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SEWER SYSTEM ANALYSIS FOR THE OCEAN BREEZE RANCH PROJECT

December 7, 2018

**SEWER SYSTEM ANALYSIS
FOR THE
OCEAN BREEZE RANCH PROJECT**

December 7, 2018



**Prepared by:
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Job No. 1007-001

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December 7, 2018

1007-001

Ocean Breeze Ranch, LLC
1550 South Coast Highway, Suite 201
Laguna Beach, CA 92651

Attention: Jim Conrad, Project Manager

Subject: Sewer System Analysis for the Ocean Breeze Ranch Project in the Rainbow
Municipal Water District

Introduction

This report provides an analysis of the proposed sewer system for the Ocean Breeze Ranch (formerly Vessels Ranch) project. Specifically, this report will estimate sewer flows and identify existing and proposed sewer facilities that will serve the project. The Ocean Breeze Ranch project is a single family residential community located in the unincorporated community of Bonsall, California, approximately 40 miles north of downtown San Diego. The project is located south of Pala Road (Highway 76), west of Interstate 15, and north of West Lilac Road. The Ocean Breeze Ranch project proposes the development of 398 single-family residential units, including estate lots/parcels and an equestrian lot. There are existing equestrian and agricultural uses on the property. Table 1 provides a land use summary for the project.

TABLE 1 OCEAN BREEZE RANCH LAND USE SUMMARY		
Description	Area, Ac.	Units
Planning Area 1	67.7	144
Planning Area 2	66.5	237
Planning Area 3	130.7	14
School Sale Parcel	32.2	1
Hillside Estate Parcel	22.0	1
Equestrian Lot	203.2`	
Open Space/Circulation	880.2	---
TOTAL	1,402.5	398

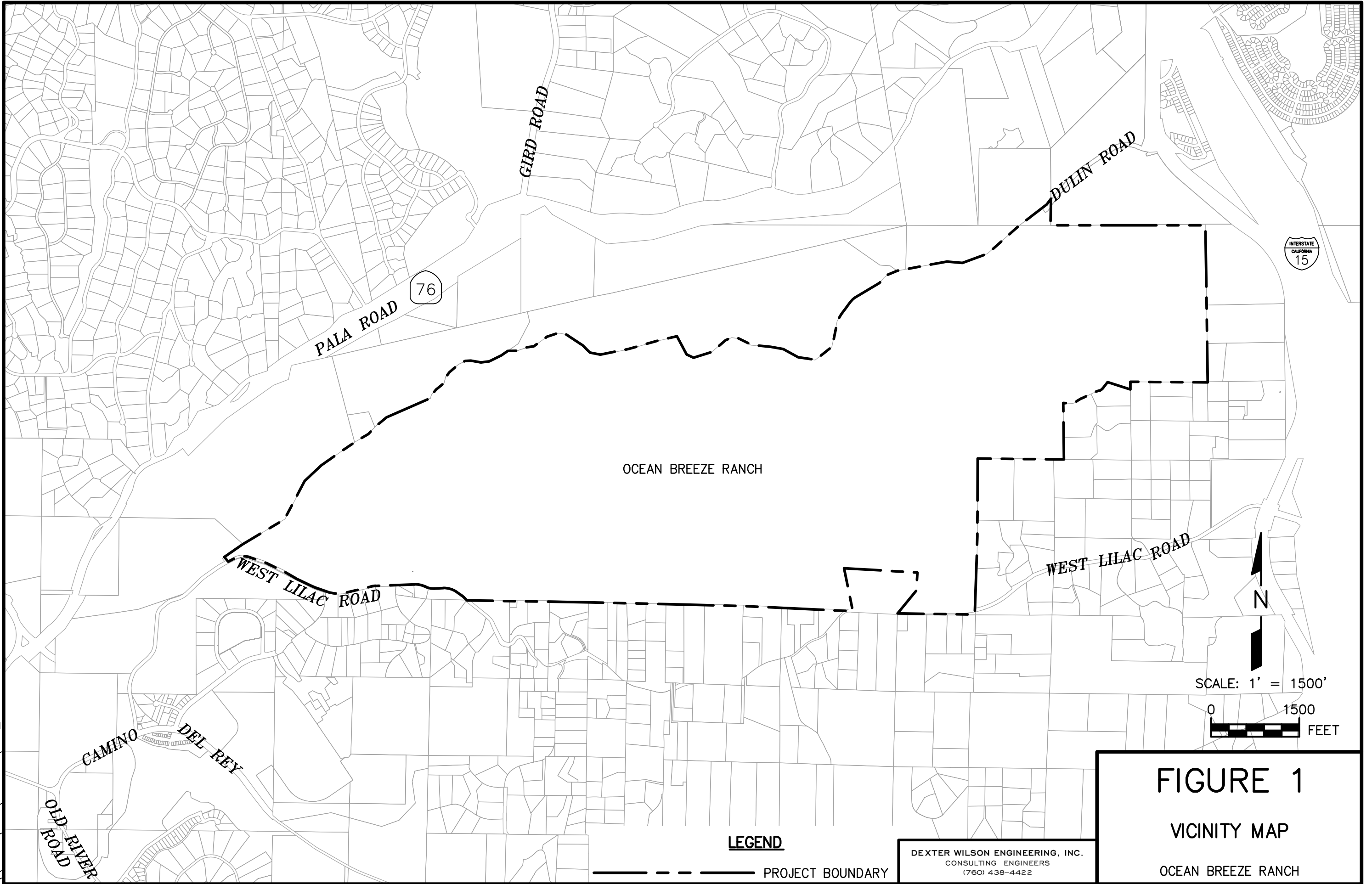
Primary access to the development will be from West Lilac Road, but a connection to Dulin Road to the northeast will also be required to serve the last phase of the project. Figure 1 presents a vicinity map for the project.

