110	0.0	0.0	2570	0.0	0.0
37035	341	4	4			1	242	0.00	1	242	0.00	9958	0.0	0.0	4295	0.0	0.0
37037	2538	12	12			2,097	1,635	1.28	2,131	1,635	1.30	JCT-14	0.0	0.0	6819	0.0	0.0
37060	398	12	15	24	2036	522	598	0.87	960	1,161	0.83	8461	0.0	0.0	8460	0.0	0.0
37062	369	10	15	24	2036	530	637	0.83	968	2,012	0.48	8460	0.0	0.0	8450	0.0	0.0
37063	213	15	15			856	1,588	0.54	1,272	1,701	0.75	8450	0.0	0.0	8451	0.0	0.0
37080	186	8	15	24	2036	521	331	1.58	960	1,894	0.51	6688	0.0	0.0	8461	0.0	0.0
37082	96	15	15			878	1,581	0.56	1,292	1,694	0.76	8451	0.0	0.0	8442	0.0	0.0
37084	216	15	15			878	967	0.91	1,292	1,036	1.25	8442	0.0	0.0	6695	0.0	0.0
37085	240	12	12			310	917	0.34	310	982	0.32	7122	0.0	0.0	8450	0.0	0.0
37087	388	8	8			16	306	0.05	16	329	0.05	8445	0.0	0.0	8444	0.0	0.0
37088	261	8	8			16	347	0.05	16	372	0.04	8444	0.0	0.0	8450	0.0	0.0
37089	255	8	8			1	306	0.00	1	328	0.00	8446	0.0	0.0	8445	0.0	0.0
37090	297	8	8			1	303	0.00	1	326	0.00	8449	0.0	0.0	8445	0.0	0.0
37091	254	8	8			0	438	0.00	0	469	0.00	8447	0.0	0.0	8448	0.0	0.0
37092	269	8	8			0	235	0.00	0	251	0.00	8448	0.0	0.0	8449	0.0	0.0
37093	416	8	8			1	349	0.00	1	375	0.00	8453	0.0	0.0	8452	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37094	107	8	8			21	372	0.06	21	399	0.05	8452	0.0	0.0	8451	0.0	0.0
37095	131	8	8			0	315	0.00	0	338	0.00	8454	0.0	0.0	8453	0.0	0.0
37096	263	8	8			0	353	0.00	0	378	0.00	8455	0.0	0.0	8454	0.0	0.0
37100	9	8	8			30	3,433	0.01	30	3,438	0.01	3955	0.0	0.0	8500	0.0	0.0
37122	158	8	8			14	233	0.06	14	252	0.06	2944	0.0	0.0	8522	0.0	0.0
37123	365	8	8			115	233	0.49	115	252	0.45	8522	0.0	0.0	2866	0.0	0.0
37140	75	6	6			1	268	0.00	1	268	0.00	8540	0.0	0.0	3906	0.0	0.0
37200	170	8	8			0	913	0.00	0	979	0.00	8601	0.0	0.0	8087	0.0	0.0
37220	156	8	8			0	777	0.00	0	833	0.00	8620	0.0	0.0	6790	0.0	0.0
37240	306	30	30			4,466	9,634	0.46	6,702	9,634	0.70	2005	0.0	0.0	8722	0.0	0.0
37242	100	30	30			4,467	9,730	0.46	6,702	9,730	0.69	8722	0.0	0.0	8721	0.0	0.0
37243	165	30	30			4,467	7,762	0.58	6,703	7,762	0.86	8721	0.0	0.0	8720	0.0	0.0
37244	175	8	8			43	530	0.08	43	531	0.08	1997	0.0	0.0	8720	0.0	0.0
37245	84	30	30			4,511	7,122	0.63	6,746	7,122	0.95	8720	0.0	0.0	2018	0.0	0.0
37280	65	8	8			422	678	0.62	422	726	0.58	8740	7.0	0.0	6791	6.8	0.0
37282	143	8	8			387	197	1.97	387	211	1.83	8742	9.8	9.9	8741	6.9	6.9
37283	285	8	8			1	899	0.00	1	964	0.00	6795	0.0	0.0	6789	0.0	0.0
37284	140	8	8			0	871	0.00	0	934	0.00	8744	0.0	0.0	8743	0.0	0.0
37285	138	8	8			0	506	0.00	0	543	0.00	8746	0.0	0.0	8745	0.0	0.0
37286	316	8	8			0	642	0.00	0	689	0.00	8745	0.0	0.0	8747	2.9	0.0
37288	238	8	8			433	519	0.83	433	557	0.78	8747	2.9	0.0	6781	2.3	0.0
37289	232	8	8			0	419	0.00	0	449	0.00	8748	0.0	0.0	8446	0.0	0.0
37290	91	8	8			0	467	0.00	0	501	0.00	8749	0.0	0.0	8446	0.0	0.0
37291	174	8	8			5	362	0.01	5	388	0.01	8750	0.0	0.0	6559	0.0	0.0
37292	25	8	8			0	451	0.00	0	484	0.00	6251	0.0	0.0	8752	0.0	0.0
37293	175	8	8			0	295	0.00	0	317	0.00	8751	0.0	0.0	8752	0.0	0.0
37294	22	8	8			2	413	0.01	1	443	0.00	6551	0.0	0.0	8753	0.0	0.0
37295	66	8	8			1	338	0.00	1	362	0.00	8754	0.0	0.0	8753	0.0	0.0
37296	138	8	8			0	320	0.00	0	344	0.00	8755	0.0	0.0	8754	0.0	0.0
37297	91	8	8			0	1,209	0.00	0	1,297	0.00	8756	0.0	0.0	8755	0.0	0.0
37300	218	8	8			1	906	0.00	1	972	0.00	8760	0.0	0.0	6368	0.0	0.0
37320	88	8	8			0	301	0.00	0	322	0.00	8793	0.0	0.0	8780	0.0	0.0
37321	191	8	8			0	299	0.00	0	320	0.00	8780	0.0	0.0	8781	0.0	0.0
37322	167	8	8			1	329	0.00	1	353	0.00	8781	0.0	0.0	8782	0.0	0.0
37323	119	8	8			1	334	0.00	1	358	0.00	8782	0.0	0.0	8783	0.0	0.0
37324	205	8	8			0	667	0.00	0	715	0.00	8784	0.0	0.0	8783	0.0	0.0
37325	189	8	8			1	324	0.00	1	348	0.00	8783	0.0	0.0	8785	0.0	0.0
37326	151	8	8			0	388	0.00	0	417	0.00	8786	0.0	0.0	8785	0.0	0.0
37327	229	8	8			47	306	0.15	47	328	0.14	8785	0.0	0.0	8787	0.0	0.0
37328	111	8	8			47	315	0.15	47	338	0.14	8787	0.0	0.0	8788	0.0	0.0
37329	8	8	8			22	864	0.02	22	926	0.02	6694	0.0	0.0	8788	0.0	0.0
37330	33	8	8			1	259	0.01	1	278	0.01	8789	0.0	0.0	8787	0.0	0.0
37331	213	8	8			1	432	0.00	1	464	0.00	8790	0.0	0.0	8789	0.0	0.0
37332	171	8	8			0	455	0.00	0	488	0.00	8791	0.0	0.0	8790	0.0	0.0
37333	176	8	8			0	476	0.00	0	510	0.00	8792	0.0	0.0	8791	0.0	0.0
37334	154	8	8			67	1,913	0.04	67	1,915	0.04	4751	0.0	0.0	4752	0.0	0.0
37340	182	8	8			1	1,898	0.00	1	1,901	0.00	8800	0.0	0.0	5906	5.7	0.0
37460	114	8	8			1	485	0.00	1	485	0.00	3244	0.0	0.0	3243	0.0	0.0
37480	77	27	27			4,220	5,920	0.71	6,461	5,920	1.09	8920	0.0	0.0	8921	0.0	0.0
37481	134	27	27			4,221	5,851	0.72	6,462	5,851	1.10	8921	0.0	0.0	8922	0.0	0.0
37482	183	27	27			4,222	5,824	0.72	6,462	5,824	1.11	8922	0.0	0.0	8923	0.0	0.0
37500	60	6	6			10	519	0.02	10	519	0.02	8941	0.0	0.0	3978	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37501	236	8	8			183	348	0.53	183	348	0.53	5699	0.0	0.0	5701	0.0	0.0
37502	7	8	8			0	588	0.00	0	588	0.00	8943	0.0	0.0	7418	0.0	0.0
37503	78	8	12	37	ura	683	750	0.91	1,079	2,394	0.45	8944	3.9	0.0	2734	3.8	0.0
37504	296	8	8			45	342	0.13	19	372	0.05	8945	4.5	0.0	8944	3.9	0.0
37505	215	8	8			28	420	0.07	19	456	0.04	8946	0.0	0.0	8945	4.5	0.0
37506	111	8	8			19	345	0.05	19	374	0.05	8947	0.0	0.0	8946	0.0	0.0
37507	147	8	8			150	447	0.34	6	485	0.01	8949	0.0	0.0	2507	2.1	0.0
37508	87	8	8			102	344	0.30	0	373	0.00	8948	5.7	0.0	8949	0.0	0.0
37509	56	8	8			10	1,248	0.01	10	1,353	0.01	8951	0.0	0.0	8950	0.0	0.0
37510	173	8	8			3	804	0.00	3	872	0.00	8952	0.0	0.0	8951	0.0	0.0
37511	152	8	8			6	344	0.02	6	373	0.02	8954	0.0	0.0	8951	0.0	0.0
37512	139	8	8			3	663	0.01	3	719	0.00	8953	0.0	0.0	8952	0.0	0.0
37513	117	8	8			6	344	0.02	6	373	0.02	8955	0.0	0.0	8954	0.0	0.0
37514	69	8	8			6	340	0.02	6	368	0.02	8956	0.0	0.0	8955	0.0	0.0
37515	84	8	8			0	345	0.00	0	374	0.00	8961	0.0	0.0	8956	0.0	0.0
37516	84	8	8			0	717	0.00	0	778	0.00	8962	0.0	0.0	8961	0.0	0.0
37517	53	8	8			6	826	0.01	6	897	0.01	8957	0.0	0.0	8956	0.0	0.0
37518	121	8	8			6	767	0.01	6	832	0.01	8958	0.0	0.0	8957	0.0	0.0
37519	169	8	8			6	940	0.01	6	1,019	0.01	8959	0.0	0.0	8958	0.0	0.0
37520	72	8	8			6	438	0.01	6	476	0.01	8960	0.0	0.0	8959	0.0	0.0
37521	92	8	8			81	335	0.24	3	363	0.01	8979	3.9	0.0	2720	4.1	0.0
37524	160	8	8			69	542	0.13	1	588	0.00	8979	3.9	0.0	8978	3.6	5.7
37531	350	10	10			524	583	0.90	524	583	0.90	8982	1.8	0.0	5462	1.7	4.7
37532	87	8	8			0	718	0.00	0	719	0.00	8983	0.0	0.0	8984	0.0	0.0
37533	99	8	8			1	417	0.00	1	418	0.00	8984	0.0	0.0	7344	0.0	0.0
37534	62	8	8			0	747	0.00	0	747	0.00	8985	0.0	0.0	7344	0.0	0.0
37535	142	8	8			0	697	0.00	0	699	0.00	8986	0.0	0.0	5458	0.0	0.0
37536	411	8	8			665	694	0.96	665	695	0.96	8987	0.0	0.0	5200	0.0	0.0
37537	80	8	8			2	415	0.01	1	416	0.00	8988	0.0	0.0	5152	0.0	0.0
37538	9	8	8			0	831	0.00	0	832	0.00	8989	0.0	0.0	4886	0.0	0.0
37539	59	8	8			0	367	0.00	0	367	0.00	8990	0.0	0.0	5191	0.0	0.0
37540	199	8	8			19	2,092	0.01	19	2,094	0.01	7153	0.0	0.0	5183	0.0	0.0
37541	229	8	8			19	1,926	0.01	19	1,929	0.01	5163	0.0	0.0	7153	0.0	0.0
37542	148	8	8			1	1,694	0.00	1	1,697	0.00	7330	0.0	0.0	5147	0.0	0.0
37543	160	8	8			1	1,587	0.00	1	1,589	0.00	5147	0.0	0.0	5126	0.0	0.0
37544	91	8	8			0	729	0.00	0	730	0.00	8991	0.0	0.0	5147	0.0	0.0
37560	203	12	12			1,369	2,176	0.63	1,828	2,358	0.78	9000	0.0	0.0	4115	0.0	0.0
37561	20	8	8			0	707	0.00	0	767	0.00	4087	0.0	0.0	4088	0.0	0.0
37562	46	8	8			60	683	0.09	60	741	0.08	9001	0.0	0.0	7649	0.0	0.0
37563	82	8	8			10	1,051	0.01	10	1,141	0.01	8950	0.0	0.0	9001	0.0	0.0
37564	268	8	8			3	341	0.01	3	370	0.01	9002	0.0	0.0	2723	0.0	0.0
37565	302	8	8			3	382	0.01	3	415	0.01	9003	0.0	0.0	9002	0.0	0.0
37566	114	8	8			3	965	0.00	3	1,047	0.00	9004	0.0	0.0	9003	0.0	0.0
37580	77	8	8			1	490	0.00	1	532	0.00	3730	0.0	0.0	9020	0.0	0.0
37581	332	8	8			21	504	0.04	21	547	0.04	9020	0.0	0.0	3725	0.0	0.0
37600	379	8	8			6	137	0.04	6	148	0.04	10117	0.0	0.0	9001	0.0	0.0
37660	356	18	18			1,278	484	2.64	1,667	519	3.21	6912	0.0	0.0	6902	0.0	0.0
37661	356	18	18			1,322	1,606	0.82	1,706	1,721	0.99	6902	0.0	0.0	6911	0.0	0.0
37662	300	8	8			15	321	0.05	15	344	0.04	7640	0.0	0.0	6806	0.0	0.0
37663	300	8	8			31	321	0.10	31	344	0.09	6806	0.0	0.0	6807	0.0	0.0
37664	267	8	8			31	300	0.10	31	322	0.09	6807	0.0	0.0	9100	0.0	0.0
37665	105	8	8			44	634	0.07	44	681	0.06	9100	0.0	0.0	6903	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37666	227	8	8			44	449	0.10	44	481	0.09	6903	0.0	0.0	6902	0.0	0.0
37667	175	8	8			15	588	0.03	15	631	0.02	9651	0.0	0.0	7640	0.0	0.0
37700	64	8	8			0	542	0.00	0	588	0.00	9120	0.0	0.0	9121	0.0	0.0
37701	123	8	8			0	542	0.00	0	588	0.00	9125	0.0	0.0	9121	0.0	0.0
37702	84	8	8			0	345	0.00	0	374	0.00	9121	0.0	0.0	9122	0.0	0.0
37703	139	8	8			1	344	0.00	1	374	0.00	9122	0.0	0.0	9123	0.0	0.0
37704	37	8	8			1	199	0.00	1	216	0.00	9123	0.0	0.0	9124	0.0	0.0
37720	53	8	8			4	1,155	0.00	4	1,156	0.00	9192	0.0	0.0	9193	0.0	0.0
37721	163	8	8			5	1,697	0.00	5	1,700	0.00	9196	0.0	0.0	9161	0.0	0.0
37722	76	8	8			5	1,334	0.00	5	1,336	0.00	9195	0.0	0.0	9196	0.0	0.0
37723	173	8	8			5	848	0.01	5	849	0.01	9194	0.0	0.0	9195	0.0	0.0
37724	86	8	8			5	460	0.01	5	461	0.01	9193	0.0	0.0	9194	0.0	0.0
37725	267	8	8			72	362	0.20	72	363	0.20	9186	0.0	0.0	7810	0.0	0.0
37726	318	8	8			72	343	0.21	72	343	0.21	9190	0.0	0.0	9186	0.0	0.0
37727	258	8	8			0	588	0.00	0	589	0.00	9171	0.0	0.0	9169	0.0	0.0
37728	99	8	8			0	1,319	0.00	0	1,322	0.00	9183	0.0	0.0	9184	0.0	0.0
37729	324	8	8			18	1,585	0.01	18	1,587	0.01	9300	0.0	0.0	9142	0.0	0.0
37730	146	8	8			13	2,410	0.01	13	2,413	0.01	9170	0.0	0.0	9169	0.0	0.0
37733	105	8	8			28	343	0.08	28	344	0.08	9163	0.0	0.0	9162	0.0	0.0
37734	99	8	8			28	344	0.08	28	345	0.08	9164	0.0	0.0	9163	0.0	0.0
37735	33	8	8			0	340	0.00	0	341	0.00	10660	0.0	0.0	7799	0.0	0.0
37738	92	8	8			5	1,167	0.00	5	1,168	0.00	9158	0.0	0.0	9159	0.0	0.0
37739	316	8	8			5	1,166	0.00	5	1,167	0.00	9157	0.0	0.0	9158	0.0	0.0
37740	139	8	8			91	1,033	0.09	91	1,035	0.09	9159	0.0	0.0	7799	0.0	0.0
37741	242	8	8			75	1,467	0.05	75	1,469	0.05	9160	0.0	0.0	9159	0.0	0.0
37742	167	8	8			28	1,228	0.02	28	1,230	0.02	9162	0.0	0.0	9160	0.0	0.0
37743	213	8	8			46	1,214	0.04	46	1,215	0.04	9161	0.0	0.0	9160	0.0	0.0
37744	193	8	8			41	1,453	0.03	41	1,455	0.03	9173	0.0	0.0	9161	0.0	0.0
37745	142	8	8			28	344	0.08	28	344	0.08	9165	0.0	0.0	9164	0.0	0.0
37746	179	8	8			0	665	0.00	0	666	0.00	9166	0.0	0.0	9165	0.0	0.0
37747	263	8	8			1	1,276	0.00	1	1,277	0.00	9167	0.0	0.0	9166	0.0	0.0
37748	74	8	8			14	535	0.03	14	535	0.03	9168	0.0	0.0	9165	0.0	0.0
37749	209	8	8			13	1,466	0.01	13	1,468	0.01	9169	0.0	0.0	9168	0.0	0.0
37750	129	8	8			6	344	0.02	6	345	0.02	9187	0.0	0.0	9176	0.0	0.0
37751	30	8	8			6	343	0.02	6	344	0.02	9188	0.0	0.0	9187	0.0	0.0
37752	111	8	8			6	611	0.01	6	612	0.01	9189	0.0	0.0	9188	0.0	0.0
37753	69	8	8			38	1,101	0.03	38	1,102	0.03	9174	0.0	0.0	9173	0.0	0.0
37754	184	8	8			38	1,689	0.02	38	1,691	0.02	9175	0.0	0.0	9174	0.0	0.0
37755	31	8	8			38	826	0.05	38	828	0.05	9176	0.0	0.0	9175	0.0	0.0
37756	194	8	8			33	344	0.10	33	344	0.10	9177	0.0	0.0	9176	0.0	0.0
37757	89	8	8			33	340	0.10	33	340	0.10	9179	0.0	0.0	9177	0.0	0.0
37758	118	8	8			33	815	0.04	33	815	0.04	9180	0.0	0.0	9179	0.0	0.0
37759	297	8	8			6	1,413	0.00	6	1,414	0.00	9184	0.0	0.0	9173	0.0	0.0
37760	160	8	8			0	1,203	0.00	0	1,206	0.00	9185	0.0	0.0	9184	0.0	0.0
37761	336	8	8			5	968	0.01	5	969	0.01	9156	0.0	0.0	9157	0.0	0.0
37762	175	8	8			5	1,074	0.00	5	1,076	0.00	9155	0.0	0.0	9156	0.0	0.0
37763	84	8	8			5	1,259	0.00	5	1,260	0.00	9154	0.0	0.0	9155	0.0	0.0
37764	232	8	8			5	1,763	0.00	5	1,765	0.00	9150	0.0	0.0	9154	0.0	0.0
37765	55	8	8			53	1,148	0.05	53	1,149	0.05	9147	0.0	0.0	9146	0.0	0.0
37766	135	8	8			53	1,851	0.03	53	1,853	0.03	9320	0.0	0.0	9147	0.0	0.0
37767	79	8	8			72	345	0.21	72	346	0.21	9191	0.0	0.0	9190	0.0	0.0
37768	327	8	8			72	1,341	0.05	72	1,343	0.05	9141	0.0	0.0	9191	0.0	0.0

