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SEWER STUDY
FOR THE OCEAN KAMP PROJECT
IN THE
CITY OF OCEANSIDE

July 1, 2021

2234 FARADAY AVENUE • CARLSBAD, CA • (760) 438-4422

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July 1, 2021

Prepared by:
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7-1-2021

Job No. 921-003

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July 1, 2021 921-003

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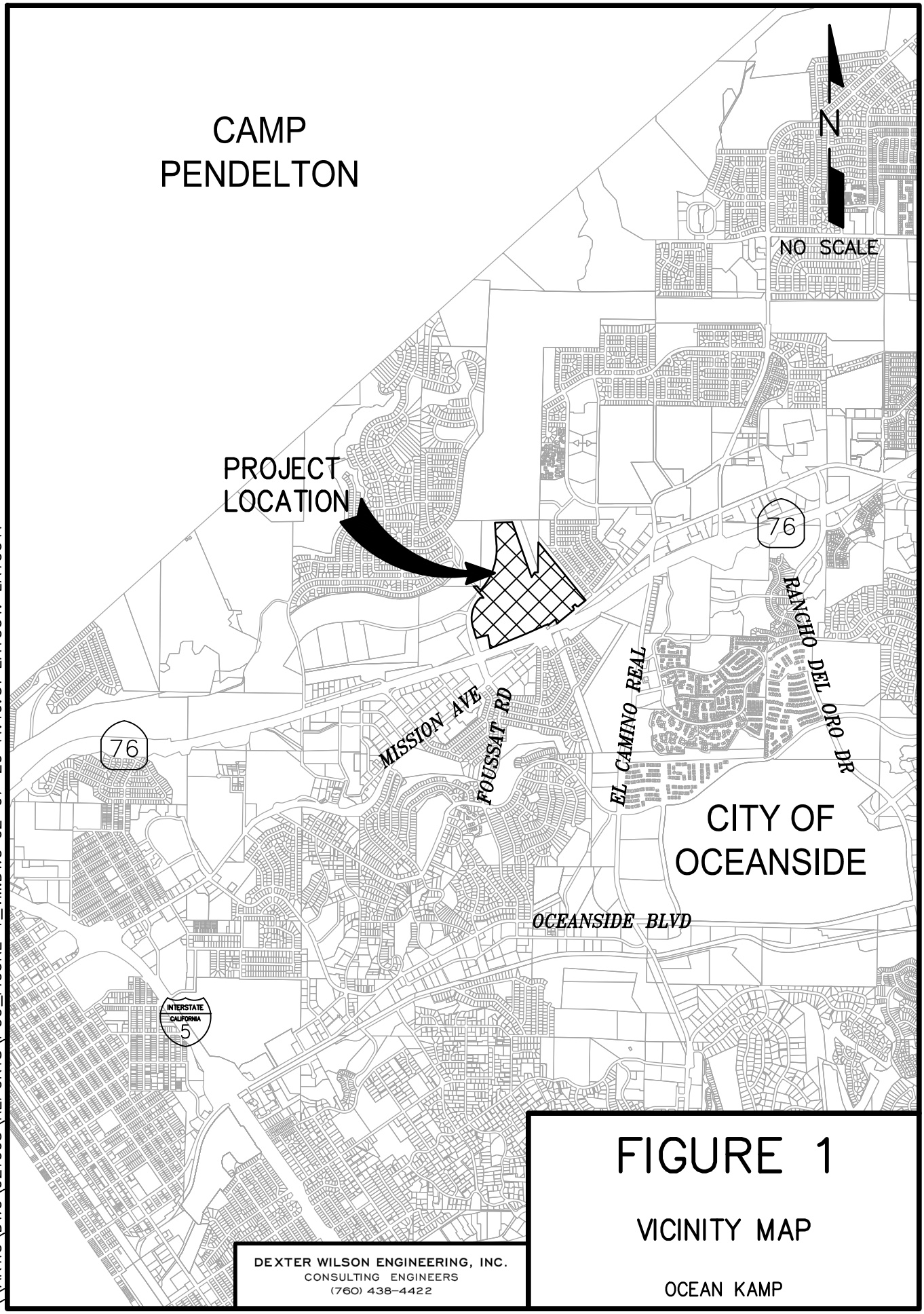
Attention: Michael Grehl, Vice President – Real Estate

Subject: Sewer Study for the Ocean Kamp Project in the City of Oceanside

Introduction

The Ocean Kamp project is located in the northern portion of the City of Oceanside. It is generally situated east of US Interstate 5 and west of El Camino Real. Specifically, it is bound by open space to the north, Mission Avenue and Highway 76 to the south, existing development on Fireside Street to the east, and Foussat Road and the San Luis Rey River to the west. See Figure 1 for the location of the project. Historically, the site has functioned as a drive-in movie theater and was until May of 2019 a meeting location for a weekly swap meet.

Features to note in proximity to the project are the two utility easements traversing the project. The larger of the two easements, in the eastern portion of the property, contains City of Oceanside water and sewer lines as well as San Diego Gas and Electric transmission lines. The easement in the western portion of the property is a prior alignment of Foussat Road (referred to as Old Foussat Road) and contains City water and sewer lines.



