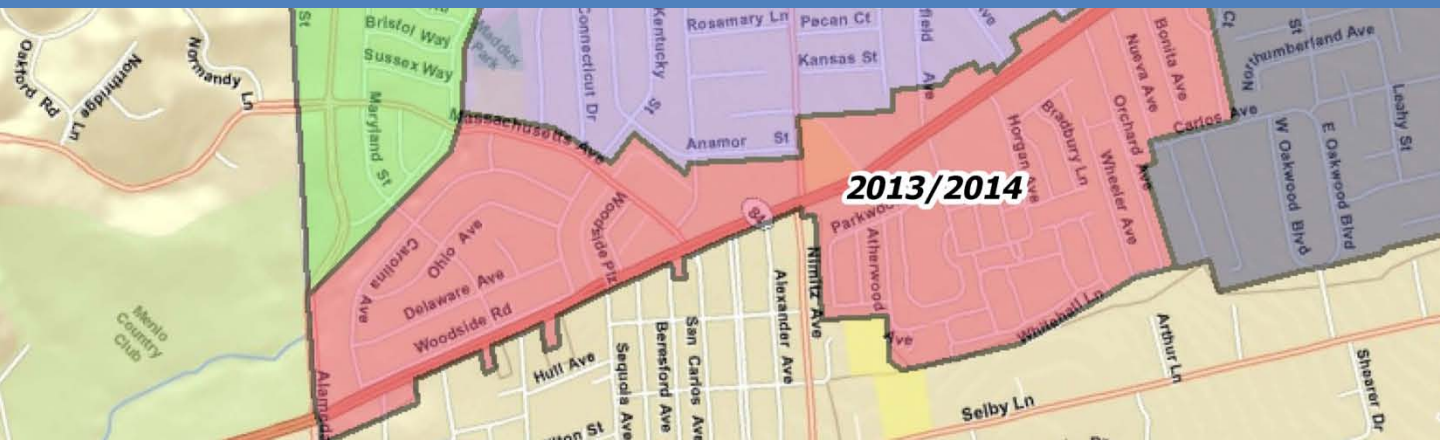
Redwood City
California
Founded 1867

Sewer System Management Plan

December 30, 2013



City of Redwood City

Sewer System Management Plan

Updated: December 2013

Preparation Supported By:

RMC Water and Environment

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A list of appendix materials for each element (as applicable), is shown at the end of the element and on the first page of each respective tabbed appendix.

List of Acronyms

BACWA – Bay Area Clean Water Agencies
BMP – Best Management Practice
CAD – Computer-Aided Design
CCTV – Closed Circuit Television Technology
CIP – Capital Improvement Plan
CIWQS – California Integrated Water Quality System
CWEA – California Water Environment Association
FOG – Fats, Oils and Grease
FSE – Food Service Establishment
I/I – Infiltration and Inflow
JPA – Joints Power Authority
OES – Office of Emergency Services
PM – Preventative Maintenance
RWB – San Francisco Regional Water Quality Control Board
SBSA – South Bayside System Authority
SOP – Standard Operating Procedure
SSMP – Sewer System Management Plan
SSO – Sanitary Sewer Overflow
SWB – State Water Resources Control Board
SWB SSO WDR – Order No. 2006-0003-DWQ, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, dated May 2, 2006

INTRODUCTION

This Sewer System Management Plan (SSMP) describes the City of Redwood City's (City's) wastewater collection system management activities. The purpose of these activities is to:

1. Maintain and improve the condition of the collection system infrastructure,

2. Control infiltration/inflow (I/I) and provide appropriate sewer capacity, and to

3. Minimize the number and impact of sanitary sewer overflows (SSOs) that occur.

The State Water Resources Control Board (SWB) has issued statewide waste discharge requirements for sanitary sewer systems which include requirements for development of an SSMP. The State Water Board requirements are outlined in Order No. 2006-0003-DWQ, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, dated May 2, 2006 (SWB SSO WDR).

The SSMP is also required by the San Francisco Bay Regional Water Quality Control Board (RWB). Requirements are outlined in the Sewer System Management Plan Development Guide dated July 2005, by the RWQCB in cooperation with the Bay Area Clean Water Agencies (BACWA).

This SSMP includes the elements required by both the SWB and RWB. There are some differences in the requirements and in the organization of the elements between the programs. The difference in organization is outlined in **Table 1**, below. This SSMP is organized following the SWB SSO WDR; **Table 1** identifies the corresponding sections in the RWB SSMP Development Guide.

Both SWB and RWB SSMP requirements are included and addressed in each element. Requirement language has been directly copied from the SWB SSO WDR and the RWB SSMP Development Guide. The SWB SSO WDR uses the term "Enrollee" to mean each individual municipal wastewater agency that has completed and submitted the required application for coverage under the WDR (in this case, the Enrollee is the City of Redwood City). The term "Order" is equivalent to "SWB SSO WDR", "Regional Water Board" is equivalent to "RWB", and "State Water Board" is equivalent to "SWB".

Table 1. Comparison of State and Regional Water Board SSMP Element Terminology and Development Deadlines

	State Water Board SSMP Requirements for Agencies Serving 10,000 to 100,000 People		Regional Water Board SSMP Requirements	
	Name of Element	**Deadline**	**Name of Element**	**Deadline**
1	Goals	Nov 2, 2007	Goals	Aug 31, 2006
2	Organization		Organization	
3	Legal Authority	May 2, 2009	Overflow Emergency Response Plan	
4	Operation and Maintenance Program		Fats, Oils, and Grease (FOG) Control Plan	
5	Design and Performance Provisions	Aug 2, 2009	Legal Authority	Aug 31, 2007
6	Overflow Emergency Response Plan	May 2, 2009	Measures and Activities	
7	FOG Control Program		Design and Construction Standards	
8	System Evaluation and Capacity Assurance Plan	Aug 2, 2009	Capacity Management	Aug 31, 2008
9	Monitoring, Measurement, and Program Modifications		Monitoring, Measurement, and Program Modifications	
10	SSMP Audits		SSMP Audits	
11	Communications Plan			

Element 1 - GOAL

SWB Requirements:

The goal of the Sewer System Management Plan (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.

1.1 Goals

The goal of this Sewer System Management Plan (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's goals for managing the sanitary sewer collection system are:

- To properly manage, operate, and maintain all parts of the wastewater collection system;
- To provide adequate capacity to convey peak flows;
- To minimize the frequency of SSOs; and,
- To mitigate the impact of SSOs.

Element 2 - ORGANIZATION

SWB Requirements:

The Sewer System Management Plan (SSMP) must identify:

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

2.1 Responsible and Authorized Representatives

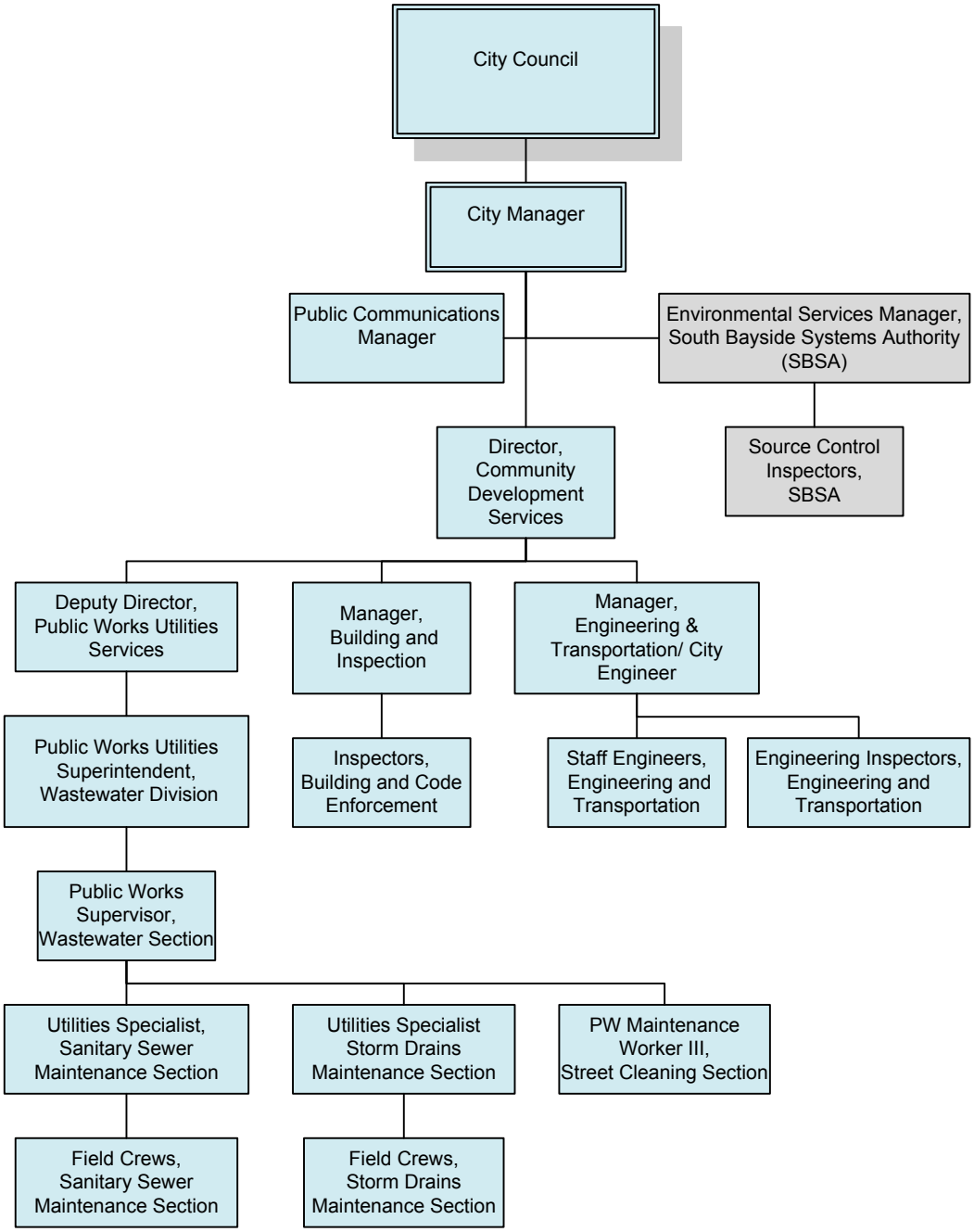
As described by the SWB SSO WDR, all SSO reports required by the WDR must be signed and certified by a person designated as either a principal executive officer or ranking elected official, or by a duly authorized representative of that person. The City's authorized representatives are the Public Works Services Director, Public Works Superintendent – Wastewater Division and the Public Works Supervisor – Sanitary Sewer Section. These staff members are responsible for certifying SSO reports and SSMP completion in the California Integrated Water Quality System (CIWQS), the electronic reporting system developed by the SWB.

The City's Public Works Service's Superintendent – Wastewater Management Services Division (Public Works Superintendent – Wastewater Division), under the direction of the Public Works Director, is responsible for implementing, managing, and updating the SSMP.

2.2 Organization Chart and Contact Information

Figure 1, below, identifies City staff responsible for implementing the SSMP. Job titles are used instead of individual names in order to accommodate staff changes. A Public Works Services Key Staff telephone list is included in the **Element 2 Appendix**. Also included is a Wastewater Management Services Personnel phone list of field crew member names, titles, and contacts and an emergency call out list. These lists are revised as necessary to reflect any changes in personnel or contact information. The examples included in the Appendix were current at the time of the latest update of this SSMP.

Figure 2-1. Organization Chart: Redwood City Staff with SSMP Implementation Responsibilities



Each position included in **Figure 1** entails certain responsibilities related to the implementation of the SSMP. Position descriptions are as follows:

- City Council – The role of the City Council is to establish policies, provide directives, and authorize services and projects according to Staff recommendations.
- City Manager – The role of the City Manger is to lead staff according to City Council policies and directives, and serve as the chief correspondent to the City Council and the Public.
- Public Communications Manager – The role of the Public Communications Manager is to ensure the development and dissemination to the community of clear, accurate and comprehensive information; and to continually develop methods and techniques for accomplishing improved communication between the City government and the general community.
- Community Development Director – The role of the Community Development Director is to oversee departmental performance and delegate responsibility and authority to the Building and Inspection Manager and to the Engineering and Transportation Manager/City Engineer. The Community Development Director is also responsible for overseeing economic development, redevelopment, and planning functions for the City.
- Public Works Services Deputy Director – The role of the Public Works Director is to oversee departmental performance and delegate authority and responsibility to the Public Works Superintendent – Wastewater Division.
- Manager, Building & Inspection – The role of the Manager of Building & Inspection is to ensure codes and regulations are followed, to oversee inspections, and to manage issuance of permits and citations.
- Engineering and Transportation Manager/City Engineer – The role of the Engineering and Transportation Manager/City Engineer is to provide direction to staff in the development and implementation of engineering design and construction standards for City facilities' construction, installation, rehabilitation, repair, and improvement and to ensure through inspection that all City works are fully compliant with these standards.
- Public Works Utilities Superintendent – The role of the Public Works Utilities Superintendent oversees Water Distribution and Wastewater. Primary responsibilities are to manage resources and budget, prepare wastewater collection system planning documents and contingency plans, correspond with other agencies regarding permits and regulations, and ensure full and proper implementation of this SSMP.
- Building and Code Enforcement Inspectors – The role of the building inspectors is to ensure conformance of newly constructed or rehabilitated residences, commercial businesses, and industries with City ordinances and adopted standards of practice (i.e., the Uniform Plumbing Code). The role of code enforcement inspectors is to ensure that residents and businesses conform to City ordinances in the performance of day-to-day operations and maintenance practices.
- Staff Engineers and Engineering Inspectors – The role of the Staff Engineers and Engineering Inspectors is to implement engineering design and construction

standards in the City's public works projects, provide support for the capital improvement program through preparation of the City's Sanitary Sewer Master Plan, and perform construction inspections to ensure proper installation and operation of the sanitary sewer system components.

- Public Works Supervisor – Wastewater Management Services Division – The Wastewater Management Services Division contains three Sections: Sanitary Sewer Maintenance, Storm Drains Maintenance, and Street Cleaning. The role of the Public Works Supervisor – Wastewater Management Services Division is to oversee field operations and maintenance activities (for all three sections), SSO response and resolution, and to report SSOs electronically to the Regional Water Board.
- Utilities Specialist – Sanitary Sewer Maintenance Section - The Utilities Specialist for the Sanitary Sewer Maintenance Section is a senior resource in the Sanitary Sewer Maintenance Section and may be delegated duties to support the Public Works Supervisor with directing sewer overflow response activities and finalizing documentation and reporting from the field crews.
- Utilities Specialist – Storm Drains Maintenance Section - The Utilities Specialist for the Storm Drains Maintenance Section is a senior resource in the Storm Drains Maintenance Section and is responsible for sample collection, additional investigation, and possible clean-up of an SSO if creeks/channels, or lagoons are impacted.
- Field Crew – The role of the field crew is to perform collection system preventive maintenance, repair, and emergency response, including responses to stoppages and SSOs. Maintenance workers for all three sections within the Wastewater Management Services Division (Sanitary Sewer Maintenance, Storm Drains Maintenance and Street Cleaning), are crossed-trained to perform the necessary division maintenance functions, including SSO response.
- SBSA – South Bayside System Authority (SBSA) is a regional wastewater treatment agency that treats the City's wastewater before discharging the clean water into San Francisco Bay. SBSA is a Joint Powers Authority (JPA) comprised of the cities of Belmont, Redwood City, and San Carlos, and West Bay Sanitary District.
- SBSA Source Control Inspectors – The City has implemented a program in which the SBSA Source Control Unit conducts inspections of grease traps and grease interceptors at commercial establishments in the City. The focus is on food service establishments. See Section 7.6 – Hot Spot Management.

The positions responsible for implementing specific elements and measures in the Sewer System Management Plan are identified in Table 2.

Table 2-1. Positions Responsible for Implementing Elements of the SSMP

SSMP Element	Responsible Position
Overall Coordination of SSMP Audit and Update	Public Works Utilities Superintendent
Goal	Public Works Utilities Superintendent Public Works Supervisor - Wastewater Section City Engineer / Manager, Engineering & Transportation Public Communications Manager
Organization	Public Works Utilities Superintendent
Legal Authority	Public Works Utilities Superintendent
Operation and Maintenance	Public Works Supervisor – Wastewater Section
Design and Performance Provisions	City Engineer / Manager, Engineering & Transportation
Overflow Emergency Response Plan	Public Works Supervisor – Wastewater Section
Fats, Oils, and Grease Control	Public Works Utilities Superintendent
System Evaluation and Capacity Assurance	City Engineer / Manager, Engineering & Transportation
Monitoring, Measurement, and Program Modifications	Public Works Utilities Superintendent
SSMP Program Audits	Public Works Utilities Superintendent
Communication	Public Communications Manager

2.3 Chain-of-Communication for Reporting and Responding to SSOs

In response to an SSO event, Public Works Services immediately implements its Sanitary Sewer Overflow and Backup Response Plan (Response Plan), discussed in more detail in Element 6. The Response Plan provides direction for the immediate verbal and written notification of City staff and agencies. The chain-of-communication for reporting and responding to SSOs, as described in the Response Plan, is summarized in **Table 2**, below.

Table 2-2. Chain of Communication for Reporting and Responding to SSOs

Step No.	Staff Responsible	Description of Activity
1	Public Works Services Call Taker (business hours) or Police Dispatcher (non-business hours)	**SSO Information Received:** Receives service calls originating from the public, other agencies, or from sources within the City; documents caller-provided information including caller contact information (if not anonymous).
2	Public Works Services Call Taker or Police Dispatcher	**Sewer Service On-Call Worker Paged:** Call taker or dispatcher pages the Sewer Service On-Call Worker.
3	Sewer Service On-Call Worker Responder	**Sewer Service On-Call Worker Responds to Page:** Sewer Service On–Call Worker calls back and obtains information from Call Taker or Dispatcher. If the Sewer Service On-Call Worker does not respond, the Public Works Supervisor is contacted and is responsible for ensuring a Sewer Service On-Call Worker responds.
4	Sewer Service On-Call Worker Responder	**Initial Assessment:** Sewer Service On-Call Worker Responder performs an initial incident assessment based on information provided by the caller and requests additional equipment and staff if circumstances dictate.
5	Sewer Service On-Call Worker Responder	**On-Site Assessment:** Upon arriving at SSO site, the Sewer Service On-Call Worker Responder conducts a preliminary assessment of SSO extent and suspected cause. Photographs of spill source and extent of spilled sewage may be taken, if possible. The responder will request additional equipment and staff as circumstances dictate. Public Works Supervisor is notified immediately if spill meets conditions requiring the two-hour notification to regulatory agencies.
6	Sewer Service On-Call Worker Responder	**Repair, Divert, Contain and Clean:** If the SSO is from City maintained laterals/mains, On-Call Responder and field crew(s) (as appropriate) stop the SSO, divert the spill from sensitive areas, contain and return the spill to the system, if possible, and assign staff to post signage, as necessary, and perform necessary clean-up activities. Responding maintenance crew will write up the appropriate sanitary sewer overflow report containing all relevant information regarding the incident. If SSO is not from City maintained lateral/main, property owner is notified and such steps as possible are taken to minimize environmental and health impacts. Photographs are taken of all steps implemented, if possible.
7	Sewer Service On-Call Worker Responder	**Response to Impacted Water Bodies:** If the SSO reaches or is likely to reach surface waters, the Sewer Service On-Call Worker will contact the Public Works Supervisor and alert of the discharge into surface waters.

Step No.	Staff Responsible	Description of Activity
8	Public Works Supervisor	**Notification and Coordination:** If the SSO reaches or is likely to reach a storm drain or surface waters, the Public Works Supervisor contacts California Governor's Office of Emergency Services (Cal OES) and San Mateo County Environmental Health and communicates any further direction from to the field crew. If creeks/channels or lagoons are impacted, the Public Works Supervisor contacts the Storm Drain Maintenance Section Utilities Specialist for sample collection, additional investigation and possible clean-up.
9	Field Crew SSO On-Call Responder	**Additional Resources Required:** If additional resources are required to contain/recover the SSO, the on-call responder contacts the Public Works Supervisor to request additional assistance.
10	Public Works Supervisor	**Additional Resources Required:** If needed, the Public Works Supervisor obtains necessary resources from other local agencies and/or private service companies.
11	Field Crew SSO On-Call Responder	**Documentation – On-Call Responder:** The on-call responder completes the Sanitary Sewer Overflow Report, City Maintenance Report and follows the actions detailed in the "Guide to Reporting to Regulatory Authorities" (included in the Response Plan).
12	Public Works Supervisor	**Documentation – Public Works Supervisor:** The Public Works Supervisor ensures that appropriate SSOs are reported within two-hour to the Cal OES and the San Mateo County Environmental Health Services Department[1]. The Public Works Supervisor also ensures that all necessary reporting has been completed per the Response Plan's "Guide to Reporting to Regulatory Authorities", including reports to the California Integrated Water Quality System (CIWQS) at http://ciwqs.waterboards.ca.gov as required by the SWB.
13	Public Works Superintendent - Wastewater Division	**Documentation – Public Works Superintendent**: The Public Works Superintendent verifies that all reporting has been completed per City policy and regulatory requirement. Necessary corrective actions are taken if reporting requirements have not been precisely followed.

List of Documents in Element 2 Appendix (see separate tab):

1. Public Works Services Key Staff Telephone List
2. Personnel – Wastewater Management Services Division
3. Public Works Services Department, Wastewater Management Services Phone List

[1] Regional Water Board staff provided notification via email on June 2, 2011 that indicated that the City was no longer required to report Category 1 SSOs within 2 hours directly to the Regional Water Board, as these reports are automatically forwarded from Cal OES. The Regional Water Board's SSO electronic reporting system was terminated as of July 1, 2011. The City recognizes that this direction is not consistent with existing SSS WDR requirements, and is awaiting further clarification from regulators.

Element 3 - LEGAL AUTHORITY

SWB Requirements:

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 I/I, stormwater, 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 prevent illicit discharges into the collection system, require proper design and construction of sewers and connections, and require proper installation, testing, and inspection of sewers is provided by the City's Municipal Code. The most recent version of the City's Municipal Code was Ordinance No. 2391, passed January 28, 2013. The City of Redwood City's Municipal Code can be found on the internet at the following website:

http://www.redwoodcity.org/government/codesandordinances.html

The specific sections applicable to the requirements of the Sewer System Management Plan (SSMP) are summarized in **Table 3-1**. The following section provide a narrative of the existing legal authorities and the City's current plans to update legal authorities.

Table 3-1: Summary of City of Redwood City Legal Authorities

Requirement	Reference in Municipal Code	Reference in Engineering Standards
PREVENT ILLICIT DISCHARGES		
Prevent illicit discharges into the wastewater collection system	Sec. 27.10-14 Sec. 27.32.4 Sec. 41-18	
Limit the discharge of fats, oils, and grease and other debris that may cause blockages	Sec. 27.13	
Control infiltration and inflow (I/I) from private service laterals	Sec. 27.11	Vol.1, Sec. 02730
ENSURE PROPER DESIGN AND INSPECTION		
Require that sewers and connection be properly designed and constructed	Sec. 18.237 Sec. 27-51-60 Sec. 30.116	Vol.1, Sec. 02730 Vol. 2, M-3 to M-7 Vol. 2, S-1 Vol. 3, Part IV
Require proper installation, testing, and inspection of new and rehabilitated sewers		Vol.1, Sec. 02730 Vol. 3, Part IV
ACCESS TO LATERALS		
Clearly define District responsibility and policies	Sec. 27.50	Vol. 3, Part IV
Ensure access for maintenance, inspection, or repairs for portions of the service lateral owned or maintained by the District		Vol. 2, S-1
FOG SOURCE CONTROL		
Requirements to install grease removal devices (such as traps or interceptors)	Sec. 9.117	
Design standards for the grease removal devices	Sec. 9.117	
Maintenance requirements, BMP requirements, record keeping and reporting requirements for grease removal devices	Sec. 27.31.8	
Authority to inspect grease producing facilities	Sec. 27.32.2	
ENFORCEMENT		
Enforce any violations of its sewer ordinances	Sec. 27, Article X	

3.1 Prevent Illicit Discharges

Authorities to prevent illicit discharges are provided in Section 27.10 through Section 27.14 of the City's Municipal Code. The Municipal Code also includes additional authorities to provide protective measures against accidental or unauthorized discharges in Section 27.32.4. In addition, Section 41.18 requires all new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of floodwaters into the sewer system.

Section 27.13 prohibits the discharge or oil or grease into the sewerage facilities. The code specifically prohibits the discharge of oil or grease of animal or vegetable origin in quantities greater than 300 mg/l. The code also specifically prohibits the discharge of oil or grease of mineral or petroleum origin in quantities greater than 100 mg/l.

3.2 Requirements for Proper Design and Construction of Sewer Facilities

Section 27.52 of the City's Municipal Code requires a connection permit for any connection to the City's sanitary sewer system. The design and construction of any sewerage facilities connecting to the City's sewer system requires the approval of the City's Community Development Director. The Community Development Department will review sewerage facility design and will require construction, inspection, and testing according to the City's Engineering Standards. The City's Engineering Standards can be downloaded from the City's website at the following webpage:

http://www.redwoodcity.org/bit/infrastructure/standards/index.html

The City's Engineering Standards include standard technical specifications, standard design details, and design guidelines for the sewer system as follows:

- Engineering Standards, Volume 1, Standard Technical Specifications, 02730 Sanitary Sewers
- Engineering Standards, Volume 2, Standard Details, M-3, M-4, M-5, M-6, M-7 & S-1
- Engineering Standards, Volume 3, Part IV, Sanitary Sewer System Design Criteria

The Community Development Department also oversees the design and construction of sewer pump stations and sewer pipeline rehabilitation. Standards and specification for the proper design, construction, inspection and testing of these facilities are developed by the engineering firm performing design services on behalf of the City for each project. The Community Development Department ensures newly designed sewer pump stations and pipeline rehabilitation are designed, constructed, and installed properly prior to acceptance into the sewer system.

The City Municipal Code Chapter 9 – Buildings, Section 9.117 adopts, by reference, the California Plumbing Code, 2010 Edition. The California Plumbing Code requires the installation of a backflow preventer or approved backwater valve. In the past, the City has become aware of properties with plumbing fixtures on a floor level lower that the next upstream manhole of the City's sewer. In these cases, the City has communicated the California Plumbing Code requirement to the property owner resulting in the installation of a backflow preventer or backwater valve.

3.3 Access to Laterals for Maintenance, Inspection, and Repair

Section 27.50 of the City's Municipal Code defines a sewer lateral as "That portion of a building sewer located in the public right-of-way which extends from the sewerage

facilities to the street property line or limit of public right-of-way or easement". The City's Engineering Standards, Volume 3, Part IV, Sanitary Sewer System Design Criteria, states "the City will maintain sanitary sewers in public streets, private streets, and easements up to the cleanout". The City's Engineering Standards include Standard Detail S-1 requiring the location of a cleanout at the edge of the property line.

The City will maintain, inspect, and repair sewer laterals with a cleanout at the property line or with a cleanout at the edge of a public easement. In cases where access is not provided via cleanout at the property line or edge of easement, the City recommends that the homeowner hire a plumber to install a cleanout at the property line so that a verification can be made that a maintenance or structural issue exists in the portion of the lateral maintained by the City. If the City encounters a property with a maintenance or structural issues in the portion of the sewer lateral maintained by the City and without a cleanout at the property line or edge of easement, installation of a cleanout is required prior to or as a result of the City performing maintenance on the sewer lateral.

3.4 Limit the Discharge of Fats, Oils, and Grease, and Other Potential Sources of Blockages

Section 27.13 of the City's Municipal Code limits the discharge of oil and grease of animal, vegetable, mineral, or petroleum origin. The City has developed a Fats, Oils, and Grease Ordinance and plans to amend the Municipal Code to incorporate this new ordinance in Calendar Year 2014.

The City's Municipal Code Section 27.13 prohibits discharges containing any "sand, grit, straw, metal, glass, rags, feathers, paper, tar, plastic, wood, leaves, garden clippings, manure, dead animals, offal or any other solid or viscous substance capable of causing obstruction to the flow in the sewerage facilities, or which in any way interferes with the proper operation of the sewerage facilities".

3.5 Ability to Enforce Violations of City Ordinances

Chapter 27 – Sanitary Sewerage Facilities, Article XI of the City's Municipal Code provides the City with the authority to enforce violations of ordinances relating to sanitary sewerage facilities and defines the enforcement process.

Element 4 - OPERATION AND MAINTENANCE PROGRAM

SWB Requirements:

The Sewer System Management Plan (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 stormwater 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 a 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 and maintenance, and require contractors to be appropriately trained; and

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

RWB Requirements:

***Outreach to Plumbers and Building Contractors**: Implement an outreach program to educate commercial entities involved in sewer construction or maintenance about the proper practices for preventing blockages in private laterals. This requirement can be met by participating in a region-wide outreach program.*

The City maintains approximately 192 miles of sewer main lines (including 12 miles of force mains), and 31 lift stations. The City is also responsible for maintaining the lower portion of the sewer laterals that connect to their main lines if the lateral has a property line cleanout.

4.1 Collection System Map

The City maintains comprehensive maps of its collection system, made available to the public at the Maps and Record Counter at City Hall. In order to keep the maps current, the Engineering Division integrates as-built information from City projects and private developments. In addition, when Wastewater Division staff discover inaccuracies , the findings are logged onto the map's master copy and forwarded to the Engineering Division. Information updates are entered into both the City's computer-aided design (CAD) and geographic information systems (GIS). Examples of the collection system map, showing streets and parcels, manhole locations, pipe locations and sizes, and pump station locations, are included in the **Element 4 Appendix**.

Maintenance workers carry block books (printed from the City's GIS records) and mobile maps by utilizing InfraMap software to identify sewer and storm drain lines for maintenance purposes. InfraMap is the software utilized by the City for utility infrastructure mapping. InfraMap provides City staff with the ability to access attribute data for sewer and stormwater pipelines using a mobile device. Stormwater facilities are included in these block books and InfraMap software, represented by dashed lines. Sanitary sewers are shown as solid, brown color coded lines with arrows indicating flow direction. Sewer lines are also labeled with their material type. Force mains can be differentiated from gravity sewers by the type of material. The block books also show streets and parcels, manhole locations and elevations, pipe locations and sizes, pump station locations, and location of air relief valves (ARVs).

4.2 Collection System Maintenance

4.2.1 Sewer Main Preventive Maintenance - Scheduling

All sewer mains in the City are assigned a preventive maintenance schedule which consists of performing sewer cleaning at a minimum of once every four years. In addition, the City assigns more frequent preventive maintenance to sewer mains susceptible to root intrusion, grease accumulation, and debris deposition with the goal of preventing sewer line blockage and overflows. More frequent preventive maintenance of a sewer main is determined by a combination of the past history of blockages, sewer cleaning crew feedback, maintenance defects identified through CCTV inspection, and location with respect to other risk factors. The City maintains a list of the sewer mains identified as requiring more frequent preventive maintenance. This list is continually being updated as additional information is collected and analyzed. A sample list of sewer mains identified as requiring more frequent preventive maintenance, including the frequency at which each is cleaned, is included in the **Element 4 Appendix.** The City utilizes OASIS computerized maintenance management system software to track preventive maintenance activities on pipelines with more frequent sewer cleaning. The City is planning on expanding the use of InfraMap software to include work order generation and tracking of the City-wide jetting program.

One of the primary sources of information utilized by the City to determine the appropriate preventive maintenance schedules for sewer mains is feedback from sewer cleaning crews provided daily on the following maintenance feedback forms:

- Preventive Maintenance Rodding Basin Program form
- Preventive Maintenance Jetting Basin Program form
- Sewer Lateral Data form

These forms include the following information: cleaning activity, method of cleaning, findings, and whether or not further actions are necessary. Examples of these forms are included in the **Element 4 Appendix**. These reports provide the Public Works Supervisor with an important additional data point upon which to base a decision on whether to increase or decrease preventive maintenance on a particular sewer main. The maintenance feedback forms are also utilized to identify inspection and repairs required. Based on the information collected in these cleaning reports, the Public Works Supervisor may create work orders for sewer main repair or to install and raise city manholes to street grade.

4.2.2 Sewer Main Preventive Maintenance - Equipment

The major equipment utilized for sewer system maintenance includes:

- A combination vacuum/jetter truck is the City's primary tool for cleaning gravity sewers. The City traps roots, grease, silt, and debris dislodged during hydro-jetting in a downstream manhole and uses the vacuum to extract this material from the sewer system.
- A truck-mounted rodder is used to remove obstructions from inside sewer lines, and is primarily assigned to clean areas with known root problems.
- A repair utility truck carries equipment designed for sewer line emergencies as well as regular maintenance. One of the primary pieces of equipment on the truck is a generator powered electric-driven line cleaner for 4-6 inch sewer lines. The truck is also equipped with a portable sea snake closed-circuit television (CCTV) unit.

The hydro-jetter truck is the City's primary sewer cleaning tool. The rodder is primarily used to clear sections of mainline of heavy grease or root intrusion. Its use may be triggered by: (1) cleaning reports identifying areas of concern, (2) CCTV inspection results originating from the Engineering Department, or (3) heavily tree-lined streets.

4.2.3 Pump Station Maintenance

The Wastewater Division's Utilities Specialist and supporting Utilities Worker are responsible for performing and overseeing preventive and emergency maintenance on the City's lift stations, force mains, and gate and check valve systems. An example of a completed Pump Station Preventive Maintenance Check List and an associated work order are included in the **Element 4 Appendix**.

The Check List and work order forms are used to document preventive maintenance activities and any additional corrective maintenance, rehabilitation, or replacement needs identified at that time. Documentation of dates of recent generator testing and scheduled key maintenance is also kept on a clip-board at each pump station.

Corrective maintenance activities or special projects are scheduled by the Wastewater Management Division Supervisor based on priority. The Utilities Specialist and Utilities Worker recommend and discuss prioritization of these projects with the Wastewater Management Division Supervisor based on their findings and knowledge of the facilities. Pump station preventative maintenance is scheduled in two to three week cycles. Ideally, preventive maintenance activities can be completed within the first week of this cycle, leaving two weeks between cycles to complete follow-up maintenance activities and special projects. However, if critical issues are identified that could cause an SSO, these are addressed right away.

When additional maintenance projects are completed, the Wastewater Management Division Supervisor pairs and files work orders for those projects with the original work order where the necessity was identified.

The City's pump stations are equipped with Supervisory Control and Data Acquisition (SCADA) control systems. SCADA functionality is observed every morning by both the Utilities Specialist and the Utilities Worker. These staff members carry laptops from which they can access SCADA at any time. Otherwise, access to SCADA is limited. City engineers can view the system, but cannot make changes to pump station controls.

The City maintains a contract with a SCADA system consultant, who provides regular system support as well as on-call emergency support if needed. Either one or both of the Utilities Specialist and Utilities Worker are on-call 24-hours a day, 7-days a week for emergency response, also.

The City maintains written documentation describing protocols and the application of their SCADA system. This explanation of the SCADA system is in process of being updated.

4.2.4 Lower Lateral Maintenance

The City maintains the lower portion of each service lateral from the main line to the property line cleanout. Customers are responsible for installing this cleanout, and the City is not responsible for maintenance of the lower lateral if a property line cleanout is not present However, if a resident excavates the area at the property line, City sewer crews will cut and access the pipe to perform a CCTV inspection of the City's lower lateral to verify whether or not there are any deficiencies of the sewer pipe. If it has been determined that there is, City crews will perform a repair of the lower lateral. If not, the City will recommend that the property owner installs a property line sewer cleanout to allow the City's sewer staff to have access of the lower lateral. City staff estimates that approximately 90 percent of service laterals include property line cleanouts. Lower lateral maintenance responsibilities include cleaning, inspections, and repairs or replacements.

The Wastewater Division is prepared to respond to lateral service calls from customers twenty-four hours a day, seven days a week. Section 2.3 describes how these calls are

received and routed to the on-call crew member. In the case of a lower lateral blockage, the on-call crew member clears the blockage, documents the response, and indicates if a CCTV inspection is needed to check the line for defects that might warrant repair or replacement. These lateral CCTV inspections are conducted as needed each Friday (although they can be completed sooner in particularly urgent situations). The CCTV inspection crew will assess and report if the line needs to be repaired or replaced, and with what urgency. Lateral CCTV inspections and findings are documented via work orders. Information from these work orders is entered, compiled, and tracked in an electronic database. Approximately four or five laterals are repaired or replaced each week.

A copy of a door hanger that explains the City's response to a service lateral request is included in the **Element 4 Appendix**. The door hanger is available in both English and Spanish, and can be used to communicate follow-up instructions to the property owner if they are not available.

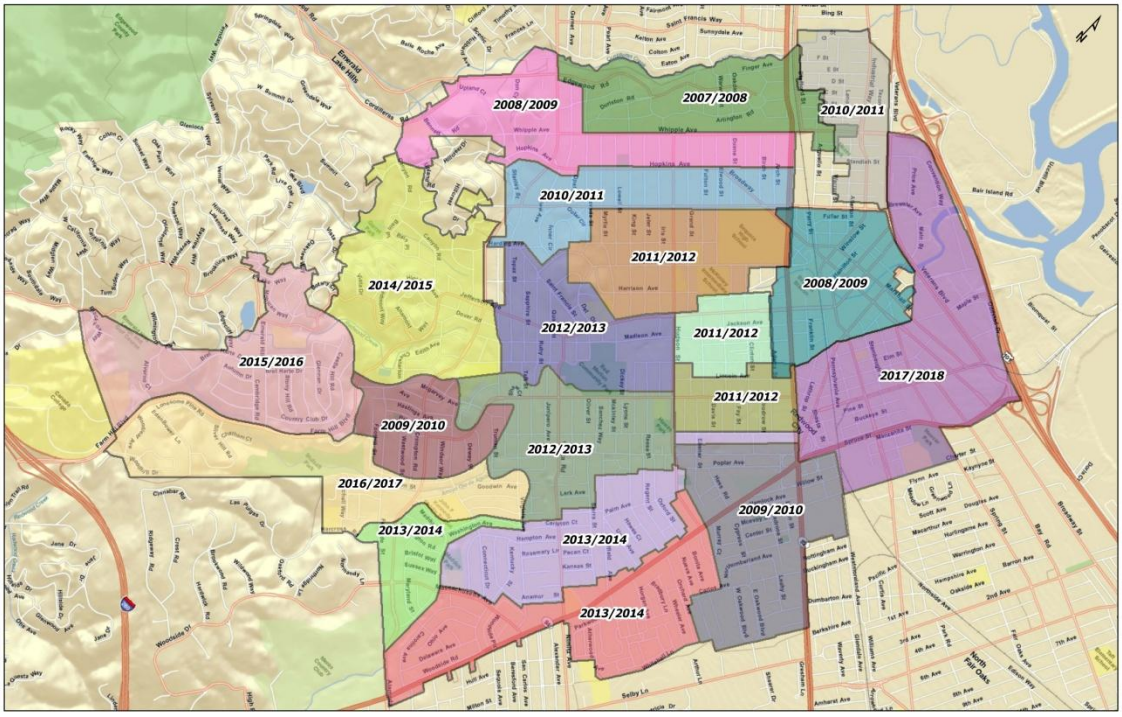
4.3 Collection System Rehabilitation and Replacement Planning

This section describes the City's on-going process for identifying, prioritizing, and implementing sewer pipeline and lift station rehabilitation and replacement.

4.3.1 Sewer Pipeline and Manhole Inspection

The City has implemented a multi-year program to perform CCTV inspection of all sewer pipeline segments and visual inspection of all sewer manholes. The City performs CCTV inspection utilizing a CCTV contractor. CCTV inspections are documented utilizing the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) inspection standard. Inspection data is collected and stored in WinCan V8, a commercially available CCTV inspection software. The City maintains a master CCTV database repository of all sewer pipeline inspections. Inspection of the sewer system is performed by sewerage catchment basins and prioritized based on inflow/infiltration factors documented in the August 2008 Redwood City Sanitary Sewer Master Plan. **Figure 4-1** shows the City's sewer basins, which are the basis for selecting groups of sewer pipeline and manholes for CCTV and visual inspection.

Figure 4-1: Sewer Basins Used for Scheduling System-Wide CCTV Inspection



The City is performing a baseline inspection of all sewer pipeline and manholes over a seven-year period. The inspection schedule for each meter basin is shown in **Table 4-1**.

Table 4-1: Inspection Schedule for Sewer Basins

Sewer Basin	Miles of Sewer Pipelines	Total Miles	Inspection Schedule	Inspection Status as of May 2013
1	6.21	64.58	2007/2008	Completed
2	7.61		2008/2009	Completed
DT1	12.90		2008/2009	Completed
5E	4.53		2009/2010	Completed
8	7.91		2009/2010	Completed
4	5.87		2010/2011	Completed
3	6.44		2010/2011	Completed
C04	6.61		2010/2011	Completed
5C	3.34		2011/2012	Completed
9	3.16		2011/2012	Completed
5F	9.93	83.70	2012/2013	Not Completed
5B	6.97		2012/2013	Not Completed
6	7.83		2013/2014	Not Completed
5H	3.29		2013/2014	Not Completed
7	11.98		2013/2014	Not Completed
5A	11.98		2014/2015	Not Completed
5D	7.97		2015/2016	Not Completed
5G	9.13		2016/2017	Not Completed
DT2	14.62		2017/2018	Not Completed

The City's sewer pipeline CCTV contractor inspects sewer manholes as part of the same inspection contract. The inspection contractor performs a visual inspection of the manhole structures and documents manhole inspections using a Sewer Manhole Inspection Form included in the **Element 4 Appendix**.

4.4 Sewer Pipeline and Manhole Condition Assessment, Rehabilitation Planning, and Prioritization

The City's Community Development Services Department, Engineering and Transportation Division are responsible for performing sewer and manhole condition assessment and sewer rehabilitation planning. The City has developed an internal inspection data review process for performing sewer condition assessment. Inspection and video data is linked using the City's geographical information system (GIS) to pipeline segments on a map. The map has symbology color coding sewer pipeline defect locations. The reviewer can select a specific pipeline for review and view inspection and video data for selected segments. A City staff engineer will perform evaluation and video review of all pipeline segments within a meter basin and will document the City's decision to perform rehabilitation or replacement of pipeline segments within the meter basin. Once all of the pipeline segments within a meter basin are evaluated, the City will develop sewer rehabilitation and replacement projects to address all segments selected for rehabilitation and replacement within a meter basin. Rehabilitation and replacement projects generally follow the prioritization of meter basins based on I/I factors listed. In some cases, the schedule for larger rehabilitation and replacement projects are shifted based on available funding.

Rehabilitation and replacement of sewer manholes is performed separately from sewer pipeline rehabilitation and replacement. City staff perform a secondary inspection on all sewer manholes identified by the inspection contractor as having a severe structural condition. The purpose of secondary manhole inspections are to identify the potential candidates for inclusion on a manhole repair, rehabilitation, and replacement contract. The City typically creates a sewer manhole rehabilitation and replacement contract once approximately 50 sewer manholes are identified for rehabilitation and replacement. The City will include sewer manholes identified for rehabilitation and replacement by the Sanitary Sewer Maintenance Section. The City will expedite sewer rehabilitation or replacement if severe structural deterioration is identified.

4.5 Resources and Budget

Based on the level of sewer rehabilitation and replacement identified by the City through 2012, the City estimates approximately 25 percent of the sewer system will have to be rehabilitated or replacement over the next 25 years. This equates to approximately 1 percent replacement of the sewer system per year for the next 25 years. The City anticipates this level of sewer rehabilitation and replacement will proceed indefinitely due to ongoing system deterioration. The City has been proactive in increasing sewer rates to achieve the level of sewer rehabilitation and replacement required to address system structural deficiencies and inflow/infiltration. The City recently performed a rate study and approved sewer rate increases on July 1, 2012 to increase rates by 9 percent per year over the next five years.

The City's two-year budget is made available to the public both as a "Recommended Budget" submitted by the City Manager, and in its final form once approved by City Council. The current fiscal period and historical budgets can be found on the City's Finance Department website along with detailed information describing the review process.

The budget is structured around City departments, each composed of programs and subprograms. The sources of financing and resources allocated to each program are itemized for each budget period. Two City departments, Public Works Services and Community Development Services, are directly involved in the effective operation, maintenance and repair of the wastewater collection system.

Within Public Works Services, Wastewater Management Services has two pertinent subprograms: Sanitary Sewer Maintenance and Wastewater Treatment and Disposal. Wastewater treatment and disposal services are provided by the South Bayside Systems Authority (SBSA) as part of a joint powers agreement. Sources of revenue for the programs are Special Assessments and the Sewer Fund. These are comprised of connection fees, sewer service charges, other small revenue sources, and interest income. The budget includes funding for additional department resources including staff, supplies and services, internal services (such as vehicle maintenance), and capital allocations.

Community Development Services, another City department, houses the Engineering and Construction program which provides sewer construction, design and permitting services. Within the Engineering and Construction program is the Capital Improvement Engineering subprogram which receives funding to implement the projects identified in the CIP. Sources of revenue are from the General Fund and Capital Projects Fund which include collected funds from property and other taxes, licenses and permits, fines, other agencies, charges for services, utility user taxes, and revenue and interest income.

4.6 Training

The City of Redwood City is committed to ensuring City staff and contractors working on the sewer system are properly trained.

4.6.1 California Water Environment Association Collection System Maintenance Certification

All City employees working in the Wastewater Management Services Division and assigned duties on the sanitary sewer system are required to obtain California Water Environment Association (CWEA) Collection System Maintenance certification. The job description of each position indicates the minimum grade level of the CWEA Collection System Maintenance certification required.

Table 4-2: Minimum CWEA Collection System Maintenance Certification

Position	Minimum Grade Level
Utilities Specialist	Grade II
Utilities Worker	Grade II
Lead Public Works Maintenance Worker	Grade II
Public Works Maintenance Worker III	Grade II
Public Works Maintenance Worker II	Grade I
Public Works Maintenance Worker I	Grade I

Employees of the Wastewater Management Services Division, which includes the storm drains maintenance, , and sanitary sewer maintenance sections, are continually acquiring, renewing and increasing their California Water Environment Association (CWEA) Operation and Maintenance of Wastewater Collection Systems certifications. In fiscal year 2005-2006, the Redwood City, City Council approved a two-year incentive program for additional monetary compensation with the Service Employees International Union (SEIU) to encourage workers to earn and maintain collection system knowledge and certifications. The program included incentives to encourage employees to obtain higher level certifications as well. The incentive program ended on June 30, 2008; however, the City continues to fund training, application costs, certification dues, membership dues and overtime costs associated with testing and training for maintaining certifications.

An example CWEA Collection System Maintenance Candidate Handbook (**Element 4 Appendix**) describes the requirements of the certification. CWEA certificate holders must obtain a basic level of competency, as described by the following CWEA Certification of Competency Standard.

<u>The CWEA Certification of Competency Standard</u>

The basic standard of CWEA certification is that certificate holders have, and continue to perform at, a level of basic competence that enables them to perform the Essential Duties of the job safely, effectively, without close supervision, and without further training.

The standard is determined by the following factors:

- Meeting minimum experience and education requirements
- Passing the appropriate written examination.
- Demonstrating continuing competence through education, training, and/or re-testing.
- Continuing to perform the Essential Duties at, or above, the minimal level of competency described by the basic standard of CWEA certification (see above paragraph).

4.6.2 Sanitary Sewer Overflow Emergency Response Training

The City of Redwood City will perform annual refresher training to review the Sanitary Sewer Overflow Response Plan and related Pump Station SSO Emergency Response

Plans. The annual refresher training will include at least one simulated sewer overflow response drill to test response crews on the major SSO response activities including:

- Initial response
- SSO containment
- SSO mitigation
- SSO clean-up
- SSO volume estimation
- SSO reporting and documentation

4.6.3 Public Works Services Safety and Training Program

In addition, the Public Works Services Safety and Training Program is dedicated to providing a properly trained, safe, and professional work force to operate and maintain the City's sanitary sewer collection system. Excerpts from the program's purpose and goals are included in the **Element 4 Appendix**. The Department's Health, Safety and Wellness Committee oversees the Safety and Training Program. The Safety and Training Program offers, at minimum, monthly sessions covering topics such as:

- Tractor/Loading and Backhoe
- Confined Spaces
- Forklift Operator
- Shoring
- First aid/CPR
- Fire Extinguisher
- Work Zone/Traffic Control

A sample Public Works Services Safety Training Perpetual Calendar is included in the Safety and Training Program Excerpts in the **Element 4 Appendix**. The Wastewater Division also has documented progression requirements. For example, in order to be promoted from a Lead Public Works Services Maintenance Worker I to a Lead Public Works Services Maintenance Worker II, the crew member must meet certain basic requirements related to experience and certifications, and must demonstrate competency with specific technical, safety and administrative skills. A sample Training Plan for the Sanitary Sewer Section can also be found in the Safety and Training Program excerpts in the **Element 4 Appendix**.

4.7 Contingency Equipment and Replacement Inventories

The City's inventory of replacement parts is tracked monthly to ensure effective maintenance of the sewer system. An example spare parts inventory and submersible pump inventory is included in the **Element 4 Appendix**. The City stocks an assortment of materials including pipes, couplings, main line plugs and submersible pumps.

The City has purchased a trailer to be utilized specifically for spill response emergencies. The trailer is stored in the Corporation yard and is available if needed, to be towed to all SSO incident locations. The trailer is equipped with a generator, pump, hosed,

barricades, personal protective equipment (PPE) and other related items to assist staff in responding to any and all sewer overflows.

4.8 Outreach to Plumbers and Building Contractors

The City is a member of the Bay Area Clean Water Agencies (BACWA), an association of Bay area governmental agencies that own and operate collections systems and publicly owned treatment works.

BACWA has developed a brochure directed toward plumbers and building contractors to provide information on how to prevent blockages in private laterals, which can contribute to SSOs. Blockages can be caused by improper construction and maintenance of laterals. When a lateral blockage occurs, plumbers may end up pushing debris from the lateral into the mainline sewer where it may cause blockages and/or overflows from the City's system. The City has customized the BACWA brochure with information specific to the service area. The brochure will be mailed to local businesses based on business license information and will also be distributed by the Building Department to individuals seeking a plumbing permit. A copy of the brochure is included in the **Element 4 Appendix**.

List of Documents in Element 4 Appendix (see separate tab):

1. Example Map for Redwood City Utility System, Map E18
2. Example Map for Redwood City Utility System, Map G14
3. Sample List of Sewer Mains Requiring More Frequent Preventive Maintenance
4. Maintenance Feedback Forms
    a. Preventive Maintenance Rodding Basin Program form
    b. Preventive Maintenance Jetting Basin Program form
    c. Sewer Lateral Data form
5. Pump Station Preventive Maintenance Check List and Associated Work Order
6. Service Lateral Request Response – English
7. Service Lateral Request Response - Spanish
8. Sewer Manhole Inspection Form
9. CWEA Collection System Maintenance Candidate Handbook
10. Safety and Training Program Excerpts
    a. Goals and Objectives
    b. Sample Training Plan
    c. Safety Training Perpetual Calendar
11. Example Spare Parts Inventory
12. Submersible Pump Inventory
13. BACWA Plumber Outreach Brochure

Element 5 - DESIGN AND PERFORMANCE PROVISIONS

SWB Requirements:

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

The City's Engineering Standards (Standards), adopted by the City Council on October 13th, 2003 with updates on July 28, 2008, are available to contractors on the Engineering and Construction portion of the City's website.

http://www.redwoodcity.org/bit/infrastructure/standards/index.html

Conformance to the Standards is required, and the criteria are considered a minimum. The Standards comprises three volumes. Volume 1 provides direction for sewer construction, specifications for earthwork, pipe work, manholes, materials and reinforcement. **Table 3** indicates where the listed specifications appear in Volume 1.

Table 3. Specifications in Engineering Standards, Volume 1

Specifications	Section of Volume 1
Trenching, backfill, pipe bedding and cover material	Section 02202
Pipe material, sizes and grades	Section 02730 Part 2.01
Manholes	Section 02730 Part 2.03
Reinforcement	Section 02550
Testing sanitary sewers	Section 02730 Part 3.07

Volume 2 includes the technical drawings associated with the construction of public improvements**.**

Volume 3 comprises design criteria including general planning requirements, survey and grading criteria, and sanitary sewer system design criteria for both public and private improvements. Size specifications, alignment criteria, required materials and designation of maintenance responsibilities for wastewater collection systems can be found in Part VI of Volume 3. Special design criteria have been developed for underground utilities in

areas with bay mud or other special geotechnical conditions and are provided for in individually designated sections.

5.2 Standards for Inspection and Testing of New Facilities

As specified in Volume 1, Section 02730, sanitary sewer force mains and laterals require testing for tightness after the completion of backfilling but prior to the request for final inspection. Sewer lines are tested for water tightness, obstructions, and vertical deflection. Hydrostatic or air pressure methods, depending on the specific project, can be used to ensure test requirements are satisfied. Cases with geotechnical considerations require an internal television inspection to detect defects.

Element 6 - EMERGENCY RESPONSE PLAN

SWB Requirements:

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 an 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 WDRs or NPDES permit requirements. The Sewer System Management Plan (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*

- *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.*

6.1 Existing Documentation

SSO emergency response protocol is documented in the City's Sanitary Sewer Overflow and Backup Response Plan (Response Plan), originally prepared by *Risk Management Solutions* in 2006 and updated in 2009 and most recently in 2012. A copy of the Plan is included in the **Element 6 Appendix**.

The document is organized in sections as follows:

- Section 1 – Response Plan Binder (PB)
- Section 2 – Regulatory Notifications Packet (RN)
- Section 3 – Sanitary Sewer Backup Packet (BP)
- Section 4 – Sanitary Sewer Overflow Packet (OP)
- Section 5 – Field Sampling Kit (FS)

- Section 6 – Field Guide (FG)
- Section 7 – Miscellaneous

The Response Plan's purpose is to provide guidance to personnel for responding to SSOs and backups to maximize protection of public health and the environment. The City's policy is to respond promptly to SSOs following notification and to report wastewater overflows in compliance with regulatory requirements.

6.2 Notification

Section 1 of the Response Plan include a flow chart on page PB-3 for Receiving a Sewer Overflow/Backup Report. The flow chart describes the City's procedure for receiving service calls. During business hours, calls are routed through the main line at Public Works Services. The details of the call are logged into a database and the Sewer On-Call Person is contacted via pager. If the service call is received during non-business hours, the call is routed to Police Dispatch who will notify the On-Call Person via pager. If at any time the Sewer On-Call Person cannot be reached, then the Public Work Supervisor-Sewer Section will be contacted via pager. If additional assistance is required, the Sewer On-Call Person will contact the needed collection system staff through the Main Office (business hours) or via the Public Work Supervisor-Sewer Section (non-business hours). Section 2 of the Response Plan, Regulatory Notification Packet, includes instructions for notifying regulatory agencies as required by the SWB. Section 3 and Section 4 of the Response Plan describes the chain-of-communication for reporting and responding to backups and SSOs, and includes internal notification procedures.

6.3 Response

Section 3, Sanitary Sewer Backup Packet, and Section 4, Sanitary Sewer Overflow Packet, provide detailed instructions on responding to indoor sewer backups and outdoor SSOs, respectively. These two Tabs make up the majority of the contents of the Response Plan.

Section 4, OP-1, Responding to a Sanitary Sewer Overflow, includes the following information:

- Procedures for initial evaluation of the spill, placement of warning signs, and the dispatch of the appropriate crew and equipment;
- Instructions on containing and diverting the SSO from sensitive areas, clearing blockages, cleaning up the area, and documenting the event; and
- A reference to Tab 8 for emergency vendor and employee contact information if additional support is necessary.

The Response Plan states that every effort must be made to prevent the discharge of wastewater to surface waters. If the SSO does reach surface water, Section 5, Field Sampling Kit, includes Procedures for Sampling Receiving Waters and Posting, which provides detailed instructions for collecting samples. In addition, Section 6, Field Guide,

of the Response Plan contains a number of subsections with instructions on quantification, documentation and reporting of the SSO.

6.4 Reporting

The Sewer On-Call Person is responsible for completing the Sewer Overflow Report; located in the Sanitary Sewer Overflow Packet of the Response Plan. This report provides internal documentation of the specifics of the SSO, and includes details that are necessary to fulfill regulatory reporting requirements.

Officials receiving immediate notification of the SSO vary depending on the size of the spill and whether or not the spill reaches, or is likely to reach, surface waters, as indicated in **Table 4**.

Table 4. City Staff Receiving Immediate Notification of SSOs

Contact	Circumstances for Immediate Notification
Public Works Supervisor	Any SSOs
Sewer Utilities Specialist	If the SSO is likely to reach surface waters
Storm Drains Utilities Specialist	If Sewer Utilities Specialist is unavailable
Storm Drain Maintenance Leader	If the SSO is impacting a creek/channel
Storm Drain Maintenance Utilities Specialist	If the SSO is impacting a lagoon

6.5 Response Plan Training

Immediately following updates of the Response Plan, Public Works staff receive interactive training covering the updated document. A certificate of completion for each staff member attending the training is on file. Refresher training is periodically held and weekly tailgate trainings on plan components ensure staff response readiness.

List of Documents in Element 6 Appendix (see separate tab):

1. Sanitary Sewer Overflow and Backup Response Plan

Element 7 - FATS, OILS, AND GREASE (FOG) CONTROL PROGRAM

SWB Requirements:

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 sufficient staff to inspect and enforce the FOG ordinance;*
f. *An identification of sanitary sewer system sections subject to FOG blockages and establishment of 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 and Outreach

The City's website includes a page dedicated to Sewer Service that displays the following links to public education and outreach material promoting proper disposal of fats, oils and grease (FOG):

- Be Sewer Smart, Helpful Hints: (http://www.sewersmart.org/). This comprehensive interactive website includes information for residents on how to prevent sewer backups and how to properly dispose of FOG. The website, sewersmart.org, is maintained by the Association of Bay Area Governments.
- Fat-Free Sewers Brochure: (http://www.redwoodcity.org/publicworks/sewer/pdf/Fat-Free%20Sewers_brochure.pdf). The Water Environment Federation's "Fat-Free

Sewers" is an English/Spanish educational brochure on the impacts of improperly disposed FOG. The brochure lists specific steps one can take to prevent FOG from entering the sanitary sewer system. In addition to the electronic version included on the website, copies of the Fat-Free Sewers brochure are also available and on display at the City's Public Works Services building and are included as an insert with residential water bills prior to the holidays. A copy of the brochure can be found in the **Element 7 Appendix**.

- Fat-Free Sewers Webpage: (http://www.redwoodcity.org/publicworks/sewer/fat_oil_free.html). Residential FOG control practices are described in English and Spanish on this page of the City's site.

7.2 FOG Disposal

SBSA accepts FOG from San Francisco, San Mateo, and Santa Clara counties at the wastewater treatment plant in Redwood City. Several additional FOG disposal sites are located throughout the San Francisco Bay area. A list of these facilities is available online at CalFOG.org.

7.3 Legal Authority to Prohibit FOG Discharges

The legal authority to prohibit improper discharges to the collection system is documented in Ordinance No. 2329, known as the City Code of Redwood City, updated May 12, 2008. The following sections of this ordinance apply to the FOG control program:

Sec. 27.10 ***General Prohibitions.***

A. No person shall discharge waste into the sewerage facilities which causes, threatens to cause or is capable of causing, either alone or by interaction with other substances:

1. *A fire or explosion;*
2. *Obstruction of flow in, or injury to, the sewerage facilities, or any portion thereof;*
3. *Danger to life or safety of persons;*
4. *Conditions inhibiting or preventing the effective maintenance or operation of the sewerage facilities;*
5. *Strong or offensive odors, air pollution, or any noxious, toxic, or malodorous gas or substance, or gas producing substances;*
6. *Interference with the wastewater treatment process, or overloading of the sewerage facilities, or excessive collection or treatment costs, or use of a disproportionate share of the capacity of the sewerage facilities;*
7. *Interference with any wastewater reclamation process, which does or may operate in conjunction with the sewerage facilities, or overloading, or a breakdown of such reclamation process, or excessive reclamation costs, or any product of the treatment process*

which renders such reclamation process impracticable or not feasible under normal operating conditions;

8. *A detrimental environmental impact, or a nuisance wherever located, or a condition unacceptable to any public agency having regulatory jurisdiction over operation of the sewerage facilities;*
9. *Discoloration, or any other adverse condition in the quality of the effluent from the sewerage facilities such that receiving water quality requirements established by any statute, rule, regulation, ordinance, or permit condition cannot be met by the City or the Authority;*
10. *Conditions at or near the sewerage facilities, or any portion thereof, which cause, or may cause, the City or Authority to be in violation of the requirements of law.*
11. *Pollutants introduced into the sewerage facilities which pass through or interfere with the operation or performance of the sewerage facilities.*

B. *No person shall discharge hazardous waste into the sewerage facilities except pursuant to a permit issued by Authority's Manager upon a determination that such hazardous waste will not constitute or create a detrimental discharge.*

C. *Except pursuant to an express applicable pretreatment standard, no user shall ever increase the use of process water or, in any other way, attempt to dilute a discharge of waste or wastewater as a partial or complete substitute for adequate treatment to achieve compliance with a pretreatment standard. The Authority may impose limitations upon mass emission rates on users which are using dilution to meet applicable pretreatment standards or in other cases where the imposition of mass limitations is appropriate. (Ord. No. 2065, § 2, 8-16-93)*

Sec. 27.13 ***Specific Wastes Prohibited.*** *No person shall discharge, cause to be discharged, or permit to be discharged any wastewater into the sewerage facilities:*

A. *The temperature of which is higher that one hundred fifty degrees (150°) Fahrenheit (65°Centigrade);*
B. *Containing more than three hundred (300) mg/l of oil or grease of animal or vegetable origin;*
C. *Containing more than one hundred (100) mg/l of oil or grease of mineral or petroleum origin;*
D. *Having a pH lower than six (6.0) or having a corrosive property capable of causing damage or hazard to structures or equipment of the sewerage facilities, or any portion thereof;*
E. *Containing any sand, grit, straw, metal, glass, rags, feathers, paper, tar, plastic, wood, leaves, garden clippings, manure, dead animals, offal or any other solid or viscous substance capable of causing obstruction to the flow in the sewerage facilities, or which in any way interferes with the proper operation of the sewerage facilities;*

F. Containing any pollutant not otherwise specifically prohibited in these regulations, in sufficient quantities to constitute a hazard to humans or animals, or to create a hazard to the sewerage facilities, or to injure or interfere with the operation thereof;

G. Comprised of any waste containing suspended solids, not otherwise specifically prohibited under the provisions of these regulations, the characteristics or quantity of which require or requires unusual attention, treatment, or expense in handling or treating in the sewerage facilities or any portion thereof;

H. Any waste streams with a closed cup flashpoint of less than one hundred forty degrees (140º) Fahrenheit;

I. Any trucked or hauled wastes except at points designated by the Authority or City. (Ord. No. 2065, § 2, 8-16-93)

7.4 Grease Removal Device Installation Requirements

Section 9.117 of the Redwood City Municipal Code adopts by reference the 2010 California Plumbing Code (as of January 24, 2011). Chapter 10 of the 2010 California Plumbing Code includes requirements and specifications for the installation, plumbing, and sizing of grease removal devices.

7.5 Commercial Source Control Inspection Program

The City has an active commercial fats, oils, and grease source control inspection program (FOG Program) to reduce the amount of fats, oils, and grease improperly discharged from food service establishments (FSEs). The FOG Program has been in place since 2007. South Bayside System Authority (SBSA), the wastewater treatment Joint Powers Authority of which the City is a part, is responsible for managing the industrial waste pretreatment program that regulates industries in the City and also assists with the implementation of the FOG Program. The following paragraphs further describe the organization of the FOG Program.

The City identifies all FSEs in the City and provides that list to SBSA. The City generates the list of FSEs from the City's business database, in which FSEs are flagged with specific standard industrial classification (SIC) codes for food establishments. The FOG Program currently includes approximately 75 FSEs.

SBSA conducts inspections of the FSEs to locate and evaluate maintenance of grease removal devices, evaluate kitchen plumbing, and review FOG management procedures. During the inspections, SBSA provides outreach material and educates FSE staff on the use of industry-standard BMPs. SBSA generally obtains outreach materials from the Bay Area Pollution Prevention Group, a local industry organization in which SBSA is an active member. SBSA, and the City, requires FSEs to maintain records of grease trap maintenance and provide FSEs with one of the following logs created for that purpose:

- Grease Removal Device Maintenance Log (**Element 7 Appendix**)
- Grease Hauling Log (**Element 7 Appendix**)

SBSA inspectors document inspection results using the Food Serving Establishment Data Entry Form (**Element 7 Appendix**), and prioritize FSEs into the following categories:

- Priority 3 – High Priority – SBSA recommends enforcement review by City
    - No grease removal devices, or inadequate grease removal device (e.g. no interceptor at a large restaurant)
    - No use of BMPs to reduce FOG discharge
    - No maintenance records
    - Improper plumbing, Dishwasher hooked up to trap or interceptor or a drain or sink not plumbed to trap or interceptor.
    - Evidence of improper disposal of grease; stains around drains
    - No waste grease drum
    - Improper housekeeping
    - Complaints from sewer crews to SBSA that sewer lines are being impacted
- Priority 2 – Medium Priority – SBSA re-inspection requiring improved BMP implementation and documentation
    - Grease removal device installed but not being maintained
    - No use of BMPs
    - No maintenance records or improper documentation
    - Generally, proper plumbing installation
    - Evidence that grease is being disposed of properly
    - Waste Grease Drum present
    - Housekeeping is acceptable
- Priority 1 – Low Priority – Encourage continued performance
    - Grease removal devices installed and properly maintained
    - Use of BMPs to reduce FOG discharge
    - Plumbing was correct, dishwasher did not go the grease removal device, drainage fixture units were properly plumbed to grease removal devices
    - Grease removal records are being maintained
    - Waste drum in place
    - Good to excellent housekeeping

The following goals have been established for the minimum frequency for conducting inspections at each FSE:

- Priority 3 – High Priority: Inspected monthly until the identified problem is resolved or alternate enforcement actions are taken by the City
- Priority 2 – Medium Priority: Inspected quarterly
- Priority 1 – Low Priority: Inspected annually

SBSA staff maintains a database of FSE information and inspection results. SBSA provides quarterly reports to the City on their inspections and findings. Meetings are held following the receipt of these reports to discuss issues in the field, particularly regarding areas prone to FOG problems. The City's Wastewater Management Services Supervisor also communicates directly with the SBSA source control manager on a more regular basis as needed. SBSA staff will prepare and transmit an initial Notice of Violation to FSEs when a violation is discovered. SBSA staff will also provide a written explanation, within 30 days of the investigation, of the cause of the violation. All additional enforcement is conducted by City Code Enforcement staff.

7.6 Hotspot Management

Those areas found to be more prone to grease build-up or stoppages (grease hotspots) have been identified and are included as appropriate in the City's accelerated cleaning schedule for pipe requiring more frequent cleaning. An example list of pipes requiring more frequent cleaning is included in the **Element 4 Appendix**. The City is also inspecting the entire system over an 11-year period, a process that is likely to ensure that any as-yet unidentified pipes with grease issues are discovered and accounted for.

List of Documents in Element 7 Appendix (see separate tab):

1. Water Environment Federation's "Fat Free Sewers" Brochure
2. Grease Removal Device Maintenance Log
3. Grease Hauling Log
4. Food Serving Establishment Data Entry Form

Element 8 - SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

SWB Requirements:

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 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 Sewer System Management Plan (SSMP) review and update requirements as described in Section D. 14.*

8.1 Capacity Assessment

The City of Redwood City Sewer Master Plan Update, January 2013, identifies and prioritizes capacity and rehabilitation improvement projects and recommends a phased capital improvement program (CIP), including budget estimates, for implementing the needed capacity improvements to the wastewater collection system.

The Master Plan Update includes the following chapters:

1. Background
2. Existing Sanitary Sewer System
3. Hydraulic Model Updates

4. Existing and Future Wastewater Flows
5. Capacity Analysis
6. Updated Capital Improvement Program
7. Project Implementation Recommendations

The Master Plan Update is included in the **Element 8 Appendix.**

8.2 System Evaluation and Capacity Assurance Plan

Evaluation:
The Master Plan Update includes estimates of peak flows (Pages 8 through 11, and Appendix A) and the capacity of key system components (Chapter 5), and identifies hydraulic deficiencies (Chapter 5) and the major sources contributing to peak flows that have the potential to overcharge the system (Chapters 5).

Design Criteria:
Wastewater flow projections for the City were developed using population, water use and land use information. A hydraulic model of the trunk sewer system was developed to identify existing capacity deficiencies and future requirements. Based upon the findings, a phased CIP was recommended.

Capacity Enhancement Measures:
The current Master Plan recommends $38 million in CIP over the next 10 years. The CIP calls for an update to the Master Plan following completion and evaluation of short-term recommended improvement projects. The results of this evaluation will provide the basis for decisions on future capital improvements.

The City's two fiscal year budget includes a budget for Capital Improvement Funds. This budget allocates funds specifically to a Sewer Capital Projects Fund.

Schedule:
Evaluation, design criteria, and short-term CIP requirements are currently fulfilled by the completion of the Master Plan. The CIP includes a schedule of planned improvement projects and the next scheduled update to the Master Plan. Auditing and updates of this schedule will be conducted as described in SSMP Elements 9 and 10.

List of Documents in Element 8 Appendix (see separate tab):

1. Sanitary Sewer Master Plan Executive Summary
2. Sanitary Sewer Master Plan (on CD)

Element 9 - Monitoring, Measurement, and Program Modifications

SWB Requirements:

The Enrollee shall:

a. *Maintain relevant information that can be used to establish and prioritize appropriate Sewer System Management Plan (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.*

The effectiveness of each SSMP element is measured through the use of selected performance indicators tracked annually in an internal Annual SSO Report. The Public Works Supervisor is responsible for collecting data and monitoring these indicators annually. The Annual SSO Report template is included in the **Element 9 Appendix.**

The Annual SSO Report template includes the following performance indicators:

- Number of dry weather SSOs
- Number of wet weather SSOs
- Total number of SSOs
- Number of SSOs <100 gallons
- Number of SSOs 100 to 999 gallons
- Number of SSOs 1,000 to 9,999 gallons
- Number of SSOs >10,000 gallons
- Total volume of SSOs
- Total volume recovered
- Total volume conveyed
- Number of SSOs caused by each of the blockage types: roots, grease, debris and other
- Blockages due to each of the following: roots, grease, debris, and other
- Number of SSOs caused by capacity limitations

The Public Works Supervisor compiles performance indicator data from information regularly collected and maintained by the City. Current and readily available sources, which are described throughout this SSMP, include SSO field report forms, CIWQS database reports, sewer system cleaning schedules, and FOG inspection reports.

The City's Public Works Superintendent-Wastewater Division, is responsible for communicating the results of the Annual SSO Report to the Public Works Services Director and, if necessary, to the City Council. Based on the results of the internal Annual SSO Report, the Public Works Superintendent and Public Works Supervisor will evaluate if opportunities for improvement exist in the SSMP and if modifications are necessary to improve the effectiveness of the SSMP implementation. The evaluation is documented using the Annual SSMP Evaluation form. Necessary updates to the SSMP made based on these annual evaluations. A record of changes to the SSMP since last certification indicating when a subsection of the SSMP was changed and/or updated and who authorized the change or update is included in **Element 9 Appendix**.

List of Documents in Element 9 Appendix (see separate tab):

1. Annual Report of Sanitary Sewer Overflows (template)
2. Annual SSMP Audit Form
3. Record of Changes to the SSMP

Element 10 - SSMP PROGRAM AUDITS

SWB Requirements:

As part of the Sewer System Management Plan (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.

In addition to the internal Annual SSO Report and Annual SSMP Evaluation, the City also performs an internal audit of the Sewer System Management Plan every two years. The SSMP audit will systematically review each SSMP element to evaluate the effectiveness of the SSMP implementation and to ensure the SSMP contains current information and satisfies regulatory requirements. The SSMP audit report will document the evaluation of the effectiveness of the SSMP and will identify specific deficiencies and corrective actions required to address identified deficiencies. If the SSMP audit indicates updates or changes are required, the Public Works Superintendent will be responsible for delegating SSMP update activities to the parties responsible for updating the specific SSMP elements requiring modification as identified in Table 2-1.

The City may choose to perform an SSMP audit of individual SSMP elements over an extended period or may choose to perform the audit of the entire SSMP at the same time. The City will audit all SSMP elements at least once within a period of two years. The Public Works Superintendent is responsible for ensuring SSMP audit activities are completed for each SSMP element at least once every two years.

Element 11 - COMMUNICATION

SWB Requirements:

The Enrollee shall communicate on a regular basis with the public on the development, implementation, and performance of its Sewer System Management Plan (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 communicates with the public annually at a minimum on the development, implementation, and performance of the SSMP through public meetings with the Utilities Committee and City Council. Any significant changes to specific aspects of the SSMP must be brought before the City's Utilities Committee for review and approval before being presented to the City Council and these meetings are open to the public. At a minimum, this process occurs annually to implement new or revised budgets and/or sewer rates. City Council meetings are open to the public and announced on the City's website.

In addition to public meetings with the Utilities Committee and City Council, the City's website provides the public with information regarding the sewer services provided by the City and how customers can reduce sewer overflows and backups. This information can be found on-line at http://www.redwoodcity.org/publicworks/sewer/index.html. The City's website also provides two direct means for public interaction with the City. One is through the use of the "Suggestions" button which enables anyone accessing the website to provide suggestions to the City. The second is through the use of the "Contacts" list which provides contact information for "Sewer System Maintenance and Repair".

The City also maintains a Community GIS. This publicly-accessible database provides information about City projects (including relevant contact information), and can be found on-line at http://pubgis.redwoodcity.org/gis/.

11.2 Communication with Tributary Systems

Wastewater from five unincorporated County of San Mateo areas and the Town of Woodside flows through the City's collection system for treatment at SBSA. The County areas include:

- Fair Oaks Sewer Maintenance District
- Emerald Lake Heights Sewer Maintenance District
- Oak Knoll Sewer Maintenance District

- Kensington Square Sewer Maintenance District
- Edgewood Sewer Maintenance District

A map showing the County administered sewer maintenance districts is included in the **Element 11 Appendix.**

Communication between the City and these tributary agencies is primarily shaped by the individual agreements with each and the resulting billing processes. The agreements describe terms of payment and designated responsibilities. For example, fees paid to the City through these agreements include a proportional share of the City's total CIP obligation to SBSA based on flows from the Districts or the number and type of connections. The City prepares bills regularly for the Fair Oaks Sewer Maintenance District and the Town of Woodside. The County pays fees to the City automatically for the remaining four Districts.

The County and the Town of Woodside are responsible for operation and maintenance of their own systems. The City's agreement with the Edgewood Sewer Maintenance District, for example, states that the "District agrees to maintain, repair, replace, and operate District facilities, in good and operable condition while this Agreement is in effect so as not to impair the efficiency of operation of City Facilities or SBSA Facilities." The SSMP for the County sewer maintenance districts is available online at: http://www.co.sanmateo.ca.us/publicworks.

11.3 Communication with Neighboring Systems

The City of San Carlos borders the City of Redwood City to the northwest. Sewer mains from each City run parallel at certain points along the border. The City communicates with the City of San Carlos on an as-needed basis regarding SSO emergency response and maintenance of these mains. The Cities have also exchanged system maps for this area. The City also has emergency mutual aid contracts in place with the Cities of San Carlos and Belmont to provide additional crew and equipment for SSO response.

List of Documents in Element 11 Appendix (see separate tab):

1. Map of County of San Mateo Administered Sewer Districts

Element 2 Appendix

1. Public Works Services Key Staff Telephone List
2. Personnel – Wastewater Management Services Division
3. Public Works Services Department, Wastewater Management Services Phone List

COMMUNITY DEVELOPMENT DEPARTMENT

PUBLIC WORKS SERVICES KEY STAFF TELEPHONE LIST

Redwood City Public Works Division
1400 Broadway
Redwood City, CA 94063
(650) 780-7464
Hours of Operation:
Monday – Friday, 7:00am – 4:30pm

Public Works Emergency Number (After Hours)
(650) 780-7190

Terence Kyaw, Public Works Services Deputy Director
mailto:tkyaw@redwoodcity.org
Phone (650) 780-7466
Fax (650) 780-7445

Justin Chapel, Utilities Superintendent
mailto:jchapel@redwoodcity.org
Phone (650) 780-7469
Fax (650) 780-7445

Mike Gibbons, Public Works Superintendent
Right of Way Maintenance
mailto:mgibbons@redwoodcity.org
Phone (650) 780-7493
Fax (650) 780-7445

WASTEWATER MANAGEMENT SERVICES PERSONNEL

SANITARY SEWER MAINTENANCE

NAME	SECTION	POSITION	ACTIVITY CURRENTLY PERFORMING	CELL	LAND LINE
Paul Heavenston	Sanitary Sewer	Utilitiy Specialist (Pumping)	same	[redacted]	650-780-7470
Rich Chaffey	Sanitary Sewer	Utility Worker (Pumping)	same	[redacted]	650-780-7470
Shawn Rees	Sanitary Sewer	Lead Public Wks Maint. Wkr	same	[redacted]	650-780-7470
Ben Fenech	Sanitary Sewer	Lead Public Wks Maint. Wkr	same	[redacted]	650-780-7470
Chad Cattaneo	Sanitary Sewer	Equipment Operator III	same	[redacted]	650-780-7470
Ramiro Rodriguez	Sanitary Sewer	Public Wks Maint Wkr II	same		650-780-7470
Dominic Finocchiaro	Sanitary Sewer	Public Works Maint. Wkr I	same		650-780-7470
Jason Claire	Sanitary Sewer	Public Wks Maint Wkr II	same		650-780-7470
Latu Taufalele	Sanitary Sewer	Public Wks Maint. Wkr II	same		650-780-7470
Rich DelBen Jr.	Sanitary Sewer	Public Wks Maint. Wkr II	same / sewer service truck operator	[redacted]	650-780-7470
Sione Tu'uhoko	Sanitary Sewer	Public Wks Maint. Wkr II	same / sewer service truck operator	[redacted]	650-780-7470

STORM DRAINS MAINTENANCE

NAME	SECTION	POSITION		CELL	LAND LINE
Rich DelBen Sr.	Storm Drains	Utility Specialist (Pumping)	same	[redacted]	650-780-7470
Eddie Lopez	Storm Drains	Lead Public Wks Maint. Wkr	same	[redacted]	650-780-7470
Robert Ortiz	Storm Drains	Equipment Operator III	same	[redacted]	650-780-7470
Victor Castaneda	Storm Drains	Public Wks Maint. Wkr II	same		650-780-7470
Albert Munguia	Storm Drains	Public Wks Maint. Wkr II	same		650-780-7470

COMMUNITY DEVELOPMENT DEPARTMENT

PUBLIC WORKS SERVICES DIVISION – WASTEWATER MANAGEMENT SERVICES

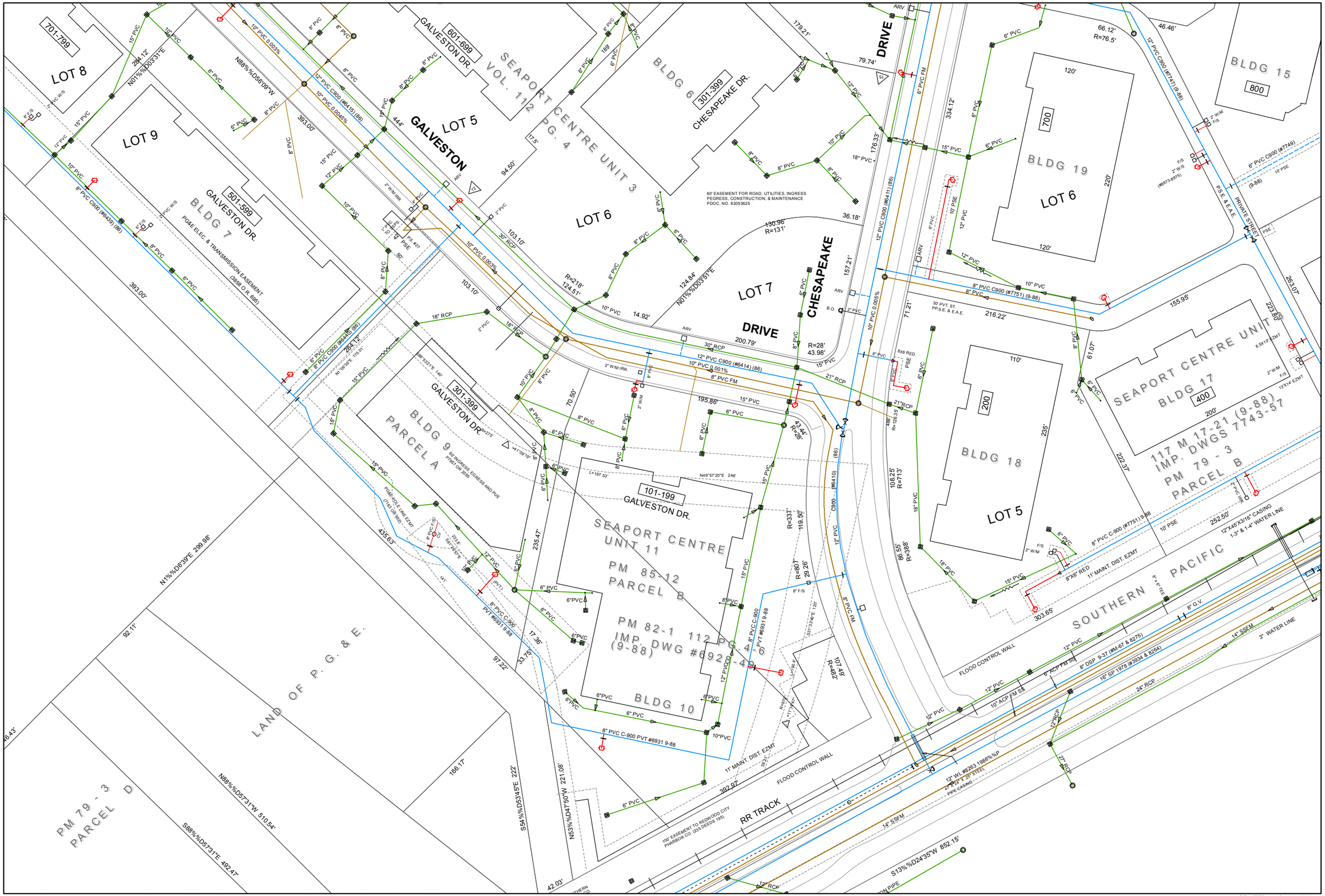
EMERGENCY CONTACT LIST

Management/Administrative	**Telephone**	**Pager**	**Cellular**
Utility Superintendent	650-780-7469		[redacted]
Wastewater Supervisor	650-780-7477		[redacted]
Administrative Office Staff	650-780-7464	N/A	XXX-XXX-XXXX
Sanitary Sewer Maintenance			
Sewer Lift Station Maint.	650-780-7464	[redacted]	[redacted]
Utility Worker	650-780-7464	[redacted]	[redacted]
Repair Crew	650-780-7464	[redacted]	[redacted]
Hydro Jetter	650-780-7464	[redacted]	[redacted]
Root Cutter	650-780-7464	N/A	[redacted]
Service Truck	650-780-7464	[redacted]	[redacted]
Storm Drains Maintenance			
Storm Pump Station Maint.	650-780-7464	[redacted]	[redacted]
Storm Drain, Creeks, Channels	650-780-7464	[redacted]	[redacted]
Street Cleaning			
PWMW II/EOIII	650-780-7464	N/A	[redacted]
SCADA			
EDDCO (Eric Daniel)	650-364-6683	N/A	[redacted]

Element 4 Appendix

1. Example Map for Redwood City Utility System, Map E18
2. Example Map for Redwood City Utility System, Map G14
3. Sample List of Sewer Mains Requiring More Frequent Preventive Maintenance
4. Maintenance Feedback Forms
    a. Preventive Maintenance Rodding Basin Program form
    b. Preventive Maintenance Jetting Basin Program form
    c. Sewer Lateral Data form
5. Pump Station Preventive Maintenance Check List and Associated Work Order
6. Service Lateral Request Response – English
7. Service Lateral Request Response - Spanish
8. Sewer Manhole Inspection Form
9. CWEA Collection System Maintenance Candidate Handbook
10. Safety and Training Program Excerpts
    a. Goals and Objectives
    b. Sample Training Plan
    c. Safety Training Perpetual Calendar
11. Example Spare Parts Inventory
12. Submersible Pump Inventory
13. BACWA Plumber Outreach Brochure

Example Map for Redwood City Utility System, Map E18



REDWOOD CITY ENGINEERING & CONSTRUCTION

REDWOOD CITY UTILITY SYSTEM

FEET 0 100 200 300

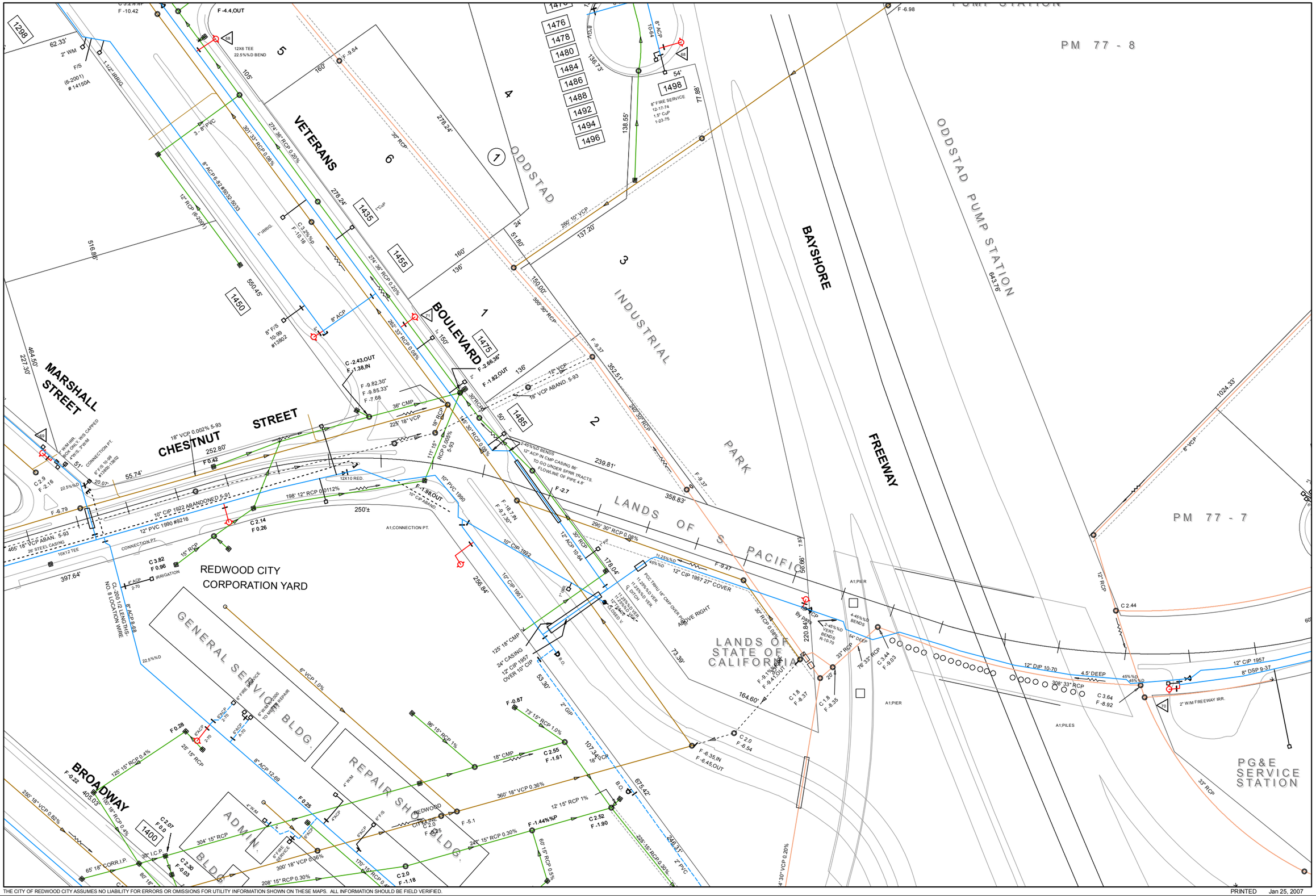
C16	C18	C20
D16	D18	D20
E16		E20
F16	F18	
G16		

E18

THE CITY OF REDWOOD CITY ASSUMES NO LIABILITY FOR ERRORS OR OMISSIONS FOR UTILITY INFORMATION SHOWN ON THESE MAPS. ALL INFORMATION SHOULD BE FIELD VERIFIED.

PRINTED Oct 17, 2007

Example Map for Redwood City Utility System, Map G14



REDWOOD CITY ENGINEERING & CONSTRUCTION

REDWOOD CITY UTILITY SYSTEM

E12	E14	E16
F12	F14	F16
G12		G16
H12	H14	H16
I12	I14	I16

G14

THE CITY OF REDWOOD CITY ASSUMES NO LIABILITY FOR ERRORS OR OMISSIONS FOR UTILITY INFORMATION SHOWN ON THESE MAPS. ALL INFORMATION SHOULD BE FIELD VERIFIED.