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Sanitary Sewer Master Plan
City of Medford

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37769	100	8	8			72	343	0.21	72	344	0.21	9142	0.0	0.0	9141	0.0	0.0
37770	89	8	8			53	364	0.15	53	364	0.15	9143	0.0	0.0	9142	0.0	0.0
37771	168	8	8			53	342	0.15	53	343	0.15	9144	0.0	0.0	9143	0.0	0.0
37772	90	8	8			53	1,141	0.05	53	1,142	0.05	9146	0.0	0.0	9144	0.0	0.0
37773	176	8	8			1	1,351	0.00	1	1,352	0.00	9153	0.0	0.0	9146	0.0	0.0
37774	103	8	8			0	944	0.00	0	945	0.00	9152	0.0	0.0	9153	0.0	0.0
37775	143	8	8			0	765	0.00	0	765	0.00	9151	0.0	0.0	9152	0.0	0.0
37776	331	8	8			1	1,469	0.00	1	1,471	0.00	9182	0.0	0.0	9183	0.0	0.0
37777	242	8	8			5	1,806	0.00	5	1,808	0.00	9149	0.0	0.0	9150	0.0	0.0
37778	198	8	8			33	1,272	0.03	33	1,274	0.03	9181	0.0	0.0	9180	0.0	0.0
37779	110	8	8			0	1,219	0.00	0	1,322	0.00	9197	0.0	0.0	9198	0.0	0.0
37780	72	8	8			0	546	0.00	0	592	0.00	9198	0.0	0.0	9199	0.0	0.0
37781	149	8	8			15	341	0.04	15	370	0.04	9201	0.0	0.0	9204	0.0	0.0
37782	297	8	8			0	343	0.00	0	372	0.00	9202	0.0	0.0	9201	0.0	0.0
37783	120	8	8			0	343	0.00	0	372	0.00	9203	0.0	0.0	9202	0.0	0.0
37784	338	8	8			10	559	0.02	10	606	0.02	9200	0.0	0.0	9201	0.0	0.0
37785	72	8	8			0	452	0.00	0	490	0.00	9199	0.0	0.0	9200	0.0	0.0
37786	275	8	8			15	754	0.02	15	819	0.02	9204	0.0	0.0	7283	0.0	0.0
37787	55	8	8			0	327	0.00	0	355	0.00	9205	0.0	0.0	9206	0.0	0.0
37788	211	8	8			0	344	0.00	0	374	0.00	9206	0.0	0.0	9207	0.0	0.0
37789	128	8	8			0	711	0.00	0	772	0.00	9208	0.0	0.0	9207	0.0	0.0
37790	169	8	8			1	383	0.00	1	415	0.00	9207	0.0	0.0	9209	0.0	0.0
37791	14	8	8			1	481	0.00	1	522	0.00	9209	0.0	0.0	9210	0.0	0.0
37792	54	8	8			13	704	0.02	13	764	0.02	9210	0.0	0.0	3736	0.0	0.0
37793	305	8	8			4	1,221	0.00	4	1,222	0.00	9222	0.0	0.0	9181	0.0	0.0
37794	71	8	8			31	1,141	0.03	31	1,142	0.03	9218	0.0	0.0	9219	0.0	0.0
37795	125	8	8			0	638	0.00	0	639	0.00	9211	0.0	0.0	9212	0.0	0.0
37796	86	8	8			3	817	0.00	3	818	0.00	9216	0.0	0.0	9217	0.0	0.0
37798	167	8	8			1	1,706	0.00	1	1,708	0.00	9215	0.0	0.0	9213	0.0	0.0
37799	167	8	8			0	1,072	0.00	0	1,073	0.00	9220	0.0	0.0	9215	0.0	0.0
37800	204	8	8			5	1,566	0.00	5	1,568	0.00	9221	0.0	0.0	9149	0.0	0.0
37801	103	8	8			0	969	0.00	0	971	0.00	9220	0.0	0.0	9221	0.0	0.0
37802	94	8	8			31	930	0.03	31	931	0.03	9219	0.0	0.0	9181	0.0	0.0
37803	85	8	8			30	1,214	0.02	30	1,215	0.02	9217	0.0	0.0	9218	0.0	0.0
37804	78	8	8			28	1,504	0.02	28	1,506	0.02	9214	0.0	0.0	9217	0.0	0.0
37805	56	8	8			28	348	0.08	28	348	0.08	9213	0.0	0.0	9214	0.0	0.0
37806	47	8	8			24	1,306	0.02	24	1,308	0.02	9212	0.0	0.0	9213	0.0	0.0
37810	413	8	8			21	1,199	0.02	21	1,200	0.02	9231	0.0	0.0	9233	0.0	0.0
37811	209	8	8			0	547	0.00	0	549	0.00	9232	0.0	0.0	9231	0.0	0.0
37813	169	8	8			27	1,722	0.02	27	1,724	0.02	9233	0.0	0.0	7792	0.0	0.0
37820	157	8	8			21	1,165	0.02	21	1,166	0.02	9230	0.0	0.0	9240	0.0	0.0
37821	400	8	8			21	1,164	0.02	21	1,165	0.02	9240	0.0	0.0	9231	0.0	0.0
37841	116	8	8			3	342	0.01	3	342	0.01	9260	0.0	0.0	9216	0.0	0.0
37842	142	8	8			0	1,440	0.00	0	1,442	0.00	9261	0.0	0.0	9260	0.0	0.0
37843	238	8	8			3	1,005	0.00	3	1,006	0.00	9264	0.0	0.0	9260	0.0	0.0
37844	55	8	8			0	542	0.00	0	543	0.00	9265	0.0	0.0	9264	0.0	0.0
37845	150	8	8			0	1,090	0.00	0	1,091	0.00	9266	0.0	0.0	9265	0.0	0.0
37846	87	8	8			6	1,485	0.00	6	1,487	0.00	10373	0.0	0.0	9267	0.0	0.0
37847	246	8	8			6	1,041	0.01	6	1,042	0.01	9267	0.0	0.0	9268	0.0	0.0
37848	148	8	8			7	1,926	0.00	7	1,928	0.00	10355	0.0	0.0	9268	0.0	0.0
37849	98	8	8			13	695	0.02	13	696	0.02	9268	0.0	0.0	9276	0.0	0.0
37850	91	8	8			13	765	0.02	13	766	0.02	9276	0.0	0.0	9269	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37851	224	8	8			13	1,774	0.01	13	1,776	0.01	9269	0.0	0.0	9170	0.0	0.0
37852	95	8	8			1	343	0.00	1	344	0.00	9270	0.0	0.0	9170	0.0	0.0
37853	147	8	8			1	344	0.00	1	344	0.00	9271	0.0	0.0	9270	0.0	0.0
37854	112	8	8			0	344	0.00	0	344	0.00	9272	0.0	0.0	9271	0.0	0.0
37855	83	8	8			0	744	0.00	0	744	0.00	9273	0.0	0.0	9272	0.0	0.0
37856	103	8	8			0	1,447	0.00	0	1,449	0.00	9274	0.0	0.0	9273	0.0	0.0
37857	77	8	8			0	1,721	0.00	0	1,723	0.00	9275	0.0	0.0	9274	0.0	0.0
37858	363	8	8			2	1,736	0.00	2	1,738	0.00	9294	0.0	0.0	9293	0.0	0.0
37859	95	8	8			2	1,792	0.00	2	1,794	0.00	9293	0.0	0.0	9292	0.0	0.0
37860	98	8	8			2	1,835	0.00	2	1,838	0.00	9292	0.0	0.0	9291	0.0	0.0
37861	203	8	8			0	1,044	0.00	0	1,046	0.00	9286	0.0	0.0	9287	0.0	0.0
37862	141	8	8			3	1,169	0.00	3	1,170	0.00	9291	0.0	0.0	9289	0.0	0.0
37863	204	8	8			12	344	0.03	12	344	0.03	9289	0.0	0.0	9290	0.0	0.0
37864	69	8	8			0	333	0.00	0	333	0.00	9288	0.0	0.0	9289	0.0	0.0
37865	41	8	8			0	599	0.00	0	600	0.00	9287	0.0	0.0	9288	0.0	0.0
37866	144	8	8			0	874	0.00	0	876	0.00	9278	0.0	0.0	9281	0.0	0.0
37867	171	8	8			0	1,099	0.00	0	1,100	0.00	9282	0.0	0.0	9297	0.0	0.0
37868	70	8	8			0	337	0.00	0	338	0.00	9297	0.0	0.0	9299	0.0	0.0
37869	161	8	8			0	342	0.00	0	342	0.00	9299	0.0	0.0	9300	0.0	0.0
37870	239	8	8			1	2,101	0.00	1	2,103	0.00	9277	0.0	0.0	9296	0.0	0.0
37871	134	8	8			47	2,092	0.02	47	2,095	0.02	9296	0.0	0.0	9295	0.0	0.0
37872	122	8	8			47	1,999	0.02	47	2,001	0.02	9295	0.0	0.0	9285	0.0	0.0
37873	197	8	8			47	1,425	0.03	47	1,427	0.03	9285	0.0	0.0	9284	0.0	0.0
37874	136	8	8			47	1,923	0.02	47	1,926	0.02	9284	0.0	0.0	9283	0.0	0.0
37875	194	8	8			52	1,935	0.03	52	1,938	0.03	9283	0.0	0.0	9281	0.0	0.0
37876	160	8	8			53	1,783	0.03	53	1,785	0.03	9281	0.0	0.0	9320	0.0	0.0
37877	294	8	8			12	1,762	0.01	12	1,764	0.01	9290	0.0	0.0	9300	0.0	0.0
37878	147	8	8			0	876	0.00	0	877	0.00	9279	0.0	0.0	9320	0.0	0.0
37879	196	8	8			1	1,070	0.00	1	1,072	0.00	9304	0.0	0.0	9301	0.0	0.0
37882	97	8	8			1	1,955	0.00	1	1,958	0.00	9303	0.0	0.0	9304	0.0	0.0
37883	174	8	8			1	1,470	0.00	1	1,472	0.00	9302	0.0	0.0	9303	0.0	0.0
37884	211	8	8			0	344	0.00	0	344	0.00	9305	0.0	0.0	4853	0.0	0.0
37885	308	8	8			1	2,067	0.00	1	2,069	0.00	4854	0.0	0.0	9305	0.0	0.0
37886	323	8	8			1	853	0.00	1	854	0.00	9340	0.0	0.0	9341	0.0	0.0
37887	213	8	8			1	815	0.00	1	816	0.00	9341	0.0	0.0	4291	0.0	0.0
37888	227	8	8			1	860	0.00	1	860	0.00	4291	0.0	0.0	9342	0.0	0.0
37889	224	8	8			26	801	0.03	26	803	0.03	9342	0.0	0.0	4292	0.0	0.0
37920	56	8	8			26	332	0.08	26	333	0.08	4292	0.0	0.0	4348	0.0	0.0
37921	106	8	8			0	547	0.00	0	547	0.00	9343	0.0	0.0	9344	0.0	0.0
37922	57	8	8			1	457	0.00	1	458	0.00	9344	0.0	0.0	9345	0.0	0.0
37923	74	8	8			1	453	0.00	1	454	0.00	9345	0.0	0.0	9346	0.0	0.0
37924	100	8	8			1	410	0.00	1	411	0.00	9346	0.0	0.0	9348	0.0	0.0
37925	98	8	8			1	410	0.00	1	410	0.00	9348	0.0	0.0	9349	0.0	0.0
37926	129	8	8			1	411	0.00	1	411	0.00	9349	0.0	0.0	5369	0.0	0.0
37927	132	8	8			0	619	0.00	0	619	0.00	9347	0.0	0.0	9346	0.0	0.0
37940	122	8	8			0	1,184	0.00	0	1,186	0.00	9360	0.0	0.0	9361	0.0	0.0
37941	97	8	8			0	496	0.00	0	497	0.00	9361	0.0	0.0	9362	0.0	0.0
37942	71	8	8			0	490	0.00	0	491	0.00	9362	0.0	0.0	9363	0.0	0.0
37943	119	8	8			6	909	0.01	6	910	0.01	9363	0.0	0.0	9364	0.0	0.0
37944	80	8	8			6	924	0.01	6	925	0.01	9364	0.0	0.0	9365	0.0	0.0
37945	115	8	8			6	895	0.01	6	896	0.01	9365	0.0	0.0	9366	0.0	0.0
37946	175	8	8			6	956	0.01	6	958	0.01	9366	0.0	0.0	9367	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
37947	133	8	8			6	805	0.01	6	806	0.01	9367	0.0	0.0	9368	0.0	0.0
37948	101	8	8			6	1,246	0.01	6	1,247	0.01	9368	0.0	0.0	9370	0.0	0.0
37949	86	8	8			6	341	0.02	6	342	0.02	9370	0.0	0.0	9369	0.0	0.0
37950	116	8	8			11	456	0.02	11	457	0.02	9369	0.0	0.0	4731	0.0	0.0
37960	359	8	8			0	365	0.00	0	392	0.00	9400	0.0	0.0	9401	0.0	0.0
37961	110	8	8			0	988	0.00	0	1,060	0.00	9401	0.0	0.0	9402	0.0	0.0
37962	55	8	8			1	503	0.00	1	540	0.00	9402	0.0	0.0	9403	0.0	0.0
37963	153	8	8			1	1,254	0.00	1	1,345	0.00	9403	0.0	0.0	9404	0.0	0.0
37964	145	8	8			1	1,110	0.00	1	1,191	0.00	9404	0.0	0.0	6735	0.0	0.0
38003	209	8	8			77	1,222	0.06	77	1,326	0.06	9440	0.0	0.0	4356	0.0	0.0
38007	241	8	8			77	463	0.17	77	501	0.15	9441	0.0	0.0	9440	0.0	0.0
38020	280	8	8			1	542	0.00	1	542	0.00	9460	0.0	0.0	3637	0.0	0.0
38040	287	8	8			25	326	0.08	25	327	0.08	9480	0.0	0.0	9481	0.0	0.0
38041	115	8	8			1	538	0.00	1	538	0.00	9482	0.0	0.0	9481	0.0	0.0
38042	449	8	8			26	342	0.08	26	342	0.08	9481	0.0	0.0	9486	0.0	0.0
38043	256	8	8			50	342	0.15	50	343	0.15	9486	0.0	0.0	9488	0.0	0.0
38044	27	8	8			1	347	0.00	1	347	0.00	9489	0.0	0.0	9483	0.0	0.0
38045	139	8	8			22	341	0.07	22	342	0.07	9483	0.0	0.0	9484	0.0	0.0
38046	66	8	8			23	340	0.07	23	341	0.07	9484	0.0	0.0	9485	0.0	0.0
38047	126	8	8			24	321	0.07	24	321	0.07	9485	0.0	0.0	9486	0.0	0.0
38048	97	8	8			1	540	0.00	1	540	0.00	9490	0.0	0.0	9488	0.0	0.0
38049	469	8	8			58	342	0.17	58	343	0.17	9488	0.0	0.0	9491	0.0	0.0
38051	37	8	8			79	399	0.20	79	399	0.20	9491	0.0	0.0	9492	0.0	0.0
38052	499	8	8			80	392	0.20	80	392	0.20	9492	0.0	0.0	9493	0.0	0.0
38053	120	8	8			17	340	0.05	17	340	0.05	9494	0.0	0.0	9493	0.0	0.0
38054	418	8	8			97	342	0.28	97	342	0.28	9493	0.0	0.0	9495	0.0	0.0
38055	155	8	8			216	380	0.57	216	381	0.57	2391	0.0	0.0	9495	0.0	0.0
38056	270	8	8			330	382	0.86	330	383	0.86	9495	0.0	0.0	2390	0.0	0.0
38057	317	8	8			17	339	0.05	17	340	0.05	9496	0.0	0.0	9494	0.0	0.0
38058	26	8	8			1	1,218	0.00	1	1,220	0.00	9497	0.0	0.0	9483	0.0	0.0
38059	326	8	8			31	190	0.16	31	190	0.16	7392	0.0	0.0	9498	0.0	0.0
38060	326	8	8			40	285	0.14	40	285	0.14	9498	0.0	0.0	2333	0.0	0.0
38061	242	8	8			8	518	0.02	8	519	0.02	9499	0.0	0.0	9498	0.0	0.0
38080	265	10	10			531	731	0.73	531	731	0.73	5961	0.0	0.0	9500	0.0	0.0
38082	70	10	10			544	637	0.85	544	636	0.85	5972	0.0	0.0	9501	0.0	0.0
38083	378	10	10			564	671	0.84	564	670	0.84	9501	0.0	0.0	5971	0.0	0.0
38084	65	10	10			542	721	0.75	542	720	0.75	9500	0.0	0.0	5970	0.0	0.0
38085	96	10	10			543	702	0.77	543	701	0.78	5970	0.0	0.0	5972	0.0	0.0
38086	245	8	8			1	1,140	0.00	1	1,142	0.00	9502	0.0	0.0	9501	0.0	0.0
38087	130	8	8			1	641	0.00	1	642	0.00	9503	0.0	0.0	9502	0.0	0.0
38088	100	8	8			11	906	0.01	11	908	0.01	9504	0.0	0.0	9500	0.0	0.0
38100	85	8	8			1	2,231	0.00	1	2,234	0.00	9520	0.0	0.0	9521	0.0	0.0
38101	194	8	8			1	1,940	0.00	1	1,942	0.00	9521	0.0	0.0	9523	0.0	0.0
38102	138	8	8			1	1,874	0.00	1	1,876	0.00	9523	0.0	0.0	9522	0.0	0.0
38103	65	8	8			1	1,323	0.00	1	1,324	0.00	9522	0.0	0.0	9524	0.0	0.0
38104	318	8	8			3	1,386	0.00	3	1,388	0.00	9524	0.0	0.0	9532	0.0	0.0
38105	150	8	8			1	1,982	0.00	1	1,985	0.00	9525	0.0	0.0	9526	0.0	0.0
38106	292	8	8			1	2,090	0.00	1	2,092	0.00	9526	0.0	0.0	9527	0.0	0.0
38107	277	8	8			1	2,097	0.00	1	2,100	0.00	9527	0.0	0.0	9528	0.0	0.0
38108	97	8	8			10	1,056	0.01	10	1,057	0.01	9528	0.0	0.0	4799	0.0	0.0
38109	115	8	8			1	2,649	0.00	1	2,652	0.00	9529	0.0	0.0	9520	0.0	0.0
38111	48	8	8			0	2,578	0.00	0	2,582	0.00	9531	0.0	0.0	9530	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38112	60	8	8			0	2,090	0.00	0	2,092	0.00	9530	0.0	0.0	9523	0.0	0.0
38113	87	8	8			3	1,028	0.00	3	1,028	0.00	9532	0.0	0.0	9533	0.0	0.0
38114	183	8	8			3	1,133	0.00	3	1,134	0.00	9533	0.0	0.0	4799	0.0	0.0
38115	50	8	8			62	1,395	0.04	62	1,397	0.04	4608	0.0	0.0	8330	0.0	0.0
38116	250	8	8			79	820	0.10	79	821	0.10	8330	0.0	0.0	4670	0.0	0.0
38120	431	8	8			16	1,688	0.01	16	1,690	0.01	7981	0.0	0.0	7983	0.0	0.0
38121	197	8	8			1	765	0.00	1	767	0.00	9604	0.0	0.0	9582	0.0	0.0
38122	148	8	8			1	1,854	0.00	1	1,856	0.00	9581	0.0	0.0	9582	0.0	0.0
38123	201	8	8			1	799	0.00	1	800	0.00	9582	0.0	0.0	9583	0.0	0.0
38124	143	8	8			11	1,119	0.01	11	1,121	0.01	9583	0.0	0.0	9584	0.0	0.0
38125	190	8	8			11	1,433	0.01	11	1,435	0.01	9584	0.0	0.0	9585	0.0	0.0
38126	128	8	8			12	1,117	0.01	12	1,119	0.01	9585	0.0	0.0	7326	0.0	0.0
38127	49	8	8			1	906	0.00	1	908	0.00	9586	0.0	0.0	9585	0.0	0.0
38128	112	8	8			1	1,423	0.00	1	1,424	0.00	9587	0.0	0.0	9586	0.0	0.0
38129	183	8	8			0	1,444	0.00	0	1,447	0.00	9589	0.0	0.0	9588	0.0	0.0
38130	17	8	8			1	492	0.00	1	492	0.00	9588	0.0	0.0	9587	0.0	0.0
38140	129	8	8			0	1,939	0.00	0	1,941	0.00	9600	0.0	0.0	9601	0.0	0.0
38141	55	8	8			1	773	0.00	1	774	0.00	9601	0.0	0.0	9602	0.0	0.0
38142	180	8	8			1	770	0.00	1	772	0.00	9602	0.0	0.0	9603	0.0	0.0
38143	104	8	8			1	2,208	0.00	1	2,210	0.00	9603	0.0	0.0	9604	0.0	0.0
38144	101	8	8			0	423	0.00	0	424	0.00	9606	0.0	0.0	9601	0.0	0.0
38145	43	8	8			0	1,201	0.00	0	1,203	0.00	9605	0.0	0.0	9601	0.0	0.0
38160	135	8	8			1	423	0.00	1	424	0.00	9620	0.0	0.0	9621	0.0	0.0
38161	154	8	8			35	591	0.06	35	592	0.06	9623	0.0	0.0	9624	0.0	0.0
38162	347	8	8			35	1,037	0.03	35	1,038	0.03	9622	0.0	0.0	9623	0.0	0.0
38163	196	8	8			1	288	0.00	1	288	0.00	9621	0.0	0.0	9622	0.0	0.0
38180	402	8	8			30	706	0.04	30	765	0.04	10929	0.0	0.0	9642	0.0	0.0
38181	338	8	8			14	1,294	0.01	14	1,403	0.01	9640	0.0	0.0	9642	0.0	0.0
38182	50	8	8			0	343	0.00	0	372	0.00	9645	0.0	0.0	9643	0.0	0.0
38183	330	8	8			48	799	0.06	48	867	0.06	9642	0.0	0.0	9643	0.0	0.0
38184	160	8	8			48	660	0.07	48	716	0.07	9643	0.0	0.0	9644	0.0	0.0
38185	259	8	8			48	630	0.08	48	683	0.07	9644	0.0	0.0	9441	0.0	0.0
38187	210	8	8			0	343	0.00	0	372	0.00	9641	0.0	0.0	8148	0.0	0.0
38189	210	8	8			1	919	0.00	1	921	0.00	7188	0.0	0.0	4492	0.0	0.0
38200	157	8	8			1	1,635	0.00	1	1,637	0.00	9660	0.0	0.0	4512	0.0	0.0
38220	216	8	8			0	931	0.00	0	1,010	0.00	9684	0.0	0.0	9683	0.0	0.0
38221	86	8	8			0	1,097	0.00	0	1,189	0.00	9683	0.0	0.0	9681	0.0	0.0
38222	65	8	12	37	ura	533	1,100	0.48	533	3,513	0.15	9685	0.0	0.0	9682	0.0	0.0
38223	156	8	12	37	ura	533	569	0.94	533	1,819	0.29	9682	0.0	0.0	9681	0.0	0.0
38224	87	8	12	37	ura	540	660	0.82	540	2,110	0.26	9681	0.0	0.0	9680	0.0	0.0
38225	94	8	8			0	657	0.00	0	713	0.00	9686	0.0	0.0	9687	0.0	0.0
38240	127	8	8			0	670	0.00	0	727	0.00	10991	0.0	0.0	9687	0.0	0.0
38241	1031	54	54			22,757	14,017	1.62	24,805	14,017	1.77	2363	0.0	8.2	9703	0.0	8.7
38242	1031	54	54			26,653	18,233	1.46	32,269	18,233	1.77	9703	0.0	8.7	2362	0.0	8.4
38243	431	24	24		Existing	3,896	7,210	0.54	7,686	7,764	0.99	10083	0.0	11.2	9703	0.0	8.7
38244	248	8	8			14	969	0.01	14	1,051	0.01	10920	0.0	0.0	9706	0.0	0.0
38245	475	8	8			14	645	0.02	14	700	0.02	9706	0.0	0.0	9640	0.0	0.0
38246	229	8	8			1	1,088	0.00	1	1,180	0.00	10923	0.0	0.0	9705	0.0	0.0
38247	194	8	8			1	1,183	0.00	0	1,283	0.00	9705	0.0	0.0	8161	0.0	0.0
38260	74	8	8			0	1,000	0.00	0	1,001	0.00	9720	0.0	0.0	9721	0.0	0.0
38261	54	8	8			1	1,128	0.00	1	1,129	0.00	9721	0.0	0.0	9722	0.0	0.0
38262	347	8	8			1	1,303	0.00	1	1,305	0.00	9722	0.0	0.0	9723	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38263	199	8	8			1	1,033	0.00	1	1,034	0.00	9723	0.0	0.0	9724	0.0	0.0