\\ARTIC\DWG\921003\REPORTS\PCO_FIGURE-1_VM.DWG 02-07-20 11:19:31 LAYOUT: LAYOUT1

FIGURE 1

VICINITY MAP

OCEAN KAMP

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Ocean Kamp Development Plan

The Ocean Kamp project proposes to construct a combination of resort and residential development. The central portion of the project consists of a 300-room hotel, a wave pool and associated amenities, and 126,000 square feet of commercial space. The residential component will include 700 multi-family residential dwelling units.

The project site is divided by the north-south SDG&E utility corridor within which are overhead power lines. The City of Oceanside has water, sewer, and recycled water utilities buried within this joint use easement. The west side of the project contains all the wave park facilities including the hotel and commercial/retail space and an estimated 400 residential dwelling units. The east side of the SDG&E corridor is planned to be developed with approximately 300 residential dwelling units.

Sewer service to the project will be provided by an on-site sewer system a portion of which will be public and the remainder will be private. The onsite sewer will connect to the City of Oceanside's public sewer system near the existing Mission Avenue Sewer Lift Station.

Purpose for the Sewer Study

The purpose of this report is to present an overview of the Ocean Kamp project's proposed sewer system including detailing the sewage flows generated by the project, identifying the connection point to the City of Oceanside's public sewer system, and evaluating the public system components which will convey these flows.

Also, the sewer study will discuss associated sewer improvements such as the relocation of the Mar Lado Sewer Lift Station force main and the upsizing of the Mission Avenue Trunk Sewer.

Sewer System Design Criteria

The design criteria used for the evaluation of the sewer system serving the Ocean Kamp project is based on Section 3 of the City of Oceanside Design and Construction Manual, revised August 2017. Based on this Manual, sewage generation is estimated based on land use; the flow generation factors in the Manual are consistent with the Wastewater Master Plan, October 2015, Table 3-3. The rates are presented in Table 1.

TABLE 1
SEWAGE GENERATION RATES

Land Use	Generation Rate
Low Density Residential	170 gpd/EDU
Mid Density Residential	140 gpd/EDU
Industrial	1,000 gpd/acre
Commercial	1,000 gpd/acre
Hotels	100 gpd/room

Land uses within Ocean Kamp are commercial, hotel, wave pool, and multi-family residential. The design guide covers all land uses but the wave pool. The sewage flow generated by the wave pool will be a portion of the daily filter backwash water which isnot able to be recycled back into the pool. The estimate of waste backwash water is 15,000 gallons per day average.

Peaking Factors. The peaking factor is identified in the City of Oceanside Design & Construction Manual. To convert average dry weather flows to peak wet weather flows, the peaking factors in Table 2 are used.

TABLE 2 PEAK FACTORS	
Population	**Peak Factor**
< 500	3.5
500-1,000	2.75
1,000-5,000	2.50
> 5,000	2.00

Manning's "n". The gravity sewer analyses are made using a computer spreadsheet which uses the Manning Equation for all of its calculations. The Manning's "n" used by the computer spreadsheet is held as a constant for all depths in a circular conduit. The value of Manning's "n" used for this study is 0.013.

Sewer Depth of Flow Criteria. Public sewer main design criteria include a maximum d/D criterion (depth to diameter ratio) of 0.5 for pipes 10-inch and smaller and a maximum d/D of 2/3 for pipes 12-inch and larger.

Flow Velocity Criteria. A minimum velocity of 2 feet per second (fps) must be achieved in the pipe at peak flow to avoid the deposition of solids. If 2 fps cannot be achieved, the minimum slope of the sewer must be 1.6 percent.

Projected Wastewater Flows

Table 3 below summarizes the wastewater flows to be generated by the Ocean Kamp project.

TABLE 3
OCEAN KAMP PROJECT WASTEWATER FLOWS

Land Use	Quantity	Generation Rate	Average Flow, gpd	Equivalent Population, persons	Peak Flow, gpd
Development West of SDG&E Easement					
Commercial	126,000 SF, 10.3 gross ac	1,000 gpd/ac	10,300	184	36,050
Hotel	300 rooms	100 gpd/room	30,000	536	82,500
Wave Pool	3.1 acres	--	15,000	268	52,500
Residential	420 units	140 gpd/unit	58,800	1,050	147,000
Subtotal West Side Average Flow			**114,100**	**2,038**	
Subtotal West Side Peak Flow		x 2.5	**285,250**		
Development East of SDG&E Easement					
Residential	280 units	140 gpd/unit	39,200	700	107,800
Subtotal East Side Average Flow			**39,200**	**700**	
Subtotal East Side Peak Flow		x 2.75	**107,800**		

Existing Sewer Facilities

Figure 2 shows the existing sewer facilities located within and around the Ocean Kamp development site. There are several sewage pipelines within the SDG&E easement; however, no grading or improvements are proposed by the Ocean Kamp project within the SDG&E easement so these existing sewer utilities will remain in place undisturbed.

Two other existing sewer facilities are of interest in reference to the Ocean Kamp project. First is the existing 8-inch Mar Lado Sewer Lift Station force main. It crosses the San Luis Rey River in Foussat Road and presently continues south in Old Foussat Road, crosses SR

76, and discharges into a 12-inch gravity sewer in Mission Avenue. From there the sewage flows east to the Mission Avenue Lift Station.

