

Appendix H-a Infrastructure Technical Report for Hydrology, Sewer, Water, and Water Quality

Appendices

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CITY OF SANTA ANA GENERAL PLAN UPDATE

INFRASTRUCTURE TECHNICAL REPORT FOR
HYDROLOGY,
SEWER, WATER, & WATER QUALITY

City of Santa Ana
Orange County, California

Prepared For

PLACEWORKS
3 MacArthur Place, Suite 1100
Santa Ana, CA 92707
714.966.9220

Prepared By

Fusco Engineering, Inc.
16795 Von Karman, Suite 100
Irvine, California 92606
949.474.1960

Project Manager:

Ian Adam

Principal / Stormwater Manager

Date Prepared: May 5, 2020

Updated: June 3, 2020

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H-a-1

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FUSCOE ENGINEERING, INC.
16795 Von Karman, Suite 100
Irvine, CA 92606
949.474.1960
www.fuscoec.com

DATE PREPARED: MAY 5, 2020 (UPDATED 6/3/2020)

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1. INTRODUCTION & BACKGROUND

The City of Santa Ana (“City”) is currently undergoing a General Plan Update (GPU) which is intended to shape development in the City over the next 30-plus years. A General Plan is the principal long-range policy and planning document for guiding the physical development, conservation, and enhancement of California cities and counties. As part of the California Environmental Quality Act (CEQA) process associated with General Plan Updates, infrastructure such as drainage, sewer, water systems and water quality that support the existing and proposed land uses will be analyzed at a level consistent with the city-wide program-level planning of an EIR. This report will focus on the existing conditions of these infrastructure systems that serve the City (referred to the Santa Ana GPU area).

The City is located in the center of Orange County and is bounded by the City of Orange to the north, the cities of Irvine and Tustin to the east, Fountain Valley and Westminster to the west, and Costa Mesa to the south. The GPU includes five “Focus Areas” throughout the City. Focus Areas will feature the majority of land use changes and proposed increases in land use density in addition to Citywide land use changes also proposed outside of the Focus Areas. Details of these Focus Areas are listed below and shown in Figure 1:

Table 1 City of Santa Ana GPU Focus Areas

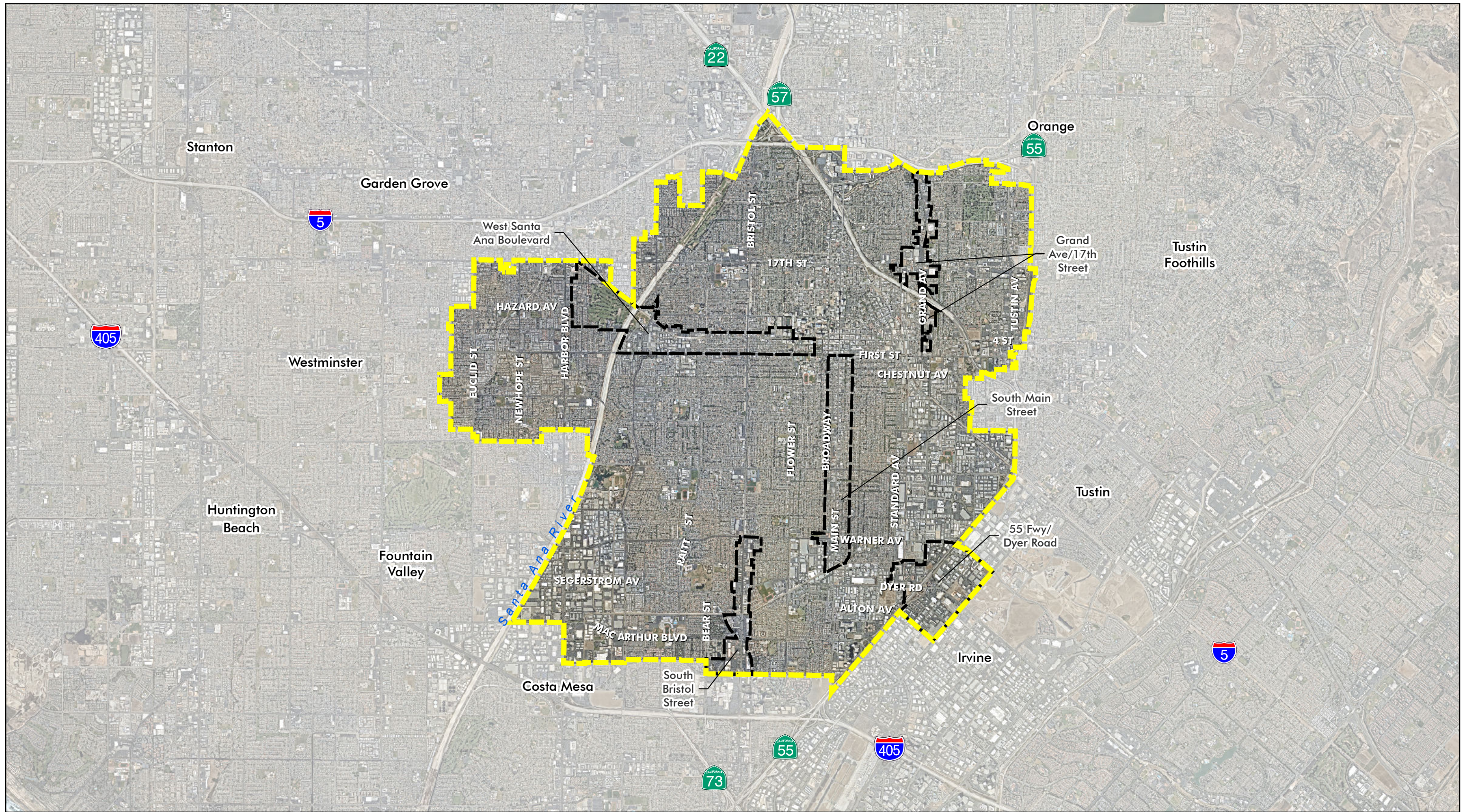
Focus Area	Acreege	Location within the City	Primary Existing Land Uses
West Santa Ana Boulevard	604 acres	Central portion of the City between 1 st Street and 5 th Street	<ul style="list-style-type: none"> • Low density residential • Industrial • Open Space
South Bristol Street	236 acres	South central portion of City along Bristol Street	<ul style="list-style-type: none"> • General Commercial • South Bristol Street
Grand Avenue/17 th Street	202 acres	North east portion of City along 17 th Street	<ul style="list-style-type: none"> • General Commercial • Professional/Admin Office
South Main Street	408 acres	Central portion of City along the Main Street corridor	<ul style="list-style-type: none"> • Low density residential • General commercial
55 Freeway/Dyer Road	438 acres	South east portion of City off the 55 Freeway	<ul style="list-style-type: none"> • General Commercial • Professional/Admin Office

The proposed land use changes will increase residential land uses and commercial square footage. An estimated growth of 36,261 dwelling units is anticipated across the City as compared to existing land use, concentrated mainly among the five Focus Areas and additional specific plan and special zoning areas. Approximately 5.8 million square feet of additional commercial land uses are anticipated across the City as compared to existing land use, and a corresponding increase of 11,436 Citywide jobs is anticipated.

This report analyzes the existing infrastructure systems that serve the City and the Focus Areas. The analysis includes a review and summary of the baseline conditions of the storm drainage system, water and wastewater systems, and existing water quality regulations currently in place,

and provides a comparison to proposed conditions under final buildout conditions of the GPU. The analysis also utilizes assumptions made under the current General Plan as this document was utilized to inform many of the regional infrastructure planning documentation and associated master plans. Any significant impacts will be identified by analyzing the CEQA thresholds of significance as they relate to storm drain, water, sewer and water quality. The analysis also includes the utilization of GIS tools and data and ongoing communication with City staff.


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Aerial Date: 09/26/2018

Santa Ana GPU and Focus Areas Aerial Extent

City of Santa Ana General Plan Update

 Santa Ana City Boundary

 Focus Area



Figure 1

4/10/2020

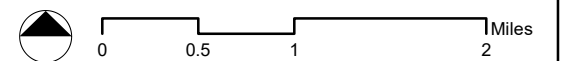
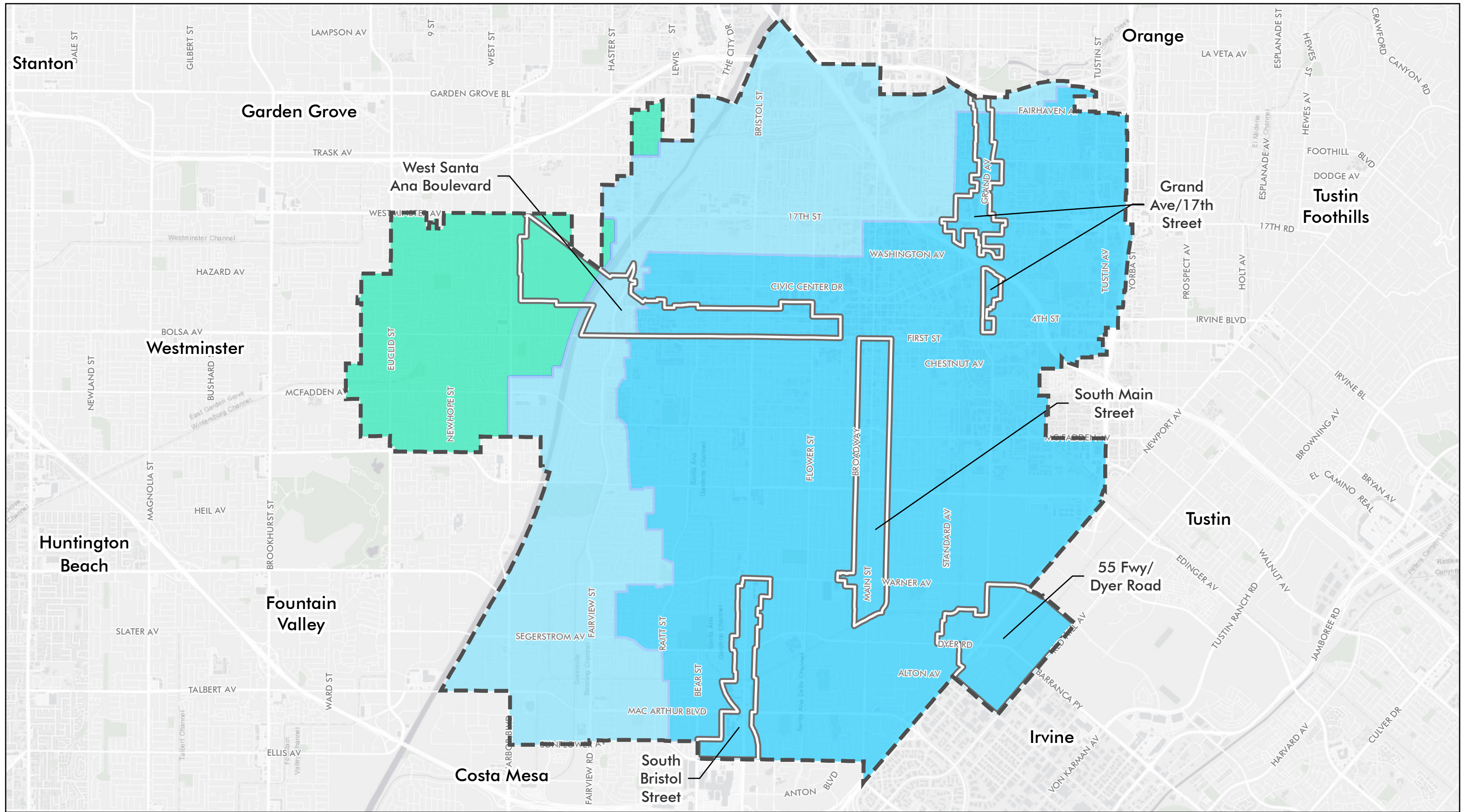


Table 2 Existing Drainage Facilities within Focus Areas

Focus Area	Acreage	Primary Drainage Facilities
West Santa Ana Boulevard	604 acres	12"-60" City Storm Drain Lines OCFCD Drainage Channels Santa Ana River (OCFCD Maintained)
South Bristol Street	236 acres	12"-72" City Storm Drain Lines OCFCD Drainage Channel (Gardens)
Grand Avenue/17th Street	202 acres	36"-81" City Storm Drain Lines
South Main Street	408 acres	12"-84" City Storm Drain Lines
55 Freeway/Dyer Road	438 acres	12"-48" City Storm Drain Lines OCFCD Drainage Channel (Lane-Barranca)



See Figure 2 below that shows the watersheds within the City and Figure 4 that shows existing storm drain system throughout the City and the Focus Areas.



City of Santa Ana Watersheds

City of Santa Ana



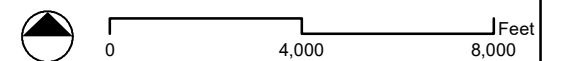
-  Santa Ana Boundary
-  Focus Area

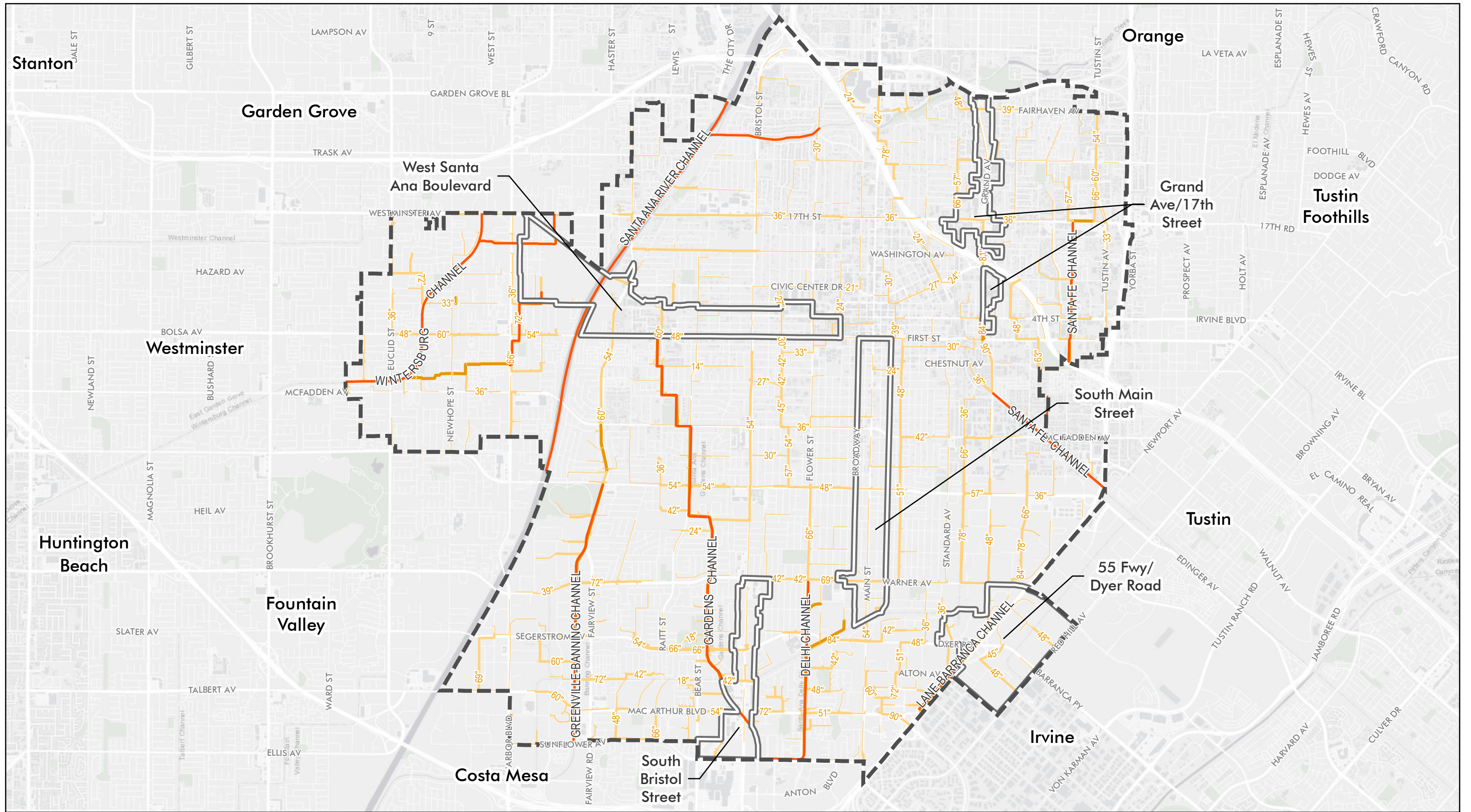
Watersheds

-  Anaheim Bay-Huntington Harbour
-  Newport Bay
-  Santa Ana River

Figure 2



4/10/2020



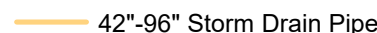
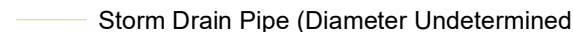




City of Santa Ana Existing Storm Drain Facilities



-  Santa Ana City Boundary
-  Focus Area

- City Storm Drain Facilities**
-  Trapezoidal Channel
-  12"-42" Storm Drain Pipe
-  42"-96" Storm Drain Pipe
-  Storm Drain Pipe (Diameter Undetermined)


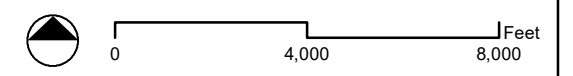
- OCFCD Facilities**
-  Storm Drain Lines

Figure 3

4/10/2020



2.1.2 Storm Drain Master Plan

City of Santa Ana Master Plan of Storm Drainage

The City of Santa Ana’s Master Plan of Storm Drainage (MPD) prepared in December 2015 by Michael Baker International. The purpose of the MPD is to analyze existing storm drain infrastructure capacity and provide recommendations on any flooding issues for all lines 36” or larger throughout the City. In order to perform this analysis, the Bentley CivilStorm program was used for hydrodynamic modeling of storm drain infrastructure. In addition, hydrology calculations for the entire City were conducted using GIS General Plan data. Flooding results for the 10-, 25-, and 100-year storm conditions were compared to County of Orange design protection levels for streets and properties in order to determine deficient segments and locations.

After identifying deficiencies, proposed condition (post-improvement) runs were conducted in CivilStorm in order to determine the extent of upsizing necessary for the various facilities (catch basins, conduits, pipe inverts and diameters) present in the deficient segments. Based on model results and extent of improvements necessary, recommended improvements were prioritized for each regional watershed within the City. Top recommended improvements are shown in Table 3 below.

Table 3 City of Santa Ana Recommended Storm Drain Improvements

Improvement Number	Regional Watershed	Improvement
1	Delhi	Improve County Delhi Channel between Alton and Sunflower
2	Gardens	Improve County Gardens Channel between Edinger and Sunflower
3	Santa Ana	Improve City system along 17 th Street between Santa Ana River and west of Flower St
4	Santa Fe	Improve City system along Grand Avenue between Santa Clara and the Santa Fe Channel
5	Santa Fe	Improve City system along Tustin Avenue between 17 th Street and the Santa Fe Channel
6	Greenville Banning	Improve City system between Macarthur and Sunflower
7	Lane Barranca	Improve the City system between Alton and Macarthur connecting to the Lane Channel
8	Santa Ana	Improve City system along Flower between Santa Clara and Santiago Creek
9	Santa Ana	Improve City system along Fairview between Trask and the Santa Ana River
10	Wintersburg	Improve City system along Rosita between Hazard Avenue and the Wintersburg Channel

Source: 2015 City of Santa Ana Master Plan of Drainage

The MPD recommends that all improvements are implemented beginning at the most downstream portion of the target area. All recommendations made in the MPD are done so at a master planning level. For individual projects, specific modeling/analysis may be necessary. Of the 10 improvement projects identified in the MPD, one project (Improvement 7) was

included in the 2018/2019 City of Santa Ana Capital Improvement Plan (CIP). Figure 4 illustrates recommended storm drain improvement areas in the City and their associated improvement numbers.

The 2018/2019 CIP includes a stormwater capture project located at Mabury Park. This project includes the construction of a large bioretention basin to slow and treat flows draining the Newport Bay.

