ATKINS

Spring Valley Sewer Service Area

Sewer Master Plan

January 2013

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Prepared For:

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Contents

APPENDICES

TABLES

FIGURES

Acronyms

CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
County	County of San Diego
d/D	depth to pipe diameter ratio
District	County Sanitation District
DU	dwelling unit
du/ac	dwelling units per acre
EDUs	Equivalent Dwelling Units
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
fps	feet per second
GIS	Graphical Information System
gpcd	gallons per capita per day
gpd/ac	gallons per day per acre
gpd/du	gallons per day per dwelling unit
I/I	inflow and infiltration
LAFCO	Local Area Formation Commission
LS	Lift Station
Master Plan	Spring Valley SSA Sewer Master Plan Update
Metro	Metropolitan Wastewater System
Metro JPA	Metropolitan Joint Powers Authority
MWWD	Metropolitan Wastewater Department
NASSCO	National Association of Sewer Service Companies
NPDES	National Pollutant Discharge Elimination System
OWD	Otay Water District
PVC	poly vinyl chloride
RDI&I	Rainfall derived inflow and infiltration
RPMP	Reinforced Plastic Mortar Pipe
SANDAG	San Diego Association of Governments
SSA	Sewer Service Area
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflows
SWRCB	State Water Resources Control Board
VCP	vitrified clay pipe
WDR	Waste Discharge Requirement

CHAPTER 1
INTRODUCTION

The County of San Diego (County) is updating Sewer Master Plans (previously conducted in 2002) for its sewer service areas. Due to increased growth, system expansions, and aging infrastructure, the County needs to address its capacity needs and update its 10-year Capital Improvement Program (CIP). This Sewer Master Plan Update addresses the Spring Valley Sewer Service Area (SSA).

This introductory chapter to the Spring Valley SSA Sewer Master Plan Update (Master Plan) provides a summary of the:

- Master Plan Objectives
- Contents and Organization of this Report
- Background Information on the District
- Overview of Regulatory Requirements
- Environmental Compliance and Policy Considerations

1.1 Sewer Master Plan Objectives

The objectives of this Master Plan are to evaluate the system capacity and provide an assessment of the condition of identified portions of the existing sewer collection system, including its pump stations, in order to develop a comprehensive 10-year CIP. The 10-year CIP includes pipeline and pump station condition and capacity improvement projects, long range maintenance program enhancements and regional treatment and transportation needs and opportunities. This recommended CIP forms the basis for capital facility needs, sewer rate evaluations, and long-range financial plans to be completed in separate financial studies.

1.2 Report Organization

This Master Plan provides a comprehensive review and evaluation of the SSA's wastewater collection, conveyance, and capacity requirements under existing and future conditions. Based on findings of the evaluation, the Master Plan recommends facility improvements and capital cost requirements to ensure that aging infrastructure remains serviceable and to allow for the continued buildout of the County General Plan.

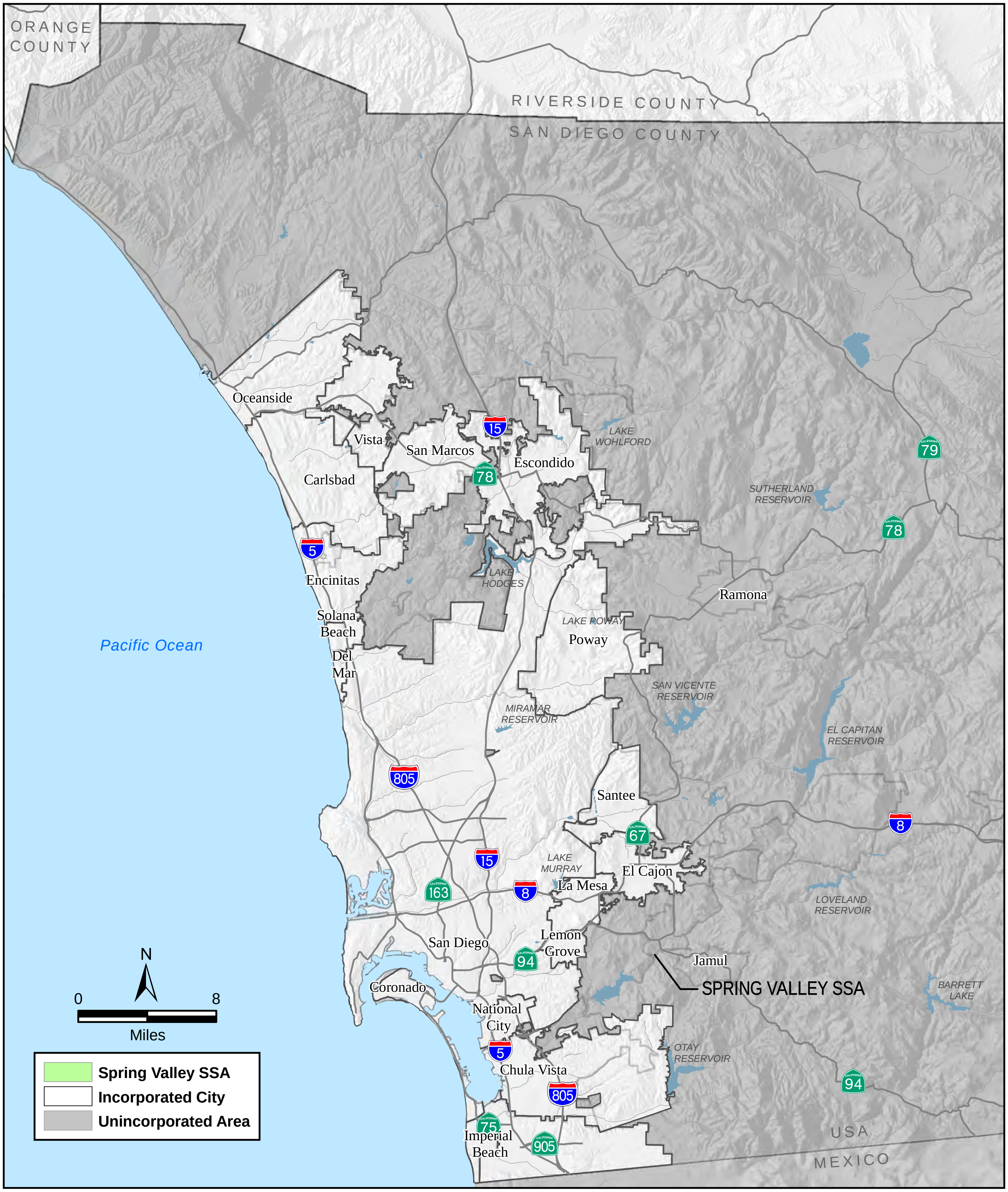
The Master Plan is presented in seven (7) chapters:

- Chapter 1 provides an introduction to the project.
- Chapter 2 presents an overview of the study area and existing wastewater collection facilities.
- Chapter 3 presents an overview of the sewer basins and provides estimates of future wastewater generation rates and regional treatment capacity requirements.
- Chapter 4 presents the methodology and findings of the sewer capacity evaluation, including summaries of hydraulic computer models used to analyze flow conditions.
- Chapter 5 presents a condition assessment of identified SSA facilities including pump stations and major trunk sewers and specific condition deficiencies, as well as recommends enhancements to the County's ongoing Video Inspection Program.
- Chapter 6 presents a conceptual level evaluation of the SSA's current disposal costs, an overview of treatment plant studies in the region, and provides recommendations for further study or County action.
- Chapter 7 presents a recommended 10-year CIP for the SSA's wastewater facilities.

1.3 Background

The County Board of Supervisors serves as the Board of Directors (Governing Board) for the San Diego County Sanitation District, which the Spring Valley SSA is a part of. The SSA serves the community of Spring Valley and is maintained by the County of San Diego Wastewater Management Section. Operation and maintenance costs required for the SSA is collected through connection and service fees assessed to each connection to the sewerage system. The location of the Spring Valley SSA is shown on Figure 1-1.

The Spring Valley SSA conveys all sewer flows into the City of San Diego Metropolitan Wastewater System (Metro) under a comprehensive Regional Wastewater Disposal Agreement enacted between the City of San Diego and the participating agencies within Metro. The Metro Treatment Plant, located in Point Loma, treats sewage from all of the participating agencies. While there are several separate County SSAs within the District (a total of 9), the District is considered one entity by Metro for purposes of capacity rating and its current Metro capacity is 17.503 mgd. Within the District, the SSAs are proportioned, based on historical regional agreements, a share of Metro capacity for the purposes of projecting future regional capacity needs. The Spring Valley SSA has been proportioned 10.353 mgd of Metro capacity.



PROJECT LOCATION

FIGURE 1-1

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The Spring Valley SSA, formerly the Spring Valley Sanitation District (SVSD) was formed in 1952 by the County Board of Supervisors and serves the community of Spring Valley, including portions of the cities of Lemon Grove, National City, Chula Vista, San Diego, La Mesa, and the Rancho San Diego community serviced by Otay Water District. Spring Valley is an unincorporated community of San Diego County located southeast of the City of San Diego. Spring Valley is bordered by La Mesa and El Cajon to the North, Jamul and Dulzura to the East, Chula Vista to the South, and Paradise Hills and Lemon Grove to the West. Within the community of Spring Valley are a variety of smaller neighborhoods: Casa de Oro, Rancho San Diego, La Presa, Dictionary Hill, Mt. Helix, and Bancroft. Based upon a County Board of Supervisors action, on July 1, 2011 all existing sanitation and sewer maintenance districts maintained by the County of San Diego Wastewater Management Section were annexed into the Spring Valley Sanitation District and the Spring Valley Sanitation District was reorganized and renamed the San Diego County Sanitation District.

1.4 Regulatory Requirements

On May 2, 2006, the State Water Resources Control Board (SWRCB) adopted Order 2006-0003, the Statewide General Waste Discharge Requirements (WDRs) for Sanitary Sewer Systems, which requires all federal and state agencies, municipalities, counties, districts, and other public entities that own or operate a sanitary sewer system greater than one mile in length to comply with the elements of the WDRs. The WDRs serve to provide a unified statewide approach for reporting and tracking Sanitary Sewer Overflows (SSO), establishing consistent and uniform requirements for Sewer System Management Plan (SSMP) development and implementation, establishing consistency in reporting, and facilitating consistent enforcement for violations.

The County's state mandated SSMP was initially approved July 2009 and encompassed all of the separate sanitation and sewer maintenance districts at the time. The SSMP documents include detailed information demonstrating the County's efforts to comply with each of the mandatory and applicable elements required. Revisions will be made to the SSMP documents to reflect the reorganization of previously separated sanitation and sewer maintenance districts into the consolidated San Diego County Sanitation District.

1.5 Environmental Compliance

The SAA's Sewer Master Plan is statutorily exempt from the preparation of an Environmental Impact Report (EIR) or a Negative Declaration per Section 15262 of the California Environmental Quality Act (CEQA) guidelines. However, the approval or adoption of this project represents a discretionary action by the County, which is subject to review under CEQA.

1.6 Policy Considerations

The County of San Diego Board of Supervisors has adopted a number of policies which affect wastewater service in the County. These policies were reviewed for their applicability and impact to the Spring Valley SSA. Appendix A summarizes the policies reviewed. Policy I-107, last updated in 2008, is applicable to Spring Valley SSA. The policy was adopted to encourage infilling of certain portions of East County consistent with the County's land use plans. The policy limits the extension of sewer service in the Rancho San Diego area the Urban Limit Line.

CHAPTER 2
STUDY AREA

This chapter provides a description of the Master Plan study area including:

- existing and planned land uses;
- existing and projected populations;
- physical attributes of the collection system; and
- regional wastewater facilities serving the SAA.

2.1 Study Area Description

The Spring Valley SSA is located in unincorporated area of San Diego County generally along State Route 94 approximately 11 miles east of the City of San Diego. The Spring Valley SSA services the communities of Casa de Oro, Rancho San Diego, La Presa, Dictionary Hill, Mt. Helix, and Bancroft. The Spring Valley SSA conveys flows generated within its boundary and as well as flows generated from areas within the cities of Chula Vista, National City, La Mesa, Lemon Grove, San Diego, and the Otay Water District sewer service jurisdiction.

The Spring Valley SSA's LAFCO Sphere of Influence (SOI) boundary, affirmed September 2010, includes the SSA boundary north of the Sweetwater Reservoir areas, the community of Rancho San Diego currently serviced by Otay Water District, and excludes the SSA boundary in the Sweetwater River Valley. The Otay Water District has latent powers to provide sewer service to potential future sewer customers within the Rancho San Diego community, which is within the Jamacha drainage basin.

The study area for this Master Plan includes the SSA's LAFCO SOI boundary, those portions of Chula Vista, National City, La Mesa, Lemon Grove, the City of San Diego, and the Otay Water District (OWD) sewer service areas that convey wastewater flows to the SSA system and the portions of the OWD sewer service area that are within the Jamacha basin, not currently being provided sewer service. Figure 2-1 presents the study area for Spring Valley SSA.

The study area includes both developed and undeveloped areas and encompasses approximately 42,250 acres. Terrain in the study area ranges in elevation significantly from just above sea level to 2,000 feet. Generally, wastewater generated within the study area drains toward the Sweetwater Reservoir and Sweetwater River valley.

2.2 Potential Impacts to the Wastewater Collection System

Atkins reviewed the County and Otay Water District's sewer permit database and the current Sewer Master Plans for La Mesa, Lemon Grove, National City, San Diego, and Chula Vista, and attributed existing customers to the parcel database. Within the study area, approximately 81 percent of parcels are connected to the sewer system, with the remaining parcels either vacant or on septic systems. Within the OWD jurisdiction boundary, 22 percent of parcels are connected to the sewer system, with the remaining parcels either vacant or on septic systems. The sewer basins draining to the Spring Valley SSA within the surrounding incorporated cities were delineated and the parcels were noted as either vacant or connected to the sewer system.

This Master Plan considers the future impacts of private septic system connections to the sewer system, due to potentially failing septic systems in the future. The septic system conversions within the study area are prioritized into two tiers. San Diego County Code Section 68.312 states that any new building construction or reconstruction where the building is located within 200 feet of an existing public sewer shall connect to a public sewer. Based on this code, parcels within 200 feet of an existing public sewer were included in Tier 1. Properties located beyond the required 200 feet may request sewer service and, as such, a distance of 1,000 feet was established to determine Tier 2 parcels. The remaining parcels within the study area were included as Tier 3. Each tier is summarized below:

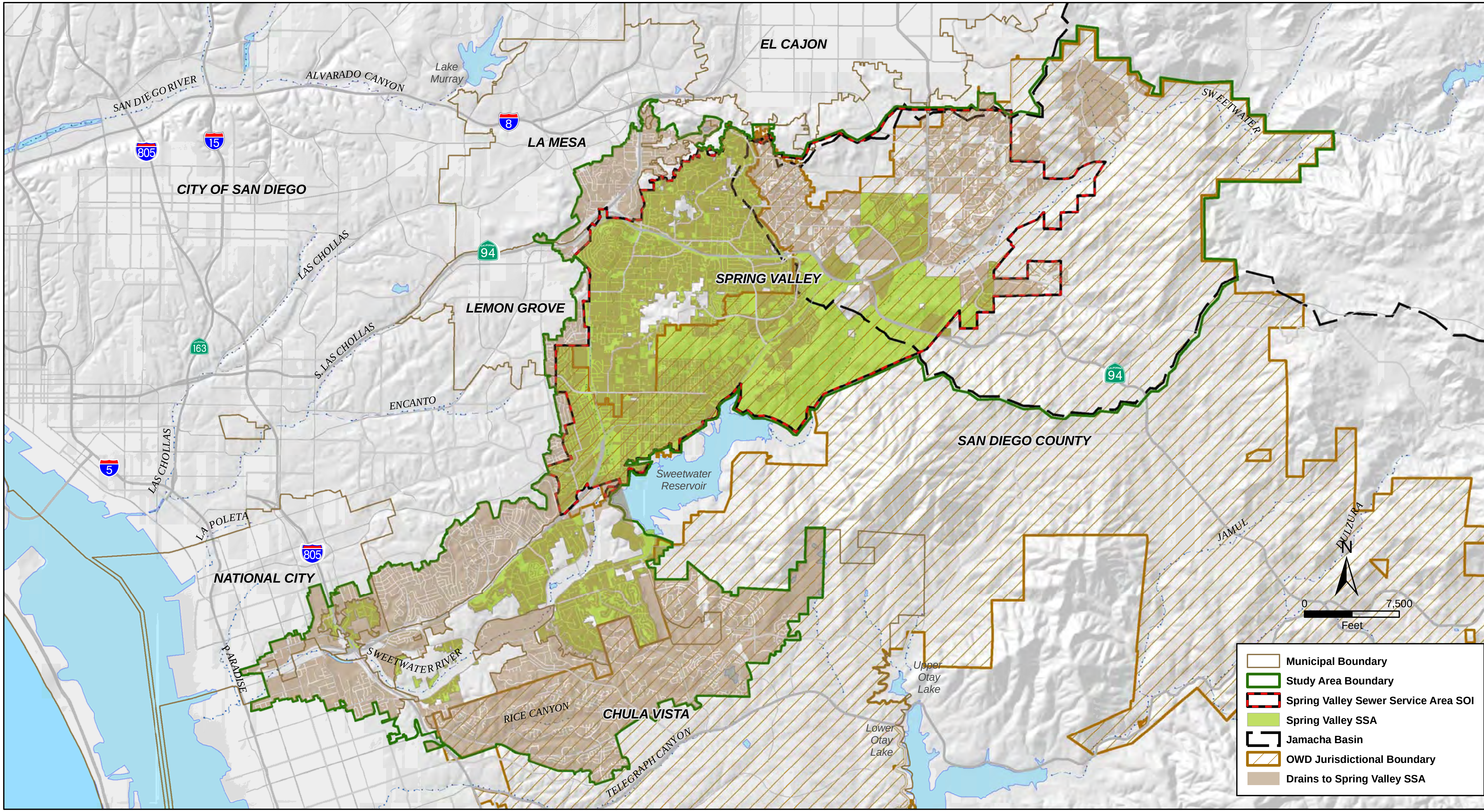
- Tier 1 includes all known future developments and septic conversions for parcels located within 200 feet of the existing sewer system.
- Tier 2 includes all known future developments and septic conversions for parcels located within 1,000 feet of the existing sewer system.
- Tier 3 includes all known future developments and septic conversions for parcels located beyond 1,000 feet of the existing sewer system within the entire study area.

Figure 2-2 graphically presents the location of the permitted parcels and the two phases of future development and septic system conversions within the study area.

2.3 Land Uses

In August of 2011, the County adopted a new General Plan. The General Plan Update establishes future growth and development thresholds for the unincorporated areas of the County. When compared to the former General Plan adopted in 1979, this update concentrated population growth in the western areas of the County where infrastructure and services are more readily available. The evaluations of proposed land uses in this Master Plan were conducted prior to the adoption of the General Plan.

Prior to the adoption of the General Plan, the Board of Supervisors previously endorsed two land use maps (the "Referral Map" and "Draft Land Use Map") for consideration in the EIR for the General Plan Update. Because the Board specifically directed the creation of the Referral Map (May 2008) and it is more intensive than the Draft Land Use Map, it is anticipated that the Referral Map will become the Proposed Project upon the County Board's adoption of the General Plan Update. Therefore, as directed by County staff, the future land uses shown in the Referral Map were used for this analysis. Appendix B includes the Referral Maps for the community of Spring Valley.



STUDY AREA

Figure 2-1

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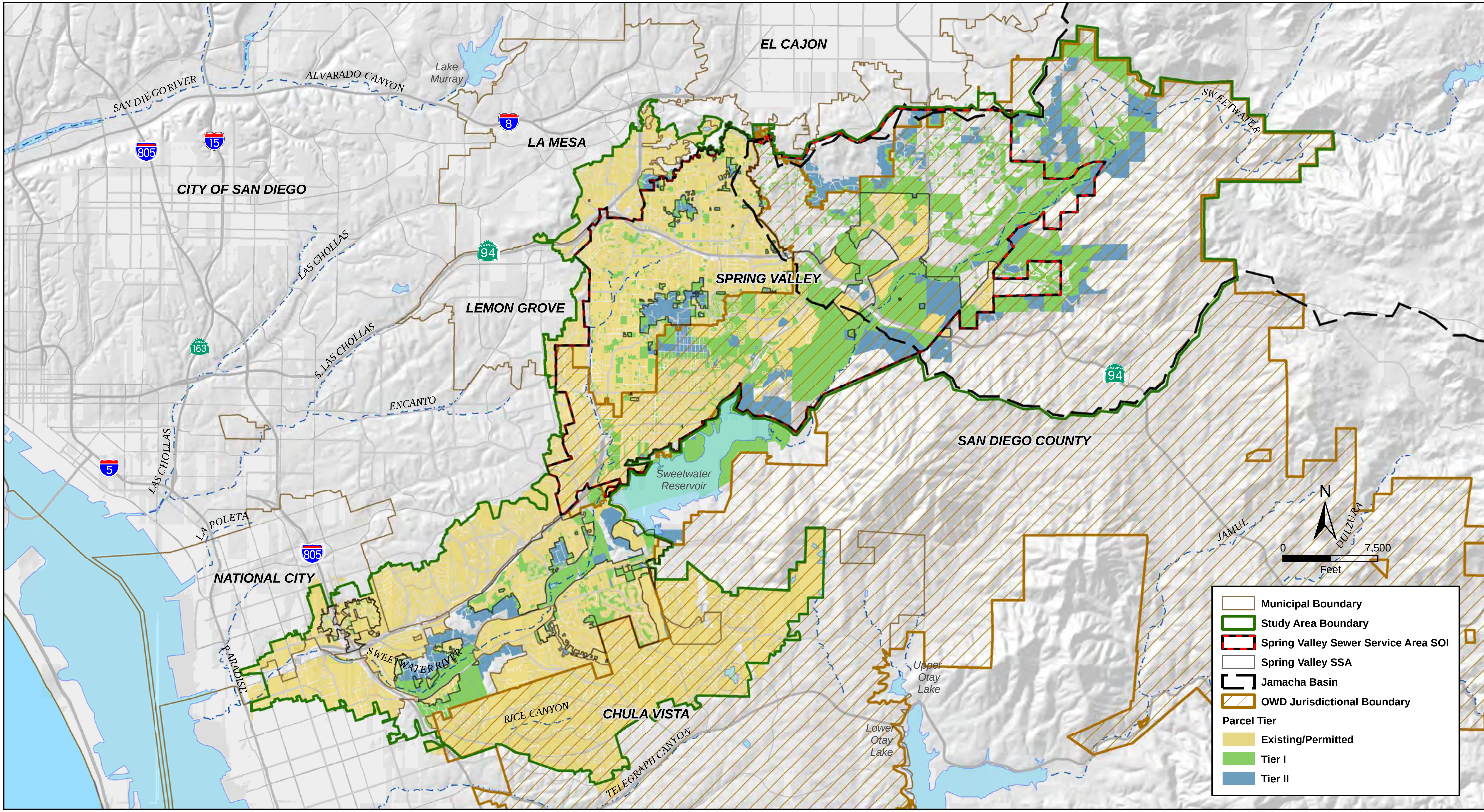

EXISTING AND FUTURE CUSTOMERS

Figure 2-2

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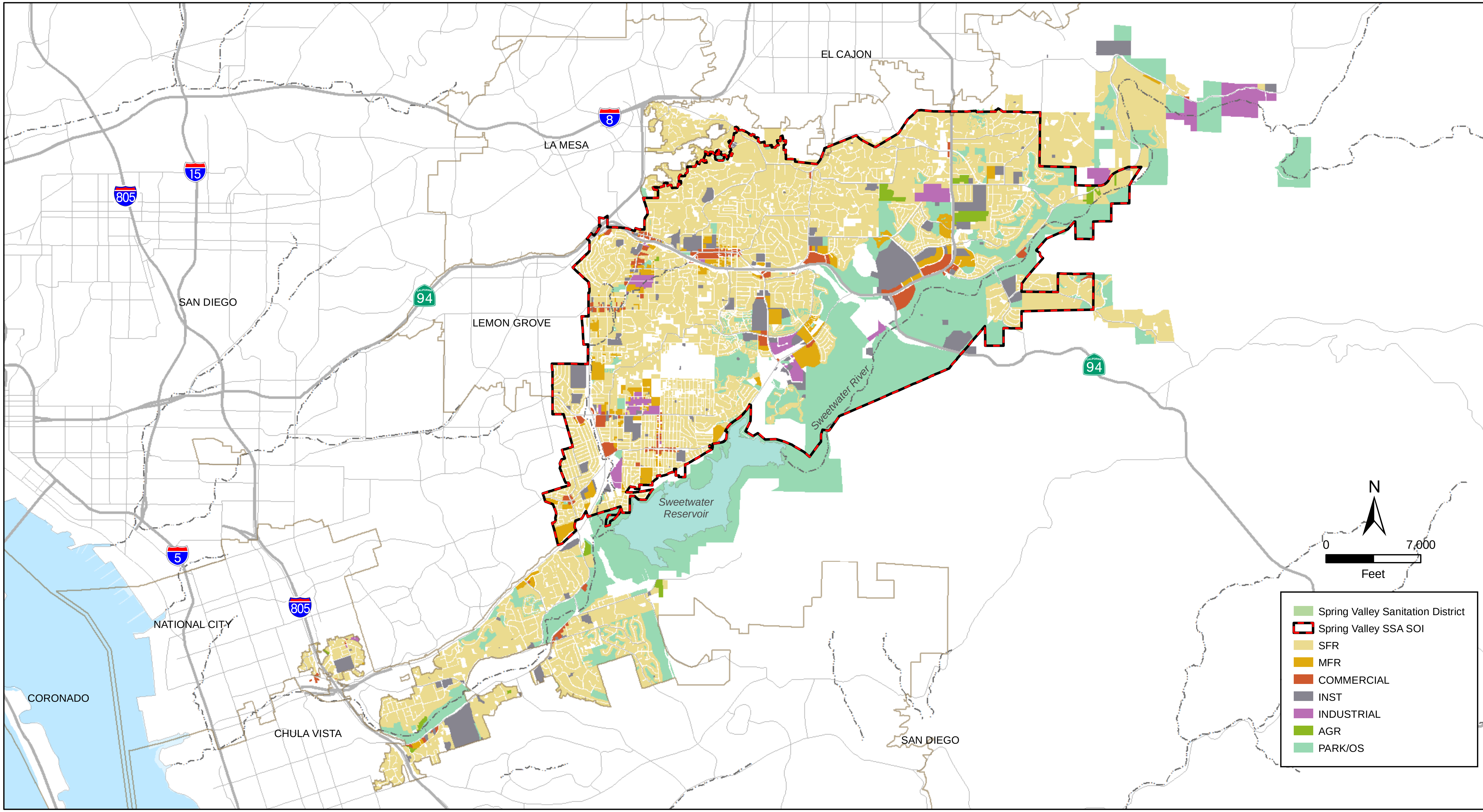

EXISTING LAND USE

Figure 2-3

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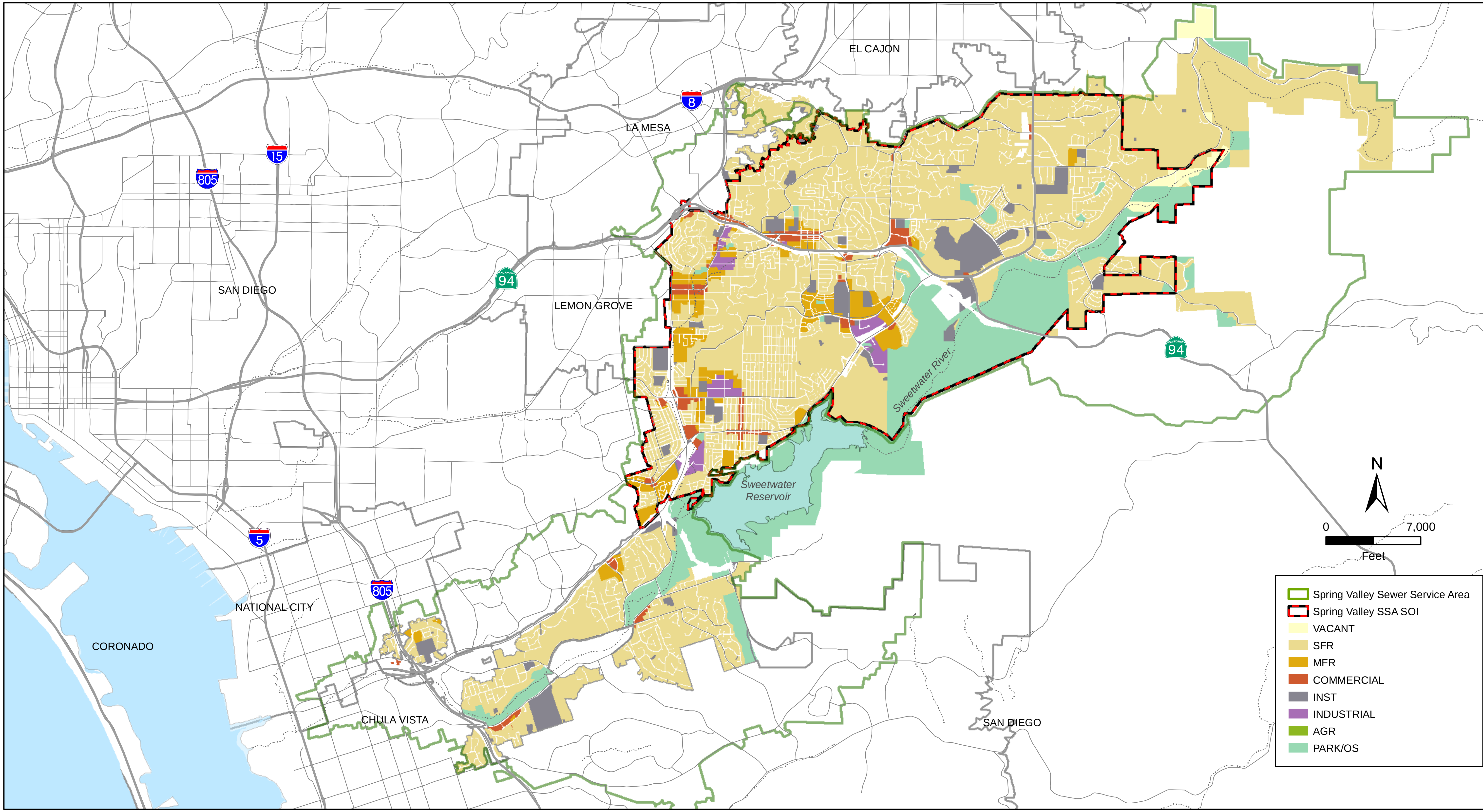

PLANNED LAND USE

Figure 2-4

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To document land use and population projections within the study areas, the San Diego Association of Governments (SANDAG) 2030 Regional Growth Forecast was utilized. The primary function of the SANDAG land use model is to produce mid-range and long-range demographic and economic forecasts for the San Diego region. Essential model inputs include assumptions about birth and death trends, international and domestic migration, and national economic and demographic forecasts, as well as forecasts for the California population and economy. These forecasts act as independent driving variables in the model, supplying the overall trend and direction that the local demographics and economy are likely to follow. The forecast utilized (Series 11 – 2030 San Diego Regional Growth Forecast Update) was completed in April 2008 and is the eleventh forecast completed since SANDAG began forecasting in the late 1970s. The Series 11 forecast was generated based on regional land use plans from the June 2006 version of the General Plan Update. For this study, only the existing land use and population projections were extracted from the Series 11 data for the County areas. The County's Referral Map was used to project future land use within the County. For land uses in incorporated cities the future land uses are based on the Series 11 projected land uses.

The land uses within the study area were divided into eight categories; single-family residential, multi-family residential, commercial, industrial, institutional, parks and open space, undeveloped land, and agricultural. Multi-family land uses were defined as having a residential density equal to or greater than 8 dwelling units per acre (du/ac). SANDAG Series 11 existing land use coverage was used as the existing land use. The County's General Plan 2020 Update Referral Map was used for the planned land uses within the County and the SANDAG Series 11 planned land use coverage was used as the future land use. Figure 2-3 and Figure 2-4, present the existing and planned land uses, respectively.

The land use coverages were overlayed with parcels from the most recent SANGIS parcel database (September 2008). Parcels were attributed with a Master Plan land use category based on the location of the parcel centroid and the SANDAG or General Plan land use overlay. Table 2-1 and Table 2-2 summarize existing and planned dwelling unit counts for residential parcels and acreage for nonresidential parcels within the study area for the Spring Valley SSA, the Otay Water District Service Area, and the other contributing agencies. The incorporated cities were included together because they do not include areas with significant existing vacant or septic parcels that are contained within Tiers I and II. Appendix C includes the land use files provided by SANDAG and a detailed summary table describing the land uses by agency.

The majority of the study area appears to be at or near buildout levels, based on land use comparisons between existing and planned land uses. All agricultural and vacant land is planned to be developed. Residential growth within the study area shows single family residential units and multi-family residential growth is minimal. Commercial and industrial areas also show consistent growth within the study area. There is a slight decrease in institutional acreage, which is attributed to existing institutional areas being redeveloped or rezoned. Full development of the planned land uses represents the ultimate buildout of the District. Population projections are considered in the following section to better understand the timing of future development.

Table 2-1 Existing Land Use

Land Use	Permit		Tier 1		Tier 2		Study Area Total	
County of San Diego - Spring Valley								
Single-Family Residential	9,356	Ac	418	Ac	180	Ac	9,954	Ac
Single-Family Residential	20,765	DU	580	DU	200	DU	21,545	DU
Multi-Family Residential	8,180	Ac	25	Ac	2	Ac	8,207	Ac
Multi-Family Residential	7,871	DU	7	DU	2	DU	7,880	DU
Commercial	262	Ac	34	Ac	0	Ac	296	Ac
Industrial	144	Ac	48	Ac	1	Ac	193	Ac
Institutional	456	Ac	142	Ac	17	Ac	615	Ac
Parks/Recreation/Open Space	347	Ac	1,854	Ac	757	Ac	2,958	Ac
Agricultural	10	Ac	13	Ac	0	Ac	23	Ac
Undeveloped Land/Vacant	131	Ac	497	Ac	324	Ac	951	Ac
Spring Valley Total	**18,886**	**Ac**	**3,031**	**Ac**	**1,281**	**Ac**	**23,197**	**Ac**
Otay Water District - Rancho San Diego Pump Station Basin								
Single-Family Residential	2,562	Ac	1,019	Ac	3,129	Ac	6,710	Ac
Single-Family Residential	4,364	DU	507	DU	2,279	DU	7,150	DU
Multi-Family Residential	55	Ac	979	Ac	35	Ac	1,068	Ac
Multi-Family Residential	1,059	DU	276	DU	42	DU	1,377	DU
Commercial	51	Ac	4	Ac	21	Ac	77	Ac
Industrial	63	Ac	129	Ac	237	Ac	429	Ac
Institutional	254	Ac	184	Ac	66	Ac	505	Ac
Parks/Recreation/Open Space	290	Ac	811	Ac	4,246	Ac	5,347	Ac
Agricultural	9	Ac	285	Ac	94	Ac	388	Ac
Undeveloped Land/Vacant	391	Ac	392	Ac	1,546	Ac	2,329	Ac
Otay Water District Total	**3,675**	**Ac**	**3,803**	**Ac**	**9,374**	**Ac**	**16,853**	**Ac**
Other Contributing Agencies - La Mesa, Lemon Grove, National City, San Diego, and Chula Vista								
Single-Family Residential	12,079	Ac	0	Ac	0	Ac	12,079	Ac
Single-Family Residential	19,767	DU	0	DU	0	DU	19,767	DU
Multi-Family Residential	7,399	Ac	0	Ac	0	Ac	7,399	Ac
Multi-Family Residential	8,625	DU	0	DU	0	DU	8,625	DU
Commercial	498	Ac	0	Ac	0	Ac	498	Ac
Industrial	99	Ac	0	Ac	0	Ac	99	Ac
Institutional	602	Ac	0	Ac	0	Ac	602	Ac
Parks/Recreation/Open Space	2,611	Ac	0	Ac	0	Ac	2,611	Ac
Agricultural	16	Ac	0	Ac	0	Ac	16	Ac
Undeveloped Land/Vacant	647	Ac	0	Ac	0	Ac	647	Ac
Total	**23,952**	**Ac**	**0**	**Ac**	**0**	**Ac**	**23,952**	**Ac**
Spring Valley SSA Total	**46,513**	**Ac**	**6,834**	**Ac**	**10,655**	**Ac**	**64,001**	**Ac**

Table 2-2 Planned Land Use

Land Use	Permitted	Tier 1	Tier 2	Study Area Total
County of San Diego - Spring Valley				
Single-Family Residential	11,083 Ac	1,381 Ac	603 Ac	13,067 Ac
Single-Family Residential	19,939 DU	1,229 DU	402 DU	21,570 DU
Multi-Family Residential	6,853 Ac	116 Ac	3 Ac	6,972 Ac
Multi-Family Residential	8,047 DU	144 DU	4 DU	8,195 DU
Commercial	223 Ac	48 Ac	0 Ac	271 Ac
Industrial	195 Ac	51 Ac	13 Ac	259 Ac
Institutional	279 Ac	156 Ac	12 Ac	447 Ac
Parks/Recreation/Open Space	253 Ac	1,280 Ac	650 Ac	2,182 Ac
Agricultural	0 Ac	0 Ac	0 Ac	0 Ac
Undeveloped Land/Vacant	0 Ac	0 Ac	0 Ac	0 Ac
Spring Valley Total	**18,886 Ac**	**3,031 Ac**	**1,281 Ac**	**23,197 Ac**
Otay Water District - Rancho San Diego Pump Station Basin				
Single-Family Residential	3,053 Ac	2,267 Ac	5,404 Ac	10,723 Ac
Single-Family Residential	5,163 DU	863 DU	2,531 DU	8,557 DU
Multi-Family Residential	14 Ac	424 Ac	30 Ac	468 Ac
Multi-Family Residential	101 DU	181 DU	24 DU	306 DU
Commercial	48 Ac	9 Ac	66 Ac	123 Ac
Industrial	0 Ac	0 Ac	0 Ac	0 Ac
Institutional	272 Ac	189 Ac	235 Ac	695 Ac
Parks/Recreation/Open Space	284 Ac	734 Ac	3,082 Ac	4,101 Ac
Agricultural	0 Ac	0 Ac	0 Ac	0 Ac
Undeveloped Land/Vacant	4 Ac	181 Ac	557 Ac	742 Ac
Otay Water District Total	**3,675 Ac**	**3,803 Ac**	**9,374 Ac**	**16,853 Ac**
Other Contributing Agencies - La Mesa, Lemon Grove, National City, San Diego, and Chula Vista				
Single-Family Residential	11,939 Ac	0 Ac	0 Ac	11,939 Ac
Single-Family Residential	17,806 DU	0 DU	0 DU	17,806 DU
Multi-Family Residential	7,406 Ac	0 Ac	0 Ac	7,406 Ac
Multi-Family Residential	8,631 DU	0 DU	0 DU	8,631 DU
Commercial	495 Ac	0 Ac	0 Ac	495 Ac
Industrial	97 Ac	0 Ac	0 Ac	97 Ac
Institutional	762 Ac	0 Ac	0 Ac	762 Ac
Parks/Recreation/Open Space	2,601 Ac	0 Ac	0 Ac	2,601 Ac
Agricultural	13 Ac	0 Ac	0 Ac	13 Ac
Undeveloped Land/Vacant	639 Ac	0 Ac	0 Ac	639 Ac
Contributing Agencies Total	**23,952 Ac**	**0 Ac**	**0 Ac**	**23,952 Ac**
Spring Valley SSA Total	**46,513 Ac**	**6,834 Ac**	**10,655 Ac**	**64,001 Ac**

2.4 Existing and Forecasted Populations

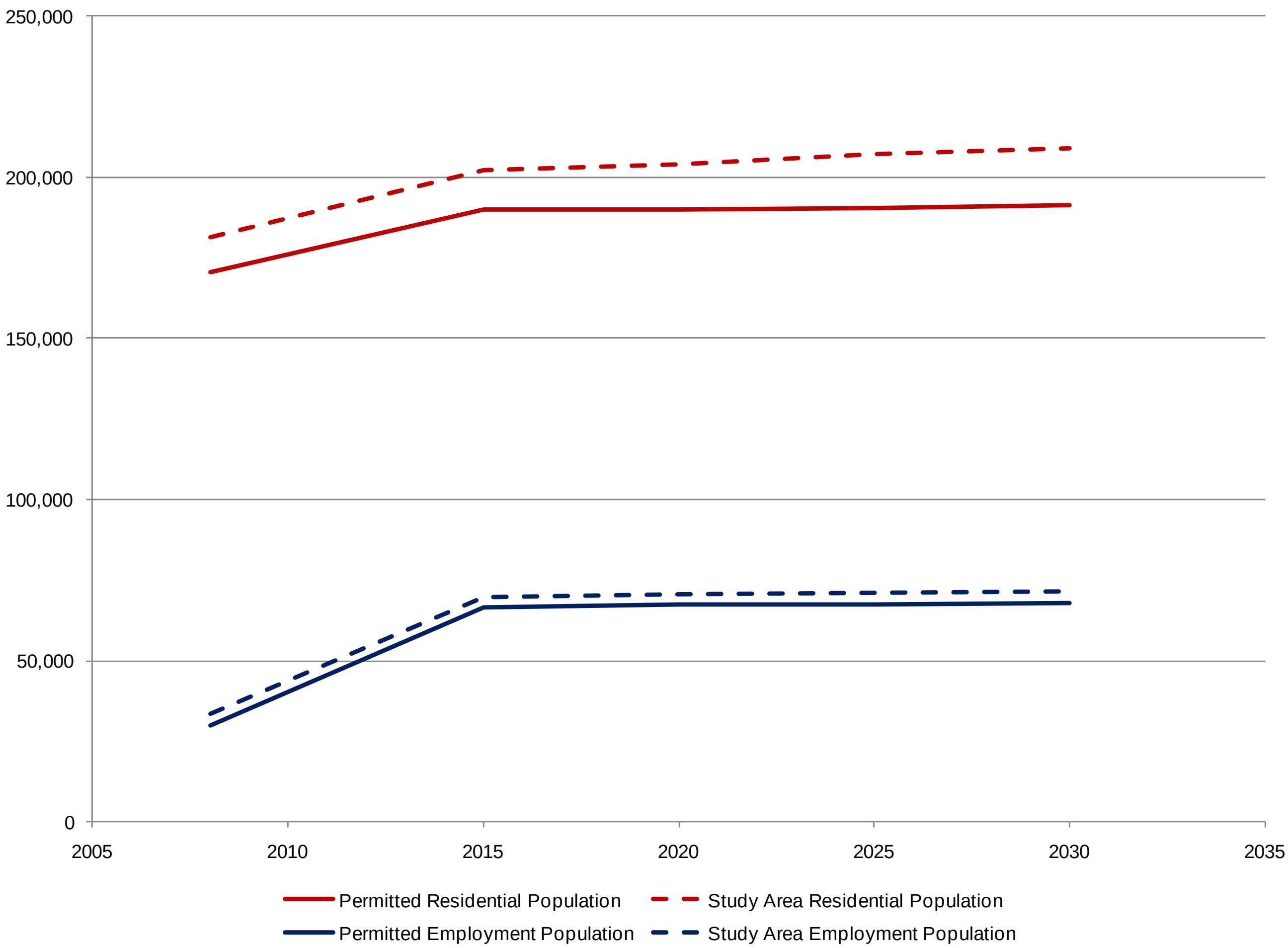
Residential and employment population estimates for the study area were provided by SANDAG for years 2008, 2015, 2020, 2025, and 2030 at the parcel level and are based on the Series 11 data. SANDAG regional growth model develops their existing estimates from data provided by the US Census Bureau, San Diego County Assessor, local jurisdictions, and the California Department of Finance. Residential populations represent persons residing in a given area. Employment populations represent persons employed and performing work functions in a given area. Table 2-3 summarizes the residential and employment population projections through 2030 for the Spring Valley SSA, the Otay Water District and the other contributing agencies. Figure 2-5 illustrates the increase in residential and employment populations within the existing permitted parcels and within the study area. Appendix D includes the population files provided by SANDAG.