PRINTED Jan 25, 2007

List of Sewer Mains Requiring More Frequent Preventive Maintenance

BlockID	StreetName	Jet Frequency	CrossStreet1	Hotspot Comments	HotSpot Status	DateNot HotSpot
2400	GOODWIN COURT	1 Week		Trunk Line		
700	HAMILTON WAY	1 Week				
101	TWIN DOLPHIN DRIVE	1 Week				
400	WOODSIDE ROAD	1 Week				
100	CALIFORNIA STREET	2 Weeks				
500	EL CAMINO REAL	2 Weeks		Main in sidewalk from Hopkins- Burger King		
1200	EL CAMINO REAL	2 Weeks	JACKSON AVENUE	Jackson Street to #1222		
400	HUDSON STREET	2 Weeks				
3600	JEFFERSON AVENUE	2 Weeks				
1200	MIDDLEFIELD ROAD	2 Weeks				
200	PINE STREET	2 Weeks	HELLER STREET			
0	VALOTA ROAD	2 Weeks	REDWOOD AVENUE			
0	Commercial Way	3 Weeks		Alley behind 2600 blk Broadway		
0	Winklebleck Street	4 Weeks	CALIFORNIA STREET	From California to ECR		
500	ARGUELLO STREET	4 Weeks				
0	BRIDGE PARKWAY	4 Weeks				
0	CARLOS AVENUE	4 Weeks	LEAHY STREET			
0	CARLOS AVENUE	4 Weeks	East Oakwood			
10	DUANE STREET	4 Weeks				
10	EDGEWOOD ROAD	4 Weeks				
1400	EL CAMINO REAL	4 Weeks				
300	EL CAMINO REAL	4 Weeks	CLAREMONT AVENUE			
400	EL CAMINO REAL	4 Weeks	WHIPPLE AVENUE			
500	EL CAMINO REAL	4 Weeks	WHIPPLE AVENUE	backwards toward ECR		
2500	GOODWIN COURT	4 Weeks		2500 to 2600 block; 8" mainline		
1500	GORDON STREET	4 Weeks				
0	HASTING SHORES LANE	4 Weeks	MAIN STREET	Main from Nob Hill Foods		
0	HOPKINS AVENUE	4 Weeks	WINSLOW STREET	Easement		
2400	HOPKINS AVENUE	4 Weeks				
200	HOWLAND STREET	4 Weeks				
1100	HUDSON STREET	4 Weeks				
0	INDUSTRIAL ROAD	4 Weeks	D STREET			
1300	JAMES AVENUE	4 Weeks		Line needs CIP		
1200	JOHNSON STREET	4 Weeks				
100	MADISON AVENUE	4 Weeks				
300	MADRONE STREET	4 Weeks		Check M.H. on Center Street		
100	MAPLE STREET	4 Weeks		R/R track to Lathrop, 550'		
400	MAPLE STREET	4 Weeks		400 to 500 block		
10	MURRAY COURT	4 Weeks	WOODSIDE ROAD	475' from Woodside		
0	REDWOOD AVENUE	4 Weeks	VIRGINIA AVENUE	Virginia to ECR. Inspect M.H. and jet if needed.		
1000	SILVER HILL ROAD	4 Weeks				
0	SPRING STREET	4 Weeks	CASSIA STREET			
100	STAMBAUGH STREET	4 Weeks				
400	WARREN STREET	4 Weeks				
800	WINSLOW STREET	4 Weeks				
400	ALDEN STREET	5 Weeks		400-500 blk Alden street		
3591	ALTAMONT WAY	5 Weeks		Easement M.H.		
900	BREWSTER AVENUE	5 Weeks		Jet 10" mainline		
2200	BROADWAY	5 Weeks		2200 to 2300 block		
2400	BROADWAY	5 Weeks	WINSLOW STREET	2400 to 2500 blk , Winslow to Perry; 600'		
700	CASSIA STREET	5 Weeks				
1700	EL CAMINO REAL	5 Weeks		1700 to 1800 blk ECR. Vacuum out siphon as needed		
1100	EL CAMINO REAL	5 Weeks	HARRISON AVENUE			
200	FINGER AVENUE	5 Weeks				
1300	GORDON STREET	5 Weeks		1300 to 1400 block		
1300	JEFFERSON AVENUE	5 Weeks				

List of Sewer Mains Requiring More Frequent Preventive Maintenance

BlockID	StreetName	Jet Frequency	CrossStreet1	Hotspot Comments	HotSpot Status	DateNot HotSpot
100	LOCUST STREET	5 Weeks				
600	MAPLE STREET	5 Weeks		600 to 700 block;		
0	ORCHARD AVENUE	5 Weeks	WOODSIDE ROAD	Woodside Rd to Carlos Ave.		
100	POPLAR AVENUE	5 Weeks				
0	RED MORTON PARK	5 Weeks		Include siphon, vacuum out as needed.		
1200	REESE STREET	5 Weeks				
0	SHELL PARKWAY	5 Weeks	MARINE PARKWAY			
200	SPRING STREET	5 Weeks		200 to 300 block		
100	WINSLOW STREET	5 Weeks	BREWSTER AVENUE	100-300 blk Winslow street		
1200	WOODSIDE ROAD	5 Weeks				
1100	JOHNSON STREET	6 Weeks				
900	OAK AVENUE	6 Weeks		900 - 1100 block		
0	CANYON ROAD	8 Weeks		783-92' and 735' - 330'		
10	CLAREMONT AVENUE	8 Weeks				
0	CYPRESS STREET	8 Weeks		Woodside to Center St.		
1900	EL CAMINO REAL	8 Weeks				
200	ELWOOD STREET	8 Weeks		Easement from Katherine		
600	FOX CROSSING COURT	8 Weeks				
500	GENEVA AVENUE	8 Weeks				
1400	HESS ROAD	8 Weeks		1400 to 1600 Blk. If holding, Woodside is likely backing up.		
200	HUDSON STREET	8 Weeks		Easement from Katherine		
1300	JUNIPERO AVENUE	8 Weeks				
1700	KENTFIELD AVENUE	8 Weeks				
1100	LYONS STREET	8 Weeks				
900	MAIN STREET	8 Weeks				
0	MARTINIQUE DRIVE	8 Weeks		M.H. frm L.S #9 to Barcelona Circle		
0	MONROE STREET	8 Weeks		Easement from Wilson to Monroe		
400	NORTHUMBERLAND AVENU	8 Weeks		Jet from M.H. in front of #444		
900	WHITEHALL LANE	8 Weeks	KINGSFORD LANE	Kingsford to Brighton - 525'		
10	WILLOW STREET	8 Weeks				
0	YARBOROUGH LANE	8 Weeks		Easement from Wheeler - 257'		
800	BEECH STREET	12 Weeks				
0	CASSIA STREET	12 Weeks	MIDDLEFIELD ROAD			
1000	HILTON STREET	12 Weeks		1000 - 1100 block		
100	JACKSON AVENUE	12 Weeks				
0	MAIN STREET	12 Weeks	ELM STREET	R/R track to Spruce,		
350	MARINE PARKWAY	12 Weeks				
0	RENATO COURT	12 Weeks				
1000	STAMBAUGH STREET	12 Weeks		1000 to 1100 block		

CITY OF REDWOOD CITY
SEWER SYSTEM MAINTENANCE SECTION
WORK ORDER

LOCATION: _____ USA TICKET #: _____

DATE: _____ NO PARKING POSTED: YES / NO _____

MILEAGE BEGINNING_____MILEAGE ENDING_____

HOURS	CODES & CATS.	TASKS											LIST OF MATERIALS	
	1 PREVENTIVE MAINTENANCE	LATERAL REPAIR	MAIN REPAIR	TELEVISE LATERALS	RODDING MACHINE	LATERAL INSTALLATION	MANHOLE REHAB / REPLACEMENT	**TIME BEGIN**	**TIME COMPLETED**	**TOTAL BILLABLE HOURS**	TOTAL HOURS	TOTAL $	MATERIALS	TOTAL $
	2 SCHEDULED SYSTEM MGMT													
	3 SERVICE REQUEST WORK													
	4 EMERGENCY RESPONSE													
	5 ADMINISTRATIVE													
	6 C I P													
PERSONNEL														

EQUIPMENT	**BEGIN MILEAGE**	**END MILEAGE**					
SERVICE TRUCK # 1775							
DUMP TRUCK # 1836							
BACKHOE # 2836							
TRAILER # 3675							
COMPRESSOR # 3034							
CRANE TRUCK # 2118							
TOTAL EQUIPMENT : $							**TOTAL : $** -

PREPARED BY: _____ PERFORMED TO QUALITY STANDARDS BY: _____

COMMENTS: _____

_____

_____

_____

REDWOOD CITY
PUBLIC WORKS SERVICES

PREVENTATIVE MAINTENANCE RODDING BASIN PROGRAM

ASSIGNMENT

BEGINNING MILEAGE -
ENDING MILEAGE -
TOTAL MILEAGE FOR DAY -

REAR ENGINE START -
REAR ENGINE END -
TOTAL RUN HOURS -

PERSONNEL:_____

DATE: _____

BASIN# _____

TASKS

LOCATION	START TIME	END TIME	BILLABLE HOURS	CUTTER SIZE	ROOTS	GREASE	SILT	RECOMMEND TV	BROKEN PIPE	RECOMMEND REP.	OVERFLOWED ?	ESTIMATED QUANTITY	COMMENTS
1) STREET NAME - **MANHOLES** - FROM TO													
2) STREET NAME - **MANHOLES** - FROM TO													
3) STREET NAME - **MANHOLES** - FROM TO													
4) STREET NAME - **MANHOLES** - FROM TO													
5) STREET NAME - **MANHOLES** - FROM TO													
6) STREET NAME - **MANHOLES** - FROM TO													
7) STREET NAME - **MANHOLES** - FROM TO													
8) STREET NAME - **MANHOLES** - FROM TO													
9) STREET NAME - **MANHOLES** - FROM TO													
10)STREET NAME - **MANHOLES** - FROM TO													
11)STREET NAME - **MANHOLES** - FROM TO													

TOTAL BILLABLE HOURS FOR DAY-

Manhole Inspection Form

DATE-

OPERATOR -

BASIN #

IN FRONT OF RESIDENCE-

WALL CONDITION	cracks	no cracks	roots	lining material missing	other	
WALL MATERIAL TYPE	concrete	brick	plastic	other		
BASE CONDITION	good	poor	severe	no base - erroded	other	
EVIDENCE OF SURCHARGE?	yes	no	mild	severe		
FLOW CONDITION	good	poor	fast	slow	no flow	
INVERT DEPTH MEASUREMENT						
GREASE	yes	no	mild	severe		
ROOTS	yes	no	mild	severe		
MANHOLE COVER TYPE	holes	no holes				

DATE-

OPERATOR -

BASIN #

IN FRONT OF RESIDENCE-

WALL CONDITION	cracks	no cracks	roots	lining material missing	other	
WALL MATERIAL TYPE	concrete	brick	plastic	other		
BASE CONDITION	good	poor	severe	no base - erroded	other	
EVIDENCE OF SURCHARGE?	yes	no	mild	severe		
FLOW CONDITION	good	poor	fast	slow	no flow	
INVERT DEPTH MEASUREMENT						
GREASE	yes	no	mild	severe		
ROOTS	yes	no	mild	severe		
MANHOLE COVER TYPE	holes	no holes				

REDWOOD CITY
PUBLIC WORKS SERVICES
PREVENTATIVE MAINTENANCE JETTING BASIN PROGRAM

ASSIGNMENT

BEGINNING MILEAGE -
ENDING MILEAGE -
TOTAL MILEAGE FOR DAY -

REAR ENGINE START -
REAR ENGINE END -
TOTAL RUN HOURS -

PERSONNEL: _____

DATE: _____

BASIN #: _____

TASKS

LOCATION	START TIME	END TIME	BILLABLE HOURS	FLUSH FOOTAGE	CAUSE (1)	CAUSE (2)	RECOMMEND TV	RECOMMEND ROD	BROKEN PIPE	RECOMMEND REP.	OVERFLOWED?	ESTIMATED QUANTITY	COMMENTS
1) STREET NAME -													
MANHOLES - FROM TO													
2) STREET NAME -													
MANHOLES - FROM TO													
3) STREET NAME -													
MANHOLES - FROM TO													
4) STREET NAME -													
MANHOLES - FROM TO													
5) STREET NAME -													
MANHOLES - FROM TO													
6) STREET NAME -													
MANHOLES - FROM TO													
7) STREET NAME -													
MANHOLES - FROM TO													
8) STREET NAME -													
MANHOLES - FROM TO													
9) STREET NAME -													
MANHOLES - FROM TO													
10)STREET NAME -													
MANHOLES - FROM TO													

TOTAL BILLABLE HOURS FOR DAY- _____

POSSIBLE CAUSES - REFERENCE NUMBER UNDER CAUSE (1) (2)

1	ROOTS	6	ANIMAL CARCASS	11	ELECTRICAL POWER FAILURE	16	INVALID
2	GREASE	7	CONSTRUCTION DEBRIS	12	FLOW CAPACITY DEFICIENCY		
3	DEBRIS	8	MULTIPLE CAUSES	13	NATURAL DISASTER		
4	DEBRIS FROM LATERALS	9	INFRASTRUCTURE FAILURE	14	BYPASS		
5	VANDALISM	10	INFLOW & INFILTRATION	15	CAUSE UNKNOWN		

REDWOOD CITY PUBLIC WORKS SERVICES
SEWER LATERAL DATA

HOURS	CODES & CATS.
	1. PREVENTIVE MAINTENANCE
	2. SCHEDULED SYSTEM MGMT.
	3. SERVICE REQUEST WORK
	4. EMERGENCY REPONSE
	5. ADMINISTRATIVE
	6. CIP

PERSONNEL: _____

DATE: _____

TASK: _____

CALL	ADDRESS	RECEIVED CALL	START - TIME	END - TIME	ROD - FEET	CUTTER SIZE	CAUSE (1)	CAUSE (2)	CAUSE (3)	CITY SIDE CLEAR?	MILD	SEVERE	DOOR HANGER DISTRIBUTED?	CAN'T LOCATE C/O	FOLLOW UP ACTION NEEDED?	DRY/WET WEATHER	COMMENTS
1																	
Odometer Reading Begin:																	
2																	
Odometer Reading Begin:																	
3																	
Odometer Reading Begin:																	
4																	
Odometer Reading Begin:																	
5																	
Odometer Reading Begin:																	
6																	
Odometer Reading Begin:																	
7																	
Odometer Reading Begin:																	
8																	
Odometer Reading Begin:																	
9																	
Odometer Reading Begin:																	
TOTAL BILLABLE HOURS FOR DAY																	

POSSIBLE CAUSES - REFERENCE NUMBER UNDER CAUSE (1) (2) (3)

1	ROOTS	6	ANIMAL CARCASS	11	ELECTRICAL POWER FAILURE	16	INVALID
2	GREASE	7	CONSTRUCTION DEBRIS	12	FLOW CAPACITY DEFICIENCY		
3	DEBRIS	8	MULTIPLE CAUSES	13	NATURAL DISASTER		
4	DEBRIS FROM LATERALS	9	INFRASTRUCTURE FAILURE	14	BYPASS		
5	VANDALISM	10	INFLOW & INFILTRATION	15	CAUSE UNKNOWN		

Form Revised: 8/3/10

Author: Supv R Bartolo

WORK ORDER

Clear Form

Section: Sewer System Maintenance

Work Order No.

Priority: ☐ 1 = Low ☐ 2 = Medium ☐ 3 = High

Location: Lift Station #3

Description:

PM Service: ☐ "A" Service ☒ "B" Service ☐ "C" Service ☐ "D" Service

Status: ☑ Open ☐ Closed

Initiated By: Ray Bartolo **Initiation Date:**

Submit To: Paul Heavenston **Projected Start Date:**

Actual Start Date: 12-5-11 **Actual Start Time:** 1015

Downtime Date (Begin): **Downtime Time (Begin):**

Downtime Date (End): **Downtime Time (End):**

Downtime Reason:

Finish Date: 12-5-11 **Finish Time:** 1145

Closed By: R.C. **Closed Date:** 12-5-11

Comments:

Sewer Section
Pump Station Preventative Maintenance Check List

✓ = OK	X = REPAIRED OR REPLACED	O = ADJUSTED	N/A = NOT APPLICABLE

	A	B	C	D	
					BEFORE EVERY PM SERVICE
1		✓			Trip Entry Alarm / SCADA Test / Bad Switch / Failed PLC
					A SERVICE - (16) PER YEAR
2		✓			Security and Appearance of pump station / Check for graffiti / Vandalism
3		NA			Check fence and gate condition / Vandalism / Hinge failure / Lock froze
4		✓			Check external lighting / Burnt out lamp
5		✓			Check station visibility from the street / Vandalism / Grafitti / Aesthetics
6		✓			Check condition of doors and locks / Hinge failure / Lock froze / Leaks
7		✓			Check intrusion alarm / Push reset button
8		✓			Building and Structure / Vandalism / Grafitti / Aesthetics / Leaks
9		✓			Check overall condition of station and building / Repair / Paint
10		✓			Check dry well / Valves Leaking / Sump pump not working
11		✓			Inspect wet well / Chains or cords fallen / guide rails deterioate / grease, solids, rags, silt buildup
12		NA			Inspect odor control bed / Broken sprinklers, pipes / Malfunction of timer
13		NA			Safety Equipment and Emergency Response Kits / Inspect / Replace
14		✓			Check the condition of signage (confined space, hearing protection requirement) / Clean / Replace
15		✓			Check fall protection, wet well hatches / Broken hinges, latches, locks
16		✓			Check hand guards, railing, kickboards, platforms, and grating / Repair / Replace
17		✓			Check hearing protection / Replace / Restock
18		✓			Instrumentation / Test / Repair / Replace
19		✓			Record generator run time meter / Replace meter if not working properly
20		✓			Record wet well level
21		✓			Inspect SCADA / Abnormality report to EDDCO
22		✓			Inspect motor control cabinet / Grafitti / Vandalism / Doors not open or close properly
		✓			Engine, Electrical and Switching
24		✓			Inspect automatic transfer switches operation / Call electrician if not operating properly
25		✓			Check transformer / electrical cabinets / conduits / wire ways / Repack
26		✓			Inspect generator engine's oil level, coolant level, battery condition / Refill to correct level / Leaks
27		✓			Inspect generator engine's belts, fluid leaks, block heater operation / Call autoshop
28		✓			Inspect ventilation system / Fan not turning / Broken belt
29		✓			System Operations
30		✓			Exercise genset / Does not start
31		✓			Pump down wet wells
					B SERVICE - (2) PER YEAR *** INCLUDES A SERVICE ***
32		NA			Rotate Impellers on spare pump / Impellers don't rotate
33		✓			Inspect valve vaults, valves, check valves, piping, sump pump, fittings / Operation / Leaks
34		✓			ATS-operate switch / Does not transfer from normal to emergency power
35		NA			Inspect air release valve / Leaks
					C SERVICE - (1) PER YEAR *** INCLUDES A & B SERVICE ***
36					Inspect VFD
37					Inspect milltronics level controller
38					Inspect & clean PLC / Low battery / CPU fault / Forced I/O
39					Clean transducer / Not reading correctly
40					Back flush ARV's / Leaks
					D SERVICE - (1) PER YEAR *** INCLUDES A, B & C SERVICE ***
41					Exercise gate, plug valves, check valves / Repair / Replace
					Inspect Flygt pumps / Repair / Replace
					AFTER EVERY PM SERVICE
43		✓			Reset entry alarm

City of Redwood City
Public Works Services

SANITARY SEWER SERVICE

On _____, at _____ am/pm

We responded to your request for sewer service.

- ☐ We cleared the main line.
- ☐ We found the lateral clear from the property line cleanout to the mainline in the street.
- ☐ Stoppage is between the house & the property line cleanout. We suggest you call a commercial sewer cleaning service.
- ☐ We were unable to locate a property line cleanout. We suggest you install a city standard cleanout. You must obtain a permit to do this by calling (650) 780-7350 before work begins
- ☐ We cleared the City portion of the Sanitary Sewer Lateral Line and we found:

Roots ☐ Grease ☐ Paper ☐

Other: _____

Comments: _____

_____

_____

Operator: _____

You should always inform the City when you have had sewer lateral cleaning services performed at your home. This ensures that waste material from your private lateral gets fully flushed to the main line so that future backups can be prevented.

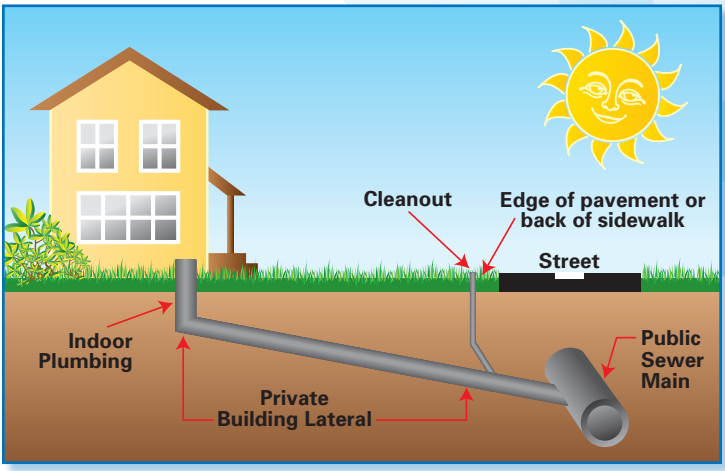
For questions or comments, please call the Sanitary Sewer Supervisor at (650) 780-7470

For Sewer emergencies at night and on weekends, call (650) 780-7190

See other side for more information

Your Property Line Cleanout

The sanitary sewer lateral cleanout near the sidewalk belongs to the property owner. This cleanout must be accessible and properly maintained by the property owner in order for the City to service the sanitary sewer lateral line from the cleanout to the main in the street. The illustration below shows the location of the property line cleanout.



What You Need To Do For a Sewer Back up In Your Home

The City has prepared these brief instructions to help you minimize the impacts and loss due to a backup in your home.

- ❑ Do not attempt to clean the area yourself, let the cleaning & restoration company handle this.
- ❑ Keep people & pets away from the affected area(s).
- ❑ Do not remove items from the area, the cleaning firm will do this for you.
- ❑ If you had recent plumbing work done, contact your plumber or contractor & inform them of the incident, immediately.
- ❑ If you intend to file a claim, do so as soon as practical. California Government Code, requires the filing of a written claim and outlines specific timelines & procedures that must be used for a claim to receive consideration.

Ayuntamiento de Redwood City Servicios de Obras Públicas

SERVICIO DE ALCANTARILLADO SANITARIO

El _____, a la(s) _____ am/pm

Respondimos a su solicitud de servicio de alcantarillado.

- ☐ Despejamos la tubería principal.
- ☐ No encontramos obstrucciones en la tubería lateral en el tramo comprendido entre el registro de limpieza de la tubería de la propiedad y la tubería principal de la calle.
- ☐ La obstrucción se encuentra entre la casa y el registro de limpieza de la tubería de la propiedad. Sugerimos que llame a una compañía de servicio comercial de limpieza de alcantarillados.
- ☐ No pudimos localizar el registro de limpieza de la tubería de la propiedad. Sugerimos que instale un registro de limpieza estándar de acuerdo a lo indicado por el Ayuntamiento. Para realizar esto, debe obtener un permiso llamando al (650) 780-7350 antes de dar inicio a las labores.
- ☐ Despejamos la porción de la tubería lateral del alcantarillado sanitario correspondiente al Ayuntamiento y encontramos:

Raíces ☐ Grasa ☐ Papel ☐

Otro: _____

Comentarios: _____

_____

_____

Operador: _____

Siempre debe informar al Ayuntamiento cuando haya efectuado servicios de limpieza de la tubería lateral de su hogar. Esto asegura que los desechos de su lateral privada sean transportados en su totalidad a la línea central para evitar que vuelva a ocurrir un retroflujo.

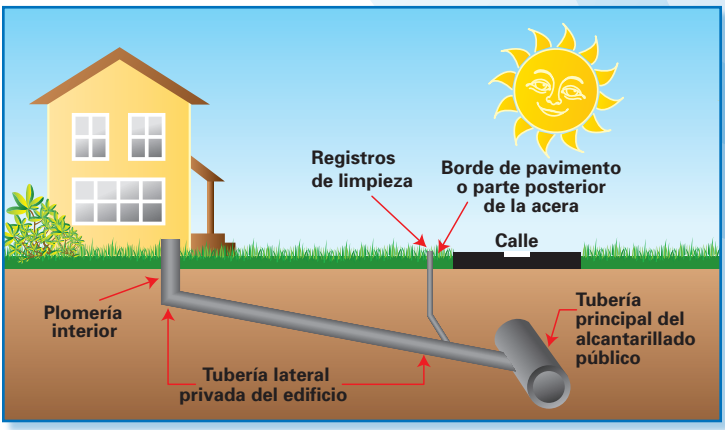
Si tiene alguna pregunta o comentario, por favor llame al Supervisor de Alcantarillado Sanitario (Sanitary Sewer Supervisor) al (650) 780-7470

En caso de emergencias relacionadas con el alcantarillado durante la noche o los fines de semana, llame al (650) 780-7190

Se proporciona mayor información al reverso ☛

Registro de limpieza de la tubería de su propiedad

El registro de limpieza de la tubería lateral del alcantarillado sanitario cerca de la acera pertenece al dueño de la propiedad. Este registro de limpieza debe permanecer accesible y el dueño de la propiedad debe brindarle el mantenimiento adecuado a fin de que el Ayuntamiento pueda ofrecer servicio a la tubería lateral del alcantarillado sanitario en el tramo comprendido entre el registro de limpieza y la tubería principal de la calle. La ilustración que aparece a continuación muestra la ubicación de el registro de limpieza de la tubería de la propiedad.



Lo que debe hacer en caso de un retroflujo en su hogar

El Ayuntamiento ha preparado estas breves instrucciones a fin de ayudarle a reducir al mínimo los impactos y pérdidas debido a un retroflujo en su hogar.

- ❑ No intente limpiar el área usted mismo, sino que permita que la compañía de limpieza y restauración se haga cargo de ello.
- ❑ Mantenga a las personas y a los animales domésticos alejados de la(s) área(s) afectada(s).
- ❑ No retire objetos del área, la compañía de limpieza hará esto por usted.
- ❑ Si se han realizado trabajos de plomería en su propiedad recientemente, comuníquese con el plomero o contratista e infórmele del incidente de inmediato.
- ❑ Si tiene pensado presentar una queja, hágalo lo más rápidamente posible. El Código del Gobierno de California, requiere una reclamación por escrito y detalla los procedimientos y periodos de tiempo específicos que deben ser utilizados para que las reclamaciones reciban la consideración correspondiente.

MANHOLE INSPECTION HEADER FROM LEVEL 1 & LEVEL 2 INSPECTIONS

Surveyed By (1) 1,2	Certificate Number (2) 1,2	Owner (3)	Customer (4)
L. Cabrera	U-209-8147	Redwood City	Redwood City

Drainage Area (5)	Sheet Number (6) 1,2	P/O. Number (7)	Date (YYYY/MM/DD) (8) 1,2
			2012/07/25

Time (9)	Street (No. & Name) (10) 1,2	City (11) 1,2	Location Details (12)
12:30 pm	732 Adams St	Redwood City	Street Area

Manhole Number (13) 1,2	Rim to Invert (14) 2	MH Use (17) 1,2	Purpose (21) 1,2
2654	70"	Sanitary	Routine Assessment

Evidence of Surcharge (37)	Inspection Level (38) 1,2
no	2

MANHOLE COMPONENT OBSERVATION FORM LEVEL 1 & 2

Cover Size (41) 1,2	Cover Condition (50) 1,2	Cone Type (72) 1,2	Cone Material (73) 1,2
25"	good	Conical Centered	Cast Iron

Wall Material (78) 1,2	Bench Present (82) 1,2	Step Number (89) 1,2	General Condition
Brick	yes	3	good

Collection System Maintenance Certification

2007-2008

Candidate Handbook

EXAMPLE

This booklet contains...

- ✓ Subject matter for the Collection System Maintenance tests
- ✓ Education and experience requirements
- ✓ Selected study references
- ✓ Certification policies

Collection System Maintenance

2007-2008
Candidate Handbook

This handbook contains information about the Collection System Maintenance certification program. Please read this entire handbook to become familiar with certification procedures and policies. As a certificate applicant, you are responsible for knowing the contents of this handbook. If you have any questions please contact your Local Section Chair (listed in the TCP Application) or the CWEA office at 510-382-7800.

Statement of Non-Discrimination Policy

CWEA does not discriminate among applicants on the basis of age, gender, race, religion, national origin, disability, sexual orientation or marital status.

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California Water Environment Association
Technical Certification Program
7677 Oakport Street, Suite 525
Oakland, CA 94621

phone: 510-382-7800
fax: 510-382-7810
web: www.cwea.org

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EXAMPLE

Introduction

The California Water Environment Association

CWEA's mission is to enhance the education and effectiveness of California wastewater professionals through training, certification, dissemination of technical information, and promotion of sound policies to benefit society through protection and enhancement of the water environment.

CWEA is a California Nonprofit Corporation and is a Member Association of the Water Environment Federation and a member of the National Organization for Competency Assurance.

The Technical Certification Program

The Technical Certification Program (TCP) was created to offer multilevel technical certification for individuals employed in the water quality field. Tests are written by vocational specialists and administered twice yearly in six different disciplines: Biosolids, Collection System Maintenance, Environmental Compliance Inspection, Laboratory Analyst, Plant Maintenance (Electrical/Instrumentation and Mechanical Technologies), and Industrial Waste Treatment Plant Operator.

CWEA first offered a certification program for operators of wastewater treatment plants in 1937. The program was administered by CWEA until 1973 when the State of California assumed responsibility for the program. During those 36 years, CWEA awarded 3915 operator certificates.

In 1975 the first committees were formed to establish a new voluntary certification program for water quality professionals specializing in disciplines other than plant operation. Eventually, the Voluntary Certification Program (VCP) emerged with specialized certificate programs for Biosolids Land Application Management, Collection System Maintenance, Plant Maintenance, Environmental Compliance Inspection, and Laboratory Analyst. The first of the new certifications were given in April of 1976. In the 1980s two more disciplines were added: Electrical/Instrumentation, and Industrial Waste Treatment Plant Operator.

Today CWEA offers certification in six different vocational programs with a total of 23 different certifications. About 1600 certification applications are processed every year and over 4000 certificates are currently held by individuals in California, Michigan, Hawaii, Missouri and Alaska .

The Certification Process

To become certified, ***all applicants*** must complete the Application For Technical Certification, pay the application fee, have appropriate experience and education, and pass the written test. Application instructions and fee schedules are listed on the application.

Important Information

After applications are received at the CWEA office applicant information is compiled in the certification database. Application receipts are then mailed to all applicants. The experience and education given on the application is then reviewed by CWEA staff. Next, the applications are reviewed by TCP Local Section Chairs. If the application is approved, then the applicant will receive a confirmation letter giving test site information. If the application is rejected, the applicant will be notified and may be asked to supply more information if warranted. After completing the written test applicants are sent results. Those who pass will then be mailed certificates and wallet cards.

Code of Ethics

The Code of Ethics is intended to reflect the standards and behavior that California Water Environment Association certificate holders and applicants expect of each other as they perform their work protecting public health and the environment and that reaffirm the value of holding a CWEA certificate. The purpose of the Code of Ethics is to ensure public confidence in the integrity and service of professional water quality workers while performing their duties.

All California Water Environment Association certificate holders and applicants are expected to meet the following standards of professional conduct and ethics:

1. To protect public health, themselves, their co-workers, property, and the environment by performing the Essential Duties of the CWEA certified vocation safely and effectively, and complying with all applicable federal, state and local regulations.
2. To represent themselves truthfully and honestly throughout the entire certification process.
3. To adhere to all test site rules and make no attempt to complete the test dishonestly or to assist any other person in doing so.
4. To refrain from activities that may jeopardize the integrity of the Technical Certification Program.

Test Administration And Admission

Testing Dates and Sites: Tests are given twice a year on the fourth Saturday of January and July (see Application for Technical Certification for test schedule and test site map). Applicants eligible for the test will receive a confirmation letter and map to their test site. Reasonable accommodations can be made for those who cannot take the test on Saturdays due to religious reasons by contacting CWEA at 510-382-7800.

EXAMPLE

CWEA also provides reasonable accommodations for those with physical or learning disabilities (See following page: "Accommodations For Those With Physical or Learning Disabilities").

Test Site Admission: Certificate candidates are required to show at least one valid government issued photo identification (State driver's license or ID, or passport). Only after positive identification has been made by the proctor may a candidate's test booklet be distributed. Candidates are not required to show their confirmation letters to enter the test site.

Test Security: All tests are closed-book. No reference material, programmable calculators, cell phones, palm pilots, PDAs, computers, or cameras are allowed in the test site. Candidates should only bring a scientific calculator and a few #2, or softer, pencils. All writing and notes must be in the test booklet. Candidates are not allowed to take any notes from the test site.

Candidates who violate test site rules may be asked to leave the site and may be disqualified from that test. All violations of test security will be investigated by CWEA and appropriate action will be taken.

Test Design And Format

Test Design: All certification tests are designed to test knowledge and abilities required to perform *Essential Duties* with minimal acceptable competence.The *Essential Duties* and *Test Content Areas* for each certification were determined by a job analysis and *meta-analysis* of job specifications by two independent psychometric consulting firms.

The studies gathered data from onsite visits of over 31 water and wastewater agencies, interviews with 110 water and wastewater professionals, and analysis of more than 300 job specifications. All research was conducted under the guidance of the Technical Certification Program Committee, vocational sub-committees, and CWEA staff. All test questions are designed to measure at least one area of knowledge or ability that is required to perform an essential duty.

Test Delivery Mechanism: All tests are given in a test booklet with a separate form for marking answers. Tests are written in the English language only.

Test Format: All Collection System Maintenance tests are given completely in the multiple choice format (see *Sample Test Questions* in this booklet for examples). The multiple choice format is considered the most effective for use in standardized tests. This objective format allows a greater coverage in content for a given amount of testing time and improves competency measurement reliability. Multiple choice questions range in complexity from simple recall of knowledge to the synthesis and evaluation of the subject matter.

Test Scoring

Scoring Method: All tests are mechanically scored by CWEA. The overall test score will determine if you pass or fail the test. Generally, the minimum score required to pass the test is 75% (this passing score may be adjusted downward depending on the difficulty level of each particular test). The minimum passing score is determined by the modified Angoff Method. When taking your test it is recommended that you try your best to score as high as possible. Do not try to target the minimum passing score.

How Passing Scores Are Set: Each time a certification test is given the questions are changed resulting in a different test form. Since each form has different questions the difficulty level of the test may not be the same from form to form. The passing score is developed as an overall estimate of minimal acceptable competence in the Test Content Areas by subject matter and testing experts. Passing scores are determined by an overall passing score, not by performance on individual Test Subject Areas, and are independent of other candidate's scores. Partial credit will not be awarded for any test item answered incorrectly.

Exam Postponement and Cancellation Instructions

To postpone your application you must submit a signed written request (a letter stating that you wish to postpone), with a $35 administrative fee. The written request and payment must be received at the CWEA office no later than six (6) days after the scheduled test date. You may only postpone your application twice. There are no exceptions to this policy.

To cancel your application you must submit a signed written request (a letter stating you wish to cancel your application) to CWEA. The written request must be received at the CWEA office no later than six (6) days after the scheduled test date. Full refunds, less a $35 administrative fee, will be made within 4 weeks after the scheduled date. There are no exceptions to this policy.

Item Appeals

Candidates who wish to appeal a specific test item must do so during the test by completing an Item Appeal form available from the test proctor. Item appeals will be evaluated and appropriate adjustments made during the scoring process.

Test Result Notification

Exam results are routinely mailed to certificate candidates approximately 4 weeks after the exam date. No results are given over the phone, via fax or email. All results are confidential and are only released to the certificate candidate.

Issue of Certificate

Certificates will be issued to all candidates who pass the exam. Certificates are mailed about two to three weeks after result notifications have been mailed.

EXAMPLE

Renewal of Certification

All certificates must be renewed annually. The first renewal is due one year from the last day of the month in which the certification exam was held. Certificate renewals less than one year past due are subject to the renewal fee plus a late fee. Certificates more than one year past due are not renewable. Re-testing is required to reinstate certificates more than one year past due. Renewal notices are mailed to certificate holders two months before the due date. It is the responsibility of the certificate holder to ensure that his or her certificate (s) remains valid. Continuing education will be required for renewal after July 2002.

Re-Certification:

CWEA Certificate holders shall be required to renew certificates annually, and shall be required to provide evidence of completion of 12 contact hours of continuing education requirements every two years. For more information, visit CWEA's website: www.cwea.org.

Accommodations For Those With Physical or Learning Disabilities

In compliance with the Americans with Disabilities Act, special accommodations will be provided for those individuals who provide CWEA with a physician's certificate, or its equivalent, documenting a physical or psychological disability that may affect the individual's ability to successfully complete the certification examination. Written requests for special accommodations must be made no later than 3 weeks before the examination date.

EXAMPLE

Grade I Collection System Maintenance

Collection System Maintenance Grade I Certification is designed to demonstrate competency at the entry and basic working level. More specifically, Grade I certification implies competence in the knowledge, skills and abilities required to perform the *Essential Duties* of an entry Collection System Maintenance Technologist.

Eligibility Criteria For Taking The Test
There are no experience or education requirements for Grade I certification. Completing the Application for Technical Certification, paying the appropriate application fee, and passing the written examination are the only requirements. It is, however, *recommended* that Grade I candidates have at least one year of experience working as an Collection System Maintenance Technologist performing the *Essential Duties* listed below. Many candidates without the recommended experience have difficulty successfully completing the written test.

Essential Duties Of The Grade I Collection System Maintenance Technologist
Individuals certified as Grade I Collection System Maintenance Technologists are expected to possess acceptable competency when performing the tasks that are necessary for entry level Collection System Maintenance Technologists. These necessary tasks are known as the *Essential Duties*. The certification test measures knowledge, skills and abilities required to perform the *Essential Duties*.

Essential Duties for Grade I

1. Participates in inspecting, cleaning, maintaining, constructing and repairing of wastewater collection systems, utilizing a variety of mechanical or specialized equipment
2. Assists with pump station inspections, records instrument readings and makes minor adjustments to keep flow steady
3. Performs a variety of manual tasks including the lifting, carrying and removal of heavy loads including materials, equipment and debris
4. Inspects and maintains easements, some of which may be remote or difficult to access
5. Participates in excavating, shoring and re pairing the collection system, including damaged pipe, manholes and casting adjustments
6. Breaks, cuts and restores concrete and paved surfaces using jackhammers, concrete saws, etc.
7. Prepares, inspects, and maintains vehicles for use; ensures vehicles are in proper operating condition and arranges for maintenance when required
8. Ensures that tools and equipment are in proper operating condition for daily use and arranges for maintenance when required
9. Participates in the maintenance and repair of wastewater collection system lift stations and components
10. Completes accurate, legible and timely records/data of work performed
11. Participates in maintaining proper traffic safety controls at work sites to move traffic safely and efficiently around work site
12. Responds to public inquiries in a courteous manner and provides information appropriate to the area of assignment
13. Adheres to safe work practices and abides by all applicable regulations, policies and procedures
14. Reads and interprets collection system maps to determine basic flow characteristics and construction details
15. Participates in the containment and clean-up of wastewater spills
16. Stays abreast of new trends and innovations in the field of wastewater collection system operation and maintenance
17. Participates in confined space entries

Complexity Of Test Questions
At the Grade I level, certificate candidates are expected to have basic knowledge of the job and the ability to safely perform the *Essential Duties* listed above. Examinees will have to answer multiple choice questions that test knowledge, comprehension, and application of the subject matter. The complexity of the questions will range from basic recall of previously learned material and the ability to understand the meaning of the subject

EXAMPLE

matter, to being able to apply knowledge to new situations.

Test Content Areas

The following list is an outline of *Test Content Areas*. Each content area is a Knowledge, Skill, or Ability that is required to perform the *Essential Duties* listed above. Since all of the Knowledge, Skills, or Abilities are required to perform the *Essential Duties* they are all equally important in the demonstration of acceptable competency. Thus, all of the content areas listed below are equally weighted on the test.

Test Content Areas for Grade I

Knowledge of:

101. Operations, services, and activities of a wastewater collection system operations and maintenance program

102. Methods and techniques of recording instrument readings and related measuring devices

103. Methods and techniques of traffic control

104. Operation and proper application of collection system maintenance equipment and tools

105. Occupational hazards and standard safety practices

106. Applicable codes, regulations, policies, and procedures

107. Underground Service Alert (USA) markings

Skill to:

108. Establish and maintain cooperative relationships with those contacted in the course of work

109. Communicate accurately, clearly, and concisely: in writing, orally, and electronically, in the English language

110. Read and interpret essential technical information including maps and drawings

111. Perform basic mathematical calculations

Ability to:

112. Perform operation, maintenance, and repair of the wastewater collection system

113. Operate a variety of specialized equipment including vehicles and collection system maintenance devices, hand and power tools, air compressors and jackhammers

114. Perform basic facilities and grounds maintenance

115. Understand and follow oral and written instructions

116. Learn more difficult collection systems construction, maintenance, and repair techniques

117. Properly lift and carry heavy loads in a variety of difficult conditions

118. Obtain appropriate licenses and certifications

119. Work in hazardous, difficult, and disagreeable conditions

EXAMPLE

Grade II Collection System Maintenance

Collection System Maintenance Grade II Certification is designed to demonstrate competency at the skilled or journey level. More specifically, Grade II certification implies competence in the knowledge, skills, and abilities required to perform the *Essential Duties* of a skilled Collection System Maintenance Technologist.

Eligibility Criteria For Taking The Test

The basic requirement is four years of full-time work in Collection System Maintenance. You may also qualify by having two years of experience and holding a Collection System Maintenance Grade I Certificate for one year, **OR** having two years of full-time experience and holding an Associate's degree in a related field, **OR** having one year of full-time experience and holding a Bachelor's, or higher, degree in a related field.

Eligibility criteria are summarized in the table below. You may qualify by meeting either Education/ Experience Combination **A**, **B**, **C**, or **D**. If you do not meet any of the combinations of experience and education, then you do not qualify for Grade II:

Combination	EDUCATION & CERTIFICATIONS +	EXPERIENCE
A	None	4 full-time years in Collection System Maintenance
B	Grade I Collection System Maintenance Certificate for 1 year	2 full-time years in Collection System Maintenance
C	AA/AS degree in a related field	2 full-time years in Collection System Maintenance
D	Hold a BA/BS, or higher, degree in a related field	1 full-time year in Collection System Maintenance

Qualifying With Your Education

Holding a college degree, or its equivalent, in a field related to your vocation will reduce the number of years required for your test (see the table above). Your degree must be in a field that is related to the certificate for which you are applying. If you are uncertain if your degree is related to your vocation you should still include your degree information in your application. The Technical Certification Program Committee will determine if your degree qualifies. If it does not, you will be accepted for the next highest grade level for which you qualify. Associate's and Bachelor's degrees in technical fields are usually accepted. Degrees are evaluated on a case-by-case basis upon receipt of the application. College credit without a degree is not accepted unless it can be demonstrated that the credit is equivalent to a degree.

Essential Duties Of The Grade II Collection System Maintenance Technologist

Individuals certified as Grade II Collection System Maintenance Technologists are expected to possess acceptable competency when performing the tasks that are necessary for skilled or journey level Collection System Maintenance Technologists. These necessary tasks are known as the *Essential Duties*. The certification test measures knowledge, skills and abilities required to perform the *Essential Duties*.

Essential Duties for Grade II

1. Performs, trains and directs the duties listed for Collection System Maintenance Grade I
2. Inspects, troubleshoots and maintains proper collection system operation using advanced techniques and instruments
3. Conducts confined space entries
4. Performs maintenance and repair of waste-water collection system
5. Provides information and reports on activities as required
6. Provides assistance to individuals, agencies and private organizations with underground service alert (USA) markings, utilities and manholes
7. Plans routine traffic safety at worksites and performs non-routine traffic control under general supervision
8. Resolves routine complaints in an efficient and timely manner
9. Monitors crew performance to ensure adherence to safe work practices and compliance with all applicable regulations, policies and procedures
10. Participates in the development and promotion of safe work practices and procedures

Complexity Of Test Questions

At the Grade II level, certificate candidates are expected to have the knowledge, skill and ability to

EXAMPLE

safely and effectively accomplish most of the *Essential Duties* listed above. Grade II candidates are also expected to be familiar with the Grade I Test Content Areas. Examinees will have to answer multiple choice questions that test comprehension, application and analysis of the subject matter. The complexity of the questions will cover the ability to basically understand the subject matter; to recall and apply principles, ideas, and theories; and to break down ideas and theories into their constituent parts.

Test Content Areas

The following list is an outline of Test Content Areas. Each content area is a knowledge, skill, or ability that is required to perform the *Essential Duties* listed above. Since all of the knowledge, skills, or abilities are required to perform the *Essential Duties* they are all equally important in the demonstration of acceptable competency. Thus, all of the content areas listed below are equally weighted on the test. Candidates should also be thoroughly familiar with the Grade I Collection System Maintenance Technologist *Test Content Areas*.

Knowledge of:

Test Content Areas for Grade II

200. Knowledge, skill and ability identified on the Test Content Specifications for Collection Systems Grade I

201. Operations, services and activities of a wastewater collection system operations and maintenance program

202. Methods and techniques of wastewater collection system inspection, maintenance and repair

203. Operation and characteristics of collection system maintenance equipment and tools including heavy equipment, CCTV inspection, and monitoring devices

204. Methods and techniques, tools and materials used in the maintenance and repair of wastewater collection systems and lift stations

205. Safe working practices pertinent to wastewater collection system maintenance, repair, and construction

206. Occupational hazards and standard safety practices

207. Applicable codes, regulations, policies, and procedures

Skill to:

208. Establish and maintain effective relationships with those contacted in the course of work

209. Communicate accurately, clearly, and concisely: in writing, orally, and electronically, in the English language

210. Perform simple algebra and geometrical calculations

Ability to:

211. Perform maintenance and repair of the wastewater collection system

212. Operate a variety of collection system maintenance construction equipment such as air compressors, compactors, vibrators, jackhammers, tampers, cutters and CCTV inspection and monitoring devices

213. Work independently in the absence of direct supervision

214. Understand and follow oral and written instructions

215. Learn new and advanced collection systems construction, maintenance, and repair techniques

216. Effectively assess and interpret situations and conditions and apply independent judgement

217. Operate a variety of heavy construction equipment, such as backhoes, loaders, dozers, and dump trucks

EXAMPLE

Grade III Collection System Maintenance

Collection System Maintenance Grade III Certification is designed to demonstrate competency at the lead or advanced technical level. More specifically, Grade III certification implies competence in the knowledge, skills and abilities required to perform the *Essential Duties* of a lead or advanced Collection System Maintenance Technologist.

Eligibility Criteria For Taking The Test

The basic requirement is six years of full-time work in Collection System Maintenance. You may also qualify by having four years of experience and holding a Collection System Maintenance Grade II Certificate for two years, **OR** having four years of full-time experience and holding an Associate's degree in a related field, **OR** having three years of full-time experience and holding a Bachelor's, or higher, degree in a related field.

Eligibility criteria are summarized in the table below. You may qualify by meeting either Education/ Experience Combination **A**, **B**, **C**, or **D**. If you do not meet any of the combinations of experience and education, then you do not qualify for Grade III:

Combination	EDUCATION & CERTIFICATIONS +	EXPERIENCE
A	None	6 full-time years in Collection System Maintenance
B	Hold Grade II Collection System Maintenance Certificate for 2 years	4 full-time years in Collection System Maintenance
C	Hold an Associate's degree in a related field	4 full-time years in Collection System Maintenance
D	Hold a BA/BS, or higher, degree in a related field	3 full-time Years in Collection System Maintenance

Using Your Education To Help Qualify For The Written Test

Holding a college degree, or its equivalent, in a field related to your vocation will reduce the number of years required for your test (see the table above). Your degree must be in a field that is related to the certificate for which you are applying. If you are uncertain if your degree is related to your vocation you should still include your degree information in your application. The Technical Certification Program Committee will determine if your degree qualifies. If it does not, you will be accepted for the next highest grade level for which you qualify. Associate's and Bachelor's degrees in technical fields are usually accepted. Degrees are evaluated on a case-by-case basis upon receipt of the application. College credit without a degree is not accepted unless it can be demonstrated that the credit is equivalent to a degree.

Essential Duties Of The Grade III Collection System Maintenance Technologist

Individuals certified as Grade III Collection System Maintenance Technologists are expected to possess acceptable competency when performing the tasks that are necessary for lead or advanced level Collection System Maintenance Technologists. These necessary tasks are known as the *Essential Duties*. The certification test measures knowledge, skills and abilities required to perform the *Essential Duties*.

Essential Duties for Grade III

1. Plans, coordinates and reviews the performance of the duties of Collection System Maintenance Grade I and Grade II
2. Coordinates with other utilities, the public, agencies and private organizations to address complex or non-routine issues
3. Participates in the evaluation of the performance of the wastewater collection system such as energy efficiency, material costs and preventive/predictive maintenance programs
4. Participates in the development and implementation of training of assigned employees in their areas of work in wastewater collection system inspection and repair methods, techniques, equipment and safety
5. Verifies the work of assigned employees for accuracy, proper work methods, techniques and compliance with applicable standards and specifications
6. Monitors and inspects the work of contractors for a variety of construction or maintenance projects
7. Analyzes and reviews system data to recommend priorities, schedules and workload performance measures
8. Develops and directs the execution of complex or non-routine traffic safety plans
9. Responds to exceptional and/or non-routine public inquiries in a courteous manner and participates in the development of formal reports and responses to the media
10. Participates in, ensures the development of, and adherence to the safety program

EXAMPLE

11. Participates in fact-gathering to respond to liability claims

12. Participates in investigations into potential wrongdoing or policy violations

13. Attends and participates in professional group meetings; stays abreast of new trends and innovations in the field of wastewater collection system operation and maintenance

Complexity Of Test Questions

At the Grade III level, certificate candidates are expected to have the knowledge, skill and ability to safely and effectively accomplish and coordinate complex tasks as listed in the *Essential Duties* above. Grade III candidates are also expected to be familiar with the Grade I and II Collection System Maintenance Technologist knowledge, skills and abilities. Examinees will have to answer multiple choice questions that test application, analysis, and synthesis of the subject matter. The complexity of the questions will cover the ability: to abstract in particular and concrete situations; to clarify and organize theories and ideas; and to put facts together to form a new solution.

Test Content Areas

The following list is an outline of Test Content Areas. Each content area is a Knowledge, Skill, or Ability that is required to perform the *Essential Duties* listed above. Since all of the Knowledge, Skills, or Abilities are required to perform the *Essential Duties* they are all equally important in the demonstration of acceptable competency. Thus, all of the content areas listed below are equally weighted on the test. Candidates should also be thoroughly familiar with the Grade I and II Collection System Maintenance *Test Content Areas.*

Knowledge of:

Test Content Areas for Grade III

300. Knowledge, skill and ability identified on the Test Content Specifications for Collection Systems Grades I and II.

301. Operations, services, and activities of a wastewater collection system operations and maintenance program.

302. Principles of leadership, supervision, and training.

303. Methods and techniques of wastewater collection system inspection, predictive/preventive maintenance and repair.

304. Operation and characteristics of collection system maintenance equipment and tools.

305. Methods and techniques, tools and materials used in the maintenance and repair of wastewater collection systems.

306. Procedures, methods, tools, and equipment used in the operation of motors, pumps, controls, and instrumentation.

307. Safe working practices applicable to wastewater collection system maintenance, repair and construction.

308. Pipeline and manhole design and construction.

309. Occupational hazards and safety practices including the management of exceptional circumstances.

310. Office equipment including computers and supporting word processing, spreadsheets, and databases.

311. Applicable codes, regulations, policies and procedures.

Skill to:

312. Establish and maintain cooperative working relationships with those contacted in the course of work.

313. Communicate accurately, clearly, and concisely: in writing, orally, and electronically, in the English language.

314. Perform advanced algebra, geometry, statistical analysis.

Ability to:

315. Lead and train maintenance and repair staff. Includes scheduling and assigning personnel and the use of materials and equipment to assure desired quality and quantity of work.

316. Work cooperatively with co-workers; identify and minimize conflict.

317. Compute time requirements, labor, materials, and equipment needed for various jobs.

318. Plan, organize, and schedule training.

319. Inspect and diagnose operating problems on pumps, electrical motors, and automatic control systems.

320. Supervise and direct the most difficult collection system maintenance and repair tasks.

321. Work independently under general supervision.

322. Competently inspect the work of contractors and staff.

323. Operate a variety of collection system maintenance equipment and tools.

324. Understand, follow and provide oral and written instructions.

325. Effectively assess and interpret situations and conditions and apply independent judgement.

SAMPLE

Grade IV Collection System Maintenance

Collection System Maintenance Grade IV Certification is designed to demonstrate competency at the program manager level. More specifically, Grade IV certification implies competence in the knowledge, skills and abilities required to perform the *Essential Duties* of a management level Collection System Maintenance Technologist.

Eligibility Criteria For Taking The Test

The basic requirement is eight years of full-time work in Collection System Maintenance. You may also qualify by having six years of experience and holding a Collection System Maintenance Grade III Certificate for two years, **OR** having six years of full-time experience and holding an Associate's degree in a related field, **OR** having five years of full-time experience and holding a Bachelor's, or higher, degree in a related field. All Grade IV candidates must also demonstrate at least one year of experience supervising the work of others.

Eligibility criteria are summarized in the table below. You may qualify by meeting either Education/Experience Combination **A**, **B**, **C**, or **D**. If you do not meet any of the combinations of experience and education, then you do not qualify for Grade IV:

Combination	EDUCATION & CERTIFICATIONS +	EXPERIENCE
A	None	8 years in Collection System Maintenance with one of those years supervising others
B	2 years holding Grade III Collection System Maintenance	6 years in Collection System Maintenance with one of those years supervising others
C	Hold an AA/AS, or higher, degree in a related field	6 years in Collection System Maintenance with one of those years supervising others
D	Hold an Bachelor's, or higher, degree in a related field	5 years in Collection System Maintenance with one of those years supervising others

Qualifying With Your Education

Holding a college degree, or its equivalent, in a field related to your vocation will reduce the number of years required for your test (see the table above). Your degree must be in a field that is related to the certificate for which you are applying. If you are uncertain if your degree is related to your vocation, you should still include your degree information in your application. The Technical Certification Program Committee will determine if your degree qualifies. If it does not, you will be accepted for the next highest grade level for which you qualify. Associate's and Bachelor's degrees in technical fields are usually accepted. Degrees are evaluated on a case-by-case basis upon receipt of the application. College credit without a degree is not accepted unless it can be demonstrated that the credit is equivalent to a degree.

Essential Duties Of The Grade IV Collection System Maintenance Technologist

Individuals certified as Grade IV Collection System Maintenance Technologists are expected to possess acceptable competency when performing the tasks that are necessary for management level Collection System Maintenance. These necessary tasks are known as the *Essential Duties*. The certification test measures knowledge, skills and abilities required to perform the *Essential Duties*.

Essential Duties for Grade IV

1. Administers and manages the performance of the duties of Collection System Maintenance Grade I, Grade II and Grade III
2. Responsible for all services and activities associated with the operation, maintenance and repair of the wastewater collection system
3. Manages the development and implementation of goals, objectives and policies for the wastewater collection program
4. Directs and supports supervisors and staff to ensure high performance in a customer service-oriented work environment that supports achieving desired goals and objectives
5. Evaluates the performance of the wastewater collection system such as staffing levels, predictive/preventive maintenance programs, energy efficiency and material costs.
6. Plans, directs, coordinates, prioritizes and reviews the work plan for the collection system
7. Selects, motivates and evaluates personnel; works with employees to achieve performance goals and objectives; implements disciplinary procedures; conducts general labor relations activities
8. Develops, implements and oversees a comprehensive equipment selection and maintenance program

EXAMPLE

9. Coordinates wastewater collection system activities with other divisions, outside agencies and organizations. Negotiates and resolves sensitive and controversial issues

10. Provides responsible and complex technical support to upper management and prepares and presents staff reports, including organizational studies

11. Originates and administers the work of contractors/consultants/engineers for a variety of construction or maintenance projects

12. Responsible for the development and administration of safety training programs for wastewater collection system staff and ensures compliance with safe working practices, rules and regulations

13. Responsible for the development and administration of assigned employees in wastewater collection system inspection, repair methods, techniques and equipment

14. Oversees and participates in the development and administration of the wastewater collection system annual budget; tracks and forecasts resources needed for staffing, equipment, materials, and supplies; monitors and approves expenditures and implements adjustments

15. Initiates, develops and administers programs, policies, and procedures to ensure the safe and efficient operation of the wastewater collection system

16. Attends and participates in professional group meetings; stays abreast of new trends and innovations in the field of wastewater collection system operation and maintenance; ensures the availability of opportunities for all staff to participate in professional development

17. Responds to difficult and sensitive public inquiries in a courteous manner and develops formal reports and responses to the media

18. Reviews and responds to liability claims

19. Investigates potential wrongdoing or policy violations

Complexity Of Test Questions

At the Grade IV level, certificate candidates are expected to have the knowledge, skill and ability to administer, coordinate and manage complex programs described in the *Essential Duties* above. Grade IV candidates are also expected to be familiar with the Grade I, II, and III Collection System Maintenance Technologist knowledge, skills and abilities. Examinees will have to answer multiple choice questions that test analysis, synthesis and evaluation of the subject matter. The complexity of the questions will cover the ability: to clarify and organize theories and ideas; to put together facts to form new solutions; to make managerial level judgements.

Test Content Areas

The following list is an outline of *Test Content Areas*. Each content area is a Knowledge, Skill, or Ability that is required to perform the *Essential Duties* listed above. Since all of the Knowledge, Skills, or Abilities are required to perform the *Essential Duties* they are all equally important in the demonstration of acceptable competency. Thus, all of the content areas listed below are equally weighted on the test. Candidates should also be thoroughly familiar with the Grade I, II, and III Collection System Maintenance *Test Content Areas*.

Knowledge of:

Test Content Areas for Grade IV

400. Knowledge, skill and ability identified on the Test Content Specifications for Collection Systems Grades I, II, and III

401. Operational characteristics, services and activities of a wastewater collection system maintenance program

402. Operation and characteristics of collection systems maintenance equipment and tools

403. Methods and techniques, tools and materials used in the maintenance and repair of wastewater collection systems

404. Wastewater collection system inspection methods and techniques

405. Principles and practices of program development and administration

406. Principles and practices of budget preparation and administration.

407. Principles of leadership, supervision, training and performance evaluation

408. Principles of labor relations administration

409. Recent developments, current literature and sources of information related to wastewater collection

410. Office equipment including computers and supporting word processing, spreadsheets,databases and specialized computer software programs

411. Occupational hazards and general safety practices

412. Applicable codes, regulations, policies, and procedures

Skill to:

413. Establish and maintain cooperative relationships with those contacted in the course of work

414. Communicate accurately, clearly, and concisely: in writing, orally, and electronically, in the English language

EXAMPLE

415. Perform budget development, expenditure forecasting, statistical evaluation, and cost analysis

Ability to:

416. Manage, direct and coordinate the work of staff
417. Select, supervise, train, and evaluate staff
418. Oversee and direct the operations, services and activities of a wastewater collection system
419. Manage and administer inspection services on wastewater collection system projects
420. Read and interpret blueprints, construction drawings and specifications
421. Develop and administer goals, objectives and procedures
422. Interpret, explain, and enforce division policies and procedures
423. Develop and implement safety training programs
424. Prepare and administer program budget
425. Prepare clear and concise administrative and financial reports
426. Research, analyze, and evaluate new methods and techniques
427. Interpret and apply appropriate codes, regulations, policies, and procedures
428. Understand, follow and provide oral and written instructions
429. Effectively assess and interpret situations and conditions and apply independent judgement

Sample Test Questions

The following sample test questions are provided to help you become familiar with the multiple choice format. These questions reflect only a sample of the subject matter covered at each grade level.

For each question, choose the single most correct answer. An answer key is given on page 15.

Grade I Collection System Maintenance

1. Operation and maintenance of a Wastewater Collection System means keeping the:

   a. power supply available.
   b. system in good operating condition.
   c. water flowing from the spigot.
   d. electrical equipment dry.

2. Upon arrival to a service request for a building lateral stoppage, you notice a constant flow coming up from the clean-out. The first thing you should do is:

   a. cap the clean-out and see if any sewage comes into the building.
   b. set up the hydro-cleaner at the downstream manhole.
   c. open the upstream manhole to see if it is full.
   d. make sure that water is not being used in the building.

3. In order to complete a sewer repair, the crew had to cut out a section of sidewalk 4 feet wide, 8 feet long and 4 inches thick. How many cubic yards of concrete are needed to restore the sidewalk?

   a. 3.5 cubic yards
   b. 0.39 cubic yards
   c. 9.6 cubic yards
   d. 0.96 cubic yards

Grade II Collection System Maintenance

1. A report of a clean-out cover missing in the side walk is routed to you. Which of the following would be the best response?

   a. Make a note and take care of it when you are in the area.
   b. Respond immediately and put a cone over it.
   c. Take care of it after lunch.
   d. Respond immediately and repair or replace the clean-out cover.

2. While conducting a video inspection, the camera becomes stuck. Which of the following would be the first step in solving this problem?

   a. Call for a backhoe and dig up the area where the camera is stuck.
   b. Disconnect the wires and close the manhole; return the following morning to see if it has freed itself.
   c. Attempt to dislodge the camera by using the tag line.

EXAMPLE

d. Attach pulling cable to a truck hitch and pull through the bad spot, then continue your inspection.

3. A new sewer line is installed using a bubble level. For every foot of pipe installed, the level measures a quarter (1/4) inch of fall. A quarter (1/4) inch of fall for every foot is equal to what percent?

a. 4%
b. 1.4%
c. 2%
d. 0.002%

Grade III Collection System Maintenance

1. The main advantage of using variable speed pumping equipment is that the pumping rate can be adjusted to meet:

a. Head loss rate.
b. Discharge rate.
c. Inflow rate.
d. Friction loss.

2. When preparing a lift station maintenance program, which of the following factors should be considered first?

a. Computer activity codes
b. Station I.D. codes
c. Equipment specifications
d. History of stoppages

3. A wet well is 115 feet long by 85 feet wide and has a water level of 18 feet. The flow is 22 million gallons a day. What is the detention time?

a. 76 minutes
b. 1 hour 26 minutes
c. 1 hour 43 minutes
d. 2 hours 26 seconds

4. Which characteristic is typical of workers who are high achievers in performing their jobs?

a. Seek out problems rather than avoid them
b. Develop faster methods without seeking supervisorial advice
c. Resolve routine problems
d. Achieve mediocre results with abundant resources

Grade IV Collection System Maintenance

1. You receive an anonymous complaint that one of your maintenance vehicles is parked in a neighborhood and two employees are inside of the vehicle drinking alcohol. What steps, if any, should you take?

a. Call in all maintenance personnel and have everyone tested for drugs and alcohol.
b. Go out to the site and send the suspected employees home.
c. Suspend the employees until fact finding is complete.
d. Take another supervisor out to the site, observe employees, ask questions and investigate the circumstances.

2. One of your maintenance crews reports to you that a contractor working within your jurisdiction is pumping raw sewage into a nearby creek. Which of the following should you do?

a. Tell your crew to ask the contractor to keep a record of how many gallons are pumped into the creek.
b. Take a police officer to the site, have the contractor arrested, and call the health department.
c. Have your crews contain the sewage in the creek, pump it back into a nearby sanitary sewer, and have the contractor let them know if any more sewage is to be pumped.
d. Go to the site, confirm the illegal discharge, advise the contractor to stop, take photos, take down names, and notify the health department.

3. Which of the following would be a detrimental effect of excessive infiltration and inflow?

a. Contamination of the ground water supply
b. Higher power costs for pump stations
c. Reducing storm water runoff
d. Reducing root intrusion into sanitary sewer lines

4. Which of the following would be a typical item in the Operating Budget?

a. Purchase of a new backhoe
b. A large sewer main replacement project
c. Purchase of daily materials and supplies
d. Reserve funding for future projects

Answer Key on Page 15

EXAMPLE

Selected References

The following table lists references that may be useful when studying for the certification test. The table lists primary and supplementary study references. Primary study references are recommended as the best sources for studying for the certification test. Supplementary study references are recommended as sources that will help to further your understanding of the subject matter beyond the primary references.

For each reference a "P" indicates Primary reference and an "S" indicates a Supplementary reference. Check the Grade column that corresponds to the grade level you will be taking to determine if a reference is Primary or Supplementary. Blank boxes indicate that the reference is not appropriate for that grade level.

For information about obtaining these publications, use the contact information listed in the reference. If no phone number or website is listed, contact the publishing agency directly or contact your local library or bookstore.

This reference list is intended to assist certificate candidates in their preparation for the Collection System Maintenance Technologist certification test. Use of these references does not guarantee successful completion of the test. There may be other publications that may be helpful to candidates preparing for the test. CWEA encourages you to identify and utilize other resources in preparing for your test.

	GRADE			
Reference	**I**	**II**	**II**	**iV**
"Operation and Maintenance of Wastewater Collection Systems", Volume I, Kenneth Kerri, Office of Water Programs, California State University Sacramento, 6000 J Street, Sacramento, CA. 95819-6025, (916) 278-6142. www.owp.csus.edu	P	P	P	P
"Collection System Maintenance Study Guide", Grades 1-4 (2001) CWEA (510) 382-7800 www.cwea.org	P	P	P	P
"Confined Space Entry", WEF Publication, 1998 Edition", Water Environment Federation, 601 Wythe Street, Alexandria, VA. 22314-1994, Phone: 1-800-666-0206 www.wef.org ISBN: 1-57278-122-X	P	P	P	P
"Wastewater Collection System Maintenance", Michael J. Parcher CRC Press. ISBN: 1566765692 www.crcpress.com Phone: 800/272-7737 Fax: 800/374-3401 email: orders@crcpress.com	P	P	P	P
"The Math Text for Water and Wastewater Technology" Second Edition, Wrights Training, P.O. Box 515, Elmira, CA. 95625-0515. (707) 448-3659 www.wrights-trainingsite.com (download form to order)	P	P		
"Operation and Maintenance of Wastewater Collection Systems" Volume II, Kenneth Kerri, Office of Water Programs, California State University Sacramento, 6000 J Street, Sacramento, CA. 95819-6025, Phone: (916) 278-6142.			P	P
"Wastewater Collection Systems Management", (Manual of Practice No.7), 5th Edition, ISBN: 1-57278-152-1 Water Environment Federation, 601 Wythe Street, Alexandra, VA. 22314-1994, 1-800-356-5705. www.wef.org			P	P
"Supervision", 6 th Edition, Allyn and Bacon, Longman Publishers, a Division of Pearson 160 Gould Street, Needham Heights, MA. 02194. (888) 977-7900 www.ablongman.com			P	P
"Supervisor's Guide to Safety and Health Programs", Water Environment Federation, 601 Wythe Street, Alexandria, VA. 22314-1994, 1-800-666-0206.			P	P
"Applied Math for Wastewater Operators", Joan Kirkpatrick Price, CRC Press, 1-800-374-3401 www.crcpress.com ISBN: 0877620892			P	P
"Supervisory Management in the Water/Wastewater Field", Michigan State University, Self Study Course, 3535 Forest Rd. Lansing, Michigan 48910, 1-800-358-5705 www.vu.msu.edu			P	P
"Existing Sewer Evaluation & Rehabilitation", Water Environment Federation, 601 Wythe Street, Alexandra, VA. 22314-1994, 1-800-666-0206. www.wef.org	S	S	S	S

EXAMPLE

Reference	GRADE I	II	III	IV
"Utility Management" Office of Water Programs California State University Sacramento 6000 J Street Sacramento, CA 95819-6025 916/278-6142 www.owp.csus.edu/	S	S	P	P
"Manual of Traffic Controls for Construction and Maintenance Work Zones-1996 State of California Department of Transportation 1900 Royal Oaks Drive Sacramention, CA 95815 www.dot.ca.gov Download from www.cwea.org/book_brcsg_csm3.shtml or www.dot.ca.gov/manuals.htm	P	P	P	P
"Safety and Health in Wastewater Systems" , WEF Manual of Practice SM-1 Water Environment Federation 601 Wythe St. Alexandria, VA 22314-1994 800/666-0206 www.wef.org ISBN: 1-881369-87-0	P	P	P	P
"Sewer System Infrastructure Analysis and Rehabilitation", (EPA/625/6-9/030 Handbook), U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH. 45268.	S	S	S	S
"Gravity Sanitary Sewer Design and Construction", Water Environment Federation, 601 Wythe Street, Alexandra, VA. 22314-1994, (This Manual will be of use to the design engineer), 1-800-666-0206.	S	S	S	S
"Odor and Corrosion Control in Sanitary Sewerage Systems and Treatment Plants" (EPA/625/1-85/018 Design Manual), U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH.	S	S	S	S
"Pipe Bedding and Backfill", Amster K. Howard Bureau of Reclamation, Attention Code 822-A, P.O. Box 25007, Denver Federal Center, Denver, CO. 80225-0007, (303)236-6741.	S	S	S	S
"Maintaining Wastewater Equipment", TPC Training Systems, Technical Publishing, 1301 So. Grove Ave., Barrington, Illinois 60010, (312)381-1840 www.tpctraining.com	S	S	S	S
"Cave-in Protection and Competent Person Training Manual", ACR Publications Inc., 1298 Elm Street SW Albany, OR. 97321, (503) 928-5211. 1 (800) 433-8150 http://www.acrp.com/ acr_pb_water_ww_books.html	S	S	S	S
"Pumps & Pumping", ACR Publications Inc., 1298 Elm Street SW Albany, OR. 97321, (503) 928-5211. 1 (800) 433-8150 http://www.acrp.com/	S	S	S	S
"Existing Sewer Evaluation and Rehabilitation", WEF Manual of Practice FD-6, ASCE Manual and Report on Engineering Practice No. 62, Water Environmental Association, 601 Wythe Street, Alexandria, VA. 22314-1994, 1-800-666-0206.	S	S	S	S
"Pump Handbook", Mc Graw-Hill Publishing Company, 1221 Avenue of the Americas New York, NY. 10020, 1-800-2-Mcgraw. http://www.mcgraw-hill.com/ ISBN: 0070340323	S	S	S	S

EXAMPLE

Answer Key To Sample Test Questions

Question #	Grade I	Grade II	Grade III	Grade IV
1	b	d	c	d
2	d	c	c	d
3	b	c	b	b
4	—	—	a	c

Preparing For Your Test

This section addresses a few possible methods for preparing for the certification test. Since you are most familiar with your own abilities you are responsible for determining the best method for preparing for your certification test. Following the suggestions in this section does not guarantee you will pass the certification test.

Determining Your Preparedness: An individual's preparedness for the certification test depends on a number of things including amount of practical experience in the vocation and years of education. If you are unsure how prepared you are for the test review the *Essential Duties* and *Test Content Areas* for the test that you are considering. If you are not familiar with most of the *Essential Duties* and *Test Content Areas* you should consider reviewing some of the material in the references listed for that grade level. You may also want to consider applying for a lower grade level if appropriate.

Using The Selected References: After evaluating how well prepared you are for the written test you may want to review some of the Selected References. The references in this list may be used to review those Test Content Areas that you are not familiar with or those for which you have little background. Well prepared candidates may only have to brush-up on a few topics while those less prepared may have to study extensively.

Study Sessions: CWEA Local Sections host at least two study sessions in various parts of California. All applicants will be mailed the date and location of the nearest preparation classes. Usually these classes are given about one month before the test date and last a full day with Grades I and II material covered in the morning and Grades III and IV covered in the afternoon.

Using the Essential Duties and Test Content Areas as a Guide to Your Study: The Essential Duties (EDs) are a basic outline of the test subject matter. You can use the EDs as your study guide by referring to the EDs in the primary Selected References. For example, if you are preparing for the Grade II test, and you are not very familiar with ED #7 (Routine traffic safety planning), you can look up "Traffic control zones" in the index of *Operation and Maintenance of Wastewater Collection Systems Volume 1.* There you can read about safe procedures for traffic control on pages 141-145. Similarly, you could read about Test Content Area (TCA) #6 (Occupational hazards and standard safety), in the same reference. As you study you will find that the TCAs are related to the EDs (TCA #6 is clearly related to ED #7). Each test question is written to address at least one TCA and its related ED.

FAQs

Frequently Asked Questions

Question: Is it required that I begin at the Grade I level then work my way up from there to higher levels?
Answer: No, you may take any test that you qualify for with your education and experience. However, if you are just starting out you can see by the education and experience requirements that you can work your way up the grade levels faster if you become certified at Grade I, then achieve each successive certification as soon as you get the required education and experience.

Question: If I take a Grade II, III, or IV test will I have to know the Test Content Areas for the lower level tests?
Answer: Yes, the subject matter for each test builds on the subject matter for those tests below its grade level. A thorough knowledge of the Test Content Areas for the grade level that you are taking is most important to your preparation, but you should expect questions from any of the lower grade levels.

Question: If I am re-taking a test that I had previously failed do I need to re-submit a full application and the entire application fee?
Answer: Yes.

Question: Is continuing education required to renew my certification?
Answer: Yes. For any certificate earned on or after July 2002, you need to obtain 12 hours of continuing education every two years. For more information, visit www.cwea.org, or feel free to call the CWEA office.

Question: How long is the test?
Answer: All tests have about 75-100 questions and 3 hours are given for completion.

Question: Can I take more than one certification test at once?
Answer: Yes, but you can only take up to two at a time. You will be given a total of three hours to complete both tests.

Question: How do I get a receipt showing I paid for the test?
Answer: A receipt is sent to all applicants who have paid their fees about one month after the application deadline. Hold on to this receipt until the certification process is over in case you have to submit it to your employer for reimbursement.

Question: If I am applying for the Grade IV test do I need to be a Supervisor?
Answer: No, you just need to have about one year of supervision experience. You do not have to hold the title of "Supervisor."

EXAMPLE

Test Application Dates and Deadlines	
Application Deadline	Test date
April 30, 2006	July 22, 2006
October 31, 2006	January 27, 2007

Other CWEA Certificate Programs

- Biosolids Land Application Management
- Environmental Compliance Inspector
- Laboratory Analyst
- Plant Maintenance
- Industrial Waste Treatment Plant Operator

For more information about these programs call CWEA at 510-382-7800, or visit our web site at http://www.cwea.org

Conversions and Formulas Given in the Certification test

Conversions

12 inches = 1 foot
36 inches = 3 feet = 1 yard
5,280 feet = 1 mile
1,440 minutes = 1 day = 24 hours
144 square inches = 1 square foot
9 square feet = 1 square yard
43,560 square feet = 1 acre
1,728 cubic inches = 1 cubic foot
27 cubic feet = 1 cubic yard
1 cubic foot of water contains 7.48 gallons
1 cubic foot of water weighs 62.4 pounds
1 gallon of water = 8.34 pounds
1 million gallons per day (mgd) = 694 gallons per minute (gpm)
1 million gallons per day (mgd) = 1.55 cubic feet per second (cfs)
1 horse power = 0.746 kilowatts (kw)

Formulas

Flow = Area×Velocity

Area:

Rectangle = Length×Width
Circle = 0.785×(Diameter)^2

Circumference of a Circle = 3.14×Diameter

Volume:

Rectangular Solid = Length×Width×Depth
Right Rectangular Cylinder = 0.785×(Diameter)^2
= π×(Radius)^2×Length

$$Slope = \frac{Rise}{Run}$$

California Water Environment Association
7677 Oakport Street, Suite 525
Oakland, CA 94621-1935

EXAMPLE

Have a question?
Give us a call at (510) 382-7800.

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES
SAFETY AND TRAINING PROGRAM

Excerpts from the Public Works Services' Safety and Training Program are included as a demonstration of the City's commitment to a properly trained, safe, and professional work force to operate and maintain the City's sanitary sewer collection system.

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES
SAFETY AND TRAINING PROGRAM

HEALTH, SAFETY, AND WELLNESS GOALS

FY 2006 – FY 2009

SHORT TERM GOALS *(0 - 1 YEAR)*

1. **Develop safety standards**
2. **Develop continuing safety training**
3. **Develop a continuous resource commitment**
4. **Keep up with Research & Development safety efforts**
5. **Equipment acquisition to enhance safety**
6. **Safety modification of equipment**
7. **Safeguard and prioritize hazards**
8. **Comprehensive structured program**
9. **Formalize training program (Safety Perpetual Calendar)**
10. **Make necessary changes in Safety Management System**
11. **Reorganize Health, Safety and Wellness committee and system**
12. **Improve on and off-the-job safety**
13. **Change Quality standard procedures with safety in mind**
14. **Increase employee safety awareness**
15. **Develop Job Safety Analysis for each Quality Standard**
16. **Implement near-miss reviews. Incorporate into Health, Safety and Wellness meetings. Take back to employees.**

INTERMEDIATE GOALS *(1 - 3 YEARS)*

Suggested Goals

1. **Reduce injuries /accident - 0%**
   (Target: zero accidents / zero injuries)
2. **Look at way we work and equipment we use (Stump grinder)**
   (Continuous improvement JSA/Standards)
   (Safety modification of equipment)
   (Continue safety review and training on equipment)
3. **Continue bi-weekly tailgate meetings**
   (Increase employee safety awareness - continue existing training systems)
4. **Fill vacancies / fully staff sections**
   (Develop a continuous resource commitment)
5. **Look at cross-training /staff section**
   (Develop a continuous resource commitment)
   (Increase awareness & understanding of other section's tasks)
6. **Safety training needs management present - feedback from instructor**
   (Total line supervisor commitment)

7. **Refresher training for employees return from injuries (quality standards, JSA's…)**
   (Provide refresher training for employees returning from long-term injuries)
8. **Look at employees returning 100% (challenge Dr. / employee)**
   (Encourage employees return to work only when 100% recovered)
9. **Warehouse closing - stockpiling supplies**
   (Not safety related - forward to section/division for discussion)
10. **Incentive programs (repetitive work wears you out) - can work both ways**
    (Evaluate incentive reward program pro and cons)
    (Design a complete incentive reward program base on evaluation results)
11. **Look at decreasing specific injuries**
    (Increase awareness and training for identified injuries)
12. **Where are we in injury standards**
    (Research and benchmark industry standards)
13. **Go out to job sites to check safety standards**
    (Perform periodic worksite audits to provide safety recommendations)
14. **Form subcommittees for knees and back injury prevention**
    (Leave same)
15. Get best safety program you can and adhere to it
    (Leave same)
16. **Involve every single employee in safety (own topic)**
    (All employee involvement and development of section's bi-weekly tailgate topics)
17. **0% not realistic - talk about it before it happens**
    (Continue near miss discussion and OSHA required bi-weekly tail gate meetings)

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES
SAFETY AND TRAINING PROGRAM

HEALTH, SAFETY, AND WELLNESS COMMITTEE MEETING AGENDA

Date: **Wednesday, March 26, 2008**
Time: **7:15 to 8:15 A.M.**
Place: MSC Conference Room
Participants: **Health, Safety & Wellness Committee**
Coordinator: Ralph Pacheco, PWS Supervisor
Meeting Chair: Victor Palmberg, PWS Supervisor

MONTH OF APRIL'S THEME

" CONFINED SPACE – DO YOU KNOW WHAT IT IS ??"

FOR DISCUSSION:

1. Meeting Notes (Discussion) — R. Pacheco

2. Accident and Near Miss Review — Tor
   - A. Accident
   - B. Discussion and Follow-up — R. Pacheco
     1) USA Standard follow-up
     2) Section Quality Standards review / updates by May 28, 2008
   - C. Shape team meeting — R. Pacheco
   - D. Near Miss Report — Tor

3. Safety Share — All

4. Open Forum
   - A. Injury and Illness Prevention Program city wide — R. Pacheco
   - B. Confined Space training - April 10th and 11th — R. Bartolo
   - C. Competent Person Training — R. Bartolo

5. Upcoming Events – CalTrain RR Safety Training — R. Pacheco
   March 27th 7am – MSC Conference Room

6. Next Committee Meeting: Wednesday, April 30, 2008 @ 7:15 a.m. to 8:15 a.m.
   Next Committee Chair: Paul Vukelich

Attachments:

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES
SAFETY AND TRAINING PROGRAM

Injury and Illness Prevention Program (IIPP)

Safety at the Public Works Services (PWS) Department

Safety in all aspects of our work is a top priority at the City of Redwood City Public Works Services Department. To insure that all employees are supported to do their jobs safely, we have established this written Injury and Illness Prevention Program (IIPP). This program spells out what we do to make this a safe place in which to work. Remember, though, the most basic rule:

Safety is everyone's responsibility!

Employees must observe the rules of safety, every time they come to work, in every job they do, on every piece of equipment they handle.

A. PURPOSE

The overall purpose of the PWS Safety and Health Program, in conjunction with the IIPP, is to reduce accidents, injuries, and illnesses. Our goal is ZERO accidents and injuries. Our Safety and Health Program includes:

1. Continuation of a Health, Safety, and Wellness Committee to oversee safety and health activities.
2. Conduct a program of safety inspections to find and eliminate unsafe working conditions or practices, to control health hazards, and to comply fully with the industry safety and health standards for every job.
3. Train all employees in progressive and appropriate safety and health practices.
4. Provide necessary personal protective equipment, training, and instructions for its use and care.
5. Provide mechanical and physical safeguards to the maximum extent possible.
6. Develop and enforce safety and health rules, requiring that employees respect these rules as a condition of employment.
7. Investigate every accident and near miss promptly and thoroughly, to find out what caused it and to correct the problem so it won't happen again.
8. Hold bi-monthly tailgate meetings.

B. POLICY STATEMENT

The Public Works Services Department recognized the importance of an effective safety policy and program for the well-being of each department employee and the public, to the productivity of city operations, and ultimately, to the cost of public services. The Department is committed to providing employees with safe and healthy working conditions, sufficient training, materials and equipment to perform work safely. The Department will fully comply with the CalOSHA regulations and other applicable industry standards.

This responsibility is delegated as detailed below to all employees of the department. Each employee is responsible to participate and cooperate in the effort to develop and maintain an effective safety program. The Department recognizes that the responsibility for safety and health are shared throughout the department.

C. PWS DEPARTMENT SAFETY RESPONSIBILITIES

All managers are responsible for implementing and maintaining the Injury and Illness Prevention Program (IIPP) in their work areas and for answering worker questions about the IIP Program. A copy of this IIP Program is available from each manager and one copy will be placed in each day room.

Director

- Evaluate the effectiveness of the Department's Injury and Illness Prevention Program and initiate changes as needed to meet objectives
- Provide resources to accomplish program goals

Injury and Illness Program Officer / PWS Management Analyst

- Measure the effectiveness of the Department's Injury and Illness Prevention Program and make recommendations to the Director as needed to meet objectives
- Provide resources for Department's overall Safety and Health Program and training
- Facilitate Department's Health, Safety, and Wellness Committee (monthly)
- Serve as Department representative on the Citywide Safety Committee (S.H.A.P.E.)
- Schedule and provide departmental general training such as First Aid, CPR, Fire Extinguisher Training, and Annual Hearing Testing
- Record keeping (general training, tailgate, and worksite self inspection records only)
- Display OSHA 300 log summary (from HR)
- Maintain and classify injury and illness statistics

General Section Responsibilities (All employees, with leadership from Supervisors)

- Designate a Health, Safety, and Wellness Committee Representative
- Develop yearly training calendar
- Investigate section specific accidents, near misses, and develop reports
- Perform section specific job safety analysis
- Provide section specific hazardous materials training
- Provide section specific hazard communications training (MSDS and Right-to-Know)
- Facilitate bi-weekly tailgate sessions
- Perform quarterly safe work area inspections
- Perform quarterly hazardous materials inspections
- Record keeping (training, tailgate, and inspection records)
- Coordinate division / section overall safety and health program and training

Section Specific Responsibilities

Auto Shop Superintendent/Leaders / Building Maintenance Dept.

- ★ Coordinate Fire Safety Inspection (Fire Dept.)
- ★ Provide Diamond Signs for Buildings

Right-of-Way Superintendent/Supervisors

- ★ In Charge of Respirator Program/Training
- ★ Provide Work Zone Safety Training/Certification
- ★ Provide Aerial Lift Truck Training
- ★ Provide D.O.T. training to new employees
- ★ Provide forklift training

Wastewater Superintendent/Supervisors

- ★ In Charge of Confined Space Program/Training (CPR)
- ★ Coordinate Hazardous Materials (HazMat) Removal with San Mateo County
- ★ Provide D.O.T. training to new employees
- ★ In charge of Hazardous Materials (HazMat) Identification on Sheds in Yard

Water Superintendent/Supervisors

- ★ Provide Cranes and Slings Training
- ★ Provide Backhoe Training
- ★ Section Excavation and Trenching Training
- ★ Provide D.O.T. training to new employees

Employees

It is the responsibility of every employee to:

- Know, respect, and use safe work practices and procedures at all times.
- Comply with all rules and regulations and continuously practice safety while on the job
- Recognize job hazards and take proper precautions to insure the safety of oneself, as well as fellow employees and the public.
- Inform his/her supervisor immediately of hazards, unsafe equipment and acts, and recommend solutions to correct deficiencies.
- Actively participate in the safety program and training.
- Immediately report accidents, injuries and near misses to his/her supervisor.
- Report to work in a condition to be able to work safely.

Health, Safety and Wellness Committee

The Public Works Services Department’s Health, Safety, and Wellness (HS&W) Committee is organized to represent the various operation and maintenance functions of the Public Works Services Department and all levels of management and workers.

The Safety Committee's mission is to provide an avenue for employee involvement in safety program decision making; to serve as a venue to assist and coordinate safety training; and to discuss safety conditions, complaints, accidents, and areas for continuous improvement.

D. CITY OF REDWOOD CITY PUBLIC WORKS SERVICES DEPARTMENT IIPP

The City of Redwood City Public Works Services Department IIPP is established to comprehensively manage employee safety and health in the workplace. Basic elements of the program are:

1. Accident/Injury Management

a. Unsafe Condition/Accident and Near Miss Report
b. Accident, Investigation, and Prevention
c. Workman's Compensation Procedures
   1) assistance/evaluation
   2) injury management
d. Accident/Injury Analysis

2. Training and Instruction

a. Regulations, Procedures, Plans – Employees will be trained and updated in safety regulations, work procedures and emergency plans by management. Orientation of new employees will include this training through the HR Department.
b. General Safety Training – We will provide periodic training in general and industry specific topics pertaining to employee safety and health. The Safety Committee will assist in developing, scheduling and the presentation of programs.
c. Supervisory Training - Managers and supervisors will be provided regular safety training.

3. Communication

We recognize that open, two-way communication between management and employees on health and safety issues is essential to an injury-free, productive workplace. The following system of communication is designed to facilitate a continuous flow of safety and health information between management and employees in a form that is readily understandable and consists of the following items:

a. New employee orientation including a discussion of safety and health policies and procedures.
b. Review of IIP Program.
c. Workplace safety and health training program
d. Regularly scheduled safety meetings.
e. Effective communication of safety and health concerns between employees and supervisors.
f. Posted or distributed safety information.
g. A system for employees to anonymously inform management about workplace hazards.
h. Labor/management Health Safety and Wellness Committee that meets regularly, prepares written records of the committee meetings. In addition, the Committee reviews results of the periodic scheduled inspections, review investigations of accidents and exposes and makes suggestions to management for the prevention of future incidents, reviews investigations of alleged hazardous conditions, and submits recommendations to assist in the evaluation of employee safety suggestions.

4. Health, Safety and Wellness (HS&W) Committee

As outlined in the Safety Responsibilities (Section C), the HS&W Committee represents the various functional areas of Public Works Services Department. The Committee's mission is:

a. Provide an avenue for employee involvement in the safety program
b. Assist and coordinate safety training.
c. Discuss and review safety conditions, complaints, accidents, areas for continuous improvement, and make advisory recommendations.
d. Review injury and illness statistics
e. Meet once a month

5. Hazard Assessment

Periodic inspections to identify and evaluate workplace hazards shall be performed by a competent observer(s) in the following areas of our workplace:

a. Warehouse
b. Equipment Services
c. Traffic Section
d. Street Maintenance Section
e. Sidewalk Repair Section
f. Tree
g. Street Cleaning
h. Sewer Section
i. Storm Section
j. Customer Support & Service Section
k. Water Section

Periodic inspections are performed according to the following schedule:

a. When we initially established our IIP Program
b. Quarterly inspection
c. When new substances, processes, procedures or equipment which present potential new hazards are introduced into our workplace
d. When occupational injuries and illnesses occur
e. Whenever workplace conditions warrant an inspection

Periodic inspections consist of identification and evaluation of workplace hazards utilizing applicable sections of the attached Hazard Assessment Checklist and any other effective methods to identify and evaluate workplace hazards.

6. Accident/Exposure Investigations

Procedures for investigating workplace accidents and hazardous substance exposures include:

a. Visiting the accident scene as soon as possible
b. Interviewing injured workers and witnesses
c. Examining the workplace for factors associated with the accident/exposure
d. Determining the cause of the accident/exposure
e. Taking corrective action to prevent the accident/exposure from recurring
f. Recording the findings and corrective actions taken

7. Hazard Correction

Unsafe or unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

a. When observed or discovered
b. When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers from the area except those necessary to correct the existing condition. Workers necessary to correct the hazardous condition shall be provided with the necessary protection. Only qualified and trained employees shall be allowed to correct the hazard
c. All such actions taken and dates they are corrected shall be documented on the appropriate forms

8. Personal Protective Equipment (PPE)

Employees will be provided personal protective equipment and training for proper use in accordance with CalOSHA regulations, industry standards, and established department safety regulations and procedures.

Employees are responsible for cleaning and maintenance of protective gear. Intentional abuse, failure to use, or repeated loss or destruction of protective gear shall be cause for progressive disciplinary action.

9. General Safety Regulations

Safety regulations will be developed and updated regularly. General regulations for department-wide use will be supplemented by rules and regulations specific to each divisions/sections.