In addition, the City provides frequent updates to the status of their CIP projects for sewer, water and storm drain systems. The following projects are listed on the October – March 2020 CIP quarterly executive summary schedule:

- D-03 Channel Improvements at Alton Ave
- Civic Center Storm Drain Lift Station
- C-5-F channel Repair between Newhope and Harbor
- First Street Undercrossing Stormwater Lift Station
- Warner Avenue Storm Drain Improvements (Ph 1) (Main St to Oak St)

The majority of the projects listed above are either going through the design phase or construction phase as of March 2020.²

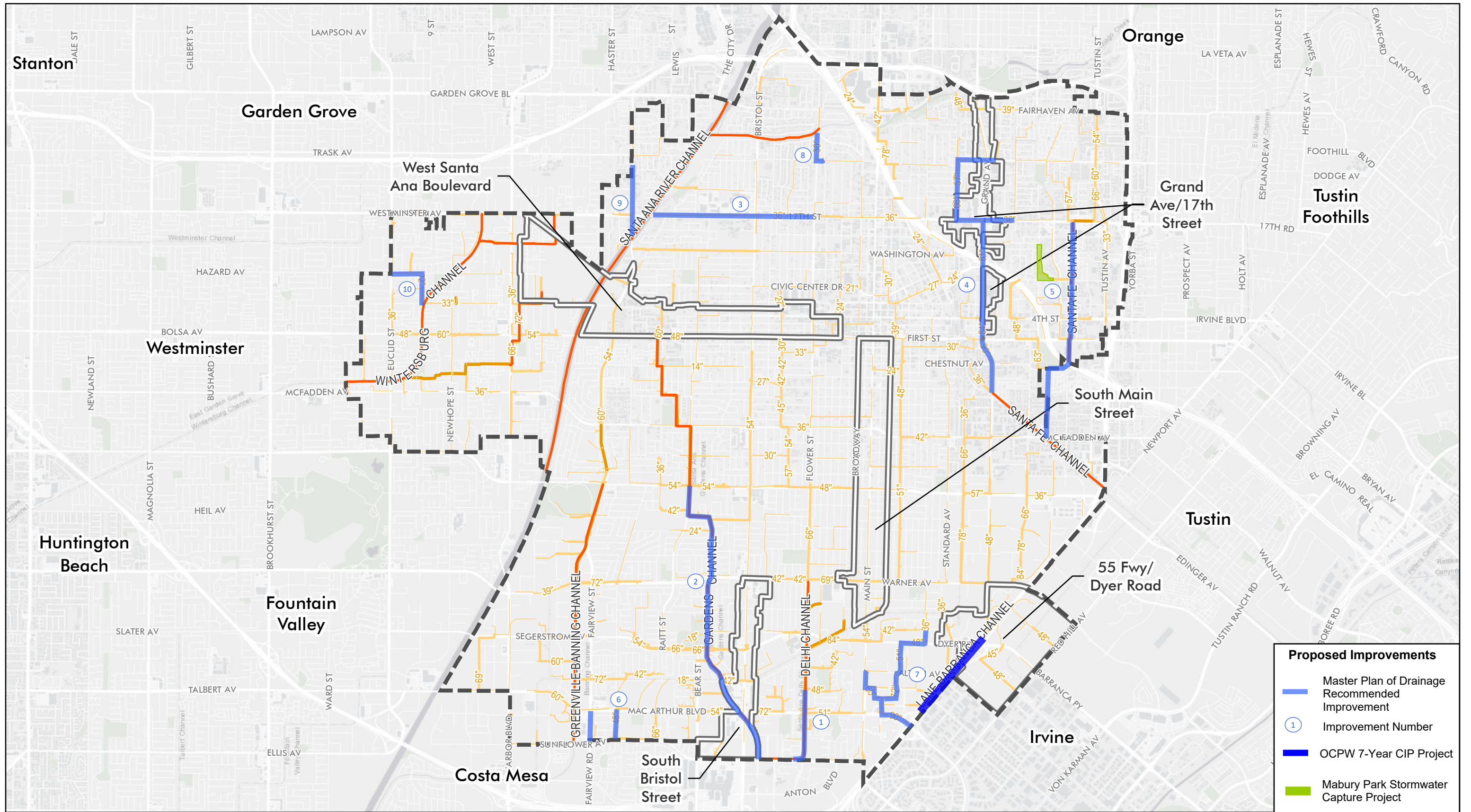
2.1.3 Orange County Public Works 7-Year CIP

Orange County Public Works' (OCPW) 7-Year Capital Improvement Plan covers OCFCD drainage facilities, Road, Bridge, Flood, and Bikeway Projects for Fiscal Years 2019/20 – 2025/26. There was one project within the GPU area downstream of the 55 Freeway/Dyer Road Focus Area included in the 2018/19 CIP that is estimated to be concluded in June 2020³:

Lane Channel (FY 18/19) – Demolish existing damaged concrete-lined channel and replace with channel lining constructed with current design standard criteria.

² City of Santa Ana – Public Works Agency. Capital Improvement Program – Quarterly Executive Summary Schedule (October – March 2020). Found here: <https://www.santa-ana.org/sites/default/files/pw/documents/Executive-Monthly-CIP-Update-Oct-to-March-2020.pdf>

³ Personal communication with OCFCD Staff, April 8, 2020.



City of Santa Ana Existing Storm Drain Recommended Improvements

Figure 4

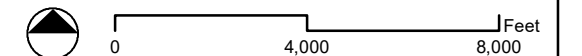


Santa Ana City Boundary
 Focus Area

City Storm Drain Facilities
 Trapezoidal Channel
 12"-42" Storm Drain Pipe

42"-96" Storm Drain Pipe
 Storm Drain Pipe (Diameter Undetermined)

OCFCD Facilities
 Storm Drain Lines

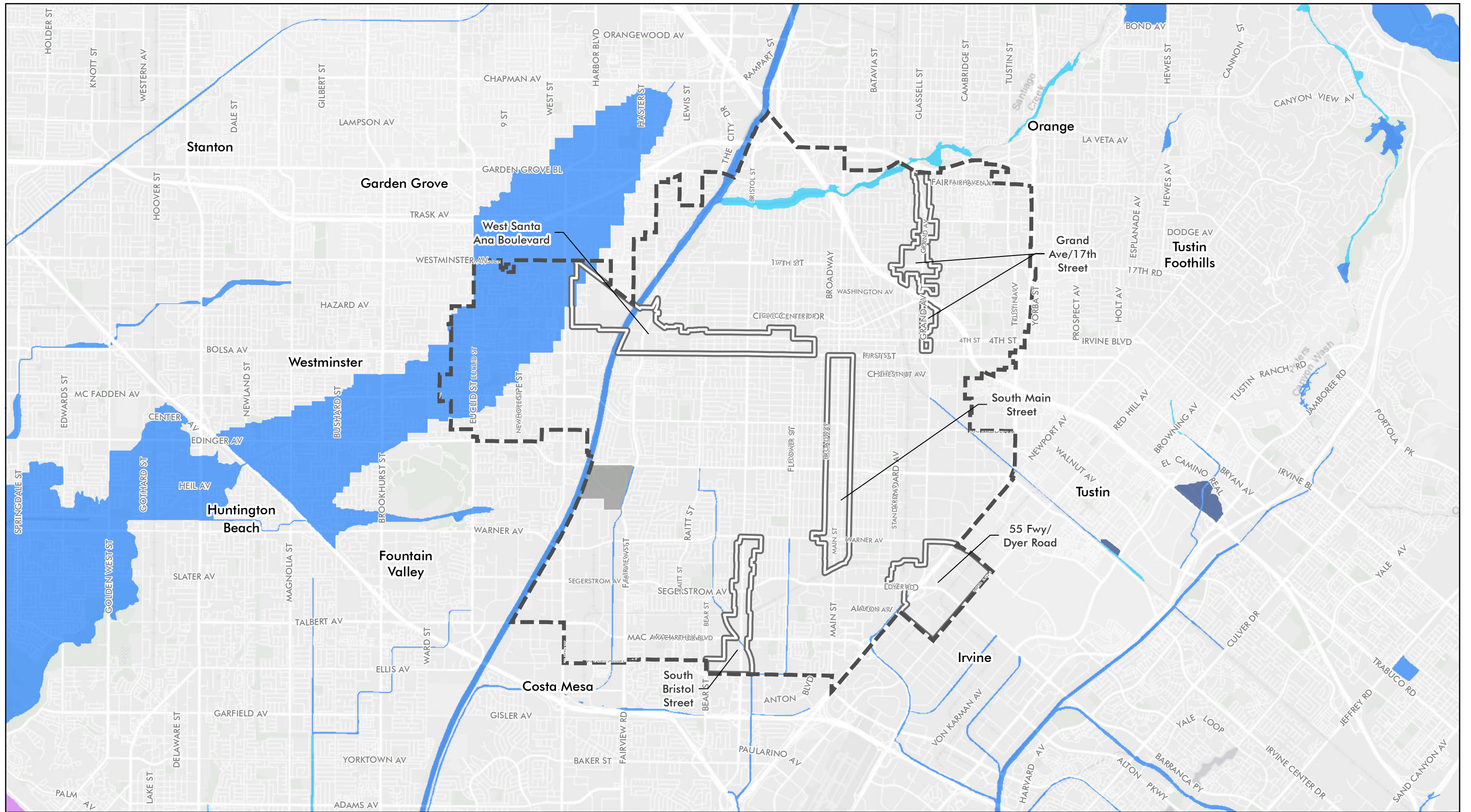


2.1.4 Existing Floodplain Mapping

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for flood plain management and is designed to minimize flood damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency that administrates the National Flood Insurance Program. Special Flood Hazard Areas (SFHA) are defined as areas that have a 1 percent chance of flooding within a given year, also referred to as the 100-year flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

According to the Flood Zone determination covering the Santa Ana GPU Area, the majority of the City lies within Zone X. Zone X is designated as the area determined to be outside the 500-year flood, protected by levee from 100-year flood, and with a minimal or 0.2% chance of flooding. The western portion of the City is protected by levee from flood events or features a 0.2% chance of flooding, while the eastern portion features a minimal risk of flooding. There are small areas surrounding the various drainage channels throughout the City including the Delhi Channel that are listed as Zone A, which represents areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. These areas are immediately adjacent to the drainage channels in question, with surrounding developments and neighborhoods protected by levee. The drainage area within and surrounding Santiago Creek, located in the northern portion of the City, is listed as both Zone AE and as a Regulatory Floodway. Zone AE represents a 1% annual chance of flooding with a base flood elevation. In addition, a small segment of the City located between the Santa Ana River and the Greenville-Banning Channel is designated as Flood Zone D, representing areas where no flood analysis has been conducted, or where recent incorporation into a larger community has resulted in no map being prepared.

See Figure 5 below for a map of the FEMA flood zones within the Santa Ana GPU.



Aerial Date: 09/26/2018

City of Santa Ana Flood Zones

City of Santa Ana General Plan Update



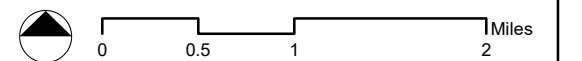
- Santa Ana City Boundary
- Focus Area

FEMA Flood Zones

- Zones A
- Zones AE
- Zones AH
- Zones D
- Zones VE
- Zones X

Figure 5

4/10/2020



2.2 SEWER & WASTEWATER INFRASTRUCTURE

2.2.1 Existing Sewer System and Facilities

The City operates and maintains the City’s sewer system which serves the entire City as well as portions of Garden Grove and Orange. The City’s sewer collection system consists of approximately 390/450 miles of sewer mains, including approximately 60 miles of Orange County Sanitation District (OCSD) regional trunk facilities within the City. The system operates largely by gravity and discharges at several locations into OCSD gravity trunk sewers for conveyance to OCSD Treatment Plant #1.

The sewer system is divided into minor sewers (6”-8” in diameter) serving an area no greater than 25 miles and major sewers that are larger sewer systems that convey greater than 25 miles of sewer discharges.⁴ See below for summary of sewer facilities within the Focus Areas.

Table 4 Existing Sewer Facilities within the Focus Areas

Focus Area	Acreage	Primary Sewer System Facilities
West Santa Ana Boulevard	604 acres	10”-15” City Lines 21” City Trunk Line
South Bristol Street	236 acres	8”-15” City Lines 30”-33” OCSD Trunk Line
Grand Avenue/17th Street	202 acres	8”-12” City Lines 15” City Trunk Line
South Main Street	408 acres	8”-15” City Lines 21”-27” City Trunk Line
55 Freeway/Dyer Road	438 acres	8”-10” City Lines 21”-24” OCSD Trunk Line

Figure 6 illustrates existing City and OCSD sewer infrastructure in the City.

⁴ City of Santa Ana 2016 Sewer Master Plan Update Final Report. December 2016.

2.2.2 Existing Sewer Flows

For each land use in the City of Santa Ana and the five Focus Areas, a total sewer generation was estimated to provide a baseline condition and to allow for comparison against proposed land use changes. Acreages of the existing development (i.e. residential & non-residential) were utilized along with their corresponding flow/generation factors to develop existing condition flow rates. Commercial sewer generation factors were provided from the Orange County Sanitation District Design and Construction Standards for Sanitary Sewers (2016). Residential sewer generation factors were derived from the Municipal Water District of Orange County (MWDOC) Orange County Water Reliability Study (2016) water flow factors for single and multi-family residences for 2015 multiplied by a 0.95 sewer factor as indoor water flows and sewer flows are similar. This sewer factor per land use is the recommended approach by sewer agencies to determine any impacts to sewer infrastructure at a level consistent with a general plan update. This method allows for a conservative understanding of sewer flow depths, velocities, diurnal patterns, surcharges and peak capacities which are ultimately used to evaluate capacity issues under existing conditions and in the future. The generation factors are typically conservative in nature and tend to over-represent sewer flows as a means to incorporate a safety factor into pipe network design and hydraulic capacity assessments.

Table 5 provides a summary of the existing wastewater flows for the City and Focus Areas. See Appendix A for detailed sewer flow calculations.

Table 5 Existing Condition Average Daily Sewer Flows

Area	Number of Dwelling Units	Commercial Square Footage	Average Sewer Flows (GPD)
Focus Areas			
West Santa Ana Boulevard	2,658	3,090,472	827,553
South Bristol Street	220	1,577,511	125,918
Grand Avenue/17th Street	561	1,400,741	188,358
South Main Street	1,720	1,685,978	565,500
55 Freeway/Dyer Road	1,221	5,666,453	538,450
Focus Area Total	6,380	13,421,155	2,245,779
Remainder of City			
All Other Areas of City	72,412	53,697,441	27,786,561
Citywide Total	78,792	67,118,596	30,032,340
Notes: GPD – Gallons per day SF – Square Feet Land use data supplied by Placeworks, 2020			

Under the existing conditions, average daily sewer flows are estimated at 30 million gallons per day (MGD) throughout the City of Santa Ana. Under existing conditions, the Focus Areas represent approximately 7.5% of the City’s sewer flows. These conservative flow estimates are for land planning purposes only.

2.2.3 Existing Sewer Capacity Assessment

City of Santa Ana 2016 Sewer Master Plan

The City's most recent Sewer Master Plan update was performed in December 2016 by RMC consultants. The 2016 Sewer Master Plan Update Final Report ("2016 SMP") was an update to a sewer capacity analysis performed in 2003. The 2016 SMP analyzed the age of the sewer infrastructure, and the capacity of the City's sewer collection system for existing and future peak flow conditions under both dry and wet weather conditions. In addition, the 2016 summarized the rankings of the condition of the sewer pipes/manholes and the recommended rehabilitation and replacement of these sewers based on the most recent CCTV inspection reports. The results of the capacity analysis and condition assessment are summarized below.

City Sewer Capacity Assessment

The capacity of the City's sewer system was assessed through use of an InfoWorks™ ICM hydraulic model. The model includes all major trunk lines with diameters ranging from 10"-39" in size. In total, the model network includes approximately 97 miles of City pipelines, 20 miles of OCS D trunk lines and a total of 1,799 manholes. The capacity of the system was assessed for existing and future (2040) base flow scenarios in addition to peak wet-weather flows (PWWF) derived for a 10-year storm event.

For Santa Ana, since the design storm PWWF represents a relatively infrequent return period event, the City considers it acceptable to allow surcharging over the pipe crown, provided the hydraulic grade line (water level) remains at least five feet below the ground surface. During peak dry weather conditions, however, sewers should be able to convey the peak flow without surcharge. The following summarizes the trigger and design criteria:

- Manning's n friction factor of 0.013 for all pipes
- Allowable depth of flow (PDWF) before triggering an improvement project
 - $d/D < 0.5$ for less than 12"
 - $d/D < 0.75$ for 12" and greater
- Allowable depth of flow before triggering an improvement project
 - 2-feet of surcharge for sewers over 12" in diameter
 - Full pipe for sewers smaller than 12"
- Freeboard depth >5-feet (depth from rim elevation to maximum water level)
- Design depth of flow for sizing improvements
 - 75% of full pipe for all sewers

The results were based on the following Likelihood to Failure (LOF) scores below:

- Score 1 (Low): No surcharge or not in model
- Score 3: Model predicts surcharge resulting from backwater conditions
- Score 5: Model shows surcharging due to throttle pipe
- Score 8: Model shows surcharging due to throttle pipe resulting in spills or less than 5-foot freeboard
- Score 10 (High): Model shows surcharging due to throttle pipe resulting in spills or less than 5-foot freeboard for current (2015) flows

The hydraulic model was used to simulate flows for the design storm event and identify areas of the Santa Ana trunk sewer system that fail to meet specified performance criteria during existing and future PWWF. The model identified four areas of the City where “surcharged” sewers were identified. A surcharge condition occurs when the full pipe capacity is less than the predicted peak flow. In these conditions, the hydraulic grade line exceeds the pipe slope indicating the pipe has insufficient capacity to convey peak flows. These surcharged pipes can increase the risk of sewer overflows occurring during significant rainfall events.

The most significant areas of potential wet weather capacity deficiencies are between Fairhaven Avenue and 17th Street running through Old Grand Street, to Santa Clara Avenue, and then onto Wright Street in the northeastern area of the City. Predicted peak flows result in surcharging with depths ranging from 2 to 5-feet above pipe crown, with some manholes less than desired 5-feet of freeboard.

City Sewer Condition Assessment

In addition to the sewer capacity assessment, the City uses a specialist CCTV contractor to inspect the condition of the City’s sewer system. The 2016 SMP included a review of the CCTV inspection data to provide an independent assessment of the accuracy and consistency of the condition scores provided by the CCTV contractor. Similar to the capacity assessment, the LOF matrix was used to score the condition of the sewer system as shown below.

Table 6 Sewer System Condition Assessment Rating Score

Likelihood Category	Indicator	Likelihood Score				
		1 (Low)	3	5	8	10 (High)
Condition	Pipe Age	<20 years	20 to <40 years	40 to <60 years	60 to <80 years	>=80 years
Notes Source: 2016 Sewer Master Plan Update, RMC						

The review identified several defects in the condition in the sewer system primarily in the central part of the City including the downtown area. This area is known to have older pipes compared to the outer neighborhoods and consequently has more defect issues.

For purposes of grouping pipes into sewer rehabilitation projects, the improvement projects identified through the decision process were assigned to “mini-basins” delineated by Traffic Area Zone (TAZ) areas. The TAZ areas provide a mechanism for bundling pipe improvements into manageable projects which benefit from efficient cost savings through combined construction mobilization, collective and organized street closures, bulk cost savings for materials and equipment rentals and overall design and construction cost savings. The combined deficiencies and recommended improvement areas found by the capacity assessment and the condition assessment are portrayed below in Figure 7. Individual sewer capacity and sewer condition deficiency maps from the 2016 SMP are included in Appendix B.

Capital improvement projects are prioritized to allocate available funds to critical projects based on risk of failure and level of impact to economic, social and environment issues. Similar to

many public agencies, the City has an annual budget for replacing or rehabilitating aging infrastructure and therefore requires a systematic and defensible method for prioritizing both capacity and condition-based improvement projects. The SMP has aided in prioritizing projects on each years CIP. The SMP references 20 projects for FY2016/17 – FY2020/21. The current 2018/19 CIP sewer projects are listed below⁵:

- #43 Bristol Street Sewer Main Improvements
- #44 Santa Ana Memorial Neighborhoods Sewer Main Improvements
- #45 Warner Garnsey Sewer Main Diversion Improvements (Project listed in SMP as CIP-CAP-006A)
- #46 Willard Neighborhood Sewer Main Improvements

In addition, the current CIP projects currently under design or construction are listed below:

- Citywide Sewer Main Improvements Phase II
- Columbine Sewer Main Improvements
- Washington Square Neighborhood Sewer Main Improvements
- Flower St Sewer Main Improvements (Washington St – 17th)
- Segerstrom/San Lorenzo Sewer List Station

In addition to the SMP and CIP sewer system management procedures, the City currently requires sewer monitoring studies for all projects that go through the entitlement process. After submittal and review of these studies by City staff, if the sewer system is found to be deficient, the developer will be required to upsize the portion of the sewer pipe within the frontage of their property. There may be options depending on the condition of the sewer infrastructure for the developers to enter into a Joint Cost Sharing Agreement with the City to cover a portion of the cost for required upsizing that may be done by the City at a later date. If improvements are needed to infrastructure downstream of the project site, the developer may be required to participate and pay into the Fair Share Agreement currently employed by the City. The Fair Share Agreement will allow the developer to fund a percentage of the downstream improvement that will be carried out by the City in the future. Therefore, the City has a robust process in place on a project-by-project basis to ensure the sewer system is functioning efficiently.

Orange County Sanitation District Master Plan Update Report No. 3

OCSD, in coordination with Woodard & Curran, prepared an update to its Master Plan in December 2019. The purpose of this Update Report was to evaluate collections system capacity throughout the OCSD service area. A new model was developed to replace the previous 2006 model, based on Center for Demographic Research (CDR) population and employment data and growth estimates. The updated capacity assessment was conducted between 2016 and 2017.

