



SEWER SYSTEM MANAGEMENT PLAN

City of Healdsburg

Prepared by

City of Healdsburg Public Works Department

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WATERWORKS
ENGINEERS



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List of Acronyms

APWA	American Public Works Association
ASCE	American Society of Civil Engineers
BMP	Best Management Practice
CASA	California Association of Sanitation Agencies
CCTV	Closed-Circuit Television
CIP	Capital Improvement Program
CIWQS	California Integrated Water Quality System
CMMS	Computerized Maintenance Management System
CMOM	Capacity, Management, Operations, and Maintenance
CPC	California Plumbing Code
CWEA	California Water Environment Association
FOG	Fats, Oils, and Grease
FSE	Food Service Establishments
GIS	Geographic Information System
GRD	Grease Removal Device
I/I	Infiltration and Inflow
KPI	Key Performance Indicator
LRO	Legally Responsible Official
MGD	Million Gallons per Day
MOP	Manual of Practice
MS4	Municipal Separate Storm Sewer System
NACWA	National Association of Clean Water Agencies
NASSCO	National Association of Sewer Service Companies
NGO	Non-Government Organization
NOI	Notice of Intent
NOV	Notice of Violation
O&M	Operations & Maintenance
OERP	Overflow Emergency Response Plan

OES	Office of Emergency Services, State of California
PACP	Pipeline Assessment & Certification Program
PLSD	Private Lateral Sewer Discharge
PM	Preventive Maintenance
POTW	Publicly Owned Treatment Works
QA/QC	Quality Assurance/Quality Control
R&R	Rehabilitation or Repair/Replacement
RWQCB	Regional Water Quality Control Board
SECAP	System Evaluation and Capacity Assurance Plan
SOPs	Standard Operating Procedures
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SSS	Sanitary Sewer System
SSS WDR	Statewide General WDR for Sanitary Sewer Systems
SWRCB	State Water Resources Control Board
USEPA	United States Environmental Protection Agency
WDR	Waste Discharge Requirements
WWC	Wastewater Collection
WWTP	Waste Water Treatment Plant

List of Terms

Collection System – Generic term for any system of pipes or sewer lines used to convey wastewater to a treatment facility.

Enrollee – A public entity that owns or operates a sanitary sewer system and has submitted a complete and approved application for coverage under the SSS WDR.

Lateral (also called Service Lateral) – A segment of pipe that connects a home or building to a sewer main, which may be located beneath a street or easement. The responsibility for maintaining a lateral can be solely that of the Enrollee or the private property owner; or it can be shared between the two parties. Local communities dictate lateral responsibility and the basis for a shared arrangement, if it applies. See Lower Lateral and Upper Lateral definitions.

Lower Lateral – That portion of a lateral from the property line or easement line to the sewer main. The lower lateral is owned and maintained by the City of Healdsburg, if there is a cleanout installed on the lateral.

Miles of Gravity Sewer – Length of gravity sewer lines/pipes in an Enrollee’s sanitary sewer system, expressed in miles.

Miles of Publicly-Owned Laterals – Length of laterals in an Enrollee’s sanitary sewer system that the Enrollee is responsible for maintaining, expressed in miles.

Miles of Pressure Sewer (Miles of Force Main) – Length of pressurized sewer lines/pipes in an Enrollee’s sanitary sewer system, expressed in miles or portions thereof.

Miles of Private Laterals – Length of private laterals tributary to an Enrollee’s sanitary sewer system that private property owners are responsible for maintaining, expressed in miles or portions thereof.

Percent Reaching Surface Water – Volume of sewage discharged from a sanitary sewer system or private lateral or collection system estimated to have reached surface water divided by the total volume of sewage discharged.

Percent Recovered – Volume of sewage discharged that was captured and disposed of properly, divided by the total volume of sewage discharged.

Private Lateral – Privately owned sewer service lateral. The City of Healdsburg is not responsible for this portion of the lateral.

Private Lateral Sewage Discharge (PLSD) – Sewage discharges caused by blockages or other problems within privately owned laterals, collection systems or other private sewer assets that are tributary to the reporting Enrollee’s sanitary sewer system. Reports of these events may be submitted by Enrollees on a voluntary basis except in San Diego Region 9, but are not the Enrollee’s responsibility unless caused by issues in the main line or because of other Enrollee activity.

Sanitary Sewer Overflow (SSO) – Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:

- i. Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
- ii. Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
- iii. Wastewater backups into buildings and on private property caused by blockages or flow conditions within the publicly-owned portion of a sanitary sewer system.

Sanitary Sewer System – Any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a WWTP head works and which is comprised of more than one mile of pipes and sewer lines, used to collect and convey wastewater to a publicly owned treatment facility.

SSO Category 1 – All discharges of sewage resulting from a failure in an Enrollee’s sanitary sewer system that results in a discharge to a drainage channel and/or surface water.

SSO Category 2 – All discharges of sewage resulting from a failure in an Enrollee’s sanitary sewer system of a volume equal to or greater than 1,000 gallons that did not reach surface water.

SSO Category 3 – All discharges of sewage resulting from a failure in an Enrollee’s sanitary sewer system of a volume less than 1,000 gallons that did not reach surface water.

SSO Database – Online reporting system developed, hosted, and maintained by the SWRCB for compliance with the Monitoring and Reporting Program contained in SSS WDR.

Storm Drain – For the purposes of complying with the SSS WDR, any pipe that is part of a Municipal Separate Storm Sewer System (MS4) used for collecting or conveying storm water.

Total # of SSOs per 100 miles of Sewer per Year – Broad metric used to compare the relative performance of Enrollees and their sanitary sewer systems. This metric expresses the number of SSOs for which the reporting Enrollee is responsible, for every 100 miles of pipe or sewer lines in an Enrollee’s sanitary sewer system. Due to the large variation in facility specific characteristics, this metric should only be viewed as a rough comparison of the operation and maintenance performance of Enrollees and their sanitary sewer systems. This metric is calculated as described below:

$$\text{Total \# of SSOs per year / 100 miles of pipe} = \frac{(\text{Total \# of SSOs} \times 100)}{(\text{Miles of Pressure Sewer} + \text{Miles of Gravity Sewer})}$$

Total Volume of SSOs Reaching Surface Water per 100 miles of Sewer – Broad metric used to compare the relative performance of Enrollees and their sanitary sewer systems. This metric expresses the volume of SSOs, for which the reporting Enrollee is responsible, that reached surface water for every 100 miles of pipe or sewer lines in an Enrollee’s sanitary sewer system. Because sewage discharges that reach surface water pose a greater threat to public health and the environment, this metric reflects some accounting of the threat posed by SSOs. Due to the large variation in facility specific characteristics, this metric should only be viewed as a rough comparison of the operation and maintenance performance of Enrollees and their sanitary sewer systems. This metric is calculated as described below:

Total Annual Volume of SSOs Reaching Surface Waters / 100 miles of pipe =

$$\frac{(\text{Total volume of SSOs reaching Surface Waters} \times 100)}{(\text{Miles of Pressure Sewer} + \text{Miles of Gravity Sewer})}$$

Total Volume Reaching Surface Water – Amount of sewage discharged from a sanitary sewer system, private lateral, or collection system estimated to have reached surface water.

Total Volume Recovered – Amount of sewage discharged that was captured and disposed of properly.

Upper Lateral – Portion of a lateral usually from the building foundation to the property line or easement line where it connects to the Lower Lateral. The City does not own and maintain this portion of lateral since responsibility lies with the owner of the property that the lateral serves.

WDID – Waste Discharge Identification Number assigned as a unique identifier by the SWRCB to each Enrollee for regulatory recordkeeping and data management purposes.

Introduction

On May 2, 2006, the California SWRCB adopted Statewide General Waste Discharge Requirements (WDR) Order No. 2006-003, for wastewater collection systems. The WDR requires all enrollees to develop a Sanitary Sewer Management Plan (SSMP) and make it available to the public, to the SWRCB, and the RWQCB. The SSMP must be audited at least every two (2) years and updated every five (5) years from the original adoption date by the Enrollee's governing board. The original SSMP must have been approved by the governing board of the enrollee at a public meeting and adopted. All federal and state agencies, municipalities, counties, districts, and other public entities that own or operate sanitary sewer systems with piping greater than one mile in length are required to comply with the WDRs. The City filed a NOI to comply with the terms of the Order on October 25, 2006 and originally certified the SSMP on July 20, 2009.

The Order includes eleven (11) mandatory elements that must be addressed in the SSMP. The SSMP elements describe the activities the City will employ to manage, operate, and maintain the wastewater collection system effectively. **Table 1** briefly summarizes the WDR elements. The exact text of each WDR element is stated at the beginning of each subsequent SSMP element.

Table 1 – SSS WDR D.13 Required Elements

SSMP Element	Requirements
1. Goals	Develop goals for operation and maintenance of SSS
2. Organization	a) Identify the Legally Responsible Official (LRO) b) SSMP responsibility and staff organization chart c) Chain of communication for reporting SSOs
3. Legal Authority	a) Prevent illicit discharges into SSS b) Require proper design and construction of SSS components c) Ensure access to laterals owned/maintained by City d) Limit the discharge of FOG or other debris that may cause blockages e) Enforce violations of sewer ordinance
4. Operations and Maintenance Program	a) Maintain up-to-date collection system maps b) Schedule, conduct, and document preventive O&M activities c) Condition assessment, rehabilitation and replacement (R&R) plan d) Training for SSS O&M staff e) Maintain adequate equipment and critical replacement part inventory
5. Design and Performance Provisions	a) Maintain SSS design and construction specifications b) Procedures and standards for inspecting and testing new construction and R&R projects
6. Overflow Emergency Response Plan (OERP)	a) Proper notification procedures for SSOs b) Program for appropriate SSO response c) Procedure for prompt notification to regulatory agencies d) Appropriate staff and contractor training for OERP execution e) Procedures to address emergency operations during SSOs f) Procedures to ensure containment of SSOs to prevent discharge to surface waters including water quality monitoring when required

7. Fats, Oils, and Grease (FOG) Control Program	<ul style="list-style-type: none"> a) Public education plan to promote proper disposal of FOG b) FOG disposal plan c) Legal authority to prohibit discharge of FOG d) Requirements to install and maintain grease removal devices e) Authority to inspect and enforce FOG ordinance f) FOG characterization assessment and hot spot cleaning schedule g) FOG source control program measures
8. System Evaluation and Capacity Assurance Plan ("SECAP")	<ul style="list-style-type: none"> a) Develop SSS hydraulic model and identify capacity deficiencies b) Establish SSS hydraulic design criteria c) Establish short- and long-term CIP for capacity enhancement measures d) Develop schedule of completion dates for projects
9. Monitoring, Measurement and Program Modifications	<ul style="list-style-type: none"> a) Maintain records and information for SSMP activities b) Measure effectiveness of SSMP elements and programs c) Assess success of the preventative maintenance program d) Update SSMP program elements based on performance evaluations e) Identify and illustrate SSO trends
10. SSMP Program Audits	Conduct periodic SSMP audits
11. Communications Program	Communicate on a regular basis with the public regarding SSMP development, implementation, and performance

System Overview

The City of Healdsburg (City) Department of Public Works and Utility Department operate and maintain a total of 50.2 miles of collection system gravity main piping, eleven (11) lift stations, and 3.0 miles of forcemain. The lift stations' capacities range from under 200 gpm to approximately 8 MGD. The table below summarizes the distribution of gravity main sizes throughout the collection system as of 2020.

Table 2 – Collection System Gravity Main Size Distribution

Pipe Size (inch)	Total Length (LF)
< 6	178
6	151,171
8	58,004
10	15,107
12	14,489
15	5,858
16	1,617
18	5,077
21	5,442
24	2,281
33	6,087
(Lineal Feet)	265,311
(Miles)	50.2

An overview map of the City's Sewer Collection System can be found in **Appendix 4.1**.

Sewage flows by gravity to the Magnolia Lift Station, which pumps all of the City's flow to the Wastewater Reclamation Facility (WRF). The northern area of the City is served by the relatively new North Trunk Sewer, which was constructed in 1995. This trunk sewer was constructed to serve the areas of the City where nearly all significant new non-infill growth was expected to occur.

The 33-inch Magnolia Trunk sewer collects all wastewater within the City near the south end of Healdsburg Avenue, where it runs under Highway 101 and flows another 4,400 linear feet south to the Magnolia Lift Station, located near the Foss Creek/Dry Creek confluence. After flowing through a grinder, flow enters the wetwell at the Magnolia Lift Station and is then pumped approximately 3,500 linear feet through parallel 14-inch diameter force mains to the WRF. The City is currently replacing the two sections of 14" force main that run under Dry Creek. The City is installing three (two duty and one spare) 16-inch force mains deeper below the stream bed, below projected scour depths.

The other 10 lift stations serve smaller areas within the City, two of which are located in the Corporation Yard. The Orangewood, Mountain View and Heron Drive lift stations serve the southeastern portion of the City between South Fitch Mountain Road and the Russian River, and isolated areas north of South Fitch Mountain Road. All flows from the Orangewood and Mountain View lift stations are directed through the Heron Drive lift station. **Table 3** lists the characteristics of all the City's lift stations.

Table 3 – Collection System Lift Stations

Lift Station	Status	Pumps		Customer Accounts		
		No.	HP	Residential	Non- Residential	Total
Dry Creek* (formerly Operations Building)	Active	1	2	0	1	1
		2	2			
Corporation Yard Lift Station*	Active	1	2	0	1	1
Animal Shelter*	Removed	-	-	-	-	-
Giorgi Park	Active	1	2	0	1	1
Chablis	Active	1	10	23	0	23
		2	10			
Hendricks	Active	1	2	3	1	4
		2	2			
Heron**	Active	1	10	586	4	590
		2	10			
Kennedy	Active	1	6.5	124	1	125
		2	6.5			
Kinley	Active	1	6.5	0	9	9
		2	6.5			
Moore	Removed	-	-	-	-	-
Orangewood	Active	1	3.9	118	1	119
		2	3.9			
Orchard	Active	1	6.5	173	2	175
		2	6.5			
Magnolia	Active	1	60	4,790 (approximate as of 2020)	460 (approximate as of 2020)	5,250
		2	60			
		3	60			
		4	56			
*Located at the City of Healdsburg Corporation Yard property						
**Heron also pumps flow from Orchard, Orangewood and Hidden Acres and Sunset.						

1.0. Goals

D.13.(i) Goals: The goal of the SSMP is to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system. This will help reduce and prevent SSOs, as well as mitigate any SSOs that do occur.

The City of Healdsburg recognizes that the sewer collection system is a key component of its sewer utility and is committed to providing responsible and reliable service to the community through a comprehensive operation and maintenance program. The City has therefore implemented a sewer collection system maintenance program, which is intended to accomplish the following:

- Protect the environment and public health by minimizing blockages and overflows.
- Reduce operating and maintenance costs.
- Minimize groundwater and surface water intrusion into the sewer system.
- Identify non-compliant dischargers to the City sewer system and take appropriate corrective action.
- Educate the public to avoid misuse of the wastewater system.
- Identify areas of the collection system that need increased maintenance, repair or replacement through a comprehensive CCTV inspection program.
- Identify defective gravity sewer lines located within one hundred fifty (150) feet of surface waters, including storm drainage channels and creeks, and give them higher priority for repair and/or replacement.
- Monitor and assess the hydraulic capacity of the wastewater collection system to ensure that adequate capacity is available for peak flows and to accommodate future development within the City's service area.

2.0. Organization

D.13.(ii) Organization: The SSMP must identify:

(a) The name of the responsible or authorized representative as described in Section J of this Order (SSS WDR).

(b) The names and telephone numbers for management, administrative, and maintenance positions responsible for implementing specific measures in the SSMP program. The SSMP must identify lines of authority through an organization chart or similar document with a narrative explanation; and

(c) The chain of communication for reporting SSOs, from receipt of a complaint or other information, including the person responsible for reporting SSOs to the State and Regional Water Board and other agencies if applicable (such as County Health Officer, County Environmental Health Agency, Regional Water Board, and/or State Office of Emergency Services (Cal OES)).

2.1. Legally Responsible Official (LRO)

The City's Legally Responsible Officials (LROs) are authorized to electronically sign and certify SSO reports in CIWQS. The City's LROs are:

- Water/Wastewater Operations Superintendent
- Wastewater Operations Foreman
- Utility Director

Following containment and documentation of an SSO event by the Public Works and Utilities Crew, the SSO workbook (found within the City's OERP) is delivered to the Water/Wastewater Operations Superintendent to review and enter data into CIWQS. The Water/Wastewater Operations Superintendent may contact the Public Works or Utilities Crew for additional information as required. Reviewing and certifying the SSO report in CIWQS may also be performed by either the Wastewater Operations Foreman or the Utility Director.

2.2. Organization Chart

Appendix 2.1 defines the responsible party for each SSMP element, including names and telephone numbers.

Public Works Department

The Public Works Department is responsible for development and maintenance of the City's infrastructure. Responsibilities include design and construction of public streets (including sidewalks, street and traffic signs, and pavement markings), water system distribution, sewer collection, and storm drain systems. The Department also provides engineering review and inspection of public improvements for new development projects and for public capital improvement and replacement projects.

Figure 1 shows the organization chart for the City of Healdsburg Public Works Department. The Public Works Maintenance Division (positions shaded grey) is responsible for planning and execution of the sewer collection system cleaning and CCTV inspection programs. The Maintenance Division is also responsible for abatement of sidewalk hazards, maintaining streets, traffic signals, signing and striping, storm drains, water distribution piping, and City buildings.

The Public Works Engineering Division consists of engineers, public works inspectors, engineering technicians, and an administrative specialist. Responsibilities include implementing the City’s Capital Improvement Program (CIP) and interacting on behalf of the City with outside agencies and reviewing land development projects. Other responsibilities include maintaining and updating the City’s standard plans and specifications; inspections; issuance and administration of permits, licenses and agreements; flood plain administration; traffic engineering; surveying; and customer service related to public utilities, property development and public right-of-way issues.

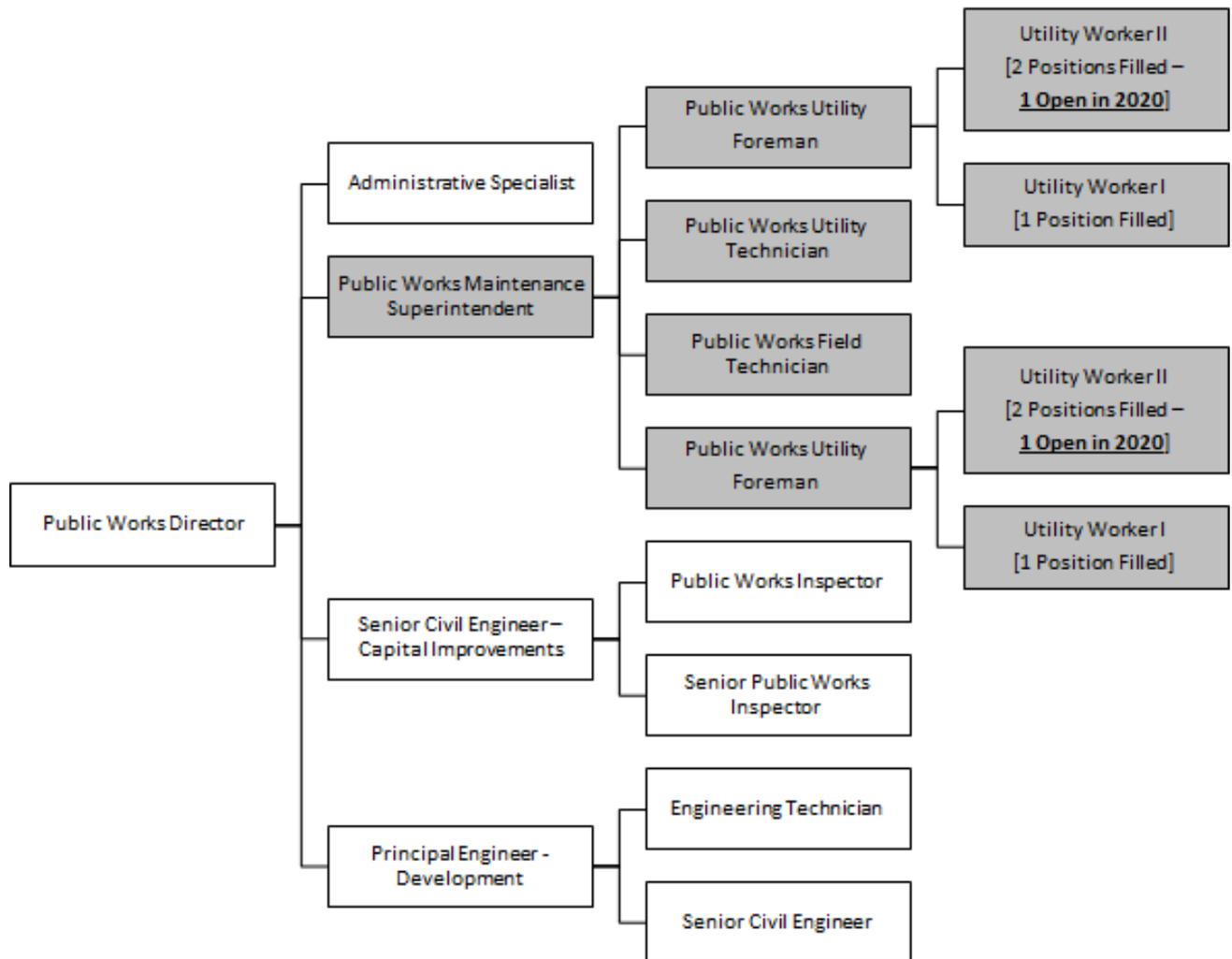


Figure 1 – Organization Chart – Public Works 2020

Public Works Position Descriptions and SSMP Responsibilities

General descriptions of each position and SSMP-specific responsibilities are listed below:

Public Works Director: Establishes policies; plans strategy; approves capital improvement projects; authorizes outside contractors to perform services; and serves as the public information officer.

Administrative Specialist: Performs clerical and organizational tasks, assists with FOG control program public outreach.

Public Works Maintenance Superintendent: Responsible for planning and resource allocation for the sewer collection system cleaning and CCTV inspection programs. Responsible for overseeing execution of the City's Overflow Emergency Response Plan and conducting the training program for all Foreman and Utility Workers.

Public Works Foremen: Executes and documents scheduled preventative maintenance tasks. Responds to emergency repairs and SSOs; generates work orders for repairs and other services; maintains data/records; answers service request calls and relays information to the Public Works Maintenance Superintendent. Performs SSO incident investigation, communications as appropriate; and delivers the completed SSO report to the Water/Wastewater Operations Superintendent.

Public Works Utility Worker I/II: Executes and documents scheduled preventative maintenance tasks. Responds to emergency repairs and SSOs. Identifies sewer collection system mapping updates required.

Public Works Utility Technician: Performs a variety of tasks in ordering, receiving, storing, distributing, shipping, and issuing equipment, apparatus, materials, and supplies. Maintains spare parts inventory.

Public Works Field Technician: Performs collection system maintenance related traffic control, as well as marking out utilities.

Principal Engineer – Development: Supervises development projects and systems; reviews and approves plans for new construction and ensures adherence to the City's design and construction standards.

Senior Civil Engineer – Development: Conducts plan review, responsible for keeping the City's design and construction standards up to date.

Engineering Technician – Development: Supports work directed by Principal Engineer and Senior Civil Engineer.

Senior Civil Engineer – Capital Improvements: Develops and updates the City's overall Capital Improvement Plan, including budgeting and prioritization of projects. Ensures that sewer collection system defects identified through the CCTV inspection program are adequately addressed in the Capital Improvement Plan.

Public Works Inspectors: Conduct review and inspection of new construction to ensure compliance with the City's design and construction standards and approved plans.

Utilities Department

Figure 2 shows the organization chart for the City of Healdsburg Utilities Department.

The Utilities Department (Electric, Water & Wastewater) is responsible for safe and reliable delivery of electricity and water as well as proper conveyance and treatment of wastewater. Responsibilities include maintenance and improvements of the electric distribution system, maintenance and operation of the potable water system (including production, treatment, storage and distribution), and operation of the wastewater system (including pumping stations and the City's Wastewater Reclamation Facility). The Utilities Department also provides engineering review and inspection of the utility portion of public improvements for new development projects and for public capital improvement and replacement projects.

The Wastewater Utility Division (positions shaded grey) has primary responsibility for operation and maintenance of the WRF, water quality sampling and analysis, and inspection of commercial and industrial dischargers to ensure compliance with the City's sewer ordinance. The Wastewater Utility Division takes primary responsibility for operation and maintenance of the City's sewer lift stations, whereas the Public Works Maintenance Division takes primary responsibility for the gravity sewer collection system piping. The Wastewater Utility Division shares the responsibility of responding to and reporting SSOs with the Public Works Maintenance Division.

The Water Utility Division is responsible for the City's water production, treatment, and storage systems. This Division operates and maintains the City's Gauntlett, Dry Creek, and Fitch Treatment Facilities, fifteen production wells; chemical treatment systems, seven storage reservoirs, the SCADA communication system, and the cross-connection control program. Duties include maintaining the well pumps, reservoirs, and booster pumps. Maintenance of water quality to meet State water quality standards is a priority.

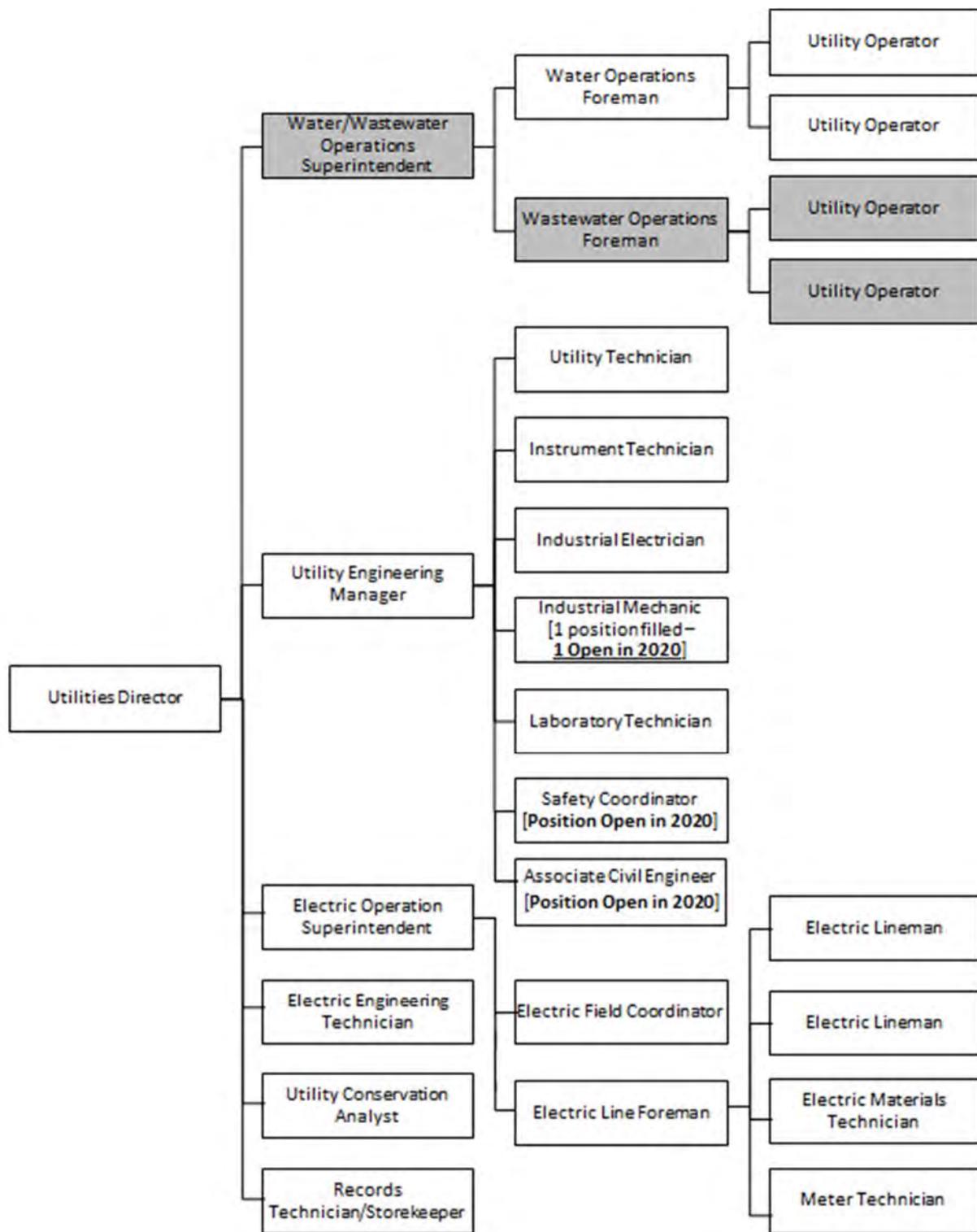


Figure 2 – Organization Chart – Utilities 2020

Utilities Position Descriptions and SSMP Responsibilities

General descriptions of each position and SSMP-specific responsibilities are listed below:

Utilities Director: Oversees the operation and maintenance of the water treatment and wastewater reclamation facilities. This position is authorized to electronically sign and certify SSO reports in CIWQS (LRO).

Water/Wastewater Operations Superintendent: Manages the operation and maintenance of the water treatment and wastewater reclamation facilities. Reviews the SSO event reports and contacts the Public Works or Utilities Crew for more information. Oversees implementation of the City's Industrial Pretreatment Program and FOG Control Program. This position is authorized to electronically sign and certify SSO reports in CIWQS and complete the chain of custody (LRO).

Wastewater Operations Foreman: Maintains the City's SSO records and internal database. Responsible for planning and resource allocation for maintenance and operation of the WRF and wastewater pump stations; generates work orders for repairs and other services; maintains data/records; and relays information to the Water/Wastewater Operations Superintendent. Conducts food service establishment industrial pretreatment inspections and enforces permit requirements. This position is also authorized to electronically sign and certify SSO reports in CIWQS (LRO).

Utility Operator: Executes and documents scheduled preventative maintenance tasks. Responds to emergency repairs and SSOs. Conduct industrial pretreatment inspections.

Utility Engineering Manager: Oversees compliance of the City's utilities programs with regulatory requirements, including keeping the City's SSMP up-to-date. Provides technical oversight of improvements to the City's utilities systems including the WRF, sewer collection system, water treatment plant, and water distribution system. Primarily responsible for implementing the sewer collection system evaluation and capacity assurance plan.

Instrumentation Technician: Operates and maintains the City's SCADA computer monitoring system for the water and wastewater systems.

Laboratory Technician: Performs water quality sampling and regulatory reporting.

Records Technician/Storekeeper: Performs a variety of tasks in records retention, materials ordering, receiving, storing, and documenting equipment, apparatus, materials, and supplies. Manages the sewer lift station spare parts inventory.

Safety Coordinator: Establishes training schedules, and documents training for each employee to ensure regulatory compliance.

2.3. Chain of Communication for Reporting SSOs

The Public Works Maintenance Division and the Utilities Department Wastewater Division perform SSO response and document each incident as indicated in the OERP (**Appendix 6.1**). Upon completion of the chain of custody, the report is delivered to the Water/Wastewater Operations Superintendent.

The Water/Wastewater Operations Superintendent or designee reviews the SSO report/checklist, and contacts the Public Works Crew and/or Utilities Crew for additional information if necessary. If there is an SSO backup into a home or a business, the documentation is sent to the City Administrative Specialist. The Water/Wastewater Operations Superintendent completes the Collection System Failure Analysis Form, enters SSO data into CIWQS, and will complete the chain of custody.

Related Appendices

Appendix 2.1 – SSMP Element Responsible Personnel

Appendix 6.1 – Sanitary Sewer Overflow Emergency Response Plan (OERP)

3.0. Legal Authority

D.13.(iii) Legal Authority: Each Enrollee must demonstrate, through sanitary sewer system use ordinances, service agreements, or other legally binding procedures, that it possesses the necessary legal authority to:

- (a) Prevent illicit discharges into its sanitary sewer system (examples may include infiltration and inflow (I/I), storm water, chemical dumping, unauthorized debris and cut roots, etc);
- (b) Require that sewers and connections be properly designed and constructed;
- (c) Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency;
- (d) Limit the discharge of fats, oils, and grease and other debris that may cause blockages, and
- (e) Enforce any violation of its sewer ordinances.

The City's legal authority to control use of the sewer collection system is provided by Ordinance 763, which has been in effect since 1984. The City's ordinances, including Ordinance 763, are enforced through the City's Code Enforcement Ordinance No. 985. The Chief Building Official is currently the designated "Enforcement Officer" for purposes of enforcement. The Code Enforcement Ordinance authorizes enforcement actions for all City ordinances, as well as any applicable state laws and regulations, and contains provisions for escalating levels of enforcement actions. The ordinance authorizes administrative actions with accompanying fines and penalties, civil actions for collection of costs by the City, and prosecution as a misdemeanor criminal offense.

In addition, Ordinance No. 1127 was added to Chapter 13.2 of the Municipal Code to provide requirements for inspection and replacement of private sewer laterals. A list of all applicable ordinance codes related to the City's SSMP is listed in **Table 4**.

Table 4 – Municipal Code Chapter 13.20 Sewer System Ordinance Codes

Legal Authority	Municipal Code	Ordinance Number	Section Title	Description
Title 13.2 Sewer System				
Prevent illicit discharges into the wastewater collection system (D.13.iii.a)	13.20.020	Ord. 763 § 2, 1984. Code 1964 § 15-61.	Prohibited substances	Prohibits the discharge of any substance that causes the City to violate any State or Federal regulation for sewage discharge, any substance that cannot be treated in the sewer system, any substance which would harm or adversely affect the sewer system.
	13.20.030	Ord. 763 § 2, 1984. Code 1964 § 15-62.	Abatement of nonconforming wastewater discharge	Prohibits waste discharges from adversely affecting the sewer system, the operation of the treatment facilities, the quality of effluent from the treatment plant or the quality of the receiving water.
	13.20.040	Ord. 763 § 2, 1984. Code 1964 § 15-63.	Damage to system	Holds any dischargers liable to the City for all damage caused by illegal discharges.
	13.20.060	Ord. 763 § 2, 1984. Code 1964 § 15-65.	Sewer charges and regulations	Requires permits for any connection to the public sewer and requires compliance with all adopted requirements that apply to sewer connections.
	13.20.080	Ord. 763 § 2, 1984. Code 1964 § 15-67.	Separation of storm drainage and sewage	Specifically requires separation of sewer and storm drain discharges and prohibits discharge of storm drainage to the sewer system, and vice-versa.
	13.20.380	Ord. 763 § 2, 1984. Code 1964 § 15-97.	Industrial wastewater discharge permits	Requires permits for all non-domestic sewage discharges to the sewer system.
	13.20.440	Ord. 763 § 2, 1984. Code 1964 § 15-103.	Prohibited wastes	Comprehensive list of prohibited discharges, including numeric limits on various toxic substances.
	13.20.510	Ord. 763 § 2, 1984. Code 1964 § 15-110.	Damage caused by prohibited wastewater discharge	Holds any dischargers liable to the City for all damage caused by illegal discharges.

Legal Authority	Municipal Code	Ordinance Number	Section Title	Description
Title 13.2 Sewer System				
Require proper design and construction of new and rehabilitated sewers and connections (D.13.iii.b)	13.20.170	Ord. 763 § 2, 1984. Code 1964 § 15-76.	Lateral permits	Requires a permit for constructing a building sewer, lateral, or connection to the public sewer.
	13.20.180	Ord. 763 § 2, 1984. Code 1964 § 15-77.	Public sewer construction permits	Requires a permit for using, construction, extending, or connecting to the public sewer.
	13.20.190	Ord. 763 § 2, 1984. Code 1964 § 15-78.	Plans, profiles and specifications required	Requires compliant plans, profiles, and specifications for a permit application.
	13.20.200	Ord. 763 § 2, 1984. Code 1964 § 15-79.	Public sewer construction	Requires developers to enter into a development agreement covering cost, type, quality, and standards for sewer infrastructure.
	13.20.250	Ord. 763 § 2, 1984. Code 1964 § 15-84.	Design and construction standards	Requires minimum standards for the design and construction of sewers and in accordance with the design standards of the City, as adopted by resolution of the City Council.
	13.20.260	Ord. 763 § 2, 1984. Code 1964 § 15-85.	Compliance with local regulations	Requires permits and compliance with all State, County, or City regulations pertaining to any construction within a street.
	13.20.310	Ord. 763 § 2, 1984. Code 1964 § 15-90.	As-built drawings	Requires "As-built" drawings to be filed showing the actual location of all mains, structures, "Tees" and laterals before final acceptance of public sewers.
	13.20.320	Ord. 763 § 2, 1984. Code 1964 § 15-91.	Completion of sewer required	Requires testing of new public sewer lines for compliance with all City Standards before any acceptance by the City.
	13.20.330	Ord. 763 § 2, 1984. Code 1964 § 15-92.	All work to be inspected	Requires inspection of all lateral and main sewer construction work to ensure compliance.
	13.20.460	Ord. 1127 § 2, 2013; Ord. 763 § 2, 1984. Code 1964 § 15-105	General	Establishes design requirements for private sewer laterals.

Legal Authority	Municipal Code	Ordinance Number	Section Title	Description
Title 13.2 Sewer System				
Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency (D.13.iii.c)	13.20.270	Ord. 763 § 2, 1984. Code 1964 § 15-86.	Easements or rights-of-way	Requires easements or right-of-way for the extension of the public sewers sufficient to allow the laying, maintenance and replacement of the sewer, with widths to be determined by the City Engineer.
	13.20.465	Ord. 1127 § 3, 2013.	Responsibilities for private sewer mains and private sewer laterals	Requires accessible cleanouts for maintenance, repair, or replacement. If an accessible cleanout is not available, the owner shall be responsible for all aspects of maintenance, repair or replacement of the private sewer lateral to its connection to the public main.
	13.20.500	Ord. 763 § 2, 1984. Code 1964 § 15-109.	Right of entry	Grants right of entry for the City's employee to enter all properties served by the City for inspection, sampling, and testing.
Limit the discharge of fats, oils, and grease and other debris that may cause blockages (D.13.iii.d)	13.20.440	Ord. 763 § 2, 1984. Code 1964 § 15-103.	Prohibited wastes	Establishes numeric limits for fats, oils, and grease content of sewage discharges.
	13.20.450	Ord. 763 § 2, 1984. Code 1964 § 15-104.	Pretreatment of wastewaters	Requires pretreatment systems, including gravity separation inceptors, or other devices prior to discharge if necessary.
Enforce any violation of its sewer ordinances (D.13.iii.e)	1.12.010	Ord. 985 § 2, 2002.	Code enforcement	Authorizes enforcement actions for all City ordinances.
	13.20.030	Ord. 763 § 2, 1984. Code 1964 § 15-62.	Abatement of nonconforming wastewater discharge	Authorizes the City to disconnect a user if necessary.
	13.20.400	Ord. 763 § 2, 1984. Code 1964 § 15-99.	Suspension of permit for industrial wastewater discharge	Authorize the City engineer to suspend an industrial waste discharge permit, for a period not to exceed 45 days when necessary.
	13.20.410	Ord. 763 § 2, 1984. Code 1964 § 15-100	Revocation of permit for industrial wastewater discharge	Authorize the City Council to revoke industrial wastewater discharge upon violation of the regulations.
	13.20.420	Ord. 763 § 2, 1984. Code 1964 § 15-101.	Notice	Describes the procedure to notify any person found to be in violation of the regulations.

Legal Authority	Municipal Code	Ordinance Number	Section Title	Description
Title 13.2 Sewer System				
Enforce any violation of its sewer ordinances (D.13.iii.e)	13.20.460	Ord. 1127 § 2, 2013; Ord. 763 § 2, 1984. Code 1964 § 15-105.	General	Holds any applicant responsible for any damage caused to the public sewer upon connection of a new service.
	13.20.465	Ord. 1127 § 3, 2013.	Responsibilities for private sewer mains and private sewer laterals	Holds property owners responsible for compliance of a private sewer lateral.
	13.20.490	Ord. 763 § 2, 1984. Code 1964 § 15-108.	Accidental discharges	Requires the discharger to furnish the City engineer within 15 days from the day of an accidental discharge a detailed written statement describing the causes of the accidental discharge and the measures being taken to prevent future occurrence.
	13.20.510	Ord. 763 § 2, 1984. Code 1964 § 15-110.	Damage caused by prohibited wastewater discharge	Holds any industrial discharger liable for discharging prohibited wastewater that causes damage to City facilities.

Municipal Code Chapter 13.20 – Sewer System Link:

<https://www.codepublishing.com/CA/Healdsburg/#!/Healdsburg13/Healdsburg1320.html#13.20>

4.0. Operation and Maintenance Program

D.13.(iv) Operation and Maintenance Program. The SSMP must include those elements listed below that are appropriate and applicable to the Enrollee's system:

(a) Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable storm water conveyance facilities;

(b) Describe routine preventive operation and maintenance activities by staff and contractors; including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders;

(c) Develop rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short and long term plans plus a schedule for developing the funds needed for the capital improvement plan;

(d) Provide training on a regular basis for staff in sanitary sewer system operations, maintenance, and require contractors to be appropriately trained; and

(e) Provide equipment and replacement part inventories, including identification of critical replacement parts.

The Public Works Maintenance Division is responsible for execution of the City's sewer collection system preventative maintenance program for the gravity sewer system, and the Wastewater Utility Division is responsible for execution of the preventative maintenance program for the sewer lift stations.

A list of the sewer collection system O&M programs implemented by the City is summarized in **Figure 3**.

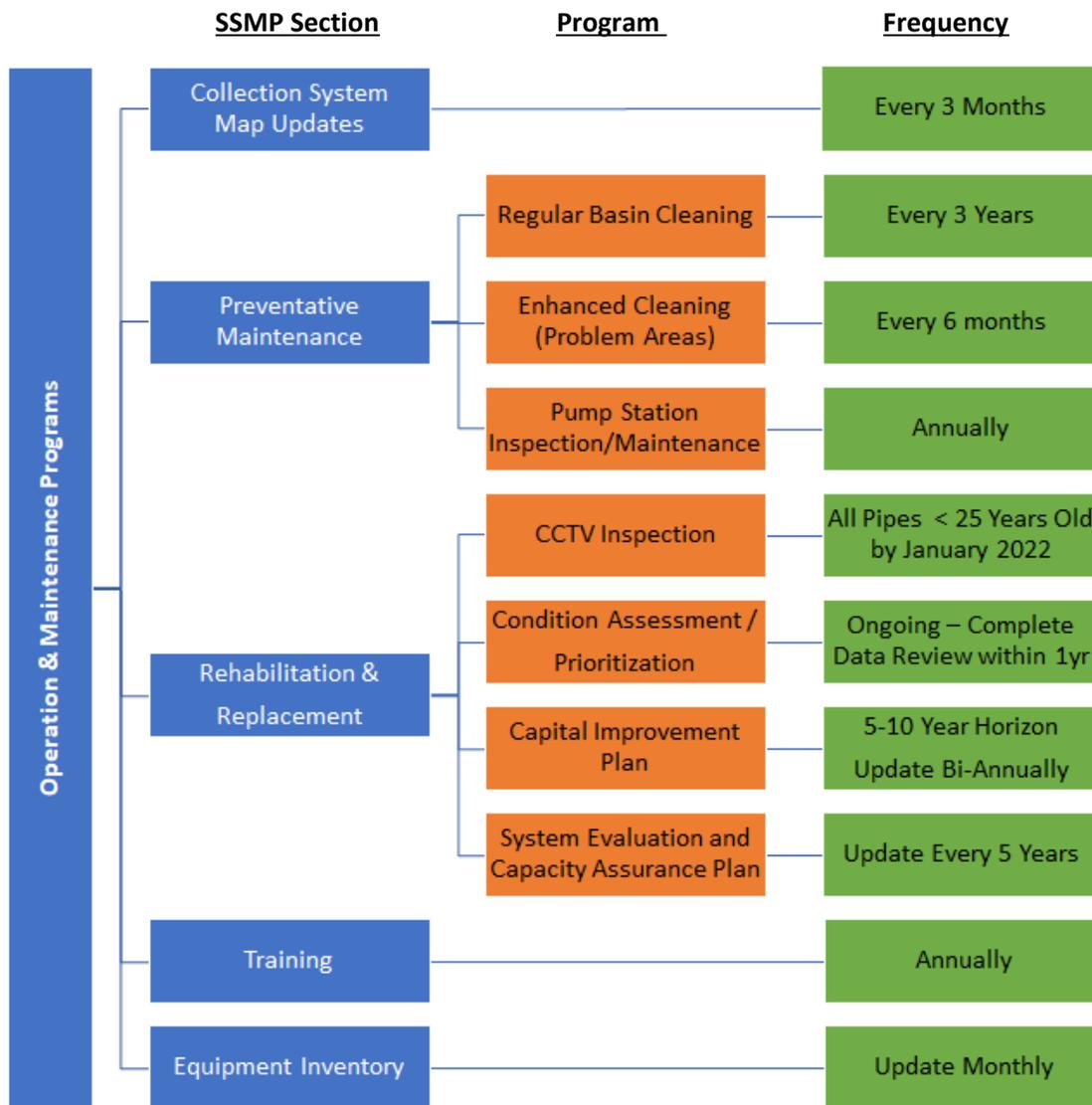


Figure 3 – O&M Program Overview

4.1. Collection System Mapping

The City of Healdsburg maintains sewer system mapping as Environmental Systems Research Institute (ESRI) GIS shape files. The files are maintained as a part of a comprehensive GIS program used to document City infrastructure.

The City maintains electronic and hard copy mapping of the sewer collection system showing all gravity mains, manholes, cleanouts, lift stations, and force mains. In addition, to assist field personnel in the event of a sewer overflow, the City's mapping includes other City utilities including Storm Drain, Water, and Electric. The City's GIS sewer mapping includes the information listed in **Table 5**.

An overview figure showing the City's sewer collection system and lift station locations can be found in **Appendix 4.1**.

Table 5 – The Sewer System GIS Map Information

Asset Type	Map Information
Manholes, Cleanouts, Lift Stations (points)	<ul style="list-style-type: none"> • Feature ID • Rim elevation • Location • Notes
Gravity Mains (lines)	<ul style="list-style-type: none"> • Feature ID • Diameter • Year lined (if applicable) • Upstream and downstream manhole ID • Upstream and downstream invert elevation • Pipe type • Year installed • Length • Reference documentation (construction plan number) • Staff comments • Links to CCTV records (via IT Pipes software)

The sewer system mapping is available to all City personnel in a variety of formats. The GIS can be accessed from any City computer work station. For use in the field, The Esri ArcGIS maps can be accessed by the field crew utilizing an Esri Explorer application on their phones. Field staff has also been provided with hard copy indexed map books carried in their vehicles.

Updates to the sewer collection system mapping come from one of two sources:

1. New asset construction or rehabilitation/replacement of existing assets:
 - (a) The Public Works Maintenance Superintendent maintains a file of all “as-built” drawings that are received from the Engineering Division.
2. Updates/corrections to existing mapping from field staff:
 - (a) Field staff record “red-line” markups on the hard copy indexed map books carried in their vehicles whenever they see something in the field that does not match what is shown on the system maps. Field staff take photos of the red-line markups and transmit to the Public Works Maintenance Superintendent.

In order to keep the system maps up-to-date, the Public Works Maintenance Superintendent maintains a spreadsheet log of all new map updates received from either the Engineering Division or field staff. On a quarterly basis, the Public Works Maintenance Superintendent meets with a GIS technician who is capable of making edits to the GIS mapping system, and delivers and reviews the most current map update needs with the technician. At the beginning of each quarterly meeting, the Public Works Maintenance Superintendent reviews the map update log and confirms with the technician that all map updates submitted during the previous meeting have been updated, and then updates the tracking log to mark those items as complete.

4.2. Preventive Operations and Maintenance Programs

Regular Preventative Basin Cleaning Program

The City has invested over \$500,000 in specialized sewer cleaning equipment, the most significant of which is two combination Jetting/Vactor Trucks.

- GapVax MC1510 combination jetting/vactor: 1,500 gallon water tank and 10 cy debris tank
- GapVax MC 1007 combination jetting/vactor: 1,000 gallon water tank and 7 cy debris tank



In addition, the City has a separate truck-mounted Harben high pressure water jetting unit and four industrial sewer lateral maintenance tools (augers). The City uses several cleaning techniques for preventative maintenance and blockage removal. These methods include the following:

- Flushing: Introduces a heavy flow of water into the sewer line at a manhole. This method is typically used to remove floatable material as well as sand and grit. This method is commonly used in combination with other cleaning methods, especially mechanical augering.
- Jetting: This is the most commonly utilized form of cleaning. Uses multiple jets of extremely high-pressure water directed against pipe walls. This technique is highly effective at removing debris and grease build-up, clearing blockages and cutting roots within small diameter pipes.
- Augering: Mechanical rotating blades are used to break up grease deposits, cut roots and loosen debris. This method also partially removes large deposits of silt, sand, gravel and some types of solid waste. This is the primary method used for root removal, particularly in laterals. As a policy, the City of Healdsburg does not employ chemical root control in the sewer collection system.

The regular preventative basin cleaning program, planned and executed by the Public Works Maintenance Division, is an ongoing program that is designed to systematically clean all gravity sewer lines every 3 years. The City currently maintains three spreadsheet-based lists of all gravity sewer pipes that are located within the City's 3 main sewer basins, called the "North", "Central", and "South" Basins.

Each basin spreadsheet is sub-divided by street, and all gravity lines on that street are listed by upstream and downstream manhole ID. The Public Works Maintenance Division plans and schedules to conduct cleaning of a basin starting at the upper most reaches and working downstream.

During sewer cleaning, a debris basket is typically placed in the flow channel at the downstream end of the manhole where the sewer cleaning nozzle is inserted to clean the upstream line. The crew attempts to capture as much debris as possible in the basket to prevent the material from simply being pushed downstream. Light debris may be collected from the manhole following cleaning using a manual “clam” extraction tool. Heavy debris is removed using the vacuum function of the combination truck and stored in the on-board debris tank.

The crew observes both the number of passes and difficulty of cleaning the line, in combination with the type and amount of debris removed from the downstream manhole after the cleaning is completed in order to determine the a “Condition” rating for that line. A condition rating of 0-2 is assigned per **Figure 4** below.

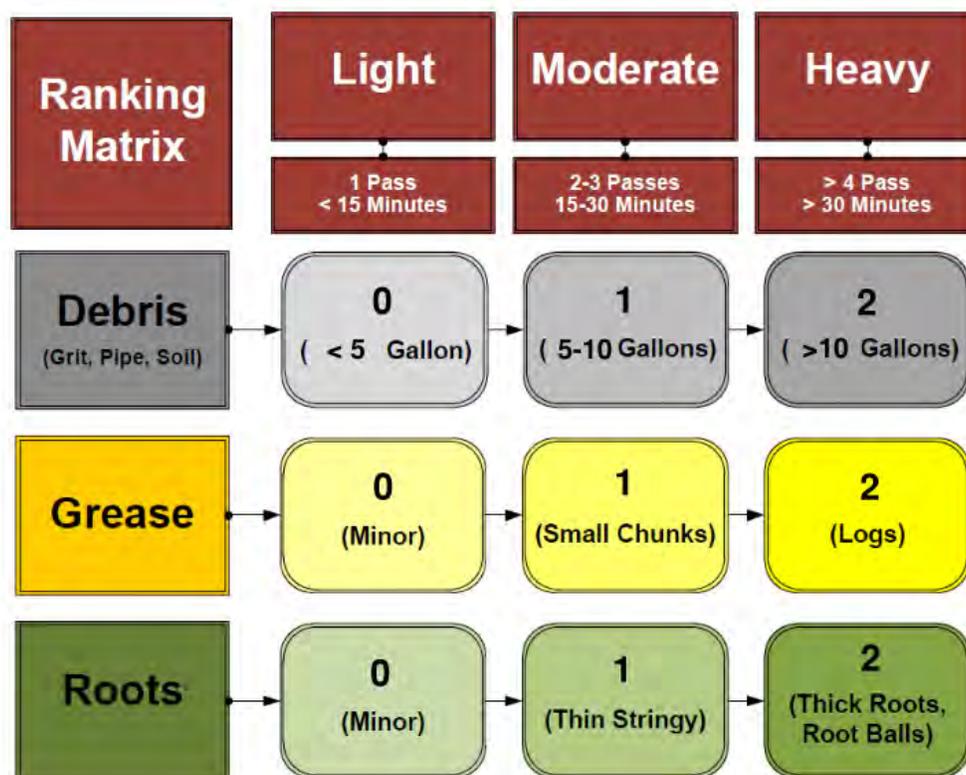


Figure 4 – Sewer Debris Condition Rating Matrix

- Condition 0: No follow-up action required.
- Condition 1: Results/observations noted to assist with future analysis.
- Condition 2: Triggers automatic CCTV inspection of the line and further analysis of cause for excessive debris accumulation (identify bellies, protruding taps, FOG, roots, etc)

The sewer crew reports the results of all cleaning work to the Public Works Maintenance Superintendent who updates the basin cleaning tracking spreadsheets including the footage cleaned, date cleaned, the debris condition ratings, and any comments. At that time the Public Works Maintenance Superintendent will schedule follow-up CCTV inspection of any lines with a reported Condition Rating of 2, and subsequent to the CCTV inspection update the 180-day enhanced cleaning schedule as required based on the results.

The Public Works Maintenance crews highlight completed segments of pipe on a large printed map of the sewer collection system located at the Corporation Yard, to visually help them tracking the cleaning progress and identify the next lines to be completed moving downstream. The City is moving toward implementation of a Computerized Maintenance Management System (CMMS), which will be used to generate work orders and document work by sewer asset. The CMMS will eventually replace use of the hard copy highlighted map and basin cleaning documentation spreadsheets which will allow for automatic report generation on work completed and visualization via GIS which will make the regular SSMP audit process more streamlined.

See **Appendix 4.2** for an example of a current Basin Cleaning schedule spreadsheet.

Enhanced Cleaning Program

The enhanced cleaning program, performed by the Public Works Maintenance Division, involves cleaning of mainlines or laterals (the publicly-owner lower lateral) at a higher 6-month frequency. This program targets individual assets, unlike the regular basin cleaning program that includes all assets within a basin. Pipeline assets are added to the enhanced cleaning program based on one of the following criteria:

1. Asset experiences an SSO due to blockage
2. Asset is a known problem area for FOG or debris accumulation based on O&M experience
3. CCTV inspection shows defects that are known to cause heavy debris accumulation indicating high risk of future blockage/SSO

When an asset is cleaned, the debris load is noted similar to the regular preventative basin cleaning program. An asset may be removed from the enhanced cleaning program list at the discretion of the Public Works Maintenance Superintendent if it is cleaned 4 or more consecutive times and receives a "0" debris rating, and also if the source/cause of the previously noted heavy debris load is known to have been eliminated.

Like the regular preventative basin cleaning program, this program is tracked using a spreadsheet, which is continuously assessed and revised based on the field reports. There are separate spreadsheets to track gravity mains and laterals. Assets that remain in the enhanced cleaning program for long periods of time will typically be targeted for rehabilitation or replacement if the reason for debris accumulation is related to the structural integrity of the line such as bellies, offset joints, protruding taps, and root intrusion.

See **Appendix 4.2** for an example of the Enhanced Cleaning schedule.

Lift Station Maintenance

The City's Wastewater Utility Division operates and maintains 11 lift stations, including the 8 MGD Magnolia Lift Station and 10 smaller satellite lift stations, which are described in **Appendix 4.3**. Two of these stations are located in the City of Healdsburg Corporation Yard.

Each of the lift stations has been equipped with an electrical transfer switch so that they can be readily powered by stand-by generators. For the smaller satellite lift stations, portable generators owned and maintained by the City are used with manual transfer switches. At the Magnolia Lift Station, a permanently installed dedicated generator is connected through an automatic transfer switch which starts and operates during a power outage. The City owns a portable trailer-mounted 6-inch diesel engine-driven pump which is normally parked at the Magnolia Lift Station. This pump can be used for sewer bypassing at the satellite lift stations or within the collection system for gravity main repair work, and also as a back-up to the four permanently mounted pumps at the Magnolia Lift Station.

The City operates an extensive Supervisory Control and Data Acquisition (SCADA) system that closely monitors all of the City's water and sewer facilities, including the lift stations. All lift stations are each monitored by a local programmable logic (PLC) controller, which transmits data to the SCADA system over a wireless network. Each lift station is monitored for water levels and pump status. A level indicator is shown on the local lift station display, and also sends a remote reading to the SCADA system. The PLC controller uses this indication to start and stop the pumps and to generate an alarm when warranted. For protection, a high-high level float in each lift station operates as a hard-wired backup to the level indicator to start both pumps if the wet well reaches a level above the normal operating range. The controller also monitors and transmits pump data, number of pump starts, pump runtime and wet well level for historical data collection. In addition to the alarm call-outs, the on-call operator can access the SCADA system for remote sites via an internet connection and observe the status of all water and sewer facilities, including the lift stations.

The PLC at each lift station also sends remote alarms for high (or low) level, high-high level float trigger, incorrect pump control settings, loss of power, PLC cabinet intrusion, or a communication or pump failure. These alarms are transmitted back to the SCADA system, where a voice dialer calls the on-call operator and describes the location and the specific alarm condition. As a backup to the wireless data link, a general lift station failure relay (operated by the high-high float or loss-of-power) also sends a signal by a dedicated phone line to the main sewage lift station (Magnolia), where a cellular dialer will also notify the on-call operator. Taken together, these monitoring and alarming systems provide robust protection against lift station failures that could otherwise cause a spill or overflow.

Each lift station is visited by the Wastewater Utility Division weekly, and any observations or notes are kept in a logbook located at each station. Typical weekly inspection activities include:

- Record pump run hours
- Manually run both pumps to trigger and verify operation of low level alarm
- Manually test operation of high-high level float
- General visual inspection and level transducer cleaning

Annually, the Public Works Maintenance Division conducts a thorough cleaning of each lift station wet well, and the Wastewater Utility Division conducts a mechanical inspection of each station. Typical pump maintenance/inspection activities are listed in **Table 6**.

Table 6 – Typical Sewer Lift Station Pump Inspection / Maintenance Activities

Service Item	Action
Change Oil	<ul style="list-style-type: none"> • Pull pump, drain and change oil according to Manufacturer’s O&M Manual.
Cable	<ul style="list-style-type: none"> • If the outer jacket is damaged, replace the cable. • Check that the cables do not have any sharp bends and are not pinched.
Connection to Power	<ul style="list-style-type: none"> • Check that all connections are properly secured.
Impeller	<ul style="list-style-type: none"> • Check impeller clearance vs. Manufacturer’s O&M Manual recommendations. • Adjust the impeller if necessary. • Check condition of wear parts including bearings and mechanical seal.
Stator Housing	<ul style="list-style-type: none"> • Drain liquid, if any. • Check the resistance of the leakage sensor to verify it is working.
Motor Insulation Resistance	<ul style="list-style-type: none"> • Check the resistance between the ground (earth) and phase lead is within Manufacturer’s O&M Manual recommendations. • Conduct a phase-to-phase resistance check per Manufacturer’s O&M Manual.
Junction Box	<ul style="list-style-type: none"> • Check that it is clean, dry, and free from damage.
Lifting Handle	<ul style="list-style-type: none"> • Check the screws and condition of the lifting handle and chain. • Replace if necessary.
O-rings	<ul style="list-style-type: none"> • Replace the oil plug O-rings. • Replace the O-rings at the entrance or junction cover. • Grease the new O-rings.
Voltage and Amperage	<ul style="list-style-type: none"> • Check the running values and compare to past values to identify any degradation in performance.

Pump overhauls for pumps 3 HP or greater include bearing, mechanical seal, and/or impeller replacement are conducted as-needed based on the results of pump inspections, or in some cases the pumps may simply be replaced if an overhaul is needed. Typically pumps less than 2HP are simply replaced when they are approaching the end of service life, and are not designed to be overhauled.

The Wastewater Utility Division uses LLUMIN CMMS to create, document, and manage work orders for the City’s Wastewater Reclamation Facility and sewer lift stations. The larger pumps at the Magnolia Lift Station have additional inspection and maintenance requirements that differ from the smaller submersible pumps at the satellite lift stations that are managed in LLUMIN, including:

- Coolant level verification and changeout
- Functional inspection of safety and control devices (trigger manually for testing purposes)
- Vibration monitoring and measurement if warranted
- Overhauls if required (bearings, shaft seals, o-rings, impellers, wear rings, etc.)

Every 2 years, the City's Wastewater Utility Division conducts a condition assessment and survey of the City's lift stations to identify improvements that may be required in order to maintain the operability and reliability of the station (refer to 2018 Lift Station Survey in **Appendix 4.3**). This information is fed into the City's Capital Improvement Program. The electronic version of the document includes links to pump curves and pump operations and maintenance manuals.

4.3. Rehabilitation and Replacement (R&R) Program

CCTV Inspection Program

The City's collection system CCTV inspection program is performed by the Public Works Maintenance Division. The City conducts CCTV condition assessment using the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) coding standard. The NASSCO PACP method provides quantitative standardized inspection results that allow for straight-forward prioritization of system deficiencies.

The City owns one closed-circuit television (CCTV) truck that is used to conduct internal inspections of gravity sewer pipes. The CCTV inspection truck was outfitted and provided by RS Technical Services (RST) and includes CCTV cameras, several different camera transporters (for mobility down the sewer line), camera remote control equipment, camera cable reel system, power generator, and computer equipment. The City operates the CCTV truck and equipment according to the RST's latest Manufacturer's Operations and Maintenance Manual, which provides guidance and instructions that cover topics including:

- Positioning the truck
- Safety zone creation around manhole and truck
- Generator startup
- Equipment inspection and selection of transporter equipment
- Equipment connections, cable grip and tension adjustment
- Powering on the equipment and testing operation
- Laying out the down-hole roller set to guide camera cable into manhole and pipe
- Launching the equipment into the manhole
- Conducting the inspection
- Retrieving camera and transporter

The City utilizes ITpipes Pipe Inspection Management Software on the CCTV truck computers to create CCTV inspection records for each pipe utilizing NASSCO PACP standardized defect coding. The results of all CCTV inspections are entered into a PACP standard database, and the CCTV video inspection records are available using the ITpipes software, which links the videos to the pipes in the City's GIS system. The ITpipes software also has the ability to create point shapefiles for all identified defects that can be viewed using the GIS to assist with development of the City's rehabilitation and replacement program. The City recently upgraded its ITpipes software, which enhanced the system's GIS interface capability.

The City utilizes ITPipe’s software documentation and training materials to guide collection and management of the City’s CCTV data by City Staff.

The City has developed a plan and schedule to complete CCTV inspection of all gravity sewer pipelines that are older than 25 years by January of 2022. The CCTV schedule shown in **Appendix 4.4** shows all lines that have been inspected to date, all lines scheduled to be inspected in 2020 and 2021, and all lines that are less than 25 years old that will be inspected in 2022 and beyond. CCTV inspection will follow the City’s regular basin sewer cleaning work.

After the City has finished the CCTV inspection work shown in **Appendix 4.4**, a new schedule that will facilitate inspection of the entire system on a 10-year cycle will be developed and implemented.

Sewer manholes are inspected visually during sewer cleaning and/or CCTV, and any significant leaks or defects are documented on a standard Manhole Observation Form (refer to **Appendix 4.5**) which is transmitted to the Public Works Maintenance Superintendent. Manholes with significant defects may be scheduled for near-term repairs that are performed internally by the Public Works Department which has the capability to perform injection grouting to stop infiltration and inflow. Manhole repairs that cannot be completed internally will be completed by contractors as part of the R&R program.

Condition Assessment Methodology

CCTV inspections conducted using the NASSCO PACP coding interface result in the creation of a standardized report that documents the locations within the pipe at which observations were made. A still picture of each observation is taken, and a live video for the entire inspection is also provided. Every observation made using a PACP code is classified as either a structural defect (i.e. cracks, offsets, corrosion, etc.), maintenance defect (i.e. debris, grease, roots, etc.), or a miscellaneous observation (i.e. tap, manhole, end of survey, etc.). Appendix D of the PACP Manual includes a condition grading system that rates the severity of each defined structural and maintenance defect on a scale from 1-5. Standard NASSCO PACP reports can be configured to automatically record the associated “maintenance grade” and “structural grade” for each observation made during an inspection. As a general guideline, defect severity levels 1-5 may cause failure of the asset on a timeline as described below:

- Severity 5 – asset has failed or will likely fail within next 5 years (asset requires immediate attention, very poor condition)
- Severity 4 – asset will probably fail in 5 to 10 years (asset is in poor condition)
- Severity 3 – asset may fail in 10 to 20 years (asset is in fair condition)
- Severity 2 – asset unlikely to fail for at least 20 years (asset is in good condition)
- Severity 1 – asset failure unlikely in the foreseeable future (asset is in excellent condition)

NASSCO has developed an overall asset condition rating system, known as the PACP “Quick Rating”. The Quick Rating is a four-digit code, with the following characteristics:

1. First digit is the highest severity observation noted (1-5)
2. Second digit is the number of observations of the highest severity
3. Third digit is the second highest severity observation noted
4. Fourth digit is the number of observations of the second highest severity

The Quick Rating provides a quantitative assessment of asset condition. A quick rating can be generated for either structural observations only, maintenance observations only, or for both types of observations combined. The quick rating system prioritizes assets first by the highest severity observation (the first digit), and second by the quantity of defects. It only takes one severity 5 defect, which may indicate that the asset has already failed or is near to failing, to cause an SSO. A single severity 5 defect is considered more serious than several severity 4 defects.

Rehabilitation and Replacement (R&R) Prioritization

The City’s policy is to repair, rehabilitate, or replace all Severity 5 Structural defects as soon as possible, but no longer than 5 years from the date of discovery via CCTV and no longer than 2 years if the defect is within 150’ of a waterway. Severity 5 Maintenance defects that require a physical repair to alleviate the defect will also be addressed in the same priority. Severity 5 Maintenance defects that do not require physical repair but can be managed through targeted enhanced O&M techniques will be added to the City’s enhanced cleaning program.

The City’s policy regarding Severity 4 Structural defects is to also include the necessary repairs in the City’s overall Capital Improvement Plan. The repair of Severity 4 Structural defects is prioritized and scheduled based on a Risk of Failure analysis as further described below.

Risk of Failure = Probability of Failure x Consequences of Failure

Probability of Failure = PACP Structural Quick Rating/1000 + PACP Maintenance Quick Rating/1000 + X

Where X = 2 for pipes on the enhanced cleaning schedule due to roots, and; X = 1 for other pipes on the enhanced cleaning schedule.

Criticality of Failure = Capacity Rating + Location Rating

The Capacity Rating is based on the pipe diameter and is related to the potential spill volume according to **Table 7** below.

Table 7 – Capacity Ratings

Pipe Diameter	Capacity Rating
8" or less	1
10"-12"	2
14"-18"	3
Greater than 18"	4

To determine the Location Rating, a series of buffering evaluations are made in GIS with respect to waterways and roadways. All assets are given Location Ratings on a 1-6 scale, with 1 being the lowest rating and 6 being the highest rating. The following routine is executed in GIS to assign ratings to each asset. Assignments are made by making buffering selections in GIS and overwriting ratings within the attribute tables throughout the routine to ensure the highest applicable rating is assigned to each asset.

1. Assign an initial rating of 1 to all assets.
2. Assign a rating of 2 to all assets further than 250' from a roadway.
3. Assign a rating of 4 to all assets within 500' of a waterway of the US.
4. Assign a rating of 3 to all assets further than 500' from a roadway, or are otherwise considered extremely difficult to access by City Staff.
5. Assign a rating of 5 to all assets with 250' of a waterway of the U.S.
6. Assign a rating of 6 to all assets with 150' of a waterway of the U.S.

The risk of failure score is the product of the overall criticality of failure and probability of failure scores. The highest possible risk of failure score is approximately 100. An example of a risk of failure calculation is provided below:

Given

- PACP structural quick rating = 4833
- PACP maintenance quick rating = 4131
- Asset is on the enhanced cleaning schedule for grit accumulation
- Asset is within 150' of a waterway
- Pipe Diameter = 12"

$$\text{Probability of Failure} = 4833/1000 + 4131/1000 + 1 = 9.96$$

$$\text{Consequence of Failure} = 2 + 6 = 8$$

$$\text{Risk of Failure} = 9.96 \times 8 = 79.7$$

Table 8 below provides guidance for initial capital improvement project prioritization based on results from the asset risk analysis:

Table 8 – CIP Prioritization Guidance for Severity 4 Defects

Risk of Failure Score	Recommended Action
0-50	Described in Capital Improvement Plan but may not yet be scheduled
50-75	Consider for rehabilitation or replacement within next 10+ years
75-90	Consider for rehabilitation or replacement within next 5-10 years
90-100	Consider for rehabilitation or replacement within next 5 years

The City retains sole discretion regarding the prioritization and scheduling of repair for Severity 4 defects. The recommendations shown in **Table 8** are to be considered guidelines only. All Severity 4 defects shall be at minimum listed within the City’s CIP including their Risk of Failure score, however the repair of these defects is likely to be driven by coordination with other City maintenance projects such as water line repair and street paving. Prioritizing and scheduling the repair of Severity 4 defects will also take into consideration City budgeting constraints and risk analysis, compared to Severity 5 defects which trigger an automatic requirement to repair or replace the asset within 5 years.

A flowchart depicting collection system R&R programs in conjunction with the preventative O&M programs, performed by the Public Works Department, is shown in **Figure 5**.

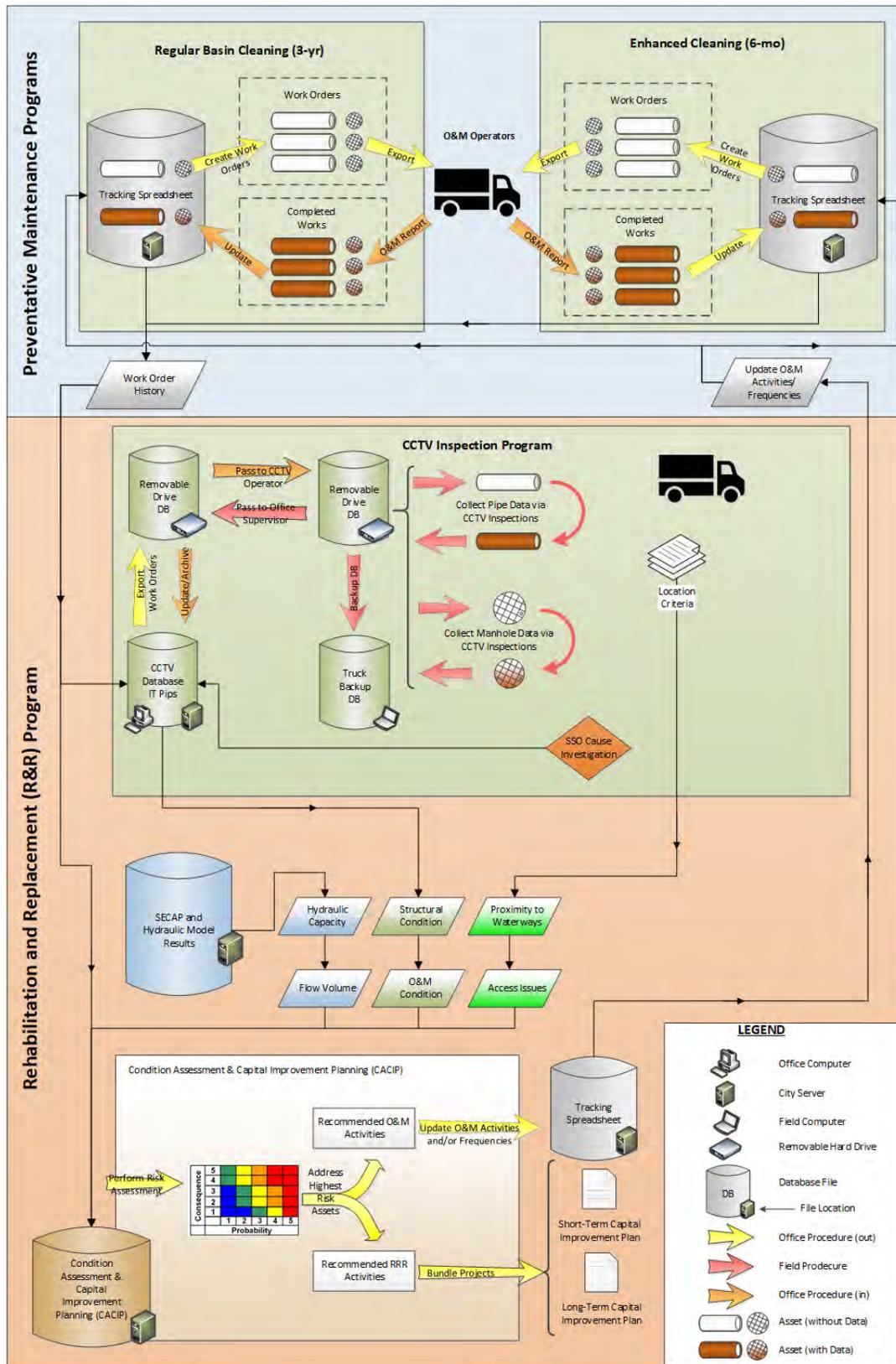


Figure 5 – Collection System O&M and R&R Flowchart

City Staff (typically Senior Civil Engineer – Capital Improvements) initially review condition assessment data when new data is available from CCTV field work. Licensed City Staff or contracted civil engineering consultants will review CCTV inspection videos and reports for assets with Severity 4 and 5 defects and provide preliminary R/R method recommendation reports including cost estimates. The Senior Civil Engineer – Capital Improvements and Utility Engineering Manager will then conduct the Risk of Failure analysis to aid in prioritizing and scheduling future capital improvement projects on a 10-year horizon.

Short-Term Actions

The Public Works Maintenance Division has the ability to conduct emergency manhole and pipeline repairs in the case of SSOs caused by asset failures, or severe defects identified during CCTV inspections that pose in imminent risk of causing an SSO which cannot wait for engineering design and public bidding to contractors. The Public Works Maintenance Division has two backhoes that can be used to expose sewer pipe and the parts and equipment necessary to conduct sewer bypassing and pipe segment replacement.

Capital Improvement Program Development

City Staff group identified sanitary sewer collection system asset R/R activities into capital improvement project bid packages that are publicly bid for construction. Projects may be bundled by risk, for example the highest risk assets may be bundled into the first year of the capital improvement plan (CIP). Projects may also be bundled by geographic proximity, construction methodology, or ease of coordination with other City public works projects such as water and streets projects. The Senior Civil Engineer – Capital Improvements updates the CIP at least bi-annually based on work completed and new CCTV inspection data received. Projects that are scheduled within the next two years are contracted out for design to civil engineering consultants, or designed in-house if practicable. Civil engineering consultants or City Staff produce construction plans and specifications, which are bid publicly for construction. The City may also develop an on-call list for typical sanitary sewer collection system R/R work (i.e. cured-in-place-pipe lining, manhole sealing, etc.) that can be used to complete work which does not require civil engineering design. Small R/R projects may also be completed in-house, if practicable.

The City has invested significantly in the sewer collection system within the CIP. The City currently has several sewer rehabilitation/replacement projects in its 2018-2023, 5-year CIP:

- Healdsburg Ave Sewer Replacement: 2,300 LF replacement of failed/problematic sewer line
- Orchard LS Reconstruction: Replacement of structure that is at end of its useful life
- Westside Road Gravity Sewer: Convert corporation yard force main to gravity sewer and abandon Hendricks LS
- College St. Sewer / Water Main Replacement: Replace 1,800 LF of severely deteriorated water main, replace older sewer main at the same time
- Fitch St. Sewer / Water Replacement: Replace 3,000 LF of deteriorated sewer / water mains.
- Piper St. Sewer / Water Replacement: Replace 1,600 LF of deteriorated sewer / water mains.
- Heron Lift Station Relocation: Relocate lift station that is prone to FOG buildup.

The City's Capital Improvement Plan can be found online:

<https://www.cityofhealdsburg.org/589/Planning-Projects>

Capital Improvement Budgeting

The City's sewer collection system is operated as an enterprise fund, meaning that its operations are financed in a manner similar to private business enterprises, where the costs (expenses, including capital depreciation) of providing sewer service are financed primarily through user charges. Using a valuation of all of its sewer facilities and an estimate of design life, the City has identified annual depreciation amounts in the sewer system. In the City's sewer collection system, depreciation amounts are estimated for gravity sewers, manholes, lift stations, and the public portions of sewer laterals and cleanouts.

The goal of the Capital Improvement Program (CIP) is to fully fund this annual depreciation amount, primarily by setting sewer service rates at a level which generates revenue in excess of operating expenses, with the additional revenue directed to projects that replace aging and fully depreciated sewer infrastructure. Where portions of a specific replacement project are attributable to new development, funding derived from service charge revenue may be augmented by revenue from sewer capacity (development) fees.

Periodically, the City conducts utility rate studies in order to evaluate revenues versus expenditures to determine if changes to the rates are necessary in order to provide adequate levels of funding for operations, maintenance, capital replacement projects, and debt service. The City last conducted a rate study in 2016 which is included in **Appendix 4.6**. Another rate study update is planned for 2020. As part of previous rate studies, the sewer collection system GIS was queried in order to determine the length and diameter of all sewer lines, and number of manholes. A value per foot of pipe for various pipe diameters was assigned, as well as a value per manhole and per sewer lateral. A value for each lift station was estimated. The total value of the collection system was calculated, and the remaining useful life of the various assets estimated in order to determine annual depreciation value. This annual depreciation value was then used to estimate the annual capital replacement expenditures that are expected to maintain the system's condition over the long-term. The City's 2016 Rate Study planned for \$1.5M in capital projects for the wastewater system through FY 20/21 in line with this evaluation.

Within City Rate Studies, the wastewater funding and reserve structure is comprised of:

- **Operating Fund:** The primary fund of each utility. Most of revenues, including rates, flow into the operating fund and all of the operating and maintenance costs, including debt service payments are paid out of this fund. The City also has an annual transfer of funds from the Operating Fund to the Capital Replacement Reserve, to meet the long-term average capital improvement needs for the wastewater system.
- **Capital Replacement Reserve:** Serves as a mechanism for funding rehabilitation, replacement, and upgrade projects contained in the City's CIP. The reserve is funded with annual transfers of rate revenue from the Operating Fund. Funds are then transferred from the reserve to the Capital Projects Fund, where actual CIP expenditures occur.

Uniform transfers from the Operating Fund (which should closely match the annual system depreciation value) enables the City to fund capital projects that facilitates rate stability and/or modest annual rate adjustment. This also helps establish and maintain steady funding of the ongoing replacement and rehabilitation efforts.

- **Capital Projects Fund:** Used to account for revenues and debt proceeds available for capital project expenditures. All capital projects are funded with this fund. Funds are moved into the Capital Projects Fund when the funds are encumbered for specific projects. Debt proceeds obtained to finance new projects are also placed in the Capital Projects Fund.
- **Capacity Fund:** Used to account for revenues from water and wastewater capacity fees from new development/connections. Capacity fees are one-time charges to new developments to pay for capacity in the wastewater utility. These revenues are used to help pay for development-driven CIPs.

4.4. Training

The City of Healdsburg conducts weekly 10 to 15 minute tailgate meetings covering a range of topics. These tailgate safety meetings also are required by Cal/OSHA regulations in Title 8, Sections 8406 and 1509 of the California Code of Regulations; however the City has expanded the tailgate schedule to include topics of sewer operations & maintenance. The Public Works Maintenance Division and Wastewater Utility Division are trained annually on the critical topics outlined in **Table 9** below.

Table 9 – City of Healdsburg Training Topics

Training Category	Topics
SSMP Review	Review latest updates to the City's SSMP
O&M Training	Work order scheduling and documentation
	Standard operating procedures for vector/jetting truck
	Standard operating procedures for auger equipment
	Standard operating procedures for CCTV inspection equipment/software
	Lift station inspection and equipment maintenance
	Use of portable generator at lift stations
	Conducting sewer bypassing at lift stations including use of portable pump
	Conducting sewer bypassing and point repair for gravity mains
OERP Training	Review recent changes to the OERP
	SSO response procedures, containment, and chain of communication reporting
	SSO volume estimation techniques
	Impacted surface waters and response/notification procedures, water quality sampling
	Private lateral backups and customer service
Safety Training	Excavator use
	Confined Space Entry Policy and gas detector use

Public Works Utility Workers that conduct CCTV inspections are re-trained and recertified in PACP defect coding at least every 3 years.

In 2020, the City will be implementing a new Safety Coordinator position within the Utilities Department. The Safety Coordinator will be responsible for planning, scheduling, and documenting the completion of all required training topics for all Public Works Maintenance Division and Wastewater Utility Division staff.

The City also requires all contractors working on sewer collection system assets to review and maintain a hard copy of the City's OERP, and to develop a project-specific OERP that includes specific details regarding the nature of the work and the worksite. Contractors are required to train their workers on the contents of the City's OERP and the project-specific OERP as part of their pre-project safety training and preparation.

When sewer bypass pumping is required for project construction, the City will require the contractor to develop a detailed bypass pumping plan that includes redundancy for all equipment as well as spill detection and remote alarming equipment. Review of the sewer bypass pumping plan will be conducted by the Public Works Maintenance Superintendent and/or the Water/Wastewater Operations Superintendent.

4.5. Equipment and Replacement Part Inventories

The Public Works Utility Technician manages the City's supply of spare parts for gravity sewer repair that is located at the Corporation Yard. Spare parts include various sizes of pipe, repair couplings, wyes, tees etc. New parts are ordered as soon as they are used. The Public Works Utility Technician also manages the tool inventory to track purchase and replacement of tools used to maintain the sewer collection system including saws, drills, generators, concrete mixers, wrenches, work lights, shovels, spill containment materials, etc. Tracking of spare parts and tools maintained at the Corporation Yard is currently done using spreadsheets but will likely transition to CMMS in the future.

The Utilities Records Technician/Storekeeper and Industrial Mechanic maintain inventories of spare parts for the City's Lift Stations. All mechanical and electrical components of each individual sewer lift station are maintained as assets in the LLumin CMMS that is used by the Utilities Department to manage the WRF and lift stations. An inventory of common critical spare parts is maintained at the WRF that includes:

1. One spare for each type of pump in the sewer collection system
2. Float switches
3. Motor starters
4. Level transducers

In the case of a PLC or radio communications equipment failure, the lift station can be operated using float switches only while the electrical equipment is repaired or replaced.

All vehicles used for operations and maintenance of the sewer collection system, including two vector trucks and one CCTV truck are maintained by the City's Administrative Services Department. The Vehicle and Equipment Services Section schedules, performs, and documents routine maintenance on vehicles using Mitchell1, which is a web-based maintenance planning program that can be used to:

- Schedule maintenance and create work orders
- Manage spare parts inventory and stocking levels
- Vendor setup and ordering parts for inventory and daily needs
- Create estimates, repair orders, invoices, and reports

Related Appendices

Appendix 4.1 – Sewer System Map

Appendix 4.2 – Example Preventative Cleaning Documentation Forms

Appendix 4.3 – 2018 Lift Station Survey

Appendix 4.4 – CCTV Inspection Schedule

Appendix 4.5 – Standard Manhole Inspection Form

Appendix 4.6 – 2016 Rate Study

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5.0. Design and Performance Provisions

D.13.(v) Design and Performance Provisions:

- (a) Design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations and other appurtenances; and for the rehabilitation and repair of existing sanitary sewer systems; and
- (b) Procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.

5.1. Standards for Installation, Rehabilitation and Repair

Design and performance provisions for work related to the City's public sanitary sewer system are detailed in the Public Works Standard Specifications and Details. The current Public Works Standard Specifications and Details were approved in August 2008, and are routinely updated to reflect new procedures, materials and other improvements/changes within the industry. Bound versions of the Public Works Standard Specifications and Details are available for sale in the City office or can be downloaded from the City's website.

The Public Works Standard Specifications and Details are composed of four elements:

- Engineering Design Standards - Provides detailed guidance for design of public sewer system improvements.
- Specific Provisions - Provides guidance to design professionals and construction contractors on the materials, installation and required testing methods for public sewer system improvements.
- Approved Materials list - Provides a list of the approved materials as they relate to the Standard Details.
- Standard Details - provides details for the installation of the public sewer system improvements.

5.2. Standards for Inspection and Testing of New and Rehabilitated Sewer

All new construction, rehabilitation and repair projects affecting the City sanitary sewer system are reviewed and tested by the Public Works Department for conformance with the Public Works Standard Specifications and Details. The Development Section of Public Works Engineering oversees permitting and plan review for new development projects. The Capital Improvement Section of Public Works Engineering performs construction inspection and testing. The City has two full-time Inspectors and one Engineering Technician.

Inspection is required for all sewer improvements and other work within the public right-of-way, all public easements, and for any work for which an encroachment permit has been issued. The City inspects new sewer facilities at all phases of the work in order to ensure complete conformance with the requirements of the City's standard specifications. At a minimum, work is inspected at the following points during the progress of sewer installation:

- Prior to the placement of any fill material.
- Immediately after the placement of all pipe and prior to bedding or to backfill.
- During all backfill and compaction operations.
- Prior to and during the placement and compaction of any aggregate base material.
- Form and reinforcement inspections prior to pouring any concrete.
- Prior to paving.
- During all paving operations.
- Prior to requests for payment for any contract items of work.

The City's Specific Provisions include specific testing procedures for public sewers that include:

- Cleaning and flushing
- Low pressure air testing
- Pipe deflection testing
- CCTV inspection
- Water or vacuum manhole testing

The City has a well-established inspection scheduling and tracking system. The inspection standards are enforced for private development projects, as well as City capital improvement projects.

Additionally, the City's Sewer Lateral Ordinance (No. 1127) was adopted in 2013 which requires the video inspection and repair of all private sewer laterals under the following circumstances:

1. A sewer lateral service backup or spill call is reported to the City
2. Issuance of a building permit with a valuation of \$25,000 or more
3. A change in the use of the structure
4. Upon replacement or repair of any part of the sewer lateral
5. Upon significant repair or replacement of the main sewer line to which the lateral is attached

The property owner must submit a video recording of the private sewer main/lateral inspection to the Department of Public Works for review to verify there are no defects in violation of the Sewer Lateral Ordinance. If the City Engineer determines that a private sewer main and/or private sewer lateral is in a defective condition, the City will provide a written notice of violation. The City will review the final submitted CCTV inspection for compliance following any repairs. When all conditions are met the City will issue a certificate of private sewer lateral compliance to the property owner. Implementation of the City's Sewer Lateral Ordinance has been effective in reducing the frequency of SSOs from sewer laterals since its adoption in 2013.

Sewer Lateral Ordinance link:

<https://ci.healdsburg.ca.us/882/Sewer-Lateral-Ordinance>

Sanitary Sewer Standard Details and Specifications and permitting link:

<https://www.ci.healdsburg.ca.us/306/Documents-Forms-Permits>

6.0. Overflow Emergency Response Plan

D.13.(vi) Overflow Emergency Response Plan - Each Enrollee shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:

- (a) Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;
- (b) A program to ensure appropriate response to all overflows;
- (c) Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, regional water boards, water suppliers, etc) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDR or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification;
- (d) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;
- (e) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and
- (f) A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

Overflow Response: The City has an Overflow Emergency Response Plan (see **Appendix 6.1**) for handling service calls and sewer overflows. The plan includes notification procedures for emergency response, spill recovery, overflow mitigation, cleanup, and restoration of damaged dwellings and buildings. It also includes provisions for public notification, testing for contamination, and notification to regulators.

The plan includes procedures for after-hours and weekend spill events. One Utility Worker II and one Utility Operator are available on an on-call basis at all times. These employees can be reached 24-hours per day on their City cell phones.

Overflow Reporting Policy: All overflows and backups are investigated to determine the cause and corrective actions needed to prevent future incidents. Category 1 SSOs greater than or equal to 1,000 gallons are reported to the State Office of Emergency Services (OES) within two (2) hours after the City is notified of the spill.

All overflows are reported in the State Water Board’s electronic reporting system (CIWQS). The plan also includes reporting requirements to other regulatory agencies as may be appropriate. The Water/Wastewater Operations Superintendent is responsible for reviewing and completion of the SSO reports and entering the data into CIWQS.

Related Appendices

Appendix 6.1 – Sanitary Sewer Overflow Emergency Response Plan (OERP)

Appendix 6.2 – Water Quality Monitoring Plan

7.0. FOG Control Program

D.13.(vii) Fats, Oils, and Grease (FOG) Control Program: Each Enrollee shall evaluate its service area to determine whether a FOG control program is needed. If an Enrollee determines that a FOG program is not needed, the Enrollee must provide justification for why it is not needed. If FOG is found to be a problem, the Enrollee must prepare and implement a FOG source control program to reduce the amount of these substances discharged to the sanitary sewer system. This plan shall include the following as appropriate:

- (a) An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG;
- (b) A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area. This may include a list of acceptable disposal facilities and/or additional facilities needed to adequately dispose of FOG generated within a sanitary sewer system service area;
- (c) The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG;
- (d) Requirements to install grease removal devices (such as traps or interceptors) design standards for the removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements;
- (e) Authority to inspect grease producing facilities, enforcement authorities, and whether the Enrollee has enough staff to inspect and enforce the FOG ordinance;
- (f) An identification of sanitary sewer system sections subject to FOG blockages and establish a cleaning maintenance schedule for each section; and
- (g) Development and implementation of source control measures, for all sources of FOG discharged to the sanitary sewer system, for each section identified in (f) above.

7.1. Public Education Program

The City's FOG Disposal Public Outreach Program includes three main components:

1. Outreach to permitted Food Service Establishments (FSEs) as part of regular annual inspections
2. Distribution of information in conjunction with City utility service billing or in FOG problem areas
3. School Outreach

Examples of informational flyers distributed to the public in the past can be found in **Appendix 11.1**.

The City initiated its school outreach program in late 2004, and visits K through 12 grades in as many as eight classes each year. City Staff typically sends out letters offering the program to all teachers in the

Healdsburg Unified School District twice each year, and the level of participation and number of classes visited depends on teacher response.

The program includes a slide show presentation, a diorama showing the physical aspects of the storm drain and sewer systems, as well as an activities folder. The City provides teachers with in-class materials to prepare the students for the topics presented in the program.

7.2. FOG Disposal

The City maintains a list of known licensed grease haulers that service FSEs located within the City's collection system based on records obtained from the FSE inspection program. The City contacts grease haulers to confirm where the hauler is disposing of grease collected from City of Healdsburg customers. All licensed grease haulers in the service area dispose at either the Santa Rosa or Napa Wastewater Treatment Plants. The City's WRF does not accept hauled grease.

If an FSE reports grease interceptor cleaning/hauling by a grease hauler that is not on the City's list of known providers, the City will contact the company to confirm they are appropriately licensed and are disposing of grease at an appropriately licensed acceptance facility.

7.3. Legal Authority

City Code Section 13.20.440 prohibits "Any water or waste containing floatable grease, oil, fat or ether-soluble matter in excess of 50 parts per million, or dispersed nonfloatable grease, oil, fat or ether-soluble matter other than soap, in excess of 500 parts per million."

City Code Section 13.20.450 states "Grease, oil, and sand interceptors shall be provided by the waste discharger when, in the opinion of the City Engineer, they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand, or other harmful ingredients. All interceptors shall be of a type and capacity approved by the City Engineer, and shall be so located as to be readily and easily accessible for cleaning and inspection."

The City permits and inspects FSEs as part of its mandated Industrial Wastewater Pretreatment Program. This program is established in City Code Section 13.20.380 which states "No person intending to discharge anything except domestic sewage shall make a connection to the sewer system without first applying to and receiving from the office of the City Engineer a permit therefor."

7.4. GRD Installation and Maintenance Requirements

To monitor and control grease in the collection system, the City issues waste discharge permits with grease control provisions to restaurant and FSEs. See **Appendix 7.1** for an example of a FOG Wastewater Discharge Permit. Permits are typically valid for a period of 5 years.

GRD Installation and Design Requirements

The City requires that new Food Service Establishments (FSEs) and existing FSEs being remodeled install GRDs as part of the building permit review and approval process. The City may require existing FSEs that

are found to be discharging FOG excessively in violation of City Code Section 13.20.440 to install grease removal devices. The City of Healdsburg has adopted the California Plumbing Code (CPC), which is strictly applied to all new or remodeled FSEs. Attachment A of the City's standard FOG Wastewater Discharge Permit provides grease interceptor design guidelines that are from Appendix H of the CPC.

Ultimately, Chapter 10 of the CPC serves as the City's design standard for GRDs. Additional design and construction guidelines are provided in Attachment A of the standard FOG Wastewater Discharge Permit.

Typically, newly constructed FSEs will be required to install gravity grease interceptors per CPC Section 1014.3 and Appendix H of the CPC. Where existing or remodeled FSEs are determined to require additional GRDs, the City may consider the use of smaller distributed hydromechanical grease interceptors as described in CPC Section 1014.2.

GRD Maintenance Requirements

Part II of the City's standard FOG Wastewater Discharge Permit requires each permittee to implement minimum best management practices (BMPs) that include the installation of drain screens, the segregated disposal of waste cooking oil, prohibitions against discharge of food waste into the drainage system, dry wiping of greasy pots and pans, and training of employees on FOG disposal methods.

The Permit will specify a minimum GRD cleaning frequency and maximum grease accumulation limit for the permitted device.

FSE Record Retention Requirements

Part III of the City's standard FOG Wastewater Discharge Permit requires permittees to maintain records for a minimum of 2 years for all BMPs implemented and grease disposal activity. Each year, each permittee is required to submit both a BMP self-monitoring report (Attachment B of permit) and GRD Waste Hauling Report (Attachment C of permit) to the City. The required self-submittal of these reports ensures that the operator of each facility is complying with the record keeping requirements and helps the City to target enforcement actions when reports are not received.

7.5. FSE Inspections

The City's Utilities Department maintains a spreadsheet database of all permitted FSEs. All permittees are scheduled for an annual inspection, and the City creates a schedule that distributes the inspections throughout the year. Some permittees may be inspected semi-annually and this can be triggered by any of the following:

- Failure to submit the required self-monitoring reports
- Excessive FOG accumulation noted downstream of the facility
- Private lateral spill or backup
- Poor condition of GRD noted during previous inspection

A copy of the current inspection schedule is provided in **Appendix 7.2** for reference.

When conducting the inspections, the City uses a standard Industrial Discharger Inspection Report that can be filled out using a mobile device. An example is included in **Appendix 7.3**.

A typical inspection includes the following items:

1. Review any changes to ownership, business operations, or wastewater/drain utilities.
2. Inspect each GRD for solids/grease accumulation and review grease hauling records/receipts. Determine if current GRD maintenance schedule appears adequate or if changes to the schedule and permit specifications are warranted.
3. Conduct a non-stormwater discharge inspection to verify that there are not any illicit discharges into the local storm drain system.
4. Determine if any liquid wastes (such as used cooking oil) are being stored on-site and if storage and spill prevention is adequate to prevent an illicit discharge to the storm drain system.

The City maintains on file all previous Industrial Discharger Inspection Reports for each FSE, and also keeps a single running note file for each permittee that provides an abbreviated summary of the results of each FSE inspection that is easier for a City employee to review in order to gain an understanding of previous inspection results and enforcement actions that have occurred going back as far as 2002.

7.6. Enhanced Collection System Maintenance for FOG

Sewer lines that have been subject to increased FOG accumulation are moved into the Enhanced 180-day Cleaning Program (see Section 4.2). Triggers for identifying lines subject to increased FOG accumulation include the following:

- The occurrence of SSOs that are due to FOG based on SSO investigatory CCTV inspection
- The occurrence of private lateral spills or backups due to FOG
- Observations from the City's regular CCTV inspection program that show a high level of FOG accumulation
- Observations of material removed from the line during the City's regular cleaning program

7.7. Source Control Measures

FOG problem areas that are included on the Enhanced 180-day Cleaning Program are typically due to one of the following sources:

1. Food Service Establishments
2. High Density Residential Areas

The City uses the Industrial Pretreatment Inspection and Permitting Program to control FOG from FSEs and its Public Education Program to control FOG from high density residential areas.

Related Appendices

Appendix 6.2 – Water Quality Monitoring Plan

Appendix 7.1 – Industrial Waste Permits

Appendix 7.2 – Industrial Waste Inspection Schedule

Appendix 7.3 – Industrial Waste Inspection Report

8.0. System Evaluation and Capacity Assurance Plan

D.13.(viii) System Evaluation and Capacity Assurance Plan: The Enrollee shall prepare and implement a capital improvement plan (CIP) that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event. At a minimum, the plan must include:

(a) Evaluation: Actions needed to evaluate those portions of the sanitary sewer system that are experiencing or contributing to an SSO discharge caused by hydraulic deficiency. The evaluation must provide estimates of peak flows (including flows from SSOs that escape from the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity) and the major sources that contribute to the peak flows associated with overflow events;

(b) Design Criteria: Where design criteria do not exist or are deficient, undertake the evaluation identified in “a” above to establish appropriate design criteria; and

(c) Capacity Enhancement Measures: The steps needed to establish a short- and long-term capital improvement plan (CIP) to address identified hydraulic deficiencies including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I/I reduction programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.

(d) Schedule: The Enrollee shall develop a schedule of completion dates for all portions of the capital improvement program developed in (a-c) above. This schedule shall be reviewed and updated consistent with the SSMP review and update requirements as described in Section D. 14.

8.1. Hydraulic Capacity Evaluation Process

The City began development of a system-wide GIS-based sewer collection system hydraulic model in 2020 that was based on the City’s existing GIS data which was updated and imported into the Innowyze InfoWorks ICM software platform. The City will be utilizing analysis of the system-wide hydraulic model to develop an updated Sewer System Master Plan including identification of capital improvement projects. An overview of the analysis undertaken using the hydraulic model is provided below. The final Master Plan is anticipated to be completed in the Fall of 2020 and will be added as **Appendix 8.1** when complete.

Flow Monitoring Data Collection and Analysis

In the Winter/Spring of 2020, the City deployed five temporary flow meters distributed throughout the sewer collection system in order to measure sewer flows from the delineated sewer basins upstream of each meter in order to characterize both dry weather and wet weather sewer flows from varying areas

of the City with higher accuracy for the updated hydraulic model. The City also deployed a temporary rain gauge located in the center of town.

The temporary flow meter and rain gauge data is then analyzed along with the City's regularly monitored and collected flow data at the Magnolia Lift Station and the Water Reclamation Facility's permanent rain gauge. An analysis of the temporary wet weather season flow monitoring data is done in order to quantify rain-derived infiltration and inflow (RDII) which enters the sewer collection system during storm events and is a major contributor to peak flows. **Figure 6** below illustrates the analysis of sewer flow meter data which identifies flows from each contributing area during dry weather (i.e. Dry Weather Flow or DWF) and during periods of rainfall. The difference between flows during rainfall and average DWF is equal to the RDII.

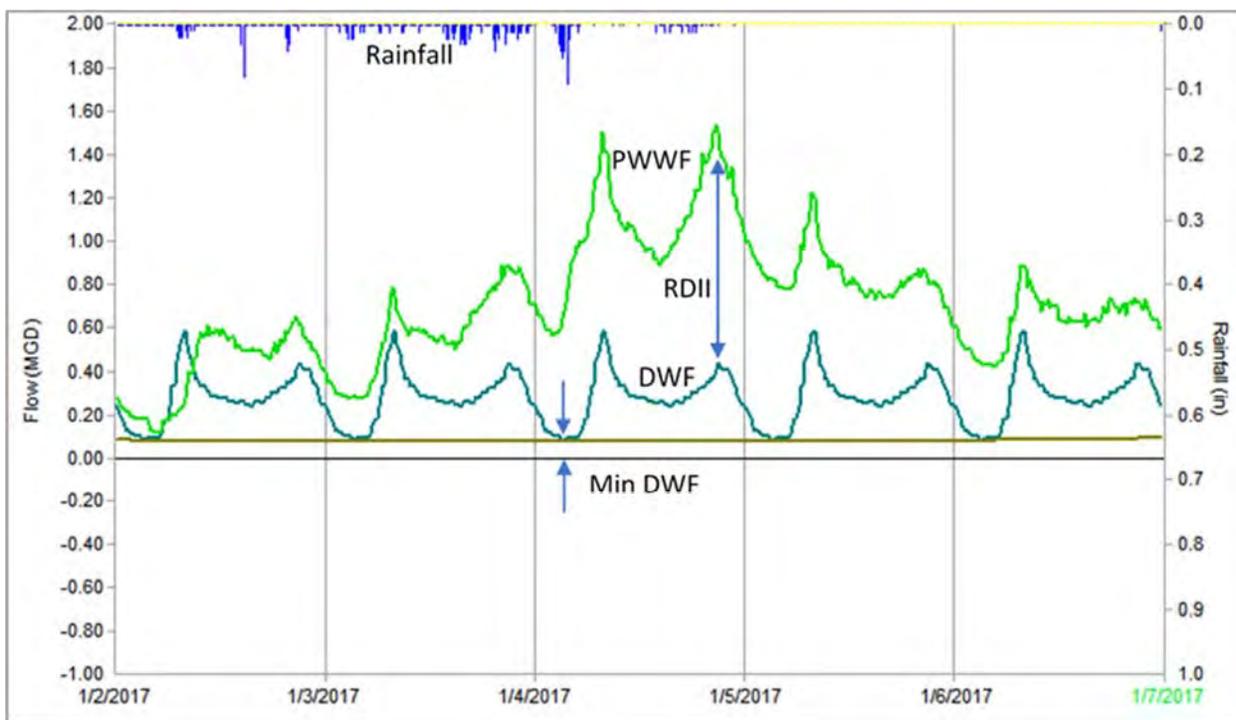


Figure 6 – Sewer Flow Meter Data Analysis

The analysis of flow metering data is conducted utilizing EPA's Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox software to generate I/I hydrographs that can then be scaled up to a specified design storm. SSOAP utilizes a triangular synthetic hydrograph approach called the "RTK" method. R, T, and K are determined for each flow metering area through analysis of the field data collected:

- "R" is the percentage of rainfall that lands on a given analysis area that makes its way into the sewer collection system as I/I, and is the total volume under the unit I/I hydrograph curve
- "T" is the time of the peak flow of the hydrograph
- "K" is the time of the total length of I/I flow generated by a given rainfall amount/duration

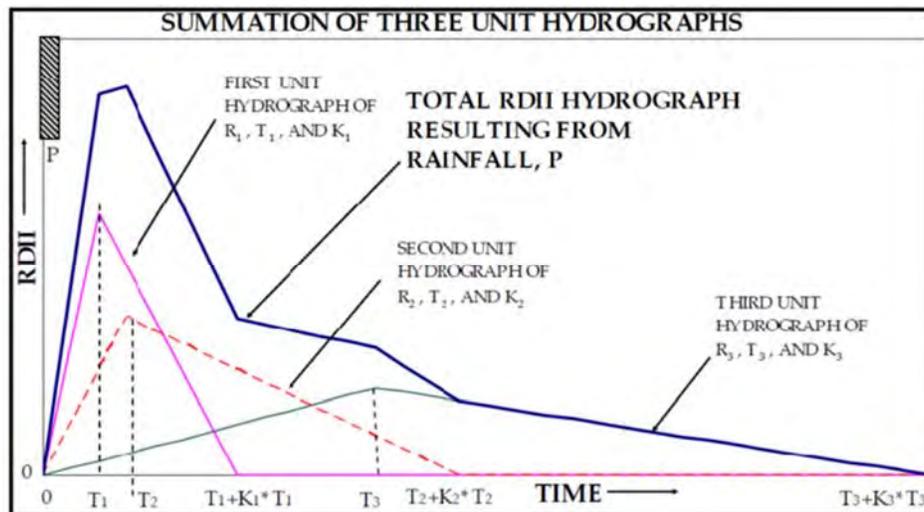


Figure 7 – RDII Hydrograph

The unit hydrograph approach is then used to generate “synthetic” RDII flow curves related to the selected design storm for each monitored area of the system, and the “synthetic” RDII is added to the base DWF in the hydraulic model to simulate conditions during peak wet weather flow (PWWF).

Existing Conditions Hydraulic Model Scenario

Within the InnoVize InfoWorks ICM hydraulic model, multiple “scenarios” are developed. The Existing Conditions Scenario simulates both dry (DWF) and peak wet weather flow (PWWF) in the sewer collection system under the current level of development within the City and is calibrated so that the results of the model closely match flow data that was actually observed as part of the flow monitoring effort.

To load sewer flows into the hydraulic model, the City’s parcel maps are used to develop a database of developed parcels, and sewer flows from each parcel are calculated based on a combination of the City’s design standards for sewer flows as well as analysis of the most recently available flow metering data. A GIS shape file is developed based on the parcel map that creates a point at the centroid of each parcel that contains the calculated sewer flow from that parcel. The GIS-based model is then used to load that sewer flow into the closest manhole in the collection system to that parcel. To calibrate the DWF in the Existing Conditions Scenario, that calculations used to determine flow from each parcel are adjusted until the results of the model best match recorded flow data. To calibrate the PWWF in the Existing Conditions Scenario, the synthetic hydrographs developed using SSOAP are also loaded into the model individually for each area that is flow-monitored, and adjusted until the results of the model are best calibrated with the flow metering data that was collected in the field.

The purpose of the Existing Conditions Scenario is to identify hydraulic capacity deficiencies that may exist currently at PWWF that may require capital improvement projects to ensure that capacity-related SSOs do not occur in the event of a design storm.

Future Conditions Hydraulic Model Scenario

Future Conditions Scenarios are designed to simulate both dry (DWF) and peak wet weather flow (PWWF) in the sewer collection system taking into consideration additional development that will occur in the future such as infill (densification of existing developed areas) and the construction of newly developed areas.

When considering additional sewer flows due to future infill, the City's current General Plan is analyzed to determine the allowable density of housing units per acre for each City-defined land use designation. All parcels within the sewer collection system service area are assumed to be "developed" (i.e. none are vacant). The housing density for each land use designation is adjusted using engineering judgment as it is not realistic to assume that every parcel would develop to the maximum allowable density. The shape file used to load sewer flows into the hydraulic model is updated and the impact of the additional sewer flow can be seen in the hydraulic model results.

Regarding future developments, for the City's 2020 hydraulic model update the following new development areas are being considered, as listed in **Table 10**.

Table 10 – Future Development Areas for 2020 Hydraulic Model Update

Project	General Plan Land Use Designation	New Development Area	Development Project Description
MONTAGE	VLR - Very low density (0-1 units per acre)	204.36	<ul style="list-style-type: none"> • 130 room resort • 70 units (single family)
	PQP - Public/Quasi Public	37.51	<ul style="list-style-type: none"> • Park (36.15 acres) • Fire Substation (0.85 acres) • Pump Station (0.51 acres)
	MHR - Medium High Density Residential (6-10 units per acre)	14.16	<ul style="list-style-type: none"> • up to 150 units (SFR or MFR)
NORTH VILLAGE (COMSTOCK)	MU- Mixed Use (10-16 units per acre)	32.18	<ul style="list-style-type: none"> • 301 residential units (MFR and senior housing) • 108 room hotel • 12,000 SF retail/commercial + ancillary uses

The purpose of the Future Conditions Scenario is to identify hydraulic capacity deficiencies that are triggered by the addition of future development that do not occur under the current level of development. Capital improvement projects that are required to provide additional hydraulic capacity for future development are planned to be constructed in conjunction with those projects and are to be funded by the developers of those projects.

8.2. Hydraulic Capacity Design Criteria

The City's Public Works Standard Specifications provide design requirements for new sanitary sewer collection system piping. The standards generally include the following:

-
- Base sewer flow factors are provided for residential, commercial, and industrial developments
 - Peak sewer flow factors are provided for residential, commercial, and industrial developments
 - Infiltration and Inflow (I/I) is required to be added to peak sewer flow, and an I/I rate is provided for both new and existing sewer lines
 - Manning's Equation is required to be used to determine pipe capacity, minimum Manning's "n" value of 0.013 shall be used
 - Minimum public sewer main size is 8" and cannot be designed to flow surcharged

The City's Public Works Standard Specifications do not include hydraulic design/performance criteria specific to system-wide collection system hydraulic modeling and the identification of hydraulic capacity deficiencies for the purposes of capital improvement planning. The City's design/performance criteria for hydraulic model evaluation of the existing collection system infrastructure are defined below:

1. For the City's Existing Conditions hydraulic model, sewer loads from currently developed parcels are based on the analysis of flow monitoring data, not based on application of the City Standard flows.
2. For the City's Existing Conditions hydraulic model, I/I loads from currently developed parcels are based on the analysis of flow monitoring data and the development of synthetic hydrographs for the Design Storm, not based on application of the City Standard flows.
3. For the City's Future Conditions hydraulic model, additional flows from new and infill development shall be determined based on the City Standard flow factors.
4. The City's Design Storm is the 10-year, 24-hour return period event of 6.47" per NOAA Atlas 14, Volume 6, Version 2. The temporal distribution of the storm is developed per the applicable Soil Conservation Service (SCS) standard distribution.
5. A hydraulic capacity deficiency for the gravity sewer system is defined as any location where the calculated hydraulic grade line at peak wet weather flow associated with the Design Storm is less than 3'-0" below the rim of a manhole.
6. A hydraulic capacity deficiency for a sewer lift station is defined as any lift station where there is not a redundant standby pump available to pump the calculated peak wet weather flow associated with the Design Storm.

8.3. Capacity Enhancement Measures

The City's Sewer System Master Plan (refer to **Appendix 8.1**) summarizes the results of the flow monitoring and hydraulic model analysis. The Master Plan identifies all hydraulic deficiencies (for both Existing Conditions and Future Conditions) and develops planning level capital improvement project descriptions and cost estimates to address each deficiency.

A recommended completion date for each capital improvement project is provided in the Master Plan based on consideration of the following factors:

- Severity of the deficiency and potential volume of an SSO caused by this deficiency
- Proximity of the deficiency to waterways
- Coordination with other City Publics Works projects
- Anticipated pace of development for deficiencies triggered by future growth

Infiltration and Inflow Reduction

Updates to the Sewer System Master Plan may include the collection and analysis of additional temporary flow monitoring conducted at locations strategically selected to identify potential sources of increased infiltration and inflow. The City's Sewer System Master Plan will describe the City's efforts to monitor I/I occurring during storm events and take steps to identify sources of excess I/I that could potentially be eliminated to make additional collection system hydraulic capacity available. I/I reduction strategies that may be employed by the City as defined in the Sewer System Master Plan may include:

- Conducting CCTV during storm events in suspected problem areas to pinpoint I/I sources
- Conducting smoke testing to identify illicit storm drain connections to the SSS
- Performing replacement or lining of pipes identified through CCTV to have excessive I/I through cracks, offset joints, break-in lateral connections, etc.
- Lining of manholes with observed I/I leakage through joints
- Replacement of sewer laterals found to be defective

8.4. Schedule

The City's Sewer System Master Plan will be updated every 5 years coincident with the required 5-year SSMP update and recertification. Whenever an update to the Sewer System Master Plan is completed, the City's 5-year Overall Capital Improvement Program will be updated to include projects identified in the Sewer System Master Plan.

<https://www.ci.healdsburg.ca.us/DocumentCenter/View/9134/COH-FY18-23-Capital-Improvement-Program>

Related Appendices

Appendix 8.1 – Sewer System Master Plan

9.0. Monitoring, Measurement, and Program Modifications

D.13.(ix) Monitoring, Measurement, and Program Modifications: The Enrollee shall:

- (a) Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities;
- (b) Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;
- (c) Assess the success of the preventative maintenance program;
- (d) Update program elements, as appropriate, based on monitoring or performance evaluations; and
- (e) Identify and illustrate SSO trends, including: frequency, location, and volume.

9.1. Maintain Relevant Information

Relevant and accurate data is important for the assessment of performance against goals established by the SSMP and for the formulation of program modifications when necessary. The City maintains a variety of documented information that is used to develop or modify SSMP activities. A summary of the documentation maintained for applicable SSMP elements is provided below:

- Section 4(a) – Mapping:
 - Map Update Log – to document and verify completion of requested GIS map updates
- Section 4(b) – O&M Program:
 - Spreadsheet Based, Transitioning to CMMS - Documentation of all sewer cleaning activities by year and by pipe segment
 - Spreadsheet Based, Transitioning to CMMS - Continuous update of Enhanced 180-day sewer main cleaning schedule for high FOG, root, or debris areas
 - Spreadsheet Based, Transitioning to CMMS - Continuous update of Enhanced 180-day auger list for problematic sewer laterals
 - Spreadsheet Based, Transitioning to CMMS - Documentation of lift station cleaning
 - CMMS (LLumin) – Documentation and scheduling of lift station maintenance work orders.
- Section 4(c) – R&R Program:
 - IT Pipes - CCTV inspection historical database
 - Spreadsheet Based, Transitioning to CMMS – tracking of sewer collection system replacement value and annual spending on rehabilitation and replacement projects
 - 5-year City Capital Improvement Program – Updated with any new identified sanitary sewer collection system rehabilitation projects identified via CCTV
- Section 4(d) – Training Program:
 - Employee Training Documentation

-
- Section 4(e) – Replacement Parts Inventory:
 - Spreadsheet Based – Gravity Sewer Spare Parts and Tool Inventory
 - CMMS (LLumin) – Lift Station Spare Parts Inventory
 - Mitchell1 – Fleet Maintenance Tracking Software
 - Section 5 – Design and Performance Provisions:
 - Plan Review and Public Works Inspection records for new construction
 - Section 6 – Overflow Emergency Response Plan
 - SSO Reports Submitted via CIWQS
 - Internal City Sanitary Sewer Overflow Field Reports (OERP Appendix C)
 - SSO Collection System Failure Analysis Report (OERP Appendix F)
 - Section 7 – FOG Control Program
 - Public outreach materials used or developed
 - List of known licensed grease haulers
 - FSE permit inspection schedule
 - FSE inspection Industrial Discharger Inspection Reports
 - FSE self-monitoring BMP implementation and GRD maintenance reports
 - Section 8 – System Evaluation and Capacity Assurance
 - Magnolia Lift Station flow data
 - Wastewater Reclamation Facility rain gauge data
 - Temporary sewer flow monitoring data
 - Temporary rain gauge data
 - GIS-based sewer collection system hydraulic model results
 - Sewer System Master Plan

9.2. Measure SSMP Element Effectiveness

The City has established performance indicators relative to specific SSMP activities that can be quantitatively measured. Performance indicators are developed to provide the City a means by which to monitor its performance in effectively executing SSMP programs. Each key performance indicator (KPI) is tracked by a responsible person who documents specific statistics and ensures that adequate data is being collected to evaluate performance. The responsible person is an employee that is naturally involved with the collection or use of the data required to track the performance indicator to ensure effective and accurate data collection and tracking.

The City's KPI tracking summary is shown in **Appendix 9.1**.

Each responsible person will collect the necessary information and enter the calculated KPI value into the overall tracking sheet during each SSMP audit. The Key Performance Indicator Tracking Sheet will be collected by one of the LROs and reviewed to assist in the completion of the mandatory internal audit. SSMP activities will be evaluated during the audit and revisions to the SSMP will be made at that time.

9.3. PM Program Assessment

The success of the preventative maintenance program is based on the completion of established numerical goals for regular and enhanced (180-day) preventative sewer cleaning and CCTV inspection. If the City falls short of the established goals in any given year, the City will determine if additional staffing is required in order to ensure completion of the goals for the following year.

