

Murrieta Sewer Master Plan

PREPARED FOR

Western Municipal Water District



PREPARED BY



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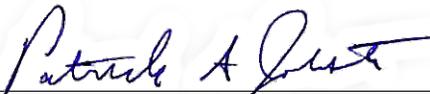
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LIST OF ACRONYMS AND ABBREVIATIONS

ADWF	Average Dry Weather Flow
BWF	Base Wastewater Flow
CCI	Construction Cost Index
CCTV	Closed-Circuit Television
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
D	Diameter
d	Depth of Flow
EDU	Equivalent Dwelling Units
Eastern	Eastern Municipal Water District
Elsinore Valley	Elsinore Valley Municipal Water District
ENR	Engineering News Record
FM	Flow Monitoring
fps	Feet Per Second
GIS	Geographic Information System
gpd	Gallons Per Day
GWI	Groundwater Infiltration
IEC	Infrastructure Engineering Corporation
KJ	Kennedy/Jenks Consultants
MG	Million Gallons
mgd	Million Gallons Per Day
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
q	Maximum Flow in The Pipe Under Design Conditions
Q	Full Pipe Capacity
RDII	Rainfall-Dependent Inflow and Infiltration
SMP	Sewer Master Plan
SRRRA	Santa Rosa Regional Resources Authority
SRWRF	Santa Rosa Water Reclamation Facility

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TVRWRF	Temecula Valley Regional Water Reclamation Facility
WMP	Water Master Plan

Executive Summary

This Sewer Master Plan (SMP) has been prepared to update Western Municipal Water District's (Western) Murrieta Sewer Division Sewer Master Plan, which was last developed in 2014. Since completion of that document, Western has invested considerable effort in refining potential development scenarios, growth projections, and developing potential future service alternatives for the Murrieta Retail Service Area. This SMP integrates recent planning work and system upgrades to evaluate the ability of the existing collection system and treatment facilities to meet the identified future requirements under a buildout planning horizon.

The Murrieta Sewer Division is 6.5 square miles in size and lies within the City of Murrieta. In 2006, Western took over ownership of the Murrieta Retail Area from the Murrieta County Water District and incorporated it into Western. Most of the wastewater generated flows by gravity to the Santa Rosa Regional Resources Authority (SRRRA) Santa Rosa Water Reclamation Facility (SRWRF). The remaining flows are received by Eastern Municipal Water District-owned gravity mains and are conveyed to their Temecula Valley Regional Water Reclamation Facility (TVRWRF).

SRRRA has a collection system hydraulic model of the SRRRA trunk conveyance system that uses Innovyze's InfoSewer software platform. This model contains the trunk gravity mains that convey flow from Rancho California Water District, Elsinore Valley Municipal Water District, and Murrieta Service Area customers. For this SMP, small diameter pipes that were not previously included were added to the model. The flows were updated in the model to correspond to the flow monitoring results from the service area's 2017/2018 study.

Although some intensification of existing land uses is projected, with predicted increased flows from existing development, the majority of the growth in wastewater flows is driven by development expansion into currently undeveloped and unserved regions of the Murrieta Service Area. With the projected land uses within the service area and the District's gravity sewer planning criteria, no existing gravity mains are anticipated to require an increase in pipe diameter by installation of a replacement pipe. All proposed improvements are gravity sewers to serve future land development in unserved areas. These proposed improvements include approximately 38,000 feet of 8-inch diameter, 5,300 feet of 10-inch diameter and 3,100 feet of 15-inch diameter gravity sewers. These proposed improvements will include approximately 19,500 feet of pipe north of the creek and approximately 26,800-feet of pipe south of the creek.

At the buildout future flow condition, both the SRRRA treatment capacity of 1.0 million gallons per day (mgd) owned by Western and the 0.25 mgd capacity agreed to by Eastern Municipal Water District (Eastern) are exceeded for the Murrieta Service Area. Future treatment capacity studies will be required as the service area continues to develop to understand the extent of the future system needs.

CHAPTER 1

Introduction and Purpose

This Sewer Master Plan (SMP) has been prepared to update Western Municipal Water District's (Western) Murrieta Sewer Division Sewer Master Plan. The current SMP for the Murrieta Retail Service Area was developed in 2014. Since completion of that document, Western has invested considerable effort in refining potential development scenarios, growth projections, and developing potential future service alternatives for the Murrieta Retail Service Area. This SMP will integrate recent planning work and system upgrades to evaluate the ability of the existing collection system and treatment facilities to meet the identified future requirements under a build-out planning horizon.

The following work tasks were performed as part of this SMP:

- Review of existing data and studies including the Murrieta General Plan
- Review of Geographic Information System (GIS) for the Murrieta Service Area to identify recent upgrades to the collection system infrastructure
- Development of InfoSewer hydraulic model to correspond to the updated GIS
- Development of wastewater flow projections
- Evaluation of hydraulic capacity of existing collection system infrastructure under existing and future flow scenarios
- Evaluation of treatment capacity
- Development of a capital improvement program and conceptual level cost estimates for each supply alternative
- Development of program-level California Environmental Quality Act (CEQA) compliance documentation

This SMP will be used as a guide for planning short- and long-term collection system improvements for the Murrieta Sewer Division and as a basis for evaluating the various rate and financial impacts for existing customers and future development.

1.1 REPORT ORGANIZATION

This Sewer Master Plan is organized into the following chapters:

- Chapter 1. Introduction and Purpose
- Chapter 2. Existing Service Area and Wastewater Collection System
- Chapter 3. Collection System Wastewater Flows
- Chapter 4. Design and Performance Criteria
- Chapter 5. Existing Wastewater System Evaluation
- Chapter 6. Future Wastewater System Evaluation
- Chapter 7. Capital Improvement Projects
- Chapter 8. References

CHAPTER 2

Existing Service Area and Wastewater Collection System

This chapter describes the Murrieta Retail Service Area’s characteristics and its existing wastewater collection system.

2.1 EXISTING SERVICE AREA DESCRIPTION

The Murrieta Sewer Division is 6.5 square miles in size and lies within the City of Murrieta. In 2006, Western took over ownership of the Murrieta Retail Area from the Murrieta County Water District and incorporated it into Western. The area is contained by Interstate 15 to the northeast and the Santa Rosa Plateau to the southeast. It is on the south end of the Western service area boundary, bordered by Eastern Municipal Water District (Eastern) to the northeast and Elsinore Valley Municipal Water District (Elsinore Valley) to the Northwest. The area is essentially surrounded by Rancho California Water District (Rancho). Most of the development within the service area has occurred north of the Murrieta Creek, and 27 percent of the properties within the service area are currently connected to the existing sewer system. The service area can be seen on Figure 2-1 and service status on Figure 2-2.

2.2 EXISTING WASTEWATER COLLECTION SYSTEM DESCRIPTION

Due to the natural terrain, all flow generated within the Murrieta Sewer Division flows by gravity to the south east. Ultimately, conveyed wastewater will either reach the Santa Rosa Regional Resources Authority (SRRRA) Santa Rosa Water Reclamation Facility (SRWRF), or the Temecula Valley Regional Water Reclamation Facility (TVRWRF). SRWRF is located at 26266 Washington Avenue, Murrieta, CA. TVRWRF is located at 42565 Avenida Alvarado, Temecula, CA. SRWRF receives approximately 80 percent of Western’s capacity of 1.0 million gallons (MG) during average dry weather flow (ADWF) conditions. The existing collection system and drainage areas are detailed in table below.

2.2.1 Gravity Mains

The Murrieta Sewer Division collection systems consists of approximately 38 miles of pipeline ranging from 4 inches to 15 inches in diameter of ductile iron, polyvinyl chloride, or vitrified clay material. By length, 88 percent of the pipelines are 8 inches in diameter and 65 percent are polyvinyl chloride. The length of pipe by diameter is shown in Table 2-1, and the length of pipe by material is shown in Table 2-2.

Diameter, inches	Length, feet	Length, miles	Percentage
4	1,260	0.2	1
6	9,665	1.8	5
8	174,665	33.1	88
10	3,609	0.7	2
12	6,800	1.3	3
15	1,904	0.4	1
Total	197,904	37.5	100

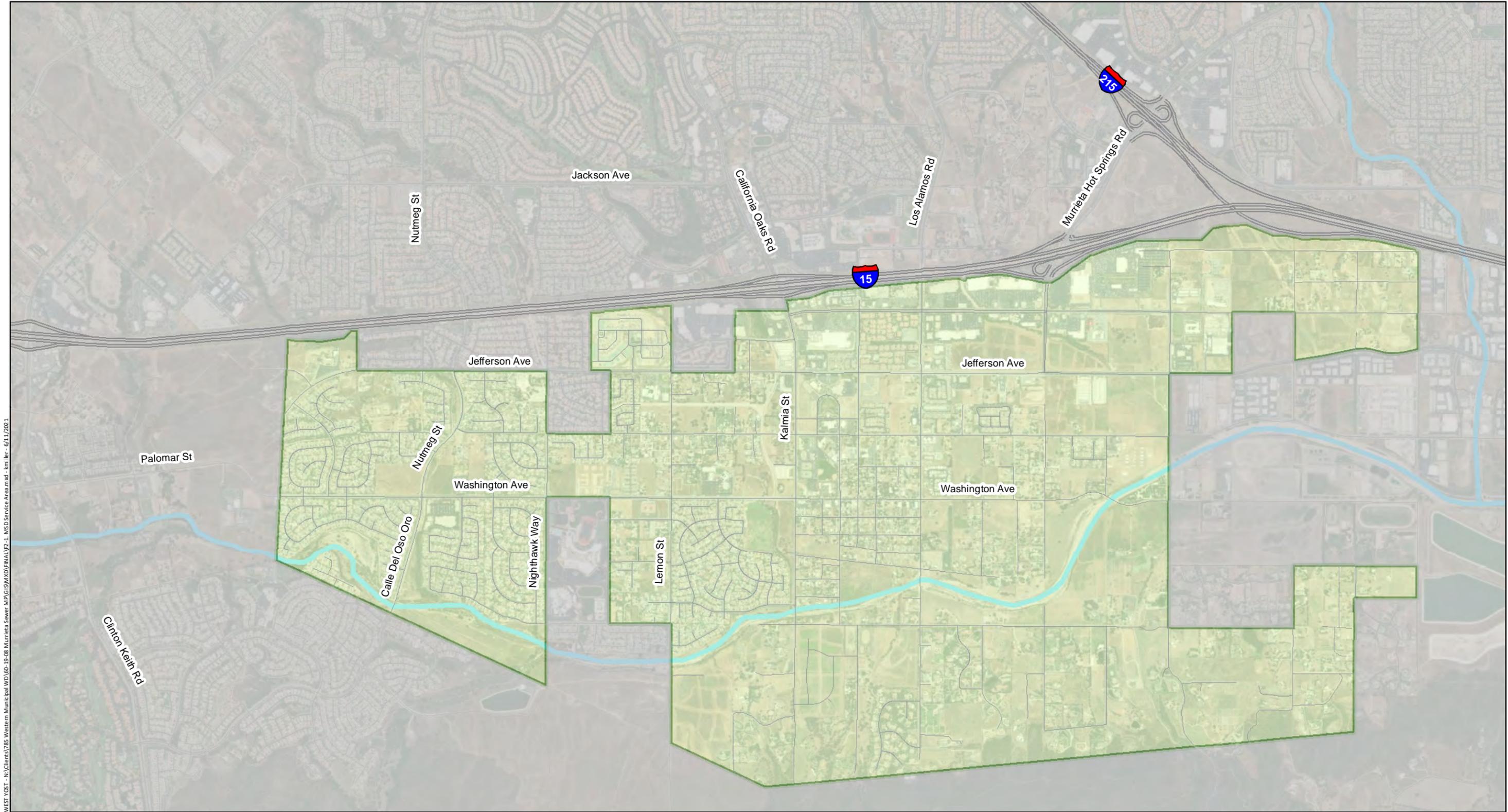
Table 2-2. Gravity Main Quantities by Material

