

# **APPENDIX D**

## *Water and Sewer Study*



**VALLECITOS WATER DISTRICT**  
*KASIER PERMANENTE HOSPITAL, SAN MARCOS WATER AND SEWER STUDY*  
*WORK ORDER # 223079*

FINAL TECHNICAL MEMORANDUM

March 20, 2020

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**INTRODUCTION**

The proposed Kaiser Permanente Hospital, San Marcos (Project) is a 7-story hospital to be constructed on 36.31-acres located on Craven Road between Echo Lane and Rush Drive (APNs 221-091-24 & 221-091-25), adjacent to an existing Kaiser Medical Center on the same parcels.

The Project property is located within VWD's water and sewer service boundaries. Both water and wastewater services will be provided by the Vallecitos Water District (VWD). The property will not be required to annex.

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)

## WATER SYSTEM ANALYSIS

The proposed 36.31-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 Project property's land use designation per the City of San Marcos, Heart of the City Specific Plan is Hospital Complex (SPA-HC). This equates to the Public Facilities land use designation in VWD's 2018 Master Plan. The 2018 Master Plan based its ultimate water demand planning on this approved land use. The Project is developing under the approved land use but will propose a density increase.

Table 1 provides the average water demand 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 water demand from the 2018 Master Plan land use based on data provided by the developer's engineer of 350 gallons per day per bed.

**Table 1 – Project Estimated Water Demands**

Land Use Type	Area (acres)	Number of Beds	Duty Factor (gpd/ac)	Duty Factor (gpd/bed)	Water Demand (gpd)
<b>2018 Master Plan Land Use Demand</b>					
Public Facilities	36.31		1,000		36,310
<b>Total</b>	<b>36.31</b>	-			<b>36,310</b>
<b>Proposed Project Demand</b>					
Hospital (Medical)		206		350	72,100
<b>Total</b>	<b>36.31</b>				
<b>Water Demand Increase</b>					<b>35,790</b>