9.4. Update SSMP Program Elements

As part of the biennial SSMP Audit, all KPIs are reviewed, and specific recommendations are made by one of the City's LROs to address poor performance compared to established numerical goals. It is during the auditing process that potential updates to program elements are identified and documented in the audit. Physical changes to the SSMP text will be made at a minimum of every 5 years which may include but is not limited to the following:

- Detailed efforts to increase funding or staffing
- Changes to the cleaning, CCTV inspection, or FOG programs (i.e. procedural changes, changes to work production levels, modifications to documentation methods, etc.)
- Updates to CIP prioritization and funding processes
- Changes to OERP protocols
- Additions or modifications to the Ordinance Code or Improvement Standards
- Changes in hydraulic modeling methods or priorities, etc.

Any major changes to SSMP elements or programs will be presented to the Board of Supervisors, and approval gained for budgetary or staffing impacts resulting from program modifications. The City also maintains a record of any SSMP updates made between SSMP recertifications, found in **Appendix 9.2**.

9.5. SSO Analysis

As a required part of each SSMP Audit, SSO events are analyzed in detail to identify key information such as frequency, location, cause, and volume. These trends are illustrated in order to determine causation that may be addressed through adjustment of the preventative maintenance program. The City's FY 2015-2019 Audit provides a defined template for future SSMP Audits.

Related Appendices

Appendix 9.1 – Key Performance Indicators (KPI)

Appendix 9.2 – SSMP Change Log

10.0. SSMP Program Audit

D.13.(x) SSMP Program Audits - As part of the SSMP, the Enrollee shall conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the Enrollee's compliance with the SSMP requirements identified in this subsection (D.13.), including identification of any deficiencies in the SSMP and steps to correct them.

Evaluation of established key performance indicators (KPIs), described in SSMP Section 9, forms the basis for the audit process. The KPIs are used to determine if programs are being implemented as planned. The KPI tracking and evaluation process can be used to determine if the necessary resources are in place for successful execution of key programs and activities. The KPI tracking results are reviewed by the City's LROs as described in SSMP Section 9. The results are intended to be used to guide decision making regarding modifications and updates to SSMP programs that are deemed necessary.

During each SSMP audit, it will be determined if all recommendations from the previous audit have been implemented, and if not, a course of action will be identified to ensure implementation over the next audit period.

The City's FY 2015-2019 Audit (found in **Appendix 10.1**) provides a defined template for future SSMP Audits.

Related Appendices

Appendix 10.1 – SSMP Audit FY 15/16 – FY 18/19

11.0. Communication Program

D.13.(xi) Communication Program. The Enrollee shall communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input to the Enrollee as the program is developed and implemented.

The Enrollee shall also create a plan of communication with systems that are tributary and/or satellite to the Enrollee's sanitary sewer system.

11.1. Communication with the Public

The City maintains a web page specific to the SSMP:

<https://ci.healdsburg.ca.us/446/Sewer-System-Management-Plan>

The SSMP webpage allows the public to download the entire contents of the most recent version of the City's SSSMP, and also includes an email link that can be used by the public to submit comments on the SSMP to the City.

The City's SSMP webpage includes a link from the City's website to the State Water Resources Control Board CIWQS SSO Public Reports website and the City will be publicizing the updating of the City's SSMP and the City's SSMP webpage to members of the public through a City billing insert notification in 2020. Additionally, the City's SSMP webpage includes contact information for the City's Utility Trouble Hotline which is used for the public to report SSOs which is available 24-hours, 7 days per week.

11.2. Communication with Tributary Systems

The City does not have any tributary or satellite systems to the City's main sewer collection system.

Related Appendices

Appendix 11.1 – Public Awareness Program Materials

Appendix 2.1 – SSMP Element Responsible Personnel

SSMP Element Responsible Personnel

SSMP Element	Sub-section	Responsible Party (Position)	Responsible Party (Name)	Phone Number
1 – Goals		Utility Engineering Manager	Patrick Fuss	(707) 271-3218
2 – Organization	a,b,c	Utility Engineering Manager	Patrick Fuss	(707) 271-3218
3 – Legal Authority	a,b,c,d,e	Public Works Director	Larry Zimmer	(707) 431-3346
4 – O&M Program	a-Mapping	Public Works Maintenance Superintendent	Jarrod Dericco	(707) 431-3346
	b-PM	Public Works Maintenance Superintendent Water/Wastewater Ops Superintendent	Jarrod Dericco Rob Scates	(707) 431-3346 (707) 431-3369
	c-CCTV	Public Works Maintenance Superintendent	Jarrod Dericco	(707) 431-3346
	c-CIP	Senior Civil Engineer – Capital Improvements	Clay Thistle	(707) 431-3346
	d-Training	Safety Coordinator	New Position 2020	New Position 2020
	e-Inventory	Utility Technician Records Technician / Storekeeper	Tyler Kettmann Rosa Gutierrez	(707) 431-3342 (707) 431-3330
5 – Design & Performance Provisions	a-standards	Senior Civil Engineer – Development	Curt Bates	(707) 431-3346
	b-inspection	Senior Public Works Inspector	Selena Dixon	(707) 431-3346
6 – Overflow Emergency Response Program	a-notification	Water/Wastewater Ops Superintendent Wastewater Operations Foreman	Rob Scates David Hambly	(707) 431-3369 (707) 473-4479
	b-response	Wastewater Operations Foreman Public Works Maintenance Superintendent	David Hambly Jarrod Dericco	(707) 473-4479 (707) 431-3346
	c-reporting	Water/Wastewater Ops Superintendent Wastewater Operations Foreman	Rob Scates David Hambly	(707) 431-3369 (707) 473-4479
	d-training	Wastewater Operations Foreman Public Works Maintenance Superintendent	David Hambly Jarrod Dericco	(707) 473-4479 (707) 431-3346
	e-emergency ops	Wastewater Operations Foreman Public Works Maintenance Superintendent	David Hambly Jarrod Dericco	(707) 473-4479 (707) 431-3346
	f-water quality	Water/Wastewater Ops Superintendent	Rob Scates	(707) 431-3369
7 – FOG Control Program	a-public education	Administrative Specialist	Kelly Casey	(707) 431-3493
	b-FOG disposal	Administrative Specialist	Kelly Casey	(707) 431-3493
	c-legal authority	Public Works Director	Larry Zimmer	(707) 431-3346
	d-permits	Water/Wastewater Ops Superintendent	Rob Scates	(707) 431-3369
	e-inspections	Wastewater Operations Foreman	David Hambly	(707) 473-4479
	f-hot spots	Public Works Maintenance Superintendent	Jarrod Dericco	(707) 431-3346
	g-source control	Administrative Specialist	Kelly Casey	(707) 431-3493
8 – System Evaluation and Capacity Assurance	a-hydraulic model	Utility Engineering Manager	Patrick Fuss	(707) 271-3218
	b-hydraulic criteria	Utility Engineering Manager	Patrick Fuss	(707) 271-3218
	c-CIPs	Senior Civil Engineer – Capital Improvements	Clay Thistle	(707) 431-3346
	d-schedule	Senior Civil Engineer – Capital Improvements	Clay Thistle	(707) 431-3346

9 – Monitoring, Measurement, and Program Modifications	a,b,c,d,e	Utility Engineering Manager	Patrick Fuss	(707) 271-3218
10 – SSMP Program Audits		Utility Engineering Manager	Patrick Fuss	(707) 271-3218
11 – Communication		Administrative Specialist	Kelly Casey	(707) 431-3493

Updated: 02/01/2020

Appendix 4.1 – Sewer System Map

City of Healdsburg Sewer System Map

February 2020

Legend

Sewer Features

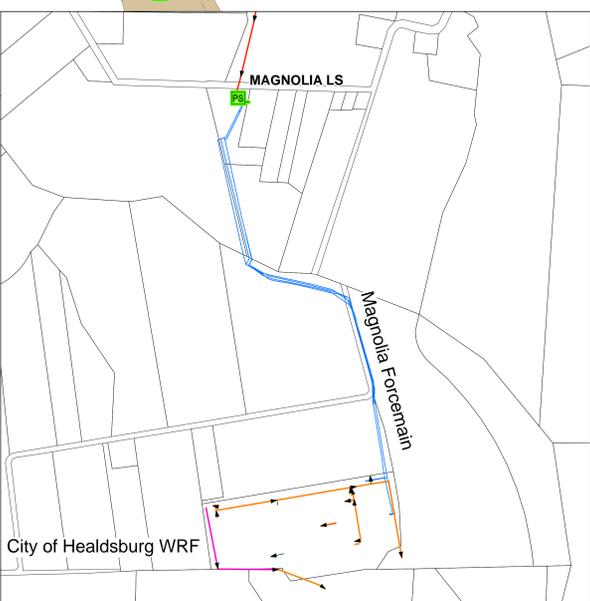
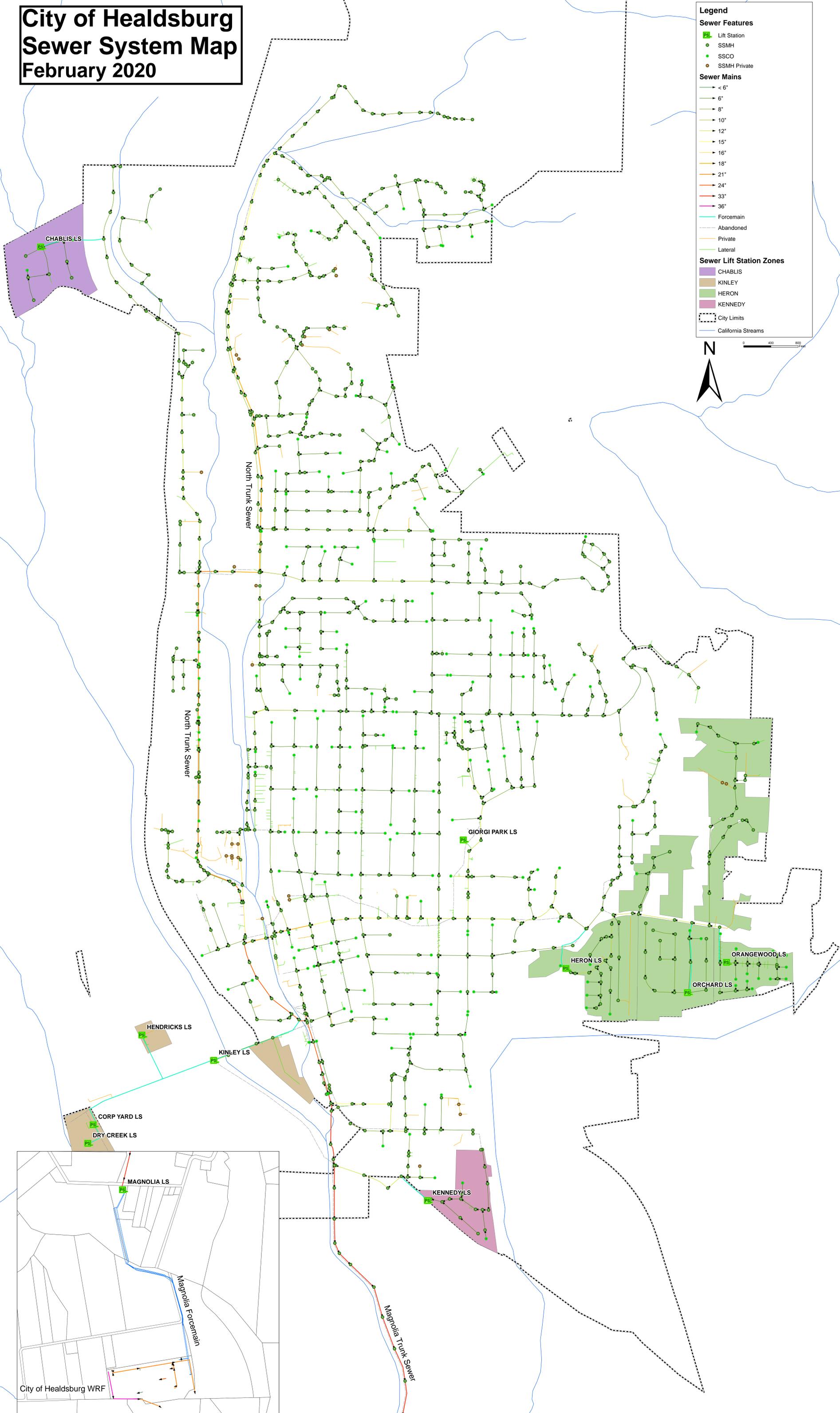
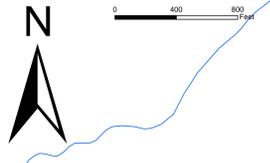
- PS Lift Station
- SSMH
- SSCO
- SSMH Private

Sewer Mains

- < 6"
- 6"
- 8"
- 10"
- 12"
- 15"
- 16"
- 18"
- 21"
- 24"
- 33"
- 36"
- Forcemain
- Abandoned
- Private
- Lateral

Sewer Lift Station Zones

- CHABLIS
- KINLEY
- HERON
- KENNEDY
- City Limits
- California Streams



See Inset to Left

Appendix 4.2 – Example Preventative Cleaning Documentation Forms



Sunnyvale

**Sewer Maintenance - Ongoing 3yr Cleaning
Field Evaluation**

Main Location	Manhole to Manhole	Feet	F,R,O,G	Grit	Roots	Date	Initials	Comments
243 Pheasant	536 to CO	201	0	1	0	03/27/18	AE/VH	
Rosewood @ Pheasant	591 to 536	410	0	1	0	03/27/18	AE/VH	
Rosewood @ Pheasant	591 to CO	212	0	0	0	03/27/18	AE/VH	
222 Solar	577 to CO	206	0	0	0	03/27/18	AE/VH	
Solar @ Rosewood (N)	586 to 591	266	1	0	0	03/27/18	AE/VH	
Solar @ Rosewood (E)	586 to 577	63	0	0	0	03/27/18	AE/VH	
201 Solar	608 to 586	193	0	1	0	03/27/18	AE/VH	
303 Sunnyvale	528 to CO	171	0	0	0	03/27/18	AE/VH	
Sunnyvale @ Lupine	531 to CO	197	0	0	0	03/27/18	AE/VH	
Sunnyvale @ Lupine	531 to 528	93	0	0	1	03/27/18	AE/VH	
222 Sunnyvale	572 to 531	314	0	0	0	03/27/18	AE/VH	
Sunnyvale @ Spruce (N)	610 to 608	299	0	0	0	03/27/18	AE/VH	
Sunnyvale @ Spruce (E)	610 to 572	309	0	0	0	03/27/18	AE/VH	
Sunnyvale @ Alley 6	625 to 610	168	1	0	0	03/27/18	AE/SN	
Sunnyvale @ Alley 6	625 to CO	215	0	0	0	04/02/18	AE/SN	
Alley 6	948 to 625	278	0	0	0	08/31/18	CW/BM	
Terrace to Alley 6	626 to 948	280	0	1	0	08/31/18	CW/BM	
Terrace @ Alley 6	626 to 609	165	0	1	0	08/31/18	CW/BM	
111 Terrace	1076 to 626	15	0	0	0	08/31/18	CW/BM	
111 Terrace	1075 to 1076	10	0	0	0	08/31/18	CW/BM	
Total		4,065						

Condition Rating 0 good conditions, small amounts of debris 1 medium amounts of debris 2 heavy debris, impending blockage
--

Additional Notes

Red Indicates Drop Inlet



180 day Sewer Lateral Auger Maintenance

Main Location	Issue/Problem	Grease	Grit	Roots	Auger/Jet	Date	Initials
522 Johnson St	Roots to main						
716 Johnson St	Roots/Belly						
555 Matheson St	Roots						
717 Brown St.	Roots/Grease						
433A Healdsburg Ave	Roots/Belly						
435 Healdsburg Ave	Offset/Belly						
426 Fitch St.	Roots						
555 Manor Ct	Roots						
754 Rose Ln	Roots						
761 Rose Ln	Roots						
215 Center St	Roots/Belly						
406 Grant St	Roots/Belly						
410 Grant St	Roots						
219 Piper St	Roots/Belly						
406 Piper St	Roots/Belly						
401 Grove St	Belly						
743 Johnson St	Roots						
304 North St	Roots						

<p>Condition Rating</p> <p>0 No Debris</p> <p>1 good conditions, small amounts of debris</p> <p>2 medium amounts of debris</p> <p>3 heavy debris, impending blockage</p> <p>Auger/HydroJet (Y or N)</p>

Additional Notes



July

Lift Station Maintenance

Main Location	Manhole to Manhole	Feet	Grease	Grit	Roots	Date	Initials
Chablis	Wet well to 785	11					
	Wet Well	30 Deep					
Kinley	354 to Wet Well	43					
	Wet Well	20 Deep					
Corp Yard O&M	Wet Well	9 Deep					
Corp Yard Wash Rack	Wet Well	6 Deep					
Hendricks	Wet Well to CO	171					
	Wet Well to CO	6 Deep					

Condition Rating
 0 good conditions, small amounts of debris
 1 medium amounts of debris
 2 heavy debris, impending blockage

Comments

Appendix 4.3 – 2018 Lift Station Survey



Satellite Lift Stations Survey

2018

Prepared in compliance with Sanitary Sewer Management Plan audit and update

Rob Scates, Water & Wastewater Operations Superintendent
Patrick Fuss, Water & Wastewater Principal Engineer
David Hambly, Wastewater Operations Foreman

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Kennedy Lift Station.....	16
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Hendricks Lift Station.....	29
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Introduction

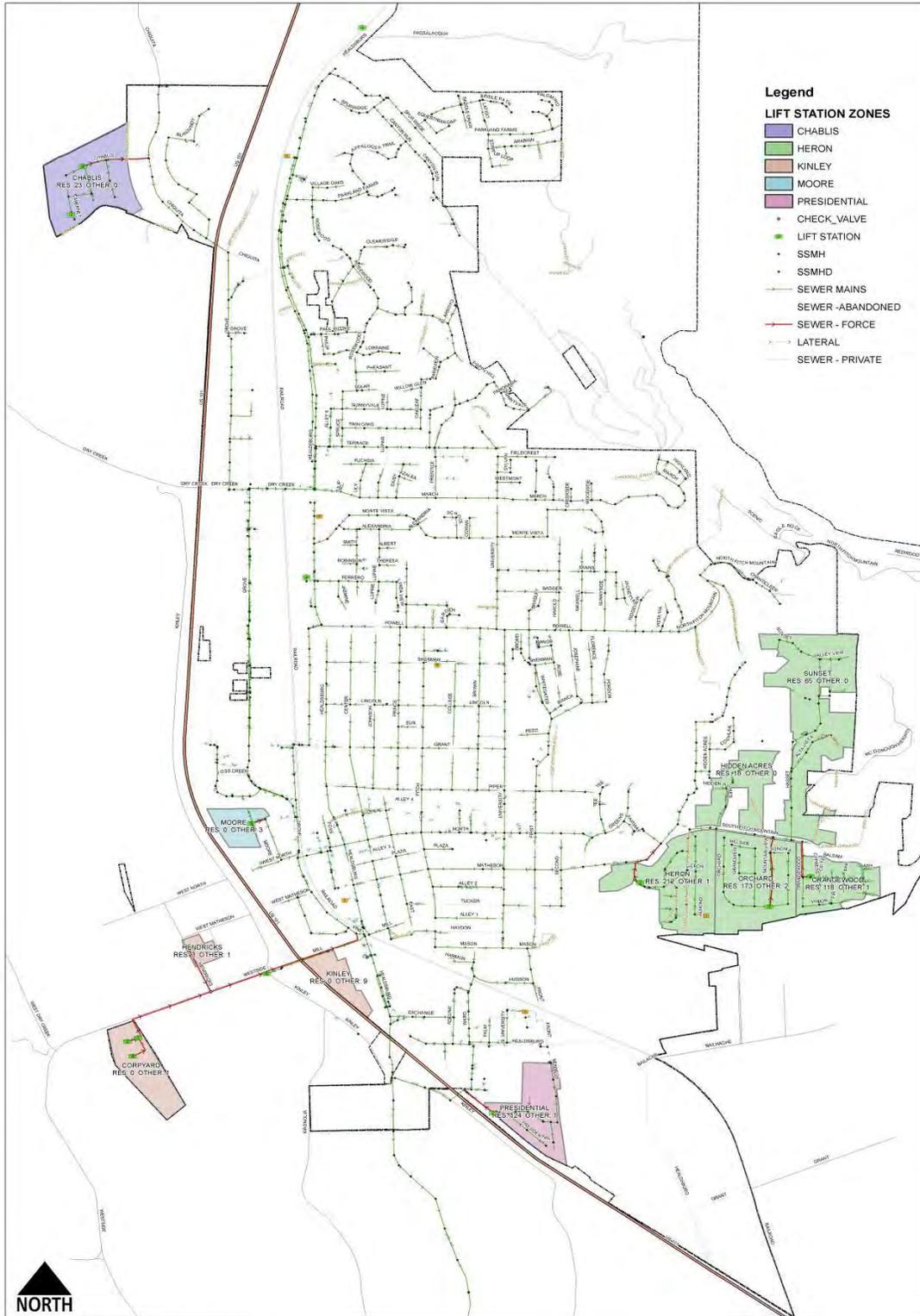
In 2018, the Wastewater Division of the Municipal Utilities Department completed an overall survey of the wastewater collection system satellite lift stations. The following is a current assessment of each lift station, condition, equipment identification, and recommended maintenance for each site.

Project Description

This report includes current information including the following:

- Overview schematic of lift station zones
- photos of each lift station
- documentation of wet wells
- pumps
- additional equipment pertinent to the function of each site

Overall Lift Station Map



City of Healdsburg
 Areas Served by Sanitary Sewer Lift Stations

Lift Stations

Heron Lift Station



Control Panel: C-Moore Micro Operator Interface. Direct Logic DL-06 Programmable Logic Controller

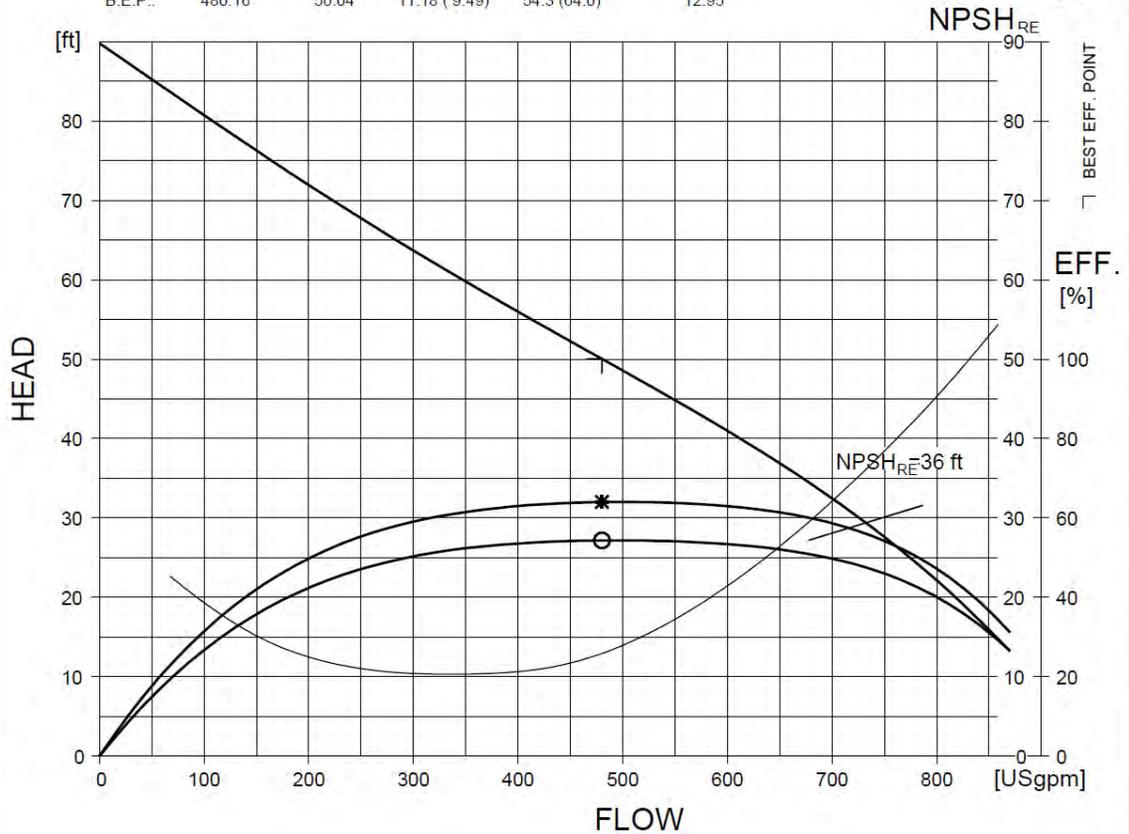
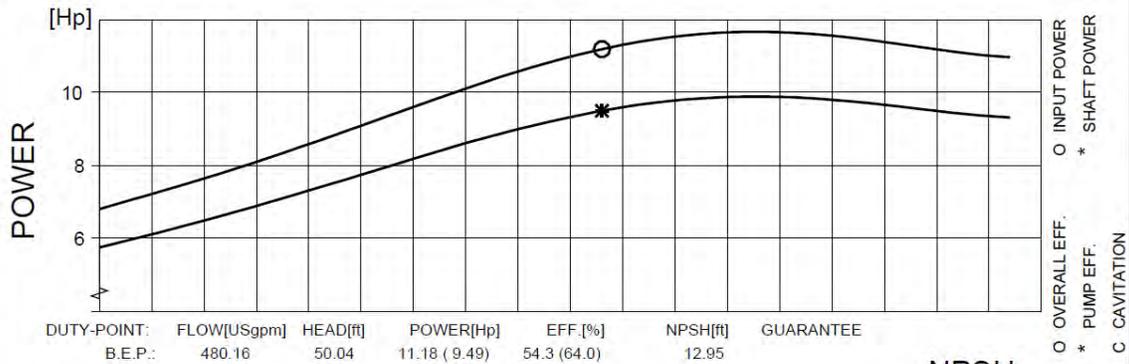
Power: 3 phase, with connection for mobile generator in the event of a utility power outage

Lid: aluminum and in good condition

Pumps: #1 - Flygt 3127, 10 HP, 230V, 3~, 1750 RPM, 488 impeller
#2 - Flygt 3127, 10 HP, 230V, 3~, 1750 RPM, 488 impeller

Spare pumps: 2, shared with Chablis, stored in Pump Shop at the WRF

		PERFORMANCE CURVE		PRODUCT CP3127.180		TYPE HT	
DATE 2008-01-25		PROJECT		CURVE NO 63-483-00-3755		ISSUE 3	
POWER FACTOR		1/1-LOAD	3/4-LOAD	1/2-LOAD	RATED POWER	IMPELLER DIAMETER	
EFFICIENCY		0.89	0.87	0.81	10.0 Hp	228 mm	
MOTOR DATA		---	---	---	STARTING CURRENT ... 64 A	MOTOR #	STATOR
COMMENTS		INLET/OUTLET		RATED CURRENT ... 13 A	1735 rpm	21-12-4AL	12YSER
		- /100 mm		TOT. MOM. OF INERTIA ... 0.12 kgm2	60 Hz	3	460 V
		IMP. THROUGHLET		NO. OF BLADES ... 1	GEARTYPE	RATIO	
		76 mm			---	---	



Performance with clear water and ambient temp 40 °C

CURVE

Bypass: 3” pump capability with cam-lock fittings

Chains: stainless steel and in good condition

Guide Bars: galvanized and in good condition

Safety Grate: aluminum and in good condition

Hooks: stainless steel and in good condition

Floats: redundant with transducer; pump start, pump stop, and high level alarm

Pumping Levels: high 6.5’, low 0.5’

Transducer: PTX 1290 Series (GE) 0-15 psi

Communications: Radio to SCADA via Substation, Sunset Tank, and WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 6,388 gallons

Wet well capacity: diameter 8.0’ x depth 17.0’

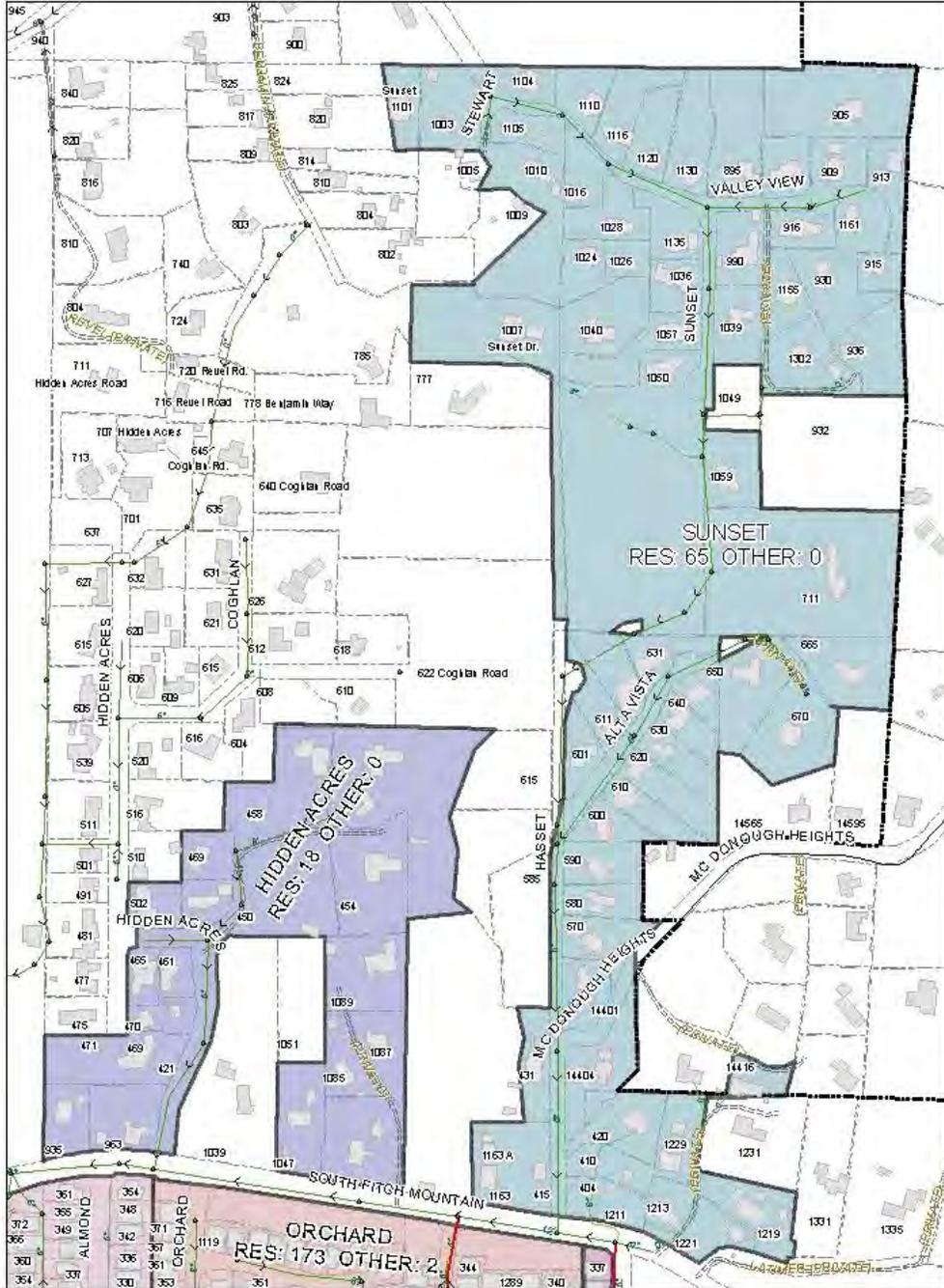
Customer connections: 212 residential units, 1 other (non-residential) unit

Note: Heron Lift Station collects wastewater from other lift stations and residential units as noted on the overall lift station map.

- Orchard Lift Station 173 residential units, 2 other (non-residential) units
- Orangewood Lift Station 118 residential units, 1 other (non-residential) unit
- Hidden Acres region 18 residential units
- Sunset region 65 residential units

Total of 586 residential units and 4 other (non-residential) units

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Healdsburg
Sunset 17 Hidden Acres



Orchard Lift Station



Control Panel: C-Moore Micro Operator Interface. Direct Logic DL-06 Programmable Logic Controller. Schneider Electric Phase Converter Variable Frequency Drives

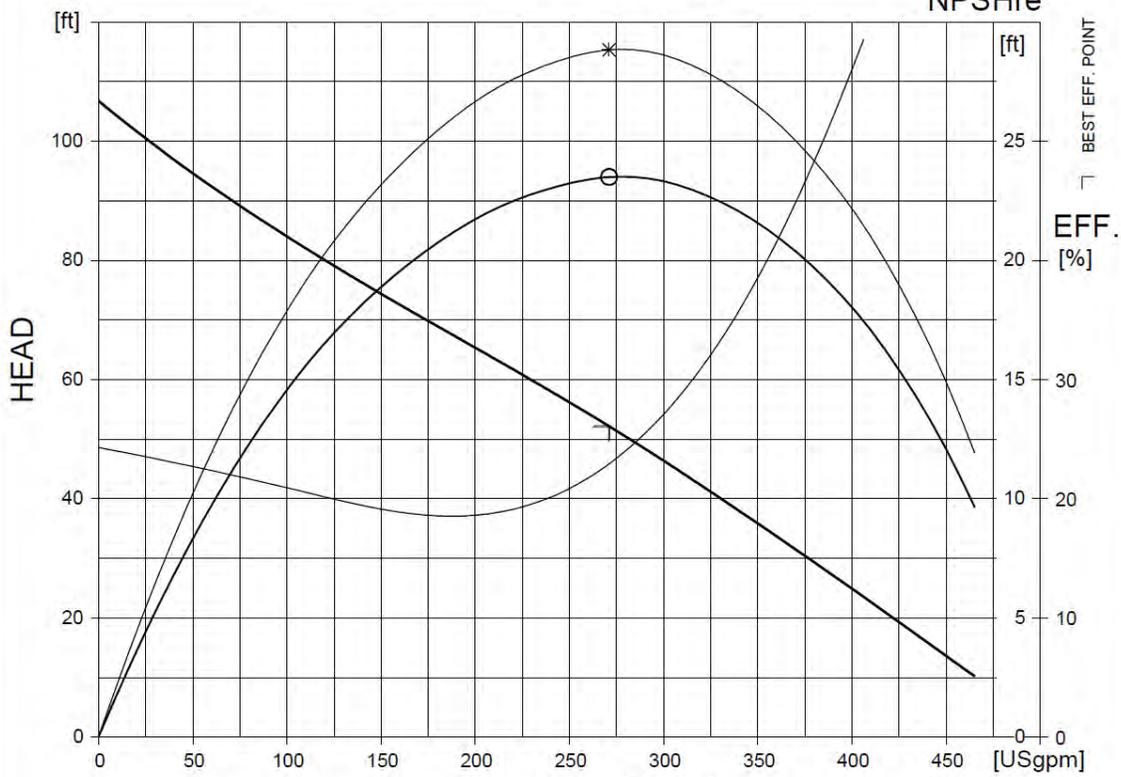
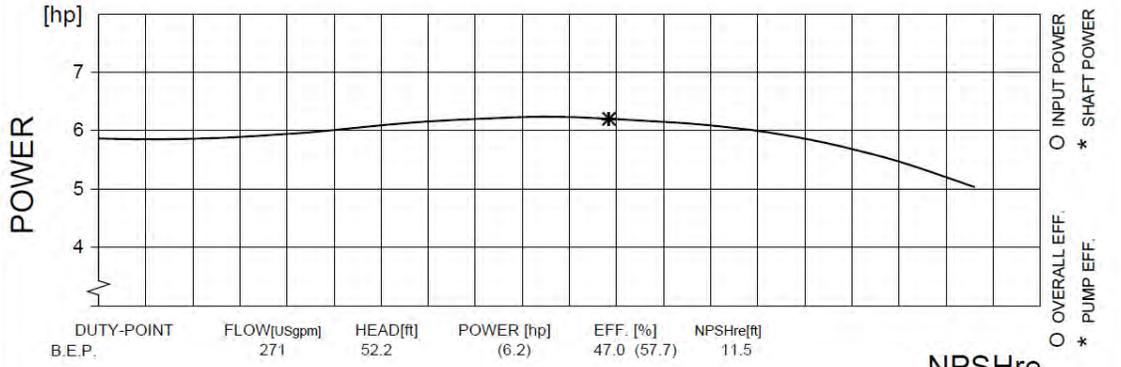
Power: 1 phase, with connection for mobile generator in the event of a utility power outage

Lid: iron and in good condition

Pumps: #1 - Flygt 3102, 5 HP, 230V, 3~, 3450 RPM, 434 impeller
#2 - Flygt 3102, 5 HP, 230V, 3~, 3450 RPM, 434 impeller

Spare pumps: 2, shared with Kinley & Kennedy, stored in Pump Shop at the WRF

		PERFORMANCE CURVE		PRODUCT	TYPE
DATE		PROJECT		NP3102.181	SH
2010-08-02		FLYGT US Catalog		CURVE NO	ISSUE
				63-256-00-5206	7
POWER FACTOR	1/1-LOAD	3/4-LOAD	1/2-LOAD	RATED POWER	IMPELLER DIAMETER
EFFICIENCY	0.94	0.94	0.91	6.5 hp	135 mm
MOTOR DATA	79.0 %	80.0 %	79.0 %	STARTING CURRENT	MOTOR #
COMMENTS	---	---	---	133 A	18-10-2AL
				RATED CURRENT	STATOR
				19 A	68D
				RATED SPEED	REV
				3445 rpm	10
				TOT.MOM.OF INERTIA	FREQ.
				0.0096 kgm2	60 Hz
				NO. OF BLADES	PHASES
				2	3
					VOLTAGE
					200 V
					POLES
					2
					GEARTYPE
					RATIO



NPSHre = NPSH3% + min. operational margin
 Performance with clear water and ambient temp 40 °C

	CURVE
--	--------------

Bypass: 3” pump capability with cam-lock fittings

Chains: stainless steel and in good condition

Guide Bars: galvanized and in good condition

Safety Grate: aluminum and in good condition

Hooks: stainless steel and in good condition

Floats: high level pump start and high-high level alarm

Pumping Levels: high 4.5’, low 0.7’

Transducer: PTX 1290 Series (GE) 0-15 psi

Communications: Radio to SCADA via Sunset Tank and WRF

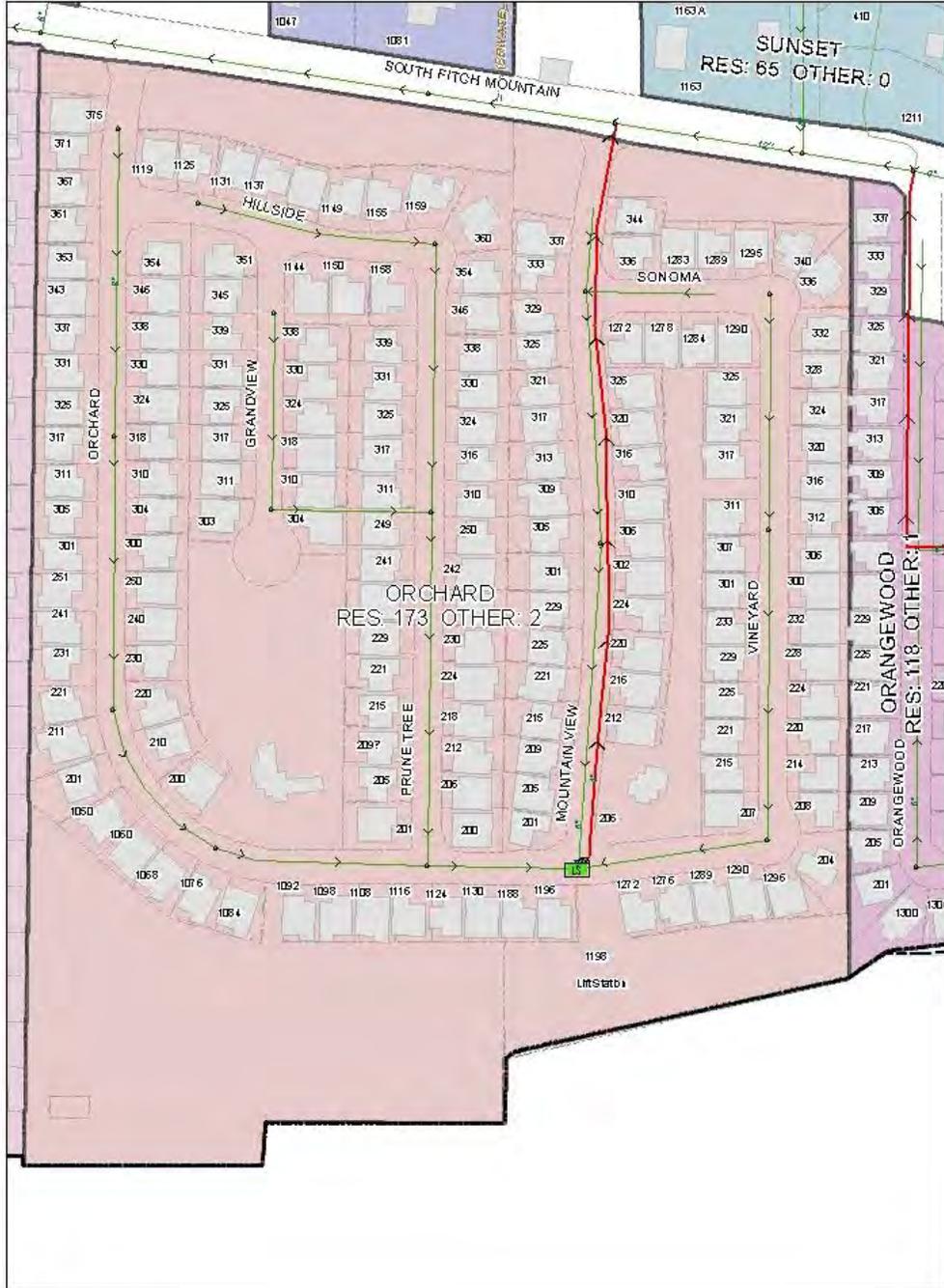
- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 2,202 gallons

Wet well capacity: diameter 5.0’ x depth 15.0’

Customer connections: 173 residential units, 2 other (non-residential) units

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Heidelberg
Mountain View



Orangewood Lift Station



Control Panel: C-Moore Micro Operator Interface. Direct Logic DL-06 Programmable Logic Controller

Power: 1 phase, with connection for mobile generator in the event of a utility power outage

Lid: aluminum and in good condition

Pumps: #1 - Flygt 3102, 3.9 HP, 230V, 1~, 1750 RPM, 434 impeller
#2 - Flygt 3102, 3.9 HP, 230V, 1~, 1750 RPM, 434 impeller

Spare pumps: 2, stored in Pump Shop at the WRF

Bypass: 3” pump capability with cam-lock fittings

Chains: stainless steel and in good condition

Guide Bars: galvanized and in good condition

Safety Grate: epoxy coated steel and in good condition

Hooks: stainless and in good condition

Floats: high level pump start and high-high level alarm

Pumping Levels: high 5.5’, low 0.5’

Transducer: PTX 1290 Series (GE) 0-15 psi

Communications: Radio to SCADA via Sunset Tank and WRF

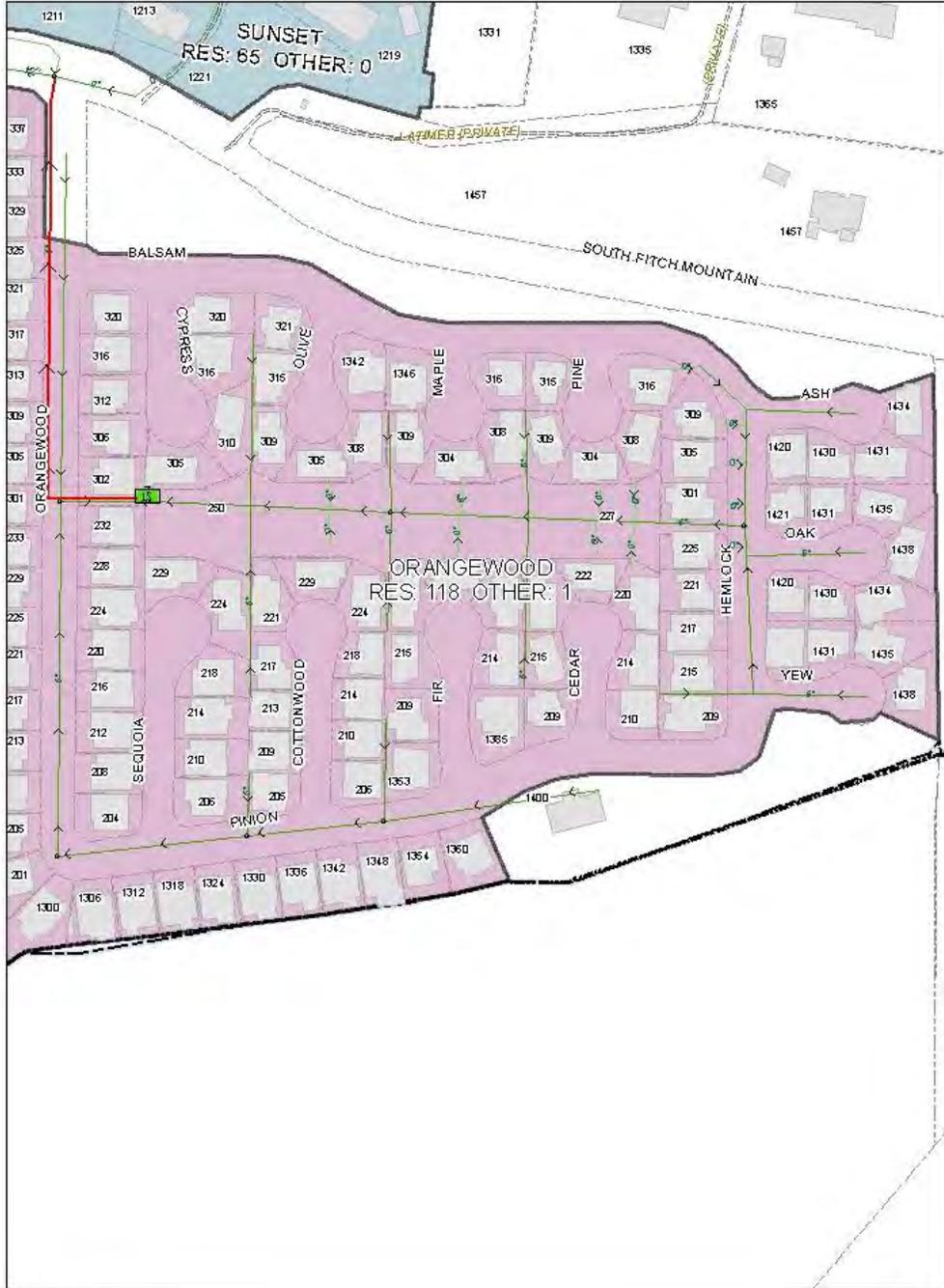
- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 1,908 gallons

Wet well capacity: diameter 5.0’ x depth 13.0’

Customer connections: 118 residential units, 1 other (non-residential) unit

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Healdsburg
Oranewood



Kennedy Lift Station



Control Panel: C-Moore Micro Operator Interface. Direct Logic DL-06 Programmable Logic Controller

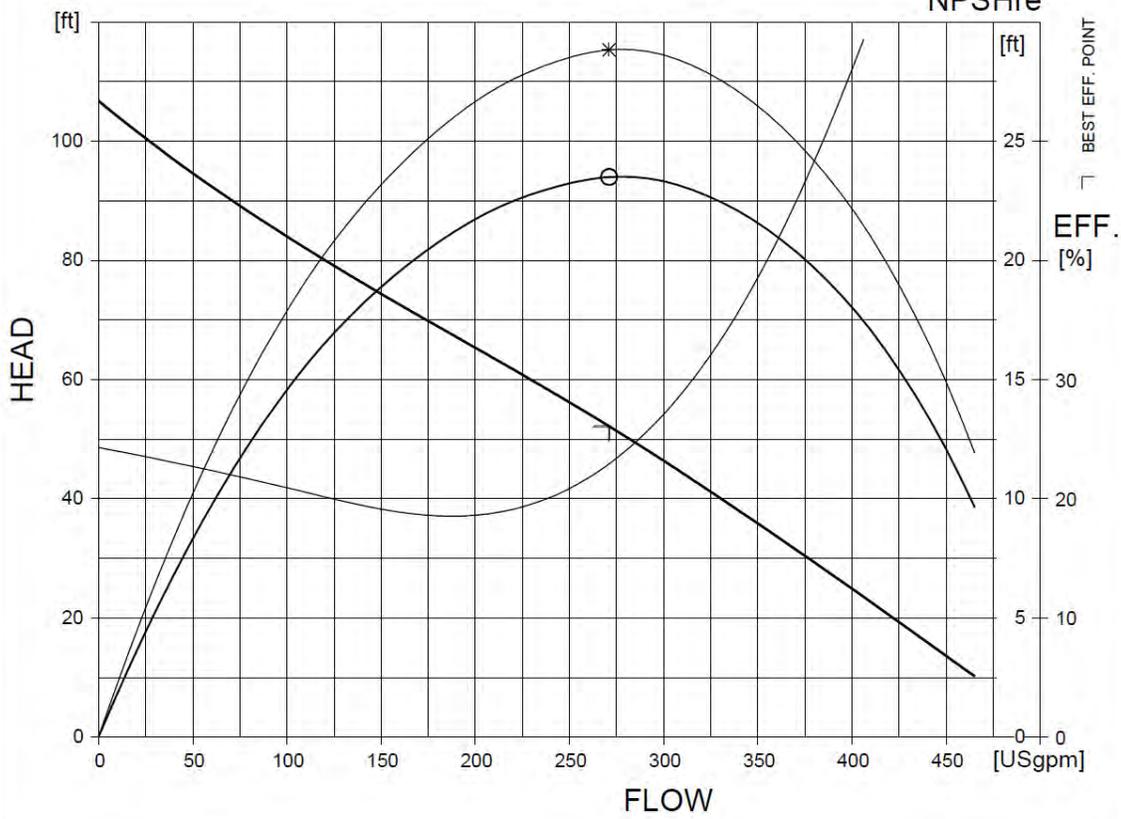
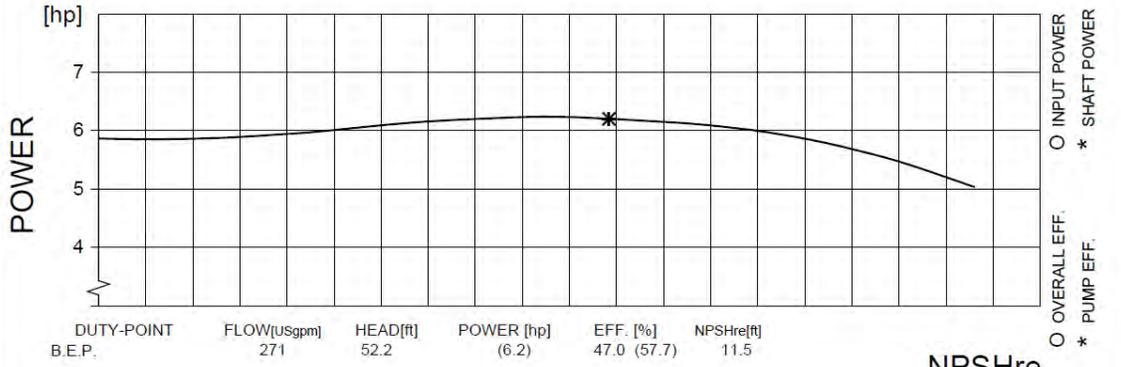
Power: 3 phase, with connection for mobile generator in the event of a utility power outage

Lid: aluminum and in good condition

Pumps: #1 - Flygt 3102, 5 HP, 230V, 3~, 3450 RPM, 434 impeller
#2 - Flygt 3102, 5 HP, 230V, 3~, 3450 RPM, 434 impeller

Spare pumps: 2, shared with Kinley & Orchard, stored in Pump Shop at the WRF

		PERFORMANCE CURVE		PRODUCT	TYPE
DATE		PROJECT		CURVE NO	ISSUE
2010-08-02		FLYGT US Catalog		63-256-00-5206	7
POWER FACTOR	1/1-LOAD	3/4-LOAD	1/2-LOAD	RATED POWER	IMPELLER DIAMETER
EFFICIENCY	0.94	0.94	0.91	6.5 hp	135 mm
MOTOR DATA	79.0 %	80.0 %	79.0 %	STARTING CURRENT	MOTOR #
COMMENTS	---	---	---	133 A	18-10-2AL
NEMA Code Letter: H	INLET/OUTLET			RATED CURRENT	STATOR
	- / 3.0 inch			19 A	68D
IMP. THROUGHLET			RATED SPEED	REV	
---			3445 rpm	10	
			TOT.MOM.OF INERTIA	FREQ.	PHASES
			0.0096 kgm2	60 Hz	3
			NO. OF BLADES	VOLTAGE	POLES
			2	200 V	2
				GEARTYPE	RATIO
				---	---



NPSHre = NPSH3% + min. operational margin
 Performance with clear water and ambient temp 40 °C

CURVE

Bypass: 3” pump capability with cam-lock fittings

Chains: stainless steel and in good condition

Guide Bars: galvanized and in good condition

Safety Grate: aluminum and in good condition

Hooks: stainless steel and in good condition

Floats: high level pump start and high-high level alarm

Pumping Levels: high 7.0’, low 1.0’

Transducer: WIKA SL 0-15 psi

Communications: Radio to SCADA via Sunset Tank and WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 5,285 gallons

Wet well capacity: diameter 6.0’ x depth 25.0’

Customer connections: 124 residential units, 1 other (non-residential) unit

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Healdsburg
 Presidential



Kinley Lift Station



Control Panel: C-Moore Micro Operator Interface. Direct Logic DL-06 Programmable Logic Controller

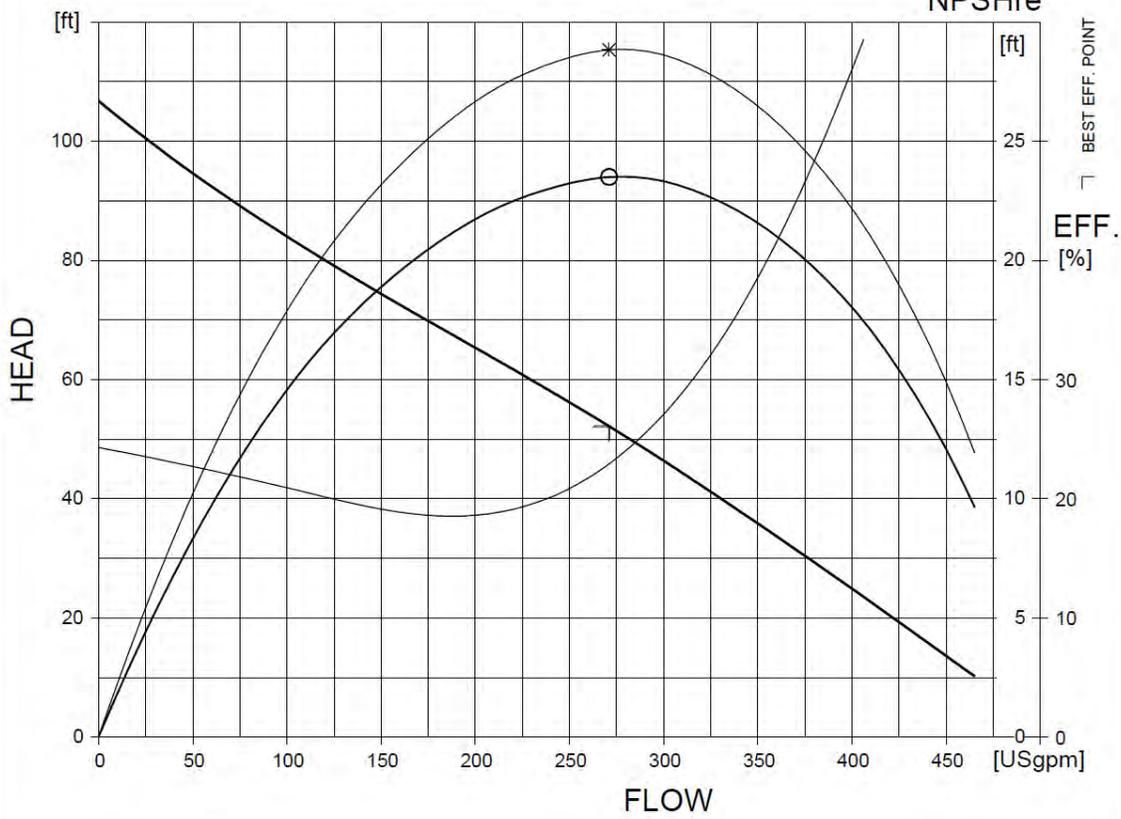
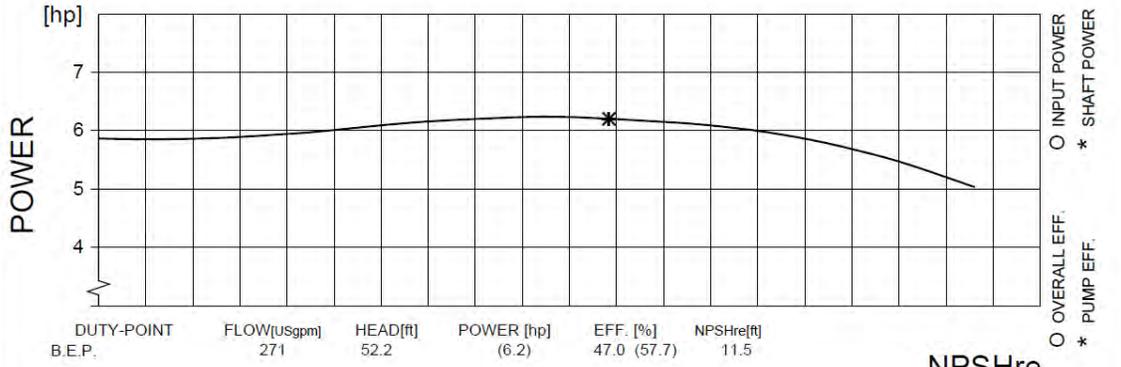
Power: 3 phase, with connection for mobile generator in the event of a utility power outage

Lid: aluminum and in good condition

Pumps: #1 - Flygt 3102, 5 HP, 230V, 3~, 3450 RPM, 434 impeller
#2 - Flygt 3102, 5 HP, 230V, 3~, 3450 RPM, 434 impeller

Spare pumps: 2, shared with Kennedy & Orchard, stored in Pump Shop at the WRF

		PERFORMANCE CURVE		PRODUCT NP3102.181	TYPE SH
DATE 2010-08-02	PROJECT FLYGT US Catalog			CURVE NO 63-256-00-5206	ISSUE 7
POWER FACTOR 0.94	1/1-LOAD 0.94	3/4-LOAD 0.94	1/2-LOAD 0.91	RATED POWER 6.5 hp	IMPELLER DIAMETER 135 mm
EFFICIENCY 79.0 %				STARTING CURRENT 133 A	MOTOR # 18-10-2AL
MOTOR DATA ---				RATED CURRENT ... 19 A	STATOR 68D
COMMENTS NEMA Code Letter: H	INLET/OUTLET - / 3.0 inch			RATED SPEED 3445 rpm	REV 10
	IMP. THROUGHLET ---			TOT.MOM.OF INERTIA ... 0.0096 kgm2	FREQ. 60 Hz
				NO. OF BLADES 2	PHASES 3
					VOLTAGE 200 V
					POLES 2
					GEARTYPE ---
					RATIO ---



NPSHre = NPSH3% + min. operational margin
 Performance with clear water and ambient temp 40 °C

	CURVE
--	--------------

Bypass: 3” pump capability with cam-lock fittings

Chains: stainless steel and in good condition

Guide Bars: galvanized and in good condition

Safety Grate: epoxy coated steel and in good condition

Hooks: stainless steel and in good condition

Floats: high level pump start and high-high level alarm

Pumping Levels: high 5.5’, low 0.5’

Transducer: PTX 1290 Series (GE) 0-15 psi

Communications: Radio to SCADA via Corporation Yard and WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

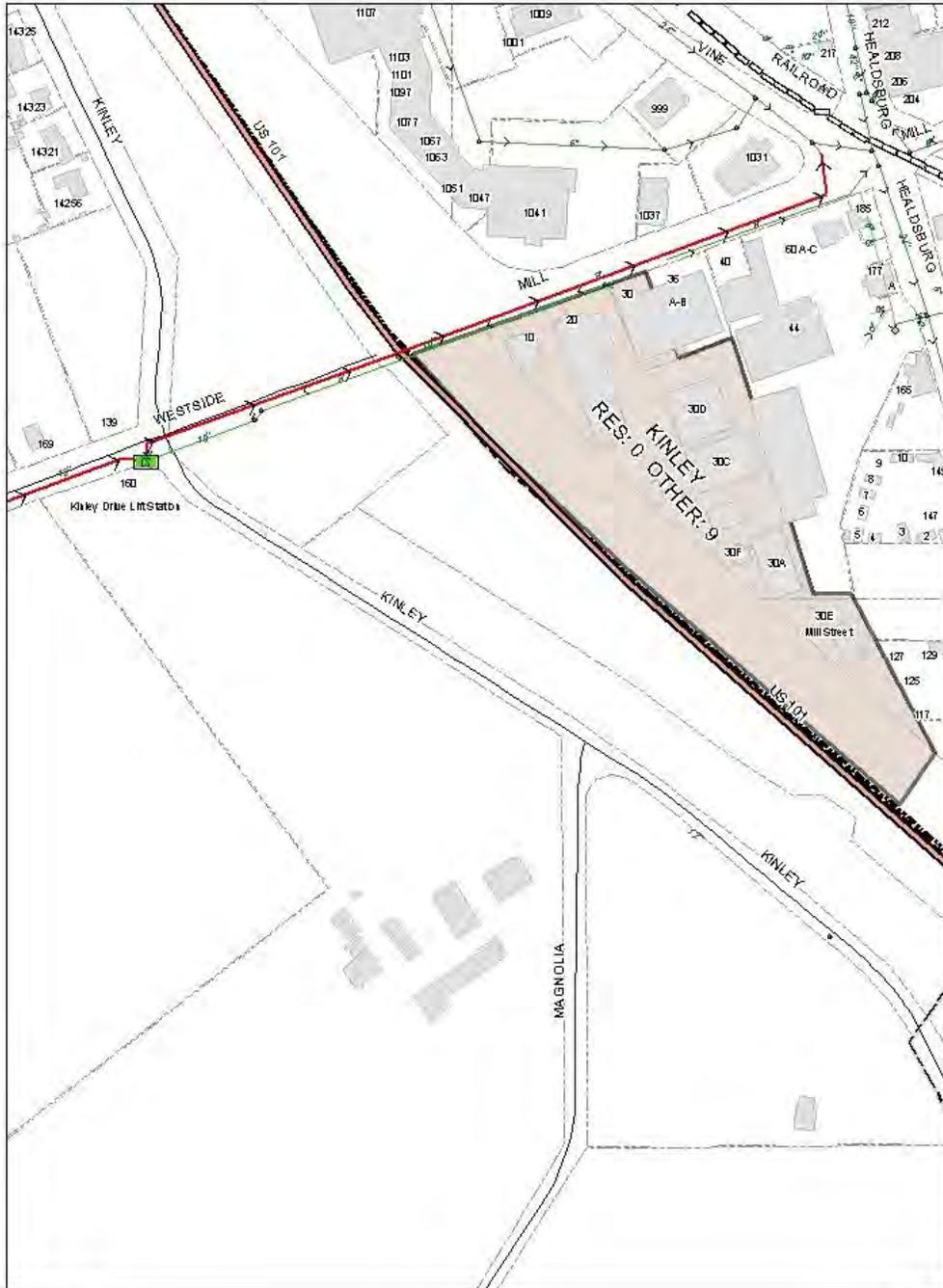
Maximum Capacity: 2,936 gallons

Wet well capacity: diameter 5.0’ x depth 20.0’

Customer connections: 0 residential units, 9 other (non-residential) units

Note: Kinley Lift Station collects wastewater from Hendricks Lift Station and the City of Healdsburg Corporation Yard.

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Healdsburg
Kinley



Chablis Lift Station



Control Panel: C-Moore Micro Operator Interface. Direct Logic DL-06 Programmable Logic Controller

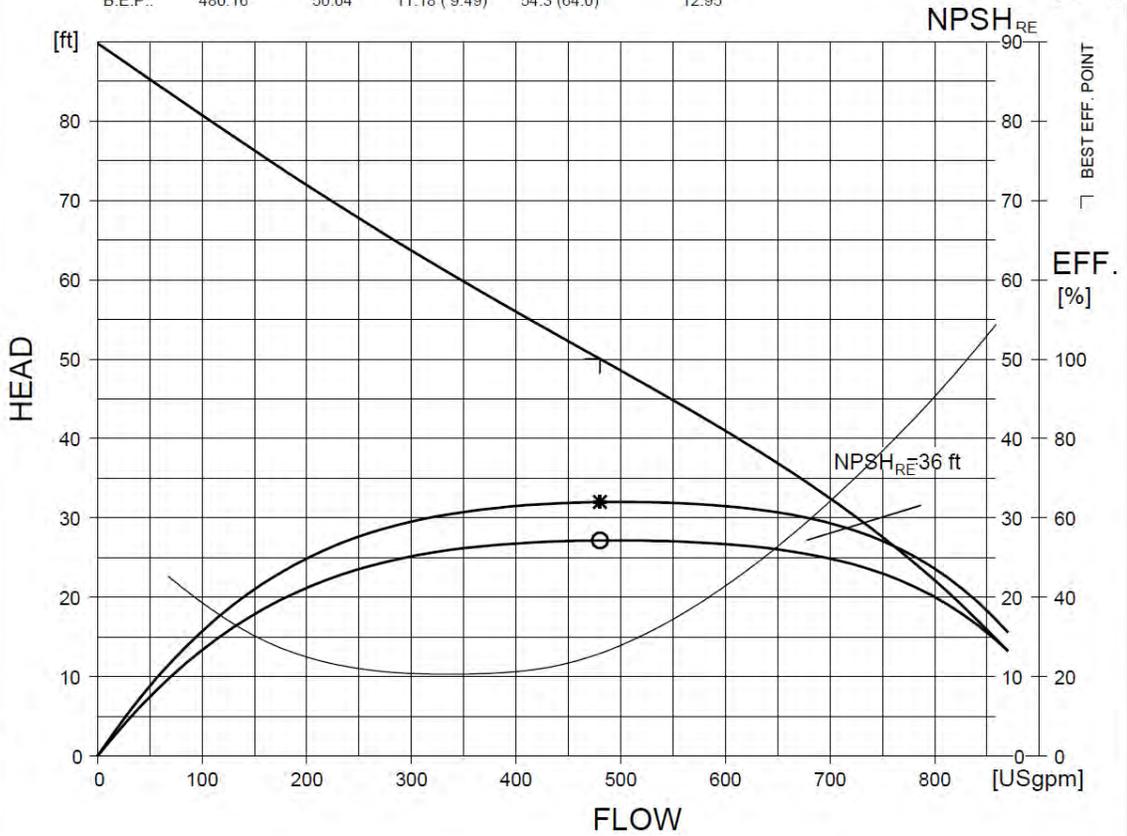
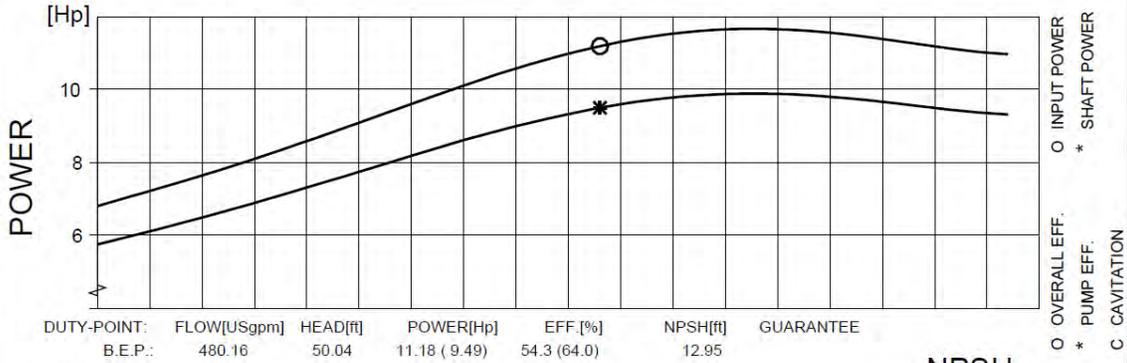
Power: 3 phase, with connection for mobile generator in the event of a utility power outage

Lid: iron and in good condition

Pumps: #1 - Flygt 3127, 10 HP, 230V, 3~, 1750 RPM, 488 impeller
#2 - Flygt 3127, 10 HP, 230V, 3~, 1750 RPM, 488 impeller

Spare pumps: 2, shared with Heron, stored in Pump Shop at the WRF

		PERFORMANCE CURVE		PRODUCT CP3127.180		TYPE HT	
DATE 2008-01-25		PROJECT		CURVE NO 63-483-00-3755		ISSUE 3	
POWER FACTOR		1/1-LOAD	3/4-LOAD	1/2-LOAD	RATED POWER	IMPELLER DIAMETER	
EFFICIENCY		0.89	0.87	0.81	10.0 Hp	228 mm	
MOTOR DATA		---	---	---	STARTING CURRENT ... 64 A	MOTOR #	STATOR
COMMENTS		INLET/OUTLET		RATED CURRENT ... 13 A	1735 rpm	21-12-4AL	12YSER
		- /100 mm		TOT. MOM. OF INERTIA ... 0.12 kgm2	60 Hz	3	460 V
		IMP. THROUGHLET		NO. OF BLADES ... 1	GEARTYPE	RATIO	
		76 mm			---	---	



Performance with clear water and ambient temp 40 °C

CURVE

Bypass: 3” pump capability with cam-lock fittings

Chains: stainless steel and in good condition

Guide Bars: galvanized and in good condition

Safety Grate: aluminum and in good condition

Hooks: stainless steel and in good condition

Floats: pump start, pump stop, and high level alarm

Pumping Levels: high 5’, low .5’

Transducer: removed

Communications: Radio to SCADA via Gauntlett Reservoir, Corporation Yard, and WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 4,862 gallons

Wet well capacity: diameter 6.0’ x depth 23.0’

Customer connections: 23 residential units, 0 other (non-residential) units

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Healdsburg
 Chablis



Moore Lift Station



History: Moore Lift Station has been abandoned with the installation of 735' of new 8" PVC gravity sewer main connected to the North St. sewer trunk.

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts

Hendricks Lift Station



Control Panel: Internally designed and fabricated. Direct Logic DL-05 Programmable Logic Controller

Power: 1 phase, with connection for mobile generator in the event of a utility power outage. This station is connected to PG&E, not City Electric.

Lid: Cast iron manhole cover and in good condition

Pumps: #1 - Goulds 2 HP, 230V, 1~, HS2012BHF
#2 - Peabody Barnes 3/4 Hp, 1~

Spare pumps: 1, shared with Dry Creek, Corporation Yard, & Giorgi Park, stored in Pump Shop at the WRF

Bypass: None

Chains: None (universal coupling connection)

Guide Bars: None (universal coupling connection)

Safety Grate: None (manhole cover)

Hooks: None

Floats: pump start, pump stop, and high level alarm

Pumping Levels: high 5.5', low 1.0'

Transducer: None

Communications: Radio to SCADA via Corporation Yard and WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 544 gallons

Wet well capacity: wide 3.0' x depth 8.0'

Customer connections: 3 residential units, 1 other (non-residential) units

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts



City of Hendricks
Hendricks



The following lift stations are all located at the City of Healdsburg Corporation Yard property:

- Dry Creek Lift Station (formerly Operations Building)
- Corporation Yard Lift Station
- Animal Shelter Lift Station (abandoned)



Dry Creek Lift Station (formerly PW O&M Building)



Control Panel: Sunbelt Power Controls

Power: 3 phase, connected to permanently installed back-up generator at Dry Creek Drinking Water Production Facility in the event of a utility power outage

Lid: iron and in good condition

Pumps: unknown

Spare pumps: 1, shared with Hendricks, Corporation Yard, & Giorgi Park, stored in Pump Shop at the WRF

Bypass: None

Chains: steel and in decent condition

Guide Bars: galvanized and in decent condition

Safety Grate: None

Hooks: None

Floats: pump start, pump stop, and high level alarm

Pumping Levels: high 4.0', low 1.0'

Transducer: none

Communications: Hardwired to SCADA via Dry Creek Wellfield, then radio to WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 752 gallons

Wet well capacity: diameter 4.0' x depth 8.0'

Customer connections: 0 residential units, 1 other (non-residential) unit

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts

Corporation Yard Lift Station



Control Panel: Peabody Barnes

Power: 1 phase, connected to permanently installed back-up generator at Corporation Yard in the event of a utility power outage

Lid: cast iron manhole cover

Pump: Goulds 2 HP, 230V, 1~, HS2012BHF

Spare pumps: 1, shared with Dry Creek, Hendricks, & Giorgi Park, stored in Pump Shop at the WRF

Bypass: None

Chain: new stainless steel

Guide Bars: none

Safety Grate: none

Hooks: none

Float: pump start, pump stop, and high level alarm

Pumping Levels: high 4.5', low 3.0'

Transducer: none

Communications: Hardwired to SCADA via Corporation Yard, then radio to WRF

- High and low level alarms
- Utility power failure alarm
- Communication failure alarm

Maximum Capacity: 881 gallons

Wet well capacity: diameter 5.0' x depth 6.0'

Customer connections: 0 residential units, 1 other (non-residential) unit

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts

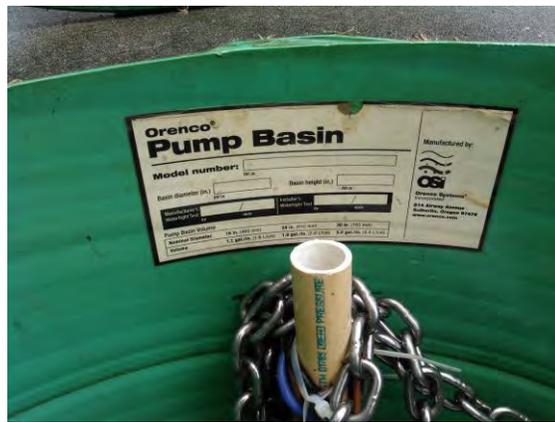
Animal Shelter Lift Station



History: Abandoned with demolition of old Animal Shelter.

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts

Giorgi Park Lift Station



Control Panel: Orenco

Power: 1 phase, no connection for mobile generator

Lid: fiberglass, and in good condition

Pump: Goulds 2 HP, 230V, 1~, HS2012BHF

Spare pumps: 1, shared with Dry Creek, Hendricks, & Corporation Yard, stored in Pump Shop at the WRF

Bypass: None

Chain: new stainless steel

Guide Bars: none

Safety Grate: none

Hooks: none

Float: pump start, pump stop, and high level alarm

Pumping Levels: high 4.5', low 3.0'

Transducer: none

Communications: Radio to SCADA via Gauntlett Reservoir and WRF

- High and low level alarms
- Communication failure alarm

Maximum Capacity: 220 gallons

Wet well capacity: diameter 2.5' x depth 6.0'

Customer connections: 0 residential units, 1 other (non-residential) unit

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts

Magnolia Lift Station



Pumps: #1 - Fairbanks Morse B5414, 60 HP, 460V, 3~, 1200 RPM, 15.25 impeller
#2 - Fairbanks Morse B5414, 60 HP, 460V, 3~, 1200 RPM, 15.25 impeller
#3 - Pentair Fairbanks D5434WD, 60 HP, 460V, 3~, 1200 RPM
#4 - Wilo Emu FA20.54E, 56 HP, 460V, 3~, 1200 RPM

Chains: none required

Guide Bars: none required

Safety Grate: aluminum throughout the wet well and in poor condition

Hooks: none required

Float: high level alarm

Transducer: PTX 1290 Series (GE) 0-15 psi

Pumping Levels: lead pump set point – 7', lag start 7.5', lag-2 start 8', lag-3 start 8.5'

Communications: Radio to SCADA via WRF

Customer connections: All City of Healdsburg wastewater flows through this station;
WRF influent pump station

Records: Annual logbook, weekly rounds sheets, ER Portal equipment maintenance software, As-builts

Flows at 60 Hz (maximum speed) and 7' NPSH:

- pump #1: 1950 GPM
- pump #2: 1970 GPM
- pump #3: 2050 GPM
- pump #4: 1950 GPM
- all 4 pumps running simultaneously: 5300 GPM



Generator: Peterson Power Systems / CAT
Model # SR4
Serial # 6DA01962
3 Phase
500 kva
603 hp
1800 rpm
1,000 gallon fuel tank (will run approximately 40 hours/tank)
60 hz

Communications: Radio to SCADA via WRF



Auxiliary 6" Pump: Power Prime Pump
Perkins diesel engine
Model # DV150
Serial # 453019
38 hp
2,250 gpm
160 gallon fuel tank (will run approximately 24 hours/tank)

Communications: none

Summary and Recommendations

Heron Lift Station – Usable condition, recently replaced force mains, recommend rehabilitation to eliminate massive root intrusion, or potential future station relocation to Badger Park.

Orchard Lift Station – Good condition, recently replaced pumps controlled by new VFDs, recommend rehabilitation of very heavy traffic-rated wet well lid.

Orangewood Lift Station - Good condition, no recommendations at this time.

Kennedy Lift Station – Good condition, no recommendations at this time.

Kinley Lift Station - Good condition, no recommendations at this time.

Chablis Lift Station - Good condition, no recommendations at this time.

Hendricks Lift Station – Poor condition, recommend rehabilitation or abandonment in favor of gravity main solution.

Dry Creek Lift Station (formerly Operations Building) - Good condition, recommend replacement of uni-strut and pipe anchorage hardware due to heavy deterioration.

Corporation Yard Lift Station – Very poor condition, only one installed pump, heavy wetwell and piping deterioration, recommend complete station rehabilitation.

Giorgi Park Lift Station - Good condition, no recommendations at this time.

Magnolia Lift Station – Good condition, recently completed replacement of pump #3 and ventilation system, recommend replacement of deteriorated & unstable safety grating in wet well.

Appendix 4.4 – CCTV Inspection Schedule

Figure 1A - CCTV Inspection Schedule
Northern Portion of City

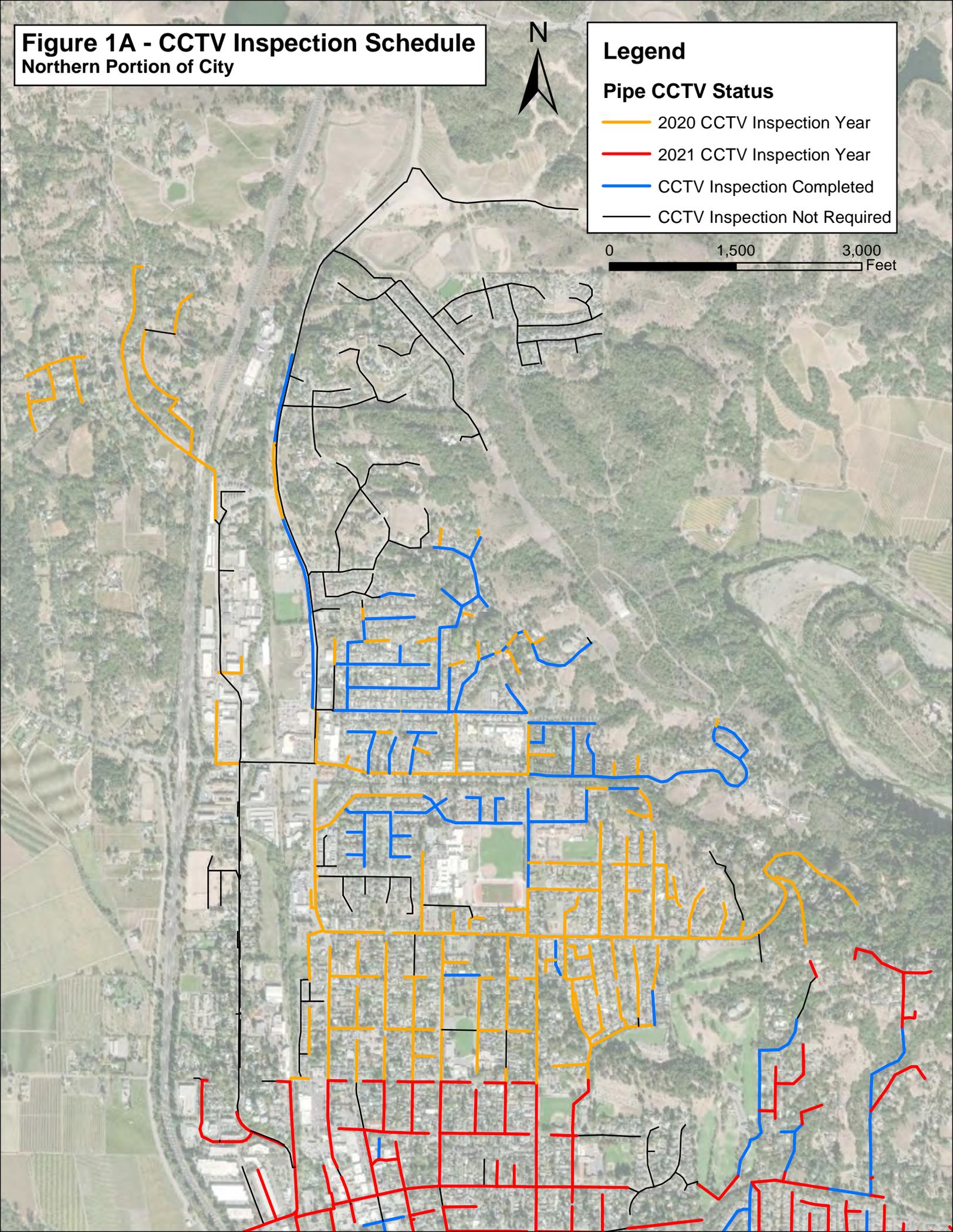


Legend

Pipe CCTV Status

-  2020 CCTV Inspection Year
-  2021 CCTV Inspection Year
-  CCTV Inspection Completed
-  CCTV Inspection Not Required

0 1,500 3,000 Feet



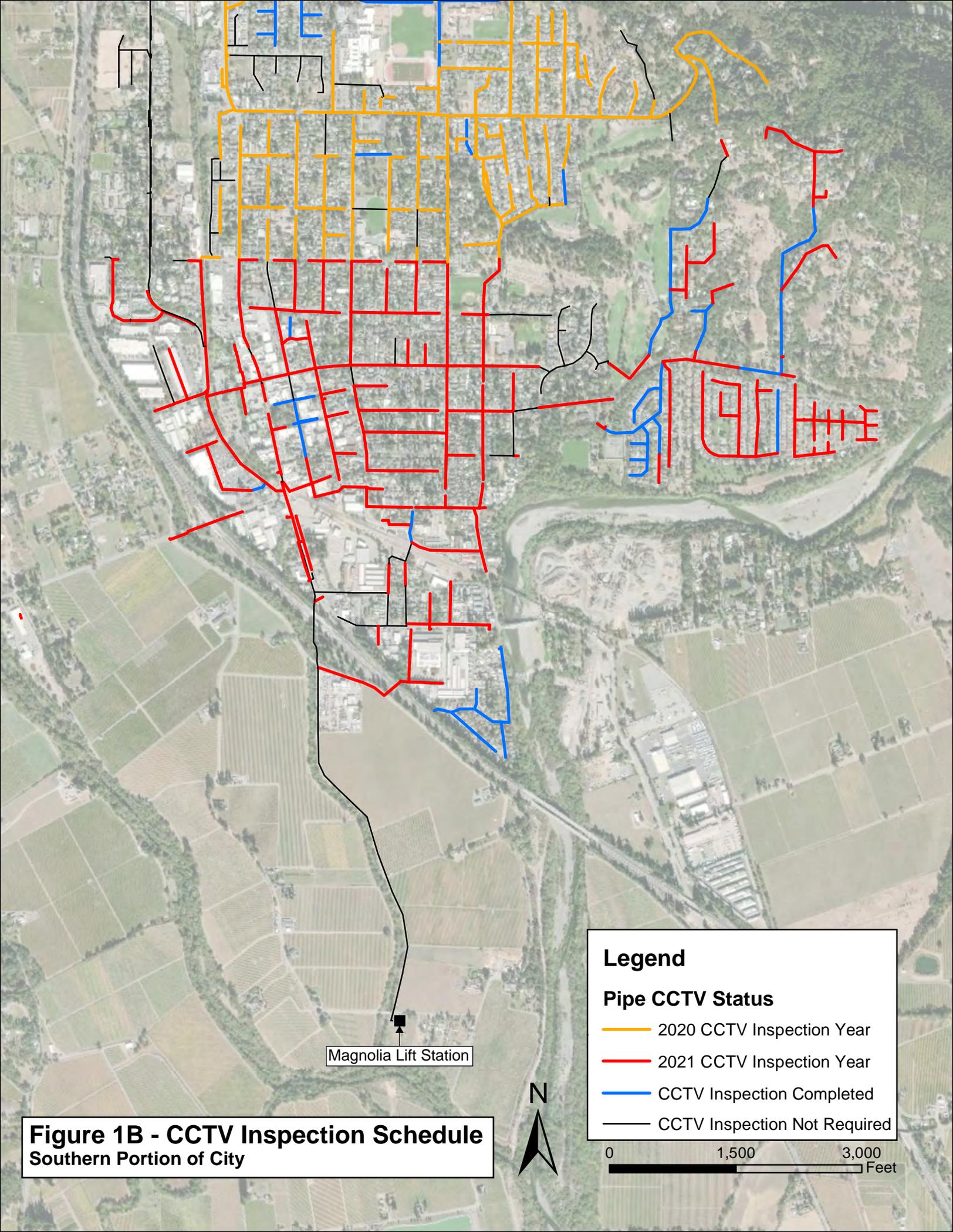


Figure 1B - CCTV Inspection Schedule
Southern Portion of City

Legend

Pipe CCTV Status

- 2020 CCTV Inspection Year
- 2021 CCTV Inspection Year
- CCTV Inspection Completed
- CCTV Inspection Not Required

0 1,500 3,000
Feet

Diameter [inches]	CCTV Category			
	Not Required [LF]	Completed [LF]	2020 [LF]	2021 [LF]
UNK	167	18	1,279	257
4	0	0	0	213
6	15,604	39,344	51,891	43,941
8	31,700	4,901	6,486	15,332
10	2,809	3,904	7,495	875
12	5,435	1,879	2,029	5,146
15	3,960	0	0	1,899
16	0	0	0	1,617
18	3,972	0	51	1,054
21	5,442	0	0	0
24	2,937	0	0	2,281
30	202	0	0	0
33	6,087	0	0	0
36	918	0	0	0

Appendix 4.5 – Standard Manhole Inspection Form

Manhole Observation Form

City of Healdsburg
Public Works Department

CDC # _____

GIS Electronically Filed

Employee Name: _____ **Date:** ____/____/____ **MH ID #** (See Zone Map): _____

Intersection or Nearest Address: _____

Nearest Cross Street: _____ **SSMH / SDMH**

Manhole Structure:

Vent Holes in Lid/Cover? **Y N** Rim & Cover Fit? **Y N** Rim & Cover Secured? **Y N**

Concrete Cone? **Y N** Concrete Barrel Section? **Y N** Concrete Base? **Y N**

Is base configured correctly for flow? **Y N** If structure is not concrete then what material? _____

Manhole Conditions:

Roots Present? **Y N** Visible Ground Water Infiltration? **Y N** Grease build up? **Y N** Solids build up? **Y N**

Please add any comments here or on reverse side. _____

Please send completed form to Joshua Damron

Manhole Observation Form

City of Healdsburg
Public Works Department

CDC # _____

GIS Electronically Filed

Employee Name: _____ **Date:** ____/____/____ **MH ID #** (See Zone Map): _____

Intersection or Nearest Address: _____

Nearest Cross Street: _____ **SSMH / SDMH**

Manhole Structure:

Vent Holes in Lid/Cover? **Y N** Rim & Cover Fit? **Y N** Rim & Cover Secured? **Y N**

Concrete Cone? **Y N** Concrete Barrel Section? **Y N** Concrete Base? **Y N**

Is base configured correctly for flow? **Y N** If structure is not concrete then what material? _____

Manhole Conditions:

Roots Present? **Y N** Visible Ground Water Infiltration? **Y N** Grease build up? **Y N** Solids build up? **Y N**

Please add any comments here or on reverse side. _____

Please send completed form to Joshua Damron

Updated 4/2011

Appendix 4.6 - 2016 Rate Study

CITY OF HEALDSBURG

RESOLUTION NO. 34-2016

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF HEALDSBURG DETERMINING THAT THERE WAS NO MAJORITY PROTEST OF THE PROPOSED WATER AND WASTEWATER SERVICES RATE INCREASE AND ADOPTING UPDATED WATER AND WASTEWATER SERVICES RATES AND SUPERSEDING THE EXISTING RATES ESTABLISHED BY RESOLUTION NO. 49-2012

RECITALS

WHEREAS, the City of Healdsburg (“City”) operates and maintains potable water and wastewater systems for the benefit of residents and businesses in the City, and also for certain customers outside the boundaries of the City; and

WHEREAS, the City water and wastewater systems are operated as self-supporting utility enterprises; and

WHEREAS, revenue from water and wastewater services rates and other sources fund the ongoing operating and capital needs of City water and wastewater systems, including providing for normal facility operations and maintenance, replacement and repair of equipment and facilities, improvements required to meet state and federal regulatory requirements, inflation and other costs; and

WHEREAS, the water and wastewater services rates currently applied to City customers were last updated by Resolution No. 49-2012 adopted by City Council on May 21, 2012; and

WHEREAS, on May 4, 2015 Council adopted a resolution approving a professional services agreement with The Reed Group, Inc. (“Reed Group”) to update the City’s water and wastewater financial plans and to recommend rates based on the financial plans; and

WHEREAS, on October 5, 2015, the Council approved changing the method of calculating the Seasonal Sewer Average to allow the highest monthly water use during the 4-month Seasonal Sewer Average period to be excluded from the calculation of the winter average; and

WHEREAS, Reed Group has prepared a report dated March 9, 2016 entitled “Water and Wastewater Financial Plans and Rate Study – Final Report” (“Report”); and

WHEREAS, the Report presents a five-year financial plan for each utility that reflects the City’s FY 2015-16 budget and financial conditions as of the beginning of the current fiscal year, as well as obtaining funds to meet the City’s debt service obligations and capital improvement projects to maintain service with existing service areas during the five-year planning period extending through FY 2020-21; and

WHEREAS, recommendations in the Report concerning water services rates include applying 6 percent, 4 percent, 4 percent, 3 percent and 3 percent overall annual rate increases in the first part of each of the next five fiscal years, and charging certain fixed monthly charges regardless of the amount of water actually used; and

WHEREAS, recommendations in the Report concerning wastewater services rates includes a 2 percent decrease in July 2016; and

WHEREAS, the Report demonstrated that the recommended rates do not exceed the reasonable cost of providing water and wastewater services and, as such, the proposed rates are not levied for general revenue purposes; and

WHEREAS, the proposed rates reflect the cost of providing service to all customers and customer classes through the apportionment of costs based on customer, capacity, and demand characteristics; and

WHEREAS, on March 7, 2016, the Council accepted the Water and Wastewater Financial Plans and Rate Study report as basis for proposing multi-year rate increases for the City's Water Funds; and directed staff to prepare and mail, as required by law, a notice of public hearing on the proposed water and wastewater rates; and

WHEREAS, in accordance with Government Code Section 50076, fees that do not exceed the reasonable cost of providing the service or regulatory activity for which the fees are charged and which are not levied for general revenue purposes are not special taxes; and

WHEREAS, at least forty-five days in advance of the public hearing at which this Resolution was considered, notice of the public hearing, and notice of oral and written protest procedures against the proposed rates increases, were mailed to all property owners and customers in compliance with California Constitution Article XIII D, Section 6; and

WHEREAS, notice of the public hearing was also published in a local newspaper in accordance with applicable laws; and

WHEREAS, at the conclusion of the public hearing, the City Clerk tabulated the number of written and oral protests received and reported that there was not a majority protest of the proposed water services rate increase or of the proposed wastewater services rate increase by owners or authorized representatives of identified parcels receiving such services.

FINDINGS

WHEREAS, based on the information presented, including the staff report and comments made by members of the public, the City Council of the City of Healdsburg finds as follows:

A. The purposes of the updated water and wastewater services rates established pursuant to this Resolution are to (1) recover the reasonable estimated cost of the services for which the rates are charged; (2) provide that such costs are allocated among City customers so as to bear a fair and reasonable relationship to customers' burdens on and benefits from City water and wastewater services; (3) secure the financial stability of the water and wastewater systems; (4) ensure high quality services; and (5) provide a sound financial plan that meets existing debt service obligations, which will assist in funding capital improvement projects.

B. The updated water and wastewater services rates established pursuant to this resolution are not levied for general revenue purposes.

C. The rates set forth in this Resolution are intended to meet operating expenses, meet financial reserve needs and requirements, secure funding for capital improvement projects to maintain service with existing service areas, and recover costs necessary to maintain the current level of City water and wastewater services. As such, adoption of the rates proposed in the Report, as they relate to provision of water and wastewater services to City customers, is not a "project" within the meaning of the California Environmental Quality Act or C.E.Q.A. (Public Resources Code § 21080(b)(8)(A, C, and D)).

D. In adopting the rates set forth in this Resolution, the City Council of the City of Healdsburg is exercising its powers under Article XI, Section 7 of the California Constitution.

E. The record of proceedings ("Record") establishes that the costs listed in the Report as those incurred by the City in providing water and wastewater services to City customers are reasonable estimates of the cost of providing such services, and that the revisions recommended in the Report for existing water and wastewater service rates are necessary to recover the reasonable, estimated cost of providing such services for which the rates are charged, to allocate such costs among City customers so that they bear a fair and reasonable relationship to customers, and to secure the financial stability of City water and wastewater systems in accordance with the analyses contained in the Report.

F. The procedures followed and the rates adopted are in compliance with California Constitution Article XIII D.

G. There is not a protest of the proposed water services rate increases or of the proposed wastewater services rate increases by a majority of owners, or authorized representatives, of identified parcels receiving such services.

ADOPTION OF RATES

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF HEALDSBURG DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. Definitions.

a. “City Customer” shall mean any person, corporation, or other entity that receives City water and/or wastewater services, regardless of whether City water and/or wastewater services are provided to property within the City, or property outside the boundaries of the City.

b. “Rates” shall mean the charge or charges imposed on City Customers to recover the costs incurred by the City in providing water and wastewater services.

Section 2. Water and Wastewater Services Rates Imposed. The Rates set forth in Exhibit “A”, attached, are hereby approved adopted and said Rates shall supersede and replace the rates set forth in City Council Resolution 49-2012. Rates shall apply to and be paid by City Customers at the times, and in the amounts, and otherwise apply and be administered as prescribed in this Resolution, said Rates to become effective as of July 1 of each fiscal year, through and including July 1, 2020.

Section 3. Time for Payment of Rates. City Customers shall pay the Rates as prescribed in bills issued to City Customers in accordance with Section 13.12.190 of the City’s Municipal Code, subject to all applicable regulation, requirements and penalties for non-compliance pursuant to the Municipal Code and other applicable law.

Section 4. Rate Amounts. The Rate amounts shall be as specified in the rate schedule attached as Exhibit “A” to this Resolution, which schedule is hereby incorporated into this Resolution.

Section 5. Use of Rate Revenue. The revenues raised by payment of the Rates shall be used to fund the estimated reasonable cost of providing the services for which the Rates are charged, and the Rate revenues shall not be used for general revenues purposes.

Section 6. Subsequent Analysis and Revision of the Rates. The Rates set herein are adopted and implemented by the City Council in reliance on the Record identified above. The City may continue to conduct further study and analyses to determine whether the Rates should be revised. When additional information is available, the City Council may review the rates to determine that the Rate amounts do not exceed the estimated reasonable cost of providing the services for which the Rates are charged.

Section 7. Effective Date. This Resolution will become effective immediately upon adoption.

Section 8. Severability. The Rates and all portions of this Resolution are severable. Should any of the Rates or any portion of this Resolution be adjudged to be invalid and unenforceable by a body of competent jurisdiction, then the remaining Rates and/or Resolution portions shall be and continue in full force and effect, except as to those Rates and/or Resolution that have been adjudged invalid.

The City Council hereby declares that it would have adopted each of the Rates and this Resolution and each section, subsection, clause, sentence, phrase and other portion thereof, irrespective of the fact that one or more of the Rates or sections, subsections, clauses, sentences, phrases or other portions of this Resolution may be declared invalid or unconstitutional.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Healdsburg this 2nd day of May 2016, by the following vote:

AYES: Councilmembers: (4) Mansell, McCaffery, Plass and Mayor Chambers

NOES: Councilmembers: (0) None

ABSENT: Councilmembers: (1) Ziedrich

ABSTAINING: Councilmembers: (0) None

SO ORDERED:

ATTEST:


Thomas L. Chambers, Mayor


Maria Curiel, City Clerk

I, MARIA CURIEL, City Clerk of the City of Healdsburg, do hereby certify that the foregoing is a full, true, and correct copy of Resolution No. 34-2016 adopted by the City Council of the City of Healdsburg on the 2nd day of May, 2016.

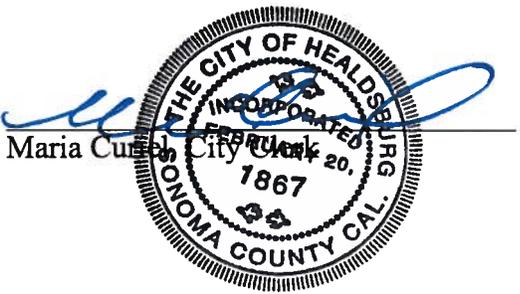


EXHIBIT "A"

Water Rate Schedule

	July 2016	July 2017	July 2018	July 2019	July 2020
Monthly Service Charge					
Single Family	\$ 20.21	\$ 21.01	\$ 21.85	\$ 22.51	\$ 23.19
Multi-Family (per DU)	\$ 14.05	\$ 14.62	\$ 15.20	\$ 15.66	\$ 16.13
Non-Residential					
1" meter	\$ 32.33	\$ 33.62	\$ 34.96	\$ 36.01	\$ 37.09
1 1/2" meter	\$ 62.36	\$ 64.85	\$ 67.44	\$ 69.46	\$ 71.54
2" meter	\$ 98.54	\$ 102.48	\$ 106.58	\$ 109.78	\$ 113.07
3" meter	\$ 183.03	\$ 190.35	\$ 197.96	\$ 203.90	\$ 210.02
4" meter	\$ 303.69	\$ 315.84	\$ 328.47	\$ 338.32	\$ 348.47
Water Usage Rates (\$/HCF)					
All Potable Water Use	\$ 4.80	\$ 4.99	\$ 5.19	\$ 5.35	\$ 5.51
Riverview HOA (1)	\$ 1.26	\$ 1.31	\$ 1.36	\$ 1.40	\$ 1.44
Hydrant Water Sales (2)	\$ 9.60	\$ 9.98	\$ 10.38	\$ 10.70	\$ 11.02

Notes:

- (1) Rate applicable to Riverview HOA under terms of 1997 order of condemnation.
- (2) Deposits and connection charges may also apply.

Wastewater Rate Schedule

July 2016	
Monthly Service Charge	
Single Family	\$ 37.33
Flat Rate (1)	\$ 99.79
Multi-Family (per DU)	\$ 34.50
Non-Residential	
1" meter	\$ 60.67
1 1/2" meter	\$ 118.49
2" meter	\$ 188.16
3" meter	\$ 350.82
4" meter	\$ 583.15
Wastewater Usage Rate (\$/HCF)	
Residential (2)	
Single Family	\$ 10.41
Multi-Family	\$ 10.41
Non-Residential (3)	
Low Strength	\$ 9.37
Medium Strength	\$ 13.62
High Strength	\$ 19.85

Notes:

- (1) Applies to residential customers for whom the City does not provide water service.
- (2) Applies to customer's average water usage from bills rendered from January through April, except that the highest value during this period will be omitted from the average.
- (3) Applies to actual monthly water usage. Includes an allowance for up to 10 percent of water usage to not return to the wastewater system (e.g., used for irrigation).

CITY OF HEALDSBURG

Water and Wastewater Financial Plans and Rate Study

Final Report

March 9, 2016



THE REED GROUP, INC.

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SECTION I. EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

In May 2015, the City of Healdsburg retained The Reed Group, Inc. to review the financial condition of the City's water and wastewater utilities and to propose adjustments to the water and wastewater rates. The purpose of the study was to ensure that each utility is meeting financial obligations for ongoing operation and maintenance, debt service, and capital improvements while maintaining prudent reserves. The study also provides the cost of service analyses to support the water and wastewater rate structures, which helps ensure that the City's water and wastewater rates meet legal standards for the proportionate distribution of costs to rate payers.

Both utilities, though the water utility in particular, have been affected by drought-related water use restrictions. State-mandated water use restrictions have resulted in a significant reduction in water rate revenues. The combination of ongoing operation and maintenance costs, debt service obligations, and capital program needs are requiring an immediate water rate increase, as well as modest annual increases in future years. The wastewater utility, on the other hand, is in a healthy financial condition, and a modest wastewater rate decrease is warranted. In addition, both water and wastewater rate schedules should be adjusted to reflect an updated cost of service analysis, consistent with legal standards.

To help address the financial impacts of drought conditions and water use restrictions, this study also includes a water shortage financial analysis and development of a multi-prong financial strategy for dealing with the financial deficit created by reduced water sales. The multi-pronged strategy includes (1) dipping into available financial reserves, (2) supplementing water rate revenue with temporary water shortage charges, and (3) if necessary in more severe conditions, reducing the financial support for the capital improvement program.

The recommendations presented in this report are intended to help ensure that the City's water and wastewater utilities continue to provide essential services to the City in a cost effective and financial prudent and responsible manner.

The scope of services for the water and wastewater financial planning study included the following:

- ❖ Review financial goals and policy objectives
- ❖ Review current budgets, existing debt obligations, and capital improvement plans
- ❖ Prepare a five-year financial plan and determine annual revenue requirements for each utility
- ❖ Perform cost of service analyses for both water and wastewater utilities in order to proportionately allocate costs to each customer class, commensurate for system demands and capacity requirements

- ❖ Recommend water and wastewater rate structure changes consistent with the cost of service analyses, annual revenue needs, and other objectives
- ❖ Prepare rate schedules for implementation beginning in July 2016
- ❖ Prepare a water and wastewater rate study report (this report) to document the analyses performed during the study
- ❖ Present draft recommendations to the City Council to review the assumptions, conclusions, and recommendations from the financial plan and rate analyses
- ❖ Assist the City in preparing a public notice of proposed water and wastewater rate increases
- ❖ Present final water and wastewater rate recommendations during a public hearing to adopt new rates

The purpose of this report is to summarize our findings and recommendations regarding the financial needs of the water and wastewater utilities and to present rate recommendations for each utility.

FINANCIAL PLANS AND REVENUE NEEDS

Financial plan findings and recommendations are summarized below for both the water and wastewater utilities. Details of the financial plans are contained in Section II of this report.

Water Utility

Until recently, the water utility has been able to meet financial and service obligations, including debt service payments, through current rates and other revenues. However, while still covering operating and maintenance costs, as a result drought conditions and reduced water sales, the water utility may not meet debt service coverage requirements in FY 15-16. Debt covenants require the City to maintain water rates and other revenues such that total revenues less operating and maintenance costs are at least 1.20 times annual debt service payments. Proposed increases in water rates are driven primarily by the need to meet this debt security obligation.

At present, the financial condition of the City's water utility is characterized with some basic statistics. The water utility has:

- Estimated current annual operating and maintenance costs, including debt service obligations, totaling nearly \$5.05 million,
- Current annual Operating Fund revenues and transfers in from other funds of about \$5.06 million, including about \$4.3 million in water rate revenues,
- Insufficient current revenues to meet debt service coverage requirements, creating a need for an immediate water rate increase,
- Sufficient cash in the Operating Fund to maintain the Contingency Reserve and Debt Service Reserve, as well as provide funds for limited transfers to the Capital Replacement Reserve, but insufficient to meet the full needs of the 5-year capital improvement program,

- With moderate annual adjustments to water rates, an ability to meet the needs of the 5-year capital improvement program, as well as to begin to fund the Rate Stabilization Fund.

As a result of the forgoing, it is recommended that the City of Healdsburg increase the overall level of water rates as indicated below:

July 2016	6%
July 2017	4%
July 2018	4%
July 2019	3%
July 2020	3%

It is recommended that the City follow the process necessary to adopt new water rate schedules to be implemented beginning in July 2016 and covering a five-year period. The new rates are intended to provide the revenue necessary to support ongoing operation and maintenance, pay annual debt service and meet debt service coverage obligations, support the utility's 5-year capital improvement program without the need for additional long-term debt, and begin the funding of a Rate Stabilization Fund for the water utility. The financial plan analyses include a reasonable estimate for a partial rebound in water demand during the five-year planning period. With this rebound and the proposed water rate adjustments, annual water rate revenue is estimated to increase from the current \$4.3 million per year to \$5.95 million over this period, based on the assumed rebound in water demands. Actual revenues will depend on actual customer demand characteristics in upcoming years.

Wastewater Utility

The wastewater utility is currently able to cover all current and estimated future operating and maintenance costs, debt service payments, and capital program needs, as well as maintain a Contingency Reserve and begin funding a Rate Stabilization Fund, with current rates and other revenues. Because of its strong financial condition, it appears possible to slightly reduce wastewater rates at this time.

At present, the financial condition of the City's wastewater utility is characterized with some basic statistics. The wastewater utility has:

- Estimated current annual operating and maintenance costs, including debt service obligations, totaling about \$8.22 million, with an additional nearly \$1.5 million transferred to the Capital Replacement Reserve,
- Current annual Operating Fund revenues of about \$8.36 million, including about \$7.05 million in wastewater rate revenues,
- Sufficient revenues to meet debt service coverage requirements, and also begin the funding of the Rate Stabilization Fund,
- Sufficient cash in the Operating Fund to maintain the Contingency Reserve, provide for transfers to the Capital Replacement Reserve, and begin the funding of the Rate Stabilization Fund, and

- An apparent ability to meet the financial and service obligations of the wastewater utility, and meet the needs of the 5-year capital improvement plan with a decrease in wastewater rates.

As a result of the financial condition of the wastewater utility, it is possible to decrease the overall level of wastewater rates at this time, and, depending on changes in customer demands, it may not be necessary increase them for the duration of the planning period. A **2 percent decrease** in the overall level of the wastewater rates is proposed for July 2016, with no changes anticipated for the remainder of the planning period. The rate decrease for July 2016 would coincide with a change in the manner in which the seasonal sewer average (SSA) is calculated for residential customers and applied to the determination of residential wastewater bills, as described in Section IV of this report.

It is recommended that the City decrease its wastewater rates as proposed herein to be effective in July 2016. The reduced wastewater rates are expected to continue to provide the revenue necessary to support ongoing operation and maintenance, pay annual debt service and meet debt service coverage obligations, and support the utility's 5-year capital improvement program without the need for long-term debt. Annual wastewater rate revenue would decrease from the current \$7.05 million per year to \$6.52 million in FY 16-17, and then grow to about \$6.97 million over the planning period as water demands rebound. These revenue estimates incorporate changes in the calculation of the SSA, as approved by the City Council in October 2015.

PROPOSED WATER AND WASTEWATER RATES

The City's water and wastewater rates must meet the constitutional requirements that they reflect the cost of providing service, and costs are allocated to customers in proportion to service requirements. The scope of this water and wastewater rate study included updating the cost of service analyses consistent with current legal standards. Proposed water and wastewater rate schedules reflect the revenue needs of the utilities, as determined with the financial planning models, as well as the updated cost of service analyses. No major rate structure changes are proposed at this time.

Proposed water and wastewater rate schedules are summarized below. Details of the water and wastewater rate calculations are presented in Sections III and IV of the report, respectively.

Water Utility

Exhibit I-1 presents current and proposed water rate schedules to be implemented beginning in July 2016. The proposed water rates reflect the cost of providing service to all customers and customer classes through the apportionment of costs based on customer, capacity, and demand characteristics.

Exhibit I-1
City of Healdsburg
Current and Proposed Water Rates

	Current (1)	July 2016	July 2017	July 2018	July 2019	July 2020
Monthly Service Charge						
Single Family	\$ 19.96	\$ 20.21	\$ 21.01	\$ 21.85	\$ 22.51	\$ 23.19
Multi-Family (per DU)	\$ 12.88	\$ 14.05	\$ 14.62	\$ 15.20	\$ 15.66	\$ 16.13
Non-Residential						
1" meter	\$ 31.80	\$ 32.33	\$ 33.62	\$ 34.96	\$ 36.01	\$ 37.09
1 1/2" meter	\$ 61.17	\$ 62.36	\$ 64.85	\$ 67.44	\$ 69.46	\$ 71.54
2" meter	\$ 96.56	\$ 98.54	\$ 102.48	\$ 106.58	\$ 109.78	\$ 113.07
3" meter	\$ 179.17	\$ 183.03	\$ 190.35	\$ 197.96	\$ 203.90	\$ 210.02
4" meter	\$ 297.16	\$ 303.69	\$ 315.84	\$ 328.47	\$ 338.32	\$ 348.47
Water Usage Rates (\$/HCF)						
All Potable Water Use	\$ 4.49	\$ 4.80	\$ 4.99	\$ 5.19	\$ 5.35	\$ 5.51
Riverview HOA (2)	\$ 1.18	\$ 1.26	\$ 1.31	\$ 1.36	\$ 1.40	\$ 1.44
Hydrant Water Sales (3)	\$ 8.98	\$ 9.60	\$ 9.98	\$ 10.38	\$ 10.70	\$ 11.02

Notes:

- (1) Effective July 1, 2015.
- (2) Rate applicable to Riverview HOA under terms of 1997 order of condemnation.
- (3) Deposits and connection charges may also apply.

Wastewater Utility

Exhibit I-2 presents current and proposed wastewater rate schedule to be implemented beginning in July 2016. No additional changes are proposed beyond July 2016 at this time. The proposed wastewater rates reflect the cost of providing service to all customers and customer classes through the apportionment of costs based on customer, capacity, demand, and loading characteristics.

IMPACT OF PROPOSED RATES ON REPRESENTATIVE CUSTOMER BILLS

Exhibit I-3 summarizes how combined water and wastewater bills for a variety of representative customers may change as a result of the water and wastewater rate recommendations for July 2016. The proposed water rates each July for 2017, 2018, 2019, and 2020 do not include rate structure changes and bill impacts would be uniform with those rate adjustments. The wastewater rate changes proposed for July 2016 are the only changes proposed for wastewater rates during the 5-year planning period.

Exhibit I-2
City of Healdsburg
Current and Proposed Wastewater Rates

	Current (1)	July 2016
Monthly Service Charge		
Single Family	\$ 38.02	\$ 37.33
Flat Rate (2)	\$ 98.61	\$ 99.79
Multi-Family (per DU)	\$ 34.49	\$ 34.50
Non-Residential		
1" meter	\$ 61.76	\$ 60.67
1 1/2" meter	\$ 120.61	\$ 118.49
2" meter	\$ 191.51	\$ 188.16
3" meter	\$ 357.07	\$ 350.82
4" meter	\$ 593.55	\$ 583.15
Wastewater Usage Rate (\$/HCF)		
Residential (3)		
Single Family	\$ 10.10	\$ 10.41
Multi-Family	\$ 10.10	\$ 10.41
Non-Residential (4)		
Low Strength	\$ 9.09	\$ 9.37
Medium Strength	\$ 13.47	\$ 13.62
High Strength	\$ 19.91	\$ 19.85

Notes:

- (1) Effective July 1, 2015.
- (2) Applies to residential customers for whom the City does not provide water service.
- (3) Currently applies to average water usage from bills rendered from January through April. Under the new SSA methodology, the highest value during this period will be omitted from the average.
- (4) Applies to actual monthly water usage. Includes an allowance for up to 10 percent of water usage to not return to the wastewater system (e.g., used for irrigation).

Because of the proposed reduction in wastewater rates, some customers will benefit from lower combined water and wastewater utility bills. The exact change will depend on each customer's unique demand and service characteristics. The comparison of utility bills between the current and proposed water and wastewater rates is complicated by the fact that the method of determining residential seasonal sewer average (SSA) is changing. For many residential customers the SSA used to determine the monthly wastewater bill will be lower under the proposed method, relative to the current method. Separate water bill impact summaries and wastewater bill impact summaries are presented at the end of Sections III and IV of this report, respectively. In all cases, the proposed water and wastewater rates are believed to be more equitable than the current rates in that costs have been apportioned between customers and customer classes in a reasonable manner, consistent with cost of service requirements. Details on the water rate calculations are presented in Section III of this report. Details of the wastewater rate calculations, including the change in calculating the SSA, are presented in Section IV of this report.

Exhibit I-4 graphically shows how a typical monthly water and wastewater bill for single family home in Healdsburg would compare with utility bills in neighboring communities. The calculation is based on a typical monthly water usage of 8 HCF, and typical wastewater usage (SSA) of 4 HCF. Several of the communities shown are currently undergoing their own rate review processes and/or have adopted multi-year rate plans.