10. Procedures/Plans

Programs will be developed and updated for functions requiring special emphasis, which include the following:

- Emergency Evacuation & Fire Plans
- Confined Space Entry
- Hazard Communication
- Hearing Conservation
- JSA / Quality Standards
- Lockout – Tag Out
- Respiratory Protection
- Personal Protective Equipment
- Blood-borne Pathogen
- Crane and Hoist Safety
- Excavation and Shoring
- Forklift Safety
- Aerial & Scissor Lift Safety Program

11. Hazard Communication/Hazardous Substances (Employee Right to Know Program)

The Public Works Services Department will comply with Right to Know laws and regulations.

Basic requirements of this program are:

a. Initial and follow up training in hazardous substances
b. Container labeling – primary and secondary
c. Maintenance of material safety data sheets (M.S.D.S.) for the period required by law, Right to Know Catalogs, and inventories of hazardous substances for the period required by law.
d. Elimination and minimization of exposures to hazardous substances
e. Appropriate documentation of program
f. Annual review of status and program effectiveness

12. Inspections

a. Management will conduct regular inspections to identify and eliminate hazards of the workplace.
b. Safety equipment will be inspected regularly to assure it is in place and maintained properly.
c. Vehicles, tools, and equipment will be inspected regularly to assure safe operating condition. Repairs or replacements will be made in a timely manner.

13. Employee Compliance

Safety performance will be evaluated as a portion of every employee's work performance. The Public Works Services Department will emphasize a participative, educational approach to obtaining employee compliance with safe work practices and regulations. In event of repeated or intentional failure of an employee to comply with the safety policy and program, management will use progressive disciplinary measures to bring the employee into compliance.

14. Employee Wellness

The Public Works Services Department recognizes that overall employee wellness is directly related to the ability of the employee to work safely. The Public Works Services Department will use available resources, including Employee Assistance Program (EAP), periodic training and any other means available to improve the wellness of its personnel.

15. Record Keeping

PWS will follow the City of Redwood City's Injury and Illness Program record keeping requirements for the safety programs. At a minimum, we will maintain safety training and inspection records for one year. If inspection records are needed for defense purposes, we will maintain them for seven years. (Training records should be part of the employee's file and maintained indefinitely).

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES
SAFETY AND TRAINING PROGRAM

STAFF PERFORMANCE OBJECTIVES

The City has adopted written objectives for the development and performance of the sewer maintenance field crews. The objectives define the knowledge and skill sets necessary to meet the positions' needs and to gain advancement opportunities. Three samples of this approach are attached.

WASTEWATER MANAGEMENT SERVICES DIVISION
(Sanitary Sewer Maintenance Section)

LEAD PUBLIC WORKS MAINTENANCE WORKER
HELPFUL GUIDELINES

Congratulations on your new assignment!

The Sanitary Sewer Maintenance Section welcomes you to your new position as Lead Public Works Maintenance Worker. The Public Works Services Department has a vested interest in your success and to that end your Supervisor will assist you in your development and continuous improvement in the position. Please know that your superintendent, supervisor, coworkers and Public Works Services management team are committed to helping you become a knowledgeable and successful leader in the Department.

Ultimately, your success depends on you, the attitude you bring and the priority you place on improving your technical knowledge and understanding of the City's sanitary sewer system. As a Lead Worker you are expected to lead by example, motivate, coach and supervise your crew to safely complete the daily work tasks assigned to you. It's imperative that you apply yourself to obtaining as much knowledge and skills about the sewer system early on in your new position.

WORK AREAS

Currently in the Sewer Section, lead workers oversee two main areas: (1) Repair/Replacement activities and (2) Preventative Maintenance functions that includes but is not limited to the following types of activities:

(1) Repair projects within the section, including lateral, main line, force main and manhole repair tasks related to the sewer system;

(2) Line cleaning: Hydro-jetting and day to day oversight of the main line root cutting activities

(3) CCTV of laterals and mainlines

(4) Special work activities assigned by the Supervisor and often in support of other departments in the City.

All work activities will involve you working with the Supervisor on scheduling and planning the work on a daily basis. Further, as the Lead Worker, you will be expected to identify tools, equipment and supply needs for the work; and as you become more familiar with the needs of each task, you will be making the purchases decision necessary for work.

Your work will often involve contact with the residents of Redwood City. You are expected to follow the City's guidelines for courteous customer service. On occasion you may encounter situations that may make you uncomfortable, and you should direct customers to speak directly with your Supervisor.

GOALS

Below are goals to help you understand the responsibilities of your new position. If at any time you are not clear about your work assignments, be proactive with your Supervisor and request discussion and clarification.

These goals will be the basis for evaluating your work performance every three months during your 12-month probationary period to give you the direction, encouragement and support you need to meet these expectations. Your "On-the-Job" performance will be routinely observed and evaluated to assure that you grow and develop as a lead worker in the section.

SUPERVISION

1) Communication with your Supervisor is essential to your success. You must communicate concerns, recommendations, suggestions, questions, or incidents to your Supervisor.
2) Customer questions or complaints that are not related to you or operations should be given to your supervisor for follow up.
3) ALL special requests must be authorized by your Supervisor.
4) If your immediate Supervisor is not available, you shall report to the supporting Supervisor (Storm Section) within the Wastewater Division.
5) Crew member injuries must be reported to your Supervisor immediately and the injured employee must be prevented from continuing to work.
6) Report all equipment failures or break downs immediately to your Supervisor and Fleet, notify secretaries (650) 780-7464, so that calls from the public can be handled with correct information.
7) Report all equipment accidents to Fleet and your supervisor immediately, and complete the necessary forms

LEADERSHIP / LEAD BY EXAMPLE

You will be expected to set the example for your crew in terms of safety, punctuality, communication, job productivity and customer service.

1) Follow the MSC Rules of Conduct (see attachment). As a lead worker, you will be responsible for the employees (performance and safety) on your crew.
2) Be prepared to depart the MSC for your job site promptly after each morning briefing and return to the section dayroom at 3:15 p.m. or earlier when you have prior agreement with your supervisor.
3) Communicate frequently with your crew. Be sure to motivate, mentor and develop their performance with the goal being to improve productivity, in a safe manner.
4) Develop and maintain a positive, safe and productive work site.
5) All non-routine work requests must first be authorized by your supervisor. If he is not available for any reason, contact the supporting supervisor (storm section) within the Wastewater Division.
6) Report all equipment breakdowns or failures immediately to your supervisor and Fleet.
7) Efficiency is of the utmost importance - If the work project is completed well before the end of the day notify your supervisor and, alternate job assignments can be performed and completed, when possible.

SAFETY

1) Enforce the use of all PPE (personal protection equipment) for you and your crew at all times. Hard hat, gloves, safety vests, steel toe boots, eye and ear protection must be utilized when working.

2) Follow all USA procedures in advance of an excavation projects, i.e. lateral repair, etc.

3) Enforce the DOT rule: All vehicles must complete their pre- and post-trip inspection slips correctly and consistently. These inspection slips are to be turned in to your supervisor each and every Friday for signature authorization.

4) Conduct safety tailgate meetings with your crew, as needed, and document the meetings, as appropriate.

5) Represent the Sanitary Sewer Section on the Health, Safety & Wellness Committee, when assigned by your Supervisor.

ADMINISTRATIVE

1) Complete and submit daily work orders, mileage logs and any other daily reports to your supervisor. You will be allowed additional time to complete your paperwork in the dayroom prior to 3:15 p.m. (see supervisor for additional information)

2) Adhere to and assure crew compliance to the SSO (sanitary sewer overflow) standard.

3) Adhere, review and revise the Sanitary Sewer Section quality standards and Job Safety Analyses (JSA), when needed.

4) Develop close and contributing relationships with engineering staff to further discussions regarding CIP (Capital Improvement Projects) – your supervisor will explain in more detail later.

5) Complete your timecards (and the timecards of your crew) correctly and submit them to your supervisor on a daily basis.

6) You will be assigned a City email address, which you may use to send and receive communications with other city personnel. Email is another tool for communication, and is not a substitute for direct verbal conversation in the course of doing your work. You are encouraged to communicate verbally with others, as much as possible.

PERSONAL/TECHNICAL DEVELOPMENT

1) You will be giving Sewer collection system specific training equivalent to the Grade II Wastewater Collection System certification available through the California Water Environment Association (CWEA). You are encouraged to take the test to qualify for the Grade II certification. (See supervisor for additional information).

2) Complete City training programs in the areas of customer service, and leadership, and other training opportunities that may be offered by the City from time to time (see supervisor for additional information)

3) Obtain Work Zone Safety certification

4) Complete on the job training to be proficient in the operation of the section's equipment (main line jetter, rodder, backhoe, power rodder, CCTV, etc)

5) Complete confined space training and certification

6) Acquire knowledge and understand the use of the Wastewater Block Book

7) Acquire competent person certification.

8) Learn the City's accident and reporting procedures

9) Complete training to obtain crane operator certification.

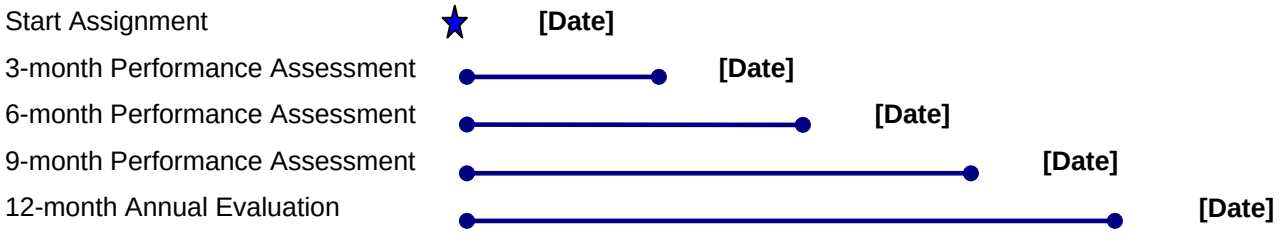
10) Complete training, as appropriate, to coordinate work activities with the Storm Drains Maintenance Section, particularly with regards to illicit discharges to the storm drain system from sewer overflows.

11) You are encouraged to take the initiative to identify other appropriate training opportunities offered in and around the SF Bay Area that are related to your work in the Sewer Section and your position as a Lead.

12) Maintain effective, close communication with your supervisor

PERFORMANCE REVIEW PROCESS
Lead Worker performance will be evaluated at 3, 6, and 9 months from the date of assignment, [DATE] followed by the 12-month Annual Evaluation on your anniversary date, as follows: .

Performance Assessment Schedule: **Lead Public Works Maintenance Worker**



LPWMW TRAINING PLAN / SANITARY SEWER SECTION

ON THE JOB TRANING AND DEVELOPMENTAL PLAN - (NAME)	Training completed & approved by supervisor	Completion Date
AT 6 MONTHS IN LEAD POSITION		
1) Siphon Maintenance - inspection & degreasing (OTJT)		
2) Manhole Inspection (OTJT)		
4) Main Line Jetter Usage & Operation (OTJT)		
5) Main Line Rodder Usage & Operation (OTJR)		
6) Basin Rodding management oversight and Scheduling (discussions with supv)		
7) Sewer Block Book Training (discussion w/ Civil Engineer - OTJT)		
8) Accident Reporting Procedures (discussion with Supervisor)		
9) Degreasing application & use		
10) Daily Jetting/Rodding Work Order / Activity Reports (discussion with Supervisor)		
AT 12 MONTHS IN LEAD POSITION		
1) Sewer Related Tools (OTJT)		
2) Clean Out & Lateral TV/Video Inspection Training (OTJT)		
3) Sewer Line Repairs & Maintenance With mains, laterals (OTJT)		
4) Underground Service Alert Protocol (discussion w/ Supervisor		
& OTJT)		
5) Lamphole Maintenance & Repair (OTJT)		
6) Power Rodder Training (OTJT)		
7) Utility Line Probing Training (OTJT)		
8) Sewer Line Dye Testing (OTJT)		
9) Quality Work Standards (discussion with Supervisor & OTJT)		
10) Engineering Standards (discussion w/ Engineering & OTJT)		
11) Lateral Line Service Rodding (Hand Snakes) Procedures (OTJT)		
12) Knowledge And Methods used for installations, Repair And Maintenance Using Various Types of Pipe (discussion w/ Supervisor & OTJT)		
13) Sewer Lateral Connection (OTJT) - new installations		
14) Sewer Line Plugging - flow diverting & isolation (OTJT)		
15) Clean Out & Riser Assembly, Repair & Installation per engineering		
Standards (OTJT)		
TRAINING COMPONENTS TO BE ACHIEVED DURING THE 12 MONTH PERIOD		
1) Leadership & Motivational Training 2) Oral Communication Skills And Development 3) Customer Service Training		

Leaders are required to work closely with section Supervisor and trainer with planning, scheduling, coordinating and completing projects to the highest quality work standards. Leaders are responsible for assigned tasks and all work zone safety. Leadworkers are also required to train and educate maintenance workers on an ongoing basis. Communication with Supervisor and Leader input is encouraged at all times.

OTJT - On The Job Training

Training Achieved:

ON THE JOB TRAINING AND DEVELOPMENTAL PLAN - (NAME)	Approval Authorization & Date
AT 6 MONTHS IN LEAD POSITION (Supervision, Communication & Customer Service)	
Maintenance Program Management .	
1) Ability to plan, schedule and implement maintenance programs - responsibilities include	
direct oversight along with supervisor in scheduling & planning of repair and line preventative	
maintenance operations - includes appropriate techniques for scheduling, assigning and reviewing	
work	
Technical Skills & Development	
1) Ability to perform Underground Service Alert Protocols	
2) Ability to read and interpret wastewater block book, maps & blue prints (discussion w/ Civil Engineer)	
Safety	
Ability to obtain knowledge & utilize proper safety precautions to all work performed (work zone safety, PPE)	
Administrative	
1) Ability to initiate Accident Reporting Procedures (discussion with Supervisor)	
2) Ability to utilize and revise, if necessary, Quality Work Standards (discussion with Supervisor)	
3) Ability to understand and apply Engineering Standards to sewer system (standardized materials, repairs)	
(discussion w/ Engineering)	
AT 12 MONTHS IN LEAD POSITION (Leadership, Oral Communication & Customer service)	
Leadership & Motivational Training	
Ability to encourage, motivate and inspire a team work atmosphere on the job	
Oral Communication Skills And Development	
1) Ability to verbally present your thoughts, expectations and feelings in a clear manner	
2) Ability to speak and communicate with confidence in a team work environment	
3) Ability to demonstrate assertiveness when appropriate	
Customer Service Training	
Ability to provide and deliver exceptional customer service to those we serve	

Leaders are required to work closely with section Supervisor with planning, scheduling, coordinating and completing projects to the highest quality work standards. Leaders are responsible for assigned tasks and all work zone safety. Lead workers are also required to train and educate maintenance workers on an ongoing basis. Communication with Supervisor and Leader input is encouraged at all times.

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES DEPARTMENT

EMPLOYEE NAME

REQUIREMENTS FOR PROMOTION FROM PWMW I TO PWMW II

The following qualifications must be achieved to promote from Public Works Maintenance Worker I to Public Works Maintenance II:

ITEM A

It will be necessary for the employee to demonstrate an understanding of the following standard policies, procedures, rules, forms and processes to promote from PWMW I to PWMW II:

TASK (General)	***SIGN OFF DATE***	***SPEC***	***LEADERS***	***COMMENTS***
Obtain Class A driver license				
Understanding of usage to Quality Standards				
Training in confined space				
Receive work zone training certification				
Complete DOT training and certification				
Pre and post trip vehicle inspections				
Knowledge of MSC Rules of Conduct				
Knowledge of procedures for Underground Service Alert (USA)				
Knowledge of accident reporting procedures				
Knowledge of demographics of city limits				
Obtain first aid certification				
TASK (Sewer System)	***SIGN OFF DATE***	***SPEC***	***LEADERS***	***COMMENTS***
Understanding of use to sewer main and lateral lines				
Understanding of use to sewer trunk line				
knowledge in the operation of main line jetter				
knowledge in the operation of main line rodder				
knowledge of performing sewer main and lateral repairs				
Knowledge of repair tool usage and operation				
Knowledge in setting up trench shoring				
Understanding of usage of sewer block book				
Understanding of demographics of sewer lift stations				
Knowledge in the installation and removal of submersible pumps				
Knowledge in the operation of lift station Motor Control Panel				
Knowledge in the operation of generator				
Ability to perform lift station site inspections				
Knowledge in performing lift station preventative maint.				
Knowledge in performing lift station pump sequences				

Date , LPWMW

Date , Utilities Specialist

Date , LPWMW

Date & authorization for promotion - (supervisor)

CITY OF REDWOOD CITY
PUBLIC WORKS SERVICES
SAFETY AND TRAINING PROGRAM

TRAINING TOPICS

ANNUAL TRAININGS FOR PWS SEWER SECTION & DEPARTMENT PERSONNEL

See Attached Perpetual Calendar

HS&W TRAINING TOPICS (Committee meets every last Wednesday of every month)

- Poison Oak
- Preventing Trip & Falls
- Safe Lifting techniques
- Preventing Pinch Points
- Confined Space
- Safe House
- Keep Sidewalk Safe
- Housekeeping on Construction Sites
- Working In a Hot Environment
- Working Smarter
- Looking Out in Confined Space and Trenches
- Beware of Walking Surfaces
- Work Zone Safety Techniques

SEWER SECTION TAILGATE MEETING TOPICS (addressed annually at a minimum)

- Jobsite Fall Protection
- Personal Protection Equipment
- Pre-Trip Inspections & Hand Tool Safety
- Eye Safety
- Back Injury Protection
- Hearing Conservation
- Poisonous Plants

CALIFORNIA WATER ENVIRONMENT ASSOCIATION (CWEA) COLLECTION SYSTEM MAINTENANCE CERTIFICATION PROGRAM – TRAINING TOPICS

Grade I

- Operations, services, and activities of a wastewater collection system operations and maintenance program.
- Methods and techniques of recording instrument readings and related measuring devices.
- Methods and techniques of traffic control

- Operation and proper application of collection system maintenance equipment and tools.
- Occupational hazards and standard safety practices.
- Applicable codes, regulations, policies, and procedures.
- Underground Service Alert (USA) markings.

Grade II

- Knowledge, skills, and abilities identified under Grade I.
- Methods and techniques of wastewater collection system inspection, maintenance and repair.
- Operation and characteristics of collection system maintenance equipment and tools including heavy equipment, CCTV inspection, and monitoring devices.
- Methods and techniques, tools, and materials used in the maintenance and repair of wastewater collection systems and lift stations.
- Safe working practices pertinent to wastewater collection system maintenance, repair, and construction.
- Occupational hazards and standard safety practices.

Grade III

- Knowledge, skills, and abilities identified under Grade I and Grade II.
- Principles of leadership, supervision, and training.
- Methods and techniques of wastewater collection system inspection, predictive/preventive maintenance, and repair.
- Operation and characteristics of collection system maintenance equipment and tools.
- Methods and techniques, tools, and materials used in the maintenance and repair of wastewater collection systems.
- Procedures, methods, tools, and equipment used in the operation of motors, pumps, controls, and instrumentation.
- Safe working practices applicable to wastewater collection system maintenance, repair, and construction.
- Pipeline and manhole design and construction.
- Occupational hazards and safety practices including the management of exceptional circumstances.
- Office equipment including computers and supporting word processing, spreadsheets, and databases.

Grade IV

- Knowledge, skills, and abilities identified under Grade I, Grade II, and Grade III.
- Operation and characteristics of collection systems maintenance equipment and tools.
- Methods and techniques, tools, and materials used in the maintenance and repair of wastewater collection systems.
- Wastewater collection system inspection methods and techniques.
- Principles and practices of program development and administration.
- Principles and practices of budget preparation and administration.
- Principles of leadership, supervision, training, and performance evaluation.
- Principles of labor relations administration.

- Recent developments, current literature, and sources of information related to wastewater collection.
- Office equipment including computers and supporting word processing, spreadsheets, databases, and specialized computer software programs.
- Occupational hazards and general safety practices.
- Applicable codes, regulations, policies, and procedures.

PWS SAFETY TRAINING PERPETUAL CALENDAR

City of Redwood City
Public Works Services
Perpetual Training Calendar

Annually												
TRAININGS	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Forklift									X			
Work Zone / Traffic Control									X			
Shoring / Competent Person				X								
				15-20 max								
Boom Truck / Crane (2-days)		X										
		10 max										
Tractor/Loader and Backhoe										X		
										10 max		
Back Training		X						X				
Fire Extinguisher											X	
Rigging (1-day)		X										
Respiratory											X	
Confined Space (Entrant 1-day)			X									
Confined Space (Rescue 3-days)			X									
Hearing Test				X								
Bloodborne Pathogen			X									
Quarterly Section Worksite Walkaround Checklist	X			X			X			X		
First Aid / CPR												X
Cal Train Worker Protection Training	X											
Haz/com w/Business Plan						X						

CITY OF REDWOOD CITY
WASTEWATER MANAGEMENT SERVICES
SPARE PARTS INVENTORY

Fitting and Tools	Size(inches)	Number of Fitting in Stock
CAP / Ferrule	6	1
CAP / Ferrule	4	30
Clay to Plastic ARC Couplings	4	35
Clay to Plastic ARC Couplings	6	6
Clay to Plastic ARC Couplings	8	6
Clay to Plastic ARC Couplings	10	2
Cast Iron to Plastic (Plastic/Plastic)	4	30
Cast Iron to Plastic (Plastic/Plastic)	6	20
Cast Iron to Plastic (Plastic/Plastic)	8	2
Cast Iron to Plastic (Plastic/Plastic)	10	1
Y's	4	9
Y's	6	8
Inline Y's	8 x 4	2
22° 's	4	36
22° 's	6	10
45° 's	4	40
45° 's	6	6
Saddles	4	11
Saddles	6	10
Pipe Lube		13
Brooms		6
Barricades		33
Barricade Lights		5
Cones	28" tall	30
Hand Rods	Boxes	1
Hand Rod Cutters	3	6
Hand Rod Cutters	2	2
Trench Shovels		17
Square Point Shovels		20
Hose Wands		5
Flex hose (for flusher)	3/4" x 20'	4
Bags of Concrete	80 lbm	32
Rags	Box	4
Snap Cutter		2

CITY OF REDWOOD CITY
WASTEWATER MANAGEMENT SERVICES
SPARE PARTS INVENTORY

Fitting and Tools	Size(inches)	Number of Fitting in Stock
Flagger Signs		2
Men at Work Signs		4
Road Closed Signs		2
Detour Signs		4
Sign Holders		4
SDR-26 Pipe	4" x 14'	95
SDR-26 Pipe	6" x 10'	1
SDR-26 Pipe	8" x 14'	1
SDR-26 Pipe	10" x 14'	1
Manhole Ring / Lid Combo's		6
V-1 Concrete Cleanout Box		43
V-1 Concrete Cleanout Box Sewer Lids		63
MAIN LINE PLUG	4"	4
MAIN LINE PLUGS	6"	6
MAIN LINE PLUG	8"	4
MAIN LINE PLUG	10"	4
MAIN LINE PLUG	12"	2
MAIN LINE PLUG	15-18"	1

SPARE PARTS

The City stores and maintains a supply of spare parts for their maintenance and repair program. The City also has plumbing part suppliers like Robert's & Brunne and Cal Steam Supply located in Redwood City. Robert's & Brunne is located just across the street for the City of Redwood City Municipal Corporation yard and also provides "after hour" service to City crews for parts and supplies for after hour emergencies.

CITY OF REDWOOD CITY

WASTEWATER MANAGEMENT SERVICES

FLYGT SUBMERSIBLE PUMP INVENTORY

MODEL #	HP	QTY
Flygt Model #3231	160	2
Flygt Model #3152	20	5
Flygt Model #3127	10	3
Flygt Model #3127	7.5	3
Flygt Model #3102	5	4
Flygt Model #3085	3	1

PUMP INVENTORY

The City maintains an inventory of submersible pumps that are stored in a City facility located in Redwood Shores. In the event a pump becomes inoperable to one of the City's 31 lift station locations, the City will be able to immediately replace the inoperable pump with the designated pump within the inventory. The City also contracts out with Xylem Water Solutions for submersible pump repair and maintenance for all of the City's 62 submersible sewer pumps.

Plumbers & Sewer Contractors:

Your Actions Can Prevent Sanitary Sewer Overflows!

What are Sanitary Sewer Overflows or SSOs?
SSOs discharge untreated or partially treated human and industrial waste, debris and disease-causing organisms from the sanitary sewer onto the ground near and into homes and potentially into creeks, rivers, lakes or streams.

What are the impacts of SSOs?
SSOs may result in property damage, environmental damage and/or potential liability to you or your company. Allowing sewage to discharge to a gutter, storm drain or waterway may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up efforts and regulatory penalties.

Plomeros y Contratistas de Alcantarillado:

¡Sus Acciones Pueden Prevenir Desbordamientos de las Alcantarillas Sanitarias!

¿Qué son los Desbordamientos de las Alcantarillas Sanitarias o SSO (por sus siglas en inglés)?
Los SSO descargan desechos no tratados o tratados parcialmente humanos e industriales, desperdicios y organismos causantes de enfermedades desde las alcantarillas sanitarias a las viviendas y al terreno cercano, y potencialmente a los riachuelos, ríos, lagos y arroyos.

¿Cuál es el impacto de los SSO?
Los SSO pueden causar daños materiales, deterioro medioambiental y/o responsabilidad civil potencial para usted o su compañía. Permitir que las aguas residuales se viertan a la cuneta, alcantarillados o vías pluviales, puede resultar en sanciones y/o gastos de su bolsillo para pagarle a las ciudades o agencias públicas por la labor de limpieza y por sanciones de acuerdo a los reglamentos.

Who Do I Call to Avoid an SSO?

Help us help you…

If you require our free assistance to help clear root balls, grease blockages and other debris from a main sewer line to prevent an SSO or to open a manhole in our service area, please call us at:

(650) 780-7464 during regular business hours or **(650)-780-7190** for emergencies after hours, weekends & holidays.

Visit the City's website at:
www.redwoodcity.org/

¿A quién debo llamar para evitar que se produzca un SSO?

Ayúdenos a que le ayudemos…

Si requiere nuestra ayuda gratuita para ayudarle a limpiar las raíces, atascos de grasa y demás desperdicios del conducto principal con el fin de evitar que se produzca un SSO o para abrir un registro de inspección en nuestra área de servicio, sírvase llamarnos al:

(650) 780-7464 durante las horas de oficina normales o al **(650)-780-7190** para situaciones de emergencia a otras horas, los fines de semana y los días feriados.

Visite el sitio Web de la Ciudad en:
www.redwoodcity.org/

Recycled Stock • 10% Post Consumer Fiber • Acid Free • Soy Based Inks • 1/09

Plumbers & Sewer Contractors:

Your Actions Can Prevent Sanitary Sewer Overflows!

Plomeros y Contratistas de Alcantarillado:

¡Sus Acciones Pueden Prevenir Desbordamientos de las Alcantarillas Sanitarias!

Bay Area Clean Water Agencies

BAPPG

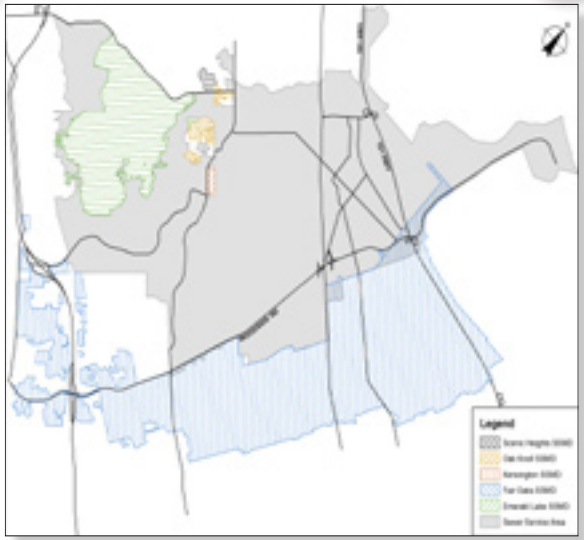
How can you prevent SSOs? *and avoid associated penalties & fines*

When clearing plugged sewer laterals:

- ☑ Whenever possible, remove root balls, grease blockages and any other debris; don't push debris from the lateral to the sewer main.
- ☑ If you can't prevent a root ball or other debris from entering the sewer main when working in our service area, please call Public Works Services, so we can work with you (free of charge) to remove the root ball from the sewer main to prevent blockages further downstream.
- ☑ Use plenty of water to flush lines.
- ☑ Don't open any manholes. Hazardous sewer gases from manholes are odorless, undetectable and can be deadly. Call Public Works Services to open manholes for you. Please note any discharging into a publicly-owned manhole requires a permit for the City. Start with a visit to the Community Development Services' (CDS) Public Counter at City Hall, or call **(650) 780-7350**.

When constructing sewer laterals:

- ☑ In the Redwood City service area, contact our Engineering Division for the construction specifications at **(650) 780-7380** and get your permit for the work from the Community Development Services' (CDS) Public Counter at City Hall or call **(650) 780-7350** and ask to speak with a Permit Technician
- ☑ Check your work area. Gravel, backfill material and test plugs can become lodged in the sewer line and cause blockages. Make sure no debris is left in the sewer line before you backfill.
- ☑ Avoid offset joints – offset joints make sewer lines vulnerable to root intrusion & grease accumulation, cause debris hang-ups and make lines harder to clean. Properly bed your joints and don't hammer tap.



¿Cómo puede evitar los SSO? *y evitar las sanciones y multas que acarrean*

Al limpiar los servicios domiciliarios de aguas residuales obstruidos:

- ☑ Siempre que sea posible, retire las raíces, atascos de grasa y demás desperdicios; no empuje los desperdicios de los servicios domiciliarios a la tubería principal.
- ☑ Si no puede evitar que las raíces u otros desperdicios entren en el canal principal al trabajar en nuestra área de servicio, sírvase llamar a los Servicios de Obras Públicas (Public Works Services) para que podamos colaborar con usted (sin cargo) para retirar las raíces de la tubería principal con el fin de evitar que se produzcan obstrucciones en puntos más adelante en la red.
- ☑ Utilice agua suficiente para destapar los conductos.
- ☑ No abra ningún registro de inspección del alcantarillado. Los peligrosos gases que emanan de los registros de inspección son inodoros, indetectables y pueden ser mortales. Llame a Public Works Services para que abran los registros.

Tenga en cuenta que toda descarga a los registros de inspección públicos requiere un permiso expedido por la Ciudad. Para empezar, visite el mostrador público de los Servicios de Desarrollo Comunitario (Community Development Services – CDS) ubicado en el Ayuntamiento, o llame al **(650) 780-7350**.

Al construir servicios domiciliarios de aguas residuales:

- ☑ En el área de servicio de Redwood City, póngase en contacto con la División de Ingeniería (Engineering Division) para conocer las especificaciones de construcción llamando al **(650) 780-7380** y obtenga el permiso para las obras en el mostrador público de los Servicios de Desarrollo Comunitario (CDS) ubicado en el Ayuntamiento, o llame al **(650) 780-7350** y hable con un Técnico de Permisos.
- ☑ Revise el área de las obras. La gravilla, el material de relleno y los tapones de prueba se pueden quedar alojados en el conducto de deshechos y causar atascos. Asegúrese de que no queden desechos en el conducto antes de aplicar el relleno.
- ☑ Evite las uniones desalineadas — las uniones desalineadas hacen vulnerables a la intrusión de raíces y la acumulación de grasa, producen dificultades en el paso de desperdicios y dificultan la limpieza de los conductos. Asiente correctamente las secciones de tubería sobre la rasante del terreno y no haga conexiones a golpe de martillo.

Element 6 Appendix

1. Sanitary Sewer Overflow and Backup Response Plan

City of Redwood City

Overflow Emergency Response Plan

Effective Date:	
Revised Date:	12-30-2013
Approved by:	Justin Chapel, Public Works Superintendent
Signature:	
Date:	12-30-2013

Prepared by David Patzer, DKF Solutions Group
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Sewer Spill Reference Guide ..... pamphlet
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Element 6: Sanitary Sewer Overflow Emergency Response Plan

6.1 Purpose

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

6.2 Policy

The City's employees are required to report all wastewater overflows found and to take the appropriate action to secure the wastewater overflow area, properly report to the appropriate regulatory agencies, relieve the cause of the overflow, 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 overflows as soon as possible following notification. The City will follow reporting procedures in regards to sewer spills as set forth by the San Francisco Regional Water Quality Control Board (*SFRWQCB)* and the California State Water Resources Control Board (*SWRCB)***.**

6.3 Definitions As Used In This OERP

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.

Private Lateral Sewage Discharges – Sewage discharges that are caused by blockages or other problems within a privately owned lateral.

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 that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.

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

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SSO Categories -

Category 1: Discharge of untreated or partially treated wastewater of any volume resulting from a sanitary sewer system failure or flow condition that either:

- Reaches surface water and/or drainage channel tributary to a surface water; or
- Reached a Municipal Separate Storm Sewer System (MS4) and was not fully captured and returned to the sanitary sewer system or otherwise captured and disposed of properly.

Category 2: Discharge of untreated or partially treated wastewater greater than or equal to 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 SSO discharged to the storm drain system was fully recovered and disposed of properly.

Category 3: All other discharges of untreated or partially treated wastewater resulting from a sanitary sewer system failure or flow condition.

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 SSOs.

Untreated or partially treated wastewater – Any volume of waste discharged from the sanitary sewer system upstream of a wastewater treatment plant headworks.

6.4 Regulatory Requirements for OERP Element of SSMP

GWDR Requirement

The collection system agency 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 Monitoring and Reporting Program (MRP). All SSOs 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 Emergency Response Plan and are appropriately trained;

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(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 United States and 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.

6.5 Goals

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

- Work safely;
- Respond quickly to minimize the volume of the SSO;
- Eliminate the cause of the SSO;
- 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 SSO;
- Meet the regulatory reporting requirements;
- Evaluate the causes of failure related to certain SSOs; and
- Revise response procedures resulting from the debrief and failure analysis of certain SSOs.

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6.6 SSO Detection

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

The City operates 31 wastewater pump/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.

6.6.1 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: http://www.redwoodcity.org/publicworks. The City's telephone number for reporting sewer problems is (650) 780-7464 during normal work hours, and (650) 780-7190 after hours.

Normal Work Hours
When a report of a sewer spill or backup is made during normal work hours, Public Works Administration receives the call, enters the information into the PublicStuff program and dispatches via pager to the Sewer Call Truck. Alternatively, the public can report an SSO/Backup online through PublicStuff on the City's web site or through the PublicStuff mobile app.

After Hours
After hours call are answered by Police Dispatch, which notifies the On-Call Employee.

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

- Time and date of call
- Specific location of potential problem
- Nature of call
- In case of SSO, 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

The following is an overview of receiving a sewage overflow or backup report:

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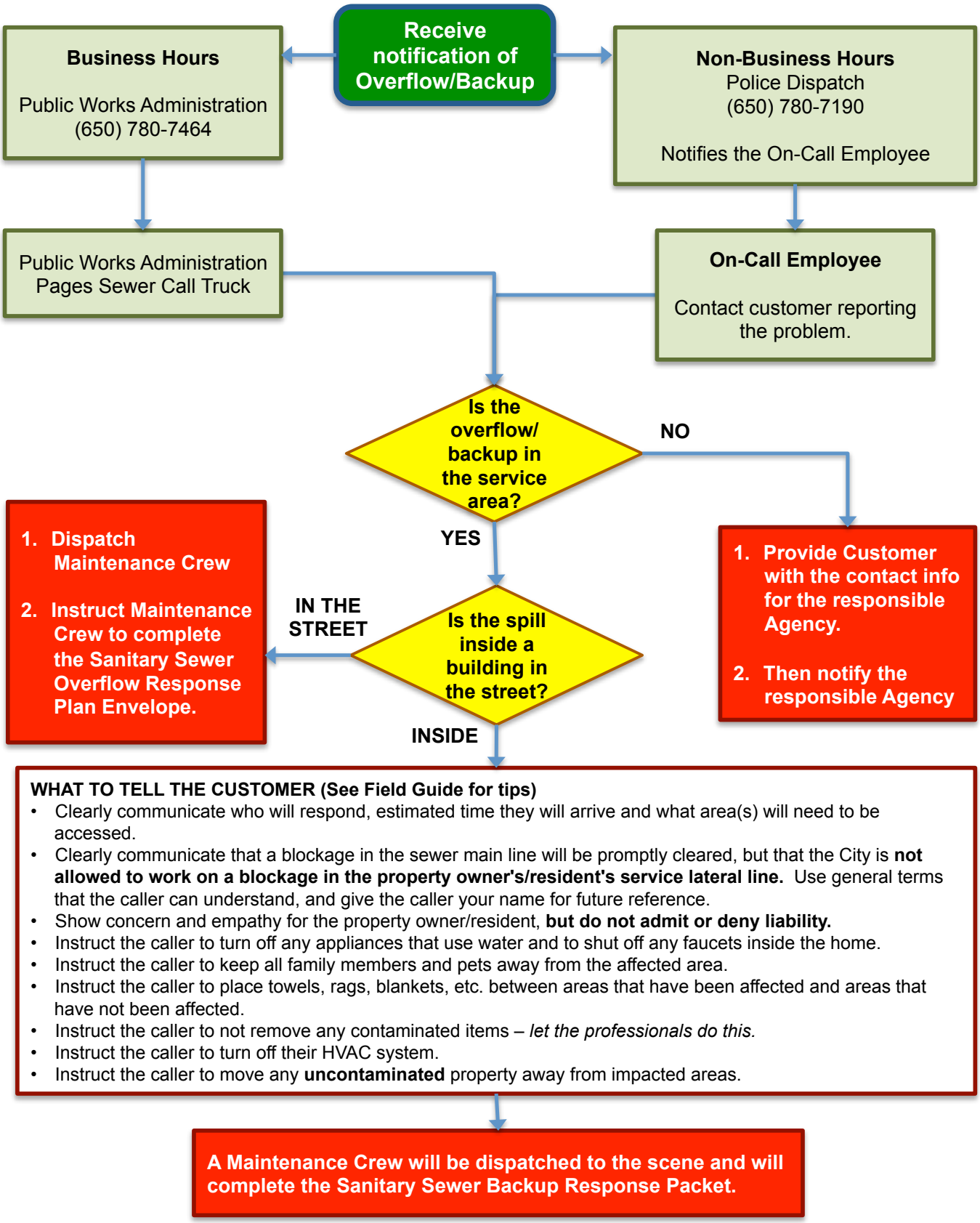

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6.6.2 CITY STAFF OBSERVATION

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 that, in turn, responds to emergency situations. Work orders are issued to correct non-emergency conditions.

6.6.3 CONTRACTOR OBSERVATION

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

1. Immediately notify the City
2. Protect storm drains
3. Protect the public
4. Provide Information to the City Maintenance Crew such as start time, appearance point, suspected cause, weather conditions, etc.
5. Direct ALL media and public relations requests to the Public Information Officer, Assistant Public Works Director and/or Public Works Superintendent.

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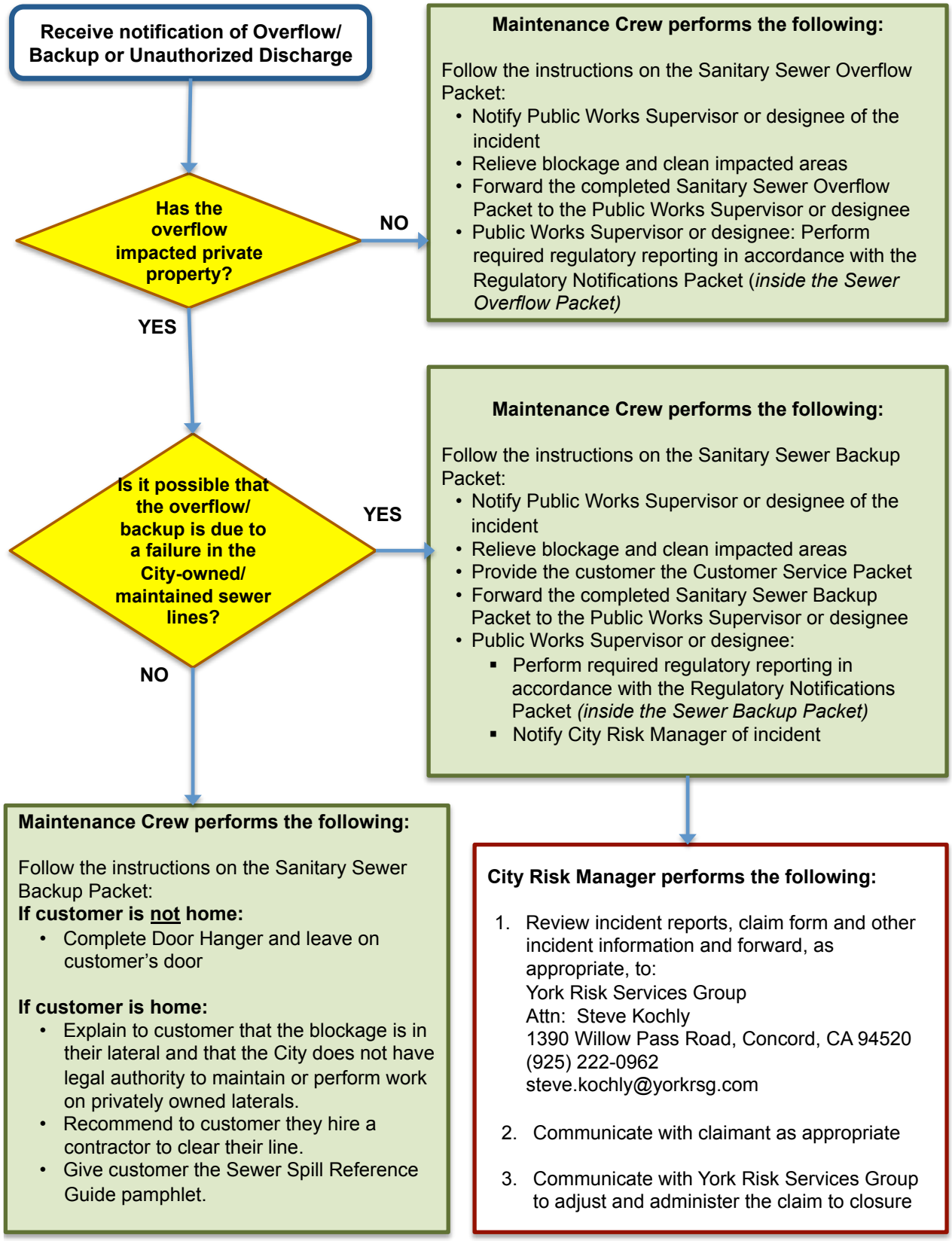
6.7 SSO Response Procedures

6.7.1 Sewer Overflow/Backup Response Summary



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6.7.2 First Responder Priorities

The first responder's priorities are:

- 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 Public Works Supervisor in event of major SSO.
- To return the spilled sewage to the sewer system.
- To restore the area to its original condition (or as close as possible).

6.7.3 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.

6.7.4 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 should:

- Note arrival time at the site of the overflow/backup.
- Verify the existence of a sewer system spill or backup.
- Determine if the overflow or blockage is from a public or private sewer.
- Identify and assess the affected area and extent 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.

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6.7.5 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 recur 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 assistance is required, immediately contact other employees, contractors, and equipment suppliers.

6.7.6 Initiate Spill Containment Measures

The first responder should 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/pump station.

6.8 Water Quality

6.8.1 Waters of the State

The following Waters of the State are in the City of Redwood City's service area. In the event that these waters are impacted by a sanitary sewer overflow, the City has identified the following response measures, equipment and vendors:

Water Body	Equipment	Vendors
Cordilleras Creek	Combo Trucks Trailer Trash Pumps Portable Pumps	Rain for Rent Clean Lakes Mutual Aid Contacts (SBSA – San Carlos – Belmont)
Redwood Creek	Combo Trucks Trailer Trash Pumps Portable Pumps	Rain for Rent Clean Lakes Mutual Aid Contacts (SBSA – San Carlos – Belmont)
San Francisco Bay	Not accessible for City equipment	Rain for Rent Clean Lakes
Belmont Slough	Not accessible for City equipment	Rain for Rent Clean Lakes
Steinberger Slough	Not accessible for City equipment	Rain for Rent Clean Lakes
Smith Slough	Not accessible for City equipment	Rain for Rent Clean Lakes
Westpoint Slough	Not accessible for City equipment	Rain for Rent Clean Lakes
Corkscrew Slough	Not accessible for City equipment	Rain for Rent Clean Lakes

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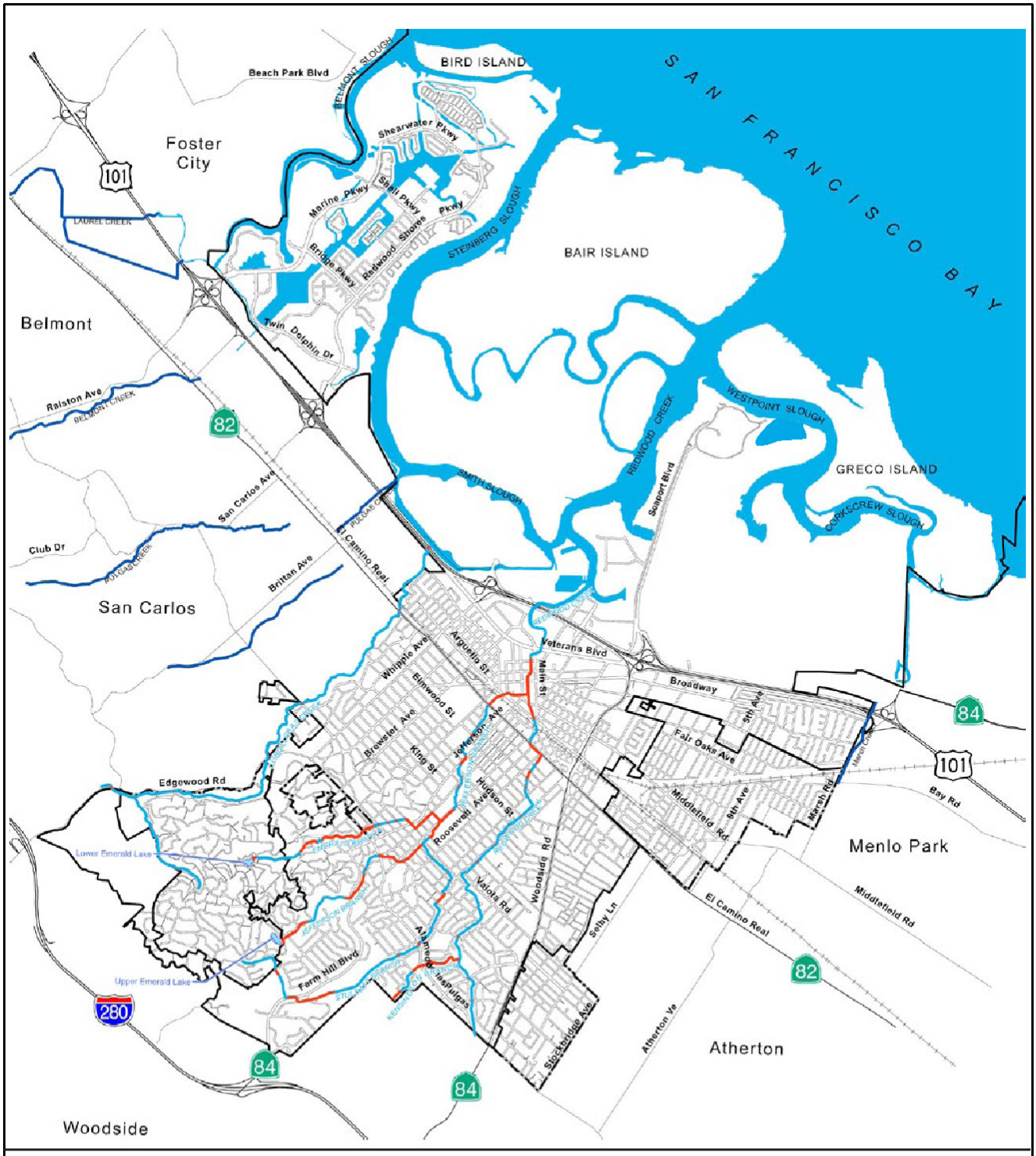

Legend

City Boundary	Creeks
Sphere of Influence	Below Ground
Freeway/Highway	Above Ground
Major Roads	Waterbodies
Railroad	Tidal Waters
Creeks (Outside City)	Lakes

Source: Nomad Ecology, 2009

NORTH

1 inch equals 5,500 feet

Feet
0 2,750 5,500

CirclePoint

Redwood City General Plan EIR

Creeks and Waterbodies

FIG **4-4.1**

Geografika Consulting 04.06.10

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6.8.2 Water Quality Sampling and Testing

Water quality sampling and testing will be performed whenever 50 gallons or more of spilled sewage enters a water body and is performed to determine the extent and impact of the SSO. The water quality sampling procedures are:

- The first responders should call to have samples collected as soon as possible after the discovery and mitigation of the SSO event.
  - For Impacted Creeks/Channels: Storm Drain Maintenance Leader
    Pager: (650) 216-0731 Cell: (650) 740-7450
  - For Impacted Lagoons: Storm Drain Maintenance Utilities Specialist
    Pager: (650) 216-0730 Cell: (650) 740-7451

- The water quality samples should 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 should be collected near the point of entry of the spilled sewage.

- The samples shall then be brought to the San Mateo County Environmental Health Lab.

6.8.3 Water Quality Monitoring Plan

A Water Quality Monitoring Plan will be implemented immediately upon discovery of any Category 1 SSO of 50,000 gallons or more in order to assess impacts from SSOs to surface waters. The SSO 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, access restrictions, 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 SSO 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 48 hours of the City becoming aware of the SSO, require water quality sampling for ammonia and enterococcus.

6.8.4 SSO Technical Report

The City will submit an SSO Technical Report in the CIWQS Online SSO Database within 45 calendar days of the SSO end date for any SSO in which 50,000 gallons or greater are spilled to surface waters. This report, which does not preclude the Water Boards from requiring more detailed analyses if requested, shall include at a minimum, the following:

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Causes and Circumstances of the SSO:

- Complete and detailed explanation of how and when the SSO was discovered.
- Diagram showing the SSO 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 SSO and, if applicable, the SSO volume recovered.
- Detailed description of the cause(s) of the SSO.
- Copies of original field crew records used to document the SSO.
- Historical maintenance records for the failure location.

City's Response to SSO:

- Chronological narrative description of all actions taken by the City to terminate the spill.
- Explanation of how the SSMP Overflow Emergency Response Plan was implemented to respond to and mitigate the SSO.
- 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.

6.9 Recovery and Cleanup

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

6.9.1 Estimate the Volume of Spilled Sewage

Use the methods outlined in the Field Guide to estimate the volume of the spilled sewage. Wherever possible, document the estimate using photos of the SSO site before and during the recovery operation.

6.9.2 Recovery of Spilled Sewage

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

6.9.3 Clean-up and Disinfection

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

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Private Property
City crews are responsible for the cleanup when the property damage is minor in nature and is outside of private building dwellings. 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, City claim forms may be issued if requested by the property owners.

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 until the water runs clear. 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 should 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 as appropriate in the event of:

- Fish kill
- SSO greater than or equal to 1,000 gallons

Fish and Wildlife will provide the professional guidance needed to effectively clean up spills that occur in these sensitive environments. Clean up should proceed quickly in order to minimize negative impact. Sewage causes depletion of dissolved oxygen, which will kill aquatic life. Any water that is used in the cleanup should be de-chlorinated prior to use.

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.

6.10 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 Public Works Supervisor will use his/her 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, Public Works Supervisor, or designee.

Creeks, streams and beaches that have been contaminated as a result of an SSO will be posted at visible access locations until the risk of contamination has subsided to acceptable background

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bacteria levels. The warning signs, once posted, will be checked every day to ensure that they are still in place. Photographs of sign placement will be taken.

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

When contact with the local media is deemed necessary, the Public Information Officer, Assistant Public Works Director and/or Public Works Superintendent will provide the media with all revelvant information.

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6.11 Failure Analysis Investigation

The objective of the failure analysis investigation is to determine the "root cause" of the SSO and to identify corrective action(s) needed that will reduce or eliminate future potential for the SSO to recur.

The investigation should include reviewing all relevant data to determine appropriate corrective action(s) for the line segment. The investigation should include:

- Reviewing and completing the Sewer Overflow Report,
- Reviewing the incident timeline and other documentation regarding the incident,
- Reviewing communications with the reporting party and witness.
- Review 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 the line segment immediately following the SSO and reviewing the video and logs,
- Reviewing any FOG related information or results

The product of the failure analysis investigation should be the determination of the root cause and the identification of the corrective actions. The Collection System Failure Analysis Form should be used to document the investigation.

6.12 Post SSO Event Debriefing

Every SSO event is an opportunity to evaluate the response and reporting procedures. Each overflow event is unique, with its own elements and challenges including volume, cause, location, terrain, and other parameters.

As soon as possible after Category 1 and Category 2 SSO events, all of the participants, from the person who received the call to the last person to leave the site, should meet to review the procedures used and to discuss what worked and where improvements could be made in responding to and mitigating future SSO events. The results of the debriefing should be recorded and tracked to ensure the action items are completed.

6.13 Notification, Reporting, Monitoring and Recordkeeping Requirements

In accordance with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (SSS WDRs), the City of Redwood City 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 SSO, field crew response operations, and site conditions after field crew SSO 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 overflow were calculated

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ELEMENT	REQUIREMENT	METHOD
NOTIFICATION	Within two hours of becoming aware of any Category 1 SSO 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	• Category 1 SSO: The City will submit draft report within three business days of becoming aware of the SSO and certify within 15 calendar days of SSO end date. • Category 2 SSO: The City will submit draft report within 3 business days of becoming aware of the SSO and certify within 15 calendar days of the SSO end date. • Category 3 SSO: The City will submit certified report within 30 calendar days of the end of month in which SSO the occurred. • SSO Technical Report: The City will submit within 45 calendar days after the end date of any Category 1 SSO in which 50,000 gallons or greater are spilled to surface waters. • "No Spill" Certification: The City will certify that no SSOs occurred within 30 calendar days of the end of the month or, if reporting quarterly, the quarter in which no SSOs occurred. • Collection System Questionnaire: The City will update and certify every 12 months	Enter data into the CIWQS Online SSO Database[1] (http://ciwqs.waterboards.ca.gov/), certified by the Legally Responsible Official(s)[2]. All information required by CIWQS will be captured in the Sanitary Sewer Overflow Report. Certified SSO reports may be updated by amending the report or adding an attachment to the SSO report within 120 calendar days after the SSO end date. After 120 days, the State SSO Program Manager must be contacted to request to amend an SSO report along with a justification for why the additional information was not available prior to the end of the 120 days.
WATER QUALITY MONITORING	The City will conduct water quality sampling within 48 hours after initial SSO notification for Category 1 SSOs in which 50,000 gallons or greater are spilled to surface waters.	Water quality results will be uploaded into CIWQS for Category 1 SSOs in which 50,000 gallons or greater are spilled to surface waters.
RECORD KEEPING	The City will maintain the following records: • SSO event records. • Records documenting Sanitary Sewer Management Plan (SSMP) implementation and changes/updates to the SSMP. • Records to document Water Quality Monitoring for SSOs of 50,000 gallons or greater spilled to surface waters. • Collection system telemetry records if relied upon to document and/or estimate SSO Volume.	Self-maintained records shall be available during inspections or upon request.

For reporting purposes, if one SSO event of whatever category results in multiple appearance points in a sewer system, a single SSO report is required in CIWQS that includes the GPS coordinates for the location of the SSO appearance point closest to the failure point, blockage or location of the flow condition that cause the SSO, and descriptions of the locations of all other discharge points associated with the single SSO event.

[1] In the event that the CIWQS online SSO database is not available, the Public Works Supervisor 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 SSO 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 SSO 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.

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6.14 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 SSO
- Narrative description describing the complaint
- A statement from the complainant or informant, if they know, of whether or not the potential SSO may have reached waters of the state
- Name, address, and contact telephone number of the complainant or informant reporting the potential SSO (if not reported anonymously)
- Follow-up return contact information for each complaint received (if not reported anonymously)
- Final resolution of the complaint
- Work service request information used to document all feasible and remedial actions taken

The procedure is as follows:

1. Public Works Administration receives the call, enters the information into the PublicStuff program, and dispatches via pager to the Sewer Call Truck. Alternatively, the public can report an SSO/Backup online through PublicStuff on the City's web site or through the PublicStuff mobile app.

2. The Maintenance Crew will respond to service request and complete the Sanitary Sewer Overflow Report.

3. The Maintenance Crew will forward the SSO Report to the Public Works Supervisor. S/he will review, add/complete any missing info and initiate an SSO file. Once any regulatory reporting required is completed, s/he will close and archive the file in hardcopy and electronic format.

4. Public Works Supervisor will archive the service call request (work order/SSO Report/Other) in hardcopy and electronically.

All records will be maintained for a minimum of five years whether or not they result in an SSO.

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6.15 Equipment

This section provides a list of specialized equipment that is required to support this Overflow Emergency Response Plan.
Closed Circuit Television (CCTV) Inspection Unit – A CCTV Inspection Unit is required to determine the root cause for all SSOs 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 should 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 SSO.
- *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 SSO event.

The following equipment may be necessary in the event of a sanitary sewer overflow or backup:

Equipment	Standard Operating Procedure Location
Rigid Portable Rodder	Wastewater dayroom and repair work truck vehicle
CCTV Equipment	Wastewater dayroom and repair work truck vehicle
Sewer Lateral Repair	Wastewater dayroom and repair work truck vehicle
Main Line Rodder	Wastewater dayroom and repair work truck vehicle
Vacuum Truck	In vehicle

6.16 SSO Response Training

This section provides information on the training that is required to support this Overflow Emergency Response Plan.

6.16.1 Initial and Annual Refresher Training

All City personnel who may have a role in responding to, reporting, and/or mitigating a sewer system overflow should receive training on the contents of this OERP. All new employees should receive training before they are placed in a position where they may have to respond. Current employees should receive annual refresher training on this plan and the procedures to be followed.

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Affected employees will receive annual training on the following topics by knowledgeable trainers:

- The City's Overflow Emergency Response Plan
- SSO Volume Estimation Techniques
- Researching and documenting SSO Start Times
- Impacted Surface Waters: Response Procedures
- SWRCB Employee Knowledge Expectations
- Employee Core Competency Evaluations

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 should be able to answer the following:

- Please briefly describe your name and job title.
- Please describe for us approximately when you started in this field and how long you have worked for your agency.
- Please expand on your current position duties and role in responding in the field to any SSO complaints.
- Please describe your SOPs used to respond/mitigate SSOs when they occur.
- Describe any training your agency provides or sends you to for conducting spill volume estimates.
- We are interested in learning more about how your historical SSO 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.
- Historically, before any recent changes, can you please walk us through how you would typically receive and respond to any SSO complaints in the field?
- Can you tell us who is responsible for estimating SSO volumes discharged? If it is you, please describe how you go about estimating the SSO volume that you record on the work order/service request forms?
- What other information do you collect or record other than what is written on the work order form?
- Describe if and when you ever talk with people that call in SSOs (either onsite or via telephone) to further check out when the SSO might have occurred based on what they or others know? If you do this, can you tell us where this information is recorded?
- We understand you may be instructed to take pictures of some sewer spills/backups into structures. Other than these SSOs, when else would you typically take any pictures of an SSO?
- Please walk us through anything else you'd like to add to help us better understand how your field crews respond and mitigate SSO complaints.

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6.16.2 SSO Response Drills

Periodic training drills should 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, force main failure, pump station failure, and lateral blockage). The results and the observations during the drills will be recorded and action items should be tracked to ensure completion.

6.16.3 SSO Training Record Keeping

Records should be kept of all training that is provided in support of this plan. The records for all scheduled training courses and for each overflow emergency response training event and will include date, time, place, content, name of trainer(s), and names of attendees.

6.16.4 Contractors Working On City Sewer Facilities

All contractors working on City sewer facilities will be required to develop a project-specific OERP. All contractor personnel will be required to receive training in the contractor's OERP and to follow that OERP in the event that they cause or observe an SSO.

6.17 Authority

- 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

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Contractor Orientation

The following procedures are to be followed in the event that you cause or witness a Sanitary Sewer Overflow.

Contractor causes or witnesses a Sanitary Sewer Overflow

↓

Immediately notify the City
Business Hours: (650) 780-7464
After Hours: (650) 780-7190

↓

Protect the storm drains
using mats, dykes, berms, etc.

↓

Protect the Public
If the spill is entering an area where public contact may occur, and if it is safe to do so, monitor the location until the City Maintenance Crew arrives.

↓

Provide Information
Provide the City Maintenance Crew with information about the overflow such as start time, appearance point, suspected cause, weather conditions, etc.

↓

Direct ALL media and public relations requests to:

- Sheri Costa-Batis, Public Information Officer: (650) 780-7305 or (650) 780-7300
- Terence Kyaw, Assistant Public Works Director: (650) 780-7466
- Justin Chapel, Public Works Superintendent: (650) 780-7469

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Sanitary Sewer Overflows

How to avoid them and what to do if you don't

What? A sanitary sewer overflow (SSO) is a discharge of untreated human and industrial waste before it reaches the wastewater treatment facility.

Where? SSOs usually occur through manholes, plumbing fixtures and service cleanouts.

Why? SSOs are usually caused by grease, debris, root balls, or personal hygiene products blocking the sewer lines, or by unusually high flow volume.

If you cause or witness an SSO, immediately contact:

City of Redwood City

Business Hours: **(650) 780-7464**

After Hours (Police Dispatch): **(650) 780-7190**

How to prevent SSOs:

...when clearing plugged sewer laterals:

- Remove root balls, grease blockages and any other debris from the sewer
- If you can't prevent root balls, grease or debris from entering the sewer main, call us at (650) 780-7464, so we can work with you to remove the blockage and prevent blockages further downstream
- Use plenty of water to flush lines.

...when constructing or repairing sewer laterals:

- Contact Building Permit Information at (650) 780-7350 for a permit and lateral specifications.
- Check your work area. Make sure there is no debris left in the sewer line before you backfill.
- Avoid offset joints, which may make sewer lines vulnerable to root intrusion and grease or debris accumulation. Properly bed your joints and don't hammer tap.

Redwood City Public Works Services Department, 1400 Broadway, Redwood City California 94063 (650) 780-7464

Sanitary Sewer Overflows

How to avoid them and what to do if you don't

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- Avoid offset joints, which may make sewer lines vulnerable to root intrusion and grease or debris accumulation. Properly bed your joints and don't hammer tap.

If you cause or witness an SSO, immediately contact:

City of Redwood City

Business Hours:

(650) 780-7464

After Hours (Police dispatch):

(650) 780-7190

City of Redwood City

Public Works Services Department
1400 Broadway
Redwood City, California 94063

www.redwoodcity.org

The following assets need to be monitored and inspected prior to, during, and following an extreme weather event or natural disaster:

Critical Asset	Location	Access issues	Description of what to monitor and inspect	Plan to monitor for reliable operation	Plan to ensure reliable operation	Inspection following event/ disaster
Sewer Lift Stations (31)	Various - Refer to Sewer Lift Station Emergency Response Plans					
Force Main	**Sewer Lift Station #10** 1. 14" ACP sewer force main at 747 Davit Lane, east to Shell Pkwy 2. 14" ACP sewer force main at Shell Pkwy to Redwood Shores Pkwy 3. 18" ACP sewer force main at Redwood Shores Pkwy to Seastorm Dr. 4. 18" ACP sewer force main at Seastrom Dr., across Redwood Shores Pkwy, down to levy to SBSA (South Bayside Systems Authority) **Marina** 1. 10" ACP sewer force main at Seaport Ct. on Seaport Blvd. 2. 10" ACP sewer force main at Seaport Blvd. to Blomquist St. 3. 10" ACP sewer force main at Blomquist to Maple St. **Pacific Shores #1** 1. 14" PVC sewer force main at Pacific Shores to Lyngso Ct., on Seaport Blvd.	N/A	Street surface water, undermining	Inspect as required		Daily

(continued on next page)

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(continued from previous page)

Critical Asset	Location	Access issues	Description of what to monitor and inspect	Plan to monitor for reliable operation	Plan to ensure reliable operation	Inspection following event/ disaster
Air Release Valves	**Pacific Shores No.1**- 5 Air Release Valves 1. Approx. 100' from Pump Station in corner of parking lot. MODEL APCO 200- 2" INLET & 1" OUTLET 2. 42' from reclaimed water valves in fast lane heading west on Seaport Blvd. from Pacific Shores and Hinman Road intersection. MODEL APCO 200- 2" INLET & 1" OUTLET 3. 88' from the most western PG&E power pole in the center median on Seaport Blvd. MODEL APCO 200- 2" INLET & 1" OUTLET 4. 172' from middle of intersection in the east bound slow lane, west of the intersection on Seaport Blvd. MODEL APCO 200- 2" INLET & 1" OUTLET 5. In westbound turn lane going into Lyngso on Seaport Blvd. MODEL APCO 446-2, 2" INLET & 2" OUTLET **Pacific Shores No. 2** - 1 Air Release Valve 1. 143' from ARV #1 of P.S. #1 (On Seaport Blvd.) APCO MODEL 144/1461200 2" **Sanitary Sewer lift Station #25** - 1 Air Release Valve 1. 575' from middle of intersection of Bridge Pkwy & Island Drive, on Island Drive CRISPEN MODEL - 36/21/28L **Sanitary Sewer Pump Station #12**- 2 Air Release Valves 1. On Shell Pkwy in center median at lagoon crossing. APCO MODEL- 445-2 2. Southwest corner of Davit & Shell Pkwy. APCO MODEL- 445-2 *(continued on next page)*	N/A	Street surface water	Inspect as required	PM Service as Required	Daily

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	(continued from previous page) **Sanitary Sewer Lift Station #15**- 1 Air Release Valve 1. Adjacent to Wetwell. MODEL APCO 200- 2" INLET & 1" OUTLET **Sanitary Sewer Pump Station #10**- 5 Air Release Valves 1. Adjacent to Wetwell. APCO MODEL - 445-2 2. 113' from corner of Shell Pkwy in sidewalk area of north side of Redwood Shores Pkwy. APCO MODEL - 445-2 3. Northwest corner of Redwood Shores Pkwy & Avocet. APCO MODEL 144/1461200 2" 4. Redwood Shores Pkwy/ northside sidewalk at lagoon crossing between Avocet & Egret. APCO MODEL - 445-2 5. Redwood Shores Pkwy/ northside sidewalk at bus stop west of Egret. APCO MODEL - 445-2					
Gate Valves	Redwood Shores Parkway – 150 feet East of Avocet Drive	Removal of Grates	8" and 18" valves	Inspect as required	PM Service as Required	Daily
48-inch RCP Truck Line underneath Freeway 101	Dead End of Walnut Street (at Int. 101)	N/A	Flow inside sewer manhole	Inspect as required		Daily

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REGULATORY NOTIFICATIONS PACKET

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Instructions:

1. Receive call from on-site Maintenance Crew reporting a Sanitary Sewer Overflow.
2. Open this packet.
3. Refer to the Regulatory Reporting Guide for instructions.
4. Use the SSO Reporting Checklist (RN-2) for the appropriate category of spill to document that all notifications are made according to the reporting schedule.

Contents:

Form **Page Number**

Regulatory Reporting Guide RN-1

Reporting Checklist ..... -2

RWQCB Notification Fax ..... -3

Print on 6”x9” envelope

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Reporting Instructions				
Deadline	**See reverse side for contact information and definitions of the categories** of spills of untreated or partially treated wastewater from publically owned sanitary sewer system			**Spill from Private Lateral**
	Category 1	**Category 2**	**Category 3**	
2 hours after awareness of SSO	• If SSO is greater than or equal to 1,000 gallons, call CalOES at (800) 852-7550. • Notify San Mateo County Environmental Health Services • Make Internal Notifications if applicable (see Side B)	Notify San Mateo County Environmental Health Services	-	-
48 Hours after awareness of SSO	If 50,000 gal or more were not recovered, begin water quality sampling and initiate impact assessment	-	-	-
3 Days after awareness of SSO	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*. Update as needed until 120 days after SSO end time	Certify Spill Report in the CIWQS* database. Update as needed until 120 days after SSO end time	-	-
30 Days after end of calendar month in which SSO occurred	-	-	Certify Spill Report in the CIWQS* database. Update as needed until 120 days after SSO end time	-
45 days after SSO end time	If 50,000 gal or more were not recovered, submit SSO Technical Report using CIWQS*	-	-	-

* In the event that the CIWQS online SSO database is not available, do the following until the CIWQS online SSO database becomes available: (See contact information on Side B)

1. Make required notifications to the San Francisco Regional Water Quality Control Board (SFRWQCB office) using RN-3, and
2. Notify the State Water Resources Control Board (SWRCB) by phone or email

Note: For reporting purposes, if one SSO event results in multiple appearance points, complete one SSO report in the CIWQS SSO Online Database, and report the location of the SSO failure point, blockage or location of the flow condition that caused the SSO, in the CIWQS SSO Online Database, including all the discharge points associated with the SSO event.

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Internal Notifications

- For impacted lagoons/slough or San Francisco Bay, contact: Utilities Specialist – Storm:
  Cell: (650) 740-7451 Pager: (650) 216-0730

- For Pump Station and Force Main SSOs/Issues, contact: Utilities Specialist – Sewers:
  Cell: (650) 740-4941 Pager: (650) 216-0727

Contact Information

Contact	Telephone/Fax/Email
San Mateo County Environmental Health Services City Contact: Greg Smith	Telephone: (650) 599-1679
San Francisco Regional Water Quality Control Board	Telephone: (510) 622-2300 Fax: (510) 622-2460
State Water Resources Control Board (SWRCB):	
Russell Norman, P.E.	(916) 323-5598 Russell.Norman@waterboards.ca.gov
Victor Lopez, Water Resources Control Engineer	(916) 323-5511 Victor.Lopez@waterboards.ca.gov

Authorized Personnel

The following City personnel are authorized to perform regulatory reporting:

Name	Job Title	Telephone	✔ If LRO*
Justin Chapel	Public Works Superintendent	(650) 780-7469	✔
Terence Kyaw	Assistant Public Works Director	(650) 780-7466	✔
	Public Works Supervisor	(650) 780-7477	
Maintenance crew members are authorized to make the CalOES 2-hour notification if the LROs are not available.			

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

Definitions of Spill Categories

The response crew will complete the SSO Report form in the SSO Packet to document how category was determined.

Category	Definition
Category 1:	Discharge of untreated or partially treated wastewater of any volume resulting from a sanitary sewer system failure or flow condition that either: • Reaches surface water and/or drainage channel tributary to a surface water; or • Reached a Municipal Separate Storm Sewer System (MS4) and was not fully captured and returned to the sanitary sewer system or otherwise captured and disposed of properly.
Category 2:	Discharge of untreated or partially treated wastewater greater than or equal to 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 SSO discharged to the storm drain system was fully recovered and disposed of properly.
Category 3:	All other discharges of untreated or partially treated wastewater resulting from a sanitary sewer system failure or flow condition

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Use this Checklist for Category 1 SSOs only

STEP 1: Receive call from crew.

☐ Confirm whether or not they have notified CalOES. If so, complete the information in Step 2.

STEP 2: 2-hour Notification

☐ If SSO is greater than or equal to 1,000 gallons, notify CalOES within 2 hours of the time the agency was notified of the spill: (800) 852-7550

- Date Called: _____
- Time called: _____:_____ ☐AM ☐PM
- CalOES Control number: _____

☐ Notify San Mateo County Environmental Health Services

☐ Make Internal Notifications if applicable (see RN-1 Side B)

STEP 3: Within 48-Hours after awareness of SSO

☐ Only if 50,000 gallons or more was not recovered, implement Water Quality Monitoring Plan.

STEP 4: Within 3 Days after awareness of SSO

☐ Submit a Draft Spill Report using the CIWQS online reporting database.

STEP 5: Within 15 Days after response conclusion

☐ Certify the Spill Report using the CIWQS online reporting database. Updates to the Spill Report may be made for up to 120 days following the conclusion of the SSO Response.

STEP 6: Within 45 Days after SSO end time

☐ Within 45 days after the conclusion of the SSO Response, submit an SSO Technical Report using the CIWQS online reporting database only if 50,000 gallons or more was spilled to surface waters.

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Use this Checklist for Category 2 and 3 SSOs only

STEP 1: Receive call from crew.

STEP 2: Make notifications if applicable

- ☐ Notify San Mateo County Environmental Health Services (Category 2 only)
- ☐ Make Internal Notifications if applicable (see RN-1 Side B)

STEP 3: Submit Draft Spill Report (Category 2 only)

- ☐ Submit a Draft Spill Report using the CIWQS online reporting database within 3 days after awareness of Category 2 SSO.

STEP 4: Certify Spill Report

- ☐ Certify the Spill Report using the CIWQS online reporting database:
  - Category 2 SSO: Within 15 days after the conclusion of the response
  - Category 3 SSO: Within 30 days after the end of the calendar month in which the SSO occurred

- ☐ Updates to the Spill Report may be made for up to 120 days following the conclusion of the SSO Response.

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City of Redwood City
Overflow Emergency Response Plan

Regional Water Quality Control Board Notification Fax

RN-3

NOTE TO Redwood City Staff: Only use this form in the event that the CIWQS online SSO database is not available

FAX TO: San Francisco Regional Water Quality Control Board
Fax Number: (510) 622-2460

Date: _____
Pages: _____

FROM: City of Redwood City
Telephone: (650) 780-7464
Fax: (650) 780-7445

Address of SSO: _____ City: _____

County: _____ Date/Time: _____

SSO Start Time: _____ SSO Stop Time: _____

Volume of SSO: _____ Volume Recovered: _____

Final Disposition: _____

_____

Affected Water Body: _____

Samples Collected? ☐YES ☐NO

Taken to: _____

Crew Members: _____

Agencies Notified	Number(s)		Contact	Time	Date
CalOES	(800) 852-7550	☐YES ☐NO	_____	_____	_____
CIQWS		☐YES ☐NO	_____	_____	_____

OTHER: _____

_____

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BACKUP PACKET

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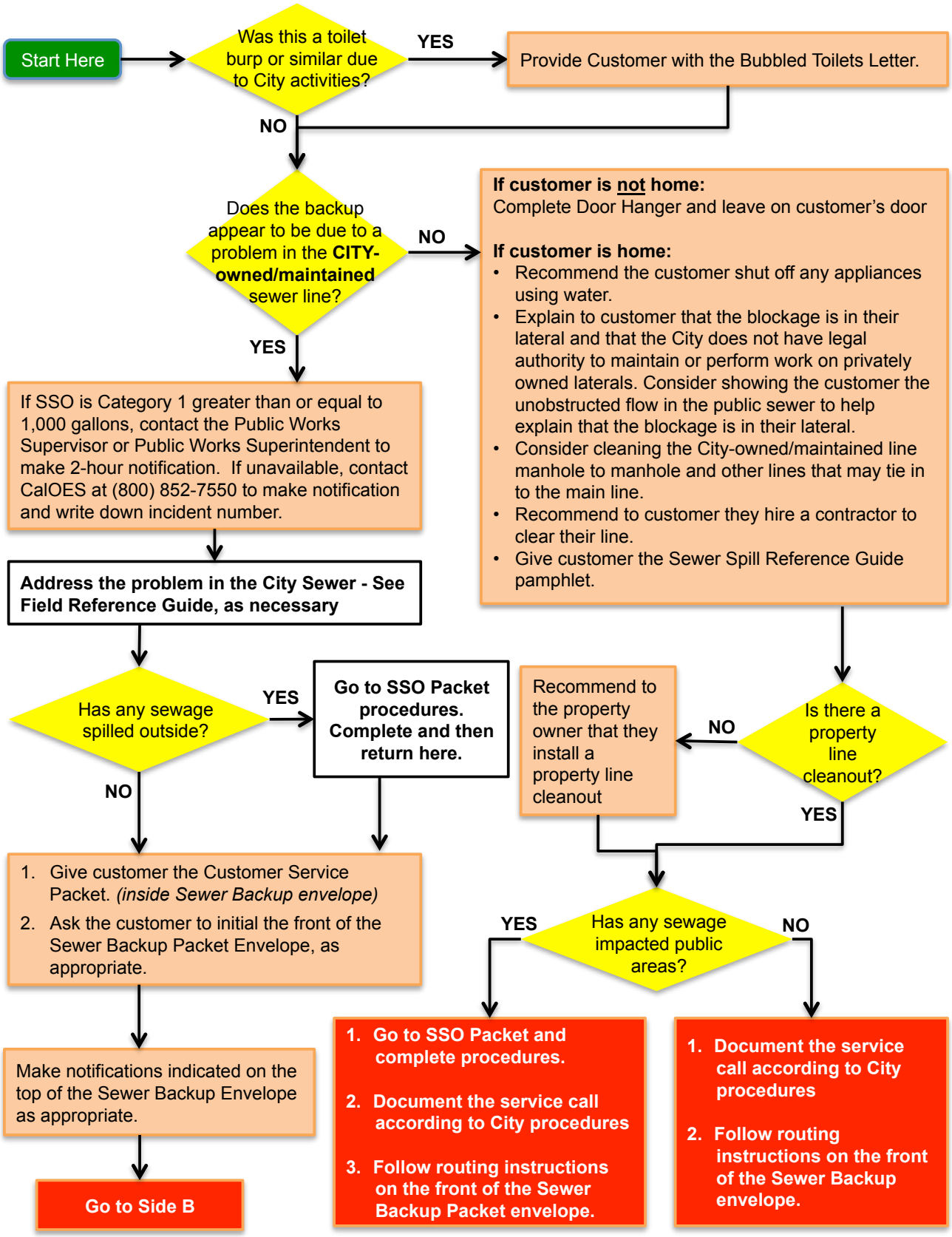
Backup Response Flowchart

BP-1
Side A



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Backup Response Flowchart

Continue Here From Side A

Does the customer want cleaning service?

NO

1. Have Customer sign the Cleaning Declination form *(inside Sewer Backup envelope).*
2. Ask permission to photograph the affected area. If they decline, note on the Cleaning Declination form.
3. Give the customer the bottom copy of the form and put other copies in the Sewer Backup envelope.

YES

1. Call for a restoration/remediation team. See Sewer Backup Packet Envelope for contact information.
2. Wait for restoration team to arrive, if possible.
3. Clean/disinfect any overflow **outside** of the building. **Note:** DO NOT allow any disinfectants to escape to storm drains.

Remove the First Responder form from the Sewer Backup Packet envelope and complete as much as possible. Immediately contact Steve Kochly (*York Risk Services Group Client Services Representative)* at (925) 222-0962 and provide the information from the completed First Responder Form.

Can you locate a backwater prevention device (BPD) or cleanout on the affected building?

YES

Ask for permission to photograph the backwater prevention device or cleanout and photograph, if allowed.

NO

Do you want the lateral televised? (if applicable)

YES

1. Schedule televising of the lateral as soon as possible
2. Complete Lateral TV Report

NO

1. **Complete the Sanitary Sewer Overflow Report if not already completed as part of the SSO Packet.**
2. **Document the service call according to City procedures.**
3. **Complete the remaining instructions in the Maintenance Crew box on the front of the Sewer Backup Packet envelope.**
4. **Follow routing instructions as indicated on the front of the Sewer Backup Packet envelope.**

MEDIA AND PUBLIC RELATIONS GUIDELINES:

Exercise caution in contacts with the public or media when you respond to a spill. Any information you provide or statements you make may become pertinent in the event of possible court action, it is important to AVOID THE FOLLOWING:

- Giving out the wrong information,
- Speculating about the situation you are responding to
- Making accusations against customers, businesses or other agencies
- Providing incorrect facts about a company or other agency

Be courteous and attempt to provide accurate information to questions within the limits above. In some cases, it may be appropriate to say that we do not have any information, or to delay answering a question and then to say when an answer might be available.

In most cases, refer media requests to the media coordinator indicated on the front of the Sewer Overflow Packet envelope.

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In the event of a Sewer Backup into a home/business
READ THIS FIRST

Trigger	Contact Immediately	Telephone
☐ **For all backups into/onto private property possibly due to problems in the public sewer**	Public Works Supervisor	(650) 780-7477
☐ **For restoration/remediation**	Restoration Management ServiceMaster	(800) 400-5058 (650) 299-9080

☐ **For any media requests:**

Sheri Costa-Batis
Public Information Officer
(650) 780-7305 or (650) 780-7300

Terence Kyaw
Assistant Public Works Director
(650) 780-7466

Justin Chapel
Public Works Superintendent
(650) 780-7469

Instructions

Maintenance Crew

1. **Open this envelope.**
2. **Follow instructions on BP-1 Backup Response Flowchart.**
3. **If Category 1 SSO greater than or equal to 1,000 gallons, contact CalOES at (800) 852-7550.**
4. **If the backup appears to be due to a failure in the City-owned sewer line & the customer is home, give them the Customer Service Packet and have them initial this envelope below:**
   Customer acknowledges receipt of Customer Service Packet: _____

   If customer is not home, complete the Door Hanger and hang it on the customer's door.
5. **Complete the Chain of Custody record (right) and forward this packet to the Public Works Supervisor.**

Public Works Supervisor

1. **Open this envelope. Review forms.**
2. **Forward the Regulatory Notifications Packet to the person authorized to make required notifications (enter name and title of that individual to the right).**
3. **Complete the Claims Submittal Checklist (enclosed)**
4. **Copy all items on the Claims Submittal Checklist for internal archiving purposes and forward the originals to the City Risk Manager**
5. **Debrief using the Collection System Failure Analysis Form.**

City Risk Manager

Refer to Claims Handling Procedure Summary

Chain of Custody

_____
Print Name

_____
Initial

_____ _____
Date Time

_____
Print Name

_____
Initial

_____ _____
Date Time

Regulatory Notification Packet given to:

_____
Name

_____
Title

City of Redwood City
Sanitary Sewer Overflow and Backup Response Plan

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Form	Form Number
Instructions and Chain of Custody	envelope label
Backup Response Flowchart	BP-1
Bubbled Toilets Letter	-2
Declination of Sewage Cleaning Services	-3
First Responder Form	-4
Lateral TV Report	-5
Sewer Overflow Report	-6
Claims Submittal Checklist	-7
Collection System Failure Analysis Form	-8
Customer Service Packet	
Instructions	envelope
Customer Information	CS-1
Sewer Spill Reference Guide	pamphlet
Regulatory Notifications Packet	
Instructions	envelope
Regulatory Reporting Guide	RN-1
Category 1 SSO Reporting Checklist	-2a
Category 2 & 3 SSO Reporting Checklist	-2b
RWQCB Reporting Fax	-3
Door Hanger	n/a
Sewer Spill Reference Guide	pamphlet

For pre-assembled packets contact DKF Solutions Group at 707.373.9709 or losscontrol@sbcglobal.net

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Dear City of Redwood City Customer,

Thank you for informing us that your toilet bubbled while our crews were working in proximity of your property. We apologize for the inconvenience and hope that this letter will answer some of your questions about bubbling toilets.

1. **Is this a health risk?**
   The water that came out of your toilet is potable water from the toilet bowl. Unless your toilet was in use when this occurred, this water is no different than that encountered while cleaning your toilet.

2. **What is the City doing in the street?**
   In order to insure reliable sewer service, the City inspects, cleans, and repairs its sewer system on a continuous basis.

3. **How does sewer cleaning cause my toilet to bubble?**
   Typical industry cleaning equipment uses high-pressure water to clean sewers. The first step is to use the high-pressure water jets to propel the hose and cleaning nozzle upstream as far as 800 feet. During this process, air within the main pipe is displaced and sometimes goes up the private lateral pipe and releases though the toilet. This can also happen during the cleaning phase, when high-pressure water is pulled downstream to the cleaning truck.

4. **What causes the air to come from my toilet?**
   Over the years, City crews have found that the bubbling of toilets have many causes, some of which are:
   - Obstructed vent pipes;
   - Vent pipes that are positioned too far from the toilet;
   - Lateral pipes that may be in use as the crew is cleaning (e.g. draining washing machine, draining bathtub, etc.);
   - Lateral pipes that may have obstructions that are causing them to hold water (e.g. roots, grease, etc.).

5. **What does City staff do, once informed of a bubbling toilet?**
   Once notified of a bubbling toilet, the crew leader explains to the customer what has happened, and checks to see if there is a clean-out in the customer's yard that could be opened in the future during cleaning. The crew leader then makes notes and completes paperwork that puts the address on the City's computerized notification list. In the future, crews will notice that this address was "bubbled" at one time, and, before commencing the cleaning, they will notify the occupant of the possibility of bubbling toilets. In the event the occupant is not present when the cleaning begins, the crews will attempt to open clean-outs and/or lower water pressure to avoid bubbling.

6. **What can I do to prevent my toilet from bubbling?**
   When a sewer begins to drain slowly, it may be a sign that it needs to be cleaned or repaired. Trees and shrubs may have root structures that are entering the lateral pipe. The homeowner needs to make sure to have a clean-out for accessing the line. Unless there is a cleanout on the property line, it is the homeowner's responsibility to keep the sewer lateral pipe in good working condition. **The City also recommends the homeowner install a back-flow prevention device to prevent bubbling or sewer back-ups into the home.**

It is always a good idea to keep the toilet lid down when not in use, and not install carpets in the bathroom unless they can be easily removed and cleaned. For more information, please visit our website at www.redwoodcity.org/publicworks or call the Public Works office at (650) 780-7464.

Sincerely,

City of Redwood City Public Works

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City of Redwood City
Overflow Emergency Response Plan

Sanitary Sewer Backup Response Packet
Declination of Sewage Cleaning Services

BP-3

Customer Information		
NAME:	ADDRESS:	TELEPHONE:

ON (date)	**AT** (time)	**Approximately** (quantity)	**GALLONS OF:** ☐ Sewage ☐ Grey Water ☐ Toilet Bowl Water ☐ Odor ☐ Other (describe):

Overflowed from (or odor emanating from)
- ☐ Toilet
- ☐ Shower/Tub
- ☐ Washer
- ☐ Other (describe):

The overflow affected the following areas *(check one)*:
- ☐ Bathroom ☐ Bedroom
- ☐ Hallway ☐ Garage
- ☐ Kitchen ☐ Crawlspace
- ☐ Other (specify):

The overflow affected the following flooring:
- ☐ Tile ☐ Wood Flooring
- ☐ Linoleum ☐ Carpet
- ☐ Other (specify):

and/or additional materials:
- ☐ Area Rugs ☐ Towels
- ☐ Clothing ☐ Other (specify):

Photos: ☐ Were Not Taken ☐ Were Taken, number of photos: _____

This Form Completed By: **Date:** _____ **Time:**

CUSTOMER, please read the following and sign below:
I/We acknowledge the City of Redwood City (*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 District 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. Please refer to the Customer Service Packet for whom to contact if you have any questions.

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 cleanup, 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.
- See immediate attention if you become injured or ill.

Distribution Instructions – Top Copy to City records; Middle Copy to York Risk Services Group; Bottom Copy to Customer

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City of Redwood City
Overflow Emergency Response Plan

Sanitary Sewer Backup Response Packet
First Responder Form

BP-4
Side A

Fill out this form as completely as possible.
Ask customer if you may enter the home. If so, take photos of damaged and undamaged areas.

PERSON COMPLETING THIS FORM:	PHONE: DATE: TIME:
TIME STAFF ARRIVED ON-SITE:	
DID CUSTOMER CALL CLEANING CONTRACTOR? ☐ Yes ☐ No If YES, name of contractor:	
RESIDENT:	PROPERTY MANAGERS: OWNER/TENANT:
STREET ADDRESS: CITY, STATE AND ZIP: PHONE:	STREET ADDRESS: CITY, STATE AND ZIP: PHONE:
IS NEAREST UPSTREAM MANHOLE VISIBLY HIGHER THAN THE DRAIN THAT OVERFLOWED? ☐ Yes ☐ No	
# OF PEOPLE LIVING AT RESIDENCE:	

Approximate Age of Home:	# of Bathrooms:	# of Rooms Affected:
Approximate Amount of Spill (gallons):	Approximate Time Sewage Has Been Sitting (hrs/days):	

Numbers of Pictures Taken	Digital or Film?
Does property have a Property Line Cleanout?	☐ YES ☐ NO ☐ Unknown
Does the Customer have a Backwater Prevention Device (BPD)?	☐ YES ☐ NO ☐ Unknown
If yes, was the BPD operational at the time of the overflow?	☐ YES ☐ NO ☐ Unknown
Have there ever been any previous spills at this location?	☐ YES ☐ NO ☐ Unknown
Has the resident had any plumbing work done recently? *If YES, please describe:*	☐ YES ☐ NO

GO TO SIDE B

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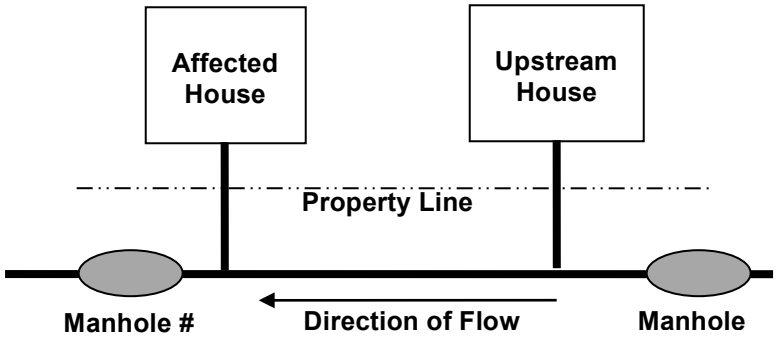
SANITARY SEWER LINE BLOCKAGE LOCATION

PLEASE CHECK THE BOX THAT DESCRIBES YOUR OBSERVATIONS			
Customer Cleanout Was:	**Public Cleanout was:**		
	Non - Existent	**Full**	**Empty**
Non-Existent			
Full			
Empty			

Place an X where the blockage occurred
Circle the areas where sewage overflowed/backed



Did sewage go under buildings? ☐ Yes ☐ No ☐ Unsure

Recommended Follow-Up Action(s):

Place completed form in Sewer Backup Envelope and follow routing instructions

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PLEASE COMPLETE AS THOROUGHLY AS POSSIBLE

PERSON COMPLETING THIS FORM:

DATE:
PHONE:

CAMERA TYPE:

LOCATION OF CAMERA ENTRY:

AFFECTED PROPERTY STREET ADDRESS:

CITY, STATE AND ZIP:

PHONE

LOCATION OF CAMERA STOP:

DESCRIBE AREA TV'd:

UPSTREAM MANHOLE #:

PLEASE CHECK ALL THAT WERE DISCOVERED – *Describe Extent & Location Using Camera Entry Point As Reference*:

- ❒ Broken Lateral – Describe:
  Depth:
- ❒ Roots – Severity: ☐ Light ☐ Moderate ☐ Heavy
- ❒ Grease – Severity: ☐ Light ☐ Moderate ☐ Heavy
- ❒ Sag – Describe:
  Depth:
- ❒ BPD – Describe:
  Location:
- ❒ Cleanout – Describe:
  Location:
- ❒ Joint/Junction – Describe:
  Depth
- ❒ Grade – Describe:
- ❒ Grit – Severity: ☐ Light ☐ Moderate ☐ Heavy
- ❒ Other – Describe:

TIME OF OVERFLOW:

TIME BLOCKAGE RELIEVED:

TIME LATERAL TV'd:

DEPTH OF LATERAL:

RECOMMENDED
FOLLOW UP WORK ACTIONS:

Mark for USA location? ☐ Yes ☐ No

Lateral Locations Marked in Green Paint? ☐ Yes ☐ No

SIGNATURE OF EMPLOYEE PERFORMING TV WORK:

DATE

If applicable, place completed form in Sewer Backup Packet and follow routing instructions.