Table 2-3 Existing and Forecasted Populations

	Residential Populations					Employment Populations				
Agency	2008	2015	2020	2025	2030	2008	2015	2020	2025	2030
Spring Valley SSA										
Permitted	82,527	88,307	88,425	88,635	88,941	11,324	17,006	17,036	17,044	17,060
Tier 1	2,057	2,244	3,620	5,017	5,417	1,769	1,765	1,981	2,068	2,188
Tier 2	524	616	877	1,104	1,155	52	23	23	23	25
Tier 3	44	44	44	44	44	1	0	0	0	0
Subtotal	**85,152**	**91,210**	**92,966**	**94,801**	**95,558**	**13,146**	**18,794**	**19,040**	**19,135**	**19,273**
Otay Water District										
Permitted	16,341	15,866	15,393	15,534	15,637	2,335	2,360	2,391	2,391	2,391
Tier 1	1,442	2,404	2,616	2,823	2,988	962	474	474	474	474
Tier 2	2,107	2,110	2,198	2,271	2,315	258	259	259	259	259
Tier 3	4,694	4,692	4,807	5,470	5,488	679	589	589	589	589
Subtotal	**24,584**	**25,071**	**25,013**	**26,098**	**26,428**	**4,235**	**3,682**	**3,713**	**3,713**	**3,713**
Other Contributing Agencies										
Existing	74,107	88,151	88,541	88,746	89,318	16,371	48,505	49,215	49,528	49,707
Subtotal	**74,107**	**88,151**	**88,541**	**88,746**	**89,318**	**16,371**	**48,505**	**49,215**	**49,528**	**49,707**
Total (Permitted)	**172,975**	**192,327**	**192,362**	**192,919**	**193,899**	**30,030**	**67,871**	**68,642**	**68,963**	**69,158**
Total	**183,843**	**204,433**	**206,520**	**209,645**	**211,304**	**33,752**	**70,981**	**71,968**	**72,376**	**72,693**

Note: The contributing agencies are assumed not to have septic systems within their extents.

Figure 2-5 Forecasted Population Trends



Within the Spring Valley SSA, the population projections show modest growth in residential population and significant employment population growth through 2030, with the majority of the increases located within the existing permitted parcels and within 200 feet of the existing system, occurring beyond 2015. Within the Otay Water District, the population projections show only growth in residential population within 200 feet of the existing system, occurring uniformly to 2030. Within the other contributing agencies, the population projections show modest growth in residential population and significant employment population growth through 2030, with the majority of the increases located within the existing permitted parcels and within 200 feet of the existing system, occurring beyond 2015.

In general, most of the population growth is occurring before 2015 and uniformly in both areas that are currently being provided sewer collection services and those areas that are not. It is important to note that any growth beyond Tier I, or beyond 200 feet from the existing sewer system is not required by County Code to connect to the existing collection system. For that reason, phased population projections were developed for the purpose of developing reasonable growth projections for assessment of the existing collection system.

The recommended population projection was developed for assessment of the existing and planned infrastructure based on the four development Tiers that can potentially impact the collection system, as described earlier in this chapter. The three development Tiers include:

- Tier 1 includes all known future developments and septic conversions for parcels located within 200 feet of the existing sewer system.
- Tier 2 includes all known future developments and septic conversions for parcels located within 1,000 feet of the existing sewer system.
- Tier 3 includes all known future developments and septic conversions for parcels located beyond 1,000 feet of the existing sewer system within the entire study area.

The recommended population projections made assumptions on whether to include a specific Tier's population forecast within a specific horizon year. For 2008, or existing, only the populations for permitted parcels were included. For 2015, the populations from the permitted parcels as well as population growth from parcels within 200 feet of the existing collection system (2015 Tier 1 less 2008 Tier 1 populations). In 2020 and 2025, the populations from all parcels within 200 feet of the existing collection system was included (Tier 1). In 2030 the populations from all parcels within 1,000 feet of the existing collection system was included (Tier 2). Populations from the remaining parcels, beyond 1,000 feet from the existing collection system (Tier 3) were included in the buildout scenario, which is beyond the horizon year of 2030. The following bullets provide a summary of the recommended population projection assumptions:

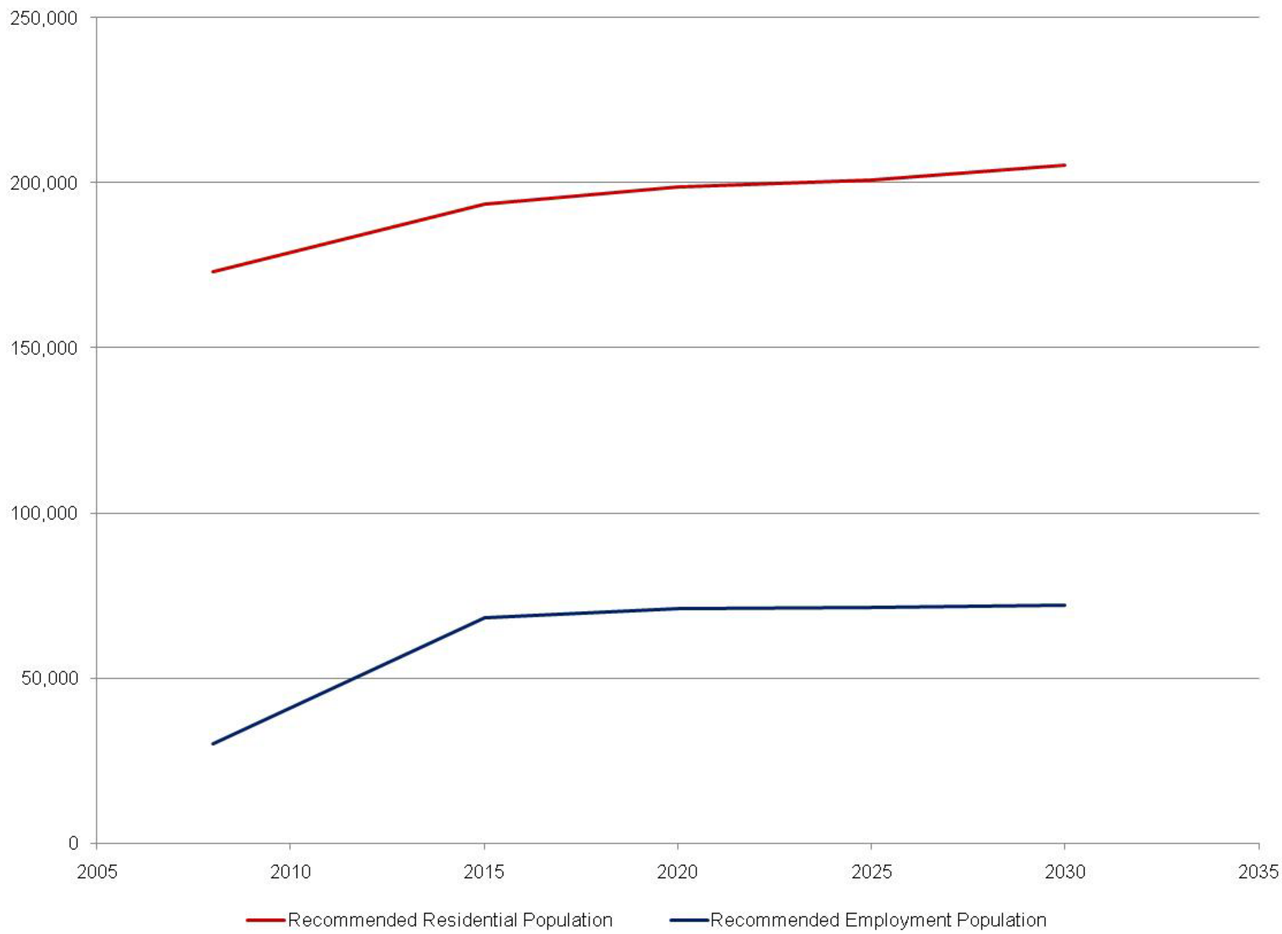
- 2008 = existing permitted population
- 2015 = 2015 permitted population + 2015 Tier 1 population – 2008 Tier 1 population
- 2020 = 2020 permitted population + 2020 Tier 1 population
- 2025 = 2025 permitted population + 2025 Tier 1 population
- 2030 = 2030 permitted population + 2030 Tier 1 population + 2030 Tier 2 population

Table 2-4 summarizes the recommended phased population projections for the Spring Valley SSA and the population trends are illustrated together in Figure 2-6.

Table 2-4 Recommended Phased Populations

	Residential				Employment			
Phase	Spring Valley	OWD	Other Agencies	Total	Spring Valley	OWD	Other Agencies	Total
2008	82,527	16,341	74,107	172,975	11,324	2,335	16,371	30,030
2015	88,494	16,827	88,151	193,473	17,002	2,834	48,505	68,341
2020	89,988	16,567	88,541	195,096	17,248	2,865	49,215	69,328
2025	91,595	16,915	88,746	197,257	17,343	2,865	49,528	69,736
2030	95,558	26,428	89,318	211,304	19,273	3,713	49,707	72,693

Figure 2-6 Recommended Phased Population



The use of the recommended phased populations represents a more reasonable growth pattern for the study area, for the interim 5 year projection and the 20 year horizon projection when compared to the overly conservative assumption that the entire study area would be connected to the existing collection system by 2030.

For the 5 year horizon (2015) the recommended phased populations estimate an increase of approximately 7 and 50 percent in residential and employment population, respectively. For the 20 year horizon (2030) the recommended phased populations estimate an increase of approximately 16 and 70 percent in residential and employment population, respectively.

2.5 Existing Wastewater Collection System

The Spring Valley SSA conveys wastewater flows generated in its service area as well as wastewater flows generated in Otay Water District's service area and portion of Chula Vista, La Mesa, Lemon Grove, National City and San Diego, to the MWWD's Metropolitan Wastewater System (Metro) under a comprehensive Regional Wastewater Disposal Agreement enacted between the City of San Diego and the Metro-participating agencies. Wastewater generated within the study area generally flows southwesterly toward the Sweetwater Dam and then westerly toward San Diego Bay, where they discharge into Metro's South Metro Interceptor. The existing wastewater collection system and lift stations for the Spring Valley SSA and contributing agency pipelines are shown on Figure 2-7. There are four lift stations and associated force mains within the Spring Valley SSA. In addition to the force mains, a dual barreled siphon in Jamacha Road is utilized to convey wastewater flows through a low point on Jamacha Road. Lift station, force main and siphon information are summarized in Tables 2-5 and 2-6, respectively.

Table 2-5 Lift Stations

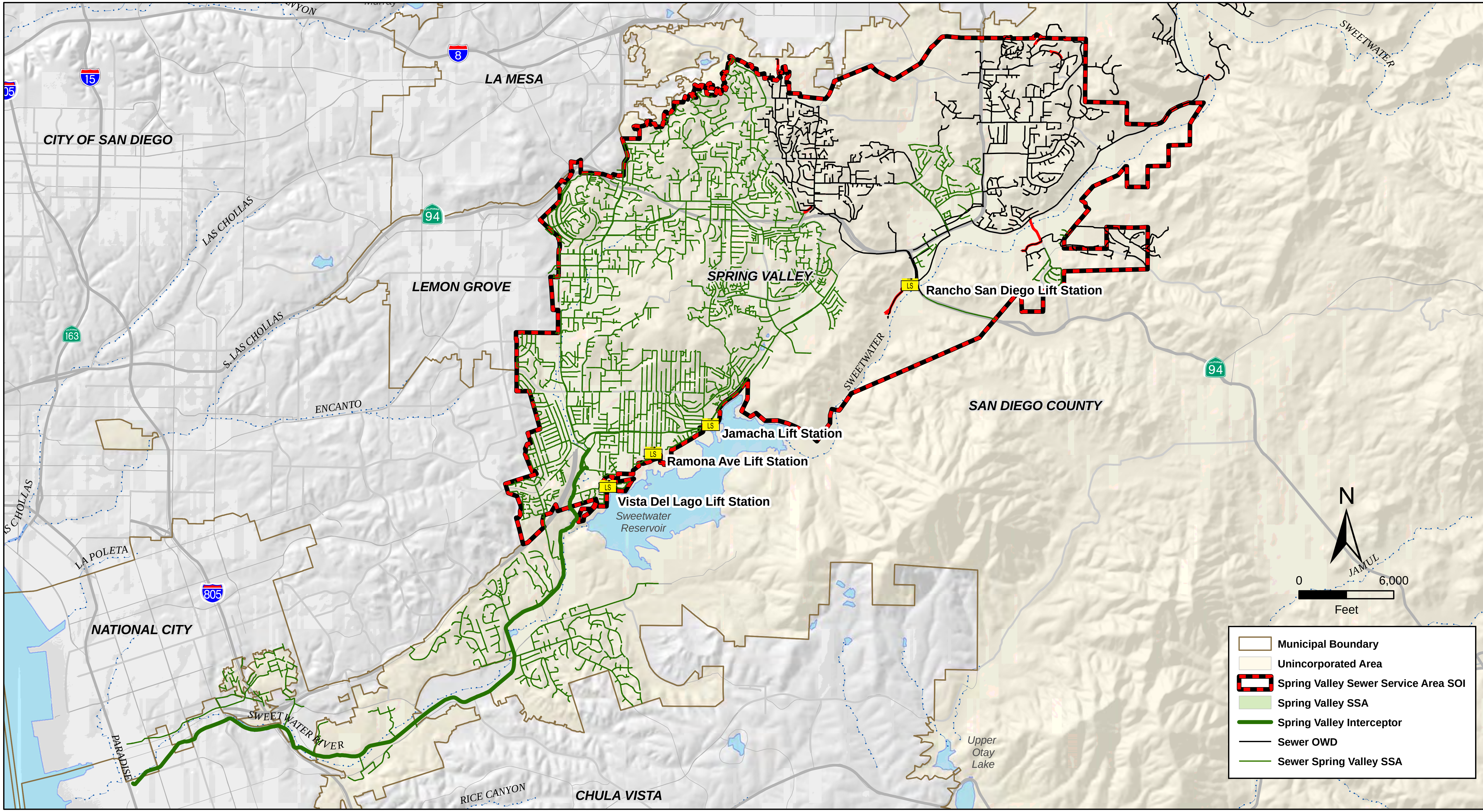
Lift Station	Date Installed/ Upgraded	No. Pumps	Design Discharge (gpm)	Firm Capacity (gpm)	Design TDH (feet)	Hp	Emergency Storage (gallons)	Backup Power
Jamacha Pump Station	1977/1993	3	650	1,300	131	50	187,000	Yes
Ramona Pump Station	1986/1996	2	250	250	115	23.5	54,000	Yes
Rancho San Diego Pump Station	1988/1995	3	2400	4,800	230	200	850,000	Yes
Vista Del Lago Pump Station	1981/2004	2	100	100	57	5	23,000	No

Table 2-6 Force Mains and Siphons

Force Main/Siphon	Diameter (inches)	Material	Length (feet)
Jamacha Force Main	6	CI	1,246
	12	ACP	4,550
Ramona Force Main	4	CI	865
	6	CI	1,350
Rancho San Diego Force Main	24	DI	8,300
Vista Del Lago Force Main	4	PVC	550
Jamacha Siphon	12	PVC	11,435
	20	PVC	11,435

Tables 2-6, 2-7, and 2-8, summarize the gravity collection system facilities within SVSD by size, age and material, respectively. The system inventory is based on information contained within the County's Graphical Information System (GIS) database. The GIS database was created for the County Wastewater Department by digitizing the as-built record drawings. The SVSD wastewater collection system consists of 8,345 manholes, and 1,406,594 feet (266 miles) of gravity sewer. The information from the tables is also shown in Figures 2-8, 2-9, and 2-10. Figure 2-11 highlights the existing trunk and interceptor sewers.

In general, the Spring Valley SSA includes predominantly 8-inch diameter pipelines constructed of either Vitrified Clay Pipe (VCP) generally before the 1980s or Poly Vinyl Chloride (PVC) pipe in the 1980s and beyond.



EXISTING SEWER SYSTEM

Figure 2-7

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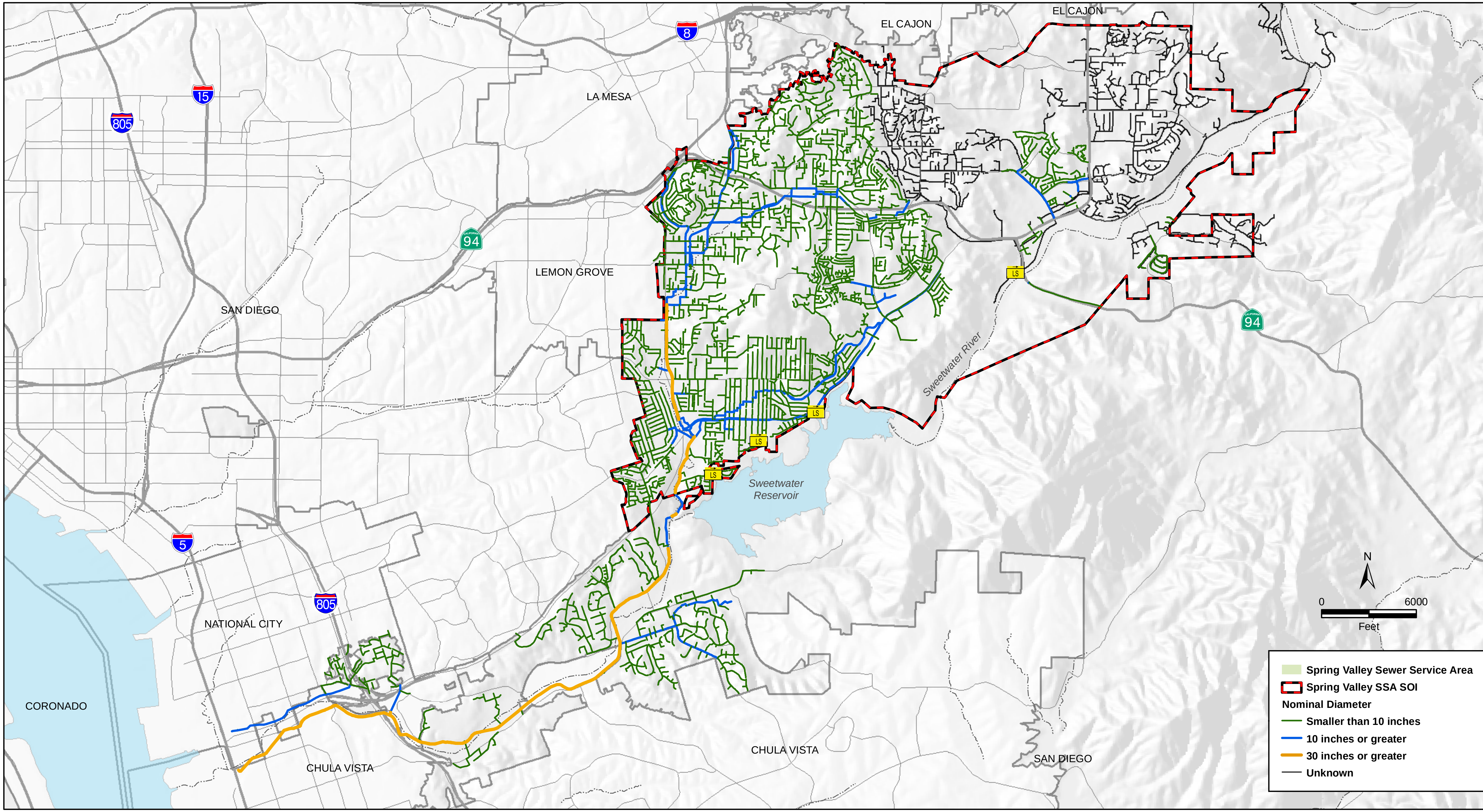
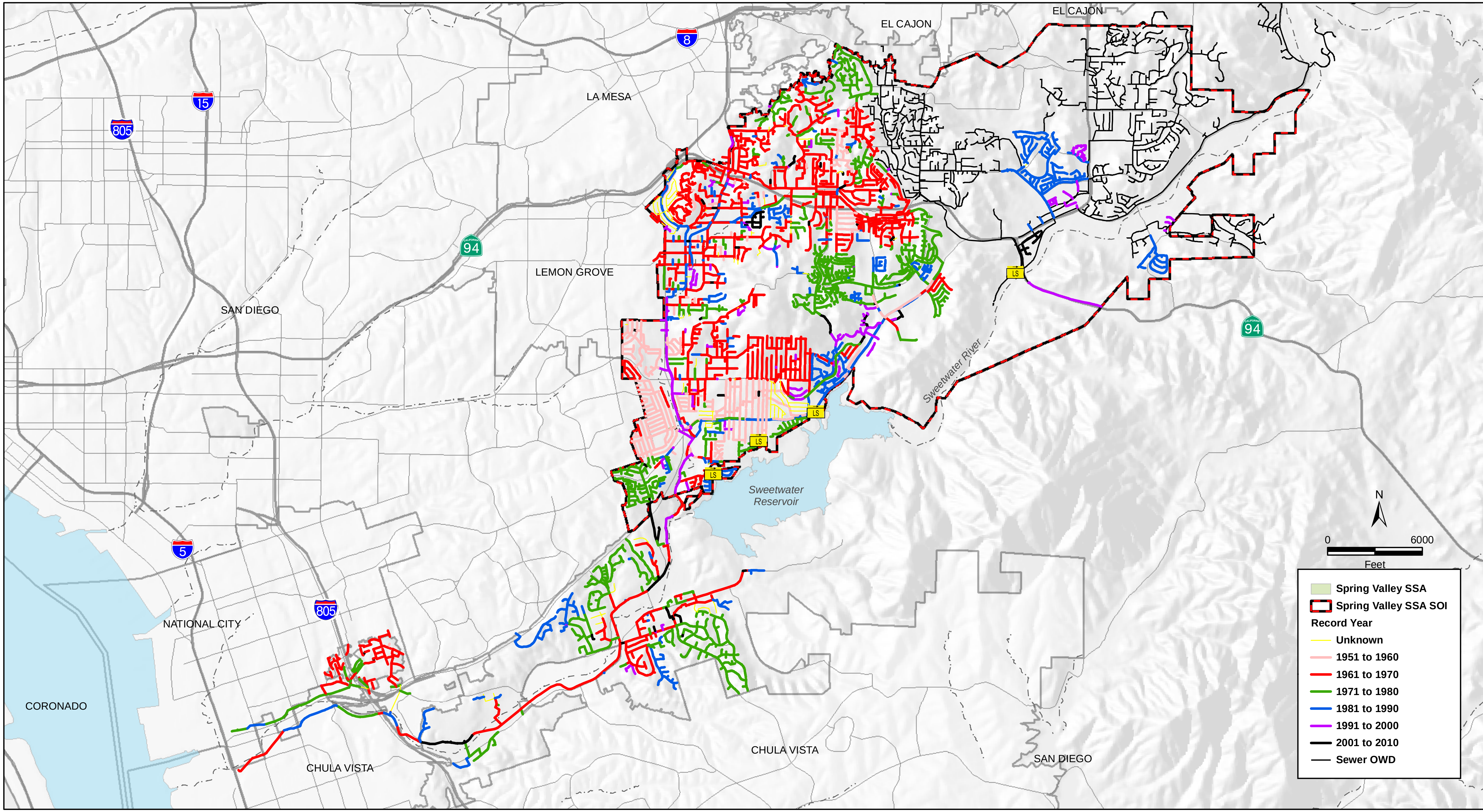


EXISTING GRAVITY MAINS
PIPELINE DIAMETERS
Figure 2-8

01/28/2013 LH Z:\Projects\IS\SanDiegoCounty\1472AsNeeded\x-xSpringValley\mxd\11571_SVMP_Gravity_DIA F2-8.mxd



EXISTING GRAVITY MAINS
PIPELINE AGE
Figure 2-9

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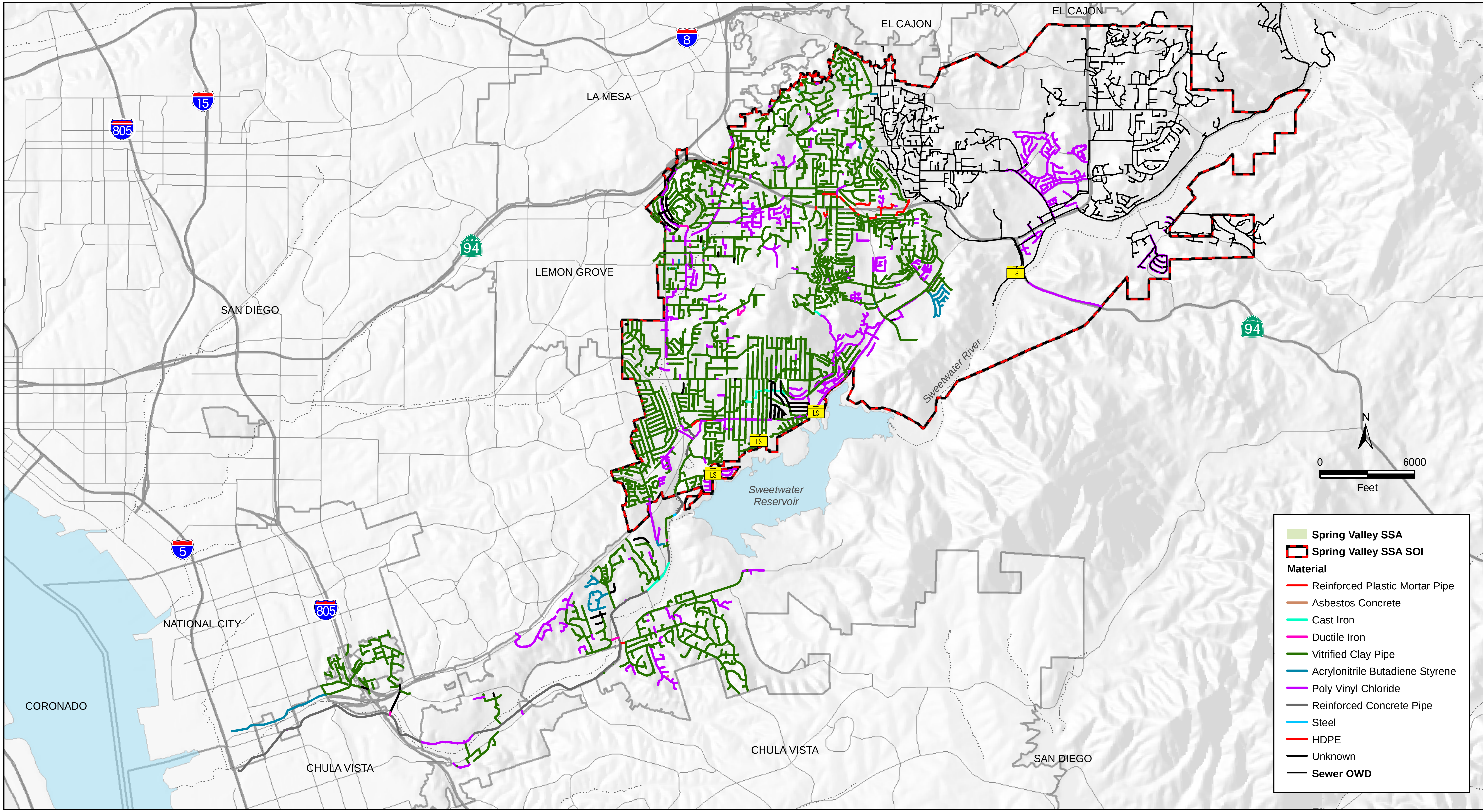

EXISTING GRAVITY MAINS
PIPELINE MATERIAL

Figure 2-10

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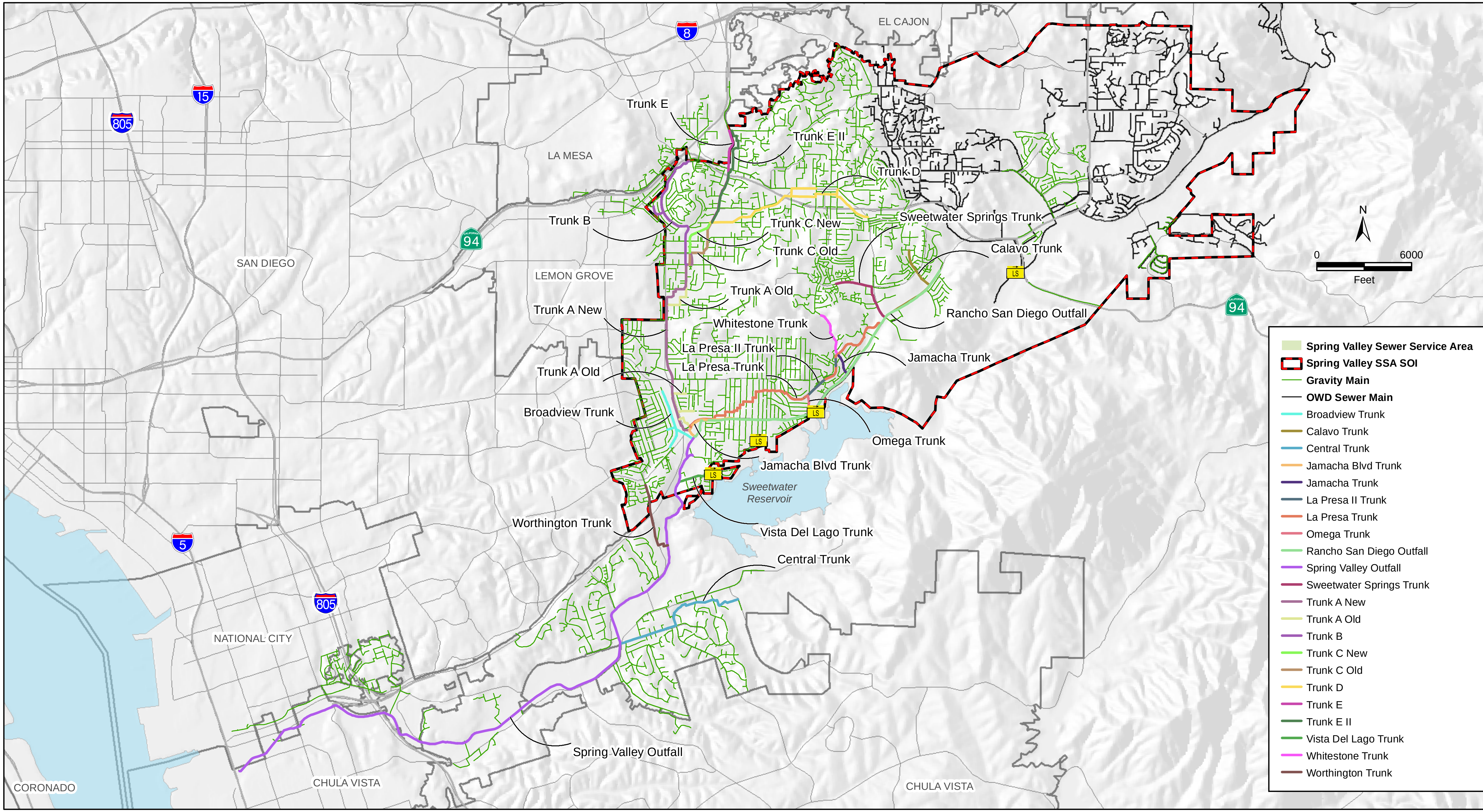


EXISTING TRUNK AND INTERCEPTOR SEWERS

Figure 2-11

1/28/2013 LH Z:\Projects\IS\SanDiegoCounty\1472AsNeeded\x-xSpringValley\mxd\11571_SVMP_TrunkSewers_F2-11.mxd

Table 2-7 Gravity Sewer Pipelines by Diameter

Diameter (inches)	Length (feet)	Length (miles)	Percent of System (%)
4	99	0.0	0.0
6	52,366	9.9	3.7
8	1,154,234	218.6	82.1
10	29,119	5.5	2.1
12	38,635	7.3	2.7
15	29,246	5.5	2.1
16	4,238	0.8	0.3
18	16,613	3.1	1.2
21	5,962	1.1	0.4
24	19,963	3.8	1.4
27	5,706	1.1	0.4
30	12,691	2.4	0.9
36	6,950	1.3	0.5
39	11,891	2.3	0.8
42	13,700	2.6	1.0
54	4,045	0.8	0.3
Unknown	1,136	0.2	0.1
Total	**1,406,594**	**266.4**	**100.0**

Table 2-8 Gravity Sewer Pipelines by Age

Age (Decade)	Length (feet)	Length (miles)	Percent of System (%)
1950 - 1959	132,495	25.1	9.4
1960 - 1969	539,702	102.2	38.4
1970 - 1979	346,070	65.5	24.6
1980 - 1989	185,713	35.2	13.2
1990 - 1999	109,158	20.7	7.8
2000 - 2009	38,068	7.2	2.7
Unknown	55,388	10.5	3.9
Total	**1,406,594**	**266.4**	**100.0**

Table 2-9 Gravity Sewer Pipelines by Material

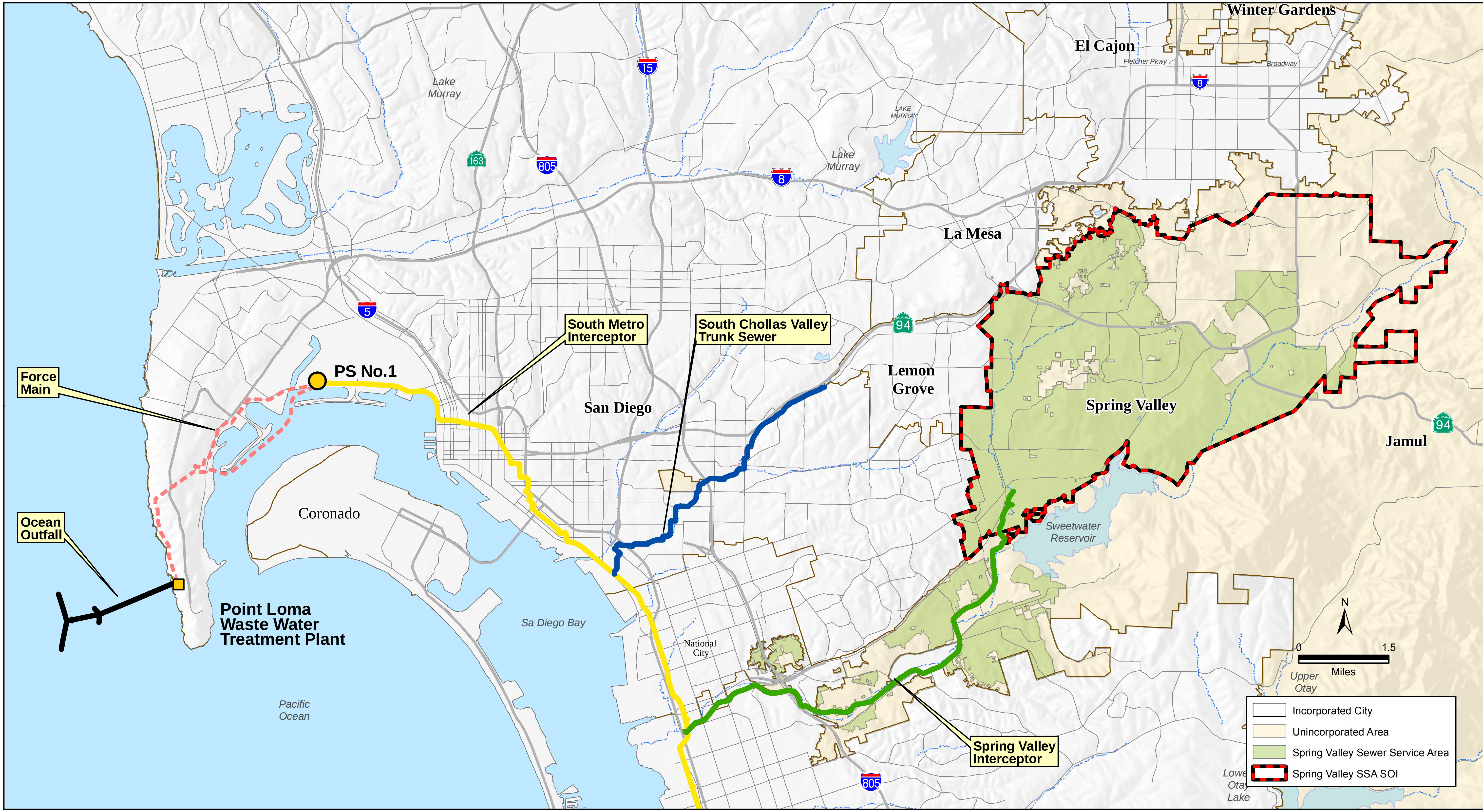
Material	Length (feet)	Length (miles)	Percent of System (%)
Acrylonitrile Butadiene Styrene Pipe (ABS)	22,805	4.3	1.6
Asbestos Cement Pipe (AC)	165	0.0	0.0
Cast Iron Pipe (CI)	4,502	0.9	0.3
Cast In Place Pipe (CIPP)	2,693	0.5	0.2
Ductile Iron Pipe (DI)	2,893	0.5	0.2
High density Polyethylene Pipe (HDPE)	379	0.1	0.0
Poly-Vinyl Chloride Pipe (PVC)	250,500	47.4	17.8
Reinforced Concrete Pipe (RCP)	34,824	6.6	2.5
Reinforced Plastic Mortar Pipe (RPMP)	10,354	2.0	0.7
Steel Pipe (STL)	302	0.1	0.0
Vitrified Clay Pipe (VCP)	1,022,712	193.7	72.7
Unknown	54,465	10.3	3.9
Total	**1,406,594**	**266.4**	**100.0**

2.6 Regional Sewerage Facilities

The Spring Valley SSA serves as a regional sewerage facility conveying wastewater flows generated within the SSA and portions of flows generated within the cities of Chula Vista, La Mesa, Lemon Grove, National City, and San Diego as well as the Otay Water District's sewer service area. The SSA conveys the wastewater generated within the study area into Metro under a comprehensive Regional Wastewater Disposal Agreement enacted between the City of San Diego and the Metro-participating agencies. Metro considers each participating agency as a separate entity and each contributing agency flow is estimated by use of either permanent flow meters or house count areas.