Material	Length, feet	Length, miles	Percentage
Ductile Iron	40	< 0.1	< 1
Polyvinyl Chloride	129,366	24.5	65
Vitrified Clay Material	68,498	13.0	35
Total	197,904	37.5	100

2.3 EXISTING WASTEWATER TREATMENT

The Murrieta Sewer Division is a component of the SRRRA. The SRRRA is a Joint Powers Authority (JPA) formed by Elsinore Valley, Rancho, and Western, established on November 12, 2015. The JPA is responsible for the collection, transmission, treatment, and disposal of wastewater from the member agencies. This wastewater generated within the SRRRA service area is treated at the SRRRA-owned SRWRF. Western owns 1.0 million gallons per day (mgd) of capacity in the SRWRF as part of the SRRRA formation agreement.

The portion of the Murrieta Sewer Division tributary to the SRWRF comprises the largest portion of the Murrieta Sewer Division. A small portion of the Murrieta Sewer Division flows into Eastern and is not tributary to the SRWRF. Flow from this portion of the Murrieta Sewer Division is collected in Eastern-owned gravity mains and conveyed to the TVRWRF for treatment. Western has an agreement with Eastern for 0.25 mgd of treatment capacity.



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- Murrieta Sewer Division Service Area
- Highways
- Roads
- Creek

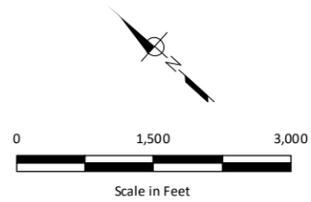
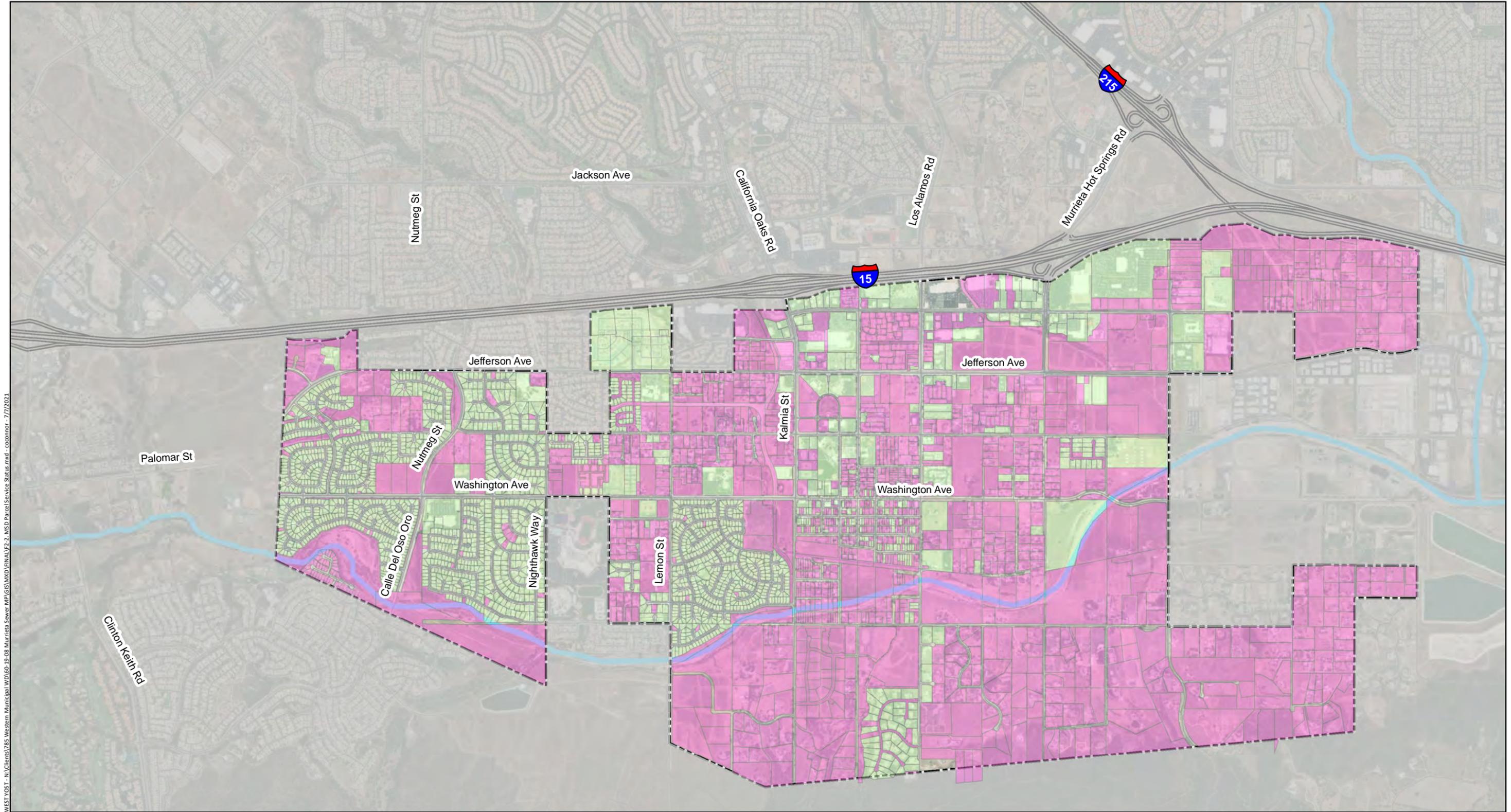


Figure 2-1
Service Area



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- Murrieta Sewer Division Service Area
- Highways
- Roads
- Creek
- Parcel Service Status**
- Connected
- Not Connected

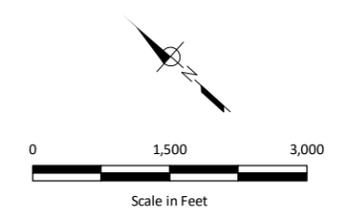
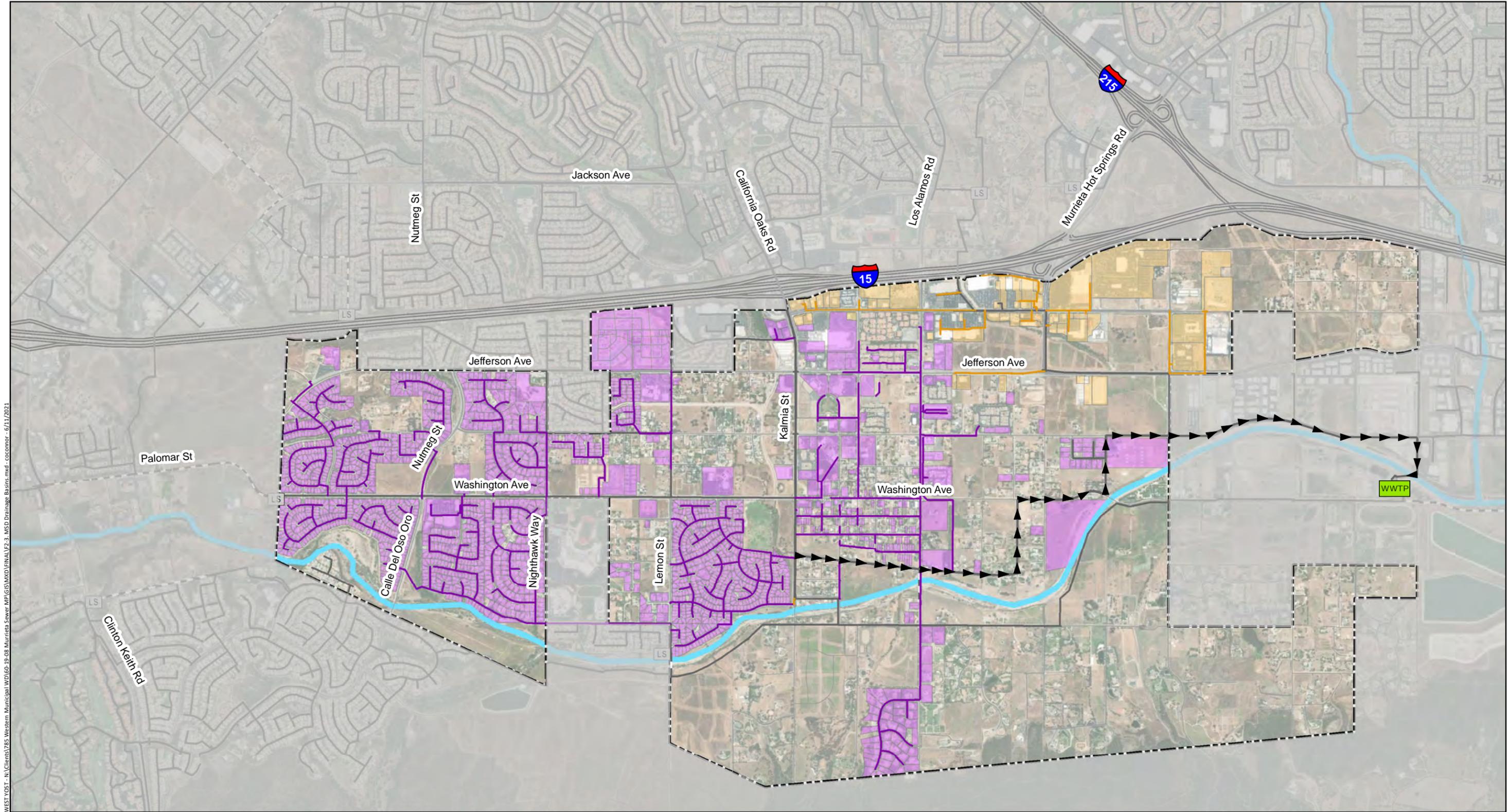


