APPENDIX M

Sewer System Analysis

SEWER SYSTEM ANALYSIS
FOR THE
AGUA HEDIONDA SOUTH SHORE SPECIFIC PLAN
FOR 85% OPEN SPACE AND 15% RETAIL

May 7, 2015

Prepared for:
Dudek
605 Third Street
Encinitas, CA 92024

And

Caruso Acquisition Co. II, LLC
701 Palomar Airport Road, Suite 130
Carlsbad, CA 92011

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
760-438-4422

Job No. 539-005

DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
STEPHEN M. NIELSEN, P.E.
NATALIE J. FRASCHETTI, P.E.

May 7, 2015 539-005

Dudek & Associates
605 Third Street
Encinitas, CA 92024

Attention: Carey Fernandes, Principal

Subject: Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail Sewer System Analysis

This letter-report summarizes our findings and recommendations for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail (Specific Plan).

Specific Plan Overview

The Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail (Agua Hedionda 85/15 Specific Plan or Specific Plan) is comprised of approximately 203.4 acres of land between the south shore of the Agua Hedionda Lagoon and Cannon Road in the City of Carlsbad, California. The Specific Plan will permanently protect and conserve approximately 176.7 acres for open space, the continuation of strawberry farming and coastal agricultural (more than 85% of the Specific Plan area), and will reserve approximately 26.7 acres (less than 15% of the Specific Plan area) for a new pedestrian-friendly visitor serving outdoor retail, shopping, dining and entertainment promenade, at no tax burden to the residents of Carlsbad. The Specific Plan requires that the open space lands be improved with low impact public access by providing passive recreation amenities

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including miles of new nature trails and walkways, picnic and rest areas, lagoon vistas, an outdoor classroom, parking and an integrated resource and educational signage program. The Outdoor Shopping, Dining and Entertainment Promenade, together with supporting uses including a farm-to-table restaurant and farm stand will provide for a total of approximately 585,000 square feet of visitor serving uses within the Specific Plan. The implementation of the Specific Plan is anticipated to occur between 2017 and 2019. This report has been prepared consistent with the Specific Plan.

Specific Plan Area Location

The Specific Plan area is located in Carlsbad, in northwest San Diego County, California. The City occupies about 39 square miles of beaches, bluffs, lagoons, rolling hills, and other land along the northern coast of San Diego County, and is situated about 30 miles north of the San Diego metropolitan area. In addition to the Pacific Ocean coastline along its western boundary, existing communities surrounding Carlsbad include the city of Oceanside to the north, the city of Encinitas to the south, and the cities of Vista and San Marcos and unincorporated areas of San Diego County to the east.

Three coastal lagoons help define the City's environs. Agua Hedionda Lagoon is centrally located in Carlsbad's coastal zone, and comprises approximately 230 acres of water surface and additional upland marsh and wetland areas. Buena Vista Lagoon is along the City's northern edge, acting as a boundary between Carlsbad and Oceanside. The Batiquitos Lagoon is situated along the City's southern edge, defining the boundary between Carlsbad and Encinitas.

The Specific Plan area is comprised of two separate parcels, identified as San Diego County's Assessor Parcel Numbers (APN) 211-010-024, and 211-010-031 (the portion north of Cannon Road). The Specific Plan area is regionally accessed by Interstate 5 (I-5) and locally accessed by Cannon Road. Figure 1 illustrates the Specific Plan area.

Planning Criteria

The Specific Plan area will receive sewer service from the City of Carlsbad. Planning criteria for the Specific Plan area is based on the City's Engineering Standards Volume 1 (2004) and the Carlsbad Sewer Master Plan (2012), and can be summarized as follows:

- Non-Residential Sewer Generation Factor – 800 gallons per day (gpd)/10,000 SF of building area.
- Factor to Convert Average Flow to Peak Flow – 2.5.
- Minimum Gravity Sewer Size – 8-inch.
- Minimum Gravity Sewer Slope – 0.40% (8-inch pipe).
- Minimum Gravity Sewer Velocity – 2.0 Fps
- Minimum Gravity Sewer Velocity – 10.0 Fps
- Gravity Sewer Lines are Sized for Peak Flow.
- Maximum Depth to Diameter (d/D) Ratio for Sewers 12-inch and Smaller is 0.50.