The County is considered one entity by Metro for purposes of capacity rating and its current Metro capacity is 17.503 mgd. Within the County, the SSAs are proportioned a share of Metro capacity, based on historical agreements, for the purposes of projecting future regional capacity needs. The Spring Valley SSA has been proportioned with 10.353 mgd of Metro Capacity.

Regional sewerage facilities including the Spring Valley SSA and Metro facilities are shown in Figure 2-12. Metro facilities include regional sewer interceptors and trunk sewers, pump stations, and treatment and disposal facilities. Wastewater in the Spring Valley Outfall flows to Pump Station No. 1. Pump Station No. 1 pumps flows to the City of San Diego's Point Loma Wastewater Treatment Plant (via Pump Station No. 2) for treatment and disposal.



REGIONAL SEWERAGE FACILITIES

Figure 2-12

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CHAPTER 3
WASTEWATER GENERATION ANALYSIS

This chapter provides descriptions of the wastewater generation including:

- Existing flow meter data summary;
- Methodology for developing unit generation rates;
- Recommended unit generation rates;
- Estimated future wastewater flows; and
- Metro capacity needs.

3.1 Flow Meters

As described in Chapter 2, wastewater generated within the Spring Valley SSA is collected by County-owned facilities that ultimately connect to Metro for treatment and disposal. The combined flows enter Metro through the Spring Valley Interceptor and, as such, the County has proportioned approximately 10.353 mgd of their 17.503 mgd of Metro capacity rights to the Spring Valley SSA.

The County has 14 flow meters in the Spring Valley SSA and there are 35 interconnections with the cities of Chula Vista, La Mesa, Lemon Grove, National City, and San Diego. Flow meter data used for calibration is included in Appendix E. Figure 3-1 presents the locations of the flow meters and interconnections. The City of San Diego bills the County for wastewater flows from the Spring Valley SSA based on readings from Metro meter SV-8M, metered interconnections with the cities of Chula Vista and La Mesa, and estimated house counts at the remaining interconnections. Based on meter records and information provided by the County, existing flows from each of the meters are presented in Table 3-1.

3.1.1 Metered Sewer Basins

The existing sewer collection system is metered in several strategic locations to provide accurate flow records to assist in evaluating potential problem areas. This data will assist in hydraulic model calibration, as well as estimating peak dry weather sewer flows.

Table 3-1 Existing Wastewater Flows by Meter

Meter Name	Location	Average Dry Weather Flow (mgd)	Average Wet Weather Flow (mgd)
MS1	8940 Jamacha Blvd	0.57	0.79
MS2	699 Sweetwater Rd	0.42	0.55
MS3	699 Sweetwater Rd	2.99	4.46
MS4	8375 Jamacha Blvd	1.71	2.31
MS5	Jamacha Blvd at SR-125	0.57	0.71
MS6	5540 Sweetwater Rd - Sweetwater GC	6.78	9.60
MS7	4475 Bonita Rd - Chula Vista GC	8.06	10.19
MS8	Singer Lane - RSD PS	0.48	0.85
MS9	9903 Jamacha Blvd - Jamacha PS	0.23	0.28
MS10	9150 Olive Dr	1.15	1.50
MS11	8832 Valencia St	1.59	2.26
MS12	8832 Valencia St	0.26	0.42
MS13	2640 Central Ave	0.61	0.94
SV8M	**5th Ave & Brisbane St**	**12.75**	**16.19**

Notes:
1. Average dry weather flow based on August 2010 data.
2. Average wet weather flow based on January 2010 data.

Meter MS-1 Sewer Basin

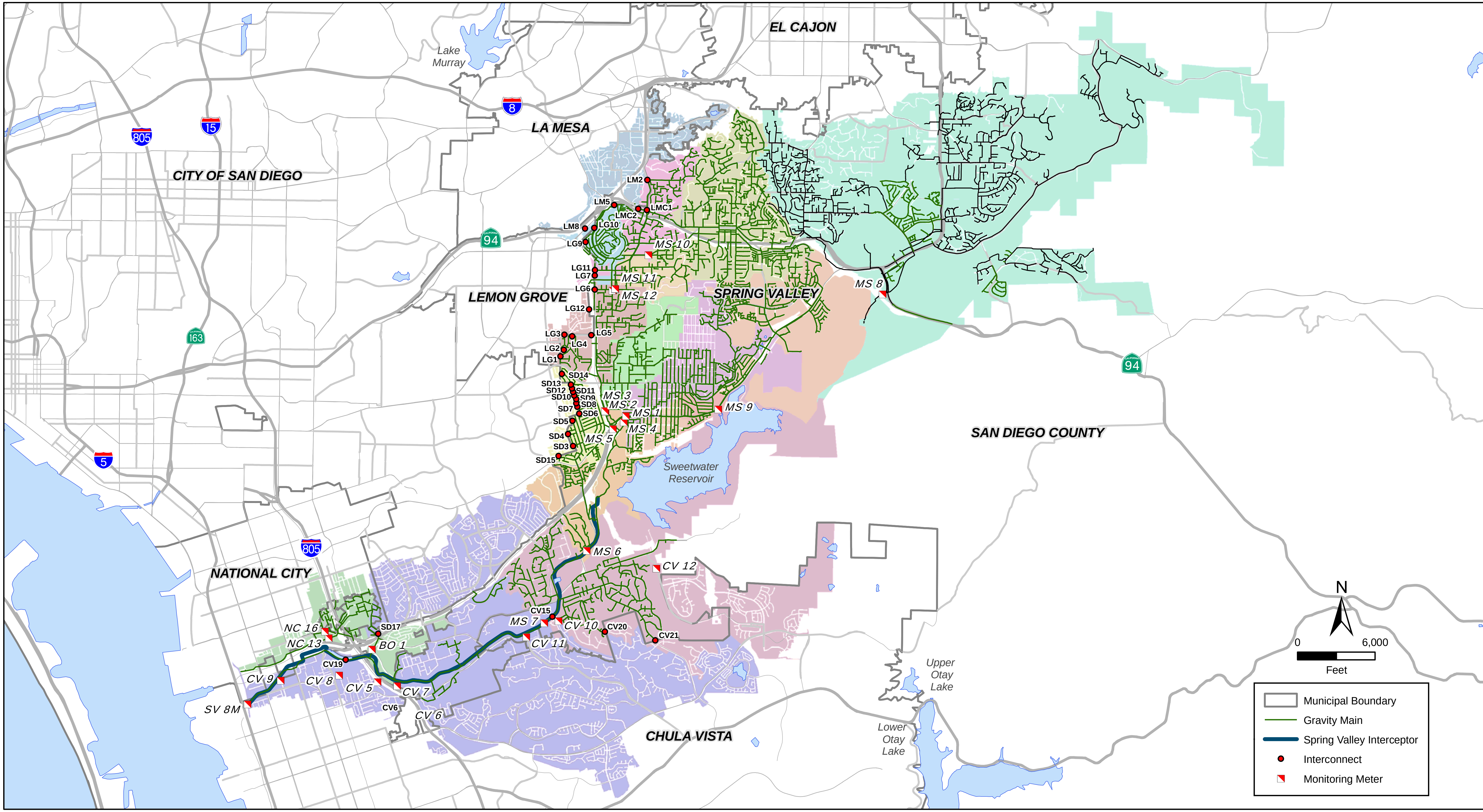
The Meter MS-1 basin encompasses approximately 380 acres within the central portion of the Spring Valley SSA and is generally located north of Jamacha Boulevard. The Meter MS-1 basin collects flows tributary to the La Presa Trunk Sewer and is located on the 15-inch diameter pipeline.

Meter MS-2 Sewer Basin

The Meter MS-2 basin encompasses approximately 315 acres within the central portion of the Spring Valley SSA and is generally located east of SR-125 and north of Jamacha Boulevard. The basin collects flows tributary to the Old Trunk A, which runs parallel to the New Trunk A and SR-125. Meter MS-2 is located on the 21-inch trunk sewer.

Meter MS-3 Sewer Basin

The Meter MS-3 basin encompasses approximately 425 acres within the northwestern portion of the Spring Valley SSA. The basin is located along SR-125 and collects flows tributary to the New Trunk A. Meter MS-3 is located on the 30-inch trunk sewer and receives flows from Meter MS-11, MS-12, and MS-13, as well as flows from the City of Lemon Grove interconnections.



FLOW MONITORING
AND INTERAGENCY CONNECTIONS

Figure 3-1

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Meter MS-4 Sewer Basin

The Meter MS-4 basin encompasses approximately 1,370 acres within the southern portion of the Spring Valley SSA and is generally is generally located south of Jamacha Boulevard and east of SR-125. The basin collects flows tributary to the Jamacha Trunk Sewer, the Sweetwater Springs Trunk Sewer, and the Rancho San Diego Outfall. Meter MS-4 is located on the 27-inch Rancho San Diego Outfall.

Meter MS-5 Sewer Basin

The Meter MS-5 basin encompasses approximately 160 acres along the western portion of the Spring Valley SSA and extends west from SR-125 between Jamacha Road and Paradise Valley Road. The basin collects flows tributary to the Broadview Trunk Sewer as well as flows from the city of San Diego interconnections and is located on the 18-inch trunk sewer.

Meter MS-6 Sewer Basin

The Meter MS-6 basin encompasses approximately 260 acres within the central portion of the Spring Valley SSA and generally runs along SR-54. The Meter MS-6 basin collects flows tributary to the Vista del Lago Trunk Sewer, the Worthington Trunk Sewer and the Spring Valley Outfall. Meter MS-6 is located on the 36-inch Spring Valley Outfall and receives flows from Meters MS-1, MS-2, MS-3, MS-4, MS-6, MS-11, MS-12, and MS-13.

Meter MS-7 Sewer Basin

The Meter MS-7 basin encompasses approximately 950 acres within the southern portion of the Spring Valley SSA and generally runs along Bonita Road. The basin collects flows tributary to the Central Trunk Sewer and the Spring Valley Outfall. Meter MS-7 is located on the 39-inch Spring Valley Outfall and also measures flows from the City of Chula Vista and Meter MS-6.

Meter MS-8 Sewer Basin

The Meter MS-8 basin meters wastewater flows from the Rancho San Diego basin and the majority of the area is operated and maintained by Otay Water District. Meter MS-8 is located at the County-owned Rancho San Diego Lift Station, upstream of the diversion to the OWD-owned Ralph W. Chapman Water Reclamation Facility.

Meter MS-9 Sewer Basin

The Meter MS-9 basin encompasses approximately 50 acres within the central portion of the Spring Valley SSA and is located north of the Sweetwater Reservoir. The basin collects flows tributary to the Jamacha Trunk Sewer and is located at the Jamacha LS.

Meter MS-10 Sewer Basin

The Meter MS-10 basin encompasses approximately 1,180 acres within the northern portion of the Spring Valley SSA and is generally located along SR-94, extending north to the Spring Valley Sphere of Influence boundary. The basin collects flows tributary to Trunk Sewer D and are monitored downstream through Meter MS-3. Meter MS-10 is located on the 18-inch Trunk Sewer C.

Meter MS-11 Sewer Basin

The Meter MS-11 basin encompasses approximately 380 acres along the northern portion of the Spring Valley SSA. The basin is located north of SR-94 and collects flows tributary to the New Trunk Sewer C, and Trunk Sewers E and EII. Flows conveyed through the Old Trunk Sewer C flow through the Bancroft diversion structure and may be split through Meters MS-11 and MS-12. Meter MS-11 is located on the 24-inch New Trunk Sewer A.

Meter MS-12 Sewer Basin

The Meter MS-12 basin encompasses approximately 175 acres within the northern portion of the Spring Valley SSA and collects flows tributary to the Old Trunk Sewer C. Meter MS-12 is located on the 18-inch Old Trunk Sewer C.

Meter MS-13 Sewer Basin

The Meter MS-13 basin encompasses approximately 130 acres along the northern portion of the Spring Valley SSA and extends from Bancroft Drive west to the SSA's Sphere of Influence boundary. The basin collects flows tributary to the Old Trunk Sewer A and Trunk Sewer B. Meter MS-13 is located on the 15-inch Old Trunk Sewer A.

Meter SV-8M Sewer Basin

The Meter SV-8M basin encompasses approximately 8,120 acres within the southern portion of the Spring Valley SSA and extends from I-5 to Otay Lakes Road. The basin collects flows tributary to the Spring Valley Outfall and includes flows monitored by Meter MS-7 as well as contributing flows from the city of Chula Vista. Meter SV-8M is located on the 54-inch Spring Valley Outfall.

3.2 Interconnections

The County has interagency agreements with neighboring agencies for the various interconnections to the Spring Valley sewer system. The interagency connections are described below. The County monitors the interconnections to establish proportional flows and obtain cost reimbursement for its ongoing operations and maintenance of the Spring Valley SSA trunk sewers. The County is currently completing a new Apportionment Model to facilitate assignment of costs to the neighboring agencies based on a flow analysis.

San Diego

The City of San Diego has 14 connections to the Spring Valley sewer system. The connections are not metered and flows are calculated using house counts and equivalent dwelling units (EDUs). The majority of existing development consists of residential land uses. Flow from the City of San Diego generate from two basins: one basin drains into the Spring Valley Outfall via the Broadview Trunk Sewer; the other basin drains to the Spring Valley Outfall through Metro meter BO-1. Appendix F presents a connection report describing the house count areas in the City of San Diego.

Chula Vista

The City of Chula Vista has eight metered connections to the Spring Valley sewer system to monitor flows from the Chula Vista Sweetwater Basin. The basin includes the northern portion of the City of Chula Vista bounded by the Telegraph Canyon and G Street Sewer Basins to the south and the unincorporated area of Bonita and the City of National City to the north. The majority of existing development consists of residential land uses with approximately half of the basin currently undeveloped.

Basin sewers drain through metered connections into the Central Trunk Sewer and the Spring Valley Outfall, which in turn convey the flow westerly to a connection to the South Metro Interceptor near the Interstate 5 crossing of the Sweetwater River. A limited number of parcels within the basin are served by the City of Chula Vista sewers that discharge directly (unmetered) to County mains. These flows are approximated by house count formulas for Metro billing purposes.

Lemon Grove

The City of Lemon Grove has 10 connections to the Spring Valley sewer system. The connections are not metered and flows are calculated using house counts and equivalent dwelling units (EDUs). The majority of existing development consists of residential land uses. Wastewater flows from Lemon Grove flow through Trunk Sewer A to the Spring Valley Interceptor, which in turn conveys the flow westerly to a connection to the South Metro Interceptor near the Interstate 5 crossing of the Sweetwater River.

La Mesa

The City of La Mesa has two connections to the Spring Valley sewer system, metered at two located by Meter LM-2 and LM-5. The area draining to Spring Valley is located in the southeastern portion of the City of La Mesa and extends along both sides of Interstate 125 from Interstate 8 south to Highway 94. Development within this area is largely built-out and is primarily residential land uses.

There is a third area of La Mesa that flows into the Spring Valley sewer system through a connection in Lemon Grove, which is metered by Meter LM-8. Flows from La Mesa are conveyed through Trunk Sewer E and Trunk Sewer B to the Spring Valley Outfall.

National City

The City of National City has two metered connections (Meters NC-8 and NC-15) to the Spring Valley sewer system, as well as two small areas that discharge into the Spring Valley system unmetered. Development within this area is largely built-out and is primarily residential land uses. National City flows into the Spring Valley Outfall are conveyed through Metro meter BO-1.

3.3 Wastewater Generation Rates

The purpose of establishing wastewater generation rates is to characterize the existing unit use by either population or land use, and for use in forecasting wastewater flows. The existing metered flows were compared with land use data and population estimates to develop unit wastewater generation rates. Unit generation rates were estimated using two sources for comparison purposes: 1) population estimates compiled by SANDAG (Series 12), and 2) the County's current land use data (Referral Map, May 2008). Based on the findings of the unit generation rate analysis by land use and population, recommended unit rates will be established for use in forecasting future wastewater flows.

The unit generation rate calibration of each basin is described in the following sections and summarized in Table 3-2 and Table 3-3. A detailed summary of the calibration process is presented as Appendix G.

3.3.1 Generation Rates Using SANDAG Population

The purpose of estimating population based unit generation rates is to establish the amount of wastewater a typical residential person and non-residential employee generate over a given day in order to assist in forecasting the amount of wastewater that the SSA can expect through 2030. Per capita unit generation rates are determined through a comparison of the existing SANDAG population data within a given meter basin against the average wastewater flows observed at that flow meter, and industry standard ranges.

SANDAG provided 2008 residential and employment population projections by basin for the SSA based on Series 12 data. Through an iterative process, per capita generation rates for residential and employment populations were estimated. Table 3-2 summarizes the estimated unit generation rates by population through the flow calibration process. Per capita unit generation rates were calibrated to within ten percent of existing flows based on industry standards, with the exception of Meter MS-4. The MS-4 meter basin showed a high household density, which may have led to a higher than average per capita generation.

Typically, design and planning standards for agencies in San Diego County assume per capita wastewater generation rates between 60 to 100 gallons per capita per day (gpcd) for residential and 15 to 35 gpcd for employment populations. Table 3-2 summarizes the flows and calibration for the Spring Valley SSA. Spring Valley has an estimated residential per capita unit generation rate ranging from 60 to 90 gpcd and an employment per capita unit generation rate of 25 gpcd.

Table 3-2 Wastewater Unit Generation Rate Calibration Based on Population

Basin	Residential	Employment	Calculated Flow	Calibration %
MS-1	60 gpcd	25 gpcd	0.566 mgd	2.4
MS-2	65 gpcd	25 gpcd	0.423 mgd	4.6
MS-3	60 gpcd	25 gpcd	2.993 mgd	3.3
MS-4	90 gpcd	25 gpcd	1.707 mgd	-11.7
MS-5	90 gpcd	25 gpcd	0.567 mgd	8.6
MS-6	85 gpcd	25 gpcd	6.781 mgd	-1.0
MS-7	70 gpcd	25 gpcd	8.064 mgd	3.5
MS-8	80 gpcd	25 gpcd	1.876 mgd	-2.4
MS-9	90 gpcd	25 gpcd	0.226 mgd	-7.9
MS-10	75 gpcd	25 gpcd	1.151 mgd	-3.6
MS-11 & MS-12	65 gpcd	25 gpcd	1.851 mgd	1.9
MS-13	65 gpcd	25 gpcd	0.613 mgd	2.1
SV-8M	85 gpcd	25 gpcd	12.746 mgd	5.2

gpcd = gallons per capita per day
mgd = million gallons per day

3.3.2 Generation Rates Using County Land Use Data

The purpose of estimating land use based unit generation rates is to establish the amount of wastewater is generated on an average day over an acre of land by general land use types in order to assist in estimating the amount of wastewater that the SSA can expect at the buildout of the study area. Land use based unit generation rates are determined through a comparison of the existing area per land use type within a given meter basin against the average wastewater flows observed at that flow meter, and industry standard ranges.

As shown in Figure 2-3 of the previous chapter, existing land uses include single-family residential, multi-family residential, industrial, commercial, and institutional. When the GIS land use coverage is overlaid with the County's permitted parcel database, it was possible to estimate the number of single-family and multi-family dwelling units and calculate industrial, commercial, and institutional acreage for the Spring Valley SSA.

The single-family residential land use unit generation rate was first assigned a value equal to the higher of the calculated or census population density multiplied by the calibrated population unit generation rate. The multi-family residential land use unit generation rate was then set equal to 75 percent of the single-family unit generation rate, and the rates were adjusted through an iterative process to reasonably match the estimated residential wastewater generation, as presented in Table 3-2. Non-residential land use unit generation rates were set equal to each other and then were adjusted through an iterative process to reasonably match the estimated employment wastewater generation presented in Table 3-2.

Table 3-3 summarizes the calibration of sewer flows for the Spring Valley SSA with estimated unit wastewater generation rates summarized by land use. Unit wastewater generation rates were calibrated to within ten percent of existing flows. The 2010 data projected an average of 3.29 persons per household for Spring Valley. The calculated household population density ranged from 3.07 to 4.94 persons per household.

Approximately 0.5 mgd of I&I was observed in the Spring Valley Outfall. The SV-8M meter sub-basin has a comparatively low number of units draining directly into the Spring Valley Outfall (i.e., not through other metered connections) so the residential unit generation rate is higher than average due to the I&I flows being attributed to these remaining residential units in the SV-8M basin.

Typically, design standards for agencies in San Diego County assume wastewater flows between 200 to 400 gallons per day per dwelling unit (gpd/du) for single-family residential, with multi-family residential ranging from 60 percent to 75 percent of single-family residential, and 500 to 1500 gallons per day per acre (gpd/ac) for non-residential land uses. When compared to typical design standards, the calibrated unit generation rates suggest that the Spring Valley SSA consists of a range of water use residential customers and has a lower than average employment density.

Table 3-3 Wastewater Unit Generation Rate Calibration Based on Land Use

Basin	SFR	MFR	Commercial	Industrial	Institutional	Calculated Flow	Calibration %
MS-1	185 gpd/DU	140 gpd/DU	500 gpd/ac	500 gpd/ac	500 gpd/ac	0.566 mgd	5.6
MS-2	270 gpd/DU	200 gpd/DU	500 gpd/ac	500 gpd/ac	500 gpd/ac	0.423 mgd	7.0
MS-3	195 gpd/DU	145 gpd/DU	500 gpd/ac	500 gpd/ac	500 gpd/ac	2.993 mgd	4.2
MS-4	420 gpd/DU	315 gpd/DU	500 gpd/ac	500 gpd/ac	500 gpd/ac	1.707 mgd	-9.6
MS-5	295 gpd/DU	180 gpd/DU	500 gpd/ac		500 gpd/ac	0.567 mgd	7.6
MS-6	300 gpd/DU	225 gpd/DU	500 gpd/ac	0 gpd/ac	500 gpd/ac	6.781 mgd	-0.9
MS-7	220 gpd/DU	165 gpd/DU	500 gpd/ac		500 gpd/ac	8.064 mgd	3.6
MS-8	270 gpd/DU	202 gpd/DU	500 gpd/ac		500 gpd/ac	1.876 mgd	2.5
MS-9	340 gpd/DU				500 gpd/ac	0.226 mgd	-7.3
MS-10	250 gpd/DU	190 gpd/DU	500 gpd/ac	500 gpd/ac	500 gpd/ac	1.151 mgd	-1.1
MS-11 & MS-12	235 gpd/DU	175 gpd/DU	500 gpd/ac	500 gpd/ac	500 gpd/ac	1.851 mgd	2.6
MS-13	200 gpd/DU	150 gpd/DU	500 gpd/ac		500 gpd/ac	0.613 mgd	2.3
SV-8M	420 gpd/DU	315 gpd/DU	500 gpd/ac		500 gpd/ac	12.746 mgd	5.3

gpd/ac = gallons per day per acre
gpd/DU = gallons per day per dwelling unit
mgd = million gallons per day

3.3.3 Recommended Unit Generation Rates

For future development, it is typical to develop uniform unit generation rates. The County has relatively uniform wastewater generation for land use and population projections based on our unit generation rate analyses. Therefore, for the existing system analysis, the calibrated unit generation rates shown above will be used. For future wastewater generation, only slightly more conservative generation rates will be used. The wastewater generation rates used to estimate future flows are summarized in Table 3-4. The City of San Diego and the County utilize Equivalent Dwelling Units (EDUs) for non-single family residential land uses and equate an EDU to 280 gpd and 240 gpd, respectively.

Table 3-4 Recommended Unit Generation Rates

Land Use / Population	Recommended Unit Generation Rate	
Land Use		
Single-Family Residential	270	gpd/du
Multi-Family Residential	200	gpd/du
Commercial	500	gpd/ac
Industrial	500	gpd/ac
Institutional	500	gpd/ac
Population		
Residential	75	gpcd
Employment	25	gpcd

The recommended unit generation rates assume that I&I flows observed at the meters in the Spring Valley SSA trunk sewers are distributed solely among areas within the County of San Diego and do not assume I&I from contributing agencies. These assumptions result in a per EDU generation rate closer to 280 gpd/EDU than the County's standard 240 gpd/EDU, which is conservative for future planning.

3.4 Wastewater Flow Projections

Wastewater flow projections were developed through 2030 and for buildout. Flow projections through 2030 were estimated by applying the recommended population unit generation rates to the recommended phased populations. Buildout wastewater flow projections were determined by applying the land use based unit generation rates to the land use acreages and allowable densities (Referral Map, May 2008). These projections form the basis for sewer input flows to the hydraulic model, and analyses of future capacity needs in the wastewater collection system. Table 3-5 summarizes the estimated future flows based on recommended phasing through 2030 and Table 3-6 summarizes the estimated buildout flow based on the land use for ultimate conditions in each SSA.

Table 3-5 Spring Valley Wastewater Flow Projections through 2030 (by Population)

Basin	Population					Estimated Wastewater Generation (mgd)				
	2010	2015	2020	2025	2030	2010	2015	2020	2025	2030
Spring Valley										
Residential	82,527	88,494	92,045	93,652	94,883	5.36	6.64	6.90	7.02	7.12
Employment	11,324	17,002	19,017	19,112	19,300	0.28	0.43	0.48	0.48	0.48
OWD										
Residential	16,341	16,827	18,009	18,357	20,940	1.06	1.26	1.35	1.38	1.57
Employment	2,335	2,834	2,865	2,865	3,124	0.06	0.07	0.07	0.07	0.08
Other Agencies - La Mesa, Lemon Grove, National City, San Diego, and Chula Vista										
Residential	74,107	88,151	88,541	88,746	89,318	4.82	6.61	6.64	6.66	6.70
Employment	16,371	48,505	49,215	49,528	49,707	0.41	1.21	1.23	1.24	1.24
Total						**11.99**	**16.22**	**16.67**	**16.84**	**17.19**

Table 3-6 Spring Valley Buildout Wastewater Flow Projections (by Land Use)

Land Use	Units/Acres			Recommended Unit Generation Rate	Estimated Wastewater Generation (mgd)			
	Spring Valley	OWD	Other Agencies		Spring Valley	OWD	Other Agencies	Total
Single-Family Residential	20,575 DU	8,068 DU	18,743 DU	270 gpd/du	5.56	2.18	5.06	12.79
Multi-Family Residential	8,072 DU	306 DU	8,631 DU	200 gpd/du	1.61	0.06	1.73	3.40
Commercial	271 ac	123 ac	495 DU	500 gpd/ac	0.14	0.06	0.25	0.44
Industrial	259 ac	0 ac	97 DU	500 gpd/ac	0.13	0.00	0.05	0.18
Institutional	447 ac	695 ac	908 DU	500 gpd/ac	0.22	0.35	0.45	1.03
Total					**7.66**	**2.65**	**7.54**	**17.84**

3.5 Conclusions

Existing average wastewater flows generated within the Spring Valley SSA are approximately 12 mgd, including flows from contributing agencies. Based on the recommended phased SANDAG population projections, the total Spring Valley SSA average flow rate at 2030 is estimated to be 17.19 mgd, with contributing agencies. Assuming the buildout of the entire study area, the estimated average flow rate is estimated at approximately 17.84 mgd, which will likely not occur until beyond 2050.

The County's portion of Spring Valley SSA has a current Metro capacity of 10.353 mgd. Based on the estimated wastewater flow projections of 7.66 mgd at buildout, the current Metro capacity rights will be sufficient through buildout. The County should continue to monitor flows into Metro over the next five to ten years to determine whether the recommended phased populations are consistent with future flow projections.

CHAPTER 4
CAPACITY EVALUATION

This chapter provides a description of the capacity analysis performed as part of the Master Plan, and includes:

- Evaluation criteria;
- Model selection, development and calibration;
- Capacity analysis; and
- Potential phased recommended improvements.

4.1 Background

A capacity evaluation of the Spring Valley SSA existing wastewater collection system was completed to identify sewer reaches that may be deficient under recommended design criteria and to identify any upgrades needed to accommodate existing and projected dry and wet weather wastewater flows. Based on the capacity evaluation, phased facility improvements were identified to reduce the potential for sanitary sewer overflows as well as to allow for projected growth within the study area.

4.2 Methodology

The principal tool utilized in the capacity analysis was the dynamic hydraulic model. The hydraulic model simulates flow conditions, such as wastewater flow depth, flow rate, and velocity, within pipes and manholes in the SSAs wastewater collection systems. The model selected in this study, InfoWorks CS (Innovyze, Version 8.5), belongs to a class of models referred to as dynamic wave models. These models provide a reasonable representation of hydraulic flow conditions over an extended period of time.

The model was developed using the physical collection system data, existing and forecasted populations, per capita unit generation rates, diurnal patterns, and rainfall events. The model was then calibrated to flow metering records for dry and wet weather conditions. Once the model was calibrated, it was utilized to evaluate the existing collection system under existing and projected dry and wet weather flow conditions in order to identify potential recommended improvements to the existing collection system.

4.3 Flow Monitoring

Flow records from various locations within the Spring Valley SSA collection system were used to develop initial diurnal patterns and calibrate the hydraulic model. As discussed in Chapter 3, the County maintains flow meters at thirteen (13) locations within the collection system and Metro maintains the Meter SV-8M billing meter, which meters all flows from the Spring Valley SSA. These meters continuously record flow, depth and velocity measurements. Flow monitoring data from August 2008 at all of the meters was used to develop initial diurnal patterns and calibrate the existing dry weather hydraulic model scenario. The month of January 2010 was identified as having a rainfall event typical of a 2-year return storm, and was used to calibrate wet weather events.

4.4 Limitations of Hydraulic Modeling

The hydraulic model was utilized as the primary planning tool for the sewer capacity analysis and provides a reasonable representation of actual flow conditions within a sanitary sewer system in response to existing and future sewage loading. The accuracy of the simulation, however, is directly related to the accuracy of the model input data, including physical parameters and sewage loading projections. For example, in a case where roots had entered the sewer causing a blockage, the model would be unable to predict a resulting surcharge condition. Consequently, an understanding of the data sources is critical in interpreting the modeling results.

4.5 Evaluation Criteria

Recommended criteria were developed to evaluate the capacity of the existing collection system under existing and projected dry and wet weather flow conditions. The recommended evaluation criteria were developed by comparing existing County criteria to criteria for similar Southern California sewer agencies. The recommended evaluation criteria are presented in Table 4-1 and will be utilized to identify deficient facilities and size replacement infrastructure. The evaluation criteria presented in this master plan is not intended to replace the County's existing criteria, which shall continue to be utilized for the design of new infrastructure.

Table 4-1 Recommended Evaluation Criteria

Item	Recommended Evaluation Criteria
Gravity Main Criteria	
Minimum Pipe Diameter	8 inches
Minimum Velocity	2 fps at peak flow rate
Manning's Roughness Coefficient	0.013
Maximum Peak d/D Ratio for Existing Sewers	0.50 Peak Dry Weather Flow for dia. ≤ 15-inch
	0.75 Peak Dry Weather Flow for dia. > 15-inch
	0.92 Peak Wet Weather Flow for a 2-year storm
Maximum Peak d/D Design Criteria for New Sewers	0.50 Peak Wet Weather Flow for dia. ≤ 15-inch
	0.75 Peak Wet Weather Flow for dia. > 15-inch
Force Main Criteria	
Minimum Pipe Diameter	4 inches
Minimum Velocity	3 fps
Maximum Velocity	8 fps
Hazen Williams 'C' Factor	130
Siphon Criteria	
Minimum Pipe Diameter	6-inch
Minimum Number of Pipes	2
Minimum Velocity	3 fps at Peak Dry Weather Flow
Hazen Williams 'C' Factor	120
Pump Station Criteria	
Minimum Number of Pumps	2
Minimum Pump Capacity	Duty pumps capable of handling ultimate wet weather capacity
Standby Capacity	100% of largest pump capacity
Emergency Power	Required
Emergency Storage Capacity	6 hour pumping volume at average dry weather flow

4.6 Model Development

The model was developed with the physical collection system data, existing and forecasted populations, per capita unit generation rates, diurnal patterns, and rainfall events. Details regarding the collection system and the application of sewage loading factors and rainfall events are described below.

4.6.1 Collection System Attributes

Data required to create the model includes information describing the physical wastewater collection system, such as physical location, pipe diameters and reach lengths, manhole invert elevations, and estimated pipe roughness coefficients. Model connectivity was reviewed and verified against County as-built records. The physical parameters of the model, including pipe diameter, slope, and roughness coefficients were based principally on the County's GIS records. Where the data appeared to be inaccurate or unclear, data was inferred.

The source of the model attributes was the County's GIS system. Concurrently with this project, the County instituted an ongoing program to improve their GIS system. As the part of the GIS system update, the sewer system attributes were populated in GIS from geo-referenced scanned as-built drawings. This process developed a good data source to build the model from.

4.6.2 Model Loading

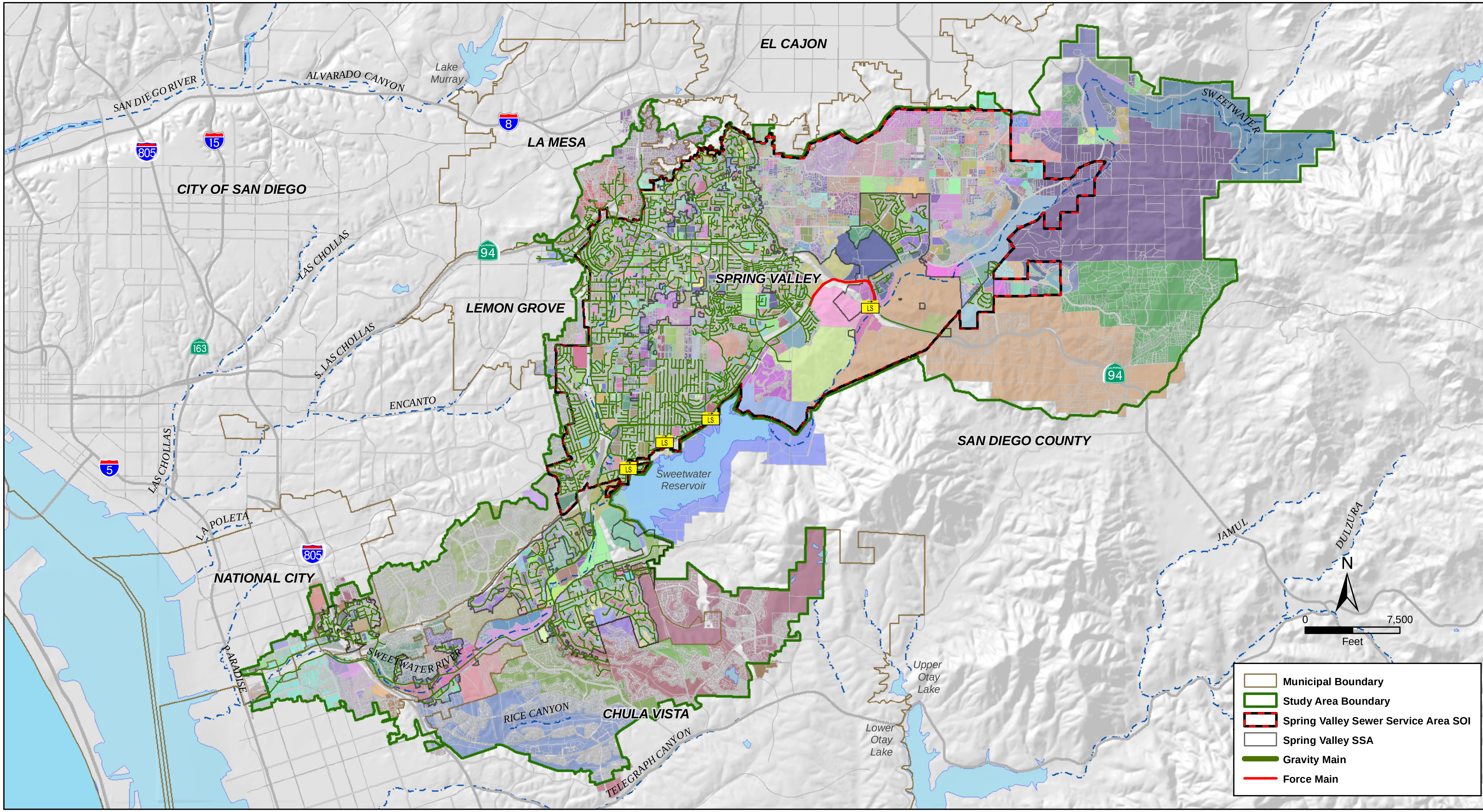
Wastewater flows are generated in the model by applying basin populations to per capita unit generation rates and time-varying hydrographs (diurnal patterns) at the basin's identified tributary node. Populations were applied for existing, interim and ultimate conditions at the parcel level. Each parcel was assigned a corresponding tributary model node based on available lateral information and topography. Model basins were then formed by merging parcels with identical tributary nodes.

The parcel's existing, interim, and ultimate residential and employment populations were summed and input into the model at the basin level. Residential and employment population estimates for the existing and interim conditions were provided by SANDAG. Residential and employment population estimates for the buildout condition were calculated based on proposed land use. Figure 4-1 presents the location of the model basins.

A diurnal pattern is expressed as a varying flow rate over time and is applied to the estimated average residential and employment flows to develop model flow inputs into the collection system. It is necessary to develop multiple diurnal patterns in order to properly model communities with varying types of sewer discharge patterns. For instance residential users typically discharge the most sewage during the early morning and early evening hours, while employment users typically discharge the most sewage in the middle of the day. Initial residential diurnal patterns were developed for both the Spring Valley SSA based upon the flow metering data. The flow patterns for the Spring Valley SSA are typical of largely residential communities, which exhibit the largest peak in the morning and a smaller peak in the early evening. Employment populations represent only a small portion of the overall flows and as such, diurnal patterns for employment populations were assumed as a typical bell curve with the peak occurring at midday, which is conservative. The shapes of the residential diurnal patterns were refined during the dry weather model calibration to better simulate the observed peaking of the sewage flows. Appendix H includes model basin population projections and diurnal patterns.

4.6.3 Rainfall Events

Rainfall events are applied to the model to identify their potential impacts on the collection system. Rainfall derived inflow and infiltration (RDI&I) flows into the system are modeled by applying infiltration and routing coefficients to rainfall event. These coefficients were refined during the wet weather model calibration to better simulate the observed peaking of the sewage flows. A storm event occurring January 18 to 22, 2010 was selected for use in calibrating the wet weather model. The precipitation readings for the January storm are slightly lower than the two-year design storms for San Diego County. Figure 4-2 presents a comparison of the average daily flows recorded at Meter SV-8M to the average daily rainfall totals at rain gauges in close proximity to the collection system. Figure 4-3 presents the name and location of the rain gauges utilized in this study. Rainfall totals for each gauge are summarized in Appendix I.

