CITY OF AVALON

Santa Catalina Island

(Source: www.wikipedia.com)

SEWER SYSTEM MANAGEMENT PLAN

June 2014 Update

Originally Adopted September 2010
Revisions Adopted June 2012

Prepared By:

RBF CONSULTING
A Baker Company

In Coordination with:

environ strategy es

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TABLE OF CONTENTS

Page

1.0 SSMP Goals 1-1
1.1 Introduction 1-1
1.2 Goals and Schedule 1-2
2.0 Organizational Structure 2-1
2.1 Owner 2-1
2.2 Operation and Maintenance 2-2
3.0 Legal Authority 3-1
4.0 Operation and Maintenance Program 4-1
4.1 Collection System Mapping 4-2
4.2 Routine Preventative O&M 4-2
4.3 Flushing Program 4-4
4.4 Root Abatement Program 4-4
4.5 Rehabilitation and Replacement 4-4
4.6 Employee Training 4-4
4.7 Tools and Equipment Inventory Program 4-5
5.0 Overflow Emergency Response Plan 5-1
5.1 Overflow Response Procedures 5-1
5.2 Water Quality Sampling 5-5
5.3 Training 5-8
6.0 Fats, Oil, and Grease Control Program 6-1
6.1 Best Management Practices 6-1
6.2 Grease Control Devices 6-2
6.3 Inspections 6-3
7.0 System Evaluation And Capacity Assurance Plan 7-1
7.1 Flow Monitoring and Capacity Analysis 7-1
7.2 Inflow and Infiltration 7-2
7.3 Existing Conditions Evaluation 7-2
7.4 Future Conditions Evaluation 7-2

8.0 Design and Perfomance Provisions 8-1
8.1 Pipeline Replacement 8-1
8.2 Pipeline Rehabilitation 8-1
8.3 Inspection and Testing 8-2
9.0 Monitoring, Measurement, and Program Modifications 9-1
9.1 Monitoring and Measurement 9-1
9.2 Program Modifications 9-4
10.0SSMP Audits 10-1
11.0Communications Program 11-1

List of Figures ii
List of Acrynoms iii

Appendices:

Appendix 1: City of Avalon Municipal Code (Updated June 2013)
Appendix 2: Annual Preventative Operations and Maintenance Plan
Appendix 3: Sanitary Sewer Overflow Response and Cleanup Plan
Appendix 4: Fats, Oil, and Grease (FOG) Reduction Program – Inspection Forms
Appendix 5: System Evaluation and Capacity Assurance Plan
Appendix 6: 20-Year Capital Improvement and Financial Plan

LIST OF FIGURES

Figure 1-1: City of Avalon Jurisdictional Boundary 1-2
Figure 2-1: SSMP Responsibility Organization Chart 2-4

LIST OF ACRONYMS

ADWF	Average Dry Weather Flow
BMP	Best Management Practices
CAO	Chief Administrative Officer
CCTV	Closed Circuit Television
CDO	Cease and Desist Order
CDFW	California Department of Fish and Wildlife
CIP	Capital Improvement Plan
City	City of Avalon
CMMS	Computerized Maintenance Management System
DHS	Department of Health Services
FOG	Fats, Oil, and Grease
FSE	Food Service Establishment
GCD	Grease Control Device
GGI	Gravity Grease Interceptor
GIS	Geographic Information System
GPS	Global Positioning System
HGI	Hydraulic Grease Interceptor
I/I	Infiltration / Inflow
LACDPH	Los Angeles County Department of Public Health
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PDWF	Peak Dry Weather Flow
PVC	Polyvinylchloride Pipe
PWD	Public Works Department
RWQCB	Regional Water Quality Control Board
SCADA	Supervisory Control and Data Acquisition
SECAP	System Evaluation and Capacity Assurance Plan
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
VCP	Vitrified Clay Pipe
WDR	Waste Discharge Requirement
WWTP	Wastewater Treatment Plant

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1.0 SSMP GOALS

1.1 Introduction

The City of Avalon (City) and Avalon Bay are located on Santa Catalina Island (see **Figure 1-1**), within the County of Los Angeles, approximately 22 miles south/southwest of the City of Los Angles, and encompasses approximately 2.67 square miles. The sewer collection system serves a population of approximately 3,800 residents, which consists primarily of residential and some commercial customers. The sewer collection system service area covers approximately 1.4 square miles, and includes approximately 11 miles of gravity sewers, 1.25 miles of force mains, and two (2) pump stations.

The City is a recreational destination for boaters, fisherman, divers, beachgoers, and other ocean and hiking oriented visitors. Residents and visitors use the local beaches year-round for recreational uses. The primary industry on Santa Catalina Island is tourism, accommodating an average annual visitor count of approximately one million. Therefore, the number of occupants within the City fluctuates day-to-day and seasonally, producing a transient populace. Municipal sewer collection systems average dry weather flows (ADWF) are typically stable during periods of dry weather; however, in the case of Avalon, the ADWF is irregular depending on the fluctuating tourism populace on a day-by-day basis. Therefore, the transient populace generates a peaking factor greater than what would be typically used for sewer system design.

The City owns the Avalon Wastewater Treatment Plant (WWTP) located at 123 Pebbly Beach Road. The Avalon WWTP and appurtenant sanitary sewer collection system operates under Regional Water Quality Control Board (RWQCB) Order No. R4-2008-0028, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0054372. The sewer collection system is also subject to State Water Resources Control Board (SWRCB) Order No. 2006-0003-DWQ, *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems* (SSO WDR) and the SWRCB Order No. WQ-2008-0002-EXEC, *Adopting Amended Monitoring and Reporting Requirements for the SSO WDR* (SSO MRP Amendment). This document fulfills the requirement of the governing legislation to provide a Sewer System Management Plan (SSMP).

Figure 1-1: City of Avalon Jurisdictional Boundary

1.2 Goals and Schedule

The City of Avalon in coordination with the Regional Water Quality Control Board (RWQCB) and the State Water Resources Control Board (SWRCB) have developed several goals focused on reducing sanitary sewer overflows (SSOs), improving the water quality of Avalon Bay, and to comply with the RWQCB's Cease and Desist Order (CDO) No. R4-2012-0077. The goals and/or requirements of the SSMP to comply with CDO No. R4-2012-0077 includes:

- Prepare an SSO Reduction Plan by June 30, 2012 **(complete)**.
- Maintain individual SSO records for a minimum five (5) years from the date of the SSO.

- Complete an assessment of the collection system staff and develop a plan to provide training to collection system O&M personnel by June 30, 2012 **(complete)**.
- Develop and implement an Overflow Emergency Response Plan by June 30, 2012 **(complete)**.
- Obtain and utilize a Computerized Maintenance Management System (CMMS) by June 30, 2012 **(complete)**.
- Develop and implement a System-Wide Cleaning Program for the collection system by June 30, 2012 **(complete)**.
- Develop and implement a Root Control Program for the collection system by June 30, 2013 **(complete)**.
- Develop and implement a Fats, Oil, and Grease (FOG) control program for the collection system by June 30, 2013 **(complete)**.
- Develop and implement an Illicit Discharges Elimination Program, including smoke testing by June 30, 2013 **(complete)**.
- Complete a system-wide condition assessment, including force mains for the collection system by June 30, 2013 **(complete)**.
- Complete an updated System Evaluation and Capacity Assurance Plan (SECAP) by June 30, 2013 **(complete)**.
- Prepare and Implement a 20-year Capital Improvement Plan (CIP) and Financial Plan by June 30, 2013 **(complete)**.
- Develop and Implement a private sewer lateral replacement program (and ordinance) to reduce the addition of I/I from defective laterals by December 31, 2013 **(complete)**.
- Report Category 1 and 2 SSOs to the online SSO System no later than three (3) business days after the City is made aware of the SSO.
- Review and update the SSMP as necessary every five years, beginning June 2014.
- Conduct an annual audit of the SSMP every March 15 and submit an SSMP Audit Report to the RWQCB.
- No exceedances of the numeric targets for discharges from the City's WWTP.

- No allowable discharge from the City's sanitary sewer collection system resulting in detectable levels of the fecal indicator bacterial (FIB) identified as numeric targets in the FIB TMDL, by June 30, 2015.
- No allowable exceedance days at any monitoring site during summer dry weather (Apr. 1 to Oct. 31), by April 1, 2016.
- During winter dry-weather (Nov. 1 – Mar. 31), if daily sampling occurs, achieve an exceedance level of no more than nine (9) exceedance days at any monitoring site. If weekly sampling is conducted, achieve an exceedance level of no more than one (1) exceedance day at any monitoring site, by November 1, 2016.
- During winter wet-weather (Nov. 1 – Mar. 31), if daily sampling occurs, achieve an exceedance level of no more than seventeen (17) exceedance days at any monitoring site. If weekly sampling is conducted, achieve an exceedance level of no more than three (3) exceedance days at any monitoring site, by November 1, 2017.

The SSMP is a living document that will be updated and refined to meet changing conditions as the program develops. Since 2000, Avalon Bay has made an appearance on the Heal the Bay's *Beach Bummer List* twelve (12) of the past fourteen (14) years. Heal the Bay is a non-profit environmental organization that uses science, education, community action, and advocacy to make Southern California coastal waters and watersheds safe, healthy, and clean. Since the issuance of the CDO, the City of Avalon has spent over $5.7 million (City and State funding) on upgrading the City's sanitary sewer collection system, analyzing water quality issues in Avalon Bay, and implementation of a GIS-based inspection and tracking system as part of its sanitary sewer inspection and repair program. As a result of the City's efforts, over the past two years, significant water quality improvement in Avalon Bay has been documented by the Heal the Bay organization, and therefore, Avalon Bay was recently removed from the Heel the Bay's *2013-2014 Annual Beach Report Card Beach Bummer List*.

2.0 ORGANIZATIONAL STRUCTURE

The City of Avalon (City), owns the Avalon Wastewater Treatment Plant (WWTP), a publicly owned treatment works, and the associated wastewater collection system. The City contracts with a third-party professional to operate and maintain the WWTP and collection system and delegates day to day responsibility to that entity. This section of the SSMP sets forth the organizational structure (see **Figure 2-1**) of the City (owner) and the City's third-party professional (operations and maintenance). It contains the information required by Section D.13(ii) of Order No. 2006-0003 and illustrates how the City and third party operator will work jointly to implement the SSMP.

2.1 Owner

As the owner of the WWTP and the sewer collection system, the City of Avalon is the initial legally responsible entity under Section J.1(i) of Order No. 2006-0003. In accordance with Section J.1(i) of Order No. 2006-0003, the designated responsible person for the City is the City Manager. The key personnel at the City and organizational description are provided below.

- **Mayor and City Council**: The Mayor and City Council are responsible for setting City policy, adopting all ordinances, resolutions and minute orders, and appropriating funds necessary to implement the SSMP.
    - Mayor is Ann Marshall (amarshall@cityofavalon.com)
    - City Council Mayor Pro Tem is Oley Olsen (wfolsen@cityofavalon.com)
    - City Council Members are:
        - Cinde MacGugan-Cassidy (ccassidy@cityofavalon.com)
        - Richard Hernandez (rhernandez@cityofavalon.com)
        - Joe Sampson (jsampson@cityofavalon.com)
    - (310) 510-0220 ext. 122
- **City Manager:** The City Manager serves as the administrative head of the City and runs the day-to-day operations of the City.
    - City Manager is Ben Harvey (bharvey@cityofavalon.com)
    - (310) 510-0220 ext. 120

- **Chief Administrative Officer**: The Chief Administrative Officer (CAO) is responsible for assisting the City Manager in the day-to-day operations of the City. The CAO is responsible for implementing the SSMP.
    - CAO is Denise Radde (dradde@cityofavalon.com),
    - (310) 510-0220 ext. 129
- **Director of Public Works:** The Director of Public Works is responsible for constructing, maintaining, and enhancing public facilities, programs and infrastructure. The Director pays a key role in the SSMP, including through issuance of permits pursuant to the sewer ordinance.
    - Interim Director of PW is Dennis Jaich (djaich@cityofavalon.com)
    - (310) 510-0220 ext. 122
- **City Attorney:** The City Attorney is responsible for providing legal advice to the City, through the City Council and City staff. The City Attorney is responsible for framing all ordinances necessary to implement the SSMP. The City Attorney would also prosecute violations of the City's sewer ordinance.
    - City Attorney is Scott Campbell (Scott.Campbell@bbklaw.com)
    - (310) 510-0220 ext. 130

2.2 Operations and Maintenance

The City has contracted with Environ Strategy Consultants, Inc. (Environ Strategy) as the duly authorized representative of the City. The City Manager interacts with Environs Strategy's Operations Manager concerning the overall implementation of the service contract. Under the contract, Environ Strategy operates and maintains all components of the WWTP and sewer collection system. In addition, as the duly authorized representative of the City, they are responsible for filing all reports and any other information required by Order No. 2006-0003, NPDES Permit No. CA0054372, and any other applicable laws or regulations.

- **Operations Manager:** The Operations Manager is responsible for implementation of the contract with the City and the operations of the WWTP facility and personnel.
    - Operations Manager is Jeff Mummert (jmummert@environstrategy.com)
    - (714) 919-6500

- **Chief Plant Operator / Plant Manager:** The Chief Plant Operator / Plant Manager is responsible for the day-to-day operations of the facility and supervision of the Lead Operator, O&M Technician, and OITs. The Chief Plant Operator also reviews operational data with the Operations Manager for process control.
    - Chief Plant Operator is David Clary (dclary@environstrategy.com)
    - 310-510-0731
- **Lead Operator:** The Lead Operator reviews plant operation by doing "rounds" around the facility and perform preventative maintenance activities.
    - Lead Operator is Cliff Casanova (ccasanova@environstrategy.com)
    - 310-510-0731
- **Operations and Maintenance Technician / Operator-In-Training (OIT):** The O&M Technician / OIT are responsible for preventative and corrective maintenance, laboratory work, and assisting the Lead Operator as directed.
    - O&M Technician / OIT is Ian Morrison (imorrison@environstrategy.com)
    - O&M Technician / OIT is Joey Hall (jhall@environstrategy.com)
    - O&M Technician / OIT is Mario Perez (mperez@environstrategy.com)
    - 310-510-0731

Environ Strategy implements a *SSO Response and Cleanup Plan*. Any complaint of an SSO received by the City is immediately referred to the Environ Strategy Project Manager for response pursuant to the plan. The applicable authority is contacted in a manner consistent with Order No. 2008-0002. Environ Strategy is responsible for reporting SSOs through the online reporting system and for timely reports to the following entities:

- Office of Emergency Services;
- Los Angeles County Department of Health (LACDPH); and
- Regional Water Quality Control Board (RWQCB).

Refer to **Appendix 3** for notification procedures and contact numbers in the *SSO Response and Cleanup Plan*.

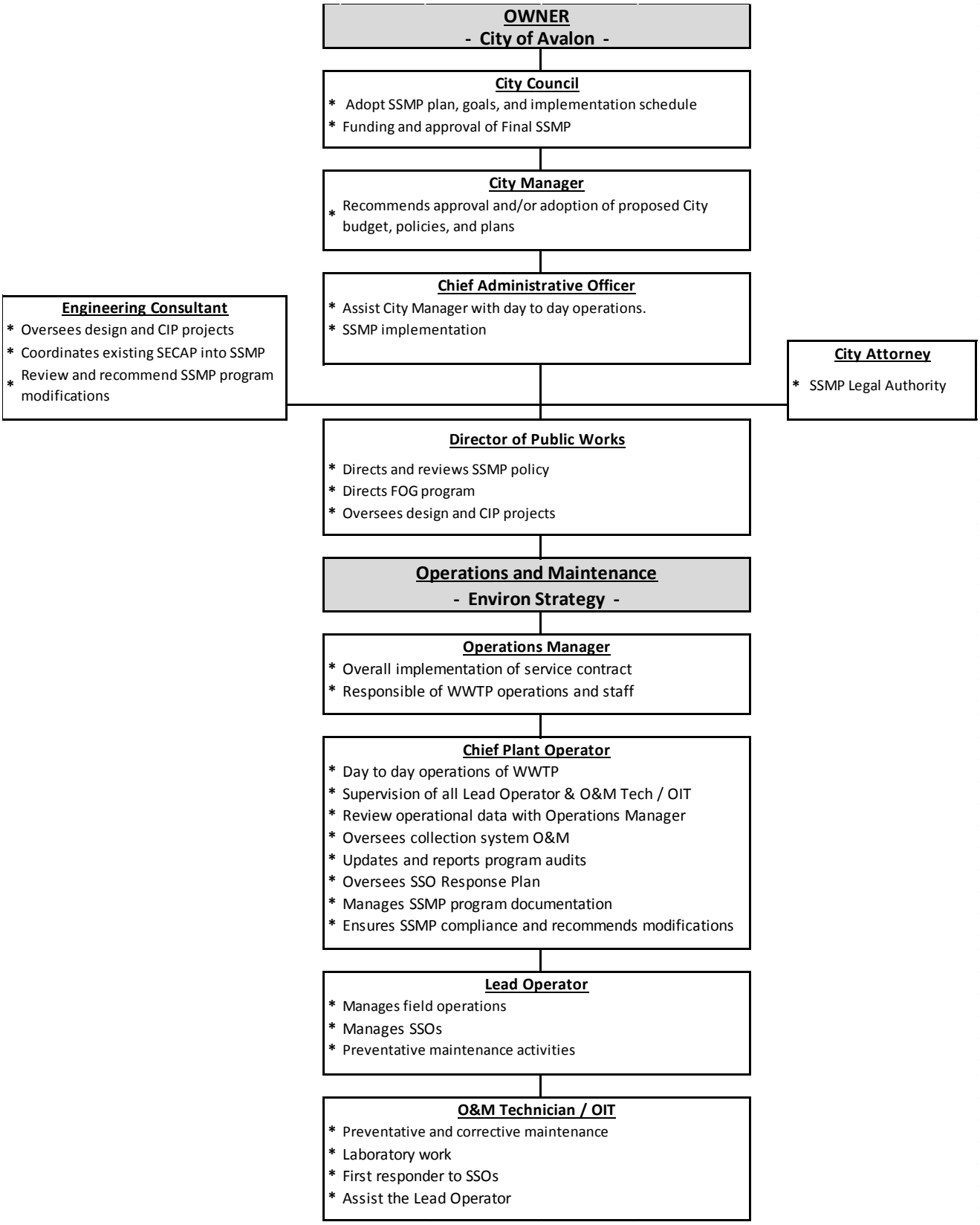

Figure 2-1: SSMP Responsibility Organization Chart

3.0 LEGAL AUTHORITY

This section of the SSMP demonstrates the City's legal authority to own, operate, or cause to be operated, a public sewer system through its sanitary sewer system use ordinance, service agreements, or other legally binding procedures in a manner to ensure health and safety standards and requirements, including private satellite systems (i.e. Hamilton Cove and Descanso Beach) that are within the jurisdictional boundary of the City. Refer to **Figure 1-1** for illustration of City of Avalon's jurisdictional boundary.

The City of Avalon is a general law city and municipal corporation possessing all the legal authority provided to general law cities by the California Constitution, the California State Legislature and local ordinances. In accordance with Article XI, Section 7 of the California Constitution, the City may make and enforce within its limits all local, police, sanitary and other ordinances and regulations not in conflict with general law. In accordance with California Government Code sections 38900 and 38901, the City has express legal authority to own and operate, or cause to be operated, a sewer system. As provided in California Government Code sections 54725-54740.6, the City has the legal authority to limit the introduction of pollutants into the sanitary sewer system.

The City's legal authority to collect, expend, and enforce the sewer charge fund, which is established to maintain the public sanitary sewer facilities within the City, is provided in Title 6, Chapter 7, Article 2, Division 3. The City therefore has the legal authority to implement the requirements of Order No. 2006-0003. Through Title 6, Chapter 7 (Sewers) and other portions of the City's Municipal Code, the City has adopted local laws designed to prevent illicit discharges into its sanitary sewer system (Section 6-7.226); to require that sewers and connections be properly designed and constructed (Section 6-7.230); to ensure access for maintenance, inspection or repairs, to limit discharges that may cause blockages in the system (Section 6-7.237); establish regulations for the inspection and maintenance of private sewer laterals (Section 6-7.301); and to enforce any violation of its sewer ordinance (Section 6-7.501). The City's legal authority for each of these areas is discussed in more detail below.

1. ***Prevent illicit discharges into its sanitary sewer system:***

   Through Title 6, Chapter 7 of its Municipal Code, the City has established the legal authority necessary to prevent illicit discharges and illicit connections to its sanitary sewer system. Section 6-7.225 of the Code provides that *a person must obtain a written*

permit from the City Manager and pay all fees, bonds, and deposits as required by resolution before making, maintaining, or causing to be made or maintained any connection with any public sanitary sewer. In addition, Section 6-7.226 states that *No person shall discharge or cause to be discharged by any means any storm water, surface water, groundwater, roof runoff, subsurface drainage, cooling water, or process waters to any public sanitary sewer, except as permitted by this Chapter*. This prohibition is enforceable (Section 6-7.238) by the City through civil and criminal procedures per Chapter 7, Article 5 of the Code.

In addition, Section 6-7.403 of the Code prohibits the discharge of specified waste, including any waste that the City Engineer finds to be adverse or harmful, directly or indirectly to the sewer system. This prohibition is also enforceable (Section 6-7.421) by the City through administrative civil and criminal procedures per Title 6, Chapter 7, Article 5 of the Code.

Therefore, the City has both general and specific legal authority to prevent both illicit discharges and illicit connections to its sanitary sewer system.

2. ***Require that sewers and connections be properly designed and constructed:***

In accordance with Section 6-7.230 of the Code, all public and private sewers and laterals shall comply with the City's required design and construction standards. When coupled with the permit requirements of Section 6-7.225, the City possesses full and enforceable legal authority to require that sewers and connections comply with the City's design and construction standards.

3. ***Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the City:***

Pursuant to Sections 6-7.237 of the Code, the City has legal authority to access (right of entry) the sanitary sewer system for maintenance, inspection or repairs. Section 6-7.237 provides that *Whenever necessary to make an inspection, perform testing, maintenance, or repairs, or whenever the City Manager has cause to believe that there exists, or potentially exists, in or on any premises any condition which constitutes a violation of this Chapter, the City Manager may enter such premises at all reasonable times to inspect, test, maintain, or repair, as needed*. This section of the Code provides the City with legal authority to ensure access for maintenance, inspection or repairs of the sanitary sewer system.

4. ***Limit the discharge of fats, oil, and grease and other debris that may cause blockages:***

The City recently adopted a fats, oil, and grease (FOG) source control ordinance (Municipal Code Title 6, Chapter 7, Article 4), which became effective July 4, 2013. The purpose of the Article is to:

1.) Prevent blockages and overflows from sewer lines caused by discharge of FOG;

2.) Reduce the adverse effects on sewage treatment operations resulting from discharges of FOG into the system;

3.) Specify requirements [Best Management Practices (BMPs) and grease control devices (GCD)] for FOG producing facilities discharging into the public sanitary sewer system; and

4.) Protect public health and the environment by minimizing public exposure to unsanitary conditions (i.e. SSOs due to pipeline FOG blockages).

The City has legal authority to prohibit discharges of other waste and debris that may cause blockages to the system. Section 6-7.236(a) provides that *The City may prohibit the discharge to the public sanitary sewer of any substance that may interfere with or pass through the City's pretreatment operations*. Section 6-7.419(b) authorizes the City to inspect, test, or sample the discharge of any device used to prevent discharge into any sewer of illegal wastes, such as grease traps, clarifiers or other such devices. In addition, Section 6-7.418(c) requires that all waste cooking oil shall be collected and stored properly in recycling barrels and picked up by a licensed hauler or approved recycling facility. Therefore, the City has legal authority to regulate the discharge of wastes such as FOG that might create system blockages.

5. ***Enforce any violation of its sewer ordinances:***

The City has legal authority to enforce any violation of its sewer ordinance per Title 6, Chapter 7, Article 5 of the Code. Section 6-7.504(b) of the Code makes any violation of the sewer ordinance a misdemeanor. Each and every day during which any violation takes place is a separate offense. At its option, the City may seek administrative criminal or civil penalties or treat the violation as a public nuisance subject to abatement. For all the reasons set forth above, the City has the legal authority to implement the requirements of CDO No. R4-2012-0077.

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4.0 OPERATION AND MAINTENANCE PROGRAM

This section focuses on the operations and maintenance (O&M) associated with the sanity sewer collection system. The wastewater system operator (Environ Strategy) is required to submit to the City an *Annual Preventative Operations and Maintenance Plan* on an annual basis, due December 31 of each year. The current *Annual Preventative Operations and Maintenance Plan* is provided in **Appendix 2**. The plan includes activities by its 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 program has a system to document scheduled and conducted activities, such as work orders. In order to monitor and maintain the entire City sewer collection system, Environ Strategy has established O&M practices that collectively form the City's Preventative Maintenance Program, which assists in identifying and eliminating SSOs and blockages. The O&M Program activities include the following:

- Collection System O&M Management
    - GIS Mapping System
    - Computerized Maintenance Management System (CMMS)
    - Supervisory Control and Data Acquisition (SCADA)
- Routine Preventative O&M
    - Closed Circuit Television (CCTV) Inspection
    - Visual Manhole Inspection
    - Pipeline Cleaning
    - Root Abatement Program
    - Flushing Program
- Lift Station Preventative O&M
    - Wet-Well Cleaning
    - Motor and Pump Maintenance
    - Generator Load Testing
    - Emergency Call Out Testing

- Employee Training
- Part and Equipment Inventory Program

4.1 Collection System Mapping

The City of Avalon has created and maintains a state-of-the-art customized electronic internet based Geographic Information System (GIS) sewer collection system map, showing all pipeline segments and manholes within the City jurisdictional boundary as validated by CCTV sewer inspections. At the current time a map is available indicating general pipeline and manhole locations, including CCTV inspection videos and photos.

The City utilizes its current GIS data to create the map and database for the sewer system. The GIS database includes detailed information for all collection system components, such as manhole identification numbers, distances between manholes, pipe diameters, site photos, and CCTV inspection videos.

Electronic maps generated from the GIS database are considered to be real time documents and can be printed for use by field operators and engineering staff at any desirable scale to show any necessary details. The City or its contractor can also use printed GIS maps to identify the storm drainage system inlets relative to the sewer collection system.

4.2 Routine Preventative O&M

Pipeline Cleaning

Environ Strategy has divided the sewer collection system into twelve (12) separate zones and implemented them into the CMMS program to generate work orders in a timely fashion. Refer to **Appendix 2** for a map illustrating the 12 zones. These twelve zones are designed to break up the collection system into sections that allow staff adequate time to conduct sewer line cleaning on 100% of the gravity mains on an annual basis, by cleaning one zone each month. This allows staff a hands-on approach in identifying problem areas in the collection system that require more frequent cleaning and provide an opportunity for staff to conduct visual inspections on the condition of the collection system and all manholes. The condition of the pipe; the severity of the obstruction, if one was found; what material was located in the piping; and the recommended cleaning frequency after cleaning, are all documented. If a section of pipe is recommended for more frequent cleaning or if any type of material (i.e. rags, gravel,

roots, debris) are found, then these sections of pipe are identified as areas of concern or higher maintenance areas and input into the CMMS program for additional scheduled maintenance.

Maintenance of collection system areas of concern (hot spots) is an important element of the Preventative O&M Plan. These include locations that have regular blockages due to grease buildup, root intrusion, sediment buildup, or vandalism. The frequency of maintenance for these hot spots varies and is determined by follow-up cleaning, video inspection, system performance, and maintenance history. Each identified area of concern is treated individually, evaluated, and maintained based on field findings. If frequent blockages occur in the same location, the cause of the blockage will be determined by CCTV inspection, and appropriate measures will be taken to try and eliminate the source.

Closed Circuit Television (CCTV) Inspection

CCTV inspection is used for overall assessment of the collection system and provides useful visual information where problem areas are located between manholes. CCTV is an essential part of the Preventative O&M Plan and provides visual details of the collection systems internal condition. Environ Strategy and the City's Public Works Department have developed a CCTV inspection plan, which includes coordinated CCTV inspections of sewer pipelines directly after the segment has been cleaned. Pipeline cleaning is performed by the third party operator (Environ Strategy), while CCTV inspections are performed by the City PW Department. This allows for annual CCTV inspections of one hundred percent of the collection system. The inspection process is enhanced since the pipeline walls are free of debris allowing for a more detailed CCTV inspection of the condition of each segment of pipe. It also provides evidence that the collection system is being properly cleaned.

Manhole Inspections

Planned manhole and pipe inspections are coordinated with the routine pipeline cleaning program (see below) and generally follow the cleaning schedule. During cleaning activities of the Preventative O&M Plan, Environ Strategy staff conducts visual inspections of the interior and exterior of manholes for any structural defects, sewage flow condition, presence of vermin, deleterious waste, odors, and any signs of unusual settlement around or evidence of debris within the manholes and along sewer alignments. The manholes with detected defects are noted and the information is provided to the Supervisor for tracking and reporting purposes. As part of the assessment process, manholes identified as requiring repair, rehabilitation, or replacement are prioritized and included in the CIP and Financial Plan.

4.3 Flushing Program

A flushing program has been incorporated into the O&M activities and included in the CMMS to maintain the dead ends of the collection system. During off season months (September – April), dead end pipes on the perimeter of the collection system are flushed with at least 300 gallons of water to provide enough volume and velocity to dislodge any buildup that may have occurred due to the lower demand during these months.

4.4 Root Abatement Program

Environ Strategy began a Root Abatement Program in 2011 to control the growth of roots in the sewer collection system. Root abatement is performed using an environmentally safe chemical product called 'RootX'. The dead roots decay and are carried out with the flow of the pipe, restoring the pipe to its full capacity. RootX also leaves a barrier on the pipe walls to prevent future root growth. The effectiveness of chemical root control treatment is carefully monitored and the frequency of treatment and application rates adjusted as required to eliminate blockages caused by roots. Environ Strategy staff uses the system wide cleaning program to locate and document areas in the collection system which have root intrusion and schedule maintenance on an as needed basis. Identified sections are input into the CMMS program and scheduled for annual inspection and treatment as necessary. If the root problem persists, the pipeline is identified as requiring a spot repair, rehabilitation, or replacement and included in the *Capital Improvement and Financial Plan*, which is provided in **Appendix 6**.

4.5 Rehabilitation and Replacement

The pipeline and manhole Rehabilitation and Replacement Program is based on the results of the Preventative O&M Plan (i.e. CCTV and visual inspections). The information obtained from the CCTV inspections and visual observations is recorded, reviewed, and a preliminary assessment is made by the City's engineering consultant, RBF Consulting, Environ Strategy, and City Staff. As part of the assessment process, sewer pipelines, laterals, and manholes identified as requiring repair, rehabilitation, or replacement are prioritized and included in the *Capital Improvement and Financial Plan*, which is provided in **Appendix 6**.

4.6 Employee Training

Pursuant to the WDR set forth in Order No. 2006-0003-DWQ, all system operators are adequately trained and possess the knowledge, skills, and abilities to assure adequate

operations and maintenance of the sanitary sewer collection system. All current sewer operation and maintenance staff will be California Water Environmental Association (CWEA) certified. Environ Strategy employees are required to be CWEA certified and routinely complete required OHSA certified Online Safety Courses each month using Pure Safety on Demand software. Environ Strategy utilizes a combination of in-house skill training; the self-study technical wastewater training courses offered through California State University, Sacramento; conferences and vendor training programs to enhance skills for performing daily work duties; and provide certified operators continuing education (CEU) hours.

On-the-Job cross training is actively pursued to ensure staff has a proficient working knowledge of each and every aspect of the responsibilities of operating and maintaining a sanitary sewer system. Hands on training with emergency pumps, jetting equipment, and use of the Vactor truck is a requirement set forth to provide staff with the experience needed to operate and maintain the sanitary sewer system while preparing them with enough knowledge and skill to adequately respond in the event of emergency or any situation encountered in the day to day operation of the system.

Staff is trained in confined space entry and hazardous materials management, as required by regulations. Emergency training exercises are conducted and documented annually. Training records are maintained for each employee in a log book located in the main office of the WWTP. Appropriate safety equipment is maintained, including protective clothing, safety glasses, hard hats, gloves, respirators, harnesses, hoists, fire extinguishers and maintains and calibrates atmospheric testing equipment. Lights, barricades, signage and exhaust fans are also available.

4.7 Tools and Equipment Inventory Program

The City of Avalon and Environ Strategy both contributed to the purchase of a new jetting machine to provide adequate means of conducting maintenance activities. The City purchased a brand new emergency pump to be use in the event that one of the lift stations needs to be by-passed. A Vactor truck is adequately maintained by the City mechanics. This equipment is essential to providing the means necessary to conduct the activities developed in the Preventative O&M Plan. Parts for the maintenance of these essential items have been purchased and are located in the City Public Works warehouse.

Critical part inventories are an important part of providing the City with the necessary controls to eliminate the possibility of a SSO occurrence due to equipment failure. Additional parts for

lift station (Catherine and Pebbly Beach) equipment are either stored onsite at the lift station or at the WWTP for easy access when needed. A redundant centrifugal pump was purchased for the Catherine lift station to assure that there are always two pumps available. Special order redundant transducers were purchased for both lift stations and are available in the event of an emergency. Continual normal operation of both lift stations is essential to eliminate the possibility of a SSO occurrence.

The complete A*nnual Preventative Operations and Maintenance Plan (2014)* is provided in **Appendix 2**.

5.0 OVERFLOW EMERGENCY RESPONSE PLAN

The wastewater system operator (Environ Strategy) has implemented a *Sanitary Sewer Overflow Response and Cleanup Plan*, which identifies measures to protect public health and the environment, defines reporting procedures, and addresses mandatory SSMP provisions outlined in RWQCB CDO No. R4-2012-0077. The complete *Sanitary Sewer Overflow Response and Cleanup Plan (April 2014)* is provided in **Appendix 3**, which includes:

- Proper notification procedures so that primary responders and regulatory agencies are informed of all SSOs in a timely manner;
- A program to ensure an appropriate response to all overflows;
- Procedures which ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, Regional Water Boards, water suppliers, etc.);
- Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;
- Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities;
- 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.

5.1 Overflow Response Procedures

All procedures listed in this section will be performed by any of the members of Environ Strategy's spill response team, unless otherwise noted. It will be the responsibility of the first Environ Strategy employee arriving at the scene of the SSO to take the following steps to protect the health and safety of the public:

1. Assess the situation upon arrival and evacuate anyone in the flow or path of the SSO;
2. Determine the immediate destination of the SSO (i.e. curb gutter, storm drain, body of water, streambed, etc.). Then contain and isolate the SSO spill;
3. Determine if hazardous substances are present;

4. Determine if the spill is public or private. If the spill is private, the property owner shall be given a form to complete to inform of appropriate response;
5. Identify and request any additional personnel and equipment or private contractors necessary to contain the flow, mitigate the cause, and secure the site.

Once these steps have been taken, Environ Strategy staff shall perform the following steps:

1. Coordination with Hazardous Material Response, if Needed:

Upon arrival at the scene of an SSO, should a suspicious substance (e.g. oil sheen, foamy residue) be found on the ground surface, or should a suspicious odor (e.g. the strong smell of gasoline) not common to the sewer system be detected, Environ Strategy's on-call duty personnel will contact the fire department.

If containment can be done without harmful exposure or contact, then containment shall be performed immediately. The response crew shall then wait for the arrival of the fire department.

After arrival of the fire department, sewer response crew members will take direction from the fire departments on scene commander. Only when the on scene commander determines it is safe and appropriate for the sewer response crew to proceed, can they then carry on with containment and cleanup activities in accordance with the SSMP.

2. Spill Containment and Site Isolation:

The primary objective of the responders to a sewer overflow incident is to protect the public's health. This can be achieved by working to achieve both containment of the overflow and the isolation of the spill site in an effort to avoid any human contact. Although these two tasks can be done simultaneously, the initial effort will be focused on the containment of the spill. Expeditious attempts will be made to prevent sewage from contaminating storm drains, drainage channels, and surface waters by performing the following:

- Determine the immediate destination of the SSO (e.g. storm drain, street curb gutter, body of water, culvert, landscaped area, etc.).
- Take immediate steps to contain the overflow, including:
    - Place sand bags and rubber mats around the storm drain inlet.
    - Direct overflow to a natural low point or construct a containment pond.

  - Recover the ponded material utilizing a combination truck.

- In the event of a prolonged line blockage, breakage or collapse, a determination will be made to set up a portable bypass pumping operation around the problem area. If this becomes the case, personnel will continuously monitor the bypass pumping operation.
- Control perimeter of SSO site with barricades, cones, vehicles, or other barrier to restrict access.
- Establish required traffic control, per Regional Standard Drawings, to divert traffic around the spill area and work zone.

3. Determine the Cause and Responsible Party of the Overflow

Primary causes of a sewage overflow may include:

Public Causes:

- Sewer main pipe blockage
- Sewer main pipe failure
- Pump station failure

Private Causes:

- Private lateral pipe blockage
- Private lateral failure
- Grease trap overflow

If the cause is found to be at a pump station or in a sewer main, Environ Strategy will be responsible for mitigating the SSO and making the appropriate notifications. The service lateral that stems from the sewer main line, with the exception of the saddle connection to the main line, is owned by the associated private property owner(s). Environ Strategy will be required to respond to a private sewer spill to contain it and notify the proper authorities. It is the responsibility of the property owner to mitigate and repair any damages resulting from the spill. If the property owner is not present, Environ Strategy will contain the spill and contact a plumbing contractor to make the necessary repairs. The property owner will then be accountable for the plumber's work and for the time and materials expended by Environ Strategy crews.

If the spill is entirely created by and contained on private property, the field staff will provide the property owner with the information for private sewer backups, which is provided in the *SSO Response and Cleanup Plan* provided in **Appendix 3**.

4. Devise and Initiate a Remedy Plan of Action to Mitigate a Public Sewer Overflow:

- Gather any additional staff and/or equipment needed to put the plan of action into effect.
- Determine the flow path width, length, and depth in order to determine the volume of the spill.
- If possible, take pictures to document the spill and your efforts to contain the flow and restore the area. A system for estimating volume is located in the complete *SSO Response and Cleanup Plan* provided in **Appendix 3**.
- Utilize the SSO Response Flow Chart to aid in decision making.

5. Correct Cause of the Overflow:

- If overflow out of a manhole lid occurs, the spill response staff will work to remove the obstruction in the length of pipe downstream of that overflowing manhole.
- If an attempt at cleaning the downstream pipe does not remedy the problem, the pipe flow shall be diverted around the overflowing manhole to allow the inspection of the suspected length(s) of pipe with a CCTV unit.
- In the event of a pipe breakage, that portion of the sewer conveyance system shall be bypassed in order to facilitate necessary repairs.
- If there is an overflow out of a private cleanout, or a breakage in a private lateral, Environ Strategy will respond. If the property owner is unavailable to correct the cause of the spill, Environ Strategy will contain the spill and hire a private plumbing contractor to perform the necessary cleaning or repairs.

6. Notification

Environ Strategy is responsible for reporting and monitoring all spills per the requirements of Orders 2006-0003, R9-2007-0005, WQ 2008-0002-EXEC and its NPDES permits and current legislation. Individual NPDES permit holders and enrollees under the statewide general sanitary sewer overflow (SSO) order are able to submit information to the Water Boards via the CIWQS online database. In order to prevent re-registration, the "Collection

System Questionnaire" will be up-dated as needed. Environ Strategy on-call duty personnel or delegated staff member will submit the draft report of the SSO to the CIWQS digital database. The draft report is certified by Environ Strategy.

7. Spill Cleanup

Sewer overflow sites are to be thoroughly cleaned as soon as possible after the overflow incident is mitigated. No residue is to be left for future rains to carry away or for public contact to occur. The following steps will be taken to ensure that the overflow sites are returned to their former conditions:

- Wash down and clean up all areas of the spill. Recover the wash down water and return it back into the system.
- Solids and debris will be flushed, swept, raked or picked up by combination truck, brought to the City's yard, contained in order to dry and transported to the landfill or waste water treatment plant.
- On impervious areas, the SSO site is to be completely washed down. Never flush any disinfectant into a storm drain or body of water.
- In the event of a grease trap spill, apply simple green with push broom. The simple green will break up the grease if left to soak. Then pressure wash and collect.
- If sewage results in ponding, the pond will be vacuumed dry with the combination truck and the residue and site cleanup managed as previously mentioned.
- In addition to the actions described for spill response, Environ Strategy shall engage in the following activities to prepare for spills and analyze and spill that have occurred:
- If in natural waterways the California Department of Fish and Game (CDFG) should be notified in the event an SSO impacts any creeks, gullies, or natural waterways. CDFG will provide the professional guidance needed to effectively clean up spills that occur in these sensitive environments. Cleanup should proceed quickly in order to minimize negative impact. Any water that is used in the cleanup process should be de-chlorinated prior to use.

5.2 Water Quality Sampling

Water quality sampling and testing is required whenever spilled sewage enters a water body to determine the extent and impact of the SSO. The following guidelines must be followed:

1. The first responder should notify Plant Manager to collect samples. Samples should be collected as soon as possible after the discovery of the SSO event.
    - For spills less than 1,000 gallons, at a minimum water quality samples should be collected at the discharge point, 100 feet upstream, and 100 feet downstream.
    - If a spill is more than 1,000 gallons, additional sites should be sampled; recommendations should be given according to County of Los Angeles Environmental Health Services (EHS) requirements.
    - If a spill reaches a large water body, the water quality samples should be collected near the point of entry of the spilled sewage and every 100 feet along the shore of stationary water bodies.
2. The water quality sampling procedures, which are the same as the EHS procedures are:
    - Keep the sterile collection bottle closed until it is to be filled. Do not contaminate inner surface of the lid or bottle rim.
    - Collect water sample just below the surface in knee deep water, approximately 3 feet deep (full arm's length), without rinsing. If needed, extend the sampling pole to the fullest length to reach deeper water depth. Minimize contact with bank or beach bed as water fouling may occur.
    - Remove cap and hold the bottle near its base and plunge it, neck downward, below the surface.
    - Turn bottle until neck points slightly upward and mouth is directed toward the current.
    - Fill bottle leaving about 1 inch of air to allow lab to mix by shaking.
    - Collect a minimum of 100 mL (If applicable, insert sterile collection bottle into the holder on the sample pole. Extend the sample pole and plunge bottle end into the water, bottle opening downward).
    - Immediately place cap securely on bottle to avoid leaks and contamination.
    - Dry the bottle.
    - Label container with distinctive sample site name, date, and time collected.
    - Complete the laboratory requisition slip with requested information (site, bottle number, collector, date and time of collection, type of sample, test requested, name

and phone number of responsible person for reporting purposes, and deliverer name). Note any field observations that may have occurred during the sampling.

- Test samples from SSO events for ammonia, dissolved oxygen, fecal coliform, total coliform and enterococcus. The method of analysis for ammonia and dissolved oxygen may be a readily available, good quality test kit, suitable for field analysis.

3. Samples should be stored and shipped according to the following procedures:

- Place water sample bottle in a cooler with frozen blue ice. Water sample must be kept cool. Ice may be used but care must be taken so water samples are not contaminated or diluted by the ice.
- Bring to the City of Avalon Waste Water Treatment (WWTP) lab for testing following county mandated procedures. Alternatively, if the WWTP lab is not available:
    - Bring to a California state-certified laboratory within 8 hours of collection. For compliance tests, the holding time must not exceed 8 hours from the time of collection to time of processing or the tests will be invalidated. Other water tests for non-compliance purposes may be held below 10 degrees C until the time of analysis, up to 24 hours.
    - Water samples may be taken to the County of Los Angeles Health and Human Services Public Health Laboratory, 213-974-1234
    - The water samples must be brought to the Public Health Lab within 8 hours of collection, before 3:00 pm, for processing.
    - If the County Health Laboratory is closed, utilize an alternate testing laboratory that is certified for the required water quality tests.

4. If deemed necessary by County EHS, sampling must be tested for compliance with Public Beach Sanitation and Ocean Water-Contact Sports bacteriological standards. A single sample exceeds the standard if:

- Total coliform bacteria are > 1,000 per 100 mL sample, if the ratio of fecal/total coliform bacteria exceeds 0.1; or
- Total coliform bacteria are > 10,000 per 100 mL sample; or
- Fecal coliform bacteria are > 400 per 100 mL sample; or

- Enterococcus bacteria > 104 per 100 mL of sample.

5. The mean value of at a least five weekly consecutive samples during any 30-day sampling period exceeds the standards if:
   - Total coliform bacteria > 1,000 per 100 mL of sample; or
   - Fecal coliform bacteria are > 200 per 100 mL sample; or
   - Enterococcus bacteria are > 35 per 100 mL sample.
6. If water quality samples are required by an environmental or health regulatory agency or State law, or if voluntary monitoring is conducted by the City or its agent(s), as a result of any SSO, records of monitoring information shall include:
   - The date, exact place, and time of sampling or measurements;
   - The individual(s) who performed the sampling or measurements;
   - The date(s) analyses were performed;
   - The individual(s) who performed the analyses;
   - The analytical technique or method used; and
   - The results of such analyses.

5.3 Training

Environ Strategy's personnel shall schedule training designed to identify resource shortcomings, clarify roles and responsibilities, improve response performance and reveal any response weaknesses. The training may consist of:

- **Response Training:** An awareness training meeting will be conducted as needed with respect to the details of the SORP and the responsibilities of each employee. All employees will attend this meeting. Additional training sessions may also be conducted at the discretion of Environ Strategy to further familiarize employees with the response procedures.
- **Tabletop Exercise:** A simulated spill event may be scheduled, according to need, to allow the exercise participants to discuss and understand the necessary response actions, test equipment and gauge the response ability of the employees. Scheduling a simulate Tabletop exercise will be at the discretion of Environ Strategy.

- **Spill Review Committee** - After each spill event, Environ Strategy and the City will meet in order to review the event's cause, the procedural response of the employees, the regulatory and compliance documentation and whether additional issues and/or resources have to be addressed. The committee shall use the forms included in the *Sanitary Sewer Overflow Response and Cleanup Plan* provided in **Appendix 3**.
- **Estimate the Volume of Spilled Sewage:** Use the methods outlined in **Appendix 3** to estimate the volume of the spilled sewage. Some spills may occur in locations where the wastewater can seep into the ground or flow away from the spill location. In such conditions, consider when the spill was first detected and observations from bystanders in order to determine the total spill volume.

The current *Sanitary Sewer Overflow Response and Cleanup Plan* is provided in **Appendix 3**.

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6.0 FATS, OIL, AND GREASE CONTROL PROGRAM

The City of Avalon currently has approximately sixty (60) food service establishments (FSEs) that potentially contribute fats, oil, and grease (FOG) to the sanitary sewer collection system. On June 4, 2013, the Avalon City Council approved and adopted the revised Municipal Code Chapter 7, Article 4, which defines and enforces the FOG control program. The newly adopted Municipal Code concerning FOG source reduction is provided in **Appendix 1**. The adopted Code became effective July 4, 2013. The Code includes but is not limited to:

- Purpose, Intent, and Discharge Prohibitions;
- Food Service Establishment Permit Requirements and Fees;
- Best Management Practices (BMPs);
- Grease Control Device (GCD) Requirements and design and maintenance standards;
- Monitoring and Inspection Requirements;

The key purpose to implementing a FOG control program is to prevent blockages and overflows from sewer lines caused by discharge of FOG and reduce the adverse effects on sewage treatment operations resulting from discharges of FOG into the collection system.

6.1 Best Management Practices

FSEs are subject to Best Management Practices (BMPs), as required by City Municipal Code, Section 6-7.418, to minimize the amount of FOG that enters the sanity sewer collection system. All FSEs are required, at a minimum, to comply with the following BMPs, when applicable. Acceptable fulfillment of all requirements is subject to approval by the City.

- Dispose food waste directly into the trash and not into sinks (remove garbage disposals).
- Install drain screens on all drainage pipes. Periodically clean drain screens and dispose screened solids into trash cans.
- “Dry Wipe” pots, pans, dishware, and work areas prior to washing.
- Use rubber scrapers or paper towels to remove fats, oil, and grease from cookware, utensils, and serving ware prior to washing.
- Use absorbent products to clean under fryer baskets and other locations where fats, oil, and grease may be spilled or dripped.

- Routinely clean kitchen exhaust system filters.
- Collect waste cooking oil and store properly in recycling barrels or drums. Use a licensed hauler or recycling facility to dispose of this waste. Keep log book.
- Follow proper grease control device (GCD) cleaning and maintenance procedures to ensure the device is operating properly.
- Train kitchen staff and all other employees to follow BMPs.
- Post BMP list in the food prep and dishwashing areas.

6.2 Grease Control Devices

A grease control device (GCD) is any grease interceptor, grease trap, or other mechanism, device, or process, which attaches to, or is applied to, wastewater plumbing fixtures and pipelines, the purpose of which is to trap, collect, or treat FOG prior to it being discharged into the public sewer collection system. In the case of Avalon, two (2) GCDs are acceptable for use:

- **Gravity Grease Interceptor (GGI):** Formerly called grease interceptors. Redefined by 2008 UPC revision. Per UPC definition GGIs are 500 gallons or larger.
- **Hydro-mechanical Grease Interceptor (HGI):** Formerly called "grease traps". Redefined by 2008 UPC revision.

Due to the uniqueness of the City layout, not many private properties have the space to install a GGI device. These GCDs take up a large amount of space, which is not available without encroaching into the public right-of-way (ROW). Most GGIs are installed in the FSEs private parking lot, which don't exist in Avalon. The only other location feasible to install a GGI is in the alley of an FSE which are already congested with several utilities (wet and dry) and would still be located in the public ROW, therefore requiring an encroachment permit from the City.

Due to the several unknowns of the plumbing system of each FSE (i.e. is kitchen plumbing separate from bathroom plumbing?, etc.), the City is currently implementing Phase 1 of the FOG program, which involves all FSEs that are classified as requiring a GCD, to install an above ground HGI device. This approach is focused on keeping installation costs low, so as not to put any FSE out of business (relies heavily on tourism). The HGI would be connected to the worst-case FOG producing source in the kitchen, which is typically the 3-, 2-, or 1-compartment sink. If applicable, multiple sinks in a kitchen will be required to be plumbed together and discharged directly into the HGI device to increase FOG reduction.

All plans and proposals regarding the FOG program and GCD installation are required to go through the Los Angeles County Department of Public Health (LACDPH) for approval and is the responsibility of the FSE. Each FSE is anticipated to have an HGI device installed by January 2015.

Phase 2 of the FOG Source Reduction Program will require any FSE that performs any renovation (which requires City approval), and continues to operate as a FSE, will be required (per City Municipal Code Section 6-7.412) to excavate and install an underground HGI or GGI device to collect wastewater from all FOG producing sources in the FSEs kitchen (i.e. compartment sinks, mop sinks, floor drains, etc.). FSEs that have recently renovated, currently renovating, or have plans for future renovations have followed this criterion.

Per Municipal Code Section 6-7.416, any FSE required to install a GCD shall be required to adequately maintain the GCD, including a maintenance log, which keeps record of date, time, amount pumped, hauler, and disposal site.

6.3 Inspections

An initial classification inspection was conducted in October 2013. The purpose of the initial inspection was to prepare a database that lists each FSE and identify whether it currently is following BMPs, has a GCD, requires a GCD, or doesn't need a GCD (due to lack of FOG producing food or equipment). In addition, the database lists the equipment and drains (i.e. compartment sinks, mop sink, floor drain, automatic dishwasher, fryer, Class I hood, etc.) installed in each kitchen.

Per City Municipal Code Sections 6-7.419 and 6-7.420, the City (and contracted personnel) are authorized to enter the premises of the any FSE during normal business hours for the purposes of inspecting the FSEs GCD, reviewing manifests, receipts and invoices relating to the cleaning, maintenance and inspection of the GCDs and otherwise determining whether the requirements of the Code are being met.

In March 2015, the City will begin FSE inspections twice a year (March and September) to inspect each FSE and confirm they are following the BMPs and properly maintaining their GCD. A notification of non-compliance (NON) will be addressed to each FSE not in compliance with the Code. After two (2) years of inspections, the City may reduce to one (1) inspection per year. Refer to **Appendix 4** for the FOG BMP and GCD inspection forms and location map of all FSEs within the City of Avalon's jurisdiction.

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7.0 SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

A *System Evaluation and Capacity Assurance Plan* (SECAP) was completed in December 2013, and is provided in its entirety in **Appendix 5**. The SECAP, in addition to the *Sewer Collection System Assessment Study*, are used to prepare and implement a Capital Improvement Plan (CIP) and Financial Plan that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate wet weather event. The SECAP includes, but is not limited to:

- Flow Monitoring – Data Collection and Analysis
- Inflow and Infiltration Evaluation
- Existing Conditions Evaluation and Recommendations
- Future Conditions Evaluation and Recommendations

7.1 Flow Monitoring and Capacity Analysis

Avalon sanitary sewer flow monitoring occurred from March 19 to June 4, 2013. Flow monitoring sites where chosen to create five (5) flow monitoring basins. Flow monitoring basins are localized areas of a sanitary sewer collection system upstream of a given flow monitoring site (i.e. flow meter), including all pipelines, inlets, and appurtenances. The basin refers to the ground surface area near, and enclosed by the pipelines. Flow meters were installed within sanitary sewer manholes that access the sanitary sewer pipelines within the collection system. A data logger is secured at the top of the manhole structure. In addition, a rain gauge was installed on Avalon's Green Pleasure Pier.

Measured peak flows and flow level are important to understand the capacity of the flow monitoring system. The peak flows and flow levels reported are from the peak measurements as taken across the entirety of the flow monitoring period. These may or may not correspond to a rainfall event. The following capacity analysis terms are defined as follows:

- **Peaking factor** is the peak measured flow divided by the average dry weather flow.
- **d/D Ratio** is the peak measured depth of flow divided by the pipe diameter.

A d/D ratio of 0.50 during ADWF is a common criteria used for sewer pipe design. A d/D ratio not to exceed 0.85 is recommended during peak conditions. A d/D ratio greater than 1.0 indicates a surcharged condition.

7.2 Inflow and Infiltration

Inflow and Infiltration (I/I) consists of storm water (rain) and groundwater which enters the sewer system through pipe defects and improper storm drainage connections. Starting in October 2011, several improvements were made to the sewer collection system, including spot repairs and replacement / rehabilitation (i.e. cast in place pipe (CIPP) lining) of approximately 1.8 miles of City sewer pipelines. The recent smoke testing of the sewer collection system showed that the improvements made in 2011-12, have considerably reduced sewer flows contributed by I/I. Inflow and infiltration essentially does not exist in Basins 1, 4, and 5. A theory that possibly explains the high I/I flows coming from Basin 2 and Basin 3 is that low flow diverters have been installed at the Crescent Avenue storm drain inlets that divert nuisance dry weather surface water and the initial storm water flow from a storm to the sewer system, rather than flowing into Avalon Harbor.

7.3 Existing Conditions Evaluation

To perform a detailed analysis of the Avalon sewer collection system, a mathematical hydraulic model is used to simulate the operating characteristics of the sewer system. The hydraulic model software used was InfoSewer by Innovyze®. It is used to simulate average day dry-weather, average day wet-weather, and peak day wet-weather flows. Average dry-weather sewer flows (ADWF) are calculated from the flow monitoring activities that occurred over the 10-week period. Average wet-weather sewer flow rates use the same ADWF, but also include additional inflow and infiltration (I/I) flows that were calculated from the flow monitoring activities. Peak wet-weather flow rates use the ADWF multiplied by a peaking factor calculated from the flow monitoring activities. At the completion of a model run, output data is created, including average and peak flow rate, velocity, pipe capacity, and ratio of flow depth to pipe diameter (d/D). Modeling results for the existing conditions evaluation are available in the complete *System Evaluation and Capacity Assurance Plan*, provided in **Appendix 5**. All recommended improvements from the SECAP are included in the *Capital Improvement and Financial Plan* which is provided in **Appendix 6**.

7.4 Future Conditions Evaluation

Future conditions evaluation simulations are conducted in the same manner, using the same modeling software, as the existing conditions evaluation listed above, except that additional sewer loads are added to the model in specific locations to simulate proposed developments. This provides the City the ability to determine if any deficiencies will exist in the collection

system once the new development is online. Modeling results for the future conditions evaluation are available in the complete *System Evaluation and Capacity Assurance Plan*, provided in **Appendix 5**. Based on the schedule of the proposed development, the City can schedule the required improvements accordingly.

All recommended improvements from the SECAP are included in the *Capital Improvement and Financial Plan* which is provided in **Appendix 6**.

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8.0 DESIGN AND PERFOMANCE PROVISIONS

This section addresses design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations, and other appurtenances, in addition to rehabilitation and repair of existing sanitary sewer systems.

8.1 Pipeline Replacement

Sewer collection system and lateral design and construction standards on private property are governed by the California Plumbing Code and Title 6, Chapter 7, Article 2 of the City Code.

Sewer collection system and lateral design and construction standards on public property are governed by the Los Angeles County Building code and Chapter 7, Article 2 of the City Municipal Code. In addition, the *Standard Specifications for Public Works Construction* (Greenbook) is used for construction specifications, including all current supplements, addenda, and revisions thereof. In the case of conflict between the Greenbook and Contract Documents, the Contract Documents shall prevail.

Below is a list of minimum pipeline design criteria for the City sewer collection system:

- 8-inch diameter (ASTM - D 3034)
- Polyvinylchloride (PVC) pipe
- SDR-35 wall thickness
- d/D ratio = 0.5 (based on PDWF)
- Minimum velocity = 3.0 ft/sec (based on PDWF)
- Minimum slope = 0.005 ft/ft
- Manning's roughness coefficient "n" = 0.014
- Standard 24-inch traffic manhole (Type D) including frame and cover
- Manhole steps not permitted.

8.2 Pipeline Rehabilitation

Pipeline rehabilitation (trenchless construction method) is a cost effective alternative to installing a new sewer pipeline using standard trench installation. Pipelines in the collection system that have adequate capacity, but are at the end of their useful life are candidates for

Cured-in-Place Pipe Liner (CIPP). Pipelines that are currently 6-inch diameter are recommended to be replaced and increased in diameter to a minimum 8-inch. In some cases, due to the accessibility of the pipeline, it is not economically feasible to replace the pipeline and therefore the pipeline may be rehabilitated until it is recommended to increase diameter due to future capacity requirements. Over the past decade, the City of Avalon has rehabilitated several miles of pipeline within the sanitary sewer collection system, using CIPP lining. Rehabilitation projects shall be done in accordance with the *Standard Specifications for Public Works Construction* (Greenbook), Section 500, including all current supplements, addenda, and revisions thereof. In the case of conflict between the Greenbook and Contract Documents, the Contract Documents shall prevail.

Below is a list of minimum CIPP rehabilitation design criteria for the sewer collection system:

- Specification 500-1.4 (Greenbook)
- Min. Long Term Flexural Modulus = 150,000 psi
- Min. Wall Thickness:

Nom. I.D.	CIPP Wall Thickness
6-inch	0.24 in
8-inch	0.24 in
10-inch	0.30 in
12-inch	0.34 in
15-inch	0.45 in
18-inch	0.51 in

8.3 Inspection and Testing

Proper installation is a key element to insure proper operation and maximum life expectancy. The City's standard public works contract provides that facilities are not placed into service and accepted until inspection and testing is completed. The City (or hired construction manager) provides continuous inspection during the construction of sewer facilities. The City inspectors utilize the Greenbook Inspection Manual for reference if needed although the combination of experience and training allows the inspectors to provide effective observation of contractors' work. With regard to testing sewer lines, the City uses the Greenbook recommended air testing procedures on all new main lines.

9.0 MONITORING, MEASUREMENT, AND PROGRAM MODIFICATIONS

This section fulfills the Monitoring, Measurement, and Program Modifications requirement of the SSMP. The requirements for this element are as follows:

- The City of Avalon and its contract engineer and wastewater management firm together will maintain relevant information that can be used to establish and prioritize appropriate SSMP activities;
- Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;
- Assess the success of the preventative maintenance program;
- Update program elements, as appropriate, based on monitoring or performance evaluations; and
- Identify and illustrate SSO trends, including: frequency, location, and volume.

9.1 Monitoring and Measurement

The City of Avalon tracks several performance measures through tracking logs, computer database, and annual reports. The data for each preventative O&M activity and CIP projects (i.e. pipe cleaning, SSO, lateral replacement, pipeline repairs, etc.) are compiled in a database (CMMS) and tracked via the GIS system. Environ Strategy generates monthly reports to monitor and evaluate the effectiveness of the City's collection system operation. The monthly report is also discussed with City staff. The report includes the number, cause, location, volume of SSOs and length of pipe cleaned and type of debris found. The City plans to continue tracking performance measures that are currently tracked. In order to monitor the effectiveness of the SSMP, the City has selected certain, specific parameters that can be documented and compared on an annual basis. These parameters were selected because they are straightforward, quantitative, and focused on results. Changes in these parameters over time will indicate the overall success of the SSMP or, conversely, underlying conditions that can then be investigated further. Refer to the following page for a list of the SSMP elements, summary of their purpose, and the actions or measures taken for tracking effectiveness.

Actions or Measures for Tracking Effectiveness

1. SSMP Goals:

Purpose: Reduce SSOs and increase Avalon Bay's water quality.

Actions: Number of SSOs and Bay water quality testing results.

2. Organizational Structure:

Purpose: Establish hierarchy and assign responsibility within the organization.

Actions: Review and update accordingly based on organizational changes.

3. Legal Authority:

Purpose: Ensure City has sufficient legal authority to properly maintain the system.

Actions: Modify as needed.

4. O&M Program:

Purpose: Minimize blockages and reduce SSOs by properly maintaining the system and keeping the system in good condition.

Actions: - Total number and volume of SSOs.
- Number of repeat SSOs (same location).
- Total number of mainline blockages.
- Total number of lateral blockages.
- Length of pipeline cleaned.
- Length of pipeline inspected using CCTV.
- Number of laterals replaced.
- Number of cleanouts installed.
- Length of pipelines replacedand rehabilitated.

5. SSO Emergency Response:

Purpose: Provide timely and effective response to SSO emergencies and comply with regulatory reporting requirements.

Actions: Response time, overtime hours, and monthly trend analysis.

6. FOG Control Program:

Purpose: Minimize blockages and overflows due to FOG.

Actions: - Number of blockages and SSOs due to FOG.
- Number of FSE inspections.

7. SECAP:

Purpose: Minimize SSOs due to insufficient capacity by evaluating system capacity and implementing necessary improvement projects.

Actions: Number of SSOs due to capacity limitations and wet weather.

8. Design & Construction Standards:

Purpose: Ensure new facilities are properly designed and constructed

Actions: Modify as needed.

9. Monitoring, Measurement & Program Modifications:

Purpose: Evaluate SSMP effectiveness, identify necessary changes, and keep it updated.

Actions: Modify as needed.

10. Program Audits:

Purpose: Review the SSMP program effectiveness and make necessary changes to comply with requirements.

Actions: Formally audit the program once per year.

11. Communication Program:

Purpose: Evaluate effectiveness of comm. program and identify necessary changes.

Actions: Modify as needed.

9.2 Program Modifications

The SSMP will be modified to include operational changes that affect each SSMP element. The City will review the successes and needed improvements of the SSMP as part of the SSMP annual audit (refer to next section). City staff will update critical information, such as radio call signs, contact information, name of the Designated Authorized Representative and the SSO response chain of communication, as needed. A comprehensive SSMP update will occur every 5 years, as required per RWQCB CDO No. R4-2012-0077.

10.0 SSMP AUDITS

Due to the importance of the City's initial implementation and development of the SSMP, based on the CDO requirements, the City's SSMP program audits will occur annually on March 15.

As stated in Section 1.0 – *SSMP Goals*, the SSMP is intended to be a living document that is regularly updated and refined. To achieve this goal, the City shall conduct, or cause to be conducted by a qualified consultant, periodic program audits. These audits shall focus on evaluating the effectiveness of the SSMP and the City's compliance with the program requirements as set forth in RWQCB CDO No. R4-2012-0077. These audits will identify any deficiencies in the SSMP and establish a process and timeline to correct them. For each audit, a written report will be prepared and will be kept on file with the City.

For the first audit, and every audit thereafter, the City may consider retaining a third-party consultant to assist the City in completing the audit. All audits will be conducted using an audit checklist. The results of the first audit, and such subsequent audits as are deemed necessary, shall be presented to the Avalon City Council at an open and public meeting. The written report shall also be posted on the City's water quality website.

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11.0 COMMUNICATIONS PROGRAM

As an integral component of the SSMP, the City shall communicate with the public on the development, implementation, and performance of the SSMP. The City's communication program shall allow the public the opportunity to provide input to the City on its program. The City's communication program shall use, at a minimum, the following methods to communicate with the public about the program:

- **Public Meetings** - The Avalon City Council meets twice a month, on the first and third Tuesday of the month, at 7:00 p.m. The City Council meetings occur at the City Hall Council Chambers, located at 410 Avalon Canyon Road. The City Council meetings are broadcast live. The City will use these regular City Council meetings to provide a public forum for discussion about the SSMP. City staff shall provide regular reports on SSMP implementation. In addition, as discussed in the Section 10.0 - Program Audit section of this SSMP, at least the first program audit will be presented to the City Council at an open and public meeting. The City will also seek to include SSMP issues as part of the public meetings of its other public bodies such as the Avalon Community Improvement Agency and the Planning Commission, as appropriate.
- **Online Communications** - The City shall use its existing website (www.cityofavalon.com) to foster public knowledge about the SSMP. Currently, the City's website includes a Bay Water Quality section. As part of this section of the website, the City will post a copy of the SSMP and documents related to the SSMP. In addition, the website will be updated to include public outreach information about private laterals, tree root blockage prevention, and other SSO prevention issues.
- **Print/Customer Communications** - The City shall provide newsletters, brochures, and notices to customers throughout the year. These communications will address sewer system management issues, preventative maintenance, and related information.
- **Business/Local Organizations** - The City will work with the local organizations such as the Catalina Island Chamber of Commerce and Visitors Bureau, the Rotary Club of Avalon, Avalon Beautiful, and the Lions Club of Avalon to conduct public outreach and information, both to local residents, business owners, and importantly, visitors to Avalon.

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Appendix 1: City of Avalon Municipal Code (Updated June 2013)

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ORDINANCE INDEX 2013

1117-13 An Ordinance of the City of Avalon, California Amending Sections 4-4.1703(g)(1), 5-11.03, 5-11.04, and 5-11.06 of the Avalon Municipal Code Regarding Autoette Permits for Dwelling Units and Hotels. (April 2, 2013 5 Ayes-Kennedy, Ponce, Hernandez, Morrow and Olsen)

1118-13 An Ordinance of the City of Avalon Adding Article 3 – Private Sanitary Sewer Laterals and Article 4 – Fats, Oils and Grease to Chapter 7, Title 6 of the Avalon Municipal Code. (June 4, 2013 5 Ayes-Kennedy, Ponce, Hernandez, Morrow and Olsen)

1119-13 An Ordinance of the City of Avalon Amending Chapter 7 – Sewers – of Title 6 – Sanitation and Health of the Avalon Municipal Code and Adopting Chapter 13 – Water Quality Control to Title 6 – Sanitation and Health. June 4, 2013 5 Ayes-Kennedy, Ponce, Hernandez, Morrow and Olsen)

1120-13 An Ordinance of the City Council of the City of Avalon, California Amending Title 6, Chapter 9, Floodplain Management, Article 1 thru 6, of the Municipal Code to Comply with California Model Floodplain Ordinance for Coastal Communities. (June 4, 2013 5 Ayes-Kennedy, Hernandez Morrow, Olsen and Ponce)

ORDINANCE NO. 1120-13

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF AVALON, CALIFORNIA AMENDING TITLE 6, CHAPTER 9, FLOODPLAIN MANAGEMENT, ARTICLE 1 THRU 6, OF THE MUNICIPAL CODE TO COMPLY WITH CALIFORNIA MODEL FLOODPLAIN ORDINANCE FOR COASTAL COMMUNITIES

WHEREAS, the Title 6, Chapter 9, of the City of Avalon's ("City") Municipal Code ("Code") governs the development in the Flood Plain; and

WHEREAS, the City has previously adopted a Floodplain ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood condition; and

WHEREAS, California Department of Water Resources has reviewed the existing ordinance and recommended changes to comply with the California Model Floodplain Ordinance for Coastal Communities; and

WHEREAS, based upon the entire record before the City Council, all written and oral evidence presented to the City Council, the City Council believes that amending the Municipal Code is warranted.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF AVALON DOES ORDAIN AS FOLLOWS:

Section 1. That the above recitals are hereby incorporated by reference.

Section 2. That the City of Avalon City Council amend the Avalon Municipal Code to comply with California Model Floodplain Ordinance for Coastal Communities per attached Exhibit "A".

INTRODUCED at a regular meeting of the City Council of the City of Avalon on the 7th day of May, 2013, by the following vote:

AYES: Mayor Kennedy, Councilmembers Hernandez, Olsen and Ponce
NOES: None
ABSENT: Councilmember Morrow
ABSTAIN: None

PASSED, APPROVED AND ADOPTED at a regular meeting of the City Council of the City of Avalon on this 4th day of June, 2013, by the following vote:

AYES: Mayor Kennedy, Councilmembers Hernandez, Morrow, Olsen and Ponce
NOES: None
ABSENT: None
ABSTAIN: None

Robert Kenney, Mayor

ATTEST:

Denise Radde, City Clerk

Chapter 9 - FLOODPLAIN MANAGEMENT

Article 1. Statutory Authorization, Findings of Fact, Purpose and Methods

Sec. 6-9.101 Statutory Authorization.

The Legislature of the State of California has in Government Code Sections 65302, 65560, and 65800 conferred upon local governments the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the City Council of the City of Avalon does hereby adopt the following floodplain management regulations.

Sec. 6-9.102 Findings of Fact and Statement of Purpose.

A. The flood hazard areas of the City of Avalon are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

B. These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contributes to flood losses.

C. It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land within flood prone, mudslide [i.e. mudflow] or flood related erosion areas. These regulations are designed to:

1. Protect human life and health;

2. Minimize expenditure of public money for costly flood control projects;

3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

4. Minimize prolonged business interruptions;

5. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;

6. Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;

7. Ensure that potential buyers are notified that property is in an area of special flood hazard; and

8. Ensure that those who occupy the areas of special flood hazard assume responsibility for

their actions.

Sec. 6-9.103 Methods of Reducing Flood Losses.

In order to accomplish its purposes, this chapter includes regulations to:

A. Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;

B. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

C. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;

D. Control filling, grading, dredging, and other development which may increase flood damage;

E. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas; and

Article 2. Definitions

Sec. 6-9.201 Definitions

Unless specifically defined below, words or phrases used in this chapter shall be interpreted so as to give them the meaning they have in common usage and to give this chapter its most reasonable application.

(1) "**A zone**" - see "**Special flood hazard area**".

(2) "**Accessory structure**" means a structure that is either:

a. Solely for the parking of no more than 2 cars; or

b. A small, low cost shed for limited storage, less than 150 square feet and $1,500 in value.

(3) "**Accessory use**" means a use which is incidental and subordinate to the principal use of the parcel of land on which it is located.

(4) "**Alluvial fan**" means a geomorphologic feature characterized by a cone or fan-shaped deposit of boulders, gravel, and fine sediments that have been eroded from mountain slopes, transported by flood flows, and then deposited on the valley floors, and which is subject to flash flooding, high velocity flows, debris flows, erosion, sediment movement and deposition, and channel migration.

(5) "**Apex**" means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

(6) "**Appeal**" means a request for a review of the Floodplain Administrator's interpretation of any provision of this chapter.

(7) "**Area of shallow flooding**" means a designated AO or AH Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

(8) "**Area of special flood-related erosion hazard**" is the land within a community which is most likely to be subject to severe flood-related erosion losses. The area may be designated as Zone E on the Flood Insurance Rate Map (FIRM).

(9) "**Area of special flood hazard**" - See "Special flood hazard area."

(10) "**Area of special mudslide (i.e., mudflow) hazard**" is the area subject to severe mudslides (i.e., mudflows). The area is designated as Zone M on the Flood Insurance Rate Map (FIRM).

(11) "**Base flood**" means a flood which has a one percent chance of being equaled or exceeded in any given year (also called the "100-year flood"). Base flood is the term used throughout this chapter.

(12) "**Base flood elevation**" (BFE) means the elevation shown on the Flood Insurance Rate Map for Zones AE, AH, A1-30, VE and V1-V30 that indicates the water surface elevation resulting from a flood that has a 1-percent or greater chance of being equaled or exceeded in any given year.

(13) "**Basement**" means any area of the building having its floor subgrade - i.e., below ground level - on all sides.

(14) "**Breakaway walls**" are any type of walls, whether solid or lattice, and whether constructed of concrete, masonry, wood, metal, plastic or any other suitable building material which is not part of the structural support of the building and which is designed to break away under abnormally high tides or wave action without causing any damage to the structural integrity of the building on which they are used or any buildings to which they might be carried by flood waters. A breakaway wall shall have a safe design loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls must be certified by a registered engineer or architect and shall meet the following conditions:

a. Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and

b. The elevated portion of the building shall not incur any structural damage due to the effects of wind and water loads acting simultaneously in the event of the base flood.

(15) "**Building**" - see "**Structure**".

(16) "**Coastal high hazard area**" means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. It is an area subject to high velocity waters, including coastal and tidal inundation or tsunamis. The area is designated on a Flood Insurance Rate Map (FIRM) as Zone V1-V30, VE, or V.

(17) "**Development**" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

(18) "**Encroachment**" means the advance or infringement of uses, plant growth, fill, excavation, buildings, permanent structures or development into a floodplain which may impede or alter the flow capacity of a floodplain.

(19) "**Existing manufactured home park or subdivision**" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of this chapter.

(20) "**Expansion to an existing manufactured home park or subdivision**" means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of

streets, and either final site grading or the pouring of concrete pads).

(21) "**Flood, flooding, or flood water**" means:

a. A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters; the unusual and rapid accumulation or runoff of surface waters from any source; and/or mudslides (i.e., mudflows); and

b. The condition resulting from flood-related erosion.

(22) "**Flood Boundary and Floodway Map (FBFM)**" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the floodway.

(23) "**Flood Insurance Rate Map (FIRM)**" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

(24) "**Flood Insurance Study**" means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Insurance Rate Map, the Flood Boundary and Floodway Map, and the water surface elevation of the base flood.

(25) "**Floodplain or flood-prone area**" means any land area susceptible to being inundated by water from any source - see "**Flooding.**"

(26) "**Floodplain Administrator**" is the Planning Director or other community official designated by title to administer and enforce the floodplain management regulations.

(27) "**Floodplain management**" means the operation of an overall program of corrective and preventive measures for reducing flood damage and preserving and enhancing, where possible, natural resources in the floodplain, including but not limited to emergency preparedness plans, flood control works, floodplain management regulations, and open space plans.

(28) "**Floodplain management regulations**" means this chapter and other zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as grading and erosion control) and other application of police power which control development in flood-prone areas. This term describes federal, state or local regulations in any combination thereof which provide standards for preventing and reducing flood loss and damage.

(29) "**Floodproofing**" means any combination of structural and nonstructural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents. For guidelines on dry and wet floodproofing, see FEMA Technical Bulletins TB 1-93, TB 3-93, and TB 7-93.

(30) "**Flood-related erosion**" means the collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water

exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

(31) **"Flood-related erosion area"** or **"flood-related erosion prone area"** means a land area adjoining the shore of a lake or other body of water, which due to the composition of the shoreline or bank and high water levels or wind-driven currents, is likely to suffer flood-related erosion damage.

(32) **"Flood-related erosion area management"** means the operation of an overall program of corrective and preventive measures for reducing flood-related erosion damage, including but not limited to emergency preparedness plans, flood-related erosion control works, and floodplain management regulations.

(33) **"Floodway"** means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Also referred to as "Regulatory Floodway."

(34) **"Floodway fringe"** is that area of the floodplain on either side of the "Regulatory Floodway" where encroachment may be permitted.

(35) **"Fraud and victimization"** as related to Article 6 of this chapter, means that the variance granted must not cause fraud on or victimization of the public. In examining this requirement, the City Council will consider the fact that every newly constructed building adds to government responsibilities and remains a part of the community for fifty to one-hundred years. Buildings that are permitted to be constructed below the base flood elevation are subject during all those years to increased risk of damage from floods, while future owners of the property and the community as a whole are subject to all the costs, inconvenience, danger, and suffering that those increased flood damages bring. In addition, future owners may purchase the property, unaware that it is subject to potential flood damage, and can be insured only at very high flood insurance rates.

(36) **"Functionally dependent use"** means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, and does not include long-term storage or related manufacturing facilities.

(37) **"Governing body"** is the local governing unit, i.e. county or municipality, that is empowered to adopt and implement regulations to provide for the public health, safety and general welfare of its citizenry.

(38) **"Hardship"** as related to Article 6 of this chapter means the exceptional hardship that would result from a failure to grant the requested variance. The City Council requires that the variance be exceptional, unusual, and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical handicaps, personal preferences, or the disapproval of one's neighbors likewise cannot, as a rule,

qualify as an exceptional hardship. All of these problems can be resolved through other means without granting a variance, even if the alternative is more expensive, or requires the property owner to build elsewhere or put the parcel to a different use than originally intended.

(39) "**Highest adjacent grade**" means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

(40) "**Historic structure**" means any structure that is:

a. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

b. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

c. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or

d. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved state program as determined by the Secretary of the Interior or directly by the Secretary of the Interior in states without approved programs.

(41) "**Levee**" means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water so as to provide protection from temporary flooding.

(42) "**Levee system**" means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accord with sound engineering practices.

(43) "**Lowest floor**" means the lowest floor of the lowest enclosed area, including basement (see "**Basement**" definition).

a. An unfinished or flood resistant enclosure below the lowest floor that is usable solely for parking of vehicles, building access or storage in an area other than a basement area, is not considered a building's lowest floor provided it conforms to applicable non-elevation design requirements, including, but not limited to:

i. The flood openings standard in Section 6-9.501.C.3;

ii. The anchoring standards in Section 6-9.501.A;

iii. The construction materials and methods standards in Section 6-9.501.B; and

iv. The standards for utilities in Section 6-9.502.

b. For residential structures, all subgrade enclosed areas are prohibited as they are considered to be basements (see "**Basement**" definition). This prohibition includes below-grade garages and storage areas.

(44) "**Manufactured home**" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle".

(45) "**Manufactured home park or subdivision**" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

(46) "**Market value**" shall be determined by estimating the cost to replace the structure in new condition and adjusting that cost figure by the amount of depreciation which has accrued since the structure was constructed.

a. The cost of replacement of the structure shall be based on a square foot cost factor determined by reference to a building cost estimating guide recognized by the building construction industry.

b. The amount of depreciation shall be determined by taking into account the age and physical deterioration of the structure and functional obsolescence as approved by the floodplain administrator, but shall not include economic or other forms of external obsolescence.

Use of replacement costs or accrued depreciation factors different from those contained in recognized building cost estimating guides may be considered only if such factors are included in a report prepared by an independent professional appraiser and supported by a written explanation of the differences.

(47) "**Mean sea level**" means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929, North American Vertical Datum (NAVD) of 1988, or other datum, to which base flood elevations shown on the City of Avalon's Flood Insurance Rate Map are referenced.

(48) "**Mudslide**" describes a condition where there is a river, flow or inundation of liquid mud down a hillside, usually as a result of a dual condition of loss of brush cover and the subsequent accumulation of water on the ground, preceded by a period of unusually heavy or sustained rain.

(49) "**Mudslide** (i.e., mudflow) **prone area**" means an area with land surfaces and slopes of unconsolidated material where the history, geology, and climate indicate a potential for

mudflow.

(50) "**New construction**", for floodplain management purposes, means structures for which the "start of construction" commenced on or after the effective date of these regulations, and includes any subsequent improvements to such structures.

(51) "**New manufactured home park or subdivision**" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of these regulations.

(52) "**Obstruction**" includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure, vegetation or other material in, along, across or projecting into any watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, or due to its location, its propensity to snare or collect debris carried by the flow of water, or its likelihood of being carried downstream.

(53) "**One-hundred-year flood**" or "100-year flood" - see "**Base flood.**"

(54) "**Primary frontal dune**" means a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively mild slope.

(55) "**Program deficiency**" means a defect in a community's floodplain management regulations or administrative procedures that impairs effective implementation of those floodplain management regulations.

(56) "**Public safety and nuisance**" as related to Article 6 of this chapter, means that the granting of a variance must not result in anything which is injurious to safety or health of an entire community or neighborhood, or any considerable number of persons, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin.

(57) "**Recreational vehicle**" means a vehicle which is:

a. Built on a single chassis;

b. 400 square feet or less when measured at the largest horizontal projection;

c. Designed to be self-propelled or permanently towable by a light-duty truck; and

d. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

(58) "**Regulatory floodway**" means the channel of a river or other watercourse and the

adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

(59) "**Remedy a violation**" means to bring the structure or other development into compliance with State or local floodplain management regulations, or if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the chapter or otherwise deterring future similar violations, or reducing State or Federal financial exposure with regard to the structure or other development.

(60) "**Riverine**" means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

(61) "**Sand dunes**" mean naturally occurring accumulations of sand in ridges or mounds landward of the beach.

(62) "**Sheet flow area**" - see "**Area of shallow flooding.**"

(63) "**Special flood hazard area (SFHA)**" means an area in the floodplain subject to a 1 percent or greater chance of flooding in any given year. It is shown on an FHBM or FIRM as Zone A, AO, A1-A30, AE, A99, AH, V1-V30, VE or V.

(64) "**Start of construction**" includes substantial improvement and other proposed new development and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufacture home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

(65) "**Structure**" means a walled and roofed building that is principally above ground; this includes a gas or liquid storage tank or a manufactured home.

(66) "**Substantial damage**" means

a. Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred; or

b. Flood-related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such event, on the average,

equals or exceeds 25 percent of the market value of the structure before the damage occurred. This is also known as "repetitive loss."

(67) "**Substantial improvement**" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:

a. Any project for improvement of a structure to correct existing violations or state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

b. Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

(68) "**V zone**" - see "**Coastal high hazard area.**"

(69) "**Variance**" means a grant of relief from the requirements of this chapter which permits construction in a manner that would otherwise be prohibited by this chapter.

(70) "**Violation**" means the failure of a structure or other development to be fully compliant with this chapter. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this chapter is presumed to be in violation until such time as that documentation is provided.

(71) "**Water surface elevation**" means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, North American Vertical Datum (NAVD) of 1988, or other datum, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

(72) "**Watercourse**" means a lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

Article 3. General Provisions

Sec. 6-9.301 Lands to which this Chapter Applies.

This chapter shall apply to all areas of special flood hazards within the jurisdiction of the City of Avalon.

Sec. 6-9.302 Basis for Establishing the Areas of Special Flood Hazard.

The areas of special flood hazard identified by the Federal Emergency Management Agency (FEMA) in the "Flood Insurance Study (FIS) for the City of Avalon dated November 1, 1985, with accompanying Flood Insurance Rate Maps (FIRM's) and Flood Boundary and Floodway Maps (FBFM's), and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this chapter. This FIS and attendant mapping is the minimum area of applicability of this chapter and may be supplemented by studies for other areas which allow implementation of this chapter and which are recommended to the City Council by the Floodplain Administrator. The study, FIRM's and FBFM's are on file at the Avalon Planning and Building Department.

Sec. 6-9.303 Compliance.

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this chapter and other applicable regulations. Violation of the requirements (including violations of conditions and safeguards) shall constitute a misdemeanor. Nothing herein shall prevent the City Council from taking such lawful action as is necessary to prevent or remedy any violation.

Sec. 6-9.304 Abrogation and Greater Restrictions.

This chapter is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this chapter and another chapter, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

Sec. 6-9.305 Interpretation.

In the interpretation and application of this chapter, all provisions shall be:

A. Considered as minimum requirements;

B. Liberally construed in favor of the governing body; and

C. Deemed neither to limit nor repeal any other powers granted under state statutes.

Sec. 6-9.306 Warning and Disclaimer of Liability.

The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This chapter does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from

flooding or flood damages. This chapter shall not create liability on the part of the City of Avalon, any officer or employee thereof, the State of California, or the Federal Emergency Management Agency, for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.

Sec. 6-9.307 Severability.

This chapter and the various parts thereof are hereby declared to be severable. Should any section of this chapter be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the chapter as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid.

Article 4. Administration

Sec. 6-9.401 Designation of the Floodplain Administrator.

The Director of Planning is hereby appointed to administer, implement, and enforce this chapter by granting or denying development permits in accord with its provisions.

Sec. 6-9.402 Duties and Responsibilities of the Floodplain Administrator.

The duties and responsibilities of the Floodplain Administrator shall include, but not be limited to the following:

A. **Permit Review.** Review all development permits to determine:

1. Permit requirements of this chapter have been satisfied, including determination of substantial improvement and substantial damage of existing structures;

2. All other required state and federal permits have been obtained;

3. The site is reasonably safe from flooding;

4. The proposed development does not adversely affect the carrying capacity of areas where base flood elevations have been determined but a floodway has not been designated. This means that the cumulative effect of the proposed development when combined with all other existing and anticipated development will not increase the water surface elevation of the base flood more than 1 foot at any point within the City of Avalon; and

5. All Letters of Map Revision (LOMR's) for flood control projects are approved prior to the issuance of building permits. Building Permits must not be issued based on Conditional Letters of Map Revision (CLOMR's). Approved CLOMR's allow construction of the proposed flood control project and land preparation as specified in the "start of construction" definition.

6. The cumulative value of the proposed development within the last five years.

B. **Development of Substantial Improvement and Substantial Damage Procedures.**

1. Using FEMA publication FEMA 213, "Answers to Questions About Substantially Damaged Buildings," develop detailed procedures for identifying and administering requirements for substantial improvement and substantial damage, to include defining "Market Value."

2. Assure procedures are coordinated with other departments/divisions and implemented by community staff.

C. **Review, Use and Development of Other Base Flood Data.**

When base flood elevation data has not been provided in accordance with Section 6-9.302, the Floodplain Administrator shall obtain, review, and reasonably utilize any base flood

elevation and floodway data available from a federal or state agency, or other source, in order to administer Article 5.

NOTE: A base flood elevation may be obtained using one of two methods from the FEMA publication, FEMA 265, "Managing Floodplain Development in Approximate Zone A Areas – A Guide for Obtaining and Developing Base (100-year) Flood Elevations" dated July 1995.

D. **Notification of Other Agencies.**

1. Alteration or relocation of a watercourse:

   a. Notify adjacent communities and the California Department of Water Resources prior to alteration or relocation;

   b. Submit evidence of such notification to the Federal Emergency Management Agency; and

   c. Assure that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained.

2. Base Flood Elevation changes due to physical alterations:

   a. Within 6 months of information becoming available or project completion, whichever comes first, the floodplain administrator shall submit or assure that the permit applicant submits technical or scientific data to FEMA for a Letter of Map Revision (LOMR).

   b. All LOMR's for flood control projects are approved prior to the issuance of building permits. Building Permits must not be issued based on Conditional Letters of Map Revision (CLOMR's). Approved CLOMR's allow construction of the proposed flood control project and land preparation as specified in the "start of construction" definition.

   Such submissions are necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements are based on current data.

3. Changes in corporate boundaries:

   Notify FEMA in writing whenever the corporate boundaries have been modified by annexation or other means and include a copy of a map of the community clearly delineating the new corporate limits.

E. **Documentation of Floodplain Development.**

Obtain and maintain for public inspection and make available as needed the following:

1. Certification required by Section 6-9.501.C.1 and Section 6-9.504 (lowest floor elevations);

2. Certification required by Section 6-9.501.C.2 (elevation or floodproofing of nonresidential structures);

3. Certification required by Section 6-9.501.C.3 (wet floodproofing standard);

4. Certification of elevation required by Section 6-9.503.A.3 (subdivisions and other proposed development standards);

5. Certification required by Section 6-9.506.B (floodway encroachments);

6. Information required by Section 6-9.507.F (coastal construction standards); and

7. Maintain a record of all variance actions, including justification for their issuance, and report such variances issued in its biennial report submitted to the Federal Emergency Management Agency.

F. **Map Determination.**

Make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazard, where there appears to be a conflict between a mapped boundary and actual field conditions. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in Section 6-9.404.

G. **Remedial Action.**

Take action to remedy violations of this chapter as specified in Section 6-9.303.

H. **Biennial Report.**

Complete and submit Biennial Report to FEMA.

I. **Planning.**

Assure community's General Plan is consistent with floodplain management objectives herein.

Sec. 6-9.403 Development Permit.

A development permit shall be obtained before any construction or other development, including manufactured homes, within any area of special flood hazard established in Section 6-9.302. Application for a development permit shall be made on forms furnished by the City of Avalon. If the cumulative cost of improvements over a five-year period equals or exceeds fifty-percent (50%) of the market value of the structure before the start of construction of the improvement, the structure must meet current floodplain management standards. The applicant shall provide the following minimum information:

A. Plans in duplicate, drawn to scale, showing:

1. Location, dimensions, and elevation of the area in question, existing or proposed

structures, storage of materials and equipment and their location;

2. Proposed locations of water supply, sanitary sewer, and other utilities;

3. Grading information showing existing and proposed contours, any proposed fill, and drainage facilities;

4. Location of the regulatory floodway when applicable;

5. Base flood elevation information as specified in Sections 6-9.302 or 6-9.402.C;

6. Proposed elevation in relation to mean sea level, of the lowest floor (including basement) of all structures; and

7. Proposed elevation in relation to mean sea level to which any nonresidential structure will be floodproofed, as required in Section 6-9.501.C.2 of this chapter and detailed in FEMA Technical Bulletin TB 3-93.

B. Certification from a registered civil engineer or architect that the nonresidential floodproofed building meets the floodproofing criteria in Section 6-9.501.C.2.

C. For a crawl-space foundation, location and total net area of foundation openings as required in Section 6-9.501.C.3 of this chapter and detailed in FEMA Technical Bulletins 1-93 and 7-93.

D. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

E. All appropriate certifications listed in Section 6-9.402.E of this chapter.

Sec. 6-9.404 Appeals.

The City Council of the City of Avalon shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this chapter.

Article 5. Provisions for Flood Hazard Reduction

Sec. 6-9.501 Standards of construction.

In all areas of special flood hazards the following standards are required:

A. **Anchoring.**

All new construction and substantial improvements of structures, including manufactured homes, shall be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.

B. **Construction Materials and Methods.**

All new construction and substantial improvements of structures, including manufactured homes, shall be constructed:

1. With flood resistant materials, and utility equipment resistant to flood damage for areas below the base flood elevation;

2. Using methods and practices that minimize flood damage;

3. With electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and

4. Within Zones AH or AO, so that there are adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures.

C. **Elevation and Floodproofing.**

1. **Residential construction.**

All new construction or substantial improvements of residential structures shall have the lowest floor, including basement:

a. In AE, AH, A1-30 Zones, elevated to or above the base flood elevation.

b. In an AO zone, elevated above the highest adjacent grade to a height equal to or exceeding the depth number specified in feet on the FIRM, or elevated at least 2 feet above the highest adjacent grade if no depth number is specified.

c. In an A zone, without BFE's specified on the FIRM [unnumbered A zone], elevated to or above the base flood elevation; as determined under Section 6-9.402.C.

Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered civil engineer or licensed land surveyor, and verified by the community building inspector to be properly elevated. Such certification

and verification shall be provided to the Floodplain Administrator.

2. **Nonresidential construction.**

   All new construction or substantial improvements of nonresidential structures shall either be elevated to conform with Section 6-9.501.C.1 or:

   a. Be floodproofed, together with attendant utility and sanitary facilities, below the elevation recommended under Section 6-9.501.C.1, so that the structure is watertight with walls substantially impermeable to the passage of water;

   b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and

   c. Be certified by a registered civil engineer or architect that the standards of Sections 6-9.501.C.2.a and b are satisfied. Such certification shall be provided to the Floodplain Administrator.

3. **Flood openings.**

   All new construction and substantial improvements of structures with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement must meet the following minimum criteria:

   a. For non-engineered openings:

      1. Have a minimum of two openings on different sides having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;

      2. The bottom of all openings shall be no higher than one foot above grade;

      3. Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of floodwater; and

      4. Buildings with more than one enclosed area must have openings on exterior walls for each area to allow flood water to directly enter; or

   b. Be certified by a registered civil engineer or architect.

4. **Manufactured homes.**

   a. See Section 6-9.504.

5. **Garages and low cost accessory structures.**

a. Attached garages.

1. A garage attached to a residential structure, constructed with the garage floor slab below the BFE, must be designed to allow for the automatic entry of flood waters. See Section 6-9.501.C.3. Areas of the garage below the BFE must be constructed with flood resistant materials. See Section 6-9.501.B.

2. A garage attached to a nonresidential structure must meet the above requirements or be dry floodproofed. For guidance on below grade parking areas, see FEMA Technical Bulletin TB-6.

b. Detached garages and accessory structures.

1. "Accessory structures" used solely for parking (2 car detached garages or smaller) or limited storage (small, low-cost sheds), as defined in Article 2, may be constructed such that its floor is below the base flood elevation (BFE), provided the structure is designed and constructed in accordance with the following requirements:

a. Use of the accessory structure must be limited to parking or limited storage;

b. The portions of the accessory structure located below the BFE must be built using flood-resistant materials;

c. The accessory structure must be adequately anchored to prevent flotation, collapse and lateral movement;

d. Any mechanical and utility equipment in the accessory structure must be elevated or floodproofed to or above the BFE;

e. The accessory structure must comply with floodplain encroachment provisions in Section 6-9.506; and

f. The accessory structure must be designed to allow for the automatic entry of flood waters in accordance with Section 6-9.501.C.3.

2. Detached garages and accessory structures not meeting the above standards must be constructed in accordance with all applicable standards in Section 6-9.501.

Sec. 6-9.502 Standards for Utilities.

A. All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate:

1. Infiltration of flood waters into the systems; and

2. Discharge from the systems into flood waters.

B. On-site waste disposal systems shall be located to avoid impairment to them, or

contamination from them during flooding.

Sec. 6-9.503 Standards for Subdivisions and Other Proposed Development.

A. All new subdivisions proposals and other proposed development, including proposals for manufactured home parks and subdivisions, greater than 50 lots or 5 acres, whichever is the lesser, shall:

1. Identify the Special Flood Hazard Areas (SFHA) and Base Flood Elevations (BFE).

2. Identify the elevations of lowest floors of all proposed structures and pads on the final plans.

3. If the site is filled above the base flood elevation, the following as-built information for each structure shall be certified by a registered civil engineer or licensed land surveyor and provided as part of an application for a Letter of Map Revision based on Fill (LOMR-F) to the Floodplain Administrator:

   a. Lowest floor elevation.

   b. Pad elevation.

   c. Lowest adjacent grade.

B. All subdivision proposals and other proposed development shall be consistent with the need to minimize flood damage.

C. All subdivision proposals and other proposed development shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.

D. All subdivisions and other proposed development shall provide adequate drainage to reduce exposure to flood hazards.

Sec. 6-9. 504 Standards for Manufactured Homes.

A. All manufactured homes that are placed or substantially improved, on sites located: (1) outside of a manufactured home park or subdivision; (2) in a new manufactured home park or subdivision; (3) in an expansion to an existing manufactured home park or subdivision; or (4) in an existing manufactured home park or subdivision upon which a manufactured home has incurred "substantial damage" as the result of a flood, shall:

1. Within Zones A1-30, AH, and AE on the community's Flood Insurance Rate Map, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely fastened to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

2. Within Zones V1-30, V, and VE on the community's Flood Insurance Rate Map, meet the requirements of Section 6-9.507.

B. All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A1-30, AH, AE, V1-30, V, and VE on the community's Flood Insurance Rate Map that are not subject to the provisions of Section 6-9.504.A will be securely fastened to an adequately anchored foundation system to resist flotation, collapse, and lateral movement, and be elevated so that either the:

1. Lowest floor of the manufactured home is at or above the base flood elevation; or

2. Manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade.

Upon the completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered civil engineer or licensed land surveyor, and verified by the community building inspector to be properly elevated. Such certification and verification shall be provided to the Floodplain Administrator.

Sec. 6-9.505 Standards for Recreational Vehicles.

A. All recreational vehicles placed in Zones A1-30, AH, AE, V1-30 and VE will either:

1. Be on the site for fewer than 180 consecutive days; or

2. Be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or

3. Meet the permit requirements of Section 6-9.403 of this chapter and the elevation and anchoring requirements for manufactured homes in Section 6-9.504.

B. Recreational vehicles placed on sites within Zones V1-30, V, and VE on the community's Flood Insurance Rate Map will meet the requirements of Section 6-9.505.A and Section 6-9.507.

Sec. 6-9.506 Floodways.

Since floodways are an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

A. Until a regulatory floodway is adopted, no new construction, substantial development, or other development (including fill) shall be permitted within Zones A1-30 and AE, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other development, will not increase the water surface elevation of the base flood more than 1 foot at any point within the City of Avalon.

B. Within an adopted regulatory floodway, the City of Avalon shall prohibit encroachments, including fill, new construction, substantial improvements, and other development, unless certification by a registered civil engineer is provided demonstrating that the proposed encroachment shall not result in any increase in flood levels during the occurrence of the base flood discharge.

C. If Sections 6-9.506.A and B are satisfied, all new construction, substantial improvement, and other proposed new development shall comply with all other applicable flood hazard reduction provisions of Article 5.

Sec. 6-9.507 Coastal High Hazard Areas.

Within coastal high hazard areas, Zones V, V1-30, and VE, as established under Section 6-9.302, the following standards shall apply:

A. All new residential and non-residential construction, including substantial improvement/damage, shall be elevated on adequately anchored pilings or columns and securely anchored to such pilings or columns so that the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level. The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable state or local building standards.

B. All new construction and other development shall be located on the landward side of the reach of mean high tide.

C. All new construction and substantial improvement shall have the space below the lowest floor free of obstructions or constructed with breakaway walls as defined in Article 2 of this chapter. Such enclosed space shall not be used for human habitation and will be usable solely for parking of vehicles, building access or storage.

D. Fill shall not be used for structural support of buildings.

E. Man-made alteration of sand dunes which would increase potential flood damage is prohibited.

F. The Floodplain Administrator shall obtain and maintain the following records:

1. Certification by a registered engineer or architect that a proposed structure complies with Section 6-9.507.A; and

2. The elevation (in relation to mean sea level) of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) of all new and substantially improved structures, and whether such structures contain a basement.

Sec. 6-9.508. Mudslide (i.e., Mudflow) Prone Areas.

A. The Floodplain Administrator shall review permits for proposed construction of other development to determine if it is proposed within a mudslide area.

B. Permits shall be reviewed to determine that the proposed site and improvement will be reasonably safe from mudslide hazards. Factors to be considered in making this determination include, but are not limited to:

1. The type and quality of soils;

2. Evidence of ground water or surface water problems;

3. Depth and quality of any fill;

4. Overall slope of the site; and

5. Weight that any proposed development will impose on the slope.

C. Within areas which may have mudslide hazards, the Floodplain Administrator shall require:

1. A site investigation and further review by persons qualified in geology and soils engineering;

2. The proposed grading, excavation, new construction, and substantial improvement be adequately designed and protected against mudslide damages;

3. The proposed grading, excavations, new construction, and substantial improvement not aggravate the existing hazard by creating either on-site or off-site disturbances; and

4. Drainage, planting, watering, and maintenance not endanger slope stability.

Sec. 6-9.509 Flood-Related Erosion-Prone Area.

A. The Floodplain Administrator shall require permits for proposed construction and other development within all flood-related erosion-prone areas known to the community.

B. Permit applications shall be reviewed to determine whether the proposed site alterations and improvements will be reasonably safe from flood-related erosion, and will not cause flood-related erosion hazards or otherwise aggravate the existing hazard.

C. If a proposed improvement is found to be in the path of flood-related erosion or would increase the erosion hazard, such improvement shall be relocated or adequate protective measures shall be taken to avoid aggravating the existing erosion hazard.

D. Within Zone E on the Flood Insurance Rate Map, a setback is required for all new development from the ocean, lake, bay, riverfront or other body of water to create a safety buffer consisting of a natural vegetative or contour strip. This buffer shall be designated according to the flood-related erosion hazard and erosion rate, in relation to the anticipated "useful life" of structures, and depending upon the geologic, hydrologic, topographic, and climatic characteristics of the land. The buffer may be used for suitable open space purposes, such as for agricultural, forestry, outdoor recreation and wildlife habitat areas, and for other activities using temporary and portable structures only.

Article 6. Variance Procedure

Sec. 6-9.601 Nature of Variances.

The issuance of a variance is for floodplain management purposes only. Insurance premium rates are determined by statute according to actuarial risk and will not be modified by the granting of a variance.

The variance criteria set forth in this section of the chapter are based on the general principle of zoning law that variances pertain to a piece of property and are not personal in nature. A variance may be granted for a parcel of property with physical characteristics so unusual that complying with the requirements of this chapter would create an exceptional hardship to the applicant or the surrounding property owners. The characteristics must be unique to the property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

It is the duty of the City Council to help protect its citizens from flooding. This need is so compelling and the implications of the cost of insuring a structure built below flood level are so serious that variances from the flood elevation or from other requirements in the flood ordinance are quite rare. The long term goal of preventing and reducing flood loss and damage can only be met if variances are strictly limited. Therefore, the variance guidelines provided in this chapter are more detailed and contain multiple provisions that must be met before a variance can be properly granted. The criteria are designed to screen out those situations in which alternatives other than a variance are more appropriate.

Sec. 6-9.602 Conditions for Variances.

A. Generally, variances may be issued for new construction, substantial improvement, and other proposed new development to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing that the procedures of Articles 4 and 5 of this chapter have been fully considered. As the lot size increases beyond one-half acre, the technical justification required for issuing the variance increases.

B. Variances may be issued for the repair or rehabilitation of "**historic structures**" (as defined in Article 2 of this chapter) upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as an historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

C. Variances shall not be issued within any mapped regulatory floodway if any increase in flood levels during the base flood discharge would result.

D. Variances shall only be issued upon a determination that the variance is the "minimum necessary" considering the flood hazard, to afford relief. "Minimum necessary" means to afford relief with a minimum of deviation from the requirements of this chapter. For example, in the case of variances to an elevation requirement, this means the City Council need not grant permission for the applicant to build at grade, or even to whatever elevation

the applicant proposes, but only to that elevation which the City Council believes will both provide relief and preserve the integrity of the local ordinance.

E. Any applicant to whom a variance is granted shall be given written notice over the signature of a community official that:

1. The issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage, and

2. Such construction below the base flood level increases risks to life and property. It is recommended that a copy of the notice shall be recorded by the Floodplain Administrator in the Office of the County of Los Angeles Recorder and shall be recorded in a manner so that it appears in the chain of title of the affected parcel of land.

F. The Floodplain Administrator will maintain a record of all variance actions, including justification for their issuance, and report such variances issued in its biennial report submitted to the Federal Emergency Management Agency.

Sec. 6-9.603 Appeal Board.

A. In passing upon requests for variances, the City Council shall consider all technical evaluations, all relevant factors, standards specified in other sections of this chapter, and the:

1. Danger that materials may be swept onto other lands to the injury of others;

2. Danger of life and property due to flooding or erosion damage;

3. Susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the existing individual owner and future owners of the property;

4. Importance of the services provided by the proposed facility to the community;

5. Necessity to the facility of a waterfront location, where applicable;

6. Availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

7. Compatibility of the proposed use with existing and anticipated development;

8. Relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

9. Safety of access to the property in time of flood for ordinary and emergency vehicles;

10. Expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and

11. Costs of providing governmental services during and after flood conditions, including

maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water system, and streets and bridges.

B. Variances shall only be issued upon a:

1. Showing of good and sufficient cause;

2. Determination that failure to grant the variance would result in exceptional **"hardship"** to the applicant; and

3. Determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create a nuisance (see **"Public safety and nuisance"**), cause **"fraud and victimization"** of the public, or conflict with existing local laws or ordinances.

C. Variances may be issued for new construction, substantial improvement, and other proposed new development necessary for the conduct of a functionally dependent use provided that the provisions of Sections 6-9.603.A through D are satisfied and that the structure or other development is protected by methods that minimize flood damages during the base flood and does not result in additional threats to public safety and does not create a public nuisance.

D. Upon consideration of the factors of Section 6-9.602.A and the purposes of this chapter, the City Council may attach such conditions to the granting of variances as it deems necessary to further the purposes of this chapter.

ORDINANCE NO. 1119-13

AN ORDINANCE OF THE CITY OF AVALON AMENDING CHAPTER 7 – SEWERS -- OF TITLE 6 – SANITATION AND HEALTH OF THE AVALON MUNICIPAL CODE AND ADOPTING CHAPTER 13 – WATER QUALITY CONTROL TO TITLE 6 – SANITATION AND HEALTH

WHEREAS, the City of Avalon (City) owns and maintains a sewer and a municipal separate storm sewer system; and

WHEREAS, pursuant to the Cease and Desist Order issued by the Los Angeles Regional Water Quality Control Board, the City is required to ensure that it has all legal authority necessary to prevent illicit connections to the collection system, to operate and maintain the system in good working order and to commence enforcement actions as appropriate; and

WHEREAS, pursuant to the Federal Water Pollution Control Act, the implementing regulations for the National Pollutant Discharge Elimination System (NPDES), and the California Porter-Cologne Water Quality Control Act, the City is required to obtain coverage under the Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems; and

WHEREAS, the State Water Resources Control Board initially adopted a permit on April 30, 2003, and renewed it on February 5, 2013 through Order No. 2013-0001-DWQ, NPDES Permit No. CAS000004 (General Permit); and

WHEREAS, the General Permit requires the City to review and revise relevant ordinances and other regulatory mechanisms to obtain adequate legal authority, to the extent allowable under state or local law, to effectively prohibit non-storm water discharges into the storm drain system, to implement controls to reduce the discharge of pollutants from the storm drain system to the maximum extent practicable, and to meet the other requirements of the General Permit; and

WHEREAS, in order to maintain adequate and required legal authority, the City requires a water quality control ordinance which will regulate storm water and non-storm water discharges into and from the storm drain system, establish construction and post construction storm water management requirements, and provide additional enforcement authority for violations.

NOW THEREFORE THE CITY COUNCIL OF THE CITY OF AVALON DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Chapter 7 – Sewers of Title 6 – Sanitation and Health of the Avalon Municipal Code is hereby repealed and replaced to read as set forth in Exhibit A to this Ordinance, which Exhibit is incorporated by this reference as if set forth fully at this point.

Section 2. Chapter 13- Water Quality Control of Title 6 – Sanitation and Health of the Avalon Municipal Code is hereby adopted and added to the Avalon Municipal Code to read as set forth in Exhibit B to this Ordinance, which Exhibit is incorporated by this reference as if set forth fully at this point.

Section 3. Severability
The provisions of this Ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance, or the application thereof to any person or circumstance shall be held invalid, such invalidity shall not affect the other provisions of this Ordinance or the application of those provisions.

Section 4. Effective Date
This Ordinance shall become effective thirty (30) days after its adoption.

Section 5. Exemption from California Environmental Quality Act.
The City finds that the amendments to the Municipal Code, made pursuant to this Ordinance, are exempt from the California Environmental Quality Act ("CEQA") because the amendments are an action by a regulatory agency as authorized by state law, local ordinance or resolution for the protection of natural resources (i.e., water) under State CEQA Guidelines Section 15307 and the environment under State CEQA Guidelines Section 15308. The amendments will protect natural resources and the environment through the implementation of discharge procedures, water runoff controls, monitoring and reporting requirements, and enforcement provisions. Through these provisions, and others implemented by the amendments, the City will assure the maintenance, restoration, enhancement or protection of a natural resource and the environment. The City has also determined that the exceptions provided in State CEQA Guidelines Sections 15300.2 do not apply because the amendments' enforcement and inspection provisions, among others restrictive provisions, will protect the environment and do not otherwise involve unusual circumstances or cumulative effects. The City Clerk shall be the custodian of record for the documentation supporting this action. Staff is hereby directed to file a Notice of Exemption with the Los Angeles County Clerk's Office within five (5) working days.

Section 6.
The City Clerk is directed to certify the adoption of this Ordinance and cause the same to be published as required by law.

INTRODUCED AND FIRST READ at a Regular Meeting of the City Council of the City of Avalon, California, on the 7th day of May, 2013, and thereafter ADOPTED at a Regular Meeting of said City Council held on the 4th day of June, 2013, by the following vote to wit:

AYES: Mayor Kennedy, Councilmembers Hernandez, Morrow, Olsen, and Ponce
NOES: None
ABSENT: None
ABSTAIN: None

Robert Kennedy, Mayor

ATTEST:

Denise A. Radde, City Clerk

Exhibit A
Avalon Municipal Code
Title 6
Chapter 7 – Sewers

[Attached behind this page]

AVALON MUNICIPAL CODE

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 1	-	Generally
Article 2	-	Public Sanitary Sewer
Article 3	-	Reserved
Article 4	-	Reserved
Article 5	-	Enforcement

AVALON MUNICIPAL CODE

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 1: Generally

Section 6-7.101	-	**Definitions**
Sections 6-7.102 through 6-7.200	-	**Reserved**

Section 6-7.101 Definitions

Except as otherwise provided, the following terms are defined for purposes of this Chapter 7:

Annual means the twelve (12) month period commencing July 1 of any calendar year and ending June 30 of the following calendar year.

Authorized Inspector means the person designated by the City Manager to conduct inspections and repair for the purpose of ensuring compliance with this Chapter.

City means the City of Avalon, located in the County of Los Angeles, California.

City Attorney means the City Attorney of the City or an authorized deputy, agent, or representative.

City Manager means the City Manager of the City or an authorized deputy, agent, or representative.

Floor Area means the area included within the surrounding walls of a building, or portions thereof, exclusive of vent shafts and courts.

Lot means any piece or parcel of land bounded, described, or shown upon a map, plat, or deed recorded in the office of the County Recorder or shown as a separate parcel on the last equalized assessment roll which conforms to the boundaries of such lot as shown upon such recorded map, plat, or deed or roll; provided, however, in the event any building, structure, or intended use covers more area than a lot, as defined in this subsection, "lot" shall include all such pieces or parcels of land upon which such building, structure, or intended use is wholly or partly located, together with the yards, courts, and other unoccupied spaces legally required for the building or structure.

Owner means an person, firm, partnership, corporation, organization or anyone having legal title to or any interest in any real property, lot or parcel of land in the City.

Peak Flow means the instantaneous maximum rate of flow of sewage being discharged to the public sanitary sewer and shall, for the purposes of this Chapter, be as provided in this Chapter or as determined by the City Manager.

Person means any individual, partnership, firm, association, corporation or public agency, including the State of California and the United States of America.

Premises means a parcel of real property or other unit, building, premises or lot whether or not connected to the City's public sewer system.

Private Sanitary Sewer Lateral and **Private Sewer Lateral** mean the privately owned sanitary sewer piping or line connecting a building or other structure to the public sewer, and includes the "wye" or saddle at the public sewer.

Public sanitary Sewer and **Public Sewer** mean all of the publicly owned property involved in the operation of the sewage collection, treatment, and disposal system in the City, including land, sewers and appurtenances, pumping stations, and the treatment works and equipment.

Satellite System means any privately owned property involved in the operation of sewage collection, treatment, and/or disposal, including land, sewers, pumping stations, and appurtenant facilities and equipment, which is not located within the City or presently permitted to discharge to the public sanitary sewer.

Sewage means the spent water of the community received by the public sanitary sewer system. From the standpoint of source, it may be a combination of the liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions.

User means an owner or occupant, whether private, governmental or otherwise, of a unit, building, premises, or lot, whether within or outside the City.

Sections 6-7.102 – 6-7.200 Reserved

AVALON MUNICIPAL CODE

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 2: Public Sanitary Sewer

Division 1	-	Public Sanitary Sewer - Generally
Division 2	-	Connections to Public Sanitary Sewer
Division 3	-	Public Sanitary Sewer Service Charges

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 2: Public Sanitary Sewer

Division 1: Public Sanitary Sewer - Generally

Section 6-7.201	-	Purpose
Section 6-7.202	-	Master Plan
Section 6-7.203 through 6-7.220	-	Reserved

Section 6-7.201 Purpose

The purposes of this Article are to (1) protect the public health, safety and welfare by establishing rules for the construction, operation, maintenance and connects to the public sanitary sewer system; (2) establish a means of providing adequate public sanitary sewers which are required for the development and redevelopment of the City; (3) establish a charge to be collected from property owners proposing to discharge to the public sanitary sewer; and (4) establish a fund in which such charges may be deposited and from which moneys will be available for the public sanitary sewer reconstruction program.

Section 6-7.202 Master Plan

The public sanitary sewer shall be managed in accordance with a master plan adopted by the City

to best serve the public health, safety and welfare. The master plan includes, but is not limited to, the City's sewer system management plan, its system evaluation and capacity assessment plan and its sewer capital improvement program.

Sections 6-7.203 – 6-7.220 Reserved

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 2: Public Sanitary Sewer

Division 2: Connections to Public Sanitary Sewer

Section 6-7.221	-	Purpose and Intent
Section 6-7.222	-	Compliance with Provisions
Section 6-7.223	-	Connection to Public Sewer – Required
Section 6-7.224	-	Connection to Public Sewer – When Public Sewer Unavailable
Section 6-7.225	-	Connection to Public Sewer – Permit Required
Section 6-7.226	-	Connection to Public Sewer – Prohibitions
Section 6-7.227	-	Connection to Public Sewer – Sewer Connection Permit Application
Section 6-7.228	-	Connection to Public Sewer – Sewer Connection Capacity Required
Section 6-7.229	-	Connection to Public Sewer – Sewer Connection Determination of Capacity
Section 6-7.230	-	Connection to Public Sewer – Sewer Connection Design and Construction
Section 6-7.231	-	Connection to Public Sewer – Sewer Connection Permit Fees
Section 6-7.232	-	Connection to Public Sewer – Sewer Connection Fees Doubled
Section 6-7.233	-	Connection to Public Sewer – Sewer Connection Permit Revocation
Section 6-7.234	-	Connection to Public Sewer – Private Sewer System within City
Section 6-7.235	-	Connection to Public Sewer – Connections outside City
Section 6-7.236	-	Pretreatment
Section 6-7.237	-	Right to Enter
Section 6-7.238	-	Enforcement
Sections 6-7.239	-	Reserved

through 6-7.250		

Section 6-7.221 Purpose and Intent

The purpose of this Division is to protect the public health, safety and welfare by regulating the use, construction, alteration and repair of public sanitary sewer facilities within the City.

Section 6-7.222 Compliance with Provisions

No person shall erect, construct, enlarge, or alter any building or structure in the City, or cause the same to be done, without first having complied with the provisions of this Chapter.

Section 6-7.223 Connection to Public Sewer – Required

A. All plumbing which receives waste discharge from any building, structure or place of business shall be connected to a public sanitary sewer in compliance with all requirements of this Chapter.

B. No plumbing receiving waste discharge from any building, structure or place of business shall be connected to a private disposal system, such as a septic system, except as permitted in this Chapter.

Section 6-7.224 Connection to Public Sewer – When Public Sewer Unavailable

A. The City Manager may grant a conditional waiver of the requirement to connect to a public sanitary sewer required by Section 6-7.223.

B. A conditional waiver granted pursuant to this section shall be available only when all of the following conditions exist:

1. No connection to the public sanitary sewer is possible;

2. A private sewage disposal system would be adequate and safe according to the sole discretion of the City Manager; and

3. A private sewage disposal system would not adversely effect public health, safety or welfare.

C. A conditional waiver granted pursuant to this section shall be automatically revoked if any of the conditions above are unmet or if, in the sole discretion of the City Manager, revocation is necessary for the immediate protection of the public health, safety and welfare.

Section 6-7.225 Connection to Public Sewer – Permit Required

A person must obtain a written permit from the City Manager and pay all fees, bonds and deposits as required by resolution before making, maintaining, or causing to be made or maintained any connection with any public sanitary sewer.

Section 6-7.226 Connection to Public Sewer – Prohibitions

A. No person shall make, maintain or cause to be made or maintained any connection or discharge to the public sanitary sewer, except as permitted by this Chapter.

B. No person shall make, maintain, or cause to be made or maintained at any time or in any manner any connection from a satellite sewer to any public sanitary sewer, except as permitted by this Chapter.

C. No person shall at any time make any connection of any source of storm runoff, groundwater, or source of uncontaminated water directly or indirectly to any public sanitary sewer or private sewer lateral, except as permitted by this Chapter.

D. No person shall discharge or cause to be discharged by any means any storm water, surface water, ground water, roof runoff, subsurface drainage, cooling water, or process waters to any public sanitary sewer, except as permitted by this Chapter.

Section 6-7.227 Connection to Public Sewer – Sewer Connection Permit Application

The City Manager, before issuing a permit required by Section 6-7.225, shall require a written application to be made and filed. A completed application must set forth the name, residence or business address of the person making such application and, in detail, the location, description, work to be done or facilities to be used, the legal owner of the property to be served, information sufficient to determine capacity, as set forth in this Article, and any other information the City Manager deems necessary to determine whether the proposed work or use complies with the provisions of this Code, and local, state, and federal law and regulations.

Section 6-7.228 Connection to Public Sewer – Sewer Connection Capacity Required

The City Manager shall determine the capacity necessary in the public sanitary sewer to provide for the proper collection of sewage in the City. In the event a lot in the City is to undergo development or redevelopment and the anticipated sewage from the proposed use is found by the City Manager to exceed the capacity available in the public sewer, the building permit for such development or redevelopment shall not be issued until such time as the capacity in the public sanitary sewer is available or unless it can be made available before the building is occupied.

Section 6-7.229 Connection to Public Sewer – Determination of Capacity

A. The size and grade of each public sewer shall be such as to provide at all times sufficient capacity for peak flow rates of discharge. In order to establish estimates of sanitary sewage at peak flow, a permit applicant shall submit building plans and such other information as the City Manager may require.

B. The peak flows for the various occupancies are established in the following table and shall be used as the basis for computing the discharge rates to the public sanitary sewer:

Occupancy	**Peak Daily Flow**
Apartments and single residences	600 gal/dwelling unit
Assembly areas	15 gal/person
Auditoriums	15 gal/seat
Bars and cocktail lounges	60 gal/seat
Hotels	360 gal/room
Churches	600 gal/1,000 square feet of floor area
Laundries, automatic (public)	225 gal/machine
Industries, light (no water processes)	600 gal/1,000 square feet of floor area
Medical offices	900 gal/1,000 square feet of floor area
Hospitals	1,500 gal/bed
Offices	600 gal/1,000 square feet of floor area
Storage garages and warehouses	75 gal/1,000 square feet of floor area
Restaurants	150 gal/seat
Stores, commercial and display	300 gal/1,000 square feet of floor area
Stands for the sale of lunches, ice cream, beverages, and similar items	900 gal/1,000 square feet of floor area
Schools:	
Elementary	27 gal/capita
Other	75 gal/capita

C. All other occupancies shall be classified by the occupancy most nearly resembled as determined by the City Manager or computed by the City Manager in accordance with the anticipated use.

D. The daily flow to the sanitary sewer for a building containing mixed occupancies shall be determined by adding the peak flow characteristics of the various occupancies as set forth in the above table.

E. If the daily flow from a room or building in use prior to July 1, 1979 is to undergo structural innovations, and such innovations shall not increase the peak flow as it existed from the lot immediately prior to July 1, 1979, to the sanitary sewer, the owner shall submit to the City Manager an affidavit or statement pursuant to the provisions of Section 2015.5 of the Code of Civil Procedure of the State, in duplicate, verifying the actual occupancy load prior to July 1, 1979.