Facilities constructed for the Specific Plan area must also comply with the Coastal Act and the Agua Hedionda Land Use Plan.

Projected Sewer Flows

Table 1 summarizes the projected sewer flows for the Specific Plan area using the Specific Plan's land use section and the planning criteria above. The projected average flow is 47,300 gpd. The projected peak flow is 118,250 gpd.

TABLE 1 CANNON ROAD SPECIFIC PLAN PROJECTED SEWER FLOWS			
Description	**Quantity**	**Generation Factor**	**Average Sewer Flow, gpd**
Visitor-Serving Commercial/Open Space			
Various Commercial	585,000 SF[1]	800 gpd/10,000 SF	46,800
Subtotal	**585,000 SF**		**46,800**
Open Space/Agricultural			
Habitat Management Plan Open Space Lands (HMP- OS)	75.8 ac	0	0
Passive Open Space (P-OS)	33.5 ac	0	0
Exclusive Agricultural Open Space (EAG-OS)	45.6	0	0
Agricultural Support Open Space (AGS-OS)	15.9	0	0
Restroom (Public)	1	---	500[3]
Subtotal			**500**
TOTAL			**47,300**

[1] SF – Square Feet
[2] AGS-
[3] Estimate based on 125 visitors per day and a unit flow of 4 gpd/visitor.

Existing System

The City's Sewer Service Area consists of the majority of the City's developed area. The sewer system consists of gravity sewer lines, interceptor sewers, collector sewers, lift stations, force mains, and wastewater treatment and disposal facilities. Six interceptors exist in the system, including the South Agua Hedionda (SAH) Interceptor located in Cannon Road, adjacent to the Specific Plan area.

The SAH Interceptor conveys only City flows. The SAH interceptor originates east of El Camino Real and conveys flows to the Cannon Road Lift Station. This lift station conveys flow through a 14-inch force main to the interceptor's downstream gravity section. The

interceptor's downstream section ranges from 15-inches to 24-inches where it fronts the Specific Plan area, continues west across Interstate 5, and terminates with a connection to the Vista/Carlsbad Interceptor. The Vista/Carlsbad Interceptor conveys flow south to the Encina Wastewater Authority for treatment and disposal. Figure 2 provides the location of existing sewer facilities surrounding the Specific Plan area.