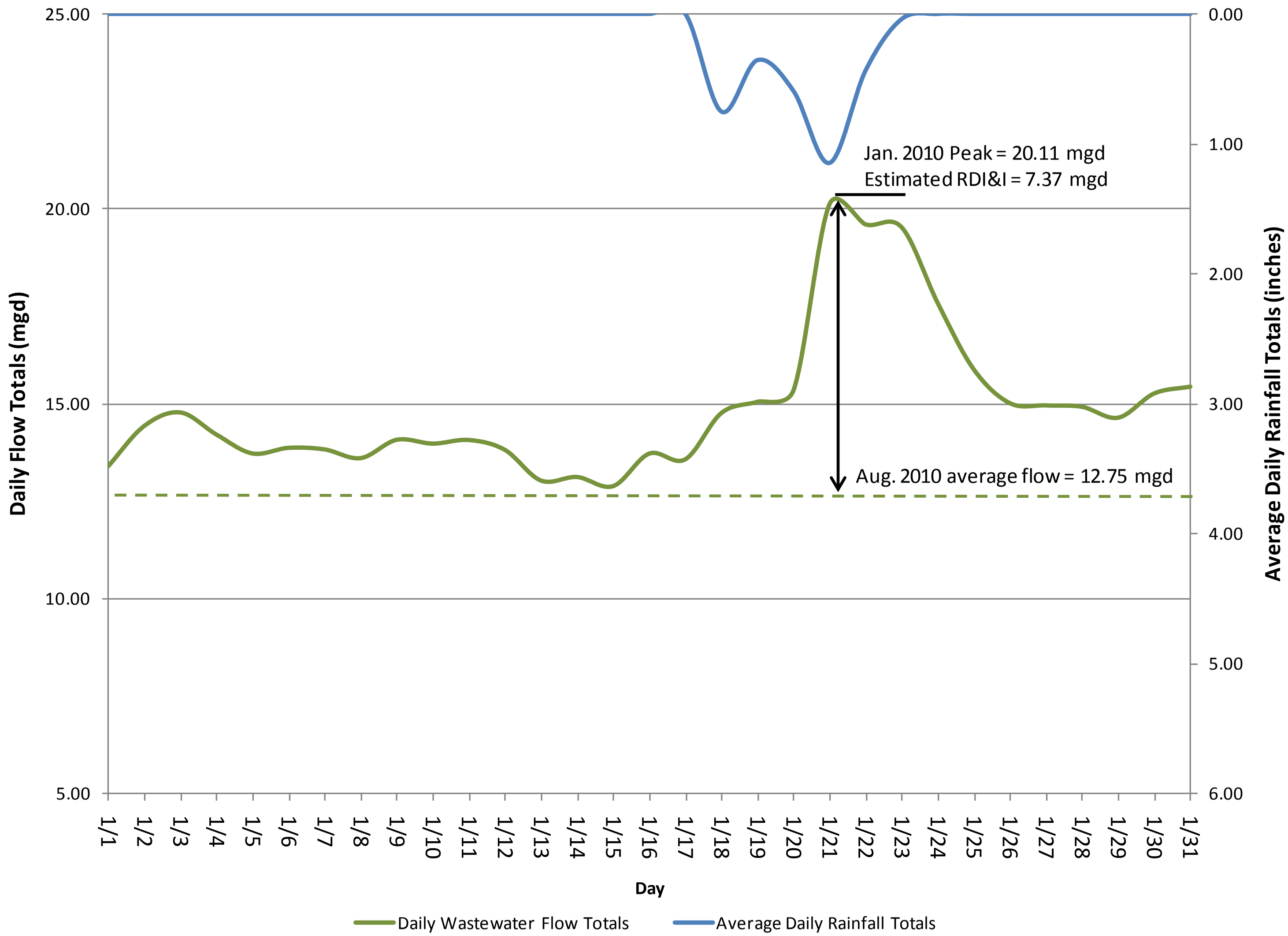


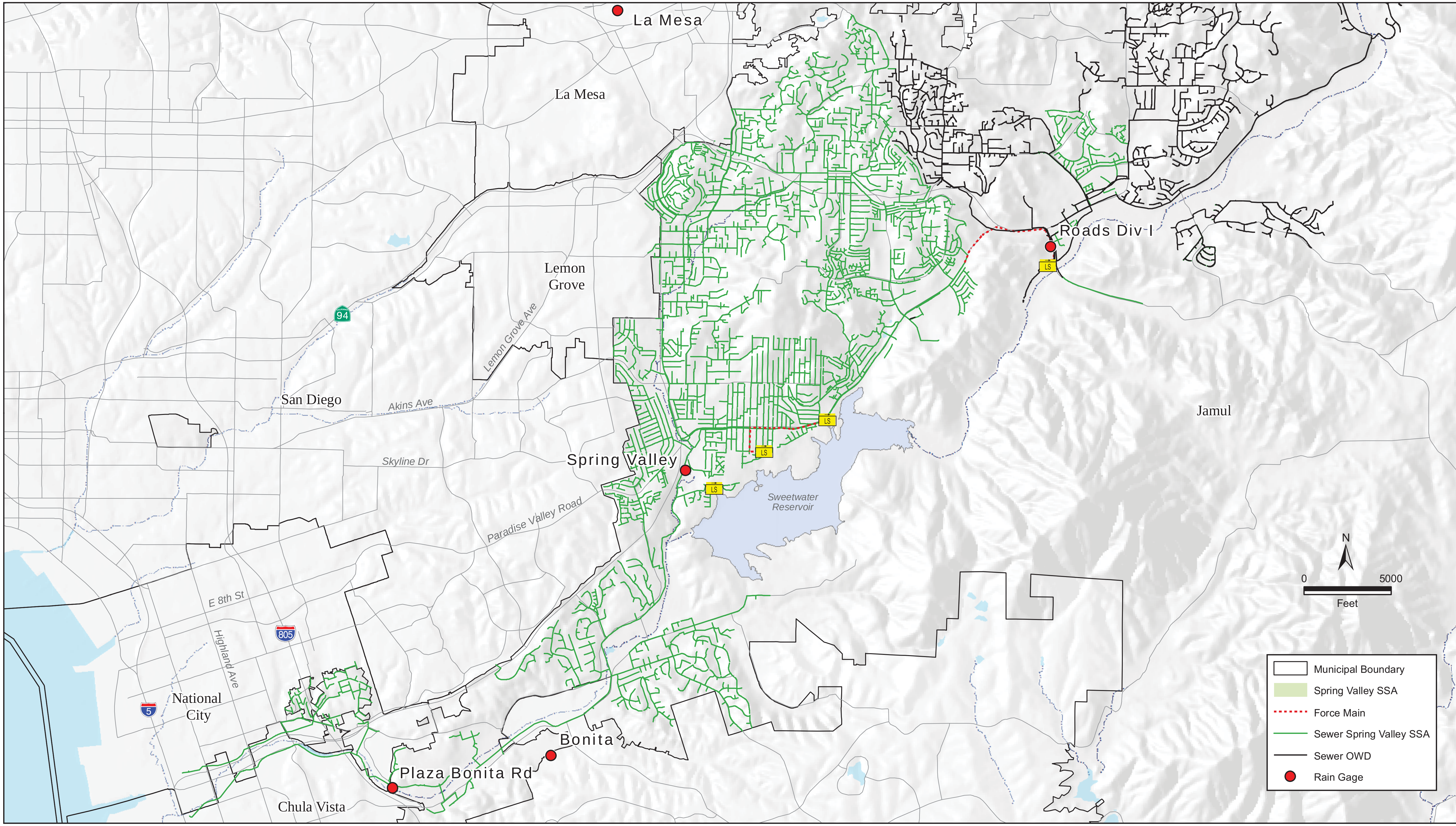
SPRING VALLEY
MODEL BASINS

Figure 4-1

12/27/2012 LH SD Z:\Projects\IS\SanDiegoCounty\100001472_AsNeeded\xx_SpringValley\mxd\11571_ModelBasins_F4-4.mxd

Figure 4-2 Meter SV-8M Wet Weather Flow Assessment





RAIN GAUGE LOCATIONS

Figure 4-3

12/27/2012 LH SD Z:\Projects\IS\SanDiegoCounty\100001472_AsNeeded\xx_SpringValley\mxd\11571_SVMP_RainGuages-F4-3.mxd

As shown on Figure 4-2, the January storm event produced a peak increase of approximately 7.37 mgd, or a 58 percent increase over average flow, at Meter SV-8M from a storm event that averaged over an inch of rain during its 5 day period.

4.7 Model Calibration

The model was calibrated by refining estimated model parameters under dry and wet weather conditions so that the simulated model flow conditions reasonably approximated the measured flow conditions. Diurnal curves were adjusted for the dry weather calibration such that simulated and recorded wastewater flow and depth hydrographs matched to within a reasonable level of accuracy. Infiltration and routing coefficients were adjusted in the wet weather calibration such that simulated and recorded wastewater peak flows matched to within a reasonable level of accuracy.

4.7.1 Dry Weather Calibration

The model was calibrated to dry-weather meter data recorded in the month of August 2008 at the seven County-maintained flow meters. The flow records for August 15th were selected to calibrate volume because they represented the maximum day in that month. Peak flow calibration was based on the highest observed flow recorded in that month. Simulated flow hydrographs at each meter location were compared with recorded discharge measurements. The purpose of the comparison was to allow for refinement of estimated model parameters so that the simulated flow conditions reasonably approximated the measured flow conditions. These parameters generally include diurnal curve patterns and peak to average flow ratios (peaking factors).

Results of the dry weather calibration are best presented graphically, and are shown in Figures 4-4 through 4-10. The typical range of sewer volume and peak flows for dry weather model calibration is within +/– 10 percent of field measurements for master planning purposes. Table 4-2 summarizes the results of the dry weather calibration.

Table 4-2 Dry Weather Calibration Summary

Meter Name	Observed Peak Flow (mgd)	Modeled Peak Flows (mgd)
MS1	0.81	0.97
MS2	0.65	0.82
MS3	4.52	5.13
MS4	3.56	3.78
MS5	0.83	0.98
MS6	11.14	11.59
MS7	12.03	13.69
MS8	1.89	1.90
MS9	0.37	0.39
MS10	2.19	1.92
MS11	2.52	2.61
MS12	0.40	0.57
MS13	0.93	1.14
SV8M	18.64	20.83

Figure 4-4 Dry Weather Calibration at Meter MS-1

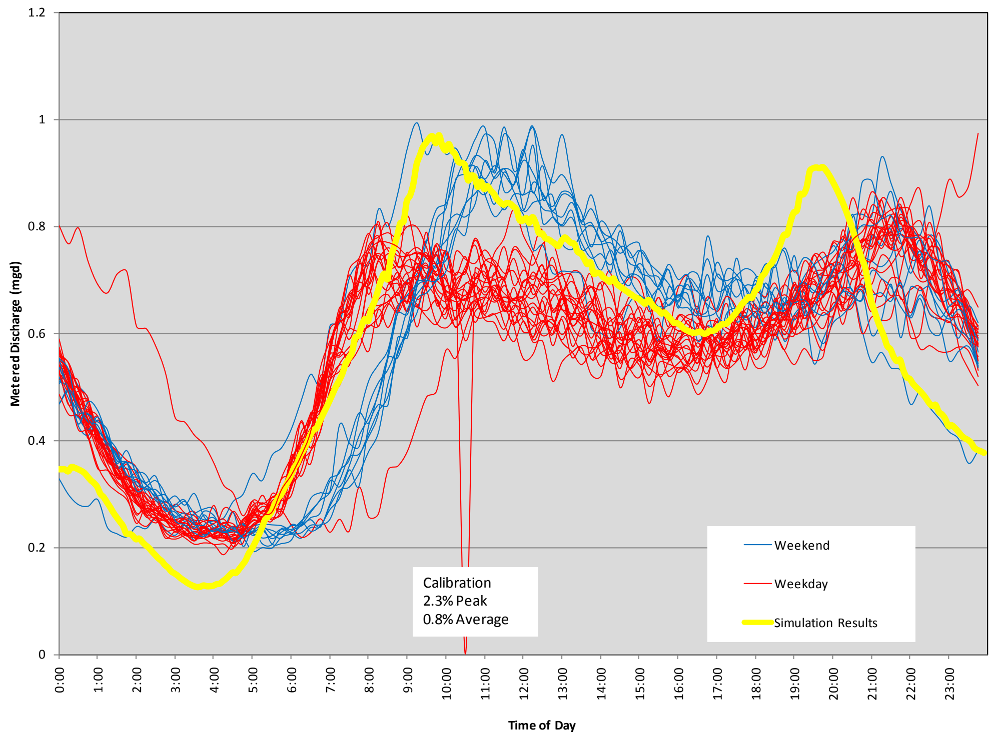


Figure 4-5 Dry Weather Calibration at Meter MS-2

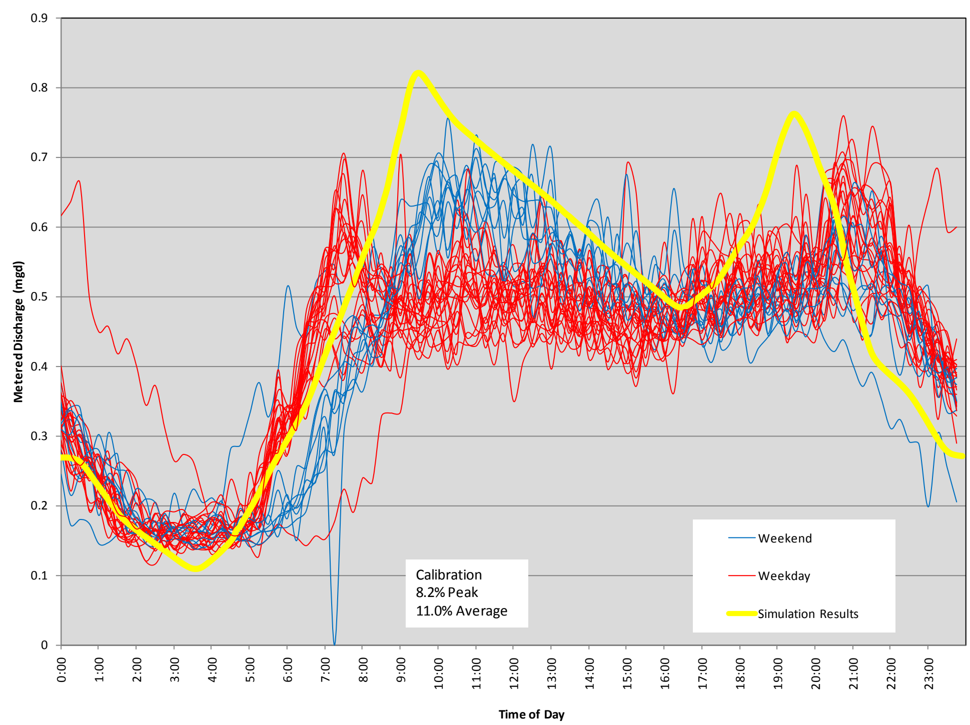


Figure 4-6 Dry Weather Calibration at Meter MS-3

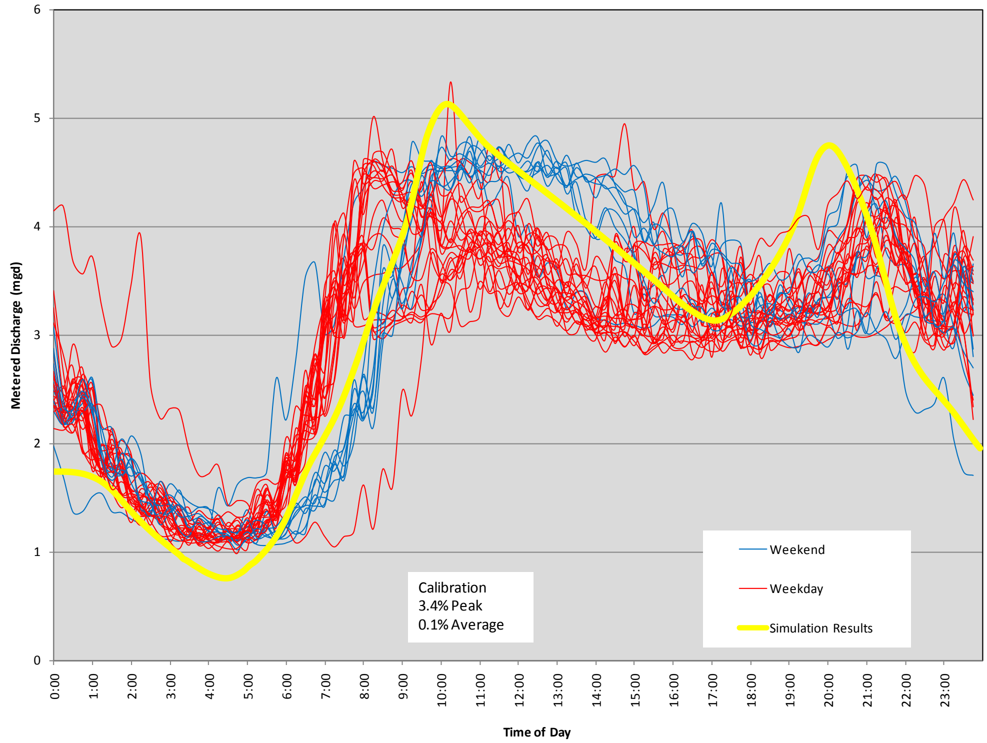


Figure 4-7 Dry Weather Calibration at Meter MS-4

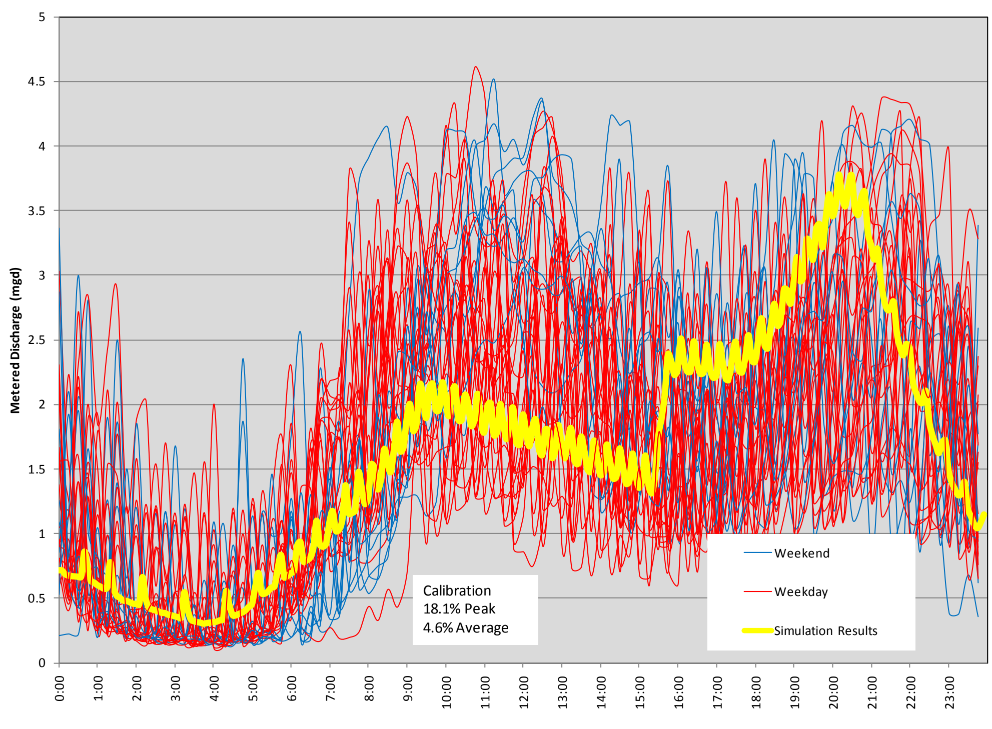


Figure 4-8 Dry Weather Calibration at Meter MS-5

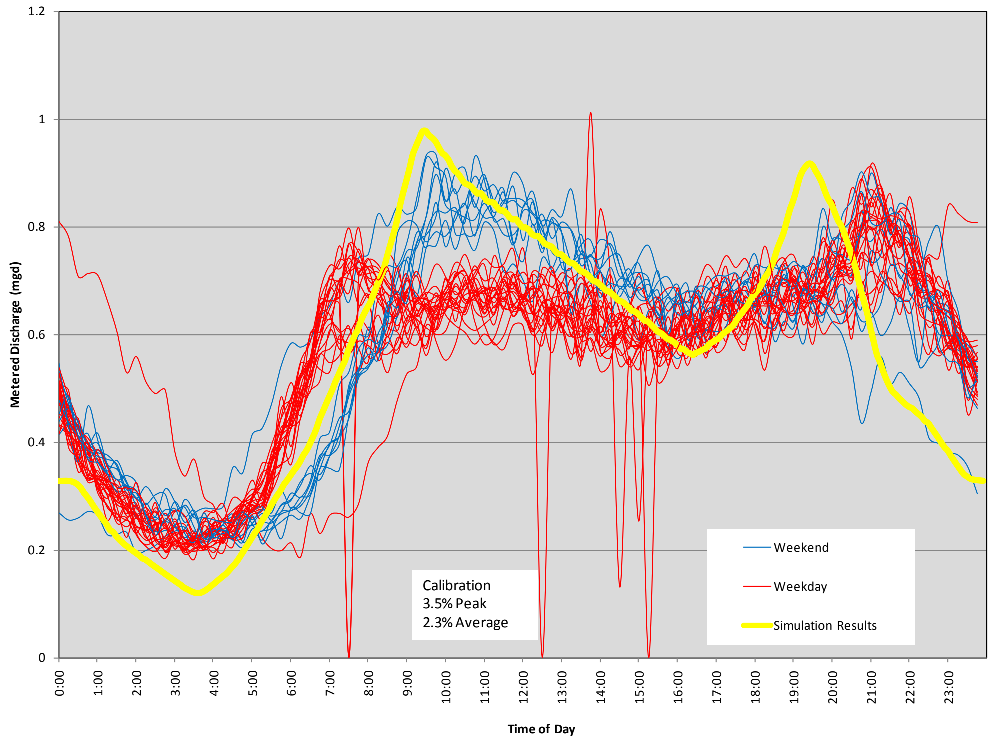


Figure 4-9 Dry Weather Calibration at Meter MS-6

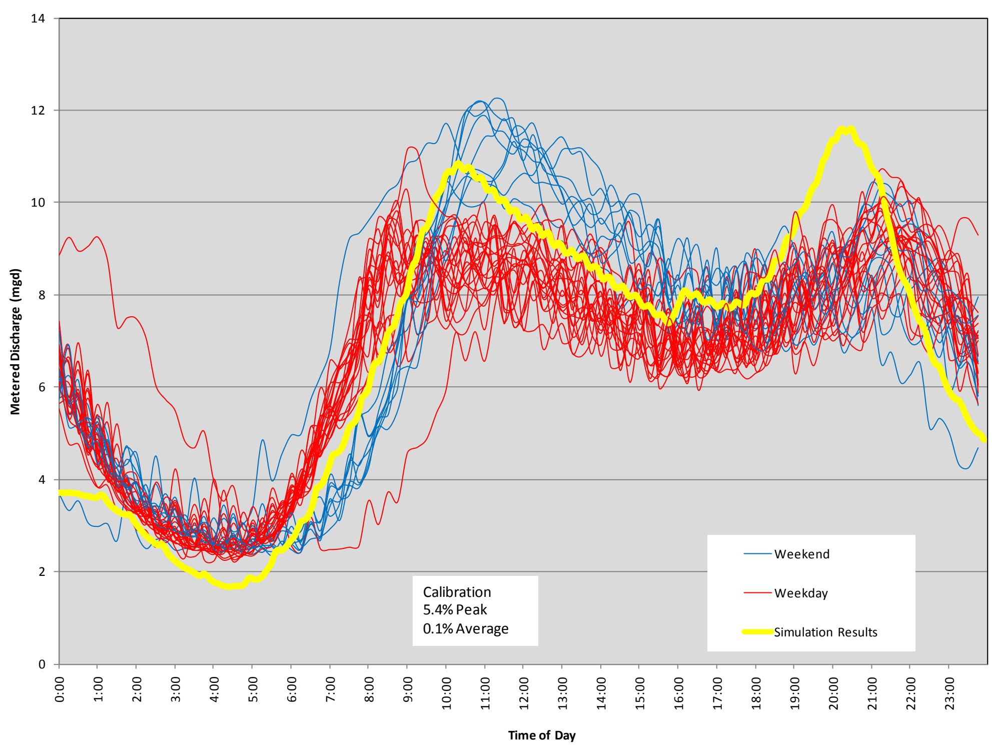


Figure 4-10 Dry Weather Calibration at Meter MS-7

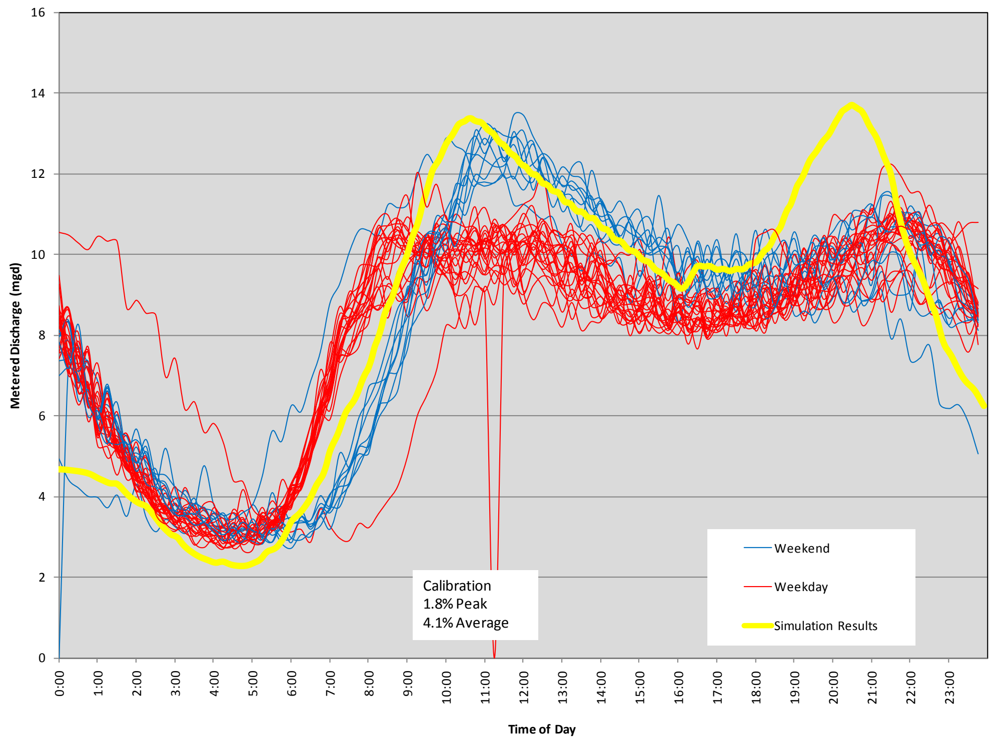


Figure 4-11 Dry Weather Calibration at Meter MS-8

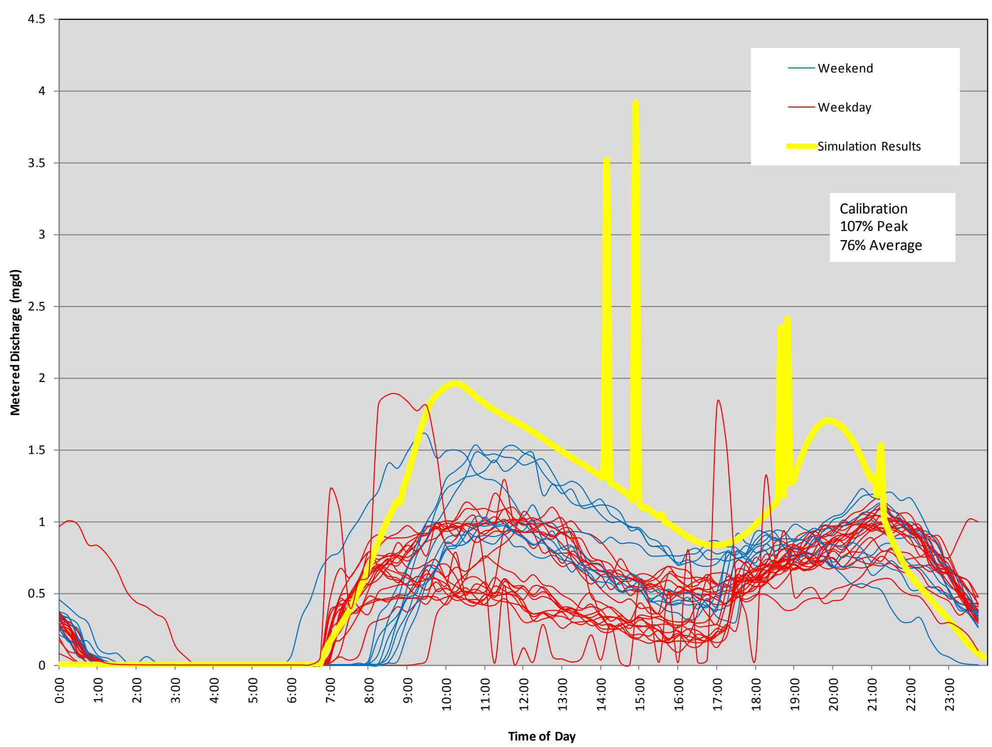


Figure 4-12 Dry Weather Calibration at Meter MS-9

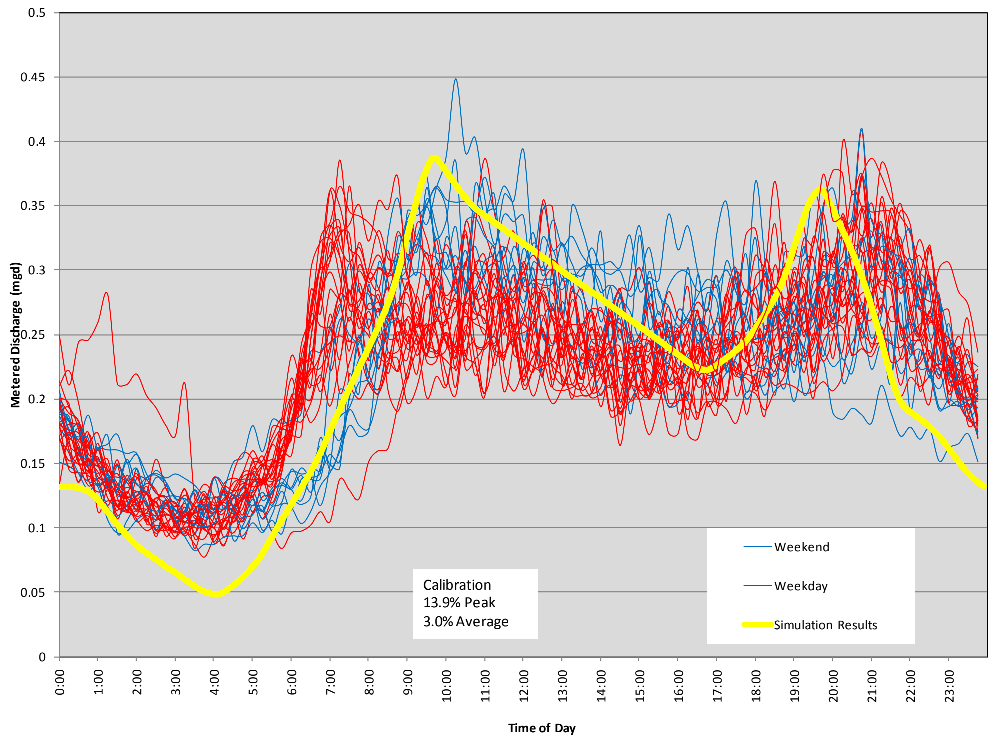


Figure 4-13 Dry Weather Calibration at Meter MS-10

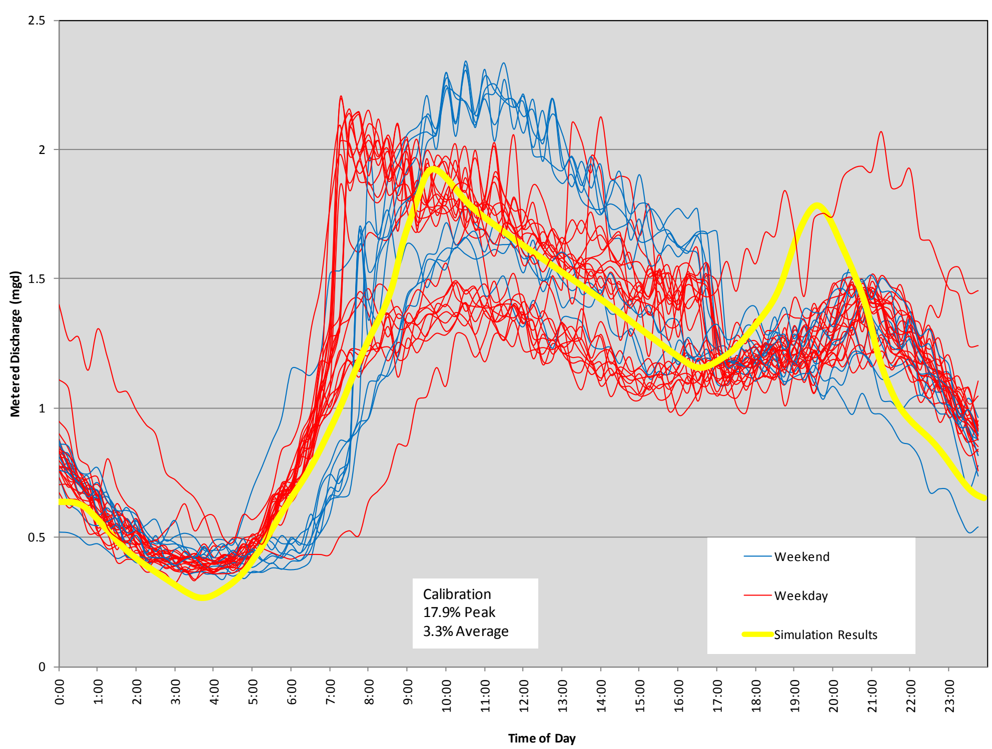


Figure 4-14 Dry Weather Calibration at Meter MS-11

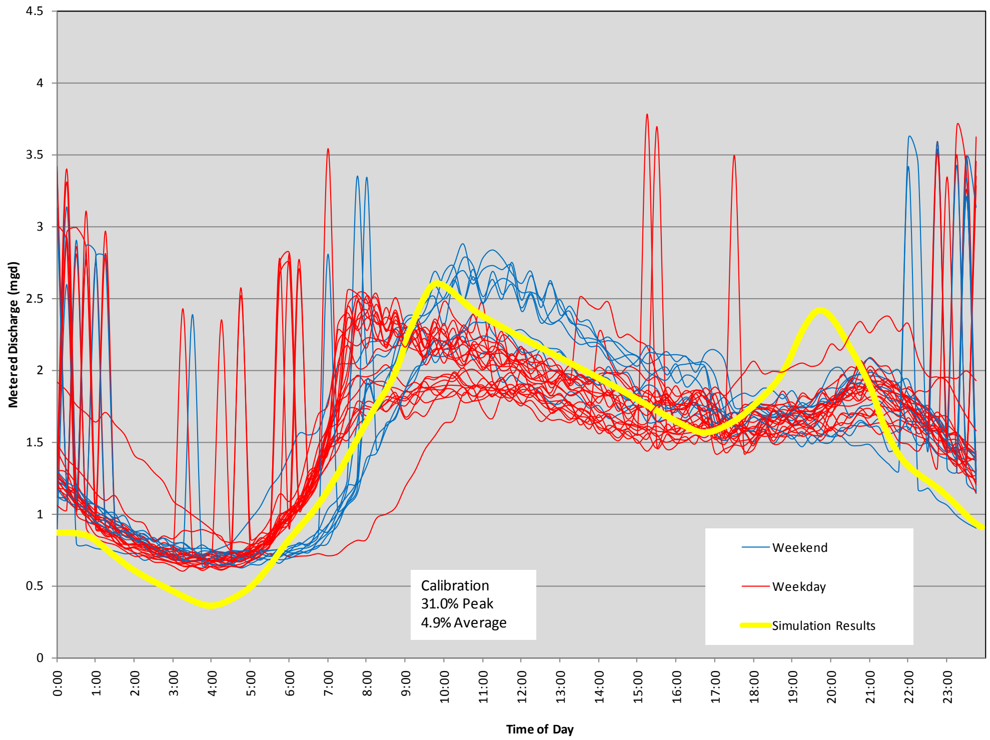


Figure 4-15 Dry Weather Calibration at Meter MS-12

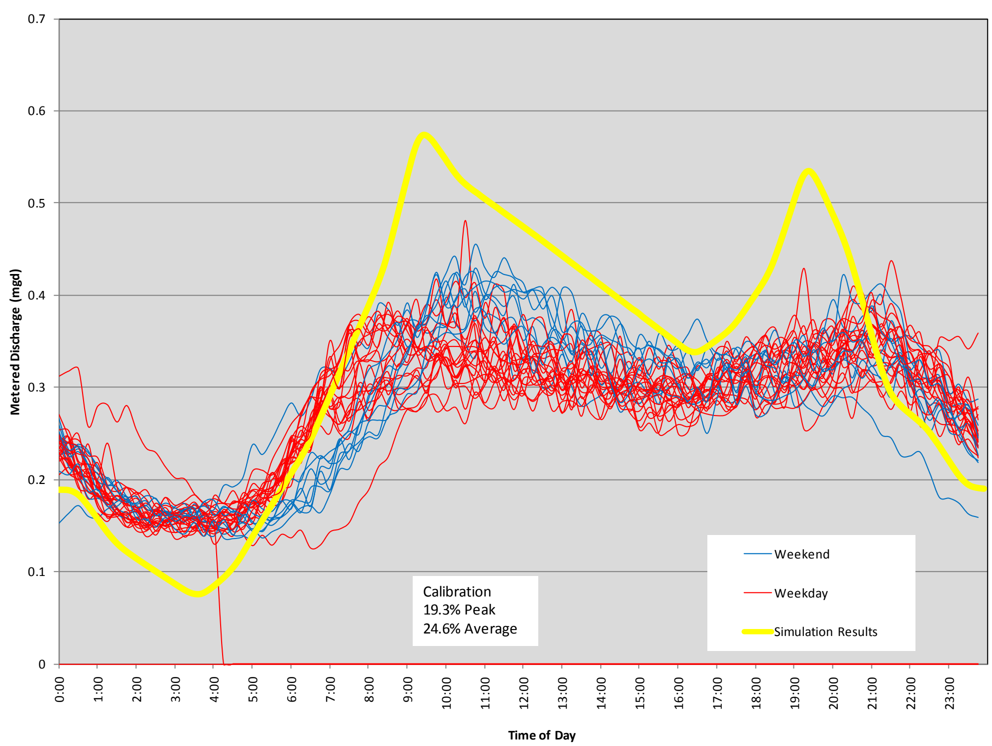


Figure 4-16 Dry Weather Calibration at Meter MS-13

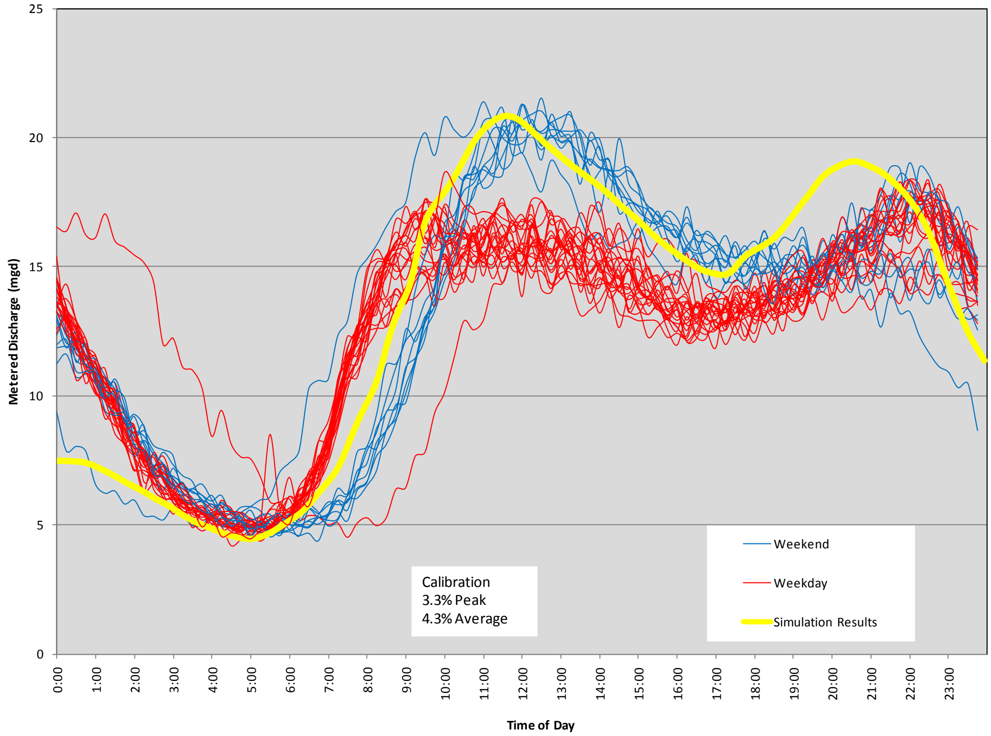
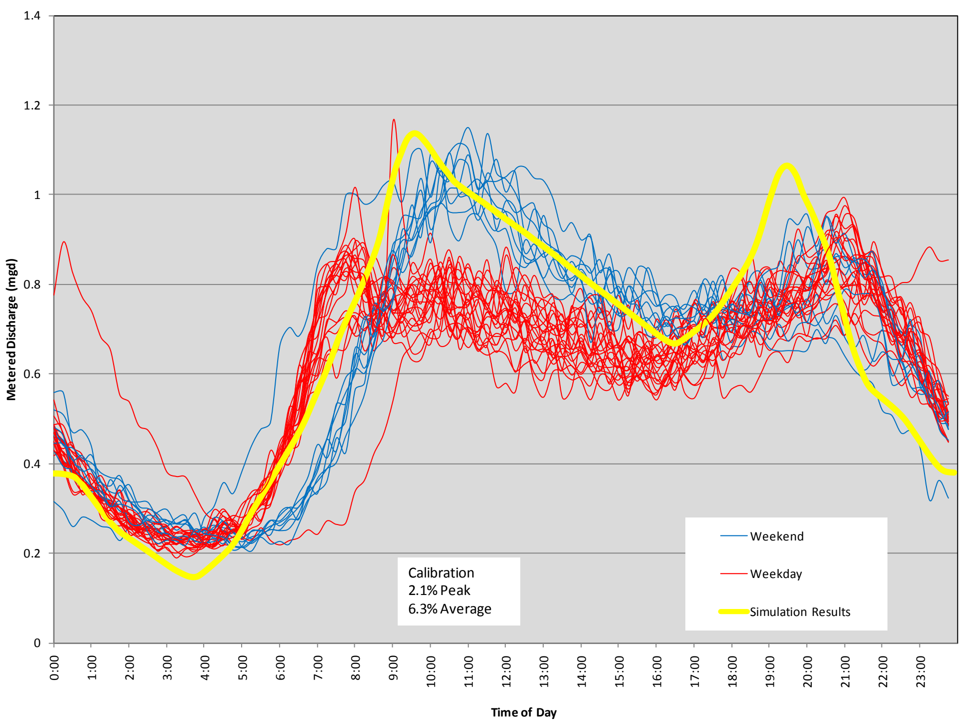


Figure 4-17 Dry Weather Calibration at Meter SV-8M



4.7.2 Wet Weather Calibration

The model was calibrated to the peak wet-weather flow event that occurred on January 20, 2010 at the County-maintained flow meters. The flow records for January 20 were selected because they represented the largest spike in flows that corresponded with the peak intensity of the storm. Simulated flow hydrographs at each meter location were compared with recorded discharge measurements. The purpose of the comparison was to allow for refinement of estimated model parameters so that the simulated flow conditions reasonably approximated the measured flow conditions. These parameters include the infiltration and routing coefficients. The infiltration coefficient determines what percentage of the rainfall enters the system. The routing coefficient determines how fast or slow the rainfall enters the system.

