VALLECITOS WATER DISTRICT

CAPALINA APARTMENTS WATER AND SEWER STUDY

WORK ORDER # 268583

FINAL TECHNICAL MEMORANDUM

October 17, 2023

Prepared By: Elizabeth Lopez, Development Services Senior Engineer, and Eileen Koonce

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INTRODUCTION

The proposed Capalina Apartment project (Project) is a 119-unit mixed-use multi-family residential development with 4,000 square feet of commercial space on 2.51-acres, located on west Mission Road east of Rancho Sante Fe Road and west of Pacific Street (APN 219-115-33).

The Project is located within Vallecitos Water District's (VWD) boundaries for water and wastewater service. The property does not need to annex. Both water and wastewater services can be provided by VWD.

All new projects undergo evaluation by VWD to determine if the current water and sewer infrastructure is sufficient to accommodate the proposed water demands and sewage generation.

This study projects water demand and sewage generation increases due to the project densification. It analyzes the following aspects of VWD's infrastructure and makes recommendations for capital improvements for impacts that are created due to the land use change:

- Water distribution system, including the need to upsize pipelines, install new pipelines, or install flow control facilities.
- Water storage, including the need for additional storage and the adequacy of existing storage tanks and reservoirs to serve the proposed development.
- Water pump stations, including the need to install new pump stations or upsize existing pump stations to serve the proposed development.
- Wastewater collection system, including the need to upsize pipelines and manholes, or the need to install new pipelines and manholes.
- Wastewater lift stations, including the need to install new lift stations or upsize existing lift stations to serve the proposed development.
- Wastewater land outfall, including the need to construct a parallel land outfall to serve this and other proposed developments.

- Wastewater treatment facilities, including the need for obtaining additional capacity at the Encina Water Pollution Control Facility (EWPCF) or for expanding the Meadowlark Water Reclamation Facility (MRF).
- Existing VWD water and/or sewer facilities not being utilized for proposed development will need to be abandoned per VWD Standards and Specifications. Asbestos cement pipe shall be properly removed and legally disposed of by the Developer.

WATER SYSTEM ANALYSIS

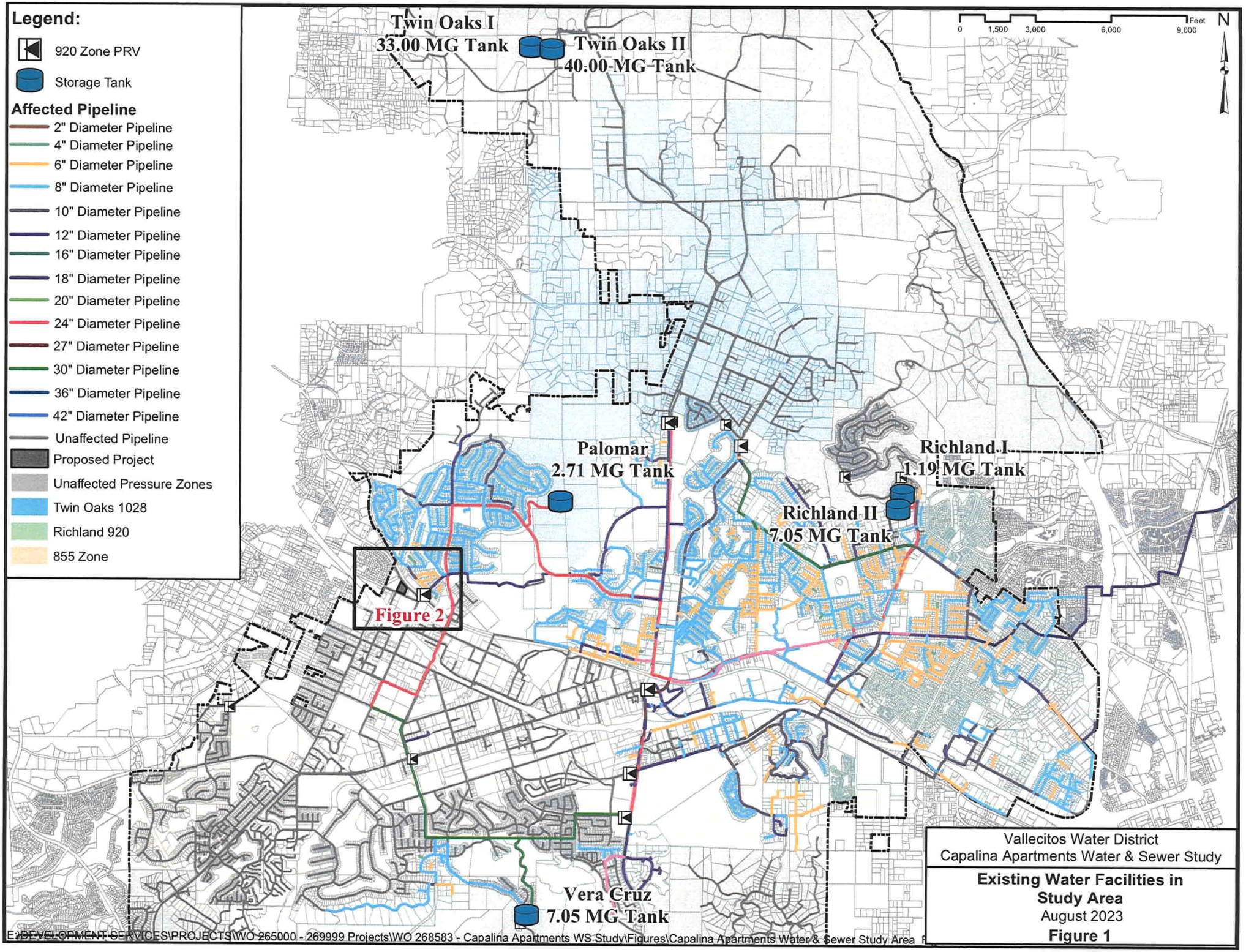
The proposed 2.51-acre Project lies completely within VWD's 855 Pressure Zone. Figures 1 and 2 show the development's location in relation to pressure zone boundaries, identify pipelines within the vicinity of the development, and identify storage reservoirs that supply the development area.