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City of Redwood City
Overflow Emergency Response Plan

Sanitary Sewer Backup Response Packet
Sanitary Sewer Overflow Report

BP-6
Side A

INSTRUCTIONS: Complete all items *EXCEPT* those that are shaded gray

Spill Category *(check one)*:

☐ Category 1: Discharge of untreated or partially treated wastewater of any volume resulting from a sanitary sewer system failure or flow condition that either (1) Reaches surface water and/or drainage channel tributary to a surface water; OR (2) Reached a Municipal Separate Storm Sewer System (MS4) and was not fully captured and returned to the sanitary sewer system or otherwise captured and disposed of properly.

☐ Category 2: Discharge of untreated or partially treated wastewater greater than or equal to 1,000 gallons resulting from a sanitary sewer system failure or flow condition that either (1) Does not reach surface water, a drainage channel, or an MS4, OR (2) The entire SSO discharged to the storm drain system was fully recovered and disposed of properly.

☐ Category 3: All other discharges of untreated or partially treated wastewater resulting from a sanitary sewer system failure or flow condition

☐ Spill from Private Lateral

Describe in detail the basis for choosing the spill category:

☐ **IMMEDIATE NOTIFICATION: If this is a Category 1 spill greater than or equal to 1,000 gallons, contact CalOES within 2 hours at (800) 852-7550.**

A. SPILL LOCATION

Spill Location Name:		
Latitude Coordinates*:	Longitude Coordinates:	
Street Name and Number:		
Nearest Cross Street:	City: City of Redwood City	Zip Code:
County: San Mateo	Spill Location Description:	

B. SPILL DESCRIPTION

Spill Appearance Point (check one or more): ☐ Building/Structure ☐ Force Main ☐ Gravity Sewer ☐Pump Station
☐Other Sewer System Structure *(i.e. cleanout)* ☐ Manhole- Structure ID#: ☐ Other *(specify):*

Did the spill reach a drainage channel and/or surface water? ☐ Yes (*Category 1)* ☐No

If the spill reached a storm sewer, was it fully captured and returned to the Sanitary Sewer? ☐ Yes ☐No (*Category 1)*

Was this spill from a private lateral? ☐ Yes ☐No If YES, name of responsible party:

Discharged into: ☐Ocean/ocean beach ☐Waters of the state other than ocean ☐Drainage channel ☐Combined storm drain
☐Separate storm drain ☐Paved surface ☐Unpaved surface ☐Building/structure ☐Street/curb/gutter
☐Other:
Provide name(s) of affected drainage channels, beach, etc.:

Total Estimated spill volume *(in gallons – 1,000gal or more = Category 1)*: gallons

Est. volume that reached a separate storm drain that flows to a surface water body:	gal	Recovered:	gal
Est. volume that reached a drainage channel that flows to a surface water body:	gal	Recovered:	gal
Est. volume discharged directly to a surface water body:	gal	Recovered:	gal
Est. volume discharged to land:	gal	Recovered:	gal

Calculation Methods: ☐Eyeball ☐Photo Comparison ☐Upstream Connections ☐Area/Volume ☐Lower Lateral
☐Other (describe):

NOTE: Attach all Spill Volume Estimation documentation including calculations and summary.

C. SPILL OCCURRING TIME

Estimated spill start date:	Estimated spill start time:
Date spill reported to sewer crew:	Time spill reported to sewer crew:
Date sewer crew arrived:	Time sewer crew arrived:
Who was interviewed to help determine start time?	
Estimated spill end date:	Estimated spill end time:

NOTE: Attach detailed start time determination documentation.

* If multiple appearance points, use the GPS coordinates for the location of the SSO appearance point closest to the failure point/blockage.

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D. CAUSE OF SPILL

Location of Blockage: ☐ Main ☐ Lateral ☐Private Lateral ☐ Other:

SSO cause *(check all that apply)*: ☐ Debris/Blockage ☐ Flow exceeded capacity ☐Grease ☐ Operator error ☐ Roots
☐ Pipe problem/failure ☐ Pump station failure ☐ Rainfall exceeded design ☐ Vandalism ☐ Inflow/infiltration
☐ Animal carcass ☐ Electrical power failure ☐ Bypass ☐ Debris from laterals ☐ Construction Debris
☐ Other (specify):

Diameter (in inches) of pipe at point of blockage/spill cause (if applicable):

Sewer pipe material at point of blockage/spill cause (if applicable):

Estimated age of sewer asset at the point of blockage or failure (if applicable):

Description of terrain surrounding point of blockage/spill cause: ☐ Flat ☐ Mixed ☐ Steep

E. SPILL RESPONSE

Spill response activities (check all that apply): ☐ Cleaned up ☐ Contained all/portion of spill ☐ TV inspection ☐ Restored flow
☐ Returned all/portion of spill to sanitary sewer ☐Other (specify):

Spill response completed (date & time):

Visual inspection result of impacted waters (if applicable):

Any fish killed? ☐ Yes ☐ No Any ongoing investigation? ☐ Yes ☐ No

Were health warnings posted? ☐ Yes ☐ No If yes, provide health warning/beach closure posting/details:

Was there a beach closure? ☐ Yes ☐ No If yes, name of closed beach(es):

Were samples of impacted waters collected? ☐ Yes ☐ No
If YES, select the analyses: ☐ DO ☐ Ammonia ☐ Bacteria ☐ pH ☐ Temperature ☐ Other:

Recommended corrective actions: (check all that apply and provide detail)
☐ Clean line again ASAP:
☐ CCTV:
☐ Re-CCTV:
☐ Additional work:
☐ Cleaning schedule change:
☐ Cleaning method change:
☐ Fog investigation:
☐ Repair line segment:
☐ Replace line segment:
☐ Additional comments:

List all agency personnel involved in the response including name, title and their role in the response:

Name	Title	Role

F. NOTIFICATION DETAILS

CalOES contacted date and time (if applicable):

CalOES Control Number (if applicable): Spoke to:

G. RECOMMENDED FOLLOW-UP ACTIONS TO PREVENT FUTURE OCCURRENCES

CURRENT PM FREQUENCY: DATE OF LAST PM:

RECOMMENDED ACTIONS: ☐ TV ☐ RE-RUN ☐ CHANGE CLEANING SCHEDULE
☐ REPAIR LINE SEGMENT ☐ REPLACE LINE SEGMENT ☐ OTHER (describe):

NOTES:

Place completed form in Sewer Backup Envelope and follow routing instructions.

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Public Works Supervisor

1. **Complete the following information:**

   Title: _____

   Name: _____

   Phone: _____

   Today's Date: _____

2. **Copy the items listed below and retain for internal archiving purposes.**

3. **Place the originals back in the Backup Response Envelope and forward envelope with original forms to the Public Works Director or City Administrator:**

   - ☐ **Form BP-3: Declination of Sewage Cleaning Services Form**
   - ☐ **Form BP-4: First Responder Form**
   - ☐ **Form BP-5: Lateral TV Report**
   - ☐ **Form BP-6: Sanitary Sewer Overflow Report**
   - ☐ **Form BP-7: Claims Submittal Checklist** *(this form)*
   - ☐ **All photos taken** *(hardcopy or electronic)*
   - ☐ **Any other information you feel is important in this claim**

4. **Complete Form BP-8: Collection System Failure Analysis**

Public Works Supervisor or Other Reporting Authority

Go to Regulatory Notifications Packet and make all appropriate notifications.

City Risk Manager

1. **Verify claims packet is complete.**
2. **Notify York Risk Services Group:**

   York Risk Services Group
   Attn: Steve Kochly
   1390 Willow Pass Road
   Concord, CA 94520
   (925) 222-0962
   steve.kochly@yorkrsg.com

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To be completed by the Public Works Supervisor

Incident Report #		Prepared By	
SSO/Backup Information			
Event Date/Time	Address		
Volume Spilled	Volume Recovered		
Cause			
Summary of Historical SSOs/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			
Recommendations			
	No Changes or Repairs Required		
	Maintenance Equipment		
	Maintenance Frequency		
	Repair (Location and Type)		
	Add to Capital Improvement Rehabilitation/Replacement List: ☐Yes ☐ No		
Supervisor Review Date		Superintendent Review Date	

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City of Redwood City
Overflow Emergency Response Plan

Customer Service Packet

Contents:

Form	Form Number
Customer Information Letter	CS-1
Sewer Spill Reference Guide	pamphlet

Instructions:

1. Review the Customer Information letter to determine actions that need to be taken immediately.
2. See the Customer Information letter for information about filing a claim.
3. Review the Sewer Spill Reference Guide pamphlet.

If you have any questions contact:

Regarding Sewer Issues: City Public Works Supervisor at (650) 780-7477
Regarding Submitting a Claim for Damages: City Risk Manager(650) 780-7072

Paquete informativo del servicio al cliente

Contenido:

Formulario	Número de formulario
Carta informativa para el cliente	CS-1
Guía de referencia sobre desbordes cloacales	folleto

Instrucciones:

1. Analice la carta informativa para el cliente a fin de determinar las medidas que se deben tomar de manera inmediata.
2. Consulte la carta informativa para el cliente a fin de obtener información sobre cómo presentar un reclamo.
3. Analice el folleto de la Guía de referencia sobre desbordes cloacales.

En caso de preguntas, comuníquese con:

Para temas cloacales: el Supervisor de Obras Públicas de la ciudad, llamando al (650) 780-7477

Para presentar un reclamo por daños: el Gerente de riesgos de la ciudad, llamando al (650) 780-7072

This packet provided by: _____ Phone: _____

Print on 6” x 9” envelope

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Dear Resident:

We recognize that sewer back flow incidents can be stressful and require immediate response when all facts concerning how an incident occurred are unknown. Rest assured that we do all we can to prevent this type of event from occurring. Nevertheless, occasionally tree roots or other debris in the sewer lines cause 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 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.

If you wish to discuss this matter, please contact the City Public Works Supervisor for Sewer Maintenance at 650.780.7477. If you wish to submit a claim for damages, please contact the City Clerk's Office at 650.780.7220 for instructions on how to obtain a City Claim Form and to receive instructions on claims filing procedures. Completed Claims Forms are to be submitted to the City Clerk at 1017 Middlefield Road, Redwood City CA 94063.

Claims against the City must comply with the California Government Code Sec. 910-913.2. The City Risk Manager has the responsibility for processing any claims for damages that are submitted and can be reached at 650.780.7072.

What you need to do now:

The City has prepared this brief set of instructions to help you 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).
- Turn off all 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, contact your plumber or contractor and inform them of this incident.
- If you intend to file a claim, do so as soon as practical in order to have your claim considered. To obtain a claim form contact City Clerk's Office at 650.780.7220.
    - **Please Note:** The general provisions for the filing of claims against public entities are contained in Part 3 (*commencing at Section 900)* of Division 3.6 of the Government code. Certain claims are not governed by these provisions, including tax and assessment matters, liens, employee compensations, workers' compensation, unemployment compensation, welfare, securities, and others.
    - The form and contents of a claim are specified by Section 910, et seq. A claim relating to a cause of action for death or for injury to person or to personal property or growing crops shall be presented not later than six months after accrual of the cause of action; other claims shall be presented within one year (*Section 911.2).*
    - Claims are to be presented by delivery or mailing to the City Clerk, City Hall, Redwood City *(Section 915).*
    - It is suggested that the claimant refer to claims law and be fully advised with respect to the exceptions and further provisions contained therein.

Important Legal Notice: For your protection, read carefully, obtain a reliable translation, and/or consult your attorney.

Noticia Legal Importante: Para su proteccion lea usted con cuidado debe de obtener una translacion que sea punctual y de confianza o consulte con su abogado.

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Ciudad de South San Francisco
Desbordamiento del Plan de Respuesta a Emergencias

Paquete informativo de la respuesta ante desbordes

Información del cliente sobre reclamos por desbordes cloacales

CS-1

Estimado vecino:

Reconocemos que los incidentes provocados por el reflujo de aguas cloacales pueden ser estresantes y exigen una respuesta inmediata cuando se desconocen los hechos relacionados con la causa del incidente. Tenga la seguridad de que hacemos todo lo posible para evitar que sucedan este tipo de incidentes. Sin embargo, las raíces de los árboles u otros desechos que se encuentran en las cañerías principales del sistema cloacal provocan, de vez en cuando, un desborde en el interior de las viviendas justo arriba de la obstrucción. 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, así como a proteger la salud de aquellas personas que hayan sido afectadas durante el proceso de reparación.

La empresa de servicios de limpieza que provee la Ciudad fue seleccionada debido a su cumplimiento con los protocolos establecidos, los que se diseñaron para garantizar servicios de limpieza cuidadosos, expeditivos y de bajo costo a todas las partes. También tiene derecho a elegir su propia empresa de servicios de limpieza; sin embargo, la Ciudad no garantiza el pago de cargos y/o gastos que incurra y se reserva el derecho a objetar los cargos y/o gastos que considere que no son habituales.

Si desea conversar sobre este tema, comuníquese con el Supervisor de Obras Públicas de la Ciudad para el Mantenimiento de Cloacas llamando al 650.780.7477. Si desea presentar un reclamo por daños, comuníquese con la Oficina del Secretario de Ayuntamiento llamando al 650.780.7220 para recibir instrucciones sobre cómo obtener un Formulario de reclamo ante la Ciudad y sobre los procedimientos para presentar los reclamos. Los Formularios de reclamo que estén completos deben presentarse ante el Secretario de Ayuntamiento, que se encuentra ubicado en 1017 Middlefield Road, Redwood City CA 94063.

Los reclamos presentados contra la Ciudad deben cumplir con las disposiciones de los artículos 910-913.2 del Código del Gobierno de California (*California Government Code Sec. 910-913.2*). El Jefe de Riesgo de la Ciudad asume la responsabilidad de procesar todos los reclamos iniciados por daños que se presenten, éstos pueden consultarse llamando al 650.780.7072.

Lo que necesita saber en este momento:

La Ciudad redactó esta breve serie de instrucciones para ayudarlo a minimizar el impacto de la pérdida respondiendo de manera inmediata ante la situación.

- No intente limpiar la zona usted mismo; permita que la empresa de limpieza y restauración se encargue de esto.
- Mantenga a las personas y a las mascotas alejadas de la(s) zona(s) afectada(s).
- Apague todos los aparatos que utilicen agua.
- Apague los sistemas de calefacción y/o aire acondicionado.
- No quite los elementos que se encuentran en la zona; la empresa de limpieza y restauración se encargará de esto.
- Si recientemente se realizaron obras de plomería, comuníquese con su plomero o servicio de plomería e infórmele sobre este incidente.
- Si tiene pensado presentar un reclamo, hágalo lo antes posible para que éste sea tenido en cuenta. Para obtener un formulario de reclamo, comuníquese con la Oficina del Secretario de Ayuntamiento llamando al 650.780.7220.
    - **Observación:** Las disposiciones generales que rigen la presentación de reclamos contra organismos públicos están incluidas en la Parte 3 (*que comienza en el Artículo 900)* del Capítulo 3.6 del Código del Gobierno (*Division 3.6 of the Government code*). Existen determinados reclamos que no se rigen por estas disposiciones, incluyendo los asuntos relacionados con los impuestos y las tasaciones, los gravámenes, la remuneración para los empleados, las indemnizaciones de los trabajadores, el subsidio de desempleo, la asistencia social, los títulos y demás.
    - La forma y el contenido del reclamo se especifican en el Artículo 910 y siguientes. Un reclamo que esté relacionado con la causa de acción por muerte o lesión de una persona o de los bienes personales o de la cosecha en crecimiento deberá presentarse antes de que se cumplan los seis meses posteriores a dicha causa de acción; los demás reclamos deberán presentarse dentro del período de un año (*Artículo 911.2).*
    - Los reclamos deberán presentarse ante el Secretario de Ayuntamiento, Redwood City *(Artículo 915),* en persona o por correo.
    - Se sugiere que el reclamante haga referencia a la legislación sobre reclamos y que usted esté completamente asesorado sobre las excepciones y demás disposiciones incluidas en dicha legislación.

Aviso legal importante: Para su protección, lea atentamente el material, obtenga una traducción confiable y/o hable con su abogado.

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OVERFLOW PACKET

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Overflow Emergency Response Plan

Overflow Response Flowchart

OP-1
Side A

Start Here → Is the spill entering an area where public contact may occur?

YES → Is this an area where the public recreates in the impacted waters? If YES consider posting "WARNING RAW SEWAGE" signs in immediate areas. Be sure to photograph any areas where warnings/barricades are posted, as appropriate.

NO → If SSO is Category 1 greater than or equal to 1,000 gallone, contact the Public Works Supervisor or Public Works Superintendent to make 2-hour notification. If unavailable, contact CalOES at (800) 852-7550 to make notification.

BEGIN DIVERSION AND CONTAINMENT

1. **DIVERT AWAY FROM SENSITIVE AREAS:**
   a. Cover unplugged storm drains w/mats, or use dirt/other material to divert sewage away from sensitive areas (e.g., schools, playgrounds, intersections, etc.)
   b. ENSURE PUBLIC CONTACT DOES NOT OCCUR. Use cones/barricades to isolate area.
2. **CONTAIN SPILL & RETURN TO SYSTEM, IF POSSIBLE:**
   a. Plug storm drain catch basins or use rubber mats to cover basin inlet and divert flow to catch basin
   b. Build/excavate a berm to channel flow to downstream sanitary sewer manhole (*barricade manhole if left open)*
   c. Use bypass pumps to pump around blockage until it can be removed
   d. Divert to low area of ground where it can be collected later
3. **PHOTOGRAPH HOW THE SSO WAS DIVERTED/CONTAINED, AS APPROPRIATE**

Where is the SSO coming from?

- Private Property → **PRIVATE PROPERTY SSO**
- Pump Station → **PUMP STATION FAILURE RESPONSE**
- Manhole or Cleanout → **CLEAR BLOCKAGE/ STOPPAGE**

PUMP STATION FAILURE RESPONSE

1. Contact the Utilities Specialist
2. Refer to the Pump Station Emergency Response Plans for Redwood Shores.
3. Ensure all electrical hazards have been Locked & Tagged out!
4. Determine the cause of the pump station failure
5. If power failure, if power failure at Station #10 or #12, notify the Utilities Specialist
6. If pump failure, determine nearest downstream manhole you can bypass pump to & send for appropriately sized pump and hoses
7. Photograph staff activities to document City actions, as appropriate
8. Go to Side B

PRIVATE PROPERTY SSO

1. Photograph & document **all** evidence that this SSO is from private property.
2. If customer is not home, complete Customer Service door hangar. If they are home, provide them with the pamphlet – "Sewer Spill Reference Guide."
3. If tenant or property owner is unable to unwilling to address the cause of the overflow, immediately contact the Public Works Supervisor and discuss whether Code Enforcement, the County Department of Environmental Health or Regional Water Quality Control Board should be notified.

End. Do not continue to Side B.

CLEAR BLOCKAGE/ STOPPAGE

Photograph staff activities while clearing the blockage, as appropriate.

Go to Side B

MEDIA AND PUBLIC RELATIONS GUIDELINES:

Exercise caution in contacts with the public or media when you respond to a spill. Any information you provide or statements you make may become pertinent in the event of possible court action, it is important to **AVOID THE FOLLOWING**:

- Giving out the wrong information including providing incorrect facts about a company or other agency
- Making accusations against customers, businesses or other agencies
- Speculating about the situation you are responding to

Be courteous and attempt to provide accurate information to questions within the limits above. In some cases, it may be appropriate to say that we do not have any information, or to delay answering a question and then to say when an answer might be available.

In most cases, refer media requests to the media coordinator indicated on the front of the Sewer Overflow Packet envelope.

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Continue Here From Side A

Have 50 gallons or more reached receiving waters?

NO

YES

Immediately call to have receiving waters collected. Refer to the front of the Sewer Overflow Packet envelope for contact information.

Assign staff to post "WARNING: RAW SEWAGE" signs or other means of warning along the shoreline of impacted receiving waters as appropriate, or as directed by the County Environmental Health Department. Be sure to document how many signs were posted and where they were posted.

Is it feasible/ practical to contain/recover any of the SSO from the receiving waters?

NO

YES

If unable to contain/recover the SSO with City resources, contact Public Works Supervisor to request outside assistance, as appropriate.

Were storm drains impacted?

NO

YES

STORM DRAIN CLEANING SOP

1. Seal or berm the storm drain immediately downstream of point the SSO reached
2. Photograph impacted storm drain catch basins before cleaning
3. Vacuum any visible sewage – *Record the volume of sewage recovered*
4. Flush impacted sections of storm drain with 3X amount of SSO, if possible – *Record volume of flush water*
5. Ensure all visible signs of sewage have been removed
6. Return flush water to sanitary sewer – *Record volume of flush water recovered*
7. Photograph all storm drain catch basins after cleaning is completed

AREA CLEANUP

1. **Assign staff to begin cleanup**
   NOTE: If SSO was caused by a failure in a private service line, clean up impacted public areas & document staff time, equipment used & expenses incurred
2. **Remove all signs of gross pollution**
   (toilet paper, solids, grease, etc.)
3. **Flush area with unchlorinated water – Unless raining**
   (*3X amount of SSO, if possible*)
   a. Setup berm/other means to contain all chlorinated flush water so it can be returned to sewer
   b. Don't use disinfectants if they may enter storm drain system and not be fully recovered or if they may enter a water body
4. **Photograph the area when cleanup operations are complete**

ESTIMATE SPILL VOLUME

1. Complete the Start Time Determination form. Remember – the spill was probably occurring for a period of time before it was reported.
2. Estimate SSO volume using two or more methods listed in the Field Guide
3. Complete the Volume Estimation section on the Sanitary Sewer Overflow Report.

DOCUMENTATION

Complete the **Sanitary Sewer Overflow Report.**

Place in Sewer Overflow Packet envelope and follow paperwork routing instructions indicated on the front of the envelope:

1. **All completed forms**
2. **Digital or disposable camera**
3. ***ALL* notes/documentation made**

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READ THIS FIRST

In the event of a Sanitary Sewer Overflow

☐ **Check here if you believe that fats, oils and/or grease (FOG) caused or contributed to the SSO**

Instructions

Maintenance Crew

1st: Open this envelope.

2nd: Follow the instructions on the Overflow Response Flowchart

3rd: If Category 1 SSO greater than or equal to 1,000 gallons, contact CalOES at (800) 852-7550.

4th: Reference the SMART Field Guide as necessary

5th: Complete the Chain of Custody record (right) and forward this packet to the Public Works Supervisor.

Public Works Supervisor

1st: Open this envelope. Review forms.

2nd: Complete the Regulatory Notifications Packet.

3rd: Archive this packet and all other information regarding this overflow incident according to City policy.

4th: Debrief using the Collection System Failure Analysis Form.

Chain of Custody

Print Name: _____

Initial: _____

Date: _____

Time: _____

Print Name: _____

Initial: _____

Date: _____

Time: _____

To have receiving waters sampled:	Contact	Telephone
For impacted lagoons/slough or San Francisco Bay	Utilities Specialist – Storm	Cell: (650) 740-7451 Pager: (650) 216-0730
For Pump Station and Force Main SSOs/Issues	Utilities Specialist – Sewers	Cell: (650) 740-4941 Pager: (650) 216-0727

For any media requests:

Sheri Costa-Batis, Public Information Officer
(650) 780-7305 or (650) 780-7300

Terence Kyaw
Assistant Public Works Director
(650) 780-7466

Justin Chapel
Public Works Superintendent
(650) 780-7469

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Form	Form Number
Instructions and Chain of Custody	envelope label
Responding to a Sanitary Sewer Overflow	OP-1
Sewer Overflow Report	-2
Collection System Failure Analysis Report	-3
Regulatory Notifications Packet	
Instructions	envelope
Regulatory Reporting Guide	RN-1
Category 1 SSO Reporting Checklist	-2a
Category 2 & 3 SSO Reporting Checklist	-2b
RWQCB Notification Fax	-3
Public Posting	n/a

For pre-assembled packets contact DKF Solutions Group at 707.373.9709 or kpatzer@dkfsolutions.com

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INSTRUCTIONS: Complete all items *EXCEPT* those that are shaded gray

Spill Category *(check one)*:

- ☐ Category 1: Discharge of untreated or partially treated wastewater of any volume resulting from a sanitary sewer system failure or flow condition that either (1) Reaches surface water and/or drainage channel tributary to a surface water; OR (2) Reached a Municipal Separate Storm Sewer System (MS4) and was not fully captured and returned to the sanitary sewer system or otherwise captured and disposed of properly.
- ☐ Category 2: Discharge of untreated or partially treated wastewater greater than or equal to 1,000 gallons resulting from a sanitary sewer system failure or flow condition that either (1) Does not reach surface water, a drainage channel, or an MS4, OR (2) The entire SSO discharged to the storm drain system was fully recovered and disposed of properly.
- ☐ Category 3: All other discharges of untreated or partially treated wastewater resulting from a sanitary sewer system failure or flow condition
- ☐ Spill from Private Lateral

Describe in detail the basis for choosing the spill category:

☐ **IMMEDIATE NOTIFICATION: If this is a Category 1 spill greater than or equal to 1,000 gallons, contact CalOES within 2 hours at (800) 852-7550.**

A. SPILL LOCATION		
Spill Location Name:		
Latitude Coordinates*:	Longitude Coordinates:	
Street Name and Number:		
Nearest Cross Street:	City: City of Redwood City	Zip Code:
County: San Mateo	Spill Location Description:	

B. SPILL DESCRIPTION			
Spill Appearance Point (check one or more): ☐ Building/Structure ☐ Force Main ☐ Gravity Sewer ☐Pump Station ☐Other Sewer System Structure *(i.e. cleanout)* ☐ Manhole- Structure ID#: ☐ Other *(specify):*			
Did the spill reach a drainage channel and/or surface water? ☐ Yes (*Category 1)* ☐No			
If the spill reached a storm sewer, was it fully captured and returned to the Sanitary Sewer? ☐ Yes ☐No (*Category 1)*			
Was this spill from a private lateral? ☐ Yes ☐No If YES, name of responsible party:			
Discharged into: ☐Ocean/ocean beach ☐Waters of the state other than ocean ☐Drainage channel ☐Combined storm drain ☐Separate storm drain ☐Paved surface ☐Unpaved surface ☐Building/structure ☐Street/curb/gutter ☐Other: Provide name(s) of affected drainage channels, beach, etc.:			
Total Estimated spill volume *(in gallons – 1,000gal or more = Category 1)*:			gallons
Est. volume that reached a separate storm drain that flows to a surface water body:	gal	Recovered:	gal
Est. volume that reached a drainage channel that flows to a surface water body:	gal	Recovered:	gal
Est. volume discharged directly to a surface water body:	gal	Recovered:	gal
Est. volume discharged to land:	gal	Recovered:	gal
Calculation Methods: ☐Eyeball ☐Photo Comparison ☐Upstream Connections ☐Area/Volume ☐Lower Lateral ☐Other (describe):			
NOTE: Attach all Spill Volume Estimation documentation including calculations and summary.			

C. SPILL OCCURRING TIME	
Estimated spill start date:	Estimated spill start time:
Date spill reported to sewer crew:	Time spill reported to sewer crew:
Date sewer crew arrived:	Time sewer crew arrived:
Who was interviewed to help determine start time?	
Estimated spill end date:	Estimated spill end time:
NOTE: Attach detailed start time determination documentation.	

* If multiple appearance points, use the GPS coordinates for the location of the SSO appearance point closest to the failure point/blockage.

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D. CAUSE OF SPILL

Location of Blockage: ☐ Main ☐ Lateral ☐Private Lateral ☐ Other:

SSO cause *(check all that apply)*: ☐ Debris/Blockage ☐ Flow exceeded capacity ☐Grease ☐ Operator error ☐ Roots
☐ Pipe problem/failure ☐ Pump station failure ☐ Rainfall exceeded design ☐ Vandalism ☐ Inflow/infiltration
☐ Animal carcass ☐ Electrical power failure ☐ Bypass ☐ Debris from laterals ☐ Construction Debris
☐ Other (specify):

Diameter (in inches) of pipe at point of blockage/spill cause (if applicable):

Sewer pipe material at point of blockage/spill cause (if applicable):

Estimated age of sewer asset at the point of blockage or failure (if applicable):

Description of terrain surrounding point of blockage/spill cause: ☐ Flat ☐ Mixed ☐ Steep

E. SPILL RESPONSE

Spill response activities (check all that apply): ☐ Cleaned up ☐ Contained all/portion of spill ☐ TV inspection ☐ Restored flow
☐ Returned all/portion of spill to sanitary sewer ☐Other (specify):

Spill response completed (date & time):

Visual inspection result of impacted waters (if applicable):

Any fish killed? ☐ Yes ☐ No Any ongoing investigation? ☐ Yes ☐ No

Were health warnings posted? ☐ Yes ☐ No If yes, provide health warning/beach closure posting/details:

Was there a beach closure? ☐ Yes ☐ No If yes, name of closed beach(es):

Were samples of impacted waters collected? ☐ Yes ☐ No
If YES, select the analyses: ☐ DO ☐ Ammonia ☐ Bacteria ☐ pH ☐ Temperature ☐ Other:

Recommended corrective actions: (check all that apply and provide detail)
☐ Clean line again ASAP:
☐ CCTV:
☐ Re-CCTV:
☐ Additional work:
☐ Cleaning schedule change:
☐ Cleaning method change:
☐ Fog investigation:
☐ Repair line segment:
☐ Replace line segment:
☐ Additional comments:

List all agency personnel involved in the response including name, title and their role in the response:

Name	Title	Role

F. NOTIFICATION DETAILS

CalOES contacted date and time (if applicable):

CalOES Control Number (if applicable): Spoke to:

G. RECOMMENDED FOLLOW-UP ACTIONS TO PREVENT FUTURE OCCURRENCES

CURRENT PM FREQUENCY: DATE OF LAST PM:

RECOMMENDED ACTIONS: ☐ TV ☐ RE-RUN ☐ CHANGE CLEANING SCHEDULE
☐ REPAIR LINE SEGMENT ☐ REPLACE LINE SEGMENT ☐ OTHER (describe):

NOTES:

Place completed form in Sewer Backup Envelope and follow routing instructions.

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To be completed by Public Works Supervisor

Incident Report #		Prepared By	
SSO/Backup Information			
Event Date/Time	Address		
Volume Spilled	Volume Recovered		
Cause			
Summary of Historical SSOs/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			
Recommendations			
	No Changes or Repairs Required		
	Maintenance Equipment		
	Maintenance Frequency		
	Repair (Location and Type)		
	Add to Capital Improvement Rehabilitation/Replacement List: ☐Yes ☐ No		
Supervisor Review Date		Superintendent Review Date	

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FIELD SAMPLING KIT

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Form	Form Number
Procedures for Sampling Receiving Waters and Posting Warnings after a Sewage Spill	FS-1
Sample Collection Chain of Custody Record	-2

The Field Sample Kit contains:

- Cooler w/ice pack
- Latex gloves
- Safety glasses
- 2 ammonia-nitrogen sample bottles (1pt bottle w/H2SO4)
- 20 Sample bottle labels
- Waterproof Pen (i.e. Sharpie®)
- 10 Enterococcus sample bottles (100ml sterilized bottle)
- Combination temperature/pH meter
- Extra batteries for temperature/pH meter
- Chain of Custody form

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City of Redwood City
Overflow Emergency Response Plan

FIELD SAMPLING KIT

Procedures for Sampling Receiving Waters and Posting Warnings after a Sewage Spill

FS-1
Side A

Get Field Sampling Kit → Get ice pack from a convenience store and place in cooler → Determine point spill entered waterway – photograph this location (*include a reference point in the photo)* → Don the PPE from the Sampling Kit

- Collect all samples against the direction of the water flow! (face upstream)
- Collect upstream sample first!
- Collect samples well away from the bank (preferably where water is visibly flowing) and 6" below the surface
- Avoid sampling debris or scum layer from the surface.
- Photograph evidence of dead fish!

SAMPLING STEPS

Move 50' upstream of point where spill entered waterway (reference sample)

Take out the temp/pH meter. Calibrate it. Take temperature and pH of the water at that sample location. Record those results on the chain of custody form.

Remove the seal from the enterococcus sample container (100ml) just prior to collecting your sample. A chemical has been added to the sample container. Leave the chemical in the bottle and do not rinse.

1. Remove the cap immediately before collecting each sample.
2. Do not allow the inside of the cap to touch anything
3. Holding the bottle in one hand, face upstream and lower the bottle 6" below the water surface. Then sweep the bottle upstream and out of the water. Be careful not to disturb the bottom sediment. Pour a little water out so that bottle is filled to the line. Immediately replace the cap.

Open the ammonia-nitrogen sample container and follow collection process above (steps 1-3) to fill to just below the neck of the jar. NOTE: The ammonia-nitrogen sample bottle contains sulfuric acid – LEAVE THE ACID IN THE BOTTLE AND DO NOT ALLOW IT TO TOUCH YOUR SKIN!

Label all of the samples with their location and note the date and time collected → Place samples in cooler on the ice pack → Take a photo of this sample location (*include a reference point in the photo)*

Move at least 10' downstream of point where spill entered waterway and repeat sampling steps (red boxes) → Complete the Chain of Custody form from the Sampling Kit.

Immediately contact: Bob Wandrow at South Bayside System Authority Laboratory at (650) 868-6426 and inform him that the following samples require processing: Ammonia-Nitrogen and Enterococcus. → Take cooler containing the samples and completed chain of custody to South Bayside System Authority at 1201 Radio Road, Redwood City CA 94065. Samples should be taken to lab within 6 hours of collection time.

Post warning signs as directed by the County Environmental Health Department or the Public Works Supervisor. (Remove Warning Signs and lift restrictions when authorized by County Environmental Health.)

Repeat sampling daily from time the spill is known until the results of two consecutive sets of samples indicate the return to the normal level or cessation of monitoring is authorized by the County Environmental Health Department.

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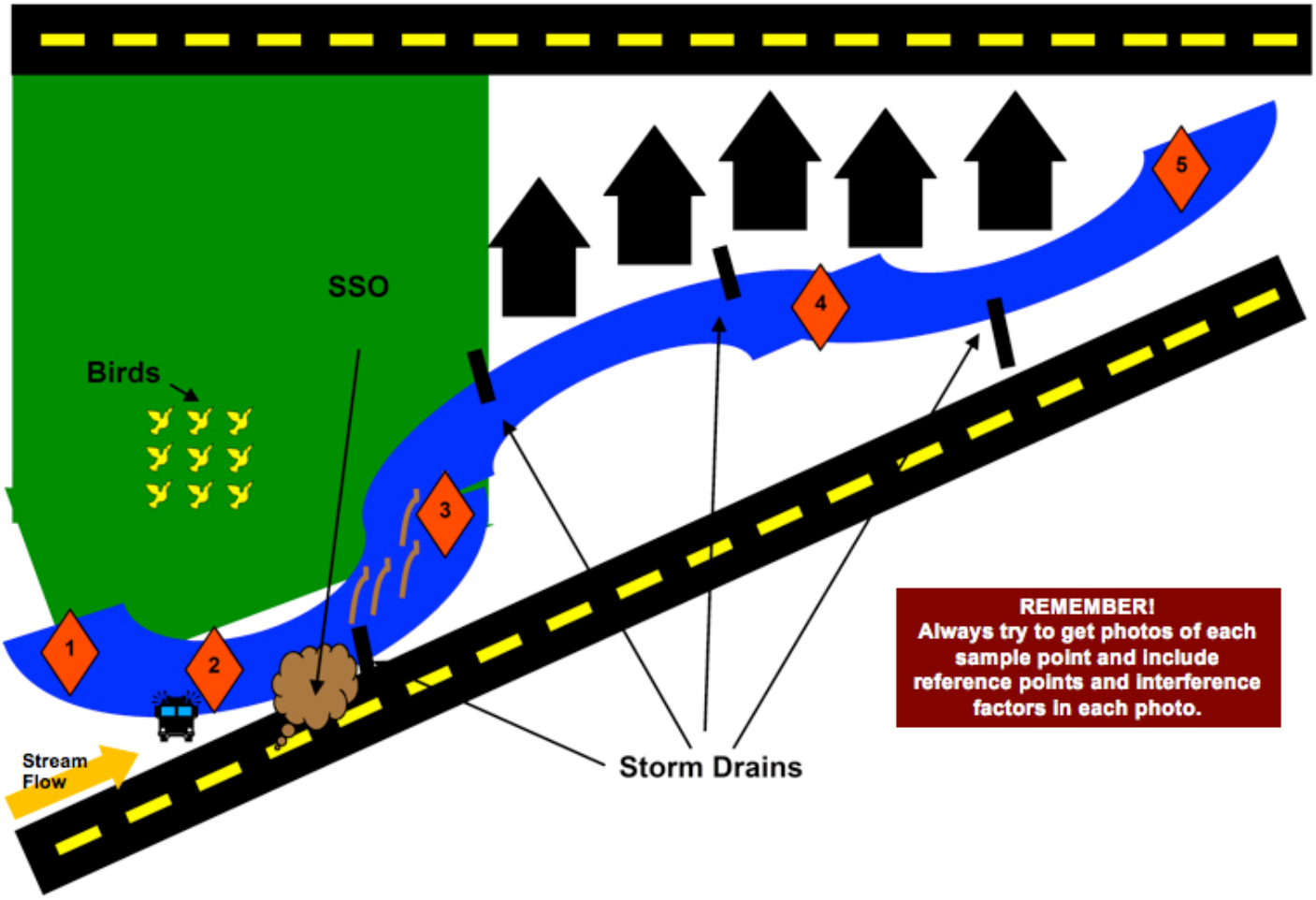

1 **Sample Location 1: Baseline Sample, *no* observable interference from birds, animals, runoff, etc**

2 **Sample Location 2: Baseline Sample, *observable* interference from birds, animals, runoff, etc**
NOTE: Only collect this sample if you observe any possible interfering factors upstream from the spill location

3 **Sample Location 3: Immediately downstream of SSO entry point**

4 **Sample Location 4: Further downstream of SSO entry point – note any possible interfering factors**

5 **Sample Location 5: Further downstream of SSO entry point – note any possible interfering factors**

NOTE: This example is provided for illustrative purposes *only!* Base each sampling event on the geography, drainage and interference factors (*i.e. birds, animals, runoff, etc.)* of the area impacted.

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City of Redwood City
Overflow Emergency Response Plan

FIELD SAMPLING KIT
Sample Collection Chain of Custody Record

FS-2

Customer Name				☐	**Hazardous Waste**	**PO#**	
Customer Address				☐	**Unknown Material**	**WO#**	
Customer Telephone		**Mail Code**		**CONTRACT LAB INFORMATION**		**Turnaround Requirement**	
Program Name				Ship to:		☐ Normal (21 days)	
Lab Program Coordinator		**Phone #**		Ship Date:		☐ Rush: _____	
Sampled By				Courier:		☐ Other:	

LIMS# (Issued by Lab)	SAMPLE COLLECTION INFORMATION							# Containers	Matrix*	Analysis Requested					QA/QC Requirements	
	Date	Time	Type		Sample Location	Field pH	Field Temp			Ammonia	Enterococcus				☒	Lab Standard
															☐	Special (see attached)
			Composite	Grab												Remarks/Notes
			☐	☒	Upstream			2	A	☒	☒	☐	☐	☐		
			☐	☒	Entry Point			2	A	☒	☒	☐	☐	☐		
			☐	☒	Downstream			2	A	☒	☒	☐	☐	☐		
			☐	☐				2		☐	☐	☐	☐	☐		
			☐	☐				2		☐	☐	☐	☐	☐		
			☐	☐				2		☐	☐	☐	☐	☐		
			☐	☐				2		☐	☐	☐	☐	☐		

*Matrix: P = Potable Water, W = Wastewater, A = Ambient Water, G = Groundwater, S = Soil, B = Biosolids, I = Industrial, O = Other (specify in remarks)

Relinquished	Date	Time

Relinquished to	Date	Time

Transport/Shipping Information		
☐ USPS	☐ UPS	☐ FedEx
Tracing #:		
☐ Other:		

Sample Receiving Documentation

Container intact? ☐ Yes ☐ No	Correct container? ☐ Yes ☐ No	Field preserved? ☐ Yes ☐ No	Custody tape intact? ☐ Yes ☐ No
Cooled? ☐ Yes ☐ No	Temp. Blank? ☐ Yes ☐ No (°C)	Comments:	
Sample distribution: ☐ Lab bench ☐ Ice chest ☐ Walk-in cooler shelf #		Disposal Date:	Disposed by: (inits.)
C-O-C Distribution Date: By:	☐ Lab Admin File ☐ Prog/proj Mgr. ☐ Lab Prog. Coord. ☐ Delivery courier ☐ Pick-up courier		

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MISC

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Overflow Emergency Response Plan

Public Posting

DANGER

RAW SEWAGE • AVOID CONTACT

PELIGRO

AGUA CONTAMINADA • EVITE TODO CONTACTO

For more information **Para mas informacion**

City of Redwood City CA

M-F 7:30am - 4:30pm: 650.780.7464
After Hours: 650.780.7190

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City of Redwood City

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
- ☐ The City-maintained portion of your sanitary sewer lateral and cleared the line.
- ☐ Your portion of the sanitary sewer lateral, which is your responsibility to maintain. We also found the City's portion of the lateral and the main to be flowing normally.

If you require assistance to clear your portion of the lateral you can look in the Yellow Pages of your telephone book under "Sewer Contractors" or "Plumbing Drains & Sewer Cleaning". If you plan to hire a contractor we recommend getting estimates from more than one company.

City of Redwood City representative notes: _____

_____

_____

City of Redwood City Representative:

_____

For questions or comments, please call

City of Redwood City

M-F 7:30am - 4:30pm: 650.780.7464
After Hours: 650.780.7190

City of Redwood City

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
- ☐ The City-maintained portion of your sanitary sewer lateral and cleared the line.
- ☐ Your portion of the sanitary sewer lateral, which is your responsibility to maintain. We also found the City's portion of the lateral and the main to be flowing normally.

If you require assistance to clear your portion of the lateral you can look in the Yellow Pages of your telephone book under "Sewer Contractors" or "Plumbing Drains & Sewer Cleaning". If you plan to hire a contractor we recommend getting estimates from more than one company.

City of Redwood City representative notes: _____

_____

_____

City of Redwood City Representative:

_____

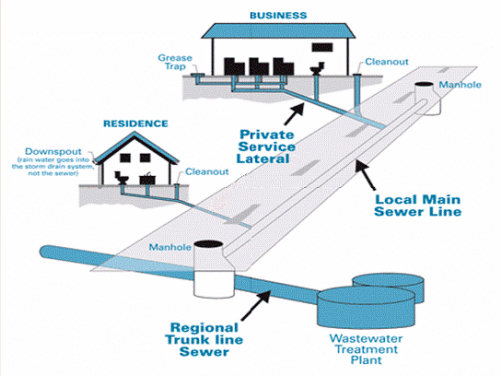
For questions or comments, please call

City of Redwood City

M-F 7:30am - 4:30pm: 650.780.7464
After Hours: 650.780.7190

How a Sewer System Works

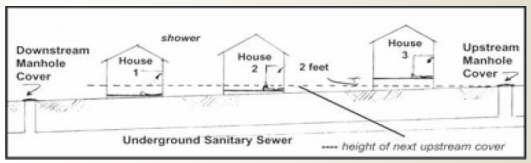
A property owner's sewer pipes are called ***service laterals*** and are connected to larger local main and regional trunk lines.
Service laterals run from the connection at the home to the connection with the public sewer. These laterals are the responsibility of the property owner and must be maintained 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 Redwood City
(650) 780-7464

San Mateo County Environmental Health
(650) 372-6200

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.

San Francisco Regional Water Quality Control Board
(510) 622-2300
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

Provided to you by:

City of Redwood City
Public Works Department

1400 Broadway Street
Redwood City, CA 94063
(650) 780-7464

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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.

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 Redwood City. 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, You can locate local firms by looking in the Yellow Pages under "Water Damage" or "Fire Damage." 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 solutions, 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.

Element 7 Appendix

1. Water Environment Federation's "Fat Free Sewers" Brochure
2. Grease Removal Device Maintenance Log
3. Grease Hauling Log
4. Food Serving Establishment Data Entry Form

Fats, oils, and greases aren't just bad for arteries and waistlines; they're bad for sewers, too.

Sewer overflows and backups can cause health hazards, damage home interiors and threaten the environment. A common cause of overflows is sewer pipes blocked by grease. Grease gets into the sewer from household drains as well as from poorly maintained grease traps in restaurants and other businesses.

Las grasas y los aceites no sólo son perjudiciales para las arterias y para la figura; también son dañinos para las alcantarillas.

Los derrames y desbordamientos de aguas residuales pueden ser peligrosos para la salud, dañar el interior de los hogares, y amenazar el medio ambiente. Una causa cada vez más común de derrames es las alcantarillas obstruidas por grasa. La grasa llega a las alcantarillas desde los desagües domésticos y trampas de grasa mal mantenidas en restaurantes y otros negocios.

Water Environment Federation®
Preserving & Enhancing the Global Water Environment

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Alexandria, Virginia
22314-1994 USA
Tel. 1-800-666-0206
Fax. 1-703-684-2492
www.wef.org

Printed on 100% recycled paper.

HS1100 8/2008

Fat-Free Sewers

Prevent Fats, Oils, and Greases from Damaging Your Home and the Environment

ALCANTARILLAS SIN GRASA

Evite que las grasas y los aceites dañen su hogar y el medio ambiente

Helping To Prevent Sewer Overflows and Backups Is Easy.

Where Does the Grease Come From?

Grease is a byproduct of cooking that comes from meat fats, lard, oil, shortening, butter, margarine, food scraps, baked goods, sauces and dairy products. When washed down the sink, grease sticks to the insides of sewer pipes (both on your property and in the street). Over time, it can build up and block an entire pipe.

Caution: Home garbage disposals do not keep grease out of the plumbing system. Moreover, hot water and products such as detergents that claim to dissolve grease only pass it down the line and cause problems elsewhere.

The results can be:

- Raw sewage overflowing in your home or the house next door.
- An expensive and unpleasant cleanup that often must be paid for by you, the home or business owner.
- Raw sewage overflowing into parks, yards, and streets.
- Potential contact with disease-causing organisms.
- An increase in operation and maintenance costs for local sewer departments, which leads to higher sewer bills for customers.

You Can Help!
Help prevent sewer overflows by:

- Never pouring grease down sink drains or into toilets.
- Scraping grease and food scraps into a can or the trash for disposal (or recycling where available).
- Putting baskets/strainers in sink drains to catch food scraps and other solids, and emptying them into the trash.
- Speaking with your friends and neighbors about how to keep grease out of sewers.

Es fácil prevenir los derrames y desbordamientos de aguas residuales.

¿De dónde proviene la grasa?

La grasa, uno de los productos derivados de la preparación de comida, está presente en la carne, manteca animal, aceite vegetal, manteca vegetal, mantequilla, margarina, sobras de comida, productos para hornear, salsas, y productos lácteos. Cuando entra por el desagüe, la grasa se pega al interior de las tuberías de alcantarillado (tanto las de su propiedad como las de la calle); con el tiempo, puede acumularse al punto de bloquear la tubería por completo.

Advertencia: Los trituradores de basura domésticos no impiden la entrada de grasa al sistema de cañerías. Es más, el agua caliente y los productos como los detergentes que alegan ser capaces de disolver la grasa, pueden trasladarla por las cañerías y causar problemas en otras zonas.

Esto puede traer las siguientes consecuencias:

- Desborde de aguas residuales en el interior de su hogar o el de su vecino.
- Necesidad de una limpieza costosa y desagradable que casi siempre es responsabilidad de usted, el propietario de la casa o negocio.
- Desborde de aguas residuales hacia parques, jardines, y calles.
- Posible contacto con organismos causantes de enfermedades.
- Crecientes costos de operación y mantenimiento para los organismos locales de alcantarillado y, en consecuencia, facturas más altas para los consumidores.

¡Usted puede ayudar!
Ayude a evitar derrames en las alcantarillas de las siguientes maneras:

- No vierta nunca grasa por el desagüe del fregadero ni en inodoros.
- Raspe la grasa y las sobras de comida y colóquelas en una lata o en la basura para desecharlas (o reciclarlas, si dispone de esta opción).
- Ponga filtros o coladores en los desagües de los fregaderos para atrapar las sobras de comida y otros sólidos, y deseche su contenido en la basura.
- Hable con sus amigos y vecinos sobre cómo impedir que la grasa entre en las alcantarillas.

MAINTENANCE LOG (GREASE TRAPS & VAULTS)

Facility Name: _____

DATE	NAME	TRAP OR VAULT	ACTIVITY (F.O.G. Removed, Notes)

For questions or comments contact the City of Redwood City Public Works Services at 650-780-7464.

GREASE HAULING LOG

Facility Name: _____

DATE	NAME/ADDRESS OF GREASE HAULER	ESTIMATED VOLUME HAULED OFF-SITE

For questions or comments contact the City of Redwood City Public Works Services at 650-780-7464.

SOUTH BAYSIDE SYSTEM AUTHORITY

FOOD SERVING ESTABLISHMENT DATA ENTRY FORM (draft 8-26-08)

Business Name: _____**Database File No.:** _____

Inspection Date: _____

Start Time: _____ **End:** _____ **Total Time:** _____

Facility Address: _____

User Contact: _____

Title: _____

Contact Telephone: _____ **Fax:** _____ **Email:** _____

SBSA Inspector(s): _____ **Report Completed by:** _____

Type of FSE: _____

FSE Priority and inspection frequency: ☐3 – monthly inspection needed ☐ 2 – quarterly inspection needed ☐1 – annual inspection or less frequently ☐not classified – not yet inspected

Purpose of Inspection: ☐Initial complete ☐Interceptor check and follow up

☐Trap check and follow up

☐Other_____

Date of Last SBSA Inspection: _____ By: _____

Sample Taken? ☐Yes ☐No If yes, split? ☐Yes ☐No

Describe: _____

Grease Removal Device (GRD): ☐Grease Trap ☐Grease Interceptor

Frequency of GRD cleaning:

Stated by FSE staff _____

Based on log entries _____

List SBSA Recommended Logs: ☐Grease Removal Device (GRD) Maintenance Log

☐Grease Hauling Log

On-site Measurements: ☐Grease Trap ☐Grease Interceptor

_____Depth of top grease layer (inches)

_____Depth of lower solid's layer (inches)

_____Total depth (inches)

_____ % capacity used

What grease generating Kitchen Equipment is Present, where does grease go?

___Skillet Grease: _____

___Deep Fryer Grease: _____

___Grill Grease: _____

___Rotisserie Grease: _____

___Ventilation System Grease: _____

___Wok Station Grease: _____

___Garbage Disposal Grease: _____

___Dishwasher Grease: _____

___Other Grease: _____

Comments:_____
_____
_____
_____
_____

Sinks and drains in the kitchen and surrounding area:

___hand wash sink ___food prep sink ___pot sinks

___Pre-rinse sink ___ rinse sink ___ mop sinks

___floor drains

Comments:_____
_____
_____
_____

Grease Disposal Method:

☐Grease Hauler ☐Garbage ☐Private Citizen ☐Other

Name of Grease Hauler: _____

Comments:_____
_____
_____
_____

Element 8 Appendix

1. City of Redwood City Sewer Master Plan Update

WEST YOST ASSOCIATES
Consulting Engineers

TECHNICAL MEMORANDUM

DATE: January 28, 2013 Project No.: 369-06-12-06

TO: Jimmy Tan, P.E., Senior Civil Engineer

FROM: Vivian Housen, R.C.E. #46324
Jon Wells, R.C.E. #67782

SUBJECT: City of Redwood City Sewer Master Plan Update

BACKGROUND

The City of Redwood City (City) updated its Sanitary Sewer Master Plan in August of 2008 (2008 Master Plan). The 2008 Master Plan developed wastewater flow projections based on population, water use, and land use information; developed a hydraulic model of the trunk sewer system; identified existing capacity deficiencies and future capacity requirements; identified priority areas for I&I reduction opportunities; and developed a capacity-related Capital Improvement Program (CIP). The proposed CIP included sixteen (16) capacity improvement projects required to eliminate sewer system overflows (SSOs) during the selected design storm, which comprised a wet weather event with 5-year recurrence interval and 8-hour duration (5-year storm).

Since this time, the City has completed the highest priority capacity project that was identified in the 2008 Master Plan and conducted additional annual flow monitoring. The ongoing flow monitoring program captured high quality data from several wet weather seasons that occurred subsequent to completion of the 2008 Master Plan. The City has also recently updated its General Plan demand projections. To address these changes, this 2013 Master Plan Update was conducted to accomplish the following: amend the hydraulic model to incorporate updated buildout projections; review and recalibrate the hydraulic model using recently collected flow data; and evaluate the need for capacity improvements using new flow projections. The 2013 Update also reviewed how system flows and associated CIP recommendations would change under a more severe 10-year, 24-hour design storm condition (10-year storm).

This Technical Memorandum (TM) is organized to generally follow the outline of the 2008 Master Plan. Each section of the TM briefly summarizes and then supplements the information provided in the 2008 Master Plan. Specifically, this TM consists of the following sections:

- Existing Sanitary Sewer System
- Hydraulic Model Updates

- Existing and Future Wastewater Flows
- Capacity Analysis
- Updated Capital Improvement Program
- Project Implementation Recommendations

EXISTING SANITARY SEWER SYSTEM

Redwood City is located in San Mateo County, between the City of San Carlos to the north, and the Town of Atherton and City of Menlo Park to the south. The City's service area comprises three distinct areas. The main part of the City includes the City's Downtown as well as residential areas. Two additional communities, Seaport/Pacific Shores and Redwood Shores, are located along the San Francisco Bay, on the eastern boundary of the City. The City's service area is shown on Figure 1.

The City's sanitary sewer collection system consists of approximately 192 miles of gravity and force mains, as well as lower laterals. The system also includes 31 pump stations that are located in Seaport/Pacific Shores and Redwood Shores. Flows are conveyed from all parts of the City to the Maple Street pump station, and then to the South Bay System Authority (SBSA) wastewater treatment plant.

The City's sanitary sewer system and County of San Mateo connections have not changed significantly since the 2008 Master Plan. Several pipeline projects have been completed, as discussed further below. However, these projects did not change the overall operation of the sewer collection system.

The City's projected buildout flows, as presented in the updated General Plan, have generally decreased from the values that were used in the 2008 Master Plan. The most significant changes in water demands, which translate to sewer flows, occurred within the main part of the City. However, the methodology that was used to refine future water demands, which is discussed below, resulted in a decrease in projected buildout flows throughout the service area.

The 2013 Update focused only on changes that have occurred within the City's service area. Therefore, flow projections from the County of San Mateo Sewer Maintenance Districts, were not adjusted as part of this update.

HYDRAULIC MODEL UPDATES

The existing hydraulic model represents the trunk sewer system, and includes 36 miles of pipe, or approximately 20 percent of the sewer collection system. The model also includes eight pump stations in Redwood Shores and two pump stations in Seaport/Pacific Shores. The modeled network includes nearly all of the City's 10-inch and larger pipes as well as a few 8-inch pipes.

The 2008 hydraulic model appears to have been developed and calibrated using Innovyze® Infoworks™ CS modeling software. The network was then converted to DHI's MIKE URBAN software for the analysis. The 2013 hydraulic model update and analyses were both completed using Infoworks™ CS software. This software provides fully dynamic flow routing of both dry and wet weather sanitary sewer flows for analysis.

Pipeline Assets

The 2008 hydraulic model network, including modeled manhole rim and invert elevations and the existing representation of the City's numerous flow splits, was utilized for the 2013 Update. The following attributes of the existing model network were reviewed for completeness:

- Physical pipe network, sewer loads (flows) and hydraulic model results;
- GIS shapefiles used form model development;
- Available electronic data and flow information, including flow data collected post-2008; and
- SSO information as obtained from the CIWQS public database.

In addition, the following recent system changes were reviewed and addressed as follows:

1. The City provided as-built drawings for a gravity main in Hopkins Avenue that was upsized from 6- to 8-inches in diameter. This pipe was not included in the original network, and is not hydraulically critical. Therefore, the pipe was not added to the hydraulic model network. However, the as-built drawings contained invert elevations for the 15-inch gravity main in Hopkins Avenue that were different than those included in the model. The inverts in the model were updated as indicated on the drawings.
2. The City provided as-built drawings for small diameter gravity main replacement projects in Redwood Avenue and Hillcrest Drive. As with the Hopkins Avenue pipeline, these pipes were not hydraulically critical and were not added to the hydraulic model.
3. The City provided as-built drawings for a gravity main diameter increase and flow route change in Manzanita Drive. This new infrastructure, which comprised 2008 Master Plan project 08b, was added to the hydraulic model. Also, the flow route was changed as indicated in the drawings.
4. In response to a City inquiry about developer flows, it was discovered that an existing 12-inch diameter gravity main in Winslow Street and the adjoining easement to the north had not been included in the original hydraulic model. The gravity main was added to the model network and associated flow loadings adjusted based upon sewer system maps provided by the City.

The updated hydraulic model network is shown on Figure 2.

Pump Station Assets

The hydraulic model network includes the ten pump stations that discharge to the modeled pipe network. The remaining 21 pump stations are smaller, and discharge to the unmodeled collection system. Since 2008, the City has completed upgrades to Pump Stations 12, 14 and 15. Of these three stations, Pump Station 12 is included in the hydraulic model network. The modeled pump station parameters were adjusted from the original network to reflect the upgrades, as shown in Table 1. Because base wastewater flow projections decreased system-wide, the master plan update did not re-evaluate pump station assumptions or capacities for the 5-year storm.

As part of the master plan update, the predicted pump station flows for the ten modeled pump stations as compared to firm capacity were reviewed under the 10-year storm scenario. Pump station firm capacities are listed in Table 1, which is also included as Table 3-1 in the 2008 Master Plan.

Table 1. Modeled Pump Station Firm Capacities

Pump Station	Number of Pumps	Pump Type	Approximate Firm Capacity, MGD[(a)]
PS #1	2	VFD	0.9
PS #2	2	VFD	1.5
PS #3	2	VFD	1.9
PS #10	2	VFD	5.1
PS #12[(b)]	2	VFD	2.0
PS #7	2	Constant	1.2
PS #19	2	Constant	1.0
PS #22	2	VFD	0.7
Marina PS	2	VFD	1.2
Pacific Shores PS #1	2	VFD	1.3

(a) See 2008 Master Plan Table 3-1 for assumptions related to pump station firm capacity.
(b) PS # 12 capacity changed from 2008 Master Plan. Third pump converted from dry pit to submersible. Pumps upsized to 30 hp. Although the firm capacity of this pump station was listed as 2.7 mgd in the 2008 Master Plan, the capacity was actually 1.4 mgd because only one pump was operated at a time.

Sewersheds

The 2008 hydraulic model included 231 sewersheds ranging in size from just over one acre to nearly 300 acres. Sewersheds delineate groups of pipes that flow by gravity to a single point in the collection system. A review of the sewershed delineations confirmed that the defined boundaries were generally appropriate. Due to the complex nature of the City's many flow splits, the delineation of split flows was not changed from the original model.

In the 2008 model, sewersheds were then grouped into A, B, and C basins in order to isolate areas tributary to the available flow monitors. These larger basins were retained in the 2013 Update where possible. However, basin borders required minor adjustments, and some new basins were added as needed to coordinate the larger basins with post-2008 flow monitoring locations. Revisions that were made to the basin delineations are described on Figure 3.

EXISTING AND FUTURE WASTEWATER FLOWS

The 2008 Master Plan developed base wastewater flow estimates using population and water consumption data. Flow monitoring and rainfall data were then used to calibrate the model for dry and wet weather flow conditions.

Base Wastewater Flow

A review of existing base wastewater flow estimates from the 2008 hydraulic model confirmed that the methodology used to estimate existing flows, and the resulting values were reasonable. 2010 census data shows that population within the City has increased from the assumptions used for the 2008 Master Plan. However, an evaluation of water usage, as discussed below, shows that current water usage, and resulting base wastewater flows, are lower than were projected in 2008 for the current period. Therefore, the 2013 Update assumed that projections for the current year are conservative and approiate, and focused primarily on changes in the volume and location of future dry weather flows which would result from changes in long-term General Plan projections.

The City recently completed a Water Master Plan that provided detailed estimates of future water usage based on anticipated development, and considering recycled water usage and conservation. The locations of future demand increases were identified by using City-supplied Traffic Area Zone (TAZ) polygons that indicated where population and employment growth is predicted to take place in the City. The TAZ areas are shown on Figure 4. The polygons shown in red indicate areas where growth in residential or employment population is expected. Nearly all future residential growth is assumed to occur in multiple family developments within the Downtown area, along transit corridors, and in emerging mixed use waterfront neighborhood centered on Bair Island Road in the Seaport/Pacific Shores area. Additional information on water demand projections can be found in Chapter 2 of the City's 2011 Water Master Plan.

The Urban Water Management Plan predicts an increase of water demand by 12% in the Single Family Residential, Multi-Family Residential, and Commercial classifications by 2030. A 12% growth in sewer flow from existing values would result in an increase of 0.99 mgd. This flow growth volume was apportioned to residential and non-residential growth based upon water demand growth, and the results were distributed according to the distribution of dwelling units in the residential TAZ values and distribution of non-residential square footage in the non-residential TAZ values. To be consistent with the methodology used to assign sewer loads to the existing model, buildout dry weather flows for the main portion of the City and Redwood Shores were adjusted within the associated sewer subcatchments, and flows for the Seaport/Pacific Shores area were adjusted globally at the Maple Street pump station.

A sample of residential TAZ data is shown in Table 2; a sample of non-residential data is shown in Table 3.

Table 2. Sample Residential TAZ Data

TAZ ID	Gross Acres	Residential - Multifamily					
		2008	2008 – 2030				2030
		Existing DU	Pipeline Growth DU	Targeted Growth DU	Distributed Growth DU	Total Growth DU	Total DU
170 57		3	-	-	-	-	3
171 57		-	-	-	-	-	-
172 90		5	-	-	-	-	5
173 23		-	-	-	0	0	0
174 37		-	-	-	-	-	-
184 42		-	-	786	0	786	786
186 23		52	-	20	0	20	72

Table 3. Sample Non-Residential TAZ Data

TAZ ID	Gross Acres	Non-Residential-Retail					
		2008	2008 – 2030				2030
		Existing Sq Ft	Pipeline Growth Sq Ft	Targeted Growth Sq Ft	Distributed Growth Sq Ft	Total Growth Sq Ft	Total Sq Ft
170 57		189,835	-	-	24,838	24,838	214,673
171 57		-	-	-	-	-	-
172 90		-	-	-	-	-	-
173 23		-	-	-	-	-	-
174 37		-	-	-	-	-	-
184 42		356,273	-	-	46,789	46,789	403,061
186 23		62,569	-	-	24,805	24,805	87,374

Diurnal flow patterns from the 2008 model were retained in the updated hydraulic model. Existing and future flows are shown in Table 4.

Table 4. Comparison of Existing and Future Average Dry Weather Flows (Including Redwood Shores)

Flow Description	2008 Master Plan	2013 Update	Decrease from Predicted, %
2008 Flows	8.91 mgd	n/a	n/a
2013 Flows	9.03 mgd	8.04 mgd	11.0%
Future Flows (2030)	10.90 mgd	8.94 mgd	18.0%

Groundwater Infiltration

During the development of the 2008 hydraulic model, flow measurements did not indicate the presence of significant groundwater infiltration within the main area of the City. Moderate groundwater infiltration was found in Redwood Shores and Seaport/Pacific Shores. This flow was represented by the addition of 240 gallons per day of base flow in the hydraulic model. A review of flow data collected since this time did not indicate any factors that would change these assumptions. Therefore, groundwater infiltration values from the 2008 hydraulic model were used in the 2013 Update.

Flow Monitoring Data

The 2008 hydraulic model was calibrated to dry and wet weather conditions using temporary flow monitoring data from three separate winter seasons: 2004/2005 (eight sites), 2005/2006 (seven sites), and 2006/2007 (twelve sites). The two earlier flow monitoring programs captured flows in the upper basins, whereas the 2006/2007 program captured downstream flows.

One rain gauge was installed for the two earlier flow monitoring periods, and two gauges for the 2006/2007 program. Rainfall in 2004/2005 and 2006/2007 was generally mild. However, the City was able to capture flows during several significant events 2005/2006.

The City has conducted yearly wet weather flow monitoring studies since the completion of the 2008 Master Plan. Flow monitoring locations have varied from year to year in order to address specific issues in a given year (for instance a potential Capital Improvement Project) and to provide coverage around the entire collection system. The 2007/2008, 2008/2009, 2009/2010, 2010/2011, and 2011/2012 wet weather temporary flow studies were provided by the City and used to further calibrate the hydraulic model for the 2013 Update. The flow monitoring locations from these studies are shown on Figure 5, and in detail on subsequent Figures 5a through 5e. As shown on Figure 5, not all of the flow monitoring locations are found on gravity mains that are included in the hydraulic model.

Table 5 lists the largest measured rainfall event from each season beginning in 2004/2005. It is generally advantageous to calibrate the hydraulic model to the largest possible wet weather event, provided the system does not experience overflows during this event. The City experienced wet weather events after 2008 that were larger than the calibration event used for the 2008 Master Plan. Therefore, factors representing I&I in the hydraulic model were adjusted so that predicted wet weather flows more closely matched post-2008 measured flows. This effort resulted in a more closely calibrated hydraulic model.

Table 5. Largest Measured Rainfall Events

Monitoring Season	Date of Event	Max 24-Hour Rainfall, in
2004/2005	Dec 26-28, 2004	1.16
2005/2006	Dec 30-31, 2005	2.33
2006/2007	Feb 7-11, 2007	1.12
2007/2008	Jan 3-4, 2008	3.36[(a)]
2008/2009	Jan 21-22, 2009	0.61
2009/2010	Jan 19-20, 2010	1.74
2010/2011	Dec 18-19, 2010	1.94
2011/2012	Jan 20-21, 2012	1.43

[(a)] Although the largest rainfall was measured during 2007/2008, meters were placed in locations that isolated smaller, upstream sewersheds in lieu of downstream interceptors. For this reason, this time period was not ideal for wet weather calibration.

Hydraulic Model Recalibration

The 2008 hydraulic model flows were first calibrated to measured dry weather flow data from each of the three flow monitoring periods, and then to measured wet weather flows, again from each of the three periods. Model calibration involved adjusting parameters that impact the amount and timing of collection system flows until predicted flows match measured data for a selected time period.

Dry Weather Flow Calibration

The 2008 dry weather calibration yielded reasonable overall results. However, discrepancies at a number of meters could not be resolved, and were generally attributed to incorrectly modeled flow splits. The 2008 dry weather calibration was reviewed by comparing modeled flows to new data collected after 2008. The more recent dry weather flow data showed flows that were generally lower than those measured prior to 2008. The decrease in dry weather flows is likely the result of decreased water usage that has been documented in the same timeframe, and is discussed further in the City's 2011 Water Master Plan.

The 2013 hydraulic model was recalibrated to dry weather flows measured between 11/28/2011 and 2/7/2012. In general, modeled dry weather flows were calibrated to within 5 percent of measured flows. The recalibrated model generated Average Dry Weather Flow (ADWF) from main City area of 6.85 mgd, as compared to a calibration value of 7.61 mgd reported in the 2008 Master Plan. Calibration results are shown in Table 6. Individual calibration plots are included in Appendix A.

In general, monitored and modeled flows were calibrated closely, and most of the challenges described in the 2008 Master Plan were not seen in calibration during the 2013 Update. However, two areas did present calibration challenges. The first of these areas was described in the 2008 Master Plan as the difficulty in calibrating across the C01/C02 flow split. The same challenge was experienced in the 2013 Update with Site 1 and Site 2 from the 2008/2009 dataset. However, the cumulative flow volumes for the meters are consistent, and effects of the flow split are localized

in the collection system. A second challenge was encountered at Site 6 from the 2009/2010 dataset. An un-monitored flow split upstream might be the source of the difficulty, but the flow balance could not be confirmed. Because the difficulty occurred at a downstream location, the uncertainty resulting from this calibration variance was minimized.

Table 6. Dry Weather Calibration Results for Flows Between 11/28/2011 and 2/7/2012

Meter	Meter Peak Dry Weather Flow, mgd	Model Peak Dry Weather Flow, mgd	Percent Difference	Meter Average Dry Weather Flow, mgd	Model Average Dry Weather Flow, mgd	Percent Difference
1	0.68 0.71		4.3%	0.41 0.38		7.1%
2	.07 .07		0.1%	.04 .05		14.5%[(a)]
3	0.33 0.34		4.0%	0.19 0.19		0.0%
4	0.49 0.51		4.0%	0.28 0.27		4.2%
5	0.08 0.07		4.1%	0.05 0.05		0.2%
6	0.59 0.61		3.0%	0.35 0.35		0.1%

[(a)] A flow split occurs at the location of meters 1 and 2 that was difficult to replicate in the hydraulic model during wet weather flow. However, combined flows across the two meters were matched during calibration. Therefore, this is a localized issue.

Wet Weather Flow Calibration

The 2008 hydraulic model was calibrated for wet weather conditions, selecting one period from each of the three flow monitoring seasons. Flows were calibrated first to upstream meters, and then to downstream meters. The wet weather calibration confirmed that antecedent rainfall conditions strongly influenced model accuracy. The sensitivity of the hydraulic model results to antecedent conditions further supports recalibration to the larger, longer duration storms that were measured post-2008.

The 2008 wet weather recalibration utilized the RTK method. This method is the most widely used synthetic unit hydrograph prediction methodology for collection system model development, and provides reliable results. The RTK method generates a series of three triangular hydrographs that represent short-term, medium-term, and long-term rainfall response. The RTK parameters include:

1. R is the area of the graph representing the portion of rainfall falling on a subcatchment that enters the sewer collection system.
2. T is the time from the onset of rainfall to the peak of the triangle.
3. K is the ratio of the “time to recession” to the “time to peak” of the hydrograph.

This methodology was different that the regression analysis methodology used by SBSA to predict peak wet weather flow (PWWF). Both methods provide reasonable results, but are only as accurate as the data that is used to develop flow projections.

The City has collected a large amount of site-specific data over eight consecutive years. The availability and accuracy of this information supports the use of the RTK method for calibration of the hydraulic model. Because the RTK method enables the City to match flows for every basin, which then translate to calibrated flows from the overall system, this methodology should provide the most accuracy in model calibration results.

For the 2013 Update, wet weather calibration began with comparison of 2008 calibration values to subsequently gathered flow monitoring data. R, T, and K values were adjusted for each sewer drainage basin until predicted wet weather flow in the 2013 hydraulic model matched results gathered during the selected wet weather calibration events.

Overall, modeled wet weather flow was recalibrated to within five percent of measured peak flow. This standard was not achieved at the locations described above in the dry weather calibration study. In addition, the modeled flow at Site 2 from the 2009/2010 dataset did not respond to wet weather as the flow monitor measured. This phenomenon was isolated and not repeated at surrounding meters, either upstream or downstream.

The wet weather periods used for model calibration from each post-2008 flow monitoring study are listed in Table 7. Calibration results for the largest rainfall event, which occurred between December 16 and December 23, 2010, are summarized in Table 8. Individual calibration plots for flow monitor locations are included in Appendix B. These plots also show predicted flow at the Maple Street Pump Station for each calibration event.

Table 7. Wet Weather Calibration Periods

Monitoring Season	Date of Event
2007/2008	Jan 2-9, 2008
2008/2009	Dec 21-28, 2009
2009/2010	Jan 16-23, 2010
2010/2011	Dec 16-23, 2010
2011/2012	Jan 19-24, 2012

Table 8. Wet Weather Calibration Results for Rainfall on 12/16/2010 to 12/23/2010

Flow Meter	Meter Peak Flow, mgd	Model Peak Flow, mgd	Percent Difference in Peak Flow
1 1.09		1.11	1.4%
2 0.47		0.70	49%[(a)]
3 1.77		1.75	1.2%
5 1.68		1.72	2.1%
7 0.96		0.96	0.2
8 1.29		1.27	1.7%

[(a)] The calibration result at Site 2 is the result of a brief spike that does not represent the true data trend at the site during calibration.

CAPACITY ANALYSIS

The capacity analysis for the 2013 Update was performed in an analogous manner to that performed for the 2008 Master Plan. Design criteria were established, and then the capacity of the collection system was evaluated based upon these criteria using the hydraulic model.

Capacity Analysis Criteria

The same pump station and gravity main design criteria that were used for the 2008 Master Plan were used for consistency in the 2013 Update. Pump stations were determined to have sufficient capacity when the PWWF entering the pump station was equal to or less than the firm capacity of the pump station, defined as the capacity with the largest pump out of service.

Gravity mains were determined to have sufficient capacity when flows did not exceed a surcharge condition that was within five feet of the manhole rim elevation. An exception to this criteria was made for shallow pipes that showed water level within five feet of the manhole rim, when at the same time connecting pipes were not surcharged.

Force mains were considered sufficient if velocities did not exceed 7.5 feet per second.

Design Storm Criteria

A design storm establishes the volume and distribution of rainfall that the collection system will experience during a single rainfall event. For the 2008 Master Plan, a synthetic design storm with a five year recurrence interval and 8-hour duration was created for the analysis, based on the IDF curves in the City's 2006 Design Standards. This design event was a "nested" storm, in that it also included the 5-year 1-hour storm, the 5-year 2-hour storm, etc.

Following this evaluation, a more conservative design storm with a 10-year recurrence interval and 24-hour duration, as provided through the National Oceanographic and Atmospheric Administration (NOAA) rainfall atlas and distributed using the Soil Conservation Services (SCS) Type 1 distribution, was applied to the model. An intermediate design storm, such as the 10-year 6-hour storm would provide similar results in terms of capacity needs, because peak flows for a

10-year storm are consistent for various duration events. The difference between a 10-year, 6-hour and 10-year, 24-hour event is found in the volume of flow, which becomes important when planning for wet weather storage. The 10-year, 24-hour design storm criteria is consistent with criteria in use by SBSA for planning future pumping, conveyance, and wet weather storage improvements.

Figure 6 shows the 10-year, 24-hour design storm rainfall hyetograph for Redwood City, and compares this information to a NOAA 10-year, 6-hour and 5-year, 24-hour design storm. Also shown on Figure 6 is the 5-year, 8-hour design storm from the 2008 Master Plan.

Capacity Analysis Results – Dry Weather Flows

The 2008 Master Plan identified one pipeline, the Manzanita Street gravity sewer, which would be greater than half full during the dry weather scenario. This project was addressed through a recent capital improvement project. The 2008 evaluation determined that the remaining system has sufficient capacity to convey dry weather flows.

The results of the 2013 capacity analysis for gravity mains in the main City area are shown on Figure 7 for existing peak dry weather flow (PDWF), on Figure 8 for future PDWF. The surcharge state (depth to diameter, or d/D ratio) is shown on each figure for the City's gravity mains. The 2013 Update confirmed that the City's collection system has adequate capacity for both existing and future PDWF, and that the system operates less than half full under PDWF conditions.

Capacity Analysis Results – Wet Weather Flows

The 2008 Master Plan identified 16 wet weather capacity improvement projects, for a total program cost in 2007 dollars of $37.8 million. Due to the number and cost of proposed projects, and the potential implications that could result from the application of a larger design storm, these recommendations were reviewed carefully as part of the 2013 Update.

The evaluation first reviewed pipeline capacity under existing and future wet weather flows generated using the 5-year storm and followed this evaluation with a similar analysis using the 10-year storm.

2008 (5-Year) Design Storm Results

Existing and future dry weather flows were reduced in the 2013 update. Therefore, dry weather, and subsequently, predicted wet weather flows were generally lower across the City. These lower flows result in a reduction in the capacity improvements described as Project 10 from the 2008 Master Plan (James Avenue, California Street, Marshall Street, Jefferson Avenue, Bradford Street, Walnut Street), and also result in Project 9 being potentially not needed (El Camino Real from Center Street to Manzanita Street). If the pipeline improvements of Project 9 are not required, the pipeline improvements of Project 8c (Heller Street from Manzanita to Chestnut, Chestnut Street to Broadway) also become unnecessary.

Due to the extent of the Project 10 project, it is recommended that any reduction in scope be reviewed as part of the preliminary design process for the project. Also, to address potential changes in Projects 9 (and subsequently, Project 8c), additional flow monitoring is recommended to isolate this project area and determine whether capacity improvements are required.

As part of the recalibration effort, which was based on additional, site-specific flow data, areas of localized higher predicted flows were also found. Specifically, Project 4 from the 2008 Master Plan requires a greater extent of pipeline replacement than listed in 2008. Using the 5-year storm, it is recommended that this project be expanded to include 2,250 linear feet of 15-inch pipe, for an adjusted estimated cost (in 2007 dollars) of $1,141,000.

Figures 9 and 10 show capacity results using the 5-year, 8-hour design storm criteria. The surcharge state (depth to diameter, or d/D ratio) is shown for gravity mains, and manholes are identified if the surcharge level is within 5 feet of rim elevation, or if the manhole is predicted to overflow. Shallow pipes may show water level within five feet of the manhole rim, although connecting pipes are not surcharged.

10-Year Design Storm Results - Pipelines

Figures 11 and 12 show capacity results for existing and future flows using the 10-year, 24-hour design storm.

Using the 10-year storm criteria, the hydraulic model determined that two of the 2008 capacity improvements require more extensive upgrades, and identified two new capacity improvement projects. The four new/expanded projects are shown in Table 9 and also on Figure 13.

Table 9. Updated CIP Projects

Project ID	Location	Change in Project
4 Revised	Brewster Avenue Between Arch Street and Myrtle Street	Surcharge extends further up Brewster Avenue. Replacement length increased from 600 to 2,900 linear feet. Final pipe diameter ranges from 12- to 15-inches.
12 Revised	Lincoln Avenue, Beech Street, Stambaugh Street, Walnut Street	Surcharge extends further up Lincoln Avenue. Replacement length increased from 5,700 to 6,800 linear feet. Final Pipe diameter ranges from 30- to 33-inches.
14 New	Clinton Street and Adams Street West of Lincoln Avenue	Upsize 2,900 linear feet of existing 8- and 10-inch pipe on and Adams Streets, west of Lincoln Avenue to 12-inch diameter pipe. Flow monitoring confirmed that surcharges were not the result of backwater effects from Lincoln Avenue.
15 New	Dover Road, Madison Avenue, and Upton Street	Upsize 3,200 linear feet of existing 10- and 12-inch pipe to 15-inch diameter pipe. Model predicts insufficient capacity downstream of an existing flow split to use the split to relieve capacity deficiencies.

10-Year Design Storm Results – Pump Stations

The 2008 Master Plan confirmed that modeled pump stations had sufficient firm capacity using 5-year storm criteria. The 2013 Update evaluated these pump stations based on their ability to provide firm capacity to convey flows from the 10-year storm assuming buildout conditions. The results of the pump station evaluations are shown in Table 10.

Table 10. Future PWWF Capacity Analysis

Pump Station	Number of Pumps	Approximate Firm Capacity, MGD[(a)]	Future PWWF Inflow, 10-Year Storm
PS #1	2	0.9	0.8
PS #2	2	1.5	2.1
PS #3	2	1.9	2.5
PS #10	2	5.1	6.0
PS #12	2	2.0	3.5
PS #7	2	1.2	1.3
PS #19	2	1.0	1.3
PS #22	2	0.7	0.7
Marina PS	2	1.2	0.8
Pacific Shores PS #1	2	1.3	2.1

[(a)] See 2008 Master Plan Table 3-1 for assumptions related to pump station firm capacity.

Modeled buildout peak wet weather inflow using the 10-year design storm exceeded firm capacity for seven of the ten modeled pump stations. This information should be considered preliminary, as these results were not compared to actual flow data, and the Redwood Shores and Seaport/Pacific Shores areas have not be included in the City's targeted flow monitoring programs. The wet weather factors that were applied to the Redwood Shores area in both the 2008 and 2013 hydraulic models were taken as an average of RTK factors across the main City system. Actual I&I contributions could vary across this portion of the service area, and a change in projected I&I would also change pump station flow results.

Force main velocities in the collection system did not exceed 7.5 feet per second under PWWF conditions from the 10-year storm. Also, the gravity mains in the Redwood Shores and Seaport areas have sufficient capacity to convey PWWF from the 10-year storm.

Maple Street Pump Station Flows

The 2008 Master Plan does not report a PWWF at the Maple Street pump station resulting from the 5-year design storm. However, based on 2008 hydraulic model results, terminal flow during the design storm in the buildout scenario is 37.3 mgd. When compared to the 2008 ADWF of 6.7 mgd, this value translates to a wet weather peaking factor of 5.4.

When a 10-year storm is applied to the buildout model, PWWF at the Maple Street pump station increases to 42.2 mgd. SBSA is currently finalizing design criteria for the Maple Street pump station upgrade. Prior SBSA documents established 33.7 mgd as the new design capacity of the pump station. However, based on the City's updated hydraulic model results, it would be prudent to adjust the design criteria to reflect a higher design capacity for this pump station.

The City has budgeted approximately $3.5 million annually for collection system improvements. The resulting improvements will remove sources of I&I and reduce wet weather flows over time. Therefore, it would be overly conservative to size the Maple Street pump station for the predicted buildout wet weather flow of 42.2.

The City's available budget is sufficient to replace up to 1.5 percent of the collector sewers on an annual basis. The City replaces lower laterals at the same time as pipeline replacements. Based on this understanding, and with reference to extensive studies conducted recently by other Bay Area agencies on the potential for future I&I reduction, it would reasonable to assume that replacement of all system pipes and lower laterals (over a period of 70 to 100 years) could achieve 50 percent or greater I&I reduction.

Using this approach, if the City rehabilitates 1.5 percent of the system per year, and this effort achieves up to 3/4 percent I&I reduction annually, the City could expect to reduce peak wet weather I&I by up to 260,000 gallons per day per year, or potentially up to 4 mgd by the end of the buildout timeframe (2030). As discussed further in the 2008 Master Plan, and should be explored further by the City, I&I reduction opportunities are basin-specific and cannot be generalized for the City or its service area. These values are presented only as a way to provide a preliminary estimate of system flows for future planning.

A 4 mgd I&I reduction would lower predicted buildout PWWF to approximately 38 mgd by the end of the buildout timeframe. Based on this estimate, designing the Maple Street pump station to accommodate PWWF of 38 mgd would be reasonable. As discussed further below, even if the City does not achieve the projected levels of I&I reduction, limiting pump station capacity to 38 mgd would not create an SSO risk for the City. When the Maple Street pump station capacity is limited to 38 mgd, flows back up into the system, but remain within the established planning criteria (*i.e.*, water surface remains at least five feet below the manhole rim elevation). As with all other scenarios, this criteria is exceeded for pipes that are shallower than five feet.

It would be prudent for the new station to be configured to cost effectively facilitate future expansion if needed, and for the City to develop a consistent and strategic annual pipeline replacement program to be implemented concurrently with the pump station expansion project. Also, the best measure of I&I reduction will be achieved through future flow monitoring, to track the benefits gained through the planned pipeline replacements.

Relationship Between Maple Street Pumping Capacity and System Hydraulics

Flow enters the Maple Street pump station through bar screens and then into the wet well. When the bar screens are maintained properly, the entrance to the pump station functions much like a free outfall for the collection system. The system was modeled with a free outfall into the Maple Street pump station in both the 2008 Master Plan and the 2013 in order to evaluate capacity needs for the collection system pipelines.

From time to time, during wet weather events, constraints at the Maple Street pump station create a backwater effect that raises the hydraulic gradeline (HGL) and created surcharging in the City's collection system. In order to assess the effects of pump station operations on collection system hydraulics, a 25.9 mgd flow constraint was placed on the modeled pump station outfall, and the existing PWWF scenario using the 5-yr storm was examined.

Because predicted PWWF is greater than the existing pump station capacity, the 25.9 mgd flow constraint creates significantly more surcharging in the collection system than found using a free outfall. The elevated HGL extends back across the Highway 101 and into the large gravity mains that convey flow to Maple Street. Presuming that the 2008 capacity improvements are implemented, in this scenario, the model may violate planning criteria (in terms of maintaining flows at least five feet below the manhole rim). However, even though surcharging is extensive, the model does not predict that any flow leaves the system.

Under buildout conditions, a 33.7 mgd constraint was added to the pump station outfall to represent the future capacity that is planned by SBSA. When future PWWF flows from both the 5-year and 10-year storms are constrained in this manner, surcharging is increased in a similar manner to the conditions that are found under existing conditions. Similarly, presuming that the capacity improvements that are presented in this 2013 Update are implemented, the model violates planning criteria but does not predict SSOs.

When the existing system is constrained as described above and analyzed without the benefit of the recommended capacity improvements, the combination of the flow constraint and existing capacity constraints results in predicted overflows. This is true for both the 5-year and 10-year storms. The results of this analysis for the 5-year storm are presented on Figure 14. As shown, surcharging increases throughout the downstream system. Overflows are predicted in the gravity main east of Maple Street that serves the area north of Highway 101, in the vicinity of the intersection of Maple Street and Marshall Street, in the gravity main that serves Main Street north of Veterans Boulevard, and in the gravity main serving Winslow Street at Whipple Avenue. The predicted overflows are similar, but with greater extent for the 10-year storm.

The predicted overflows described above result from the combination of downstream constraints and relatively flat gradients that result in the predicted HGL being above rim elevation. The implementation of the described CIP projects will reduce the capacity restrictions to the extent that the HGL can be lowered sufficiently to avoid overflows. However, as described above, the design criteria of 5 feet of freeboard between rim and HGL will not be maintained.

UPDATED CAPITAL IMPROVEMENT PROGRAM

The 2008 Master Plan presented a CIP that included sixteen projects with total estimated cost $38 million, in 2007 dollars. The 2008 CIP prioritized projects and also assigned a level of confidence in each project recommendation based on the strength of assumptions and background data. The 2013 Update amends and expands this CIP and uses a consistent approach for cost estimating and project prioritization, then updates all costs to a current (2012) cost estimating basis.

Estimated Project Costs

The 2008 project costs include baseline construction costs for gravity trunk sewers using open-cut and trenchless methods, lower lateral replacement for remove-and-replace projects, and cost allowances for project mobilization and demobilization, traffic control, and bypass pumping. An additional cost allowance for increased shoring was added for projects located near the San Francisco Bay. A 30 percent allowance for contingencies for unknown conditions and an allowance of 30 percent of construction cost for engineering, administration, and legal costs were added to develop the total project cost.

Capital costs for the 2013 Update were estimated by applying the 2008 unit costs and contingencies for consistency. Costs for both the 2008 Master Plan and 2013 Update were then adjusted from the December 2007 Engineering News Record Construction Cost Index (ENR-CCI) for San Francisco Bay Area of 9132 to the current ENR-CCI of 10355 (Four Quarter 2012).

The unit costs used for the original project cost estimates can be found in Table 6-2 of the 2008 Master Plan. Detailed project cost estimates are included as Appendix C of this TM.

Priority Ratings and Flow Confidence Levels

The 2008 Master Plan assigned Project Priority Ratings and Flow Confidence Levels to the proposed projects. Each project was given one of four priority ratings, based on the severity of the capacity limitation under existing PWWF conditions, as follows:

- Priority 1: Model-predicted overflow
- Priority 2: Model-predicted surcharging within approximately 3 feet of ground level
- Priority 3: Model-predicted surcharging within approximately 5 feet of ground level
- Priority 4: Project not triggered under existing conditions (surcharge, if any, greater than 5 feet)

Two project expansions and two new requirements were identified in this 2013 Update. Each of these projects is required to address a capacity deficiency that causes one or more SSOs in the hydraulic model, under the 10-year design storm. Therefore, all four projects were assigned a Priority Rank of 1.

Flow Confidence Levels indicated the level of confidence in the model flows based on metered flows in the area. Three different rankings were used in the 2008 Master Plan:

- Level 1: Flow meter on project reach surcharged during metered storm
- Level 2: Flow meter on project reach confirms model flow, but did not surcharge during metered storm
- Level 3: Flow meter near project reach (upstream or downstream) confirms flow

Following this criteria, three of the updated projects (4-Rev, 12-Rev and 14-New) were assigned Flow Confidence Level of 2 because a flow monitor was present in the project reach. The fourth project, 15-New, was assigned a Flow Confidence Level of 3.