In general, the system exhibited a significant rapid response to the storm event. The system's response and wet weather calibration results are best presented graphically and are shown in Figures 4-18 through 4-31. Table 4-3 summarizes the results of the wet weather calibration.

Table 4-3 Wet Weather Calibration Summary

Meter Name	Observed Peak Flow (mgd)	Modeled Peak Flow (mgd)
MS1	1.75	1.91
MS2	1.49	1.55
MS3	7.91	8.99
MS4	5.82	6.07
MS5	1.61	1.61
MS6	17.93	19.70
MS7	17.38	21.81
MS8	3.27	2.41
MS9	0.90	1.38
MS10	2.87	2.92
MS11	4.63	4.49
MS12	0.84	1.92
MS13	1.83	1.97
SV8M	28.10	29.42

Based on typical master planning calibration criteria, the hydraulic model is within acceptable ranges when compared to metered flow data and observed rainfall data. The model is considered a calibrated model and can be used for future planning scenarios.

Figure 4-18   Wet Weather Calibration at Meter MS-1

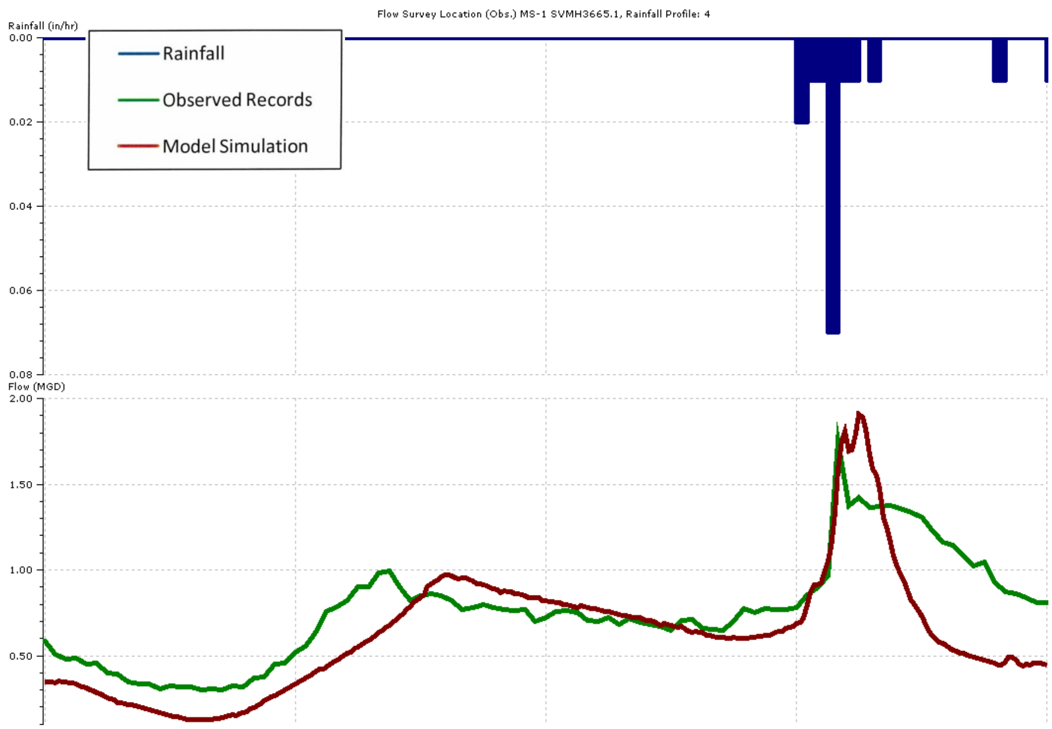


Figure 4-19   Wet Weather Calibration at Meter MS-2

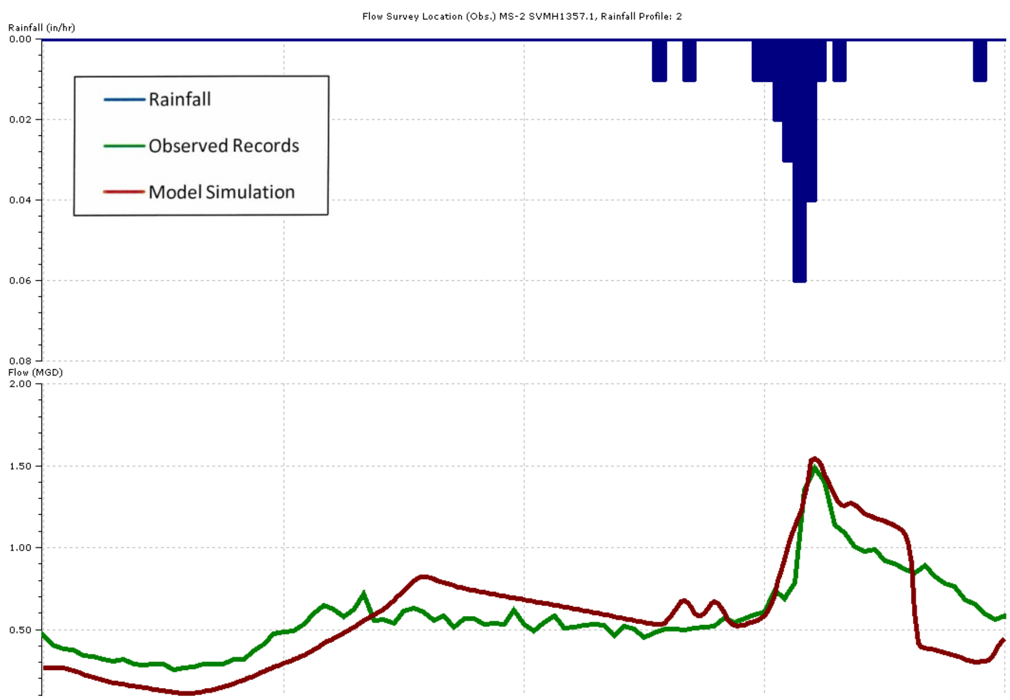


Figure 4-20 Wet Weather Calibration at Meter MS-3

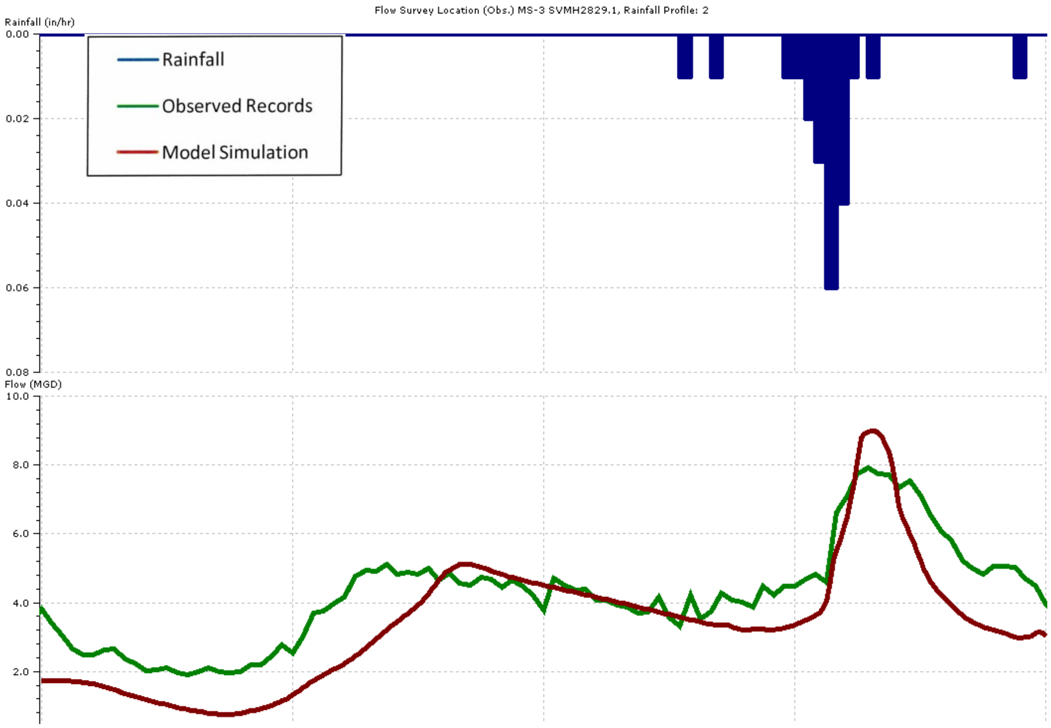


Figure 4-21 Wet Weather Calibration at Meter MS-4

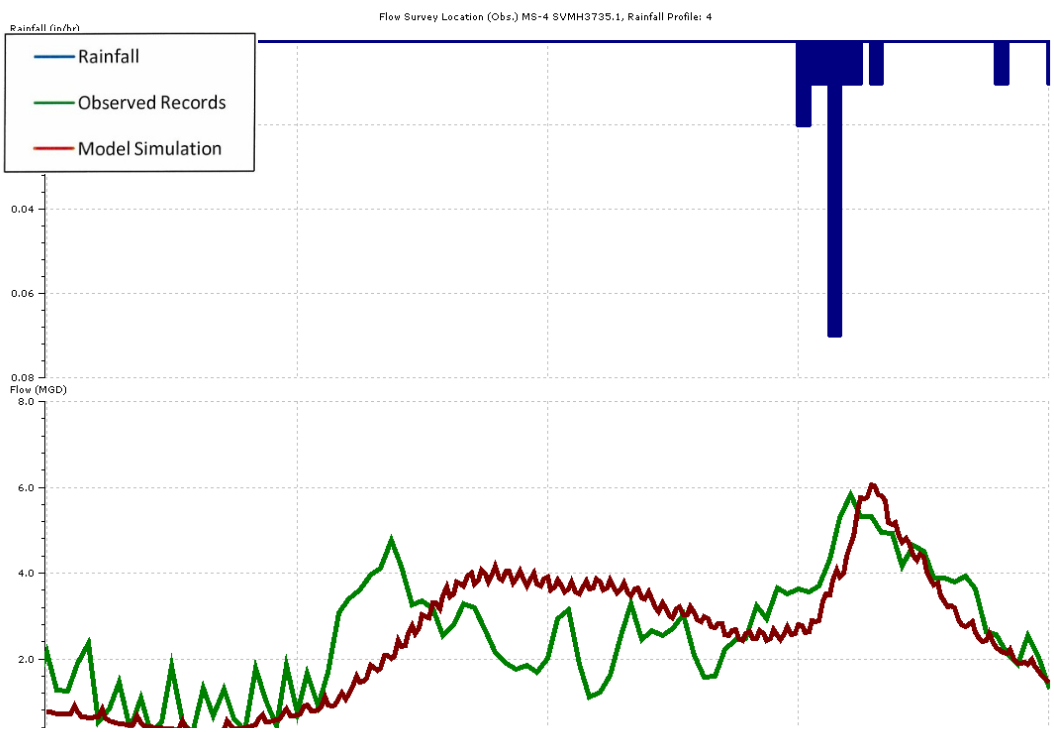


Figure 4-22 Wet Weather Calibration at Meter MS-5

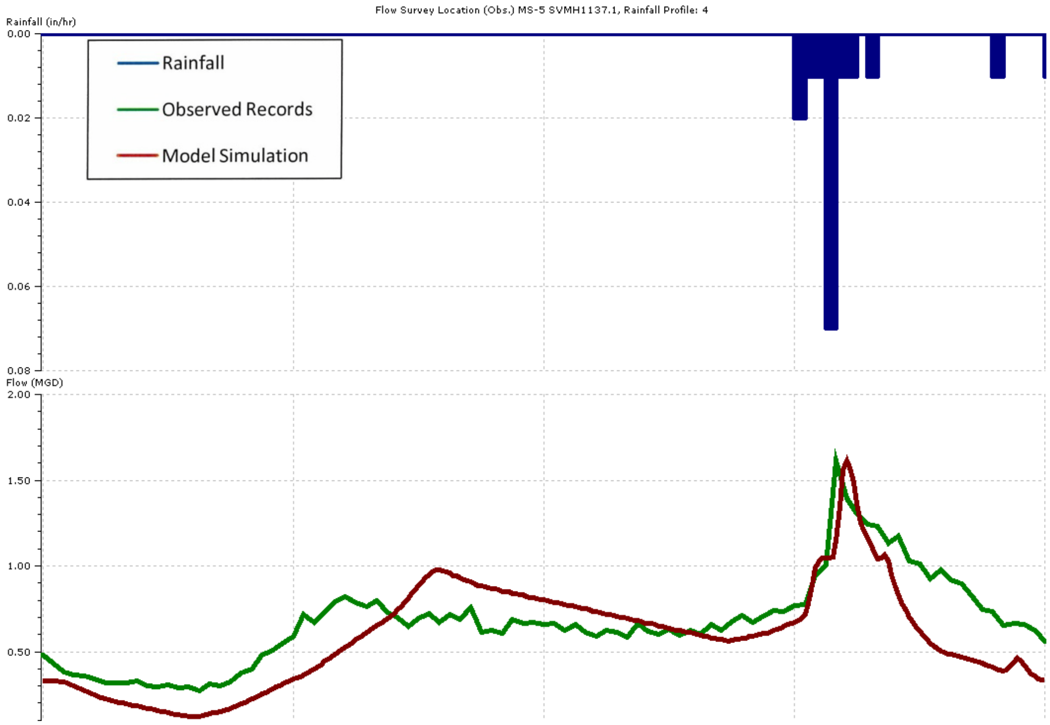


Figure 4-23 Wet Weather Calibration at Meter MS-6

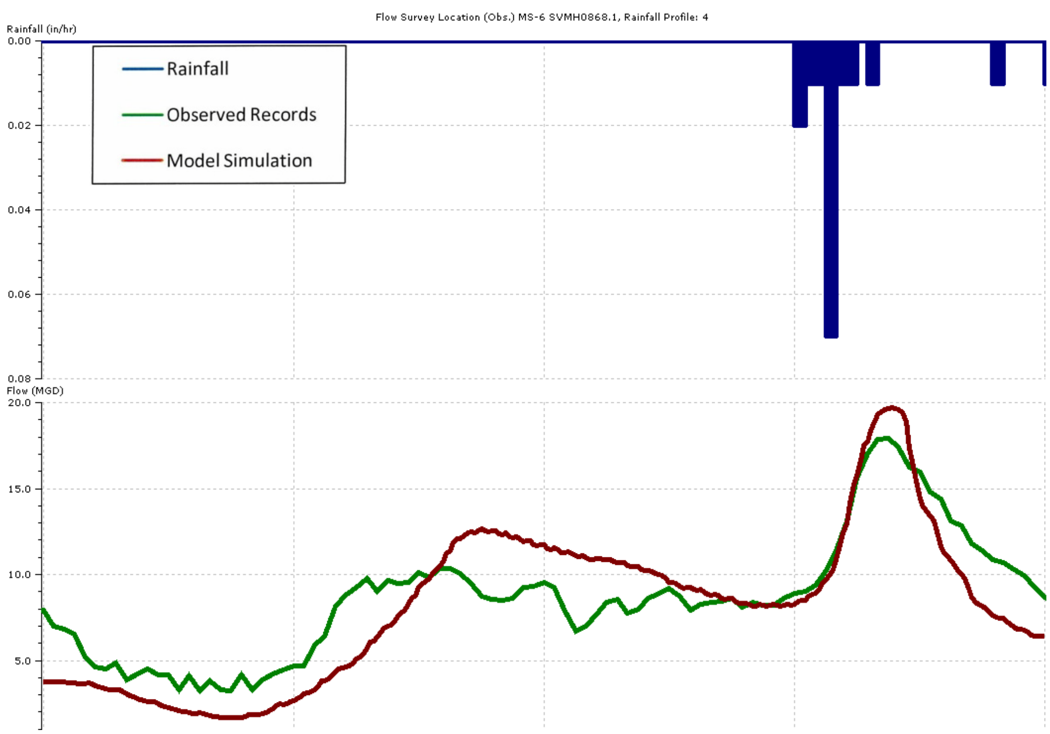


Figure 4-24 Wet Weather Calibration at Meter MS-7

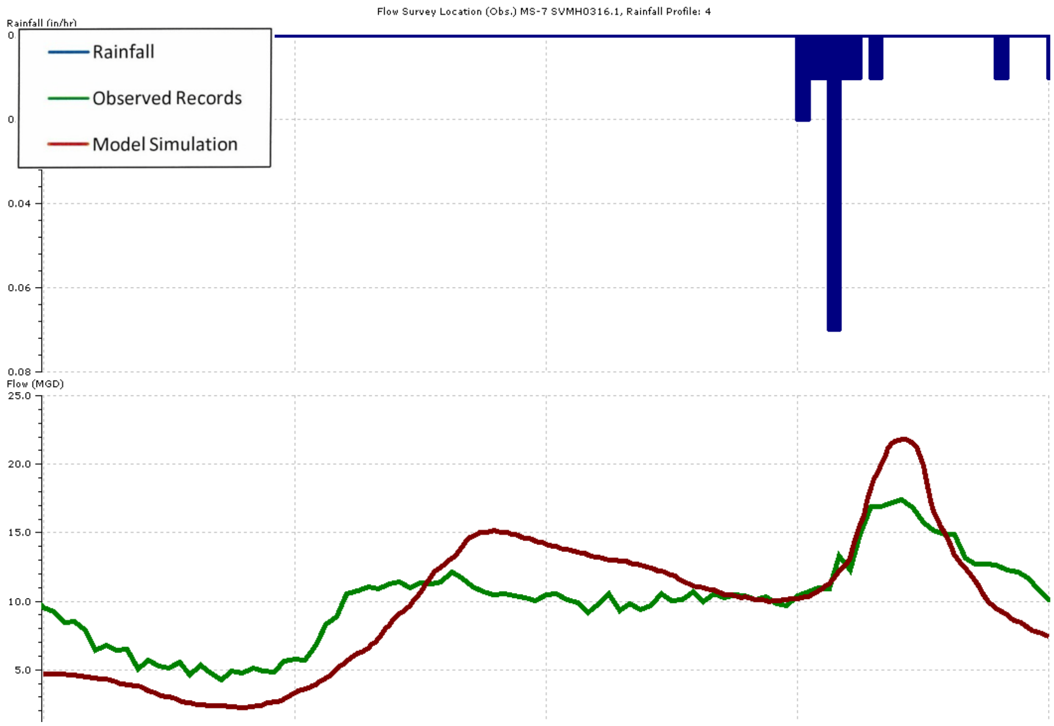


Figure 4-25 Wet Weather Calibration at Meter MS-8

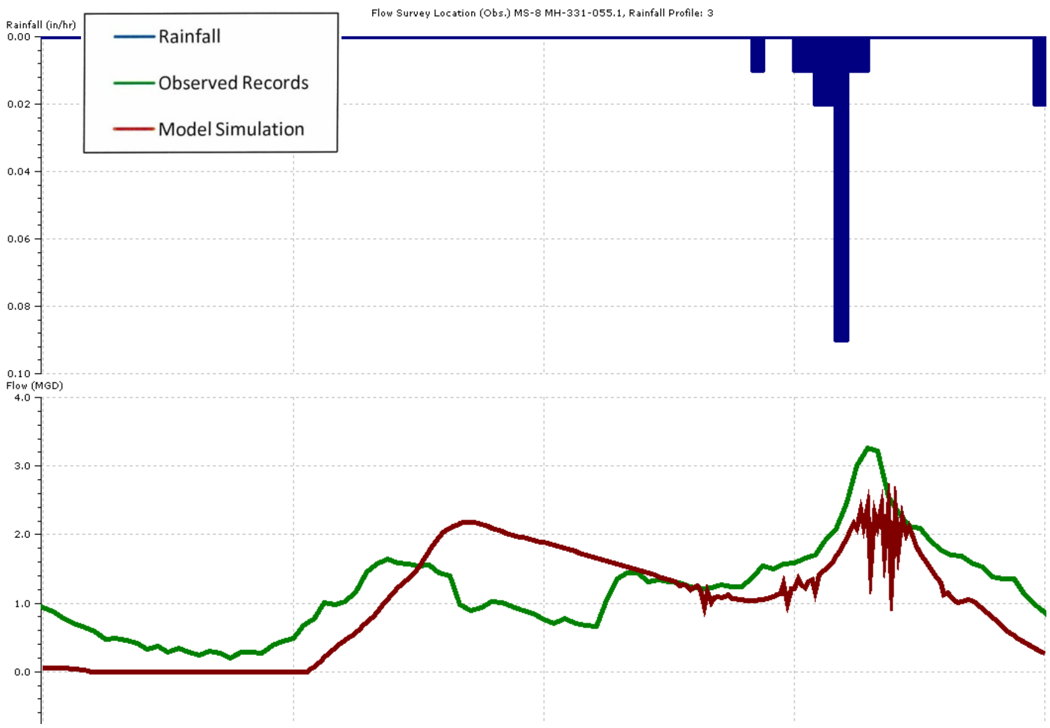


Figure 4-26 Wet Weather Calibration at Meter MS-9

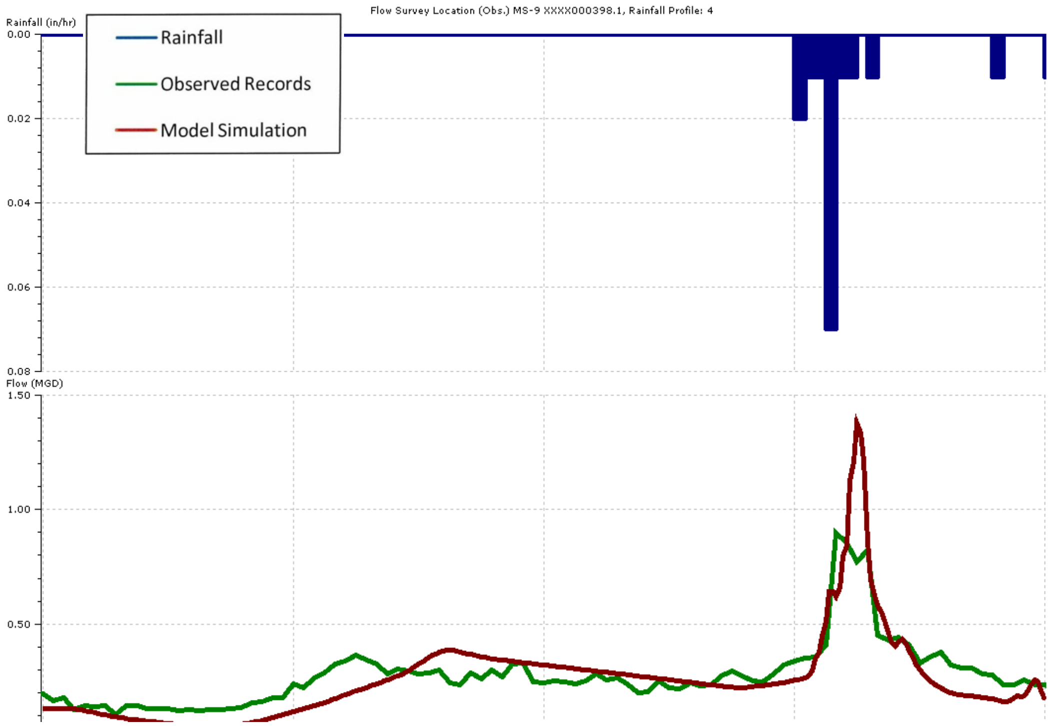


Figure 4-27 Wet Weather Calibration at Meter MS-10

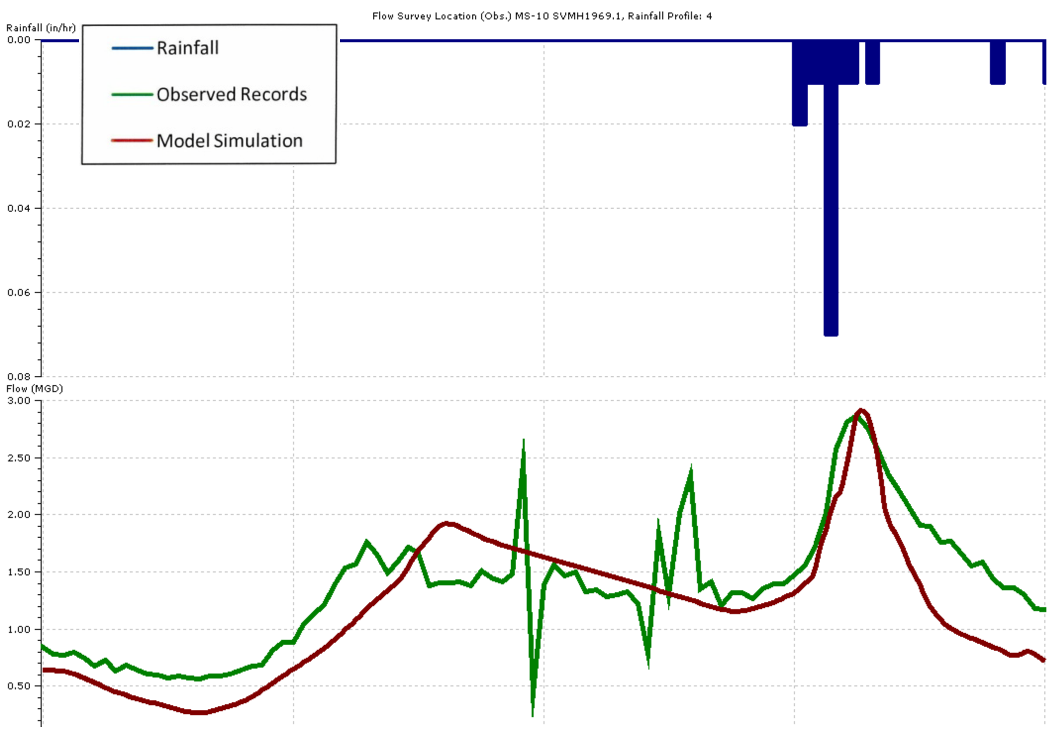


Figure 4-28 Wet Weather Calibration at Meter MS-11

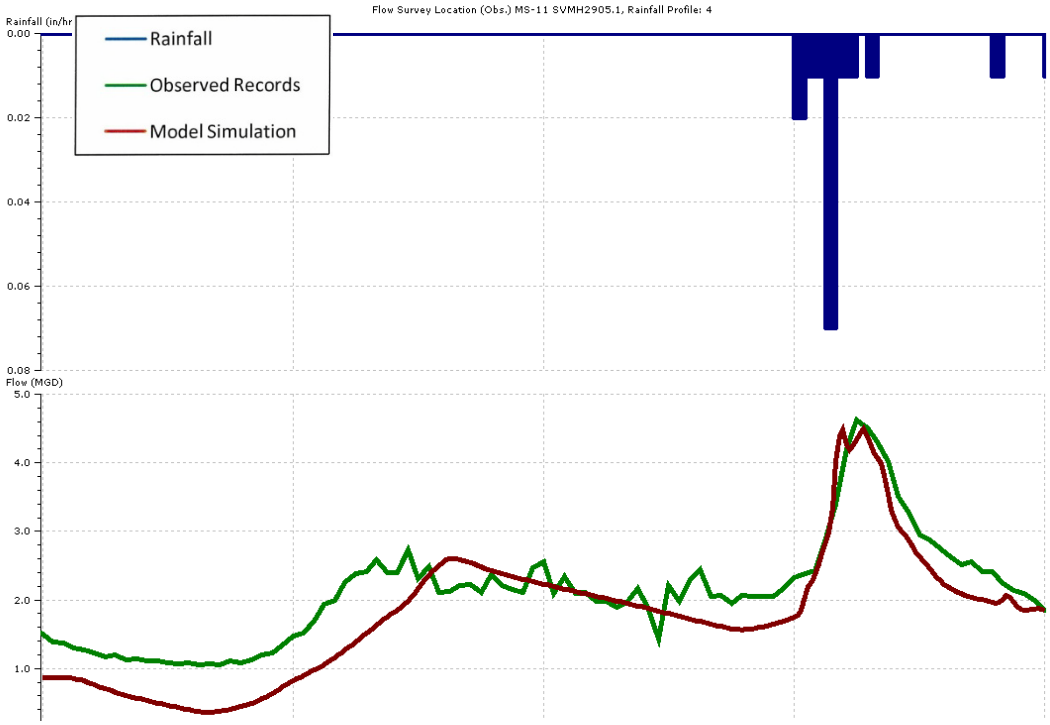


Figure 4-29 Wet Weather Calibration at Meter MS-12

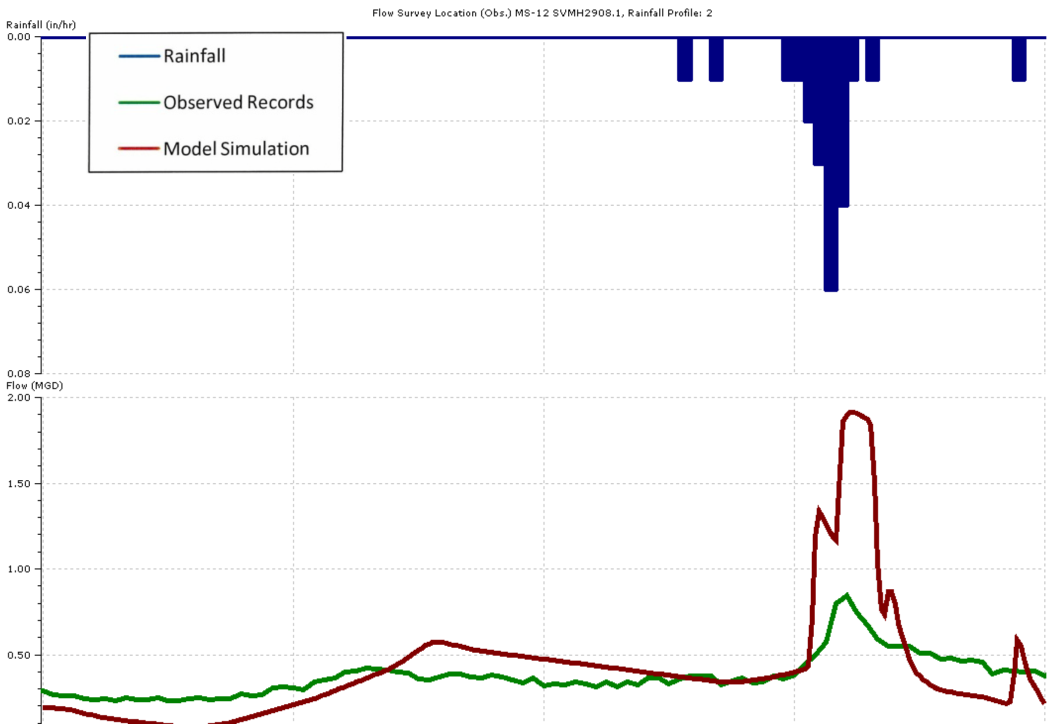


Figure 4-30 Wet Weather Calibration at Meter MS-13

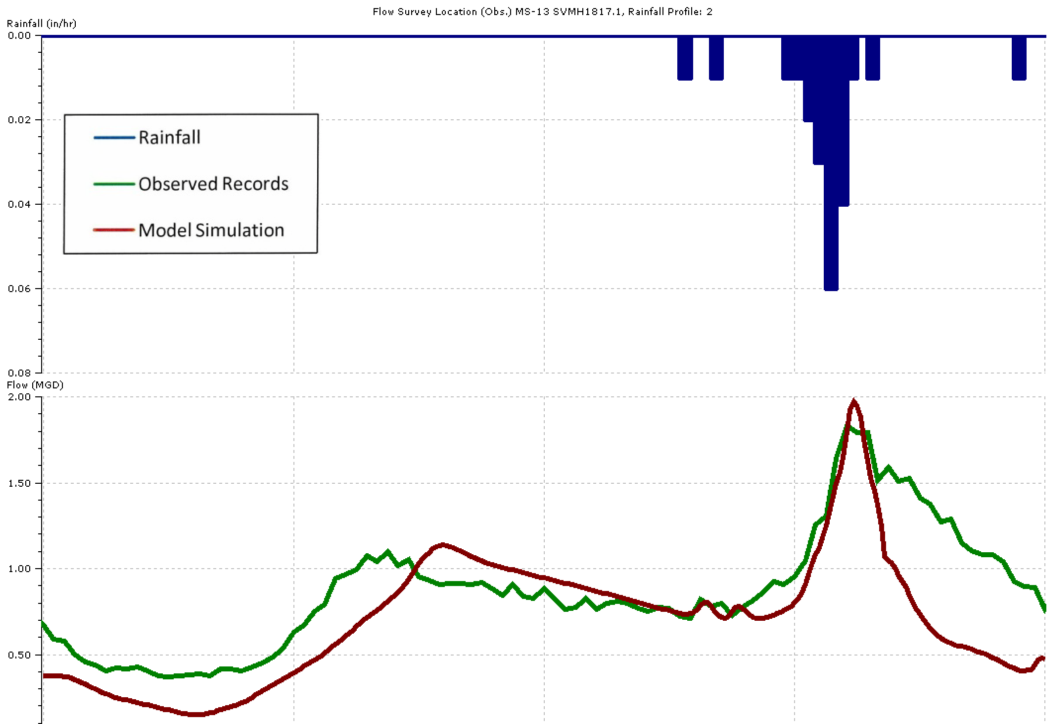
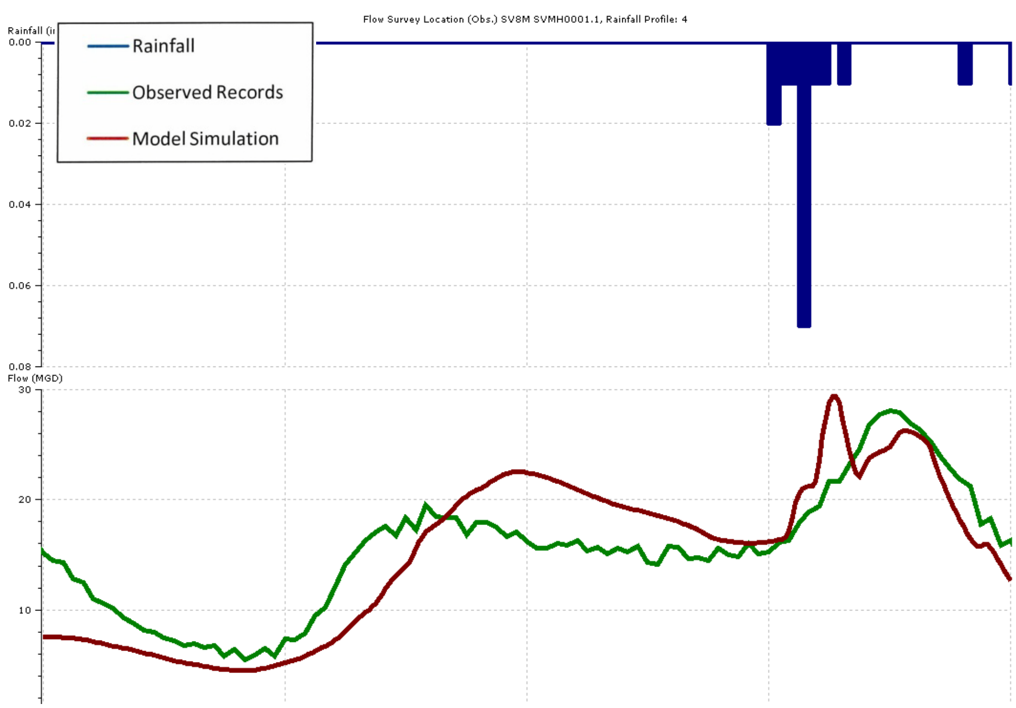


Figure 4-31 Wet Weather Calibration at Meter SV-8M



4.8 Capacity Analysis

A capacity analysis of the existing collection system was performed under existing and forecasted dry and wet weather flow conditions. Model simulations were performed for the recommended 2030 wastewater generation, discussed in Chapter 3, in order to identify potential improvement projects. The identified improvement projects were then sized to accommodate the buildout flow projections based on the land use. Projects were evaluated under the existing and recommended 2020 wastewater generation to identify project priority and phasing. Identified improvement projects were evaluated against identified condition related projects presented in the next chapter to form the Capital Improvement Plan presented in Chapter 7.

4.8.1 Lift Stations and Force Mains

The lift stations and force mains owned and operated by the County were evaluated under existing and projected wastewater flows based upon the criteria listed in Table 4-1. Table 4-4 summarizes the existing and future lift station pump capacities. Table 4-5 summarizes the existing and future lift station force main capacities.

Table 4-4 Lift Station Pump Capacities

Lift Station	Firm Capacity (gpm)	Existing		2030 Condition		Buildout Condition		2030 Deficiency (gpm)
		Dry Weather Peak Flow (gpm)	Wet Weather Peak Flow (gpm	Dry Weather Peak Flow (gpm)	Wet Weather Peak Flow (gpm	Dry Weather Peak Flow (gpm)	Wet Weather Peak Flow (gpm	
Jamacha Lift Station	1,300	567	1,733	697	1,912	729	1,902	612[1]
Ramona Lift Station	250	108	137	95	131	124	160	None
Rancho San Diego Lift Station	4,800	3,662	3,944	3,858	4,266	4,367	4,518	None
Vista Del Lago Lift Station	100	42	45	38	43	53	58	None

(1) Jamacha Lift Station currently undergoing upgrades and is under construction.

Table 4-5 Force Main Capacities

Force Main	Existing Diameter (inches)	Existing Pump Firm Capacity (gpm)	Existing Velocity (fps)	2030 Diameter (inches)	2030 Pump Firm Capacity (gpm)	2030 Velocity (fps)
Jamacha Pump Station	12	1,300	3.7	12	1,950	5.5
Ramona Pump Station	6	250	2.8	6	250	2.8
Rancho San Diego Pump Station	24	4,800	3.4	24	4,800	3.4
Vista Del Lago Pump Station	4	100	2.6	4	100	2.6

County planning criteria requires lift stations to have emergency storage capabilities equivalent to a six hour pumping volume at average dry weather flow rates. The existing lift stations' emergency storage basins were evaluated under existing, 2030, and buildout conditions. Table 4-6 summarizes the existing and future lift station storage capacities.