Proposed Facilities

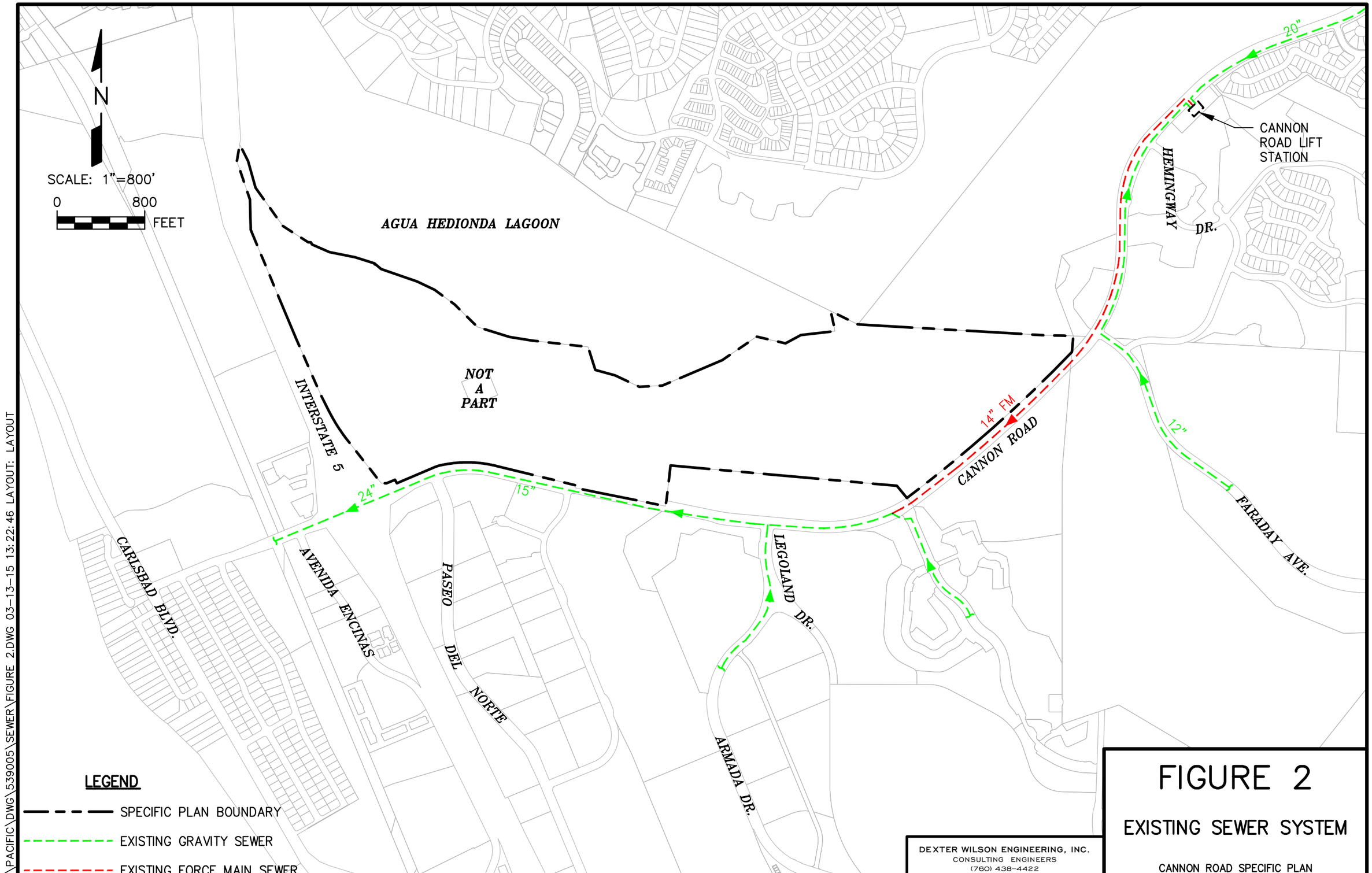
The Carlsbad Sewer Master Plan (2012) was based on build-out land use projections from the City's Growth Management Plan to ensure the provision of adequate facilities for future development. Implementing the Growth Management Plan involved preparing Local Facility Management Plans (LFMPs) for the City's 25 sub-areas or zones. The LFMPs organize and summarize growth data for the City's 25 zones.

The Specific Plan area is located in Local Facility Management Plan (LFMP) 13, which also includes areas south of Cannon Road. Future development within LFMP 13 includes commercial and industrial uses with no projected residential development. The Zone 13 LFMP analyzes both wastewater treatment and sewer collection facilities to accommodate projected build-out development and a summary of key findings from this plan is as follows:

- Wastewater treatment facilities are evaluated on a citywide basis and are mitigated through the payment of sewer connection fees.

- Wastewater collection facilities meet the adopted performance standard with mitigation through build-out. The only identified mitigation improvements are to the sewer line in Cannon Road and these improvements have already been completed.