The second facility of interest is the existing 24-inch Mission Avenue Interceptor which flows from east to west and discharges into the 30-inch influent sewer line to the Mission Avenue Lift Station. The City has identified this interceptor sewer to be upsized to 30-inch diameter as part of Water Utilities Department's capital improvement program.

Proposed Onsite Sewer System Layout

Figure 3 shows the proposed onsite sewer system layout. Identified on Figure 3 are the proposed private and public sewer lines within the site. The onsite sewer will be public where it is providing service to the multi-family residential areas. This is because the residential areas are expected to be constructed by several home builders thus having separate ownerships. The City requires that separate ownerships are served by a public sewer.

West Side Onsite Sewer. The commercial component of the project in the northwest area of the Ocean Kamp site will be served by a private sewer until it reaches the south side of the project parallel to Mission Avenue. At this location the relocated Mar Lado Sewer Lift Station force main is proposed to connect into the gravity sewer which will require the gravity sewer to become a public facility. The Mar Lado Sewer Lift Station force main currently extends across the property in the old Foussat Road alignment. The force main will be routed into new Foussat Road until just north of SR 76; then it will be extended east within a utility easement through the Ocean Kamp project to the new onsite public sewer.

From the multi-family residential lots at the north end of the western portion of Ocean Kamp, a public gravity sewer will extend south in the Loop Road and connect to the public sewer line extending from the west parallel to SR 76. These two onsite public sewers will then be routed in one gravity sewer line around the west and south sides of the Mission Avenue Lift Station and connect to the existing 30-inch Lift Station influent line with a new manhole.