38264	50	8	8			16	536	0.03	20	537	0.04	9724	0.0	0.0	9726	0.0	0.0
38265	115	24	24			2,660	4,334	0.61	3,330	4,334	0.77	9726	0.0	0.0	6134	0.0	0.0
38266	80	8	8			0	621	0.00	0	622	0.00	9729	0.0	0.0	9727	0.0	0.0
38267	261	8	8			1	780	0.00	1	781	0.00	9727	0.0	0.0	9730	0.0	0.0
38268	187	8	8			3	773	0.00	3	774	0.00	9730	0.0	0.0	9731	0.0	0.0
38270	220	8	8			1	394	0.00	1	394	0.00	5357	0.0	0.0	9731	0.0	0.0
38271	38	8	8			4	403	0.01	4	403	0.01	9731	0.0	0.0	5356	0.0	0.0
38272	220	12	12			31	2,633	0.01	31	2,633	0.01	9732	0.0	0.0	4882	0.0	0.0
38273	108	8	8			1	1,462	0.00	1	1,464	0.00	4250	0.0	0.0	9732	0.0	0.0
38274	348	8	8			1	1,363	0.00	1	1,364	0.00	9734	0.0	0.0	4250	0.0	0.0
38275	194	8	8			0	1,224	0.00	0	1,226	0.00	4254	0.0	0.0	9734	0.0	0.0
38276	41	8	8			1	2,438	0.00	1	2,441	0.00	4249	0.0	0.0	4250	0.0	0.0
38280	63	12	12			667	634	1.05	699	634	1.10	3314	3.4	6.8	9741	3.5	6.8
38281	279	12	12			667	627	1.06	700	627	1.12	9741	3.5	6.8	9740	2.1	5.6
38282	244	6	6			30	195	0.15	1	195	0.00	3359	2.1	0.0	9740	2.1	5.6
38283	63	12	12			668	1,247	0.54	701	1,247	0.56	9740	2.1	5.6	3311	2.4	5.8
38300	37	8	8			1	542	0.00	1	543	0.00	9760	0.0	0.0	2112	0.0	0.0
38301	7	8	8			10	820	0.01	10	822	0.01	9761	0.0	0.0	7237	0.0	0.0
38302	303	8	8			10	463	0.02	10	463	0.02	9762	0.0	0.0	9761	0.0	0.0
38303	182	8	8			1	392	0.00	1	392	0.00	9763	0.0	0.0	2103	0.0	0.0
38304	84	8	8			1	345	0.00	1	346	0.00	9764	0.0	0.0	9765	0.0	0.0
38305	39	8	8			28	460	0.06	28	460	0.06	9765	0.0	0.0	9766	0.0	0.0
38306	98	8	8			28	342	0.08	28	342	0.08	9766	0.0	0.0	9767	0.0	0.0
38307	35	8	8			28	343	0.08	28	344	0.08	9767	0.0	0.0	2124	0.0	0.0
38320	100	8	8			19	402	0.05	19	403	0.05	9780	0.0	0.0	9782	0.0	0.0
38321	298	8	8			19	860	0.02	19	862	0.02	9781	0.0	0.0	9780	0.0	0.0
38340	235	8	8			1	2,139	0.00	1	2,142	0.00	9803	0.0	0.0	9801	0.0	0.0
38341	192	8	8			13	1,956	0.01	13	1,958	0.01	9801	0.0	0.0	9800	0.0	0.0
38342	133	8	8			12	2,366	0.00	12	2,369	0.00	9802	0.0	0.0	9801	0.0	0.0
38343	125	8	8			13	1,182	0.01	13	1,184	0.01	9800	0.0	0.0	6390	0.0	0.0
38380	105	8	8			0	1,225	0.00	0	1,329	0.00	9823	0.0	0.0	9820	0.0	0.0
38381	100	8	8			0	649	0.00	0	703	0.00	9820	0.0	0.0	9821	0.0	0.0
38382	265	8	8			1	1,126	0.00	1	1,222	0.00	9821	0.0	0.0	9822	0.0	0.0
38400	290	8	8			1	1,076	0.00	1	1,168	0.00	9842	0.0	0.0	9841	0.0	0.0
38401	212	8	8			0	1,068	0.00	0	1,158	0.00	9841	0.0	0.0	9840	0.0	0.0
38402	88	8	8			0	978	0.00	0	1,061	0.00	9840	0.0	0.0	8182	0.0	0.0
38403	208	8	8			329	962	0.34	329	1,044	0.32	9843	0.0	0.0	9844	0.0	0.0
38404	365	8	8			329	1,341	0.25	329	1,454	0.23	9844	0.0	0.0	9845	0.0	0.0
38405	35	8	8			330	1,664	0.20	330	1,805	0.18	9845	0.0	0.0	8184	0.0	0.0
38420	105	8	8			1	287	0.00	1	287	0.00	9860	0.0	0.0	9861	0.0	0.0
38421	181	8	8			1	271	0.01	1	271	0.01	9861	0.0	0.0	9862	0.0	0.0
38422	126	8	8			19	310	0.06	19	311	0.06	9862	0.0	0.0	9863	0.0	0.0
38441	233	8	8			1	1,797	0.00	1	1,799	0.00	9880	0.0	0.0	4984	0.0	0.0
38461	310	6	6			1	105	0.01	1	105	0.01	9900	0.0	0.0	3547	0.0	0.0
38480	166	8	8			12	225	0.05	12	241	0.05	9921	0.0	0.0	9920	0.0	0.0
38481	48	8	8			1	823	0.00	1	883	0.00	9922	0.0	0.0	9921	0.0	0.0
38483	264	8	8			1	562	0.00	1	603	0.00	9923	0.0	0.0	9922	0.0	0.0
38484	181	8	8			0	504	0.00	0	541	0.00	9925	0.0	0.0	9923	0.0	0.0
38485	254	8	8			1	979	0.00	1	1,051	0.00	9924	0.0	0.0	9923	0.0	0.0
38486	316	8	8			387	528	0.73	387	566	0.68	9926	0.0	0.0	6789	0.0	0.0
38487	10	8	8			5	333	0.01	4	357	0.01	9927	0.0	0.0	9926	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38488	35	8	8			387	356	1.09	387	381	1.01	9926	0.0	0.0	8741	6.9	6.9
38490	2	8	8			69	105	0.66	67	113	0.60	8742	9.8	9.9	9929	9.8	9.9
38491	313	8	8			0	557	0.00	0	597	0.00	8743	0.0	0.0	8740	7.0	0.0
38492	497	8	8			0	411	0.00	0	441	0.00	6790	0.0	0.0	9930	0.0	0.0
38494	199	8	8			17	149	0.11	17	160	0.10	9930	0.0	0.0	6904	0.0	0.0
38495	371	8	8			1	1,283	0.00	1	1,285	0.00	5938	0.0	0.0	9931	0.0	0.0
38496	44	8	8			13	1,283	0.01	13	1,284	0.01	9931	0.0	0.0	5854	4.5	0.0
38497	44	8	8			11	547	0.02	11	547	0.02	9932	0.0	0.0	9931	0.0	0.0
38498	149	8	8			10	407	0.03	10	408	0.03	9933	0.0	0.0	9932	0.0	0.0
38499	149	8	8			10	478	0.02	10	479	0.02	9934	0.0	0.0	9933	0.0	0.0
38500	109	8	8			369	668	0.55	0	669	0.00	9940	3.0	0.0	5859	1.4	0.0
38501	202	10	15	18	Existing	797	328	2.43	799	968	0.83	5858	0.0	0.0	9940	3.0	0.0
38502	248	10	15	18	Existing	458	333	1.38	800	983	0.81	9940	3.0	0.0	5860	4.9	0.0
38503	288	8	8			1	290	0.00	1	291	0.00	9941	0.0	0.0	5617	0.0	0.0
38504	57	8	8			13	373	0.04	13	374	0.04	9942	0.0	0.0	8987	0.0	0.0
38505	163	8	8			13	506	0.02	13	507	0.02	9943	0.0	0.0	9942	0.0	0.0
38506	141	8	8			13	1,439	0.01	13	1,441	0.01	9944	0.0	0.0	9943	0.0	0.0
38507	330	8	8			1	588	0.00	1	588	0.00	9945	0.0	0.0	9944	0.0	0.0
38508	100	8	8			0	372	0.00	0	372	0.00	9946	0.0	0.0	9945	0.0	0.0
38509	207	8	8			1	826	0.00	1	828	0.00	9947	0.0	0.0	9948	0.0	0.0
38510	102	8	8			1	298	0.00	1	299	0.00	9948	0.0	0.0	9863	0.0	0.0
38511	329	8	8			20	262	0.08	20	262	0.08	9863	0.0	0.0	9951	0.0	0.0
38512	279	8	8			1	1,058	0.00	1	1,059	0.00	9949	0.0	0.0	9950	0.0	0.0
38513	77	8	8			1	815	0.00	1	815	0.00	9950	0.0	0.0	9951	0.0	0.0
38514	241	8	8			33	285	0.12	33	286	0.12	9951	0.0	0.0	9953	0.0	0.0
38515	106	8	8			34	987	0.03	34	988	0.03	9953	0.0	0.0	9954	0.0	0.0
38516	376	8	8			1	1,032	0.00	1	1,033	0.00	9952	0.0	0.0	9954	0.0	0.0
38517	147	8	8			35	1,274	0.03	35	1,276	0.03	9954	0.0	0.0	9955	0.0	0.0
38518	127	8	8			35	817	0.04	35	817	0.04	9955	0.0	0.0	9956	0.0	0.0
38519	180	8	8			56	575	0.10	51	576	0.09	9956	0.0	0.0	5290	2.4	0.0
38520	205	4	4			0	176	0.00	0	176	0.00	JCT-10	0.0	0.0	9958	0.0	0.0
38521	37	8	8			22	322	0.07	22	322	0.07	9959	0.0	0.0	9957	0.0	0.0
38522	139	8	8			1	341	0.00	1	342	0.00	9960	0.0	0.0	9959	0.0	0.0
38523	227	8	8			4	410	0.01	1	411	0.00	9962	0.0	0.0	4498	3.3	0.0
38524	215	8	8			1	1,114	0.00	1	1,115	0.00	9963	0.0	0.0	9962	0.0	0.0
38525	393	8	8			0	579	0.00	0	580	0.00	9964	0.0	0.0	9963	0.0	0.0
38540	81	8	8			292	1,077	0.27	292	1,168	0.25	2503	0.0	0.0	9980	0.0	0.0
38541	136	8	8			364	1,208	0.30	364	1,310	0.28	9980	0.0	0.0	2504	0.0	0.0
38542	169	8	8			72	541	0.13	72	587	0.12	9982	0.0	0.0	9980	0.0	0.0
38543	67	8	8			0	542	0.00	0	588	0.00	9981	0.0	0.0	9982	0.0	0.0
38544	223	8	8			0	940	0.00	0	1,019	0.00	9983	0.0	0.0	9982	0.0	0.0
38545	414	8	8			1	340	0.00	1	340	0.00	9984	0.0	0.0	9985	0.0	0.0
38546	249	10	10			1	616	0.00	1	615	0.00	9985	0.0	0.0	9986	0.0	0.0
38547	154	10	10			167	607	0.27	167	606	0.27	9986	0.0	0.0	9987	0.0	0.0
38548	312	10	10			167	287	0.58	172	287	0.60	9987	0.0	0.0	9988	0.0	0.0
38549	179	10	10			228	810	0.28	229	810	0.28	9988	0.0	0.0	9989	0.0	9.2
38550	260	8	8			9	336	0.03	9	337	0.03	2215	0.0	0.0	9990	0.0	0.0
38551	195	8	8			26	330	0.08	25	330	0.08	9990	0.0	0.0	2214	6.0	6.0
38552	253	6	6			13	280	0.04	13	280	0.04	9991	0.0	0.0	9990	0.0	0.0
38553	219	8	8			288	340	0.85	288	340	0.85	2207	7.1	7.1	9992	0.0	0.0
38554	93	8	8			304	342	0.89	306	342	0.89	9992	0.0	0.0	2214	6.0	6.0
38555	252	8	8			22	343	0.06	22	344	0.06	9998	0.0	0.0	9992	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38556	137	8	8			21	353	0.06	21	353	0.06	9996	0.0	0.0	9998	0.0	0.0
38557	135	8	8			20	385	0.05	20	385	0.05	9997	0.0	0.0	9996	0.0	0.0
38558	400	8	8			56	542	0.10	56	543	0.10	9999	0.0	0.0	10000	0.0	0.0
38559	67	8	8			57	257	0.22	57	257	0.22	10000	0.0	0.0	2190	0.0	0.0
38560	412	8	8			40	349	0.11	40	349	0.11	2334	0.0	0.0	10001	0.0	0.0
38561	68	8	8			41	294	0.14	41	294	0.14	10001	0.0	0.0	2348	0.0	0.0
38562	86	8	8			1	336	0.00	1	336	0.00	10002	0.0	0.0	10001	0.0	0.0
38563	72	8	8			1	469	0.00	1	470	0.00	10003	0.0	0.0	10002	0.0	0.0
38564	262	8	8			72	343	0.21	72	344	0.21	2175	0.0	0.0	2161	0.0	0.0
38565	113	8	8			73	342	0.21	73	343	0.21	2161	0.0	0.0	2145	0.0	0.0
38566	80	8	8			344	343	1.00	344	344	1.00	2203	5.8	5.8	10005	5.6	0.0
38567	356	8	8			390	342	1.14	389	343	1.13	10005	5.6	0.0	2238	0.0	0.0
38568	350	8	8			1	444	0.00	1	445	0.00	10006	0.0	0.0	10005	5.6	0.0
38569	395	8	8			10	331	0.03	10	331	0.03	7237	0.0	0.0	10007	0.0	0.0
38570	89	8	8			22	385	0.06	22	386	0.06	10007	0.0	0.0	2123	0.0	0.0
38571	250	8	8			10	343	0.03	10	344	0.03	10009	0.0	0.0	10007	0.0	0.0
38572	189	8	8			40	265	0.15	40	265	0.15	7006	0.0	0.0	10010	0.0	0.0
38573	213	8	8			40	276	0.14	40	276	0.14	10010	0.0	0.0	2130	0.0	0.0
38575	246	8	8			1	346	0.00	1	347	0.00	2313	0.0	0.0	9782	0.0	0.0
38576	77	8	8			20	339	0.06	20	339	0.06	9782	0.0	0.0	2270	0.0	0.0
38578	96	8	8			6	943	0.01	6	944	0.01	10014	0.0	0.0	2253	0.0	0.0
38581	65	8	8			18	431	0.04	18	431	0.04	2397	0.0	0.0	10016	0.0	0.0
38582	350	8	8			31	429	0.07	31	430	0.07	10016	0.0	0.0	7243	0.0	0.0
38583	248	8	8			13	924	0.01	13	926	0.01	10015	0.0	0.0	10016	0.0	0.0
38584	95	8	8			42	1,217	0.03	0	1,218	0.00	2246	0.0	0.0	2416	0.0	0.0
38585	198	15	15			107	1,147	0.09	67	1,147	0.06	2454	0.0	0.0	10018	0.0	0.0
38586	176	15	15			115	977	0.12	75	977	0.08	10018	0.0	0.0	7244	0.0	0.0
38587	142	8	8			7	542	0.01	7	543	0.01	10017	0.0	0.0	10018	0.0	0.0
38588	109	8	8			101	341	0.30	101	341	0.30	2103	0.0	0.0	10020	0.0	0.0
38589	251	8	8			109	341	0.32	109	341	0.32	10020	0.0	0.0	2139	0.0	0.0
38590	170	8	8			1	383	0.00	1	384	0.00	10019	0.0	0.0	10020	0.0	0.0
38600	167	8	8			172	218	0.79	172	218	0.79	2126	0.0	0.0	10040	0.0	0.0
38601	203	8	8			173	295	0.59	173	295	0.59	10040	0.0	0.0	2125	0.0	0.0
38606	245	18	18			1,581	2,333	0.68	1,672	2,333	0.72	2449	0.0	0.0	10045	0.0	0.0
38607	245	18	18			1,582	1,086	1.46	1,672	1,086	1.54	10045	0.0	0.0	2450	0.0	0.0
38608	38	8	8			111	249	0.45	111	249	0.45	2461	0.0	0.0	10046	0.0	0.0
38609	312	8	8			111	288	0.39	111	288	0.39	10046	0.0	0.0	2460	0.0	0.0
38611	35	8	8			0	1,769	0.00	0	1,771	0.00	10046	0.0	0.0	2449	0.0	0.0
38621	70	8	8			32	476	0.07	30	477	0.06	10060	0.0	0.0	2291	5.6	0.0
38622	63	8	8			15	432	0.03	15	433	0.03	2292	0.0	0.0	10064	0.0	0.0
38623	249	8	8			15	569	0.03	15	569	0.03	10064	0.0	0.0	10060	0.0	0.0
38625	201	8	8			6	429	0.01	6	430	0.01	10061	0.0	0.0	10062	0.0	0.0
38626	123	8	8			6	385	0.02	6	385	0.02	10062	0.0	0.0	10060	0.0	0.0
38627	103	8	8			8	597	0.01	8	599	0.01	10063	0.0	0.0	10060	0.0	0.0
38629	56	8	8			1	437	0.00	1	438	0.00	10068	0.0	0.0	1685	0.0	0.0
38640	135	8	8			1	415	0.00	1	416	0.00	10080	0.0	0.0	1698	0.0	0.0
38641	202	8	8			1	352	0.00	1	352	0.00	10081	0.0	0.0	1285	0.0	0.0
38642	303	8	8			15	343	0.04	15	343	0.04	1285	0.0	0.0	10082	0.0	0.0
38645	426	24	24		Existing	3,895	6,808	0.57	7,697	7,294	1.06	10084	0.0	8.0	10083	0.0	11.2
38646	177	24	24		Existing	3,895	6,810	0.57	7,618	7,297	1.04	10085	0.0	8.3	10084	0.0	8.0
38647	132	24	24		Existing	3,895	6,851	0.57	7,525	7,340	1.03	10086	0.0	0.0	10085	0.0	8.3
38648	22	24	24			144	6,765	0.02	367	7,248	0.05	10087	0.0	9.8	10086	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38649	7	24	24			47	6,652	0.01	166	7,127	0.02	10089	0.0	9.7	10087	0.0	9.8
38650	109	18	24	26	Existing	3,894	3,544	1.10	7,455	8,178	0.91	6882	0.0	0.0	10086	0.0	0.0
38652	103	10	10			431	833	0.52	431	833	0.52	3269	0.0	0.0	3268	0.0	0.0
38660	374	8	8			0	597	0.00	0	647	0.00	10101	0.0	0.0	10100	0.0	0.0
38661	500	21	21			3,806	6,769	0.56	5,228	7,333	0.71	2925	0.0	0.0	10100	0.0	0.0
38662	234	21	21			3,806	9,264	0.41	5,228	10,036	0.52	10100	0.0	0.0	7495	0.0	0.0
38663	279	12	15	5	Existing	717	1,038	0.69	1,445	1,882	0.77	1828	1.5	0.0	1827	0.0	0.0
38665	188	8	8			31	604	0.05	31	655	0.05	10107	0.0	0.0	2671	0.0	0.0
38666	104	8	8			31	344	0.09	31	374	0.08	10108	0.0	0.0	10107	0.0	0.0
38667	260	8	8			0	751	0.00	0	815	0.00	10109	0.0	0.0	10108	0.0	0.0
38668	29	8	8			31	349	0.09	31	378	0.08	10110	0.0	0.0	10108	0.0	0.0
38669	147	8	8			31	344	0.09	31	373	0.08	10111	0.0	0.0	10110	0.0	0.0
38670	35	8	8			31	733	0.04	31	796	0.04	10112	0.0	0.0	10111	0.0	0.0
38671	262	8	8			31	514	0.06	31	557	0.05	10113	0.0	0.0	10112	0.0	0.0
38672	120	8	8			0	838	0.00	0	908	0.00	10114	0.0	0.0	10113	0.0	0.0
38673	248	8	8			0	913	0.00	0	990	0.00	10115	0.0	0.0	10114	0.0	0.0
38680	70	8	8			0	367	0.00	0	367	0.00	10120	0.0	0.0	4564	0.0	0.0
38700	27	8	8			0	417	0.00	0	453	0.00	10141	0.0	0.0	2930	0.0	0.0
38701	193	8	8			1	342	0.00	1	372	0.00	10142	0.0	0.0	2949	0.0	0.0
38702	166	8	8			0	344	0.00	0	374	0.00	10144	0.0	0.0	10142	0.0	0.0
38703	254	8	8			0	544	0.00	0	590	0.00	10145	0.0	0.0	10144	0.0	0.0
38704	89	8	8			1	545	0.00	1	592	0.00	10143	0.0	0.0	10142	0.0	0.0
38705	75	8	8			0	542	0.00	0	588	0.00	10147	0.0	0.0	10146	0.0	0.0
38706	165	8	8			0	542	0.00	0	588	0.00	10146	0.0	0.0	10143	0.0	0.0
38707	128	8	8			0	542	0.00	0	588	0.00	10148	0.0	0.0	10143	0.0	0.0
38708	25	8	8			0	420	0.00	0	456	0.00	10149	0.0	0.0	2954	0.0	0.0
38709	45	8	8			0	420	0.00	0	456	0.00	10150	0.0	0.0	10149	0.0	0.0
38710	66	18	21	42	2036	3,320	3,670	0.90	4,746	5,998	0.79	10151	0.0	0.0	2675	0.0	0.0
38711	76	18	18			2,380	3,290	0.72	3,183	3,564	0.89	10152	0.0	0.0	7250	0.0	0.0
38713	63	8	8			111	596	0.19	110	597	0.19	10153	0.0	0.0	3014	0.0	0.0
38714	188	8	8			0	470	0.00	0	471	0.00	10154	0.0	0.0	4332	0.8	0.0
38730	304	12	12			281	642	0.44	281	642	0.44	10180	0.0	0.0	3235	0.0	0.0
38731	44	12	12			280	1,181	0.24	280	1,181	0.24	3164	0.0	0.0	10180	0.0	0.0
38740	114	8	8			3	305	0.01	3	305	0.01	3274	0.0	0.0	3234	0.0	0.0
38741	107	12	12			281	1,071	0.26	281	1,071	0.26	3235	0.0	0.0	3234	0.0	0.0
38742	97	10	10			280	556	0.50	280	556	0.50	10181	0.0	0.0	3164	0.0	0.0
38745	105	8	8			1	542	0.00	1	543	0.00	10183	0.0	0.0	10184	0.0	0.0
38746	89	8	8			1	617	0.00	1	617	0.00	10184	0.0	0.0	10182	0.0	0.0
38747	73	8	8			1	790	0.00	1	792	0.00	10182	0.0	0.0	3274	0.0	0.0
38760	85	6	6			38	442	0.08	17	442	0.04	1882	0.0	0.0	10200	2.7	0.0
38761	194	6	6			103	438	0.24	37	438	0.08	10200	2.7	0.0	1866	4.0	0.0
38764	180	8	8			6	708	0.01	1	710	0.00	10201	0.0	0.0	10200	2.7	0.0
38765	70	6	6			1	280	0.00	1	280	0.00	1883	0.0	0.0	1850	0.0	0.0
38766	217	6	6			17	260	0.06	17	260	0.06	1850	0.0	0.0	1882	0.0	0.0
38768	91	6	6			2	133	0.02	2	133	0.02	10220	0.0	0.0	1958	0.0	0.0
38769	445	16	16			879	3,093	0.28	415	3,091	0.13	5588	0.0	0.0	10221	0.0	0.0
38770	313	16	16			880	3,095	0.28	415	3,093	0.13	10221	0.0	0.0	1864	0.0	0.0
38771	260	16	16			2,810	2,537	1.11	3,014	2,537	1.19	2026	0.0	0.0	10222	0.0	10.0
38772	251	16	16			2,811	2,569	1.09	3,015	2,569	1.17	10222	0.0	10.0	1998	0.0	0.0
38774	126	8	8			1	324	0.00	1	324	0.00	10226	0.0	0.0	3250	0.0	0.0
38775	33	8	8			1	412	0.00	1	412	0.00	10223	0.0	0.0	10224	0.0	0.0
38776	327	8	8			1	374	0.00	1	375	0.00	10224	0.0	0.0	10225	0.0	0.0