Table 4-6 Storage Capacities

Lift Station	Emergency Storage (gal)	Existing Capacity		2030 Condition		Build-out Condition		2030 Deficiency (gal)
		Average DWF (mgd)	Storage (hours)	Average DWF (mgd)	Storage (hours)	Average DWF (mgd)	Storage (hours)	
Jamacha Lift Station	187,000	0.27	16.6	0.54	8.3	0.57	7.9	None
Ramona Lift Station	55,000	0.06	22.0	0.08	16.5	0.1	13.2	None
Rancho San Diego Lift Station	850,000	1.03	19.8	1.25	16.3	1.44	14.2	None
Vista Del Lago Lift Station	23,000	0.03	18.4	0.03	18.4	0.04	13.8	None

Note: Existing Average DWF from County of San Diego 2010 lift station flow report. Forecasted DWF from modeled results.

Jamacha Lift Station

The Jamacha Lift Station (LS) was originally constructed in 1977 and upgraded in 1993. The lift station contains a 5-foot by 22.5-foot wet well and three installed pumps. The two duty pumps and one standby pump operate in lead/lag based on wet well levels providing a firm pumping capacity of 1,300 gpm. In addition the lift station has backup power to operate during an emergency.

Existing and future dry weather flows can be met with the installed pump capacity but the lift station cannot adequately meet peak wet weather flows. An additional 650-gpm pump is recommended to handle peak wet weather flows. The Jamacha Lift Station is currently being upgraded and will be constructed with a larger pumping capacity.

The lift station currently has over 16 hours of emergency storage under existing conditions and eight hours of storage under future conditions, which is more than the recommended minimum six hours of storage and considered to be adequate for operation.

Ramona Lift Station

The Ramona Lift Station (LS) was originally constructed in 1986 and upgraded in 1996. The lift station contains an 8-foot circular wet well and two installed pumps. The duty pump and standby pump operate in lead/lag based on wet well levels providing a firm pumping capacity of 250 gpm. In addition the lift station has backup power to operate during an emergency.

Existing and future peak weather flows can be met with the installed pump capacity.

The Ramona Lift Station was upgraded to include additional emergency storage with a 5,000-gallon circular tank and a 49,000-gallon rectangular tank. The lift station currently has over 22 hours of emergency storage under existing conditions and 16 hours of storage under future conditions, which is more than the recommended minimum six hours of storage and considered to be adequate for operation.

Rancho San Diego Lift Station

The Rancho San Diego Lift Station (LS) was originally constructed in 1988 and was upgraded in 1995. The lift station contains a 4-foot by 44-foot wet well and three installed pumps. The two duty pumps and standby pump operate in lead/lag based on wet well levels providing a firm pumping capacity of 4,800 gpm. In addition the lift station has backup power to operate during an emergency.

Existing and future peak weather flows can be met with the installed pump capacity.

The lift station currently has over 19 hours of emergency storage under existing conditions and 16 hours of storage under future conditions, which is more than the recommended minimum six hours of storage and considered to be adequate for operation.

Vista Del Lago Lift Station

The Vista Del Lago Lift Station (LS) was originally constructed in 1981 and upgraded in 2004. The lift station contains an 4-foot circular wet well and two installed pumps. The duty pump and standby pump operate in lead/lag based on wet well levels providing a firm pumping capacity of 100 gpm. The lift station does not have an emergency generator onsite, but can accommodate a portable generator during an outage.

Existing and future peak weather flows can be met with the installed pump capacity.

The lift station currently has over 18 hours of emergency storage under existing conditions and 14 hours of storage under future conditions, which is more than the recommended minimum six hours of storage and considered to be adequate for operation.

4.8.2 Jamacha Siphon

The existing 11,435 feet of 12 and 20-inch diameter siphon located in Jamacha Road is owned and maintained by the County. The siphon is designed to convey flows through the 12-inch diameter pipeline. In the event of a blockage, the 12-inch diameter pipeline will back up and overflow into the 20-inch diameter pipeline. The 12-inch siphon currently conveys a peak dry weather flow of approximately 900 gpm at a velocity of 2.5 feet per second (fps). The 20-inch siphon currently conveys a peak dry weather flow of approximately 1,230 gpm at a velocity of 1.25 feet per second (fps). With a relatively low peak daily velocity or “cleansing” velocity, it is recommended that the County add the 20-inch siphon to the list of special maintenance sites.

4.8.3 Gravity Pipelines

The gravity pipelines were evaluated under existing and projected wastewater flows based upon the criteria listed in Table 4-1. Under dry weather flow conditions pipeline capacity projects were identified if the peak flows exceeded a flow depth to pipe diameter (d/D) ratio of 0.50 for pipeline diameters 15-inch and smaller and 0.75 for pipelines greater than 15 inches in diameter. Under wet weather flow conditions pipeline capacity projects were identified if the peak flows exceeded a d/D ratio of 0.92 for all pipeline diameters.

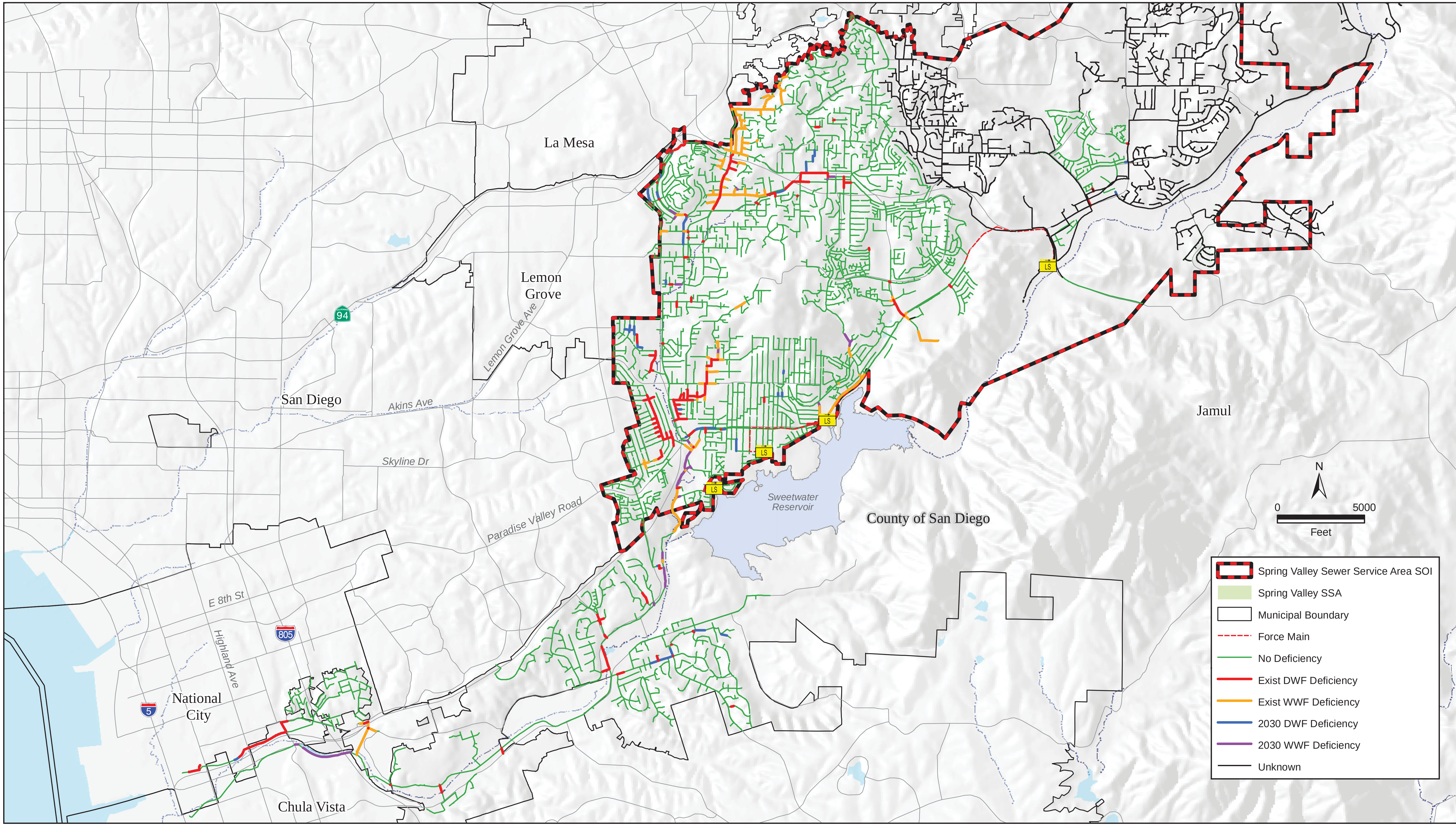
The identified capacity limitations were analyzed for reasonableness by verifying that the capacity constraint reported by the model was a function of a downstream pipe size not extending far enough upstream and/or a pipe slope flatter than adjacent segments. Improvements required to provide adequate capacity for projected flows were then determined through an iterative modeling process. The process consisted of simulating flow conditions after increasing the diameter of downstream portions of the identified reaches. Table 4-7 summarizes the total length of the identified deficiencies in gravity pipeline capacity based on model condition. A detailed summary of the identified deficiencies in gravity pipeline capacity is provided in Appendix J.

Table 4-7 Gravity Pipeline Identified Deficiencies by Model Condition

Model Condition	Length (feet)
Existing Dry Weather	81,415
Existing Wet Weather	103,968
2030 Dry Weather	105,009
2030 Wet Weather	122,493

In summary, the capacity evaluation concluded that the County has a significant quantity of capacity-constrained sewers based on the evaluation criteria, especially under existing flow conditions. Figure 4-32 presents the location of the identified pipeline deficiencies. Identified capacity deficiencies were also evaluated in conjunction with identified condition related projects (presented in Chapter 5) to form the Capital Improvement Plan presented in Chapter 7.

Prior to construction of improvements, it is recommended that the County conduct detailed engineering investigations of the identified reaches that may include field inspections, flow metering during peak flow periods (such as holidays) and under wet-weather conditions, and video inspection to accurately assess the improvements needed.



GRAVITY PIPELINE IDENTIFIED DEFICIENCIES

Figure 4-32

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CHAPTER 5
CONDITION ASSESSMENT

This chapter provides a description of the condition assessment performed as part of the Master Plan, and includes:

- Collection system characteristics;
- Current maintenance goals and practices;
- Video inspection and assessment of two trunk sewers;
- Inspection and assessment results;
- Recommended rehabilitation program;
- Lift station condition assessment; and
- Potential phased recommended improvements.

5.1 Background

A wastewater system condition assessment provides municipalities with valuable information used to determine the funding required to repair and rehabilitate an aging collection system and to prioritize how the funds should be allocated. An assessment is used to identify the existing system conditions and defects which may contribute to potential overflows. Such conditions include root intrusion at misaligned joints or cracks, inflow and infiltration (I/I) entering into the system through cracks in pipes or manholes or via illegal storm drain connections, which affect pipe capacity and treatment costs. The condition assessment of the existing Spring Valley SSA collection system included physical inspection of two main trunk sewers (totaling 4.2 miles) in the Spring Valley SSA and extrapolating the condition assessment results obtained from the inspection of the other County Sewer service areas including Alpine, Lakeside, Julian, Winter Gardens, Pine Valley, and Campo and applying them to the Spring Valley system that is of similar age.

Trunk sewer inspection in the Spring Valley SSA included approximately 10,500 linear feet of the 42-inch to 54-inch diameter Spring Valley Interceptor and approximately 12,150 linear feet of the 15-inch to 18-inch diameter La Presa Trunk Sewer. The pipeline segments selected for inspection and assessment were proportionate to the material and age for large and medium trunk sewers within the SSA.

To establish the general condition of the smaller diameter pipelines within the Spring Valley SSA, the results of the condition assessments performed for the Alpine, Lakeside, Julian, Winter Gardens, Pine Valley, and Campo SSAs were applied to the Spring Valley SSA system as it consists of facilities with similar characteristics including pipe age and material. The condition assessment results were applied to extrapolate results for the Spring Valley SSA system. The inspection and condition assessment of the Alpine, Lakeside, Julian, Winter Gardens, Pine Valley, and Campo SSAs are documented in their respective SSA master plans which include:

- *Alpine and Lakeside Sewer Service Areas Master Plan*, dated January 2013
- *Julian Sewer Service Area Master Plan*, dated January 2013
- *Winter Gardens Sewer Service Area Sewer Master Plan*, dated January 2013
- *Pine Valley Sewer Service Area Sewer Master Plan*, dated January 2013
- *Campo Sewer Service Area Sewer Master Plan*, dated January 2013

5.2 Collection System Characteristics

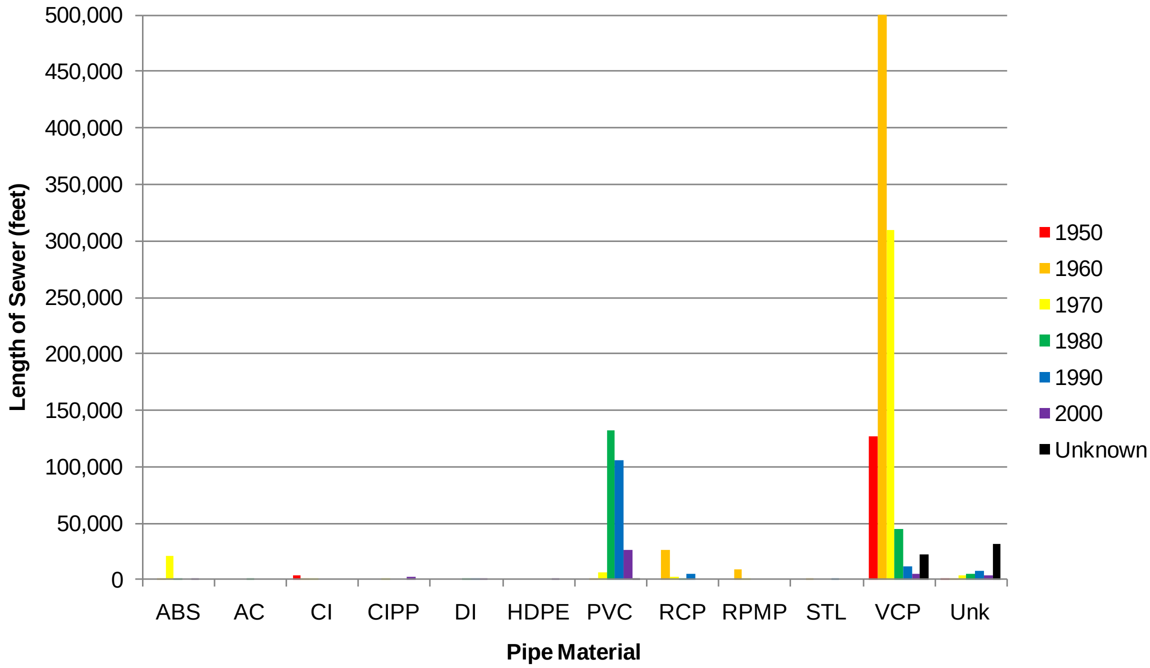
Similar to several of the other County SSAs, the construction of the Spring Valley collection system began in the 1950s when VCP was the most common pipe material used for construction. Gravity pipelines constructed of Vitrified Clay Pipe (VCP) accompanied the growth in Spring Valley during the 1960s and 1970s, while PVC accompanied the growth in Spring Valley during and the 1980s and 1990s. A breakdown of the total pipeline length in the Spring Valley SSA by length of material and age is provided in Table 5-1 and presented graphically in Figure 5-1. The pipeline material abbreviations presented in the table and figure are defined below:

- ABS - Acrylonitrile Butadiene Styrene Pipe
- AC - Asbestos Cement Pipe
- CI - Cast Iron Pipe
- CIPP – Cured in place pipe
- DI - Ductile Iron Pipe
- HDPE – High Density Polyethylene
- PVC - Poly-Vinyl Chloride Pipe
- RCP – Reinforced Concrete Pipe
- RPMP - Reinforced Plastic Mortar Pipe
- STL - Steel
- VCP - Vitrified Clay Pipe

Table 5-1 Spring Valley SSA Gravity Pipeline Length of Material by Age

Age	Material												Total
	ABS	AC	CI	CIPP	DI	HDPE	PVC	RCP	RPMP	STL	VCP	Unk	
1950	0	0	3,825	0	0	0	0	0	0	0	126,986	1,684	132,495
1960	472	0	559	0	0	0	22	27,068	8,678	279	502,294	330	539,702
1970	20,861	0	118	364	0	0	7,220	2,762	1,676	0	309,518	3,551	346,070
1980	1,279	165	0	0	1,334	0	132,187	360	0	0	44,920	5,468	185,713
1990	0	0	0	0	832	0	106,348	4,634	0	23	12,043	8,148	132,028
2000	193	0	0	2,329	727	379	26,313	0	0	0	4,753	3,374	38,068
Unknown	0	0	0	0	0	0	1,280	0	0	0	22,198	31,910	55,388
Total	**22,805**	**165**	**4,502**	**2,693**	**2,893**	**379**	**273,370**	**34,824**	**10,354**	**302**	**1,022,712**	**54,465**	**1,429,464**

Figure 5-1 Spring Valley SSA Gravity Pipeline Length of Material by Age



As can be determined from Table 5-1 and in Figure 5-1, over 70 percent of the Spring Valley system was constructed of VCP pipe. Historically, VCP pipe has a life span ranging from 50-70 years. Based on the information presented above, over 60 percent of the VCP has reached the initial years of the pipe material life cycle. Therefore, as the wastewater collection system continues to age, routine inspection is critical for monitoring and establishing the condition of the pipelines and identifying methods to extend its service life.

5.2 Current Maintenance Practices

The County's Facility Operations staff conducts routine cleaning and inspection of pipelines within Spring Valley SSA, as well as the County's other eight (8) SSAs. The County's goal is to clean the Spring Valley SSA pipelines of diameters 15 inches and smaller on a yearly basis. Pipelines larger than 15 inches in diameter require specialized equipment; therefore the County contracts the work when necessary. Additionally, crews clean Special Maintenance locations on a quarterly basis. The Special Maintenance locations within the Spring Valley SSA are presented in Figure 5-2 and include several of the County's pipelines with sags and areas identified as having excessive amounts of grease and sludge accumulation and root concentrations.

5.3 Inspection and Assessment

Closed circuit television cameras offer valuable insight to the structural and maintenance condition of underground infrastructure. Video inspection of sewer pipelines is used to evaluate the existence and severity of cracks, misaligned joints, accumulation of roots or silt, and potential sources of infiltration. Two main trunk lines within the Spring Valley SSA, encompassing 1.5 percent of the total collection system length of the SSA, but 16 percent of the larger diameter pipelines in the SSA, were video inspected for this study. Figure 5-3 shows the sections of the Spring Valley Interceptor and La Presa Trunk Sewer that were inspected.

As noted, results from the condition assessments performed for the additional SSAs were used to extrapolate the current condition of the smaller diameter pipelines and the rehabilitation needs for the Spring Valley SSA. Information pertaining to the specific pipelines inspected in each of the SSAs is included in the respective master plans identified in Section 5.1 and prepared by Atkins.

The video inspection for the Spring Valley Interceptor and La Presa Trunk Sewer was performed by Houston and Harris, PCS, Inc. Standard observations and severity ratings were documented on video inspection logs, which included various locations of sewer mains with deficiencies including broken or cracked pipe, misaligned joints, grade breaks and rooting. Inspection log reports are provided in Appendix K. The inspection logs were independently reviewed by Atkins and each observation was assessed for its criticality to assist in determining the final trunk sewer rehabilitation recommendations. The following sections describe the criteria and procedures performed during the inspection and assessment.

5.3.1 Inspection Criteria and Procedures

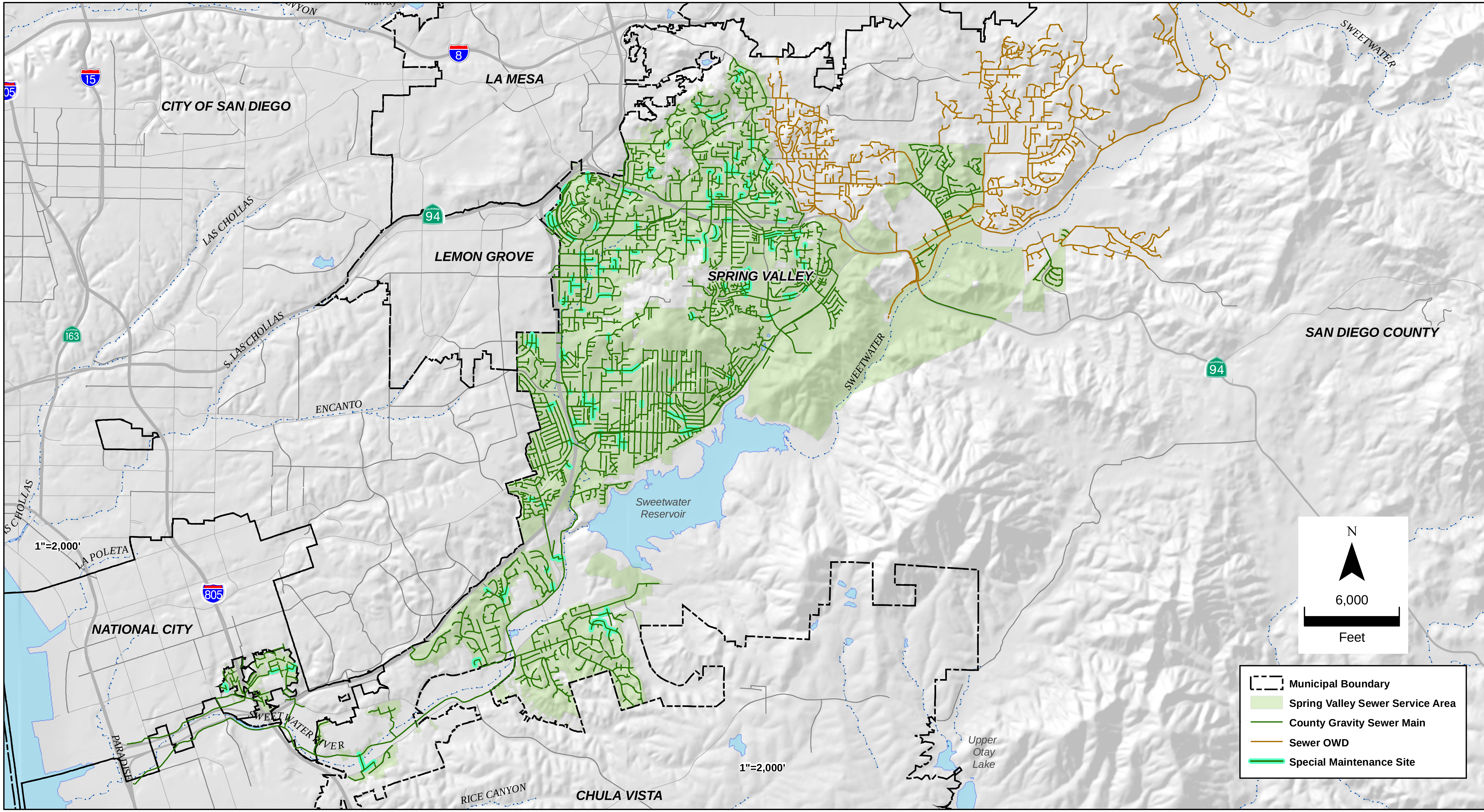
For the purposes of this project, National Association of Sewer Service Companies (NASSCO) inspection codes and ratings were used. Implementation of the NASSCO codes provides a consistent method in the manner with which the inspection was conducted and the observations noted. A summary of the observation codes used for the CCTV inspection are included in Appendix L. The numeric severity rating (1-5) assigned to the specific structural and/or maintenance observations are also defined. A NASSCO severity rating of one (1) is minor while a severity rating of five (5) is severe. The severity ratings, as noted, are automatically assigned based on the structural and/or maintenance observation noted by the CCTV operator.

5.3.2 Assessment Criteria and Procedures

For each trunk sewer inspection conducted, the video record and log was independently reviewed as a quality check of the noted observations and respective ratings included in the database results and as confirmation that the data provided for performing the condition assessment was acceptable. The video inspection log for each trunk sewer segment was analyzed and ranked to indicate the criticality of the asset condition using a scale of “A” through “E” to indicate the severity of the pipeline’s condition, with “E” being the worst condition. Table 5-2 provides a summary of the general criticality ranking associated with the severity of the overall condition of the asset, as well as the recommended response time to complete the recommended action.

Table 5-2 Condition Severity Ranking

A	B	C	D	E
Good	Adequate	Moderate	Poor	Failing
Maintenance	5+ years	3 to 5 years	1 to 2 years	Immediate



Note: Special Maintenance Sites based on information supplied by County Staff.

SPECIAL MAINTENANCE SITES

Figure 5-2

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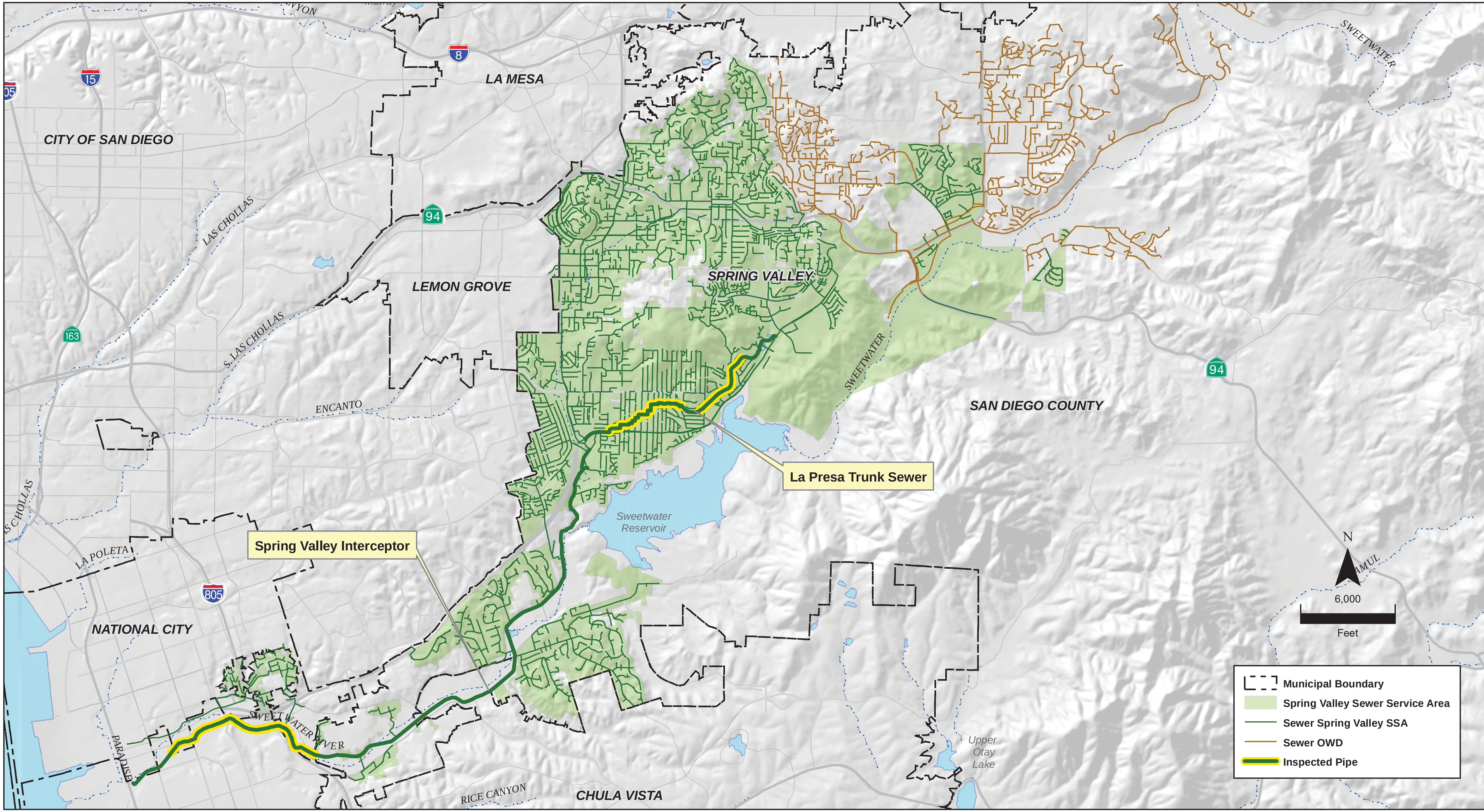

INSPECTED
AND ASSESSED PIPELINES

Figure 5-3

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The severity assigned to each trunk sewer is based on the criteria listed in Table 5-3 to ensure consistency and uniformity in the process.

Table 5-3 Condition Assessment Criteria – Severity

Observation	A	B	C	D	E
Cracks • Circular • Longitudinal • Multiple	None	Very small hair line crack(s)	Hair line crack(s) <50% of ID in length	Cracks ≤1/8” wide or >50% of ID in length	Cracks >1/8” wide
Broken Pipe	None	Connecting cracks, no displacement	Connecting cracks, displacement≤1/4”	Connecting cracks, displacement >1/4”	Collapsed pipe, impassable
Joints - Offset	Minimal	Up to 1/2 of the pipe thickness	1/2 to thickness of the pipe	Thickness of the pipe to 1½ times	> 1½ times the thickness of the pipe
Joints – Separation	None	Gasket exposed	Bell exposed	Dirt exposed at top	Dirt exposed at invert
Roots	Minimal	10% to 35% Fine roots	35% to 60% Fine/medium roots	60% to 80% Medium roots	80% to 100% Tap root(s) visible
Debris Accumulation	Minimal	Sporadic deposits (no rocks)	≤10% of ID (no rocks)	10% to 25% of ID and/or rocks	>25% of ID or impassable
Erosion (typical concrete pipe)	None	Rough surface	Exposed aggregate	Exposed rebar	Missing concrete
Mineral Deposits	None	Minimal (possible infiltration)	≤10% ID thickness	>10% ID thickness	Impassable, heavy mineral deposits
Infiltration	None	Dripping	Seeping	Constant stream	Gushing water
Sag	None	Minimal (probably not perceptible)	≤25% of ID	25% to 75% of ID	>75% of ID
Flow Capacity	Minimal	2/5 or less full	2/5 to 1/2 full	1/2 to 3/4 full	3/4 to totally full

Using the applicable observation and severity, a preliminary recommendation for each trunk sewer segment was determined. Table 5-4 summarizes the preliminary recommendations for each observed condition and severity ranking.

5.4 Trunk Sewer Inspection and Assessment Results

The trunk sewers inspected were initially evaluated using the NASSCO Rating System and were subsequently more thoroughly assessed by conducting a comprehensive review of the videos, still images, and any additional data available. Prior to scheduling maintenance efforts and/or implementing repair and rehabilitation improvements, information included in the appendices should be further reviewed for additional detailed information pertaining to the overall condition of the pipelines inspected and assessed.

Table 5-4 Preliminary Pipeline Recommendation Criteria

Observation	Condition Criticality Ranking				
	A	B	C	D	E
Cracks • Circular • Longitudinal • Multiple	No Action	No Action or Rehabilitate	No Action or Rehabilitate	Rehabilitate	Rehabilitate or Replace
Broken Pipe	No Action	No Action or Rehabilitate	Point Repair or Rehabilitate/ Replace	Point Repair or Replace	Immediate Point Repair
Joints – Offset	No Action	No Action or Rehabilitate	Point Repair and/or Rehabilitate	Point Repair and/or Rehabilitate/ Replace	Point Repair and/or Rehabilitate/ Replace
Joints – Separation	No Action	Rehabilitate	Rehabilitate	Point Repair and/or Rehabilitate/ Replace	Rehabilitate or Replace
Roots	No Action	Clean and Rehabilitate	Clean and Rehabilitate	Clean and Rehabilitate	Clean and Rehabilitate/ Replace
Debris Accumulation	No Action	Clean	Clean	Clean	Clean
Erosion (typical concrete pipe)	No Action	Rehabilitate	Rehabilitate or Replace	Rehabilitate or Replace	Replace
Mineral Deposits	No Action	No Action or Rehabilitate	Point Repair or Rehabilitate	Rehabilitate	Rehabilitate
Infiltration	No Action	No Action or Rehabilitate	Point Repair or Rehabilitate	Rehabilitate	Rehabilitate
Sag	No Action	No Action	Any Option	Replace	Replace
Flow Capacity	No Action	No Action	No Action	Evaluate Capacity	Evaluate Capacity

Spring Valley Interceptor

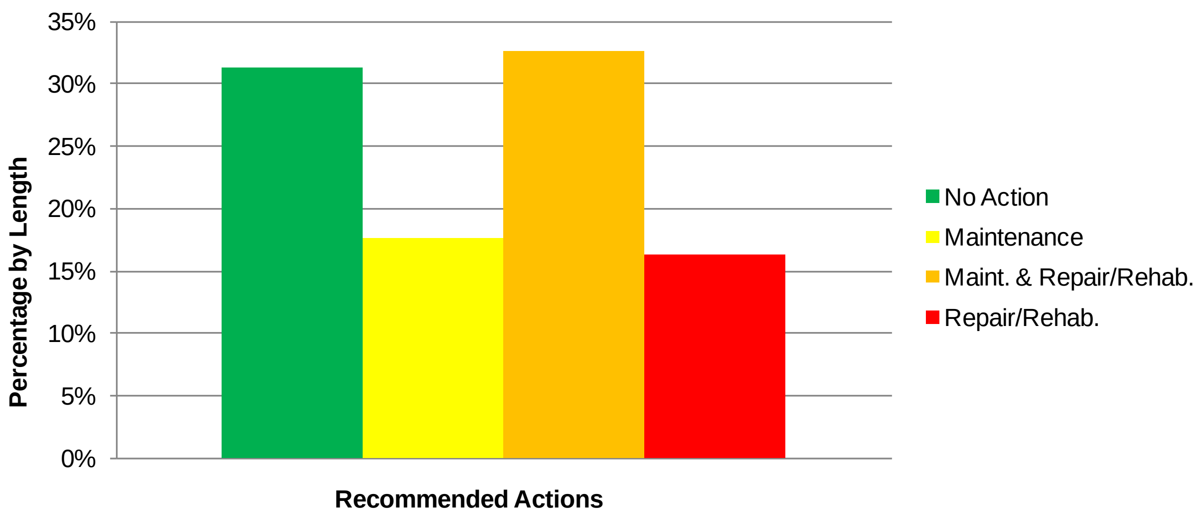
The Spring Valley Interceptor was constructed in the 1950s and consists of mostly RCP lined pipe and is located in the Sweetwater River valley. The portion of the Spring Valley Interceptor inspected and assessed consisted primarily of 42-inch lined RCP pipe. Approximately 600 feet of 54-inch RCP pipe was televised. The pipelines televised represent approximately 11 percent of the large diameter pipelines (20- through 54-inches) in the SSA. Overall, the segments inspected are generally in good to fair condition. Approximately 30 percent of the pipe segments inspected required No Action. Most segments are in need of cleaning as approximately 18 percent of the pipeline segments have debris accumulation or deposits and over 30 percent of the segments inspected require maintenance and a form of repair/ rehabilitation work. Defects were identified in approximately 50 percent of the pipe segments inspected with over 30 percent of the segments included in the category of pipe segments requiring maintenance and repair/rehabilitation and over 15 percent requiring repair/ rehabilitation.

Table 5-5 includes a summary of the assessment findings based on pipe segments inspected. Figure 5-4 graphically presents the pipeline inspection and assessment findings by length inspected.

Table 5-5 Spring Valley Interceptor Assessment

Spring Valley Interceptor	No Action	Maintenance	Maintenance & Repair/ Rehabilitate	Repair / Rehabilitate	Clean & Retelevise	Not Televised	Total
Number of Segments	7	3	4	4	0	1	19
Length	3,391	1,910	3,540	1,776	0	218	10,835
Percentage by Length	31%	18%	33%	16%	0%	2%	100%

Figure 5-4 Spring Valley Interceptor Inspection and Assessment Findings Length



La Presa Trunk Sewer

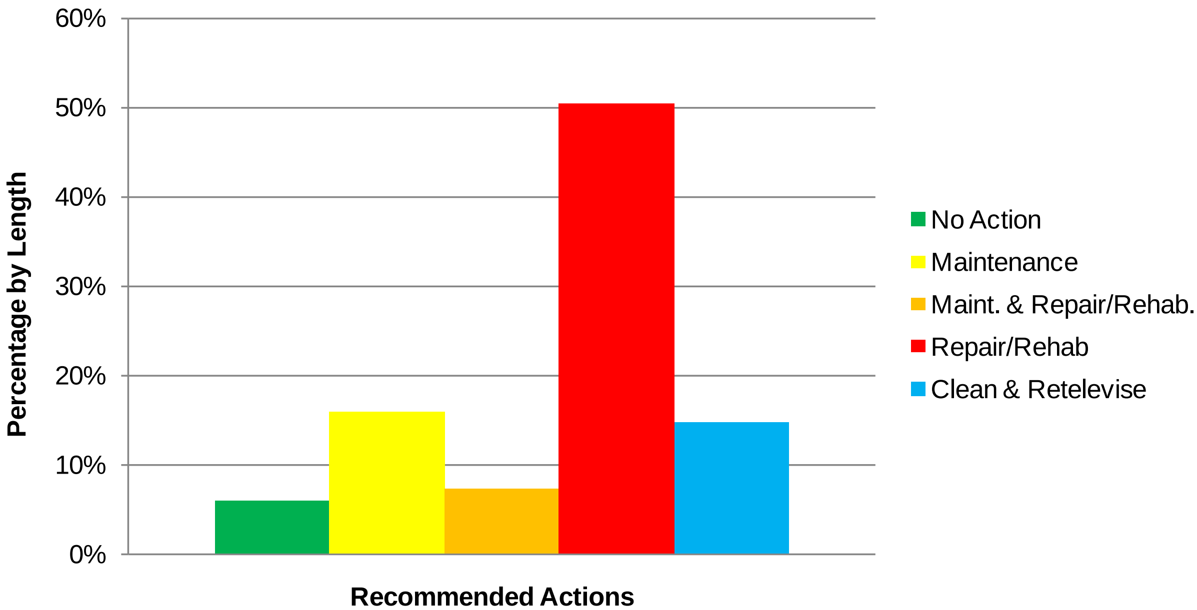
The La Presa Trunk Sewer was constructed in the 1950s and consists primarily of CI and VCP and is generally located in roads and easements through private properties. The segments inspected and assessed consist of PVC, CI, and VCP material, with diameters ranging from 15- to 18-inches, and represent approximately 24 percent of the medium sized diameter pipelines in the SSA. Overall, the pipe segments inspected are generally in poor to fair condition. Only 6 percent of the segments inspected require No Action, while approximately 16% of the pipe segments require maintenance due to debris accumulation or deposits in the pipeline. Defects were identified in approximately 60% of the pipeline segments inspected with 7% of the segments requiring maintenance and repair/rehabilitation and 50% requiring a form of repair/rehabilitation.

Additionally, approximately 15 percent of the pipe segments, primarily consisting of CI pipe, are recommended for cleaning and re-televising as heavy tuberculation and/or debris buildup along the pipeline prevented the CCTV equipment from completing the inspections. Table 5-6 includes a summary of the assessment findings based on pipe segments inspected. Figure 5-5 graphically presents the recommended actions presented in Table 5-6 based on the percent of length inspected.

Table 5-6 La Presa Trunk Sewer Assessment

La Presa Trunk Sewer	No Action	Maintenance	Maintenance & Repair/ Rehabilitate	Repair / Rehabilitate	Maintenance & Retelevise	Not Televised	Total
Number of Segments	5	8	6	30	8	6	63
Length	775	2,051	951	6,478	1,893	721	12,869
Percentage by Length	6%	16%	7%	50%	15%	6%	100%

Figure 5-5 La Presa Trunk Sewer Recommended Actions



Figures 5-6 through Figure 5-9 illustrate the recommended actions for the pipeline segments along the Spring Valley Interceptor and La Presa Trunk Sewer that were inspected and assessed based on age and material while Figure 5-10 presents the locations of the recommended actions for the Spring Valley Interceptor and La Presa Trunk Sewer. The recommendations include No Action, Maintenance, Maintenance and Repair/Rehabilitate, Repair/Rehabilitate, and Maintenance and Re-televise. Detailed pipeline recommendations are included in Appendix M.