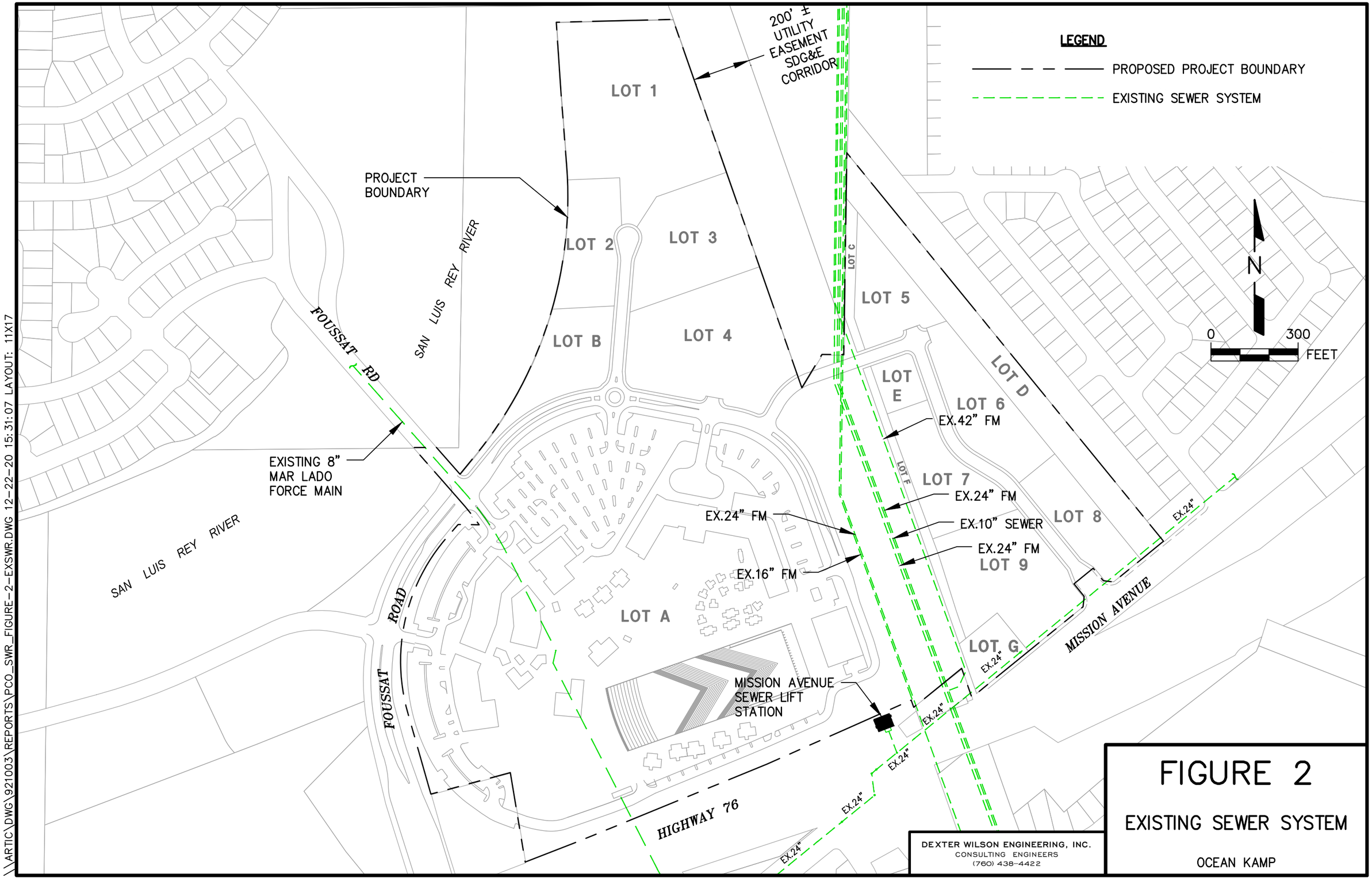

FIGURE 2

EXISTING SEWER SYSTEM

OCEAN KAMP

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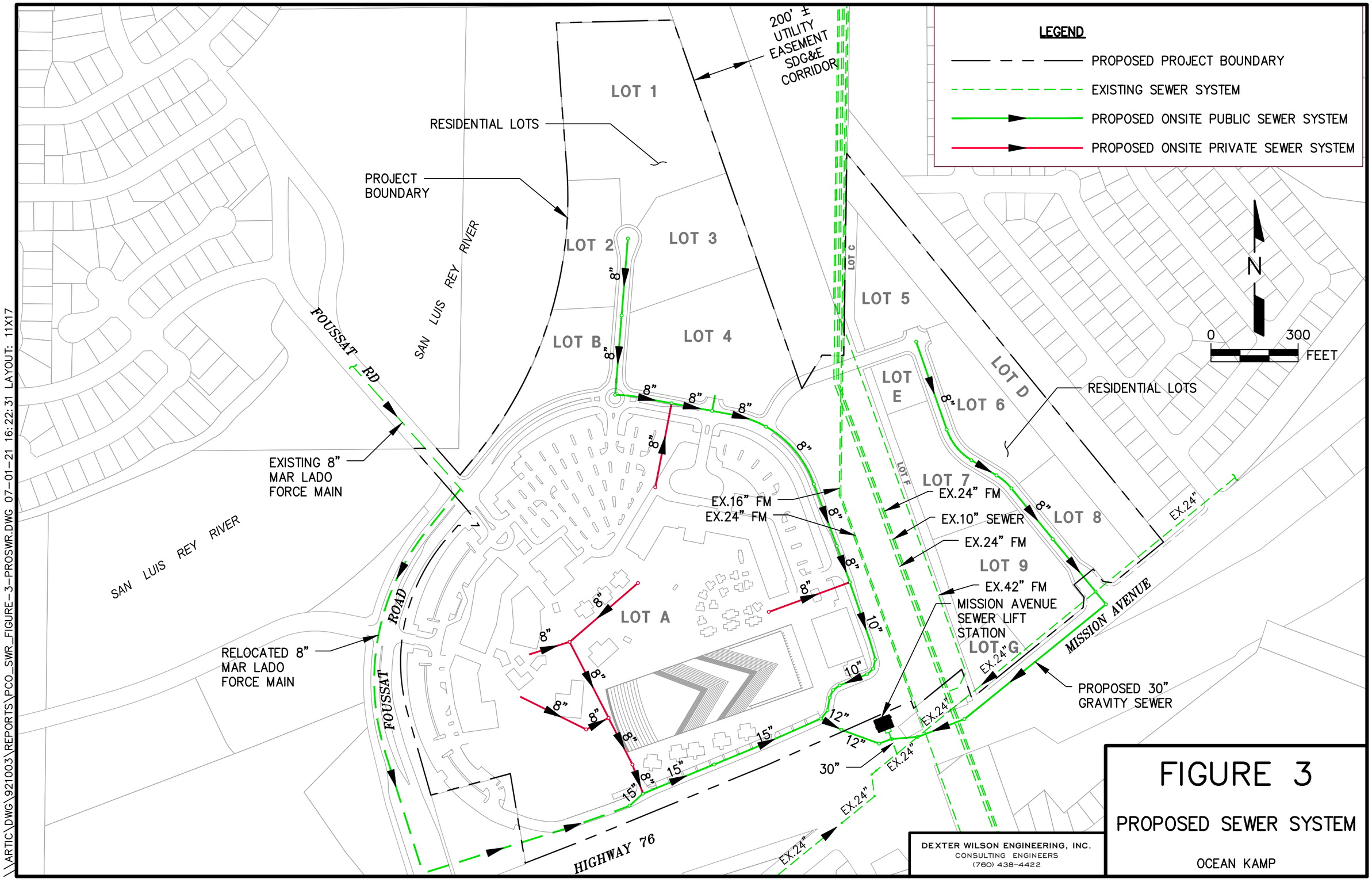

\\ARTIC\DWG\921003\REPORTS\PCO_SWR_FIGURE-3-PROSWR.DWG 07-01-21 16:22:31 LAYOUT: 11X17

FIGURE 3

PROPOSED SEWER SYSTEM

OCEAN KAMP

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East Side Onsite Sewer. The east side of the Ocean Kamp project only has multi-family residential development. Sewer will flow south to Mission Avenue. Where the new onsite public sewer line would expect to be connected to the 24-inch Mission Avenue Interceptor, the current approach is for Ocean Kamp to construct a new 30-inch gravity sewer in Mission Avenue from their connection point west to the Mission Avenue Lift Station. This work would be done in lieu of constructing a parallel 8-inch sewer just for the Ocean Kamp project. Prior to the construction of the new 30-inch sewer interceptor, the City and Ocean Kamp would enter into a reimbursement agreement in which the City would fund this capital improvement except for the equivalent cost of building an 8-inch parallel sewer just for the Ocean Kamp project.

Onsite Sewer Facilities Analysis

The public and private onsite sewer system was analyzed based on the tentative map level sewer slopes to determine what sizes are necessary to accommodate peak sewage flow from the Ocean Kamp project.