Figure 2-2
Service Status
by Parcel



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- | | |
|---|---|
| <ul style="list-style-type: none"> LS Other Lift Station WMWD Main Drainage Basin — SRRRA Gravity Main — EMWD Gravity Main — Other Gravity Main - - - Other Force Main | <ul style="list-style-type: none"> SRRRA Drainage Area EMWD Drainage Area SRRRA Wastewater Treatment Plant Murrieta Sewer Division Service Area Highways Roads Creek |
|---|---|

Scale in Feet

Figure 2-3
Existing System
Drainage Basins

Western Municipal Water District
Murrieta Sewer Division
Sewer Master Plan Update

CHAPTER 3

Collection System Wastewater Flows

This Chapter describes the existing and future flows which the collection system must convey.

3.1 OVERVIEW OF TYPICAL COLLECTION SYSTEM FLOWS

Collection systems such as that in the Murrieta Sewer Division collect and convey flow from several different sources. It is important to understand these sources when evaluating existing and developing future flows for a collection system.

Collection systems typically convey both sanitary flow, which is the intended use of the collection system, and external flows from inflow and infiltration that enter the collection system infrastructure. The detailed flow components relevant to the flow generation in the Murrieta Sewer Division collection system include:

- Average Dry Weather Flow (ADWF)
- Peak Dry Weather Flow (PDWF)
- Peak Wet Weather Flow (PWWF)

3.1.1 Average Dry Weather Flow

ADWF is generally accepted to include two components: base wastewater flow (BWF) and groundwater infiltration (GWI). BWF represents the sanitary flow contributions from residential, commercial, institutional, and industrial dischargers to the collection system. BWF is the flow for which known customers are being charged. GWI refers to groundwater that infiltrates into the collection system via defects in wastewater pipes and manholes. GWI tends to increase following rainfall events, and generally tends to be highest in winter and spring, and in low-lying areas. In some collection systems, GWI is low enough, compared to BWF, that it can be assumed to be negligible. In other collection systems, GWI forms a significant portion of the flow in the system.

Short of flow monitoring studies that measure and quantify wastewater salinity (such studies require more expensive equipment than typical flow monitoring studies and are generally cost prohibitive), GWI cannot be directly measured in a collection system. GWI is typically estimated using statistical methods that compare the ratios of flow characteristics such as maximum flow, minimum flow, and average flow. These statistical methods have replaced older and less sophisticated estimates that assumed a certain percentage of night-time flow was GWI, which we now know to be false. In this evaluation, GWI was evaluated using three established methods: The Minimum Flow Factor Method, the Stevens-Schutzbach Equation, and the Wastewater Production Method. Because the Wastewater Production Method was developed for larger flow basins, and therefore estimated higher values for GWI than the other two methods, which were consistent with each other, it was determined that GWI values calculated by the Minimum Flow Factor Method and the Stevens-Schutzbach Equation provided the most reliable estimates for GWI for this evaluation. Relative temperature comparisons can also be used to evaluate the amount of GWI present.

3.1.2 Peak Dry Weather Flow

While GWI tends to remain relatively constant over any given day, BWF varies throughout the day, but typically follows predictable diurnal patterns depending on the type of land use. For example, residential dischargers tend to produce higher flows in the morning hours and in the evening hours, while commercial dischargers tend to have fairly steady discharge during business hours, but very low discharge outside of business hours. Industrial dischargers have flow patterns that depend upon their individual processes.

PDWF is defined as the diurnal flow peak within the collection system during baseline dry weather conditions. PDWF is typically 1.2 to 3.0 times the ADWF, depending on the mixture of discharger types and the size and layout of the collection system.

3.1.3 Peak Wet Weather Flow

PWWF is composed of PDWF and rainfall-dependent inflow and infiltration (RDII). RDII consists of stormwater inflow and infiltration that enter the system in direct response to rainfall events, either through direct connections such as holes in manhole covers or illicitly-connected roof leaders or area drains, or through defects in wastewater pipes, manholes, and service laterals. RDII is typically characterized by short-term peak flows that recede relatively quickly after a given rainfall event ends. The magnitude of RDII flows are related to the intensity and duration of the rainfall, but also related to the degree of soil saturation arising from earlier (antecedent) rainfall conditions.

RDII can be quantified for collection system analysis in multiple ways. A common technique is the R-T-K Method. In this method, R-T-K factors are used to quantify the amount of RDII that enters the collection system for each flow monitoring basin, as well as the timing of the RDII entry with respect to the rainfall that generates the RDII. The R-T-K Method uses a series of three triangular hydrographs that represent short-term, medium-term, and long-term rainfall response for each flow monitoring basin. The individual R-T-K factors are defined as follows:

- **R-factor:** The percentage of rainfall that enters the collection system in the form of RDII
- **T-factor:** The time from the storm onset to the runoff peak
- **K-factor:** A constant used in defining the ratio of the “time to recession” to the “time to peak” of the hydrograph

3.2 DEVELOPMENT OF MURRIETA SERVICE AREA FLOWS

Western has invested significant resources into flow monitoring and flow studies to calculate wastewater flows in the Murrieta Sewer Division. These efforts are described in more detail below.

3.2.1 Flow Monitoring in the Murrieta Sewer Division

The primary source of data for flow development for this SMP is flow monitoring data collected in recent years. SRRRA conducted temporary flow monitoring, summarized in the SRRRA - 2017 to 2018 Sewer Flow Monitoring Study Report by Infrastructure Engineering Corporation (IEC Flow Monitoring Report, March 2018). In addition, SRRRA is conducting on-going flow monitoring at six locations within the Western’s service area. The portion of the Murrieta Sewer Division tributary to the SRWRF, and therefore captured by the flow monitoring, consists of pockets of parcels of varying sizes interspersed with Rancho parcels.

The temporary flow monitoring study, consisting of 13 locations, was performed throughout SRRRA in January and February of 2018. The results of this temporary study were provided in the IEC Flow Monitoring Report, March 2018. Eight of the 13 locations directly measured Western flow in the Murrieta Sewer Division. Two of the eight direct measurements in the temporary study used specialized equipment to measure very low flows from small tributary areas. The results from these two areas indicate that the flows at these locations were right on the boundary of what can be effectively measured, and therefore these locations were not included in the subsequent permanent flow monitoring study. As a result, the permanent flow monitoring program for the Murrieta Sewer Division consists of six flow monitoring locations. The numbering convention used to identify the flow monitors changed between the initial identification of the temporary flow monitoring sites, the reporting of results in the IEC Flow Monitoring Report, March 2018, and the permanent flow monitoring program. To minimize confusion, the numbering convention used for the permanent flow monitoring program is used throughout this SMP. The temporary flow monitoring study gathered data in January 2018 and February 2018. The permanent flow monitoring program provides monthly results starting in January 2019, and reports are received by Western on a monthly basis. The six permanent flow monitoring locations are shown on Figure 3-1.