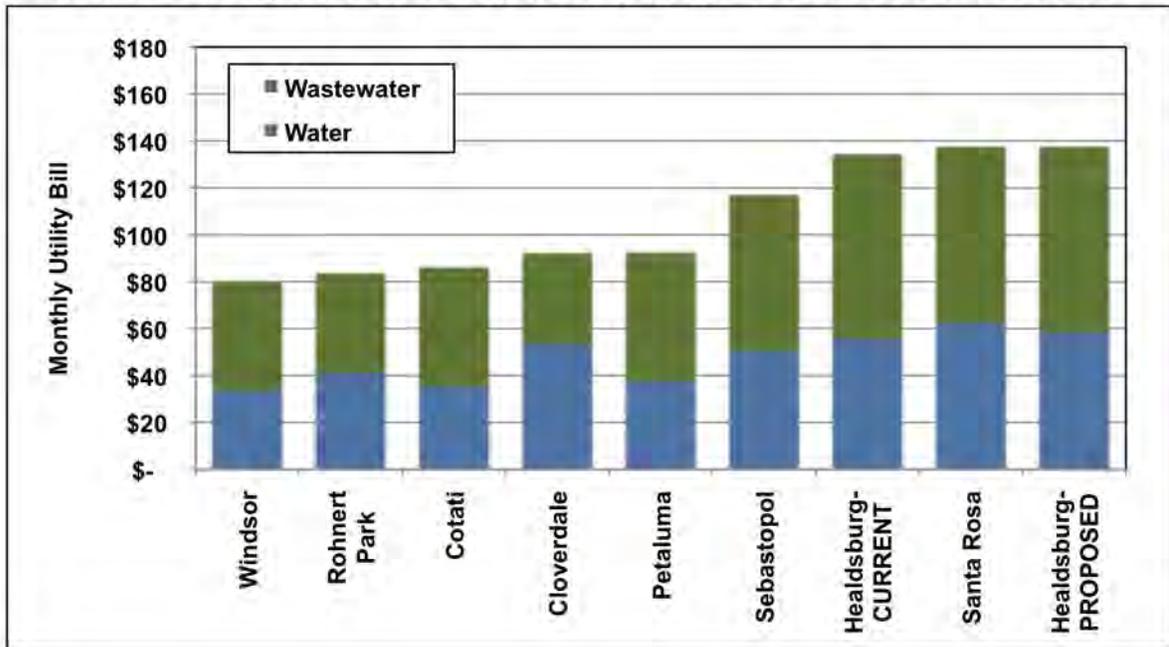
**Exhibit I-3
City of Healdsburg
Bills Impacts of Combined Sample Water and Wastewater Bills (1)**

	Use (HCF) (2)	Current	Proposed	Change
Combined Water/WW Bill Impacts				
Single Family (3)	Low	\$ 106.24	\$ 107.97	\$ 1.73
Single Family (3)	Median	\$ 134.30	\$ 137.58	\$ 3.28
Single Family (3)	High	\$ 218.48	\$ 226.41	\$ 7.93
Multi-Family Dwelling	Average	\$ 124.81	\$ 129.40	\$ 4.59
Small Retail - 1" L	15	\$ 297.26	\$ 305.52	\$ 8.26
Office Building - 1" L	30	\$ 500.96	\$ 518.03	\$ 17.07
Large Retail - 2" L	150	\$ 2,325.07	\$ 2,411.87	\$ 86.80
Restaurant - 1" H	50	\$ 1,313.56	\$ 1,325.50	\$ 11.94
Laundromat - 2" L	200	\$ 3,004.07	\$ 3,120.25	\$ 116.18
Large Hotel w/ Rest - 3" M	500	\$ 9,516.24	\$ 9,745.16	\$ 228.92
Landscape Irrig - 2"	300	\$ 1,443.56	\$ 1,538.54	\$ 94.98

Notes:

- (1) Bill impacts for water bills are presented at the end of Section III, and bill impacts for wastewater bills are presented at the end of Section IV.
- (2) Residential water and wastewater bills are based on the following:
 - Single family low usage: 4 HCF for water and 3 HCF for wastewater
 - Single family median usage: 8 HCF for water and 4 HCF for wastewater
 - Single family high usage: 20 HCF for water and 7 HCF for wastewater
 - Average multi-family dwelling unit: 6 HCF for water and 5 HCF for wastewater
- (3) Does not reflect the benefit derived from the change in the SSA calculation. See the end of Section IV for an explanation of the potential benefit.

**Exhibit I-4
City of Healdsburg
Comparison of Typical Single Family Water/Wastewater Bill with Other Communities**



SECTION II. WATER AND WASTEWATER FINANCIAL PLANS

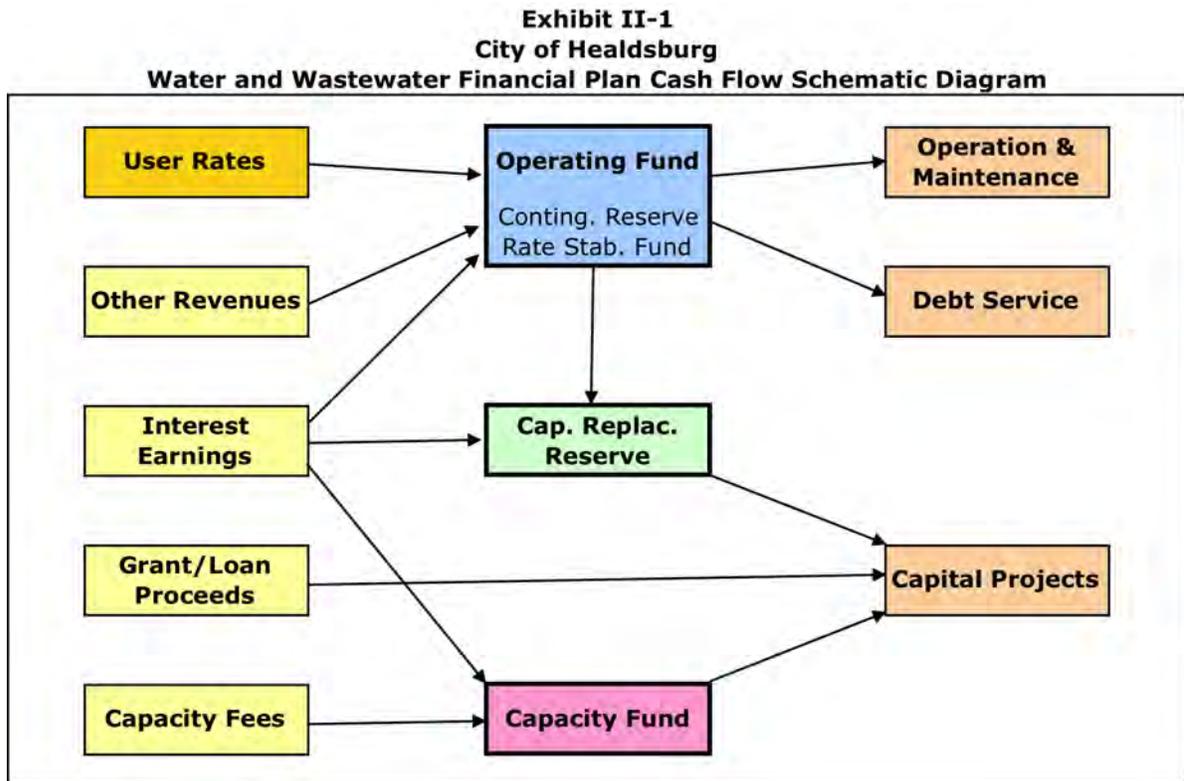
This section of the report describes the financial plans for the City’s water and wastewater utilities. The five-year financial plans are used to determine annual water and wastewater rate revenue requirements. The annual rate revenue requirements are the amount of revenue needed from water and wastewater rates to cover planned operating, maintenance, debt service, and capital program costs with consideration of other revenues and financial reserves.

FUND STRUCTURE AND CASH FLOWS

The financial plan is an annual cash flow model. As a cash flow model, it differs from standard accounting income statements, and balance sheets. The financial plan models sources and uses of funds into, out of, and between the various funds and reserves of the water and wastewater utilities.

The financial plan model is based on the fund, reserve, and account structures currently used by the City. These structures include recent modifications to improve efficient funding of the capital improvement program. **Exhibit II-1** is a schematic diagram of the funds/reserves and major cash flows associated with the financial plan models.

An understanding of the fund/reserve structure is helpful in understanding the financial plan exhibits that model annual cash flows through the water and wastewater utilities from one year to the next. The fund/reserve structure is comprised of:



- **Operating Fund** – The Operating Fund is the primary fund within each utility. Most of each utility system’s revenues, including rate revenues, flow into the Operating Fund and all operating and maintenance costs, including debt service payments, are paid out of this fund. Funds are also transferred from the Operating Fund to the Capital Replacement Reserve to provide funds for capital projects intended to rehabilitate and upgrade facilities. The City is implementing procedures for annually transferring funds from the Operating Fund to the Capital Replacement Reserve sufficient to meet the long-term average capital improvement needs of the water and wastewater systems.
 - *Contingency Reserve* – The City currently has a policy to maintain Contingency Reserves within the Operating Fund equal to 25 percent of annual water or wastewater system operating revenues. The purpose of the Contingency Reserve is to provide working capital and funds for unplanned operating and maintenance expenditures. The balances in the Operating Funds are currently above the target Contingency Reserve for both utilities.
 - *Debt Service Reserve (restricted)* – The water utility also includes a Debt Service Reserve within the Water Operating Fund. The Debt Service Reserve is a restricted reserve required by debt agreements as security against debt repayment obligations, and is not available for general operating purposes.
 - *Rate Stabilization Fund* – Debt obligations of the water and wastewater utilities allow for establishing and maintaining a Rate Stabilization Fund. The fund can be used to help meet debt service coverage obligations. Money taken from the rate stabilization fund can be counted as revenue from debt service coverage purposes. Placing money into the fund reduces the amount of revenue in the coverage calculation. City staff has expressed an interest in beginning to fund the Rate Stabilization Funds in each utility. Financial plan models include funding the wastewater Rate Stabilization Fund in FY 15-16. However, due to limited current water rate revenue, and the need to meet debt service coverage requirements, funding of the water Rate Stabilization Fund does not begin until FY 17-18.
 - *Available Reserves* – The balance in the Operating Fund in excess of the target amount for the Contingency Reserves, as well as the Debt Service Reserve (water utility) and the Rate Stabilization Funds, are shown in the financial plans as Available Reserve. After all other obligations are met this amount is available to offset rate increases, and the financial plan model generally seeks to reduce this over time, and use it to smooth the annual rate adjustments, to the extent possible.
- **Capital Replacement Reserve** – The Capital Replacement Reserve is intended to serve as a mechanism for funding rehabilitation, replacement, and upgrade projects contained in the capital improvement program. The reserve is funded with annual transfers of rate revenue from the Operating Fund. Funds are then used for capital project expenditures. By establishing uniform transfers (or gently increasing transfers) of available funds from the Operating Fund the City

is able to fund capital projects in a manner that facilitates rate stability and/or modest annual rate adjustments. This reserve also helps to establish and maintain steady funding of the ongoing replacement and rehabilitation efforts of the utility system, which many utilities neglect as part of the financial obligations of long-term sustainability of service.

- **Capacity Fund** – The Capacity Fund is used to account for revenues from water and wastewater system capacity fees. Capacity fees are one-time charges to new development to pay for capacity in the utility systems. The City’s capacity fees are based on a system buy-in methodology. As such, capacity fee revenues reimburse the utilities for prior investment in water and wastewater system capacity. The financial plan models use available capacity fee revenues to help pay for planned capital improvement projects. At present, due to the current state of the economy, capacity fee revenues are lower than normal. The calculation or detailed analysis of the City’s water and wastewater system capacity fees is beyond the scope of this study, which focuses on rate revenue needs.

FINANCIAL PLAN ASSUMPTIONS

The financial plan was created to reflect the FY 15-16 budget and financial conditions as of the beginning of the current fiscal year. The financial plan also reflects the City’s debt service obligations and capital improvement program, as identified by City staff, during the five-year planning period extending through FY 20-21.

The process used to develop the financial plans involved estimating future revenues and expenditures based on inflation and interest rates, water supply and demand projections, anticipated capital improvement needs, and other information. The City does not have formal estimates of future operating and maintenance costs, and capital improvement needs are defined at a planning level. The financial plan is based on the best available information and assumptions are believed to be reasonable; however, no assurance can be provided as to the accuracy and completeness of the estimates.

Primary assumptions reflected in financial plan analyses are shown in **Exhibit II-2** and summarized below.

- **Interest Earnings** – Interest earned on fund/reserve balances is estimated to be 0.25 percent in FY 15-16 and FY 16-17, then increasing to 0.5 percent for the remainder of the planning period. Interest calculations are based on beginning of year balances. Interest accrues to each of the funds/reserves. The City also pays interest on outstanding long-term debt obligations at rates specified within each debt agreement.
- **Inflation Rates** – Three separate annual inflation rates are included in the financial plan analysis. General inflation, affecting most operating costs, is assumed to be 2.0 percent per year, based on recent history. Energy and chemical costs are assumed to increase at 4.0 percent annually, due to more variable conditions in the energy, utility, and petroleum sectors. Construction costs, as estimated in the City’s 5-year capital improvement program are assumed to increase by 3.5 percent per year.

Exhibit II-2
City of Healdsburg
Summary of Financial Plan Assumptions

	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Financial Assumptions							
General Inflation Rate			2.0%	2.0%	2.0%	2.0%	2.0%
Utility/Chemical Infl. Rate			4.0%	4.0%	4.0%	4.0%	4.0%
Construction Infl. Rate			3.5%	3.5%	3.5%	3.5%	3.5%
Interest Rate on Invest.		0.25%	0.25%	0.50%	0.50%	0.50%	0.50%
Customer and Growth Assumptions							
No. of Water Accounts		4,603	4,626	4,649	4,672	4,696	4,719
No. of WW Accounts		4,300	4,322	4,343	4,365	4,387	4,409
Customer Growth Rate			0.5%	0.5%	0.5%	0.5%	0.5%
Water Demand and Wastewater Flow							
Annual Water Sales (HCF)	687,000	660,000	660,000	700,000	735,000	764,000	779,000
Change in Water Demand		-4%	0%	6%	5%	4%	2%
Annual WW Flow (HCF)	412,000	371,000	337,000	337,000	347,000	357,000	364,000
Change in WW Demand		-10%	-9%	0%	3%	3%	2%
Capacity Fee Revenues							
Water Capacity Fee	\$ 5,834	\$ 5,834	\$ 6,038	\$ 6,249	\$ 6,468	\$ 6,694	\$ 6,928
Water Capacity Fee Rev.	\$ 54,106	\$ 97,000	\$ 139,000	\$ 145,000	\$ 150,000	\$ 156,000	\$ 163,000
Wtr. Capac. Fee Loan Pmts.							
Wastewater Capacity Fee	\$ 9,676	\$ 9,676	\$ 10,015	\$ 10,366	\$ 10,729	\$ 11,105	\$ 11,494
WW Capacity Fee Rev.	\$ 86,543	\$ 151,000	\$ 215,000	\$ 224,000	\$ 233,000	\$ 242,000	\$ 252,000

- *Growth Projections* – The City of Healdsburg anticipates limited new growth and development due to the current economic climate. The financial plan model presented herein includes 0.5 percent annual growth in the customer base. This is a conservative assumption from a financial perspective, and believed reasonable considering current economic trends.
- *Operation and Maintenance Costs* – The financial plan model is based on current operating and maintenance costs as reflected in the FY 15-16 operating budget. Most costs are assumed to increase at the rate of general inflation, however, utility and chemical costs are assumed to escalate at a higher inflation rate, as previously identified. In addition, in recent years the City reduced or deferred certain utility costs due to economic and water supply conditions. Staff indicated the need to return certain costs to pre-drought and pre-recession levels. As a result, the financial plan reflects a *normalization* of operating and maintenance costs. Staff also anticipates increased wastewater costs associated with NPDES permit requirements. Wastewater operating costs have been increased by \$100,000 annually to address this need.
- *Capital Improvement Program* – The water and wastewater utilities’ capital improvement plans includes a number of projects totaling about \$5.4 million and \$10.3 million (future dollars), respectively, over a five-year period. Planned projects for both utilities are predominately required to rehabilitate and replace existing infrastructure, and are not intended to provide new capacity. All capital projects costs are supported from rate revenues, with no new debt reflected in the financial plans. **Exhibit II-3** summarizes the water and wastewater capital improvement plans reflected in the financial plans.

Exhibit II-3
City of Healdsburg
Water and Wastewater Capital Improvement Programs

	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	Total
WATER PROJECTS							
Redwood Tank Replacement Project		240,000					240,000
Water Main Reloc. - Scenic Drive (~1200')	50,000	250,000					300,000
Water Main Replac. - College Ave (~1500')			495,000				495,000
Meter Replacement Program		600,000	600,000	600,000			1,800,000
Water Main Replac. - Sunnyvale Ave (~1200')					396,000		396,000
Gauntlett Reservoir Roof Replacement				445,000			445,000
Water Main Replac. - Grant St (~1800')						594,000	594,000
Fitch Well Field Reconstruction		120,000	120,000	120,000			360,000
Gauntlett Well Field Reconstruction					180,000	180,000	360,000
Total	50,000	1,210,000	1,215,000	1,165,000	576,000	774,000	4,990,000
Adjusted for Inflation (1)	50,000	1,252,000	1,302,000	1,292,000	661,000	919,000	5,476,000
WASTEWATER PROJECTS							
Recycled Water Storage Upgrades			550,000				550,000
Lift Sta. Rebuilds - Moore, Orchard, Kinley		360,000					360,000
Relocate Force Mains to Dry Creek Bridge		2,735,000					2,735,000
WRF Membrane Replacement				1,300,000			1,300,000
Sewer Main Replac. - Fitch St (~2000')					600,000		600,000
Sewer Main Replac. - University (~2000')						600,000	600,000
Recycled Water Pipeline Expan. (2,500'/yr)		625,000	625,000	625,000	625,000		2,500,000
Sewer Main Rehabilitation (~3000')			900,000				900,000
Total	-	3,720,000	2,075,000	1,925,000	1,225,000	600,000	9,545,000
Adjusted for Inflation (1)	-	3,850,000	2,223,000	2,134,000	1,406,000	713,000	10,326,000

Notes:

(1) Assumes inflation at 3.5 percent per year. Inflated values carried forward into financial plan exhibits.

- *Debt Obligations* – The water and wastewater utilities have several different long-term debt obligations outstanding. Outstanding debt on the water system at the end of FY 15-16 will be about \$9.4 million, and about \$25.5 million on the wastewater system. Annual debt service for the water and wastewater utilities is currently about \$950,000 and \$1,800,000, respectively. **Exhibit II-4** summarizes the annual debt service payments for the two utilities, over the planning period.
- *Debt Service Coverage* – In addition to making annual principal and interest payments on long-term debt, the City is obligated to set rates and charges in order to meet debt service coverage requirements. For the water utility, net water system revenues (defined as gross water system revenues minus operating and maintenance costs) must be at least 1.20 times annual debt service. For the wastewater utility, net wastewater system revenues must be at least 1.15 times annual debt service.

At present, due to drought-related water use reductions, it appears that the water utility will not meet the debt service coverage requirement in the current fiscal year. The proposed level of water rate increase is dictated by the amount needed to meet this obligation in FY 16-17. The wastewater revenue requirement is not currently affected by the debt service coverage obligation. The extra revenues (above and beyond operating, maintenance, and debt service costs) generated by rates that meet the coverage obligation are available for capital program expenditures.

- *Water and Wastewater Capacity Fees* – The current water capacity fee for a single family dwelling is \$5,834 and the wastewater capacity fee for a single family dwelling is \$9,676. For purposes of this study these fees are assumed adjusted annually by the rate of construction inflation. Annual capacity fee revenue has been estimated based on the previously described growth assumption and the capacity fee amounts. Capacity fee revenues accrue to the Capacity Fund of each utility, and can then be used to pay for any capital improvement projects. None of the capacity fee revenue is applied to current or future debt service.

FINANCIAL PLAN FINDINGS AND CONCLUSIONS

The preceding portion of this section describes the basic framework and assumptions underlying the financial analyses for the City's water and wastewater utilities. The financial plan models were used to show how financial obligations can be met through use of revenues and reserves. In particular, the financial plans are used to identify the annual water and wastewater rate revenue requirements during the planning period. One objective of the analysis was to attempt to minimize the magnitude of required rate increases. Specific findings and recommendations pertaining to the water and wastewater utilities are presented below, beginning with a description of the current situation.

**Exhibit II-4
City of Healdsburg
Summary of Water and Wastewater Debt Service Obligations**

	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
WATER SYSTEM DEBT SERVICE							
<i>2005D CSCDA Water and Wastewater Revenue Bonds (only water portion remains)</i>							
Principal	100,000	105,000	110,000	115,000	115,000	120,000	125,000
Interest	107,255	103,435	99,295	94,850	90,250	85,475	80,375
Total	207,255	208,435	209,295	209,850	205,250	205,475	205,375
Remaining Balance	2,320,000	2,215,000	2,105,000	1,990,000	1,875,000	1,755,000	1,630,000
<i>2014 Water Revenue Refunding Bonds</i>							
Principal	370,000	430,000	449,000	473,000	496,000	508,000	531,000
Interest	367,861	306,270	288,031	268,899	248,792	227,959	206,400
Total	737,861	736,270	737,031	741,899	744,792	735,959	737,400
Remaining Balance	7,595,000	7,165,000	6,716,000	6,243,000	5,747,000	5,239,000	4,708,000
WASTEWATER SYSTEM DEBT SERVICE							
<i>2005D CSCDA Water and Wastewater Revenue Bonds (wastewater portion refinanced 7.1.15)</i>							
Principal	115,000	2,440,000					
Interest	114,929	-					
Total	229,929	2,440,000	-	-	-	-	-
Remaining Balance	2,440,000	-	-	-	-	-	-
<i>2006 Wastewater Revenue Bonds (refinanced 7.1.15)</i>							
Principal	615,000	23,340,000					
Interest	1,113,643	-					
Total	1,728,643	23,340,000	-	-	-	-	-
Remaining Balance	23,340,000	-	-	-	-	-	-
<i>2015 Wastewater Revenue Refunding Bonds</i>							
Principal		1,110,000	885,000	910,000	940,000	975,000	1,015,000
Interest		681,167	908,525	881,600	853,850	820,250	780,450
Total		1,791,167	1,793,525	1,791,600	1,793,850	1,795,250	1,795,450
Remaining Balance	26,625,000	25,515,000	24,630,000	23,720,000	22,780,000	21,805,000	20,790,000

Water Utility

At present, the financial condition of the City's water utility is characterized with some basic statistics. The water utility has:

- Estimated current annual operating and maintenance costs, including debt service obligations, totaling nearly \$5.05 million,
- Current annual Operating Fund revenues and transfers in from other funds of about \$5.06 million, including about \$4.3 million in water rate revenues,
- Insufficient current revenues to meet debt service coverage requirements, creating a need for an immediate water rate increase,
- Sufficient cash in the Operating Fund to maintain the Contingency Reserve and Debt Service Reserve, as well as provide funds for limited transfers to the Capital Replacement Reserve, but insufficient to meet the full needs of the 5-year capital improvement program,
- With moderate annual adjustments to water rates, an ability to meet the needs of the 5-year capital improvement program, as well as to begin to fund the Rate Stabilization Fund.

As a result of the forgoing, it is recommended that the City of Healdsburg increase the overall level of water rates as indicated below:

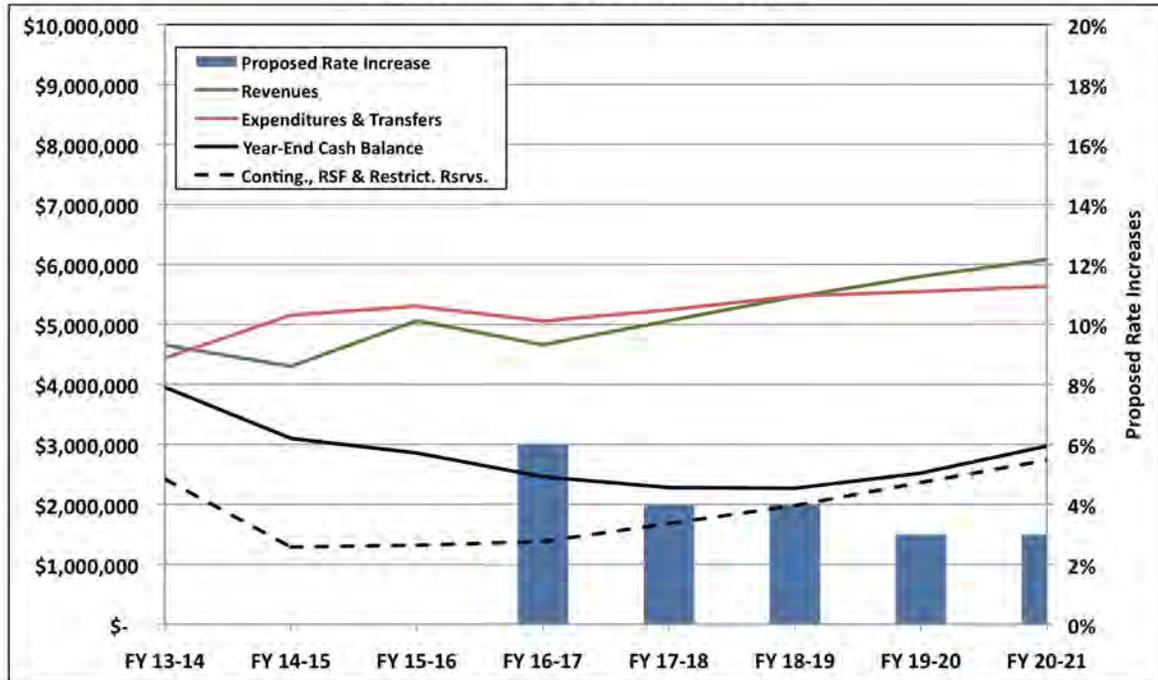
July 2016	6%
July 2017	4%
July 2018	4%
July 2019	3%
July 2020	3%

Exhibit II-5 graphically summarizes the revenues, expenses, year-end fund balance, and estimated annual rate increases for the water system Operating Fund. **Exhibit II-6** provides the details of the financial plan model for the City's water utility.

Two important issues drive the need for the proposed water rate increases. The first is the City's existing obligations to maintain rates and other revenues at levels sufficient to maintain a debt service coverage ratio of 1.20. Due to current drought-related water use reductions, the current level of revenue does not meet this requirement, and the City risks a default condition if the situation is not rectified. The proposed rate increase for July 2016 of 6 percent is expected to correct this deficiency.

Second, the City's water rates should contribute to the ongoing replacement and upgrade of the water system. The capital improvement program is not sufficiently supported by water rates to fund annual replacement and upgrade needs on a pay-as-you-go basis. However, with moderate annual rate increases over the next few years it may be possible to provide a stable level of funding for capital program needs. This would help to avoid the need for future long-term debt and the interest costs associated with debt.

Exhibit II-5
City of Healdsburg
Graphical Summary of Water Operating Fund



The financial plan model reflects assumptions and estimates that are believed reasonable at the present time. However, conditions change. It is recommended that the City review the financial condition of the water utility annually as part of the budget process, and perform a more comprehensive financial plan and water rate update study every 3 to 5 years, unless otherwise needed sooner.

Specific recommendations related to the water rate structure and rate schedules for the next four years are described in Section III of this report.

**Exhibit II-6
City of Healdsburg
Water System Financial Plan**

	Estimated FY 14-15	Budgeted FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Proposed Rate Increases -->			6%	4%	4%	3%	3%
WATER OPERATING FUND (520)							
Beginning Balance	3,952,517	3,100,000	2,856,464	2,460,764	2,279,964	2,268,564	2,521,364
Revenues							
Utility Service Charges	4,173,669	4,302,000	4,542,000	4,936,000	5,333,000	5,671,000	5,951,000
CSA #41	89,969	94,500	96,400	98,300	100,300	102,300	104,300
Interest Income	21,714	7,800	7,100	12,300	11,400	11,300	12,600
Miscellaneous Revenue	16,532	15,000	15,300	15,600	15,900	16,200	16,500
Transfers from Other Funds	-	641,864					
Total Revenues	4,301,884	5,061,164	4,660,800	5,062,200	5,460,600	5,800,800	6,084,400
Expenditures							
Salaries & Benefits	1,244,914	1,710,500	1,569,500	1,601,000	1,633,000	1,666,000	1,699,000
Public Works Admin.	121,116	115,600	147,000	150,000	153,000	156,000	159,000
Supplies & Services							
Utilities & Chemicals	237,607	305,000	341,000	355,000	369,000	384,000	399,000
Water Supply Contract		50,000	52,000	54,000	56,000	58,000	60,000
Maintenance & Operation	403,786	384,500	480,000	490,000	500,000	510,000	520,000
Professional & Technical	223,453	341,700	169,000	172,000	175,000	179,000	183,000
General & Admin. Overhead	635,236	809,400	852,000	869,000	886,000	904,000	922,000
Capital Projects	1,343,289	394,000	-	-	-	-	-
Debt Service							
2005 CSCDA Bonds	207,000	208,000	209,000	210,000	205,000	205,000	205,000
2014 Water Refunding Bonds	738,000	736,000	737,000	742,000	745,000	736,000	737,000
Transfers Out							
To Wtr. Replac. Reserve (522)		250,000	500,000	600,000	750,000	750,000	750,000
Total Expenditures	5,154,401	5,304,700	5,056,500	5,243,000	5,472,000	5,548,000	5,634,000
Ending Balance	3,100,000	2,856,464	2,460,764	2,279,964	2,268,564	2,521,364	2,971,764
Debt Service Reserve (restricted)	213,961	214,000	214,000	214,000	214,000	214,000	214,000
Contingency Reserve (25% of Rev.)	1,075,000	1,105,000	1,166,000	1,266,000	1,366,000	1,451,000	1,522,000
Rate Stabilization Fund	-	-	-	200,000	400,000	700,000	1,000,000
Available Reserve	1,811,039	1,537,464	1,080,764	599,964	288,564	156,364	235,764
DS Coverage (1.20 min.)	1.59	0.85	1.26	1.39	1.73	1.92	2.14

Exhibit II-6 -- Continued
City of Healdsburg
Water System Financial Plan -- Continued

	Estimated FY 14-15	Budgeted FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
WATER CAPITAL REPLACEMENT RESERVE (522)							
Beginning Balance	750,000	750,000	951,900	602,300	303,300	262,800	853,100
Revenues							
Interest Income	-	1,900	2,400	3,000	1,500	1,300	4,300
Transfer from Water Fund (520)		250,000	500,000	600,000	750,000	750,000	750,000
Transfer from Wtr Capac. Fund (920)			400,000	400,000	500,000	500,000	500,000
Total Revenues	-	251,900	902,400	1,003,000	1,251,500	1,251,300	1,254,300
Expenditures							
Capital Projects		50,000	1,252,000	1,302,000	1,292,000	661,000	919,000
Total Expenditures	-	50,000	1,252,000	1,302,000	1,292,000	661,000	919,000
Ending Balance	750,000	951,900	602,300	303,300	262,800	853,100	1,188,400
WATER CAPACITY FUND (920)							
Beginning Balance	1,752,175	1,624,600	1,725,700	1,469,000	1,221,300	877,400	537,800
Revenues							
Development Fees	54,106	97,000	139,000	145,000	150,000	156,000	163,000
Other Revenue	1,946						
Interest Income	7,973	4,100	4,300	7,300	6,100	4,400	2,700
Transfer from Wtr. Cap. Fund (820)	58,400	-					
Total Revenues	122,425	101,100	143,300	152,300	156,100	160,400	165,700
Expenditures							
Capital Projects	-	-					
Transfer to Wtr. Cap. Repl. Rsrv.		-	400,000	400,000	500,000	500,000	500,000
Transfer Out to Street Fund	250,000						
Total Expenditures	250,000	-	400,000	400,000	500,000	500,000	500,000
Ending Balance	1,624,600	1,725,700	1,469,000	1,221,300	877,400	537,800	203,500

Wastewater Utility

At present, the financial condition of the City's wastewater utility is characterized with some basic statistics. The wastewater utility has:

- Estimated current annual operating and maintenance costs, including debt service obligations, totaling about \$8.22 million, with an additional nearly \$1.5 million transferred to the Capital Replacement Reserve,
- Current annual Operating Fund revenues of about \$8.36 million, including about \$7.05 million in wastewater rate revenues,
- Sufficient revenues to meet debt service coverage requirements, and also begin the funding of the Rate Stabilization Fund,
- Sufficient cash in the Operating Fund to maintain the Contingency Reserve, provide for transfers to the Capital Replacement Reserve, and begin the funding of the Rate Stabilization Fund, and
- An apparent ability to meet the financial and service obligations of the wastewater utility, and meet the needs of the 5-year capital improvement plan with a decrease in wastewater rates.

As a result of the financial condition of the wastewater utility, it is possible to decrease the overall level of wastewater rates at this time, and, depending on changes in customer demands, it may not be necessary increase them for the duration of the planning period. A **2 percent decrease** in the overall level of the wastewater rates is proposed for July 2016, with no changes anticipated for the remainder of the planning period. The rate decrease for July 2016 would coincide with a change in the manner in which the seasonal sewer average (SSA) is calculated for residential customers and applied to the determination of residential wastewater bills, as described in Section IV of this report.

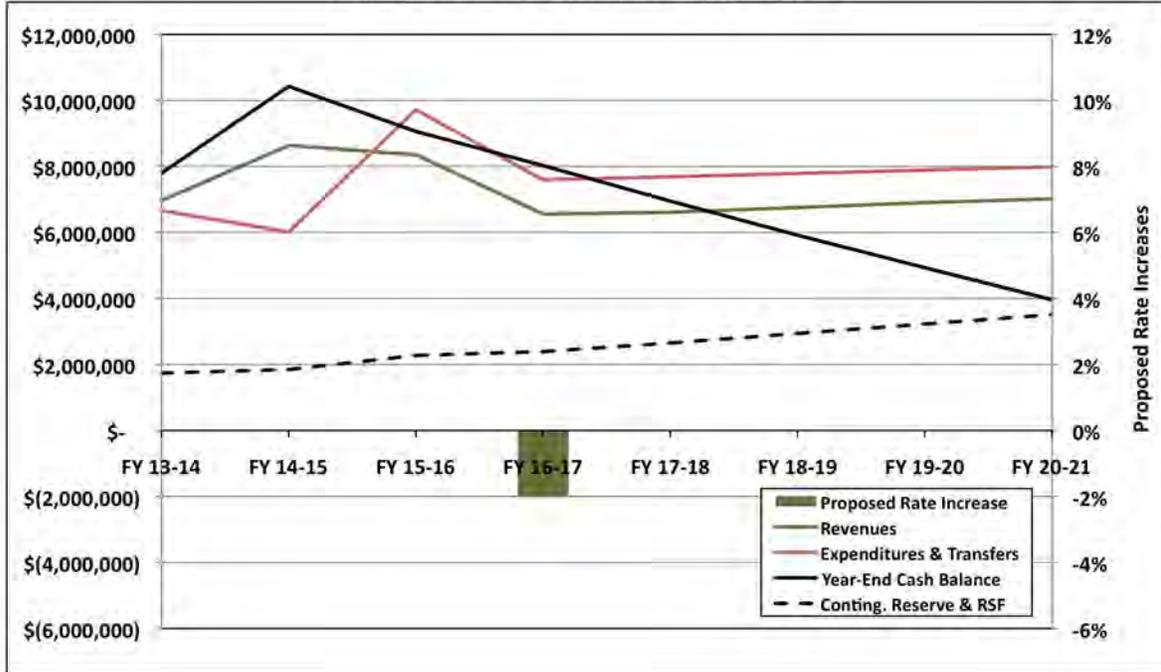
Exhibit II-7 graphically summarizes the revenues, expenses, and year-end fund balance with the proposed decrease in wastewater rates for the wastewater system Operating Fund. **Exhibit II-8** provides the details of the financial plan model for the City's wastewater utility.

In addition to meeting all the financial obligations of the wastewater utility, the financial plan includes initially establishing the wastewater Rate Stabilization Fund with \$500,000 in FY 15-16, and then adding \$250,000 annually fund until it reaches 25 percent of annual revenue.

The financial plan model reflects assumptions and estimates that are believed reasonable at the present time. However, conditions change. It is recommended that the City review the financial condition of the wastewater utility annually as part of the budget process, and perform a more comprehensive financial plan and wastewater rate update study every 3 to 5 years, unless otherwise needed sooner.

Specific recommendations related to the wastewater rate structure and the proposed rate schedule for July 2016 is described in Section IV of this report.

Exhibit II-7
City of Healdsburg
Graphical Summary of Wastewater Operating Fund



**Exhibit II-8
City of Healdsburg
Wastewater System Financial Plan**

	Estimated FY 14-15	Budgeted FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
	Proposed Rate Increases -->		-2%	0%	0%	0%	0%
WASTEWATER OPERATING FUND (530)							
Beginning Balance	7,797,785	10,425,600	9,062,000	8,028,100	6,950,000	5,917,000	4,934,200
Revenues							
Utility Service Charges	7,312,707	7,050,000	6,517,000	6,549,000	6,699,000	6,854,000	6,972,000
Interest Income	53,459	26,100	22,700	40,100	34,800	29,600	24,700
Miscellaneous Revenue	20,825	20,000	20,400	20,800	21,200	21,600	22,000
Transfer In from Fund 930	1,250,000	1,260,000	-	-	-	-	-
Total Revenues	8,636,991	8,356,100	6,560,100	6,609,900	6,755,000	6,905,200	7,018,700
Expenditures							
Salaries & Benefits	1,201,005	2,092,600	1,865,000	1,902,000	1,940,000	1,979,000	2,019,000
Public Works Admin.	519,924	133,600	283,000	289,000	295,000	301,000	307,000
Supplies & Services	429,699	360,000	469,000	488,000	508,000	528,000	549,000
Maintenance & Operation	414,966	289,900	397,000	405,000	413,000	421,000	429,000
Professional & Technical	226,468	147,000	305,000	311,000	317,000	323,000	329,000
General & Admin. Overhead	756,070	910,100	981,000	1,001,000	1,021,000	1,041,000	1,062,000
Capital Projects	502,044	2,495,500					
Debt Service							
2005 CSCDA Bonds	230,000	-	-	-	-	-	-
2006 CSCDA Bonds	1,729,000	-	-	-	-	-	-
2015 WW Revenue Refunding		1,791,000	1,794,000	1,792,000	1,794,000	1,795,000	1,795,000
Transfers Out							
To WW Replac. Reserve (532)		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Total Expenditures	6,009,176	9,719,700	7,594,000	7,688,000	7,788,000	7,888,000	7,990,000
Ending Balance	10,425,600	9,062,000	8,028,100	6,950,000	5,917,000	4,934,200	3,962,900
Contingency Reserve (25% of Rev.)	1,847,000	1,774,000	1,640,000	1,652,000	1,689,000	1,726,000	1,755,000
Rate Stabilization Fund	-	500,000	750,000	1,000,000	1,250,000	1,500,000	1,755,000
Available Reserve	8,578,600	6,788,000	5,638,100	4,298,000	2,978,000	1,708,200	452,900
DS Coverage (1.15 min.)	2.02	1.58	1.25	1.24	1.27	1.30	1.31

Exhibit II-8 -- Continued
City of Healdsburg
Wastewater System Financial Plan -- Continued

	Estimated FY 14-15	Budgeted FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
WASTEWATER CAPITAL REPLACEMENT RESERVE (532)							
Beginning Balance	4,476,633	4,499,100	6,010,100	4,075,100	3,772,100	3,557,100	4,069,100
Revenues							
Interest Income	22,467	11,000	15,000	20,000	19,000	18,000	20,000
Transfer from WW Fund (530)		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Transfer from WW Capac. Fund (930)			400,000	400,000	400,000	400,000	400,000
Total Revenues	22,467	1,511,000	1,915,000	1,920,000	1,919,000	1,918,000	1,920,000
Expenditures							
Capital Projects		-	3,850,000	2,223,000	2,134,000	1,406,000	713,000
Total Expenditures	-	-	3,850,000	2,223,000	2,134,000	1,406,000	713,000
Ending Balance	4,499,100	6,010,100	4,075,100	3,772,100	3,557,100	4,069,100	5,276,100
WASTEWATER CAPACITY FUND (930)							
Beginning Balance	4,052,416	2,999,200	1,897,700	1,717,400	1,550,000	1,390,800	1,239,800
Revenues							
Development Fees	86,543	151,000	215,000	224,000	233,000	242,000	252,000
Other Revenue	1,227						
Interest Income	16,881	7,500	4,700	8,600	7,800	7,000	6,200
Transfer from WW Fund (830)	92,133						
Total Revenues	196,784	158,500	219,700	232,600	240,800	249,000	258,200
Expenditures							
Capital Projects							
Transfer to WW Cap. Repl. Rsrv.		-	400,000	400,000	400,000	400,000	400,000
Transfer to WW Fund (530)	1,250,000	1,260,000					
Total Expenditures	1,250,000	1,260,000	400,000	400,000	400,000	400,000	400,000
Ending Balance	2,999,200	1,897,700	1,717,400	1,550,000	1,390,800	1,239,800	1,098,000

SECTION III. WATER RATES

This section of the report describes and presents recommendations for updating water rates to provide sufficient revenues for the water utility's ongoing operations, debt service obligations, and capital improvement needs. Proposed water rates also reflect an updated cost of service analysis to help ensure that the water rates meet legal requirements, and maintain equity across the City's water customers.

An overall water rate increase of 6 percent is proposed for July 2016, followed by increases of 4 percent per year in FY 17-18 and FY 18-19 and 3 percent in FY 19-20 and FY 20-21. The water rates and rate schedules presented in this section are intended to result in an overall increase in revenues, relative to the current rates, of 6 percent consistent with the requirements for July 2016. Subsequent rate adjustment would not involve rate structure changes. It should be noted that cost of service refinements to the rate structure, even in a revenue neutral situation, can cause some customer bills to increase while others decrease. These changes are in the interest of legal compliance, improved equity and improved rate structure performance in relation to rate setting policy objectives.

EXISTING WATER RATES

Exhibit III-1, on the following page, presents the City's current water rates, which became effective in July 2015. Single family and multi-family residential customers are subject to a monthly service charge for each dwelling unit, as well as a uniform water usage rate applicable to all units of water consumption. Commercial, institutional, industrial, and irrigation accounts are subject to monthly service charges based on meter size, and a uniform water usage rate for all water usage.

FY 14-15 water demands, which reflects drought conditions and reduced water sales, result in approximately 67 percent of water rate revenue is generated from water usage charge and about 33 percent from fixed service charges. The water conservation best management practice for water rates (BMP 1.4), as promulgated by the California Urban Water Conservation Council (CUWCC), suggest that at least 70 percent of revenue to be generated by usage charges. As water demands return to normal levels the revenue mix is likely to meet BMP target revenue mix.

Based upon a review of the current water rate structure no changes to the rate structure are recommended at this time. However, water rate calculations do reflect an updated cost of service analysis in order to continue to meet legal requirements.

RATE SETTING OBJECTIVES

The development of water rate recommendations was also guided by several rate-setting objectives. These objectives were reviewed with City staff and include:

- Rates should generate sufficient revenues to meet the utility's financial obligations related to operations, debt service, capital improvement needs, and maintenance of prudent reserves

**Exhibit III-1
City of Healdsburg
Current Water Rates**

	Current (1)
Monthly Service Charge	
Single Family	\$ 19.96
Multi-Family (per DU)	\$ 12.88
Non-Residential	
1" meter	\$ 31.80
1 1/2" meter	\$ 61.17
2" meter	\$ 96.56
3" meter	\$ 179.17
4" meter	\$ 297.16
Water Usage Rates (\$/HCF) (1)	
All Potable Water Use	\$ 4.49
Riverview HOA (2)	\$ 1.18
Hydrant Water Sales (3)	\$ 8.98

Notes:

- (1) Effective July 1, 2015.
- (2) Rate applicable to Riverview HOA under terms of 1997 order of condemnation.
- (3) Deposits and connection charges may also apply.

- Rates should reflect a proportionate allocation of the costs of providing service to each customer class based on service demands and capacity requirements
- Rates should continue to encourage water conservation and efficient water use

These objectives guided the review of and recommendations on water rates and rate structures.

CUSTOMER ACCOUNT DATA AND WATER USE ESTIMATES

Water rate calculations are based on a number of factors related to the City's customer base. Factors include the number of customers, customer classes, number of dwelling units, meter size, and actual water usage. The City provides water service through about 4,600 customer accounts. Single family customers comprise about 84 percent of the customers and nearly 59 percent of the water usage. Multi-family dwelling units make up 2 percent of the customers and 9 percent of the water usage. The 87 multi-family water service connections serve about 854 dwelling units. Non-residential and dedicated irrigation accounts comprise 14 percent of the accounts and about 33 percent of the water usage.

While there are extremes on both the low and high ends, average single family water usage is currently about 8.0 HCF per month (one HCF = 100 cubic feet = 748 gallons). Single family customers also exhibit a wide variation in demand throughout the year. Winter water usage for single family homes currently averages about 4.1 HCF per month, while summer usage varies dramatically depending on landscape irrigation and other factors. Average water usage for multi-family dwellings is about 5.6 HCF per month. Multi-family water demands are lower than single family for a variety of reasons including

fewer people per household and limited landscape irrigation (or irrigation that is separately metered). Non-residential water usage can vary dramatically, and non-residential customers are served by meters of varying sizes to accommodate the differences in water demand.

Customers of different meter sizes can place different demands on the water system. Much more water can be delivered through a 4" water meter than through a 1" meter. To relate the potential demands on the water system from customers with different sized water meters, hydraulic capacity factors are used to determine the number of equivalent meters represented by the total customer base with variable meter sizes. For purposes of rate analysis, each single family accounts is assign a meter equivalency factor of 1.0. Each multi-family dwelling is assigned a factor of 0.66 (based on the relationship of average single family demand to multi-family demand). The ratios of instantaneous flow capacities of the various meter sizes to the capacity of a 1" meter are used to determine the meter equivalencies for non-residential accounts. This capacity relationship across meter sizes is generally used to allocate capacity-related costs to various customers.

The foregoing customer account and water use data have been used in water rate analysis that is presented in the remainder of this section.

WATER RATE CALCULATIONS

There are three steps to determining water rates. These are:

- Determine annual water rate revenue requirements
- Analyze the cost of providing service to each customer class
- Design water rates to recover costs from each customer class.

Water Rate Revenue Requirements

The 5-year financial plan was used to identify the water rate revenue required to meet financial obligations for each fiscal year of the five-year planning period. Water rate calculations presented herein are based on the revenue to be generated in FY 16-17. The revenue requirement for FY 16-17 is \$4,542,000, as presented in Section II of this report. This is the annual water rate revenue requirement used for water rate calculation purposes for FY 16-17 represents an overall increase in the level of water rate revenues of 6 percent over the current water rates, with consideration stable water demand in FY 16-17 and growth in the customer base.

Cost of Service Analysis

Once the annual water rate revenue requirement has been determined using the financial plan model, the next step in the rate setting process is to evaluate the cost of providing service. Water rate calculations contained herein are intended to generate the level of revenue commensurate with the revenue requirement from the City's water service customers. The manner in which each customer is responsible for the water utility's costs is the determining factor in the cost of service analysis.

The water utility incurs certain types of costs associated with making water service available to customers. Other costs are incurred as a direct result of customer water usage. A cost of service analysis is intended to allocate the costs of providing water service to customers in proportion to the extent to which each customer causes the costs to be incurred. There are many approaches to cost of service analysis; some are more complex than others. The approach used herein is commensurate with the data available, the distinctions currently made between various types of customers, and the requirement to fairly and reasonably reflect differences in service provisions to differently situated customers.

The cost allocation methodology used herein begins by assigning all costs to one of three categories. The cost allocation process is performed with data available in the City's budget and accounting documents. The three categories include:

- Customer costs, such as meter reading and billing, are fixed costs that tend to vary as a function of the number of customers being served. Customer costs are allocated to customers based on the number of accounts. That is, every customer will pay an equal share of customer-related costs.
- Capacity costs are also fixed costs; however, these tend to vary in relation to the capacity of the water system. Customers that place greater or lesser burdens on the capacity of the water system should bear greater or lesser shares of these costs. The sizing of the water system is based on the potential demand that each customer could place on the water system. Capacity costs are allocated to customers on a dwelling unit basis (residential) or based on the hydraulic capacity of the water meter (non-residential). The hydraulic capacity reflects the potential demand that a customer could place on the water system at any given time. A customer with a large meter size will be assigned a large share of fixed capacity-related costs than one with a smaller meter. Capacity costs include costs associated with the water system's capacity including contributions to the capital program, debt service, maintenance costs, etc.
- Commodity costs are variable costs that vary with the amount of actual water use. Water treatment costs and energy costs are two primary examples. However, in an effort to encourage water conservation, a portion of fixed costs is frequently included in commodity components such that a majority of costs are recovered on the basis of usage. Even though some commodity costs are fixed, rather than variable, it is reasonable to allocate these costs to customers on the basis of usage, rather than the capacity relationship expressed by meter size. A significant portion of the water utility's fixed costs is recovered through water usage charges.

The water conservation best management practice for retail water rates (BMP 1.4), as promulgated by the CUWCC, specifies that at least 70 percent of water rate revenue be generated through usage charges. The City's current water rates generate about 67 percent of revenue from usage (commodity) charges. However, this is due to reduced water usage that has resulted from drought conditions and state-mandated water use restrictions. It is anticipated that the revenue mix will return to 70 percent from usage charges as water demands return to normal. Maintaining the City's policy objective of encouraging water

conservation, recognizing the standard established by the CUWCC, and recognizing current state-mandated water use reductions, the allocation of costs presented herein maintains this relationship with 67 percent of the revenue requirement allocated to the commodity component.

Based on a review of the FY 15-16 budget for the water utility, customer service costs are estimated to be about 3 percent of the annual water rate revenue requirement. This leaves 30 percent of the revenue requirement allocated to capacity costs. In summary, the cost allocation resulted in a distribution of costs to customer, capacity, and commodity categories at about 3 percent, 30 percent, and 67 percent, respectively.

Water Rate Design

The third step in the rate setting process is the design of water rates to recover costs from each customer class and generate the revenue needed for the utility. The City's water rates include both fixed monthly service charges and water usage rates. **Exhibit III-2** presents the calculation of service charges and water usage charges for the water rates proposed for FY 16-17. The calculation of each of these is described below.

Service Charges

Service charges are intended to recover the customer and capacity costs identified through the cost of service analysis. Service charges apply to all customer water bills, regardless of the amount of water actually used. Customers that use no water during a month should still be required to pay the monthly service charge. In calculating service charges customer costs are allocated equally to all customers and capacity costs are allocated based on meter size in relation to the hydraulic capacity associated with the various meter sizes.

The proposed monthly service charge for a single family home is \$20.21 and \$14.05 for a multi-family dwelling unit. The proposed service charge for a single family home is \$0.25 per month higher than the current charge. The proposed charge for a multi-family dwelling is \$1.17 per month higher than the current charge. These changes are due to the relative demand characteristics between single family homes and multi-family dwelling units, and reflect the proportionality requirement embodied in the State constitution. Proposed non-residential service charges vary from \$32.33 to \$303.69, depending on meter size. These are 1.7 to 2.2 percent higher than current service charges, and reflect the capacity relationship across meter sizes. The variation of service charges through meter sizes reflects the fact that a small portion of water system costs are directly related to the number of customers served. A majority of fixed costs are allocated on a capacity basis as reflected by the meter size. The changes to the service charges across the range of meter sizes better reflects the cost of providing service to customers of varying meter sizes.

Water Usage Rates

The proposed water usage rates continue a uniform rate applicable to both residential and non-residential customers. Dividing the commodity costs identified in the cost of service analysis by total water sales results in a uniform water usage rate of \$4.80 per HCF. This is 6.9 percent higher than the current \$4.49 per HCF.

**Exhibit III-2
City of Healdsburg
Water Rate Calculations for FY 16-17**

	No. of Accounts	No. of Dwell. Units	No. of Non-Residential Accounts by Meter Size						
			1"	1 1/2"	2"	3"	4"		
Customer Class									
Single Family	3,870	3,870							
Multi-Family	87	854							
Non-Residential	482		355	36	78	8	5		
Irrigation	164		91	20	48	1	4		
Total	4,603	4,724	446	56	126	9	9		
Hydr. Capac. Factor		1.00 / 0.66	1.67	3.33	5.33	10.00	16.7		
Total 1" Equiv. Mtrs.	6,277	4,434	745	186	672	90	150		
Monthly Service Charges									
	SF DUs	MF DUs	Non-Residential Accounts by Meter Size						
Customer Costs	\$ 2.11	\$ 2.11	\$ 2.11	\$ 2.11	\$ 2.11	\$ 2.11	\$ 2.11	\$ 2.11	
Capacity Costs	\$ 18.09	\$ 11.94	\$ 30.21	\$ 60.24	\$ 96.43	\$ 180.91	\$ 301.58		
Total Service Charge	\$ 20.21	\$ 14.05	\$ 32.33	\$ 62.36	\$ 98.54	\$ 183.03	\$ 303.69		
Ann. Serv. Chrg. Rev.	\$ 938,351	\$ 144,032	\$ 173,013	\$ 41,905	\$ 148,993	\$ 19,767	\$ 32,799	\$ 1,499,000	
FY 16-17 Revenue Requirement			Water Usage Rates						
Customer Costs	\$ 136,260	3.0%	Single Family	Annual Wtr. Use (HCF)	Usage Rate (\$/HCF)	Annual Revenue			
Capacity Costs	\$ 1,362,600	30.0%	Multi-Family	373,400	\$ 4.80	\$ 1,793,400			
Commodity Costs	\$ 3,043,140	67.0%	Non-Residential	54,300	\$ 4.80	\$ 260,800			
Total Rev. Rqmt.	\$ 4,542,000		Irrigation	125,400	\$ 4.80	\$ 602,300			
			Riverview HOA	79,700	\$ 4.80	\$ 382,800			
			Totals	3,000	\$ 1.26	\$ 3,800			
				635,800		\$ 3,043,100			

Special Rates

The City currently has a number of special rates applicable to certain situations. Recommendations related to each of these are as follows:

- *Riverview Homeowner Association* - The water rates applicable to the Riverview Homeowner Association (HOA) is determined based on the Order of Condemnation from 1997. This order specifies that the City charge the Riverview HOA an initial \$0.33 per HCF for untreated well water for irrigation purposes. This initial rate can be adjusted based on changes to the City's rate for domestic water. This results in a water usage rate for FY 16-17 of \$1.26 per HCF.
- *Hydrant Water Sales* - The City provides water through fire hydrants for construction, dust control, or other purposes. The current rate is \$8.98 per HCF. It is recommended that the City continue to maintain a rate for hydrant water sales equal to two times the uniform water rate for water service. This would be a rate of \$9.60 per HCF for FY 16-17. Deposits and connection fees may also apply, as determined by the City. The higher rate is intended to reflect the extra administrative cost associated with this type of service.
- *County Service Area 41* - The City provides water to County Service Area (CSA) 41 (previously CSA 24) under terms of an agreement from 1992. Current water usage rate for CSA 41 is 80 percent of the general water usage rate, and monthly service charges for the 3" and 4" connections are the same as that paid by other non-residential accounts with those meter sizes. City staff is currently working to update the water rates applicable to CSA 41, and these rates were not addressed by this report.

The proposed water rates reflect the cost of providing water service to customers, as well as the requirement that costs be proportionately allocated to customers based on capacity requirements and service demands.

PROPOSED WATER RATE SCHEDULES

Exhibit III-3 summarizes proposed water rate schedules for rates to become effective beginning in July 2016 and then each July from 2017 through 2020. The proposed water rates for July 2016 reflect an overall 6 percent increase in revenue relative to the current water rates, as well as the cost of service adjustments previously described. Water rate schedules for July 2017 and July 2018 each include a 4 percent rate increase, and the schedules for July 2019 and July 2020 represent rate increases of 3 percent each year, in accordance with revenue needs identified with the financial plan presented in Section II. No rate structure changes are proposed in these four later years, and all service charges and water usage rates are to change by the same percentage.

Exhibit III-3
City of Healdsburg
Current and Proposed Water Rates

	Current (1)	July 2016	July 2017	July 2018	July 2019	July 2020
Monthly Service Charge						
Single Family	\$ 19.96	\$ 20.21	\$ 21.01	\$ 21.85	\$ 22.51	\$ 23.19
Multi-Family (per DU)	\$ 12.88	\$ 14.05	\$ 14.62	\$ 15.20	\$ 15.66	\$ 16.13
Non-Residential						
1" meter	\$ 31.80	\$ 32.33	\$ 33.62	\$ 34.96	\$ 36.01	\$ 37.09
1 1/2" meter	\$ 61.17	\$ 62.36	\$ 64.85	\$ 67.44	\$ 69.46	\$ 71.54
2" meter	\$ 96.56	\$ 98.54	\$ 102.48	\$ 106.58	\$ 109.78	\$ 113.07
3" meter	\$ 179.17	\$ 183.03	\$ 190.35	\$ 197.96	\$ 203.90	\$ 210.02
4" meter	\$ 297.16	\$ 303.69	\$ 315.84	\$ 328.47	\$ 338.32	\$ 348.47
Water Usage Rates (\$/HCF)						
All Potable Water Use	\$ 4.49	\$ 4.80	\$ 4.99	\$ 5.19	\$ 5.35	\$ 5.51
Riverview HOA (2)	\$ 1.18	\$ 1.26	\$ 1.31	\$ 1.36	\$ 1.40	\$ 1.44
Hydrant Water Sales (3)	\$ 8.98	\$ 9.60	\$ 9.98	\$ 10.38	\$ 10.70	\$ 11.02

Notes:

- (1) Effective July 1, 2015.
- (2) Rate applicable to Riverview HOA under terms of 1997 order of condemnation.
- (3) Deposits and connection charges may also apply.

Impact of Proposed Rates on Representative Customer Bills

Exhibit III-4 summarizes the impact of the proposed water rates for July 2016 relative to the current water rates for a variety of typical customers. Any cost of service adjustment can result in changes in customer bills, even when applied in a revenue neutral situation. The specific impact to any individual customer will depend on the customer class, number of dwelling units, meter size, and actual water usage.

Monthly water bills for single family customers will generally increase between 3 and 6 percent, depending on the amount of water used. Multi-family dwelling units will have larger bill increases, ranging from about 7 to 9 percent depending on water use, due to the cost of service adjustments. Monthly water bills for non-residential customers and dedicated irrigation accounts will generally increase between 2 and 7 percent depending on individual circumstances with respect to meter size and water usage.

In all cases, the bills under the proposed water rates are intended to reflect the overall cost of providing water service, as well as to reflect the proportionate allocation of costs across customers.

Exhibit III-4
City of Healdsburg
Bill Impacts for Sample Water Customers

	Use (HCF)	Current	Proposed	Change
<i>Sample Water Bill Impacts</i>				
Single Family	4	\$ 37.92	\$ 39.41	\$ 1.49
Single Family	8	\$ 55.88	\$ 58.61	\$ 2.73
Single Family	20	\$ 109.76	\$ 116.21	\$ 6.45
Multi-Family Dwelling	6	\$ 39.82	\$ 42.85	\$ 3.03
Small Retail - 1"	15	\$ 99.15	\$ 104.33	\$ 5.18
Office Building - 1"	30	\$ 166.50	\$ 176.33	\$ 9.83
Large Retail - 2"	150	\$ 770.06	\$ 818.54	\$ 48.48
Restaurant - 1"	50	\$ 256.30	\$ 272.33	\$ 16.03
Laundromat - 2"	200	\$ 994.56	\$ 1,058.54	\$ 63.98
Hotel w/ Restaurant - 3"	500	\$ 2,424.17	\$ 2,583.03	\$ 158.86
Landscape Irrig - 2"	300	\$ 1,443.56	\$ 1,538.54	\$ 94.98

SECTION IV. WASTEWATER RATES

This section of the report describes and presents recommendations for updating wastewater rates to provide sufficient revenues for the wastewater utility's ongoing operations, debt service obligations, and capital improvement needs. An update of the cost of service analysis is presented to ensure that wastewater rates reflect the costs of providing service among the City's wastewater customers.

The annual wastewater rate revenue requirement was presented in Section II as a result of the development of the 5-year financial plan. The annual wastewater rate revenue requirement for FY 16-17 is used to perform rate analyses and to develop wastewater rate schedules presented herein. This revenue requirement reflects a 2 percent decrease in the overall level of the wastewater rates relative to the current wastewater rates.

EXISTING WASTEWATER RATES

Exhibit IV-1, on the following page, summarizes the current wastewater rates for the City's wastewater utility. Wastewater rates were last adjusted in July 2015.

Single family and multi-family residential customers are subject to fixed monthly service charges plus a usage charge based on winter water usage. Residential monthly service charges differ between single family and multi-family residential dwellings due to differences in demand characteristics. Each year, the City monitors water usage during low-use winter months (bills rendered in January through April) and then determines the average winter usage for each residential customer (seasonal sewer average or SSA). Winter water usage is primarily indoor water usage. In May of each year, the City calculates a new wastewater bill amount for each residential customer based on the prior winter water use. When the winter average is not available the average for all residential accounts is used. In some cases, adjustments are made to the winter average based on special circumstances.

In October 2015, the City Council considered and accepted a recommendation from City staff and The Reed Group, Inc. to modify the calculation of the SSA. Rather than using the 4-month average (bills rendered in January through April) of winter water usage, the new approach will be to exclude the highest value during the 4-month period, and use the average from the remaining three months for the SSA. This change is expected to be more equitable for customers because, occasionally, a dry month can lead to irrigation usage during the winter period. The proposed new approach would reduce the adverse affect of this irrigation usage affecting wastewater bills.

Non-residential customers are subject to a low, medium, or high strength usage rate based on actual water usage within each monthly billing cycle. Non-residential wastewater bills also include a fixed service charge based on the size of the water meter.

At present, approximately 39 percent of wastewater rate revenue is derived from the monthly service charges and minimum charges. Approximately 61 percent of wastewater rate revenue is related to water usage and estimated wastewater flows.

**Exhibit IV-1
City of Healdsburg
Current Wastewater Rates**

	Current (1)
Monthly Service Charge	
Single Family	\$ 38.02
Flat Rate (2)	\$ 98.61
Multi-Family (per DU)	\$ 34.49
Non-Residential	
1" meter	\$ 61.76
1 1/2" meter	\$ 120.61
2" meter	\$ 191.51
3" meter	\$ 357.07
4" meter	\$ 593.55
Wastewater Usage Rate (\$/HCF)	
Residential (3)	
Single Family	\$ 10.10
Multi-Family	\$ 10.10
Non-Residential (4)	
Low Strength	\$ 9.09
Medium Strength	\$ 13.47
High Strength	\$ 19.91

Notes:

- (1) Effective July 1, 2015.
- (2) Applies to customers not receiving water service.
- (3) Currently applies to average winter water usage during the preceeding December-March period. Under the new calculation the highest monthly value would be omitted from the average.
- (4) Applies to actual monthly water usage.

Upon review of the current wastewater rate structure no rate structure changes recommended, however, the rate calculation reflects an updated cost of service analysis to help ensure the wastewater rates meet legal requirements.

RATE SETTING OBJECTIVES

The development of wastewater rate recommendations has been guided by several rate-setting objectives. These objectives were reviewed with City staff and include:

- Rates should generate sufficient revenues to meet the utility's financial obligations related to operations, debt service, capital improvement needs, and maintenance of prudent reserves
- Rates should reflect a proportionate allocation of the costs of providing service to each customer class based on service demands and capacity requirements
- Rates should continue to encourage water conservation and efficient water use

These objectives guided the review of and recommendations on wastewater rates and rate structures.

CUSTOMER ACCOUNT DATA AND WASTEWATER FLOW AND LOADING ESTIMATES

Wastewater rate calculations are based on a number of factors related to the City's customers. Factors include the number of customers, customer classes, water usage and wastewater flows, and strength characteristics of wastewater as determined by BOD and TSS. **Exhibit IV-2** summarizes customer account and water usage data obtained from the City's utility billing system, as well as estimates of resulting wastewater flow and loading characteristics.

Residential wastewater flows are estimated based on average water usage during winter months. A review of residential water usage data indicated that about 52 percent of annual water usage returns to the wastewater system (based on average winter water usage). For multi-family customers, about 69 percent of annual water usage is estimated to return to the wastewater system. For multi-family customers irrigation water usage tends to be either minimal or separately metered. Non-residential wastewater flows are based on actual water usage, as most non-residential irrigation is separately metered. However, in wastewater rate calculations a 90 percent rate of return to the wastewater system is assumed to reflect minor irrigation usage.

The wastewater utility serves nearly 3,650 single family homes, about 1,090 multi-family dwellings, and nearly 450 non-residential customers. On average, single family wastewater flows (based on winter water usage) is about 4.1 HCF per month. For multi-family dwellings, the average wastewater flow is about 3.7 HCF per month (based on the proposed new SSA calculation). Non-residential wastewater flows vary based on customer characteristics.

Wastewater rate analyses consider the strength (loading) characteristics of wastewater entering treatment facilities. Strength factors for biochemical oxygen demand (BOD) and total suspended solids (TSS) are considered, as these factors play a key role in treatment plant operations. Residential customers are assigned standard residential strength factors of 240 mg/l for BOD and 200 mg/l for TSS. While actual strength characteristics of individual customers can vary (and generally exist within a range), low, medium, and high non-residential strength categories have been defined with strength factors as indicated below:

- Low strength: 240 mg/l for BOD 200 mg/l for TSS
- Medium strength: 500 mg/l for BOD 400 mg/l for TSS
- High strength: 1,000 mg/l for BOD 600 mg/l for TSS

Applying residential and non-residential strength factors to estimates of annual wastewater flows results in an estimated annual wastewater volume and loading that is commensurate to actual treatment plant inflows. Strength factors assigned to each category of customer are based on guidelines published by the California State Water Resources Control Board (SWRCB) and other sources. Customers that exhibit unique or unusually high strength characteristics should be billed in accordance with special provisions, described later in this section.

**Exhibit IV-2
City of Healdsburg
Wastewater Customer Account Data and Estimated Wastewater Flows and Loadings for FY 16-17**

Customer Class	No. of DUs/ Accts. (1)	No. of ESFDs	Water Usage (1)	Rate of Return	Estimated		BOD Strength (4)	Annual BOD Loading lbs	TSS Strength (4)	Annual TSS Loading lbs
					Annual Sewer Flow (2)	Annual Sewer Flow MG				
Residential			HCF		HCF		mg/l		mg/l	
Single Family	3,651	3,651	343,300	52%	178,300	133	240	266,950	200	222,458
Multi-Family (3)	1,090	1,001	71,200	69%	48,900	37	240	73,213	200	61,011
Non-Residential										
Low Strength	321	831	65,800	90%	59,220	44	240	88,664	200	73,887
Medium Strength	79	230	29,200	90%	26,280	20	500	81,972	400	65,577
High Strength	56	149	26,800	90%	24,120	18	1,000	150,468	600	90,281
Totals	5,197	5,861	536,300		336,820	252	315	661,267	244	513,214

Notes:

- (1) Based on utility billing system data from FY 14-15, adjusted for estimated water usage in FY 16-17. DU = dwelling units.
- (2) Based on annualized average winter water usage for residential accounts and annual water usage for non-residential accounts.
- (3) Utility billing indicate there are 1,090 multi-family dwelling units served by the wastewater utility through 193 separate service connections.
- (4) Based on previous wastewater rate analyses, SWRCB guidelines, and adjustments to better match actual treatment plant flows and loadings.

WASTEWATER RATE CALCULATIONS

There are three steps to determining wastewater rates. These are:

- Determine annual wastewater rate revenue requirements
- Analyze the cost of providing service to each customer class
- Design wastewater rates to recover costs from each customer class.

Wastewater Rate Revenue Requirements

The 5-year financial plan was used to identify the wastewater rate revenue requirements for each fiscal year of the five-year planning period. Wastewater rate calculations presented herein are based on the revenue to be generated in FY 16-17 and reflects an overall 2 percent rate decrease relative to the current wastewater rates. The revenue needed to meet financial obligations for FY 16-17 is estimated to be \$6,517,000. This is the annual wastewater rate revenue requirement used for wastewater rate calculation purposes for July 2016, and also incorporates the affects of the new SSA calculation.

Cost of Service Analysis

Once the annual wastewater rate revenue requirement has been determined, the next step in the rate setting process is to evaluate the cost of providing service. Wastewater rate calculations contained herein are intended to generate the level of revenue commensurate with the revenue requirement from the City's wastewater service customers. The manner in which each customer is responsible for the wastewater utility's costs is the determining factor in the cost of service analysis.

To develop equitable wastewater rates, the revenue requirement is allocated to various customer classifications according to the services provided and the demands placed on the wastewater system. The City recovers a majority of wastewater costs on the basis of water usage (wastewater flows), BOD, and TSS, resulting in usage charges generating about 60 percent of wastewater rate revenues. Fixed service charges account for about 40 percent of wastewater revenues. This revenue mix is consistent with the City's water conservation objective.

Exhibit IV-3 summarizes how the FY 16-17 wastewater rate revenue requirement is allocated to fixed charges as well as to flow, BOD, and TSS components, which comprise the usage charges. Once total costs are allocated, unit costs were determined by dividing the total cost for each component by the number of units identified in Exhibit IV-2. These unit costs become the basis for then assigning costs to customer classes.

**Exhibit IV-3
City of Healdsburg
Determination of Unit Costs**

Cost Category	Category Allocation Percentages	Parameter Allocation Percentages (5)	Annual Cost Allocated to Each Parameter	Total Quantities (6)	Unit Cost for Each Parameter
Fixed Charge Costs (1)					
Customer Accounts	40%	6%	\$ 156,000	5,197	\$ 30.02
Equiv. Single Family Dwellings (ESFDs)		94%	\$ 2,450,000	5,861	\$ 417.99
Usage Charge O&M Costs for Collection (2)	15%	100%	\$ 978,000	252	\$ 3,881.86
Flow (MG)					
Usage Charge O&M Costs for Treatment (3)	45%				
Flow (MG)		34%	\$ 997,000	252	\$ 3,957.27
BOD (lbs)		33%	\$ 968,000	661,267	\$ 1,464
TSS (lbs)		33%	\$ 968,000	513,214	\$ 1,886
Total FY 16-17 Wastewater Rate Rev. Rqmt. (4)			\$ 6,517,000		

Notes:

- (1) Includes estimated customer costs, a portion of administrative costs, and a portion of debt service.
- (2) Includes estimated collection system and a portion of administrative and capital program costs.
- (3) Includes estimated wastewater treatment costs and a portion of capital program and debt service costs.
- (4) Revenue requirement for FY 16-17 based on financial plan model presented in Section II.
- (5) Parameter allocations based on previous rate analyses, information provided by City, and rate setting practices.
- (6) From Exhibit IV-2.

The cost of service analysis for wastewater is more complicated than water rate analysis in that treatment costs are separated from collection system costs. Collection system costs are allocated entirely on the basis of flow, whereas treatment costs are allocated on the basis of flow, BOD, and TSS.

The City's budget structure does not lend itself to the segregation of costs into collection and treatment components, or to the allocation of treatment costs to flow, BOD and TSS parameters. We have relied on the information that is available for allocating costs to the various categories, as well as relied upon professional judgment and standard estimating practices used in rate setting to allocate costs across flow, BOD, and TSS parameters. The wastewater revenue requirement has been allocated 40 percent to fixed service charges, 15 percent to the collection system, and 45 percent to treatment. Wastewater treatment costs have been allocated 34 percent to flow, 33 percent to BOD, and 33 percent to TSS. We believe these allocations are reasonable, and are within the ranges found in other wastewater rate analyses.

Unit costs are applied to the annual wastewater flows, as well as BOD and TSS loadings associated with each customer class to arrive at the allocation of total costs to each customer class. **Exhibit IV-4** presents the allocation of costs to each user class.

Exhibit IV-5 presents the final wastewater user rates and charges recommended for each customer class. Rates for residential customers include a fixed service charge for each dwelling unit, plus a usage charge to be applied to winter water usage. Unmetered (sewer only) residential accounts will have a flat monthly wastewater charge based on estimated average winter water usage. Non-residential (low, medium, and high) customers are subject to a monthly service charge based on meter size and wastewater usage rates applied to actual monthly water usage. Usage charges vary for each strength category. The usage charges have also been adjusted for an estimated 90 percent rate of return to the wastewater system. That is, it is estimated that 10 percent of non-residential water use (exclusive of dedicated irrigation meters) does not return to the wastewater system

Wastewater Rate Design

No changes in the wastewater rate structure is proposed at this time, although the proposed rate schedule for July 2016 reflects the updated cost of service analysis, as presented herein. This update results in slightly different changes to each of the rate components, as well as incorporating the new SSA calculation into the residential wastewater bill determination.

Special Rates

The City currently has a few special rates applicable in certain circumstances. Recommendations related to these special circumstances are as follows:

**Exhibit IV-4
City of Healdsburg
Allocation of Wastewater Costs to Users (1)**

No. of DUs/ Accts.	Customer Class	Fixed Charge Costs		Usage Charge Costs				Allocation of Total Costs
		Customer Unit Cost = \$ 30.02	Capacity Unit Cost = \$ 417.99	Collection	Treatment			
				Flow Unit Cost = \$ 3,881.86	Flow Unit Cost = \$ 3,957.27	BOD Unit Cost = \$ 1.464	SS Unit Cost = \$ 1.886	
	Residential							
3,651	Single Family	\$ 109,593	\$ 1,526,066	\$ 517,717	\$ 527,775	\$ 390,777	\$ 419,591	\$ 3,491,519
1,090	Multi-Family	\$ 32,719	\$ 418,534	\$ 141,987	\$ 144,746	\$ 107,173	\$ 115,076	\$ 960,235
	Non-Residential							
321	Low Strength	\$ 9,636	\$ 347,183	\$ 171,953	\$ 175,293	\$ 129,791	\$ 139,362	\$ 973,218
79	Medium Strength	\$ 2,371	\$ 96,041	\$ 76,307	\$ 77,790	\$ 119,995	\$ 123,689	\$ 496,192
56	High Strength	\$ 1,681	\$ 62,175	\$ 70,036	\$ 71,396	\$ 220,264	\$ 170,284	\$ 595,836
5,197	Totals	\$ 156,000	\$ 2,450,000	\$ 978,000	\$ 997,000	\$ 968,000	\$ 968,000	\$ 6,517,000

Notes:

(1) Unit costs at the top of each column are multiplied by the wastewater flow, the BOD loading, or the SS loading for each customer class from Exhibit IV-2.

**Exhibit IV-5
City of Healdsburg
Wastewater Rate Determination for FY 16-17**

No. of DUs/ Accts.	Customer Class	Est. Ann. Sewer Flow	BOD Strength	TSS Strength	Monthly Fixed Charge	Usage Rate (1)	Fixed Charges	Usage Charges	Total Annual Revenue
		HCF	mg/l	mg/l	\$/DU	\$/HCF			
	Residential								
3,651	Single Family	178,300	240	200	\$ 37.33	\$ 10.41	\$ 1,635,660	\$ 1,855,859	\$ 3,491,519
1,090	Multi-Family	48,900	240	200	\$ 34.50	\$ 10.41	\$ 451,253	\$ 508,982	\$ 960,235
	Non-Residential								
321	Low Strength	59,220	240	200	Varies by Meter Size (2)	\$ 9.37	\$ 356,819	\$ 616,399	\$ 973,218
79	Medium Strength	26,280	500	400		\$ 13.62	\$ 98,412	\$ 397,780	\$ 496,192
56	High Strength	24,120	1,000	600		\$ 19.85	\$ 63,856	\$ 531,979	\$ 595,836
5,197	Totals	336,820					\$ 2,606,000	\$ 3,911,000	\$ 6,517,000

Notes:

- (1) Wastewater usage rates apply to winter water use for residential customers and actual monthly water use for non-residential customers.
- (2) See Exhibit IV-6 for monthly service charges for non-residential customers, which vary based on the size of the water meter.

	1"	1 1/2"	2"	3"	4"
Monthly Non-Residential Service Charges -->	\$ 60.67	\$ 118.49	\$ 188.16	\$ 350.82	\$ 583.15

- *Residential Flat Rates* – Residential customers receiving wastewater service, but not water service, from the City should continue to be charged for service based on a flat monthly service charge. The sewer-only residential wastewater rate for single family customers was determined to be \$99.79 per month based on the monthly service charge for single family customers, plus a usage charge based on the average winter water use among single family customers.
- *Non-Residential Flat Rates* – The City maintains a small number of non-residential flat rate customers. The City should continue to charge these customers for wastewater service based on customer characteristics and estimated service demands for each account. The non-residential wastewater rate for these customers is determined based on a monthly service charge, plus a usage charge based on estimated flow and strength characteristics.
- *Wastewater Usage Rate for Special Situations* – In limited situations, the City may provide wastewater service to customers with unique and/or significant wastewater discharge characteristics. Examples may include wineries, breweries, or food processors with non-standard strength characteristics, or with wastewater flow that does not correlate with water usage like other non-residential accounts. In these situations, the City may determine it is reasonable and appropriate to calculate a special wastewater usage rate based on the specific wastewater flow characteristics of each special case customer.

The cost of service calculations described in the preceding pages resulted in unit costs for the volumetric portion of wastewater collection and treatment in terms of flow volume, pounds of BOD, and pounds of TSS. These unit costs for collection and treatment are the building blocks for wastewater usage rates.

Flow volume	\$5.86 per HCF
BOD	\$1.46 per pound
TSS	\$1.89 per pound

An example calculation for developing a customer-specific wastewater usage rate for a special situation (a large winery) is shown below. The calculation relies on the unit costs identified above. The customized wastewater usage rate would be used in place of a standard (low, medium, or high) wastewater usage rate.

Sample Special Wastewater Usage Rate Calculation

Wastewater strength characteristics are estimated or determined through sampling. For this sample calculation, BOD is assumed to be 2,500 mg/l and TSS is assumed to be 1,000 mg/l.

$$\begin{aligned}
 \text{Wastewater Usage Rate} &= \$5.86 + [\text{BOD} \times \$1.46 + \text{TSS} \times \$1.89] \times 8.34 / \\
 &\quad 1,000,000 \times 748 \\
 &= \$5.86 + [2,500 \times \$1.46 + 1,000 \times \$1.89] \times 8.34 / \\
 &\quad 1,000,000 \times 748 \\
 &= \mathbf{\$40.46 \text{ per HCF of wastewater flow}}
 \end{aligned}$$

This customized wastewater usage rate would apply to the wastewater flow volume. To apply the wastewater usage rate to metered water usage a rate of return factor should be applied. For example, if it is determined that 80 percent of the water usage returns to the sewer system as wastewater then the appropriate wastewater usage rate, applied to metered water usage, would be **\$32.37/HCF of water usage** ($\$40.46 \times 80\%$). A fixed service charge, based on meter size, would also be part of the wastewater bill.

The unit costs used in the sample calculation above should be adjusted commensurate with any future wastewater rate changes.

PROPOSED WASTEWATER RATE SCHEDULES

Exhibit IV-6 summarizes the proposed wastewater rate schedule for July 2016, which reflects an overall 2 percent decrease from the current wastewater rates. No further changes to the wastewater rates are proposed at this time through FY 20-21.

Impact of Proposed Rates on Representative Customer Bills

Exhibit IV-7 summarizes the impact of the proposed wastewater rates relative to current rates for a variety of typical customers. The proposed wastewater rates reflect the cost of providing wastewater service, improve the equity between customer classes, and provide an updated distribution of costs across customers and customer classes.

Exhibit IV-6
City of Healdsburg
Current and Proposed Wastewater Rates

	Current (1)	July 2016
Monthly Service Charge		
Single Family	\$ 38.02	\$ 37.33
Flat Rate (2)	\$ 98.61	\$ 99.79
Multi-Family (per DU)	\$ 34.49	\$ 34.50
Non-Residential		
1" meter	\$ 61.76	\$ 60.67
1 1/2" meter	\$ 120.61	\$ 118.49
2" meter	\$ 191.51	\$ 188.16
3" meter	\$ 357.07	\$ 350.82
4" meter	\$ 593.55	\$ 583.15
Wastewater Usage Rate (\$/HCF)		
Residential (3)		
Single Family	\$ 10.10	\$ 10.41
Multi-Family	\$ 10.10	\$ 10.41
Non-Residential (4)		
Low Strength	\$ 9.09	\$ 9.37
Medium Strength	\$ 13.47	\$ 13.62
High Strength	\$ 19.91	\$ 19.85

Notes:

- (1) Effective July 1, 2015.
- (2) Applies to residential customers for whom the City does not provide water service.
- (3) Currently applies to average water usage from bills rendered from January through April. Under the new SSA methodology, the highest value during this period will be omitted from the average.
- (4) Applies to actual monthly water usage. Includes an allowance for up to 10 percent of water usage to not return to the wastewater system (e.g., used for irrigation).

Exhibit IV-7
City of Healdsburg
Bill Impacts for Sample Wastewater Customers

	Use (HCF) (1)	Current	Proposed	Change
Sample Wastewater Bill Impacts				
Single Family (2)	3	\$ 68.32	\$ 68.56	\$ 0.24
Single Family (2)	4	\$ 78.42	\$ 78.97	\$ 0.55
Single Family (2)	7	\$ 108.72	\$ 110.20	\$ 1.48
Multi-Family Dwelling	5	\$ 84.99	\$ 86.55	\$ 1.56
Small Retail - 1" L	15	\$ 198.11	\$ 201.19	\$ 3.08
Office Building - 1" L	30	\$ 334.46	\$ 341.70	\$ 7.24
Large Retail - 2" L	150	\$ 1,555.01	\$ 1,593.33	\$ 38.32
Restaurant - 1" H	50	\$ 1,057.26	\$ 1,053.17	\$ (4.09)
Laundromat - 2" L	200	\$ 2,009.51	\$ 2,061.71	\$ 52.20
Hotel w/ Restaurant - 3" M	500	\$ 7,092.07	\$ 7,162.13	\$ 70.06

Notes:

- (1) Average winter water usage for residential customers, and actual monthly water usage for non-residential customers.
- (2) Does not reflect the benefit derived from the change in the SSA calculation.

Examples shown in Exhibit IV-7 do not reflect the potential savings to residential wastewater customers stemming from the change in the SSA calculation methodology. A reduction in the SSA of 0.5 HCF would result in a reducing the wastewater bill by \$5.05 per month, based on the proposed wastewater rates and the change in the SSA methodology. **Exhibit IV-8** illustrates how the SSA is calculated under the current method, as well as under the new method approved by the City Council in October 2015.

Exhibit IV-8
City of Healdsburg
Current and Proposed Seasonal Sewer Average (SSA) Calculation Methodology

Billing Month	Current SSA Calc.		New SSA Calc.	
	Water Use (HCF)	4-Month Avg. (HCF)	Water Use (HCF)	3-Month Avg. (HCF)
Jan-15	5	} 5.5	5	} 5
Feb-15	4			
Mar-15	7			
Apr-15	6			
May-15	9		9	
Jun-15	12		12	
Jul-15	19		19	
Aug-15	21		21	
Sep-15	20		20	
Oct-15	17		17	
Nov-15	12		12	
Dec-15	6		6	

Appendix 6.1 – Sanitary Sewer Spill ~~Overflow~~ Emergency Response Plan (SERP)

updated 06/05/2023





Spill Emergency Response Plan



Effective Date: 2/1/2020

Revised Date: 5/31/2023

Approved by: Rob Scates

Signature: 

Date: 5/31/2023

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2023 City of Healdsburg Edits

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Sanitary Sewer Spill Emergency Response Plan

1. Purpose

The purpose of the City of Healdsburg's Spill Emergency Response Plan (SERP) is to support an orderly and effective response to Sanitary Sewer Spills (Spills). The SERP provides guidelines for City personnel to follow in responding to, cleaning up, and reporting Spills that may occur within the City's service area. This SERP satisfies the SWRCB Statewide General Waste Discharge Requirements (GWDR), which require wastewater collection agencies to have an Spill Emergency Response Plan.

2. Policy

The City's employees are required to report all sanitary sewer spills found and to take the appropriate action to secure the sanitary sewer spill area, properly report to the appropriate regulatory agencies, relieve the cause of the spill, and ensure that the affected area is cleaned as soon as possible to minimize health hazards to the public and protect the environment. The City's goal is to respond to sewer system spills as soon as possible following notification. The City will follow reporting procedures in regards to sewer spills as set forth by the North Coast Regional Water Quality Control Board (NCRWQCB) and the California State Water Resources Control Board (SWRCB).

3. Definitions as Used in This SERP

CALIFORNIA INTEGRATED WATER QUALITY SYSTEM (CIWQS): Refers to the State Water Resources Control Board online electronic reporting system that is used to report SSSs, certify completion of the SSMP, and provide information on the sanitary sewer system.

FOG – Fats, Oils, and Grease: Refers to fats, oils, and grease typically associated with food preparation and cooking activities that can cause blockages in the sanitary sewer system.

LEGALLY RESPONSIBLE OFFICIAL (LRO): Refers to an individual who has the authority to certify reports and other actions that are submitted through CIWQS.

MAINLINE SEWER: Refers to City wastewater collection system piping that is not a private lateral connection to a user.

MAINTENANCE HOLE OR MANHOLE: Refers to an engineered structure that is intended to provide access to a sanitary sewer for maintenance and inspection.

NOTIFICATION OF AN SSS: Refers to the time at which the City becomes aware of an SSS event through observation or notification by the public or other source.

NUISANCE - California Water Code section 13050, subdivision (m), defines nuisance as anything that meets all of the following requirements:

- a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
- b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
- c. Occurs during, or as a result of, the treatment or disposal of wastes.

PREVENTATIVE MAINTENANCE: Refers to maintenance activities intended to prevent failures of the wastewater collection system facilities (e.g. cleaning, CCTV, inspection).

PRIVATE LATERAL SEWAGE DISCHARGES – Sewage overflow discharges that are caused by blockages or other problems within a privately-owned lateral.

SANITARY SEWER SPILL (SSS or Spill) - Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSSs include:

- (i) Overflows or releases of untreated or partially treated wastewater that reach waters of the State;
- (ii) Overflows or releases of untreated or partially treated wastewater that do not reach waters of the State; and
- (iii) Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.

SSSs that include multiple appearance points resulting from a single cause will be considered one SSS for documentation and reporting purposes in CIWQS.

***NOTE:** Wastewater backups into buildings caused by a blockage or other malfunction of a building lateral that is privately owned are not SSSs.*

SSS Categories:

- Category 1: Discharges of untreated or partially treated wastewater of **any volume** resulting from an enrollee's sanitary sewer system failure or flow condition that:
- Reach surface water or surface water body that contains no flow or volume of water, or
 - Reach a Municipal Separate Storm Sewer System (MS4) and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the MS4 is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or groundwater infiltration basin (e.g., infiltration pit, percolation pond).

A spill out of a lateral and is caused by a failure or blockage in the sanitary sewer system that discharges to a surface water is a Category 1 spill.

- Category 2: Discharge of untreated or partially treated wastewater 1,000 gallons or greater resulting from a sanitary sewer system failure or flow condition that :
- Does not reach surface water or surface water body that contains no flow or volume of water
 - The entire SSS discharged to the storm drain system was fully recovered and disposed of properly.

A spill of 1,000 gallons or greater that spills out of a lateral and is caused by a failure or blockage in the sanitary sewer system, is a Category 2 spill.

- Category 3: Discharge of untreated or partially treated wastewater greater than 50 gallons and less than 1,000 gallons resulting from a sanitary sewer system failure or flow condition that either:
- Does not reach surface water, a drainage channel, or an MS4, or
 - The entire SSS discharged to the storm drain system was fully recovered and disposed of properly.

A spill of 50 gallons or greater but less than 1,000 gallons that spills out of a lateral

and is caused by a failure or blockage in the sanitary sewer system, is a Category 3 spill.

Category 4: Discharge of untreated or partially treated wastewater less than 50 gallons resulting from a sanitary sewer system failure or flow condition that either:

- Does not reach surface water, a drainage channel, or an MS4, or
- The entire SSS discharged to the storm drain system was fully recovered and disposed of properly.

A spill of less than 50 gallons that spills out of a lateral and is caused by a failure or blockage in the sanitary sewer system, is a Category 4 spill.

SANITARY SEWER SYSTEM: Any publicly-owned system of pipes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant headworks used to collect and convey wastewater to the publicly owned treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are considered to be part of the sanitary sewer system, and discharges into these temporary storage facilities are not considered to be SSSs.

SENSITIVE AREA: Refers to areas where an SSS could result in a fish kill or pose an imminent or substantial danger to human health (e.g. parks, aquatic habitats, etc.)

SEWER SERVICE LATERAL: Refers to the piping that conveys sewage from the building to the City's wastewater collection system.

UNTREATED OR PARTIALLY TREATED WASTEWATER: Any volume of waste discharged from the sanitary sewer system upstream of a wastewater treatment plant headworks.

WATERS OF THE STATE: Waters of the State means any surface water, including saline waters, within the boundaries of California. In case of a sewage spill, storm drains are considered to be waters of the State unless the sewage is completely contained and returned to the wastewater collection system and that portion of the storm drain is cleaned.

4. State Regulatory Requirements for Element 6, Spill Emergency Response Plan

GWDR Requirement

The collection system agency shall develop and implement a spill emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:

- (a) Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSSs in a timely manner;
- (b) A program to ensure appropriate response to all SSSs;
- (c) Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, regional water boards, water suppliers, etc.) of all SSSs that potentially affect public health or reach the waters of the State in accordance with the Monitoring and Reporting Program (MRP). All SSSs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board Waste Discharge Requirements or National Pollutant Discharge Elimination System (NPDES) permit requirements. The Sewer System Management Plan should identify the officials who will receive immediate notification;
- (d) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Spill Emergency Response Plan and are appropriately trained;
- (e) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and
- (f) A program to ensure that all reasonable steps are taken to contain untreated wastewater and prevent discharge of untreated wastewater to Waters of the State and minimize or correct any adverse impact on the environment resulting from the SSSs, including such accelerated or additional monitoring as may be

- necessary to determine the nature and impact of the discharge.
- (g) Procedures to remove sewage from drainage conveyance system.
 - (h) Procedures to clean the spill area and drainage conveyance system in a manner that does not inadvertently impact beneficial uses in the receiving waters.
 - (i) Lists of technologies, practices, equipment, and interagency coordination to expedite spill containment and recovery.
 - (j) Procedures to implement pre-planned coordination and collaboration with storm drain agencies and other utility agencies/departments prior, during, and after a spill even.
 - (k) Processes to conduct post-spill assessments of spill response activities.
 - (l) Requirements for documenting and reporting spill events.
 - (m) A requirement to annually review and assess effectiveness of the Spill Emergency Response Plan, and update the Plan as needed.

The Sewer System Management Plan and critical supporting documents are available to the public at www.healdsburg.gov.

5. Goals

The City's goals with respect to responding to SSSs are:

- Work safely;
- Respond quickly to minimize the volume of the SSS;
- Eliminate the cause of the SSS;
- Prevent sewage system overflows or leaks from entering the storm drain system or receiving waters to the maximum extent practicable;
- Contain the spilled wastewater to the extent feasible;
- Minimize public contact with the spilled wastewater;
- Mitigate the impact of the SSS;
- Meet the regulatory reporting requirements;
- Evaluate the causes of failure related to certain SSSs; and
- Revise response procedures resulting from the debrief and failure analysis of certain SSSs.

6. SSS Detection and Notification

The processes that are employed to notify the City of the occurrence of an SSS include: observation by the public, receipt of an alarm, or observation by City staff during the normal course of their work.

The City operates 11 wastewater lift stations. In the event of any pump failure, the high-level sensor activates the SCADA alarm system and the City is contacted. To prevent overflow, wastewater from the wet well can either be pumped into a vacuum truck for disposal to a nearby sanitary sewer manhole, or bypassed around the station into the sanitary sewer system.

6.1 PUBLIC OBSERVATION

Public observation is the most common way that the City is notified of blockages and spills. Contact numbers and information for reporting sewer spills and backups are in the phone book and on the City's website: www.healdsburg.gov. The City's telephone number (Dispatch) for reporting sewer problems is (707) 431-7000 or (855) 755-6586.

Normal Work Hours

When a report of a sewer spill or backup is made during normal work hours, Dispatch answers the call. Dispatch contacts the Utility Maintenance Superintendent or designee, who will dispatch a Public Works Crew.

After Hours

After hours service calls are answered by Dispatch, which will notify the On-Call Employee.

When calls are received, either during normal work hours or after hours, dispatch will collect the following information:

- Time and date of call
- Specific location of potential problem
- Nature of call
- In case of SSS, estimated start time of overflow
- Caller's name and telephone number
- Caller's observation (e.g., odor, duration, location on property, known impacts, indication if surface water impacted, appearance at cleanout or manhole)
- Other relevant information

If the overflow/backup is not in the service area the customer is given the contact information for the responsible agency and the agency is notified.

If the overflow/backup is in the City's service area, a Public Works Crew is dispatched and instructed to complete the Sanitary Sewer Spill/Backup Response Workbook.

6.2 CITY STAFF OBSERVATION

City staff conducts periodic inspections of its sewer system facilities as part of their routine activities. Any problems noted with the sewer system facilities are reported to appropriate City staff who, in turn, respond to emergency situations. Work orders are issued to correct non-emergency conditions.

6.3 CONTRACTOR OBSERVATION

The following procedures are to be followed in the event that a contractor/plumber causes or witnesses a Sanitary Sewer Spill. If the contractor/plumber causes or witnesses an SSS they should:

1. Immediately notify the City Dispatch (707) 431-7000 or (855) 755-6586.
2. Protect storm drains.
3. Protect the public.
4. Provide Information to the City Public Works Crew such as start time, appearance point, suspected cause, weather conditions, etc.
5. Direct ALL media and public relations requests to the City Public Information Officer.

6.4 NO OBSERVATION

If there are no witnesses or no call was received for an SSS, the Public Works Crew will contact nearby residences or business owners in the vicinity of the SSS, in an attempt to obtain information that brackets a given start time that the SSS began. This information will be collected and placed with records for the specific SSS.

7. SSS Response Procedures

7.1 Sewer Spill/Backup Response Summary

The City will respond to SSSs as soon as feasible following notification of an overflow/backup or unauthorized discharge.

If it is not possible that the overflow/backup is due to a failure in the City-owned/maintained sewer lines the Public Works Crew performs the following:

- Follows the instructions in the Sanitary Sewer Spill/Backup Response Workbook.
- If the customer is not home the Public Works Crew completes the Door Hanger and leaves it on the customer's door.
- If the customer is home the Public Works Crew:
 - Explains that the blockage is in the customer's lateral and the City does not have legal authority to maintain or perform work on privately owned laterals.
 - Recommends to the customer that they hire a contractor to clear their line.
 - Gives the customer the Sewer Spill Reference Guide pamphlet.

If it is possible that the spill/backup is due to a failure in the City-owned/maintained sewer lines the Collections Crew and Utilities Crew:

- Follow the instructions in the Sanitary Sewer Spill/Backup Response Workbook.
- Notify Water/Wastewater Operations Superintendent of the incident.
- Relieves blockage and clean impacted areas.
- Forwards the completed Sanitary Sewer Spill/Backup Response Workbook to the Water/Wastewater Operations Superintendent.

The Water/Wastewater Operations Superintendent performs required regulatory reporting in accordance with the Sanitary Sewer Spill/Backup Response Workbook's Regulatory Reporting section.

If the overflow has impacted private property, the Public Works Crew:

- Follows the instructions in the Sanitary Sewer Spill/Backup Response Workbook.
- Provides the customer with forms and information as indicated in the Sanitary Sewer Spill/Backup Response Workbook.
- Forwards the completed Sanitary Sewer Spill/Backup Response Workbook to the Utility Maintenance Superintendent.

The Utility Maintenance Superintendent:

- Reviews incident reports, claim form and other incident information and forwards, as appropriate, to:
George Hills Co / CIRA

MyGHCNewClaims@georgehills.com

With a cc to: Kin Ong, kong@cira-jpa.org
Amy Northam, anortham@cira-jpa.org
Erike Young, eyoung@cira-jpa.org

- Communicates with claimant as appropriate.

- Communicates with George Hills Co / CIRA to adjust and administer the claim to closure.

7.2 First Responder Priorities

The first responder's priorities support the City's goals when responding to SSSs including:

- To follow safe work practices.
- To respond promptly with the appropriate and necessary equipment.
- To contain the spill wherever feasible.
- To restore the flow as soon as practicable.
- To minimize public access to and/or contact with the spilled sewage.
- To promptly notify the Water/Wastewater Operations Superintendent in event of any SSS.
- To return the recovered sewage to the sewer system or transport to treatment plant.
- To restore the area to its original condition (or as close as possible).

7.3 Safety

The first responder is responsible for following safety procedures at all times. Special safety precautions must be observed when performing sewer work. There may be times when City personnel responding to a sewer system event are not familiar with potential safety hazards peculiar to sewer work. In such cases it is appropriate to take the time to discuss safety issues, consider the order of work, and check safety equipment before starting the job.

7.4 Initial Response

The first responder must respond to the reporting party/problem site and visually check for potential sewer stoppages or overflows.

The first responder will:

- Note arrival time at the site of the overflow/backup.
- Verify the existence of a public sewer system spill or backup.
- Take photos of overflowing manhole(s)/cleanout(s).
- Determine if the overflow or blockage is from a public or private sewer.
- Identify and assess the affected area and extent of spill.
- Estimate volume of spill
- Contact caller if time permits.
- If the spill is large or in a sensitive area, document conditions upon arrival with photographs. Decide whether to proceed with clearing the blockage to restore the flow or to initiate containment measures. The guidance for this decision is:
 - Small spills (i.e., spills that are easily contained) – proceed with clearing the blockage.
 - Moderate or large spill where containment is anticipated to be simple – proceed with the containment measures.
 - Moderate or large spills where containment is anticipated to be difficult – proceed with clearing the blockage; however, whenever deemed necessary, call for additional assistance and implement containment measures.

7.5 Equipment

This section provides a list of specialized equipment that is required to support this Spill Emergency Response Plan.

- *Closed Circuit Television (CCTV) Inspection Unit* – A CCTV Inspection Unit is required to determine the cause for all SSSs from gravity sewers.
- *Camera* -- A digital or disposable camera is required to record the conditions upon arrival, during clean up, and upon departure.
- *Emergency Response Trucks* -- A utility body pickup truck, or open bed is required to store and transport the equipment needed to effectively respond to sewer emergencies. The equipment and tools will include containment and clean up materials.
- *Portable Generators, Portable Pumps, Piping, and Hoses* – Equipment used to bypass pump, divert, or power equipment to mitigate an SSS.
- *Combination Sewer Cleaning Trucks* -- Combination high velocity sewer cleaning trucks with vacuum tanks are required to clear blockages in gravity sewers, vacuum spilled sewage, and wash down the impacted area following the SSS event.
- *Air plugs, sandbags and plastic mats*
- *SSS Sampling Kits*
- *Portable Lights*

Standard operating procedures for equipment that may be necessary in the event of a sanitary sewer overflow or backup can be found in the Corp Yard.

7.6 Initiate Spill Containment Measures

The first responder will attempt to contain as much of the spilled sewage as possible using the following steps:

- Determine the immediate destination of the overflowing sewage.
- Plug storm drains using air plugs, sandbags, and/or plastic mats to contain the spill, whenever appropriate. If spilled sewage has made contact with the storm drainage system, attempt to contain the spilled sewage by plugging downstream storm drainage facilities.
- Contain/direct the spilled sewage using dike/dam or sandbags.
- Pump around the blockage/pipe failure.

For procedures refer to the Sanitary Sewer Spill/Backup Response Workbook.

7.7 Restore Flow

Using the appropriate cleaning equipment, set up downstream of the blockage and hydro-clean upstream from a clear manhole. Attempt to remove the blockage from the system and observe the flows to ensure that the blockage does not reoccur downstream. If the blockage cannot be cleared within a reasonable time from arrival, or sewer requires construction repairs to restore flow, then initiate containment and/or bypass pumping. If other assistance is required, immediately contact the Water/Wastewater Operations Superintendent. For procedures refer to the Sanitary Sewer Spill/Backup Response Workbook.

8. Recovery and Cleanup

The recovery and cleanup phase begins immediately after the flow has been restored and the spilled sewage has been contained to the extent possible. The SSS recovery and cleanup procedures are:

8.1 Estimate the Flow and Volume of Spilled Sewage

To estimate the flow rate, crew members will use the SSCSC Manhole Overflow Gauge if the same style of manhole cover is observed overflowing. A variety of approaches exist for estimating the volume of a sanitary sewer spill. Crew members should use the method most appropriate to the sewer overflow in question and reference the Sanitary Sewer Spill/Backup Response Workbook which provides three (3) methods:

- Eyeball Estimation Method
- Duration and Flow Rate Calculation Method
- Area/Volume Method

In addition, wherever and whenever possible, document the estimate using photos and/or video of the SSS site before and during the recovery operation.

8.2 Recovery of Spilled Sewage

Vacuum up and/or pump the spilled sewage and rinse water and discharge it back into the sanitary sewer system.

8.3 Clean-up and Disinfection

Clean up and disinfection procedures will be implemented to reduce the potential for human health issues and adverse environmental impacts that are associated with an SSS event. The procedures described are for dry weather conditions and will be modified as required for wet weather conditions. Where cleanup is beyond the capabilities of City staff, a cleanup contractor will be used.

Private Property

City crews are responsible for the cleanup when the property damage is minor in nature and is outside of private building dwellings, such as in front, side and backyards, easements, etc. In all other cases, affected property owners can call a water damage restoration contractor to complete the cleanup and restoration. If the overflow into property is the definite cause of City system failure, the property owner can call out a water damage restoration contractor to complete the cleanup and restoration. In both cases, property owners may pick up City claim forms from the City Clerk's office.

Hard Surface Areas

Collect all signs of sewage solids and sewage-related material either by protected hand or with the use of rakes and brooms. Wash down the affected area with clean water and/or deozyme or similar non-toxic biodegradable surface disinfectant until the water runs clear. The flushing volume will be approximately three times the estimated volume of the spill. Take reasonable steps to contain and vacuum up the wastewater. Allow area to dry. Repeat the process if additional cleaning is required.

Landscaped and Unimproved Natural Vegetation

Collect all signs of sewage solids and sewage-related material either by protected hand or with the use of rakes and brooms. Wash down the affected area with clean water until the water runs clear. The flushing volume will be approximately three times the estimated volume of the spill. Either contain or vacuum up the wash water so that none is released. Allow the area to dry. Repeat the process if additional cleaning is required.

Natural Waterways

The Department of Fish and Wildlife will be notified by CalOES for SSSs greater than or equal to 1,000 gallons.

Wet Weather Modifications

Omit flushing and sampling during heavy storm events (i.e., sheet of rainwater across paved surfaces) with heavy runoff where flushing is not required and sampling would not provide meaningful results.

In the event that an overflow occurs at night, the location will be inspected first thing the following day. The field crew will look for any signs of sewage solids and sewage-related material that may warrant additional cleanup activities.

8.4 Public Notification

Signs will be posted and barricades put in place to keep vehicles and pedestrians away from contact with spilled sewage. County Environmental Health instructions and directions regarding placement and language of public warnings will be followed. Additionally, the Water/Wastewater Operations Superintendent will use their best judgment regarding supplemental sign placement in order to protect the public and local environment. Signs will not be removed until directed by County Environmental Health, the Water/Wastewater Operations Superintendent or designee.

Creeks, streams and beaches that have been contaminated as a result of an SSS will be posted at visible access locations until the risk of contamination has subsided to acceptable background bacteria levels. The area and warning signs, once posted, will be checked every day to ensure that they are still in place. Photographs of sign placement will be taken.

When contact with the local media is deemed necessary by regulating agencies, the Public Information Officer or their designee will provide the media with all relevant information.

9. Water Quality

9.1 Waters of the State

The following Waters of the State are in the City of Healdsburg's service area:

- Russian River
- Foss Creek
- Dry Creek
- West Slough
- Norton Slough

9.2 Water Quality Sampling and Testing

Water quality sampling and testing will be performed for Category 1 SSSs of 50,000 gallons or greater to determine the extent and impact of the SSS. The water quality sampling procedures must be implemented within 18 hours and include the following:

- The first responders or designated staff will collect samples as soon as possible after the discovery and mitigation of the SSS event.
- The water quality samples will be collected from upstream of the spill, from the spill area, and

downstream of the spill in flowing water (e.g. creeks). The water quality samples will be collected near the point of entry of the spilled sewage.

- The samples shall then be brought to the Water Reclamation Facility.

9.3 Water Quality Monitoring Plan

The State SSS Monitoring and Reporting Program will be implemented immediately upon discovery of any Category 1 SSS of 50,000 gallons or greater in order to assess impacts from SSSs to surface waters. The SSS Water Quality Monitoring Program will:

1. Contain protocols for water quality monitoring.
2. Account for spill travel time in the surface water and scenarios where monitoring may not be possible (e.g. safety, legal right to access, etc.)
3. Require water quality analyses for ammonia and bacterial indicators to be performed by an accredited or certified laboratory.
4. Require monitoring instruments and devices used to implement the SSS Water Quality Monitoring Program to be properly maintained and calibrated, including any records to document maintenance and calibration, as necessary, to ensure their continued accuracy.
5. Within 18 hours of the City becoming aware of the SSS, require water quality sampling for fecal coliform, E. Coli, and ammonia.
6. Observe proper chain of custody procedures.
7. If the City's current standard operating procedures (SOP's) cannot fully mitigate an SSS and if it is determined that the SSS may pose an imminent and substantial endangerment to public health or the environment, the City shall consult a qualified biologist, health care specialist or equivalent professional to assist.

9.4 SSS Technical Report

The City will submit an SSS Technical Report to the CIWQS Online SSS Database within 45 calendar days of the SSS end date for any Category 1 SSS of 50,000 gallons or greater. The Water/Wastewater Operations Superintendent will supervise the preparation of this report and will certify this report. This report, which does not preclude the Water Boards from requiring more detailed analyses if requested, shall include at a minimum, the following:

Causes and Circumstances of the SSS:

- Complete and detailed explanation of how and when the SSS was discovered.
- Diagram showing the SSS failure point, appearance point(s), and final destination(s).
- Detailed description of the methodology employed and available data used to calculate the volume of the SSS and, if applicable, the SSS volume recovered.
- Detailed description of the cause(s) of the SSS.
- Copies of original field crew records used to document the SSS.
- Historical maintenance records for the failure location.

City's Response to SSS:

- Chronological narrative description of all actions taken by the City to terminate the spill.
- Explanation of how the SSMP Spill Emergency Response Plan was implemented to respond to and mitigate the SSS.
- Final corrective action(s) completed and/or planned to be completed, including a schedule for actions not yet completed.

Water Quality Monitoring:

- Description of all water quality sampling activities conducted including analytical results and evaluation of the results.
- Detailed location map illustrating all water quality sampling points.

10. Sewer Backup Into/Onto Private Property Claims Handling Policy

It is the policy of the City that a claims form shall be offered to anyone wishing to file a claim. The following procedures will be observed for all sewer overflows/backups into/onto private property:

City staff will offer a City claim form irrespective of fault whenever it is possible that the sanitary sewer backup may have resulted from an apparent blockage in the City-owned sewer lines or whenever a City customer requests a claim form. The claim may later be rejected if subsequent investigations into the cause of the loss indicate the City was not at fault.

- It is the responsibility of the Utilities Crew to gather information regarding the incident and notify the Water/Wastewater Operations Superintendent or his/her designee.
- It is the responsibility of the City Clerk or his/her designee to review all claims and to oversee the adjustment and administration of the claim to closure.

11. Notification, Reporting, Monitoring and Recordkeeping Requirements

In accordance with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (SSS GWDRs), the City of Healdsburg maintains records for each sanitary sewer overflow. Records include:

- Documentation of response steps and/or remedial actions
- Photographic evidence to document the extent of the SSS, field crew response operations, and site conditions after field crew SSS response operations have been completed. The date, time, location, and direction of photographs taken will be documented.
- Documentation of how any estimations of the volume of discharged and/or recovered volumes were calculated including all assumptions made.
- Regulator required notifications are outlined in Section 11.1 on the following page.

11.1 Regulator Required Notifications

ELEMENT	REQUIREMENT	METHOD
NOTIFICATION	Within two hours of becoming aware of any Category 1 SSS greater than or equal to 1,000 gallons discharged to surface water or spilled in a location where it probably will be discharged to surface water, the City will notify the California Office of Emergency Services (CalOES) and obtain a notification control number.	Call Cal OES at: (800) 852-7550
REPORTING	<ul style="list-style-type: none"> • Category 1 SSS: The City will submit draft report within three business days of becoming aware of the SSS and certify within 15 calendar days of SSS end date. • Category 2 SSS: The City will submit draft report within 3 business days of becoming aware of the SSS and certify within 15 calendar days of the SSS end date. • Category 3 SSS: The City will submit certified report within 30 calendar days of the end of month in which SSS the occurred. • Category 4 SSS: The City will report and certify the estimated total spill volume exiting the sanitary sewer system, and the total number of all Category 4 spills to the online CIWQS Sanitary Sewer System Database, within 30 calendar days after the end of the month in which the spills occurred. • SSS Technical Report: The City will submit within 45 calendar days after the end date of any Category 1 SSS in which 50,000 gallons or greater are spilled to surface waters. Annually upload and certify a report, in an appropriate digital format, of all recordkeeping of spills to the online CIWQS Sanitary Sewer System Database, by February 1st after the end of the calendar year in which the spills occurred. • “No Spill” Certification: The City will certify that no SSSs occurred within 30 calendar days of the end of the month or, if reporting quarterly, the quarter in which no SSSs occurred. • Collection System Annual Report (previously referred to as the Collection System Questionnaire): The City will update and certify every 12 months. update their previous year’s Annual Report, by April 1 for each calendar year (January 1 through December 31). 	<p>Enter data into the CIWQS Online SSS Database¹ (http://ciwqs.waterboards.ca.gov/) certified by the Legally Responsible Official(s)².</p> <p>All information required by CIWQS will be captured in the Sanitary Sewer Spill Report.</p> <p>Certified SSS reports may be updated by amending the report or adding an attachment to the SSS report within 90 calendar days after the SSS end date. After 90 days, the State SSS Program Manager must be contacted to request to amend an SSS report along with a justification for why the additional information was not available prior to the end of the 90 days.</p>
WATER QUALITY MONITORING	The City will conduct water quality sampling within 18 hours after initial SSS notification for Category 1 SSSs in which 50,000 gallons or greater are spilled to surface waters.	Water quality results will be uploaded into CIWQS for Category 1 SSSs in which 50,000 gallons or greater are spilled to surface waters.

RECORD KEEPING	<p>The City will maintain the following records:</p> <ul style="list-style-type: none"> • SSS event records. • Records documenting Sanitary Sewer Management Plan (SSMP) implementation and changes/updates to the SSMP. • Records to document Water Quality Monitoring for SSSs of 50,000 gallons or greater spilled to surface waters. • Collection system telemetry records if relied upon to document and/or estimate SSS Volume. 	<p>Self-maintained records shall be available during inspections or upon request. Records shall be maintained for a minimum of five (5) years.</p>
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¹ In the event that the CIWQS online SSS database is not available, the Water/Wastewater Operations Superintendent will notify SWRCB by phone and will fax or e-mail all required information to the RWQCB office at (510) 622-2460 in accordance with the time schedules identified above. In such an event, the City will submit the appropriate reports using the CIWQS online SSS database when the database becomes available. A copy of all documents that certify the submittal in fulfillment of this section shall be retained in the SSS file.

² The City always has at least one LRO. Any change in the LRO(s) including deactivation or a change to contact information, will be submitted to the SWRCB within 30 days of the change by calling (866) 792-4977 or emailing help@ciwqs.waterboards.ca.gov.

For reporting purposes, if one SSS event of whatever category results in multiple appearance points in a sewer system, a single SSS report is required in CIWQS that includes the GPS coordinates for the location of the SSS appearance point closest to the failure point, blockage or location of the flow condition that cause the SSS, and descriptions of the locations of all other discharge points associated with the single SSS event.

11.2 Complaint Records

The City maintains records of all complaints received whether or not they result in sanitary sewer overflows. These complaint records include:

- Date, time, and method of notification
- Date and time the complainant or informant first noticed the SSS or occurrence related to the call
- Narrative description describing the complaint
- A statement from the complainant or informant, if they know, of whether or not the potential SSS may have reached waters of the state
- Name, address, and contact telephone number of the complainant or informant reporting the potential SSS (if not reported anonymously)
- Follow-up return contact information for each complaint received (if not reported anonymously)
- Final resolution of the complaint with the original complainant
- Work service request information used to document all feasible and remedial actions taken

All complaint records will be maintained for a minimum of five years whether or not they result in an SSS. SSS records are maintained in the Collections System office.

12. Post SSS Event Debriefing

Every SSS event is an opportunity to evaluate the City response and reporting procedures. Each overflow event is unique, with its own elements and challenges including volume, cause, location, terrain, climate, and other parameters.

As soon as possible after Category 1 and Category 2 SSS events all of the participants, from the person who received the call to the last person to leave the site, will meet to review the procedures used and to discuss what worked and where improvements could be made in preventing or responding to and mitigating future SSS events. The results of the debriefing will be documented and tracked to ensure the action items are completed as scheduled.

13. Failure Analysis Investigation

The objective of the failure analysis investigation is to determine the “cause” of the SSS and to identify corrective action(s) needed that will reduce or eliminate future potential for the SSS to recur or for other SSSs to occur.

The investigation will include reviewing all relevant data to determine appropriate corrective action(s) for the line segment. The investigation will include:

- Reviewing and completing the Sanitary Sewer Spill Report and any other documents related to the incident
- Reviewing the incident timeline and other documentation regarding the incident
- Reviewing communications with the reporting party and witness
- Reviewing volume estimate, volume recovered estimate, volume estimation assumptions and associated drawings
- Reviewing available photographs
- Interviewing staff that responded to the spill
- Reviewing past maintenance records
- Reviewing past CCTV records,
- Conducting a CCTV inspection to determine the condition of all line segments immediately following the SSS and reviewing the video and logs,
- Reviewing any Fats, Oils, and Grease (FOG) related information or results
- Post SSS debrief records
- Interviews with the public at the SSS location

The product of the failure analysis investigation will be the determination of the root cause and the identification and scheduling of the corrective actions. The Collection System Failure Analysis Form (in Sanitary Sewer Spill/Backup Response Workbook) will be used to document the investigation.

14. SSS Response Training

This section provides information on the training that is required to support this Spill Emergency Response Plan.

14.1 Initial and Annual Refresher Training

All City personnel who may have a role in responding to, reporting, and/or mitigating a sewer system overflow will receive training on the contents of this SERP. All new employees will receive training before they are placed in a position where they may have to respond. Current employees will receive annual refresher training on this plan and the procedures to be followed. The City will document all training.

Affected employees will receive annual training on the following topics by knowledgeable trainers:

- The City's Spill Emergency Response Plan and Sanitary Sewer Management Plan
- Sanitary Sewer Spill Volume Estimation Techniques
- Researching and documenting Sanitary Sewer Spill Start Times
- Impacted Surface Waters: Response Procedures
- State Water Resources Control Board Employee Knowledge Expectations
- Employee Core Competency Evaluations on Sanitary Sewer Operations
- Water Quality Sampling Plan

The City will verify that annual safety training requirements are current for each employee, and that employees are competent in the performance of all core competencies. This will be verified through electronic testing, interviews and observations. The City will address, through additional training/instruction, any identified gaps in required core competencies.

Through SWRCB Employee Knowledge Expectations training the employee will be able to answer the following:

1. Please briefly describe your name and job title.
2. Please describe for us approximately when you started in this field and how long you have worked for your agency.
3. Please expand on your current position duties and role in responding in the field to any SSS

- complaints.
4. Please describe your SOPs used to respond/mitigate SSSs when they occur.
 5. Describe any training your agency provides or sends you to for conducting spill volume estimates.
 6. We are interested in learning more about how your historical SSS response activities have worked in the field. We understand from discussions with management earlier that you use the OERP from the SSMP. Please elaborate on how you implement and utilize the procedures in the plan.
 7. Historically, before any recent changes, can you please walk us through how you would typically receive and respond to any SSS complaints in the field?
 8. Can you tell us who is responsible for estimating SSS volumes discharged? If it is you, please describe how you go about estimating the SSS volume that you record on the work order/service request forms?
 9. What other information do you collect or record other than what is written on the work order form?
 10. Describe if and when you ever talk with people that call in SSSs (either onsite or via telephone) to further check out when the SSS might have occurred based on what they or others know? If you do this, can you tell us where this information is recorded?
 11. We understand you may be instructed to take pictures of some sewer spills/backups into structures. Other than these SSSs, when else would you typically take any pictures of an SSS?
 12. Please walk us through anything else you'd like to add to help us better understand how your field crews respond and mitigate SSS complaints.

14.2 SSS Response Drills

Periodic training drills or field exercises will be held to ensure that employees are up to date on these procedures, equipment is in working order, and the required materials are readily available. The training drills will cover scenarios typically observed during sewer related emergencies (e.g. mainline blockage, mainline failure, and lateral blockage). The results and the observations during the drills will be recorded and action items will be tracked to ensure completion.

14.3 SSS Training Record Keeping

Records will be kept of all training that is provided in support of this plan. The records for all scheduled training courses and for each spill emergency response training event and will include date, time, place, content, name of trainer(s), and names and titles of attendees.