Ocean Kamp Project Flows. The sewer flow calculation spreadsheets for Ocean Kamp project flows within the onsite sewer system are included in Appendix B. The manhole numbering diagram associated with the sewer calculation spreadsheet is Exhibit A at the back of this report. Individual spreadsheets are provided for the west side sewer system and the east side sewer line.

The results of the onsite sewer calculations show that 8-inch and 10-inch gravity sewer piping throughout the site is adequate to convey the Ocean Kamp peak sewage flows. The west side analysis shows a maximum d/D of 0.38 for 8-inch sewer lines at 0.50 percent slope. The 10-inch gravity sewer piping flows at d/D of 0.31.

The majority of the onsite gravity sewer system is designed at 0.50 percent slope because the project site has very little grade differential. For this reason, several segments of the upstream-most sewer serving the west side multi-family lots have flow velocity less than 2

fps. This is unavoidable because of the lack of grade differential on the project site. As part of final design sewer slopes will be re-evaluated and increased as much as possible.

The private sewer laterals also have velocity less than 2 feet per second; however, these laterals are set a a minimum of 1 percent slope which is acceptable by the Plumbing Code. During final design, these sewer slopes will be re-evaluated and increased as much as possible.

For the east side multi-family lots, the run of sewer is shorter which enables the sewer slope to be greater. The 8-inch sewer for the east side is designed at 1.0 percent slope.

Ocean Kamp Plus Mar Lado Lift Station Flows. Separate spreadsheet calculations have been prepared to show the effect of adding Mar Lado Lift Station flows into the onsite public sewer system. The 8-inch Mar Lado Sewer Lift Station force main is being relocated by the Ocean Kamp project; the force main is currently in the Old Foussat Road alignment. In addition to relocating the force main into Foussat Road, the force main will be routed within the south side of the Ocean Kamp project and will discharge into the onsite gravity sewer. This will eliminate the sewer force main crossing under SR 76.

The Mar Lado SLS pumped flow was obtained from field test data supplied by the Water Utilities Department. Appendix C has a copy of the City's correspondence which indicates that the Mar Lado Sewer Lift Station capacity is 860 gpm with one pump operating, and 1,150 gpm with two pumps operating.

The Mar Lado SLS Force Main is proposed to transition to gravity flow upstream of where the Ocean Kamp flows enter the public sewer line. This first reach of the public gravity sewer is from MH 36 to MH 28 on Exhibit A. It is a 12-inch gravity sewer currently set at 0.65 percent slope. With only the Mar Lado SLS pumping capacity of 860 gpm (one pump operating), it flows at a depth of 0.60 d/D at a velocity of 3.9 fps (Appendix D).

The next segment of proposed public sewer is at 1 percent slope. When adding the Mar Lado Lift Station force main flow of 860 gpm to the onsite flow from the commercial area and wave pool, the gravity sewer pipe must be increased from 8-inch diameter to 12-inch diameter in

order to flow below design criteria. A 10-inch sewer would operate at a d/D of 0.75 at 1 percent slope and a d/D of 0.67 at 1.7 percent slope. Both of these conditions are greater than the 0.5 d/D sewer design criterion for 10-inch pipe. Therefore, upsizing from 8-inch to 12-inch is necessary to accommodate the Mar Lado Sewer Lift Station flow.

At a slope of 1.0 percent, the depth of onsite peak flow in the proposed 12-inch sewer line plus the Mar Lado Lift Station force main discharge of 860 gpm is 0.54 d/D. Velocity is 4.7 fps.

The next segment of proposed public sewer main is at a slope of 1.7 percent. This reach of sewer includes additional flow from the Ocean Kamp project. Depth of flow with Ocean Kamp peak flow and Mar Lado SLS single pump capacity of 860 gpm is 0.49 d/D and flow velocity is 5.9 fps.

An additional analysis was run to check the sewer system capacity when Mar Lado Sewer Lift Station has two pumps running at 1,150 gpm. The spreadsheet output is in Appendix D. With two pumps running, the sewer line needs to be increased to 15-inch diameter. With a slope for the 15-inch line of 0.65 percent, the flow depth is 0.50 d/D. The downstream segment of 15-inch sewer at 1.0 percent flows at 0.45 d/D, and the 12-inch segment at 1.7 percent slope flows at 0.58 d/D. Velocities are 5.0 fps and 6.3 fps, respectively.

These spreadsheet calculations are provided in Appendix D and use the same manhole numbering diagram, Exhibit A.

Mission Avenue 24-inch Interceptor. The 24-inch gravity sewer line in Mission Avenue is planned to be upgraded to a 30-inch sewer by the City Water Utilities Department as a capital improvement project. Since this interceptor is already slated for upgrade, this sewer study does not include a capacity analysis of this line. Figure 3 shows the conceptual horizontal alignment of the new 30-inch sewer interceptor within Mission Avenue. This alignment which is shown on the Ocean Kamp tentative map will need to be further vetted during the final design phase to ensure there are no conflicts between other wet and dry utilities in Mission Avenue.

The City Water Utilities Department performed an analysis of the sewer lines upstream of the Mission Avenue Lift Station using their sewer system hydraulic model. To the working computer model were added flows from the Ocean Kamp project. The information received is provided in Appendix E.