# Legend:

 920 Zone PRV

 Storage Tank

## Affected Pipeline

 4" Diameter Pipeline

 6" Diameter Pipeline

 8" Diameter Pipeline

 10" Diameter Pipeline

 12" Diameter Pipeline

 14" Diameter Pipeline

 16" Diameter Pipeline


 18" Diameter Pipeline

 21" Diameter Pipeline


 22" Diameter Pipeline

 30" Diameter Pipeline

 Unaffected Pipeline

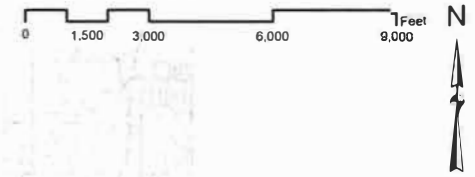
 Proposed Project

 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

**Figure 2**

**Vera Cruz**  
7.05 MG Tank

Vallecitos Water District  
Keiser Permanente Hospital S.M. Water & Sewer Study

**Existing Water Facilities in  
Study Area**  
March 2020

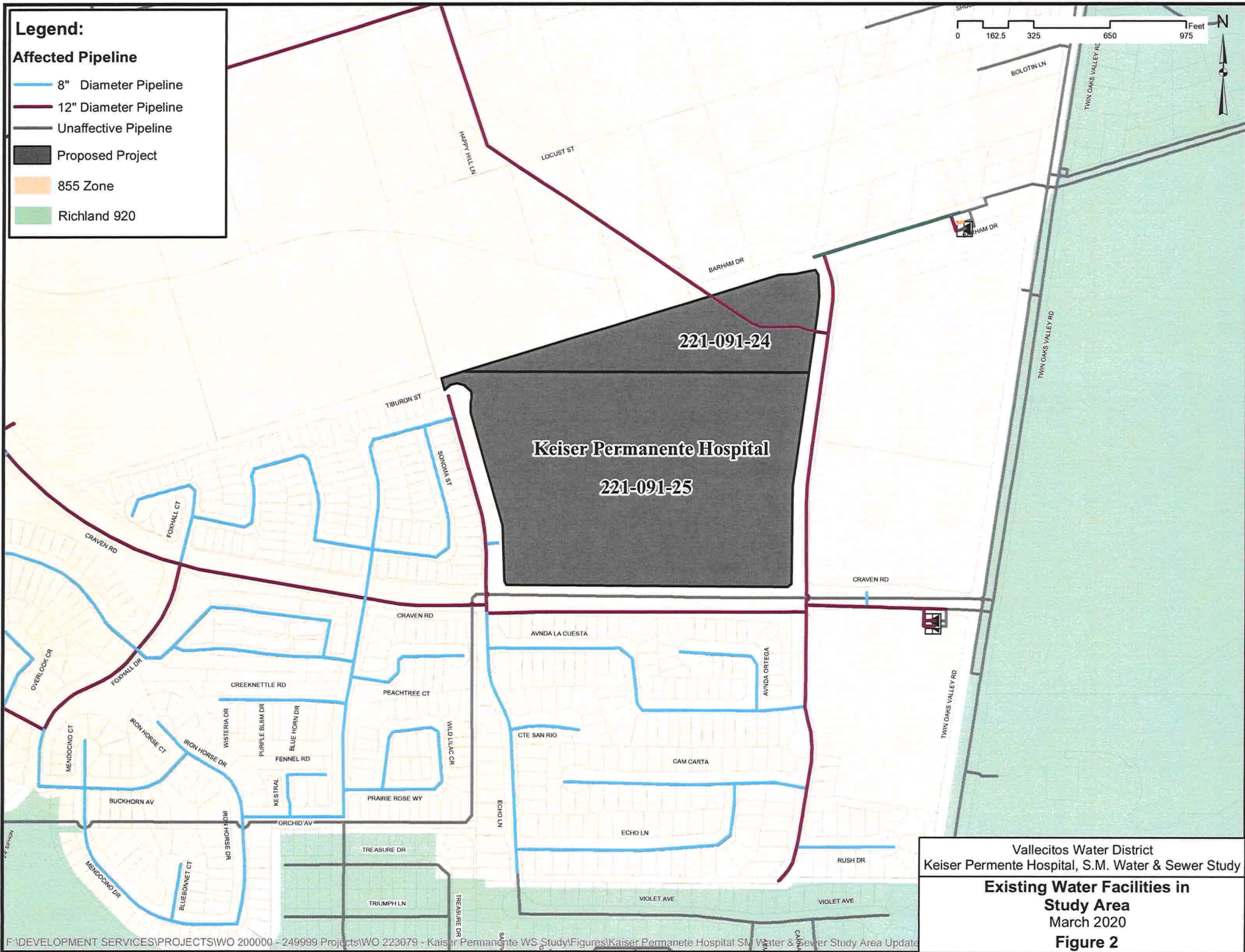
**Figure 1**



## Legend:

### Affected Pipeline

- 8" Diameter Pipeline
- 12" Diameter Pipeline
- Unaffected Pipeline
- Proposed Project
- 855 Zone
- Richland 920



Vallecitos Water District  
 Keiser Permanente Hospital, S.M. Water & Sewer Study  
**Existing Water Facilities in  
 Study Area**  
 March 2020  
**Figure 2**

### ***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 3,000 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 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 or maximum day plus fire flow demand conditions.

### ***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 Richland and 1028 Twin Oaks pressure zones, as shown in Figure 1. Table 2 shows the required storage in the 855, 920 Richland, 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 2 – 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 Richland	5.61		10.40		18
1028 Twin Oaks	0.66		3.06		73
<b>Totals</b>	<b>10.01</b>	<b>50.05</b>	<b>20.25</b>	<b>101.25</b>	<b>91</b>

The Project will increase the projected average water demand by approximately 35,790 gallons per day as shown in Table 1.