Water Demand Projections

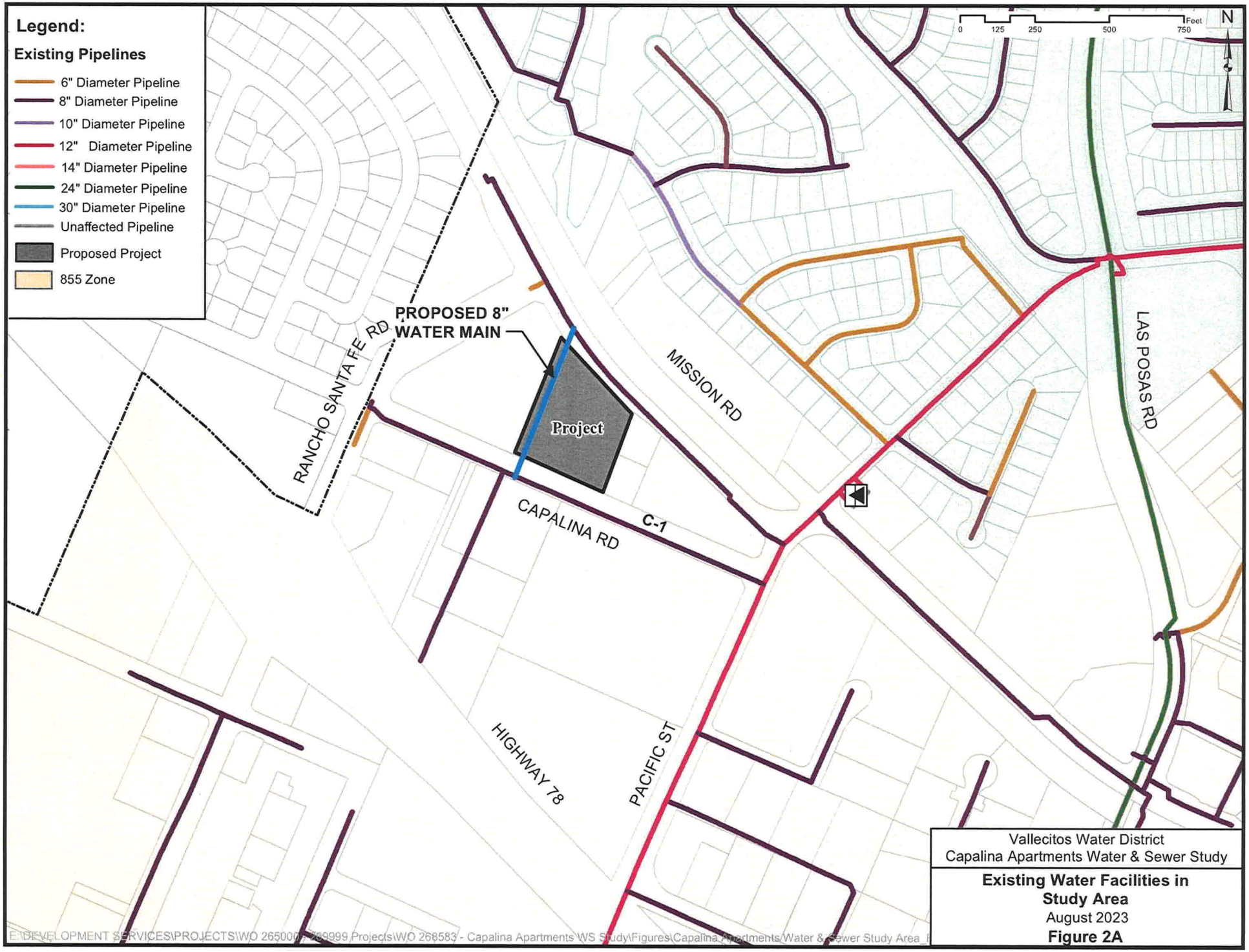
The City of San Marcos' approved land use designation for the proposed Project is MU-3 Mixed (Commercial & Office – no residential). The 2018 Master Plan based its ultimate water demand planning on this land use. The Project is proposing 119 multi-family residential units with 4,000 SF of commercial use. Table 1 provides the average water demand generated both under the density planned for the 2018 Master Plan and for the proposed Project. The table shows that the Capalina Apartment project will increase the projected average water demand from the 2018 Master Plan land use by **18,885** gallons per day.

Table 1 – Project Estimated Water Demands for Capalina Apartments

Land Use Type	Area (acres)	Residential Units	Duty Factor (gpd/ac)	Water Demand (gpd)
2018 Master Plan Land Use Demand				
Commercial/Office	2.51		1,500	3,765
Total	**2.51**			**3,765**
Proposed Project Demand				
Residential (40-50 du/ac)	2.51	119	9,000	22,590
Commercial/Mixed use	0.04		1,500	60
Total	**2.51**			**22,650**
Water Demand Increase				**18,885**


Legend:
920 Zone PRV
Storage Tank
Affected Pipeline
2" Diameter Pipeline
4" Diameter Pipeline
6" Diameter Pipeline
8" Diameter Pipeline
10" Diameter Pipeline
12" Diameter Pipeline
16" Diameter Pipeline
18" Diameter Pipeline
20" Diameter Pipeline
24" Diameter Pipeline
27" Diameter Pipeline
30" Diameter Pipeline
36" Diameter Pipeline
42" Diameter Pipeline
Unaffected Pipeline
Proposed Project
Unaffected Pressure Zones
Twin Oaks 1028
Richland 920
855 Zone
Twin Oaks I
33.00 MG Tank
Twin Oaks II
40.00-MG-Tank
Palomar
2.71 MG Tank
Richland I
1.19 MG Tank
Richland II
7.05 MG Tank
Vera Cruz
7.05 MG Tank
Figure 2
0
1,500
3,000
6,000
9,000
Feet
N
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Water Facilities in Study Area
August 2023
Figure 1
E:\DEVELOPMENT SERVICES\PROJECTS\WO 265000 - 269999 Projects\WO 268583 - Capalina Apartments WS Study\Figures\Capalina Apartments Water & Sewer Study Area

Legend:
Existing Pipelines
6" Diameter Pipeline
8" Diameter Pipeline
10" Diameter Pipeline
12" Diameter Pipeline
14" Diameter Pipeline
24" Diameter Pipeline
30" Diameter Pipeline
Unaffected Pipeline
Proposed Project
855 Zone
0 125 250 500 750 Feet
N
RANCHO SANTA FE RD
MISSION RD
LAS POSAS RD
Project
CAPALINA RD
C-1
HIGHWAY 78
PACIFIC ST
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Water Facilities in Study Area
August 2023
Figure 2
E:\DEVELOPMENT SERVICES\PROJECTS\WO 265000 - 269999 Projects\WO 268583 - Capalina Apartments WS Study\Figures\Capalina Apartments Water & Sewer Study Area_


Legend:
Existing Pipelines
6" Diameter Pipeline
8" Diameter Pipeline
10" Diameter Pipeline
12" Diameter Pipeline
14" Diameter Pipeline
24" Diameter Pipeline
30" Diameter Pipeline
Unaffected Pipeline
Proposed Project
855 Zone
0 125 250 500 750 Feet
N
PROPOSED 8" WATER MAIN
Project
RANCHO SANTA FE RD
MISSION RD
LAS POSAS RD
CAPALINA RD
C-1
HIGHWAY 78
PACIFIC ST
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Water Facilities in Study Area
August 2023
Figure 2A
E:\DEVELOPMENT SERVICES\PROJECTS\WO 265000 - 269999 Projects\WO 268583 - Capalina Apartments WS Study\Figures\Capalina Apartments Water & Sewer Study Area_

Water Distribution System Analysis

The 2018 Master Plan water system distribution and pressure criteria are as follows:

Water Distribution Infrastructure Criteria

The water service pressure criteria to be met by this development are as follows:

- Minimum allowable pressure at peak hour demand: 40 psi
- Minimum allowable pressure at max day plus fire demand: 20 psi
- Maximum allowable pressure: 150 psi

The City of San Marcos Fire Marshall has set the required fire demand at **1,625 gpm** for the Project.

To avoid excessive velocity and headloss within the distribution system, the following pipeline design criteria was also utilized:

- Maximum allowable velocity: 7 feet per second
- Maximum allowable headloss gradient: 15 feet per 1,000 feet
- Hazen-Williams C-factor: 130

Water Model Scenarios

The following scenarios were modeled to identify system impacts that may be created by the proposed water demands, and to recommend any improvements required to provide service to the Project:

- Average Day Demand with existing demands at the Project site
- Average Day Demand with the proposed Project
- Maximum Day Demand with existing demands at the Project site
- Maximum Day Demand with the proposed Project
- Peak Hour Demand with existing demands at the Project site
- Peak Hour Demand with the proposed Project
- Maximum Day Demand plus Fire Flow with existing demands at the Project site
- Maximum Day Demand plus Fire Flow with the proposed Project

Per the 2018 Master Plan, maximum day demands for this project are 300% those of average day demands, and peak hour demands are 620% those of average day demands.

Water Model Results

Modeling focused on the existing infrastructure in the direct vicinity of the Project. The model found that the Project did not create any distribution system deficiencies under average day demand but did create system deficiencies under maximum day plus fire flow demand conditions in the existing 8-inch water main in Capalina Road (C-1) as shown in Table 2. Static Pressure: 113 psi / Residual Pressure: 105 psi with 8-inch pipe and 96 psi with 10-inch pipe.