Figure 5-6 Spring Valley Interceptor Inspection and Assessment Findings by Age

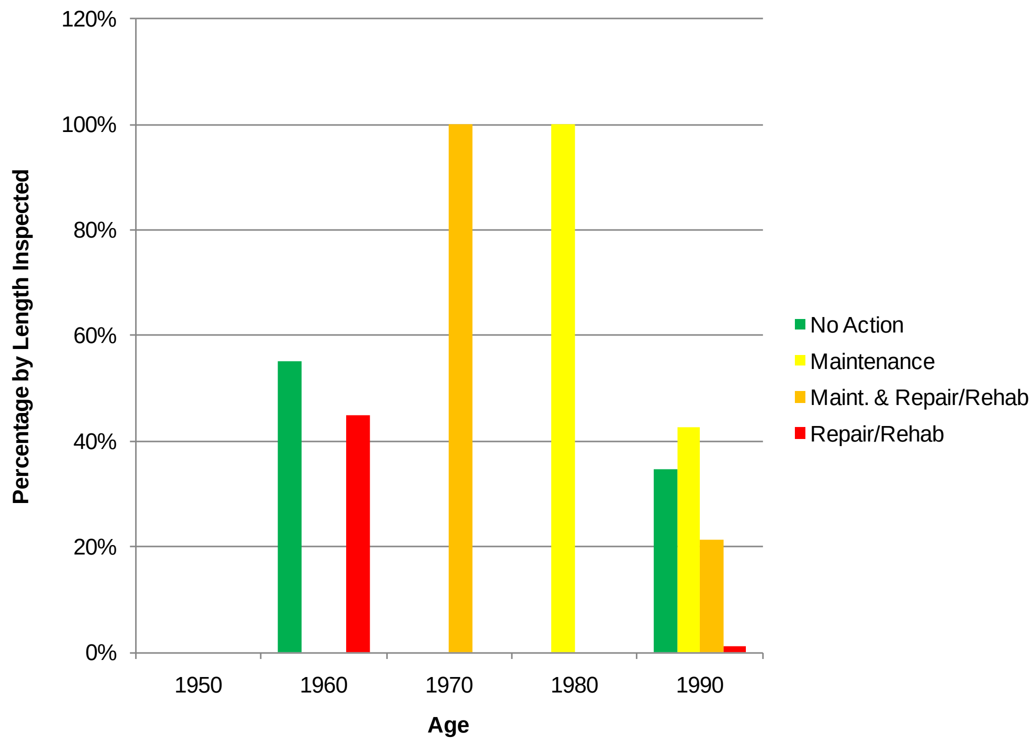


Figure 5-7 Spring Valley Interceptor Inspection and Assessment Findings by Material

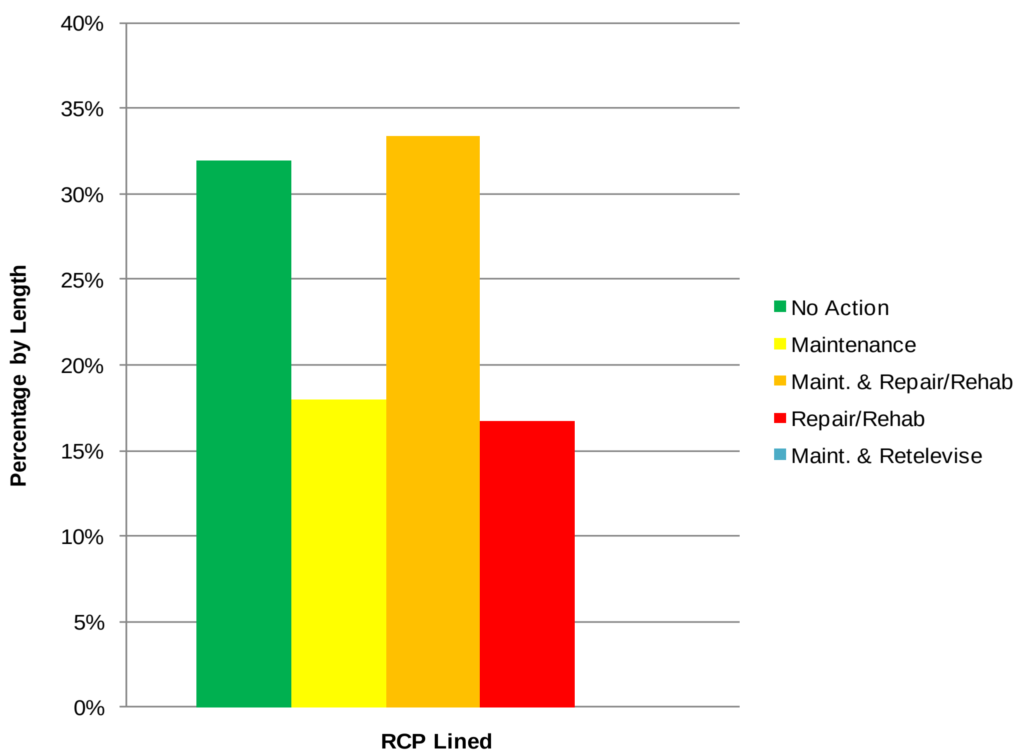


Figure 5-8 La Presa Trunk Sewer Inspection and Assessment Findings by Age

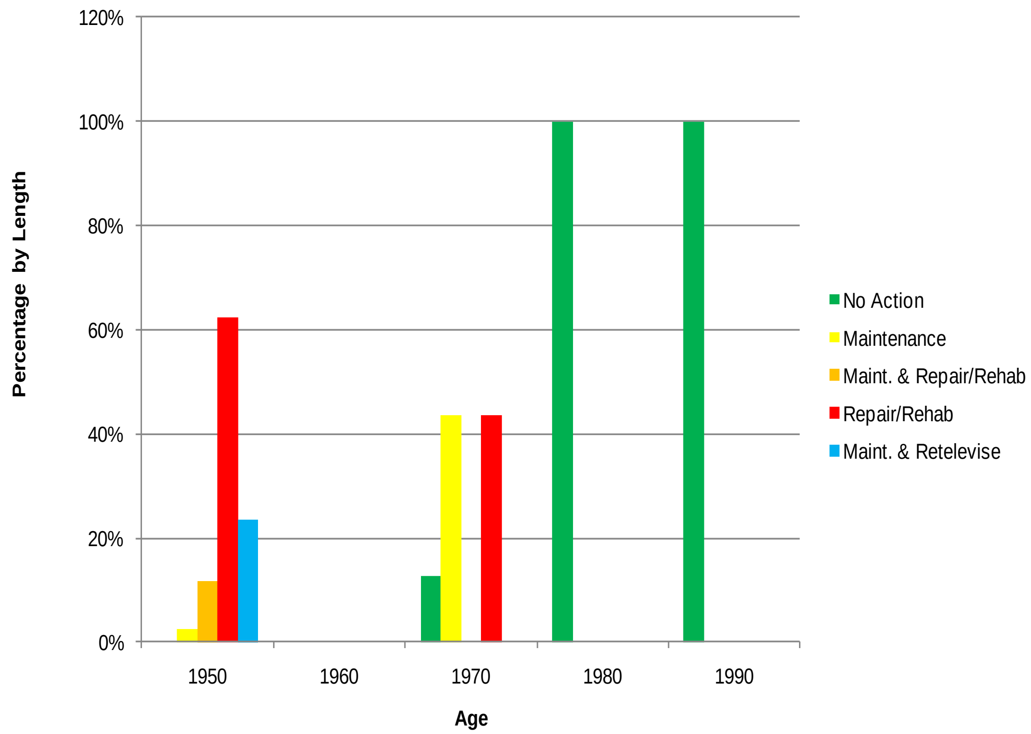
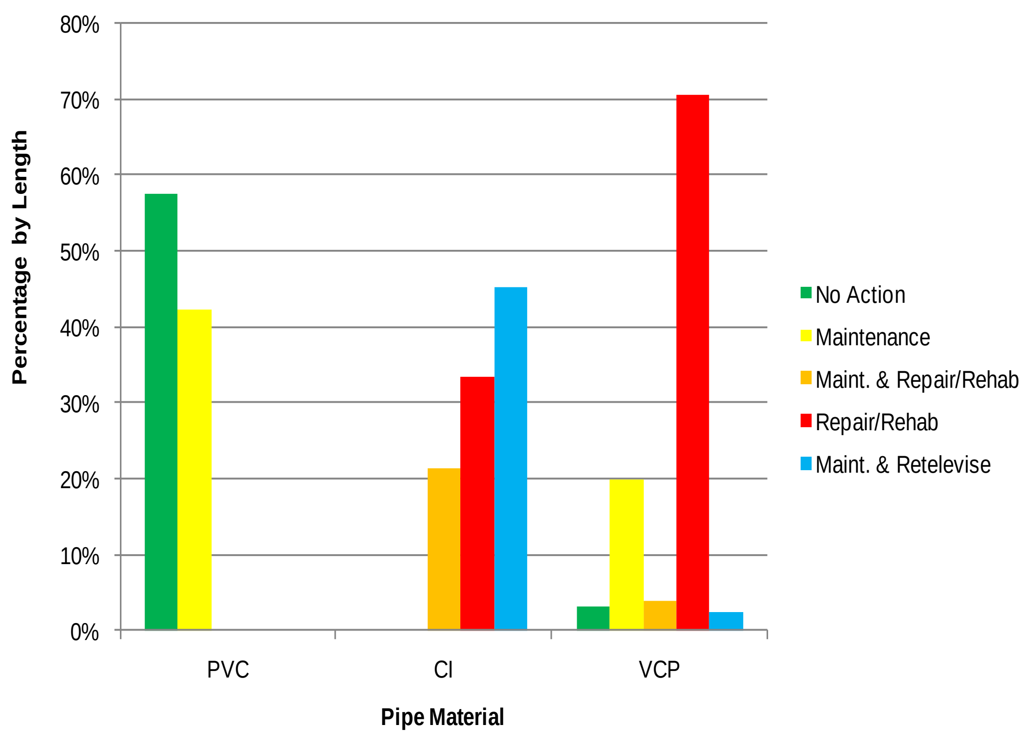
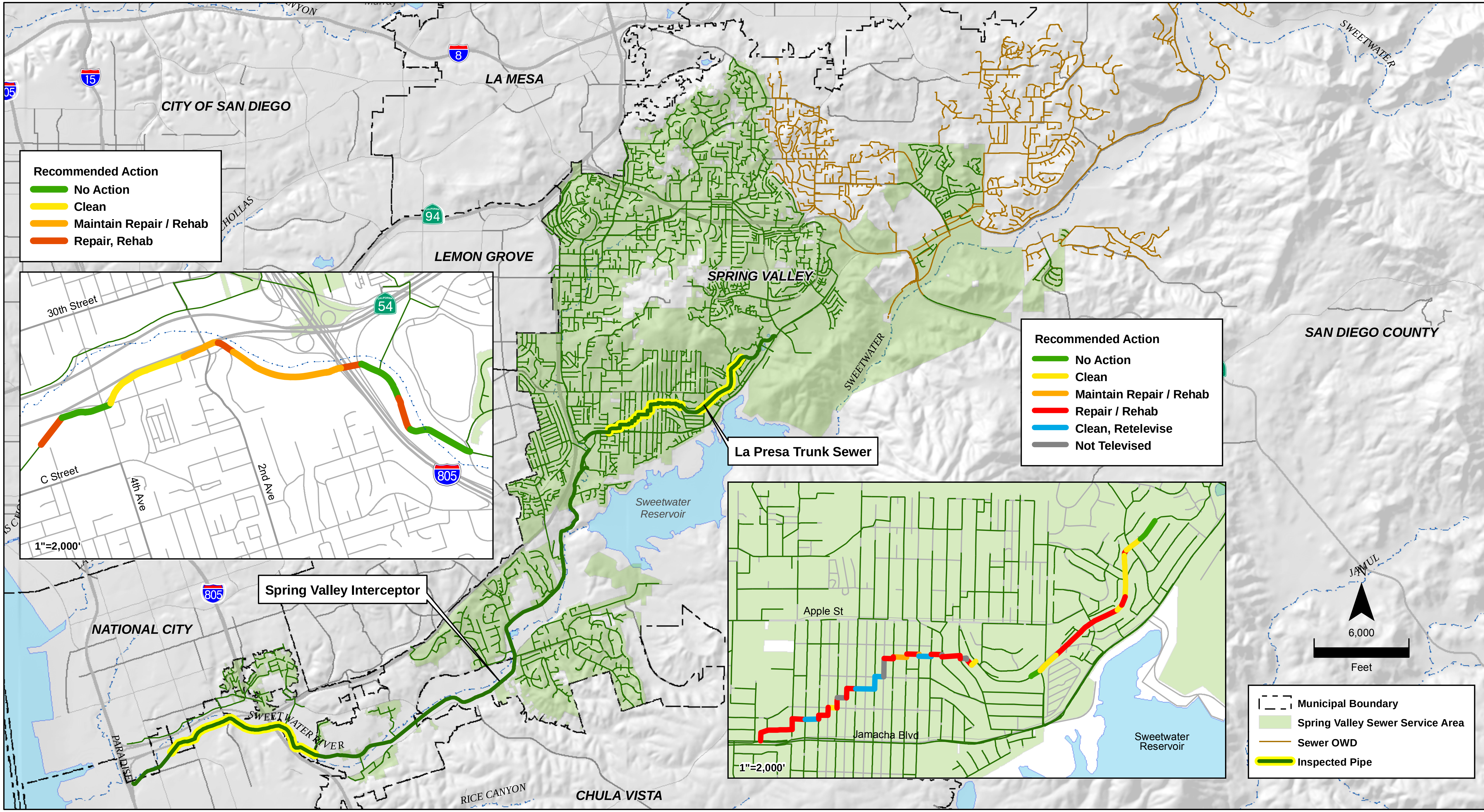


Figure 5-9 La Presa Trunk Sewer Inspection and Assessment Findings by Material





RECOMMENDED ACTION

Figure 5-10

12/27/2012 LH SD Z:\Projects\IS\SanDiegoCounty\100001472_AsNeeded\xx_SpringValley\mxd\11571_RecommAction_F5-10.mxd

Summary of Findings for Large Diameter Sewers

As previously stated, the portion of the 42- and 54-inch diameter Spring Valley Interceptor that was inspected consists of RCP lined pipe and serves to provide a representative cross section of the large diameter pipelines in the Spring Valley SSA (20-inches through 54-inches). Based on the inspection of 11 percent of the large diameter trunk sewers in the Spring Valley SSA, it appears that approximately 50 percent of the large diameter pipelines that have been in service for approximately 50 years are likely to need repair or rehabilitation. Extrapolating these results over the entire SSA for the large diameter pipelines yields approximately 15,000 (2.85 miles) of large diameter pipe may potentially require rehabilitation or repair.

Summary of Findings for Medium Size Sewers

Inspection of portions of the La Presa Trunk Sewer serves to provide a representative cross section of the medium sized diameter pipelines (15- through 18-inches) in the SSA. It appears that pipelines in service for 50 to 60 years are likely to need repair or rehabilitation or even replacement. Extrapolating these results over the entire SSA for the medium size diameter pipelines, approximately 9,600 (1.8 miles) of medium size diameter pipe would potentially require rehabilitation or repair. Table 5-7 summarizes the projected length of rehabilitation or repair for the large and medium size diameter pipelines in the Spring Valley SSA.

Table 5-7 Large and Medium Sewer Repair/Rehabilitation

Large & Medium Size Diameter Pipelines	Percent to Repair/Rehabilitate	Total Length of Medium/Large Diameter Pipeline approx. 50 yrs old or older	Extrapolated Length (feet)
Large Diameter Pipelines	50%	29,900	15,000
Medium Diameter Pipelines	57%	16,900	9,600

Small Diameter Pipeline Assessment

Physical inspection of a cross sectional area of smaller diameter pipelines was not performed in the Spring Valley SSA. To establish the overall condition of the smaller diameter pipelines, the condition assessment results and the recommended actions established for the smaller diameter pipelines in the Alpine, Lakeside, Julian, Winter Gardens, Pine Valley, and Campo SSAs were consolidated and used to extrapolate the overall condition of the small diameter pipelines within the Spring Valley SSA.

The assessment results were based on the physical inspection of other County SSA pipelines ranging from 6- to 24-inches in diameter totaling approximately 55,700 linear feet. Table 5-8 includes a summary of the total pipeline length inspected and assessed by length of material and age for the various SSAs.

As can be determined from Table 5-8, over 50 percent (30,700 linear feet) of the pipelines inspected were constructed between the 1940s to the 1960s and consisted primarily of VCP. Additional materials used included AC, CI and concrete.

Table 5-8 Summary of County SSAs Pipelines Inspected by Material and Age

Age	Material										Total (feet)
	ABS	AC	CI	DI	PVC/Lined	VCP	Rib-Loc	Truss	Concrete	Unk	
1940s	0	557	548	0	209	2,846	0	0	0	273	4,433
1950s	0	691	0	0	0	1,261	0	0	0	0	1,952
1960s	0	382	0	0	1,186	22,368	0	0	347	0	24,283
1970s	201	155	200	0	500	3,212	0	0	0	0	4,268
1980s	431	0	0	795	4,620	0	0	4,555	0	0	10,401
1990s	0	0	0	0	4,847	0	0	0	0	0	4,847
2000s	0	0	220	0	3,204	280	0	0	0	100	3,804
Unk	0	446	0	0	0	330	146	0	0	793	1,715
Total	**632**	**2,231**	**968**	**795**	**14,566**	**30,297**	**146**	**4,555**	**347**	**1,166**	**55,700**

Summary of Findings for Small Diameter Sewers

To establish the general characteristics of the small diameter pipelines in the Spring Valley SSA, results from the inspection and assessment process applied to the various County SSAs were consolidated, summarized and applied to the pipelines within the Spring Valley SSA. Table 5-9 includes a summary of the pipelines that were inspected in the various SSAs by diameter and pipe material.

Table 5-9 Summary of County SSAs Pipelines Inspected by Pipe Diameter and Material Type

Diameter	ABS	AC	CI	DI	PVC	VCP	Rib-Loc	Truss	Concrete	Unk	Total	Percentage by Diameter
6-inch	0	155	0	0	280	6,782	0	0	0	0	7,217	13%
8-inch	632	2,076	613	0	9,316	18,547	0	4,555	347	373	36,460	65%
10-inch	0	0	355	0	1,215	2,249	0	0	0	0	3,819	7%
12-inch	0	0	0	0	0	852	0	0	0	0	852	2%
15-inch	0	0	0	0	2,442	1,782	0	0	0	0	4,224	8%
18-inch	0	0	0	0	597	0	0	0	0	0	597	1%
21-inch	0	0	0	0	0	162	0	0	0	0	162	0%
24-inch	0	0	0	795	793	0	146	0	0	793	2,381	4%
Total	**632**	**2,231**	**968**	**795**	**14,566**	**30,297**	**146**	**4,555**	**347**	**1,166**	**55,700**	100%

Included in the table is approximately 7,400 linear feet of pipe ranging from 15- to 24 inch in diameter that was inspected in the Lakeside SSA as part of the Alpine and Lakeside Sewer Service Areas Master Plan. This equates to approximately 13 percent of the total combined length inspected in the SSAs. As these pipes were identified as requiring primarily maintenance and/or re-televising and will have a negligible effect on the projections for determining the necessary improvements in the Spring Valley SSA, the total length for these pipelines was included in the overall estimates.

Table 5-10 includes a summary of the recommended actions developed for the pipe segments inspected and assessed in the various County SSAs. The table also includes the length of pipe associated with the recommended actions. Additionally, Table 5-11 is a summary of the number of pipe segments and length associated by criticality rankings.

Table 5-10 Summary of County SSAs Recommended Actions for Inspected Pipelines

Description	No Action	Maintenance	Maintenance & Repair/ Rehab	Maintenance & Re-televise	Repair/Rehab	Total
Total Number of Segments	84	35	0	11	113	243
Total Length (ft)	17,164	9,874	0	2,113	26,506	55,700
Percentage by Length	31%	18%	0%	4%	48%	100%

Table 5-11 Summary of County SSAs Criticality Rankings by Segment and Length

Description	Criticality						Total
	A	B	C	D	E	N/A	
No of Pipeline Segments	89	61	47	30	13	3	243
Length (feet)	16,936	15,448	11,742	7,868	3,086	577	55,700
Percentage by Length	30%	28%	21%	14%	6%	1%	100.0%

Although Table 5-10 and Figure 5-11 illustrate that approximately 50 percent of the of the inspected pipelines were identified as requiring repair or rehabilitation, Table 5-11 illustrates that approximately 40 percent of the deficiencies documented should be further evaluated for implementation within the next 5 years. Pipelines that were not inspected due to inaccessibility constraints were not rated for rehabilitation and are noted as N/A. Figure 5-11 graphically illustrates the presents the overall pipeline inspection and assessment findings by percentage of length.

Figure 5-12 illustrates the recommendation actions based on age and includes the recommended actions for all criticality rankings from A through E.

Figure 5-11 County SSAs Pipeline Inspection and Assessment Findings by Length

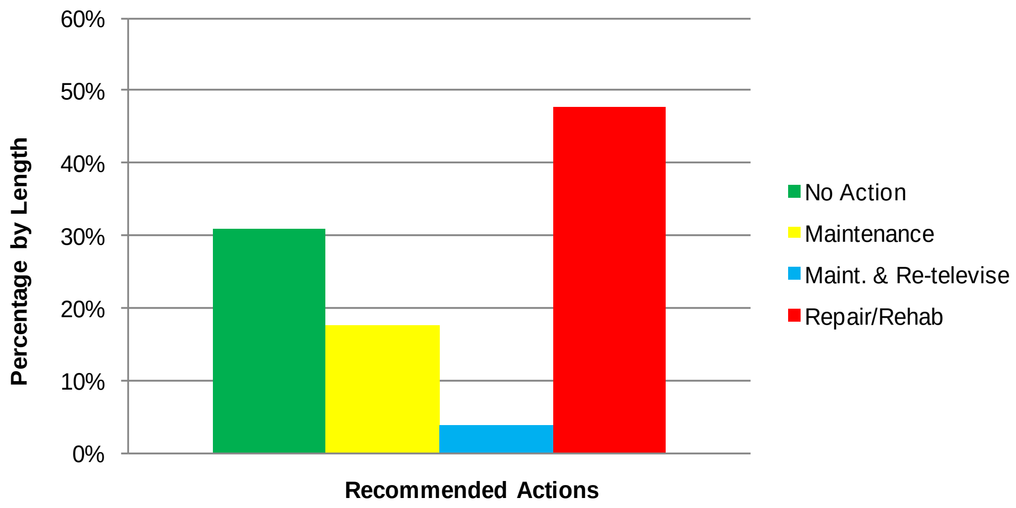


Figure 5-12 County SSAs Pipeline Inspection and Assessment Findings by Age

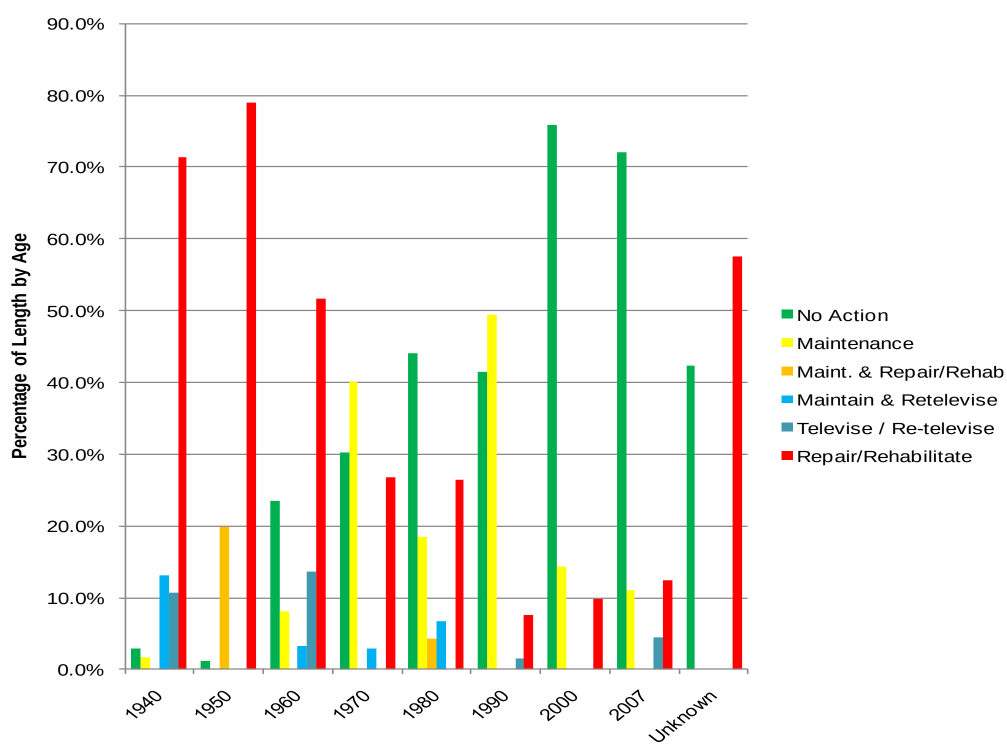
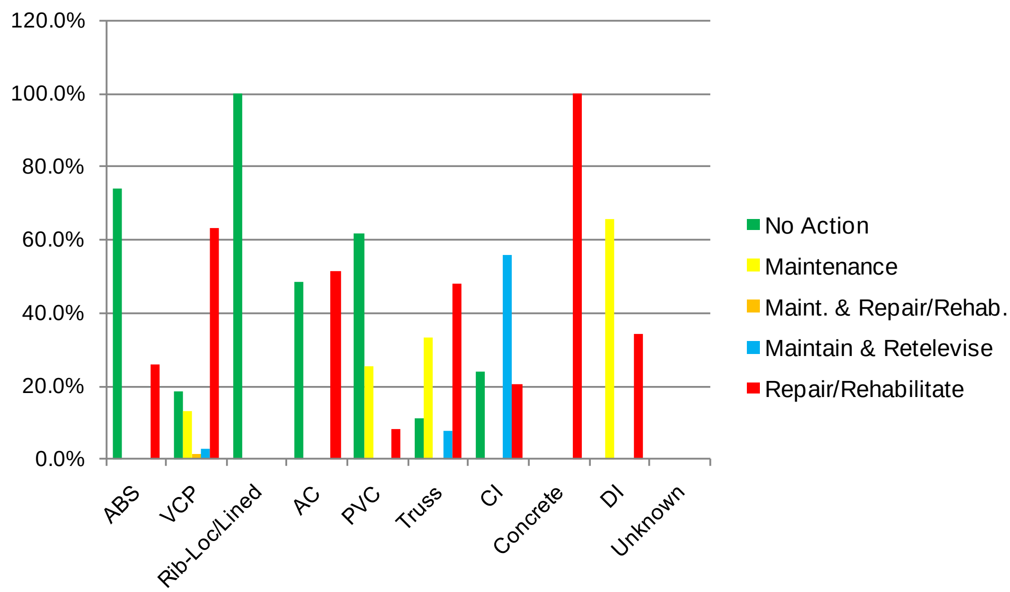


Table 5-12 includes a summary of the number of pipe segments and the length of pipe inspected and assessed based on material type while Figure 5-13 illustrates the recommended actions based on material type.

Table 5-12 County SSAs Pipeline Inspections by Segment and Material

Description	Material										
	AC	ABS	CI	PVC	DI	Concrete	VCP	Unk	Rib-Loc (Lined-PVC)	Truss	Total
Number of Segments	12	3	5	66	2	1	141	3	1	11	245
Length (feet)	2,231	632	968	14,499	795	347	30,374	1,166	146	4,555	55,700
Percentage by Length	4%	1%	2%	26%	1%	1%	55%	2%	0%	8%	100%

Figure 5-13 County SSAs Pipeline Inspection and Assessment Findings by Material Type



Based on the summary of the results for approximately 55,700 linear feet of small diameter pipelines inspected and assessed, over 50 percent of the pipelines inspected were constructed from the 1940s through the 1960s; 50 percent consist of VCP while over 25 percent of consist of PVC, and approximately 65 percent were 8-inches in diameter. Additionally, it appears that over 60 percent of the VCP pipelines constructed between the 1940s and 1960s require some form of repair and/or rehabilitation.

The Spring Valley SSA consists of approximately 1,290,406 linear feet (244 miles) of smaller diameter pipelines ranging from 4- to 12-inches in diameter which makes up over 90 percent of the SSA. Approximately 186,000 linear feet of the small diameter pipelines in the Spring Valley SSA have been in service for more than 50 years. To project the probable actions that may be required for the smaller diameter pipelines in the Spring Valley SSA, the percent of recommended actions determined based on the summary of the inspection and assessment results (Table 5-10) were applied to the length of the small diameter pipelines in the Spring Valley System that have been in services for more than 50 years (186,000 linear feet).

Table 5-13 summarizes the probable actions for the smaller diameter pipelines in the Spring Valley SSA based on similar findings in the other County SSAs. The results suggest that the County would potentially need to rehabilitate approximately 89,300 feet (17 miles) of sewer main or approximately 7% of the small diameter pipelines in the Spring Valley SSA. Table 5-14 summarizes the probable actions by pipe diameter.

Table 5-13 Spring Valley SSA Recommended Action Extrapolations by Length

Description	No Action	Maintenance	Maintenance & Repair/ Rehab	Maintenance & Re-televise	Repair/Rehab	Total
Percentage by Length	30%	18%	0%	4%	48%	100%
Total Length (ft)	55,800	33,480	0	7,440	89,280	186,000

Table 5-14 Spring Valley SSA Recommended Action Extrapolations by Pipe Diameter

Recommended Actions	Small Pipe Diameters			Total (ft)
	Up to 8-inches	10-inches	12-inches	
No Action	53,605	487	684	54,775
Maintenance	31,377	473	2,702	34,552
Repair & Rehabilitate	96,171	462	0	96,633
Total	181,152	1,422	3,386	186,000

Since the estimated percentages and the summary of probable recommended actions included in Table 5-13 and Table 5-14 are generally based on the inspection of a representative cross section of the collection systems in the various County SSAs, it is recommended that the County perform video inspection and condition assessment of the small diameter pipelines in the Spring Valley SSA and/or allocate funding in the CIP for performing inspection and assessment services to obtain more accurate information pertinent to the SSA. The inspection and assessment of the collection system within the Spring Valley SSA will assist the County in refining the probable actions and rehabilitation costs required within the SSA

5.5 Lift Station Assessment

A visual inspection was performed of the lift stations with County operations staff to assess the physical condition of the facilities on February 24, 2011. The lift station's structure, wet well, odor control, instrumentation, pumps, and motors were inspected and assessed. Recommended phased condition improvements were based on the visual inspection and current staff maintenance concerns.

All active County-owned or maintained lift stations within the Spring Valley SSA were assessed including Ramona, Vista Del Lago, Rancho San Diego, and Jamacha Lift Stations. The following sections describe each lift station in detail and highlight recommended improvements.

5.5.1 Ramona Lift Station

The existing Ramona Lift Station was constructed in 1986 and is located at the north-east corner of Ramona Avenue and San Carlos Street. The station serves a small, mainly residential area north of Sweetwater Reservoir. The station currently utilizes two Wilco EMU 23.5 hp submersible pumps in the 8-foot diameter wet well in duty/standby operation. The site is equipped with a ten-foot diameter emergency storage basin and was upgraded to include additional storage. The lift station has a firm capacity of 250 gpm. The pumps and alarms are controlled using bubbler system with float switches back-up.

The above-grade building houses the electrical room and the 600 kW propane emergency generator.

In 1996, a below-grade metering vault, with a magnetic flow meter, was installed with revised discharge piping. Additional upgrades included the float switch as backup.

Within the last five years the wet well was recently coated and the pumps replaced. An air relieve valve is currently being replaced due to wear on the existing valve.

The lift station discharges to approximately 860 linear feet of 4-inch cast-iron force main and approximately 1,350 linear feet of 6-inch PVC prior to discharging into a sewer discharge structure located at Jamacha Boulevard and Grand Avenue. The 6-inch force main and the 20-inch siphon in Jamacha Boulevard converge at the discharge structure.

There are no recommended upgrades since the lift station has been operating in good condition. Based on the capacity analysis performed in Chapter 4, this station does not require any additional capacity upgrades through 2030.

5.5.2 Vista Del Lago Lift station

The Vista Del Lago Lift Station was constructed in 1981 and is located on Camino Lago Vista, just east Circulo Margen. The station serves a small residential area south of Jamacha Boulevard. The pre-packaged Smith and Loveless lift station has a separate 7-foot diameter dry well and 4-foot diameter wet well. The lift station utilizes two vertical centrifugal non-clog pumps, each rated at 100 gpm at 60 feet TDH and requires 5 hp, 1800 rpm motors. The site has a buried 23,000 gallon emergency storage tank. Since the sewage lift station is located within the Sweetwater

Reservoir drainage basin, a drinking water source for Sweetwater Authority, sewer spills must be avoided.

The pumps and alarms are controlled using a bubbler system. A float system level control was installed in the emergency storage basin in 1996.

Although there is no emergency generator at the lift station, the lift station upgrades performed in 1996 included a receptacle for an emergency generator and an automatic transfer switch at the main switchboard. A portable generator located at the Spring Valley maintenance yard is only 5.8 miles away. The station is also equipped with an at grade pump bypass force main tee, which allows the County to pump out the wet well into the force main in the event of a pump failure.

The lift station discharges to approximately 550 linear feet of 4-inch PVC force main prior to discharging into the sewer manhole located at the intersection of Lakeview Avenue and Camino Lago Vista. The force main enters the receiving manhole with a grade break which tends to accumulate rocks and debris requires regular maintenance to ensure the force main can freely discharge into the manhole.

There are no recommended upgrades to since the lift station has been operating in good condition. However, retrofitting the manhole to eliminate the force main grade break would eliminate the additional maintenance on the discharge manhole. Based on the capacity analysis performed in Chapter 4, this station does not require any additional capacity upgrades through 2030.

5.5.3 Rancho San Diego Lift Station

The Rancho San Diego Lift Station (RSD LS) was constructed in 1988 and upgraded in 1995. The lift station is located on Singer Lane Access Road which is off Campo Road, south of intersection of Jamacha Boulevard and Campo Road. The RSD LS serves a large basin area within the SSA; mostly consisting of open space with pockets of residential and commercial areas.

The RSD LS conveys wastewater from the watershed drainage basin (Jamacha Basin), which includes a portion of the SV SSA as well as the Otay Water District (OWD) SSA. Just upstream of the lift station is OWD's Steele Bridge Pump Station which diverts a portion of the wastewater to the OWD Ralph W. Chapman Water Reclamation Facility (RWCWRF). The RWCWRF treats up to 1.3 mgd of wastewater and returns 0.1 mgd of sludge to the RSD LS. If the RWCWRF is not operating, flows are not diverted and all the wastewater flows will be conveyed to the RSD LS.

The facility is a custom-built lift station with a below-grade pumping area adjacent to the wet well and above grade electrical equipment. The lift station utilizes the three Fairbanks Morse vertical non-clog pumps, each is rated at 2,400 gpm at 217 TDH with 200 hp motors. The site is equipped with a 850,000 gallon emergency storage basin (combined onsite and offsite storage) and an emergency generator.

The pumps and alarms are controlled using a bubbler system and float system level control was installed in the emergency storage basin in 1996.

The lift station discharges to approximately 8,300 linear feet of 24-inch ductile iron pipe force main prior to discharging into Spring Valley Outfall Facilities. The discharge sewer manhole is located on the Jamacha Boulevard just east of Trace Road

The lift station was upgraded in 1995 with new motor supports, wet well hatch, and a magnetic flow meter.

The County has indicated that the lift station has reached its useful life because of the equipment age and the pump inefficiencies and is in the process of upgrading the lift station. The preliminary design report includes recommendations to replace of all electrical and mechanical equipment. The selected pumps will better fit the pumping conditions of the oversized force main.

5.5.4 Jamacha Lift Station

The Jamacha Lift Station was constructed in 1977 and is located on the south side of Jamacha Boulevard, just east of Omega Street. The station serves a small residential area. The custom-built Jamacha Lift Station has a below-grade pump room adjacent to the wet-well and an above grade electrical room and emergency generator. The list station was upgraded in 1993 and included three Fairbanks Morse vertical non-clog pumps, each is rated at 650 gpm with 50 hp motors. The site includes a 187,000 gallon open emergency storage basin.

The pumps and alarms are controlled using a bubbler system. A redundant wet well float system sends high level alarm to the County and to Sweetwater Authority.

The lift station discharges to approximately 1,250 linear feet of 6-inch cast-iron pipe force main and approximately 4,500 linear feet of 12-inch asbestos cement pipe prior to discharging into the sewer manhole located at the intersection of Jamacha Boulevard and Grand Avenue.

The County has indicated that the lift station has reached its useful life because of the equipment age and is currently constructing a new lift station. The new lift station will be located at the site of the existing maintenance building.

CHAPTER 6
WASTEWATER DISPOSAL AND REUSE OPPORTUNITIES

This chapter summarizes the existing wastewater disposal to Metro and discusses potential disposal and reuse opportunities being evaluated in the region that may impact the County in the future. The chapter includes:

- Background
- Summary of the existing Metro disposal system and costs
- Issues associated with continued participation in Metro
- Potential disposal and reuse opportunities including regional water reclamation facility planning
- Recommendations for further study

6.1 Background

The Metropolitan Joint Powers Authority (Metro JPA) represents participating agencies, including the County of San Diego, which contribute wastewater to the City of San Diego (City) Metropolitan wastewater collection and treatment system (Metro). Each of the participating agencies pays their commensurate share of conveyance, treatment and disposal costs. The Spring Valley SSA conveys wastewater flows to the Metro via the Spring Valley Interceptor where it connects to the City's South Metro Interceptor. Wastewater is transported approximately 15 miles through City conveyance lines and two large pump stations to the City's Point Loma Wastewater Water Treatment Plant for treatment and disposal. The Point Loma Wastewater Treatment Plant utilizes advanced primary treatment before disposal to the ocean, and every five years the City applies for a waiver to the United States Environmental Protection Agency (EPA) to waive a requirement under the Clean Water Act to achieve secondary treatment standards. The Point Loma Wastewater Treatment Plant is located on a constrained site and has little room to accommodate the expanded facilities required to go to secondary treatment levels.

To meet conditions of the waiver, the City, the Metro JPA and its participating agencies are actively evaluating alternatives to significantly reduce the wastewater flows to the Point Loma Wastewater Treatment Plant. These alternatives include expanded reuse opportunities throughout the region, including the potential for indirect potable reuse (IPR). However, it is possible that the Point Loma Wastewater Treatment Plant may eventually be required to expand its treatment capabilities to meet secondary standards, which will be a very costly.

This chapter serves to document existing disposal costs for the Spring Valley SSA and potential issues associated with continued participation in Metro. Opportunities to divert flows from Metro through participation in a potential expansion of the OWD Ralph W. Chapman Water Reclamation Plant (WRP) or to the City's South Bay WRP to expand water reuse in the South Bay region are also discussed. A potential new water reclamation plant is currently being contemplated by the City of Chula Vista that would increase disposal capacity and reuse in the South Bay region, as well. Depending on long term Metro disposal and treatment costs, it may also be feasible for the County to consider constructing and operating its own scalping plant along the Spring Valley Interceptor or possibly in the vicinity of the Chapman WRP.

6.2 Existing Metro Treatment and Disposal

The Spring Valley SSA conveys wastewater flows to Metro under a comprehensive Regional Wastewater Disposal Agreement enacted between the City of San Diego and the Metro JPA participating agencies. The EPA has granted the City of San Diego a waiver to its National Pollutant Discharge Elimination System (NPDES) Permit of 1995. The waiver allows the City to continue to operate the 240 mgd Point Loma Wastewater Treatment Plant as an advanced primary treatment facility rather than requiring an upgrade to secondary treatment. A condition of the waiver requires the City to prepare a comprehensive water reuse study that identifies opportunities to reduce flows to Point Loma Wastewater Treatment Plant and maximize water reuse.

In 2009, Metro treatment and disposal costs were approximately $191.6 Million and the Spring Valley SSA portion of those costs was approximately $5.4 Million plus transportation costs. The treatment costs have been steadily rising over the decade and could be dramatically affected if the EPA does not grant the City the waiver to its NPDES permit in 2015. The estimated cost to upgrade the Point Loma Wastewater Treatment Plant to full secondary treatment is not accurately known, but is anticipated to be between $1 Billion and $1.5 Billion. The County's share of these upgrades for the Spring Valley SSA would be substantial and could be between $77 Million to $244 Million.