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

$$35,790 \text{ gallons} * 500\% = \mathbf{178,950 \text{ gallons}}$$

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 36.31-acre Project lies completely within VWD sewer shed 24C. Figures 3 through 6 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 Project property's land use designation per the City of San Marcos, Heart of the City Specific Plan is Hospital Complex (SPA-HC). This equates to the Public Facilities land use designation in VWD's 2018 Master Plan. The 2018 Master Plan based its ultimate wastewater generation planning on this approved land use. The Project will propose a density increase.

Table 3 provides the average wastewater flow generated both under the density planned for in 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. This estimate is based on data provided by the developer's engineer of 270 gallons per day per bed.

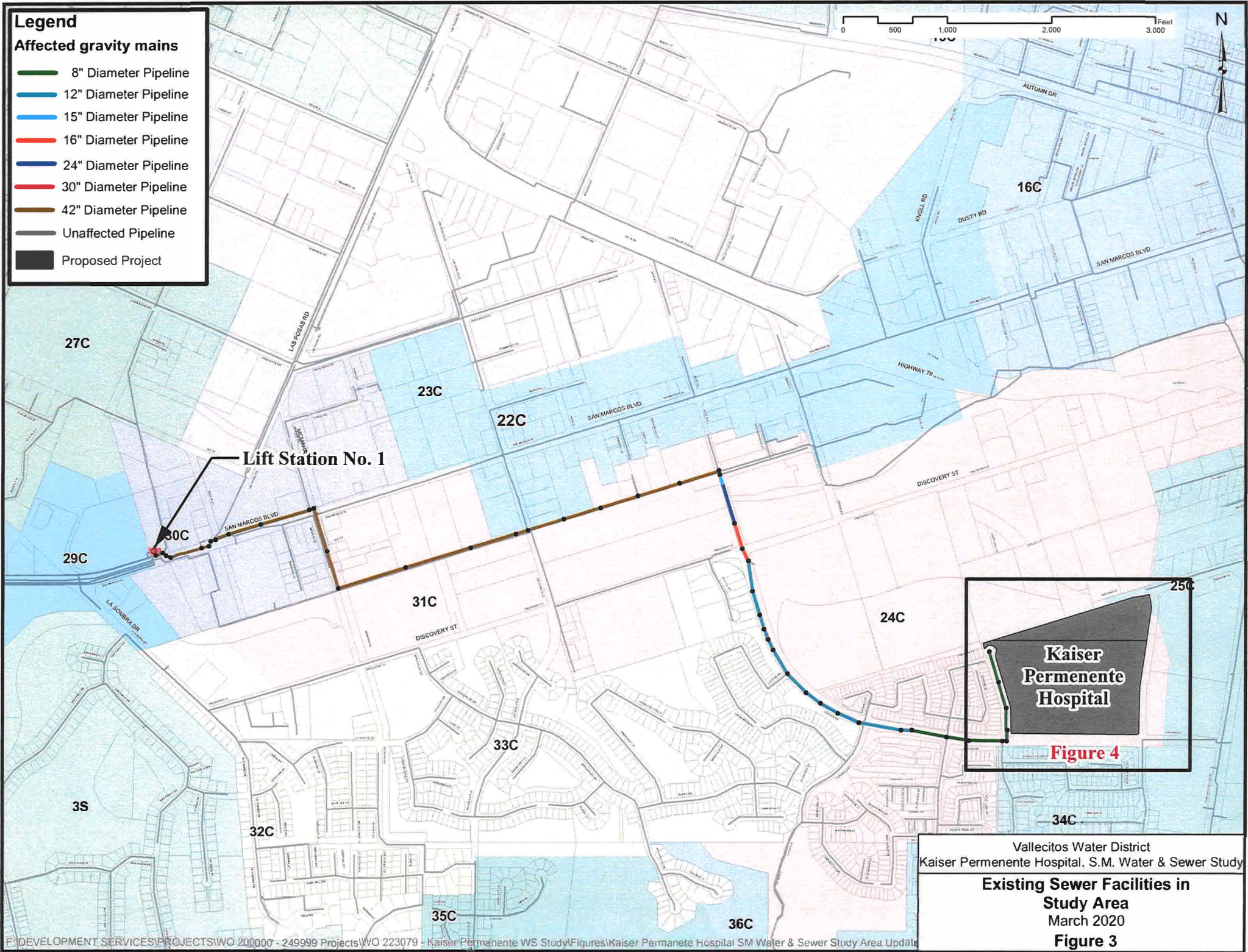
**Table 3 – Project Estimated Wastewater Flows**