Sewer Service

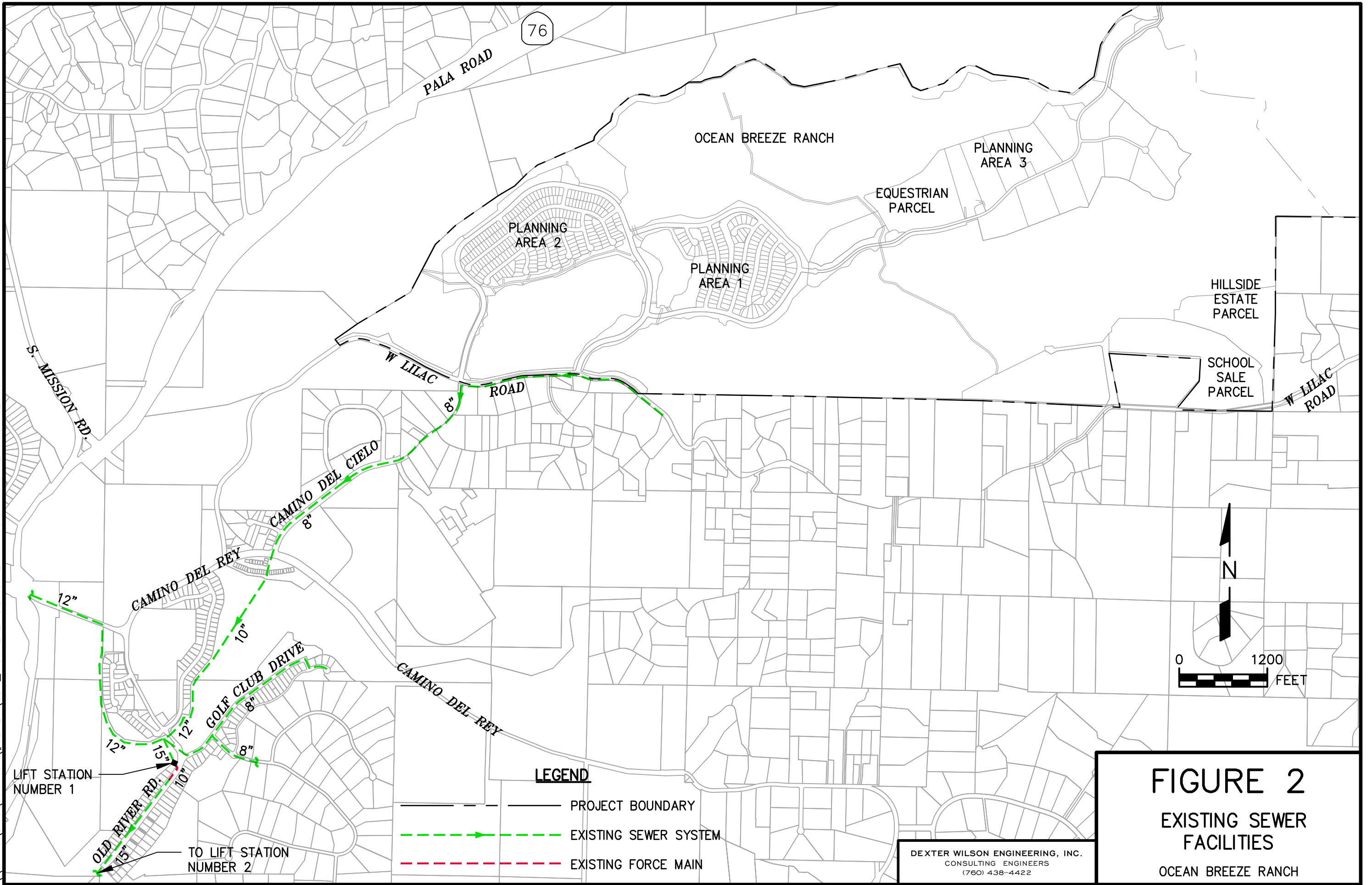
The Ocean Breeze Ranch development is located within the community of Bonsall whose sewer service is provided by the Rainbow Municipal Water District. The project area is adjacent to an existing gravity sewer line in West Lilac Road.