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						Before Improvements			After Improvements				Before Improvement	After Improvement		Before Improvement	After Improvement
Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38777	33	8	8			1	353	0.00	1	353	0.00	10225	0.0	0.0	10226	0.0	0.0
38778	278	8	8			1	535	0.00	1	535	0.00	10228	0.0	0.0	10227	0.0	0.0
38779	313	10	10			415	539	0.77	415	538	0.77	3270	0.0	0.0	10227	0.0	0.0
38780	87	10	10			431	538	0.80	431	537	0.80	10227	0.0	0.0	3269	0.0	0.0
38800	102	8	8			51	370	0.14	1	371	0.00	1999	4.6	0.0	10240	4.5	0.0
38802	156	12	15	2	Existing	1,023	1,133	0.90	1,603	2,053	0.78	2014	0.5	0.0	10241	0.4	0.0
38803	336	6	6			54	186	0.29	45	186	0.24	7002	2.9	0.0	10241	0.4	0.0
38805	73	12	15	2	Existing	1,068	1,149	0.93	1,649	2,084	0.79	10241	0.4	0.0	2012	0.0	0.0
38806	5	10	10			30	735	0.04	10	734	0.01	2014	0.5	0.0	10242	0.4	4.8
38809	5	10	10			21	900	0.02	11	899	0.01	10243	0.0	0.0	2012	0.0	0.0
38820	222	33	33			7,638	8,579	0.89	10,060	8,579	1.17	2152	0.0	0.0	2149	0.0	0.0
38822	130	33	33			7,638	16,913	0.45	10,060	16,913	0.59	2149	0.0	0.0	10260	0.0	0.0
38823	84	18	18			2,835	2,301	1.23	3,755	2,301	1.63	7007	0.0	0.0	2147	0.0	0.0
38824	84	21	21			3,420	3,470	0.99	4,849	3,470	1.40	7007	0.0	0.0	2147	0.0	0.0
38825	84	12	12			1,383	781	1.77	1,458	781	1.87	7007	0.0	0.0	2147	0.0	0.0
38840	13	33	33			7,638	20,819	0.37	10,061	20,819	0.48	10260	0.0	0.0	7007	0.0	0.0
38861	33	16	16			1,308	3,542	0.37	844	3,540	0.24	1864	0.0	0.0	10282	0.0	0.0
38863	347	16	16			1,309	3,399	0.39	844	3,397	0.25	10282	0.0	0.0	10283	0.0	0.0
38864	257	16	16			1,310	3,444	0.38	844	3,442	0.25	10283	0.0	0.0	2003	0.0	0.0
38883	28	18	18			1,322	1,892	0.70	1,706	2,026	0.84	6910	0.0	0.0	7125	0.0	0.0
38920	563	8	8			90	392	0.23	90	393	0.23	3594	0.0	0.0	7183	0.0	0.0
38940	70	8	8			0	608	0.00	0	609	0.00	10340	0.0	0.0	10341	0.0	0.0
38941	72	8	8			0	535	0.00	0	535	0.00	10341	0.0	0.0	10342	0.0	0.0
38942	118	8	8			0	889	0.00	0	890	0.00	10342	0.0	0.0	10343	0.0	0.0
38943	110	8	8			8	1,590	0.01	8	1,592	0.01	10343	0.0	0.0	10344	0.0	0.0
38944	100	8	8			8	1,868	0.00	8	1,871	0.00	10344	0.0	0.0	10345	0.0	0.0
38945	49	8	8			8	1,959	0.00	8	1,962	0.00	10345	0.0	0.0	10346	0.0	0.0
38946	57	8	8			8	1,239	0.01	8	1,240	0.01	10346	0.0	0.0	10347	0.0	0.0
38947	62	8	8			9	838	0.01	9	839	0.01	10347	0.0	0.0	10348	0.0	0.0
38948	97	8	8			9	1,167	0.01	9	1,169	0.01	10348	0.0	0.0	10349	0.0	0.0
38949	193	8	8			9	1,578	0.01	9	1,580	0.01	10349	0.0	0.0	4776	0.0	0.0
38950	122	8	8			3	1,366	0.00	3	1,367	0.00	10354	0.0	0.0	10355	0.0	0.0
38951	207	8	8			4	554	0.01	4	555	0.01	10360	0.0	0.0	10355	0.0	0.0
38952	165	8	8			4	2,369	0.00	4	2,372	0.00	10359	0.0	0.0	10360	0.0	0.0
38953	314	8	8			3	1,014	0.00	3	1,015	0.00	10358	0.0	0.0	10359	0.0	0.0
38954	131	8	8			3	1,337	0.00	3	1,338	0.00	10357	0.0	0.0	10358	0.0	0.0
38955	156	8	8			3	974	0.00	3	976	0.00	10356	0.0	0.0	10357	0.0	0.0
38956	113	8	8			5	2,113	0.00	5	2,115	0.00	10364	0.0	0.0	10365	0.0	0.0
38957	45	8	8			5	2,022	0.00	5	2,024	0.00	10365	0.0	0.0	10366	0.0	0.0
38958	50	8	8			5	2,045	0.00	5	2,048	0.00	10366	0.0	0.0	10367	0.0	0.0
38959	47	8	8			5	2,082	0.00	5	2,085	0.00	10367	0.0	0.0	10368	0.0	0.0
38960	54	8	8			5	2,325	0.00	5	2,328	0.00	10368	0.0	0.0	10369	0.0	0.0
38961	63	8	8			5	2,062	0.00	5	2,065	0.00	10369	0.0	0.0	10371	0.0	0.0
38962	109	8	8			6	2,058	0.00	6	2,060	0.00	10371	0.0	0.0	10372	0.0	0.0
38963	75	8	8			6	2,067	0.00	6	2,069	0.00	10372	0.0	0.0	10373	0.0	0.0
38964	69	8	8			0	554	0.00	0	555	0.00	10361	0.0	0.0	10363	0.0	0.0
38965	56	8	8			0	970	0.00	0	972	0.00	10363	0.0	0.0	10371	0.0	0.0
38966	54	8	8			0	1,214	0.00	0	1,215	0.00	10350	0.0	0.0	10351	0.0	0.0
38967	58	8	8			0	542	0.00	0	543	0.00	10351	0.0	0.0	10352	0.0	0.0
38968	61	8	8			0	496	0.00	0	497	0.00	10352	0.0	0.0	10353	0.0	0.0
38969	136	8	8			0	997	0.00	0	998	0.00	10353	0.0	0.0	4720	0.0	0.0
38981	105	8	8			328	406	0.81	328	406	0.81	6242	0.0	0.0	6243	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
38982	139	8	8			97	603	0.16	97	604	0.16	5712	0.0	0.0	5691	0.0	0.0
39041	8	8	8			93	332	0.28	93	333	0.28	10460	0.0	0.0	3586	0.0	0.0
39042	323	8	8			71	340	0.21	71	340	0.21	3628	0.0	0.0	10462	0.0	0.0
39043	351	8	8			93	87	1.07	93	87	1.07	10462	0.0	0.0	10460	0.0	0.0
39044	15	8	8			44	343	0.13	44	344	0.13	3622	0.0	0.0	10463	0.0	0.0
39045	363	8	8			69	335	0.21	69	336	0.21	10463	0.0	0.0	3582	0.0	0.0
39046	236	24	24			2,126	1,811	1.17	3,201	1,811	1.77	7100	0.0	0.0	10464	0.0	0.0
39047	236	24	24			2,126	2,545	0.84	3,201	2,544	1.26	10464	0.0	0.0	5883	0.0	0.0
39048	297	8	8			1	388	0.00	1	389	0.00	10465	0.0	0.0	10466	0.0	0.0
39049	300	8	8			13	397	0.03	13	398	0.03	10466	0.0	0.0	5493	0.0	0.0
39060	44	8	12	37	ura	660	383	1.72	1,043	1,225	0.85	2718	3.6	0.0	2719	2.8	0.0
39061	136	8	12	37	ura	694	583	1.19	1,092	1,861	0.59	2720	4.1	0.0	2721	3.5	0.0
39062	133	8	8			365	388	0.94	401	421	0.95	2580	0.0	0.0	2537	0.0	0.0
39063	162	8	8			363	395	0.92	400	428	0.93	2537	0.0	0.0	2684	0.0	0.0
39064	155	6	6			51	148	0.34	1	148	0.00	10481	1.7	0.0	10480	0.4	0.0
39065	155	8	8			144	213	0.68	143	213	0.67	1797	1.6	0.0	10480	0.4	0.0
39066	125	8	8			147	213	0.69	144	213	0.68	10480	0.4	0.0	1770	0.0	0.0
39080	10	12	12			1	1,517	0.00	1	1,517	0.00	10500	0.0	0.0	1154	0.0	0.0
39100	286	8	8			1	342	0.00	1	343	0.00	3583	0.0	0.0	10520	0.0	0.0
39101	229	8	8			18	353	0.05	18	353	0.05	10520	0.0	0.0	3627	0.0	0.0
39102	10	21	21			1,750	3,376	0.52	2,804	3,376	0.83	10523	5.1	0.0	5837	5.3	0.0
39103	545	21	21			1,737	3,412	0.51	2,804	3,412	0.82	10521	7.2	0.0	10523	5.1	0.0
39104	15	8	8			31	1,386	0.02	4	1,388	0.00	7101	7.0	0.0	10521	7.2	0.0
39105	14	21	21			1,660	6,989	0.24	2,733	6,989	0.39	5839	0.0	0.0	10522	7.3	0.0
39106	407	21	21			1,663	3,101	0.54	2,733	3,101	0.88	10522	7.3	0.0	10521	7.2	0.0
39107	256	10	15	18	Existing	514	388	1.33	885	1,143	0.77	5866	8.2	0.0	5865	8.1	0.0
39108	39	10	18	18	Existing	515	386	1.33	886	1,851	0.48	5865	8.1	0.0	5839	0.0	0.0
39120	76	8	8			38	513	0.07	38	514	0.07	3139	0.0	0.0	10540	0.0	0.0
39121	226	8	8			43	513	0.08	43	513	0.08	10540	0.0	0.0	3088	0.0	0.0
39160	15	24	24			2,127	2,542	0.84	3,202	2,542	1.26	5883	0.0	0.0	10580	0.0	0.0
39180	948	54	54			18,347	45,866	0.40	19,681	45,866	0.43	5835	0.0	0.0	10580	0.0	0.0
39181	948	54	54			20,473	42,616	0.48	22,878	42,616	0.54	10580	0.0	0.0	5834	0.0	0.0
39182	68	8	8			12	360	0.03	12	391	0.03	10602	0.0	0.0	10601	0.0	0.0
39183	181	8	8			12	372	0.03	12	403	0.03	10601	0.0	0.0	10600	0.0	0.0
39185	212	8	8			31	363	0.08	31	394	0.08	10600	0.0	0.0	10151	0.0	0.0
39186	223	8	8			12	196	0.06	12	213	0.06	2673	0.0	0.0	10602	0.0	0.0
39200	131	8	8			0	542	0.00	0	588	0.00	10628	0.0	0.0	10620	0.0	0.0
39201	149	8	8			1	382	0.00	1	415	0.00	10621	0.0	0.0	10620	0.0	0.0
39202	323	8	8			0	383	0.00	0	415	0.00	10626	0.0	0.0	10621	0.0	0.0
39203	143	8	8			0	700	0.00	0	759	0.00	10629	0.0	0.0	10626	0.0	0.0
39204	143	8	8			0	385	0.00	0	417	0.00	10630	0.0	0.0	10626	0.0	0.0
39208	329	8	8			39	542	0.07	39	588	0.07	10620	0.0	0.0	10622	0.0	0.0
39209	324	8	8			40	803	0.05	40	872	0.05	10622	0.0	0.0	10623	0.0	0.0
39210	174	8	8			40	383	0.10	40	416	0.10	10623	0.0	0.0	10624	0.0	0.0
39211	155	8	8			69	1,138	0.06	69	1,235	0.06	10624	0.0	0.0	10625	0.0	0.0
39220	219	18	18			138	2,706	0.05	138	2,706	0.05	5616	0.0	0.0	10680	0.0	0.0
39221	232	18	18			138	2,709	0.05	138	2,709	0.05	10680	0.0	0.0	5644	0.0	0.0
39222	140	15	21	20	Existing	1,938	1,103	1.76	3,011	2,707	1.11	5837	5.3	0.0	10681	0.0	0.0
39223	308	15	21	20	Existing	1,938	1,109	1.75	3,012	2,720	1.11	10681	0.0	0.0	7355	5.7	0.0
39224	144	8	8			1	367	0.00	1	368	0.00	10682	0.0	0.0	10681	0.0	0.0
39225	203	8	8			1	295	0.00	1	295	0.00	5747	0.0	0.0	10683	0.0	0.0
39226	317	8	8			37	294	0.13	37	294	0.13	10683	0.0	0.0	5746	0.0	0.0