Recommended Projects

Table 11 restates the 14 proposed projects from the 2008 Master Plan that were not revised through this 2013 Update. These projects are also listed in Table ES-1 of the 2008 Master Plan. Table 11 shows the Priority Ranking, Flow Confidence Level, 2008 proposed cost, and the updated 2013 cost estimate for each project.

Table 12 provides the same information for the two expanded projects and two new projects that are required to meet the 10-year design storm criteria.

The 2013 CIP includes 18 projects for a total cost in unadjusted (2007) dollars of $39.9M. After adjustment to a 2013 cost basis, the total estimated CIP cost is $45.3M.

PROJECT IMPLEMENTATION RECOMMENDATIONS

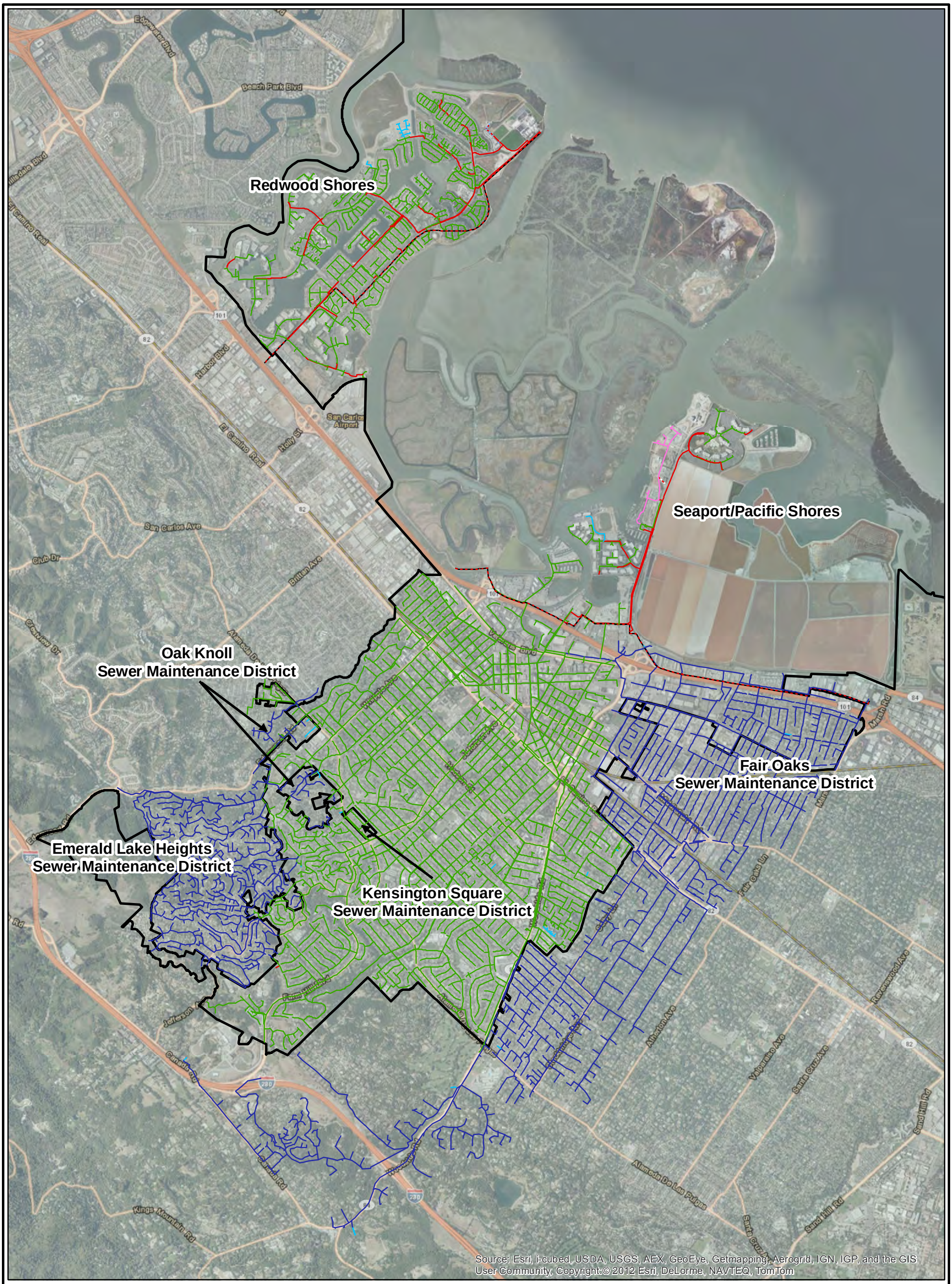
The following implementation recommendations have been developed to be consistent with and supplement recommendations from the 2008 Master Plan:

- Continue to move forward with planning and design of the Priority 1 projects, including Projects 11, 07, 10, 04-Rev, and 12-Rev. Seek opportunities to streamline and combine these and other proposed projects.
- Conduct additional flow monitoring in the Redwood Shores and Seaport/Pacific Shores areas and more closely evaluate pump station capacity under the 10-year, 24-hour design storm.
- Increase the Maple Street pump station future capacity requirement from 33.7 mgd to 36 mgd.
- Develop a strategic asset management program to prioritize pipeline replacements. Through this program address I&I reduction on a continuous basis, conduct future flow monitoring, and revisit capacity improvement needs improvements are implemented.

Table 11. 2008 Master Plan CIP Projects with Adjusted Cost, by Priority

2008 Project ID	Location	Description	Priority Rank	Conf. Level	Cost (2007 $)	Cost (2013 $)
08b	Manzanita Street north of El Camino, under railroad	1,700 feet of 18 inch pipe	1	1	Completed	n/a
11	El Camino Real, Maple Street, Main Street	3,300 feet of 15 inch pipe	1	1	$2,360,000	$2,676,000
07	Palm Avenue between Kentfield Avenue and Hudson Street	2,300 feet of 12 to 15 inch pipe	1 2		$1,150,000	$1,304,000
10	James Avenue, California Street, Marshall Street, Jefferson Avenue, Bradford Street, Walnut Street	4,400 feet of 15 to 33 inch pipe	1 2-3		$7,940,000	$9,003,000
05a	Truman Avenue to MacGarvey Avenue to Fairview Avenue to Roosevelt Avenue, ending at Junipero Avenue	2,100 feet of 15 to 21 inch pipe	2 2		$1,110,000	$1,259,000
01	Edgewood Road between Yorkshire Lane and Alameda de las Pulgas	200 feet of 12 inch pipe	3	3	$90,000	$102,000
03	Winslow Street from Whipple Avenue to Brewster Street. Brewster Street from Winslow Street to Veterans Blvd	2,000 feet of 18 inch pipe	3	3	$3,550,000	$4,025,000
06	Roosevelt Avenue from Connecticut Drive to Upton Street	1,600 feet of 10 inch pipe	3	3	$680,000	$771,000
08a	Adjacent to Woodside Road, south of El Camino Real	1,000 feet of 12 to 15 inch pipe	3 3		$2,220,000	$2,517,000
08c	Heller Street from Manzanita to Chestnut, Chestnut Street to Broadway	3,400 feet of 18 to 21 inch pipe	3 3		$3,200,000	$3,629,000
09	El Camino Real from Center Street to Manzanita Street	1,300 feet of 10 inch pipe	3	3	$720,000	$186,000
05b	Roosevelt Avenue from Junipero Avenue to Hudson Street	2,800 feet of 24 inch pipe	4	2	$1,690,000	$1,916,000
02	Whipple Avenue between Arguello Street and Warren Avenue	400 feet of 12 inch pipe	4	3	$190,000	$215,000
13	Walnut Street to Maple PS	1,400 feet of 54 inch pipe	4	3	$4,950,000	$5,613,000
				Total	**$29,850,000**	**$33,846,000**

Table 12. 2013 Master Plan Update - Amended / New Projects						
Project ID	Location	Description	Priority Rank	Conf. Level	Cost (2007 $)	Cost (2013 $)
04-Rev	Brewster Avenue Between Arch Street and Myrtle Street	Pipe length increased from 600 to 2,900 linear feet of 12- to 15-inch pipe	1 2		$1,081,000	$1,226,000
12-Rev	Lincoln Avenue, Beech Street, Stambaugh Street, Walnut Street	Pipe length increased from 3,300 to 6,800 linear feet of pipe. Diameter increased from 30- to 33-inches	1 2		$6,673,000	$7,567,000
14-New	Clinton Street and Adams Street West of Lincoln Avenue	2,900 feet of 12-inch pipe	1	2	$1,081,000	$1,226,000
15-New	Dover Road, Madison Avenue, and Upton Street	3,200 feet of 15-inch pipe	1	3	$1,249,000	$1,416,000
05a	Truman Avenue to MacGarvey Avenue to Fairview Avenue to Roosevelt Avenue, ending at Junipero Avenue	2,100 feet of 15 to 21 inch pipe	2	2	$1,110,000	$1,259,000
				Total	**$10,084,000**	**$11,435,000**



LEGEND

- City-Owned Force Main
- SBSA-Owned Force Main
- Port-Owned Force Main
- Private Force Main
- City-Owned Gravity Main
- County-Owned Gravity Main
- Private Gravity Main
- Port-Owned Gravity Main
- City Limit

N

0 0.225 0.45 0.9

Scale in Miles

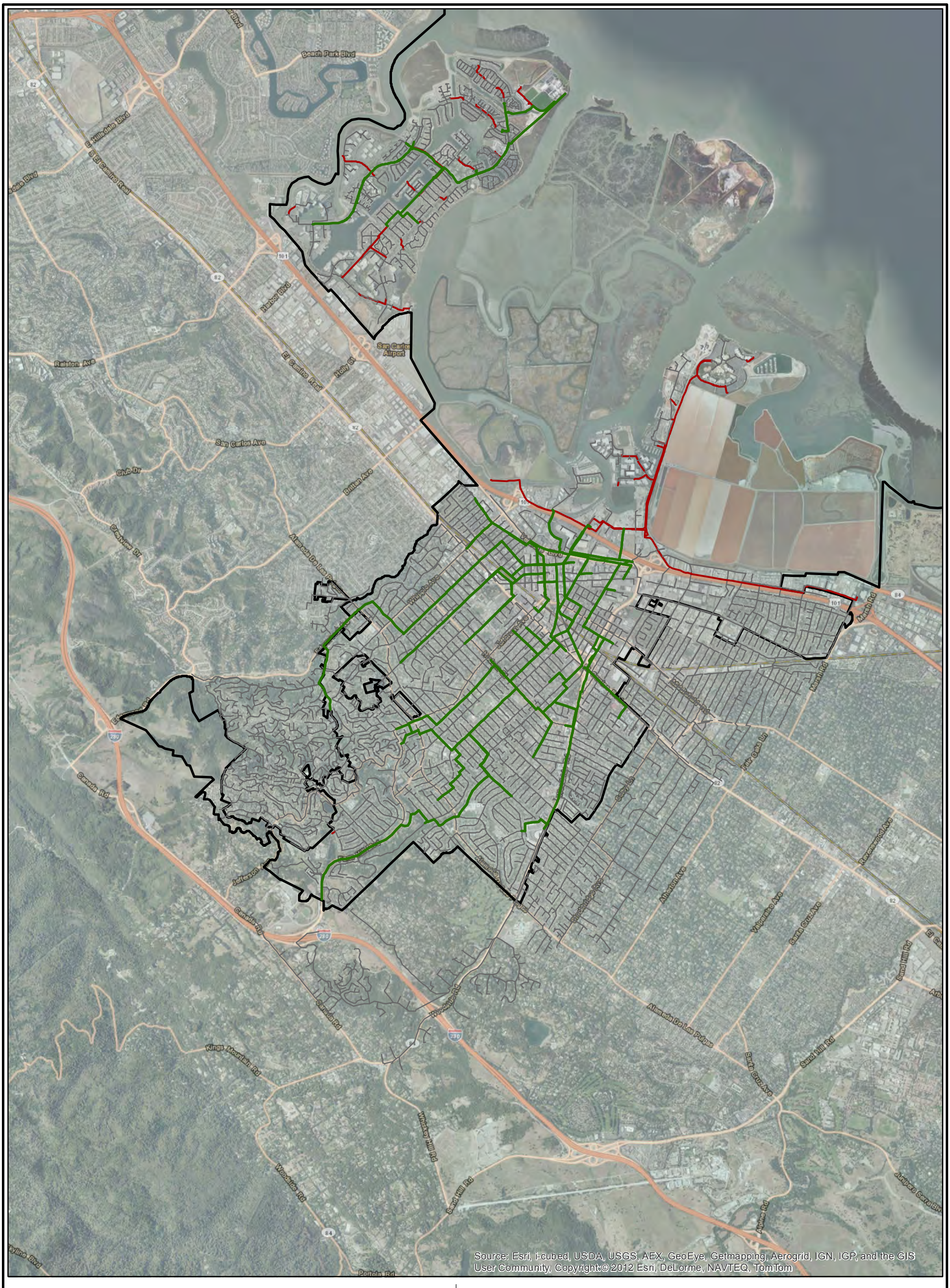
FIGURE 1

City of Redwood City
Sewer System Master Plan Update

CITY SERVICE AREA

Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main

N

0 0.55 1.1

Scale in Miles

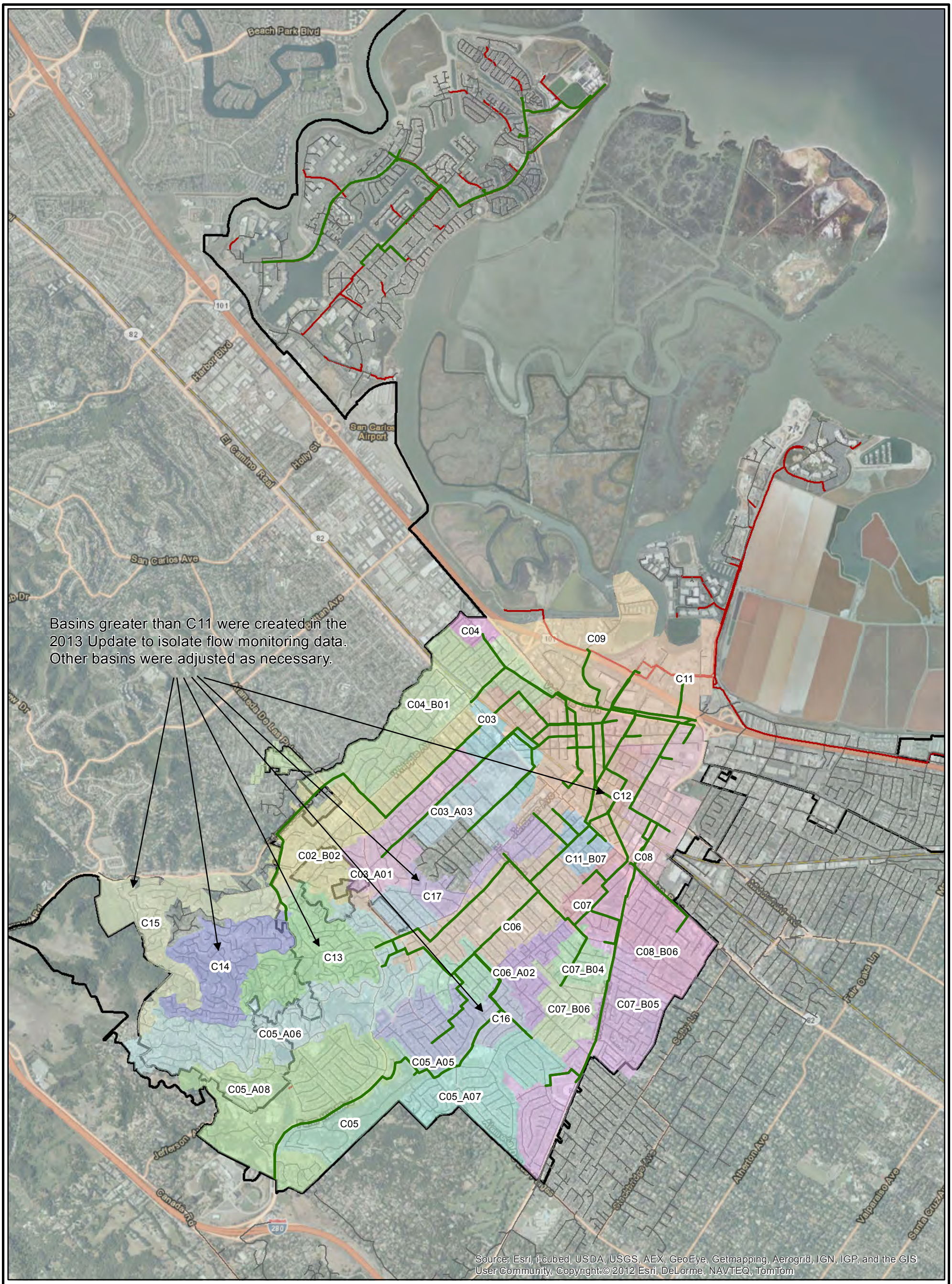
FIGURE 2

City of Redwood City
Sewer System Master Plan Update

UPDATED HYDRAULIC MODEL NETWORK

Redwood City California Incorporated 1867
Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- Modified Wet Weather Flow Basins (Various Colors)

Note: The basins shown on this figure differ in some cases from the basins created created for the 2008 Master Plan. They were adjusted based upon new flow monitoring locations used in the 2013 Update. The basins from the 2008 Master Plan should continue to be used as CCTV and rehabilitation basins.

N

0 0.4 0.8

Scale in Miles

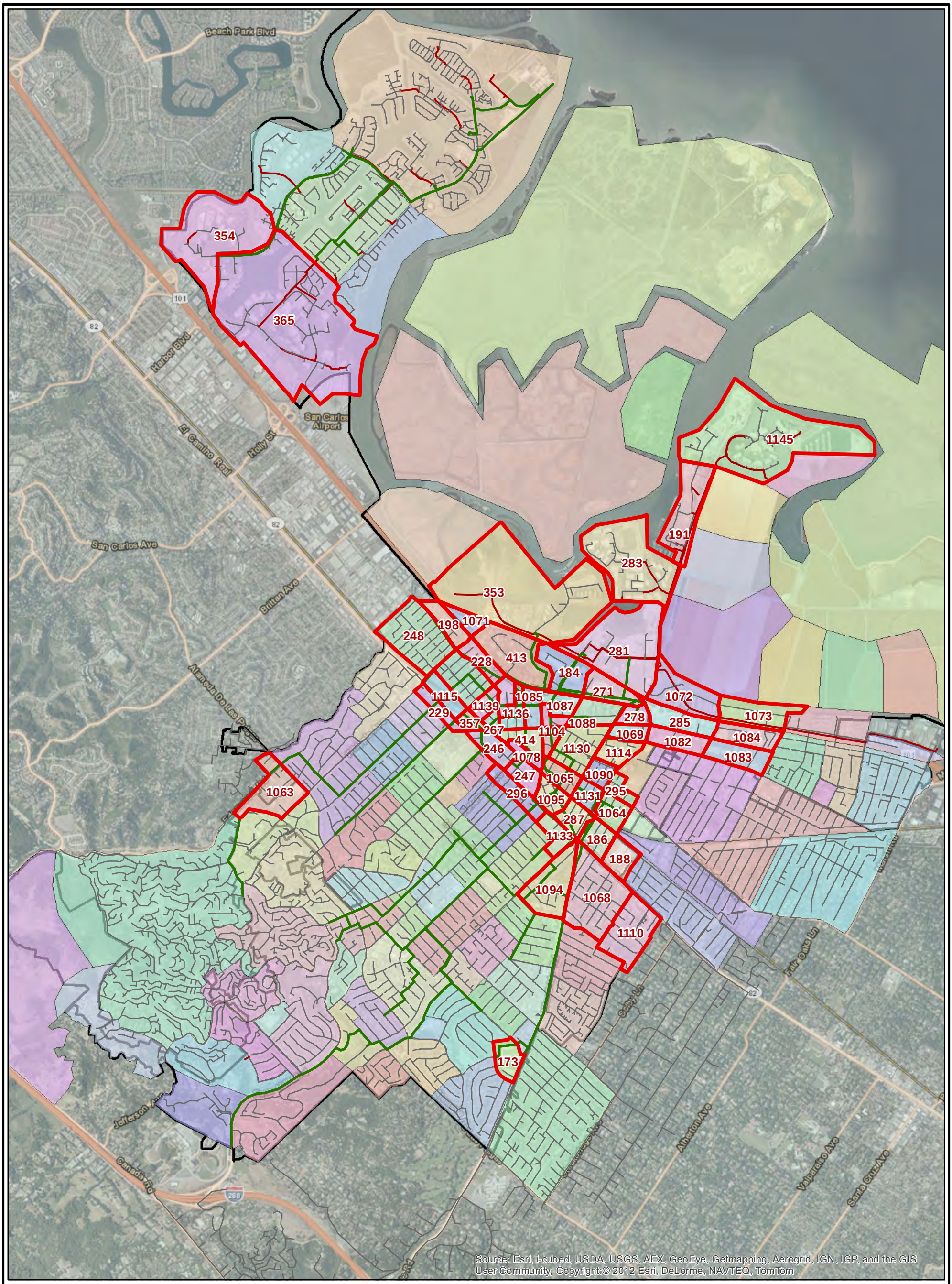
FIGURE 3

City of Redwood City
Sewer System Master Plan Update

2013 UPDATE WET WEATHER FLOW BASINS

Redwood City California Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- Growth Areas With TAZ ID Label
- TAZ (Various Colors)

N

0 0.45 0.9

Scale in Miles

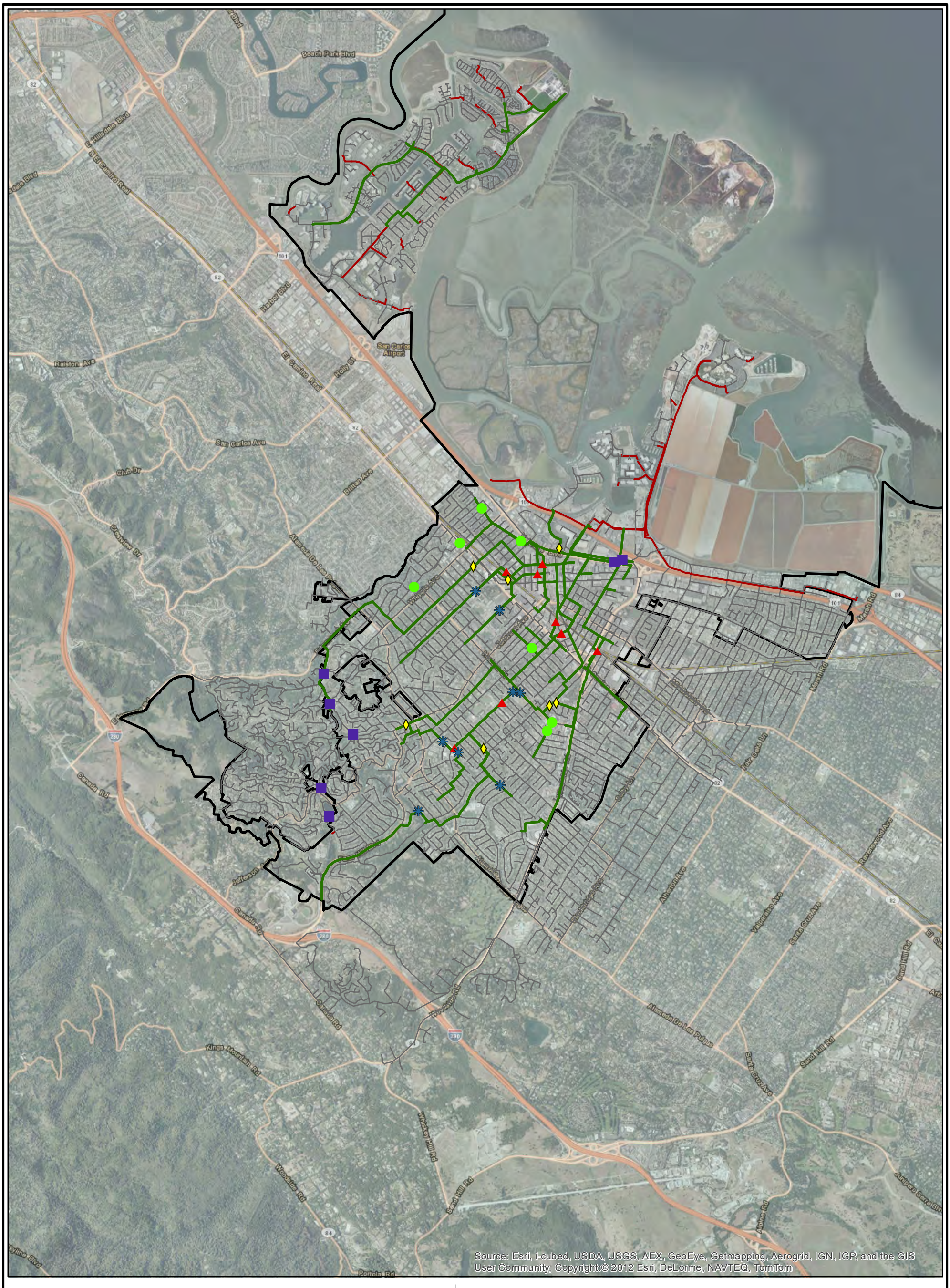
FIGURE 4

City of Redwood City
Sewer System Master Plan Update

TAZ GROWTH AREAS

Redwood City California Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main

Flow Monitoring Locations By Year

- 07/08
- 08/09
- 09/10
- 10/11
- 11/12

N

0 0.55 1.1

Scale in Miles

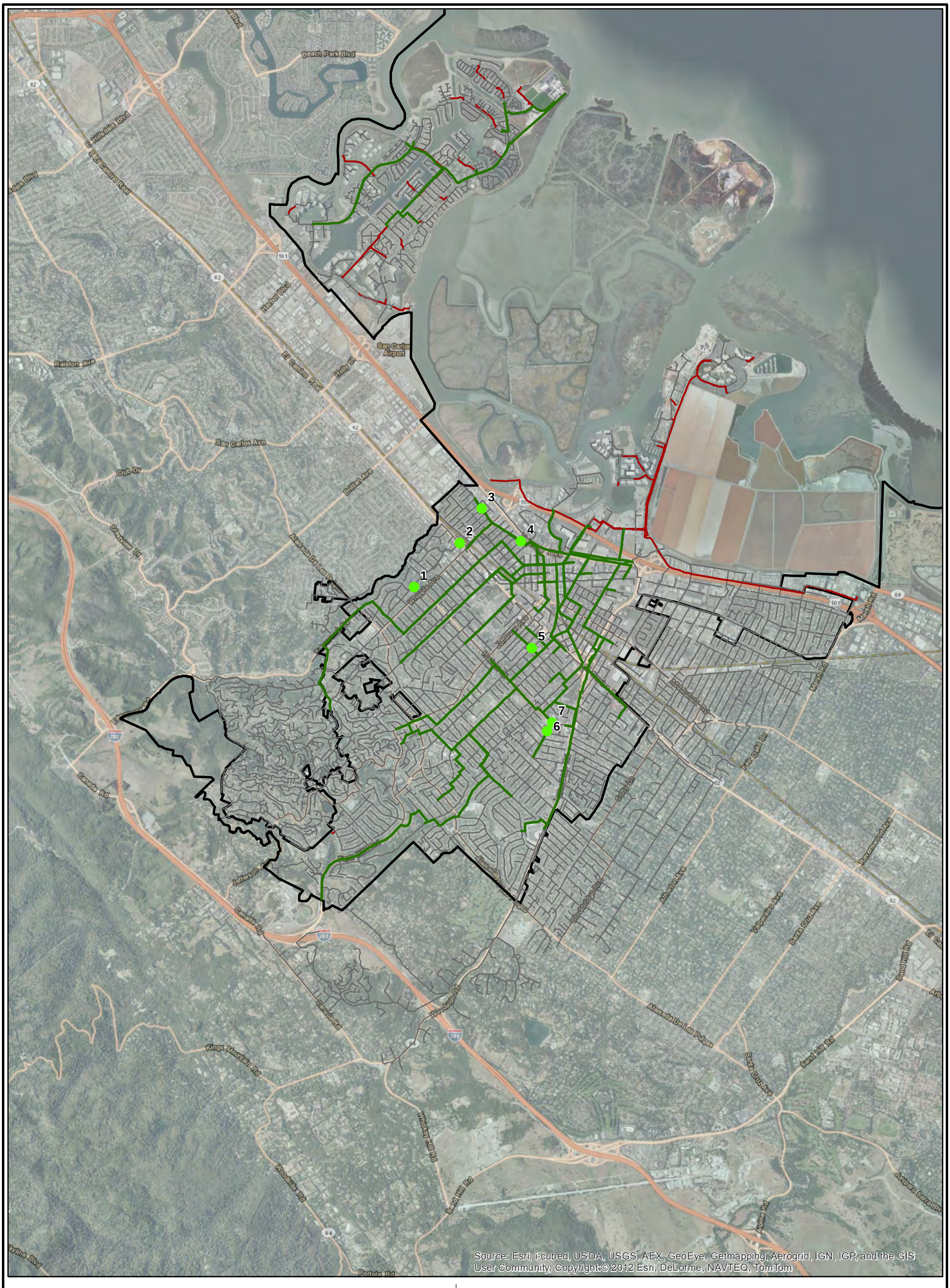
FIGURE 5

City of Redwood City
Sewer System Master Plan Update

FLOW MONITORING LOCATIONS
(2008-2012)

Redwood City California Incorporated 1867 Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- 2007/2008 Flow Monitoring Locations

N

0 0.55 1.1

Scale in Miles

FIGURE 5a

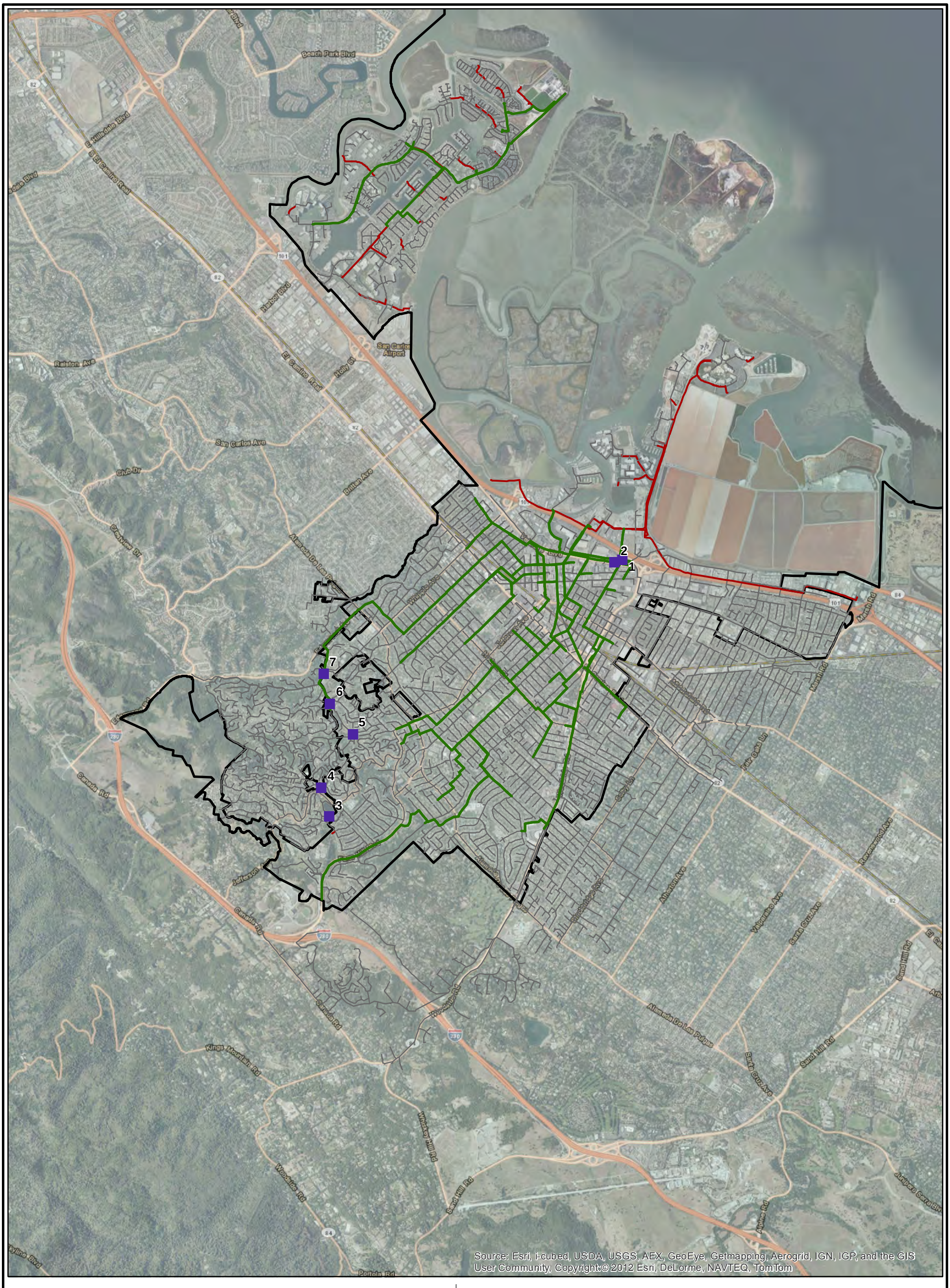
City of Redwood City
Sewer System Master Plan Update

FLOW MONITORING LOCATIONS (2007/2008)

Redwood City California

Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- 2008/2009 Flow Monitoring Locations

N

0 0.55 1.1

Scale in Miles

FIGURE 5b

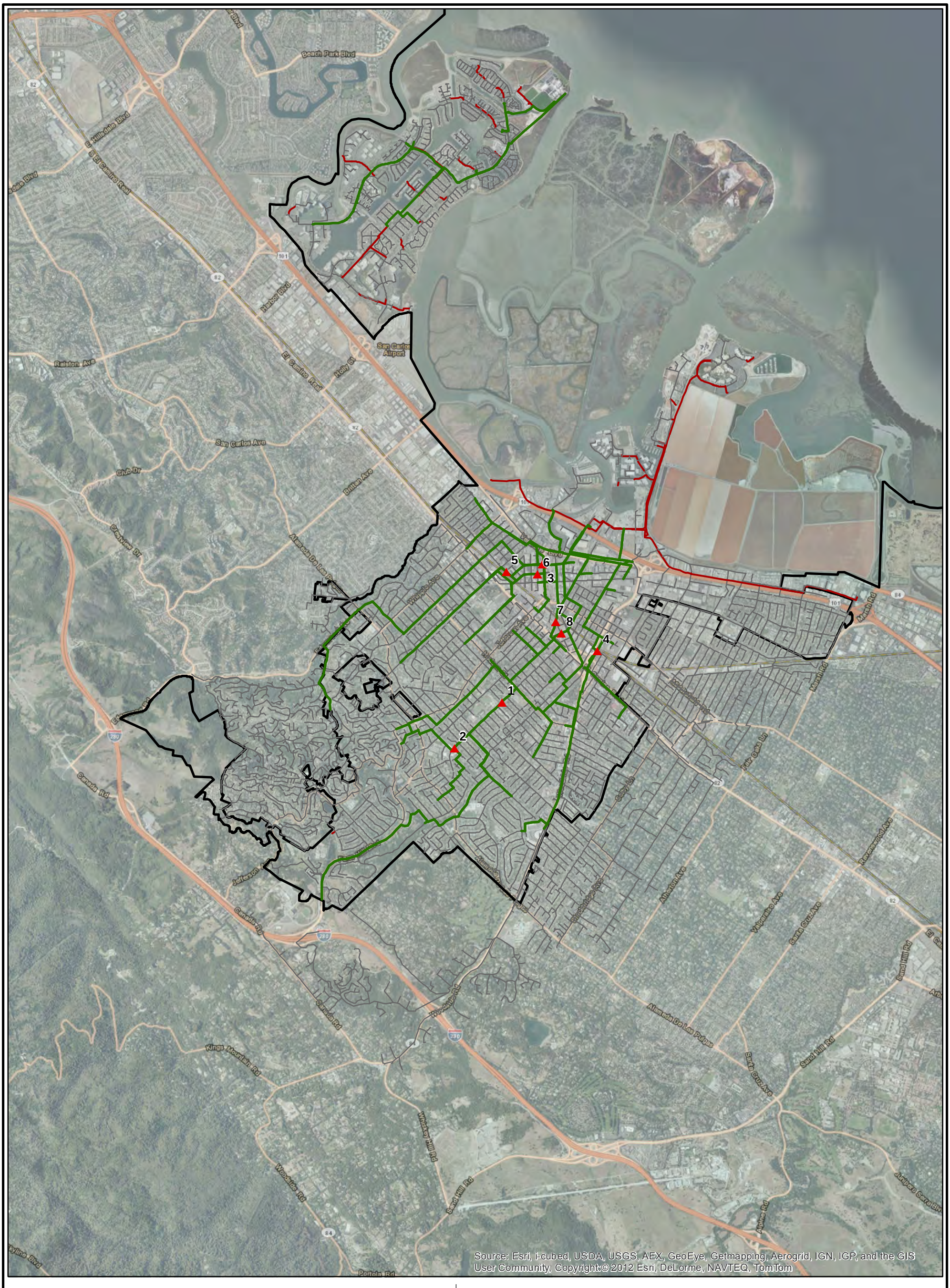
City of Redwood City
Sewer System Master Plan Update

FLOW MONITORING LOCATIONS (2008/2009)

Redwood City California

Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- ▲ 2009/2010 Flow Monitoring Locations

N

0 0.55 1.1

Scale in Miles

FIGURE 5c

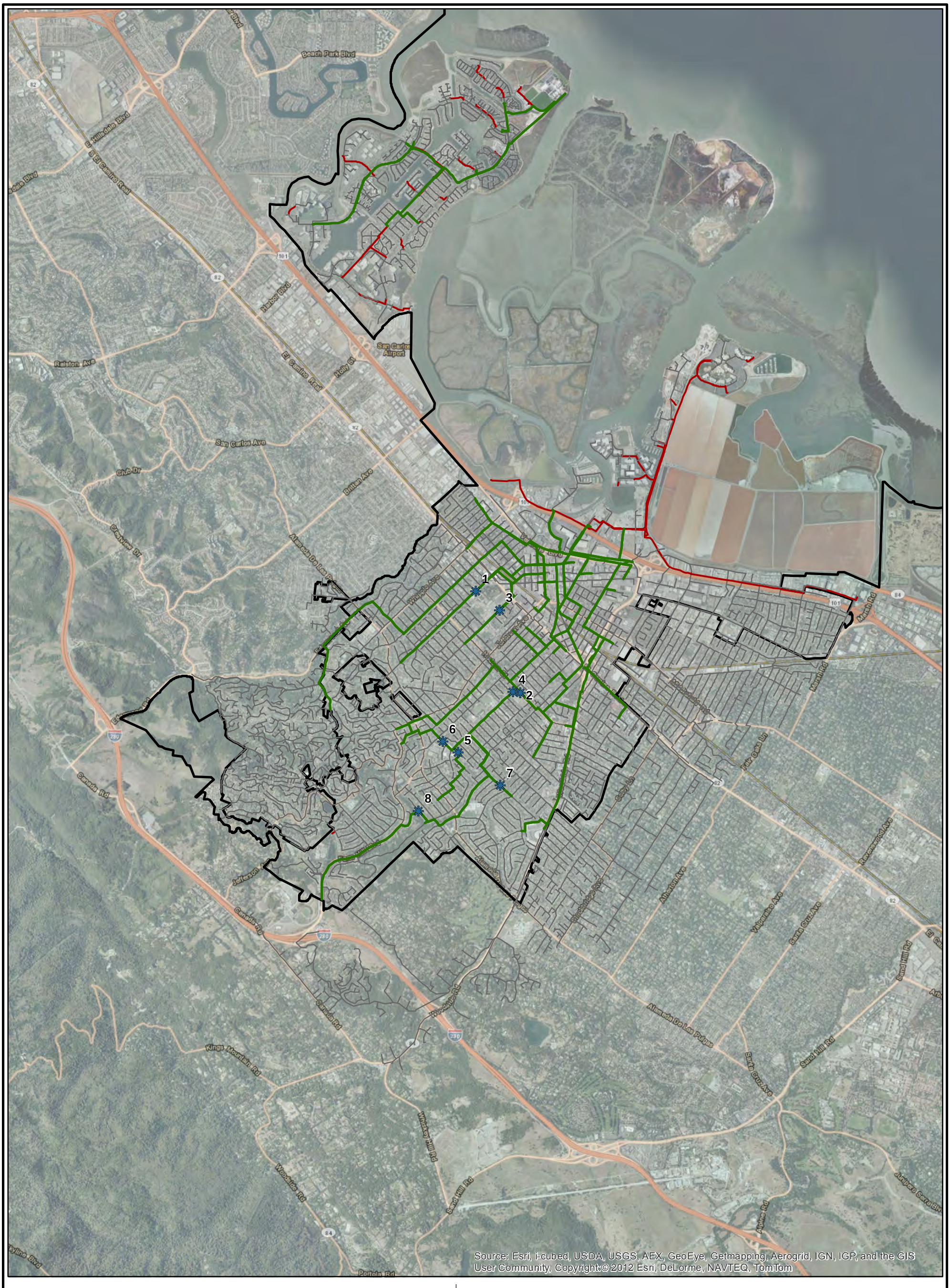
City of Redwood City
Sewer System Master Plan Update

FLOW MONITORING LOCATIONS (2009/2010)

Redwood City California

Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- 2010/2011 Flow Monitoring Locations

N

0 0.55 1.1

Scale in Miles

FIGURE 5d

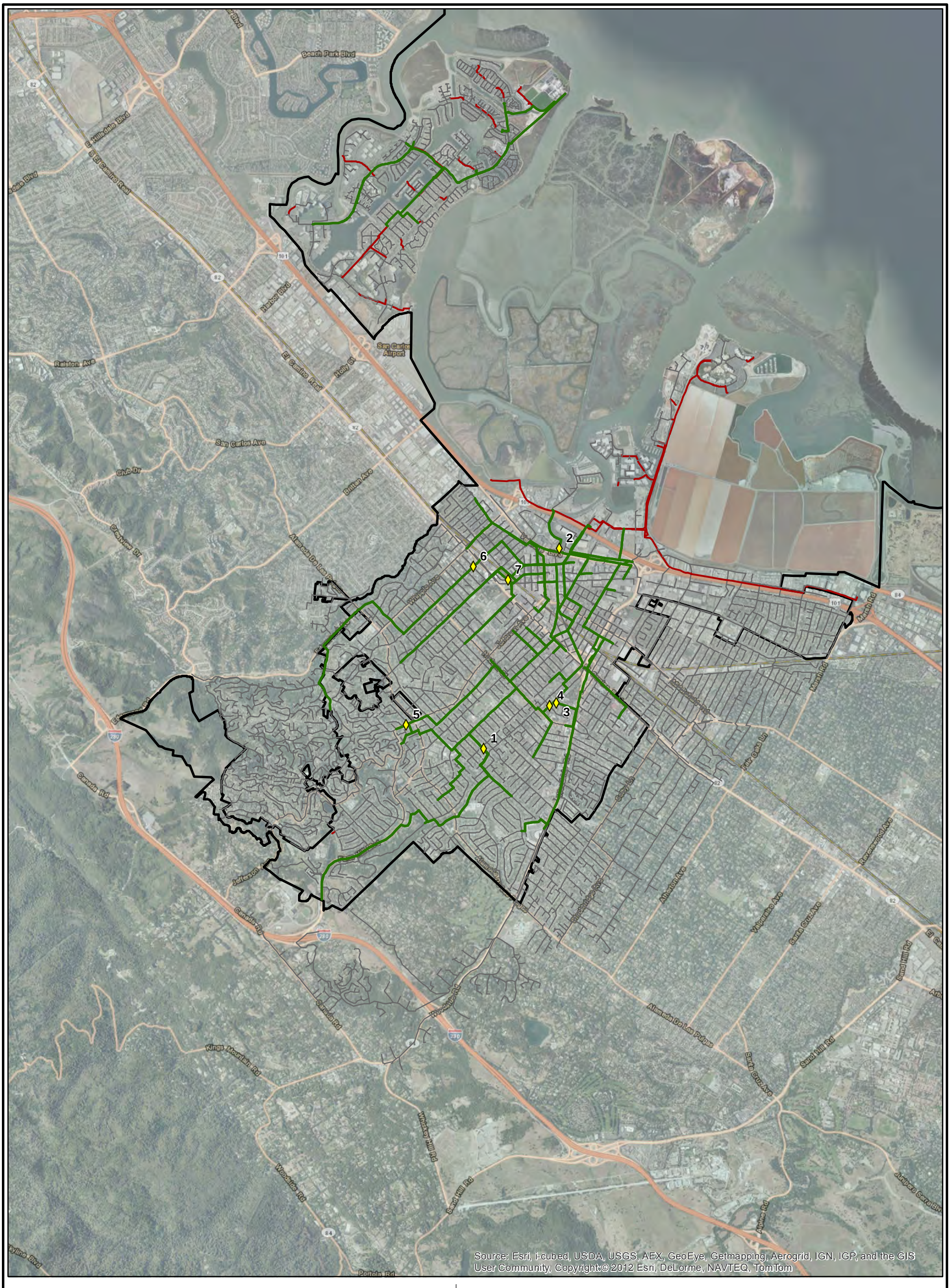
City of Redwood City
Sewer System Master Plan Update

FLOW MONITORING LOCATIONS (2010/2011)

Redwood City California

Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Modeled Gravity Mains
- Un-Modeled Gravity Main
- Force Main
- 2011/2012 Flow Monitoring Locations

N

0 0.55 1.1

Scale in Miles

FIGURE 5e

City of Redwood City
Sewer System Master Plan Update

FLOW MONITORING LOCATIONS (2011/2012)

Redwood City California

Engineering & Construction

WEST YOST ASSOCIATES

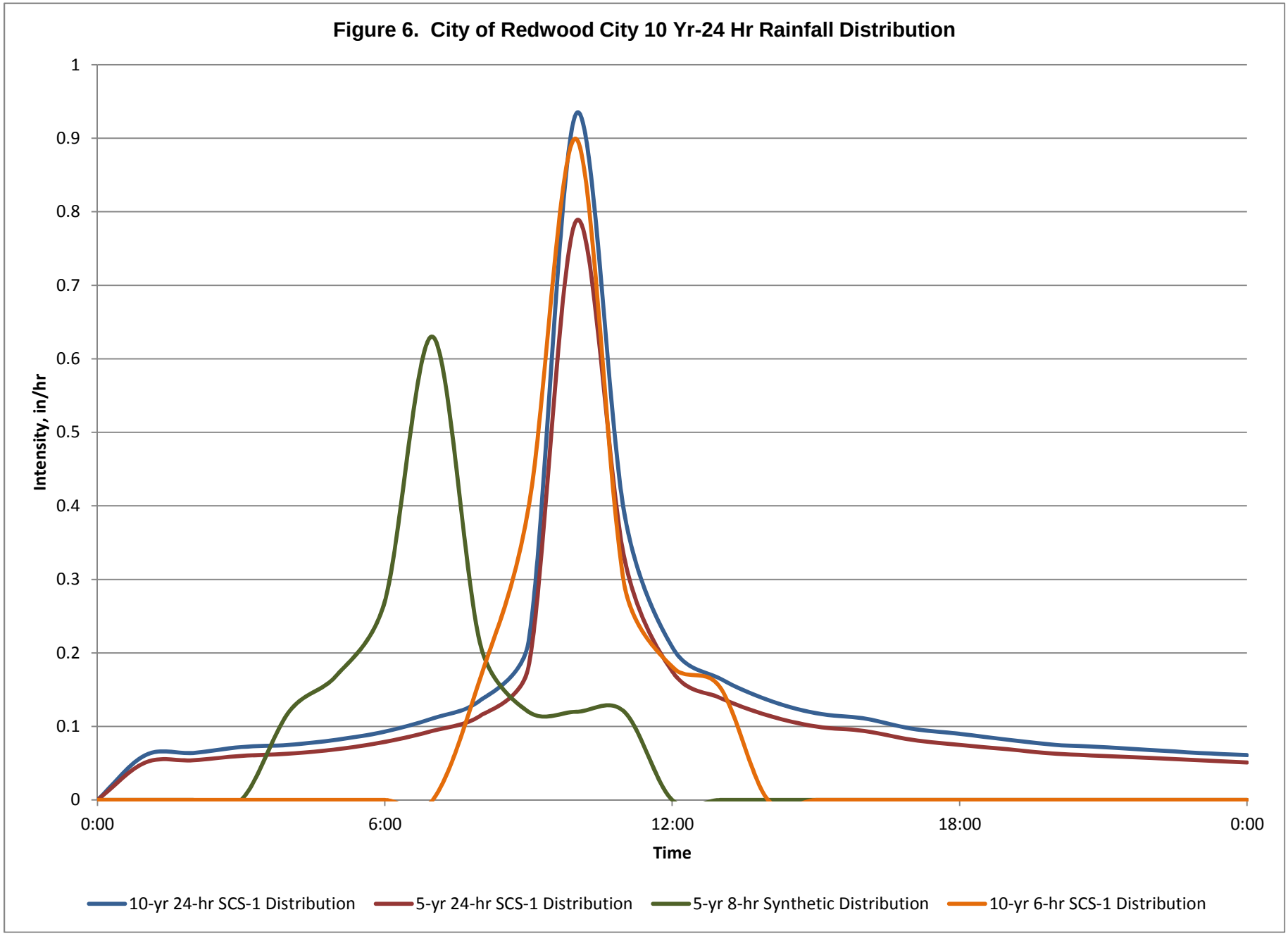
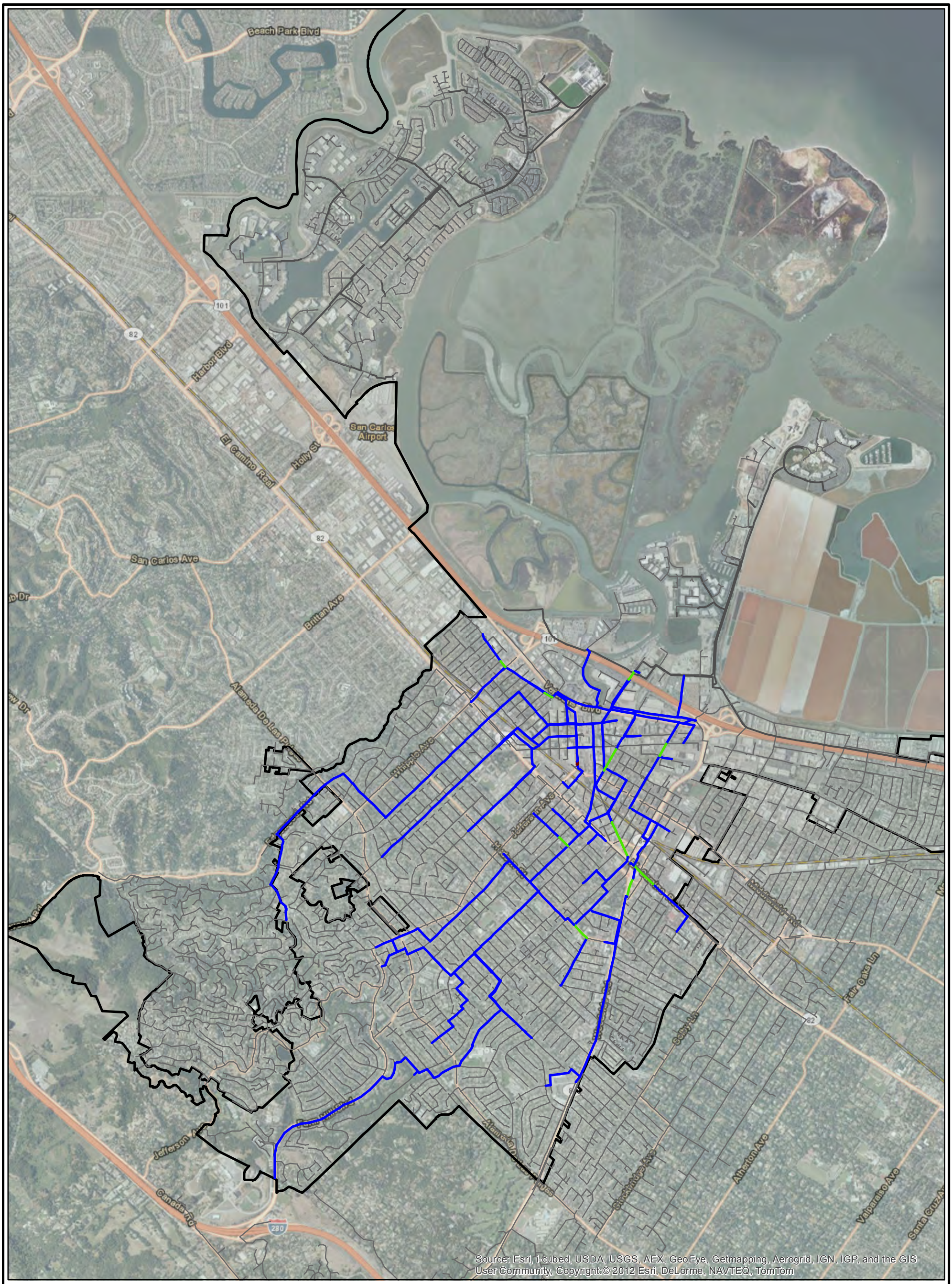


Figure 6. City of Redwood City 10 Yr-24 Hr Rainfall Distribution
Intensity, in/hr
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0:00
6:00
12:00
18:00
0:00
Time
10-yr 24-hr SCS-1 Distribution
5-yr 24-hr SCS-1 Distribution
5-yr 8-hr Synthetic Distribution
10-yr 6-hr SCS-1 Distribution



LEGEND

Gravity Main d/D

- <0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.99
- >2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow

N

0 0.45 0.9

Scale in Miles

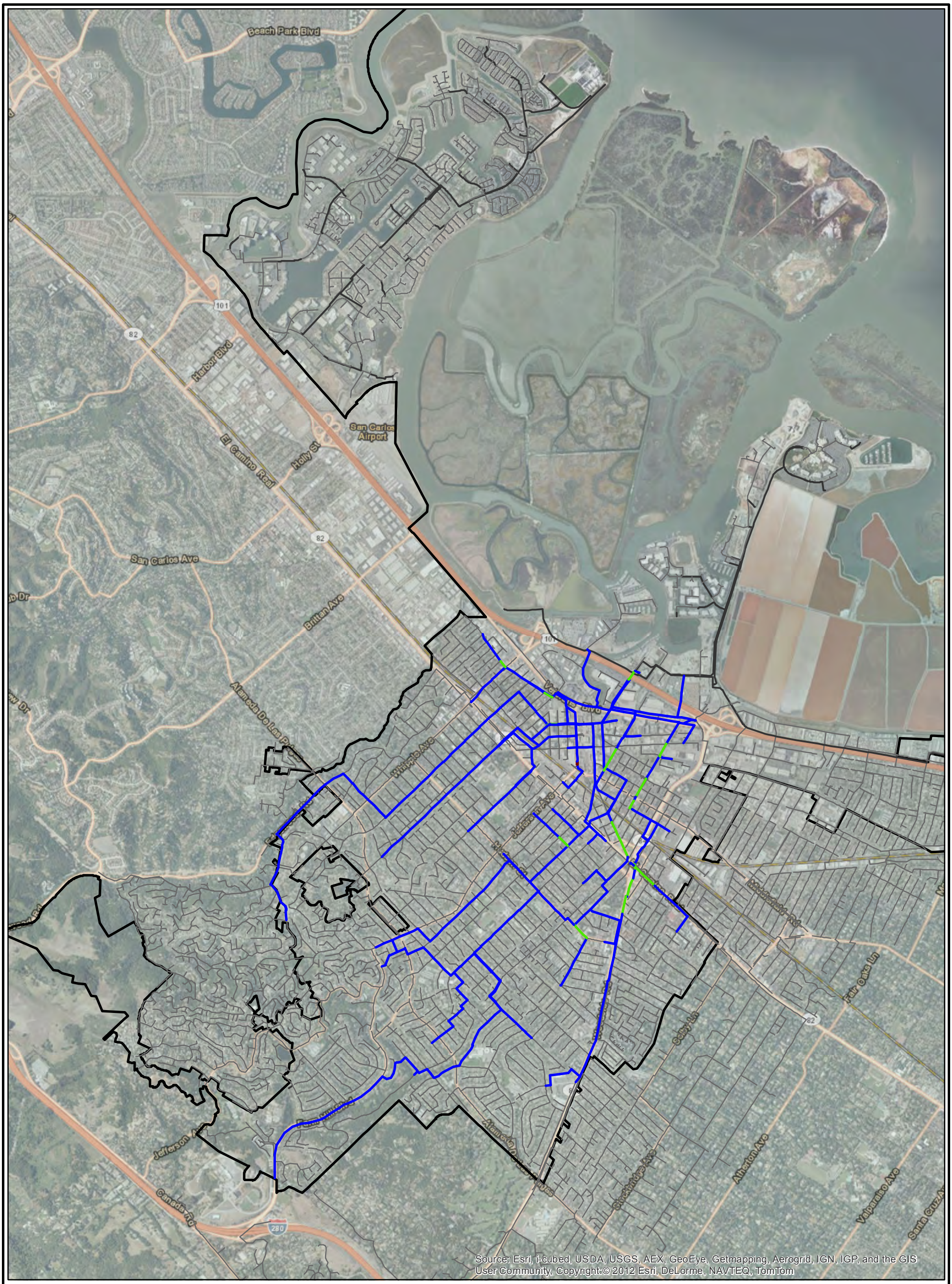
FIGURE 7

City of Redwood City
Sewer System Master Plan Update

EXISTING PDWF RESULTS

Redwood City California Incorporated 1867
Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- <0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.99
- >2.00
- Un-Modeled Gravity Main
- Force Main

Simulated Overflow

N

0 0.45 0.9

Scale in Miles

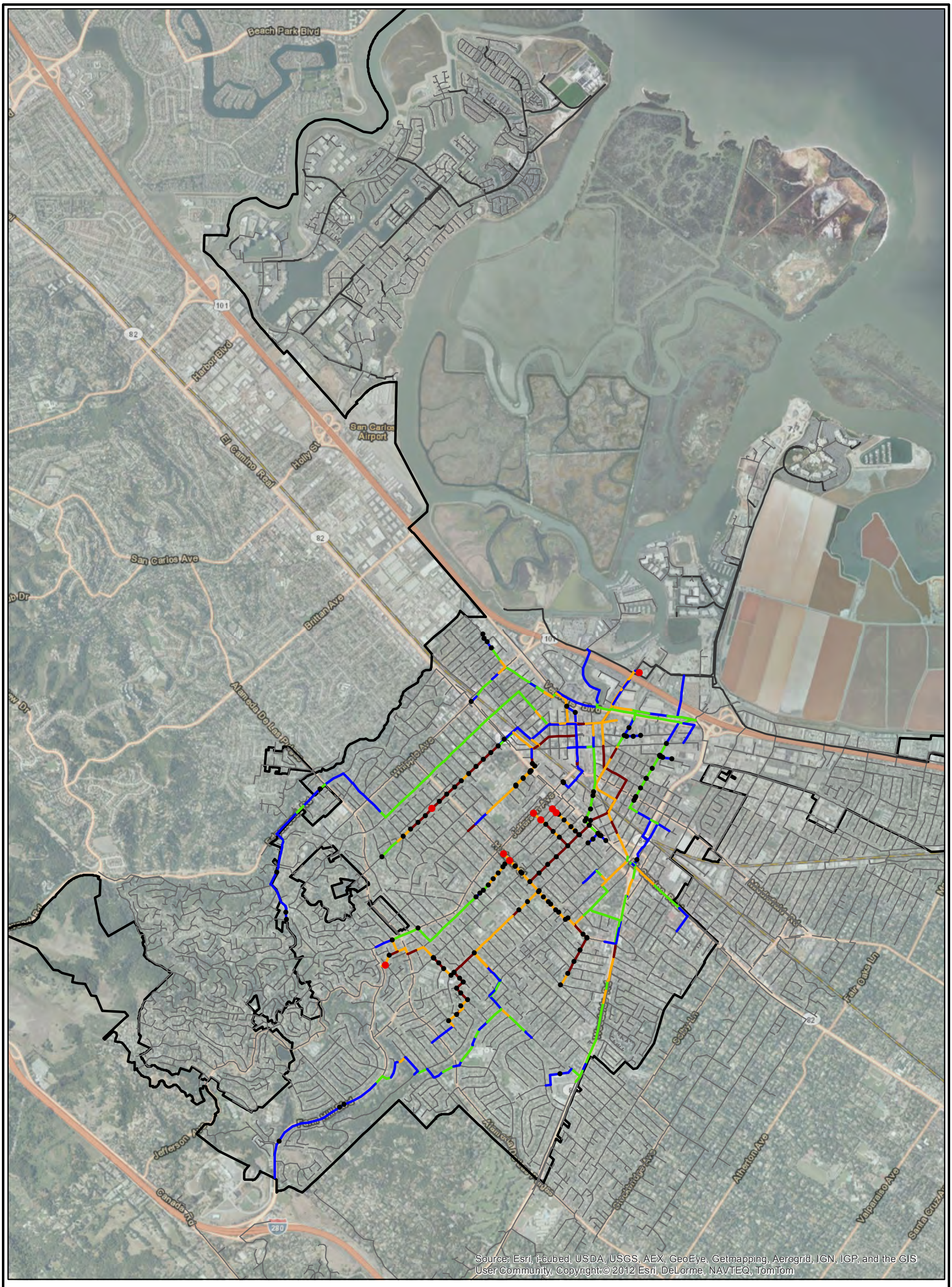
FIGURE 8

City of Redwood City
Sewer System Master Plan Update

FUTURE PDWF RESULTS

Redwood City California Incorporated 1867
Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- <0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.99
- >2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow
- HGL Within 5' of Rim

N

0 0.45 0.9

Scale in Miles

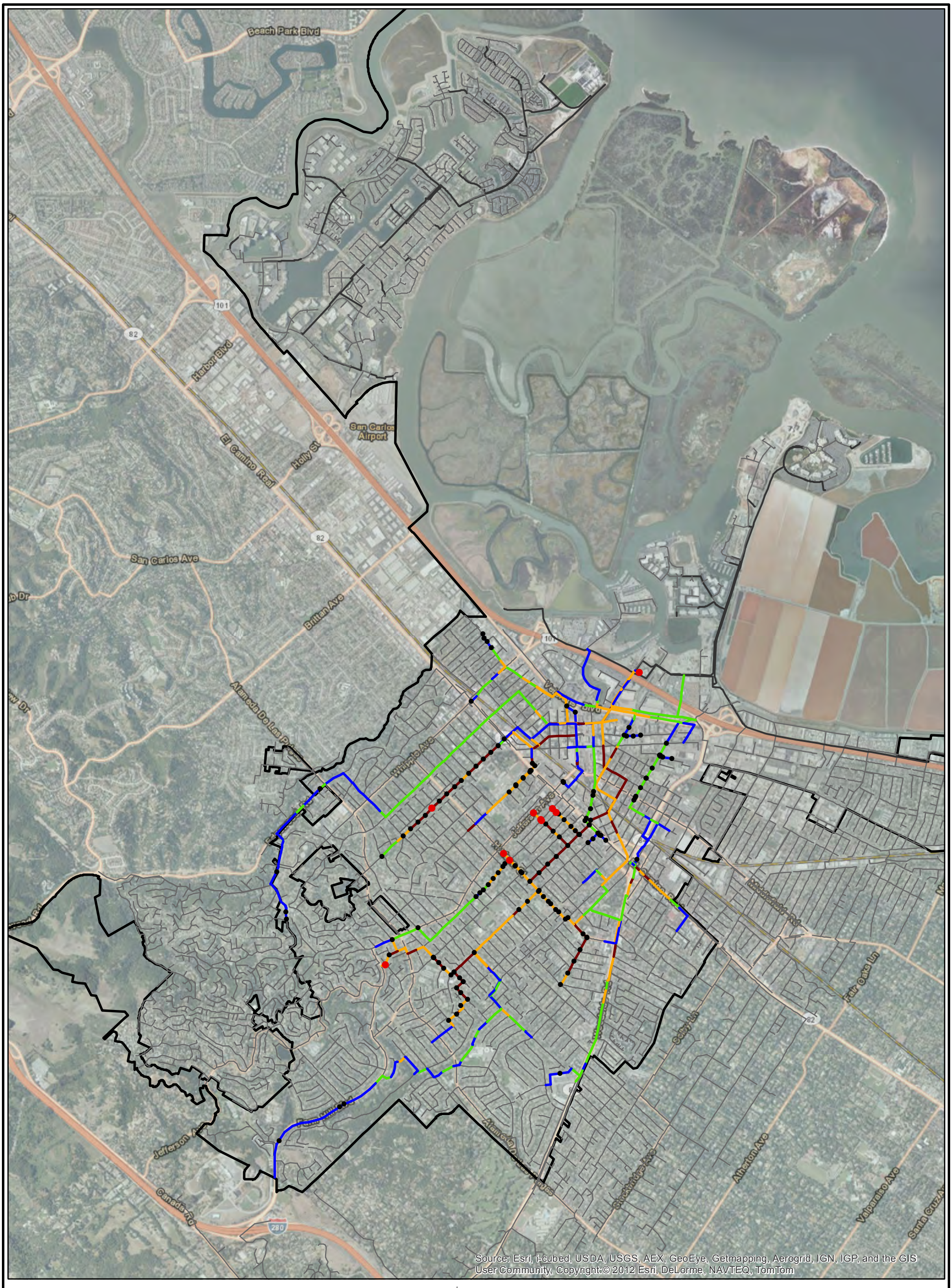
FIGURE 9

City of Redwood City
Sewer System Master Plan Update

EXISTING PWWF RESULTS
5-YR 8-HR SYNTHETIC DESIGN STORM

Redwood City Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- <0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.99
- >2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow
- HGL Within 5' of Rim

N

0 0.45 0.9

Scale in Miles

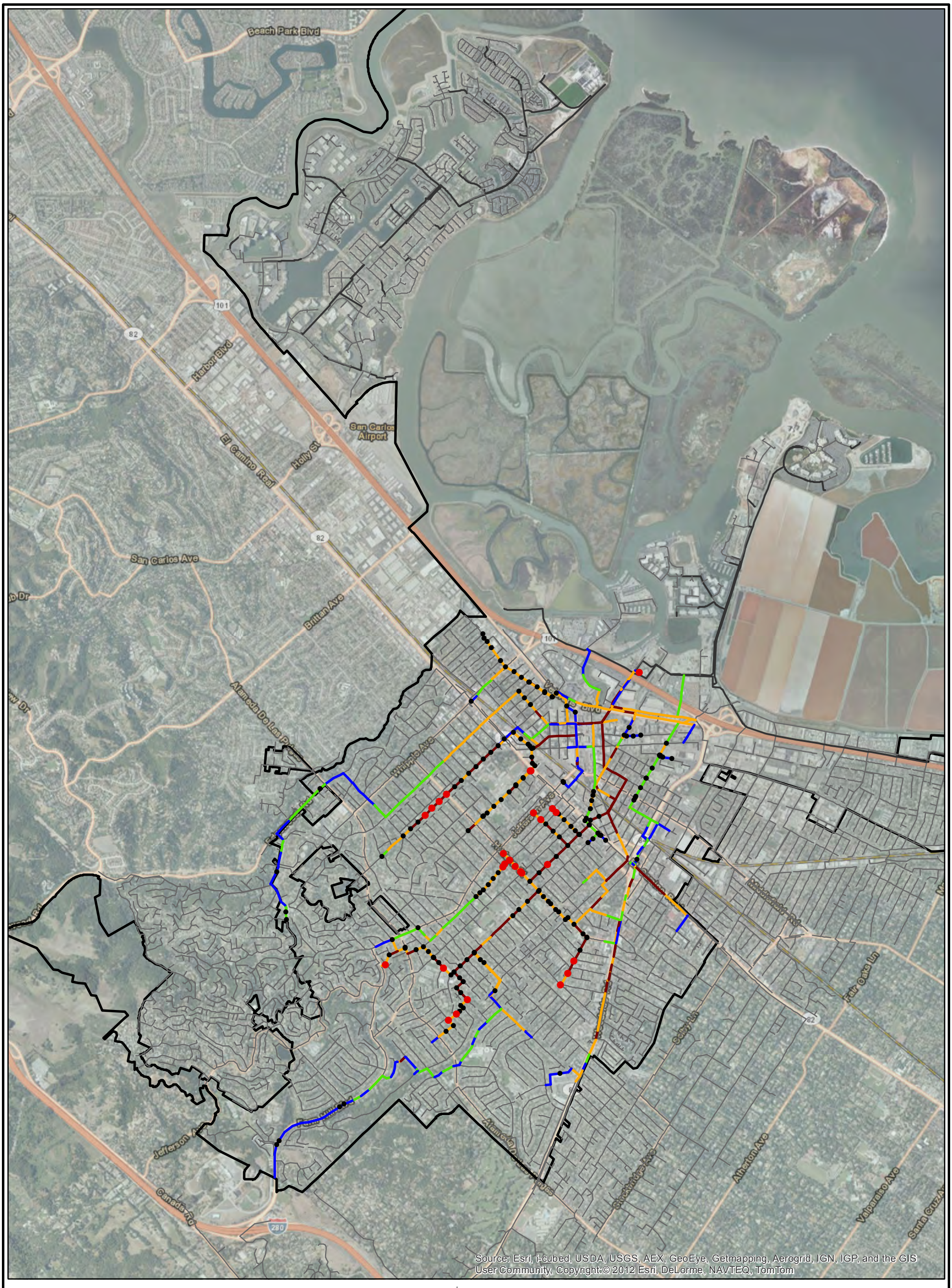
FIGURE 10

City of Redwood City
Sewer System Master Plan Update

FUTURE PWWF RESULTS
5-YR 8-HR SYNTHETIC DESIGN STORM

Redwood City Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- <0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.99
- >2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow
- HGL Within 5' of Rim

N

0 0.45 0.9

Scale in Miles

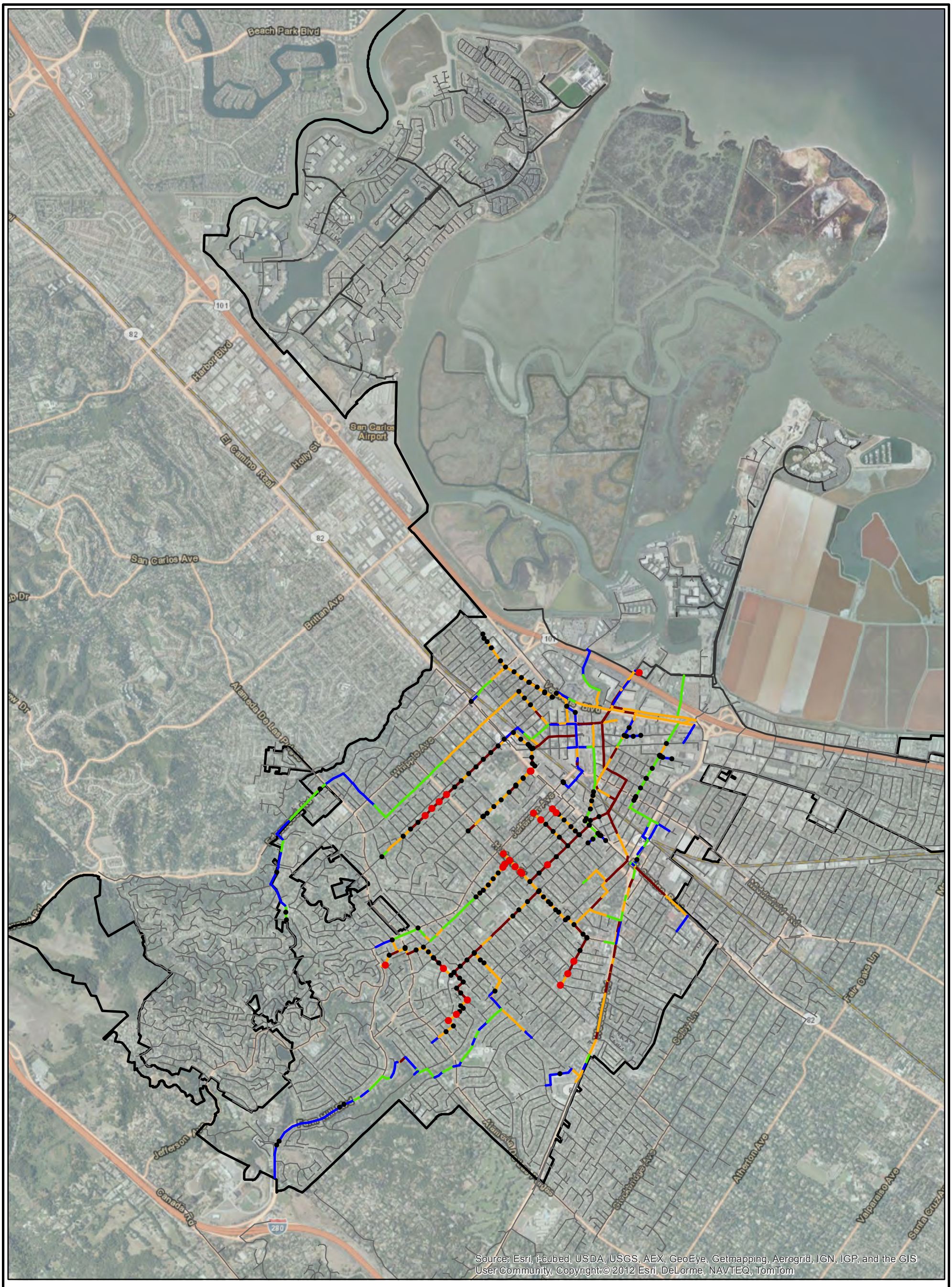
FIGURE 11

City of Redwood City
Sewer System Master Plan Update

EXISTING PWWF RESULTS
10 YR 24 HR DESIGN STORM

Redwood City Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- <0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.99
- >2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow
- HGL Within 5' of Rim

N

0 0.45 0.9

Scale in Miles

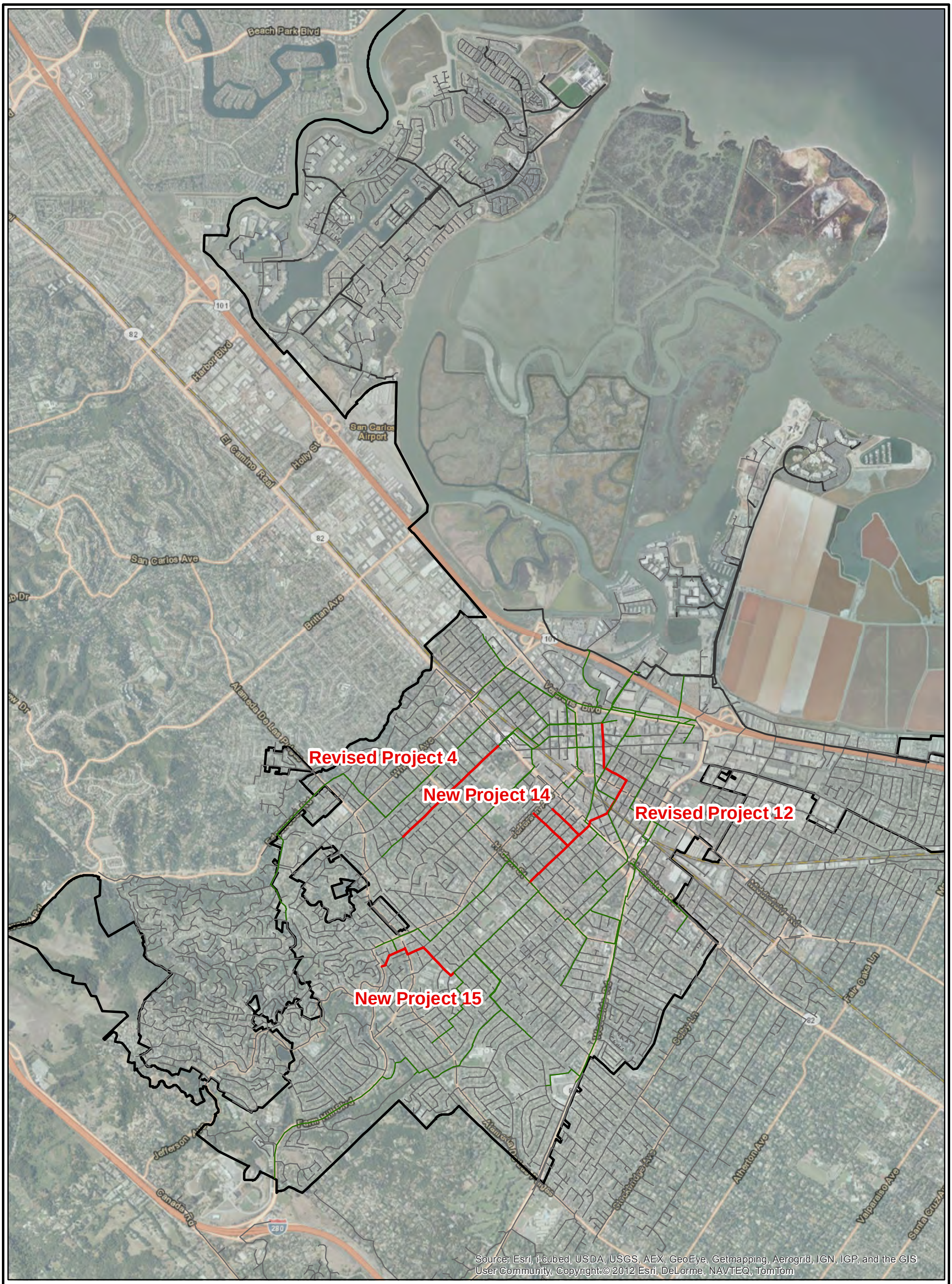
FIGURE 12

City of Redwood City
Sewer System Master Plan Update

FUTURE PWWF RESULTS
10 YR 24 HR DESIGN STORM

Redwood City Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

- Revised Project Gravity Main
- Other Modeled Gravity Main
- Un-Modeled Gravity Main
- Force Main

N

0 0.45 0.9

Scale in Miles

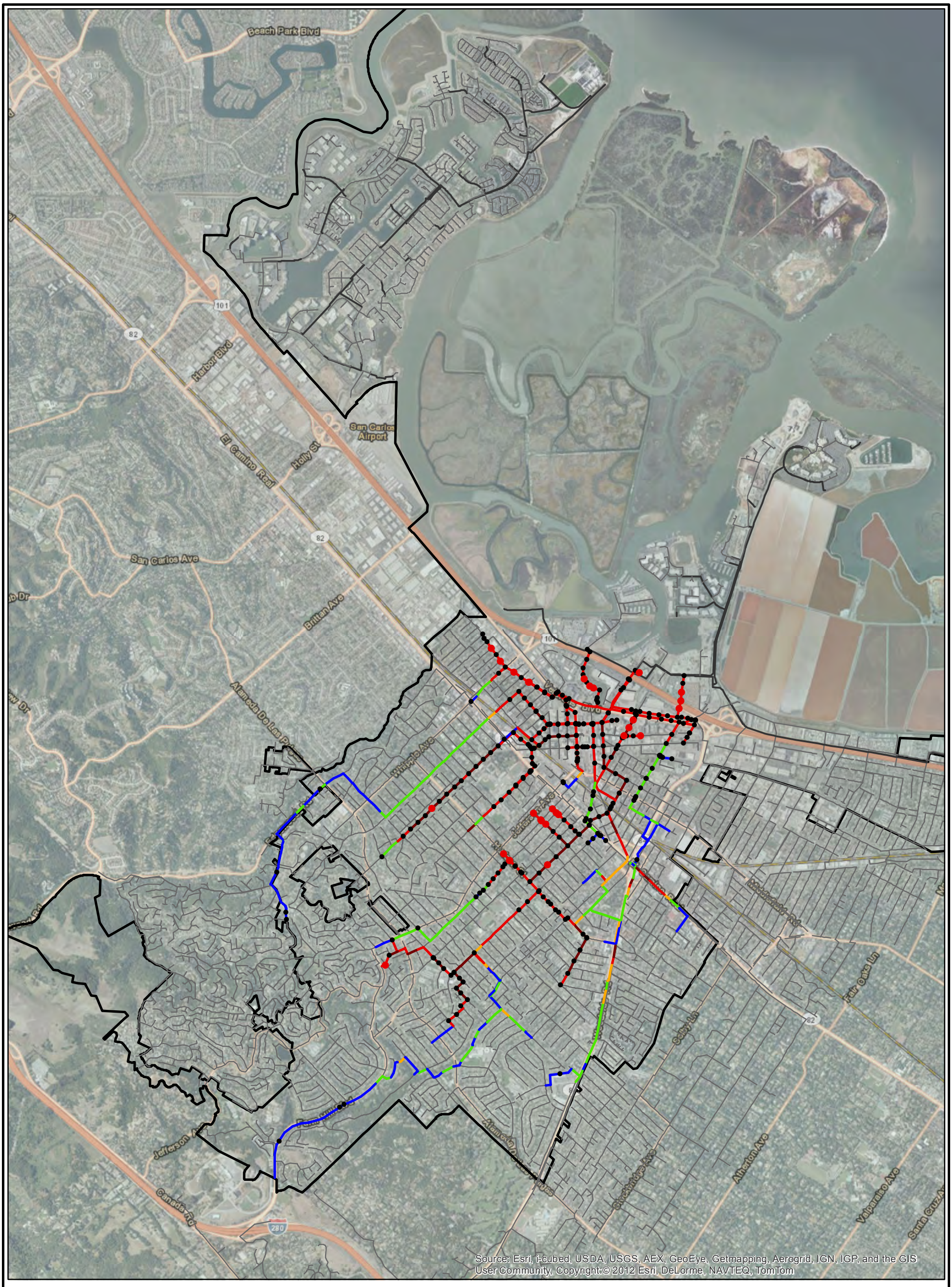
FIGURE 13

City of Redwood City
Sewer System Master Plan Update

REVISED AND NEW PROJECTS FOR 2013 UPDATE

Redwood City California Incorporated 1867
Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- 0.05 - 0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01- 1.99
- 2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow
- HGL Within 5' of Rim

N

0 0.45 0.9

Scale in Miles

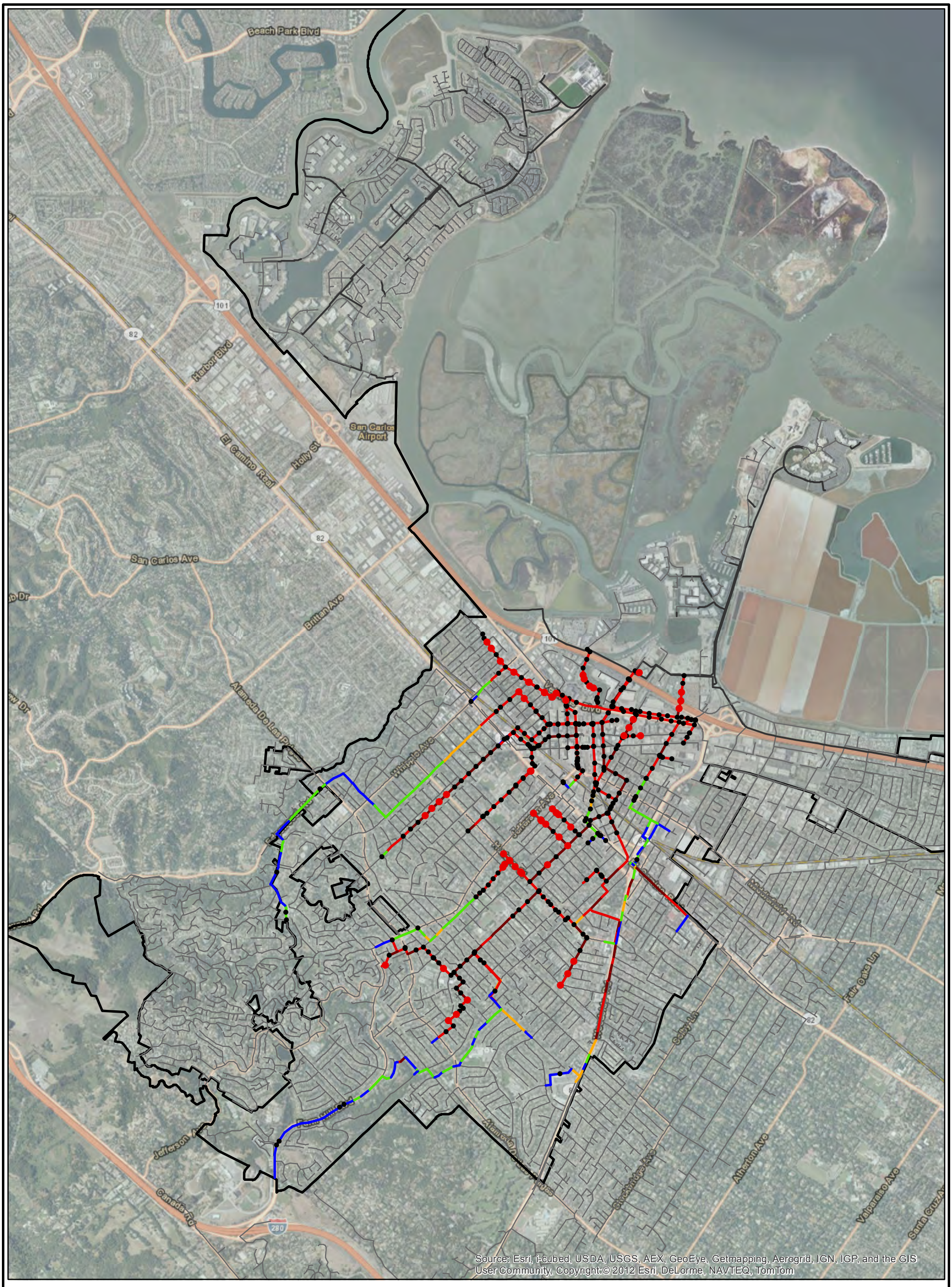
FIGURE 14

City of Redwood City
Sewer System Master Plan Update

FUTURE PWWF RESULTS 5 YR 8 HR DESIGN STORM CONSTRAINED AT MSPS

Redwood City California Incorporated 1867
Engineering & Construction

WEST YOST ASSOCIATES



LEGEND

Gravity Main d/D

- 0.05 - 0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01- 1.99
- 2.00
- Un-Modeled Gravity Main
- Force Main

- Simulated Overflow
- HGL Within 5' of Rim

N

0 0.45 0.9

Scale in Miles

FIGURE 15

City of Redwood City
Sewer System Master Plan Update

FUTURE PWWF RESULTS 10 YR 24 HR DESIGN STORM CONSTRAINED AT MSPS

Redwood City Engineering & Construction

WEST YOST ASSOCIATES

APPENDIX A

Dry Weather Calibration Plots

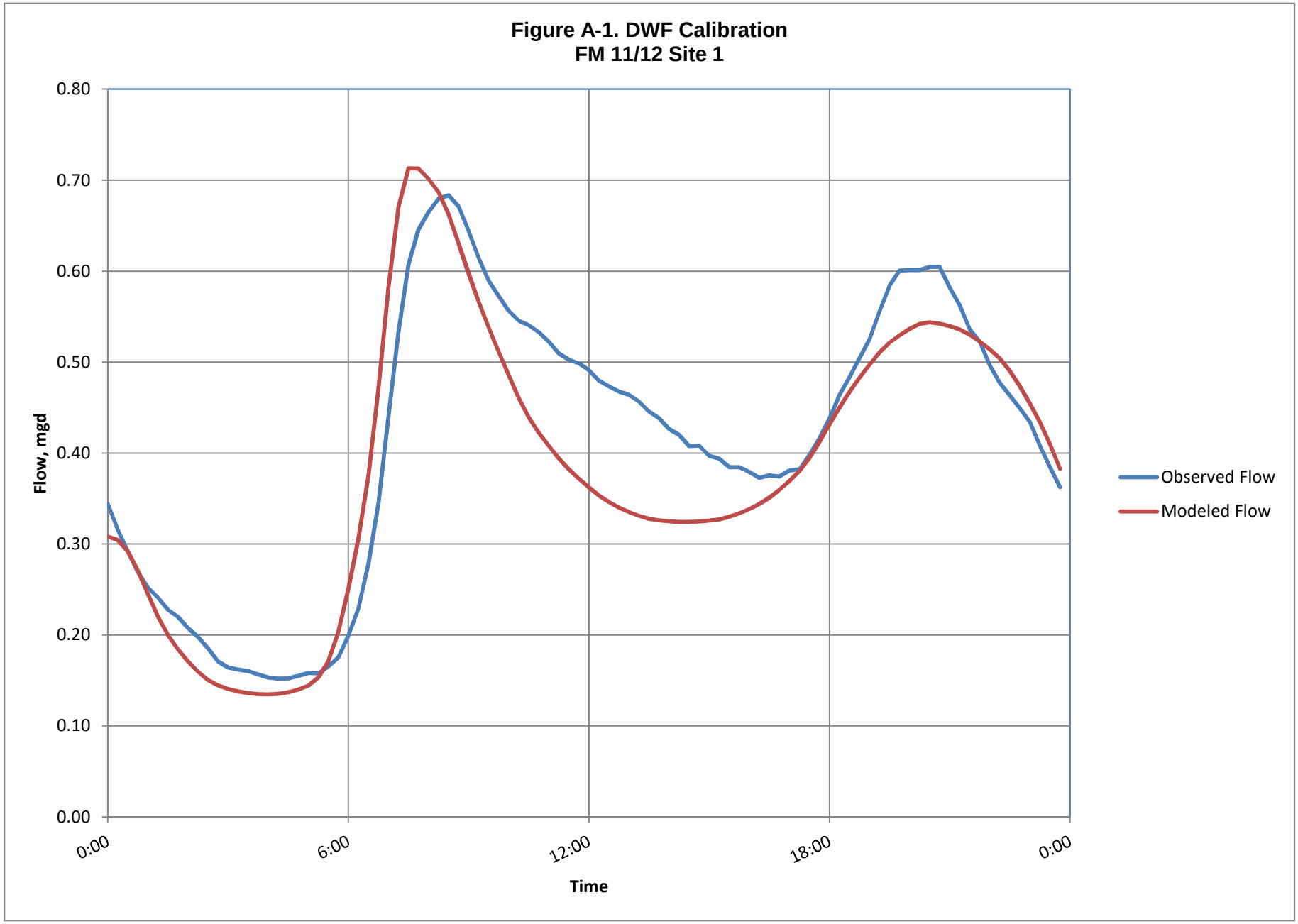


Figure A-1. DWF Calibration
FM 11/12 Site 1
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed Flow
Modeled Flow