Land Use Type	Area (acres)	Number of Beds	Duty Factor (gpd/ac)	Duty Factor (gpd/bed)	Water Demand (gpd)
<b>2018 Master Plan Land Use Flows</b>					
Public Facilities	36.31		800		29,048
<b>Total</b>	<b>36.31</b>	-			<b>29,048</b>
<b>*Proposed Project Demand</b>					
Hospital (Medical)		206		270	55,620
<b>Total</b>	<b>36.31</b>				
<b>Sewer Generation Increase</b>					<b>26,572</b>

## Legend

### Affected gravity mains

- 8" Diameter Pipeline
- 12" Diameter Pipeline
- 15" Diameter Pipeline
- 16" Diameter Pipeline
- 24" Diameter Pipeline
- 30" Diameter Pipeline
- 42" Diameter Pipeline
- Unaffected Pipeline
- Proposed Project



Vallecitos Water District  
Kaiser Permanente Hospital, S.M. Water & Sewer Study  
**Existing Sewer Facilities in  
Study Area**  
March 2020  
**Figure 3**




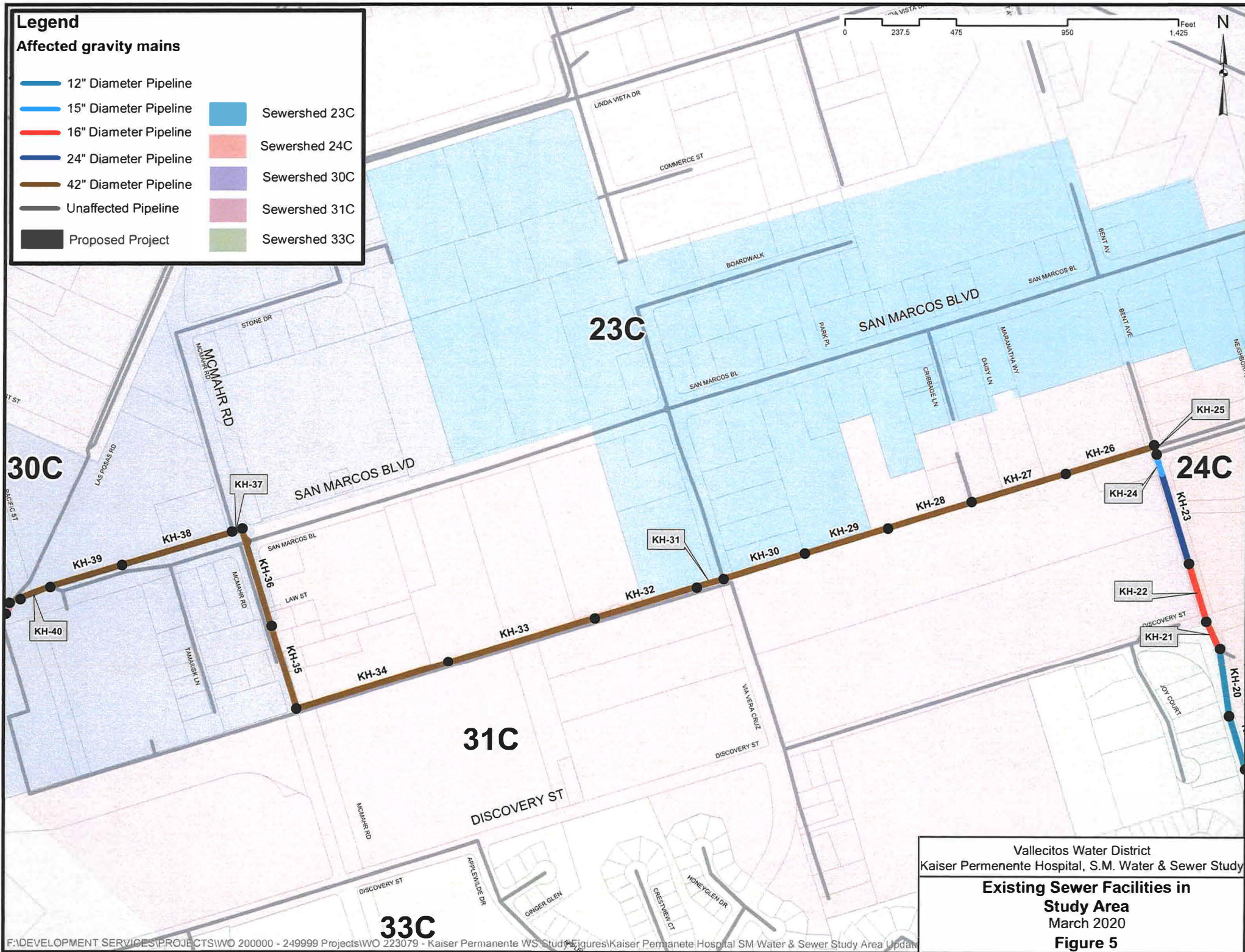




## Legend

### Affected gravity mains

	12" Diameter Pipeline		Sewershed 23C
	15" Diameter Pipeline		Sewershed 24C
	16" Diameter Pipeline		Sewershed 30C
	24" Diameter Pipeline		Sewershed 31C
	42" Diameter Pipeline		Sewershed 33C
	Unaffected Pipeline		
	Proposed Project		



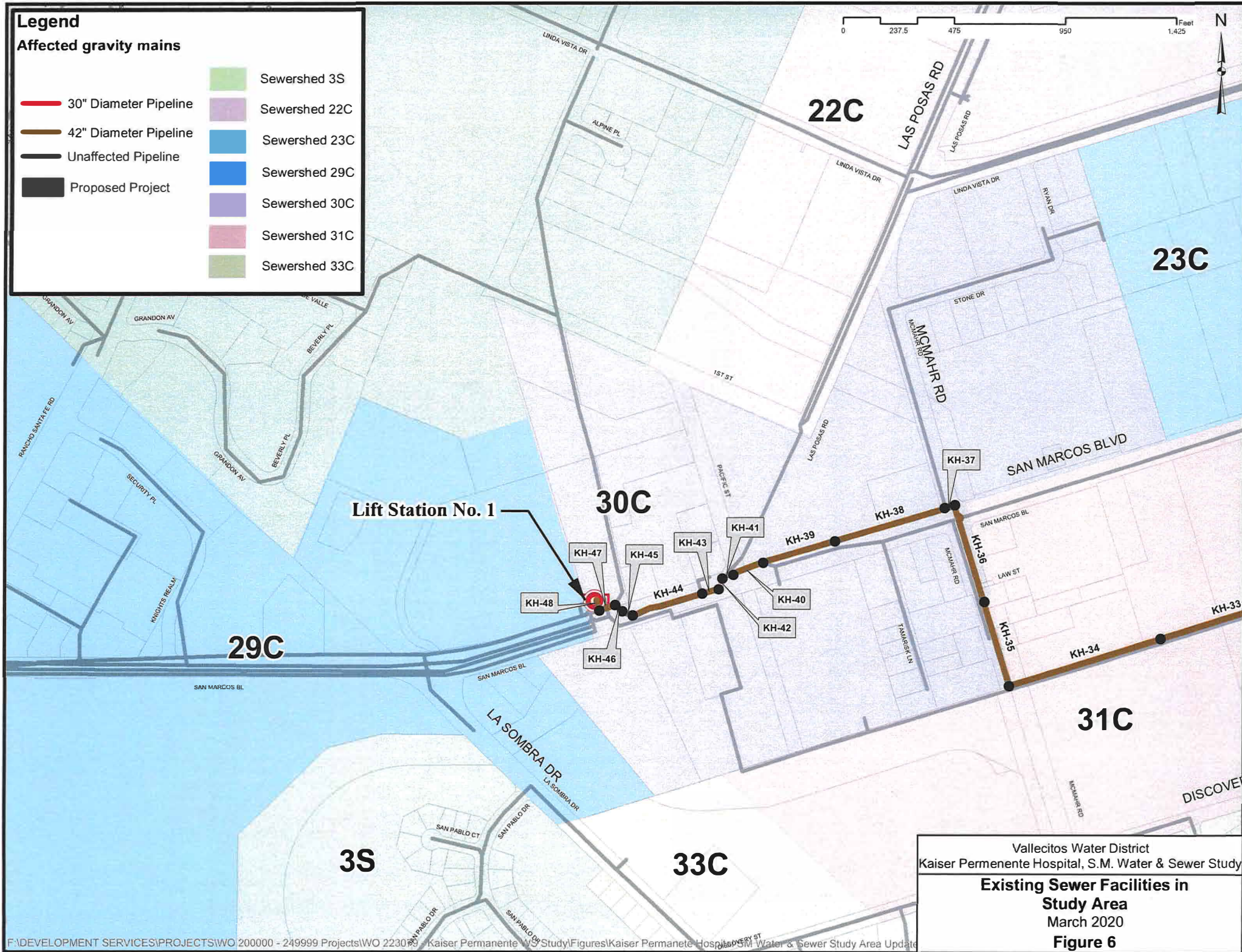
Vallecitos Water District  
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**Existing Sewer Facilities in  
Study Area**  
March 2020  
**Figure 5**