Section 6-7.230 Connection to Public Sewer – Design and Construction Standards

A. All private sewer laterals shall comply with the City's required design and construction standards and shall meet the requirements of Article 3 of this Chapter.

B. Design and construction standards may include, but are not limited to the following:

1. Minimum size of private sewer lateral pipe;

2. Type of private sewer lateral pipe;

3. Method of connecting wet tap;

4. Installation of clean out;

5. Minimum depth;

6. Minimum slope;

7. Installation of sump pump;

8. Encroachment permits.

Section 6-7.231 Connection to Public Sewer – Sewer Connection Permit Fees

Before any sewer connection permit shall be issued, the applicant shall pay to the City a sewer connection fee in accordance with a schedule of fees adopted by resolution of the City Council. The applicant shall be solely responsible for the cost of all labor and materials required for the excavations, sewer connections, backfilling, paving, clean-up, and miscellaneous other work required. No connection to the public sewer shall be made until after the fees have been paid

and all permits have been issued.

Section 6-7.232 Connection to Public Sewer – Sewer Connection Fees Doubled

A. If connection is made to the public sewer prior to securing a permit required by Section 6-7.225, and if the City determines in its sole discretion to permit the illicit connection, all applicable fees shall be in an amount that is twice the amount otherwise required.

B. Nothing in this Section 6-7.232 limits the City's enforcement options for illicit connections or requires the issuance of an after-the-fact permit for such connections.

Section 6-7.233 Connection to Public Sewer – Sewer Connection Permit Revocation

The City may revoke any permit issued under this Article for and may disconnect from the public sewer any connection which is constructed or connected without the proper permit, or which is used in violation of this Code or any applicable law, regulation, order, or permit.

Section 6-7.234 Connection to Public Sewer – Private Sewer System within City

The owner or operator of any private sewer system located within the City must obtain a permit pursuant to this Article and comply with any operational requirements imposed by the City before connecting to or discharging to the public sanitary sewer system at any point.

Section 6-7.235 Connection to Public Sewer – Connections outside City

A. No dwelling unit or property located outside the corporate boundaries of the City shall receive public sewer services unless the City Council determines the connection to be (a) necessary or beneficial for the advancement and protection of the public health, safety or general welfare of the City and its residents, and (b) consistent with applicable policies of the general plan.

B. If the City Council makes the findings required in subdivision A of this Section, a dwelling unit or property located outside the corporate boundaries of the City may receive public sewer services only after the owner or owner's authorized agent of such property enters into a written agreement with the which includes at least the following provisions:

1. The connection shall be at the sole expense of the applicant;

2. Installation of all sewer mains, private lateral connections and appurtenances must be completed by a licensed sewer contractor approved by the City, in accordance with City specifications, and to the satisfaction of the City Manager.

3. The property owner, assigns, and successors in interest shall pay any applicable monthly fee or charge;

4. The agreement may be terminated and the terms constituting default;

5. The agreement shall be recorded and shall run with the land and be binding on all successors in interest of the contracting party;

6. In the event the property is proposed for annexation to the City under proceedings initiated by property owner petition or otherwise, the contracting party expressly waives any right of protest to such annexation, except that such party shall have the right to be heard in any hearing in which zoning of the subject property is considered; and

7. After annexation of the property, the contracting owner or successor in interest shall pay the annexation fees regardless of whether the annexation is initiated by property owner petition or otherwise.

Section 6-7.236 Pretreatment

A. The City may prohibit the discharge to the public sanitary sewer of any substance that may interfere with or pass through the City's pretreatment operations.

B. The City may require a permit, BMPs, monitoring, recordkeeping, or other control mechanisms necessary to provide adequate pretreatment of sewage.

Section 6-7.237 Right to Enter

A. Whenever necessary to make an inspection, perform testing, maintenance or repairs, or whenever the City Manager has cause to believe that there exists, or potentially exists, in or on any premises any condition which constitutes a violation of this Chapter, the City Manager may enter such premises at all reasonable times to inspect, test, maintain, or repair, as needed.

B. In the event the owner or occupant refuses entry after a request to enter and inspect has been made, the City is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.

Section 6-7.238 Enforcement

A. **Violation**. No person shall violate any provision or fail to comply with any of the requirements of this Division. Any violation or failure to comply with the requirements of this Division shall be a violation of this Code.

B. **Enforcement**. The City may enforce any violation of the requirements of this Division in accordance with Article 5 of this Chapter.

Sections 6-7.239 – 6-7.250 Reserved

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 2: Public Sanitary Sewer

Division 3: Public Sanitary Sewer Service Charges

Section 6-7.251	-	**Purpose**
Section 6-7.252	-	**Charges**
Section 6-7.253	-	**Minimum Credit**
Section 6-7.254	-	**Sewer Charge Fund – Deposits**
Section 6-7.255	-	**Sewer Charge Fund – Expenditures**
Section 6-7.256	-	**Sewer Charge Fund – Refunds**
Section 6-7.257	-	**Sewer Charge Fund - Billing, Collection, Payment of Charges**
Section 6-7.258	-	**Enforcement**
Sections 6-7.259 through 6-7.300	-	**Reserved**

Section 6-7.251 Purpose

The purpose of this Division is to protect the public health, safety and welfare by establishing a fund for the maintenance of adequate public sanitary sewer facilities within the City.

Section 6-7.252 Charges

A. An applicant for a permit pursuant to Section 6-7.227 shall declare all the information necessary to comply with the provisions of this Article. At the time of issuing a permit, the applicant shall pay to the City a charge, based on the additional peak flow created by the new construction, equal to the sum of Fifty Cents ($.50) per gallon per day of additional peak flow. Charges for new subdivisions or construction which does not have an existing connection to the

public sewer shall be based on peak flows without credit for any existing flow. This Section 6-7.252 does not limit the City's ability to refuse to issue a permit to connect to the public sanitary sewer system.

B. All premises in the City shall be subject to an annual sewer service charge representing such premises' share of the burden placed on the sewer system, which amount shall be adopted by ordinance of the City Council in accordance with Government Code section 66013 and following. In those instances where premises are not connected to the sewer system, the annual sewer charge shall reflect the burden placed on the sewer system by users of the premises who are required to use public sanitary facilities.

C. In the event the City has excess proceeds of taxes as defined in Article XIIIB of the California Constitution, the City Council may return a portion of the annual sewer charge as provided by Section 2 of that article. The portion of sewer charge revenue representing the amount of excess proceeds of taxes may be set aside in a special fund to be applied in the form of a credit against the sewer charges due and owing each fiscal year. The Council may, by resolution each fiscal year, establish the precise amount to be applied against the sewer charge so as to implement the return of excess proceeds to the people. In the alternative, the Council may place a measure on the City-wide ballot to adjust the City's appropriations limit as pro-vided in Section 4 of Article XIIIB so as to use the excess proceeds for some other specified purposes.

Section 6-7.253 Minimum Credit

In calculating the additional peak flow, it shall be deemed that the existing peak flow is not less than three hundred (300) gallons per day per one thousand (1,000) square feet of lot area. Such credit shall not be applied more than once to the same lot except when the building has been demolished.

Section 6-7.254 Sewer Charge Fund - Deposits

All moneys collected pursuant to the provisions of Section 6-7.252 of this Division shall be deposited with the City Treasurer and credited to the Sewer Charge Fund.

Section 6-7.255 Sewer Charge Fund - Expenditures

Moneys deposited in the Sewer Charge Fund may be expended by the Council to accomplish any lawful purpose as set forth in Section 6-7.201 of this Article and in Section 5471 of the Health and Safety Code of the State, or for such other sewer purpose as the Council may lawfully authorize. All engineering costs, mileage, overhead, and construction costs necessarily incurred in the construction of such sewers shall be charged to the Sewer Charge Fund to the extent permitted by law, and refunds may be drawn from the Sewer Charge Fund as provided in Section 6-7.256 of this Division.

Section 6-7.256 Sewer Charge Fund - Refunds

In the event any person shall have paid the applicable sewer charge based on the additional peak flow created by the new construction as provided in this Article, and no portion of the new construction shall have been commenced and the permit for such construction shall have been canceled or expired, such person shall be entitled to a refund in an amount equal to one hundred (100%) percent of the sewer charges paid by such person, minus one percent of such charge; provided, however, the amount retained shall not be less than Ten Dollars ($10.00) and no more than One Hundred Dollars ($100.00).

Section 6-7.257 Sewer Charge Fund - Billing, Collection, Payment of Charges

A. The collection of the sewer service charges imposed by this Division shall be as a part of the annual County general tax bill authorized by the provisions of Section 38902 of the Government Code of the State.

B. The City Manager shall furnish, in writing, to the Board of Supervisors of the County and to the County Auditor descriptions of each parcel for which such charges are to be billed, together with the amount of such charges applicable to each parcel, in sufficient time to meet the schedule established by the County for inclusion on the County general tax bill.

C. As authorized by the provisions of Section 38902 of the Government Code of the State, the sewer service charges shall become a lien against the parcel of land to which it is charged in the same manner as County general taxes.

D. As authorized by the provisions of Section 38902 of the Government Code of the State, penalties shall be collected for the late payment of sewer service charges, or the amount thereof unpaid, in the manner and at the rates applicable for the late payment, or the amount thereof unpaid, of County general taxes.

Section 6-7.258 Enforcement

A. **Violation.** No person shall violate any provision or fail to comply with any of the requirements of this Division. Any violation or failure to comply with the requirements of this Division shall be a violation of this Code.

B. **Enforcement.** The City may enforce any violation of the requirements of this Division in accordance with Article 5 of this Chapter.

Sections 6-7.259 – 6-7.300 Reserved

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 3: Reserved

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 4: Reserved

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 5: Enforcement

Section 6-7.501	-	**Enforcement – Generally**
Section 6-7.502	-	**Enforcement – Administrative Remedies**
Section 6-7.503	-	**Enforcement – Civil Remedies**
Section 6-7.504	-	**Enforcement – Criminal Remedies**
Section 6-7.505	-	**Enforcement – Nonexclusive Remedies**
Section 6-7.506	-	**Enforcement – Consecutive Violations**
Section 6-7.507	-	**Notices**
Section 6-7.508	-	**Appeals**
Section 6-7.509	-	**Judicial Review**
Section 6-7.510	-	**Severability**
Sections 6-7.511 through 6-7.600	-	**Reserved**

Section 6-7.501 Enforcement – Generally

In addition to any remedies provided in this Code or available under any applicable law, the City may take any enforcement action or combination of enforcement actions provided in this Article against any person who violates any provision of this Chapter.

Section 6-7.502 Enforcement – Administrative Remedies

A. **Notice of Violation.** The Authorized Inspector may deliver to the owner or occupant of any property, or to any person who violates any provision of this Chapter, a Notice of Violation. The Notice of Violation shall be delivered in

accordance with Section 6-7.507.

1. The Notice of Violation shall identify the provision(s) of this Chapter or the applicable permit which has been violated. The Notice of Violation shall state that continued noncompliance may result in additional enforcement actions against the owner, occupant and/or person.

2. The Notice of Violation shall state a compliance date that must be met by the owner, occupant and/or person; provided, however, that the compliance date may not exceed ninety (90) days unless the Authorized Inspector extends the compliance deadline an additional ninety (90) days where good cause exists for the extension. Uncontrolled threats to public health, safety and welfare shall be abated immediately and in no case longer than thirty (30) days.

B. **Administrative Compliance Orders**. Separate from, in addition to, or in combination with, a Notice of Violation or Cease and Desist Order, the Authorized Inspector may issue an Administrative Compliance Order against the owner and/or occupant of any public or private property and/or any other person responsible for a violation of this Chapter. Issuance of a Notice of Violation or Cease and Desist Order is not a prerequisite to the issuance of an Administrative Compliance Order.

C. **Cease and Desist Orders**. The Authorized Inspector may issue a Cease and Desist Order directing the owner or occupant, or other person in charge of day-to-day operations of any public or private property and/or any other person responsible for a violation of this Chapter to:

1. Immediately discontinue any violation of this Chapter;

2. Immediately remedy any source or cause of a continuing violation of this Chapter;

3. Clean up any area affected by the violation.

D. **Monetary Penalty.**

1. In addition to, or in combination with a Notice of Violation, Administrative Compliance Order or Cease and Desist Order, the City Manager or the Authorized Inspector may issue a civil penalty for violations of this Chapter. The Notice of Violation, Administrative Compliance Order, or Cease and Desist Order to which the penalty will attach shall allege the act(s) or failure(s) to act that constitute violations of this Chapter and shall set forth the penalty for the violation. The City Manager or the Authorized Inspector may impose the following monetary penalties, in addition to other appropriate corrective action requirements:

a. An amount that shall not exceed one hundred dollars ($100.00) for

each day a person fails or refuses to provide the City with any report or information required by this Chapter.

b. An amount that shall not exceed two hundred dollars ($200.00) for each day a person fails or refuses to timely comply with a Notice of Violation or Cease and Desist Order or fails or refuses to remedy any source of a continuing violation as required by the City Manager or this Chapter.

c. An amount that shall not exceed one thousand dollars ($1,000.00) per day for each day on which a person violates Sections 6-7.223, 6-7.225, 6-7.226, 6-7.403, 6-7.404 or 6-7.409 of this Chapter.

2. The amount of any penalties imposed under this section which have remained delinquent for a period of sixty (60) days may become a special assessment against the real property of the person violating this Chapter.

3. The assessment may be collected at the same time and in the same manner as ordinary municipal taxes are collected, and shall be subject to the same penalties and the same procedure and sale in case of delinquency as provided for ordinary municipal taxes. All laws applicable to the levy, collection and enforcement of municipal taxes shall be applicable to the special assessment.

4. If the identity of the owner of the real property can be determined, the City shall make its best effort to provide notice of the special assessment to the owner by certified mail at the time of imposing the assessment. Such notice will specify that the property may be sold after three years by the tax collector for unpaid delinquent assessments. The tax collector's power of sale shall not be affected by the failure of the property owner to receive notice. Assessment of administrative fines as provided hereunder does not preclude assessment of other costs of abatement of any nuisance against the same property at a later date.

5. If any real property against which the special assessment relates has been transferred or conveyed to a bona fide purchaser for value, or if a lien of a bona fide encumbrancer for value has been created and attaches thereon, prior to the date on which the first installment of the taxes would become delinquent, then the cost of abatement shall not result in a lien against the real property but instead shall be transferred to the unsecured roll for collection.

6. A sale of vacant residential developed property for which the payment of a special assessment imposed pursuant to this Chapter is delinquent may be conducted, subject to the requirements applicable to the sale of property pursuant to Section 3691 of the Revenue and Taxation Code.

7. Notices or instruments relating to the special assessment shall be entitled

to recordation.

E. **Recovery of Costs.** The Authorized Inspector may deliver to the owner or occupant of any property, any permittee or any other person who becomes subject to a Notice of Violation or other administrative order, an invoice for costs documenting any and all costs incurred by the City in cleaning up a site, remedying a violation, and issuing the Notice of Violation or other administrative order and directing payment to the City. An invoice for costs shall be delivered in accordance with Section 6-7.507 of this Chapter. An invoice for costs shall be immediately due and payable to the City for the actual costs incurred by the City in issuing and enforcing any notice or order. If any owner or occupant, permittee or any other person subject to an invoice for costs fails to either pay the invoice for costs or successfully appeal the invoice for costs in accordance with Section 6-7.508, then the City Attorney may institute collection proceedings.

F. Unless timely appealed, an administrative compliance order shall be effective and final as of the date it is issued by the City Manager.

Section 6-7.503 Enforcement – Civil Remedies

A. **Nuisance.** Any condition in violation of the prohibitions of this Chapter shall constitute a threat to the public health, safety and welfare, and is declared and deemed a nuisance pursuant to Government Code section 38771.

1. **City Abatement.** In the event the owner of property, the operator of a facility, a permittee or any other person fails to comply with any provision of a compliance schedule issued to such owner, operator, permittee or person pursuant to this Chapter, the Authorized Inspector may request the City Attorney to obtain an abatement warrant or other appropriate judicial authorization to enter the property, abate the condition and restore the area. Any costs incurred by the City in obtaining and carrying out an abatement warrant or other judicial authorization may be recovered pursuant to Section 6-7.502.E.

   a. **Court Order to Enjoin or Abatement.** At the request of the City Manager, the City Attorney may seek a court order to enjoin and/or abate the nuisance.

   b. **Notice to Owner and Occupant.** Prior to seeking any court order to enjoin or abate a nuisance or threatened nuisance, the City Manager shall provide notice of the proposed injunction or abatement to the owner and occupant, if any, of the property where the nuisance or threatened nuisance is occurring.

2. **Emergency Abatement.** In the event the nuisance constitutes an imminent danger to public safety or the environment, the Authorized Inspector may

enter the property from which the nuisance emanates, abate the nuisance and restore any property affected by the nuisance. To the extent reasonably practicable, informal notice shall be provided to the owner or occupant prior to abatement. If necessary to protect the public safety or the environment, abatement may proceed without prior notice to or consent from the owner or occupant thereof and without judicial warrant.

3. **Reimbursement of Costs.** All costs incurred by the City in responding to any nuisance, all administrative expenses and all other expenses recoverable under State law, shall be recoverable from the person(s) creating, causing, committing, permitting or maintaining the nuisance.

4. **Nuisance Lien.** All costs shall become a lien against the property from which the nuisance emanated and a personal obligation against the owner thereof in accordance with Government Code sections 38773.1 and 38773.5. The owner of record of the property subject to any lien shall be given notice of the lien prior to recording as required by Government Code section 38773.1. At the direction of the City Manager, the City Attorney is authorized to collect nuisance abatement costs or enforce a nuisance lien in an action brought for a money judgment or by delivery to the County Assessor of a special assessment against the property in accord with the conditions and requirements of Government Code section 38773.5.

B. **Injunction.** At the request of City Manager, the City Attorney may cause the filing in a court of competent jurisdiction, of a civil action seeking an injunction against any threatened or continuing noncompliance with the provisions of this Chapter.

C. **Order for Reimbursement.** Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the City of all costs incurred in enforcing this Chapter, including costs of inspection, investigation and monitoring, the costs of abatement undertaken at the expense of the City, costs relating to restoration of the environment and all other expenses as authorized by law.

D. **Damages.** The City Manager may cause the City Attorney to file an action for civil damages in a court of competent jurisdiction seeking recovery of (i) all costs incurred in enforcement of this Chapter, including, but not limited to, costs relating to investigation, sampling, monitoring, inspection, administrative expenses, all other expenses as authorized by law, and consequential damages, (ii) all costs incurred in mitigating harm to the environment or reducing the threat to human health, and (iii) damages for irreparable harm to the environment.

E. **Damages from Trespass or Nuisance on Public Land.** The City Attorney is authorized to file actions for civil damages resulting from any trespass or nuisance occurring on public land or other property from any violation of this Chapter where the same has caused damage, contamination or harm to the environment,

public property or equipment.

Section 6-7.504 Enforcement – Criminal Remedies

A. **Infractions**. Any person who may otherwise be charged with a misdemeanor under this Chapter may be charged, at the discretion of the City Attorney, with an infraction punishable by a fine of not more than one hundred dollars ($100.00) for a first violation, two hundred dollars ($200.00) for a second violation, and a fine not exceeding five hundred dollars ($500.00) for each additional violation occurring within one (1) year.

B. **Misdemeanors**. Any person who violates any provision of this Chapter, undertakes to conceal any violation of this Chapter, continues any violation of this Chapter after notice thereof, or violates the terms, conditions and requirements of any permit issued pursuant to this Chapter, shall be guilty of a misdemeanor punishable by a fine of not more than one thousand dollars ($1,000.00) or by imprisonment for a period of not more than six (6) months, or both.

Section 6-7.505 Enforcement – Nonexclusive Remedies

Each and every remedy available for the enforcement of this Chapter shall be nonexclusive and it is within the discretion of the Authorized Inspector or City Attorney to seek cumulative remedies, except that multiple monetary fines or penalties shall not be available for any single violation of this Chapter.

Section 6-7.506 Enforcement – Consecutive Violations

Each day in which a violation occurs and each separate failure to comply with either a separate provision of this Chapter, an Administrative Compliance Order, a Cease and Desist Order or a permit issued pursuant to this Chapter, shall constitute a separate violation of this Chapter punishable by fines or sentences issued in accordance herewith.

Section 6-7.507 Notices

Delivery of Notice. Any Notice of Violation, Administrative Compliance Order, Cease and Desist Order or Invoice of Costs to be delivered pursuant to the requirements of this Chapter shall be subject to the following:

A. The notice shall state that the recipient has a right to appeal the matter as set forth in Section 6-7.508 of this Chapter.

B. Delivery shall be deemed complete upon personal service to the recipient, deposit in the U.S. mail, postage pre-paid for first class delivery, by facsimile service with confirmation of receipt, or by any other means permitted by law.

C. Where the recipient of notice is the owner of the property, the address for notice shall be the address from the most recently issued equalized assessment roll for

the property or as otherwise appears in the current records of the City.

D. Where the owner or occupant of any property cannot be located after the reasonable efforts of the City Manager or Authorized Inspector, a Notice of Violation or Cease and Desist Order shall be deemed delivered after posting on the property for a period of five (5) business days.

Section 6-7.508 Appeals

Any person subject to a Notice of Violation, Administrative Compliance Order, or Cease and Desist Order aggrieved by the issuance of an order may appeal from the issuance thereof to a hearing officer in accordance with the appeal procedures set forth in Chapter 4 of Title 1 of this Code, except that any such appeal shall be filed within fifteen (15) days of the date of service of the notice of violation, cease and desist order or administrative compliance order by the Authorized Inspector upon the appealing party. A person subject to an order to remedy a condition which poses an immediate threat to the public health, safety or welfare shall comply with that order during the pendency of any appeal. To the extent that any provision of this section conflicts with the provisions of Chapter 4 of Title 1 of this Code, the provisions contained in Chapter 4 of Title 1 shall control.

Section 6-7.509 Judicial Review

The provisions of Sections 1094.5 and 1094.6 of the Code of Civil Procedure set forth the procedure for judicial review of any act taken pursuant to this Chapter. Parties seeking judicial review of any action taken pursuant to this Chapter shall file such action within ninety (90) days of the occurrence of the event for which review is sought.

Section 6-7.510 Severability

A. If any section, subsection, subdivision, paragraph, sentence, clause or phrase added by this Chapter, or any part thereof, is for any reason held to be unconstitutional or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this Chapter or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase thereof irrespective of the fact that any or more subsections, subdivisions, paragraphs, sentences, clauses or phrases are declared unconstitutional, invalid or ineffective.

B. If any provision of this Chapter or the application of the Chapter to any circumstance is held invalid, the remainder of the Chapter or the application of the Chapter to other persons or circumstances shall not be affected

Sections 6-7.511 – 6-7.600 Reserved

Exhibit B
Avalon Municipal Code
Title 6
Chapter 13 – Water Quality Control

[Attached behind this page]

AVALON MUNICIPAL CODE

TITLE 6 – Sanitation and Health

Chapter 13 – Water Quality Control

Section 6-13.101	-	**Purpose and Intent**
Section 6-13.102	-	**Definitions**
Section 6-13.103	-	**Discharges Prohibited**
Section 6-13.104	-	**Connections Prohibited**
Section 6-13.105	-	**Control of Runoff Required – Generally**
Section 6-13.106	-	**Control of Runoff Required – Construction Projects**
Section 6-13.107	-	**Control of Runoff Required – Industrial and Commercial Facilities**
Section 6-13.108	-	**Control of Runoff Required – New Development and Redevelopment**
Section 6-13.109	-	**Monitoring and Reporting Required**
Section 6-13.110	-	**BMP Authorized and Required**
Section 6-13.111	-	**Right to Inspect**
Section 6-13.112	-	**Enforcement – Violations**
Section 6-13.113	-	**Enforcement – Administrative Remedies**
Section 6-13.114	-	**Enforcement – Civil Remedies**
Section 6-13.115	-	**Enforcement – Criminal Remedies**
Section 6-13.116	-	**Enforcement – Nonexclusive Remedies**
Section 6-13.117	-	**Enforcement – Consecutive Violations**
Section 6-13.118	-	**Notices**
Section 6-13.119	-	**Appeals**
Section 6-13.120	-	**Judicial Review**
Section 6-13.121	-	**Severability**
Sections 6-13-121 through 6-13.200	-	**Reserved**

Section 6-13.101 Purpose and Intent

This Chapter implements the Federal Water Pollution Control Act (the "Clean Water Act" or "CWA"), 33 U.S.C. Sections 1251 - 1387, and the California Water Code by prohibiting the discharge of any pollutant to navigable waters of the United States from a point source unless the discharge is authorized by a permit issued pursuant to the National Pollutant Discharge Elimination System ("NPDES") required by CWA Section 402, 33 U.S.C. Section 1342 or the Water Code, and effectively prohibits non-storm water discharges into the municipal separate storm sewer system ("MS4"). This Chapter shall be construed to assure consistency with the requirements of the Clean Water Act, its

implementing regulations, and Porter-Cologne Water Quality Control Act, and any Permit issued under the Acts.

Section 6-13.102 Definitions

For the purposes of this Chapter, the following words and phrases shall have the meanings ascribed to them by this Chapter. Words and phrases not ascribed a meaning by this Chapter shall have the meanings ascribed by the regulations implementing the National Pollutant Discharge Elimination System, Clean Water Act Section 402, and Division 7 of the California Water Code, as they may be amended from time to time, if defined therein, and if not, to the definitions in any applicable permit issued by the California Water Resources Control Board or the California Regional Water Quality Control Board, Los Angeles Region, as appropriate, as such permits may be amended from time to time.

Best Management Practices or BMPs means schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to storm water, receiving waters, or storm water conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

City means the City of Avalon, located in the County of Los Angeles, California.

City Attorney means the City Attorney of the City or an authorized deputy, agent, or representative.

City Manager means the City Manager of the City or an authorized deputy, agent, or representative.

Director means the person designated by the City Manager to administer this chapter and conduct inspections for the purpose of ensuring compliance with this Chapter or an authorized deputy, agent, or representative.

Incidental Runoff means unintended amounts (volume) of runoff, such as unintended, minimal over-spray from sprinklers that escapes the area of intended use. Water leaving an intended use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or other application, or if it is due to negligence.

Illegal Discharge means any direct or indirect non-storm water discharge to the storm drain system, except as exempted in this Chapter.

Illicit Connection means any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system, including but not

limited to any conveyance which allows non-storm water discharge, including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency. Illicit Connection also means any drain or conveyance connected to the storm drain system which has not been documented in approved plans, maps, or equivalent records.

MS4 or Municipal Separate Storm Sewer System means the publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

NPDES means National Pollution Discharge Elimination System.

Person means any individual, partnership, firm, association, corporation or public agency, including the State of California and the United States of America.

Pollutant means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes solvents, oil, automotive fluids, non-hazardous liquid and solid wastes, yard wastes, refuse, rubbish, garbage, litter, discarded or abandoned objects, ordinances, floatables, pesticides, herbicides, fertilizers, hazardous substances and wastes, sewage, fecal coliform and pathogens, dissolved and particulate metals, animal wastes, construction wastes, noxious or offensive matter of any kind.

Regulated Project means projects are those that create and/or replace 5,000 square feet or more of impervious surface. Regulated projects include new and redevelopment projects on public or private land under the planning and permitting authority of the City. Regulated projects do not include detached single family home projects that are not part of a larger plan of development, interior remodels, routine maintenance or repair such as exterior wall surface replacement and pavement resurfacing within the existing footprint, or linear utility projects ("LUP"), unless the LUP has a discrete location with 5,000 square feet or more of new contiguous impervious surface.

Storm Water means runoff from storm events, snow melt runoff and surface runoff and drainage related to precipitation events.

Waste Water means any water or other liquid other than uncontaminated storm water, discharged from a facility.

Section 6-13.103 Discharges Prohibited

A. No person shall:

1. Discharge non-storm water to the City's MS4 except in compliance with the requirements of this Chapter and in compliance with any separate individual or general NPDES permit;

2. Cause, allow or facilitate any prohibited discharge;

3. Discharge any material into the MS4, or any water body within the City's jurisdiction that may cause, or threaten to cause a condition of pollution, contamination, or nuisance within the meaning of California Water Code Section 13050;

4. Discharge to Areas of Special Biological Significance except in compliance with all applicable NPDES permits, waivers, orders and other regulatory controls;

5. Discharge of any non-incidental runoff; or

6. Discharge non-storm water, including without limitation, non-storm water used for pier, boat or surface washing, to Avalon Bay.

B. The following discharges shall not constitute prohibited discharges unless determined by the City Manager to be a significant source of pollutants, pose a threat to water quality standards, or discharge to an Area of Special Biological Significance, or otherwise meet the requirements of Section 6-13.103.C:

1. Water line flushing;

2. Diverted streamflows;

3. Rising groundwater, where ground water seepage is not otherwise regulated by a separate NPDES permit;

4. Uncontaminated groundwater infiltration to the City's MS4;

5. Uncontaminated pumped groundwater provided such discharges are compliant with all applicable permit requirements, including enrollment in any applicable NPDES Permit or Waste Discharge Requirement from the Los Angeles Regional Water Quality Control Board;

6. Discharges from potable water sources, except when used for surface washing and discharge directly or indirectly into Avalon Bay;

7. Gravity flow from foundation drains, footing drains and crawl space pumps, when ground water seepage is not otherwise regulated by a separate NPDES permit or provided such discharges are compliant with all applicable permit requirements, including enrollment in any applicable NPDES Permit or Waste Discharge Requirement from the Los Angeles Regional Water Quality Control Board;

8. Air conditioning condensation, when not otherwise regulated by a separate NPDES permit;

9. Natural springs;

10. Flows from riparian habitats and wetlands;

11. Discharges composed entirely of storm water;

12. Discharges subject to regulation under current EPA, State Water Resources Control Board, or Regional Water Quality Control Board issued NPDES permits, State General Permits, or other waivers, permits or approvals granted by an appropriate government agency;

13. Discharges from emergency fire fighting activities unless identified as a significant source of pollutants to waters of the United States;

14. Discharges of dechlorinated water from swimming pools, when not otherwise regulated by a separate NPDES permit;

15. Individual residential car washing.

C. Notwithstanding the conditional exemptions provided in Section 6-13.103.B, if the Director, independently or at the direction of the Regional Board, determines that a conditionally exempt discharge is a significant source of pollutants, threatens water quality standards, causes or significantly contributes to a violation of any receiving water limitation, results in the conveyance of significant quantities of pollutants to surface waters, or is otherwise a danger to public health or safety, the Director may prohibit, limit, or direct the control of such discharge and may take any enforcement option available under this chapter.

Section 6-13.104 Connections Prohibited

A. No person shall:

1. Construct, maintain, operate and utilize any illicit connection to the City's MS4.

2. Act, cause, permit or suffer any agent, employee, or independent contractor, to construct, maintain, operate or utilize any illicit connection.

Section 6-13.105 Control of Runoff Required – Generally

A. Every person within the City shall control incidental runoff by taking the following actions:

1. Detecting and correcting leaks within 72 hours of learning of the leak.

2. Properly design and aim sprinkler heads.

3. Cease watering during precipitation events.

4. Properly manage ponds containing recycled water such that no discharge occurs in violation of any applicable permit, state or local law or regulation.

5. Any actions necessary to prevent the discharge of non-storm water runoff to the MS4 or to the waters of the state or United States.

B. **Waste Disposal**

1. Except when deposited into containers or in lawfully established dumping areas, no person shall throw, deposit, leave, maintain, keep or permit to be thrown, deposited, placed, left or maintained any refuse, rubbish, garbage or other discarded or abandoned objects, articles and accumulations, including but no limited to dirt, green waste and animal waste, in or upon any street, alley, sidewalk, storm drain, inlet, catch basin, conduit, or other drainage structures, business place or upon any public or private lot of land in the City, so that the same may cause or contribute to pollution.

2. Each person responsible for any real property adjacent to a paved sidewalk shall maintain said sidewalk free of dirt or litter. Sweepings from sidewalk shall not be swept or otherwise made or allowed to go into the gutter or roadway, but shall be disposed of in receptacles maintained on such real property as required for garbage disposal.

3. Each person responsible for pets shall promptly pick up animal waste deposited in public areas and properly dispose of it in a trash receptacle.

Section 6-13.106 Control of Runoff Required – Construction Projects

A. **Plan Review**. Prior to and as a condition of issuing a grading permit, or building permit by the City, the appropriate department shall review the project plans and impose terms, conditions and requirements on the project to ensure compliance with this Chapter and any applicable permit. If the project will be approved without application for a grading permit, or building permit, the appropriate department shall review the project plans and impose terms, conditions and requirements on the project prior to the issuance of a discretionary land use approval or, at the City's discretion, prior to recordation of a subdivision map.

B. Every project that disturbs one acre or more of soil or disturbs less than one acre but is part of a larger common plan of development or sale is subject to the State Construction General Permit (CGP) and shall comply with all provisions of such permit. Proof of compliance with the CGP is required prior to obtaining a grading or building permit.

C. **Erosion and Sediment Control Plan**. Each operator or person responsible for the day to day operations of construction activity within the City, regardless of size, shall prepare and submit an erosion and sediment control plan prior to and as a condition of issuing a grading or building permit. The

erosion and sediment control plan shall, at a minimum, appropriate site-specific construction site BMPs, the rational used for selecting or rejecting BMPs, a quantification of expected soil loss from the BMPs, a list of applicable permits, and evidence that permits have been obtained. No construction activity shall commence before the construction site operator receives written approval of the erosion and sediment control plan from the Director or City Manager.

C. **Permit Coverage**. Prior to and as a condition of issuing construction or grading permit, a construction site operator shall demonstrate existing coverage under applicable permits, including but not limited to the State Water Board's Construction General Permit, State Water Board 401 Water Quality Certification, United States Army Corp 404 permit, and California Department of Fish and Game 1600 agreement. The City may require documentation demonstrating coverage by and compliance with any applicable permit, including copies of any notice of intent, storm water pollution prevention plans, inspection reports, monitoring results, and other information deemed necessary to assess compliance with this Chapter or any permit.

D. **BMPs**. The Director may require, as a condition to such permit, the implementation of BMPs to ensure that the discharge of pollutants from the site will be effectively prohibited and will not cause or contribute to an exceedance of water quality standards. Each construction site shall implement such BMPs to ensure that discharges of pollutants are effectively prohibited and will not cause or contribute to an exceedance of water quality standards. All construction and grading activities shall comply with applicable laws, including all applicable city ordinances and the City's NPDES Permit regulating discharges into and from the MS4.

E. **Cost Recovery**. The City shall be reimbursed by the project applicant for all costs and expenses incurred by the City in the review of project plans. The City may elect to require a deposit of estimated costs and expenses, and the actual costs and expenses shall be deducted from the deposit, and the balance, if any, refunded to the project applicant.

Section 6-13.107 Control of Runoff Required – Industrial and Commercial Facilities

A. No person shall operate or cause to be operated any industrial or commercial facility without first obtaining any required NPDES storm water permit. The City may require documentation demonstrating coverage by and compliance with any applicable permit, including copies of any notice of intent, storm water pollution prevention plans, inspection reports, monitoring results, and other information deemed necessary to assess compliance with this Chapter or any permit.

B. On receipt of written notice from the City, the owner or operator of any

industrial or commercial facility or source of storm water shall select, install, implement and maintain BMPs consistent with the CASQA Industrial/Commercial BMP Handbook or equivalent. BMPs must be designed to implement the requirements of this Chapter and any applicable permit.

C. The Director may require the responsible person for any industrial or commercial facility to enter into an agreement for the operation and maintenance of any structural control measures and to record such agreement with the County Recorder's office. The signature of the owner of the property or any successive owner shall be sufficient for the recording of these terms, conditions and requirements and a signature on behalf of the City shall not be required for recordation.

Section 6-13.108 Control of Runoff Required – New Development and Redevelopment

A. All new development and redevelopment within the City shall be undertaken in accordance with the best management practices for pollution prevention, the City's NPDES Permit for discharges into and from its MS4, and any other conditions, requirements and water quality management plans adopted by the City.

1. Regulated Projects must implement measures, as the City may require, for site design, source control, runoff reduction, storm water treatment, baseline hydromodification, low impact development, operations and maintenance verification of storm water treatment, and baseline hydromodification management structural control.

2. Regulated Projects with the following pollutant-generating activities and sources shall also implement permanent and operation source control measures, as required by the City. These source control measures shall be selected and designed consistent with CASQA's Stormwater Best Management Practice Handbook for New Development and Redevelopment, or equivalent manual:

   a. Accidental spills or leaks

   b. Interior floor drains

   c. Parking/storage areas and maintenance

   d. Indoor and structural pest control

   e. Landscape/outdoor pesticide use

   f. Pools, spas, ponds, decorative fountains, and other water features

   g. Restaurants, grocery stores, and other food service operations

h. Refuse areas

i. Industrial processes

j. Outdoor storage of equipment or materials

k. Vehicle and equipment cleaning

l. Vehicle and equipment repair and maintenance

m. Fuel dispensing areas

n. Loading docks

o. Fire sprinkler test water

p. Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources

q. Unauthorized non-storm water discharges

r. Building and grounds maintenance

s. Any other activity designated by the Director.

B. The owner of a new development or redevelopment project, or upon transfer of the property, its successors and assigns, shall implement and adhere to the terms, conditions and requirements imposed pursuant to Section 6-13.108.A on a new development or redevelopment project. Failure by the owner of the property or its successors or assigns, to implement and adhere to the terms, conditions and requirements imposed pursuant to Section 6-13.108.A shall constitute a violation of this Chapter.

C. The Director may require the responsible person for any new or redevelopment project to enter into an agreement for the operation and maintenance of any structural control measures and to record such agreement with the County Recorder's office. The signature of the owner of the property or any successive owner shall be sufficient for the recording of these terms, conditions and requirements and a signature on behalf of the City shall not be required for recordation.

Section 6-13.109 Monitoring and Spill Reporting Required

A. The City Manager may require by written notice of requirement that any person engaged in any activities or owning or operating any facility which may cause or contribute to storm water pollution, illegal discharges, or non-storm water discharges to the storm drain system or waters of the United States, to undertake at no cost to the City sampling, monitoring and analysis

and to furnish reports to the City as deemed necessary to determine compliance with this Chapter.

B. Notwithstanding any other requirement of law, any known or suspected release of materials, pollutants or waste, which may result in pollutants or non-storm water discharges entering storm water, the MS4 or waters of the State or United States, shall be reported immediately in the following manner by any person in charge of a premises or responsible for the premises' emergency response:

1. The release of a hazardous material or hazardous waste shall be immediately reported to emergency services by emergency dispatch services (911).

2. The release of a non-hazardous waste shall be reported as follows:

   a. To the Director and to the 24-hour storm water hotline by telephone no later than 5:00 P.M. on the same business day.

   b. If the release occurs after 5:00 P.M. on a weekday, on a weekend or holiday, to the 24-hour storm water hotline on the same day and to the Director by telephone on the next business day.

   c. A written notification of the release shall also be made to the Director within five business days of the release. A copy of the written notice shall be retained at the premises for at least three (3) years.

3. In addition to the above requirements, a release of any hazardous materials or substances, sewage, oil, or petroleum to any waters of the state, or discharged or deposited where it is or probably will be discharged in or on any waters of the state, shall be reported to the State Office of Emergency Services, as required by Sections 13271 and 13272 of California Water Code.

Section 6-13.110 BMP Authorized and Required

Each owner, operator, or person in charge of day to day activities of any construction site, new or redevelopment project, industrial or commercial facility, or of any other site, activity, operation, or facility that may discharge any pollutant to the MS4 shall minimize the discharge of pollutants to the MS4 through the installation, implementation and maintenance of BMPs consistent with the California Storm Water Quality Association's Best Management Practices Handbook, or equivalent, as required by the Director or City Manager. Properties with a high potential threat of discharge may be required to implement a monitoring program that meets standards as determined necessary by the City.

Section 6-13.111 Right to Inspect and Collection Information

A. **Right to Inspect**. The Director shall have the authority to make an inspection to enforce the provisions of this Chapter and to ascertain whether the purposes of this Chapter are being met.

B. **Entry to Inspect**. The Director may enter both public and private property to investigate the source or potential source of any discharge of a pollutant to any public street, inlet, gutter, storm drain or the MS4 located within the jurisdiction of the City.

C. **Compliance Assessments**. The Director may inspect property for the purpose of verifying compliance with this Chapter.

D. **Portable Equipment**. For purposes of verifying compliance with this Chapter, the Director may inspect any vehicle, truck, trailer, tank truck or other mobile equipment.

E. **Records Review**. Maintenance records must be kept on-site and remain available for inspection. Failure to keep records on site and available for inspection shall constitute a violation of this Chapter. The Director may inspect all records of the owner or person in charge of the day to day activities of private property relating to chemicals or processes presently or previously occurring on-site, including material and/or chemical inventories, facilities maps or schematics and diagrams, material safety data sheets, hazardous waste manifests, business plans, pollution prevention plans, state general permits, storm water pollution prevention plans, monitoring program plans and any other record(s) relating to illicit connections, prohibited discharges, a legal nonconforming connection or any other source of discharge or potential discharge of pollutants to the MS4.

F. **Sample and Test**. The Director may inspect, sample and test any area runoff, soils area (including groundwater testing), process discharge, materials within any waste storage area (including any contained contents) and/or treatment system discharge for the purpose of determining the potential for the discharge of pollutants to the storm water drainage system. The Director may investigate the integrity of all storm drain and sanitary sewer systems, any legal nonconforming connection or other pipelines on the private property using appropriate tests, including, but not limited to, smoke and dye tests or video surveys. The Director may take photographs or videotapes, make measurements or drawings and create any other record reasonably necessary to document conditions on the property.

G. **Monitoring**. The Director may erect and maintain monitoring devices for the purpose of measuring any discharge or potential source of discharge to the MS4.

H. **Data Collection**. The Director may require information deemed necessary to

assess compliance with this chapter or any NPDES permit.

I. **Response Plans.** The Director may, together with the City Attorney, develop and implement an Enforcement Response Plan setting forth enforcement procedures and actions to address repeat and continuing violations of this chapter and a Spill Response Plan setting forth the procedures, roles and responsibilities for investigating, cleaning up and reporting spills.

J. **Cost Recovery.** If an inspection pursuant to this section results in an enforcement action, the City may issue an invoice of costs and recover in an enforcement action its reasonable inspection costs.

Section 6-13.112 Enforcement – Violations

A. A civil or administrative violation of Section 6-13.103 or Section 6-13.104 shall occur irrespective of the negligence or intent of the violator to construct, maintain, operate or utilize an illicit connection or to cause, allow or facilitate any prohibited discharge.

B. The City Manager may, in addition to any other remedies provided in this Code or available under applicable law, take enforcement action against violators of this Chapter through any combination of the administrative enforcement options set forth below.

Section 6-13.113 Enforcement – Administrative Remedies

A. **Notice of Violation.** The Director may deliver to the owner or occupant of any property, or to any person responsible for an illicit connection or prohibited discharge a Notice of Violation. The Notice of Violation shall be delivered in accordance with Section 6-13.118 of this Chapter.

1. The Notice of Violation shall identify the provision(s) of this Chapter or the applicable permit which has been violated. The Notice of Violation shall state that continued noncompliance may result in additional enforcement actions against the owner, occupant and/or person.

2. The Notice of Violation shall state a compliance date that must be met by the owner, occupant and/or person; provided, however, that the compliance date may not exceed ninety (90) days unless the Director extends the compliance deadline an additional ninety (90) days where good cause exists for the extension. Uncontrolled sources of pollutants shall be abated immediately and in no case longer than thirty (30) days.

B. **Administrative Compliance Orders.** Separate from, in addition to, or in combination with a Notice of Violation or Cease and Desist Order, the Director may issue an Administrative Compliance Order against the owner and/or occupant of any public or private property and/or any other person responsible for a violation of this Chapter. Issuance of a Notice of Violation or Cease and Desist

Order is not a prerequisite to the issuance of an Administrative Compliance Order.

C. **Cease and Desist Orders.** The Director may issue a Cease and Desist Order directing the owner or occupant, or other person in charge of day-to-day operations of any public or private property and/or any other person responsible for a violation of this Chapter to immediately or by a specified day or time:

1. Immediately discontinue any illicit connection, or illicit discharge to the MS4;

2. Immediately contain or divert any flow of non-storm water off the property, where the flow is occurring in violation of any provision of this Chapter;

3. Immediately discontinue any other violation of this Chapter;

4. Clean up the area affected by the violation;

5. Implement BMPs and take other actions necessary to comply with the requirements of this Chapter.

D. **Monetary Penalty.**

1. In addition to, or in combination with a Notice of Violation, Administrative Compliance Order or Cease and Desist Order, the City Manager or the Director may issue a civil penalty for violations of this Chapter. The Notice of Violation, Administrative Compliance Order, or Cease and Desist Order to which the penalty will attach shall allege the act(s) or failure(s) to act that constitute violations of this Chapter and shall set forth the penalty for the violation. The City Manager or the Director may impose the following monetary penalties, in addition to other appropriate corrective action requirements:

    a. An amount that shall not exceed one hundred dollars ($100.00) for each day a person fails or refuses to provide the City with any report or information required by this Chapter;

    b. An amount that shall not exceed two hundred dollars ($200.00) for each day a person fails or refuses to timely comply with a Notice of Violation or Cease and Desist Order or fails or refuses to remedy any source of a continuing violation as required by the City Manager or this Chapter.

    c. An amount that shall not exceed one thousand dollars ($1,000.00) per day for each day on which a person violates Sections 6-13.103 or 6-7.104 of this Chapter.

2. The amount of any penalties imposed under this section which have remained delinquent for a period of sixty (60) days may become a special assessment against the real property of the person violating this Chapter.

3. The assessment may be collected at the same time and in the same manner as ordinary municipal taxes are collected, and shall be subject to the same penalties and the same procedure and sale in case of delinquency as provided for ordinary municipal taxes. All laws applicable to the levy, collection and enforcement of municipal taxes shall be applicable to the special assessment.

4. If the identity of the owner of the real property can be determined, the City shall make its best effort to provide notice of the special assessment to the owner by certified mail at the time of imposing the assessment. Such notice will specify that the property may be sold after three years by the tax collector for unpaid delinquent assessments. The tax collector's power of sale shall not be affected by the failure of the property owner to receive notice. Assessment of administrative fines as provided hereunder does not preclude assessment of other costs of abatement of any nuisance against the same property at a later date.

5. If any real property against which the special assessment relates has been transferred or conveyed to a bona fide purchaser for value, or if a lien of a bona fide encumbrancer for value has been created and attaches thereon, prior to the date on which the first installment of the taxes would become delinquent, then the cost of abatement shall not result in a lien against the real property but instead shall be transferred to the unsecured roll for collection.

6. A sale of vacant residential developed property for which the payment of a special assessment imposed pursuant to this Chapter is delinquent may be conducted, subject to the requirements applicable to the sale of property pursuant to Section 3691 of the Revenue and Taxation Code.

7. Notices or instruments relating to the special assessment shall be entitled to recordation.

E. **City's Performance of Work.** The Director may enter property to perform abatement activities or conduct clean up work in the event abatement or clean up activities ordered pursuant to this Chapter are not conducted within by the established deadline. In the event a violation of this Chapter constitutes an imminent danger to public safety or the environment, the Director may enter the property from which the violation emanates, conduct abatement activities and restore any property affected by the violation. To the extent reasonably practicable, informal notice shall be provided to the owner or occupant prior to abatement. If necessary to protect the public safety or the environment, abatement may proceed without prior notice to or consent from the owner or occupant thereof and without judicial warrant.

F. **Recovery of Costs.** The Director may deliver to the owner or occupant of any property, any permittee or any other person who becomes subject to a Notice of Violation or other administrative order or to abatement or clean up activities by the City, an invoice for costs documenting any and all costs incurred by the City in cleaning up a site and issuing the Notice of Violation or other administrative order and directing payment to the City. An invoice for costs shall be delivered in

accordance with Section 6-13.118 of this Chapter. An invoice for costs shall be immediately due and payable to the City for the actual costs incurred by the City in issuing and enforcing any notice or order. If any owner or occupant, permittee or any other person subject to an invoice for costs fails to either pay the invoice for costs or successfully appeal the invoice for costs in accordance with Section 6-13.119 then the City Attorney may institute collection proceedings.

G. Unless timely appealed, an administrative compliance order shall be effective and final as of the date it is issued by the City Manager.

Section 6-13.114 Enforcement – Civil Remedies

A. **Nuisance**. Any condition in violation of the prohibitions of this Chapter, including, but not limited to, the maintenance or use of any illicit connection or the occurrence of any prohibited discharge, shall constitute a threat to the public health, safety and welfare, and is declared and deemed a nuisance pursuant to Government Code section 38771.

1. **City Abatement**. In the event the owner of property, the operator of a facility, a permittee or any other person fails to comply with any provision of a compliance schedule issued to such owner, operator, permittee or person pursuant to this Chapter, the Director may request the City Attorney to obtain an abatement warrant or other appropriate judicial authorization to enter the property, abate the condition and restore the area. Any costs incurred by the City in obtaining and carrying out an abatement warrant or other judicial authorization may be recovered pursuant to Section 6-13.113.E.

   a. **Court Order to Enjoin or Abatement**. At the request of the City Manager, the City Attorney may seek a court order to enjoin and/or abate the nuisance.

   b. **Notice to Owner and Occupant**. Prior to seeking any court order to enjoin or abate a nuisance or threatened nuisance, the City Manager authorized designee shall provide notice of the proposed injunction or abatement to the owner and occupant, if any, of the property where the nuisance or threatened nuisance is occurring.

2. **Emergency Abatement**. In the event the nuisance constitutes an imminent danger to public safety or the environment, the Director may enter the property from which the nuisance emanates, abate the nuisance and restore any property affected by the nuisance. To the extent reasonably practicable, informal notice shall be provided to the owner or occupant prior to abatement. If necessary to protect the public safety or the environment, abatement may proceed without prior notice to or consent from the owner or occupant thereof and without judicial warrant.

3. **Reimbursement of Costs.** All costs incurred by the City in responding to any nuisance, all administrative expenses and all other expenses recoverable under State law, shall be recoverable from the person(s) creating, causing, committing, permitting or maintaining the nuisance.

4. **Nuisance Lien.** All costs shall become a lien against the property from which the nuisance emanated and a personal obligation against the owner thereof in accordance with Government Code sections 38773.1 and 38773.5. The owner of record of the property subject to any lien shall be given notice of the lien prior to recording as required by Government Code section 38773.1. At the direction of the City Manager, the City Attorney is authorized to collect nuisance abatement costs or enforce a nuisance lien in an action brought for a money judgment or by delivery to the County Assessor of a special assessment against the property in accord with the conditions and requirements of Government Code section 38773.5.

B. **Injunction.** At the request of City Manager, the City Attorney may cause the filing in a court of competent jurisdiction, of a civil action seeking an injunction against any threatened or continuing noncompliance with the provisions of this Chapter.

C. **Order for Reimbursement.** Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the City of all costs incurred in enforcing this Chapter, including costs of inspection, investigation and monitoring, the costs of abatement undertaken at the expense of the City, costs relating to restoration of the environment and all other expenses as authorized by law.

D. **Damages.** The City Manager may cause the City Attorney to file an action for civil damages in a court of competent jurisdiction seeking recovery of (i) all costs incurred in enforcement of this Chapter, including, but not limited to, costs relating to investigation, sampling, monitoring, inspection, administrative expenses, all other expenses as authorized by law, and consequential damages, (ii) all costs incurred in mitigating harm to the environment or reducing the threat to human health, and (iii) damages for irreparable harm to the environment.

E. **Damages from Trespass or Nuisance on Public Land.** The City Attorney is authorized to file actions for civil damages resulting from any trespass or nuisance occurring on public land or to the MS4 from any violation of this Chapter where the same has caused damage, contamination or harm to the environment, public property or the MS4.

Section 6-13.115 Enforcement – Criminal Remedies

A. **Infractions.** Any person who may otherwise be charged with a misdemeanor under this Chapter may be charged, at the discretion of the City Attorney, with an infraction punishable by a fine of not more than one hundred dollars ($100.00) for

a first violation, two hundred dollars ($200.00) for a second violation, and a fine not exceeding five hundred dollars ($500.00) for each additional violation occurring within one (1) year.

B. **Misdemeanors**. Any person who negligently or knowingly violates any provision of this Chapter, undertakes to conceal any violation of this Chapter, continues any violation of this Chapter after notice thereof, or violates the terms, conditions and requirements of any permit issued pursuant to this Chapter, shall be guilty of a misdemeanor punishable by a fine of not more than one thousand dollars ($1,000.00) or by imprisonment for a period of not more than six (6) months, or both.

Section 6-13.116 Enforcement – Nonexclusive Remedies

Each and every remedy available for the enforcement of this Chapter shall be nonexclusive and it is within the discretion of the Director or City Attorney to seek cumulative remedies, except that multiple monetary fines or penalties shall not be available for any single violation of this Chapter.

Section 6-13.117 Enforcement – Consecutive Violations

Each day in which a violation occurs and each separate failure to comply with either a separate provision of this Chapter, an Administrative Compliance Order, a Cease and Desist Order or a permit issued pursuant to this Chapter, shall constitute a separate violation of this Chapter punishable by fines or sentences issued in accordance herewith.

Section 6-13.118 Notices

Delivery of Notice. Any Notice of Violation, Administrative Compliance Order, Cease and Desist Order or Invoice of Costs to be delivered pursuant to the requirements of this Chapter shall be subject to the following:

A. The notice shall state that the recipient has a right to appeal the matter as set forth in Section 6-13.119 of this Chapter.

B. Delivery shall be deemed complete upon personal service to the recipient, deposit in the U.S. mail, postage pre-paid for first class delivery, facsimile service with confirmation of receipt, or by any other means permitted by law.

C. Where the recipient of notice is the owner of the property, the address for notice shall be the address from the most recently issued equalized assessment roll for the property or as otherwise appears in the current records of the City.

D. Where the owner or occupant of any property cannot be located after the reasonable efforts of the Director, a Notice of Violation or Cease and Desist Order shall be deemed delivered after posting on the property for a period of five (5) business days.

Section 6-13.119 Appeals

Any person subject to a Notice of Violation, Administrative Compliance Order, or Cease and Desist Order aggrieved by the issuance of an order may appeal from the issuance thereof to a hearing officer in accordance with the appeal procedures set forth in Chapter 4 of Title 1 of this Code except that any such appeal shall be filed within fifteen (15) days of the date of service of the notice of violation, cease and desist order or administrative compliance order by the Director upon the appealing party. A person subject to an order to remedy a condition which poses an immediate threat to the public health, safety or welfare shall comply with that order during the pendency of any appeal. To the extent that any provision of this section conflicts with the provisions of Chapter 4 of Title 1 of this Code, the provisions contained in Chapter 4 of Title 1 shall control.

Section 6-13.120 Judicial Review

The provisions of Sections 1094.5 and 1094.6 of the Code of Civil Procedure set forth the procedure for judicial review of any act taken pursuant to this Chapter. Parties seeking judicial review of any action taken pursuant to this Chapter shall file such action within ninety (90) days of the occurrence of the event for which review is sought.

Section 6-13.121 Severability

A. If any section, subsection, subdivision, paragraph, sentence, clause or phrase added by this Chapter, or any part thereof, is for any reason held to be unconstitutional or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this Chapter or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase thereof irrespective of the fact that any or more subsections, subdivisions, paragraphs, sentences, clauses or phrases are declared unconstitutional, invalid or ineffective.

B. If any provision of this Chapter or the application of the Chapter to any circumstance is held invalid, the remainder of the Chapter or the application of the Chapter to other persons or circumstances shall not be affected

ORDINANCE NO. 1118-13

AN ORDINANCE OF THE CITY OF AVALON ADDING ARTICLE 3 – PRIVATE SANITARY SEWER LATERALS AND ARTICLE 4 – FATS, OILS AND GREASE TO CHAPTER 7, TITLE 6 OF THE AVALON MUNICIPAL CODE

WHEREAS, the City of Avalon (City) owns and maintains a sewer and a municipal separate storm sewer system; and

WHEREAS, the City is required by the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, State Water Resources Control Board Order No. 2006-0003-DWQ (SSO WDR) to eliminate sanitary sewer overflows;

WHEREAS, pursuant to the Cease and Desist Order issued by the Los Angeles Regional Water Quality Control Board, Order No. R4-2012-0077 (CDO), the City is required to develop and implement a private sewer lateral replacement program to reduce the addition of inflow and infiltration from defective private sewer laterals to the City's municipal separate storm sewer system;

WHEREAS, the private sewer lateral replacement program required by the CDO must include an ordinance requiring (1) testing of private sewer laterals on sale of property, on a major remodel, and on any remodel that adds a bathroom or significant plumbing fixtures, (2) replacement of defective private sewer laterals, and (3) evidence from a landowner that defective private sewer laterals have been repaired, rehabilitated, or replaced as a condition to closing or to issuing a permit; and

WHEREAS, the CDO requires the City to develop and implement a Fats, Oil and Grease Blockage Control Program that will ensure compliance with the SSO WDR.

NOW THEREFORE THE CITY COUNCIL OF THE CITY OF AVALON DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Article 3 – Private Sanitary Sewer Laterals of Chapter 7 – Sewers of Title 6 – Sanitation and Health of the Avalon Municipal Code is hereby adopted and added to the Avalon Municipal Code to read as set forth in Exhibit A to this Ordinance, which Exhibit is incorporated by this reference as if set forth fully at this point.

Section 2. Article 4 – Fats, Oils and Grease of Chapter 7 – Sewers of Title 6 – Sanitation and Health of the Avalon Municipal Code is hereby adopted and added to the Avalon Municipal Code to read as set forth in Exhibit B to this Ordinance, which Exhibit is incorporated by this reference as if set forth fully at this point.

Section 3. Severability
The provisions of this Ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance, or the application thereof to any person or circumstance shall be held invalid, such invalidity shall not affect the other provisions of this Ordinance or the application of those provisions.

Section 4. Effective Date
This Ordinance shall become effective thirty (30) days after its adoption.

Section 5. Exemption from California Environmental Quality Act.
The City finds that the amendments to the Municipal Code, made pursuant to this Ordinance, are exempt from the California Environmental Quality Act ("CEQA") because the amendments are an action by a regulatory agency as authorized by state law, local ordinance or resolution for the protection of natural resources (i.e., water) under State CEQA Guidelines Section 15307 and the environment under State CEQA Guidelines Section 15308. The amendments will protect natural resources and the environment through the implementation of discharge procedures, water runoff controls, monitoring and reporting requirements, and enforcement provisions. Through these provisions, and others implemented by the amendments, the City will assure the maintenance, restoration, enhancement or protection of a natural resource and the environment. The City has also determined that the exceptions provided in State CEQA Guidelines Sections 15300.2 do not apply because the amendments' enforcement and inspection provisions, among others restrictive provisions, will protect the environment and do not otherwise involve unusual circumstances or cumulative effects. The City Clerk shall be the custodian of record for the documentation supporting this action. Staff is hereby directed to file a Notice of Exemption with the Los Angeles County Clerk's Office within five (5) working days.

Section 6.
The City Clerk is directed to certify the adoption of this Ordinance and cause the same to be published as required by law.

INTRODUCED AND ALL READINGS WAIVED at a Regular Meeting of the City Council of the City of Avalon, California, on the 21st day of May, 2013, and thereafter ADOPTED at a Regular Meeting of said City Council held on the 4th day of June, 2013, by the following vote to wit:

AYES: Mayor Kennedy, Councilmembers Hernandez, Morrow, Olsen and Ponce
NOES: None
ABSENT: None
ABSTAIN: None

Robert Kennedy, Mayor

ATTEST:

Denise Radde, City Clerk

Exhibit A
Avalon Municipal Code
Title 6 - Sanitation and Health
Chapter 7 – Sewers
Article 3 – Private Sanitary Sewer Laterals

[Attached behind this page]

AVALON MUNICIPAL CODE

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 3: Private Sanitary Sewer Laterals

Section 6-7.301	-	**Purpose and Findings**
Section 6-7.302	-	**Definitions**
Section 6-7.303	-	**Private Sewer Lateral Inspection, Maintenance, Repair, Rehabilitation and Replacement – Required**
Section 6-7.304	-	**Private Sewer Lateral Notice, Inspection and Inspection Report - Requirements**
Section 6-7.305	-	**Private Sewer Lateral Maintenance, Repair, Rehabilitation and Replacement – Requirements**
Section 6-7.306	-	**Violation and Enforcement**
Section 6-7.307	-	**Private Sewer Lateral Program Authorized**
Section 6-7.308	-	**Private Sewer Lateral Fees**
Sections 6-7.309 through 6-7.400	-	**Reserved**

Section 6-7.301 Purpose and Findings

A. **Purpose**. The purpose of this Article is to protect the public health, safety and welfare by establishing regulations for the inspection, maintenance, repair, rehabilitation and replacement of private sewer laterals by property owners within the City.

B. **Findings**. When not properly inspected, maintained, repaired or replaced by property owners, private sewer laterals may become blocked and result in overflows of sewage from the private sewer laterals. Such sewage overflows negatively impact the public health, safety and welfare of both the property owner and the public by exposing them to untreated sewage. Such sewage overflows could also result in illicit discharges of sewage from private property to the public storm drains or waters of the United States or the State. Further, private sewer laterals that are not properly inspected, maintained, repaired or replaced by property owners can interfere with the operation of the public sewer system. Interference with the operation of the public sewer system may, in turn, cause sewage overflows from the public sewer system. Moreover, private sewer laterals that are not properly inspected, maintained, repaired or replaced by property owners may contain defects that result in the leakage of sewage from the private lateral to the ground water and ultimately to Avalon Beach. Therefore, the establishment of regulations for private sewer laterals is necessary to protect the public health, safety and welfare by both preventing overflows from the private laterals, interference with the operation of the public sewer system and leakage of sewage from private sewer laterals to groundwater and ultimately to Avalon Beach.

Section 6-7.302 Definitions

As used in this Article, the following terms shall have the following meanings:

Commercial Property means all types of nongovernmental commercial uses, including hospitals, hotels, motels and rooming houses, operated within the City, including such uses located on property which is zoned "C" (commercial), "SC" (special commercial), "R/R" (resort/recreation) on the City's official zoning map, as it may be amended from time to time.

Common Interest Development means a development characterized by individual ownership of a unit or parcel coupled with the shared ownership or right to use common areas and facilities, including, but not limited to, condominium projects, community apartment projects, stock cooperatives and planned developments.

Licensed Plumber means a plumbing contractor with a valid C36 contractor's license.

Section 6-7.303 – Private Sewer Lateral Inspection, Maintenance, Repair, Rehabilitation and Replacement – Required

A. **Property Owner's Obligation.** Each property owner shall, at the property owner's expense, inspect, maintain in good working order, repair, rehabilitate and replace, as necessary, the private sewer lateral so that it does not cause or contribute to any sewage leakage or overflow from either the private sewer lateral or the public sewer. The private sewer lateral shall be free of displaced joints, open joints, root intrusion, substantial deterioration of the line, cracks, leaks, inflow, infiltration of extraneous water, fats, oils and grease, sediment deposits or any other similar conditions, defects or obstructions likely to cause or contribute to blockage of the private sewer lateral or the public sewer.

B. **Private Sewer Laterals not Part of Public Sewer System.** The private sewer laterals are the property of the property owner and are not part of the public sewer. Nothing in this Article shall be interpreted as changing the private nature of the private sewer laterals or incorporating them into the public sewer.

Section 6-7.304 – Private Sewer Lateral Notice, Inspection and Inspection Report - Requirements

A. **Authorization to Issue Notice.** The City may issue a written notice that an inspection is required whenever it determines from its operation, maintenance or inspection of the public sewer, or through any other means, that a private sewer lateral is defective or otherwise in a condition that might cause leakage from or blockage in the private sewer lateral or the public sewer. Conditions that render the private sewer lateral defective or in a condition that might cause a blockage include, but are not limited to, displaced joints, open joints, root intrusion, substantial deterioration of the line, cracks, leaks, inflow, infiltration of extraneous water, fats, oils and grease, sediment deposits or any other similar conditions, defects or obstructions likely to cause or contribute to blockage of the private sewer lateral or the public sewer. The City's written notice shall set forth a reasonable time in which the inspection must occur and shall require the property owner to submit an inspection report meeting the requirements of this Article to the City within a reasonable time, to be specified in the City's written notice, after completion of the inspection.

B. **Inspection and Report Upon Notice from City.** A property owner shall cause the private sewer lateral to be inspected by a licensed plumber upon receipt of written

notice from the City that an inspection is required. Such inspection must occur within the time established by the written notice for the inspection.

C. **Inspection and Report Upon Sale of Property**. A property owner shall have the private sewer lateral inspected by a licensed plumber prior to and as a condition precedent to any sale of the property. An inspection report meeting the requirements of this Article shall be prepared and submitted to the buyer, with a copy to the City, prior to any sale of the property.

D. **Inspection and Report for Common Interest Developments and Commercial Properties**. In addition to the requirements of this Section, the property owner or property owners of any common interest development or commercial property shall have the private sewer lateral inspected in accordance with the requirements of this Article once every ten (10) years beginning January 1st of the year following the adoption of this Article. A copy of the inspection report shall be provided to the City within thirty days of the property owner's receipt of the report.

E. **Inspection and Report for Significant Construction, Remodeling, or Change in Use**. Whenever a property owner undertakes any of the following activities, the property owner shall cause a licensed plumber to inspect the private sewer lateral:

1. Applies for any permit or other approval needed for construction, remodeling, modification or alteration of any structure with a private sewer lateral within the City;

2. Engages in any activities on the property that require an application for a permit to be made;

3. Undertakes significant remodeling (remodel costs exceed $75,000.00); or

4. Undertakes a remodel to add a bathroom or major plumbing.

An inspection report meeting the requirements of this Article shall be prepared and submitted to the City, prior to the issuance of any permit or other approval needed for construction, remodeling, modification or alteration.

F. **Inspection and Inspection Report Standards**. All inspections and inspection reports required by this Article shall be completed in accordance with the following requirements:

1. The inspection and inspection report shall be completed by a licensed plumber.

2. The inspection shall include, at a minimum, a video inspection of the private sewer lateral.

3. The inspection and inspection report shall identify all of the following:

   a. Displaced joints, open joints, root intrusion, substantial deterioration of the line, cracks, leaks, inflow or infiltration of extraneous water, sediment deposits or other conditions likely to cause or contribute to blockage of the private lateral or the public sewer.

b. Any connection by pipe or otherwise, that allows rainwater or groundwater to enter the private lateral or public sewer.

c. Any backwater device installed in the private sewer lateral and the condition of the backwater device.

d. All corrective actions that must be taken to maintain, repair, rehabilitate or replace the private sewer lateral and the estimated time and cost associated with such maintenance, repair, rehabilitation or replacement.

4. The inspection report shall contain a recording of the video inspection of the private sewer lateral in a format acceptable to the City.

Section 6-7.305 – Private Sewer Lateral Maintenance, Repair, Rehabilitation and Replacement – Requirements

A. **Maintenance, Repair, Rehabilitation and Replacement in Response to City Notice.** Based upon the inspection report required by Section 6-7.304.A or B, the City may provide the property owner with a written notice to maintain, repair, rehabilitate or replace the private sewer lateral by taking specified corrective actions by a date to be specified in the written notice. In establishing the date by which the work must be completed, the City may take into account the cost of the work and the risk that the private sewer lateral will leak or overflow. The property owner must cause the corrective actions specified in the written notice to be taken by a licensed plumber within the time specified in the notice and in accordance with this Article. The property owner shall provide the City with written notice of completion of the corrective actions in accordance with the requirements set forth in the City's written notice.

B. **Maintenance, Repair, Rehabilitation and Replacement Upon Sale of Property**. Based upon the inspection report required by Section 6-7.304.C, the property owner shall cause a licensed plumber to perform the corrective actions identified in the inspection report prior to the sale of the property and in accordance with the requirements of this Article. The property owner shall provide the City with written notice of completion of the corrective actions prior to the sale of the property. The property owner and the buyer may agree on who will pay for the costs of the corrective work.

C. **Maintenance, Repair, Rehabilitation and Replacement Upon Inspection of Commercial Property or Common Interest Development**. Based upon the inspection report required by Section 6-7.304.D, the property owner shall cause a licensed plumber to perform the corrective actions identified in the inspection report. The property owner shall cause the work to be completed within a reasonable time after receiving the report, but in no case later than six months after receipt of the report. Upon written request, the City may grant additional time to complete the work, taking into account the cost of repairs and the risk that the private lateral will overflow. The property owner shall provide the City with written notice of completion of the corrective action within thirty days of completion of the work.

D. **Maintenance, Repair, Rehabilitation and Replacement for Significant Construction, Remodeling, or Change in Use.** Based on the inspection report required by Section 6-7.304.E, the property owner shall cause a licensed plumber to perform the

corrective actions identified in the inspection report prior to final approval of a permit by the City.

E. **Use of Best Management Practices During Maintenance, Repair, Rehabilitation and Replacement Work.** The property owner shall cause its licensed plumber to use all reasonable and feasible best management practices when performing the maintenance, repair, rehabilitation or replacement work required by this Article. Such best management practices must be employed to prevent the maintenance, repair, rehabilitation or replacement work from causing or contributing to an overflow of the private sewer lateral or the public sewer, including, without limitation, preventing debris, root-balls, sediment or fats, oils and grease from being flushed into the public sewer.

Section 6-7.306 – Violation and Enforcement

A. **Violation.** No person shall violate any provision or fail to comply with any of the requirements of this Article, including any provision of the private sewer lateral program adopted pursuant to Section 6-7.307. Any violation or failure to comply with the requirements of this Article shall be a violation of this Code.

B. **Public Nuisance.** Any violation or failure to comply with the requirements of this Article shall constitute a public nuisance. The city attorney is authorized to commence necessary proceedings provided by local or state law to abate, remove and enjoin such public nuisance.

C. **Enforcement.** The City may enforce any violation of the requirements of this Article in accordance with Article 5 of this Chapter.

Section 6-7.307 – Private Sewer Lateral Program

The City Manager may prepare and administratively adopt a private sewer lateral program to provide administrative guidance on the implementation and enforcement of this Article. The City Manager may update the private sewer lateral program administratively as needed to achieve the applicable performance standards for the public sewer.

Section 6-7.308 – Fees

The City may establish fees by resolution for the administration of this Article.

Sections 6-7.309 – 6-7.400 Reserved

Exhibit B
Title 6 - Sanitation and Health
Chapter 7 – Sewers
Article 4 – Fats, Oils and Grease

[Attached behind this page]

AVALON MUNICIPAL CODE

TITLE 6 – Sanitation and Health

Chapter 7 – Sewers

Article 4: Fats, Oils, and Grease

Section 6-7.401	-	Purpose and Intent
Section 6-7.402	-	Definitions
Section 6-7.403	-	Discharge Prohibition
Section 6-7.404	-	Adoption of the FOG Control Program
Section 6-7.405	-	Food Service Establishment – Connection Permit Required
Section 6-7.406	-	Food Service Establishment – Connection Permit Application
Section 6-7.407	-	Food Service Establishment – Duration of Connection Permit
Section 6-7.408	-	Food Service Establishment – Connection Permit Non-Transferable
Section 6-7.409	-	Food Service Establishment – Revocation of Connection Permit
Section 6-7.410	-	Food Service Establishment – FOG Control Program Fees
Section 6-7.411	-	Food Service Establishment – Maintenance Reports
Section 6-7.412	-	Grease Interceptor – Required
Section 6-7.413	-	Grease Interceptor – Variance or Waiver
Section 6-7.414	-	Grease Interceptor – Design and Maintenance Standards – Generally
Section 6-7.415	-	Grease Interceptor – Design and Maintenance Standards - Design Provisions
Section 6-7.416	-	Grease Interceptor – Design and Maintenance Standards - Maintenance Provisions
Section 6-7.417	-	Grease Trap - Required
Section 6-7.418	-	Best Management Practices – Required
Section 6-7.419	-	Monitoring and Inspection Requirements
Section 6-7.420	-	Right of Entry
Section 6-7.421	-	Enforcement

Sections 6-7.422 through 6-7.500	-	**Reserved**

Section 6-7.401 Purpose and Intent

A. The purposes of this Article are to:

1. Prevent blockages and overflows from sewer lines caused by the discharge of fats, oils and grease;
2. Reduce the adverse affects on sewage treatment operations resulting from discharges of fats, oils, and grease into the system;
3. Specify requirements for fat, oil and grease producing facilities discharging into the public sanitary sewer; and
4. Protect public health and the environment by minimizing public exposure to unsanitary conditions.

B. The intent of this Article is to use the police power of the City to regulate the direct and indirect discharge of waste containing fats, oils, and grease into the public sanitary sewer in a manner that complies with all applicable laws, including the federal Clean Water Act, California Water Code, and applicable waste discharge requirements. It is the intent of this Article to protect the public health, safety and welfare by establishing regulations for the disposal of grease and other insoluble waste discharges from food service establishments within the City.

C. The City Council, in enacting this Chapter, intends to provide for the maximum beneficial public use of the public sewer, to prevent blockages of that system and the accidental discharge of wastewater into the storm drain system or the Pacific Ocean, to ensure the cost of maintaining the public sewer is equitably distributed among users, to clarify grease disposal requirements for existing food service establishments, and to promote public health, safety and welfare.

D. In the event of any conflict or inconsistency between the provisions of this Article and the provisions of the Plumbing Code as adopted by this Code, the provisions of this Article shall govern.

Section 6-7.402 Definitions

As used in this Article, the following terms are defined:

Effluent means any liquid outflow from the Food Service Establishment that is discharged to the public sanitary sewer.

Fats, Oils, and Grease or FOG means any substance such as a vegetable or animal product that is used in, or is a by product of, the cooking or food preparation process, and that turns or may turn viscous or solidifies with a change in temperature or other conditions.

Food Service Establishment or **FSE** means any food preparation establishment, restaurant, cafeteria, or any other establishment preparing food for consumption. Residences are not considered food service establishments under this definition.

Food Grinder means any device whose purpose is to grind food waste or food

preparation by products for the purpose of disposing it in the sewer system.

Grease Control Device means any grease interceptor, grease trap or other mechanism, device, or process, which attaches to, or is applied to, wastewater plumbing fixtures and lines, the purpose of which is to trap or collect or treat FOG prior to it being discharged into the public sewer system.

Grease Interceptor means a multi-compartment device that is constructed in different sizes and is generally required to be located, according to the Plumbing Code, underground between a Food Service Establishment and the connection to the public sewer system. These devices primarily use gravity to separate FOG from the wastewater as it moves from one compartment to the next. These devices must be cleaned, maintained, and have the FOG removed and disposed of in a proper manner on regular intervals to be effective.

Grease Trap means a control device that is used to serve individual fixtures and has limited effect and should only be used in those cases where the use of a grease interceptor or other grease control device is determined to be impossible or impracticable.

Plumbing Code means the California Plumbing Code, as adopted by reference into the Avalon Municipal Code, together with any local amendments thereto.

Pretreatment means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into the public sanitary sewer. Pretreatment may be obtained through physical, chemical, or biological processes, process changes, or by other means approved by the City.

Remodel means a physical change or operational change causing generation of the amount of FOG that exceed the current amount of FOG discharge to the sewer system by the Food Service Establishment in an amount that alone or collectively causes or creates a potential for sanitary sewer overflows to occur or exceeding a cost of $50,000 to a Food Service Establishment that requires a building permit, and involves any one or combination of the following: (1) under slab plumbing in the food processing area; (2) a 30% increase in the net public seating area; (3) a 30% increase in the size of the kitchen area; or (4) any change in the size or type of food preparation equipment.

Section 6-7.403 Discharge Prohibition

A. **General Prohibition.** No person shall discharge or cause to be discharged into the public sewer system from a Food Service Establishment any FOG that may accumulate and/or cause or contribute to blockages in the public sewer system or at the private sewer lateral which connects the Food Service Establishment to the public sewer system.

B. **Food Grinders.** No person shall install food grinders in the plumbing system of new constructions of Food Service Establishments. Furthermore, all food grinders shall be removed from all existing Food Service Establishments within 180 days of formal notification by the City that this Article has become effective, except as expressly allowed by the City Manager.

C. **Additives.** No person shall introduce any additives into a Food Service

Establishment's wastewater system for the purpose of emulsifying FOG, unless a specific written authorization from the City Manager is obtained.

D. **Waste Cooking Oil.** No person shall dispose of waste cooking oil into drainage pipes. All waste cooking oils shall be collected and stored properly in receptacles such as barrels or drums for recycling or other acceptable methods of disposal.

E. **Dishwasher Wastewater.** No person shall discharge wastewater from dishwashers to any grease trap or grease interceptor.

F. **Wastewater Temperature.** No person shall discharge wastewater with temperatures in excess of 140°F to any grease control device, including grease traps and grease interceptors.

G. **Fecal Material.** No person shall discharge wastes from toilets, urinals, wash basins, or other fixtures containing fecal materials to sewer lines intended for grease interceptor service, or vice versa.

H. **Grease Control Device.** No person shall discharge any waste including FOG and solid materials removed from a grease control device to the sewer system. Grease removed from grease interceptors shall be wastehauled periodically as part of the operation and maintenance requirements for grease interceptors.

Section 6-7.404 Adoption of the FOG Control Program

The City Manager may prepare and administratively adopt a fats, oils and grease (FOG) program to provide administrative guidance on the implementation and enforcement of this Article. The City Manager may update the FOG program administratively as needed to achieve the applicable performance standards for the public sewer.

Section 6-7.405 Food Service Establishment – Connection Permit Required

Every food service establishment shall obtain a permit from the City Manager prior to discharging wastewater to the public sanitary sewer, pursuant to Section 6-7.225, within 180 days of receiving notice from the City that such permit is required. The connection permit issued to a FSE pursuant to this Section may require pretreatment of wastewater prior to discharge, restriction of peak flow discharges, discharge of certain wastewater only to specified sewers of the City, relocation of point of discharge, prohibition of discharge to certain wastewater components, restrictions of discharge to certain hours of the day, payment of additional charges to defray increase costs of the city created by the wastewater discharge, and other conditions as may be required to effectuate the purpose and intent of this Chapter. No person shall discharge wastewater in excess of the quantity or quality limitations set by any permit issued pursuant to this Section and any other applicable requirements pursuant to federal, state or local law.

Section 6-7.406 Food Service Establishment – Connection Permit Application

In addition to the application requirements of Section 6-7.227, an FSE shall submit the following information:

1. Name and address of applicant;
2. Volume of wastewater to be discharged;

3. Time of daily food preparation operations;
4. Description of food preparation, type, number of meals served, cleanup procedures, dining room capacity, number of employees and size of kitchen; and
5. Any other information as may be deemed necessary by the City Manager to evaluate the permit application.

The City Engineer may require additional information and an on-site inspection of the waste discharge system, treatment systems or other system relating to the waste discharge. Within thirty (30) days of the submission of an application deemed complete by the City Manager, the City shall either issue subject to certain terms and conditions or deny a FSE sewer connection permit.

Section 6-7.407 Food Service Establishment - Duration of Permit

A permit issued pursuant to this Article shall be issued for a specified time period not to exceed five years. The terms and conditions of the permit may be subject to modification by the city during the term of the permit as deemed necessary by the city engineer. The FSE shall be informed of any proposed changes in the permit at least thirty days prior to the effective date of change. Any changes or new conditions in the permit shall include a reasonable time schedule for compliance.

Section 6-7.408 Food Service Establishment - Permit Non-Transferable

A permit issued pursuant to this Article shall be issued only for specific use for a specific operation. Any sale, lease, transfer or assignment of the use or operation for which the permit issued shall require a new permit. Any new or changed conditions of use or operation may also require a new permit.

Section 6-7.409 Food Service Establishment - Revocation of Permit

The City Manager may revoke any permit issued to any FSE found to be in violation of the requirements of this Chapter or for any of the following:

a. Failing to comply with the conditions of the permit;
b. Failing to install any required grease control device as required by the permit;
c. Failing to comply with the reporting or pretreatment requirements or pretreatment device maintenance as required by the permit;
d. Failing to comply with a notice of violation or a compliance schedule agreement or any other provision of this Code;
e. Falsifying information in a permit application, making false representations or submitting false documents, reports or logs to the city engineer;
f. Refusing to allow inspections during normal business hours or after hours if emergency conditions exist such as an overflow or suspected overflow;
g. Interfering with an inspection or the sampling authorized pursuant to this Chapter; or
h. Causing or contributing to sewer blockages or sewer overflows within the public sewer or failing to address the conditions leading to more than one overflow event

from a private system within a twelve-month period.

Section 6-7.410 Food Service Establishment – FOG Control Program Fees

a. **General.** Fees identified in this Article shall be established from time to time by resolution of the City Council.

b. **Permit Fee.** Permit fees shall be collected in conjunction with the issuance of the permit.

c. **Inspection Fee.** A fee based on the specified frequency of inspection as outlined in the FOG control program shall be collected at the time of permit issuance.

d. **Re-Inspection Fee.** A re-inspection fee may be collected for additional inspections required to determine whether specified corrective actions for noted violations of this Chapter have been implemented and if additional improvements are required.

Section 6-7.411 Maintenance Reports

Food Service Establishments shall maintain records of grease control device cleaning, maintenance and grease removal and report on such maintenance to the City as requested. The city engineer may require the FSE to provide results of periodic measurements of its discharge which may include chemical analysis of oil and grease content.

Section 6-7.412 Grease Interceptor – Required

A. **Generally.** Food Service Establishments are required to install, operate and maintain an approved type and adequately sized grease interceptor necessary to maintain compliance with the objectives of this Article. The grease interceptor shall be adequate to separate and remove FOG contained in wastewater discharges from Food Service Establishments prior to discharge to the sewer system. Fixtures, equipment, and drain lines located in the food preparation and clean up areas of Food Service Establishments that are sources of FOG discharges, including but not limited to three-compartment sinks, scullery (preparation) sinks, floor drains, mop sinks along a cook line, prewash sinks at dishwashing stations, shall be connected to the grease interceptor.

B. **Plan Review.**

1. Applicants or users are required to submit copies of detailed facility proposed grease interceptors, pretreatment facilities, spill containment facilities, and operating procedures, prepared by a licensed and registered professional engineer, together with a fee established by resolution of the City Council, to the City. Facility plans shall also include site plans, floor plans, mechanical and plumbing plans, and details to show all wastewater plumbing, spill containment, and appurtenances by size, location, and elevation. The review of the plans and procedures shall in no way relieve the user of the responsibility of modifying the facilities or discharge, and to meet the requirements of this Article or any requirements of other regulatory agencies.

2. The design, location and procedures for operation and maintenance of a required grease interceptor shall be approved by the City Manager. Such approval shall be obtained prior to the user's connection of the facility to the public

wastewater system.

3. No food service establishment or other identified user shall be constructed except according to plans and specifications approved by the City Manager.

4. Approved plans and specifications shall not be changed or altered without written approval by the City Manager.

C. **Compliance with this Section Shall be Established as Follows:**

1. New Construction of Food Service Establishments. New construction of Food Service Establishments shall include and install grease interceptors prior to commencing discharges of wastewater to the sewer system.

2. Existing Food Service Establishments.

a. For existing Food Service Establishments, the requirement to install and to properly operate and maintain a grease interceptor may be conditionally stayed, that is, delayed in its implementation, on written approval from the City Manager for up to three years after the effective date of this Article. The City Manager may also issue additional stays, as appropriate, and variances or waivers as set forth in Section 6-7.405.

b. Existing Food Service Establishments that have reasonable potential to adversely impact the sewer system or have sewer laterals connected to hot spots, as determined by the Program Manager, shall install grease interceptors within 180 days of formal notice from the Program Manager to install such a grease interceptor.

c. Existing Food Service Establishments undergoing remodeling or a change in operations as defined in Section 6-7.402 of this Article, or Food Service Establishments that change ownership, shall install a grease interceptor.

Section 6-7.413 Grease Interceptor – Variance or Waiver

A. **Variance from Grease Interceptor Requirements**. A variance from the grease interceptor requirements to allow alternative pretreatment technology that is, at least, equally effective in controlling the FOG discharge in lieu of a grease interceptor may be granted to Food Service Establishments demonstrating that it is impossible or impracticable to install, operate or maintain a grease interceptor. The City Manager's determination to grant or revoke a variance will be based on, but not limited to, evaluation of the following conditions:

1. There is no adequate space for installation and/or maintenance of a grease interceptor.

2. There is no adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private collection lines or the public sewer.

3. The Food Service Establishment can justify that the alternative pretreatment technology is equivalent or better than a grease interceptor in

controlling its FOG discharge. In addition, the Food Service Establishment must be able to demonstrate, after installation of the proposed alternative pretreatment, its effectiveness to control FOG discharge through downstream visual monitoring of the sewer system, for at least three months, at its own expense. A Variance may be granted if the results show no visible accumulation of FOG in its lateral and/or tributary downstream sewer lines.

B. **Conditional Waiver from Installation of Grease Interceptor.** A conditional waiver from installation of a grease interceptor may be granted for Food Service Establishments that have been determined to have negligible FOG discharge and insignificant impact to the sewer system. The City Manager's determination to grant or revoke a conditional waiver shall be based on, but not limited to, evaluation of the following conditions:

1. Quantity of FOG discharge as measured or as indicated by the size of Food Service Establishment based on seating capacity, number of meals served, menu, water usage, amount of on-site consumption of prepared food and other conditions that may reasonably be shown to contribute to FOG discharges.
2. Adequacy of implementation of Best Management Practices and compliance history.
3. Sewer size, grade, condition based on visual information, FOG deposition in the sewer by the Food Service Establishment, and history of maintenance and sewage spills in the receiving sewer system.
4. Changes in operations that significantly affect FOG discharge.
5. Any other condition deemed reasonably related to the generation of FOG discharges by the City Manager.

C. **Application for Waiver or Variance of Requirement for Grease Interceptor.** A Food Service Establishment may submit an application and fee in an amount established by Resolution of the City Council, for waiver or variance from the grease interceptor requirement to the City Manager. The Food Service Establishment bears the burden of demonstrating, to the City Manager's reasonable satisfaction, that the installation of a grease interceptor is not feasible or applicable. Upon determination by the Program Manager that reasons are sufficient to justify a variance or waiver, the permit will be issued or revised to include the variance or waiver and relieve the Food Service Establishment from the requirement.

D. **Revocation of Waiver or Variance.** A waiver or variance may be revoked at any time when any term or condition for its issuance is not satisfied or if the conditions on which the waiver was based change so that the justification for the waiver or variance no longer exist.

Section 6-7.414 Grease Interceptor – Design and Maintenance Standards – Generally

A. The installation of a proper grease interceptor shall be the responsibility of the

person who applies for the connection and the person whose operations cause or contribute to the necessity for a grease interceptor.

B. Grease interceptors shall be installed, utilized, and properly maintained for continuous and efficient operation at all times and at the expense of the user.

C. The City Manager shall approve the type, capacity and construction of all grease interceptors in writing prior to installation.

D. A common grease interceptor shared by multiple businesses may be utilized only if specifically authorized by the City Manager and upon evidence of legal operating and maintenance agreements between the involved property owners.

E. Grease interceptors no longer in use shall be abandoned in accordance with the Plumbing Code.

Section 6-7.415 Grease interceptor – Design and Maintenance Standards - Design Provisions.

A. Grease interceptors for food service establishments shall be sized and designed in compliance with the Plumbing Code, unless otherwise specified herein.

B. Other factors that may influence the design include, but shall not be limited to, the following:

1. The type of facility (such as a restaurant, bakery, food processing factory, etc.);

2. The volume of the user's business or operation (such as number of meals served, number of seats, hours of operation, etc.);

3. The peak flow of process wastewater discharged to the collection system;

4. Size and nature of facilities (including kitchen facilities) based on size, type, number of fixtures, and type of processing or cooking equipment used;

5. The type of service provided or operation undertaken (such as dine-in meal service versus carry-out meal service);

6. The type of foods or other materials used in cooking, processing or manufacturing operations conducted within the facility;

7. The overall potential for grease-laden discharges;

8. The existence of devices, procedures or processes designed to minimize the amount of fats, oil or grease from entering the collection system;

9. The location of the facility, if it is located in a known problem area;

10. Any prior problems with the facility, such as blockages, violations, etc.

C. All grease interceptors shall be certified by the International Association of Plumbing and Mechanical Officers, or another listing agency approved by the City Manager, and be installed according to the Plumbing Code.

D. All grease interceptors shall include an effluent sample box of a type and size

approved by the City Manager.

E. Inspection by the City Manager, or an authorized inspector, of installed grease interceptors and piping prior to backfilling is required. Piping shall meet the requirements of the Plumbing Code.

F. Grease interceptors shall have a sanitary tee located inside the sample box on the discharge side of the sample box.

G. Grease interceptors shall have a cleanout installed after the sample box on the private lateral and at intervals required by the Plumbing Code.

H. All manholes and sample boxes are to be installed a minimum of one-half inch above the finished grade with a concrete collar a minimum of eighteen inches around the manhole and sample box lids.

Section 6-7.416 Grease Interceptor – Design and Maintenance Standards - Maintenance Provisions

A. Any user who is required by the City Manager or this Article to install or operate a grease interceptor shall be required to adequately maintain the grease interceptor at the user's expense, so that the grease interceptor is in proper working order at all times. Maintenance shall include the complete removal of all contents, including floating materials, wastewater, sludge and solids. Decanting or discharging of removed waste back into the grease interceptor from which the waste was removed or into any other grease interceptor, for the purpose of reducing the volume to be hauled is prohibited.

B. Grease interceptors shall be cleaned out completely by a permitted waste hauler as necessary to assure that the grease interceptor will operate as designed at all times or as otherwise specified by the City Manager.

C. A maintenance log indicating each pumping of a grease interceptor for the previous twelve months and any other pertinent information shall be maintained by each Food Service Establishment. This log shall include, but not be limited to, date, time, amount pumped, hauler, and disposal site, and the log shall be kept in a conspicuous location for inspection by the City Manager or the Authorized Inspector during normal business hours.

D. All users must sign a waste manifest form before having a waste load transported by a permitted hauler. The user shall also keep copies of the manifest form for a period of at least three years, and make all manifest records available for inspection by the City Manager during normal business hours.

E. All waste removed from a grease interceptor must be disposed at a facility permitted by the county of Los Angeles or applicable regulatory agencies to receive such waste. The pumpage shall not be returned to the public sewer system or manhole, any private wastewater system or storm drains.

F. All grease interceptors shall be located as to be readily and easily accessible for cleaning, inspection and removal of intercepted waste.

G. Any fixture connected to a grease interceptor shall have a nonremovable, secured

food strainer of such integrity to withstand daily operational usage.

Section 6-7.417 Grease Trap – Required

A. The City may require Food Service Establishments to install grease traps in the waste line leading from drains, sink, and other fixtures or equipment where grease may be introduced into the sewer system in quantities that can cause blockage.

B. Sizing and installation of grease traps shall conform to the Plumbing Code.

C. Grease traps shall be maintained in efficient operating conditions by removing accumulated grease on a daily basis.

D. Grease traps shall be maintained free of all food residues and any FOG waste removed during the cleaning and scraping process.

E. Grease traps shall be inspected periodically to check for leaking seams and pipes, and for effective operation of the baffles and flow regulating device. Grease traps and their baffles shall be maintained free of all caked-on FOG and waste. Removable baffles shall be removed and cleaned during the maintenance process.

F. Dishwashers and food waste disposal units shall not be connected to or discharged into any grease trap.

Section 6-7.418 Best Management Practices – Required

A. **Generally**. All Food Services Establishments shall implement Best Management Practices in their operations to minimize the discharge of FOG to the sewer system. This may include kitchen practices and employee training that are essential in minimizing FOG discharge. At a minimum, best management practices shall include the requirements of this Section.

B. **Drain Screens.**

1. Drain screens shall be installed on all drainage pipes in food preparation areas for existing food service establishments within one year after the effective date of this chapter.

2. Within one year after the effective date of this chapter, drain screens shall be installed on all drainage pipes in food preparation areas for all new food service establishments deemed by the City Manager to generate grease.

C. **Waste Cooking Oil.**

1. All waste cooking oil shall be collected and stored properly in recycling barrels or drums. Such recycling barrels or drums shall be maintained appropriately to ensure they do no leak.

2. Licensed haulers or an approved recycling facility must be used to dispose of waste cooking oil.

D. **Food Waste**. All food waste shall be placed in enclosed plastic bags and disposed of directly into the trash or garbage, and not in sinks.

E. **Employee Training.**

1. Employees of the food service establishment shall be trained within one

year after the effective date of this Chapter, and twice each calendar year thereafter, on the following subjects:

a. How to "dry wipe" pots, pans, dishware and work areas before washing to remove grease;

b. How to properly dispose of food waste and solids in enclosed plastic bags prior to disposal in trash bins or containers to prevent leaking and odors;

c. The location and use of absorption products to clean under fryer baskets and other locations where grease may be spilled or dripped;

d. How to properly dispose of grease or oils from cooking equipment into a grease barrel or drum without spilling.

2. Training shall be documented and employee signatures retained indicating each employee's attendance and understanding of the practices.

3. Training records shall be available for review at any reasonable time by an authorized inspector.

F. **Maintenance of Kitchen Exhaust Filters.** Kitchen exhaust filters shall be cleaned as frequently as necessary to be maintained in good operating condition, but in no event less than one time per month.

G. **Kitchen Signage.** All best management practices shall be posted conspicuously in the food preparation and dishwashing areas at all times.

Section 6-7.419 Monitoring and Inspection Requirements

A. The City may require a Food Service Establishment to construct and maintain in proper operating condition at the Food Service Establishment's sole expense, monitoring facilities and practices.

B. The City may require a Food Service Establishment to inspect and sample wastewater discharges of any Food Service Establishment to ascertain whether the intent of this Article is being met.

C. The City may require the Food Service Establishment to submit waste analysis plans, contingency plans, and meet other necessary requirements to ensure proper operation and maintenance of the grease control device or grease interceptor and compliance with this Article.

D. No Food Service Establishment shall increase the use of water or in any other manner attempt to dilute a discharge as a partial or complete substitute for treatment to achieve compliance with this Article and any order.

Section 6-7.420 Right of Entry

A. The City is hereby authorized to enter the premises of any Food Service Establishment at all times during normal business hours, for purposes of inspecting the Food Service Establishment's grease control devices or grease interceptor, reviewing the manifests, receipts and invoices relating to the cleaning, maintenance

and inspection of the grease control devices or grease interceptor and otherwise determining whether the requirements of this Article are being met. The City may require the Food Service Establishment to provide immediate, clear, safe and uninterrupted access to the Food Service Establishment's monitoring and metering facilities.

B. No person shall interfere with the City's ready access to all parts of a Food Service Establishment's premises.

Section 6-7.421 Enforcement

A. **Violation.** No person shall violate any provision or fail to comply with any of the requirements of this Article. Any violation or failure to comply with the requirements of this Article shall be a violation of this Code.

B. **Public Nuisance.** Any violation or failure to comply with the requirements of this Article shall constitute a public nuisance. The city attorney is authorized to commence necessary proceedings provided by local or state law to abate, remove and enjoin such public nuisance.

C. **Enforcement.** The City may enforce any violation of the requirements of this Article in accordance with Article 5 of this Chapter.

Sections 6-7.422 – 6-7.500 Reserved

ORDINANCE NO. 1117-13

AN ORDINANCE OF THE CITY OF AVALON, CALIFORNIA AMENDING SECTIONS 4-4.1703(g)(1), 5-11.03, 5-11.04, AND 5-11.06 OF THE AVALON MUNICIPAL CODE REGARDING AUTOETTE PERMITS FOR DWELLING UNITS AND HOTELS

WHEREAS, the California Legislature has adopted California Vehicle Code section 21100.5 that applies to the City of Avalon (City) and provides that the City may adopt rules and regulations by ordinance or resolution regulating the size and number of vehicles in the City. Additionally, the section allows the City to prohibit the operation of designated classes of vehicles; and

WHEREAS, given the density of the City, street configuration, the lack of parking, narrow streets of the City and traffic congestion, the City has adopted extensive regulations on the number and types of vehicles authorized in the City; and

WHEREAS, the Section 4-4.1703(g)(1) of the City's Municipal Code provides that only one autoette can be registered to a dwelling unit; and

WHEREAS, on March 20, 2012, a moratorium was adopted so that the Avalon City Council (City Council) could determine whether owners of dwelling units should be able to receive autoette permits for dwelling units occupied by others and determine whether to amend the Code; and

WHEREAS, the City Council conducted study sessions on December 4, 2012 and February 5, 2013, at which time the public was provided an opportunity to comment on the issue; and

WHEREAS, at the study sessions, City Staff also presented to the City Council current statistics regarding the number of autoette permits, the City's limited parking capacity, and the impact that at least 260 additional autoette permits would have if owners of dwelling units applied for and received autoette permits for dwelling units they own but do not occupy; and

WHRERAS, visitors to the City have the option of renting golf carts, bicycles, electric bicycles, walking, or taking taxis for their transportation needs; and

WHEREAS, case law provides that laws enacting distinctions between residents and non-residents are appropriate, and that environmental and social objectives, such as aiming to improve the quality of life of residents by reducing vehicular noise, traffic hazards and congestion, are not barred by the Constitution of the United States; and

WHEREAS, for all of the above reasons and those raised in the staff reports, at the study sessions and at the meeting where this ordinance is adopted, and in furtherance of the goals of Section 21100.5 of the Vehicle Code, the City Council finds and determines that the public health, safety and welfare can be enhanced and protected by limiting autoette permits by to the residents of dwelling units. Exceptions can be make for owners of hotels who apply for and

obtain conditional permits for autoette use by transient occupants from the City Council pursuant to Title 5, Chapter 11 of the Code; and

WHEREAS, those owners of dwelling units that have been issued autoette permits for dwelling units they do not occupy shall be permitted to maintain such autoette permits upon proof that off-street parking is available for such autoettes and if not, such permits shall eventually expire if not transferred to occupiers of dwelling units or a hardship is proven.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF AVALON DOES ORDAIN AS FOLLOWS:

Section 1. The recitals set forth above are incorporated herein.

Section 2. Avalon Municipal Code Section 4-4.1703(g)(1) is hereby amended to read as follows:

(g) *Autoette Permits.*

(1) Per Dwelling Unit. One (1), and only one (1), autoette permit may be granted per dwelling unit as defined in this Chapter. The permit shall be issued only where the dwelling unit is located within the City limits and only to a person who actually occupies or resides in the dwelling unit. An owner of a dwelling unit shall not be entitled to personally use an autoette permit issued for such unit unless the owner actually occupies or resides in the unit. Autoette permits may be requested by owners of Hotels for transient occupants pursuant to Avalon Municipal Code Section 5-11.03. In the event more than one (1) autoette permit has been issued in connection with a dwelling unit to an occupant as of April 4, 1989, all but one (1) of such permits shall not be eligible for renewal upon their normal date of expiration in 1993. An autoette permit that has previously been issued to an owner of a dwelling unit who does not actually occupy or reside in the subject dwelling unit is eligible for renewal if proof of dedicated off-street parking for the autoette is provided. Such autoette permits may also be transferred to a person who actually occupies or resides in the dwelling unit. If proof of dedicated off-street parking is not provided during the five year expiration period, such autoette permit held by a non-occupant or non-resident owner shall expire five years from the date when renewal is sought and proof of off-street parking has not been provided. A hardship exception may be granted if the following criteria is met by a non-occupant or non-resident owner: A)The autoette is needed regularly and the need cannot be met by other means of transportation or by parking the autoette remotely; B) No off-street parking space is available for the vehicle on the dwelling unit's premises or within a reasonable distance of the dwelling unit; C) The dwelling unit's garage or other parking space has not been converted to or placed in other use without City permission; and D) Another vehicle regularly parked on the dwelling unit premises cannot be displaced without equivalent hardship.

Section 3. Avalon Municipal Code Section 5-11.03 is hereby amended to read as follows:

Permit Required.

A permit shall be required of any person or entity in the business of renting or leasing vehicles without providing a driver to any person in the City. A permit shall be required of the operator of any Hotel who provides or makes available the temporary use of an autoette along with or as an integrated part of the purchase of lodging to transient occupants of the Hotel, except that such Hotel operator need not comply with Sections 5-11.08 through 5-11.012 because autoettes are not being made available for rent or lease to the general public. For purposes of this Section, a Hotel shall be defined as set forth in Section 3-3.402(a) of the Avalon Municipal Code.

Section 4. Avalon Municipal Code Section 5-11.04 is hereby amended to read as follows:

Permit Application.

Any person applying for a permit under Section 5-11.03 shall first apply for a permit by making written application to the Council. Such application shall be in the form and shall contain such information as is prescribed by the City Manager and shall be accompanied by an application fee prescribed by resolution of the Council.

Section 5. Avalon Municipal Code Section 5-11.06 is hereby amended to read as follows:

Permit: Decision.

The Council may grant a permit if it is able to make affirmative findings based on the following criteria:

(a) The applicant has presented facts demonstrating a need for the proposed rental or leasing business in the City for residents and visitors, or for a Hotel in the City, facts demonstrating why the Hotel or its transient occupants need such autoettes.

(b) In view of the size and nature of the streets of the City and the character of the City itself, the proposed business or provision of autoette(s) to Hotel transient occupants will not have a deleterious impact on the public health, safety and welfare.

(c) The vehicles/autoettes associated with the business or Hotel will not have a deleterious impact on traffic or parking congestion, traffic safety, noise and air pollution.

(d) The proposed business or provision of autoette(s) to Hotel transient occupants will be conducted in a manner which will not be detrimental to the public health, safety and welfare.

Any approval may be subject to such conditions as will assure that the proposed business or provision of auotette(s) to Hotel transient occupants will be conducted in accordance with the public health, safety and welfare and will not be a detriment to City visitors or residents. Such conditions may include a limitation on the number and type of vehicles/autoettes which may be used in conjunction with the business or Hotel, or conditions pertaining to the parking of such vehicles/autoettes.

Section 6. **Prior Ordinances Repealed.** Upon the effective date of this Ordinance, Ordinance No. U-1112-12 shall be repealed and superseded by this Ordinance.

Section 7. **Severability.** If any section, subsection, subdivision, sentence, clause, or phrase of this Ordinance, or any part thereof is for any reason held to be unconstitutional, such decisions shall not affect the validity of the remaining portion of this Ordinance or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause, or phrase thereof, irrespective of the fact that any one or more section, subsection, subdivision, paragraph, sentence, clause, or phrase be declared unconstitutional.

Section 8. **CEQA Exemption.** The City Council finds that adoption of this Ordinance is exempt from the California Environmental Quality Act ("CEQA") pursuant to Section 15358 (the activity will not result in a direct or reasonably foreseeable indirect physical change in the environment) of the CEQA Guidelines, California Code of Regulations, Title 14, Chapter 3, because it has no potential for resulting in physical change to the environment, directly or indirectly. Further, the City Council finds that this ordinance is exempt under CEQA pursuant to Section 15061(b)(3) (there exists no possibility that the activity will have a significant adverse effect on the environment) of the CEQA Guidelines because this Ordinance will not cause a change in any of the physical conditions within the area affected by the Ordinance.

Section 9. **Certification.** The City Clerk of the City of Avalon shall certify the passage and adoption of this Ordinance and shall cause the same, or a summary thereof, to be published and/or posted in the manner required by law.

INTRODUCED at a regular meeting of the City Council of the City of Avalon on the 19th day of March, 2013, by the following vote:

AYES: Mayor Kennedy, Councilmembers Ponce, Hernandez, Morrow and Olsen
NAYS: None
ABSENT: None
ABSTAIN: None

PASSED, APPROVED AND ADOPTED at a regular meeting of the City Council of the City of Avalon on this 2nd day of April, 2013, by the following vote:

AYES: Mayor Kennedy, Councilmembers Ponce, Hernandez, Morrow and Olsen
NAYS: None
ABSENT: None
ABSTAIN: None

Robert Kennedy, Mayor

ATTEST:

Denise A. Radde, City Clerk

APPROVED AS TO FORM:

Scott Campbell, City Attorney
Best Best & Krieger, LLP

Appendix 2: Annual Preventative Operations and Maintenance Plan

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ANNUAL PREVENTATIVE OPERATIONS & MAINTENANCE PLAN

for the:

City of Avalon

Avalon, California

Sewer System Maintenance Plan

environ strategy consultants inc. es

Water and Wastewater Services

2014

Distribution:

Mrs Denise Radde, City of Avalon
Mr. Ryan Bonner, Environ Strategy

RE: 2014 ANNUAL PREVENTATIVE OPERATIONS AND MAINTENANCE PLAN

Dear Denise: May 15, 2014

Environ Strategy Consultants, Inc. (ESCI) is pleased to present our 2014 routine Preventative Operation and Maintenance Plan detailing operations and maintenance activities conducted on an annual basis as part of the City of Avalon's Sewer System Management Plan (SSMP). Our report addresses the following key areas:

Table of Contents

1. General System Information

1.1. Owner of Facilities

1.2. Designated Responsible Party

1.3. Collection System Description

1.3.1. Gravity Sewer System

1.3.2. Force Main

1.3.3. Pump Station

1.3.3.1. Catherine Lift Station

1.3.3.2. Pebbly Beach Lift Station

2. Collection System Operation and Maintenance Management

2.1. Computerized Maintenance Management System (CMMS)

2.2. Geographic Information Systems (GIS)

2.3. Supervisory Control and Data Acquisition (SCADA)

3. Routine Preventative O&M Activities

3.1. Inspection and Assessment Program

3.1.1. Visual/Manhole Inspection Program

3.1.2. Closed Circuit Television Video (CCTV) Inspection Program

3.1.3. Inspection Assessment Program

3.2. Operation and Maintenance Program

3.2.1. Routine Line Cleaning Program

3.2.2. Increased Frequency "Areas of Concern" Cleaning Program

3.2.3. Root Abatement Program

3.2.4. Flushing Program

3.3. Lift Station Preventative O&M Program

3.3.1. Wet Well Cleaning Program

3.3.2. Motor & Pump Maintenance Program

3.3.3. Generator Load Testing Program

3.3.4. Emergency Call Out Testing Program

3.4. Employee Training Program

3.5. Part and Equipment Inventories Program

4. Odor Control Program

5. Customer Service

6. Conclusion

List of Figures

Fig 1 Map of the collection system

Should you have any question or concern regarding this report or any aspect of our operation, please allow me the opportunity to provide clarification.

Sincerely,

ENVIRON STRATEGY CONSULTANTS, INC.

Ryan Bonner
Project Manager

CC: Distribution List

1.0 GENERAL SYSTEM INFORMATION

1.1 OWNER OF FACILITIES

The City of Avalon is the owner of the Avalon Wastewater Treatment Facility (AWWTF), a Publicly Owned Treatment Works (POTW), and appurtenant sanitary sewer wastewater collection system which operates under Order No. R4-2008-0028, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0054372. As part of this Order, the Discharger must properly operate and maintain its collection system (40 CFR part 122.41(e)). The Discharger must report any non-compliance (40 CFR part 122.41(I)(6) and (7)) and mitigate any discharge from the collection system in violation of this Order (40 CFR part 122.41(d)). Under contract, the City of Avalon delegates authority to Environ Strategy (ES) Consultants, Inc. as the duly authorized representative of the City the responsibility of Operating and Maintaining the AWWTF and all components of the sanitary sewer wastewater collection system, which is also subject to State Water Board Order No. 2006-0003-DWQ, *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems* (SSO WDR) and State Water Board Order No. WQ-2013-0058-EXEC, *Amending Monitoring and Reporting Program for Statewide General WDR for Sanitary Sewer Systems* (SSO MRP Amendment).

1.2 DESIGNATED RESPONSIBLE PARTY

As the duly authorized representative of the City, ES is responsible for filing all documentation and reports required by these orders, including Cease and Desist Order (CDO) No. R4-2012-0077 adopted by the Regional Board on April 5, 2012 which requires the Discharger to submit reports and technical information pursuant to Water Code section 13267 and any other applicable laws and regulations required by the operation and maintenance of the City of Avalon's wastewater collection system. ES has a staff of five full-time operation and maintenance positions. Contactors are used for some maintenance activities and for emergency support when warranted.

Relation to Other Municipal Functions

Environ Strategy is responsible for management, operations and maintenance of the wastewater collection system and treatment facilities. Many activities of the City of Avalon sewer collection system are supported by the following City of Avalon departments and partners:

- Collection system mapping is supported by RBF's GIS mapping system. RBF also provides support, policy recommendations, and advice concerning the City of Avalon's future growth and development, and is responsible for maintaining and updating the City of Avalon's GIS existing sewer infrastructure mapping system.

- Contingency equipment and replacement inventories are shared between the City of Avalon and Environ Strategy per the contractual agreement
- Outreach to plumbers and building contractors is done by ES and City staff
- System Evaluation & Capacity Assurance Plan and Capital Improvement Plans have been developed by RBF to assess the system and develop a set of recommendations for rehabilitation or replacing segments of the system
- A private lateral program is being conducted by the City of Avalon
- Design and Construction Standards for installation, rehabilitation and repair are overseen and reviewed by the City of Avalon planning department
- Implementation of a fog program is being shared between RBF, Legal Counsel and the City of Avalon
- Inspection of grease interceptors/separators is performed by the city inspector
- Procurement of non-routine equipment, services or supplies is authorized by the City of Avalon Chief Administrative Officer
- The City of Avalon Public Works section provides assistance when applicable.
- Legal Counsel provides legal services and advisory opinions to the City of Avalon on regulatory issues, contracts and agreements and is responsible for handling all claims against the City of Avalon and prosecuting violations of all Sewer Ordinances

1.3 COLLECTION SYSTEM DESCRIPTION

The City of Avalon (COA) sewer collection system serves a population of approximately 3,800 residents and consists primarily of residential customers and some commercial customers. The COA service area covers approximately 1.4 square miles. The collection system consists of approximately 10.2 miles of gravity sewers and force mains, three low-flow storm drain diversion stations, two pump lift stations and a chemical treatment system. The majority of the collection system piping conveys flow by gravity from higher elevations to a lower point in the system where it enters into a lift station wet well. Sewage is then pumped and forced under pressure to a second lift station were pumps lift the sewage again for processing at the Avalon Wastewater Treatment Facility (AWWTF).

In order to protect water quality in the Avalon Bay, the collection system also conveys a portion of the dry weather surface runoff and first flush of storm water (first half hour of rainfall), via low flow diversions into the sewer collection system. This is an intermittent system and only actuates during dry weather and the first half hour of rainfall events; it is not a Combined Sewer System. After the first half hour of rain, rainfall remains in the storm water system, as per design, and outlets to the ocean. Sewer capacity must transport both peak and average sewage flows, and first flush volumes of storm water to the Avalon Wastewater Treatment Facility (AWWTF).

To help eliminate odors and corrosion in the downstream portion of the collection system, Calcium Nitrate “Bioxide” is added to the system at the Catherine Lift Station wet well.

1.3.1 GRAVITY SEWER SYSTEM

The City of Avalon has approximately 9.0 miles of sewer line which collects, combines, and transports by gravity, sewage in increasing larger pipes to the main sewer line below Crescent Avenue. Pipe sizes range from 6 inches to 24 inches in diameter. Outlying areas are typically serviced by 6-inch diameter lines that flow to 8-inch lines in the central 'flats' area of Avalon that feed the 12-inch trunk line at Crescent Avenue. There is one additional section of 24 inch gravity main that connects a section of force main to the second lift station.

1.3.2 FORCE MAIN

The City of Avalon has approximately 1.2 miles of force main that conveys flow by pressure from the first lift station through a 16-inch force main which follows beneath Pebbly Beach Road to the second lift station where the flow is conveyed by pressure again to the Avalon Wastewater Treatment Facility for treatment.

1.3.3 PUMP LIFT STATIONS

The City of Avalon has two lift stations which pump wastewater by pressure and are described in more detail below:

1.3.3. 1 CATHERINE LIFT STATION

Catherine Lift Station is the first lift station used in the collection system and is located at the intersection of Crescent Avenue and Pebbly Beach Road. This lift station wet well is at the lowest point in the City of Avalon gravity sewer system where the flow is lifted and pumped by pressure to the second lift station wet well.

1.3.3. 2 PEBBLY BEACH LIFT STATION

The Pebbly Beach Lift Station is the second lift station used in the collection system to convey sewage to the Avalon Wastewater Treatment Facility. It is approximately 1.1 miles downstream of the Catherine Lift Station and is located along Pebbly Beach Road at another low point in the system. Here, the flow is again lifted and pumped by pressure to the treatment plant for treatment.

2.0 COLLECTION SYSTEM OPERATIONS AND MAINTENANCE MANAGEMENT

This Preventive Operation and Maintenance Plan has been prepared to provide the City of Avalon with the tools and procedures for maintaining its gravity sewer system and sewer pump stations with adequately trained staff, and contractors possessing adequate knowledge, skills, and abilities.

One of the most important tools is the implementation of an Operation and Maintenance (O&M) Program. The goal of the O&M Program is to eliminate sanitary sewer overflows, and thereby protect public health and the environment. It complies with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, Order No. 2006-0003 (Order), issued by the California State Water Resources Control Board. ES uses a few key computerized software programs as everyday tools in managing the system.

2. 1 COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM (CMMS)

Environ Strategy uses a Computerized Maintenance Management System (CMMS) to maintain a computer database of information about the City of Avalon's maintenance operations for its collection system as well as all of its other assets. Typical CMMS functions include but are not limited to:

- Work order generation, prioritization and tracking by equipment/component
- Tracking of scheduled and unscheduled maintenance activities
- Historical tracking of all work orders generated
- Storing of maintenance procedures as well as all warranty information by component
- Storing of all technical documentation or procedures by component
- Calendar- or run-time-based preventive maintenance work order generation
- Achieving a higher level of planned maintenance activities that enable a more efficient use of staff resources
- Maintaining optimal equipment performance that reduces downtime and results in longer equipment life
- Logging and tracking incoming SSO complaints and generating SSO-related work orders
- Retaining and storing all SSO records and/or SSO related activities

Environ Strategy utilizes CMMS in its Preventive Maintenance O&M activities by keeping track of when maintenance needs to be done on pumps and for generating work orders to perform the work, scheduling routine cleaning of the collection system and more frequent cleaning of identified 'areas of concern'. It includes scheduling of the yearly flushing program and generation of work orders for maintenance activities at the lift stations. These are just a few examples of why the CMMS program is so essential to the O&M preventive maintenance program that Environ Strategy conducts for the City of Avalon. Any activity performed by staff is generated and tracked through CMMS. The CMMS produces daily, weekly, quarterly, bi-annual and annual written work orders for the performance of routine maintenance as well as repairs and corrective actions in response to inspection findings or customer complaints. Upon completion of the task(s), data related to the work order is entered into CMMS for tracking performance and historical information on all aspects of the collections system. The CMMS serves as Environ Strategy's information management system for all of the collection systems operation and maintenance. The CMMS program is an important element in ES's Preventive Operations and Maintenance Plan.

2. 2 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

The City of Avalon has created a modern state-of-the-art customized electronic GIS map of the entire sanitary sewer system which includes other information layers and is actively utilized by Environ Strategy staff in planning preventative O&M activities on the collection system. Knowledge of the location of all wastewater collection system facilities is essential to effective management. The GIS map of the sanitary sewer system shows all line segments ID's, manholes, pumping facilities, valves, and applicable storm water conveyance facilities. The GIS database includes detailed information for all collection system components, such as

identification numbers for manholes, distances between manholes, pipe diameters, and CCTV inspection video for every segment of pipe. Electronic maps generated from the GIS database provide valuable data for staff that can be printed for use in the field. The GIS mapping program is an important element in the Preventive Operations and Maintenance Plan conducted by ES and was used by staff to develop its adopted Twelve Zone annual cleaning plan. ES utilized the GIS system in implementing its sewer line cleaning program by using the GIS mapping assignments of manholes and individual sections of pipe to develop a systematically scheduled cleaning system of twelve zones to allow ES to clean 100% of its sanitary sewer system on an annual basis. This also allows ES to provide a monthly print out to the City of Avalon of a detailed sewer maintenance list of each section of pipe operated and maintained during any given time period.

2. 3 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

A Supervisory Control and Data Acquisition (SCADA) system is a collection of computer and communications equipment designed to work together to control the wastewater treatment process. SCADA systems also perform monitoring, alarming, data logging and problem-solving functions so wastewater process systems can be operated efficiently and maintained by a relatively small staff.

The SCADA system can control and monitor specific levels in tanks, maintain flow rates, and maintain various processes at specific temperatures, pressures and sequences. They also can also execute logic for automating the starting and stopping of pumps, opening and closing of valves, and other discrete functions.

SCADA Systems monitor a variety of plant data including flows, motor currents, temperatures, water levels, voltages, and pressures. Alarms at central or remote sites triggered by any abnormal conditions are propagated to the HMI computer for operator's attention. In addition to alarms, important plant information such as, levels, flows, pressure will be logged in the HMI computer database for reports and trending.

A SCADA System is currently being installed at the Avalon Wastewater Treatment Facility which will include monitoring and control of both the Catherine and Pebbly Beach Lift Station. ES Staff will be able to access and monitor operations of pumps, vfd's, and levels of both lift stations. This will be an essential key element of the Annual Preventative Operations and Maintenance Plan used by ES staff to provide optimal performance in maintaining the City of Avalon's system.

3.0 ROUTINE PREVENTATIVE O&M ACTIVITIES

OPERATION AND MAINTENANCE PROGRAM REQUIREMENTS

The California State Water Resources Control Board issued Order No. 2006-0003, Statewide General Waste Discharge Requirements for Wastewater Collection Agencies on May 2, 2006. The Order prohibits any sanitary sewer overflow (SSO) that results in a discharge of untreated or partially treated wastewater to the waters of the United States or that creates a nuisance as defined in California Water Code Section 13050(m).

The implementation of a comprehensive operation and maintenance program is a very important component of a wastewater collection agency's responsibility in minimizing the possibility of sanitary sewer overflows, and possible discharge of untreated sewage to surface water streams. A significant additional benefit of an operation and maintenance program is the extended useful life of the existing assets. The Operation and Maintenance Program is one element of the Sewer System Management Plan required by the Order, as detailed in the Provisions (Section D.13).

The following provisions of Order No. 2006-0003 provide the requirements for the Operation and Maintenance Program:

D.8 - The Enrollee shall properly, manage, operate, and maintain all parts of the sanitary sewer system owned or operated by the Enrollee, and shall ensure that the system operators (including employees, contractors, or other agents) are adequately trained and possess adequate knowledge, skills, and abilities.

D.13-(iv)(a)-Maintain an up-to-date map of the sanitary sewer system.

D.13-(iv)(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.

D.13-(iv)(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.13-(iv)(d) Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained.

D.13-(iv)(e) Provide equipment and replacement part inventories, including identification of critical replacement parts.