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39227	423	8	8			1	574	0.00	1	576	0.00	10684	0.0	0.0	10683	0.0	0.0
39231	79	8	8			1	374	0.00	1	374	0.00	10685	0.0	0.0	10686	0.0	0.0
39232	114	8	8			3	368	0.01	3	369	0.01	10686	0.0	0.0	10687	0.0	0.0
39233	53	8	8			3	408	0.01	3	409	0.01	10687	0.0	0.0	5806	0.0	0.0
39262	139	8	8			4	299	0.01	2	299	0.01	5868	0.0	0.0	10720	7.8	0.0
39263	111	8	8			8	296	0.03	3	297	0.01	10720	7.8	0.0	5869	6.5	0.0
39280	138	8	8			2	358	0.01	2	358	0.01	10741	0.0	0.0	10686	0.0	0.0
39281	103	8	8			1	328	0.00	1	328	0.00	10740	0.0	0.0	10741	0.0	0.0
39282	89	8	8			1	315	0.00	1	315	0.00	10742	0.0	0.0	10741	0.0	0.0
39300	37	8	8			12	332	0.04	1	333	0.00	10780	0.0	0.0	3306	4.4	0.0
39303	18	6	6			1	1,449	0.00	1	1,449	0.00	1793	0.0	0.0	1792	0.0	0.0
39306	204	6	6			1	251	0.00	1	251	0.00	10785	0.0	0.0	1820	0.0	0.0
39310	181	8	8			1	291	0.00	1	292	0.00	10787	0.0	0.0	1832	0.0	0.0
39312	86	8	8			1	319	0.00	1	319	0.00	10788	0.0	0.0	10787	0.0	0.0
39317	155	8	8			1	441	0.00	1	441	0.00	10793	0.0	0.0	10794	0.0	0.0
39318	146	8	8			1	278	0.00	1	278	0.00	10794	0.0	0.0	10795	0.0	0.0
39319	61	8	8			42	282	0.15	42	283	0.15	10795	0.0	0.0	10796	0.0	0.0
39320	77	8	8			42	275	0.15	42	276	0.15	10796	0.0	0.0	1692	0.0	0.0
39321	15	8	8			191	278	0.69	301	279	1.08	7128	2.2	0.0	10798	2.2	0.0
39322	149	8	8			119	319	0.37	149	319	0.47	3431	0.0	9.1	3509	0.0	17.1
39323	214	8	8			119	304	0.39	149	305	0.49	3509	0.0	17.1	3418	0.0	17.1
39324	11	8	8			3	420	0.01	3	421	0.01	3505	0.0	0.0	3457	0.0	0.0
39328	64	12	18	5	Existing	1,516	1,077	1.41	2,531	3,176	0.80	10800	5.7	0.0	1824	6.9	0.0
39330	33	12	18	5	Existing	1,515	1,037	1.46	2,530	3,056	0.83	10799	4.8	0.0	10801	5.9	0.0
39331	99	12	18	5	Existing	1,515	826	1.84	2,531	2,435	1.04	10801	5.9	0.0	10802	5.2	0.0
39332	25	12	18	5	Existing	1,517	1,162	1.31	2,531	3,426	0.74	10802	5.2	0.0	10800	5.7	0.0
39340	73	8	8			1	572	0.00	1	573	0.00	10820	0.0	0.0	1686	0.0	0.0
39360	337	6	6			33	253	0.13	33	253	0.13	1709	0.0	0.0	10840	1.4	0.0
39361	337	6	6			35	49	0.71	34	49	0.70	10840	1.4	0.0	1708	1.5	0.0
39362	40	6	6			1	162	0.00	1	162	0.00	10841	0.0	0.0	1592	0.0	0.0
39363	56	6	6			1	150	0.00	1	150	0.00	7218	0.0	0.0	11102	0.0	0.0
39364	51	6	6			2	181	0.01	1	181	0.00	10842	0.0	0.0	10780	0.0	0.0
39365	100	6	6			1	144	0.00	1	144	0.00	10843	0.0	0.0	10842	0.0	0.0
39380	80	10	10			1	565	0.00	1	565	0.00	10860	0.0	0.0	3495	0.0	0.0
39381	35	6	6			1	155	0.00	1	155	0.00	10861	0.0	0.0	7448	0.0	0.0
39400	14	8	8			108	604	0.18	108	605	0.18	6115	0.0	4.7	10883	0.0	0.0
39401	234	8	8			1	683	0.00	1	684	0.00	10881	0.0	0.0	6118	0.0	0.0
39420	9	12	12			863	750	1.15	814	750	1.09	1762	6.3	0.0	10900	6.3	0.0
39421	245	15	15			1,713	1,621	1.06	1,628	1,621	1.00	10900	6.3	0.0	3413	6.5	0.0
39422	9	12	12			863	750	1.15	814	750	1.09	1762	6.3	0.0	10900	6.3	0.0
39423	50	12	12			441	881	0.50	249	881	0.28	1763	6.3	0.0	1762	6.3	0.0
39426	255	8	8			1	220	0.01	1	220	0.01	1414	0.0	0.0	1438	0.0	0.0
39427	255	8	8			48	416	0.12	48	417	0.12	1438	0.0	0.0	1377	0.0	0.0
39440	289	8	8			0	835	0.00	1	906	0.00	10921	0.0	0.0	10920	0.0	0.0
39441	385	8	8			1	1,051	0.00	1	1,140	0.00	10922	0.0	0.0	10923	0.0	0.0
39443	173	8	8			16	518	0.03	16	563	0.03	10925	0.0	0.0	10926	0.0	0.0
39444	307	8	8			16	785	0.02	16	852	0.02	10926	0.0	0.0	10927	0.0	0.0
39445	100	8	8			16	413	0.04	16	448	0.04	10927	0.0	0.0	10928	0.0	0.0
39446	113	8	8			17	582	0.03	17	631	0.03	10928	0.0	0.0	10930	0.0	0.0
39447	231	8	8			17	649	0.03	17	703	0.02	10930	0.0	0.0	10929	0.0	0.0
39460	180	8	8			1	468	0.00	1	469	0.00	10940	0.0	0.0	3295	0.0	0.0
39461	330	8	8			1	321	0.00	1	322	0.00	10941	0.0	0.0	7678	0.0	0.0

Appendix G.3 - Build-Out Condition (URA) Detailed Modeling Results - Before and After Improvement
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City of Medford

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Pipe Segment ID	Length (ft)	Existing Diameter (inches)	Improved Diameter (inches)	SSMP Improvement ID	Timing	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Maximum Q (gpm)	Manning Full Q (gpm)	Q/Qm	Upstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)	Downstream Manhole ID	Distance Below Manhole Rim (ft)	Distance Below Manhole Rim (ft)
39480	267	8	8			1	1,018	0.00	1	1,104	0.00	10924	0.0	0.0	10960	0.0	0.0
39481	255	8	8			16	767	0.02	16	832	0.02	10960	0.0	0.0	10925	0.0	0.0
39488	223	8	8			80	567	0.14	80	568	0.14	4297	0.0	0.0	10968	0.0	0.0
39489	52	8	8			81	565	0.14	81	565	0.14	10968	0.0	0.0	4299	0.0	0.0
39500	125	8	8			0	303	0.00	0	325	0.00	10984	0.0	0.0	10985	0.0	0.0
39501	261	8	8			16	316	0.05	16	339	0.05	10985	0.0	0.0	10987	0.0	0.0
39502	231	8	8			120	322	0.37	120	345	0.35	10987	0.0	0.0	10988	0.0	0.0
39503	123	8	8			0	331	0.00	0	355	0.00	10983	0.0	0.0	10981	0.0	0.0
39504	488	8	8			15	578	0.03	15	620	0.02	10981	0.0	0.0	10986	0.0	0.0
39505	193	8	8			15	495	0.03	15	531	0.03	10986	0.0	0.0	10985	0.0	0.0
39506	102	8	8			0	774	0.00	0	830	0.00	10982	0.0	0.0	10981	0.0	0.0
39507	31	8	8			0	470	0.00	0	504	0.00	10980	0.0	0.0	6626	0.0	0.0
39508	75	8	8			88	551	0.16	88	591	0.15	6624	0.0	0.0	10987	0.0	0.0
39511	365	8	8			120	641	0.19	120	688	0.17	10988	0.0	0.0	6688	0.0	0.0
39512	161	8	8			0	1,165	0.00	0	1,264	0.00	10990	0.0	0.0	10989	0.0	0.0
39513	97	8	8			10	1,252	0.01	10	1,358	0.01	10989	0.0	0.0	7914	0.0	0.0
39514	218	8	8			1	1,586	0.00	1	1,721	0.00	10998	0.0	0.0	10994	0.0	0.0
39515	105	8	8			0	982	0.00	0	1,065	0.00	10994	0.0	0.0	10993	0.0	0.0
39516	193	8	8			0	685	0.00	0	743	0.00	10993	0.0	0.0	10992	0.0	0.0
39517	103	8	8			0	1,201	0.00	0	1,303	0.00	10992	0.0	0.0	10991	0.0	0.0
39518	155	8	8			0	787	0.00	0	853	0.00	10994	0.0	0.0	10995	0.0	0.0
39519	362	8	8			0	633	0.00	0	686	0.00	10995	0.0	0.0	10996	0.0	0.0
39520	156	8	8			0	941	0.00	0	1,020	0.00	10999	0.0	0.0	10996	0.0	0.0
39521	136	8	8			532	1,026	0.52	532	1,114	0.48	10996	0.0	0.0	10997	0.0	0.0
39522	137	8	12	37	ura	533	971	0.55	533	3,102	0.17	10997	0.0	0.0	9685	0.0	0.0
39523	139	8	8			0	531	0.00	0	576	0.00	11001	0.0	0.0	11000	0.0	0.0
39524	366	8	8			0	664	0.00	0	720	0.00	11000	0.0	0.0	10997	0.0	0.0
39540	177	18	18			2,505	7,058	0.35	3,186	7,058	0.45	6088	0.0	0.0	11021	0.0	0.0
39541	105	18	18			2,505	7,049	0.36	3,187	7,049	0.45	11021	0.0	0.0	11020	0.0	0.0
39542	45	18	18			2,505	3,524	0.71	3,187	3,524	0.90	11020	0.0	0.0	6089	0.0	0.0
39543	181	6	6			1	189	0.00	1	189	0.00	11022	0.0	0.0	11023	0.0	0.0
39544	144	6	6			1	205	0.00	1	205	0.00	11023	0.0	0.0	11024	0.0	0.0
39560	15	8	8			206	313	0.66	206	314	0.66	11040	0.0	0.0	2241	0.0	0.0
39581	210	8	8			0	458	0.00	0	497	0.00	11080	0.0	0.0	10928	0.0	0.0
39620	235	8	8			11	641	0.02	11	642	0.02	11140	0.0	0.0	11141	0.0	0.0
39621	390	8	8			1	130	0.01	1	130	0.01	7425	0.0	0.0	11141	0.0	0.0
39622	390	8	8			13	360	0.03	13	360	0.03	11141	0.0	0.0	6157	0.0	0.0
39640	96	8	8			0	946	0.00	0	1,026	0.00	11160	0.0	0.0	2508	0.0	0.0
39660	30	8	8			1	370	0.00	1	371	0.00	11181	0.0	0.0	5963	0.0	0.0
39680	228	8	8			103	753	0.14	103	754	0.14	7323	0.0	0.0	11202	0.0	0.0
39681	217	8	8			161	728	0.22	161	729	0.22	11202	0.0	0.0	4889	0.0	0.0
39720	298	8	8			0	122	0.00	0	131	0.00	6920	0.0	0.0	7645	0.0	0.0
39721	390	8	8			33	334	0.10	33	358	0.09	6922	0.0	0.0	11260	0.0	0.0
39722	74	8	8			33	333	0.10	33	357	0.09	11260	0.0	0.0	6905	0.0	0.0
39723	400	8	8			14	240	0.06	14	240	0.06	11261	8.1	8.1	5845	0.0	0.0
39724	35	8	8			1	460	0.00	1	460	0.00	11262	0.0	0.0	5977	0.0	0.0
39725	159	15	15			1,756	2,210	0.79	1,933	2,368	0.82	6820	0.0	0.0	11263	0.0	0.0
39727	11	24	24			4,942	81,911	0.06	4,870	81,911	0.06	3299	0.0	0.0	3377	0.0	0.0
39728	454	10	10			69	413	0.17	69	447	0.16	10625	0.0	0.0	11266	0.0	0.0
39729	454	10	10			80	317	0.25	80	342	0.23	11266	0.0	0.0	10627	0.0	0.0
39730	361	8	8			1	465	0.00	1	504	0.00	11265	0.0	0.0	11266	0.0	0.0
39733	193	8	8			0	421	0.00	0	456	0.00	11267	0.0	0.0	11265	0.0	0.0

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39734	72	8	8			0	542	0.00	0	588	0.00	11268	0.0	0.0	11267	0.0	0.0
39735	323	8	8			0	498	0.00	0	540	0.00	11269	0.0	0.0	11160	0.0	0.0
39736	85	8	8			24	603	0.04	24	647	0.04	11270	0.0	0.0	6342	0.0	0.0
39737	157	8	8			0	778	0.00	0	835	0.00	11271	0.0	0.0	11270	0.0	0.0
39738	419	8	8			10	382	0.03	10	410	0.03	11272	0.0	0.0	8019	5.2	0.0
39739	127	8	8			10	298	0.03	10	319	0.03	11273	0.0	0.0	11272	0.0	0.0
39740	201	8	8			10	617	0.02	10	662	0.01	11274	0.0	0.0	11273	0.0	0.0
39741	339	8	8			1	833	0.00	1	893	0.00	11275	0.0	0.0	11274	0.0	0.0
39742	251	8	8			0	421	0.00	0	451	0.00	11276	0.0	0.0	11273	0.0	0.0
39743	477	8	8			0	393	0.00	0	422	0.00	11277	0.0	0.0	11276	0.0	0.0
39744	83	8	8			1	926	0.00	1	928	0.00	11278	0.0	0.0	2246	0.0	0.0
39866	284	21	21			3,914	6,910	0.57	5,686	7,403	0.77	6008	0.0	0.0	11414	7.1	0.0
39867	156	24	24			3,903	5,542	0.70	5,783	5,542	1.04	11414	7.1	0.0	11413	0.9	0.0
39868	143	24	24			5,463	5,551	0.98	7,476	5,947	1.26	11413	0.9	0.0	5974	0.0	0.0
39869	166	15	15			1,767	2,215	0.80	1,897	2,374	0.80	11263	0.0	0.0	11413	0.9	0.0
39873	395	8	8			73	406	0.18	73	406	0.18	5973	0.0	0.0	5976	0.0	0.0
39874	6	8	8			0	188	0.00	0	188	0.00	11675	0.0	0.0	5976	0.0	0.0
39875	9	18	21	25	2036	3,724	4,718	0.79	5,645	7,626	0.74	5957	0.0	0.0	11417	0.0	0.0
39876	118	18	21	25	2036	3,763	4,832	0.78	5,645	7,809	0.72	11417	0.0	0.0	6008	0.0	0.0
39912	77	8	8			0	1,175	0.00	0	1,175	0.00	11472	0.0	0.0	11414	7.1	0.0
39913	43	8	8			0	452	0.00	0	452	0.00	11473	0.0	0.0	11472	0.0	0.0

APPENDIX H – SSMP RECOMMENDED PROJECTS CITY COMMENTS

SSMP Project Review

Project #1- Mace road from Howard to Elliot, Elliot from Mace to Dan, Dan from Elliot to Marilee, Marilee from Dan to Ellen

Maintenance review: This section is 12" on Mace and 15" from Elliot on. There are several runs that have infiltration observations in them, but structurally the pipe is in good shape. The biggest issue we see in this project is the flow slows way down in the run on Elliot south of Dan to Dan. Then on Dan the line has severe sags where the line sits full. A new section of 18" PVC was added on Ellen to take the flow to Bursell, also an overflow pipe was installed on Howard north of Mace to relieve a manhole that used to frequently overflow. There has not been significant surcharging witnessed in this project in recent years.