# Legend

## Affected gravity mains

- |  |                       |   |               |
|--|-----------------------|---|---------------|
|  | 30" Diameter Pipeline |  | Sewershed 3S  |
|  | 42" Diameter Pipeline |  | Sewershed 22C |
|  | Unaffected Pipeline   |  | Sewershed 23C |
|  | Proposed Project      |  | Sewershed 29C |
|  |                       |  | Sewershed 30C |
|  |                       |  | Sewershed 31C |
|  |                       |  | Sewershed 33C |



Vallecitos Water District  
Kaiser Permanente Hospital, S.M. Water & Sewer Study  
**Existing Sewer Facilities in  
Study Area**  
March 2020  
**Figure 6**

### ***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 Project flows (see Figures 3 through 6).

The modeling results show that with the addition of the proposed project, there are system deficiencies in pipeline segments (KH-8) under peak wet weather flows during ultimate build-out conditions as shown in Table 4.

The following improvements are required to mitigate these deficiencies:

- Upsize approximately 339 feet of existing 8-inch diameter sewer main in Craven Road to 10-inch diameter sewer main (KH-8).



**Table 4 - 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-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio
KH-1	220	8	0.004	0	0.00			62	0.29		
KH-2	220	8	0.004	0	0.00			62	0.29		
KH-3	224	8	0.054	1	0.03			63	0.16		
KH-4	104	8	0.017	25	0.13			87	0.24		
KH-5	16	8	0.025	27	0.13			89	0.22		
KH-6	322	8	0.032	88	0.21			150	0.27		
KH-7	220	8	0.011	90	0.27			152	0.36		
KH-8	339	8	0.008	210	0.46			272	0.54	10	0.39
KH-9	109	12	0.011	211	0.24			273	0.28		
KH-10	407	12	0.009	211	0.26			273	0.29		
KH-11	222	12	0.007	402	0.38			464	0.41		
KH-12	193	12	0.009	402	0.36			464	0.38		
KH-13	145	12	0.007	402	0.38			464	0.41		
KH-14	263	12	0.01	404	0.35			466	0.37		
KH-15	245	12	0.041	432	0.25			494	0.27		
KH-16	115	12	0.041	432	0.25			494	0.27		
KH-17	102	12	0.041	432	0.25			494	0.27		
KH-18	145	12	0.068	432	0.22			494	0.24		
KH-19	239	12	0.072	434	0.22			496	0.23		
KH-20	289	12	0.005	436	0.44			498	0.47		