This program consists of regular inspection of the sewer system including manholes, pipes, pump stations, regular cleaning, more frequent cleaning, root abatement, flushing, repair, and related activities. This program is designed and carried out to detect and correct potential problems before they develop into major problems. The following is a summary of the key preventive maintenance activities, and where applicable, frequencies for these services have been included:

3.1 INSPECTION AND ASSESSMENT PROGRAM

Environ Strategy incorporates a highly proactive and positive preventive maintenance program that is designed to help identify, prevent, and eliminate sanitary sewer overflows and blockages in the City of Avalon's collection system. The inspection and assessment program is an integral part of Environ Strategy's commitment to understanding how the City of Avalon's wastewater collection system operates and allows operators the opportunity of identifying potential problems areas before they develop into a situation and provides adequate time for corrective actions to be taken to eliminate the issue. The object is to keep the system in good repair and minimizing the blockages, Inflow/Infiltration and failures that can result in Sanitary Sewer Overflow's if not corrected in time. Each component of the collection system is inspected both visually and by use of CCTV video on an annual basis. A goal of the program is to assess the entire system each year during routine operation and maintenance activities. Routine inspection of wastewater collection system facilities provides a means to monitor the condition of the facilities and the effectiveness of the maintenance operations. Information obtained from routine inspections serves to:

- Identify existing or potential problems;
- Provide accurate information regarding any existing or potential problems;
- Isolate the location of any existing or potential problems;
- Provide information regarding the criticality of any existing or potential problems; and
- Facilitate identification of the optimal method to rectify problems.

Regular and systematic inspection and assessment of wastewater collection system infrastructure provides a basis for identifying and scheduling capital improvements as well as identifying needed maintenance activities. The results of the overall assessment are used to identify and prioritize projects, determine the funding required to repair, rehabilitate, and replace an aging collection system, and to prioritize the allocation of funds. Recommendations for capital improvements will optimize the expenditure and efforts to operate a sewer collection system.

The City employs CCTV technology for the inspection of its wastewater pipelines. The CCTV inspections are generally performed subsequent to pipe cleaning and debris removal and of all new and rehabilitated pipelines to ensure contractor compliance with City design and construction standards. The information obtained and recorded from the CCTV inspections is reviewed, recorded, and a preliminary assessment is made by the CCTV crew. The progress is recorded by the crew members and submitted to ES staff where it is utilized for tracking and reporting purposes. The inspection and assessment efforts performed by Environ Strategy and Public Works staff provide valuable insight to the internal structural condition of buried infrastructure. Anything identified to be critical, through these efforts, is coordinated closely with the City of Avalon and the engineering company, RBF, who is contracted by the City of Avalon to complete assessment, inspection and rehabilitation/replacement of its sanitary sewer system.

All data gathered on the collection system during maintenance is entered into a Computerized Maintenance Management System (CMMS) and logged into a Sewer System Cleaning document that provides a breakdown of each segment of pipe, what form of maintenance was conducted it (cleaning, flushing, root abatement), the date the maintenance was completed, it identifies the condition the pipe during cleaning, and gives a brief description of what was found in the pipe (if anything). It also identifies segments of pipe determined to be higher maintenance areas or areas of concern (formally known as 'Hot Spots'). An updated Sewer Line Cleaning/Maintenance List showing the work completed during the previous month is provided to the City for review monthly, at the beginning of each month.

The cleaning, inspection and assessment program includes: Visual inspection of manhole structures and their flow channels, Closed Circuit Television Video inspection of piping, and an evaluation of the condition of the pipes and manholes. Results from the assessment program are used to categorize the cleaning and inspection frequencies for both the sub-areas and problem pipe-sections.

3.1.1 Visual/Manhole Inspection Program

Planned manhole and pipe inspections are coordinated with the cleaning program and generally follow the cleaning schedule. During cleaning aspects of the Preventive O&M Plan Environ Strategy staff conducts visual inspections of the interior and exterior of manholes for any structural defects, sewage flow condition, presence of vermin or rodents, deleterious waste, odors and any signs of unusual settlement around or evidence of debris within the manholes and along sewer alignments. As an integral part of the wastewater collection system, access manholes require the same degree of inspection and maintenance as the pipeline sewer network. Manhole inspections are generally visual and include evaluating the condition of the manhole cover, ring, cone, barrel, steps (if included), trough, and bench for any defective condition. Manholes should be inspected on a routine basis to ensure that they are in adequate condition and are accessible. Older manholes may require more frequent inspections to detect signs of possible I/I and ensure structural integrity. During the inspection of manholes, the following information may be obtained and documented for assessment of sewer manholes and future planning purposes:

- Exact location of the access manhole (inaccessible, within an easement, buried, etc.)
- Diameter of the clear opening of the manhole
- Condition of frame and cover (include defects that allow inflow to enter)
- Access manhole lid is located at proper grade or elevation
- Whether cover is subject to ponding or surface runoff
- Type of material and condition of the cone and walls
- Condition of steps, cone and riser joints
- Configuration, size, and type of the incoming and outgoing lines (including drops)
- Signs of leakage in the riser or damage to the frame's seal
- Observed infiltration sources and the rate of infiltration, and
- Indicate height of surcharge

Although ES does not currently have a formal manhole inspection and assessment program, ES crews conduct visual inspections of the manholes. The inspections occur concurrently with pipeline cleaning and inspections. The manholes with detected defects are noted and the information is provided to the Supervisor for tracking and reporting purposes. As part of the assessment process, pipelines and/or manholes identified as requiring repair, rehabilitation, or replacement are prioritized.

3.1.2 Closed Circuit Television Video (CCTV) Inspection Program

CCTV inspection is used for overall assessment of the collection system and provides useful visual information where problem areas are located between manholes. Documentation of inspections is very critical to a successful operation and maintenance program. CCTV cameras offer valuable insight to the internal structural condition of buried infrastructure. CCTV inspections produce a video record of the inspection that can be used for future reference. The CCTV is utilized additionally by allowing inspections of frequent areas of concern, to identify any necessary repairs or special maintenance needs and to help determine the cause after the initial occurrence of an overflow. CCTV takes an essential part in the ES preventive operation and maintenance plan and provides visual details of the collections systems internal condition of the pipe. This allows ES staff to work more efficiently and effectively by providing the information necessary to achieve the goals set forth in the Preventative Operation and Maintenance Plan. As part of the solution to a more preventative approach in managing the collection system, Environ Strategy and the City of Avalon Public Works Director have developed a CCTV Plan that goes well beyond the guidelines required in the Order, by coordinating CCTV inspections of sewer mains directly after a segment of line has been cleaned. This will allow for annual CCTV inspections of one hundred percent of the collection system. The inspection process will be enhanced because the pipe walls will be free of debris allowing for a more detailed CCTV inspection of the condition of each segment of pipe inspected. It will also provide evidence that the collection system is being properly cleaned. The goal is to CCTV video inspect the entire gravity sewer system on a yearly basis and provide up to date video that is a valuable tool for recognizing and determining issues that need assessment in the near future. The information obtained and recorded from the CCTV inspections is reviewed, recorded, and a preliminary assessment is made by ES and City Staff.

3.1.3 Inspection Assessment Program

Assessment of the Collection System using both Visual and Video inspection are an essential part of Environ Strategy's Preventative Operations and Maintenance Plan. Depending on what is identified during these inspections, all data is recorded and logged in the CMMS program and additional work orders are created for additional maintenance when a potential problem area is found. If a more serious problem is found to exist within the pipe which requires possible rehabilitation or replacement, the information about the segment of pipe identified to have an issue is communicated to the person responsible for implementing the work necessary to fixing it. At this time, Environ Strategy is not responsible for implementation of a Rehabilitation and Replacement program which would have been part of this overall Preventative Operation and Maintenance Plan developed by ES. RBF is currently in control of this aspect of the Plan.

3.2 OPERATION AND MAINTENANCE PROGRAM

3.2.1 Routine Line Cleaning Program

Environ Strategy has divided the entire collection system into twelve separate zones and implemented them into the CMMS program to generate work orders in a timely fashion. These twelve zones were designed to break up the collection system into sections that would allow staff adequate time to conduct sewer line cleaning on 100% of the gravity mains on an annual basis. This allows staff a hands-on approach in identifying problem areas in the collection system that require more frequent cleaning and provide an opportunity for staff to conduct visual inspections on the condition of the collection system and all manholes. The condition of the pipe, the severity of the obstruction if one was found, what material was located in the piping, and the recommended cleaning frequency after cleaning are all documented. If a section of pipe is recommended for more frequent cleaning or if any type of material (rags, gravel, roots, debris) are found then these sections of pipe are identified on the Sewer Cleaning Maintenance List, determined areas of concern or higher maintenance areas and inputted into the CMMS program for additional scheduled maintenance.

3.2.2 Increased Frequency "Areas of Concern" Cleaning Program

Maintenance of collection system areas of concern, or high-priority areas, is an important element of Environ Strategies Preventive O&M Program. Areas of concern require high-frequency maintenance of known problem locations within the system. These include locations that have regular blockages because of grease buildup, root intrusion, sediment buildup, or vandalism. The frequency of maintenance for these areas of concern vary and is determined by follow up cleaning of the known segment of the collection system, video inspection of the segment of pipe, system performance and risk factors, and maintenance history. Each identified high priority area is treated individually, evaluated and maintenance based on field findings. For example, if the maintenance crew sees minimal buildup, then staff recommends a less frequent cleaning schedule. If, on the other hand, field maintenance finds severe buildup or blockage, then staff recommends a more frequent scheduled cleaning as a proactive risk management measure. If frequent blockages occur in the same section of pipe, the cause of the blockage will be determined by staff and appropriate measures will be taken to try to eliminate the source.

3.2.3 Root Abatement Program

Environ Strategy started a Root Abatement Program in 2011 to control the growth of roots in sewers by the use of an environmentally safe chemical product called 'RootX'. RootX kills the roots on contact. The dead roots decay over time and are carried out with the flow of the pipe, restoring the pipe to its full capacity. RootX also leaves a barrier on the pipe walls to prevent future root growth. The effectiveness of chemical root control treatment is carefully monitored and the frequency of treatment and application rates adjusted as required to eliminate blockages caused by roots. Environ Strategy staff uses the system wide cleaning program to locate and document areas in the collection system which have root intrusion and schedule maintenance on an as needed basis. Identified sections of pipe that are treated are also inputted into the CMMS program and scheduled for annual inspection and treatment as necessary.

3.2.4 Flushing Program

Environ Strategy has incorporated a flushing program as part of the Operation and Maintenance activities used to maintain the dead ends of the collection system. During off season month's dead end pipes on the perimeter of the collection system are flushed with at least 300 gallons of water to provide enough volume and velocity to dislodge any buildup that may have occurred because of the lower demand during these months. The flushing program was inputted into the CMMS program and scheduled to be conducted during the off season as part of the Preventative Operations and Maintenance Plan.

3.3 LIFT STATION PREVENTATIVE O & M PROGRAM

The collection system contains two lift stations that Environ Strategy incorporates into the Preventive Operation and Maintenance Plan for the City of Avalon. Continual normal operation of both lift stations is essential to ES's commitment to providing the City of Avalon with the necessary controls that prevent and eliminate the possibility of a Sanitary Sewer Overflow occurrence. The Catherine lift station and Pebbly Beach lift station are both important aspects of ES's O&M program. Continual monitoring and daily inspections of the lift stations are conducted by ES staff to ensure that all equipment is operating at all times and to identify any abnormalities that may be developing so that adequate response to the situation can be conducted to provide preventative maintenance activities to correct the problem. Environ Strategy takes great pride in providing the City of Avalon with a Proactive Preventative Maintenance approach to the management of its collection system. The performance of the lift stations is monitored on a daily basis through lift station inspections. During these inspections, staff log pump run hours, check pumps, wet well levels and alarms. Some of the key components of our lift station preventive maintenance and operations plan are listed below.

3.3.1 Wet Well Cleaning Program

Wet well cleaning is a critical element of a preventive operation and maintenance plan. Environ Strategy staff take a proactive approach to preventing the opportunity for buildup of grease and rags in the wet wells to protect the pumps as much as possible and prevent the possibility of odors. Visual inspections of Catherine and Pebbly Beach wet wells are conducted daily. At the current time, bi-weekly wet well cleaning with the Vactor truck is scheduled and conducted on both wet wells. If daily inspections reveal that a more frequent cleaning needs to be conducted appropriate measures will be taken to schedule and complete the maintenance as soon as possible.

3.3.2 Motor & Pump Maintenance Program

Environ Strategy, in accordance with the pump manufacturer, has scheduled maintenance for all pumps and motors at both lift stations. All maintenance activities are inputted into CMMS using the manufacturer recommended maintenance schedule and are issued out work orders in the time frame specified by the manufacturer. In addition to the scheduled maintenance, Daily inspection of the pumps are a common practice of ES employees including inspection of the control panels to these pumps to assure that operations are functioning normally and nothing is out of the ordinary. Mini CAS relays are checked for early warning signs of a problem developing by making sure no over temperature or seal leak has occurred with one of the pumps or motors. Pumps are alternated on a weekly basis to balance out the work load between pumps. Lag pumps are checked periodically to

make sure they are not air locked and are ready to pump in the event of higher flows requiring two pumps. The continual operation of pumps and motors at each lift station is of major concern and the implementation of the Preventive Operations and Maintenance Plan by ES staff is the key component to assuring that Motors and Pumps continue to operate and provide service for many years to come.

3.3.3 Generator Load Testing Program

Both lift stations have emergency generators that are designed to startup in the event of power loss to the lift station. Weekly load testing of the generators is conducted by ES staff to ensure that the load transfer will actually take place if a power outage. Each generator has testing capabilities to conduct this test. Control panel readings are taken weekly and are compared to previous records to identify trends that may be taking place that would indicate additional maintenance requirements may be needed. A maintenance schedule has been inputted into CMMS and work orders are generated using the equipment manufacturers recommended schedule. Generator operation at the lift stations is an important element of the Preventive Operation and Maintenance Plan.

3.3.4 Emergency call out Testing Program

Both lift stations are equipped with communications devices that are programmed to call out staff in the event of an alarm at one of the lift stations. Environ Strategy staff do alarm testing once a week to verify that all systems are functioning as intended. Any alarm found not functioning properly requires immediate attention from Environ Strategy staff to resolve and correct the issue. ES takes matters very seriously when it comes to alarms. Alarms are a very important element of the ES preventative operations and maintenance plan.

3.4 EMPLOYEE TRAINING PROGRAM

Environ Strategy's training program provides a mechanism for educating employees and establishing their technical competence through the CWEA certification program. Environ Strategy employees are required to be CEWA trained and routinely complete required OHSA certified Online Safety Courses each month using Pure Safety On Demand software. Environ Strategy utilizes a combination of in-house skill training, the self-study technical wastewater training courses offered through California State University – Sacramento, conferences and vendor training programs to enhance skills for performing daily work duties and provide certified operators continuing education hours.

Pursuant to Waste Discharge Requirements (WDR) set forth in Order No. 2006-0003-DWQ all system operators are adequately trained and possess the knowledge, skills and abilities to assure adequate operations and maintenance of the sanitary sewer collection system.

On-the-Job cross training is actively pursued to ensure staff has a proficient working knowledge of each and every aspect of the responsibilities of operating and maintaining a sanitary sewer system. Hands on training with emergency pumps, jetting equipment and use of the Vactor truck is a requirement set forth to provide staff with the experience needed to operate and maintain the sanitary sewer system while preparing them with enough knowledge and skill to adequately respond in the event of emergency or any situation encountered in the day to day operation of the system. Additionally, mock drills are developed on different scenarios and possible emergency situations encountered to prepare operators on the responsibilities and actions required.

Staff are cross-trained so that critical tasks can be done without interruption even when the crew members change. Task proficiency is a requirement for all job positions and promotions. Every staff member receives formal training. Staff is trained in confined space entry. Employees are trained in hazardous materials management, as required by regulations. Environ Strategy prepares employees to respond to emergencies. Emergency training exercises are conducted and documented annually.

Training records are maintained for each employee in a log book located in the main office of the Wastewater Treatment Facility. Environ Strategy maintains appropriate safety equipment including protective clothing, safety glasses, hard hats, gloves, respirators, harnesses, hoists, fire extinguishers and maintains and calibrates atmospheric testing equipment. Lights, barricades, signage and exhaust fans are also available at the Wastewater Treatment Facility.

3.5 PART AND EQUIPMENT INVENTORIES PROGRAM

The City of Avalon and Environ Strategy both contributed to the purchase of a new jetting machine to provide an adequate means of conducting maintenance activities. The City purchased a brand new emergency pump to be use in the event that one of the lift stations needs to be bypassed. A vactor truck is adequately maintained by the City mechanics. These are all an essential part to providing means to conduct the activities developed as part of the preventative operation and maintenance program. Part inventories for the maintenance of these items have been purchased and are in the possession of the City garage.

Critical part inventories are an important part of providing the City of Avalon with the necessary controls to eliminate the possibility of a Sanitary Sewer Overflow occurrence due to equipment failure. Additional parts are kept for equipment at the lift stations and are either stored onsite at the lift station or stored at the wastewater treatment plant for easy access when needed. A redundant pump was purchased for the Catherine lift station to assure that there is always two pumps available at all times. Special order redundant transducers were purchased for both stations and are available in the event of emergency. Continual normal operation of both lift stations is essential to ES's commitment to providing the City of Avalon with the necessary controls that prevent and eliminate the possibility of a Sanitary Sewer Overflow occurrence.

4.0 ODOR CONTROL PROGRAM

Environ Strategy relies on its systematic proactive approach of cleaning the entire collection system each year and identifying 'Areas of Concern' to prevent and eliminate odors in the gravity sewer mains. The pressure main from the lift stations to the treatment plant is treated with a nutrient called 'Bioxide'. This solution is introduced into the collection system through the Catherine lift station wet well. Bioxide is a trade name for calcium nitrate which is a liquid solution that is supposed to provide another source of oxygen for the bacteria in the water to prevent Hydrogen Sulfide (the rotten egg smell) from forming in the collection system. This, along with preventive maintenance activities of cleaning the lift station wet wells helps to prevent and eliminate odors in the collection system. Odor control is an important element in the Preventive Operation and Maintenance Plan.

5.0 CUSTOMER SERVICE

Complaint Management Program

Complaints and requests are received by various means (e.g., phone calls, e-mail, other City of Avalon departments, and occasionally in person). Regardless of the nature or means of receipt, all complaints and requests are taken care of in a professional manner to resolve the complaint in a timely fashion. Environ Strategy takes great pride in an effective customer service and public relations. Complaint information is gathered by staff at the time of call to better address the complaint. Detailed information of the complaint or request includes the following:

- Receiver of complaint / dispatcher
- Time and date of request
- Complainant information (Name, address, call back phone number)
- Location of the problem
- Type of complaint
- Specific request
- Personnel assigned to complaint
- Findings type, including cause of problem
- Sketch of area, if applicable
- Complaint closeout information / recommendations
- Date complaint closed

Once a complaint is assigned, our field personnel perform an investigation. If the problem cannot be immediately resolved, Environ Strategy will generate a work order to take appropriate action for permanent correction of the problem. If the City of Avalon is not responsible for correcting the problem, the Environ Strategy will provide the complainant with guidance on a recommended course of action. Once an investigation has been completed, the staff enters closeout information into the service record and logs it in the plant log book.

6.0 CONCLUSION

Environ Strategy's (ES) Preventative Operation and Maintenance Plan (POMP) covers the assets managed in the City of Avalon's wastewater collection system and is one component of the City's overall Capacity, Management, Operations and Maintenance (CMOM) Plan. The POMP combines preventive, predictive and corrective maintenance strategies with our best management practices. The CMOM Plan and POMP have been prepared to help Environ Strategy effectively manage the City of Avalon's wastewater collection system and achieve the following goals:

Goals

- Prevent public health hazards
- Protect the environment
- Comply with regulations
- Eliminate SSOs
- Mitigate the impact of SSOs
- Minimize disruptions in service
- Minimize complaints
- Provide quick response to any disruption in service that occurs
- Protect the City of Avalon's large investment in the sewer collection system by maintaining maximum capacity and extending the useful life of the associated assets
- Prevent unnecessary damage to public/private property
- Reduce expenditures for emergency maintenance
- Convey wastewater to the Avalon Wastewater Treatment Facility with a minimum of infiltration, inflow and exfiltration
- Provide adequate capacity to convey peak flow
- Provide immediate, responsive, and efficient service to all emergency calls
- Provide a safe work environment for employees, employers, and residents in the City of Avalon
- Perform all operations in a safe manner to prevent personal injury
- Provide reliable service now and into the future

Map of the Collection System

Figure One

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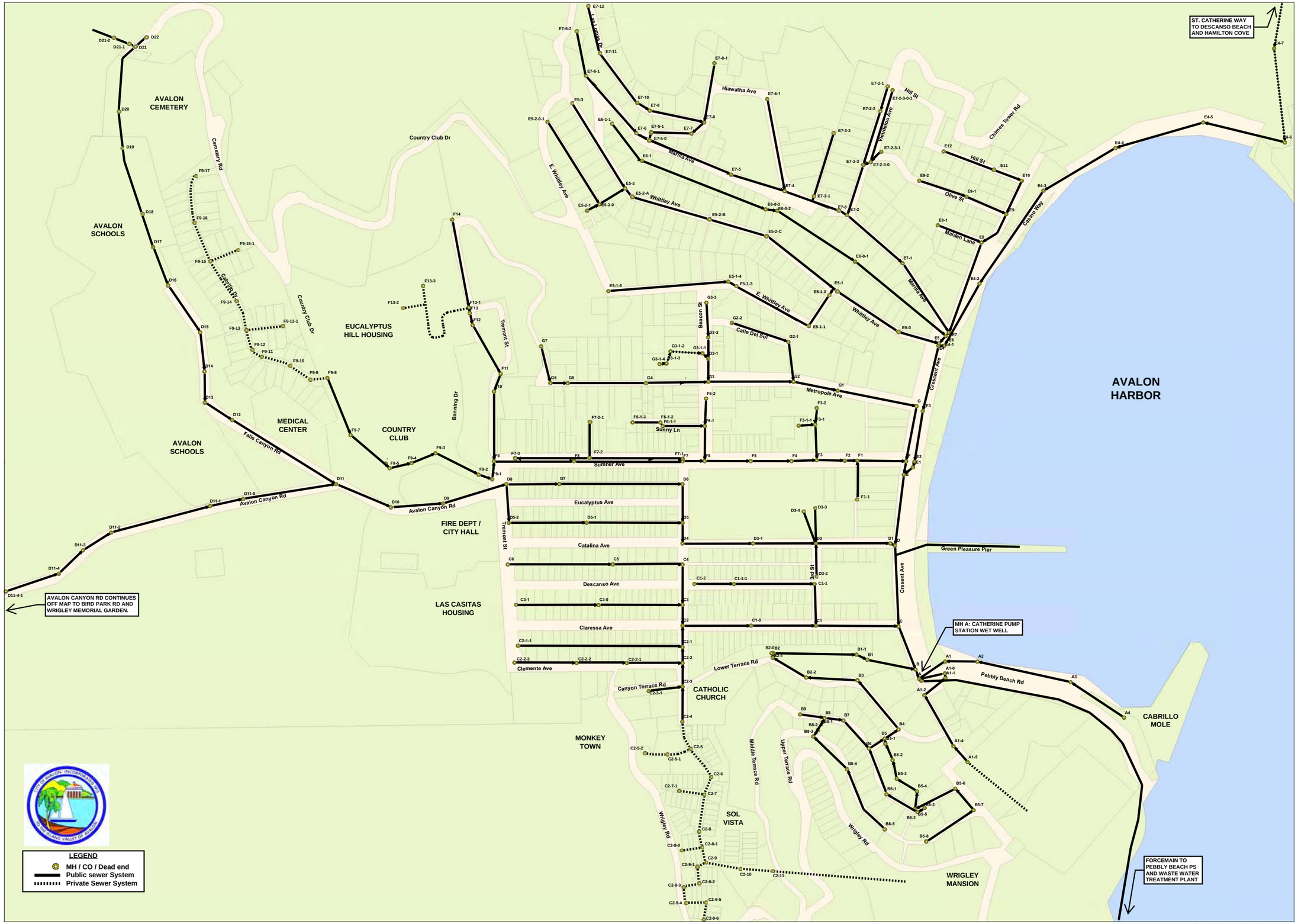

CITY OF AVALON SEWER IMPROVEMENT PROGRAM

SEWER COLLECTION SYSTEM

(07/10/2013, rev 2)

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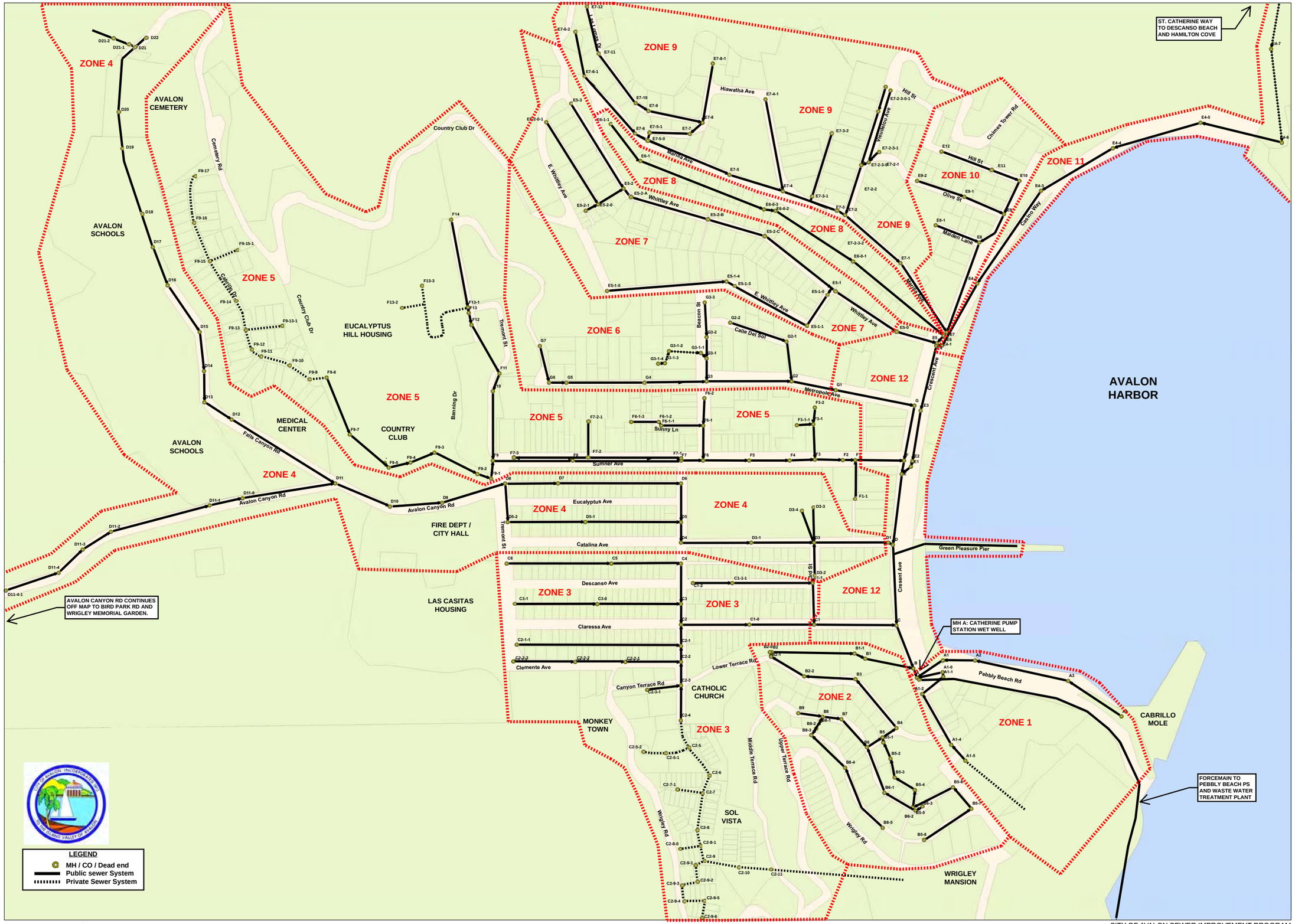

CITY OF AVALON SEWER IMPROVEMENT PROGRAM

SEWER COLLECTION SYSTEM - ZONE ID MAP

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Appendix 3: Sanitary Sewer Overflow Response and Cleanup Plan

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SSO RESPONSE AND CLEANUP CONTINGENCY PLAN

for the:

City of Avalon

Avalon, California

Wastewater Treatment Facilities

environ strategy consultants, inc.

Water and Wastewater Services

Revised April 2014

Table of Contents

Subject	Page
Overflow Emergency Response Plan	**3**
1. Overflow Response Procedures	**4**
2. Coordination with Hazardous Material Response, if needed	**4**
3. Spill Containment and Site Isolation	**5**
4. Determining the Cause and Responsible Party	**5**
5. Devising and Initiating a Remedy Plan of Action	**6**
6. Correcting Cause of the Overflow	**6**
7. Notification	**6**
8. Spill Cleanup	**7**
9. Water Quality Sampling	**7**
10. Training	**10**
Appendix 1 – Overflow Response Standard Operating Procedures	**11**
Appendix 2 – First Responders Emergency Contact List	**14**
Appendix 3 – Notification, Monitoring and Reporting	**16**
Appendix 4 – Sanitary Sewer Overflow Service Call & Field Report Forms	**25**
Appendix 5 – Methods for Estimating Spill Volume	**30**
Appendix 6 – Sewer Backup Summary Report	**36**
Appendix 7 – Collection System Failure Analysis Form	**38**
Appendix 8 – Residential Property Sewage Contamination Flyer	**40**
Appendix 9 – Conceptual Monitoring Protocol for Spills to Beach Sands	**42**

Overflow Emergency Response Plan

Environ Strategy has prepared this Sanitary Sewer Overflow Response and Cleanup Contingency Plan. The Overflow Emergency Response Plan and reporting procedure will address those mandatory SSMP provisions outlined in SWRCB Order No. 2006-0003, SWRCB Order No. WQ 2013-0058-EXEC, and NPDES Permit Order No. R4-2013-0182 and updates the Plan to be in compliance with the recently amended Monitoring and Reporting Program Waste Discharge requirements. Environ Strategy has implemented an overflow emergency response plan that identifies measures to protect public health and the environment, thereby satisfying SWRCB Order No. 2006-0003 by including:

- Proper notification procedures so that primary responders and regulatory agencies are informed of all SSOs in a timely manner;
- A program to ensure an appropriate response to all overflows;
- Procedures which ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, Regional Boards, water suppliers, etc.)
- Procedures to ensure that appropriate staff and contractor personnel are aware of and following the Emergency Response Plan and are appropriately trained;
- Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and to eliminate public contact;
- 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.

1. Overflow Response Procedures

All procedures listed in this section will be performed by any of the members of Environ Strategy's spill response team, unless otherwise noted. It will be the responsibility of the first Environ Strategy employee arriving at the scene of the sewer overflow to take the following steps to protect the health and safety of the public:

1. Assess the situation upon arrival.
2. Evaluate anyone in the flow or in the path of the flow.
3. Determine the immediate destination of the overflow, for example, the street curb gutter, storm drain, body of water, streambed, etc.
4. Determine if spill is Public or Private.
5. Determine if hazardous substances are present.
6. Identify and request any additional personnel and equipment or private contractors necessary to contain the flow, mitigate the cause and secure the site.

Once these steps have been taken, Environ Strategy staff shall perform the following steps:

1. Coordination with Hazardous Material Response, if needed
2. Spill Containment and Site Isolation
3. Determine the Cause and Responsible Party of the Overflow
4. Devise and Initiate a Remedy Plan
5. Correct Cause of the Overflow
6. Spill Notification
7. Cleanup of the Spill

2. Coordination with Hazardous Material Response, if Needed

- Upon arrival at the scene of an SSO, should a suspicious substance (e.g. oil sheen, foamy residue) be found on the ground surface, or should a suspicious odor (e.g. the strong smell of gasoline) not common to the sewer system be detected, Environ Strategy's on-call duty personnel will contact the Avalon fire department.
- If containment can be done without harmful exposure or contact, then containment shall be performed immediately. The response crew shall then wait for the arrival of the fire department.
- After arrival of the fire department, sewer response crew members will take direction from the fire departments on scene commander. Only when the on scene commander determines it is safe and appropriate for the sewer response crew to proceed, can they then carry on with containment and cleanup activities in accordance with the SSMP and SORP

3. Spill Containment and Site Isolation

The primary objective of the responders to a sewer overflow incident is to protect the public's health. This can be achieved by working to achieve both containment of the overflow and the isolation of the spill site in an effort to avoid any human contact. Although these two tasks can be done simultaneously, the initial effort will be focused on the containment of the spill.

Expeditious attempts will be made to prevent sewage from contaminating storm drains, drainage channels and surface waters by performing the following:

- Determine the immediate destination of the overflow, e.g. storm drain, street curb gutter, body of water, culvert, landscaped area, et cetera.
- Take immediate steps to contain the overflow, e.g.:
    - Place sand bags and rubber mats around the storm drain inlet.
    - Direct overflow to a natural low point, if possible, or construct a containment area.
    - Recover the ponded material utilizing a combination truck.
- In the event of a prolonged line blockage, breakage or collapse, a determination will be made to set up a portable bypass pumping operation around the problem area. If this becomes the case, personnel will continuously monitor the bypass pumping operation.
- Control perimeter of overflow site with barricades, cones, vehicles, or other barrier to restrict access.
- Establish required traffic control, per Regional Standard Drawings, to divert traffic around spill area and work zone.

4. Determine the Cause and Responsible Party of the Overflow

Primary causes of a sewage overflow may include:

Public Causes:

- Sewer main pipe blockage
- Sewer main pipe failure
- Pump station failure

Private Causes:

- Private lateral pipe blockage
- Private lateral failure
- Grease trap overflow

If the cause is found to be at a pump station or in a sewer main, Environ Strategy will be responsible for mitigating the sewer overflow and making the appropriate notifications. The service lateral that stems from the sewer main line, including the saddle connection or wye to the main line, is owned by the associated private property owner(s). Environ Strategy will be required to respond to a private sewer spill and notify the proper authorities, but it is the responsibility of the property owner to mitigate and repair any damages resulting from that spill. If the property owner is not present, Environ Strategy will contain the spill and contact a plumbing contractor to make the necessary repairs. The property owner will then be accountable for the plumber's work and for the time and materials expended by Environ Strategy crews.

5. Devise and Initiate a Remedy Plan of Action to Mitigate a Public Sewer Overflow (Sewer Division Supervisor/On-Call Duty Personnel)

- Gather any additional staff and/or equipment needed to put the plan of action into effect.
- Determine the flow path, width, length and depth in order to document the volume of the spill.
- If possible, take pictures to document the spill and your efforts to contain the flow and restore the area.
- Utilize the SSO Response Flow Chart to aid in decision making.

6. Correct Cause of the Overflow

- If overflow out of a manhole lid occurs, the spill response staff will work to remove the obstruction in the length of pipe downstream of that overflowing manhole.
- If an attempt at cleaning the downstream pipe does not remedy the problem, the pipe flow shall be diverted around the overflowing manhole to allow the inspection of the suspected length(s) of pipe with a CCTV unit.
- In the event of a pipe breakage, that portion of the sewer conveyance system shall be bypassed in order to facilitate necessary repairs.
- If there is an overflow out of a private cleanout, or a breakage in a private lateral, Environ Strategy will respond. If the property owner is unavailable to correct the cause of the spill, Environ Strategy will contain the spill and hire a private plumbing contractor to perform the necessary cleaning or repairs.

7. Notification

Environ Strategy will be responsible to report and monitor all spills according to the requirements of Orders 2006-0003, WQ 2013-0058-EXEC and its NPDES permits. Individual NPDES permit holders and enrollees under the statewide general sewer overflow (SSO) order are able to submit information to the Water Boards via the CIWQS SSO Online Database. Environ Strategy on-call duty personnel or delegated staff member will submit the draft report of the spill to the CIWQS digital database and then certify it once the report has

been completed.

Notification regarding spills will be made as described in Appendix 3.

8. Spill Cleanup

Sewer overflow sites are to be thoroughly cleaned as soon as possible after the overflow incident is mitigated. No residue is to be left for future rains to carry away or for public contact to occur. The following steps will be taken to ensure that the overflow sites are returned to their former conditions:

1. Wash down and clean up all areas of the spill. Recover the wash down water and return it back into the system.
2. Solids and debris will be flushed, swept, raked or picked up by combination truck, brought to the City's yard, contained in order to dry and transported to the landfill or wastewater treatment plant.
3. On impervious areas, the overflow site is to be disinfected with bleach with a 6:1 water to bleach concentration ratio. Never flush any disinfectant into a storm drain or body of water.
4. In the event of a grease trap spill, apply simple green with push broom. The simple green will break up the grease if left to soak. Then pressure wash and collect.
5. If sewage results in ponding, the pond will be vacuumed dry with the combination truck and the residue and site cleanup managed as previously mentioned.
6. If in Natural Waterways the California Department of Fish and Game (CDFG) should be notified in the event an SSO impacts any creeks, gullies, or natural waterways. CDFG will provide the professional guidance needed to effectively clean up spills that occur in these sensitive environments. Cleanup should proceed quickly in order to minimize negative impact. Any water that is used in the cleanup process should be de-chlorinated prior to use.

9. Water Quality Sampling

Water quality sampling and testing is required whenever spilled sewage enters a water body to determine the extent and impact of the SSO. The following guidelines must be followed:

1. The first responder should notify the Plant Manager to collect samples. Samples should be collected as soon as possible after the discovery of the SSO event.
    a. For spills less than 1,000 gallons, at a minimum water quality samples should be collected at the discharge point, 100 feet upstream, and 100 feet downstream.
    b. If a spill is more than 1,000 gallons, additional sites should be sampled; recommendations should be given according to County of Los Angeles Environmental Health Services (EHS) Division requirements.
    c. If a spill reaches a large water body, the water quality samples should be collected near the point of entry of the spilled sewage and every 100 feet along the shore of stationary water bodies.

2. The water quality sampling procedures, which are the same as the EHS procedures are:
    a. Keep the sterile collection bottle closed until it is to be filled. Do not contaminate inner surface of the lid or bottle rim.
    b. Collect water sample just below the surface in knee deep water, approximately 3 feet deep (full arm's length), without rinsing. If needed, extend the sampling pole to the fullest length to reach deeper water depth. Minimize contact with bank or beach bed as water fouling may occur.
    c. Remove cap and hold the bottle near its base and plunge it, neck downward, below the surface.
    d. Turn bottle until neck points slightly upward and mouth is directed toward the current.
    e. Fill bottle leaving about 1 inch of air to allow lab to mix by shaking.
    f. Collect a minimum of 100mL (If applicable, insert sterile collection bottle into the holder on the sample pole. Extend the sample pole and plunge bottle end into the water, bottle opening downward).
    g. Immediately place cap securely on bottle to avoid leaks and contamination.
    h. Dry the bottle.
    i. Label container with distinctive sample site name, date, and time collected.
    j. Complete the laboratory requisition slip with requested information (site, bottle number, collector, date and time of collection, type of sample, test requested, name and phone number of responsible person for reporting purposes, and deliverer name). Note any field observations that may have occurred during the sampling.
    k. Test samples from SSO events for ammonia, dissolved oxygen, fecal coliform, total coliform and enterococcus. The method of analysis for ammonia and dissolved oxygen may be a readily available, good quality test kit, suitable for field analysis.

3. Samples should be stored and shipped according to the following procedures:
    a. Place water sample bottle in a cooler with frozen blue ice. Water sample must be kept cool. Ice may be used but care must be taken so water samples are not contaminated or diluted by the ice.
    b. Bring to the City of Avalon Waste Water Treatment Plant (WWTP) lab for testing following county mandated procedures. Alternatively, if the WWTP lab is not available:
        i. Bring to a California state-certified laboratory within 8 hours of collection. For compliance tests, the holding time must not exceed 8 hours from the time of collection to time of processing or the tests will be invalidated. Other water tests for non-compliance purposes may be held below 10 degrees C until the time of analysis, up to 24 hours.

ii. Water samples may be taken to the County of Los Angeles Health and Human Services Public Health Laboratory, 213-974-1234

iii. The water samples must be brought to the Public Health Lab within 8 hours of collection, before 3:00pm, for processing.

iv. If the County Health Laboratory is closed, utilize an alternate testing laboratory that is certified for the required water quality tests.

4. If deemed necessary by County EHS, sampling must be tested for compliance with Public Beach Sanitation and Ocean Water-Contact Sports bacteriological standards. A single sample exceeds the standard if:
   a. Total coliform bacteria are > 1,000 per 100mL sample, if the ratio of fecal/total coliform bacteria exceeds 0.1; or
   b. Total coliform bacteria are > 10,000 per 100mL sample; or
   c. Fecal coliform bacteria are > 400 per 100mL sample; or
   d. Enterococcus bacteria > 104 per 100mL sample.

5. The mean value of at a least five weekly consecutive samples during any 30-day sampling period exceeds the standards if:
   a. Total coliform bacteria > 1,000 per 100mL sample; or
   b. Fecal coliform bacteria > 200 per 100mL sample; or
   c. Enterococcus bacteria are > 35 per 100mL sample.

6. If water quality samples are required by an environmental or health regulatory agency or State law, or if voluntary monitoring is conducted by the City or its agent(s), as a result of any SSO, records of monitoring information shall include:
   a. The date, exact place, and time of sampling or measurements;
   b. The individual(s) who performed the sampling or measurements;
   c. The date(s) analyses were performed;
   d. The individual(s) who performed the analyses;
   e. The analytical technique or method used; and
   f. The results of such analyses.

7. Monitoring shall be done on a daily basis from the time the spill is known until the results of two consecutive sets of bacteriological monitoring indicate the return to the background level or the County Department of Health Services authorizes cessation of monitoring.

10. Training

Environ Strategy's personnel shall schedule training designed to identify resource shortcomings, clarify roles and responsibilities, improve response performance and reveal any response weaknesses. The training may consist of:

Response training- An awareness training meeting will be conducted as needed with respect to the details of the SORP and the responsibilities of each employee. All employees will attend this meeting. Additional training sessions may also be conducted at the discretion of Environ Strategy to further familiarize employees with the response procedures.

Tabletop exercise- A simulated spill event may be scheduled, according to need, to allow the exercise participants to discuss and understand the necessary response actions, test equipment and gauge the response ability of the employees. Scheduling a simulate Tabletop exercise will be at the discretion of Environ Strategy.

Spill Review Committee- After each spill event, Environ Strategy and the City, if applicable, will meet in order to review the event's cause, the procedural response of the employees, the regulatory and compliance documentation and whether additional issues and/or resources have to be addressed.

Estimate the Volume of Spilled Sewage- Use the methods outlined in Appendix 5 to estimate the volume of the spilled sewage. Some spills may occur in locations where the wastewater can seep into the ground or flow away from the spill location. In such conditions, consider when the spill was first detected and observations from bystanders in order to determine the total spill volume.

Appendix 1-Overflow Response Standard Operating Procedures

Appendix 1- Overflow Response SOP

The purpose of this Standard Operational Procedure (SOP) is to aid staff in prompt and responsible SSO response and is intended only as a condensed version of the Sanitary Sewer Overflow Response Plan (SSO).

Addressing Service calls

- When a report of a sewer spill or backup is made, an ES employee receives the call, takes the information from the caller, and fills out the first section of Field Report (Appendix 4).
- The person who took the call verbally communicates it to the Plant Manager (do not leave a voicemail) along with any information collected on the Field Report.
- The response measures will be based on the information provided by the caller (weather, traffic conditions, small back up vs. sewage flowing on the ground, etc). If additional help is needed, the Plant Manager will contact other employees, contractors, and/or equipment suppliers as listed in the First Responder Emergency Contact List (Appendix 2).

Responding to SSOs

- The First Responder shall visit the site immediately in an attempt to minimize or eliminate an overflow. Respond with the combination sewer cleaning truck and/or spill response vehicle depending on the situation.
- Upon arrival at the site, clearly assess the situation and comply with all safety precautions (traffic, confined space, etc.) and verify the existence of a sewer system spill or backup. Prevent public contact with spilled wastewater.
- Identify and assess the affected area and extent/impact of the spill and request additional help as needed for line cleaning or repair, containment, recovery, lab analysis and site cleanup.
- 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 or conveyance system requires construction repairs, contingency plans must be employed as needed, including containment, bypass pumping, contractual assistance etc. If assistance is required, immediately contact other employees, contractors and equipment suppliers as required. See First Responder Emergency Contact List (Appendix 2).

- Signs warning the public of a sewage release should be posted in the affected area. Use barricades, caution tape, cones, etc. as needed. Warning signs should remain posted until the Plant Manager approves their removal.
- If the spill or overflow volume is estimated to equal or exceeds 1,000 gallons or the spill is in a sensitive area, sampling shall be conducted.
- The response crew shall complete the Sanitary Sewer Overflow Service Call & Field Report Forms (Appendix 4) and provide copies as stated at the bottom of the report.
- SSO Notification, Monitoring and Reporting: Accurate and responsive reporting is vital. Refer to the SSO External Reporting Requirement Check List (Figure 1, Appendix 3) for a quick reference on Notification & Certifying requirements. If any spill of untreated or partially treated wastewater reaches surface water or probably will reach surface water, the first responder must notify the California Emergency Management Agency (Cal EMA) and obtain a notification control number within two hours of becoming aware of the spill. The Department of Public Health should also be notified immediately.

Home or Business Back Ups

In the event of a backup into a home or business, the Residential Property Sewage Contamination Flyer (Appendix 8) shall be used to guide staff through the process.

Appendix 2 - First Responders Contact List

Appendix 2 – First Responder Emergency Contact List

City of Avalon

Name	Title	Office Number	Cell Number
Ben Harvey	City Manager	310-510-0220	213-364-2699
Denise Radde	City Administrator	310-510-0220	310-650-4779
Pastor Lopez	Public Works Director	310-510-0220	310-882-8226
Dennis Jaich	CIP Manager	310-510-0220	619-843-0088

Environ Strategy
Primary Contact List

On-Call Service Tech Cell
(310)-405-1678

Backup Emergency Cell
(310) 909-4294

Name	Title	Office Number	Cell Number
David Clary	Chief Plant Operator	310-510-0731	909-522-2702
Cliff Casanova	Lead Operator	310-510-0731	310-405-1678
Ian Morison	Operator in Training	310-510-0731	310-405-1678
Joey Hall	Operator in Training	310-510-0731	310-405-1678
Cliff Casanova	Operator	310-510-0731	310-405-1678
Ian Morison	Operator in Training	310-510-0731	310-405-1678
Joey Hall	Operator in Training	310-510-0731	310-405-1678
Jeff Mummert	Project Manager	714-919-6500	909-561-6254
Ryan Bonner	President	714-919-6500	618-218-5736
Patrick Evans -	Backup Field Tech	714-919-6500	714-928-9864
Brian Bertsch -	Backup Operator	714-919-6500	949-680-8491
Laura DeMomeu	Backup Lab	714-919-6500	714-743-1756

Appendix 3 -Notification, Monitoring and Reporting

Public Notification

Spills that do not Reach Public Waters- For spills that are contained and do not release unrecovered sewage into a storm drain, stream or a surface water body, notification to the public shall be accomplished through the use of signs at the location of the spill.

Spills that Reach Public Waters - County EHS Requirements. The EHS Deputy Director shall determine if a field investigation of the discharge site and potentially affected areas is required. If possible, verify the extent of the contamination in the field before the water body closure decision is made. During the field investigation, EHS staff shall notify the Deputy Director of their findings by telephone.

Creeks, streams and beaches that have been contaminated as a result of an SSO should be posted at visible access locations until the risk of contamination has subsided to acceptable background levels. The warning signs, once posted, should be checked every day to ensure that they are still in place. "Closed" signs shall be posted at the outfall and a minimum of 100 feet upstream and 100 feet downstream of the discharge. If there is a large volume of sewage, more signs must be posted downstream.

Signs must remain posted until at least two consecutive days of samplings meet the Public Beach Sanitation and Ocean Water-Contact Sports standards. In the event where background levels of the water bodies may exceed the standards, ES will analyze available test results, the situation at hand, and/or require more testing to determine if the Public Beach Sanitation and Ocean Water-Contact Sports standards can be met. The removal of signs must be approved by EHS and the County Public Health Officer.

EHS has the authority to close and re-open the beaches and water bodies for public water contact. The water bodies affected are determined by the following parameters and best professional judgment:

a) The volume of sewage discharged

b) Parameters affecting flow of sewage to the water bodies

c) Direction of current

d) Tides

e) Past experience in the area and/or

f) Any other pertinent information.

Point of Contact – The City Manager shall be responsible for public notification, if necessary.

Regulatory Notification Requirements

CAL EMA – *In accordance with the requirements of CWC section 13271, the Discharger shall provide notification to the California Emergency Management Agency (Cal EMA) of the release of reportable amounts of hazardous substances or sewage that causes, or probably will cause, discharge to any waters of the state as soon as possible, but not later than two hours after becoming aware of the release. The CCR, Title 23, section 2250, defines a reportable amount of sewage as being 1,000 gallons. The phone number for reporting these releases to Cal EMA is (800) 852-7550.*

For any Category 1 SSO greater than or equal to 1,000 gallons that results in a discharge to a surface water or spilled in a location where it probably will be discharged to surface water, either directly or by way of a drainage channel or MS4, the enrollee shall, as soon as possible, but no later than 2 hours after

(A) The enrollee has knowledge of the discharge,

(B) Notification is possible, and

(C) Notification can be provided without substantially impeding cleanup or other emergency measures,

Notify Cal EMA and obtain a notification control number.

To satisfy notification requirements for each applicable SSO, the enrollee shall provide certain information requested by Cal EMA before receiving a control number. Spill information requested by Cal EMA may include:

I. Name of person notifying Cal EMA and direct return phone number.

II. Estimated SSO volume discharged (gallons).

III. If ongoing, estimated SSO discharge rate (gallons per minute).

IV. SSO incident Description:

a) Brief narrative.

b) On-scene point of contact for additional information (name and cell phone number).

c) Date and time enrollee became aware of the SSO.

d) Name of sanitary sewer system agency causing the SSO.

e) SSO cause (if known).

V. Indication of whether the SSO has been contained.

VI. Indication of whether surface water is impacted.

VII. Name of surface water impacted by the SSO, if applicable.

VIII. Indication of whether a drinking water supply is or may be impacted by the SSO.

IX. Any other known SSO impacts.

X. SSO incident location (address, city, state, and zip code).

Following the initial notification to Cal EMA and until such time that an enrollee certifies the SSO report in the CIWQS online SSO database, the enrollee shall provide updates to Cal EMA regarding substantial changes to the estimated volume of untreated or partially treated sewage discharged and any substantial change(s) to known impact(s).

PLSDs - The enrollee is strongly encouraged to notify Cal EMA of discharges greater than or equal to 1,000 gallons of untreated or partially treated wastewater that result or may result in a discharge to surface water resulting from failures or flow conditions within a privately owned sewer lateral or from other private sewer asset(s) if the enrollee becomes aware of the PLSD.

LA COUNTY DEPT. OF PUBLIC HEALTH – *In accordance with the requirements of Health and Safety Code section 5411.5, the Discharger shall provide notification to the local health officer or the director of environmental health with jurisdiction over the affected body of any unauthorized release of sewage or other waste that causes, or probably will cause, a discharge to any waters of the state as soon as possible, but no later than two hours after becoming aware of the release.*

The Los Angeles County Department of Public Health, Environmental Health Division is responsible for monitoring ocean water quality. The Department is charged with taking appropriate action when untreated sewage enters a drainage channel that discharges into a coastal region where public health may be jeopardized.

If discharging sewage is found to be flowing from a property, into the street, is moving toward or is already entering a storm drain (waters of the state), the County Operator shall be notified immediately.

- All notifications of sewage spills shall be assigned an Incident Number when called into the County Operator.
- The person reporting the sewage discharge is required to provide the following minimal information:
  1. Contact information.
  2. Location of the discharge.
  3. Amount of the discharge.
  4. Start time and end time of the discharge, and
  5. Disposition of the discharge (contained, went into a storm drain/waterway, soaked into ground, etc.).
- Additional information shall be provided upon containment of discharge.

REGIONAL WATER QUALITY CONTROL BOARD – *The Discharger shall notify the Regional Water Board of any unauthorized release of sewage from its POTWs that causes, or probably will cause, a discharge to a water of the state as soon as possible, but not later than two hours after becoming aware of the release. This initial notification does not need to be made if the Discharger has notified Cal EMA and the local health officer or the director of environmental health with jurisdiction over the affected water body. The phone number for reporting these releases of sewage to the Regional Water Board is (213) 576-6657. The phone numbers for after hours and weekend reporting of releases of sewage to the Regional Board are (213) 305-2284 and (213) 305-2253.*

At a minimum, the following information shall be provided to the Regional Water Board:

1. *The location, date, and time of the release;*
2. *The water body that received or will receive the discharge;*
3. *An estimate of the amount of sewage or other waste released and the amount that reached a surface water at the time of notification;*
4. *If ongoing, the estimated flow rate of the release at the time of the notification;*
5. *The name, organization, phone number and email address of the reporting representative; and,*
6. *A certification that the State Office of Emergency Services and the local health officer or directors of environmental health with jurisdiction over the affected water bodies have been notified of the discharge.*

Regulatory Reporting Requirements

SSO Mandatory Reporting Information: For reporting purposes, if one SSO event results in multiple appearance points in a sewer system asset, the enrollee shall complete one SSO report in the CIWQS Online SSO Database which 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 caused the SSO, and provide descriptions of the locations of all other discharge points associated with the SSO event.

Spill Categories and Definitions

CATEGORIES	DEFINITIONS
CATEGORY 1	Discharges of untreated or partially treated wastewater of **any volume** resulting from an enrollee's sanitary sewer system failure or flow condition that: • Reach surface water and/or reach a drainage channel tributary to a surface water; or • Reach a Municipal Separate Storm Sewer System (MS4) and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the MS4 is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or groundwater infiltration basin (e.g., infiltration pit, percolation pond).
CATEGORY 2	Discharges of untreated or partially treated wastewater of **1,000 gallons or greater** resulting from an enrollee's sanitary sewer system failure or flow condition that **do not** reach surface water, a drainage channel, or a MS4 unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.
CATEGORY 3	All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition
PRIVATE LATERAL SEWAGE DISCHARGE (PLSD)	Discharges of untreated or partially treated wastewater resulting from blockages or other problems **within a privately owned sewer lateral** connected to the enrollee's sanitary sewer system or from other private sewer assets. PLSDs that the enrollee becomes aware of may be voluntarily reported to the California Integrated Water Quality System (CIWQS) Online SSO Database.

Requirements

Category 1 SSO: All SSOs that meet the above criteria for Category 1 SSOs must submit a draft report within three (3) business days of becoming aware of the SSO and certify within 15 calendar days of SSO end date to the CIWQS Online SSO Database.

Category 2 SSO: All SSOs that meet the above criteria for Category 2 SSOs must submit a draft report within three (3) business days of becoming aware of the SSO and certify within 15 calendar days of SSO end date to the CIWQS Online SSO Database.

Category 3 SSO: All SSOs that meet the above criteria for Category 3 SSOs shall submit certified report within 30 calendar days of the end of the month in which the SSO occurred to the CIWQS Online SSO Database. (e.g., all Category 3 SSOs occurring in the month of February shall be entered into the database and certified by March 30).

SSO Technical Report: The enrollee shall submit an SSO Technical Report in the CIWQS Online SSO Database within forty five (45) calendar days after the end date of any Category 1 SSO in which 50,000 gallons or greater are spilled to surface waters.

PLSDs: Discharges of untreated or partially treated wastewater resulting from blockages or other problems within a privately owned sewer lateral connected to the enrollee's sanitary sewer system or from other private sanitary sewer system assets may be voluntarily reported to the CIWQS Online SSO Database.

1. The enrollee is also encouraged to provide notification to Cal EMA when a PLSD greater than or equal to 1,000 gallons has or may result in a discharge to surface water. For any PLSD greater than or equal to 1,000 gallons regardless of the spill destination, the enrollee is also encouraged to file a spill report as required by Health and Safety Code section 5410 et. seq. and Water Code section 13271, or notify the responsible party that notification and reporting should be completed as specified above and required by State Law.
2. If a PLSD is recorded in the CIWQS Online SSO Database, the enrollee must identify the sewage discharge as occurring and caused by a private sanitary sewer system asset and should identify a responsible party (other than the enrollee), if known. Certification of PLSD reports by enrollees is not required.

CIWQS Not Available

In the event that CIWQS is not available, the Plant Manager, or their designee will fax all required information to the RWQCB office in accordance with the time schedules identified above. In such event, the City will submit the appropriate reports using CIWQS as soon as practical. The Los Angeles RWQCB (Region 4) number is (213)-305-2253.

Additional WWTF Spill Reporting: As soon as possible, but not later than twenty-four hours after becoming aware of an unauthorized discharge of sewage or other waste from the wastewater treatment plant to a water of the state, the Discharger shall submit a statement to the Regional Water Board by email at aanijielo@waterboards.ca.gov. If the discharge is 1,000 gallons or more, this statement shall certify that Cal EMA has been notified of the discharge in accordance with CWC section 13271. The statement shall also certify that the local health officer or director of environmental health with jurisdiction over the affected water bodies has been notified of the discharge in accordance with Health and Safety Code section 5411.5. The statement shall also include at a minimum the following information:

1. Agency, NPDES No., Order No., and MRP CI No. 0066, if applicable;
2. The location, date, and time of the discharge;
3. The water body that received the discharge;
4. A description of the level of treatment of the sewage or other waste discharged;
5. An initial estimate of the amount of sewage or other waste released and the amount that reached a surface water;
6. The Cal EMA control number and the date and time that notification of the incident was provided to Cal EMA; and,
7. The name of the local health officer or director of environmental health representative notified (if contacted directly); the date and time of notification; and the method of notification (e.g., phone, fax, email).

A written preliminary report five working days after disclosure of the incident is required. Submission to the Regional Water Board of the California Integrated Water Quality System (CIWQS) Sanitary Sewer Overflow (SSO) event number shall satisfy this requirement. Within 30 days after submitting the preliminary report, the Discharger shall submit the final written report to the LA County Regional Board. (A copy of the final written report, for a given incident, already submitted pursuant to a statewide General WDRs for Wastewater Collection System Agencies, may be submitted to the Regional Water Board to satisfy this requirement.) The written report shall document the information required in the section 'Records' below, monitoring results and any other information required in provisions of the Standard Provisions document including corrective measures implemented or proposed to be implemented to prevent/minimize future occurrences. The Executive Officer for just cause can grant an extension for submittal of the final written report.

SSO Documentation and Reporting- All SSOs should be thoroughly investigated and documented by using the Fire Department as the base for all information and calls to be recorded. Below is a description of procedures used to document SSOs.

Internal SSO Documentation

Category 1, 2, and 3 SSO's

The first responder will complete a work order and Field Report (Appendix 4). The first responder will follow the procedures and complete the Sewer Backup Summary Report (Appendix 6) if an SSO has occurred in a residence or building.

The Plant Manager will prepare a file for each individual SSO. The file should include the following information:

a) Initial call information from the reporting party

b) Collection System Service Call & Overflow Field Report Form (Appendix 4)

c) Copies of the California Integrated Water Quality System (CIWQS) report forms, once submitted

d) Volume estimate and amount recovered

e) Water quality sampling and test results, if applicable.

External SSO Documentation-The GWDR requires that individual SSO records be maintained by the City for a minimum of five years from the date of the SSO. This period may be extended when requested by a RWQCB Executive Officer. All records shall be made available for review upon SWRCB, RWQCB, or EPA staff's request. Records shall be retained for all SSOs, including but not limited to the following when applicable:

a) Copy of Certified CIWQS report;

b) All original recordings for continuous monitoring instrumentation;

c) Service call records and complaint logs of calls received by the City; SSO calls; SSO records;

d) Steps that have been and will be taken to prevent the SSO from recurring and a schedule to implement those steps;

e) Work orders, work completed, and any other maintenance records from the previous five years which are associated with responses and investigations of system problems related to SSOs;

f) A list and description of complaints from customers or others from the previous five years; and

g) Documentation of performance and implementation measures for the previous five years.

Monthly No Spill Certification: If there are no SSOs during the calendar month, the enrollee shall either;

1) Certify, within 30 calendar days after the end of each calendar month, a "No Spill" Certification statement in the CIWQS Online SSO Database certifying that there were no SSOs for the designated month, or
2) Certify, quarterly within 30 calendar days after the end of each quarter, "No Spill" certification statements in the CIWQS Online SSO Database certifying that there were no SSOs for each month in the quarter being reported on.

For quarterly reporting, the quarters are 1st Quarter – January/February/March, 2nd Quarter – April/May/June, 3rd Quarter – July/August/September, and 4th Quarter – October/November/December.

EPA Reporting Requirements

On the fifteenth day of January, April, July, and October in each year in which activities are conducted pursuant to the EPA Administrative Order, the City shall submit a tabulation of all sewage spills occurring during the previous calendar quarter. The quarterly reports shall indicate, for each spill, the spill date, spill volume, volume recovered, spill location, cause, and spill destination. Certified and uncertified spill reports submitted to the SWRCB's CIWQS during the previous calendar quarter may be included.

If the City cannot be at the spill location within 60 minutes after becoming aware of the spill, the late response shall be reported as part of the quarterly spill report. The City will include in the quarterly spill report a description of all late responses, reasons for each late response, and steps that will be taken to improve the response time.

Records: The Discharger shall develop and maintain a record of all spills, overflows or bypasses of raw or partially treated sewage from its collection system or treatment plant. This record shall be made available to the Regional Water Board upon request. The records shall contain:

1. The date and time of each spill, overflow, or bypass;
2. The location of each spill, overflow, or bypass;
3. The estimated volume of each spill, overflow, and bypass including gross volume, amount recovered and amount not recovered, monitoring results as defined above;
4. The cause of each spill, overflow, or bypass;
5. Whether each spill, overflow, or bypass entered a receiving water and, if so, the name of the water body and whether it entered via storm drains or other man-made conveyances;
6. Any mitigation measures implemented;
7. Any corrective measures implemented or proposed to be implemented to prevent/minimize future occurrences; and,
8. The mandatory information included in SSO online reporting for finalizing and certifying the SSO report for each spill, overflow, or bypass under the SSO WDR.

Amended SSO Reports

The enrollee may update or add additional information to a certified SSO report within 120 calendar days after the SSO end date by amending the report or by adding an attachment to the SSO report in the CIWQS Online SSO Database.

Water Quality Monitoring

To define the geographical extent of the spill's impact, grab samples (if feasible, accessible, and safe) should be obtained for all spills, overflows or bypasses of any volume that reach any waters of the State (including surface and ground waters). Samples shall be analyzed for total and fecal coliform or E. coli, and enterococcus, and relevant pollutants of concern, upstream and downstream of the point of entry of the spill (if feasible, accessible, and safe). This monitoring shall be done on a daily basis from the time the spill is known until the results of two consecutive sets of bacteriological monitoring indicate the return to the background level or the County Department of Health Services authorizes cessation of monitoring.

All water samples will be obtained at the point of discharge and both 100 feet upstream and downstream of the discharge point.

State Board: For SSOs in which 50,000 gallons or greater are spilled to surface waters, Water Quality Monitoring shall be conducted within 48 hours, at a minimum, for the following constituents:

1. Ammonia
2. Appropriate Bacterial indicator(s) per the applicable Basin Plan water quality objective or Regional Board direction which may include total and fecal coliform, enterococcus, and e-coli.

Public Health: The LA Department of Public Health will notify the operator upon reporting if there is any Water Quality Monitoring required by their department.

External SSO Reporting Procedure

SWRCB Requirements (CIWQS) - The CIWQS electronic reporting system should be used for reporting SSO information to the SWRCB whenever possible.

Figure 1: SSO External Reporting Requirement Check List

Reporting & Certification

Category 1 SSOs that reach Surface Waters

2-Hour Notification: Regulatory Agencies (OES, County Health, RWQCB) must be notified as soon as possible, but no later than two hours of ANY discharge of sewage (untreated/partially treated) to a surface water or drainage channel (that is not fully captured and returned to sewer).

24-Hour Certification: Any SSO requiring notification based on the two-hour rule must be followed up with a certification submitted to the RWQCB within 24 hours.

Within 3 Business Days of Notification: As a Category 1 SSO, a draft must be reported to SWRCB using CIWQS.

Within 15 calendar Days of Conclusion of Response/Remediation: Must be certified by LRO using CIWQS.

Category 2 SSOs that do not reach Surface Waters

Within 3 Business Days of Notification (SWRCB/CIWQS): As a Category 2 SSO, it must be reported to SWRCB using CIWQS.

Within 15calendar Days of Conclusion of Response/Remediation: Must be certified by LRO using CIWQS.

Category 3 SSOs (All other discharges of untreated or partially treated wastewater)

Within 30-Days After End of Calendar Month with SSO Event: Must be reported to SWRCB using CIWQS; Must be certified by LRO using CIWQS.

Negative Reporting (No SSOs in Month)

Within 30 days past the end of the month: The LRO or designee must report using CIWQS.

Private Lateral SSOs (Reporting is Optional)

If reporting is desired, report to SWRCB as "Private lateral" SSO and identify responsible party, if known (not City), using CIWQS. Must be certified by LRO using CIWQS.

California Integrated Water Quality Systems (CIWQS)

SWRCB Reporting Timeframes Depend on the Size and Final Destination of the SSO.

- CIWQS must be used for reporting if the website is available (http://ciwqs.waterboards.ca.gov)
  - User Name:_____ Password:_____
  - Waste Discharge Identification Number (WDID) #_____
  - The SSO database will automatically generate an email notification with customized information about the SSO upon initial reporting and final certification for all reported SSOs.
  - Emails will be sent to the EHS and the Los Angeles RWQCB
- Fax RWQCB (only if website is down)

Two-Hour Notification /24-Hour Certification

1. **California Emergency Management Agency (Cal EMA)**
   Phone: (800} 852-7550; Make sure you ask for an "Cal EMA Control Number" (for RWQCB)
2. **Los Angeles County Environmental Health Services**
   Phone- Day: (415} 499-6907
3. **RWQCB Region 4 (Los Angeles)**
   Option of phoning in the 2-hour notification and follow up within 24 hours using the online certification or utilize the online feature for both Phone (2-Hour Notification)
   Phone- Day (213) 576-6657
   Phone – After hours & Weekends (213) 305-2253 & (213) 305-2284

Sanitary Sewer Overflow

Appendix 4 -Sanitary Sewer Overflow Service Call & Field Report Forms

Appendix 4 - Sanitary Sewer Overflow Service Call & Field Report Form

INITIAL INFORMATION

DATE:	CALL RECEIVED: AM/PM
RECEIVED BY:	CALLER'S NAME:
CALLER'S PHONE#:	CALLER'S ADDRESS:
SPILL LOCATION NAME LOCATION OF OVERFLOW:	CROSS STREET:
TIME AND NAMES OF CREW MEMBERS CONTACTED:	
DESCRIPTION OF COMPLAINT:	

FIELD REPORT FOR RESPONSE CREW'S Use

TIME MOBILIZED: AM/PM		CREW:	
TIME ARRIVED AT SITE: AM/PM			
FORM COMPLETED BY:		DATE:	
ASSET#:	U/S ASSET#	WORK AREA:	D/S ASSET#:
SIZE OF LINE:	LENGTH OF LINE:	EASEMENT: Yes☐ No☐	
GPS COORDINATES (LATITUDE / LONGITUDE; IF AVAILABLE):			

COMMENTS:

SKETCH OF AREA: (INCLUDE MANHOLES, INTERSECTIONS, STOPPAGE LOCATION, ETC.)

COMPLETE FORM IF AN OVERFLOW HAS OCCURRED

TIME OVERFLOW STARTED:	TIME OVERFLOW STOPPED:
DURATION OF SSO:	EST. SPILL VOLUME (GALLONS):

DESCRIBE HOW OVERFLOW QUANTITY WAS CALCULATED

- EYEBALL ESTIMATE
- DURATION / FLOWRATE
- MEASURED VOLUME
- OTHER:_____

DID SSO REACH STORM DRAIN PIPE THAT WAS NOT FULLY RECOVERED?
YES ☐ No ☐

DID SSO DISCHARGE TO DRAINAGE CHANNEL AND/OR SURFACE WATER?
YES ☐ No ☐

IMPACTED SURFACEWATER(S) (IF APPLICABLE):

IMPACTED BEACH(ES) (IF APPLICABLE):

FINAL SSO DESTINATION:

STORM DRAIN BUILDING YARD/LAND SURFACE WATER NO WATER INVOLVED

CAPTURED FROM STORM DRAIN (100%) OTHER:_____

VOLUME RECOVERED / RETURNED TO SEWER SYSTEM (GALLONS):

VOLUME TO WATERS & NOT RECOVERED, INCLUDING SURFACE WATER, DRAINAGE CHANNEL, OR NOT RECOVERED FROM STORM DRAIN (GALLONS):

FOR CONTINUING SPILLS WITHOUT COMPLETE BLOCKAGE REMOVAL AND/OR REPAIRS (IF APPLICABLE), CURRENT SPILL RATE {GALLONS PER MINUTE):

WEATHER: SUNNY CLOUDY RAINY RAIN FOR SERVERAL DAYS

PRIMARY CAUSE:

ROOTS	GREASE	DEBRIS	VANDALISM
CONSTRUCTION DAMAGE		PUMP STATION FAILURE	PIPE FAILURE
CAPACITY (HEAVY RAIN)	POWER FAILURE	OTHER:_____	

ADDITONAL INFORMATION:

SPILL APPEARANCE POINT / SOURCE OF SSO: MANHOLE GRAVITY MAIN FORCEMAIN CLEAN OUT PRIVATE LATERAL PUMP STATION:_____(NAME) OTHER: _____
BLOCKAGE LOCATION: PRIVATE LATERAL UPSTREAM MH#:_____ DOWNSTREAM MH#:___ | OVERFLOW MH#:___
DESCRIBE CLEANUP METHOD:
PHOTO/VIDEO TAKEN: YES ☐ NO ☐ PHOTO/VIDEO FILE LOCATION:
SAMPLES TAKEN BY: LOCATION OF SAMPLES:
DESCRIBE PROPERTY DAMAGE:
SIGNS POSTED: YES ☐ NO ☐ NEIGHBORS NOTIFIED: YES ☐ NO ☐
BARRICADED: YES ☐ NO ☐ OES NOTIFIED: YES ☐ NO ☐ ; DATE / TIME:
OES CONTACTS/DETAILS:
OES SSO#:
RWQCB NOTIFIED: YES ☐ No ☐; DATE / TIME:_____
OTHER AGENCIES NOTIFIED:_____
SSO INFORMATION FAXED TO RWQCB: YES ☐ No ☐ ; DATE/TIME:_____
CALLER/CUSTOMER NOTIFIED RE: STATUS: YES No
IF NOT, WHY:
RECOMMENDED SPILL CORRECTIVE ACTIONS:

Appendix 5 -Methods for Estimating Spill Volume

Appendix 5 - Methods for Estimating Spill Volume

A variety of approaches exist for estimating the volume of a sanitary sewer spill. This appendix documents the three methods that are most often employed. The person preparing the estimate should use the method most appropriate to the sewer overflow in question and use the best information available.

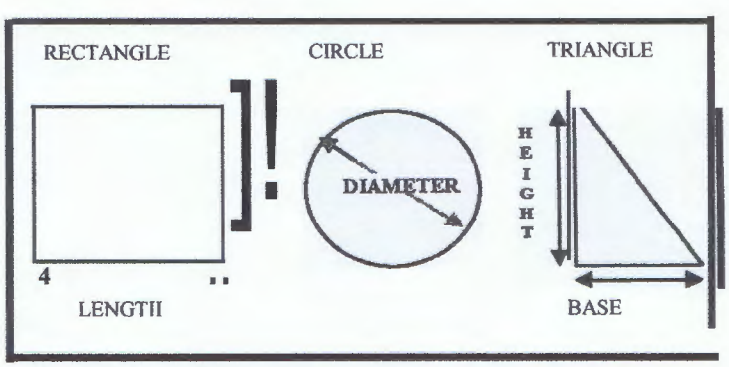
Method 1: Eyeball Estimate

The volume of small spills can be estimated using an "eyeball estimate". To use this method imagine the amount of water that would spill from a bucket or a barrel. A bucket contains 5 gallons and a barrel contains 50 gallons. If the spill is larger than 50 gallons, try to break the standing water into barrels and then multiply by 50 gallons. This method is useful for contained spills up to approximately 200 gallons.

Method 2: Measured Volume

The volume of most small spills that have been contained can be estimated using this method. The shape, dimensions, and the depth of the contained wastewater are needed. The shape and dimensions are used to calculate the area of the spills and the depth is used to calculate the volume.

Common Shapes and Dimensions



1. Sketch the shape of the contained sewage (see figure above).
2. Measure or pace off the dimensions.
3. Measure the depth at several locations and select an average.
4. Convert the dimensions, including depth, to feet.
5. Calculate the area in square feet using the following formulas: Rectangle: Area = length (feet) x width (feet)
   - Circle: Area= diameter (feet) x diameter (feet) x 0.785
   - Triangle: Area = base (feet) x height (feet) x 0.5
6. Multiply the area (square feet) times the depth (in feet) to obtain the volume in cubic feet.
7. Multiply the volume in cubic feet by 7.5 to convert it to gallons

Method 3: Duration and Flow Rate

Calculating the volume of larger spills, where it is difficult or impossible to measure the area and depth, requires a different approach. In this method, separate estimates are made of the duration of the spill and the flow rate. The methods of estimating duration and flow rate are:

Duration

The duration is the elapsed time from the time the spill started to the time that the flow was restored.

Start Time: The start time is sometimes difficult to establish. Here are some approaches:

1. Local residents can be used to establish start time. Inquire as to their observations. Spills that occur in rights-of-way are usually observed and reported promptly. Spills that occur out of the public view can go on longer. Sometimes observations like odors or sounds (e.g. water running in a normally dry creek bed) can be used to estimate the start time.

2. Changes in flow on a downstream flow meter can be used to establish the start time. Typically the daily flow peaks are "cut off" or flattened by the loss of flow. This can be

identified by comparing hourly flow data during the spill event with flow data from prior days. This method will likely only be effective with consistent weather.

3. Conditions at the spill site change over time and can be used to establish the start time. Initially there will be limited deposits of toilet paper and other sewage solids. After a few days to a week, the sewage solids form a light-colored residue. After a few weeks to a month, the sewage solids turn dark. The quantity of toilet paper and other materials of sewage origin increase over time. These observations can be used to estimate the start time in the absence of other information. Taking photographs to document the observations can be helpful if questions arise later in the process. This method is valid for spills that have been occurring for a long time and may be used in conjunction with either of the above methods.

4. It is important to remember that spills may not be continuous. Blockages are not usually complete {some flow continues). In this case the spill would occur during the peak flow periods (typically 10:00 to 12:00 and 13:00 to 16:00 each day). Spills that occur due to peak flows in excess of capacity will occur only during, and for a short period after, heavy rainfall.

End Time: The end time is usually much easier to establish. Field crews on-site observe the "blow down" that occurs when the blockage has been removed. The "blow down" can also be observed in downstream flow meters.

Flow Rate

The flowrate is the average flow that left the sewer system during the time of the spill.

There are three common ways to estimate the flowrate:

1. The San Diego Manhole Flowrate Chart: This chart, included as at the end of this appendix, shows sewage flowing from manhole covers at a variety of flowrates. The observations of the field crew can be used to select the appropriate flowrate from the chart. If possible, photographs are useful in documenting basis for the flowrate estimate.

2. Flowmeter: Changes in flows in downstream flowmeters can be used to estimate the flowrate during the spill.

3. Counting Connections: Once the location of the spill is known, the number of upstream connections can be determined from the sewer maps. Multiply the number of connections by 200 to 250 gallons per day per connection or 8 to 10 gallons per hour per connection.

For example: 22 upstream connections * 9 gallons per hour per connection

= 198 gallons per hour / 60 minutes per hour

= 3.3 gallons per minute

Spill Volume

Once duration and flowrate have been estimated, the volume of the spill is the product of duration (hours or days) and the flowrate (gallons per hour or gallons per day).

For example:

Spill start time= 11:00

Spill end time= 14:00

Spill duration = 3 hours

3.3 gallons per minute x 3 hours x 60 minutes per hour

= 594 gallons

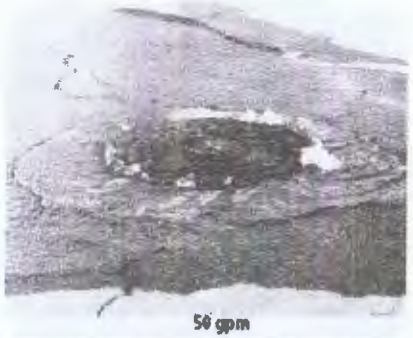
Reference Sheet for Estimating Sewer Spills from Overflowing Sewer Manholes

Reference Sheet for Estimating Sewer Spills from Overflowing Sewer Manholes

All estimated are calculated in gallons per minute *(gpm)*

5 gpm

25 gpm

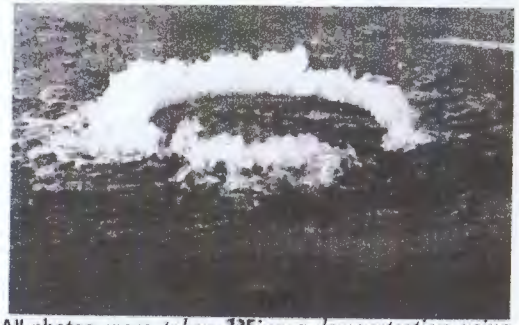


50 gpm

100 gpm

150 gpm

200 gpm



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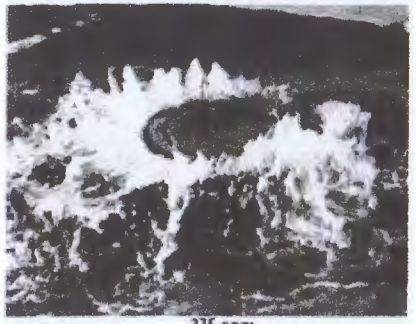

275 gpm

All photos *were taken during a demonstration using metered water from a hydrant.*

Appendix 6 - Sewer Backup Summary Report

Appendix 6 - Sewer Backup Summary Report

Time Cleaning Contractor Called:_____

City's Site Arrival Time:_____ Time Cleaning Contractor Called:_____

Section A

DATE;_____TIME:_____EMPLOYEE NAME:_____

RESIDENT:

STREET ADDRESS:

CITY, STATE AND ZIP:

PHONE:

PROPERTY MANAGER(S):

STREET ADDRESS:

CITY, STATE AND ZIP:

PHONE:

CAUSE OF FLOODING:

LOCATION/SEWER: ____STREET ____REAR EASEMENT ____MANHOLE#_____TO_____

____MAINLINE ____SERVICE LINE _____DOUBLE-WYE

DAMAGE: ____BLACKWATER _____GREYWATER ____FRESHWATER

#OF PEOPLE LIVING AT RESIDENCE:

Comments:

CLEANING SERVICES: ____REQUESTED BY OWNER- WAIT FOR CLEANING CONTRACTOR TO ARRIVE

____DECLINED BY OWNER

APPROXIMATE AGE OF HOME: _____.# OF BATHROOMS:_____# OF ROOMS AFFECTED_____

APPROXIMATE AMOUNT OF SPILL:_____(GALLONS)

APPROXIMATE TIME SEWAGE HAS BEEN SITTING:_____ *(HOURS/DAYS)*

NUMBER OF PICTURES TAKEN:_____

DIGITAL OR FILM?_____

DOES THE CUSTOMER HAVE A BACKFLOW PREVENTION DEVICE (BPD)? ___YES ____No

IF YES, WAS THE BPD OPERATIONAL AT THE TIME OF THE OVERFLOW? ___YES ____No

HAVE THERE BEEN ANY PREVIOUS SPILLS AT THIS LOCATION? __YES __No __UNKNOWN TYPE OF FLOORING IN THE ROOM AFFECTED:

____TILE: CONDITION OF TILE AND SEAMS (CRACKING, VISIBLE OPEN SPACES, ETC.)

____ CARPET: CONDITION OF FLOORING AND JOINTS (CRACKING, VISIBLE OPEN SPACES, ETC.)

____WOOD

____OTHER PLEASE IDENTIFY:

HAS THE RESIDENT HAD ANY PLUMBING WORK DONE RECENTLY? _____YES _____NO ____UNKNOWN

IF YES, PLEASE DESCRIBE:

ARE THERE BASEBOARDS: ____YES ____No BASEBOARD MATERIAL:_____

CONDITION OF BASEBOARDS:

____BASEBOARD BOTTOM HAS TIGHT SEAL WITH WALL

____BASEBOARD TOP HAS TIGHT SEAL WITH WALL

____BASEBOARD HAS SPACE BETWEEN BOTTOM & FLOOR

____BASEBOARD HAS SPACE BETWEEN BASEBOARD & WALL

Appendix 7 -Collection System Failure Analysis Form

Appendix 7 - Collection System Failure Analysis Form

CIWQS Event ID:		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 Improvements Rehabilitation/Replacement List: Yes No		
Maintenance Manager:	Review Date:		
Operational Services Director:	Review Date:		

Appendix 8 - Residential Property Sewage Contamination Flyer

General Precautions for Sewage Contamination on Residential Property

If a sewer backup causes flooding in your home:

- Keep people and pets away from the affected area(s).
- Do not attempt to clean it yourself.
- Turn off central heat and air-conditioning systems and prevent flow from reaching floor vents by using towels or blankets as a berm. You can also remove the vent cover and stuff a towel in the opening to help prevent the flow from entering.
- Leave items in the affected area for the experts to handle.

Homeowner responsibilities

The homeowner is responsible for clearing any blockage in the home's plumbing system or private lateral and for any resulting flood damage to the structure. The homeowner is also responsible for damage that happens because a lateral was not properly installed. If the sewage flooding was caused by blockage in your private lateral:

1

- Call an experienced restoration company for cleanup and removal of affected surfaces.
- Report a claim to your homeowner's insurance carrier.
- If you had recent plumbing work, contact your plumber or contractor.

If the sewage flooding was caused by a blockage in the public sewer main, the agency may be responsible for the damage. If you have a claim, file your claim as soon as possible. And the agency and/or insurance carrier will arrange for a restoration company.

Note: This information is provided to assist residents who experience an overflow of sewage on their property. It is not inclusive of events involving severe flooding, which can cause additional structural damage.

To report a sewage spill, contact Emergency Standby at: (310) 405-1678.

see "Water Damage Restoration" section of the Yellow Pages for a list of restoration contractors.

Appendix 9 – Conceptual Monitoring Protocol for Spills to Beach Sands

Conceptual Monitoring Protocol for Spills to Beach Sands

The intent of these procedures is to provide Operations staff with guidance on clean-up activities to be undertaken after a spill, overflow, or bypass of raw or partially treated sewage to beach sands. These procedures are intended to supplement the Avalon WWTFs existing procedures for response, monitoring, and reporting after sewage spills. The existing Notification and Reporting Procedures for Sewage Spills identify agencies to be notified in case of an overflow. As outlined in these existing procedures, the Los Angeles Regional Water Quality Control Board is notified of all spills that reach waters of the State within their jurisdiction, and if feasible, this notification is made within two hours of the spill reaching receiving waters. Additionally, the Avalon WWTF notifies the local Health Department of any sewage spill within their jurisdiction that may impact public health. Other agencies (i.e. the Department of Fish and Game) are notified, as needed, depending on the conditions of the spill.

The existing Overflow Emergency Response Plan provides guidance on the receiving waters sampling to be conducted after an overflow in accordance with the Avalon WWTF NPDES discharge permit requirements. When a spill occurs in open waters (such as the ocean) samples are collected from up-gradient (e.g., up coast) and down-gradient (e.g., down coast) locations to identify the area of impact. This minimum sampling routine is often expanded to additional sample locations to address spill specific questions.

The existing procedures described above do not describe when additional efforts should be initiated to define the extent of waste discharged to beach sands and adjacent surface waters or in confirming the conclusion and effectiveness of the clean-up and/or mitigation measures initiated. Nor does it describe a protocol for coordination with the local health department during such events. This, Appendix 9 of the Spill Contingency Plan, has been developed to provide procedural guidance for spills which reach beach sands.

Health Department Notification

Consultations and discussions should provide the Health Department with descriptions of all completed conventional clean-up measures already undertaken. These discussions should be focused on the needs and potential options for additional clean-up of the impacted soils, the potential by-products of those activities, and the resultant public notification.

At a minimum, this consultation should include discussions on:

- The level of public exposure at the spill location;
- The potential health risks associated with the residual spill;
- Identification of soil and water sampling/monitoring strategy, if deemed necessary;
- If more than general clean-up measures are determined to be necessary, identification of potentially appropriate clean-up actions, and;
- Public notification and outreach efforts associated with spill clean-up efforts.

Collect and analyze background and impacted samples, as necessary:

Based on conversations with the local Health Department, perform initial (baseline) sampling, if necessary, for fecal indicator bacteria (fecal coliform/e. coli and enterococci) to determine the potential public health threat and to refine clean-up options. Per conversations, establish a protocol for collecting and analyzing beach sand samples. This protocol should be used, or modified as appropriate based on the best available information regarding the measurement of fecal coliform/e. coli and enterococci in sand.

Final Clean-up Method Determinations

Based on conversations with the local Health Department, select the appropriate clean-up method. When selecting a clean-up method, consideration shall be given for potential exposure of the public to the spill location. The degree of public exposure (incidental versus probable direct contact) will dictate the potential clean-up options and the extent of the clean-up necessary (surface versus subsurface). For instance, if there is a high probability that the public will have direct contact (e.g., digging and/or ingestion) with the soil in the spill location then a soil sanitizing operation may be warranted. In the situation where the use of chemicals for sanitizing are employed, measures should be implemented to ensure that the chemical will not adversely impact the environment nor pose a potential threat to public health. Whenever possible the Districts shall implement clean-up measures that are both protective of public health and the environment. It is reasonable to expect that in rare circumstances, clean-up measures employed to protect public health may have a localized and temporary effect on the environment. In such cases, when priority is given to protection of public health, the Avalon WWTF shall

make all reasonable efforts to minimize impacts to the environment. Other considerations shall be given to the factors listed below when selecting spill clean-up measures:

- Potential and relative degree of public health threat
- Level of mitigation targeted
- Site access
- Time of year when clean-up activity is occurring
- Potential for clean-up site to be inundated with storm flows or high tides
- Estimated duration of clean-up activity
- Effective control of chemical usage
- Cross-contamination issues (wind, soil replacement options, etc...)
- Potential for off-site nuisance conditions during clean-up operations
- Restriction of public access during clean-up operations
- Presence of endangered species
- Potential impact of clean-up measure on the environment or to public health

Monitoring Plan Development

Based on discussions with the Health Department listed above and the clean-up method selected, the Avalon WWTF shall design a sampling/monitoring plan to monitor the effectiveness of the clean-up operations. The monitoring should include fecal indicator bacteria monitoring. Collection and analysis of beach sand samples for fecal indicator bacteria shall be conducted based on Health Department recommendations and should be used, or modified as appropriate based on the best available information regarding the measurement of fecal coliform/e. coli and enterococci in sand. Appropriate operational parameters shall also be identified and recorded during the course of the clean-up activity. The spatial pattern and extent of the monitoring will be dependent on the size of the, the location and available laboratory resources. The monitored constituents will be based on the clean-up method selected. Depending on the selected clean-up measures, and if appropriate, chemical constituents of concern shall be identified and a monitoring plan shall be developed to demonstrate the controlled use of applied chemicals. Analytical methods used for determinations of chemical constituents should be selected or adapted from widely accepted methods (i.e., Standard Methods or EPA methods), wherever possible.

If there is a potential for the spill affect soil to become inundated, causing contact with receiving waters (e.g., from a rising tide, stormwater washout, or other flows) the Sanitary Sewer Overflow Spill Contingency & Response Plan procedures should be consulted so that sampling can be conducted within the required time frame. Bacteria sampling in receiving waters should be conducted in accordance with NPDES permit requirements.

Develop appropriate public notification/communication strategy:

Public notification to the residents that have the potential to be directly affected by clean-up activities shall be conducted prior to, during and at the completion of clean-up operations. The notification should be made either in writing or in person by the City of Avalon. If appropriate, one-to-one public notification shall be conducted by the City and if available, a local Health Department representative. At a minimum, the notification to the public should include the description of the incident, an explanation of why clean-up measures are being conducted, a description of the clean-up method selected, the date operations are expected to begin, the anticipated date operations will end, any associated public health and/or environmental concerns, and the City's efforts to mitigate those concerns.

Whenever possible the perimeter of the clean-up area shall be clearly marked and posted with appropriate warnings/access restrictions. The Avalon WWTF shall consult with the local Health Department on content of signage. The signage shall remain at the clean-up site until the local Health Department determines that the potential public health threat has been mitigated.

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Appendix 4: Fats, Oil, and Grease (FOG) Reduction Program – Inspection Forms

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CITY OF AVALON

410 Avalon Canyon Road
Avalon, CA 90704
(310) 510-0220

FOOD SERVICE ESTABLISHMENT - FOG CONTROL PROGRAM

BEST MANAGEMENT PRACTICES (BMP) INSPECTION REPORT

Name of Facility:_____ **Address:**_____

Name/Title of Facility Contact:_____ **Phone:** _____

FACILITY BMP INSPECTION (Section 6-7.400):

1.	Removal of Food Grinder	Installation/usage prohibited
2.	Drain Screens Installed/Maintained	Must be present and in good working condition
3.	Grease Collection Maintenance Log	Must be kept current and accessible at all times
4.	Exhaust Hood Maintenance Log	Must be kept current and accessible at all times
5.	Employee Training Log	Must be kept current and accessible at all times
6.	Food Waste Practices	Food Waste to be placed in plastic bags or trash, not in sink(s)
7.	Dry Wiping Practices	Pots, Pans, Plates to be Dry Wiped of food debris before washing
8.	Emergency Spill Response Materials	Grease Absorbent Materials present/accessible in event of spill
9.	BMP Poster(s) in approved areas	BMP Poster visible in all food preparation and dishwashing areas

Remarks:_____

_____

_____

( ) Facility is in **COMPLIANCE.** No corrective action is required at this time (note any remarks)

( ) NOTICE OF NON-COMPLIANCE

Facility is not in compliance for the items checked below. Corrective action is required.

( ) Food Grinder installed or in usage
( ) Drain Screens missing/damaged/clogged
( ) Exhaust Hood Maintenance Log missing/not current
( ) Employee Training Log missing/not current
( ) Grease Collection Maintenance Log missing/not current
( ) Food Waste in sink(s) and not in enclosed plastic bag or garbage
( ) Employee(s) observed not following Dry Wiping practices
( ) Missing/inadequate or inaccessible Grease Absorbing Material(s)
( ) BMP Poster(s) missing/obscured/damaged etc.
( ) Other_____

Required corrective action includes any or all of the following:

( ) Remove Food Grinder(s)
( ) Make available/accessible/update Maintenance or Training Log(s)
( ) Install/repair/clean drain screen(s)
( ) Instruct/train employee(s) to observe all listed BMP's
( ) Make available/accessible Grease Absorbent Material(s) for use in event of spill
( ) Post/repair/replace BMP Poster(s) in all food preparation and dishwashing areas
( ) Other_____

The item(s) checked above must be corrected within _____ days from date of this notice

_____ _____
Signature of Facility Contact Date

_____ _____
Inspector Date

CITY OF AVALON

410 Avalon Canyon Road
Avalon, CA 90704
(310) 510-0220

FOOD SERVICE ESTABLISHMENT - FOG CONTROL PROGRAM

GREASE CONTROL DEVICE (GCD) INSPECTION REPORT

Name of Facility:_____ **Address:**_____

Name/Title of Facility Contact:_____ **Phone:** _____

FACILITY GREASE CONTROL DEVICE INSPECTION:

Parameter	Range/Limit	Results
1. pH Range	5.0 to 11.0	_____
2. Oil and grease	300 mg/L	_____
3. Mechanical condition	See Results	_____

Remarks:

_____

_____

_____

[ ] Facility is in **COMPLIANCE**. No corrective action is required at this time (note any remarks)

[ ] **NOTICE OF NONCOMPLIANCE.**
Facility is in noncompliance of the items checked below. Corrective action is required immediately.
[ ] Interceptor inaccessible for inspection.
[ ] Interceptor capacity has been exceeded.
[ ] Excessive oil and grease in the sample box.
[ ] Discharge (effluent) line restricted.
[ ] Baffle tubes plugged, submerged, damaged or missing.
[ ] Other _____

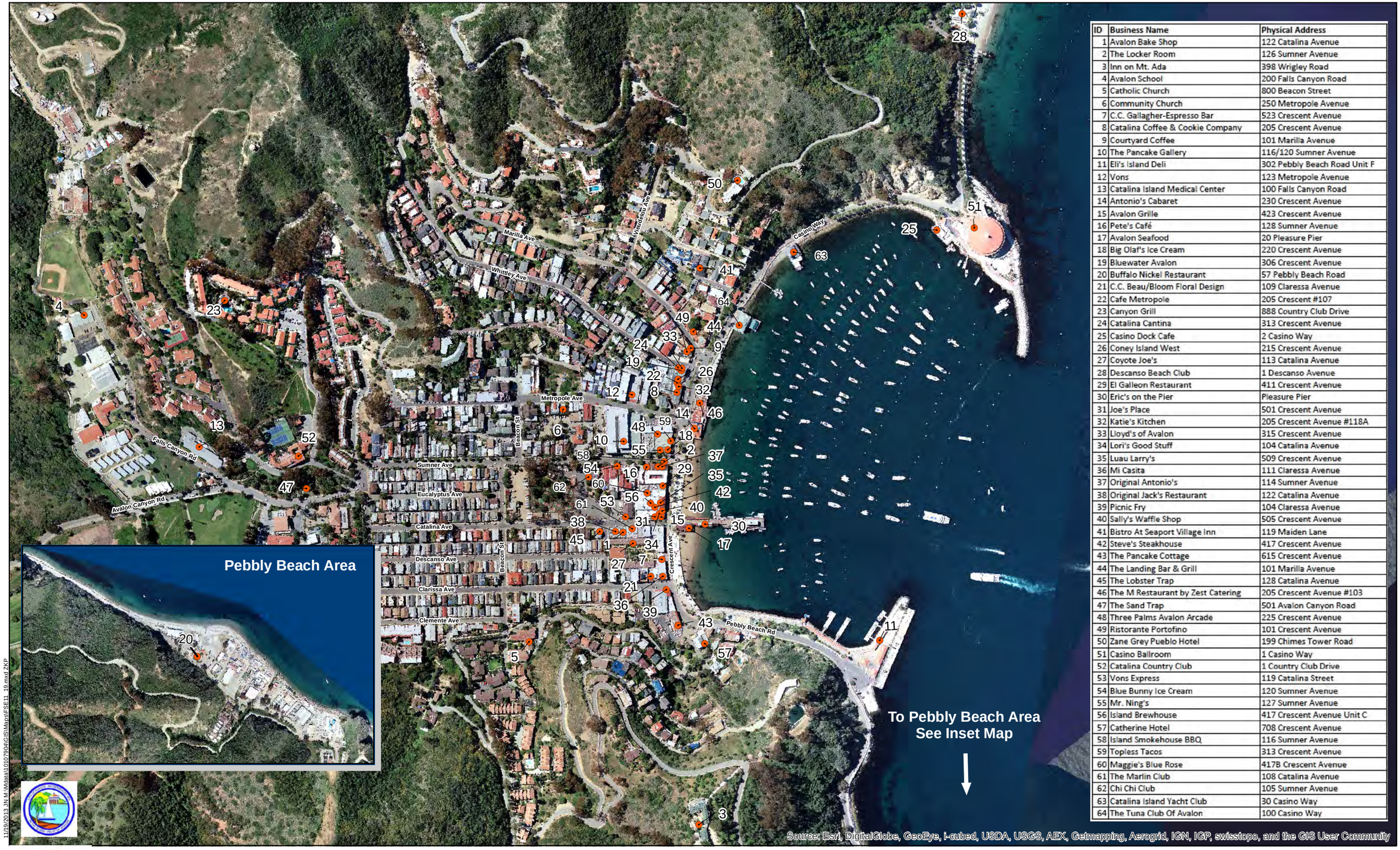
Required corrective action includes any or all of the following:
[ ] Promptly remove any obstruction that does not allow safe and easy access to the interceptor.
[ ] Repair or replace baffles.
[ ] Pump out interceptor completely.
[ ] Other _____

The item(s) checked above must be corrected within seven (7) days from date of this notice.

Corrective action shall be verified by a return inspection on _____

_____ _____
Signature of Facility Contact Date

_____ _____
Inspector Date



ID	Business Name	Physical Address
1	Avalon Bake Shop	122 Catalina Avenue
2	The Locker Room	126 Sumner Avenue
3	Inn on Mt. Ada	398 Wrigley Road
4	Avalon School	200 Falls Canyon Road
5	Catholic Church	800 Beacon Street
6	Community Church	250 Metropole Avenue
7	C.C. Gallagher-Espresso Bar	523 Crescent Avenue
8	Catalina Coffee & Cookie Company	205 Crescent Avenue
9	Courtyard Coffee	101 Marilla Avenue
10	The Pancake Gallery	116/120 Sumner Avenue
11	Eli's Island Deli	302 Pebbly Beach Road Unit F
12	Vons	123 Metropole Avenue
13	Catalina Island Medical Center	100 Falls Canyon Road
14	Antonio's Cabaret	230 Crescent Avenue
15	Avalon Grille	423 Crescent Avenue
16	Pete's Café	128 Sumner Avenue
17	Avalon Seafood	20 Pleasure Pier
18	Big Olaf's Ice Cream	220 Crescent Avenue
19	Bluewater Avalon	306 Crescent Avenue
20	Buffalo Nickel Restaurant	57 Pebbly Beach Road
21	C.C. Beau/Bloom Floral Design	109 Claressa Avenue
22	Cafe Metropole	205 Crescent #107
23	Canyon Grill	888 Country Club Drive
24	Catalina Cantina	313 Crescent Avenue
25	Casino Dock Cafe	2 Casino Way
26	Coney Island West	215 Crescent Avenue
27	Coyote Joe's	113 Catalina Avenue
28	Descanso Beach Club	1 Descanso Avenue
29	El Galleon Restaurant	411 Crescent Avenue
30	Eric's on the Pier	Pleasure Pier
31	Joe's Place	501 Crescent Avenue
32	Katie's Kitchen	205 Crescent Avenue #118A
33	Lloyd's of Avalon	315 Crescent Avenue
34	Lori's Good Stuff	104 Catalina Avenue
35	Luau Larry's	509 Crescent Avenue
36	Mi Casita	111 Claressa Avenue
37	Original Antonio's	114 Sumner Avenue
38	Original Jack's Restaurant	122 Catalina Avenue
39	Picnic Fry	104 Claressa Avenue
40	Sally's Waffle Shop	505 Crescent Avenue
41	Bistro At Seaport Village Inn	119 Maiden Lane
42	Steve's Steakhouse	417 Crescent Avenue
43	The Pancake Cottage	615 Crescent Avenue
44	The Landing Bar & Grill	101 Marilla Avenue
45	The Lobster Trap	128 Catalina Avenue
46	The M Restaurant by Zest Catering	205 Crescent Avenue #103
47	The Sand Trap	501 Avalon Canyon Road
48	Three Palms Avalon Arcade	225 Crescent Avenue
49	Ristorante Portofino	101 Crescent Avenue
50	Zane Grey Pueblo Hotel	199 Chimes Tower Road
51	Casino Ballroom	1 Casino Way
52	Catalina Country Club	1 Country Club Drive
53	Vons Express	119 Catalina Street
54	Blue Bunny Ice Cream	120 Sumner Avenue
55	Mr. Ning's	127 Sumner Avenue
56	Island Brewhouse	417 Crescent Avenue Unit C
57	Catherine Hotel	708 Crescent Avenue
58	Island Smokehouse BBQ	116 Sumner Avenue
59	Topless Tacos	313 Crescent Avenue
60	Maggie's Blue Rose	417B Crescent Avenue
61	The Marlin Club	108 Catalina Avenue
62	Chi Chi Club	105 Sumner Avenue
63	Catalina Island Yacht Club	30 Casino Way
64	The Tuna Club Of Avalon	100 Casino Way

11/19/2013 JN M:\Matlab\010794\GIS\Maps\FSE11_19.mxd ZKP

0 250 500 1,000 Feet

Source: City of Avalon

City of Avalon - Catalina Island

Food Service Establishment Locations

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Appendix 5: System Evaluation and Capacity Assurance Plan

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CITY OF AVALON
SEWER COLLECTION SYSTEM

SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN (SECAP)

December 2013

Prepared by:

RBF CONSULTING
A Baker Company

9755 Clairemont Mesa Boulevard
San Diego, California 92124-1324
T: 858.614.5000 | F: 858.614.5001

Table of Contents

Introduction 1
Sanitary Sewer System 1
Flow Monitoring – Data Collection 2
Flow Monitoring – Capacity Analysis 5
Inflow and Infiltration 6
Hydraulic Model 8
Recommendations and Cost Estimates 12

List of Appendices

Appendix A: Exhibits
Appendix B: Sanitary Sewer Flow Monitoring and Inflow/Infiltration Study

Introduction

The City of Avalon (Avalon) is located on Santa Catalina Island off the coast of California, approximately 22 miles south-southwest of Los Angeles, CA. Santa Catalina Island is 76 square miles, with the majority of that area comprising a conservancy area. Avalon is a resort community, approximately 3.2 square miles in size, surrounding Avalon Bay. Avalon has a permanent population of approximately 3,800 residents. The number of occupants within the City fluctuates day-to-day and seasonally as Avalon's primary industry is tourism, which affects the sanitary sewer discharge flows into the collection system.

Avalon is making extensive efforts to actively maintain and improve the City's sewer collection system, reduce sanitary sewer overflows (SSOs), and provide a level of sewer service indicative of the City's high standards. The City has taken action by completing a comprehensive inspection of the entire sewer collection system to assess the condition of each pipeline within the system. Avalon has contracted with Environ Strategy (ES) for the operation and maintenance of their publicly owned waste water treatment plant (WWTP), sewer collection system, and saltwater system (used for toilets, urinals, and hydrants). Environ Strategy has implemented an active approach to the operation and maintenance of the WWTP and the sewer collection system.

The *System Evaluation and Capacity Assurance Plan* (SECAP) will evaluate Avalon's sewer collection system and will identify areas susceptible to infiltration and inflow (I/I), bottlenecks, and capacity deficiencies while conveying sewage during peak conditions. To complete the SECAP, several tasks are required as listed below:

- Sanitary sewer flow monitoring
- Rainfall monitoring
- Infiltration and Inflow
- Hydraulic model

The SECAP will identify projects and associated cost estimates to eliminate any identified capacity deficiencies. The projects will consist of replacing sewer mains throughout the sewer collection system that are identified as having capacity deficiencies, and require increasing diameter to accommodate existing flow conditions and future conditions (i.e. proposed development). These identified projects and cost estimates are incorporated into the City's *Sanitary Sewer Capital Improvement and 20-Year Financial Plan*, in compliance with Section III and IV of Cease and Desist Order (CDO) No. R4-2012-0077.

Avalon's sanitary sewer pump stations and force mains were studied in a separate report, titled *Sewer Force Main And Pump Station Evaluation Report* (RBF Consulting - July 2013), which provides an evaluation of the two (2) sanitary sewer pump stations and approximately 7,250 feet of force main that reside in the City's sewer collection system.

Sanitary Sewer System

The 100 year old City of Avalon is located in a valley and fronts the Pacific Ocean. The City's 3,800 residents live in the flat area facing the bay and surrounding hills. Approximately half of the residential structures and the entire commercial district lie on the floor of the valley. The remaining residences are on terraced streets rising into the surrounding hills.

The Avalon sewer collection system, illustrated in **Exhibit A** (Appendix A), consists of approximately 9 miles of gravity mains ranging in size from 6-inch to 18-inch. The sewer collection system also includes two sewer pump stations and approximately 1.2 miles of 12-inch and 16-inch force mains, as illustrated in **Exhibit B** (Appendix A). The system is of unknown age and has recently undergone significant rehabilitation and replacement improvements. Low flow diverters are installed at the Crescent Avenue storm drain inlets that divert nuisance dry weather surface water and the initial storm water flow for a storm to the sewer system.

As previously mentioned, Avalon uses a salt water (seawater) system to flush toilets and urinals, which makes the City's sewage highly corrosive due to the salinity. The sewer mains run through streets, alleys, and easements. The majority of residents use golf carts to travel and many of the streets are narrow. The narrow streets provide challenges for maintaining the sewer system as it is difficult or impossible to access significant portions of the system with a full sized combination hydro-jet and vacuum truck.

The force main system consists of pressurized and gravity pipeline segments, varying in size and material, as illustrated in **Exhibit B** (Appendix A). The force main can be broken down into three basic segments as listed below:

- **Force main:** 16-inch polyvinyl chloride (PVC) ~ 4,900 feet
- **Gravity main:** 18-inch vitrified clay pipe (VCP) ~ 985 feet
- **Force main:** 12-inch asbestos concrete (AC) ~ 1,370 feet

The initial lift is provided by the Catherine Pump Station (CPS), which discharges raw sewage collected from Avalon, Descanso Beach, and Hamilton Cove, into a 16-inch PVC force main, which was installed around 1990 (based on As-builts). At approximately 4,900 feet, the 16-inch PVC force main transitions into an 18-inch VCP gravity main in the Pebbly Beach area. The 18-inch gravity main was installed in 1981 (based on As-builts), and conveys raw sewage approximately 985 feet to the Pebbly Beach Pump Station (PBPS). The PBPS is used to pump raw sewage from CPS and additional flow collected from the residential, commercial, and industrial facilities in the Pebbly Beach area. The PBPS discharges the raw sewage into a 12-inch AC force main, which was installed in 1981 (based on As-builts), and conveys the raw sewage approximately 1,370 feet to the Avalon WWTP.

Flow Monitoring – Data Collection

The purpose of flow monitoring is to measure sanitary sewer flows at specific sites and conduct analyses pertaining to capacity and infiltration and inflow (I/I) occurring in the basins upstream from the specified flow monitoring sites. Avalon sanitary sewer flow monitoring occurred over a 10-week period from March 19 to June 4, 2013. The complete *Sanitary Sewer Flow Monitoring and Inflow/Infiltration Study* report, prepared by V&A, is available in Appendix B.

Five (5) flow monitoring sites where chosen to create five flow monitoring basins, as shown in **Figure 1**. Flow monitoring basins are localized areas of a sanitary sewer collection system upstream of a given flow monitoring site (i.e. flow meter), including all pipelines, inlets, and appurtenances. The basin refers to the ground surface area near, and enclosed by, the pipelines. Flow meters were installed within sanitary sewer manholes that access the sanitary sewer pipelines within the collection system. A data

logger is secured at the top of the manhole structure. The sensor is typically mounted on a stainless steel band that is secured inside of the influent pipeline to take advantage of smoother upstream flow conditions. The sensor may be offset to one side to lessen the chances of fouling and sedimentation where these problems are expected to occur. The flow for each Basin is calculated using the equation shown in **Table 1**. In addition, a rain gauge was installed on Avalon's Green Pleasure Pier, which is centrally located within the limits of the project area.

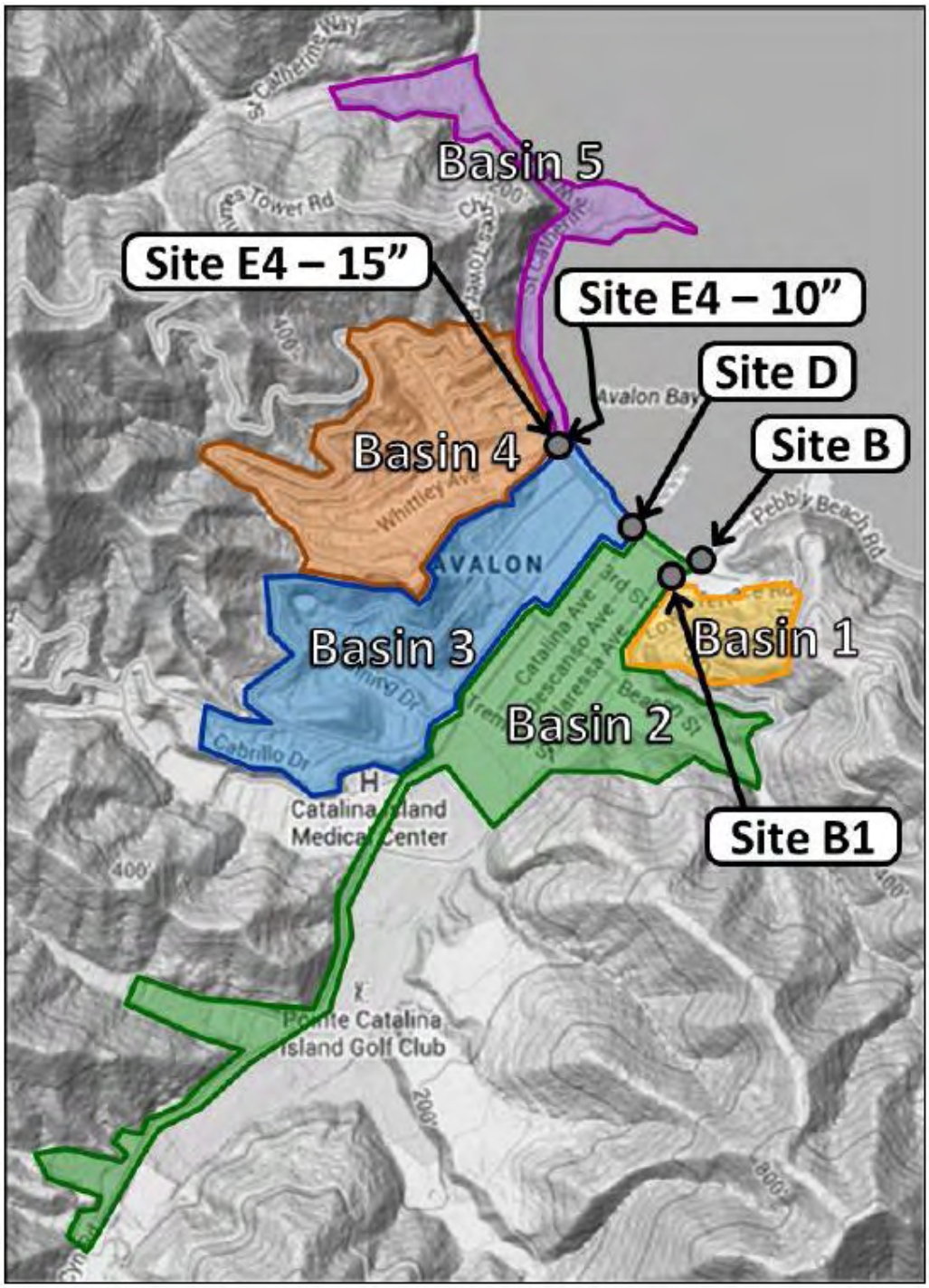

Figure 1: Flow Monitoring Sites and Basins

Table 1: Basin Flow Calculations

Flow Monitoring Basin	Size (feet)	Basin Flow Calculation
Basin 1	3,180	$Q_{1(Basin)} = Q_{B1(Site)}$
Basin 2	11,730	$Q_{2(Basin)} = Q_{B(Site)} - Q_{D(Site)}$
Basin 3	8,025	$Q_{3(Basin)} = Q_{D(Site)} - (Q_{E4\text{-}10(Site)} + Q_{E4\text{-}15(Site)})$
Basin 4	9,450	$Q_{4(Basin)} = Q_{E4\text{-}15(Site)}$
Basin 5	2,975	$Q_{5(Basin)} = Q_{E4\text{-}10(Site)}$

Manual sewer flow level and velocity measurements were taken during the confined-space entry that took place during the installation of the flow meters and again when they were removed. These manual measurements were compared to simultaneous level and velocity readings from the flow meters to ensure proper calibration and accuracy. The pipe diameter was also verified in order to use the correct geometry in calculating flows.

Continuous depth and velocity readings were recorded by the flow meters on a 5-minute interval. The data is stored in flash memory for security. Data was retrieved via an at-grade data port connection from the data logger to a portable laptop computer. The sites were visited weekly for data transfer as well as to check conditions within the manhole and assure the flow sensors were clear of debris. Data retrieved from the flow meters was placed into a spreadsheet program for analysis. Data analysis includes data comparison to field calibration measurements, as well as necessary geometric adjustments as required for sediment (i.e. reduction in pipe's wetted cross-sectional area).

The number of occupants within the City of Avalon fluctuates day-to-day and seasonally as Avalon's primary industry is tourism. Due to the transient nature of the populace of Avalon, weekday and weekend flow patterns differ and must be separated when establishing average dry weather flow rates (ADWF). For many systems this is a stable number; however, in the case of Avalon, the ADWF is irregular depending on the fluctuating tourism population. Days least affected by rainfall were used to estimate weekend and weekday average flows. The ADWF used within this report for calculation and analysis were for an average of all dry days as monitored over the course of this study, specifically the dry period from March 20 to May 4, 2013, and from May 8 to June 3, 2013. However, to demonstrate the extent of the effect of tourism on flows within Avalon, "Peak Dry Week" and "Low Dry Week" calculations were developed. A dry week is defined as a complete week starting on Monday and ending on Sunday, during a dry weather period. Refer to **Table 2** below for the calculated sewer flow rates for each monitoring site, based on the 10-weeks of flow monitoring data collected.

Table 2: Calculated Flow Rates per Monitoring Site

Item	Site B	Site B1	Site D	Site E4-10	Site E4-15
Peak Dry Week (mgd):	0.013	0.38	0.27	0.030	0.108
Low Dry Week (mgd):	0.009	0.31	0.22	0.013	0.086
ADWF, Overall (mgd):	0.012	0.35	0.24	0.022	0.096

One thing to keep in mind is that the flow monitoring was conducted during late spring and early summer. Therefore the average flow rates calculated in Table 2 are an average between the off-season (winter) and the peak tourist season (4th of July). Therefore the ADWF calculated is high for off-season average flow rates, and is possibly a little less than the average for peak tourist season.

Flow Monitoring – Capacity Analysis

Peak measured flows and the flow level (elevation) at the peak flow is important to understand the capacity of the flow monitoring system. The peak flows and flow levels reported are from the peak measurements as taken across the entirety of the flow monitoring period. These may or may not correspond to a rainfall event. The following capacity analysis terms are defined as follows:

- ***Peaking factor*** is the peak measured flow divided by the average dry weather flow (ADWF).
- ***d/D Ratio*** is the peak measured depth of flow divided by the pipe diameter.

A d/D ratio less than 0.75 is a common threshold value used for pipe design. A d/D ratio greater than 1.0 indicates a surcharged condition. The d/D ratio for each site was computed based on the maximum depth of flow during the flow monitoring study. **Figure 2** illustrates the peak recorded flows at each monitoring station during the 10-week study period (March 19 to June 4, 2013). **Table 3** summarizes the peak recorded flows, levels, d/D ratios, and peaking factors per site during the flow monitoring period. Capacity analysis data is presented on a site-by-site basis and represents the hydraulic conditions only at the point site location. Hydraulic conditions in other areas of the collection system will differ.

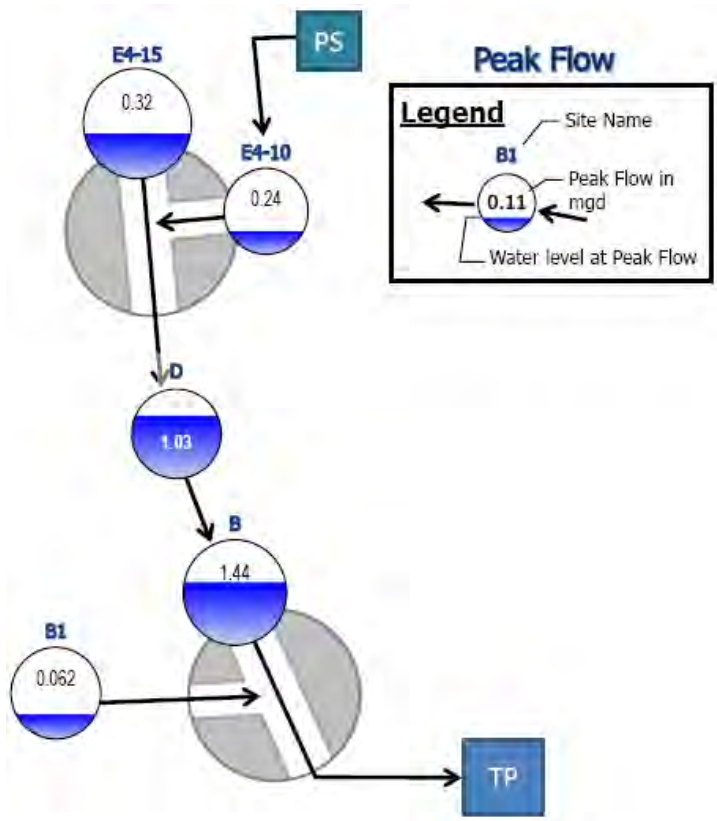

Figure 2: Peak Measured Flow Schematic

The capacity analysis data shown in **Table 3** and the calculated flow rates shown in **Table 2** will be used to develop input data (i.e. sewer flow rates, scenarios, etc.) for the Avalon sewer collection system hydraulic model, which is discussed later in this report. The hydraulic model will take into consideration wet-weather events, peak tourism (i.e. 4th of July weekend), and future developments to determine any capacity deficiencies in the sewer collection system.

Table 3: Pipeline Capacity Results per Flow Monitoring Site

Site	ADWF (mgd)	Peak Measured Flow (mgd)	Peaking Factor	Diameter (in)	Peak Level (in)	d/D Ratio
Site B1	0.012	0.062	5.4	14.5	3.11	0.27
Site B	0.35	1.44	4.1	11.5	8.69	0.60
Site D	0.24	1.03	4.2	10.5	7.42	0.71
Site E4-10"	0.022	0.24	11.2	15	2.73	0.27
Site E4-15"	0.096	0.32	3.4	10	6.12	0.41

Inflow and Infiltration

Inflow and Infiltration (I/I) consists of storm water (rain) and groundwater which enters the sewer system through pipe defects and improper storm drainage connections.

Inflow can be defined as storm water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard and area drains, holes in manhole covers, cross connections from storm drains, or catch basins, as illustrated in **Figure 3**. Inflow can create a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Because the response and magnitude of inflow is tied closely to the intensity of the storm event, the short-term peak instantaneous flows may result in surcharging and overflows within a collection system. Severe inflow may result in sewage dilution, resulting in upsetting the biological treatment (secondary treatment) at the treatment facility.

Infiltration can be defined as water entering the sanitary sewer system through defective or broken pipes, broken or offset pipe joints, and cracked manhole walls, as illustrated in **Figure 3**. Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water.

Infiltration can be further subdivided into three (3) components, listed below:

- **Groundwater Infiltration**
- **Rainfall Dependent Infiltration (RDI)**
- **Rainfall Responsive Infiltration (RRI)**

Groundwater Infiltration depends on the depth of the groundwater table above the pipelines as well as the percentage of the system submerged. The variation on groundwater levels and subsequent groundwater infiltration rates are seasonal by nature, or in this case, could be tidally influenced.

Rainfall Dependent Infiltration (RDI) occurs as a result of storm (rain) water and enters the sewer system through pipe defects similar to groundwater infiltration. The storm water first percolates directly into the soil and then migrates to an infiltration point. Typically, the time of concentration for rainfall related infiltration may be 24 hours or longer, but depends on the soil permeability and saturation levels.