Project #2- Clark from Narregan to Central, Central from Clark to the Med Fab easement, across the easement to Central, Central to the car wash easement, across the easement to Walnut, Walnut to Alley, Alley to Madrona, Madrona to Riverside.

Maintenance review: Structurally these segments have several deficiencies that would benefit from replacement however I believe more monitoring may be necessary to figure out how necessary this project is from a capacity stand point. The line on Clark is 10" concrete, on Central it goes to 8" clay. The section of clay on Central has several structural issues as well as heavy root intrusions. The section through Med-Fab was replaced with 10" PVC. The rest of the project is 10" concrete with areas of severe surface damage and we had planned on lining some of it with CIPP however if there truly are capacity issues that may not be an option.

Project #4- Jackson from Holly to Central

Maintenance review: This section has been replaced, it is 10" PVC from Holly to Front and 12" PVC from Front to Central. I would imagine any surcharging seen in this section is from the tie in with Central. Manhole 1762 has 4 lines (3-12" and 1-10") flowing into it and 2-12" going out of it, then 10' downstream the 2-12" dump into manhole 10900 and exit in 1-15". I think the flow coming down 2nd street to Central (which is the bottom end of projects 5-9) is holding the water back on Jackson.

Projects #5 through #9-

Maintenance review: This project should be considered high priority as this system experience's drastic surcharging, however the city has already made a huge investment in replacing and up-sizing these sections. The system still has very significant surcharging in all of these projects and also experienced an SSO in project# 7 this past January. I think with the investment the city has already dedicated to these projects that I&I identification and reduction efforts for the laterals as well as the system upstream of projects 7 and 9 could be a feasible alternative. Surcharging in these project areas occurs very quickly in heavy rain events indicating possible direct connections impacting the system.

Project #10- 9th from Holly to Riverside, Riverside from 9th to Jackson

Maintenance review: I believe this project can be eliminated or modified if project #11 was completed. Tree Top who discharges into the manhole at 9th and Grape causes the 18" mainline on 12th street to run at 3/4 pipe without additional storm flow. With Tree Top discharging as much as

they do I feel the majority of surcharging during a heavy rain event comes from the 8" overflow pipes at 11th & Oakdale, 12th & Ivy, 12th & Holly, and 12th & Fir. During the heavy snow melt/rain event in January we monitored this section and observed significant surcharging on 9th street from Holly to just west of Riverside.
However 12th street was less than 2' from surface elevation meaning that all overflows listed above were taking water and those streets were surcharged as well.

Project #12- 11th street from Peach to Laurel

Maintenance review: 11th was upsized and replaced from Hamilton to Oakdale, it is 12" to Laurel and 15" from there on. Further study may be necessary to check for capacity issues.

Project#13- Holmes from Kenyon to Holly

Maintenance review: These lines are 8" concrete and experience relatively high flow. The project could possibly even be extended further west as the lines typically run just less than pipe and also contain heavily mortared joints that also restrict capacity.

Project #15- Spring from Sunrise to Berkeley

Maintenance review: Not really sure why this one is indicated for up-sizing.

Project# 16- Easement from Royal to Market, Market from Cardley to Biddle.

Maintenance review: These lines are 10" concrete with some surface damage. These lines do flow close to 1/2 pipe with all the apartments that tie in to them. I do not recall surcharging in this system however when flows are high at Spring and Crater Lake it does overflow down this system.

Project #17- Ramada from McAndrews to Petunia

Maintenance review: These lines are 8" concrete and experience moderate flow. The areas upstream of this segment also contains multiple line segments with heavy infiltration, however the worst sections for surcharging are downstream in project 19 which should be considered higher priority.

Project #18- Corona from Roberts to Morrow, Morrow from Corona to Velia.

Maintenance review: These section experiences heavy flows as well as the areas that feed these segments have heavy infiltration. The section on Morrow has several heavy root intrusions.

Project#19- Ramada from Petunia north to easement, easement from Ramada to Honeysuckle, Honeysuckle to Camellia, Camellia to CLA, CLA to Grand, Grand to Corona, Corona to Johnson, Johnson to Velia, Velia to Morrow

Maintenance review: This project is definitely necessary however portions of this project should be considered very high priority. Specific areas of concern are Camellia from Larkspur through the easement to CLA, as well as Grand from CLA to Covina. The flow slows down as it enters the easement east of CLA and root intrusion on Grand also creates issues. There was an SSO in December of 2016 at Camellia and Yucca caused by a combination of heavy rain and restriction

from roots. The lines on Grand have to have the roots cut out twice a year which has created severe surface damage that needs addressed.

Project #20- Morrow approximately 900' east of Biddle to Biddle.

Maintenance review: This is the next phase of upsizing Morrow road that was done in the mid 2000's. Morrow was upsized to 21" from Velia west for 955' and then down sizes back to 15".

Project #21- Old Hilton road from HWY 62 to Biddle.

Maintenance review: This line is 16" TSP that has several root intrusions and should be up-sized.

Project #22- Easement from St. Augustine to Bailey, Bailey to Delta Waters
Maintenance review: This line does not currently have capacity issues that we see however with the proposed growth south of Cedar Links that will tie in here and potential for expansion east of Foothills it may be necessary.

Projects #23 through #27

Maintenance review: The extent and priority for these projects will be dependent on the proposed development that will affect them.

Maintenance Goals for SSMP

Current review of the Asset Management Software indicates that the city has over 900 segments of pipe rated in the critical stage. The software data however can be somewhat skewed as a line with a couple of major defects that require 10' of replacement can score the same as a line that has severe surface damage and missing pipe throughout the whole run and requires complete replacement. Jeff is constantly reviewing the data/video and categorizing the critical line segments as to which form of repair is best suited. We are currently in the process of working with TS on development of a GIS base map that will allow us to populate the City's mainlines by rehabilitation needs, schedule, and status for better prioritization.

In-House Work:

1. Subsurface crews will replace between 6 and 10 mainlines per year either by pipe bursting or dig and replace methods. Quantities may increase with the splitting of the former street department which could allow for more time to be dedicated to underground work as opposed to paving.
2. Subsurface crews will also perform numerous spot repairs ranging from 2'-50' to sewer mainlines throughout the year.
3. Maintenance will continue with their CIPP contract program. Currently there is $500,000/year dedicated to this program which has resulted in 23,000' of 6" and 8" mainline pipe being re-lined in the last 2 years. The current budget has a proposal to increase the amount of funds to $750,000/year.
4. Maintenance crews will continue and hopefully increase the amount of internal pipe repairs (Pipe Patch) being installed. Currently the goal is 24/year however with an additional TV van added to the budget we will be able to leave the old van set-up for patching and increase the amount of time we dedicate to the program.

APPENDIX I – I/I REDUCTION PROGRAM ASSUMPTIONS

					Sewer Mains			Laterals Only			Laterals/Side Sewers			Side Sewers Only			Direct Disconnects			SSES			
Basin	Overall Targeted I/I Reduction	Recommended Technique	Technique Reduction %	Portion of Basin/ Subbasin	Impacted Sewer Mains[1]	Total Mains (LF)	Impacted Mains (LF)	Impacted Laterals[1]	Total No. of Laterals	Impacted Laterals	Impacted Laterals/ Side Sewers[1]	Total No. of Laterals/ Side Sewers	Impacted Laterals	Impacted Side Sewers[1]	Total No. of Side Sewers	Impacted Side Sewers	Direct Disconnects	Total No. of Connections	Assumed No. of Disconnects	Impacted Total Feet of Laterals	Total Length of Impacted Pipe (LF)	Assumed Feet of Pipe in SSES[2]	No. of Temp Meters[3]
Basin 1	80%	2	80%	100%	95%	46,777	**44,438**	0%	600	-	95%	600	**570**	0%	600	-	4%	94	4	51,300	95,738	47,869	3
	40%	3	40%	100%	50%	46,777	**23,388**	50%	600	**300**	0%	600	-	0%	600	-	4%	94	4	19,500	42,888	21,444	3
	60%	4	60%	100%	0%	46,777	-	0%	600	-	50%	600	**300**	45%	600	**270**	4%	94	4	33,750	33,750	16,875	3
Average							**44,438**			-			**570**			-		**94**	**4**	**51,300**	**95,738**	**47,869**	**3**
Basin 2	35%	2	80%	44%	95%	90,173	**37,478**	0%	1,525	-	95%	1,525	**634**	0%	1,525	-	4%	181	4	57,045	94,522	47,261	5
	35%	3	40%	88%	50%	90,173	**39,450**	50%	1,525	**667**	0%	1,525	-	0%	1,525	-	4%	181	7	43,367	82,818	41,409	5
	35%	4	60%	58%	0%	90,173	-	0%	1,525	-	50%	1,525	**445**	45%	1,525	**400**	4%	181	5	50,039	50,039	25,020	5
Average							**25,643**			**222**			**360**			**133**		**181**	**5**	**50,150**	**75,793**	**37,897**	**5**
Basin 4	20%	2	80%	25%	95%	72,053	**17,113**	0%	922	-	95%	922	**219**	0%	922	-	4%	145	2	19,708	36,820	18,410	4
	20%	3	40%	50%	50%	72,053	**18,013**	50%	922	**231**	0%	922	-	0%	922	-	4%	145	3	14,983	32,996	16,498	4
	20%	4	60%	33%	0%	72,053	-	0%	922	-	50%	922	**154**	45%	922	**138**	4%	145	2	17,288	17,288	8,644	4
Average							**11,709**			**77**			**124**			**46**			**2**	**17,326**	**29,034**	**14,517**	**4**
Basin 6	35%	2	80%	44%	95%	124,768	**51,857**	0%	2,602	-	95%	2,602	**1,081**	0%	2,602	-	4%	250	5	97,331	149,188	74,594	7
	35%	3	40%	88%	50%	124,768	**54,586**	50%	2,602	**1,138**	0%	2,602	-	0%	2,602	-	4%	250	9	73,994	128,581	64,290	7
	35%	4	60%	58%	0%	124,768	-	0%	2,602	-	50%	2,602	**759**	45%	2,602	**683**	4%	250	6	85,378	85,378	42,689	7
Average							**25,928**			-			**920**			**342**			**6**	**91,355**	**117,283**	**58,642**	**7**
Basin 7	30%	2	80%	38%	95%	82,493	**29,388**	0%	1,639	-	95%	1,639	**584**	0%	1,639	-	4%	165	3	52,550	81,939	40,969	5
	30%	3	40%	75%	50%	82,493	**30,935**	50%	1,639	**615**	0%	1,639	-	0%	1,639	-	4%	165	5	39,951	70,886	35,443	5
	30%	4	60%	50%	0%	82,493	-	0%	1,639	-	50%	1,639	**410**	45%	1,639	**369**	4%	165	4	46,097	46,097	23,048	5
Average							**20,108**			**205**			**331**			**123**			**4**	**46,199**	**66,307**	**33,154**	**5**
Basin 8	15%	2	80%	19%	95%	58,644	**10,446**	0%	1,090	-	95%	1,090	**194**	0%	1,090	-	4%	118	1	17,474	27,920	13,960	3
	15%	3	40%	38%	50%	58,644	**10,996**	50%	1,090	**204**	0%	1,090	-	0%	1,090	-	4%	118	2	13,284	24,280	12,140	3
	15%	4	60%	25%	0%	58,644	-	0%	1,090	-	50%	1,090	**136**	45%	1,090	**123**	4%	118	2	15,328	15,328	7,664	3
Average							**7,147**			**68**			**110**			**41**			**2**	**15,362**	**22,509**	**11,255**	**3**
Basin 10	50%	2	80%	63%	95%	106,581	**63,283**	0%	2,070	-	95%	2,070	**1,229**	0%	2,070	-	4%	214	6	110,616	173,898	86,949	6
	40%	3	40%	100%	50%	106,581	**53,291**	50%	2,070	**1,035**	0%	2,070	-	0%	2,070	-	4%	214	9	67,275	120,566	60,283	6
	50%	4	60%	83%	0%	106,581	-	0%	2,070	-	50%	2,070	**863**	45%	2,070	**776**	4%	214	8	97,031	97,031	48,516	6
Average							**31,641**			-			**1,046**			**388**			**7**	**103,823**	**135,465**	**67,732**	**6**

Notes:
1. Per assumed technique reduction percentage.
2. 50% of Total Length of Impacted Pipe
3. For each six-month period of flow monitoring (one before and one after I/I reduction).

	Technique	SSES				I/I Reduction Projects												
		CCTV Inspections	Smoke Testing/ Flow Isolation	Temporary Meter[1]	Total SSES	Sewer Main Rehab	Laterals	Laterals/ Side Sewers	Side Sewers	Direct Disconnects	Baseline Construction Cost	Construction Contingency	Construction Cost	Project Contingency	I/I Improvements Project Cost	Subtotal Program Cost	Capacity Projects not Alleviated	Total Program Cost
Unit Costs		$0.50	$1.00	$600.00		$45	$5,000	$10,000	$5,000	$4,000								
Basin		LF	LF	EA		LF	EA	EA	EA	EA		30%		50%				
Basin 1	2	$23,934	$47,869	$1,800	**$74,000**	$1,999,700	$0	$5,700,000	$0	$16,000	**$7,715,700**	$2,314,710	**$10,030,000**	$5,015,000	**$15,045,000**	**$15,119,000**	$1,300,000	**$16,419,000**
	3	$10,722	$21,444	$1,800	**$34,000**	$1,052,474	$1,500,000	$0	$0	$16,000	**$2,568,474**	$770,542	**$3,339,000**	$1,669,500	**$5,009,000**	**$5,043,000**	$1,300,000	**$6,343,000**
	4	$8,438	$16,875	$1,800	**$28,000**	$0	$0	$3,000,000	$1,350,000	$16,000	**$4,366,000**	$1,309,800	**$5,676,000**	$2,838,000	**$8,514,000**	**$8,542,000**	$1,300,000	**$9,842,000**
Average					**$45,333**						**$4,883,391**	$1,465,017	**$6,348,000**	$3,174,000	**$9,522,000**	**$9,567,000**	$1,300,000	**$10,867,000**
Basin 2	2	$23,631	$47,261	$3,000	**$74,000**	$1,686,508	$0	$6,338,281	$0	$16,000	**$8,040,789**	$2,412,237	**$10,453,000**	$5,226,500	**$15,680,000**	**$15,754,000**		**$15,754,000**
	3	$20,704	$41,409	$3,000	**$66,000**	$1,775,271	$3,335,938	$0	$0	$28,000	**$5,139,209**	$1,541,763	**$6,681,000**	$3,340,500	**$10,022,000**	**$10,088,000**		**$10,088,000**
	4	$12,510	$25,020	$3,000	**$41,000**	$0	$0	$4,447,917	$2,001,563	$20,000	**$6,469,479**	$1,940,844	**$8,410,000**	$4,205,000	**$12,615,000**	**$12,656,000**		**$12,656,000**
Average					**$60,333**						**$6,549,826**	$1,964,948	**$8,515,000**	$4,257,500	**$12,773,000**	**$12,833,000**		**$12,833,000**
Basin 4	2	$9,205	$18,410	$2,400	**$31,000**	$770,063	$0	$2,189,750	$0	$8,000	**$2,967,813**	$890,344	**$3,858,000**	$1,929,000	**$5,787,000**	**$5,818,000**		**$5,818,000**
	3	$8,249	$16,498	$2,400	**$28,000**	$810,593	$1,152,500	$0	$0	$12,000	**$1,975,093**	$592,528	**$2,568,000**	$1,284,000	**$3,852,000**	**$3,880,000**		**$3,880,000**
	4	$4,322	$8,644	$2,400	**$16,000**	$0	$0	$1,536,667	$691,500	$8,000	**$2,236,167**	$670,850	**$2,907,000**	$1,453,500	**$4,361,000**	**$4,377,000**		**$4,377,000**
Average					**$25,000**						**$2,393,024**	$717,907	**$3,111,000**	$1,555,500	**$4,667,000**	**$4,692,000**		**$4,692,000**
Basin 6	2	$37,297	$74,594	$4,200	**$117,000**	$2,333,559	$0	$10,814,563	$0	$20,000	**$13,168,121**	$3,950,436	**$17,119,000**	$8,559,500	**$25,679,000**	**$25,796,000**	$200,000	**$25,996,000**
	3	$32,145	$64,290	$4,200	**$101,000**	$2,456,378	$5,691,875	$0	$0	$36,000	**$8,184,253**	$2,455,276	**$10,640,000**	$5,320,000	**$15,960,000**	**$16,061,000**	$200,000	**$16,261,000**
	4	$21,345	$42,689	$4,200	**$69,000**	$0	$0	$7,589,167	$3,415,125	$24,000	**$11,028,292**	$3,308,488	**$14,337,000**	$7,168,500	**$21,506,000**	**$21,575,000**	$200,000	**$21,775,000**
Average					**$95,667**						**$10,793,555**	$3,238,067	**$14,032,000**	$7,016,000	**$21,048,000**	**$21,144,000**	$200,000	**$21,344,000**
Basin 7	2	$20,485	$40,969	$3,000	**$65,000**	$1,322,471	$0	$5,838,938	$0	$12,000	**$7,173,408**	$2,152,022	**$9,325,000**	$4,662,500	**$13,988,000**	**$14,053,000**	$2,700,000	**$16,753,000**
	3	$17,721	$35,443	$3,000	**$57,000**	$1,392,074	$3,073,125	$0	$0	$20,000	**$4,485,199**	$1,345,560	**$5,831,000**	$2,915,500	**$8,747,000**	**$8,804,000**	$2,700,000	**$11,504,000**
	4	$11,524	$23,048	$3,000	**$38,000**	$0	$0	$4,097,500	$1,843,875	$16,000	**$5,957,375**	$1,787,213	**$7,745,000**	$3,872,500	**$11,618,000**	**$11,656,000**	$2,700,000	**$14,356,000**
Average					**$53,333**						**$5,871,994**	$1,761,598	**$7,634,000**	$3,817,000	**$11,451,000**	**$11,504,000**	$2,700,000	**$14,204,000**
Basin 8	2	$6,980	$13,960	$1,800	**$23,000**	$470,069	$0	$1,941,563	$0	$4,000	**$2,415,632**	$724,689	**$3,140,000**	$1,570,000	**$4,710,000**	**$4,733,000**		**$4,733,000**
	3	$6,070	$12,140	$1,800	**$21,000**	$494,810	$1,021,875	$0	$0	$8,000	**$1,524,685**	$457,405	**$1,982,000**	$991,000	**$2,973,000**	**$2,994,000**		**$2,994,000**
	4	$3,832	$7,664	$1,800	**$14,000**	$0	$0	$1,362,500	$613,125	$8,000	**$1,983,625**	$595,088	**$2,579,000**	$1,289,500	**$3,869,000**	**$3,883,000**		**$3,883,000**
Average					**$19,333**						**$1,974,647**	$592,394	**$2,567,000**	$1,283,500	**$3,851,000**	**$3,870,000**		**$3,870,000**
Basin 10	2	$43,475	$86,949	$3,600	**$135,000**	$2,847,719	$0	$12,290,625	$0	$24,000	**$15,162,344**	$4,548,703	**$19,711,000**	$9,855,500	**$29,567,000**	**$29,702,000**		**$29,702,000**
	3	$30,141	$60,283	$3,600	**$95,000**	$2,398,079	$5,175,000	$0	$0	$36,000	**$7,609,079**	$2,282,724	**$9,892,000**	$4,946,000	**$14,838,000**	**$14,933,000**		**$14,933,000**
	4	$24,258	$48,516	$3,600	**$77,000**	$0	$0	$8,625,000	$3,881,250	$32,000	**$12,538,250**	$3,761,475	**$16,300,000**	$8,150,000	**$24,450,000**	**$24,527,000**		**$24,527,000**
Average					**$102,333**						**$11,769,891**	$3,530,967	**$15,301,000**	$7,650,500	**$22,952,000**	**$23,054,000**		**$23,054,000**