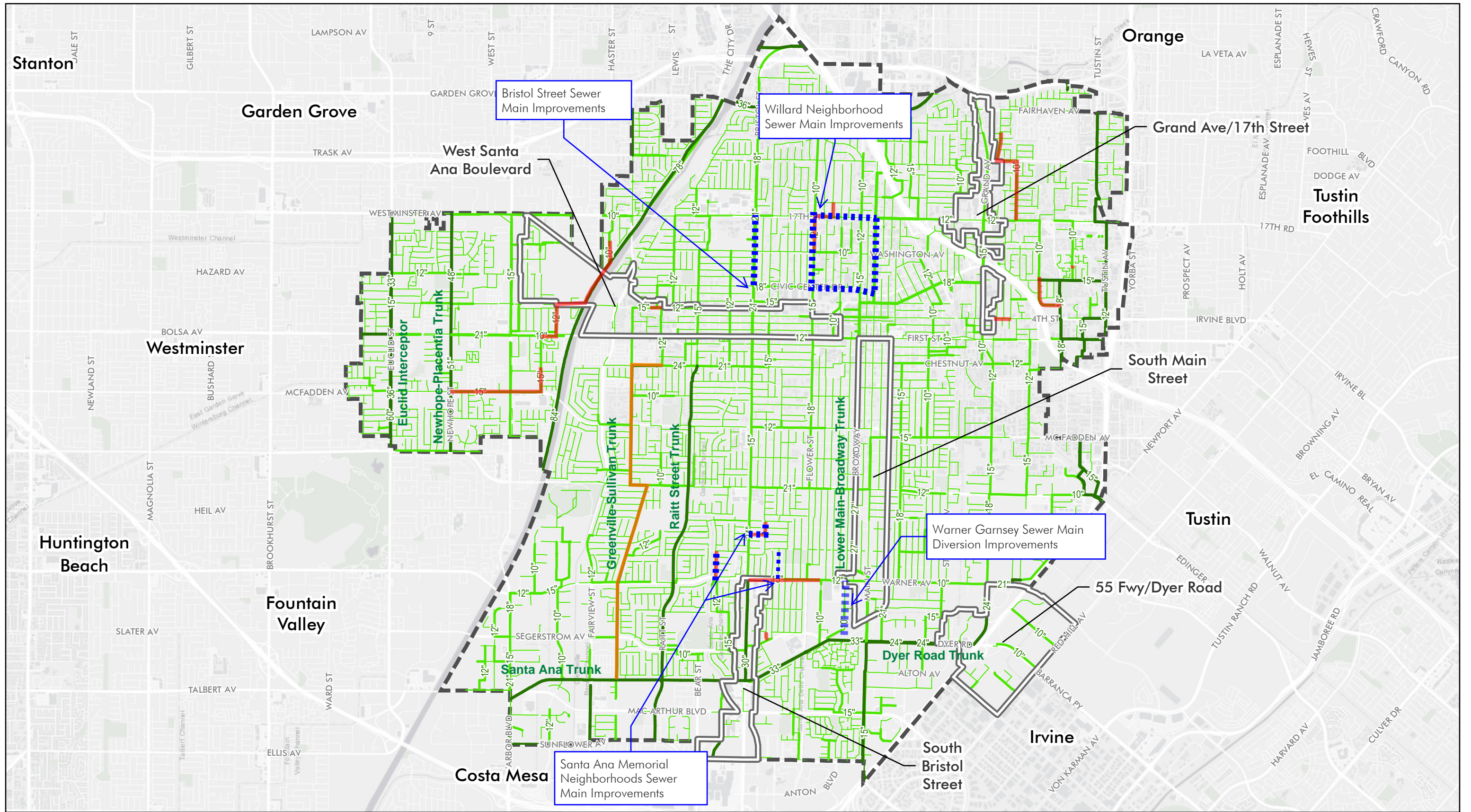
The 2019 Update Report determined a series of trunk line segments that exhibited hydraulic deficiencies or potential hydraulic deficiencies under existing (2017) and buildout (2040)

⁵ City of Santa Ana Capital Improvement Program 2018/2019. Found here: <https://www.santa-ana.org/sites/default/files/FY18-19-CIP.pdf>

conditions. Hydraulic deficiencies were assessed for both peak dry weather flow and peak wet weather flow scenarios. Of the assessed segments, the Greenville-Sullivan Trunk Line within the GPU boundary was shown to exhibit surcharge conditions for peak wet weather flows. The Greenville-Sullivan Trunk line was shown to have potential surcharge above the crown from 2' to over 5' for both existing and proposed buildout conditions.

A capacity improvement project for the Greenville-Sullivan Trunk line has been included in OCSD's proposed projects and is currently under review. The project will upsize all 33" segments within the trunk line to a 39" diameter, addressing all surcharge concerns.

DRAFT



City of Santa Ana Existing Sewer System Improvement Projects

Figure 7

City of Santa Ana

5/5/2020



Santa Ana Boundary

City Sewer Pipelines
 8" and Below in Diameter
 9" - 84" in Diameter

OCSD Sewer Pipelines
 OCSD Sewer Lines

Proposed Improvements
 Sewer Master Plan Recommended
 5-Year CIP Improvements for City Sewer Facilities

2018/19 City Capital Improvement Plan Project
 Proposed OCSD Trunk Line Capacity Improvement Project



2.3 WATER DISTRIBUTION SYSTEM

2.3.1 Existing Water System

The City's Water Utility provides water service within a 27-square mile service area. The service area includes the City of Santa Ana and a small neighborhood in the City of Orange, near Tustin Avenue and Fairhaven by the northeast corner of Santa Ana.⁶ There are also Irvine Ranch Water District (IRWD) water lines that serve portions of the City. In addition, Orange County Water District (OCWD) provides recycled water service to portions of the City. Metropolitan Water District of Southern California (Metropolitan) also has delivery/conveyance lines that run through the City.

The City obtains water from two primary sources: local groundwater from the Orange County Groundwater Basin (OC Basin), which is managed by OCWD and imported water from Metropolitan. The City is a member agency of Metropolitan. Groundwater production accounts for roughly 70-75% of the water supply and Metropolitan imported water supplies provide the remaining 25-30%. The City's water system has a total of nine reservoirs with a storage capacity of 49.3 million gallons, 21 groundwater wells, and seven imported water connections.⁷ The seven imported water connections that receive water through Metropolitan's Orange County and East Orange County Feeder pipelines have a total capacity of 60,580 gallons per minute (gpm) to transfer water into the City's distribution system.

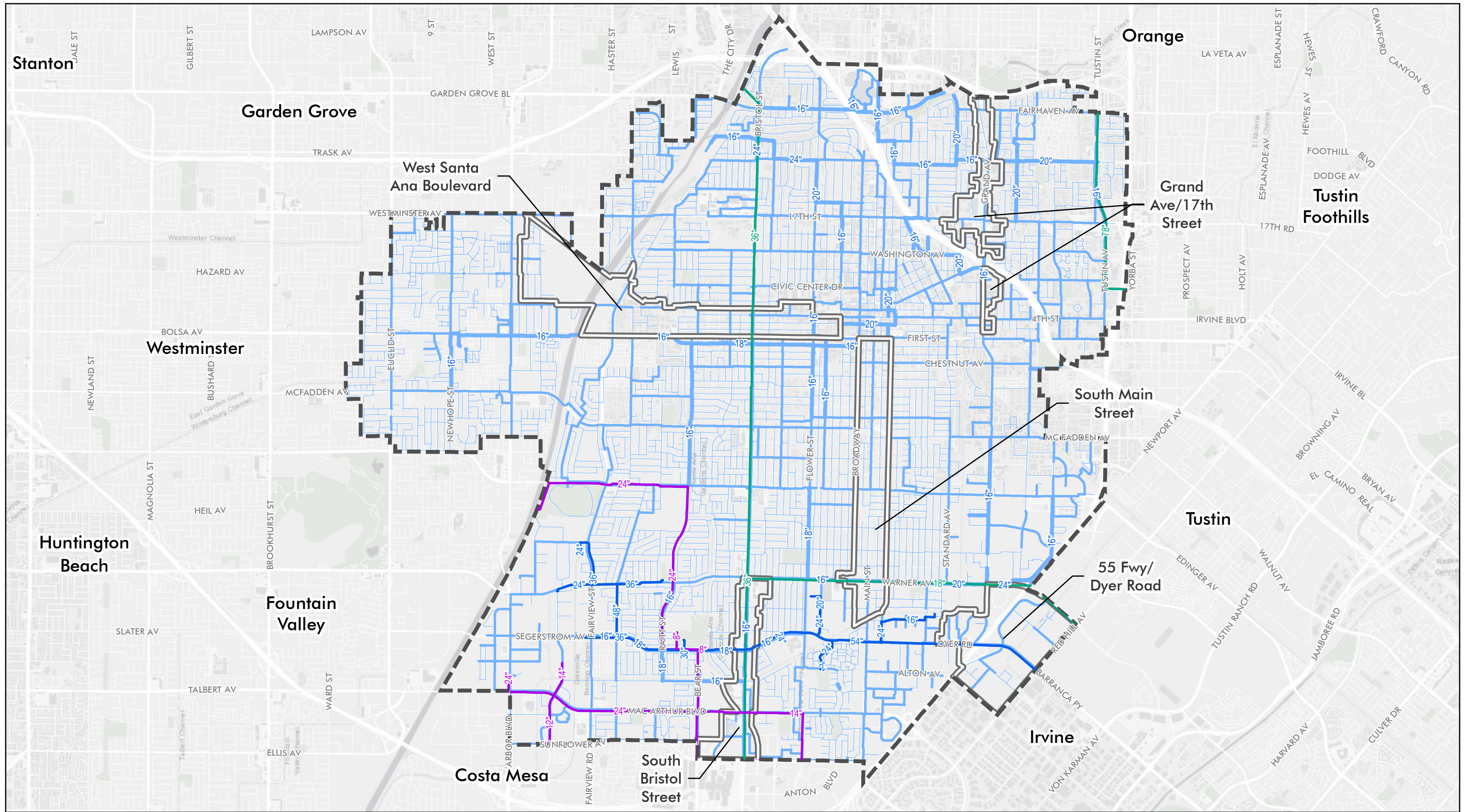
The City's water system consists of two pressure zones (High Zone and Low Zone). Each of these pressure zones have groundwater wells, reservoirs and booster pump stations which supplies potable water to the City's customers. In general, the facilities are consolidated into several stations consisting of multiple groundwater wells, a storage reservoir, and a booster pump station. At each station, the wells pump groundwater into the storage reservoir and the booster pump station pumps water from the storage reservoir to the distribution system. The City's water distribution system is comprised of approximately 480 miles of transmission/distribution mains ranging from 4"-30" in diameter. The majority of the City's water lines were constructed in the 1960s. The primary water facilities within the Focus Areas are summarized below in Table 7 and shown in Figure 8.

⁶ 2015 City of Santa Ana Urban Water Management Plan, June 2016. City of Santa Ana.

⁷ 2017 Water Master Plan, January 2018. City of Santa Ana.

Table 7 Existing Water System within Focus Areas

Focus Area	Acreage	Primary Water Facilities
West Santa Ana Boulevard	604 acres	6"-12" City water lines 36" MWD conveyance water line
South Bristol Street	236 acres	8" – 36" City water lines 36" MWD conveyance line 16"-18" IRWD water lines 14" OCWD reclaimed water lines
Grand Avenue/17th Street	202 acres	6"-12" City water lines
South Main Street	408 acres	4"-24" City water lines 16"-18" MWD conveyance line 24"-54" IRWD water lines
55 Freeway/Dyer Road	438 acres	8"-12" City water lines 24" MWD conveyance line 54" IRWD water line



City of Santa Ana Existing Water System Facilities

City of Santa Ana



Santa Ana City Boundary



Focus Area

Santa Ana Municipal Utilities Water Lines

8" and Below in Diameter

9" - 14" in Diameter
15" - 30" in Diameter

Other Water Lines

IRWD Water Lines

MWD Water Lines

OCWD Reclaimed Water Lines

Figure 8

4/10/2020



0 4,000 8,000 Feet

2.3.2 Existing Water Flow

For each land use in the City of Santa Ana and its Focus Areas, water flow estimates were developed to provide a baseline condition and to allow for comparisons against any proposed land use changes. Acreages and units of development (i.e. residential & non-residential) were utilized along with their corresponding flow factors to identify changes in water flow. Commercial water flow factors were provided from the City of Santa Ana Guidelines for Water and Sewer Facilities (2017). Residential water flow factors were provided from the MWDOC Orange County Water Reliability Study (2016), and utilized Water Use Factors from Survey of Water Agencies in Orange County (FY 2013-14) for single family and multifamily water flow estimates. Similar to the methodology employed to estimate sewer flows as described in Section 2.2.2, the generation factors for estimating water flows are typically conservative in nature and tend to over-represent water flows as a means to incorporate a safety factor into pipe network design and hydraulic capacity assessments specifically for infrastructure.

Table 8 provides a summary of the existing condition water flow for the City and Focus Areas. Detailed calculations are provided in Appendix C.

Table 8 Existing Condition Average Daily Water Flow

Area	Number of Dwelling Units	Commercial Square Footage	Average Water Flows (GPD)
Focus Areas			
West Santa Ana Boulevard	2,658	3,090,472	880,807
South Bristol Street	220	1,577,511	136,957
Grand Avenue/17th Street	561	1,400,741	202,362
South Main Street	1,720	1,685,978	600,682
55 Freeway/Dyer Road	1,221	5,666,453	582,841
Focus Area Total	6,380	13,421,155	2,403,648
Remainder of City			
All Other Areas of City	72,412	53,697,441	29,403,648
Citywide Total	78,792	67,118,596	31,833,589
Notes: GPD – Gallons per day SF – Square Feet Land use data supplied by Placeworks, 2020			

Under the existing conditions, average daily water flows are estimated at 31.83 MGD through the City of Santa Ana. Focus Area water flows represent approximately 7.5% of existing Citywide water flows. These conservative flow estimates are for infrastructure capacity planning purposes only.

2.3.3 Existing Water Capacity Assessment

City of Santa Ana Water Master Plan

The 2017 Santa Ana Water Master Plan (WMP) was prepared by Tetra Tech to document a multi-year capital improvement program to maintain the City’s water utility infrastructure systems in sound operable condition and to meet the level of service expectations of the City over the proposed planning period from 2017/18 to 2039/40. The goal of the 2017 WMP was to

identify needed system improvements, define typical refurbishment and replacement requirements, recommend the prioritization of these improvements/replacements, and establish an overall general implementation schedule and budget for these future capital improvement projects.

The WMP analyzed several components of the City's water system including groundwater well rehabilitation needs, reservoir and pump station status, distribution system upgrade needs and other miscellaneous improvements. Maintaining groundwater wells has been given the highest priority as groundwater supply is more affordable as compared the water supplies purchased from Metropolitan. The WMP referenced a study by IDModeling, Inc. that developed and calibrated a computerized water system model of the City's existing water system for the evaluation and analysis of the City's water system for reliability and system hydraulic operations/capacity.

The results of the water supply analysis indicated that the City's water system has adequate capacity and distribution capabilities to supply the entire water system demands using only groundwater wells. However, as discussed in the WMP, as of 2017, based on age of the existing pipe, 20% (about 560,000 feet of pipe) of the City's distribution system has already past the pipe materials typical useful life. By the end of the proposed planning period (fiscal year 2039/40), 70% (about 1,870,000 feet of pipe) of the City's distribution system will be past the materials lifetime. In summary, while the City's distribution system is robust and hydraulically sound, the system is old and needs to be systematically replaced. The recommended proposed pipeline replacement program from the WMP is summarized below in addition to updates from the City's most recent CIP Update list referenced above and discussions with the City on the status of improvement projects.

Table 9 Water System Projects

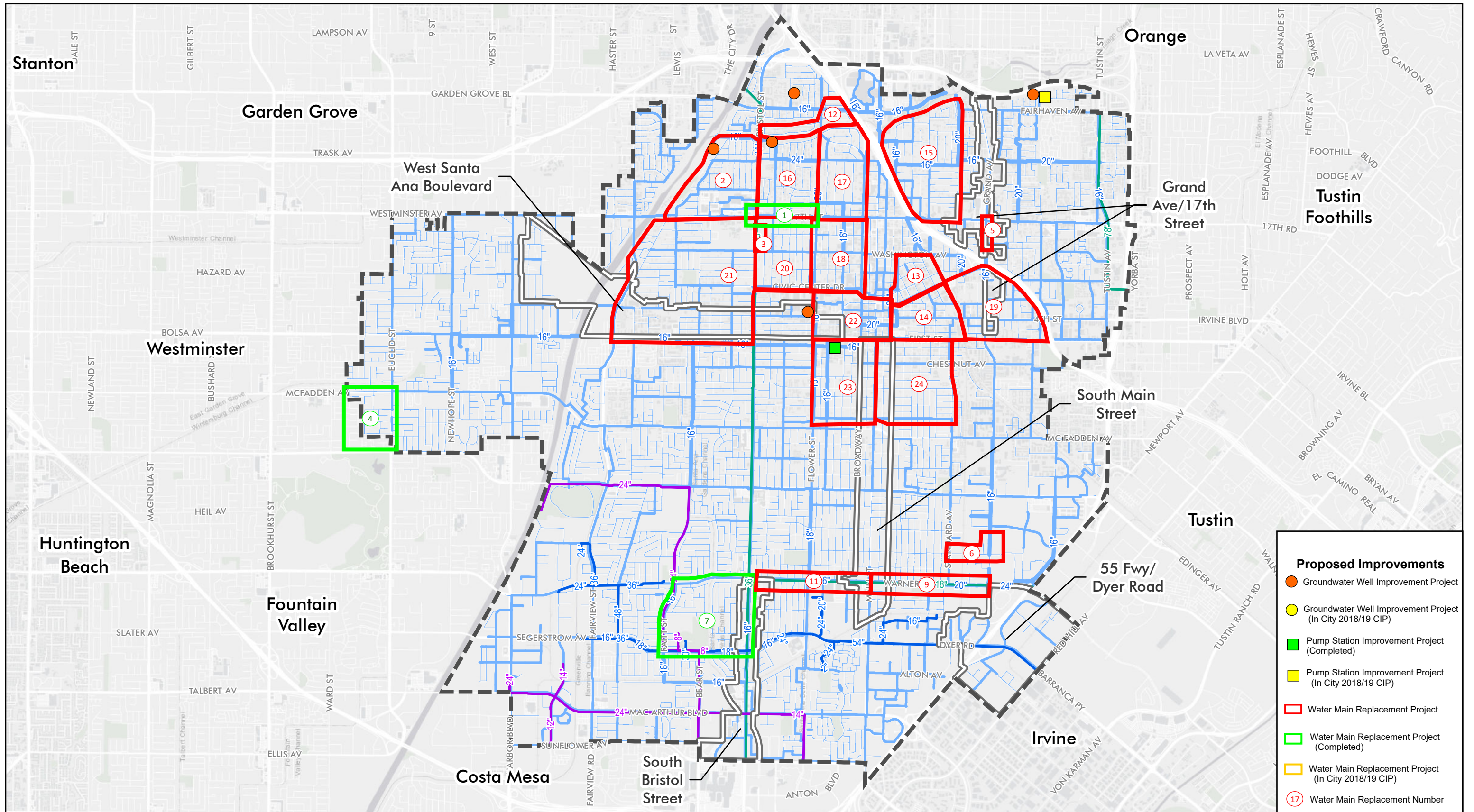
Project Type	Project Description	March 2020 CIP Updates
Groundwater	Replace Groundwater Well 22 in High Zone	N/A
	Construct 1-2 new wells near elevated tank to resolve low pressures	N/A
	Replace Groundwater Wells W16, W18, W24 due to age	N/A
	Rehabilitation of W32 due to elevated nitrate levels at W29	Well #29 rehab is 79% through the design phase of the project.
	Install emergency generators for groundwater wells W31, W35, W37, W40, W41 in short term and W28, W32, W36 and W38 in long term	Well #32 rehab is 41% through the design phases of the project.
Pump Station	Walnut Pump Station Rehabilitation	The Walnut Pump Station rehab has been completed.
	Cambridge Pump Station¹ and East Pump Station Facilities	N/A
	Emergency generator at Crooke and Cambridge Pump Station facilities due to criticalness of these facilities in the High Zone	N/A
Distribution Systems / Water Main Improvements	(1) 17 th Street	Improvement project completed
	(2) Riverview Phase 2	Riverview Neighborhood improvements are 86% through the design phase of the project. Southern portion of the project is under construction.
	(3) Bristol Phase 3	Bristol Street Phase 3A is 75% through the design phase; Bristol Street Phase 3B is 42% through the warranty phase.
	(4) West Grove Valley	Improvement project completed
	(5) Grand Avenue	Grand Avenue (fourth St to 17 th St) is pending.
	(6) St Gertrude and Grand	St Gertrude and Grand Ave Improvements are 85% through the design phase of the project. Construction estimated to begin late Spring 2020.
	(7) Thornton Park	Improvement project completed
	(8) Bristol Phase 4	N/A
	(9) Warner Widening	Warner Avenue (Bristol St – Main St) Improvement planning is anticipated to start in early 2020.