3.2.2 Murrieta Service Area Flow Study

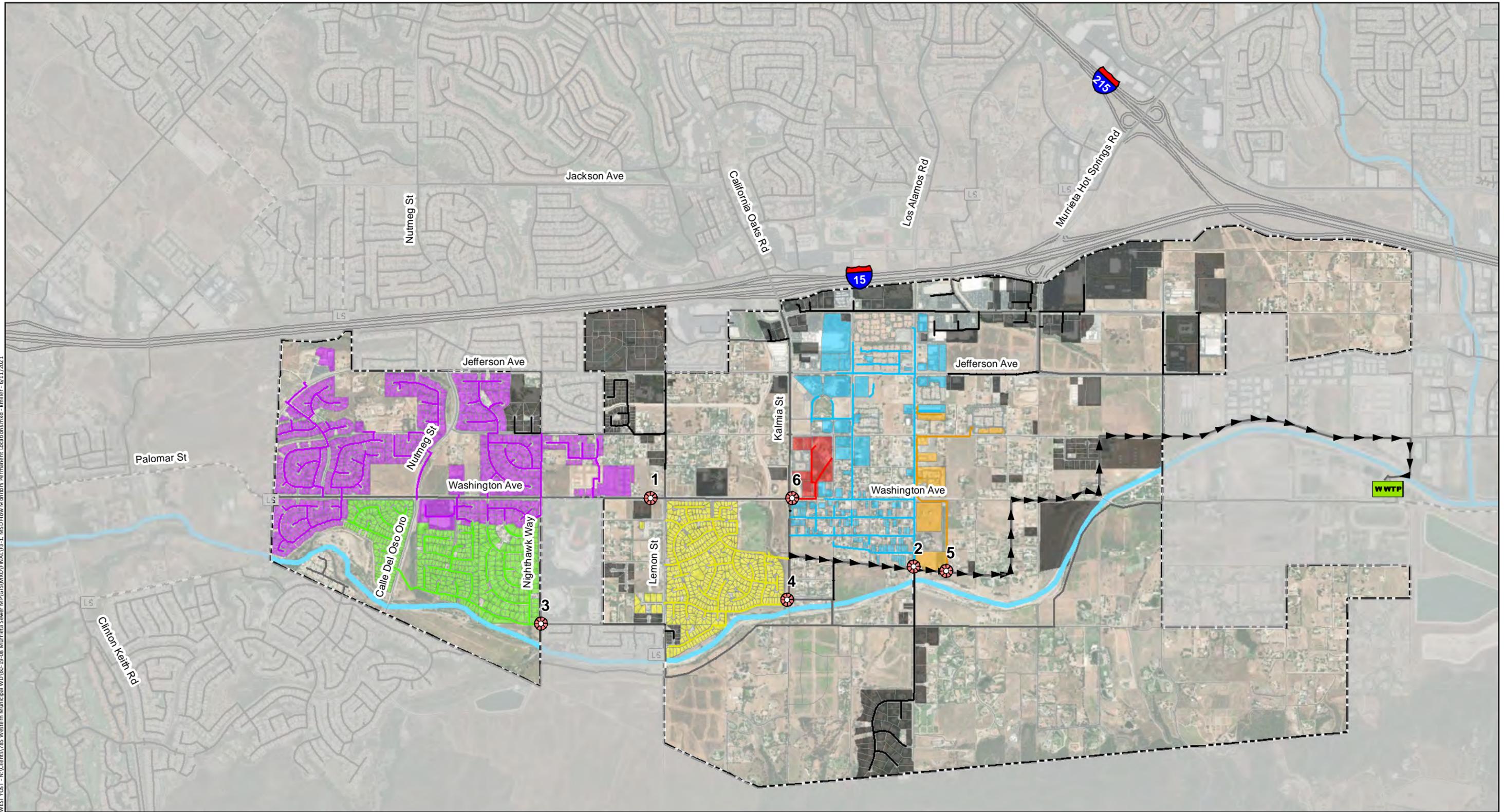
Flow monitoring studies such as those described above, in conjunction with billing analysis conducted by both Western and SRRRA since the inception of SRRRA, have consistently indicated that the wastewater generated within the Murrieta Sewer Division is relatively high given the wastewater customers served. Under an agreement separate from this SMP, West Yost was contracted by Western to evaluate the wastewater flows being generated in the portion of the Murrieta Sewer Division tributary to SRRRA. The components of this Murrieta Service Area Flow Study were:

- Confirm that wastewater generation is high in the study area
- Identify source(s) of high wastewater generation in the study area
- Identify potential solutions and reduce unaccounted for wastewater flows
- Perform a cost evaluation to determine whether potential solutions to high wastewater generation are cost-effective given the cost of treating wastewater at SRWRF

The Murrieta Service Area Flow Study used a desktop evaluation of existing data to quantitatively determine if the wastewater generation in the Murrieta Sewer Division is indeed high relative to the customers served. Based upon the findings of this study, it was determined that a substantial portion of the high generation is the result of groundwater entering the collection system through defects in the collection system, rather than through discharge of unusually high amounts of sanitary flow from known customers, or from discharge of unknown customers (illegal connections). This high wastewater generation is not found uniformly across the Murrieta Sewer Division, but is concentrated into several basins within the division.

Field investigation was used subsequently to further identify and quantify the high wastewater generation sources based upon the findings of the desktop evaluation. The field investigation consisted of sub-basin flow monitoring targeted at the basins identified in the desktop study, and then closed-circuit television (CCTV) inspection of the sub-basin. The results of this study were incorporated into the existing flow calculations provided in Section 3.3 for the SMP.

WEST YOST - N:\Clients\785 - Western Municipal W.D\60-19-08 Murrieta Sewer MPA\GIS\WXD\FINAL\F3-1_MSD Flow Monitors Permanent Location.mxd - kmiller - 6/11/2021



- SRRRA Permanent Flow Monitor Locations
- Other Lift Station
- Other Gravity Main
- Other Force Main

- Gravity Main by FM Basin**
- N/A
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6

- Flow Monitoring Basin**
- None
 - Basin 1
 - Basin 2
 - Basin 3
 - Basin 4
 - Basin 5
 - Basin 6

- SRRRA Wastewater Treatment Plant
- Murrieta Sewer Division Service Area
- Highways
- Roads
- Creek

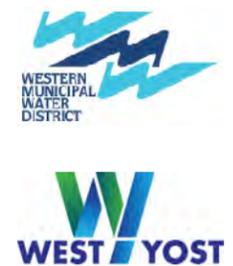
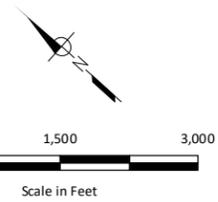


Figure 3-1
Flow Monitors
Permanent Locations

3.2.3 SRRRA Wet Weather Flow Study

Rancho contracted with IEC to conduct a comprehensive wet weather flow analysis based on the temporary flow monitoring study conducted in 2017/2018 as described above. Wet weather flows were analyzed to develop R-T-K values for each flow monitoring basin. The R-T-K values were delivered in a technical memorandum to Rancho, which was shared with SRRRA member agencies. These values were used to develop design flows for the Murrieta Sewer Division as part of this SMP.

3.3 MURRIETA SERVICE AREA EXISTING FLOWS

A demand projection report (demand report) for the Murrieta service area was completed in July of 2017 by Kennedy/Jenks Consultants (KJ). The report was used as the basis for the demand calculations and projections contained in the 2019 Draft Murrieta Service Area Water Mater Plan Update (WMP). The report analyzed population growth estimates and past water use trends for different water use sectors in order to produce existing and projected water demands. Due to the relatively small size and land use characteristics of the Murrieta Service Area, the projected horizon year for the area was assumed to be build-out conditions.

These water demands, which are described in the WMP, in addition to the sewer flow development sources listed above, were used to develop existing and future flows in the Murrieta Service Area; therefore, the flows developed in this SMP are consistent with measured values, as well as, consistent with water demand as described in the WMP.

3.3.1 Base Sanitary Flow

As described above, wastewater flow from the Murrieta Service Area is tributary either to SRRRA or to Eastern. Flows for this SMP are developed based upon metering data by flow monitoring basin and are used to estimate the flow generation per equivalent dwelling units (EDU) for each drainage basin. See Table 3-1 for flow generation rates per EDU.

Flow Monitoring Basin	BWF, gpd/EDU
1	147
2	196
3	182
4	177
5	287
6	233
Unmetered	182

Existing ADWF tributary to SRRRA from the Murrieta Service Area is shown in Table 3-2. Also shown in the table, ADWF tributary to SRRRA is calculated to be approximately 800,000 gallons per day (gpd). Over 200,000 gpd of this ADWF is estimated to be GWI. There is approximately 125,000 gpd of GWI during dry weather months, and approximately 115,000 gpd of additional GWI during wet weather months when the

groundwater table is higher. These GWI values represent dry weather condition in that they do not include infiltration that is entering the collection system during precipitation events, which would increase flows beyond those in the table. The GWI values estimated for the Murrieta Service Area are high when compared to both neighboring agencies, and to agencies across California. The following Chapters of this SMP provide recommendations for reducing the GWI values. Table 3-3 breaks down the existing flows to SRRRA by drainage basin.

Table 3-2. Existing Flow to SRRRA by FM Basin, gpd

Flow Monitoring Site	BWF	Dry Season Dry Weather Infiltration	Wet Season Dry Weather Infiltration	Total ADWF
1	135,100	51,000	23,600	209,700
2	158,900	-	52,600	211,500
3	78,100	42,800	1,500	122,400
4	81,800	17,700	20,100	119,600
5	44,700	3,800	7,700	56,200
6	23,500	-	2,100	25,600
Subtotal - Metered	522,100	115,300	107,600	745,000
Unmetered	39,300	8,700	8,100	56,100
District Total	561,400	124,000	115,700	801,100

Table 3-3. Existing Flow to SRRRA by Region, gpd

Region	BWF	Dry Season Weather Infiltration	Wet Season Dry Weather Infiltration	Total ADWF
North of Creek	555,600	122,700	114,500	792,800
South of Creek	5,800	1,300	1,200	8,300
District Total	561,400	124,000	115,700	801,100

A portion of the Murrieta Service Area is tributary to Eastern. The existing tributary to Eastern for the Murrieta Service Area can be found in Table 3-4. These values were not measured by flow monitoring, but were calculated based on flow per EDU values developed from the SRRRA-tributary flows. The existing flows tributary to Eastern Municipal Water District (EMWD) were calculated to be approximately 220,000 gpd. This value includes approximately 154,500 gpd of BWF and 65,900 gpd of dry and wet season GWI.

Table 3-4. Existing Flow to EMWD by Region, gpd

Region	BWF	Dry Season Dry Weather Infiltration	Wet Season Dry Weather Infiltration	Total ADWF
North of Creek	154,500	34,200	31,800	220,500
South of Creek	-	-	-	-
District Total	154,500	34,200	31,800	220,500

3.3.2 Groundwater Infiltration

As described above, the GWI component of total wastewater flow from the Murrieta Service Area is relatively high when compared to other service areas. The wastewater flow study found that several flow monitoring basins tributary to SRRRA had particularly high GWI values. The recommended improvements for this SMP include elements to reduce and control into the future amount of GWI that enters the collection system.

3.3.3 Rainfall Dependent Inflow and Infiltration

RDII flow values in the Murrieta Service Area were calculated from the temporary flow monitoring program described above. These values were calculated for SRRRA by IEC during a calibration project. The RDII flows are calculated as R-T-K values and presented in Table 3-5.