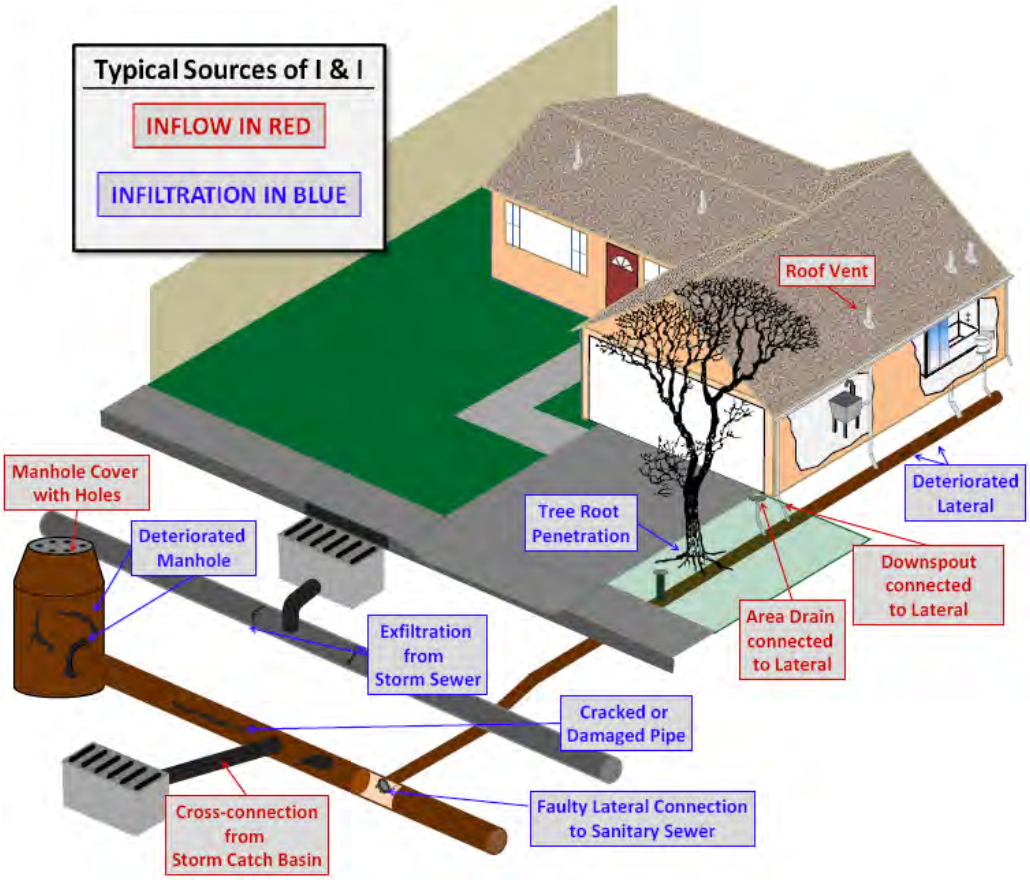

Figure 3: Typical Sources of Inflow and Infiltration

Rainfall Responsive Infiltration (RRI) is storm (rain) water which enters the collection system indirectly through pipe defects, but normally in sewers constructed close to the ground surface such as private laterals. RRI is independent of the groundwater table, and reaches defective sewers via the pipe trench in which the sewer was constructed. If the pipe is placed in impermeable soil and bedded and backfilled with a granular material, the pipe trench serves as a conduit similar to a French drain, conveying storm drainage to defective joints and other openings in the system.

Sources of RDI and RRI can be found using smoke testing, which involves forcing non-toxic smoke-filled air into the sanitary sewer lines. The smoke exits through openings into the sewer system, such as manholes, building roof vents, and defects (i.e. catch basins, cross connections with storm sewers, roof downspouts, basement and foundation drains, etc.), all of which may contribute to storm water inflow. Smoke testing was performed on Avalon's sewer collection system in May 2013 with findings and recommendations provided in the *City of Avalon Sewer Collection System Smoke Test Report* (RBF Consulting – July 2013). Improvement projects identified in the smoke test report are addressed in the *Capital Improvement and Financial Plan*.

After differentiating I/I flows from ADWF flows, various calculations are made to determine which component (inflow or infiltration) is more prevalent at a particular site, and to compare the relative magnitude of the I/I components between drainage basins and between storm events. Results of the calculated I/I flows are shown in **Table 4**.

Table 4: Inflow and Infiltration Results per Basin

Basin	ADWF (mgd)	Peak I/I Rate (mgd)	Total I/I (gallons)	Inflow Ranking	Evidence of High Groundwater Infiltration?	Combined I/I Ranking
Basin 1	0.012	0	0	3	Yes	3
Basin 2	0.13	0.15	7,000	2	Yes	2
Basin 3	0.14	0.30	23,000	1	No	1
Basin 4	0.10	0	0	3	Yes	3
Basin 5	0.022	0	0	3	Yes	3

Starting in October 2011, several improvements were made to the sewer collection system, including spot repairs and replacement / rehabilitation (i.e. cast in place pipe (CIPP) lining) of approximately 1.8 miles of City sewer pipelines. The recent smoke testing of the sewer collection system has shown that the improvements made in 2011-12, have considerably reduced sewer flows contributed by I/I. As shown in **Table 4**, inflow and infiltration essentially does not exist in Basins 1, 4, and 5. A theory that possibly explains the high I/I flows coming from Basin 2 and Basin 3 is that low flow diverters have been installed at the Crescent Avenue storm drain inlets that divert nuisance dry weather surface water and the initial storm water flow from a storm to the sewer system, rather than flowing into Avalon Harbor.

Hydraulic Model

To perform a detailed analysis of the Avalon sewer collection system, a mathematical hydraulic model was used, that is capable of simulating the operating characteristics of the sewer system. The simulations were performed utilizing InfoSewer, developed by Innovyze®, which is a powerful ArcGIS based computer modeling program for use in the planning, design, analysis, and expansion of sanitary sewer collection systems. The program can be effectively used to model both dry-weather and wet-weather flows and also manages and maintains the database that stores the sewer analysis input and output results.

The sewer system is modeled by entering pipeline data that has been accumulated over the past year (i.e. pipe diameters, lengths, roughness coefficients, manhole rim elevations, invert elevations, slope, etc.). The sewer model includes all of the City's existing manholes, sewer pipelines (excluding laterals), force mains, pump stations, and large point source flows (low storm flow diverter). The average dry weather flow rates that were used as inputs to the model were calculated from the flow monitoring data that was provided in the previous section. A peaking factor is used (based on flow monitoring data) to determine peak daily flows. At the completion of a model run, output data is created, including average and peak flow rate, velocity, pipe capacity, and ratio of flow depth to pipe diameter (d/D).

The sewer hydraulic model was developed using manhole survey data (rim elevations, invert elevations), CCTV data (pipe diameter and material), and flow monitoring data (dry- and wet-weather flow rates, peaking factor, etc.). The model was used to simulate six (6) flow condition scenarios as listed below:

1. Average dry-weather (Existing conditions)
2. Average wet-weather (Existing conditions)
3. Peak wet-weather (Existing conditions)
4. Average dry-weather (Future Development)
5. Average wet-weather (Future Development)
6. Peak wet-weather (Future Development)

Average dry-weather sewer flow rates (ADWF) were calculated from the flow monitoring activities that occurred over a 10-week period from March 19 to June 4, 2013, and shown in **Table 2**. Average wet-weather sewer flow rates used the same ADWF, but also included additional inflow and infiltration (I/I) flows that were also calculated from the flow monitoring activities, and shown in **Table 4**. Peak wet-weather flow rates used the ADWF multiplied by a peaking factor.

The peaking factor was calculated from the flow monitoring activities and is shown in **Table 3**. Due to the flow monitoring location at Site E4-10, the large peaking factor is assumed to be attributed to the low flow diverters that have been installed at the Crescent Avenue storm drain inlets that divert nuisance dry weather surface water and the initial storm water flow from a storm event to the sewer system, rather than flowing into Avalon Harbor. Therefore, a Peaking Factor of 4.2 was used, which was the average of 4 of the 5 monitoring sites (minus Site E4-10).

The future condition scenarios (Scenarios 4, 5, and 6) used the same flow rates that were used for existing conditions scenarios (Scenarios 1, 2, and 3), respectively, but they also included additional sewer flows for proposed development in Avalon (i.e. hotel, condominiums, apartments, Vons Market, community / aquatic center, etc.). **Exhibit C** (Appendix A) illustrates the approximate location and number of units of the proposed developments in Avalon. **Exhibit D** (Appendix A) illustrates the approximate location and number of units of the proposed developments along Avalon Canyon Road.

Exhibit E (Appendix A) illustrates the existing pipeline diameters (color coded) for the gravity segments of the sewer collection system in Avalon. **Exhibit F** (Appendix A) illustrates the existing pipeline diameters (color coded) for the force main segments of the sewer collection system from Catherine Pump Station to the waste water treatment plant (WWTP) in the Pebbly Beach area.

The following subsections provide the results of both the existing and future conditions.

Existing Conditions

Under average day dry-weather existing conditions, the Avalon sewer collection system has adequate capacity in the system, with all pipelines having a d/D ratio less than 0.50. **Exhibit G1** (Appendix A) illustrates the results of the average day dry-weather simulation for the gravity segments in Avalon, while **Exhibit G2** (Appendix A) illustrates the results of the average day dry-weather existing conditions simulation for the force main segments in the Pebbly Beach area.

Under average day wet-weather existing conditions, two (2) pipe segments (F1 – F and E – D) in the sewer collection system showed d/D ratios greater than 0.5, but less than 0.75, which is considered acceptable. **Exhibit H1** (Appendix A) illustrates the results of the average day wet-weather simulation for the gravity segments in Avalon, while **Exhibit H2** (Appendix A) illustrates the results of the average day wet-weather existing conditions simulation for the force main segments in the Pebbly Beach area.

Under peak day wet-weather existing conditions, three (3) pipe segments (listed below) in the sewer collection system showed d/D ratios greater than 0.75, which is close to full capacity and therefore recommended for replacement with a larger diameter pipeline. Several pipe segments (listed below) in the sewer collection system showed d/D ratios greater than 0.5, but less than 0.75, which is considered acceptable. **Exhibit I1** (Appendix A) illustrates the results of the peak day wet-weather existing conditions simulation for the gravity segments in Avalon, while **Exhibit I2** (Appendix A) illustrates the results of the average day wet-weather existing conditions simulation for the force main segments in the Pebbly Beach area.

- GM-1 – GM-2 d/D = 0.78
- F1 – F d/D = 1.0
- E – D d/D = 1.0
- D – C d/D = 0.69
- C – B d/D = 0.69
- B – A d/D = 0.69
- F4 – F3 d/D = 0.65
- F2 – F1 d/D = 0.64
- D5 – D4 d/D = 0.56
- D7 – D6 d/D = 0.51
- C1 – C d/D = 0.51

Future Conditions

As previously mentioned, the future condition scenarios (Scenarios 4, 5, and 6) used the same flow rates that were used for existing conditions scenarios (Scenarios 1, 2, and 3), respectively. In addition, they include sewer flow rates for proposed development within Avalon. The proposed development projects that were accounted for in the model are listed below. Design flow rates for the proposed developments were calculated using City of Los Angeles sewer design standards (Sewer Design Manual).

- Vons Market: 20,000 SF Grocery Store
- Country Club Resort: 5,000 SF Fitness Center, 150 Seat Banquet Hall
- Avalon Canyon: 120 Single-Family Residential Units
- City Recreational Facilities: Community / Aquatic Center
- Buena Vista Site: 500 Room Hotel, 50 Condominium Units
- Kite Hill: 24 Condominium Units
- Canyon Apartments: 48 Apartment Units
- Hamilton Cove: 85 Condominium Units

In addition to the known proposed developments listed above, the future conditions scenarios include an additional 180 dwelling units due to potential growth forecasts included in the *City of Avalon 2030 General Plan / Local Coastal Plan*. The General Plan estimates that approximately 631 new dwelling units will be constructed by year 2030. Therefore, the future conditions scenarios include an additional 180 dwelling units that were assumed to be distributed throughout the Upper Terrace / Wrigley area (90 units) and the Avalon Canyon Road area (90 units).

Exhibit C (Appendix A) illustrates the approximate location and number of units of the proposed developments in Avalon. **Exhibit D** (Appendix A) illustrates the approximate location and number of units of the proposed developments along Avalon Canyon Road.

Under average day dry-weather future conditions, the Avalon sewer collection system has adequate capacity in the system, with all pipelines having a d/D ratio less than 0.50. **Exhibit J1** (Appendix A) illustrates the results of the average day dry-weather future conditions simulation for the gravity segments in Avalon, while **Exhibit J2** (Appendix A) illustrates the results of the average day dry-weather future conditions simulation for the force main segments in the Pebbly Beach area.

Under average day wet-weather future conditions, two (2) pipe segments (F1 – F and E – D) in the sewer collection system showed d/D ratios greater than 0.5, but less than 0.75, which is considered acceptable. **Exhibit K1** (Appendix A) illustrates the results of the average day wet-weather future conditions simulation for the gravity segments in Avalon, while **Exhibit K2** (Appendix A) illustrates the results of the average day wet-weather future conditions simulation for the force main segments in the Pebbly Beach area.

Under peak day wet-weather future conditions, several pipe segments in the sewer collection system, as listed below, had d/D ratios greater than 0.90, which is close to full capacity and therefore recommended for replacement with a larger diameter pipeline. Several other pipe segments in the sewer collection system showed d/D ratios greater than 0.50, but less than 0.75, which is considered acceptable. **Exhibit L1** (Appendix A) illustrates the results of the peak day wet-weather future conditions simulation for the gravity segments in Avalon, while **Exhibit L2** (Appendix A) illustrates the results of the average day wet-weather future conditions simulation for the force main segments in the Pebbly Beach area.

- GM-1 – GM-2 d/D = 1.0
- F1 – F d/D = 1.0
- E – B d/D = 1.0
- D7 – D6 d/D = 1.0
- D5 – D4 d/D = 1.0
- F4 – F3 d/D = 0.79
- B – A d/D = 0.78
- F2 – F1 d/D = 0.75
- D3 – D d/D = 0.63
- D5-1 – D5 d/D = 0.60
- F5 – F4 d/D = 0.58
- D4 – D3-1 d/D = 0.57
- D9 – D8 d/D = 0.56
- D3-1 – D3 d/D = 0.53
- C1 – C d/D = 0.51
- D10 – D9 d/D = 0.51

Recommendations and Cost Estimates

This section provides recommendations based on the hydraulic simulation models to replace and increase diameter for several pipeline segments in the Avalon sewer collection system to accommodate existing and future (i.e. proposed development) flow conditions. These recommended improvements will increase system reliability and address any system capacity deficiencies to reduce the risk of future sanitary sewer overflows (SSO).

As mentioned previously, the ratio of flow depth to pipe diameter (d/D) provides the active pipe capacity for any pipe segment. A d/D ratio of 0.50 is typically used when designing and sizing sewer mains. As sewer flow increases over time, the active d/D ratio can be greater than the design value of 0.50. Typically when a d/D ratio is between 0.90 and 1.0 (full capacity pipe, surcharged), during peak day flow conditions, the pipeline should be replaced with a larger diameter to reduce the risk of future SSOs. In addition to flow rate and diameter, pipe slope is a contributing factor to determine d/D. Therefore, if a pipeline with a d/D greater than 0.75 has a very small slope, increasing the pipe diameter, would have little effect on the d/D capacity of the pipe segment. Based on simulated d/D values and pipe slopes, **Table 5** below provides the pipe segments that are recommended for replacement based on priority.

Table 5: Recommended Pipe Segment Replacement

#	Pipe Segment	Street Location	Length	Proposed Diameter	Capital Cost
			(ft)	(in)	
1	GM-1 - GM-2	Pebbly Beach Rd	350	24	$140,000
2	F1 - F	Sumner Ave	200	12	$45,000
3	F - E	Crescent Ave	50	12	$20,000
4	E - A	Crescent Ave	770	18	$310,000
5	D8 - D6	Alley - Sumner / Eucalyptus Ave	645	8	$260,000
6	D5-2 - D5	Alley - Catalina / Eucalyptus Ave	635	8	$255,000

These recommended improvement projects and associated cost estimates are incorporated into the City's *Sanitary Sewer Capital Improvement and 20-Year Financial Plan*, in compliance with Section III and IV of Cease and Desist Order (CDO) No. R4-2012-0077.

Appendix A:

Exhibits

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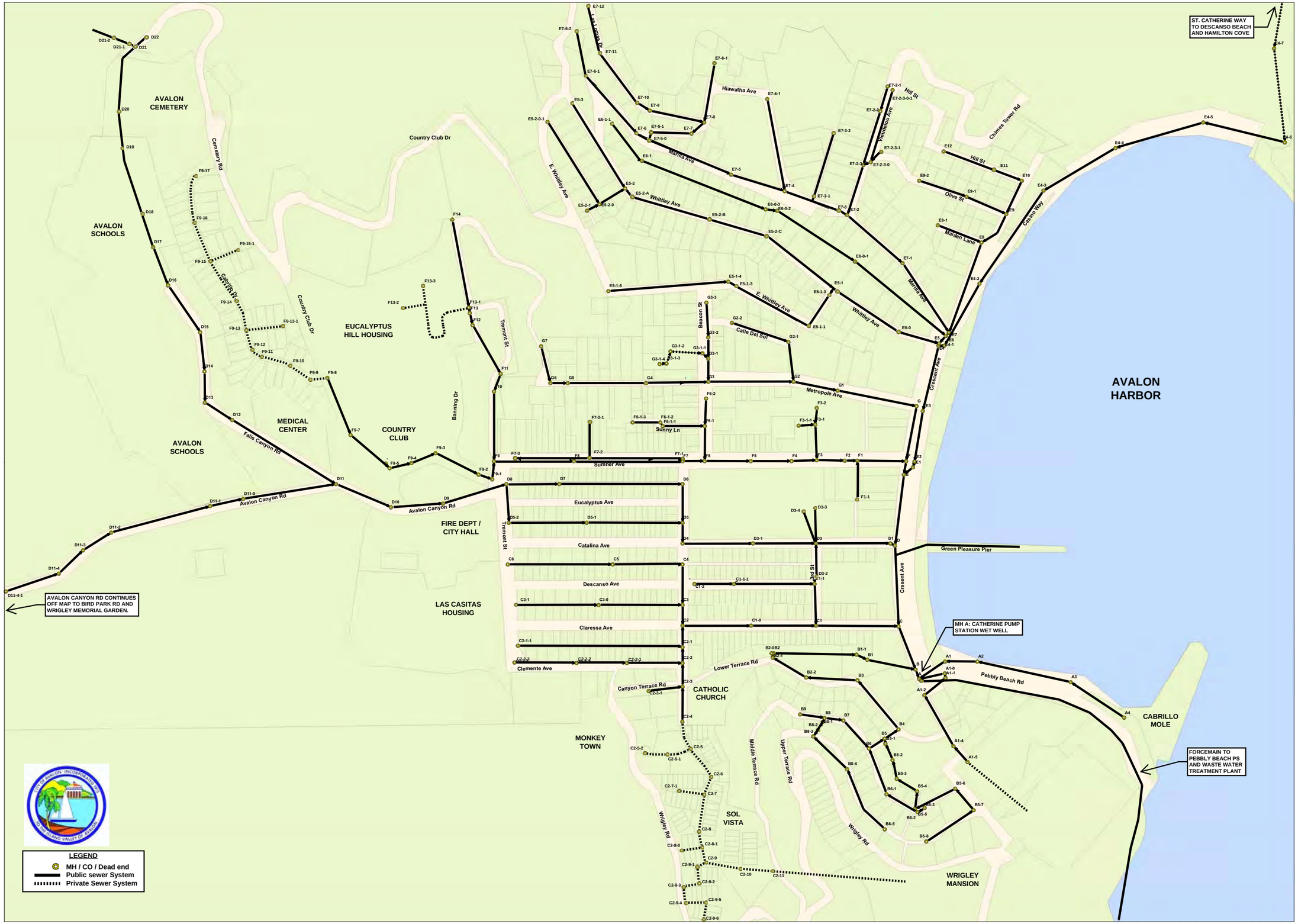

CITY OF AVALON SEWER IMPROVEMENT PROGRAM

EXHIBIT A - SEWER COLLECTION SYSTEM

(07/10/2013, rev 2)

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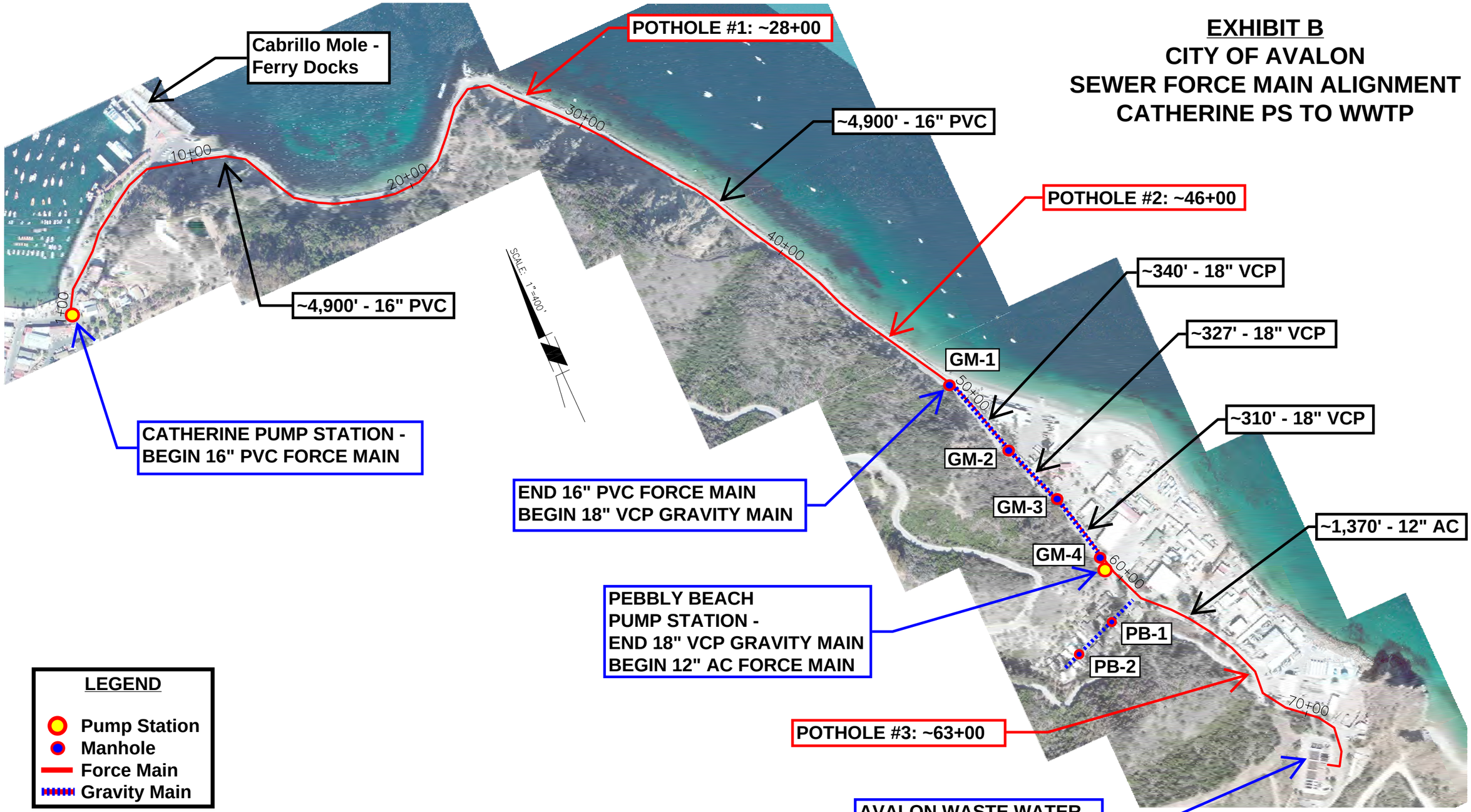
EXHIBIT B
CITY OF AVALON
SEWER FORCE MAIN ALIGNMENT
CATHERINE PS TO WWTP



LEGEND

- Pump Station
- Manhole
- Force Main
- Gravity Main

400 200 0 400 800

SCALE: 1"=400'

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A Baker Company

PLANNING ■ DESIGN ■ CONSTRUCTION

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SAN DIEGO, CALIFORNIA 92124-1324
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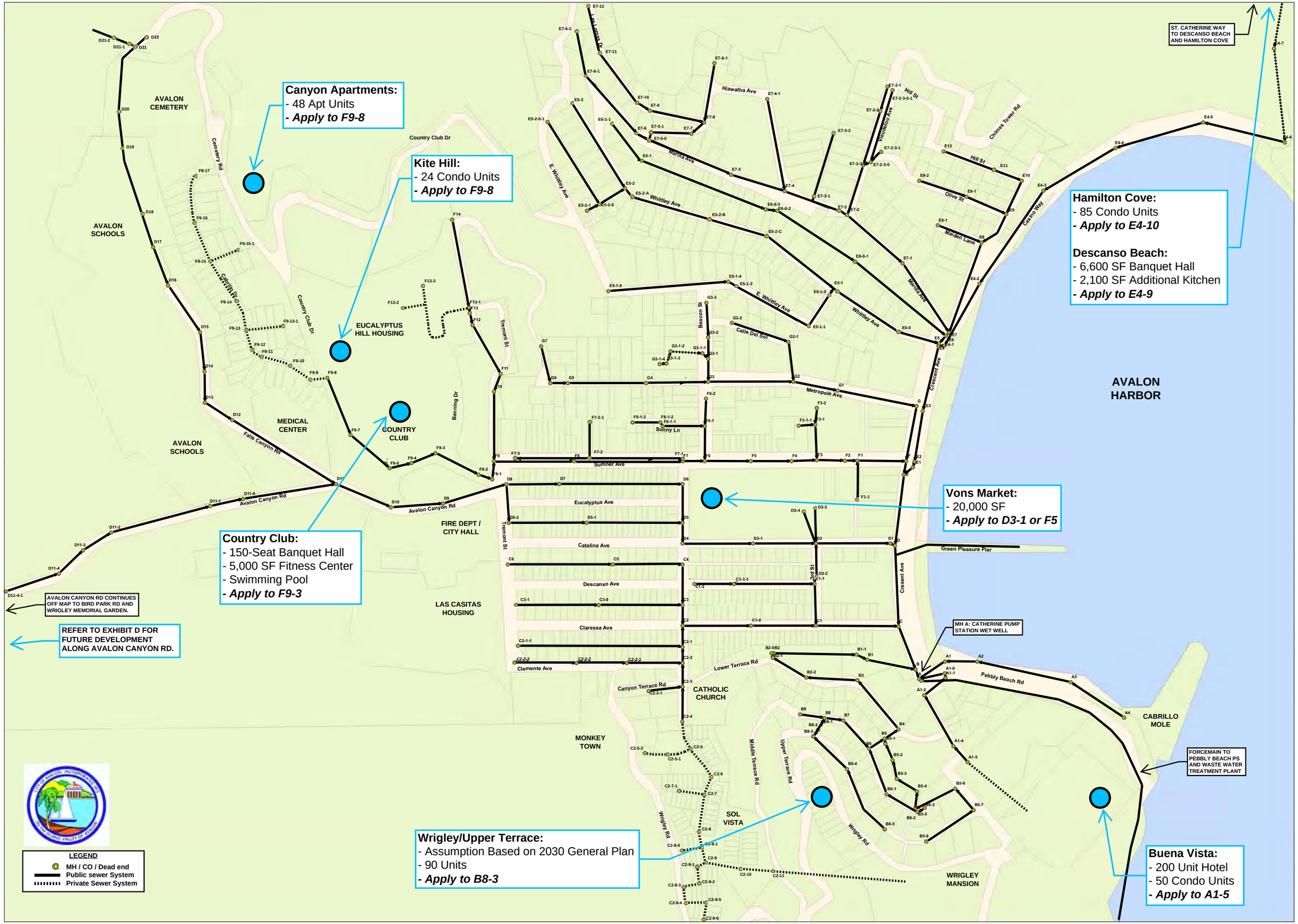

CITY OF AVALON SEWER IMPROVEMENT PROGRAM

EXHIBIT C - PROPOSED FUTURE DEVELOPMENT

(10/28/2013, Rev 1)

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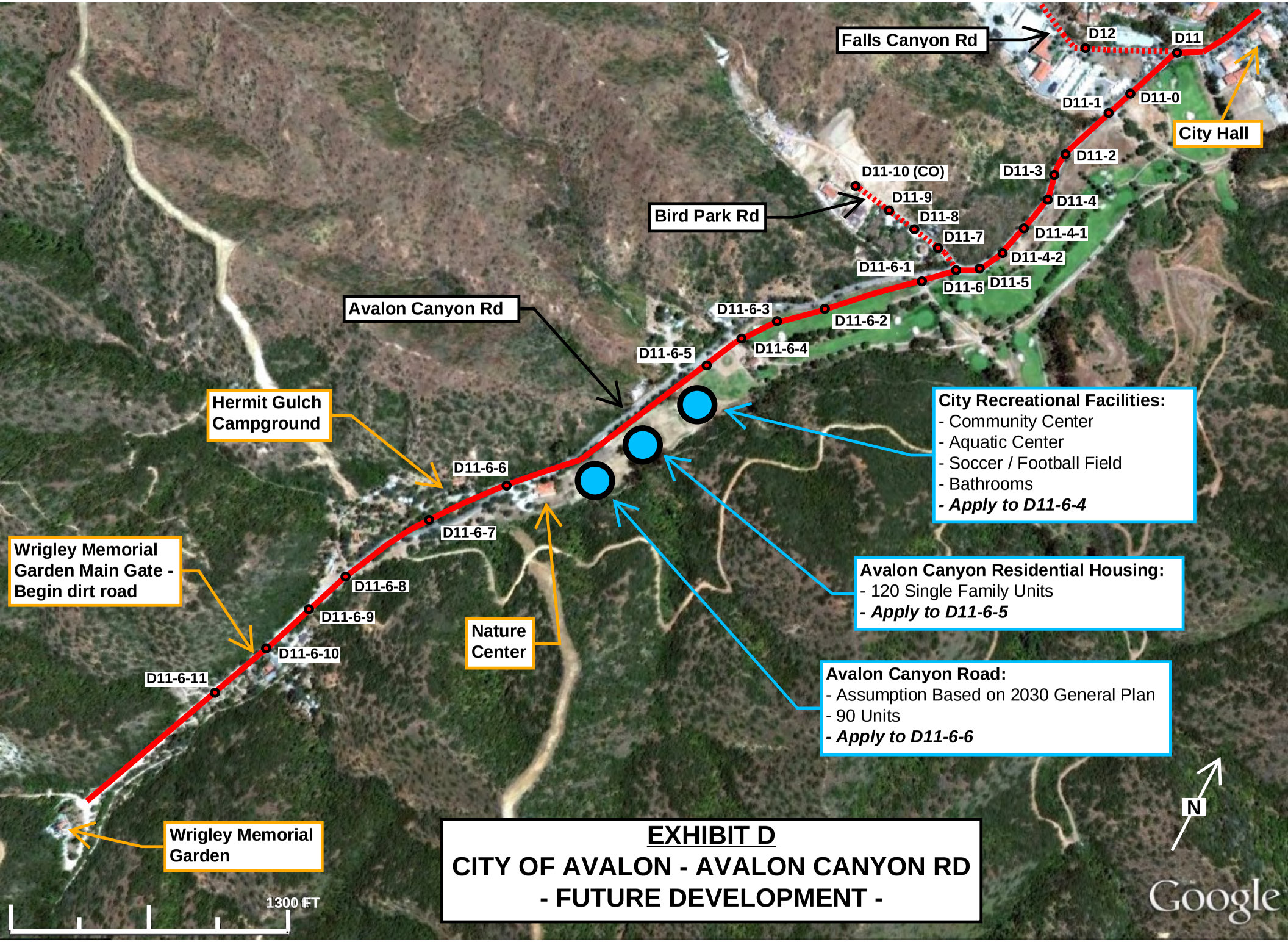
Falls Canyon Rd
D12
D11
D11-0
D11-1
City Hall
D11-2
D11-3
D11-10 (CO)
D11-4
D11-9
Bird Park Rd
D11-8
D11-4-1
D11-7
D11-4-2
D11-6-1
D11-5
D11-6
D11-6-3
Avalon Canyon Rd
D11-6-2
D11-6-4
D11-6-5
Hermit Gulch Campground
D11-6-6
D11-6-7
Wrigley Memorial Garden Main Gate - Begin dirt road
D11-6-8
D11-6-9
Nature Center
D11-6-10
D11-6-11
Wrigley Memorial Garden
1300 FT
N
Google
City Recreational Facilities:
- Community Center
- Aquatic Center
- Soccer / Football Field
- Bathrooms
- Apply to D11-6-4
Avalon Canyon Residential Housing:
- 120 Single Family Units
- Apply to D11-6-5
Avalon Canyon Road:
- Assumption Based on 2030 General Plan
- 90 Units
- Apply to D11-6-6
EXHIBIT D
CITY OF AVALON - AVALON CANYON RD
- FUTURE DEVELOPMENT -

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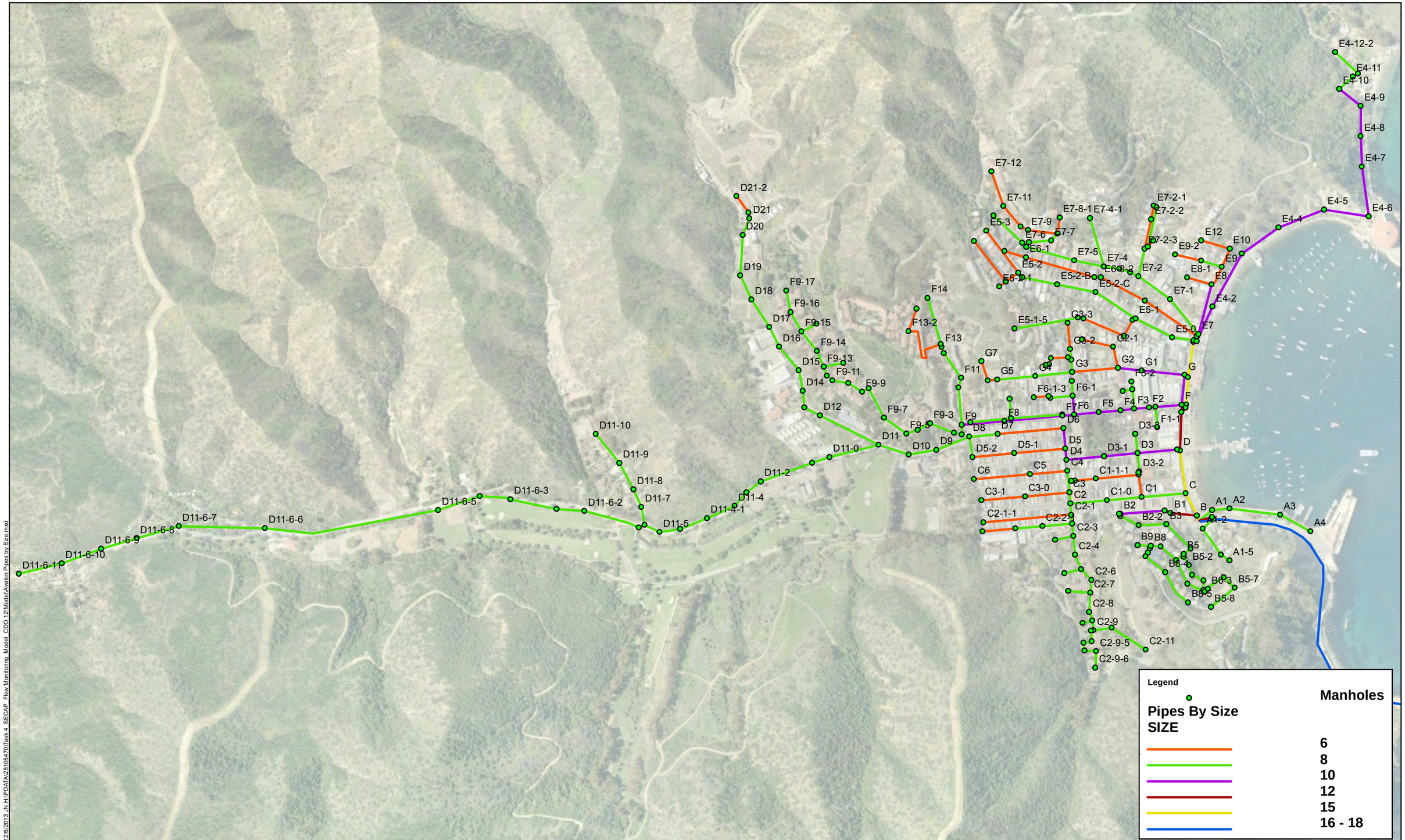

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0 125 250 500 Feet

Source:

AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

Existing Sewer Collection System Pipe Diameters – Avalon

Exhibit E

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

Existing Force Main Pipe Diameters – Pebbly Beach

Exhibit F

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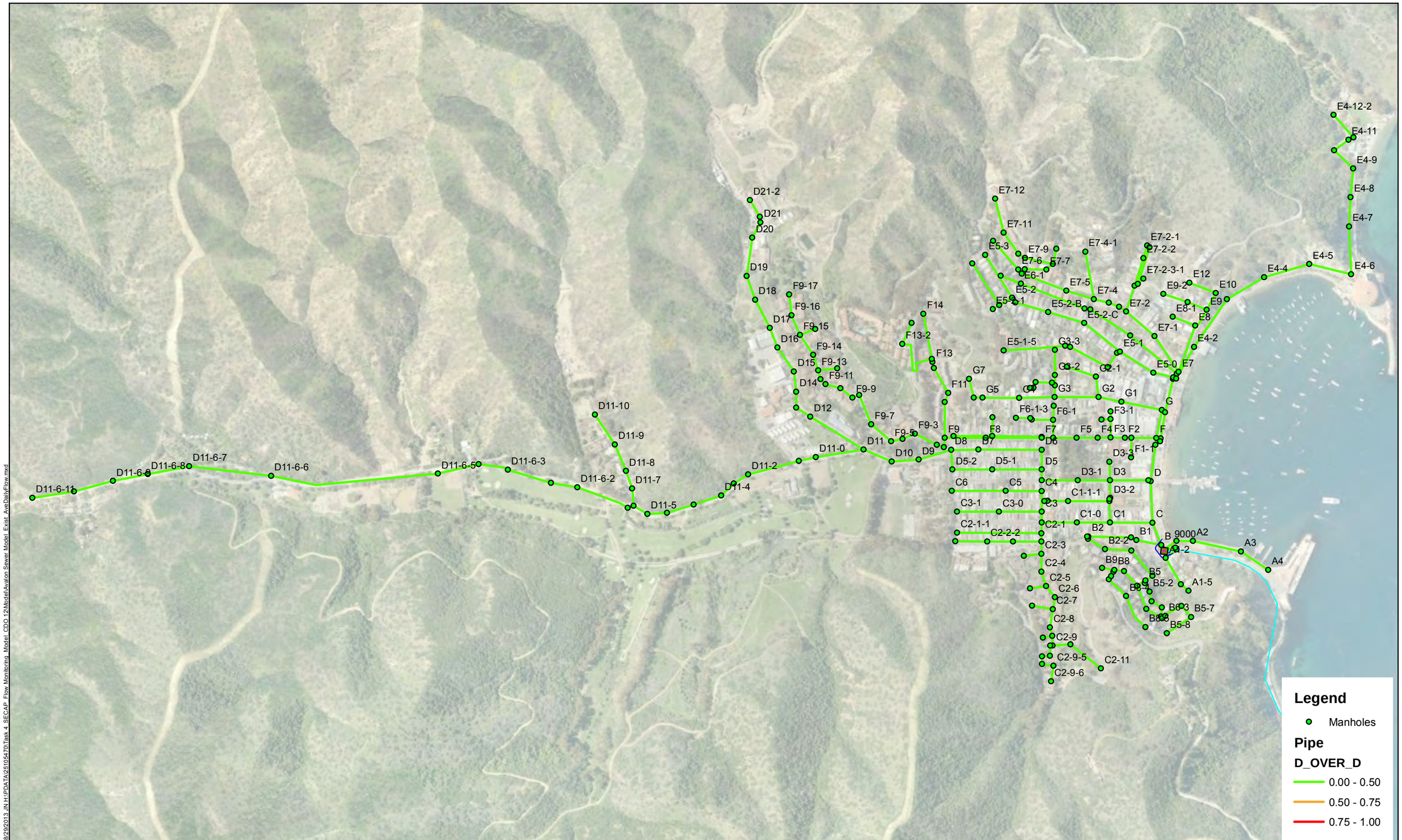

AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Dry Weather Flows (Exist) – Avalon

Exhibit G1

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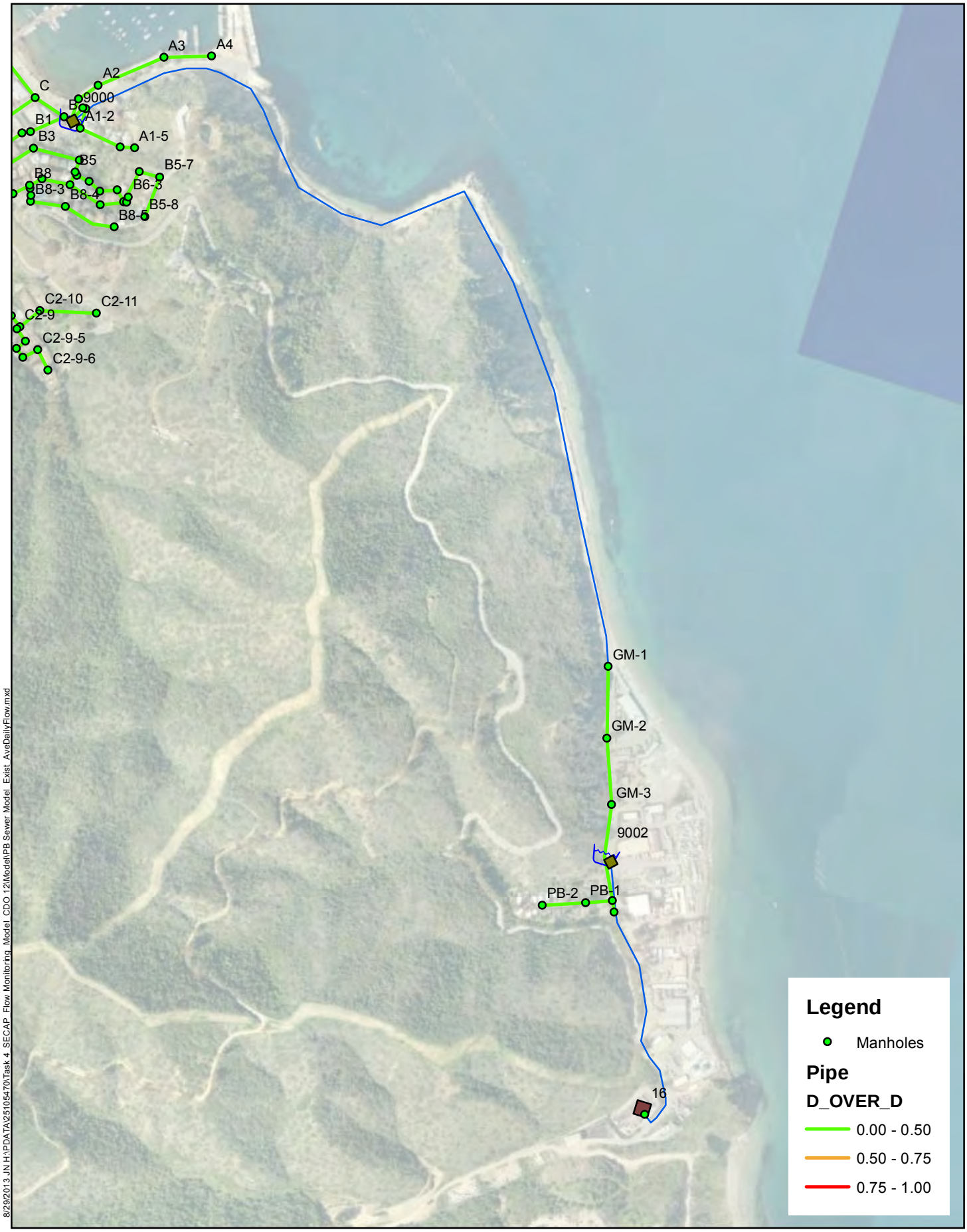

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Dry Weather Flows (Exist) – Pebbly Beach

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Exhibit G2

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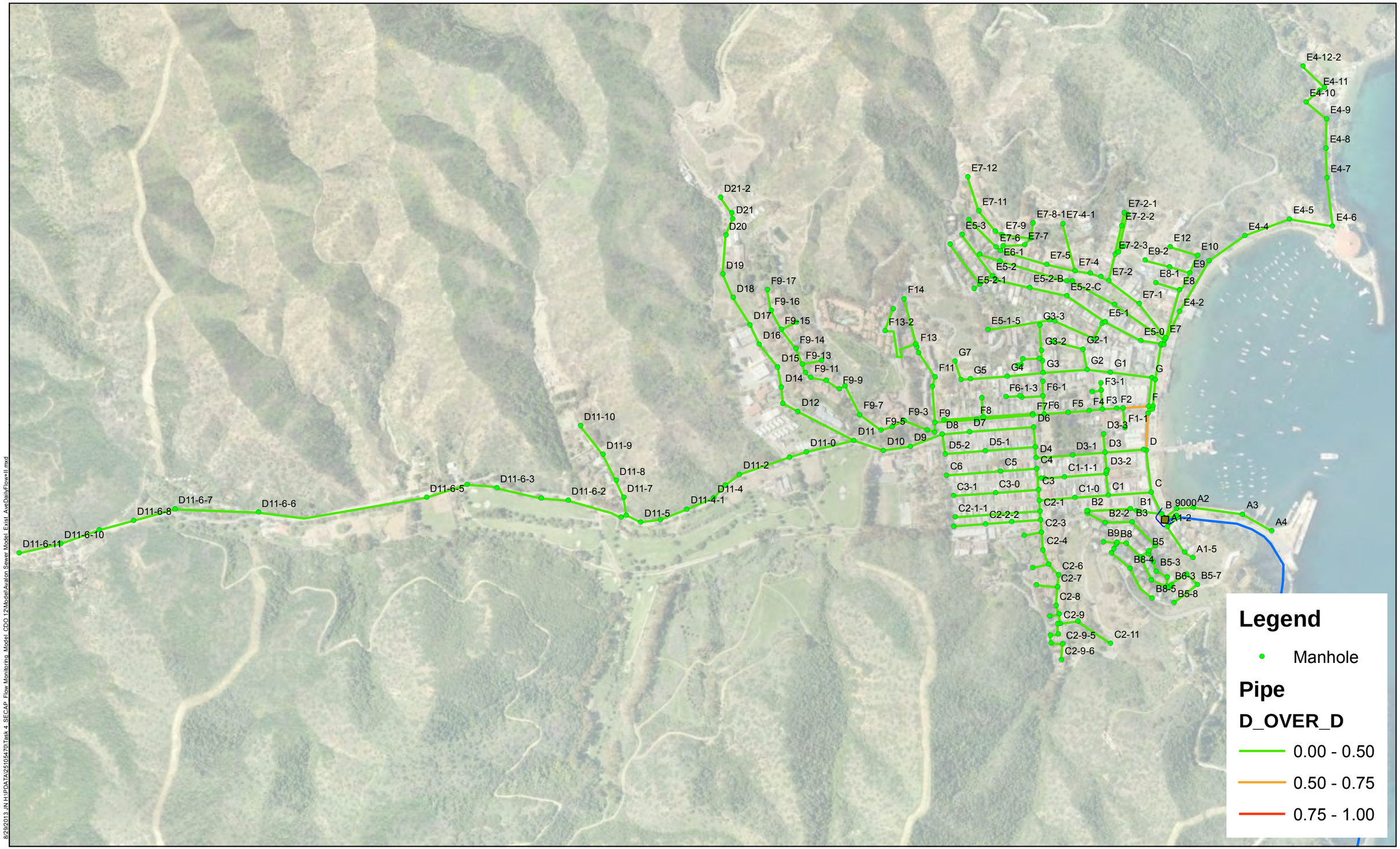

AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Wet Weather Flows (Exist) – Avalon

Exhibit H1

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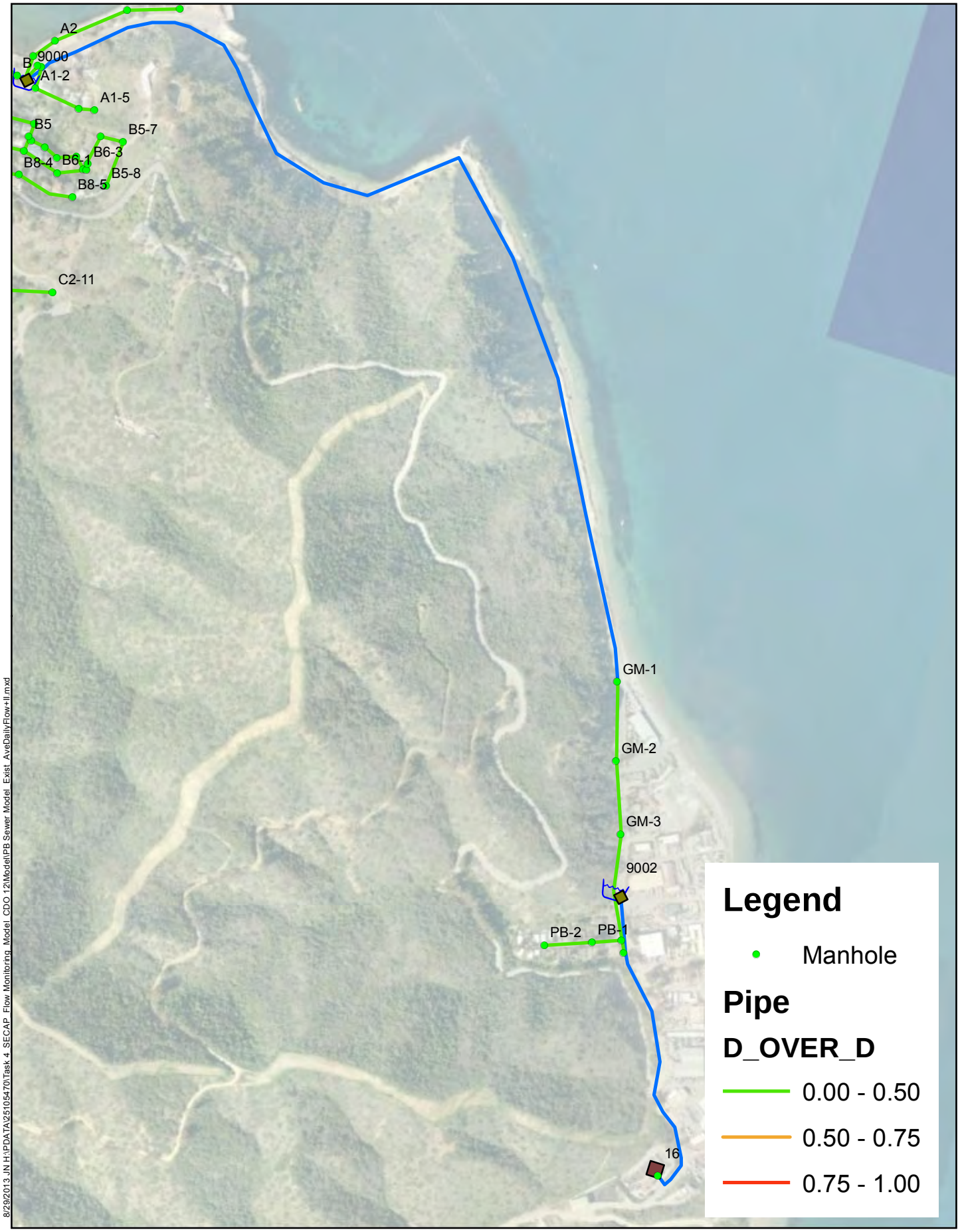

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Wet Weather Flows (Exist) – Pebbly Beach

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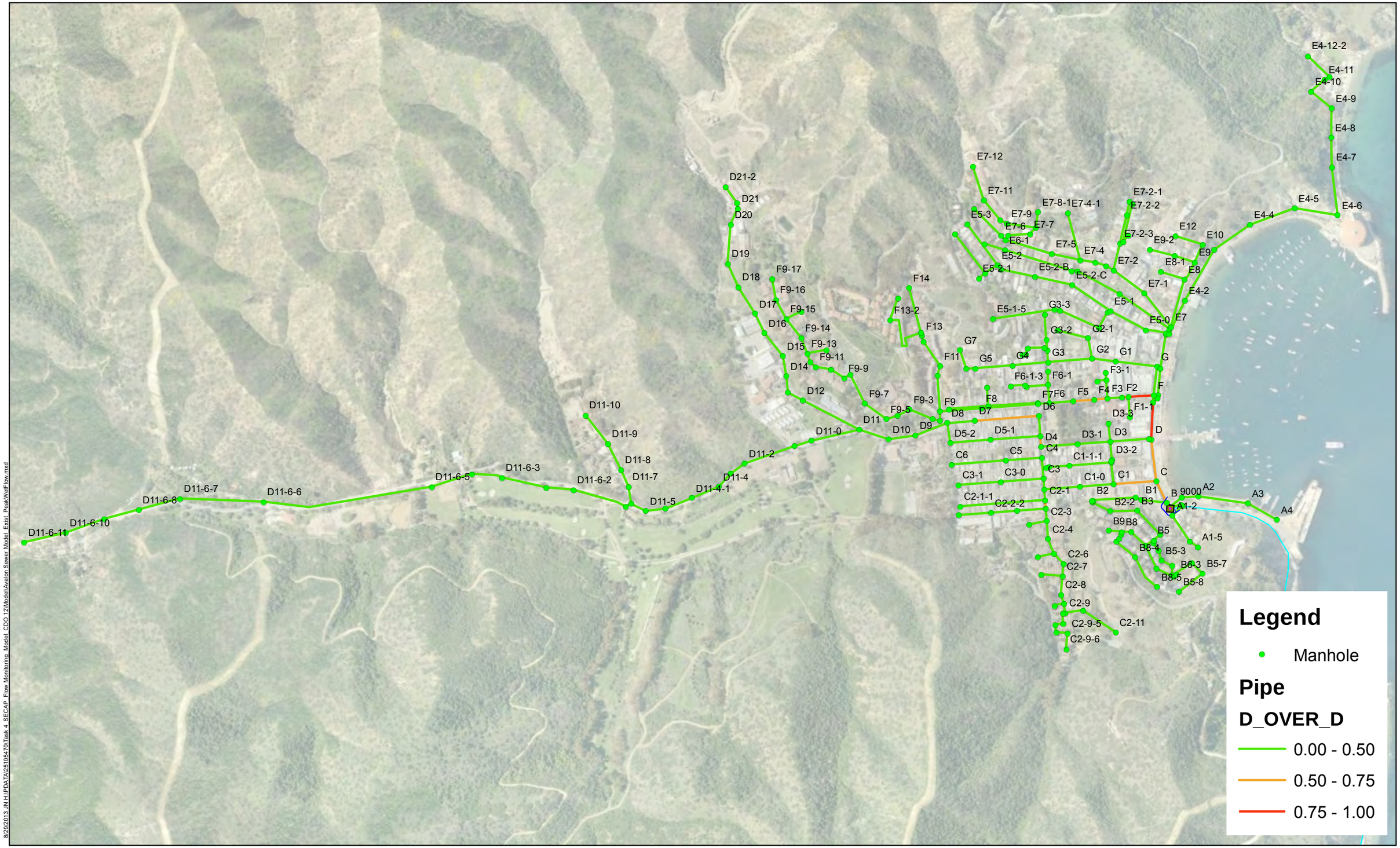

AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Peak Day Wet Weather Flows (Exist) – Avalon

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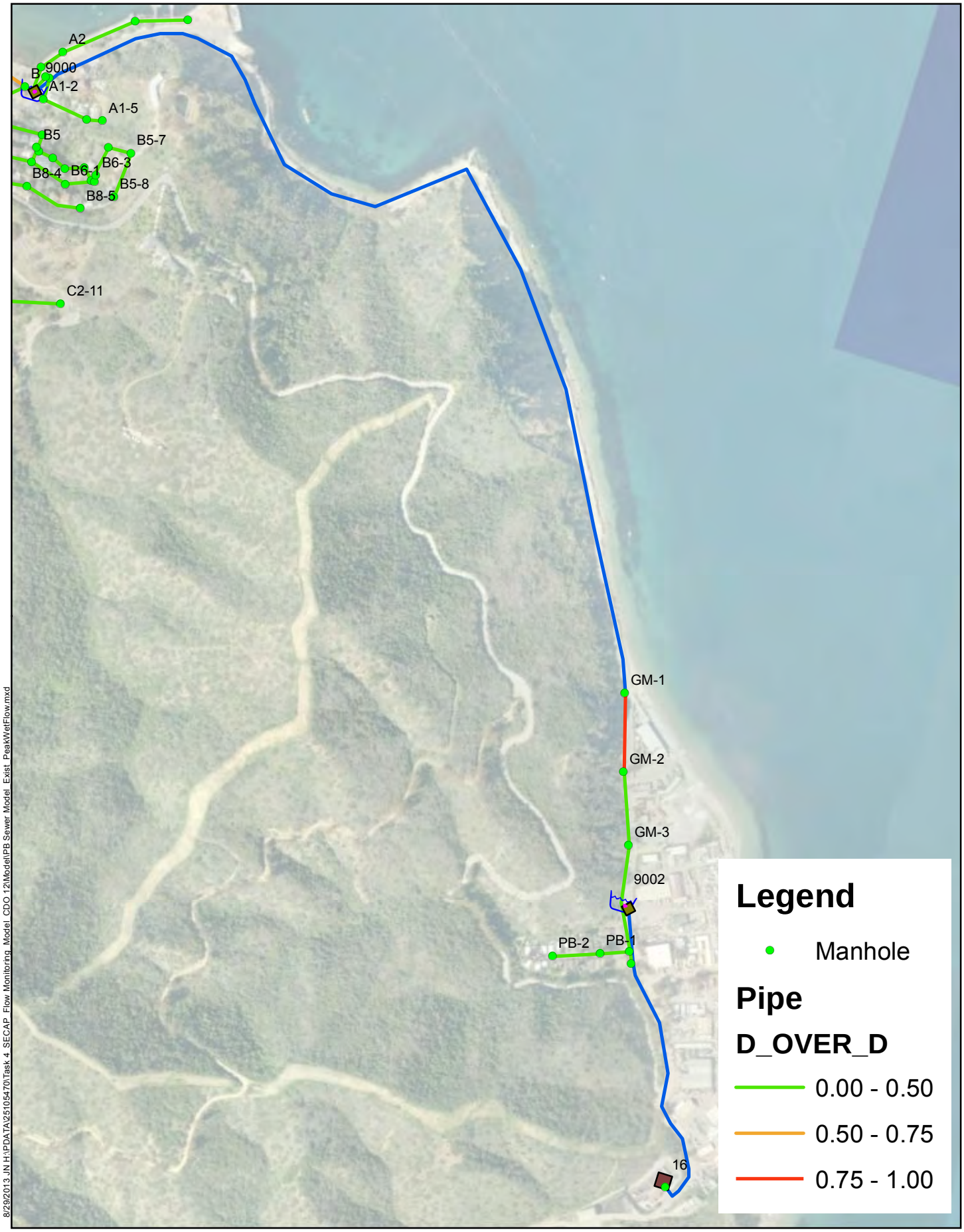

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Peak Day Wet Weather Flows (Exist) – Pebbly Beach

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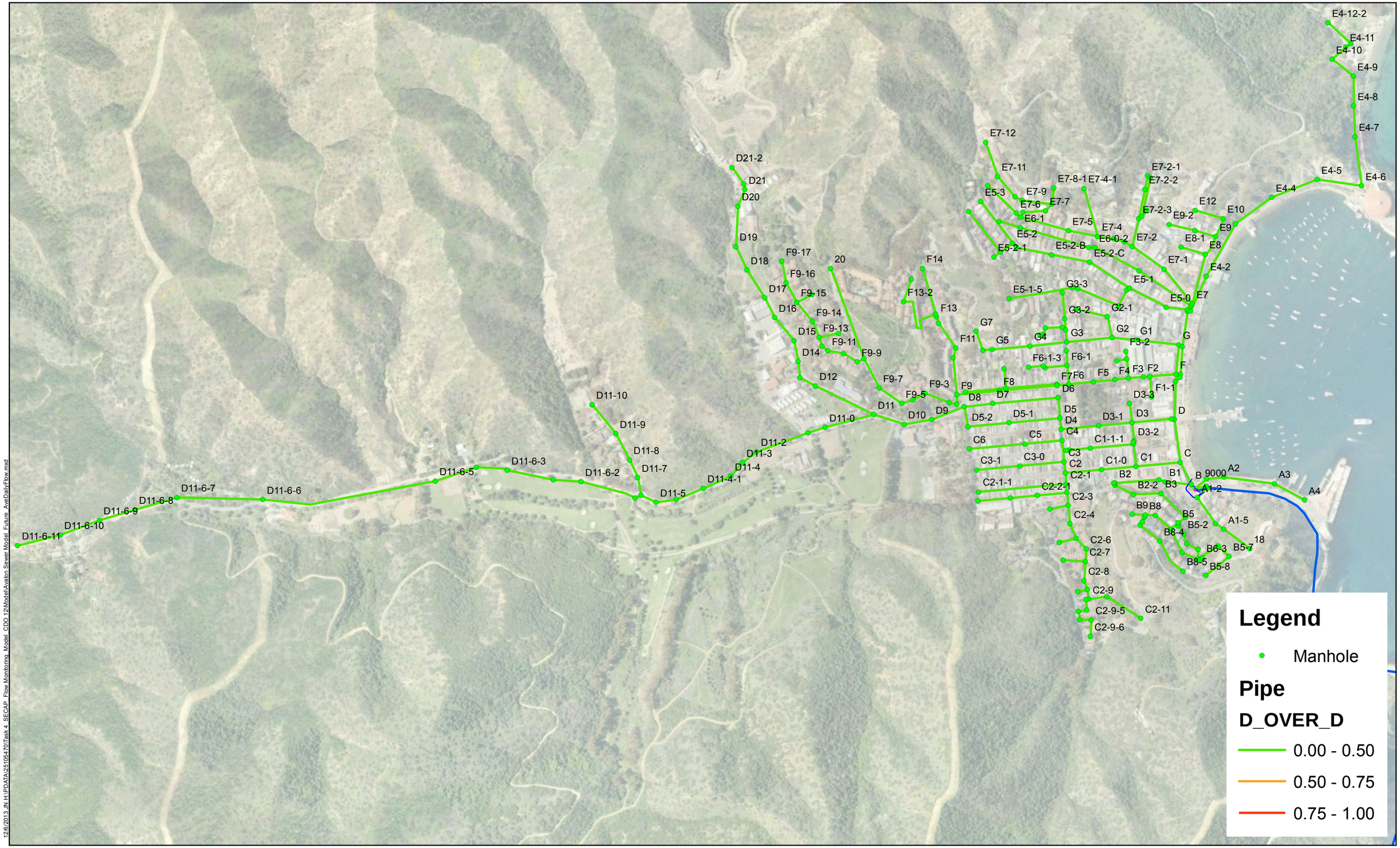

AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Dry Weather Flows (Future) – Avalon

Exhibit J1

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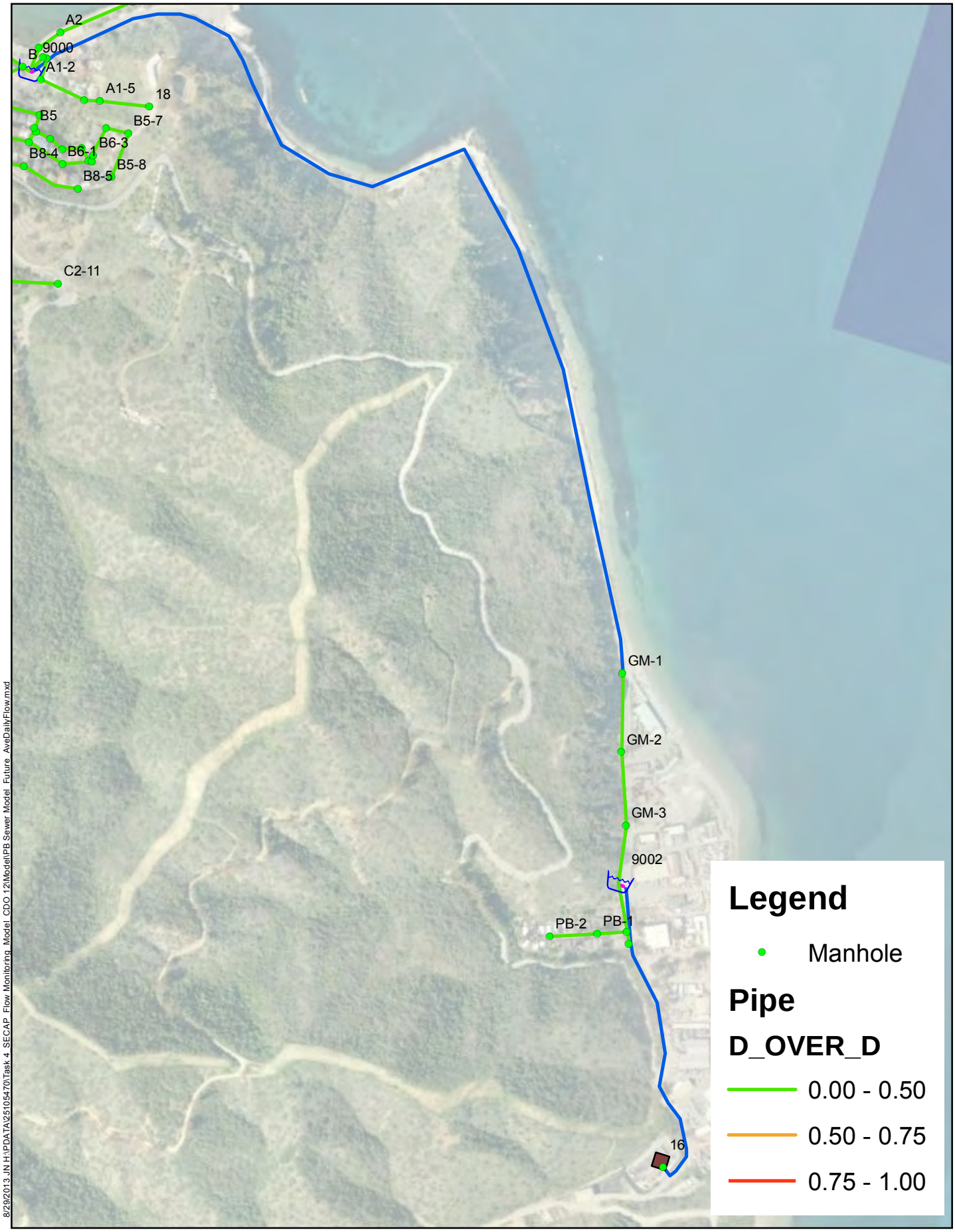

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Dry Weather Flows (Future) – Pebbly Beach

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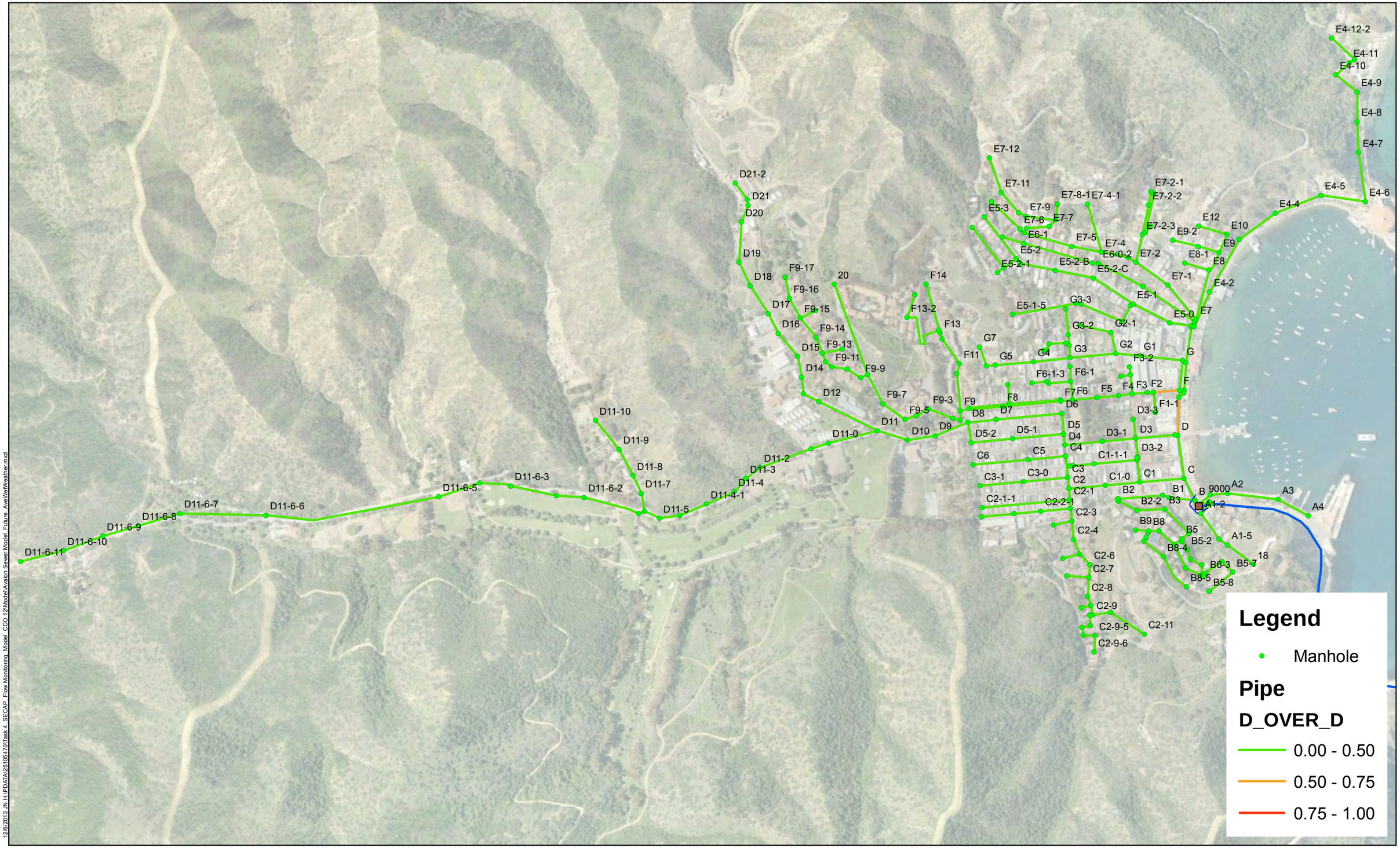

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Wet Weather Flows (Future) – Avalon

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Avg. Day Wet Weather Flows (Future) – Pebbly Beach

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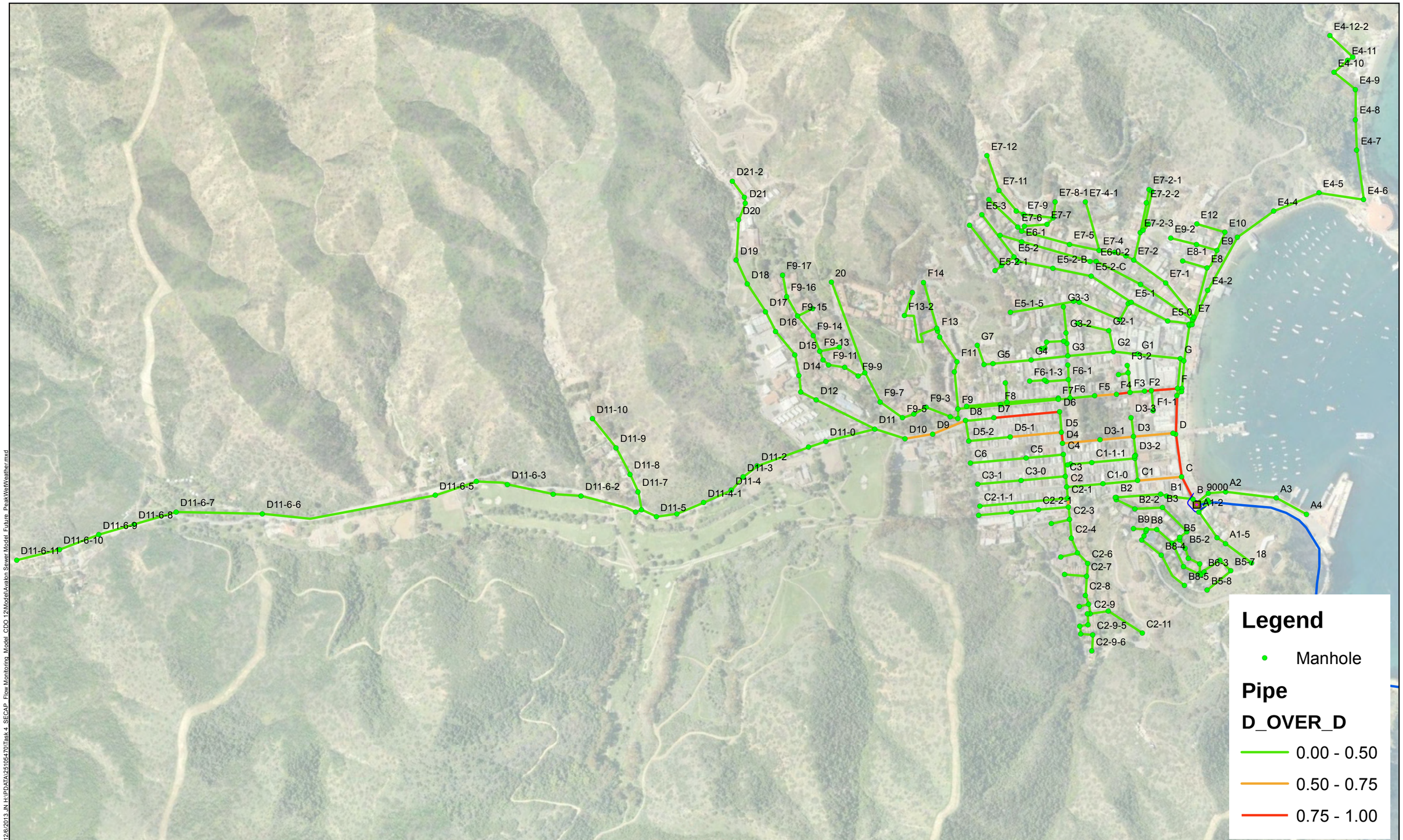

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Peak Day Wet Weather Flows (Future) – Avalon

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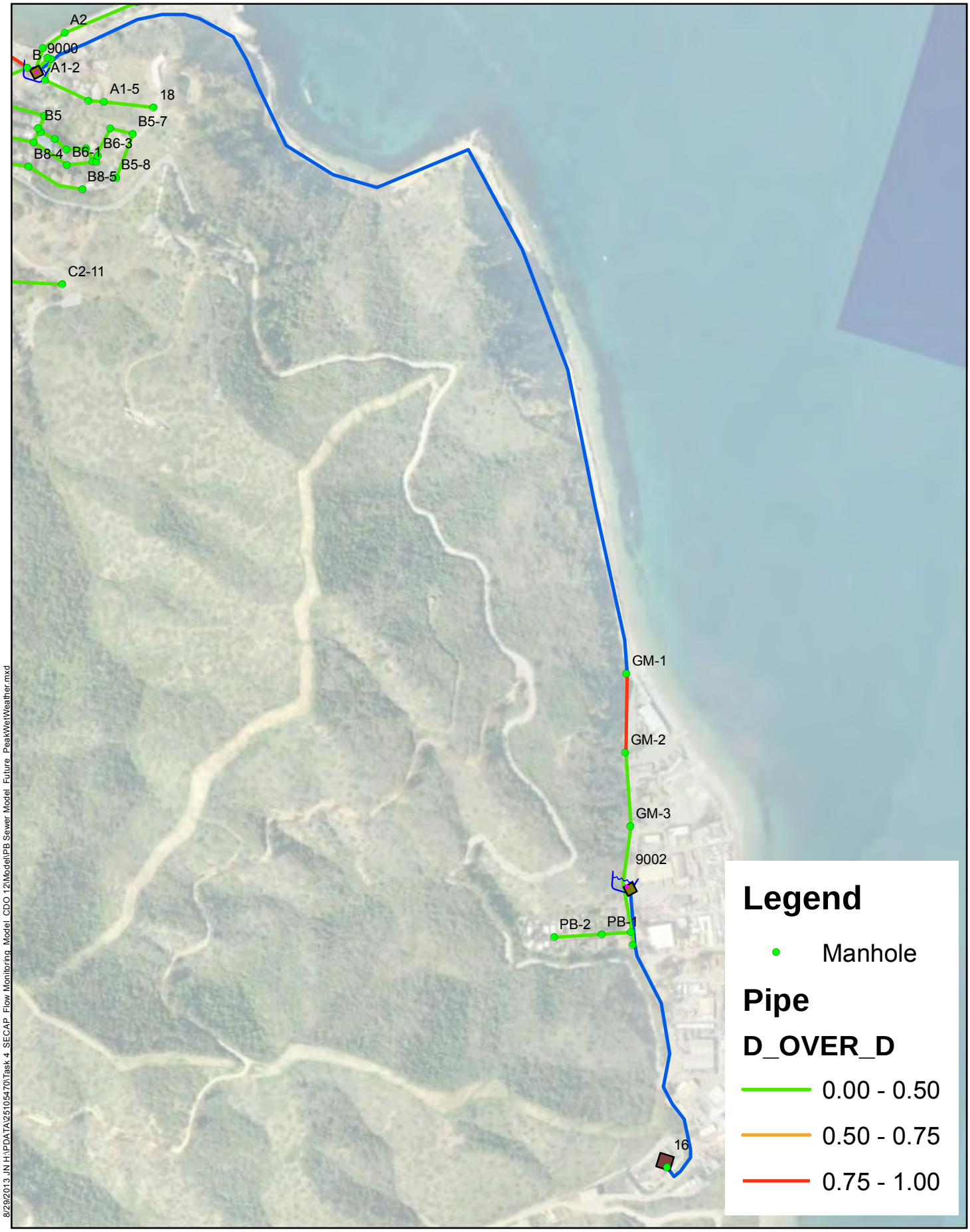

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AVALON SEWER EVALUATION AND CAPACITY ASSURANCE PLAN

d/D Results – Peak Day Wet Weather Flows (Future) – Pebbly Beach

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Appendix B:

Sanitary Sewer Flow Monitoring and Inflow/Infiltration Study

July 2013

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SANITARY SEWER FLOW MONITORING AND INFLOW/INFILTRATION STUDY

City of Avalon

July 2013

V&A

SANITARY SEWER FLOW MONITORING AND INFLOW / INFILTRATION STUDY

City of Avalon

Prepared for

Prepared by

July 2013

TABLE OF CONTENTS

ABBREVIATIONS, TERMS and DEFINITIONS iv
EXECUTIVE SUMMARY 1
Scope and Purpose 1
Considerations for Transient Populace 2
Site Flow Monitoring and Capacity Results 2
Basin Inflow and Infiltration Analysis Results 4
INTRODUCTION 10
Preface 10
Scope and Purpose 10
Site Selection 10
Equipment Selection 12
Installation 13
Confined Space Entry 13
Monitoring and Data Collection 14
ANALYSIS FACTORS AND CONSIDERATIONS 15
Flow Calculation 15
Average Dry Weather Flows 15
Capacity Analysis: Peaking Factor and d/D Ratio 16
Inflow / Infiltration Analysis: Definitions and Identification 16
Inflow 16
Infiltration 17
Infiltration Components 18
Inflow / Infiltration: Analysis Methods 18
Inflow/Infiltration Isolation Graph 20
Attenuation 21
ADWF Considerations for Transient Populace 21
SUMMARY OF DATA COLLECTED 22
RESULTS AND ANALYSIS 23
Rainfall: Rain Gauge Data 23
Rainfall: Storm Event Classification 24
Flow Monitoring: Average Dry Weather Flows 25
Flow Monitoring: Peak Measured Flows and Pipeline Capacity Analysis 26
I/I Analysis: I/I Isolation Graphs 28
I/I Analysis: Inflow Summary 29
I/I Analysis: Combined I/I Summary 31
I/I Analysis: Groundwater Infiltration Summary 33
RECOMMENDATIONS 35

TABLES

Table 1. Summary of Data Collected 2
Table 2. Capacity Analysis Summary 3
Table 3. Avalon Basins I/I Analysis Summary 4
Table 4. List of Flow Monitoring Sites 11
Table 5. Summary of Data Collected 22
Table 6. Dry Weather Flow Summary 25
Table 7. Capacity Analysis Summary 26
Table 8. Basin 4 Inflow Analysis Summary 29
Table 9. Combined I/I Analysis 31

FIGURES

Figure 1. Flow Monitoring Sites and Basins 1
Figure 2. Bar Graphs: Peaking Factor and d/D Ratio 3
Figure 3. Peak Measured Flow (Flow Schematic) 6
Figure 4. Inflow Temperature Map (by Rank) 7
Figure 5. Combined I/I Temperature Map (by Rank) 8
Figure 6. Basins with Groundwater Infiltration 9
Figure 7. Flow Monitoring Site Map 11
Figure 8. Avalon Basins Map 12
Figure 9. Typical Isco 2150 Flow Meter Installation 13
Figure 10. Typical Sources of Infiltration and Inflow 17
Figure 11. Groundwater Infiltration Sample Figure 19
Figure 12. Sample Infiltration / Inflow Isolation Graph 20
Figure 13. Attenuation Illustration 21
Figure 14. Rainfall Activity over Flow Monitoring Period 23
Figure 15. Storm Event Classification Curves: Avalon, CA 24
Figure 16. Average Dry Weather Flow (Flow Schematic) 25
Figure 17. Bar Graphs: Peaking Factor and d/D Ratio 26
Figure 18. Peak Measured Flow (Flow Schematic) 27
Figure 19. I/I Graphs: Basin B and Basin D 28
Figure 20. Bar Graphs: Basin Inflow Analysis Summary 29
Figure 21. Temperature Map: Basin Inflow Analysis Summary 30
Figure 22. Bar Graphs: Basin Combined I/I Analysis Summary 31
Figure 23. Temperature Map: Basin Combined I/I Analysis Summary 32
Figure 24. Minimum Flow Ratios vs. ADWF 33
Figure 25. Basins with Possible Groundwater Infiltration 34

APPENDIX

Appendix A: Flow Monitoring Sites: Data, Graphs, Information

ABBREVIATIONS, TERMS AND DEFINITIONS USED IN THIS REPORT

Table i.
Abbreviations

Abbreviation	Term
ADWF	average dry weather flow
CCTV	closed-circuit television
CIP	capital improvement plan
CO	carbon monoxide
d/*D*	depth/diameter ratio
FM	flow monitor
gpd	gallons per day
gpm	gallons per minute
GWI	groundwater infiltration
H_2S	hydrogen sulfide
I/I	inflow and infiltration
IDM	inch-diameter-mile, miles of pipeline multiplied by the diameter of the pipeline in inches.
IDW	inverse distance weighting
LEL	lower explosive limit
mgd	million gallons per day
NOAA	National Oceanic and Atmospheric Administration
Q	flow rate
RDI	rainfall dependent infiltration
RRI	rainfall responsive infiltration
RG	rain gauge
SSO	sanitary sewer overflow
WEF	Water Environment Federation
WRCC	Western Regional Climate Center

Table ii.
Terms and Definitions

Term	Definition
Average dry weather flow (ADWF)	Average flow rate or pattern from days without noticeable inflow or infiltration response. ADWF usage patterns for weekdays and weekends differ and must be computed separately. ADWF can be expressed as a numeric average or as a curve showing the variation in flow over a day. ADWF includes the influence of normal (non-rain event) groundwater infiltration.
Basin	Sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. Also refers to the ground surface area near and enclosed by the pipelines. A basin may refer to the entire collection system upstream from a flow meter, or if flow meters are aligned in series (flowing into each other), a basin may exclude separately monitored basins upstream.
Depth/diameter (*d*/*D*) ratio	Depth of water in a pipe as a fraction of the pipe's diameter. A measure of fullness of the pipe. This term is used as a part of *Capacity Analysis*.
Design storm	A theoretical storm event of a given duration and intensity that aligns with historical frequency records of rainfall events. For example, a 10-year, 24-hour design storm is a storm event wherein the volume of rain that falls in a 24-hour period would historically occur once every 10 years. Design storm events are used to predict I/I response and are useful for modeling – to approximate how a collection system will react to a given set of storm event scenarios.
Infiltration and Inflow	Infiltration and inflow (I/I) rates are calculated by subtracting the ADWF flow curve from the instantaneous flow measurements taken during and after a storm event. Flow in excess of the baseline consists of inflow, rainfall-responsive infiltration, and rainfall-dependent infiltration. **Total I/I** is the total sum in gallons of additional flow attributable to a storm event. This is calculated by subtracting the expected ADWF totalized flow from the measured real-time totalized flow across the limits of the storm event.
Infiltration, *Groundwater*	Groundwater infiltration (**GWI**) is groundwater that enters the collection system through pipe defects. GWI depends on the depth of the groundwater table above the pipelines as well as the percentage of the system submerged. The variation on groundwater levels and subsequent groundwater infiltration rates are seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
Infiltration, *Rainfall Dependent*	Rainfall Dependent Infiltration (**RDI**) is similar to groundwater infiltration but occurs as a result of storm water. The storm water percolates into the soil, submerges more of the pipe system, and enters through pipe defects. RDI is the slowest component of storm-related infiltration and inflow, beginning gradually and often lasting 24 hours or longer. The response time depends on the soil permeability and saturation levels.
Infiltration, *Rainfall Responsive*	Rainfall Responsive Infiltration (**RRI**) is storm water which enters the collection system through pipe defects, but normally in sewers constructed close to the ground surface such as private laterals. RRI is independent of the groundwater table and reaches defective sewers via the pipe trench in which the sewer is constructed, particularly if the pipe is placed in impermeable soil and bedded and backfilled with a granular material. In this case, the pipe trench serves as a conduit similar to a French drain, conveying storm drainage to defective joints and other openings in the system.
Inflow	**Inflow** is defined as water discharged into the sewer system, including private sewer laterals, from **direct** connections such as downspouts, yard and area drains, holes in manhole covers, cross-connections from storm drains, or catch

Term	Definition
	basins. Inflow creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. SSOs are often attributable to high inflow rates.
Normalization	To run an "apples-to-apples" comparison amongst different basins, calculated metrics must be **normalized**. Each basin will have different runoff areas, pipe lengths and sanitary flows. Normalization is typically completed in three different methods. Depending on the information available, one or all methods can be applied to a given project: ❖ Pipe Length: The metric is divided by the length of pipe in the upstream basin expressed in units of inch-diameter-mile (IDM). ❖ Basin Area: The metric is divided by the estimated drainage area of the basin in acres. ❖ ADWF: The metric is divided by the average dry weather sanitary flow (ADWF).
Normalization, *Inflow*	The peak I/I flow rate is used to quantify inflow. Although the instantaneous flow monitoring data will typically show an inflow peak, the inflow response is measured from the I/I flow rate (in excess of baseline flow). This removes the effect of sanitary flow variations and measures only the I/I response: ❖ Pipe Length: The peak I/I flow rate is divided by the length of pipe (IDM) in the upstream basin. The result is expressed in gallons per day (gpd) per IDM (gpd/IDM). ❖ Basin Area: The peak I/I flow rate is divided by the geographic area of the upstream basin. The result is expressed in gpd per acre. ❖ ADWF: The peak I/I flow rate is divided by the average dry weather flow (ADWF). This is a ratio and is expressed without units.
Normalization, *GWI*	The estimated GWI rates above typical accepted GWI rates as defined by the Water Environment Federation is used to identify basins with high GWI: ❖ Pipe Length: The GWI flow rate is divided by the length of pipe (IDM) in the upstream basin. The result is expressed in gallons per day (gpd) per IDM (gpd/IDM). ❖ Basin Area: The GWI flow rate is divided by the geographic area of the upstream basin. The result is expressed in gpd per acre. ❖ ADWF: The GWI flow rate is divided by the average dry weather flow (ADWF). This is a ratio and is expressed without units.
Normalization, *RDI*	The estimated RDI rates at a period 24 hours or more after the conclusion of a storm event are used to identify basins with high RDI: ❖ Pipe Length: The RDI flow rate is divided by the length of pipe (IDM) in the upstream basin. The result is expressed in gallons per day (gpd) per IDM (gpd/IDM). ❖ Basin Area: The RDI flow rate is divided by the geographic area of the upstream basin. The result is expressed in gpd per acre. ❖ ADWF: The RDI flow rate is divided by the average dry weather flow

Term	Definition
	(ADWF). This is a ratio and is expressed without units.
Normalization, *Total I/I*	The estimated totalized I/I in gallons attributable to a particular storm event are used to identify basins with high total I/I. Because this is a totalized value rather than a rate and can be attributable solely to an individual storm event, the volume of the storm event is also taken into consideration. This allows for a comparison not only basin-to-basin, but also storm event-to-storm event: ❖ Pipe Length: Total gallons of I/I are divided by the length of pipe (IDM) in the upstream basin and the inches of rain of the storm event. The result is expressed in gallons per IDM per inch-rain. ❖ Basin Area (R-Value): Total gallons of I/I are divided by total gallons of rainfall water that fell within the acreage of the basin area. This is a ratio and expressed as a percentage. R-Value is described as "the percentage of rain that falls that enters the collection system." Systems with R-Values less than 5%[1] are often considered to be performing well. ❖ ADWF: Total gallons of I/I are divided by the ADWF and the inches of rain of the storm event. The result is expressed in gallons (x 10^6)per MGD of ADWF per inch-rain.
Peaking factor	Ratio of peak measured flow to average dry weather flow. This ratio expresses the degree of fluctuation in flow rate over the monitoring period. This is used for *Capacity Analysis*.
Surcharge	When the flow level is higher than the crown of the pipe, then the pipeline is said to be in a **surcharged** condition. The pipeline is surcharged when the d/D ratio is greater than 1.0.
Synthetic hydrograph	A set of algorithms developed to approximate the actual I/I hydrograph. The synthetic hydrograph is developed strictly using rainfall data and response parameters representing response time, recession coefficient and soil saturation.
Weekend/weekday ratio	The ratio of weekend ADWFs to weekday ADWFs. In residential areas, it is typical that this ratio would be slightly higher than 1.0. In business districts, depending on type of service, this ratio can be significantly less than 1.0.

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

EXECUTIVE SUMMARY

Scope and Purpose

V&A has completed sanitary sewer flow monitoring, rainfall monitoring and inflow/infiltration (I/I) analysis within the City of Avalon, California (City). Flow and rainfall monitoring occurred over a 10-week period from March 19 to June 4, 2013. The purpose of this study was to measure sanitary sewer flows at the flow monitoring sites and conduct analyses pertaining to capacity and infiltration and inflow (I/I) occurring in the basins upstream from the flow monitoring sites. A map of the flow monitoring sites and basins for this project is shown in Figure 1.

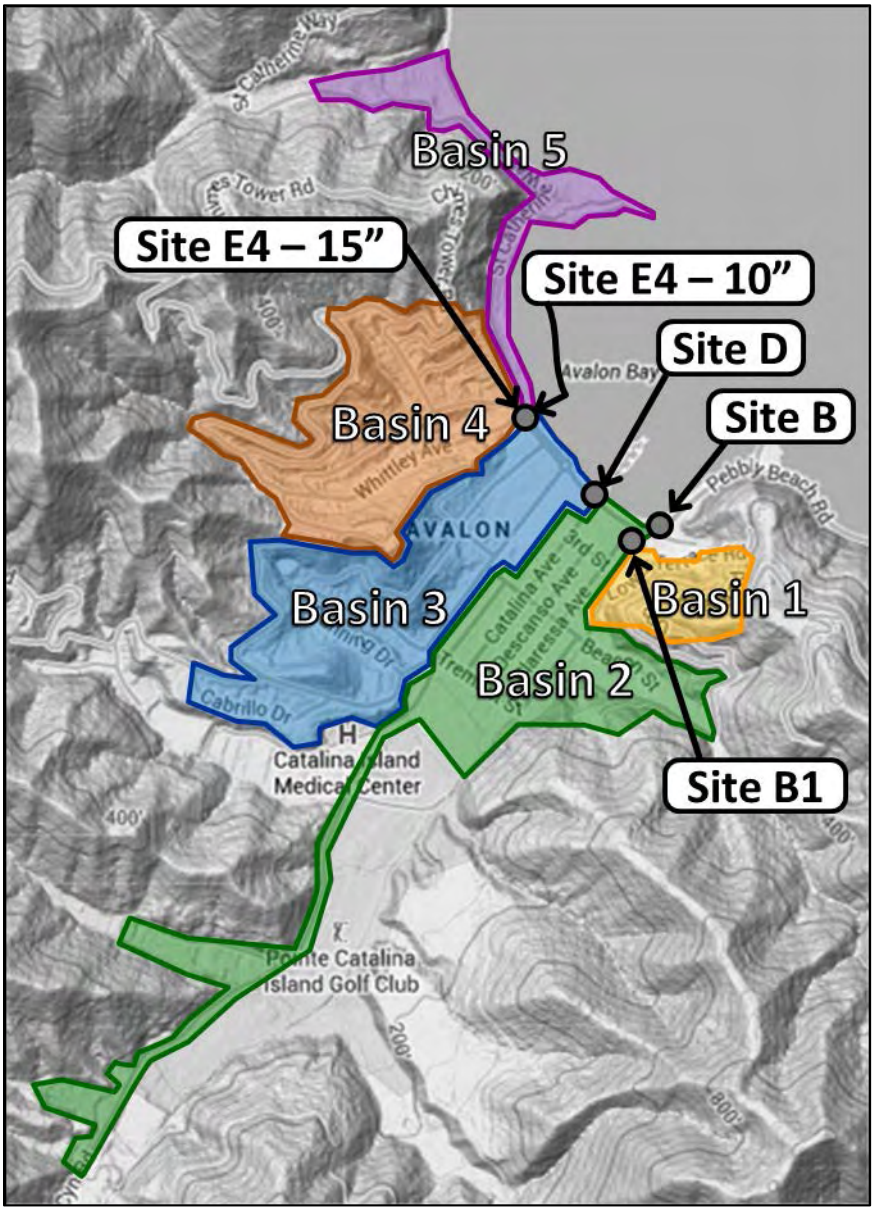


Figure 1. Flow Monitoring Sites and Basins

Considerations for Transient Populace

The number of occupants within the City of Avalon fluctuates day-to-day and seasonally as Avalon's primary industry is tourism. As it pertains to this project, the fluctuating population also affects the sanitary sewer discharge into the collection system. A term commonly used to identify the average flow into a system during periods of dry weather is ADWF, which stands for Average Dry Weather Flow. For many systems this is a stable number; however, in the case of the City of Avalon, the ADWF is irregular depending on the fluctuating tourism populace on a day-by-day basis.

For this report, the ADWF flows used for calculation and analysis were for an average of all dry days as monitored over the course of this study, specifically the dry period from March 20 to May 4, 2013, and from May 8 to June 3, 2013. However, it is acknowledged that the ADWF variable shifts day-to-day and week-to-week. It is ultimately at the discretion of the reader and of the Engineer to determine how much weight he/she should place in using the "per-ADWF" methods of for I/I analysis.

To further demonstrate the fluctuating nature of the populace, the "peak dry week" flows and "low dry week" flows for each site are shown in Table 1. A dry week is defined as a complete week starting on Monday and ending on Sunday, during a dry weather period.

Table 1. Summary of Data Collected

Item	Site B	Site B1	Site D	Site E4-10	Site E4-15
Peak Dry Week (mgd):	0.013	0.38	0.27	0.030	0.108
Low Dry Week (mgd):	0.009	0.31	0.22	0.013	0.086
ADWF, Overall (mgd):	0.012	0.35	0.24	0.022	0.096

Another analysis method, the "per-pipe length" method for normalizing inflow and infiltration is presented within this report and is given more weight when used to rank basins for I/I contribution.

Site Flow Monitoring and Capacity Results

Peak measured flows and the flow level (elevation) at the peak flow is important to understand the capacity of the flow monitoring system. The peak flows and flow levels reported are from the peak measurements as taken across the entirety of the flow monitoring period. These may or may not correspond to a rainfall event.

The following capacity analysis terms are defined as follows: **Peaking Factor:** Peaking factor is defined as the peak measured flow divided by the average dry weather flow (ADWF). **d/D Ratio:** The d/D ratio is the peak measured depth of flow divided by the pipe diameter. A d/D ratio less than 0.75 is a common threshold value used for pipe design. The d/D ratio for each site was computed based on the maximum depth of flow for the flow monitoring study.

Table 2 summarizes the peak recorded flows, levels, d/D ratios and peaking factors per site during the flow monitoring period. Capacity analysis data is presented on a **site-by-site** basis and represent

the hydraulic conditions only at the point site location. Hydraulic conditions in other areas of the collection system will differ. Figure 2 shows bar graphs of the capacity results.

Table 2. Capacity Analysis Summary

Site	ADWF (mgd)	Peak Measured Flow (mgd)	Peaking Factor	Diameter (in)	Peak Level (in)	d/D Ratio
Site B1	0.012	0.062	5.4	14.5	3.11	0.27
Site B	0.35	1.44	4.1	11.5	8.69	0.60
Site D	0.24	1.03	4.2	10.5	7.42	0.71
Site E4-10”	0.022	0.24	11.2	15	2.73	0.27
Site E4-15”	0.096	0.32	3.4	10	6.12	0.41

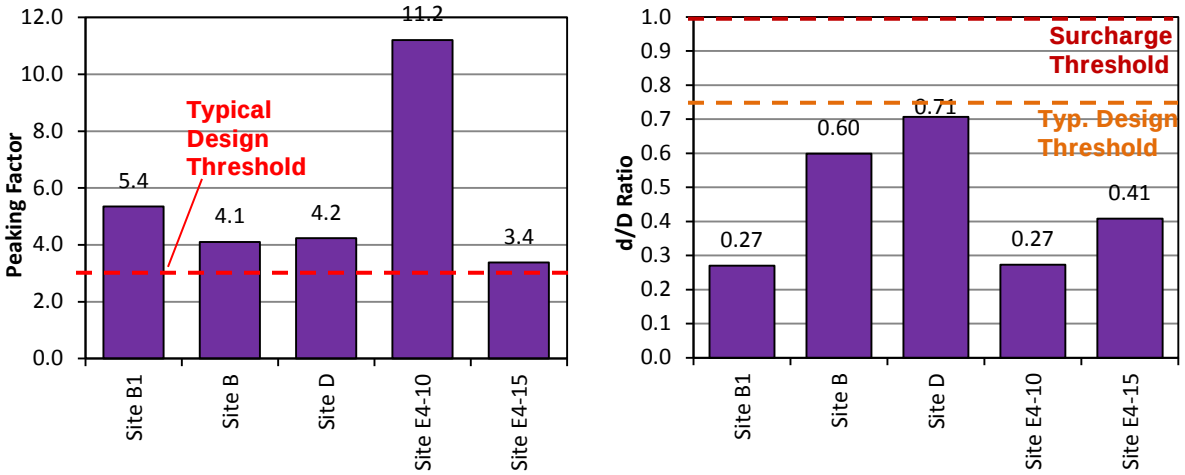


Figure 2. Bar Graphs: Peaking Factor and d/D Ratio

The following capacity analysis results are noted:

- All monitoring sites had d/D ratios that were less than the typical design threshold for sanitary sewers
- Though Site E4-10 had a peaking factor that was higher than the other flow monitoring locations, it is noted that this site is located directly downstream from a pump station pumping flow from the Catalina Casino. The peak flow through this site is determined by the pumping capacity of the pump station and given that the d/D ratio for Site E4-10 was 0.27, there does not appear to be a capacity issue at this specific location.

Basin Inflow and Infiltration Analysis Results

Table 3 summarizes the flow monitoring and I/I results for the five flow monitoring basins that were isolated at the start of this study. Infiltration and inflow rankings are shown such that 1 = highest infiltration or inflow contribution, to 3 = least infiltration or inflow contribution.

Table 3. Avalon Basins I/I Analysis Summary

Basin	ADWF (mgd)	Peak I/I Rate (mgd)	Total I/I (gallons)	Inflow Ranking	Evidence of High Groundwater Infiltration?	Combined I/I Ranking
Basin 1	0.012	0	0	3	Yes	3
Basin 2	0.13	0.15	7,000	2	Yes	2
Basin 3	0.14	0.30	23,000	1	No	1
Basin 4	0.10	0	0	3	Yes	3
Basin 5	0.022	0	0	3	Yes	3

The following capacity analysis results are noted:

- Both Basins 2 and 3 had evidence of I/I contribution; Basin 3 ranked highest for normalized I/I contribution.
- RDI rates were negligible and RDI analysis was not performed. For the storm events observed in this study, the inflow component comprised the majority of the I/I response.
- Groundwater rates were analyzed against typical groundwater infiltration rate standards set forth by the Water Environment Federation. It is possible that night-time industrial discharges or unusual nightlife activities (for example, the Catalina Casino) could increase Low-to-Average Ratios higher than typical ratios that would erroneously indicate high groundwater levels. The analysis results are shown for information, but should be used at the discretion of the City's master planning consultant.

Figure 4 and 5 show temperature basin maps of the overall inflow and infiltration rankings. Figure 6 shows a temperature map of the basins with rates of groundwater infiltration above typical groundwater infiltration rates.

Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

1. **Basins 2 and 3:** Basins 2 and 3 were the only basins that showed a definitive I/I response to the rainfall event, with Basin 3 ranking higher than Basin 2. Future I/I reduction efforts should first focus on Basin 3, and then focus on Basin 2.
2. **Inflow vs. RDI:** For Basins 2 and 3, the inflow component comprised the majority of the I/I response. For this particular study, the RDI component was negligible. Future I/I reduction efforts should focus on the reduction of **inflow**.

a. **Inflow Observation:** The quick and spiked inflow response to rainfall was noteworthy given the rainfall intensity only reached a peak rate of 0.06 inches per hour. NOAA states that a 1-year, 15-minute rainfall event within Avalon measures 0.25 inches, or an average rate of 1.00 inches per hour – approximately17 times the rate observed during this study. Inflow typically has a direct relationship with rainfall intensity. There are several factors at play, but initial indications are that a rainfall event with a larger rainfall intensity may result in a sizeable contribution of inflow into the collection system from Basins 2 and 3.

b. **Inflow Identification and Removal**: Inflow locations are usually less difficult to find and less expensive to correct. These sources include direct and indirect cross connections with storm drainage systems, roof downspouts, and various types of surface drains. Generally, the costs to identify and remove sources of inflow are low compared to potential benefits to public health and safety, the costs of building new facilities to convey and treat the resulting peak flows or the costs from fined of regulatory agencies of any sanitary sewer overflows.

3. **Inflow Investigation Methods:** Potential inflow investigation methods include the following:

   a. **Smoke testing:** Smoke testing involves forcing non-toxic smoke-filled air into sanitary sewer lines. The smoke exits through openings into the sewer system, such as manholes, building roof vents, and defects. Defects may include catch basins, cross-connections from storm sewers, roof downspouts basement and foundation drains, all of which may contribute to storm water inflow. Smoke may also locate defects in the pipe or laterals, following a path from the defect and exiting at the ground surface

   b. **Sub-basin flow monitoring and I/I Study:** Sub-basin flow monitoring and I/I study would be similar in scope to this study, but focused on the sub-basins identified has having the highest contributions of I/I. The sub-basin(s) would be parsed into smaller mini-basins to further isolate and identify the areas of the sub-basin that have the greatest I/I contribution.

4. **I/I Reduction Cost Effectiveness Analysis:** The City should conduct a study to determine which is more cost-effective:

   a. (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines; or

   b. (2) continued treatment of the additional rainfall dependent I/I flow.

Infiltration investigation and reduction information is shown here, but is not recommended at this time.

- **Infiltration (RDI) Identification and Removal**: Infiltration sources are usually harder to find and more expensive to correct than inflow sources. Infiltration sources include defects in deteriorated sewer pipes and/or manholes, and may include cracks, offset joints, root intrusion points, and broken pipes. The sources may be wide-spread throughout a sanitary sewer system

- **Infiltration Investigation Methods:** Potential inflow investigation methods include the following:

  - Night-time reconnaissance work to determine the areas and pipe reaches responsible for high levels of infiltration contribution.

  - CCTV Inspection

Note: The V&A recommendations are made based on V&A's knowledge of the project specifically as it relates to flow monitoring and the items within this study; however, V&A does not have knowledge of other considerations important to the overall well-being of the City and future CIP improvements, such as sanitary sewer model scenarios and results, future plans for zoning and build-out, etc. The results and recommendations of this report should be used at the discretion of the City's master planning consultant to determine the correct course of action for addressing the results and recommendations of this study in association with the direction and intent of the overall City master plan.

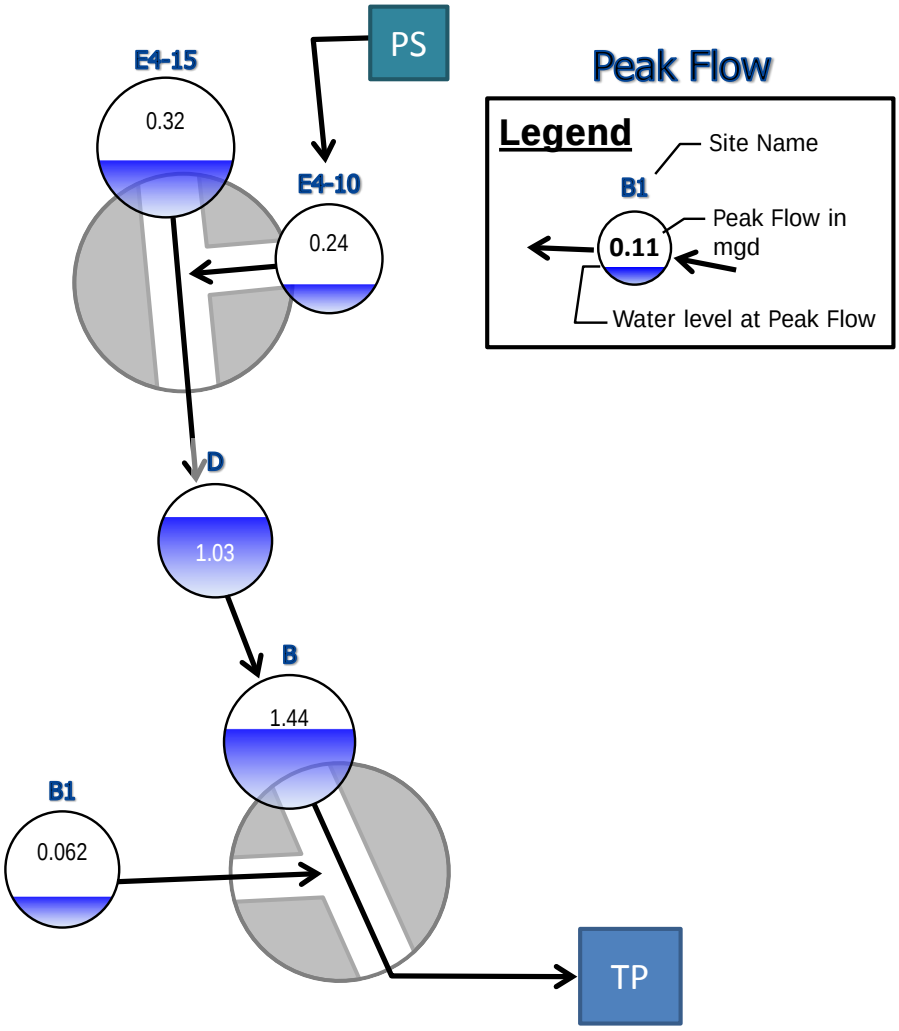


Figure 3. Peak Measured Flow (Flow Schematic)

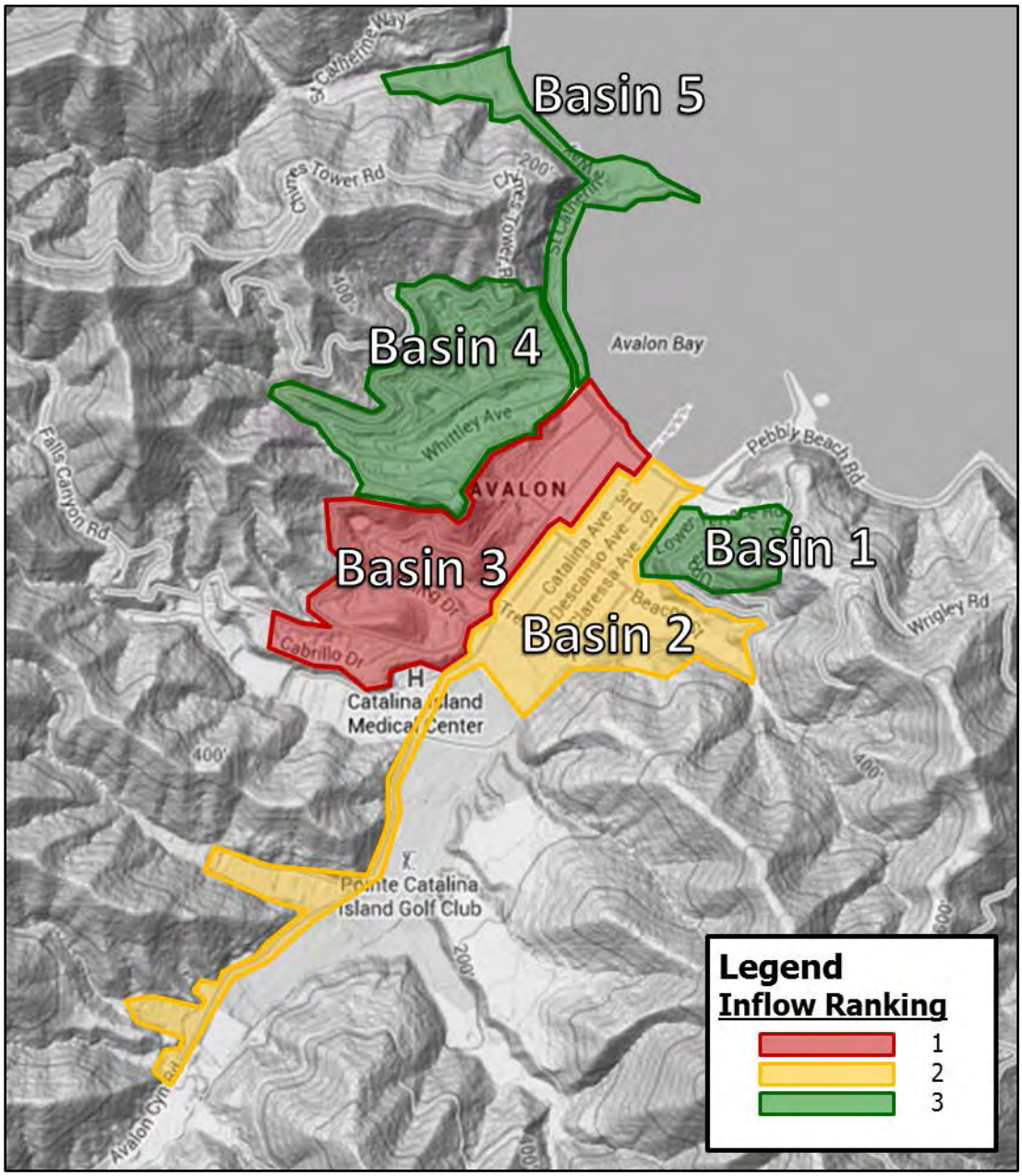


Figure 4. Inflow Temperature Map (by Rank)

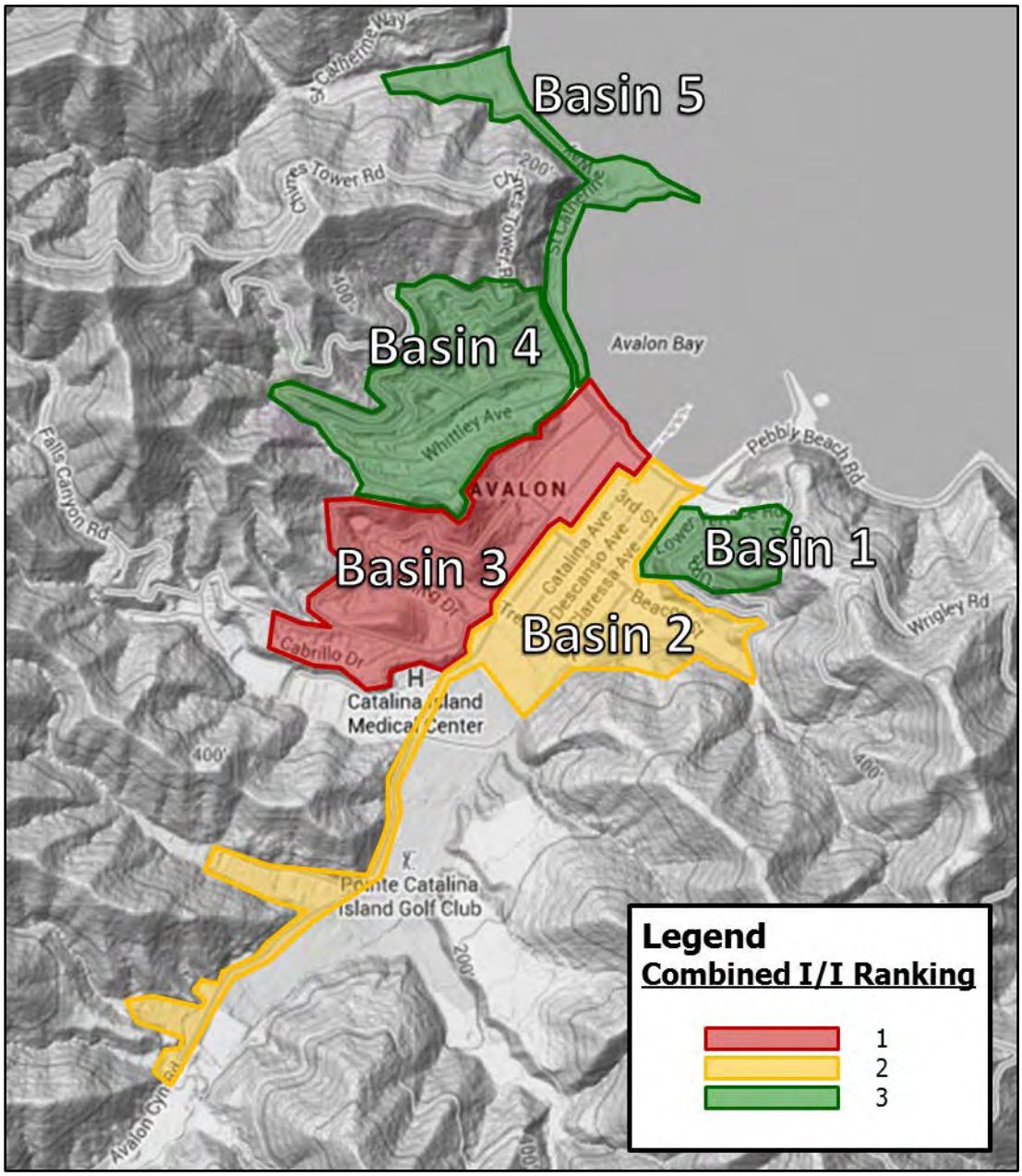


Figure 5. Combined I/I Temperature Map (by Rank)

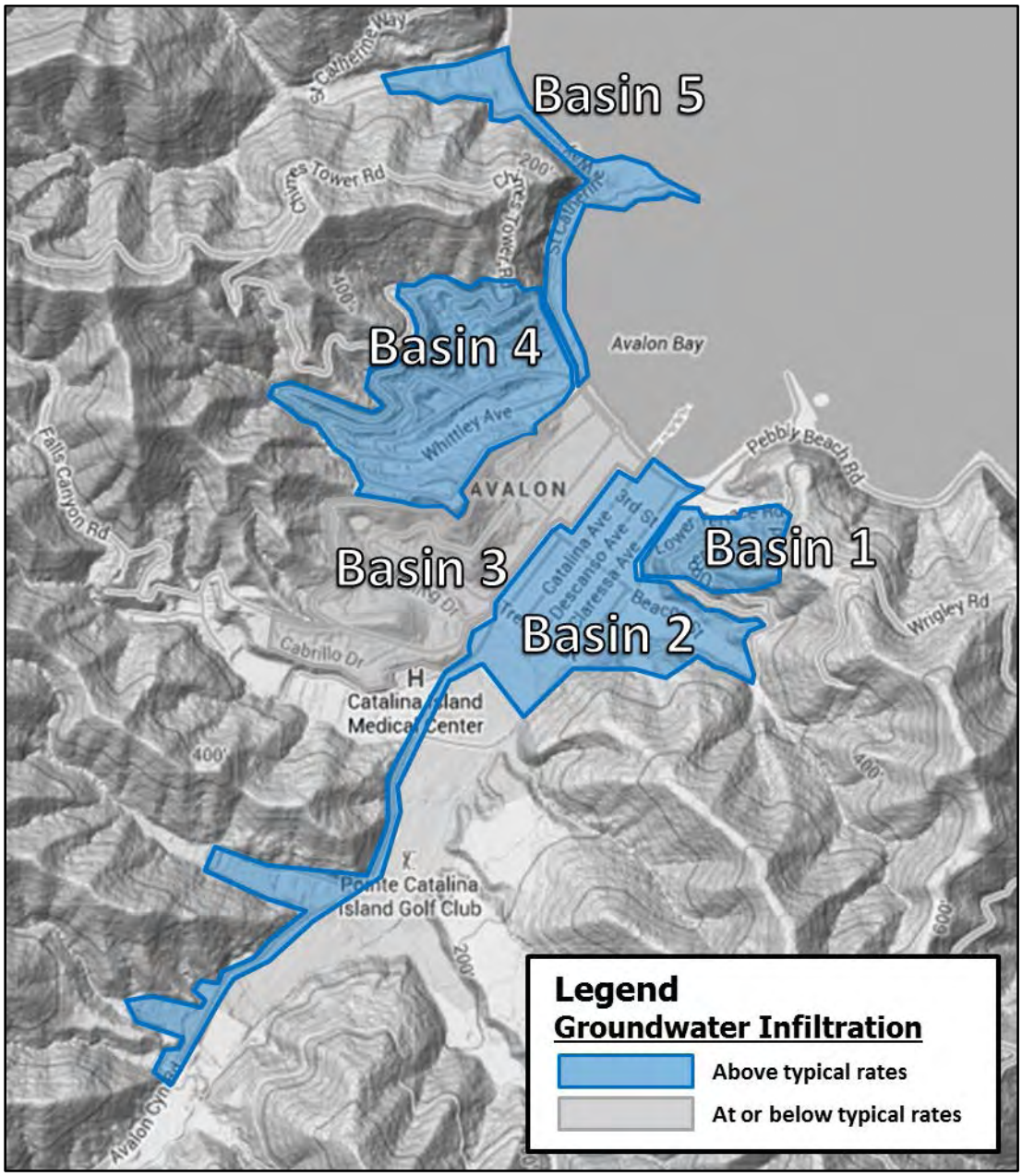


Figure 6. Basins with Groundwater Infiltration

Note: Groundwater rates were analyzed against typical groundwater infiltration rate standards set forth by the Water Environment Federation. Night-time industrial discharges or unusual nightlife activities (for example, the Catalina Casino) could increase Low-to-Average Ratios higher than typical ratios that would erroneously indicate high groundwater levels. The analysis results are shown for information, but should be used at the discretion of the City's master planning consultant.