Table 2 – Potable Water Pipeline Results under Maximum Day Demand plus Fire Flow Conditions

Pipe ID Number	Length (ft)	Existing Pipe Diameter (in)	Velocity under Average Day Demand (ft/s)	Velocity under Maximum Day + Fire Flow (ft/s)	Upsized Pipe Diameter (in)	Velocity under Maximum Day + Fire Flow w/ Upsized Pipe (ft/s)
C-1	876	8	0.08	**10.50**	**10**	6.72

The developer has proposed constructing an 8-inch public water main within a new District easement along the west side of the property connecting the 8-inch water main in Mission Road and the 8-inch water main in Capalina Road as shown in Figure 2A. Modeling of this scenario showed that the Project did not create any distribution system deficiencies under average day demand or under maximum day demand plus fire flow conditions. This scenario removes the required upsizing of the 8-inch main (C-1) in Capalina Road shown in Table 2. Static Pressure: 113 psi / Residual Pressure: 108 psi.

Water Storage Analysis

The 2018 Master Plan outlines VWD's potable water storage reservoirs for each pressure zone as follows:

> 1.5 times ADD (operational storage) + 3.0 times ADD (emergency storage) + fire flow demand = 4.5 times ADD + fire flow demand
>
> OR
>
> 5.0 times ADD, whichever is greater.

The Project is located entirely within the VWD 855 pressure zone. Water storage for this zone is located within the 920 zone and 1028 Twin Oaks pressure zones, as shown in Figure 1. Table 2 shows the required storage in the 855, 920, and 1028 Twin Oaks pressure zones for existing and ultimate build-out (Master Plan) conditions relative to the existing storage provided within each zone.

Table 3 – Existing Reservoir Storage Capacity and Requirements

Pressure Zone	Existing ADD (MGD)	Existing Storage Requirement (MG)	Ultimate ADD (MGD)	Ultimate Storage Requirement (MG)	Existing Storage Available (MG)
855	3.74	50.05	6.79	101.25	0
920	5.61		10.40		18
1028 Twin Oaks	0.66		3.06		73
Totals	10.01	**50.05**	20.25	**101.25**	**91**

The Project will increase the projected average water demand by approximately **18,885** gallons per day as shown in Table 1.

The amount of additional reservoir storage required is 500% of the development's average day demand or:

18,885 gallons * 500% = 94,425 gallons

The analysis finds that water storage capacity is currently available to serve the Project's increased storage requirements. Master Plan projects address and accommodate the ultimate build-out storage deficiency and Water Capital Facility Fees paid by this project will be used for the increase in storage necessitated by the Project's demand calculated above.

Water Pump Station Analysis

Since the proposed Project is located in a pressure zone that is not served by pumping, there are no impacts to existing or proposed pump stations by this Project.

WASTEWATER SYSTEM ANALYSIS

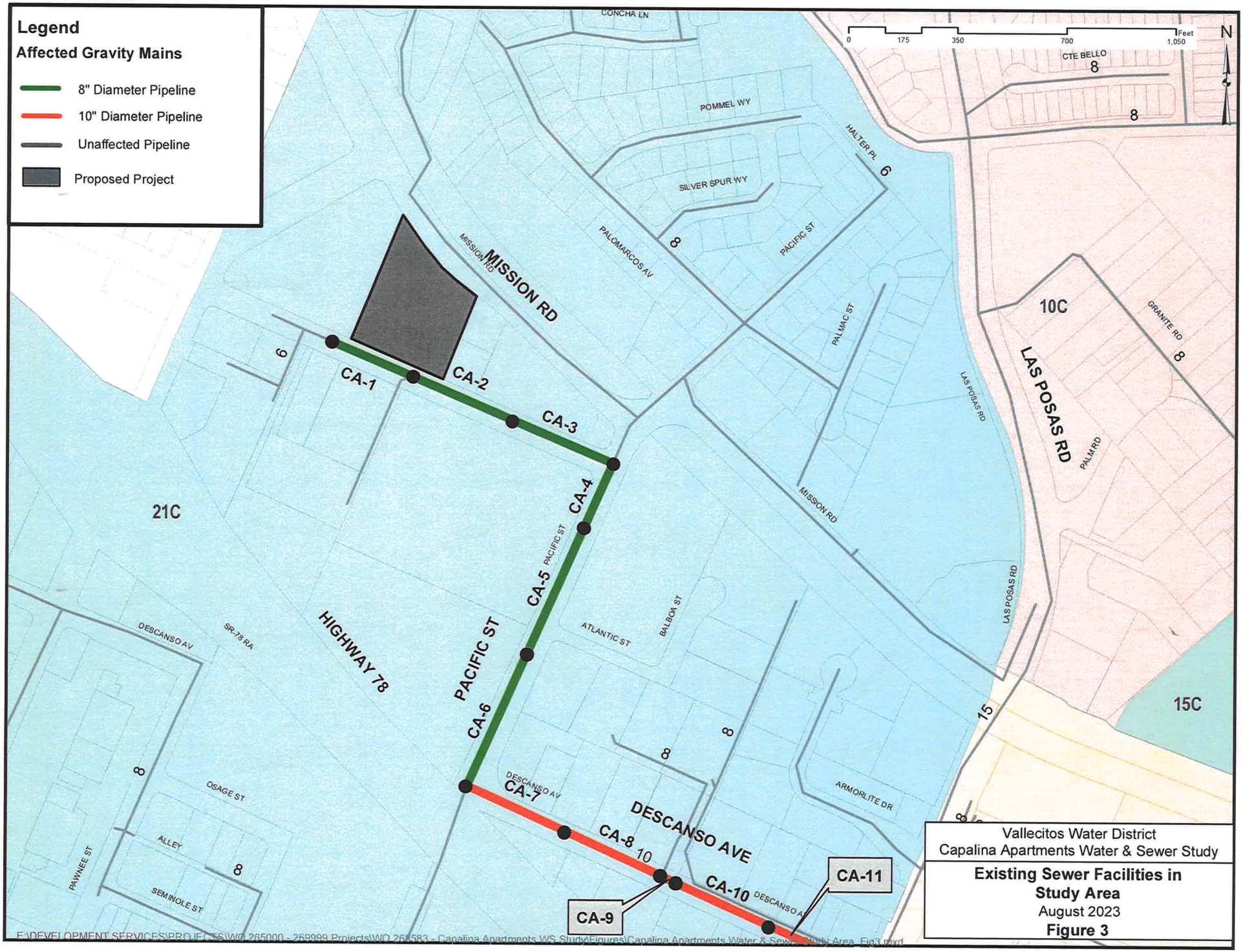
The proposed 2.51-acre Project lies completely within VWD sewer shed 21C. Figures 3 through 5 show the development's location in relation to sewer shed boundaries, identify wastewater infrastructure within the vicinity of the development, and identify the downstream collection infrastructure that will be impacted by the development.

Wastewater Flow Projections

The City of San Marcos' approved land use designation for the proposed Project is MU-3 Mixed (Commercial & Office – no residential). The 2018 Master Plan based its ultimate water demand planning on this land use. The Project is proposing 119 multi-family residential units with 4,000 SF of commercial use. Table 4 provides the average wastewater flow generated both under the density planned for the 2018 Master Plan and with the proposed Project. The table shows that the Project will increase the projected average wastewater generation from the 2018 Master Plan land use by **17,367** gallons per day.