Flow Monitoring Site	Response Type	R	T	K
FM 1	Short Term (R ₁)	0.0016	0.95	1.148
	Medium-Term (R ₂)	0.0015	1.25	4.0
	Long-Term (R ₃)	0.0007	4.0	10.0
FM 2	Short Term (R ₁)	0.005	0.739	0.949
	Medium-Term (R ₂)	0.0045	2.349	2.867
	Long-Term (R ₃)	0.0045	3.0	3.0
FM 3	Short Term (R ₁)	0.0004	0.221	0.174
	Medium-Term (R ₂)	0.002	0.8	5.263
	Long-Term (R ₃)	0.0014	3.151	4.762
FM 4	Short Term (R ₁)	0.0025	0.45	0.76
	Medium-Term (R ₂)	0.0019	1.05	4.832
	Long-Term (R ₃)	0.002	4.443	4.293
FM 5	Short Term (R ₁)	0.025	0.76	1.9
	Medium-Term (R ₂)	0.0018	2.5	3.5
	Long-Term (R ₃)	0.007	6.0	11.0
FM 6	Short Term (R ₁)	0.003	0.185	1.739
	Medium-Term (R ₂)	0.0006	1.6	3.0
	Long-Term (R ₃)	0.0001	3.359	5.612

The total R values calibrated for the Murrieta Service Area range from 0.37 percent in FM Basin #6 to 3.38 percent in FM Basin #5. Generally speaking, total R values of less than 4.0 percent are considered indicative of low RDII generation. The Murrieta Service Area has low RDII generation, and relatively small amounts of capacity are being consumed by wet weather flows. As described above, more capacity is being consumed by GWI, and the recommended improvements in this SMP are designed to target GWI flows over the long term.

3.4 MURRIETA SERVICE AREA FUTURE FLOWS

Future flows for this SMP were calculated in accordance with the water demand projection process used in the WMP. Therefore, the wastewater flow projections developed in this SMP are consistent with the WMP demand projections. Because the WMP demand projections were developed based upon the City of Murrieta’s most recent general plan, the water demand projections and the sewer flow projections incorporate the growth allowed by the general plan.

3.4.1 Base Wastewater Flow

Similar to the water demand projections in the WMP, BWF in the Murrieta Service Area was projected based upon EDU wastewater generation values in combination with EDU projections. The EDU projections are based upon allowable future EDUs as defined by the general plan. For both the WMP and the SMP, parcels within the Murrieta Service Area were classified as Developed or Undeveloped. EDU values were assigned to all Undeveloped parcels within the service area. Future wastewater flows are therefore buildout projections and are in alignment with the buildout water projections from the WMP.

In the portion of the Murrieta Service Area tributary to SRRRA, BWF projections were made by flow monitoring basin. Existing unit factors were projected for each basin. The flow projections can be seen in Table 3-6.

Table 3-6. Future Base Flow to SRRRA by Metering Site, gpd

Flow Monitoring Site	Existing BWF	Growth BWF	Future BWF
1	135,100	62,500	197,600
2	158,900	153,800	312,700
3	78,100	9,000	87,100
4	81,800	10,900	92,700
5	44,700	21,800	66,500
6	23,500	8,200	31,700
Subtotal - Metered	522,100	266,200	788,300
Unmetered	39,300	804,200	843,500
Total	561,400	1,070,400	1,631,800

In the portion of the Murrieta Service Area tributary to SRRRA, BWF projections were made using flow per equivalent dwelling units (EDU) values developed from the SRRRA-tributary flows. Existing unit factors were projected for the north and south sides of Murrieta Creek (Creek). The flow projections can be seen in Table 3-6.

Table 3-7. Future Base Flow Tributary to SRRRA on Each Side of Creek, gpd

Region	Existing BWF	Growth BWF	Future BWF
North of Creek	555,600	662,200	1,217,800
South of Creek	5,800	408,200	414,000
District Total	561,400	1,070,400	1,631,800

In the portion of the Murrieta Service Area tributary to EMWD, BWF projections were made using flow per EDU values developed from the SRRRA-tributary flows. Existing unit factors were projected for the north and south sides of Murrieta Creek (Creek). The flow projections can be seen in Table 3-6.

Table 3-8. Future Base Flow Tributary to EMWD, gpd

Region	Existing BWF	Growth BWF	Future BWF
North of Creek	154,500	514,800	669,300
South of Creek	-	-	-
District Total	154,500	514,800	669,300

3.4.2 Groundwater Infiltration

GWI enters the collection system through defects in the buried infrastructure. Therefore, it increases as the size of the collection system increases, and as the number of defects increase (as the collection system infrastructure begins to deteriorate). GWI is often normalized by area served by the collection system as a method of projecting future values.

This method (normalization by area) was followed in projecting GWI values in the Murrieta Service Area. GWI generation per acre values were used to calculate GWI for future areas served by the Murrieta Service Area collection system. Although the new infrastructure is expected to have lower GWI values, the new infrastructure is expected to approach existing GWI rates over time. Therefore, projecting GWI values in this manner is conservative and appropriate for future planning. ADWF values including GWI for existing and future conditions in the portion of the Murrieta Service Area tributary to SRRRA are provided in Table 3-9. The total future ADWF for the Murrieta Service Area is projected to be more than 1,900,000 gpd in the portion tributary to SRRRA.

Table 3-9. Existing Vs Future Flows to SRRRA, gpd

Flow	Existing ADWF	Future ADWF From Septic	Future ADWF From Other Development	Total
North of Creek	792,800	296,400	395,900	1,485,100
South of Creek	8,300	61,100	375,600	445,000
Total	801,100	357,500	771,500	1,930,100

ADWF values including GWI for existing and future conditions in the portion of the Murrieta Service Area tributary to Eastern are provided in Table 3-10. Total ADWF tributary to Eastern is projected to be nearly 800,000 gpd at buildout.

Table 3-10. Existing vs Future Flows to EMWD, gpd

Flow	Existing ADWF	Future ADWF From Septic	Future ADWF From Other Development	Total
North of Creek	220,500	114,500	457,500	792,500
South of Creek	-	-	-	-
Total	220,500	114,500	457,500	792,500

The GWI values projected for the future can be altered with focused rehabilitation and repair projects to reduce defects and therefore GWI. Potential projects and impacts on GWI, and therefore impacts on future wastewater flows in the Murrieta Service Area, are discussed in the following chapters.

3.4.3 Rainfall Dependent Inflow and Infiltration

The R-T-K values calibrated for existing conditions within each flow monitoring basin are maintained for future conditions. The area of projected future growth within each flow monitoring basin was used in conjunction with the R-T-K values to calculate RDII within the system for future conditions.

CHAPTER 4

Design and Performance Criteria

Chapter 4 defines the performance criteria that are used to evaluate the ability of the collection system to convey these flows.

4.1 PERFORMANCE CRITERIA

The capacity of the collection system is evaluated for the SMP based on the performance criteria defined in this section. The criteria have been developed from industry standards, modified to incorporate Western's specific policies and risk tolerance. The criteria are supplemented with other commonly-used criteria as needed and as specified below. The following performance criteria are discussed in this section:

- Gravity Main Performance Criteria
- Gravity Main Proximity Criteria
- Lift Station and Force Main Performance Criteria

4.1.1 Gravity Main Performance Criteria

Conceptually speaking, gravity main performance criteria concern the determination of how full a gravity main will be at a given flow (what is the capacity of the gravity main), and determination of how full a gravity main may be before it is identified to have insufficient capacity (how much capacity in the gravity main can be taken by design flows before the gravity main is identified as insufficient). The following gravity main capacity topics are discussed below:

- Flow Capacity
- Maximum Allowable Flow
- Design Velocities and Minimum Slopes
- Gravity Main Proximity for Service

4.1.1.1 Flow Capacity

In evaluating flow and capacity in gravity mains, the following two equations were used to determine the depth of flow in a gravity main for any given flow, and the full flow capacity (flow at which the depth of flow equals the gravity main diameter) of the gravity main:

$$\text{Continuity Equation: } Q = V \cdot A$$

where:

Q = peak flow, cubic feet per second (fps)

V = flow velocity, fps

A = cross-sectional area of pipe, square feet

$$\text{Manning's Equation: } V = (1.486 * R^{2/3} * S^{1/2}) / n$$

where:

V = flow velocity, fps

n = Manning's coefficient of friction (unitless)

R = Hydraulic radius (cross-sectional area of flow divided by wetted perimeter), feet

S = Slope of pipe, feet per foot

Manning's "n" is a pipe friction-related coefficient that varies with pipe material, age, and other factors. For collection system gravity mains, the Manning's coefficient typically ranges between 0.011 and 0.017, with 0.013 being a typical value used for collection system master planning. A value of 0.013 is the default value used in this SMP for gravity mains,

4.1.1.2 Maximum Allowable Flow

The maximum allowable flow performance criterion concerns how much of a given gravity main's total capacity may be taken by the design flow in that gravity main before the gravity main is identified as having insufficient capacity. The maximum allowable flow in a gravity main is typically expressed in one of two ways. The first way is as a function of depth of flow (d) at design flow conditions as a ratio of the gravity main diameter (D). For instance, a d/D ratio of 0.50 for a 12-inch diameter gravity main indicates that this main is flowing at a depth of 6 inches under design flow conditions. Typically, d/D performance criteria are established between 0.50 and 1.00. The second manner of expressing the maximum allowable flow in a gravity main is the ratio of the maximum flow in the pipe under design conditions (q) to the full pipe capacity (Q). Although d/D ratios have a maximum of 1.00 (the depth of flow cannot physically be greater than the gravity main diameter), the q/Q ratio can exceed 1.00. In such a case, the design flow exceeds the maximum full pipe capacity, and surcharge conditions are created. It should be noted that for circular gravity mains (which includes all of the existing gravity mains), a d/D ratio of 0.50 is equal to a q/Q ratio of 0.50. For other ranges of flow, the d/D ratio and q/Q ratio for a given flow will be similar but not identical.

For this SMP, q/Q ratios are used to express maximum allowable flow in gravity mains. The use of q/Q ratios for performance criteria in this SMP does not preclude Western from continuing to use d/D ratios for design and construction criteria with developers. The performance criteria for the SMP are concerned with long-term management of capacity in the collection system, while the design and construction standards are concerned with constructing appropriate infrastructure for much more detailed and well-defined portions of the collection system.