This 8-inch sewer line conveys flow westerly in West Lilac Road and then southwesterly in Camino Del Cielo to Camino Del Rey. From Camino Del Rey, the sewer line increases to 10-inch and is conveyed to just north of Old River Road where it increases to a 12-inch line. The sewer line then crosses Old River Road and combines flows with the trunk sewer line from the north, prior to entering Lift Station Number 1 located along the west side of Old River Road. Lift Station Number 1 pumps sewer to a gravity sewer line that conveys flows to Lift Station Number 2. Lift Station Number 2 conveys flows to the LS2 Outfall which conveys flows to a metered connection with the City of Oceanside. Figure 2 provides a map of existing sewer facilities in the vicinity of the project.

\\ARTIC\DWG\1007001\OBR_FIGURE 1.DWG 09-01-16 10:26:49 LAYOUT: LAYOUT



\\ARTIC\DWG\1007001\SEWER\OBR_FIGURE 2-S.DWG 12-06-18 11:40:34 LAYOUT: LAYOUT



Sewer System Design Criteria

Sewer system planning and design criteria are based on the July 2016 Domestic Water, Recycled Water and Sanitary Sewer Facilities Construction Standards for the Rainbow Municipal Water District. Sewer generation is based on an average projected flow of 250 gpd per Equivalent Dwelling Unit (EDU). For single family residential units, 2.58 bedrooms is equal to 1.0 EDU. At this preliminary planning level, a mix of three and four bedroom units has been assumed. Based on the design manual, applicable average annual sewer generation factors are summarized in Table 2. To convert average flows to peak design flows a factor of 3.0 was used.

TABLE 2 SEWER EDU AND FLOW FACTORS		
Land Use	EDU Factor	Average Sewer Flow
Single Family Residential (3 Bedrooms)	1.16	290 gpd/unit
Single Family Residential (4 Bedrooms)	1.55	387.5 gpd/unit

Gravity sewer pipelines are sized for a minimum velocity of 2.0 feet per second and a maximum velocity of 10 feet per second at design flows. Gravity sewers 12-inch in diameter and less are designed for a maximum depth-to-diameter (d/D) ratio of 0.50. Gravity sewer lines greater than 12-inch shall be designed for a maximum d/D ratio of 0.67.