INTRODUCTION

Preface

The City of Avalon is located on Catalina Island, approximately 22 miles south-southwest of Los Angeles, CA. Catalina Island is 76 square miles, with the majority of that area comprising a conservancy area. The City of Avalon has an area of 3.2 square mile and a permanent population of around 3,800 residents, but the number of occupants within the City fluctuates day-to-day and seasonally as Avalon's primary industry is tourism. As it pertains to this project, the fluctuating population also affects the sanitary sewer discharge into the collection system; this item is discussed in more detail later in this report.

Scope and Purpose

V&A was retained by RBF Consulting to conduct sanitary sewer flow monitoring and inflow/infiltration (I/I) analysis within the City of Avalon, California (City). Flow monitoring occurred over a 10-week period from March 19 to June 4, 2013. The purpose of this study was to measure sanitary sewer flows at the flow monitoring sites and conduct analyses pertaining to capacity and infiltration and inflow (I/I) occurring in the basins upstream from the flow monitoring sites.

Site Selection

Flow monitoring locations were chosen by RBF Consulting. V&A conducted reconnaissance of the flow monitoring sites at the time of meter installation to evaluate and confirm the suitability of the suggested sites for open channel flow measurement.

Flow Monitoring Sites: Flow monitoring sites are the locations where the flow monitors were placed. Flow monitoring site data may include the flows of one or many drainage basins. To isolate a flow monitoring basin, an addition or subtraction of flows may be required[2]. Capacity and flow rate information is presented on a site-by-site basis.

Flow Monitoring Basins: Flow monitoring basins are localized areas of a sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. The basin refers to the ground surface area near, and enclosed by, the pipelines. A basin may refer to the entire collection system upstream from a flow meter, or if flow meters are aligned in series (flowing into each other), a basin may exclude separately monitored basins upstream. I/I analysis in this report will be conducted on a basin-by-basin basis.

Rain Gauge: V&A utilized data from a rain gauge at the Avalon Pier, centrally located within the limits of the project area.

[2] There is error inherent in flow monitoring. Adding and subtracting flows increases error on an additive basis. For example, if Site A has error ±10% and Site B has error ±10%, then the resulting flow when subtracting Site A from Site B would be ±20%. V&A performed lab and in-situ calibrations on the flow metering equipment to reduce error as much as possible.

The flow monitoring sites and rain gauge site are listed in Table 4 and illustrated in Figure 7. The five flow monitoring basins are described and illustrated in Figure 8. Detailed descriptions of the individual flow monitoring sites, including photographs, are included in *Appendix A*.

Table 4. List of Flow Monitoring Sites

Monitoring Site	Diameter (in)	Manhole ID	Location
Site B1	11.5	B1	Parking Lot at Claressa Avenue and Casino Way, behind Pancake Cottage
Site B	14.5	B	Intersection of Casino Way and Pebbly Beach Road
Site D	10.5	D	Intersection of Crescent Avenue and Catalina Avenue
Site E4-15”	15	E4	Intersection of Crescent Avenue and Whitley Avenue
Site E4-10”	10	E4	Intersection of Crescent Avenue and Whitley Avenue
Rain Gauge	Avalon Pier		

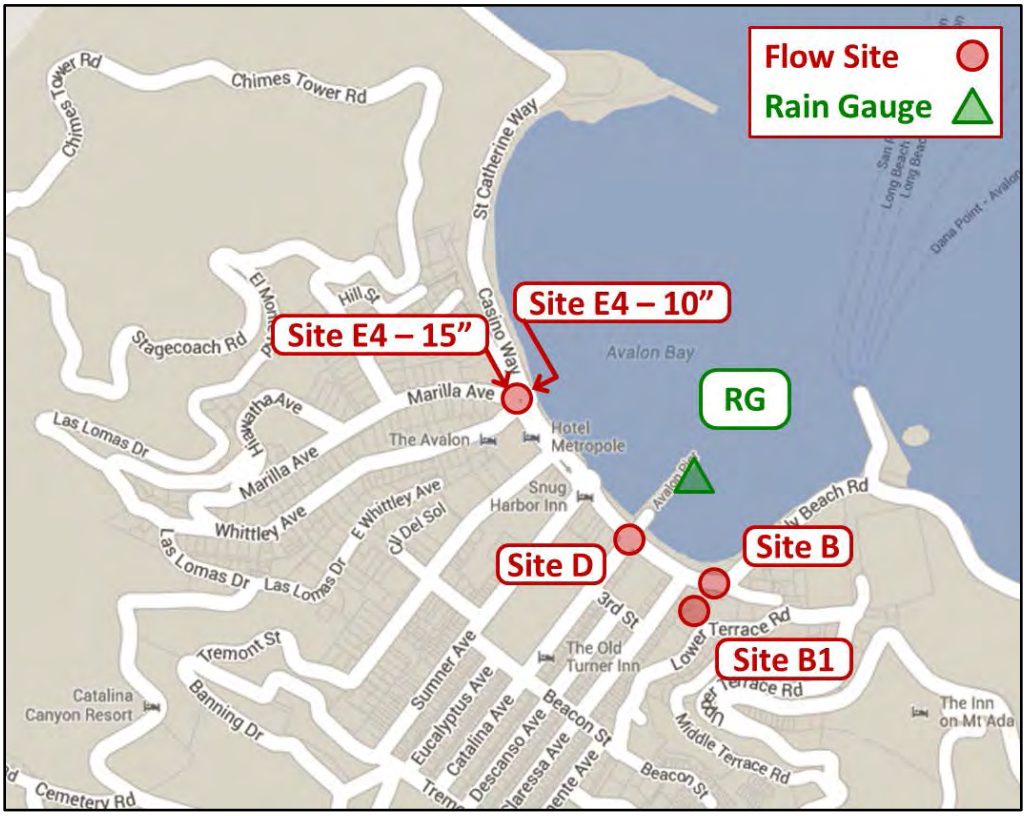
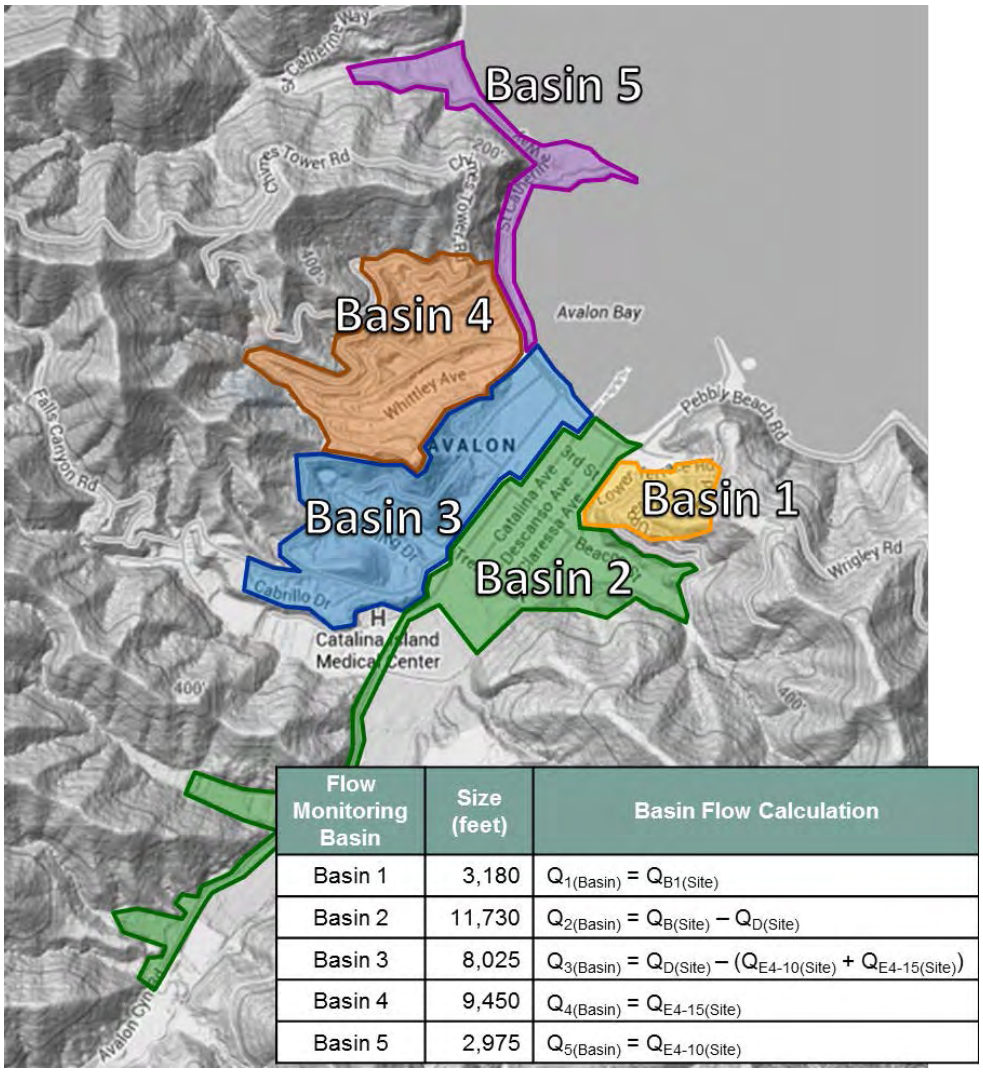


Figure 7. Flow Monitoring Site Map



Flow Monitoring Basin	Size (feet)	Basin Flow Calculation
Basin 1	3,180	$Q_{1(Basin)} = Q_{B1(Site)}$
Basin 2	11,730	$Q_{2(Basin)} = Q_{B(Site)} - Q_{D(Site)}$
Basin 3	8,025	$Q_{3(Basin)} = Q_{D(Site)} - (Q_{E4\text{-}10(Site)} + Q_{E4\text{-}15(Site)})$
Basin 4	9,450	$Q_{4(Basin)} = Q_{E4\text{-}15(Site)}$
Basin 5	2,975	$Q_{5(Basin)} = Q_{E4\text{-}10(Site)}$

Figure 8. Avalon Basins Map

Equipment Selection

V&A installed five Isco 2150 area-velocity flow meters in the sewer manholes shown in Figure 7. Submerged-sensor area velocity meters were the best option for conducting temporary flow monitoring at the proposed locations. Isco 2150 meters use submerged sensors with a pressure transducer to collect depth readings and an ultrasonic Doppler sensor to determine the average fluid velocity. The ultrasonic sensor emits high-frequency sound waves, which are reflected by air bubbles and suspended particles in the flow. The sensor receives the reflected signal and determines the Doppler frequency shift, which indicates the estimated average flow velocity.

Installation

Flow meters were installed within sanitary sewer manholes that access the sanitary sewer pipelines within a collection system. The data logger is secured at the top of the manhole structure. The sensor is typically mounted on a stainless steel band that is secured inside of the influent pipeline to take advantage of smoother upstream flow conditions. The sensor may be offset to one side to lessen the chances of fouling and sedimentation where these problems are expected to occur. Figure 9 shows a typical flow meter installation.

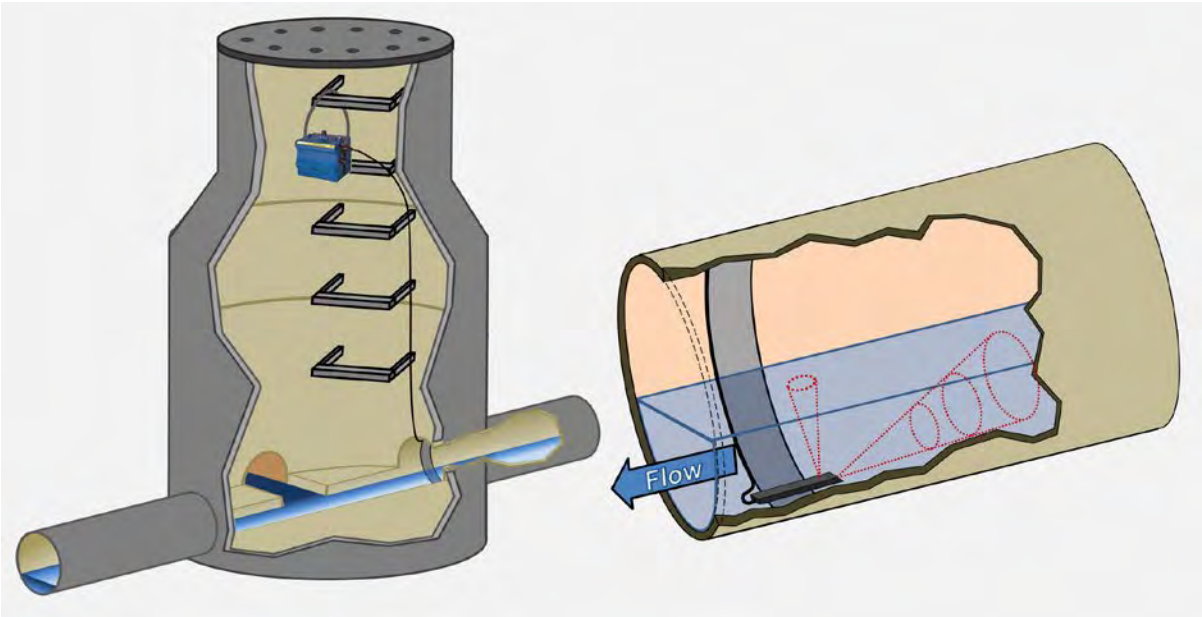


Figure 9. Typical Isco 2150 Flow Meter Installation

Confined Space Entry

The sanitary sewer manholes in which the flow meters were installed are OSHA-defined confined spaces and require special equipment and permitting procedures prior to entry. A confined space (Photo 1) is defined as any space that is large enough and so configured that a person can bodily enter and perform assigned work, has limited or restricted means for entry or exit and is not designed for continuous employee occupancy. In general, the atmosphere must be constantly monitored for sufficient levels of oxygen (19.5 to 23.0%), and the absence of hydrogen sulfide (H_2S) gas, carbon monoxide (CO) gas and lower explosive limit (LEL) levels.

A typical confined space entry crew has members with OSHA-defined responsibilities of: Entrant, Attendant and Supervisor. The Entrant is the individual performing the work. He or she is equipped with the necessary personal protective equipment needed to perform the job safely, including a personal four-gas monitor (Photo 2). The Attendant is responsible for maintaining contact with the Entrant(s) to monitor the atmosphere on another four-gas monitor and maintaining records of all Entrants, if there are more than one. The Supervisor develops the safe work plan for the job at hand prior to entering.

Photo 1. Confined Space Entry

Photo 2. Typical Personal Four-Gas Monitor

Monitoring and Data Collection

Manual level and velocity measurements were taken during the confined-space entries that took place during the installation of the flow meters and again when they were removed. These manual measurements were compared to simultaneous level and velocity readings from the flow meters to ensure proper calibration and accuracy. The pipe diameter was also verified in order to use the correct geometry in calculating flows.

The continuous depth and velocity readings were recorded by the flow meters on a 5-minute interval. The data loggers within the flow meters are stored in flash memory for security. Flash memory retains data without he concern of power failures or aging backup batteries. The data storage memory can hold approximately 79,000 readings – the equivalent of 3 months of level and velocity data when stored at 5-minute intervals.

Data was retrieved via an at-grade data port connection from the data logger to a portable laptop computer. The sites were visited weekly for data transfer as well as to check conditions within the manhole and assure the flow sensors were clear of debris.

Data retrieved from the flow meters was placed into a spreadsheet program for analysis. Data analysis includes data comparison to field calibration measurements, as well as necessary geometric adjustments as required for sediment (sediment reduces the pipe's wetted cross-sectional area available to carry flow).

ANALYSIS FACTORS AND CONSIDERATIONS

Flow Calculation

Area-velocity flow metering uses the continuity equation,

$$Q = V \cdot A,$$

where Q is the volume flow rate, V is the average velocity as determined by the ultrasonic sensor, and A is the cross-sectional area of flow as determined from the depth of flow.

In a circular pipe, the following formula is used to calculate the cross-sectional area:

$$A = \left[\frac{D^2}{4}\cos^{-1}\left(1-\frac{2d}{D}\right)\right] - \left[\left(\frac{D}{2}-d\right)\left(\frac{D}{2}\right)\sin\left(\cos^{-1}\left(1-\frac{2d}{D}\right)\right)\right],$$

where D is the pipe diameter and d is the depth of flow.

The area occupied by sediment is assumed to be impermeable. The cross-sectional area of the sediment is calculated using the equation above (using the depth of sediment instead of depth of flow) and subtracted from the total cross-sectional area to determine the final cross-sectional area that is available for conveying sanitary sewer flows through the pipeline.

Average Dry Weather Flows

Weekday and weekend flow patterns differ and must be separated when establishing average dry weather flow rates. Days least affected by rainfall were used to estimate weekend and weekday average flows. The overall average dry weather flow (ADWF) is calculated per the following equation:

$$ADWF = \left(ADWF_{Weekday} \times \frac{5}{7}\right) + \left(ADWF_{Weekend} \times \frac{2}{7}\right),$$

Due to the transient nature of the populace of Avalon, the ADWF values fluctuated on a weekly basis. The ADWF flows used within this report for calculation and analysis were for an average of all dry days as monitored over the course of this study, specifically the dry period from March 20 to May 4, 2013, and from May 8 to June 3, 2013. However, to demonstrate the extent of the effect of tourism on flows within Avalon, “Peak dry week” and “low dry week” calculations are also shown. A dry week is defined as a complete week starting on Monday and ending on Sunday, during a dry weather period.

The day-by-day fluctuation of flows can be viewed in Period Flow Summary graphic shown in *Appendix A*. There is further discussion on this point later in this section.

Capacity Analysis: Peaking Factor and d/D Ratio

Peak measured flows and the peak measure flow levels (elevation) are analyzed to understand the capacity limitations of a flow monitoring collection system. The peak flows and flow levels reported are from the peak measurements as taken across the entirety of the flow monitoring period and may or may not correspond to a rainfall event.

The following capacity analysis terms are defined as follows:

Peaking Factor: Peaking factor (PF) is defined as the peak measured flow divided by the average dry weather flow (ADWF), per the following formula:

$$PF = \frac{PeakMeasuredFlow}{ADWF},$$

A peaking factor threshold value of 3.0 is commonly used for sanitary sewer design; however, given the transient population and fluctuating ADWF values of this particular system, standard threshold values are possibly not applicable.

d/D Ratio: The d/D ratio is the peak measured depth of flow divided by the pipe diameter. The d/D ratio for each site was computed based on the maximum depth of flow for the flow monitoring study.

$$d/D = \frac{PeakMeasuredDepth}{PipeDiameter},$$

A d/D ratio less than 0.75 is a common threshold value used for pipe design. A d/D ratio greater than 1.0 indicates a surcharged condition.

Inflow / Infiltration Analysis: Definitions and Identification

Inflow / Infiltration (I/I) consists of storm water and groundwater which enters the sewer system through pipe defects and improper storm drainage connections, defined as follows:

Inflow

- **Definition:** Storm water inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard and area drains, holes in manhole covers, cross connections from storm drains, or catch basins.
- **Impact:** This component of I/I creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Because the response and magnitude of inflow is tied closely to the intensity of the storm event, the short-term peak instantaneous flows may result in surcharging and overflows within a collection system. Severe inflow may result in sewage dilution, resulting in upsetting the biological treatment (secondary treatment) at the treatment facility.
- **Graphical Identification:** Inflow is usually recognized graphically by large magnitude, short duration spikes immediately following a rain event.

Infiltration

- **Definition:** Infiltration is defined as water entering the sanitary sewer system through defective pipes, pipe joints, and manhole walls, and may include cracks, offset joints, root intrusion points, and broken pipes.
- **Impact:** Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water, and of paying for treatment (for municipalities that are billed strictly on flow volume).
- **Graphical Identification:** Infiltration is often recognized graphically by a gradual increase in flow after a wet weather event. The increased flow typically sustains for a period after rainfall has stopped and then gradually drops off as soils become less saturated, and as groundwater levels recede to normal levels.

Figure 10 illustrates the possible locations and components of I/I.

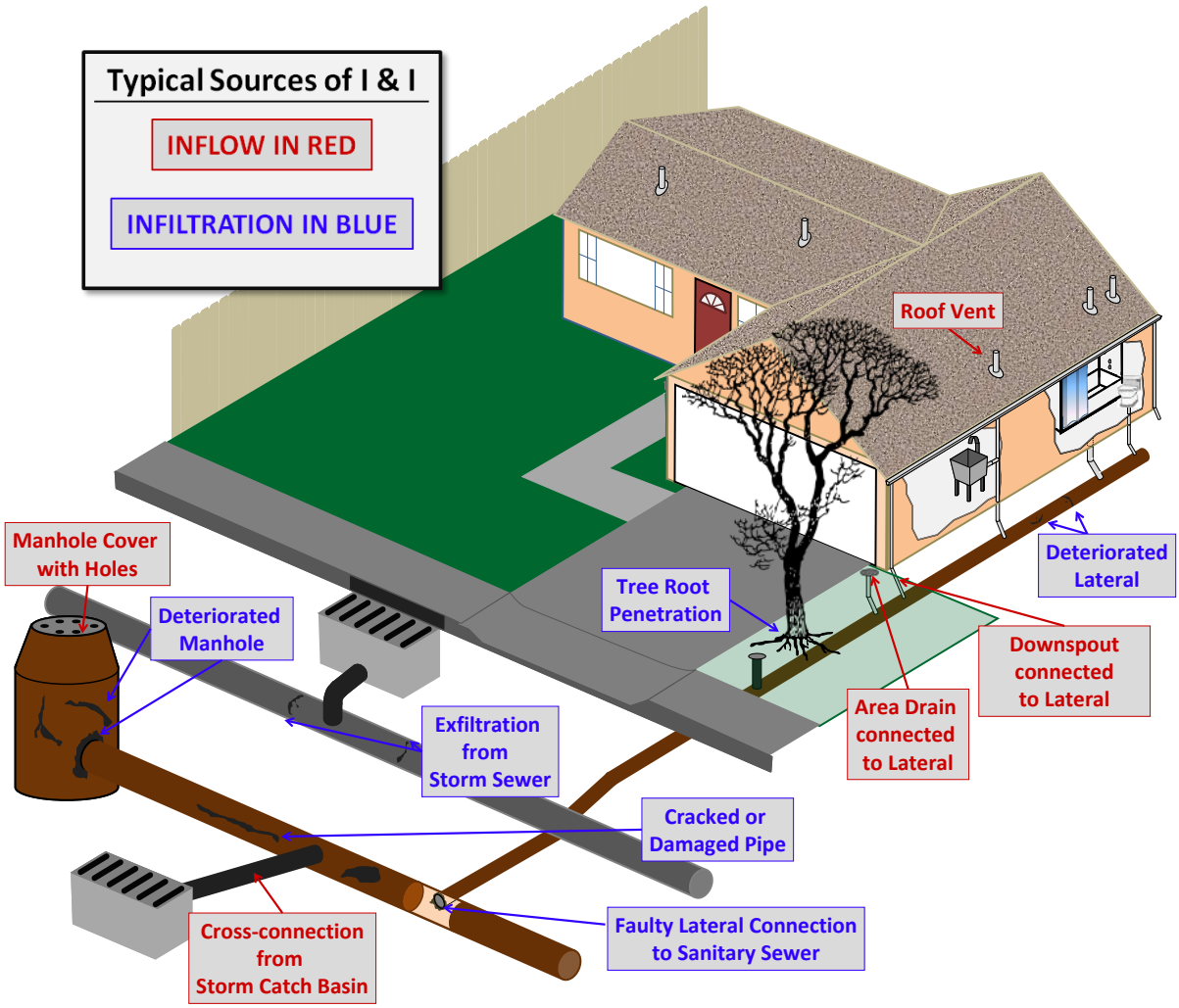


Figure 10. Typical Sources of Infiltration and Inflow

Infiltration Components

Infiltration can be further subdivided into components as follows:

- **Groundwater Infiltration** – Groundwater infiltration depends on the depth of the groundwater table above the pipelines as well as the percentage of the system submerged. The variation on groundwater levels and subsequent groundwater infiltration rates are seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
- **Rainfall Dependent Infiltration –** This component occurs as a result of storm water and enters the sewer system through pipe defects similar to groundwater infiltration. The storm water first percolates directly into the soil and then migrates to an infiltration point. Typically, the time of concentration for rainfall related infiltration may be 24 hours or longer, but depends on the soil permeability and saturation levels.
- **Rainfall Responsive Infiltration** is storm water which enters the collection system indirectly through pipe defects, but normally in sewers constructed close to the ground surface such as private laterals. Rainfall responsive infiltration is independent of the groundwater table, and reaches defective sewers via the pipe trench in which the sewer is constructed, particularly if the pipe is placed in impermeable soil and bedded and backfilled with a granular material. In this case, the pipe trench serves as a conduit similar to a French drain, conveying storm drainage to defective joints and other openings in the system. Note: this type of infiltration can have a quick response and graphically can look very similar to inflow.

Inflow / Infiltration: Analysis Methods

After differentiating I/I flows from ADWF flows, various calculations can be made to determine which I/I component (inflow or infiltration) is more prevalent at a particular site, and to compare the relative magnitude of the I/I components between drainage basins and between storm events.

Inflow Metrics

Peak I/I Flow Rate: Inflow is characterized by sharp, direct spikes occurring during a rainfall event. Peak I/I rates are isolated for inflow analysis[3]. After determining the peak I/I flow rate for a given site, and for a given storm event, there are various ways to *normalize* the peak I/I rates for an "apples-to-apples" comparison amongst the different drainage basins:

- **Peak I/I Flow Rate per Pipe Length:** Peak measured I/I rate divided by length of pipe within the drainage basin, expressed in units of lineal feet of pipe. Final units are gallons per day (gpd) per lineal foot of pipe.
- **Peak I/I Flow Rate to ADWF Ratio:** Peak measured I/I rate divided by average dry weather flow (ADWF). This is a ratio and is expressed without units.

Inflow metrics were normalized by the "per-Pipe Length" and "per-ADWF" methods in this report; rankings were determined by an average of the "per-Pipe Length" and "per-ADWF" rankings, with ties broken by the "per-Pipe Length" ranking.

[3] I/I flow rate is the realtime flow less the estimated average dry weather flow rate. It is an estimate of only flows attributable to rainfall. By using peak flow rates (inclusive of ADWF) the I/I flow rate can be skewed higher or lower depending on whether the storm event I/I response occurs during low flow or high flow hours.

Infiltration Metrics

Rainfall Dependent Infiltration (RDI): Infiltration occurring after the conclusion of a storm event is classified as rainfall dependent infiltration. Analysis is conducted by looking at the infiltration rates at set periods after the conclusion of a storm event. Depending on the system and the time required for flows to return to ADWF levels, different set periods may be examined to determine the basins with the greatest or most sustained rainfall dependent infiltration rates.

RDI flows made a rapid return to baseline levels and extended RDI rates were negligible. An RDI analysis was not performed for this report.

Groundwater Infiltration: GWI analysis is conducted by examining minimum dry weather flow to average dry weather flow ratios (low-to-ADWF) and comparing them to established standards for low-to-ADWF flow ratios. If a site has a large percentage of groundwater infiltration occurring during the periods of dry weather flow measurement, the amplitudes of the peak and low flows will be dampened[4]. Figure 11 shows a sample of two flow monitoring sites, both with nearly the same average daily flow, but with considerably different peak and low flows. In this *sample* case, Site B1 may have a considerable volume of groundwater infiltration.

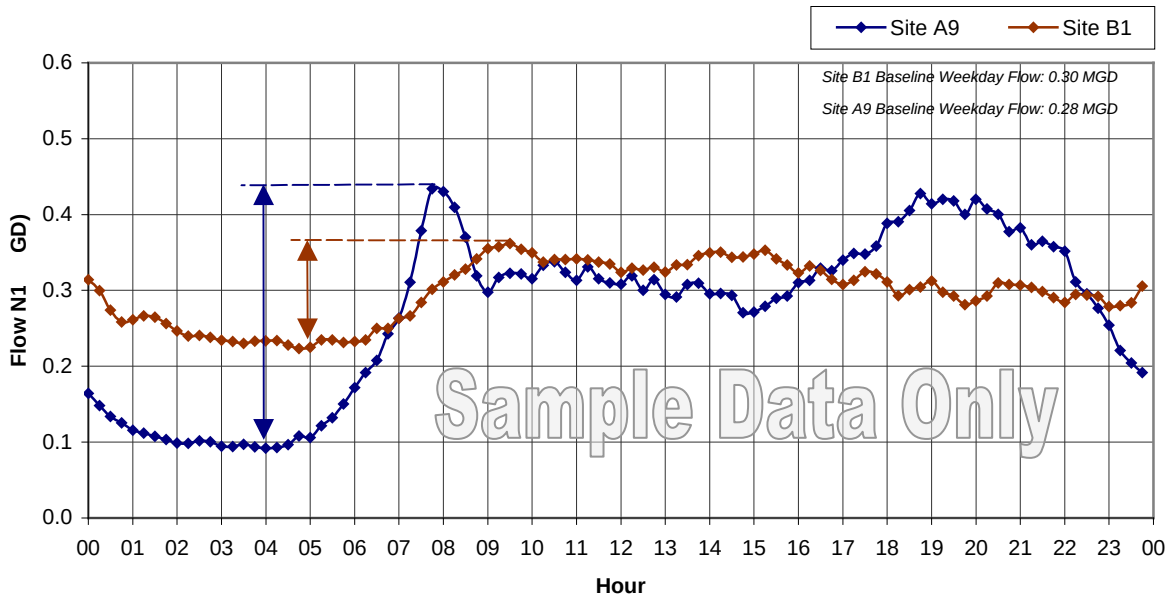


Figure 11. Groundwater Infiltration Sample Figure

A site with abnormal ratios, and with no other reasons to suspect abnormal flow patterns (such as proximity to a pump station, treatment facilities, etc.), has a possibility of higher levels of groundwater infiltration in comparison to the rest of the collection system.

[4] Theoretically imagining an extreme case, if there were 0.2 MGD of ADWF flow and 2.0 MGD of groundwater infiltration, the peaks and lows would be barely recognizable; the ADWF flow would be nearly a straight line.

Combined I/I Metrics

Total Infiltration: The total inflow and infiltration is measured in gallons per site and per storm event. Because it is based on total I/I volume, it is an indicator of combined inflow/infiltration and is used to identify the overall volumetric influence of I/I within the monitoring basin. As with inflow, pipe length, and dry weather flow can be used to normalize combined I/I for basin comparison:

- **Combined I/I Flow Rate per Pipe Length:** Total infiltration (gallons) divided by length of pipe (ft) and divided by storm event rainfall (inches of rain). Final units are gallons per day (gpd) per foot per inch-rain.
- **Combined I/I Flow Rate per ADWF:** Total infiltration (gallons) divided by the ADWF (gpd) and divided by storm event rainfall (inches of rain). Final units are gallons (x 10^6) per MGD of ADWF per inch-rain.

Combined I/I flow metrics were normalized by the "per-Pipe Length" and "per-ADWF" methods in this report; rankings were determined by the average of the "per-Pipe Length" and the "per-ADWF" rankings, with ties broken by the "per-Pipe" Length ranking.

Inflow/Infiltration Isolation Graph

I/I isolation graphs are utilized to illustrate the I/I on a site-by-site and storm-by-storm basis. Realtime flows are plotted against ADWF flows to analyze the I/I response to rainfall events. Figure 12 illustrates a sample of how this analysis is conducted and some of the measurements that are used to distinguish infiltration and inflow. Similar graphs were generated for the flow monitoring sites and can be found in *Appendix A*.

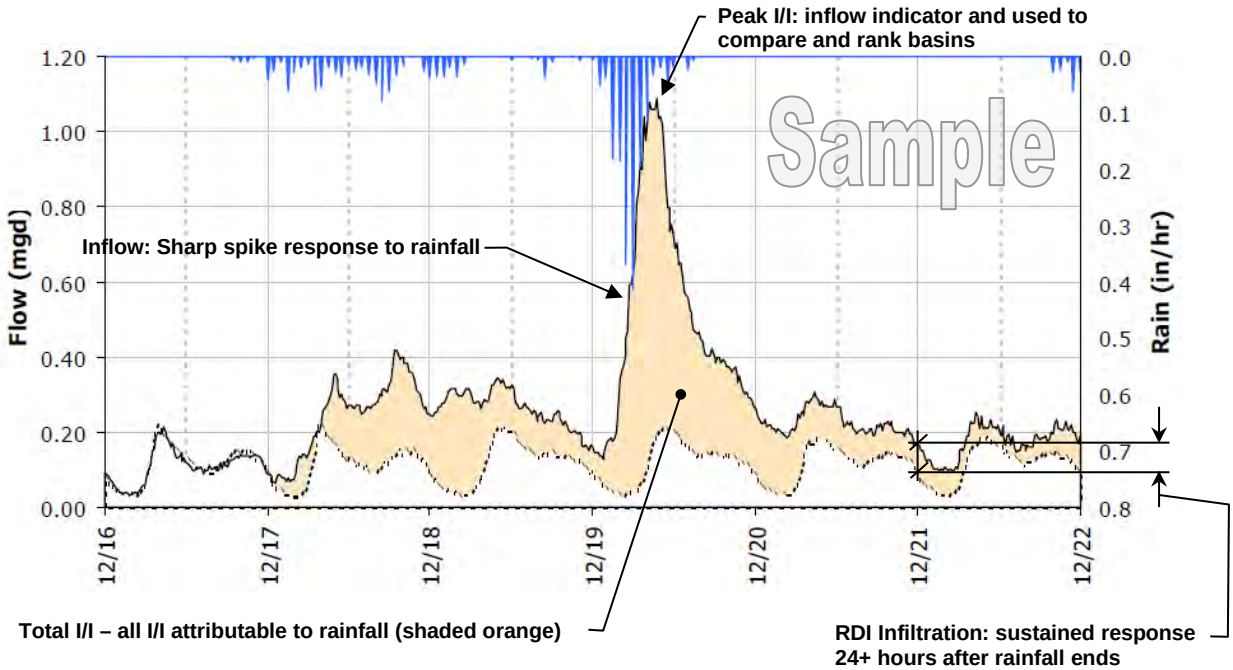


Figure 12. Sample Infiltration / Inflow Isolation Graph

Attenuation

Flow attenuation in a sewer collection system is the natural process of the reduction of the peak flow rate through redistribution of the same volume of flow over a longer period of time. This occurs as a result of friction (resistance), internal storage and diffusion along the sewer pipes. Fluids are constantly working towards equilibrium. For example, a volume of fluid poured into a static vessel with no outside turbulence will eventually stabilize to a static state, with a smooth fluid surface without peaks and valleys. Attenuation within a sanitary sewer collection system is based upon this concept. A flow profile with a strong peak will tend to stabilize towards equilibrium, shown in Figure 13.

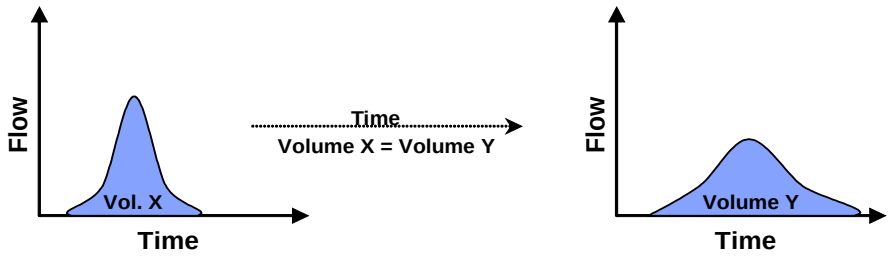


Figure 13. Attenuation Illustration

Within a sanitary sewer collection system, each individual basin will have a specific flow profile. As the flows from the basins combine within the trunk sewer lines, the peaks from each basin will (a) not necessarily coincide at the same time, and (b) due to the length and time of travel through the trunk sewers, peak flows will attenuate prior to reaching the treatment facility. The sum of the peak flows of the individual basins within a collection system will usually be greater than the peak flows observed at the treatment facility.

Peak flows and peak I/I flows are instantaneous[5] measurements and characterized by strong peaks; thus, when analyzing peak flows and peak I/I flows between basins, attenuation should be a consideration.

ADWF Considerations for Transient Populace

Given that the ADWF calculation is a shifting number dependent on the fluctuating tourism populace on a day-by-day basis, and also given that ADWF is used as factor within several calculations within this report, it is noted that metrics utilizing ADWF could be considered as “soft” metrics. For this report, the ADWF flows used for calculation and analysis were for an average of all dry days as monitored over the course of this study, specifically the dry period from March 20 to May 4, 2013, and from May 8 to June 3, 2013. It is ultimately at the discretion of the reader and of the Engineer to determine how much weight he/she should place in using the “per-ADWF” methods of for I/I analysis. The “per-pipe length” calculations may be considered as “hard” numbers (the pipe length does not fluctuate) and within this report were given more weight, being used as the preferred method to break ties when ranking basins.

[5] Note: calculations made based on flows that are not as “instantaneous” (peak flow measurements are an instantaneous measurement) will not be as affected. RDI calculations and Total I/I calculations are made over a longer period of time and are not subject to attenuation.

SUMMARY OF DATA COLLECTED

Table 5 summarizes the flow monitoring data collected during the study period for the five flow monitoring locations.

Table 5. Summary of Data Collected

Item	Site B	Site B1	Site D	Site E4-10	Site E4-15
Start Date:	3/20/2013	3/20/2013	3/20/2013	3/20/2013	3/20/2013
End Date:	6/3/2013	6/3/2013	6/3/2013	6/3/2013	6/3/2013
Days Collected:	76	76	76	76	76
Peak Flow (mgd):	0.06	1.44	1.03	0.24	0.32
Minimum Flow (mgd):	0.001	0.10	0.06	0.0002	0.008
Average Flow, all days (mgd):	0.012	0.35	0.24	0.022	0.096
ADWF[A], Weekdays (mgd):	0.011	0.33	0.23	0.019	0.092
ADWF[A], Weekends (mgd):	0.013	0.39	0.28	0.028	0.105
ADWF[A], Overall (mgd):	0.012	0.35	0.24	0.022	0.096
Peak Dry Week[B] (mgd):	0.013	0.38	0.27	0.030	0.108
Low Dry Week[B] (mgd):	0.009	0.31	0.22	0.013	0.086
Peak Flow Level (in):	3.1	8.7	7.4	2.7	6.1
Average Flow Level (in):	1.0	4.6	4.2	0.9	3.5

[A] Due to the transient nature of the populace of Avalon, the ADWF values fluctuated on a weekly basis. The ADWF flows used within this report for calculation and analysis were for an average of all dry days as monitored over the course of this study, specifically the dry period from March 20 to May 4, 2013, and from May 8 to June 3, 2013. The day-by-day fluctuation of flows can be viewed in Period Flow Summary graphic shown in *Appendix A*.

[B] The peak dry week and low dry week are shown to demonstrate the fluctuating nature of the populace. A dry week is defined as a complete week starting on Monday and ending on Sunday, during a dry weather period.

RESULTS AND ANALYSIS

Rainfall: Rain Gauge Data

There was one rainfall event over the flow monitoring period that elicited an I/I response by which to conduct infiltration and inflow analyses. The rainfall event produced 0.19 inches of rain over 2 days. Despite the volume of rain, a definite inflow response was seen at two of the flow monitoring sites. Figure 14 graphically displays the rainfall activity as recorded over the flow monitoring period.

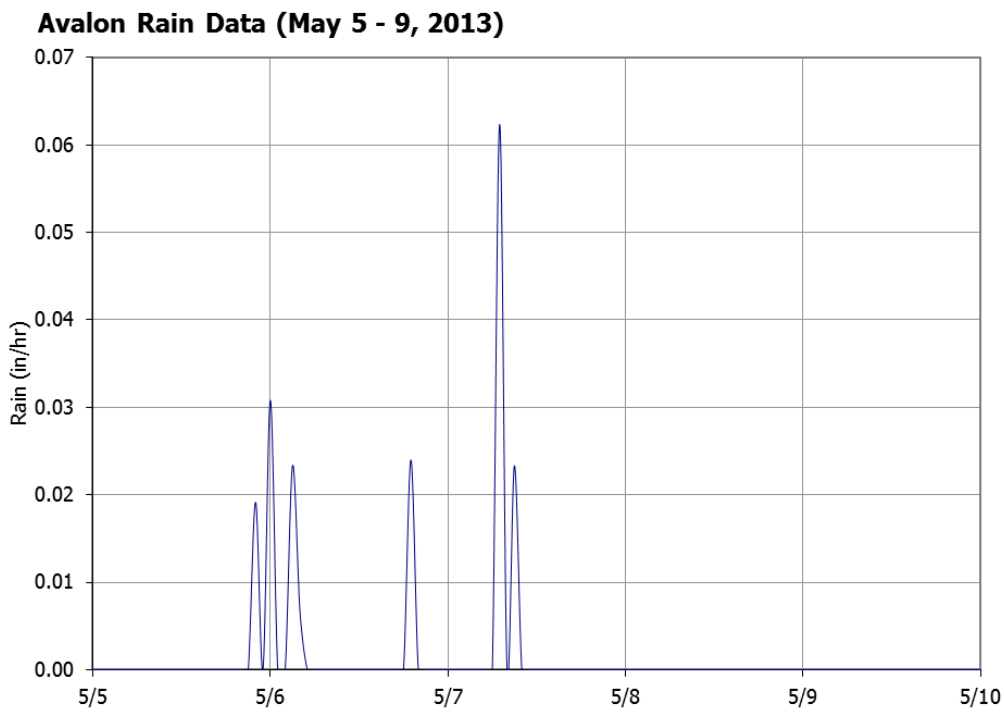


Figure 14. Rainfall Activity over Flow Monitoring Period

Rainfall: Storm Event Classification

It is important to classify the relative size of the major storm event that occurs over the course of a flow monitoring period[6]. Storm events are classified by intensity and duration. Based on historical data, frequency contour maps for given intensity and duration storm events have been developed by the National Oceanic and Atmospheric Administration (NOAA) for all areas within the continental United States. For example, the NOAA Rainfall Frequency Atlas[7] classifies a 10-year, 24-hour storm event in Avalon (at the coordinates of the rain gauge) as 4.15 inches. This means that in any given year, there is a 10% chance that 4.15 inches of rain will fall in any 24-hour period.

From the NOAA frequency maps, for a specific latitude and longitude, the rainfall densities for period durations ranging from 5 minutes to 60 days are known for rain events ranging from 1-year to 100-year intensities. These are plotted to develop a rain event frequency map specific to each rainfall monitoring site. Superimposing the peak densities for the rainfall event on the rain event frequency plot determines the classification of the storm event, shown in Figure 15 for Avalon.

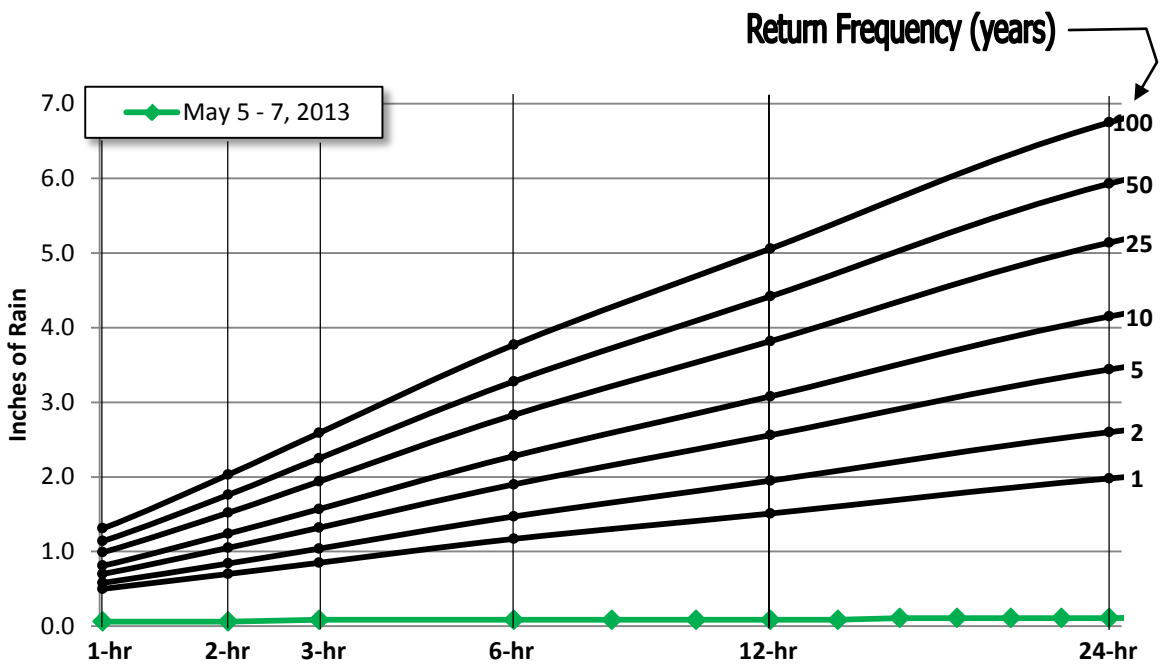


Figure 15. Storm Event Classification Curves: Avalon, CA

The rain events that occurred during the flow-monitoring period were classified as being less than 1-year rainfall events.

[6] Sanitary sewers are often designed to withstand I/I contribution to sanitary flows for specific sized "design" storm events.

[7] NOAA Western U.S. Precipitation Frequency Maps Atlas 2, 1973 <http://www.wrcc.dri.edu/pcpnfreq.html>.

Flow Monitoring: Average Dry Weather Flows

Table 6 lists the average dry weather flow (ADWF) recorded during this study for the flow monitoring sites. Figure 16 shows a schematic diagram of the average dry weather flows and flow levels. Detailed graphs of the flow monitoring data on a site-by-site basis are included in *Appendix A*.

Table 6. Dry Weather Flow Summary

Monitoring Site	Weekday ADWF (mgd)	Weekend ADWF (mgd)	Overall ADWF (mgd)	Weekend/ Weekday Ratio
Site B1	0.011	0.013	0.012	1.14
Site B	0.34	0.39	0.35	1.15
Site D	0.23	0.28	0.24	1.19
Site E4-10”	0.019	0.028	0.022	1.49
Site E4-15”	0.092	0.105	0.096	1.14

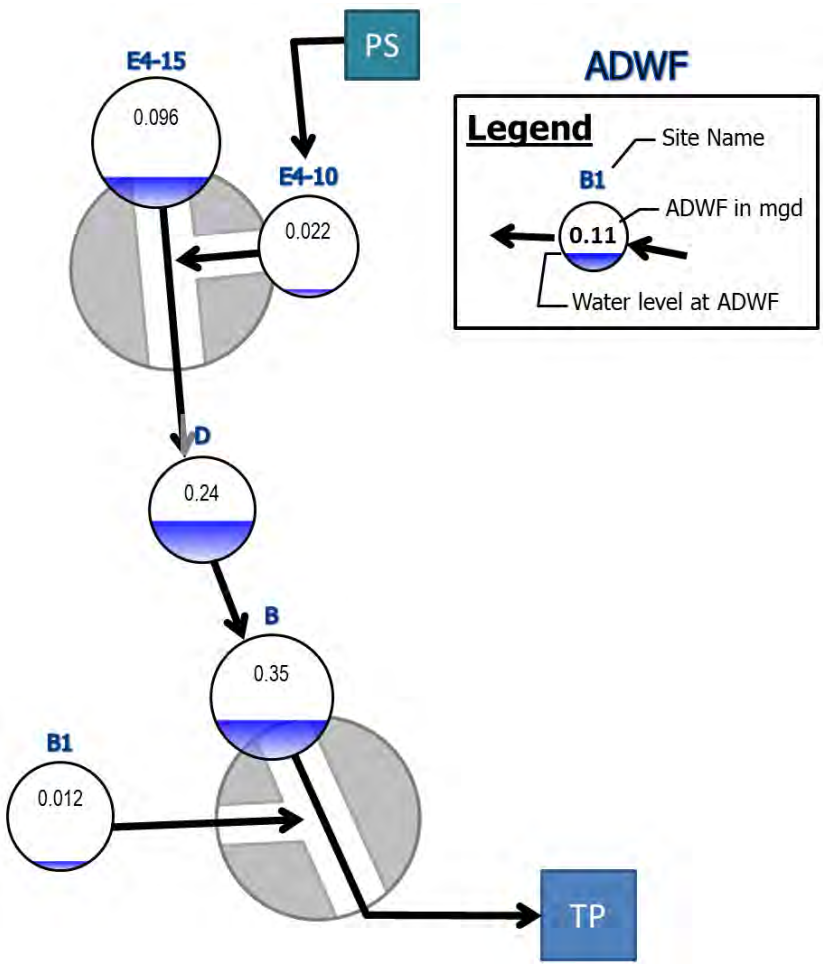


Figure 16. Average Dry Weather Flow (Flow Schematic)

Flow Monitoring: Peak Measured Flows and Pipeline Capacity Analysis

Table 7 summarizes the peak recorded flows, levels, d/D ratios and peaking factors per site during the flow monitoring period. Capacity analysis data is presented on a **site-by-site** basis and represent the hydraulic conditions only at the point site location. Hydraulic conditions in other areas of the collection system will differ. The following capacity analysis results are noted:

- All monitoring sites had d/D ratios that were less than the typical design threshold for sanitary sewers
- Though Site E4-10 had a peaking factor that was higher than the other flow monitoring locations, it is noted that this site is located directly downstream from a pump station pumping flow from the Catalina Casino. The peak flow through this site is determined by the pumping capacity of the pump station and given that the d/D ratio for Site E4-10 was 0.27, there does not appear to be a capacity issue at this specific location.

Table 7. Capacity Analysis Summary

Site	ADWF (mgd)	Peak Measured Flow (mgd)	Peaking Factor	Diameter (in)	Peak Level (in)	d/D Ratio
Site B1	0.012	0.062	5.4	14.5	3.11	0.27
Site B	0.35	1.44	4.1	11.5	8.69	0.60
Site D	0.24	1.03	4.2	10.5	7.42	0.71
Site E4-10”	0.022	0.24	11.2	15	2.73	0.27
Site E4-15”	0.096	0.32	3.4	10	6.12	0.41

Figure 17 shows bar graphs of the capacity results. Figure 18 shows a schematic diagram of the peak measured flows with peak flow levels.

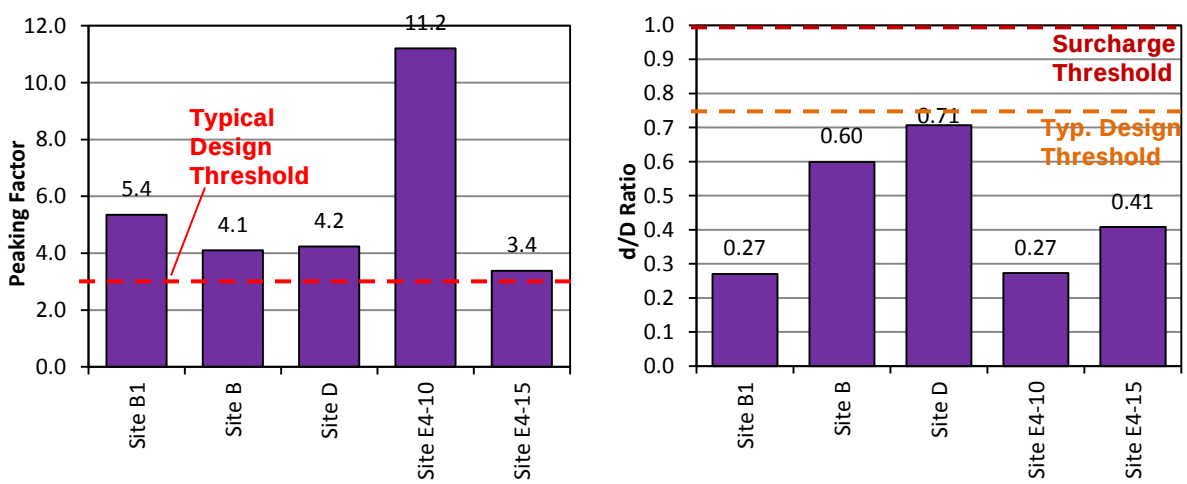


Figure 17. Bar Graphs: Peaking Factor and d/D Ratio

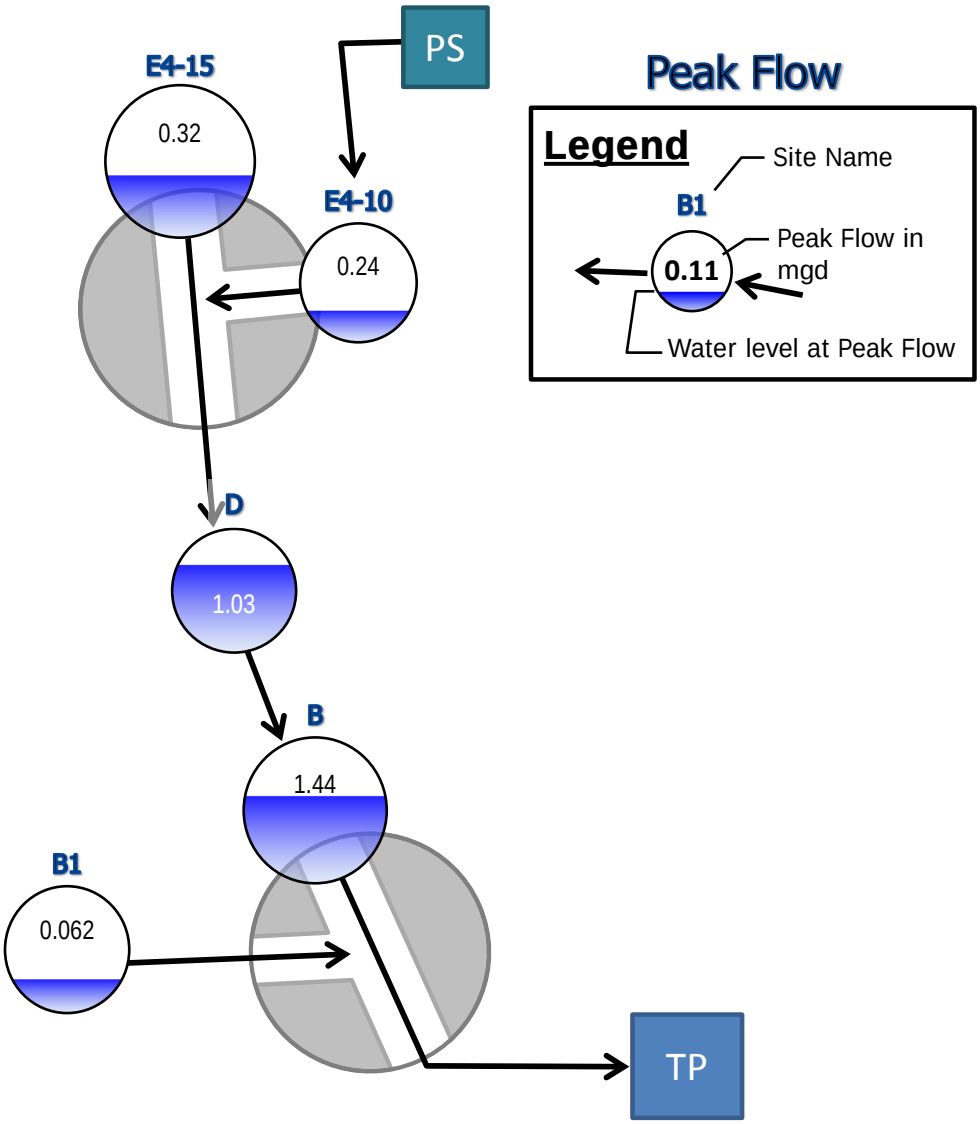


Figure 18. Peak Measured Flow (Flow Schematic)

I/I Analysis: I/I Isolation Graphs

Both Sites B and D indicated a high magnitude, short duration "spikes" in flow rates coinciding with rainfall and indicative of inflow. Sites B1, E4-10" and E4-15" did not have a clear I/I response to the rain events. Also, none of the sites indicated a sustained RDI component. Figure 19 illustrates a side-by-side graphical summary of the I/I response curves for Site B and Site D.

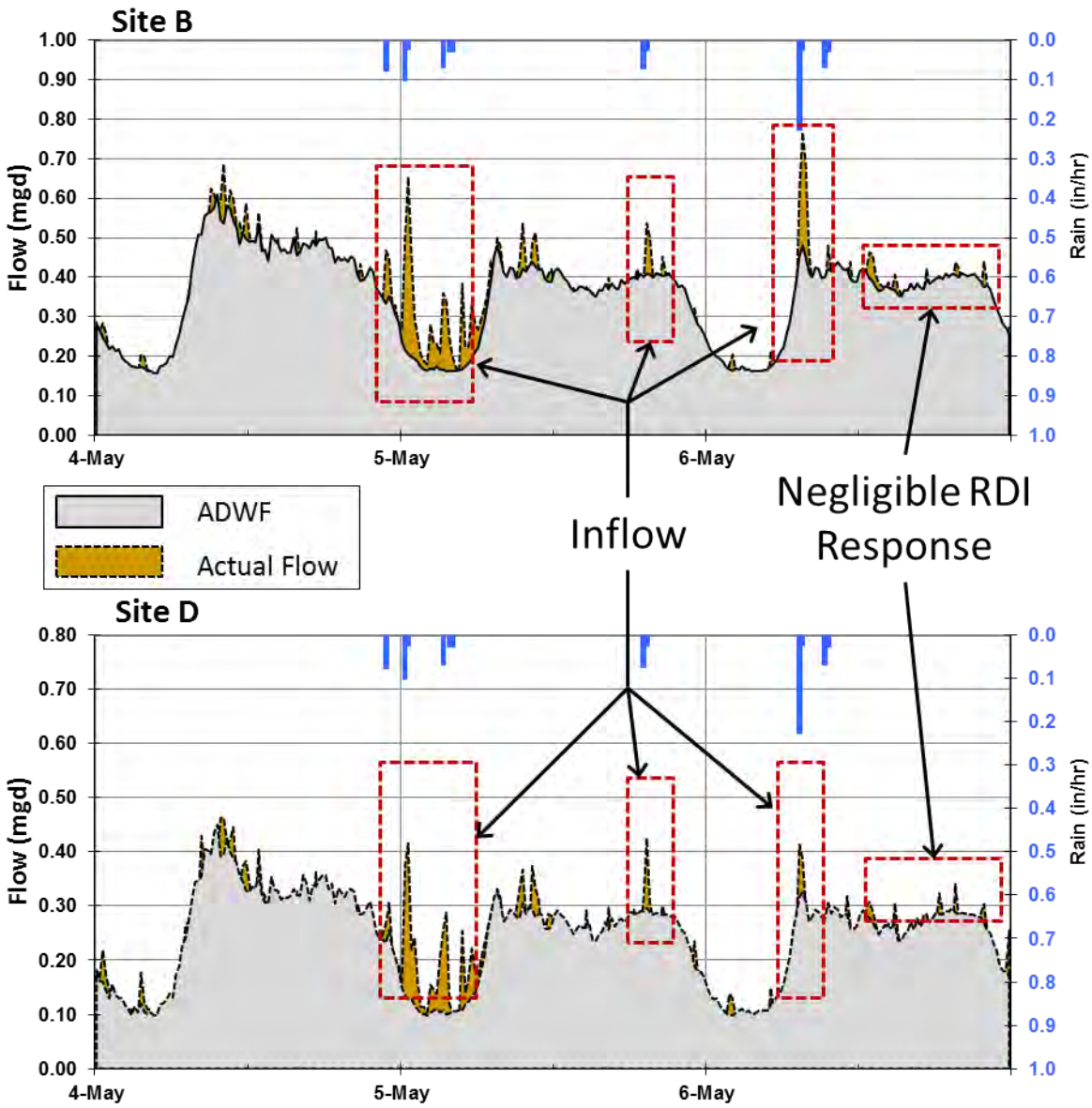


Figure 19. I/I Graphs: Basin B and Basin D

I/I Analysis: Inflow Summary

Table 8 summarizes the peak measured I/I flows and inflow analysis results for the flow monitoring. The peak I/I rate utilized was the peak I/I rate measured during the storm.

Table 8. Basin 4 Inflow Analysis Summary

Basin	ADWF (mgd)	Peak I/I Rate (mgd)	Peak I/I per Pipe Length (gpd/ft)	Peak I/I to ADWF Ratio	Inflow Ranking		
					per Pipe Length	per ADWF	Overall
Basin 1	0.012	0	0	0	3	3	3
Basin 2	0.13	0.15	13.0	1.2	2	2	2
Basin 3	0.14	0.30	36.8	2.1	1	1	1
Basin 4	0.10	0	0	0	3	3	3
Basin 5	0.022	0	0	0	3	3	3

The following inflow analysis results are noted:

- Basins 2 and 3 ranked highest for normalized inflow contribution.

Figure 20 shows bar graph summaries of the inflow analysis, and Figure 21 shows a temperature map summary of the inflow analysis results per basin.

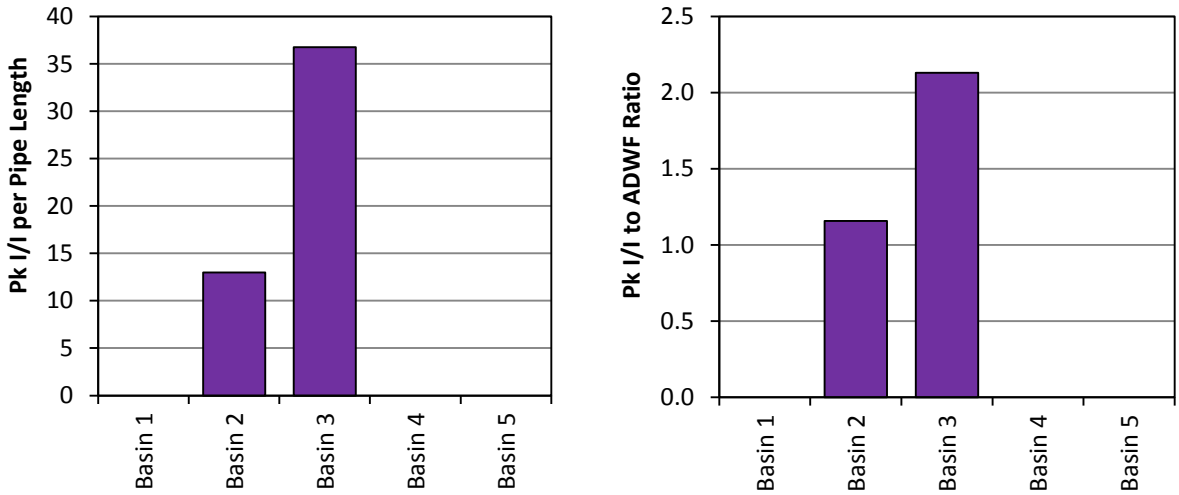


Figure 20. Bar Graphs: Basin Inflow Analysis Summary

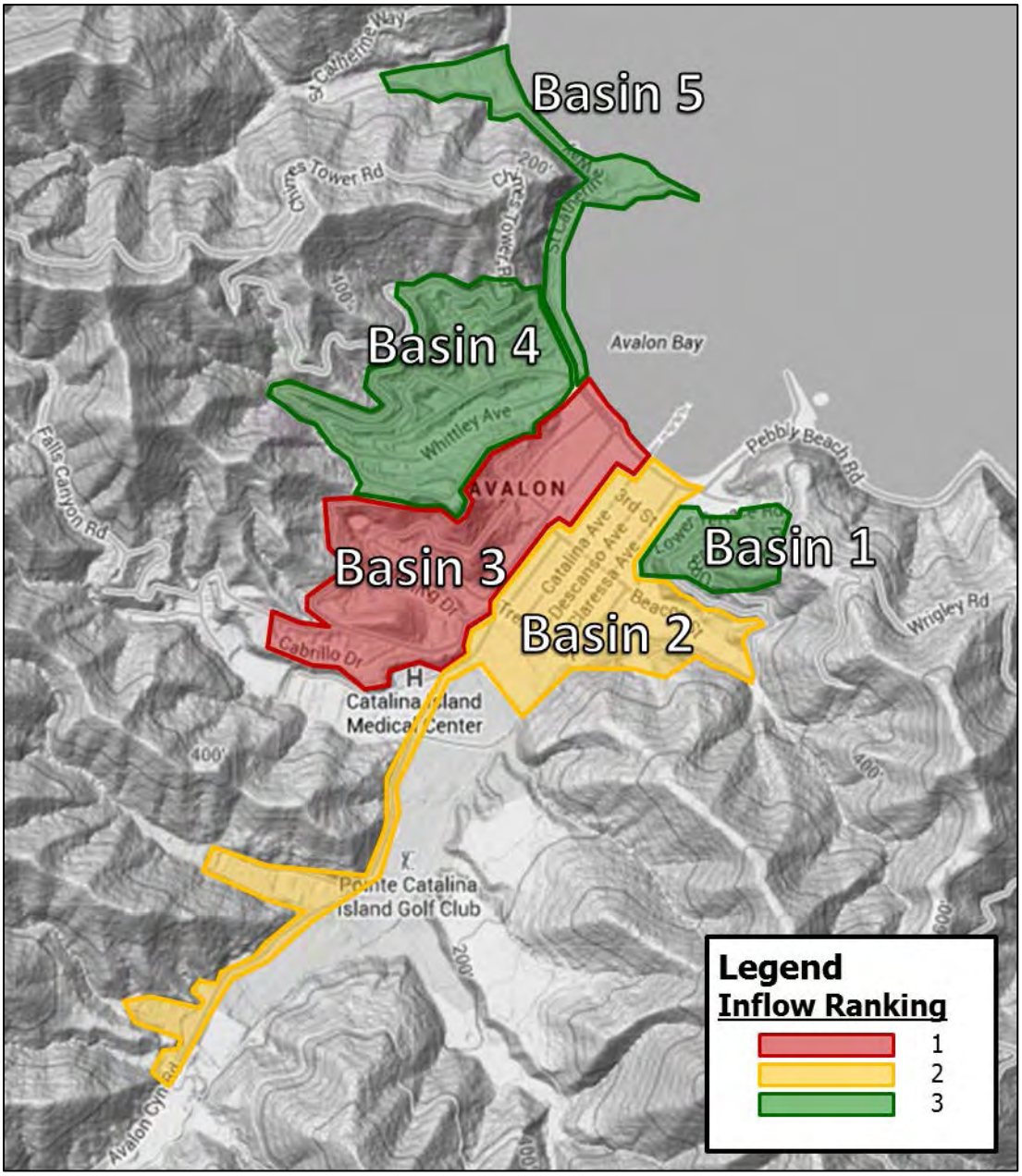


Figure 21. Temperature Map: Basin Inflow Analysis Summary

I/I Analysis: Combined I/I Summary

Combined I/I looks at the totalized gallons of both inflow and infiltration over the course of a storm event. Table 9 summarizes the combined I/I analysis results for the flow monitoring basins.

Table 9. Combined I/I Analysis

Basin	ADWF (mgd)	Total I/I (gallons)	Total I/I per Pipe Length	Total I/I per ADWF Factor	Combined I/I Ranking		
					per pipe	per ADWF	Overall
Basin 1	0.012	0	0	0	3	3	3
Basin 2	0.13	7,000	7.4	0.8	2	2	2
Basin 3	0.14	23,000	35.4	2.2	1	1	1
Basin 4	0.10	0	0	0	3	3	3
Basin 5	0.022	0	0	0	3	3	3

The following combined I/I analysis results are noted:

- Basins 2 and 3 ranked highest for normalized inflow contribution.

Figure 22 shows bar graph summaries of the combined I/I analysis, and Figure 23 shows a temperature map of the overall combined I/I rankings per basin.

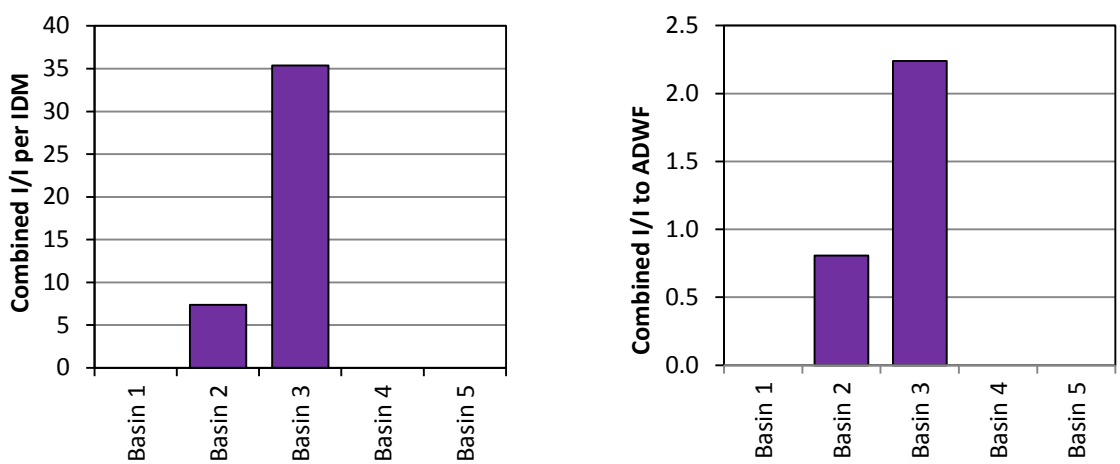


Figure 22. Bar Graphs: Basin Combined I/I Analysis Summary

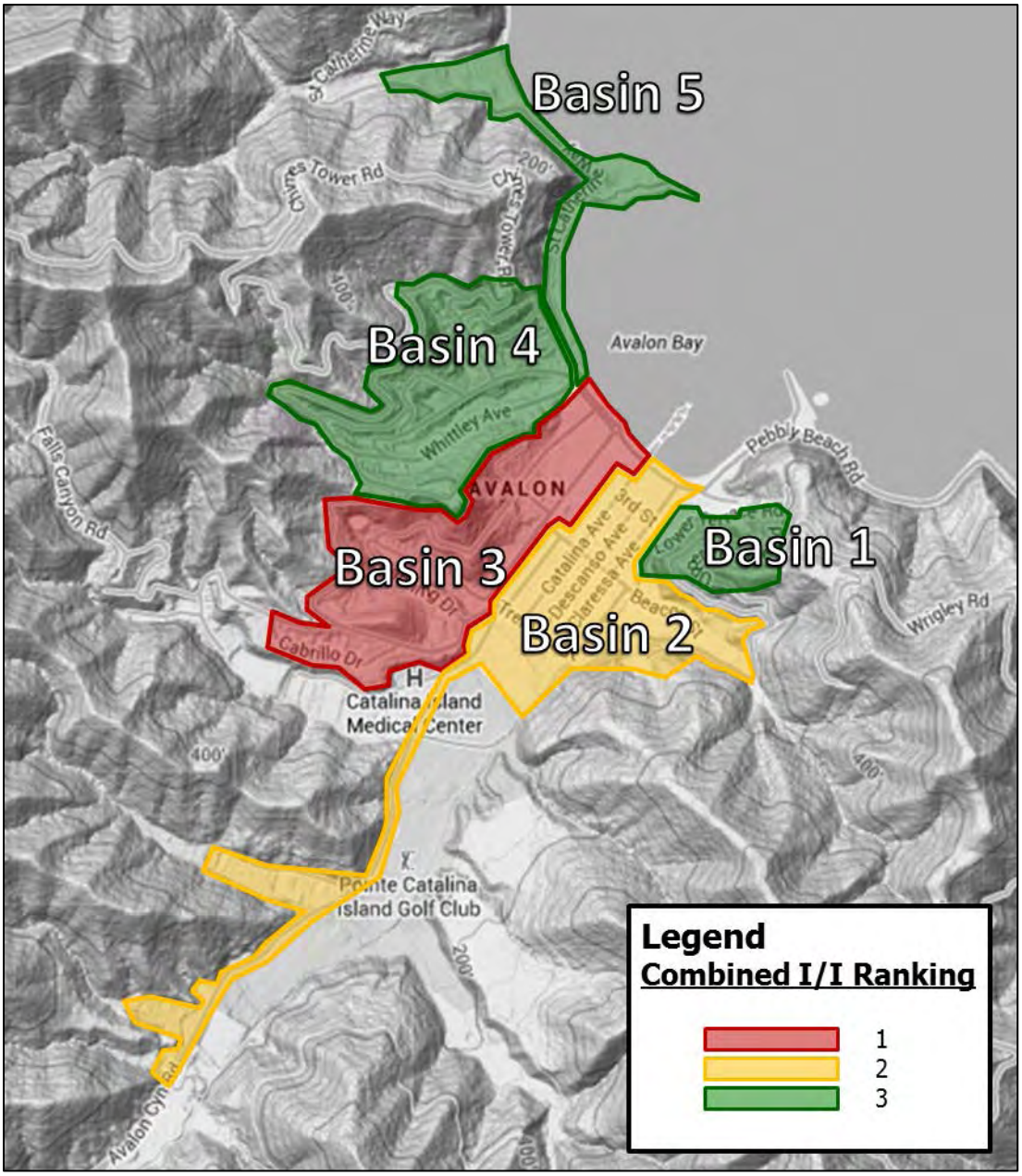


Figure 23. Temperature Map: Basin Combined I/I Analysis Summary

I/I Analysis: Groundwater Infiltration Summary

Figure 24 plots the min-to-ADWF flow ratios against the ADWF flows for the sites monitored during this study. The dotted line shows "typical" min-to-ADWF flow ratios per the Water Environment Federation (WEF)[8].

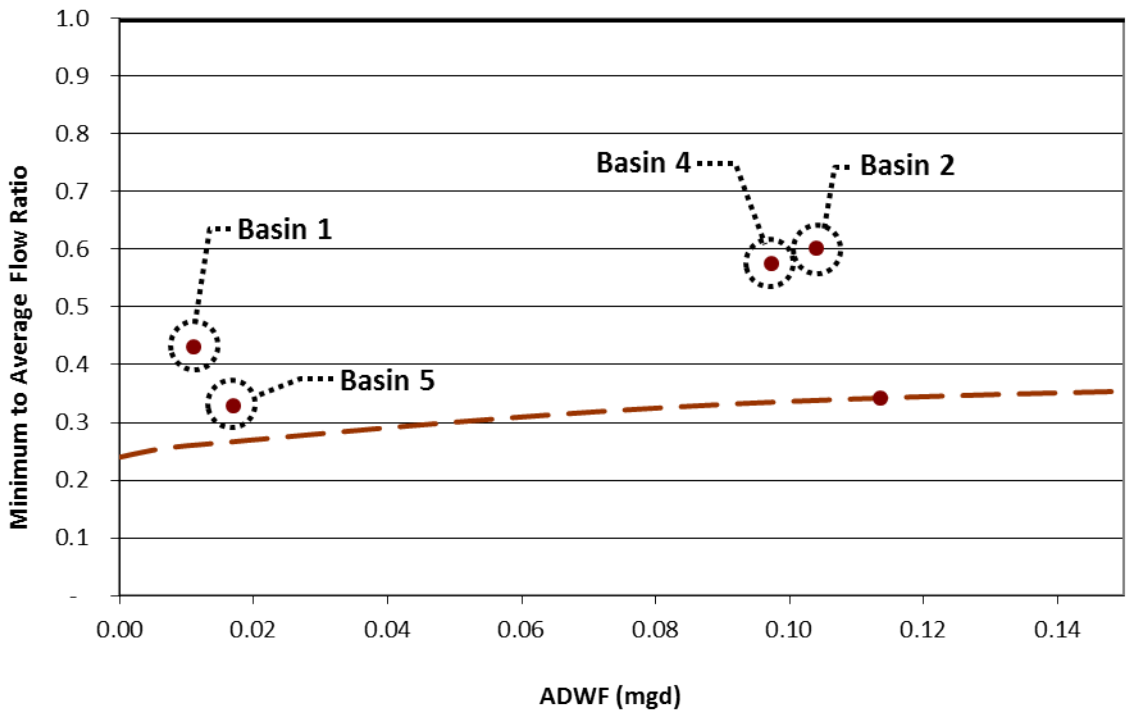


Figure 24. Minimum Flow Ratios vs. ADWF[9]

The following GWI results are noted:

- Basins 1, 2, 4 and 5 show evidence of higher than normal GWI rates; the GWI rates for these basins were **above** the WEF typical Low-to-Average Ratio, indicating the possibility of excessive groundwater infiltration.
- It is possible that night-time industrial discharges or unusual nightlife activities could increase Low-to-Average Ratios higher than typical ratios that would erroneously indicate high groundwater levels. The analysis results are shown for information, but should be used at the discretion of the City's master planning consultant.

Figure 25 shows a color-coded map of the basins with rates of groundwater infiltration above typical groundwater infiltration standards (as set forth by WEF).

[8] WEF Manual of Practice No. 9 "Design and Construction of Sanitary and Storm Sewers".

[9] Due to attenuation, it should be expected that sites with larger flow volumes should not have quite the peak-to-average and low-to-average flow ratios as sites with lesser flow volumes, which is why the WEF typical trend lines slope closer to 1.0 as the ADWF increases, as shown in the figure.

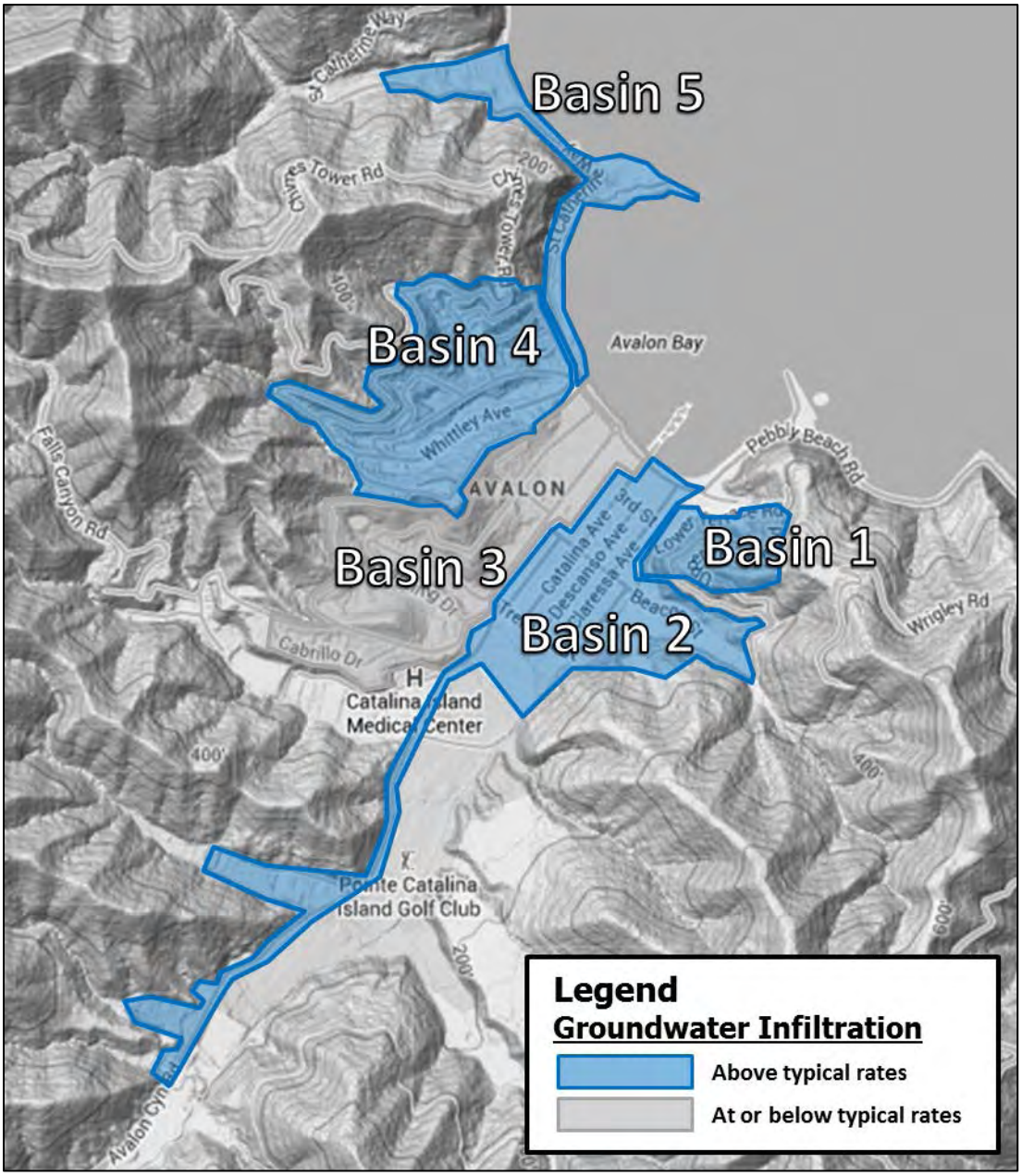


Figure 25. Basins with Possible Groundwater Infiltration

RECOMMENDATIONS

V&A advises that future I/I reduction plans consider the following recommendations:

1. **Basins 2 and 3:** Basins 2 and 3 were the only basins that showed a definitive I/I response to the rainfall event, with Basin 3 ranking higher than Basin 2. Future I/I reduction efforts should first focus on Basin 3, and then focus on Basin 2.
2. **Inflow vs. RDI:** For Basins 2 and 3, the inflow component comprised the majority of the I/I response. For this particular study, the RDI component was negligible. Future I/I reduction efforts should focus on the reduction of **inflow**.
    a. **Inflow Observation:** The quick and spiked inflow response to rainfall was noteworthy given the rainfall intensity only reached a peak rate of 0.06 inches per hour. NOAA states that a 1-year, 15-minute rainfall event within Avalon measures 0.25 inches, or an average rate of 1.00 inches per hour – approximately17 times the rate observed during this study. Inflow typically has a direct relationship with rainfall intensity. There are several factors at play, but initial indications are that a rainfall event with a larger rainfall intensity may result in a sizeable contribution of inflow into the collection system from Basins 2 and 3.
    b. **Inflow Identification and Removal**: Inflow locations are usually less difficult to find and less expensive to correct. These sources include direct and indirect cross connections with storm drainage systems, roof downspouts, and various types of surface drains. Generally, the costs to identify and remove sources of inflow are low compared to potential benefits to public health and safety, the costs of building new facilities to convey and treat the resulting peak flows or the costs from fined of regulatory agencies of any sanitary sewer overflows.
3. **Inflow Investigation Methods:** Potential inflow investigation methods include the following:
    a. **Smoke testing:** Smoke testing involves forcing non-toxic smoke-filled air into sanitary sewer lines. The smoke exits through openings into the sewer system, such as manholes, building roof vents, and defects. Defects may include catch basins, cross-connections from storm sewers, roof downspouts basement and foundation drains, all of which may contribute to storm water inflow. Smoke may also locate defects in the pipe or laterals, following a path from the defect and exiting at the ground surface
    b. **Sub-basin flow monitoring and I/I Study:** Sub-basin flow monitoring and I/I study would be similar in scope to this study, but focused on the sub-basins identified has having the highest contributions of I/I. The sub-basin(s) would be parsed into smaller mini-basins to further isolate and identify the areas of the sub-basin that have the greatest I/I contribution.
4. **I/I Reduction Cost Effectiveness Analysis:** The City should conduct a study to determine which is more cost-effective:
    a. (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines; or
    b. (2) continued treatment of the additional rainfall dependent I/I flow.

Infiltration investigation and reduction information is shown here, but is not recommended at this time.

- **Infiltration (RDI) Identification and Removal**: Infiltration sources are usually harder to find and more expensive to correct than inflow sources. Infiltration sources include defects in deteriorated sewer pipes and/or manholes, and may include cracks, offset joints, root intrusion points, and broken pipes. The sources may be wide-spread throughout a sanitary sewer system
- **Infiltration Investigation Methods:** Potential inflow investigation methods include the following:
  - Night-time reconnaissance work to determine the areas and pipe reaches responsible for high levels of infiltration contribution.
  - CCTV Inspection

Note: The V&A recommendations are made based on V&A's knowledge of the project specifically as it relates to flow monitoring and the items within this study; however, V&A does not have knowledge of other considerations important to the overall well-being of the City and future CIP improvements, such as sanitary sewer model scenarios and results, future plans for zoning and build-out, etc. The results and recommendations of this report should be used at the discretion of the City's master planning consultant to determine the correct course of action for addressing the results and recommendations of this study in association with the direction and intent of the overall City master plan.

APPENDIX A

FLOW MONITORING SITES: DATA, GRAPHS, INFORMATION

City of Avalon

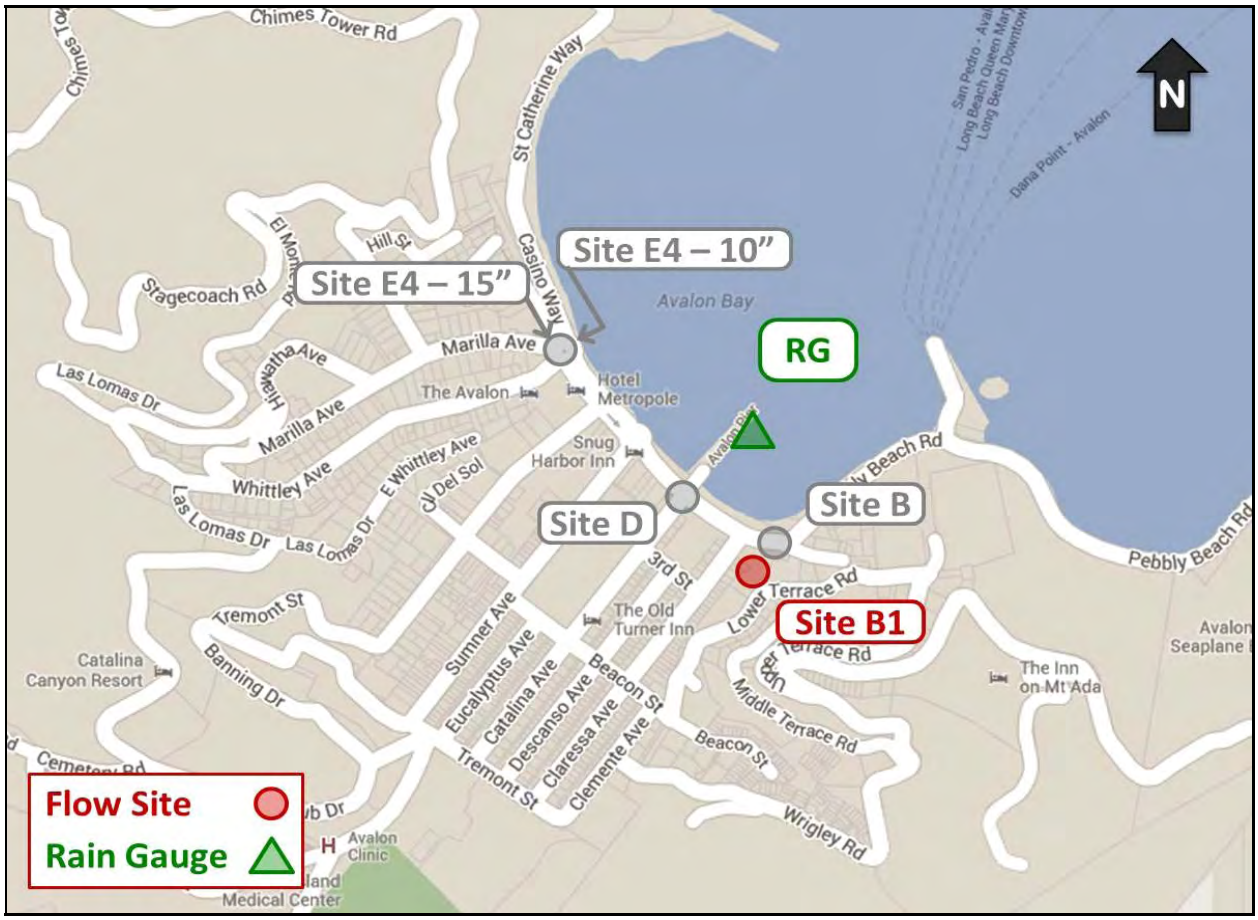
Sanitary Sewer Flow Monitoring

Temporary Monitoring: March 19 to June 4, 2013

Monitoring Site: Site B1

Location: Parking Lot at Claressa Avenue and Casino Way, behind Pancake Cottage

Data Summary Report



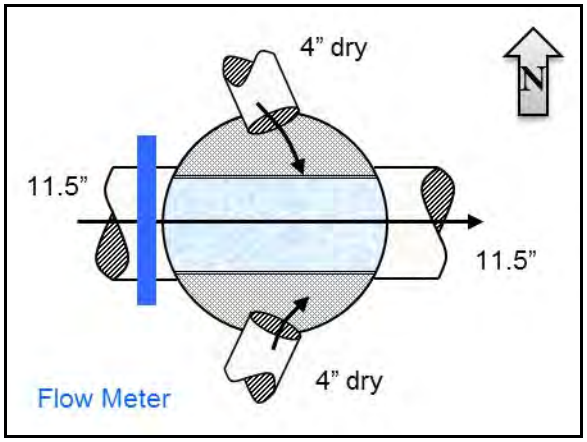
Vicinity Map: Site B1

SITE B1

Site Information

Location:	Parking Lot at Claressa Avenue and Casino Way, behind Pancake Cottage
Coordinates:	118.3243° W, 33.3425° N
Rim Elevation:	10 feet
Pipe Diameter:	11.5 inches
Baseline Flow:	0.012 mgd
Peak Measured Flow:	0.062 mgd

Satellite View



Flow Diagram

Sanitary Sewer Map

Plan View

SITE B1
Additional Site Photos

Effluent Pipe

Influent Pipe

SITE B1
Additional Site Photos

North Drop Lateral Pipe

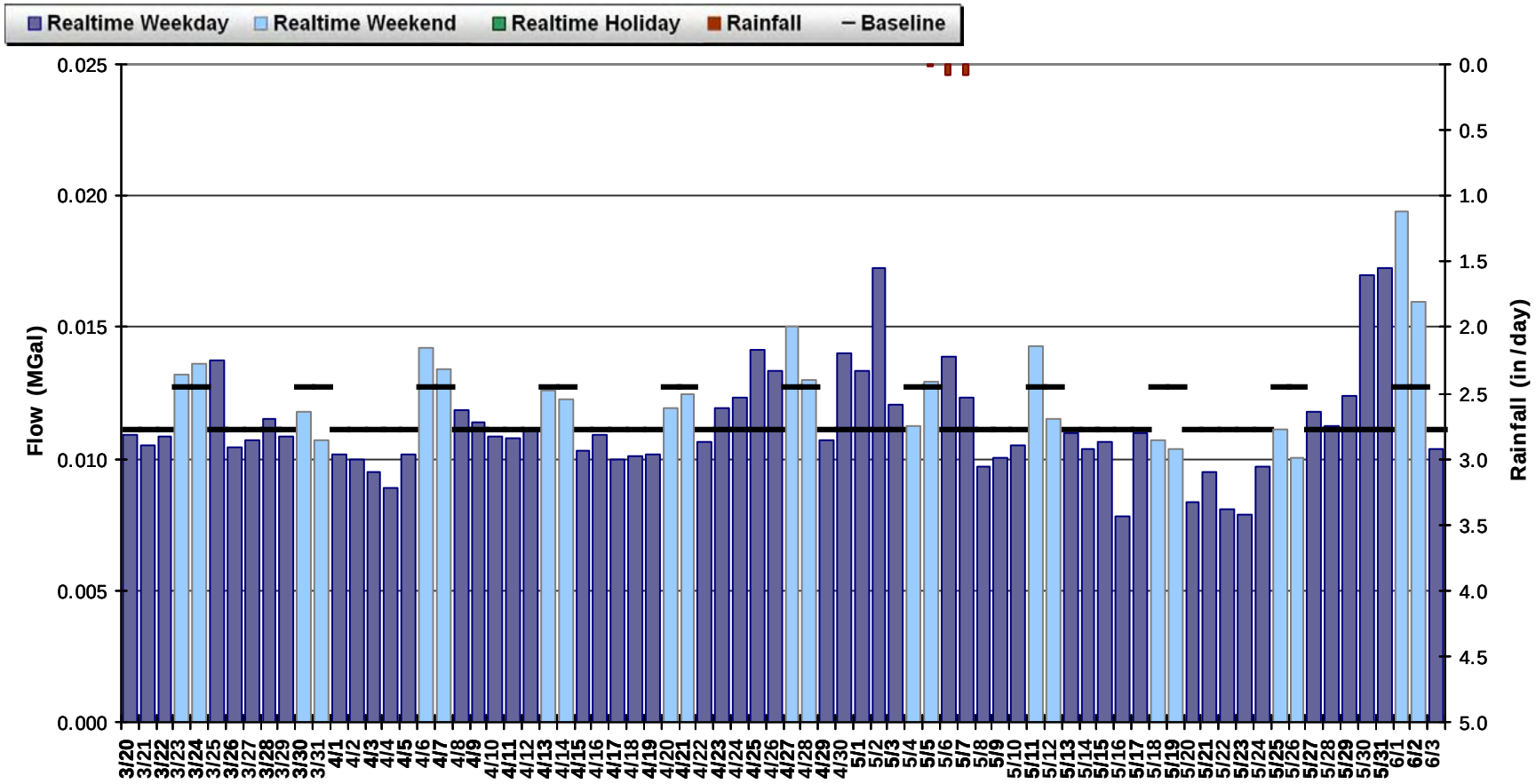
South Drop Lateral Pipe

SITE B1

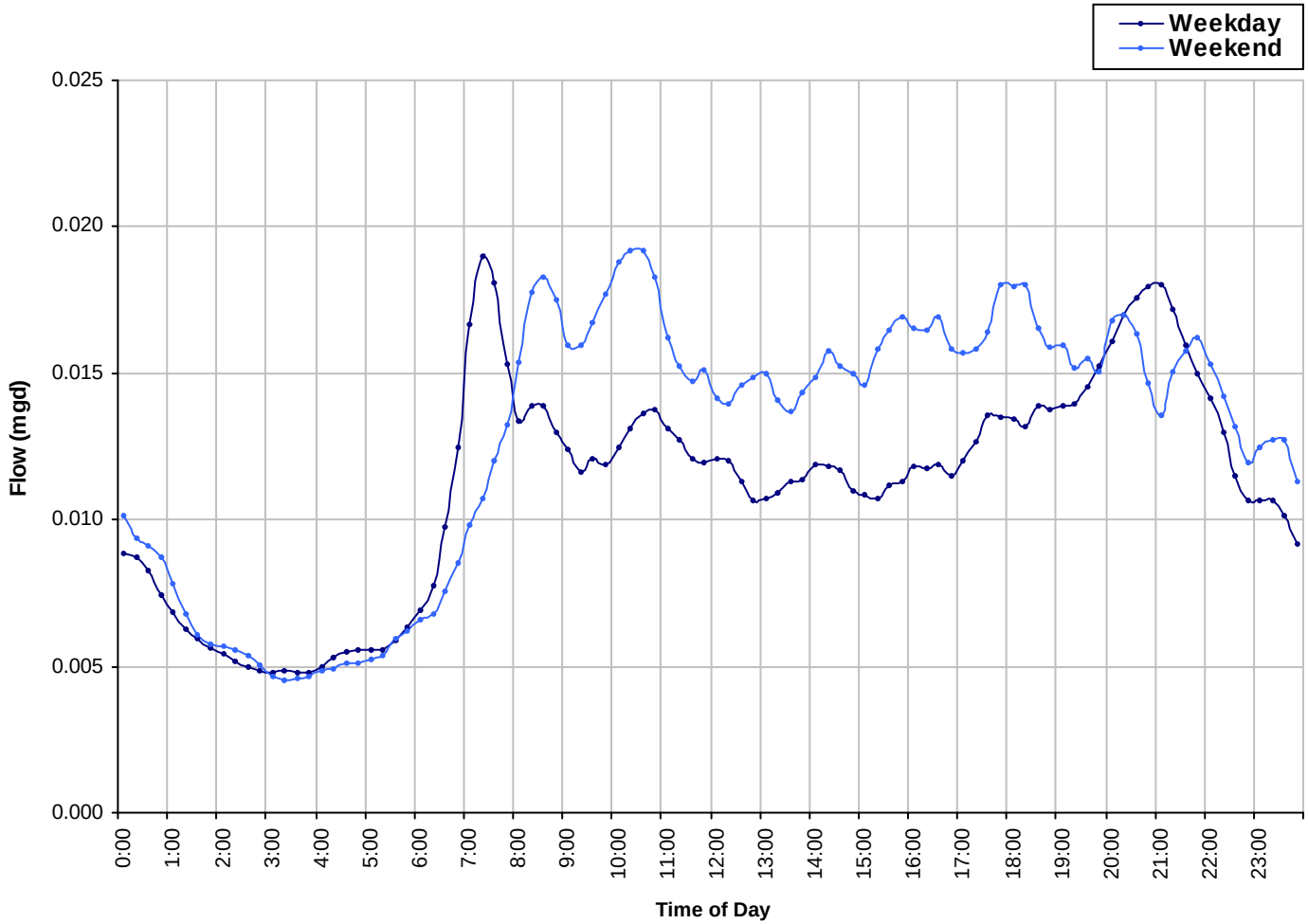
Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.012 MGal **Peak Daily Flow: 0.019 MGal** **Min Daily Flow: 0.008 MGal**

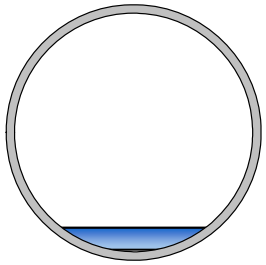
Total Period Rainfall: 0.19 inches



SITE B1
Baseline Flow Hydrographs



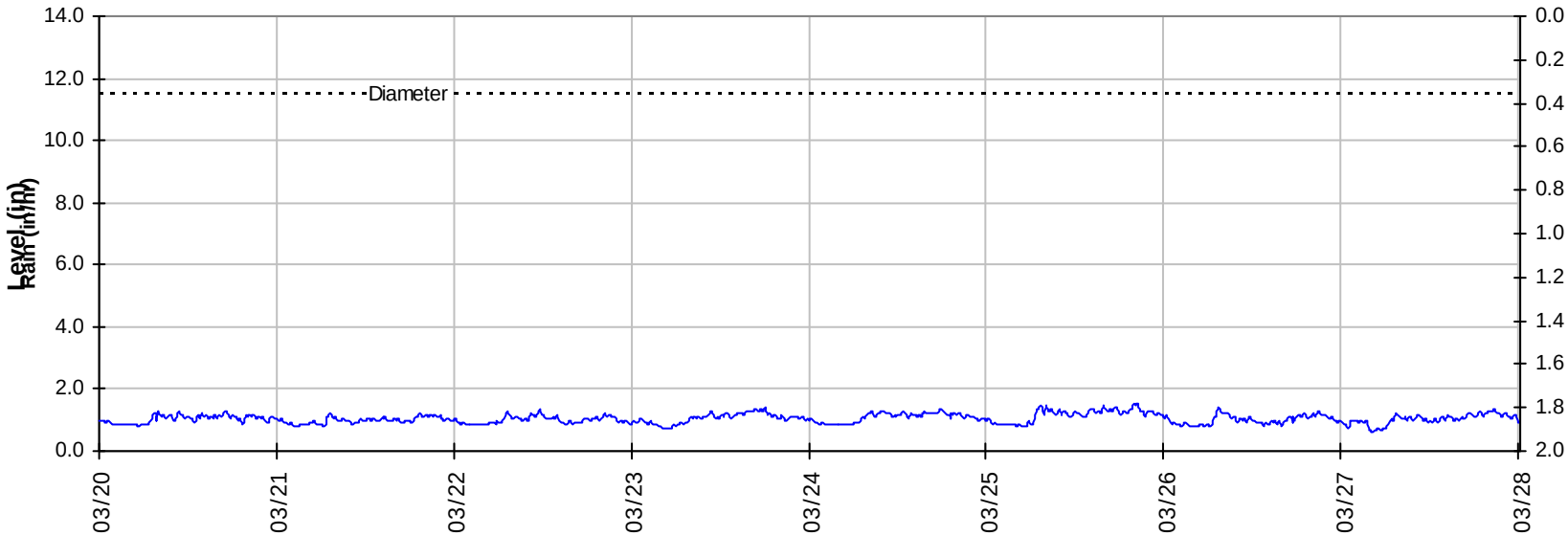
Baseline Flow:
0.012 *mgd*

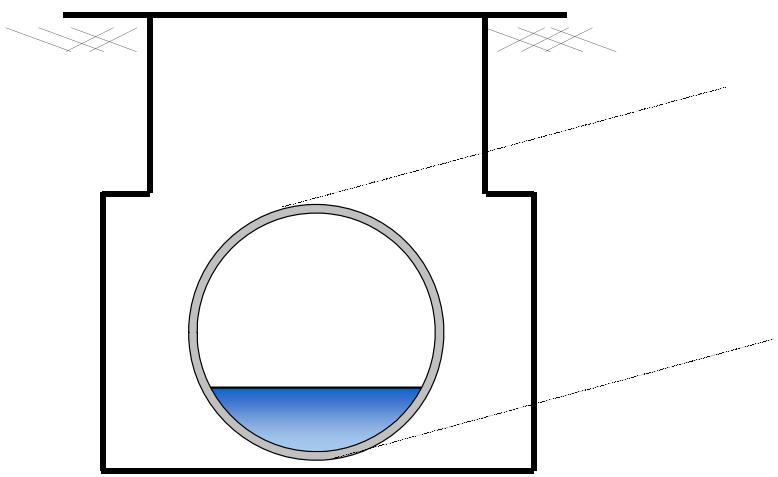


SITE B1

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period



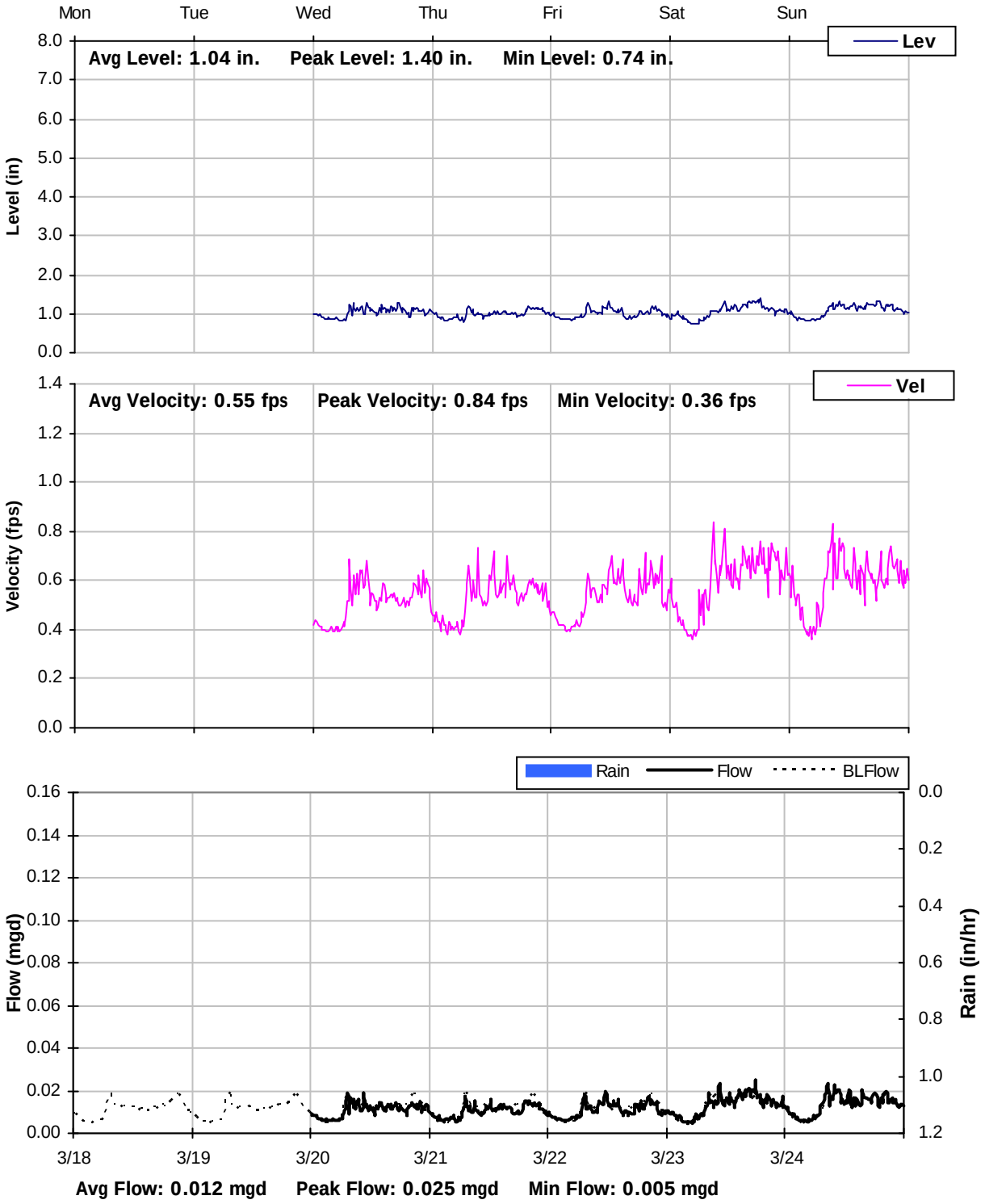


Pipe Diameter: 11.5 *inches*

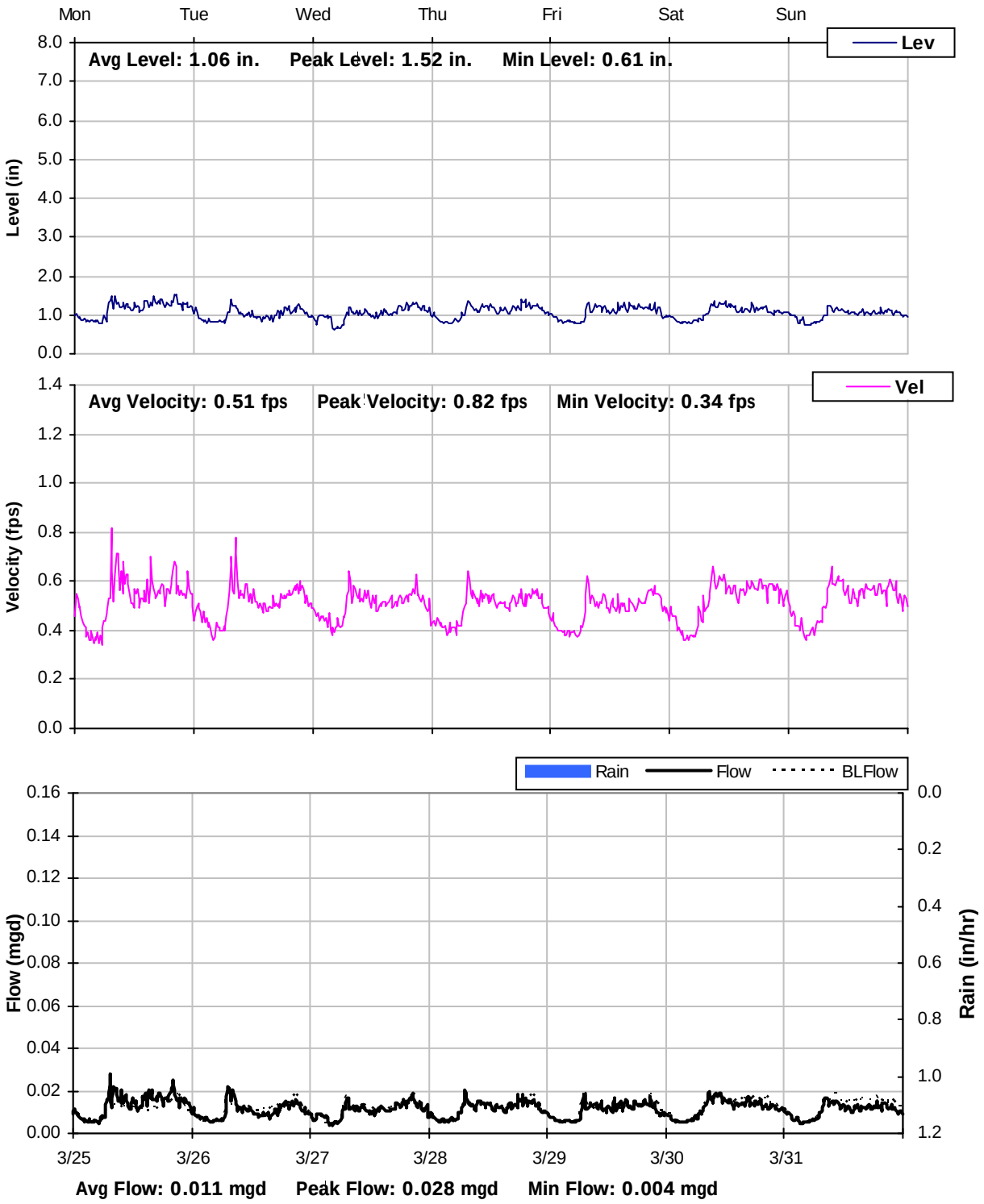
Peak Measured Level: 3.11 *inches*

Peak d/D Ratio: 0.27

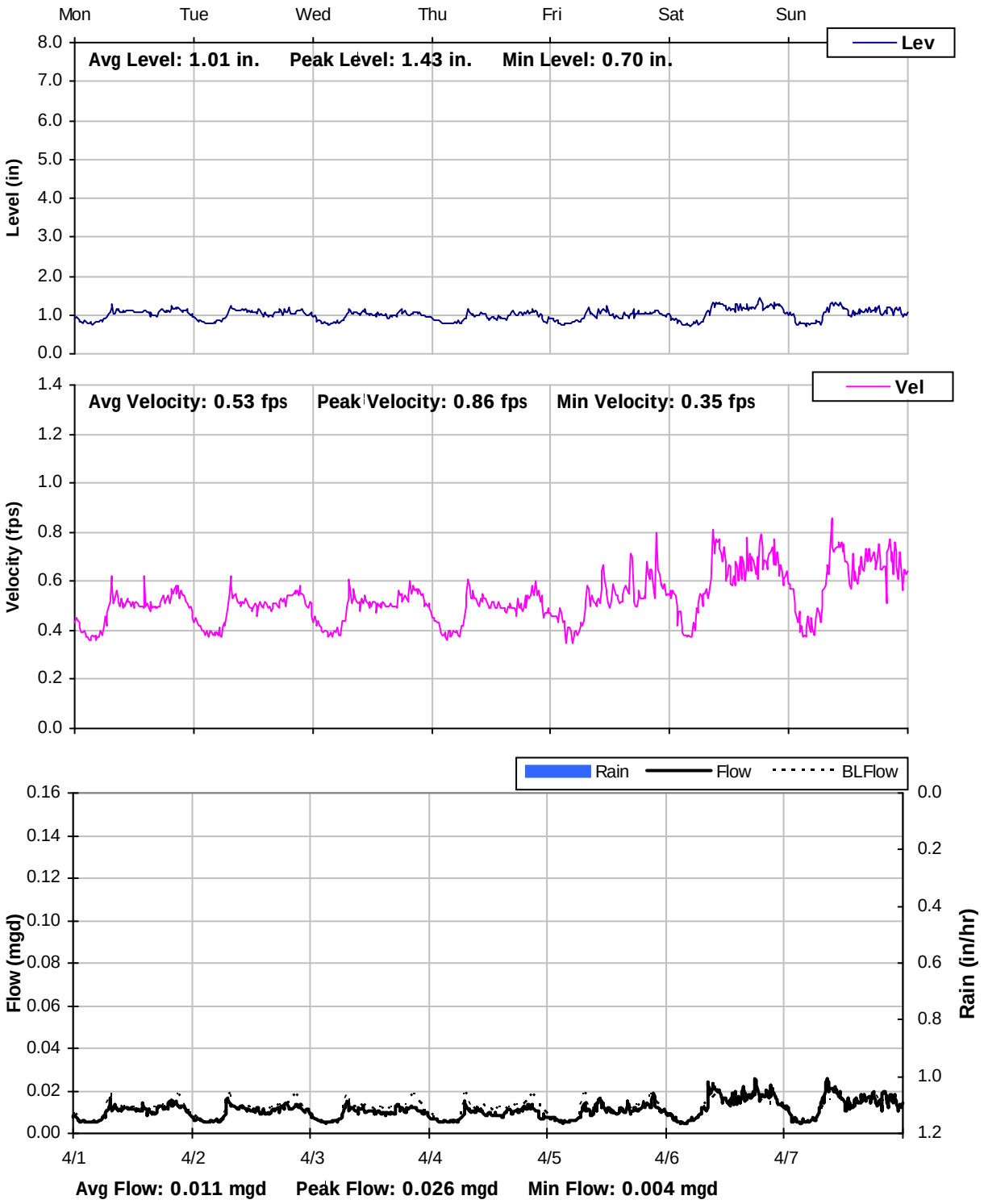
SITE B1
Weekly Level, Velocity and Flow Hydrographs
3/18/2013 to 3/25/2013



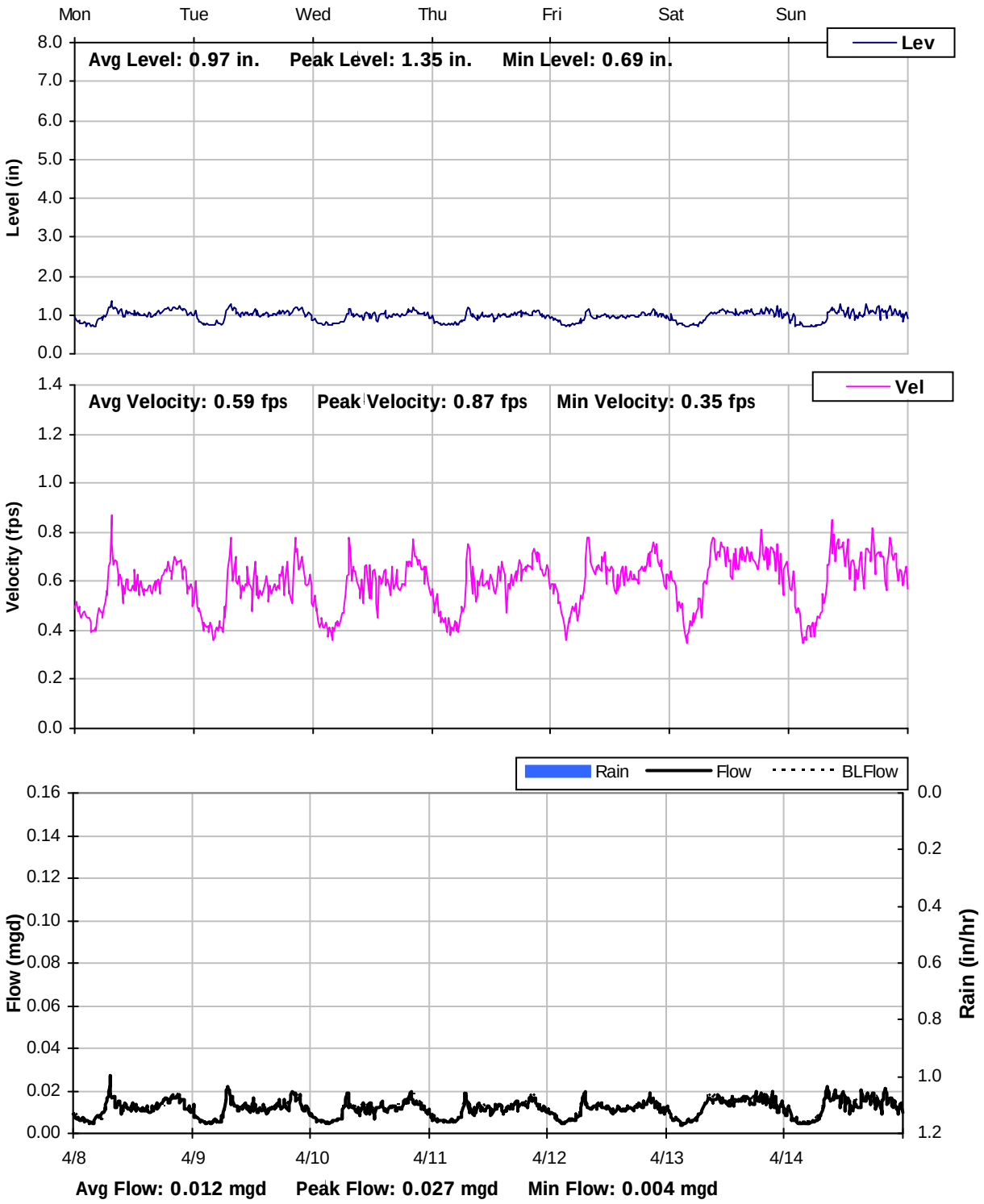
SITE B1
Weekly Level, Velocity and Flow Hydrographs
3/25/2013 to 4/1/2013



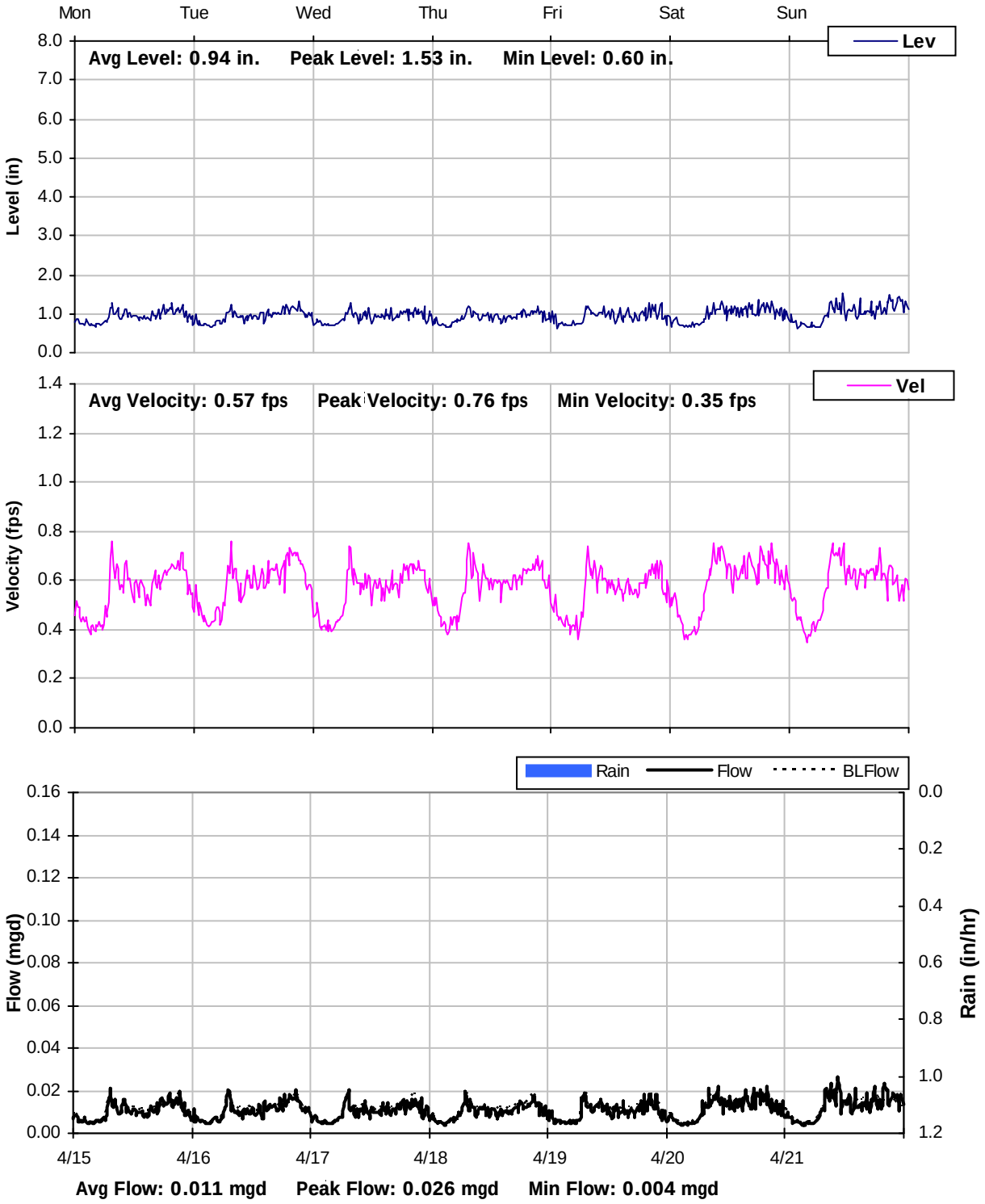
SITE B1
Weekly Level, Velocity and Flow Hydrographs
4/1/2013 to 4/8/2013