Determination of the specific q/Q ratios that are to be used as performance criteria is both a policy decision and an engineering decision that balances the risk of a potential overflow caused by insufficient capacity versus the cost required to meet a particular q/Q ratio throughout the collection system. For this SMP, it was determined that a maximum q/Q ratio of 1.00 in gravity mains provided the appropriate balance of risk versus cost.

Once a gravity main has been determined to have insufficient capacity, the gravity main performance criteria for this SMP recommend that the capacity improvement project indicated be designed to a q/Q ratio of 0.75. Once a project is required, designing the project to q/Q = 0.75 rather than q/Q = 1.00 provides significant risk reduction at a small marginal cost.

4.1.1.3 Design Velocities and Minimum Slopes

To effectively operate, gravity mains must have sufficient capacity for peak design flows, but also must operate effectively during typical daily flows. To minimize the settlement of wastewater solids in the pipe during typical daily flows, Western Standards require gravity main velocities equal to or greater than 2 fps for all gravity mains when flowing half full to ensure adequate flushing of solids. The maximum velocity for gravity mains shall normally be 8 to 10 fps. Table 4-1 lists the recommended minimum slopes for maintaining velocities greater than 2 fps when the gravity main is flowing half full.

Gravity Main Diameter, inches	Minimum Slope, feet/foot
6	0.0049
8	0.0033
10	0.0025
12	0.0019
15	0.0014
18	0.0011

4.1.1.4 Gravity Main Proximity for Service

There is extensive undeveloped land in the Murrieta Service Area that does not currently have collection system service, particularly south of Murrieta Creek. A significant amount of infrastructure extension will be required in these areas. Infrastructure extension is typically accomplished through a combination of agency construction for shared infrastructure and developer construction for service infrastructure. The balance between agency construction and developer construction varies from agency to agency.

This SMP assumes that the developers will construct the required gravity sewer mains to an existing sewer if their property is within 1,000 feet of existing or proposed infrastructure. If their property is not within 1,000 feet of existing or proposed infrastructure, this SMP assumes that the property will be served by a septic system. Based on the ultimate land use assumptions, this SMP assumes that all properties within the service area will eventually be served by the conventional sewer collection system.

4.1.2 Lift Station and Force Main Criteria

The Murrieta Service Area does not currently utilize lift stations. However, it is important to establish criteria in the event that lift stations are required in the future. Key lift station and force main criteria discussed in this section include:

- Lift Station Hydraulic Capacity
- Force Mains

4.1.2.1 Lift Station Hydraulic Capacity

For this SMP, the hydraulic criteria for lift stations is that they should have sufficient capacity to pump the peak design flow with the largest pump out of service (firm capacity). Standby power is not required but should be considered as standard on all new lift stations and all lift station rehabilitation projects.

4.1.2.2 Force Mains

Force mains are typically sized such that the velocity in the force main will exceed 3 fps under normal operating condition so that the force main will remain free of settled debris. Similarly, force mains are typically sized such that the maximum velocity in the force main will not exceed 8 fps under peak conditions. This maximum velocity prevents excessive wear and tear on the force main, and limits excessive energy expenditures due to the high friction losses that result from higher flow velocities.

For the SMP, the force main design criteria of a minimum velocity of 3 fps under normal operating conditions and a maximum velocity of 8 fps under peak operating conditions are applied. The Hazen-Williams formula is used to calculate force main velocities, as follows:

$$\text{Velocity Equation: } V = 1.32 * C * R^{0.63} * S^{0.54}$$

where:

V = flow velocity, fps

C = Hazen-Williams coefficient (unitless)

R = hydraulic radius (defined as D/4, where D is the pipe diameter), feet

S = slope of the energy gradient (defined as the friction loss divided by the pipe length), feet per foot

The value of the Hazen-Williams coefficient varies with the type of pipe material and is influenced by the type of construction and age of the pipe. A value of 120 is assumed to be the default value for this analysis.

4.2 DESIGN STORM CRITERIA

The use of wet weather design events as the basis for sewer capacity evaluation is standard practice in collection system planning and design. This process first involves calibrating a hydraulic model of the collection system to match wet weather flows from one or more observed storms (R-T-K values as described in Chapter 3), and then applying the calibrated model to a design rainfall event to identify capacity deficiencies and to size sewer improvements. The design event may be synthesized from rainfall statistics (synthetic design storm) or may be an actual historical rainfall event of appropriate duration and intensity. Other considerations for the design event include the spatial variation of the rainfall and the timing of the storm relative to the diurnal base wastewater flow pattern. For conservatism, it is assumed in this SMP that the timing of the diurnal flow peak will approximately coincide with the peak of the RDII during the design storm.

Selection of a design storm is typically based on an allowable level of risk within the collection system, and the description of the design storm is most often expressed in terms of the return period and the duration of the storm. It is recognized that while wet weather overflows are highly undesirable, the cost of providing capacity increases with the return period of the design storm and the associated design flow. Regulatory agencies have not adopted standard criteria for return periods, so wastewater agencies utilize a target return period based on a balance of desired level of service, potential impacts of overflows, and cost of providing capacity.

The design storm for this SMP is 10-year 24-hour with a total volume of 4.48 inches of rainfall. The rainfall distribution is based on the National Resources Conservation Service (NRCS) using Type 1. This return period is typical for sewer system evaluation capacity and for designing sewer facilities to meet Murrieta planning efforts.

CHAPTER 5

Existing Wastewater System Evaluation

Chapter 5 describes the updates that were made to the existing collection system hydraulic model for the SRRRA trunk sewer system. It also provides an evaluation of the existing wastewater collection and treatment facilities.

5.1 CREATION OF THE HYDRAULIC MODEL

SRRRA owns and operates a collection system hydraulic model of the SRRRA trunk conveyance system. This hydraulic model uses the InnoVize InfoSewer software platform, a commonly used software platform for collection system planning. The SRRRA trunk hydraulic model is used as a basis for the Murrieta Service Area hydraulic model. The Murrieta Service Area hydraulic model was created to provide a more comprehensive planning tool than the SRRRA trunk hydraulic model. The creation process is described below.

5.1.1 Infrastructure Updates

The SRRRA trunk collection system model contains the trunk gravity mains that convey flow from Rancho, Elsinore Valley, and Murrieta Service Area customers. The trunk collection system model does not contain the smaller diameter gravity mains that actually collect this flow and deliver it to the trunk system. Although the Elsinore Valley flows are delivered directly to the trunk system, the Rancho and the Murrieta Service Area flows are collected by small diameter gravity mains that flow to the trunk system. Because this SMP requires the hydraulic evaluation of the small diameter gravity mains in the Murrieta Service Area, the infrastructure for such was added to the hydraulic model.

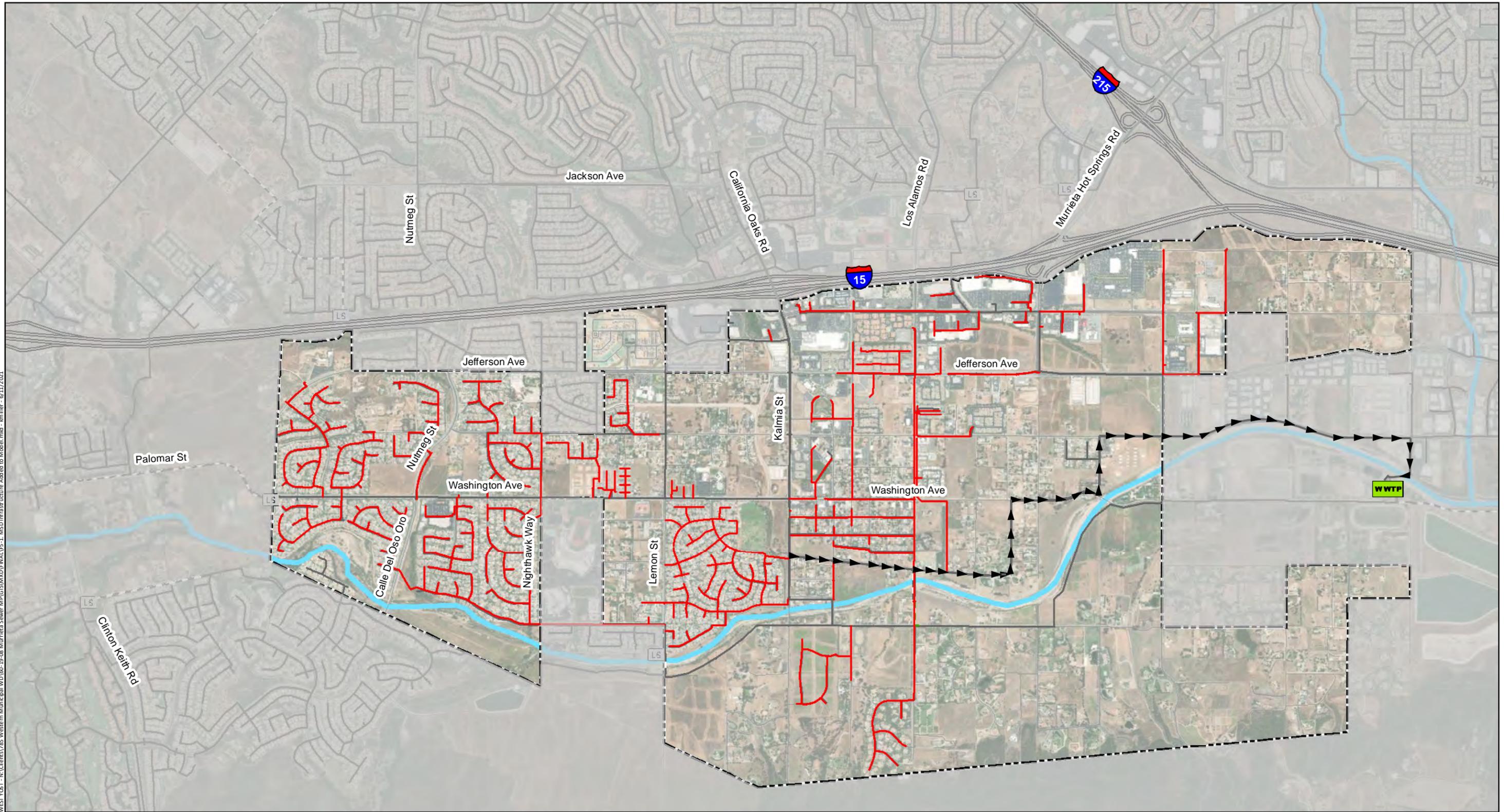
Western provided infrastructure information about the small diameter gravity mains in the form of GIS data and infrastructure as-builts in pdf format. Infrastructure was added to the model and then provided to Western staff for review. In addition to the location of the gravity mains, hydraulically significant attributes were gathered and added to the hydraulic model. Attributes that were added to the model include length, diameter, upstream invert, and downstream invert. The infrastructure added to the hydraulic model is shown on

5.1.2 Flow Updates

The SRRRA trunk hydraulic model contained existing and future flow projections for the Murrieta Service Area loaded onto the trunks that convey Murrieta Service Area flows. Therefore, to eliminate double counting of flows, the trunk projections were first removed from the model, and then the Murrieta Service Area flow projections were added. The flows were added to the small diameter gravity mains that were added to the model as described above such that the capacity of these gravity mains could be evaluated.