14.4 Contractors Working On City Sewer Facilities

All construction contractors working on City sewer facilities will be required to develop a project- specific OERP, will provide project personnel with training regarding the content of the contractor's OERP and their role in the event of an SSS, and to follow that OERP in the event that they cause or observe an SSS. Emergency response procedures shall be discussed at project pre-construction meetings, regular project meetings and after any contractor involved incidents.

All service contractors will be provided, and required to observe contractor procedures.

16. Authority

This OERP is written in accordance with the following:

- Current City of Healdsburg Sewer Lateral Ordinance
- Health & Safety Code Sections 5410-5416
- CA Water Code Section 13271
- Fish & Wildlife Code Sections 5650-5656
- State Water Resources Control Board Order No. 2006-0003-DWQ
- State Water Resources Control Board Order No. WQ 2013-0058-EXEC effective September 9, 2013

17. Appendices

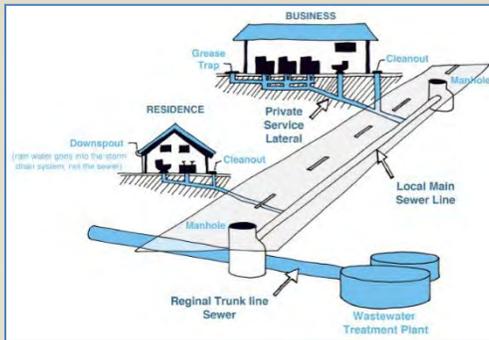
- Appendix A: Sewer Spill Reference Guide Pamphlet: Your Responsibilities as a Private Property Owner
- Appendix B: Door Hanger
- Appendix C: Sanitary Sewer Spill/Backup Response Workbook

Appendix A:

Sewer Spill Reference Guide Pamphlet: Your Responsibilities as a Private Property Owner

How a Sewer System Works

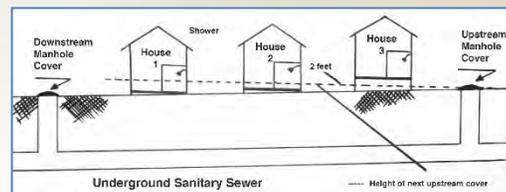
A property owner's sewer pipes are called **service laterals** and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer. These laterals are the responsibility of the property owner and must be maintained by the property owner.



Is my home required to have a backflow prevention device?

Section 710.1 of the Uniform Plumbing Code (U.P.C.) states: "Drainage piping serving fixtures which have flood level rims located below the elevation of the next upstream manhole cover or private sewer serving such drainage piping **shall** be protected from backflow of sewage by installing an approved type of backwater valve." The intent of Section 710.1 is to protect the building interior from mainline sewer overflows or surcharges.

Additionally, U.P.C. 710.6 states: "Backwater valves **shall** be located where they will be accessible for inspection and repair at all times and, unless continuously exposed, shall be enclosed in a masonry pit fitted with an adequately sized removable cover."



If you have a sewage spill from your private sewer line that impacts storm drains, waterways or public property, contact:

City of Healdsburg
(707) 431-7000

Discharge of untreated or partially treated sewage is prohibited by law. If you would like more information on this prohibition, please contact any of the following:

Sonoma County Environmental Health
(707) 565-6565

California Health and Safety Code, Sections 5410-5416 requires:

- No person shall discharge raw or treated sewage or other waste in a manner that results in contamination, pollution, or a nuisance.
- Any person who causes or permits a sewage discharge to any state waters:
 - Must immediately notify the local health agency of the discharge.
 - Shall reimburse the local health agency for services that protect the public's health and safety.
 - Who fails to provide the required notice to the local health agency is guilty of a misdemeanor and shall be punished by a fine (between \$500-\$1,000) and/or imprisonment for less than one year.

North Coast Regional Water Quality Control Board: (707) 576-2220

Requires the prevention, mitigation, response to, and reporting of sewage spills.

California Governor's Office of Emergency Services (CalOES): (800) 852-7550

California Water Code, Article 4, Chapter 4, Sections 13268-13271 & California Code of Regulations, Title 23, Division 3, Chapter 9.2, Article 2, Sections 2250-2260 require:

- Any person who causes or permits sewage in excess of 1,000 gallons to be discharged to state waters shall immediately notify the Office of Emergency Services.
- Any person who fails to provide the notice required by this section is guilty of a misdemeanor and shall be punished by a fine (less than \$20,000) and/or imprisonment for not more than one year.

Sewer Spill Reference Guide



Your Responsibilities as a Private Property Owner

City of Healdsburg
550 Westside Road
Healdsburg CA 95448
(707) 431-7000

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How do sewage spills happen?

Sewage spills occur when the wastewater in underground pipes overflows through a manhole, cleanout, or broken pipe. Most spills are relatively small and can be stopped and cleaned up quickly, but left unattended they can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways, and beaches.

CAUTION!

When trying to locate a sewer problem, never open manholes or other public sewer structures. Only our crews are allowed to open & inspect these structures.

Call for assistance: (707) 431-7000

Common causes of sewage spills

- Grease build-up
- Tree roots
- Broken/cracked pipes
- Missing or broken cleanout caps
- Undersized sewers
- Groundwater/rainwater entering the sewer system through pipe defects and illegal connections

Prevent most sewage backups with a Backflow Prevention Device

This type of device can help prevent sewage backups into homes and businesses. If you don't already have a Backflow Prevention Device, contact a professional plumber or contractor to install one as soon as possible.

Protect the environment!

If you let sewage from your property discharge to a gutter or storm drain, you may be subject to penalties and/or out-of-pocket costs for clean-up and enforcement efforts. A property owner may be charged for costs incurred by agencies responding to spills from private properties.

What to look for:

Sewage spills can be a very noticeable gushing of water from a manhole or a slow water leak that may take time to be noticed. Don't dismiss unaccounted-for wet areas. Look for:

- Drain backups inside the building.
- Wet ground and/or water leaking around manhole lids onto your street.
- Leaking water from cleanouts or outside drains
- Unusual odorous wet areas: sidewalks, external walls, ground/landscape around a building.

The following are indicators of a possible obstruction in your sewer line:

- Water comes up in floor drains, showers or toilets.
- Toilets, showers or floor drains below ground level drain very slowly.

What to do if there is a spill:

Immediately notify the City of Healdsburg. Our crews locate the blockage and determine if it is in the public sewer; if it is the crew removes the blockage and arranges for cleanup.

If the backup is in your private internal plumbing or in the private service laterals, you are required to immediately:

- Control and minimize the spill by shutting off or not using the water
- Keep sewage out of the storm drain system using sandbags, dirt and/or plastic sheeting
- Call a plumbing professional to clear blockages and make repairs as needed. Look in the yellow pages under "Plumbing Drain & Sewer Cleaning" or "Sewer Contractors."
- Always notify your sewer/public works department or public sewer district of sewage spills.

Spill cleanup inside the home:

For large clean ups, a professional cleaning firm should be contacted to clean up impacted areas. If you hire a contractor, it is recommended to get estimates from more than one company. Sometimes, homeowner's insurance will pay for the necessary cleaning due to sewer backups. Not all policies have this coverage, so check with your agent.

If you decide to clean up a small spill inside your home, protect yourself from contamination by observing the following safety measures. Those persons whose resistance to infection is compromised should not attempt this type of clean up.

Other Tips:

- Keep children and pets out of the affected area until cleanup has been completed.
- Turn off heating/air conditioning systems
- Wear rubber boots, rubber gloves, and goggles during cleanup of the affected area.
- Discard items that cannot be washed and disinfected (such as: mattresses, rugs, cosmetics, baby toys, etc.)
- Remove and discard drywall and insulation that has been contaminated with sewage or flood waters.

- Thoroughly clean all hard surfaces (such as flooring, concrete, molding, wood and metal furniture, countertops, appliances, sinks and other plumbing fixtures) with hot water and laundry or dish detergent.
- Help the drying process with fans, air conditioning units, and dehumidifiers.
- After completing cleanup, wash your hands with soap and water. Use water that has been boiled for 1 minute (allow the water to cool before washing your hands) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash clothes worn during cleanup in hot water and detergent (wash apart from uncontaminated clothes).
- Wash clothes contaminated with sewage in hot water and detergent. Consider using a Laundromat until your onsite wastewater system has been professionally inspected and serviced.
- Seek immediate attention if you become injured or ill.

Spill cleanup outside the home:

- Keep children and pets out of the affected area until cleanup has been completed.
- Wear rubber boots, rubber gloves, and goggles during cleanup of affected area.
- Clean up sewage solids (fecal material) and place in properly functioning toilet or double bag and place in garbage container.
- On hard surfaces areas such as asphalt or concrete, it is safe to use a 2% bleach solution, or ½ cup of bleach to 5 gallons of water, but don't allow it to reach a storm drain as the bleach can harm the environment.
- After cleanup, wash hands with soap and water. Use water that has been boiled for 1 minute (allow to cool before washing your hands) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash clothes worn during cleanup in hot water and detergent (wash apart from uncontaminated clothes).
- Wash clothes contaminated with sewage in hot water and detergent. Consider using a Laundromat until your onsite wastewater system has been professionally inspected and serviced.
- Seek immediate attention if you become injured/ill.

Appendix B:
Door Hanger

City of Healdsburg

On (date) _____, at (location) _____,
we responded to a reported blockage of the
sanitary sewer service to your property.

We discovered a blockage in:

- The sanitary sewer main and cleared the line
- Your sanitary sewer lateral, which is your responsibility to maintain.

If you require assistance to clear your portion of the lateral you can search for "Sewer Contractors" or "Plumbing Drains & Sewer Cleaning". If you plan to hire a contractor, we recommend getting estimates from more than one company.

City representative notes: _____

City representative: _____

For questions or comments, please call

City of Healdsburg
(707) 431-7000

City of Healdsburg

On (date) _____, at (location) _____,
we responded to a reported blockage of the
sanitary sewer service to your property.

We discovered a blockage in:

- The sanitary sewer main and cleared the line
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City representative notes: _____

City representative: _____

For questions or comments, please call

City of Healdsburg
(707) 431-7000

Appendix C:

Sanitary Sewer Spill/Backup Response Workbook

Sanitary Sewer Spill/Backup Response Workbook

- If this is a Category 1 SSS greater than or equal to 1,000 gallons, **immediately contact CALOES** at (800) 852-7550 within 2 hours.
- Refer to the Regulatory Reporting Guide** for additional reporting requirements.
- If there is a backup into a residence or business** contact Amy Northam at CIRA: Amy Northam, anortham@cira-jpa.org
- For Restoration/Remediation** contact one of the following if instructed to do so by George Hills Co./CIRA:
 - Sierra Pacific Loss Management:
 - Main Line - (800) 413-2999/707.252.5525
 - Doug Thompson – 707.592.9918
 - info@splmca.com
 - PLEASE NOTE: THAT SIERRA PACIFIC LOSS MANAGEMENT WILL HANDLE MOST, IF NOT ALL, OF THE CLAIM IF CONTACTED IMMEDIATELY.

If attempts to contact Sierra Pacific are unsuccessful, please contact George Hills staff directly. They have emergency 24/7 numbers and will answer and respond.
 - George Hills Staff:
 - Dana Calkins: (916) 333-0575
 - Parmit Randhawa: (510) 375-1141
 - Craig Nunn: (916) 378-5772 (Arcata, Eureka, Fortuna & Ft. Bragg)
 - Edie Yamamura: (707) 602-3149
- For Documentation/Reporting:**
Water/Wastewater Operations Superintendent
or designee (707) 431-3369
- To have water samples analyzed:**
Water Reclamation Facility Laboratory, 340 Foreman Lane, Healdsburg
- For any media inquiries/requests:** Public Information Officer (707) 431-3317

Don't forget to
take photos!

Public Works Crew and Utilities Crew:

- Follow the instructions on the Spill/Backup Response Flowchart and complete forms in this workbook as indicated. *Note: refer to the color code key on the first page of the flowchart to determine the actions to be taken by each crew.*
- Complete the chain of custody record (to the right) and deliver this workbook to the Water/Wastewater Operations Superintendent.

Print Name:

Initial:

Date:

Time:

Water/Wastewater Operations Superintendent or designee:

- Review the SSS Event Checklist and the forms in this booklet. Contact the Public Works Crew and/or Utilities Crew for additional information if necessary.
- If there is a backup into a home or business, send documentation to City Clerk
- Complete the Collection System Failure Analysis Form.
- Enter data into CIWQS.
- Complete the Chain of Custody record (right) and file this booklet

Print Name:

Initial:

Date:

Time:

SSS Event Checklist

Date of SSS: _____ SSS Location/Name: _____
CIWQS Event ID #: _____ Category? 1 2 3 4 OES#: _____ Property
Damage? Yes No Service Request #: _____

- Effort made to contain and return a portion/all to the sanitary sewer
- Pictures/video taken of overflow
- Pictures taken of affected/unaffected area
- If property damage, start that process
- Pictures taken of containment efforts
- If Cat 1 > 1000 gals:
OES Control # _____
- Impacted waters identified?
- No impacted waters?
- SSS Report Form Complete (includes fields for all required fields in CIWQS, and a sketch of SSS)
- Volume Estimation Worksheet(s) done
- Start Time Determination Form done
- Initial review of forms is complete (ensure consistency with dates, times, volumes, and other data)
- Review of photos and videos (label/date)
- Start Folder for all documentation for this SSS event. Put everything in it (SR, Field Reports, Worksheets/Forms, follow-up work orders, notes, pics, drawings, etc. CIWQS print outs and emails)
- Failure Analysis
 - TV to determine cause
 - Review Asset History
- Determine next steps to prevent recurrence
- Document findings and next steps on SSS Report
- Submit Draft in CIWQS w/in 3 business days (for Categories 1 and 2 only)
- Print CIWQS Draft hard copy and email
- Review CIWQS, SSS Report, Worksheets, CMMS, and any other documentation to ensure data is consistent (e.g. dates, times, volumes, cause, follow-up action, etc.)
- Attach photos, forms etc. to CIWQS
- Submit Ready to Certify in CIWQS (with sufficient time for LRO review)
- Print CIWQS Ready to Certify and email
- Hand folder to LRO
- LRO review folder and CIWQS verify accurate and consistent data
- Certify in CIWQS (within 15 calendar days for Categories 1 & 2, 30 days after the month for Category 3)
- Print Certified CIWQS and email
- Any changes? Change in CIWQS and hard copies and explain changes, print our current version
- Move completed folder to SSS Binder
- For 50, 000 gallons or larger
 - Follow Water Quality Monitoring and Sampling procedures
 - Map of where samples were taken
 - Sampling results
 - Write Technical Report
 - Attach to CIWQS
 - Add to SSS Folder/Binder
 - If any changes are made to SSMP
 - Update SSMP and link on CIWQS to SSMP
 - Add change to SSMP Change Log
 - If change is substantive, re-certify SSMP

INSERT TAB:
Regulatory Reporting

Regulatory Reporting Guide

Deadline	Category 1 SSS	Category 2 SSS	Category 3 SSS	Category 4 SSS
2 hours after awareness of SSS	<ul style="list-style-type: none"> If the spill is greater than or equal to 1,000 gallons, call CalOES. Notify downstream agencies as appropriate: <ul style="list-style-type: none"> Town of Windsor Sonoma Water 	-	-	
As soon as possible	If SSS impacts private property that may be a failure of the sewer main and/or if a claim for damages may be submitted against the City, notify the Claims Office.			
18 Hours after awareness of SSS	If 50,000 gal or more were not recovered, begin water quality sampling.	-	-	
3 Business Days after awareness of SSS	Submit Draft Spill Report in the CIWQS database.	Submit Draft Spill Report in the CIWQS database.	-	
15 Days after response conclusion	Certify Spill Report in CIWQS database..	Certify Spill Report in the CIWQS database.	-	
30 Days after end of calendar month in which SSS occurred	-	-	Certify Spill Report in CIWQS..	Certify Spill Report in CIWQS
45 days after SSS end date	If 50,000 gal or more were not recovered, submit SSS Technical Report in CIWQS.	-	-	
90 Days after response conclusion	Submit amended Spill Report I CIWQS	Submit amended Spill Report	Submit amended Spill Report in CIWQS	
By February 1st after the end of the calendar year in which the spills occur				Upload and certify a report, in an acceptable digital format, of all Category 4 spills to CIWQS

Note: For reporting purposes, if one SSS event results in multiple appearance points, complete one SSS report in the CIWQS SSS Online Database, and report the location of the SSS failure point, blockage or location of the flow condition that caused the SSS, including all the discharge points associated with the SSS event.

City of Healdsburg Spill Emergency Response Plan

Category	Definition
1	<p>Discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that:</p> <ul style="list-style-type: none"> • Reach surface water and/or reach a drainage channel (with or without water in it) tributary to a surface water; or • Reach a Municipal Separate Storm Sewer System (MS4) and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the MS4 is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or groundwater infiltration basin (e.g., infiltration pit, percolation pond).
2	<p>Discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a MS4 unless the entire SSS discharged to the storm drain system is fully recovered and disposed of properly.</p>
3	<p>Discharges of untreated or partially treated wastewater of 50 to less than 1,000 gallons resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a MS4 unless the entire SSS discharged to the storm drain system is fully recovered and disposed of properly.</p>
4	<p>Discharges of untreated or partially treated wastewater of less than 50 gallons resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a MS4 unless the entire SSS discharged to the storm drain system is fully recovered and disposed of properly.</p>
Private Lateral Sewage Discharge (PLSD)	<p>Discharges of untreated or partially treated wastewater resulting from blockages or other problems <u>within a privately-owned sewer lateral</u> connected to the enrollee's sanitary sewer system or from other private sewer assets. PLSDs that the enrollee becomes aware of may be <u>voluntarily</u> reported to the California Integrated Water Quality System (CIWQS) Online SSS Database.</p>

Authorized Personnel:

The following are authorized to perform regulatory reporting of SSSs:

- Public Works Crew
- Utilities Crew

The City’s Legally Responsible Officials (LROs) are authorized to electronically sign and certify SSS reports in CIWQS. The LROs are:

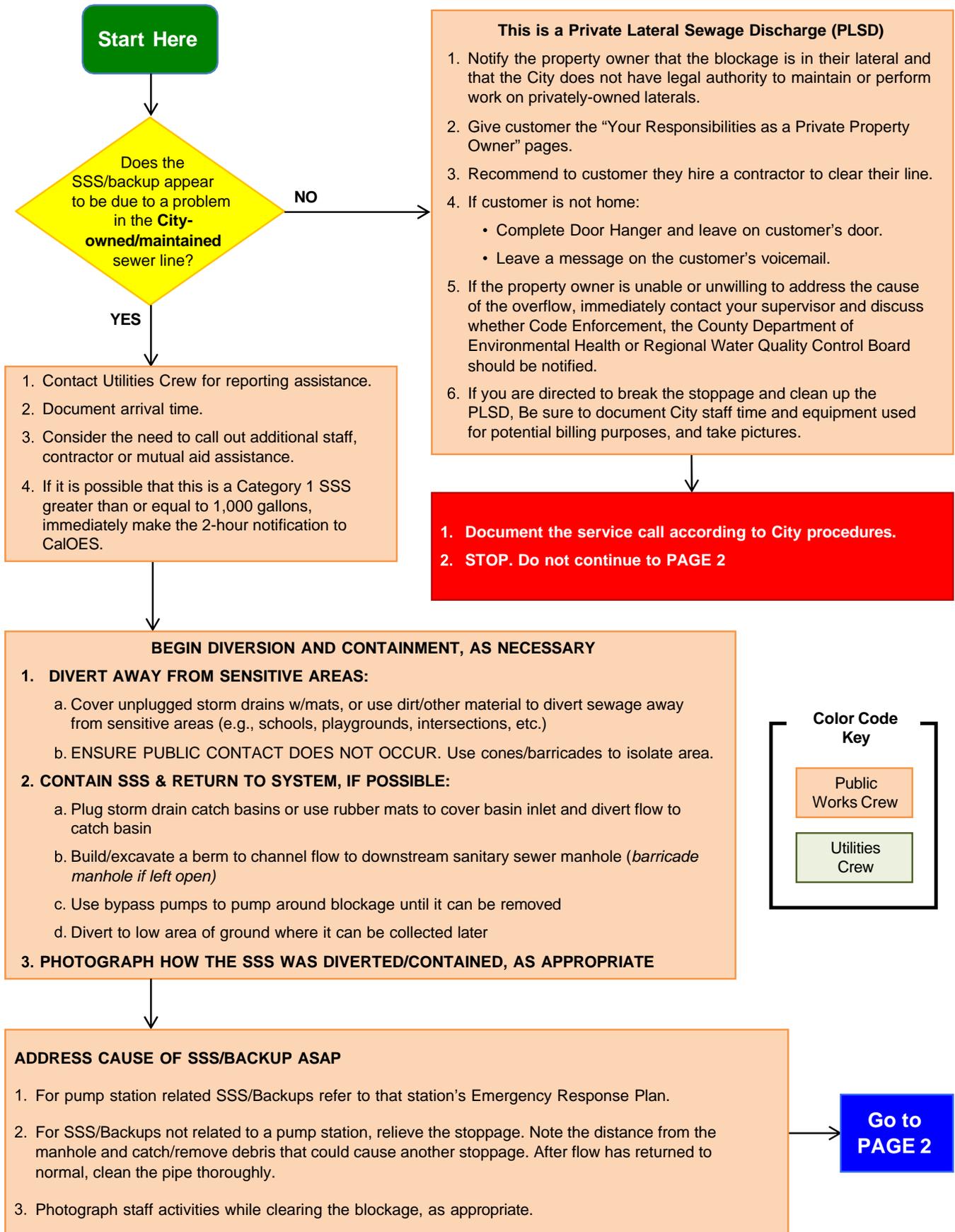
Title	Contact
Water/Wastewater Operations Superintendent	(707) 431-3369
Wastewater Operations Foreman	(707) 431-3346
Utility Director	(707) 431-3340

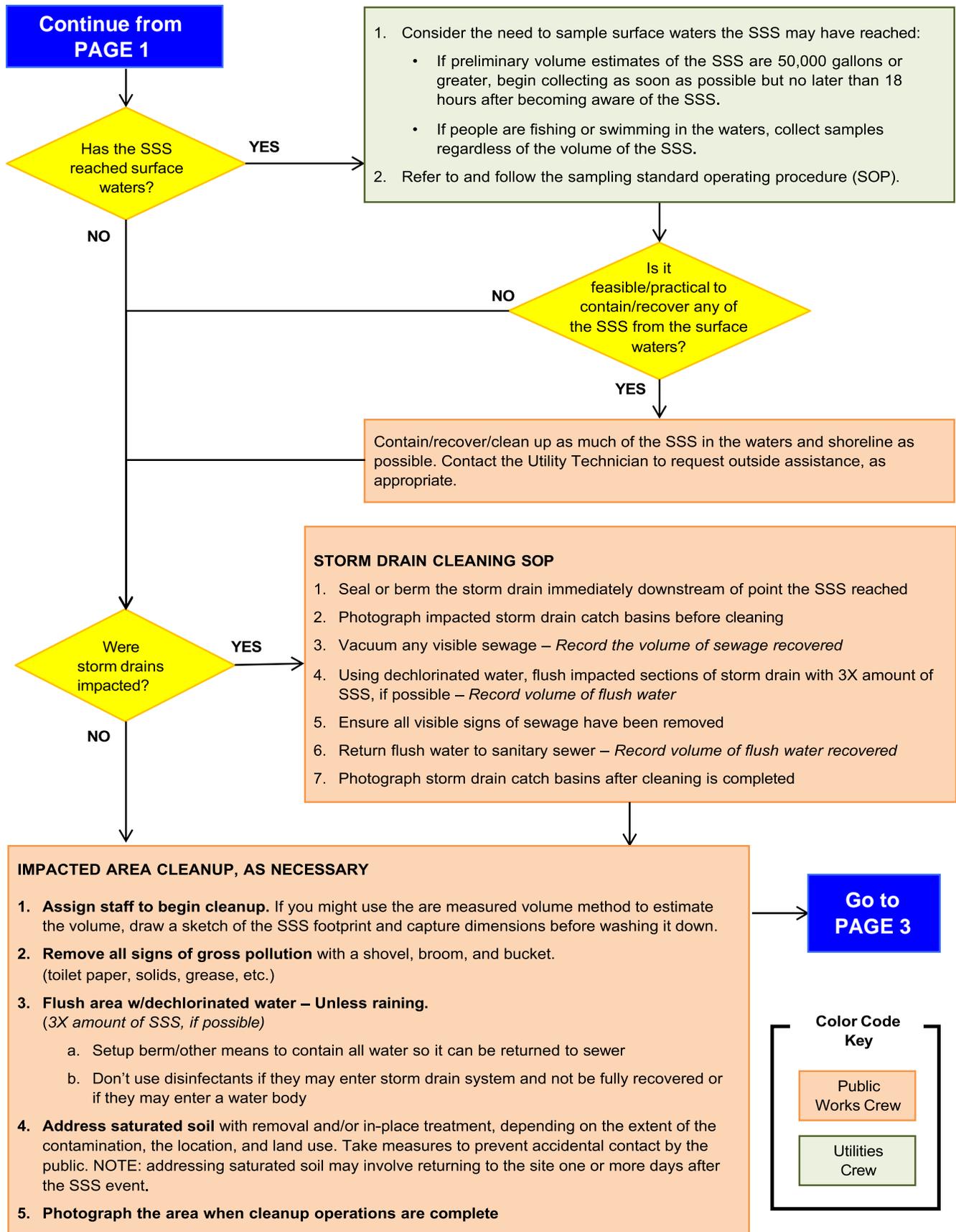
Reporting Contacts:

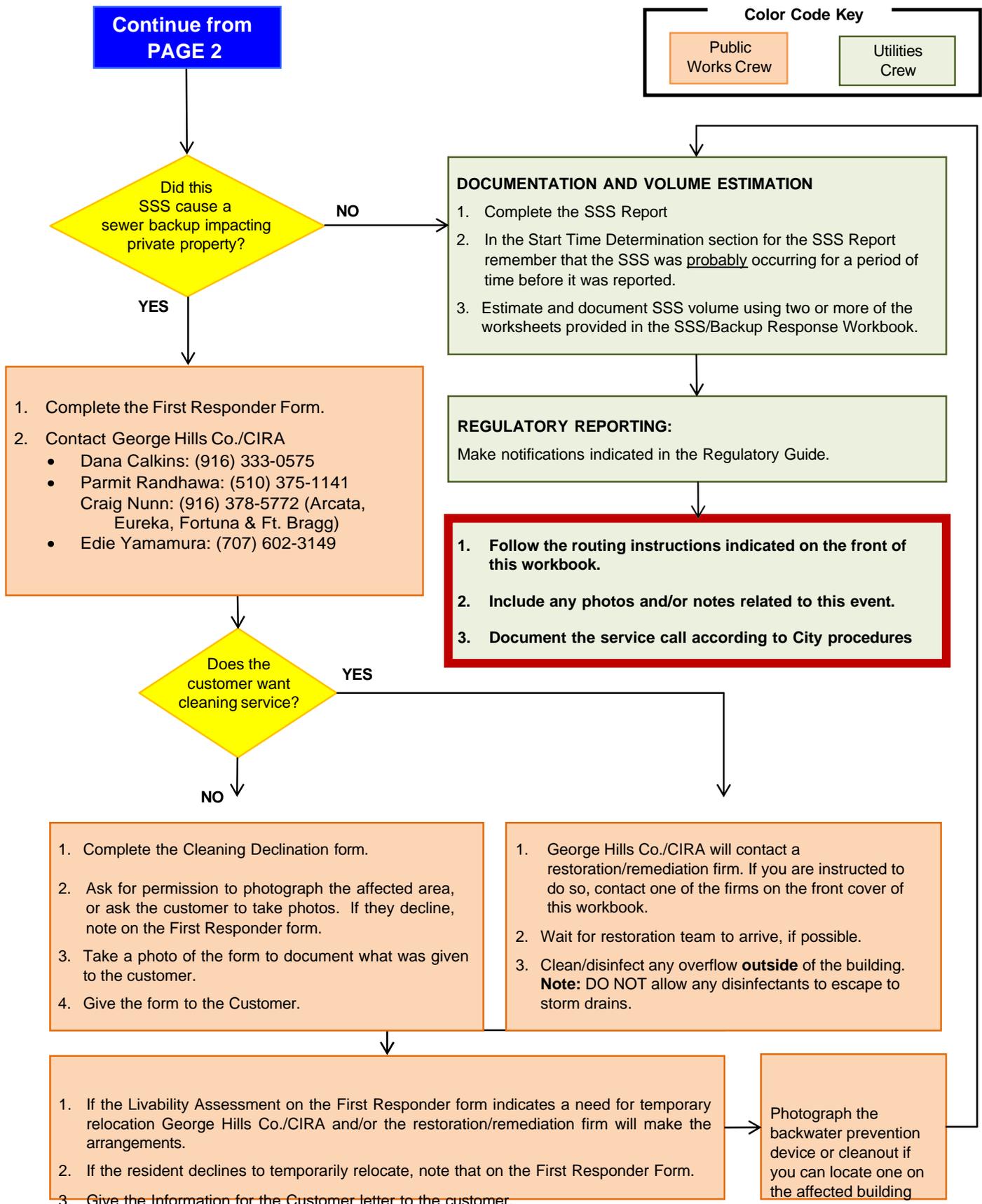
Contact	Telephone/Email
CAL OES	(800) 852-7550
City Clerk	(707) 431-3317
North Coast Regional Water Quality Control Board	(707) 576-2220
Town of Windsor, Water Operations	(707) 838-5309
Sonoma Water, Operations Hotline	(707) 523-1070
State Water Resources Control Board Armando Martinez	916) 341-5586 Armando.Martinez@waterboards.ca.gov

NOTIFICATIONS	
CAL OES (800) 852-7550	
Notification Date/Time:	
Name of Who You Spoke To:	
OES Control Number:	
Town of Windsor (707) 838-5309	
Notification Date/Time:	
Name of Who You Spoke To: Left Message: <input type="checkbox"/>	
Sonoma Water (707) 523-1070	
Notification Date/Time:	
Name of Who You Spoke To: Left Message: <input type="checkbox"/>	
City Clerk (707) 431-3317	
Notification Date/Time:	
Name of Who You Spoke To: Left Message: <input type="checkbox"/>	

INSERT TAB:
Flowchart







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SSS Report

PHYSICAL LOCATION DETAILS		
Spill location name		
Latitude of spill location		
Longitude of spill location		
County		
Regional Water Quality Control Board		
VOLUMES BY DESTINATION	Volume Spilled (Gallons)	Volume Recovered (Gallons)
2.a/2.b Estimated spill volume that reached a separate storm drain that flows to a surface body of water? (If not all recovered, this is a Category 1)		
2.c/2d Estimated spill volume that directly reached a drainage channel that flows to a surface water body? (Any volume spilled is a Category 1)		
2.e/2.f Estimated spill volume discharged directly to a surface water body? (Any volume spilled is a Category 1)		
2.g/2.h Estimated spill volume discharged to land? (Includes discharges directly to land, and discharges to a storm drain system or drainage channel that flows to a storm water infiltration/retention structure, field, or other non-surface water location. Also, includes backups to building structures).		
	Volume Spilled	Volume Recovered
Total Volume Spilled (Verify this matches the table in between 2.h and 3 in CIWQS)		

DATE/TIME DETERMINATIONS		
	DATE	TIME
Start of SSS (Use Start Time Determination/Notes Below)		
Agency Notified		
Collection System Operator Dispatched		
Collection System Operator Arrived		
End of SSS		
End of Spill Response		

Start Time Determination/Notes



Don't forget to take photos!

Caller Interview: Where did you see sewage spill from?

- Manhole
 Inside Building
 Vent/Clean Out
 Catch Basin
 Wet Well/Lift Station
 Other: _____

Comments: _____

Last Time Caller Observed **NO Spill occurring**: _____ AM / PM Date ____/____/____

Comments: _____

If the volume of the SSS and rate of flow are known, divide volume by rate of flow to get duration of SSS event.

_____ Gallons ÷ _____ GPM = Minutes (SSS Duration).

Subtract the Duration from the SSS End Date/Time to establish the SSS Start Date/Time.

Other Efforts to Determine Start Time: _____

Other Comments Regarding Spill Start Time: _____

Estimated SSS Start Time: _____ AM / PM Date: ____/____/____

SSS End Time: _____ AM / PM Date: ____/____/____

SSS FIELD REPORT	
Spill location description:	
Number of appearance points:	
Spill appearance points: (Circle all that apply) Backflow Prevention Device Force Main Gravity Mainline Inside Building/Structure Lateral Clean Out (Private / Public) Lower Lateral (Private / Public) Manhole Pump Station Upper Lateral (Private / Public) Other Sewer System Structure	
Spill appearance point explanation. (Enter information here if "Other" or multiple appearance points were selected):	
Final spill destination: (Circle all that apply) Final spill destination. (Circle all that apply). Beach Building/Structure Combined Storm Drain Drainage Channel Other (Specify Below) Paved Surface Separate Storm Drain Street/Curb and Gutter Surface Water Unpaved Surface	
Explanation of final spill destination. (Enter information if "Other" was selected.	

SSS FIELD REPORT

Spill cause: (Circle One)

Air Relief Valve (ARV)/Blow Off Valve (BOV) Failure

Construction Diversion Failure

CS Maintenance Caused Spill/Damage

Damage by Others Not Related to CS Construction/Maintenance (Specify Below)

Debris from Construction

Debris from Lateral

Debris-General

Debris-Rags

Debris Wipes/Non-Dispersible

Flow Exceeded Capacity (Separate CS Only)

Grease Deposition (FOG)

Inappropriate Discharge to CS

Natural Disaster

Operator Error

Other (Specify Below)

Pipe Structural Problem/Failure

Pipe Structural Problem/Failure – Installation

Pump Station Failure – Controls

Pump Station Failure – Mechanical

Pump Station Failure – Power

Rainfall Exceeded Design, I and I (Separate CS Only)

Root Intrusion

Siphon Failure

Surcharged Pipe (Combined CS Only)

Vandalism

Spill cause explanation: (Required if Spill Cause is "Other")

SSS FIELD REPORT		
<p>Where did failure occur?</p> <p>Air Relief Valve (ARV)/Blow Off Valve (BOV) Failure Force Main Gravity Mainline Lower Lateral (Public) Manhole Other (Specify Below) Pump Station Failure – Controls Pump Station Failure – Mechanical Pump Station Failure – Power Siphon Upper Lateral (Public)</p>		
<p>Explanation of where failure occurred: (Required if Where Failure Occurred is “Other”)</p> 		
Was spill associated with a storm event?	YES	NO
Diameter of sewer pipe at the point of blockage or failure:	inches	
Material of sewer pipe at the point of blockage or failure:		
Estimated age of sewer asset at the point of blockage or failure (if applicable):	years	
<p>Spill Response Activities. (Circle all that apply) Cleaned-Up Mitigated Effects of Spill Contained All or Portion of Spill Other (Specify Below) Restored Flow Returned All Spoil to Sanitary Sewer System Property Owner Notified Other Enforcement Agency Notified</p>		
<p>Explanation of spill response activities: (Required if spill response activities is “Other”):</p> 		

SSS FIELD REPORT		
Spill corrective action taken: (Circle all that apply) Added Sewer to Preventive Maintenance Program Adjusted Schedule/Method of Preventive Maintenance Enforcement Action Against FOG Source Inspected Sewer Using CCTV to Determine Cause Other (Specify Below) Plan Rehabilitation or Replacement of Sewer Repaired Facilities or Replaced Defect		
Explanation of corrective action taken: (Required if spill corrective action is "Other") 		
Is there an ongoing investigation?	YES	NO
Health warnings posted?	YES	NO
Did spill result in beach closure?	YES	NO
Name of Impacted Beach(es): (Enter N/A if none) 		
Name of impacted surface waters: 		

SSS FIELD REPORT	
Water quality samples analyzed for: (Circle all that apply) Biological Indicator(s) – Specify Below Other Chemical Indicators(s) – Specify Below No Water Quality Samples Taken Not Applicable to the Spill Other (Specify Below)	
Explanation of water quality samples analyzed for: (Required if water quality samples analyzed for is "Other chemical indicator(s)", "Biological indicator(s)", or "Other")	
Water quality sample results reported to: (Circle all that apply) County Health Agency Regional Water Quality Control Board Other (Specify below) No Water Quality Samples Taken Not Applicable to this Spill	
Explanation of water quality sample results reported to: (Required if water quality sample results reported to is "Other")	
Method and explanation of volume estimation methods used: (Circle all that apply) Eyeball Estimate Measured Volume Duration and Flow Rate Other (Explain):	

**INSERT TAB:
Volume Estimation**

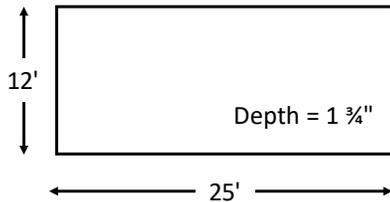
Miscellaneous Computations & Examples

To convert inches to feet (NOTE: for the purposes of this worksheet, the unit of measurement will be in feet for formula examples)	Divide the inches by 12 or use the chart on the right. Example 1: $27" \div 12 = 2.25'$ Example 2: $1\frac{3}{4}" = ?'$ $1" (0.08') + \frac{3}{4}" (0.06') = 0.14'$	Convert Inches to Feet	
		Inches	Feet
Volume of one cubic foot	7.48 gallons of liquid	1/8"	0.01'
		1/4"	0.02'
		3/8"	0.03'
		1/2"	0.04'
		5/8"	0.05'
		3/4"	0.06'
		7/8"	0.07'
		1"	0.08'
		2"	0.17'
		3"	0.25'
		4"	0.33'
		5"	0.42'
Area: Two-dimensional measurement represented in square feet (SQ/FT or ft ²)	Square/rectangle: Area = Length x Width Circle: Area = $\pi \times r^2$ (where $\pi \approx 3.14$ and $r = \text{radius} = \frac{1}{2} \text{ diameter}$) Triangle: Area = $\frac{1}{2} (\text{Base} \times \text{Height})$	6"	0.50'
		7"	0.58'
		8"	0.67'
		9"	0.75'
		10"	0.83'
		11"	0.92'
Volume: Three-dimensional measurement represented in cubic feet (CU/FT or ft ³)	Rectangle/square footprint: Volume = Length x Width x Depth Circle footprint (cylinder): Volume = $\pi \times r^2 \times \text{Depth}$ (where $\pi \approx 3.14$ and $r = \text{radius} = \frac{1}{2} \text{ diameter}$) Triangle footprint: Volume = $\frac{1}{2} (\text{Base} \times \text{Height}) \times \text{Depth}$	12"	1.00'
Depth: Wet Stain on Concrete or asphalt surface	If the depth is not measurable because it is only a wet stain, use the following estimated depths: Depth of a wet stain on concrete surface: 0.0026' (1/32") Depth of a wet stain on asphalt surface: 0.0013' (1/64") These were determined to be a reasonable depth to use on the respective surfaces through a process of trial and error. One gallon of water was poured onto both asphalt and concrete surfaces. Once the area was determined as accurately as possible, different depths were used to determine the volume of the wetted footprint until the formula produced a result that (closely) matched the one gallon spilled. This process was repeated several times.		
Depth: Contained or "Ponded" sewage	Measure actual depth of standing sewage whenever possible. When depth varies, measure several representative sample points and determine the average. Use that number in your formula to determine volume.		

Miscellaneous Computations & Examples (continued)

Area/Volume of a Rectangle or Square

Formula: Length x Width x Depth = Volume in **cubic feet**



$$\frac{25'}{\text{Length}} \times \frac{12'}{\text{Width}} \times \frac{0.14'}{\text{Depth}} = \underline{\underline{42 \text{ Cubic Feet}}}$$

Volume

Multiply the volume by 7.48 gallons to determine the volume in **gallons**:

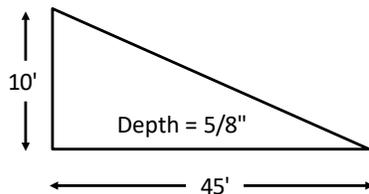
$$\frac{42 \text{ ft}^3}{\text{Volume}} \times \frac{7.48}{\text{gal/ft}^3} = \underline{\underline{314.16 \text{ gallons}}}$$

Volume

Convert Inches to Feet	
Inches	Feet
1/8"	0.01'
1/4"	0.02'
3/8"	0.03'
1/2"	0.04'
5/8"	0.05'
3/4"	0.06'
7/8"	0.07'
1"	0.08'
2"	0.17'
3"	0.25'
4"	0.33'
5"	0.42'
6"	0.50'
7"	0.58'
8"	0.67'
9"	0.75'
10"	0.83'
11"	0.92'
12"	1.00'

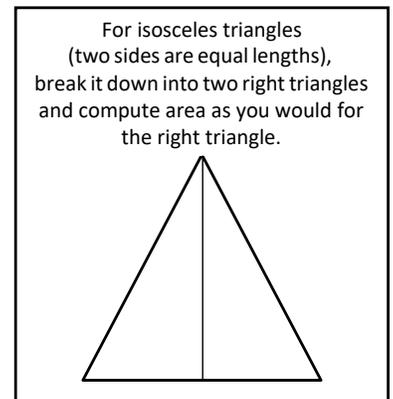
Area/Volume of a Right Triangle

Formula: Base x Height x Depth = Volume in **cubic feet**



$$\frac{45'}{\text{Base}} \times \frac{10'}{\text{Height}} \times 0.5 \times \frac{0.05'}{\text{Depth}} \times \frac{7.48}{\text{gal/ft}^3} = \underline{\underline{84.15 \text{ gallons}}}$$

Volume



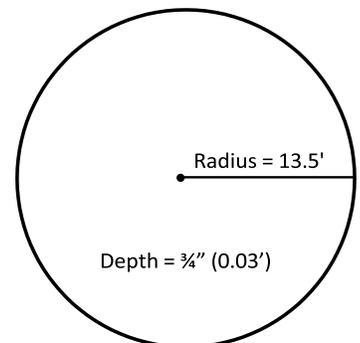
Area/Volume of a Circle

Formula: $\pi \times r^2 \times 0.785 \times \text{Depth} = \text{Volume in cubic feet}$

The diameter is a straight line passing from side to side through the center of a circle.

$$\frac{13.5'}{\text{Radius}} \times \frac{13.5'}{\text{Radius}} \times \frac{3.14}{\pi} \times \frac{0.03'}{\text{Depth}} \times \frac{7.48}{\text{gal/ft}^3} = \underline{\underline{128.42 \text{ gallons}}}$$

Volume



STEP 1: Position yourself so that you have a vantage point where you can see the entire SSS.

STEP 2: Imagine one or more buckets or barrels of water tipped over. Depending on the size of the SSS, select a bucket or barrel size as a frame of reference. It may be necessary to use more than one bucket/barrel size.

STEP 3: Estimate how many of each size bucket or barrel it would take to make an equivalent spill. Enter those numbers in Column A of the row in the table below that corresponds to the bucket/barrel sizes you are using as a frame of reference.

STEP 4: Multiply the number in Column A by the multiplier in Column B. Enter the result in Column C.

	A	B	C
Size of bucket(s) or barrel(s)	How many of this size?	Multiplier	Estimated SSS Volume (gallons)
1 gallon water jug		x 1 gallons	
5 gallon bucket		x 5 gallons	
32 gallon trash can		x 32 gallons	
55 gallon drum		x 55 gallons	
Other: _____ gallons		x _____ gallons	
Estimated Total SSS Volume:			

STEP 5: Is rainfall a factor in the SSS? Yes No

If yes, what volume of the observed spill volume do you estimate is rainfall? _____ gallons

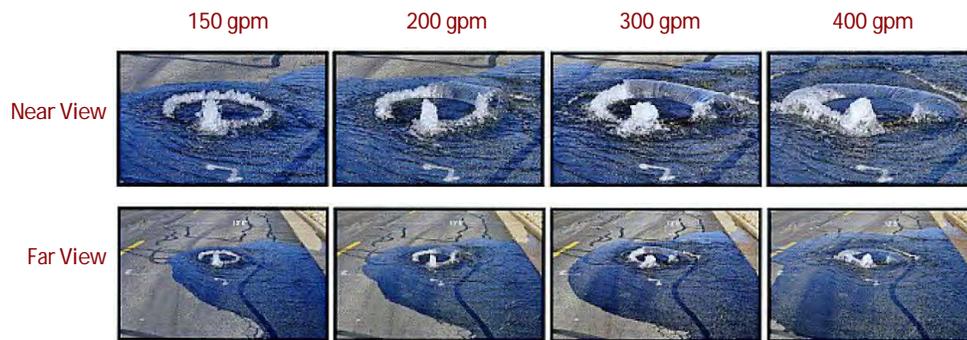
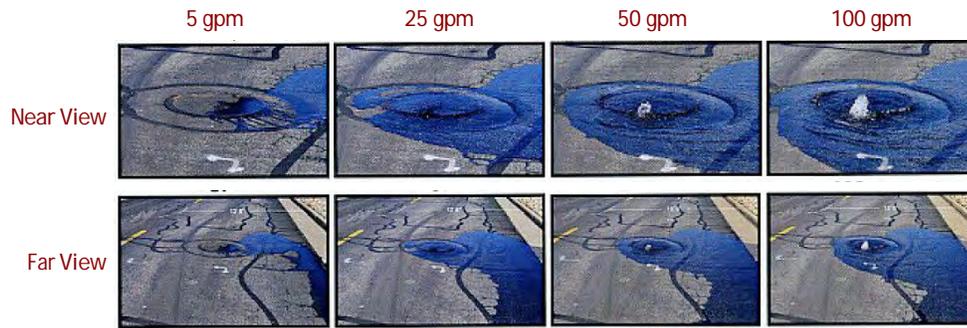
If yes, describe how you determined the amount of rainfall in the observed spill?

STEP 6: Calculate the estimated SSS volume by subtracting the rainfall from the SSS volume:

$$\begin{array}{r}
 \underline{\hspace{2cm}} \text{ gallons} - \underline{\hspace{2cm}} \text{ gallons} = \underline{\hspace{2cm}} \text{ gallons} \\
 \text{Estimated SSS Volume} \qquad \text{Rainfall} \qquad \qquad \qquad \text{Total Estimated SSS Volume}
 \end{array}$$

Compare the SSS to reference images below to estimate flow rate of the current overflow. **NOTE: If the manhole cover in your picture has vent holes or more than one pry hole, do not use these pictures for comparison.**

Describe which reference photo(s) were used and any additional factors that influenced applying the reference photo data to the actual SSS:



*SSCSC Manhole Overflow Gauge: CWEA Southern Section Collections Systems Committee
Overflow Simulation courtesy of Eastern Municipal Water District*

Flow Rate Based on Photo Comparison: _____ gallons per minute (gpm)

Start Date and Time	1.
End Date and Time	2.
SSS Event Total Time Elapsed (subtract Line 1 from Line 2. Show in minutes.)	3.
Average Flow Rate GPM (Account for diurnal flow pattern)	4.
Total Volume Estimated Using Duration and Flow Method (Line 3 x Line 4)	5.

SSS Date: _____ Location: _____

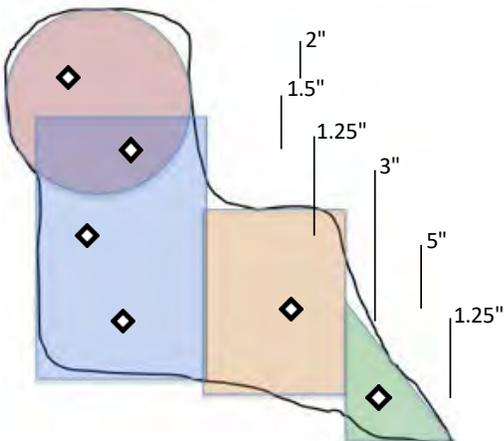
STEP 1: Describe spill area surface: Asphalt Concrete Dirt Landscape Inside Building

Other: _____

STEP 2: Draw/sketch the outline (footprint) of the spill. Then break the footprint down into recognizable shapes. See example below.

1. Sketch the outline of the spill (black line)
2. Break the sketch down into recognizable shapes (circles, squares, etc.) as well as you can.
3. Determine the volume of each shape. (note: in this example, after the volume of the circle is determined, multiply it by approximately 65% so that the overlap area won't be counted twice.)
4. If the spill is of varying depths, take several measurements at different depths and find the average. If the spill affects a dry unimproved area such as a field or dirt parking lot, determine the area of the wetted ground in the same manner as you would on a hard surface. Using a round-point shovel, dig down into the soil until you find dry soil. Do this in several locations within the wetted area and measure the depth of the wet soil. Average the measurement/thickness of the wet soil and determine the average depth of the wet soil.

Example (right): $2'' + 1.5'' + 1.25'' + 3'' + 5'' + 1.25'' = 14.0''$
 $14.0'' \div 6 \text{ measurements} = 2.33''$
Average Depth = 2.33" (0.194')



The diagram shows a spill footprint outlined in black, divided into six colored regions: a red circle at the top, a blue rectangle below it, an orange rectangle to the right of the blue one, a green triangle at the bottom right, and two white rectangular areas at the bottom. Depth measurements are indicated by vertical lines with diamond markers: 2" for the red circle, 1.5" for the blue rectangle, 1.25" for the orange rectangle, 3" for the green triangle, 5" for the bottom white area, and 1.25" for the bottom-most white area.

STEP 3: Calculate the area of the footprint by completing the table below for each shape in Step 2.

If two shapes overlap, select one of the two shapes and estimate the percentage of that shape that does not overlap. Enter that percentage in the % Not Overlapping column. This will ensure that the overlap area is only counted once. Refer to the example on the previous page.

Rectangles	Length	X	Width	X	% Not Overlapping*	=	Area
	ft	X	ft	X	%	=	ft ²
	ft	X	ft	X	%	=	ft ²
	ft	X	ft	X	%	=	ft ²

Triangles	Base	X	Height	Multiplier	X	% Not Overlapping*	=	Area
	ft	X	ft	÷ 2	X	%	=	ft ²
	ft	X	ft	÷ 2	X	%	=	ft ²
	ft	X	ft	÷ 2	X	%	=	ft ²

Circles	π	X	Radius	X	Radius	X	% Not Overlapping*	=	Area
	3.14	X	ft	X	ft	X	%	=	ft ²
	3.14	X	ft	X	ft	X	%	=	ft ²
	3.14	X	ft	X	ft	X	%	=	ft ²

Total Spill Area (sum of all three tables above): _____ **ft²**

STEP 4: Measure the depth of the spill.

If spill is of varying depths, take several measurements at different depths and find the average.

$$\frac{\text{_____ inches}}{\text{sum of measurements}} \div \frac{\text{_____}}{\text{\# of measurements}} = \frac{\text{_____ inches}}{\text{average depth in inches}} \div 12 = \frac{\text{_____ feet}}{\text{average depth in feet of ponded sewage}}$$

STEP 5: Calculate spill volume of ponded sewage in cubic feet by multiplying the Total Spill Area in Step 3 by the average depth calculated in Step 4.

Convert from cubic feet to gallons by multiplying by 7.48.

$$\frac{\text{_____ ft}^2}{\text{spill area (Step 3)}} \times \frac{\text{_____ ft}}{\text{average depth (Step 4)}} = \frac{\text{_____ ft}^3}{\text{spill volume in feet}} \times 7.48 \text{ gal} = \frac{\text{_____ gallons}}{\text{Total estimated volume}}$$

**INSERT TAB:
Backup Forms**

Complete this form only if there is a backup into a residence or business.

Instructions:

1. Follow instructions on the Spill/Backup Response Flowchart.
2. Refer to CIRA Instructions for Handling General Liability Claims as necessary.
3. Complete forms as indicated.
4. For customer forms, tear form out of this workbook and hand to customer. Take photo of each form before giving it to the customer for documentation. *Do not give the customer the First Responder Form.*
5. Check each item that was provided to the customer.
6. Have customer sign below.

Forms/Documents:

- Form E-4: Declination of Cleaning Services
- Form E-5: Customer Information Letter
- Form E-6: Your Responsibilities as a Private Property Owner

Forms Provided to:

Customer Name

Customer Signature

Date

Check here if customer declines to sign:

Forms Provided by:

Employee Name

Initial

FOR INTERNAL USE ONLY – DO NOT DISTRIBUTE EXTERNALLY
(updated as of May 2023)

**INSTRUCTIONS FOR HANDLING
GENERAL LIABILITY AND AUTO LIABILITY CLAIMS**

A. SEWER and FLOODING LOSSES

1. Process for SSS (Sanitary Sewer Spill) or Water Main Flooding:
 - a. The City/Town receives a call of a SSS or ruptured water main.
 - b. For an SSS, the department responds and confirms/denies there is a blockage in the main line and/or lower lateral (if your agency accepts responsibility at that point). Please note, each entity has their own Municipal Code that distinguishes the responsibility of the public vs. private services. CIRA recommends the agency accept responsibility at the “tap” or “connection point” and main.

Or

For water flooding, the department responds and confirms/denies if the flooding is due to an issue in the main line and service line (i.e. ruptured pipe)

- c. If the cause of the loss cannot be immediately determined, error on the side of caution and proceed as if the member entity has liability *without* verbal or written acceptance of liability. **DO NOT discuss liability.**
- d. The City/Town’s staff will need to complete the initial site assessment form and provide the following information to CIRA (or those working on behalf of CIRA) or the restoration company:

What was the cause of the blockage or water rupture?
What areas of the structure were affected?
Do the occupants need to be relocated?
Is there any other pertinent information?

CIRA (or those working on behalf of CIRA) or the restoration company will need to know:

What are the names/date of births of ALL occupants?
Is the occupant the owner or renter? (If the occupant is a renter, the homeowner and occupant will have separate claims).
Are there any pre-existing health concerns of occupants?

If emergency services are needed, please contact **Sierra Pacific Loss Management (SPLM)** at the number listed below immediately (they are working on behalf of CIRA):

Sierra Pacific Loss Management:
Main Line - (800) 413-2999/707.252.5525
Doug Thompson – 707.592.9918
info@splmca.com

PLEASE NOTE: THAT SIERRA PACIFIC LOSS MANAGEMENT WILL HANDLE MOST, IF NOT ALL, OF THE CLAIM IF CONTACTED IMMEDIATELY.

2. If attempts to contact Sierra Pacific are unsuccessful, please contact George Hills staff directly. They have emergency 24/7 numbers and will answer and respond.

George Hills Staff:

Dana Calkins: (916) 333-0575

Parmit Randhawa: (510) 375-1141

Craig Nunn: (916) 378-5772 (Arcata, Eureka, Fortuna & Ft. Bragg)

Edie Yamamura: (707) 602-3149

3. Both Sierra Pacific and George Hills staff have been trained to handle the initial part of a loss and assist any individual(s) who need to be relocated.

The claimant will hear from CIRA (or those acting on behalf of CIRA) as soon as possible to explain the claim process and needs regarding subject claim (relocation process, per diem/meals, etc.).

4. CIRA (or those acting on behalf of CIRA) will obtain all information and work with the City/Town on providing a claim form.

5. Sierra Pacific will project manage the claim until completion. This will include the following:

Usually within the first hour:

- Arrive onsite and meet with City/Town personnel and/or claimant
- Walk loss with claimant
- Discuss process with claimant
- Collect photographs

Within 30-60 minutes of arrival:

- Review initial scope with restoration contractor
- Determine if relocation is necessary
- If relocation is necessary, make arrangements with pre-approved hotel/motel for stay

Within 24 hours of arrival

- Contact George Hills with pertinent information
- Meet with restoration contractor supervisor and agree on full scope of work
- Meet with rebuild contractor to include the following:
- Introduce to claimant
- Discuss scope of work
- The claimant has the right to have his/her own contractor perform the work, but most will use the general contractor supplied by the City/Town
- Meet with rebuild contractor to include the following:

Following completion of remediation

- Arrange for hygienist to complete clearance testing (bio, mold, asbestos)
- Confirm with restoration contractor that site is ready for rebuild and arrange for them to start work

Throughout project

- Track remediation contractor to confirm that they are on schedule
- Track rebuild contractor to confirm that they are on schedule
- Communicate with claimant to assure that they are made aware of contractor visits, schedules and completion dates
- If claimant is relocated, confirm that they are satisfied with accommodations

Following Project Completion

- Review the following:
 - Emergency services (ES) invoice
 - Hygienist's report/invoice
 - Rebuild contractor's estimate
- Develop submittal package to include:
 - Adjuster's report
 - Statement of loss
 - ES invoice/detail
 - Hygienist's invoice/report
 - Rebuild Contractor's invoice/detail
 - Non-Salvageable list
- Submit package to George Hills for processing

6. Communication with the claimants will be continuous throughout the claim process. CIRA (or those acting on behalf of CIRA) will be available to relocated claimants with any special needs. If there are items that need to be purchased immediately, CIRA will purchase on their behalf.
7. The restoration company will contract directly with the claimants. The claimant will file a claim with the City/Town. CIRA will work with both and finalize the claim for both mitigation and repairs at the conclusion of the claim. If it is a large loss or problems occur, CIRA may advance fees to the restoration company or other approved vendor.
8. Often the only time things go wrong with sewer/water claims is when communication breaks down. There needs to be continuous and constant communication throughout the entire claim process with everyone (the claimant, the restoration company, the City/Town and CIRA).

B. OFFICER INVOLVED SHOOTINGS and SERIOUS AUTO ACCIDENTS

For officer involved shootings (OIS), in-custody deaths, and serious injuries due to use of force or serious bodily injury auto accidents, please use your internal processes and procedures or follow multi-agency protocols. Notify CIRA immediately or as soon as possible:

Kin Ong, kong@cira-jpa.org
Amy Northam, anortham@cira-jpa.org
Erike Young, eyoung@cira-jpa.org

C. GENERAL LIABILITY CLAIMS

1. Please follow your internal city/town procedure for reporting claims. In addition, immediately report all general liability or auto accidents involving damage to property owned by a third party, bodily injury to a third party, or other loss or injury to a third party to CIRA by sending an e-mail to:

myghnewclaims@georgehills.com

With a cc to: Kin Ong, kong@cira-jpa.org
Amy Northam, anortham@cira-jpa.org
Erike Young, eyoung@cira-jpa.org

You will receive an e-mail confirming receipt of the claim. The claim will then be assigned to an adjuster, and you will hear from the adjuster on next steps.

CITY	HOTEL	ADDRESS	PHONE NUMBER	PETS ALLOWED	GOVERNMENT RATE	OFFERS DIRECT BILLING OR CREDIT CARD AUTHORIZATION FORM
ARCATA/EUREKA	Holiday Inn Express & Suites	815 West Wabash Avenue, Eureka	707-269-0682	No	Govt. only during Sun-Thurs.	Direct billing go thru Gen. Mgr. to set up.
	Super 8 by Wyndham - Eureka	1304 4th Street, Eureka	707-443-3193	Dog up to 40 pd./\$20 per day	Not sure; all if new	Talk w/new owner.
	Super 8 by Wyndham - Arcata	4887 Valley West Boulevard, Arcata	707-822-8888	Dogs up to 50 pds. & Cats; \$10 per night	Yes; usually a 5-10% discount depending on dates of stay	Direct billing: Speak to owner or property mgr. / offers Credit card auth
CLOVERDALE	Vineyard Valley Inn	721 N. Cloverdale Blvd., Cloverdale, 95425	707-894-9119	1 dog only	\$95 Sun-Thur./\$110 Fri. & Sat./\$120 for 2 beds	Requires authorization form, photo ID and credit card info
	Super 8 by Wyndham - Cloverdale	1147 S. Cloverdale Blvd, Cloverdale, 95425	707-893-7057	No	\$139.50 +tax	Requires authorization form, photo ID and credit card info
FT. BRAGG	Harbor Lite Lodge	120 N. Harbor Dr., Ft. Bragg, 95437	707-964-0221	No	Yes; the state rate: Fall/Winter: \$70+tax; Summer: \$90+tax	Direct Billing & credit card authorization form
	Beachcomber Motel Group	1111 N. Main St., Ft. Bragg, 95437	707-964-2402	Dogs & Cats; more than 1 okay	Yes; the state rate and offers a military rate	Direct Billing & credit card authorization form
	Surf and Sand Lodge	1131 No. Main St., Ft. Bragg, 95437	707-964-9383	Yes, in certain room	Yes - Sun - Thurs.; king bed; no ocean view; \$10 Military disc. (cannot be combined w/govt. rate	No direct billing; Only credit card authorization form
	Beach House Inn	125 E. Laurel St., Ft. Bragg, 95437	707-961-1700	Dogs & Cats; \$20 per pet/per nite	Yes; \$90-99; holidays don't apply; Sun-Thurs. rate.	Direct billing & credit card authorization form
FORTUNA	Redwood Riverwalk Hotel	1859 Alamar Way, Fortuna	707-725-5500	Dogs; \$25/day	No	Direct billing & credit card authorization form
	Best Western Country Inn	2025 Riverwalk Drive, Fortuna	707-725-6822	Dogs; \$25/per nite	Yes; \$98.10 for king size; does goes up	Was unsure about Direct billing; yes credit card authorization form
	Comfort Inn & Suites	1583 Riverwalk Drive, Fortuna	707-725-7025	No	Yes	Direct billing; credit card authorization form
	Super 8 by Wyndham - Fortuna	1805 Alamar Way, Fortuna	707-682-5103	No	Government Rates: Depending on dates & availability	Direct billing; credit card authorization form
HEALDSBURG/ROHNERT PARK COTATI/WINDSOR	Travelodge by Wyndam Healdsburg	178 Dry Creek Road, Healdsburg	707-433-0101	No	No; Triple A discount only	Direct billing; credit card authorization form
	Best Western Dry Creek Inn Courtyard - Santa Rosa	198 Dry Creek Road, Healdsburg 175 Railroad Street, Santa Rosa	707-433-0300 707-573-9000	Dogs & Cats; \$30 or \$50 per day depending on room No	No	Direct billing; credit card authorization form Direct billing; credit card authorization form; can be faxed to us
LAKEPORT	The Lodge @ Blue Lakes	5135 W. Highway 20, Upper Lake	707-275-8121	Yes	Government Rates: Depending on dates & availability	Requires authorization form, photo ID and credit card info
	Super 8 by Wyndham - Upper Lake	450 E. Highway 20, Upper Lake	707-275-0888	No		
SEBASTOPOL	Fairfield Inn & Suites	1101 Gravenstein Hwy S, Sebastopol	707-829-6677	Only service animals	Yes - Sun. -Thurs. only	Direct billing; credit card authorization form
	Courtyard - Santa Rosa	175 Railroad Street, Santa Rosa	707-573-9000	No		Direct billing; credit card authorization form; can be faxed to us
SONOMA	Double Tree by Hilton Hotel Sonoma Wine Country	One Doubletree Drive, Rohnert Park	707-584-5466	Yes - 2 dogs maximum		
ST. HELENA	El Bonita Motel	195 Main Street, St. Helena	707-963-3216	Yes (additional charge)		
UKIAH/WILLITS	Fairfield Inn & Suites	1140 Airport Park Boulevard, Ukiah	707-463-3600	Only service animals	Yes - Sun. -Thurs. only	Direct billing; credit card authorization form
	Super 8 by Wyndham - Ukiah	693 South Orchard Avenue, Ukiah	707-468-8181	No	Government Rates: Depending on dates & availability	Requires authorization form, photo ID and credit card info
	Super 8 by Wyndham - Willits	1119 South Main Street, Willits		No	Government Rates: Depending on dates & availability	Requires authorization form, photo ID and credit card info

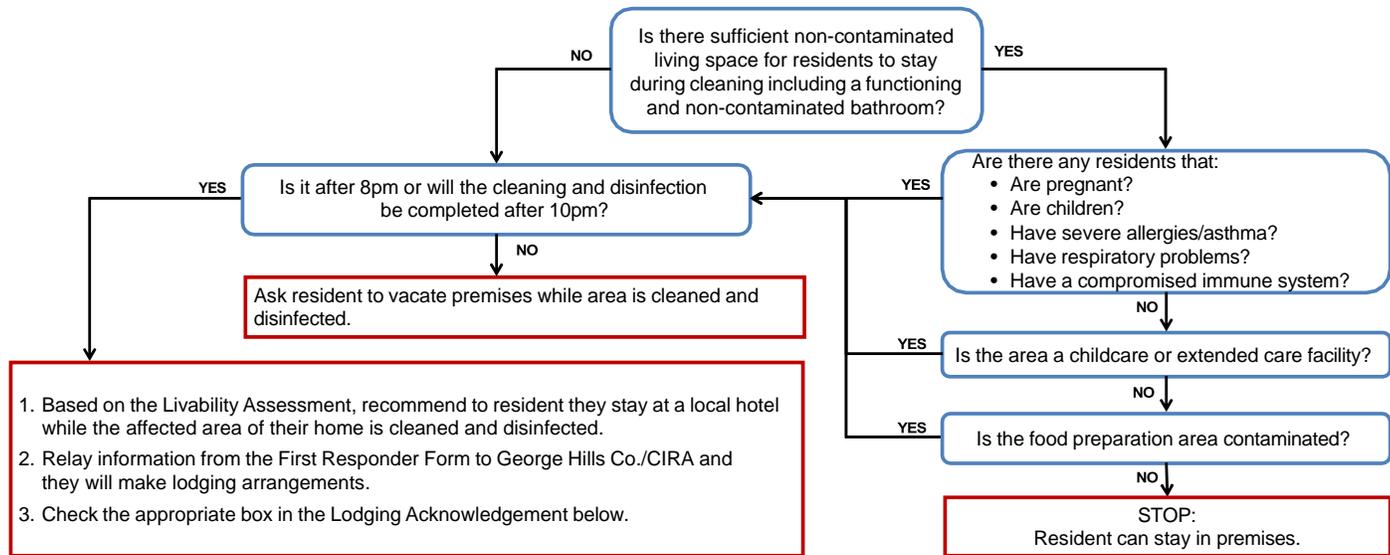
Complete this form only if there is a backup into a residence or business.

Fill out this form as completely as possible.
 Ask customer if you may enter the home. If so, take photos of all damaged and undamaged areas.

PERSON COMPLETING THIS FORM:		PHONE:
Name: _____		DATE:
Title: _____		TIME:
TIME STAFF ARRIVED ON-SITE:		
DOES THE CUSTOMER WANT THE CITY TO CALL FOR CLEANING SERVICE? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, give the customer the Cleaning Declination Form and have them sign here: _____ If customer called a cleaning contractor, provide name and contact number:		
RESIDENT NAME: <input type="checkbox"/> Owner <input type="checkbox"/> Renter ADDRESS: PHONE:	IF RENT, PROPERTY MANAGER(S): OWNER: ADDRESS: PHONE:	
# OF PEOPLE LIVING AT RESIDENCE:		
Approximate Age of Home:	# of Bathrooms:	# of Rooms Affected:
Numbers of Photographs or Videos Taken: <input type="checkbox"/> Photographs <input type="checkbox"/> Video <input type="checkbox"/> Customer did not provide or allow photographs	Where are photos/video stored?	
Is nearest upstream manhole visibly higher than the drain/fixture that overflowed? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Does property have a Property Line Cleanout or BPD?		<input type="checkbox"/> Cleanout <input type="checkbox"/> BPD <input type="checkbox"/> Neither <input type="checkbox"/> Unknown
If yes, was the Property Line Cleanout/BPD operational at the time of the overflow?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Have there ever been any previous spills at this location?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Has the resident had any plumbing work done recently?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
<i>If YES, please describe:</i>		

GO TO Page 2

LIVABILITY ASSESSMENT



Temporary lodging was offered by the City and either (check one): Accepted Rejected

SANITARY SEWER LINE BLOCKAGE LOCATION

PLEASE CHECK THE BOXES THAT DESCRIBE YOUR OBSERVATIONS:

Customer Cleanout Was: <input type="checkbox"/> Non-Existent <input type="checkbox"/> Full <input type="checkbox"/> Empty	Agency Owned/Maintained Cleanout was: <input type="checkbox"/> Non-Existent <input type="checkbox"/> Full <input type="checkbox"/> Empty
---	--

On the diagram below, indicate the location of the sewer line and where the problem occurred.



Recommended Follow-Up Action(s):

Did sewage go under buildings? Yes No Unsure

Declination of Cleaning Services (Backup Only)

Customer Information		
NAME:	ADDRESS:	TELEPHONE:

ON (date)	AT (time)	Approximately (quantity)	GALLONS OF:			
			<input type="checkbox"/> Sewage	<input type="checkbox"/> Grey Water	<input type="checkbox"/> Toilet Bowl Water	<input type="checkbox"/> Odor
			<input type="checkbox"/> Other (describe):			

Overflowed from (or odor emanating from)			The overflow affected the following areas (check one):				
<input type="checkbox"/> Toilet	<input type="checkbox"/> Shower/Tub	<input type="checkbox"/> Washer	<input type="checkbox"/> Other (describe):	<input type="checkbox"/> Bathroom	<input type="checkbox"/> Bedroom	<input type="checkbox"/> Hallway	<input type="checkbox"/> Garage
				<input type="checkbox"/> Kitchen	<input type="checkbox"/> Crawlspace	<input type="checkbox"/> Other (specify):	

The overflow affected the following flooring:		and/or additional materials:	
<input type="checkbox"/> Tile	<input type="checkbox"/> Wood Flooring	<input type="checkbox"/> Area Rugs	<input type="checkbox"/> Towels
<input type="checkbox"/> Linoleum	<input type="checkbox"/> Carpet	<input type="checkbox"/> Clothing	<input type="checkbox"/> Other (specify):
<input type="checkbox"/> Other (specify):			

This Form Completed By:	Name: _____	Date: _____
(Write legibly)	Title: _____	Time: _____

CUSTOMER, please read the following and sign below. I/We acknowledge that City of Healdsburg (City) has offered to provide professional cleaning and decontamination services to remediate the sewage backup and/or overflow described above and that we declined the offer. We further understand and acknowledge that because we have declined, any necessary remediation activities will be conducted without City assistance, and that the City will not accept responsibility for work performed by persons other than those engaged by the City. The City will also not accept responsibility for any charges related to this incident that are not usual and customary.

Customer Signature*:		Date:
The information above was explained to the customer by the following employee:	Name:	Title:
	Signature:	Date:

**Note to responders: if customer declines to sign this form, then have a co-worker sign here as a witness:*

Name: _____ Signature: _____ Date: _____

Recommendations to customer to clean up the spill:

- Keep pets and children out of the affected area
- Turn off heating/air conditioning systems
- Wear rubber boots, rubber gloves, and goggles during cleanup of the affected area.
- Remove and discard items that cannot be washed and disinfected (such as: mattresses, rugs, cosmetics, baby toys, etc.)
- Remove and discard drywall and insulation that has been contaminated with sewage or flood waters.
- Thoroughly clean all hard surfaces (such as flooring, concrete, molding, wood and metal furniture, countertops, appliances, sinks and other plumbing fixtures) with hot water and laundry or dish detergent.
- Help the drying process with fans, air conditioning units, and dehumidifiers.
- After completing clean-up, wash your hands with soap and water. Use water that has been boiled for 1 minute (allow water to cool before washing your hands.) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash all clothes worn during the cleanup in hot water and detergent (wash separately from uncontaminated clothes).
- Wash clothes contaminated with flood or sewage water in hot water and detergent. Use a laundromat for washing large quantities of clothes and linens until your onsite wastewater system has been professionally inspected and services.
- Seek immediate attention if you become injured or ill.

Dear Property Owner:

We recognize that sewer backup incidents can be stressful and require immediate response while all facts concerning how an incident occurred are still unknown. Rest assured that we do all we can to prevent this type of event from occurring in the first place. Nevertheless, occasionally tree roots or other debris in the sewer lines causes a backup into homes immediately upstream of the blockage. At this time the City is investigating the cause of this incident.

If the City is found to be responsible for the incident, we are committed to cleaning and restoring your property, and to protecting the health of those affected during the remediation process.

The cleaning contractor provided by the City has been selected because of their adherence to established protocols that are designed to assure to all parties thorough, cost-effective and expeditious cleaning services. You also have the right to select your own cleaning contractor, but the City does not guarantee payment of fees/expenses incurred and reserves the right to dispute fees/expenses deemed not usual and customary.

To discuss this matter, contact the Utility Maintenance Superintendent at (707) 431-3346. To submit a claim for damages, contact the City Clerk at (707) 431-3317.

Sincerely,
The City of Healdsburg

What you need to do now:

- Minimize the impact of the loss by responding promptly to the situation.
- Do not attempt to clean the area yourself, let the cleaning and restoration company handle this.
- Keep people and pets away from the affected area(s) until cleanup has been completed.
- Turn off any appliances that use water.
- Turn off heating/air conditioning systems.
- Do not remove items from the area – the cleaning and restoration company will handle this.
- If you had recent plumbing work done, contact your plumber or contractor and inform them of this incident.

Estimado Propietario:

Reconocemos que los incidentes de la red de alcantarillado pueden ser estresantes y requieren una respuesta inmediata, mientras que todos los hechos relacionados con la forma en que ocurrió el incidente aún son desconocidos. Tenga la seguridad de que haremos todo lo posible para evitar que este tipo de evento ocurra en primer lugar. Sin embargo, ocasionalmente las raíces de los árboles u otros residuos en las líneas de alcantarillado causan una copia de seguridad en los hogares inmediatamente antes del bloqueo. En este momento la Ciudad está investigando la causa de este incidente.

Si se determina que la Ciudad es responsable del incidente, nos comprometemos a limpiar y restaurar su propiedad, ya proteger la salud de las personas afectadas durante el proceso de remediación.

El contratista de limpieza proporcionado por la Ciudad ha sido seleccionado debido a su adhesión a los protocolos establecidos que están diseñados para asegurar a todas las partes servicios de limpieza exhaustivos, rentables y rápidos. También tiene derecho a seleccionar su propio contratista de limpieza, pero la Ciudad no garantiza el pago de los honorarios / gastos incurridos y se reserva el derecho de disputar los honorarios / gastos considerados no habituales y habituales.

Para discutir este asunto, comuníquese con el Superintendente de Mantenimiento de Servicios Públicos al (707) 431-3346. Para presentar una reclamación por daños, comuníquese con el Secretario Municipal al (707) 431-3317.

Sinceramente,
La ciudad de Healdsburg

Lo que necesitas hacer ahora:

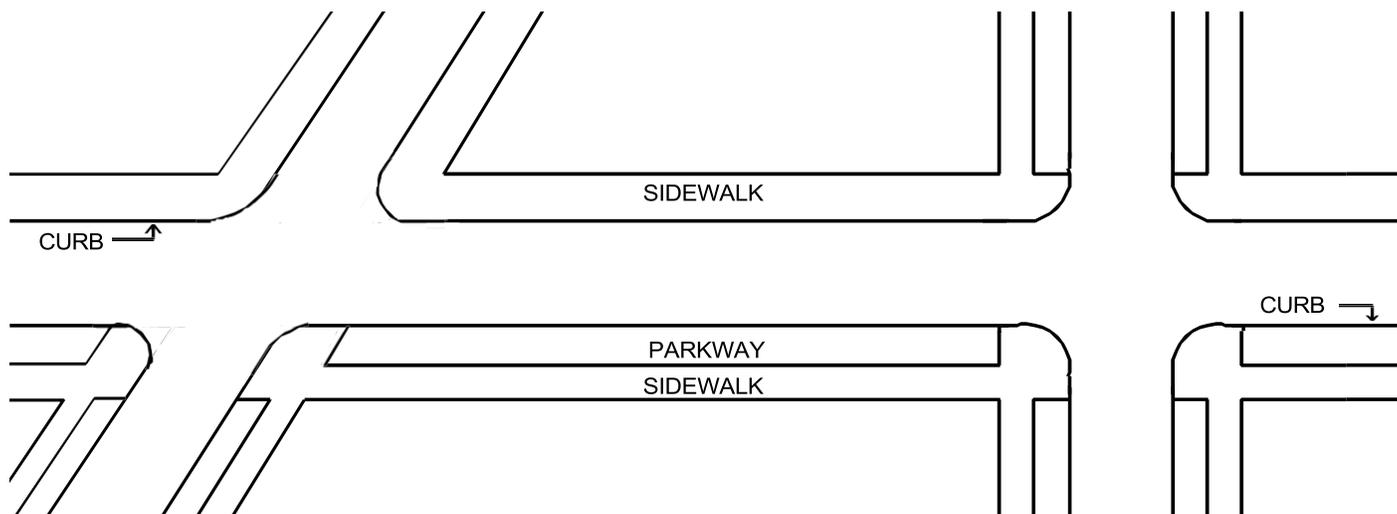
- Minimice el impacto de la pérdida respondiendo rápidamente a la situación.
- No intente limpiar el área usted mismo, deje que la empresa de limpieza y restauración se encargue de esto.
- Mantenga a las personas y las mascotas alejadas de las áreas afectadas hasta que se haya completado la limpieza.
- Apague cualquier aparato que use agua.
- Apague los sistemas de calefacción / aire acondicionado.
- No retire elementos del área: la empresa de limpieza y restauración se encargará de esto.
- Si ha realizado trabajos de plomería recientemente, comuníquese con su plomero o contratista e infórmele de este incidente.

READ CAREFULLY

For all accident claims, place on following diagram name of streets, including North, East, South, and West; indicate place of accident by "X" and by showing house numbers or distances to street corners. If City/Agency Vehicle was involved, designate by letter "A" location of City/Agency Vehicle when you first saw it, and by "B" location of yourself or your vehicle when you first saw

City/Agency Vehicle; location of City/Agency vehicle at time of accident by "A-1" and location of yourself or your vehicle at the time of the accident by "B-1" and the point of impact by "X."

NOTE: If diagrams below do not fit the situation, attach hereto a proper diagram signed by claimant.



Warning: Presentation of a false claim with the intent to defraud is a felony (Penal Code §72). Pursuant to CCP §1038, the City/Agency may seek to recover all costs of defense in the event an action is filed which is later determined not to have been brought in good faith and with reasonable cause.

Signature:

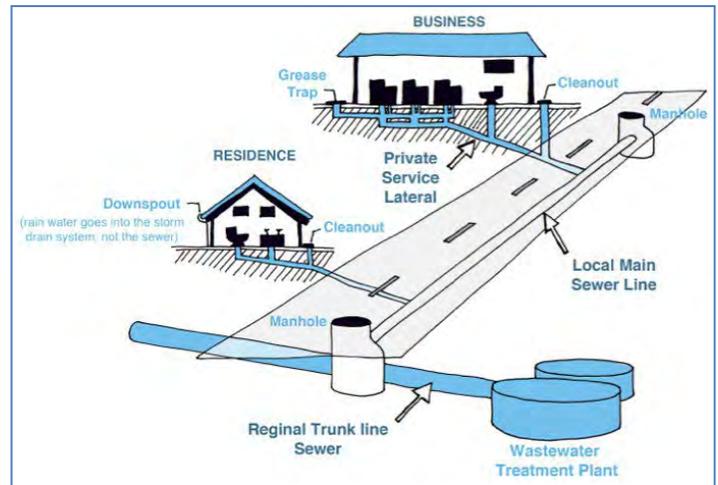
Date:

How a Sewer System Works

A property owner's sewer pipes are called **service laterals** and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer. These laterals are the responsibility of the property owner and must be maintained by the property owner.

How do sewage spills happen?

Sewage spills occur when the wastewater in underground pipes overflows through a manhole, cleanout, or broken pipe. Most spills are relatively small and can be stopped and cleaned up quickly, but left unattended they can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways, and beaches. Common causes of sewage spills include grease build-up, tree roots, broken/cracked pipes, missing or broken cleanout caps, undersized sewers, and groundwater/rainwater entering the sewer system through pipe defects and illegal connections.



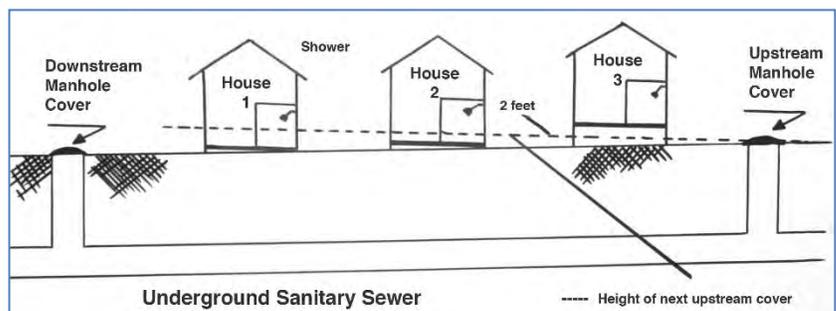
Prevent most sewage backups with a Backflow Prevention Device

This type of device can help prevent sewage backups into homes and businesses. If you don't already have a Backflow Prevention Device, contact a professional plumber or contractor to install one as soon as possible.

Is my home required to have a backflow prevention device?

Section 710.1 of the Uniform Plumbing Code (U.P.C.) states: “Drainage piping serving fixtures which have flood level rims located below the elevation of the next upstream manhole cover or private sewer serving such drainage piping **shall** be protected from backflow of sewage by installing an approved type of backwater valve.” The intent of Section 710.1 is to protect the building interior from mainline sewer overflows or surcharges.

Additionally, U.P.C. 710.6 states: “Backwater valves **shall** be located where they will be accessible for inspection and repair at all times and, unless continuously exposed, shall be enclosed in a masonry pit fitted with an adequately sized removable cover.”



Spill clean up inside the home:

For large clean ups, a professional cleaning firm should be contacted to clean up impacted areas, If you hire a contractor, it is recommended to get estimates from more than one company. Sometimes, homeowner’s insurance will pay for the necessary cleaning due to sewer backups. Not all policies have this coverage, so check with your agent.

If you decide to clean up a small spill inside your home, protect yourself from contamination by observing the following safety measures. Those persons whose resistance to infection is compromised should not attempt this type of clean up.

Seek immediate attention if you become injured or ill during or after the cleanup process.

Other Tips:

- Keep children and pets out of the affected area.
- Turn off heating/air conditioning systems
- Wear rubber boots, rubber gloves, and goggles during cleanup.
- Discard items that cannot be washed and disinfected (such as: mattresses, rugs, cosmetics, toys, etc.)
- Remove and discard drywall and insulation that has been contaminated with sewage or flood waters.
- Thoroughly clean all hard surfaces (such as flooring, concrete, molding, wood and metal furniture, countertops, appliances, sinks and other plumbing fixtures) with hot water and laundry or dish detergent.
- Help the drying process with fans, air conditioning units, and dehumidifiers.
- After completing cleanup, wash your hands with soap and water. Use water that has been boiled for 1 minute (allow the water to cool before washing your hands) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash clothes worn during cleanup in hot water & detergent (wash apart from uncontaminated clothes).
- Wash clothes contaminated with sewage in hot water and detergent. Consider using a Laundromat until your onsite wastewater system has been professionally inspected and serviced.

Spill clean up outside the home:

- Keep children and pets out of the affected area until cleanup has been completed.
- Wear rubber boots, rubber gloves, and goggles during cleanup of affected area.
- Clean up sewage solids (fecal material) and place in properly functioning toilet or double bag and place in garbage container.
- On hard surfaces areas such as asphalt or concrete, it is safe to use a 2% bleach solution, or ½ cup of bleach to 5 gallons of water, but don’t allow it to reach a storm drain as the bleach can harm the environment.
- After cleanup, wash hands with soap and water. Use water that has been boiled for 1 minute (allow to cool before washing your hands) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash clothes worn during cleanup in hot water and detergent (wash apart from uncontaminated clothes).
- Wash clothes contaminated with sewage in hot water and detergent. Consider using a laundromat until your onsite wastewater system has been professionally inspected and serviced.

INSERT TAB:
Failure Analysis

OFFICE USE ONLY

Incident Report #		Prepared By	
SSS/Backup Information			
Cause			
Summary of Historical SSSs/Backups/Service Calls/Other Problems			
Date	Cause	Date Last Cleaned	Crew
Records Reviewed By:		Record Review Date:	
Summary of CCTV Information			
CCTV Inspection Date		Tape Name/Number	
CCTV Tape Reviewed By		CCTV Review Date	
Observations			

Go to Side B

Recommendations					
✓	Type	Specific Actions	Who is Responsible?	Completion Deadline	Who Will Verify Completion?
	No Changes or Repairs Required	n/a	n/a	n/a	n/a
	Repair(s)				
	Construction				
	Capital Improvement(s)				
	Change(s) to Maintenance Procedures				
	Change(s) to Spill Response Procedures				
	Training				
	Misc.				
Comments/Notes:					
Reviewed by:			Reviewed by:		
Review Date:			Review Date:		

Appendix 6.2 – Water Quality Monitoring Plan



City of Healdsburg

Water Quality Monitoring Plan

February 2020

Water Quality Monitoring – Key Elements

- **Trigger for Sampling.** Water quality sampling must be performed for sanitary sewer overflows (SSOs) that are 50,000 gallons or greater and reach surface water and for spills less than 50,000 gallons as further defined herein.
- **Safety and Access.** Water quality sampling should only be performed if it is safe to do so and access to the surface water is not restricted. Unsafe conditions include, but are not limited to, heavy rains, steep hillsides, and fog/visibility issues. When sampling is not possible, details of the situation will be recorded in the certified Category 1 SSO Report and the SSO Technical Report submitted to the CIWQS Online SSO Database.
- **When to Sample.** Sampling must be performed (when and if it is safe to do so) within 48 hours of the City of Healdsburg (City) becoming aware of a Category 1 SSO that resulted in 50,000 gallons or greater being spilled to a surface water. Designated water quality sample Staff shall collect samples as soon as possible after the discovery and mitigation of the SSO event.

Note that “surface waters” includes waters of the State, any drainage channel tributary to a surface water, or the storm drain system if the spill is not fully captured and returned to the sanitary sewer system. The following Waters of the State are in the City of Healdsburg’s service area:

1. Russian River
 2. Foss Creek
 3. Dry Creek
 4. West Slough
 5. Norton Slough
- **Where to Sample.** Sampling should account for spill travel time in surface water (see Sample Collection Procedure below). The samples shall then be brought to the Water Reclamation Facility.
 - **Required Water Quality Analyses.** At a minimum, analyze for ammonia and appropriate bacterial indicators per the RWQCB Basin Plan (see Sampling Parameters below).
 - **Optional Follow-Up Monitoring.** Additional monitoring by sampling and/or visual inspection may be conducted, depending on the original monitoring results.

Water Quality Sampling - Protocol

SSO Sample Collection Kit Inventory (to be stored at the WRF):

- Cooler
- Ice Packs (stored in freezer)
- 6 sample bottles labeled A (1/2 gallon with preservative; for ammonia analyses)
- 6 sample bottles labeled B (120-mL; for bacteria indicator analyses)
- 6 sample bottles labeled C (120-mL; for pH, temperature, and dissolved oxygen analyses)



- 6 secondary containers (250-mL; for transfer of sample to A-labeled sample bottles)
- Safety gloves
- Safety glasses
- Sodium thiosulfate tablets (to be used when collecting bacteria samples)
- Paper towels
- Quart bags
- Gallon bags
- Thermometer / pH meter
- HACH Dissolved Oxygen Meter Product #2968800 (or approved equal)
- Floating object
- Sampling poles
- Tape
- String
- Measuring tape
- Stopwatch
- Standard Analytical Lab Chain-of-Custody Forms specific to the analytical lab used to conduct any required field tests.
- Pen/Pencil

Sampling Parameters:

- Ammonia
- Fecal Coliform
- E. coli
- Dissolved Oxygen
- pH
- Temperature

Sampling Locations (further details on location provided in subsequent sections):

- “Upstream” of SSO
- Immediate vicinity where SSO enters water body (“source”)
- “Downstream” of SSO

When to Sample for Spills Less Than 50,000 Gallons:

- The City will perform (when and if it is safe to do so) water quality sampling for spills of more than 1,000 gallons and less than 50,000 gallons if occurring directly to one of the Waters of the State listed above if the waterway is not dry at the time. Any spill over 1,000 gallons to a surface water requires notification of Cal OES. Note that the sample results are not required to be uploaded to CIQWS in this case.



Sample Collection Procedure:

- 1) If possible, determine the point that the SSO entered the waterway and photograph this location (include a reference point in the photo, i.e. an immovable part of the terrain that would allow someone to easily identify where the SSO entrance point is located by looking for the reference point in the photo).
- 2) If sampling is performed after the SSO has stopped, estimate SSO travel time. This may be done by observing or dropping floatable debris or object in the surface water and timing how long it takes to travel over a measured distance (e.g., 100 feet). Include sections in the surface water where there are bends, bottlenecks, or other characteristics that may slow down the flow. If the first measurement is uncertain, this time estimate may be performed three times, and the values averaged to determine the estimated travel time. The velocity of the water body can then be calculated by dividing the measured distance by the average time.
- 3) Determine the location where the “source” sample collection will take place by accounting for SSO travel time.
 - If the SSO is occurring, the “source” location is the point where the SSO is entering the waterway.
 - If the SSO has stopped, calculate the approximate downstream distance from the original SSO location by multiplying the time since the SSO occurred by the estimated velocity. This is the approximate downstream distance from the SSO discharge point to the “source” sampling location.
- 4) Put on the safety gloves and safety glasses.
- 5) **Upstream Sample Collection:** Collect the upstream samples first. Move approximately one hundred feet (100’) upstream of Source location. Label three each of the sample bottles marked “Upstream A”, “Upstream B”, and “Upstream C” with the date and time.
 - a. Take a photo of the sample location, including a reference point in the photo.
 - b. Ensure the sampling location is well away from the bank at a point where water is visibly flowing. Take care to avoid sampling debris or scum layer from the surface.
 - c. Starting with collection of the ammonia sample, remove the lid from one of the unused and clean 250-mL secondary containers. Fill this container against the direction of water flow while following the instructions of Step 5b. *Never dip the “Upstream A” sample bottle into the water.* After carefully opening an unused “Upstream A” ammonia sample bottle containing sulfuric acid, slowly transfer the sample from the secondary container to the sample bottle. *Due to potential contact with sulfuric acid, a highly corrosive compound, safety glasses and gloves must be worn when sampling for ammonia.* Secure the lid of the sample bottle, making sure that no leaking occurs. After drying the outside of the bottle with a paper towel, immediately place it inside a quart bag. Place this quart bag along with two ice packs into a gallon bag. Do not place the ice packs inside of the quart bag that holds the sample bottle. Repeat this process one more time for a total of two “Upstream A” samples. Place each sample in the cooler after collection.



- d. Moving on to collection of the bacteria sample, remove the lid from an unused “Upstream B” bacteria sample bottle and confirm that a sodium thiosulfate preservative tablet is inside. Fill the bottle against the direction of water flow while following the instructions of Step 5b. Pour off excess sample volume so that the bottle is filled to the 100-mL fill line. Secure the lid of the sample bottle, making sure that no leaking occurs. After drying the outside of the bottle with a paper towel, immediately place it inside a quart bag. Place this quart bag along with two ice packs into a gallon bag. Do not place the ice packs inside of the quart bag that holds the sample bottle. Repeat this process one more time for a total of two “Upstream B” samples. Place each sample in the cooler after collection.
 - e. Moving on to the last set of samples for pH and dissolved oxygen, remove the lid from an unused “Upstream C” sample bottle. Fill the bottle against the direction of water flow while following the instructions of Step 5b. Pour off excess sample volume so that the bottle is filled to the 100-mL fill line. Use the thermometer to measure the temperature of the “Upstream C” sample three times and record the results. Use the dissolved oxygen meter to measure the concentration of dissolved oxygen in the “Upstream C” sample and record the results. Secure the lid of the sample bottle, making sure that no leaking occurs. After drying the outside of the bottle with a paper towel, immediately place it inside a quart bag. Place this quart bag along with two ice packs into a gallon bag. Do not place the ice packs inside of the quart bag that holds the sample bottle. Repeat this process one more time for a total of two “Upstream C” samples. Place each sample in the cooler after collection.
- 6) **Source Sample Collection:** Collect the “source” samples next. Move approximately ten feet (10’) downstream of the Source location. Label each of the sample bottles marked “Source A”, “Source B”, and “Source C” with the date and time. Follow steps 5a-e for sampling at the Source location, using appropriately marked bottles “Source A”, “Source B”, and “Source C”.
 - 7) **Downstream Sample Collection:** Lastly, collect the downstream sample. Move one hundred feet (100’) downstream of the source location. Label each of the sample bottles marked “Downstream A”, “Downstream B”, and “Downstream C” with the date and time. Follow steps 5a-e for sampling at the Downstream location, using appropriately marked bottles “Downstream A”, “Downstream B”, and “Downstream C”.
 - 8) Complete the Lab Chain of Custody form included in spill sample collection kit.
 - 9) Transport the cooler containing the samples and the completed Lab Chain of Custody form to the WRF Lab as soon as possible after first sample collection. The parameter with the shortest holding time is bacteria at 6 hours (from sample collection to beginning of analysis), but sample analysis should begin as soon as possible after sample collection. Samples will not be analyzed if the holding time has been exceeded. The WRF Lab staff will coordinate with a contracted lab (Alpha Analytical Laboratories) for ammonia analysis as required.
 - 10) Ammonia samples have a regulatory holding time of 28 days. Maintain these samples at less than or equal to 6°C (on ice or refrigerated) from time of collection until receipt by the analytical laboratory.
 - 11) Restock the SSO Sample Collection Kit with the items listed on pages 1 and 2.



- 12) After the analyses have been performed (see “Water Quality Analyses Protocols” below) and the results have been reviewed and finalized, check if any of the following conditions are satisfied:
- Both the ammonia and bacteria levels downstream are approximately equal to or less than the upstream levels.
 - The concentration of un-ionized ammonia is below 0.4 mg/L as Nitrogen.
 - The E.Coli and fecal coliform are below their respective limits from the below table.

Bacteriological Water Quality Objectives

Beneficial Use	Fecal Coliform (MPN/100mL)	E. Coli Bacteria (colonies/100mL)
Water Contact Recreation	Median < 50 ¹	298 ²

1. North Coast Region Water Quality Control Plan – 3.3.1

2. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012-8016, for a “moderately used” area.

As soon as one of the above conditions is satisfied, monitoring for this SSO may stop. If neither are satisfied, repeat the Sample Collection Procedure steps until any or all of the conditions are satisfied, or other information is available to suggest the SSO is no longer causing a potentially adverse effect on the waterbody.

Warnings for Sample Collection:

- **Avoid Contamination.** Make every effort not to touch the sample contents, because the sample containers may contain hazardous chemicals and the sample results may be easily affected by human contamination.
- **Deliver Sample to Lab.** All samples need to be delivered to the laboratory as soon as possible due to the limited holding time required for maintaining sample integrity.

Water Quality Analyses – Protocols

Laboratory Analyses:

The WRF Laboratory and the contracted lab are accredited by the Environmental Laboratory Accreditation Program (ELAP). Specific methods used for laboratory analyses are expected to be as follows:

Parameter	Method
Total Coliform, Fecal, & E. Coli	Colilert
pH	pH



Maintenance and Calibration of Monitoring Instruments and Devices:

The SSO Sample Collection Kit is checked by the Laboratory Technician at least quarterly to verify its contents, and the Wastewater Utility Foreman replaces sample bottles as needed according to their shelf life.

Reporting Requirements

City staff is responsible for submitting water quality monitoring information with the certified Category 1 SSO report in the CIWQS Online SSO Database, which must be submitted within 15 calendar days of the SSO end date.

City staff is responsible for submitting information related to the Technical Report in the CIWQS Online SSO Database, which must be done within 45 calendar days of the SSO end date. The SSO Technical Report must include the following water quality monitoring information, in addition to other required information for the Technical Report described in Order No. WQ 2013-0058-EXEC:

- Description of all water quality sampling activities conducted
- Analytical results and evaluation of the results
- Detailed location map showing all water quality sampling points

Appendix 7.1 – Industrial Waste Permits

FATS, OILS, AND GREASE WASTEWATER DISCHARGE PERMIT

Permit No.: XXX

This permit authorizes:

XXX
Healdsburg, CA 95448

hereinafter referred to as "Permittee", to discharge wastewater into the sewer system from the above identified location, in accordance with the conditions set forth in this permit and the provisions of Ordinance No. 763 - Fats, Oils, and Grease (FOG) Discharge Regulations (FOG Ordinance) of the City of Healdsburg, herein referred to as "COH". The permit conditions are as specified in the following parts of this permit:

- Part I - Discharge Limitation and Restrictions
- Part II - Requirements for FOG Control
- Part III - Notification, Record-Keeping, and Reporting Requirements
- Part IV - Standard Conditions
- Part V - Special Conditions

This permit shall become effective on 4/1/2014 and shall expire on 4/1/2019. The COH may amend this permit at anytime during the term of the permit.

If the permittee wishes to continue to discharge after the expiration date of this permit, an application must be filed for a renewal permit a minimum of 60 days prior to the expiration date. **Discharging without a valid permit is a violation of the FOG Ordinance and may be subject to administrative fines and physical termination of sewer service.**

Compliance with this permit does not relieve the Permittee of its obligation to comply with the District's FOG Ordinance, any applicable requirements under local, State, and Federal laws, including any such regulations, standards, requirements or laws that may become effective during the term of this permit.

By:
FOG Control Program Manager

Issued on: 4-2-2014.

City of Healdsburg
Public Works Department
401 Grove St.
Healdsburg, CA 95448-4723
707-431-3346



DISCHARGE LIMITATION AND RESTRICTIONS

During the period from 4/1/2014 (effective date) to 4/1/2019 (expiration date), Permittee is authorized to discharge wastewater into the COH's sewer system, subject to the following effluent limitations and discharge restrictions:

A. DISCHARGE LIMITATION

Permittee shall not discharge into the sewer system Fats, Oils, and Grease (FOG) that may accumulate and/or cause or contribute to blockages in the sewer system or at the lateral which connects the permittee's facility to the sewer system.

B. DISCHARGE RESTRICTIONS

The following general prohibitions apply:

1. **Food Grinders.** Installation of food grinders in the plumbing system of new constructions of Food Service Establishments is prohibited. Furthermore, all food grinders shall be removed from all existing Food Service Establishments within 180 days of the effective date of this permit, except when expressly allowed in writing by the FOG Control Program Manager.
2. **Additives.** Introduction of any additives into a Food Service Establishment's wastewater system for the purpose of emulsifying or biologically/chemically treating FOG for grease remediation or as a supplement to interceptor maintenance is prohibited, unless a specific written authorization from the FOG Control Program Manager is obtained.
3. **Waste Cooking Oil.** Disposal of waste cooking oil into drainage pipes is prohibited. All waste cooking oils shall be collected and stored properly in receptacles such as barrels or drums for recycling or other acceptable methods of disposal.
4. **Dishwasher Discharge.** Discharge of wastewater from dishwashers to any grease trap or grease interceptor is prohibited.
5. **Temperature Limitation.** Discharge of wastewater with temperatures in excess of 140°F to any grease control device, including grease traps and grease interceptors, is prohibited.
6. **Domestic Wastes.** Discharge of wastes from toilets, urinals, wash basins, and other fixtures containing fecal materials to sewer lines intended for grease interceptor service or vice versa, is prohibited.
7. **FOG and Solids from Grease Interceptors.** Discharge of any waste including FOG and solid materials removed from the grease control device to the sewer system is prohibited. Grease removed from grease interceptors shall be wastehailed periodically as part of the operation and maintenance requirements for grease interceptors.
8. **25% Rule.** Operation of grease interceptors with FOG and solids accumulation exceeding 25% of the design hydraulic depth of the grease interceptor (25% Rule) is prohibited.

REQUIREMENTS FOR FOG CONTROL

Permittee shall comply with the following requirements to control the discharge of FOG to the sewer system:

A. BEST MANAGEMENT PRACTICES (BMP)

Permittee shall implement BMPs in its operation to minimize the discharge of FOG to the sewer system. At a minimum, permittee shall implement the following BMPs when applicable:

1. **Installation of drain screens.** Drain screens shall be installed on all drainage pipes in food preparation areas.
2. **Segregation and collection of waste cooking oil.** All waste cooking oil shall be collected and stored properly in recycling receptacles such as barrels or drums. Such recycling receptacles shall be maintained properly to ensure that they do not leak. Licensed waste haulers or an approved recycling facility must be used to dispose of waste cooking oil.
3. **Disposal of food waste.** All food waste shall be disposed of directly into the trash or garbage, and not in sinks. Double-bagging food wastes that have the potential to leak in trash bins is highly recommended.
4. **Employee training.** Employees of the food service establishment shall be trained within 180 days of the effective date of this Permit, and twice each calendar year thereafter, on the following subjects:
 - a) How to "dry wipe" pots, pans, dishware and work areas before washing to remove grease.
 - b) How to properly dispose of food waste and solids in enclosed plastic bags prior to disposal in trash bins or containers to prevent leaking and odors.
 - c) The location and use of absorption products to clean under fryer baskets and other locations where grease may be spilled or dripped.
 - d) How to properly dispose of grease or oils from cooking equipment into a grease receptacle such as a barrel or drum without spilling.

Training shall be documented and employee signatures retained indicating each employee's attendance and understanding of the practices reviewed. Training records shall be available for review at any reasonable time by the FOG Control Program Manager or an inspector.

5. **Maintenance of kitchen exhaust filters.** Filters shall be cleaned as frequently as necessary to be maintained in good operating condition. The wastewater generated from cleaning the exhaust filter shall be disposed properly.
6. **Maintenance of kitchen floor mats.** Floor mats used where grease spillage may occur shall be cleaned in an area appropriate for receiving the waste wash water, such as a mop sink or basin. Do not wash floor mats where waste wash water may flow into storm drains.
7. **Kitchen signage.** Best management and waste minimization practices shall be posted conspicuously in the food preparation and dishwashing areas at all times.

B. FOG PRETREATMENT

1. **Grease Interceptor Requirement.** Permittee shall install, operate, and maintain an approved type and adequately sized grease interceptor in accordance with **Attachment A**. The grease interceptor shall be adequate to separate and remove FOG contained in wastewater discharges from the permittee's facility prior to discharge to the sewer system. Under special circumstances, the District may issue a variance or waiver from this requirement as described in Section 2.6 of the District's FOG Ordinance.
2. **Grease Interceptor Maintenance Frequency.** Grease interceptors shall be maintained by periodic removal of the full content of the interceptor which includes wastewater accumulated FOG, floating materials, sludge, and solids. Permittee shall fully pump out contents of the grease interceptor at a frequency as shown below:

Minimum Grease Interceptor Cleaning Frequency	At least once every 3 months
--	------------------------------

3. **Grease Interceptor Maintenance Requirement.** Grease Interceptors shall be maintained in efficient operating condition such that the combined FOG and solids accumulation does not exceed 25% of the design hydraulic depth of the grease interceptor. Any exceedance above 25% constitutes a violation of this permit. This requirement is to

ensure that the minimum hydraulic retention time and required available volume is maintained to effectively intercept and retain FOG discharged to the sewer system.

PART III

NOTIFICATION, RECORD-KEEPING, AND REPORTING REQUIREMENTS

A. NOTIFICATION REQUIREMENTS

Permittee shall comply with the following notification requirements:

1. Notification of Spill

In case of a sewage spill, Permittee shall notify the District immediately by phone.

City of Healdsburg 707-431-3346

Confirmation of this notification shall be made in writing to the FOG Control Program Manager at the address specified in the Permit no later than five (5) working days from the date of the incident. The written notification shall state the date of the incident, the reasons for the discharge or spill, what steps were taken to immediately correct the problem, and what steps are being taken to prevent the problem from recurring.

2. Notification Regarding Planned Changes

Permittee shall notify the COH at least 60 days in advance prior to any facility expansion/remodeling, or process modifications that may result in new or substantially increased FOG discharges or a change in the nature of the discharge. Permittee shall notify the COH in writing of the proposed expansion or remodeling and shall submit any information requested by the COH for evaluation of the effect of such expansion on Permittee's FOG discharge to the sewer system.

B. RECORD-KEEPING REQUIREMENTS

Permittee shall keep records for at least two years and submit or make available for review, the following documents to the District, upon request:

1. A Record/Logbook of BMPs being implemented including employee training.
2. A Logbook of recyclable (yellow) grease pickup/disposal.

For permittees with grease interceptors or other grease control device:

3. A Logbook of grease interceptor (or other grease control device) cleaning and maintenance practices and activities.
4. Copies of records and manifests of wastehauling interceptor contents.

C. REPORTING REQUIREMENTS

1. BMP Monitoring Report

It is the COH's intent to keep inspection of your kitchen to a minimum. To accomplish this, you are required to submit BMP Monitoring Reports, as described below, to demonstrate the status of your compliance with the COH's BMP requirements.

Permittee shall submit BMP Monitoring Reports annually in accordance with the schedule specified in the following table. The report shall indicate current status of BMPs that are in place as required in Part IIA of this permit. The BMP information shall be summarized and reported on the official BMP Monitoring Report Form (example shown in **Attachment B**), which shall be mailed out to the permittee at least 4 weeks prior to the required reporting date.

Permittee shall submit a BMP Monitoring Report for each BMP monitoring period in accordance with the following schedule:

Annual Reporting Period	Due Dates for Submitting BMP Monitoring Reports
2014	7/15/2014
2015	7/15/2015
2016	7/15/2016
2017	7/15/2017
2018	7/15/2018

2. Grease Interceptor Wastehauling Report

Based on the grease interceptor maintenance frequency specified in Part IIB of this permit, Permittee shall submit a Grease Interceptor Wastehauling Report annually. The information shall be summarized and reported on the official Grease Interceptor Wastehauling Report Form (example shown in **Attachment C**), which shall be mailed out to the permittee at least 4 weeks prior to the required reporting date. The report shall indicate the grease interceptor maintenance activities performed during the wastehauling monitoring period and shall include copies of wastehauling manifests. Permittee shall submit Grease Interceptor Wastehauling Reports in accordance with the following schedule:

Wastehauling Monitoring Period	Due Dates for Submitting Grease Interceptor Wastehauling Reports
2014	7/15/2014
2015	7/15/2015
2016	7/15/2016
2017	7/15/2017
2018	7/15/2018

3. Changes in Company information

Permittee shall immediately inform the COH of any changes in ownership or facility name, and discrepancies in the food service establishment information currently on file as shown in **Attachment D**.

4. Signatory Requirements

Prior to submittal of the BMP Monitoring Report or Grease Interceptor Wastehauling Report to the COH, the information shall be verified and signed under penalty of perjury by an authorized company official.

5. Falsifying Information

Knowingly making any false statement on any report or other document required by this permit or knowingly rendering any monitoring device or method inaccurate is a crime and may result in the imposition of criminal sanctions and/or civil penalties.

STANDARD CONDITIONS

A. NON-TRANSFERABILITY OF PERMIT

This Permit is issued specifically to the owner and facility location specified in this permit. This Permit is issued for a specific user, for a specific operation at a specific location, and creates no vested rights. Any permit that is transferred to a new owner and/or operator or to a new facility is void. Permittee shall notify the COH in writing prior to the transfer of ownership and shall give a copy of the existing permit to the new owner or operator, for reference purposes only.

B. ACCESS REQUIREMENTS

Access to the permittee's facility shall be granted to the COH's personnel and/or its designee to all parts of the facility for the purpose of conducting compliance inspection during all times the facility is open, operating, or any other reasonable time. The COH may conduct random, unannounced inspections to verify compliance with the terms and conditions of this permit.

C. CIVIL PENALTIES

Any person who violates any provision of the FOG Ordinance; or any permit condition, prohibition or effluent limitation; or any suspension or revocation order shall be liable civilly for a penalty pursuant to COH's FOG Ordinance, for each day in which such violation occurs.

D. CRIMINAL PENALTIES

Any person who violates any provision of the FOG Ordinance or any permit condition, prohibition or effluent limit, is guilty of a misdemeanor, which upon conviction is punishable by a fine not to exceed one thousand dollars (\$1,000), or imprisonment for not more than six (6) months in the County Jail, or both. Each day in violation constitutes a new and separate violation and shall be subject to the penalties contained herein.

E. SEVERABILITY

The provisions of this permit are severable. If any provision of those permits limitations and/or requirements, or the application thereof, to the Permittee is held invalid, the remainder of the permit limits and/or requirements shall remain in full force and effect.

F. TERMINATION OF SERVICE

The COH, by Order of the City Manager, may physically terminate sewer service to any property on a term of any order of suspension or revocation of a permit or upon the failure of a person not holding a valid wastewater discharge permit to immediately cease discharge, whether direct or indirect, to the COH's sewer facilities after due notification. All costs for physical termination as well as for reinstating service shall be paid by the permittee.

SPECIAL CONDITIONS

- None at this time.

ATTACHMENT B

ANNUAL BEST MANAGEMENT PRACTICES (BMP) MONITORING REPORT

Restaurant		Permit No.	Submission Date:		
Contact:		Reporting Period:			Due Date:
	Requirement	BMP Compliance Checklist	Yes	No	Not Applicable (Explain why)
1	Installation of drain screens	Are drain screens installed on all sink and floor drains in the food preparation areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Segregation and collection of waste cooking oil	Is waste cooking oil collected and properly stored in drums and barrels for offsite recycling, or other acceptable disposal method?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Disposal of food waste	Are all food wastes disposed of directly into the trash or garbage, and not down the drains? Disposal of solid wastes down the sink or food grinder drain is prohibited.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Maintenance of exhaust filters/ floor mats	Is the wastewater generated from cleaning the kitchen exhaust filters and floor mats disposed of properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Kitchen Signage	Is the "Kitchen Best Management Practices for Fats, Oils, and Grease" sign posted in the kitchen?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Employee Training	Employment records maintained on the following: Male/Female, Age, Education, and other relevant information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		How to "dry wipe" pots, pans, dishware and work areas to remove food scraps and grease before washing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Proper disposal of food waste and solids in enclosed plastic bags prior to depositing in trash containers or garbage bins to prevent leaking and odors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		The location and use of absorption products to clean under fryer baskets and other locations where fats, oils, and grease may be spilled or dripped.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		How to properly dispose of grease or oils from cooking equipment into the waste grease barrel or drum without spilling to eliminate storm water contamination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Employee Training Documentation	Training is documented and employee signatures retained indicating each employee's attendance and understanding of the practices reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Other BMPs Implemented				
Certification					
<p>The results presented herein must be verified and signed under penalty of perjury by: (i) a responsible officer; (ii) general partner or proprietor; or (iii) a representative who has the responsibility for the overall operation of the permitted facility, who has been authorized by the corporate officer, general partner or proprietor to sign such reports, and such authorization has been made in writing and submitted to the District.</p> <p>I have personally examined and am familiar with the information submitted in this document. Based upon my inquiry of those individuals immediately responsible for obtaining the information reported herein, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of permit revocation/sewer access termination.</p>					
<hr/> <p align="center">Name Signature Title Date</p>					

Complete form and submit to:
 City of Healdsburg, FOGWDP Program, 401 Grove St., Healdsburg, CA 95448-4723

ATTACHMENT D

PERMITTEE INFORMATION ON FILE

The following information is currently on file. If any of the information is inaccurate or missing, permittee is required to update the District using the FSE Information Update Form provided in the Forms Tab of the Binder.