Table 4 – Project Estimated Wastewater Flows for Capalina Apartments

Land Use Type	Area (acres)	Residential Units	Duty Factor (gpd/ac)	Wastewater Flow (gpd)
2018 Master Plan Land Use Flows				
Commercial/Office	**2.51**		1,200	3,012
Total				**3,012**
Proposed Project Demand				
Residential (40-50 du/ac)	2.51	119	8,100	20,331
Commercial/Mixed Use	0.04		1,200	48
Total	**1.09**			**20,379**
Sewer Generation Increase				**17,367**


Legend
Affected Gravity Mains
8" Diameter Pipeline
10" Diameter Pipeline
Unaffected Pipeline
Proposed Project
0
175
350
700
1,050
Feet
N
CONCHA LN
CTE BELLO
POMMEL WY
SILVER SPUR WY
HALTER PL
PALOMARCOS AV
PACIFIC ST
MISSION RD
PALMAC ST
LAS POSAS RD
10C
GRANITE RD
PALM RD
21C
CA-1
CA-2
CA-3
CA-4
CA-5
CA-6
CA-7
CA-8
CA-9
CA-10
CA-11
HIGHWAY 78
SR-78 RA
DESCANSO AV
ATLANTIC ST
BALBOA ST
ARMORLITE DR
15C
OSAGE ST
ALLEY
PAWNEE ST
SEMINOLE ST
6
8
10
15
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Sewer Facilities in Study Area
August 2023
Figure 3
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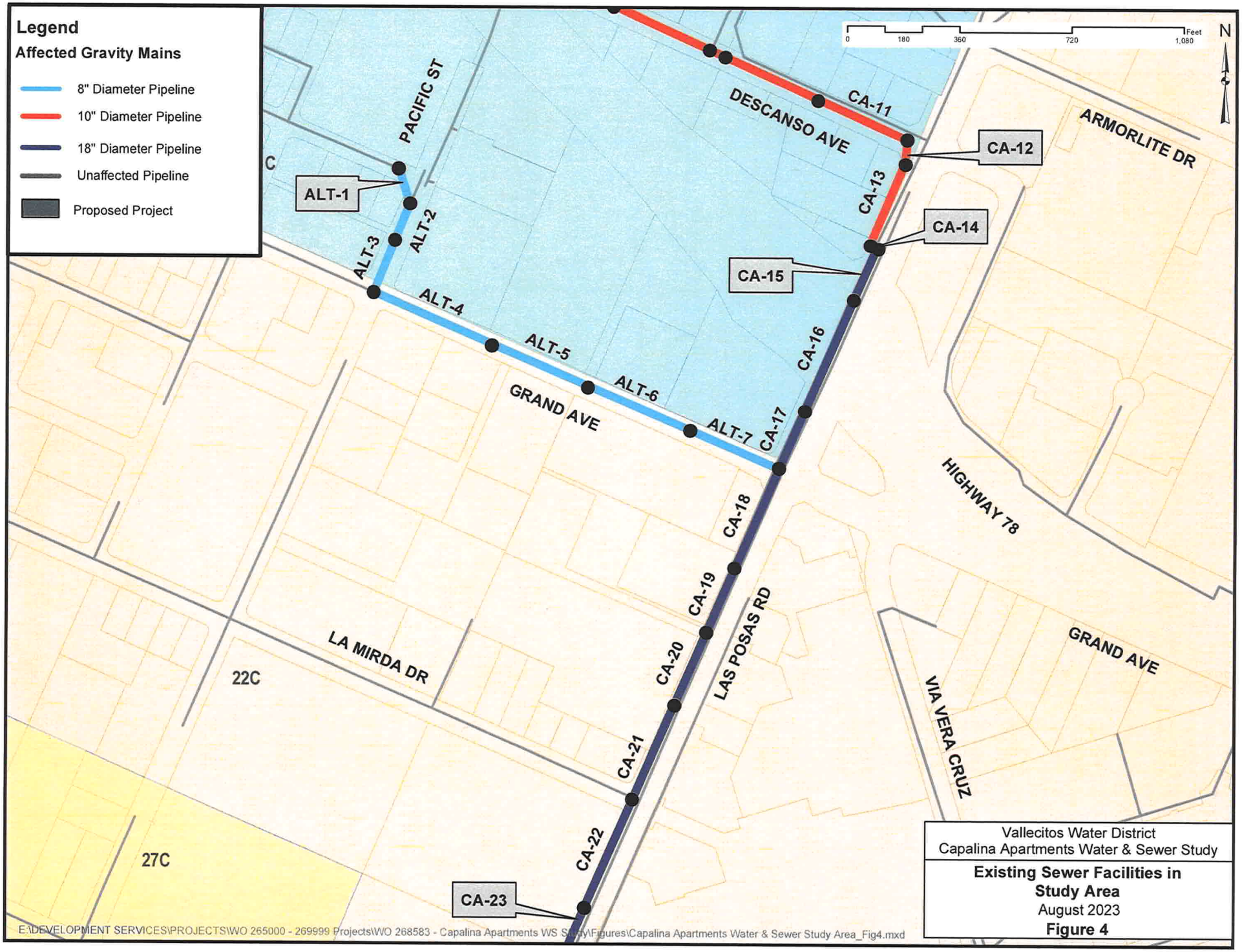
Legend
Affected Gravity Mains
8" Diameter Pipeline
10" Diameter Pipeline
18" Diameter Pipeline
Unaffected Pipeline
Proposed Project
0
180
360
720
1,080
Feet
N
PACIFIC ST
DESCANSO AVE
ARMORLITE DR
HIGHWAY 78
GRAND AVE
LA MIRDA DR
LAS POSAS RD
VIA VERA CRUZ
22C
27C
ALT-1
ALT-2
ALT-3
ALT-4
ALT-5
ALT-6
ALT-7
CA-11
CA-12
CA-13
CA-14
CA-15
CA-16
CA-17
CA-18
CA-19
CA-20
CA-21
CA-22
CA-23
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Sewer Facilities in Study Area
August 2023
Figure 4
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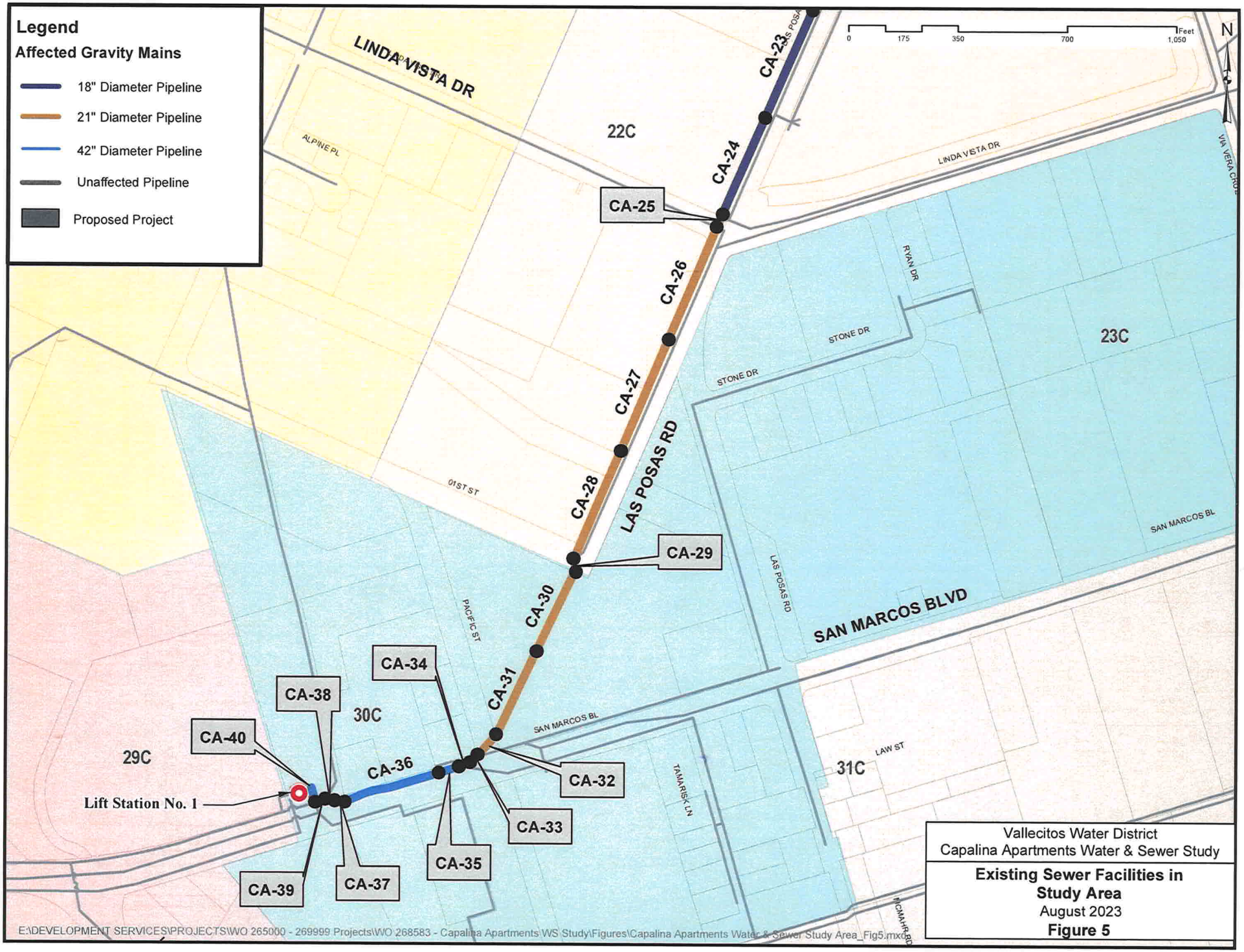
Legend
Affected Gravity Mains
18" Diameter Pipeline
21" Diameter Pipeline
42" Diameter Pipeline
Unaffected Pipeline
Proposed Project
0
175
350
700
1,050
Feet
N
LINDA VISTA DR
ALPINE PL
22C
CA-23
CA-24
CA-25
CA-26
CA-27
CA-28
CA-29
CA-30
CA-31
CA-32
CA-33
CA-34
CA-35
CA-36
CA-37
CA-38
CA-39
CA-40
LAS POSAS RD
STONE DR
RYAN DR
23C
01ST ST
SAN MARCOS BL
SAN MARCOS BLVD
PACIFIC ST
30C
29C
31C
LAW ST
TAMARISK LN
Lift Station No. 1
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Sewer Facilities in Study Area
August 2023
Figure 5
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Wastewater Collection System Analysis