To avoid upgrading to secondary treatment at Point Loma, the City of San Diego's 2012 Recycled Water Study looked at offloading the Point Loma Wastewater Treatment Plant by 100 MGD, partially by diverting up to 14 MGD (anticipated 2035 flows) from the Spring Valley Interceptor and directing it south to the City's South Bay WRP. In the City's conceptual plan, this wastewater conveyance system would be in place by 2022 and would cost $20.7 Million. The additional wastewater sent to South Bay would be available to Otay Water District for increased water recycling and would also be treated to indirect potable reuse standards and conveyed to Otay Lakes, which lie upstream of the City's Otay Water Treatment Plant. These additional treatment and conveyance facilities would be constructed by 2026 and are anticipated to cost $455 Million. Additional Metro improvements would occur in the City's Northern service area as well. Regionally, the proposed improvement costs would total between $2 Billion and $3 Billion. A number of methods for cost sharing for these regional improvements among the Metro JPA agencies were proposed and some of these costs may be offset by potential water and recycled water revenues.

6.3 Otay Water District Ralph W. Chapman WRP Expansion

OWD provides sewer collection services to the Rancho San Diego community and adjacent areas of the County. The wastewater generated within the OWD sewer service area is conveyed either to the Ralph W. Chapman WRP or to the Spring Valley Interceptor for conveyance to the Metro system for treatment and disposal. The Ralph W. Chapman WRP acts as a scalping plant to produce recycled water, while, disposing of its bio-solids back to the Metro system. Currently the Ralph W. Chapman WRP treats up to 1.3 mgd of wastewater, sending nearly 100 percent of the recycled water to the OWD Central Service Area recycled system, which is also supplemented by recycled water from the City of San Diego's South Bay WRP.

OWD is currently preparing a master plan update outlining several disposal and treatment options including expansion, maintaining current capacity, or possibly decommissioning its 1.3 mgd water reclamation facility. In order to expand recycled water production, OWD would need to divert more wastewater from the Spring Valley SSA and, depending on the desired plant capacity, may need to construct additional facilities to pump wastewater flows to the WRP site. Typical constraints to expanding a wastewater plant, located inland, are the ability to develop a fail-safe disposal system for the wastewater. In the case of an expanded Ralph W. Chapman WRP, the County could make capacity available in the Spring Valley Interceptor to provide the necessary failsafe disposal capacity. An agreement would also need to be made with Metro for failsafe capacity. Of interest to the County would be the potential for the Spring Valley SSA to become less dependent on Metro and the financial risks should the City of San Diego be required to upgrade to secondary treatment.

The potential to beneficially reuse recycled water in the County areas is somewhat constrained by Basin Plan limitations including the area tributary to the Sweetwater Reservoir, a drinking water source for the Sweetwater Authority. Therefore, a likely scenario would be for OWD to increase recycled water production from the Ralph W. Chapman WRP for use in its Central Service Area and curtail its purchase supply from the City of San Diego's South Bay WRP. The County should continue to monitor the City's request for a waiver and implementation of an IPR project, as well as projects proposed in the OWD updated sewer master plan.

6.4 City of Chula Vista WRP

The City of Chula Vista provides sewer collection services to the City of Chula Vista and adjacent areas of the County. The wastewater generated within the Chula Vista sewer service area is conveyed to the Metro system for treatment and disposal via a number of Chula Vista trunk sewers (Salt Creek, Telegraph Canyon, and Poggi Canyon) as well the County's Spring Valley Interceptor.

Over the past several years the City of Chula Vista in cooperation with OWD has prepared several feasibility studies regarding development of a Chula Vista WRP within the City limits to treat Chula Vista wastewater and produce Title 22 recycled water to sell to OWD. The primary drivers for Chula Vista include:

1. Reducing its dependency on Metro and risk of future cost escalations
2. Securing additional sewer treatment capacity for future planned growth
3. Interest from OWD in a long term deal to purchase recycled water

The City of Chula Vista has refined a proposal to develop a 5.0 mgd reclamation facility considering a membrane bioreactor (MBR) treatment process to produce highly treated effluent for OWD. A 2010 Study by RMC outlines a system which would collect wastewater from the Salt Creek Sewer and process it to Title 22 effluent standards. A failsafe disposal system would have to be constructed to the South Bay Outfall. The City of Chula of Vista plans to purchase the WRP site and closely monitor the Metro treatment and disposal cost options in the coming years before embarking on a new WRP project. It is recommended that the County continue to meet and coordinate with the City of Chula Vista regarding regional sewage treatment and disposal options.

6.5 Concept for a Spring Valley Water Reclamation Plant (WRP)

At a conceptual level, the County could potentially consider its own Spring Valley Water Reclamation Plant to provide wastewater treatment for the Spring Valley SSA and wholesale recycled water to OWD for distribution in its Central Service Area. The concept would be similar to the proposal by the City of Chula Vista.

A WRP located along the Spring Valley Interceptor near the downstream reaches has the potential to capture approximately 6 mgd of Spring Valley SSA wastewater flow for beneficial reuse. Alternatively, OWD may consider a joint treatment plant project to further optimize their future water disposal and treatment costs.

At a concept level there are a number of issues and challenges for the County to consider including financial, site constraints, permits, environmental and operations of a new facility. It is recommended that the County continue to participate and monitor the OWD sewer master plan update and Metro cost options. A small scale feasibility study to better define a County owned alternative project, such as a new WRP, would serve to provide a baseline comparison with those options.

6.6 Summary

The Spring Valley SSA currently conveys wastewater to the Metro for treatment at the Point Loma Wastewater Treatment Plant. The costs of Metro treatment have been steadily climbing over the last decade and present significant capital risk if the EPA denies the City's NPDES waiver. The City, along with the Participating Agencies, has undertaken numerous studies and evaluation of potential regional treatment plants in order to offload the Point Loma Wastewater Treatment Plant. The County should continue to closely monitor the OWD and Chula Vista treatment and disposal options being evaluated, as well as the progress of the City of San Diego's solution to its regulatory and treatment requirements.

CHAPTER 7
PROPOSED CAPITAL IMPROVEMENT PROGRAM

This chapter presents the proposed Capital Improvement Program (CIP) based on the findings of the Master Plan and includes:

- Development of Unit Costs;
- Capital Improvement Project Summary of Cost and Timing; and
- Proposed Condition Upgrades and estimated costs

7.1 Development of Unit Costs

The unit cost estimates reflect full capitalization inclusive of planning, engineering design, environmental, legal, construction, construction management and contract administration. The values are presented in mid-2010 dollars based on an anticipated ENR Construction Cost Index (ENR-CCI) of 9969 for the Los Angeles/Orange County area. These estimates are based on representative available data at the time of this report; however, since prices of materials and labor fluctuate over time, new estimates should be obtained at or near the time of construction of proposed facilities. A scaling factor has been included to account for pipeline projects that are relatively short in distance or have more significant environmental or construction challenges. The CIP has been divided into four phases.

7.1.1 Pipelines

Base unit costs for pipeline material and installation including repaving and system appurtenances that, collectively, constitute principal elements of the wastewater collection system facilities, are presented in Table 7-1.

The unit costs provided above reflect an average cost for full capitalization inclusive of planning, engineering design, environmental, legal, construction (including all appurtenances), construction management and contract administration. Special circumstances (e.g., jacking, trenchless installations, tunnels, etc.) are considered separately on a case-by-case basis. A scaling factor was applied to each project to account for project specific issues such as difficult conditions, constrained access, congested areas, etc.

Table 7-1 Pipeline Unit Costs

Diameter (inches)	Sewer, Gravity ($/LF)
4	200
6	300
8	350
10	425
12	500
15	600
18	650
21	700
24	750
30	850
36	900
39	950
42	1000
48	1150

7.2 Lift Stations

Lift station upgrades are primarily condition related and are recommended for the Rancho San Diego and Jamacha Lift Stations. County staff has indicated that the Jamacha Lift Station has reached the end of its useful life. The Jamacha Lift Station replacement is in construction and anticipated to be completed in Fall 2013. The County has recently completed a Preliminary Design Report for the Rancho San Diego Lift Station and estimates $3,000,000 for upgrades in Phase I.

7.3 Recommended CIP Program

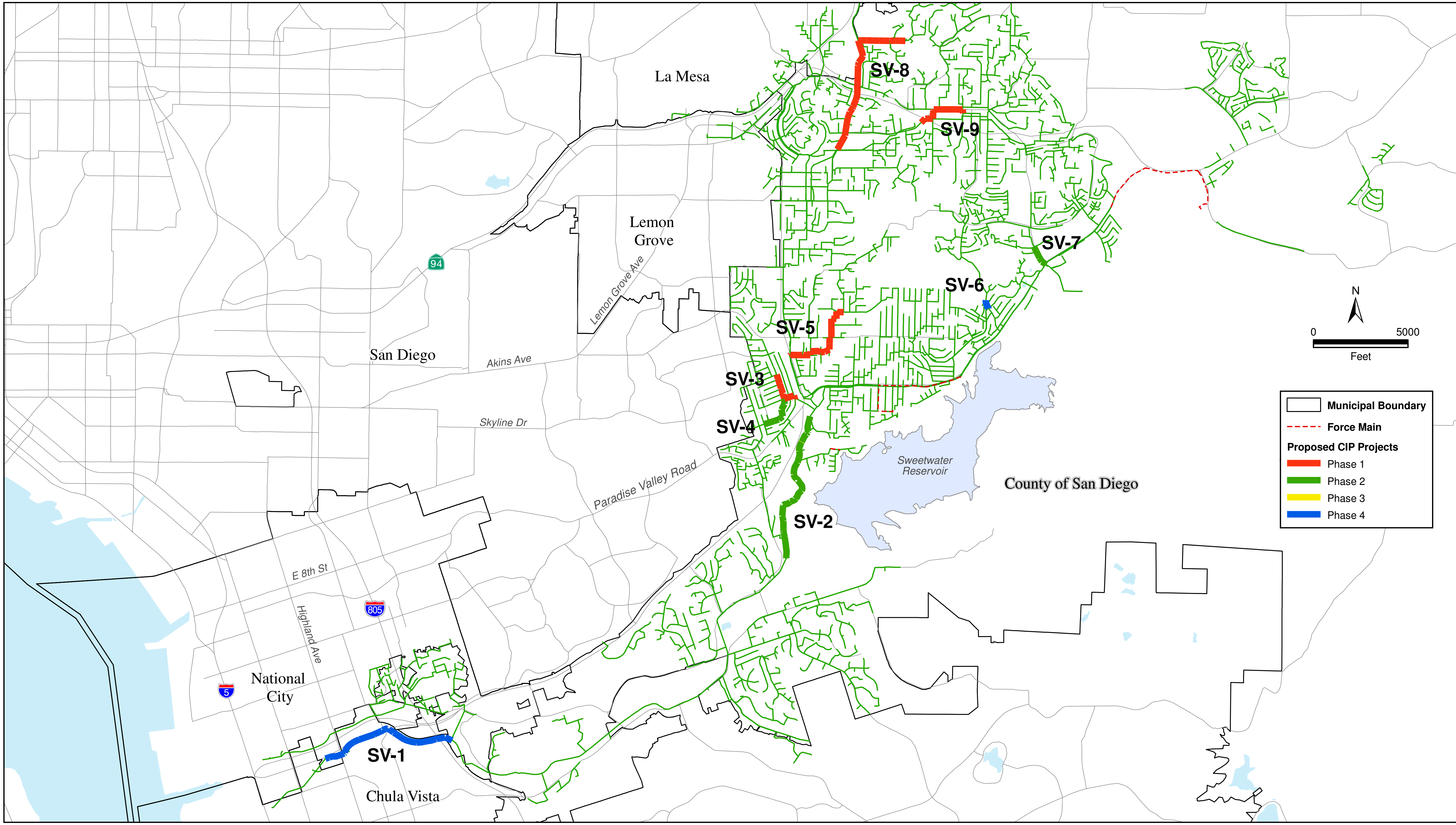
The CIP projects identify facilities needed to meet existing system needs based on the County's design criteria for the wastewater collection systems. As previously discussed, the CIP projects are presented in four major phases of work based on priority needs.

- Phase I – complete in 2013
- Phase II – complete by 2015
- Phase III – 2016-2020
- Phase IV – 2021-2030

The total CIP costs including Phase I through IV are estimated to be $46.8 million for the Spring Valley SSA. These costs are summarized by phase in Table 7-2. Proposed CIP projects recommended for the Spring Valley SSA collection system are listed in Table 7-3, and shown and described in further detail on the subsequent pages.

Table 7-2 CIP Summary

	Phase				
Service Area	I	II	III	IV	Total
Spring Valley	$16,519,000	$16,325,000	$0	$11,273,000	$46,811,000



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CAPITAL IMPROVEMENT PROJECTS

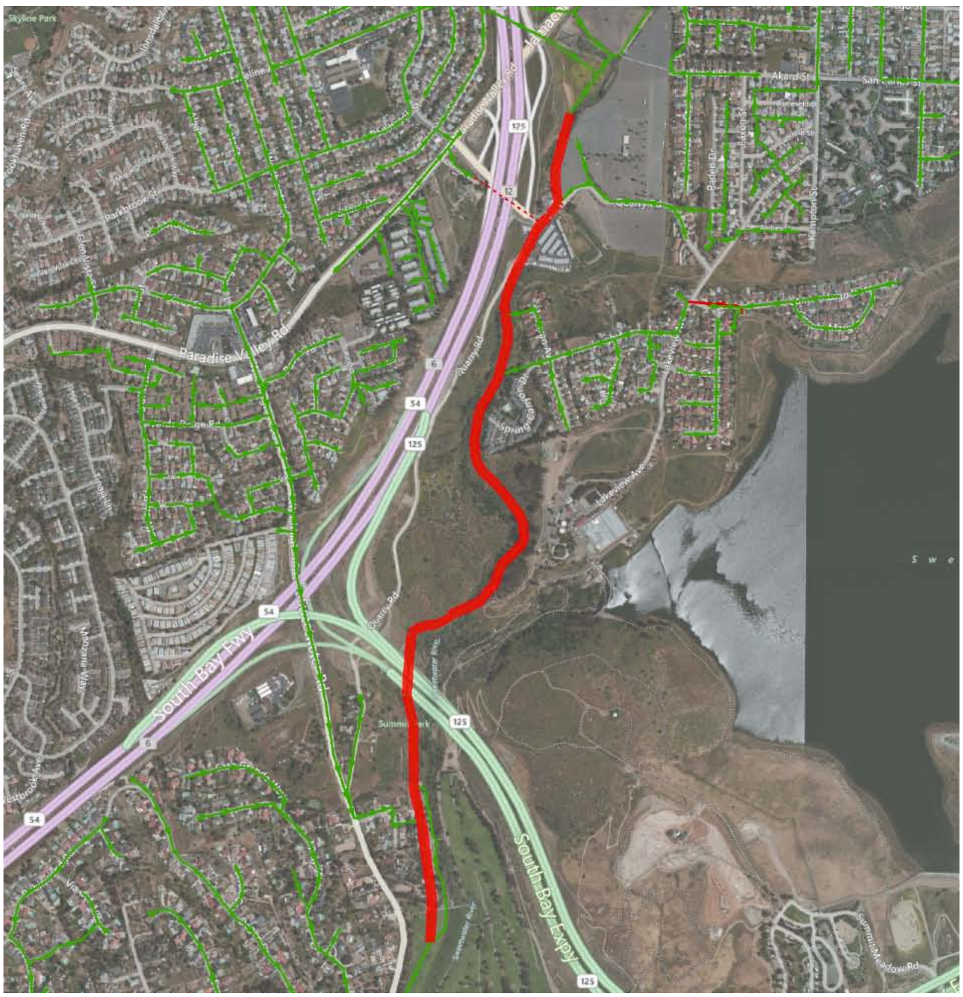
Figure 7-1

Table 7-3 Spring Valley Master Plan Capital Improvement Program

CIP #	Type	Project	Description	Units	Base Unit Cost	Scaling Factor	Description	CIP Cost	Priority	Phase				Phased Cost			
										I	II	III	IV	I	II	III	IV
SV-1	Pipeline	Spring Valley Outfall Pipeline Replacement Project from east of I-805 to just west of 2nd Street	Replace approximately 7,400 feet of existing 42 inch diameter with 48 inch diameter.	7400 -LF	$ 1150/LF	1.3	The scaling factor was taken at 1.3 to account for construction so close to the Sweetwater River	$11,063,000	4	0%	0%	0%	100%	$0	$0	$0	$11,063,000
SV-2	Pipeline	Spring Valley Outfall Pipeline Replacement Project from Swap Meet to Bonita Golf Course	Replace approximately 8,600 feet of existing 24 inch and 30 inch diameter pipeline with diameters ranging from 36 inch.	8600 -LF	$ 900 /LF	1.3	The scaling factor was taken at 1.3 to account for construction so close to the Sweetwater River	$10,062,000	2	0%	100%	0%	0%	$0	$10,062,000	$0	$0
SV-3	Pipeline	Broadway Trunk Sewer Pipeline Replacement Project	Replace approximately 1,350 feet of existing 8 inch diameter, 550 feet of existing 10 inch diameter, and 200 feet of existing 15 inch with approximately 1,350 feet of 12 inch diameter and 750 feet of 18 inch diameter.	2100 -LF	$ 554 /LF	1.0	The base unit cost was taken as a weighted average between the proposed diameters.	$1,163,000	2	0%	100%	0%	0%	$0	$1,163,000	$0	$0
SV-4	Pipeline	Parkbrook Sewer Pipeline Replacement Project	Replace approximately 2,100 feet of existing 8 inch diameter with 12 inch diameter.	2100 -LF	$ 500 /LF	1.0	No comment	$1,050,000	2	0%	100%	0%	0%	$0	$1,050,000	$0	$0
SV-5	Pipeline	Sweetwater Lane / Saint George Sewer Pipeline Replacement Project	Replace approximately 4,100 feet of existing 8 inch diameter, 1,100 feet of existing 10 inch diameter with approximately 5,200 feet of 18 inch diameter. The project also includes capping the existing diversion at the intersection of Saint George and Brucker Avenue so that all flows are conveyed through the proposed line	5200 -LF	$ 650 /LF	1.3	The scaling factor was taken at 1.3 to account for construction outside the roadway	$4,394,000	1	100%	0%	0%	0%	$4,394,000	$0	$0	$0
SV-6	Pipeline	Whitestone Road Parallel Pipeline Replacement Project	Parallel approximately 500 feet of existing 8 inch diameter with 8 inch diameter. This is only triggered by significant wet weather and should be metered to assess whether the deficiency actually exists during wet weather flow conditions	500 -LF	$ 350 /LF	1.2	The scaling factor was taken at 1.2 to account for mobilization	$210,000	4	0%	0%	0%	100%	$0	$0	$0	$210,000
SV-7	Pipeline	Sweetwater Springs Sewer Pipeline Replacement Project	Replace approximately 1,150 feet of existing 8 inch diameter and 50 feet of 10 inch diameter pipelines with 1,200 feet of 15 inch diameter pipeline.	1200 -LF	$ 575 /LF	1.0	The base unit cost was taken as a weighted average between the proposed diameters.	$690,000	2	0%	100%	0%	0%	$0	$690,000	$0	$0
SV-8	Pipeline	Trunk E Sewer Pipeline Replacement Project (Bancroft)	Replace approximately 6,250 feet of existing pipeline ranging in diameter from 10 to 12 inch with 18 inch diameter.	6250 -LF	$ 650 /LF	2.0	The scaling factor was taken at 2.0 to account for traffic control and Caltrans crossing	$8,125,000	1	100%	0%	0%	0%	$8,125,000	$0	$0	$0
SV-9	Pipeline	Trunk D Sewer Pipeline Replacement Project	Replace approximately 2,800 feet of existing 10 inch and 12 inch diameter with approximately 15 inch diameter.	2800 -LF	$ 600 /LF	2.0	The scaling factor was taken at 2.0 to account for traffic control and Caltrans crossing	$3,360,000	2	0%	100%	0%	0%	$0	$3,360,000	$0	$0
SV-LS1	Lift Station	Rancho San Diego Lift Station Upgrades	New lift station , Upgrade Mechanical and Electrical Equipment	1-EA	$ 3,000,000 /EA	1.0		$3,000,000	1	0%	100%	0%	0%	$0	$3,000,000	$0	$0

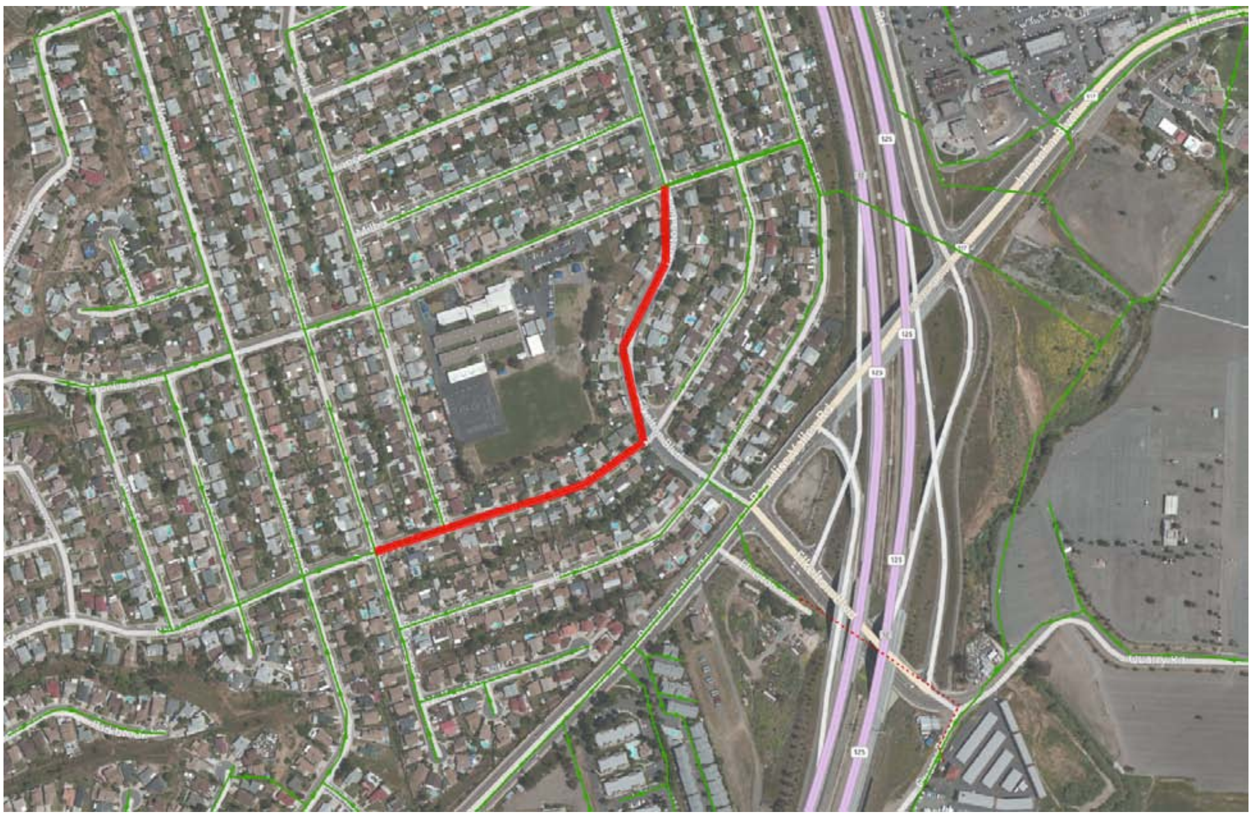
CIP Project:	SV-1 – Spring Valley Outfall Pipeline Replacement Project from east of I-805 to just west of 2nd Street (in Chula Vista)
Description:	Replace approximately 7,400 feet of existing 42-inch diameter with 48-inch diameter.
Estimated Construction Cost:	$11,063,000
Estimated Construction Schedule:	Phase IV

CIP Project:	SV-2 – Spring Valley Outfall Pipeline Replacement Project from Swap Meet to Bonita Golf Course
Description:	Replace approximately 8,600 feet of existing 24-inch and 30-inch diameter pipeline with diameters ranging from 36-inch.
Estimated Construction Cost:	$10,062,000
Estimated Construction Schedule:	Phase II



CIP Project:	SV-3 – Broadway Trunk Sewer Pipeline Replacement Project
Description:	Replace approximately 1,350 feet of existing 8-inch diameter, 550 feet of existing 10-inch diameter, and 200 feet of existing 15-inch with approximately 1,350 feet of 12-inch diameter and 750 feet of 18-inch diameter.
Estimated Construction Cost:	**$**1,163,000
Estimated Construction Schedule:	Phase II

CIP Project:	SV-4 – Parkbrook Sewer Pipeline Replacement Project
Description:	Replace approximately 2,100 feet of existing 8-inch diameter with 12-inch diameter.
Estimated Construction Cost:	$1,050,000
Estimated Construction Schedule:	Phase II



CIP Project: SV-5 – Sweetwater Lane / Saint George Sewer Pipeline Replacement Project

Description: Replace approximately 4,100 feet of existing 8-inch diameter, 1,100 feet of existing 10-inch diameter with approximately 5,200 feet of 18-inch diameter. The project also includes capping the existing diversion at the intersection of Saint George and Brucker Avenue so that all flows are conveyed through the proposed line.

Estimated Construction Cost: $4,394,000

Estimated Construction Schedule: Phase I

CIP Project:	SV-6 – Whitestone Road Parallel Pipeline Replacement Project
Description:	Parallel approximately 500 feet of existing 8-inch diameter with 8-inch diameter. This is only triggered by significant wet weather and should be metered to assess whether the deficiency actually exists during wet weather flow conditions.
Estimated Construction Cost:	$210,000
Estimated Construction Schedule:	Phase IV

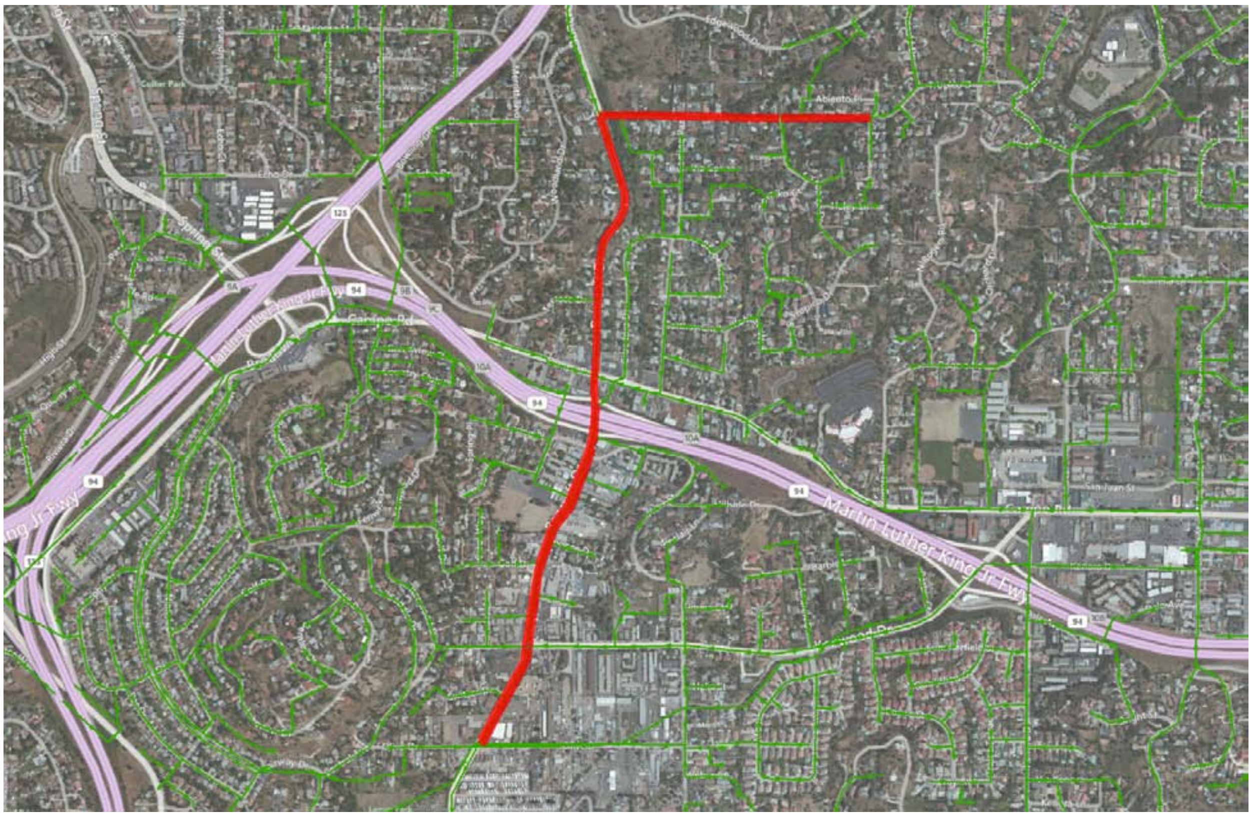
CIP Project: SV-7 – Sweetwater Springs Sewer Pipeline Replacement Project

Description: Replace approximately 1,150 feet of existing 8-inch diameter and 50 feet of 10-inch diameter pipelines with 1,200 feet of 15-inch diameter pipeline within Sweetwater Springs Road.

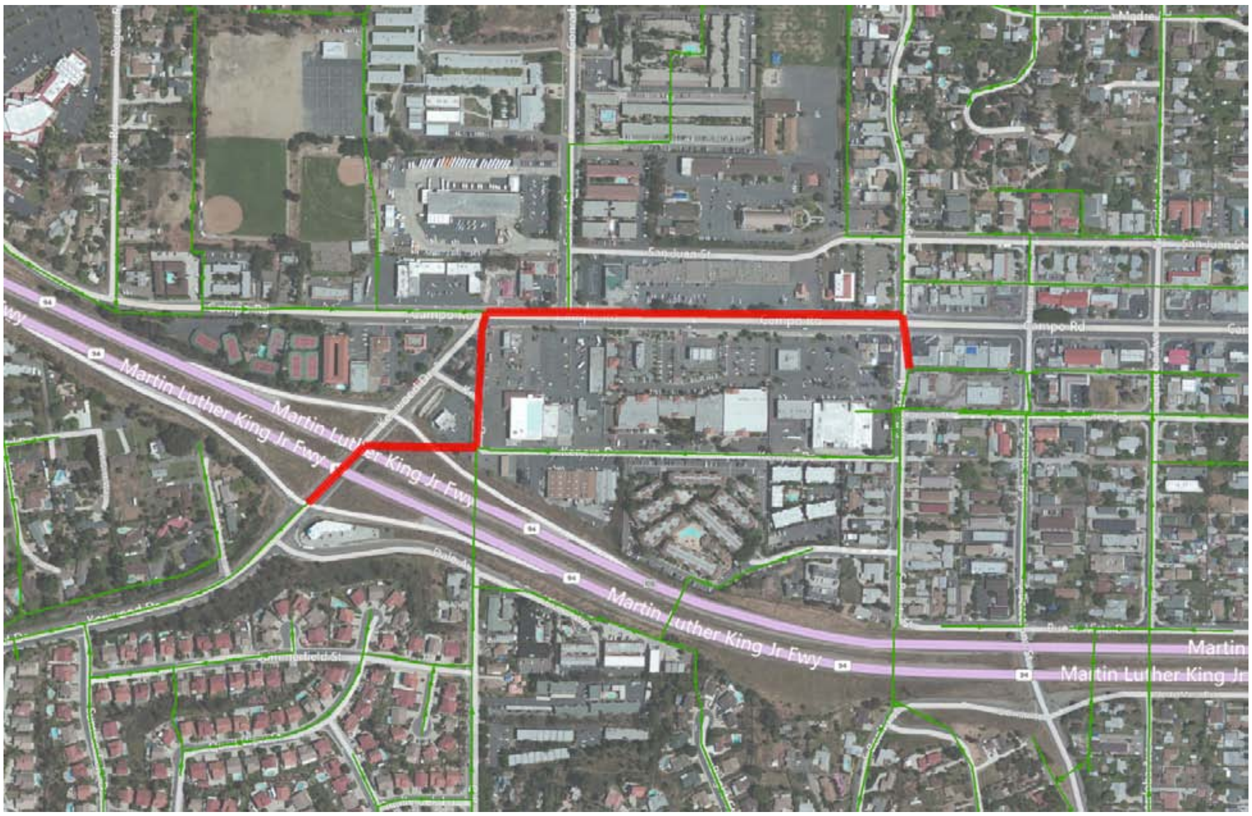
Estimated Construction Cost: $690,000

Estimated Construction Schedule: Phase II

CIP Project:	SV-8 – Trunk E Sewer Pipeline Replacement Project (Bancroft)
Description:	Replace approximately 6,250 feet of existing pipeline ranging in diameter from 10 to 12-inch with 18-inch diameter within Bancroft Road, crossing SR-94.
Estimated Construction Cost:	$8,125,000
Estimated Construction Schedule:	Phase I



CIP Project:	SV-9 – Trunk D Sewer Pipeline Replacement Project
Description:	Replace approximately 2,800 feet of existing 10-inch and 12-inch diameter with approximately 15-inch diameter from SR-94 at Kenwood Drive, extending to Campo Road.
Estimated Construction Cost:	$3,360,000
Estimated Construction Schedule:	Phase II



7.4 Condition Related Projects

As part of the Master Plan, the physical condition of portions of the Spring Valley Interceptor and the La Presa Trunk Sewer were evaluated based on video inspections. Specific recommendations were developed based on the results of a condition assessment analysis for these two sewers.. Although Table 5-7 presents the extrapolated lengths of medium and large diameter pipelines (from La Presa and Spring Valley assessment, respectively) that may require a form of repair and/or rehabilitation, the type and extent of repair/rehabilitation measures necessary may require specific design, construction and environmental measures. Therefore, it is recommended that further inspections be conducted prior to preparing detailed cost estimates for potential medium and large diameter sewer improvements.

To establish the overall condition of the smaller diameter pipelines, the condition assessments for the Alpine, Lakeside, Julian, Winter Gardens, Pine Valley, and Campo SSAs were reviewed, consolidated, and extrapolated to help predict the overall condition of the small diameter pipelines within the Spring Valley SSA. It is recommended that inspection of the Spring Valley SSA trunk sewers is conducted as it is likely additional segments will require rehabilitation. These inspection costs were not included with the Capital Improvement Projects, as they are assumed to be funded through major maintenance.

Table 7-4 summarizes the probable cost to repair/rehabilitate the smaller diameter pipelines within the Spring Valley SSA based on the assessment findings for pipeline segments that have been in service for more than 50 years and the probable recommended actions required by pipe diameter. As repair/rehabilitation improvements for 12-inch diameter pipelines were not identified with the inspection and assessment of the pipelines in the various SSA, it was assumed that approximately 10 percent of the 12-inch pipelines in the Spring Valley SSA may require some form of repair or rehabilitation. Additionally, since specific types of projects have not been identified, for cost estimating purposes eighteen (18) percent for Design and Construction Management Services and twenty (20) percent Contingency have been applied to unit costs to generate a total estimated cost of $22,940,600.

Table 7-4 Estimated Costs for Small Diameter Rehabilitation

Repair/Rehabilitation	Length (feet)	Estimated Cost
Up to 8-inch	96,200	$22,476,000
10-inch	500	$123,900
12-inch	1,300	$340,500
Total	**97,700**	**$22,940,600**

Several potential projects were developed based upon the results of the Spring Valley Interceptor and La Presa Trunk Sewer condition assessments. Table 7-5 summarizes the estimated costs of the proposed trunk sewer repair/rehabilitation. The total costs for these condition related projects for the portions inspected are approximately $1,922,000.

Table 7-5 Estimated Costs for Spring Valley and La Presa Rehabilitation Projects

Facility ID No.	Line Length	Location	Upstream Manhole	Downstream Manhole	Pipe Diameter (inches)	Recommended Action	Estimated Cost
Spring Valley Interceptor							
SV0367	682.00	Easement	SVMH0243A	SVMH0243B	42	Sectional Lining Repair	$3,000
SV0312	441.00	Easement	SVMH0211	SVMH0210	42	Sectional Lining Repair	$3,000
SV0297	1077.00	Easement	SVMH0210	SVMH0199	42	Cleaning & Sectional Lining Repairs	$12,000
SV0295	1190.00	Easement	SVMH0199	SVMH0198	42	Cleaning & Sectional Lining Repairs	$12,000
SV0294	495.00	Easement	SVMH0198	SVMH0197	42	Cleaning & Sectional Lining Repairs	$6,000
SV0293	41.00	Easement	SVMH0197	SVMH0196	42	Sectional Lining Repair	$3,000
SV0292, SV0291, SV0290, SV0289	778.00	Easement	SVMH0196	SVMH0192	42	Cleaning & Sectional Lining Repairs	$3,000
SV0012	612.00	Easement	SVMH007A	SVMH006	54	Sectional Lining Repair	$14,600
Total	**5316.00**						**$56,600**
La Presa Trunk Sewer							
SV5994	60	Easement	SVMH4165	SVMH4164	18	Sectional Lining	$2,100
SV5989	190	Greenleaf Rd	SVMH4147	SVMH4110	18	Sectional Lining	$12,000
SV5987	278	Greenleaf Rd	SVMH4146	SVMH4145	18	Lining	$72,800
SV5986	249	Carissa Lane	SVMH4145	SVMH4056	18	Lining	$65,200
SV5840	257	Carissa Lane	SVMH4056	SVMH4055	18	Lining	$90,700
SV5839	512	Carissa Lane	SVMH4055	SVMH4054	18	Sectional Lining	$19,800
SV5838	322	Felicia Lane	SVMH4054	SVMH4053	18	Sectional Lining	$17,700
SV5649	34	Banock St	SVMH4014	SVMH3902	16	Clean & Line	$8,900
SV5648	223	Easement	SVMH3902	SVGM3900	16	Lining	$58,500
SV5645	53	Pecos St	SVMH3900	SVMH3899	16	Lining	$13,900
SV5632	42	Easement	SVMH3898	SVMH3888	16	Clean & Line	$11,000
SV5610	265	Easement	SVMH3888	SVMH3870	16	Lining	$69,400
SV5609	70	Maria Ave	SVMH3870	SVMH3869	16	Clean & Line	$18,300
SV5608	280	Easement	SVMH3869	SVMH3866	16	Clean & Line	$73,300
SV5604	37	Ramona Ave	SVMH3866	SVMH3863	16	Lining	$9,700
SV5600	190	Easement	SVMH3863	SVMH3862	16	Clean & Line	$49,800
SV5558	200	Easement	SVMH3830	SVMH3829	15	Lining	$58,800
SV5556	200	Easement	SVMH3829	SVMH3828	15	Lining	$66,600
SV5550	214	Sacramento Ave	SVMH3825	SVGM3823	15	Lining	$124,600
SV5545	165	Alley	SVMH3822	SVMH3821	15	Lining	$49,800
SV5543	190	Easement	SVMH3821	SVMH3819	15	Lining	$48,400
SV5540	88	Concepcion Ave	SVMH3819	SVMH3817	15	Lining	$45,800

Table 7-5 Estimated Costs for Spring Valley and La Presa Rehabilitation Projects (continued)

Facility ID No.	Line Length	Location	Upstream Manhole	Downstream Manhole	Pipe Diameter (inches)	Recommended Action	Estimated Cost
SV5535	280	Easement	SVMH3817	SVMH3814	15	Lining	$71,400
SV5497	278	Easement	SVMH3814	SVMH3789	15	Lining	$86,400
SV5494	224	Kempton St	SVMH3789	SVMH3787	15	Lining	$103,800
SV5367	264	Maynard St	SVMH3787	SVMH3715	15	Lining	$106,200
SV5366	265	Maynard St	SVMH3715	SVMH3711	15	Lining	$114,300
SV5361	142	Easement	SVMH3711	SVMH3710	15	Lining	$36,200
SV5359	170	Easement	SVMH3710	SVMH3709	15	Lining	$43,300
SV5357	16	Easement	SVMH3709	SVMH3708	15	Lining	$4,100
SV5336	133	Jamacha Blvd	SVMH3708	SVMH3696	15	Lining	$33,900
SV5334	420	Jamacha Blvd	SVMH3696	SVMH3666	15	Lining	$146,000
SV5292	165	Jamacha Blvd	SVMH3666	SVMH3665	15	Lining	$65,400
SV5291	335	Jamacha Blvd	SVMH3665	SVMH3664	15	Clean & Line	$108,800
SV5290	198	Jamacha Blvd	SVMH3664	SVMH3663	15	Lining	$58,300
SV5289	420	Jamacha Blvd	SVMH3663	SVMH3656	15	Lining	$26,300
Total	**7,429**						**$1,991,500**