Applicant		Doing Business as (DBA)				
Street Address		Facility Phone Number				
City/ZIP Code		Facility Fax Number				
Food Service Establishment Owner		Designated Signatory				
Name / Title		Name / Title				
Address		Address				
City / State / ZIP		City/ZIP Code				
Phone No.		Phone No				
Fax No		Fax No				
Facility Contact During Business Hours Name / Title / Phone Number						
Chain Status	<input type="checkbox"/> Chain <input checked="" type="checkbox"/> Independent	Type of Ownership	<input checked="" type="checkbox"/> Single Proprietorship			
Seating Capacity	Inside:		<input type="checkbox"/> Partnership			
	Outside:	<input type="checkbox"/> Corporation				
Seating	<input type="checkbox"/> Sit-down	Average No. of Meals served during peak hour				
	<input type="checkbox"/> Take-out					
	<input checked="" type="checkbox"/> Both	Non-disposable Dish Usage	<input checked="" type="checkbox"/> Yes			
No. of Employees			<input type="checkbox"/> No			
Kitchen Equipment						
Deep Fryers - (1)		Rotisserie -				
Charbroilers -		Griddles -				
Grills - (1)		Stoves - (1)				
Oven - (1)		Woks -				
Grease trap / interceptor - (1)						
Hours of Operation						
Monday	Start: 11:00 AM	Stop: 3:00 PM	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed
Tuesday	Start: 11:00 AM	Stop: 3:00 PM	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed
Wednesday	Start: 11:00 AM	Stop: 3:00 PM	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed
Thursday	Start: 11:00 AM	Stop: 3:00 PM	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed
Friday	Start: 11:00 AM	Stop: 3:00 PM	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed
Saturday	Start: 11:00 AM	Stop: 3:00 PM	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed
Sunday	Start:	Stop:	Start: 4:30 PM	Stop: 9:00 PM	or <input type="checkbox"/> 24 Hours	or <input type="checkbox"/> Closed

Appendix 7.2 – Industrial Waste Inspection Schedule

2019 Industrial Waste Inspection Schedule

Permit #	Business	Permit Old/New/Exp date	Freq	Month													
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	CE 231	Barndiva	New / 2019	A				April									
2	CE 237	Studio Barndiva	New / 2019	A				April									
3	CE 245	Taqueria El Sombrero	New / 2019	A			March										
4	CE 304	KinSmoke	New / 2019	SA			March								Oct		
5	CE 308	Downtown Bakery	New / 2019	A			March										
6	CE 312	The Nectary	New / 2023	A			March										
7	CE 324	Flying Goat Coffee	New /2021	A							July						
8	CE 344	Valette	New	A							July						
9	CE 404	Journeyman Meat Company	New	A							July						
10	CE 415	Raven Film Center	New / 2019	A								Aug					
11	CE 420	Bravas Bar de Tapas	New / 2019	A								Aug					
12	CE 425	El Taco Grande	New / 2019	A								Aug					
13	CE 428	Sheltons Natural Food	New/2021	A								Aug					
14	CE 434	Casa del Mole	New / 2019	A								Aug					
15	CE 441	Flakey Cream	New / 2019	A								Aug					
16	DC 20	(old Divine)															
17	DC 177	(old Deli)															
18	DR 198	Adel's	New / 2019	SA				April								Nov	
19	FI 217/ EA 240	St. Johns Elem.	New / 2019	A							July						
20	FI 400	Healdsburg Elementary	New / 2021	A						June							
21	GR 315	Healdsburg Jr. High	New / 2019	A						June							
22	GR 725	Healdsburg Senior Living	New /2021	A						June							
23	GR 1530	Mugnaini Imports Inc	New / 2021	A												Nov	
24	HE 48	Healdsburg	New/2021	A									Sept				
25	HE 102	Lola's Market	New / 2019	SA			March						Sept				
26	HE 110	McDonald's	New / 2021	A									Sept				
27	HE 111	(gas station)											Sept				
28	HE 113	La Tradicion Market	New / 2019	A									Sept				
29	HE 125	Taqueria Guadalajara	New/2021	A									Sept				
30	HE 133	La Pizza	New/2021	A									Sept				
31	HE 149	OUI Cater LLC	New / 2021	A						June							
32	HE 165	Single Tree Inn	New / 2021	A									Sept				
33	HE 206	(old cafe)															
34	HE 214	Mateos Cocina	New / 2021	A		Feb											
35	HE 219	Spoonbar @ H2	New / 2021	A											Oct		
36	HE 227	Harmon Guest House @ H2	New / 2021	A											Oct		
36	HE 235																
37	HE 241	Siduri Wine Bar		A											Oct		
38	HE 244	(old Tavern Sofia)		A											Oct		
39	HE 245	Healdsburg Bar and Grill	New / 2021	SA			March								Oct		
40	HE 301	Pizzano	New / 2019	A											Oct		
41	HE 317	Dry Creek Kitchen	New / 2019	SA		Feb						Aug					
42	HE 330	Campo Fina	New / 2019	A								Aug					
43	HE 335	Barrels, Brews, Bites	New / 2023	A		Feb											
44	HE 336	Baci	New / 2021	A		Feb											
45	HE 345	Bear Republic Brewery	New / 2019	SA		Feb						Sept					
46	HE 381	Moustache Bakery	New / 2019	A						June							
47	HE 403	Will's Seafood	New / 2021	SA					May							Nov	
48	HE 417	Costeaux Bakery	New / 2019	SA		Feb					July						
49	HE 420	(John & Zekes)		A	Jan												
50	HE 505	Sake'O	New / 2019	A	Jan												
51	HE 1239	B & B	New / 2022	A												Nov	
52	HE 1270	Bean Affair	New / 2019	A					May								
53	HE 1280	Otaro Sushi	New / 2023	A					May								
54	HE 1345	Big John's	New / 2021	A												Nov	
55	HE 1351	Round Table Pizza	New/2021	A												Nov	
56	KE250	KR Catering	New / 2022	A	Jan						July						
57	MA 14	Relish Culinary Adventures	New / 2021	A						June							
58	MA 22	Wurst Sausage	New / 2021	A											Oct		
59	MA 116	Noble Folk	New / 2019	A						June							
60	MA 124	Oakville Grocery	New / 2021	A			March										
61	MA 133	Healdsburg Senior Center	New / 2021	SA			March										
62	MI 9																
63	MI 20	Encore Rentals	New / 2021	A											Oct		
64	MI 36	Soul Fixx Elixirs	New / 2023	A											Nov		
65	MI 44	Coyote Den	New/ 2023	A	Jan												
66	MI 60 'A'	The Parish	New / 2019	A	Jan												
67	MO 449	Breathless Wines Tasting Room	New / 2021	A	Jan												
68	MO 520	Fitch Mt. Elementary School-	New / 2021	A						June							
69	NO 25	The Shed	New / 2019	SA					May							Nov	
70	NO 29	Chalk Board	New / 2021	SA					May							Nov	
71	NO 109	Taste of Tea	New / 2021	A					May								
72	NO 115	Guiso Latin Fusion	New / 2021	A					May								
73	NO 131	Single Thread Farms	New / 2022	A												Nov	
74	NO 1248	Villa Chanticleer	New / 2021	A							July						
75	PL 109	The Brass Rabbit	New / 2021	A	Jan												
76	PL 109A	Dukes Common		A	Jan												
77	PL 128	El Farolito	New / 2021	A		Feb											
78	PO 557	Summer's Market/Deli	New / 2021	A		Feb											
79	PR 1024	Healdsburg High School	New / 2019	A						June							
80	SO 927	Tayman Park Clubhouse	New / 2021	A							July						
81	UN 1375	Healdsburg Hospital	New / 2021	A					May								
82	VI 1006	Thai Orchard Cuisine	New / 2019	A				April									
83	VI 1037	Carl's Jr.	New / 2021	A				April									
84	VI 1047	8 Dragons	New / 2021	A				April									
85	VI 1051	Mountain Mikes Pizza	New / 2021	SA				April								Nov	
86	VI 1063	Agave Restaurant	New / 2019	SA				April								Nov	
87	VI 1101	Subway	New / 2019	A				April									
88	VI 1115	Safeway	New / 2019	A				April									

Schedule Changes / Notes

YELLOW = Renew Discharge Permit
RED = Physical inspection & meeting
Green = Visual Inspection/ Request pumping & receipts if it appears in need of service.
SA = Semi-annually
A = Annually

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____
- 9 _____
- 10 _____
- 11 _____
- 12 _____
- 13 _____

Appendix 7.3 – Industrial Waste Inspection Report

City of Healdsburg INDUSTRIAL DISCHARGER INSPECTION REPORT

I. GENERAL INFORMATION				
Permit Number:	Issue Date:	N/A	Expiration Date: N/A	
Business Name:				
Address:				
Mailing Address: (same as above)				
Phone Number:			Fax Number:	
Industry Contact and Title:		Email:		
Persons Present During Inspection				
Name:		Title:		
Name:		Title:		
Name:		Title:		
Inspection Type: Semi annual				
Emergency	Unscheduled	Scheduled	Special Monitoring	Other (specify _____)
Frequency:	annual	Last Inspection Date:		Last Sampling Date:

II. FOCUS OF INSPECTION
Describe the purpose of the visit. For annual inspections, review items in sections III, IV and V, and for those facilities to which it applies; inspect areas with potential non-stormwater discharge (see check boxes below).
To ensure grease interceptor maintenance on a set schedule and inspect the facility.
Site evaluated for non-stormwater discharges Yes <input checked="" type="checkbox"/> N/A Storm drains free of visible pollutants? Yes <input checked="" type="checkbox"/> No
Processing areas drain to sanitary sewer? Yes <input checked="" type="checkbox"/> No Signs of illicit discharge to storm drains? Yes <input checked="" type="checkbox"/> No
Document and investigate non-stormwater discharge related issues, and summarize any enforcement on this form.

III. FACILITY & INDUSTRIAL PRETREATMENT INFORMATION
Describe the manufacturing processes used and/or services provided, and changes since the last inspection. Describe the facility's wastewater pretreatment system(s). Unauthorized discharge points in service? Has the system experienced operational/upset problems since the last inspection? If yes, describe.
This facilities pretreatment consists of a 10 gallon grease trap. This facility serves lunch and dinner seven days per week. No unauthorized discharge points or problems since last inspection.

IV. SOLIDS/GREASE GENERATION (if applicable)							
Inspect and describe condition of sump(s) and/or interceptors located at this facility. Measure sludge depth and surface scum. Compare with IU's self-monitoring report form (if available).							
Interceptor		1st Stage		2nd Stage		Other	
Location	Surface Scum	Bottom Sludge	Surface Scum	Bottom Sludge	Surface Scum	Bottom Sludge	
1. Under sink	0"	0"	0"	0"			
2.							

V. PRODUCT STORAGE AND SPILL PREVENTION (if applicable)			
List any wastes stored in a location or manner that could potentially allow spilled products to enter the sewerage or storm drains at the facility. Also describe any modification of storage practices that would prevent products from entering the sewer or storm drains.			
Product(s) Name	Quantity	Storage Location	Storage Alternatives to Prevent Sanitary Sewer/Stormdrain Entry
1.			
2.			
3.			

INSPECTION SUMMARY			
Summarize highlights, deficiencies, and follow-up requirements concluded from this inspection. Include Inspection results, recommendations, special monitoring, or stormwater/drain notes. Note discrepancies and remediation timelines.			
Able to verify or obtain copies of service receipts? Yes No <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/>			
Stormwater violations noted during this inspection? Yes No <input type="checkbox"/> N/A <input type="checkbox"/>			
Note to Discharger: Inspections are performed no less than annually to verify compliance with City Ordinance #763 Article IV (sec 15-60, 15-111). Facility inspection fees are as follows: 1 st in a one year period - \$0, each additional - \$154. Scheduled fees may or may not apply, and are levied at the discretion of inspectors.			

SIGNATURES	
Inspector Signature:	Date:
Contact Signature:	

Appendix 8.1 – Sewer System Master Plan

SEWER SYSTEM MASTER PLAN 2020

SYSTEM-WIDE HYDRAULIC EVALUATION AND CAPACITY ASSURANCE

FINAL PROJECT REPORT

Date: November, 2020

Prepared by: Joe Ziemann, P.E.
Anthony Baltazar, P.E.

Reviewed by: Tim Durbin, P.E.



2260 Douglas Blvd, Roseville, CA, 95661



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GLOSSARY

ADU	Accessory Dwelling Unit (i.e. granny flat)
ADWF	Average Dry Weather Flow; not influenced by rainfall; does not include RDII or GWI, averaged across single day
ASL	Above Sea Level
Basin	smallest unit of sewer system isolated by an individual flow meter
CCF	centum cubic feet
CIP	Capital Improvement Project (or Plan)
CIPP	Cured in place pipe; sewer pipe rehabilitation technology
design storm	Standard precipitation event to calibrate hydraulic model; specified depth, duration, and probabilistic return period
DIA	nominal diameter
Diurnal Flow	Daily Hydrograph
DU	Dwelling Unit; single household sewer producing equivalent unit
DWF	Sewer Dry Weather Flow; not influenced by rainfall; does not include RDII or GWI
EUD	Existing Use Description
EX / EXST	Existing
FAR	Floor to Area Ratio; building floor space to at-grade parcel area ratio
Force main	Pressurized sewer pipeline that is pumped from a pump station
GIS	ESRI ArcGIS (Geographical Information System) software or data
gpd	gallons per day
gpm	gallons per minute (694.44 gpm = 1.00 mgd)
GWDR	SWRCB Order No. 2006-0003 Statewide General Waste Discharge Requirements
GWI	Groundwater Infiltration; seasonal; constant underlying baseflow
HH	Household Size
hydrograph	Graph of sewer flow vs time
hyetograph	Graph of rainfall intensity (inches) vs time
I/I	Inflow and Infiltration; includes RDII and GWI
ICM / InfoWorks	Innovyze InfoWorks Integrated Catchment Modeling hydraulic modeling software
ID	actual inner diameter
Invert	Lowest flow line of sewer pipe
K	Ratio of Time Recession; RTK method
Land Use	Supersedes zoning; applied to wastewater generation rates
Lateral	Lateral service gravity line (typically 4")
LS	Lift Station
Main	City owned gravity sewer main (typically 6" to 24" DIA)
Mannings N	Manning's empirical open channel flow hydraulic roughness coefficient



mgd	million gallons per day
MH	Manhole
N Value	Manning's empirical open channel flow hydraulic roughness coefficient
NOAA	U.S. Department of Commerce: National Oceanic and Atmospheric Administration
O&M	Operation and Maintenance
OD	actual outside diameter
PDWF	Peak Dry Weather Flow; peak instantaneous dry weather flow; ADWF after multiplying by peaking factor
PWWR	Peak Wet Weather Flow; peak instantaneous during design storm event
PS	Sewer Pump Station; interchangeable with lift station
R	Fraction of rainfall volume entering sewer system as RDII; see RTK method
RDII	Rain Derived Inflow and Infiltration; sewer flow from surface (inflow) or below-grade groundwater (infiltration)
RTK	Triangular synthetic unit hydrograph to characterize RDII response to rainfall event
SECAP	System Evaluation and Capacity Assurance Plan
Soffit / Crown	Inner top of pipe
SOI	Sphere of Influence
SSCO	Sanitary Sewer Cleanout; private or public; provides delineation between private and public pipe; location to service lateral service line
SSMH	Sanitary Sewer Manhole; manhole
SSMP	Sanitary Sewer Master Plan; official municipal document mandated by SWRCB
SSOAP	U.S. Environmental Protection Agency (EPA) Sanitary Sewer Overflow and Analysis Program Software
SWRCB	State Water Resources Control Board
STEP	Septic Tank Effluent Pumping
Synthetic Unit Hydrograph	Summation of unit hydrographs resulting in common hydrograph from specified precipitation
T	Time to Peak; equivalent to Time of Concentration; see RTK method
Trunk	Large diameter gravity sewer main (typically 18" DIA or greater)
UBO	Ultimate Build Out
Unit Hydrograph	Theoretical hydrograph resulting from a unit of precipitation
WRF	Wastewater Reclamation Facility
Wet Weather Flow	Wet Weather Flow; influenced by rainfall; may include GWI, RDII
WW Generation Rate	Average sewer flow applied to parcels with specific land use to produce ADWF
WWE	Water Works Engineers
WWTP	Wastewater Treatment Plant
Zoning	Planning department zone delineation for individual City parcel

0 EXECUTIVE SUMMARY

The purpose of this Sewer System Master Plan is to assess the City of Healdsburg's (City) sewer collection system and its capacity to convey peak flow during a design storm event without resulting in sanitary sewer overflows (SSOs) for near-term and future City buildout conditions in compliance with the State Water Resources Control Board Order No. 2006-0003 Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (GWDRs). The GWDRs require that the City conduct appropriate analysis and planning to ensure that SSOs do not occur under a design storm event, as SSOs are a danger both to the public and the environment.

The sewer collection system hydraulic model of existing conditions showed that the infrastructure can currently convey the peak flow associated with the 10-year/24-hour design storm event without occurrence of an SSO, however there is a key area of concern at the terminus of the 21" North Trunk Sewer where it discharges into a 16" pipe near the intersection of Grove Street and North Street. The 21" North Trunk Sewer surcharges at this location to within 12" of the ground surface, which does not provide an adequate factor of safety, as the standard established within this Master Plan is a minimum 36" of freeboard. Under future near-term development conditions, which includes development that occurs within the next 0-10 years such as Montage Healdsburg, North Entry Area (Comstock), infill development, and accessory dwelling units, the hydraulic model shows the occurrence of SSOs in this same location.

The hydraulic model results showed that the City's sewer collection system experiences a relatively high level of infiltration and inflow (I/I) of stormwater during storm events that contributes to elevated peak flows which must be conveyed to the City's Wastewater Reclamation Facility. The City's current average dry weather flow is approximately 0.87 MGD whereas the 10-year/24-hour design storm peak flow is 8.9 MGD, representing a peaking factor greater than 10.0. The design standards for many municipalities, and a peaking factor for systems that do not have excessive I/I is typically 4.0 for reference. WWE recommends that the City initiate an I/I reduction program targeted at areas of the sewer system that were shown to have higher levels of I/I based on flow monitoring results (refer to Section 8 of this report). The potential benefits of an I/I reduction program include reduced wastewater treatment costs and ensuring that I/I does not continue to increase in the future which could trigger the need for additional capacity improvements.

In addition, Water Works recommends that the City should move forward with the implementation of a capital improvement project to address the capacity deficiency found where the 21" Lower North Trunk Sewer discharges into a 16" line near intersection of Grove Street and North Street. A larger pipe discharging into a smaller pipe does not comply with the City's sewer system design standards, and this capacity deficiency is not likely to be relieved by a moderately successful effort to reduce I/I in the collection system upstream of this area. Construction of this project will be challenging given the presence of many large diameter storm drain lines, the confluence of the 21" North Trunk Sewer and the 18" North Street Sewer, and the Foss Creek Pathway. There are several possible alternatives to constructing this capital improvement project as discussed in Section 9.1.1 of this report, however the alternative which involves replacing the existing pipe with larger diameter pipe is likely to be the most feasible, although



Water Works recommends the City conduct a more detailed pre-design report that involves field verification of existing utility locations as the first step to implementing this project.

Lastly, the Magnolia Lift Station, which conveys all sewer flow from the sewer collection system to the City’s Wastewater Reclamation Facility, is now approaching 50 years old and is in need of structural maintenance in order to extend the useful life of this critical facility into the future (refer to Section 9.1.2).

Refer to Table 0-1 below for the recommended sewer collection system hydraulic capacity Capital Improvement Program.

Table 0-1: Capital Improvement Project Summary

Capital Project #	Description	2020 Cost	Notes and Schedule
1	Replace-in-Place Upsizing from SSMH-688 to SSMH-276 (670-LF) at North Trunk Sewer Terminus	\$1.52M	Start planning/design in 2021. Refer to Figure 9-2 and Table 9-2: 24” Replace-in-Place Upsizing CIP Cost Estimate.
2	Magnolia Lift Station Improvements Phase 1	\$0.50M	Start planning/design in 2021. Refer to Table 9-5.
3	I/I Reduction Program for Basins #1, #4, #5	\$0.73 M	Start program in 2021. Refer to Section 8.4.
Total Near-Term Capital Project Cost		\$2.75 M	

1 INTRODUCTION

1.1 Project Background

The City has developed this Sewer System Master Plan (SSMP) in accordance with State Water Resources Control Board Order No. 2006-0003 Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (GWDRs). As part of the compliance process, the City has developed a dynamic hydraulic model of the sewer collection system and conducted flow monitoring to allow for development of accurate simulations of dry-weather and peak wet-weather flow conditions to allow for the capacity of all sewer collection system assets to be evaluated.

1.2 Project Objectives

The objective for development of this SSMP is to comply with GWDR Section D.13.viii:

- a) Evaluate the hydraulic capacity of the system, identify hydraulic deficiencies, and the major sources that contribute to the peak flows associated with overflow events (i.e. SSOs).
- b) Develop hydraulic capacity design criteria specific and appropriate to the system.
- c) Establish a short- and long-term capital improvement plan (CIP) to address identified hydraulic deficiencies including prioritization, alternatives analysis, and funding.
- d) Develop a schedule of completion dates for all portions of the capital improvement program.

The general steps taken to develop this SSMP are outlined below:

1. Updated the City's GIS to accurately portray existing infrastructure, including addition of newly developed areas and inclusion of recent sewer collection system rehabilitation projects.
2. Built new InfoWorks ICM 10.0 hydraulic model, generated based on the updated GIS.
3. Collected and analyzed sewer flow data from the City's Magnolia Lift Station, which pumps all of the system's flow to the City's WRF, from January 2017 through November 2019.
4. Deployed five temporary flow meters and a rain gauge in the sewer collection system from mid-January to mid-April 2020 to measure winter-time flows from defined sewer basins.
5. Produced parcel-by-parcel sewer loads calibrated to existing dry weather flow monitoring data to develop an existing conditions dry weather model.
6. Analyzed Magnolia Lift Station and temporary flow meter data to identify increases in sewer flow during rain events in order to quantify rain-dependent infiltration and inflow.
7. Established the 10-year/24-hour Design Storm as the City's criteria for peak wet-weather flow capacity, and developed sewer basin specific infiltration and inflow hydrographs related to the Design Storm using established hydrologic methods.
8. Developed a peak wet-weather Design Storm model scenario to conduct a capacity assessment for current conditions.
9. Identified sewer flows associated with anticipated future developments consistent with the City General Plan and conducted capacity assessment for future conditions peak wet-weather scenarios.
10. Developed capital improvement projects to alleviate all capacity deficiencies identified.

1.3 Description of Service Area

The City of Healdsburg sewer collection system includes a total of 50.2 miles of collection system gravity main piping, eleven (11) lift stations, and 3.0 miles of force main. Sewage flows by gravity to the Magnolia Lift Station, which pumps all of the City's flow to the Wastewater Reclamation Facility (WRF).

The current service area is approximately 1,630 acres, and includes a population of approximately 12,100 people living in 4,810 residential dwelling units.

The WRF is designed for a 1.4 MGD ADWF and 4.0 MGD PWWF, and includes an aerated and lined influent equalization pond (with a volume of 5.0 million gallons) which can temporarily store peak flows over 4.0 MGD. The Magnolia Lift Station has a reliable pumping capacity (i.e. with the largest pump out of service) of approximately 9.42 MGD with one of the fixed pumps out of service and the emergency diesel pump in operation, allowing for surcharging in the wet well and Magnolia Trunk Sewer (refer to Section 2.2.5).

An overview map of the existing collection system can be found in **Figure 1 – Appendix A**.

1.4 Previous Sewer System Rehabilitation Projects

The northern area of the City is served by the North Trunk Sewer, which was constructed in 1995. This trunk sewer was constructed to serve the areas of the City where nearly all significant new non-infill growth was expected to occur.

The 33-inch Magnolia Trunk Sewer collects all wastewater within the City near the south end of Healdsburg Avenue, where it runs under Highway 101, and stretches another 4,400 linear feet south to the Magnolia Lift Station, located near the Foss Creek/Dry Creek confluence. This deteriorated 36-inch trunk sewer was slip-lined with a 33-inch pipe in 2001 as a rehabilitation project.

1.5 Future City Growth

The City is planning for future growth in the following areas, which are described in detail in Section 5:

1. Saggio Hills (Montage)
2. North Entry (Comstock)
3. Mill District
4. Grove Street Neighborhood
5. Development of Vacant Properties
6. Accessory Dwelling Unit Infill
7. South Entry Area
8. Fitch Mountain

2 PHYSICAL MODEL DEVELOPMENT

2.1 Sources of Physical Model

2.1.1 City GIS

The City provided the latest updated sewer GIS network in the Fall of 2019, which Water Works Engineers (WWE) further adapted and modified within GIS to portray existing conditions and optimize hydraulic model parameters.

2.1.2 Collection System Capital Improvements

The City provided as-built drawings of the following more recent developments and sewer improvement projects that WWE reviewed and included in the hydraulic model update:

- SU2014-01: Chiquita Grove Subdivision
 - High density residential development on Cali Lane and Grayson way. New sewer lines to existing sewer in Grove Street.
- SU2014-02: Saggio Hills – Healdsburg Ave
 - New sewer from Passalacqua Road down Healdsburg Ave to connect to existing system.
- CIP2014-05: Terrace Blvd. Sewer Main Replacement
 - Replacement of 10” sewer line between Alley 6 and Healdsburg Ave.
- SU2015-01: Midtowne Healdsburg Subdivision
 - High density residential housing development at corner of Monte Vista Ave. and Healdsburg Ave. New private sewer lines to connect at Healdsburg Ave.
- SU2015-02: Saggio Hills – Passalacqua Drive
 - New sewer along Passalacqua Drive to Healdsburg Avenue.
- SU2015-05: Saggio Hills – Private Roads 4&5
 - Private sewer lines in Saggio Hills were not included in the hydraulic model. All Saggio Hills sewer flow was applied at Passalacqua Drive.
- CIP 2015-03: Grove Street Sewer Main Replacement
 - Replacement of 12” sewer from Dry Creek Road to Grove Ct.
- SU2016-01: Saggio Hills – Private Road 8
 - Private sewer lines in Saggio Hills were not included in the hydraulic model. All Saggio Hills sewer flow was applied at Passalacqua Drive.
- CIP2016-03: Moore Lane Sanitary Sewer Project
 - New 8” sewer in Moore Lane to W. North St.
- SU2017-01: Farmstand Subdivision
 - New sewers in Trentadue Way and Farmstand Road connecting to 21” North Street Trunk.
- SU2017-02: Grant Street Village
 - High density residential housing development along Larkspur Ave. north of Grant St. New sewer line in Larkspur Ave.

- 2021 Healdsburg Avenue Sewer Replacement
 - This capital improvement project replaces approximately 1,600 LF of deteriorated existing 8" sanitary sewer in Healdsburg Avenue from Powell Avenue to Grant Street with new 12" sewer. Sewer flows upstream of this project flowing south along Healdsburg Avenue that were previously routed to Larkspur Drive are rerouted through the new 12" sewer and the existing 12" lines (assets SS-347 and SS-459) to Larkspur Drive are abandoned. Further, at Grant Street, the new 12" sewer is routed west between SSMH-634 and SSMH-674 which diverts flow off of the Healdsburg Ave sewer to the south and into the sliplined 16" sewer along Foss Creek Pathway.

WWE also reviewed as-builts of the City's main trunk sewers to ensure that the GIS accurately reflected these critical assets:

- CIP1970-02: Original 33" trunk sewer to Magnolia Drive Lift Station
- CIP1983-08: Construction of 1st Street / North Street sewer main and 24" Vine Street trunk line from North Street to the Healdsburg Ave. roundabout.
- CIP1995-01: 21" North Trunk Sewer As-Built
- CIP2001-01: Replacement of some sections of the original 33" trunk sewer and CIPP of other sections to Magnolia Lift Station

2.1.3 Collection System Survey Verification

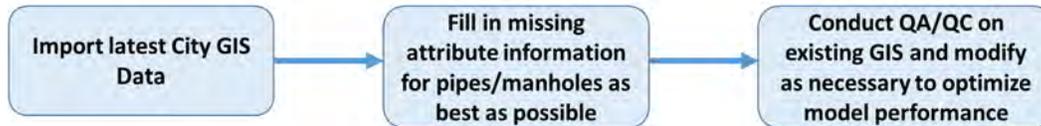
WWE's sub-consultant RFE Engineering conducted surveying of select areas of the sewer collection system in August of 2020 to verify manhole rim elevations, pipe invert elevations, and pipe sizes in the following areas:

- Exchange Avenue from SSMH-233 to SSMH-297
- Grove/Vine Street from SSMH-688 to SSMH-287
- Healdsburg Ave from SSMH-314 to SSMH-387
- Powell Ave from SSMH-72 to SSMH-192
- March Ave from SSMH-105 to SSMH-430
- Monte Vista Ave from SSMH-552 to SSMH-561
- Chiquita Ave from SSMH-773 to SSMH-758
- South Fitch Mtn. Road from SSMH-385 to SSMH-110

The survey information was used to update the sewer collection system hydraulic model infrastructure data where it was missing or inaccurate.

2.2 Physical Model Update Methodology

Incorporating the entire sewer network into the InfoWorks ICM 10.0 hydraulic model involved the process summarized below:



2.2.1 Filling in Missing Attribute Information

The City-provided GIS data included pipe diameter data for almost all assets, however approximately half of the City-provided GIS data for the gravity sewer network was missing pipe invert elevation information. WWE filled in as many of the data gaps as possible with as-built record drawings of collection system infrastructure. The remainder of the missing invert information was addressed by manually editing pipe inverts to estimated/interpolated values informed by engineering judgement and City design standards. This process is depicted in Figure 2-1 below.

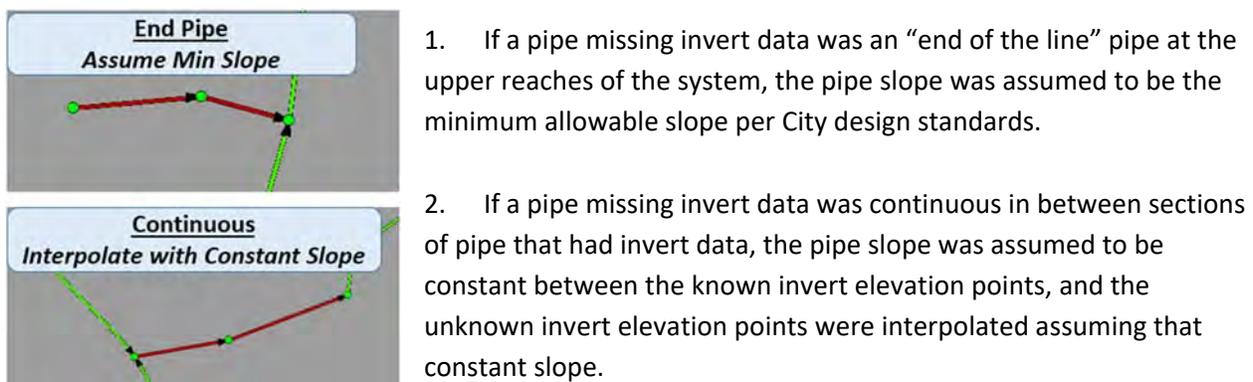
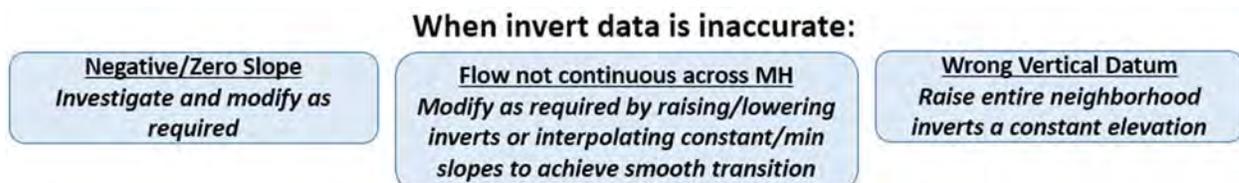


Figure 2-1. Missing Pipe Invert Determination

Approximately half of the City-provided GIS sewer network data for manholes was missing manhole rim elevation data. WWE utilized digital elevation maps in GIS and spatially interpolated rim elevations.

2.2.2 Modifying Inaccurate Attribute Information

With the help of ICM’s ability to automatically flag sewer network inconsistencies, WWE identified some inaccurate invert elevation information and manually adjusted the data to match actual conditions so that ICM could operate smoothly. This process is summarized below:



2.2.3 Common Pipe and Manhole Attribute Assumptions

The hydraulic model assumes a Manning’s roughness coefficient N-value of 0.013 for all sewer pipes, except as described below. This assumption is slightly conservative but helps to account for the effects of solids deposition in sewer lines that can reduce hydraulic capacity. A Manning’s roughness coefficient of 0.011 was assumed for trunk lines that have been recently sliplined with PVC pipe. In addition, the model assumes that all manholes are standard, fully benched, 48-in diameter circular manholes with a cone at grade.

2.2.4 Pump Stations

The City provided operational information for all of the City’s Lift Stations, summarized in Table 2-1 below.

Table 2-1: Pump Station Information

Lift Station	Pumps		Wet Well Information			Pump Design Point	Lift Station Control Description
	No.	HP	Area	Lead Pump Off Level	Lead Pump On Level		
Dry Creek	1	2	4'-0"	1.0'	4.0'	50 gpm @ 20' Head	1 Duty + 1 Standby
	2	2	Circular				
Corporation Yard	1	2	5'-0" Circular	3.0'	4.5'	50 gpm @ 20' Head	1 Duty + Shelf Spare
Giorgi Park	1	2	2'-6" Circular	3.0'	4.5'	50 gpm @ 20' Head	1 Duty + Shelf Spare
Chablis	1	10	6'-0"	0.5'	5.0'	475 gpm @ 50' Head	1 Duty + 1 Standby
	2	10	Circular				
Hendricks	1	2	3'-0"	1.0'	5.5'	50 gpm @ 20' Head	1 Duty + 1 Standby
	2	2	Circular				
Heron**	1	10	8'-0"	0.5'	6.5'	475 gpm @ 50' Head	1 Duty + 1 Standby
	2	10	Circular				
Kennedy	1	6.5	6'-0"	1.0'	7.0'	270 gpm @ 52' Head	1 Duty + 1 Standby
	2	6.5	Circular				
Kinley	1	6.5	5'-0"	0.5'	5.5'	270 gpm @ 52' Head	1 Duty + 1 Standby
	2	6.5	Circular				
Orangewood	1	3.9	5'-0"	0.5'	5.5'	325 gpm @ 25' Head	1 Duty + 1 Standby
	2	3.9	Circular				
Orchard	1	6.5	5'-0"	0.7'	4.5'	270 gpm @ 52' Head	1 Duty + 1 Standby
	2	6.5	Circular				
Magnolia	1	60	6' x 34'	Lead pump operates on VFD to maintain level at 7.0'		2,300 gpm @ 67' Head	Magnolia Lift Station Pumps 1-4 all operate on variable frequency drives. Pumps operate as required to maintain a wet well level set point and essentially match the pumping rate to the influent sewer flow rate.
	2	60					
	3	60					
	4	56		Lag Start @ 7.5' Lag 2 Start @ 8.0' Lag 3 Start @ 8.5'	2,200 gpm @ 67' Head		
	Diesel	38		Pump Operated Manually		1,000 gpm @ 85' Head	The diesel backup pump can be operated manually in case of emergency.

2.2.5 Magnolia Lift Station Capacity

The Magnolia Lift Station has four duty pumps in addition to a standby diesel pump that is kept on-site. The lift station has dual 14" force mains that traverse Dry Creek and run approximately 3,500 linear feet to the City's WRF. In 2019, a project was completed to replace the force main creek crossing section with three 16" pipes as the existing 14" pipes had been exposed within the creek bed due to channel scour.

A schematic of the lift station force mains and connection at the WRF headworks is shown in Figure 2-2 below.

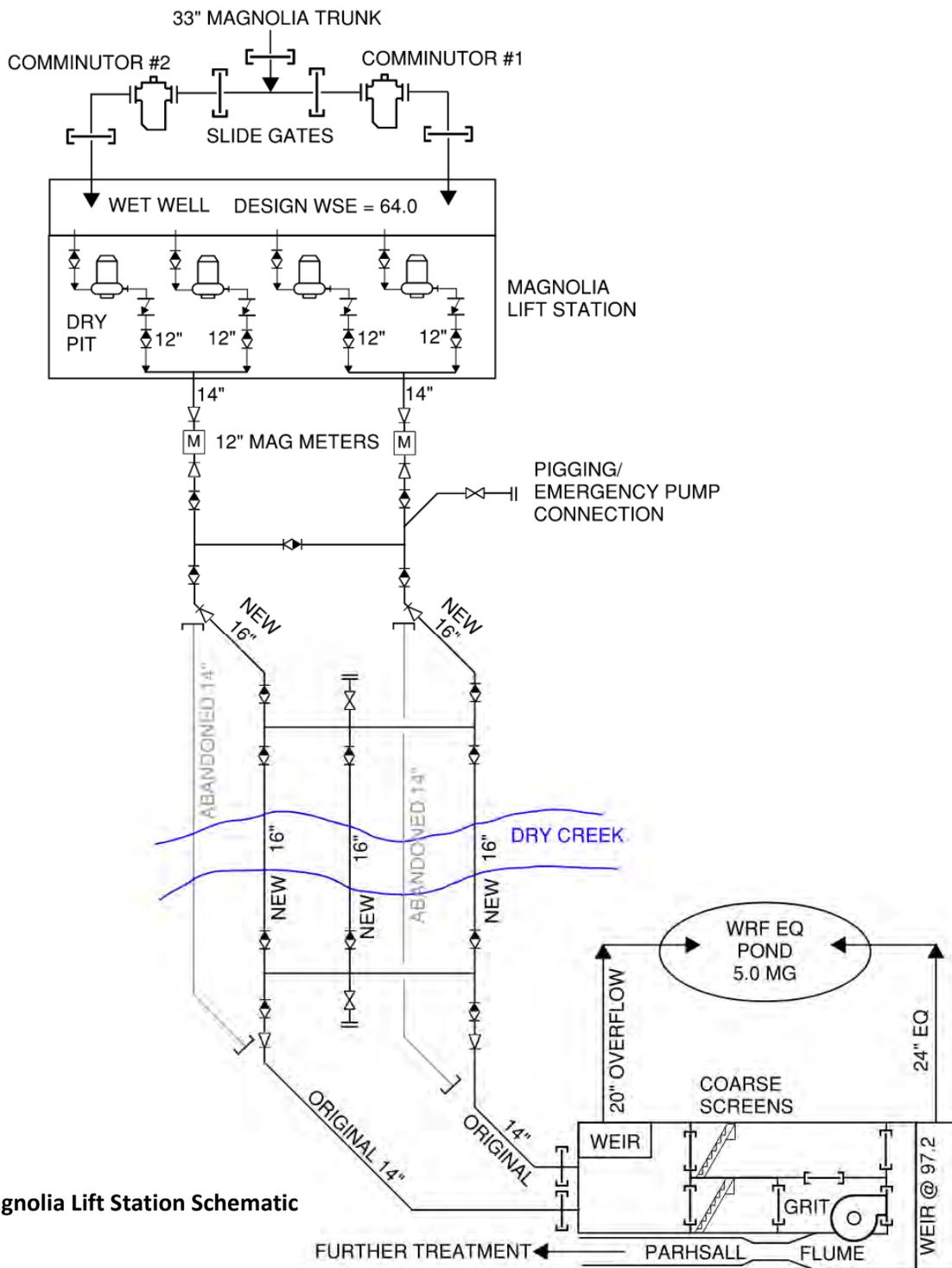


Figure 2-2: Magnolia Lift Station Schematic

Pumps #1 and #2 at Magnolia lift station are identical 60 HP Fairbanks Morse pumps. 60 HP Pump #3 was replaced in 2017 with a Pentair Fairbanks pump with slightly larger impeller than Pumps #1 and #2. The curve for Pump #3 can be found in **Appendix G**, the primary design point being 2,300 gpm @ 67 feet. Pump #4 is a 56 HP Wilo Pump with a primary design point of 2,200 gpm @ 67 feet.

WWE developed a hydraulic model of the Magnolia Lift Station and new force main system in AFT Fathom, a fluid dynamic simulation modelling software package used for pressurized pipe systems. A computer-based model was developed because of the complexity of calculations involved with 4 pumps with different pump curves through multiple parallel pipes. WWE utilized the original drawings of the Magnolia Lift Station and force mains in combination with the 2012 As-Built drawings of the WRF Upgrades Project and 2017 drawings of the Magnolia Force Main Relocation Project to develop a model reflecting current conditions. The Hazen Williams equation was used to calculate friction loss, and a Hazen Williams “C” value of 100 was assumed for the original asbestos cement pipe, whereas a “C” value of 130 was assumed for new PVC pipe. Hydraulic model results can also be found in **Appendix G**.

With the original 14” force mains, the pump station capacity was approximately 5,400 gpm (7.78 MGD) with all four of the pumps running, which coincides with measured flows at the pump station magnetic flow meters pumped during January 2017 storm events (refer to Section 4.2.1). The 60 HP Pumps #1-3 operate at 1,370 to 1,440 gpm and 56 HP Pump #4 operates at 1,170 gpm under this scenario with the static water surface in the wet well at elevation 64.0, which is the design maximum water surface without any significant surcharging of the 33” influent Magnolia Trunk Sewer. The water surface at the WRF is assumed to be 98.0, which would represent water flowing over the weir downstream of the primary screens and grit chamber to the influent equalization basin when flow is in excess of the 4.0 MGD (2,776 gpm) peak wet weather flow capacity of the downstream aeration basins.

With the three new force mains under the creek engaged, the pump station capacity has increased to approximately 5,870 gpm (8.45 MGD) based on an assumed wet well water surface elevation of 64.0 feet. See **Appendix G** for more information. However, if the wet well is allowed to surcharge to a water surface elevation of 82.5 feet, the pump station capacity increases to approximately 6,710 gpm (9.67 MGD). Allowing surcharging in the upstream Magnolia Trunk Sewer up to an elevation of 82.5 feet does not affect any tributary sewer lines and only extends up the 33” trunk line to the intersection of Exchange Avenue just north of Highway 101. The lowest manhole rim elevation on the 33” trunk line is at elevation 88 feet, and therefore this level of surcharging does not pose a significant risk of a sanitary sewer overflow.

The 38 HP emergency diesel pump does not have the same capacity as the fixed pumps. The pump curve for the diesel pump is included in Appendix G. With Pumps #1, 2, 4, and the existing emergency diesel pump in operation with surcharging up to elevation 82.5 feet in the Magnolia Trunk, the pump station capacity is reduced to approximately 6,540 gpm (9.42 MGD). The Magnolia Lift Station pump station capacity information described above is summarized in Table 2-2.

Table 2-2: Magnolia Lift Station Capacity Summary

Scenario	Pumps in Operation					Wet Well Water Surface	WRF Water Surface	Pump Station Capacity (gpm/MGD)
	P1	P2	P3	P4	Diesel			
Prior to Force Main Replacement Project – No Trunk Surcharging	X	X	X	X		64.0	98.0	5,400 gpm / 7.78 MGD
After Force Main Replacement Project – No Trunk Surcharging	X	X	X	X		64.0	98.0	5,870 gpm / 8.45 MGD
After Force Main Replacement Project – With Trunk Surcharging	X	X	X	X		82.5	98.0	6,710 gpm / 9.67 MGD
After Force Main Replacement Project – Reliable Capacity	X	X		X	X	82.5	98.0	6,540 gpm / 9.42 MGD

2.2.6 Hydraulic Loading

The hydraulic model wastewater loading was accomplished via a point load to a manhole node from individual parcels (i.e., subcatchments). The parcels were automatically assigned to manhole nodes within GIS based on closest proximity to a manhole, but WWE also manually checked and modified some manhole assignments to accurately portray existing conditions. In some cases, a particularly large or long-shaped parcel or one that hadn't been subdivided yet was manually assigned a manhole along the closest sewer line downstream of the location. An example snapshot of the resultant parcel loading system within ICM is displayed in Figure 2-3.

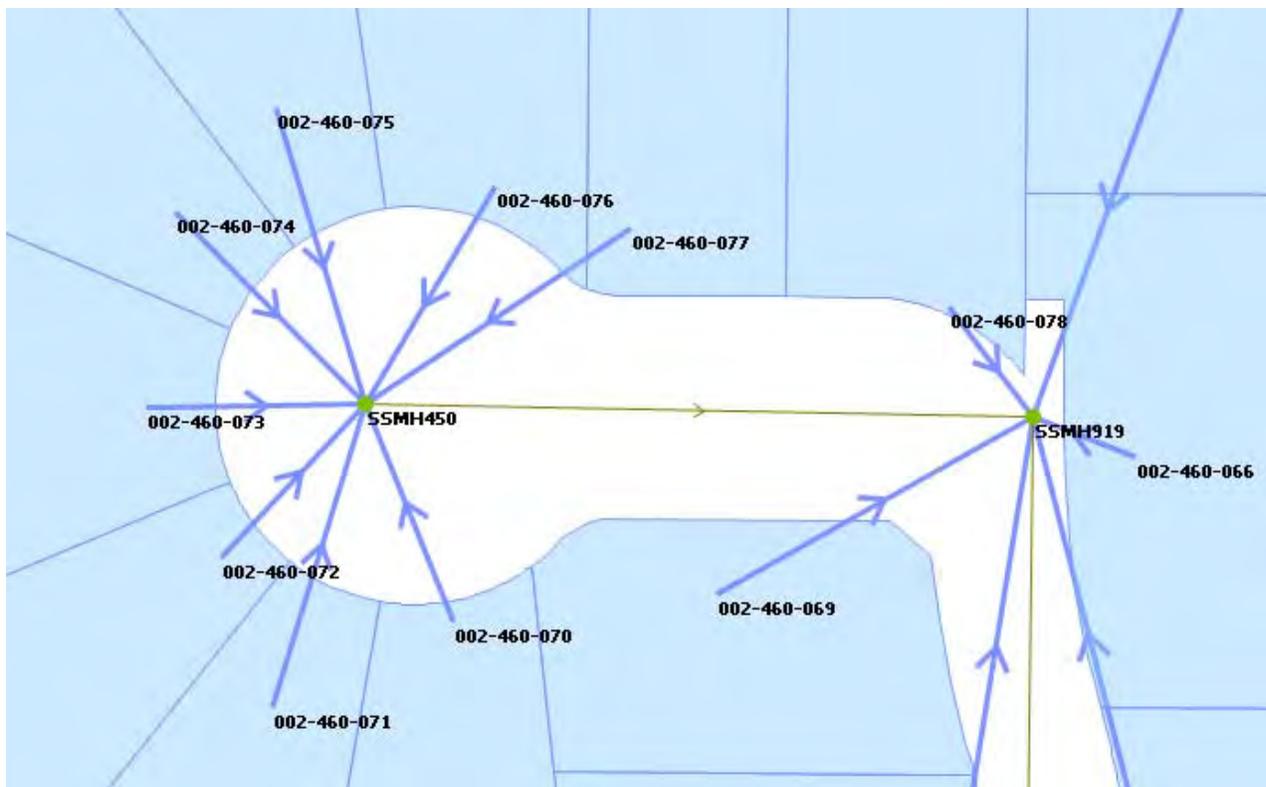


Figure 2-3: Parcel Hydraulic Loading

2.3 Hydraulic Model Scenarios

The following is a summary of the hydraulic model scenarios developed for the Master Plan:

- I. Existing Conditions Average Dry Weather Flow (ADWF): Sewer loads matching current flow metering data during periods of dry weather, typical to the August-September timeframe.
 - Used for calibration of per-capita wastewater flows and diurnal patterns.
- II. Existing Conditions Design Storm: Current ADWF + I/I associated with 10-year/24-hour storm
 - Used to identify existing condition hydraulic capacity deficiencies.
- III. Near-Term Development Conditions Dry Weather: Current ADWF + Montage Development + Comstock Development + Grove Street Development + Mill District Development + Development of Vacant Parcels + Additional ADUs
 - Dry weather flow including all new developments expected to be built within the next 0-10 years.
- IV. Near-Term Development Conditions Design Storm: Near-Term Development Conditions ADWF + 10-year/24-hour storm I/I
 - Used to identify hydraulic capacity deficiencies that could be triggered in the near term
- V. Future Buildout Conditions Dry Weather: Near-Term Development ADWF + South Entry Area + Fitch Mountain
 - Dry weather flow including all new developments for comparison to 2030 General Plan Buildout population estimates and WRF ADWF design capacity
- VI. Future Buildout Conditions Design Storm: Buildout Conditions ADWF + 10-year/24-hour storm I/I
 - Used to identify future condition hydraulic capacity deficiencies triggered at buildout of the City

3 EXISTING CONDITIONS WASTEWATER LOAD DEVELOPMENT

3.1 Existing Land Uses

WWE obtained a database of all parcels within the City's Sphere of Influence from Sonoma County. The parcel database included the following data fields:

- APN
- Existing Use Description
- Parcel Area (acres)
- 2030 General Plan Zoning

Within the parcel database, there were 166 different existing use descriptions (EUDs) utilized, which describe the type of building or facility on each parcel. The database was found to be accurate and reliable with respect to the EUDs for each parcel, and also accurately described parcels that were vacant or undeveloped. WWE created a table of sewer loads specific to each unique EUD to develop sewer loads for the "Existing Conditions" model. The EUD sewer loads can be found in **Appendix B**.

3.2 Existing Sewer Loads

Each EUD was assigned the sewer load information described below.

3.2.1 Residential Dwelling Units (DUs) Per Parcel

The majority of residential parcels consist of a single detached home per parcel. Some lots are described as having two or three separate residential structures on one lot. Duplexes and higher density multi-family uses such as fourplexes and apartments are also identified. WWE identified and quantified multi-family dwelling units through both the County parcel database and a GIS layer provided by the City.

The total number of individual residential dwelling units enumerated under existing conditions is 4,810 (as of 2020) compared to the number of dwelling units with water services identified in the City's 2016 water utility rate study which was 4,724. This represents a reasonable amount of growth in residential dwelling units over a four-year period.

3.2.2 # of Persons per DU

In general, higher density multi-family DUs tend to have a slightly lower average household size than lower density detached DUs. The # of persons per DU assigned to each EUD ranges from 2.0 – 3.0 according to the following criteria. Refer to **Appendix B**.

- 2.00 in mixed use areas
- 2.25 in high density residential areas such as fourplexes and apartments
- 2.65 in single family dwellings
- 2.75 in rural residential single family dwellings
- 3.00 in units described as having a granny unit (i.e. accessory dwelling unit or ADU)

The total City population enumerated within the parcel database is 12,055, which closely matches the 2018 US Census Bureau estimate of 12,104¹. The calibrated ADWF per capita was found to be 50 gpd.

3.2.3 Commercial / Industrial Trade Flow (gpd/acre)

For non-residential land uses, sewer flow is calculated based on a “trade flow” factor per acre. The City’s Sewer Design Standards Section 5.02 provide a 1,500 gal/day/acre value for commercial uses and 2,000 gal/day/acre value for industrial uses. WWE assigned values ranging from 500 to 2,000 gal/day/acre to specific EUDs. Lower values were assigned to uses such as car lots, and higher values to denser uses such as hotels and motels. Refer to **Appendix B**.

3.2.4 Commercial / Industrial Floor to Area Ratio (FAR)

For non-residential land uses, each parcel has a percentage of the parcel area that is built on, and a percentage of the parcel that is open such as landscaping and parking. The floor to area ratio (FAR) is the percentage of the parcel that is built on. Values range from 0.5 to 2.0 for multi-level buildings. The trade flow factor is applied only to the land area that is built on. Refer to **Appendix B**.

3.2.5 Schools

Schools within the sewer service area were identified in the parcel database and the number of students in each school was estimated based on publicly available information.

3.2.6 Calculation of Sewer Flow per Parcel

The average dry weather flow (ADWF) sewer flow for each parcel is calculated using the following formula:

$$ADWF = [\# \text{ of DUs}] \times [\# \text{ persons / DU}] \times [50 \text{ gpd/person}] + [\text{Parcel Area}] \times [\text{FAR}] \times [\text{Trade Flow Factor}] + \# \text{ of Students} \times 15 \text{ gpd/student}$$

3.2.7 Calibration of Current ADWF Flow

To calibrate the modeled ADWF to the available Magnolia Lift Station flow data and temporary flow monitor data, the trade flow factors and residential flow per person factors were adjusted until the total calculated City flow closely matched the flow metering data available. Total current City ADWF is 871,000 gallons per day as further described in Section 4 of this report with a residential flow per capita of 50 gpd.

- Total Residential Daily Flow: 628,000 gpd
- Total Commercial / Industrial Flow: 243,000 gpd

These values are also corroborated by recent City potable water consumption data from the month of March 2019, which was a particularly wet winter month in which nearly all of the water consumption throughout the City would have been indoor uses, with little or no outdoor irrigation use. In March of 2019, the City recorded 25,288 centum cubic feet (CCF) of use from residential and school accounts, which averages to 610,000 gallons per day. In that same month the City recorded 10,843 CCF of use from non-residential accounts, which averages to 261,000 gpd. Water use between residential and non-residential uses varies from month to month, but these values provide a good benchmark for comparison.

¹<https://www.census.gov/quickfacts/healdsburgcitycalifornia>

4 SEWER FLOW MONITORING

The Magnolia Lift Station has magnetic flow meters that constantly measure and record the flow pumped by the lift station. Magnolia flow data was analyzed from January 2017 through November 2019. As part of this sewer system master planning effort, five temporary open-channel sewer flow meters (Hach FloDar) were deployed from mid-January to mid-April of 2020.

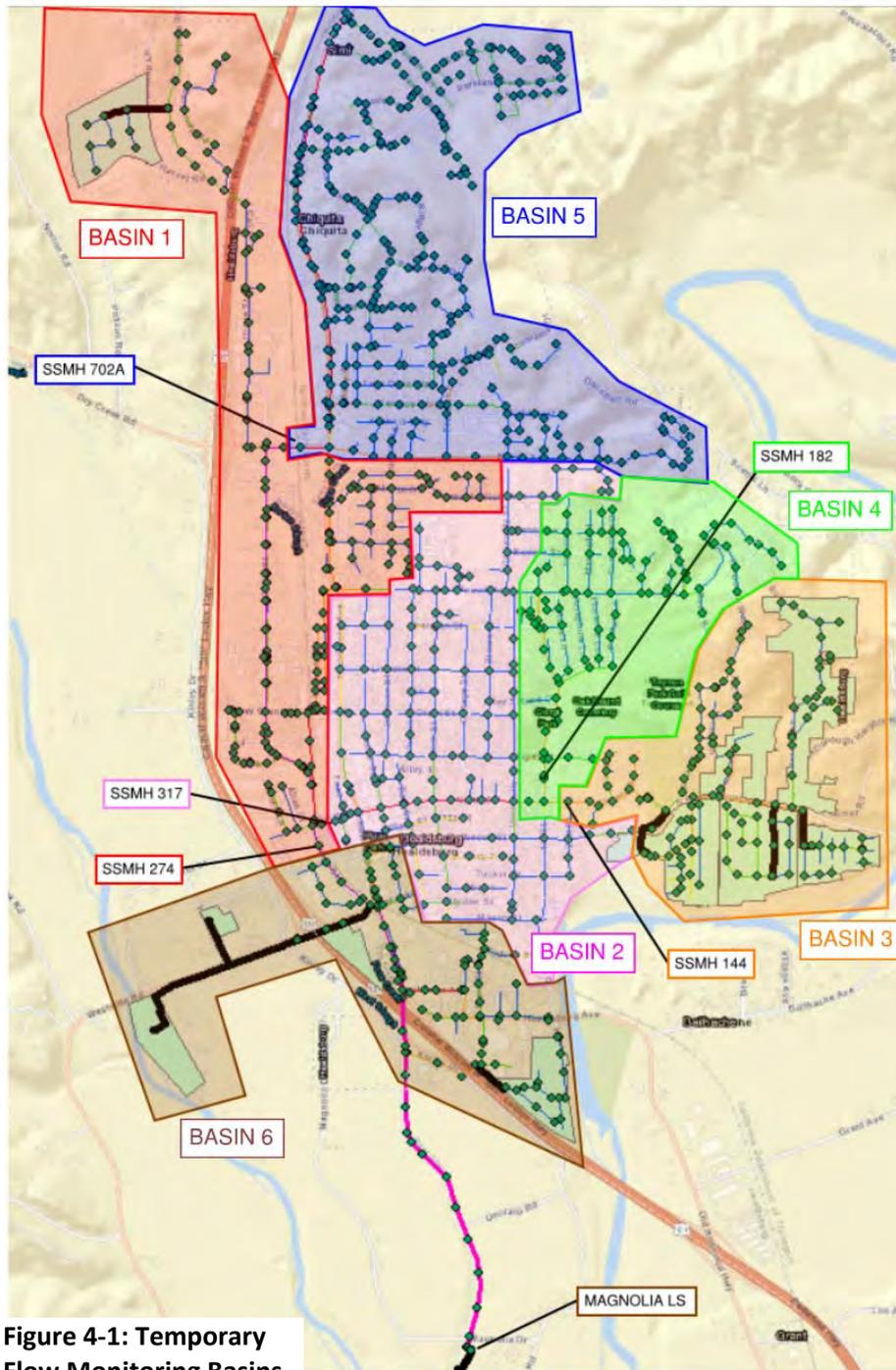


Figure 4-1: Temporary Flow Monitoring Basins

Figure 4-1 at left shows the manholes where the temporary flow meters were installed and the upstream sewer basin areas each flow meter covers.

- 1-SSMH 274 (red): Monitors flow on the Healdsburg Trunk from the northern part of the City. If the flow at SSMH 702A and SSMH-317 is subtracted, the remainder is the mostly commercial/ industrial area along Healdsburg Avenue
- 2-SSMH 317 (pink): If flow at SSMH 182 and 144 is subtracted, the remainder is the downtown residential and commercial area
- 3,4-SSMH 144, 182 (orange, green): Monitors mostly residential flow
- 5-SSMH 702A (blue): Monitors the north area of the City which is newer and mostly residential

- 6-Magnolia (brown): If flow at SSMH 274 is subtracted from the Magnolia LS flow, the remainder is from this mostly mixed use, commercial, and industrial area at the south end of the City.

A summary of the monitored sewer basin areas is provided in Table 4-1 below.

Table 4-1: Sewer Basin Summary

Sewer Basin	Flow Monitor	Flow Meter Calculation	#DUs	Residential ADWF (gpd)	Commercial ADWF (gpd)	Land Area (acres)
1	SSMH 274	= SSMH 247 – SSMH 317 – SSMH 702A	728	91,773	93,244	369.73
2	SSMH 317	= SSMH 317 – SSMH 182 – SSMH 142	1,296	165,640	23,812	234.36
3	SSMH 144	= SSMH 142	714	92,710	871	235.00
4	SSMH 182	= SSMH 182	529	84,120	6,536	218.16
5	SSMH 702A	= SSMH 702A	1,168	149,595	46,315	411.37
6	Magnolia	= Magnolia LS – SSMH 274	375	44,305	72,044	161.93
Totals			4,810	628,143	242,822	1630.55

4.1 Existing Dry Weather Flow

The total City ADWF was calculated based on flow data from the Magnolia Lift Station for the period from August 15th to August 28th, 2019. The average during this period was 0.86 MGD. The ADWF diurnal pattern is shown below in Figure 4-2.

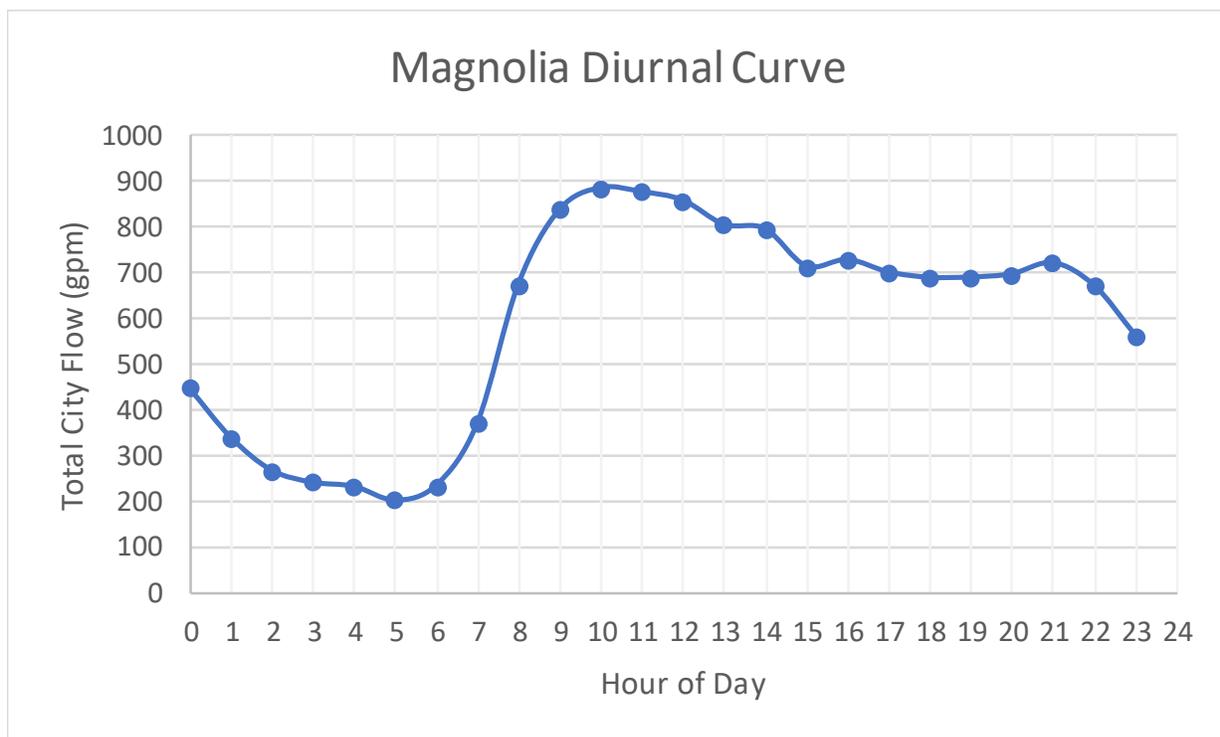


Figure 4-2: Total City ADWF Diurnal Flow

WWE developed diurnal patterns for ADFW contributed by both residential and commercial sources, and then adjusted and calibrated those patterns until the ICM hydraulic model flow results at the Magnolia Lift Station best matched the typical pattern shown in Figure 4-2 above. Flow from Sewer Basin 4 was used to approximate the residential diurnal pattern since this basin is almost entirely residential. Flow from Sewer Basin 6 was used to approximate the commercial/industrial diurnal pattern.

The commercial and residential daily diurnal patterns are shown below in Figure 4-3.

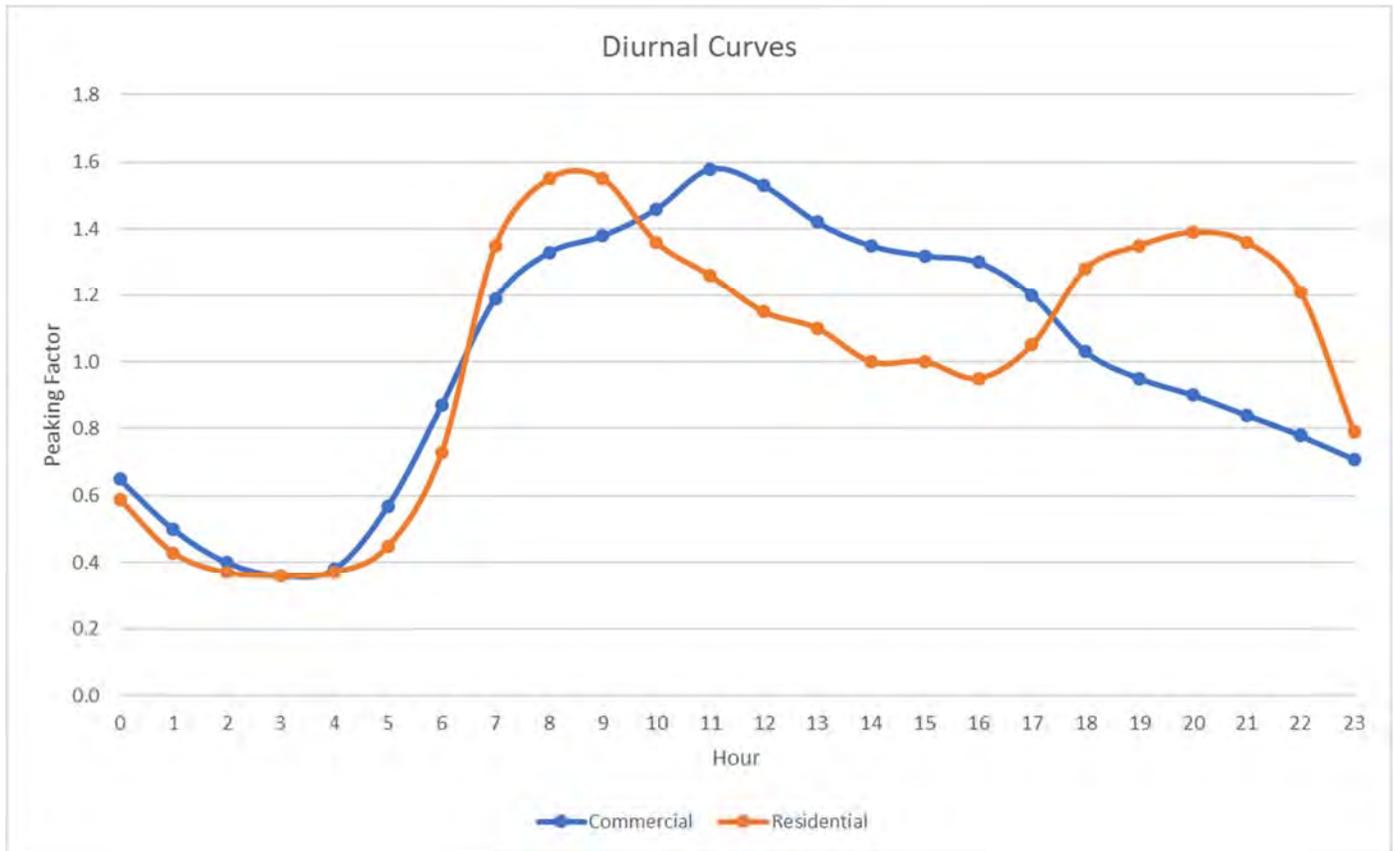


Figure 4-3: Residential / Commercial Diurnal Flow Patterns

Figure 4-4 below shows a comparison of the final calibrated ADWF model flow at Magnolia Lift Station vs. the average metered flow from August 15 – August 28, 2019.

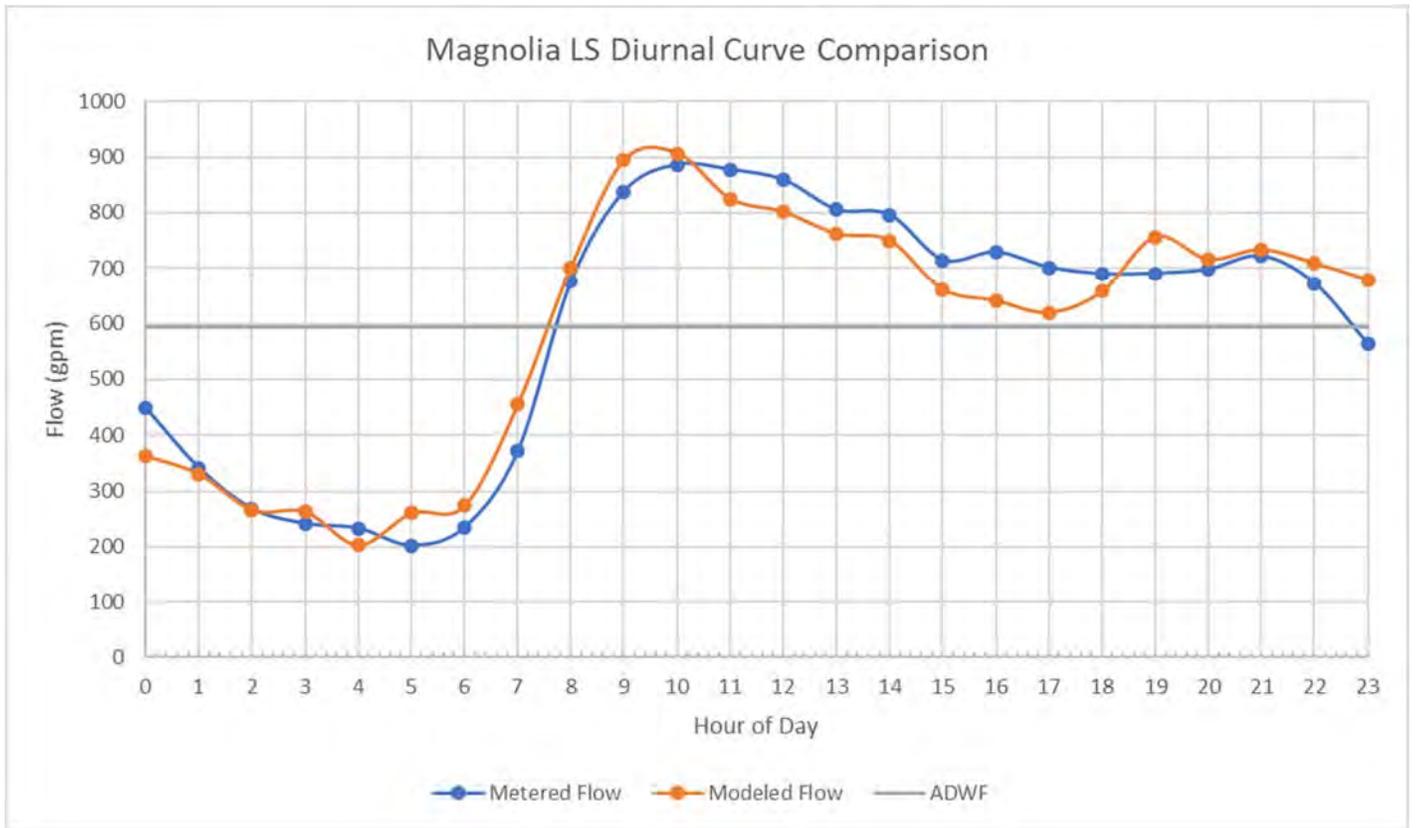


Figure 4-4: Modeled vs. Actual ADWF Flow Pattern

4.2 Existing Wet Weather Flow

4.2.1 Magnolia Lift Station Data

Magnolia Lift Station flow data was obtained and reviewed for January 2017 through April 2020. There were several significant rain events during this time period which are summarized below.

January 7 @ 12:00AM – January 10, 2017 @ 11:59PM

- 6.93" of rain measured at City's Fitch Well Field rain gauge over four days
- 9.77" of rain measured at NOAA's Windsor station over four days
- NOAA 4-Day Precipitation Frequency Estimates:
 - 1-Year = 6.05"
 - 2-Year = 7.88"
 - 5-Year = 10.0"
- Peak 24 hours within event = 4.42" (from January 7 @ 6:20 PM to January 8 @ 6:20 PM)
- NOAA 24-Hour Precipitation Frequency Estimates:
 - 1-Year = 3.56"
 - 2-Year = 4.51"

Magnolia LS saw two peak flows during this 4-day event (refer to **Figure 2 - Appendix A**). The first peak of 5,300 gpm occurred at 6:10 AM on January 8th coincident with heavy rainfall. The second peak flow occurred on January 10th from 1:30 PM to 7:30 PM. Magnolia LS pumped an average of 5,400 gpm (7.78 MGD) for those 6 hours. The rainfall at the City's Fitch Well Field rain gauge reported minimal rain at this time, and it is likely the rain gauge had a malfunction that may have been caused by the previous peak rainfall. Given that the City's Fitch Well Field rain gauge appeared to have a malfunction, the actual rainfall total during this 4-day event was likely closer to that reported at the Windsor NOAA station, making this an approximately 5-year/4-day return period event.

February 8 @ 10:00AM – February 9, 2017 @ 10:00AM

- 5.68" of rain measured at City's Fitch Well Field rain gauge in 24 hours
 - Note that rain gauge appears to have had some kind of malfunction leading up to this event as a rain total of 4.22" was registered in one single time step on February 8th at 1:09 PM. Therefore, this rain total is somewhat in question.
- 3.20" of rain measured at NOAA's Windsor station over 24 hours
- NOAA 24-Hour Precipitation Frequency Estimates:
 - 5-year = 5.64"

The peak flow seen at Magnolia LS occurred on February 9th from 10:30 AM to 4:00 PM, which coincided with the heavy rain from February 8th to February 9th. Magnolia LS pumped an average of 5,275 gpm (7.60 MGD) for those 5.5 hours. This event was approximately a 5-year/24-hour return period event.

February 13 @ 2:10 – February 14, 2019 @ 2:10AM

- 5.17” of rain measured at City’s WRF rain gauge in 24 hours
- 4.46” of rain measured at NOAA’s Windsor station over 48 hours
- This event was approximately a 5-year/24-hour return period event

The peak flow seen at Magnolia LS occurred on February 14th from 4:30 AM to 7:30 AM, which coincided with the heavy rain from February 13th to February 14th. Magnolia LS pumped an average of 4,575 gpm (6.59 MGD) for those 3 hours.

February 25 @ 1:30AM – February 27, 2019 @ 1:30AM

- 11.45” of rain measured at City’s WRF rain gauge in 48 hours
- 9.0” of rain measured at NOAA’s Windsor station over 48 hours
- This event was approximately a 50-year/2-day return period event
- Peak 24 Hours Within Event = 6.75” (from February 26 @ 1:39 AM to February 27 @ 1:39 AM)
- NOAA 24-Hour Precipitation Frequency Estimates:
 - 10-year = 6.48”

The peak flow seen at Magnolia LS occurred on February 25th starting at 6:30 PM to February 26th at 8:00 PM. Magnolia LS pumped an average of 4,160 gpm (6.00 MGD) for those 25.5 hours. It should be noted there were several “Null” values during that time period indicating the flow meter or electrical system was experiencing some problems.

4.2.2 Conclusions from Magnolia Lift Station Analysis

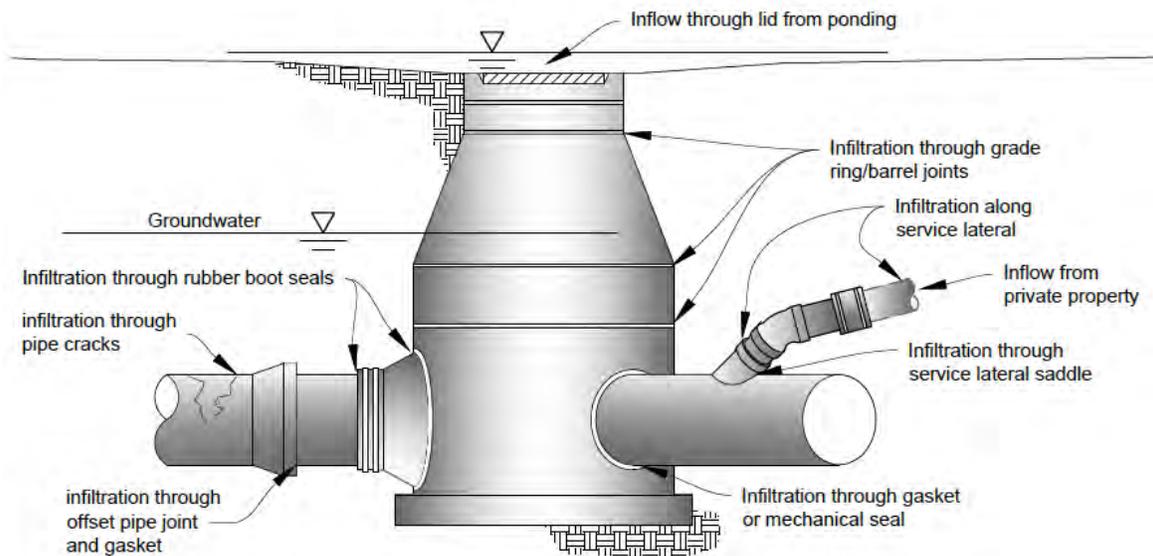
Peak Magnolia LS flows during the rain events of February 2019 did not exceed approximately 4,800 gpm. During both of these events, one of the duty pumps was out of service and the emergency diesel pump was being operated, which discharges flow downstream of the flow meters and is not registered. Therefore, the Magnolia LS flow data from these events is not particularly informative.

Both of the 2017 peak rain events produced similar peak flows at Magnolia LS (5,400-5,500 gpm) and were both approximately 5-year return period events.

Based on the above data, WWE has determined that the 5-year/24-hour return period storm event should produce a PWWF of approximately 8.0 MGD (5,550 gpm) at the Magnolia LS. This represents a 9.2 peaking factor for PWWF vs. ADWF, which is indicative of a system with relatively high rain-dependent infiltration and inflow.

4.3 SSOAP Infiltration/Inflow Analysis

WWE used the U.S. Environmental Protection Agency (EPA) Sanitary Sewer Overflow and Analysis Program (SSOAP) Software to analyze I/I occurring during storm events. Rainfall Dependent Infiltration and Inflow (RDII) is rainfall runoff that enters a closed sewer collection system through manhole and pipe defects, sewer laterals, manhole lids and clean-outs, and is visually represented in Figure 4-5.



Common Sources of Inflow and Infiltration

Figure 4-5: Common Sources of I/I

The relative magnitude of the RDII is often correlated with the age of the collection system. High intensity inflows typically dissipate soon after rainfall stops as opposed to low intensity groundwater infiltration that can stay at elevated levels for many days after a storm, as evident in a sample hydrograph displayed in Figure 4-6.

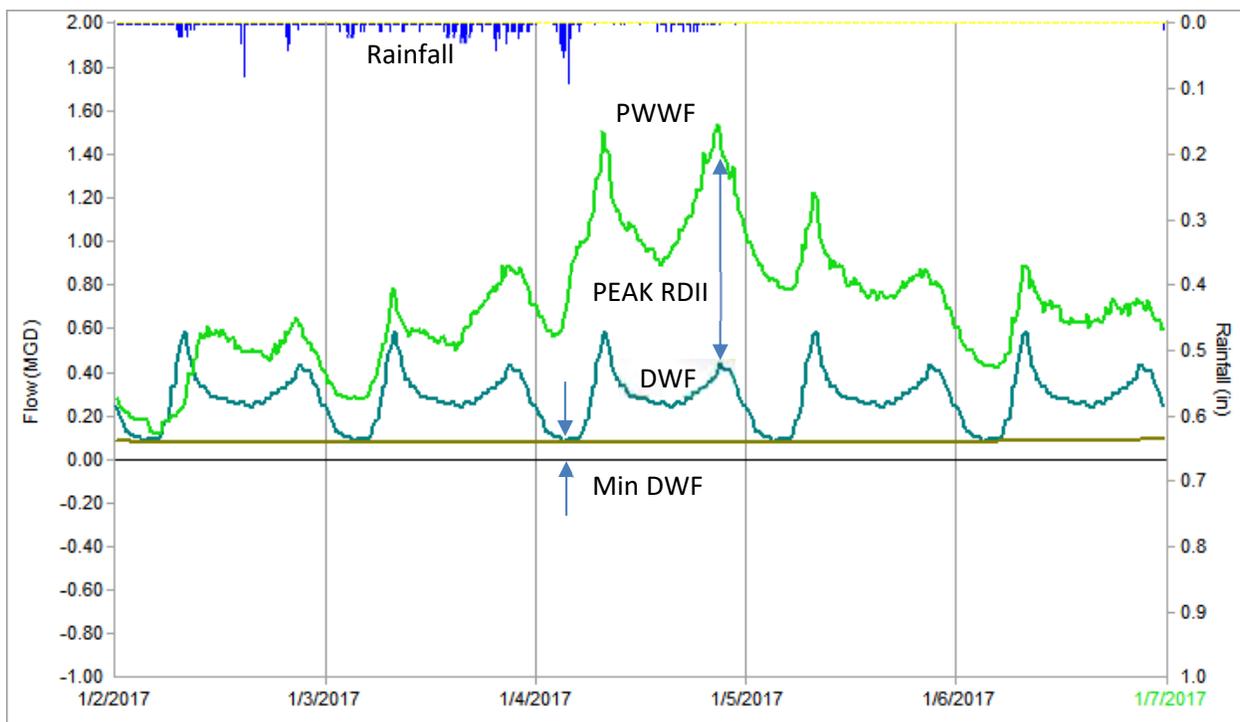


Figure 4-6: Typical Wet Weather Flow Hydrograph

4.3.1 Magnolia Lift Station SSOAP Analysis 2017

SSOAP was used to analyze the I/I occurring during the January 7 – 10, 2017 storm (refer to **Figure 2 - Appendix A** for the Magnolia Lift Station SSOAP analysis figure). The 48-hour rainfall period from 4:30 AM on January 7th, 2017 to 4:30 AM on January 9th, 2017 is the only major storm event in the historical dataset for Magnolia Lift Station for which both the flow and rainfall data appear robust and reliable. The important conclusion that can be drawn from this data is that the “R” value for the entire city is approximately 0.026, meaning that 2.6% of the rain that fell on the City’s sewer collection service area during this event entered the sewer collection system as I/I.

4.3.2 Temporary Flow Meter SSOAP Analysis 2020

The five temporary flow meters described in Table 4-1 were installed from January 21 to April 21, 2020. Unfortunately, February 2020 was the driest February in Northern California ever recorded with zero rainfall occurring. Only 2.98” of total rainfall occurred over the 3-month flow monitoring period.

The only significant rainfall event occurred on April 4th and April 5th, during which 0.89” of rain was recorded over these two days.

The purpose of the SSOAP analysis is to analyze storm event flow data in comparison to dry weather flow data to generate I/I hydrographs that can then be scaled up to specified design storm I/I hydrographs in combination with a design storm hyetograph (or rainfall pattern). SSOAP utilizes a triangular synthetic hydrograph approach called the “RTK” method.

- “R” is the percentage of rainfall that lands on a given analysis area that makes its way into the sewer collection system as I/I, and is the total volume under the unit I/I hydrograph curve
- “T” is the time of the peak flow of the hydrograph
- “K” is the time of the total length of I/I flow generated by a given rainfall amount/duration

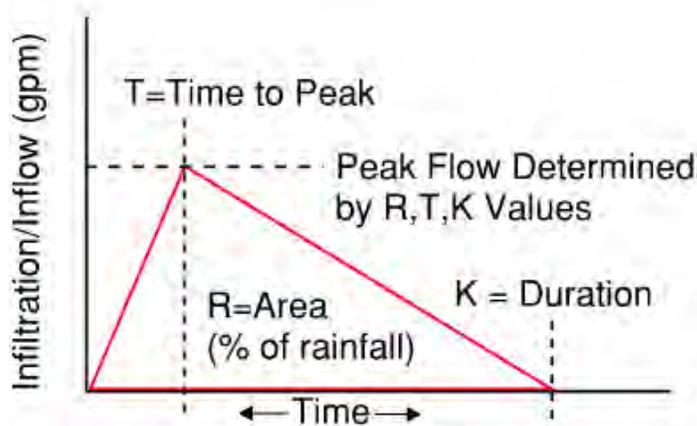


Figure 4-7: RTK Hydrograph

Basin 1 SSOAP Analysis 2020

Basin 1 exhibited a noticeable response to the rainfall occurring on April 4th and April 5th, as evidenced by the difference between the recorded Basin 1 flow during the storm event (green line) and the ADWF of Basin 1 (blue line). The red line is the difference between storm event sewer flow and ADWF flow, or the I/I. The I/I was averaging around zero until the rain event at which it peaked near 220 gpm. This basin requires subtraction of flow meter data to isolate, which results in a “choppier” looking flow trend.

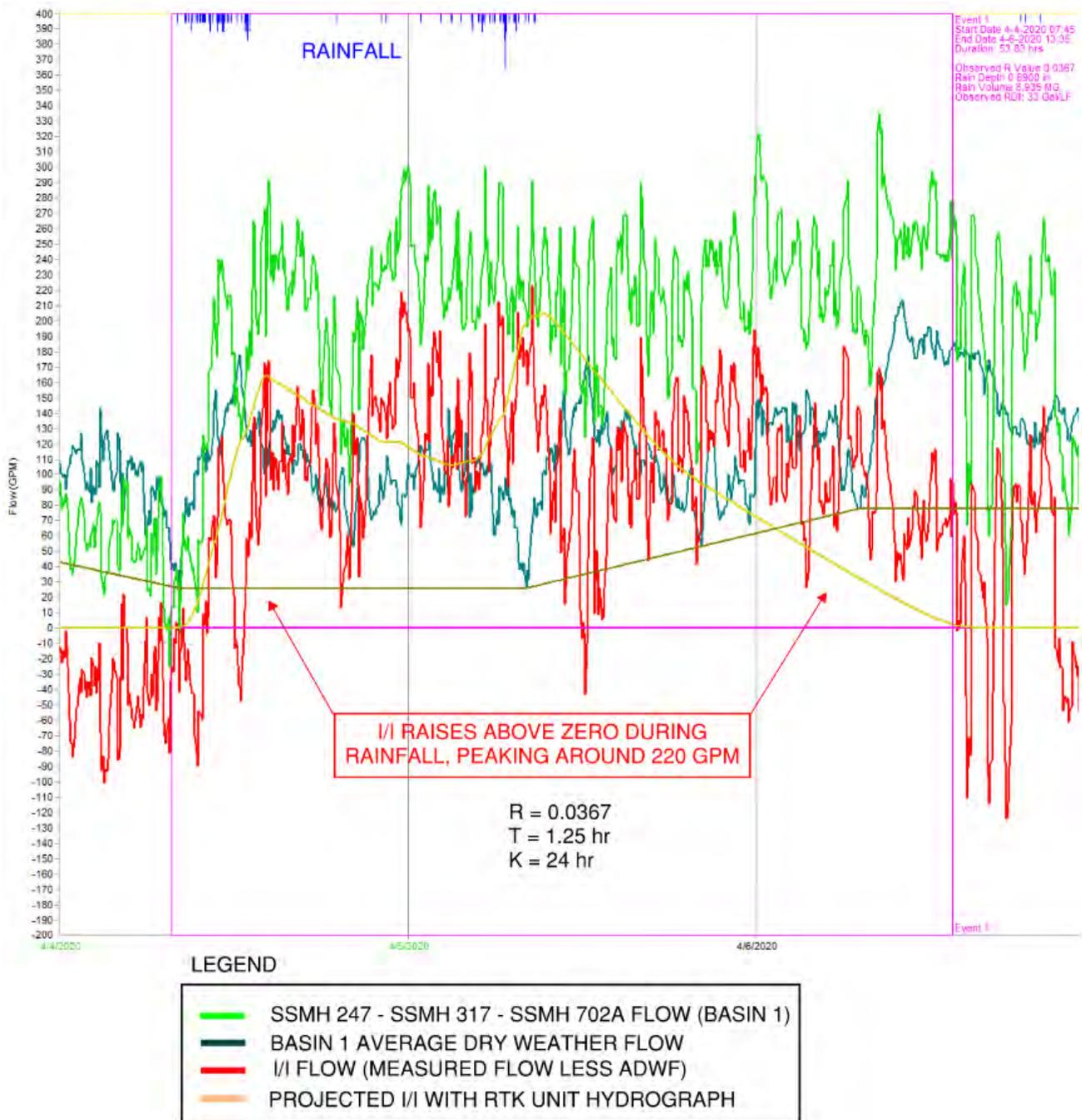


Figure 4-8: Basin 1 SSOAP Analysis of April 4 – April 5 2020 Storm

Basin 2 SSOAP Analysis 2020

Basin 2 exhibited very little response to the rainfall occurring on April 4th and April 5th, as evidenced by the I/I (red line) not increasing significantly coincident with the rainfall. This result was unexpected since this area includes the older downtown area which is believed to have aging/deteriorated pipe.

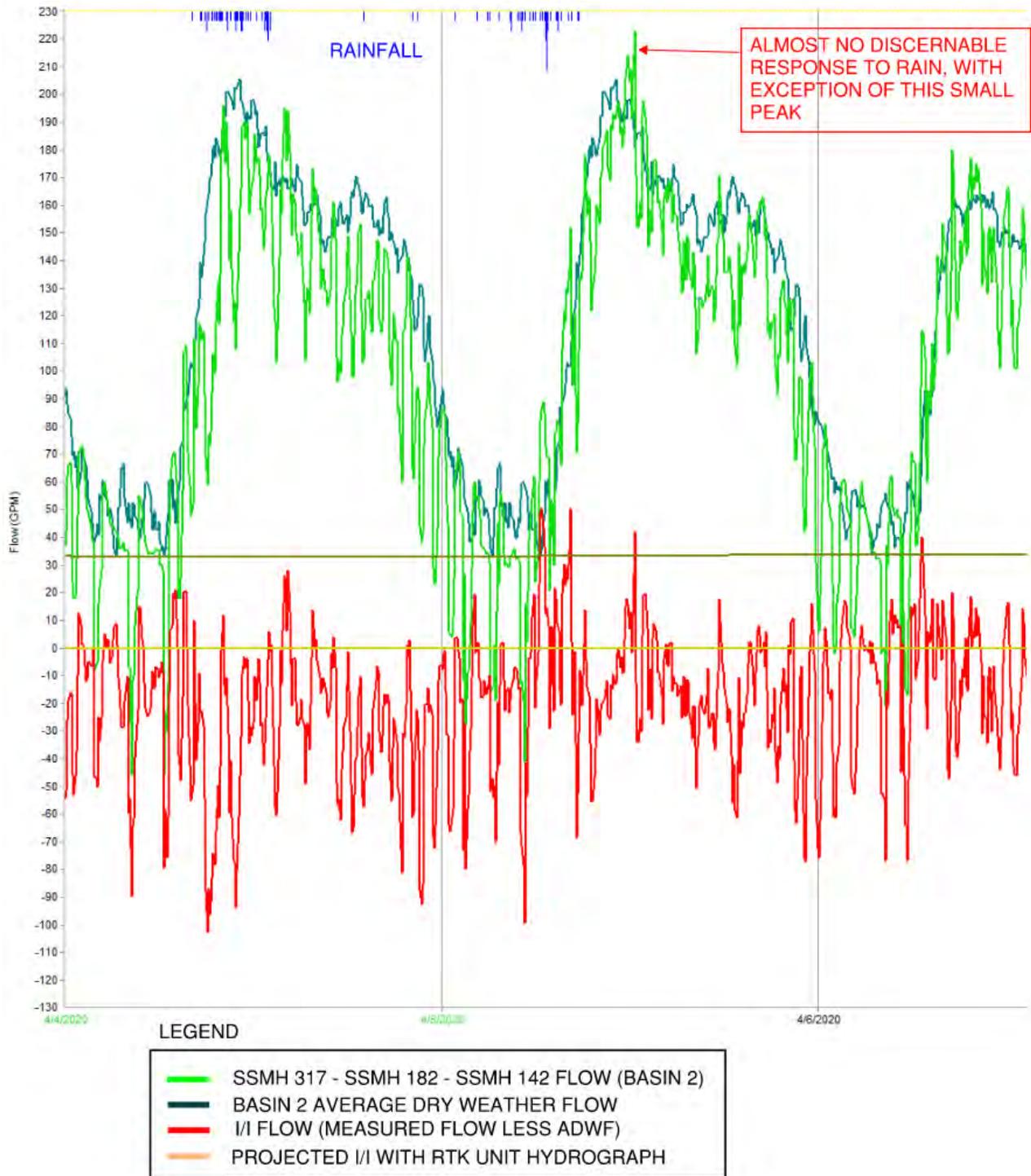


Figure 4-9: Basin 2 SSOAP Analysis of April 4 – April 5 2020 Storm

Basin 3 SSOAP Analysis 2020

Basin 3 exhibited a mild but discernable response to the rainfall occurring on April 4th and April 5th, with I/I increasing coincident with rainfall, peaking at approximately 50 gpm, and the post-rainfall flow pattern returned to tracking the ADWF pattern following the secession of rainfall.

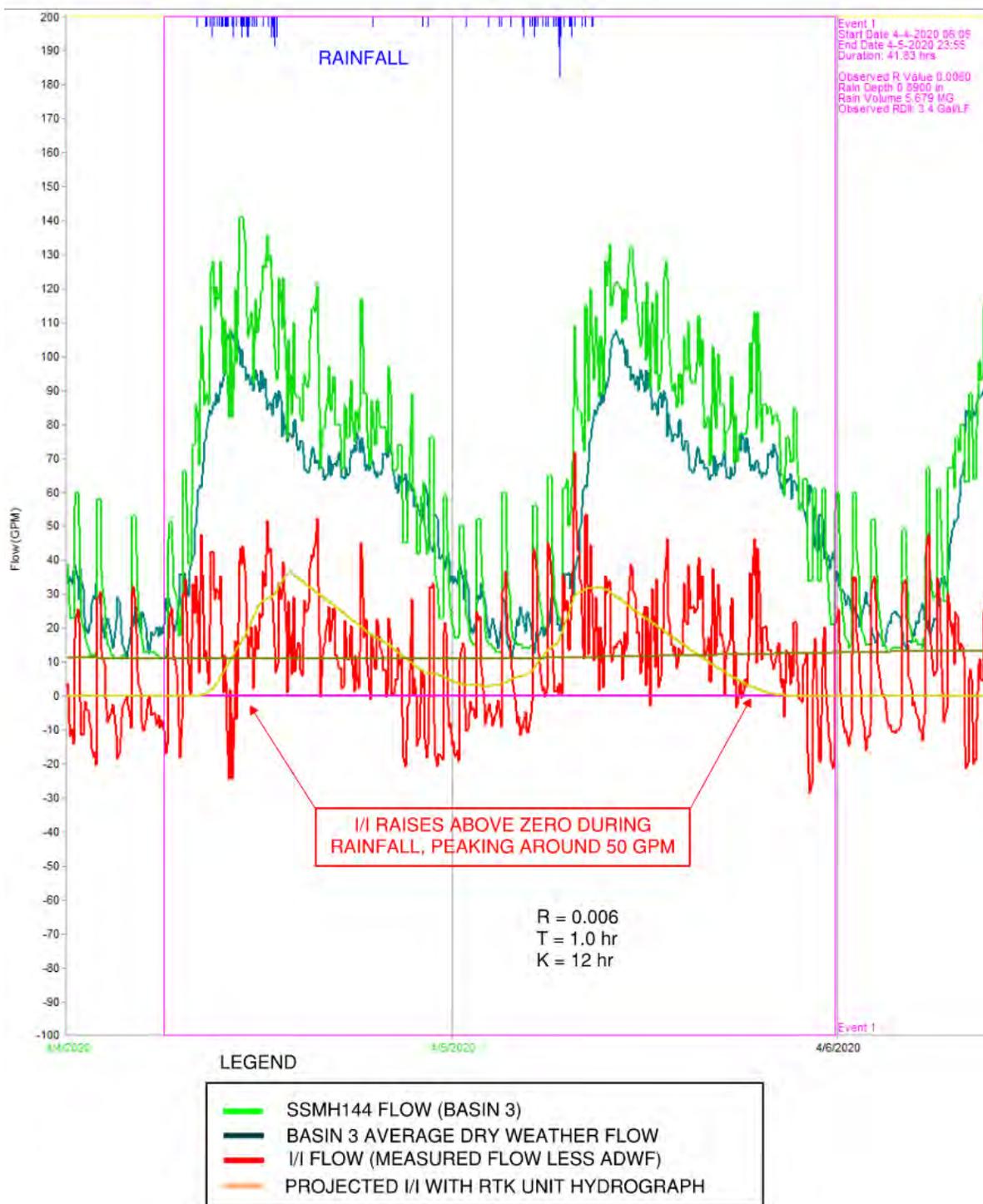


Figure 4-10: Basin 3 SSOAP Analysis of April 4 – April 5 2020 Storm

Basin 4 SSOAP Analysis 2020

Basin 4 exhibited a clear response to the rainfall occurring on April 4th and April 5th. Other small amounts of rainfall in the dataset also caused noticeable responses. This basin likely has significant sources of direct inflow.

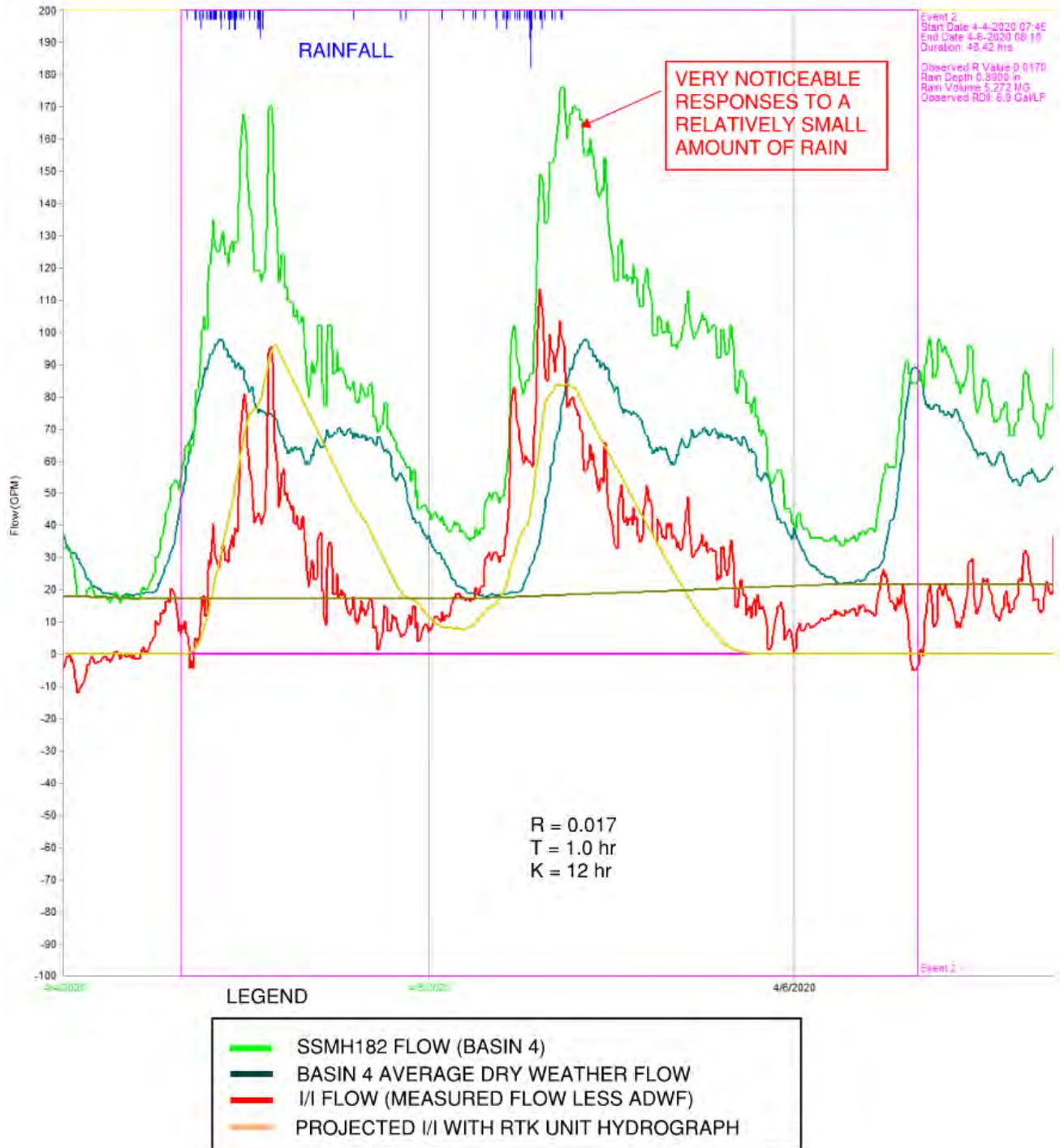


Figure 4-11: Basin 4 SSOAP Analysis of April 4 – April 5 2020 Storm

Basin 5 SSOAP Analysis 2020

Basin 5 exhibited a clear response to the rainfall occurring on April 4th and April 5th. Other small amounts of rainfall in the dataset also caused noticeable responses. This basin likely has significant sources of direct inflow.

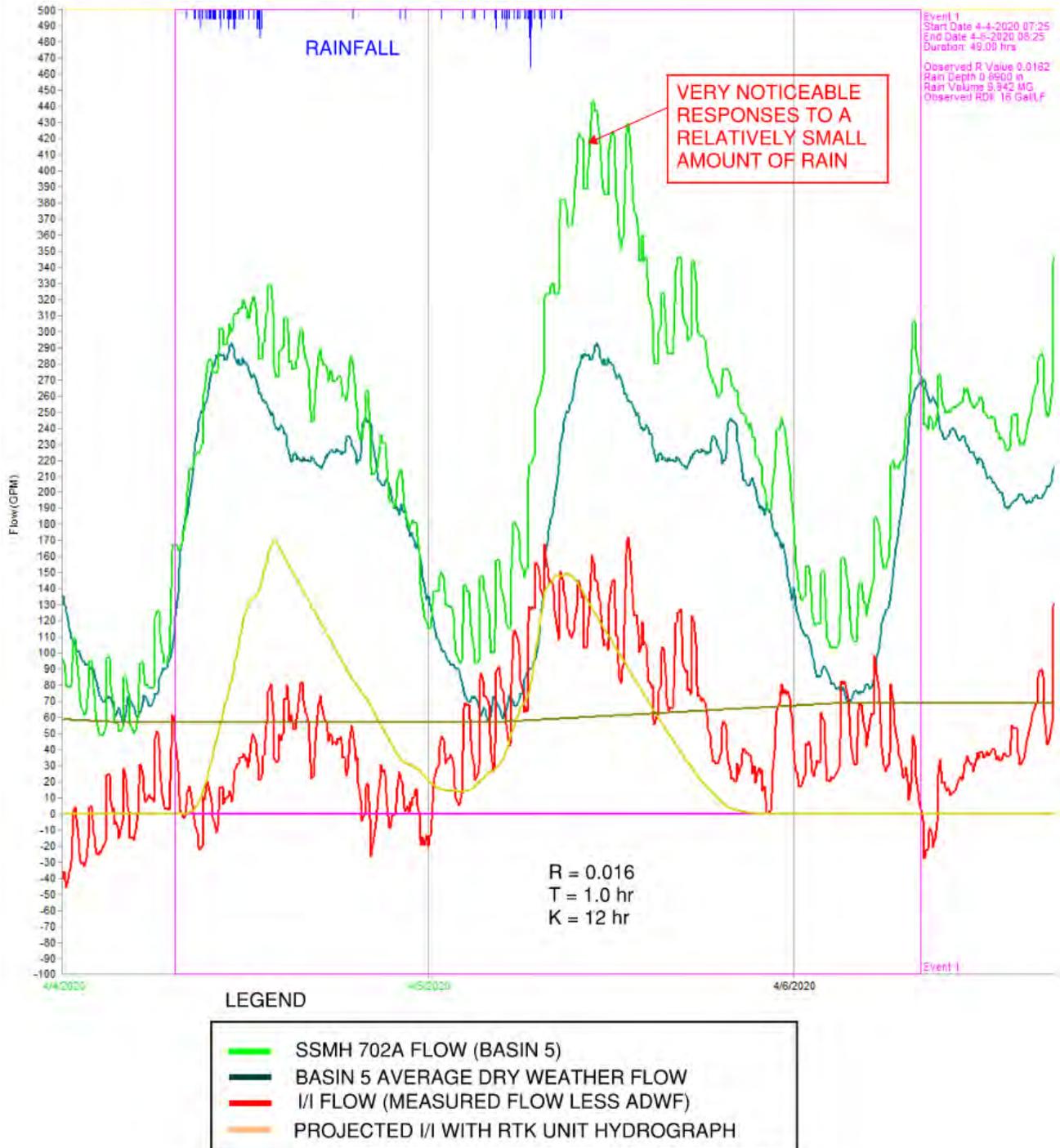


Figure 4-12: Basin 2 SSOAP Analysis of April 4 – April 5 2020 Storm

Basin 6 SSOAP Analysis 2020

Basin 6 exhibited very little response to the rainfall occurring on April 4th and April 5th.

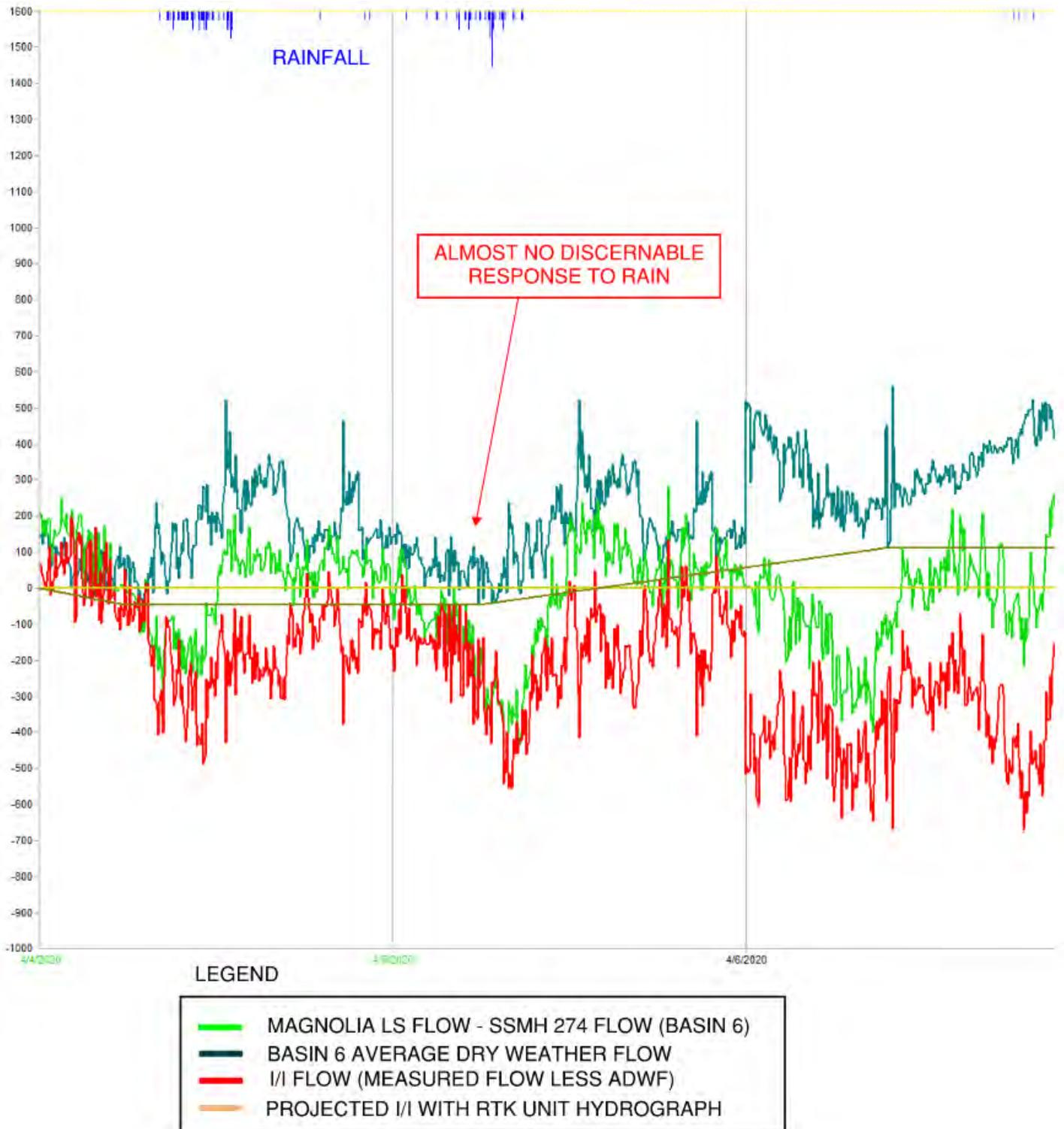


Figure 4-13: Basin 6 SSOAP Analysis of April 4 – April 5 2020 Storm

Calibrated RTK Values

As stated in Section 4.3.1, analysis of the January 7-10, 2017 storm showed that the “R” value for the entire city is approximately 0.026. The April 4-5, 2020 storm event totaled just 0.89” of rain in 48 hours, compared to the 5-year/24-hour design storm total of 5.6” of rain. During larger rain events, R-values tend to rise as localized flooding contributes to increased inflow of stormwater to the sewer collection system. An additional R-value of 0.01 (or 1 %) was added to all of the R-values calculated through SSOAP analysis of the April 4th to April 5th, 2020 storm event, resulting in a weighted average R-value of 0.0256 which closely matches that of the January 7-10, 2017 storm which approximated a 5-year return period event. Additionally, larger storm events tend to result in increased K-values as the I/I takes longer to work its way through the environment and the collection system, which is also related to localized flooding. WWE adjusted the K-values as part of the 5-year / 24-hour storm calibration effort in line with K-values commonly seen in sewer collection system flow monitoring analysis such that the peak flow at Magnolia Lift Station was modeled at 8.0 MGD.

Table 4-2: Calibrated Sewer Basin RTK Values

Flow Meter / Basin #	Area (ac)	Observed R-Value	Calibrated R-Value	Observed/ Calibrated T-Value (hr)	Observed K-Value (hr)	Calibrated K-Value (hr)
FM1-MH274 (Basin 1)	369.73	0.0370	0.0470	1.25	24	26
FM2-MH317 (Basin 2)	234.36	0.0000	0.0100	1.00	12	18
FM3-MH144 (Basin 3)	235.00	0.0060	0.0160	1.00	12	18
FM4-MH182 (Basin 4)	218.16	0.0170	0.0270	1.00	12	18
FM5-MH702A (Basin 5)	411.37	0.0160	0.0260	1.00	12	18
Magnolia (Basin 6)	161.93	0.0000	0.0100	1.00	12	18
Total	1630.55					
Weighted Average			0.0256			

The intent of calibrating the RTK values specific to each monitored basin is to ensure that the City’s hydraulic model simulates the system’s response to a design storm as accurately as possible based on the temporary wet weather flow monitoring data collected and the associated SSOAP analysis. When comparing the R-values of each basin as shown above in Table 4-2, it can be seen that Basins 1, 4, and 5 allow a larger percentage of rainfall to enter those portions of the wastewater collection system as RDII because of the higher R-values. Additionally, Basin 1’s higher T-value shows that the time needed to reach peak flow in that portion of the system is a bit longer than the other basins, and Basin 1’s higher K-value shows that infiltration and inflow continue to occur for a much longer period of time compared to the other basins. While individual basin RTK values can provide some level of insight into each basin’s response to a storm event, performing a meaningful comparison of basin responses and their RDII severity should be done on the basis of gallons per day of I/I per inch-diameter-mile of pipe (gpd/idm), as discussed in more detail in Section 8.1.

5 FUTURE CONDITIONS WASTEWATER LOAD DEVELOPMENT

The City is planning for future growth in the following areas (refer to **Figure 3 - Appendix A**).

1. Saggio Hills (Montage)
2. North Entry (Comstock)
3. Mill District
4. Grove Street Neighborhood Plan
5. Development of Vacant Properties
6. Accessory Dwelling Unit Infill
7. South Entry Area
8. Fitch Mountain

5.1 Wastewater Generation Factors

For future development, it should be noted that a per person flow factor of 70 gpd is employed. The City design standards require that 90 gpd/person is utilized to size newly installed local sewer collection piping. Through the flow monitoring work described in Section 4 of this report, it was determined that actual (calibrated) per capita sewer flow in Healdsburg is currently 50 gpd/person, which is a result of more recent water conservation efforts that are anticipated to remain in place into the foreseeable future. Therefore, a planning level value of 70 gpd/person is used to determine impacts on existing City sewer infrastructure which represents a midway point between current average City water use and City design standards that provides some factor of safety in the analysis of impacts on the existing sewer system. The City standard of 90 gpd/person would still be utilized by developers to size new sewer collection system piping installed to serve new development areas.

5.2 Saggio Hills (Montage)

Montage Healdsburg is a 258-acre private resort that is currently being built and planned to debut in the late fall of 2020. As of early 2020, no regular measurable wastewater flow was being contributed to the City's sewer collection system from this area as it was still under construction.

Sewer ADFW estimates for Montage Healdsburg are provided below:

- 130 rooms x 125 gpd / room = 16,250 gpd
- 62,000 square feet of commercial x 0.15 gpd/sf = 9,300 gpd
- 70 Single Family Residence x 2.75 person/du x 70 gpd/person = 13,475 gpd
- 150 Affordable Housing Units x 2.25 person/du x 70 gpd/person = 23,625 gpd
- Total = 62,650 gpd

5.3 North Entry (Comstock)

Comstock Healdsburg consists of three continuous parcels totaling 30.16 acres located on the west side of Healdsburg Avenue, across from the Montage Healdsburg Development. This entire area is designated Mixed Use in the 2030 General Plan. Buildout of the property anticipates 301 high density residential units, a 108 room hotel, and 12,000 square feet of commercial space.

Sewer ADFW estimates for Comstock Healdsburg are provided below:

- 301 High Density Residential Units x 2.25 person/du x 70 gpd/person = 47,407 gpd
- 108 rooms x 125 gpd / room = 13,500 gpd
- 12,000 square feet of commercial x 0.15 gpd/sf = 1,800 gpd
- Total = 62,707 gpd

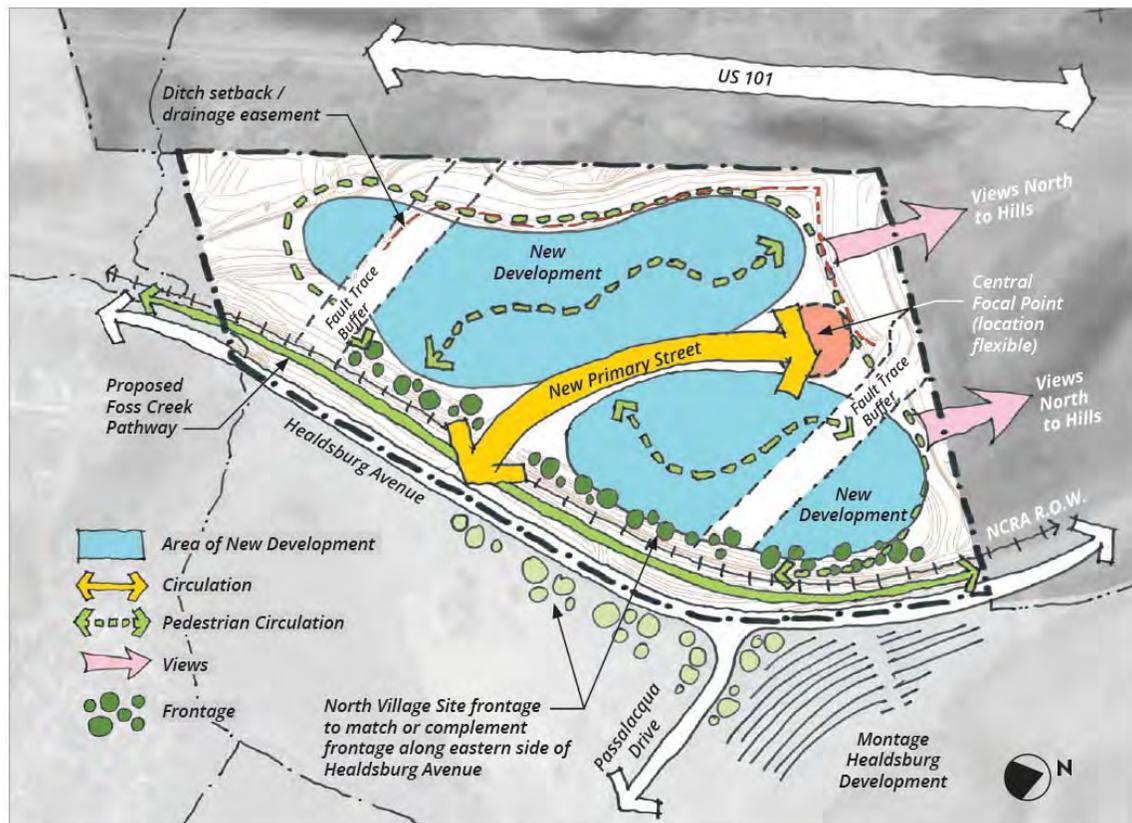


Figure 5-2: North Village Master Plan

5.4 Mill District

The Mill District is a 9.59 acre property located south of the Pacific Railroad tracks at the south end of the City. The former lumber mill has been approved for redevelopment into 7 separate parcels that will support up to 208 multi-family residential units, a 53-room hotel and 15,000 square feet of commercial space.



Figure 5-3: Mill District Area

Sewer ADFW estimates for the Mill District are provided below:

- 208 High Density Residential Units x 2.25 person/du x 70 gpd/person = 32,760 gpd
- 53 rooms x 125 gpd / room = 6,625 gpd
- 15,000 square feet of commercial x 0.15 gpd/sf = 2,250 gpd
- Total = 41,635 gpd

5.5 Grove Street Neighborhood

The Grove Street Neighborhood Plan generally defines development standards for the area between Grove St. and Hwy 101 south of Dry Creek Road. This area is already mostly developed with the exception of an approximately 9.8 acre area that includes several medium density residential parcels with mixed use parcels abutting Grove Street. Development of this area will be accounted for similarly to the methodology generally adopted for other currently vacant parcels throughout the city as identified below in Section 5.5.



Figure 5-4: Grove Street Neighborhood

5.6 Development of Vacant Parcels (Infill)

The development of currently vacant parcels in the future is assumed to occur according to the zoning designation for each parcel according to the 2030 General Plan. Table 5-1 below defines the factors used to determine ADWF sewer flow based on 2030 General Plan zones:

Table 5-1: 2030 General Plan Zone Loading

Land Use	Zone Code	Residential DU Density	Population Density	FAR	Trade Flow (gpd/acre)
Very Low Density Residential	VLR	1 DU/parcel	2.75		
Low Density Residential	LR	1 DU/parcel	2.65		
Medium Density Residential	MR	1 DU/parcel	2.65		
Medium-High Density Residential	MHR	1 DU/parcel	2.65		
High Density Residential	HR	20 DU/acre	2.25		
Downtown Residential	DR	8 DU/acre	2.25		
Transit Residential	TR	30 DU/acre	2.00		
Grove Street Mixed Use	GMU	5 DU/acre	2.25	0.5	1,500
Mixed Use	MU	10 DU/acre	2.25	0.5	1,500
Office / High Density Residential	O/HR	16 DU/acre	2.00	0.5	1,500
Downtown Commercial	DC			2.0	1,500
Service Commercial	SC			0.8	1,500
Medical Office	MO			0.50	1,500
Industrial	I			0.50	2,000

5.7 Accessory Dwelling Unit (ADU) Infill

The construction of accessory dwelling units (i.e. granny units) on currently developed residential parcels is a growing trend due to the general lack of affordable housing supply in California. Since 2015, approximately 10 ADUs have been constructed in Healdsburg per year. Between 2020 and 2030, an additional 15 ADUs per year will be assumed for future growth, or an additional 150 housing units. A population of 2 persons/ADU will be assumed, and ADU growth will be assumed to be evenly distributed amongst all Low Density Residential (LR) parcels. To add 150 ADUs throughout the City on LR parcels would represent ADU construction on one-third of those parcels.

5.8 South Entry Area

The South Entry Area is currently not served by the City’s sewer collection system and WRF. Future improvements to the Healdsburg Ave. bridge crossing the Russian River are being contemplated that would allow City sewer and potable water utilities to be extended to the area. The South Entry Area is currently mostly industrial and includes a large gravel processing plant (Syar Industries), a lumber mill and yard, warehousing, light manufacturing, a restaurant, and Memorial Beach which is a County-owned recreational facility. There are several vacant parcels in the area as well. It is assumed that sewage from this area would flow to a new local pump station and be pumped through a force main across the improved bridge and discharge into the existing sewer collection system. Refer to **Figure 1 – Appendix D**.

In the current conditions hydraulic model scenarios, no flow is being contributed to the sewer collection system from the South Entry Area. In the future, it is assumed that this area would be served by the City. A listing of the parcels, and their anticipated future ADWF sewer flows is provided in Table 5-2 below.