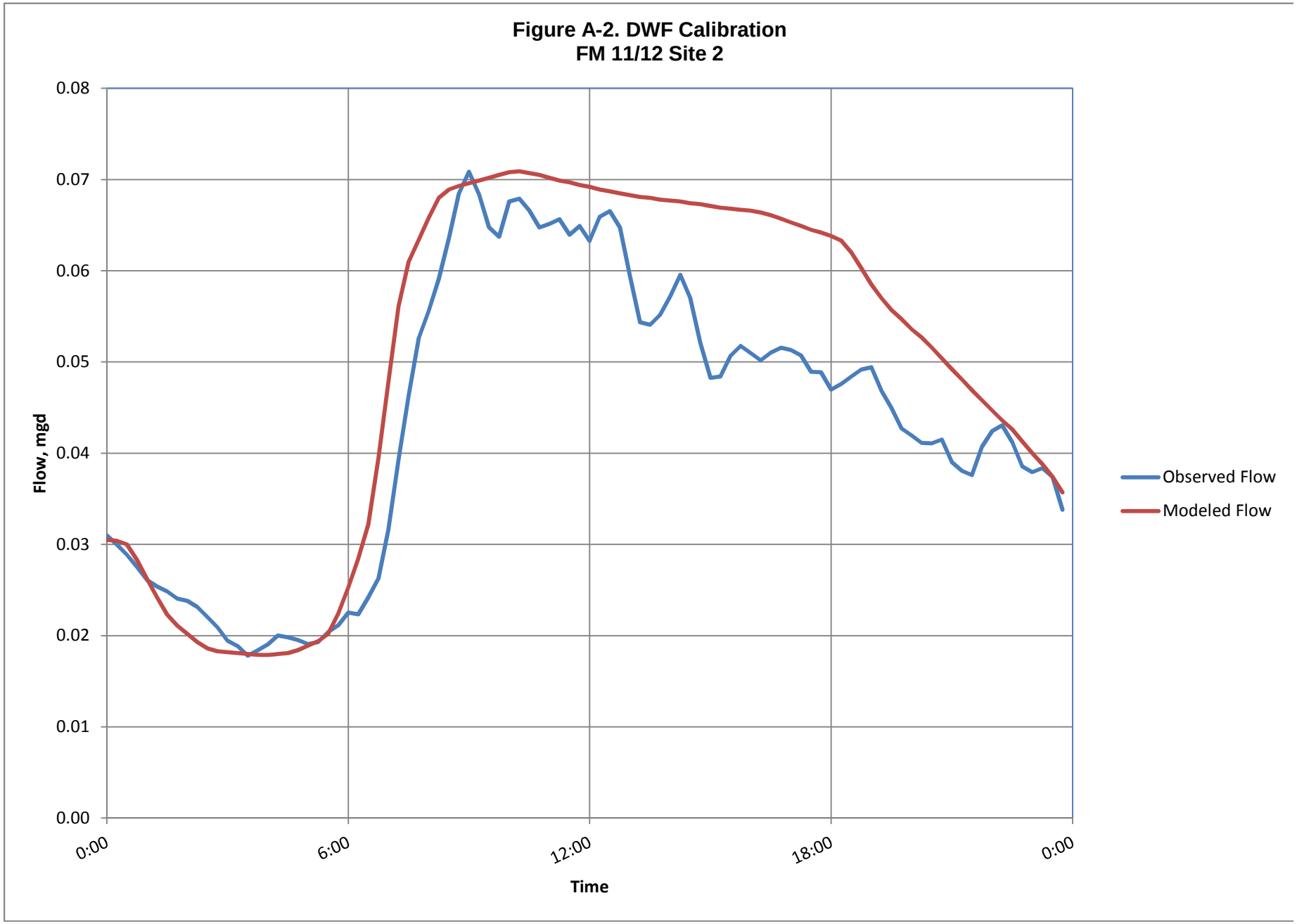


Figure A-2. DWF Calibration
FM 11/12 Site 2
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed Flow
Modeled Flow

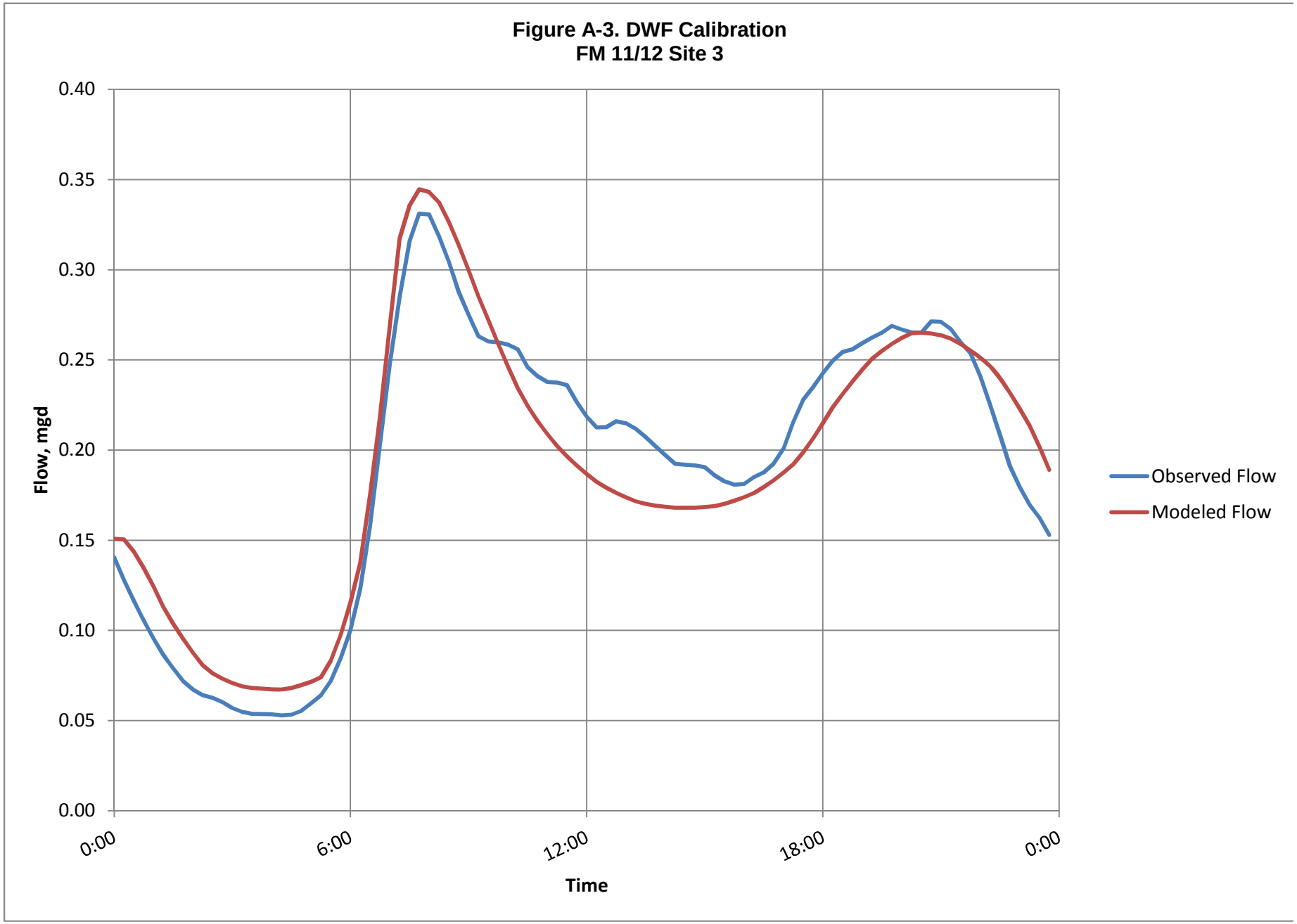
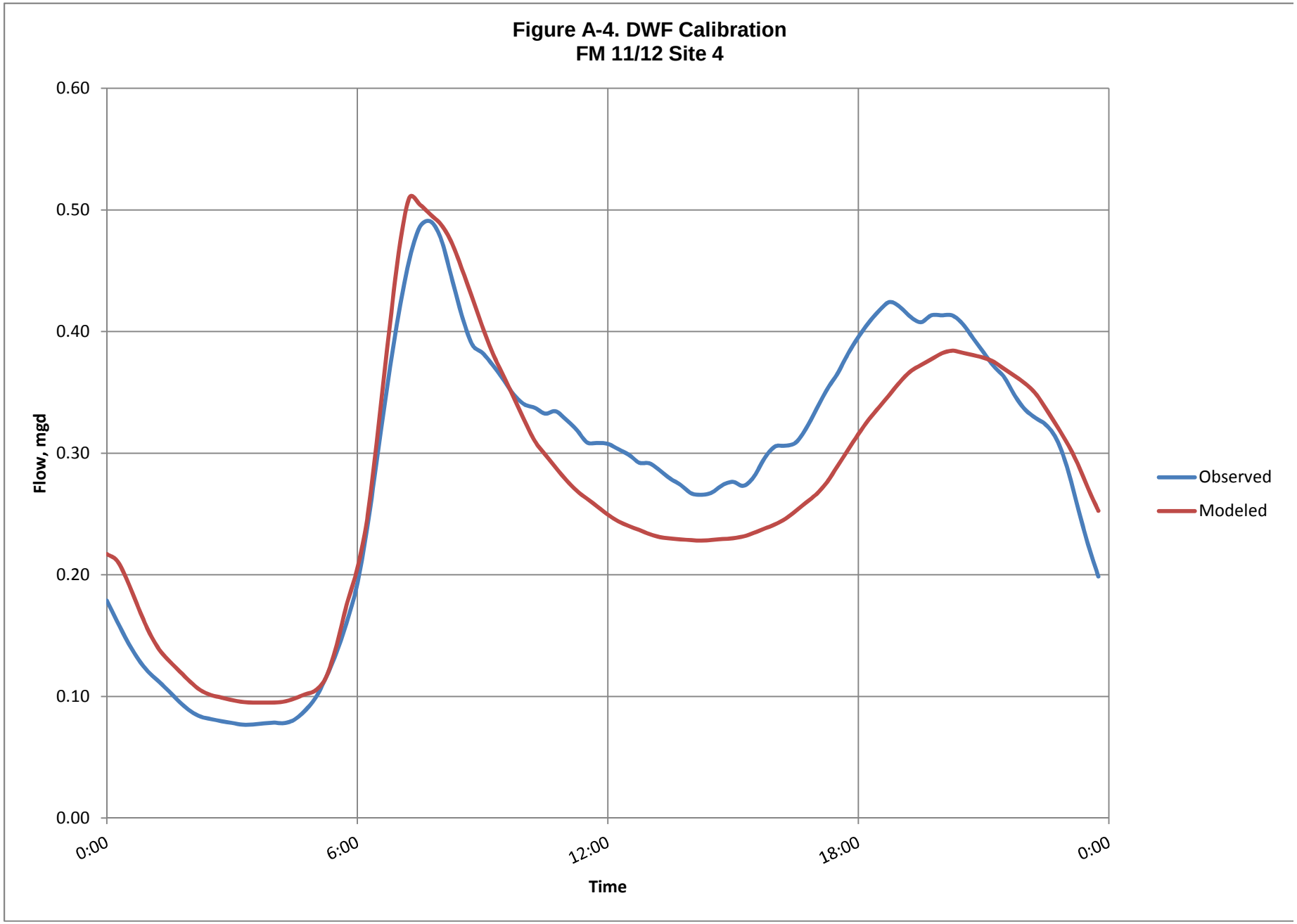


Figure A-3. DWF Calibration
FM 11/12 Site 3
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed Flow
Modeled Flow



WEST YOST ASSOCIATES
w\c\369\06-12-06\e\AppnA_FlowCompare.xlsx
Last Revised: 11-19-12

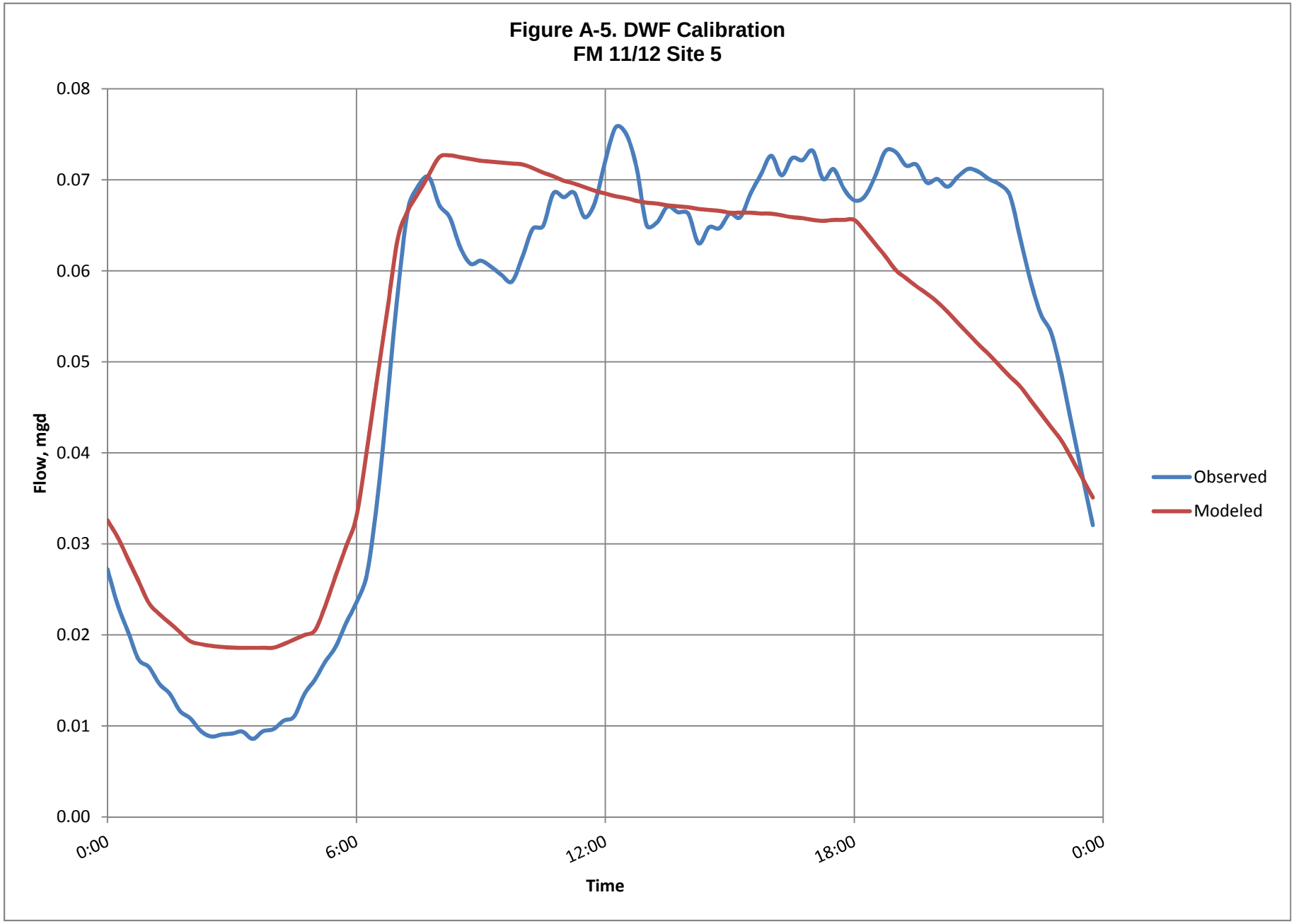


Figure A-5. DWF Calibration
FM 11/12 Site 5
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

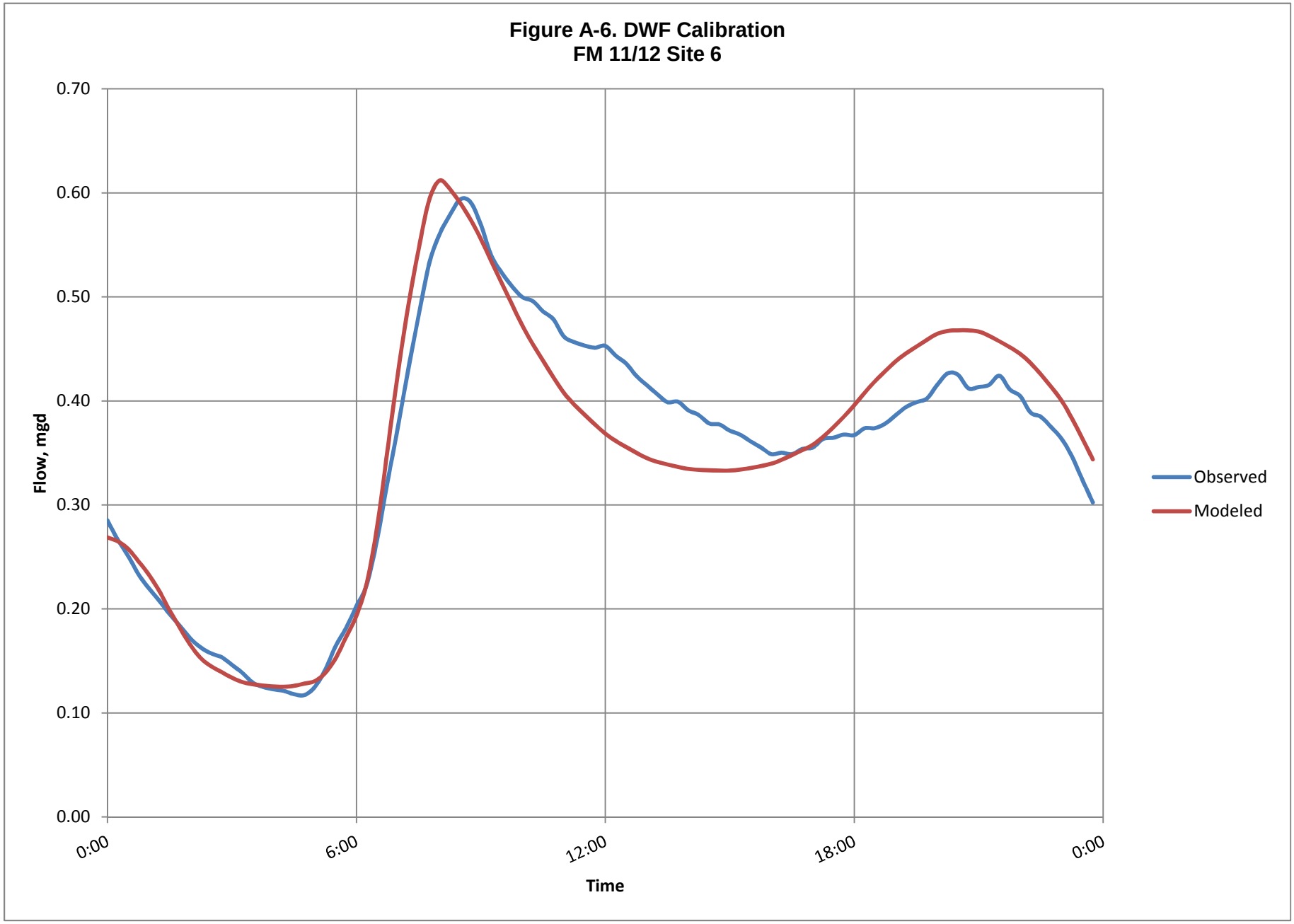


Figure A-6. DWF Calibration
FM 11/12 Site 6
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

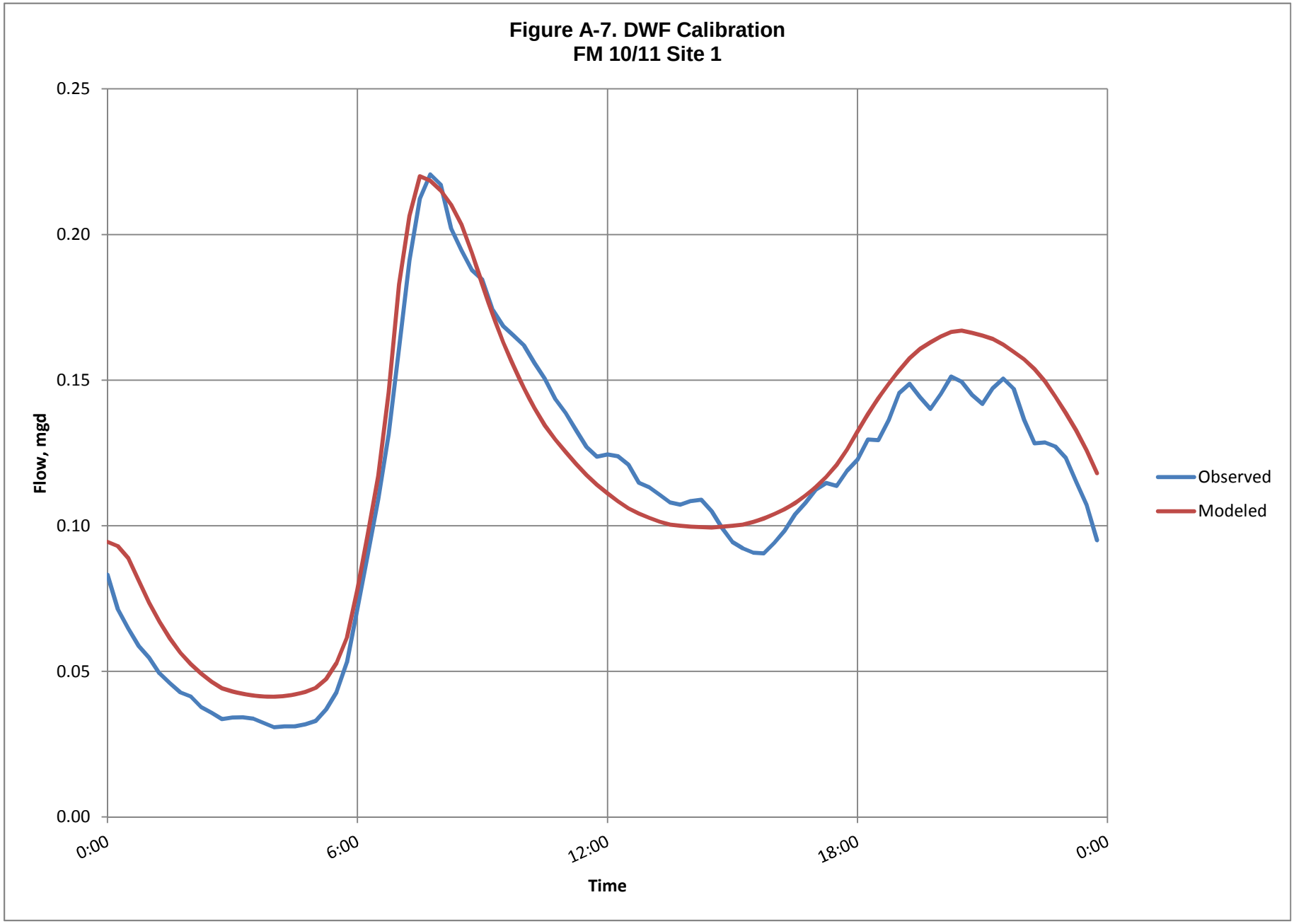


Figure A-7. DWF Calibration
FM 10/11 Site 1
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

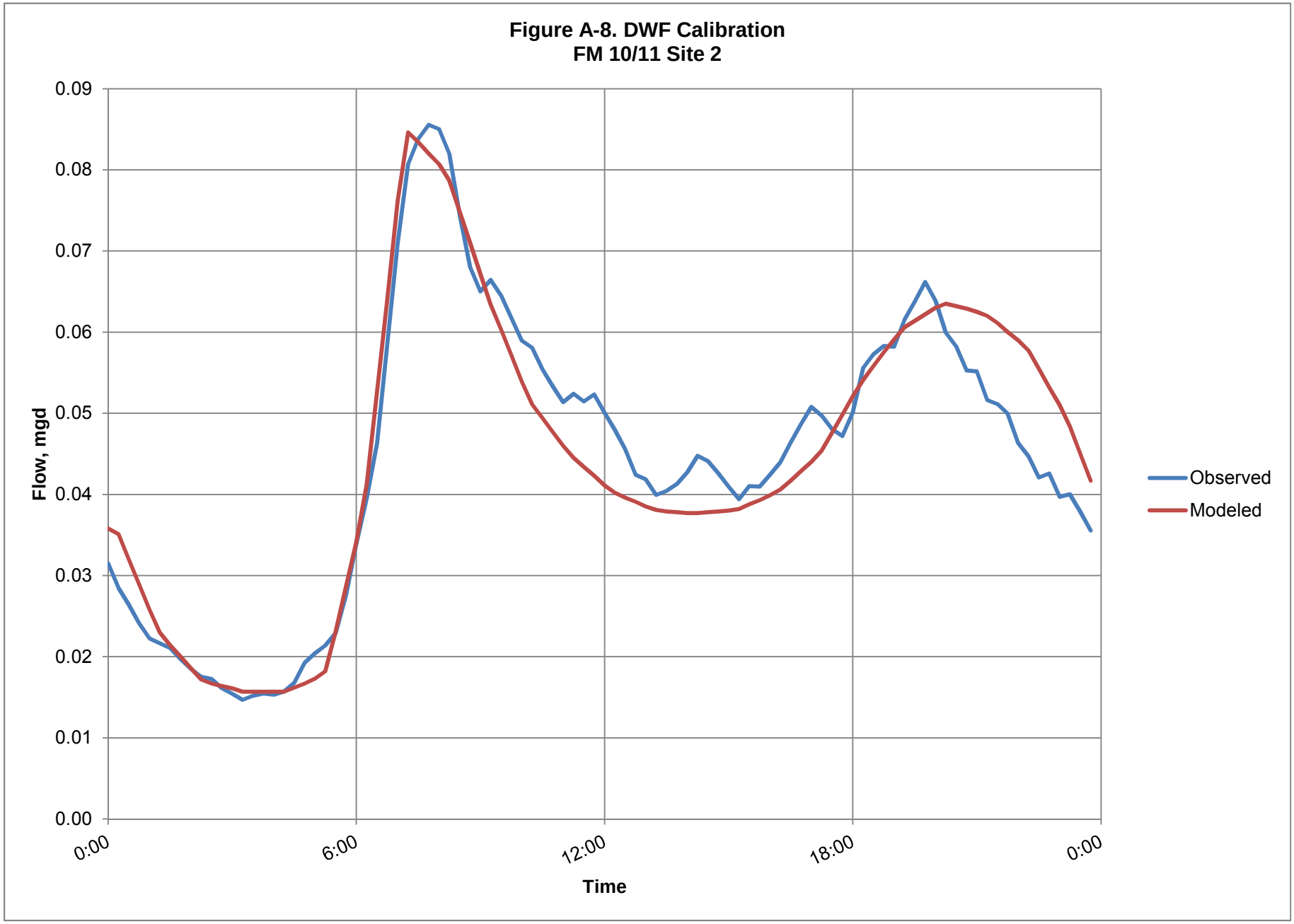


Figure A-8. DWF Calibration
FM 10/11 Site 2
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

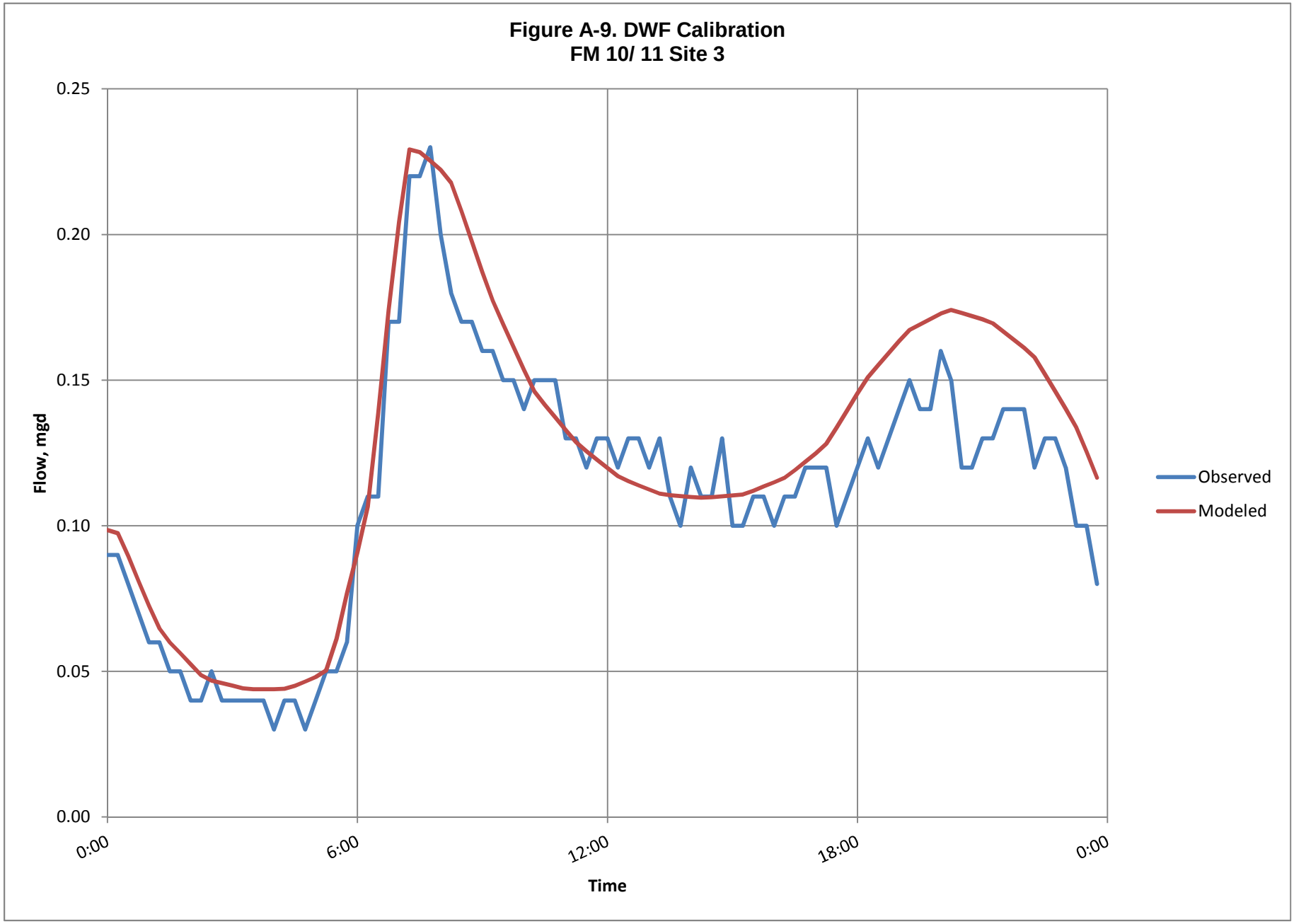


Figure A-9. DWF Calibration
FM 10/ 11 Site 3
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

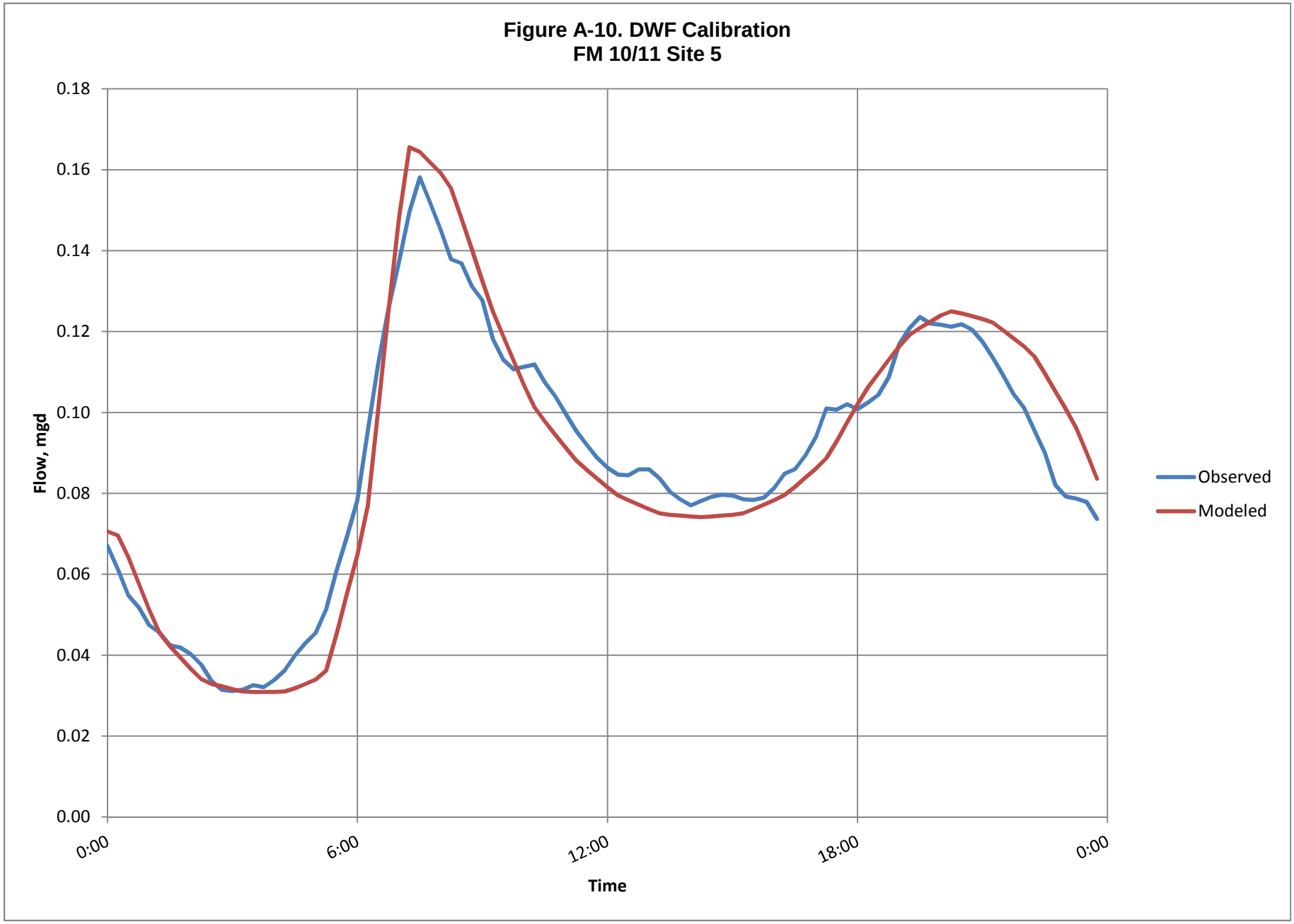


Figure A-10. DWF Calibration
FM 10/11 Site 5
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

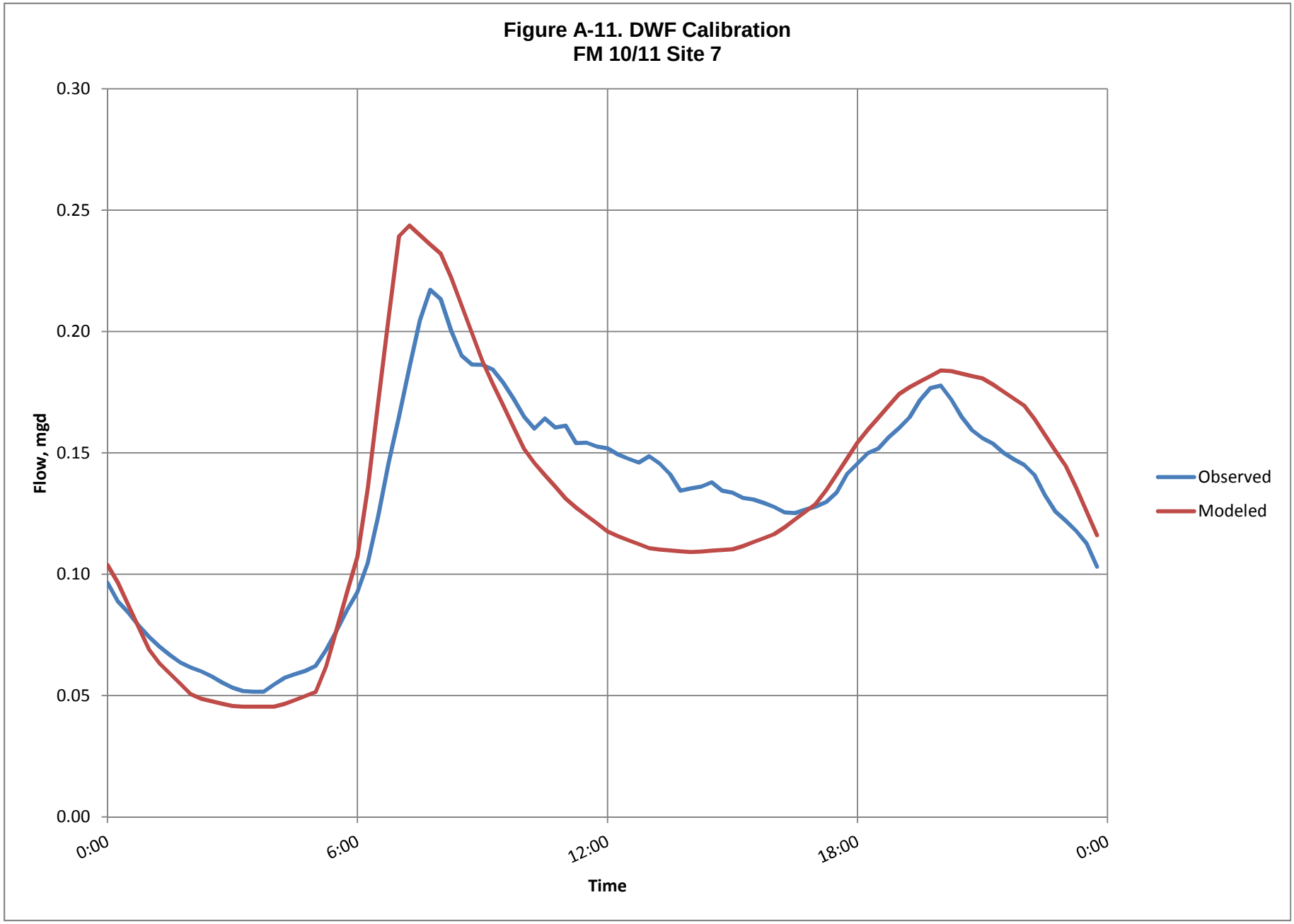


Figure A-11. DWF Calibration
FM 10/11 Site 7
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

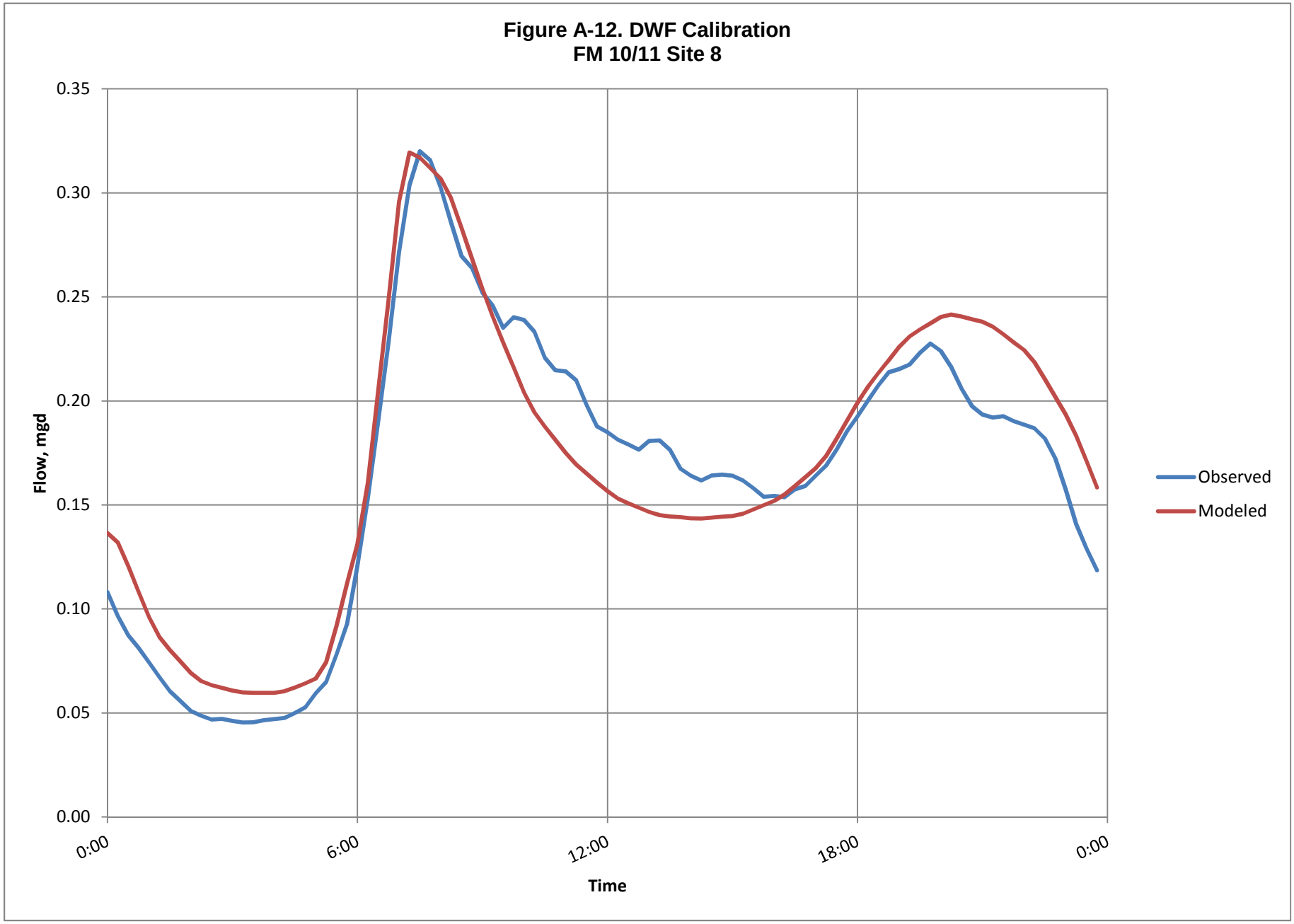


Figure A-12. DWF Calibration
FM 10/11 Site 8
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

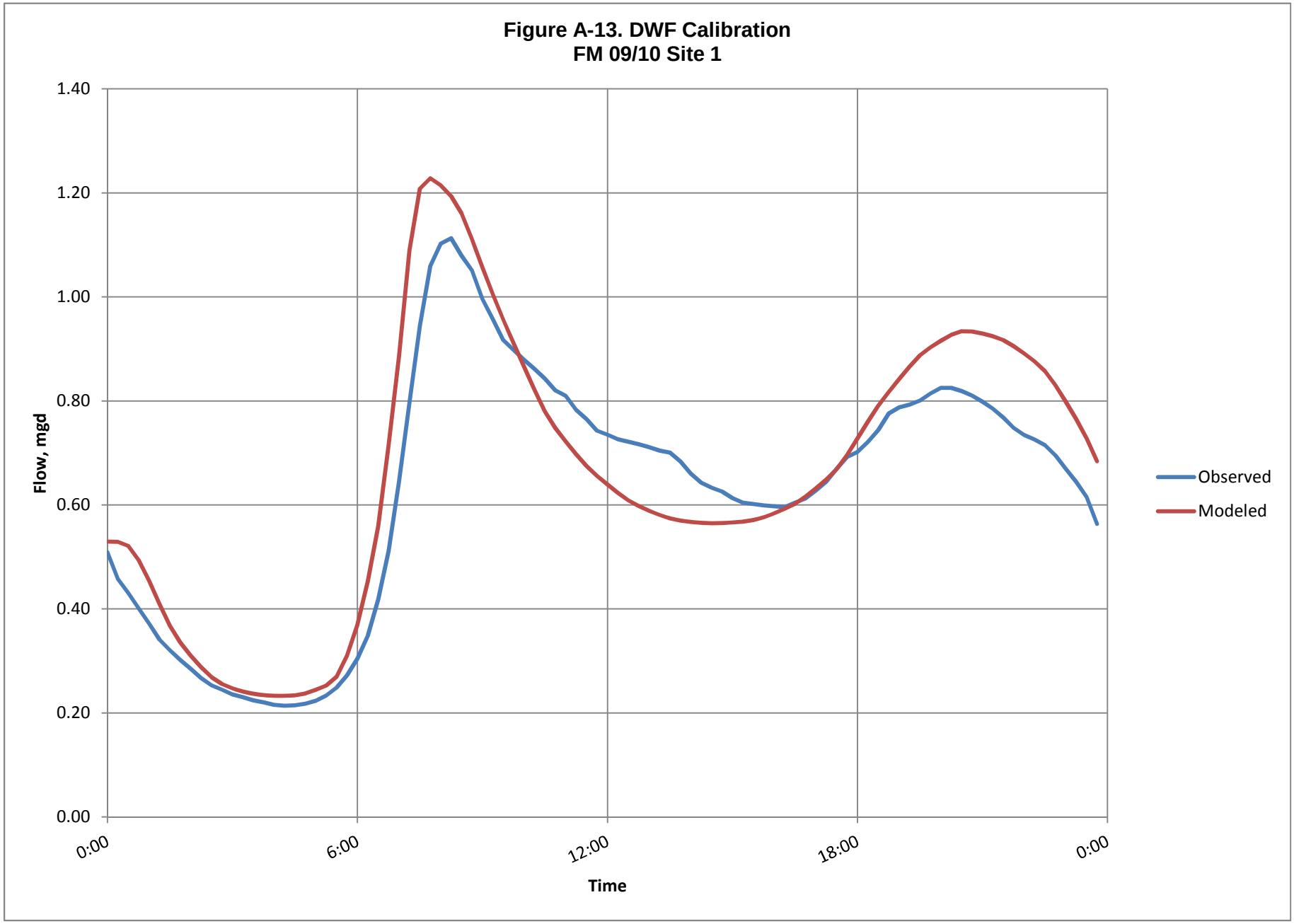


Figure A-13. DWF Calibration
FM 09/10 Site 1
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

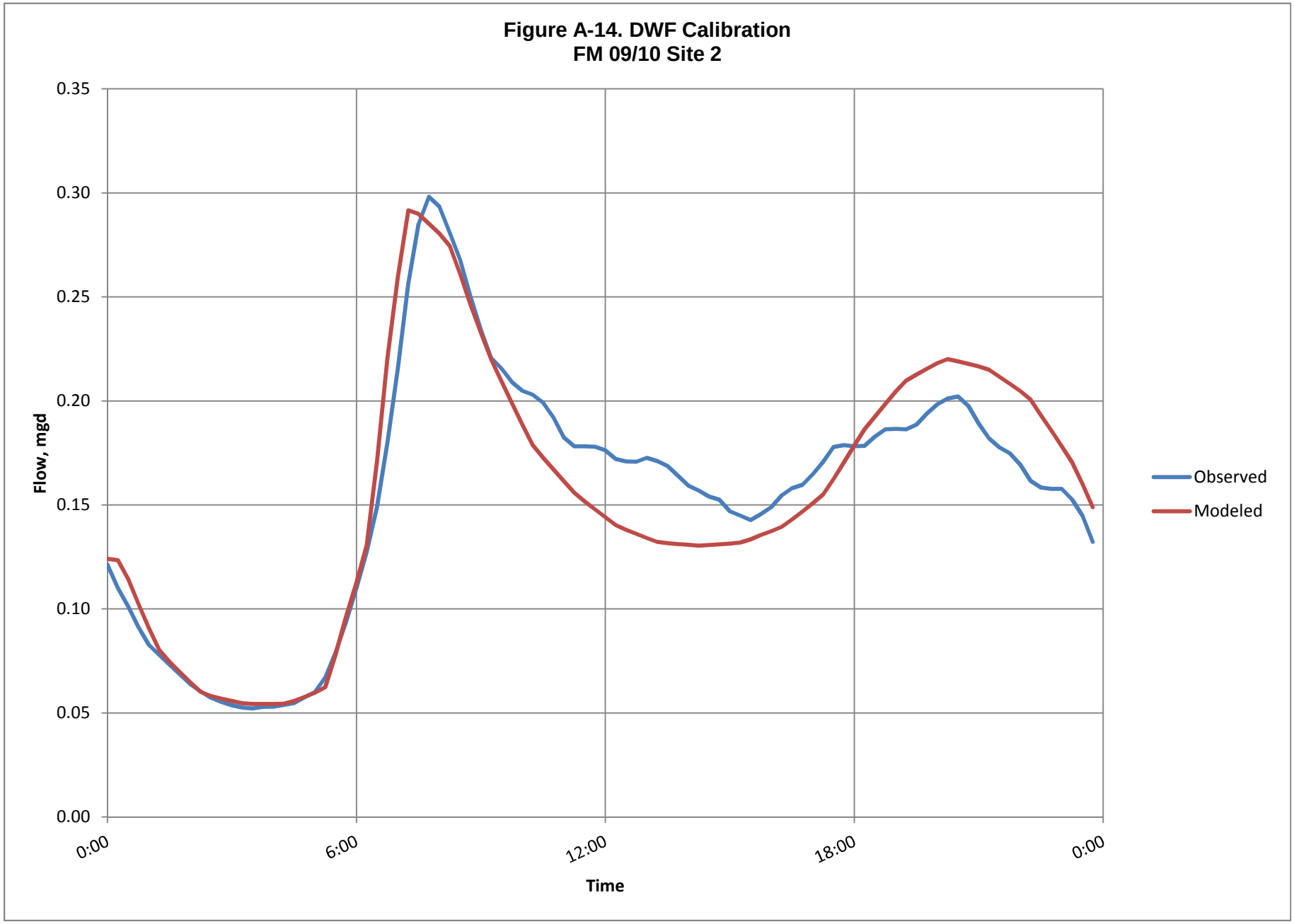


Figure A-14. DWF Calibration
FM 09/10 Site 2
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

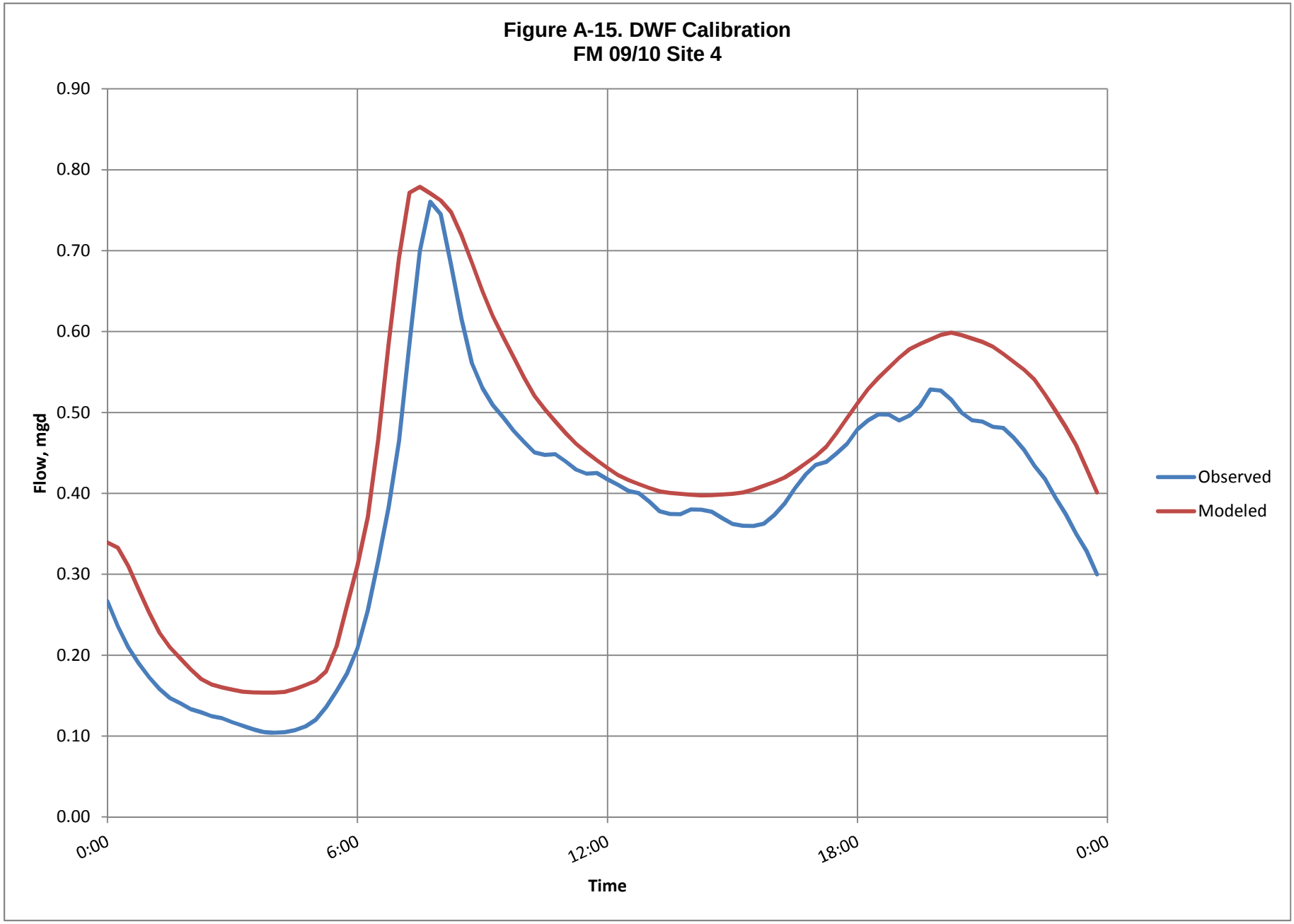


Figure A-15. DWF Calibration
FM 09/10 Site 4
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

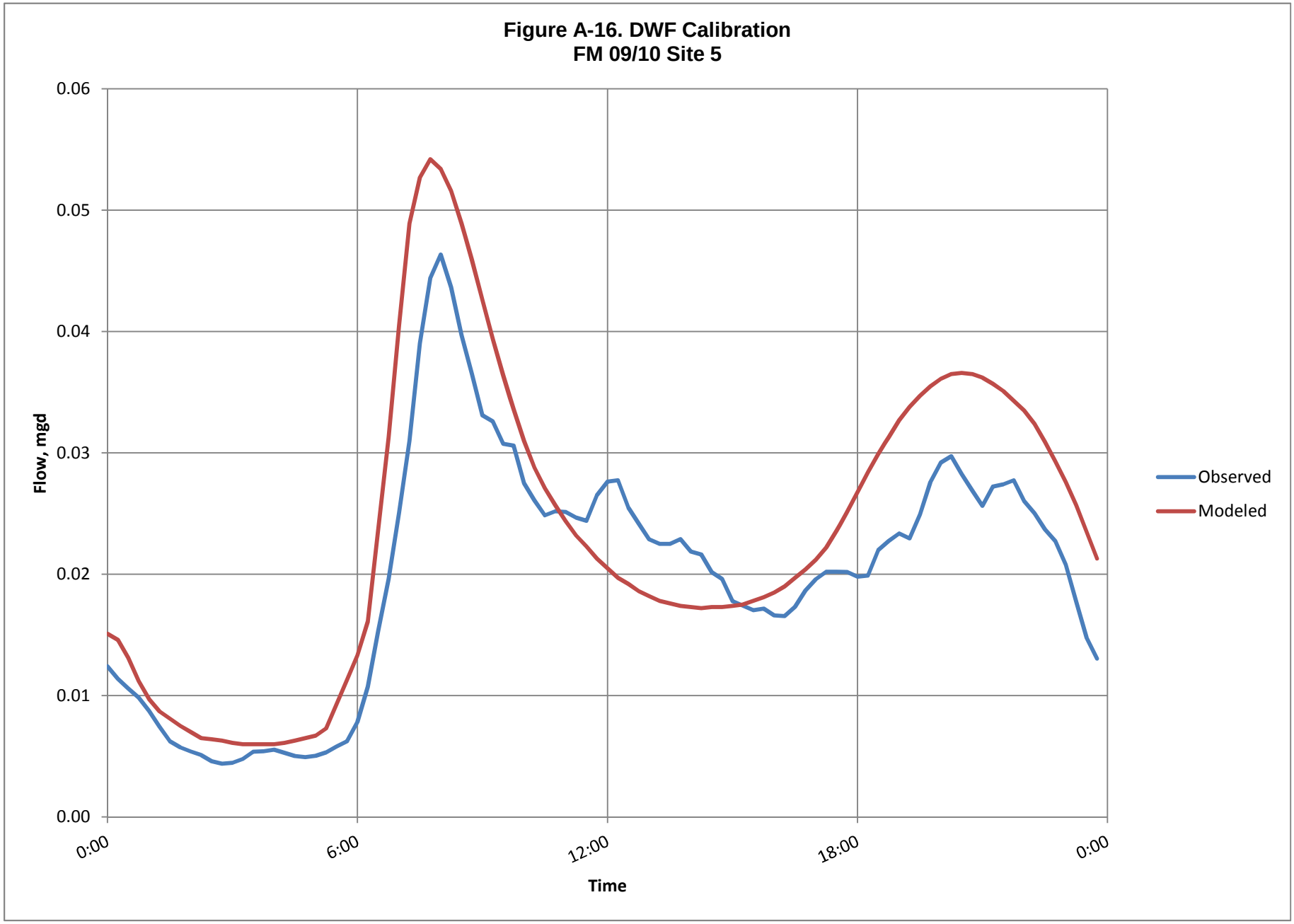


Figure A-16. DWF Calibration
FM 09/10 Site 5
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

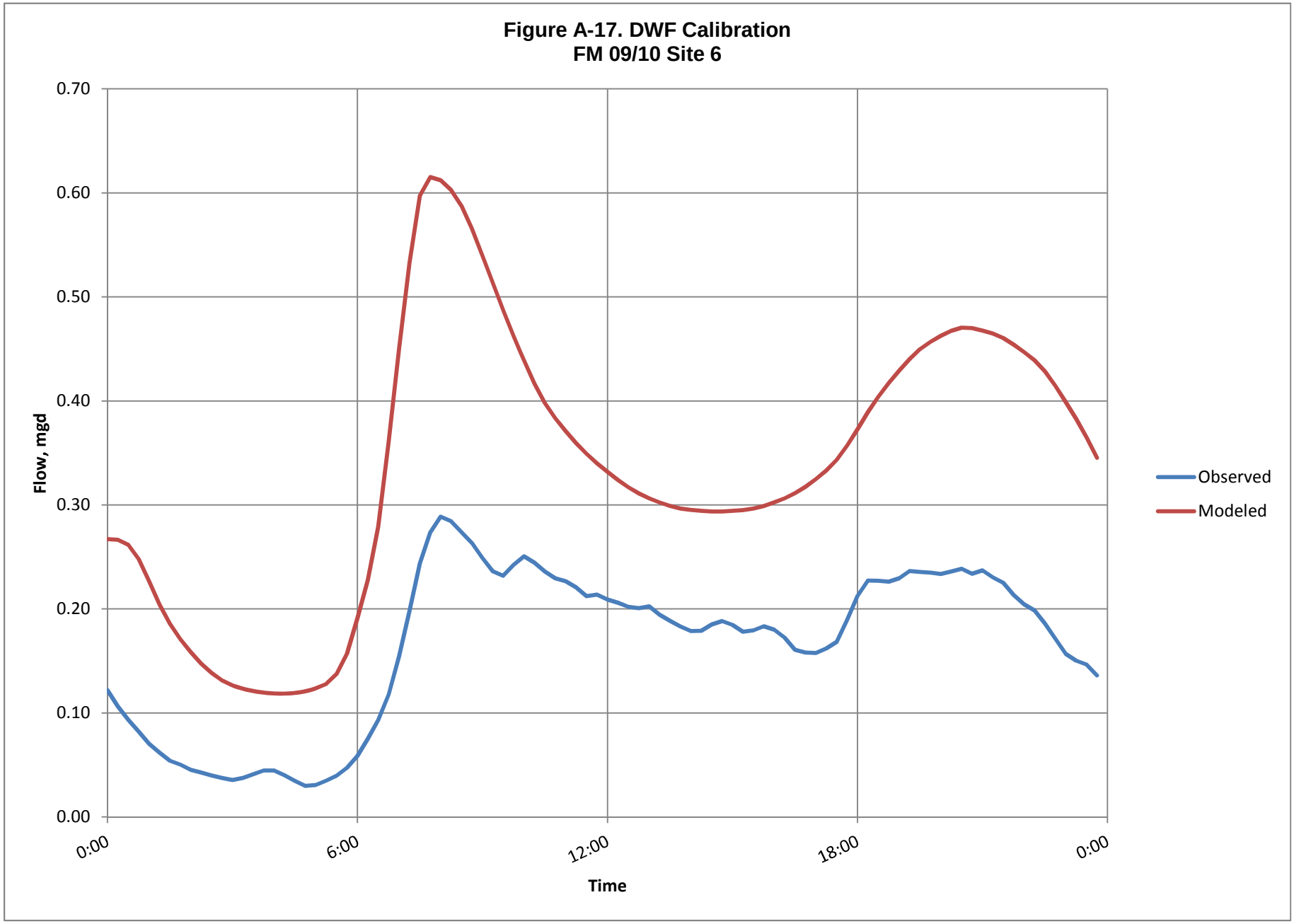


Figure A-17. DWF Calibration
FM 09/10 Site 6
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

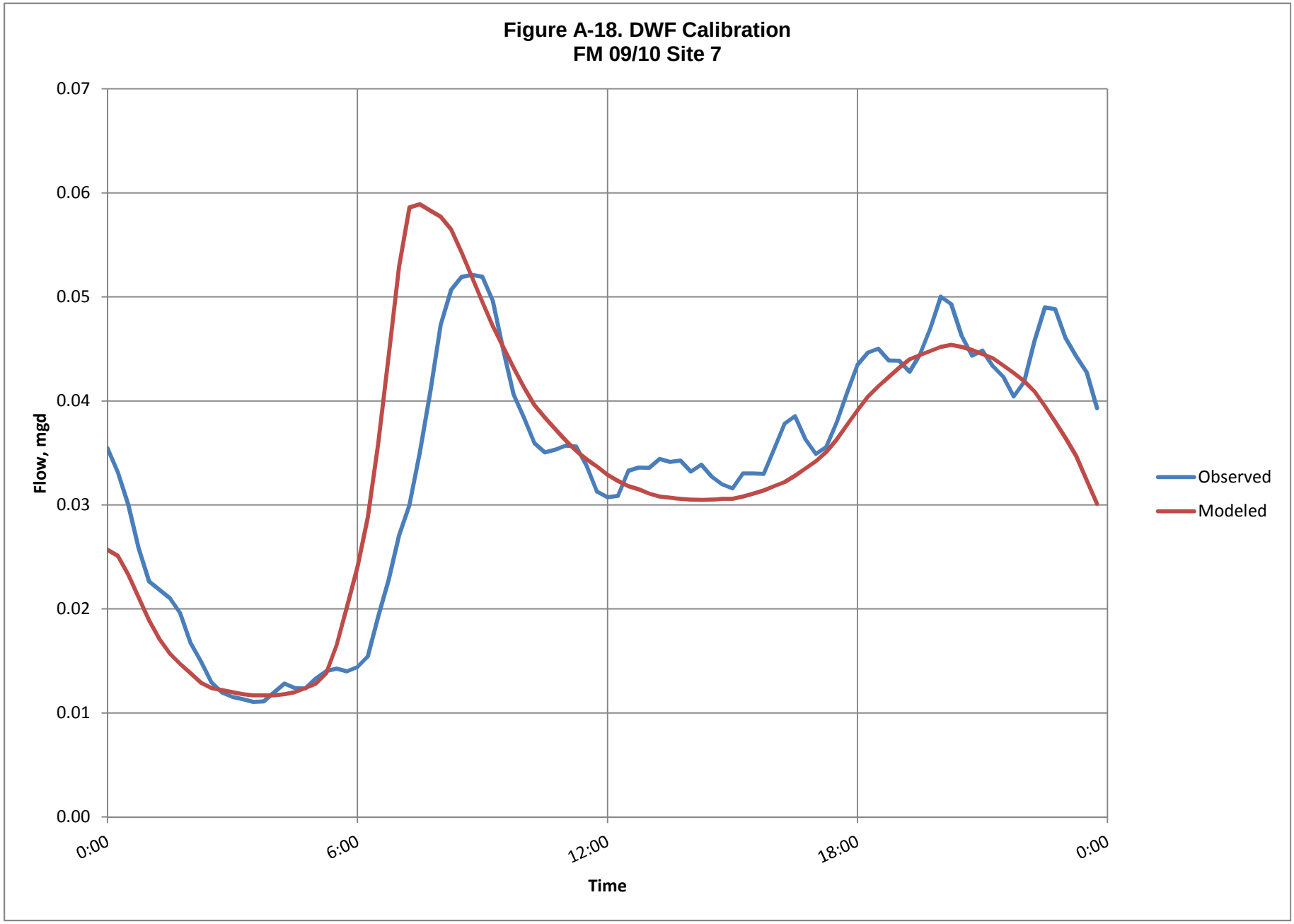


Figure A-18. DWF Calibration
FM 09/10 Site 7
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

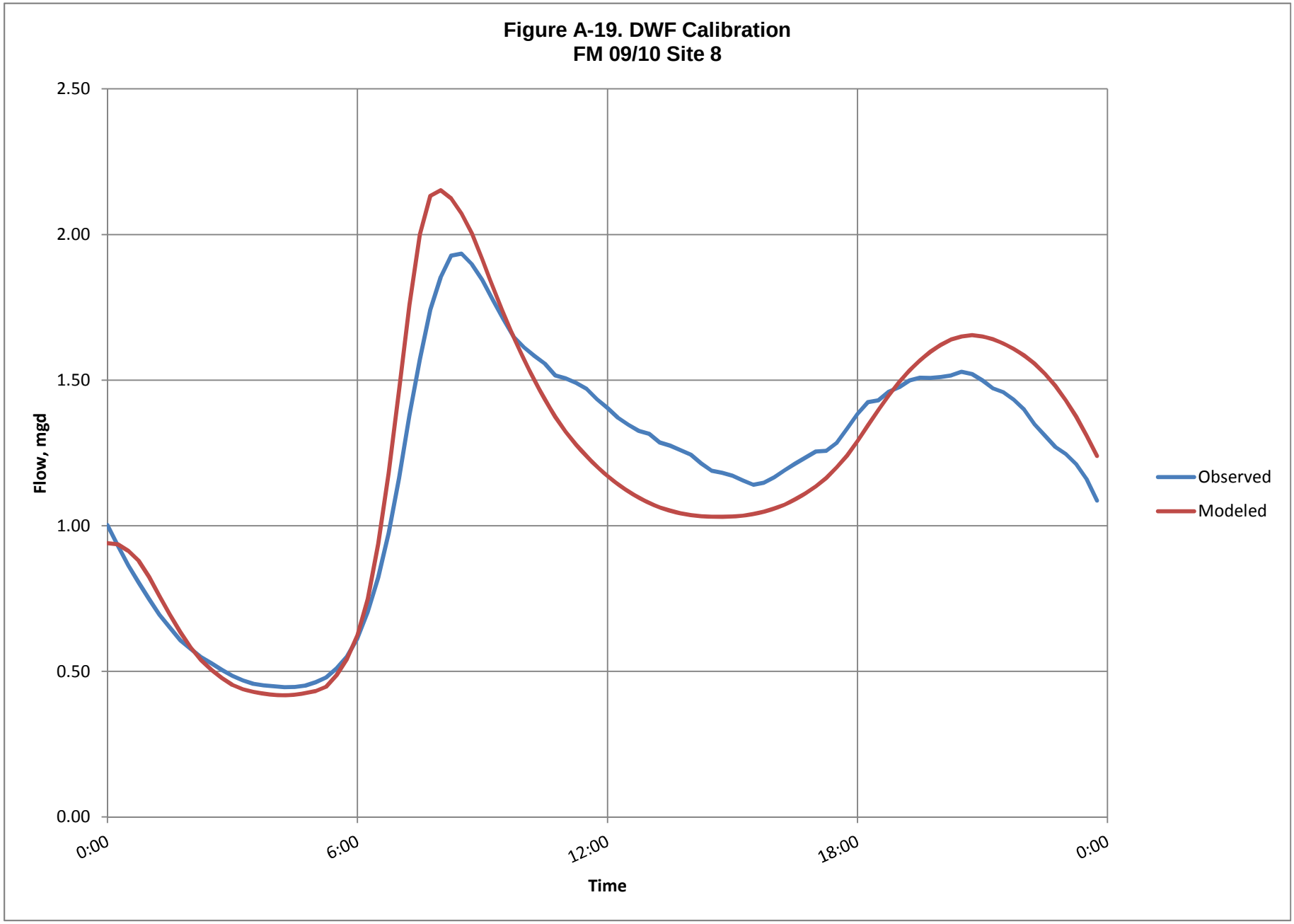


Figure A-19. DWF Calibration
FM 09/10 Site 8
2.50
2.00
1.50
1.00
0.50
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

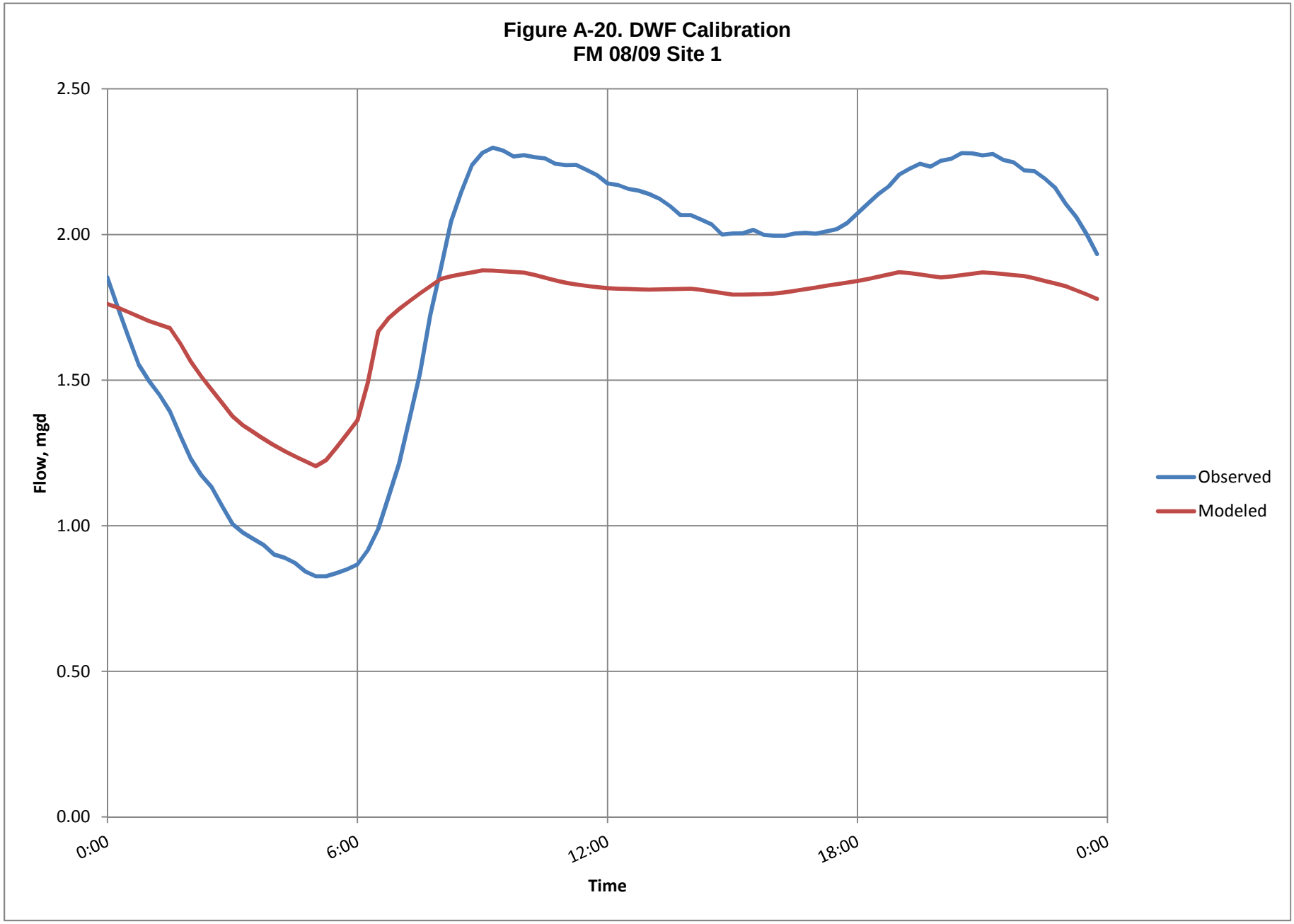


Figure A-20. DWF Calibration
FM 08/09 Site 1
2.50
2.00
1.50
1.00
0.50
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

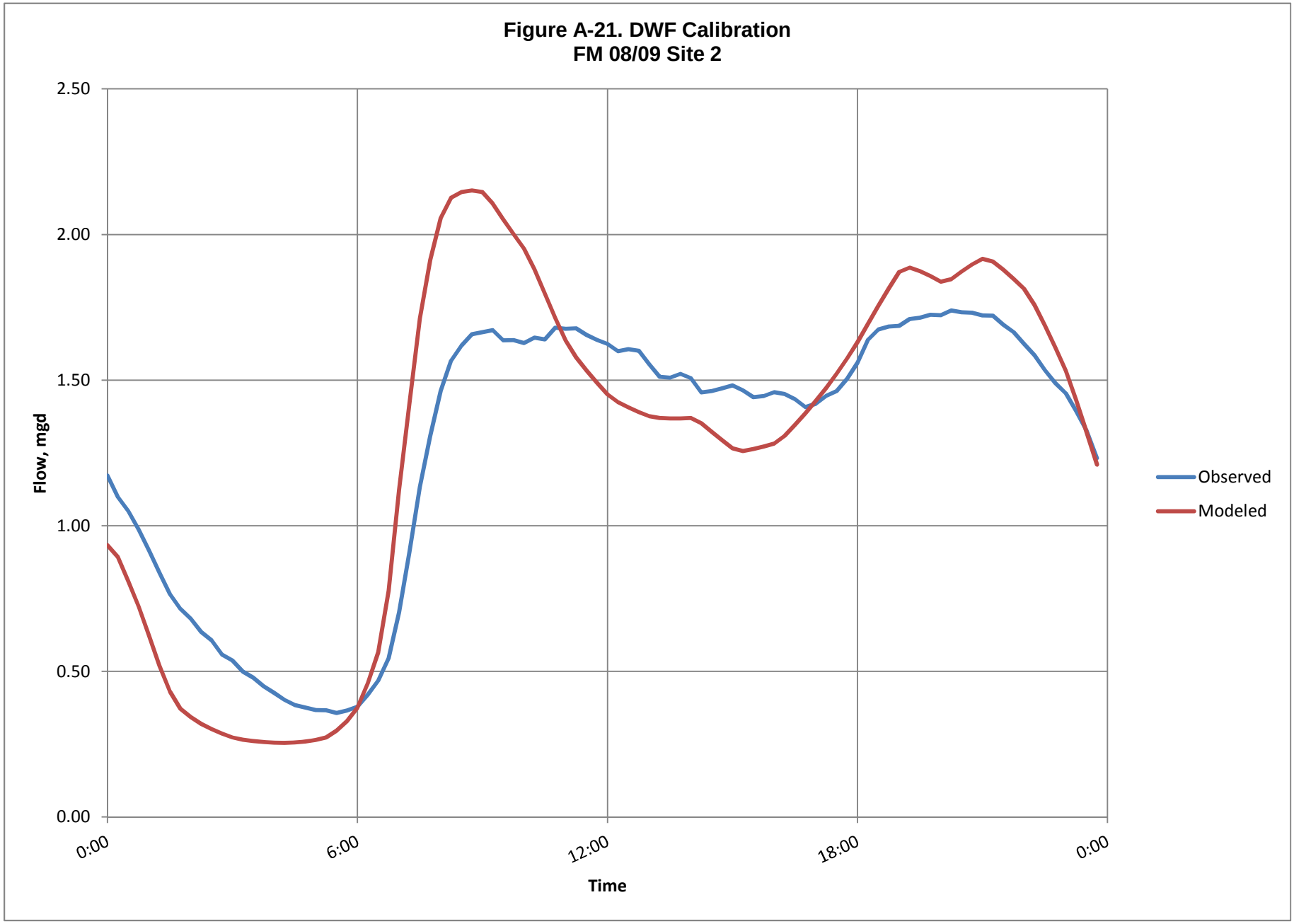


Figure A-21. DWF Calibration
FM 08/09 Site 2
2.50
2.00
1.50
1.00
0.50
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

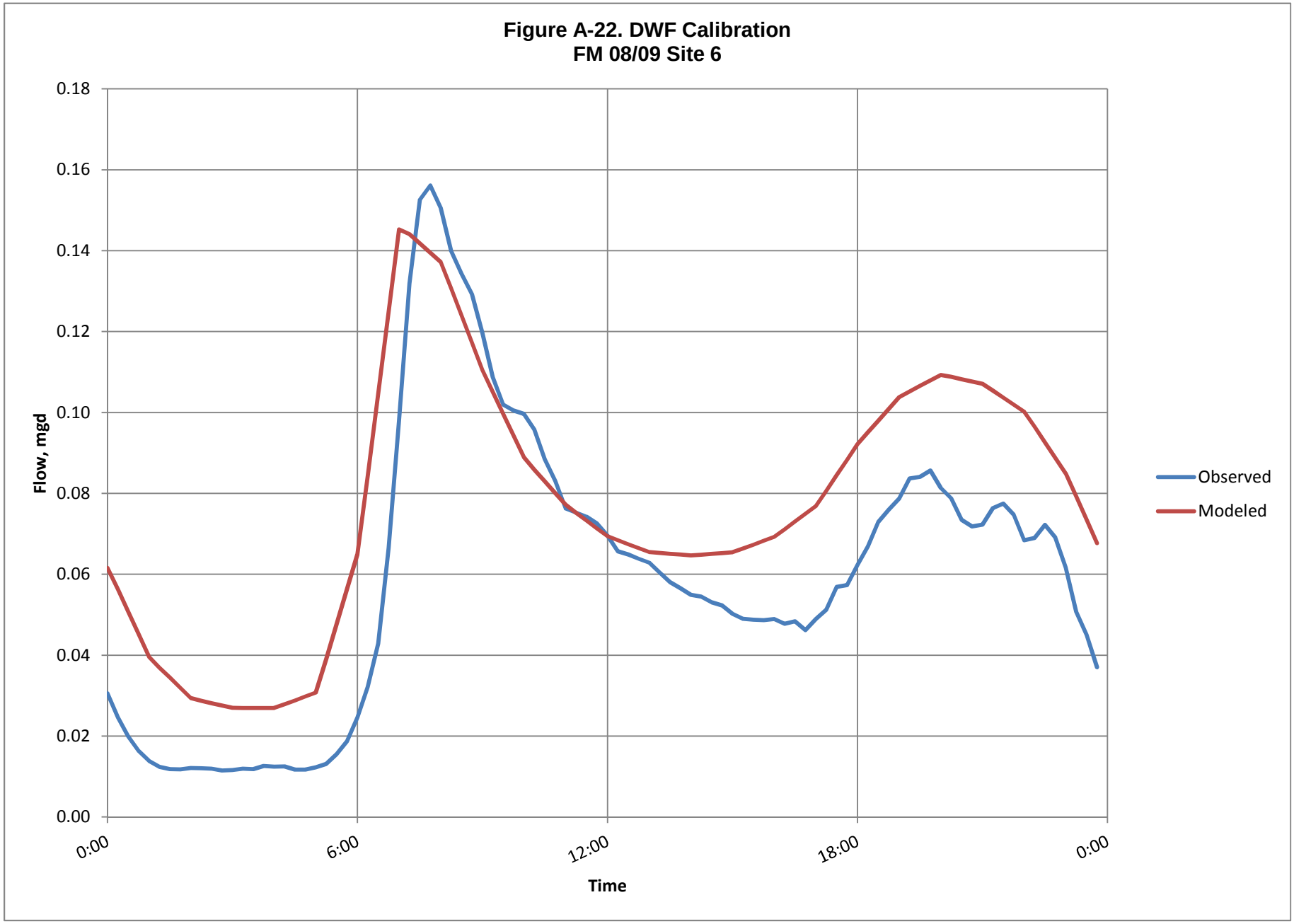


Figure A-22. DWF Calibration
FM 08/09 Site 6
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

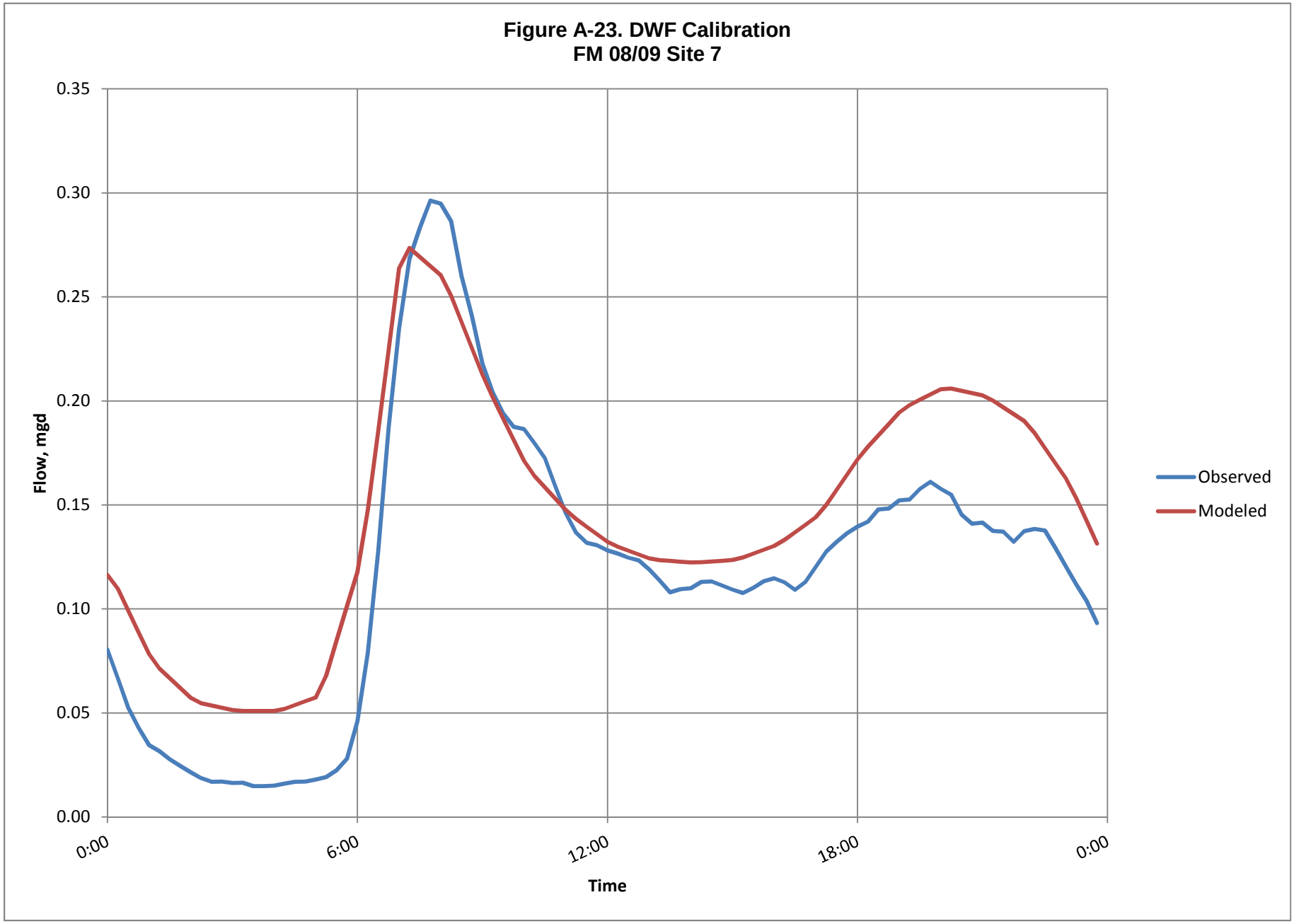


Figure A-23. DWF Calibration
FM 08/09 Site 7
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

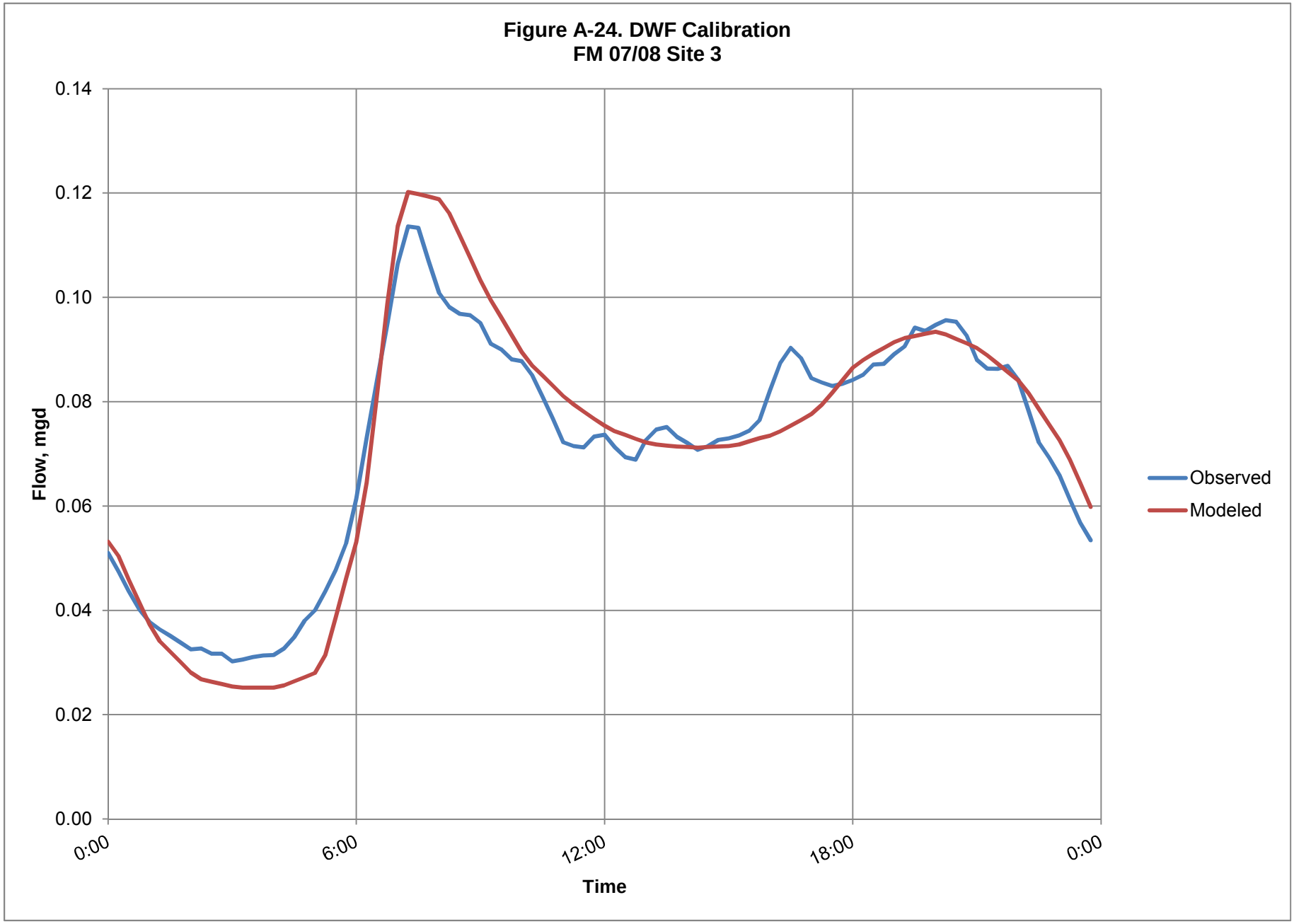


Figure A-24. DWF Calibration
FM 07/08 Site 3
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