Sewer force mains shall be 4-inches in diameter minimum and shall be generally designed for a minimum velocity of 3.0 feet per second and a maximum velocity of 8.0 feet per second. When possible, force main retention times should be limited to a maximum of 6.0 hours.

Sewer lift stations shall be avoided when possible, but when required shall comply with the RMWD July 2016 Standards, including the following:

- A minimum of two pumps shall be provided (one duty, one standby) with each pump capable of pumping peak incoming flows.

- Lift stations require backup power.
- Overflow storage equal to a minimum of 6 hours of wet weather flow shall be provided.
- Lift stations shall include dual interconnected wet wells with a minimum of 1 pump in each wet well.
- Stations shall have a telemetry system to convey status and alarm signals to the District.

A lift station basis of design report will need to be submitted prior to proceeding with design plans and specifications.

Projected Sewer Flows

Based on the sewer flow factors presented in Table 2, the estimated average sewer flow for the project is provided in Table 3. The average daily sewer flow for the Ocean Breeze Ranch project is 135,255 gpd. The resulting projected peak design flow is 405,765 gpd.

TABLE 3 OCEAN BREEZE RANCH PROJECTED SEWER FLOWS			
Description	Quantity	Sewer Flow Factor	Average Sewer Flow, gpd
Planning Area 1			
Residential (3 Bedroom)	48 units	290 gpd/unit	13,920
Residential (4 Bedroom)	96 units	387.5 gpd/unit	37,200
Planning Area 2			
Residential (3 Bedroom)	79 units	290 gpd/unit	22,910
Residential (4 Bedroom)	158 units	387.5 gpd/unit	61,225
Planning Area 3			
Residential	14 units	0 ¹	0
Other			
School Sale Parcel	1 unit	0 ¹	0
Hillside Estate Parcel	1 unit	0 ¹	0
Equestrian Lot	1 unit	0 ¹	0
TOTAL			135,255

¹ These areas are proposed to be served by septic systems.

Hydraulic Analysis

The onsite public sewer system for the Ocean Breeze Ranch project is being sized in accordance with RMWD Standards. To evaluate sewer line sizing, a computer hydraulic analysis was performed. Sewer line slopes were estimated and should be verified during final design.

Appendix A presents the hydraulic analysis results for the Ocean Breeze Ranch project and Exhibit A provides the corresponding node and pipe diagram.

Onsite Sewer System

The proposed sewer system layout for the Ocean Breeze Ranch project is provided as Figure 3. The onsite public sewer system for Ocean Breeze Ranch will consist of 8-inch gravity sewer lines to convey flow to the existing 8-inch sewer line in West Lilac Road. The majority of the project will not flow by gravity to West Lilac Road and requires a small sewer lift station and 6-inch force main to convey flows to the gravity sewer system.

The estate lots in Planning Area 3 of the project, the school sale parcel, hillside estate parcel, and the equestrian lot are to be served by septic systems. The equestrian site already has an existing septic system that will remain, but new estate lots will require new septic systems.

The projected peak design flow to the onsite sewer lift station is 405,765 gpd (283 gpm). The recommended lift station firm pumping capacity is 300 gpm and this will need to be confirmed during the basis of design report once the development plan and bedroom counts have been finalized. A 6-inch force main is recommended to convey flow from the station and would have a velocity of 3.4 feet per second at design flows.

To avoid a sewer lift station in Planning Area 1, a gravity sewer with a maximum depth of approximately 23 feet is proposed. There are also deep sections of gravity sewer in Planning Area 2 that are necessary to get flow by gravity to the proposed lift station at the western boundary of the project. Where gravity sewer lines are deeper than approximately 18 feet adjacent to proposed residential lots, a shallower parallel gravity sewer is recommended adjacent to the lots. The shallower gravity sewer will have the lateral connections from each lot and will parallel the deeper sewer and connect to it where there are no more service connections, or the depth has been reduced.