		Warner Avenue (Main St – Oak St) Improvements is 100% through design as of July 2019.
	(10) Walnut Discharge Main Lining	N/A
	(11) Warner Avenue	N/A
	(12) Fisher Park	Fisher Park NH Improvements are 16% through the design phase of the project.
	(13) French Court	
	(14) French Park	French Park NH Improvements are 18% through the design phase of the project.
	(15) Park Santiago	N/A
	(16/17) West Floral	N/A
	(18) Willard Neighborhood	N/A
	(19) Saddleback View	N/A
	(20) Washington Square	N/A
	(21) Artesia Pilar	N/A
	(22) Downtown;	N/A
	(23) Heninger Park;	N/A
	(24) Eastside Neighborhood.	N/A
Miscellaneous Improvements	Various new wellhead treatment facilities	N/A
	Remote control to four pressure reducing/sustaining facilities	N/A
	Automated meter infrastructure to access real-time water consumption data	N/A
	Upgrade SCADA and install fiber-optic backbone facility from each key facility to the City Yard	N/A
	Consideration of solar panels at Jon Garthe and West Reservoir facilities	N/A
	Intrusion alarms at reservoir sites	N/A
Notes ¹ Bolded text highlights WMP projects currently listed in the 2018/19 CIP. ² See Figure 8 for locations of Groundwater, Pump Station and Distribution System Projects.		

As shown above, due to the importance and lower cost of groundwater resources for water supply as compared to imported water purchased from Metropolitan, groundwater projects have been allocated the largest CIP budget through 2040. Ensuring water distribution lines are functioning effectively is the second largest CIP budget allocation. The remaining budget is for pump station and reservoir projects and other miscellaneous water system needs. The projects below have been prioritized within the City's current 2018/19 CIP.

- #51 Bristol Street Water Main Improvements Phase 4
- #52 Cambridge Pump Station Entry Improvements
- #53 Washington Well Site Improvements

The 2018/19 CIP projects and the projects summarized above in Table 9 are shown below in Figure 9.



City of Santa Ana Water System Improvement Projects

City of Santa Ana



Santa Ana City Boundary



Focus Area

Santa Ana Municipal Utilities Water Lines

8" and Below in Diameter

9" - 14" in Diameter

15" - 30" in Diameter

Other Water Lines

IRWD Water Lines

MWD Water Lines

OCWD Reclaimed Water Lines

H-a-34

Figure 9

4/10/2020



0 4,000 8,000 Feet

2.4 WATER QUALITY

2.4.1 Existing Regulations

Basin Plan for the Santa Ana Region

In addition to its permitting programs, the State Water Resources Control Board (SWRCB), through its nine Regional Water Quality Control Boards (RWQCBs), developed Regional Water Quality Control Plans (or Basin Plans) that designate beneficial uses and water quality objectives for California's surface waters and groundwater basins, as mandated by both the CWA and the state's Porter-Cologne Water Quality Control Act. Water quality standards are thus established in these Basin Plans and provide the foundation for the regulatory programs implemented by the state. The Santa Ana RWQCB's Basin Plan, which covers the GPU area, specifically (i) designates beneficial uses for surface waters and ground waters, (ii) sets narrative and numerical objectives that must be met in order to protect the beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Region. In other words, the Santa Ana RWQCB Basin Plan provides all relevant information necessary to carry out federal mandates for the antidegradation policy, 303(d) listing of impaired waters, and related Total Maximum Daily Loads (TMDLs), and provides information relative to National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirement (WDR) permit limits.

Total Maximum Daily Loads (TMDLs)

Under Section 303(d) of the Clean Water Act (CWA), states are required to identify water bodies that do not meet their water quality standards. Once a water body has been listed as impaired on the 303(d) list, a TMDL for the constituent of concern (pollutant) must be developed for that water body. A TMDL is an estimate of the daily load of pollutants that a water body may receive from point sources, non-point sources, and natural background conditions (including an appropriate margin of safety), without exceeding its water quality standard. Those facilities and activities that are discharging into the water body, collectively, must not exceed the TMDL. In general terms, Municipal Separate Storm Sewer System (MS4) and other dischargers within each watershed are collectively responsible for meeting the required reductions and other TMDL requirements by the assigned deadline.

TMDLs have been established for pesticides, pathogens, sediment, and nutrients for the Upper and Lower Newport Bay. The remaining 303(d) listed impairments shown in Table 10 have not yet been established and are pending approval for TMDL establishments for 2019 to 2029.

Table 10 List of 303(d) Impairments and TMDLs

Water Body/Channel	List of 303(d) Impairments ¹	TMDL
East Garden Grove Wintersburg Channel	Ammonia (Unionized),	Pending 2021 TMDL Establishment for Ammonia
Bolsa Chica Ecological Reserve	Toxicity	Pending 2027 TMDL Establishment for Toxicity
Bolsa Chica State Beach	Copper, Nickel	Pending 2019 TMDL Establishment for Copper and Nickel
Huntington City Beach	No Impairments	N/A
Huntington Beach State Park	Polychlorinated Biphenyls (PCBs)	Pending 2019 TMDL Establishment for PCBs
Talbert Channel	Toxicity	Pending 2029 TMDL Establishment for Toxicity
Santa Ana River, Reach 1	No Impairments	N/A
Newport Slough	Indicator Bacteria	Pending 2021 TMDL Establishment for Indicator Bacteria
Newport Beach	No Impairments	N/A
Balboa Beach	DDT, Dieldrin, PCBs	Pending 2019 TMDL Establishment for DDT, Dieldrin, and PCBs
Santa Ana River Delhi Channel	No Impairments	N/A

Costa Mesa Channel	No Impairments	N/A
Newport Bay, Upper	Chlordane, Copper, DDT, Indicator Bacteria, Malathion, Nutrients, PCBs, Sedimentation, Toxicity	<p>TMDLs for Chlordane, DDT, and PCBs established 2013</p> <p>TMDL for Chlorpyrifos/Diazinon established 2004</p> <p>TMDL for Lead established 2000</p> <p>TMDLs for Nutrients and Sedimentation established 1999</p> <p>Pending 2019 TMDL Establishment for Copper</p> <p>Pending 2027 TMDL Establishment for Malathion and Toxicity</p>
Lower Newport Bay	Chlordane, Copper, DDT, Indicator Bacteria, Nutrients, PCBs, Sedimentation, Toxicity	<p>TMDLs for Chlordane, DDT, and PCBs established 2013</p> <p>TMDL for Chlorpyrifos/Diazinon established 2004</p> <p>TMDL for Lead established 2000</p> <p>TMDLs for Nutrients and Sedimentation established 1999</p> <p>Pending 2019 TMDL Establishment for Copper</p> <p>Pending 2027 TMDL Establishment for Toxicity</p>
Newport Beach West Jetty	No Impairments	N/A
Corona Del Mar State Beach	No Impairments	N/A

Notes:
 Source:
 2014-2016 California 303(d) List of Water Quality Limited Segments. Retrieved January 2019:
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml

In addition, the California State Water Resources Control Board (State Board) has adopted the statewide Trash Provisions that requires implementation of Best Management Practices (BMPs) that mitigate or abate trash within Priority Land Use Areas (PLUs). PLUs are defined as, "high density residential, industrial, commercial, mixed urban, and public transportation stations." The purpose of the Trash Provisions is to establish a statewide water quality objective that ensures the quality of surface waters that enter storm drains and eventually lead out to major water ways are free of trash. The City is currently undergoing the process to comply with these new Trash Provisions.

County of Orange MS4 Permit, Drainage Area Management Plan (DAMP) & Local Implementation Plans (LIP)

In May 2009, the Santa Ana RWQCB re-issued the North Orange County MS4 Storm Water Permit as WDR Order R8-2009-0030 (NPDES Permit No. CAS618030) to the County of Orange, the incorporated cities of Orange County, and the Orange County Flood Control District within the Santa Ana Region. Pursuant to this "Fourth-Term" MS4 Permit, the Co-permittees were required to update and implement a Drainage Area Management Plan (DAMP) for its jurisdiction, as well as Local Implementation Plans (LIPs), which describe the Co-permittees' urban runoff management programs for their local jurisdictions.

Under the City's LIP, land development policies pertaining to hydromodification and low impact development (LID) are regulated for new developments and significant redevelopment projects. The term "hydromodification" refers to the changes in runoff characteristics from a watershed caused by changes in land use condition. More specifically, hydromodification refers to "the change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, interflow and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport." The use of LID Best Management Practices (BMPs) in project planning and design is to preserve a site's predevelopment hydrology by minimizing the loss of natural hydrologic processes such as infiltration, evapotranspiration, and runoff detention. LID BMPs try to offset these losses by introducing structural and non-structural design components that restore these water quality functions into the project's land plan. These land development requirements are detailed in the County-wide Model Water Quality Management Plan (WQMP) and Technical Guidance Document (TGD), approved in May 2011, which Cities have incorporated into their discretionary approval processes for new development and redevelopment projects.

The LID hierarchy requires new developments and re-developments to implement BMPs under the LID hierarchy as described in the TGD. The LID hierarchy requires new projects to first infiltrate, then harvest and reuse, then biofilter stormwater runoff from their project site depending on site constraints. New projects and redevelopments within the City will follow the set hierarchy of BMP selection, and more runoff throughout the City will be effectively treated as development occurs.

2.4.2 Existing Surface Water Conditions

According to the Santa Ana Region Water Action Plan (WAP), the channels with existing beneficial uses that serve the GPU area include San Diego Creek, the Santa Ana River, and coastal wetlands, bays, and tidal prisms.

Table 11 List of Receiving Waters and Beneficial Uses

Lower Santa Ana River Basin– Santa Ana River Reach 1	
MUN – Municipal and Domestic Supply	WARM – Warm Freshwater Habitat
GWR – Groundwater Recharge	WILD – Wildlife Habitat
REC 1 – Water Contact Recreation	RARE – Rare, Threatened, or Endangered Species
REC 2 – Non-Contact Water Recreation	
Lower Santa Ana River Basin – Santa Ana-Delhi Channel	
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
WARM – Warm Freshwater Habitat	RARE – Rare, Threatened, or Endangered Species
Lower Santa Ana River Basin – San Diego Creek Reach 1	
REC 1 – Water Contact Recreation	WARM – Warm Freshwater Habitat
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
Lower Newport Bay	
NAV – Navigation	RARE – Rare, Threatened, or Endangered Species
REC 1 – Water Contact Recreation	WILD – Wildlife Habitat
REC 2 – Non-Contact Water Recreation	SPWN – Spawning, Reproduction, and Development
COMM – Commercial and Sportfishing	MAR – Marine Habitat
	SHEL – Shellfish Harvesting
Upper Newport Bay	
REC 1 – Water Contact Recreation	RARE – Rare, Threatened, or Endangered Species
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
COMM – Commercial and Sportfishing	SPWN – Spawning, Reproduction, and Development
BIOL – Biological Habitat of Significance	MAR – Marine Habitat
EST – Estuarine Habitat	SHEL – Shellfish Harvesting
Bolsa Chica Ecological Reserve	
REC 1 – Water Contact Recreation	RARE – Rare, Threatened, or Endangered Species
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
BIOL – Biological Habitat of Significance	SPWN – Spawning, Reproduction, and Development
EST – Estuarine Habitat	MAR – Marine Habitat
Huntington Beach Wetlands	
REC 1 – Water Contact Recreation	RARE – Rare, Threatened, or Endangered Species
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
BIOL – Biological Habitat of Significance	SPWN – Spawning, Reproduction, and Development
	MAR – Marine Habitat
Santa Ana River Salt Marsh	
REC 1 – Water Contact Recreation	RARE – Rare, Threatened, or Endangered Species
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
BIOL – Biological Habitat of Significance	MAR – Marine Habitat
	EST – Estuarine Habitat

Tidal Prisms of Flood Control Channels Discharging to Coastal or Bay Waters

REC 1 – Water Contact Recreation	WILD – Wildlife Habitat
REC 2 – Non-Contact Water Recreation	MAR – Marine Habitat
COMM – Commercial or Sport Fishing	

Tidal Prism of Santa Ana River and Newport Slough

REC 1 – Water Contact Recreation	WILD – Wildlife Habitat
REC 2 – Non-Contact Water Recreation	RARE – Rare, Threatened, or Endangered Species
COMM – Commercial or Sport Fishing	MAR – Marine Habitat

Tidal Prism of Santa Ana-Delhi Channel

REC 2 – Non-Contact Water Recreation	RARE – Rare, Threatened, or Endangered Species
WILD – Wildlife Habitat	MAR – Marine Habitat

Notes:

Sources:

-California Regional Water Quality Control Board, Santa Ana Region. 1995 Water Quality Control Plan for the Santa Ana River Basin (Updated 2016). Retrieved September 2018 from https://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/docs/2016/Chapter_3_Feb_2016.pdf

General water quality objectives have been prescribed in the Basin Plan for all surface waters within the Santa Ana River Region. In order to maintain the beneficial uses listed in the previous section, inland surface waters must achieve these water quality objectives. The following numeric objectives have been established by the Basin Plan for the following surface streams that may receive flows from the GPU area:

Table 12 Numeric Water Quality Objectives

Santa Diego Creek, Reach 1	
Water Quality Objective	Numeric Objective (mg/L)
Total Dissolved Solids	1500
Total Inorganic Nitrogen	13
Chemical Oxygen Demand	90

Water Quality Objectives

General water quality objectives have been prescribed for the upstream portions of the Santa Ana River Watershed and its inland surface streams. However, site-specific objectives have not been determined for the reaches surrounding and fed by the GPU area. These areas are often impaired (by high levels of minerals) and there is not sufficient historic data to designate objectives based on natural background conditions.

2.4.3 Existing Groundwater Conditions

Regional Groundwater Conditions

The GPU area lies within the Orange County Groundwater Basin (OC Basin). The OC Basin is the source of approximately 60 to 70 percent of the water supply for 2.3 million people.

OCWD is responsible for managing the OC Basin. To maintain groundwater quality, OCWD conducts an extensive monitoring program that serves to manage the OC Basin’s groundwater production, control groundwater contamination, and comply with all required laws and regulations. A network of nearly 700 wells provides OCWD a source for samples, which are tested for a variety of purposes. OCWD collects 600 to 1,700 samples each month to monitor Basin water quality. These samples are collected and tested according to approved federal and state procedures as well as industry-recognized quality assurance and control protocols.

The OC Basin also has prescribed beneficial uses and water quality objectives as stated in the Santa Ana RWQCB Basin Plan that are described below.

Beneficial Uses

According to the Santa Ana RWQCB Basin Plan, beneficial uses have been established for the Orange Groundwater Management Zone which underlies the Santa Ana GPU area. These are listed below.

Table 13 Beneficial Uses of the OC Basin

Lower Santa Ana River Basin– Orange Groundwater Management Zone	
MUN – Municipal and Domestic Supply	IND – Industrial Service Supply
AGR – Agricultural Supply	PROC – Industrial Process Supply

Water Quality Objectives

Numeric water quality objectives within the Basin Plan have been established for the OC Basin and are listed below⁸:

Table 14 Numeric Water Quality Objectives

Basin Plan – Orange Groundwater Management Zone	
Water Quality Objective	Numeric Objective (mg/L)
Total Dissolved Solids	580
Nitrate as Nitrogen	3.4

Salinity is a significant water quality problem in many parts of southern California, including Orange County. Salinity is a measure of the dissolved minerals in water including both TDS and nitrates. The portions of the OC Basin with the highest levels are generally located in the Cities of Irvine, Tustin, Yorba Linda, Anaheim, Placentia, and Fullerton. OCWD continually monitors the levels of TDS in wells throughout the OC Basin. The TDS concentration in the OC Basin is

⁸ Santa Ana RWQCB Basin Plan. Orange Groundwater Management Zone. Found here: https://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/docs/2016/Chapter_4_Feb_2016.pdf

expected to decrease over time as the TDS concentration of Groundwater Replenishment System (GWRS) water used to recharge the OC Basin is approximately 50 mg/L.

Nitrates are one of the most common and widespread contaminants in groundwater supplies, originating from fertilizer use, animal feedlots, wastewater disposal systems, and other sources. The MCL for nitrate in drinking water is set at 10 mg/L. OCWD regularly monitors nitrate levels in groundwater and works with producers to treat wells that have exceeded safe levels of nitrate concentrations. OCWD manages the nitrate concentration of water recharged by its facilities to reduce nitrate concentrations in groundwater.

Other contaminants that OCWD monitors within the OC Basin include:

- Methyl Tertiary Butyl Ether (MTBE)
- Volatile Organic Compounds (VOC)
- NDMA
- 1-4-Dioxane
- Perchlorate
- Selenium
- Constituents of Emerging Concern (CEC)

Sustainable Groundwater Management Act

The California Sustainable Groundwater Management Act (“SGMA”), a three-bill package signed into law in 2014, creates a framework for the management of groundwater sources throughout the state. Under SGMA, local agencies form Groundwater Sustainability Agencies (“GSAs”) and create Groundwater Sustainability Plans (GSPs). If a GSA is not formed, special act districts, such as OCWD, can submit “Alternative Plans” to GSPs. Timelines and requirements are based upon basin priority. Under SGMA, the Orange County Groundwater Basin (Basin 8-1) is considered a medium-priority basin.

In January 2017 OCWD, the city of La Habra, and Irvine Ranch Water District submitted the Basin 8-1 Alternative Plan. The Alternative Plan incorporates the requirements of GSPs and is considered to be “functionally equivalent” to a GSP. The Alternative Plan analyzes existing basin conditions and demonstrates that the Basin has been operated within its sustainable yield for more than 10 years without degrading water quality, reducing storage, or lowering groundwater levels. The Alternative Plan will be updated and resubmitted every 5 years as part of SGMA requirements. The Alternative Plan was approved by the California Department of Water Resources (DWR) in July 2019.

Under the Alternative Plan, four management areas have been created for the Orange County Groundwater Basin. Each of these management areas has slightly different management goals and strategies based on the government bodies that serve them. The management areas are as follows:

- *La Habra-Brea Management Area* – Includes the northern portion of the Basin located outside of the OCWD service area.
- *OCWD Management Area* – Includes OCWD’s service area, covering approximately 89% of the Basin. This area encompasses the City of Santa Ana.

- *South East Management Area* – Includes the southern and southeastern portions of the Basin that are outside of OCWD’s service area.
- *Santa Ana Canyon Management Area* – Includes the eastern portion of the Basin outside of OCWD’s service area.

DRAFT

3. THRESHOLDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) significance criteria are used to evaluate the degree of impact caused by a development project on environmental resources such as hydrology and water quality. According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would impact any of the items listed below.

3.1 HYDROLOGY & WATER QUALITY THRESHOLDS (CEQA CHECKLIST SECTION X)

Would the Project:

- A. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?
- B. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- C. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
 - (i) Result in a substantial erosion or siltation on- or off-site;
 - (ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
 - (iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
 - (iv) Impede or redirect flood flows?
- D. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?
- E. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Should the answers to these environmental factors prove to be a potentially significant impact, mitigation measures would be required to reduce those impacts to a less-than-significant threshold.

3.2 UTILITIES AND SERVICE SYSTEMS THRESHOLDS (CEQA CHECKLIST SECTION XIX)

Would the Project:

- A. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?
- C. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Should the answers to these environmental factors prove to be a potentially significant impact, mitigation measures would be required to reduce those impacts to a less-than-significant threshold.

DRAFT

4. ENVIRONMENTAL IMPACTS

The purpose of the proposed conditions evaluation is to determine potential impacts related to the proposed land use zoning associated with the Santa Ana GPU and hydrology, sewer and water infrastructure systems.