Notes:
1. Used to identify location of flow. Assumes two months per meter.
2. Assumes 20 years of maintenance and data collection

Total Technique 2	$115,175,000
Total Technique 3	$66,003,000
Total Technique 4	$91,416,000
Average	**$90,864,000**

APPENDIX J – CAPITAL IMPROVEMENT PROGRAM COSTS DETAILS

Table 1 - Recommended Improvement Projects

Project ID	Improvement Type	Description	Basin ID	Existing Diameter (inch)	Proposed Diameter (inch)	Length (ft)	Unit Cost	Baseline Construction Cost(2)	Estimated Construction Cost(3)	Total Project Cost	Total Capital Improvement Cost(1)	Phase	Existing vs Future Customers		Reasoning
									30%	50%			Existing (%)	Future (%)	
P-1	Gravity		Basin K			**2,730**	**Total**	**$550,300**	**$715,400**	**$1,073,000**	**$1,073,000**	**Long-Term**	**75**	**25**	
	Gravity	Mace Road between Elliott Avenue and Howard Avenue/Marilee Street, Dan Avenue, and Elliott Avenue between Herman Avenue and Mace Road.		12	15	1,486	$192	$285,300	$370,900	$556,000	$556,000				Surcharging above criteria under existing condition. Historical surcharging known to the City; however, staff recently diverted flow and surcharging has not occurred since then. Recommend for continued monitoring; project moved to lower priority.
	Gravity			15	18	1,244	$213	$265,000	$344,500	$517,000	$517,000				
P-2	Gravity		Basin L			**4,761**	**Total**	**$914,100**	**$1,188,300**	**$1,782,000**	**$1,782,000**	**Short-Term**	**75**	**25**	
	Gravity	Beatty Street, Court Street, North Central Avenue, and East Clark Street between Madrona Street and West Clark Street.		8/10/12	15	4,761	$192	$914,100	$1,188,300	$1,782,000	$1,782,000				Significant surcharging under existing conditions, mostly caused by significant I/I. Basin L should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-3	Gravity		Basin B			**1,762**	**Total**	**$375,300**	**$487,900**	**$732,000**	**$732,000**	**Mid-Term**	**0**	**100**	
	Gravity	Brookdale Avenue between E McAndrews Road and Lone Pine Road.		12	18	1,762	$213	$375,300	$487,900	$732,000	$732,000				Deficiencies in this area area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers.
P-4	Gravity		Basin M			**1,109**	**Total**	**$212,900**	**$276,800**	**$415,000**	**$415,000**	**Short-Term**	**100**	**0**	
	Gravity	East Jackson Street between North Holly Street and North Central Avenue.		10/12	15	1,109	$192	$212,900	$276,800	$415,000	$415,000				Significant surcharging under existing conditions, mostly caused by significant I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
P-5	Gravity		Basin M			**2,820**	**Total**	**$582,900**	**$757,800**	**$1,137,000**	**$1,137,000**	**Short-Term**	**100**	**0**	
	Gravity	East 2nd Street between East Jackson Street and North Grape Street/North Grape Street between East 2nd Street and West 4th Street and along West 4th Street between North Oakdale Avenue and North Grape Street.		12	15	844	$192	$162,000	$210,600	$316,000	$316,000				Significant surcharging under existing condition, mostly caused by significant I/I. Basin M should be further investigated to understand causes of I/I. High priority for I/I reduction.
	Gravity			8/10/12/15	18	1,976	$213	$420,900	$547,200	$821,000	$821,000				
P-6	Gravity		Basin M			**737**	**Total**	**$188,700**	**$245,300**	**$368,000**	**$368,000**	**Short-Term**	**100**	**0**	
	Gravity	East Jackson Street between North Bartlett Street and North Riverside Avenue.		15	24	737	$256	$188,700	$245,300	$368,000	$368,000				Significant surcharging under existing conditions, mostly caused by I/I. Basin M should be further investigated to undertsand causes of I/I. High priority for I/I reduction.
P-7	Gravity		Basin M			**1,414**	**Total**	**$240,400**	**$312,500**	**$469,000**	**$469,000**	**Short-Term**	**100**	**0**	
	Gravity	West 2nd Street, North Peach Street, and Palm Street between Rose Avenue and North Holly Street.		6/8	12	1,414	$170	$240,400	$312,500	$469,000	$469,000				Significant surcharging under existing condition, mostly caused by I/I. Basin M should be further investigated to undertsand causes of I/I. High priority for I/I reduction.
P-8	Gravity		Basin M			**2,448**	**Total**	**$470,000**	**$611,000**	**$917,000**	**$917,000**	**Short-Term**	**100**	**0**	
	Gravity	West 4th Street between North Oakdale Avenue and North Orange Street /North Orange Street between West 4th Street and West Main Street and along West Main Street between Ross Court and North Orange Street.		10/12	15	2,448	$192	$470,000	$611,000	$917,000	$917,000				Significant surcharging under existing conditions, mostly caused by I/I. Basin M should be further investigated to undertsand causes of I/I. High priority for I/I reduction.
P-9	Gravity		Basin M			**754**	**Total**	**$128,200**	**$166,700**	**$250,000**	**$250,000**	**Short-Term**	**100**	**0**	
	Gravity	West Main Street between North Columbus Avenue and Ross Court.		8/10	12	754	$170	$128,200	$166,700	$250,000	$250,000				Significant surcharging under existing surcharging, mostly caused by I/I. Basin M should be further investigated to undertsand causes of I/I. High priority for I/I reduction.
P-10	Gravity		Basin M			**3,580**	**Total**	**$740,100**	**$962,200**	**$1,443,000**	**$1,443,000**	**Short-Term**	**75**	**25**	
	Gravity	South Riverside Avenue between East Jackson Street and East 9th Street and along East 9th Street between South Riverside Avenue and South Grape Street.		10	15	1,397	$192	$268,200	$348,700	$523,000	$523,000				Surcharging above criteria under existing condiitions. Infill and I/I degradation worsen the issue in the future. High priority for I/I reduction.
	Gravity			10/15	18	1,857	$213	$395,600	$514,300	$771,000	$771,000				
	Gravity			14	21	326	$234	$76,300	$99,200	$149,000	$149,000				

Table 1 - Recommended Improvement Projects																
Project ID	Improvement Type	Description	Basin ID	Existing Diameter (inch)	Proposed Diameter (inch)	Length (ft)	Unit Cost	Baseline Construction Cost(2)	Estimated Construction Cost(3)	Total Project Cost	Total Capital Improvement Cost(1)	Phase	Existing vs Future Customers		Reasoning
									30%	50%			Existing (%)	Future (%)	
P-11	Gravity	Along Lone Pine Rd between Papago Dr and Inverness Drive	Basin B			**250**	**Total**	**$48,000**	**$62,400**	**$94,000**	**$94,000**	**Long-Term**	**0**	**100**	Deficiencies in this area area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers.
	Gravity			12	15	250	$192	$48,000	$62,400	$94,000	$94,000				
P-12	Gravity	West 11th Street between South Peach Street and Laurel Street.	Basin N			**1,181**	**Total**	**$226,800**	**$294,800**	**$442,000**	**$442,000**	**Mid-Term**	**75**	**25**	No surcharging above criteria under existing conditions, however, infill and I/I degradation exacerbate pipe capacity under the 2036 condition.
	Gravity			12	15	1,181	$192	$226,800	$294,800	$442,000	$442,000				
P-13	Gravity	Holmes Avenue between Kenyon Street and South Holly Street.	Basin N			**669**	**Total**	**$113,700**	**$147,800**	**$222,000**	**$222,000**	**Short-Term**	**100**	**0**	This is a known issue to City staff and is a high priority project.
	Gravity			8	12	669	$170	$113,700	$147,800	$222,000	$222,000				
P-14	Gravity	Along Dellwood Ave between Murphy Rd and the intersection of Black Oak Dr and Siskiyou Blvd.	Basin I			**1,247**	**Total**	**$212,000**	**$275,600**	**$413,000**	**$413,000**	**Short-Term**	**25**	**75**	Surcharging above criteria caused by infill and I/I degradation under 2036 condition. No existing surcharging above criteria.
	Gravity			10/8	12	1,247	$170	$212,000	$275,600	$413,000	$413,000				
P-15	Gravity	Spring Street between North Berkeley Street and Sunrise Avenue.	Basin E			**508**	**Total**	**$86,400**	**$112,300**	**$168,000**	**$168,000**	**Short-Term**	**100**	**0**	Deficiency caused by shallow manhole at this location. Pipe was upsized to prevent surcharging in this area. It is recommended rim elevation be checked in this area before implememting this project.
	Gravity			8	12	508	$170	$86,400	$112,300	$168,000	$168,000				
P-16	Gravity	Market Street between Biddle Road and Royal Avenue.	Basin E			**1,477**	**Total**	**$283,600**	**$368,700**	**$553,000**	**$553,000**	**Mid-Term**	**25**	**75**	Surcharging above criteria caused by infill and I/I degradation under 2036 condition. No existing surcharging above criteria.
	Gravity			10	15	1,477	$192	$283,600	$368,700	$553,000	$553,000				
P-17	Gravity	Ramada Avenue between Petunia Street and East McAndrews Road.	Basin D			**380**	**Total**	**$64,600**	**$84,000**	**$126,000**	**$126,000**	**Mid-Term**	**25**	**75**	This area is a flat section of pipe upstream of a much steeper section, causing the HGL to rise, when additional flows are added to the system in the future.
	Gravity			8	12	380	$170	$64,600	$84,000	$126,000	$126,000				
P-18	Gravity	Corona Avenue between Roberts Road and Morrow Road and along Morrow Road between Velia Street and Corona Avenue.	Basin D			**1,497**	**Total**	**$288,200**	**$374,700**	**$562,000**	**$562,000**	**Short-Term**	**50**	**50**	This section of pipe is undersized for existing conditions causing the flow to overflow to Basin C, which causes surcharging in the line along Jubilant Ave. Upsizing Project 18 allows the PWWF to flow to Morrow Road and stay in Basin D, removing the deficiency observed along Jubilant Ave.
	Gravity			10/8	15	1,458	$192	$279,900	$363,900	$546,000	$546,000				
	Gravity			10	18	39	$213	$8,300	$10,800	$16,000	$16,000				
P-19	Gravity	Velia Street, Corona Avenue, Grand Avenue, Crater Lake Avenue, and Camellia Avenue between Velia Street and Ramada Avenue	Basin D			**6,780**	**Total**	**$1,333,400**	**$1,733,500**	**$2,600,000**	**$2,600,000**	**Short-Term**	**100**	**0**	This is a known issue to City staff and is a high priority project. City staff observes surcharging regularly in this section of pipe under current conditions.
	Gravity			8	12	266	$170	$45,200	$58,800	$88,000	$88,000				
	Gravity			8/12	15	4,729	$192	$908,000	$1,180,400	$1,771,000	$1,771,000				
	Gravity			10/12	18	1,785	$213	$380,200	$494,300	$741,000	$741,000				
P-20	Gravity	Morrow Road between Biddle Road and Poplar Drive.	Basin D			**923**	**Total**	**$236,300**	**$307,200**	**$461,000**	**$461,000**	**Short-Term**	**50**	**50**	This section of pipe is slightly surcharging under current system conditions, however, upsizing Project 20 will be required as soon as Project 19 is implemented upstream, and all bottlenecks removed, allowing the full PWWF to flow downstream.
	Gravity			15	24	923	$256	$236,300	$307,200	$461,000	$461,000				
P-21	Gravity	Hilton Road between Biddle Road and Crater Lake Highway 62.	Basin C			**1,602**	**Total**	**$374,900**	**$487,400**	**$731,000**	**$731,000**	**Mid-Term**	**50**	**50**	This section of pipe is slighly deficient under existing conditions, however, infill and I/I degradation will exacerbate the pipeline, which will require upsizing.
	Gravity			16	21	1,602	$234	$374,900	$487,400	$731,000	$731,000				

Table 1 - Recommended Improvement Projects

Project ID	Improvement Type	Description	Basin ID	Existing Diameter (inch)	Proposed Diameter (inch)	Length (ft)	Unit Cost	Baseline Construction Cost(2)	Estimated Construction Cost(3)	Total Project Cost	Total Capital Improvement Cost(1)	Phase	Existing vs Future Customers		Reasoning
									30%	50%			Existing (%)	Future (%)	
P-22	Gravity	Bailey Avenue and Saint Augustine Drive between Delta Waters Road and Farmington Avenue.	Basin A1			**2,072**	**Total**	**$352,200**	**$457,900**	**$687,000**	**$687,000**	**Long-Term**	**0**	**100**	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition.
	Gravity			8	12	2,072	$170	$352,200	$457,900	$687,000	$687,000				
P-23	Gravity	Delta Waters Road between Springbrook Road and Tahitian Avenue.	Basin A1			**1,015**	**Total**	**$216,200**	**$281,100**	**$422,000**	**$422,000**	**Long-Term**	**0**	**100**	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 conditions.
	Gravity			15	18	1,015	$213	$216,200	$281,100	$422,000	$422,000				
P-24	Gravity		Basin A2			**2,512**	**Total**	**$339,500**	**$441,400**	**$909,000**	**$909,000**	**Mid-Term**	**0**	**100**	
	Gravity	Webfoot Road, Ford Drive, and Springrook Road between Crater Lake Highway 62 and Springbrook Road.		8	12	744	$170	$126,500	$164,500	$247,000	$247,000				Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition.
	Gravity			8/10/12	15	1,768	$192	$339,500	$441,400	$662,000	$662,000				
P-25	Gravity		Basin A1/A2			**3,205**	**Total**	**$1,234,200**	**$1,604,500**	**$2,407,000**	**$2,407,000**	**Mid-Term**	**40**	**60**	
	Gravity	Delta Waters Road between Whitlle Avenue and Blackthorn Drive.		18	21	244	$234	$413,700	$537,800	$807,000	$807,000				Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
	Gravity			18	24	2,961	$256	$820,500	$1,066,700	$1,600,000	$1,600,000				
P-26	Gravity	east of Bullock Road between Terminal Spur Road and Crater Lake Highway 62.	Basin A			**2,574**	**Total**	**$658,900**	**$856,600**	**$1,285,000**	**$1,285,000**	**Short-Term**	**50**	**50**	This major line is shown as surcharging above criteria under existing condition, and will worsen with additional flows in the future and after upstream projects have been implemented to remove bottleneck and allow the full PWWF to flow to the interceptor.
	Gravity			18	24	2,574	$256	$658,900	$856,600	$1,285,000	$1,285,000				
P-27	Gravity	Delta Waters Road between Blackthorn Drive and east of Springbrook Road.	Basin A1			**689**	**Total**	**$161,200**	**$209,600**	**$314,000**	**$314,000**	**Mid-Term**	**25**	**75**	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
	Gravity			12/15	21	689	$234	$161,200	$209,600	$314,000	$314,000				
P-28	Gravity	north of Hillcrest Road between North Foothill Road and Annettes Way.	Basin B			**1,793**	**Total**	**$344,300**	**$447,600**	**$671,000**	**$671,000**	**Mid-Term**	**0**	**100**	Deficiencies in this area area anticipated under 2036 conditions after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers.
	Gravity			10	15	1,793	$192	$344,300	$447,600	$671,000	$671,000				
P-29	Gravity		Basin I			**1,285**	**Total**	**$235,700**	**$306,400**	**$460,000**	**$460,000**	**Short-Term**	**75**	**25**	
	Gravity	Winter Nell Cr between Murphy Road and South Foothill Road.		8	12	505	$170	$85,900	$111,700	$168,000	$168,000				Surcharging occurs under existing condition, and pipe capacity is exacerberated by future additional flows. One of the main cause for this area to surcharge above criteria is the pipe slope. This area is relatively flat, which caused the HGL to rise above 3 feet below manhole rimcunder PWWF.
	Gravity			8	15	780	$192	$149,800	$194,700	$292,000	$292,000				
P-30	Gravity	Winter Nell Cr between Murphy Road and South Foothill Road.	Basin I			**745**	**Total**	**$126,700**	**$164,700**	**$247,000**	**$247,000**	**Mid-Term**	**50**	**50**	This area is shown as slightly deficient under existing condition and deficiency worsens with the additional of future flows and I/I degradation.
	Gravity			8	12	745	$170	$126,700	$164,700	$247,000	$247,000				
P-31	Gravity	east of Jack Nicklaus Road.	Basin I			**238**	**Total**	**$40,500**	**$52,700**	**$79,000**	**$79,000**	**Short-Term**	**75**	**25**	Surcharging occurs under existing condition, and pipe capacity is exacerberated by future additional flows. One of the main causes for this area to surcharge above criteria pipe slope. This area is relatively flat, which causes the HGL to rise above 3 feet below manhole rim under PWWF.
	Gravity			8	12	238	$170	$40,500	$52,700	$79,000	$79,000				
P-32	Gravity	south of Arnold Palmer Way.	Basin I			**420**	**Total**	**$80,600**	**$104,800**	**$157,000**	**$157,000**	**Mid-Term**	**25**	**75**	One of the main causes for this area to surcharge above criteria is pipe slope. This area is relatively flat, which causes the HGL to rise above 3 feet below manhole rim under PWWF.
	Gravity			8	15	420	$192	$80,600	$104,800	$157,000	$157,000				