PALA ROAD

76

Diagram illustrating a proposed parallel sewer line and a lift station. The text indicates: "PARALLEL SEWER PROPOSED DUE TO DEPTH OF SEWER, TYP." and "LIFT STATION". The diagram shows a sewer line running parallel to a street, with a lift station located near the intersection.

W LILAC

ROAD

CONNECT TO EXISTING
SEWER SYSTEM

LEGEND

-
- PROJECT BOUNDARY
- EXISTING GRAVITY SEWER
- PROPOSED GRAVITY SEWER
- PROPOSED SEWER FORCE MAIN

NOTE: ALL PIPES ARE RECOMMENDED AS 8-INCH UNLESS OTHERWISE NOTED

FIGURE 3

PROPOSED SEWER SYSTEM

OCEAN BREEZE RANCH

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In cul-de-sacs where only a few units are connected to a sewer line, the minimum desired velocity of 2.0 feet per second is not achievable due to the low flows. In these areas, a minimum sewer slope of 1.0% is recommended. Where the backbone sewer line leaves Planning Area 1, a sewer line slope of 0.40% is recommended to keep the sewer line from being deeper than the 23 feet maximum that is already proposed. The alternative to this flatter section of gravity sewer would be gravity sewer depths of up to 30 feet or the need for a second sewer lift station.

Due to the proposed street widths and number of utilities required, RMWD will need to review and approve the street cross section for utility spacing prior to final engineering for the project. Where dual sewer lines are required, it is anticipated that a separation of 8.0 feet to 10 feet between sewer lines can be provided and the separation from curb to water line may need to be reduced slightly to achieve the required utility separations. Appendix B provides an exhibit showing the anticipated sewer depths and utility cross sections for the project.

Offsite Sewer System

The 2016 RMWD Master Plan identifies regional system deficiencies in Lift Station Number 1 and conveyance systems just upstream of Lift Station Number 1 and downstream of Lift Station Number 1 and 2. These improvements are identified as Capital Improvement Program (CIP) projects and will be funded by all future development through the payment of fees.

The existing 8-inch through 12-inch gravity sewer lines from West Lilac Road to the last reach of gravity sewer upstream of Lift Station Number 1 are shown to be adequate under existing and future development conditions in the RMWD 2016 Master Plan. For the future development condition, the RMWD Master Plan assumed an average flow of 0.08 mgd from the Vessels (now Ocean Breeze Ranch) project. The current projection for the project is 0.14 mgd per Table 3 of this report. RMWD will need to confirm that this increase in flow does not trigger any new impacts.

Conclusion and Recommendations

The following conclusions and recommendations are summarized based on the sewer system analysis prepared for the Ocean Breeze Ranch subdivision.

1. The Ocean Breeze Ranch subdivision will be served by the Rainbow Municipal Water District. There are existing gravity sewer lines in West Lilac Road and downstream of the project.
2. The equestrian site is proposed to remain as septic and the proposed estate lots are recommended to be served by septic systems. The remainder of the project is proposed to be served by constructing a public onsite sewer system to convey flows to the existing gravity sewer in West Lilac Road.
3. To convey flows to the existing system in West Lilac Road, an onsite sewer lift station is proposed. This lift station will need to be designed to RMWD standards and a basis of design report will need to be prepared prior to proceeding with design plans.
4. There are areas of the project where gravity sewer line depths of up to 23 feet are proposed. Sewer line slopes have been reduced to minimize the sewer line depths to the extent possible, but these depths are required based on project grading and to avoid the need for a second onsite sewer lift station.

Please feel free to contact us if you have any question or require additional information.

Dexter Wilson Engineering, Inc.

Stephen M. Nielsen

Stephen M. Nielsen, P.E.

SMN:pjs

Attachments



APPENDIX A

HYDRAULIC ANALYSIS

DATE: 12/6/2018

SEWER STUDY SUMMARY

FOR: Ocean Breeze Ranch

SHT 1 OF 1

JOB NUMBER: 1007-001

BY: Dexter Wilson Engineering, Inc.