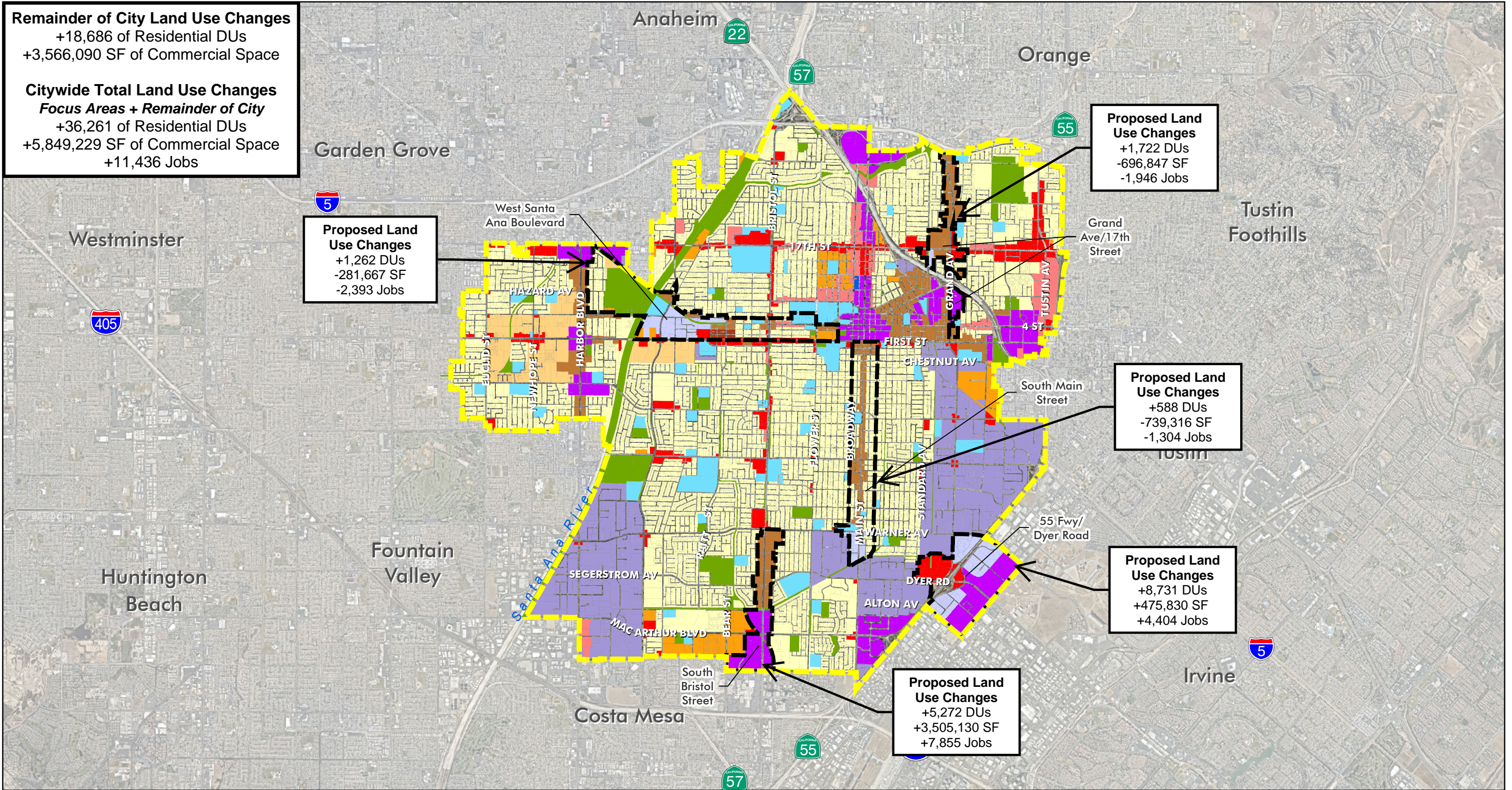
4.1 PROPOSED LAND USE CHANGES

The proposed land use changes that will largely increase mixed use land uses including single and multi-family homes, commercial, industrial, and retail of varying density. An estimated growth of 36,261 dwelling units is anticipated across the City as compared to existing land use, concentrated mainly among the five Focus Areas and additional specific plan and special zoning areas. Approximately 5.8 million square feet of additional commercial land uses are anticipated across the City, and a corresponding increase of 11,436 jobs is anticipated. Land use changes as compared to the current General Plan occur exclusively in the Focus Areas. An increase of 13,195 dwelling units and a decrease in commercial square footage of -2,665,857 square feet is proposed across all of the Focus Areas in comparison to the current General Plan. Comparison of the current General Plan to the proposed GPU is important for understand any additional impacts to sewer and water infrastructure as described in Sections 4.3.2 and 4.4.2. Table 13 provides an overview of proposed land use changes across the City. Figure 10 illustrates the proposed buildout of land uses under full implementation of the GPU.

Table 15 City of Santa Ana GPU Land Use Changes

Focus Area	Acreage	Change in Housing Units	Change in Commercial Areas
Focus Areas			
West Santa Ana Boulevard	604 acres	+ 1,262 DUs	- 281,667SF
South Bristol Street	236 acres	+ 5,272 DUs	+ 3,505,130 SF
Grand Avenue/17th Street	202 acres	+ 1,722 DUs	- 696,847 SF
South Main Street	408 acres	+ 588 DUs	-739,316 SF
55 Freeway/Dyer Road	438 acres	+ 8,731 DUs	+ 475,830 SF
Focus Area Total	1,888 acres	+17,575 DUs	+2,263,130 SF
Remainder of City			
All Other Areas of City	15,642 acres	+ 18,686 DUs	+3,586,090 SF
Citywide Total	17,530 acres	+ 36,261 DUs	+ 5,849,229 SF

Under proposed conditions, 17,575 DUs and approximately 2.3 million sf of commercial space will be created throughout the Focus Areas, representing approximately half of the proposed growth as a result of GPU buildout. Based on the proposed land use changes, sewer and water flows are anticipated to increase while runoff within existing built out areas is anticipated to decrease due to minimum landscaping requirements as well as LID features associated with storm water requirements as compared to existing conditions. Runoff increases will occur within areas of new development where previous land uses were vacant. Additional details are provided below for hydrology, sewer and water.



Aerial Date: 09/26/2018

Santa Ana GPU Proposed Zoning

City of Santa Ana General Plan Update

Figure 10

4/10/2020

Santa Ana City Boundary
 Focus Area

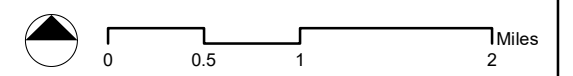
Proposed General Plan Zoning

- LR-7, Low Density Residential
- LMR-11, Low-Medium Density Residential
- MR-15, Medium Density Residential

- UN, Urban Neighborhood
- CR, Corridor Residential
- GC, General Commercial
- IND, Industrial

- FLEX, Industrial/Flex
- INS, Institutional
- OS, Open Space
- DC, District Center

- PAO, Professional and Administrative Office
- OBPDC, One Broadway Plaza District Center
- ROW



4.2 HYDROLOGY

The purpose of the proposed conditions evaluation is to evaluate impacts associated with the proposed land use changes at a city-wide program-level EIR, characterize changes as compared to the existing runoff conditions and identify where either additional storm drain facilities are required to improve runoff conditions or where conformance to master plans of drainage are required for long-term planning and protection of downstream receiving waters.

4.2.1 Proposed Hydrology Conditions

As described in Section 2.1.1, under existing conditions, the City is largely built out and there are no major areas within the City undeveloped. Therefore, impacts to hydrology and storm drain systems will be minimal and peak flows will likely be decreased overall due to the implementation of minimum landscaping requirements as well as LID features associated with water quality regulations. These features will increase pervious areas throughout the City which will decrease stormwater flows.

As shown in Figure 4, it has been identified that there are two Focus Areas that may result in an increase of stormwater runoff peak flow rates due to the potential for single family homes and vacant lots to be redeveloped into higher intensity uses. These are summarized below:

- **West Santa Ana Boulevard Focus Area:**
Description: The West Santa Ana Boulevard Focus Area has some existing single family residences that may be converted to multi family residences or commercial land uses in the future. This could result in increased imperviousness within these areas and therefore increased stormwater runoff peak flows.

There are some downstream improvements to the Gardens Channel between Edinger and Sunflower as mentioned in Section 2.1.2 and in the City's MPD to alleviate some local flooding issues near Thorton Park. These improvements are also listed on the current OCPW 7-year CIP as a qualified future project. Therefore, based on these findings, prioritizing the Gardens Channel improvements may be beneficial to ensure no hydrology impacts result from the future developments proposed under the Santa Ana GPU.

- **Grand Avenue / 17th Street Focus Area:**
Description: The Grand Avenue/17th Street Focus Areas also has some existing single family residences that may be converted to multi family residences or commercial land uses in the future. This could result in increased imperviousness within these areas and therefore increased stormwater runoff peak flows.

There are several identified improvements along Grand Avenue between Santa Clara and the Santa Fe Channel within the regional Santa Fe Watershed. The majority of these improvements are to upsize various storm drain pipes to convey the 10-year storm event. Based on these findings, prioritizing the Santa Fe Grand storm drain improvements may be beneficial to ensure no hydrology impacts results from the future developments proposed under the Santa Ana GPU.

- **South Main Street Focus Area:**

Description: The South Main Street Focus Areas also has some existing single family residences that may be converted to multi family residences or commercial land uses in the future. This could result in increased imperviousness within these areas and therefore increased stormwater runoff peak flows.

There are currently no improvements within this Focus Area identified within the City's MPD or the OCPW 7-year CIP.

- **55 Fwy/Dyer Road Focus Area:**

Description: Within the 55 Fwy/Dyer Road Focus Area, there are some large vacant parcels in the that may also result in increases in stormwater runoff.

As mentioned in Section 2.1.3, the OCPW 7-Year Capital Improvement Plan includes the Lane Channel improvements which includes demolishing and replacing a portion of damaged concrete-lined channel. These improvements are anticipated to be finished in June 2020 and will serve to improve the hydrologic capacity of downstream areas.

Additionally, the South Bristol Street Focus Area also discharge to a number of the improvement projects covered in the Santa Ana Master Plan of Drainage and discussed in Section 2.1.2. Although this area is not anticipated to have an increase in peak runoff rates due to the likely increase in pervious areas associated with new development design features, these improvement projects should be considered for prioritization. The improvement projects within or downstream of the Focus Areas are summarized below.

- Improvement #2 – Gardens Channel Improvements receives runoff from West Santa Ana Boulevard and South Bristol Street Focus Areas and also drains through South Bristol Street Focus Area.

Prioritizing this improvement may be important to ensuring no hydrologic impacts exist in the future under buildout of the Santa Ana GPU.

Despite these potential increases in runoff from the GPU and recommended improvement projects, the City and County have policies in place for reviewing and permitting new developments as they are proposed as part of the GPU. As part of the development process, detailed hydrology studies will be required and if necessary, on-site detention systems within the development can be required to match existing peak flows, thereby eliminating any potential increase in runoff.

4.2.2 Hydrology Impacts

The following impact assessments are based on the significance criteria established in Section 3.1 for hydrology.

Impact B: *Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.*

Impact Analysis: As a built out City, any proposed land use changes and development will occur within areas that are already built out and will not result in interference with groundwater recharge or management of the groundwater basin. The City of Santa Ana area relies on local groundwater resources for approximately 70% of its water supply. Therefore, increases in population could generate a higher demand for groundwater resources. However, the City of Santa Ana updates its UWMP every five years, quantifying existing and projected water supplies and demands to ensure there will not be any water supply shortages or significant groundwater depletion. The 2015 UWMP highlighted sufficient surface and underground water supplied through 2040 concluding no risk of a net deficit in aquifer volume or lowering of the groundwater table. In addition, the 2018-19 OCWD Engineer's Report also concluded sufficient groundwater supplies into the future to serve its member agencies. OCWD has multiple mechanisms to prevent groundwater overdraft. The basin is covered by Alternative Plan 8-1, and the groundwater management strategies laid out in the Plan have been approved by DWR. Impacts related to the depletion of groundwater are considered less than significant.

Impact C: *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:*

- (i) Result in a substantial erosion or siltation on- or off-site;*
- (ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;*
- (iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or*
- (iv) Impede or redirect flood flows?*

Impact Analysis:

- i) **Result in a substantial erosion or siltation on- or off-site:** Under the existing conditions and proposed conditions, drainage patterns will largely be maintained and will utilize the existing drainage facilities within the public right of way. Current runoff is captured and conveyed by existing storm drain infrastructure throughout the City before discharging to County drainage channels and to the Pacific Ocean. The City is built out with the exception of a small number of vacant parcels which are stabilized and will likely be developed under buildout conditions. The majority of streams and channels that drain the City are concrete lined and not susceptible to scour or erosion. For those areas that are tributary to streams that may be

- susceptible to scour, hydromodification requirements as part of the regional MS4 permit will ensure that impacts are minimized. Overall impacts to erosion and siltation as a result of GPU buildout are anticipated to be less than significant.
- ii) ***Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite:*** Under the proposed condition, overall drainage patterns, flow rates and flow volumes will be largely be maintained based on the high level of impervious condition under the existing condition. Hydromodification requirements and standards flood control requirements for new development will minimize impacts of increased flows and volumes on downstream receiving waters. Both hydromodification and flood control requirements are currently enforced successfully throughout the City's review of various development projects through their Public Works department. As mentioned above, any increases in stormwater runoff and peak flows will be managed on a project-by-project basis by the City and County to implement detention systems where needed. Based on these provisions, impacts related to increased runoff rates are considered less than significant.
- iii) ***Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff:*** The 2015 City of Santa Ana MPD identified a number of recommended and prioritized storm drain improvement projects throughout the City's service area. One of the projects identified was included in the 2018/19 CIP, and subsequent projects will be included in future CIP's based on priority. As identified in Section 4.2.1, there are some recommended downstream improvements to stormwater conveyance systems that may experience an increase in runoff from the conversion of single family residences to higher density uses as well as the development of vacant parcels. These areas primarily include the West Santa Ana Boulevard, the Grand Avenue/17th Street, South Main Street and the 55 Fwy/Dyer Road Focus Areas. The identified improvements within and downstream of these Focus Areas may be prioritized to be implemented to ensure no hydrology impacts results from the GPU land use changes. However, the City has policies in place to eliminate exacerbating any downstream flooding through existing flood control requirements associated with development projects and the implementation of detention systems. In addition, the City will continue monitoring its storm drain system for any segments that need immediate improvements and will regularly update its Master Plan of Drainage to adequately plan for future drainage needs. OCPW also updates their CIP each year to ensure regional drainage facilities are functioning. Redevelopment projects that will occur under implementation of the GPU will provide additional opportunities for capital improvements to occur. As new developments across the City are anticipated to reduce peak flows from existing conditions as discussed in Impact Analysis C.ii, impacts to drainage infrastructure are not anticipated.
- iv) ***Impede or redirect flood flows:*** Under proposed buildout conditions, general drainage and flood control patterns will be maintained. As discussed in Impact Analysis C.ii and C.iii above, the City regularly updates its Master Plan of Drainage and the City and County both utilize a CIP program to prioritize and fund drainage improvement projects. Impediments to or redirection of flood flows as a result of project buildout are anticipated to be less than significant.

4.3 SEWER & WASTEWATER INFRASTRUCTURE

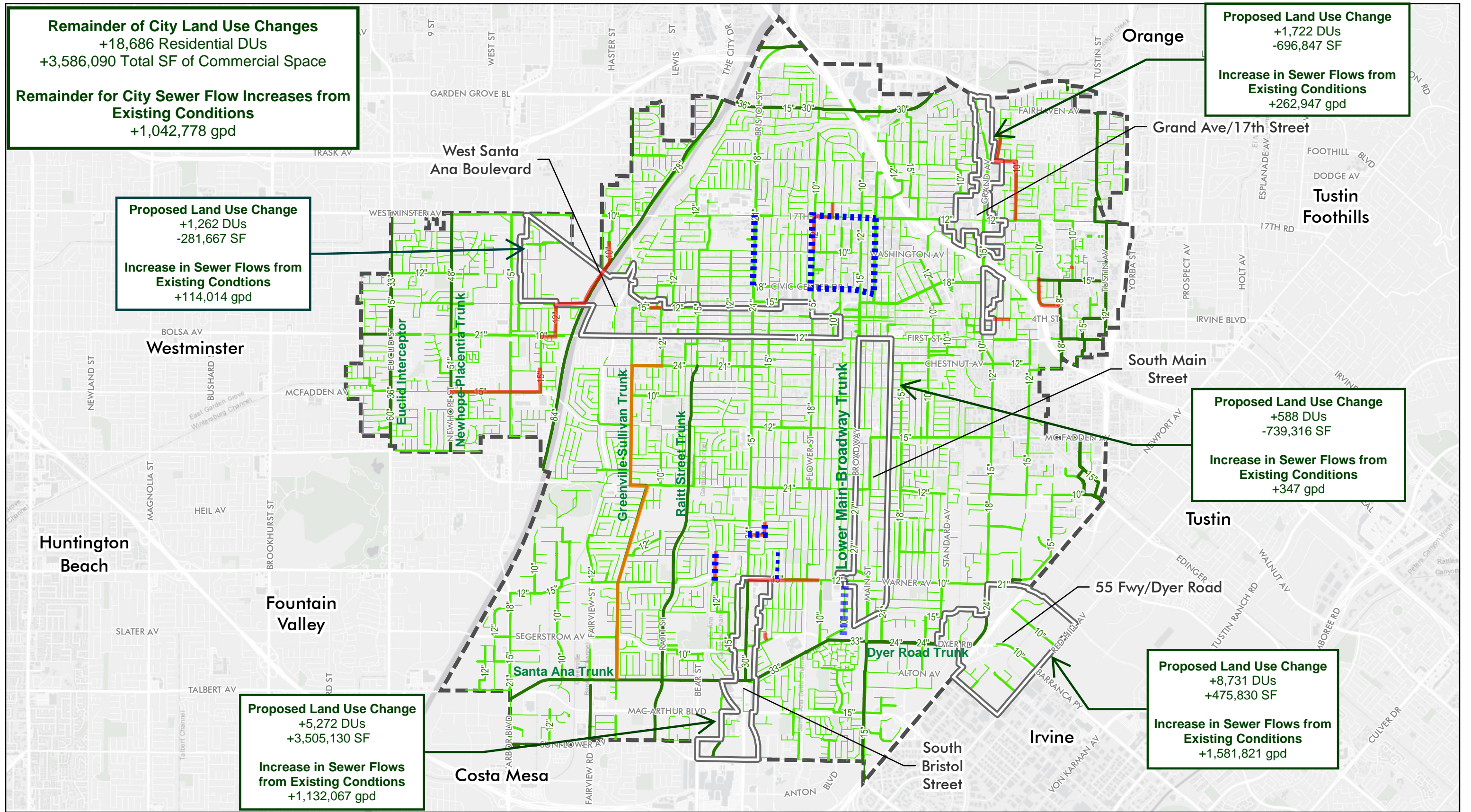
4.3.1 Proposed Wastewater Flows

Under the proposed land use changes, sewer flows will increase across the City of Santa Ana. A total increase of 36,261 dwelling units and increase of approximately 5,849,220 sf of non-residential uses are proposed. Increases under proposed conditions implements the same methodology as existing sewer flows, however flow factors for residential land uses are based on 2025-2040 flow factors from the MWDOC Orange County Water Reliability Study to reflect buildout conditions. Table 16 provides a summary of the proposed increases in sewer flows under implementation of the General Plan land use changes.

Table 16 Proposed Condition Average Sewer Flows

Area	Number of Dwelling Units	Non-Residential SF ¹	Proposed Sewer Flows (GPD)	Existing Sewer Flows (GPD)	Change in Sewer Flows (GPD)	% Increase
Focus Areas						
West Santa Ana Boulevard	3,920	2,808,805	941,567	827,553	+114,014	13.8%
South Bristol Street	5,492	5,082,641	1,257,985	125,918	+1,132,067	899%
Grand Avenue/17th Street	2,283	703,894	451,305	188,358	+262,947	140%
South Main Street	2,308	946,662	565,847	565,500	+347	0.1%
55 Freeway/Dyer Road	9,952	6,142,283	2,120,271	538,450	+1,581,821	294%
Focus Area Total	23,955	15,684,285	5,336,974	2,245,779	+3,091,195	138%
Remainder of City						
All Other Areas of City	91,098	57,283,531	28,829,359	27,786,561	+1,042,778	3.75%
City of Santa Ana Total	115,053	72,967,816	34,166,333	30,032,340	+4,133,993	13.8%
Notes: GPD – Gallons per day SF – Square Feet Land use data supplied by Placeworks, 2020						

Full implementation of the proposed land use changes has the potential to increase sewer flows by 4.13 MGD within the City and by 3.09 MGD throughout the Focus Areas. Therefore, the Focus Areas represent approximately 75% of the proposed increases in sewer flows throughout the GPU area. These flow estimates are for infrastructure planning purposes only and are considered conservative.



City of Santa Ana Proposed Sewer Flows

Figure 11

City of Santa Ana

5/5/2020



Santa Ana Boundary

City Sewer Pipelines
 — 8" and Below in Diameter
 — 9" - 84" in Diameter

OCSD Sewer Pipelines
 — OCSD Sewer Lines

Proposed Improvements
 — Sewer Master Plan Recommended 5-Year CIP Improvements for City Sewer Facilities

2018/19 City Capital Improvement Plan Project
 Proposed OCSD Trunk Line Capacity Improvement Project



4.3.2 Proposed Sewer/Wastewater System

City of Santa Ana Proposed Sewer System

The City of Santa 2016 Sewer Master Plan (SMP) noted a number of deficient segments and improvement projects throughout the City. These projects have been included in the City CIP based on priority. Three of the Focus Areas have recommended improvements from the SMP either within the Focus Area boundary of immediately adjacent to the Focus Area boundaries as shown in Figure 11. When analyzing existing recommended improvements identified in the SMP that utilized previous population estimates as well as information from the City of Santa Ana General Plan (current GP), it is important to understand how the proposed GPU may impact these recommended improvements. See below for additional details.