The analysis of the proposed 30-inch gravity sewer in Mission Avenue east of the Mission Avenue Lift Station includes the proposed 280 multi-family dwelling units within the East Residential portion of the Ocean Kamp project. At an estimated slope of 0.1 percent, the proposed 30-inch gravity sewer is flowing just under 0.6 d/D.

Existing 30-inch Sewer Influent to the Lift Station. In meetings with Water Utilities a question was raised regarding the capacity in the 30-inch influent sewer directly upstream of the Mission Avenue Lift Station.

The As-Built drawings for this line show a slope of 0.26 percent. Based on the City's maximum d/D requirement of 2/3, the 30-inch sewer line's maximum design capacity calculates to be approximately 10.6 mgd or 7,360 gpm. At full pipe flow, the capacity is 13.5 mgd or 9,370 gpm.

The 30-inch sewer segment influent to the Mission Avenue Lift Station was included in the sewer hydraulic analysis prepared by the Water Utilities Department (see Appendix E). The total flow influent to the Lift Station including the sewage from the Ocean Kamp project is estimated to be 9.548 mgd PWWF (6,630 gpm). Flow depth per the hydraulic model is 0.54 d/D. Therefore, the existing 30-inch influent pipe has sufficient capacity for peak wet weather flow based on the City's sewer hydraulic model. Using the calculated flow for a d/D of 0.667 of 10.6 mgd per the previous paragraph, there is available capacity in this reach of sewer of 1.05 mgd peak flow, or 730 gpm peak.

Conclusions

The following conclusions are summarized based on the sewer system analysis performed for the proposed Ocean Kamp project.

1. The Ocean Kamp project, consisting of a hotel, commercial center, wave pool, and 700 multi-family dwelling units will obtain sewer service from the City of Oceanside.

2. Sewage generated by the Ocean Kamp project will gravity flow to the existing Mission Avenue Lift Station.

3. Several existing sewage facilities are located within the Ocean Kamp project. Utilities within the Old Foussat Road alignment will be relocated. Those within the SDG&E easement will remain in place undisturbed.

4. Onsite gravity sewer mains within the Ocean Kamp project are 8-inch and 12-inch diameter. Portions of the sewer system will be private.

5. The exiting Mar Lado Lift Station force main will be relocated into new Foussat Road and will discharge into the new onsite public sewer system.

6. In order for the new onsite public sewer line at the south end of the Ocean Kamp project to have sufficient flow capacity to accommodate the Mar Lado Lift Station pumped flow the proposed 8-inch public gravity sewer line flowing east to the Mission Avenue Lift Station will need to be upsized to 12-inch diameter to meet sewer depth of flow design criterion.

7. The existing 24-inch Mission Avenue Interceptor has been identified by the City to be upsized to 30-inch. If this sewer main replacement project has not been completed by the time the Ocean Kamp project begins construction, the Ocean Kamp project can construct a segment of this new sewer in Mission Avenue east to the East Side Residential Area and enter into a reimbursement agreement with the City.

We appreciate the opportunity to assist you with the sewer system planning for the Ocean Kamp project. If you have any questions regarding the information presented in this report, please do not hesitate to contact us.

Dexter Wilson Engineering, Inc.

Andrew Oven, P.E.

AO:ah

Attachments

APPENDIX A

DESIGN GUIDE REFERENCE INFORMATION

SECTION 3 - SEWER SYSTEMS DESIGN GUIDELINES

3.1 GENERAL

A. All sewer system construction shall conform to the most recent edition of the City of Oceanside's Water, Sewer, and Reclaimed Water Design & Construction Manual.

B. If a conflict arises between the requirements in this manual, the order of precedence shall take place:

1. Sections 1-4, Required Notes, & Appendix
2. Standard Drawings
3. Standard Specifications

C. If the standard that is sought does not appear in this Manual, then the following standards shall be utilized in the order listed:

1. State of California Department of Health Services
2. American Water Works Association (AWWA) Standards
3. San Diego County Regional Standard Drawings
4. Standard Specifications for Public Works Construction (SSPWC or "Greenbook"), latest Edition.

Exceptions to this and all other guidelines appearing in this manual may be allowed only upon the approval of the Water Utilities Director.

B. The sewer facilities listed below will require telemetry and control equipment to be incorporated into the design of the facility. The Water Utilities Department will provide specific design requirements when improvement plans are submitted for Plan Check.

1. Treatment Facilities
2. Sewer Lift Stations and force mains
3. Metering Stations

3.2 MAINS

A. Minimum size shall be 8 inches.

B. All mains not meeting the minimum main diameter and material shall be replaced to meet current design requirements. This is applicable for all new commercial, industrial, institutional, and residential developments of four (4) units or more. Where the full replacement length(s) from manhole to manhole along the property frontage length impacts more than one main and significantly exceeds the developed

property(ies) or is deemed in excess of the overall project cost, the developer may pay an in-lieu fee upon the approval of the Water Utilities Director.

C. Slip-lining or replacement of sewer mains 8-inch or larger may be required if the main is determined to be in poor condition per CCTV report.

D. For diameters 10 inches and smaller, maximum depth of flow shall not exceed ½ the diameter. For diameters 12 inches and larger, depth of flow shall not exceed 2/3 the diameter.