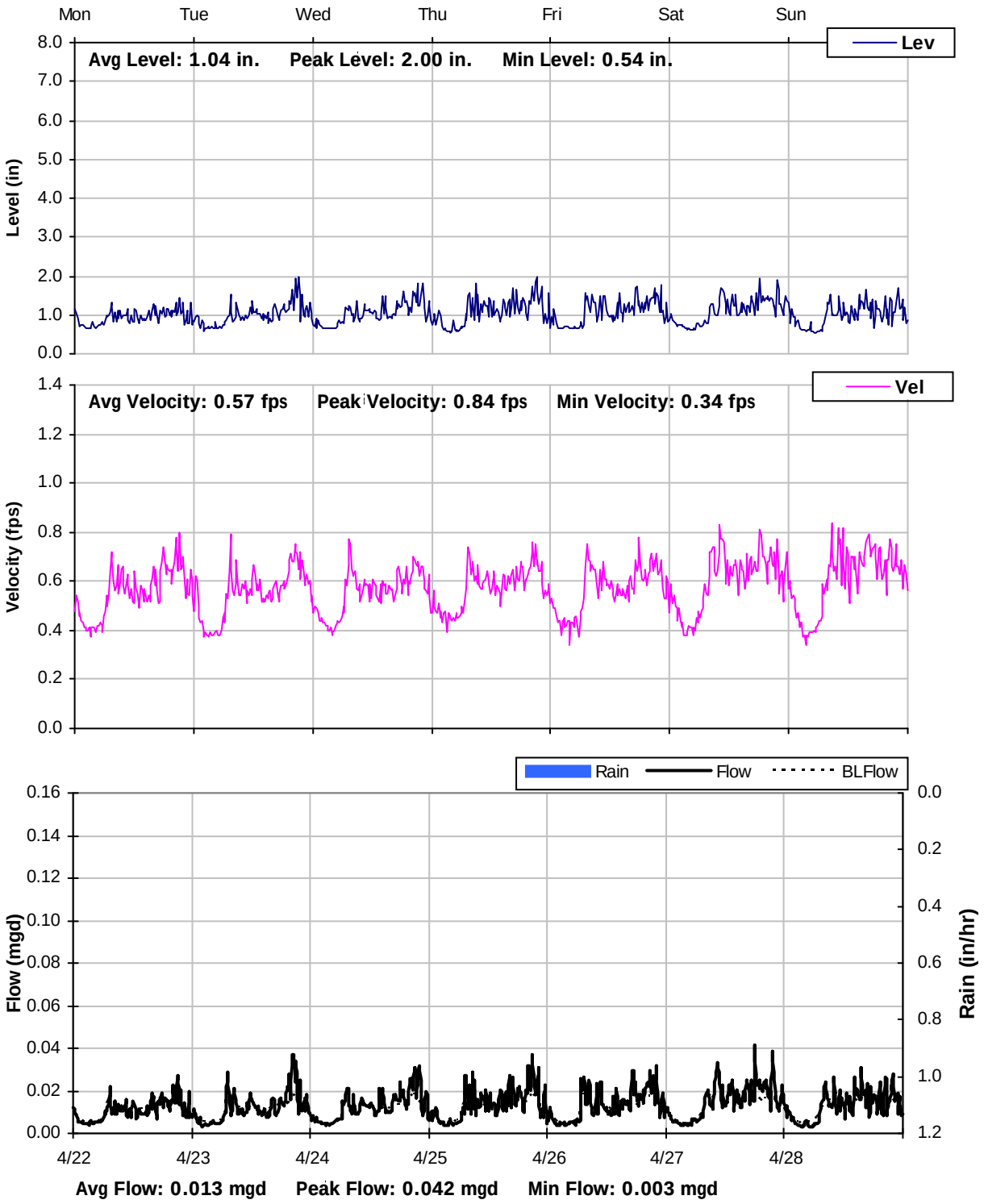
SITE B1
Weekly Level, Velocity and Flow Hydrographs
4/8/2013 to 4/15/2013



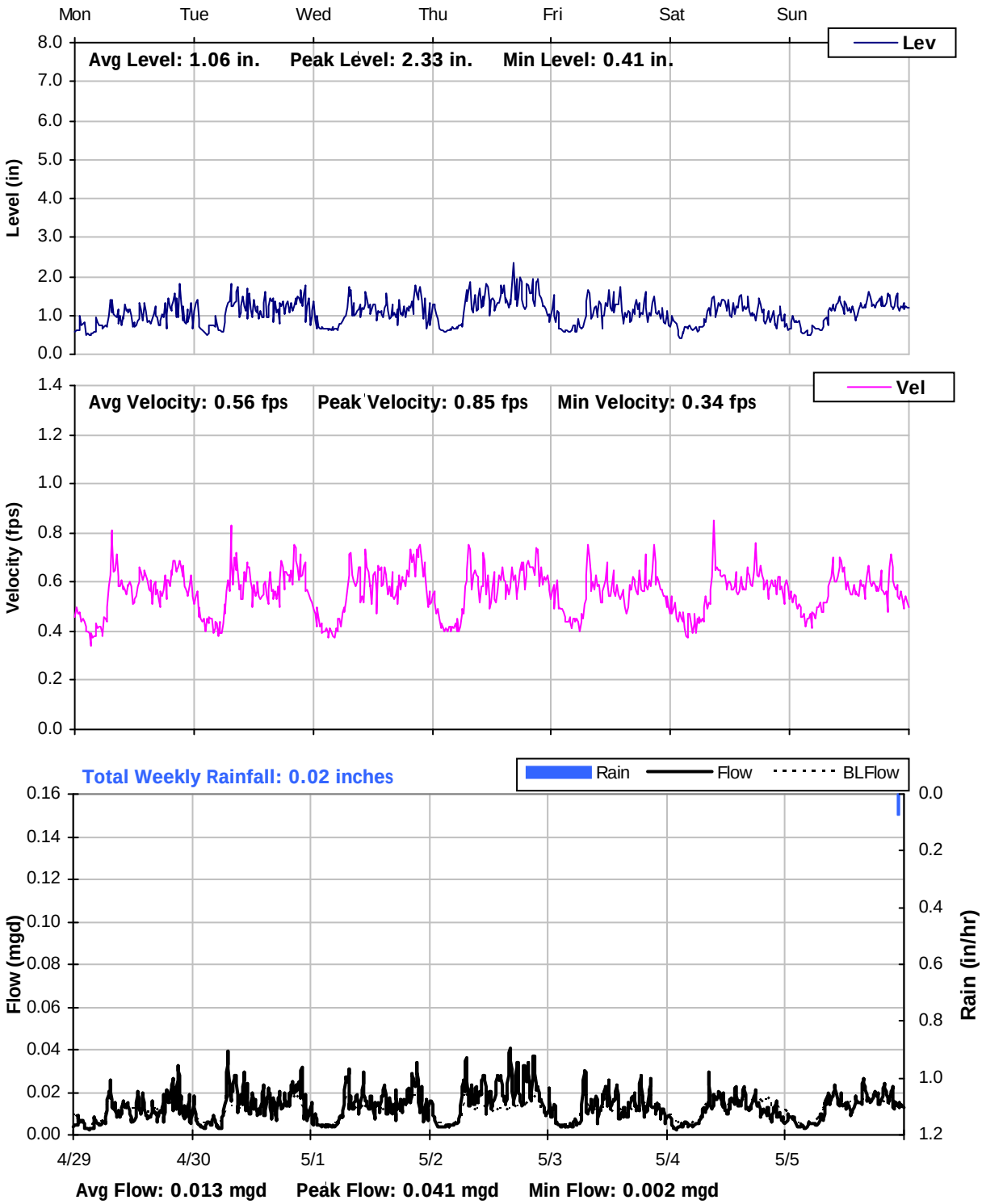
SITE B1
Weekly Level, Velocity and Flow Hydrographs
4/15/2013 to 4/22/2013



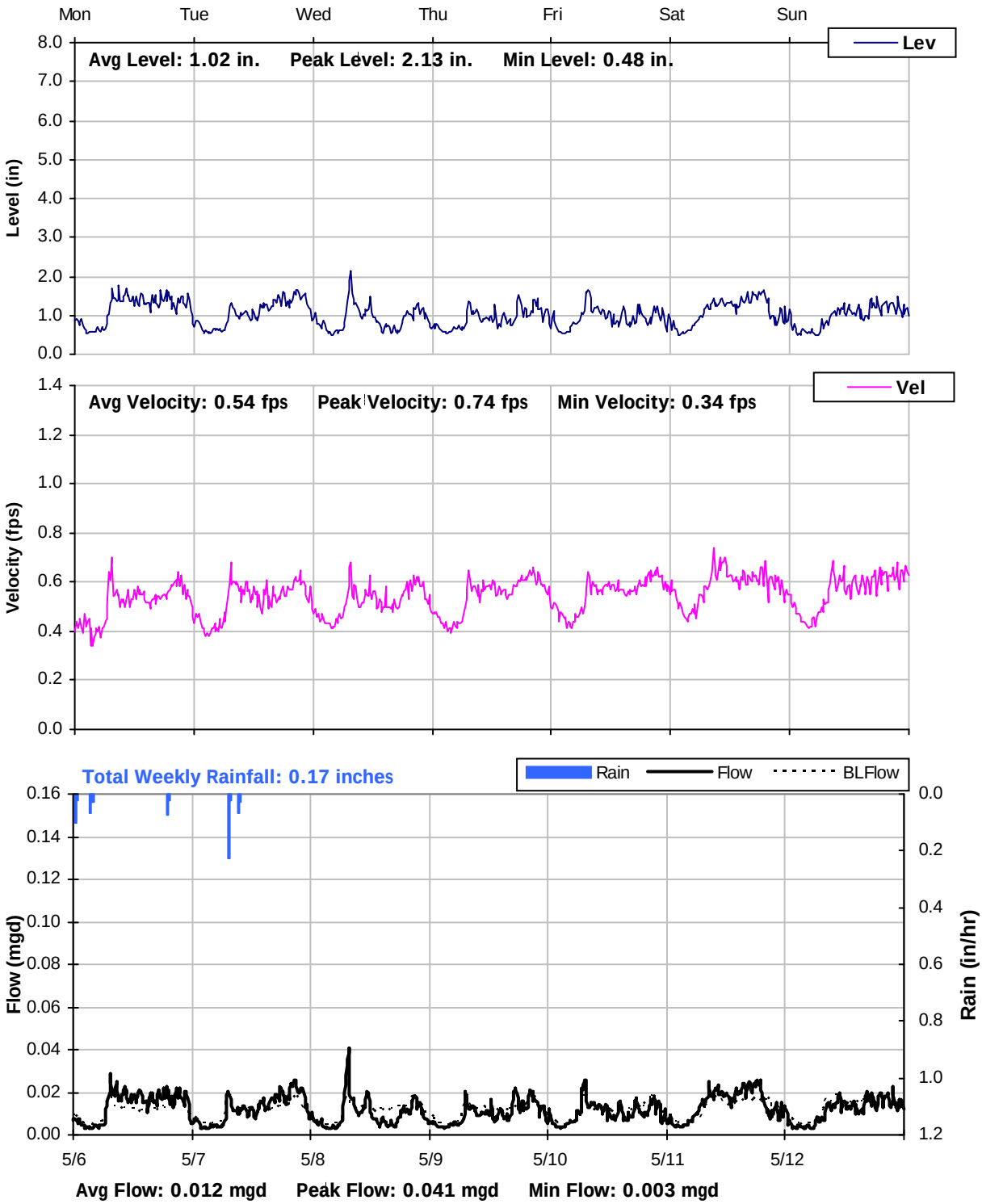
SITE B1
Weekly Level, Velocity and Flow Hydrographs
4/22/2013 to 4/29/2013



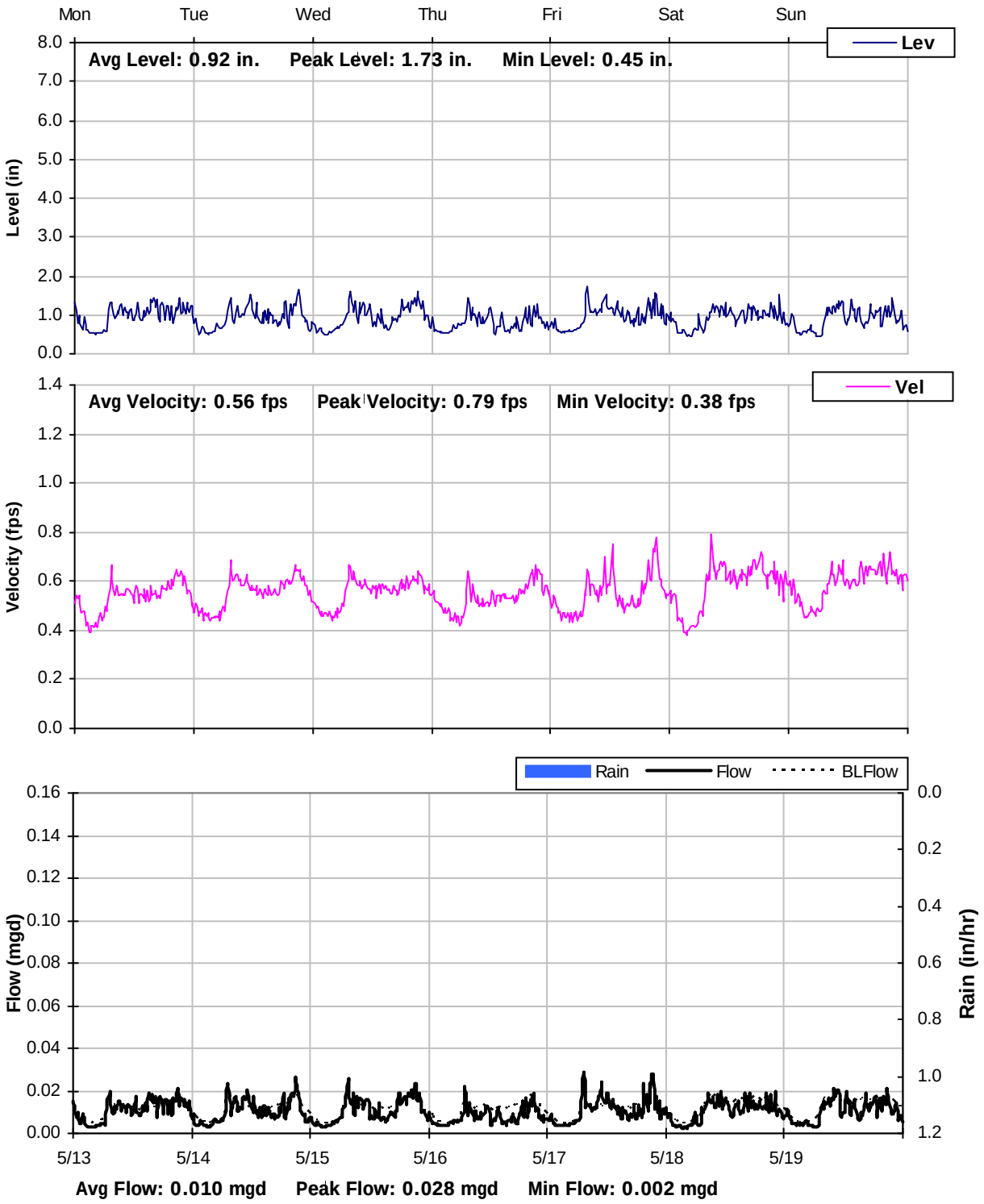
SITE B1
Weekly Level, Velocity and Flow Hydrographs
4/29/2013 to 5/6/2013



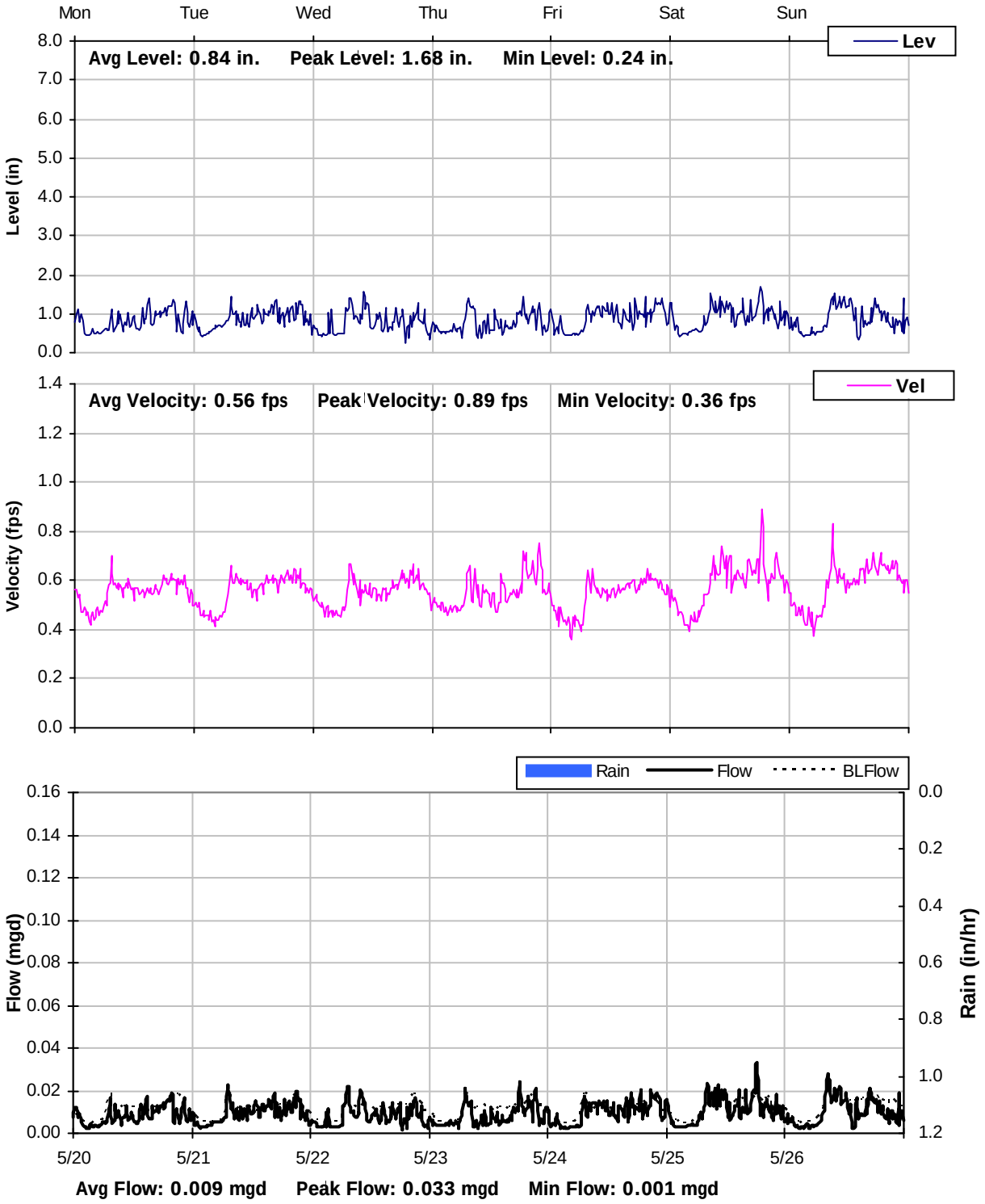
SITE B1
Weekly Level, Velocity and Flow Hydrographs
5/6/2013 to 5/13/2013



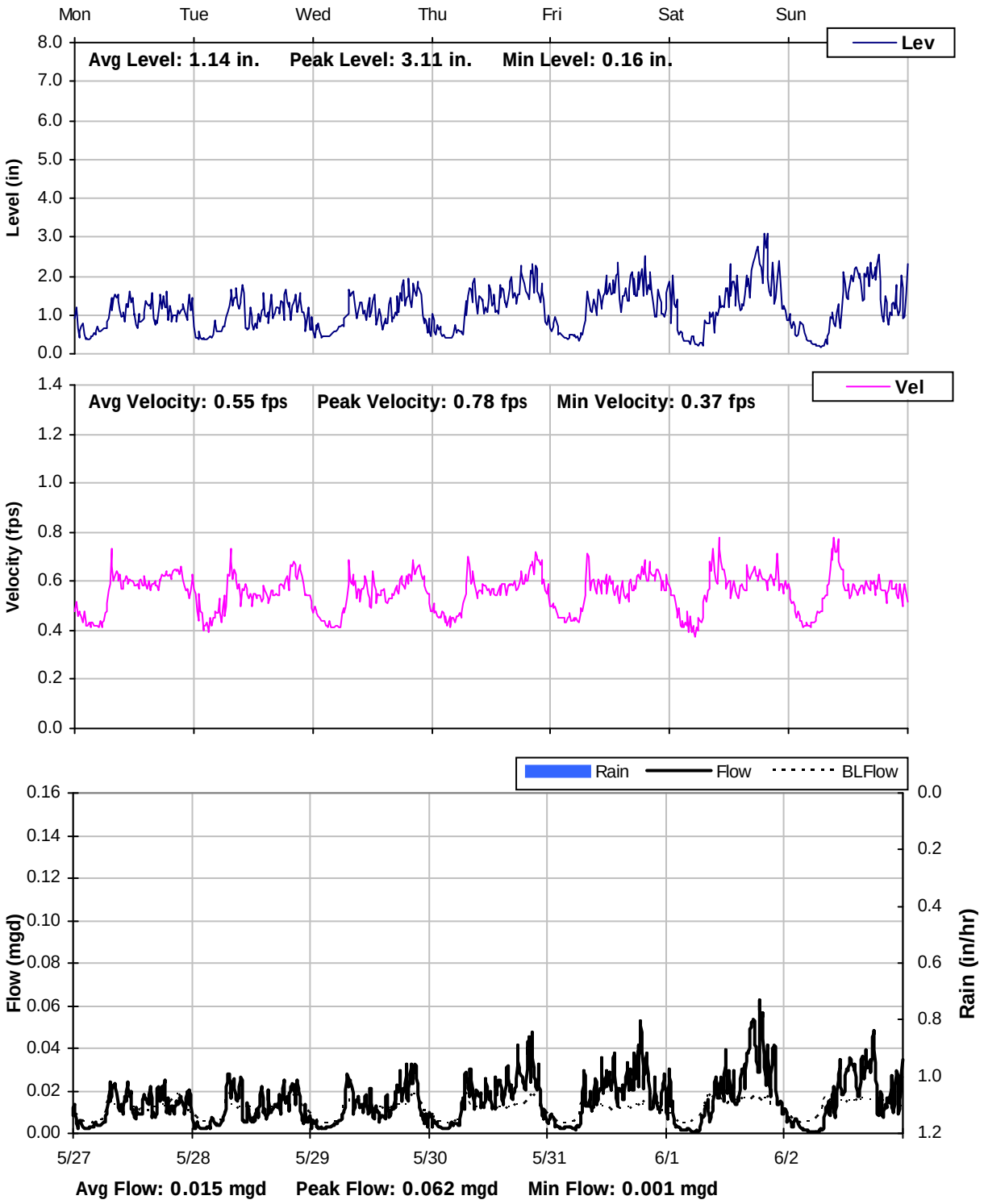
SITE B1
Weekly Level, Velocity and Flow Hydrographs
5/13/2013 to 5/20/2013



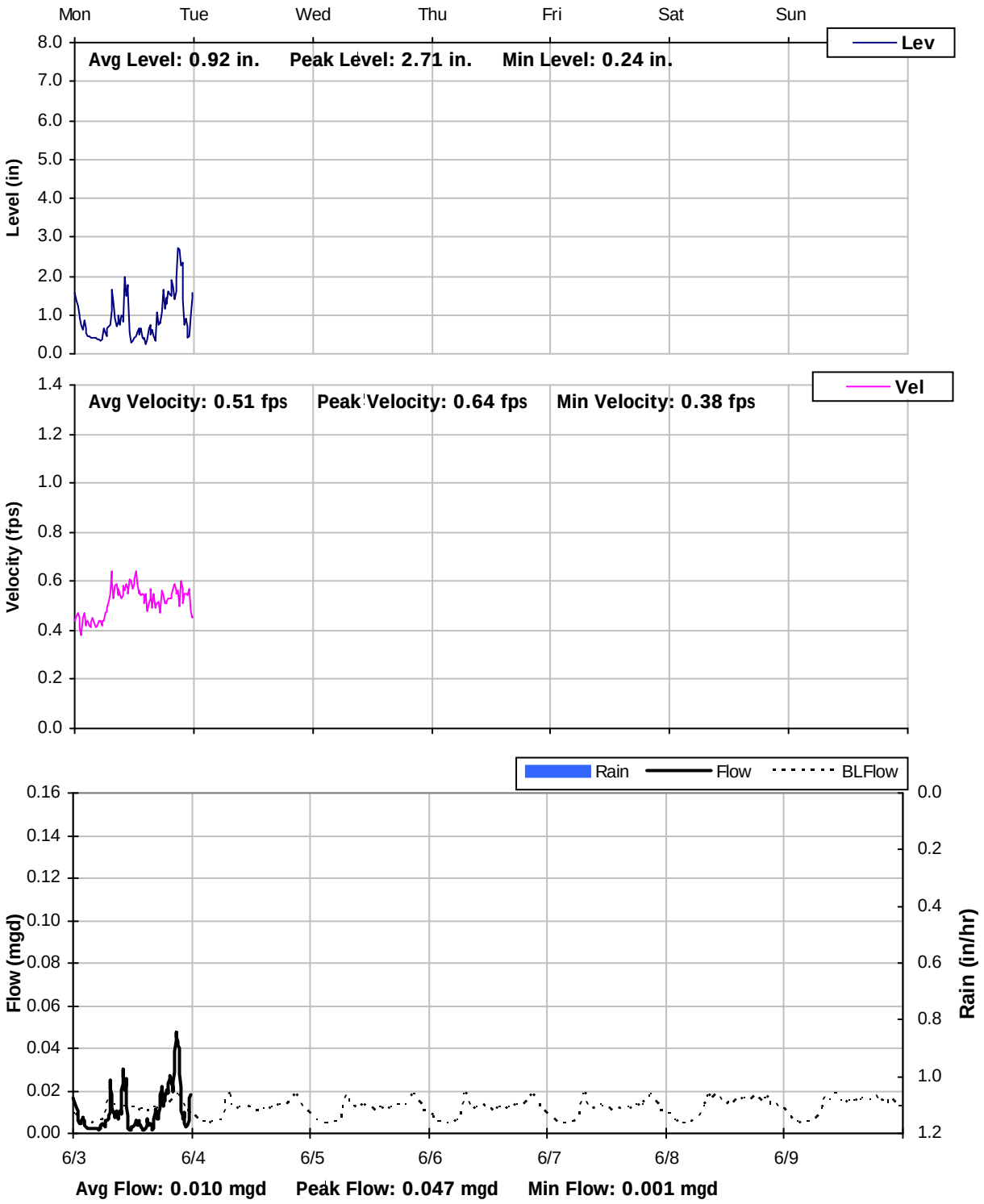
SITE B1
Weekly Level, Velocity and Flow Hydrographs
5/20/2013 to 5/27/2013



SITE B1
Weekly Level, Velocity and Flow Hydrographs
5/27/2013 to 6/3/2013



SITE B1
Weekly Level, Velocity and Flow Hydrographs
6/3/2013 to 6/10/2013



City of Avalon

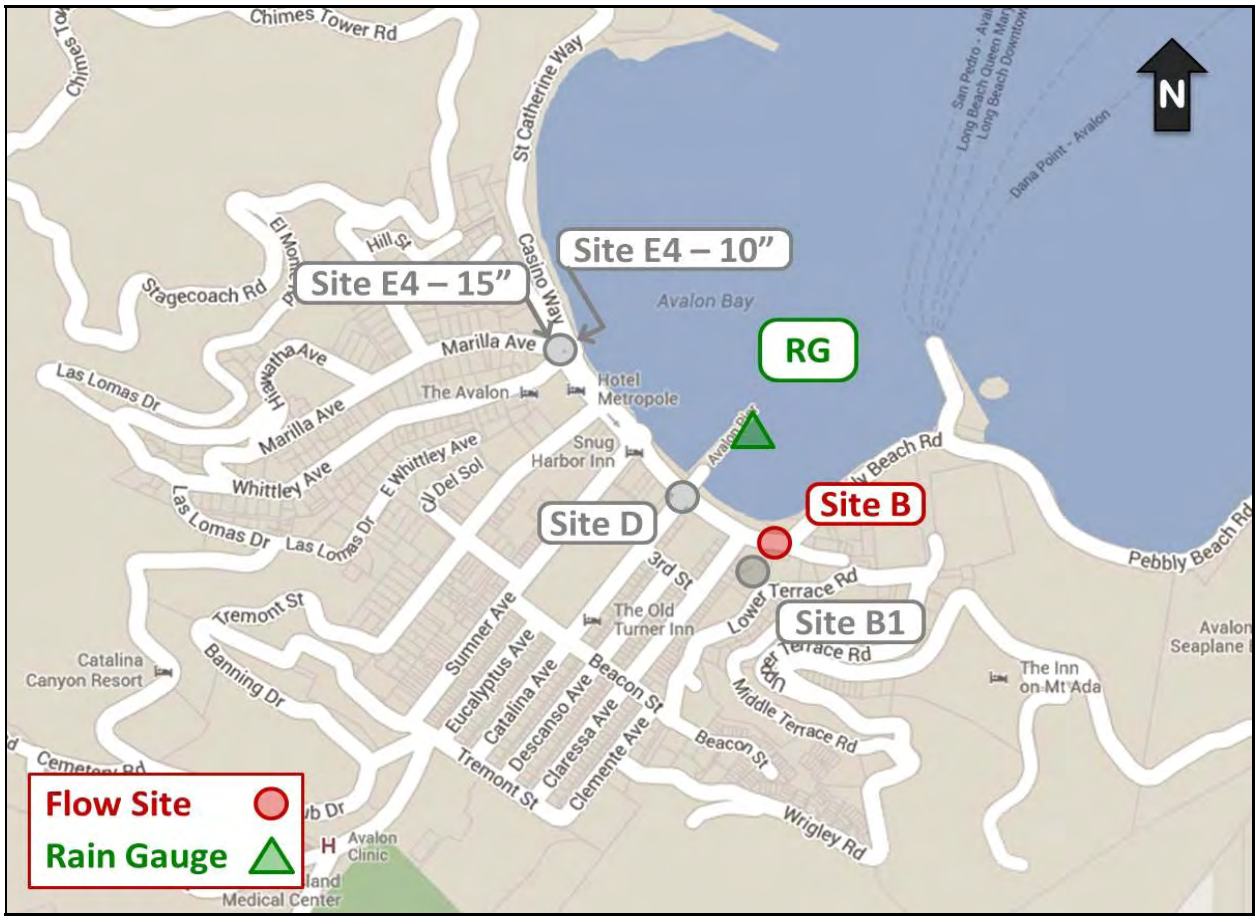
Sanitary Sewer Flow Monitoring

Temporary Monitoring: March 19 to June 4, 2013

Monitoring Site: Site B

Location: Intersection of Casino Way and Pebbly Beach Road

Data Summary Report



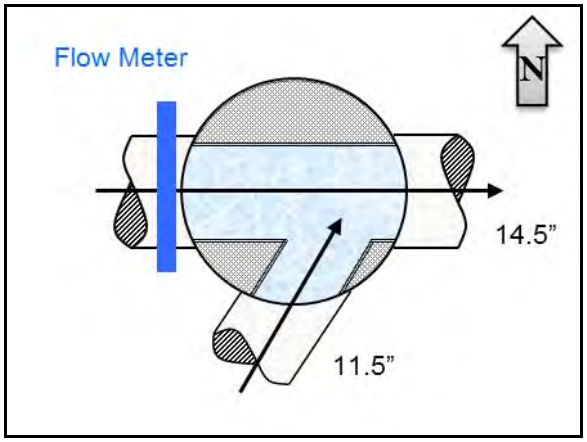
Vicinity Map: Site B

SITE B

Site Information

Location:	Intersection of Casino Way and Pebbly Beach Road
Coordinates:	118.3240° W, 33.3427° N
Rim Elevation:	11 feet
Pipe Diameter:	14.5 inches
Baseline Flow:	0.352 mgd
Peak Measured Flow:	1.443 mgd

Satellite View



Flow Diagram

Sanitary Sewer Map

Plan View

SITE B
Additional Site Photos

Effluent Pipe

Influent Pipe

SITE B
Additional Site Photos

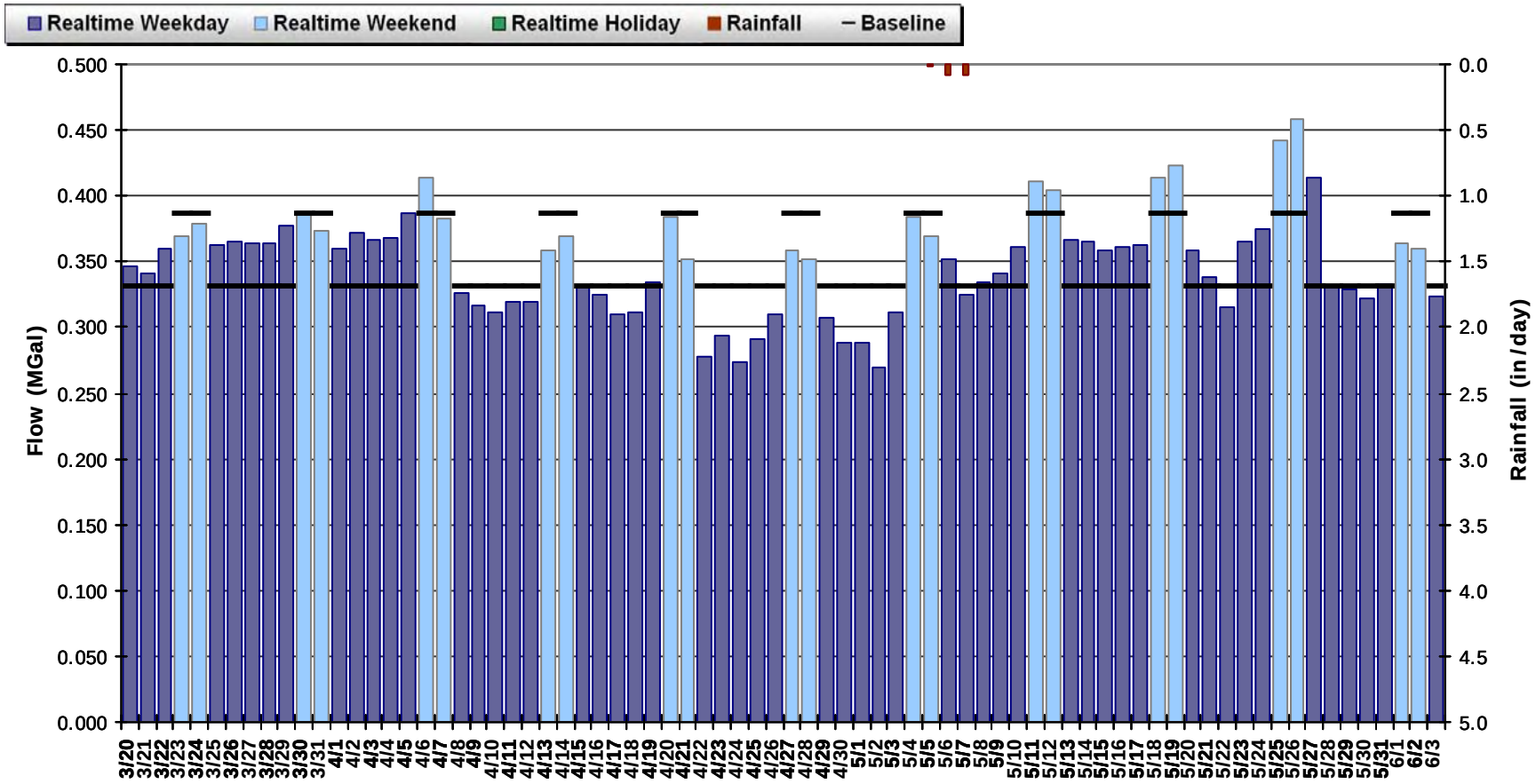
Lateral Pipe

SITE B

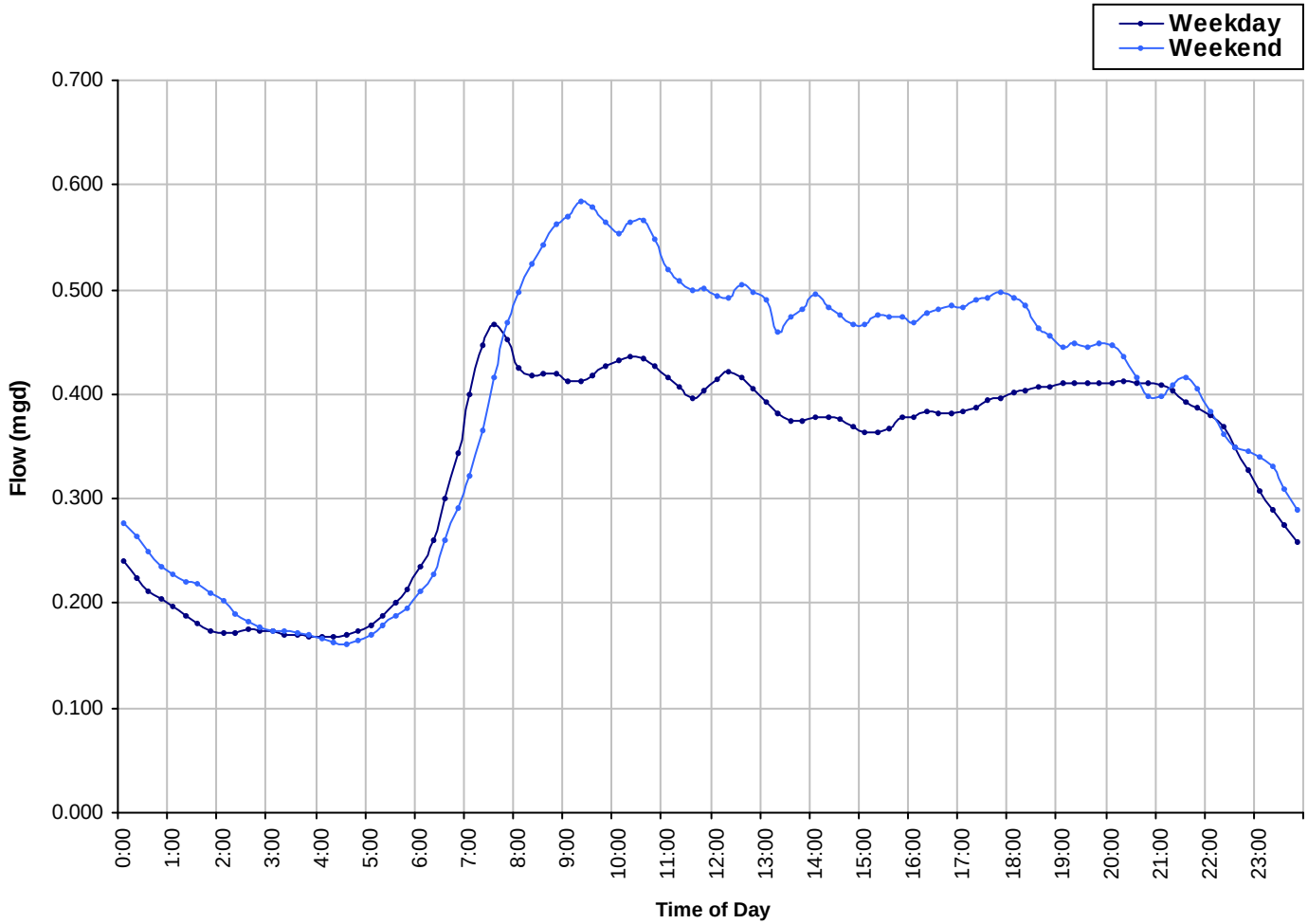
Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.351 MGal **Peak Daily Flow: 0.459 MGal** **Min Daily Flow: 0.269 MGal**

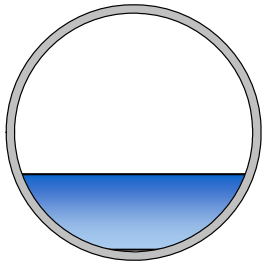
Total Period Rainfall: 0.19 inches



SITE B
Baseline Flow Hydrographs



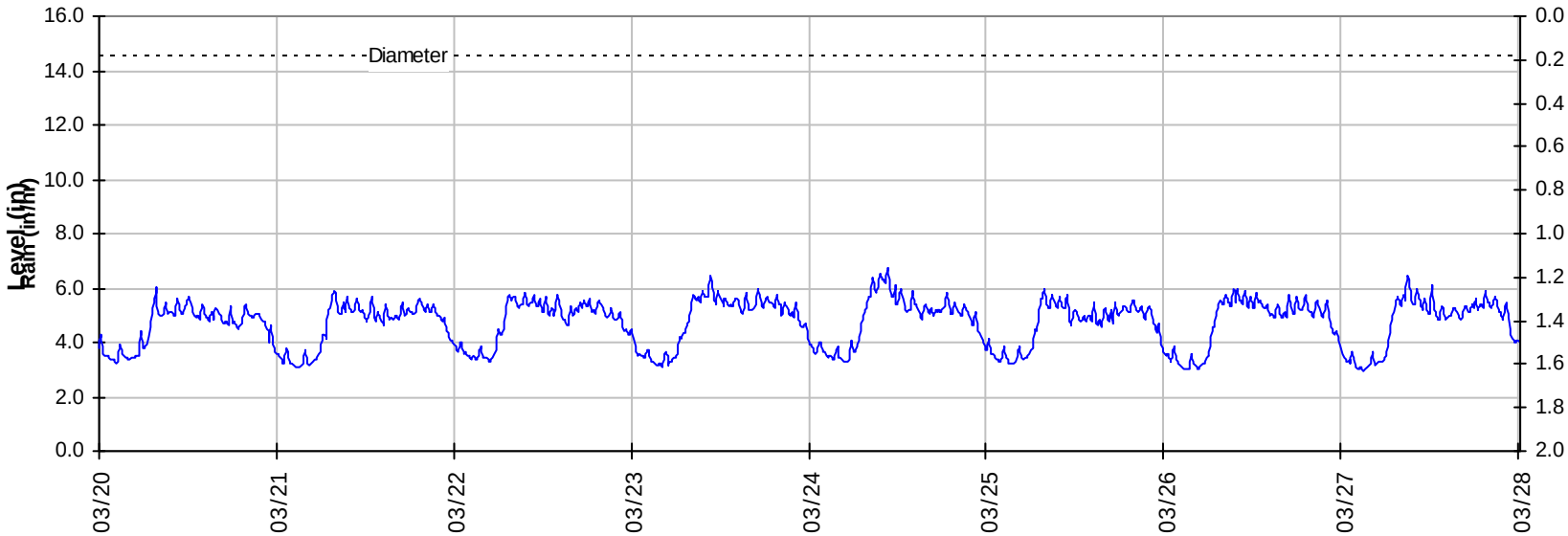
Baseline Flow:
0.352 *mgd*

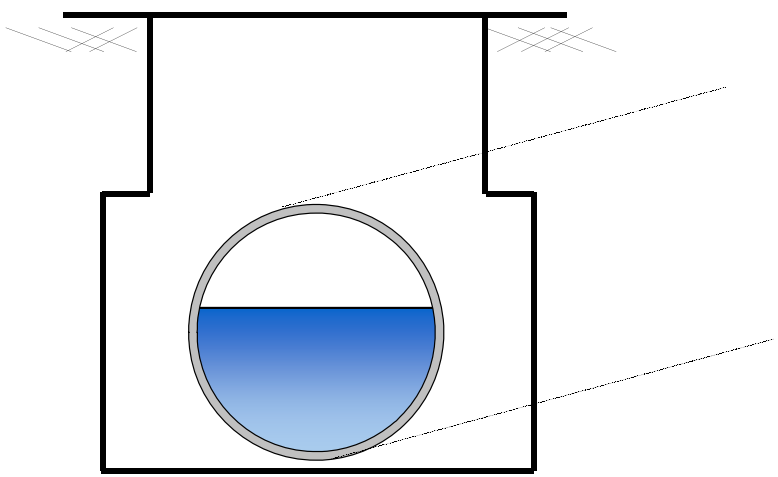


SITE B

Site Capacity and Surcharge Summary

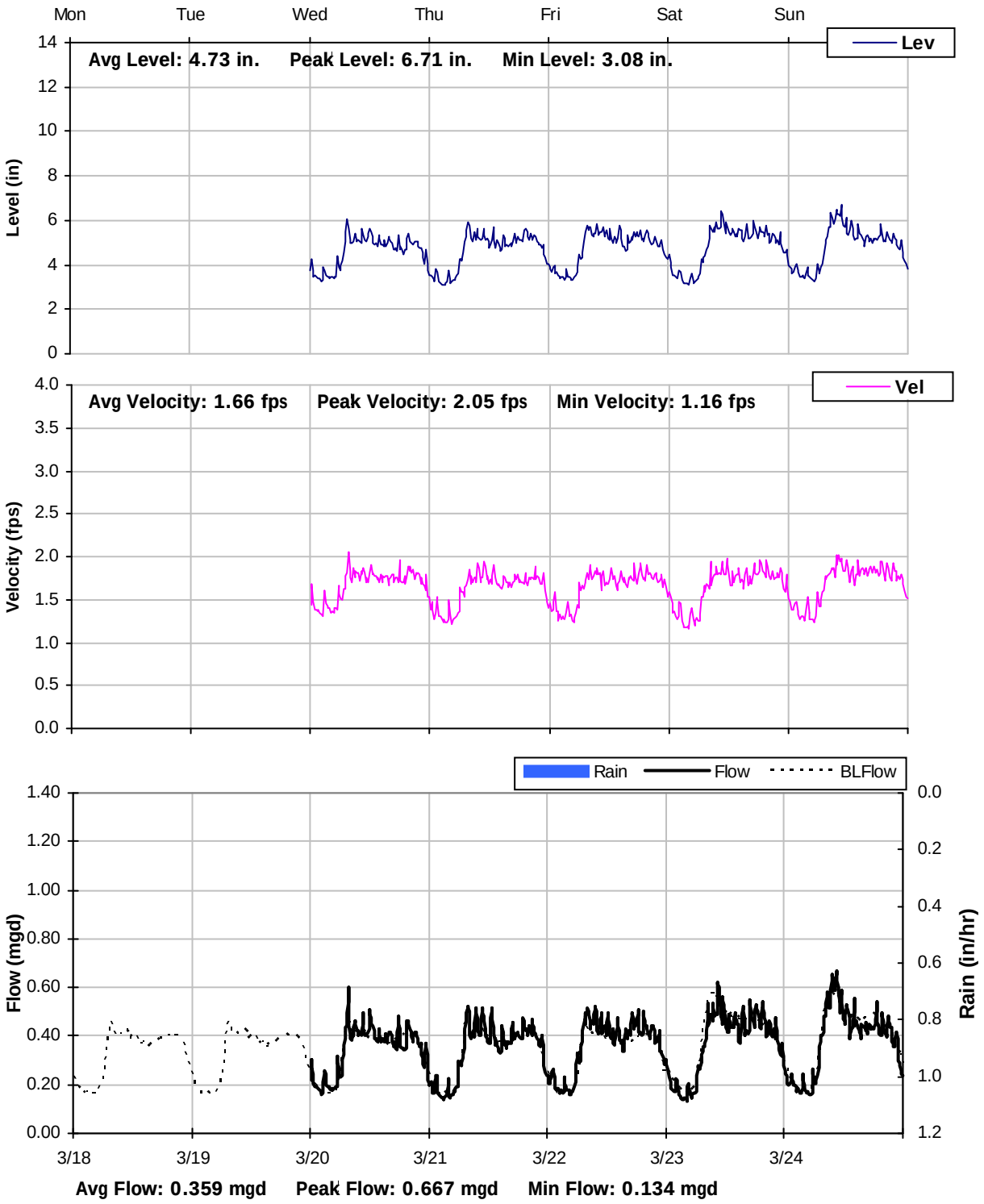
Realtime Flow Levels with Rainfall Data over Monitoring Period



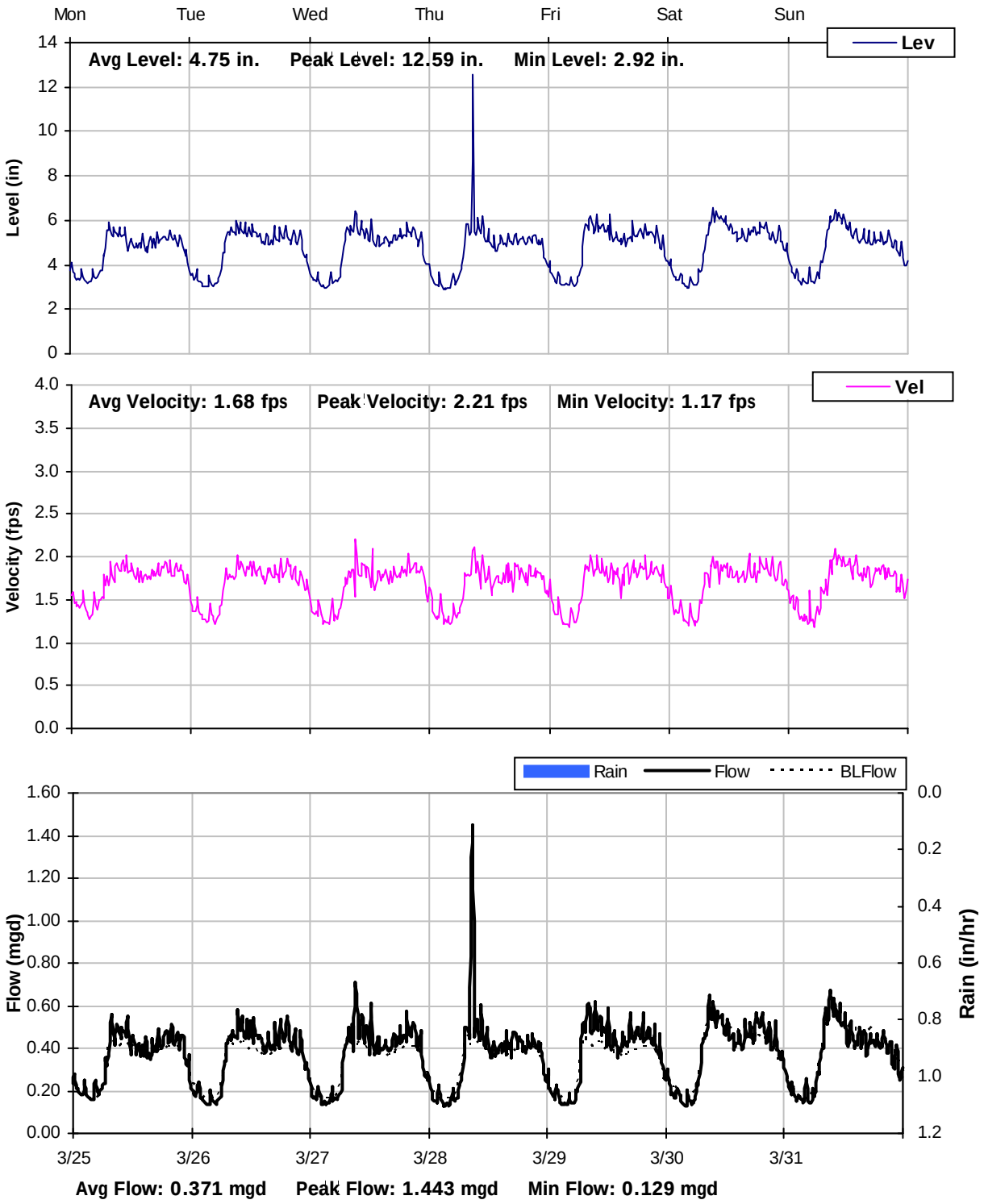


Pipe Diameter:	14.5 *inches*
Peak Measured Level:	8.69 *inches*
Peak d/D Ratio:	0.60

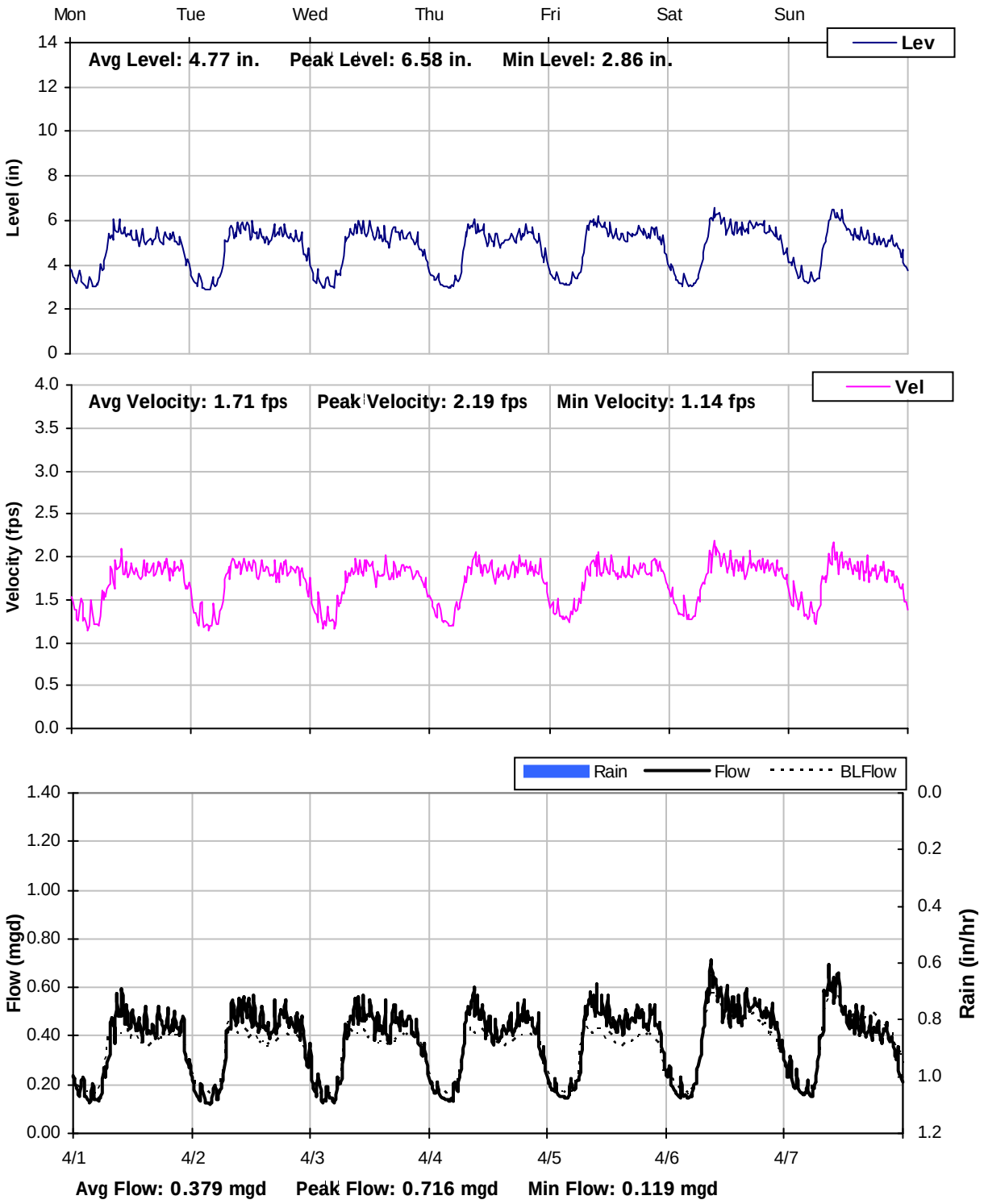
SITE B
Weekly Level, Velocity and Flow Hydrographs
3/18/2013 to 3/25/2013



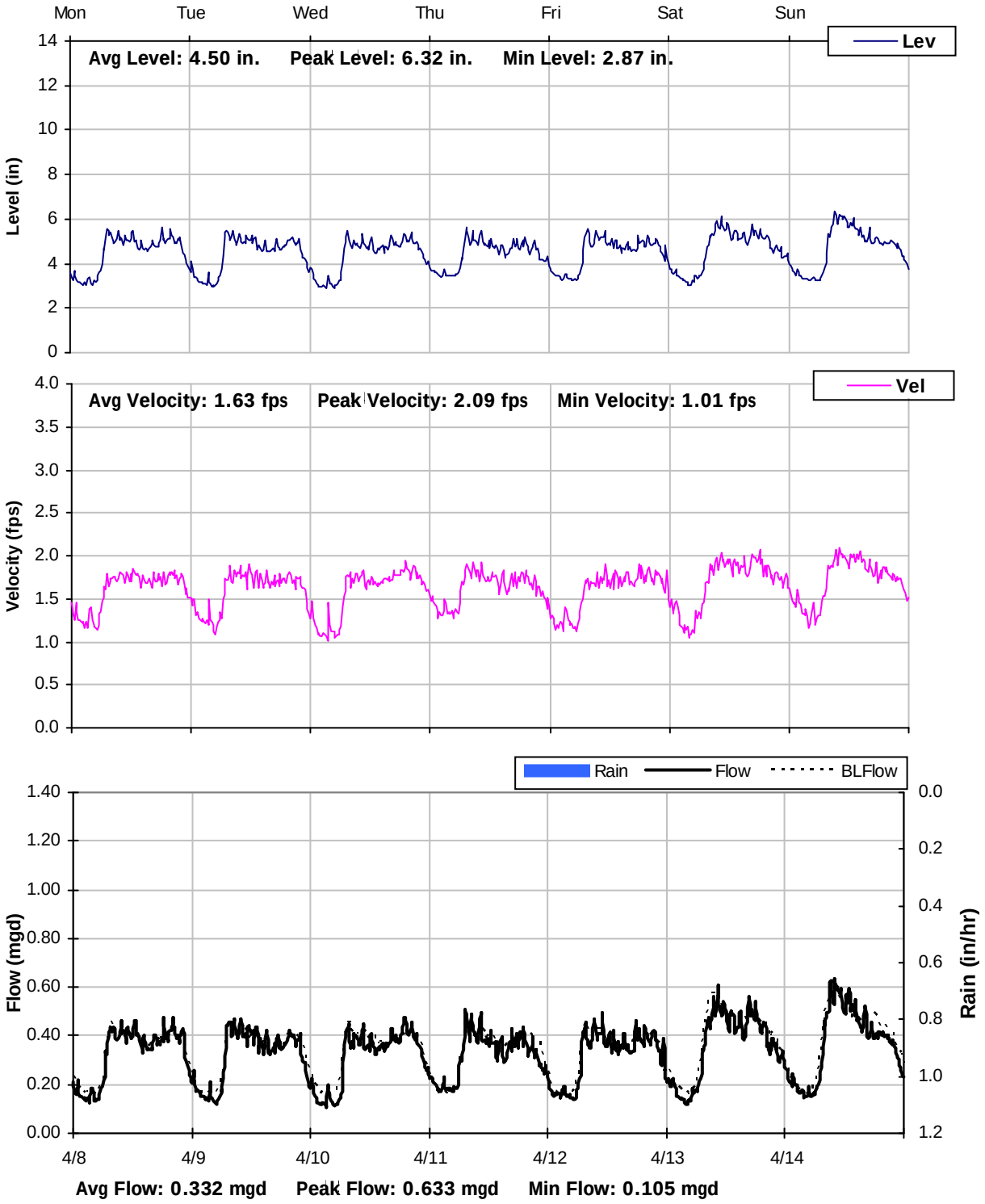
SITE B
Weekly Level, Velocity and Flow Hydrographs
3/25/2013 to 4/1/2013



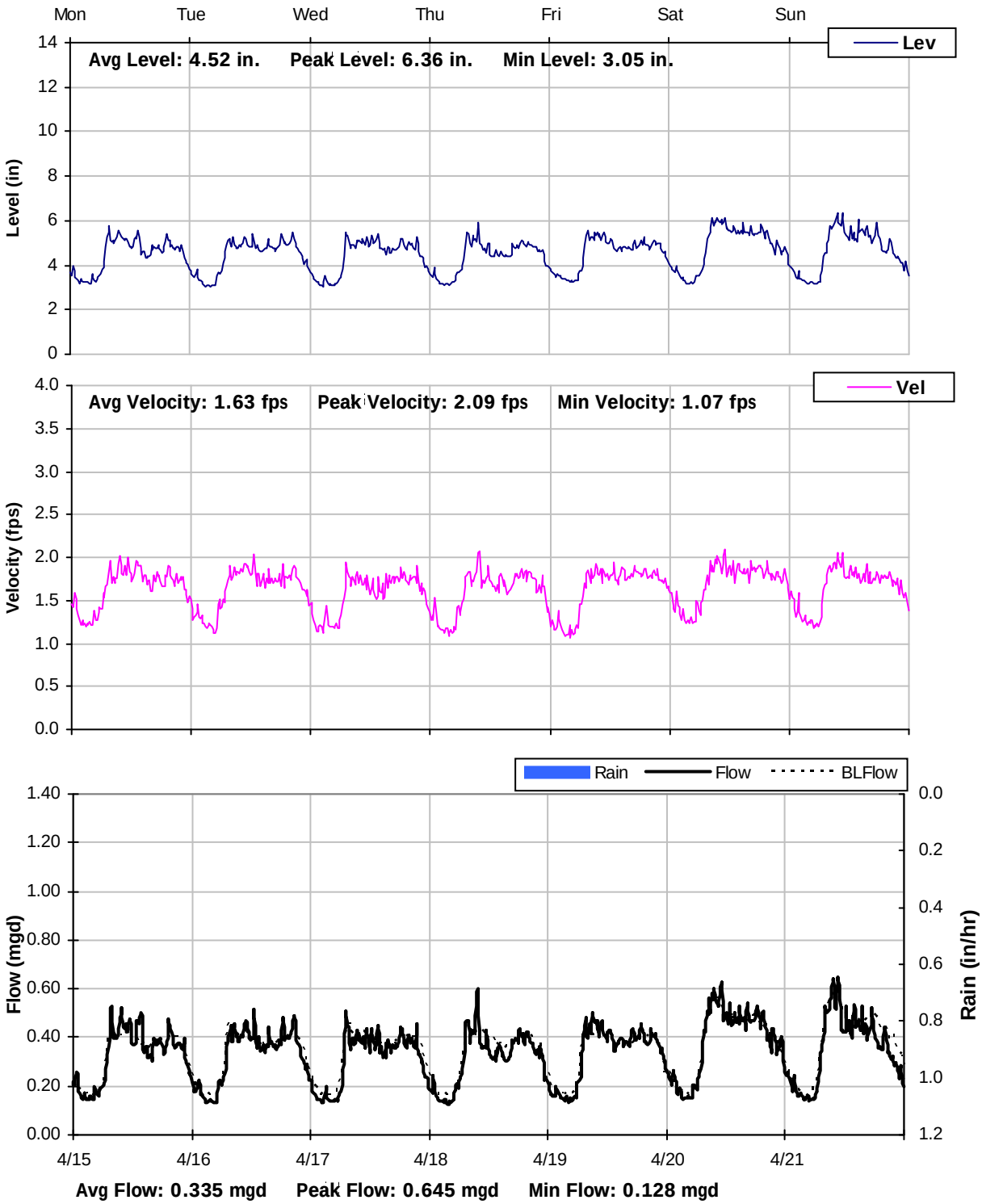
SITE B
Weekly Level, Velocity and Flow Hydrographs
4/1/2013 to 4/8/2013



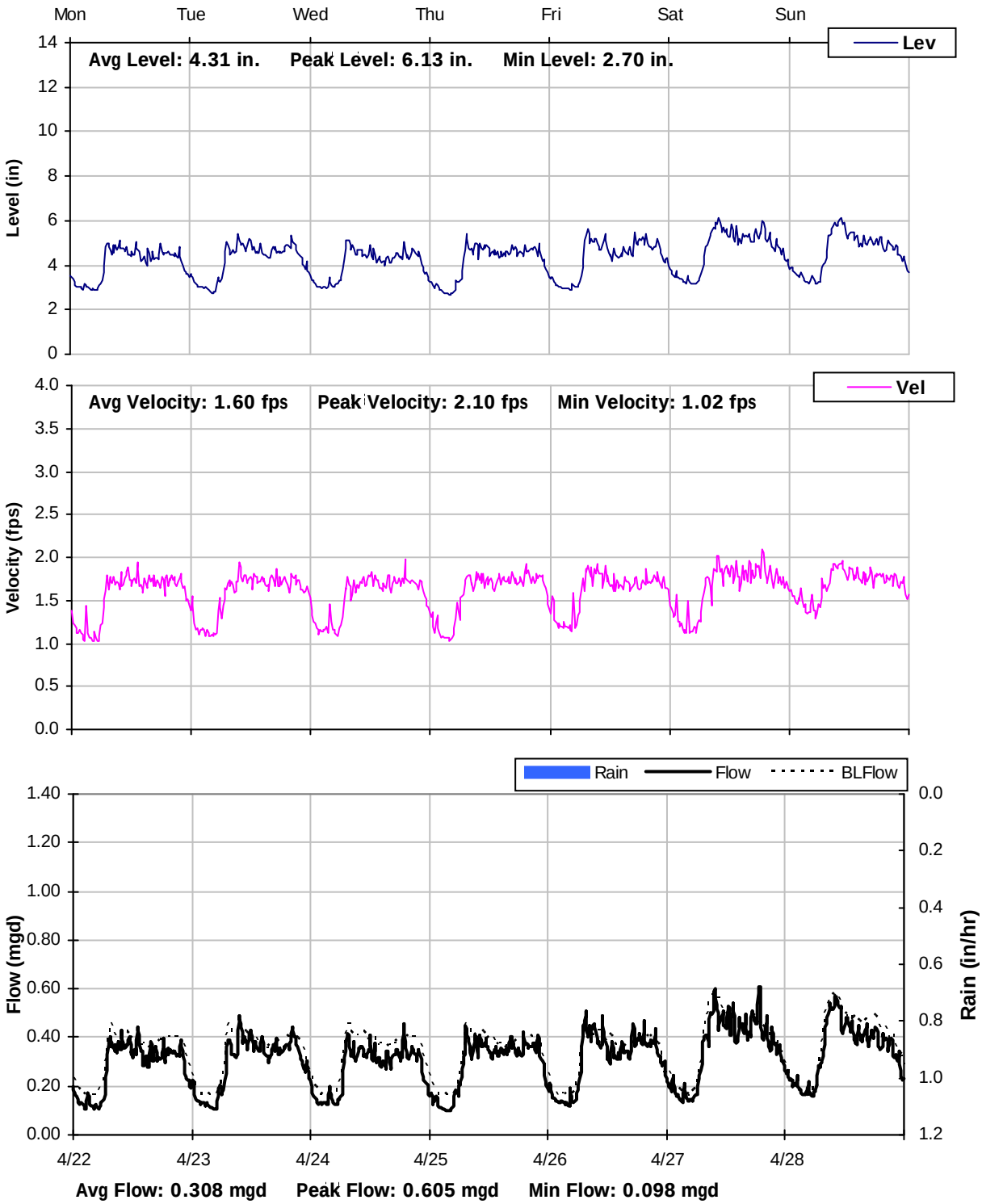
SITE B
Weekly Level, Velocity and Flow Hydrographs
4/8/2013 to 4/15/2013



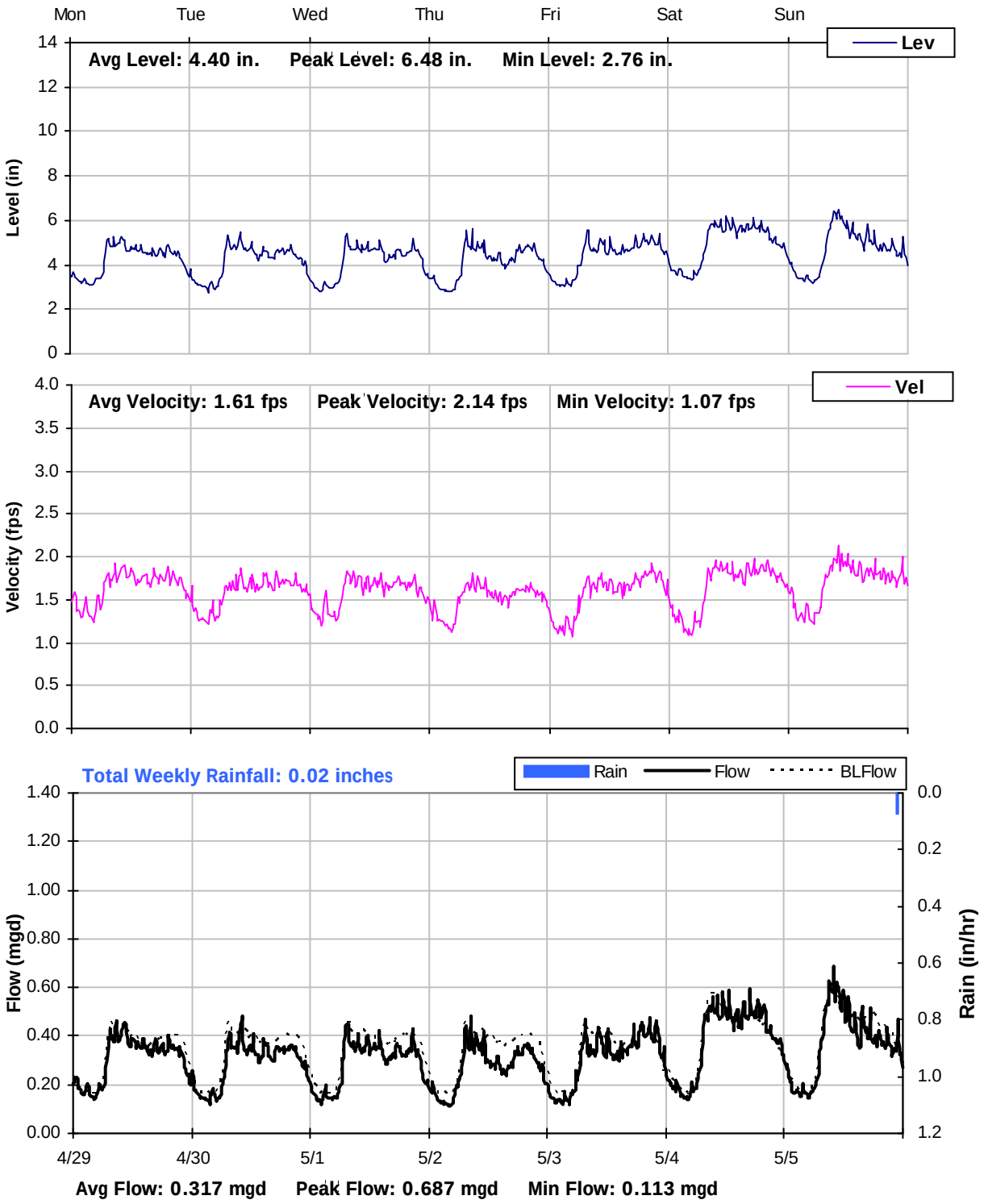
SITE B
Weekly Level, Velocity and Flow Hydrographs
4/15/2013 to 4/22/2013



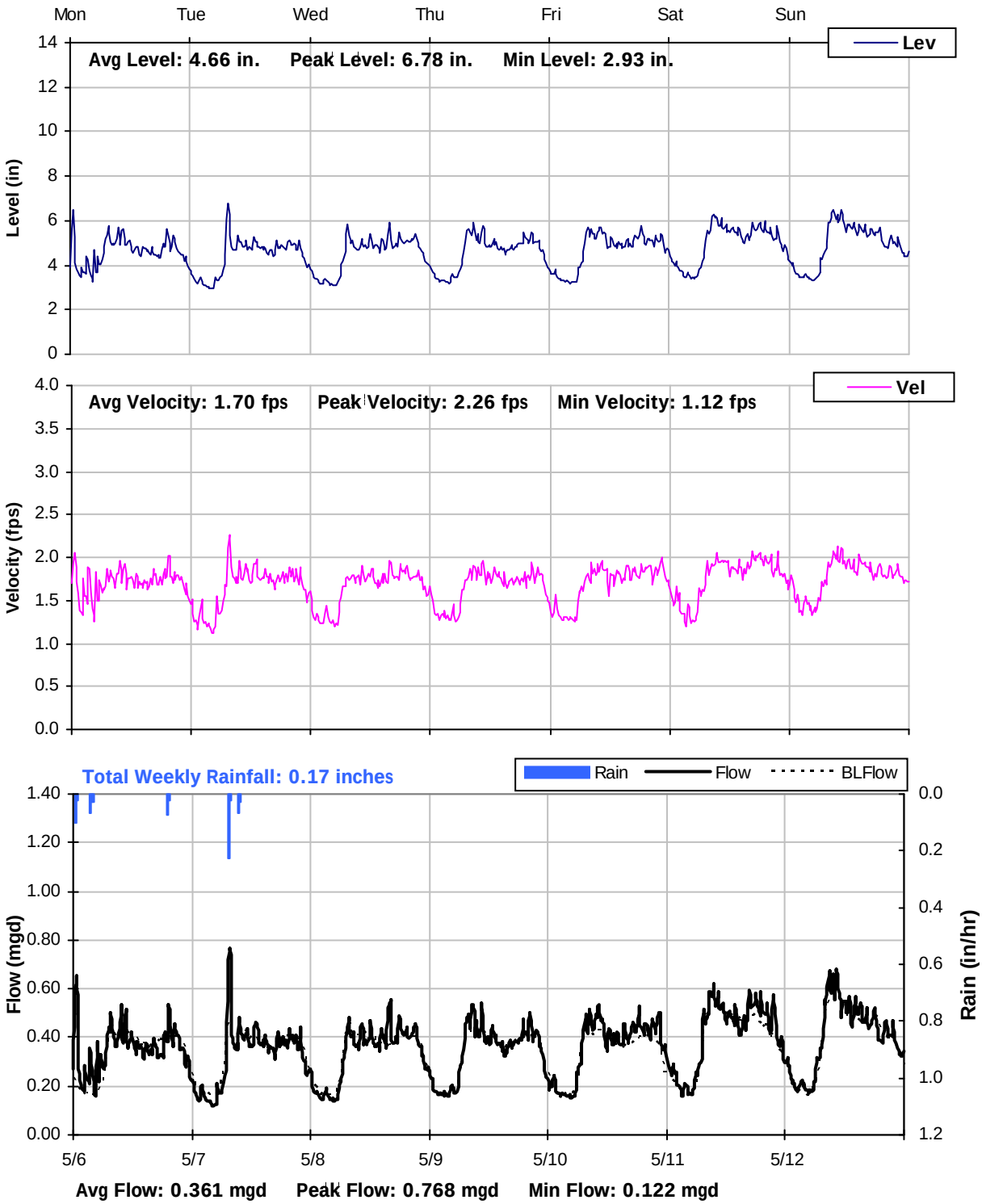
SITE B
Weekly Level, Velocity and Flow Hydrographs
4/22/2013 to 4/29/2013



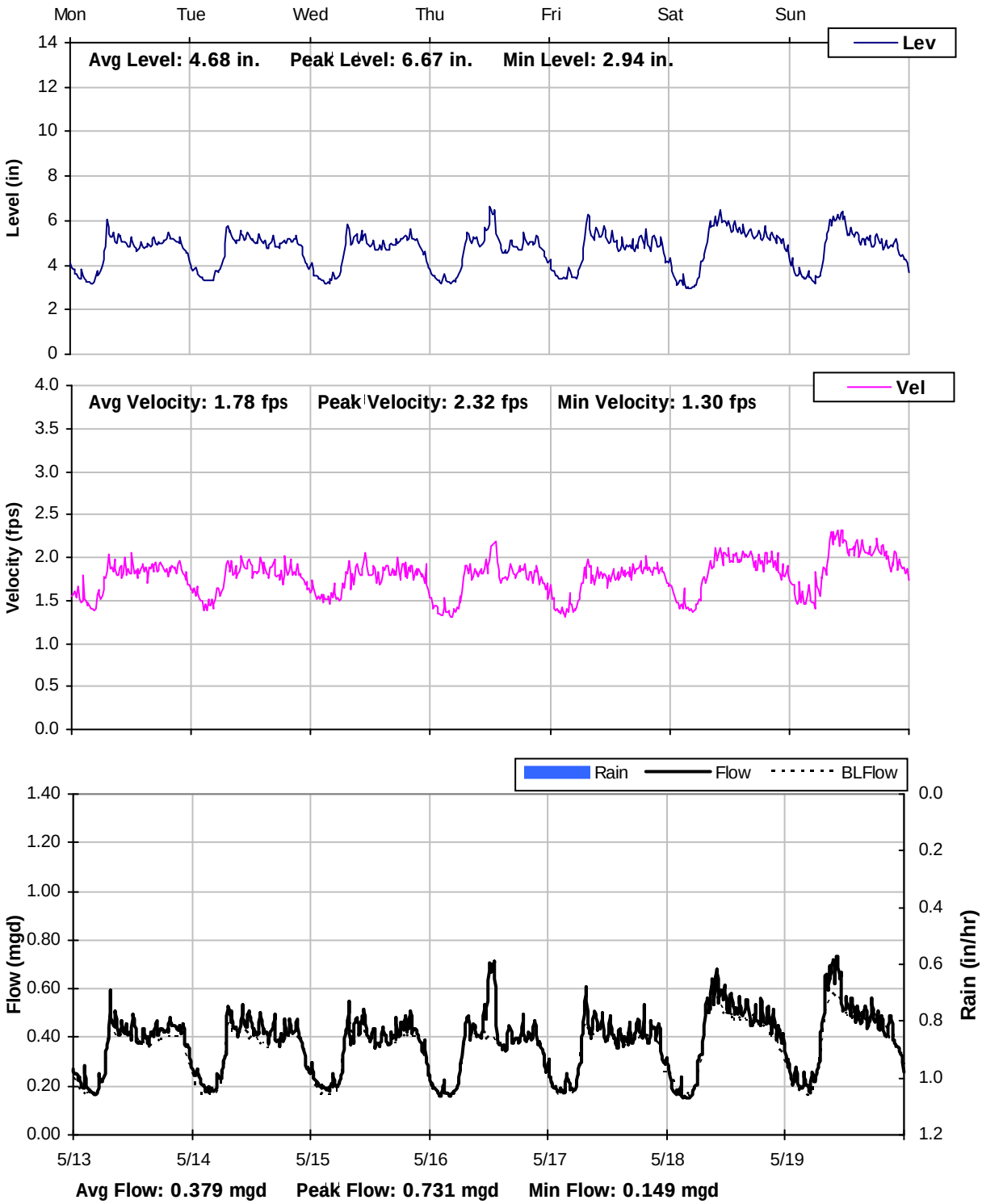
SITE B
Weekly Level, Velocity and Flow Hydrographs
4/29/2013 to 5/6/2013



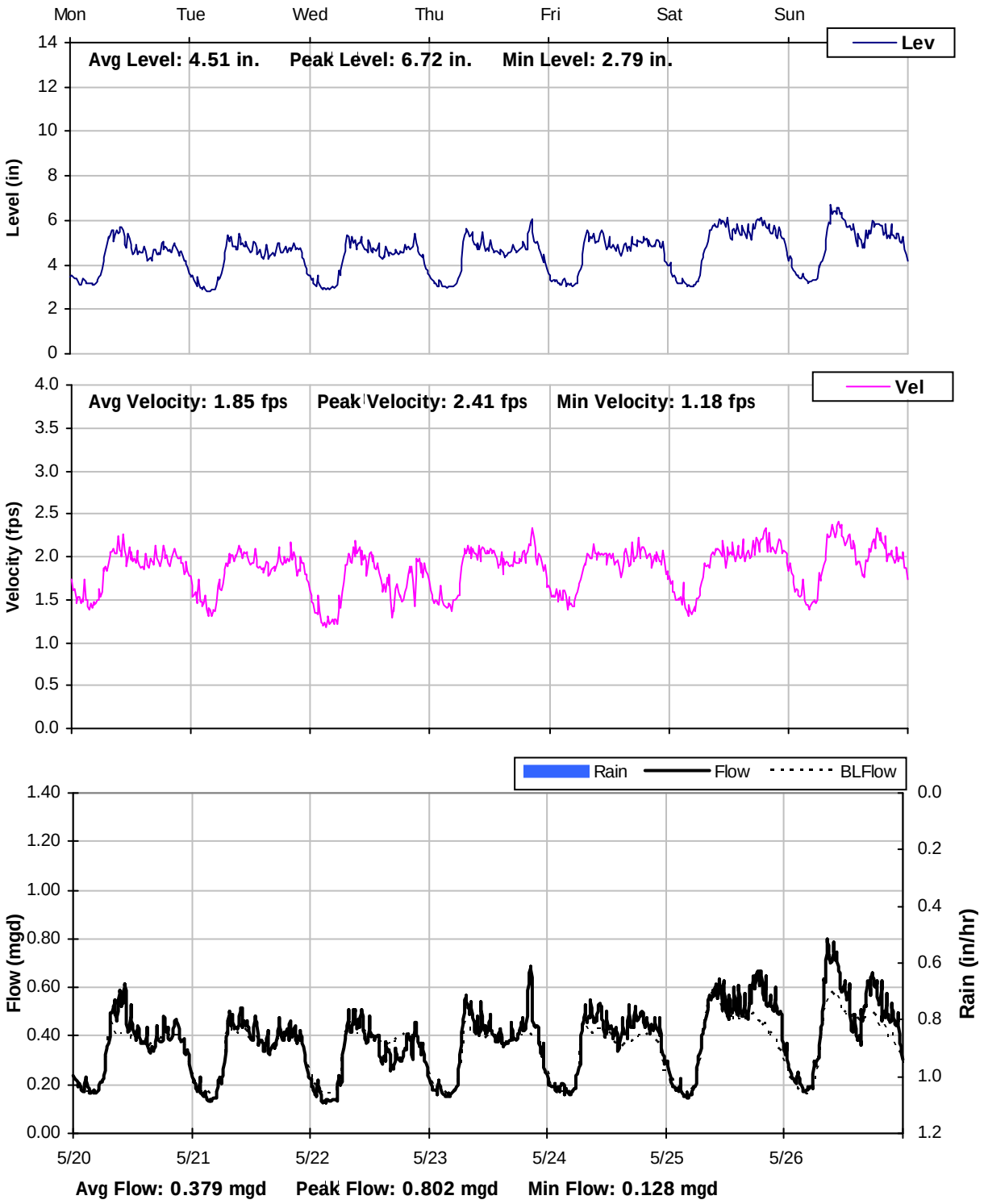
SITE B
Weekly Level, Velocity and Flow Hydrographs
5/6/2013 to 5/13/2013



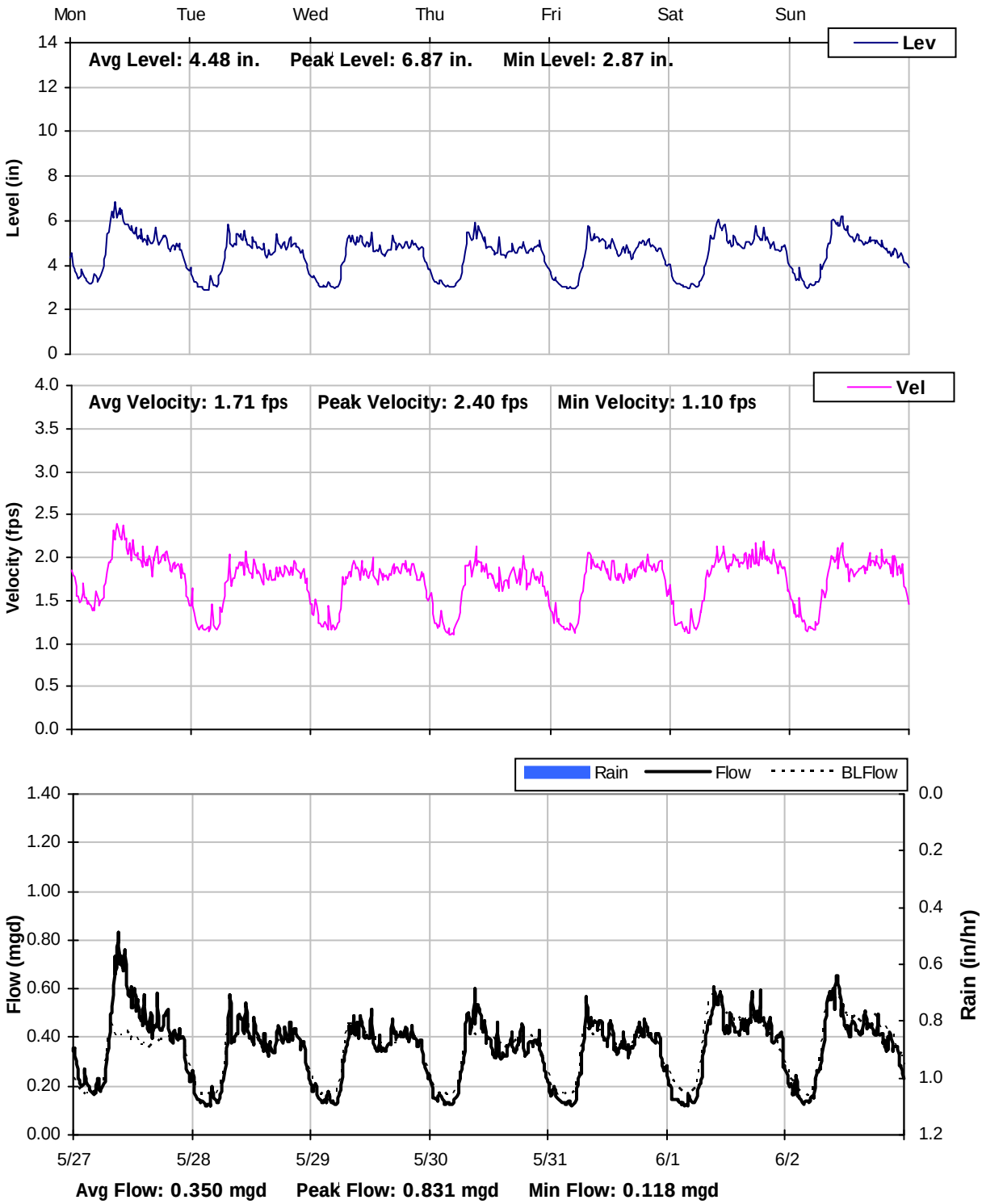
SITE B
Weekly Level, Velocity and Flow Hydrographs
5/13/2013 to 5/20/2013



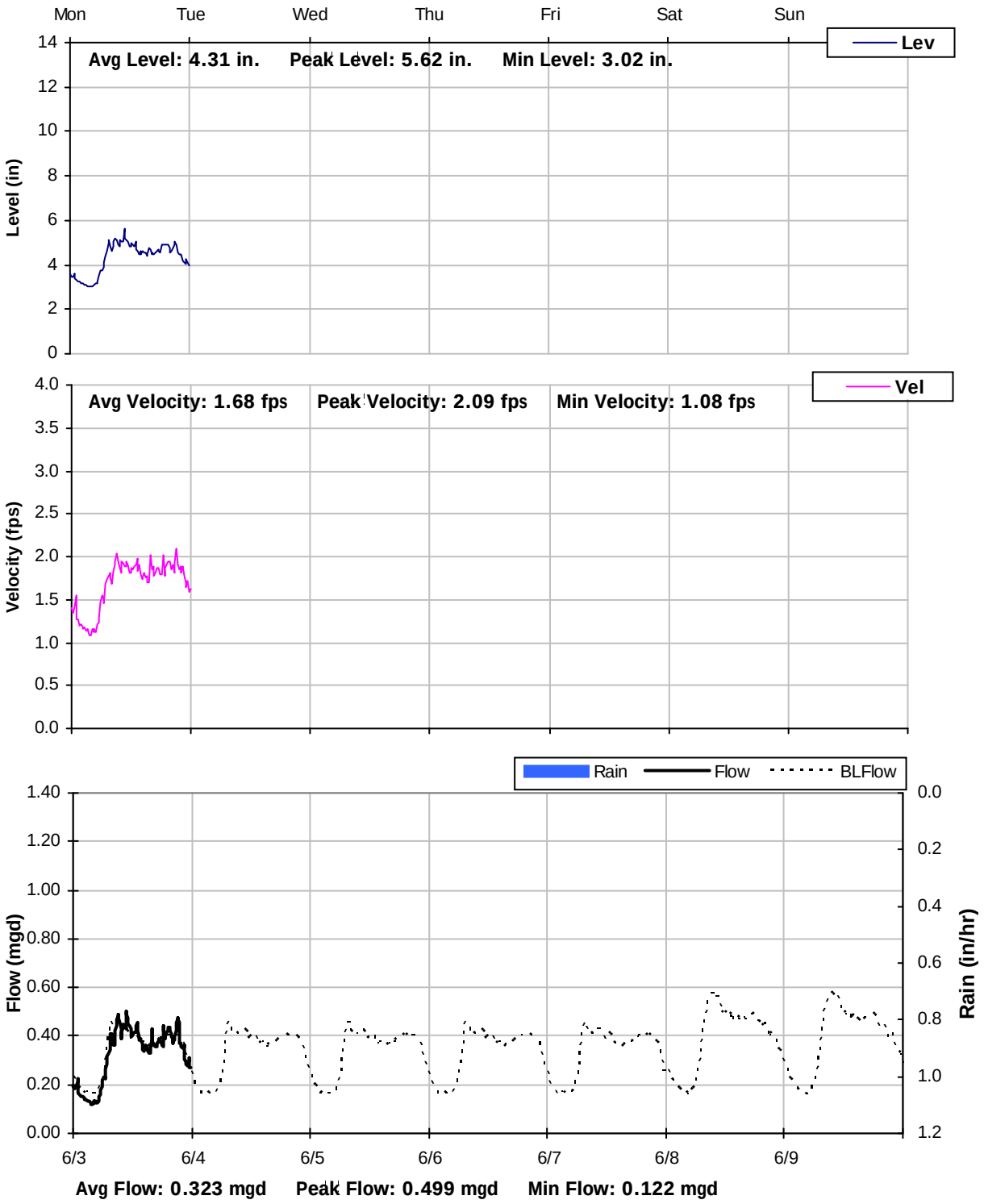
SITE B
Weekly Level, Velocity and Flow Hydrographs
5/20/2013 to 5/27/2013



SITE B
Weekly Level, Velocity and Flow Hydrographs
5/27/2013 to 6/3/2013



SITE B
Weekly Level, Velocity and Flow Hydrographs
6/3/2013 to 6/10/2013



City of Avalon

Sanitary Sewer Flow Monitoring

Temporary Monitoring: March 19 to June 4, 2013

Monitoring Site: Site D

Location: Intersection of Crescent Avenue and Catalina Avenue

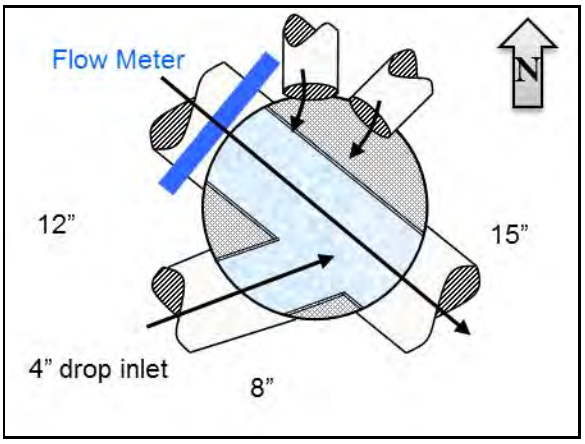
Data Summary Report

Vicinity Map: Site D

SITE D

Site Information

Location:	Intersection of Crescent Avenue and Catalina Avenue
Coordinates:	118.3253° W, 33.3433° N
Rim Elevation:	10 feet
Pipe Diameter:	10.5 inches
Baseline Flow:	0.244 mgd
Peak Measured Flow:	1.035 mgd



Flow Diagram

Sanitary Sewer Map

Plan View

Effluent Pipe

SITE D
Additional Site Photos

Influent Pipe

Lateral Pipe

SITE D
Additional Site Photos

Northeast Drop Lateral Pipe

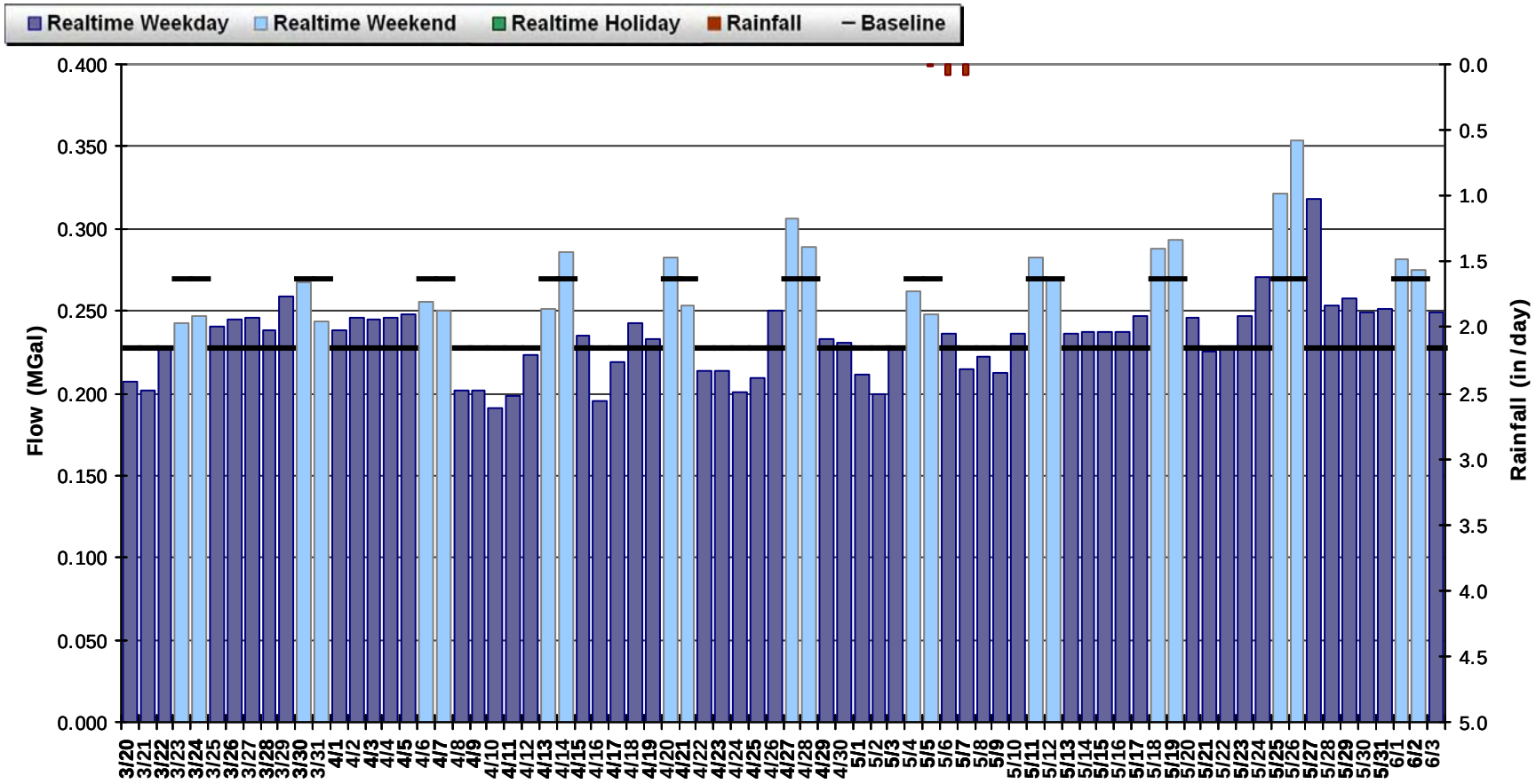
Southeast Drop Lateral Pipe

SITE D

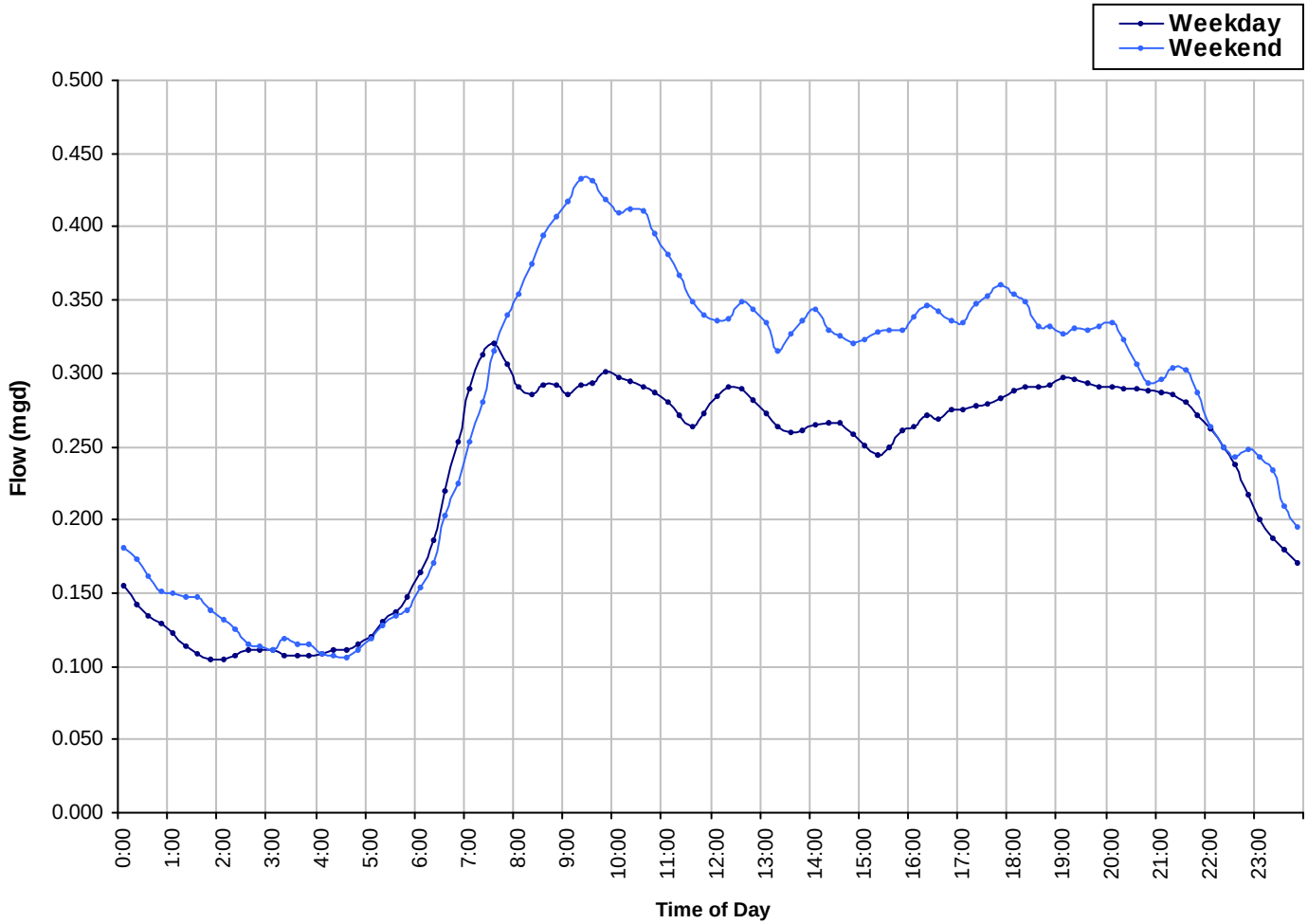
Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.244 MGal **Peak Daily Flow: 0.354 MGal** **Min Daily Flow: 0.191 MGal**

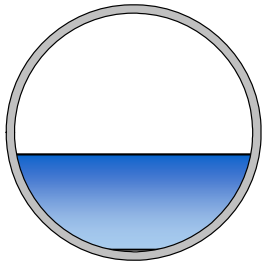
Total Period Rainfall: 0.19 inches



SITE D
Baseline Flow Hydrographs



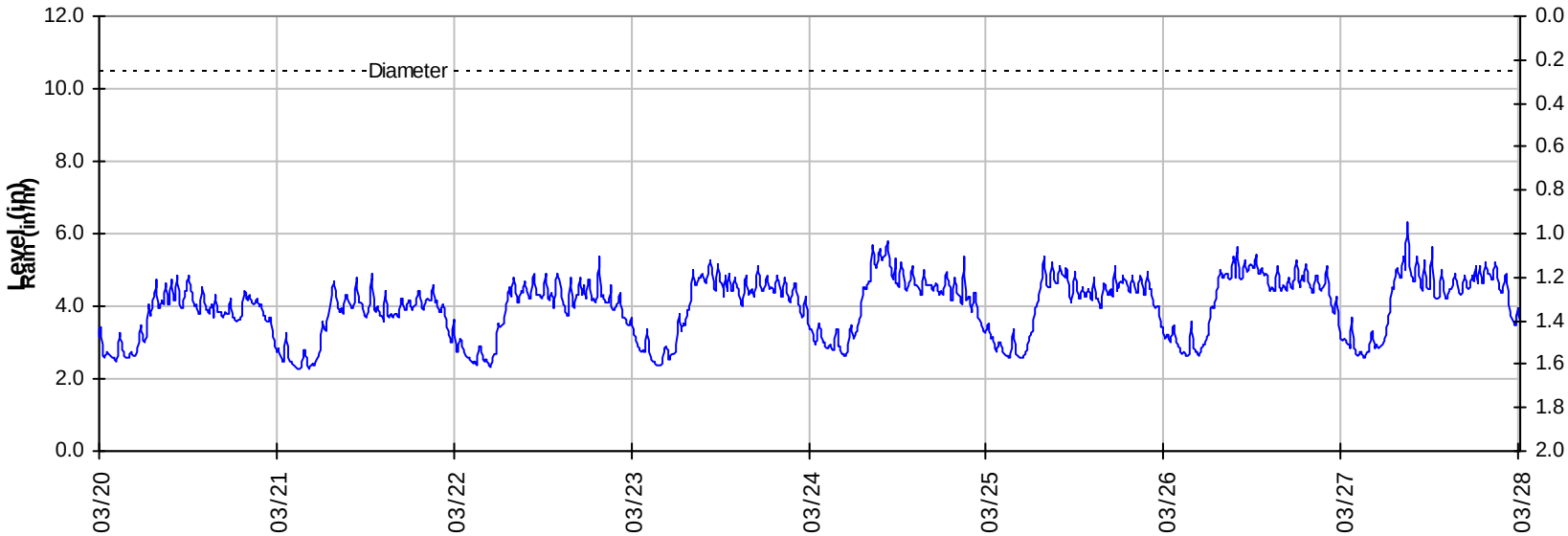
Baseline Flow:
0.244 mgd

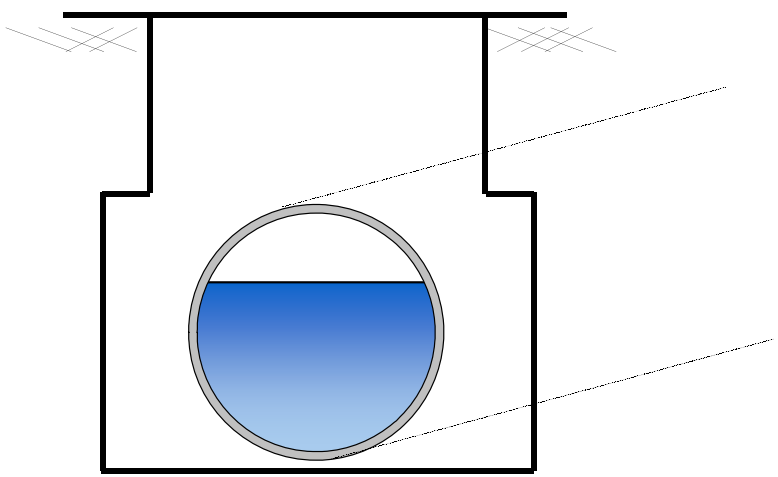


SITE D

Site Capacity and Surcharge Summary

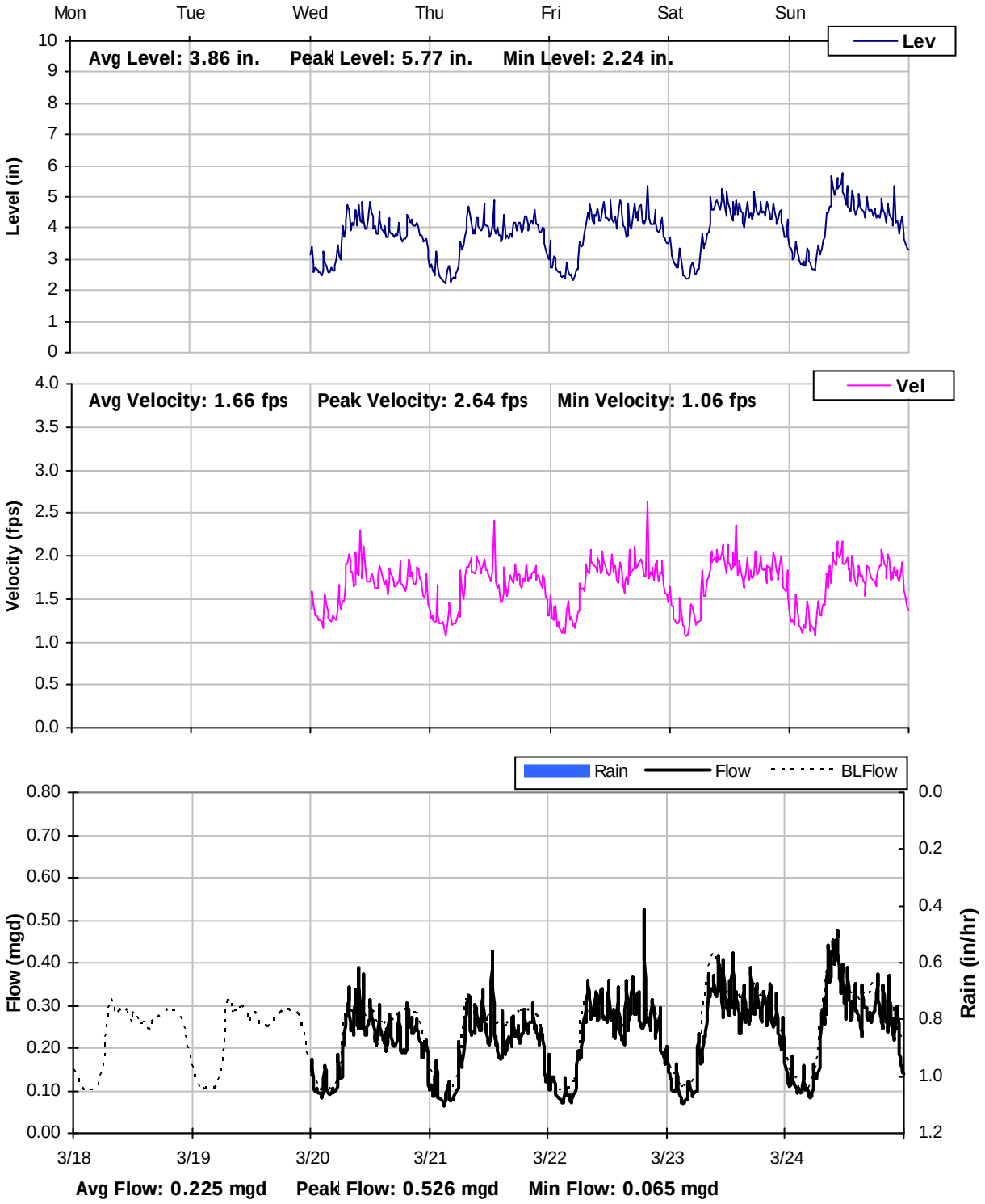
Realtime Flow Levels with Rainfall Data over Monitoring Period



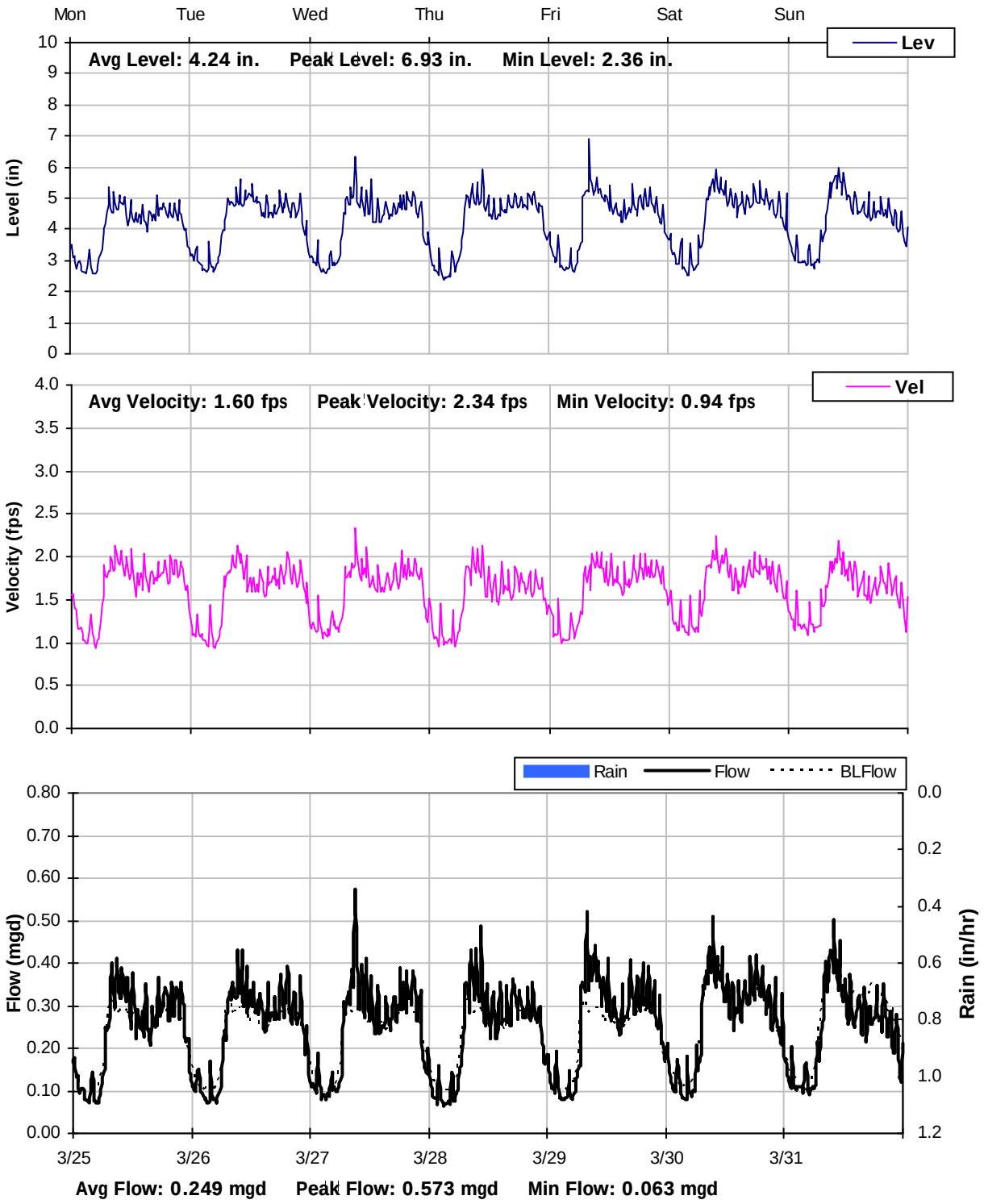


Pipe Diameter:	10.5 *inches*
Peak Measured Level:	7.42 *inches*
Peak d/D Ratio:	0.71

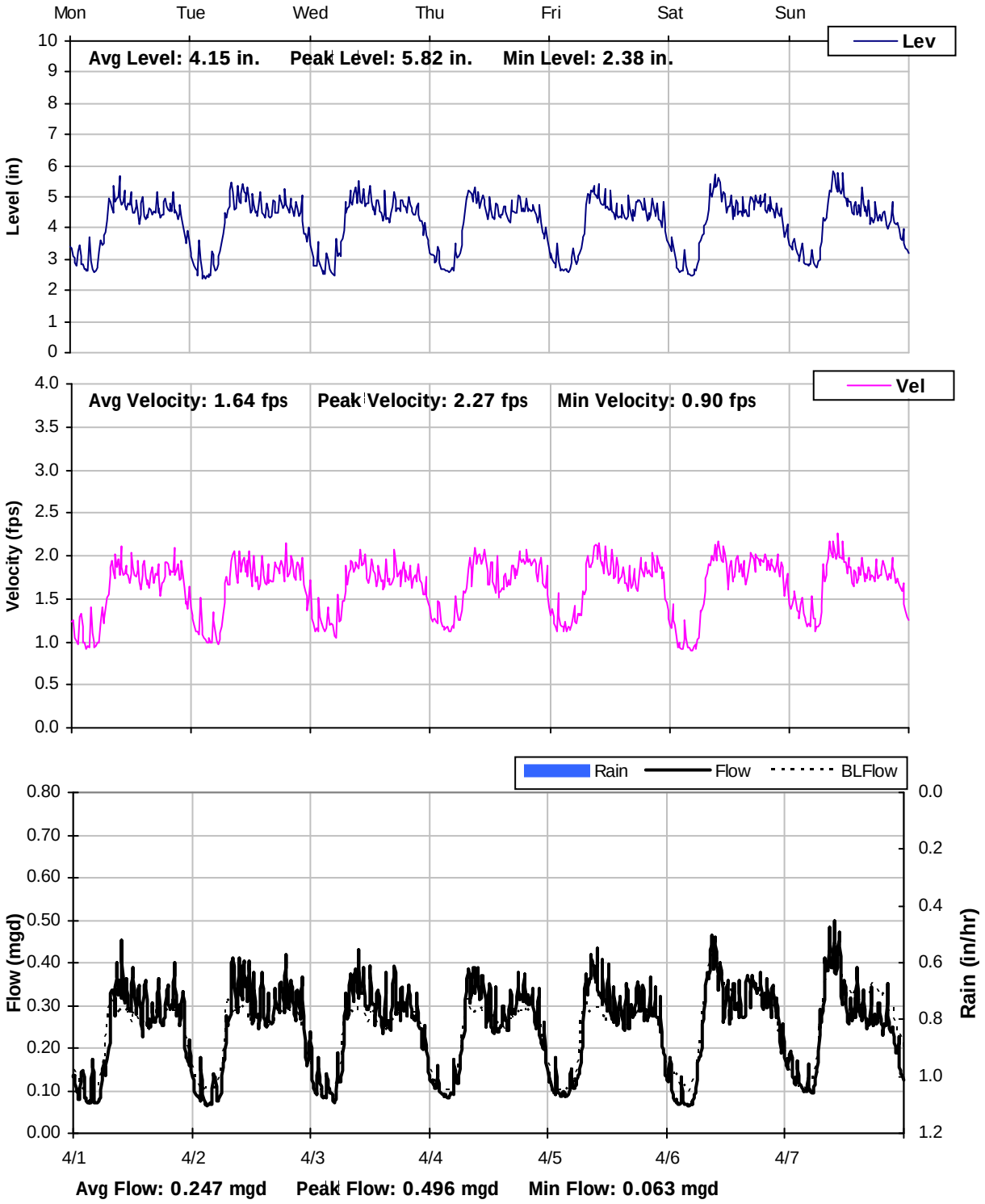
SITE D
Weekly Level, Velocity and Flow Hydrographs
3/18/2013 to 3/25/2013



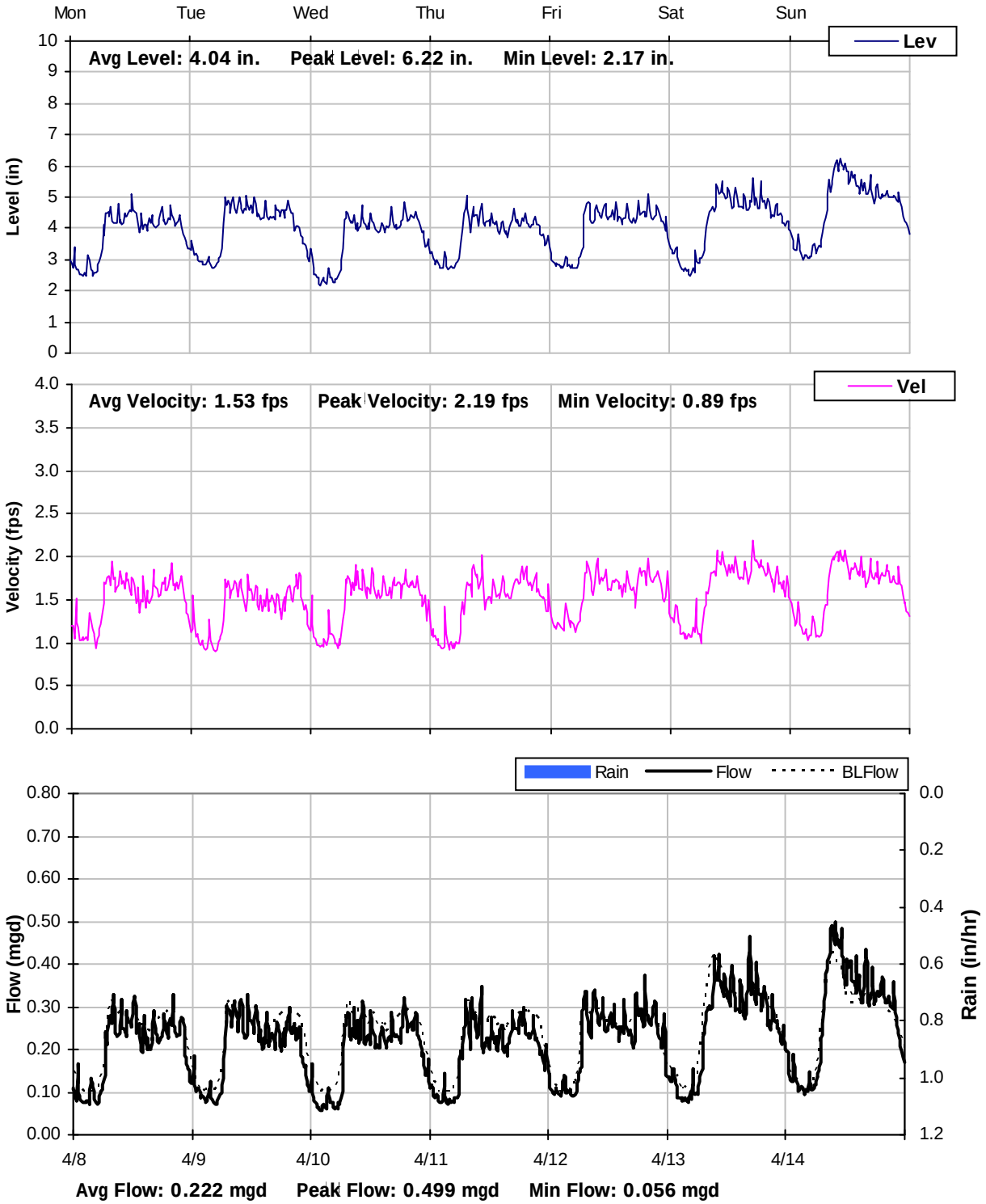
SITE D
Weekly Level, Velocity and Flow Hydrographs
3/25/2013 to 4/1/2013