Existing wastewater capacity analysis, including the 2016 Sewer Master Plan, is based on existing water meter data to establish baseline conditions and utilizes several resources including population projections and development projects associated with the current GP and its final buildout estimates. Therefore, it is helpful to understand how sewer flows under the current GP compare to the proposed GPU to refine the identification of impacts. The proposed GPU modifies buildout numbers within the GPU Focus Areas. From current GP to proposed GPU, 13,195 additional DUs, consisting primarily of multi-family units, are proposed, as well as a decrease in commercial square footage of approximately -2.7 million square feet. Table 17 below shows land use changes between the current GP buildout and the proposed GPU buildout. This analysis is based on total DU count and commercial square footage only and does not differentiate between single family and multifamily sewer flow factors. These increases in flows under the proposed GPU as compared to the current GP may have implications for capacity assessments that can be helpful for future planning and sewer monitoring.

Table 17 Sewer Flow Changes, Current GP to Proposed GPU

Focus Area	Change in Housing Units, Current GPU to Proposed	Change in Commercial Areas, Current GPU to Proposed	Change in Sewer Flows
Focus Areas			
West Santa Ana Boulevard	+ 1,308 DUs	- 38,106 SF	+ 234,115 GPD
South Bristol Street	+ 2,232 DUs	+ 946,213 SF	+ 452,011 GPD
Grand Avenue/17th Street	+ 1,766 DUs	- 1,715,794 SF	+ 226,655 GPD
South Main Street	+ 667 DUs	- 1,481,837 SF	+ 43,444 GPD
55 Freeway/Dyer Road	+ 7,222 DUs	- 376,333 SF	+ 1,284,029 GPD
Focus Area Total	+ 13,195 DUs	- 2,665,857 SF	+ 2,243,264 GPD
Remainder of City			
All Other Areas of City	+ 0 DUs	+ 0 SF	+ 0 GPD
Citywide Total	+ 13,195 DUs	-2,665,857 SF	+ 2,243,264 GPD

As shown in the table above, increases in sewer flows under the proposed GPU will be spread across the five Focus Areas, with no deviations from the current General Plan elsewhere in the City. As the 2016 Sewer Master Plan capacity analysis was completed utilizing current GP buildout scenarios, increased flows from the Focus Areas will alter the outcome of the capacity assessment as well as the suggested upsizing requirements to achieve optimal hydraulic

capacity. Additional flows beyond those modeled using the current GP are anticipated to impact the five Focus Areas as follows:

- **West Santa Ana Boulevard Focus Area:**
Hydraulic Deficiency: There are two recommended hydraulic improvements (CIP-CAP-003 of SMP) within the West Santa Ana Boulevard Focus Area as identified in the SMP. The recommended improvements along the CIP-CAP-003 segment are to upsize the pipes from 10"-12" in diameter to 15" in diameter.
Analysis: An additional 234,115 GPD is anticipated across the Focus Area under the proposed GPU compared to the modeled land use buildout from the current GP. This is likely conservative as it does not include the reduction of single family residences in this area under the proposed GPU as shown by the increase of only 114,014 gpd from existing land use to proposed GPU in Table 16. As a result of the proposed land uses under the GPU, the recommended improvement to a 15" line may need to be increased to an 18" line and will require additional flow monitoring and sewer modeling to confirm final pipe size.
- **South Bristol Street Focus Area:**
Hydraulic Deficiency: Two improvements immediately adjacent to the Focus Area were identified in the 2016 SMP.
Analysis: Under proposed GPU buildout, an additional 452,011 GPD of flows are anticipated through the Focus Area as compared to current GP; or an additional 1.13 MGD as compared to existing land use. While it is unlikely that the two improvement areas adjacent to the Focus Area will be exacerbated by the increase in flows, the magnitude of flows may result in additional improvements or deficiencies within or adjacent to the Focus Area. The sewer master plan demonstrated there is sufficient capacity under current and future conditions with the ability to accommodate significant growth over time. A primary reason is that the entire area is directly adjacent to large OCSD trunk lines which results in greater capacity. Based on the sewer flow monitoring requirements for local City lines and OCSD's separate detailed capacity assessment of their trunk lines, the system will be managed and updated to accommodate the full buildout of the proposed GPU over time.
- **Grand Avenue / 17th Street Focus Area:**
Hydraulic Deficiency: There are two nearby deficiency areas, however the Focus Area is not directly tributary to any recommended improvements (identified capacity issues are upstream).
Analysis: The additional 226,655 GPD under the proposed GPU as compared to the current GP, or additional 262,947 from existing land use to proposed GPU, will not exacerbate existing adjacent upstream capacity issues within the 15" and 18" trunk lines.
- **South Main Street Focus Area:**
Hydraulic Deficiency: None.
Analysis: The proposed GPU will result in a 43,444 GPD increase in flows spread across the Focus Area from current GP to proposed GPU; or only 347 gpd from existing land use (which takes into account a reduction of single family residences) as compared to

the proposed GPU. Given the relatively small increase in flows (0.04 MGD) spread across the Focus Area and the lack of deficiencies identified in the SMP, it is not anticipated that any new deficiencies will arise from the proposed GPU land uses.

- **55/Dyer Focus Area:**

Hydraulic Deficiency: None

Analysis: While there were no capacity issues or recommended improvement projects within or adjacent to the Focus Area identified in the 2016 SMP, buildout of the proposed GPU as compared to the current GP will result in an additional 1,284,029 GPD (1.3 MGD) across the Focus Area; or approximately 1.6 MGD from existing land use to the proposed GPU. The sewer master plan demonstrated there is sufficient capacity under current and future conditions with the ability to accommodate significant growth over time. A primary reason is that the entire area is directly adjacent to large OCSD trunk lines which results in greater capacity. Based on the sewer flow monitoring requirements for local City lines and OCSD's separate detailed capacity assessment of their trunk lines, the system will be managed and updated to accommodate the full buildout of the proposed GPU over time.

Recommendation: It is recommended that increases be shared with appropriate City staff so that they may re-analyze sewer segments as needed to ensure adequate capacity basis. This will also occur on a project by project basis, as confirmed by the City, as new development projects are proposed within the Focus Areas.

Any subsequent recommended improvements can be added to the City's CIP and prioritized at the City's discretion. Due to the proposed land use changes under the GPU, the improvements noted in the bullet points above may be prioritized in the future to eliminate any impacts to the sewer system. The City will continue to regularly update its Sewer Master Plan and CIP, allowing for deficient areas to be identified and improved.

OCSD Proposed Sewer System

The OCSD Master Plan Update Report No. 3 (2019) notes a surcharge conditions through the Greenville-Sullivan Trunk Line. A capacity improvement project for the trunk line has been proposed and is currently under review. The Greenville-Sullivan Trunk Line is not within a Focus Area but is downstream of the West Santa Ana Boulevard Focus Area that is anticipating an increase in sewer flows of 114,014 gpd or 0.01 MGD. This anticipated increase from the West Santa Ana Boulevard Focus Area will happen over a series of several years as new developments and redevelopments come online. The CIP project planned will be upsizing the Greenville-Sullivan Trunk Line from a 33" diameter line to a 39" diameter line which is more than adequate to handle the increase of 0.01 MGD proposed under the Santa Ana GPU.

OCSD bases its long-term sewer capacity assessments on CDR population estimates in coordination with all cities in their service area and does not generally utilize City-specific General or Specific Plans to plan or conduct capacity analysis. For improvement projects associated with new developments and redevelopments, OCSD manages required upgrades based on detailed population growth models and on a project by project basis. In cases where a trunk line requires upsizing as a result of a specific project and the project is not included in the CIP or any planning documents, OCSD allows the project applicant to conduct the trunk

line upsize and follow a reimbursement agreement process. Therefore, OCSD has a functioning and effective process in place to ensure the regional sewer infrastructure will support future developments under the Santa Ana GPU.

4.3.3 Sewer/Wastewater Impacts

The following impact assessments are based on the significance criteria established in Section 3.2 for wastewater.

Impact A. *Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

Impact Analysis: The estimated increase of 4.13MGD over the 30.03 MGD of existing flows is not anticipated to exceed the projected future capacity of the City of Santa Ana's wastewater infrastructure or OCSD's regional infrastructure or WWTP. The City maintains a regularly updated Sewer Master Plan and CIP and has a process in place to assess local sewer impacts on a project-by-project basis.

As noted above, there are some recommended improvements within or near Focus Areas where the majority of sewer flow increases are anticipated to occur. Additional studies using updated buildout numbers are recommended for the West Santa Ana Boulevard, South Bristol Street, and 55 Fwy/Dyer Road Focus Areas. At a citywide scale, the City's Sewer Master Plan and CIP process adequately prioritizes necessary projects as developments under the GPU come online. However, this process can likely be achieved at the local level as future development comes online and ties into the existing City infrastructure

As referenced, similar to existing protocols employed within the City, any project within the City and under the proposed GPU that goes through the entitlement process will be required to perform a sewer monitoring study. After submittal and review of the study by City staff, if the sewer system is found to be deficient, the developer will be required to upsize the portion of the sewer pipe within the frontage of their property. There may be options depending on the condition of the sewer infrastructure for the developers to enter into a Joint Cost Sharing Agreement with the City to cover a portion of the cost for required upsizing that may be done by the City at a later date. If improvements are needed to infrastructure downstream of the project site, the developer may be required to participate and pay into the Fair Share Agreement currently employed by the City. The Fair Share Agreement will allow the developer to fund a percentage of the downstream improvement that will be carried out by the City in the future. In the case of sewer line improvements, construction will follow the Construction General Permit and all pertinent City and County codes, minimizing environmental impact.

In addition, OCSD regularly updates long-term planning documents which include provisions for improving regional treatment plant and conveyance infrastructure capacity. OCSD has identified an improvement needed to the Greenville-Sullivan Trunk line within the GPU area which is currently under review. Through planning and management processes currently in place, OCSD is able to ensure the regional sewer infrastructure will support future developments under the Santa Ana GPU.

Impact C. *Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments?*

Impact Analysis: See Impact Analysis A regarding wastewater treatment capacity. The City of Santa Ana has mechanisms to create adequate capacity within its sewage conveyance facilities to handle the proposed increases in flows from the GPU. OCSD’s wastewater treatment plants have a total combined capacity of 390 MGD with the ability to route flows to either of the two WWTPs as needed. 2018-19 flows were estimated to be 185 MGD, indicating adequate capacity (205 MGD) for the proposed increase in flows of 4.13 MGD as compared to existing land use. OCSD utilizes a robust CIP process and relies on internal capacity modeling, population projects and land use projections, independent of General Plan update buildout estimates. OCSD is currently planning a CIP project along the Greenville-Sullivan trunk line within the City of Santa Ana to ensure sewer diversions are functioning effectively and to reduce surcharge conditions. As referenced in Section 4.3.2, the proposed upsizing of the trunk line from a 33” to 39” diameter pipe is more than adequate to handle the increase of 0.01 MGD from the West Santa Ana Boulevard Focus Area upstream. Through updating appropriate master plans, long-term capital improvement budgets, and plant capacity assessments, it is anticipated OCSD will be able to receive increases in flows consistent with the buildout proposed under implementation of the GPU. No impacts are anticipated to service provider capacities.

4.4 WATER INFRASTRUCTURE

4.4.1 Proposed Water Flows

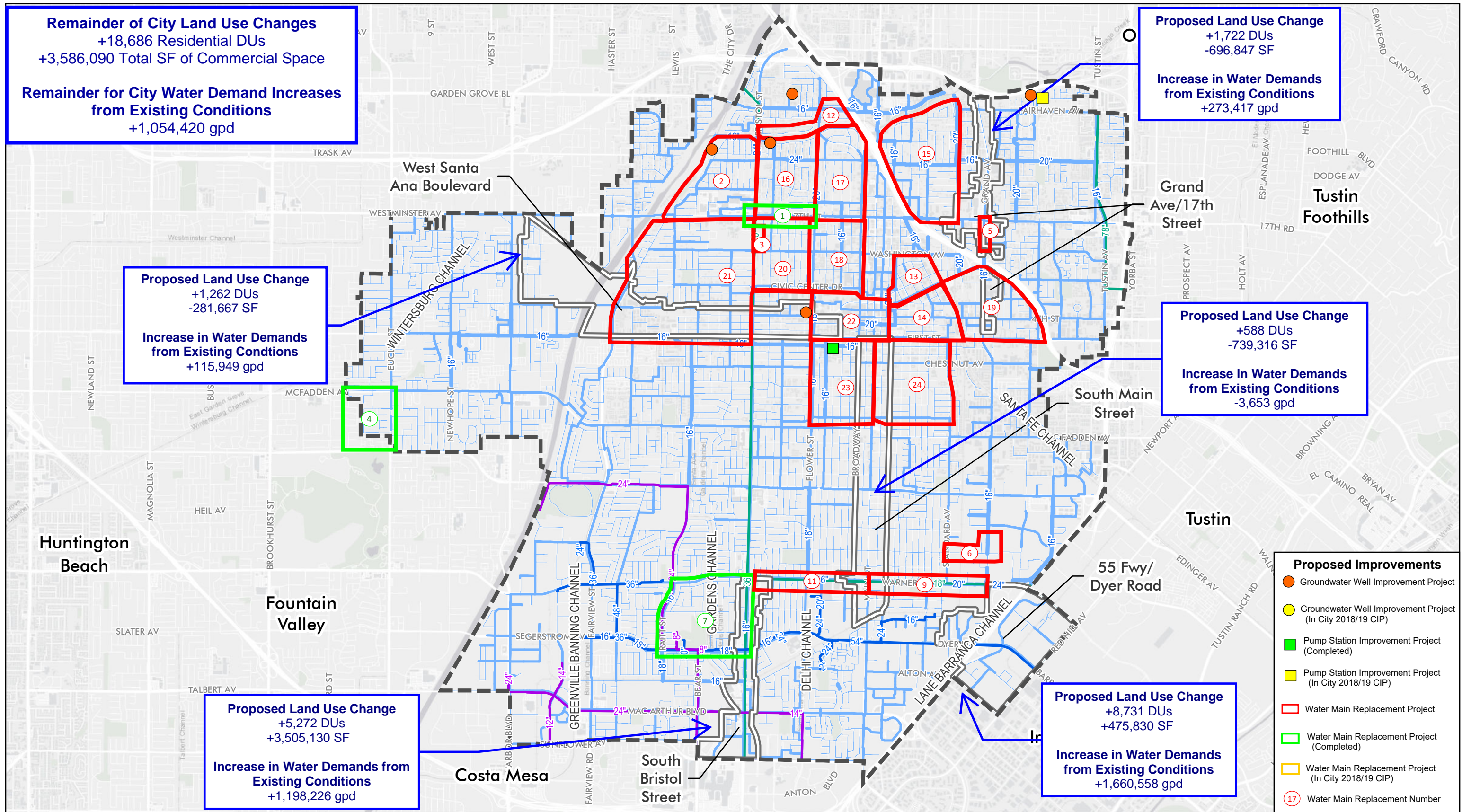
Under the proposed land use changes, water flows will increase throughout the City of Santa Ana and its Focus Areas due to increases in dwelling units and commercial land uses. A total increase of 36,261 dwelling units and increase of approximately 5,849,220 sf of non-residential uses are proposed. Table 18 shows the proposed water flows associated with each land use change, using the same methodology as for the existing conditions. Increases in water flows under proposed conditions implements the same methodology as existing waterflows, however flow factors for residential land uses are based on 2025-2040 flow factors from the MWDOC Orange County Water Reliability Study to reflect buildout conditions. Detailed calculations and associated exhibits are included in Appendix C.

Table 18 Proposed Condition Water Flows

Area	Number of Dwelling Units	Commercial SF	Proposed Water Flow (GPD)	Existing Water Flow (GPD)	Change in Flow (GPD)	% Increase
Focus Areas						
West Santa Ana Boulevard	3,920	2,808,805	996,756	880,807	+115,949	13.6%

South Bristol Street	5,492	5,082,641	1,335,183	136,957	+1,198,226	857%
Grand Avenue/17th Street	2,283	703,894	475,779	202,362	+273,417	135%
South Main Street	2,308	946,662	597,029	600,682	- 3,653	-0.6%
55 Freeway/Dyer Road	9,952	6,142,283	2,243,399	582,841	+1,660,558	666%
Focus Area Total	23,955	15,684,285	5,648,146	2,403,648	+3,244,498	135%
Remainder of City						
All Other Areas of City	91,098	57,283,531	30,458,068	29,403,648	+1,054,420	3.6%
City of Santa Ana Total	115,053	72,967,816	36,106,214	31,833,589	+4,272,625	13.4%
Notes: GPD – Gallons per day SF – Square Feet Land use data supplied by Placeworks, 2020						

Full implementation of the proposed increases has the potential to increase water flow by 4.27 MGD within the City. Water flows across all Focus Areas are anticipated to increase by 3.24 MGD, representing approximately 75% of the projected Citywide increase in water flows. Water flows will primarily come from additional dwelling units within the Focus Areas and specific plan/special zoning areas. These water flow estimates are for infrastructure capacity purposes only and are considered conservative. Figure 12 summarizes proposed increases in water flows across the City under buildout conditions.



City of Santa Ana Proposed Water Flows

Figure 12



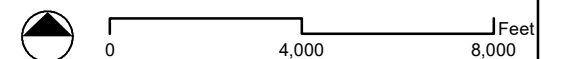
Santa Ana City Boundary
Focus Area

Santa Ana Municipal Utilities Water Lines
8" and Below in Diameter

9" - 14" in Diameter
15" - 30" in Diameter

Other Water Lines
IRWD Water Lines

MWD Water Lines
OCWD Reclaimed Water Lines



5/28/2020

4.4.2 Proposed Water System

The City currently has 19 remaining identified water main replacement projects, 6 groundwater well improvement projects, and 1 pump station improvement project throughout the City as identified in the 2017 Water Master Plan. These improvement projects are intended to increase the City water system’s capacity and functionality to keep up with population and non-residential growth throughout the service area. Of these projects, one water main replacement, one pump station improvement, and one groundwater well improvement project were included in the City’s 2018/19 CIP. Four of the five Focus Areas each have water main improvements identified as summarized below:

- West Santa Ana Boulevard Focus Area: West Santa Ana Boulevard Focus Area includes #10 and #21 water main replacement projects as well as one groundwater well improvement project.
- Grand Ave/17th Street Focus Area: The Grand Ave/17th Street Focus Area includes #5 and #19 water main replacement projects.
- South Main Street Focus Area: The South Main Street Focus Area includes #9, #11, #23 and #24 water main replacement projects.
- South Bristol Street Focus Area: The South Bristol Street Focus Area includes #8 and #11 water main replacements projects.

The projects noted above and other future projects will be included in subsequent CIP’s based on priority. The status of these projects, as well as the list of constructed or completed projects, will be updated upon releases of subsequent CIPs and water planning documents.

Similar to determining additional sewer impacts from the proposed GPU as it compares to the current GP which is utilized in water infrastructure planning efforts, the table below highlights the increases in water flows from the proposed GPU as compared to the current GP. This analysis is based on total DU count and commercial square footage only and does not differentiate between single family and multifamily water flow factors.

Table 19 Water Flow Changes, Current GP to Proposed GPU

Focus Area	Change in Housing Units, Current GPU to Proposed	Change in Commercial Areas, Current GPU to Proposed	Change in Water Flow
Focus Areas			
West Santa Ana Boulevard	+ 1,308 DUs	- 38,106 SF	+ 246,333 GPD
South Bristol Street	+ 2,232 DUs	+ 946,213 SF	+ 478,385 GPD
Grand Avenue/17th Street	+ 1,766 DUs	- 1,715,794 SF	+ 237,067 GPD
South Main Street	+ 667 DUs	- 1,481,837 SF	+41,684 GPD
55 Freeway/Dyer Road	+ 7,222 DUs	- 376,333 SF	+ 1,350,381 GPD
Focus Area Total	+ 13,195 DUs	- 2,665,857 SF	+2,354,041 GPD
Remainder of City			
All Other Areas of City	+ 0 DUs	+ 0 SF	+ 0 GPD
Citywide Total	+ 13,195 DUs	-2,665,857 SF	+2,354,041 GPD

Under buildout of the proposed GPU, water flows will increase across all Focus Areas, potentially creating deficiencies or necessitating the need for improvement projects not identified in the 2017 Water Master Plan. However, major deficiencies as a result of increased flow are not anticipated, as the 2017 WMP found that the distribution system was largely hydraulically sound. Improvement projects as a result of deteriorated or aged pipes are anticipated to constitute the majority of future water infrastructure projects. Therefore, the findings of the 2017 WMP stand and additional impacts as a result of proposed GPU buildout are not anticipated.

Through its planning and CIP mechanisms, the City of Santa Ana will have adequate capacity for the proposed increases in water flows across the City under implementation of the GPU and will be able to serve the additional dwelling units and commercial square footage proposed. This has been confirmed with City staff.⁹

4.4.3 Water Impacts

The following impact assessments are based on the significance criteria established in Section 3.2 for water systems.