Table 5-2: South Entry Area Parcel and Sewer Flows

APN	Zone Code	Area (acres)	Current Use	Future Res. DU Density	Future Pop. Density	Future FAR	Future Trade Flow (gpd/acre)	Future ADWF (gpd)
088-160-032	I	63.72	Syar Gravel Plant			0.1	2,000	12,744
088-170-015	I	0.58	Auto Repair Shop			0.5	1,500	435
088-170-016	I	0.53	Industrial			0.5	2,000	530
088-170-037	I	0.25	Vacant					0
088-170-042	PQP	6.95	County Park					0
088-170-027	PQP	0.21	County Park					0
088-170-012	PQP	2.52	County Park					0
088-170-026	PQP	1.28	County Park					0
088-170-036	I	20.82	Syar Gravel Plant			0.1	2,000	4,164
088-170-041	I	1.30	Syar Gravel Plant			0.1	2,000	260
086-010-001	I	7.11	Agriculture w/Res			0.5	2,000	7,110
086-010-017	MU	11.38	Vacant	10 DU/ac	2.25	0.5	1,500	26,458
086-010-005	MU	3.17	Vacant	10 DU/ac	2.25	0.5	1,500	7,370
086-030-001	MU	0.51	Vacant	10 DU/ac	2.25	0.5	1,500	1,185
088-170-019	I	15.54	Vacant			0.5	2,000	15,540
086-010-024	I	3.70	Lumber Yard			0.2	1,500	1,110
086-010-025	I	13.28	Lumber Yard			0.2	1,500	3,984
086-010-012	MU	1.36	Restaurant			0.2	2,000	544
086-010-018	I	2.56	Warehouse			0.5	1,500	1,920
086-010-023	I	1.60	Light Mfg.			0.5	2,000	1,600
086-010-014	I	8.95	Lumber Mill			0.5	2,000	8,950
086-030-015	I	11.24	Warehouse			0.5	1,000	5,620
Totals		178.56						99,524

5.9 Future Development ADWF Summary

Table 5-3 below summarizes dwelling units, residential population, residential sewer loads, and commercial sewer loads for current conditions and all future developments.

Table 5-3: Future Development Summary

	# EDUs	Res. Pop.	Res. ADWF	Comm. ADWF	Total ADWF
Current Conditions	4,810	12,055	628,143 gpd	242,822 gpd	870,965 gpd
Vacant Infill ¹	600	1,384	96,880 gpd	27,532 gpd	124,412 gpd
Montage	220	530	37,100 gpd	25,550 gpd	62,650 gpd
Comstock	301	677	47,407 gpd	15,300 gpd	62,707 gpd
2030 ADU Growth	150	300	21,100 gpd	0 gpd	21,100 gpd
Near Term Development Conditions	6,081	14,946	830,630 gpd	311,204 gpd	1,141,834 gpd
South Entry Area	151	339	23,730 gpd	75,794 gpd	99,524 gpd
Buildout of Current City Limits	6,232	15,285	854,360 gpd	386,998 gpd	1,241,358 gpd

Notes

1. Includes development of Grove Street Neighborhood and Mill District

The 2030 General Plan Background Report, page 85, states that “Buildout of the Healdsburg SOI [Sphere of Influence] under the General Plan could increase the SOI population to 14,468, which is less than the 14,900 population projected for 2025 by the 2003 Water System Master Plan and the 2005 UWMP.”

The methodologies used to estimate future populations for these previous studies vary, and are stated here simply for reference to demonstrate that the values listed above are generally in line with previous work. The Near Term Development growth plus the development of the South Entry Area generates an estimated ADWF of approximately 1.24 MGD, which is 89% of the City WRF’s rated capacity of 1.40 MGD ADWF.

5.10 Fitch Mountain

The Fitch Mountain area is within the City’s sphere of influence, but not within City Limits or the City’s sewer collection service area. All properties within the Fitch Mountain area are currently on septic systems. It is possible that in the future, the Fitch Mountain area could be required to provide community sewer treatment to reduce the influence on the Russian River from septic systems (i.e. introduction of pathogens). Fitch Mountain currently contains approximately 372 dwelling units and an approximate population of 1,023, which results in an ADWF of 71,610 gpd at 70 gpd/person. If Fitch Mountain is added to the sewer collection system, total ADWF would increase to approximately 1.31 MGD which is still below the permitted ADWF of 1.40 MGD. There would still remain a small amount of additional buffer in the WRF’s available capacity (i.e. 0.09 MGD) if additional homes are built in the Fitch Mountain area (there are vacant parcels but many may not actually be developable due to topography making it difficult to estimate potential growth) or if ADWF flows are a little higher from the South Entry area than are estimated above. Significant modifications to the City’s WRF would be required for flow in excess of 1.4 MGD ADWF that have not been anticipated in any City future planning efforts.

6 EXISTING CONDITIONS PEAK WET WEATHER MODEL RESULTS

6.1 Design Storm Development Methodology

The City of Healdsburg's standard design storm is the 10-year return, 24-hour duration, 6.48-in rainfall storm listed in NOAA Atlas 14, Volume 6, Version 2. The temporal distribution of the rainfall is according to the SCS Type 1A storm, shown below in Figure 6-1.

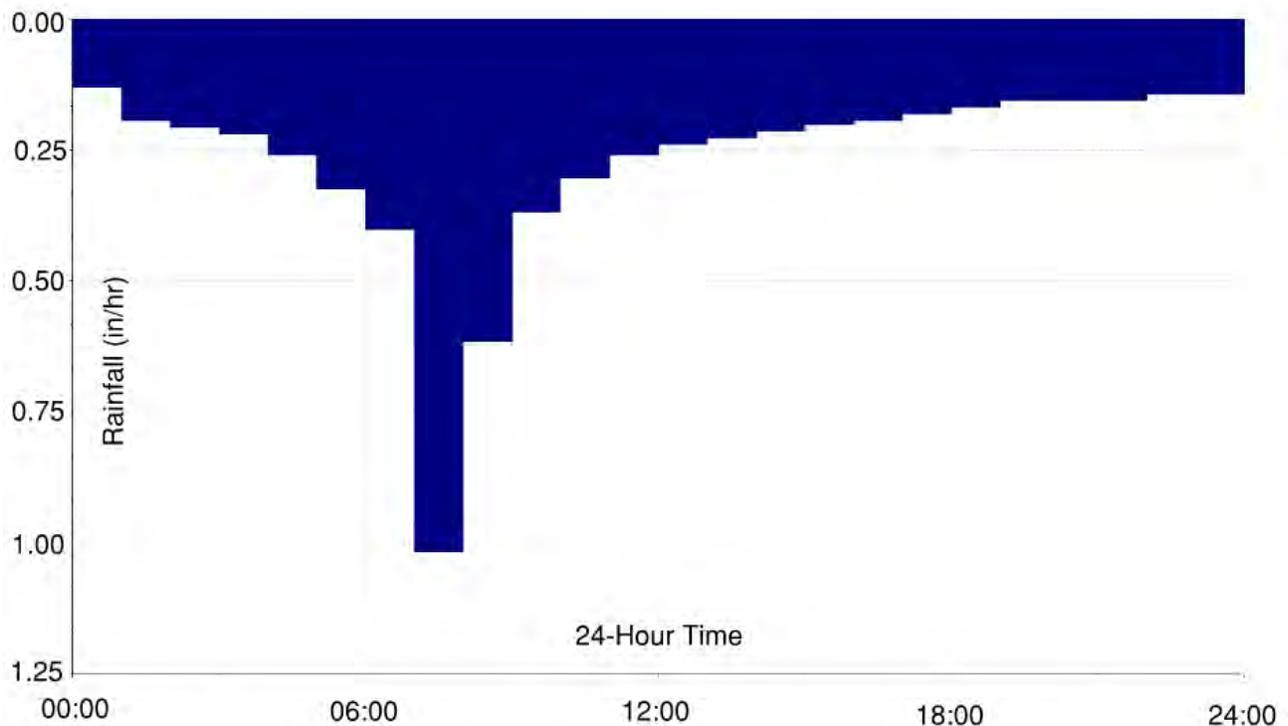


Figure 6-1: City of Healdsburg Design Storm Hyetograph

6.1.1 ICM Hydraulic Model Parameters

The hydraulic model was simulated using Innovyze InfoWorks ICM 10.0 (Integrated Catchment Modeling) software, which is a fully dynamic computational engine built on an implicit numerical solution scheme. To simulate I/I flows in addition to the base ADWF flows from each parcel, RTK values are assigned to every parcel according to the sewer basin (#1-6) they are located within, and then the design storm rainfall is applied to each parcel individually to generate I/I runoff hydrographs from that parcel according to the parcel area and the rainfall intensity at each model timestep. The ADWF diurnal pattern and rainfall intensity changes at each hour according to the design storm, however the model is executed in 1-minute time steps for results solutions and to allow for higher definition of pump station operation.

6.2 Capacity Analysis Criteria

6.2.1 Pipeline Depth to Diameter Ratio

The depth-to-diameter (d/D) ratio, or surcharge level, is calculated for each pipe segment at every time step over the model simulation. Upon completion of the model run, the maximum d/D ratio calculated over the course of the simulation is recorded for each pipe segment. The InfoWorks ICM software differentiates between a d/D value of 1 and 2 as follows:

- A d/D value of 1 indicates that the hydraulic grade line (HGL) is above the crown of the pipe and the pipe is surcharged, however the slope of the HGL is less than the slope of the pipe (i.e. the surcharging depth is dropping moving upstream along the pipe). Such a pipe segment is being surcharged by a downstream capacity restriction but is not itself “under-capacity” to carry the modeled flow (if the downstream restriction were removed).
- A d/D value of 2 indicates that the hydraulic grade line (HGL) is above the crown of the pipe and the pipe is surcharged, and the slope of the HGL is greater than the slope of the pipe (i.e. the surcharging depth is increasing moving upstream along the pipe). Such a pipe segment is “under-capacity” to carry the modeled flow and is causing the HGL to increase beyond the pipe slope, leading to surcharging of upstream pipe segments.

Figure 6-2 and Figure 6-3 illustrate the d/D values of 1 and 2, respectively (figures recreated from Innovyze’s InfoWorks ICM Help Manual).

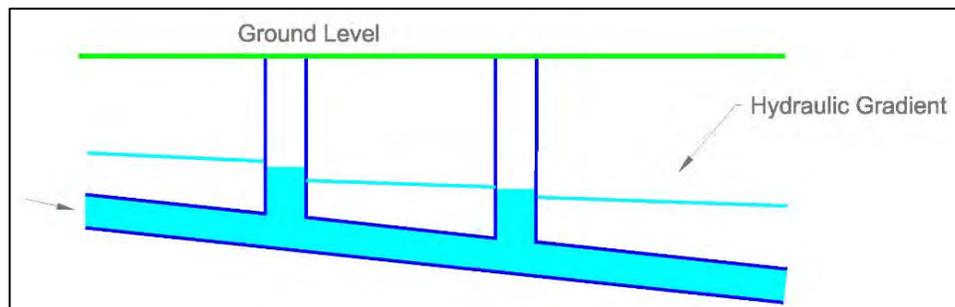


Figure 6-2: d/D Value = 1

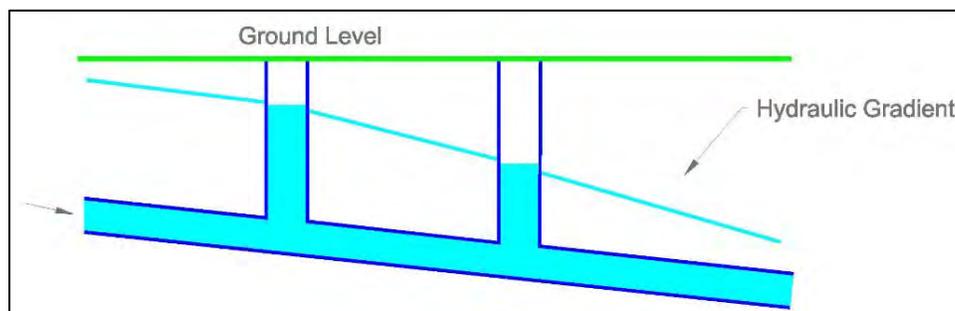


Figure 6-3: d/D Value = 2

Pipe segments with d/D of 2 typically need improvements to relieve capacity restrictions unless they are short segments causing minimal surcharging upstream that is deemed acceptable. Pipe segments of d/D of 1 will typically no longer surcharge if pipes downstream with d/D of 2 are improved. Table 6-1 summarizes the ranges of maximum d/D ratios and associated color-coding used to visually represent modeled pipe segments in subsequent figures in this Report.

Table 6-1: Color Coding for Modeling Results of d/D Ratios

Maximum Predicted d/D Ratio in Modeled Scenarios	Color Code	Description
0 to 0.49	Brown	Sufficient capacity, generally consistent w/ City design criteria for D<12"
0.50 to 0.74	Green	Sufficient capacity, generally consistent w/ City design criteria for D>=12"
0.75 to 0.84	Yellow	Sufficient capacity, consistent with City Master Plan capacity criteria
0.85 to 0.99	Orange	Nearing capacity, acceptable for short periods during design storm
1	Blue	Surcharged by Downstream Restriction
2	Red	Capacity Restriction, Surcharged

6.2.2 Manhole Flood Depth

The flood depth is calculated for each manhole at every timestep over the model simulation. The flood depth is defined as the difference between the water level (or HGL) at the current timestep and the rim elevation of the manhole. Upon completion of a model run, the maximum flood depth experienced during the model run is recorded for each manhole. This "maximum flood depth" value is used to assess the risk for surcharging at a manhole and/or an SSO occurring for the model scenario. The ranges/values for maximum flood depth and their associated color coding used in the capacity assessment are listed in Table 6-2 below. Note that a negative flood depth is equal to the "freeboard" between the HGL and the manhole rim. A positive flood depth indicates an SSO. The City has established a minimum 3' freeboard criteria as a trigger for capacity deficiency improvements.

Table 6-2: Color Coding for Modeling Results of Manhole Flood Depth

Predicted Flood Depth in Modeled Scenarios	Color Code	Description
< -3 feet	no circle	Sufficient freeboard capacity (greater than 3') – No CIP required to mitigate
-3 to -1.1 feet	blue circle	HGL within 3 feet of ground level – CIP may be required to mitigate (see Note 1)
-1 to 0 feet	cyan circle	HGL within 1 foot of ground level, close to SSO – CIP required to mitigate
> 0 feet	red circle	SSO occurring – CIP required to mitigate

Note 1: Some manholes have less than three feet from the crown of the pipe to the rim of the manhole, according to the GIS or as-built data used to build the model. These manholes will show as blue circles on the model results but are not areas of capacity restrictions. These are typically found at the upstream reaches of the system where piping was built as shallow as possible.

6.3 Existing Conditions Results Summary

Figure 6-4 below shows the modeled inflow to Magnolia Lift Station for both the 5-year/24-hour and the 10-year/24-hour storm. The modeled peak flow for the 5-year storm is 8.0 MGD, consistent with peak flows seen during the January 2017 storm events which were also approximately 5-year return period events.

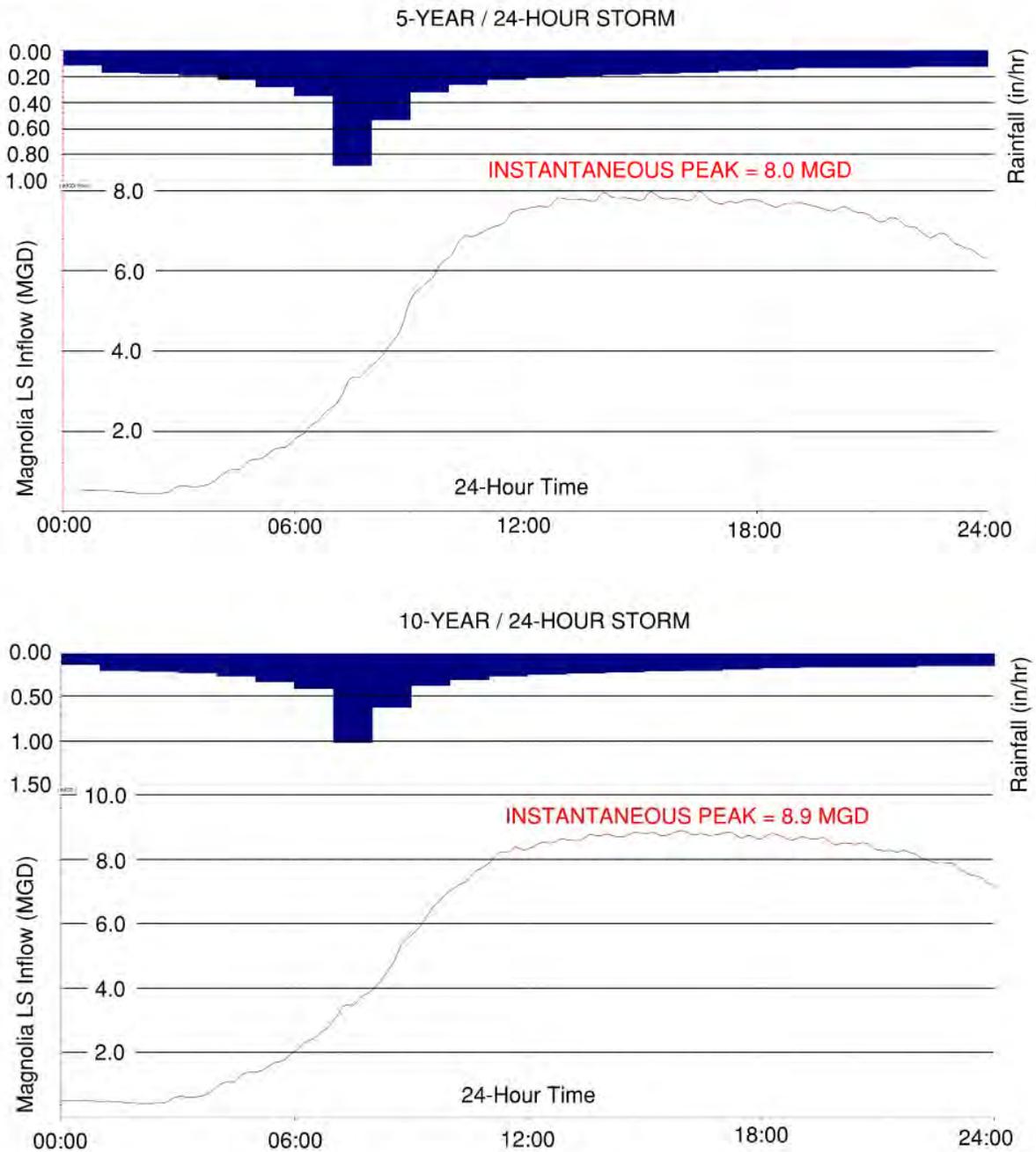


Figure 6-4: Existing Conditions Flow at Magnolia Lift Station

The modeled peak flow for the 10-year 24-hour storm is 8.9 MGD, which exceeds the Magnolia Lift Station's current maximum capacity with all four installed pumps in operation at 8.45 MGD and the water level at 64.0' in wet well. However, Magnolia Lift Station can handle this peak flow allowing for some surcharging in the 33" Magnolia Trunk Sewer, even if one of the fixed pumps is out of service as long as the emergency diesel pump is operated.

A plan view of the City's sewer collection system Existing Conditions hydraulic model results utilizing the color-coding scheme described above is provided in **Figure 1 - Appendix C**.

Note that the Existing Conditions hydraulic model results do not include the modifications that will be made by the 2021 Healdsburg Avenue Sewer Replacement since that work has not been completed to date, however it should also be noted that this project has very little effect on hydraulic model results overall under future conditions.

6.3.1 Pipe Segments with Negligible Surcharging

The hydraulic model results indicate several solitary sewer pipe segments that are essentially at capacity with the HGL reaching the crown of the pipe. These assets present no risk in causing a sewer overflow, and do not warrant a capital improvement project and are therefore not analyzed or discussed further. A list of those pipe segments, which are identified in **Figure 1 - Appendix C**, is provided below:

- 283-LF 6" pipe in an easement between Burgundy Road and Chiquita Road from SSMH-979 to SSMH-768
- 874-LF 8" pipe northwest of Spur Ridge Lane from SSMH-537 to SSMH-627
- 214-LF 15" pipe on North Street from SSMH-201 to SSMH-398

6.3.2 Pipe Segments with Minor Surcharging

The hydraulic model results indicate several sewer pipe segments with measurable surcharging that provides freeboard in excess of 4'-0". These assets are not recommended for capital improvement projects as the risk of an SSO is minimal due to the available freeboard. A list of those pipe segments, which are identified in **Figure 1 - Appendix C**, is provided below:

Monte Vista Ave 6"

456-LF of 6" pipe on Monte Vista Ave from SSMH-613 to SSMH-662 is "under-capacity" and causing surcharging up to 18" above the crown of the pipe at SSMH-613, leaving 4'-6" of freeboard. Refer to **Figure 2 - Appendix C**.

Upper North Trunk Sewer

2,006-LF of 21" trunk sewer along Grove Street is essentially at capacity with minor surcharging starting at SSMH-738 and extending to SSMH-735. Refer to **Figure 3 - Appendix C**.

6.3.3 Pipe Segments with Significant Surcharging and/or SSOs

Lower North Trunk Sewer

3,116-LF of 16-24" trunk sewer along Grove St. and Vine St. is "under-capacity" starting at SSMH-327 near the downtown roundabout and ending at SSMH-750 on Grove St. The 24" trunk in Vine St. from SSMH-327 to SSMH-276 at the North Street intersection is "under-capacity" by approximately 2.5 MGD with the hydraulic grade line rising creating surcharging of 3'-0" above the crown of the pipe at SSMH-276 with an available freeboard of approximately 7'-0". There are 3 segments of 16" diameter pipe between SSMH-276 and SSMH-688 that cause significant surcharging in the upstream 21" North Trunk Sewer and 16" slip lined pipe running along the Foss Creek Pathway up towards Larkspur Drive. Although no SSOs are indicated under existing conditions, surcharging above the crown of the 21" North Trunk sewer is approximately 5'-0" leaving only 12" of freeboard in some manholes. Refer to **Figure 4 - Appendix C**.

The 21" North Trunk Sewer was terminated at SSMH-688 into the 16" slip lined pipe rather than being continued down to the start of the 24" trunk like at SSMH-276, which is a clear capacity restriction that will need to be addressed.

Larkspur Ave

550-LF of 10" sewer along Larkspur Ave from SSMH-1012 to SSMH-684 is slightly "under-capacity", but is surcharged mainly due to the downstream restriction of the 16" slip lined pipe between SSMH-276 and SSMH-688 in Grove St. Refer to **Figure 5 - Appendix C**.

7 FUTURE CONDITIONS PEAK WET WEATHER MODEL RESULTS

7.1 I/I For New Development Areas

Calculation of dry weather base flows from new development areas is covered in Section 5 of this report. Determination of I/I flow from new development areas is discussed below.

I/I from new development areas outside of the current sewer collection system service area was determined using the same methodology as for currently served parcels, which includes applying the design storm to the developed area with assumed RTK values to create I/I hydrographs. For new development areas, the following RTK values were assumed:

- R=0.015 (1.5%)
- T=1.0 hr
- K= 18.0 hr

An "R" value of 1.5% is less than the average R value applied to the existing service area, which is 2.6%. This value is a reasonable and typical "R" value for newly developed areas with the latest sewer system materials and good construction quality control and inspection practices, and aligns with WWE's experience conducting flow monitoring for other sewer collection systems with relatively new development (i.e. less than 20 years old).

7.1.3 Mill District and Grove Street Developments

The Mill District and Grove Street Neighborhood developments are within the current City sewer collection system service area and were already partially developed (i.e. they are being re-developed). The parcels associated with the Mill District and Grove Street Neighborhood were already considered as contributing I/I to the sewer collection system under existing conditions, so they do not add additional I/I to the future conditions model results.

7.1.4 Development of Vacant Parcels and Accessory Dwelling Units

Vacant parcels that are assumed to develop under buildout of the 2030 General Plan and ADUs that are expected to be added by 2030 are also within the current City sewer collection system service area and are dispersed throughout the City, surrounded by existing collection system piping and manholes. Therefore, vacant parcels were already considered as contributing I/I to the sewer collection system under existing conditions.

7.1.5 South Entry Area

In the existing conditions hydraulic model, there were no flow contributions from the South Entry area. It is assumed that a new sewer pump station would serve the South Entry area with a force main pumping across the Healdsburg Ave. bridge.

WWE identified that the 12" sewer downstream of manhole SSMH-233 near the intersection of Healdsburg Ave and Ward Street that flows into the 33" Magnolia Trunk sewer has excess capacity to accept the South Entry Area flows without causing additional impacts to the existing system. Refer to **Figure 1 – Appendix D**.

The new pump station would require a peak wet weather flow capacity of approximately 500 gpm at 35 ft, pumping through a 2,500-lf 8" force main. There would be 1 duty and 1 standby 10-hp pumps.

A comparison of peak wet weather flow was made between WWE's design storm and RTK hydrograph I/I calculation approach versus the City Design Standards to ensure that WWE's methodology is at least as conservative as the City's Design Standards.

The City Design Standards require the following:

- Light Industrial Dry Weather Peak Flow = 4,000 gpd/acre
- I/I = 5,000 gpd/inch-diameter-mile including laterals at 75-lf of 4" lateral per parcel

The South Entry area includes 167.6 acres of industrial/mixed use area, which would result in a peak dry weather flow of 670,400 gpd.

The approximate sewer main and lateral lengths per **Figure 1 – Appendix D** are:

- 2,400 LF of 8" = 3.6 idm x 5,000 gpd = 18,000 gpd
- 2,240 LF of 12" = 5.1 idm x 5,000 gpd = 25,500 gpd
- 20 laterals x 75 LF = 1,500 LF of 4" laterals = 1.1 idm x 5,000 gpd = 5,500 gpd

The total South Entry Area PWWF per City standards would therefore be 719,400 gpd or 500 gpm. The 10-year/24-hour design storm hydraulic model of the area also predicts a 500 gpm PWWF, with an R-value of 1.5%. The percentage of the total peak wet weather flow that is I/I is much higher utilizing this approach (approximately 80%) than the City design standards, however this better reflects reality given that the City’s current PWWF of 8.9 MGD is approximately 86% I/I. The South Entry lift station was modeled as a 500-gpm constant flow pump station cycling on/off based on wet well level.

7.1.6 Fitch Mountain

In the existing conditions hydraulic model, there were no flow contributions from Fitch Mountain. All properties in this area are currently on septic. It is possible that in the future, the Fitch Mountain area could be required to provide community sewer treatment to reduce the influence on the Russian River from septic systems (i.e. introduction of pathogens).

Fitch Mountain will be a difficult area to sewer because the homes in the area wrap around the outside of the mountain along the only main road, Fitch Mountain Road, which follows the Russian River. Fitch Mountain Road has 3 intermediate high points and 3 intermediate low points (noted in Figure 7-2 below), which would likely require 3 separate pump stations to collect flow at the lowest points in between the high points.

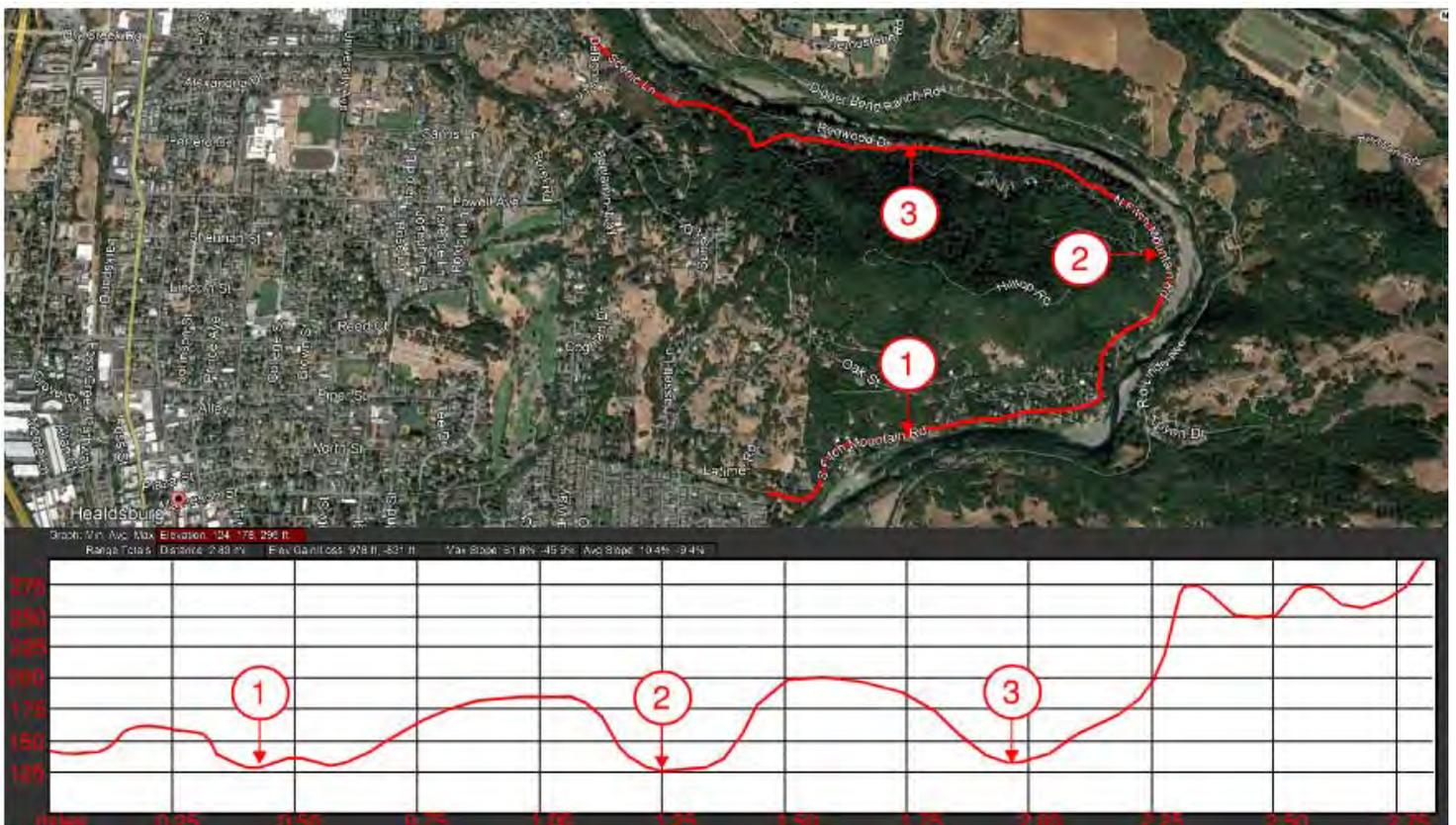


Figure 7-2: Fitch Mountain Road Elevation Profile

Fitch Mountain Scenario 1: Connect to South Entry Force Main @ Healdsburg Ave

The most important area of limited hydraulic capacity in the City's sewer collection system is where the 18" North Trunk Sewer joins the 24" trunk sewer in Grove Street north of the Healdsburg Avenue roundabout. There are no low-cost solutions to completely relieving the surcharging in this area and therefore introducing any new flow into the existing sewer collection system from future development to an area of the system downstream of this "choke point" should be considered.

Fitch Mountain Scenario #1 involves configuring the 3 Fitch Mountain Lift Stations in series, such that Lift Station 3 delivers flow to Lift Station 2; Lift Station 2 delivers flow to Lift Station 1; and Lift Station 1 delivers flow to the City's sewer collection system at a single point. The Lift Station 1 force main would be routed approximately 10,000-LF west along South Fitch Mountain Road, and then south along 1st Street and Front Street to tie into the South Entry Area Lift Station force main. This would ensure that Fitch Mountain flows do not impact areas of existing hydraulic capacity deficiency and do not create any new deficiencies.

Refer to **Figure 2 – Appendix D**. The approximate sewer main lengths are:

- 23,760 LF of 8"
- 1,400 LF of 10"
- 372 laterals x 75 LF = 27,900 LF of 4" laterals

The PWWF from the Fitch Mountain Area from 372 dwelling units utilizing the RTK hydrograph method with an R-value of 0.015 for developed lots is approximately 350 gpm (0.94 gpm per dwelling unit). For reference, the modeled PWWF discharged from Heron Lift Station is 550 gpm from 586 dwelling units (0.94 gpm per dwelling unit).

7.2 Near Term and Future Buildout Conditions Results Summary

A plan view of the City's sewer system hydraulic model results for Near Term Development and Future Buildout of the City is provided in **Figure 3 – Appendix D** for the 10-year/24-hour design storm. This includes South Entry and Fitch Mountain which have lift station force mains that join and discharge to the gravity sewer collection system at SSMH-233 south of the Healdsburg Ave roundabout. Separate figures for Near Term Development and Buildout were not produced because the resultant hydraulic capacity deficiencies in the existing system are identical with the exception of the peak flow produced at Magnolia Lift Station. When the flow from the South Entry and Fitch Mountain areas is delivered to the collection system at SSMH-233 south of the Healdsburg Ave roundabout, no additional impacts to the existing collection system gravity piping are generated. As noted on **Figure 3 – Appendix D**, peak flows at Magnolia Lift Station under future development are as follows:

- Near Term Development (All Future Development without South Entry or Fitch Mtn): 9.58 MGD
- Near Term Development + South Entry: 10.30 MGD
- Near Term Development + South Entry + Fitch Mountain: 10.80 MGD

7.2.1 Near Term Development Hydraulic Capacity Deficiencies

The areas of hydraulic capacity deficiency discussed below are all triggered by development associated with the “Near Term Development” Scenario.

Areas with negligible surcharging under Existing Conditions had a similar level of surcharging under future conditions, without a noticeable worsening of conditions. These areas include:

- 283-LF 6” pipe in an easement between Burgundy Road and Chiquita Road from SSMH-979 to SSMH-768
- 874-LF 8” pipe northwest of Spur Ridge Lane from SSMH-537 to SSMH-627
- 214-LF 15” pipe on North Street from SSMH-201 to SSMH-398

An additional pipe segment becomes negligibly surcharged under Near Term Development conditions:

- 266-LF 6” pipe on Spruce Way from SSMH-611 to SSMH-609

The areas with minor surcharging under Existing Conditions had a similar level of surcharging under future conditions (both Near Term and Buildout), without a noticeable worsening of conditions.

- Monte Vista Ave: hydraulic profile same as existing conditions - see **Figure 2 - Appendix C**
- North Street Downstream of Heron Lift Station Discharge: North Street sewer downstream of Heron Lift Station is essentially flowing at full capacity - see **Figure 4 – Appendix D**

The additional future flow created by infill of vacant properties and additional ADUs was not significant enough and also dispersed throughout the sewer service area such that the impact of this flow was minimal on the existing system. Also, I/I from this infill development was already included under existing conditions, and peak I/I is far greater in magnitude than peak ADWF flow contributions.

Upper North Trunk Sewer

The Upper North Trunk Sewer carries the additional flow from the Saggio Hills and Comstock developments, as well as infill development. Under existing conditions, this trunk was essentially at capacity. With these flows added, this section of pipe is surcharging up to 32” above the crown of the pipe at SSMH-734. The point of lowest freeboard is at SSMH-736 with 5’-0” remaining.

Refer to **Figure 5 – Appendix D**.

Lower North Trunk Sewer

Under existing conditions, surcharging was occurring to within 1’-0” of spilling along Grove Street. With additional flows from infill and new developments including Saggio Hills and Comstock, SSOs occur along Grove Street. Refer to **Figure 6 – Appendix D**.

Magnolia Lift Station

The Near Term Development PWWF of 9.58 MGD exceeds Magnolia Lift Station’s reliable capacity of 9.42 MGD allowing for surcharging in the Magnolia Trunk.

8 I&I REDUCTION PROGRAM RECOMMENDATIONS

8.1 Sewer Basin Infiltration/Inflow Comparison

The most “apples to apples” comparison of sewer basins with respect to I/I severity is on the basis of gallons per day of I/I per inch-diameter-mile of pipe (gpd/idm). As a general rule of thumb within the wastewater industry, any particular basin that exhibits an I/I response greater than 5,000 gpd/idm is a worthwhile candidate for further investigation. This measure is generally accepted to refer to the 1-year/24-hour return period event. Table 8-1 below calculates the 1-year/24-hour I/I volume for each of the metered sewer basins. The I/I volume is equal to 3.56” of rain falling on the basin area, multiplied by the basin’s R-value. The I/I volume is then divided by the quantity of inch-diameter-miles of sewer pipe in that basin which were quantified using the GIS.

Table 8-1: Sewer Basin I/I Severity Comparison

Basin #/ Flow Meter Manhole	Basin Description	Basin Area [acres]	R Value	Basin Pipe Length [ft]	1yr/24hr Storm I/I Vol [gpd]	Basin Gravity Pipe [idm]	I/I Severity [gpd/idm]
#1 / SSMH 274	Healdsburg Ave Corridor	369.73	0.047	47,787	1,679,735	86.77	19,358
#2 / SSMH 317	Downtown	234.36	0.010	51,210	226,538	66.56	3,404
#3 / SSMH 144	Heron LS	235.00	0.016	33,684	363,451	46.04	7,894
#4 / SSMH 182	Residential Gravity	218.16	0.027	33,576	569,373	42.39	13,432
#5 / SSMH 702A	Northern	411.37	0.026	69,386	1,033,866	110.19	9,383
#6 / Magnolia	Southern	161.93	0.010	33,547	156,526	82.75	1,892
City Totals		1,630.55		269,190	4,029,489		

Basins #1, #4, and #5 have the highest I/I severity, and are recommended for further I/I investigation in that order of priority. Figure 8-1 below shows the I/I severity values for each sewer basin.

The 1-year 24-hour storm event of 3.56” of rain results in approximately 4 million gallons of infiltration and inflow at the WRF in 24 hours under existing conditions, compared to the current ADWF of 0.87 MGD. The WRF’s current PWWF capacity is 4 MGD, and therefore the 1-year/24-hour return period event exceeds the WRF’s daily flow capacity. The WRF has a 5 MG aerated raw sewage equalization basin which can be used to store sewage in excess of plant’s capacity for later processing. Raw sewage first passes through the plant headworks screens (1/4” opening size) before being diverted to the equalization basin, and the screens have a maximum capacity of 9.6 MGD according to the WRF’s current NPDES permit. The headworks also has an emergency overflow that can allow flows in excess of 9.6 MGD to bypass the headworks and go directly to the equalization basin in extreme events.

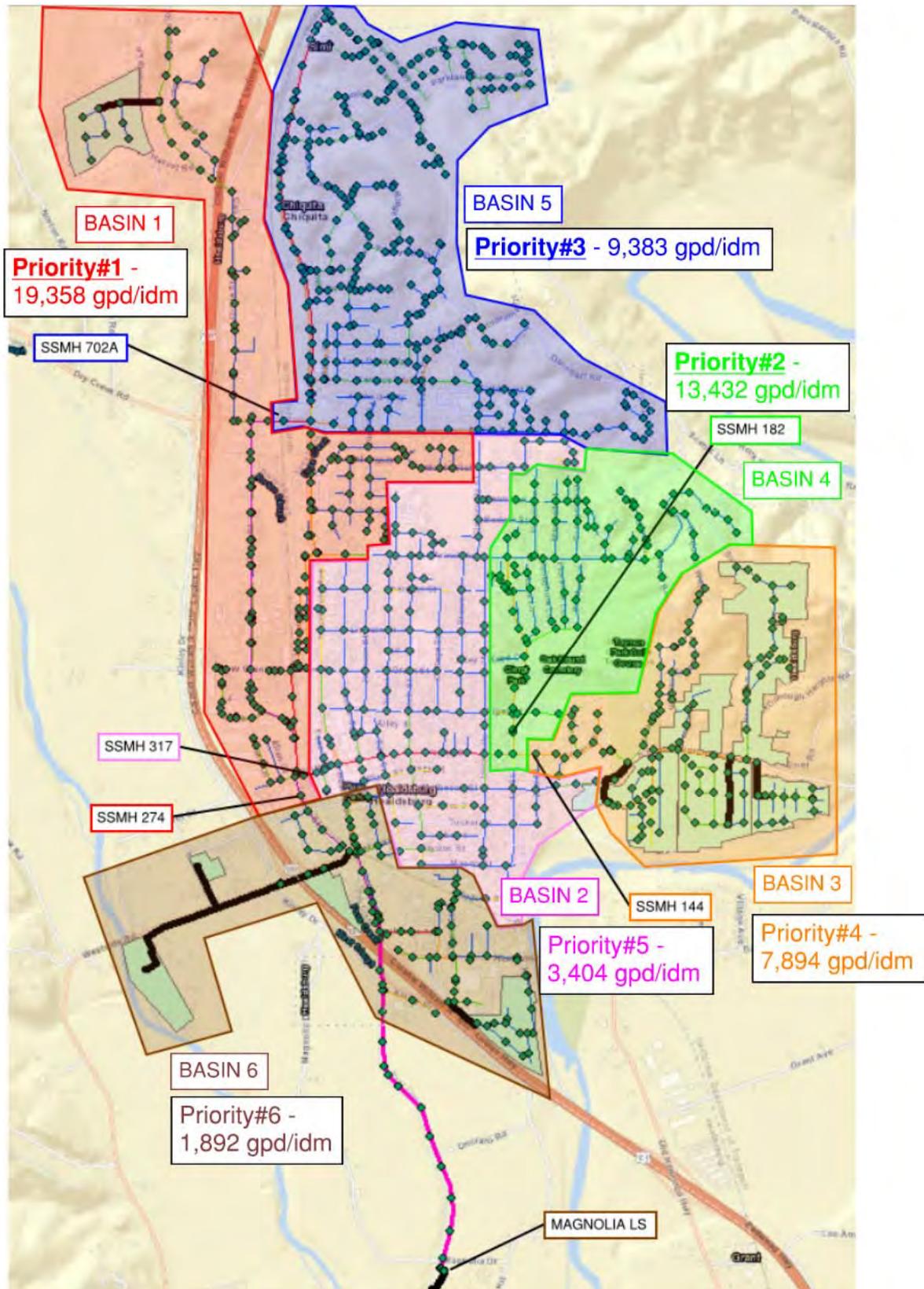


Figure 8-1: Sewer Basin I/I Values

8.2 Cost of Treating I/I

WWE performed an analysis of Magnolia Lift Station flows during the winters of '16-17, '17-18, and '18-19 to quantify the additional flow measured at the lift station from December – May vs. the average dry weather flow typically seen in the late summer. This data is summarized in Table 8-2 below.

Table 8-2: Winter I/I Generation

Winter Period	Total Winter I/I	Winter Rain Total	Winter I/I per Inch of Rain
Dec. 2016 – May 2017	199.0 MG	46.2"	4.3 MG
Dec. 2017 – May 2018	19.9 MG	18.9"	1.1 MG
Dec. 2018 – May 2019	121.1 MG	53.1"	2.3 MG
3 Year Average	113.3 MG	39.4"	2.5 MG

The data above shows a relatively wide variability in the volume of I/I generated per inch of rain. The variability is mostly likely due to the distribution and intensity of the rainfall throughout the winter. If the rainfall is extremely intense and not well distributed, more of that rain will tend to reach the system as I/I versus a season where the rainfall is less intense and well distributed.

The data above suggests that the average volume of I/I generated at the WRF is 2.5 MG per inch of rain. This is greater than the 4.0 MG of I/I predicted in 24-hours for the 3.56" 1-year/24-hour event shown in Table 8-1 (a yield of 1.12 MG per inch). This is because the 4.0 MG predicted by the 1-year/24-hour event is just the I/I that will occur within the same day as the rain event coinciding with the peak rainfall and peak wastewater flow. I/I will continue to be delivered to the WRF more slowly and at a lower rate for several days after the rain through subsurface infiltration into the sewer system. It is the peak flow (which is mainly related to direct stormwater inflow) immediately following intense rain that causes capacity restrictions in the sewer collection system; however, the longer-term extraneous total infiltration and inflow that reaches the WRF is also a concern for wastewater treatment costs.

The average annual winter rainfall historically in Healdsburg is approximately 38 inches. Using the 3-year average data from 2016-2019, the average winter season would result in approximately 95 MG of extraneous I/I delivered to the WRF for treatment.

The City conducted an analysis of average wastewater treatment costs. Power costs average \$1,277 per MG treated. Biosolids disposal costs are estimated at \$43/ton. In the winter the WRF generates 8 ton/MG of biosolids for a cost of \$344/MG. Therefore, the total average cost per million gallons treated is \$1,621.

In an average year, the City will incur approximately \$150,000 in costs to treat infiltration and inflow to the sewage collection system. However, this value could vary greatly from year to year depending on rainfall totals and distribution patterns.

8.3 I/I Reduction Program Activities and Costs

8.3.1 Smoke Testing

To conduct smoke testing, field crews blow air and smoke into the sewer system through a manhole, plug the piping at both an upstream and downstream manhole, and monitor where smoke escapes the system. Smoke may be seen coming from roof vents, building foundations, storm drain catch basins, clean-outs, down spouts, or sewer laterals. Smoke should not appear on private property if it is properly plumbed, vented, and the water traps in the building contain water. Areas where smoke is seen escaping the system are identified and documented for potential repairs.

Smoke testing is typically performed during periods of low sewer flow, such as mid-day in the late summer, because the sewer line must be plugged and flow will back up in the collection system. Manholes upstream of the smoke testing operation must be monitored and the plugs removed before excessive surcharge occurs upstream.

Figure 8-2 below shows a schematic diagram of a typical smoke testing operation.

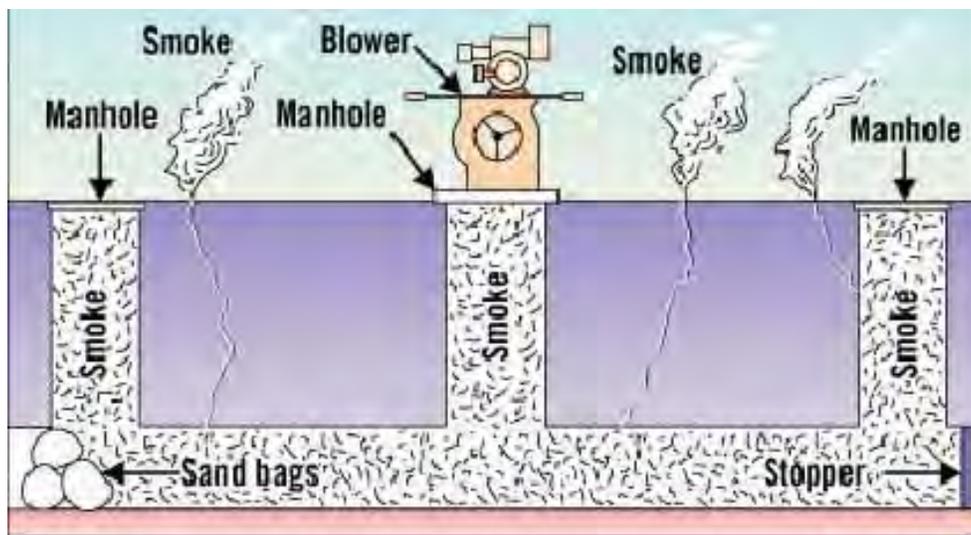


Figure 8-2: Smoke Testing Schematic

The estimated cost for a contractor to perform smoke testing and provide a report of results is \$2.00 per linear foot of sewer main based on current market conditions discussed with a potential provider in 2020.

Table 8-3: Priority Sewer Basin Smoke Testing Cost Estimate

Basin	Basin Footage	Cost/ft	Estimated Cost
#1 – Healdsburg Avenue Corridor	47,787 lf	\$2.00	\$95,000
#4 – Residential Gravity	33,576 lf	\$2.00	\$67,000
#5 – Northern Area	69,386 lf	\$2.00	\$138,000
Totals	150,749 lf (28.5 miles)		\$300,000

8.3.2 Additional Flow Monitoring

WWE recommends that additional flow monitoring is conducted by the City on a periodic basis. Flow monitoring is an important tool in an ongoing I/I reduction program to achieve the following key objectives:

- Further pinpoint sources of significant inflow to the system during storm events
- Assess the impact of I/I reduction work such as removal of illicit connections and repair of piping, manholes, and laterals by conducting flow monitoring at a similar location before and after work
- Develop a long-term trend of I/I from sewer sub-basins as they age
- Benchmark I/I from new development areas vs. City standards to inform potential updates to City sewer design standards

The most valuable time to collect flow monitoring data in the sewer collection system is in the winter from mid-December through mid-April. Flow monitoring can be accomplished several different ways:

1. **Full Service Contracted:** A contractor will install the flow meters at a specified location and charge the City a monthly fee to deliver the flow data and remove the flow meters. This is typically the most expensive option and costs approximately \$2,500 per month per flow meter.
2. **Flow Meter Rental / City Installation:** The City can rent a portable flow meter with wireless data transmission capability for \$1,650 per month, and perform the installation and removal using City labor.
3. **Flow Meter Purchase:** Portable battery powered flow meters with wireless data transmission capability can be purchased for approximately \$17,500 each (including tax, shipping, and several years of cellular data service). Batteries need to be changed every 6 months at a cost of approximately \$125 per battery.

If the City intends to continue conducting flow monitoring of 5 sites for at least 4 months a year, the annual flow meter rental cost would be \$33,000. The purchase cost of 5 meters plus battery expenses would be \$91,250 over 3 years, less than the cost of 3 years' worth of rental costs. WWE recommends that if the City plans to conduct flow monitoring over a longer period of time as part of its ongoing I/I reduction program, the City purchases 5 flow meters that can be moved to various locations by City staff, and this will also provide year-round data instead of only winter-time data if the equipment were rented. The expected useful life of the flow meters is 5-10 years.

8.3.3 CCTV and Manhole Inspection

The City has an on-going CCTV inspection and manhole inspection program, the main purpose of which is condition assessment for planning of rehabilitation and replacement projects. CCTV and manhole inspection can also be performed during periods of wet weather to identify sources of I/I such as subsurface infiltration through pipe joints, manholes, and excessive stormwater flows through individual sewer laterals. Targeted inspection can be performed during wet weather in smaller sub-areas identified with high flows and peaking factors from the City's ongoing flow monitoring program. This work can be performed internally by City Staff.

One example is SSMH-274 on the 24" Vine Street trunk sewer. Water Work's sub-consultant Total Flow Inc. noted significant infiltration through the manhole barrel section joints when installing the temporary flow meter at this location in January of 2020. The photo taken by the installer shown below displays one of several small hose-stream type leaks in this manhole. If this condition is widespread on some of the deeper sections of sewer trunk lines, it could present an opportunity to identify and eliminate these leaks with a manhole lining or grouting program.



Figure 8-3: Infiltration at SSMH-274 (January 2020)

8.3.4 Electro Scan

Leaks in sewer pipes can be located by measuring the electricity flowing from a probe which is installed behind a water jet and pipe plug that is pulled through a sewer line. As the probe is pulled through a pipe, electricity is used to scan the pipe indicating all defects which allow water to exit the pipe – hence the term ‘Electro Scan.’

[<https://www.electroscan.com/technology/>]

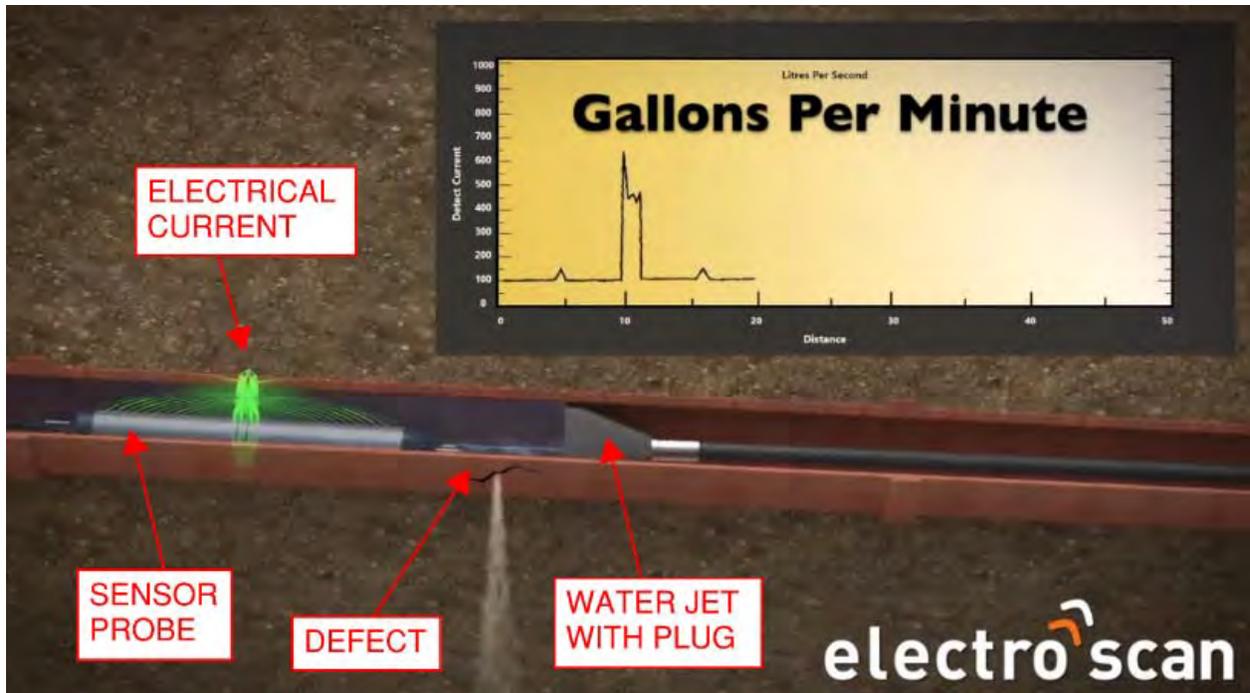


Figure 8-4: Electro Scan Schematic

Electro Scan has the ability to estimate a leakage rate in gallons per minute from each identified defect, however it relies on the assumption that the water level is 1’ above the pipe which may not be representative of reality. This technology could be used to identify significant sources of sub-surface I/I that could potentially be eliminated through pipe replacement or lining, and also allow for a cost-to-benefit analysis of repairing pipe defects based on the elimination of the estimated I/I from that defect in terms of long term treatment cost savings. The cost for Electro Scan is approximately \$3/LF in the 2020 market.

WWE recommends that the City consider utilizing Electro Scan in conjunction with its CCTV inspection and condition assessment program as part of the project identification process. If a large number of pipes are found for example in the older downtown section of the City that have offset joints and cracks, those pipes could be Electro Scanned to determine the leakiest pipes to assist with prioritization and project scheduling if all repairs cannot be made in the short-term.

8.4 Conceptual I/I Reduction Cost Analysis

When developing a defined I/I reduction program, the potential cost-to-benefit of the program must be considered to ensure that the scope of the project is appropriate. The costs of the program, which are incurred by the City, should be spent toward the most efficient alternative(s) for addressing the hydraulic capacity deficiencies that are triggered by excessive I/I in the collection system.

Key questions to answer when developing a potential I/I reduction program are:

1. What capital improvement projects that might otherwise be needed in the future could be eliminated with I/I reduction?
2. How much I/I reduction is needed to eliminate those capital improvement projects?
3. How do the potential costs to identify and reduce the I/I compare to the cost of the capital improvement project to simply convey the I/I?
4. What long term wastewater treatment costs could be saved by the anticipated I/I reduction?

The most significant area of hydraulic capacity deficiency in the City of Healdsburg's sewer collection system is caused by gravity sewer piping that is clearly undersized and does not comply with the City's current sewer collection system design standards. The 21" North Trunk Sewer that currently ends at SSMH-688 and discharges into the 16" slip-lined pipe in Grove Street violates City Design Standard 5.02.D.2 which states "pipe diameters shall not decrease in the downstream direction". A 24" stub-out was left in the last manhole in the 21" North Trunk Sewer (refer to Section 9.1 of the report) which indicates that future extension of the line was anticipated when originally designed and installed. The hydraulic capacity of the 16" slip-lined section of pipe downstream of the 21" North Trunk Sewer is exceeded by 1.5 MGD under Near Term Development Conditions and would require an approximately 30% reduction in peak I/I to alleviate the deficiency.

8.4.1 Smoke Testing, Flow Monitoring and CCTV Inspection Cost Analysis

In order to reduce excessive I/I, sources of I/I must first be positively identified. Smoke testing, ongoing flow monitoring, and CCTV inspection are the most commonly used methods for locating specific sources of I/I. As recommended in Section 8.3 of this report, the total costs for these activities are summarized below:

- Smoke testing of the 3 highest ranking sewer basins for I/I : \$300,000
- Purchase and install (by City) of 5 battery powered portable flow meters: \$100,000
- CCTV and manhole inspection during periods of wet weather: performed as-needed by City Staff as part of City's on-going operation and maintenance program (no additional contracted cost)

If it is assumed that I/I reduction will not completely eliminate any significant capital improvement projects, the minimum remaining benefit of I/I reduction is reduced wastewater treatment costs. Sources of I/I can be highly dispersed in many sewer collection systems, making them difficult and costly to locate and repair to a level that results in significant reductions in peak I/I rates. Illicit connections of storm drain systems, direct inflow of stormwater through flooded manhole covers, and high rates of infiltration through manhole barrel sections are the easiest to identify and correct through smoke testing and basic

manhole inspections during periods of heavy rain. However, sources such as infiltration through leaking pipe joints and infiltration through sewer laterals can be more difficult to identify and quantify, particularly due to the extremely high number of pipe and lateral joints throughout a sewer collection system. Areas of significant pipe deterioration such as cracked/broken pipes and severe joint offsets can be easily identified by the CCTV inspection program and corrected as condition-related rehabilitation and replacement projects.

A reasonable expectation, based on industry experience, for an active I/I reduction program is to reduce peak infiltration and inflow rates by approximately 20% from existing conditions. This represents elimination of the easiest to identify (i.e. low-hanging fruit) sources. A 20% reduction in I/I would result in an average seasonal reduction in flow to the WRF of 19 million gallons, which would result in an annual average savings of \$30,800. Over a 20-year period the City would save approximately \$616,000 in treatment costs. This estimated treatment cost savings alone could provide justification for smoke testing of approximately half of the City's sewer collection system (3 out of 6 defined sewer basins), purchasing and installing 5 portable flow meters, and limited expenditures to complete targeted repairs to remove sources of I/I identified by these efforts. Ongoing flow metering (using the new portable flow meters and Magnolia Lift Station flows) can be used to measure and quantify the success of the program.

The Magnolia Lift Station currently has a firm (reliable) pumping capacity of 9.42 MGD with the largest pump out of service, the emergency diesel pump in service, and allowing for surcharging up to elevation 82.5 in the influent Magnolia Trunk Sewer. Improvements to the pumping capacity would be required to support additional flows from the South Entry and Fitch Mountain areas, which add 1.22 MGD of additional PWWF. Assuming a 20% reduction in existing I/I through the aforementioned activities is attained, it would result in a reduction of the peak I/I flow rate by approximately 1.5 MGD, as the current 10-year/24-hour peak I/I rate is approximately 7.5 MGD. This 20% reduction would eliminate the need for any future pumping upgrades at the Magnolia Lift Station to support Buildout, as the Buildout PWWF would be reduced from 10.8 MGD to 9.3 MGD which is within the station's current reliable capacity.

Unfortunately, the ultimate cost to achieve a given reduction in peak I/I for an individual sewer collection system cannot be known or even reliably estimated without a detailed analysis of complete system CCTV records, smoke testing results, and additional targeted micro-basin flow monitoring. There are many examples of highly successful I/I reduction efforts by public agencies, but also many examples of highly unsuccessful efforts. However, smoke testing and continuous flow monitoring are, in WWE's opinion, becoming standard best-practices for the long-term management of I/I and are recommended to be implemented by the City. At a minimum, an active I/I reduction program can help prevent I/I from worsening in the future and requiring even more capacity upgrades as existing infrastructure continues to deteriorate.

A flow chart depicting a typical on-going cyclical I/I reduction program is shown in Figure 8-5 below.

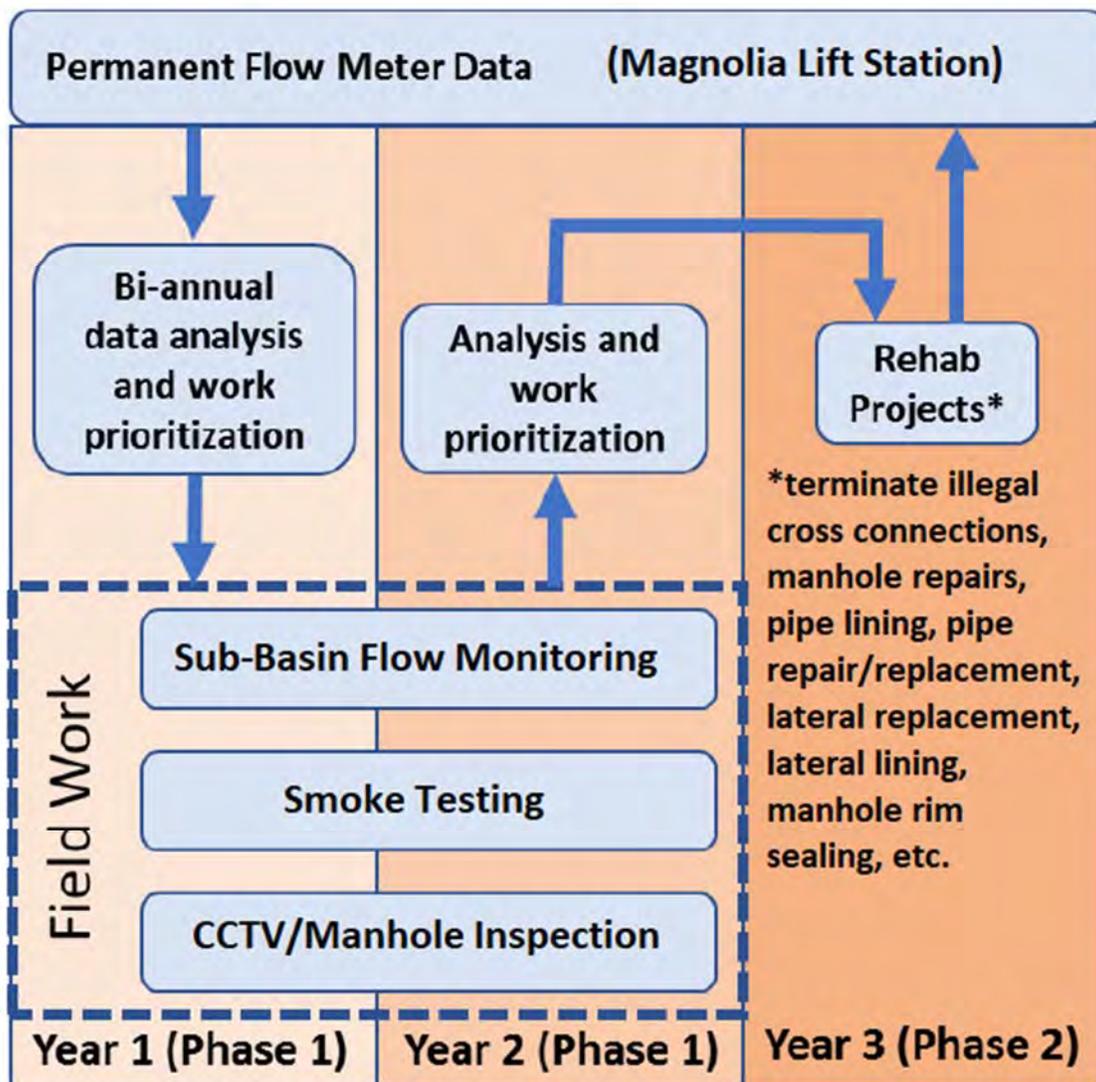


Figure 8-5: I/I Reduction Program Workflow

9 CAPITAL IMPROVEMENT PROGRAM

9.1 Projects Required under Existing and Near Term Conditions

The following section discusses the CIPs needed to mitigate hydraulic capacity deficiencies identified under Existing Conditions PWWF simulation results, as well as improvements at Magnolia Lift Station to extend the service life of that facility. Section 9.1.1 presents three alternative CIPs to mitigate the surcharging seen in the Lower North Trunk Sewer:

- Alternative 1: 21" Parallel Extension Open Cut
- Alternative 2: 24" Replace-in-Place Trunk Upsizing
- Alternative 3: 21" Parallel Extension Trenchless

Section 9.1.2 contains discussion of improvements to the Magnolia Lift Station.

9.1.1 Lower North Trunk Sewer Improvements

The hydraulic model results demonstrated that the Lower North Trunk Sewer was unacceptably surcharging under existing conditions and spilling under Near Term Development conditions. The Saggio Hills and Comstock developments are modeled as "Future Near Term Development", however both developments will be operational in coming years. Also, infill development and additional ADUs are being constructed on an ongoing basis. It would make little sense to design a capital improvement project only to handle existing condition peak flows when significant developments are only a few months or years from being completed. Therefore, the following CIPs have been designed to mitigate surcharging seen under Near Term Development PWWF conditions (excluding flows from the South Entry and Fitch Mountain areas).

Alternative 1: 21" Parallel Extension Open Cut

This CIP alternative involves extending the North Trunk Sewer from SSMH-691 to create a parallel line to the existing 16" slip lined pipe to mitigate surcharging in the Lower North Trunk Sewer to provide a minimum of 36" of freeboard. It appears that the extension of a parallel line was anticipated for the future when the North Trunk Sewer was originally designed because the as-built drawings show a capped 24" stub at SSMH-691 (labeled SSMH-2 on Figure 9-1 below which shows the as-built drawing of the end of the 21" North Trunk Sewer).

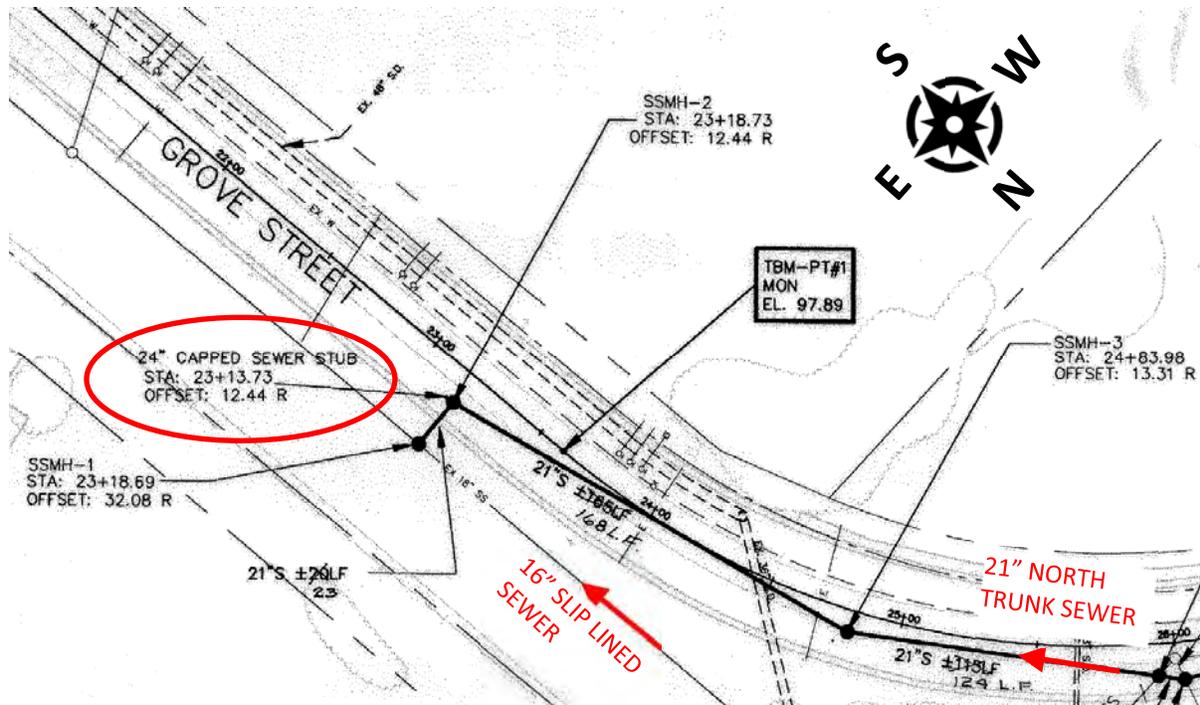


Figure 9-1: Capped Stub for Future Extension of North Trunk Sewer

The 21" sewer extension would include a manhole poured over the existing 8" line from west North Street and abandoning the 8" connection into existing SSMH-275. A custom manhole (or junction structure) would be poured over the existing 24" asbestos cement sewer line to connect the 21" extension and the top of the existing pipe would be cut out. This is feasible but would require hazardous materials provisions during construction. However, it can be done without any bypass pumping of the existing sewer lines.

A schematic of the proposed 21" sewer extension is shown in Figure 9-2.

Figure 1– Appendix E shows the hydraulic model results with this CIP implemented, and the resulting cessation of SSOs in this area while providing 42" freeboard between the HGL and lowest manhole.

It should be noted that the parallel extension pipe could be 24" instead of 21" with a minimal increase in cost, which would provide additional capacity if flows from Fitch Mountain were ever introduced to the collection system at North Street (refer to Section 9.2.1).

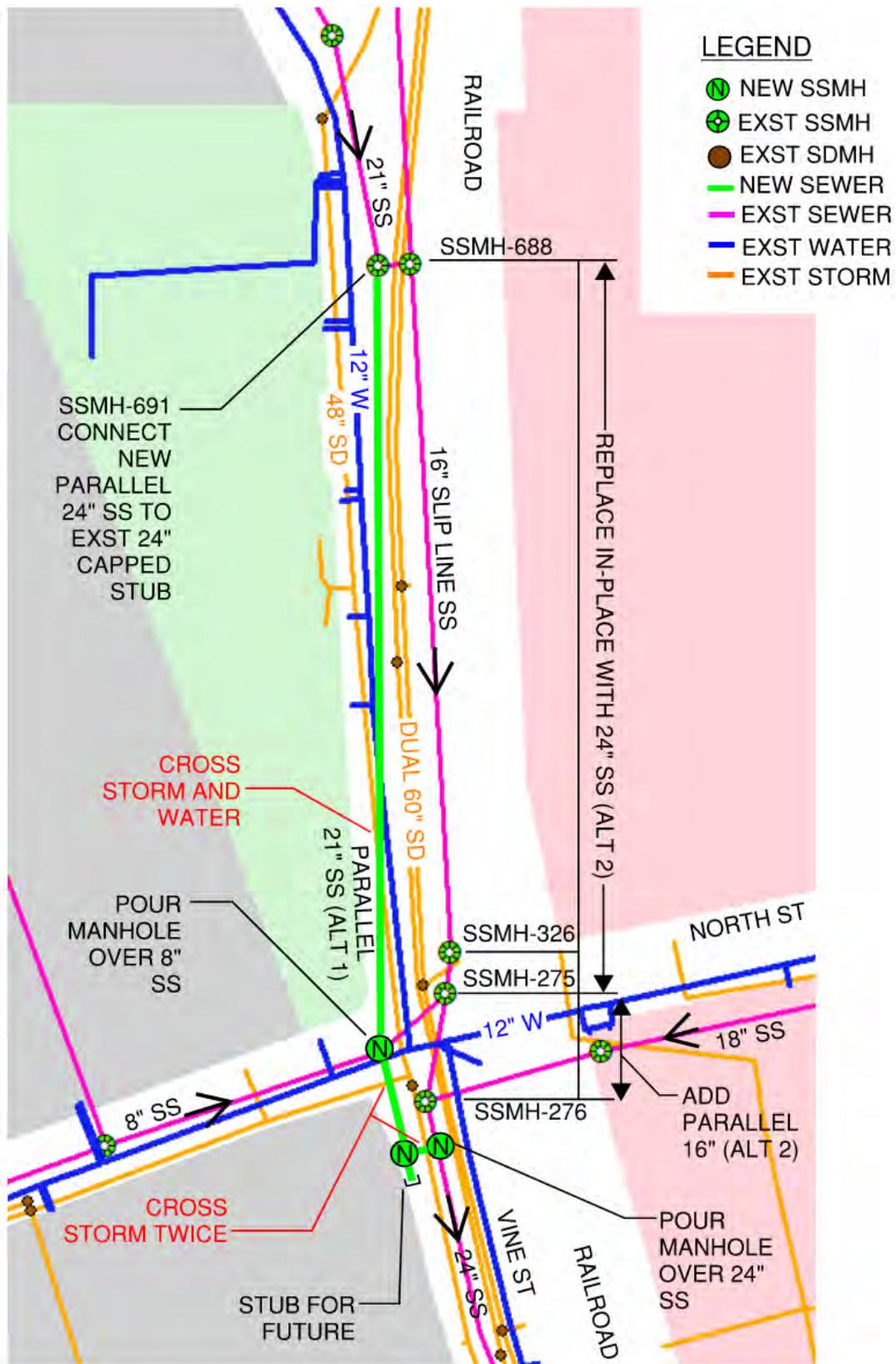


Figure 9-2: Lower North Trunk Sewer Alternatives 1 and 2



This 21" parallel extension project will be challenging to construct due to the presence of multiple large diameter underground utilities along Grove St/Vine St. The 24" sewer will need to cross under existing 12" water lines twice, and also under or over an existing 48" storm drain three times. The City's GIS also shows dual 60" storm drain lines in close proximity which may leave little to no room for the new 24" parallel sewer. Additionally, the sewer line would be nearly paralleling a 12" water line and would likely need to be bedded with controlled low strength material (CLSM) and a waiver obtained from the Department of Drinking Water (DDW) from standard sewer-water separation guidelines. DDW will typically grant waivers if the gravity sewer pipe is constructed of PVC pipe with pressure rated joints, is bedded in CLSM, and is installed a few feet below the pressurized water line.

Potholing and detailed review of the storm drain project as-builts would need to be completed to determine if the new 21" sewer line could feasibly be constructed along the alignment shown in Figure 9-2.

The alignment of the new pipe will be close to and possibly under the sidewalk south of North Street, requiring the sidewalk to be rebuilt including any utilities in the sidewalk such as street light electrical, cable/communications, etc.

A preliminary cost estimate for this alternative is provided in Table 9-1 below.

Table 9-1: 21" Parallel Extension Open Cut CIP Cost Estimate

Project Component	QTY	Unit	Unit Cost	Total Cost
21" PVC, 10-11' Depth (incl. shoring, CLSM backfill)	670	LF	\$400	\$268,000
Traffic Control	15	DAY	\$2,000	\$30,000
Utility Crossings (Support Exst Pipe)	5	EA	\$10,000	\$50,000
Hazardous Materials - Cut Exst 24" ACP	1	LS	\$20,000	\$20,000
5' Dia Manholes ~11' Deep	3	EA	\$20,000	\$60,000
Paving (12' wide)	8,040	SF	\$15	\$120,600
Sidewalk Repair	300	SF	\$25	\$7,500
Sidewalk Utility Repair	1	LS	\$25,000	\$25,000
Construction Subtotal 1				\$581,100
Conceptual Level Design Contingency			30%	\$174,330
Construction Cost Estimate				\$755,430
Design and Construction Management			25%	\$188,858
Project Total Budget				\$944,288

The above estimate assumes that 12' wide road repaving is completed above the pipe.

A capped stub-out would be left at the manhole upstream of the connection to the existing 24" trunk line so that the new parallel line could be readily extended further down Vine Street in the future if deemed necessary.

Alternative 2: Replace-in-Place Upsizing

This CIP alternative involves the excavation and removal of two existing 16" slip lined pipe segments from SSMH-688 to SSMH-275 (refer to Figure 9-2). These two pipe segments would be replaced by 24" pipe segments. Between SSMH-275 to SSMH-276, a second parallel 16" line would be installed next to the existing pipe due to an existing storm drain crossing. The existing 16" slip lined host pipe was originally installed directly underneath an existing storm drain pipe in concrete encasement, as shown below in Figure 9-3 (Sheet 10 of the North Street Trunk Sewer as-built drawings). The 48" pipe may have subsequently been replaced by the dual 60" storm drain pipes shown in Figure 9-2. The clearance between the sewer and storm drain lines is unknown and therefore dual 16" lines are assumed to be necessary as the clearance may not exist to support a 24" sewer line undercrossing.

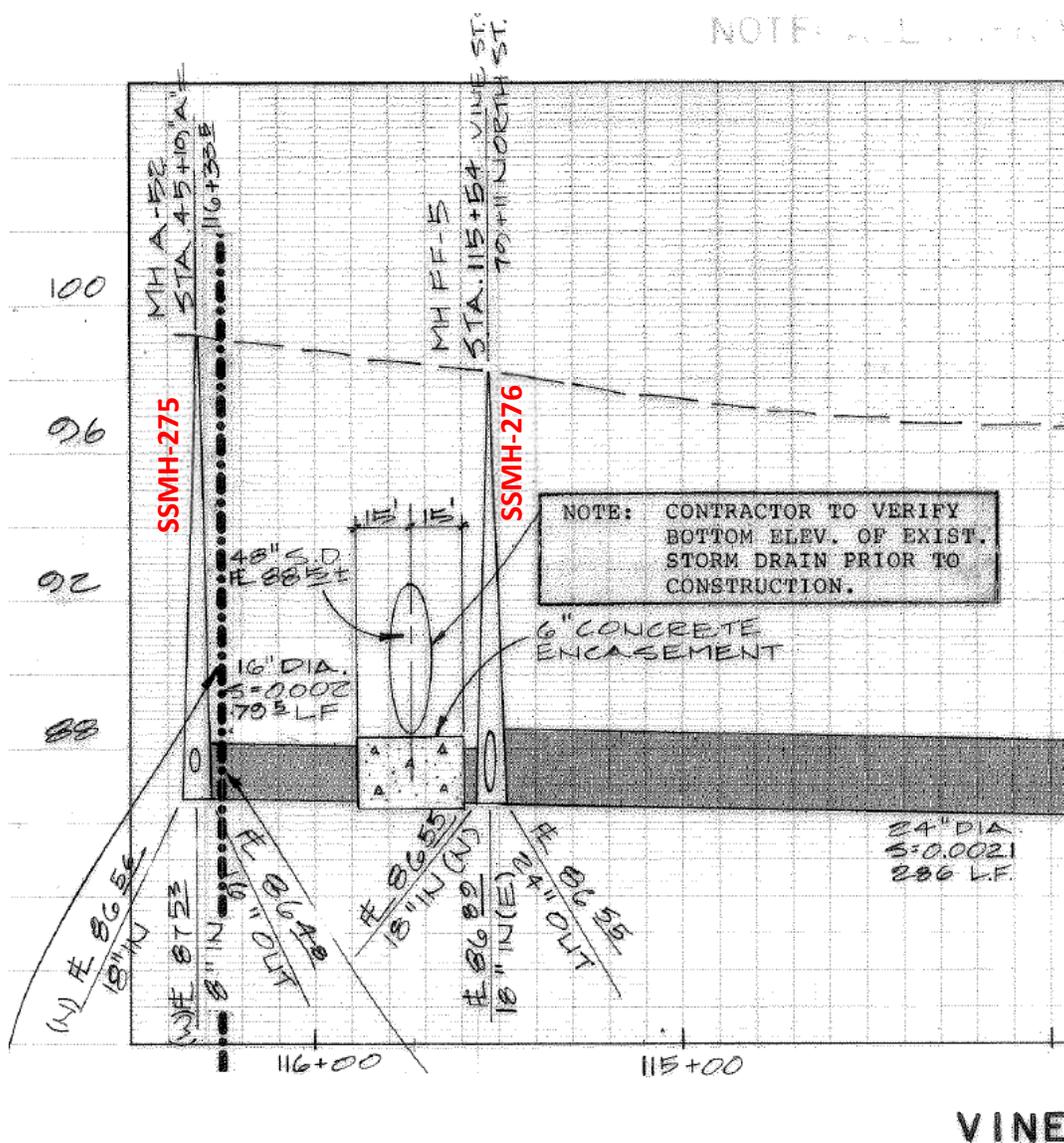


Figure 9-3: Existing 48" Storm Drain Utility Crossing at Vine/North Street Intersection

Figure 2– Appendix E shows the hydraulic model results with this CIP implemented, and the resulting cessation of SSOs in this area while providing 38” freeboard between the HGL and lowest manhole.

While the Replace-in-Place alternative is feasible, there are multiple challenges to overcome. The two pipe segments that would be excavated and removed are Asbestos Concrete Pipe (ACP) which requires hazardous materials provisions during construction. Also, a majority of the project would require excavation and reconstruction of the nicely landscaped and relatively new Foss Creek pedestrian walking path. Lastly, this project would necessitate temporary sewer bypass pumping of the existing sewer lines, adding a considerable amount of cost to the project. A preliminary cost estimate for this project is provided in **Table 9-2** below.

Table 9-2: 24” Replace-in-Place Upsizing CIP Cost Estimate

Project Component	QTY	Unit	Unit Cost	Total Cost
24" PVC, 10-11' Depth (incl. shoring, backfill)	521	LF	\$400	\$208,400
16" PVC, 10-11' Depth (incl. shoring, backfill)	78	LF	\$300	\$23,400
Traffic Control	5	DAY	\$2,000	\$10,000
Utility Crossings (Support Exst Pipe)	3	EA	\$10,000	\$30,000
Hazardous Materials - Demo Exst ACP	520	LF	\$100	\$52,000
5' Dia Manholes ~11' Deep	3	EA	\$20,000	\$60,000
Junction Structure Replacing SSMH-276	1	EA	\$40,000	\$40,000
Paving (12' wide)	1,296	SF	\$15	\$19,440
Pedestrian Walkway Repair	4,920	SF	\$25	\$123,000
Pedestrian Walkway Landscaping Repair	9,840	SF	\$12	\$118,080
Pedestrian Walkway Utility Repair	1	LS	\$100,000	\$100,000
Sewer Bypass Pumping (with redundancy)	15	DAY	\$10,000	\$150,000
Construction Subtotal 1				\$934,320
Conceptual Level Design Contingency			30%	\$280,296
Construction Cost Estimate				\$1,214,616
Design and Construction Management			25%	\$303,654
Project Total Budget				\$1,518,270

Alternative 3: 21” Parallel Extension Trenchless or Open Cut

This CIP alternative involves installing a parallel 21” line next to the existing 16” slip lined pipe within the Foss Creek Pathway. According to the City GIS, there appears to be approximately 20 feet between the existing sewer pipe and the edge of the railroad right-of-way which would be adequate to install a new 21” sewer line. Refer to Figure 9-4 below.

The approximately 500 linear foot section paralleling the existing 16” line from SSMH-688 to SSMH-326 could potentially be installed using trenchless bore-and-jack methodology in order to minimize the impact on the Foss Creek Pathway. 500 linear feet is the typically accepted practical limit on length for large diameter bore-and-jack installations.

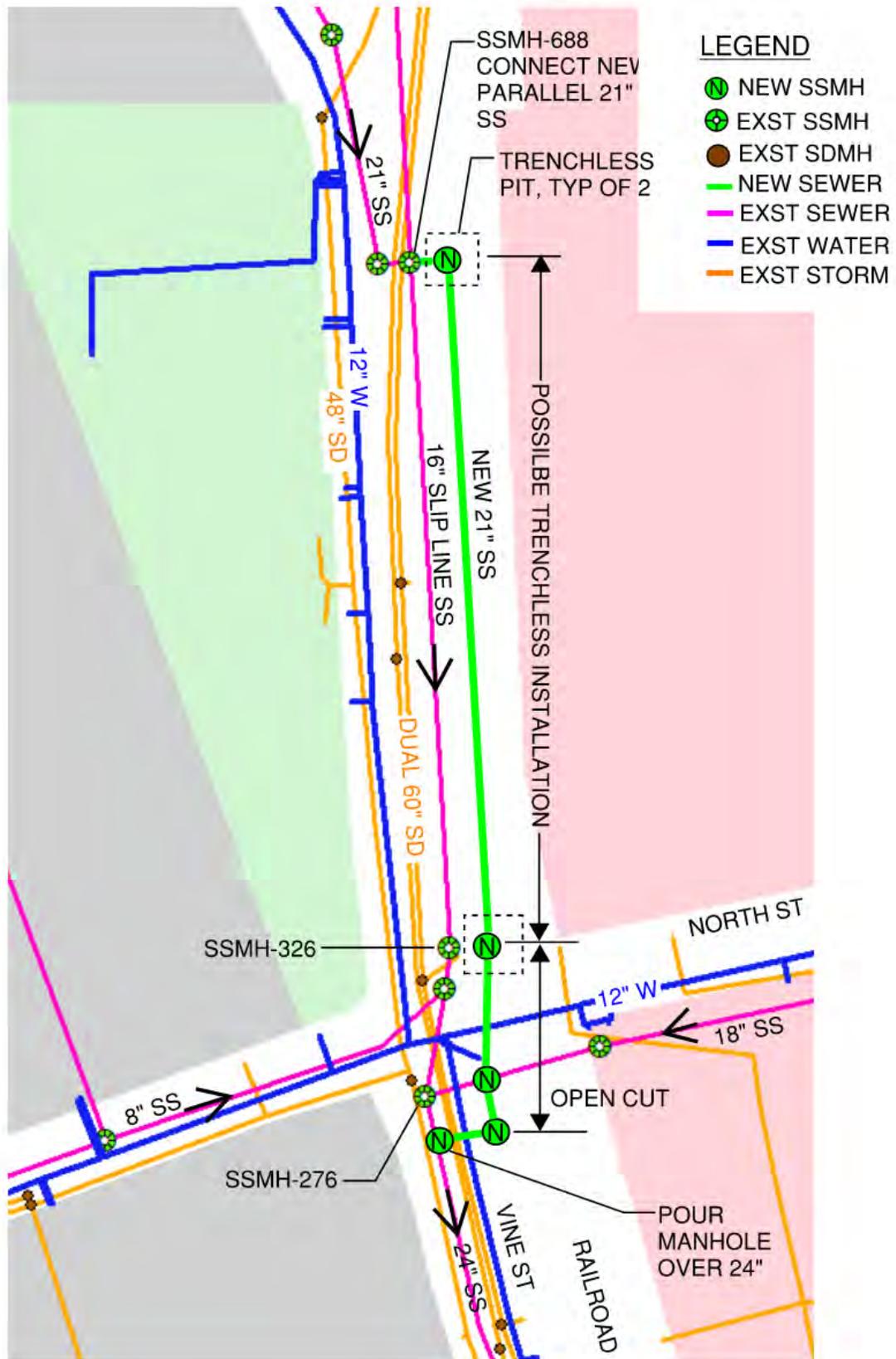


Figure 9-4: Lower North Trunk Sewer Alternative 3



A preliminary cost estimate for this alternative is provided in Table 9-3 below. The trenchless installation would require installation of jacking and receiving pits, which would still cause some disruption to the Foss Creek Pathway. Additionally, a steel casing would first be installed, with the PVC pipe then installed inside of it. The remainder of the alignment would still be open cut construction across North Street, and crossing of the existing 12” water line and dual 60” storm drain lines would still need to be navigated. The estimated cost for trenchless installation is higher than to replace the existing pipe in place using open cut construction. If trenchless construction were to be pursued, geotechnical field work and investigations would be needed to confirm the feasibility of trenchless methods based on soil and rock conditions.

Table 9-3: 21” Parallel Trenchless CIP Cost Estimate

Project Component	QTY	Unit	Unit Cost	Total Cost
Jacking Pit	15	VF	\$15,000	\$225,000
Receiving Pit	15	VF	\$5,000	\$75,000
Bore and Jack Steel Casing	500	LF	\$960	\$480,000
Install 21" PVC Pipe in Steel Casing	500	LF	\$200	\$100,000
21" PVC, 10-11' Depth (incl. shoring, backfill)	160	LF	\$400	\$64,000
Traffic Control	5	DAY	\$2,000	\$10,000
Utility Crossings (Support Exst Pipe)	4	EA	\$10,000	\$40,000
Hazardous Materials - Cut Exst 24" ACP	2	LS	\$20,000	\$40,000
5' Dia Manholes ~11' Deep	5	EA	\$20,000	\$100,000
Paving (12' wide)	960	SF	\$15	\$14,400
Pedestrian Walkway Repair	400	SF	\$25	\$10,000
Pedestrian Walkway Landscaping Repair	800	SF	\$12	\$9,600
Pedestrian Walkway Utility Repair	1	LS	\$25,000	\$25,000
Construction Subtotal 1				\$1,193,000
Conceptual Level Design Contingency			30%	\$357,900
Construction Cost Estimate				\$1,550,900
Design and Construction Management			25%	\$387,725
Project Total Budget				\$1,938,625

The 21” parallel sewer along the Foss Creek Pathway alignment may be possible using open-cut construction, however the crossing of the existing dual 60” storm drains just south of North Street would need to be investigated. If found to be feasible, the cost of Alternative 3 would be similar to Alternative 1.

9.1.2 Magnolia Lift Station

The Near Term Development 10-year / 24-hour PWWF of 9.58 MGD, with includes additional flows from Saggio Hills, Comstock, and infill development within the next 0-10 years, is greater than the calculated 9.42 MGD reliable capacity of Magnolia Lift Station with surcharging to elevation 82.5 allowed in the wet well, one fixed pump out of service, and the emergency diesel pump in service. The Future Conditions Buildout PWWF including flows from South Entry is projected at 10.3 MGD, and up to 10.8 MGD include Fitch Mountain, assuming no reduction in existing levels of I/I from an active I/I reduction program.

It should be noted that according to the WRF's NPDES permit, the design capacity of the headworks coarse screening equipment is 9.6 MGD, through which all flow passes before any is diverted to the influent equalization pond.

Water Works recommends that the City pursue an I/I reduction program with the goal that the 10-yr/24-hour PWWF to Magnolia Lift station does not exceed 9.4 MGD under any future development scenario. This will prevent the need to increase pumping capacity at Magnolia Lift Station in the future, unless the City is interested in providing higher horsepower pumps so that 9.4 MGD can be pumped without the need to surcharge the wet well. It will also prevent the need to increase the capacity of the WRF headworks screens.

Pump Station Electrical Considerations

If the City is interested in providing higher horsepower pumps when the existing pumps are eventually replaced, changing all the pumps to 75 horsepower would provide adequate pumping capacity for up to 9.4 MGD with only 3 of the 4 fixed pump in service while maintaining the design water surface elevation of 64.0 in the Magnolia Lift Station wet well. The required design point is 2,150 gpm @ 98' as compared to the current peak operational point of 1,400 gpm @ 85' for the existing 60HP pumps. A pump selection was made using Wilo USA's pump selection software, and the best available model was the EMU FA15.97Z (75 HP).

The pump station electrical infrastructure was updated in 2017 when Pump # 3 was replaced. The station's one-line diagram is shown in **Figure 3 – Appendix E**. The existing electrical service is 600A 3-phase 480V. Load calculations for the existing pump station to determine ability to upgrade all 4 pumps from 60 to 75HP are provided in Table 9-4 below. The peak load scenario assumes the following:

- All four pumps are 75 HP and operating during peak flow
- The two 3HP hoists are not operating during a peak flow event
- Both 5HP muffin monster grinders are in operation during a peak flow event
- The 5HP well pump is non-operational
- The two 1HP sump pumps are operating
- All lights and exhaust fans are operating
- Both 15 kW heaters are running





Table 9-4: Magnolia Lift Station Load Calculation

LOAD CALCULATIONS									
LOAD DESCRIPTION	CONNECTED LOAD			DEMAND LOAD			GENERATOR LOAD		
	LOAD	QTY	TOTAL	LOAD	QTY	TOTAL	LOAD	QTY	TOTAL
75 HP PUMP	96.00 A	2	159,625.8 VA	96.00 A	2	159,625.8 VA	96.00 A	2	159,625.8 VA
75 HP PUMP	96.00 A	2	159,625.8 VA	96.00 A	2	159,625.8 VA	96.00 A	1	79,812.9 VA
5 HP MUFFIN MONSTER GRINDER	7.60 A	2	12,637.0 VA	7.60 A	2	12,637.0 VA	7.60 A	2	12,637.0 VA
1 HP SUMP PUMP	1.80 A	2	2,993.0 VA	1.80 A	2	2,993.0 VA	1.80 A	1	1,496.5 VA
15 KW UNIT HEATER	36.08 A	2	30,000.0 VA	36.08 A	2	30,000.0 VA	36.08 A	2	30,000.0 VA
PEDESTAL DIST. BREAKERS 120/240	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA
PANELBOARD LP 120/240	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA
PANELBOARD LP 120/208	18.46 A	1	15,351.0 VA	14.77 A	1	12,280.8 VA	14.77 A	1	12,280.8 VA
PANELBOARD PP 277/480	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA
TOTAL LOAD =	457.35 A	<	380,232.6 VA	453.66 A	<	377,162.4 VA	355.86 A	<	295,853.0 VA
LOAD CORRECTION FACTORS									
LARGEST MOTOR LOAD x 25%:									
75 HP HP => 0.25 x	79,812.9 VA	=	24.00 A	19,953.2 VA	24.00 A	19,953.2 VA	GENERATOR SIZE NAMEPLATE = 400 KW 500 KVA @ TEMP OF 100 deg F ELEVATION OF 800 FT ASL DERATED SIZE = 390.8 KW 488.5 KVA AMPERAGE = 588 A @ 0.8 PF UTILIZATION % = 68 % @ 0.90 PF		
80% BREAKER DERATING =	TOTAL x 0.25 =		120.34 A	100,046.5 VA	119.41 A	99,278.9 VA			
FOR CONTINUOUS LOADS NEC 210-20									
SERVICE SIZE (MIN) =	601.69 A		500,232.3 VA	597.07 A		496,394.6 VA			
UTILITY SERVICE =	600 AMP								
480 V, 3 PHASE, 4 WIRE									

Given the above assumptions, the estimated connected load is 601 amps compared to the 600 amp service including an 80% breaker derating for continuous loads. The estimated demand load is 597 amps, with some uncertainty around the peak demand load from the 120/208V Panelboard LLPA which powers some miscellaneous equipment, ventilation fans, and generator 120V equipment. WWE’s assessment is that the 600A electrical service and 400kW generator are still acceptably sized as shown in the load calculation to support four 75HP pumps, particularly considering only three of them should need to operate simultaneously. A caveat to this is that it is unknown whether some improvements on the electrical utility side might be required to service the additional load.

If it were discovered that nuisance tripping was occurring at peak load, a solution to this would be to install an additional control circuit in the 15KW heater starters that would shut down the heaters in the case that multiple 75HP pumps are called to run.

Pump Station Building Rehabilitation

The pump station structure/building was constructed in 1970 and is now 50 years old. The wet well and sub-structure are generally in good condition for their age, however signs of corrosion are beginning to show with isolated areas of concrete damage and exposed rebar.

The building is constructed of pre-cast concrete panels with exposed aggregate surface and the roof is cast-in-place concrete with an asphalt roofing overlay.

The photos presented below depict areas of degradation that need to be addressed in order to extend the life of the facility into the foreseeable future.



CONCRETE FLOOR CORROSION AND REBAR BEGINNING TO BE EXPOSED



WET WELL CONCRETE CORROSION AND DELAMINATION



ASPHALT ROOFING OVERLAY IN NEED OF REPLACEMENT



ENTRANCE CANOPY IN NEED OF REPLACEMENT

General facility rehabilitation/repair efforts that are recommended include:

- Prepare and coat pump station concrete floors with protective non-slip coating
- Replace wooden entrance canopy
- Replace asphalt roof overlay
- Abrasive blast areas of concrete damage, coat exposed rebar with epoxy, apply repair mortar
- Apply Hydrogen Sulfide Resistant Epoxy Mortar Coating (Tnemec Perma-Shield Series 434 or similar) to wet well above elevation 60.0 (above the active water surface).
- Apply protective maintenance coating to interior pump station electrical room and dry pit areas.
- Replace minor mechanical components that are corroded including pipe supports, sump pump equipment, etc.

Table 9-5: Magnolia Lift Station Upgrades Phase 1

	Item	Quantity	Unit	Unit Cost	Labor Cost	Total Cost
Mechanical Piping and Valves						
1	Replace Misc. Mechanical Equipment/Piping	1	ls	\$25,000	included	\$25,000
2	Replace Corroded Hardware / Pipe Supports	1	ls	\$5,000	included	\$5,000
						\$30,000
Structural						
3	Prepare and coat pump station concrete floors with protective non-slip coating	1850	sf	\$20	included	\$37,000
4	Replace entrance canopy	1	ls	\$15,000	included	\$15,000
5	Replace roof overlay	1000	sf	\$20	included	\$20,000
6	Abrasive blast areas of concrete damage, coat exposed rebar with epoxy, apply repair mortar	100	sf	\$200	included	\$20,000
7	Apply Hydrogen Sulfide Resistant Epoxy Mortar Coating to wet well above elev. 60.0	3000	sf	\$30	included	\$90,000
8	Apply protective maintenance coating to interior pump station electrical room & dry pit	5500	sf	\$8	included	\$44,000
						\$226,000
Project Subtotal 1						\$256,000
	Pre-Design Contingency			30%		\$76,800
Project Subtotal 2						\$332,800
	Overhead, General Conditions, Bonds, Insurance, Profit			20%		\$66,560
Opinion of Probable Construction Cost						\$399,360
	Construction Drawings and Specifications			16%		\$63,898
	Construction Management			9%		\$35,942
Total Project Cost						\$499,200



If in the future, the City decides to upgrade the existing 60HP pumps to 75HP, a cost estimate for these “Phase 2” improvements is provided below.

Table 9-6: Magnolia Lift Station Upgrades Phase 2

	Item	Quantity	Unit	Unit Cost	Labor Cost	Total Cost
Mechanical Piping and Valves						
1	New Pump Suction/Discharge Piping	4	ea	\$15,000	included	\$60,000
2	Paint Piping	1	ls	\$5,000	included	\$5,000
						\$65,000
Equipment						
3	75HP Dry Pit Submersible Pump	4	ea	\$50,100	\$16,600	\$217,000
						\$217,000
Electrical, Instrumentation, Controls						
4	New 75HP VFD	4	ea	\$35,000	\$32,000	\$172,000
5	Misc Electrical	1	ls	\$10,000	\$16,000	\$26,000
6	Control Modifications & Programming Updates	1	ls	\$10,000	included	\$10,000
						\$208,000
Project Subtotal 1						\$490,000
	Pre-Design Contingency			30%		\$147,000
Project Subtotal 2						\$637,000
	Overhead, General Conditions, Bonds, Insurance, Profit			20%		\$127,400
Opinion of Probable Construction Cost						\$764,400
	Construction Drawings and Specifications			16%		\$122,304
	Construction Management			9%		\$68,796
Total Project Cost						\$955,500

9.2 Projects Required under Future Buildout Conditions

There are no additional impacts to the existing sewer collection system if flows from the South Entry Area and Fitch Mountain Area are routed through force mains to SSMH-233 at the southern end of Healdsburg Ave as shown in **Figure 2 – Appendix D**. However, if flow from Fitch Mountain were to be delivered to alternate locations as described in Section 9.2.1 below, additional impacts would be triggered.

9.2.1 Fitch Mountain Gravity Sewer

A conceptual level estimate to sewer Fitch Mountain including gravity sewers, laterals, 3 lift stations, and a ~10,000-LF force main which transmits flow south of the Healdsburg Avenue Roundabout as shown in **Figure 2 – Appendix D** is shown in Table 9-7 below.

Table 9-7: Fitch Mountain Gravity Sewer Cost Estimate

Project Component	QTY	Unit	Unit Cost	Total Cost
8" Gravity Sewer (Paving Not Included)	23,760	LF	\$125	\$2,970,000
10" Gravity Sewer (Paving Not Included)	1,400	LF	\$150	\$210,000
4' Dia Manholes	72	EA	\$7,500	\$539,143
Sewer Laterals	372	EA	\$7,500	\$2,790,000
Fitch Mountain Lift Stations #1,2,3	3	EA	\$850,000	\$2,550,000
4" Forcemain (Lift Stations #3,2) (Paving Not Included)	7,900	LF	\$65	\$513,500
6" Forcemain (Lift Station #1) (8' Wide Repave Included)	10,000	LF	\$210	\$2,100,000
Traffic Control (Assume Production = 500 ft/day)	86	DAY	\$2,000	\$172,240
Construction Subtotal 1				\$11,844,883
Design, Permitting, Construction Management			25%	\$2,961,221
Construction Subtotal 2				\$14,806,104
# of Fitch Mountain Area Homes				372
Infrastructure Cost per Home				\$39,801
City Sewer Impact Fee				10,000
Total Sewer Cost Per Home				\$49,801

The above estimate does not include repaving of the gravity sewer trenches in roadways, and assumes that the sewer project would be coordinated with a required re-paving cycle of the Fitch Mountain area roadways. Recent photos of South Fitch Mountain Road indicate that the roadway surface is generally fairly deteriorated and therefore the cost of resurfacing, which would be substantial, should not be considered as triggered by a gravity sewer project.

Fitch Mountain Alternative Discharge Location Impacts

An alternative to the ~10,000-LF force main which transmits flow south of the Healdsburg Avenue Roundabout as shown in **Figure 2 – Appendix D** is to discharge at SSMH-385 on South Fitch Mountain Road one manhole upstream of where Heron Lift Station discharges as shown on **Figure 1 – Appendix F**. **Figure 2 – Appendix F** shows the hydraulic grade line impact on the North Street main of 350 gpm additional flow added by the Fitch Mountain lift station if discharging at the same location as Heron Lift Station. The North Street Main downstream of Heron Lift Station was essentially flowing at capacity already, and the Fitch Mountain Flow causes surcharging up to approximately 3'-0" above the crown of

the pipe downstream of the lift station discharge, with less than 3'-0" of free board available at SSMH-129 which is a shallow manhole that is only 3'-3" deep.

Another alternative is to locate the main Fitch Mountain lift station on the north side of Fitch Mountain with a 4,100-LF force main which discharges at SSMH-37 on N. Fitch Mountain Road. The disadvantage of this option is that SSMH-37 has an invert elevation of 388' ASL, which requires 50-HP pumps. **Figure 3 – Appendix F** shows the hydraulic grade line impact on Powell Street downstream of SSMH-37. Up to 1'-6" of surcharging is created along Powell Avenue with 3'-3" of freeboard remaining at SSMH-153.

Both of these alternatives have similar impacts on North Street downstream of SSMH-183 since flows from Powell Street are routed down 1st Street and merge with the North Street main at SSMH-183. **Figure 4 – Appendix F** shows the hydraulic profile of the existing North Street sewer to Vine Street. Surcharging occurs to within 2'-11" of the surface at SSMH-412. Note that the results shown in this profile assume that the three segments of existing 16" slip lined pipe between SSMH-691 and SSMH-276 in Vine Street have already been improved (replaced-in-place) with 24" and dual 16" sewer to relieve the bottleneck in that area, however the 24" trunk running down Vine Street south of the North Street intersection is still somewhat undersized and causes surcharging that affects the 18" North Street sewer.

9.2.2 Potential Lower North Trunk CIP Enhancements

If either of the alternative discharge locations discussed above are eventually utilized, the Fitch Mountain Area flow would run down the North Street sewer and contribute additional flow to the area of hydraulic capacity restriction at Vine Street. The capital improvement project alternatives described in Section 9.1.1 limit surcharging to no more than 36" from the ground surface along Grove and Vine Street without Fitch Mountain sewer flow. With the addition of Fitch Mountain sewer flow, surcharging is increased very close to the 36" freeboard criterion such that consideration should be given to extending sewer trunk line improvements further south along Vine Street beyond the North Street intersection, particularly if I/I reduction efforts prove to be unsuccessful in offsetting potential Fitch Mountain sewer flow.

Extending the sewer trunk line improvements would also serve to reduce surcharging in this critical trunk sewer and reduce the City's risk of a high-volume SSO.

Figure 5, Figure 6, and Figure 7 – Appendix F show additional upsizing of existing 24" trunk pipe segments to new 30" pipe segments to downstream manholes SSMH-274, SSMH-273, and SSMH-272, respectively. Vine Street is congested with existing large diameter utilities including the dual-60" storm drains, another 48" storm drain, and a 12" water line. Therefore, replace-in-place with bypass pumping is assumed to be required. Upsizing the existing Vine Street sewer from SSMH-276 to SSMH-272 greatly reduces the level and extent of surcharging in the trunk and connecting tributary lines.

Cost estimates to upsize additional existing 24" trunk pipe segments from SSMH 276 to downstream manholes SSMH-274, SSMH-273, and SSMH-272 are shown below in Table 9-8, Table 9-9, and Table 9-10.

Table 9-8: Replace-in-Place Vine St. Trunk Upsizing CIP Cost Estimate SSMH-276 to SSMH-274

Project Component	QTY	Unit	Unit Cost	Total Cost
30" PVC, 11-12' Depth (incl. shoring, backfill)	287	LF	\$490	\$140,630
Traffic Control	10	DAY	\$2,000	\$20,000
Hazardous Materials - Demo Exst 24" ACP	287	LF	\$100	\$28,700
Paving (12' wide)	3,444	SF	\$15	\$51,660
5' Dia Manholes ~11' Deep	1	EA	\$20,000	\$20,000
Sewer Bypass Pumping	5	DAY	\$10,000	\$50,000
Construction Subtotal 1				\$310,990
Conceptual Level Design Contingency			30%	\$93,297
Construction Cost Estimate				\$404,287
Design and Construction Management			25%	\$101,072
Project Total Budget				\$505,359

Refer to **Figure 5 – Appendix F**.

Table 9-9: Replace-in-Place Vine St. Trunk Upsizing CIP Cost Estimate SSMH-276 to SSMH-273

Project Component	QTY	Unit	Unit Cost	Total Cost
30" PVC, 11-12' Depth (incl. shoring, backfill)	540	LF	\$490	\$264,600
Traffic Control	15	DAY	\$2,000	\$30,000
Hazardous Materials - Demo Exst 24" ACP	540	LF	\$100	\$54,000
Paving (12' wide)	6,480	SF	\$15	\$97,200
5' Dia Manholes ~11' Deep	2	EA	\$20,000	\$40,000
Sewer Bypass Pumping	10	DAY	\$10,000	\$100,000
Construction Subtotal 1				\$585,800
Conceptual Level Design Contingency			30%	\$175,740
Construction Cost Estimate				\$761,540
Design and Construction Management			25%	\$190,385
Project Total Budget				\$951,925

Refer to **Figure 6 – Appendix F**.

Table 9-10: Replace-in-Place Vine St. Trunk Upsizing CIP Cost Estimate SSMH-276 to SSMH-272

Project Component	QTY	Unit	Unit Cost	Total Cost
30" PVC, 11-12' Depth (incl. shoring, backfill)	909	LF	\$490	\$445,410
Traffic Control	20	DAY	\$2,000	\$40,000
Hazardous Materials - Demo Exst 24" ACP	909	LF	\$100	\$90,900
Paving (12' wide)	10,908	SF	\$15	\$163,620
5' Dia Manholes ~11' Deep	3	EA	\$20,000	\$60,000
Sewer Bypass Pumping	15	DAY	\$10,000	\$150,000
Construction Subtotal 1				\$949,930
Conceptual Level Design Contingency			30%	\$284,979
Construction Cost Estimate				\$1,234,909
Design and Construction Management			25%	\$308,727
Project Total Budget				\$1,543,636

Refer to **Figure 7 – Appendix F**.

Discussion of Improvements Triggered by Fitch Mountain

It is uncertain whether Fitch Mountain would ever be required in the future to connect to the City of Healdsburg’s sewer collection system. If it is, decisions would need to be made regarding where to discharge flow from Fitch Mountain into the existing City sewer collection system.

If Fitch Mountain Flow were to be discharged to either North Street or North Fitch Mountain Road as shown in **Figure 1 – Appendix F**, an evaluation would need to be made as to whether improvements in the existing system would be triggered such as at North Street, Powell Street, and/or Vine Street as discussed above based on more detailed sizing and design of the Fitch Mountain sewer collection system as well as current existing collection system I/I levels and peak flows (based on current flow monitoring data). Modeling of Fitch Mountain flows through these areas indicated impacts that increase surcharging near the borderline hydraulic capacity trigger of within 3’-0” of the surface.

For comparison, the shorter required 5,400-LF force main needed to discharge Fitch Mountain Flow to North Street with the Heron Lift Station discharge would save approximately \$1.2M in cost vs. constructing a 10,000-LF force main to be routed south down Front Street to discharge with the South Entry Area lift station force main. The \$1.2M in savings could be spent to upsize sections of the 24” Vine Street trunk line to offset surcharging caused by the additional Fitch Mountain flow.

However, given that the connection of Fitch Mountain is uncertain and possibly many years in the future, no capital improvement projects to accommodate Fitch Mountain flows are included in the capital improvement program at this time. The addition of Fitch Mountain to the City’s sewer collection system would bring approximately \$3.72M in sewer system capacity impact fees that could be used to make improvements to the North Street and/or Vine Street trunk sewer should they be deemed necessary at that time.

9.3 Capital Improvement Program Recommendations

The recommended sewer collection system hydraulic capacity Capital Improvement Program is summarized in Table 9-11 below.

Table 9-11: Capital Improvement Project Summary

Project #	Description	2020 Cost	Notes and Schedule
1	Replace-in-Place Upsizing from SSMH-688 to SSMH-276 (670-LF)	\$1.52M	Start planning/design in 2021. Refer to Figure 9-2 and Table 9-2: 24" Replace-in-Place Upsizing CIP Cost Estimate.
2	Magnolia Lift Station Improvements Phase 1	\$0.50M	Start planning/design in 2021. Refer to Table 9-5.
3	I/I Reduction Program for Basins #1, #4, #5	\$0.73 M	Start program in 2021. Refer to Section 8.4.
Total Near-Term Capital Project Cost		\$2.75 M	

Due to the concerns around the construction feasibility of extending a parallel pipe south from the end of the 21" North Trunk Sewer at SSMH-691, WWE has included the cost of Alternative 2 to replace-in-place the existing 16" slip lined sewer from SSMH-688 to SSMH-276 (intersection of Vine Street and North St) in the Capital Improvement Program. The Phase 1 facility rehabilitation improvements to Magnolia Lift Station are also included to ensure that the lifespan of the structure can be extended far into the future.

WWE also recommends that the City initiate an I/I reduction program to reduce surcharging along the Grove/Vine Street trunk sewer so that further replacement of existing 24" sections of pipe with 30" diameter pipe downstream of SSMH-276 is not necessary in the future and flows from Fitch Mountain could potentially be accommodated as well. An I/I reduction program would also ensure that I/I levels do not continue to increase even further beyond the already elevated levels identified in this study due to ongoing infrastructure deterioration and that I/I levels and peak flows are monitored and analyzed on at least a semi-annual basis. I/I reduction could also prevent the need for future pumping capacity improvements at Magnolia Lift Station.

The installation of 30" diameter sewer downstream of SSMH-276 in Vine Street and Magnolia Lift Station Phase 2 Improvements (providing increased pumping capacity) could be triggered in the future by the development of the South Entry and/or Fitch Mountain areas, however may not be necessary if significant reductions in I/I can be made in the existing collection system that offset the additional flows from these developments. If triggered, the cost of these projects should be assessed to the newly connected customers through sewer impact fees and not to existing City ratepayers.

9.3.1 Integration with Overall Sewer Collection System Capital Improvement Plan

The capital improvement projects listed in Table 9-11 above should be integrated into the City's overall capital improvement plan (CIP) for the sewer collection system which includes projects required to repair gravity piping and lift stations that are in deteriorating conditions based on the results of the City's ongoing CCTV inspection program and lift station survey program. The repair of damaged or failing gravity sewers identified through CCTV inspection will contribute to the City's I/I reduction program.