The 2018 Master Plan outlines VWD's wastewater system design criteria which are as follows:

Wastewater Collection Infrastructure Criteria

The wastewater pipeline criteria to be met both within and downstream of the development are as follows:

- Pipes 12 inches in diameter and smaller: ½ full maximum at peak flow
- Pipes over 12 inches in diameter: ¾ full maximum at peak flow
- Minimum velocity: 2 feet per second
- Maximum velocity: 10 feet per second
- Manning's n for gravity pipes: .013
- Hazen-Williams C-factor for force mains/siphons: 120
- Slope for pipes 8 inches in diameter and smaller: 0.4% minimum
- Slope for pipes over 8 inches in diameter: to be determined by VWD

When flow depth in gravity pipes exceeds maximum levels as stated above, a pipe upsize will be specified.

Wastewater Model Scenarios

The following scenarios were modeled to identify system impacts that may be created by the proposed sewer generation, and to recommend any improvements required to provide service to the Project:

- Average Dry Weather Flow with existing flows at the Project site
- Average Dry Weather Flow with the proposed Project
- Peak Dry Weather Flow with existing flows at the Project site
- Peak Dry Weather Flow with the proposed Project
- Peak Wet Weather Flow with existing flows at the Project site
- Peak Wet Weather Flow with the proposed Project

The peak dry weather curve is:

$$\text{Peak Dry Weather Factor} = 2.16 \times (\text{Average Dry Weather Flow Rate})^{-0.1618}$$

The wet weather peak curve is:

$$\text{Peak Wet Weather Factor} = 2.78 \times (\text{Average Dry Weather Flow Rate})^{-0.087}$$

Wastewater Model Results

Modeling focused not only on the sewer collection infrastructure in the direct vicinity of the Project, but also on all downstream infrastructure from the development to Lift Station No. 1 on San Marcos Boulevard that would be impacted by the proposed Project flows (see Figures 3 - 5).

Scenario 1

Scenario 1, modeled the Project connecting to the Districts existing sewer system.

Table 5A presents a summary of the modeling results from this analysis. The modeling results showed there are deficiencies in pipes CA-4 though CA-14, located in Pacific Street, Descanso Road and Las Posas Road under the currently approved density under peak wet weather flows during ultimate build-out conditions as shown in Table 5A. The wastewater flow from the proposed Project will increase those deficiencies. Wastewater flows from the recently approved Cherokee Multi-Use project, the South Pacific Industrial project and the Woodsprings Hotel project were not included in this Scenario.

Scenario 2

An alternate scenario has been proposed which would re-route existing sewer flows from Seminole Street south to Grand Avenue, rather than north to pipes CA-7 through CA-14, located in Descanso Avenue and Las Posas Road which were determined to have deficient capacity in Scenario 1. The South Pacific Industrial project has been approved by the VWD Board for construction of a sewer main extension in Pacific Street between Seminole Street and Grand Avenue (pipes ALT-2 and ALT-3). In this scenario, the Capalina project would construct a pipe (ALT-1) to connect the existing sewer main in Seminole Street to the new main in South Pacific Street (ALT-2 & ALT-3) and sever the connection to the existing sewer main in the northern portion of Pacific Street. The diverted flows as well as the flows from the recently approved Cherokee Multi-Use project, the South Pacific Industrial project and the Woodsprings Hotel project would be routed through pipes ALT-1 through ALT-7 to join the flows in Las Posas Road at pipe CA-18.

Table 5B presents a summary of the modeling results from this analysis with flows re-routed from Seminole Street. Table 5C shows the modeling results for the pipelines along the path of the relocated flows in Pacific Street and Grand Avenue. The modeling results showed there are still deficiencies in pipes CA-4 though CA-14 under the currently approved density under peak wet weather flows during ultimate build-out conditions and the wastewater flow from the proposed Project will increase those deficiencies. However, the deficiencies in the pipelines located in Descanso Avenue and Las Posas Road (CA-7 through CA-14) have been significantly reduced in this scenario and no new deficiencies were created in Pacific Street, Grand Avenue, and Las Posas Road by re-routing the flows as shown in Table 5C.

VWD's 2018 Master Plan has identified pipe segments CA-4 through CA-14 as CIP SP-23 Pacific Street & Descanso Avenue Replacement Project. Phase 5 projects are planned for construction after the year 2036. Pipes to be upsized from 8-inch and 10-inch pipe to 12-inch and 15-inch pipe.

- SP-23 Pacific Street & Descanso Avenue Replacement Project – (CA-4 through CA-14) Phase 5, is completely funded by development without contribution from the District's capacity fund.

ULTIMATE WWF

Table 5A - Wastewater Model Results and Recommended Gravity Main Improvements

				Wastewater Flows with Existing Density				Wastewater Flows with Proposed Density			
Pipe ID Number	Length (ft)	Diameter (in)	Slope	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diamater (in)	Replacement PWWF Depth-to-Diamater Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diameter (In)	Replacement PWWF Depth-to-Diamater Ratio
CA-1	280	8	0.0450	14	0.08	8	0.08	61	0.16	8	0.16
CA-2	350	8	0.0290	27	0.12	8	0.12	74	0.20	8	0.20
CA-3	350	8	0.0430	30	0.12	8	0.12	76	0.18	8	0.18
CA-4	240	8	0.0040	369	0.95	**12**	0.42	415	>1	**12**	0.45
CA-5	450	8	0.0040	370	>1	**12**	0.42	417	>1	**12**	0.45
CA-6	450	8	0.0040	397	>1	**12**	0.44	444	>1	**12**	0.47
CA-7	360	10	0.0110	575	0.54	**12**	0.41	622	0.57	**12**	0.43
CA-8	360	10	0.0110	582	0.54	**12**	0.41	629	0.57	**12**	0.43
CA-9	23	10	0.0073	592	0.62	**15**	0.34	639	0.66	**15**	0.35
CA-10	337	10	0.0060	592	0.67	**15**	0.36	639	0.71	**15**	0.37
CA-11	360	10	0.0050	596	0.72	**15**	0.37	643	0.76	**15**	0.39
CA-12	53	10	0.0090	599	0.59	**15**	0.32	646	0.62	**15**	0.33
CA-13	321	10	0.0090	601	0.59	**15**	0.32	648	0.62	**15**	0.34
CA-14	32	10	0.0320	603	0.41	**15**	0.24	650	0.43	**15**	0.24
CA-15	180	18	0.0070	2188	0.54	18	0.54	2,235	0.54	18	0.54
CA-16	389	18	0.0080	2191	0.52	18	0.52	2,238	0.52	18	0.52
CA-17	204	18	0.0050	2193	0.60	18	0.60	2,240	0.60	18	0.60
CA-18	281	18	0.0060	2255	0.57	18	0.57	2,302	0.58	18	0.58
CA-19	280	18	0.0040	2257	0.66	18	0.66	2,304	0.66	18	0.66
CA-20	226	18	0.0030	2259	0.73	18	0.73	2,306	0.74	18	0.74