Impact A **Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?**

Impact Analysis: The City of Santa Ana maintains a regularly updated Water Master Plan that identifies deficiencies and necessary improvement projects throughout its service area. Improvement projects are regularly incorporated into the City's CIP based on priority; including the improvements projects identified within or adjacent to Focus Areas as shown in Section 4.4.2. Major capacity deficiencies are not anticipated as the City has mechanisms in place to accommodate the proposed increases in water flows under implementation of the GPU as confirmed by City Staff. Improvement projects based on pipe age and condition may be required throughout GPU implementation, however the status or prioritization of these projects is not anticipated to be impacted by GPU buildout. Individual projects will be subject to City permits, fees, and applications in order to ensure that they will not place an undue burden on existing infrastructure. In instances where infrastructure is expanded or relocated, construction will follow the Construction General Permit and City and County specific regulations to minimize environmental impacts. No significant impacts from the construction or expansion of water facilities are anticipated.

4.5 WATER QUALITY

4.5.1 Construction Activities

Clearing, grading, excavation and construction activities associated with the proposed project may impact water quality due to sheet erosion of exposed soils and subsequent deposition of particulates in local drainages. Grading activities, in particular, lead to exposed areas of loose soil, as well as sediment stockpiles, that are susceptible to uncontrolled sheet flow. Although

⁹ Phone call with City Staff. April 30, 2020.

erosion occurs naturally in the environment, primarily from weathering by water and wind action, improperly managed construction activities can lead to substantially accelerated rates of erosion that are considered detrimental to the environment.

General Construction Permit

Prior to the issuance of grading permits, the project applicants shall provide evidence that the development of the projects one acre or greater of soil disturbance shall comply with the most current General Construction Permit (GCP) and associated local National Pollutant Discharge Elimination System (NPDES) regulations to ensure that the potential for soil erosion is minimized on a project-by-project basis. In accordance with the updated GCP (Order No. 2009-0009-DWQ), the following Permit Registration Documents are required to be submitted to the SWRCB prior to commencement of construction activities:

- Notice of Intent (NOI)
- Risk Assessment (Standard or Site-Specific)
- Particle Size Analysis (if site-specific risk assessment is performed)
- Site Map
- SWPPP
- Post-Construction Water Balance Calculator (not required – project is covered under the North Orange County MS4 permit Order No. R8-2009-0030)
- Active Treatment System (ATS) Design Documentation (if ATS is determined necessary)
- Annual Fee & Certification

Construction Best Management Practices (BMPs)

In accordance with the existing and updated GCP, a construction SWPPP must be prepared and implemented at all construction projects with 1 acre or greater of soil disturbance, and revised as necessary, as administrative or physical conditions change. The SWPPP must be made available for review upon request, shall describe construction BMPs that address pollutant source reduction, and provide measures/controls necessary to mitigate potential pollutant sources. These include, but are not limited to: erosion controls, sediment controls, tracking controls, non-storm water management, materials & waste management, and good housekeeping practices.¹⁰

Prior to commencement of construction activities within the GPU area, the project-specific SWPPP(s) will be prepared in accordance with the site specific sediment risk analyses based on the grading plans, with erosion and sediment controls proposed for each phase of construction for the individual project. The phases of construction will define the maximum amount of soil disturbed, the appropriate sized sediment basins and other control measures to accommodate all active soil disturbance areas and the appropriate monitoring and sampling plans.

¹⁰ California Stormwater Quality Association. (2003, January). *Stormwater Best Management Practices Handbook for New Development and Redevelopment*. Retrieved March 20, 2020, from <http://www.cabmphandbooks.com>

4.5.2 Post-Construction Activities

With the proposed land use changes, development resulting from the General Plan Update may result in long-term impacts to the quality of storm water and urban runoff, subsequently impacting downstream water quality. Developments can potentially create new sources for runoff contamination through changing land uses. As a consequence, developments within individual Focus Areas and the City as a whole may have the potential to increase the post-construction pollutant loadings of certain constituent pollutants associated with the proposed land uses and their associated features, such as landscaping and plaza areas.

To help prevent long-term impacts associated with land use changes and in accordance with the requirements of the City of Santa Ana LIP and consistency with OC DAMP and Fourth-Term MS4 permit, new development and significant redevelopment projects must incorporate LID/site design and source control BMPs to address post-construction storm water runoff management. In addition, projects that are identified as Priority Projects are required to implement site design/LID and source control BMPs applicable to their specific priority project categories, as well as implement treatment control BMPs where necessary. Selection of LID and additional treatment control BMPs is based on the pollutants of concern for the specific project site and the BMP's ability to effectively treat those pollutants, in consideration of site conditions and constraints. Further, both Priority and Non-Priority projects must develop a project-specific Water Quality Management Plan (WQMP) that describes the menu of BMPs chosen for the project, as well as include operation and maintenance requirements for all structural and any treatment control BMPs.

Since the GPU does not include a specific or detailed development plan, project-specific WQMP(s) will not be required at this time. Future project-specific WQMPs, preliminary and/or final, will be prepared consistent with the prevailing terms and conditions of the City's LIP, OC DAMP, and Model WQMP at the time of project application. Moreover, LID and water quality treatment solutions prescribed in project specific WQMPs shall be designed to support or enhance the regional BMPs and efforts implemented by the City as part of their City-wide efforts to improve water quality.

LID Design Approach

The overall approach to water quality treatment for the individual projects within the GPU area will include incorporation of site design/LID strategies and source control measures throughout the sites in a systematic manner that maximizes the use of LID features to provide treatment of storm water and reduce runoff. In accordance with the MS4 Permit, the use of LID features will be consistent with the prescribed hierarchy of treatment provided in the Permit: infiltration, evapotranspiration, harvest/reuse and biotreatment. Where applicable, LID features will be analyzed to demonstrate their ability to treat portions of the required design capture volume (DCV) and reduce the size of downstream on-site treatment control BMPs.

Consistent with regulatory requirements and design guidelines for water quality protection, the following principles will be followed for new projects associated with the General Plan Plan and will be supported by construction level documents in the final LID Design Plans prior to grading permit(s) issuance by the City of Santa Ana:

- LID features will be sized for water quality treatment credit according to local Regional Board sizing criteria as defined in the Fourth-Term MS4 Permit for either flow-based or volume-based BMPs.
- LID techniques within the internal development areas (site design objectives), thereby providing treatment of low-flow runoff directly at the source and runoff reduction of small (i.e., more frequent) storm event runoff (first-flush). In most instances, LID features will be sized by volume-based analyses to demonstrate compliance with the required design capture volume for the new projects under the General Plan.
- Detailed field investigations, drainage calculations, grading, and BMP sizing to occur during the detailed design phase and future project-specific WQMP documentation.
- Where feasible, LID features will be designed to infiltrate and/or reuse treated runoff on-site in accordance with feasibility criteria as defined in the 2013 Countywide Model WQMP and Technical Guidance Document (TGD).^{11 12}
- For those areas of the City where infiltration is not recommended or acceptable and harvest/reuse landscaping demands are insufficient, biotreatment LID features will be designed to treat runoff and discharge controlled effluent flows to downstream receiving waters.

Unlike flood control measures that are designed to handle peak storm flows, LID BMPs and treatment control BMPs are designed to retain, filter or treat more frequent, low-flow runoff or the “first-flush” runoff from storm events. In accordance with the Fourth-Term MS4 Permit for North Orange County, the LID BMPs shall be sized and designed to ensure on-site retention of the volume of runoff produced from a 24-hour 85th percentile storm event, as determined from the County of Orange’s 85th Percentile Precipitation Map.¹³ This is termed the “design capture volume”, or DCV. The City is split between an an 85th Percentile storm depth of 0.75 and 0.8 inches. The 2013 Model WQMP and its companion Technical Guidance Document provides design criteria, hydrologic methods and calculations for combining use of infiltration, retention, and biofiltration BMPs to meet the required design capture volume.

Consistency with the State-wide Trash TMDL

As part of the state-wide mandate to reduce trash within receiving waters, the City of Santa Ana will be required to adhere to the requirements of the amended CA Trash Total Maximum Daily Load (TMDL) from July 2016 onwards. The requirements will include the installation and maintenance of trash screening devices at all public curb inlets, grate inlets and catch basin inlets. The trash screening devices must be approved by the local agency and consistent with the minimum standards of the Trash TMDL. The City of Santa Ana has selected Track 1 as its compliance option. By selecting Track 1, the City has agreed to install, operate, and maintain full capture systems in storm drains that capture runoff from one or more priority land use areas.

Sustainable On-Lot and Public Right of Way Infrastructure Opportunities

As part of an on-going sustainable effort to improve water conservation, reduce potable water usage, support green infrastructure features within the Public R/W and reduce environmental

¹¹ County of Orange Planning Division. (December 20, 2013). Exhibit 7.III - Model Water Quality Management Plan (WQMP).

¹² County of Orange Planning Division. (December 20, 2013). Technical Guidance Document (TGD).

¹³ Figure XVI-1 in the Technical Guidance Document (County of Orange, December 20, 2013).

“footprint” within the City, there are several emerging trends and technologies that should be considered and incorporated where feasible within the future redevelopment opportunities within the GPU area. These include the following:

- **Gray Water Systems** – The use of gray water systems to collect and reuse gray water from various new developments and redevelopments can greatly reduce on-site potable water usage. The process typically includes routing water from showers, sinks and washing machines, treating the water to NSF 350 standards¹⁴ (or equivalent) and reusing the treated gray water within the building for toilet flushing or exterior landscaping. Gray water systems are especially opportune and cost effective within new hotel developments and multi-family residential developments where the constant use of water from showers, sinks and washing machines can be reused for toilet flushing and/or landscape irrigation. Reuse of gray water can help reduce both potable water and sewer generation fees.
- **Small-scale and Large-scale Cistern and Reuse Systems** – Both small- and large-scale harvest and reuse systems may be feasible based on certain project types. Depending on the type of potable demand for landscape irrigation and toilet flushing of a new development or redevelopment, the implementation of a harvested rainwater BMP would provide a multi-benefit solution that could satisfy both water quality regulations and provide for a sustainable water quantity solution that would offset potable water costs. The efficiency and cost-effectiveness for harvest and reuse systems increases when combined with on-site gray water recycling systems.
- **Green Street Features** – Green streets are sustainable design features with many benefits. Green street design components include stormwater infiltration planters within parkways to treat lot runoff and roadway runoff; bulb out planters that provide traffic calming along with runoff treatment, tree boxes and light reflective paving surfaces which reduce heat island effects.
- **Green Roofs and Green Walls** – Green roofs and green walls offer up some of the most advanced ways to reduce stormwater runoff volumes and common pollutants. As open space becomes more limited within high density areas, green roofs provide a solution with many additional benefits including stormwater treatment, internal and external cooling effects for the building and aesthetic benefits, all within a shared footprint. Green roofs are most feasible when there is a sturdy building structure included in a project. On the other hand, green walls require less structural stability and can be implemented on almost any vertical surface. Some opportunities include implementing green walls on the sides of large, above-ground parking structures. Green roof/wall design can be combined with harvest and reuse cisterns and gray water systems to provide a constant source of treated water for irrigation without increasing demands on local and regional potable water supplies.

Each of these opportunities should be evaluated to determine feasibility and appropriateness for the proposed development and redevelopment projects within the GPU area.

¹⁴ NSF/ANSI 350 and 350-1: Onsite Water Reuse Specifications. Found here: <http://www.nsf.org/services/by-industry/water-wastewater/onsite-wastewater/onsite-reuse-water-treatment-systems>

4.5.3 Water Quality Impacts

The impact assessments are based on the significance criteria established in Section 3.2 for water quality.

Impact A *Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?*

Impact Analysis:

Construction activities within the GPU area would potentially result in soil erosion and temporary adverse impacts to surface water quality from construction materials and wastes if left unregulated or unmitigated.

Both State and Local regulations will effectively mitigate construction storm water runoff impacts from the proposed land use changes under the GPU. Standard erosion control practices shall be implemented for all construction within the City. Additionally, construction sites will be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the requirements of the Statewide General Construction Permit and subject to the oversight of the Santa Ana Regional Water Quality Control Board. The SWPPP must include BMPs to reduce or eliminate erosion and sedimentation from soil disturbing activities, as well as proper materials and waste management. Implementation of these State and Local requirements would effectively protect projects from violating any water quality standards or waste discharge requirements from construction activities.

In terms of post-construction related impacts, the incorporation of site design, LID features and BMPs as required under the North Orange County MS4 Permit, the individual development and redevelopment projects within the GPU will effectively retain or treat the 85th percentile 24-hour storm water runoff for pollutants such as bacteria, metals, nutrients, oil & grease, organics, pesticides, sediment, trash, and oxygen demanding substances prior to discharge off their property. As properties within the City undergo redevelopment, existing properties that do not have water quality BMPs will be replaced with project incorporating LID BMPs. Therefore, long-term surface water quality of runoff from the GPU area would be expected to improve over existing conditions as more LID BMPs are implemented. This is considered an overall beneficial effect of the proposed land use changes associated with implementation of the GPU. Impacts to surface and groundwater quality will be less than significant.

Impact E *In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*

Impact Analysis:

It is the City's policy to avoid placing new housing within 100-year flood hazard areas based on FEMA's floodplain maps. All existing housing within Flood Zone A's and AE's require flood insurance. As noted in Impact Analysis C, the City and County regularly maintain and improve storm drain and flood control infrastructure based on priority. New developments will comply

with all pertinent flood control regulation. It is not anticipated that pollutants will be mobilized in the event of flooding or inundation.

Impact E Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Impact Analysis:

New development and redevelopment within the City of Santa Ana will not impact implementation of local or regional water quality control plans or sustainable groundwater management plans. All development within the City will follow the North Orange County MS4 permit. Groundwater levels are managed by OCWD, and development projects will be reviewed for conformance with OCWD's groundwater management goals. Impacts to water quality and groundwater management will be less than significant.

5. CONCLUSION

The proposed land use changes under buildout of the Santa Ana GPU will increase the flow within water and sewer infrastructure over existing conditions while largely maintaining existing runoff conditions. The City of Santa Ana, OCPW, and OCSD each have methods in place for prioritizing, funding, and correcting deficient infrastructure. In all cases, specific analyses will be required during final design stages of final development projects to evaluate storm drain, water and sewer infrastructure condition and capacity. Impacts to sewer, water, and storm drain infrastructure are anticipated to be less than significant.

Based on the existing built out condition of the City and the proposed land use changes under the GPU including the implementation of low impact development features, no substantial additional sources of pollutants or significant Citywide increases in runoff for the 85th percentile storm event are anticipated. Based on the findings of this technical report, the incorporation of site design/LID features, and infiltration/biotreatment BMPs as required under the MS4 Permit and local LID requirements, the individual projects will adequately reduce project related impacts to hydrology and water quality to a level less than significant.

6. TECHNICAL APPENDICES

Appendix A Sewer Flow Calculations

Appendix B City and OCSD Sewer Improvements

Appendix C Water Flow Calculations

DRAFT

APPENDIX A

SEWER FLOW CALCULATIONS

DRAFT

Santa Ana GPU Area Existing Condition Sewer Flows

	Building(s)		Parcel	Flow	Unit of Measure	Total Flow
	Units	Square Feet	Acres	GPD		GPD
55 Freeway/Dyer Road						
Residential						
Single Family Residential	-	--	0.00	390 /DU		0
Multi Family Residential	1,221	--	0.00	200 /DU		244,200
Business and Commerce						
Commercial	-	5,666,453	130.08	2262 /acre		294,250
55/Dyer Total	1,221	5,666,453	130.08	--	--	538,450
Grand Avenue/17th Street						
Residential						
Single Family Residential	18	--	0.00	390 /DU		7,020
Multi Family Residential	543		0.00	200 /DU		108,600
Business and Commerce						
Commercial	-	1,400,741	32.16	2262 /acre		72,738
17th and Grand Total	561	1,400,741	32.16	--	--	188,358
South Bristol Street						
Residential						
Single Family Residential	-	--	0.00	390 /DU		0
Multi Family Residential	220		0.00	200 /DU		44,000
Business and Commerce						
Commercial	-	1,577,511	36.21	2262 /acre		81,918
South Bristol Total	220	1,577,511	36.21	--	--	125,918
South Main Street						
Residential						
Single Family Residential	705	--	0.00	390 /DU		274,950
Multi Family Residential	1,015		0.00	200 /DU		203,000
Business and Commerce						
Commercial	-	1,685,978	38.70	2262 /acre		87,550
South Main Total	1,720	1,685,978	38.70	--	--	565,500
West Santa Ana Boulevard						
Residential						
Single Family Residential	713	--	0.00	390 /DU		278,070
Multi Family Residential	1,945		0.00	200 /DU		389,000
Business and Commerce						
Commercial	-	3,090,472	70.95	2262 /acre		160,483
West Santa Ana Total	2,658	3,090,472	70.95	--	--	827,553
Remaining Citywide						
Residential						
Single Family Residential	55,346	--	0.00	390 /DU		21,584,940
Multi Family Residential	17,066		0.00	200 /DU		3,413,200
Business and Commerce						
Commercial	-	53,697,441	1232.72	2262 /acre		2,788,421
Remaining Citywide Total	72,412	53,697,441	1232.72	--	--	27,786,561
Focus Area Total	6,380	13,421,155	308.11			2,245,779
Grand Total	78,792	67,118,596	1540.83			30,032,340

*Residential flow factors based on water demand factors multiplied by a 0.95 sewer factor

**Commercial flow factors based on OCS Design and Construction Standards for Sanitary Sewers

Santa Ana GPU Area Proposed Condition Sewer Flow Increases

	Building(s)		Parcel	Flow	Unit of Measure	Total Flow
	Units	Square Feet	Acres			
55 Freeway/Dyer Road						
Residential						
Single Family Residential	-	--	0.00	351 /DU		0
Multi Family Residential	9,952			181 /DU		1,801,312
Business and Commerce						
Commercial	-	6,142,283	141.01	2262 /acre		318,959
55/Dyer Total	9,952	6,142,283	141.01	--	--	2,120,271
Grand Avenue/17th Street						
Residential						
Single Family Residential	9	--	0.00	351 /DU		3,159
Multi Family Residential	2,274			181 /DU		411,594
Business and Commerce						
Commercial	-	703,894	16.16	2262 /acre		36,552
17th and Grand Total	2,283	703,894	16.16	--	--	451,305
South Bristol Street						
Residential						
Single Family Residential	-	--	0.00	351 /DU		0
Multi Family Residential	5,492			181 /DU		994,052
Business and Commerce						
Commercial	-	5,082,641	116.68	2262 /acre		263,933
South Bristol Total	5,492	5,082,641	116.68	--	--	1,257,985
South Main Street						
Residential						
Single Family Residential	582	--	0.00	351 /DU		204,282
Multi Family Residential	1,726			181 /DU		312,406
Business and Commerce						
Commercial	-	946,662	21.73	2262 /acre		49,159
South Main Total	2,308	946,662	21.73	--	--	565,847
West Santa Ana Boulevard						
Residential						
Single Family Residential	507	--	0.00	351 /DU		177,957
Multi Family Residential	3,413			181 /DU		617,753
Business and Commerce						
Commercial	-	2,808,805	64.48	2262 /acre		145,857
West Santa Ana Total	3,920	2,808,805	64.48	--	--	941,567
Remaining Citywide						
Residential						
Single Family Residential	55,094	--	0.00	351 /DU		19,337,994
Multi Family Residential	36,004			181 /DU		6,516,724
Business and Commerce						
Commercial	-	57,283,531	1315.05	2262 /acre		2,974,641
Remaining Citywide Total	91,098	57,283,531	1315.05	--	--	28,829,359
Focus Area Total	23,955	15,684,285	360.06			5,336,974
Grand Total	115,053	72,967,816	1675.11			34,166,333

*Residential flow factors based on water demand factors multiplied by a 0.95 sewer factor

**Commercial flow factors based on OCSD Design and Construction Standards for Sanitary Sewers

Santa Ana Changes in Sewer Flows, Current GP to Proposed GPU

	Change in Building(s)		Parcel	Flow	Unit of Measure	Total Flow
	Units	Square Feet	Acres	GPD		GPD
55 Freeway/Dyer Road						
Residential						
Residential Total	7,222	--	0.00	180.5	/DU	1,303,571
Business and Commerce						
Commercial	-	-376,333	-8.64	2262	/acre	-19,542
55/Dyer Total	7,222	-376,333	-8.64	--	--	1,284,029
Grand Avenue/17th Street						
Residential						
Residential Total	1,766	--	0.00	180.5	/DU	318,763
Business and Commerce						
Commercial	-	-1,715,794	-39.39	2262	/acre	-89,098
17th and Grand Total	1,766	-1,715,794	-39.39	--	--	229,665
South Bristol Street						
Residential						
Residential Total	2,232	--	0.00	180.5	/DU	402,876
Business and Commerce						
Commercial	-	946,213	21.72	2262	/acre	49,135
South Bristol Total	2,232	946,213	21.72	--	--	452,011
South Main Street						
Residential						
Residential Total	667	--	0.00	180.5	/DU	120,394
Business and Commerce						
Commercial	-	-1,481,837	-34.02	2262	/acre	-76,949
South Main Total	667	-1,481,837	-34.02	--	--	43,444
West Santa Ana Boulevard						
Residential						
Residential Total	1,308	--	0.00	180.5	/DU	236,094
Business and Commerce						
Commercial	-	-38,106	-0.87	2262	/acre	-1,979
West Santa Ana Total	1,308	-38,106	-0.87	--	--	234,115
Remaining Citywide						
Residential						
Residential Total	-	--	0.00	180.5	/DU	0
Business and Commerce						
Commercial	-	0	0.00	2262	/acre	0
Remaining Citywide Total	-	0	0.00	--	--	-
Focus Area Total	13,195	-2,665,857	-61.20			2,243,264
Grand Total	13,195	-2,665,857	-61.20			2,243,264