E. No vertical or horizontal curves shall be permitted, unless otherwise approved by the Water Utilities Director.

F. The maximum slope of sewer line shall be 14% unless otherwise approved by the Water Utilities Director.

G. If the main and/or lateral is at a depth of 20 feet or more than the type of pipe material must be approved by the Water Utilities Department. Calculations must be provided to the Water Utilities Department to verify that the pipe material will accommodate the design depths.

H. Locations:

1. Alley: Mains shall be offset a minimum of 3 feet from the centerline to clear alley gutter. Separation from waterlines shall be per Oceanside Standard Drawing S-1 and S-1a.

2. Street: Sewer main locations shall be located in center of the street. A minimum 10-foot separation outside of pipe to outside of pipe from waterlines shall be maintained.

3. Streets with 84 feet of right-of-way or more may require special location as approved by the Water Utilities Director.

4. Minimum cover for sewer mains shall be 6 feet below the finished grade, unless otherwise approved by the Water Utilities Director.

I. Minimum Slopes:

A minimum velocity of 2 FPS shall be maintained at peak flow. Where 2 FPS is not attainable, a minimum slope of 1.6% shall be used. When velocities are 2.0 FPS or greater the following design criteria will govern:

Pipe Diameter	Minimum Slope
8 Inch	0.50%
10 Inch and larger	0.40%

J. Demands:

1. Average daily sewer generation rates shall be:

LAND USE	LAND USE CATEGORY	UNITS

Low Density Residential	EA-R, EB-R, SDF-R	170 gpd/EDU
Mid Density Residential	MDA-R, MDB-R, MDC-R, HD-R, UHD-R	140 gpd/EDU
Industrial	LI	1,000 gpd/acre
Commercial	CC, NC, GC, SC, PC, GI, RP-I, CI, PI	1,000 gpd/acre
Hotels		100 gpd/room

Peak daily flows for residential developments, shall be based on a ratio of peak to average flow as shown below:

Population	Ratio of Peak to Average Flow
Less than 500	3.5
500 to 1,000	2.75
1,000 to 5,000	2.50
Greater than 5,000	2.00

3. Peak daily flows for all other uses shall be based on the following formula:

$$Qp = 1.84\ Qa^{.92}$$

Where Qp = Peak Flow in CFS
Qa = Average Flow in CFS

I. Residential area easements shall be constructed by the developer. They shall be fenced on both sides parallel to the easement with a gate at the entrance and the exit. Easements shall be dedicated to the City and maintained by Property Owner with a lock feature.

J. All sewer mains not located within the public right-of-way shall be provided with a minimum 20-foot wide sewer easement. In some special cases, a wider easement may be required; the Water Utilities Director shall determine size. All easements shall be easily accessible to City maintenance equipment with all weather roadways. An access road will be built for trucks and as approved by the Water Utilities Department.

K. All utility easements that contain sewer mains, which will be publicly maintained, shall demonstrate that the largest vehicle within the Sewer Collections Fleet can transverse the streets without damage to both public and private property. The turning radius of this vehicle will be made available upon request.

L. Where water and sewer mains are located within the same easement, the minimum easement size shall be 30 feet wide. All easements shall be easily accessible to the City's maintenance equipment with all-weather access roadways. No trees or structures or building overhang are allowed within the City easements. When easements are located on private properties, the property owner shall keep the easement free and clear of weeds and debris.

M. 3-inch minimum width color coded detector tape marked "SEWER" in 1-½ inch black letters shall be placed on the compacted and graded bedding material one foot above and centered over the sewer main prior to backfilling the trench.