**Table 4 - 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-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio
KH-21	151	16	0.005	438	0.29			500	0.31		
KH-22	265	16	0.005	440	0.29			502	0.31		
KH-23	400	24	0.004	451	0.18			513	0.20		
KH-24	92	15	0.013	451	0.25			513	0.27		
KH-25	10	15	0.027	451	0.21			513	0.23		
KH-26	404	42	0.006	9,754	0.36			9,816	0.37		
KH-27	404	42	0.006	9,756	0.36			9,818	0.37		
KH-28	368	42	0.003	9,761	0.44			9,823	0.44		
KH-29	368	42	0.003	9,763	0.44			9,825	0.44		
KH-30	368	42	0.003	9,765	0.44			9,827	0.44		
KH-31	120	42	0.002	9,790	0.50			9,852	0.50		
KH-32	457	42	0.004	9,793	0.41			9,855	0.41		
KH-33	650	42	0.004	9,797	0.41			9,859	0.41		
KH-34	677	42	0.004	9,802	0.41			9,864	0.41		
KH-35	373	42	0.004	9,808	0.41			9,870	0.41		
KH-36	420	42	0.004	9,812	0.41			9,874	0.41		
KH-37	20	42	0.001	9,814	0.61			9,876	0.62		
KH-38	486	42	0.004	9,839	0.41			9,901	0.41		
KH-39	500	42	0.004	9,842	0.41			9,904	0.41		
KH-40	156	42	0.004	10,311	0.42			10,373	0.42		

**Table 4 - 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-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio
KH-41	20	42	0.006	10,313	0.38			10,375	0.38		
KH-42	15	42	0.014	14,017	0.35			14,079	0.36		
KH-43	138	42	0.053	14,019	0.25			14,081	0.25		
KH-44	347	42	0.003	14,028	0.54			14,090	0.55		
KH-45	18	42	0.0018	14,030	0.64			14,092	0.64		
KH-46	10	42	0.006	14,032	0.45			14,094	0.45		
KH-47	10	42	0.03	14,224	0.29			14,286	0.29		
KH-48	73	42	0.1	14,802	0.22			14,864	0.22		

### ***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 7. 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 5 below:

**Table 5 – 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
<b>Totals</b>	<b>100.00%</b>	<b>20.85</b>

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 26,572 gallons per day of additional average wastewater flow that was not accounted for in the Land Outfall's capacity studied in the 2018 Master Plan.