CIP PROJECTS: **CA-4 through CA-14 (SP-23)**

PROPOSED DENSITY: **47** **GPM**

Table 5A - Wastewater Model Results and Recommended Gravity Main Improvements

				Wastewater Flows with Existing Density				Wastewater Flows with Proposed Density			
Pipe ID Number	Length (ft)	Diameter (in)	Slope	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diamater (in)	Replacement PWWF Depth-to-Diamater Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diameter (In)	Replacement PWWF Depth-to-Diamater Ratio
CA-21	363	18	0.0040	2265	0.66	18	0.66	2,312	0.67	18	0.67
CA-22	385	18	0.0080	2324	0.53	18	0.53	2,371	0.54	18	0.54
CA-23	380	18	0.0080	2332	0.54	18	0.54	2,379	0.54	18	0.54
CA-24	357	18	0.0080	2334	0.54	18	0.54	2,381	0.54	18	0.54
CA-25	23	18	0.0080	3072	0.64	18	0.64	3,119	0.64	18	0.64
CA-26	385	21	0.0405	3585	0.35	21	0.35	3,632	0.35	21	0.35
CA-27	380	21	0.0405	3590	0.35	21	0.35	3,637	0.35	21	0.35
CA-28	380	21	0.0405	3593	0.35	21	0.35	3,640	0.35	21	0.35
CA-29	33	21	0.0064	3737	0.60	21	0.60	3,784	0.60	21	0.60
CA-30	297	21	0.0064	3739	0.60	21	0.60	3,786	0.60	21	0.60
CA-31	295	21	0.0064	3741	0.60	21	0.60	3,788	0.60	21	0.60
CA-32	112	21	0.0064	3746	0.60	21	0.60	3,793	0.60	21	0.60
CA-33	15	30	0.0023	4229	0.49	42	0.30	4,276	0.50	42	0.31
CA-34	38	42	0.0060	4231	0.24	42	0.24	4,278	0.24	42	0.24
CA-35	100	42	0.0020	14120	0.62	42	0.62	14,167	0.62	42	0.62
CA-36	347	42	0.0020	14130	0.62	42	0.62	14,177	0.62	42	0.62
CA-37	18	42	0.0030	14134	0.55	42	0.55	14,181	0.55	42	0.55
CA-38	10	42	0.0020	14137	0.62	42	0.62	14,183	0.62	42	0.62
CA-39	10	42	0.0120	14330	0.37	42	0.37	14,377	0.37	42	0.37
CA-40	73	42	0.0040	14907	0.52	42	0.52	14,954	0.52	42	0.52

CIP PROJECTS: CA-4 through CA-14 (SP-23)

PROPOSED DENSITY: 47 GPM

ULTIMATE WWF

Table 5B - Wastewater Model Results and Recommended Gravity Main Improvements

				Wastewater Flows with Existing Density with CHEROKEE, SOUTH PACIFIC INDUSTRIAL & WOODSPRINGS HOTEL to Grand Ave				Wastewater Flows with Proposed Density			
Pipe ID Number	Length (ft)	Diameter (in)	Slope	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diamater (in)	Replacement PWWF Depth-to-Diamater Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diameter (In)	Replacement PWWF Depth-to-Diamater Ratio
CA-1	280	8	0.0450	14	0.08	8	0.08	61	0.16	8	0.16
CA-2	350	8	0.0290	27	0.12	8	0.12	74	0.20	8	0.20
CA-3	350	8	0.0430	29	0.12	8	0.12	76	0.18	8	0.18
CA-4	240	8	0.0040	366	0.91	**12**	0.42	413	>1	**12**	0.45
CA-5	450	8	0.0040	367	0.96	**12**	0.42	414	>1	**12**	0.45
CA-6	450	8	0.0040	394	>1	**12**	0.44	441	>1	**12**	0.47
CA-7	360	10	0.0110	417	0.45	**12**	0.34	464	0.48	**12**	0.36
CA-8	360	10	0.0110	423	0.45	**12**	0.35	470	0.48	**12**	0.37
CA-9	23	10	0.0073	434	0.51	**15**	0.29	481	0.55	**15**	0.30
CA-10	337	10	0.0060	434	0.55	**15**	0.30	481	0.58	**15**	0.32
CA-11	360	10	0.0050	437	0.58	**15**	0.32	484	0.62	**15**	0.34
CA-12	53	10	0.0090	441	0.49	**15**	0.28	488	0.52	**15**	0.29
CA-13	321	10	0.0090	442	0.49	**15**	0.28	489	0.52	**15**	0.29
CA-14	32	10	0.0320	444	0.35	**15**	0.20	491	0.37	**15**	0.21
CA-15	180	18	0.0080	2024	0.49	18	0.49	2,071	0.50	18	0.50
CA-16	389	18	0.0080	2026	0.49	18	0.49	2,073	0.50	18	0.50
CA-17	204	18	0.0050	2028	0.57	18	0.57	2,075	0.58	18	0.58
CA-18	281	18	0.0060	2291	0.58	18	0.58	2,338	0.59	18	0.59
CA-19	280	18	0.0040	2293	0.66	18	0.66	2,340	0.67	18	0.67
CA-20	226	18	0.0030	2295	0.74	18	0.74	2,342	0.75	18	0.75

CIP PROJECTS: **CA-4 through CA-14 (SP-23)**

PROPOSED DENSITY: **47** **GPM** **45** **GPM**

flows from Cherokee, S. Pacific & Hotel enter at pipe CA-18 (see Table 5C)

Table 5B - Wastewater Model Results and Recommended Gravity Main Improvements

				Wastewater Flows with Existing Density with CHEROKEE, SOUTH PACIFIC INDUSTRIAL & WOODSPRINGS HOTEL to Grand Ave				Wastewater Flows with Proposed Density			
Pipe ID Number	Length (ft)	Diameter (in)	Slope	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diamater (in)	Replacement PWWF Depth-to-Diamater Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diameter (In)	Replacement PWWF Depth-to-Diamater Ratio
CA-21	363	18	0.0040	2299	0.66	18	0.66	2,346	0.67	18	0.67
CA-22	381	18	0.0080	2359	0.54	18	0.54	2,406	0.55	18	0.55
CA-23	380	18	0.0080	2367	0.54	18	0.54	2,414	0.55	18	0.55
CA-24	357	18	0.0080	2369	0.54	18	0.54	2,415	0.55	18	0.55
CA-25	23	18	0.0080	3104	0.64	18	0.64	3,151	0.65	21	0.50
CA-26	385	21	0.0405	3613	0.35	21	0.35	3,660	0.35	21	0.35
CA-27	380	21	0.0405	3617	0.35	21	0.35	3,664	0.35	21	0.35
CA-28	380	21	0.0405	3621	0.35	21	0.35	3,668	0.35	21	0.35
CA-29	33	21	0.0064	3764	0.60	21	0.60	3,811	0.60	21	0.60
CA-30	297	21	0.0064	3766	0.60	21	0.60	3,813	0.60	21	0.60
CA-31	295	21	0.0064	3768	0.60	21	0.60	3,815	0.60	21	0.60
CA-32	112	21	0.0064	3773	0.60	21	0.60	3,820	0.60	21	0.60
CA-33	15	30	0.0023	4239	0.49	42	0.30	4,286	0.50	42	0.31
CA-34	38	42	0.0060	4241	0.24	42	0.24	4,288	0.24	42	0.24
CA-35	100	42	0.0020	14042	0.62	42	0.62	14,089	0.62	42	0.62
CA-36	347	42	0.0020	14049	0.62	42	0.62	14,096	0.62	42	0.62
CA-37	18	42	0.0020	14049	0.62	42	0.62	14,096	0.62	42	0.62
CA-38	10	42	0.0320	14051	0.29	42	0.29	14,098	0.29	42	0.29
CA-39	10	42	0.0120	14244	0.37	42	0.37	14,291	0.37	42	0.37
CA-40	73	42	0.0040	14821	0.52	42	0.52	14,868	0.52	42	0.52