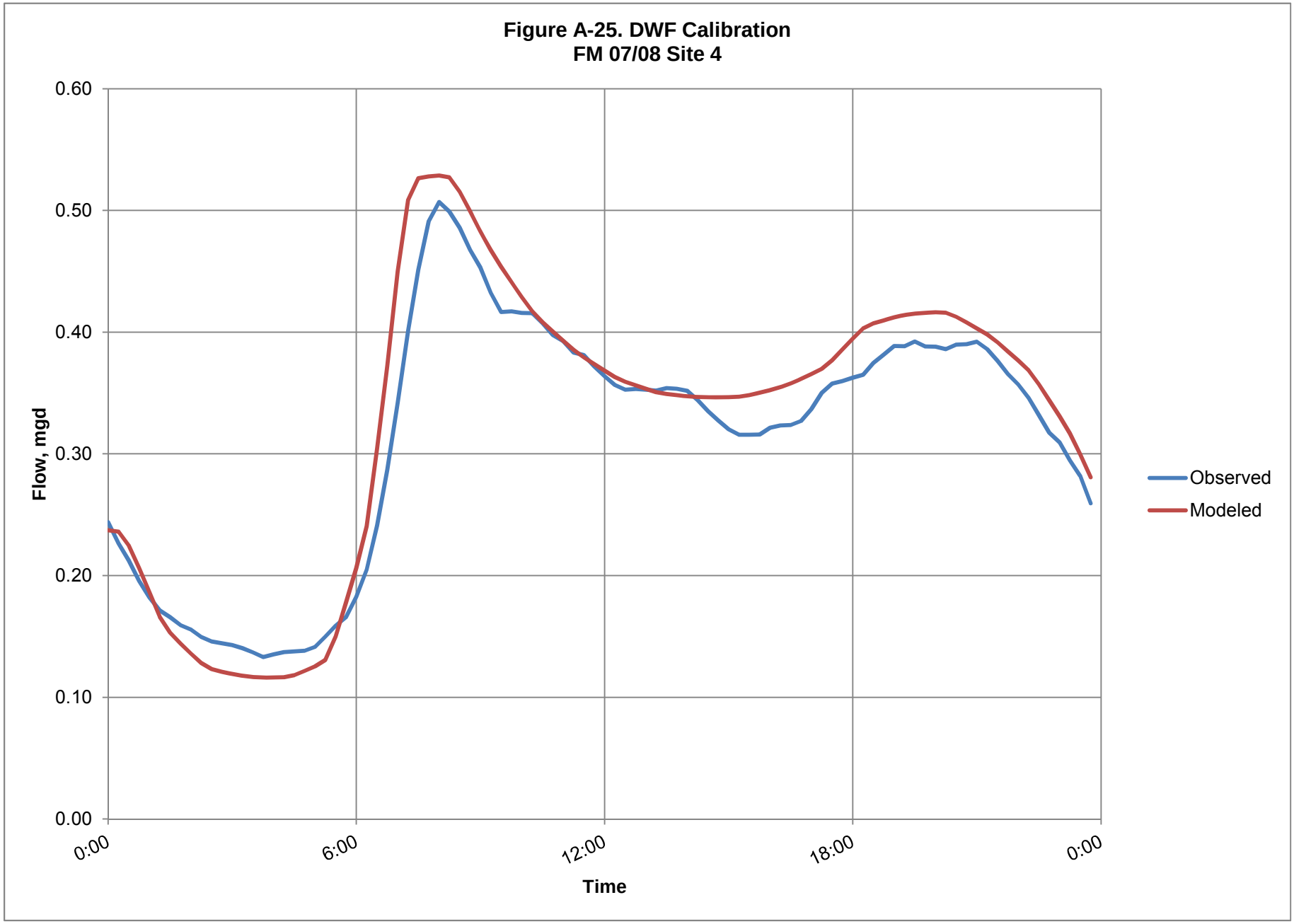


Figure A-25. DWF Calibration
FM 07/08 Site 4
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

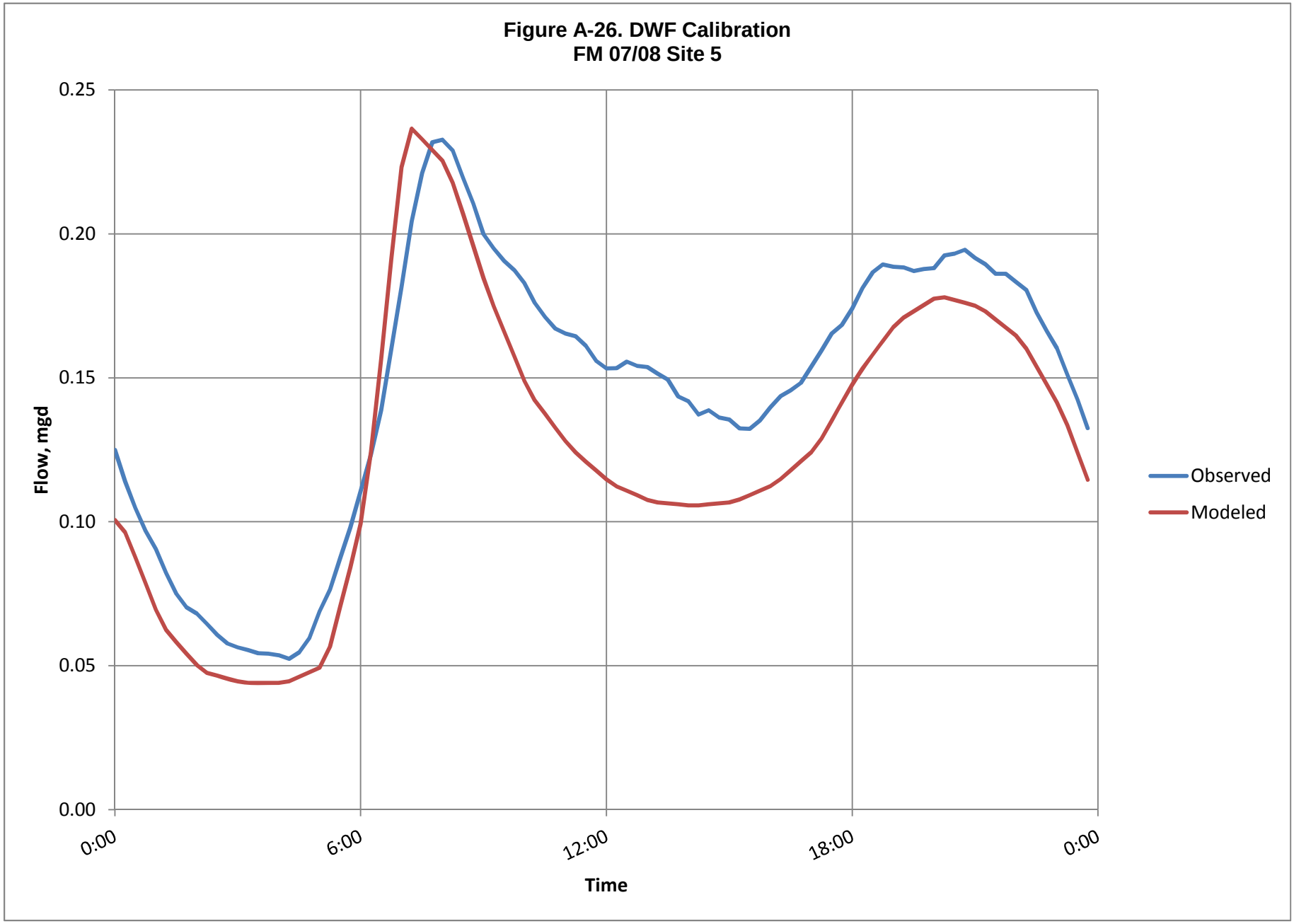
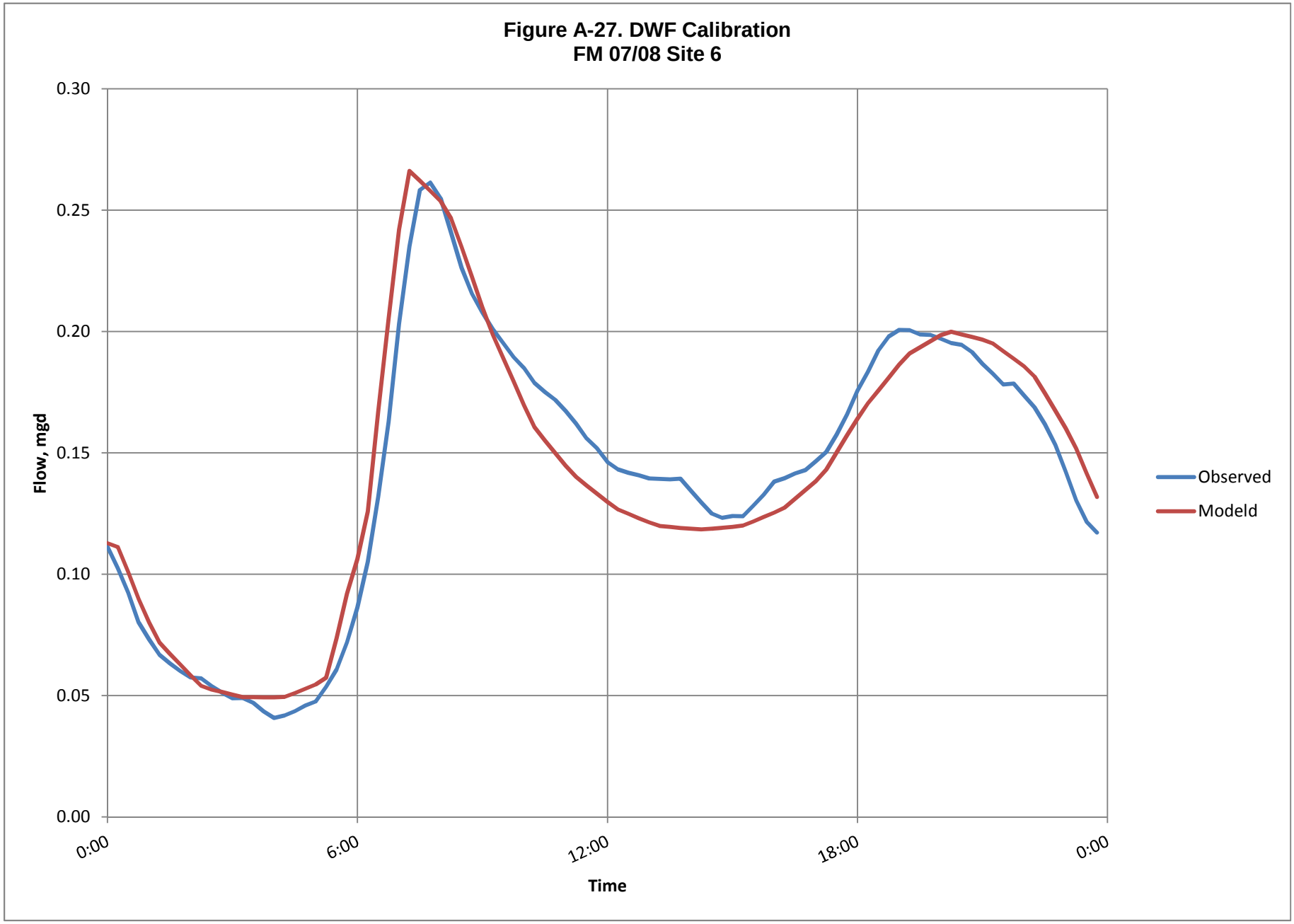


Figure A-26. DWF Calibration
FM 07/08 Site 5
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled



WEST YOST ASSOCIATES
w\c\369\06-12-06\e\AppnA_FlowCompare.xlsx
Last Revised: 11-19-12

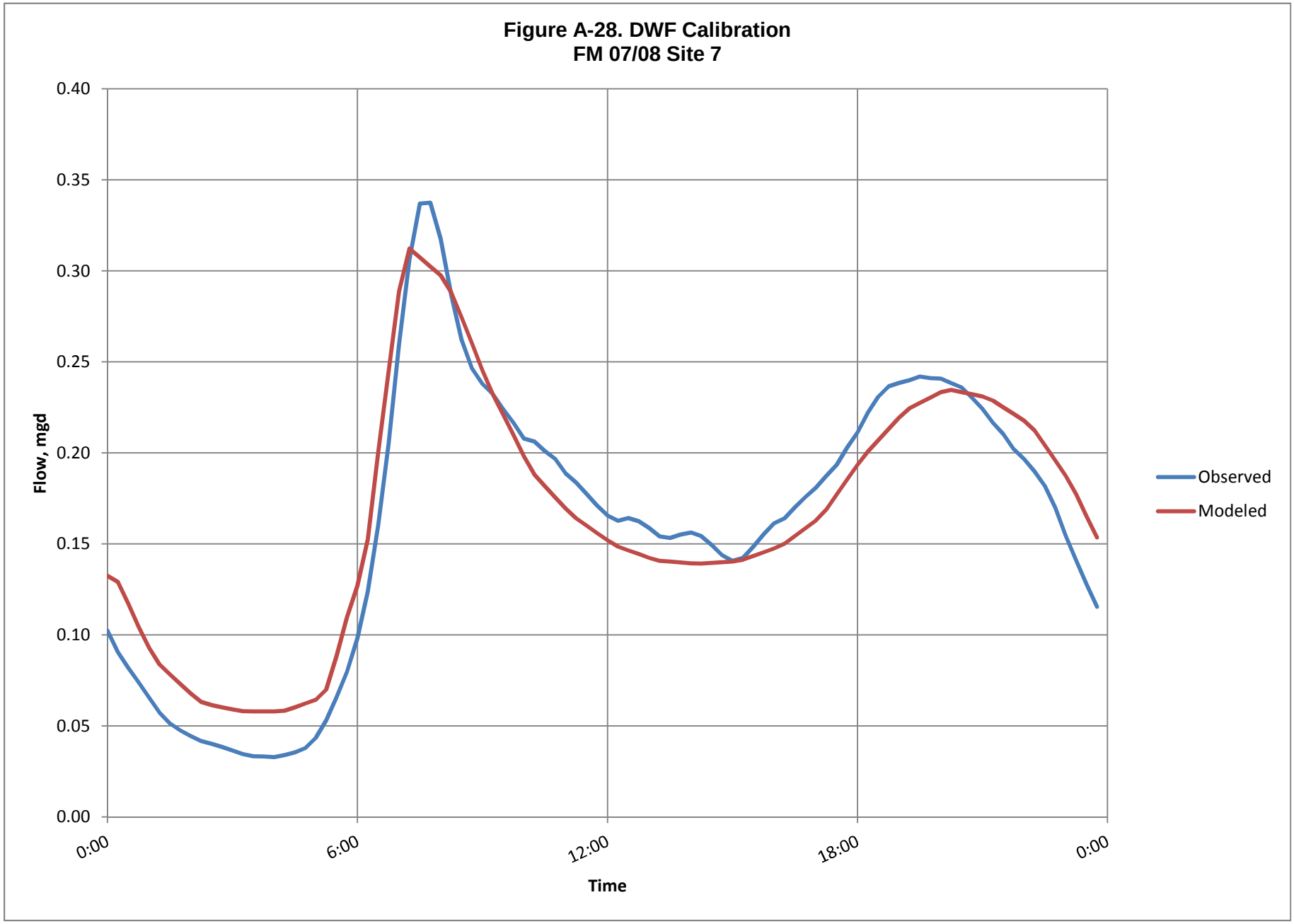


Figure A-28. DWF Calibration
FM 07/08 Site 7
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
0:00
6:00
12:00
18:00
0:00
Time
Observed
Modeled

APPENDIX B

Wet Weather Calibration Plots

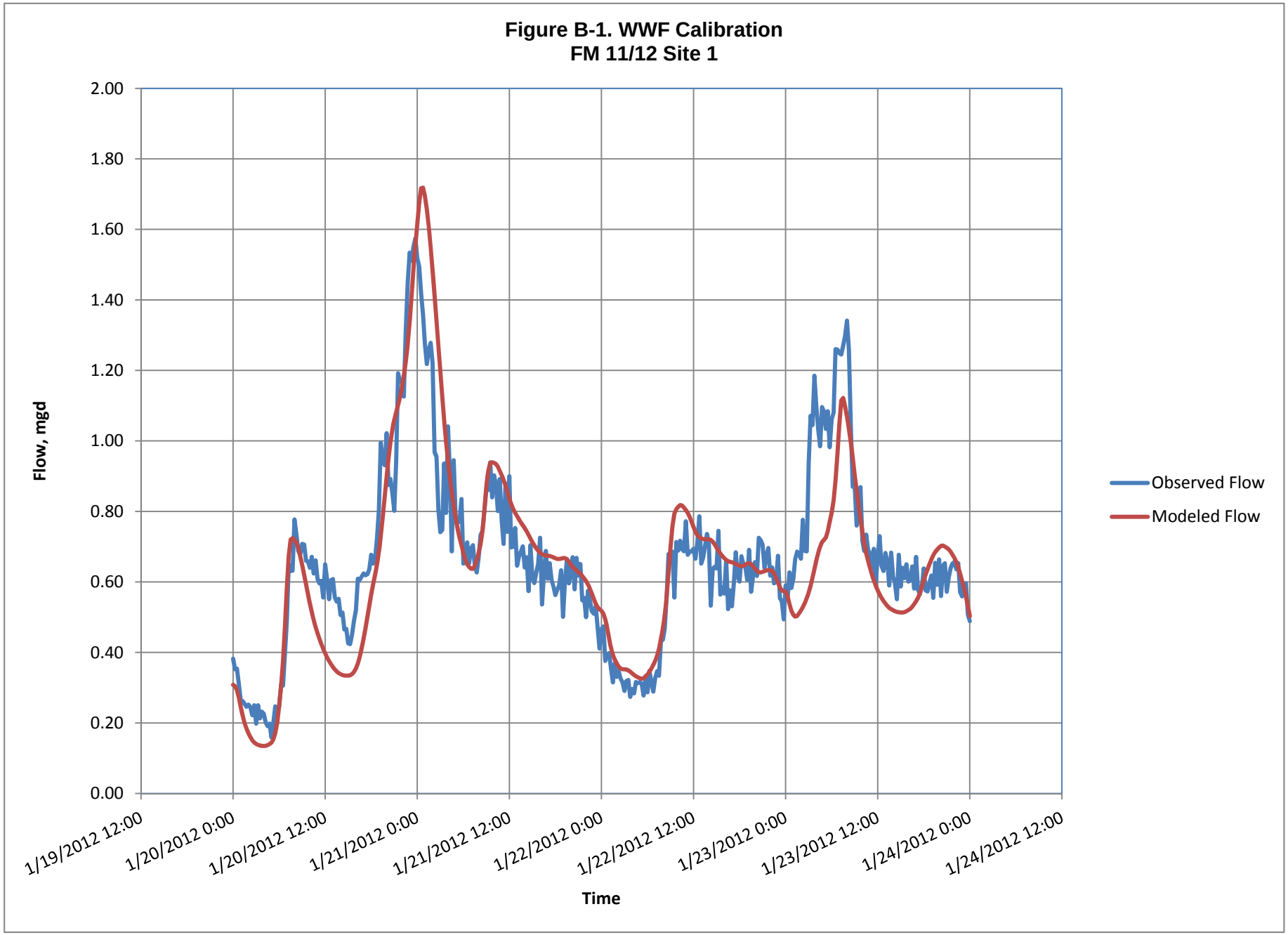


Figure B-1. WWF Calibration
FM 11/12 Site 1
Flow, mgd
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Time
Observed Flow
Modeled Flow

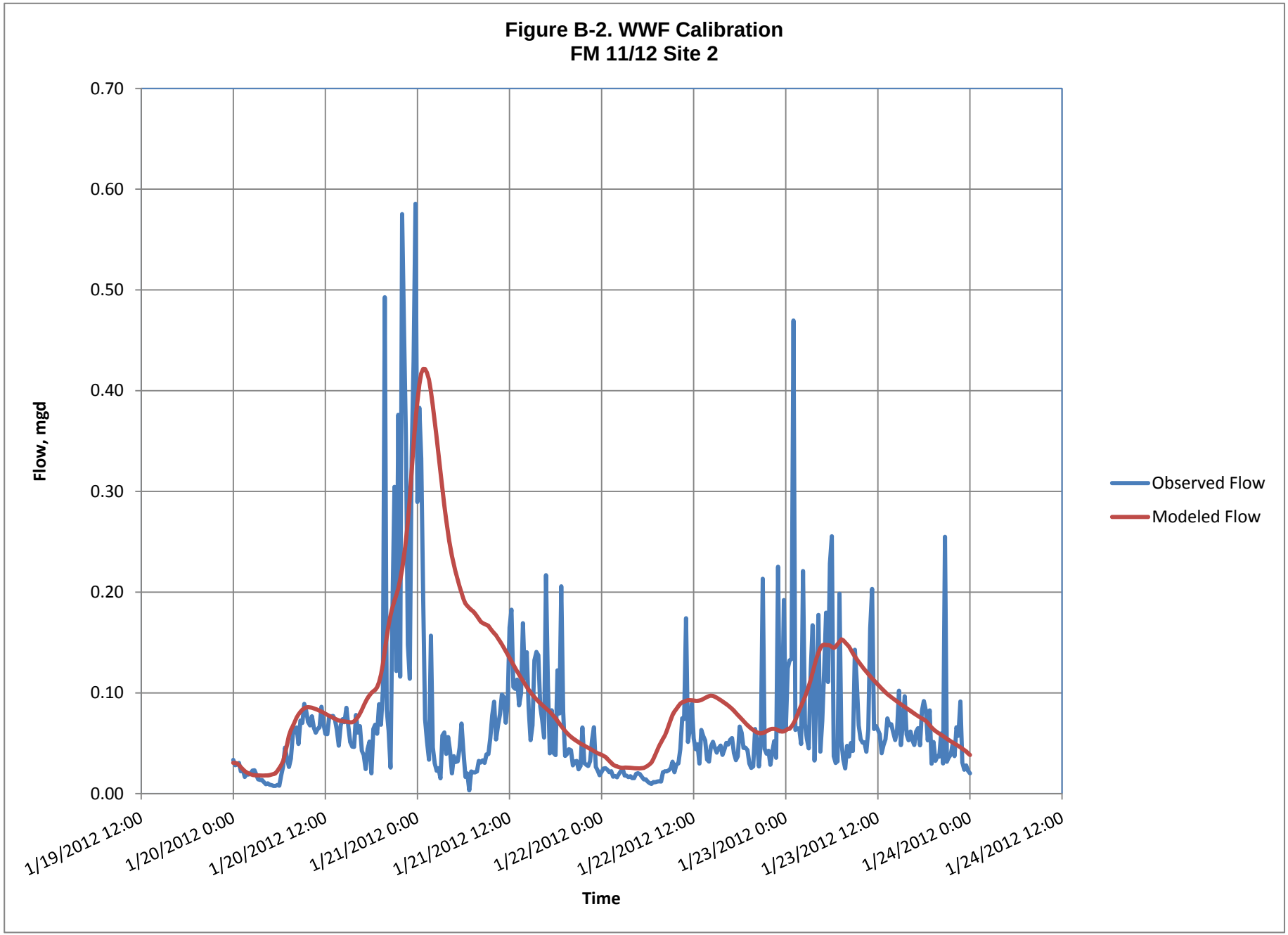


Figure B-2. WWF Calibration
FM 11/12 Site 2
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Time
Observed Flow
Modeled Flow

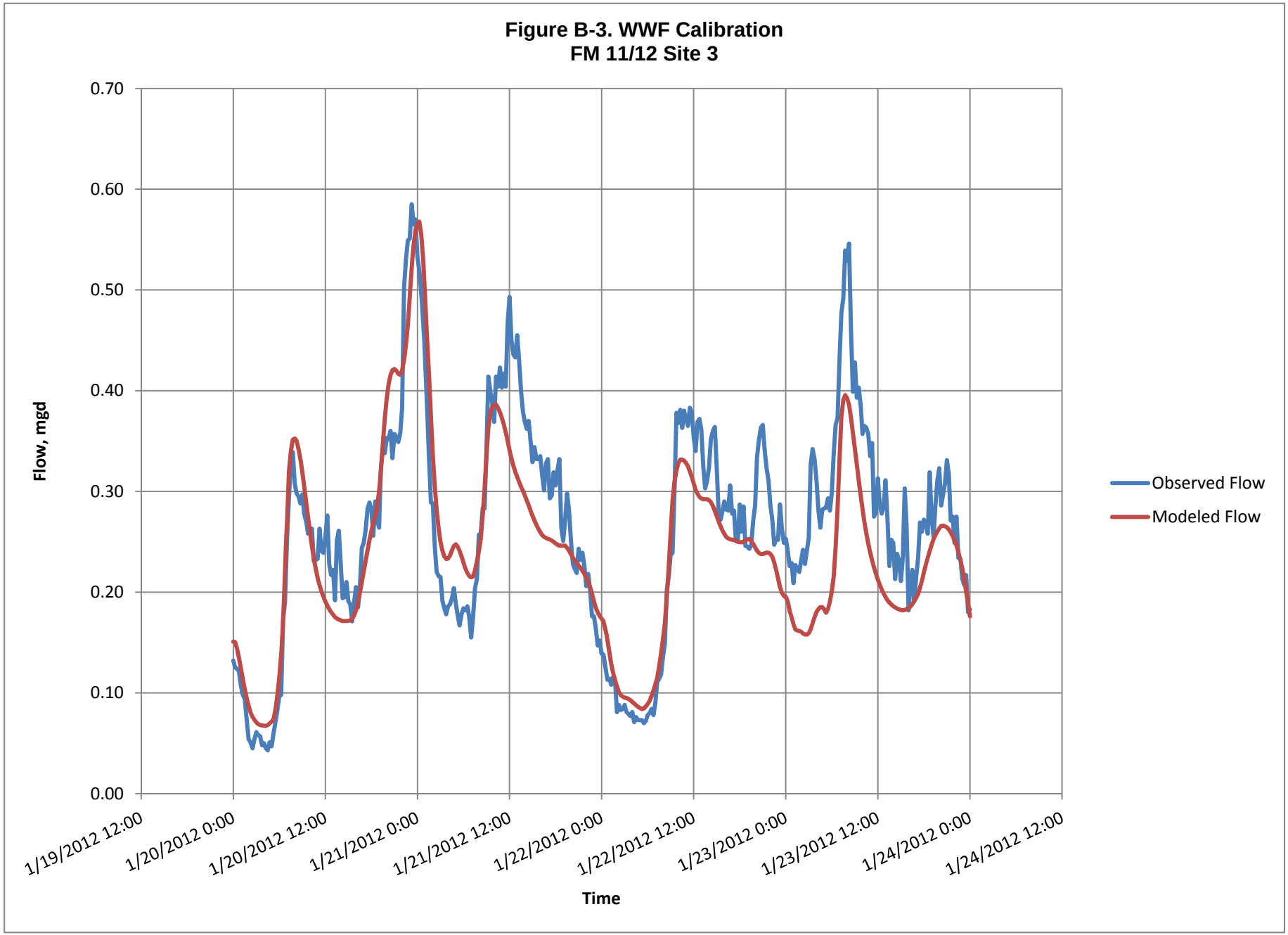


Figure B-3. WWF Calibration
FM 11/12 Site 3
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Time
Observed Flow
Modeled Flow

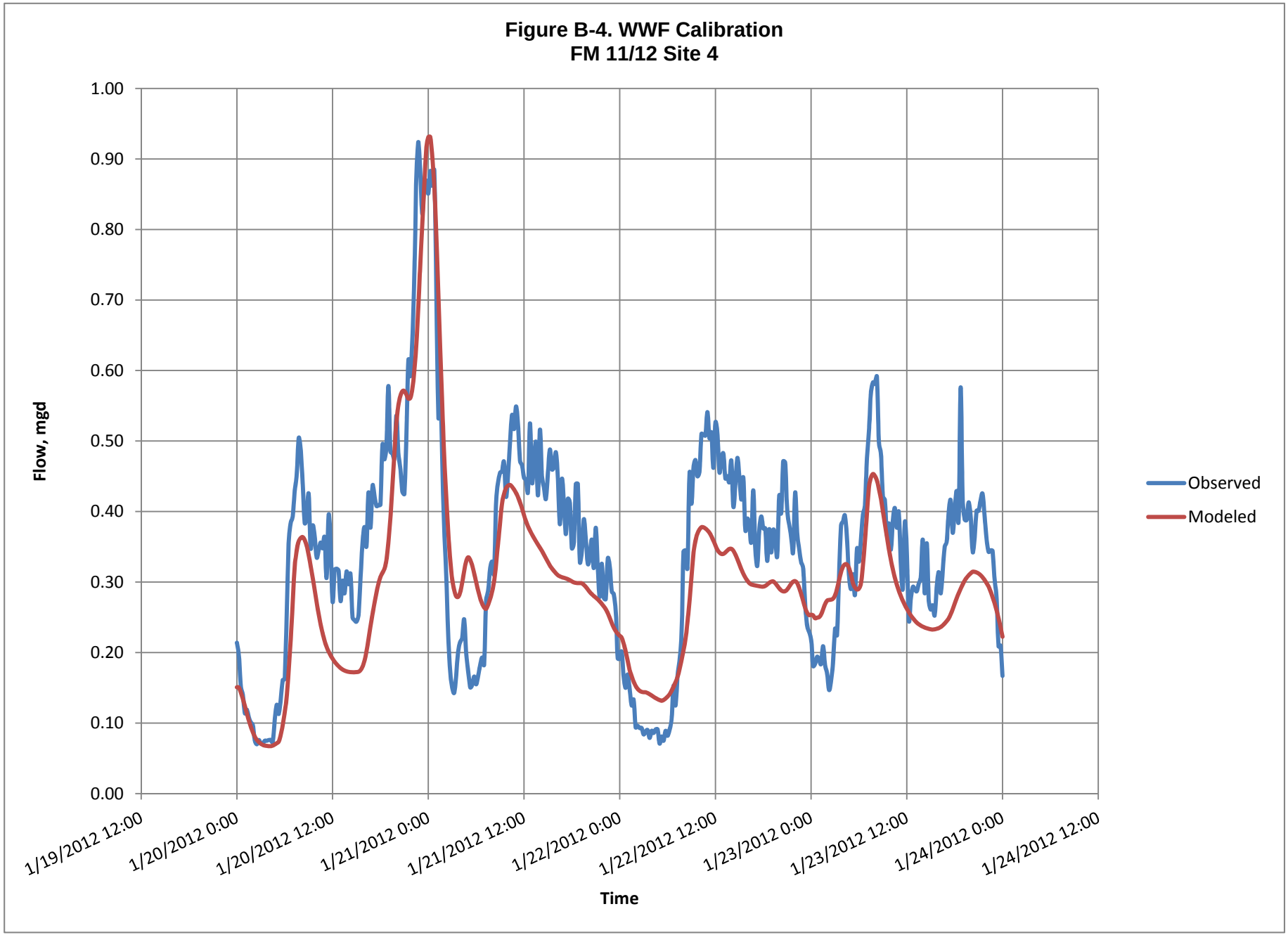


Figure B-4. WWF Calibration
FM 11/12 Site 4
Flow, mgd
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Time
Observed
Modeled

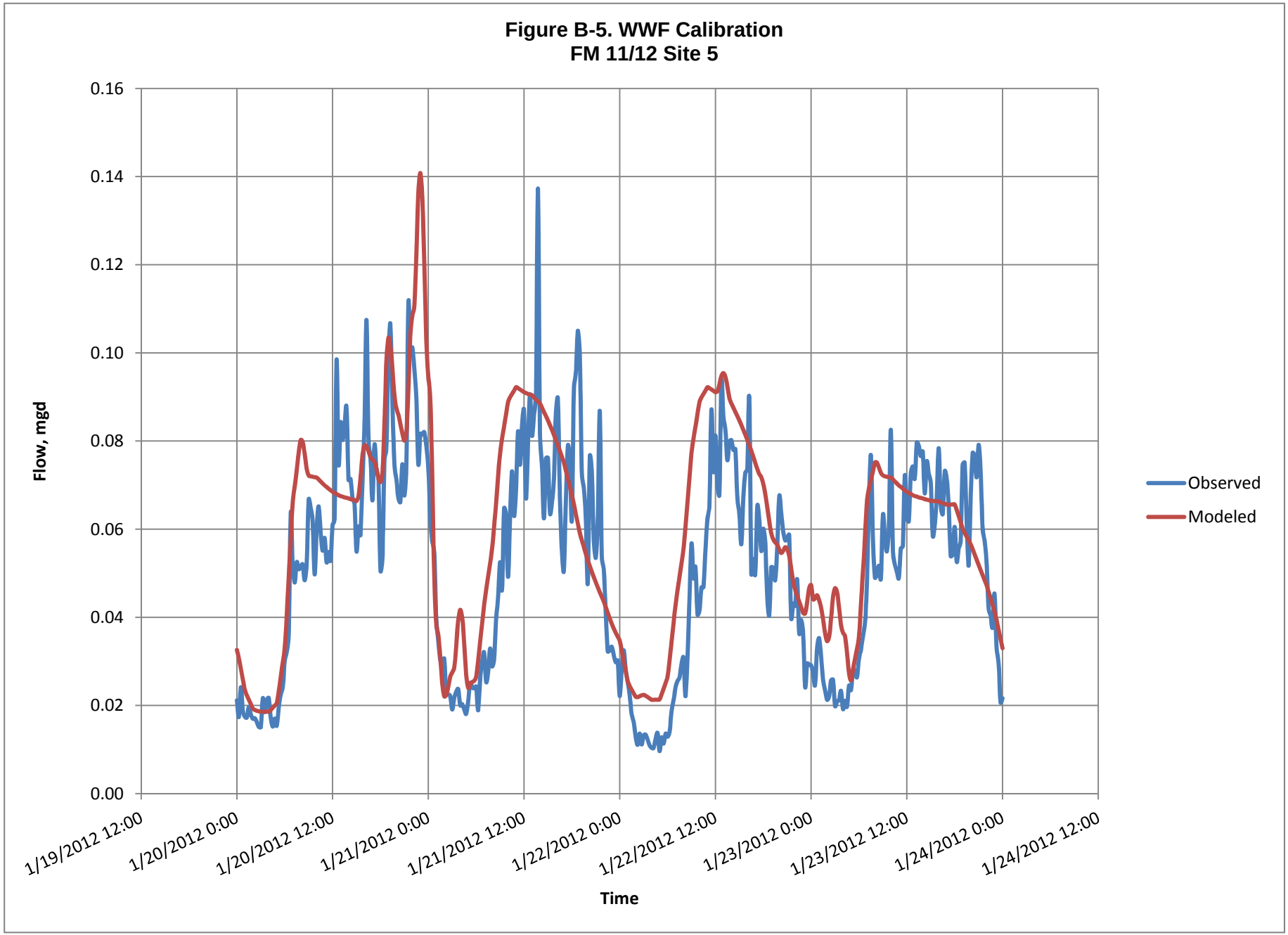


Figure B-5. WWF Calibration
FM 11/12 Site 5
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Flow, mgd
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Time
Observed
Modeled

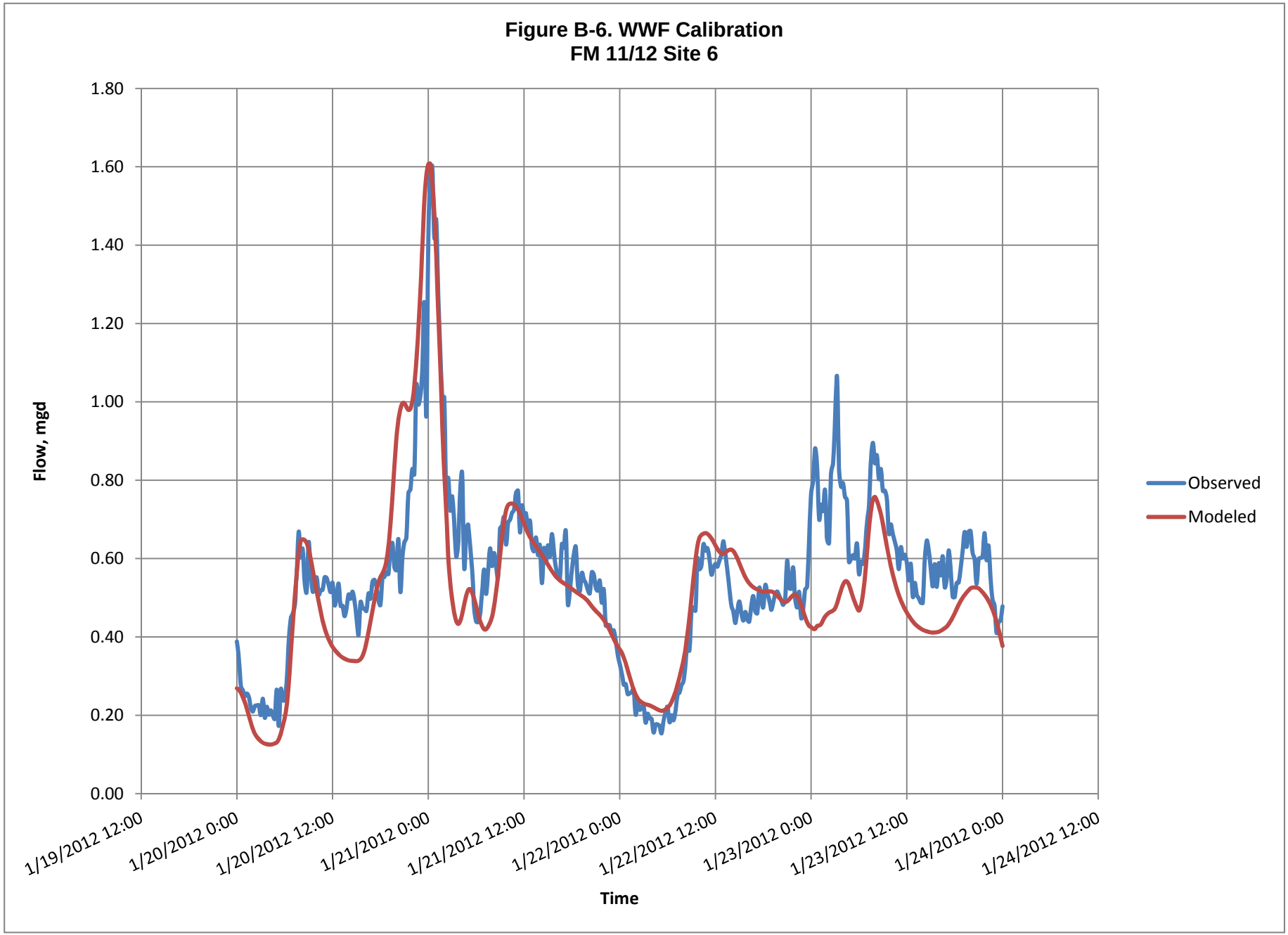


Figure B-6. WWF Calibration
FM 11/12 Site 6
Flow, mgd
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Time
Observed
Modeled

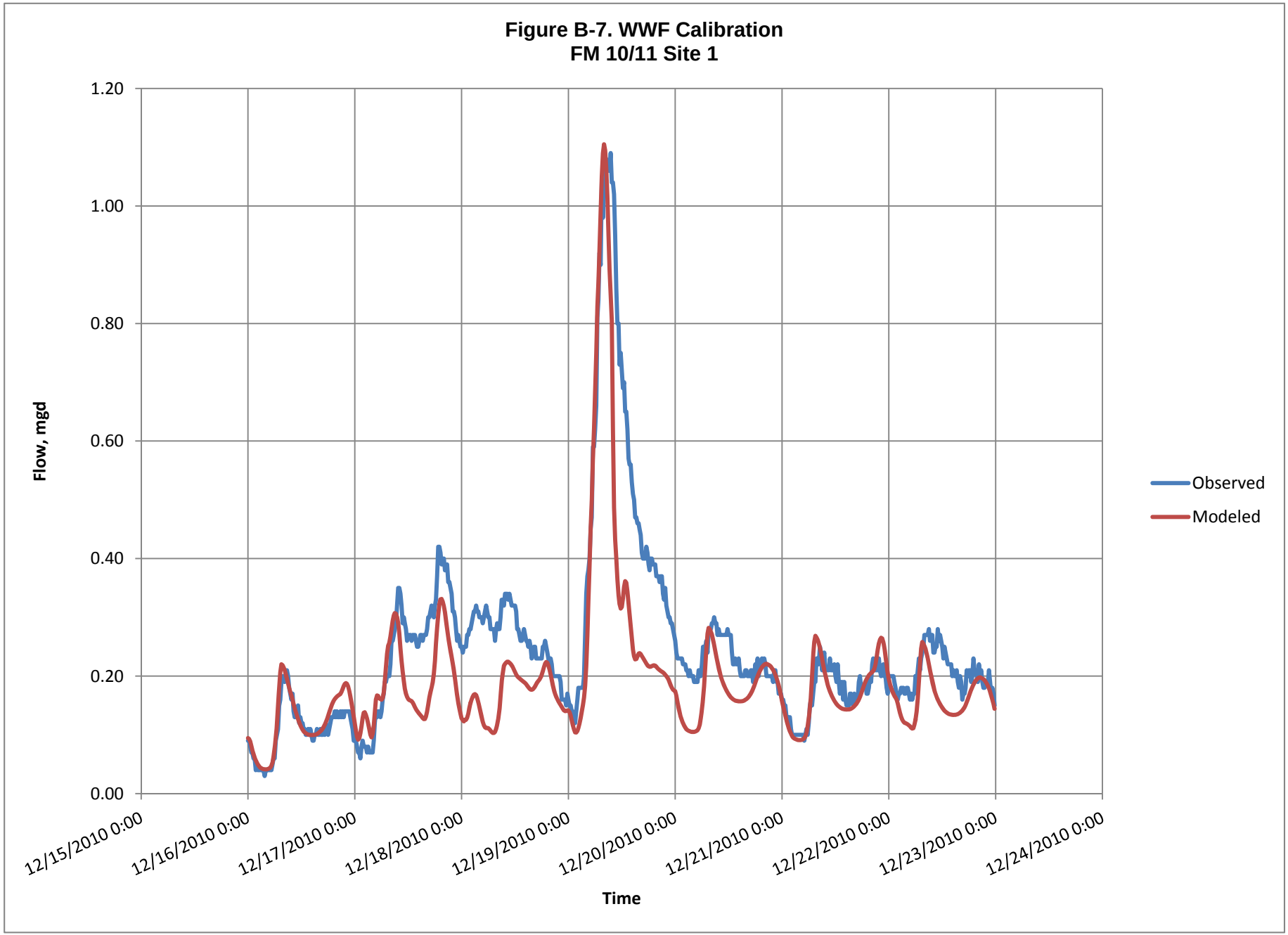


Figure B-7. WWF Calibration
FM 10/11 Site 1
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Time
Observed
Modeled

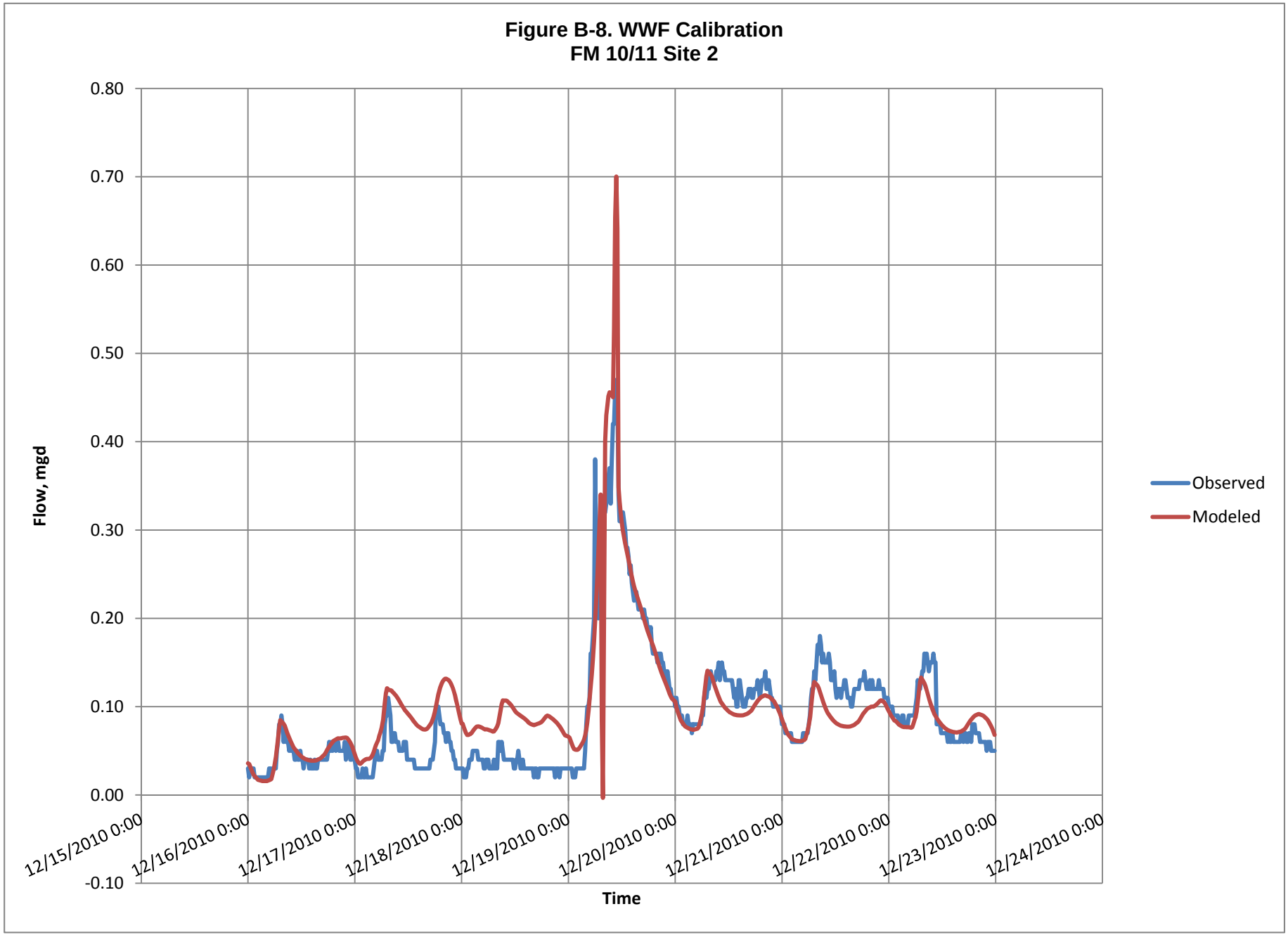


Figure B-8. WWF Calibration
FM 10/11 Site 2
Flow, mgd
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Time
Observed
Modeled

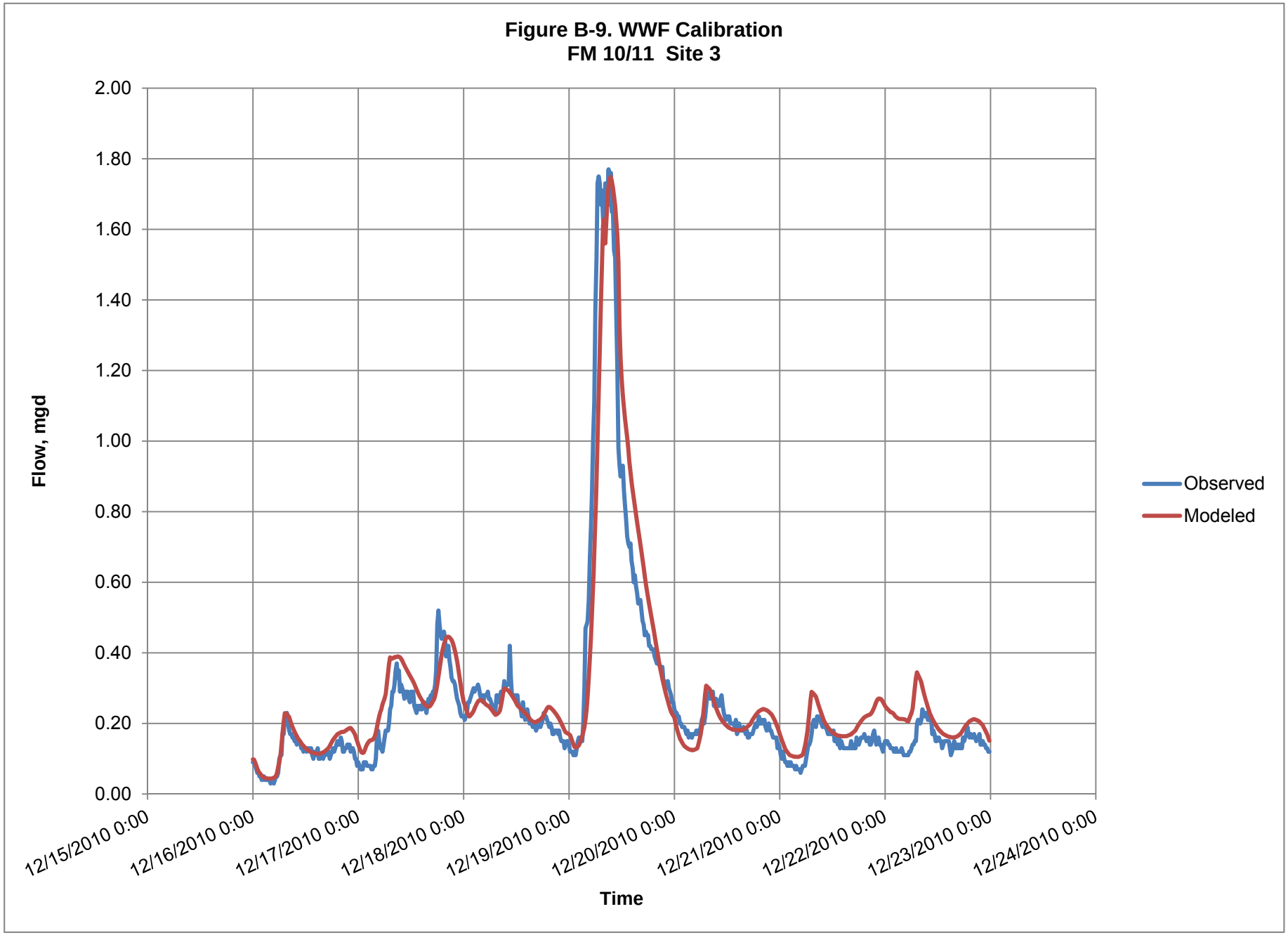


Figure B-9. WWF Calibration
FM 10/11 Site 3
Flow, mgd
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Time
Observed
Modeled

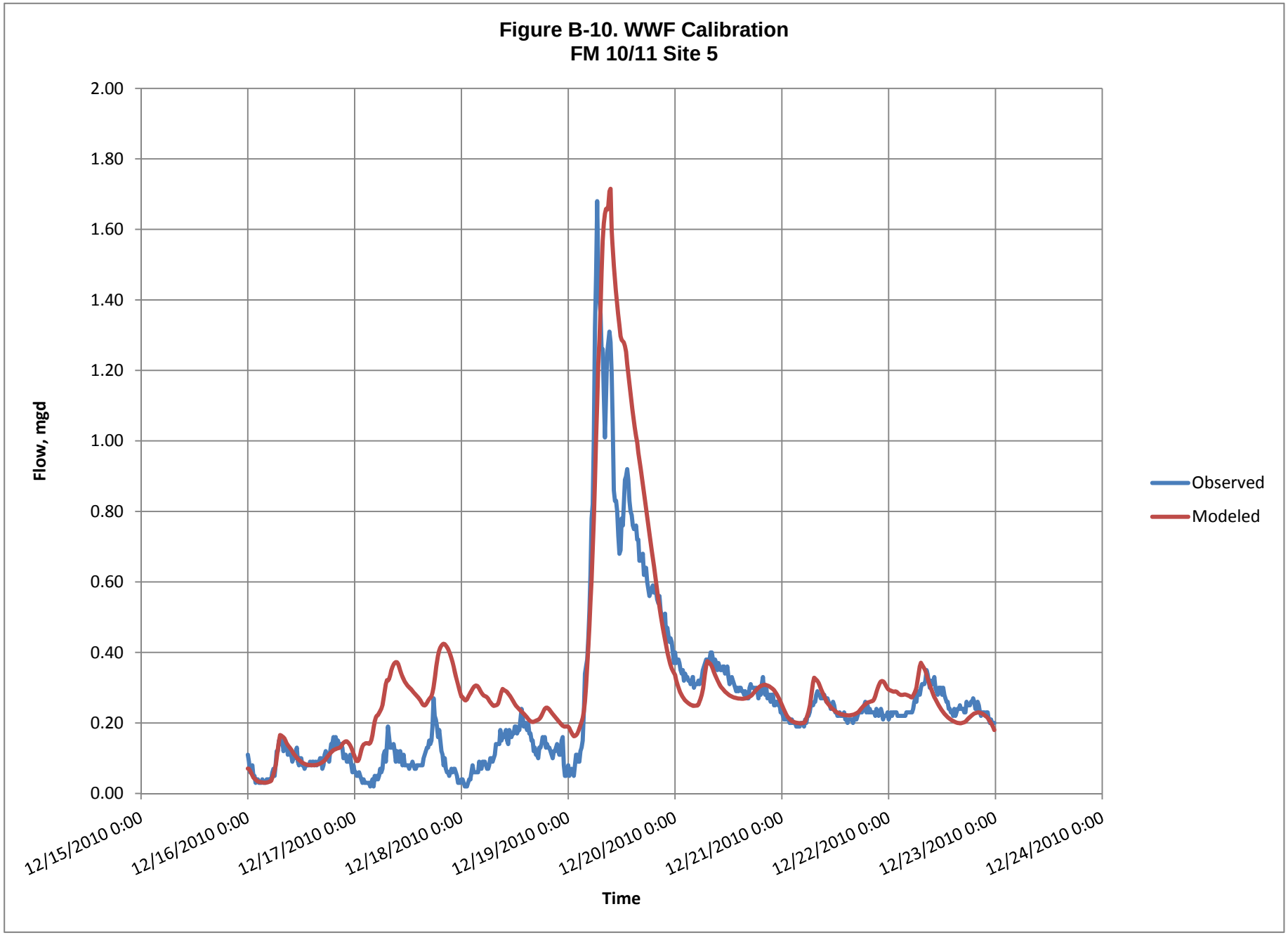


Figure B-10. WWF Calibration
FM 10/11 Site 5
Flow, mgd
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Time
Observed
Modeled

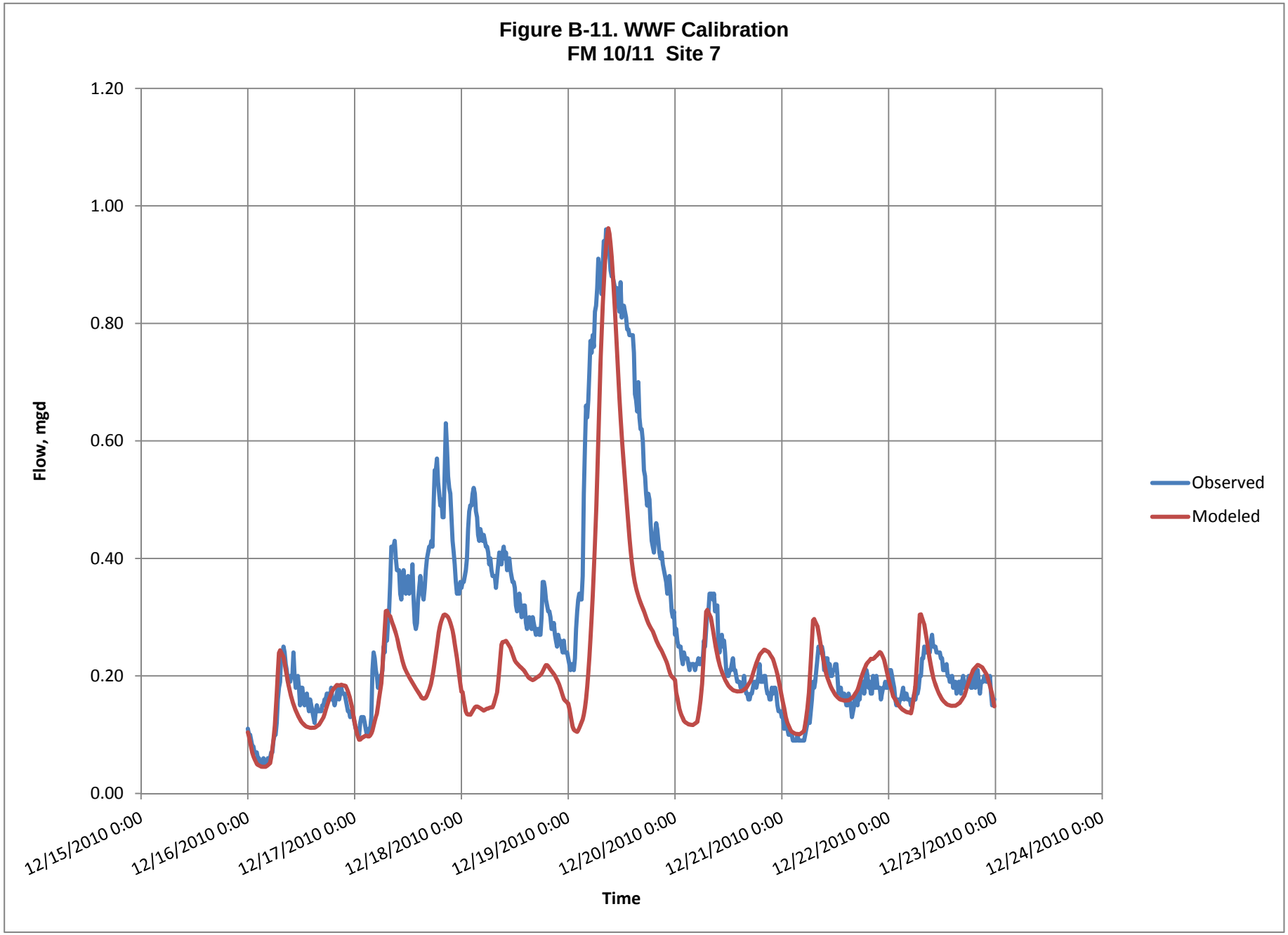


Figure B-11. WWF Calibration
FM 10/11 Site 7
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Time
Observed
Modeled

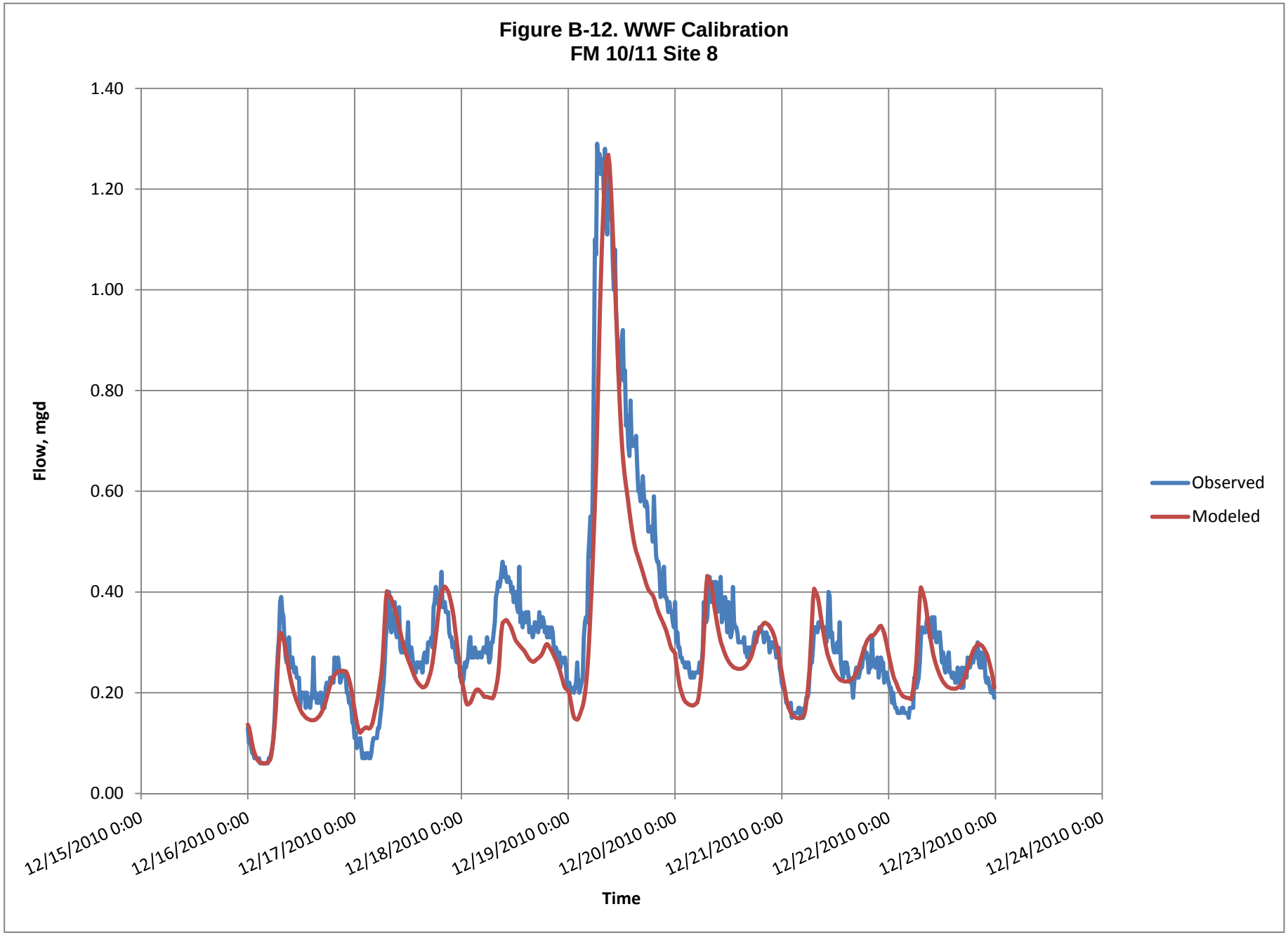


Figure B-12. WWF Calibration
FM 10/11 Site 8
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Time
Observed
Modeled

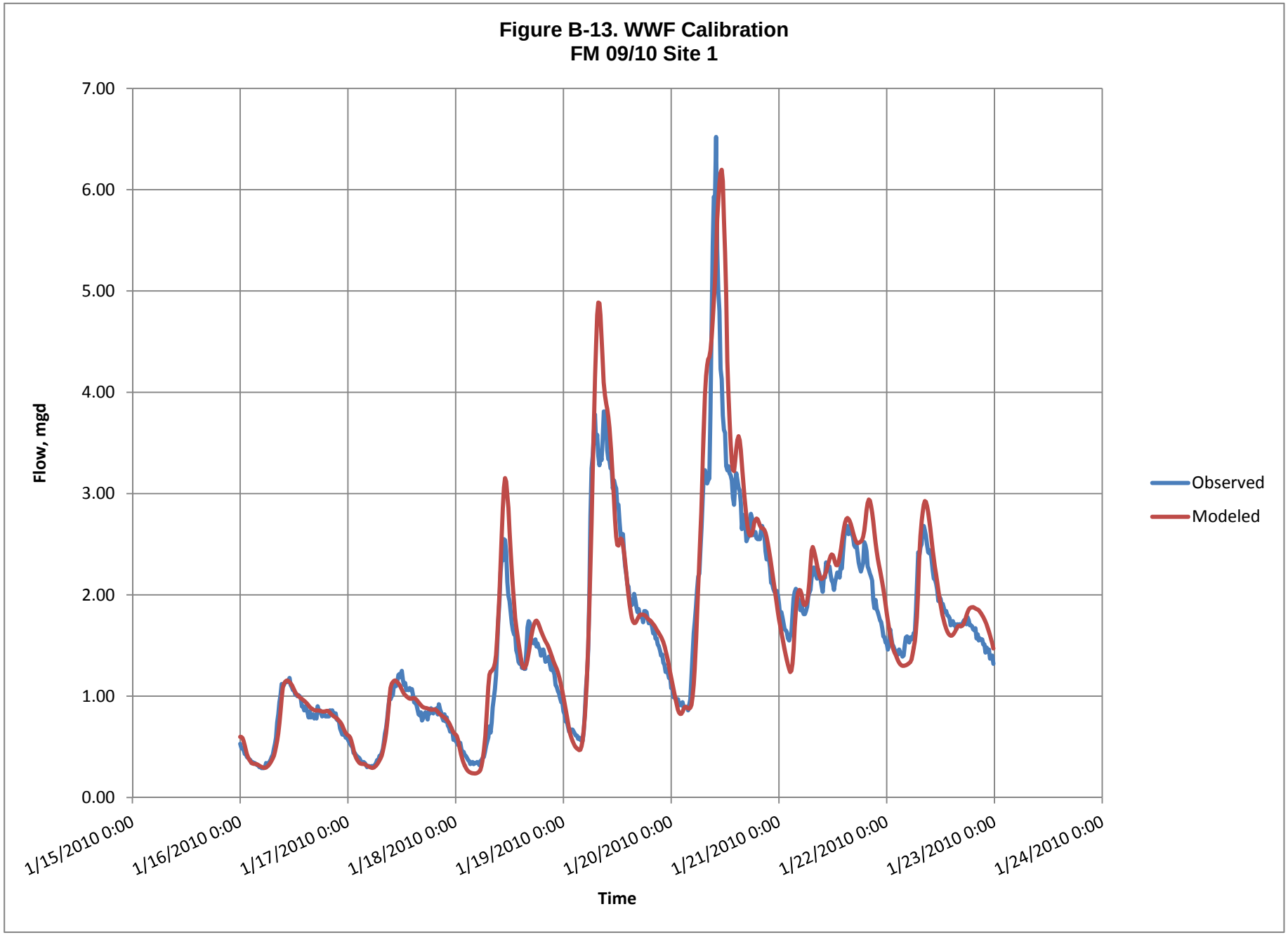


Figure B-13. WWF Calibration
FM 09/10 Site 1
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Flow, mgd
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

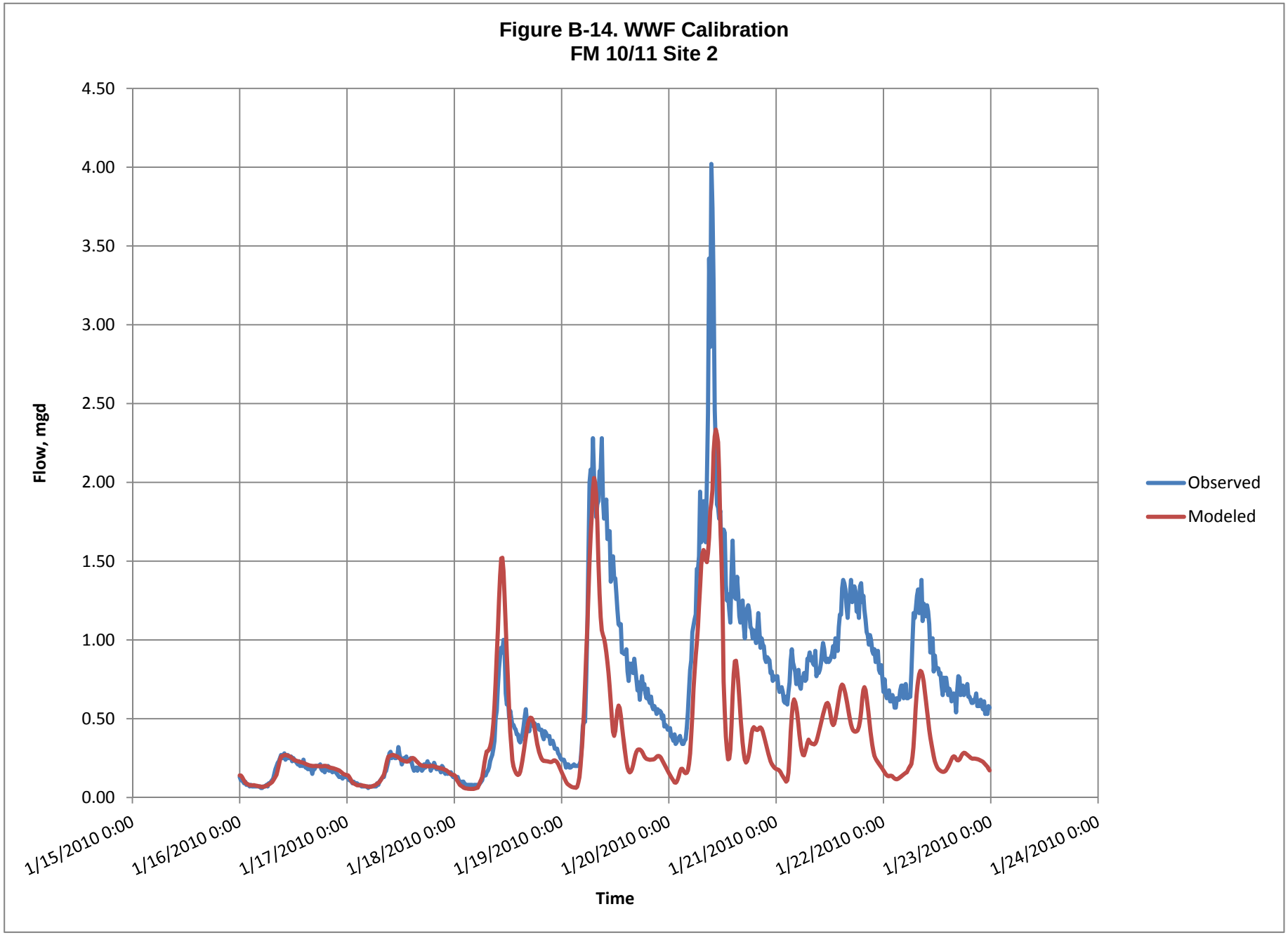


Figure B-14. WWF Calibration
FM 10/11 Site 2
Flow, mgd
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

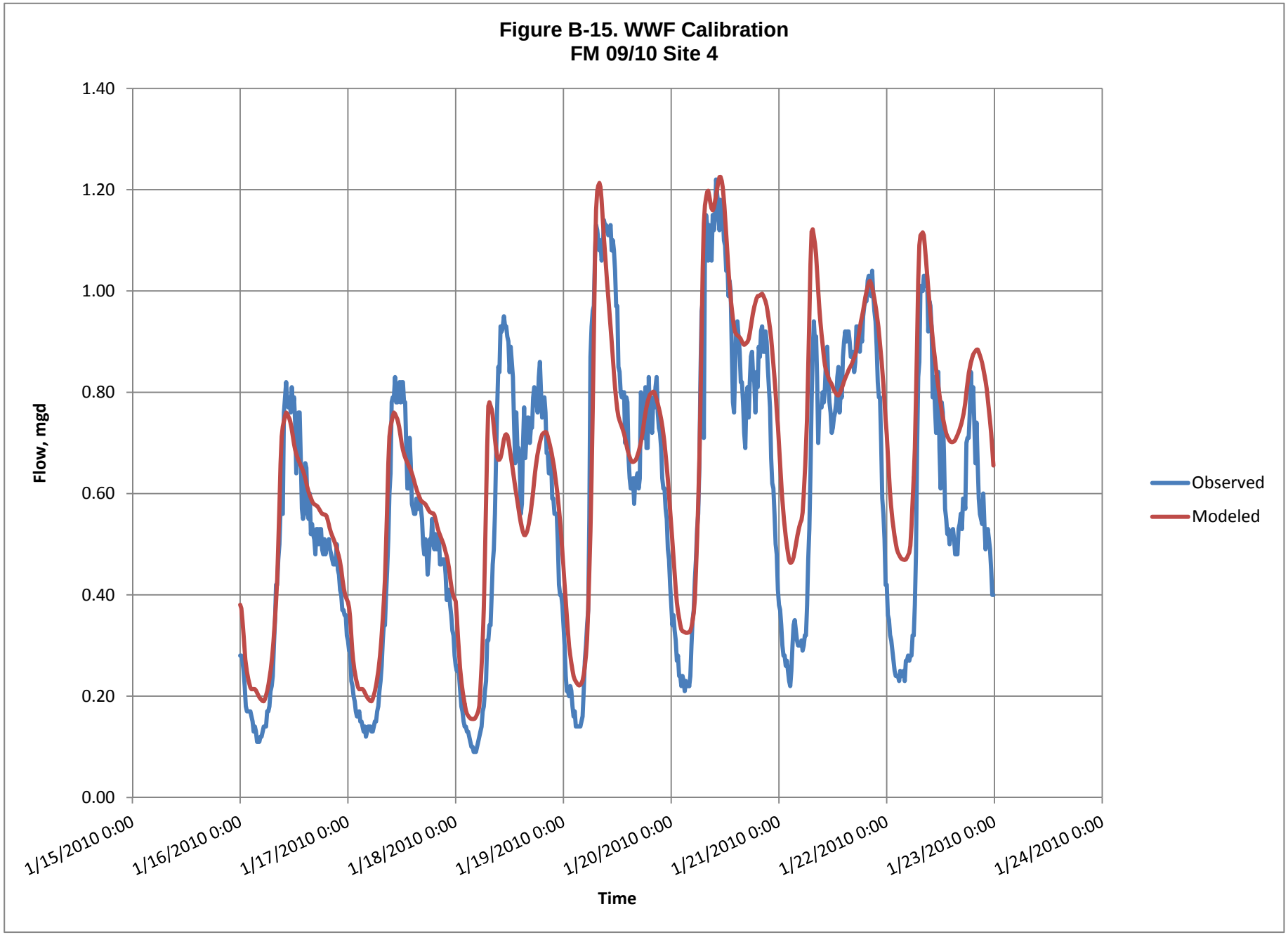


Figure B-15. WWF Calibration
FM 09/10 Site 4
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

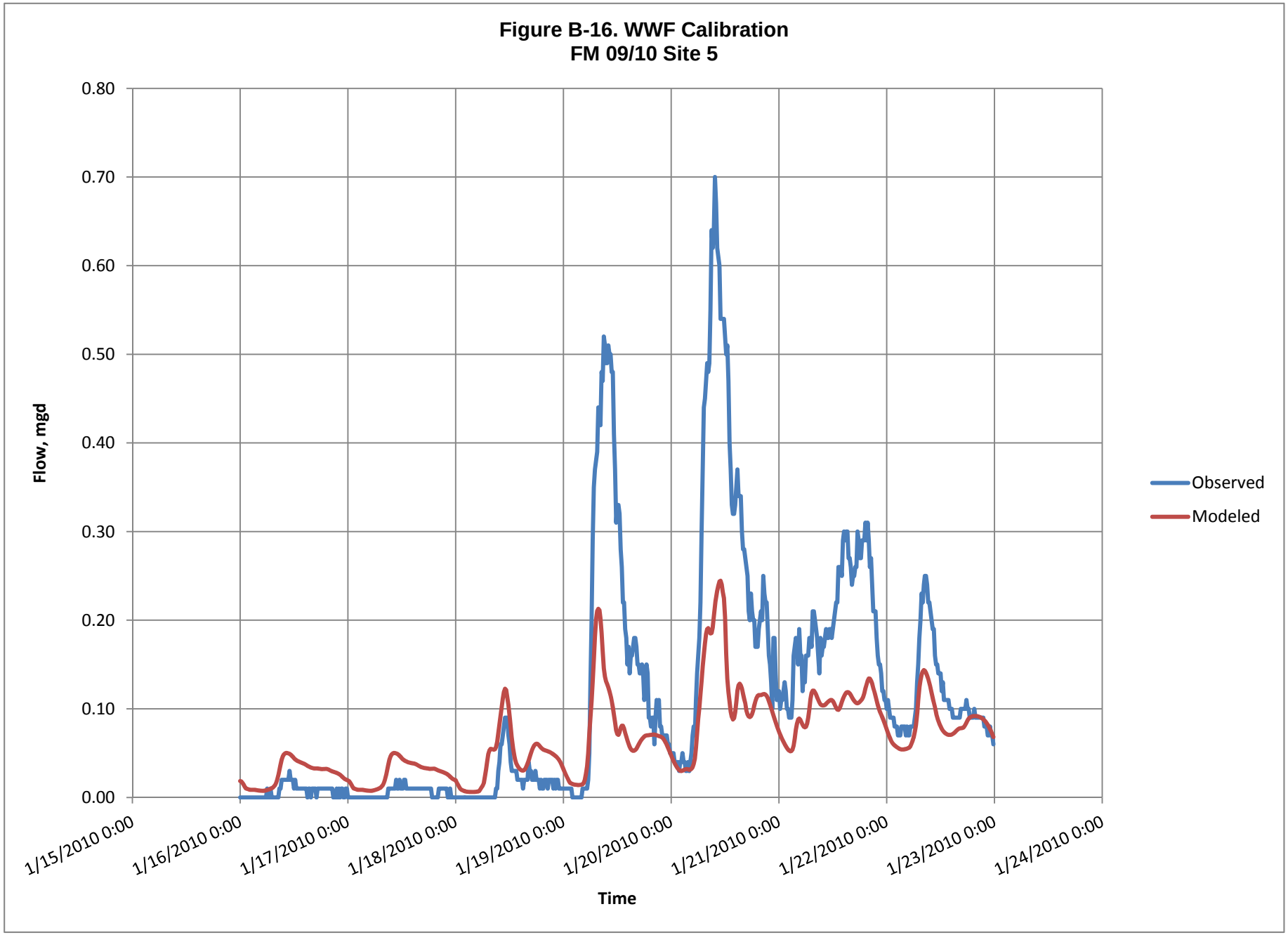


Figure B-16. WWF Calibration
FM 09/10 Site 5
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow, mgd
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

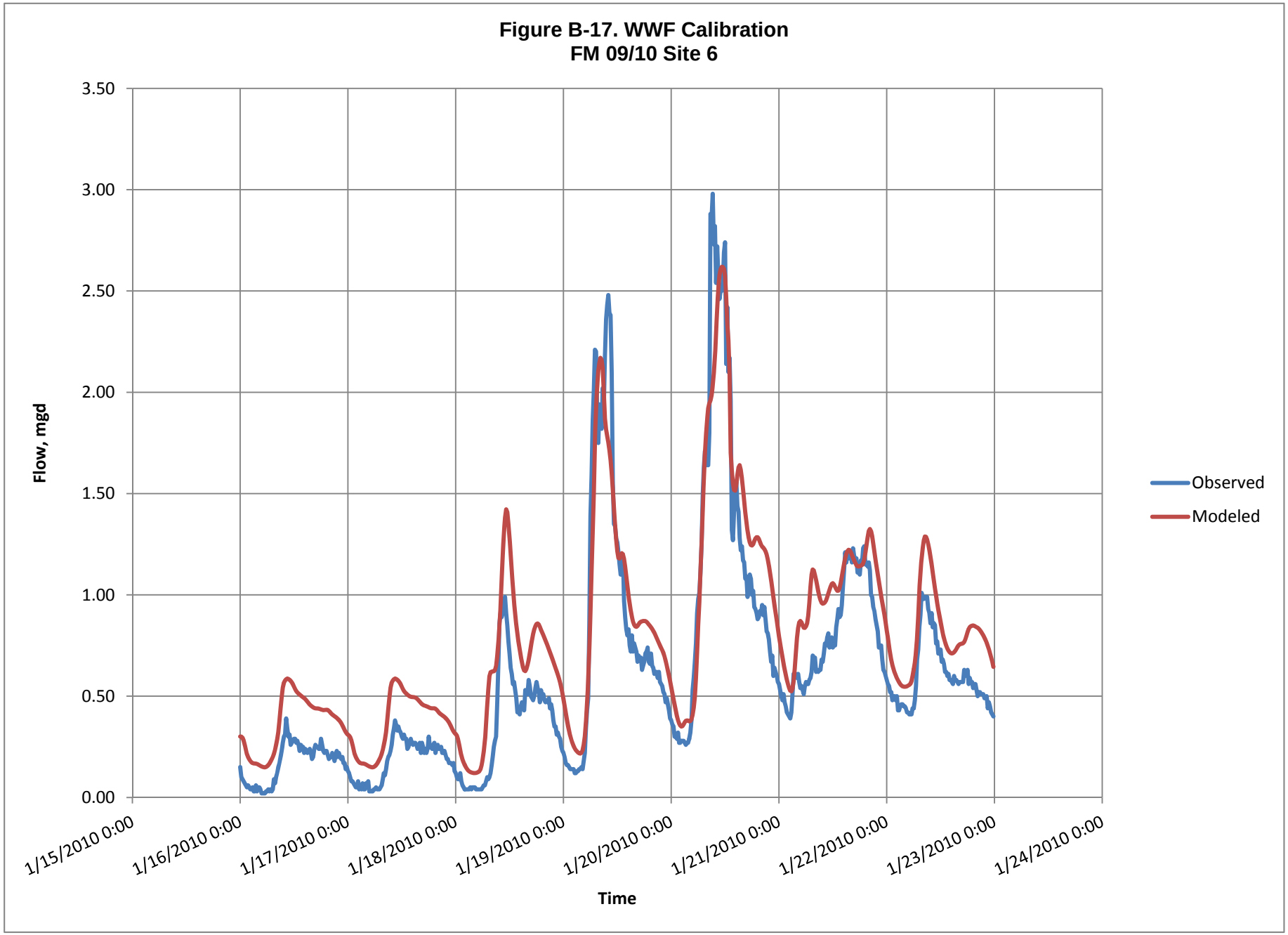


Figure B-17. WWF Calibration
FM 09/10 Site 6
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Flow, mgd
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

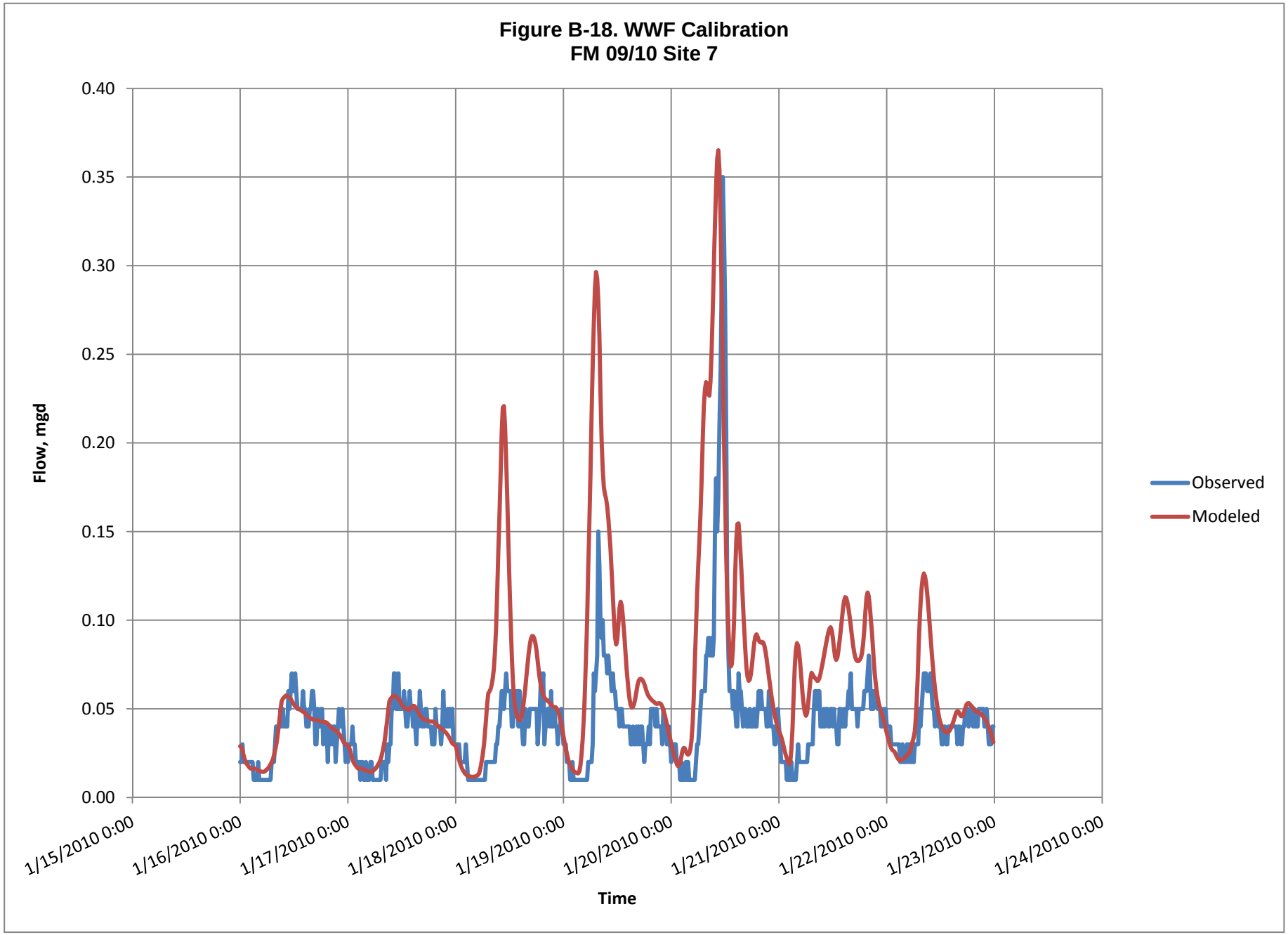


Figure B-18. WWF Calibration
FM 09/10 Site 7
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

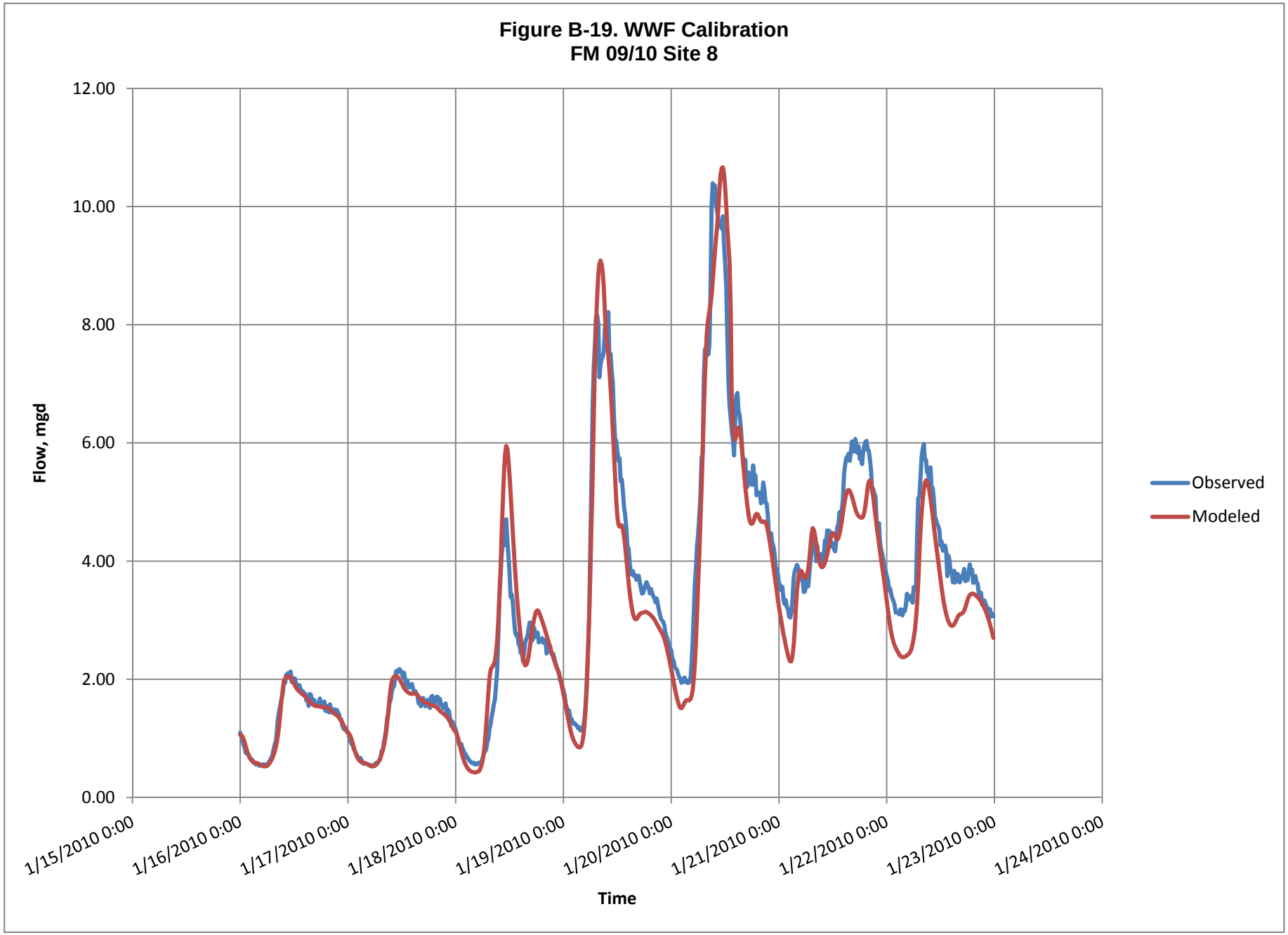


Figure B-19. WWF Calibration
FM 09/10 Site 8
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Flow, mgd
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Time
Observed
Modeled