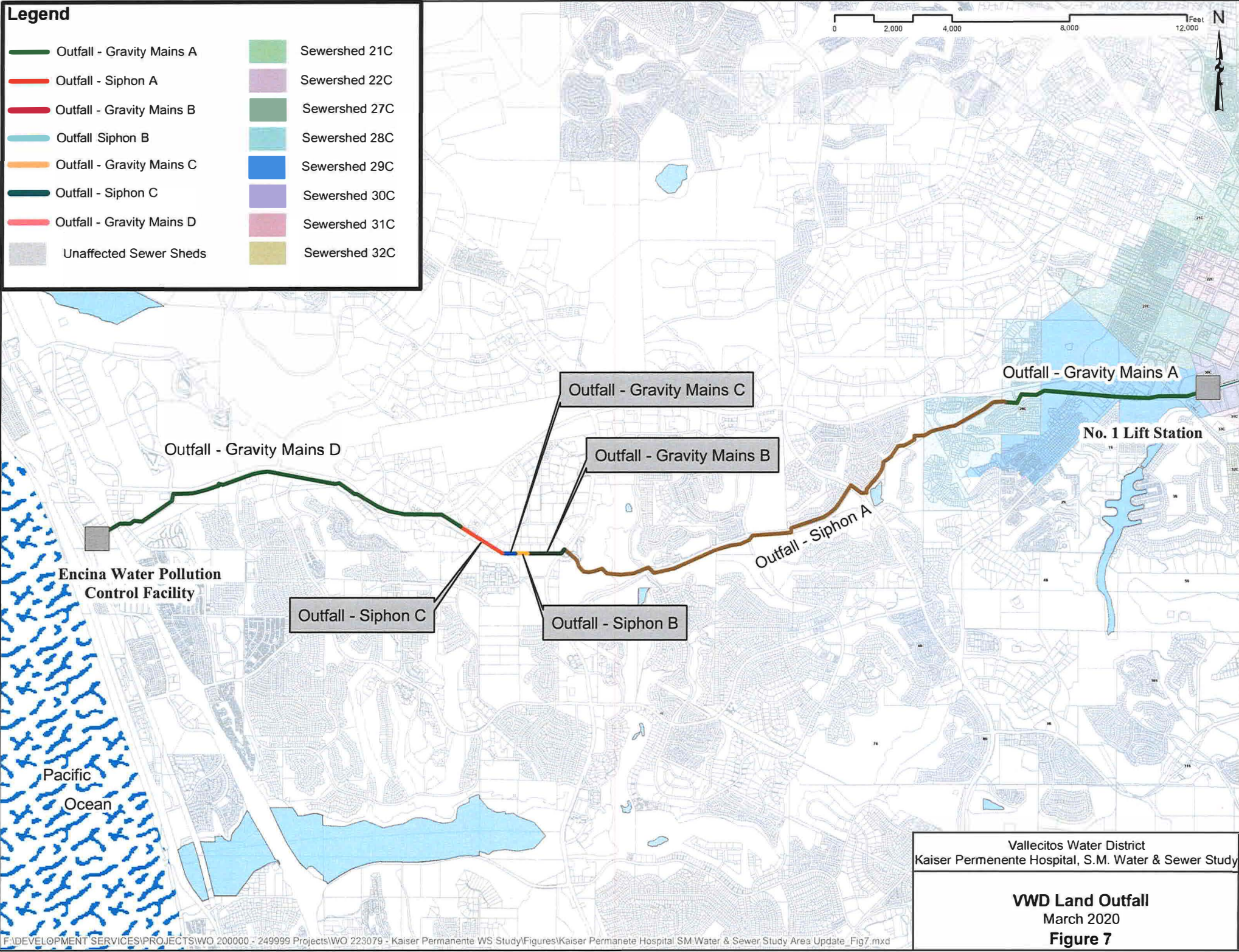
The analysis finds that outfall capacity is currently available to serve the Project's proposed wastewater generation. Wastewater Capital Facility Fees paid by this Project will be used toward design and construction of a parallel land outfall to be sized to accommodate ultimate build-out wastewater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



Vallecitos Water District  
Kaiser Permanente Hospital, S.M. Water & Sewer Study

**VWD Land Outfall**  
March 2020  
**Figure 7**



### ***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.

#### **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.

#### **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.

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 Project is expected to increase average daily water demands over the ultimate demands projected in the 2018 Master Plan. The Project is also expected to increase wastewater flow over ultimate flows projected in the 2018 Master Plan.

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

- An increase of 178,950 gallons of potable water storage requirement.
- An increase of 26,572 gallons per day in solids handling, liquids handling and ocean disposal capacity requirements at the Encina Water Pollution Control Facility.
- An increase of 26,572 gallons per day in the parallel land outfall's capacity requirement.

The following items are required as conditions of 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 acceptance of all on-site water and sewer facilities prior to service.
- Obtain an industrial waste discharge permit from the Encina Wastewater Authority.

Prior to additional flows being allowed to enter the sewer system, the pipelines below are identified as deficient.

- Upsize approximately 339 feet of existing 8-inch diameter sewer main in Craven Road to 10-inch diameter sewer main (KH-8).

The District currently has water and sewer capacity available to serve the Project as proposed. 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.