CIP PROJECTS: CA-4 through CA-14 (SP-23)

PROPOSED DENSITY: 47 GPM

45 GPM

flows from Cherokee, S. Pacific & Hotel enter at pipe CA-18 (see Table 5C)

ULTIMATE WWF

Table 5C - Wastewater Model Results and Recommended Gravity Main Improvements - GRAND AVENUE

				Wastewater Flows with Existing Density with CHEROKEE, SOUTH PACIFIC INDUSTRIAL & WOODSPRINGS HOTEL to Grand Ave				Wastewater Flows with Proposed Density			
Pipe ID Number	Length (ft)	Diameter (in)	Slope	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diamater (in)	Replacement PWWF Depth-to-Diamater Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diamter Ratio	Replacement Diameter (In)	Replacement PWWF Depth-to-Diamater Ratio
ALT-1	54	8	0.0490	151	0.24	8	0.24	151	0.24	8	0.24
ALT-2	143	8	0.0060	153	0.42	8	0.42	153	0.42	8	0.42
ALT-3	223	8	0.0160	153	0.33	8	0.33	153	0.33	8	0.33
ALT-4	408	8	0.0070	191	0.46	8	0.46	191	0.46	8	0.46
ALT-5	341	8	0.0150	197	0.38	8	0.38	197	0.38	8	0.38
ALT-6	350	10	0.0140	207	0.29	8	0.40	207	0.29	10	0.29
ALT-7	298	10	0.0180	210	0.27	8	0.37	210	0.27	10	0.27
CA-18	281	18	0.0060	2291	0.58	18	0.58	2,336	0.59	18	0.59
CA-19	280	18	0.0040	2293	0.66	18	0.66	2,293	0.66	18	0.66
CA-20	226	18	0.0030	2295	0.74	18	0.74	2,295	0.74	18	0.74

Cherokee	14 GPM	Added at pipe ALT-1
S. Pacific	0 GPM	Added at pipe ALT-2
Woodsprings	31 GPM	Added at pipe ALT-4

PROPOSED DENSITY: **47** **GPM**

Add'l flows from Cherokee, S. Pacific & Hotel **45** **GPM** Total added at pipe CA-18

Wastewater Lift Station Analysis

Lift stations are sized for peak wet weather flow with manufacturer's recommended cycling times for pumping equipment. Since the proposed Project is not located in a sewer shed that is served by a lift station, there are no lift station upgrade requirements for this project.

Parallel Land Outfall Analysis

VWD's existing land outfall is shown in Figure 6. The outfall is approximately 8 miles in length and consists of 4 gravity pipeline sections and 3 siphon sections varying in diameter from 20 inches to 54 inches. VWD maintains the entire pipeline from Lift Station No. 1 to the Encina Water Pollution Control Facility (EWPCF). From Lift Station No. 1 to El Camino Real, VWD is the sole user of this pipeline. From El Camino Real to the EWPCF, the ownership capacity is as shown in Table 6 below:

Table 6 – Land Outfall Capacity Ownership by Agency

Agency	Ownership Percentage	Capacity (MGD)
Carlsbad	23.98%	5.00
Vista	17.99%	3.75
VWD	58.03%	12.10
Totals	**100.00%**	**20.85**

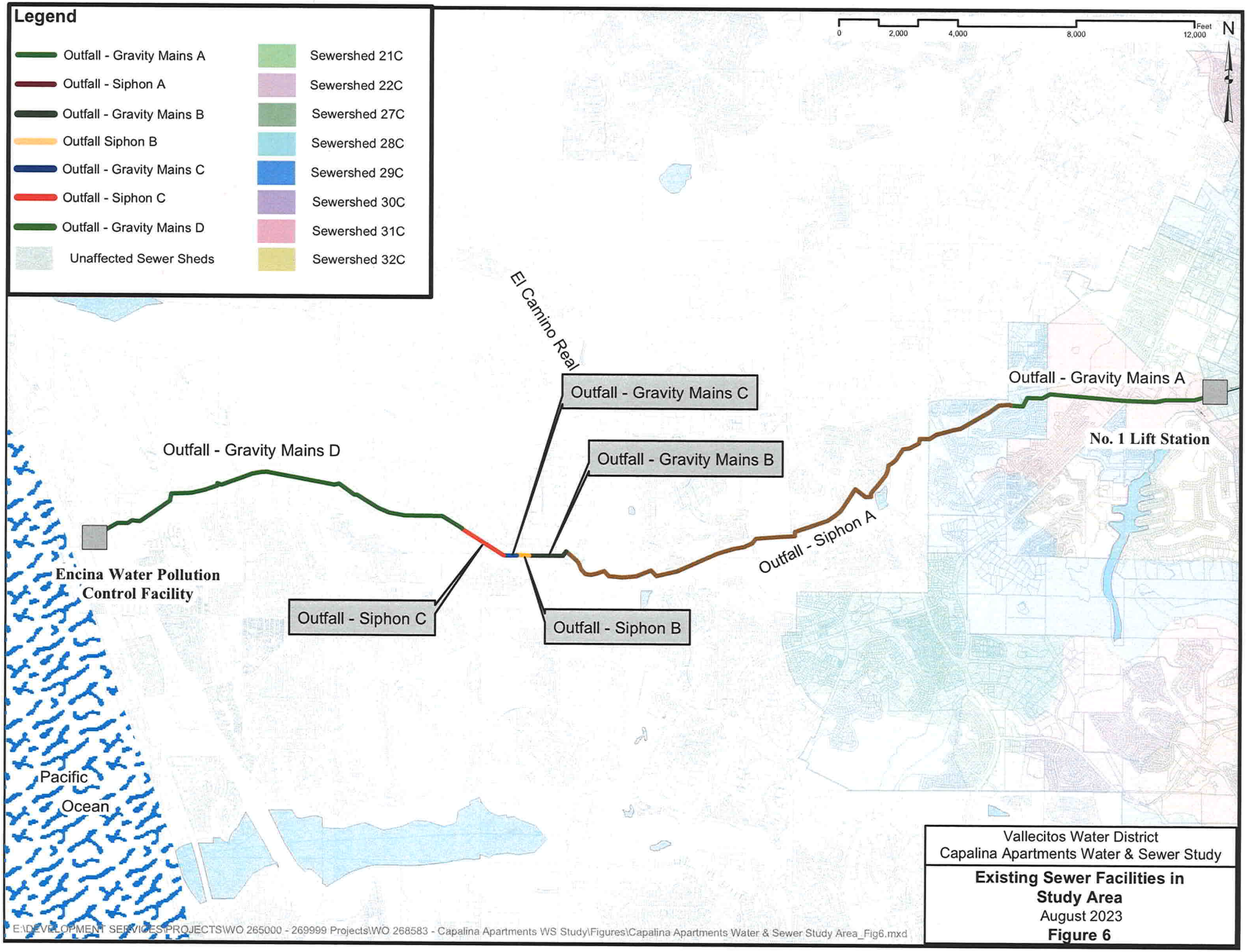
The Meadowlark Water Reclamation Facility (MRF) has a capacity of 5.0 MGD with a peak wet weather capacity of 8.0 MGD. Therefore, VWD has a combined peak wet weather wastewater collection capacity of 20.10 MGD (12.10 MGD + 8.0 MGD).