*Residential flow factors based on water demand factors multiplied by a 0.95 sewer factor

**Commercial flow factors based on OCSD Design and Construction Standards for Sanitary Sewers

APPENDIX B

CITY AND OCSD SEWER IMPROVEMENTS

DRAFT

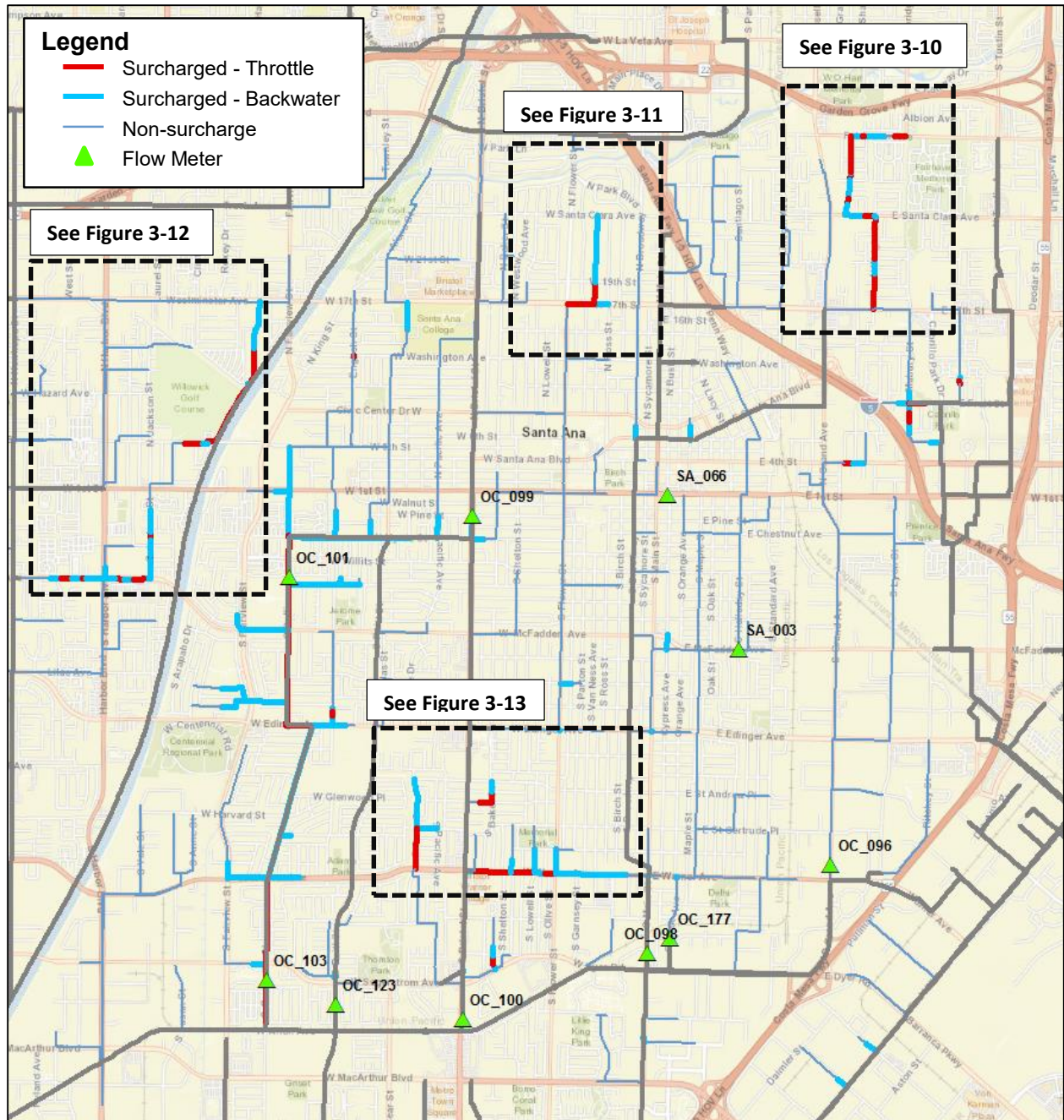


Figure ES4-1: Predicted Surcharge Pipes for Future Flows (2040) and PWWF

ES-5 Condition Assessment

CCTV inspection is the basic method used by the City to gather the data required to assess sewer condition. The City uses a specialist CCTV contractor to inspect pre-defined portions of the City’s sewer system with the target of inspecting the entire system over a 5 to 8-year period. The CCTV contractor

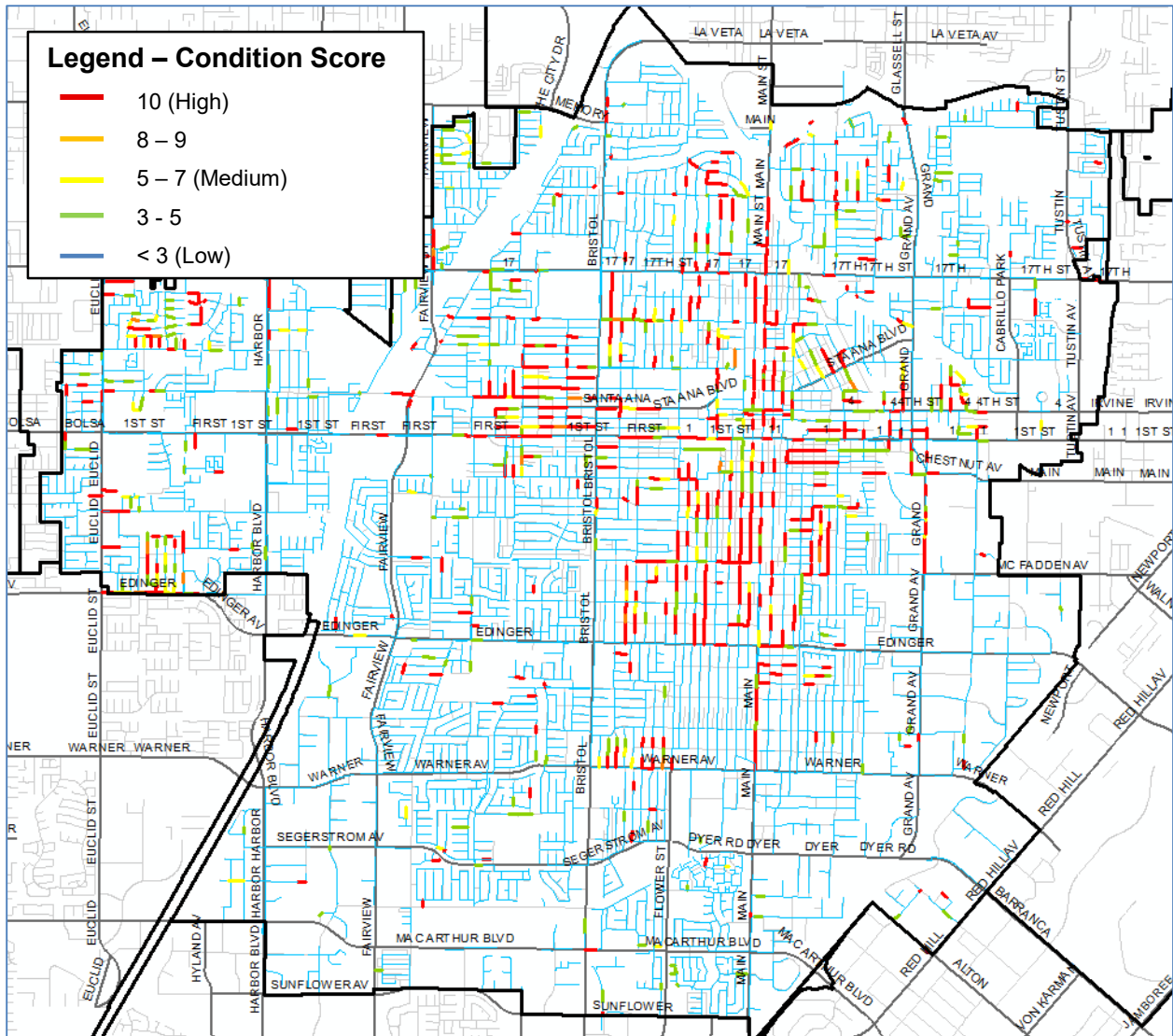


Figure ES5-1: Condition Assessment Map showing Composite Condition Scores

Capital improvement projects for sewer infrastructure are typically divided into two categories: 1) condition-based improvement projects utilizing replacement or rehabilitation (R&R) strategies, and 2) capacity improvement projects utilizing pipe upsizing or flow diversions (if applicable). Projects are triggered when; 1) existing pipe condition indicates risk of structural failure, and 2) existing and future flow projections exceed current hydraulic capacities. For this study, both condition and capacity projects were developed using a systematic process based on the following logical steps:

- Is the pipe surcharged resulting from insufficient capacity? If so, upsize pipe to convey future peak wet-weather flow (PWWF) projections.
- Has the pipe recently been lined? If so, then no project required but recommend on-going pipe inspection (CCTV).

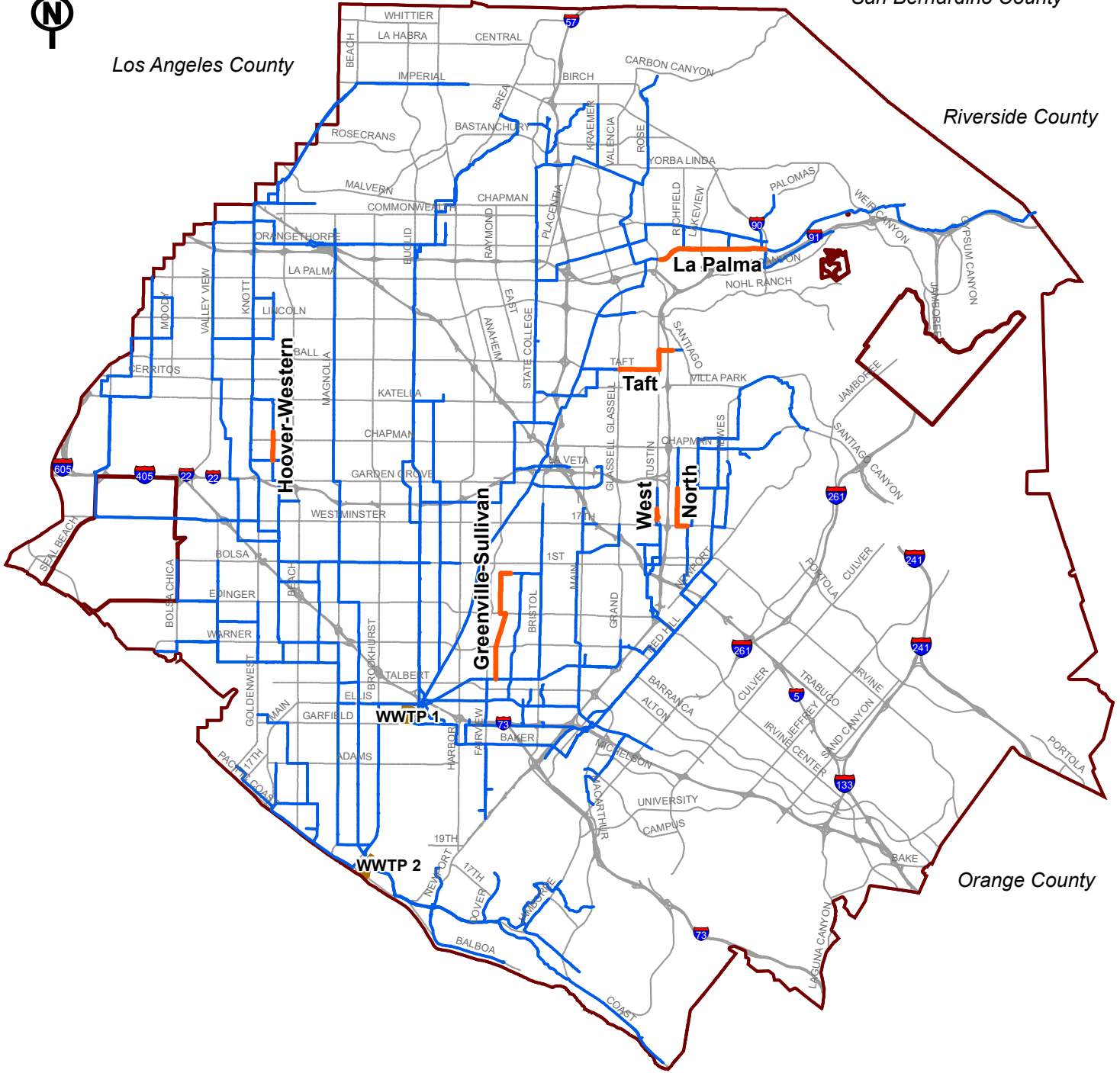


Los Angeles County

San Bernardino County

Riverside County

Orange County



Legend

- Capacity Improvement Project
- Major OCSD Sewers
- Major Streets and Highways
- OCSD Wastewater Treatment Plants
- OCSD Service Area

**OCSD Collections Capacity Evaluation
Master Plan Update**

Capacity Improvement Projects



FIGURE 6-9

Woodard & Curran shall assume no liability for any of the following: 1. Any errors, omissions, or inaccuracies in the information provided regardless of how caused or; 2. Any decision or action taken or not taken by the reader in reliance upon any information or data furnished hereunder.

DATE: DECEMBER 2019	DOC: Figure6-9.mxd
DRAWN BY: KH	PROJECT #: 0172-022.00
	SOURCE:

APPENDIX C

WATER FLOW CALCULATIONS

DRAFT

Santa Ana GPU Area Existing Condition Water Flows

	Building(s)		Parcel	Flow	Unit of Measure	Total Flow
	Units	Square Feet	Acres	GPD		GPD
55 Freeway/Dyer Road						
Residential						
Single Family Residential	-	--	0.00	411 /DU		0
Multi Family Residential	1,221	--	0.00	211 /DU		257,631
Business and Commerce						
Commercial	-	5,666,453	130.08	2500 /acre		325,210
55/Dyer Total	1,221	5,666,453	130.08	--	--	582,841
Grand Avenue/17th Street						
Residential						
Single Family Residential	18	--	0.00	411 /DU		7,398
Multi Family Residential	543		0.00	211 /DU		114,573
Business and Commerce						
Commercial	-	1,400,741	32.16	2500 /acre		80,391
17th and Grand Total	561	1,400,741	32.16	--	--	202,362
South Bristol Street						
Residential						
Single Family Residential	-	--	0.00	411 /DU		0
Multi Family Residential	220		0.00	211 /DU		46,420
Business and Commerce						
Commercial	-	1,577,511	36.21	2500 /acre		90,537
South Bristol Total	220	1,577,511	36.21	--	--	136,957
South Main Street						
Residential						
Single Family Residential	705	--	0.00	411 /DU		289,755
Multi Family Residential	1,015		0.00	211 /DU		214,165
Business and Commerce						
Commercial	-	1,685,978	38.70	2500 /acre		96,762
South Main Total	1,720	1,685,978	38.70	--	--	600,682
West Santa Ana Boulevard						
Residential						
Single Family Residential	713	--	0.00	411 /DU		293,043
Multi Family Residential	1,945		0.00	211 /DU		410,395
Business and Commerce						
Commercial	-	3,090,472	70.95	2500 /acre		177,369
West Santa Ana Total	2,658	3,090,472	70.95	--	--	880,807
Remaining Citywide						
Residential						
Single Family Residential	55,346	--	0.00	411 /DU		22,747,206
Multi Family Residential	17,066		0.00	211 /DU		3,600,926
Business and Commerce						
Commercial	-	53,697,441	1232.72	2500 /acre		3,081,809
Remaining Citywide Total	72,412	53,697,441	1232.72	--	--	29,429,941
Focus Area Total	6,380	13,421,155	308.11			2,403,648
Grand Total	78,792	67,118,596	1540.83			31,833,589

*Residential demand factors based on MWDOC Orange County Water Reliability Study, 2015 Demand Factors (2016)

**Commercial demand factors based on City of Santa Ana Guidelines for Water and Sewer Facilities (2017)

Santa Ana Changes in Water Flow, Current GPU to Proposed

	Change in Building(s)		Parcel	Demand	Unit of Measure	Total Demand
	Units	Square Feet	Acres	GPD		GPD
55 Freeway/Dyer Road						
Residential						
Residential Total	7,222	--	0.00	190	/DU	1,372,180
Business and Commerce						
Commercial	-	-376,333	-8.64	2500	/acre	-21,599
55/Dyer Total	7,222	-376,333	-8.64	--	--	1,350,581
Grand Avenue/17th Street						
Residential						
Residential Total	1,766	--	0.00	190	/DU	335,540
Business and Commerce						
Commercial	-	-1,715,794	-39.39	2500	/acre	-98,473
17th and Grand Total	1,766	-1,715,794	-39.39	--	--	237,067
South Bristol Street						
Residential						
Residential Total	2,232	--	0.00	190	/DU	424,080
Business and Commerce						
Commercial	-	946,213	21.72	2500	/acre	54,305
South Bristol Total	2,232	946,213	21.72	--	--	478,385
South Main Street						
Residential						
Residential Total	667	--	0.00	190	/DU	126,730
Business and Commerce						
Commercial	-	-1,481,837	-34.02	2500	/acre	-85,046
South Main Total	667	-1,481,837	-34.02	--	--	41,684
West Santa Ana Boulevard						
Residential						
Residential Total	1,308	--	0.00	190	/DU	248,520
Business and Commerce						
Commercial	-	-38,106	-0.87	2500	/acre	-2,187
West Santa Ana Total	1,308	-38,106	-0.87	--	--	246,333
Remaining Citywide						
Residential						
Residential Total	-	--	0.00	190	/DU	0
Business and Commerce						
Commercial	-	0	0.00	2500	/acre	0
Remaining Citywide Total	-	0	0.00	--	--	-
Focus Area Total Change in Demand	13,195	-2,665,857	-61.20			2,354,051
Grand Total Change in Demand	13,195	-2,665,857	-61.20			2,354,051

*Residential demand factors based on MWDOC Orange County Water Reliability Study (2016)

**Commercial demand factors based on City of Santa Ana Guidelines for Water and Sewer Facilities (2017)

Santa Ana GPU Area Proposed Condition Water Flow Increases

	Building(s)		Parcel	Flow	Unit of Measure	Total Flow
	Units	Square Feet	Acres	GPD		GPD
55 Freeway/Dyer Road						
Residential						
Single Family Residential	-	--	0.00	369 /DU		0
Multi Family Residential	9,952			190 /DU		1,890,880
Business and Commerce						
Commercial	-	6,142,283	141.01	2500 /acre		352,519
55/Dyer Total	9,952	6,142,283	141.01	--	--	2,243,399
Grand Avenue/17th Street						
Residential						
Single Family Residential	9	--	0.00	369 /DU		3,321
Multi Family Residential	2,274			190 /DU		432,060
Business and Commerce						
Commercial	-	703,894	16.16	2500 /acre		40,398
17th and Grand Total	2,283	703,894	16.16	--	--	475,779
South Bristol Street						
Residential						
Single Family Residential	-	--	0.00	369 /DU		0
Multi Family Residential	5,492			190 /DU		1,043,480
Business and Commerce						
Commercial	-	5,082,641	116.68	2500 /acre		291,703
South Bristol Total	5,492	5,082,641	116.68	--	--	1,335,183
South Main Street						
Residential						
Single Family Residential	582	--	0.00	369 /DU		214,758
Multi Family Residential	1,726			190 /DU		327,940
Business and Commerce						
Commercial	-	946,662	21.73	2500 /acre		54,331
South Main Total	2,308	946,662	21.73	--	--	597,029
West Santa Ana Boulevard						
Residential						
Single Family Residential	507	--	0.00	369 /DU		187,083
Multi Family Residential	3,413			190 /DU		648,470
Business and Commerce						
Commercial	-	2,808,805	64.48	2500 /acre		161,203
West Santa Ana Total	3,920	2,808,805	64.48	--	--	996,756
Remaining Citywide						
Residential						
Single Family Residential	55,094	--	0.00	369 /DU		20,329,686
Multi Family Residential	36,004			190 /DU		6,840,760
Business and Commerce						
Commercial	-	57,283,531	1315.05	2500 /acre		3,287,622
Remaining Citywide Total	91,098	57,283,531	1315.05	--	--	30,458,068
Focus Area Total	23,955	15,684,285	360.06			5,648,146
Grand Total	115,053	72,967,816	1675.11			36,106,214

*Residential demand factors based on MWD OC Orange County Water Reliability Study, 2025 to 2040 Demand Factors (2016)

**Commercial demand factors based on City of Santa Ana Guidelines for Water and Sewer Facilities (2017)