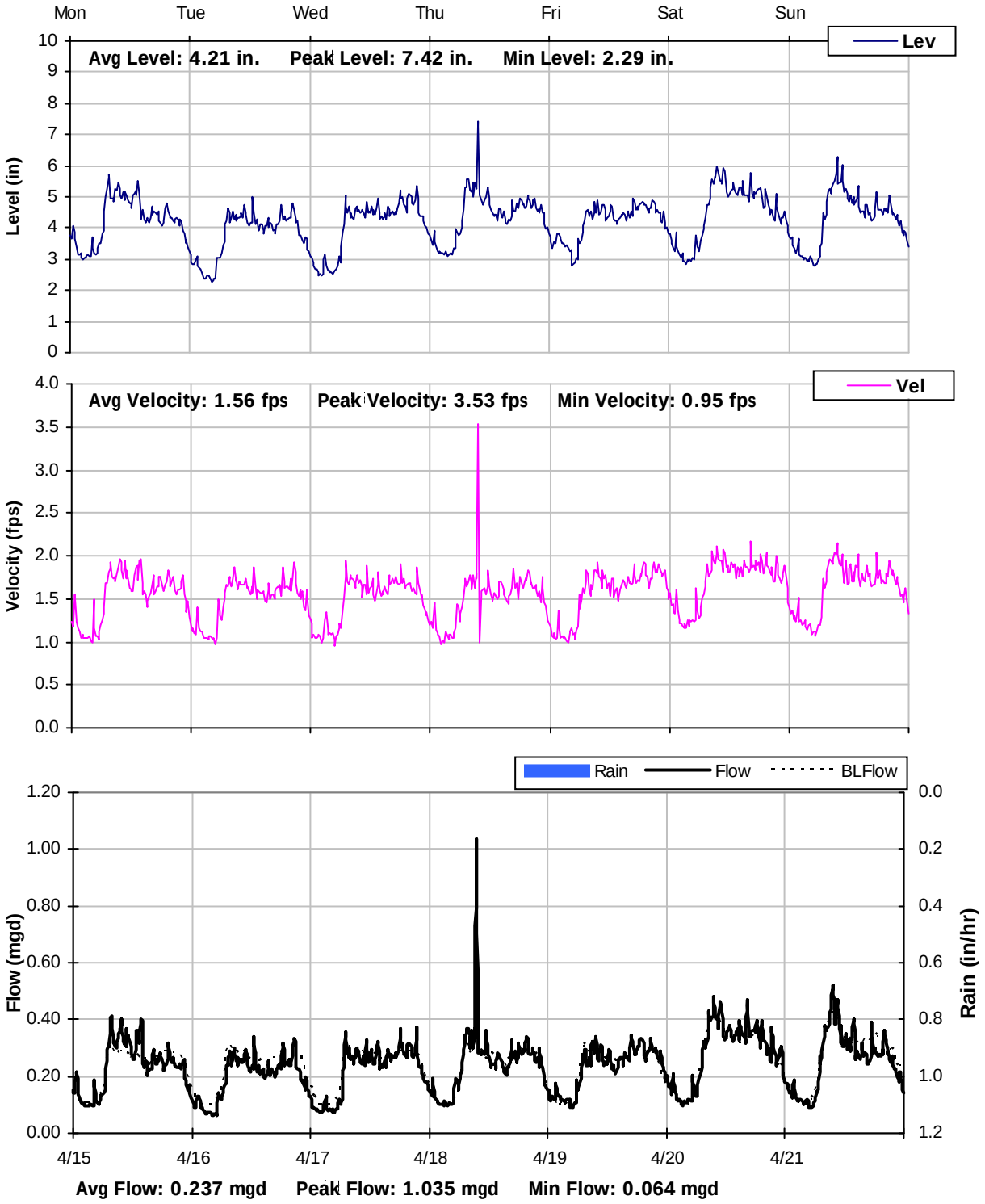
SITE D
Weekly Level, Velocity and Flow Hydrographs
4/1/2013 to 4/8/2013



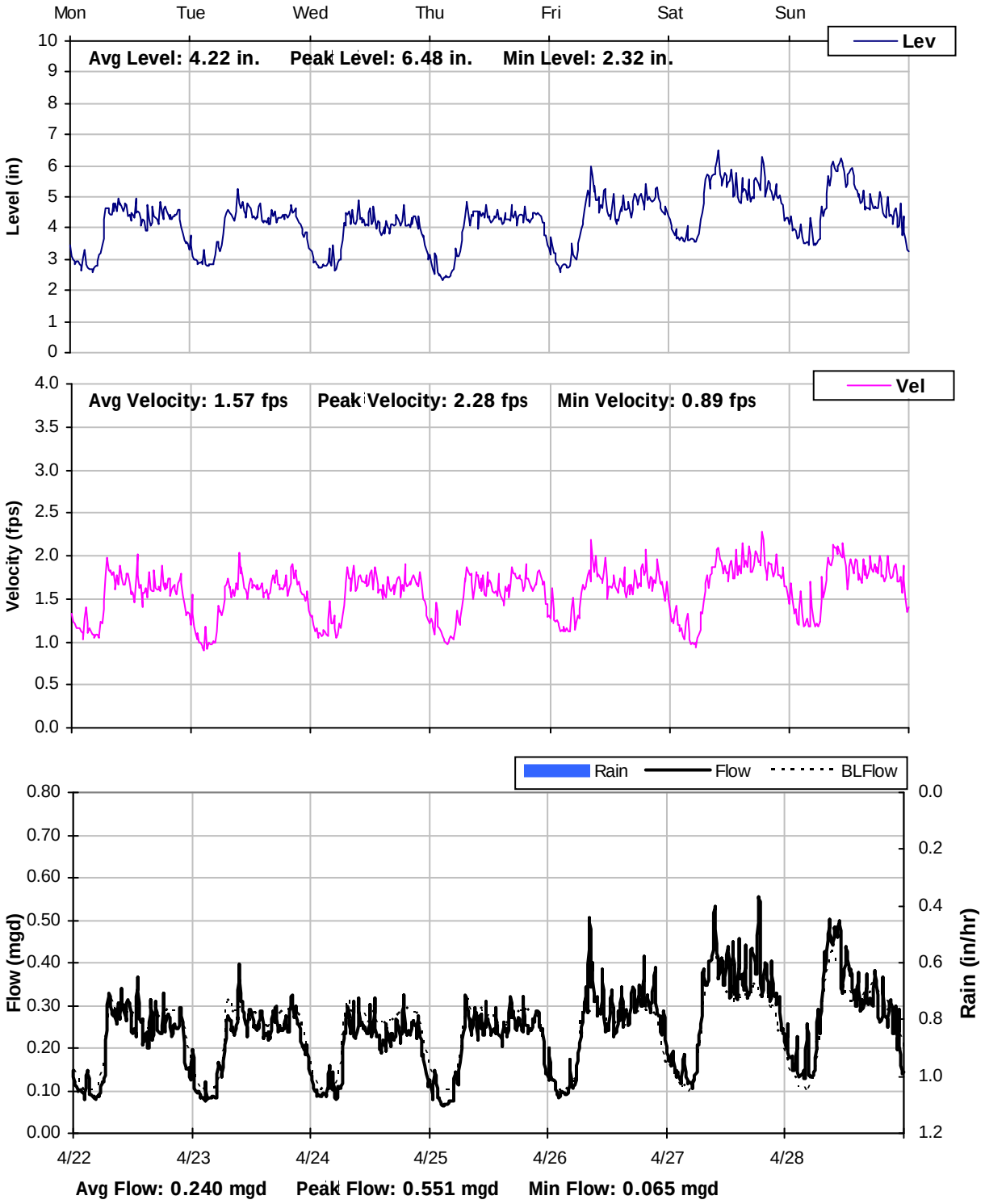
SITE D
Weekly Level, Velocity and Flow Hydrographs
4/8/2013 to 4/15/2013



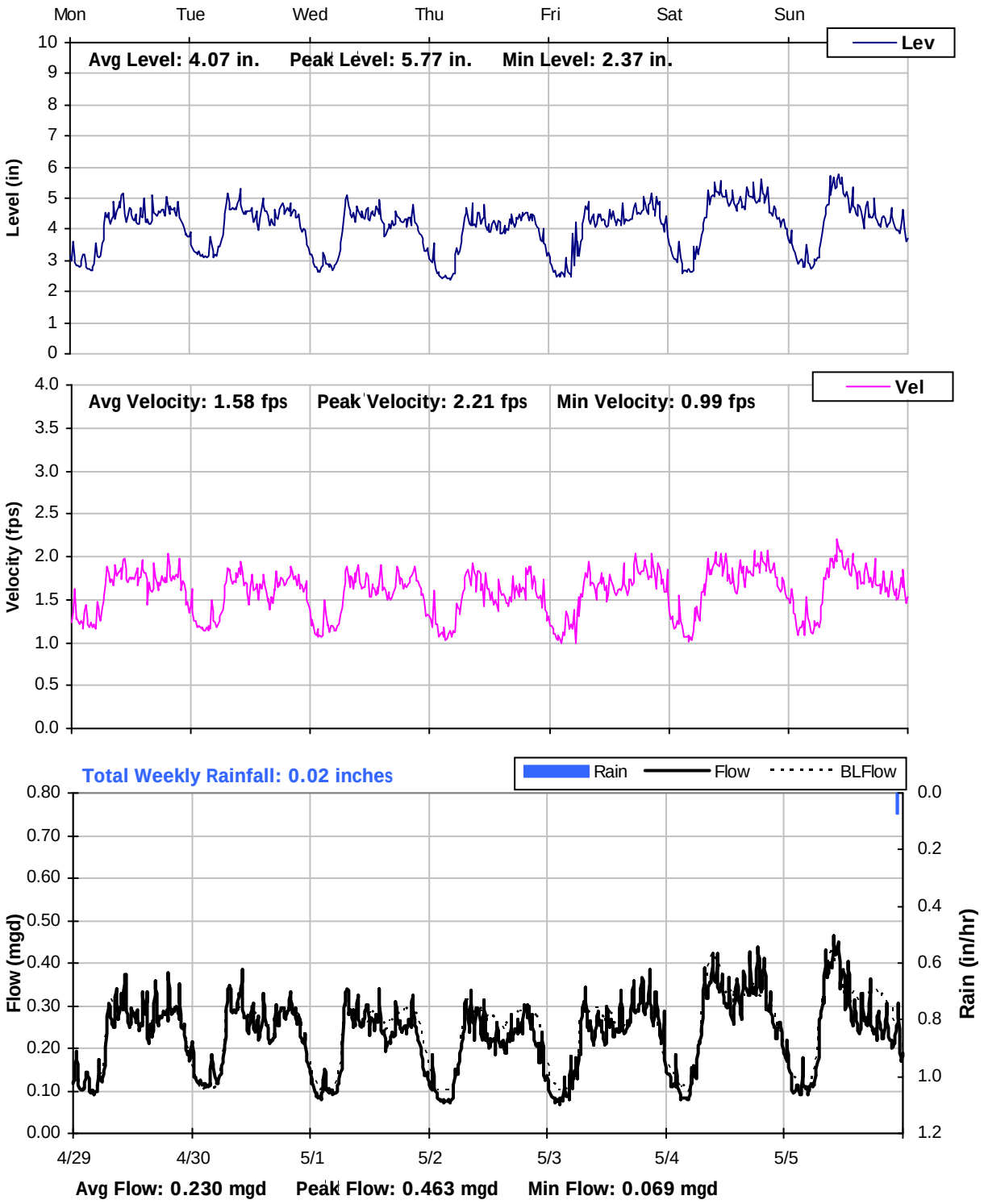
SITE D
Weekly Level, Velocity and Flow Hydrographs
4/15/2013 to 4/22/2013



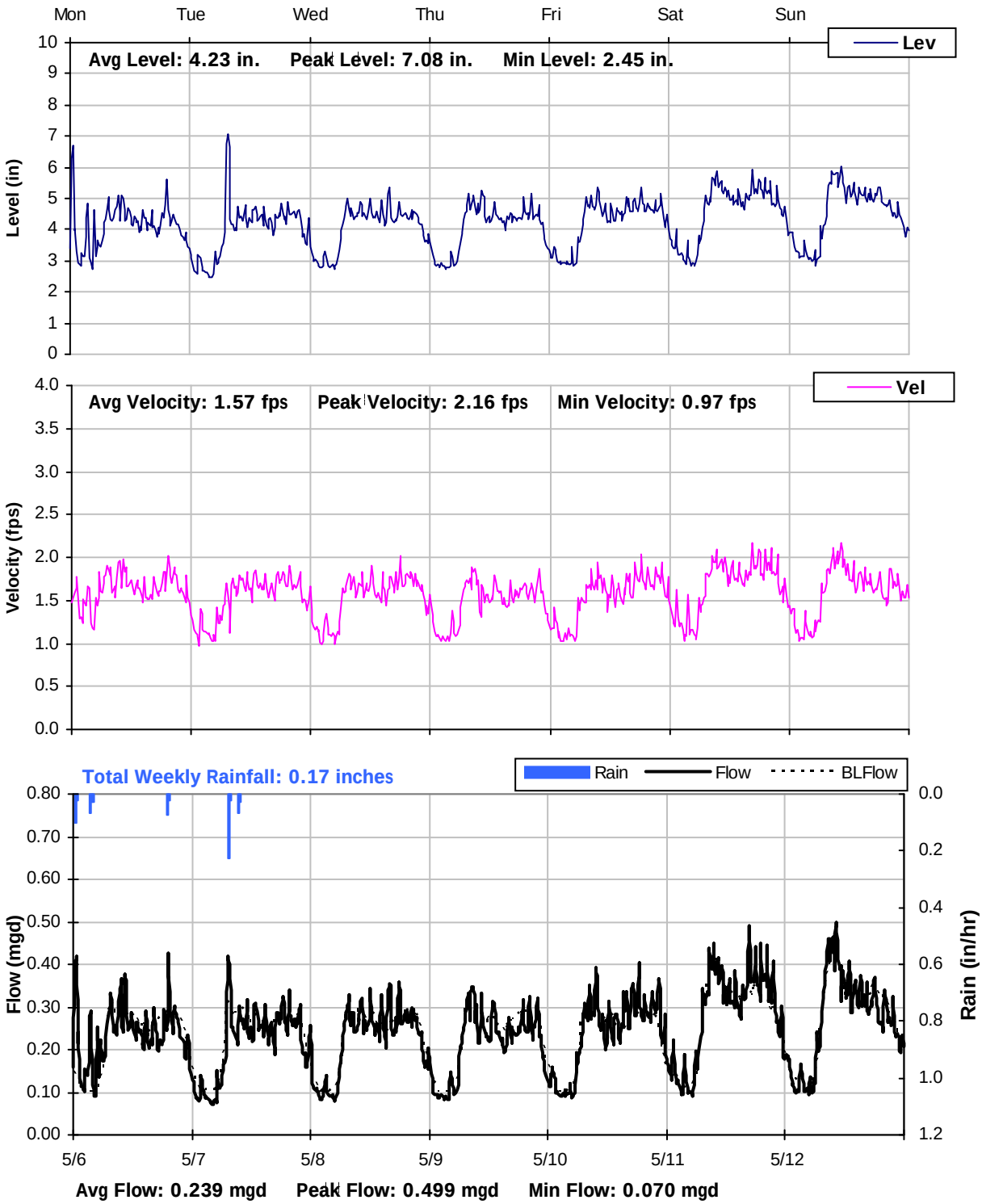
SITE D
Weekly Level, Velocity and Flow Hydrographs
4/22/2013 to 4/29/2013



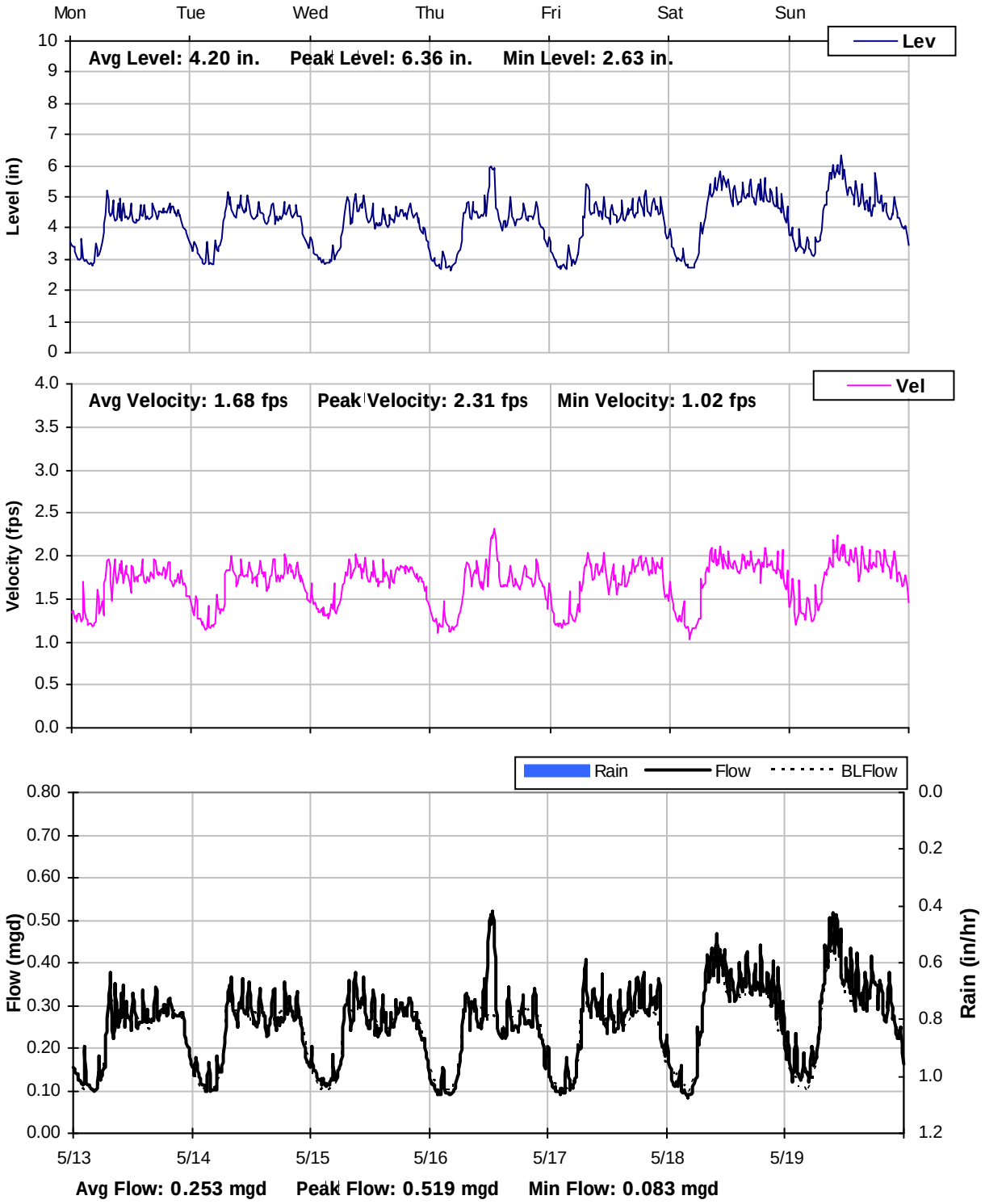
SITE D
Weekly Level, Velocity and Flow Hydrographs
4/29/2013 to 5/6/2013



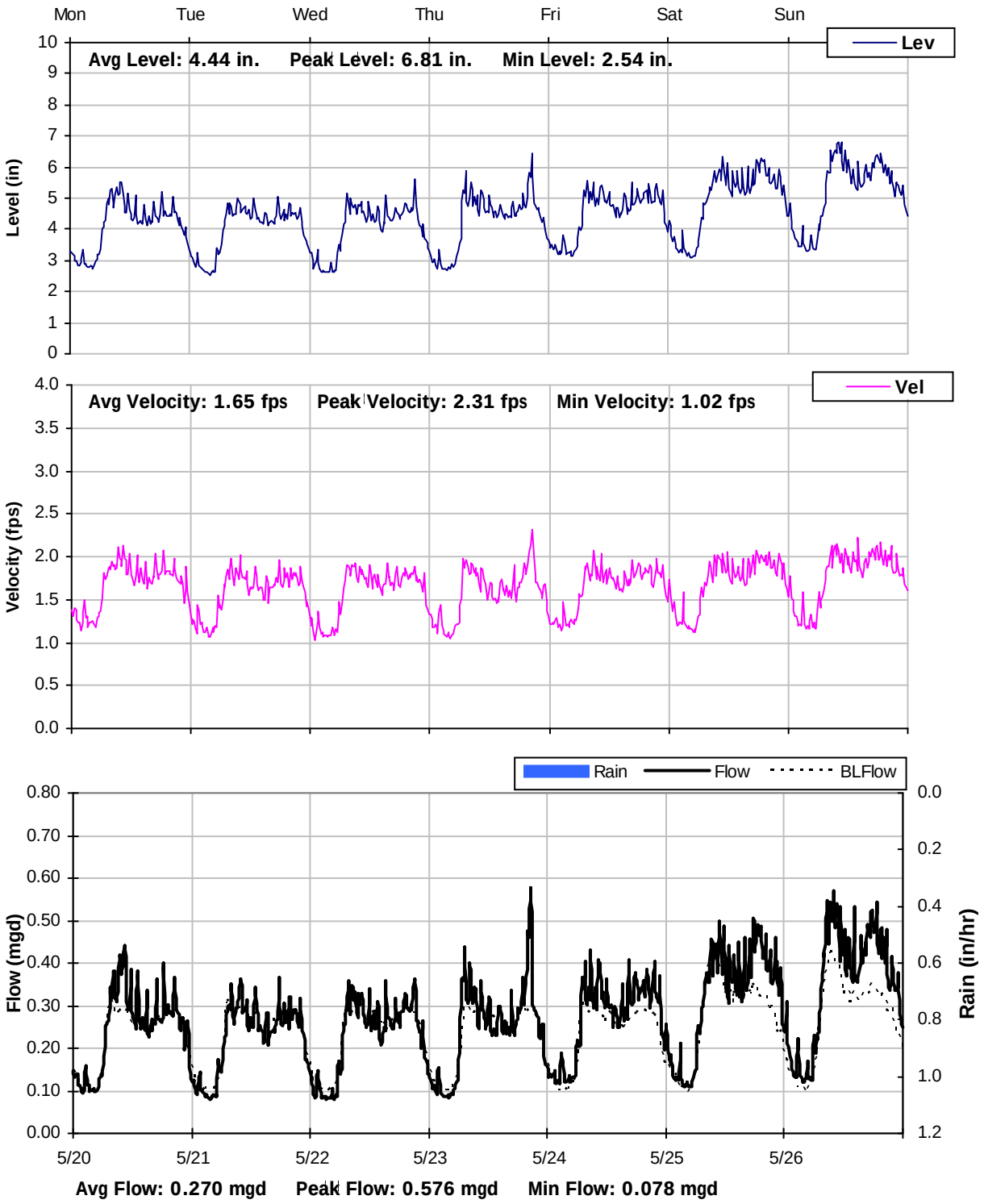
SITE D
Weekly Level, Velocity and Flow Hydrographs
5/6/2013 to 5/13/2013



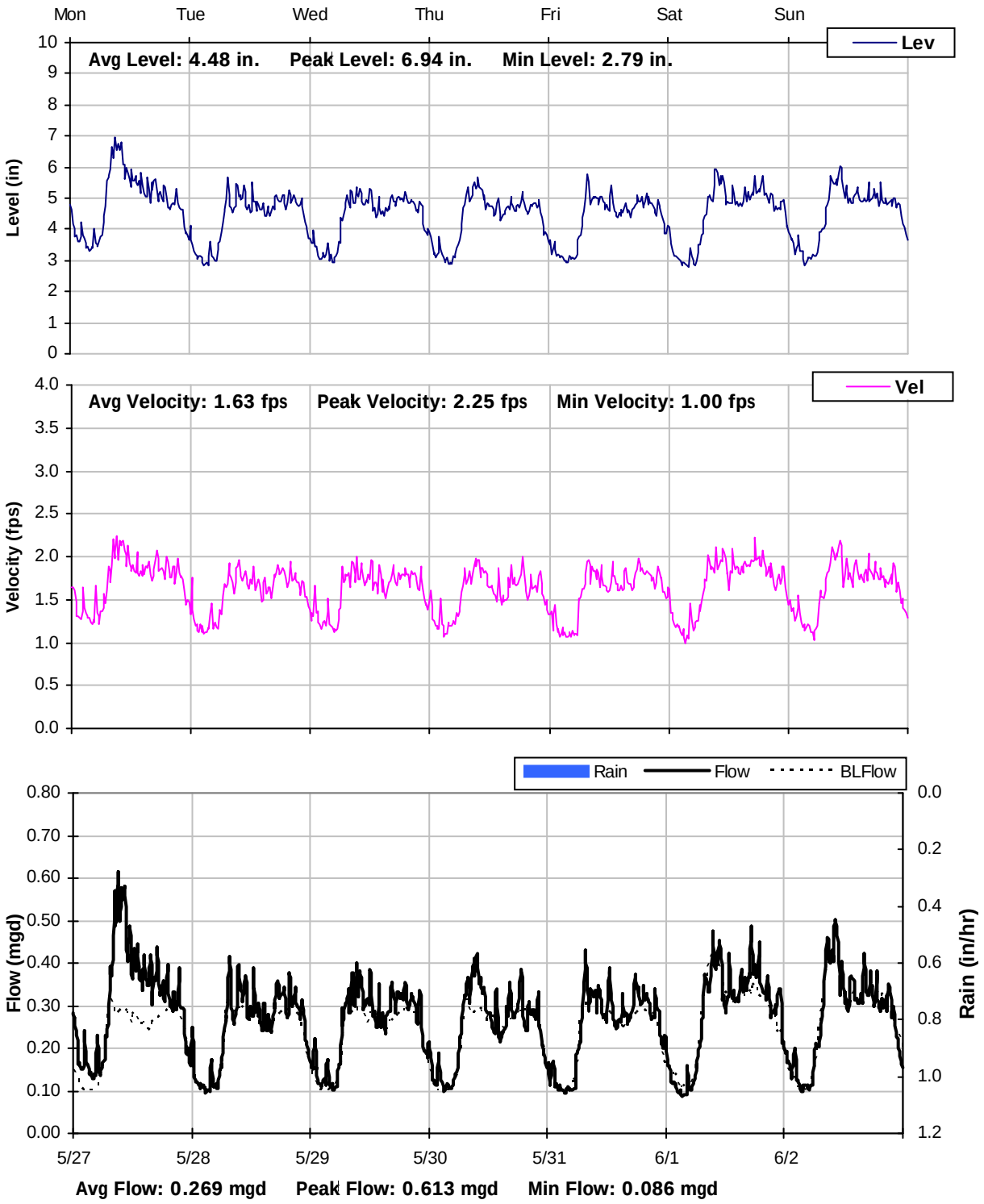
SITE D
Weekly Level, Velocity and Flow Hydrographs
5/13/2013 to 5/20/2013



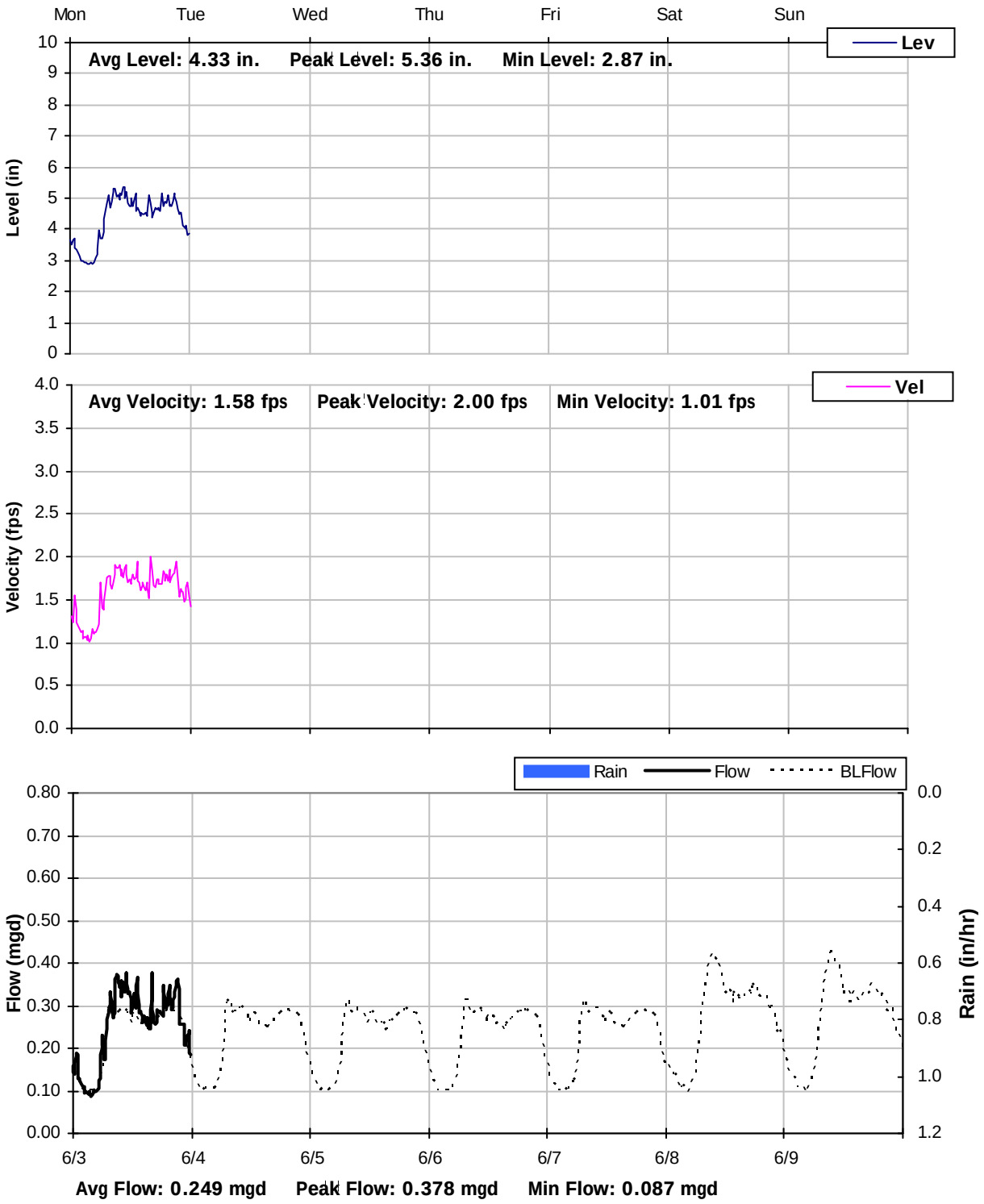
SITE D
Weekly Level, Velocity and Flow Hydrographs
5/20/2013 to 5/27/2013



SITE D
Weekly Level, Velocity and Flow Hydrographs
5/27/2013 to 6/3/2013



SITE D
Weekly Level, Velocity and Flow Hydrographs
6/3/2013 to 6/10/2013



City of Avalon

Sanitary Sewer Flow Monitoring
Temporary Monitoring: March 19 to June 4, 2013

Monitoring Site: Site E4-15"

Location: Intersection of Crescent Avenue and Whitley Avenue

Data Summary Report

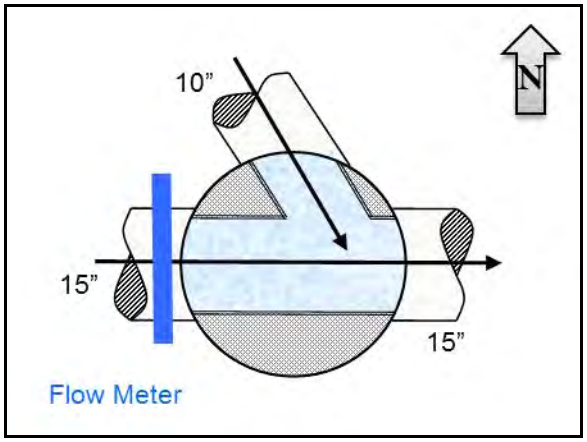
Vicinity Map: Site E4-15"

SITE E4-15"

Site Information

Location:	Intersection of Crescent Avenue and Whitley Avenue
Coordinates:	118.3269° W, 33.3449° N
Rim Elevation:	14 feet
Pipe Diameter:	15 inches
Baseline Flow:	0.096 mgd
Peak Measured Flow:	0.325 mgd

Satellite View



Flow Diagram

Sanitary Sewer Map

Plan View

SITE E4-15"
Additional Site Photos

Effluent Pipe

Influent Pipe

SITE E4-15"
Additional Site Photos

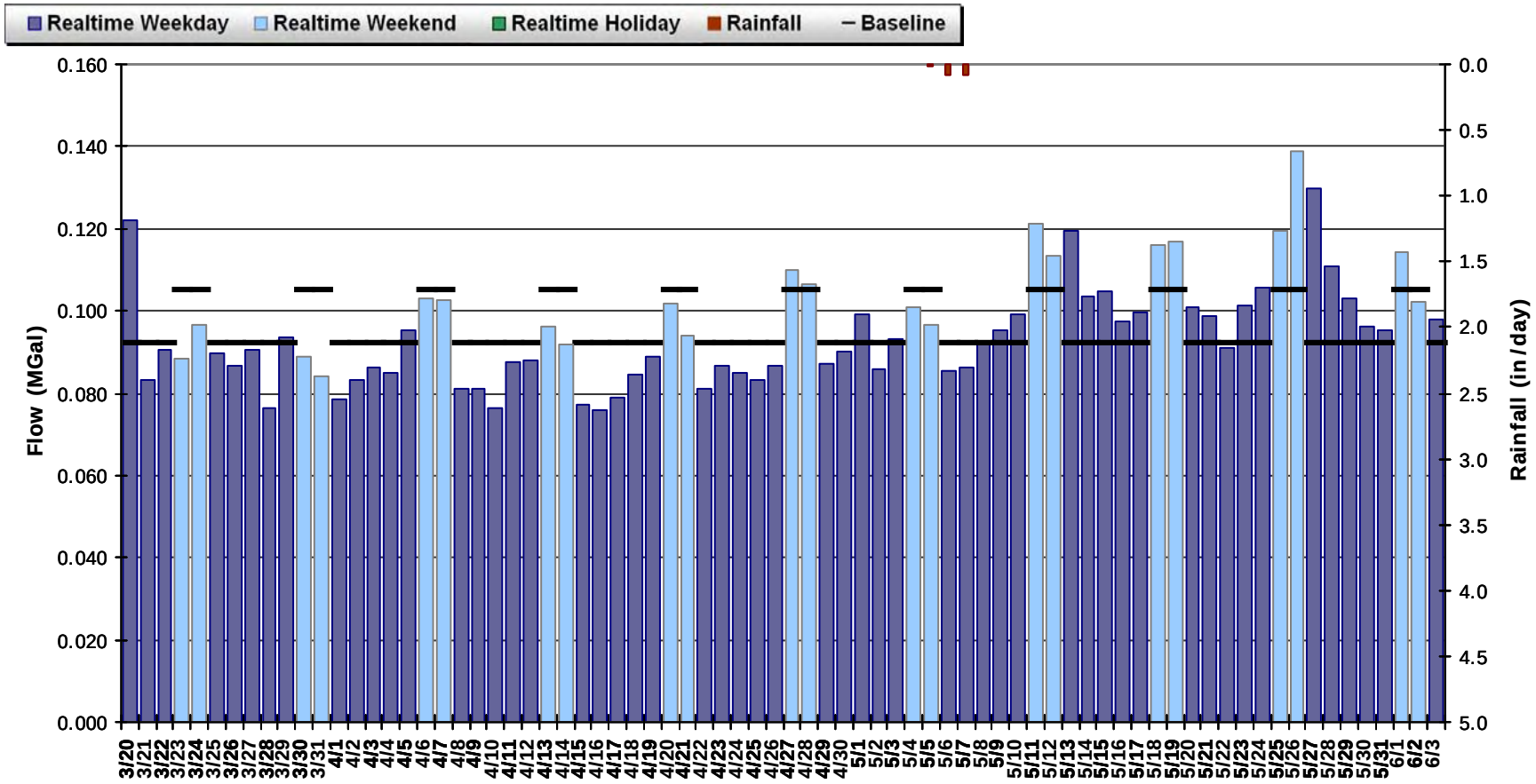
Lateral Pipe

SITE E4-15"

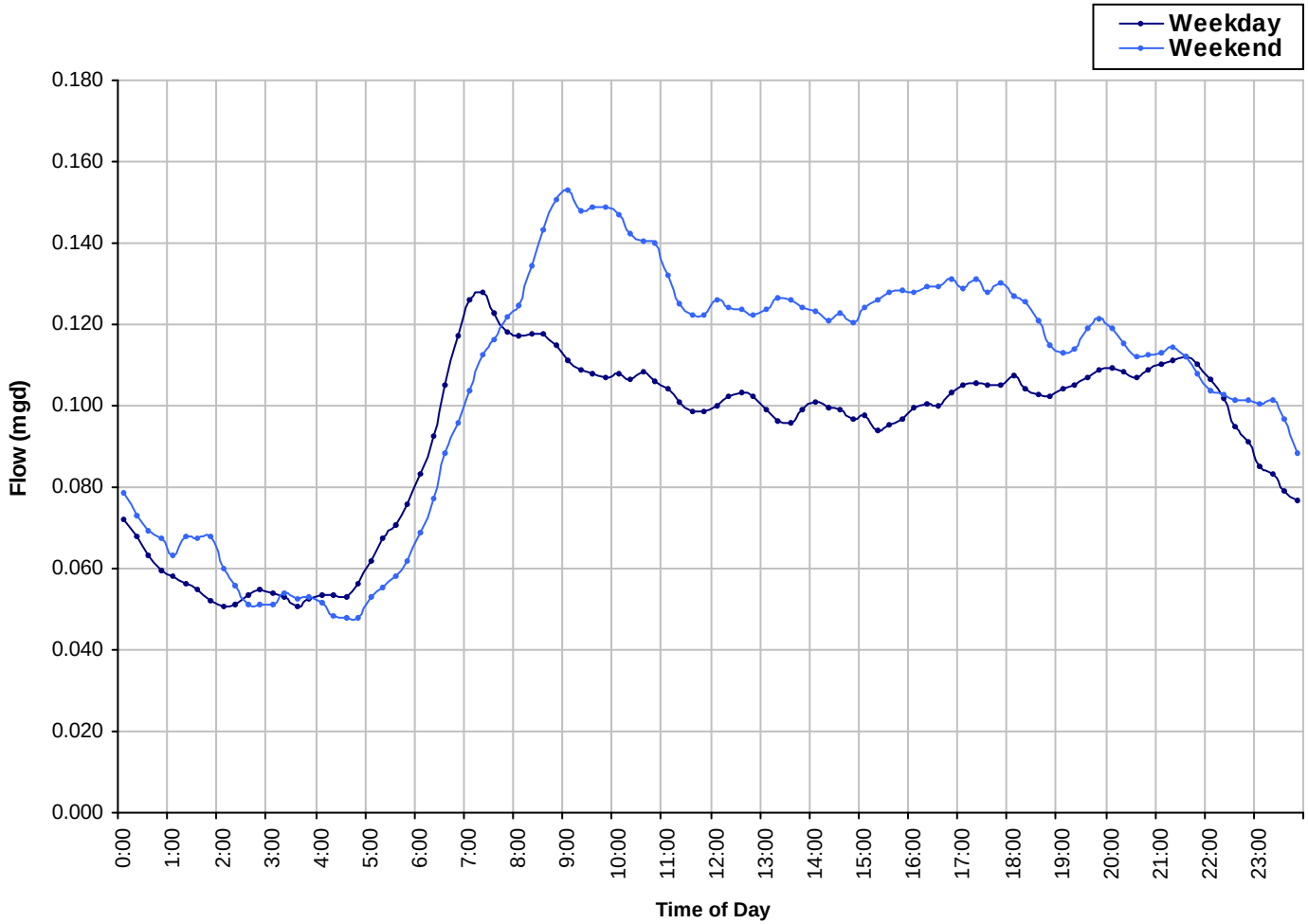
Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.096 MGal **Peak Daily Flow: 0.139 MGal** **Min Daily Flow: 0.076 MGal**

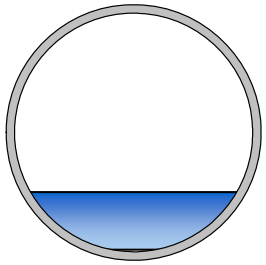
Total Period Rainfall: 0.19 inches



SITE E4-15"
Baseline Flow Hydrographs



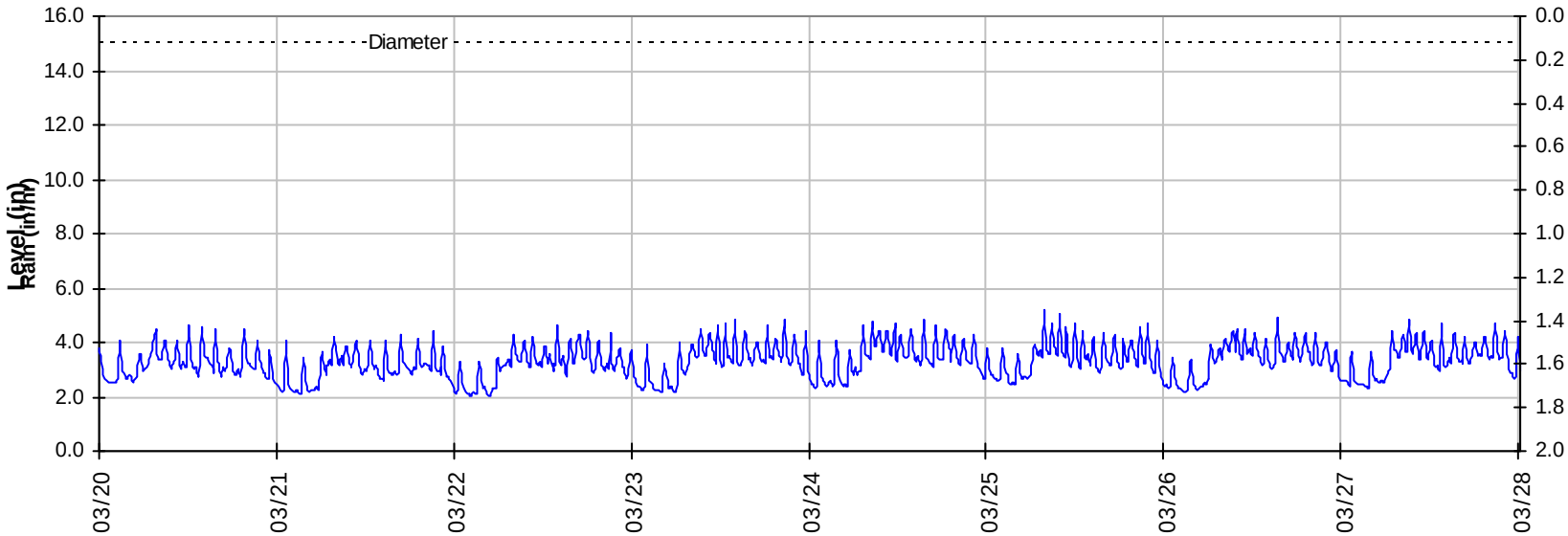
Baseline Flow:
0.096 *mgd*

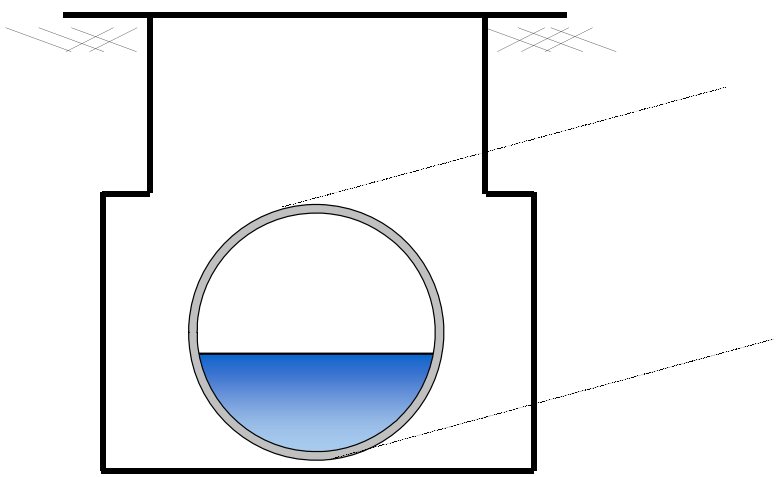


SITE E4-15"

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period



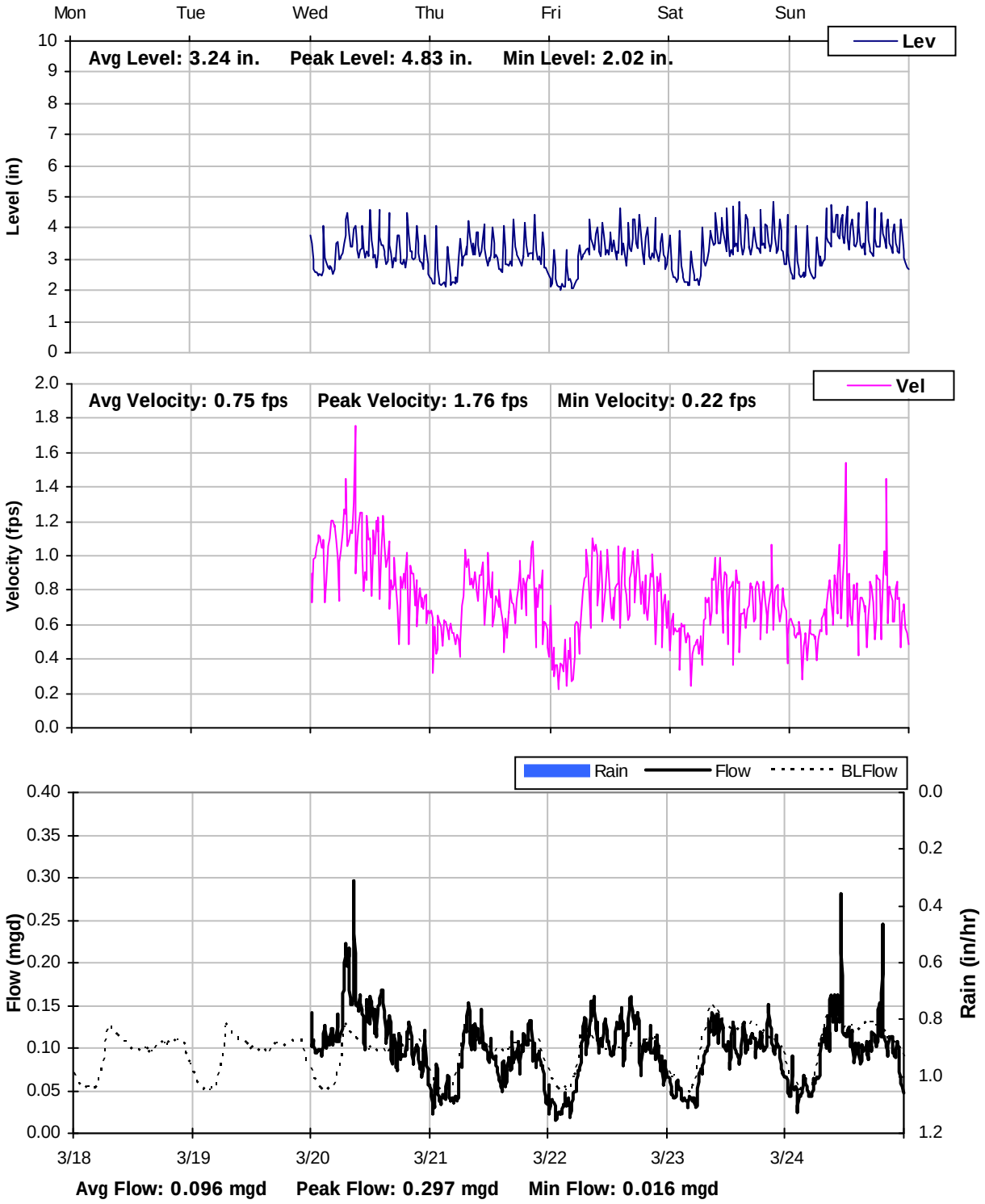


Pipe Diameter: 15 *inches*

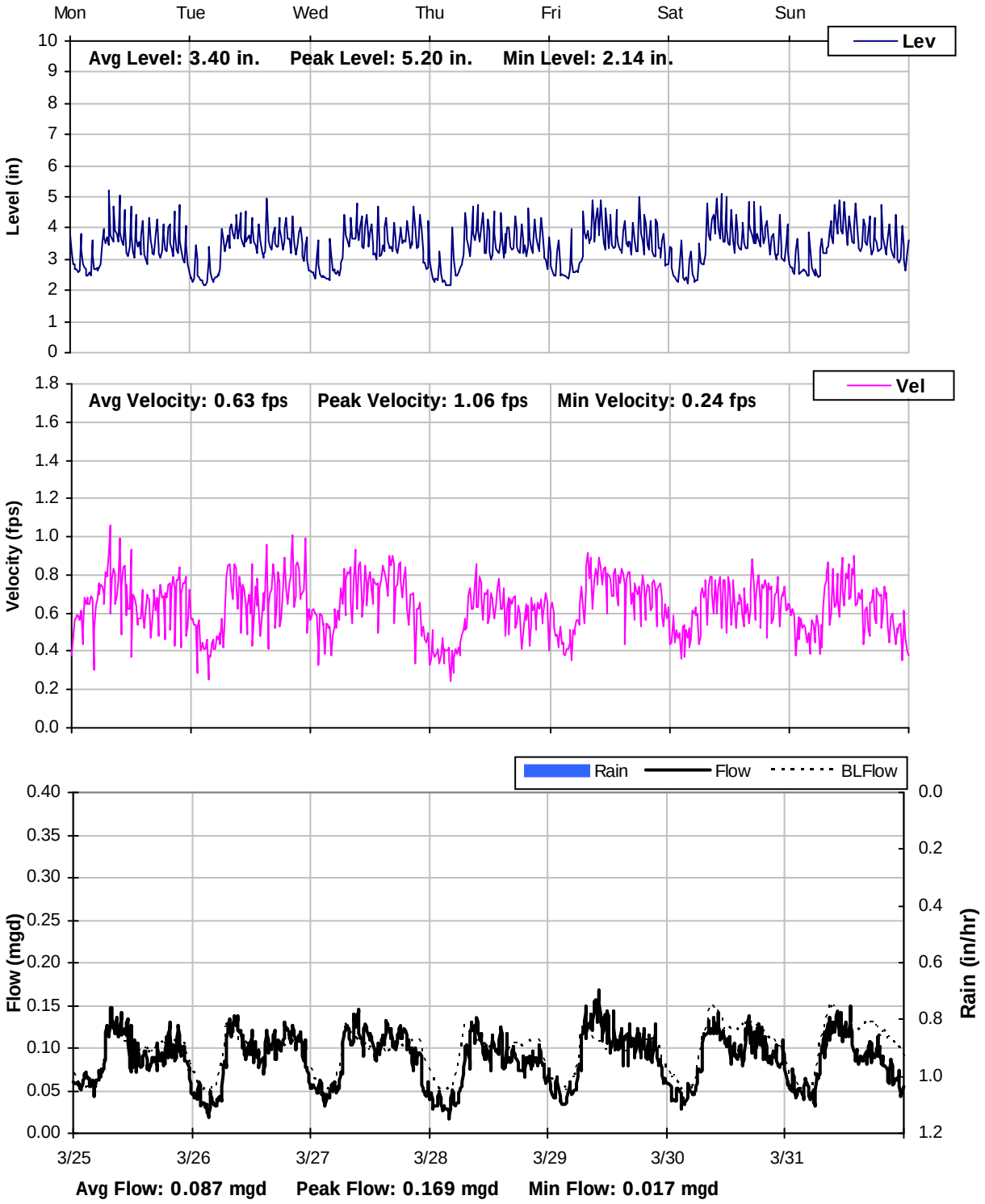
Peak Measured Level: 6.12 *inches*

Peak d/D Ratio: 0.41

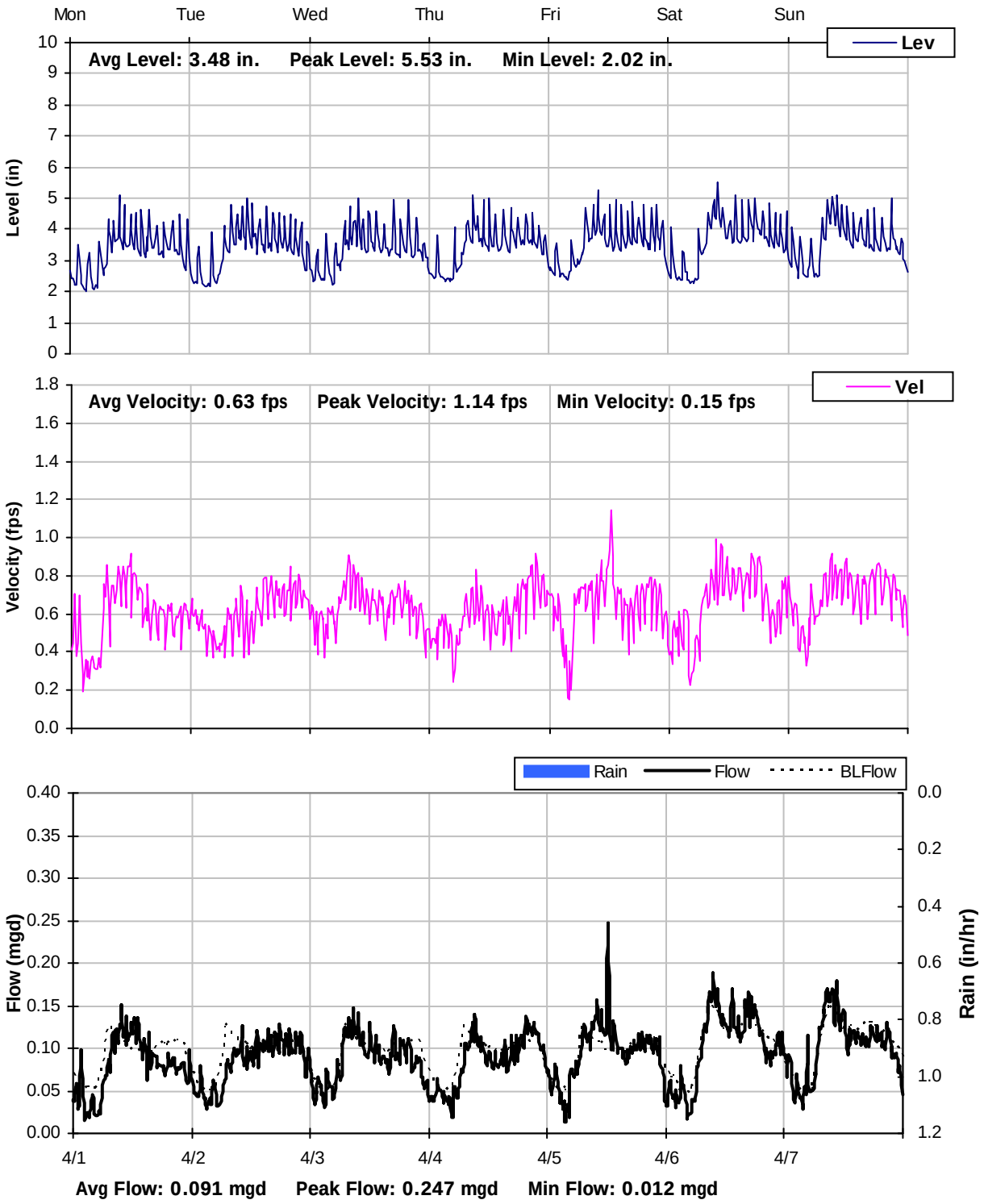
SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
3/18/2013 to 3/25/2013



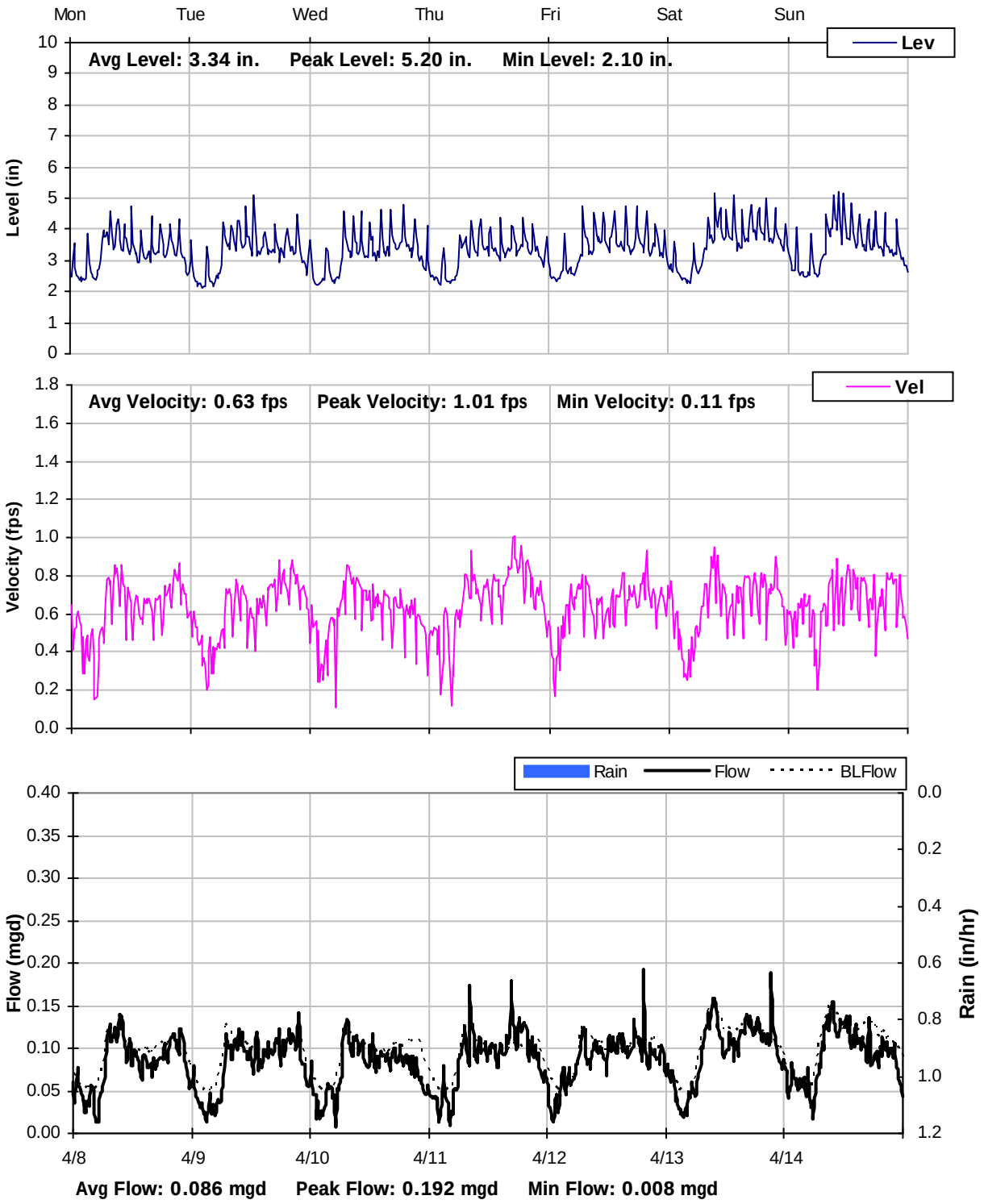
SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
3/25/2013 to 4/1/2013



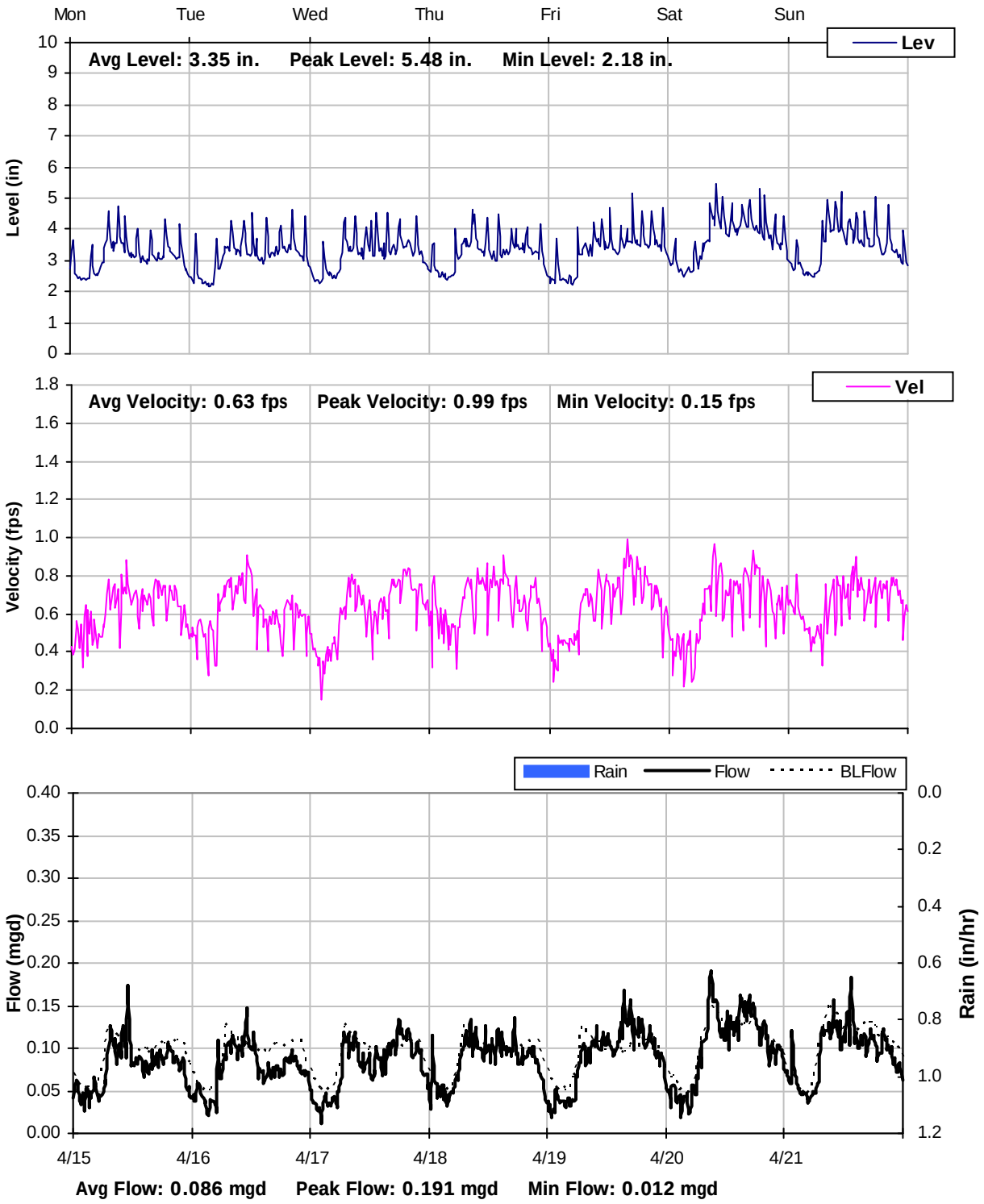
SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
4/1/2013 to 4/8/2013



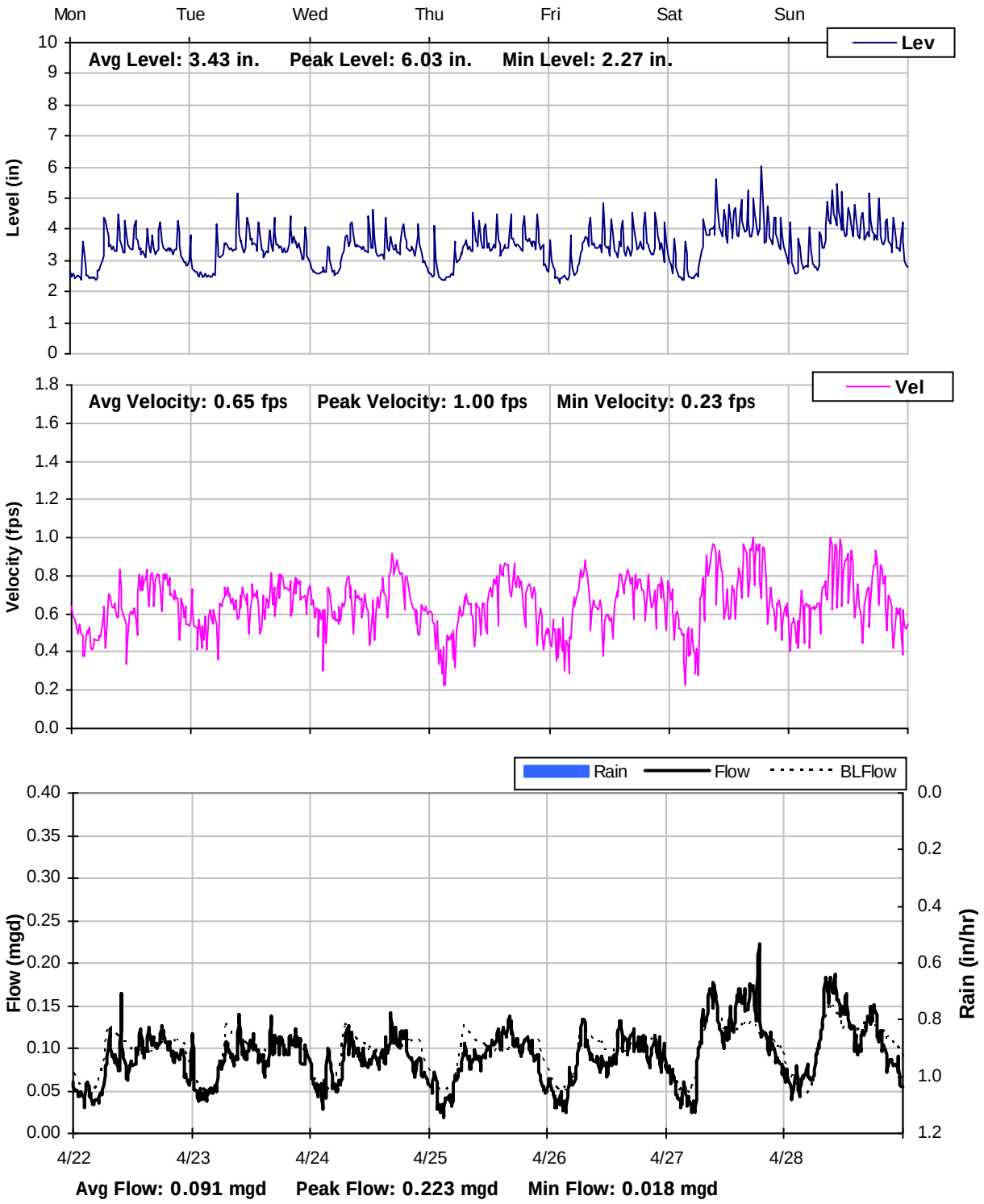
SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
4/8/2013 to 4/15/2013



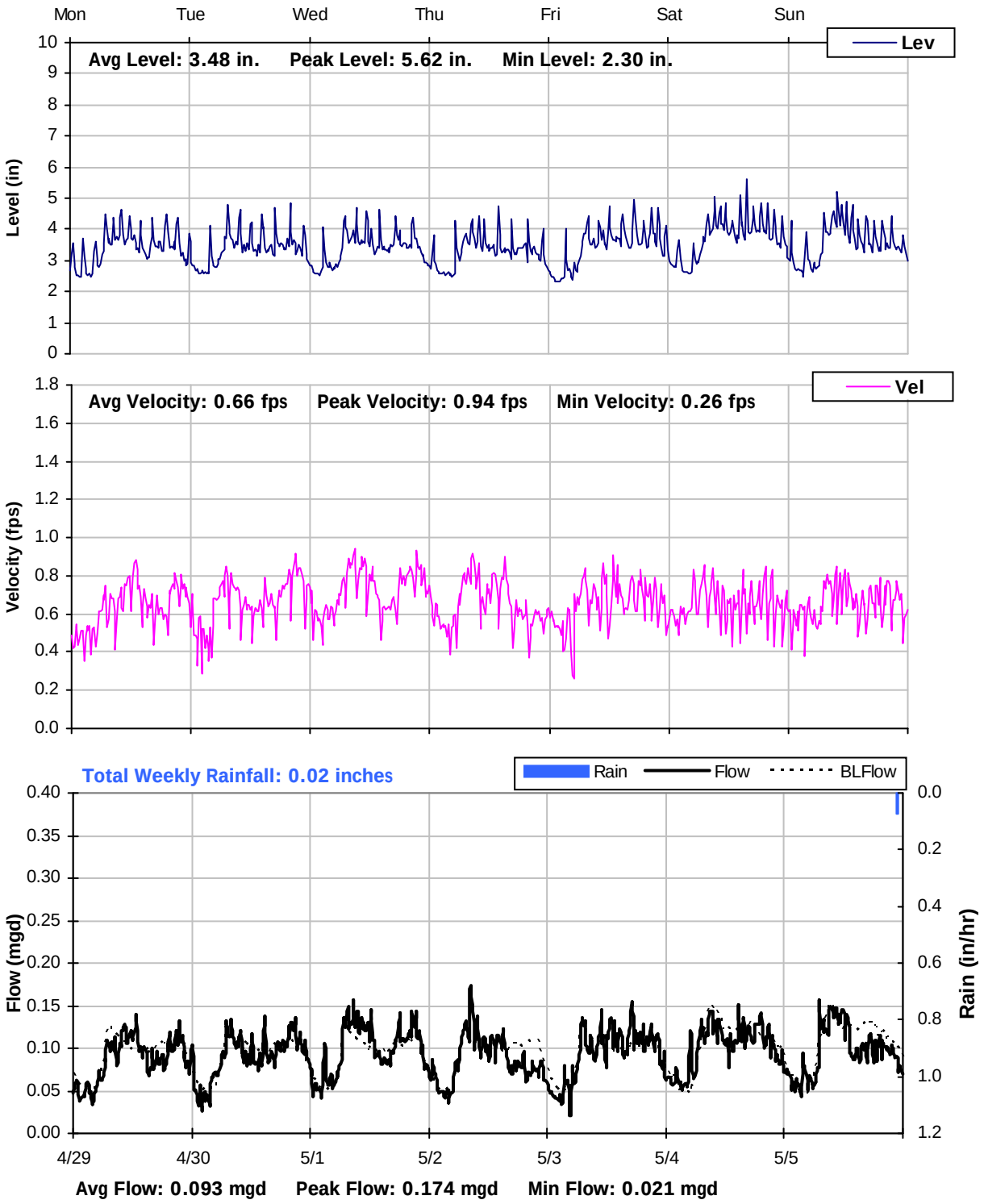
SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
4/15/2013 to 4/22/2013



SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
4/22/2013 to 4/29/2013



SITE E4-15"
Weekly Level, Velocity and Flow Hydrographs
4/29/2013 to 5/6/2013



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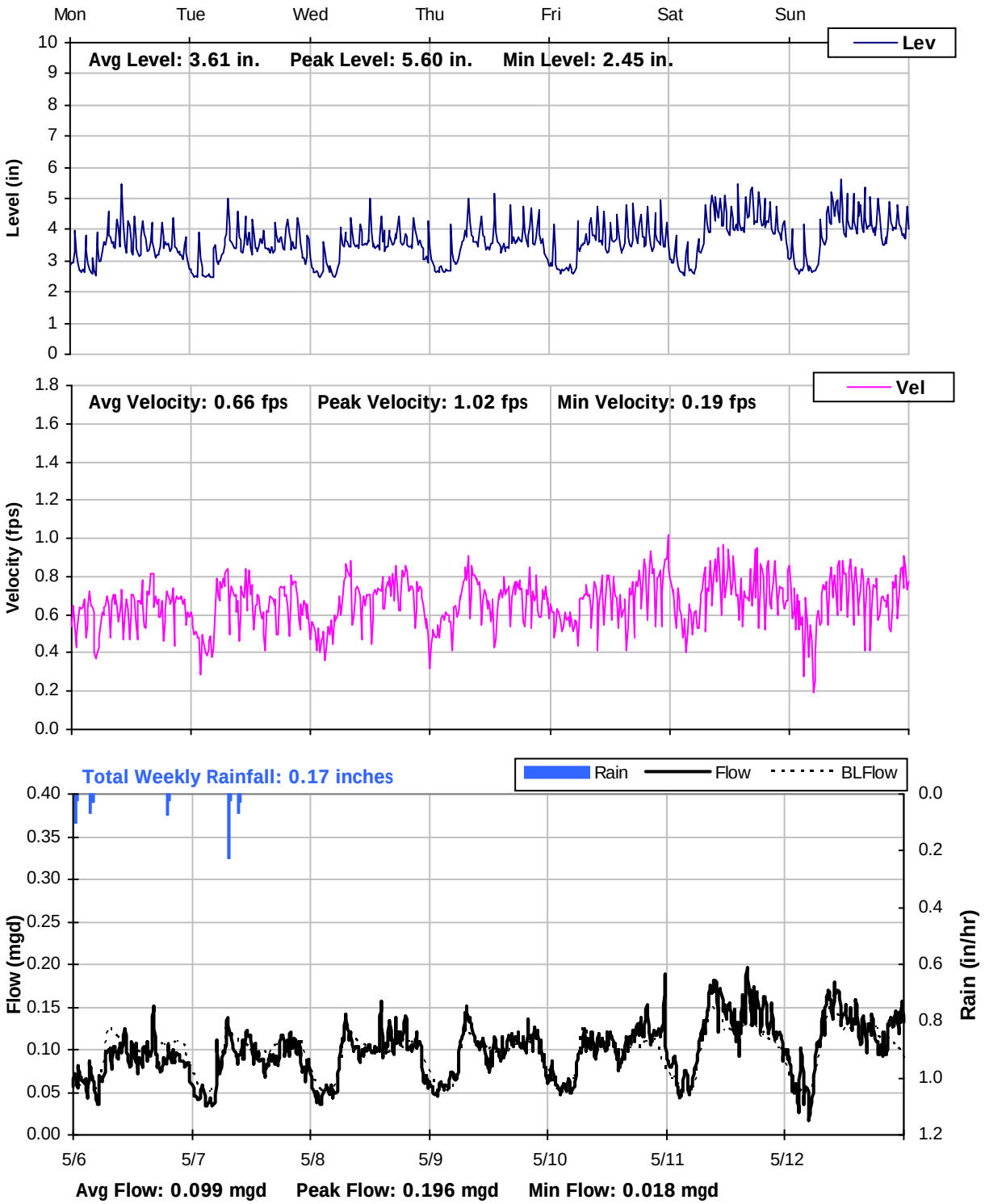
Weekly Level, Velocity and Flow Hydrographs
5/6/2013 to 5/13/2013



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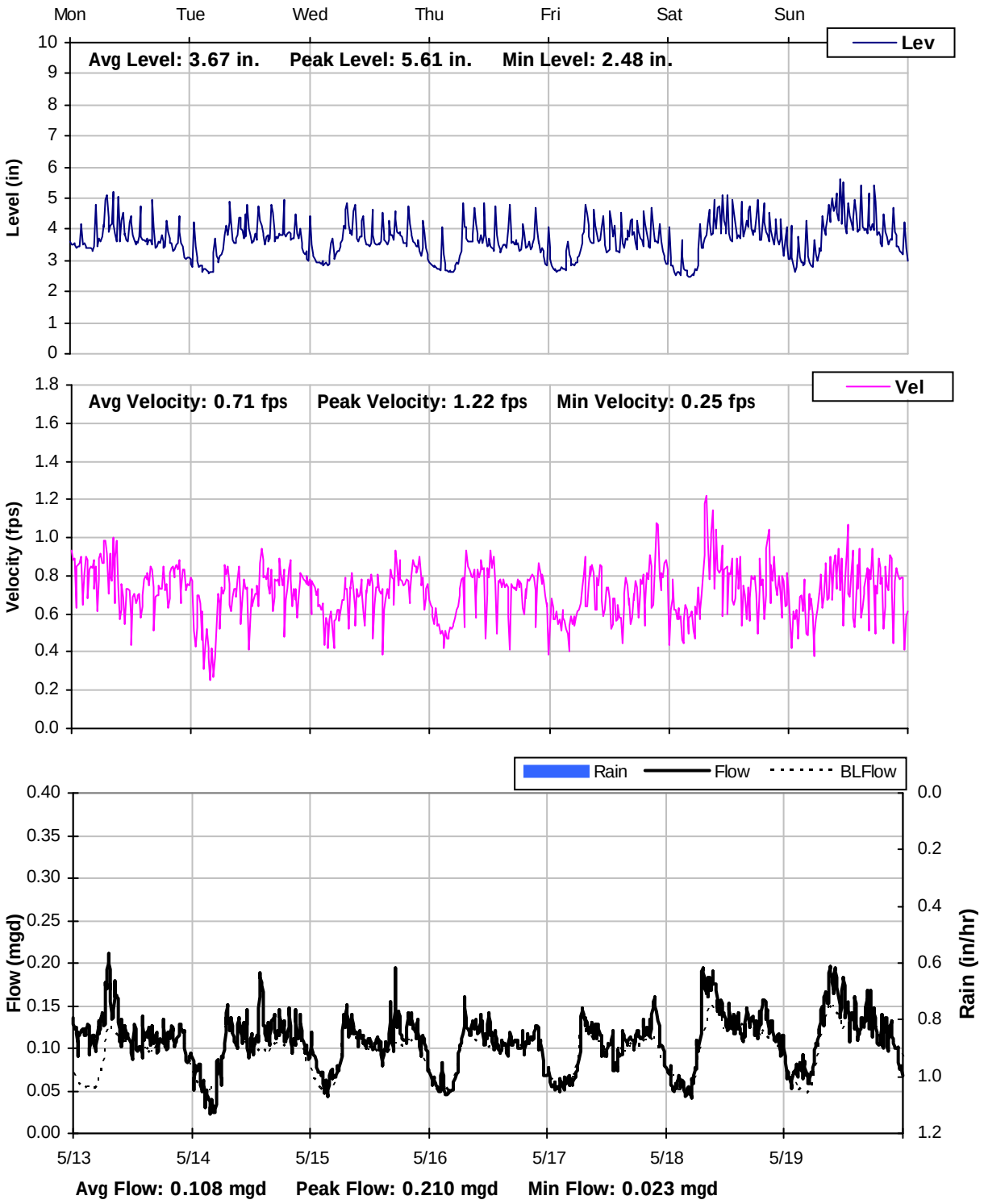

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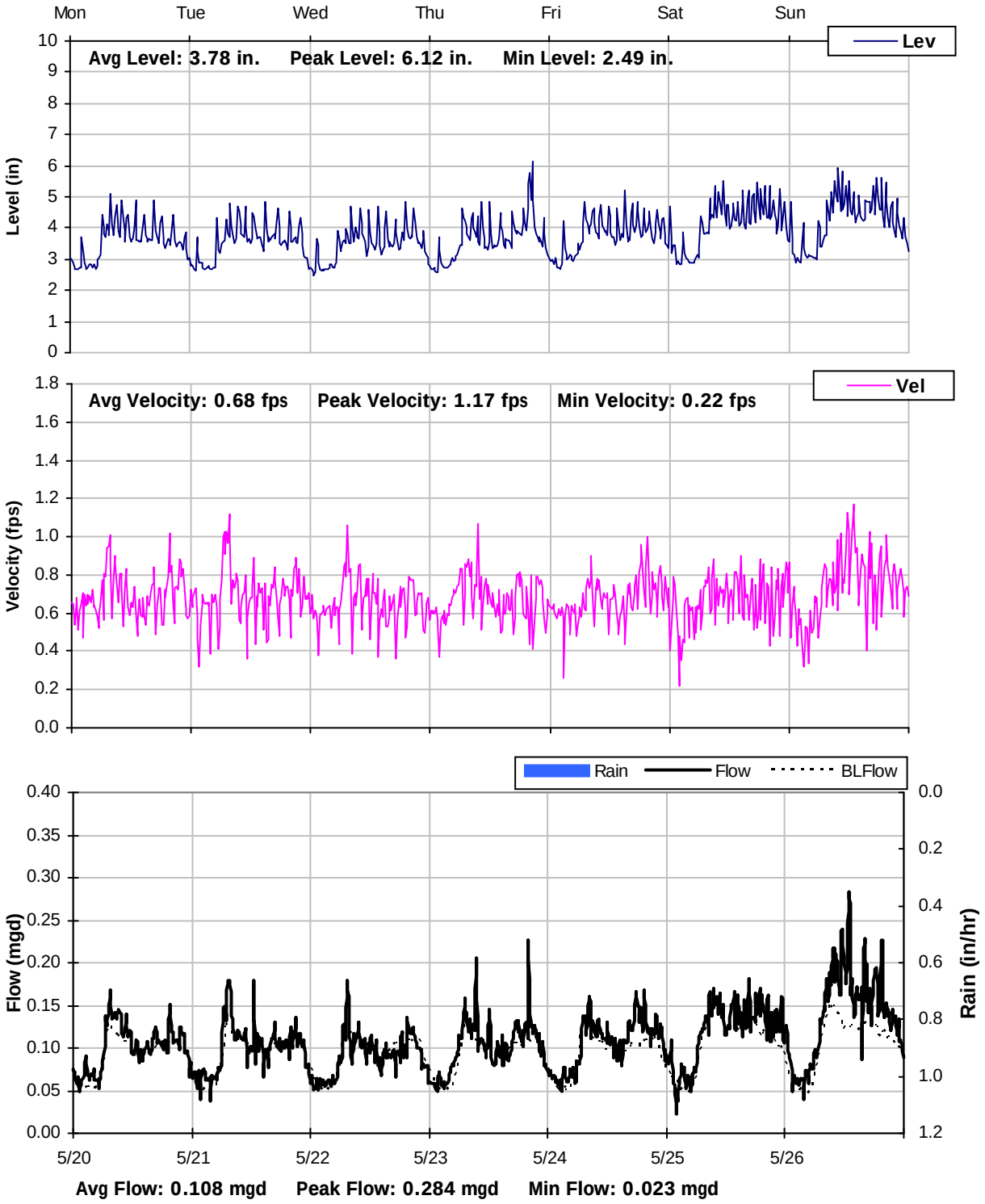
5/20/2013 to 5/27/2013



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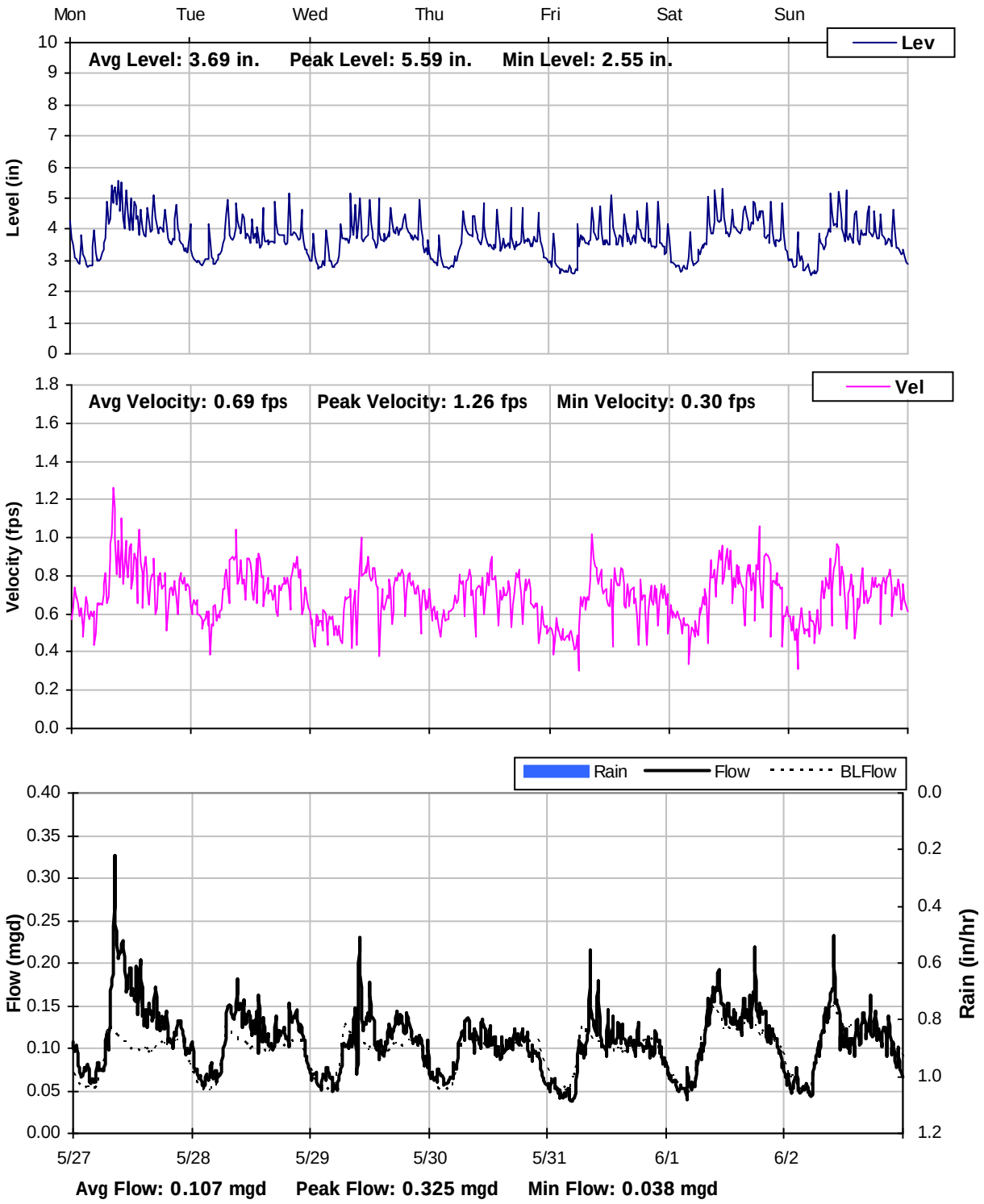
Weekly Level, Velocity and Flow Hydrographs
5/27/2013 to 6/3/2013



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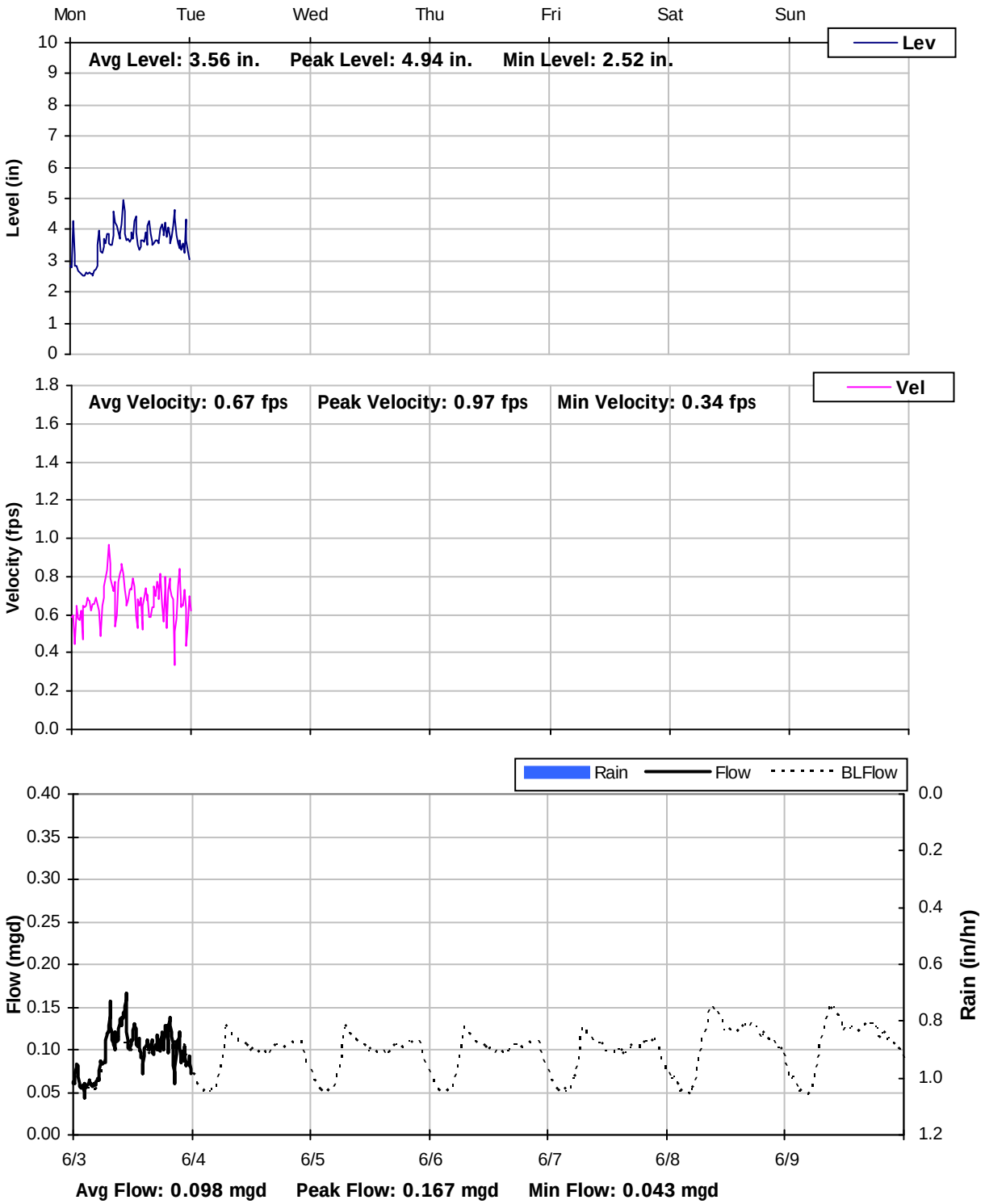
Weekly Level, Velocity and Flow Hydrographs
6/3/2013 to 6/10/2013



City of Avalon

Sanitary Sewer Flow Monitoring

Temporary Monitoring: March 19 to June 4, 2013

Monitoring Site: Site E4-10"

Location: Intersection of Crescent Avenue and Whitley Avenue

Data Summary Report

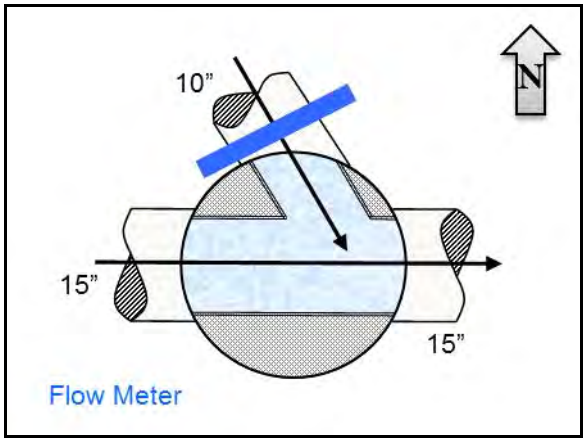
Vicinity Map: Site E4-10"

SITE E4-10"

Site Information

Location:	Intersection of Crescent Avenue and Whitley Avenue
Coordinates:	118.3269° W, 33.3449° N
Rim Elevation:	14 feet
Pipe Diameter:	10 inches
Baseline Flow:	0.022 mgd
Peak Measured Flow:	0.244 mgd

Satellite View



Flow Diagram

Sanitary Sewer Map

Plan View

SITE E4-10"
Additional Site Photos

Effluent Pipe

Influent Pipe

SITE E4-10"
Additional Site Photos

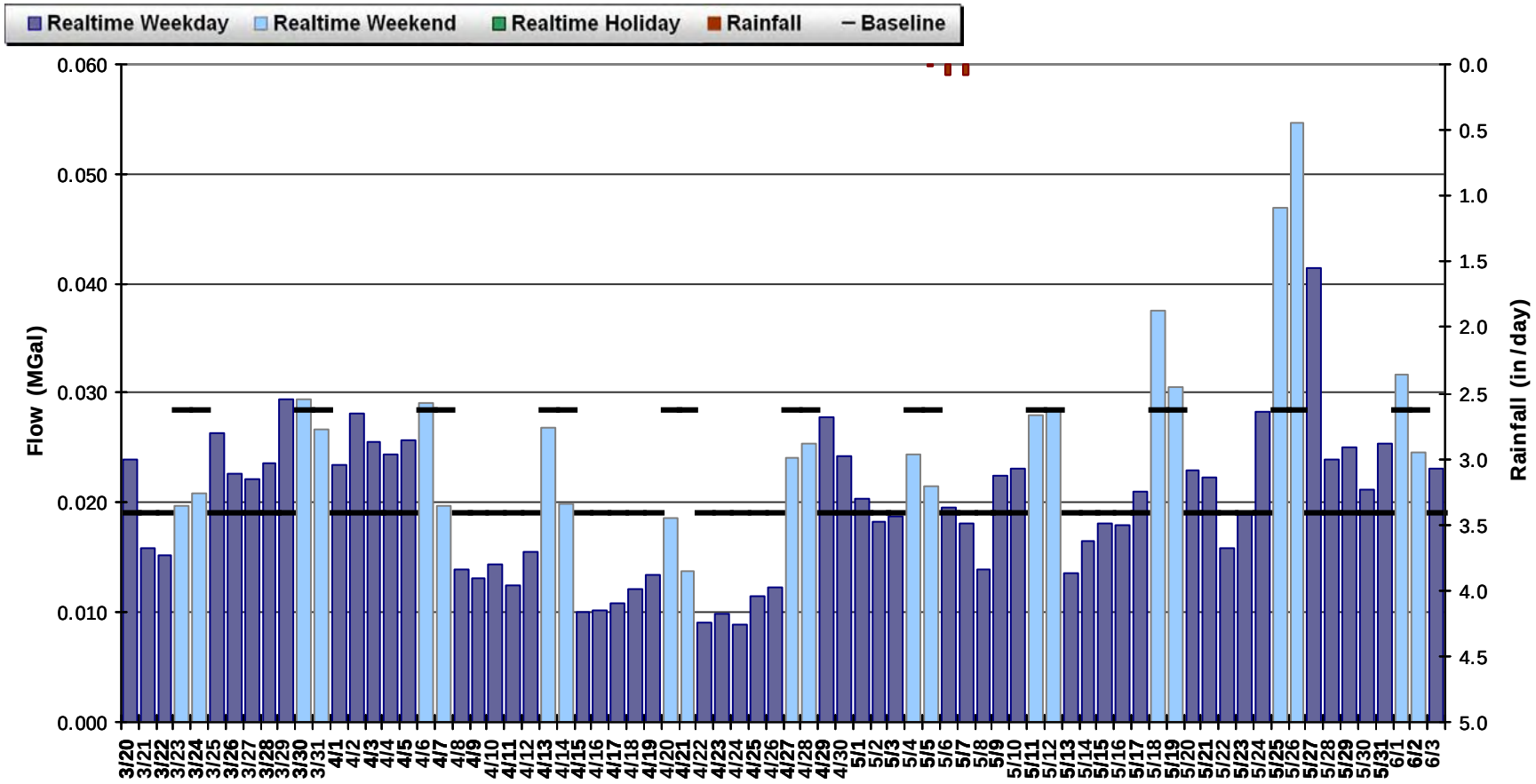
Lateral Pipe

SITE E4-10"

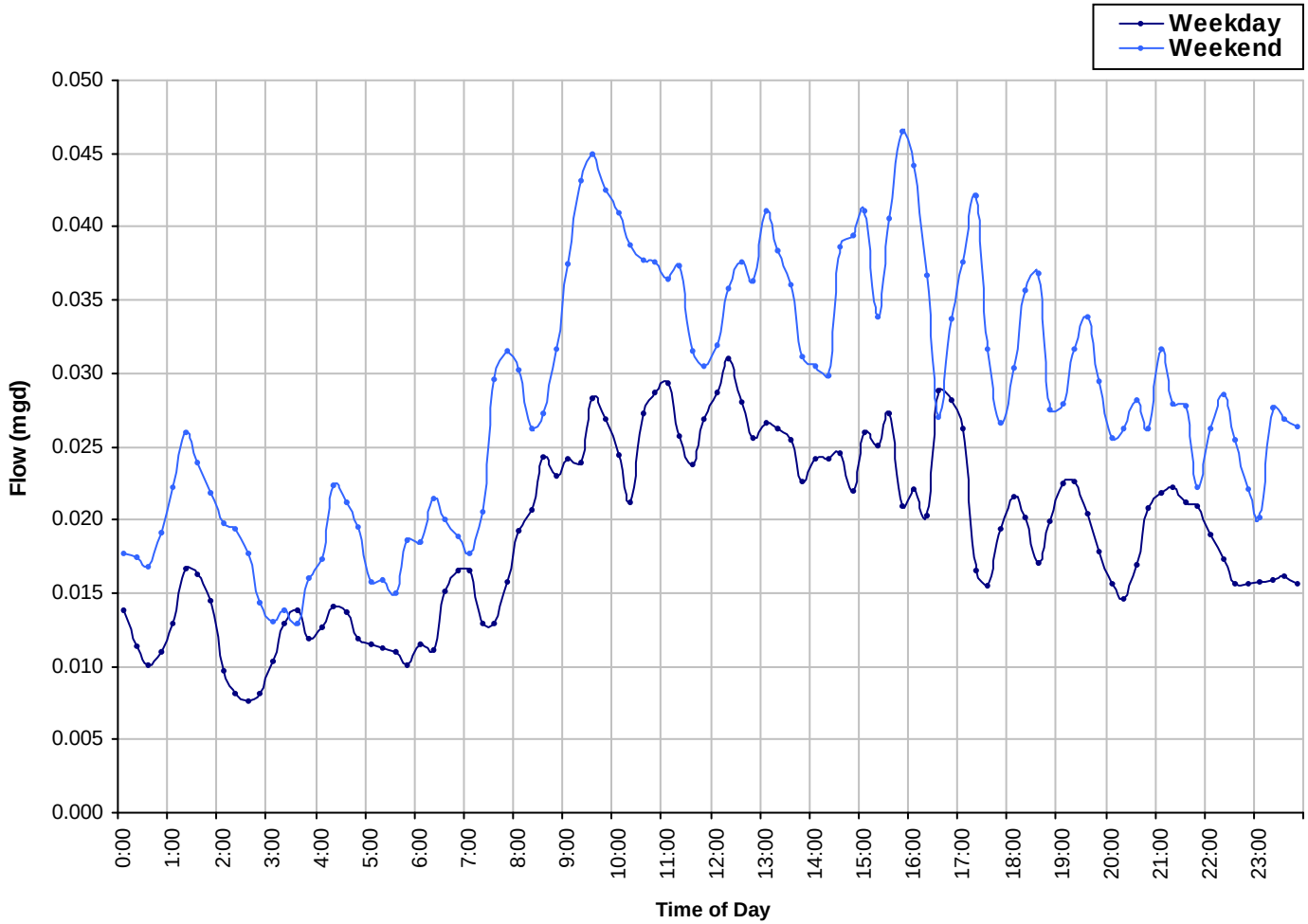
Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.022 MGal **Peak Daily Flow: 0.055 MGal** **Min Daily Flow: 0.009 MGal**

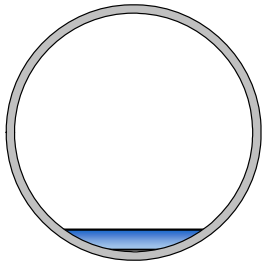
Total Period Rainfall: 0.19 inches



SITE E4-10"
Baseline Flow Hydrographs



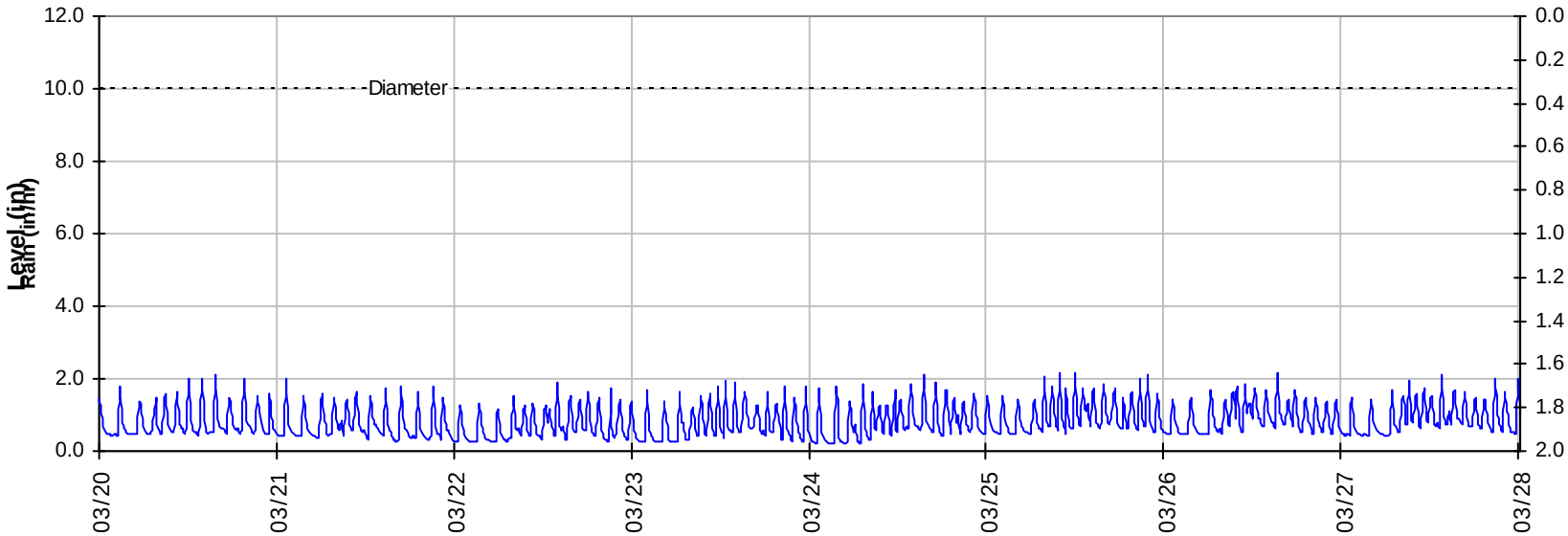
Baseline Flow:
0.022 *mgd*

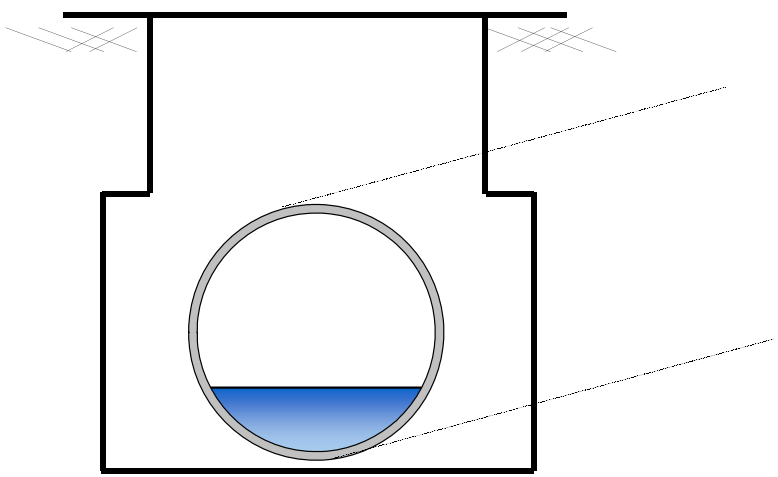


SITE E4-10"

Site Capacity and Surcharge Summary

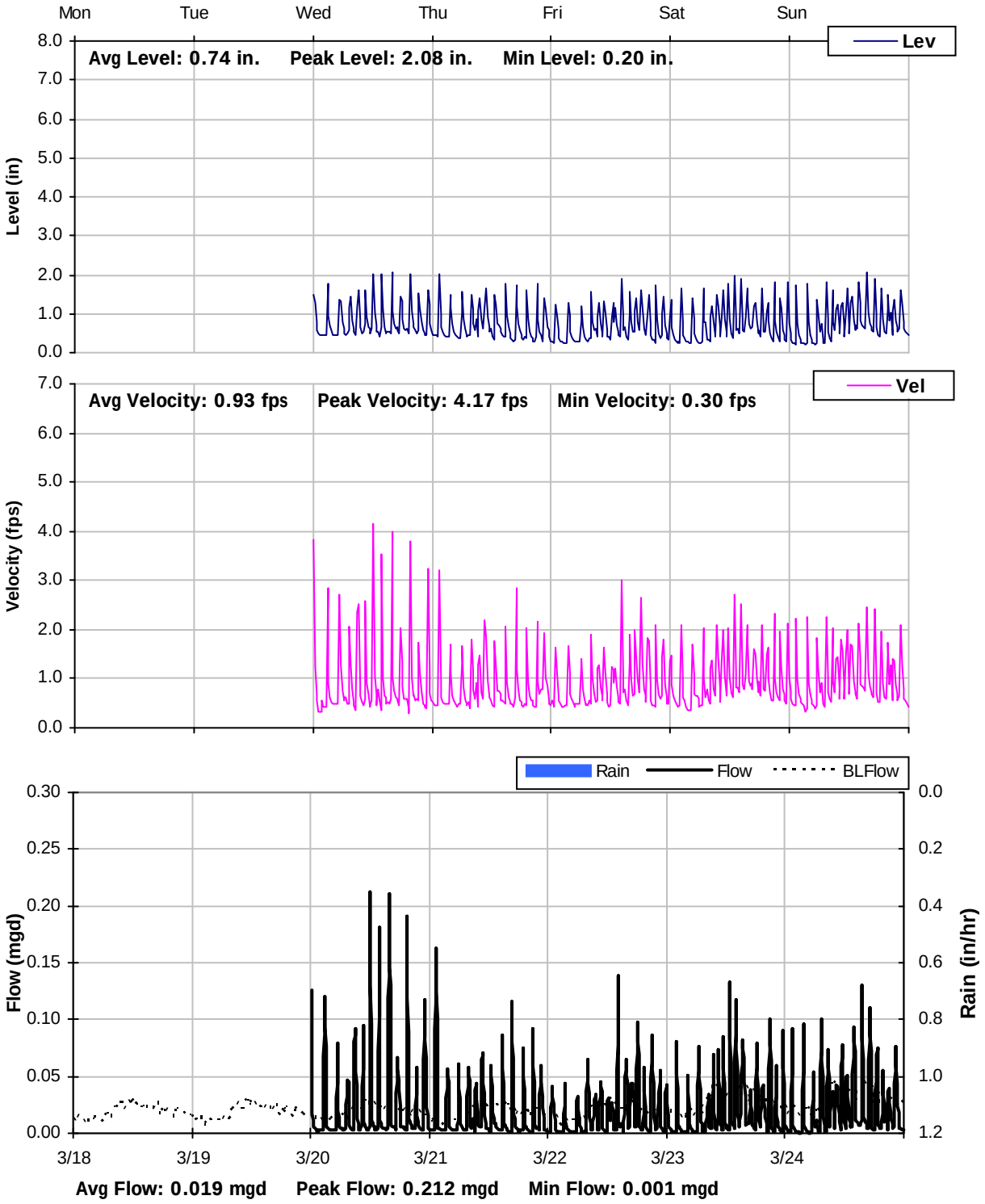
Realtime Flow Levels with Rainfall Data over Monitoring Period





Pipe Diameter:	10	*inches*
Peak Measured Level:	2.73	*inches*
Peak d/D Ratio:	0.27	

SITE E4-10"
Weekly Level, Velocity and Flow Hydrographs
3/18/2013 to 3/25/2013



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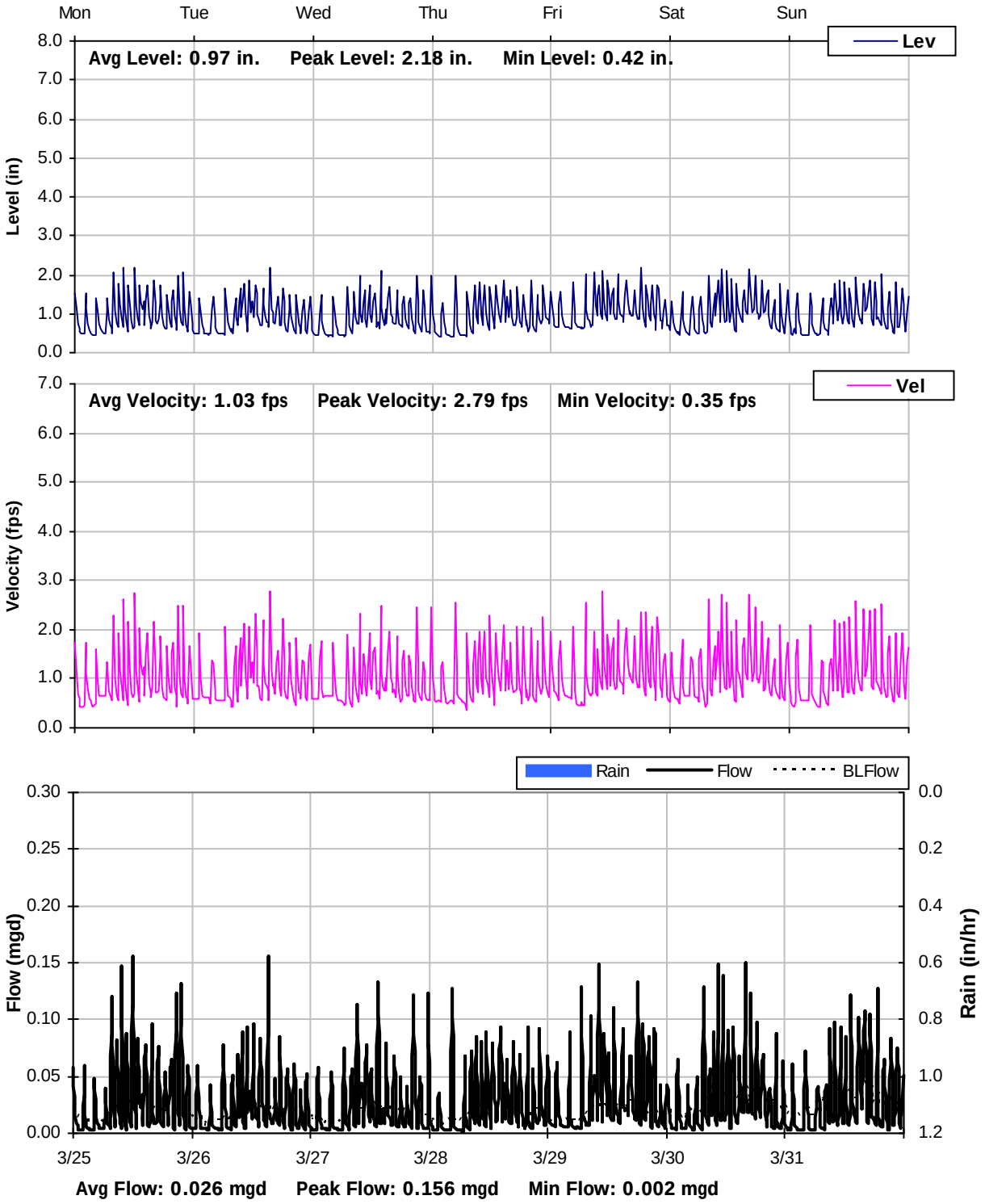
Weekly Level, Velocity and Flow Hydrographs
3/25/2013 to 4/1/2013



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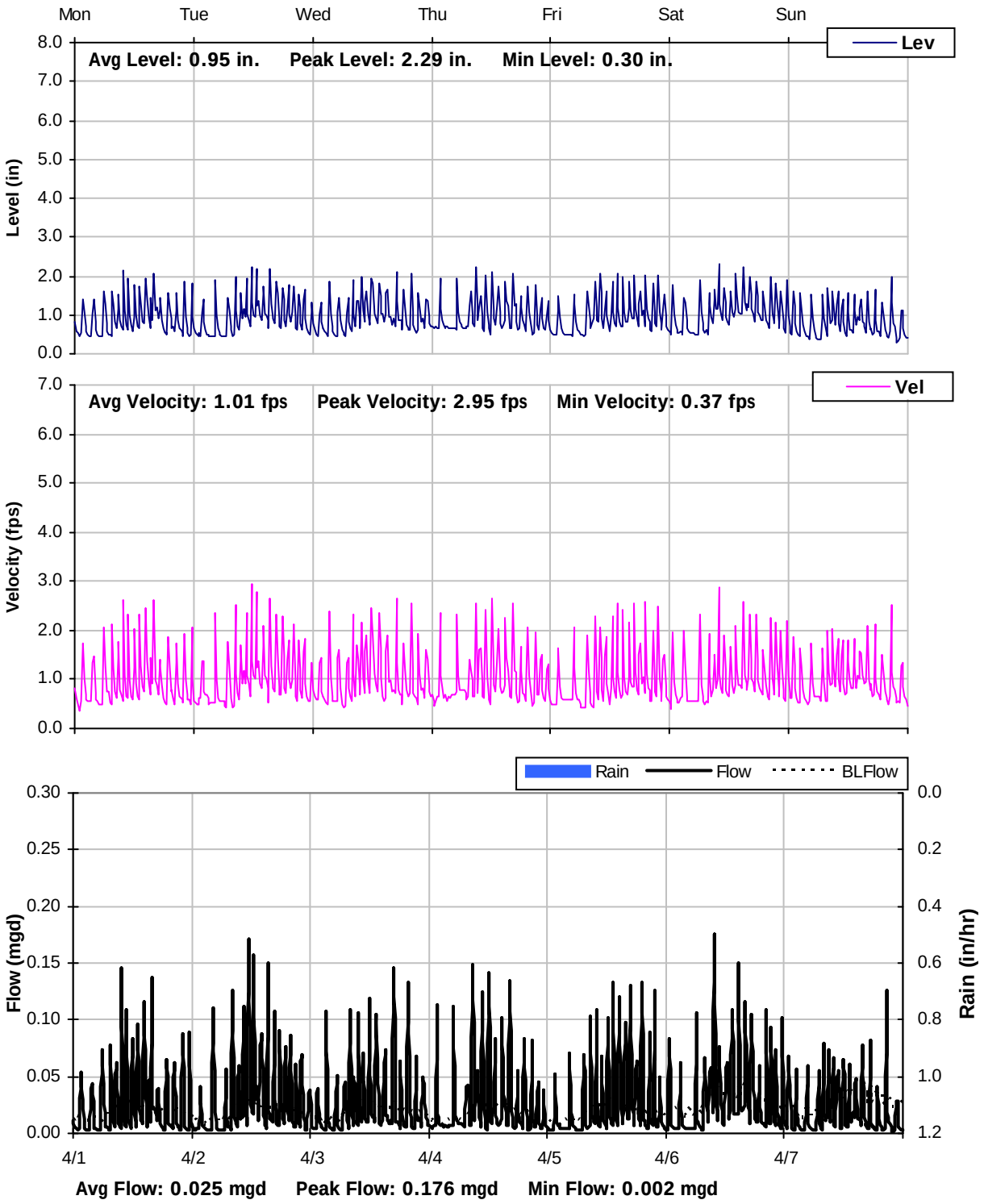
Weekly Level, Velocity and Flow Hydrographs
4/1/2013 to 4/8/2013



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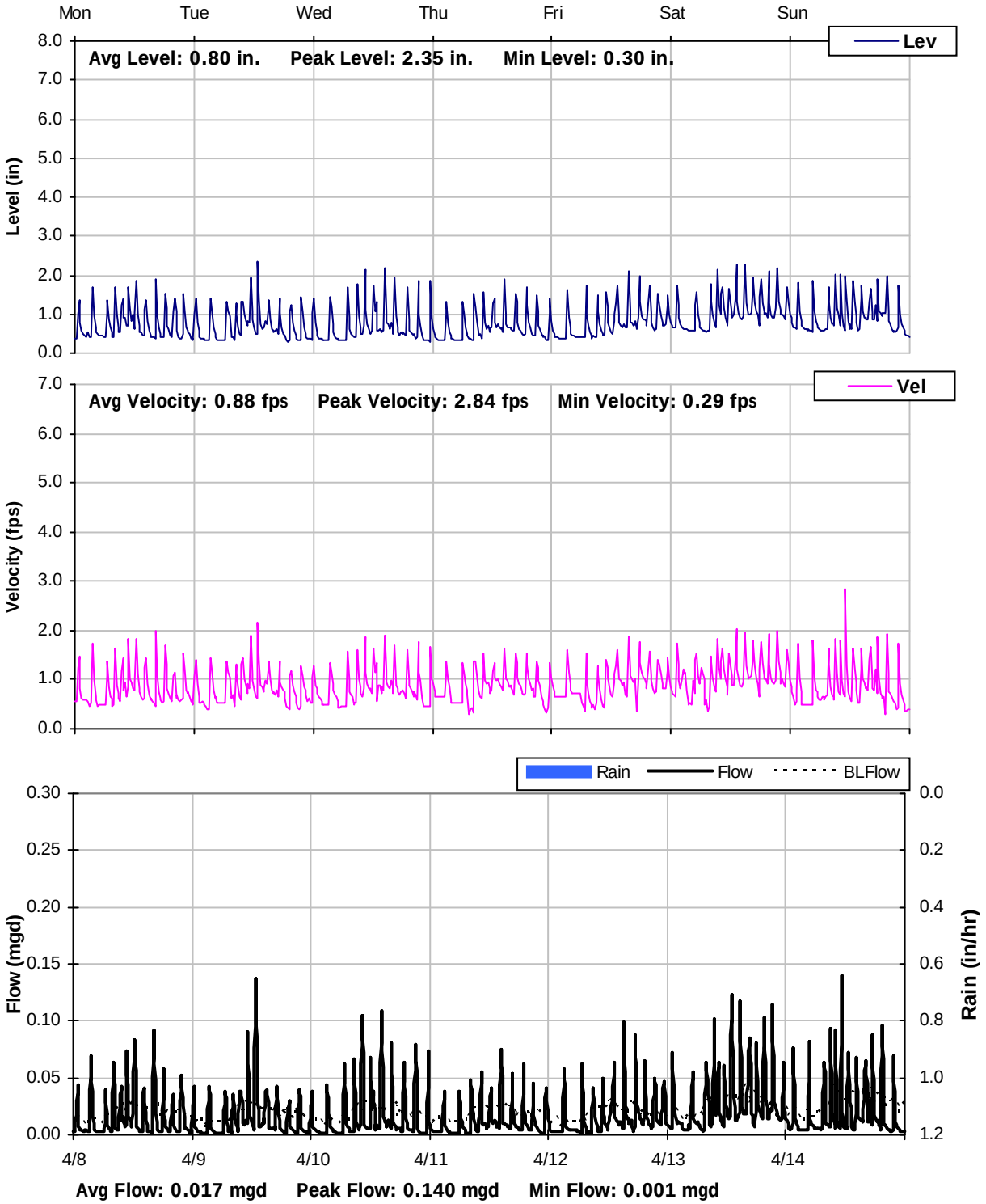
4/8/2013 to 4/15/2013