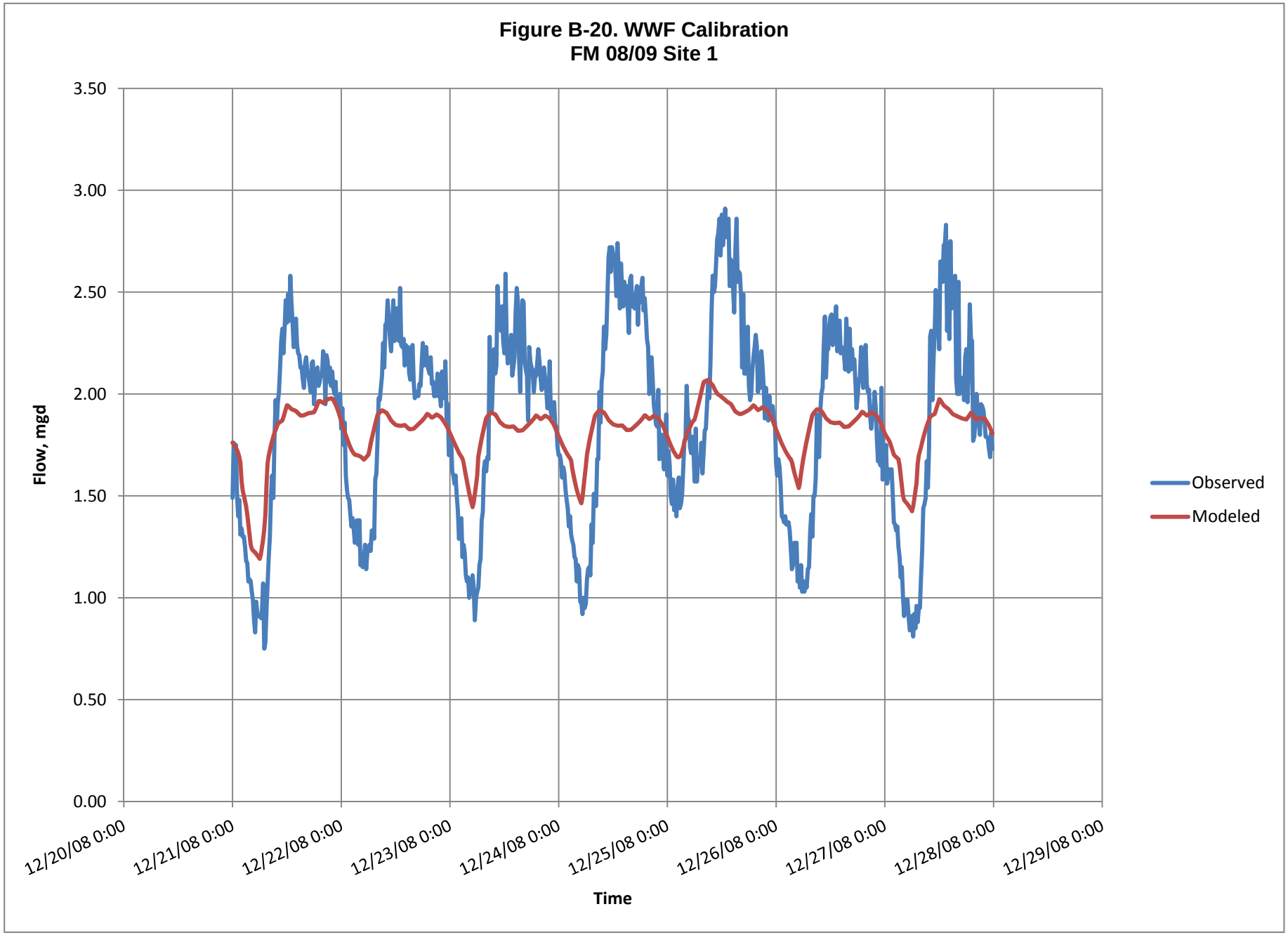


Figure B-20. WWF Calibration
FM 08/09 Site 1
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Flow, mgd
12/20/08 0:00
12/21/08 0:00
12/22/08 0:00
12/23/08 0:00
12/24/08 0:00
12/25/08 0:00
12/26/08 0:00
12/27/08 0:00
12/28/08 0:00
12/29/08 0:00
Time
Observed
Modeled

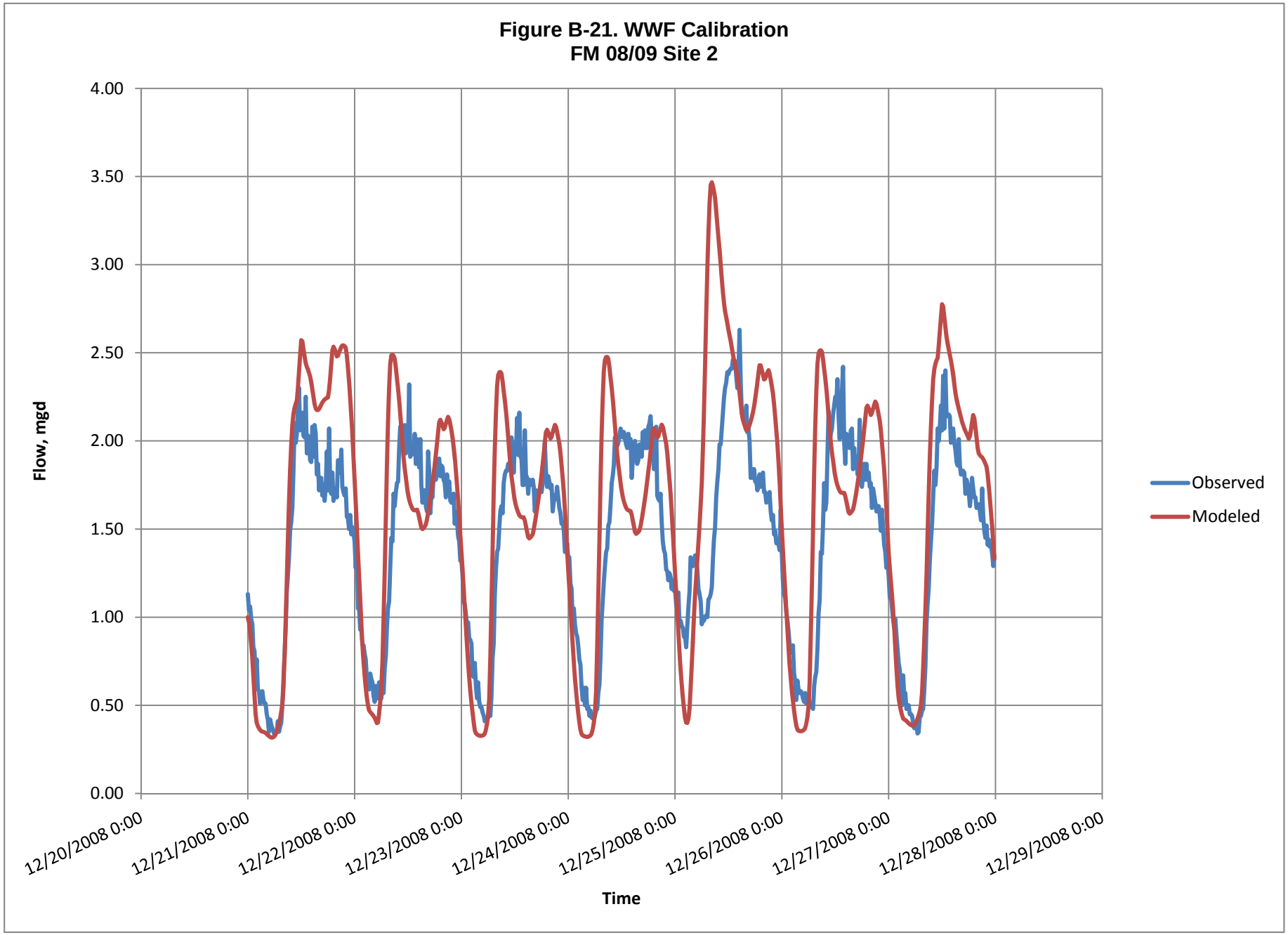


Figure B-21. WWF Calibration
FM 08/09 Site 2
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Flow, mgd
12/20/2008 0:00
12/21/2008 0:00
12/22/2008 0:00
12/23/2008 0:00
12/24/2008 0:00
12/25/2008 0:00
12/26/2008 0:00
12/27/2008 0:00
12/28/2008 0:00
12/29/2008 0:00
Time
Observed
Modeled

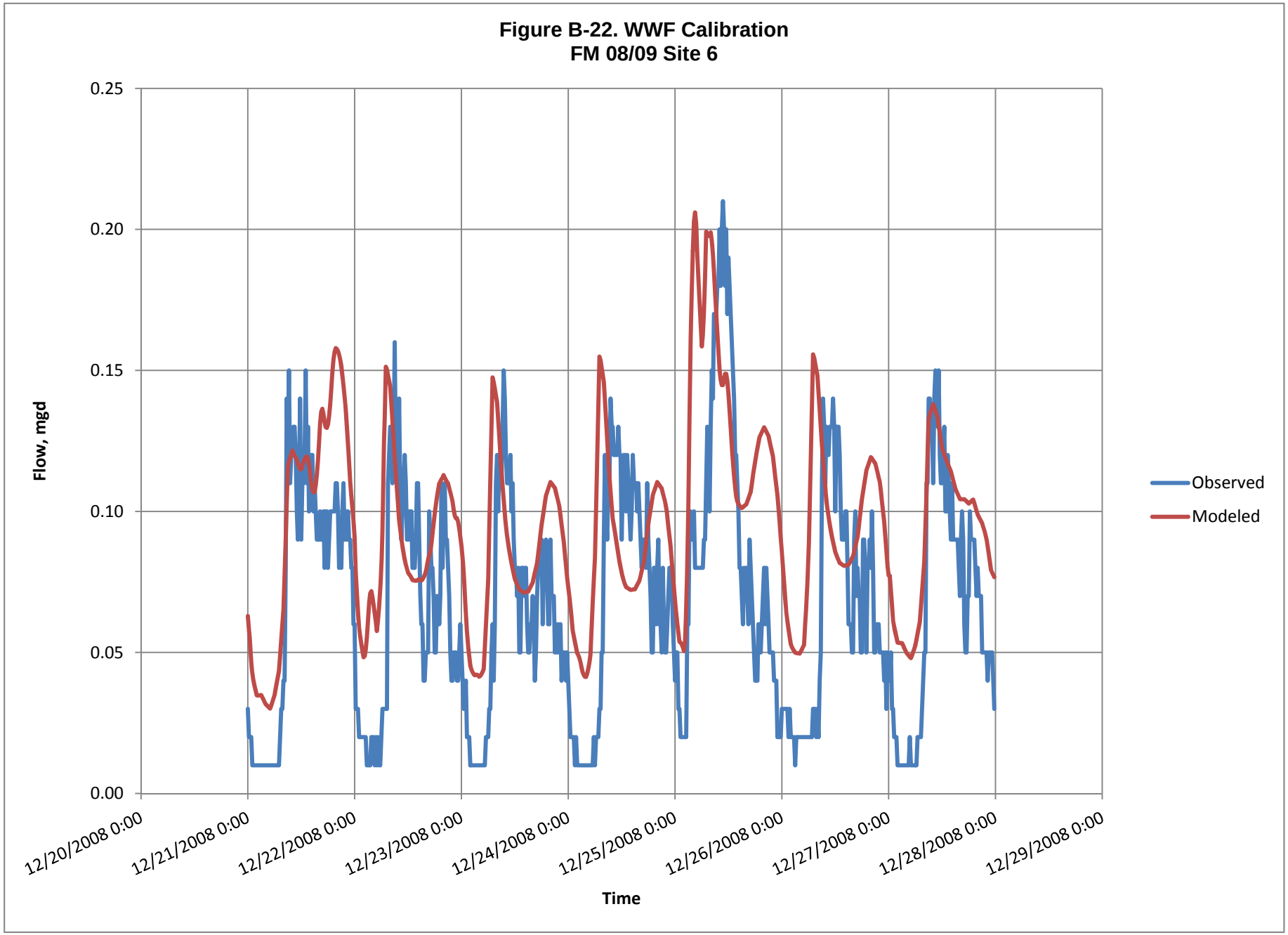


Figure B-22. WWF Calibration
FM 08/09 Site 6
0.25
0.20
0.15
0.10
0.05
0.00
Flow, mgd
12/20/2008 0:00
12/21/2008 0:00
12/22/2008 0:00
12/23/2008 0:00
12/24/2008 0:00
12/25/2008 0:00
12/26/2008 0:00
12/27/2008 0:00
12/28/2008 0:00
12/29/2008 0:00
Time
Observed
Modeled

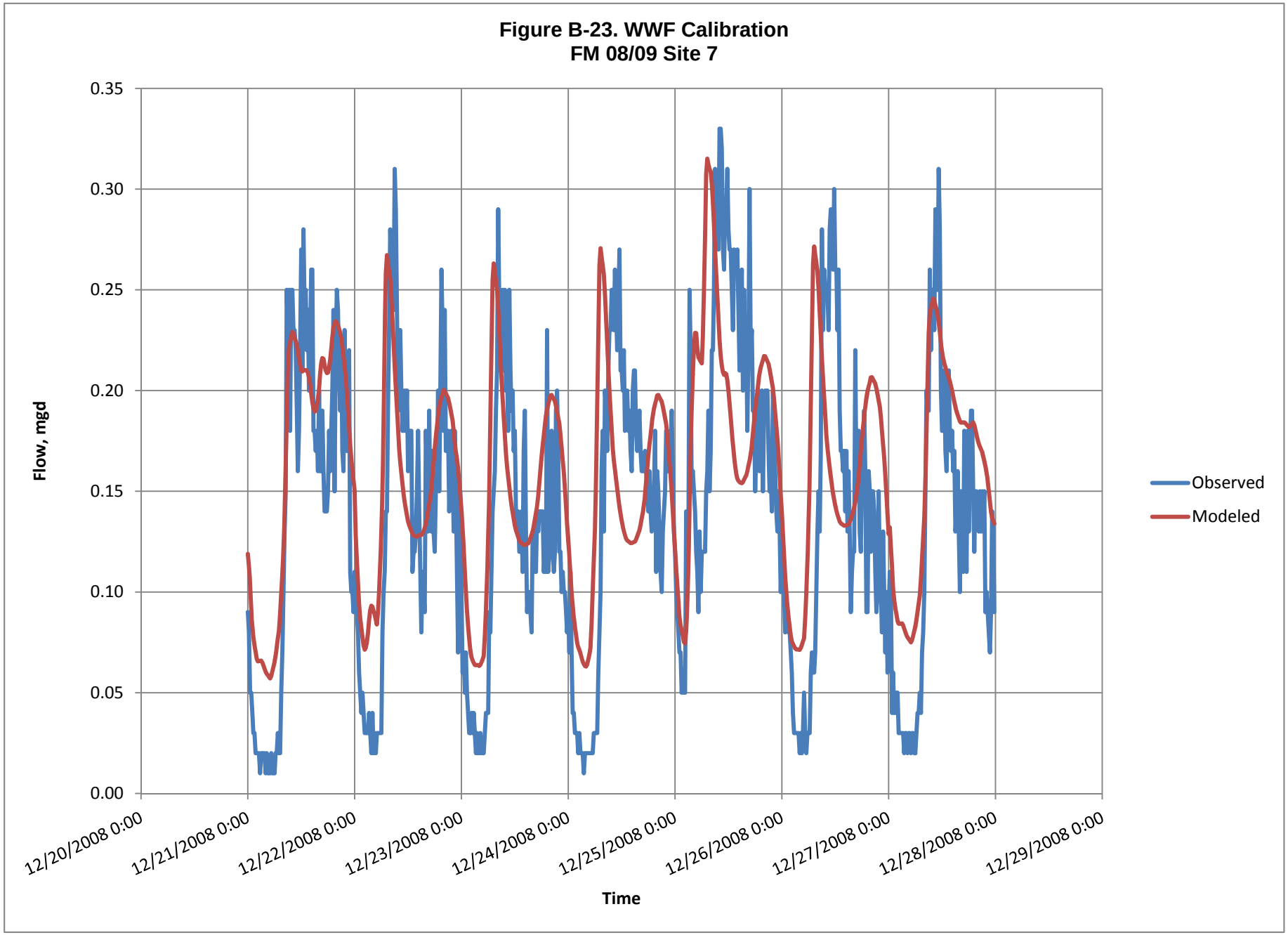


Figure B-23. WWF Calibration
FM 08/09 Site 7
Flow, mgd
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
12/20/2008 0:00
12/21/2008 0:00
12/22/2008 0:00
12/23/2008 0:00
12/24/2008 0:00
12/25/2008 0:00
12/26/2008 0:00
12/27/2008 0:00
12/28/2008 0:00
12/29/2008 0:00
Time
Observed
Modeled

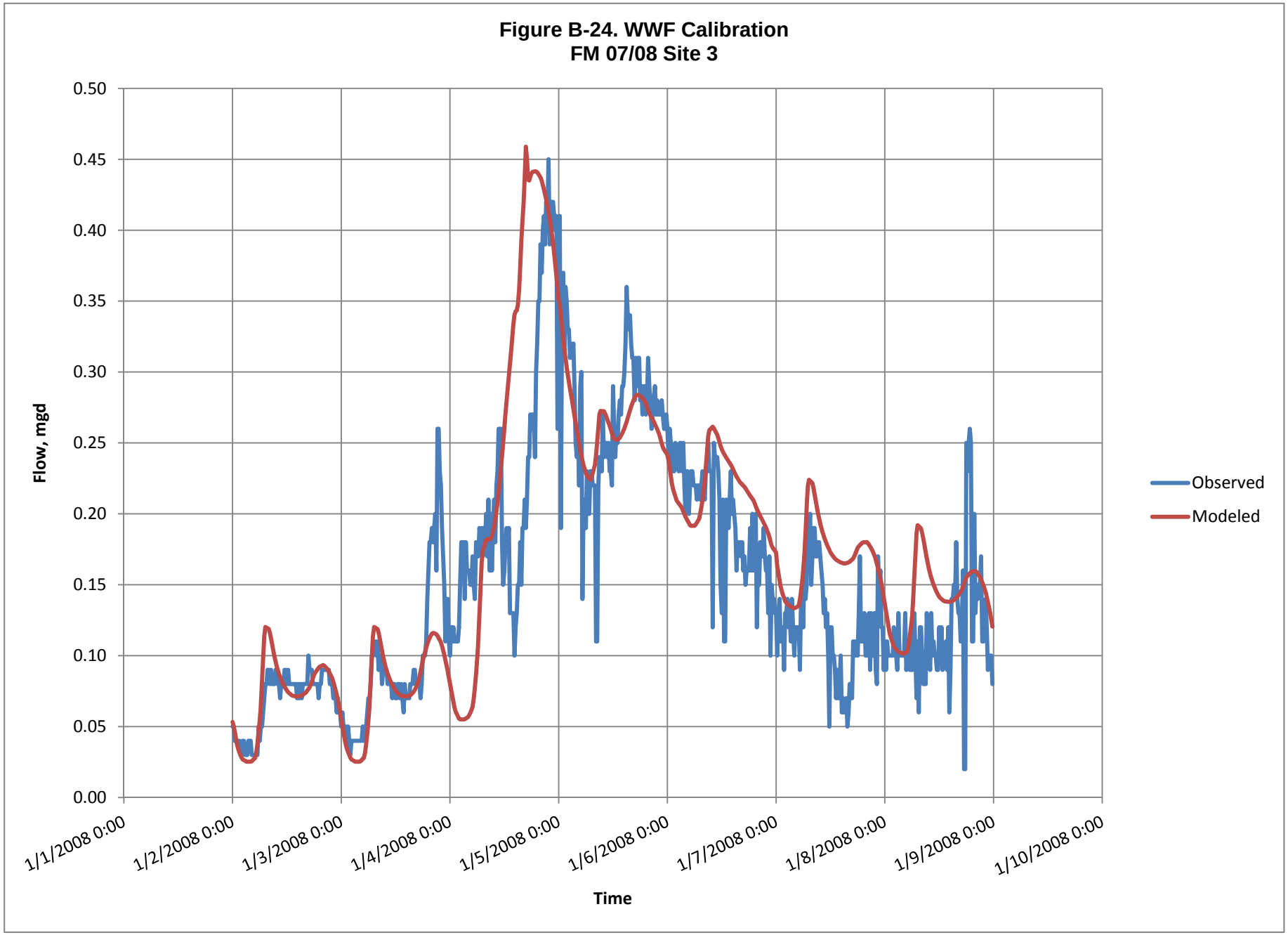


Figure B-24. WWF Calibration
FM 07/08 Site 3
Flow, mgd
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/1/2008 0:00
1/2/2008 0:00
1/3/2008 0:00
1/4/2008 0:00
1/5/2008 0:00
1/6/2008 0:00
1/7/2008 0:00
1/8/2008 0:00
1/9/2008 0:00
1/10/2008 0:00
Time
Observed
Modeled

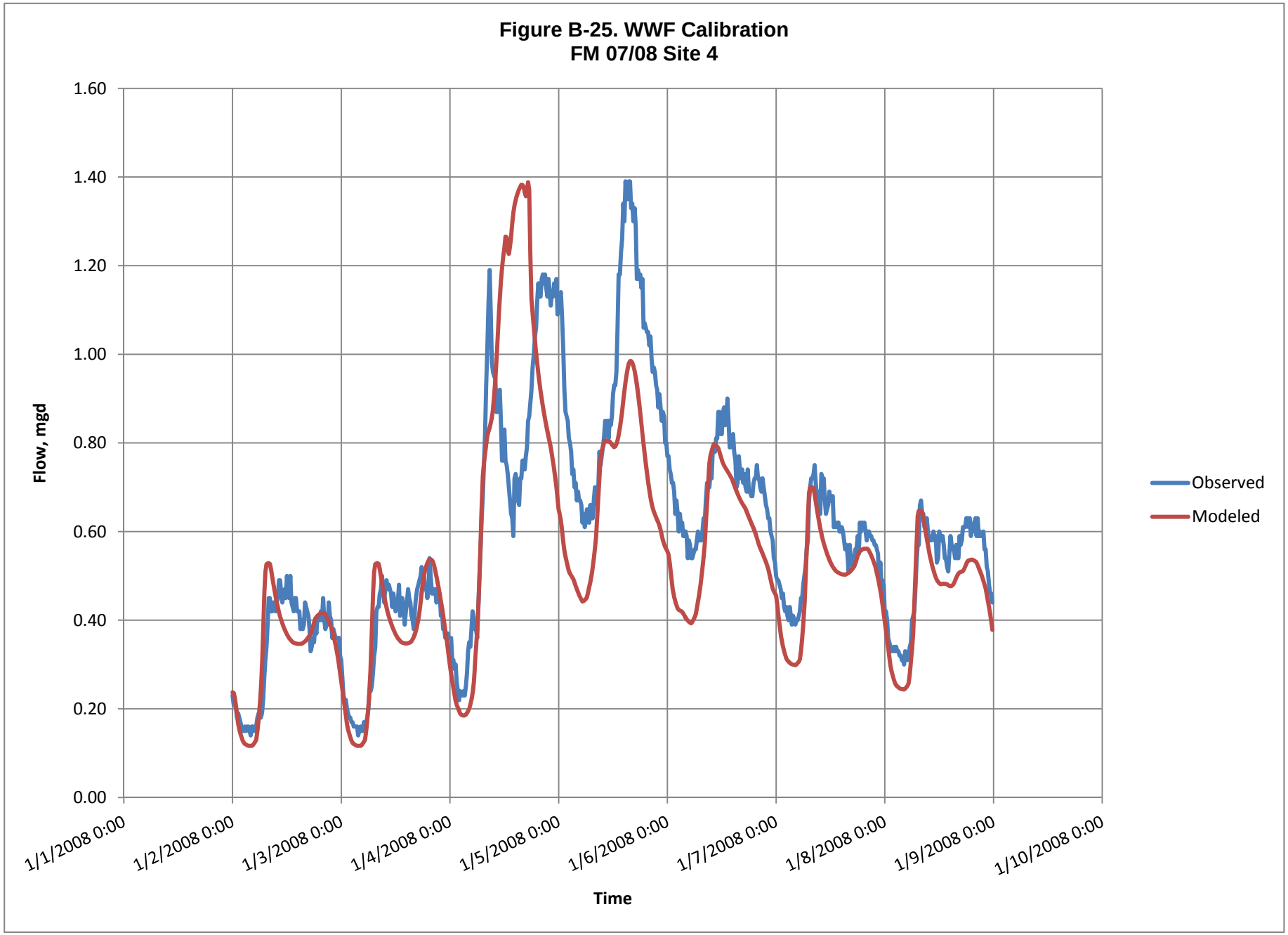


Figure B-25. WWF Calibration
FM 07/08 Site 4
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
1/1/2008 0:00
1/2/2008 0:00
1/3/2008 0:00
1/4/2008 0:00
1/5/2008 0:00
1/6/2008 0:00
1/7/2008 0:00
1/8/2008 0:00
1/9/2008 0:00
1/10/2008 0:00
Time
Observed
Modeled

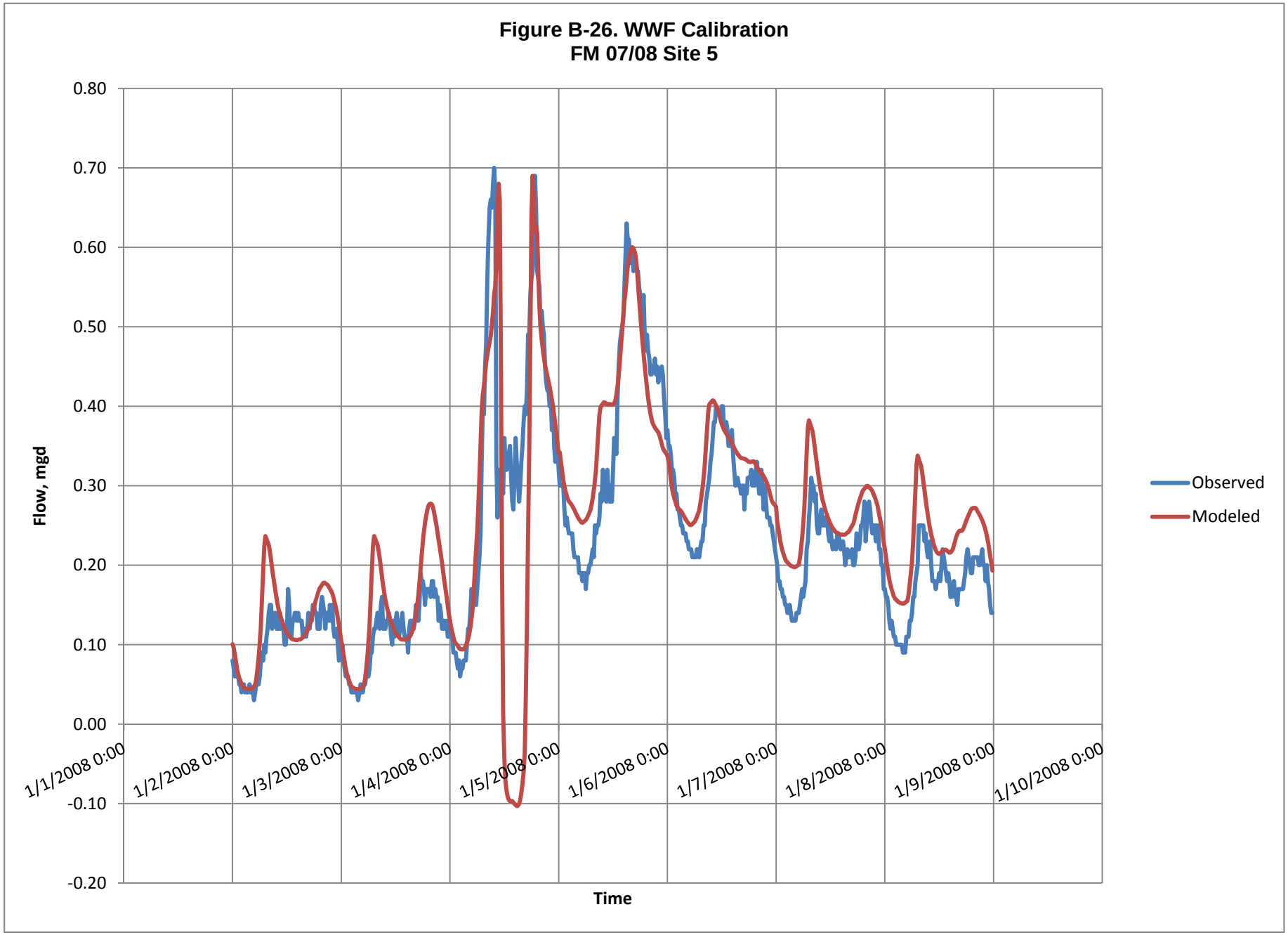


Figure B-26. WWF Calibration
FM 07/08 Site 5
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
Flow, mgd
1/1/2008 0:00
1/2/2008 0:00
1/3/2008 0:00
1/4/2008 0:00
1/5/2008 0:00
1/6/2008 0:00
1/7/2008 0:00
1/8/2008 0:00
1/9/2008 0:00
1/10/2008 0:00
Time
Observed
Modeled

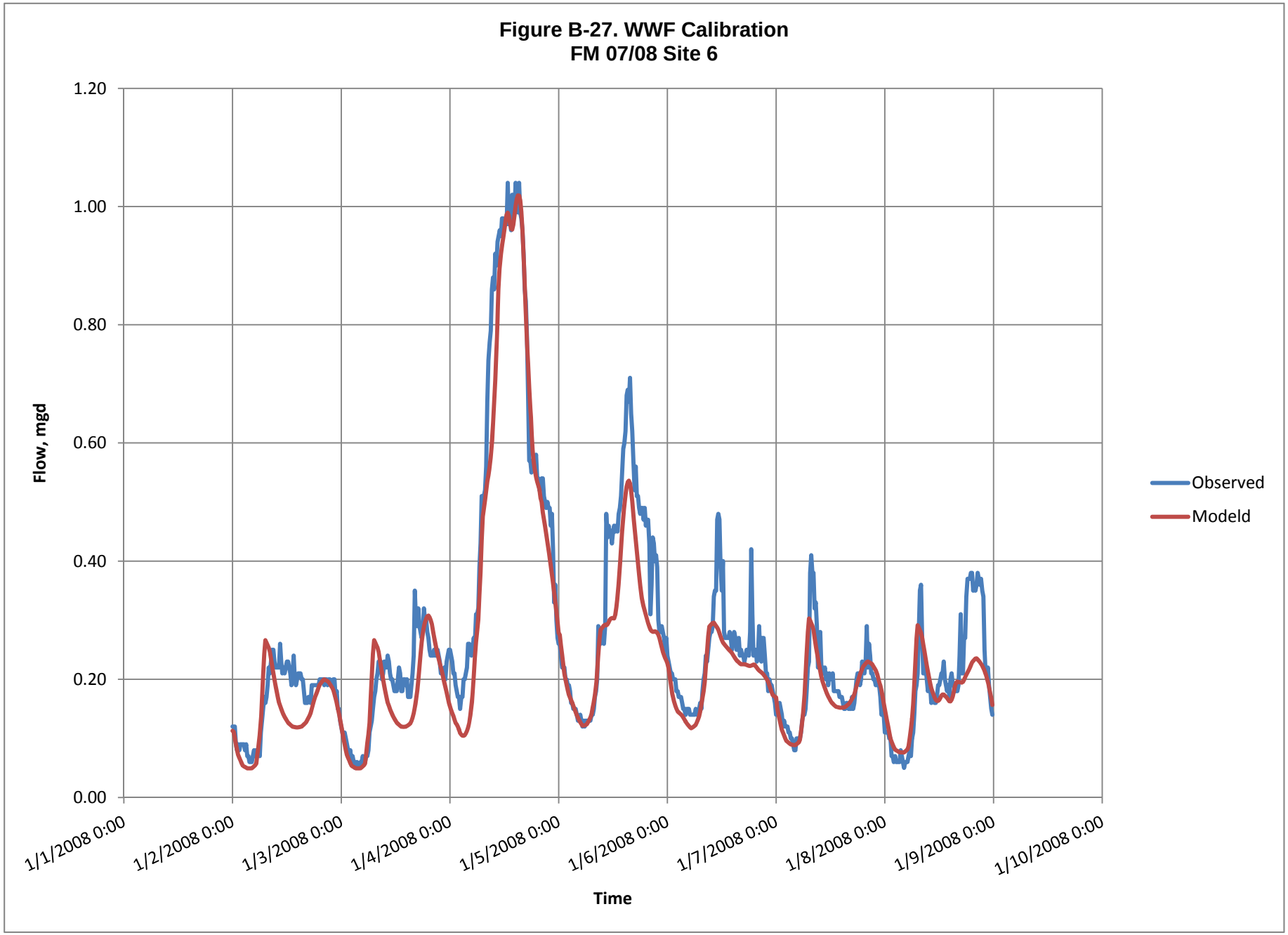


Figure B-27. WWF Calibration
FM 07/08 Site 6
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow, mgd
1/1/2008 0:00
1/2/2008 0:00
1/3/2008 0:00
1/4/2008 0:00
1/5/2008 0:00
1/6/2008 0:00
1/7/2008 0:00
1/8/2008 0:00
1/9/2008 0:00
1/10/2008 0:00
Time
Observed
Modeld

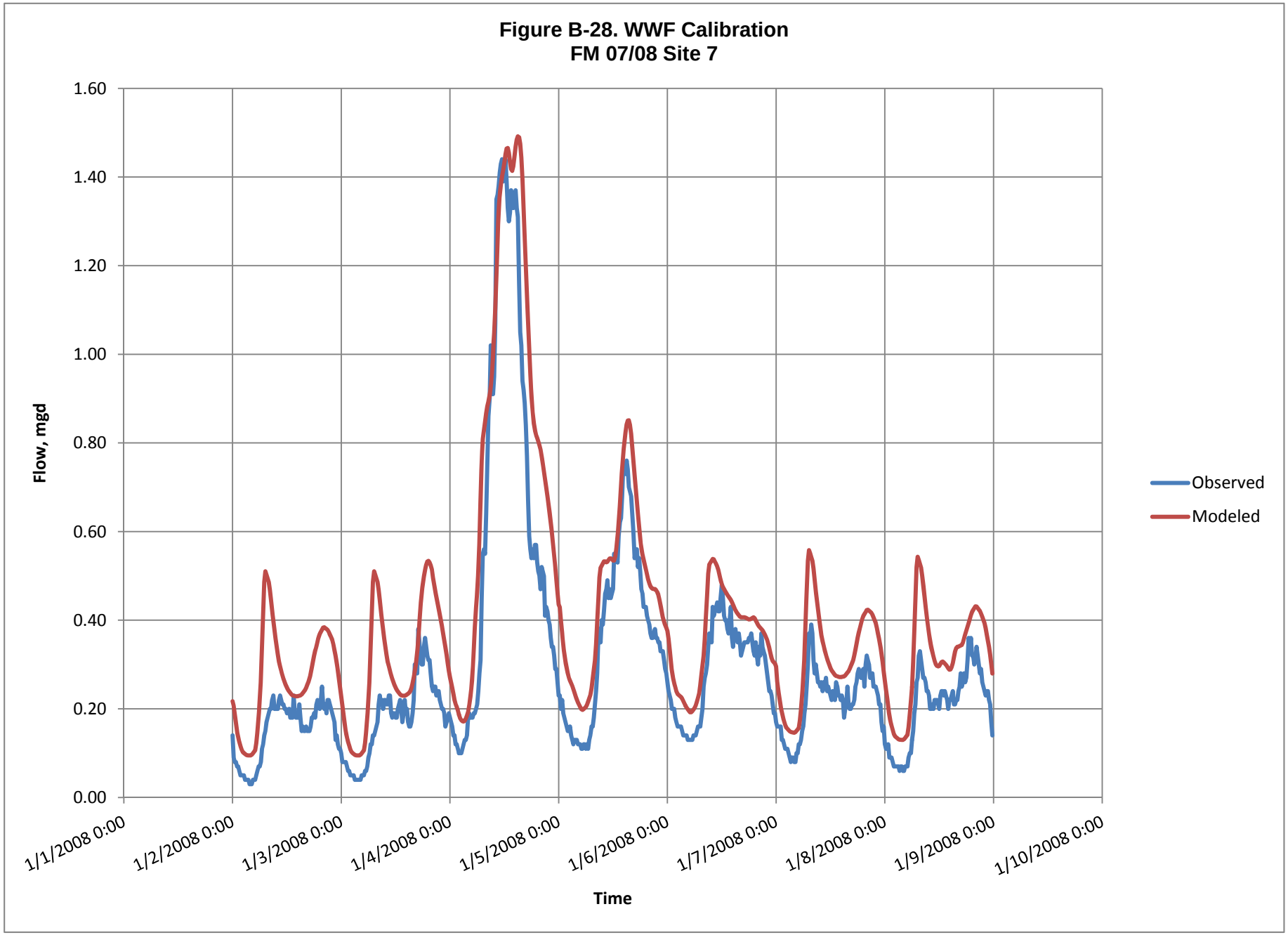


Figure B-28. WWF Calibration
FM 07/08 Site 7
Flow, mgd
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/1/2008 0:00
1/2/2008 0:00
1/3/2008 0:00
1/4/2008 0:00
1/5/2008 0:00
1/6/2008 0:00
1/7/2008 0:00
1/8/2008 0:00
1/9/2008 0:00
1/10/2008 0:00
Time
Observed
Modeled

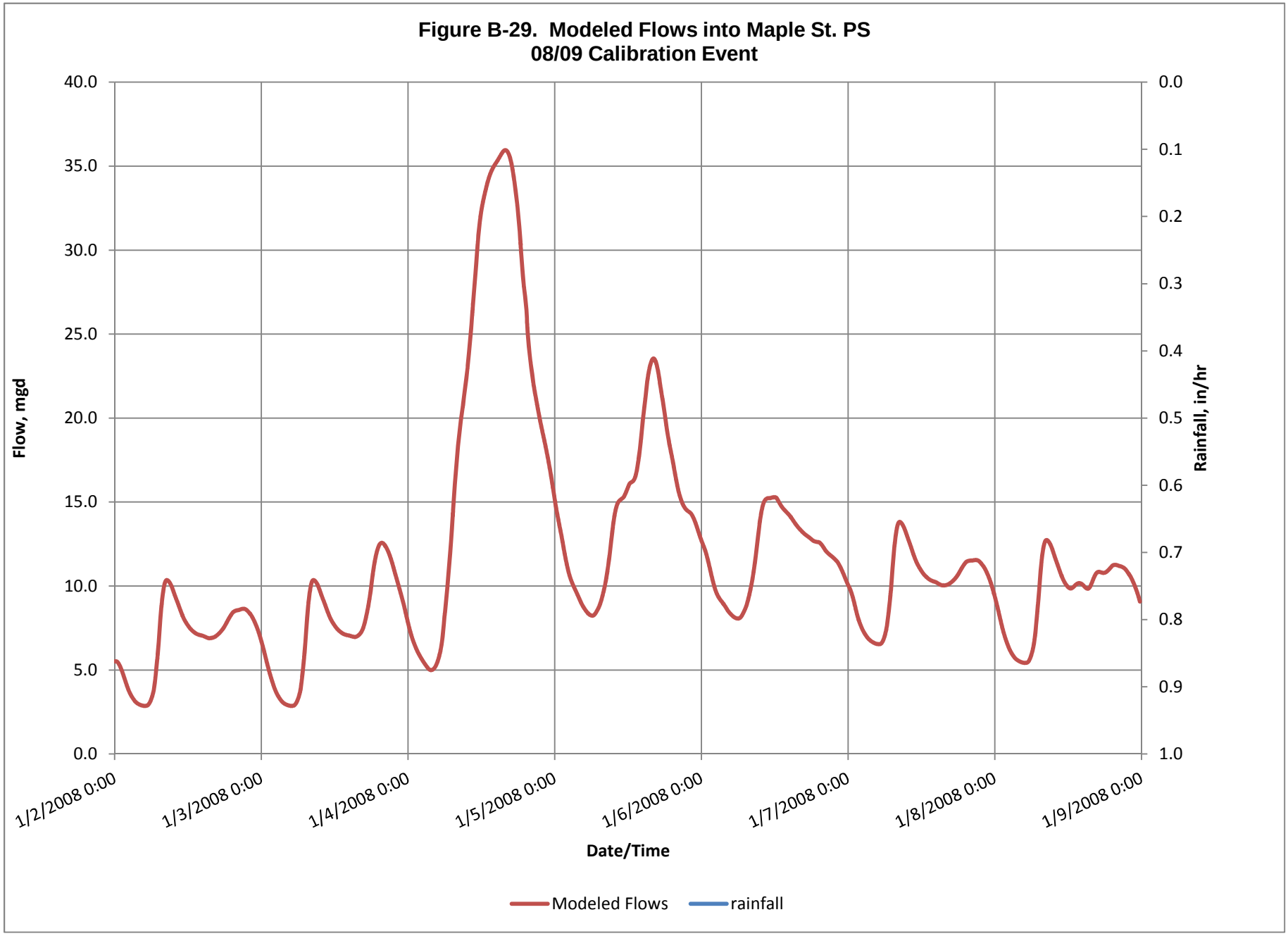
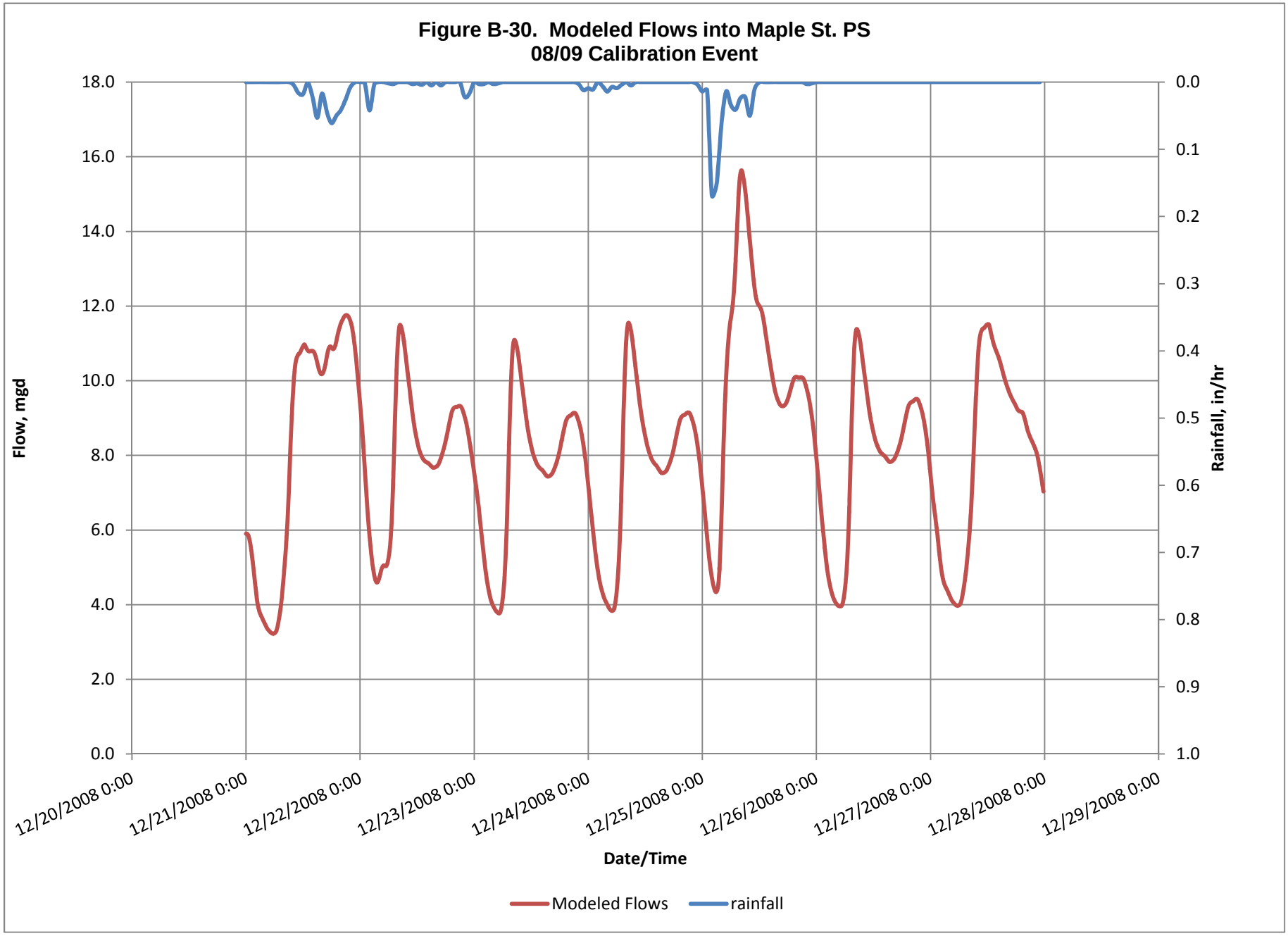


Figure B-29. Modeled Flows into Maple St. PS
08/09 Calibration Event
Flow, mgd
Rainfall, in/hr
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1/2/2008 0:00
1/3/2008 0:00
1/4/2008 0:00
1/5/2008 0:00
1/6/2008 0:00
1/7/2008 0:00
1/8/2008 0:00
1/9/2008 0:00
Date/Time
Modeled Flows
rainfall



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Last Revised: 01-28-13

City of Redwood City
Sewer Master Plan Update TM

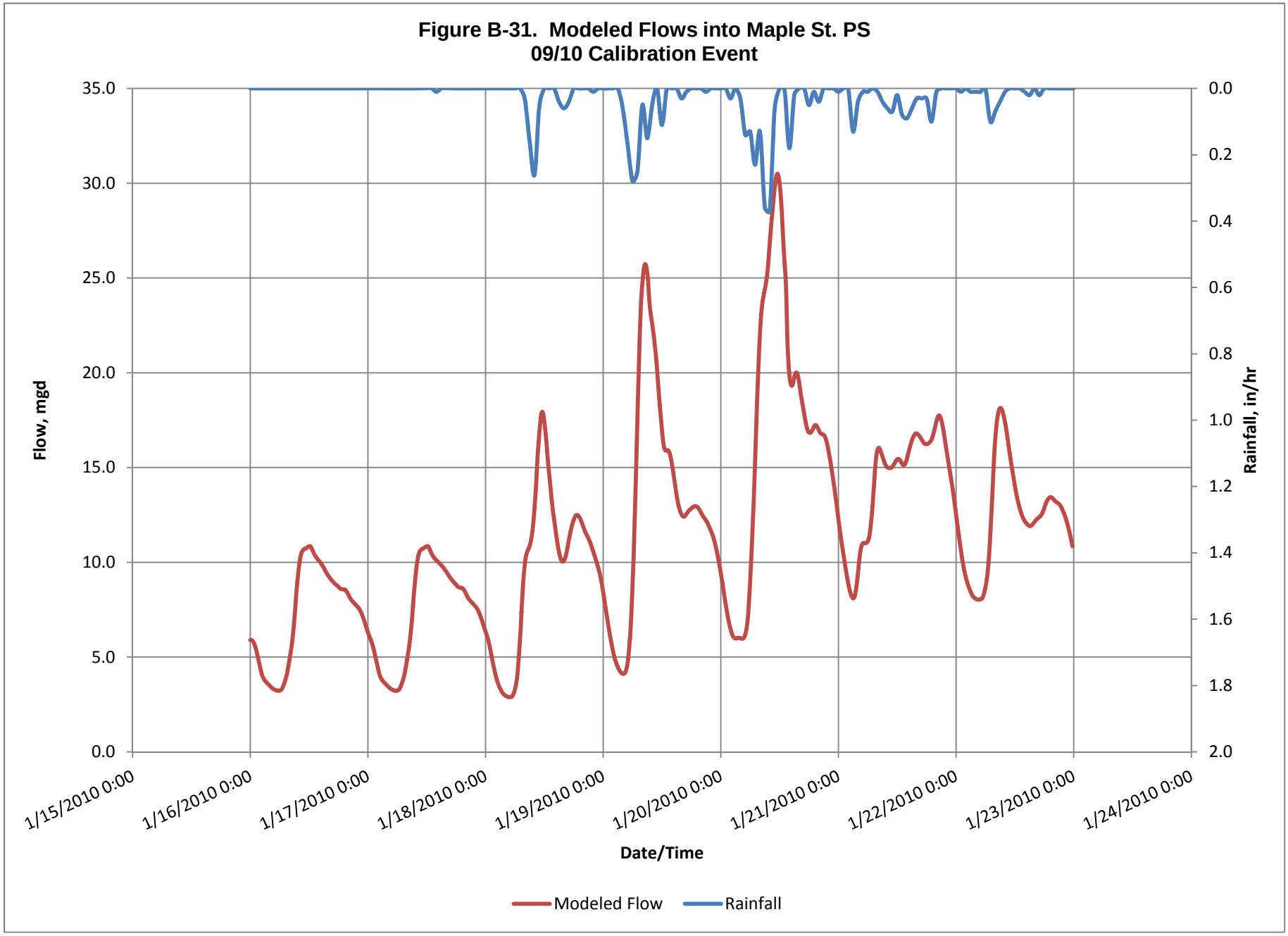


Figure B-31. Modeled Flows into Maple St. PS
09/10 Calibration Event
Flow, mgd
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Rainfall, in/hr
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
1/15/2010 0:00
1/16/2010 0:00
1/17/2010 0:00
1/18/2010 0:00
1/19/2010 0:00
1/20/2010 0:00
1/21/2010 0:00
1/22/2010 0:00
1/23/2010 0:00
1/24/2010 0:00
Date/Time
Modeled Flow
Rainfall

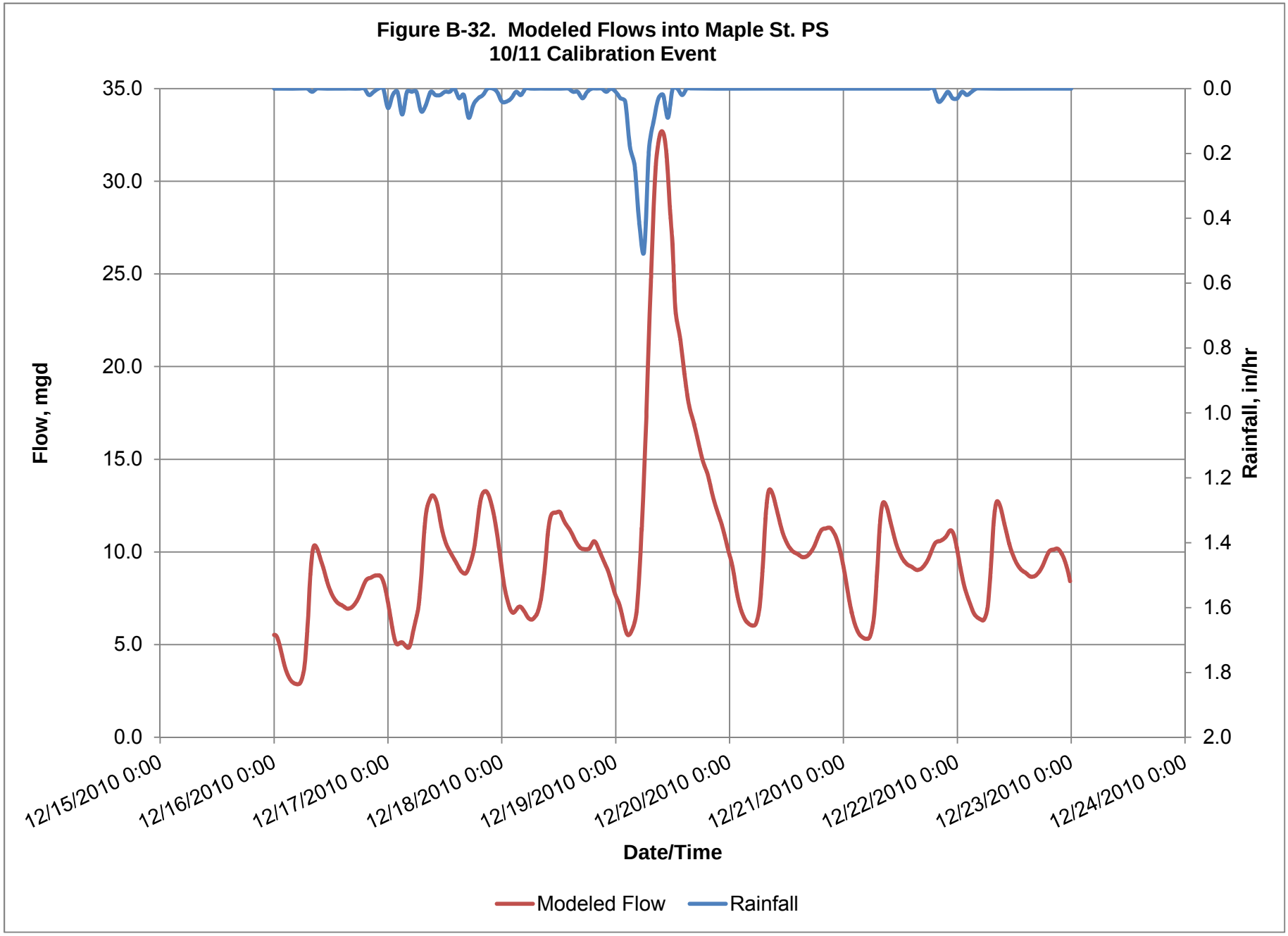


Figure B-32. Modeled Flows into Maple St. PS
10/11 Calibration Event
Flow, mgd
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Rainfall, in/hr
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
12/15/2010 0:00
12/16/2010 0:00
12/17/2010 0:00
12/18/2010 0:00
12/19/2010 0:00
12/20/2010 0:00
12/21/2010 0:00
12/22/2010 0:00
12/23/2010 0:00
12/24/2010 0:00
Date/Time
Modeled Flow
Rainfall

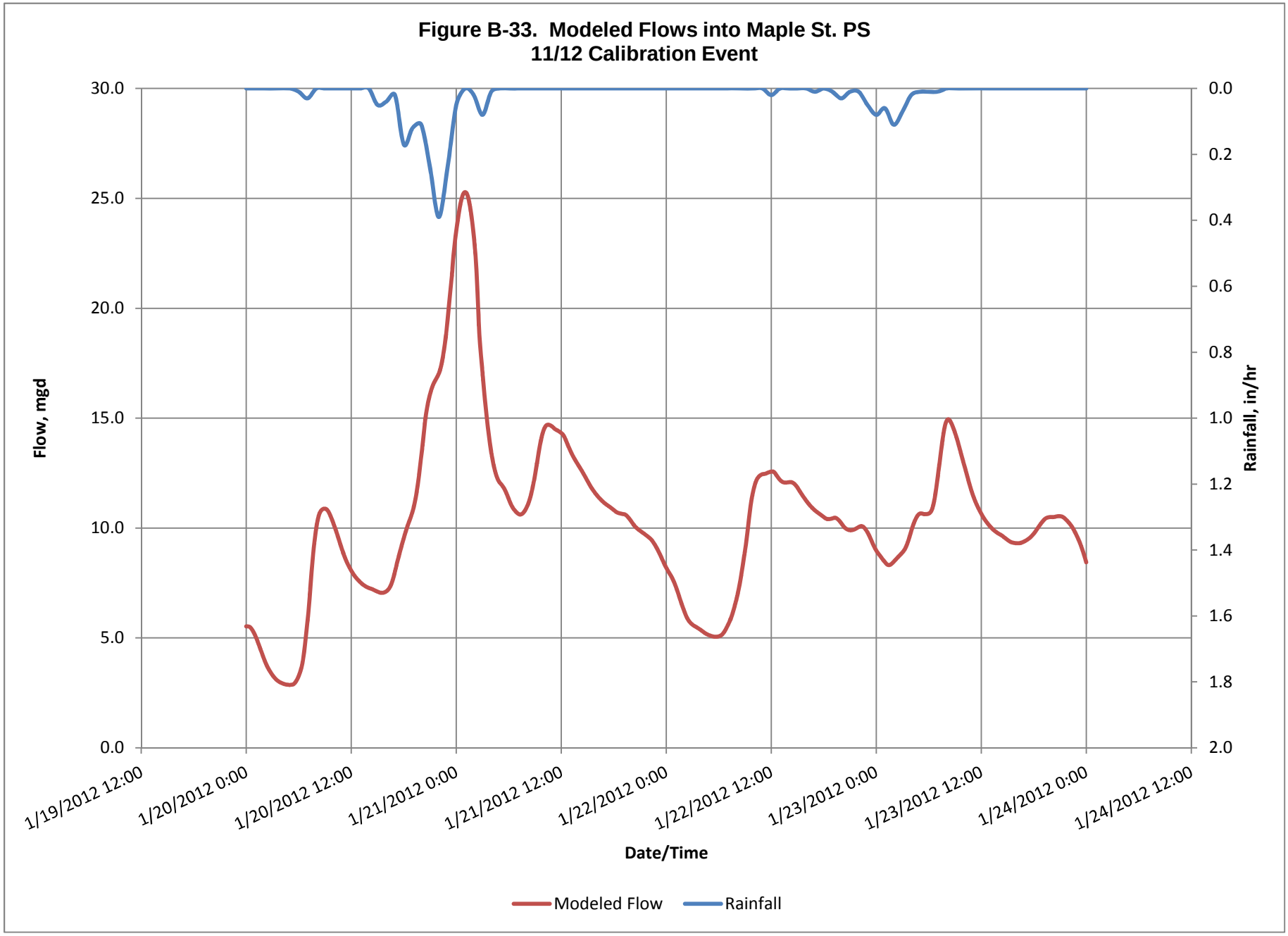


Figure B-33. Modeled Flows into Maple St. PS
11/12 Calibration Event
Flow, mgd
Rainfall, in/hr
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
1/19/2012 12:00
1/20/2012 0:00
1/20/2012 12:00
1/21/2012 0:00
1/21/2012 12:00
1/22/2012 0:00
1/22/2012 12:00
1/23/2012 0:00
1/23/2012 12:00
1/24/2012 0:00
1/24/2012 12:00
Date/Time
Modeled Flow
Rainfall

APPENDIX C

Project Cost Estimates

Appendix C. Capacity Improvement Project Cost Estimates

Project	USM	DSM	Pipe Segment ID	Proposed Diameter, in	Length, ft	Location	Action	Pipeline Replacement Method	Pipeline Replacement Difficulty	Pipeline Replacement Cost, $
4 Revised	Brewster Avenue									
	1157	1156	1157-1156	15	319	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	76,560
	1156	2780	1156-2780	15	312	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	74,880
	2780	2878	2780-2878	15	324	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	77,760
	2878	2877	2878-2877	15	318	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	76,320
	2877	2876	2877-2876	15	314	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	75,360
	2876	2875	2876-2875	15	340	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	81,600
	2875	2858	2875-2858	15	314	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	75,360
	2858	2857	2858-2857	15	320	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	76,800
	2857	2856	2857-2856	15	320	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	76,800
	2856	2855	2856-2855	15	320	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	76,800
	2855	2848	2855-2848	15	320	Brewster Avenuen ROW	Replace All	Remove & Replace	Normal	76,800

Subtotal 1	$	845,040
Mob	$	42,252
Bypass Pumping	$	84,504
Subtotal	$	971,796
Traffic Control	$	97,180
Construction Cost Subtotal	$	1,068,976
Contingency 30%	$	320,693
Estimated Construction	$	1,389,668
Technical Services and Administration	$	416,900
Total Project Cost	$	1,389,668
Rounded Total Project Cost	**$**	**1,390,000**

Appendix C. Capacity Improvement Project Cost Estimates

Project	USM	DSM	Pipe Segment ID	Proposed Diameter, in	Length, ft	Location	Action	Pipeline Replacement Method	Pipeline Replacement Difficulty	Pipeline Replacement Cost, $
12 Revised	Lincoln Ave, Beech St, Stambaugh St, Walnut St									
	4163	4165	4163-4165	30	399	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	135,660
	4165	4127	4165-4127	30	385	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	130,900
	4127	4124	4127-4124	30	385	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	130,900
	4124	4121	4124-4121	30	490	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	166,600
	4121	894	4121-894	30	498	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	169,320
	894	896	894-896	33	20	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	7,600
	896	908	896-908	33	440	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	167,200
	908	912	908-912	33	110	Lincoln Ave ROW	Replace All	Remove & Replace	Normal	41,800
	912	913	912-913	33	290	Beach Street ROW	Replace All	Remove & Replace	Normal	110,200
	913	902	913-902	33	290	Beach Street ROW	Replace All	Remove & Replace	Normal	110,200
	902	879	902-879	33	180	Beach Street ROW	Replace All	Remove & Replace	Normal	68,400
	879	880	879-880	33	90	RR Crossing	Replace All	Jack and Bore	Difficult	99,000
	880	881	880-881	33	90	RR Crossing	Replace All	Jack and Bore	Difficult	99,000
	881	1684	881-1684	33	400	Beach Street ROW	Replace All	Remove & Replace	Normal	152,000
	1684	860	1684-860	33	470	Beach Street ROW	Replace All	Remove & Replace	Normal	178,600
	860	1665	860-1665	33	480	Beach Street ROW	Replace All	Remove & Replace	Normal	182,400
	1665	2676	1665-2676	33	410	Stambaugh St ROW	Replace All	Remove & Replace	Normal	155,800
	2676	2675	2676-2675	33	330	Stambaugh St ROW	Replace All	Remove & Replace	Normal	125,400
	2675	2671	2675-2671	33	320	Stambaugh St ROW	Replace All	Remove & Replace	Normal	121,600
	2671	2807	2671-2807	33	380	Walnut Street ROW	Replace All	Remove & Replace	Normal	144,400
	2807	2695	2807-2695	33	380	Walnut Street ROW	Replace All	Remove & Replace	Normal	144,400

Subtotal 1	$ 2,641,380
Mob	$ 132,069
Bypass Pumping	$ 264,138
Shoring	$ 540,000
Subtotal	$ 3,577,587
Heavy Traffic Control	$ 1,431,035
Trenchless Pits and Mob	$ 124,750
Construction Cost Subtotal	$ 5,133,372
Contingency 30%	$ 1,540,012
Estimated Construction	$ 6,673,383
Technical Services and Administration	$ 2,002,015
Total Project Cost	$ 6,673,383
Rounded Total Project Cost	**$ 6,673,000**

Appendix C. Capacity Improvement Project Cost Estimates

Project	USM	DSM	Pipe Segment ID	Proposed Diameter, in	Length, ft	Location	Action	Pipeline Replacement Method	Pipeline Replacement Difficulty	Pipeline Replacement Cost, $
14	Clinton St. and Adams St.									
	3157	3160	3157-3160	12	320	Clinton St ROW	Replace All	Remove & Replace	Normal	73,600
	3160	3049	3160-3049	12	27	Clinton St ROW	Replace All	Remove & Replace	Normal	6,210
	3049	3163	3049-3163	12	168	Clinton St ROW	Replace All	Remove & Replace	Normal	38,640
	3163	4105	3163-4105	12	340	Clinton St ROW	Replace All	Remove & Replace	Normal	78,200
	4105	4133	4105-4133	12	264	Clinton St ROW	Replace All	Remove & Replace	Normal	60,720
	4133	4121	4133-4121	12	378	Clinton St ROW	Replace All	Remove & Replace	Normal	86,940
	2692	2644	2692-2644	12	173	Adams St ROW	Replace All	Remove & Replace	Normal	39,790
	2644	2685	2644-2685	12	262	Adams St ROW	Replace All	Remove & Replace	Normal	60,260
	2685	1679	2685-1679	12	262	Adams St ROW	Replace All	Remove & Replace	Normal	60,260
	1679	925	1679-925	12	292	Adams St ROW	Replace All	Remove & Replace	Normal	67,160
	925	893	925-893	12	186	Adams St ROW	Replace All	Remove & Replace	Normal	42,780
	893	894	893-894	12	186	Adams St ROW	Replace All	Remove & Replace	Normal	42,780

Subtotal 1	$	657,340
Mob	$	32,867
Bypass Pumping	$	65,734
Subtotal	$	755,941
Traffic Control	$	75,594
Construction Cost Subtotal	$	831,535
Contingency 30%	$	249,461
Estimated Construction	$	1,080,996
Technical Services and Administration	$	324,299
Total Project Cost	$	1,080,996
Rounded Total Project Cost	**$**	**1,081,000**

Appendix C. Capacity Improvement Project Cost Estimates

Project	USM	DSM	Pipe Segment ID	Proposed Diameter, in	Length, ft	Location	Action	Pipeline Replacement Method	Pipeline Replacement Difficulty	Pipeline Replacement Cost, $
15	Dover Rd, Madison Ave, and Upton St									
	1055	1054	1055-1054	15	115	Dover Rd ROW	Replace All	Remove & Replace	Normal	27,600
	1054	1053	1054-1053	15	331	Dover Rd ROW	Replace All	Remove & Replace	Normal	79,440
	1053	1036	1053-1036	15	291	Dover Rd ROW	Replace All	Remove & Replace	Normal	69,840
	1036	1038	1036-1038	15	270	Dover Rd ROW	Replace All	Remove & Replace	Normal	64,800
	1038	1045	1038-1045	15	236	Madison Ave ROW	Replace All	Remove & Replace	Normal	56,640
	1045	1040	1045-1040	15	296	Madison Ave ROW	Replace All	Remove & Replace	Normal	71,040
	1040	3839	1040-3839	15	236	Madison Ave ROW	Replace All	Remove & Replace	Normal	56,640
	3839	3835	3839-3835	15	227	Upton St ROW	Replace All	Remove & Replace	Normal	54,480
	3835	3907	3835-3907	15	232	Upton St ROW	Replace All	Remove & Replace	Normal	55,680
	3907	3906	3907-3906	15	26	Upton St ROW	Replace All	Remove & Replace	Normal	6,240
	3906	3904	3906-3904	15	214	Upton St ROW	Replace All	Remove & Replace	Normal	51,360
	3904	3871	3904-3871	15	238	Upton St ROW	Replace All	Remove & Replace	Normal	57,120
	3871	3873	3871-3873	15	322	Upton St ROW	Replace All	Remove & Replace	Normal	77,280
	3873	3876	3873-3876	15	131	Upton St ROW	Replace All	Remove & Replace	Normal	31,440

Subtotal 1	$	759,600
Mob	$	37,980
Bypass Pumping	$	75,960
Subtotal	$	873,540
Traffic Control	$	87,354
Construction Cost Subtotal	$	960,894
Contingency 30%	$	288,268
Estimated Construction	$	1,249,162
Technical Services and Administration	$	374,749
Total Project Cost	$	1,249,162
Rounded Total Project Cost	$	1,249,000

Element 9 Appendix

1. Annual Report of Sanitary Sewer Overflows (template)
2. Annual SSMP Audit Form
3. Record of Changes to the SSMP

[***Date***]

Bruce H. Wolfe, Executive Officer
California Regional Water Quality Control Board, San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
ATTN: Michael Chee

Dear Mr. Wolfe,

Subject: Annual Report of Sanitary Sewer System Overflows for [*Calendar Year*] and Attached Annual Sewer System Management Plan Audit Form

The purpose of this letter is to report the Sanitary Sewer System Overflows (SSOs) that occurred in the City of Redwood City sanitary sewer system during the period [*January 1, 20XX through December 31,20XX*]. This report is submitted pursuant to the requirements included in the San Francisco Bay Regional Water Quality Control Board Letter, New Requirements for Reporting Sanitary Sewer Overflows, dated November 15, 2004. This report also measures the effectiveness of Sewer System Management Plan (SSMP) elements in reducing SSOs. Performance indicators were selected and tracked to ensure the goals of the wastewater collection system agency are met.

Number and Size of SSOs

The total number of SSOs for the reporting period was [*X*]. All of the SSOs were associated with gravity sewers. [*If any SSOs were associated with pressure sewers or pump stations, indicate that here.*] There were [*X*] SSOs associated with dry weather conditions and [*X*] SSOs associated with wet weather conditions. *[If applicable, discuss SSOs to storm event return frequency here.*]The sizes of SSOs are summarized in **Table 1**.

Table 1. Number of SSOs

Size of SSO (gallons)	Number	Percent of Total by Number
Number of SSOs > 10,000 gallons		
Number of SSOs 1,000 to 9,999 gallons		
From 100 to 999		
From 10 to 99		
Less than 10 [*can include in line above*]		
Public portion of lateral [*if applicable*]		
Total		

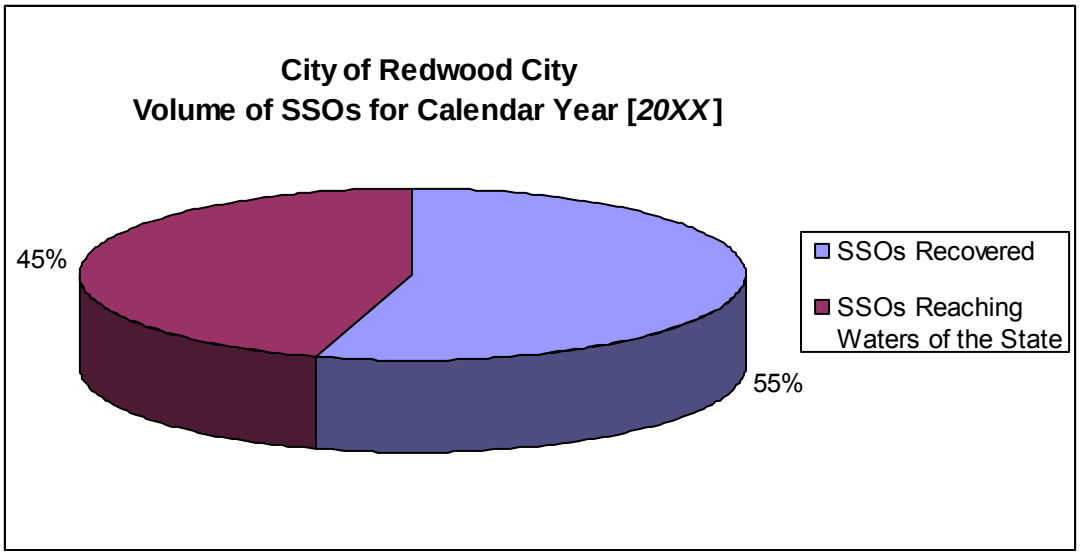
The volume of spills contained and returned to the sewer system, as well as the volume reaching waters of the State are shown in **Table 2**.

Table 2. Volume of SSOs

	Volume (gallons)	**Percent of Total by Volume**
Total volume contained and returned to sewer system for treatment		
Total volume reaching waters of the State		
Total volume not contained but not reaching waters of the State (everything else)		
Total		
Net Volume (total minus recovered)		

None of the SSOs exceeded [*X*] gallons in volume. This report does not include SSOs that occurred from private sewer service laterals within the City of Redwood City jurisdiction that were caused by conditions in privately-owned laterals or on private property. The property owners are responsible for the condition and the operation of those sewer service laterals. The percent of the total volume of spills recovered versus those that reached waters of the State is portrayed in **Figure 1**.

Example Figure 1. Percent of Total Volume *[This type of data portrait is optional.]*



Cause of SSOs

The predominant cause[*s*] of SSOs during the period of this report was [*were*] [*X, Y, and Z*]. [*Note: The causes shown in Table 3 are the same as the pull-down menus on the Regional Water Board's website*.] The distribution of SSOs by cause is shown on **Table 3**.

Table 3. Causes of SSOs

Cause of SSO	Number	Percent of Total
Blockage:		
Roots		
Grease		
Debris		
Debris from Laterals		
Vandalism		
Animal Carcass		
Construction Debris		
Multiple Causes		
Subtotal for Blockage		
Infrastructure Failure		
Inflow & Infiltration		
Electrical Power Failure		
Flow Capacity Deficiency		
Natural Disaster		
Bypass		
Cause Unknown		
Total		

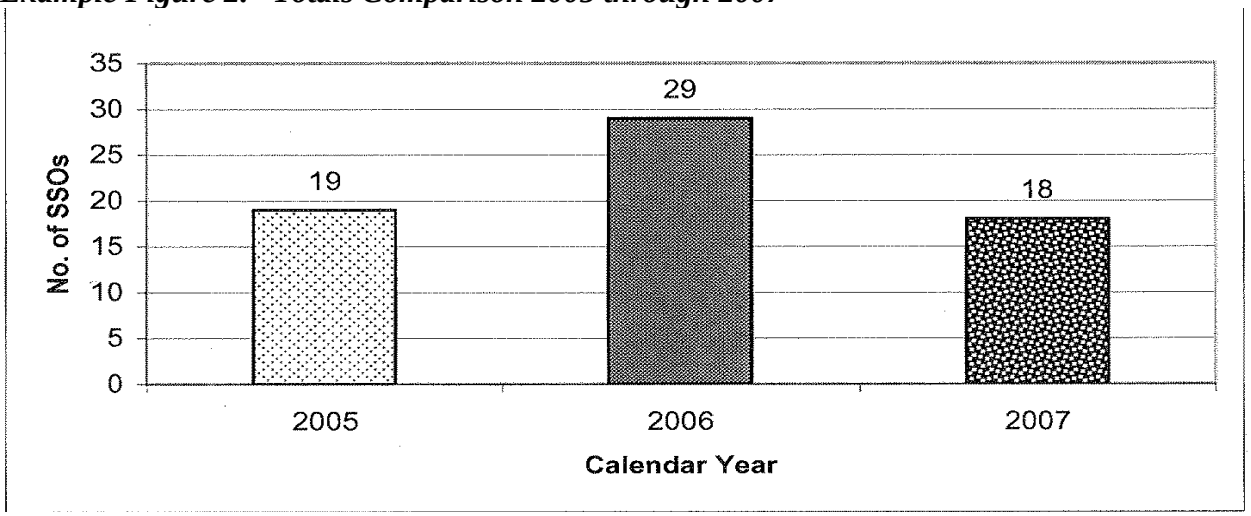
Location of SSOs

[*Summarize the general geographical locations where SSOs are occurring. Provide narrative text describing whether any SSOs are tending to occur in the same location and if so, what is being done to prevent those SSOs in the future. Note the number of locations with more than one SSO in the past year*]

SSO Trends

[*Include a bar chart or graph showing a comparison of data for the current reporting period with previous reporting periods. The example below is from the City of Redwood City's Annual Report of SSOs submitted March 14, 2008.*]

Example Figure 2. Totals Comparison 2005 through 2007



Sewer System Management Plan (SSMP) Audit

The purpose of the Annual SSMP Audit, Attachment 1, is to evaluate the effectiveness of the City of Redwood City's SSMP and to identify deficiencies, if any, and steps to correct them. The audit is submitted pursuant to the requirements included in the State Water Resources Control Board Order No. 2006-0003-DWQ and San Francisco Bay Regional Water Quality Control Board's Sewer System Management Plan Development Guide, July 2005.

City of Redwood City has completed the development of a SSMP according to the timelines of both the State and Regional Water Board. As documented in Attachment 1, the following is a description of the updates and/or changes needed in the SSMP and the timeline to complete those changes.
[*Insert information from "Description of Scheduled Updates/Changes to the SSMP" from Attachment 1*]

Capital Improvements:
In *[Reporting Year*], City of Redwood City completed the following Capital Improvement Projects related to wastewater collection:

- [*Create list here*]

In [*the following year*], City of Redwood City is expected to work on the following Capital Improvement Projects related to wastewater collection:

- [*Create list here*]

Efforts to Prevent SSOs and Minimize Their Impact through Operation and Maintenance

Count	Description of Efforts
	Number of feet of gravity sewer hydraulically cleaned
	Number of feet of gravity sewer video inspected
	Service Requests investigates
	Spot Repairs complete
	Trenchless Point Repairs complete
	Mains Cleaned on the "Hotspots" List
	Mains added to "Hotspots" list due to line condition assessment
	Mains Treated for Root Control (lines that have had root caused blockages in the past or were likely to in the future)
	Stoppages that did not result in a spill due to a quick response or to system design
	Ratio of planned sewer cleaning to unplanned sewer cleaning
	FOG Inspections
	FOG Outreach events

Other Accomplishments/Information:

- *Response Time During Business Hours*
- *Response Time After Business Hours*
- *Number of positive customer responses (compared to customer complaints)*
- *Other relevant accomplishments/highlights*

Certification

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

[**Agency Official**]

Attachment

Attachment 1
City of Redwood City
Sewer System Management Plan (SSMP)
***[YEAR]* Annual Audit Report**

The purpose of the Annual SSMP Audit is to evaluate the effectiveness of the City of Redwood City's (City's) SSMP and to identify deficiencies, if any, and steps to correct them. The audit is submitted pursuant to the requirements included in the State Water Resources Control Board Order No. 2006-0003-DWQ and San Francisco Bay Regional Water Quality Control Board's Sewer System Management Plan Development Guide, July 2005. Information collected in the Annual Report of Sanitary Sewer Overflows was used in preparing this audit and therefore the two reports are intended to be submitted as one document.

Directions: Please check **YES** or **NO** for each question. If **NO** is answered for any question, describe the updates/changes needed and the timeline to complete those changes in the "*Description of Scheduled Updates/Changes to the SSMP"* section on Page 5 of this form.

		YES	NO
ELEMENT 1 – GOALS			
A.	Are the goals stated in the SSMP still appropriate and accurate?	☐	☐
ELEMENT 2 -- ORGANIZATION			
A.	Is the Public Works Services Key Staff Telephone List current?	☐	☐
B.	Is the Sanitary Sewer Overflow Responder Telephone List current?	☐	☐
C.	Is Figure 1 of the SSMP, entitled "City Organization Chart," current?	☐	☐
D.	Are the position descriptions and accurate portrayal of staff responsibilities?	☐	☐
E.	Is Table 2 of the SSMP, titled "Chain of Communication for Reporting and Responding to SSOs," accurate and up-to-date?	☐	☐
ELEMENT 3 – LEGAL AUTHORITY			
Does the SSMP contain excerpts from the current Redwood City Municipal Code documenting the City's legal authority to:			
A.	Prevent illicit discharges?	☐	☐
B.	Require proper design and construction of sewers and connections?	☐	☐
C.	Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the City?	☐	☐

		YES	NO
D.	Limit discharges of fats, oil and grease?	☐	☐
E.	Enforce any violation of its sewer ordinances?	☐	☐
ELEMENT 4 – OPERATIONS AND MAINTENANCE			
	Collection System Maps		
A.	Does the SSMP reference the current process and procedures for maintaining the City's wastewater collection system maps?	☐	☐
B.	Are the City's wastewater collection system maps complete, current, and sufficiently detailed?	☐	☐
	Resources and Budget		
C.	Does the City allocate sufficient funds for the effective operation, maintenance and repair of the wastewater collection system and is the current budget structure documented in the SSMP?	☐	☐
	Prioritized Preventive Maintenance		
D.	Does the SSMP describe current preventive maintenance activities and the system for prioritizing the cleaning of sewer lines?	☐	☐
E.	Based upon information in the Annual SSO Report, are the City's preventive maintenance activities sufficient and effective in minimizing SSOs and blockages?	☐	☐
	Scheduled Inspections and Condition Assessments		
F.	Is there an ongoing condition assessment program sufficient to develop a capital improvement plan addressing the proper management and protection of infrastructure assets? Are the current components of this program documented in the SSMP?	☐	☐
	Contingency Equipment and Replacement Inventory		
G.	Does the SSMP list the major equipment currently used in the operation and maintenance of the collection system and document the procedures of inventory management?	☐	☐
H.	Are contingency equipment and replacement parts sufficient to respond to emergencies and properly conduct regular maintenance?	☐	☐
	Training		
I.	Is the training calendar current?	☐	☐
J.	Does the SSMP document current training expectations and programs within the City's Wastewater Division?	☐	☐
	Outreach to Plumbers and Building Contractors		
K.	Does the SSMP document current outreach efforts to plumbers and building contractors?	☐	☐

		YES	NO
ELEMENT 5 – DESIGN AND PERFORMANCE STANDARDS			
A.	Does the SSMP contain current design and construction standards for the installation of new sanitary sewer systems, pump stations and other appurtenances and for the rehabilitation and repair of existing sanitary sewer systems?	☐	☐
B.	Does the SSMP document current procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and the rehabilitation and repair of existing sewer lines?	☐	☐
ELEMENT 6 – OVERFLOW AND EMERGENCY RESPONSE PLAN			
A.	Does the City's Sanitary Sewer Overflow and Backup Response Plan establish procedures for the emergency response, notification, and reporting of sanitary sewer overflows (SSOs)?	☐	☐
B.	Are Wastewater Division staff and contractor personnel appropriately trained on the procedures of the Sanitary Sewer Overflow and Backup Response Plan?	☐	☐
C.	Considering performance indicator data in the Annual SSO Report, is the Sanitary Sewer Overflow and Backup Response Plan effective in handling SSOs in order to safeguard public health and the environment?	☐	☐
ELEMENT 7 – FATS, OILS, AND GREASE (FOG) CONTROL PROGRAM			
A.	Does the Fats, Oils, and Grease (FOG) Control Program include efforts to educate the public on the proper handling and disposal of FOG?	☐	☐
B.	Does the City's FOG Control Program identify sections of the collection system subject to FOG blockages, establish a cleaning schedule and address source control measures to minimize these blockages?	☐	☐
C.	Are requirements for grease removal devices, best management practices (BMP), record keeping and reporting established in the City's FOG Control Program?	☐	☐
D.	Does the City have sufficient legal authority to implement and enforce the FOG Control Program?	☐	☐
E.	Is the current FOG program effective in minimizing blockages of sewer lines resulting from discharges of FOG to the system	☐	☐
ELEMENT 8 – SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN			
A.	Does the Redwood City Sanitary Sewer Master Plan evaluate hydraulic deficiencies in the system, establish sufficient design criteria and recommend both short and long term capacity enhancement and improvement projects?	☐	☐
B.	Does the City's Capital Improvement Plan (CIP) establish a schedule of approximate completion dates for both short and long-term improvements and is the schedule reviewed and updated to reflect current budgetary capabilities and activity accomplishment?	☐	☐

		YES	NO
ELEMENT 9 – MONITORING, MEASUREMENT, AND PROGRAM MODIFICATIONS			
A.	Does the SSMP accurately portray the methods of tracking and reporting selected performance indicators?	☐	☐
B.	Is the City able to sufficiently evaluate the effectiveness of SSMP elements based on relevant information?	☐	☐
ELEMENT 10 – SSMP AUDITS			
A.	Will the SSMP Audit be submitted with the SSO Annual Report to the Regional Water Board by March 15th of the year following the end of the calendar year being audited?	☐	☐
ELEMENT 11 – COMMUNICATION PROGRAM			
A.	Does the City effectively communicate with the public and other agencies about the development and implementation of the SSMP and continue to address any feedback?	☐	☐

Description of Scheduled Updates/Changes to the SSMP

Directions: For each NO answer, please describe the planned revision and indicate the date the revision will be completed. Reference the SSMP element and question number with each explanation.

City of Redwood City **December 30, 2013**

Sewer System Management Plan

Record of Changes to the SSMP

Monitoring and Reporting Program Order No. WQ 2013-0058-EXEC Section E.3 requires the City to maintain a record of changes to the SSMP for a minimum of 5 years and available for review by the State Water Resources Control Board during onsite inspection or through information request. The following is an excerpt of the new requirement:

Records documenting all changes to the SSMP since its last certification indicating when a subsection(s) of the SSMP was changed and/or updated and who authorized the change or update. These records shall be attached to the SSMP.

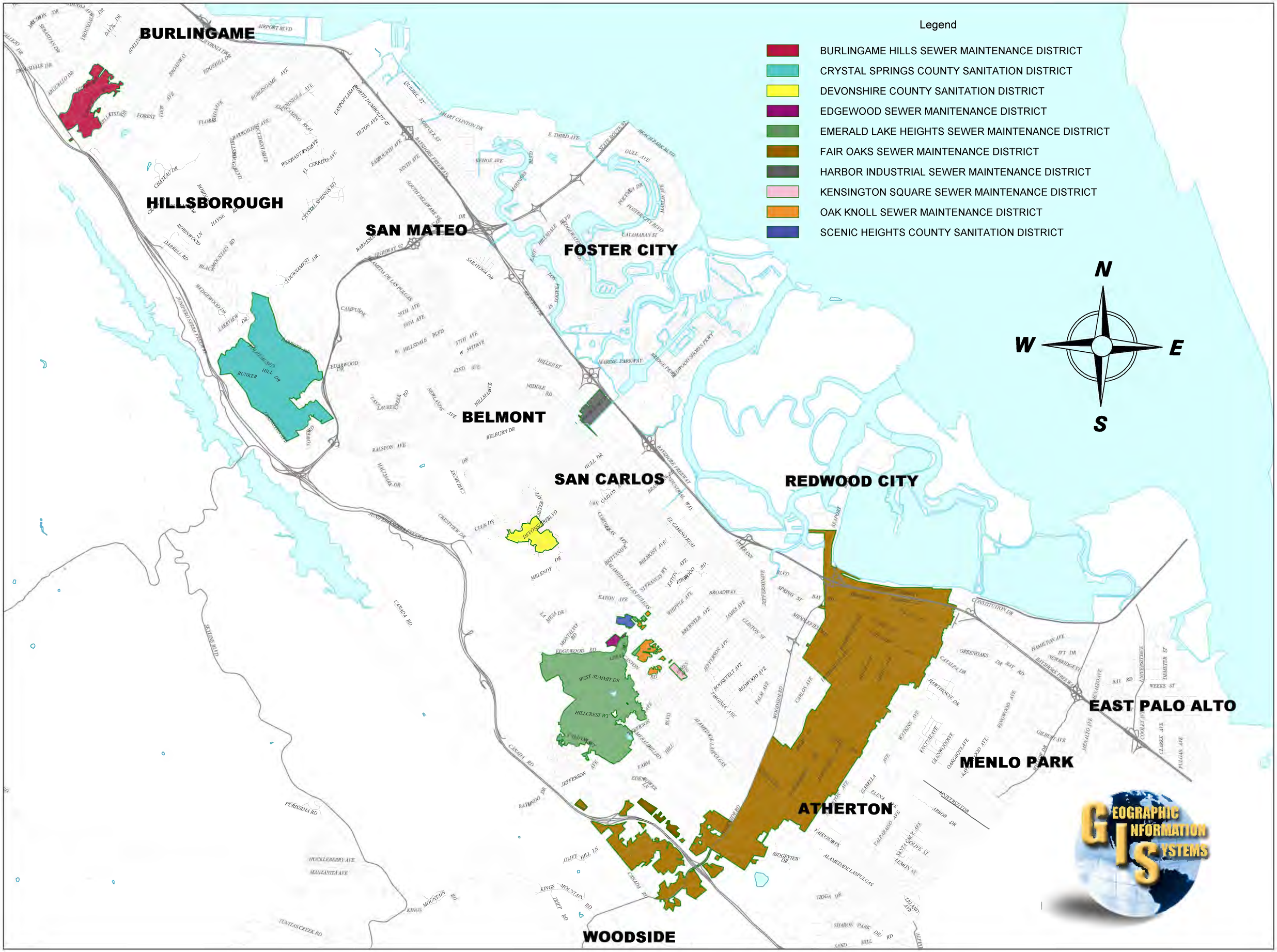
The SSMP was last certified on March 23, 2009. The following table summarizes the changes to the SSMP since its last certification.

SSMP Element	Description of Changes to SSMP Element Subsections	Authorized By
All SSMP Elements	• Removed excerpts from the Regional Board SSMP requirements included in the SSMP Development Guide when overlapping with State Water Resources Control Board requirements	Terence Kyaw
Element 1 Goals	• Updated to include a goal for the SSMP document	Terence Kyaw
Element 2 - Organization	• Reorganized section to align with WDR requirements • Updated the organization chart • Updated the position descriptions, as needed • Create Table 2-1 summarizing positions responsible for implementing Elements of the SSMP • Updated the Chain of Communication for Reporting and Responding to SSOs • Updated all Element 2 Appendix contact lists	Terence Kyaw
Element 3 – Legal Authority	• Created Table 3-1 summarizing legal authority requirements along with references to Municipal Code and Engineering Standards. • Updated narrative to clarify authorities. • Included a webpage link to the City's Municipal Code and Engineering Standards. • Removed excerpts from the Municipal Code in favor of a narrative summary and references.	Terence Kyaw
Element 4 – O&M Program - Mapping	• Updated narrative describing Collection System Mapping to include summary new technology deployed to provide electronic mapping to field employees.	Terence Kyaw
Element 4 – O&M Program – Collection System Maintenance	• Significant update to narrative summary of collection system maintenance program including: o Updates to description of information systems used to plan, schedule, and manage maintenance activities o Addition of maintenance feedback forms o Summary of major equipment available o Summary of pump station maintenance program o Description of corrective maintenance program	Terence Kyaw

SSMP Element	Description of Changes to SSMP Element Subsections	Authorized By
	o Summary of use of SCADA system o Description of lower lateral maintenance program	
Element 4 – O&M Program – Condition Assessment and Rehabilitation Planning	• Significant update to narrative summary of condition assessment and rehabilitation planning section o Included new narrative summary of sewer pipeline and manhole inspection program o Included Figure 4-1 map of CCTV inspection priorities and Table 4-1 inspection schedule for sewer basins o Included a narrative of condition assessment, rehabilitation planning, and prioritization process	Terence Kyaw
Element 4 – O&M Program - Funding	• Updated narrative of Resources and Budget section to include description of recent rate increases	Terence Kyaw
Element 4 – O&M Program - Training	• Updated narrative of training program summary describing California Water Environment Association Collection System Certification program • Included narrative summary of Sanitary Sewer Overflow Emergency Response training	Terence Kyaw
Element 5 – Design and Performance Provisions	• Included a link to the webpage to the City's Engineering Standards	Grace Le
Element 6 – Emergency Response Plan	• Updated the Sanitary Sewer Overflow and Backup Response Plan in February 2012 • All references to the Sanitary Sewer Overflow and Backup Response Plan were updated to align with the latest version of the document • The updated Sanitary Sewer Overflow and Backup Response Plan is included as an attachment • Updated Sanitary Sewer Overflow and Backup Response Plan in December 2013 due to changes in WDR specified in Order No. 2006-0003-DWQ	Justin Chapel
Element 7 – Fats, Oils, and Grease Control Program	• Updated the Public Education and Outreach section to include descriptions of outreach materials included on the City's website along with links to associated webpages • Included a new subsection to summarize Grease Removal Device Installation Requirements. • Significant update to the narrative summary of the Commercial Source Control Inspection Program	Terence Kyaw
Element 8 – System Evaluation and Capacity Assurance Plan	• The City performed a Sewer Master Plan Update in January 2013. The Sewer Master Plan Update is included as an attachment to the SSMP. • Updated the narrative description of the System Evaluation and Capacity Assurance Plan to reference the new Sewer Master Plan Update.	Grace Le
Element 9 –	• Updated narrative of annual reporting and use of the annual	Terence

SSMP Element	Description of Changes to SSMP Element Subsections	Authorized By
Monitoring, Measurement, and Program Modifications	reporting and SSMP audit results to improve effectiveness of SSMP implementation	Kyaw
Element 10 – SSMP Program Audits	• Updated narrative of SSMP Program Audits section to address rescission of San Francisco Bay Regional Water Quality Control Board requirements for annual SSMP audit.	Terence Kyaw
Element 11 – Communication	• Updated to include expanded narrative of strategies to Communicate with the Public • Included new narrative description of communication with tributary systems	Terence Kyaw

Element 11 Appendix

1. Map of County of San Mateo Administered Sewer Districts

County Administered Sewer and Sanitation Districts