VWD's 2014 average daily wastewater flow through the land outfall was 7.5 MGD. This corresponds to a peak wet weather flow of 17.5 MGD, which falls within VWD's combined peak wet weather collection capacity.

The 2018 Master Plan estimated that, under approved land uses, VWD has an ultimate build-out average dry weather flow of 14.4 MGD. This corresponds to a peak wet weather flow of 31.7 MGD, which exceeds VWD's combined peak wet weather collection capacity. To accommodate additional wastewater flows from planned development, the 2018 Master Plan recommended conveyance of peak flows to the EWPCF through a parallel land outfall.

The Project proposes to generate **17,367** gallons per day of additional average wastewater flow that was not accounted for in the Land Outfall's4capacity studied in the 2018 Master Plan.

The analysis finds that outfall capacity is currently available to serve the Project's proposed wastewater generation. Wastewater Capital Facility Fees paid by this Project will be used toward design and construction of a parallel land outfall to be sized to accommodate ultimate build-out wastewater flows.


Legend
Outfall - Gravity Mains A
Outfall - Siphon A
Outfall - Gravity Mains B
Outfall Siphon B
Outfall - Gravity Mains C
Outfall - Siphon C
Outfall - Gravity Mains D
Unaffected Sewer Sheds
Sewershed 21C
Sewershed 22C
Sewershed 27C
Sewershed 28C
Sewershed 29C
Sewershed 30C
Sewershed 31C
Sewershed 32C
0
2,000
4,000
8,000
12,000
Feet
N
El Camino Real
Outfall - Gravity Mains C
Outfall - Gravity Mains A
Outfall - Gravity Mains B
No. 1 Lift Station
Outfall - Gravity Mains D
Outfall - Siphon A
Encina Water Pollution Control Facility
Outfall - Siphon C
Outfall - Siphon B
Pacific Ocean
Vallecitos Water District
Capalina Apartments Water & Sewer Study
Existing Sewer Facilities in Study Area
August 2023
Figure 6
E:\DEVELOPMENT SERVICES\PROJECTS\WO 265000 - 269999 Projects\WO 268583 - Capalina Apartments WS Study\Figures\Capalina Apartments Water & Sewer Study Area_Fig6.mxd

Wastewater Treatment Facility Analysis

VWD utilizes two wastewater treatment facilities to treat wastewater collected within its sewer service area.

- The Meadowlark Reclamation Facility (MRF) has liquids treatment capacity of up to 5.0 MGD with a peak wet weather capacity of 8.0 MGD. MRF does not have solids treatment capacity, and therefore all solids are treated at the Encina Water Pollution Control Facility (EWPCF).
- The EWPCF is located in the City of Carlsbad. This is a regional facility with treatment capacity of up to 40.51 MGD. VWD's current ownership capacity is noted below.

Solids Treatment Capacity
VWD currently owns 10.47 MGD of solids treatment capacity at EWPCF. VWD's 2014 average daily wastewater flow was 7.5 MGD. Therefore, the analysis finds that adequate solids treatment capacity exists at this time to serve the Project.

The ultimate average wastewater flow identified in the 2018 Master Plan is 14.4 MGD, resulting in a projected solids treatment capacity deficiency of 3.93 MGD. Wastewater Capital Facility Fees paid by this Project will be used towards the deficiency to accommodate the solid treatment capacity wastewater flow.

Liquids Treatment Capacity
VWD currently owns 7.67 MGD of liquids treatment capacity at the EWPCF in addition to the liquid's treatment capacity of 5.0 MGD at MRF for a total of 12.67 MGD of liquids treatment capacity. VWD's 2014 average daily wastewater flow was 7.5 MGD. Therefore, the analysis finds that adequate liquids treatment capacity exists at this time to serve the Project.

The ultimate average wastewater flow identified in the 2018 Master Plan is 14.4 MGD, resulting in a projected liquids treatment capacity deficiency of 1.73 MGD. Wastewater Capital Facility Fees paid by this Project will be used towards the deficiency to accommodate the ultimate average wastewater flow.

Ocean Disposal Capacity
VWD currently owns 10.47 MGD of ocean disposal capacity at the EWPCF. VWD's 2014 average daily wastewater flow was 7.5 MGD. Therefore, the analysis finds that adequate ocean disposal capacity exists at this time to serve the Project.

The ultimate average wastewater flow identified in the 2018 Master Plan is 14.4 MGD, resulting in an ocean disposal deficiency of 3.93 MGD. Wastewater Capital Facility Fees paid by this Project will be used towards the deficiency to accommodate the ocean disposal wastewater flow.

The District has determined that adequate wastewater treatment and disposal capacity exists for the proposed Project at this time subject to the qualifications referenced in the Conclusions and Conditions.

CONCLUSION AND CONDITIONS

The proposed Capalina Apartment project is expected to increase average daily water demands by 18,885 gallons per day and wastewater flows by 17,367 gallons per day over the ultimate flows projected in the 2018 Master Plan.

The study concludes the proposed development will result in the following impacts:

- An increase of 18,885 gallons per day in water demand for proposed project.
- An increase of 94,425 gallons of potable water storage requirement.
- An increase of 17,367 gallons per day in solids handling, liquids handling and ocean disposal capacity requirements at Encina Water Pollution Control Facility.
- An increase of 17,367 gallons per day in the parallel land outfall's capacity requirement.

The Study also concludes that the Project's fire flow requirements create deficiencies in existing water facilities under Max Day Demand plus Fire Flow. The following improvements are needed to mitigate those deficiencies:

- Approximately 876 feet of existing 8-inch water main in Capalina Road (C-1) must be replaced with 10-inch main to meet fire flow requirements.

OR

- Construct approximately 530 feet of new 8-inch water main within a new District easement through the Project site between Mission Road and Capalina Road to meet fire flow requirements.

The Study also concludes that under both Scenario 1 and Scenario 2 there are deficiencies in sewer facilities under peak wet weather flows during ultimate build-out conditions and the project will increase these deficiencies. The following improvements are needed to mitigate those deficiencies:

- Approximately 1,860 feet of existing 8-inch and 10-inch sewer main within Pacific Street and Descanso Avenue must be replaced with 12-inch main (CA-4 through CA-8).
- Approximately 1,094 feet of existing 10-inch sewer main within Descanso Avenue and Las Posas Road must be replaced with 15-inch main (CA-9 through CA-14).

VWD's 2018 Master Plan has identified sewer pipe segments CA-4 through CA-14 for upsizing from 8-inch and 10-inch to 12-inch and 15-inch as CIP #SP-23, a Phase 5 project. Phase 5 projects are planned for construction after the year 2036 and is completely funded by development without contribution from the District's capacity fund.

The following conditions are required for providing service to the proposed Project:

- Payment of all applicable Water and Wastewater Capital Facility Fees in affect at the time service is committed in accordance with District rules and regulations.
- Construction and Board acceptance of all onsite and offsite water and sewer facilities prior to service.

The District currently has water and sewer capacity available to serve the Project as proposed with the conditions herein addressed by the Developer. However, the ability to provide water and sewer service in the future depends upon ultimate build-out of the Project and could change depending upon the timing of the build-out, as well as build-outs of other development projects, continued reliable water supplies from the San Diego County Water Authority, the District's treatment capacity at the EWPCF and other factors affecting growth in the District which may change over time.

This Study is based on the current adopted land use utilized in VWD's 2018 Master Plan. The study addresses the incremental facility impacts of this Project only and does not include or consider any additional projects within VWD's service area that have deviated from adopted Master Plan land uses. Any land use changes upstream and/or downstream of the Study area may necessitate a revision of any onsite and offsite studies. VWD shall determine if and when revisions to the Study are necessary. Costs for revising this Study shall be borne by the Developer. The results of this study are not the accepted conditions for the development, final conditions shall be part of the construction agreement process or issued separately by the District.