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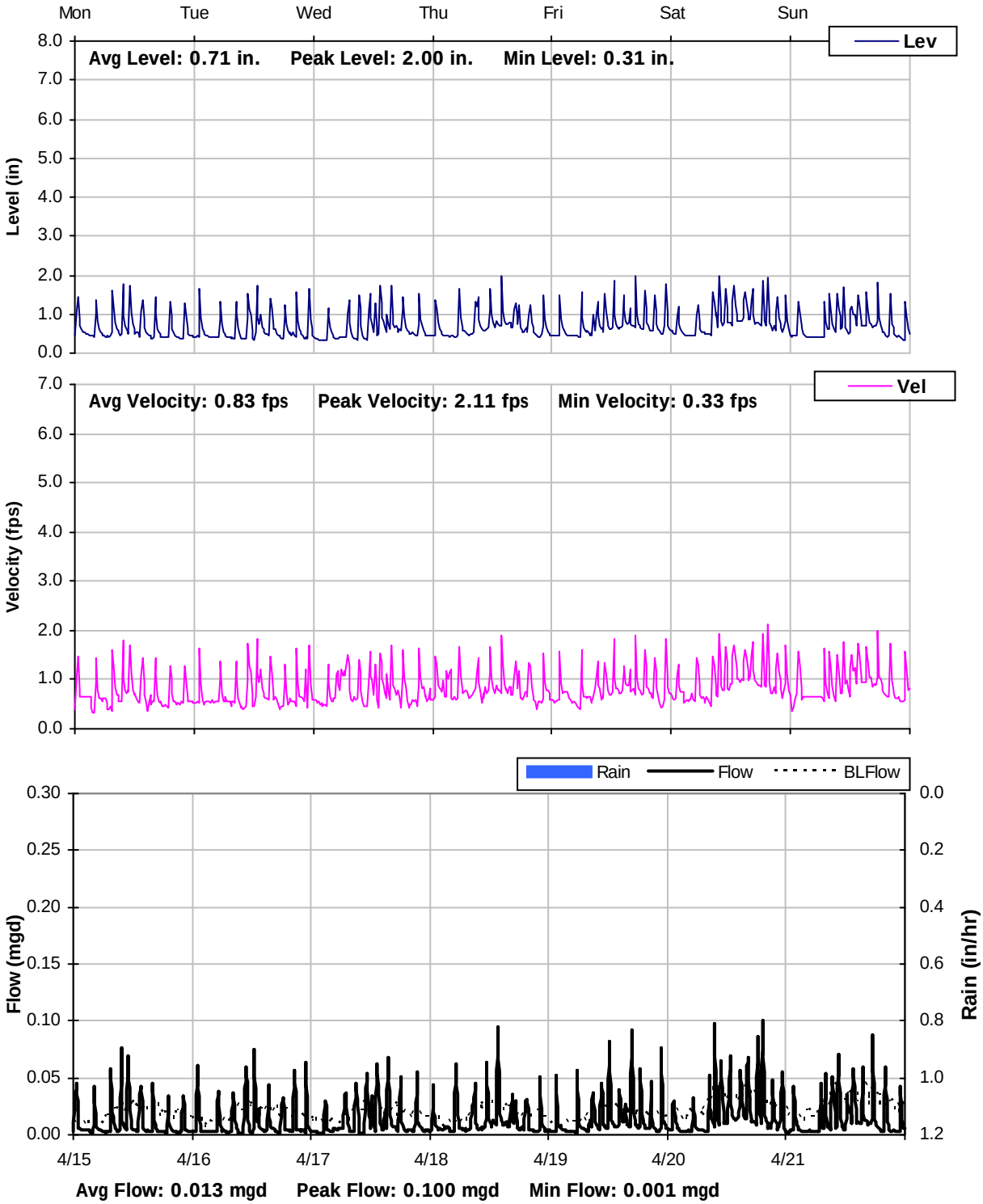
Weekly Level, Velocity and Flow Hydrographs
4/15/2013 to 4/22/2013



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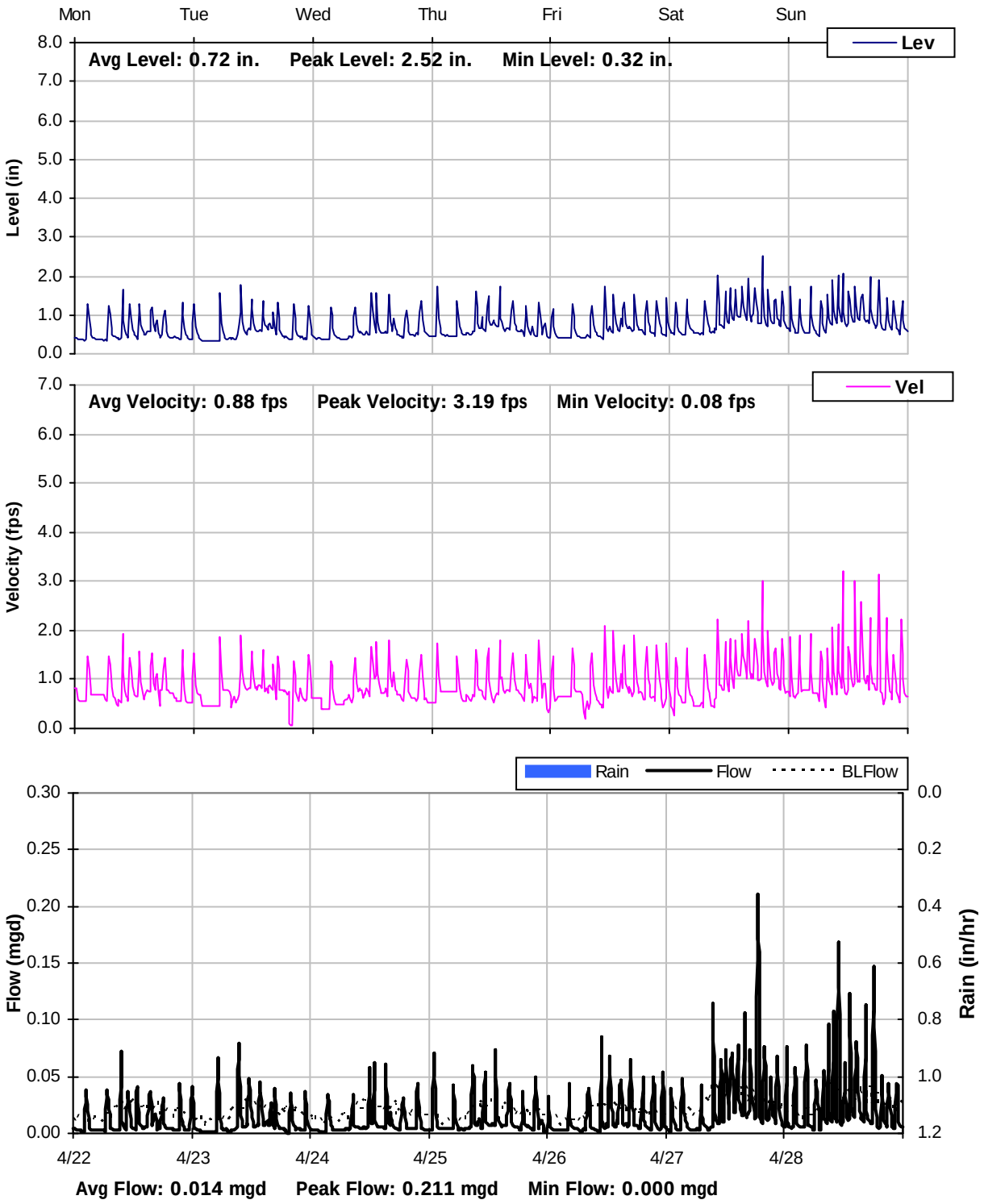
Weekly Level, Velocity and Flow Hydrographs
4/22/2013 to 4/29/2013



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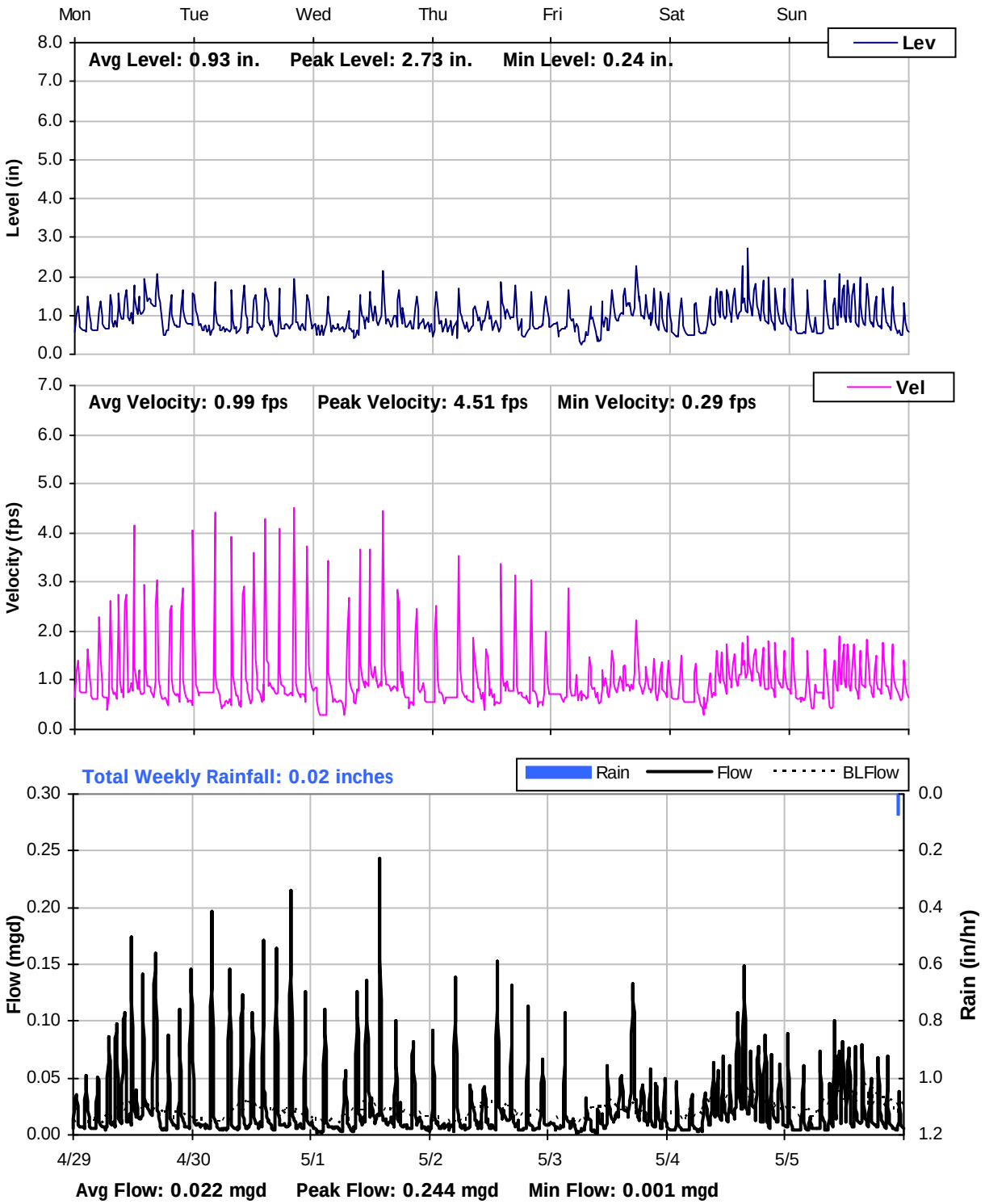
Weekly Level, Velocity and Flow Hydrographs
4/29/2013 to 5/6/2013



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Weekly Level, Velocity and Flow Hydrographs
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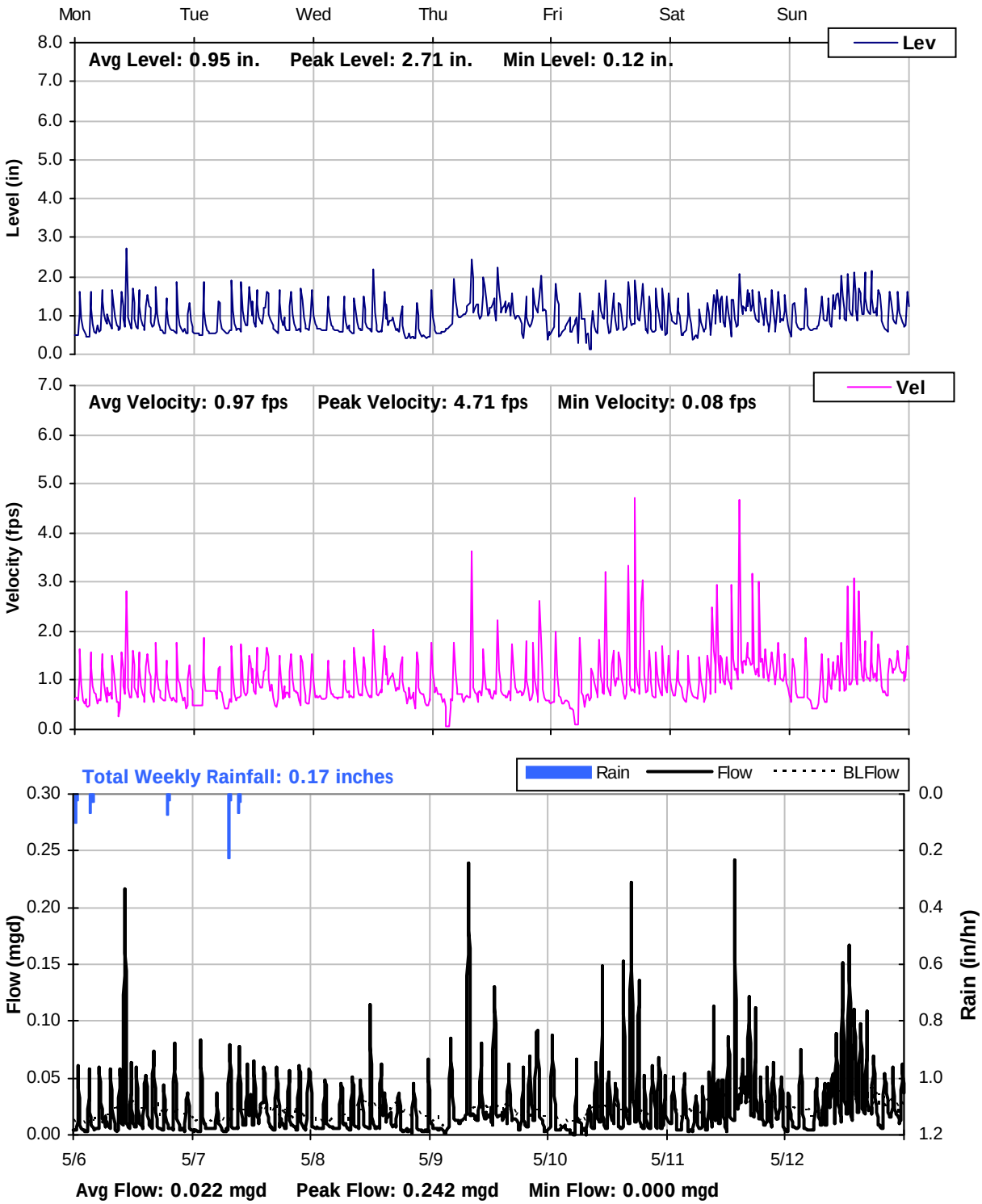

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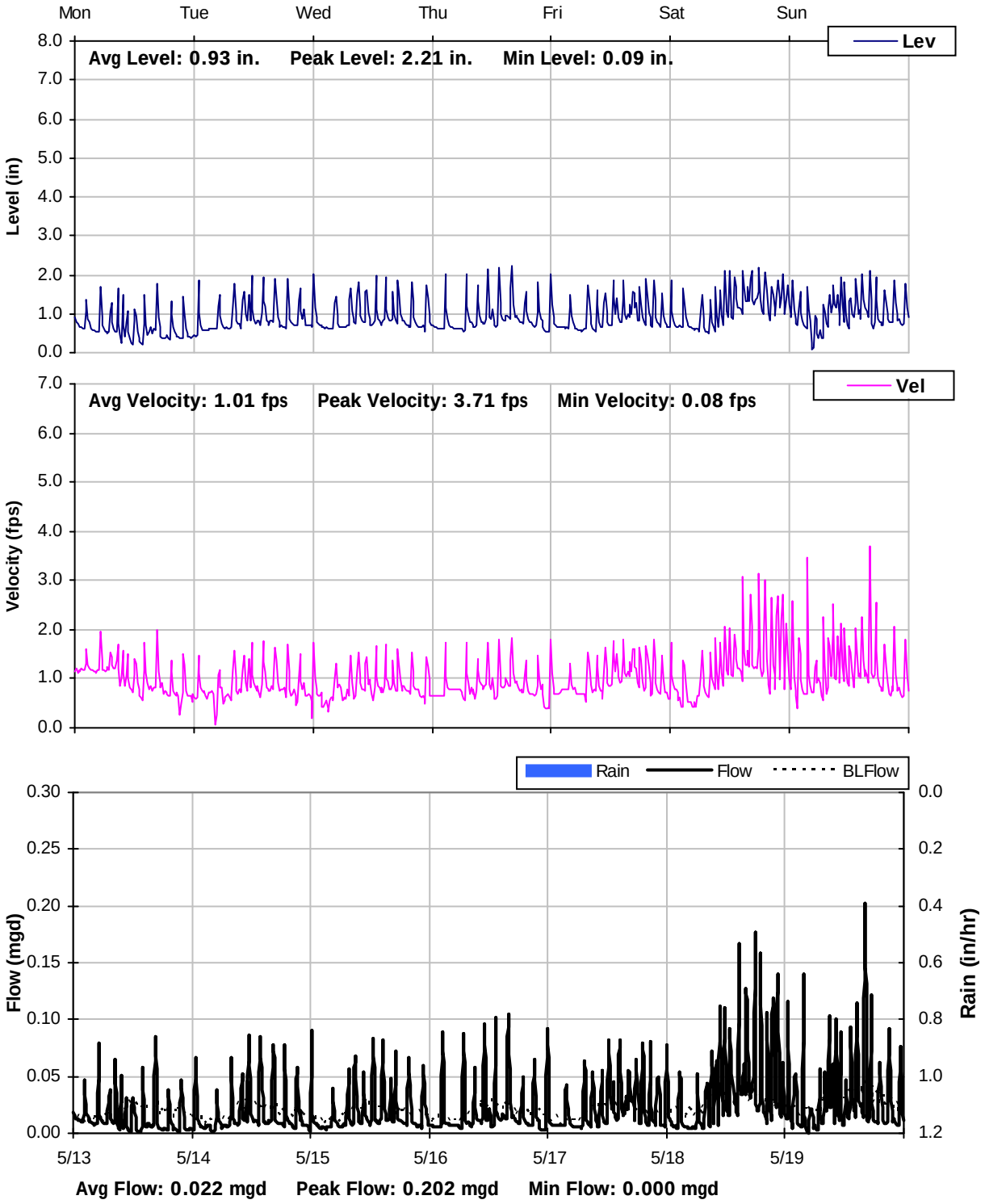
Weekly Level, Velocity and Flow Hydrographs
5/13/2013 to 5/20/2013



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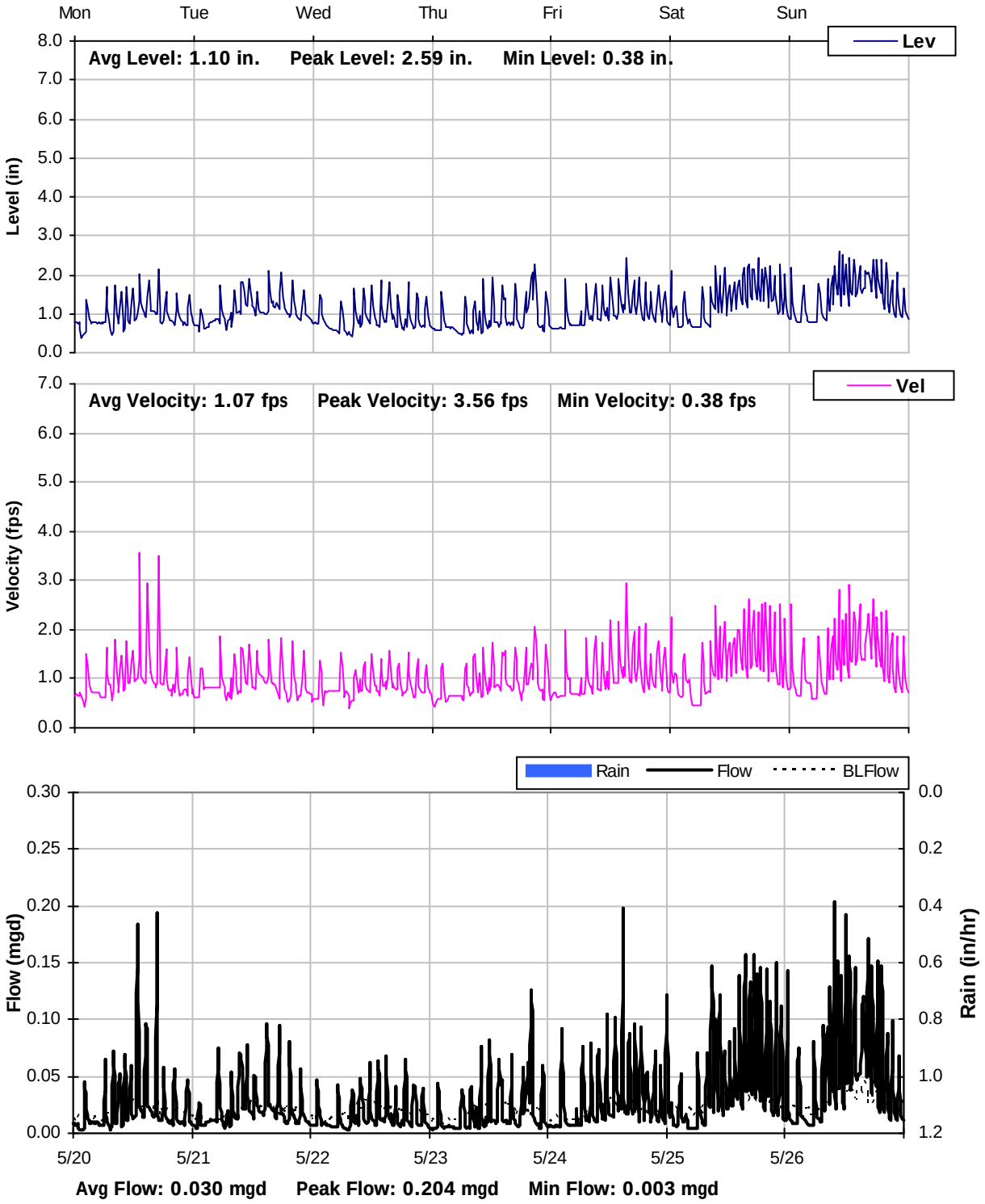
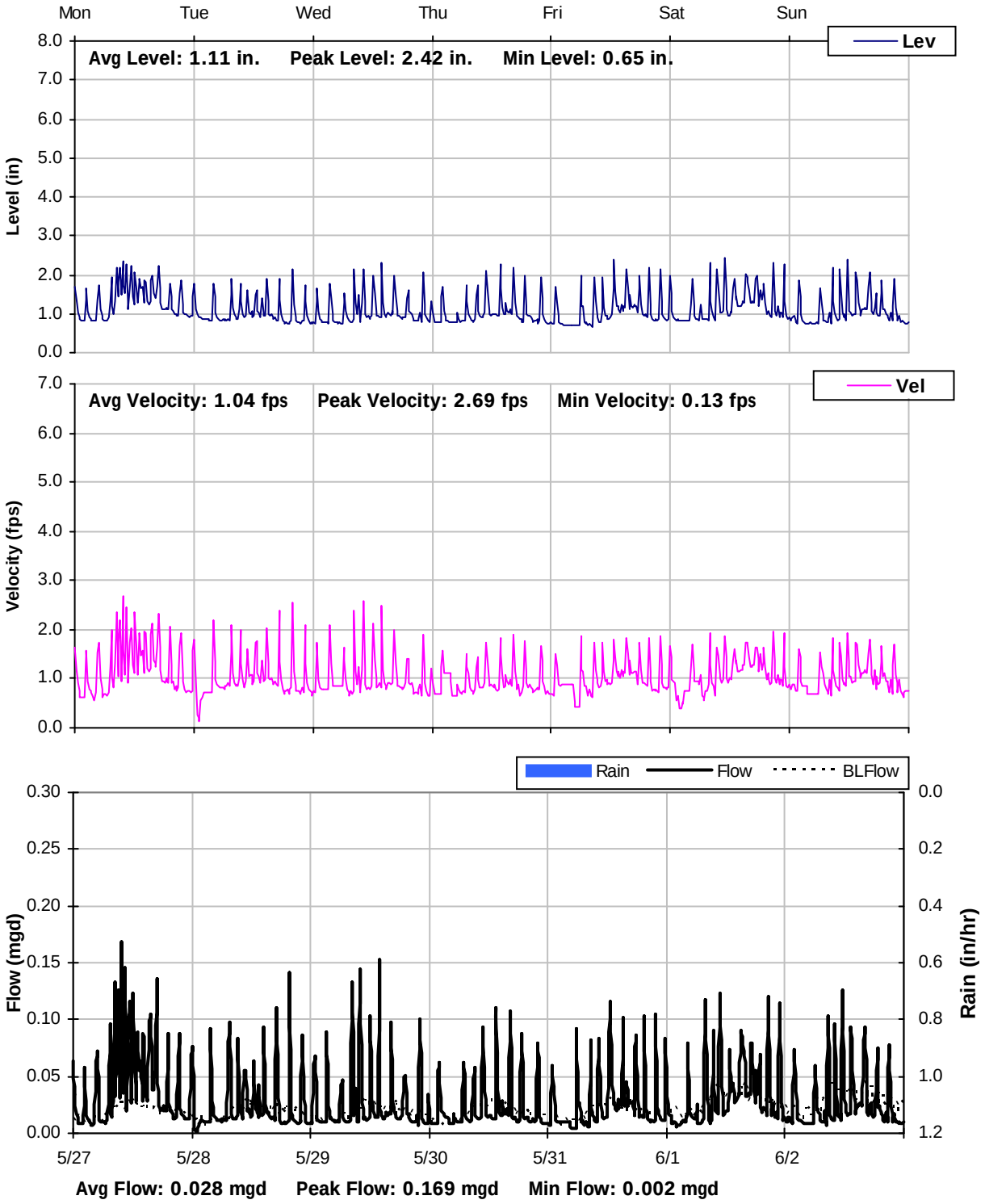
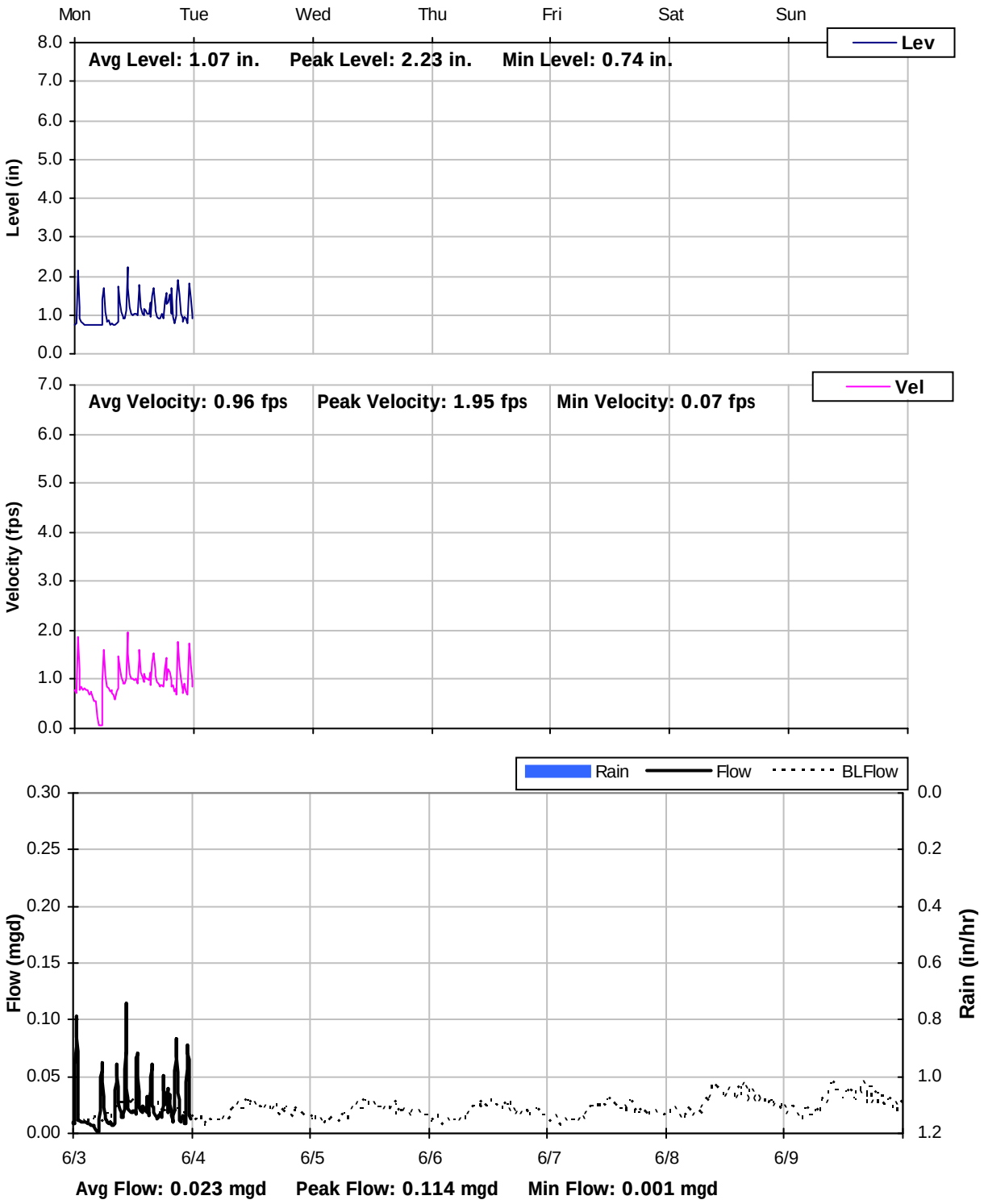
Weekly Level, Velocity and Flow Hydrographs
5/20/2013 to 5/27/2013



SITE E4-10"
Weekly Level, Velocity and Flow Hydrographs
5/27/2013 to 6/3/2013



SITE E4-10"
Weekly Level, Velocity and Flow Hydrographs
6/3/2013 to 6/10/2013



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Appendix 6: 20-Year Capital Improvement and Financial Plan

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CITY OF AVALON
SEWER COLLECTION SYSTEM

SANITARY SEWER
CAPITAL IMPROVEMENT AND
20-YEAR FINANCIAL PLAN

December 2013

Prepared by:

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A Baker Company

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Table of Contents

Introduction 1
Sanitary Sewer System 2
Background 3
Potential Funding Sources 4
Miscellaneous Private Sewer Lateral Improvements 9
Identified Capital Improvement Projects 10
20-Year Financial Plan 17
CIP Projects – FY 2013 18
CIP Projects – FY 2014 19
CIP Projects – FY 2015 20
CIP Projects – FY 2016 21
CIP Projects – FY 2017 22
CIP Projects – FY 2018 23
CIP Projects – FY 2019 24
CIP Projects – FY 2020 25
CIP Projects – FY 2021 26
CIP Projects – FY 2022 27
CIP Projects – FY 2023 28
CIP Projects – FY 2024 29
CIP Projects – FY 2025 30
CIP Projects – FY 2026 31
CIP Projects – FY 2027 32
CIP Projects – FY 2028 33
CIP Projects – FY 2029 34
CIP Projects – FY 2030 35
CIP Projects – FY 2031 36
CIP Projects – FY 2032 37

List of Appendices

Appendix A: Exhibits

Introduction

The City of Avalon (Avalon) is located on Santa Catalina Island off the coast of California, approximately 22 miles south-southwest of Los Angeles, CA. Santa Catalina Island is 76 square miles, with the majority of that area comprising a conservancy area. Avalon is a resort community, approximately 3.2 square miles in size, surrounding Avalon Bay. Avalon has a permanent population of approximately 3,800 residents. The number of occupants within the City fluctuates day-to-day and seasonally as Avalon's primary industry is tourism, which affects the sanitary sewer discharge flows into the collection system.

Avalon is making extensive efforts to actively maintain and improve the City's sewer collection system, reduce sanitary sewer overflows (SSOs), and provide a level of sewer service indicative of the City's high standards. The City has taken action by completing a comprehensive inspection of the entire sewer collection system to assess the condition of each pipeline within the system. Avalon has contracted with Environ Strategy (ES) for the operation and maintenance of their publicly owned waste water treatment plant (WWTP), sewer collection system, and saltwater system (used for toilets, urinals, and hydrants). Environ Strategy has implemented an active approach to the operation and maintenance of the WWTP and the sewer collection system.

Avalon's *Sewer Collection System Capital Improvement and 20-Year Financial Plan* is a planning and budgeting tool that provides information about the City's wastewater infrastructure needs. It identifies facility and equipment requirements for sustaining, restoring, and modernizing the facilities and infrastructure that support the wastewater collection and treatment. It also prioritizes and schedules them for funding and implementation through a multi-year plan. A number of benefits exist to implementing a Capital Improvement and Financial Plan, including coordination between capital needs and operating budgets; enhancement of the City's credit rating; control of its tax rate; stability in debt service obligations; and identification of the most economical means of financing capital projects.

In compliance with Section III and IV of Cease and Desist Order (CDO) No. R4-2012-0077, the *Sewer Collection System Capital Improvement and 20-Year Financial Plan* incorporates the wastewater capital improvement projects that were identified in the following reports:

- *System Evaluation and Capacity Assurance Plan* (August 2013) (1)
- *Sewer Collection System Smoke Test Report* (July 2013) (2)
- *Complete Sewer System Condition Assessment* (July 2013) (3)
- *Sewer Force Main and Pump Station Evaluation Report* (July 2013) (4)

The *System Evaluation and Capacity Assurance Plan* (SECAP) evaluated Avalon's sewer collection system and identified bottlenecks and capacity deficiencies. The *Sewer Collection System Smoke Test Report evaluated* areas susceptible to infiltration and inflow (I/I). The *Complete Sewer System Condition Assessment* evaluated the condition of the sewer mains by visual observation using closed circuit television (CCTV) video. The *Sewer Force Main and Pump Station Evaluation Report* evaluated the two (2) sewer lift stations and force mains (using CCTV and potholing). These identified projects and cost estimates are incorporated into this Capital Improvement and Financial Plan.

Sanitary Sewer System

The 100 year old City of Avalon is located in a valley and fronts the Pacific Ocean. The City's 3,800 residents live in the flat area facing the bay and surrounding hills. Approximately half of the residential structures and the entire commercial district lie on the floor of the valley. The remaining residences are on terraced streets rising into the surrounding hills.

The Avalon sewer collection system, illustrated in **Exhibit A1** and **Exhibit A2** (Appendix A), consists of approximately 9 miles of gravity mains ranging in size from 6-inch to 18-inch. The sewer collection system also includes two sewer pump stations and approximately 1.2 miles of 12-inch and 16-inch force mains, as illustrated in **Exhibit B** (Appendix A). The system is of unknown age and has recently undergone significant rehabilitation and replacement improvements. Low flow diverters are installed at the Crescent Avenue storm drain inlets that divert nuisance dry weather surface water and the initial storm water flow for a storm to the sewer system.

As previously mentioned, Avalon uses a salt water (seawater) system to flush toilets and urinals, which makes the City's sewage highly corrosive due to the salinity. The sewer mains run through streets, alleys, and easements. The majority of residents use golf carts to travel and many of the streets are narrow. The narrow streets provide challenges for maintaining the sewer system as it is difficult or impossible to access significant portions of the system with a full sized combination hydro-jet and vacuum truck.

The force main system consists of pressurized and gravity pipeline segments, varying in size and material, as illustrated in **Exhibit B** (Appendix A). The force main can be broken down into three basic segments as listed below:

- **Force main:** 16-inch polyvinyl chloride (PVC) ~ 4,900 feet
- **Gravity main:** 18-inch vitrified clay pipe (VCP) ~ 985 feet
- **Force main:** 12-inch asbestos concrete (AC) ~ 1,370 feet

The initial lift is provided by the Catherine Pump Station (CPS), which discharges raw sewage collected from Avalon, Descanso Beach, and Hamilton Cove, into a 16-inch PVC force main, which was installed around 1990 (based on As-builts). At approximately 4,900 feet, the 16-inch PVC force main transitions into an 18-inch VCP gravity main in the Pebbly Beach area. The 18-inch gravity main was installed in 1981 (based on As-builts), and conveys raw sewage approximately 985 feet to the Pebbly Beach Pump Station (PBPS). The PBPS is used to pump raw sewage from CPS and additional flow collected from the residential, commercial, and industrial facilities in the Pebbly Beach area. The PBPS discharges the raw sewage into a 12-inch AC force main, which was installed in 1981 (based on As-builts), and conveys the raw sewage approximately 1,370 feet to the Avalon WWTP.

Background

On April 5, 2012, the California Regional Water Quality Control Board (RWQCB) issued a Cease and Desist Order (CDO) requiring the City to bring its sewer program into compliance with State and Federal water quality regulations. The CDO requires the City to accomplish many tasks and projects within a designated time frame, which we have diligently been working on. It is conservatively estimated that complying with the requirements of the CDO, including the capital costs associated with construction projects (improvements) required to come into compliance, will cost in excess of $750,000 a year. The City does not have the option of ignoring the requirements of the CDO and faces large daily fines and potential State takeover of the City's sewer system if violations occur. The most significant requirements of the CDO include:

- Implement and fund a sewer capital improvement program and financial plan (annually);
- Perform regular and annual maintenance activities;
- Adopt ordinances to deal with source control (fats, oil, and grease) and illicit discharge;
- Perform certain studies regarding causes of Avalon Harbor pollution;
- Perform a private lateral program;
- Perform smoke testing to determine locations of Inflow and Infiltration (I/I);
- System Evaluation and Capacity Assurance Plan (SECAP);
- Sewer System Management Plan (SSMP) recertification.

Currently, the reserves for sewer capital improvements are estimated to be just over $250,000, while reserves for the Waste Water Treatment Plant (WWTP) Replacement Project are approximately $1.0 million. Operating reserves are estimated to be $958,000 and are decreasing annually. From 2011 to 2012, over $6.0 million dollars from the Avalon Community Improvement Agency (ACIA) was expended to commence sewer collection system improvements, shielding ratepayers from rate increases in order to pay for the construction activities.

The City's sewer service fees are billed on an annual basis and are collected on the property tax roll. The rate structure for the City's sewer service fees has nine (9) customer classes, as listed below. Within each customer class, the rate of the sewer service fee to be imposed is calculated to proportionately allocate the cost of providing sewer services to each property owner on a parcel basis.

- Residential – Number of dwelling units
- Hotel / Motel – Number of rooms
- Public shower – Number of showers
- Laundry – Number of washing machines
- Church – Fixed charge
- Shop / Office – Fixed charge
- Take-out restaurant – Fixed charge
- Bar / Restaurant (< 100 seats) – Fixed charge
- Bar / Restaurant (> 100 seats) – Fixed charge

Currently, expenditures exceed revenues for the operation and maintenance of the sewer collection system, including wastewater treatment, emergency repairs, outfall inspections, SCADA improvements, rate analysis, legal, overhead charges, etc. The four (4) documents previously described in the *Introduction* section, which are requirements of the CDO, identify several sewer collection system capital improvement projects needed to improve the reliability and capacity of the sewer collection system. To be able to fund these newly identified improvement projects, the City Council adopted a sewer rate increase of approximately 10 percent, which became effective July 1, 2013. This increase provides an additional $132,000 in annual revenues, for total estimated annual revenue from the sewer service fees of $1.45 million. The annual increase in the rates resulting from the newly adopted rate increase for the sewer service fees are as set forth in **Table 1** below.

Table 1: City of Avalon - Annual Sewer Service Fees

Customer Class	Previous Rate	New Rate	Annual Increase
Residential	$432.71/unit	$475.98/unit	$43.27/unit
Public Shower	$143.63/shower	$157.99/shower	$14.36/shower
Hotel / Motel	$217.26/room	$238.99/room	$21.73/room
Laundries	$292.20/unit	$321.42/unit	$29.22/unit
Shop / Office	$432.71	$475.98	$43.27
Take-out Restaurants	$656.86	$722.54	$65.68
Churches	$874.78	$962.26	$87.48
Bar / Restaurant (< 100 seats)	$1,301.09	$1,431.20	$130.11
Bar / Restaurant (> 100 seats)	$1,945.48	$2,140.03	$194.55

Potential Funding Sources

Although the recently adopted service fee increase of 10 percent generates an increase of approximately $132,000 annually, this increase is not capable of funding the newly identified capital improvement projects listed in the following section. As defined by the USEPA' s Office of Wastewater Management, Avalon is considered a "small community" since it has a population of 10,000 or fewer people and an average wastewater flow of less than 1 million gallons per day (mgd). Small community wastewater facilities are a large majority of the publicly owned wastewater facilities in the U.S. Since small communities tend to be economically disadvantaged, under-served, and resource-poor, they face significant barriers to building and maintaining effective wastewater treatment services. Therefore, this section provides several potential funding opportunities, which are listed below, to assist small communities like Avalon in funding sewer capital improvement projects.

- Clean Water State Revolving Funds (USEPA)
- Clean Beaches Initiative Grant Program (SWRCB)
- State Community Development Block Grant Program (HUD)
- Rural Water and Waste Disposal Loans and Revolving Fund Grants (USDA)

Clean Water State Revolving Funds

The Clean Water State Revolving Fund (SRF) is a self-perpetuating loan assistance authority to fund water quality improvement projects in the United States, including wastewater treatment, nonpoint source pollution control, and watershed and estuary management. The fund is administered by the Unites States Environmental Protection Agency (USEPA) and State agencies. The Clean Water SRF, which replaced the Clean Water Act Construction Grants program, provides loans for the construction of municipal wastewater facilities and implementation of nonpoint source pollution control and estuary protection projects. Congress established the fund in the Water Quality Act of 1987. Since its inception, cumulative assistance has surpassed $89 billion, and is continuing to grow through interest earnings, principal repayments, and leveraging.

All fifty (50) states, plus Puerto Rico operate a Clean Water SRF. The Clean Water SRF programs function like environmental infrastructure banks by distributing low interest rate loans for water quality projects. Loan repayments are recycled back into individual SRF programs. States can only use the funds to make loans, purchase local debt, or issue financial guarantees. They cannot make grants or otherwise dissipate the capital in their funds. Principal repayments plus interest earnings become available to finance new projects, allowing the funds to "revolve" over time. States can also increase their SRF financing capacity by issuing SRF backed revenue or general obligation bonds. To date, 27 states have leveraged their programs in this way, raising an additional $20.6 billion for water quality projects. The Clean Water SRFs are capitalized in part by federal and state contributions. For every dollar contributed by the federal government, states contribute 20 cents. Key features of the program include:

- **Low Interest Rates and Flexible Terms:** Nationally, interest rates for SRF loans average 2.2 percent. At that rate, a Clean Water SRF funded project would cost 19 percent less than projects funded at the market rate. Clean Water SRFs can fund 100 percent of the project cost and provide flexible repayment terms up to 20 years, sometimes 30 years.
- **Assistance to a Variety of Borrowers:** The Clean Water SRF has assisted a range of borrowers, including municipalities, communities of all sizes, farmers, homeowners, small businesses, and non-profit organizations.
- **Partnerships with Other Funding Sources:** Clean Water SRFs partner with banks, non-profits, local governments, and other federal and state agencies to provide the best financing source.
- **Significant Funding for Nonpoint Source Pollution Control and Estuary Protection:** To date, the Clean Water SRF has provided over $3 billion in funding for nonpoint source projects and $5.8 million for estuary management.

Additional information concerning the Clean Water State Revolving Fund can be found at: http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm.

Clean Beaches Initiative Grant Program

The Clean Beaches Initiative (CBI) Grant Program was adopted by the State Water Resources Control board (SWRCB) and provides funding for projects that restore and protect the water quality and the environment of coastal waters, estuaries, bays, and near shore waters. The CBI Grant Program was initiated in response to the poor water quality and significant exceedence of bacterial indicators revealed by Assembly Bill (AB) 411 (Stats. 1997, Ch. 765) monitoring at California's beaches.

The CBI Grant Program has provided approximately $100 million from voter-approved bonds for approximately 100 projects since it was started under the 2001 Budget Act. Typical projects include the construction of disinfecting facilities, diversions that prevent polluted storm water from reaching the beach, and scientific research that will enable early notification of unhealthy swimming conditions.

Assembly Bill 2534 (Stats. 2002, Ch. 727), the Watershed, Clean Beaches, and Water Quality Act (Act) was signed into law on September 20, 2002. The Act established the Clean Beaches Program and appropriated $46 million from Proposition 40 for additional CBI grants to help public agencies and non-profit organizations implement projects that protect and restore California's coastal water quality. AB 2534 also required that the SWRCB appoint a Clean Beaches Task Force (CBTF) to review proposals and recommend projects for funding. The CBTF was selected from local agencies, environmental advocacy groups, academia, government, and scientific research organizations representing the breadth and diversity of coastal communities. In January 2010, Senate Bill 790 (Stats. 2009, Ch. 620) became law, amending the CBI grant program statute to also authorize the award of grants for projects designed to implement or promote low impact development, and a stormwater resource plan.

The CBI funds are awarded using a continuous solicitation process. Applicants are invited to submit Concept Proposals through the SWRCBs online Financial Assistance Application Submittal Tool. There are two separate applications, one for implementation projects, and the other for research projects. The CBTF will meet periodically to review the concept proposals submitted and determine which applicants will be invited to submit detailed applications. Depending on the concept proposal submitted, the CBTF may work with the applicant to improve the project proposal prior to or during completion of the detailed application. Division staff will contact the applicants directly after the CBTF convenes each cycle, to inform them about the next steps.

Additional information concerning Clean Beaches Initiative (CBI) Grant Program can be found at:
http://www.waterboards.ca.gov/water_issues/programs/beaches/cbi_projects/

State Community Development Block Grant Program

The Community Development Block Grant (CDBG) program is one of the longest-running programs of the U.S. Department of Housing and Urban Development (HUD). The CDBG program was enacted through the Housing and Community Development Act (HCD Act) of 1974. The CDBG is a flexible program that provides communities with resources to address a wide range of unique community development needs, such as affordable housing, anti-poverty programs, and infrastructure development. CDBG, like other block grant programs, differ from categorical grants made for specific purposes, in that they are subject to less federal oversight and are largely used at the discretion of the state and local governments.

Since States are in the best position to know and respond to the needs of local governments, Congress amended the HCD Act in 1981 to give each State the opportunity to administer CDBG funds for non-entitlement areas. Non-entitlement areas include those units of general local government which do not receive CDBG funds directly from HUD as part of the entitlement program. Non-entitlement areas are cities with populations of less than 50,000 and counties with populations of less than 200,000.

CDBG funds are allocated to more than 1,100 local and state governments on a formula basis. Larger cities and urban counties, called "entitlement communities," are required to prepare and submit a "Consolidated Plan" that establishes goals for the use of CDBG funds. Grantees are also required to hold public meetings to solicit input from the community, ensuring that proposed projects are aligned with the community's most urgent needs.

Proposed projects must be consistent with broad national priorities for CDBG, which include activities that benefit low- and moderate-income people, the prevention or elimination of slums or blight, or other community development activities to address an urgent threat to health or safety. CDBG funds may be used for community development activities, such as 1.) Real estate acquisition, relocation, demolition, and rehabilitation of housing and commercial buildings; 2.) Construction of public facilities and improvements, such as water, sewer, other utilities, street paving, and sidewalks; 3.) Construction and maintenance of neighborhood centers and conversion of school buildings; 4.) Public services; 5.) Economic development and job creation/retention activities; and 6.) Preservation and restoration of historic properties in low-income neighborhoods. Nationally, CDBG funds were spent for the following purposes in 2011:

- Public infrastructure (32.7%)
- Housing (24.8%)
- Administrative and planning (15.1%)
- Public services (11.4%)
- Economic development (7.3%)
- Property acquisition (4.9%)
- Other (3.8%)

Additional information concerning the Community Development Block Grant program can be found at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Rural Water and Waste Disposal Loans and Grants

Although Avalon is not considered rural, it is a city with a population size of less than 10,000. The United States Department of Agriculture (USDA), through the Rural Utilities Service (RUS), offers rural water and waste disposal loans and grants to develop and repair water and wastewater systems in rural areas and in cities and towns with a population of 10,000 or less. They offer the following types:

- **Water and Waste Disposal Direct Loans:** Eligibility and general information is below.
- **Water and Waste Disposal Guaranteed Loans:** Same purpose as direct loans. Guaranteed loans are made and serviced by lenders such as banks and savings and loan associations. Normally, guarantees do not exceed 90 percent on any loss of interest and principal on the loan.
- **Water and Waste Disposal Grants:** Reduce water and waste disposal costs to a reasonable level for users of the system. Grants are made for up to 75 percent of eligible project costs. Eligibility requirements are the same as for direct loans.
- **Solid Waste Management Grants:** Grant assistance must be used to reduce or eliminate pollution of water resources and/or to improve planning and management of solid waste facilities.

The funds are available to public entities, such as municipalities, counties, and special-purpose districts; non-profit corporations; and Indian tribes to be used for the following:

1. Construct, enlarge, extend, or otherwise improve rural water, sanitary sewage, solid waste disposal, and storm wastewater disposal facilities.
2. Construct or relocate public or private buildings, roads, bridges, fences, or utilities, and to make other public improvements necessary for the successful operation or protection of facilities authorized in Item 1 above.

To qualify, applicants must be unable to obtain the financing from other sources at reasonable rates and terms. The interest rates that are used to calculate these loans are subject to change quarterly. Loans are made based on the applicant's authority and the life expectancy of the system's project, which may be up to the maximum of 40 years. The Funds can be used for construction, land acquisition, legal fees, engineering fees, capitalized interest, equipment, initial operation and maintenance costs, project contingencies, and any other cost that is determined by the Rural Development to be necessary for the completion of the project.

Priority is given to public entities, in areas with less than 5,500 people, to restore a deteriorating water supply, or to improve, enlarge, or modify a water facility or an inadequate waste facility. Also, preference is given to requests which involve the merging of small facilities and those serving low-income communities.

Additional information concerning Rural Water and Waste Disposal Loans and Grants can be found at:
http://www.rurdev.usda.gov/UWEP_HomePage.html

Miscellaneous Private Sewer Lateral Improvements

Table 6 provides a list of miscellaneous private sewer lateral improvements recommended due to visual observations that occurred during May 2013 Smoke Testing (ST). A majority of these improvements include installing a cleanout cap, etc., which is the responsibility of the commercial entity or private homeowner. These listed improvements are considered low priority and are not officially included as part of the CIP 20-year Financial Plan, and therefore can be implemented at any time.

Table 6: Miscellaneous Private Lateral Improvements

Project ID #	Facility	Location	Description	Total Cost	ST Setup #
m1	D20-D19	Cemetery Rd (City Yard)	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**154**
m2	C1-2-C1-1-1	Descanso Ave	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**135**
m3	C2-2-1-C2-2	Clemente Ave	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**86**
m4	C2-2-2-C2-2-1	Clemente Ave	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**88**
m5	E4-2-E4-1	100 Casino Way	Smoke detected in sewer laterals beneath 100 Casino Way (Tuna Club). Pipes are exposed under building supported by wooden pylons, located at on the shore of Avalon Bay. The laterals should be repaired to prevent any illicit discharges into the bay.	$5,000	**163**
m6	D11-6-7-D11-6-6	Avalon Canyon Rd	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**189**
m7	E5-1-5-E5-1-4	E. Whittley Ave	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**157**
m8	E7-4-1-E7-4	Hiawatha Ave	Smoke was detected at a sewer cleanout cap. Replace cleanout cap.	$200	**185**
m9	E7-5-0-E7-5	Marilla Ave	Smoke was detected from an uncapped cleanout. Install cleanout cap	$200	**206**
m10	E7-8-1-E7-8	Hiawatha Ave	Smoke was detected from an open pipe under house (317 Las Lomas Ave). Install lateral cap.	$200	**196**
m11	F7-3-F7-2	Sumner Ave	Smoke was found seeping from above ground vent pipes at 343 Sumner Ave. Pipes should be sealed to prevent leaks.	$200	**140**
m12	C2-5-C2-4	Beacon St (Sol Vista)	Sewer Lateral Cleaning and Rehab 52 ft & 60 ft DS of MH C2-5	$6,000	-
			TOTAL	**$13,000**	

Identified Capital Improvement Projects

In compliance with Section III and IV of Cease and Desist Order (CDO) No. R4-2012-0077, the *Sewer Collection System Capital Improvement and 10-Year Financial Plan* incorporates the wastewater capital improvement projects that were identified in the following reports:

- *System Evaluation and Capacity Assurance Plan* (August 2013) (1)
- *Sewer Collection System Smoke Test Report* (July 2013) (2)
- *Complete Sewer System Condition Assessment* (July 2013) (3)
- *Sewer Force Main and Pump Station Evaluation Report* (July 2013) (4)

The *System Evaluation and Capacity Assurance Plan* (SECAP) evaluated Avalon's sewer collection system and identified bottlenecks and capacity deficiencies. The *Sewer Collection System Smoke Test Report evaluated* areas susceptible to infiltration and inflow (I/I). The *Complete Sewer System Condition Assessment* evaluated the condition of the sewer mains by visual observation using closed circuit television (CCTV) video. The *Sewer Force Main and Pump Station Evaluation Report* evaluated the two (2) sewer lift stations and force mains (using CCTV and potholing). The following subsection provides a list for all the recommended capital improvement projects, by the categories listed below. The *10-Year Financial Plan* section will then divide up the improvements based on priority to develop annual budgets that will be assigned a fiscal year. Each table references the above listed reports by number to identify where the capital improvement was recommended.

- Pipeline CCTV and Cleaning
- Pump Station Improvements
- Pipeline / Manhole Construction
- Pipeline / Manhole Rehabilitation
- Misc. Improvements

CCTV and Cleaning

Table 2 lists the recommended closed circuit television (CCTV) inspections and associated cleaning. The sewer collection system is recommended to be inspected by CCTV every five (5) years to conduct proper pipeline condition assessments. Occasionally, a pipeline segment is not able to be video recorded for its entire length from the upstream (US) manhole to the downstream (DS) manhole, due to debris in the pipeline, etc. If this occurs, the pipeline would require jet cleaning to remove the debris. The assumption was made that approximately one-third of all pipelines that are inspected, would require additional jet cleaning to complete the CCTV inspection. To inspect all the pipelines in the collection system, each year approximately 8,000 linear feet of pipeline should be inspected by CCTV. Therefore, the overall lengths shown in **Table 2** are based on inspecting pipelines within the Zones that Environ Strategy (ES) has developed. Refer to **Exhibit C** (Appendix A), which illustrates the twelve (12) zones the sewer system has been broken into. The City will have to determine whether an annual CCTV inspection program is contracted out to a CCTV inspection services company or if ES will handle it. It should be conducted with proper CCTV equipment, which includes both a tractor and push camera. The CCTV data should be stored in a database that can then be produced into a condition assessment report.

Table 2: Pipeline CCTV and Cleaning Costs by Zone

CCTV Assessment	ES Zone	Length (ft)	Cleaning Unit Rate	Estimated Cleaning Cost	CCTV Unit Rate	Estimated CCTV Cost	Total Yearly Cost
1	1, 10, 11, 12	7,752	$1.00	$7,760	$4.50	$34,890	$42,650
2	2, 3	7,825	$1.00	$7,830	$4.50	$35,220	$43,050
3	4	8,659	$1.00	$8,660	$4.50	$38,970	$47,630
4	5,6	7,908	$1.00	$7,910	$4.50	$35,590	$43,500
5	7, 8, 9	9,460	$1.00	$9,460	$4.50	$42,570	$52,030

Pump Station Improvement Projects

Table 3 below lists the recommended capital improvement projects that are related to pump stations to improve efficiency, reliability, and sewer overflows.

Table 3: Pump Station Improvement Projects and Cost Estimate

Project ID #	Facility	Location	Description	Total	Source
16	Pebbly Beach PS	Pebbly Beach Rd	Air Relief System	$7,000	4
			SCADA Components	$32,000	4
			New Wet Well	$107,000	4
			Three (3) New Chopper Pumps	$112,000	4
17	Catherine PS	Crescent Ave	Air Relief System	$5,000	4
			SCADA Components	$22,000	4
			Structural Enhancements	$107,000	4
			Two (2) New Centrifugal Pumps	$60,000	4
			TOTAL	**$452,000**	

High Priority – Pipeline & Manhole Construction Projects

Table 4 below lists by priority, the recommended capital improvement projects that require excavation. These projects are recommended due to poor pipeline condition that were incurred during CCTV inspections and capacity deficiencies determined in the *System Evaluation and Capacity Assurance Plan* (SECAP). The estimated cost for the listed high priority construction projects is approximately $4.2 million. Refer to the 20-Year Financial Plan for additional information concerning the listed improvement projects and when they are recommended to occur (fiscal year).

Table 4: High Priority Pipeline and MH Construction Projects

Project ID #	Facility	Location	Description	Total Incl. Inflation
1	GM-1-GM-4	Pebbly Beach Rd	Replace with 24" Diameter PVC (PS46)	$392,000
			Replace / Install New Manhole (GM-1, 2, and 3)	$30,000
3	E6-0-1-E6	Canyon Easement	Micro-Tunnel Under Portofino Hotel	$670,000
			Replace with 8" Diameter PVC (SDR 35)	
			Re-establish 8 Laterals	
4	F-E	Crescent Ave	Replace with 12" Diameter PVC (SDR 35)	$21,000
5	E-A	Crescent Ave	Replace with 18" Diameter PVC (PS46)	$318,000
			Replace / Install New Manhole (B,C,D, and E)	$42,000
6	F1-F	Sumner Ave	Replace with 12" Diameter PVC (SDR 35)	$83,000
7	F1-1-F1	Alley (off Sumner Ave)	Replace with 8" Diameter PVC (SDR 35)	$58,000
8	B6-B5	Middle Terrace (Stairs)	Replace with 8" Diameter PVC (SDR 35)	$29,000
9	D3-2	Catalina Ave (Parking Lot)	Install New Manhole at Dead End (D3-2)	$11,000
10	D3-3	Catalina Ave (Parking Lot)	Install New Manhole at Dead End (D3-3)	$11,000
11	D3-4	Catalina Ave (Parking Lot)	Install New Manhole at Dead End (D3-4)	$11,000
12	E7-3-2	Alley off Marilla Ave	Install New Manhole at Dead End (E7-3-2)	$11,000
13	F6-2	Beacon St	Install New Manhole at Dead End (F6-2)	$11,000
14	G3-3	Beacon St	Replace Dual Sweep C.O. with New Manhole (G3-3)	$11,000
15	E1-E	Crescent Ave	Replace with 18" Diameter PVC (PS46)	$21,000
33	D5-2-D5	Alley (Eucalyptus/Catalina)	Replace with 8" Diameter PVC (SDR 35)	$278,000
34	D8-D6	Alley (Sumner/Eucalyptus)	Replace with 8" Diameter PVC (SDR 35)	$282,000
35	G3-G2	Metropole Ave	Replace with 8" Diameter PVC (SDR 35)	$110,000
			Replace 4" Sewer Lateral / Install Cleanout	$49,000
			Replace / Install New Manhole (G2)	$11,000
36	C3-1-C3	Alley (Descanso/Claressa)	Replace with 8" Diameter PVC (SDR 35)	$263,000
			Replace / Install New Manhole (C3-0)	$11,000
37	C2-1-1-C2-1	Claressa Ave	Sewer Abandonment (Alley Claressa/Clemente)	$66,000
			Install New 8" Diameter PVC (SDR 35)	$263,000
			Install New 4" Sewer Lateral (Claressa & Clemente)	$268,000
			Replace / Install New Manhole (C2-1-1, C2-1-0)	$22,000
38	B2-0-B2	Lower Terrace Rd	Sewer Abandonment 6” – 15” Diameter	$3,000
39	B2-1-B2	Lower Terrace Rd	Replace with 10" PVC (SDR 35). Tie into MH B2	$29,000
52	E7-6-2-E7-6-1	Marilla Ave (Easement)	External Point Repair, 6' & 35' US of MH E7-6-1	$35,000
			Locate MH and Raise to Grade (E7-6-2)	$9,000

Project ID #	Facility	Location	Description	Total Incl. Inflation
57	E5-3-E5-2	Whittley Ave	Replace with 8" Diameter PVC (SDR 35)	$188,000
			Replace 4" Sewer Lateral / Install Cleanout	$64,000
			Install New Manhole at Dead End (E5-3)	$12,000
58	E5-2-0-1-E5-2-0	Bonita Way (Easement)	Replace with 8" Diameter PVC (SDR 35)	$128,000
			Replace 4" Sewer Lateral / Install Cleanout	$52,000
			Replace / Install New Manhole (E5-2-0)	$12,000
			Install New Manhole at Dead End (E5-2-0-1)	$12,000
60	D21-3-D21	Cemetery Rd (Side Rd)	Replace with 8" Diameter PVC (SDR 35)	$222,000
			Locate MH and Raise to Grade (D21-2)	$9,000
			Install New Manhole at Dead End (D21-3)	$13,000

High Priority – Pipeline & Manhole Rehabilitation Projects

Table 5 below lists by priority, the recommended capital improvement projects that require pipeline rehabilitation. These projects are recommended due to poor pipeline condition that was incurred during CCTV inspections. The estimated cost for the listed high priority rehabilitation projects is approximately $700,000. Refer to the 20-Year Financial Plan for additional information concerning the listed improvement projects and when they are recommended to occur (fiscal year).

Table 5: High Priority Pipeline and Manhole Rehabilitation Projects

Project ID #	Facility	Location	Description	Total Incl. Inflation
2	GM-4	Pebbly Beach Rd	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench And Trough Rehabilitation	$5,000
18	F6-2-F6-1	Beacon St	8" Diameter Trenchless Lining	$7,000
19	G3-3-G3-2	Beacon St	8" Diameter Trenchless Lining	$9,000
			Sewer Lateral Connection "Top Hat" Method	$10,000
20	D3-2-D3	Catalina Ave (Parking Lot)	8" Diameter Trenchless Lining	$8,000
			Sewer Lateral Connection "Top Hat" Method	$16,000
21	D3-3-D3	Catalina Ave (Parking Lot)	8" Diameter Trenchless Lining	$12,000
			Sewer Lateral Connection "Top Hat" Method	$10,000
22	D3-4-D3	Catalina Ave (Parking Lot)	8" Diameter Trenchless Lining	$12,000
			Sewer Lateral Connection "Top Hat" Method	$10,000
23	A1, A2, A3, A4	Pebbly Beach Rd (walkway)	Hydrophilic Grout Injection with Sealant	$5,000
			Manhole Bench / Trough Rehabilitation	$22,000
24	A1-0	Pebbly Beach Rd	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$6,000

Project ID #	Facility	Location	Description	Total Incl. Inflation
25	C2-3	Beacon St	Hydrophilic Grout Injection with Sealant	$2,000
			Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000
26	D1	Catalina Ave	Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$6,000
27	E5-2	Marilla Ave	Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$6,000
28	E8-1	Maiden Ln	Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$6,000
29	E9-1	Upper Olive Ln	Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$6,000
30	E6-0-2	Canyon Easement	Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000
31	E6-0-3	Canyon Easement	Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000
32	F3-1	Sumner Ave (Parking Lot)	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$6,000
40	E4-1	Casino Way	Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$6,000
41	E4-2	Casino Way	Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$6,000
42	E4-3	Casino Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$6,000
43	E4-4	Casino Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$0
			Manhole Bench / Trough Rehabilitation	$6,000
44	E4-5	Casino Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$0
			Manhole Bench / Trough Rehabilitation	$6,000
45	E4-6	Casino Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$8,000
			Manhole Bench / Trough Rehabilitation	$6,000
46	E4-7	St. Catherine Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$7,000
			Manhole Bench / Trough Rehabilitation	$6,000
47	E4-8	St. Catherine Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000

Project ID #	Facility	Location	Description	Total Incl. Inflation
48	E4-9	St. Catherine Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$6,000
			Manhole Bench / Trough Rehabilitation	$6,000
49	E4-10	St. Catherine Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$7,000
			Manhole Bench / Trough Rehabilitation	$6,000
50	E4-11	St. Catherine Way	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000
51	E4-12	St. Catherine Way	Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$6,000
53	E7-6	Marilla Ave	Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$6,000
54	E7-6-1	Marilla Ave	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000
55	E7-6-2	Marilla Ave	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$6,000
56	E7-6-2-E7-6	Marilla Ave	8" Diameter Trenchless Lining	$27,000
			Sewer Lateral Connection "Top Hat" Method	$35,000
59	E4-6-E4-12	St. Catherine Way	10" Diameter Trenchless Lining	$90,000
			Sewer Lateral Connection "Top Hat" Method	$4,000
61	D11-D13	Falls Canyon Rd	8" Diameter Trenchless Lining	$42,000
			Sewer Lateral Connection "Top Hat" Method	$19,000
62	D12	Falls Canyon Rd	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$4,000
			Manhole Bench / Trough Rehabilitation	$7,000
63	D13	Falls Canyon Rd	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000
64	D15	Falls Canyon Rd	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000
65	D17	Falls Canyon Rd	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000
66	D18	Avalon School (Ball Field)	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$2,000
			Manhole Bench / Trough Rehabilitation	$7,000

Project ID #	Facility	Location	Description	Total Incl. Inflation
67	D19	Avalon School (Ball Field)	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000
68	D20	Falls Canyon Rd (City Yard)	Manhole Step Removal	$1,000
			Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000
69	D21	Falls Canyon Rd (City Yard)	Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000
70	D21-1	Falls Canyon Rd (Side Rd)	Manhole Wall Rehabilitation	$3,000
			Manhole Bench / Trough Rehabilitation	$7,000

20-Year Financial Plan

Table 7 provides a summary of each fiscal year's sanitary sewer system CIP budget based on the recommended improvements. The projects were selected for each fiscal year based on priority of need, while also incorporating construction (location) and economical (economies of scale) effectiveness. Future project costs were inflated based on the fiscal year that they would be incurred, using an inflation rate of 3 percent. The recent sewer fee increase of approximately 10 percent produces an additional $132,000 annually of revenue, which is not adequate to cover the cost of the recommended improvements. Therefore, the need to acquire additional funding sources (i.e. State Revolving Funds, etc.) to complete these projects is anticipated.

The list of CIP projects that comprise each fiscal year recommended improvements are provided in the following pages of this report. In addition, a CIP Projects Map is provided at the end of the following tables to illustrate the location of each recommended project.

Table 7: 20-Year Financial Plan Summary

Fiscal Year	Project Type	Approx. Location	Total	Avg. Annual CCTV Costs	Total Annual Cost
2013	Force Main Improvements	Pebbly Beach Rd	$431,000	$45,000	$476,000
2014	Replacement Projects	Various Locations	$1,308,000	$45,000	$1,353,000
2015	PS Improvement / Rehab Projects	Various Locations	$658,000	$45,000	$703,000
2016	Replacement Projects	Various Locations	$1,655,000	$45,000	$1,700,000
2017	Rehabilitation Projects	Casino Way / St. Catherine Way	$126,000	$45,000	$171,000
2018	Replacement / Rehab Projects	Marilla Ave / Whittley Ave	$605,000	$45,000	$650,000
2019	Rehabilitation Projects	St. Catherine Way	$94,000	$45,000	$139,000
2020	Replacement / Rehab Projects	Falls Cyn Rd / Cemetery Rd	$402,000	$45,000	$447,000
2021	Rehabilitation Projects	Avalon Canyon Rd	$115,000	$45,000	$160,000
2022	Replacement / Rehab Projects	Pebbly Beach Area	$339,000	$45,000	$384,000
2023	Replacement / Rehab Projects	Las Lomas Ave	$511,000	$45,000	$556,000
2024	Rehabilitation Projects	Middle Terrace	$60,000	$45,000	$105,000
2025	Rehabilitation Projects	Tremont St	$416,000	$45,000	$461,000
2026	Rehabilitation Projects	Upper / Lower Terrace	$101,000	$45,000	$146,000
2027	Rehabilitation Projects	E. Whittley / Calle Del Sol / Metropole	$199,000	$45,000	$244,000
2028	Rehabilitation Projects	Avalon Cyn Rd / Falls Cyn Rd	$769,000	$45,000	$814,000
2029	Rehabilitation Projects	Avalon Canyon Rd	$208,000	$45,000	$253,000
2030	Rehabilitation Projects	Beacon St (Sol Vista)	$145,000	$45,000	$190,000
2031	Rehabilitation Projects	Beacon St (Sol Vista)	$144,000	$45,000	$189,000
2032	Rehabilitation Projects	Cabrillo Dr	$206,000	$45,000	$251,000
TOTAL			**$8,492,000**	**$900,000**	**$9,392,000**

CITY OF AVALON - CATALINA ISLAND

PROJECT: **Sewer Improvement Program**
DESCRIPTION: **2013 CIP 20-Year Financial Plan**
PREPARED BY: **RBF Consulting**

INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2013	1	GM-1-GM-4	Pebbly Beach Rd	Replacement	Pipe	VCP	18	980	-	-	Replace with 24" Diameter PVC (PS46)	980	LF	$400	$392,000	$392,000	1,4
					MH	-	-	-	5	-	Replace / Install New Manhole (GM-1, 2, and 3)	3	EA	$10,000	$30,000	$30,000	1,4
	2	GM-4	Pebbly Beach Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	1,4
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$3,000	1,4
											Manhole Bench And Trough Rehabilitation	1	EA	$5,000	$5,000	$5,000	1,4
													2013	**TOTAL**		**$431,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2014 - High Prioirty Replacement	3	E6-0-1-E6	Canyon Easement	Replacement	Pipe	VCP	8	230	-	-	Micro-Tunnel Under Portofino Hotel Replace with 8" Diameter PVC (SDR 35) Re-establish 8 Laterals	1	LS	$650,000	$650,000	$670,000	3
	4	F-E	Crescent Ave	Replacement	Pipe	VCP	10	50	-	-	Replace with 12" Diameter PVC (SDR 35)	50	LF	$400	$20,000	$21,000	1
	5	E-A	Crescent Ave	Replacement	Pipe	VCP	15	770	-	-	Replace with 18" Diameter PVC (PS46)	770	LF	$400	$308,000	$318,000	1
					MH	-	-	-	6	-	Replace / Install New Manhole (B,C,D, and E)	4	EA	$10,000	$40,000	$42,000	3
	6	F1-F	Sumner Ave	Replacement	Pipe	VCP	10	200	3	-	Replace with 12" Diameter PVC (SDR 35)	200	LF	$400	$80,000	$83,000	1
	7	F1-1-F1	Alley (off Sumner Ave)	Replacement	Pipe	VCP	8	140	-	-	Replace with 8" Diameter PVC (SDR 35)	140	LF	$400	$56,000	$58,000	1
	8	B6-B5	Middle Terrace (Stairs)	Replacement	Pipe	CI	8	70	-	-	Replace with 8" Diameter PVC (SDR 35)	70	LF	$400	$28,000	$29,000	3
	9	D3-2	Catalina Ave (Parking Lot)	Replacement	MH	-	-	-	5		Install New Manhole at Dead End (D3-2)	1	EA	$10,000	$10,000	$11,000	3
	10	D3-3	Catalina Ave (Parking Lot)	Replacement	MH	-	-	-	5		Install New Manhole at Dead End (D3-3)	1	EA	$10,000	$10,000	$11,000	3
	11	D3-4	Catalina Ave (Parking Lot)	Replacement	MH	-	-	-	5		Install New Manhole at Dead End (D3-4)	1	EA	$10,000	$10,000	$11,000	3
	12	E7-3-2	Alley off Marilla Ave	Replacement	MH	-	-	-	5	-	Install New Manhole at Dead End (E7-3-2)	1	EA	$10,000	$10,000	$11,000	3
	13	F6-2	Beacon St	Replacement	MH	-	-	-	0	-	Install New Manhole at Dead End (F6-2)	1	EA	$10,000	$10,000	$11,000	3
	14	G3-3	Beacon St	Replacement	MH	-	-	-	0	-	Replace Dual Sweep C.O. with New Manhole (G3-3)	1	EA	$10,000	$10,000	$11,000	3
	15	E1-E	Crescent Ave	Replacement	Pipe	VCP	12	50	-	-	Replace with 18" Diameter PVC (PS46)	50	LF	$400	$20,000	$21,000	1
													2014	**TOTAL**		**$1,308,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2015 - High Priority Rehabilitation	16	Pebbly Beach PS	Pebbly Beach Rd	PS Improvements	Pipe	-	-	-	-	-	Air Relief System	1	LS	$6,000	$6,000	$7,000	4
											SCADA Components	1	LS	$30,000	$30,000	$32,000	4
											New Wet Well	1	LS	$100,000	$100,000	$107,000	4
											New Chopper Pumps	3	EA	$35,000	$105,000	$112,000	4
	17	Catherine PS	Crescent Ave	PS Improvements	Pipe	-	-	-	-	-	Air Relief System	1	LS	$4,000	$4,000	$5,000	4
											SCADA Components	1	LS	$20,000	$20,000	$22,000	4
											Structural Enhancements	1	LS	$100,000	$100,000	$107,000	4
											New Centrifugal Pumps	2	EA	$28,000	$56,000	$60,000	4
	18	F6-2-F6-1	Beacon St	Rehabilitation	Pipe	VCP	8	96	-	-	8" Diameter Trenchless Lining	96	EA	$60	$5,760	$7,000	3
	19	G3-3-G3-2	Beacon St	Rehabilitation	Pipe	VCP	8	140	-	-	8" Diameter Trenchless Lining	140	LF	$60	$8,400	$9,000	3
											Sewer Lateral Connection "Top Hat" Method	3	EA	$3,000	$9,000	$10,000	3
	20	D3-2-D3	Catalina Ave (Parking Lot)	Rehabilitation	Pipe	VCP	8	120	-	-	8" Diameter Trenchless Lining	120	LF	$60	$7,200	$8,000	3
											Sewer Lateral Connection "Top Hat" Method	5	EA	$3,000	$15,000	$16,000	3
	21	D3-3-D3	Catalina Ave (Parking Lot)	Rehabilitation	Pipe	VCP	8	180			8" Diameter Trenchless Lining	180	LF	$60	$10,800	$12,000	3
											Sewer Lateral Connection "Top Hat" Method	3	EA	$3,000	$9,000	$10,000	3
	22	D3-4-D3	Catalina Ave (Parking Lot)	Rehabilitation	Pipe	VCP	8	180			8" Diameter Trenchless Lining	180	LF	$60	$10,800	$12,000	3
											Sewer Lateral Connection "Top Hat" Method	3	EA	$3,000	$9,000	$10,000	3
	23	A1, A2, A3, A4	Pebbly Beach Rd (walkway)	Rehabilitation	MH	-	-	-	5	-	Hydrophilic Grout Injection with Sealant	4	EA	$1,000	$4,000	$5,000	3
											Manhole Bench / Trough Rehabilitation	4	EA	$5,000	$20,000	$22,000	3
	24	A1-0	Pebbly Beach Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	25	C2-3	Beacon St	Rehabilitation	MH	-	-	-	6	-	Hydrophilic Grout Injection with Sealant	1	EA	$1,000	$1,000	$2,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	26	D1	Catalina Ave	Rehabilitation	MH	-	-	-	5		Manhole Wall Rehabilitation	5	VF	$500	$2,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	27	E5-2	Marilla Ave	Rehabilitation	MH	-	-	-	3	-	Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	28	E8-1	Maiden Ln	Rehabilitation	MH	-	-	-	2	-	Manhole Wall Rehabilitation	2	VF	$500	$1,000	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	29	E9-1	Upper Olive Ln	Rehabilitation	MH	-	-	-	5	-	Manhole Wall Rehabilitation	5	VF	$500	$2,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	30	E6-0-2	Canyon Easement	Rehabilitation	MH	-	-	-	6	-	Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	31	E6-0-3	Canyon Easement	Rehabilitation	MH	-	-	-	6	-	Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	32	F3-1	Sumner Ave (Parking Lot)	Rehabilitation	MH	-	-	-	3	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
													2015	**TOTAL**		**$658,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2016 - High Priority City Flats	33	D5-2-D5	Alley (Eucalyptus/Catalina)	Replacement	Pipe	VCP	6	635	-	-	Replace with 8" Diameter PVC (SDR 35)	635	LF	$400	$254,000	$278,000	1
	34	D8-D6	Alley (Sumner/Eucalyptus)	Replacement	Pipe	VCP	6	645	-	-	Replace with 8" Diameter PVC (SDR 35)	645	LF	$400	$258,000	$282,000	1
	35	G3-G2	Metropole Ave	Replacement	Pipe	VCP	6	250	-	-	Replace with 8" Diameter PVC (SDR 35)	250	LF	$400	$100,000	$110,000	1
											Replace 4" Sewer Lateral / Install Cleanout	8	EA	$5,500	$44,000	$49,000	1
					MH	-	-	-	5	-	Replace / Install New Manhole (G2)	1	EA	$10,000	$10,000	$11,000	1
	36	C3-1-C3	Alley (Descanso/Claressa)	Replacement	Pipe	VCP	6	600	-	-	Replace with 8" Diameter PVC (SDR 35)	600	LF	$400	$240,000	$263,000	3
					MH	-	-	-	3	-	Replace / Install New Manhole (C3-0)	1	EA	$10,000	$10,000	$11,000	3
	37	C2-1-1-C2-1	Claressa Ave	Replacement	Pipe	VCP	6	600	-	-	Sewer Abandonment (Alley Claressa/Clemente)	600	LF	$100	$60,000	$66,000	3
											Install New 8" Diameter PVC (SDR 35)	600	LF	$400	$240,000	$263,000	3
											Install New 4" Sewer Lateral (Claressa & Clemente)	35	EA	$7,000	$245,000	$268,000	3
					MH	-	-	-	4	-	Replace / Install New Manhole (C2-1-1, C2-1-0)	2	EA	$10,000	$20,000	$22,000	3
	38	B2-0-B2	Lower Terrace Rd	Replacement	Pipe	PVC	10	25	-	-	Sewer Abandonment 6" – 15" Diameter	25	LF	$100	$2,500	$3,000	3
	39	B2-1-B2	Lower Terrace Rd	Replacement	Pipe	PVC	10	63	-	-	Replace with 10" PVC (SDR 35). Tie into MH B2	63	LF	$420	$26,460	$29,000	3
													2016	**TOTAL**		**$1,655,000**	

CITY OF AVALON - CATALINA ISLAND

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Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2017 - Casino Way / St. Catherine Way	40	E4-1	Casino Way	Rehabilitation	MH	-	-	-	3	-	Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	41	E4-2	Casino Way	Rehabilitation	MH	-	-	-	3	-	Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	42	E4-3	Casino Way	Rehabilitation	MH	-	-	-	3	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	43	E4-4	Casino Way	Rehabilitation	MH	-	-	-	3	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	0	VF	$500	$0	$0	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	44	E4-5	Casino Way	Rehabilitation	MH	-	-	-	3	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	0	VF	$500	$0	$0	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	45	E4-6	Casino Way	Rehabilitation	MH	-	-	-	14	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	14	VF	$500	$7,000	$8,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	46	E4-7	St. Catherine Way	Rehabilitation	MH	-	-	-	11	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	11	VF	$500	$5,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	47	E4-8	St. Catherine Way	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	48	E4-9	St. Catherine Way	Rehabilitation	MH	-	-	-	9	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	9	VF	$500	$4,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	49	E4-10	St. Catherine Way	Rehabilitation	MH	-	-	-	12	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	12	VF	$500	$6,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	50	E4-11	St. Catherine Way	Rehabilitation	MH	-	-	-	6	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	51	E4-12	St. Catherine Way	Rehabilitation	MH	-	-	-	4	X	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	2
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	2
													2017	**TOTAL**		**$126,000**	

CITY OF AVALON - CATALINA ISLAND

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Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2018 - Marilla / Whittley Ave	52	E7-6-2-E7-6-1	Marilla Ave (Easement)	Spot Repair	Pipe	VCP	8	93	-	-	External Point Repair, 6' & 35' US of MH E7-6-1	2	EA	$15,000	$30,000	$35,000	2
				Replacement	MH	-	-	-	5	-	Locate MH and Raise to Grade (E7-6-2)	1	EA	$7,000	$7,000	$9,000	3
	53	E7-6	Marilla Ave	Rehabilitation	MH	-	-	-	5	-	Manhole Wall Rehabilitation	5	VF	$500	$2,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	54	E7-6-1	Marilla Ave	Rehabilitation	MH	-	-	-	6	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	55	E7-6-2	Marilla Ave	Rehabilitation	MH	-	-	-	6	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$6,000	3
	56	E7-6-2-E7-6	Marilla Ave	Rehabilitation	Pipe	VCP	8	380	-	-	8" Diameter Trenchless Lining	380	LF	$60	$22,800	$27,000	3
											Sewer Lateral Connection "Top Hat" Method	10	EA	$3,000	$30,000	$35,000	3
	57	E5-3-E5-2	Whittley Ave	Replacement	Pipe	VCP	6	405	-	-	Replace with 8" Diameter PVC (SDR 35)	405	LF	$400	$162,000	$188,000	3
											Replace 4" Sewer Lateral / Install Cleanout	10	EA	$5,500	$55,000	$64,000	3
				Replacement	MH	-	-	-	3	-	Install New Manhole at Dead End (E5-3)	1	EA	$10,000	$10,000	$12,000	3
	58	E5-2-0-1-E5-2-0	Bonita Way (Easement)	Replacement	Pipe	PVC	6	275	-	-	Replace with 8" Diameter PVC (SDR 35)	275	LF	$400	$110,000	$128,000	3
											Replace 4" Sewer Lateral / Install Cleanout	8	EA	$5,500	$44,000	$52,000	3
					MH	-	-	-	4	-	Replace / Install New Manhole (E5-2-0)	1	EA	$10,000	$10,000	$12,000	3
					MH	-	-	-	4	-	Install New Manhole at Dead End (E5-2-0-1)	1	EA	$10,000	$10,000	$12,000	3
													2018	**TOTAL**		**$605,000**	

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Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2019	59	E4-6-E4-12	St. Catherine Way	Rehabilitation	Pipe	CI	10	1,070	-	X	10" Diameter Trenchless Lining	1,070	LF	$70	$74,900	$90,000	3
											Sewer Lateral Connection "Top Hat" Method	1	EA	$3,000	$3,000	$4,000	3
													2019	**TOTAL**		**$94,000**	

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Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2020 - Falls Cyn Rd / Cemetery Rd	60	D21-3-D21	Cemetery Rd (Side Rd)	Replacement	Pipe	VCP	6	450	-	-	Replace with 8" Diameter PVC (SDR 35)	450	LF	$400	$180,000	$222,000	3
					MH	-	-	-	4	-	Locate MH and Raise to Grade (D21-2)	1	EA	$7,000	$7,000	$9,000	3
					MH	-	-	-	4	-	Install New Manhole at Dead End (D21-3)	1	EA	$10,000	$10,000	$13,000	3
	61	D11-D13	Falls Canyon Rd	Rehabilitation	Pipe	VCP	8	565	-	-	8" Diameter Trenchless Lining	565	LF	$60	$33,900	$42,000	3
											Sewer Lateral Connection "Top Hat" Method	5	EA	$3,000	$15,000	$19,000	3
	62	D12	Falls Canyon Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	63	D13	Falls Canyon Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	64	D15	Falls Canyon Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	65	D17	Falls Canyon Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	66	D18	Avalon School (Ball Field)	Rehabilitation	MH	-	-	-	3	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	67	D19	Avalon School (Ball Field)	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	68	D20	Falls Canyon Rd (City Yard)	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	69	D21	Falls Canyon Rd (City Yard)	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	70	D21-1	Falls Canyon Rd (Side Rd)	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
														2020 TOTAL		**$402,000**	

CITY OF AVALON - CATALINA ISLAND

PROJECT: **Sewer Improvement Program**
DESCRIPTION: **2013 CIP 20-Year Financial Plan**
PREPARED BY: **RBF Consulting**

INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2021 - Avalon Cyn Rd	71	D9-D11	Avalon Cyn Rd	Rehabilitation	Pipe	VCP	8	400	-	-	8" Diameter Trenchless Lining	400	LF	$60	$24,000	$31,000	3
											Sewer Lateral Connection "Top Hat" Method	2	EA	$3,000	$6,000	$8,000	3
	72	D11-6-1	Avalon Canyon Rd (Golf Course Park)	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	73	D11-6-2	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	74	D11-6-3	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	75	D11-6-4	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	76	D11-6-5	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	77	D11-6-6	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	6	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	78	D11-6-7	Avalon Canyon Rd (Campground)	Rehabilitation	MH	-	-	-	6	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
													2021	**TOTAL**		**$115,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2022 - Pebbly Beach	79	PB-3-PB-0	Pebbly Beach Village	Replacement	Pipe	VCP	6	170	-	X	Replace with 8" Diameter PVC (SDR 35)	74	LF	$400	$29,600	$39,000	3
											Replace 4" Sewer Lateral / Install Cleanout	20	EA	$5,500	$110,000	$144,000	3
					MH	-	-	-	3	X	Install New Manhole at Dead End (PB-3)	1	EA	$10,000	$10,000	$14,000	3
					MH	-	-	-	3	X	Replace / Install New Manhole (PB-1)	1	EA	$10,000	$10,000	$14,000	3
	80	PB-0-GM-4	Pebbly Beach Rd	Replacement	Pipe	VCP	6	210	-	X	Replace with 8" Diameter PVC (SDR 35)	210	LF	$400	$84,000	$110,000	3
	81	PB-0	Pebbly Beach Rd	Rehabilitation	MH	-	-	-	3	X	Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	82	PB-2	Pebbly Beach Village	Rehabilitation	MH	-	-	-	3	X	Manhole Wall Rehabilitation	3	VF	$500	$1,500	$2,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
													2022	**TOTAL**		**$339,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2023 - Las Lomas Dr	83	E7-12-E7-8	Las Lomas Dr	Replacement	Pipe	VCP	6	690	-	-	Replace with 8" Diameter PVC (SDR 35)	690	LF	$400	$276,000	$371,000	3
											Replace 4" Sewer Lateral / Install Cleanout	14	EA	$5,500	$77,000	$104,000	3
					MH	-	-	-	4	-	Replace / Install New Manhole (E7-10)	1	EA	$10,000	$10,000	$14,000	3
	84	E7-11	Las Lomas Dr	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	85	E7-12	Las Lomas Dr	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
													2023	**TOTAL**		**$511,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2024 - Middle Terrace	86	B5-2	Middle Terrace Slope	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	87	B5-3	Middle Terrace Slope	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	88	B5-4	Middle Terrace Slope	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	89	B5-5	Middle Terrace Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	90	B5-6	Middle Terrace Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
	91	B5-7	Upper Terrace Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$7,000	3
													2024	**TOTAL**		**$60,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2025 - Tremont St	92	F13-2	Banning Dr	Rehabilitation	MH	-	-	-	8	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	93	F13-3	Banning Dr	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	94	F9-1-F9-2	Country Club Dr	Rehabilitation	Pipe	VCP	8	50	-	-	8" Diameter Trenchless Lining	50	LF	$60	$3,000	$5,000	3
											Sewer Lateral Connection "Top Hat" Method	23	EA	$3,000	$69,000	$99,000	3
	95	F9-2	Country Club Dr	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	96	F9-1-F14	Tremont St	Rehabilitation	Pipe	VCP	8	990	-	-	8" Diameter Trenchless Lining	990	LF	$60	$59,400	$85,000	3
											Sewer Lateral Connection "Top Hat" Method	23	EA	$3,000	$69,000	$99,000	3
	97	F10	Tremont St	Rehabilitation	MH	-	-	-	9	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	9	VF	$500	$4,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	98	F11	Tremont St	Rehabilitation	MH	-	-	-	9	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	9	VF	$500	$4,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	99	F12	Tremont St	Rehabilitation	MH	-	-	-	6	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	100	F13	Tremont St	Rehabilitation	MH	-	-	-	6	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	101	F13-1	Tremont St	Rehabilitation	MH	-	-	-	6	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	102	F14	Tremont St	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
													2025	**TOTAL**		**$416,000**	

CITY OF AVALON - CATALINA ISLAND

PROJECT: **Sewer Improvement Program**
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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2026 - Upper / Lower Terrace	103	B8-3	Upper Terrace Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	104	B8-4	Upper Terrace Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	105	B8-5	Upper Terrace Rd	Rehabilitation	MH	-	-	-	4	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	106	B5-8	Upper Terrace Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	107	B2-1	Lower Terrace Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	108	B2-2	Lower Terrace Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	109	B3	Lower Terrace Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	110	B4	Lower Terrace Rd	Rehabilitation	MH	-	-	-	5	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
													2026	**TOTAL**		**$101,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2027 - E. Whittley Ave / Calle Del Sol / Metrolpole	111	G2-2-G2	Calle Del Sol	Rehabilitation	Pipe	VCP	6	365	-	-	6" Diameter Trenchless Lining	365	LF	$60	$21,900	$34,000	3
											Sewer Lateral Connection "Top Hat" Method	5	EA	$3,000	$15,000	$23,000	3
	112	G2-1	Calle Del Sol	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	113	G2-2	Calle Del Sol	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	114	E5-1-0	E. Whittley Ave	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	115	E5-1-1	E. Whittley Ave	Rehabilitation	MH	-	-	-	3	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	3	VF	$500	$1,500	$3,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	116	E5-1-3	E. Whittley Ave	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	117	E5-1-4	E. Whittley Ave	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	118	E5-1-5	E. Whittley Ave	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$8,000	3
	119	G6, G7	Metropole Ave	Rehabilitation	MH	-	-	-	5	X	Manhole Step Removal	2	EA	$500	$1,000	$2,000	3
											Manhole Wall Rehabilitation	10	VF	$500	$5,000	$8,000	3
											Manhole Bench / Trough Rehabilitation	2	EA	$5,000	$10,000	$16,000	3
	120	G7-G5	Metropole Ave	Rehabilitation	Pipe	VCP	6	200	-	-	6" Diameter Trenchless Lining	200	LF	$60	$12,000	$19,000	3
											Sewer Lateral Connection "Top Hat" Method	2	EA	$3,000	$6,000	$10,000	3
													2027	**TOTAL**		**$199,000**	

CITY OF AVALON - CATALINA ISLAND

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Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2028 - Avalon Cyn Rd	121	D11-D11-6	Avalon Cyn Rd	Rehabilitation	Pipe	VCP	8	1,720	-	-	6" Diameter Trenchless Lining	1,720	LF	$60	$103,200	$161,000	3
											Sewer Lateral Connection "Top Hat" Method	0	EA	$3,000	$0	$0	3
	122	D11-6-D11-6-11	Avalon Cyn Rd	Rehabilitation	Pipe	VCP	8	4,365	-	X	6" Diameter Trenchless Lining	4,365	LF	$60	$261,900	$409,000	3
											Sewer Lateral Connection "Top Hat" Method	6	EA	$3,000	$18,000	$29,000	3
	123	D13-D17	Falls Canyon Rd	Rehabilitation	Pipe	VCP	8	625	-	-	8" Diameter Trenchless Lining	625	LF	$60	$37,500	$59,000	3
											Sewer Lateral Connection "Top Hat" Method	4	EA	$3,000	$12,000	$19,000	3
	124	D17-D21	Falls Canyon Rd	Rehabilitation	Pipe	VCP	8	820	-	-	8" Diameter Trenchless Lining	820	LF	$60	$49,200	$77,000	3
											Sewer Lateral Connection "Top Hat" Method	3	EA	$3,000	$9,000	$15,000	3
													2028	**TOTAL**		**$769,000**	

CITY OF AVALON - CATALINA ISLAND

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INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2029 - Avalon Cyn Rd	125	D11-0	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	8	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	126	D11-1	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	10	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	10	VF	$500	$5,000	$9,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	127	D11-2	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	8	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	128	D11-3	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	129	D11-4	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	130	D11-4-1	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	131	D11-4-2	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	132	D11-5	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	133	D11-6	Avalon Cyn Rd	Rehabilitation	MH	-	-	-	7	-	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	134	D11-6-8	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	6	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	135	D11-6-9	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	5	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	136	D11-6-10	Avalon Canyon Rd (Golf Course)	Rehabilitation	MH	-	-	-	5	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	137	D11-6-11	Avalon Canyon Rd (Campground)	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
													2029	**TOTAL**		**$208,000**	

CITY OF AVALON - CATALINA ISLAND

PROJECT: **Sewer Improvement Program**
DESCRIPTION: **2013 CIP 20-Year Financial Plan**
PREPARED BY: **RBF Consulting**

INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2030 - Beacon St (Sol Vista)	138	C2-4	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	4	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	4	VF	$500	$2,000	$4,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	139	C2-5	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	5	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	5	VF	$500	$2,500	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	140	C2-5-1	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	6	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$5,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	141	C2-6	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	142	C2-7	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	143	C2-7-1	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	144	C2-8	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	145	C2-8-1	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	146	C2-8-0	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
													2030	**TOTAL**		**$145,000**	

CITY OF AVALON - CATALINA ISLAND

PROJECT: **Sewer Improvement Program**
DESCRIPTION: **2013 CIP 20-Year Financial Plan**
PREPARED BY: **RBF Consulting**

INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2031 - Beacon St (Sol Vista)	147	C2-9	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	148	C2-9-1	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	149	C2-9-2	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	150	C2-9-3	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	10	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	10	VF	$500	$5,000	$9,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	151	C2-9-4	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	12	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	12	VF	$500	$6,000	$11,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	152	C2-9-5	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	153	C2-9-6	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	154	C2-10	Beacon St (Sol Vista)	Rehabilitation	MH	-	-	-	13	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	13	VF	$500	$6,500	$12,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
													2031	**TOTAL**		**$144,000**	

CITY OF AVALON - CATALINA ISLAND

PROJECT: **Sewer Improvement Program**
DESCRIPTION: **2013 CIP 20-Year Financial Plan**
PREPARED BY: **RBF Consulting**

INFLATION RATE: **3%**

Fiscal Year	Project ID #	Facility	Location	Category	Pipe, MH, PS	Material	Diam. (in)	Length (ft)	MH Depth (ft)	Pvt.	Description	Qty.	Unit	Unit Cost	Total (2013 Dollars)	Total Incl. Inflation	Source
2032 - Cabrillo Dr.	155	F9-8	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	156	F9-9	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	157	F9-10	Cabrillo Dr	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$8,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	158	F9-11	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	159	F9-12	Cabrillo Dr	Rehabilitation	MH	-	-	-	6	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	6	VF	$500	$3,000	$6,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	160	F9-13	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	161	F9-13-1	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	162	F9-14	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	163	F9-15	Cabrillo Dr	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$8,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	164	F9-15-1	Cabrillo Dr	Rehabilitation	MH	-	-	-	8	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	8	VF	$500	$4,000	$8,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	165	F9-16	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
	166	F9-17	Cabrillo Dr	Rehabilitation	MH	-	-	-	7	X	Manhole Step Removal	1	EA	$500	$500	$1,000	3
											Manhole Wall Rehabilitation	7	VF	$500	$3,500	$7,000	3
											Manhole Bench / Trough Rehabilitation	1	EA	$5,000	$5,000	$9,000	3
														2032 TOTAL		**$206,000**	

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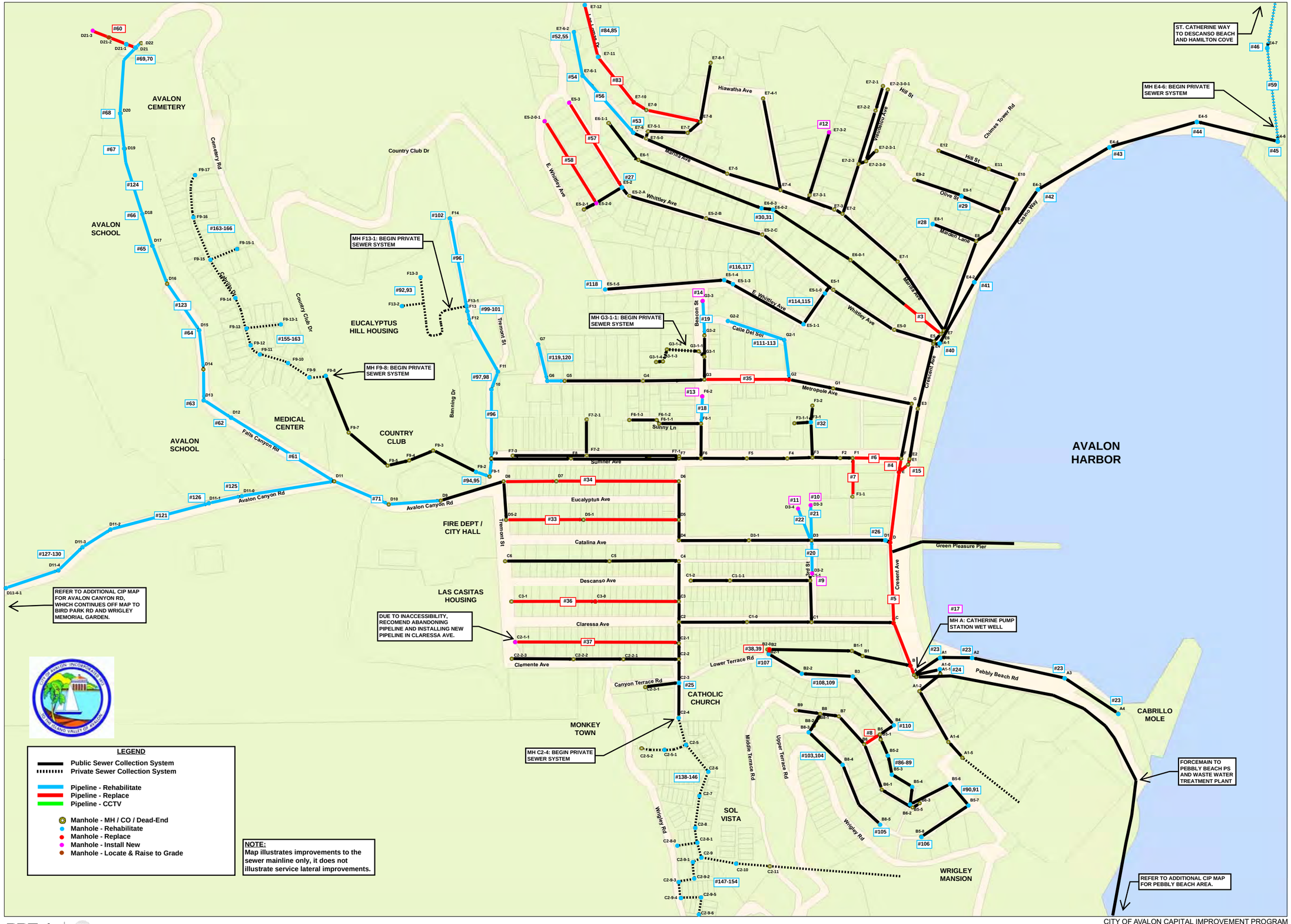

CITY OF AVALON CAPITAL IMPROVEMENT PROGRAM

SEWER COLLECTION SYSTEM IMPROVEMENTS

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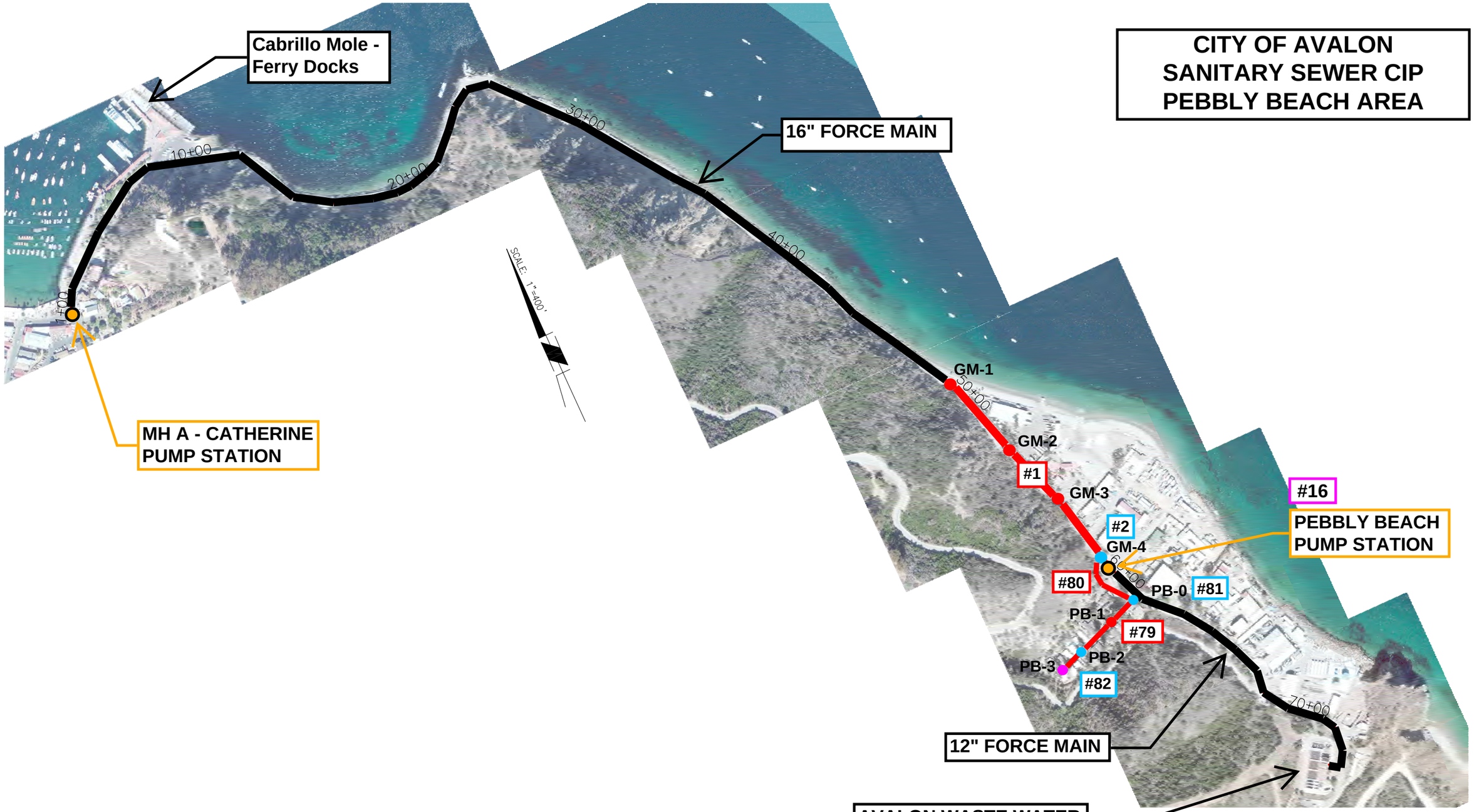
CITY OF AVALON
SANITARY SEWER CIP
PEBBLY BEACH AREA



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SCALE: 1"=400'

RBF

PLANNING ■ DESIGN ■ CONSTRUCTION

9755 CLAIREMONT MESA BOULEVARD, SUITE 100
SAN DIEGO, CALIFORNIA 92124-1324

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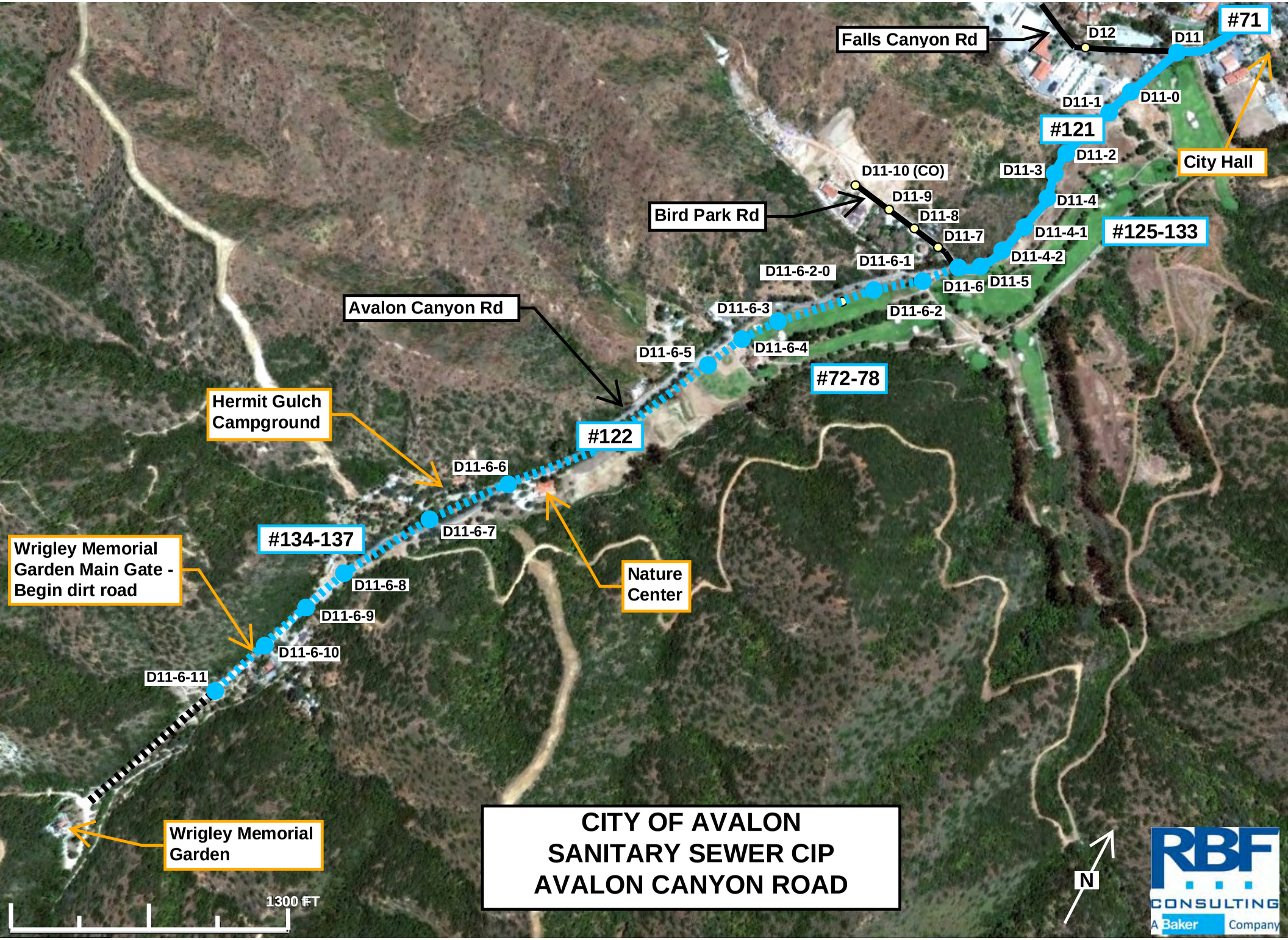

CITY OF AVALON
SANITARY SEWER CIP
AVALON CANYON ROAD

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Appendix A:

Exhibits

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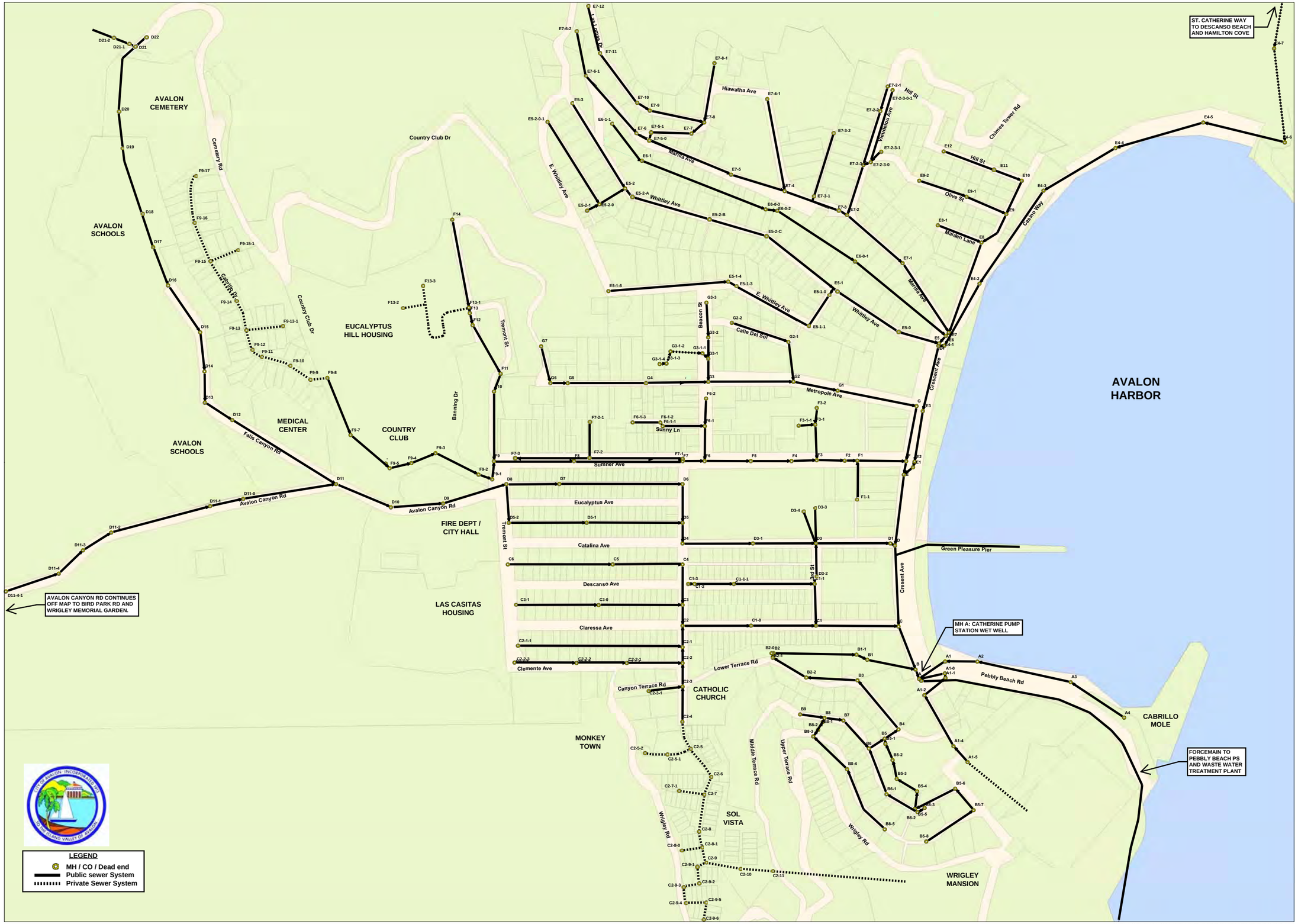

CITY OF AVALON SEWER IMPROVEMENT PROGRAM

EXHIBIT A1 - SEWER COLLECTION SYSTEM

(07/10/2013, rev 2)

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EXHIBIT A2
CITY OF AVALON
SEWER MAIN ALIGNMENT
AVALON CANYON ROAD

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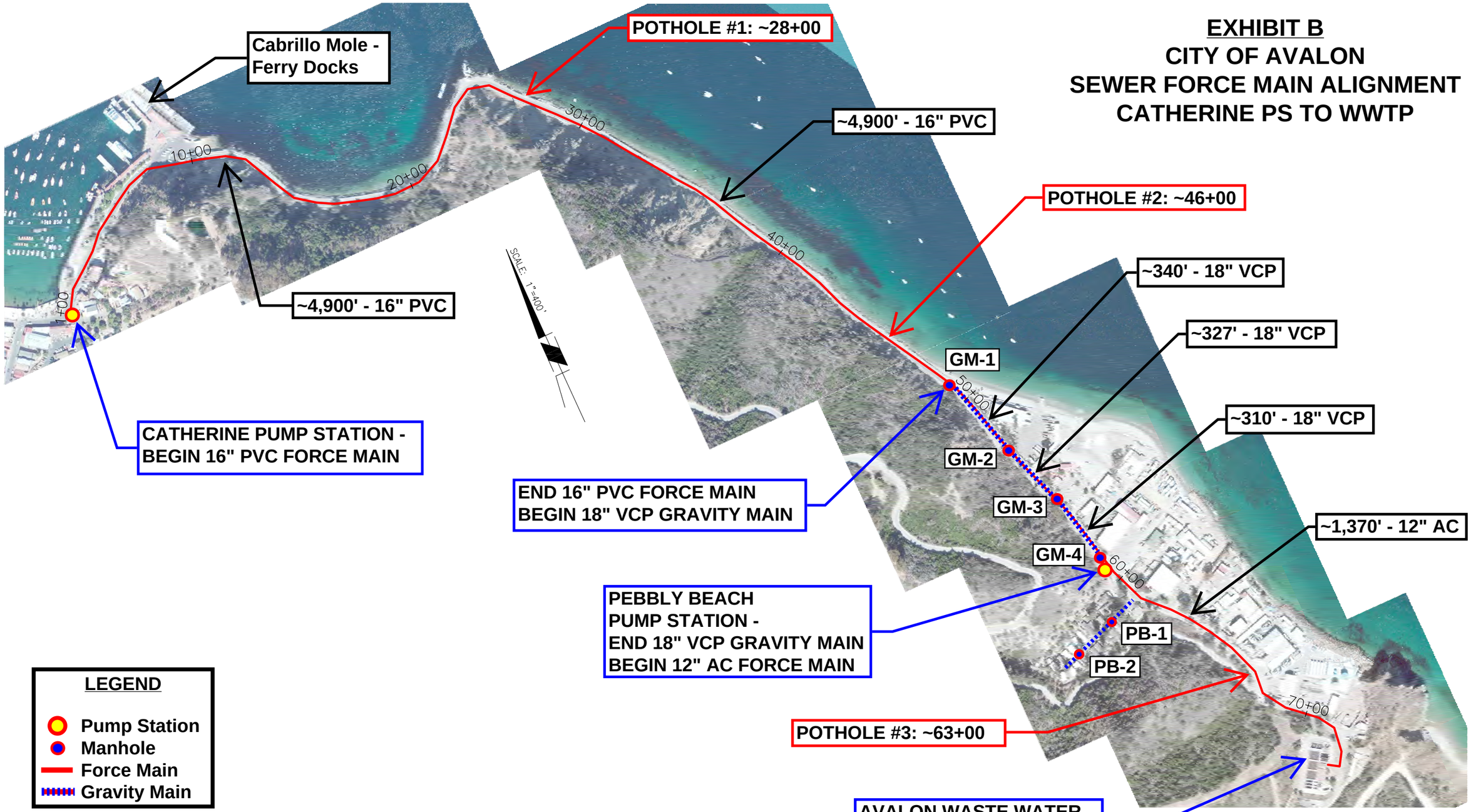
EXHIBIT B
CITY OF AVALON
SEWER FORCE MAIN ALIGNMENT
CATHERINE PS TO WWTP



LEGEND

- Pump Station
- Manhole
- Force Main
- Gravity Main

400 200 0 400 800

SCALE: 1"=400'

RBF CONSULTING
A Baker Company
PLANNING ■ DESIGN ■ CONSTRUCTION
9755 CLAIREMONT MESA BOULEVARD, SUITE 100
SAN DIEGO, CALIFORNIA 92124-1324
858.614.5000 ▪ FAX 858.614.5001 ▪ www.RBF.com

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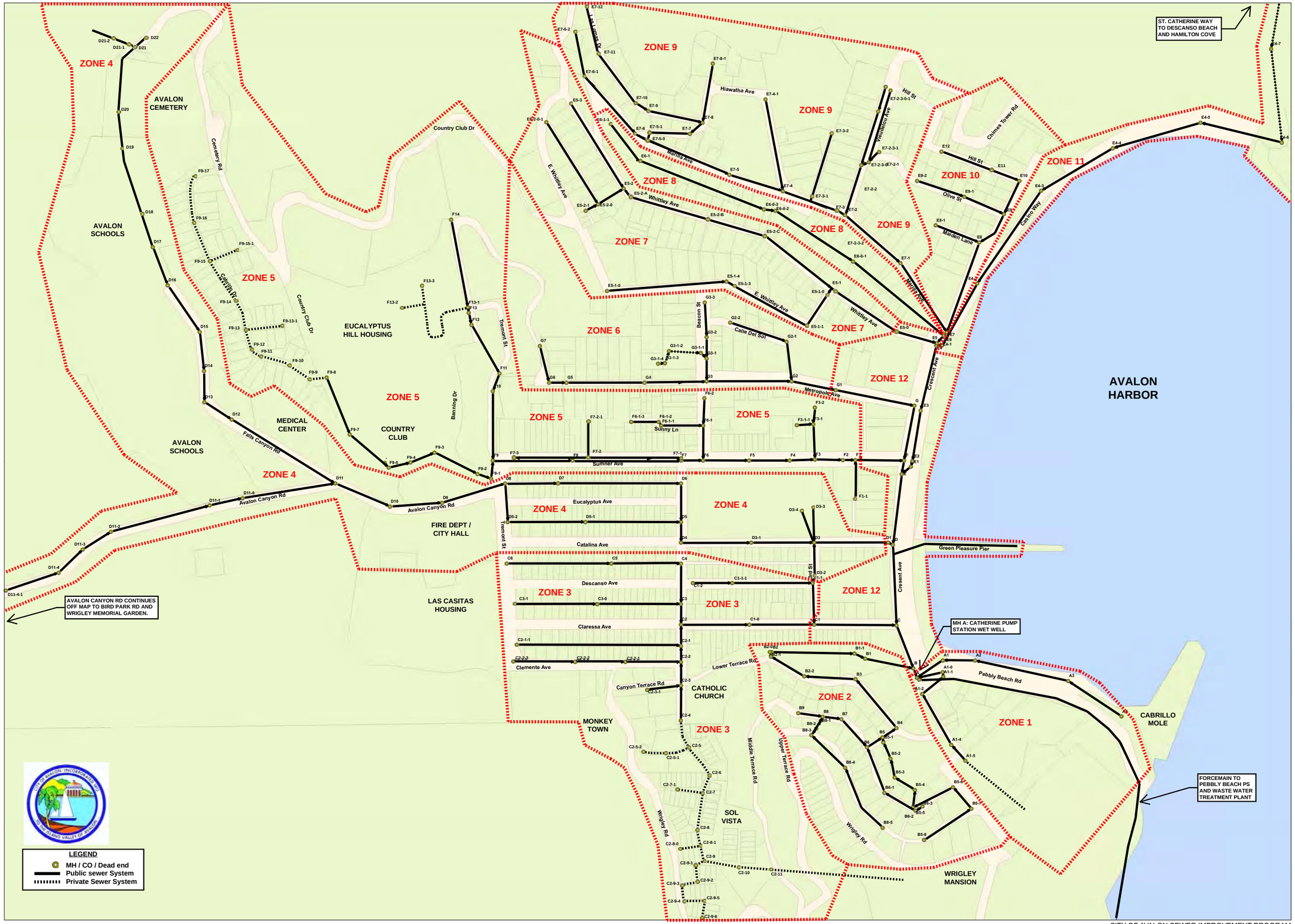

CITY OF AVALON SEWER IMPROVEMENT PROGRAM

EXHIBIT C - SEWER COLLECTION SYSTEM - ZONE ID MAP

(07/31/2013, rev 0)

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