- The proposed commercial development area is identified as "TR-1" in the LFMP and has a projected development area of 35.5 acres with 463,653 square feet of building space. This compares to the current Specific Plan which proposes 24.8 acres of development and 585,000 square feet of building space.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FEET
AGUA HEDIONDA LAGOON
NOT A PART
INTERSTATE 5
CARLSBAD BLVD.
AVENIDA ENCINAS
PASEO DEL NORTE
LEGOLAND DR.
ARMADA DR.
CANNON ROAD
HEMINGWAY DR.
FARADAY AVE.
CANNON ROAD LIFT STATION
24"
15"
14" FM
20"
12"
LEGEND
SPECIFIC PLAN BOUNDARY
EXISTING GRAVITY SEWER
EXISTING FORCE MAIN SEWER
DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422
FIGURE 2
EXISTING SEWER SYSTEM
CANNON ROAD SPECIFIC PLAN
\\PACIFIC\DWG\539005\SEWER\FIGURE 2.DWG 03-13-15 13:22:46 LAYOUT: LAYOUT

- A total of 170 equivalent dwelling units (EDUs) are projected in the LFMP from TR-1 which equates to a sewer flow of 37,400 gpd. This compares to the current Specific Plan flow projection of 47,300 gpd (See Table 1). The net proposed average flow increase is 9,900 gpd.

The City's zoning map and proposed general plan update (GPU) also direct future development for the Specific Plan area. According to the zoning map and proposed GPU, the Specific Plan area is designated as visitor-commercial (VC) in the west and open space (OS) in the east.

Based on the above discussion, we have determined that the visitor-commercial portion of the Specific Plan area was included in the build-out projections for the Sewer Master Plan. The Sewer Master Plan concludes that the SAH Interceptor is sized to accommodate build-out, including the additional development within the Specific Plan area. The incremental flow increase of 9,900 gpd for the Specific Plan area is deemed less than significant since this flow represents less than 5.0 percent of the total average flow projected for LFMP 13 and less than 0.5 percent of the average flow capacity of the SAH Interceptor at the point of connection. Therefore, no upgrades to the existing system are recommended as a result of the Specific Plan project.

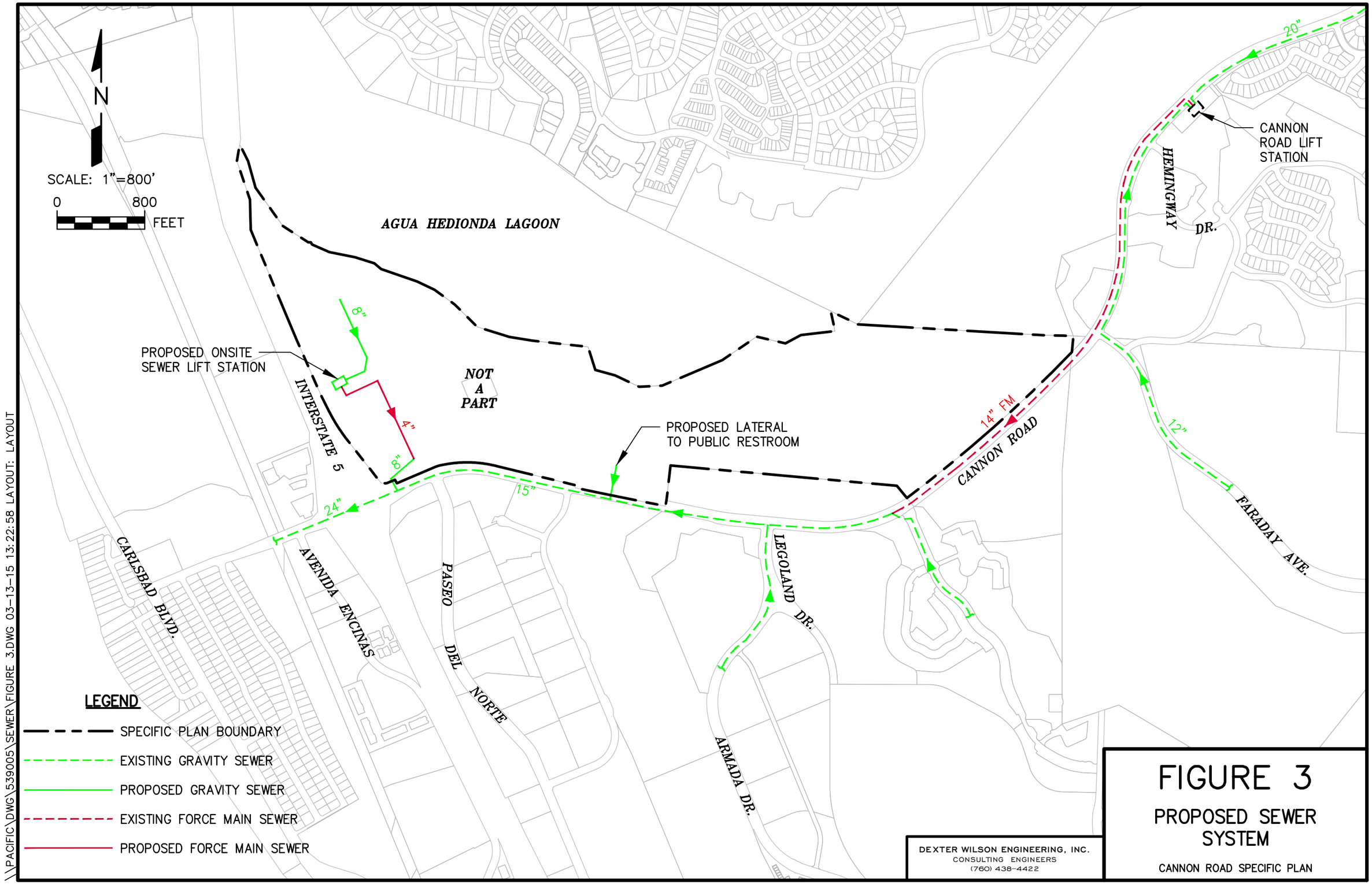
The Specific Plan area's portion generally drains from Cannon Road to the Agua Hedionda Lagoon. We propose constructing onsite gravity sewer lines to convey flow from this portion to an onsite lift station. The lift station will convey flow through a force main and connect into the SAH4 Interceptor in Cannon Road. Figure 3 depicts the proposed conceptual sewer service system plan.