Table 1 - Recommended Improvement Projects																
Project ID	Improvement Type	Description	Basin ID	Existing Diameter (inch)	Proposed Diameter (inch)	Length (ft)	Unit Cost	Baseline Construction Cost(2)	Estimated Construction Cost(3)	Total Project Cost	Total Capital Improvement Cost(1)	Phase	Existing vs Future Customers		Reasoning
									30%	50%			Existing (%)	Future (%)	
P-33	Gravity	Golf View Drive between East Barnett Road and Miller Court.	Basin J			1,157	Total	$222,100	$288,700	$433,000	$433,000	Short-Term	50	50	This area is shown as slightly deficient under existing condition and deficiency worsens with the addition of future flows from infill, expansion, and and I/I degradation.
	Gravity			8/10	15	1,157	$192	$222,100	$288,700	$433,000	$433,000				
P-34	Gravity	Innsbruck Ridget between Eric Court and Murry Hill Court.	Basin B			276	Total	$46,900	$61,000	$92,000	$92,000	Mid-Term	25	75	Deficiencies in this area area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. Additionally, this section of pipe is relatively flat, which makes the HGL rise higher in the flat portion of pipe.
	Gravity			8	12	276	$170	$46,900	$61,000	$92,000	$92,000				
P-35	Gravity	Murphy Road between East Barnett Road and Alameda Street.	Basin J			628	Total	$133,800	$173,900	$261,000	$261,000	Long-Term	0	100	Deficiencies in this area area anticipated under 2036 condition after the expansion areas connect to the east of Basins I/J, therefore, this project is almost solely caused by future customers. Expansion areas in Basins I and J are planned to connect to Juanipro Way and ultimately flow in this section of pipes.
	Gravity			15	18	628	$213	$133,800	$173,900	$261,000	$261,000				
P-36	Gravity	Along Barnett Rd between Murphy Rd and State St.	Basin J			475	Total	$91,200	$118,600	$178,000	$178,000	Mid-Term	25	75	This major trunk is shown as surcharging after upstream projects are implemented and bottlenecks removed. Significant additional flow is anticipated from the upstream area wit the connection of the expansion areas, therefore, this trunk will need to be upsized to accomodate these future flows.
	Gravity			12	15	475	$192	$91,200	$118,600	$178,000	$178,000				
P-37	Gravity	Along Creek View Dr between N Phoenix Rd and the intersection of Barnett Rd and Black Oak Dr.	Basin J			6,347	Total	$1,079,000	$1,402,700	$2,104,000	$2,104,000	Long-Term	0	100	Deficiencies in this area are anticipated future condition after the expansion areas connect to the east of Basins I/J, therefore, this project is almost solely caused by future customers. Expansion areas in Basins I and J are planned to connect to Juanipero Way and ultimately flow in this section of pipes.
	Gravity			8	12	6,347	$170	$1,079,000	$1,402,700	$2,104,000	$2,104,000				
P-39	Gravity	North Foothill Road.	Basin B			514	Total	$98,700	$128,300	$192,000	$192,000	Long-Term	25	75	Deficiencies in this area area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is almost solely caused by future customers. Relatively flat slope, I/I degradation and infill are also reasons for this project.
	Gravity			12	15	514	$192	$98,700	$128,300	$192,000	$192,000				
P-40	Gravity	Gene Cameron Way between Aitken Way and Jason Way.	Basin B			941	Total	$160,000	$208,000	$312,000	$312,000	Long-Term	0	100	Deficiencies in this area are caused by the connection of the urban reserve areas in the future. No surcharging above criteria is observed under existing or 2036 condition.
	Gravity			8	12	941	$170	$160,000	$208,000	$312,000	$312,000				
P-41	Gravity		Basin B			3,499	Total	$841,000	$1,093,300	$1,640,000	$1,640,000	Mid-Term	50	50	
	Gravity	Springbrook Road between Cedar Links Drive and Delta Waters Road.		18	21	2,490	$234	$582,700	$757,500	$1,136,000	$1,136,000				Deficiencies in this area area anticipated under 2036 condition after the expansion areas connect to the east of Basin B, therefore, this project is mostly caused by future customers. However, this line is one of the major line in Basin B and is also impacted by infill and I/I degradation.
	Gravity			18	24	1,009	$256	$258,300	$335,800	$504,000	$504,000				
P-42	Gravity	East Barnett Road between Black Oak Drive and Medical Center Drive.	Basin J			532	Total	$124,500	$161,900	$243,000	$243,000	Mid-Term	50	50	No deficiency is observed under current system condition, however, after implementing all upstream projects and with additional flows from infill and the expansion areas, this area becomes deficient and is recommended to be upsized. It is recommended to monitor this area after some usptream projects are implemented and growth started.
	Gravity			18	21	532	$234	$124,500	$161,900	$243,000	$243,000				
P-43	Gravity	Golf View Drive between Miller Court and Seventh Fairway Drive.	Basin J			2,051	Total	$393,800	$511,900	$768,000	$768,000	Mid-Term	25	75	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
	Gravity			8/10	15	2,051	$192	$393,800	$511,900	$768,000	$768,000				
P-44	Gravity	Arnold Palmer Way and Jack Nicklaus Road.	Basin I			693	Total	$117,800	$153,100	$230,000	$230,000	Mid-Term	25	75	Deficiencies in this area are predicted for the 2036 condition with the addition of some of the expansion areas to the east, infill to the existing system, and I/I degradation.
	Gravity			8	12	693	$170	$117,800	$153,100	$230,000	$230,000				
P-45	Gravity	North Phoenix Road and south of Urano Lane.	Basin I			362	Total	$61,500	$80,000	$120,000	$120,000	Mid-Term	25	75	Deficiency in this area is predicted under 2036 condition and is mainly cause by the slope of the pipe. Pipe is relatively flat in this area causing the HGL to rise above 3 feet below manhole rim with additional future flows.
	Gravity			8	12	362	$170	$61,500	$80,000	$120,000	$120,000				

Table 1 - Recommended Improvement Projects															
Project ID	Improvement Type	Description	Basin ID	Existing Diameter (inch)	Proposed Diameter (inch)	Length (ft)	Unit Cost	Baseline Construction Cost(2)	Estimated Construction Cost(3)	Total Project Cost	Total Capital Improvement Cost(1)	Phase	Existing vs Future Customers		Reasoning
									30%	50%			Existing (%)	Future (%)	
P-46	Gravity	Old Cherry Lane at Cherry Lane.	Basin I			**340**	**Total**	**$57,800**	**$75,100**	**$113,000**	**$113,000**	**Mid-Term**	**75**	**25**	Deficiency caused by shallow manhole at this location. Pipe will need to be upsized to prevent surcharging in this area. It is recommended that rim elevation be checked in this area before implementing this project.
	Gravity			8	12	340	$170	$57,800	$75,100	$113,000	$113,000				
P-38	Gravity	Medical Center Dr between E Barnett Road and Siskiyou Boulevard.	Basin I			**1,473**	**Total**	**$313,700**	**$407,800**	**$612,000**	**$612,000**	**Mid-Term**	**50**	**50**	No deficiency is observed under current system condition, however, after implementing all upstream projects and with additional flows from infill and the expansion areas, this area becomes deficient and is recommended to be upsized. It is recommended to monitor this area after some usptream projects are implemented and growth started.
	Gravity			15	18	1,473	$213	$313,700	$407,800	$612,000	$612,000				
TOTAL						**74,466**		**$15,265,850**	**$19,846,150**	**$29,894,000**	**$29,894,000**				

Table 2 - CIP										
Project ID	Improvement Type	Description	Total Capital Improvement Cost(1)	Phase	Total Short-Term Priority 1 (2018-2022)	Total Short-Term Priority 2 (2023-2027)	Total Short-Term	Mid-Term (2028-2037)	Long-Term (2038 -)	SDC Allocation: SDC Eligibility (%)	SDC Allocation: Ultimate SDC Eligibility ($)
PIPE PROJECTS											
P-1	Gravity	Mace Road between Elliott Avenue and Howard Avenue/Marilee Street, Dan Avenue, and Elliott Avenue between Herman Avenue and Mace Road.	$ 1,073,000	Long-Term					$ 1,073,000	25	$ 268,250
P-2	Gravity	Beatty Street, Court Street, North Central Avenue, and East Clark Street between Madrona Street and West Clark Street.	$ 1,782,000	Short-Term		$ 1,782,000	$ 1,782,000			25	$ 445,500
P-3	Gravity	Brookdale Avenue between E McAndrews Road and Lone Pine Road.	$ 732,000	Mid-Term				$ 732,000		100	$ 732,000
P-4	Gravity	East Jackson Street between North Holly Street and North Central Avenue.	$ 415,000	Short-Term	$ 415,000		$ 415,000			0	$ -
P-5	Gravity	East 2nd Street between East Jackson Street and North Grape Street/North Grape Street between East 2nd Street and West 4th Street and along West 4th Street between North Oakdale Avenue and North Grape Street.	$ 1,137,000	Short-Term	$ 1,137,000		$ 1,137,000			0	$ -
P-6	Gravity	East Jackson Street between North Bartlett Street and North Riverside Avenue.	$ 368,000	Short-Term	$ 368,000		$ 368,000			0	$ -
P-7	Gravity	West 2nd Street, North Peach Street, and Palm Street between Rose Avenue and North Holly Street.	$ 469,000	Short-Term	$ 469,000		$ 469,000			0	$ -
P-8	Gravity	West 4th Street between North Oakdale Avenue and North Orange Street /North Orange Street between West 4th Street and West Main Street and along West Main Street between Ross Court and North Orange Street.	$ 917,000	Short-Term	$ 917,000		$ 917,000			0	$ -
P-9	Gravity	West Main Street between North Columbus Avenue and Ross Court.	$ 250,000	Short-Term	$ 250,000		$ 250,000			0	$ -
P-10	Gravity	South Riverside Avenue between East Jackson Street and East 9th Street and along East 9th Street between South Riverside Avenue and South Grape Street.	$ 1,443,000	Short-Term		$ 1,443,000	$ 1,443,000			25	$ 360,750
P-11	Gravity	Along Lone Pine Rd between Papago Dr and Inverness Drive	$ 94,000	Long-Term					$ 94,000	100	$ 94,000
P-12	Gravity	West 11th Street between South Peach Street and Laurel Street.	$ 442,000	Mid-Term				$ 442,000		25	$ 110,500
P-13	Gravity	Holmes Avenue between Kenyon Street and South Holly Street.	$ 222,000	Short-Term		$ 222,000	$ 222,000			0	$ -
P-14	Gravity	Along Dellwood Ave between Murphy Rd and the intersection of Black Oak Dr and Siskiyou Blvd.	$ 413,000	Short-Term	$ 413,000		$ 413,000			75	$ 309,750
P-15	Gravity	Spring Street between North Berkeley Street and Sunrise Avenue.	$ 168,000	Short-Term		$ 168,000	$ 168,000			0	$ -
P-16	Gravity	Market Street between Biddle Road and Royal Avenue.	$ 553,000	Mid-Term				$ 553,000		75	$ 414,750
P-17	Gravity	Ramada Avenue between Petunia Street and East McAndrews Road.	$ 126,000	Mid-Term				$ 126,000		75	$ 94,500
P-18	Gravity	Corona Avenue between Roberts Road and Morrow Road and along Morrow Road between Velia Street and Corona Avenue.	$ 562,000	Short-Term		$ 562,000	$ 562,000			50	$ 281,000
P-19	Gravity	Velia Street, Corona Avenue, Grand Avenue, Crater Lake Avenue, and Camellia Avenue between Velia Street and Ramada Avenue	$ 2,600,000	Short-Term	$ 2,600,000		$ 2,600,000			0	$ -
P-20	Gravity	Morrow Road between Biddle Road and Poplar Drive.	$ 461,000	Short-Term		$ 461,000	$ 461,000			50	$ 230,500
P-21	Gravity	Hilton Road between Biddle Road and Crater Lake Highway 62.	$ 731,000	Mid-Term				$ 731,000		50	$ 365,500
P-22	Gravity	Bailey Avenue and Saint Augustine Drive between Delta Waters Road and Farmington Avenue.	$ 687,000	Long-Term					$ 687,000	100	$ 687,000
P-23	Gravity	Delta Waters Road between Springbrook Road and Tahitian Avenue.	$ 422,000	Long-Term					$ 422,000	100	$ 422,000
P-24	Gravity	Webfoot Road, Ford Drive, and Springrook Road between Crater Lake Highway 62 and Springbrook Road.	$ 909,000	Mid-Term				$ 909,000		100	$ 909,000
P-25	Gravity	Delta Waters Road between Whitlle Avenue and Blackthorn Drive.	$ 2,407,000	Mid-Term				$ 2,407,000		60	$ 1,444,200
P-26	Gravity	east of Bullock Road between Terminal Spur Road and Crater Lake Highway 62.	$ 1,285,000	Short-Term		$ 1,285,000	$ 1,285,000			50	$ 642,500
P-27	Gravity	Delta Waters Road between Blackthorn Drive and east of Springbrook Road.	$ 314,000	Mid-Term				$ 314,000		75	$ 235,500
P-28	Gravity	north of Hillcrest Road between North Foothill Road and Annettes Way.	$ 671,000	Mid-Term				$ 671,000		99	$ 666,550
P-29	Gravity	Winter Nell Cr between Murphy Road and South Foothill Road.	$ 460,000	Short-Term		$ 460,000	$ 460,000			25	$ 115,000
P-30	Gravity	Winter Nell Cr between Murphy Road and South Foothill Road.	$ 247,000	Mid-Term				$ 247,000		50	$ 123,500
P-31	Gravity	east of Jack Nicklaus Road.	$ 79,000	Short-Term		$ 79,000	$ 79,000			25	$ 19,750
P-32	Gravity	south of Arnold Palmer Way.	$ 157,000	Mid-Term				$ 157,000		75	$ 117,750
P-33	Gravity	Golf View Drive between East Barnett Road and Miller Court.	$ 433,000	Short-Term		$ 433,000	$ 433,000			50	$ 216,500
P-34	Gravity	Innsbruck Ridget between Eric Court and Murry Hill Court.	$ 92,000	Mid-Term				$ 92,000		75	$ 69,000
P-35	Gravity	Murphy Road between East Barnett Road and Alameda Street.	$ 261,000	Long-Term					$ 261,000	100	$ 261,000
P-36	Gravity	Along Barnett Rd between Murphy Rd and State St.	$ 178,000	Mid-Term				$ 178,000		75	$ 133,500
P-37	Gravity	Along Creek View Dr between N Phoenix Rd and the intersection of Barnett Rd and Black Oak Dr.	$ 2,104,000	Long-Term					$ 2,104,000	100	$ 2,104,000
P-38	Gravity	Medical Center Dr between E Barnett Road and Siskiyou Boulevard.	$ 612,000	Mid-Term				$ 612,000		50	$ 306,000
P-39	Gravity	North Foothill Road.	$ 192,000	Long-Term					$ 192,000	75	$ 144,000
P-40	Gravity	Gene Cameron Way between Aitken Way and Jason Way.	$ 312,000	Long-Term					$ 312,000	100	$ 312,000
P-41	Gravity	Springbrook Road between Cedar Links Drive and Delta Waters Road.	$ 1,640,000	Mid-Term				$ 1,640,000		50	$ 820,000
P-42	Gravity	East Barnett Road between Black Oak Drive and Medical Center Drive.	$ 243,000	Mid-Term				$ 243,000		50	$ 121,500
P-43	Gravity	Golf View Drive between Miller Court and Seventh Fairway Drive.	$ 768,000	Mid-Term				$ 768,000		75	$ 576,000
P-44	Gravity	Arnold Palmer Way and Jack Nicklaus Road.	$ 230,000	Mid-Term				$ 230,000		75	$ 172,500
P-45	Gravity	North Phoenix Road and south of Urano Lane.	$ 120,000	Mid-Term				$ 120,000		75	$ 90,000
P-46	Gravity	Old Cherry Lane at Cherry Lane.	$ 113,000	Mid-Term				$ 113,000		25	$ 28,250
Exp-1	Expansion	Alternative 1 - Long-Term Expansion Sewers (North)	$ 25,000	Long-Term				$ -	$ 25,000	100	$ 25,000
Exp-2	Expansion	Alternative 2 - Mid-Term Expansion Sewers	$ 100,000	Mid-Term				$ 100,000	$ -	100	$ 100,000
Exp-3	Expansion	Alternative 2 - Long-Term Expansion Sewers (South)	$ 25,000	Long-Term				$ -	$ 25,000	100	$ 25,000
TOTAL PIPE PROJECTS			**$ 30,044,000**		**$ 6,569,000**	**$ 6,895,000**	**$ 13,464,000**	**$ 11,385,000**	**$ 5,195,000**		**$ 14,594,000**

Table 2 - CIP											
Project ID	Improvement Type	Description	Total Capital Improvement Cost(1)	Phase	Total Short-Term Priority 1 (2018-2022)	Total Short-Term Priority 2 (2023-2027)	Total Short-Term	Mid-Term (2028-2037)	Long-Term (2038 -)	SDC Allocation	
										SDC Eligibility (%)	Ultimate SDC Eligibility ($)
PUMP STATION PROJECTS											
PS-1	Pump Station	PMT Pump Station - 1024 Summit Ave. (No redundant pump)	$ 50,000	Mid-Term				$ 50,000		0	$ -
PS-2	Pump Station	Service Center Pump Station - 821 Columbus Ave. (No redundant pump)	$ 50,000	Mid-Term				$ 50,000		0	
TOTAL PUMP STATION PROJECTS			**$ 100,000**		**$ -**	**$ -**	**$ -**	**$ 100,000**	**$ -**		**$ -**
GENERAL PROJECTS											
G-1	General	I/I Reduction Program - Basin M	$ 675,000	Short-Term	$ 675,000		$ 675,000			100	$ 675,000
G-2	General	Master Plan Updates	$ 300,000	Mid-Term				$ 300,000		50	$ 150,000
G-3	General	Master Plan Updates	$ 300,000	Long-Term					$ 300,000	50	$ 150,000
TOTAL GENERAL PROJECTS			**$ 1,275,000**		**$ 675,000**	**$ -**	**$ 675,000**	**$ 300,000**	**$ 300,000**		**$ 975,000**
TOTAL ($)			**$ 31,419,000**		**$ 7,244,000**	**$ 6,895,000**	**$ 14,139,000**	**$ 11,785,000**	**$ 5,495,000**		**$ 15,569,000**
Total Annual ($/year)			**$ 1,309,125**		**$ 1,207,333**	**$ 1,723,750**	**$ 1,413,900**	**$ 1,178,500**	**$ 1,373,750**		**$ 648,708**