10 APPENDICES



Appendix A – Sewer System Figures

Figure A-1: City of Healdsburg Sewer System Map

Legend

Sewer Features

- PS Lift Station
- SSMH
- SSCO
- SSMH Private

Sewer Mains

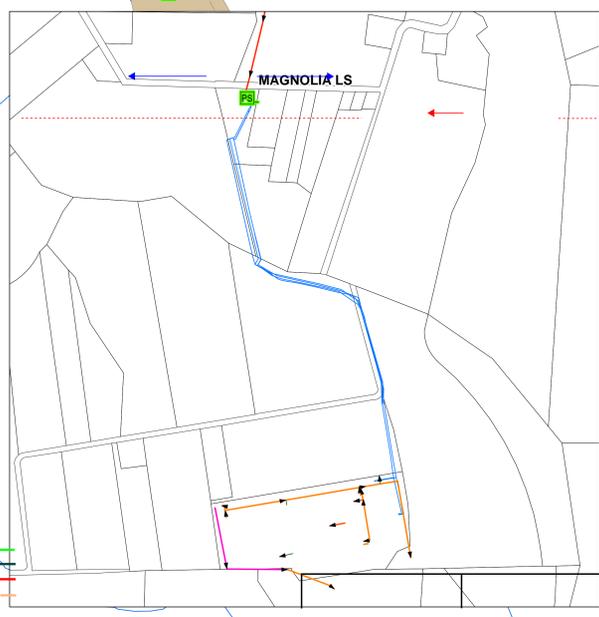
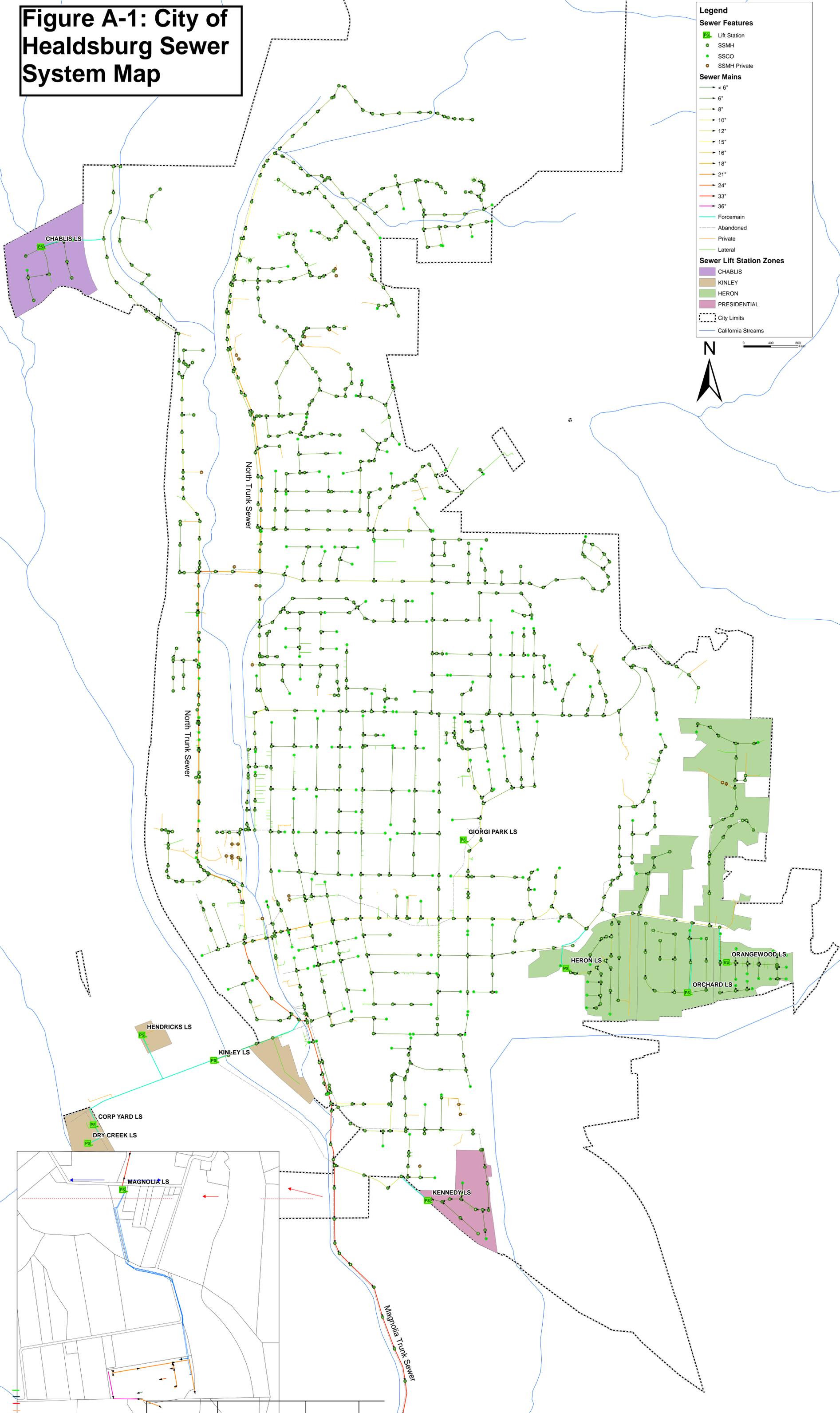
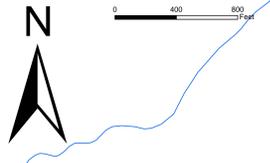
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- 6"
- 8"
- 10"
- 12"
- 15"
- 16"
- 18"
- 21"
- 24"
- 33"
- 36"
- Forcemain
- Abandoned
- Private
- Lateral

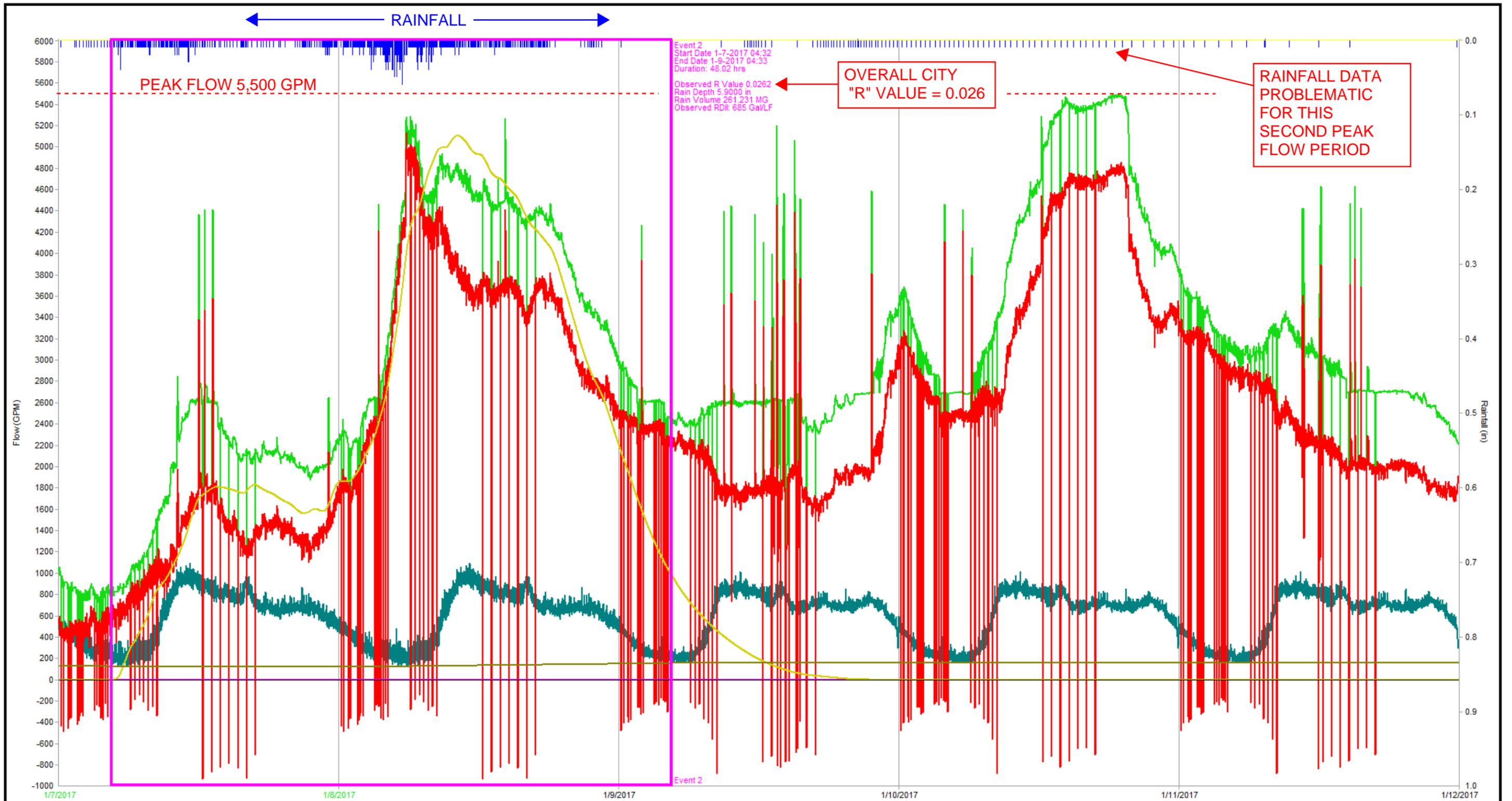
Sewer Lift Station Zones

- CHABLIS
- KINLEY
- HERON
- PRESIDENTIAL

City Limits

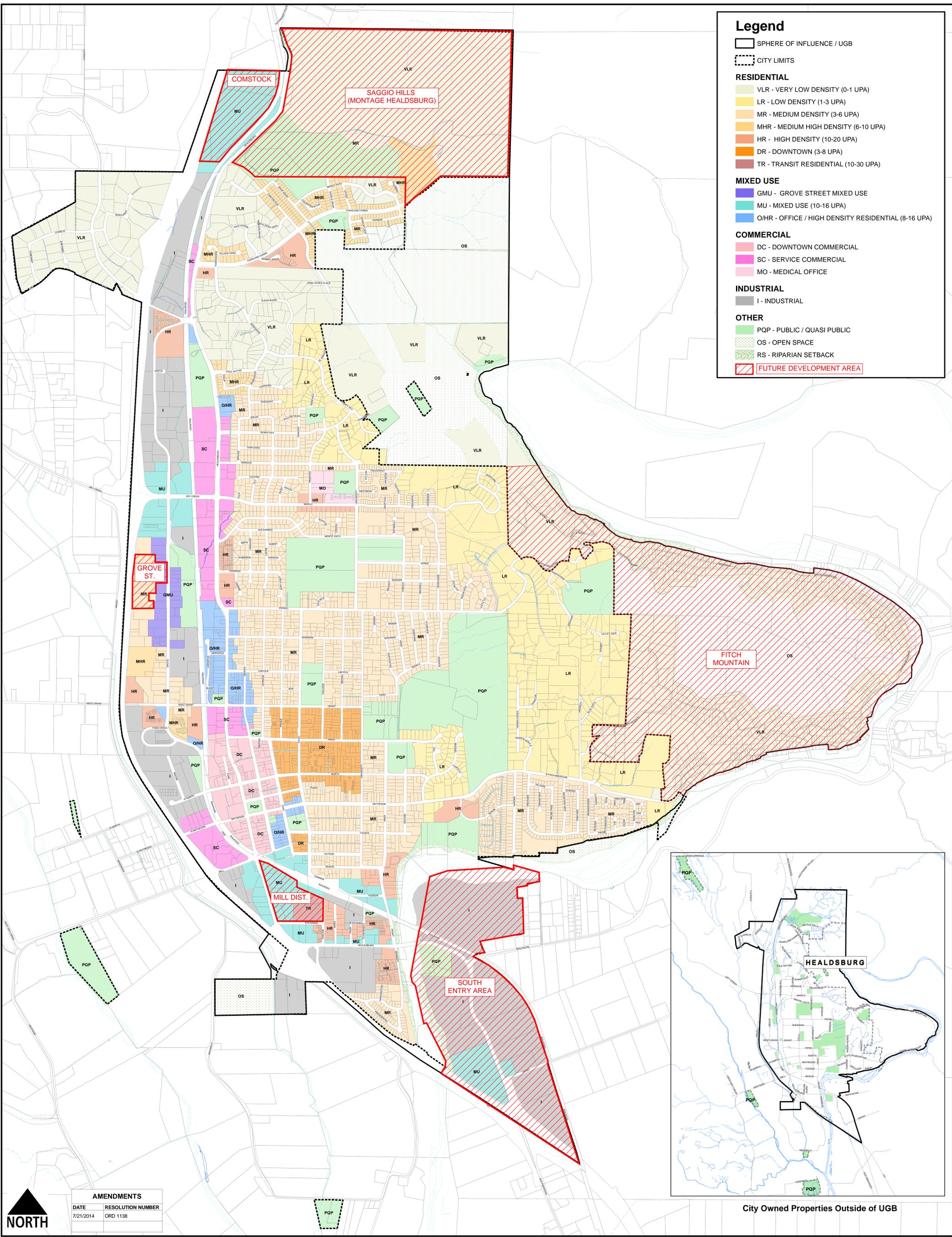
California Streams





LEGEND

—	MAGNOLIA LS FLOW
—	MAGNOLIA LS AVERAGE DRY WEATHER FLOW
—	I/I FLOW (MEASURED FLOW LESS ADWF)
—	PROJECTED I/I WITH RTK UNIT HYDROGRAPH



Legend

- SPHERE OF INFLUENCE / UGB
- CITY LIMITS
- RESIDENTIAL**
 - VLR - VERY LOW DENSITY (0-1 UPA)
 - LR - LOW DENSITY (1-3 UPA)
 - MR - MEDIUM DENSITY (3-6 UPA)
 - MHR - MEDIUM HIGH DENSITY (6-10 UPA)
 - HR - HIGH DENSITY (10-20 UPA)
 - DR - DOWNTOWN (3-8 UPA)
 - TR - TRANSIT RESIDENTIAL (10-30 UPA)
- MIXED USE**
 - GMU - GROVE STREET MIXED USE
 - MU - MIXED USE (10-16 UPA)
 - OHR - OFFICE / HIGH DENSITY RESIDENTIAL (8-16 UPA)
- COMMERCIAL**
 - DC - DOWNTOWN COMMERCIAL
 - SC - SERVICE COMMERCIAL
 - MO - MEDICAL OFFICE
- INDUSTRIAL**
 - I - INDUSTRIAL
- OTHER**
 - PQP - PUBLIC / QUASI PUBLIC
 - OS - OPEN SPACE
 - RS - RIPARIAN SETBACK
 - FUTURE DEVELOPMENT AREA

AMENDMENTS	
DATE	RESOLUTION NUMBER
7/21/2014	ORD 1138



City Owned Properties Outside of UGB



Appendix B – Sewer Load Tables

<i>UseCodDesc</i>	<i>DUs_Current</i>	<i>TradeFlow</i>	<i>FAR</i>	<i>Persons/DU</i>
11-20 RES UNIT/1 STRUCTURE	15	0	0	2.25
21-40 UNITS	30	0	0	2.25
3 UNITS/2 OR MORE STRUCTURES	3	0	0	2.25
3-OR-MORE STORY OFFICE BLDG	0	1000	2	0
4 UNITS/2 OR MORE STRUCTURES	4	0	0	2.25
41-100 UNITS	75	0	0	2
5-10 RES UNITS/1 STRUCTURE	6	0	0	2.25
5-10 RES UNITS/2+ STRUCTURES	6	0	0	2.25
ALTERNATE USE	0	1000	0.5	0
ALTERNATE USE OFFICE BLDGS	0	1000	0.5	0
ASSISTED CARE FACILITY	0	2000	0.7	0
ATTACHED UNIT	1	0	0	2.5
AUTO & TRUCK REPAIR & MAINT	0	1500	0.5	0
AUTO SALES W/O SERVICE CENTER	0	500	0.25	0
AUTO SALES W/SERVICE CENTER	0	1500	0.5	0
BANK	0	1000	0.7	0
BEACH/WATERFRONT	0	0	0	0
BED & BREAKFAST INN	0	2000	0.5	0
BULK PLANT	0	1000	0.5	0
CEMETERY	0	0	0	0
CITY BUILDING	0	1000	0.7	0
CITY PARK/OTHER REC FACILITY	0	0	0	0
CITY PROP OUTSIDE CITY BOUNDS	0	0	0	0
CITY SHOP/YARD	0	1000	0.7	0
CLINIC	0	2000	0.7	0
CLUB/LODGE HALL	0	1500	0.7	0
COCKTAIL LOUNGE BAR	0	1500	0.7	0
COM'L COMMON AREA/NOT IN CTR	0	0	0	0
COM'L USE/NO OTHER CATEGORY	0	1000	0.5	0
COMMON AREA W/ROADS & STREETS	0	0	0	0
COMMON AREA WITH STRUCTURES	0	0	0	0
COMMON AREA WITHOUT STRUCTURES	0	0	0	0
COMMUNITY SHOPPING CENTER	0	1000	0.5	0
CONDOMINIUM UNIT	1	0	0	2.25
CONVALESCENT HOSPITAL	0	2000	0.7	0
CONVENIENCE STORE	0	1000	0.7	0
COOPERATIVE	0	1000	0.7	0
COUNTY BUILDING	0	1000	0.7	0
COUNTY FLOOD CONTROL/WTR AGCY		NO SEWER FLOW		
COUNTY HOSPITAL	0	2000	0.5	0
COUNTY PARK/OTHER REC FACILITY	0	0	0	0
DENTAL OFFICES	0	1500	0.7	0
DETACHED UNIT IN A PUD	1	0	0	2.5
DISCOUNT STORE	0	1000	0.7	0
DRIVE-IN RESTAURANT	0	1500	0.7	0
DUET	1	0	0	2.25

<i>UseCodDesc</i>	<i>DUs_Current</i>	<i>TradeFlow</i>	<i>FAR</i>	<i>Persons/DU</i>
ENFORCEABLY RESTRICTED APTS	COUNTED DWELLING UNITS FROM AERIAL PHOTO			
ENFORCEABLY RESTRICTED DWELLING	1	0	0	2.5
FARM OR CONST MACH SALES ONLY	0	0	0	0
FAST-FOOD RESTAURANT	0	1500	0.7	0
FIRE DISTRICT	0	1000	0.7	0
FULL SERVICE STATION	0	1500	0.7	0
GROCERY STORE	0	1000	0.5	0
HARDWOODS AND CHAPARRAL	0	0	0	0
HEALTH SPA OR CLUB	0	1000	0.5	0
HOTEL WITH RESTAURANT	0	2000	0.5	0
HOTEL WITHOUT RESTAURANT	0	2000	0.5	0
INDIV PCL WITHIN COMMUNITY CTR	0	1000	0.5	0
INDIV PCL/NEIGHBORHD SHOP CTR	0	1000	0.5	0
INDUSTRIAL COMMON AREA	0	0	0	0
IRRIGATED VINEYARD	0	0	0	0
IRRIGATED VINEYARD W/RESIDENCE	1	0	0	2.5
IRRIGATED VINEYD/PREMIUM VAR	0	0	0	0
LIGHT MANUFCTRG & WAREHOUSING	0	1000	0.5	0
LIGHT MANUFTG & INDUSTRIAL	0	1500	0.5	0
LIVE/WORK UNITS	1	0	0	2
LOT W/MISC RES IMPROVEMENTS	1	0	0	2.5
LUMBER MILL	0	1000	0.5	0
MANUFACTURED HOME CONDOMINIUM LOT	1	0	0	2
MANUFACTURED HOME ON URBAN LOT	1	0	0	2
MANUFACTURED HOME PARK	COUNTED DWELLING UNITS FROM AERIAL PHOTO			
MEDICAL DENTAL COMPLEX	0	1500	0.5	0
MEDICAL OFFICES	0	1000	0.5	0
MINI-WAREHOUSE	0	500	0.7	0
MISC COUNTY PROPERTY	0	1000	0.5	0
MISC MULTIPLE USE/NO DOMINATE	0	1000	0.5	0
MISC MULTIPLE USE/NONE DOMINAT	0	1000	0.5	0
MISCELLANEOUS CITY PROPERTY	0	1000	0.5	0
MISCELLANEOUS DISTRICT	0	1000	0.5	0
MISCELLANEOUS STATE PROPERTY	0	1000	0.5	0
MOTEL/50 UNITS OR LESS W/KIT	0	2000	0.7	0
MOTEL/LESS THAN 50 UNITS	0	2000	0.7	0
MOTEL/OVER 50 UNITS	0	2000	0.7	0
MULTI-OFFICES/RESIDENTIAL UNITS	0	1000	0.7	0
MULTIPLE COMBO/STORES & OFFICE	0	1000	0.7	0
MULTIPLE STORES IN 1 STRUCTURE	0	1000	0.7	0
MULTIPLE STORY STORE	0	1000	1	0
MUNICIPAL UTILITY PROPERTY	0	500	0.5	0
NEIGHBORHOOD SHOPPING CENTER	0	1000	0.5	0
NON-IRRIGATED VINEYARD	0	0	0	0
NON-IRRIGATED VINEYARD W/RES	1	0	0	2.5
OFFICE CONDOMINIUM UNIT	0	1000	0.5	0

<i>UseCodDesc</i>	<i>DUs_Current</i>	<i>TradeFlow</i>	<i>FAR</i>	<i>Persons/DU</i>
ONE DUPLEX (ONE STRUCTURE)	2	0	0	2.25
ONE STORE & ONE OFFICE	0	1000	0.7	0
ONE STORY DEPARTMENT STORE	0	1000	0.7	0
ONE STORY OFFICE BUILDING	0	1000	0.7	0
PARKING LOT/GARAGE (CITY)	0	0	0	0
PARKING LOT/NO FEE	0	0	0	0
PAROCHIAL SCHOOL	ESTIMATED STUDENTS BASED ON BLDG SIZE			
PASTURE	0	0	0	0
PASTURE WITH RESIDENCE	1	0	0	2.5
PRIVATE ROAD	0	0	0	0
PRIVATELY OWNED PARK	0	0	0	0
PROF'L OFF CONDO UNIT/NON-IND	0	1000	0.5	0
PROP USED ALONG W/REL BLDG	0	1000	0.5	0
RAW SUBDIVISION LAND	0	0	0	0
RELIGIOUS BUILDING	0	1000	0.7	0
RESORT MOTEL (CABINS, ETC)	0	2000	0.7	0
RESTAURANT	0	1500	0.7	0
RETAIL LUMBER YARD	0	1000	0.7	0
RETAIL NURSERY	0	1000	0.7	0
RIGHT-OF-WAY	0	0	0	0
RIVER/LAKE	0	0	0	0
ROOMING HOUSE, CONVENT, ETC	1	0	0	4
RURAL RES SFD W/GRANNY UNIT	1	0	0	3
RURAL RES W/MISC RES IMP	1	0	0	2.75
RURAL RES/2 OR MORE RES	2	0	0	2.75
RURAL RES/MANUFACTURED HOME	1	0	0	2.75
RURAL RES/SINGLE RES	1	0	0	2.75
RURAL RES/VACANT HOMESITE	0	0	0	0
SAND AND GRAVEL, SHALE	0	0	0	0
SBE-VALUED UTILITY	0	0	0	0
SCHOOL DISTRICT PROPERTY	ESTIMATED STUDENTS BASED ON ENROLLMENT			
SELF SERVICE CAR WASH	0	2000	0.7	0
SERVICE STATION / MINI-MART	0	1000	0.7	0
SFD CONVERTED TO RES CARE FAC	0	2000	0.7	0
SFD SECONDARY USE	0	1000	0.5	0
SFD W/GRANNY UNIT	1	0	0	3
SINGLE FAMILY DWELLING	1	0	0	2.65
SINGLE FOURPLEX	4	0	0	2.25
SINGLE STORY STORE	0	1000	0.7	0
SINGLE TRIPLEX 3 UNITS/1 STRUC	3	0	0	2.25
SPECIAL SCHOOL	ESTIMATED STUDENTS BASED ON ENROLLMENT			
SPECIALTY LUMBER PRODUCTS	0	1000	0.7	0
SPECIALTY SHOP (TIRES,BRAKES)	0	1000	0.7	0
STORE 1ST FLR/OTHER USE ON 2ND	1	1000	0.7	2
STORE W/RES UNIT OR UNITS	1	1000	0.7	2
SUPERMARKET	0	1000	0.7	0

<i>UseCodDesc</i>	<i>DUs_Current</i>	<i>TradeFlow</i>	<i>FAR</i>	<i>Persons/DU</i>
TAXABLE MANUFACTURED HOME/CONDO LOT	1	0	0	2.25
TIDELAND	0	0	0	0
TWO SFD ON SINGLE PARCEL	2	0	0	2.25
TWO STORY OFFICE BUILDING	0	1000	1	0
UNDEFINED INDUSTRIAL SHELL	0	1000	0.5	0
UNDEV INDUSTRIAL LND/NO UTIL	0	0	0	0
USED CAR LOT	0	500	0.7	0
UTILITY WATER COMPANY	NO SEWER FLOW			
VACANT CITY LAND	0	0	0	0
VACANT COMMERCIAL LND W/UTIL	0	0	0	0
VACANT COMMERCIAL LND/UNDEVEL	0	0	0	0
VACANT COUNTY LAND	0	0	0	0
VACANT FEDERAL LAND	0	0	0	0
VACANT INDUSTRIAL LND W/UTIL	0	0	0	0
VACANT LOT, MAY NOT BE BUILDABLE	0	0	0	0
VACANT LOT/TOTALLY UNUSABLE	0	0	0	0
VACANT LOTS ZONED APARTMENTS	0	0	0	0
VACANT RES LOT UNDEVEL W/UTIL	0	0	0	0
VACANT RESIDENTIAL LOT/UNDEVEL	0	0	0	0
VACANT STATE LAND	0	0	0	0
VETERINARY HOSPITALS	0	2000	0.7	0
WALK-IN THEATRE	0	1000	0.7	0
WAREHOUSING CONDOMINIUM	0	1000	0.7	0
WAREHOUSING YARD	0	1000	0.7	0
WAREHOUSING/ACTIVE	0	1000	0.7	0
WAREHOUSING/INACTIVE	0	1000	0.7	0
WASTELAND	0	0	0	0
WINERY	0	1500	0.5	0



Appendix C - Existing Conditions Hydraulic Model Results (with no CIPs)

Legend

MH Flood Depth (ft)

- Within 3 FT
- Within 1 FT
- Potential SSO

Pipe Max Surge (d/D)

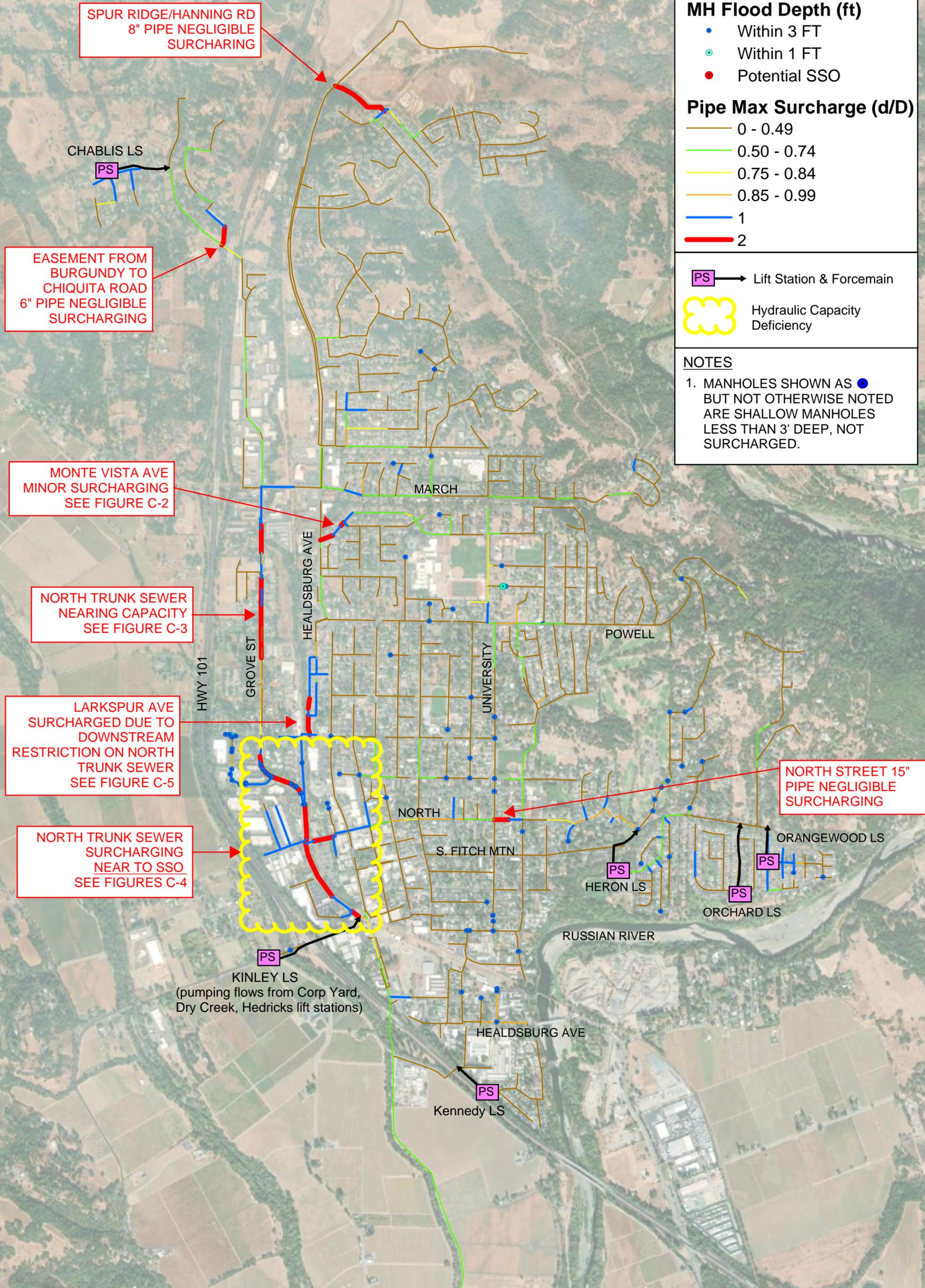
- 0 - 0.49
- 0.50 - 0.74
- 0.75 - 0.84
- 0.85 - 0.99
- 1
- 2

PS → Lift Station & Forcemain

 Hydraulic Capacity Deficiency

NOTES

1. MANHOLES SHOWN AS ● BUT NOT OTHERWISE NOTED ARE SHALLOW MANHOLES LESS THAN 3' DEEP, NOT SURCHARGED.



SPUR RIDGE/HANNING RD
8" PIPE NEGLIGIBLE
SURCHARGING

EASEMENT FROM
BURGUNDY TO
CHIQUITA ROAD
6" PIPE NEGLIGIBLE
SURCHARGING

MONTE VISTA AVE
MINOR SURCHARGING
SEE FIGURE C-2

NORTH TRUNK SEWER
NEARING CAPACITY
SEE FIGURE C-3

LARKSPUR AVE
SURCHARGED DUE TO
DOWNSTREAM
RESTRICTION ON NORTH
TRUNK SEWER
SEE FIGURE C-5

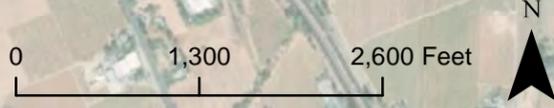
NORTH TRUNK SEWER
SURCHARGING
NEAR TO SSO
SEE FIGURES C-4

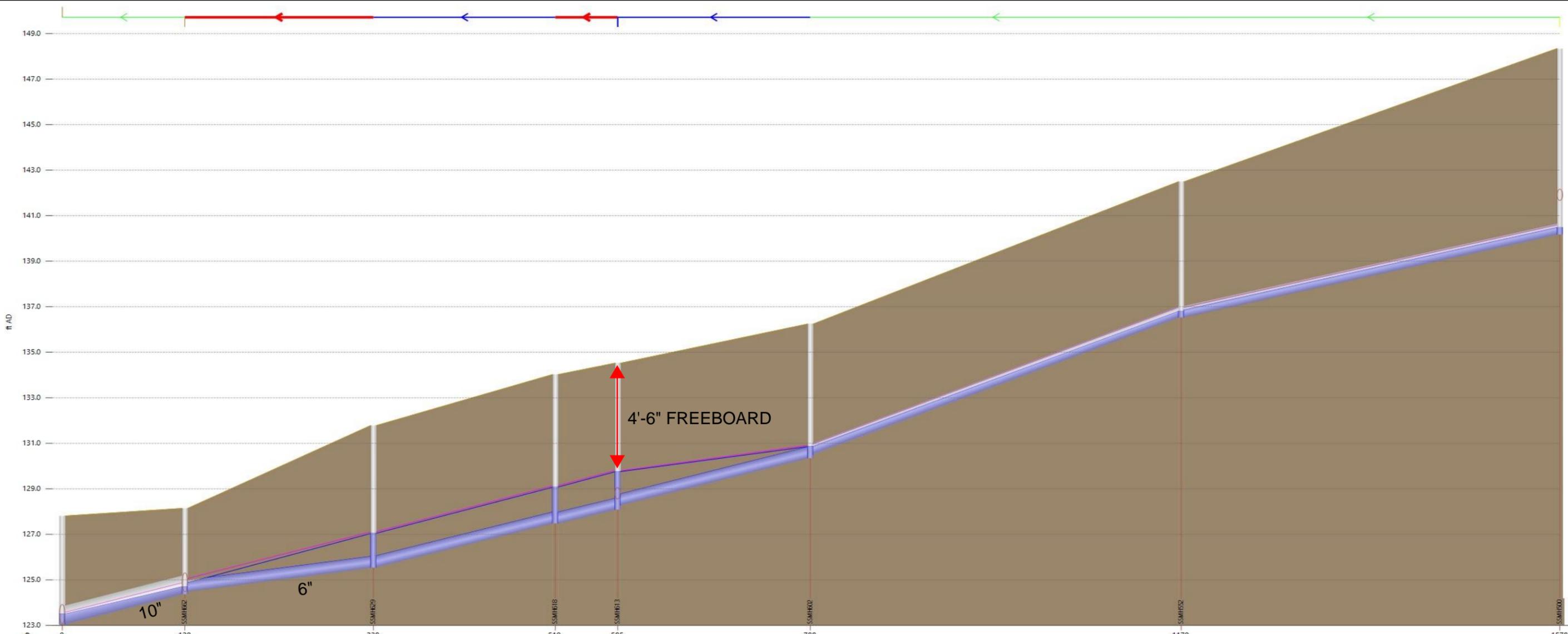
NORTH STREET 15"
PIPE NEGLIGIBLE
SURCHARGING

KINLEY LS
(pumping flows from Corp Yard,
Dry Creek, Hedricks lift stations)

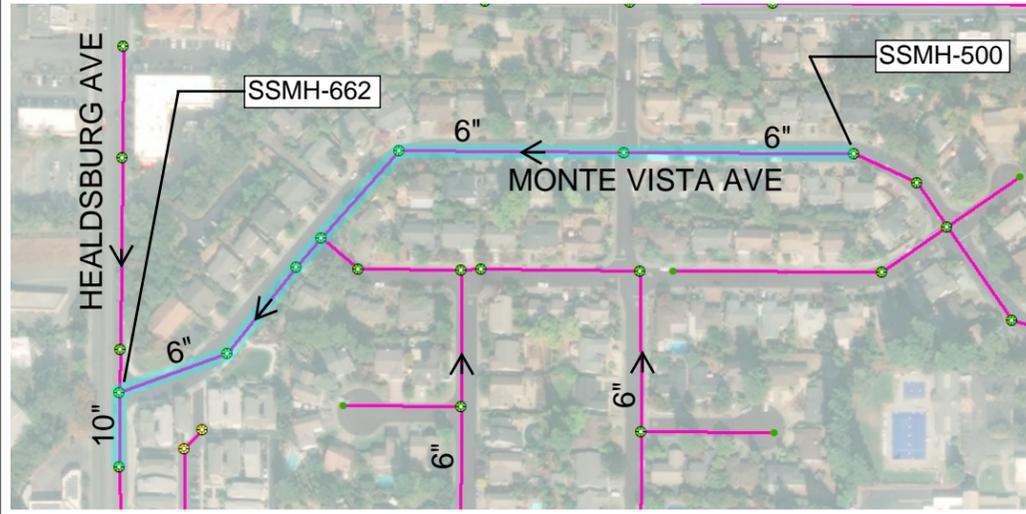
MAGNOLIA LS
PWWF = 8.9 MGD

Figure C-1
Existing Conditions PWWF
(10-Year/24-Hour Design Storm)





Link	SSMH662.1	SSMH629.1	SSMH618.1	SSMH613.1	SSMH602.1	SSMH552.1	SSMH500.1	
width (in)	10.0	6.0	6.0	6.0	6.0	6.0	6.0	
ds inv (ft AD)	123.060	124.490	125.560	127.480	128.280	130.520	136.540	
grad (%)	1.016	0.523	1.002	0.911	1.015	1.535	0.907	
DS flow (MGD)	0.4281	0.3630	0.3595	0.3537	0.2534	0.2435	0.2344	
DS velocity (ft/s)	2.279	3.448	2.434	2.943	2.902	3.404	2.793	
Node	SSMH661	SSMH662	SSMH629	SSMH618	SSMH613	SSMH602	SSMH552	SSMH500
ground (ft AD)	127.810	128.140	131.780	134.020	134.520	136.240	142.490	148.340



LEGEND

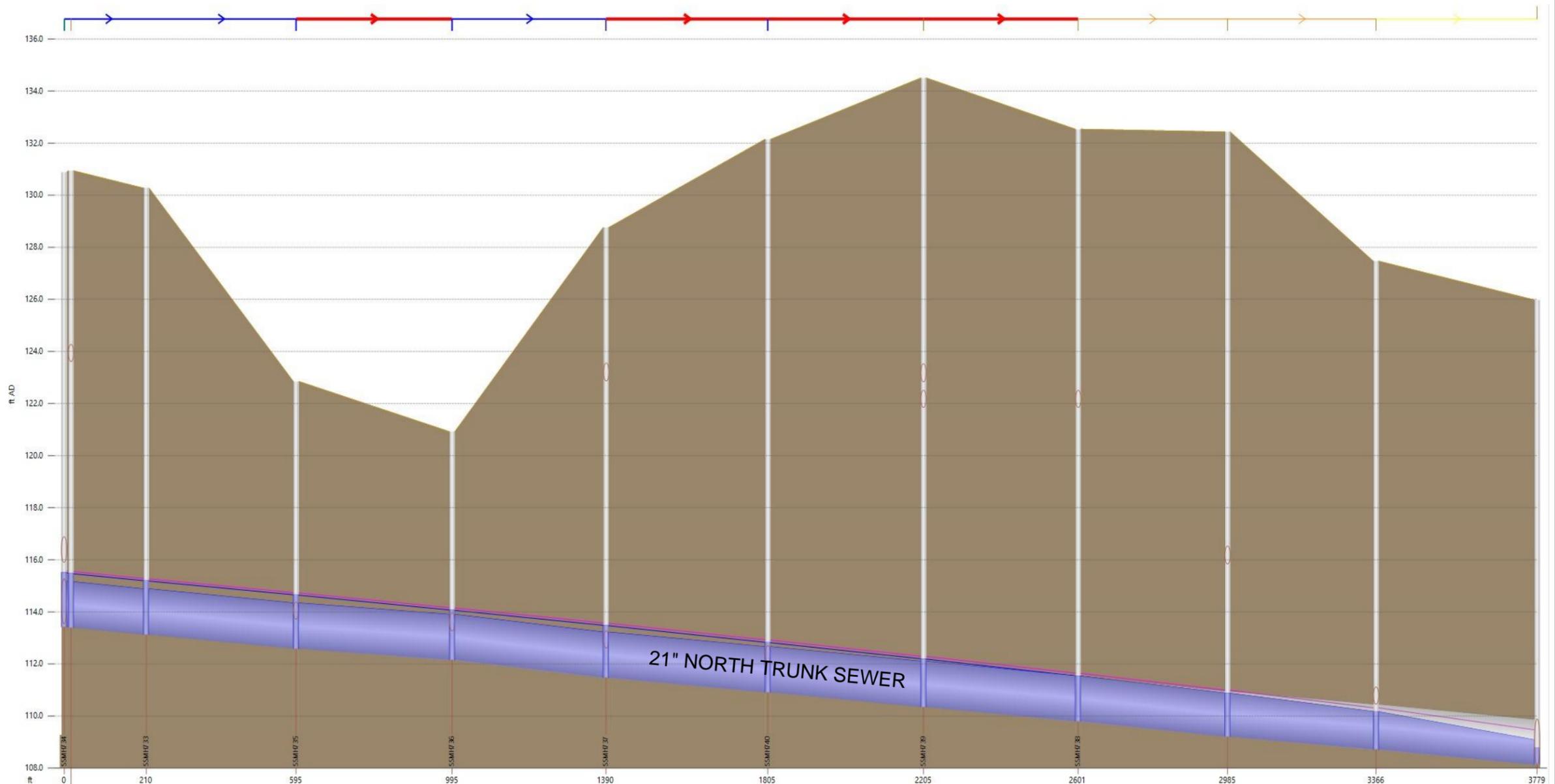
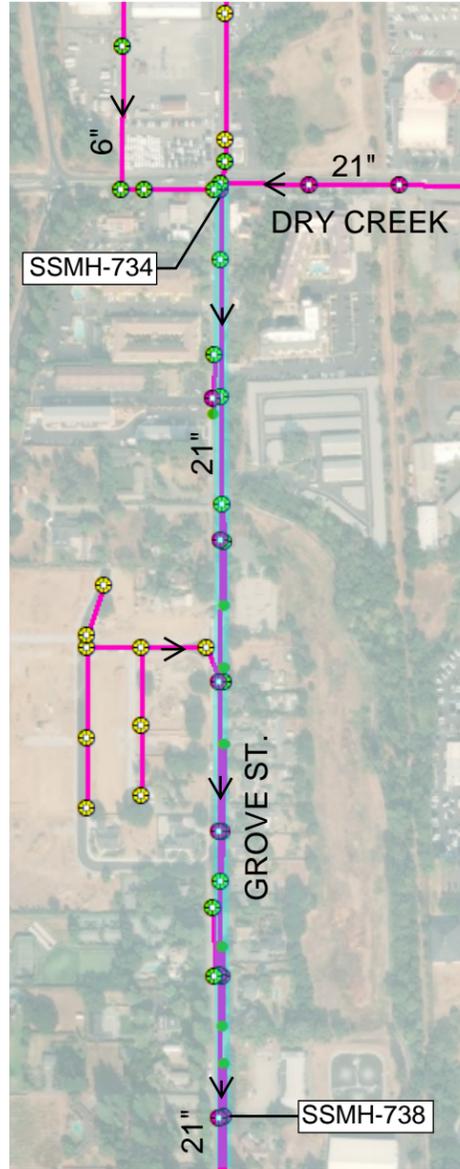
- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- \leftarrow FLOW DIRECTION
- EXIST SSMH
- EXIST CLEANOUT

CITY OF HEALDSBURG
SEWER SYSTEM
MASTER PLAN 2020

**EXISTING CONDITIONS PWWF
10-YR/24-HR DESIGN STORM
MONTE VISTA AVE**



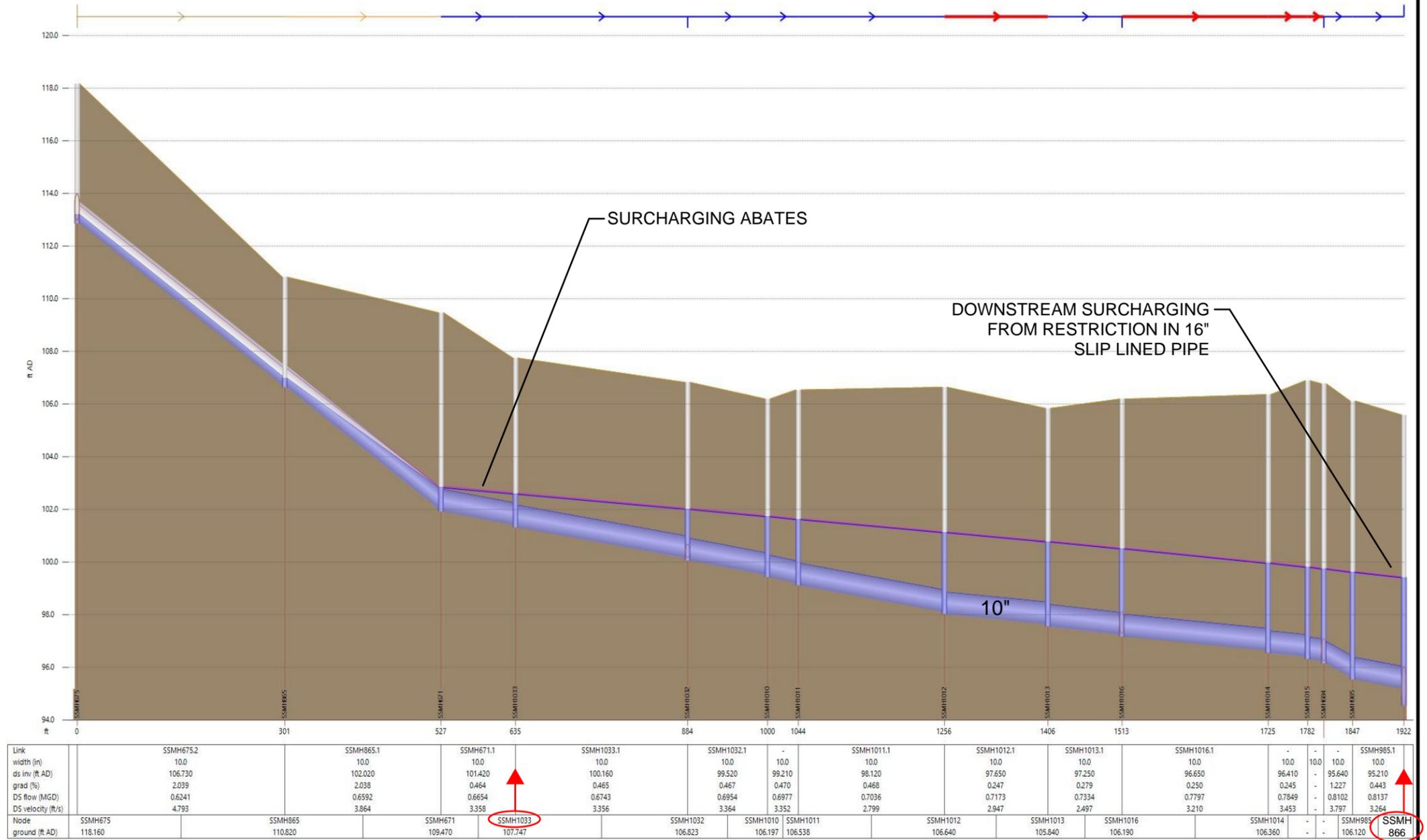
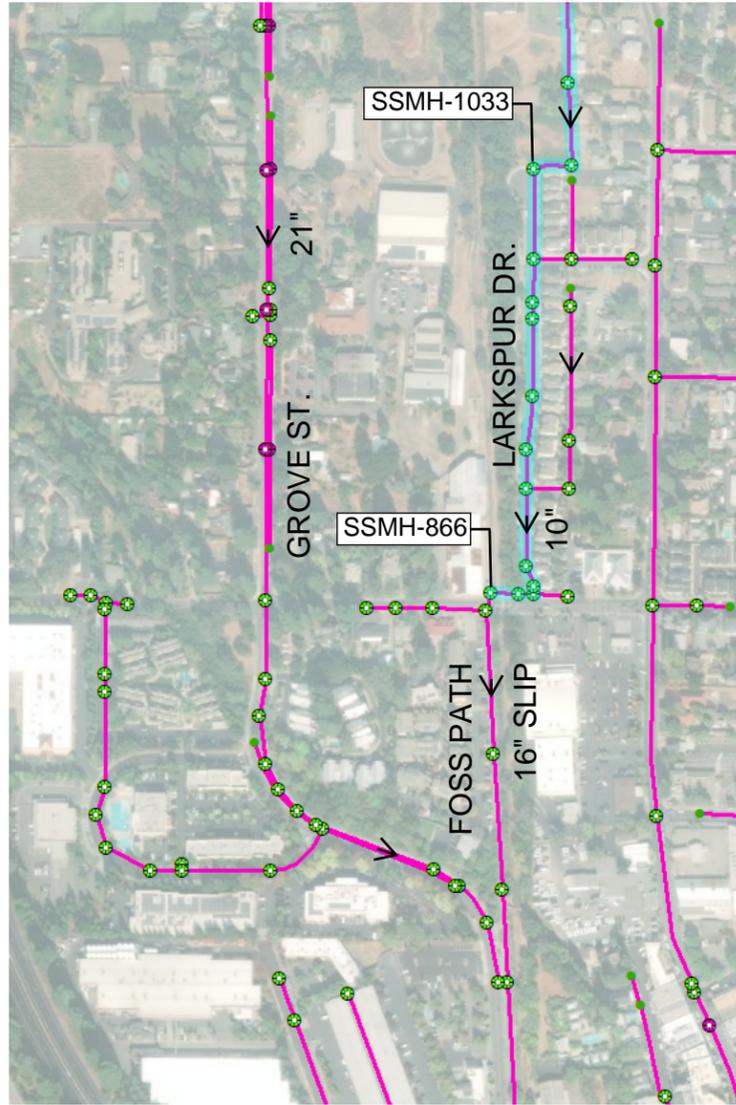
FIGURE C-2



Link	SSMH732.1	SSMH733.1	SSMH735.1	SSMH736.1	SSMH737.1	SSMH740.1	SSMH739.1	SSMH738.1	SSMH742.1	SSMH743.1	
width (in)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	
ds inv (ft AD)	113.130	112.590	112.150	111.470	110.910	110.350	109.790	109.210	108.710	108.130	
grad (%)	0.140	0.141	0.110	0.172	0.135	0.140	0.141	0.151	0.131	0.140	
DS flow (MGD)	3.7526	3.7777	3.8491	3.8996	3.9910	4.0105	4.1034	4.1596	4.2200	4.3215	
DS velocity (ft/s)	2.687	2.588	2.896	2.695	2.766	2.749	2.807	2.750	3.044	4.967	
Node	SSMH 734	SSMH733	SSMH735	SSMH736	SSMH737	SSMH740	SSMH739	SSMH738	SSMH742	SSMH743	SSMH745
ground (ft AD)	130.934	130.271	122.846	120.919	128.758	132.145	134.500	132.535	132.429	127.465	125.978

LEGEND

- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- ← FLOW DIRECTION
- ⊕ EXIST SSMH
- EXIST CLEANOUT

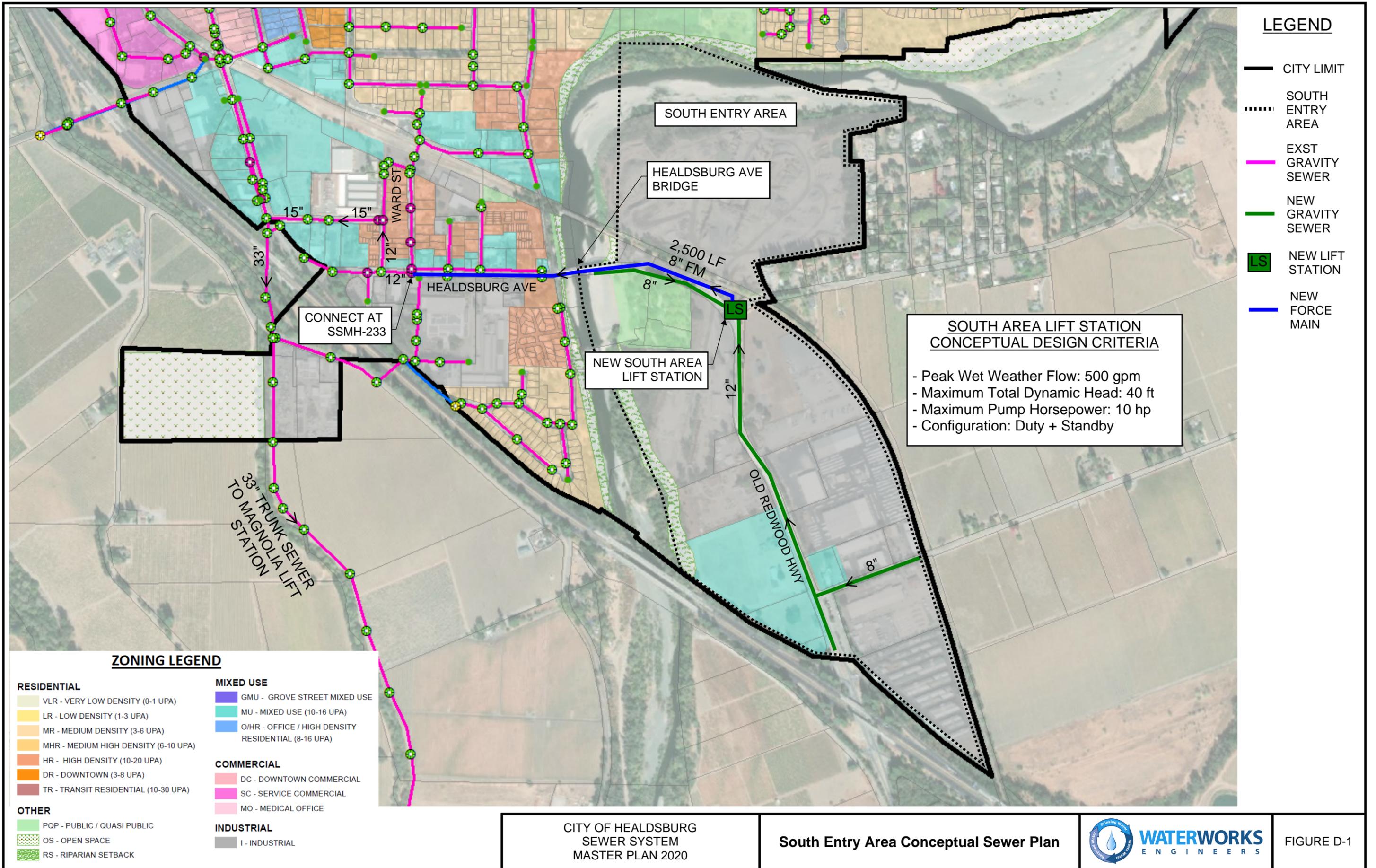


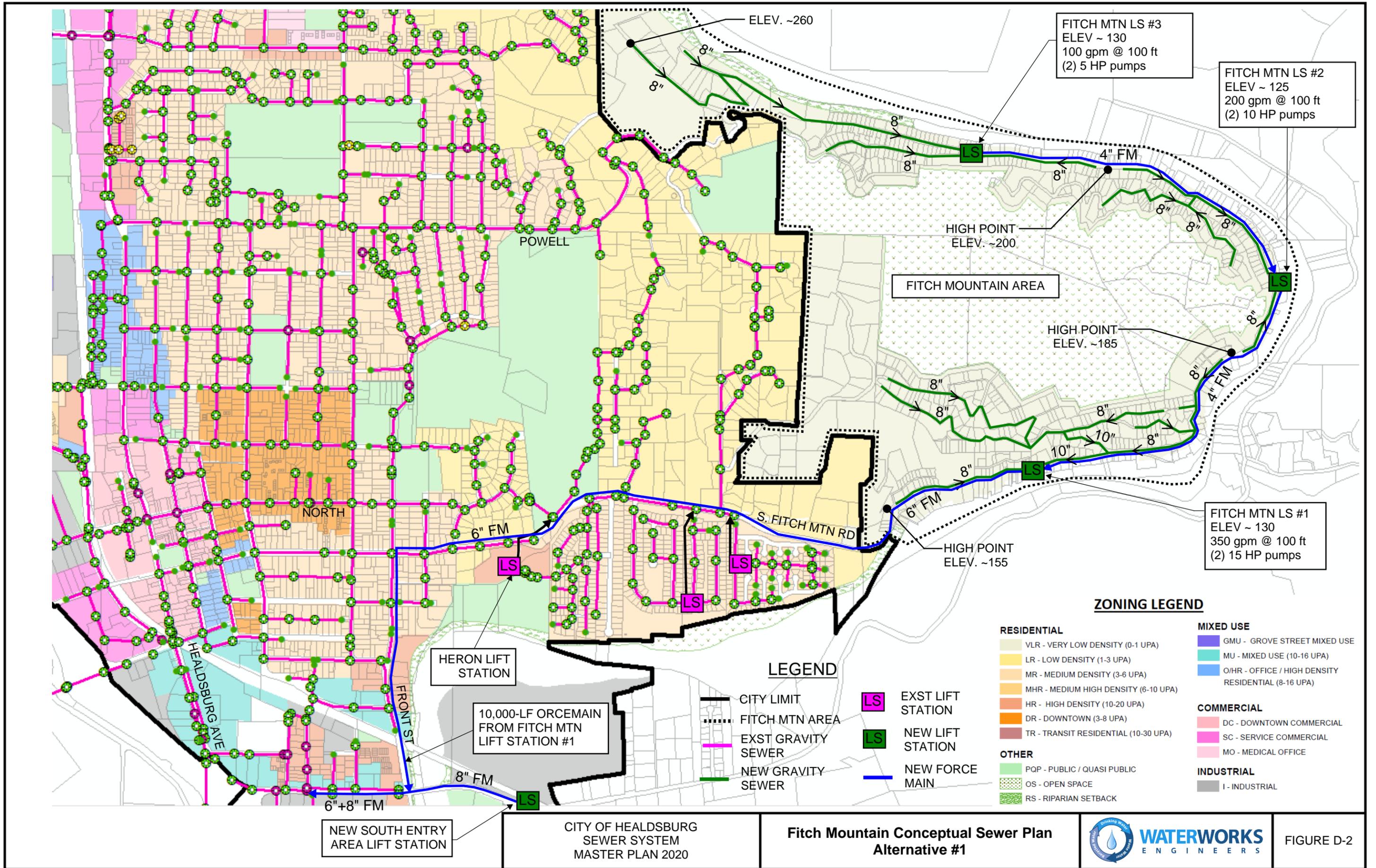
LEGEND

- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- ← FLOW DIRECTION
- ⊕ EXIST SSMH
- EXIST CLEANOUT



Appendix D - Future Conditions Hydraulic Model Results (with no CIPs)





FITCH MTN LS #3
 ELEV ~ 130
 100 gpm @ 100 ft
 (2) 5 HP pumps

FITCH MTN LS #2
 ELEV ~ 125
 200 gpm @ 100 ft
 (2) 10 HP pumps

FITCH MTN LS #1
 ELEV ~ 130
 350 gpm @ 100 ft
 (2) 15 HP pumps

ZONING LEGEND

RESIDENTIAL	MIXED USE
VLR - VERY LOW DENSITY (0-1 UPA)	GMU - GROVE STREET MIXED USE
LR - LOW DENSITY (1-3 UPA)	MU - MIXED USE (10-16 UPA)
MR - MEDIUM DENSITY (3-6 UPA)	O/HR - OFFICE / HIGH DENSITY RESIDENTIAL (8-16 UPA)
MHR - MEDIUM HIGH DENSITY (6-10 UPA)	
HR - HIGH DENSITY (10-20 UPA)	COMMERCIAL
DR - DOWNTOWN (3-8 UPA)	DC - DOWNTOWN COMMERCIAL
TR - TRANSIT RESIDENTIAL (10-30 UPA)	SC - SERVICE COMMERCIAL
	MO - MEDICAL OFFICE
OTHER	INDUSTRIAL
PQP - PUBLIC / QUASI PUBLIC	I - INDUSTRIAL
OS - OPEN SPACE	
RS - RIPARIAN SETBACK	

LEGEND

- CITY LIMIT
- FITCH MTN AREA
- EXST GRAVITY SEWER
- NEW GRAVITY SEWER
- EXST LIFT STATION
- NEW LIFT STATION
- NEW FORCE MAIN

NEW SOUTH ENTRY AREA LIFT STATION

10,000-LF ORCEMAIN FROM FITCH MTN LIFT STATION #1

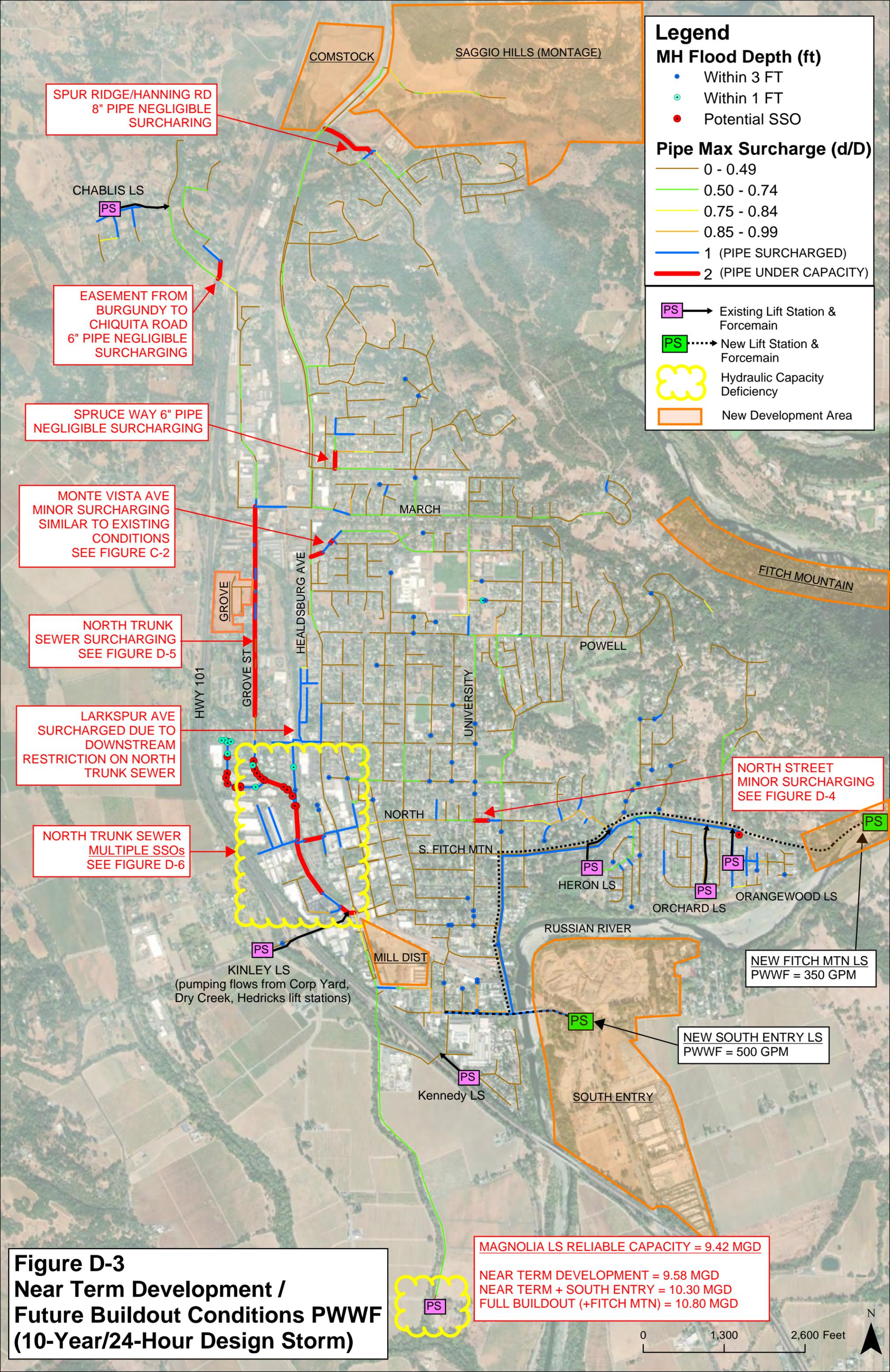
HERON LIFT STATION

CITY OF HEALDSBURG SEWER SYSTEM MASTER PLAN 2020

Fitch Mountain Conceptual Sewer Plan Alternative #1



FIGURE D-2



Legend

MH Flood Depth (ft)

- Within 3 FT
- Within 1 FT
- Potential SSO

Pipe Max Surcharge (d/D)

- 0 - 0.49
- 0.50 - 0.74
- 0.75 - 0.84
- 0.85 - 0.99
- 1 (PIPE SURCHARGED)
- 2 (PIPE UNDER CAPACITY)

Existing Lift Station & Forcemain
 New Lift Station & Forcemain
 Hydraulic Capacity Deficiency
 New Development Area

SPUR RIDGE/HANNING RD
8" PIPE NEGLIGIBLE SURCHARGING

EASEMENT FROM BURGUNDY TO CHIQUITA ROAD
6" PIPE NEGLIGIBLE SURCHARGING

SPRUCE WAY 6" PIPE NEGLIGIBLE SURCHARGING

MONTE VISTA AVE
MINOR SURCHARGING SIMILAR TO EXISTING CONDITIONS
SEE FIGURE C-2

NORTH TRUNK SEWER SURCHARGING
SEE FIGURE D-5

LARKSPUR AVE SURCHARGED DUE TO DOWNSTREAM RESTRICTION ON NORTH TRUNK SEWER

NORTH TRUNK SEWER MULTIPLE SSOs
SEE FIGURE D-6

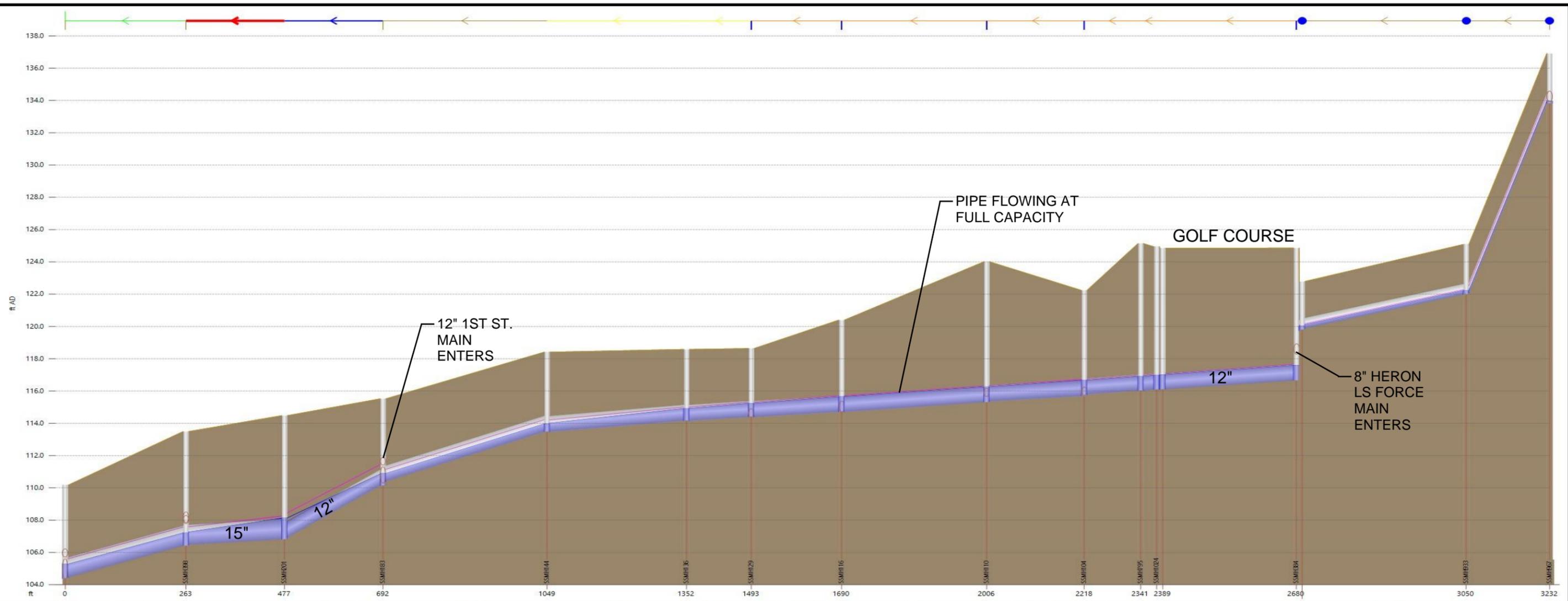
NORTH STREET
MINOR SURCHARGING
SEE FIGURE D-4

NEW FITCH MTN LS
PWWF = 350 GPM

NEW SOUTH ENTRY LS
PWWF = 500 GPM

MAGNOLIA LS RELIABLE CAPACITY = 9.42 MGD
 NEAR TERM DEVELOPMENT = 9.58 MGD
 NEAR TERM + SOUTH ENTRY = 10.30 MGD
 FULL BUILDOUT (+FITCH MTN) = 10.80 MGD

Figure D-3
Near Term Development /
Future Buildout Conditions PWWF
(10-Year/24-Hour Design Storm)



Link width (in)	SSMH398.1	SSMH201.1	SSMH183.1	SSMH144.1	SSMH136.1	SSMH129.1	SSMH116.1	SSMH110.1	SSMH104.1	SSMH795.1	SSMH384.1	SSMH933.1	SSMH967.1		
ds inv (ft AD)	104.460	106.480	106.920	110.400	113.470	114.160	114.387	114.704	115.360	115.790	116.112	119.883	122.085		
grad (%)	0.747	0.158	1.502	0.860	0.227	0.161	0.161	0.192	0.155	0.189	0.188	0.589	6.454		
DS flow (MGD)	2.5411	2.3976	2.3929	1.0163	1.0155	1.0109	1.0039	0.9873	0.9806	0.9883	0.9985	0.1487	0.1487		
DS velocity (ft/s)	4.696	4.609	4.485	4.073	3.679	2.456	2.216	2.188	2.541	2.957	2.333	2.155	4.326		
Node ground (ft AD)	SSMH412	SSMH398	SSMH201	SSMH183	SSMH144	SSMH136	SSMH129	SSMH116	SSMH110	SSMH104	SSMH796	SSMH384	SSMH385	SSMH933	SSMH967
	110.171	113.494	114.479	115.520	118.410	118.580	118.636	120.396	124.010	122.240	125.136	124.850	122.790	125.085	136.920

ZONING LEGEND

LEGEND

- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- FLOW DIRECTION
- EXIST SSMH
- EXIST CLEANOUT

RESIDENTIAL

- VLR - VERY LOW DENSITY (0-1 UPA)
- LR - LOW DENSITY (1-3 UPA)
- MR - MEDIUM DENSITY (3-6 UPA)
- MHR - MEDIUM HIGH DENSITY (6-10 UPA)
- HR - HIGH DENSITY (10-20 UPA)
- DR - DOWNTOWN (3-8 UPA)
- TR - TRANSIT RESIDENTIAL (10-30 UPA)

OTHER

- PQP - PUBLIC / QUASI PUBLIC
- OS - OPEN SPACE
- RS - RIPARIAN SETBACK

MIXED USE

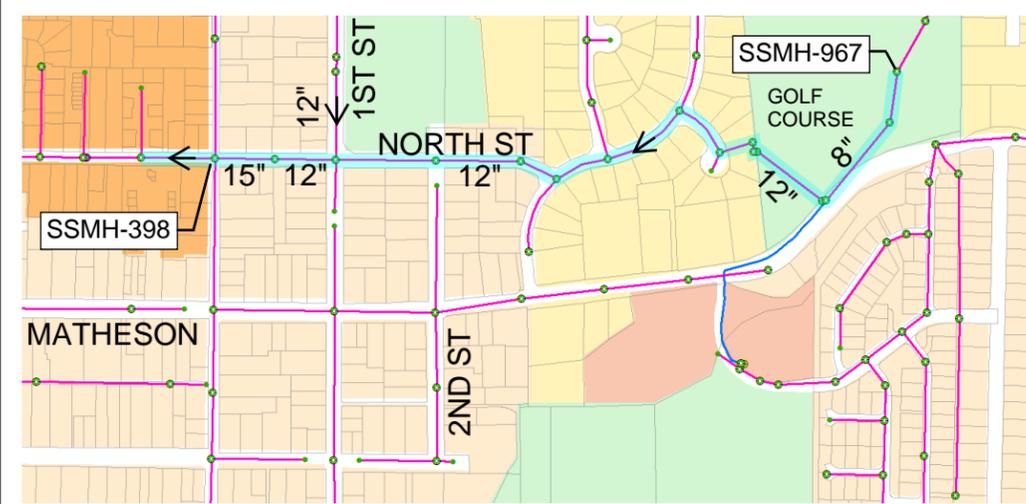
- GMU - GROVE STREET MIXED USE
- MU - MIXED USE (10-16 UPA)
- O/HR - OFFICE / HIGH DENSITY RESIDENTIAL (8-16 UPA)

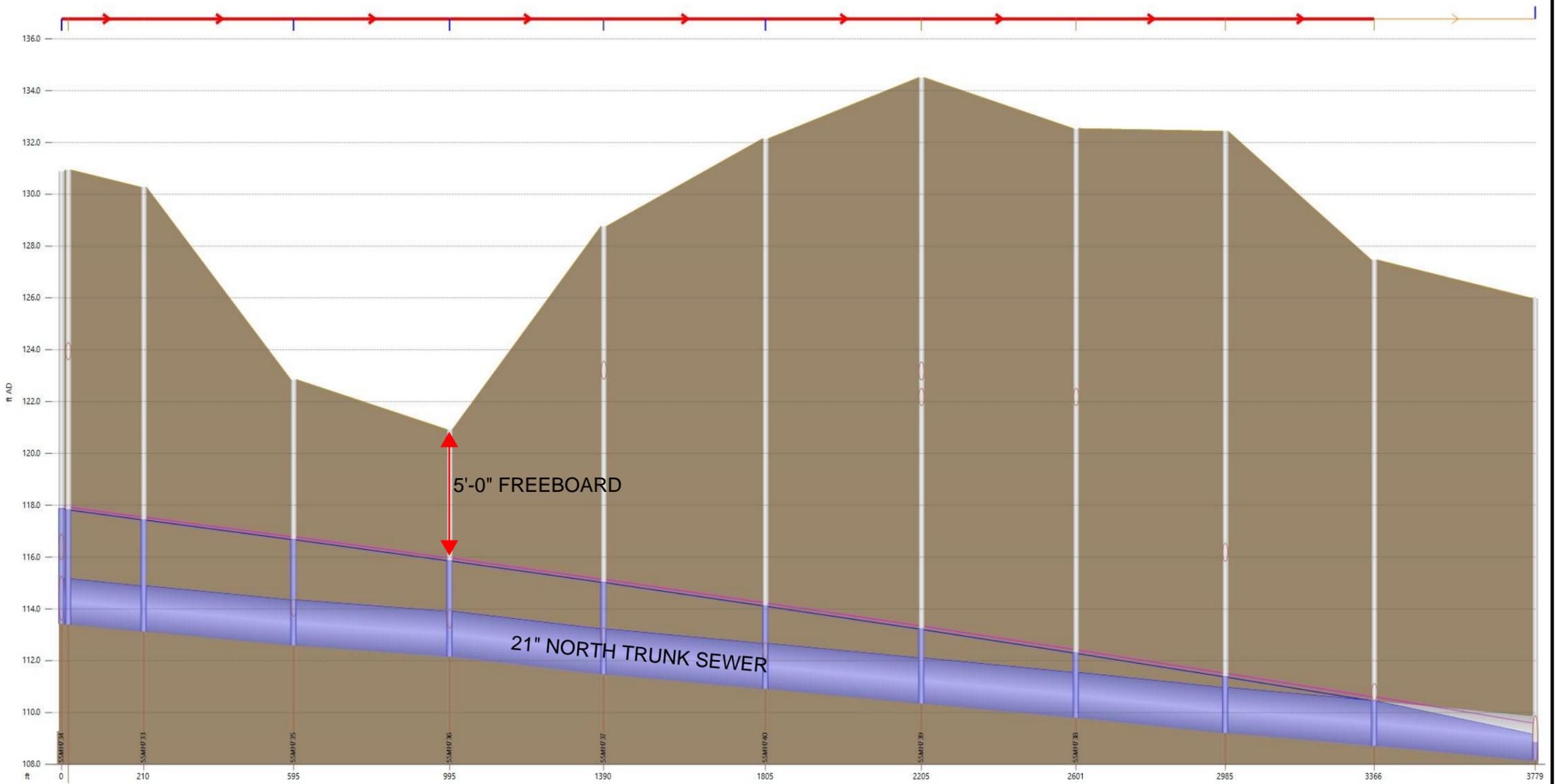
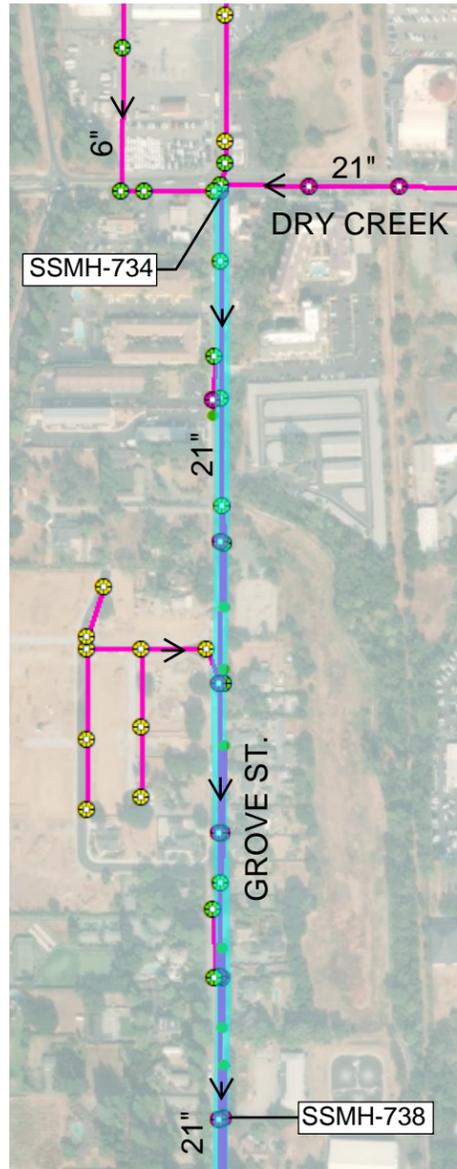
COMMERCIAL

- DC - DOWNTOWN COMMERCIAL
- SC - SERVICE COMMERCIAL
- MO - MEDICAL OFFICE

INDUSTRIAL

- I - INDUSTRIAL

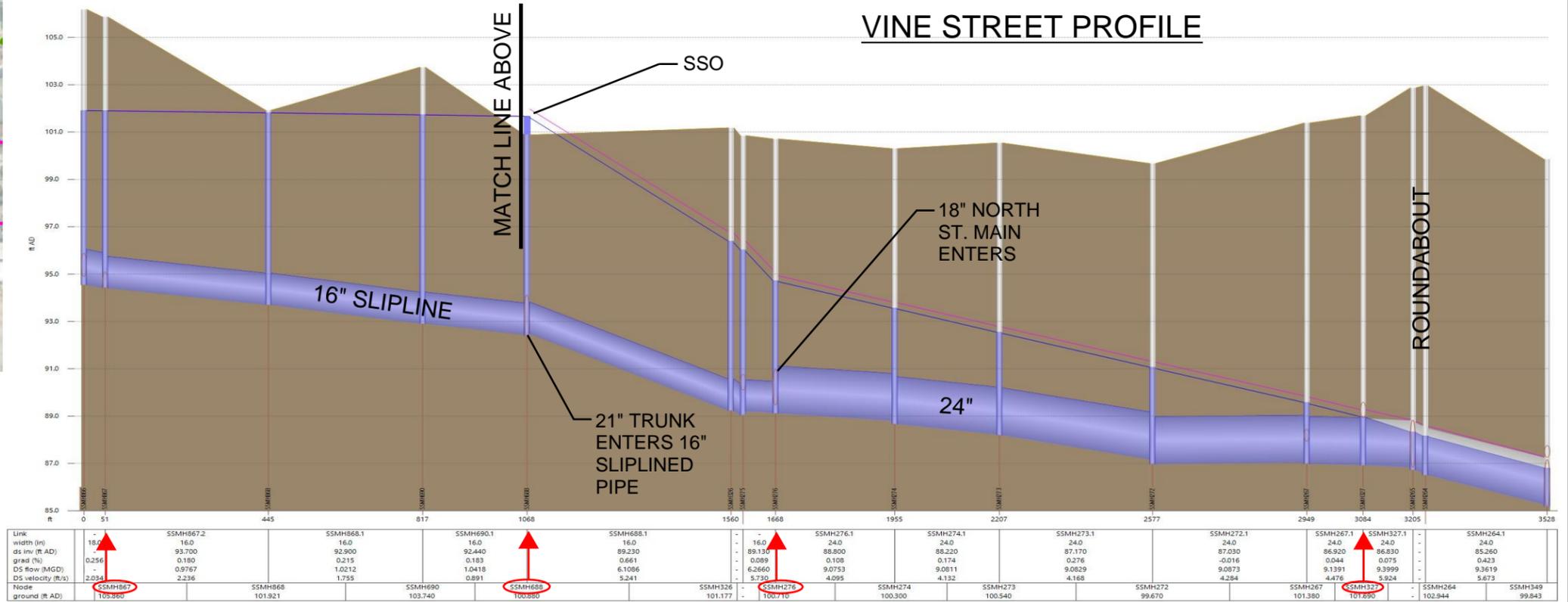
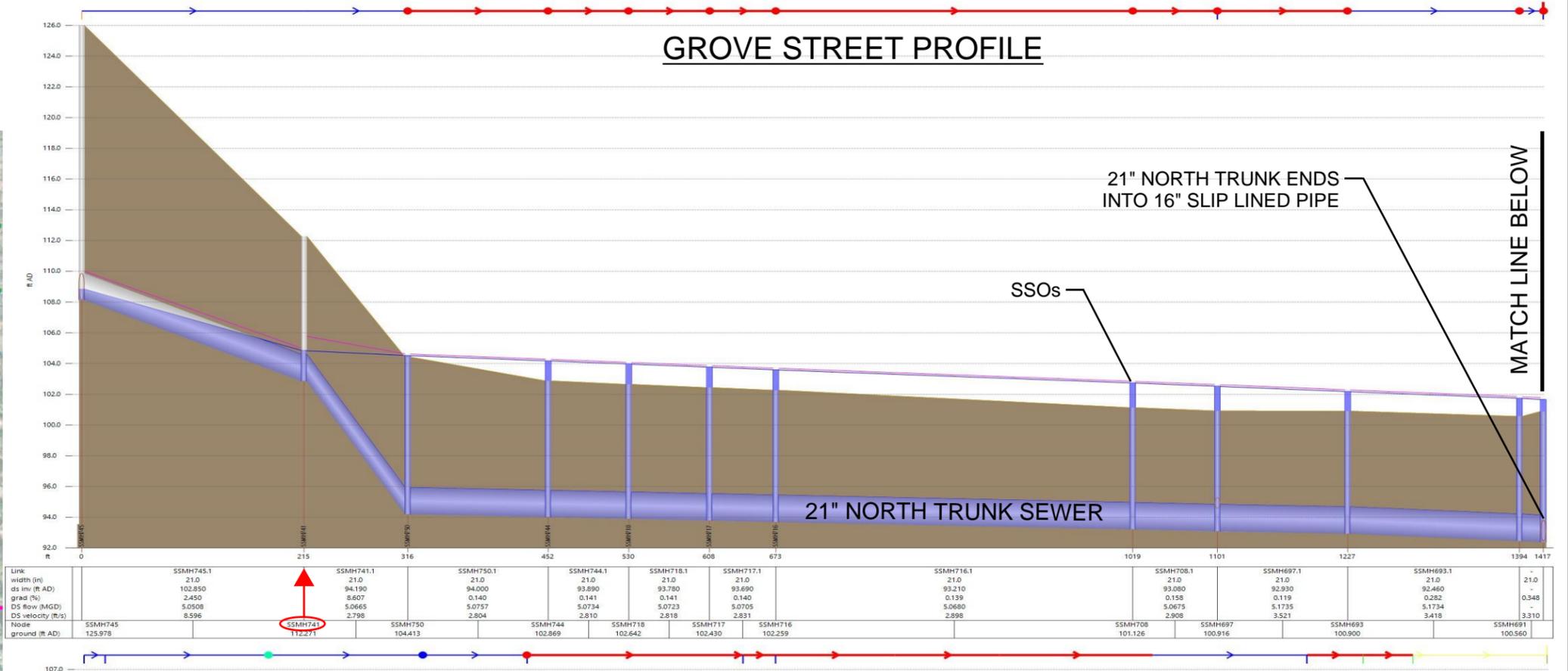
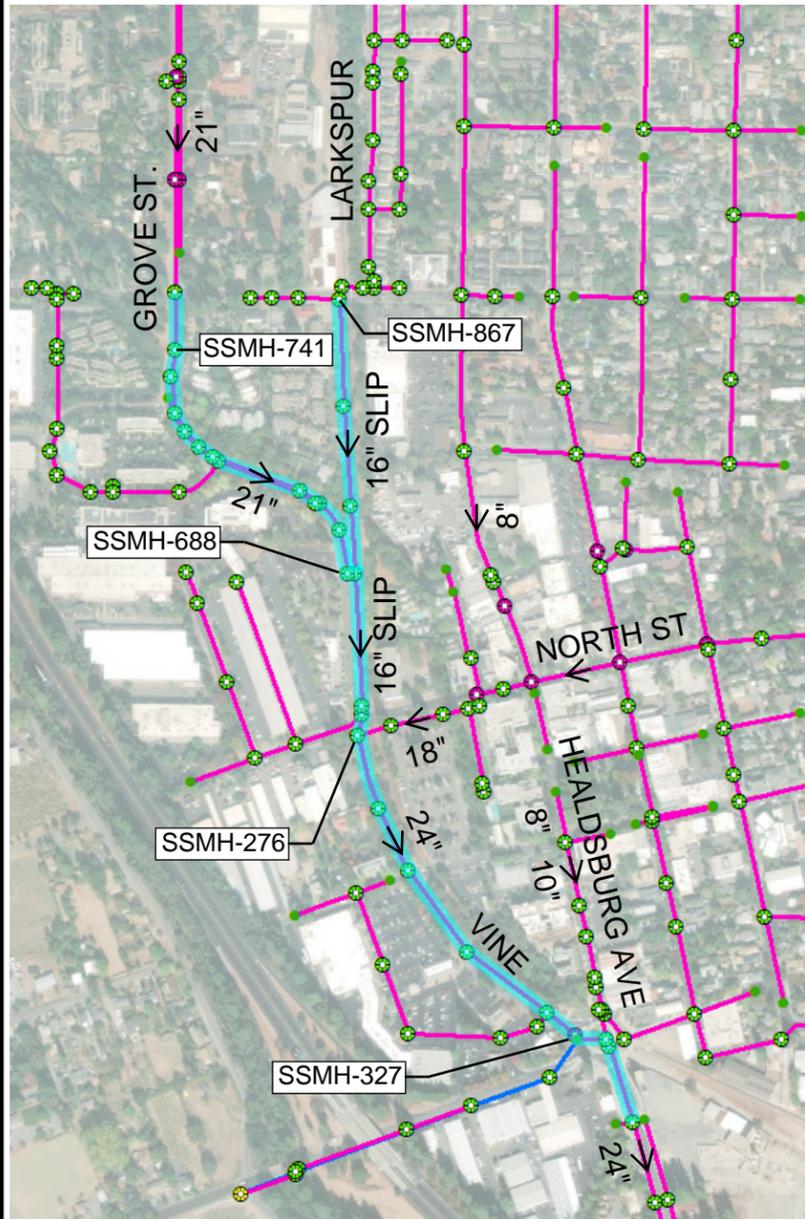




Link	SSMH732.1	SSMH733.1	SSMH735.1	SSMH736.1	SSMH737.1	SSMH740.1	SSMH739.1	SSMH738.1	SSMH742.1	SSMH743.1	
width (in)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	
ds inv (ft AD)	113.130	112.590	112.150	111.470	110.910	110.350	109.790	109.210	108.710	108.130	
grad (%)	0.140	0.141	0.110	0.172	0.135	0.140	0.141	0.151	0.131	0.140	
DS flow (MGD)	4.4636	4.4881	4.5626	4.6141	4.7132	4.7343	4.8261	4.8831	4.9432	5.0435	
DS velocity (ft/s)	2.710	2.630	2.916	2.740	2.824	2.860	2.943	3.004	3.162	5.254	
Node	SSMH 734	SSMH733	SSMH735	SSMH736	SSMH737	SSMH740	SSMH739	SSMH738	SSMH742	SSMH743	SSMH745
ground (ft AD)	130.934	130.271	122.846	120.919	128.758	132.145	134.500	132.535	132.429	127.465	125.978

LEGEND

- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- ← FLOW DIRECTION
- ⊕ EXIST SSMH
- EXIST CLEANOUT

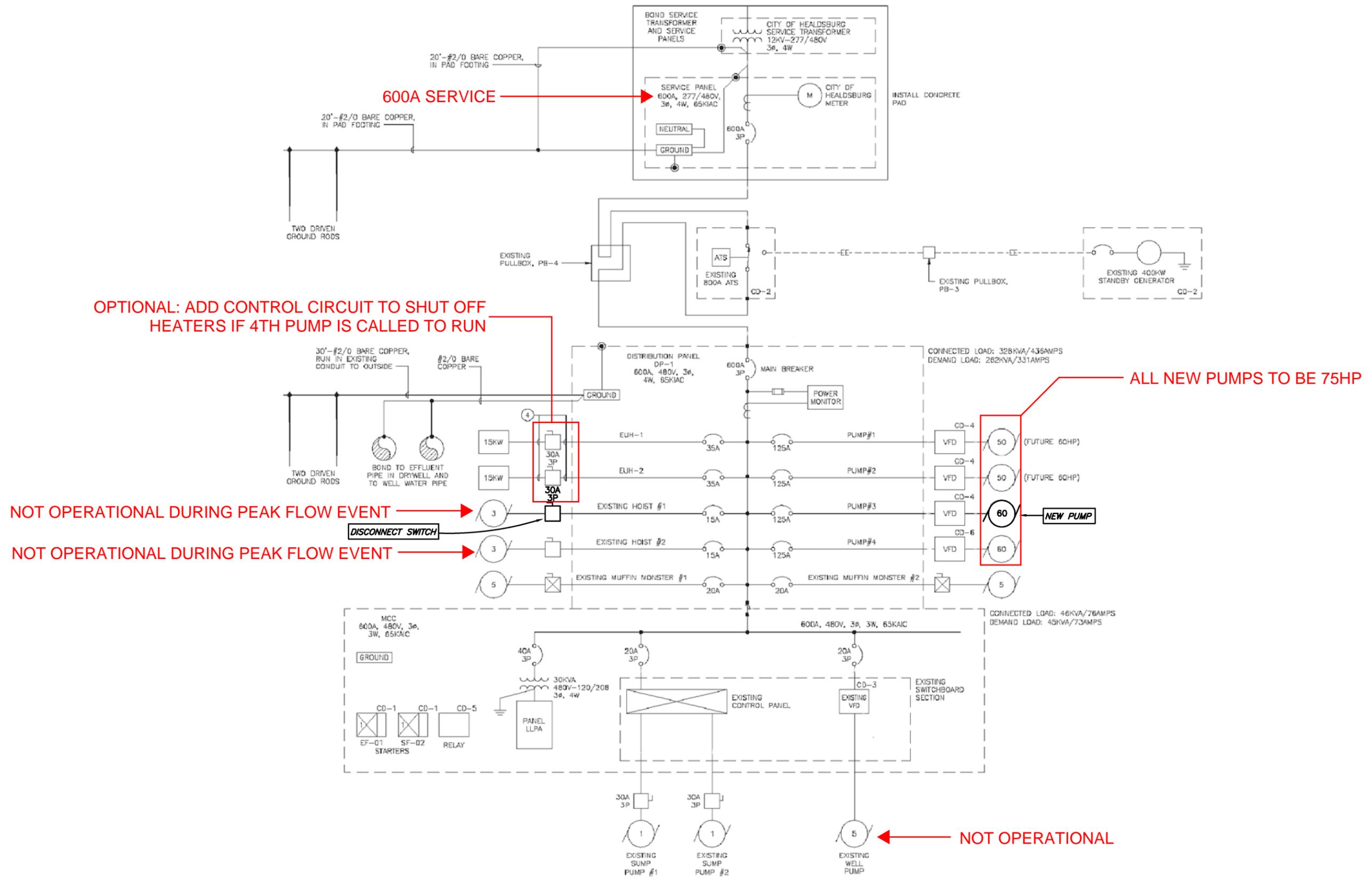


LEGEND

- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- ← FLOW DIRECTION
- EXIST SSMH
- EXIST CLEANOUT

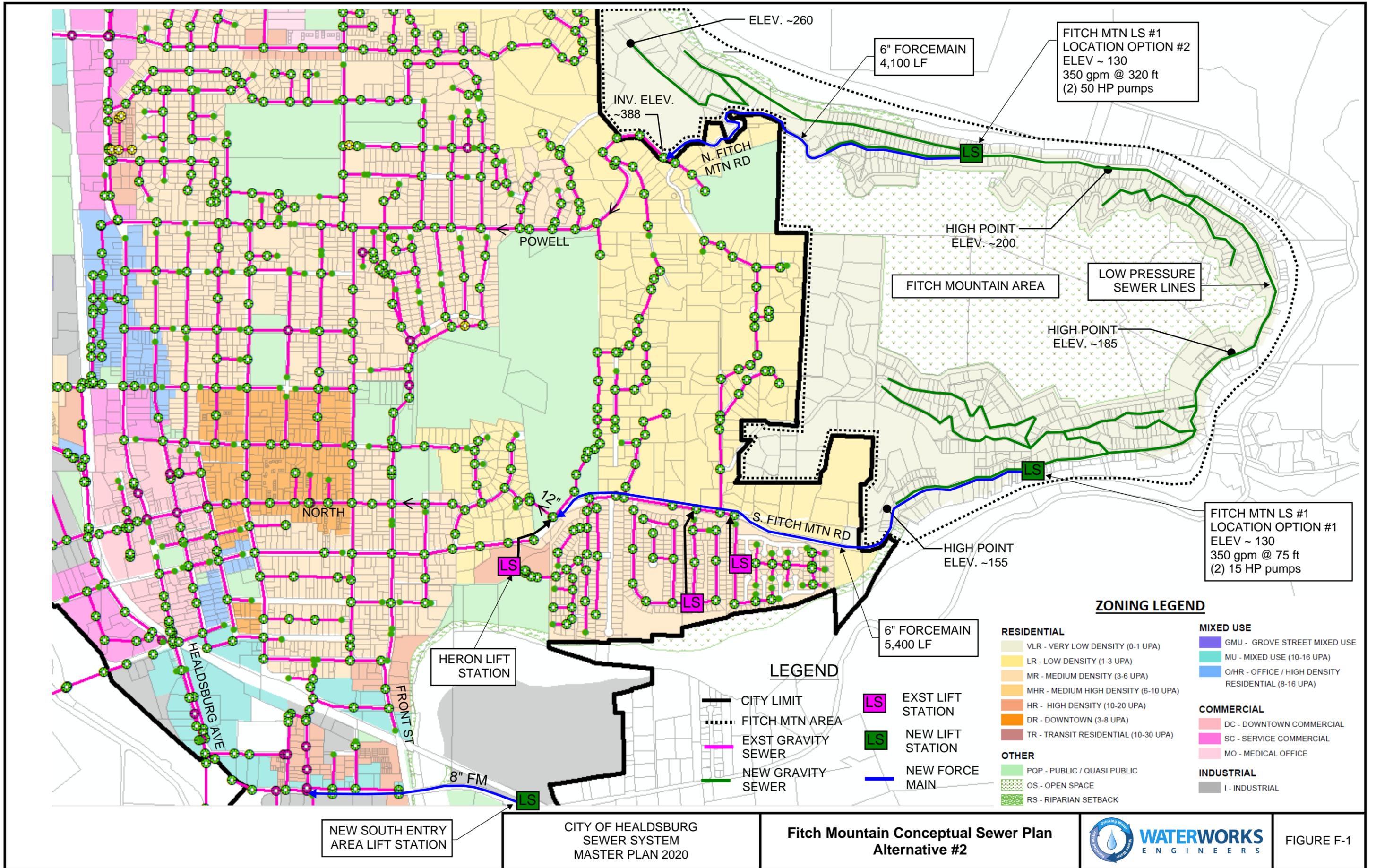


Appendix E – Existing and Near Term Development Conditions Capital Improvement Projects





Appendix F – Future Buildout Conditions Capital Improvement Projects



NEW SOUTH ENTRY AREA LIFT STATION

CITY OF HEALDSBURG SEWER SYSTEM MASTER PLAN 2020

Fitch Mountain Conceptual Sewer Plan Alternative #2



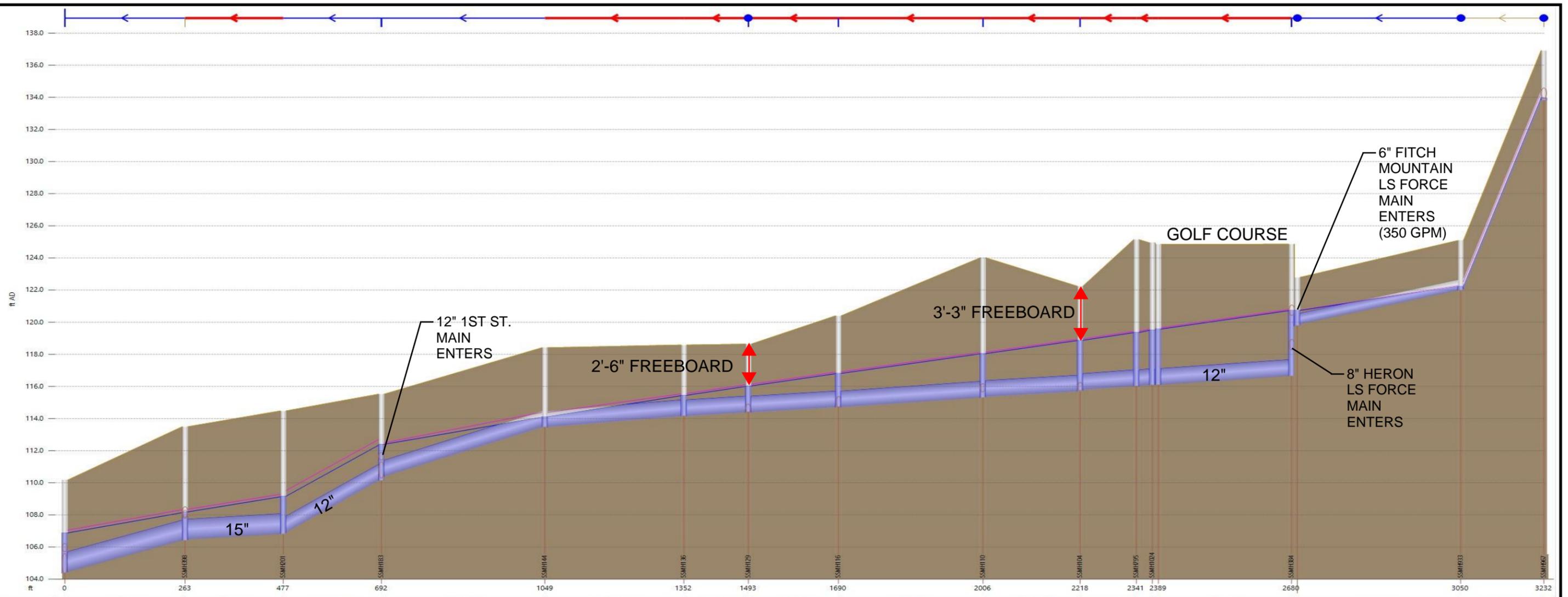
FIGURE F-1

ZONING LEGEND

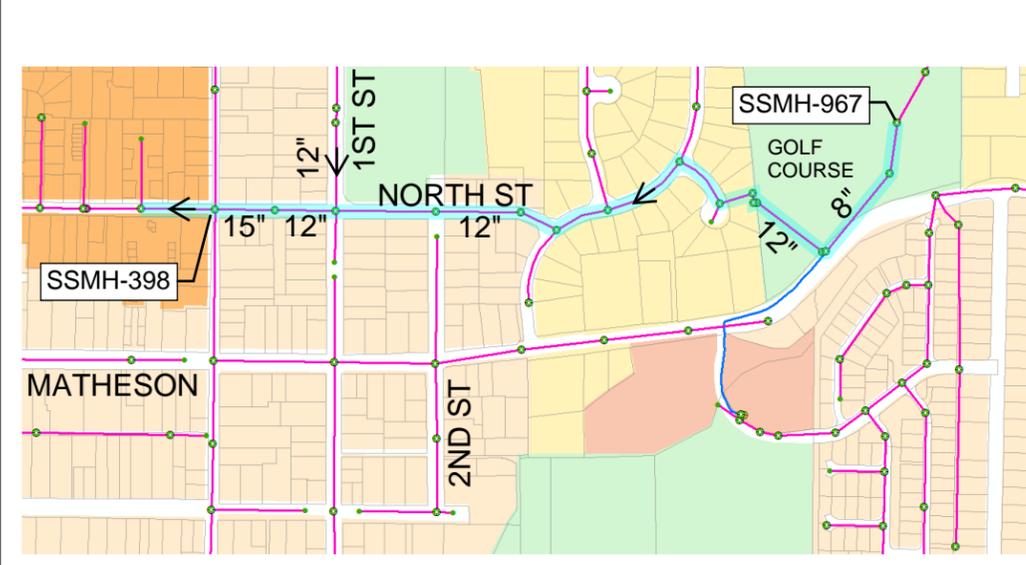
- | | |
|--------------------------------------|---|
| RESIDENTIAL | MIXED USE |
| VLR - VERY LOW DENSITY (0-1 UPA) | GMU - GROVE STREET MIXED USE |
| LR - LOW DENSITY (1-3 UPA) | MU - MIXED USE (10-16 UPA) |
| MR - MEDIUM DENSITY (3-6 UPA) | O/HR - OFFICE / HIGH DENSITY RESIDENTIAL (8-16 UPA) |
| MHR - MEDIUM HIGH DENSITY (6-10 UPA) | COMMERCIAL |
| HR - HIGH DENSITY (10-20 UPA) | DC - DOWNTOWN COMMERCIAL |
| DR - DOWNTOWN (3-8 UPA) | SC - SERVICE COMMERCIAL |
| TR - TRANSIT RESIDENTIAL (10-30 UPA) | MO - MEDICAL OFFICE |
| OTHER | INDUSTRIAL |
| PQP - PUBLIC / QUASI PUBLIC | I - INDUSTRIAL |
| OS - OPEN SPACE | |
| RS - RIPARIAN SETBACK | |

LEGEND

- CITY LIMIT
- FITCH MTN AREA
- EXST GRAVITY SEWER
- NEW GRAVITY SEWER
- EXST LIFT STATION
- NEW LIFT STATION
- NEW FORCE MAIN



Link width (in)	SSMH398.1	SSMH201.1	SSMH183.1	SSMH144.1	SSMH136.1	SSMH129.1	SSMH116.1	SSMH110.1	SSMH104.1	SSMH795.1	SSMH384.1	SSMH933.1	SSMH967.1		
ds inv (ft AD)	15.0	15.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0		
grad (%)	0.747	0.158	1.502	0.860	0.227	0.161	0.161	0.192	0.155	0.189	0.188	0.589	122.085		
DS flow (MGD)	2.8868	2.7539	2.7635	1.4151	1.4320	1.4273	1.4228	1.4227	1.4264	1.4311	1.4452	0.2496	0.1487		
DS velocity (ft/s)	4.691	4.853	5.045	4.395	4.184	2.661	2.580	2.497	2.570	3.051	2.442	2.434	4.326		
Node ground (ft AD)	SSMH412	SSMH398	SSMH201	SSMH183	SSMH144	SSMH136	SSMH129	SSMH116	SSMH110	SSMH104	SSMH796	SSMH384	SSMH385	SSMH933	SSMH967
	110.171	113.494	114.479	115.520	118.410	118.580	118.636	120.396	124.010	122.240	125.136	124.850	122.790	125.085	136.920

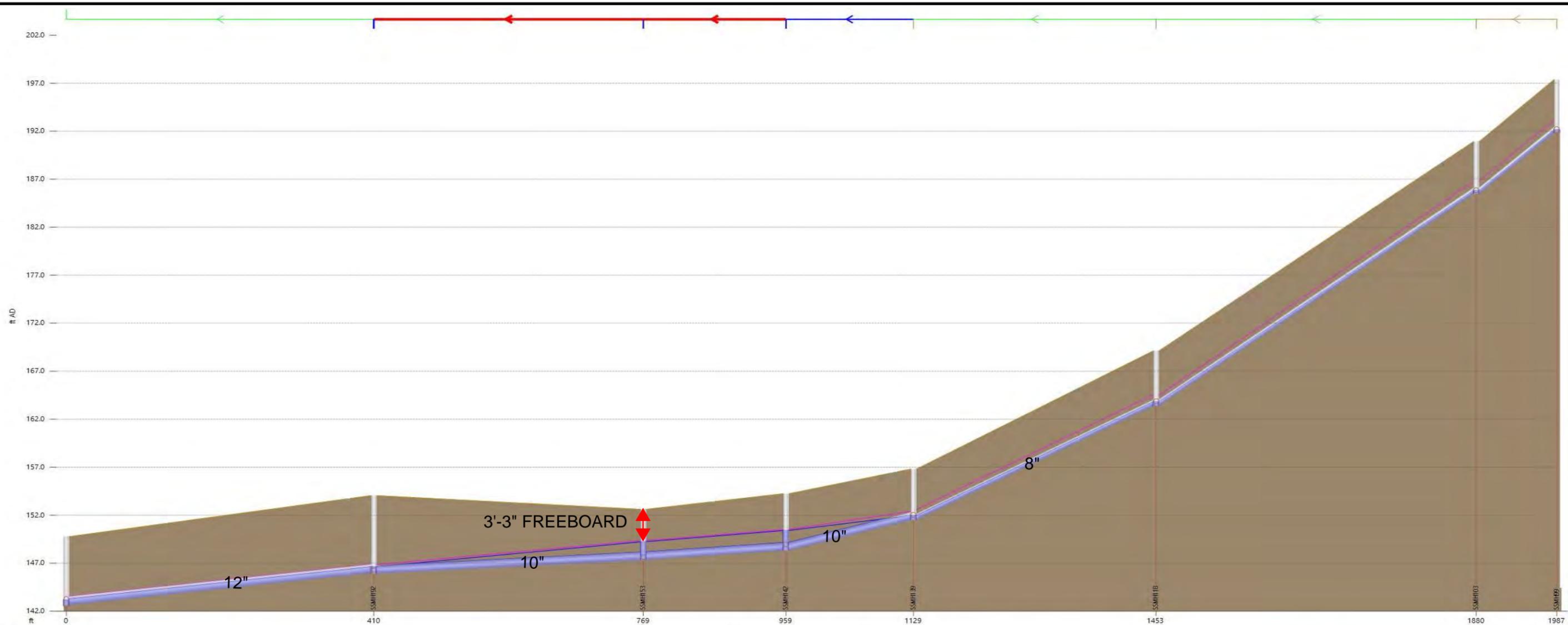


LEGEND

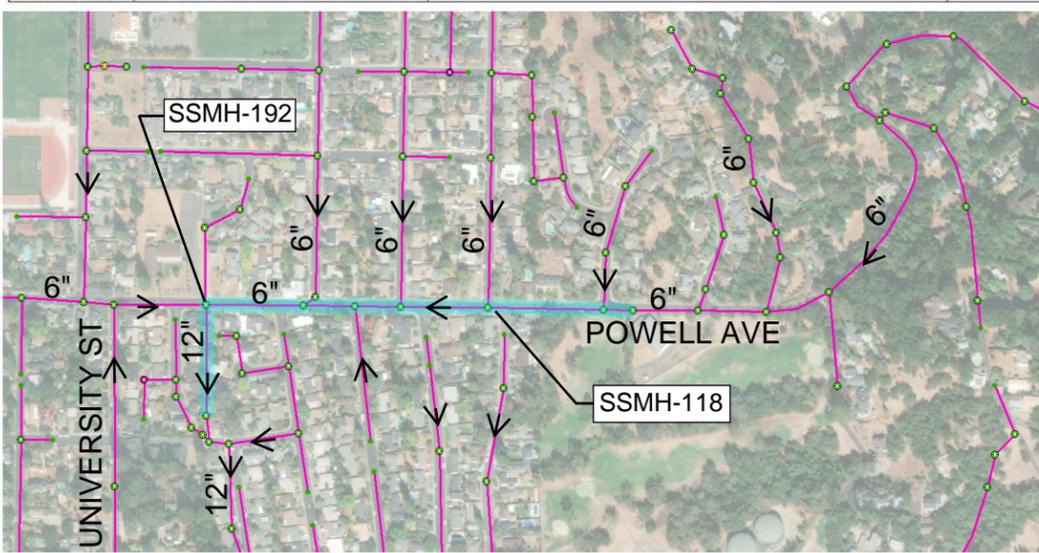
- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- FLOW DIRECTION
- EXIST SSMH
- EXIST CLEANOUT

ZONING LEGEND

- RESIDENTIAL**
 - VLR - VERY LOW DENSITY (0-1 UPA)
 - LR - LOW DENSITY (1-3 UPA)
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 - HR - HIGH DENSITY (10-20 UPA)
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 - DC - DOWNTOWN COMMERCIAL
 - SC - SERVICE COMMERCIAL
 - MO - MEDICAL OFFICE
- INDUSTRIAL**
 - I - INDUSTRIAL

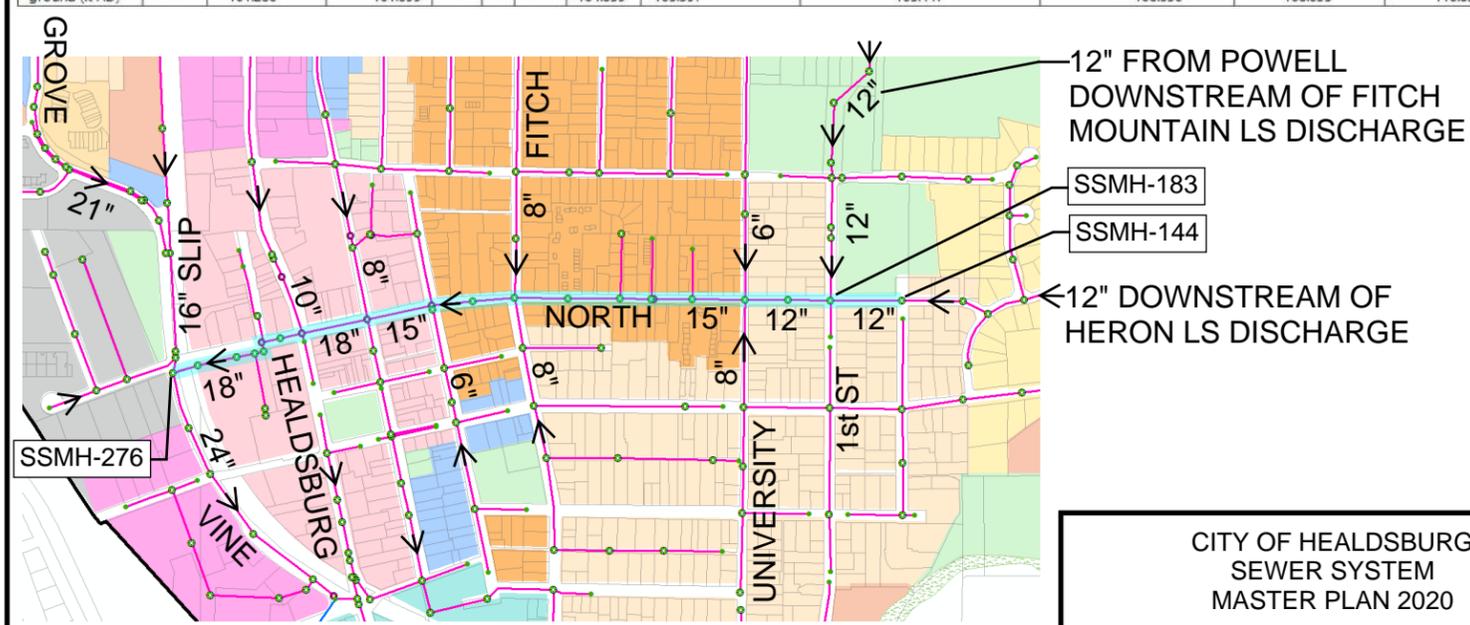
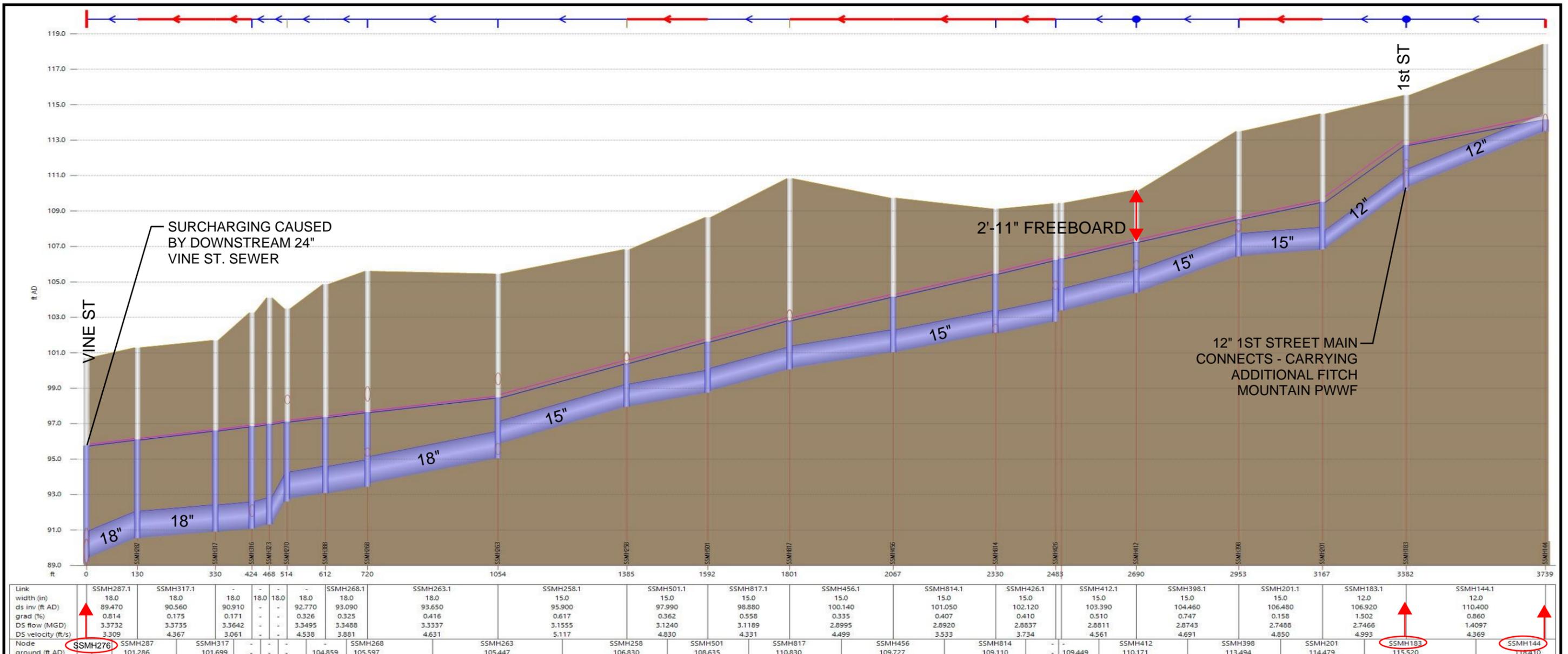


Link width (in)	SSMH192.1	SSMH153.1	SSMH142.1	SSMH139.1	SSMH118.1	SSMH103.1	SSMH99.1	
ds inv (ft AD)	142.650	145.920	147.360	148.340	151.520	163.430	185.490	
grad (%)	0.815	0.392	0.505	1.859	3.673	5.162	5.890	
DS flow (MGD)	1.5045	1.1750	1.0882	1.0702	1.0014	0.9202	0.8890	
DS velocity (ft/s)	4.397	3.634	2.747	3.164	6.288	6.690	7.911	
Node ground (ft AD)	SSMH973 149.773	SSMH192 154.040	SSMH153 152.610	SSMH142 154.240	SSMH139 156.800	SSMH118 169.110	SSMH103 190.910	SSMH99 197.370



LEGEND

- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- ← FLOW DIRECTION
- ⊕ EXIST SSMH
- EXIST CLEANOUT



LEGEND

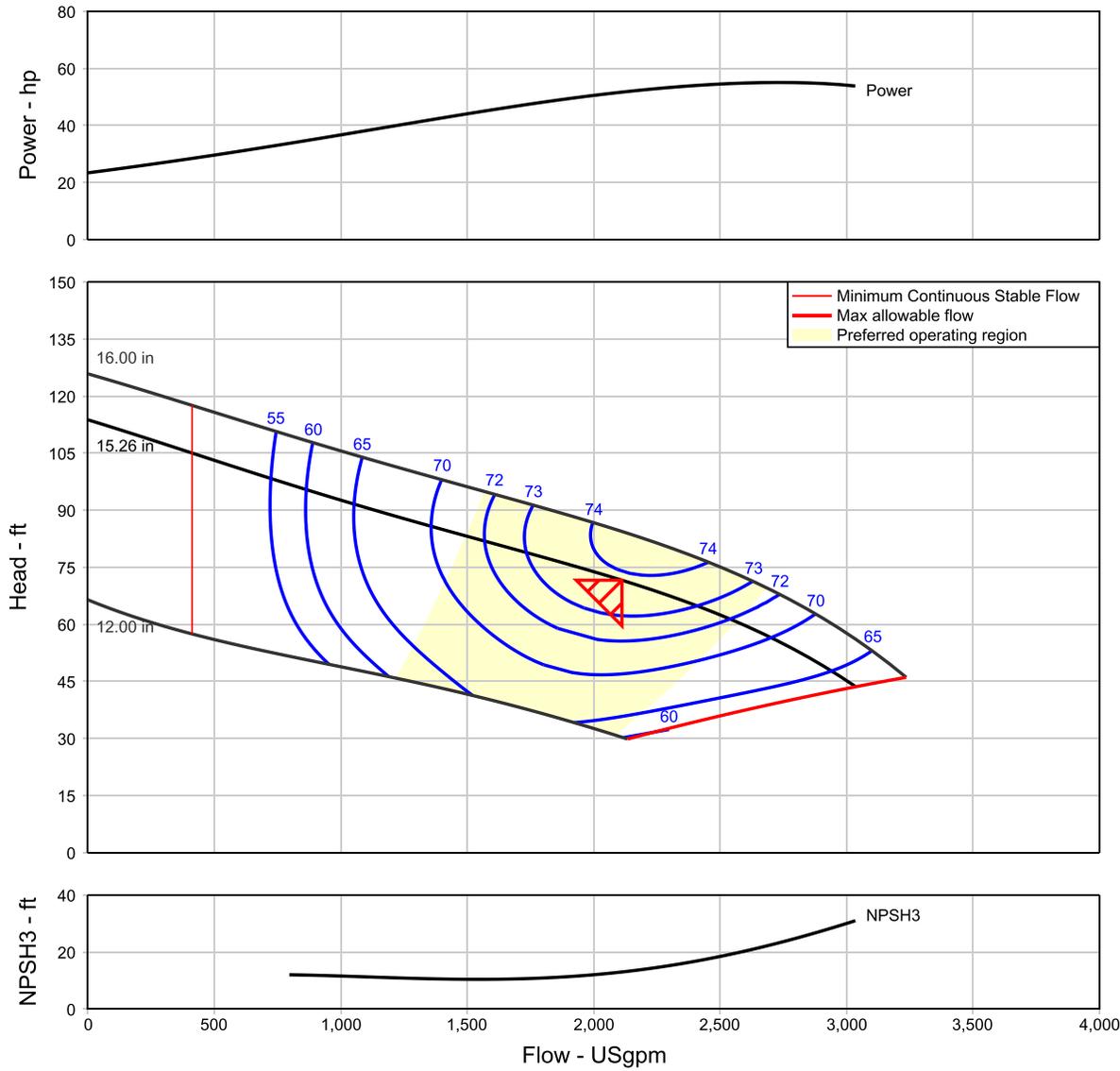
- EXST GRAVITY SEWER
- GRAVITY SEWER WHERE HYDRAULIC PROFILE TAKEN
- ← FLOW DIRECTION
- EXIST SSMH
- EXIST CLEANOUT