Onsite Sewer Lift Station. The sewer lift station and force main will be designed to City standards. Key lift station features and requirements include:

- Lift station capacity is sized to convey peak wet weather flow.

- Lift stations with a minimum of two pumps, one as a duty and the other as a standby.

- An emergency generator providing station power in the event of a commercial power outage.



\\PACIFIC\DWG\539005\SEWER\FIGURE 3.DWG 03-13-15 13:22:58 LAYOUT: LAYOUT

- Lift station equipment/measures that mitigate noise and odors.
- Lift stations with telemetry to allow remote station monitoring.
- Lift stations constructed in a wet/dry pit arrangement unless the City Engineer approves an alternative.
- Force mains sized for a minimum 2.5 feet per second velocity to a maximum 8.0 feet per second velocity.
- Minimum 4-inch force main size.
- Lift stations to include adequate vactor truck access to the wet well and installation and removal of mechanical equipment access.

Peak projected flow for the Specific Plan area's VC portion is 117,000 gpd (commercial average flow of 46,800 gpd times peak factor of 2.5); as a result, the lift station must have a minimum capacity of 81 gpm. We recommend a minimum force main velocity of 3.0 feet per second in a 4-inch force main and this requires a recommended pump capacity of 120 gpm. A preliminary design report should be prepared for City's review and approval before starting final design drawings for the lift stations.

The purpose of the preliminary design report for the lift station will be to present equipment calculations, recommend equipment selections, demonstrate compliance with City design criteria, present preliminary site and mechanical layouts, and describe proposed station components and features. The preliminary design report is prepared for review and approval by the City of Carlsbad prior to the initiation of final engineering design plans and specifications.

Thank you for the opportunity to provide assistance. If you have any questions on the information contained herein, please let us know.

Dexter Wilson Engineering, Inc.

Stephen M. Nielsen

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