The Murrieta Service Area hydraulic model is intended to be a tool that can be used for long-term management of the collection system. To facilitate the construction of a hydraulic model that can be efficiently updated as development patterns and land use changes in the future, each parcel in the Murrieta Service Area was linked to the collection system manhole that would provide service to that parcel. With this linkage, the BWF and GWI generated by that parcel can be assigned to the manhole. Similarly, the area of the parcel can be assigned to the manhole to calculate RDII values via the R-T-K method.

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- Added Infrastructure
- LS Other Lift Station
- Murrieta Sewer Division Service Area
- Highways
- Roads
- Other Force Main
- Creek
- WWTP SRRRA Wastewater Treatment Plant

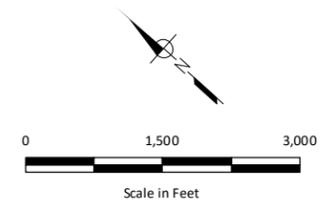


Figure 5-1
Infrastructure Added to Hydraulic Model

The InfoSewer modeling software contains ten loading fields that can be used to organize flows being imported into the model. For the Murrieta Service Area hydraulic model, flows were organized into the loading columns as shown in Table 5-1. As discussed in Chapter 4, the GWI component of ADWF varies across the collection system and contributes significantly to ADWF in some areas. To facilitate Western’s ability to vary GWI independent of BWF within the model in the future, GWI is loaded discretely from BWF in separate load fields in the hydraulic model as shown in Table 5-1.

Table 5-1 shows the load columns in the model and the corresponding description. Other loads are reserved for special analysis or for flows that are not anticipated at this time. The segregation of hydraulic model flows by type, land use, and timeframe, allows for expedited adjustments in the future as development patterns change.

Load Column	Load Description
Load 1	Existing Residential BWF (EMWD)
Load 2	Existing Non-Residential BWF (EMWD)
Load 3	Blank for Future Use
Load 4	Blank for Future Use
Load 5	Future Non-Residential BWF
Load 6	Existing Residential BWF
Load 7	Existing Infiltration
Load 8	Future Residential BWF
Load 9	Future Infiltration
Load 10	Blank for Future Use

The InfoSewer hydraulic model developed for this SMP and the InfoWater hydraulic model developed for the WMP were developed in similar fashion, with each parcel assigned to a water model node and a collection system manhole in the models. The two models provide flexible tools that can be used in tandem to manage the utilities of the Murrieta Service Area into the future.

5.2 COLLECTION SYSTEM EVALUATION

The existing collection system has sufficient capacity to accommodate existing flows. This finding is confirmed by Western operations and maintenance staff, who have not found hydraulic restrictions during their daily field work with the collection system.

5.3 TREATMENT EVALUATION

Both the SRRRA treatment tributary and the Eastern treatment tributary area have sufficient treatment capacity under existing conditions. SRRRA has sufficient existing treatment capacity even with the relatively high GWI generation values that are described above.

CHAPTER 6

Future Wastewater System Evaluation

Evaluation of the collection system using the future flows projected for the Murrieta Service Area are presented in Chapter 6.

6.1 COLLECTION SYSTEM EVALUATION

The existing and future collection systems were evaluated under weather conditions to determine the system capacity. The hydraulic analysis showed that all sewer pipes met the criteria of $q/Q < 1$. Therefore, no system improvements required.

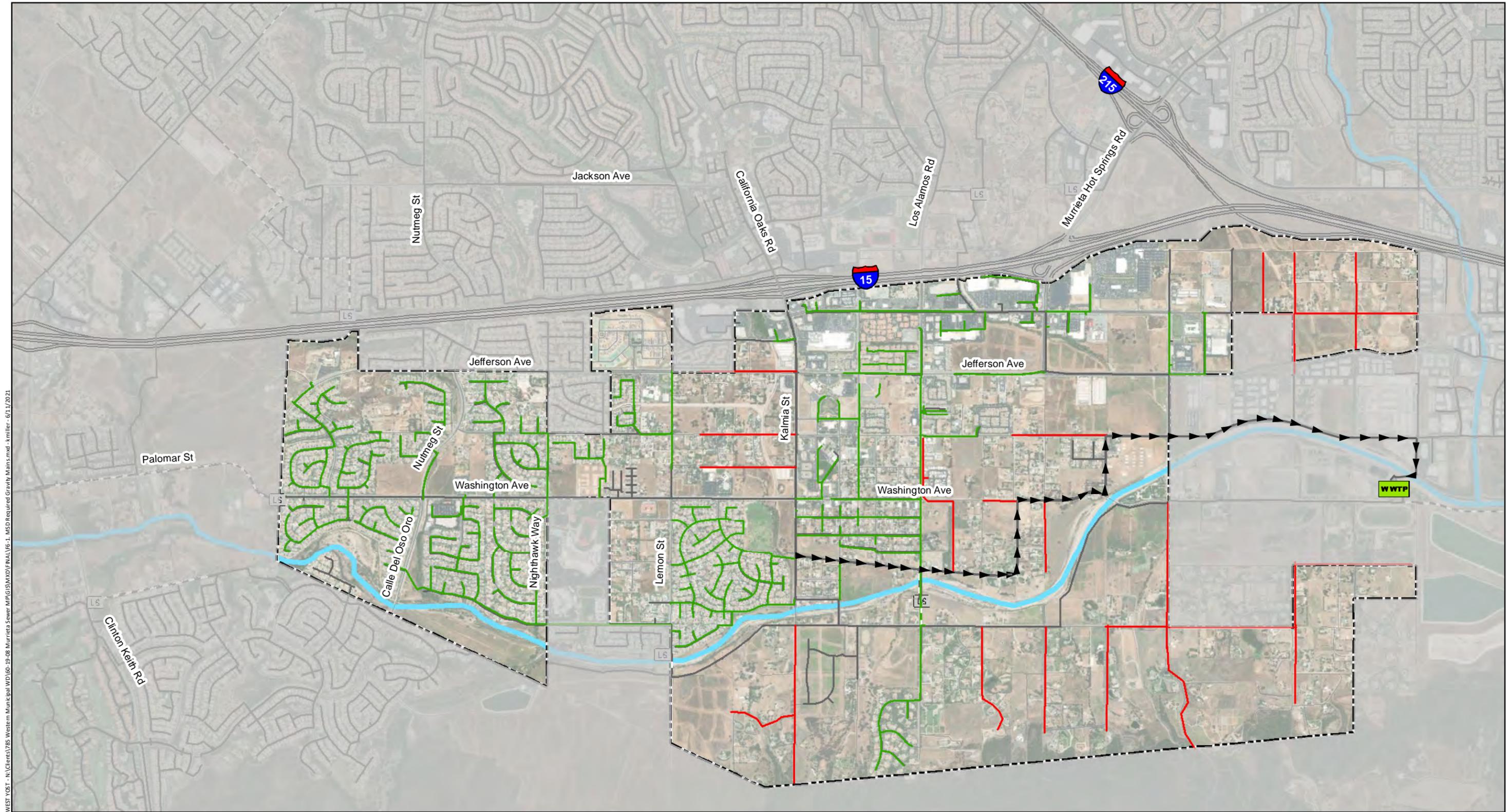
Although there is some intensification of development and therefore flows for existing development, the majority of the growth in wastewater flows (and water demand) is driven by development expansion into currently undeveloped and unserved regions of the Murrieta Service Area. Therefore, the majority of the infrastructure insufficiencies are driven by expansion and by the need to extend service to within 1,000 feet of a developed parcel, rather than by the need for increased capacity in existing gravity mains.

There are no existing gravity mains that require capacity increases based on the criteria identified in Section 4.1.1. The required expansion gravity mains are shown in Table 6-1. These expansion gravity mains include both SRRRA and Eastern treatment tributary areas. The required gravity mains are shown on Figure 6-1.

Diameter, inches	Length, feet
8	37,919
10	5,307
15	3,095
Total	46,321

6.2 TREATMENT EVALUATION

At the buildout future flow condition, both the SRRRA treatment capacity of 1.0 mgd owned by Western and the 0.25 mgd capacity agreed to by Eastern are exceeded for the Murrieta Service Area. Future treatment capacity studies will be required as the service area continues to develop to understand the extent of the future system needs.



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- Proposed Expansion Projects
- LS Other Lift Station
- MSD Gravity Main
- - - MSD Force Main
- Other Gravity Main
- - - Other Force Main
- WWTP SRRRA Wastewater Treatment Plant
- Murrieta Sewer Division Service Area
- Highways
- Roads
- Creek

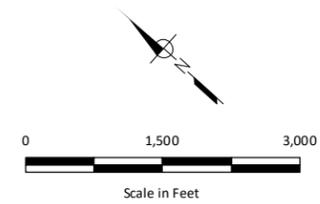


Figure 6-1
Required Gravity Mains
 Western Municipal Water District
 Murrieta Sewer Division
 Sewer Master Plan Update

CHAPTER 7

Capital Improvement Projects

This chapter presents the Capital Improvement Program (CIP) developed for future flow conditions. Each CIP contains the projects necessary to accommodate projected future development as a result of the evaluations described in the previous chapters. Along with a summary of the required capital improvement projects, estimates of probable construction costs and the methodology used to develop the costs are provided.