ZONING LEGEND

- RESIDENTIAL**
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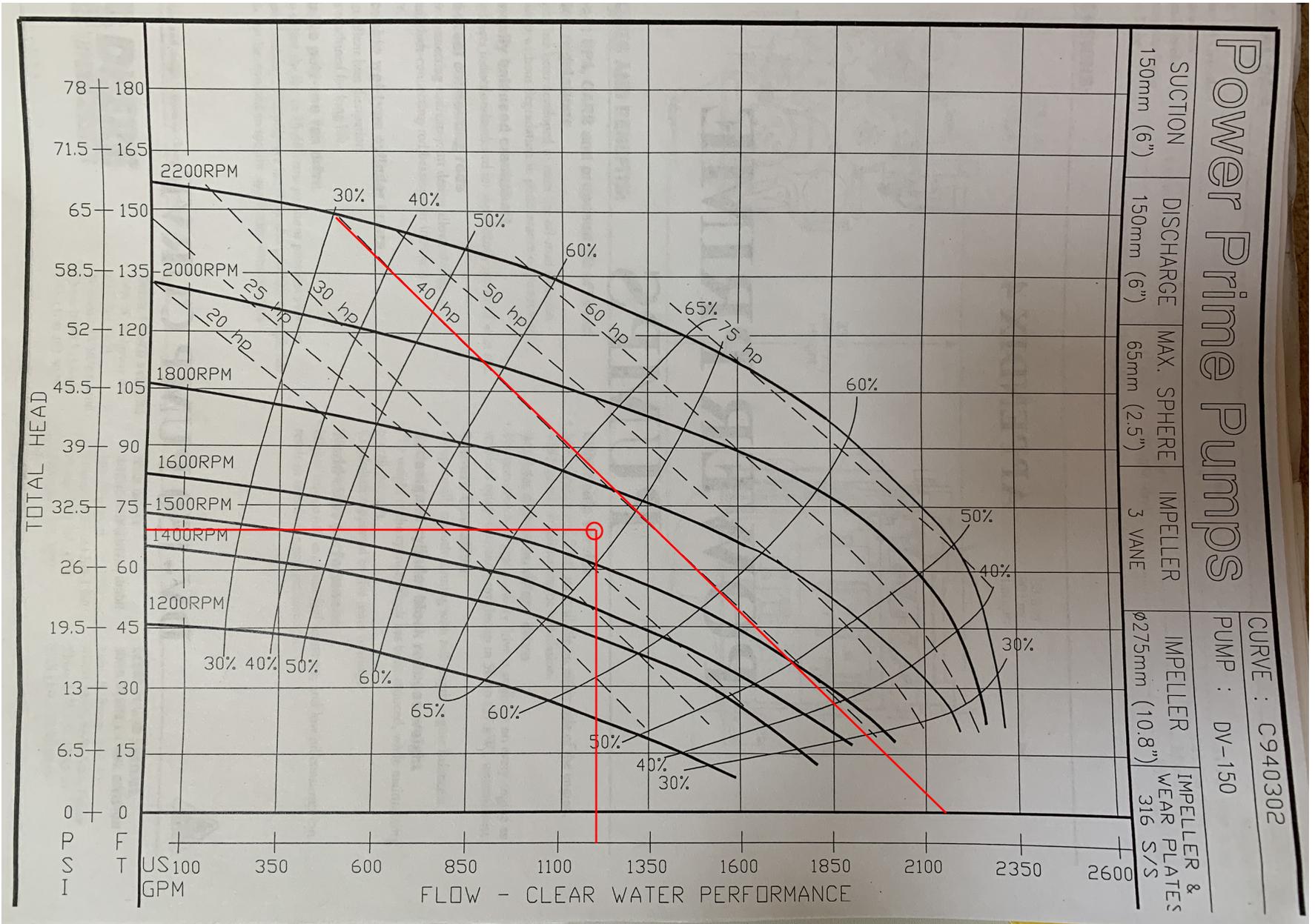
Appendix G – Magnolia Lift Station Pump Curves and Hydraulic Model Results



Item number	: 009	Size	: 6" 54X4 (TAJC5DC)
Service	:	Stages	: 1
Quantity	: 1	Speed, rated	: 1180 rpm
Quote number	: Various	Based on curve number	: 6-54x4-1200-TAJC5DC
Date last saved	: 13 Feb 2020 5:00 PM	Efficiency	: 73.86 %
Flow, rated	: 2,112.1 USgpm	Power, rated	: 51.67 hp
Differential head / pressure, rated	: 71.58 ft	NPSH required	: 12.97 ft
Fluid density, rated / max	: 1.000 / 1.000 SG	Viscosity	: 1.00 cP
		Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00

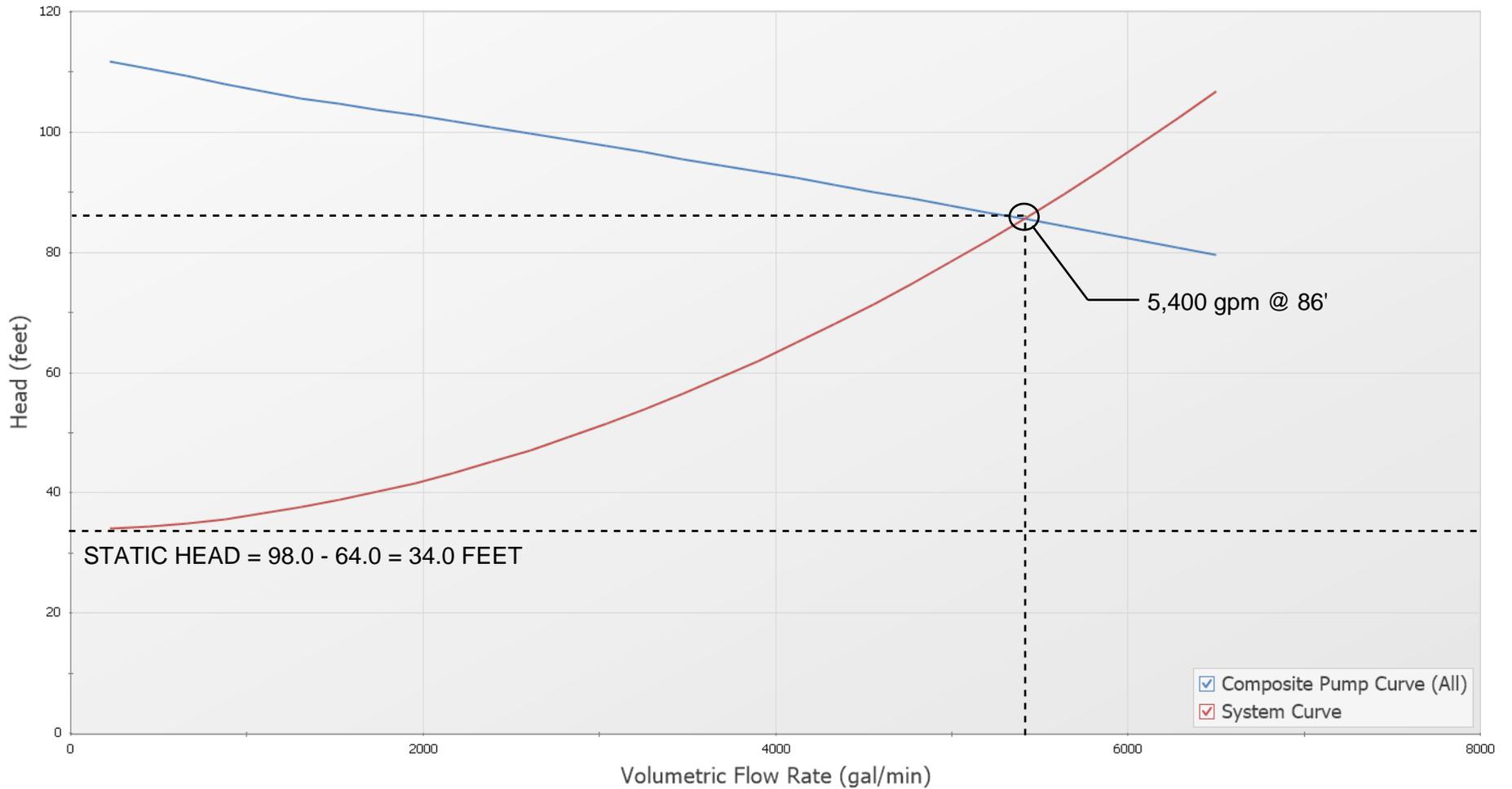
MAGNOLIA LIFT STATION PUMP #3 CURVE

STANDBY EMERGENCY DIESEL PUMP CURVE



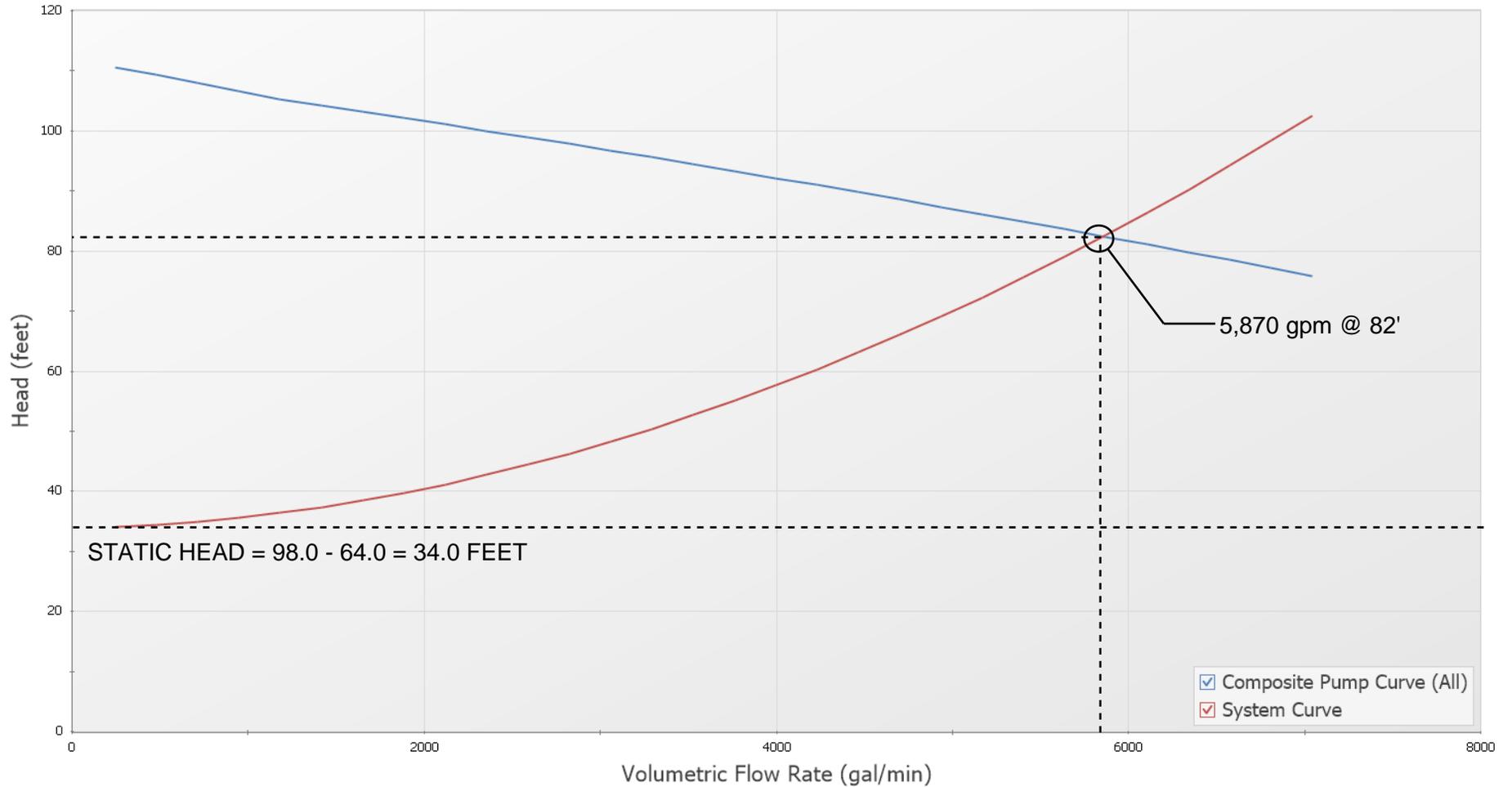
ORIGINAL DUAL 14" FORCE MAIN COMPOSITE PARALLEL PUMP VS. SYSTEM CURVE

FIXED PUMPS 1-4 IN OPERATION @ DESIGN WET WELL WATER SURFACE



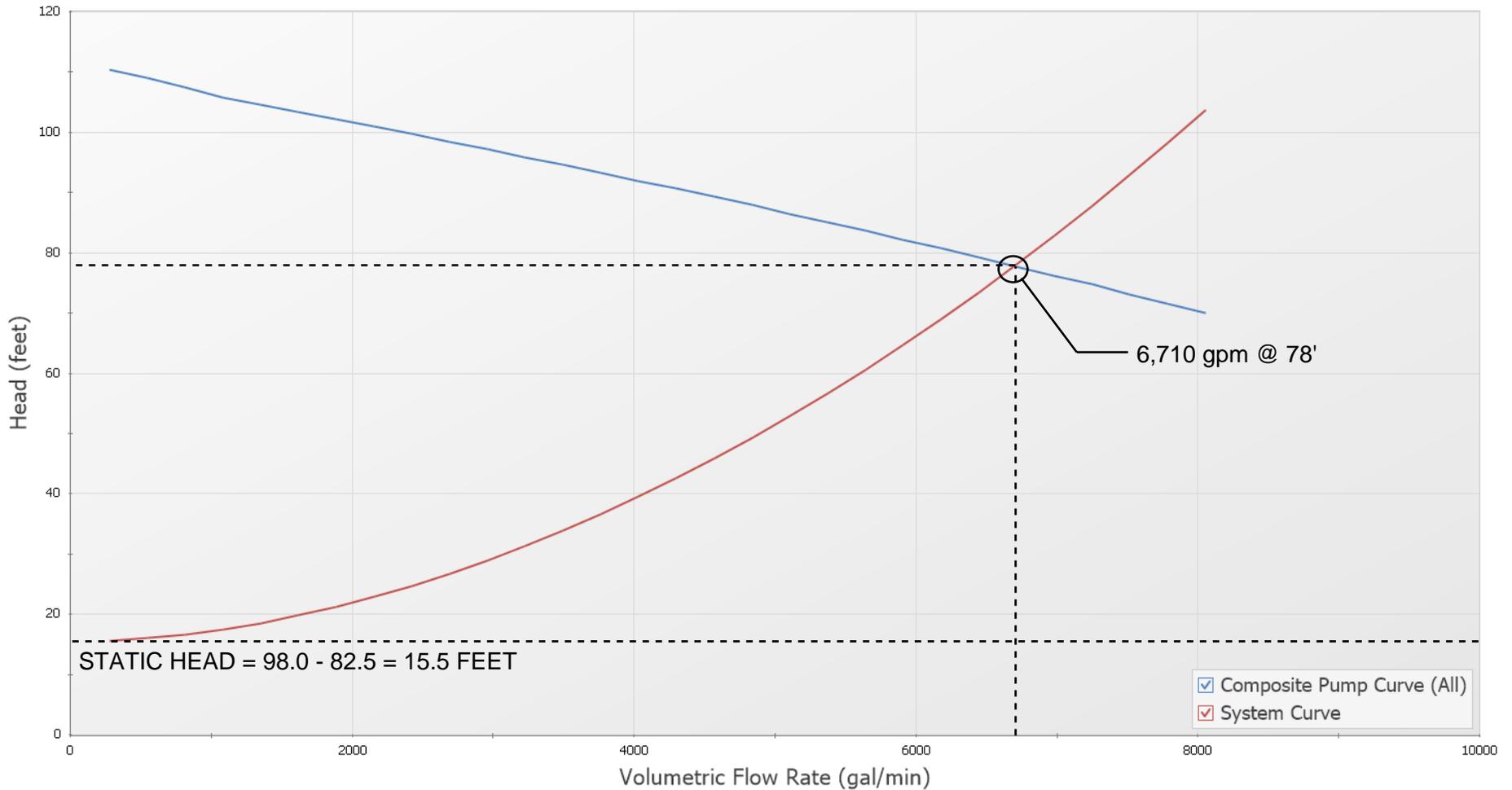
IMPROVED 16" FORCE MAINS (ALL THREE OPEN) COMPOSITE PARALLEL PUMP VS. SYSTEM CURVE

FIXED PUMPS 1-4 IN OPERATION @ DESIGN WET WELL WATER SURFACE



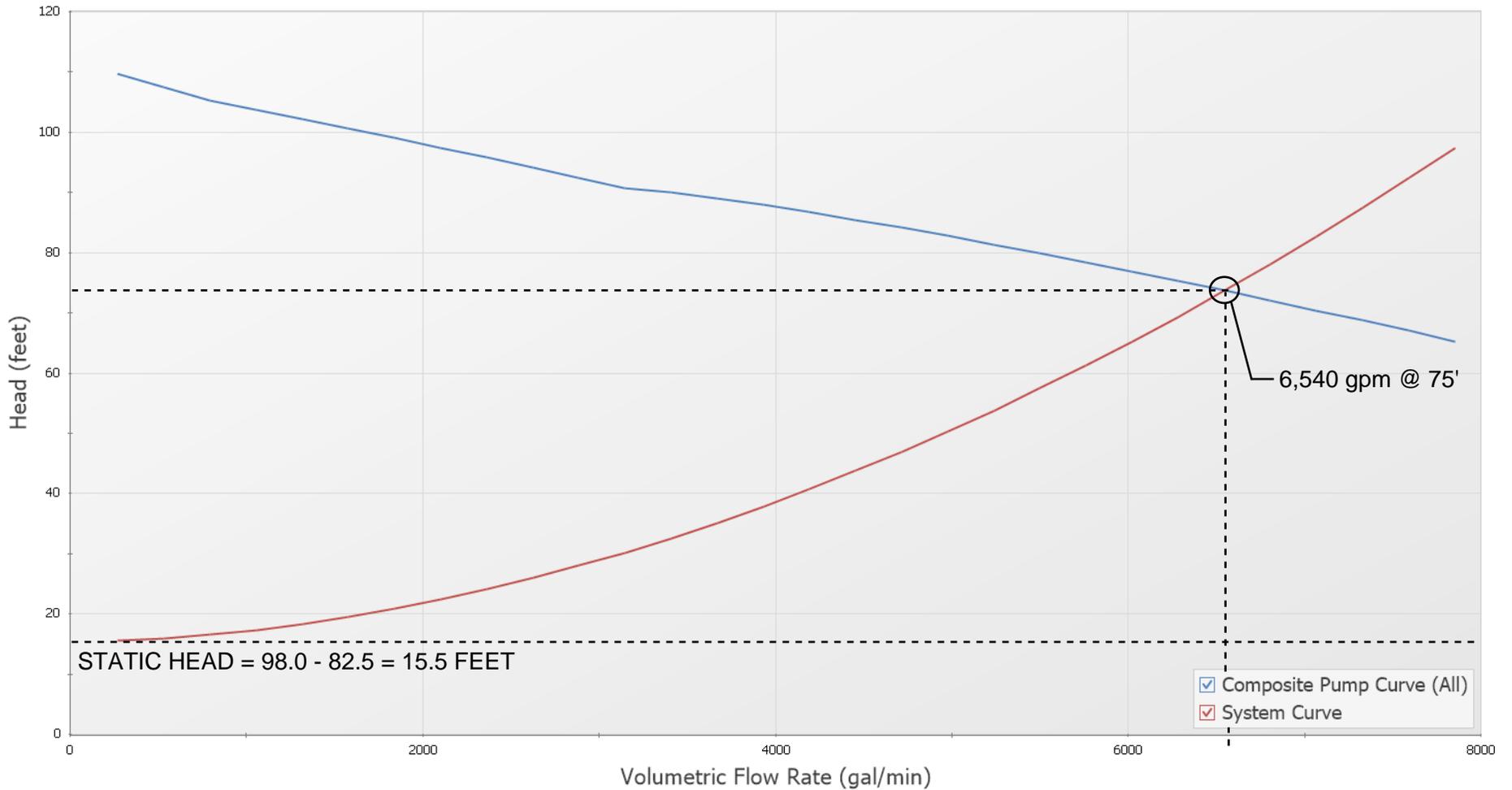
IMPROVED 16" FORCE MAINS (ALL THREE OPEN)
COMPOSITE PARALLEL PUMP VS. SYSTEM CURVE

FIXED PUMPS 1-4 IN OPERATION WITH 18.5 FEET OF SURCHARGE



IMPROVED 16" FORCE MAINS (ALL THREE OPEN) COMPOSITE PARALLEL PUMP VS. SYSTEM CURVE

FIXED PUMPS 1,2,4 + DIESEL IN OPERATION WITH 18.5 FEET OF SURCHARGE



Appendix 9.1 – Key Performance Indicators (KPI)

City of Healdsburg SSMP Audit Performance Indicators

SSMP Element	SSMP Section	Description	Performance Indicator	Unit	Target
System Information (tracking purposes only, no targets)			Total System Length	miles	
			Service Area	sq miles	
			Population	number	
			Service Connections	number	
			# Manholes	number	
			# Pump Stations	number	
			Sewer < 8 inch	miles	
			8 inch < sewer < 15 inch	miles	
			15 inch < sewer < 21 inch	miles	
			21 inch < sewer < 42 inch	miles	
			Average age of system piping	years	
			New sewer main installation	miles	
			New sewer lateral installation	miles	
			New cleanout installation	number	
Financial Information			Wastewater collections operations & maintenance staff (SEE NOTE 1)	number	14
			Total sewer collection O&M spending	\$M	\$1.0M
			Total sewer collection R&R spending	\$M	\$1.0M
Organization (tracking only, no targets)	D.13.ii.c	Chain of Communication	Total customer service calls	number	
			Total customer service calls resolved	number	
O&M	D.13.iv.a	Maps	Age of oldest un-fulfilled map update request	days	180
	D.13.iv.b	PM Activities	Certified wastewater collections operators	number	8
			Sewer laterals cleaned per year	number	20
			Sewer mains cleaned per year	miles	15
			Manholes inspected per year	number	300
			Sewer main CCTV inspected per year	miles	13.5
			Sewer laterals CCTV inspected per year	number	20
	Lift Stations maintained annually	number	11		
	D.13.iv.c	R&R Plan	Sewer main rehabilitated/replaced per year	miles	0.5 – 1.0 mi
			Sewer laterals rehabilitated/replaced per year	number	5
			Manholes rehabilitated	number	10-20
			% of CCTV inspection records reviewed for condition assessment purposes	%	100
			% of active Level 4 defects analyzed and included in CIP planning documents	%	90
			% of active Level 5 defects scheduled for repair within 5-year CIP	%	100

	D.13.iv.d	Training	Overall % completion of training matrices for all wastewater collections operations & maintenance staff	%	100
	D.13.iv.e	Critical Parts	Complete annual review of lift station spare part availability	Yes/No	Yes
Design	D.13.v.b	Construction	% of new sewer mains inspected	%	100
			% of new sewer laterals inspected	%	100
OERP	D.13.vi.a	Notification	Average response time to SSO	minutes	<60
	D.13.vi.d	SSO Containment	Percentage of SSO volume reaching a surface water	%	<25
FOG	D.13.vii.a	Public Education	Annual distribution of FOG informational flyers with City utility billing.	Yes/No	Yes
	D.13.vii.d	Grease Removal Devices	% of total FSE's with Grease Removal Devices installed	%	80
	D.13.vii.e	FOG Inspections	% of FSEs with permits inspected in the current year	%	100
			% of FSEs with violations that require increased inspections	%	<10
	D.13.vii.f	FOG Hot Spots	Length of FOG hotspot sections of pipe	feet	2,500
Number of SSO's caused by FOG			number	<2	
Monitoring & Measurement	D.13.ix	SSO Trends	SSO Rate per 100 miles of pipe	#/100 mi	7
			Total volume of SSO events per 100 miles of pipe	gal/100 mi	40,000
			% of total SSO volume recovered	%	75
			Number of SSOs caused by roots	number	<2
			Number of SSOs caused by debris	number	<2
			Number of SSOs caused by pipe failure	number	<2
			Number of SSOs caused by capacity	number	0
Total Number of Private Lateral SSOs	number	<5			
Audit	D.13.x	Updates	# of Days since completion of last audit	days	<730
			# of Days since completion of last SSMP update	days	<1,825
Communication	D.13.xi	Communication Program	Most current SSMP documents posted to City website	Yes/No	Yes

Notes:

1. Calculate the total number of City staff employed under the following positions:
 - Public Works: Public Works Maintenance Superintendent, Public Works Utility Foreman, Utility Worker
 - Utilities: Water/Wastewater Operations Superintendent, Wastewater Operations Foreman, Utility Operator.

Appendix 9.2 – SSMP Change Log

SSMP Change Log: FY 15/16 - FY 18/19

SSMP Element		2020 SSMP Updates/Changes	Date	LRO
1. Goals	(a) Develop goals for operation and maintenance of SSS	Added goal to monitor hydraulic capacity of the system.	2/17/2020	Rob Scates
2. Organization	(a) Identify the Legally Responsible Official (LRO)	Legally responsible officials updated in Appendix 2.1.	2/17/2020	Rob Scates
	(b) SSMP responsibility and organization chart	Updated, new SSMP responsibility chart in Appendix 2.1.	2/17/2020	Rob Scates
	(c) Chain of communication for reporting SSOs	Updated in new 2019 OERP.	2/17/2020	Rob Scates
3. Legal Authority	(a) Prevent illicit discharges into SSS	Added Municipal Code section numbers.	2/17/2020	Rob Scates
	(b) Require proper design and construction of SSS components	Added Municipal Code section numbers.	2/17/2020	Rob Scates
	(c) Ensure access to laterals owned/maintained by City	Added Municipal Code section numbers.	2/17/2020	Rob Scates
	(d) Limit the discharge of FOG or other debris that may cause blockages	Added Municipal Code section numbers.	2/17/2020	Rob Scates
	(e) Enforce violations of sewer ordinance	Added Municipal Code section numbers.	2/17/2020	Rob Scates
4. Operations and Maintenance Program	(a) Maintain up-to-date collection system maps	GIS updated for hydraulic model, new regular map update procedures and schedule added.	2/17/2020	Rob Scates
	(b) Schedule, conduct, and document preventative O&M activities	Updated description of preventative sewer cleaning programs, lift station maintenance, and documentation of work completed.	2/17/2020	Rob Scates
	(c) Condition assessment, rehabilitation and replacement (R&R) plan	Developed 2020-2021 CCTV inspection schedule. Provided criteria for prioritizing and scheduling of PACP Severity 5 and 4 defects identified through CCTV inspections.	2/17/2020	Rob Scates
	(d) Training	Updated description of training programs and documentation.	2/17/2020	Rob Scates
	(e) Equipment and critical replacement parts	Updated description of equipment and replacement part tracking and documentation.	2/17/2020	Rob Scates
5. Design and Performance Provisions	(a) Maintain SSS design and construction specifications	No significant changes.	2/17/2020	Rob Scates
	(b) Procedures and standards for inspecting and testing new and R&R projects	No significant changes.	2/17/2020	Rob Scates
6. Overflow Emergency Response Plan ("OERP")	(a) Proper notification procedures for SSOs	New 2019 OERP developed and adopted (Appendix 6.1).	2/17/2020	Rob Scates
	(b) Program for appropriate SSO response	New 2019 OERP developed and adopted.	2/17/2020	Rob Scates
	(c) Procedure for prompt notification to regulatory agencies	New 2019 OERP developed and adopted.	2/17/2020	Rob Scates
	(d) Appropriate staff and contractor training for OERP execution	New 2019 OERP developed and adopted.	2/17/2020	Rob Scates
	(e) Procedures to address emergency operations during SSOs	New 2019 OERP developed and adopted.	2/17/2020	Rob Scates
	(f) Procedures to ensure containment of SSOs to prevent discharge to surface waters including water quality monitoring when required	New Water Quality Monitoring Plan developed and adopted (Appendix 6.2).	2/17/2020	Rob Scates

SSMP Change Log: FY 15/16 - FY 18/19

SSMP Element		2020 SSMP Updates/Changes	Date	LRO
7. Fats, Oils, and Grease (FOG) Control Program	(a) Public education plan to promote proper disposal of FOG	No significant changes.	2/17/2020	Rob Scates
	(b) FOG disposal plan	No significant changes.	2/17/2020	Rob Scates
	(c) Legal authority to prohibit discharge of FOG	No significant changes.	2/17/2020	Rob Scates
	(d) Requirements to install and maintain grease removal devices	Updated description of standard permit conditions, GRD requirements, and maintenance requirements.	2/17/2020	Rob Scates
	(e) Authority to inspect and enforce FOG ordinance	Updated description of FSE inspection procedures.	2/17/2020	Rob Scates
	(f) FOG characterization assessment and hot spot cleaning schedule	No significant changes.	2/17/2020	Rob Scates
	(g) FOG source control program measures	No significant changes.	2/17/2020	Rob Scates
8. System Evaluation and Capacity Assurance Plan ("SECAP")	(a) Develop SSS hydraulic model and identify capacity deficiencies	City is conducting flow monitoring in Winter/Spring 2020 and developing new Sewer System Master Plan in 2020.	2/17/2020	Rob Scates
	(b) Establish SSS hydraulic design criteria	Added description of hydraulic design/performance criteria for existing SSS assets for capacity assessment in Master Plan.	2/17/2020	Rob Scates
	(c) Establish short- and long-term CIP for capacity enhancement measures	City is developing new Sewer System Master Plan in 2020. Added description of I/I reduction measures.	2/17/2020	Rob Scates
	(d) Develop schedule of completion dates for projects	City is developing new Sewer System Master Plan in 2020.	2/17/2020	Rob Scates
9. Monitoring, Measurement and Program Modifications	(a) Maintain records and information for SSMP activities	Updated description of data maintained by City.	2/17/2020	Rob Scates
	(b) Measure effectiveness of SSMP elements and programs	Added new performance indicators (Appendix 9.1).	2/17/2020	Rob Scates
	(c) Assess success of the preventative maintenance program	No significant changes.	2/17/2020	Rob Scates
	(d) Update SSMP program elements based on performance evaluations	SSMP change log added.	2/17/2020	Rob Scates
	(e) Identify and illustrate SSO trends	SSO trends established in FY 15/16-18/19 Audit.	2/17/2020	Rob Scates
10. SSMP Program Audits	(a) Conduct periodic audits	Included FY 15/16-18/19 Audit in Appendix 10.1, to serve as a template for future SSMP audits.	2/17/2020	Rob Scates
11. Communications Program	(a) Communicate on a regular basis with the public regarding SSMP development, implementation, and performance	City will add new SSMP documents and links for the 2020 updated SSMP to the City website.	2/17/2020	Rob Scates

Appendix 10.1 – SSMP Audit FY 15/16 – FY 18/19



WATERWORKS
ENGINEERS

CITY OF HEALDSBURG

Sewer System Management Plan (SSMP)

Four-Year Audit for FY 15/16 – FY 18/19

Date: February 2020

Prepared by: Joe Ziemann, P.E., Water Works Engineers
Mohsen Karbakhsh, P.E., Water Works Engineers
Mike Fisher, P.E., Water Works Engineers

Assisted by: Patrick Fuss, P.E., Principal Engineer
Rob Scates, Water/Wastewater Superintendent
Jarrod Dericco, Public Works Superintendent

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SECTION 1 Audit Objectives

This report summarizes the results of the required Sewer System Management Plan (SSMP) internal audit process for the City of Healdsburg (City) for fiscal years 2015-2016 (FY 15/16), 2016-2017 (FY 16/17), 2017-2018 (FY 17/18), and 2018-2019 (FY 18/19). The purpose of the SSMP is to provide a written framework and plan for properly managing, operating, and maintaining the City's sanitary sewer collection system. The programs described in the SSMP are designed to minimize the occurrence of sanitary sewer overflows (SSOs) and ensure compliance with California State Water Resources Control Board (SWRCB) Order No. 2006-0003-DWQ and Attachment A of the Order, known as SWRCB Order No. WQO 2013-0058-EXEC, together constituting the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (SSS WDR). The purpose of the SSMP audit is to evaluate the effectiveness of the SSMP, by reviewing the performance of programs described in the SSMP against the performance measures used by the City to evaluate compliance with requirements of the SSS WDRs.

The intention of conducting the SSMP audit is for the SSMP to evolve over time as a "living document" that the City continually adjusts after identifying potential enhancements and implementing changes in the management, operation and maintenance of the City's sanitary sewer collection system. Recently, the SWRCB is proposing a statewide sanitary sewer system order reissuance. The proposed reissuance, which will be built on the existing general order, is currently proposed to be adopted in 2020, with a primary focus of reducing the statewide spill volume. This audit briefly discusses the proposed reissued order by the SWRCB and considers recommendations to enhance future compliance.

The City will be completing the SSMP internal audit (Audit) on a biennial basis that is consistent with the procedure outlined in element ten (x) of the SSMP. The City completed its last SSMP update in 2014 and is required by the SSS WDR to update and recertify the SSMP at minimum every five years. The objective of this Audit is to review SSMP compliance, implementation, effectiveness, and make recommendations for updating the SSMP. This report includes the following key tasks:

1. Evaluate the City's historical SSO data and performance measures (Audit SECTION 3).
2. Using a standardized audit procedure detailed in Audit SECTION 4, identify areas of improvement and provide recommendations to enhance the effectiveness of the SSMP and its compliance with the future reissued Order.
3. Analyze the City's preventative maintenance (PM) program and rehabilitation and replacement (R&R) program as they relate to the operation and maintenance of the collection system (Audit Section 5.4).
4. Review the Sanitary Sewer Overflow Emergency Response Plan (OERP) and identify improvements as needed (Audit Section 5.6).
5. Document all findings during the Audit and retain it on file (Audit SECTION 6).

Note that the Audit of the City's SSMP is based on the City's 2009 (updated in 2014) version, and the results of the Audit will be used to identify updates to be made to the SSMP that will be implemented and certified by City Council in 2020.



SECTION 2 Agency Background / System Information

The City of Healdsburg is located along US Route 101 in northern Sonoma County approximately 15 miles north of Santa Rosa. The City covers approximately 4.5 square miles of area that lies west of the Russian River. Typical elevations are within a range of 100 to 300 feet above sea level with an average slope across the City of 0.5% from east to west. The City is responsible for the operation and maintenance of a sewer collection system that includes 54 miles of gravity sewer mains and serves approximately 11,800 people. **Table 1** lists key information about the sewer collection system over the past four-year period.

Table 1 – Overview of Sewer Collection System

Criteria	FY 15/16 – 18/19
Miles of gravity sewer mainline	50.2
Total Miles of laterals	90.5
Total Miles of lower laterals (owned by the City)	54.5
Total Miles of pressure sewer	3.0
Number of manholes	1,027
Lift stations	11
Customer accounts (including individual multi-family units and non-residential, approximate as of 2020, refer to 2016 Rate Study Exhibit IV-2)	5,250
Population served (approximate as of 2020)	11,800
Public Works & Utilities Departments staff number involved with sewer collection system operations, maintenance, management	26
Annual O&M budget for sanitary sewer system facilities	\$1,000,000
Annual capital expenditure budget for sanitary sewer system facilities	\$1,000,000
Category 1 SSOs	9
Category 2 SSOs	1
Category 3 SSOs	18

The City treats wastewater conveyed through its collection system at the City’s water reclamation facility (WRF). The WRF is permitted for an average daily dry weather flow of 1.4 MGD and peak daily wet weather flow of 4.0 MGD. Sewage flows by gravity to the Magnolia Lift Station, from where it is pumped approximately 3,500 ft through two parallel 14-inch force mains to the WRF. The City operates 10 other lift stations that serve smaller areas within the City. The City is a part of Region 1 (North Coast) of the SWRCB.



SECTION 3 SSO Trends

3.1 Historical SSO Data

Appendix 7.1 of this report includes the date, location, type, volume, volume recovered, and recovery percentage of total volume of each SSO reported to California Integrated Water Quality System (CIWQS) during the audit period.

One of the tasks of the Audit is to compare the information submitted to the publicly available CIWQS database with internal City records. This is done because Order No. WQ 2013-0058-EXEC (Section E – Record Keeping Requirements) requires the City to maintain detailed records of each SSO event. The Wastewater Superintendent verifies that SSO data in CIWQS is accurate and matches the SSO Field Report Forms. **Table 2** summarizes key data present in CIWQS and City internal records and shows some inconsistencies, details of which are listed in **Appendix 7.2**. The reason identified for the inconsistencies is that the City’s internal reports are initially collected during the SSO response, and the final report submitted to CIWQS includes additional follow-up and more detailed information that is collected and reported in CIWQS but may not be later added to the initial internal report. This issue is being resolved with the City’s new OERP (2019) and updated Sanitary Sewer Overflow Field Report forms which will improve documentation of post-SSO event follow-up activities.

Table 2 – CIWQS and City SSO Historic Data

SSO Historical Data since last SSMP Internal Audit	CIWQS Data FY15/16	Internal Records FY15/16	CIWQS Data FY16/17	Internal Records FY16/17	CIWQS Data FY17/18	Internal Records FY17/18	CIWQS Data FY18/19
The total number of SSOs reported	6	6	13	13	3	4	6
The reported total volume of SSOs	351	316	39,358	16,295	127,757	164,720	64,291
The reported total volume of SSOs that reached waters of the state	0	0	26,352	3,292	127,602	108,560	63,367
The percent volume of SSOs recovered	100%	100%	33%	80%	100%	34%	1%
The average SSO response time [hh:mm]	0:15	0:17	0:56	0:57	0:25	0:28	0:09
The average SSO duration time [hh:mm]	0:52	7:08	23:16	18:27	1:51	4:22	953:31 ¹

1. Due to small, slow leak in a sewer pipe that occurred for an unknown length of time but was estimated.

The following section analyzes the City’s historical SSO data to identify potential SSO trends to provide insight into measuring the effectiveness of the City SSMP and future improvements in reducing SSOs. **Figure 1** highlights the category and number of SSOs since FY 11/12. The SWRCB defined three new SSO categories as of September 13th, 2013. A Category 1 SSO is currently defined as a spill of any volume that reaches a surface water. A Category 2 SSO is currently defined as a spill greater than or equal to 1,000 gallons that does not reach surface water. A Category 3 SSO is currently defined as a spill less than 1,000 gallons that does not reach a surface water. **Figure 1** shows a declining trend for Category 3 SSO events over time and also a general downward trend in the total number of SSOs per year.

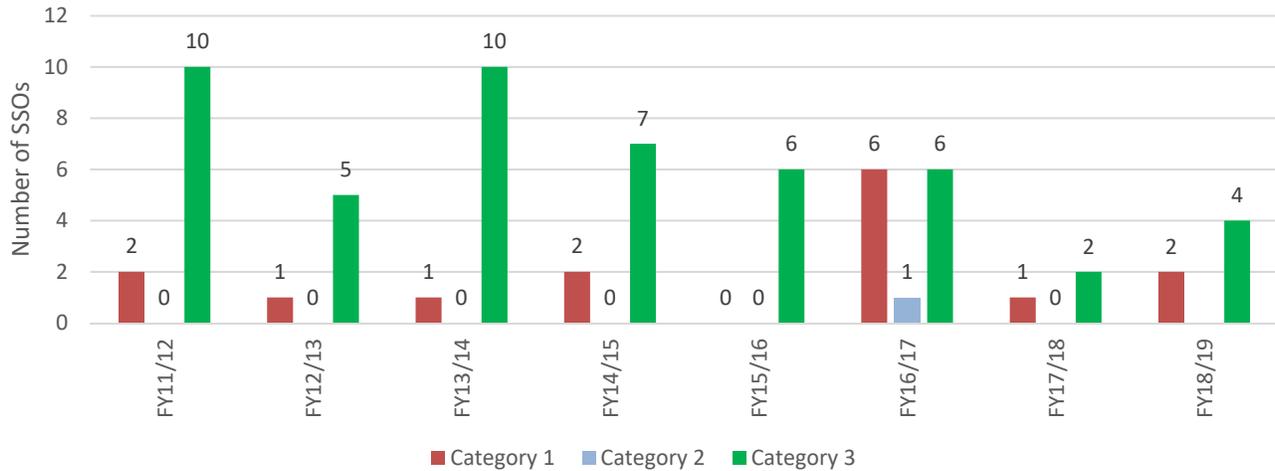


Figure 1 – Number of SSOs per Fiscal Year

Figure 2 shows the total annual SSO volume since 2011 (logarithmic scale). Although the number of SSO events has generally been decreasing over recent years (See **Figure 1**), **Figure 2** indicates that the spill volume has been increasing during this audit period. A similar trend was also observed by the SWRCB throughout the state and most regions. The two particularly significant wet weather seasons of FY 16/17 and 17/18 in terms of rainfall are a possible contributing factor to the higher regional and statewide spill volumes.

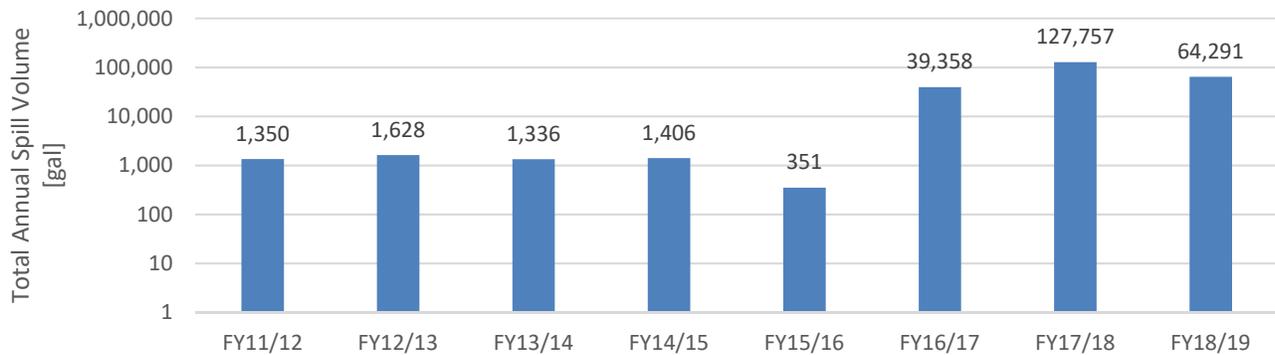


Figure 2 – Total Annual Spill Volume

Further details regarding higher volume spills that occurred between FY 16/17 and FY 18/19 are provided below:

- During FY 16/17, two SSOs (of 13 total SSO events) accounted for 35,220 gallons or approximately 90% of the spill volume for that year. One of these spills was caused by root intrusion in a main line (23,040 gallons) and the other by a contractor construction diversion failure (12,180 gallons) which was contained in the construction trench.
- Fiscal Year 17/18 involved only three SSOs, one of which was caused by a contractor construction diversion failure that resulted in a 127,602 gallon spill. This spill reached a dry waterway and was



recovered although still reported as a Category 1 event. This single spill accounted for approximately 99% of the spill volume during FY 17/18.

- During FY 18/19, two SSOs (of 6 total SSO events) accounted for approximately 99% of the total annual spill volume. A 20,400 gallon spill occurred at the City’s Magnolia Lift Station during a historic (100 year + return period) rain event that flooded areas of the City of Healdsburg and introduced a level of stormwater inflow into the sewer collection system that exceeded the lift station’s design capacity. A 42,967 gallon spill was reported from a slow leak from a crack (approximately 0.109 gpm) observed in an exposed section of gravity sewer main crossing through a concrete drainage culvert. The duration of the leak was unknown but estimated based on the last inspection of that area.

Below, the City’s number of SSOs per 100 miles of sewer pipeline (including gravity mains and force mains) and spill volume per 100 miles of sewer pipeline are compared with the results from sub-region North Coast (SWRCB Region 1) and California (State), to provide regional context and insight into the City’s collection system performance. **Table 3** summarizes these findings, gathered from the SWRCB’s annual performance reports. These reports and their related data can be found online at the following link:

https://www.waterboards.ca.gov/about_us/performance_report_1819/plan_assess/12411_sso_sewage_volume.html

The City’s SSO events per 100 miles of pipe are higher than the region and the State, during the past eight years. The spill volume per 100 miles of pipe was generally lower than the region and the State prior to FY 16/17, but has exceeded in FY 16/17, 17/18, and 18/19.

Table 3 – Regional Comparison of SSO Data

FY	# of SSOs per 100 miles of pipe			Spill Volume (gal) per 100 miles of pipe		
	City	Region 1	State	City	Region 1	State
2011/12	21.1	3.5	4.9	2,373	23,884	15,788
2012/13	10.5	3.3	5.4	2,861	6,149	10,074
2013/14	19.3	4.0	4.9	2,348	14,329	5,097
2014/15	15.8	3.4	4.6	2,471	10,324	11,484
2015/16	11.3	3.1	4.0	660	2,226	25,134
2016/17	24.4	3.4	3.7	73,981	73,372	49,725
2017/18	5.6	3.2	3.0	240,145	12,710	8,674
2018/19	11.3	3.9	3.2	120,848	69,478	23,982
Average*	13.2	3.4	3.5	108,908	39,447	26,879

*Average of 2015/16-2018/19 audit period

Table 4 demonstrates the leading causes of SSOs in this audit period compared to the previous four-year period (FY 11/12-14/15). Generally, the number of SSOs caused by roots has decreased, but the volume increased due to one 23,040 gallon spill caused by roots. Also, this table shows that debris related SSO events have decreased during this period and that FOG related SSOs remain low, which demonstrates the effectiveness and success of the preventative sewer cleaning and FOG control programs. However, there is an apparent increase in SSOs caused by pipe failure and contractor diversion failures compared to the previous four-year period.



Table 4 – Leading Causes of SSOs in FY 15-19 (compared to results from FY 11/12-14/15)

FY 15/16 - FY 18/19 (FY 11/12-14/15)					
By Number		By Volume		By Avg Volume Per SSO	
Cause	Number	Cause	Gallons	Cause	Gallons
Roots	7 (9)	Roots	24,286 (1,247)	Roots	3,469 (139)
FOG	2 (2)	FOG	7 (146)	FOG	4 (73)
Debris	6 (20)	Debris	337 (4,074)	Debris	56 (204)
Pipe Failure	5 (4)	Pipe Failure	43,358 (23)	Pipe Failure	10,840 (6)
Capacity	3 (0)	Capacity	20,458 (0)	Capacity	6,819 (0)
Contractor Diversion or Other Causes	5 (3)	Contractor Diversion or Other Causes	143,311 (230)	Contractor Diversion or Other Causes	23,885 (77)

To further illustrate the leading SSO causes, the total SSO volume per cause for the past two four-year periods are shown in **Figure 3** (logarithmic scale).

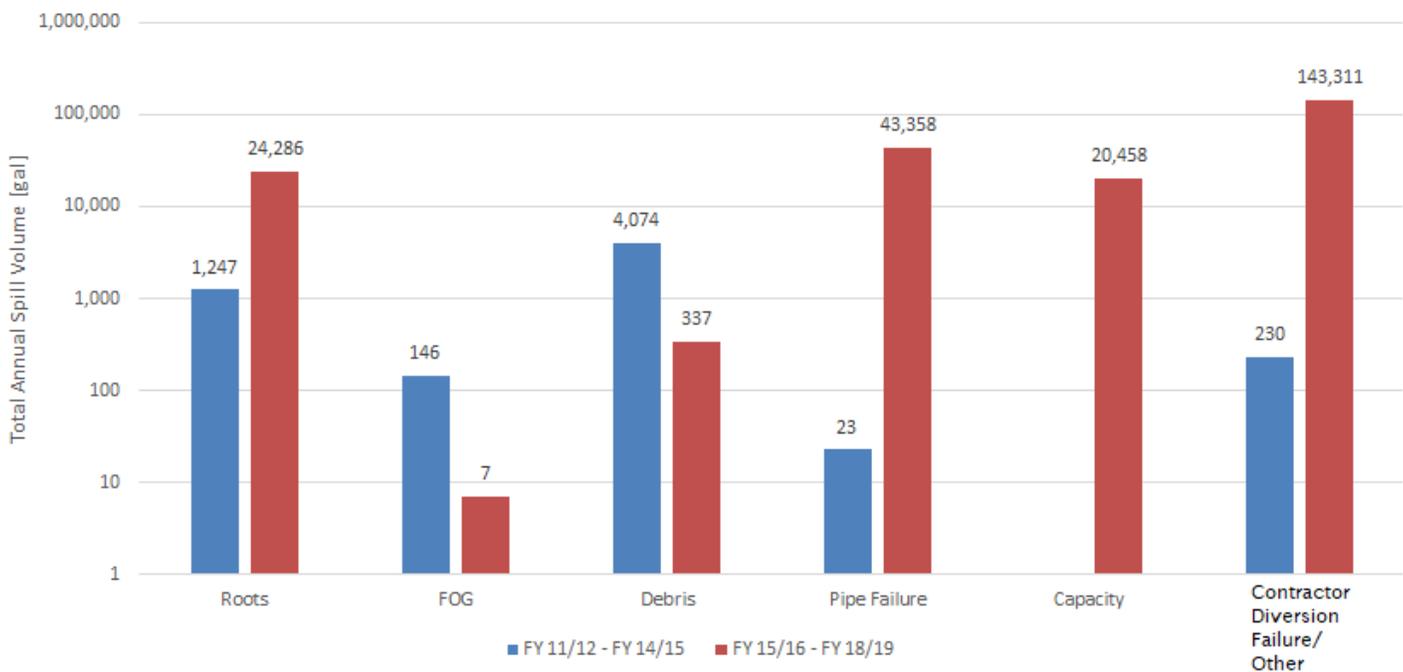


Figure 3 – Total Annual Spill Volume per Cause

For FY 19/20 and FY 20/21, the City will be focusing on implementation of its CCTV inspection program to complete inspection of all gravity sewer lines within the City that are older than 25 years in order to identify and repair pipes that are in danger of failing in the near term in order to reduce spills due to pipe failure.

Additionally, the City will be implementing more stringent redundancy and monitoring requirements for contractor bypass pumping operations in order to reduce spills that are contractor-caused.



3.2 SSO Performance Measures

To improve operation and management of the sanitary sewer system and to prevent SSOs, the City is implementing multiple performance measures to assess the effectiveness of the SSMP. The following performance measures are specific to SSO occurrences:

- SSO Rate (number of SSOs per 100 miles of collection system piping per year)
- SSO volume (gallons) per 100 miles of pipe
- Number of SSOs for each cause (roots, FOG, debris, pipe failure, capacity, lift station failures, etc.)
- Percentage of SSO volume recovered (%)
- Percentage of SSO volume reaching a surface water (%)

The City’s CIWQS SSO records were queried to analyze each performance measure from FY 15/16 to FY 18/19 and the data is shown in Table 5 below.

Table 5 – SSO Performance Measures (CIWQS)

Performance Measures		FY 15/16	FY 16/17	FY/17/18	FY18/19	CITY GOAL
SSO Rate, # SSOs/100 mi		11.3	24.4	5.6	11.3	7.0
SSO Rate, gallons SSOs/100 mi		660	73,981	240,145	120,848	40,000
SSO Cause	Roots	1	5	1	0	1
	FOG	0	0	1	1	1
	Debris	4	2	0	0	1
	Pipe Failure	1	2	1	1	1
	Capacity	0	0	0	3	0
	Contractor	0	4	0	1	0
Total SSO numbers		6	13	3	6	4
Total SSO volume (gal)		351	39,358	127,757	64,291	22,500
Average SSO Vol (gal) (total volume/# of SSOs)		59	3,028	42,586	10,715	N/A
% of SSOs > 100 gal		33.3%	61.5%	66.7%	50.0%	N/A
Category 1 % of Total SSOs		0%	46%	33%	33%	N/A
% of Spill Volume Recovered		100%	34%	100%*	1%	75%
% of Spill Vol Reaching Surface Water		0%	66%	100%	99%	25%

* A spill into a dry waterway occurred that was 100% contained but still reported as a Category 1 event.

The City has established goal values for each performance indicator for the upcoming audit period of FY 19/20 to FY 20/21 also listed in Table 5. The goals have been set at a level that encourages a reasonable increase in performance over the past 4-year averages and also brings the City closer to Region 1 average performance.



SECTION 4 Audit Procedure

In accordance with SSS WDR Section D.13.x, the primary SSMP audit objective is to focus on evaluating the effectiveness of implementing the SSMP and the City's compliance with the SSMP requirements identified in the SSS WDR Order. Also, according to recent SWRCB WDR workshops, it is expected that the statewide general order reissuance will place particular emphasis on the following:

- **Requirements focused on spill volume:** Although the total number of spills has decreased over the past few years, the CIWQS data has shown that, like the City of Healdsburg, the state has experienced higher spill volumes. While this trend may be due to high amounts of rainfall in the previous three winter seasons, the proposed reissuance will likely require enrollees to demonstrate system-specific spill reduction programs.
- **Improved Data Quality:** With the goal of enhancing data accuracy, additional measures are being considered to provide higher quality spill volume data, such as maintaining certified operators and emphasis on staff training.
- **Enhanced Order Enforceability:** Enforcement will be targeted to address poor performing systems and those with lack of SSMP implementation.
- **Incentivize Order Compliance:** SWRCB will recognize and acknowledge systems with good performance.
- **Effective Planning for System Resilience:** SWRCB will look for effective and adaptive planning for spill reduction.

4.1 Review of SSMP Compliance

This Audit assessed the City's SSMP (2009/2014) against the requirements outlined in the SSS WDR. The subsections of SECTION 5 are organized by SSMP element. Each subsection contains a table which lists the SSS WDR section D.13 requirements and the City's level of compliance of the SSMP with that requirement. The compliance status of the City's SSMP is indicated with one of the following ratings: **Yes** – *in compliance*, **No** – *not in compliance*, or **N/A** – *not applicable with a written justification in the SSMP*. If there are any compliance deficiencies, then an explanation of the deficiency is given. Each deficiency will have a recommended SSMP enhancement, which may include action items, adjustments, and/or timelines for planned completion. Potential enhancements may also be provided for SSMP elements are in compliance.

4.2 Review of SSMP Effectiveness

Following the SSMP compliance assessment compared to SSS WDR requirements, an evaluation of the effectiveness of the SSMP elements has been conducted to comply with the requirements for SSMP audits per subsection D.13.x of the SSS WDR. The discussion reviews if the programs outlined for each section are being followed, and how effective the programs are at reaching the desired objectives. Recommendations will be made where appropriate based on the results of this Audit to identify tasks to improve the effectiveness of SSMP activities or SSMP updates required.

This section will not repeat the information and programs presented in each section of the SSMP and is intended to evaluate the effectiveness of the stated programs for each SSMP element. The reader should reference the City's SSMP to obtain the information referenced by this Audit.



SECTION 5 Audit of SSMP Elements

This section evaluates all elements of the City’s SSMP. Each section of this chapter is associated with one of the eleven elements of the SSMP in accordance with SSS WDR section D.13 requirements. Each element is evaluated for compliance and effectiveness as described above in Section 4.1 and 4.2 respectively. A summary of the recommended modifications made through this Audit is included in SECTION 6.

5.1 Goals

5.1.1 Compliance

Table 6 – Compliance with SSS WDR D.13.i - Goals

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
i Provide a plan and schedule to properly manage, operate, and maintain all portions of the City’s wastewater collection system.	Yes	-

5.1.2 Effectiveness of SSMP Elements and Recommended Modifications

Healdsburg Goals (SSMP 1.0)

- Level of Effectiveness: The City currently has seven goals identified in the SSMP. The goals of the City recorded in the SSMP have been effective in guiding the City’s activities to support the objective of the SSS WDR to protect the waters of the State.
- Recommendations: None.

5.2 Organization

5.2.1 Compliance

Table 7 – Compliance with SSS WDR D.13.ii - Organization

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
ii(a) Identify Legally Responsible Official (LRO)	Yes	Update description of LROs
ii(b) SSMP responsibility and organization chart	Yes	Update City Org Chart and responsibilities
ii(c) Chain of communication for reporting SSOs	Yes	-

5.2.2 Effectiveness of SSMP Elements and Recommended Modifications

List Legally Responsible Official (LRO) (SSMP 2.1)

- Level of Effectiveness: The current SSMP lists the Public Works Direct / City Engineer as the LRO. This has since been changed per the most recent OERP to include several City positions including the Water/Wastewater Operations Superintendent, Wastewater Utility Foreman, and Utilities Director.
- Recommendations: Modify and update the LRO table and move the table into an appendix, this helps the element to be updated separately from the SSMP.



SSMP Responsibility Organization Chart (SSMP 2.2)

- Level of Effectiveness: The SSMP Responsibility Organization Chart lists descriptive definitions of the SSMP responsibilities. The chart defines the work flow and responsibilities of individual City positions as outlined in the City’s Organizational Chart (SSMP Figure 3). The organization chart has not been updated since 2014.
- Recommendations: Modify and update the current City organization chart to reflect the latest departments, work flows, and responsibilities as it relates to the SSMP elements.

Chain of Communication for SSO Reporting (SSMP 2.3)

- Level of Effectiveness: The spill notification procedures have been updated in the City’s most recent OERP (2019). The City has a 24-hour emergency call Dispatch which notifies the Utility Maintenance Superintendent during business hours, and an On-Call Employee after hours. This has been effective as the average SSO response time has remained below 60-minutes. Only 5 SSO response times were above 60 minutes during the audit period, approximately 18% of the events.
- Recommendations: None.

5.3 Legal Authority

5.3.1 Compliance

Table 8 – Compliance with SSS WDR D.13.iii – Legal Authority

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
iii(a) Prevent illicit discharges	Yes	-
iii(b) Properly designed and constructed sewers	Yes	-
iii(c) Ensure access to laterals owned/maintained by City	Yes	-
iii(d) Limit the discharge of FOG and other debris	Yes	-
iii(e) Enforce any violation of City ordinances	Yes	-

5.3.2 Effectiveness of SSMP Elements and Recommended Modifications

Prevent Illicit Discharges (SSMP 3.1)

- Level of Effectiveness: The City’s legal authority to control use of the sewer collection system is provided in Appendix C of the SSMP by Ordinance 763. This ordinance has been in effect since 1984 and it prohibits the discharges of any substances that are not in compliance with the State or Federal regulation for sewage discharge.
- Recommendations: Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.

Design and Construction Standards (SSMP 3.2)

- Level of Effectiveness: Ordinance 763 requires all entities to comply with all of the applicable City Public Works Standards for construction or improvement of any sanitary sewer connection. In addition, it requires inspection and supervision of all connections and repairs to the public sewer system. In most



instances, if there is a cleanout, the City owns and is responsible for the lower lateral (from the property line to the sewer main). This represents approximately 54.5 mi of laterals.

- Recommendations: Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.

Sewer Access Authority (SSMP 3.3)

- Level of Effectiveness: Ordinance 763 grants a right of entry for all authorized employees of the City to enter all served properties for inspection, observation, sampling, testing, maintenance, repairs, or replacement of collection system assets.
- Recommendations: Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.

FOG Control (SSMP 3.4)

- Level of Effectiveness: Section 15-103 and 15-104 of Ordinance 763 lists prohibited wastes as it relates to sewage, which includes floatable fats, oil, or grease (FOG) in excess of 50 parts per million (ppm), or dispersed non-floatable FOG matter in excess of 500 ppm. In accordance with Ordinance 763, any person discharging prohibited waste into the sewer requires a permit before doing so. Section 15-104 of Ordinance 763 requires pretreatment of such waste before being discharged to the system.
- Recommendations: Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.

Enforcement Authority (SSMP 3.5)

- Level of Effectiveness: Ordinance 763 holds any discharger who discharges prohibited waste into the City system accountable for the damage and associated costs. Existing City ordinances, including Ordinance 763, are enforced through Ordinance 985, which is typically managed by the City's "Enforcement Officer".
- Recommendations: Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.



5.4 Operation and Maintenance Program

5.4.1 Compliance

Table 9 – Compliance with SSS WDR D.13.iv – O&M Program

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
iv(a) Collection system maps	No	The City does not currently have the staffing in place to keep the GIS mapping up to date.
iv(b) Preventive O&M activities	Yes	Updates to the description of the City’s preventative sewer cleaning program described in the SSMP need to be made to reflect current practices.
iv(c) Rehabilitation and Replacement (R&R) plan	No	A plan and schedule to complete CCTV inspection of the required areas of the collection system (older than 25 years) by January of 2022 should be developed. A defined procedure for reviewing CCTV data and scheduling and prioritizing system repairs is not currently defined in the SSMP.
iv(d) Training	No	The City provides regular training. However, documentation of training should be improved to provide the City a defensible position that proper training is completed annually.
iv(e) Equipment and critical replacement parts	Yes	A more thorough description of tracking systems currently used by the City should be provided in the SSMP.

5.4.2 Effectiveness of SSMP Elements and Recommended Modifications

Collection System Maps (SSMP 4.1)

- **Level of Effectiveness:** The City maintains electronic and hard copy maps of the sanitary sewer system and storm drain system. The City’s maps are available to all personnel in a variety of formats. The Esri ArcGIS maps can be accessed by the field crew utilizing an Esri Explorer application on their phones or a work station, as well as hard copies. The GIS mapping is managed by the City’s IT Department. Redline updates to the GIS mapping requested by field crews based on conflicts identified in the field are submitted via the IT Department’s Help Desk interface. As-built drawings of new infrastructure are also submitted for addition to the GIS maps. However, the GIS mapping system has not been updated since 2012 because of a lack of staffing in the IT Department to dedicate time to making GIS mapping updates. Therefore, the City is not currently in compliance with maintaining “up-to-date” mapping.
- **Recommendations:**
 - Updates to the GIS mapping based on as-built drawings of sewer system improvements since 2012 will be made as part of the City’s Hydraulic Modeling effort.



- Identify a staff position within the Public Works Department that will be responsible for making GIS mapping updates and ensure this position is allocated adequate time on an annual basis to complete the task or outsource the GIS mapping updates to a qualified consultant.
- Develop an annual schedule for transmitting mapping updates to the position responsible for updating the GIS mapping. Sending updates in groups once every 3 to 6 months on a regular schedule may be more effective than one-at-a-time as they come up. Set deadlines for completion of mapping updates and verify completion prior to the next regularly scheduled submittal date.

Preventive Operations & Maintenance Activities (SSMP 4.2)

- Level of Effectiveness: A summary of the City's current PM programs is provided below:
 - The City's goal is to clean the entire collection system once every 3 years. The City utilizes a large-scale GIS hard-copy map located at the Corp Yard to highlight (using color coding by year) sections cleaned for an easy visual representation of what has been done and what remains to be done within the 3-year cycle. There are also Excel spreadsheets that list all main line segments that are used to document when each section was cleaned and observations of debris, FOG, grit, or roots.
 - Sewer mains that have experienced SSOs or that have been observed to have high accumulation of debris based on previous cleaning or CCTV inspections are placed on a higher frequency 180-day cleaning list. This is an Excel spreadsheet that is continually updated.
 - Sewer laterals that have had private laterals spills are placed on a 180-day sewer lateral auger list for increased maintenance or future replacement. This is an Excel spreadsheet that is continually updated.
 - Each lift station is cleaned of accumulated debris and FOG using the vactor truck once per year. An Excel spreadsheet is used to schedule the lift station cleaning by month and document results.
 - Recently, CCTV is only being performed on mainlines and laterals if the crew identify an issue during a PM activity, or after an SSO to identify the cause. Documentation of sewer lines so inspected has been limited.

Currently, the City does not use a CMMS system for tracking and managing the PM activities and these programs are maintained and tracked in a spreadsheet system. The current SSMP describes the use of HTE Sungard CMMS; however this is no longer applicable. The City is currently undergoing a City-wide CMMS implementation study to determine the system requirements of the CMMS to be acquired.

Currently, regular system cleaning is reportedly performed on staff overtime. It is unclear if the staffing to perform cleaning on a 3-year schedule and to complete CCTV inspection of the remaining portions of the system by January of 2022 is in place. Additional staffing may be required.



- **Recommendations:**
 - Update SSMP Section 4.2 to provide an updated general overview of the current O&M activities and PM programs using illustrative flow charts.
 - Provide more detailed description of criteria used to place sewer main lines on the 180-day cleaning list.
 - The City is planning to transition scheduling and documentation of sewer main line cleaning activities from Excel spreadsheets to a new CMMS. As part of the ongoing CMMS implementation, the City should ensure that the CMMS will be capable of tracking preventative maintenance down to the level of each individual pipe segment and manhole in concert with the City's GIS so that results and statistics can be readily reviewed and analyzed on a GIS platform. Ensure the system is user-friendly for staff so that it is used efficiently.
 - Update description within the SSMP of mechanical inspection/maintenance of lift stations. Specific procedures are not currently described in the SSMP.

Rehabilitation and Replacement Plan (SSMP 4.3)

- **Level of Effectiveness:** The City conducts CCTV condition assessment using the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) coding standard. The City has CCTV-inspected approximately 20% of the sewer collection system. The City has a CCTV truck equipped with IT Pipes software. However, the City has been attempting to integrate IT Pipes with its GIS system and has experienced technical challenges with the implementation of this that has temporarily halted progress on continued CCTV inspection. The City is required to complete CCTV inspection of all sewer mains that are older than 25 years by January of 2022 according to the City's settlement with River Watch. A plan and schedule to complete this work has not yet been developed.

Currently, the City doesn't perform formal manhole condition assessment and manholes are inspected visually during sewer cleaning activities, and any significant leaks or defects are repaired on the spot by the sewer crew.

The City currently has several sewer rehabilitation/replacement projects in its 2018-2023 5-year CIP:

- Healdsburg Ave Sewer Replacement: 2,300 LF replacement of failed/problematic sewer line
- Orchard LS Reconstruction: Replacement of structure that is at end of its useful life
- West Side Road Gravity Sewer: Convert corporation yard forcemain to gravity sewer and abandon Hendricks LS
- College St. Sewer / Water Main Replacement: Replace 1,800 LF of severely deteriorated water main, replace older sewer main at the same time
- Fitch St. Sewer / Water Replacement: Replace 3,00 LF of deteriorated sewer / water mains.
- Piper St. Sewer / Water Replacement: Replace 1,600 LF of deteriorated sewer / water mains.
- Heron Lift Station Relocation: Relocate lift station that is prone to FOG buildup.



However, the SSMP does not describe the process for reviewing CCTV data, identifying system repairs, and prioritizing those repairs for integration into the City-wide CIP. The City's settlement with River Watch requires that all PACP Severity 5 defects are included within the 5-year CIP.

The City has also established a goal to spend 1-2% of the total collection system asset value per year on system rehabilitation and replacement, which assumes that all assets have a useful life ranging between 50-100 years. In 2012 the City had developed an estimate of the collection system and WRF replacement value based on an asset inventory developed for the 2012 Rate Study. The calculated value at that time was approximately \$80M. The City's most recent 2016 Rate Study recommended that \$1.5M per year be transferred from the wastewater operating fund to the capital replacement reserve, which is in line with the goal stated above.

- Recommendations:
 - Complete updates to IT Pipes CCTV software as soon as possible so CCTV inspection work can resume.
 - Develop a specific CCTV inspection schedule to complete all work by January 2022 and determine if additional staffing is required or if use of outside contractors may be necessary.
 - Describe the process/procedure for evaluating CCTV data, conducting a risk assessment to prioritize repair of identified defects, and strategies used to develop individual capital improvement projects. Describe use of contracted third party services to complete this work if necessary. A regular annual schedule for completing review and analysis of CCTV data should be established to ensure that high priority system defects are integrated into the City's CIP as promptly as possible.
 - Describe within the SSMP the strategy used to determine the collection system asset replacement value and keep this value updated in order to ensure that adequate system rehabilitation and replacement funding and spending is in place, and how this information is included in ongoing rate studies.
 - Utilize future CMMS/GIS platform for calculating the sewer collection system's replacement value. If the CMMS and GIS is kept up-to-date, it will be easier to keep the replacement value up-to-date as the system expands as well.

Training (SSMP 4.4)

- Level of Effectiveness: The City's current training program for wastewater collection systems operations consists mainly of bi-weekly tailgate meetings covering a range of topics. Training topics include safety, execution of the OERP, operation of sewer cleaning and CCTV equipment, etc.
- Recommendations:
 - Develop a mandatory training matrix that covers all critical areas of competency for wastewater collection systems operations including O&M programs, OERP, safety, CIWQS data management, etc.
 - Develop a system for verifying and documenting completion of the training matrix for each wastewater collection systems operations employee and include this as an SSMP performance measure.



Equipment and Critical Replacement Parts (SSMP 4.5)

- **Level of Effectiveness:** The City owns two vactor trucks and a CCTV truck that are maintained by the City’s fleet maintenance department, via Mitchell On Demand, which is a web-based maintenance and parts inventory system. The City maintains equipment and replacement parts at the corporation yard for sewer system piping repairs, and the inventory is tracked using spreadsheets. Replacement parts for the sewer lift stations are maintained at the WRF and tracked in LLumin CMMS. The equipment and critical replacement parts inventory and upkeep is effective.
- **Recommendations:** Update the description in the SSMP of the fleet maintenance (vactor truck, CCTV truck) tracking system used by the City, and the use of LLumin to track replacement parts for sewer lift stations.

5.5 Design and Performance Provisions

5.5.1 Compliance

Table 10 – Compliance with SSS WDR D.13.v – Design and Performance Provisions

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
v(a) Sanitary sewer design and construction specifications	Yes	Update the Standard Specifications and Details link in the SSMP as the current link no longer works.
v(b) Procedures and standards for inspecting and testing new and R&R projects	Yes	Add the Public Works Inspectors to the SSMP responsibilities chart for enforcement of the design and performance provisions.

5.5.2 Effectiveness of SSMP Elements and Recommended Modifications

Sanitary Sewer Design and Specifications (SSMP 5.1)

- **Level of Effectiveness:** The City’s design and construction standards are available on the City’s website and the online SSMP document provides a link. These design and construction standards are effective in ensuring that new or rehabilitated infrastructure is designed and constructed in an acceptable manner.
- **Recommendations:** Update the Standard Specifications and Details link in the SSMP as the current link no longer works.

Sanitary Sewer System Construction and Performance Provisions (SSMP 5.2)

- **Level of Effectiveness:** The City’s construction and design standards include procedures and requirements for the testing and inspection of new/rehabilitated assets by Public Works staff and has been effective in ensuring that recently constructed assets perform as expected.
- **Recommendations:** Add the Public Works Inspectors to the SSMP responsibilities chart for enforcement of the design and performance provisions.



5.6 Overflow Emergency Response Plan

5.6.1 Compliance

Table 11 – Compliance with SSS WDR D.13.vi - OERP

SSMP Requirement	Compliance	Deficiencies / Major Recommendations
vi(a) Proper notification procedures	Yes	-
vi(b) Program for appropriate SSO response	Yes	-
vi(c) Procedure for prompt notification to regulatory agencies	Yes	Consider implementation of a QA/QC review procedure for Sanitary Sewer Overflow Report forms prior to internal close-out.
vi(d) Procedures for appropriate staff and contractor training	Yes	Per the City’s updated OERP, ensure that contractors develop project-specific OERPs for work on the sewer collection system. Ensure appropriate redundancy and monitoring provisions for any sewer bypass operations on a case-by-case basis.
vi(e) Procedures to address emergency operations (e.g., traffic, crowd control)	Yes	-
vi(f) Program to ensure containment of SSO to prevent discharge and minimize adverse impacts on the environment	No	Develop a Water Quality Monitoring Plan that meets the requirements of the current Monitoring and Reporting Program.

5.6.2 Effectiveness of SSMP Elements and Recommended Modifications

Notification Procedures (SSMP 6.1)

- Level of Effectiveness: The average SSO response time during the audit period was 34 minutes, with 15 minutes for FY 15/16, 56 minutes for FY 16/17, 25 minutes for FY 17/18, and 9 minutes for FY 18/19 (see **Table 2**). These response times are faster than the City target response time of 60 minutes and indicates that the notification procedures employed the City are effective in facilitating a rapid response from the City’s first responders.
- Recommendations: No recommended modifications at this time.

Response Program (SSMP 6.2)

- Level of Effectiveness: The City developed adopted an updated OERP in 2019. SSO response procedures are summarized in Tab 2 of Appendix C of the 2019 OERP. The flow chart uses a series of yes/no questions to guide SSO responders in quickly identifying the right sequence of decisions and actions to properly assess and mitigate an SSO. This chart is simple and effective in explaining the process in which to mitigate an SSO. During the audit period, the average SSO duration length was about 12:30 hours long. There were 8 long-duration SSOs (over 3 hours) that caused the average SSO duration length to increase. One of these SSOs in FY 16/17 spilled from a main for an estimated 50 hours and resulted in a Category 1 spill of 23,040 gallons. In all these longer duration instances, the City was not notified of the SSO at the time the spill initiated, but once notified, stopped all spills in under 60 minutes. These instances occurred before



adoption of the new OERP and the City anticipates improvements to the response program with its implementation.

Recommendations: No recommended modifications at this time.

Regulatory Notification Procedure (SSMP 6.3)

- Level of Effectiveness: The Water/Wastewater Operations Superintendent, Wastewater Utility Foreman, and Utility Director are the legally responsible officials (LRO) for certifying SSO reports submitted to CIWQs, as indicated in Tab 1 of Appendix C of the OERP. The Public Works crew and Utilities crew are authorized for reporting the SSOs to NCRWQCB, OES, City Clerk, Town of Windsor, Sonoma Water, and SWRCB. This section is effective in conveying the responsibility of the LRO in reporting SSOs to the proper authorities.
- Recommendations: Consider implementation of a QA/QC review procedure to ensure that data entered on the new Sanitary Sewer Overflow Report forms (from 2019 OERP) matches data entered into CIWQS, including all finalized and follow-up data before closing out the Sanitary Sewer Overflow Reports internally.

Staff and Contractors Training (SSMP 6.4)

- Level of Effectiveness: Each wastewater collections operations employee is required to receive training on the contents of the OERP before starting a position, as well as annual refresher trainings. The annual training involves review of the OERP and SSMP, SSO volume estimation techniques, SSO documentation, response procedures, water quality sampling, etc. Contractors working on City sewer facilities are required to develop a project-specific OERP.
- Recommendations: Per the City's updated OERP, ensure that contractors develop project-specific OERPs for work on the sewer collection system. Ensure appropriate redundancy and monitoring provisions for any sewer bypass operations on a case-by-case basis.

Emergency Response Procedures (SSMP 6.5)

- Level of Effectiveness: Tabs 2 - 4 of the new 2019 OERP include standard operating procedures for SSO mitigation, documentation, and estimating spill volumes using different methods. The updated 2019 OERP procedures flow charts and documentation forms are thorough.
- Recommendations: No recommended modifications at this time.

Spill Mitigation and Containment Procedure (SSMP 6.6)

- Level of Effectiveness: The updated OERP includes a section regarding Collection System Failure Analysis (Appendix F) that is designed to ensure that the causes of SSOs are analyzed and addressed to prevent future spills. The new amended Monitoring and Reporting Program (MRP) requirements implemented in September 2013 require a robust Water Quality Monitoring Plan that must account for spill travel time in surface water, among several new requirements. Section 9 of the City's latest OERP summarizes water quality sampling and monitoring requirements. However, a detailed Water Quality Monitoring Plan does not appear to be in place.



- **Recommendations:** Develop a Water Quality Monitoring Plan that meets the requirements of the current Monitoring and Reporting Program.

5.7 FOG Control Program

5.7.1 Compliance

Table 12 – Compliance with SSS WDR D.13.vii – FOG Control Program

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
vii(a) Public education plan	Yes	Implement billing insert FOG educational material and maintain record of public education efforts.
vii(b) FOG disposal plan	No	The City should develop a list of acceptable grease haulers and verify where each is disposing of hauled material.
vii(c) Legal authority to prohibit SSOs and blockages caused by FOG discharges	Yes	-
vii(d) BMPs, grease removal devices, recordkeeping, and reporting requirements	Yes	Provide an example of a FOG permit as an appendix to the SSMP.
vii(e) Authority to inspect and enforce FOG ordinance	Yes	-
vii(f) FOG Characterization Assessment and Hot Spot Cleaning Schedule	Yes	Use CMMS/GIS to display FOG problem areas with other City data (FSEs, schools, high density residential, etc.)
vii(g) FOG Control Program Measures	Yes	Track FOG control program using performance indicators in semi-annual audits.

5.7.2 Effectiveness of SSMP Elements and Recommended Modifications

Public Education Plan (SSMP 7.1)

- **Level of Effectiveness:** The City performs public outreach to commercial business and food service establishments as part of the City’s inspection program. The City has also implemented a school education program for K-12 which includes a slideshow presentation and diorama regarding the basics of how the sewer and storm drain system works.
- **Recommendations:**
 - Consider implementing a program to distribute FOG disposal educational material as a billing insert with City utility bills.
 - Maintain a record of FOG disposal educational programs. Include completion of FOG educational activities as an SSMP performance indicator.

FOG Disposal Plan (SSMP 7.2)

- **Level of Effectiveness:** The City requires all restaurants and food service establishments to provide copies of signed contracts with a licensed grease hauler for regular cleaning of grease traps. However, currently the City does not verify where FOG collected by grease haulers is disposed as part of the FOG program.



The City believes that FOG is mostly disposed of at either the Santa Rosa or Napa wastewater treatment plants.

- **Recommendations:**
 - Develop a list of licensed grease haulers acceptable to the City including address, name, contact information.
 - Contact each grease hauler on the City's list and verify where they are disposing of collected FOG.

Legal Authority to Prohibit SSOs and Blockages Caused by FOG Discharges (SSMP 7.3)

- **Level of Effectiveness:** The City's Ordinance 763 requires Food Service Establishments (FSE) to install and maintain Grease Removal Devices (GRD), compliant with the City's standard, before acquiring a permit to operate. The ordinance limits the maximum allowable concentration of FOG discharged to 50 mg/L for floatable material and 500 mg/L for dispersed non-floatable material. This ordinance is effective in providing the City with the tools necessary to minimize FOG discharges into the sewer system.
- **Recommendations:** Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.

BMPs, Grease Removal Devices, Recordkeeping, and Reporting Requirements (SSMP 7.4)

- **Level of Effectiveness:** The City requires all FSEs that discharge FOG to acquire a FOG permit which includes provisions for FSEs to maintain GRDs, cleaning records, and to report private FOG-related SSOs or blockages. The FOG permit requirements are effective in providing the City with the tools to limit FOG discharges into the sewer system. The following is a list of the key requirements of the FOG permit:
 - General information
 - Discharge limitation and restrictions
 - Implementation of BMPs to minimize FOG discharge
 - GRD installation and maintenance requirements
 - Notification requirements
 - Record keeping and self-reporting requirements, which includes BMP monitoring and grease hauling records.
- **Recommendations:** Provide an example of a FOG permit as an appendix to the SSMP.

Inspection and Enforcement Authority – FOG Producers (SSMP 7.5)

- **Level of Effectiveness:** Under the City's discharge permit, each FSE must comply with the Ordinance 763, and the City maintains the legal authority to physically inspect the FSE and determine if it complies. The City's Utilities Department inspects all FSEs at least once a year as part of the City's Industrial Pretreatment Program. FSE's which display a record of non-compliance with permit requirements or which are suspected to be contributing to excessive FOG accumulation identified in the collection system through regular cleaning and CCTV inspection work will be scheduled for more frequent inspections either quarterly or semi-annually.
- **Recommendations:** No recommended modifications at this time.



FOG Characterization Assessment and Hot Spot Cleaning Schedule (SSMP 7.6)

- Level of Effectiveness: The City has been effective in limiting FOG-related SSOs to 2 incidents during this audit period by identifying and placing assets impacted by FOG on the higher frequency 180-day cleaning list.
- Recommendations: Identify areas of FOG concern based on historical cleaning data, blockage reports, or PM activities using CMMS/GIS to allow for better visualization of possible sources of excess FOG accumulation in combination with other GIS data such as FSE locations, schools, high density residential, etc.

FOG Control Program Measures (SSMP 7.7)

- Level of Effectiveness: If the City encounters abnormal FOG levels in a pipe, it will reach out to FSEs and/or residents that it thinks may be contributing to it and distribute educational material to them to minimize FOG discharges. The assets affected by excess FOG accumulation will continue to be cleaned at a higher frequency and monitored until public outreach is effective in limiting FOG discharge to the point where the assets can be returned to the normal 3-year cleaning frequency.
- Recommendations: Add FOG control program performance indicators to the SSMP and track progress. This may include number of FSE inspections completed, number of FOG hot spots on the 180-day cleaning list, number of SSOs caused by FOG, and etc.



5.8 System Evaluation and Capacity Assurance Plan

5.8.1 Compliance

Table 13 – Compliance with SSS WDR D.13.viii - SECAP

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
viii(a) Evaluate hydraulic capacity deficiencies	No	No hydraulic capacity assessment has been done since 1991. Water Works is currently completing a hydraulic model update to bring the City into compliance.
viii(b) Establish design criteria	No	The SSMP does not describe the City’s hydraulic capacity design criteria specific to hydraulic modeling of the existing sewer collection system and identification of hydraulic capacity deficiencies.
viii(c) Establish short- and long-term CIP	No	Water Works will be updating the short and long-term capacity-based CIP within the new Sewer System Master Plan document.
viii(d) Develop schedule of completion dates for CIP	No	Water Works will be updating the short and long-term capacity-based CIP within the new Sewer System Master Plan document.

5.8.2 Effectiveness of SSMP Elements and Recommended Modifications

Hydraulic Capacity Evaluation (SSMP 8.1)

- **Level of Effectiveness:** Most of the new development in the City of Healdsburg is occurring in the northern portion of the City, which is served by a trunk sewer that was planned and constructed specifically to serve that area. However, the City has never developed a comprehensive hydraulic model of the entire sewer collection system.
- **Recommendations:** Water Works Engineers (WWE) is conducting wet weather flow monitoring (Winter 2019-2020) and developing a new GIS-based hydraulic model and capacity assessment to further analyze the system’s hydraulic capacity and provide recommended improvements to support future development, including infill development within the existing service area.

Design Criteria (SSMP 8.2)

- **Level of Effectiveness:** The SSMP does not include the City’s design/performance criteria for evaluation of the hydraulic capacity of the existing collection system to define capacity deficiencies that require capital improvements.
- **Recommendations:** Summarize the City’s hydraulic capacity design/performance criteria for the existing sewer collection system, including design storm for peak wet weather flows, peak flow d/D limits, I/I limits, etc. in the SSMP.



Capacity Enhancement Measures (SSMP 8.3)

- Level of Effectiveness: The 2018-23 5-year CIP includes improvements to the sewer collection system. However, none of them appear to be capacity related. The current SSMP indicates that there are no capacity-related concerns for the City's sewer collection system.
- Recommendations: Water Works Engineers will be satisfying this requirement through completion of the new Sewer System Master Plan, which will define in detail any identified improvement projects including alternatives analysis, prioritization, and identification of sources of funding.

Capital Improvement Program Schedule (SSMP 8.4)

- Level of Effectiveness: The 2018-23 5-year CIP includes improvements to the sewer collection system. However, none of them appear to be capacity related.
- Recommendations: Water Works Engineers will be satisfying this requirement through completion of the new Sewer System Master Plan which will integrate any newly identified capacity enhancement projects into the City's overall 5-year CIP.



5.9 Monitoring, Measurement, and Program Modifications

5.9.1 Compliance

Table 14 – Compliance with SSS WDR D.13.ix – Monitoring and Measurement

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
ix(a) Maintain relevant information to prioritize SSMP activities	Yes	Consider higher level of GIS and/or CMMS integration for more automated analysis of performance.
ix(b) Measure effectiveness of SSMP elements	No	City needs to establish SSMP program performance indicators (see Table 15).
ix(c) Assess success of preventative maintenance program	No	City needs to track progress against performance indicators on a biennial basis.
ix(d) Update elements based on performance evaluations	No	City should update the SSMP based on the results of SSMP Audits and log all changes.
ix(e) Identify and illustrate SSO trends	No	Update SSO trends presented in this Audit on a biennial basis.

5.9.2 Effectiveness of SSMP Elements and Recommended Modifications

Maintain Relevant Information for SSMP Activities (SSMP 9.1)

- **Level of Effectiveness:** The City documents information relative to its SSMP programs including:
 - Documentation of all sewer cleaning activities by year
 - Documentation of lift station cleaning and maintenance by year
 - Continuous update of 180-day cleaning schedule
 - CCTV inspection historical database
 - Spare parts and tool inventory
 - FSE grease trap inspection records
 - SSO records posted to CIWQS
 - Capital Improvement Plan updates and record drawings
- **Recommendations:** Consider integration of sewer collection system maintenance records with a new CMMS/GIS system to allow for more automated analysis of performance versus goals using automated queries and reports of the CMMS database.

Metrics to Monitor Effectiveness of SSMP (SSMP 9.2)

- **Level of Effectiveness:** Currently, the City only monitors SSO trends and spending on sewer collection system rehabilitation. Quantifiable goals specific to each element of the SSMP have not been established.
- **Recommendations:** Consider tracking additional performance measures related to various SSMP elements that are summarized in **Table 15**. Tracking these performance measures over time will help evaluate the effectiveness of the SSMP programs as well as adjust future PM activities and CIPs to reduce the potential for SSOs.



Assess Success of Preventative Maintenance Program (SSMP 9.3)

- Level of Effectiveness: The City's current approach to documenting PM activities is effective because it allows the City to monitor completion of planned activities. However, the City has not established specific target performance metrics, which makes it difficult to assess success of individual programs.
- Recommendations: Develop performance indicators that at minimum meet the requirements of the City's settlement with River Watch, and track the performance indicators to ensure that the terms of the settlement are met by the City.

Update Program Elements Based on Performance (SSMP 9.4)

- Level of Effectiveness: The performance of various SSMP elements are overseen by individual City staff. However, no significant updates have been regularly made to the SSMP since it was originally developed in 2009. Tracking all revisions and updates to the SSMP in a change log encourages the use of the SSMP as a living document.
- Recommendations: Provide a change log as an appendix that documents changes made to the SSMP by each City Staff member with corresponding date.

SSO Trends – Frequency, Location and Volume (SSMP 9.5)

- Level of Effectiveness: The City has not regularly analyzed and illustrated SSO trends.
- Recommendations: On a biennial basis, update the SSO trends presented within Section 3 of this Audit. Analyze trends in spill volume and cause, and determine if adjustments to PM activities are warranted to reverse trends that show increases in the volume and frequency of certain types of spills



Table 15 –Recommended Additional Performance Indicators

SSMP Element	SSMP Section	Description	Performance Indicator	Unit	Target
System Information (tracking purposes only, no targets)			Total System Length	miles	
			Service Area	sq miles	
			Population	number	
			Service Connections	number	
			# Manholes	number	
			# Pump Stations	number	
			Sewer < 8 inch	miles	
			8 inch < sewer < 15 inch	miles	
			15 inch < sewer < 21 inch	miles	
			21 inch < sewer < 42 inch	miles	
			Average age of system piping	years	
			New sewer main installation	miles	
			New sewer lateral installation	miles	
New cleanout installation	number				
Financial Information			Wastewater collections operations & maintenance staff (SEE NOTE 1)	number	14
			Total sewer collection O&M spending	\$M	\$1.0M
			Total sewer collection R&R spending	\$M	\$1.0M
Organization (tracking only, no targets)	D.13.ii.c	Chain of Communication	Total customer service calls	number	
			Total customer service calls resolved	number	
O&M	D.13.iv.a	Maps	Age of oldest un-fulfilled map update request	days	180
			D.13.iv.b	PM Activities	Certified wastewater collections operators
	Sewer laterals cleaned per year	number			20
	Sewer mains cleaned per year	miles			15
	Manholes inspected per year	number			300
	Sewer main CCTV inspected per year	miles			13.5
	Sewer laterals CCTV inspected per year	number			20
	D.13.iv.c	R&R Plan	Lift Stations maintained annually	number	11
			Sewer main rehabilitated/replaced per year	miles	0.5 – 1.0 mi
			Sewer laterals rehabilitated/replaced per year	number	5
			Manholes rehabilitated	number	10-20
			% of CCTV inspection records reviewed for condition assessment purposes	%	100
	% of active Level 4 defects analyzed and included in CIP planning documents	%	90		
% of active Level 5 defects scheduled for repair within 5-year CIP	%	100			



	D.13.iv.d	Training	Overall % completion of training matrices for all wastewater collections operations & maintenance staff	%	100
	D.13.iv.e	Critical Parts	Complete annual review of lift station spare part availability	Yes/No	Yes
Design	D.13.v.b	Construction	% of new sewer mains inspected	%	100
			% of new sewer laterals inspected	%	100
OERP	D.13.vi.a	Notification	Average response time to SSO	minutes	<60
	D.13.vi.d	SSO Containment	Percentage of SSO volume reaching a surface water	%	<25
FOG	D.13.vii.a	Public Education	Annual distribution of FOG informational flyers with City utility billing.	Yes/No	Yes
	D.13.vii.d	Grease Removal Devices	% of total FSE's with Grease Removal Devices installed	%	80
	D.13.vii.e	FOG Inspections	% of FSEs with permits inspected in the current year	%	100
			% of FSEs with violations that require increased inspections	%	<10
	D.13.vii.f	FOG Hot Spots	Length of FOG hotspot sections of pipe	feet	2,500
Monitoring & Measurement	D.13.ix	SSO Trends	SSO Rate per 100 miles of pipe	#/100 mi	7
			Total volume of SSO events per 100 miles of pipe	gal/100 mi	40,000
			% of total SSO volume recovered	%	75
			Number of SSOs caused by roots	number	<2
			Number of SSOs caused by debris	number	<2
			Number of SSOs caused by pipe failure	number	<2
			Number of SSOs caused by capacity	number	0
Total Number of Private Lateral SSOs	number	<5			
Audit	D.13.x	Updates	# of Days since completion of last audit	days	<730
			# of Days since completion of last SSMP update	days	<1,825
Communication	D.13.xi	Communication Program	Most current SSMP documents posted to City website	Yes/No	Yes

Notes:

1. Calculate the total number of City staff employed under the following positions:
 - Public Works: Public Works Maintenance Superintendent, Public Works Utility Foreman, Utility Worker
 - Utilities: Water/Wastewater Operations Superintendent, Wastewater Operations Foreman, Utility Operator.



5.10 SSMP Program Audits

5.10.1 Compliance

Table 16 – Compliance with SSS WDR D.13.x – SSMP Program Audits

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
x Conduct biennial audits	No	The City has not completed an Internal SSMP Audit prior to this audit.

5.10.2 Effectiveness of SSMP Elements and Recommended Modifications

Audit Procedures, Roles, and Responsibilities (SSMP 10.1)

- Level of Effectiveness: The City has not conducted a formal internal audit for its SSMP as required by the GWDRs.
- Recommendations: Schedule the next Internal SSMP Audit for 2022. Identify the appropriate level of internal or external resources to conduct the Audit and describe the audit procedure and schedule in the SSMP.

SSMP Program Modification/Update Process (SSMP 10.2)

- Level of Effectiveness: There has been some recent changes in the City’s SSMP Programs that have not been incorporated into the SSMP. The reasons for the changes were not based on the analysis of performance against stated metrics.
- Recommendations:
 - Update the SSMP change log and add it as an appendix to the SSMP, documenting all changes made to the SSMP since its last certification, indicating when an element was changed/updated and who authorized the change.
 - Update the SSMP at minimum every two years (preferably every year if significant changes are warranted). Re-certify SSMP updates every 5-years through City Council.



5.11 Communication Program

5.11.1 Compliance

Table 17 – Compliance with SSS WDR D.13.xi – Communications Program

SSMP Requirement	Compliance	Deficiencies / Potential Enhancements
xi(a) Communicate on a regular basis with the public and tributary/satellite systems regarding SSMP	Yes	Present results of each SSMP audit to City Council.

5.11.2 Effectiveness of SSMP Elements and Recommended Modifications

Public Communication (SSMP 11.1)

- Level of Effectiveness: The City has posted its SSMP to the City’s website and has a link where the public can submit comments via email.
- Recommendations: Present results of each SSMP audit to City Council.

Communication with Tributary / Satellite Systems (SSMP 11.2)

- Level of Effectiveness: The City of Healdsburg does not have any tributary/satellite systems.
- Recommendations: Not applicable.



SECTION 6 Audit Summary

Table 18 lists a summary of all recommendations for this Audit and the responsible party for implementation.

Table 18 – Summary of Audit Recommendations

SSMP Section	Recommendation	Responsible Party
2.1	Modify and update the LRO table and move the table into an appendix, this helps the element to be updated separately from the SSMP.	By Water Works
2.2	Modify and update the current City organization chart to reflect the latest departments, work flows, and responsibilities as it relates to the SSMP elements.	By Water Works
3.1	Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.	By Water Works
3.2	Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.	By Water Works
3.3	Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.	By Water Works
3.4	Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.	By Water Works
3.5	Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.	By Water Works
4.1	Updates to the GIS mapping based on as-built drawings of sewer system improvements since 2012 will be made as part of the City’s Hydraulic Modeling effort.	By Water Works
	Identify a staff position with the Public Works Department that will be responsible for making GIS mapping updates and ensure this position is allocated adequate time on an annual basis to complete the task or outsource the GIS mapping updates to a qualified consultant.	By City of Healdsburg-Complete in 2020
	Develop an annual schedule for transmitting mapping updates to the position responsible for updating the GIS mapping. Sending updates in groups once every 3 to 6 months on a regular schedule may be more effective than one-at-a-time as they come up. Set deadlines for completion of mapping updates and verify completion prior to the next regularly scheduled submittal date.	By City of Healdsburg-Complete in 2020
4.2	Update SSMP Section 4.2 to provide an updated general overview of the current O&M activities and PM programs using illustrative flow charts.	By Water Works
	Provide more detailed description of criteria used to place sewer main lines on the 180-day cleaning list.	By Water Works
	The City is planning to transition scheduling and documentation of sewer main line cleaning activities from Excel spreadsheets to a new CMMS. As part of the ongoing CMMS implementation, the City should ensure that the CMMS will be capable of tracking preventative maintenance down to the level of each individual pipe segment and manhole in concert with the City’s GIS so that results and statistics can be readily reviewed and analyzed on a GIS platform. Ensure the CMMS system is user-friendly for staff so that it is used efficiently.	By City of Healdsburg-Complete in 2020



4.2	Update description within the SSMP of mechanical inspection/maintenance of lift stations.	By Water Works
4.3	Complete updates to IT Pipes CCTV software as soon as possible so CCTV inspection work can resume.	By City of Healdsburg- Complete in 2020
	Develop specific CCTV inspection schedule to complete all work by January 2022 and determine if additional staffing is required or if use of outside contractors may be necessary.	By Water Works and City
	Describe the process/procedure for evaluating CCTV data, conducting a risk assessment to prioritize repair of identified defects, and strategies used to develop individual capital improvement projects. Describe use of contracted third party services to complete this work if necessary. A regular annual schedule for completing review and analysis of CCTV data should be established to ensure that high priority system defects are integrated into the City's CIP as promptly as possible.	By Water Works
	Describe within the SSMP the strategy used to determine the collection system asset replacement value and keep this value updated in order to ensure that adequate system rehabilitation and replacement funding and spending is in place, and how this information is included in ongoing rate studies.	By Water Works
4.4	Utilize future CMMS/GIS platform for calculating the sewer collection system's replacement value. If the CMMS and GIS is kept up-to-date, it will be easier to keep the replacement value up-to-date as the system expands as well.	By City of Healdsburg - Ongoing
	Develop a mandatory training matrix that covers all critical areas of competency for wastewater collection systems operations including O&M programs, OERP, safety, CIWQS data management, etc.	By Water Works and City
4.4	Develop a system for verifying and documenting completion of the training matrix for each wastewater collection systems operations employee and include this as an SSMP performance measure.	By City of Healdsburg- Complete in 2020
	Update the description in the SSMP of the fleet maintenance (vector truck, CCTV truck) tracking system used by the City, and the use of LLumin to track replacement parts for sewer lift stations.	By Water Works
4.5	Update the description in the SSMP of the fleet maintenance (vector truck, CCTV truck) tracking system used by the City, and the use of LLumin to track replacement parts for sewer lift stations.	By Water Works
5.1	Update the Standard Specifications and Details link in the SSMP as the current link no longer works.	By Water Works
5.2	Add the Public Works Inspectors to the SSMP responsibilities chart for enforcement of the design and performance provisions.	By Water Works
6.3	Consider implementation of a QA/QC review procedure to ensure that data entered on the new Sanitary Sewer Overflow Report forms (from 2019 OERP) matches data entered into CIWQS, including all finalized and follow-up data before closing out the Sanitary Sewer Overflow Reports internally.	By City of Healdsburg - Ongoing
6.4	Per the City's updated OERP, ensure that contractors develop project-specific OERPs for work on the sewer collection system. Ensure appropriate redundancy and monitoring provisions for any sewer bypass operations on a case-by-case basis.	By City of Healdsburg - Ongoing
6.6	Develop a Water Quality Monitoring Plan that meets the requirements of the current Monitoring and Reporting Program.	By Water Works and City



7.1	Consider implementing a program to distribute FOG disposal educational material as a billing insert with City utility bills.	By City of Healdsburg - Ongoing
	Maintain a record of FOG disposal educational programs. Include completion of FOG educational activities as an SSMP performance indicator.	By City of Healdsburg - Ongoing
7.2	Develop a list of licensed grease haulers acceptable to the City including address, name, contact information.	By City of Healdsburg- Complete in 2020
	Contact each grease hauler on the City’s list and verify where they are disposing of collected FOG.	By City of Healdsburg- Complete in 2020
7.3	Add specific sub-section references into the SSMP text that outlines the contents of Ordinance 763.	By Water Works
7.4	Provide an example of a FOG permit as an appendix to the SSMP.	By Water Works
7.6	Identify areas of FOG concern based on historical cleaning data, blockage reports, or PM activities using CMMS/GIS to allow for better visualization of possible sources of excess FOG accumulation in combination with other GIS data such as FSE locations, schools, high density residential, etc.	By City of Healdsburg - Ongoing
7.7	Add FOG control program performance indicators to the SSMP and track progress. This may include number of FSE inspections completed, number of FOG hot spots on the 180-day cleaning list, number of SSOs caused by FOG, and etc.	By Water Works
8.1	Water Works Engineers (WWE) is conducting wet weather flow monitoring and developing a new GIS-based hydraulic model and capacity assessment to further analyze the system’s hydraulic capacity and provide recommended improvements to support future development.	By Water Works
8.2	Summarize the City’s hydraulic capacity design/performance criteria for the existing sewer collection system, including design storm for peak wet weather flows, peak flow d/D limits, I/I limits, etc. in the SSMP.	By Water Works
8.3	Water Works Engineers will be satisfying this requirement through completion of the new Sewer System Master Plan, which will define in detail any identified improvement projects including alternatives analysis, prioritization, and identification of sources of funding.	By Water Works
8.4	Water Works Engineers will be satisfying this requirement through completion of the new Sewer System Master Plan which will integrate any newly identified capacity enhancement projects into the City’s overall 5-year CIP.	By Water Works
9.1	Consider integration of sewer collection system maintenance records with GIS or a new CMMS system to allow for more automated analysis of performance versus goals using automated queries and reports of the CMMS database.	By City of Healdsburg - Ongoing
9.2	Consider tracking additional performance measures related to various SSMP elements. Tracking these performance measures over time will help evaluate the effectiveness of the SSMP programs as well as adjust future PM activities and CIPs to reduce the potential for SSOs.	By City of Healdsburg - Ongoing



9.3	Develop performance indicators that at minimum meet the requirements of the City's settlement with River Watch, and track the performance indicators to ensure that the terms of the settlement are met by the City.	By Water Works
9.4	Provide a change log as an appendix that documents changes made to the SSMP by each City Staff member with corresponding date.	By Water Works
9.5	On a biennial basis, update the SSO trends presented within Section 3 of this Audit. Analyze trends in spill volume and cause, and determine if adjustments to PM activities are warranted to reverse trends that show increases in the volume and frequency of certain types of spills.	By City of Healdsburg - Ongoing
10.1	Schedule the next Internal SSMP Audit for 2022. Identify the appropriate level of internal or external resources to conduct the Audit and describe the audit procedure and schedule in the SSMP.	By City of Healdsburg
10.2	Update the SSMP change log and add it as an appendix to the SSMP, documenting all changes made to the SSMP since its last certification, indicating when an element was changed/updated and who authorized the change.	By City of Healdsburg - Ongoing
	Update the SSMP at minimum every two years (preferably every year if significant changes are warranted). Re-certify SSMP updates every 5-years through City Council.	By City of Healdsburg - Ongoing
11.1	Present results of each SSMP audit to City Council.	By City of Healdsburg - Ongoing



SECTION 7 Appendices

7.1 Appendix – Historical SSO Data

7.2 Appendix – SSO Data Comparison Charts



7.1 Appendix – Historical SSO Data

Dated: FY 15/16, FY 16/17, FY 17/18, FY 18/19

Appendix 7.1 – Historical SSO Data for FY 15/16 to FY 18/19

#	Event ID	Date of SSO	Address	Spill Type	Spill Volume [gal]	Spill Recovered [gal]	Spill Recovery [%]	Spill Cause	Location
1	822080	1/15/2016	33 S. University St.	Category 3	5	5	100%	Debris-General	Gravity Mainline
2	822505	2/10/2016	499 Moore Lane	Category 3	35	35	100%	Pipe Structural Problem/Failure	Force Main
3	823315	3/18/2016	25 Healdsburg Ave.	Category 3	2	2	100%	Root Intrusion	Gravity Mainline
4	823319	3/16/2016	247 East St.	Category 3	9	9	100%	Debris-General	Lower Lateral (Public)
5	824769	4/19/2016	521 Badger St.	Category 3	141	141	100%	Debris-General	Gravity Mainline
6	825752	5/16/2016	318 Piper St.	Category 3	159	159	100%	Debris-Rags	Gravity Mainline
7	827135	7/27/2016	631 Alta Vista Fire Road	Category 3	638	0	0%	Root Intrusion	Gravity Mainline
8	827329	8/15/2016	900 Chanticleer Way	Category 3	20	20	100%	Debris-General	Lower Lateral (Public)
9	829803	11/13/2016	321 East St.	Category 3	10	10	100%	Root Intrusion	Lower Lateral (Public)
10	833634	3/9/2017	766 Rose Lane	Category 3	3	3	100%	Debris-Rags	Gravity Mainline
11	833696	3/10/2017	213 Grant St.	Category 3	396	396	100%	Root Intrusion	Other (specify below)
12	833747	3/15/2017	171 Healdsburg Avenue, Healdsburg, CA 95448	Category 1	178	0	0%	Pipe Structural Problem/Failure	Gravity Mainline
13	833748	3/15/2017	171 Healdsburg Avenue	Category 1	178	0	0%	Pipe Structural Problem/Failure	Gravity Mainline
14	833954	3/24/2017	711 Heron Drive Healdsburg CA 95448	Category 1	1400	0	0%	Pump Station Failure-Controls	Pump Station-Controls
15	834383	4/9/2017	165 Healdsburg Ave.	Category 1	1255	347	28%	Construction Diversion Failure	Gravity Mainline
16	834498	4/13/2017	75 West Matheson St. Healdsburg CA 95448	Category 1	10	0	0%	Operator Error	Manhole
17	834555	4/12/2017	481 Hidden Acres Dr. , Healdsburg CA 94558	Category 1	23040	0	0%	Root Intrusion	Manhole
18	835711	6/1/2017	1124 N. Fitch Mountain Rd.	Category 3	50	50	100%	Root Intrusion	Gravity Mainline
19	835978	6/1/2017	5-way construction project	Category 2	12180	12180	100%	Construction Diversion Failure	Other (specify below)
20	839887	8/22/2017	522 Johnson St.	Category 3	5	5	100%	Grease Deposition (FOG)	Gravity Mainline
21	840679	10/5/2017	1031 Vine St. Bay Cities pump around failure	Category 1	127602	127602	100%	Construction Diversion Failure	Gravity Mainline
22	846204	3/30/2018	1124 N. Fitch Mountain Rd.	Category 3	150	150	100%	Root Intrusion	Gravity Mainline
23	850554	8/13/2018	Intersection Terrace Blvd. x Lupine Rd.	Category 3	55	55	100%	Flow Exceeded Capacity (Separate CS Only) – determined to be caused by operator error from backwash at water treatment plant	Gravity Mainline
24	854761	12/20/2018	Heron Lift Station	Category 3	864	864	100%	Pump Station Failure-Power	Pump Station-Power
25	857057	2/26/2019	1080 Magnolia Dr.	Category 1	20400	0	0%	Flow Exceeded Capacity (Separate CS Only) – caused by historic flooding event outside of City design criteria	Gravity Mainline – Magnolia Lift Station
26	857819	4/15/2019	Terrace Blvd. x Lupine Rd.	Category 3	3	3	100%	Surcharged Pipe (Combined CS Only) - determined to be caused by operator error from backwash at water treatment plant	Gravity Mainline
27	858306	5/14/2019	147 Healdsburg Ave.	Category 3	2	2	100%	Grease Deposition (FOG)	Lower Lateral (Public)
28	859278	10/30/2018	1147 Healdsburg Ave	Category 1	42967	0	0%	Pipe Structural Problem/Failure	Gravity Mainline



7.2 Appendix – SSO Data Comparison Charts

2015/2016 SSO Data Comparison

EVENT ID	Category	Address	Spill Volume [gal]		Rec Volume [gal]		SSO Duration [hh:mm:ss]		Response Time [hh:mm:ss]		Duration [#]	Response [#]	Cause		
			CIWQS	City	CIWQS	City	CIWQS	City	CIWQS	City	> 3 hr	> 60 min	CIWQS	City	
1	822080	Category 3	33 S. University St.	5	5	5	5	1:06:00	1:06:00	0:15:00	0:15:00	0	0	Debris-General	Debris-Other
2	822505	Category 3	499 Moore Lane	35	-	35	-	0:40:00	34:17:00	0:32:00	0:51:00	0	0	Pipe Structural Problem/Failure	Pipe/Structure Failure
3	823315	Category 3	25 Healdsburg Ave.	2	2	2	2	0:44:00	0:44:00	0:14:00	0:14:00	0	0	Root Intrusion	Roots
4	823319	Category 3	247 East St.	9	9	9	9	0:21:00	0:21:00	0:00:00	0:00:00	0	0	Debris-General	Debris-Other
5	824769	Category 3	521 Badger St.	141	141	141	141	1:53:00	1:52:00	0:19:00	0:10:00	0	0	Debris-General	Debris-Other
6	825752	Category 3	318 Piper St.	159	159	159	159	0:30:00	4:30:00	0:12:00	0:12:00	0	0	Debris-Rags	Debris-Rags
Totals	6			351	316	351	316	5:14:00	42:50:00	1:32:00	1:42:00	0	0		
Recovery %						100%	100%								
Averages								0:52:20	7:08:20	0:15:20	0:17:00				

2016/2017 SSO Data Comparison

EVENT ID	Category	Address	Spill Volume [gal]		Rec Volume [gal]		SSO Duration [hh:mm:ss]		Response Time [hh:mm:ss]		Duration [#]	Response [#]	Cause		
			CIWQS	City	CIWQS	City	CIWQS	City	CIWQS	City	> 3 hr	> 60 min	CIWQS	City	
1	827135	Category 3	631 Alta Vista Fire Road	638	796	-	-	26:00:00	26:00:00	0:11:00	0:11:00	1	0	Root Intrusion	Roots
2	827329	Category 3	900 Chanticleer Way	20	20	20	20	1:38:00	1:38:00	1:11:00	1:26:00	0	1	Debris-General	Debris-Other
3	829803	Category 3	321 East St.	10	10	10	10	1:45:00	1:45:00	1:16:00	1:16:00	0	1	Root Intrusion	Roots
4	833634	Category 3	766 Rose Lane	3	-	3	-	2:11:00	1:45:00	0:26:00	4:15:00	0	0	Debris-Rags	Debris-Rags
5	833696	Category 3	213 Grant St.	396	396	396	396	1:19:00	1:19:00	0:52:00	0:52:00	0	0	Root Intrusion	Roots
6	833747	Category 1	171 Healdsburg Avenue, Healdsburg, CA 95448	178	178	-	-	9:23:00	9:23:00	2:30:00	2:30:00	1	1	Pipe Structural Problem/Failure	Pipe/Structure Failure
7	833748	Category 1	171 Healdsburg Avenue	178	-	-	-	9:23:00	0:00:00	2:30:00	0:00:00	1	1	Pipe Structural Problem/Failure	#N/A
8	833954	Category 1	711 Heron Drive Healdsburg CA 95448	1,400	1,400	-	-	1:25:00	0:40:00	0:20:00	0:20:00	0	0	Pump Station Failure-Controls	Pipe/Structure Failure
9	834383	Category 1	165 Healdsburg Ave.	1,255	1,255	347	347	2:30:00	0:20:00	0:06:00	0:06:00	0	0	Construction Diversion Failure	Pipe/Structure Failure
10	834498	Category 1	75 West Matheson St. Healdsburg CA 95448	10	10	-	10	0:01:00	0:01:00	0:04:00	0:04:00	0	0	Operator Error	Pipe/Structure Failure
11	834555	Category 1	481 Hidden Acres Dr., Healdsburg CA 94558	23,040	-	-	-	50:01:00	0:00:00	0:20:00	1:03:00	1	0	Root Intrusion	Roots
12	835711	Category 3	1124 N. Fitch Mountain Rd.	50	50	50	50	2:00:00	2:00:00	0:30:00	0:30:00	0	0	Root Intrusion	Roots
13	835978	Category 2	5-way construction project	12,180	12,180	12,180	12,180	195:00:00	195:00:00	2:00:00	0:00:00	1	1	Construction Diversion Failure	Contractor Cause
Totals	13			39,358	16,295	13,006	13,013	302:36:00	239:51:00	12:16:00	12:33:00	5	5		
Recovery %						33%	80%								
Averages								23:16:37	18:27:00	0:56:37	0:57:55				

2017/2018 SSO Data Comparison

EVENT ID	Category	Address	Spill Volume [gal]		Rec Volume [gal]		SSO Duration [hh:mm:ss]		Response Time [hh:mm:ss]		Duration	Response	Cause		
			CIWQS	City	CIWQS	City	CIWQS	City	CIWQS	City	> 3 hr	> 60 min	CIWQS	City	
1	839887	Category 3	522 Johnson St.	5	5	5	5	0:50:00	0:50:00	0:37:00	0:41:00	0	0	Grease Deposition (FOG)	Grease
2	840679	Category 1	1031 Vine St. Bay Cities pump around failure	127,602	164,560	127,602	56,000	3:57:00	9:44:00	0:20:00	0:26:00	1	0	Pipe Structural Problem/Failure	Contractor
3	846204	Category 3	1124 N. Fitch Mountain Rd.	150	150	150	150	0:46:00	0:46:00	0:19:00	0:19:00	0	0	Root Intrusion	Roots
4	unknown	Category 3	640 Coghlan	-	5	-	5	0:00:00	1:46:00	0:00:00	0:00:00	0	0	#N/A	Roots
Totals				3											
				127,757	164,720	127,757	56,160	5:33:00	13:06:00	1:16:00	1:26:00	1	0		
Recovery %						100%	34%								
Averages								1:51:00	4:22:00	0:25:20	0:28:40				

2018/2019 SSO Data Comparison

EVENT ID	Category	Address	Spill Volume [gal]		Rec Volume [gal]		SSO Duration [hh:mm:ss]		Response Time [hh:mm:ss]		Duration [#]	Response [#]	Cause		
			CIWQS	City	CIWQS	City	CIWQS	City	CIWQS	City	> 3 hr	> 60 min	CIWQS	City	
1	850554	Category 3	Intersection Terrace Blvd. x Lupine Rd.	55	55	55	55	0:05:00	0:05:00	0:15:00	0:05:00	0	0	Flow Exceeded Capacity (Separate CS Only)	Capacity
2	854761	Category 3	Heron Lift Station	864	864	864	864	0:32:00	0:32:00	0:20:00	12:25:00	0	0	Pump Station Failure-Power	Power
3	857057	Category 1	1080 Magnolia Dr.	20,400	-	-	-	34:00:00	0:00:00	0:00:00	0:00:00	1	0	Flow Exceeded Capacity (Separate CS Only)	Flood
4	857819	Category 3	Terrace Blvd. x Lupine Rd.	3	-	3	-	0:13:00	0:00:00	0:12:00	0:00:00	0	0	Surcharged Pipe (Combined CS Only)	#N/A
5	858306	Category 3	147 Healdsburg Ave.	2	-	2	-	0:20:00	0:00:00	0:08:00	0:00:00	0	0	Grease Deposition (FOG)	#N/A
6	859278	Category 1	1147 Healdsburg Ave	42,967	-	-	-	5686:00:00	0:00:00	0:00:00	0:00:00	1	0	Pipe Structural Problem/Failure	#N/A
Totals				6											
				64,291	919	924	919	5721:10:00	0:37:00	0:55:00	12:30:00	2	0		
Recovery %						1%	100%								
Averages								953:31:40	0:06:10	0:09:10	2:05:00				

Appendix 11.1 – Public Awareness Program Materials

KEEP YOUR DRAIN CLOG-FREE!



Cooking grease comes from meat fats, lard, oil, butter, food scraps, sauces, etc. When washed down the drain, grease sticks to the inside of pipes, which can block both your drain and public sewer. Use these tips to keep your drain clog-free!

Questions? Contact Public Works at (707) 431-3346 or publicworks@ci.healdsburg.ca.us.

DO



- SCRAPE GREASE AND FOOD SCRAPS INTO A CAN OR THE TRASH FOR DISPOSAL
- INSERT BASKETS/STRAINERS IN SINK DRAINS TO CATCH FOOD SCRAPS AND OTHER SOLIDS
- SPEAK WITH YOUR NEIGHBORS AND FRIENDS ABOUT HOW TO KEEP GREASE OUT OF THE SEWER SYSTEM

DON'T



PUT DOWN THE DRAIN:

- FATS, OILS, GREASE, OR RAGS
- FOOD (E.G. VEGETABLES, MEAT, COFFEE GRINDS, EGG SHELLS)
- SOLIDS (E.G. CAT LITTER, RAGS, PLASTIC/PAPER WRAPPERS, TRASH)
- MEDICATIONS AND NEEDLES
- PAINT AND TOXIC CHEMICALS

SEWER BLOCKAGES CAN OVERFLOW MANHOLES.



Sewer blockages cost money to both you and the City. They often occur on private property and must be paid for by the homeowner.



Raw sewage overflowing into the streets means people and animals may come in contact with disease-causing organisms.



Home garbage disposals do not keep grease out of the plumbing systems. Products like detergents that claim to dissolve grease only push the problem farther down the pipeline.