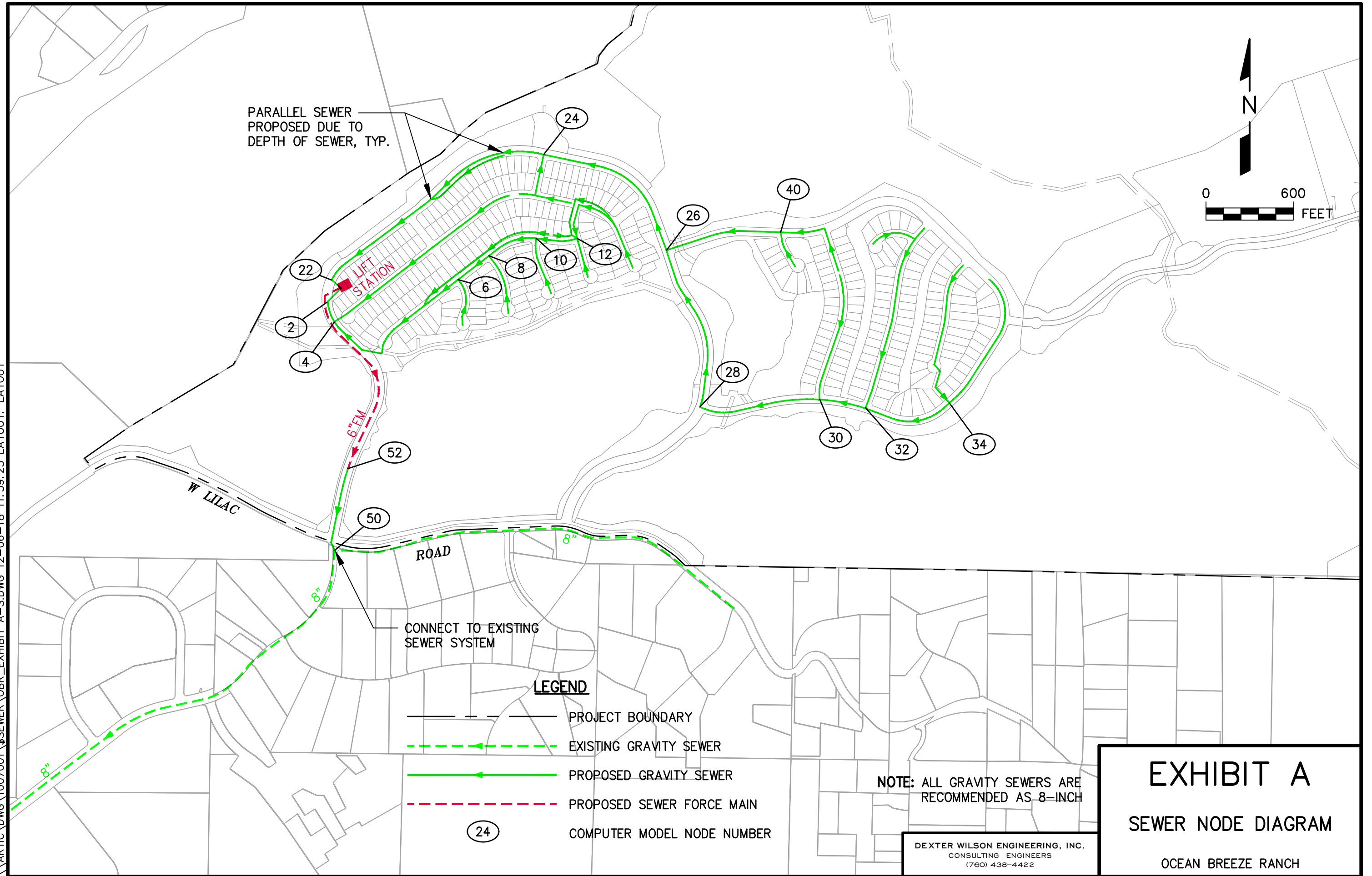
REFER TO PLAN SHEET: _____

[illegible]

1 K' based on $n = 0.013$

2 dn/D using K' in Brater King Table 7-14

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APPENDIX B

PRELIMINARY SEWER SYSTEM EXHIBIT