7.1 COST ESTIMATING ASSUMPTIONS

Estimated construction costs are presented in January 2021 dollars based on an Engineering News Record (ENR) Construction Cost Index (CCI) of 11,628 (20-Cities Average). Construction costs were developed based on bids from other collection system design projects and from standard cost estimating guides. The recommended CIPs identify improvement costs at a master plan level and are generally inclusive of the following: labor and materials, mobilization/demobilization, bonds and insurance, traffic control, grading, pavement restoration, yard piping, potholing, instrumentation, and related appurtenances such as manholes and laterals. Subsequent detailed design is required to determine the exact sizes and locations of recommended improvements. It is assumed that recommended collection system facilities will be developed in public rights-of-way or on public property; therefore, land acquisition costs have not been included. The construction cost estimates do not include costs for annual operation and maintenance.

The construction costs for gravity mains used in the SMP are presented in the Table 7-1.

Diameter	Construction Cost (2021)	Total Project Cost (2021)
8	230	400
10	250	430
12	280	480
15	310	540

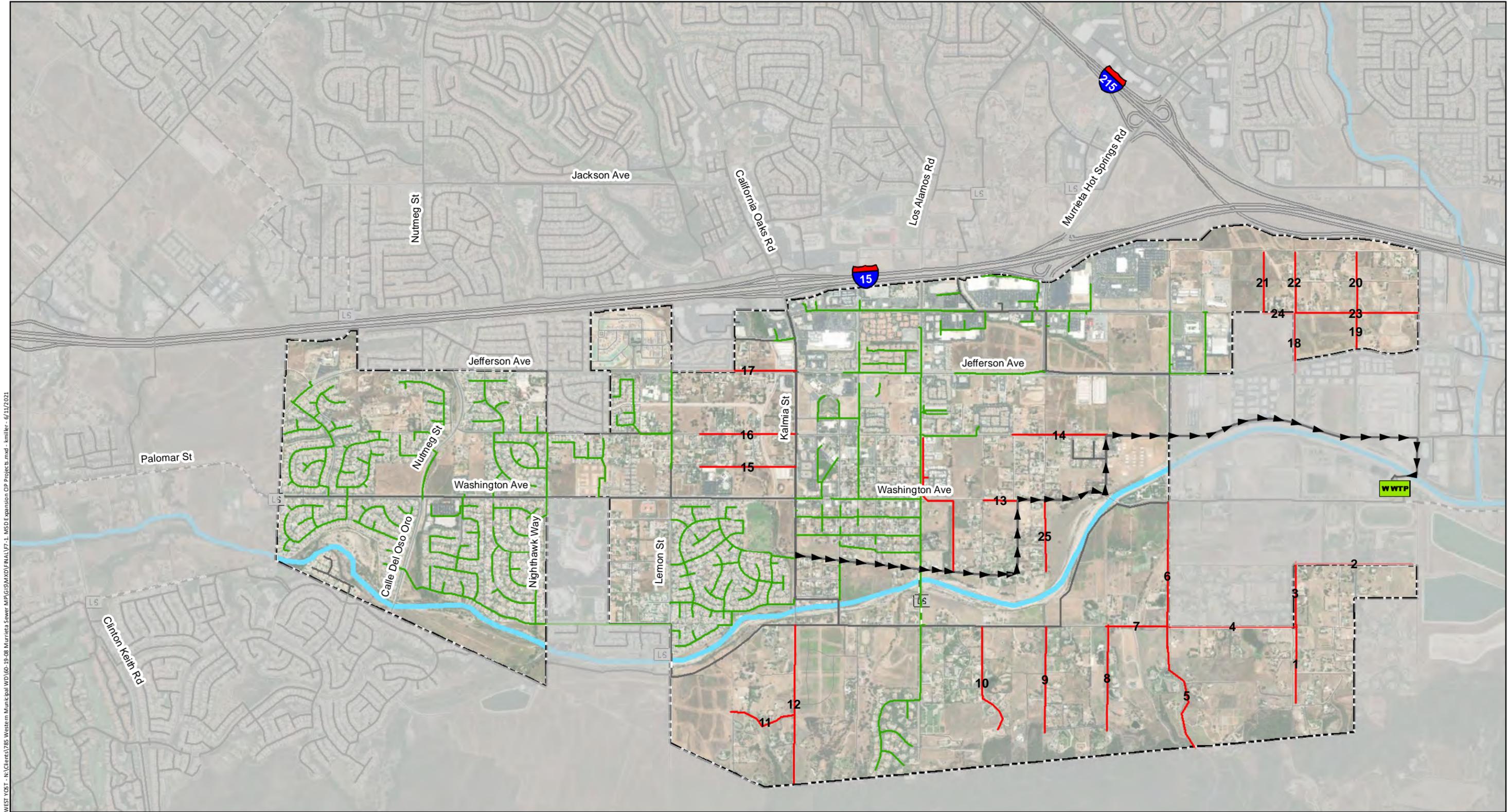
A design and construction contingency of 30 percent of the base construction costs is used based upon the conceptual level of the planning performed for this analysis. Markups for professional services during design and construction are 30 percent of the base construction costs, plus the design and construction contingency. Professional services include design, construction management and inspection, permitting and regulatory compliance, and Western administration. The addition of these soft costs to the base construction costs results in total project cost. The cost estimates have an expected accuracy of -30 percent to +50 percent.

7.2 COLLECTION SYSTEM EXPANSION

CIP project costs for each expansion gravity main identified in Chapter 6 are presented in tabular form in Table 7-2 and geospatially on Figure 7-1.

Table 7-2. CIP Construction and Total Project Costs

CIP No.	Length, feet	Diameter, inches	Construction Cost \$ (2021)	Total Project Cost \$ (2021)
South of Creek				
1	1,670	8	384,100	668,000
2	2,477	8	569,710	990,800
3	1,350	8	310,500	540,000
4	2,719	10	679,750	1,169,170
5	2,423	8	557,290	969,200
6	3,095	15	959,450	1,671,300
7	1,323	10	330,750	568,890
8	2,235	8	514,050	894,000
9	2,235	8	514,050	894,000
10	2,393	8	550,390	957,200
11	1,534	8	352,820	613,600
12	3,351	8	770,730	1,340,400
North of Creek				
13	733	8	168,590	293,200
14	2,029	8	466,670	811,600
15	2,029	8	466,670	811,600
16	2,029	8	466,670	811,600
17	2,029	8	466,670	811,600
18	1,265	10	316,250	543,950
19	715	8	164,450	286,000
20	1,299	8	298,770	519,600
21	1,299	8	298,770	519,600
22	1,299	8	298,770	519,600
23	2,608	8	599,840	1,043,200
24	679	8	156,170	271,600
25	1,503	8	345,690	601,200
Subtotal – South of Creek	26,805	-	6,493,590	11,276,560
Subtotal – North of Creek	19,516	-	4,513,980	7,844,350
Total	46,321	-	11,007,570	19,120,910



WEST YOST - N:\Clients\785 - Western Municipal W.D. 60-19-08 Murrieta Sewer MPA GIS\WXP\FINAL\F7-1_MSD Expansion CIP Projects.mxd - hmliller - 6/17/2021



- Proposed Expansion Projects
- LS Other Lift Station
- MSD Gravity Main
- - - MSD Force Main
- Other Gravity Main
- - - Other Force Main
- W WTP SRRRA Wastewater Treatment Plant
- Murrieta Sewer Division Service Area
- Highways
- Roads
- Creek

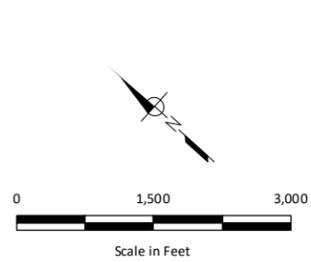


Figure 7-1
Proposed Expansion
CIP Projects
 Western Municipal Water District
 Murrieta Sewer Division
 Sewer Master Plan Update

7.3 TREATMENT EXPANSION

As the phasing of land development within the Murrieta Service Area is not known at this time, it cannot be determined as to which treatment plant will first require an increase in capacity for Western. As development continues and the average days flows to one of the plants nears Western's capacity, sewer flows may be able to be re-routed from one plant to the other to fully utilize Western's existing capacities at both plants as an alternative to expanding available capacity.

The treatment capacity available to the Murrieta Service Area in SRRRA can be increased by the following actions:

- Western reaching agreement to use (but not purchase) unused capacity from another SRRRA participant
- Western leading/participating in construction of more treatment capacity in SRRRA facilities

The treatment capacity available to the Murrieta Service area in the Eastern tributary area can be increased through a revised agreement with Eastern. Depending on Eastern treatment and conveyance capacity to treatment, infrastructure requirements might be required.

7.4 CIP PHASING

As stated in Chapter 4, this SMP assumes that the developers will construct the required gravity sewer mains to an existing sewer if their property is within 1,000 feet of existing or proposed infrastructure. If their property is not within 1,000 feet of existing or proposed infrastructure, this SMP assumes that the property will be served by a septic system in the interim. Based on the ultimate land use assumptions, this SMP assumes that all properties within the service area will eventually be served by the conventional sewer collection system. The phasing will be solely based on development needs.

As the service area continues to develop, the aforementioned CIPs will be constructed by the various developers. Since there are no capacity upgrades needed for conveyance infrastructure, no phasing is required for the CIPs.

CHAPTER 8

References

- Western Municipal Water District. 2014. *Murrieta Sewer Master Plan Report 2014*. Albert A. Webb Associates.
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- West Yost. 2019. *2019 Draft Murrieta Service Area Water Master Plan Update*.
- West Yost. 2021. *Murrieta Sewer Division Flow Analysis Technical Memoranda, Phase 1 and Phase 2 (Murrieta Flow Analysis)*.

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