APPENDIX B

ONSITE SEWER SYSTEM ANALYSIS
PROPOSED OCEAN KAMP PROJECT FLOWS

DATE: 12/21/2020

SEWER STUDY SUMMARY

FOR: West Ocean Kamp Onsite Sewer System - Proposed Pipes; Proposed Flows

SHT 1 OF 1

JOB NUMBER: 921-003

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)	COMMENTS
					IN-LINE	TOTAL					M.G.D.	C.F.S.								
20	19		2.5	120	300	300	56	16,800	3.500	58,800	0.059	0.091	8	0.50	0.049317	0.14684	0.220	0.1283	1.60	MF Residential - 120 Dus
19	18		2.5	100	250	550	56	30,800	2.750	84,700	0.085	0.131	8	0.50	0.071040	0.17646	0.265	0.1664	1.77	MF Residential - 100 Dus
18	61		2.5	100	250	800	56	44,800	2.750	123,200	0.123	0.191	8	0.50	0.103331	0.21401	0.321	0.2176	1.97	MF Residential - 100 DUs
21	61		1.79	100	179	179	56	10,002	3.500	35,006	0.035	0.054	8	2.00	0.014680	0.08128	0.122	0.0547	2.23	Hotel - 100 Rooms, Private Sewer Main
61	17		0.00	10	0	979	56	54,802	2.750	150,704	0.151	0.233	8	0.50	0.126400	0.23798	0.357	0.2517	2.08	
17	16		2.50	100	250	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	MF Residential - 100 DUs
16	15		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
15	14		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
14	13		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
58	13		1.79	150	268	268	56	15,002	3.500	52,508	0.053	0.081	8	2.00	0.022020	0.09893	0.148	0.0728	2.51	Hotel - 150 Rooms, Private Sewer Main
13	12		0.00	100	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
12	11		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
11	22		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
22	23		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
23	201		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
201	24		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
24	25		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
25	26		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
33	31		17.86	3.4	61	61	56	3,400	3.500	11,900	0.012	0.018	8	1.00	0.007057	0.05730	0.086	0.0327	1.27	Commercial - 3.4 acres, Private Sewer Main
32	31		1.79	50	89	89	56	5,001	3.500	17,503	0.018	0.027	8	1.00	0.010380	0.06889	0.103	0.0429	1.42	Hotel - 50 Rooms, Private Sewer Main
31	30		17.86	3	61	211	56	11,801	3.500	41,303	0.041	0.064	8	1.00	0.024495	0.10416	0.156	0.0784	1.83	Commercial - 3.4 Acres, Private Sewer Main
35	34		17.86	3.5	62	62	56	3,500	3.500	12,250	0.012	0.019	8	1.00	0.007265	0.05811	0.087	0.0334	1.28	Commercial - 3.5 Acres, Private Sewer Main
34	30		0.00	0	0	62	56	3,500	3.500	12,250	0.012	0.019	8	1.00	0.007265	0.05811	0.087	0.0334	1.28	Private Sewer Main
30	29		86.45	3.1	268	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	Wave Pool - 3.1 Acres, Private Sewer Main
29	28		0.00	0	0	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	Private Sewer Main
36	28		0.00	0	0	0	56	0	3.500	0	0.000	0.000	8	0.50	0.000000	0.00000	0.000	0.0000	0.00	No sewer flow from Mar Lado SLS
28	27		0.00	0	0	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	
27	26		0.00	0	0	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	
26	101		0.00	0	0	2038	56	114,112	2.500	285,281	0.285	0.441	8	1.70	0.129764	0.24134	0.362	0.2565	3.87	
101	102		0.00	0	0	2038	56	114,112	2.500	285,281	0.285	0.441	8	1.70	0.129764	0.24134	0.362	0.2565	3.87	
102	103		0.00	0	0	2038	56	114,112	2.500	285,281	0.285	0.441	8	1.70	0.129764	0.24134	0.362	0.2565	3.87	

Total EDUs	Total Pop.	Min Slope	Max dn/D
843	2038	0.50	0.43

DATE: 12/21/2020

SEWER STUDY SUMMARY

FOR: East Ocean Kamp Onsite Sewer System - Proposed Pipes; Proposed Flows

SHT 1 OF 1

JOB NUMBER: 921-003

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)	COMMENTS
					IN-LINE	TOTAL					M.G.D.	C.F.S.								
57	56		2.5	70	175	175	56	9,800	3.500	34,300	0.034	0.053	8	1.00	0.020342	0.09520	0.143	0.0688	1.74	MF Residential - 70 DUs
56	55		2.5	70	175	350	56	19,600	3.500	68,600	0.069	0.106	8	1.00	0.040684	0.13347	0.200	0.1120	2.13	MF Residential - 70 DUs
55	54		2.5	0	0	350	56	19,600	3.500	68,600	0.069	0.106	8	1.00	0.040684	0.13347	0.200	0.1120	2.13	
54	53		2.5	70	175	525	56	29,400	2.750	80,850	0.081	0.125	8	1.00	0.047950	0.14477	0.217	0.1258	2.24	MF Residential - 70 DUs
53	52		2.5	0	0	525	56	29,400	2.750	80,850	0.081	0.125	8	1.00	0.047950	0.14477	0.217	0.1258	2.24	
52	51		2.5	70	175	700	56	39,200	2.750	107,800	0.108	0.167	8	1.00	0.063933	0.16735	0.251	0.1544	2.43	MF Residential - 70 DUs

Total EDUs
280

Total Pop.
700

Min Slope
1.00

Max dn/D
0.25

APPENDIX C

FIELD TEST RESULTS FOR
MAR LADO LIFT STATION PUMPING CAPACITY

Andrew Oven

From: Mabel Uyeda <MUyeda@oceansideca.org>
Sent: Tuesday, June 23, 2020 11:38 AM
To: Andrew Oven
Cc: Sergio Madera; Ryan Herrell; Greg Shields; Winfield Beucler
Subject: Zephyr Ocean Kamp Sewer Study - Update for Ocean Kamp Study - FW: Mar Lado LS Pump Test
Attachments: OCE_OceanKamp_Sewer_Analysis_Deliverable_051320.xlsx; Figure1_reduced.pdf; OCE_OceanKamp_Sewer_Analysis_Deliverable_051320.xlsx; Mar Lado ESSCO Pump Curve.pdf

Hi Andrew,

I wanted to follow up with you on information from the City to incorporate into your sewer study update where we had comments on the Zephyr Ocean Kamp project. Please find attached results from our sewer hydraulic model, as well as, pump test results below from our sewer maintenance supervisor at the existing Mar Lado Lift Station for one and two pumps on. Also, attached are Mar Lado LS ESSCO pump curves.

Please let me know if you have any questions or comments.

Mabel

From: Jeremy Kemp <JKemp@oceansideca.org>
Sent: Thursday, April 30, 2020 12:04 PM
To: Mabel Uyeda <MUyeda@oceansideca.org>
Cc: Mike Dumas <MDumas@oceansideca.org>
Subject: Re: Mar Lado LS Pump Test

With one pump running today it was 860gpm - with two pumps on it went to 1,150gpm.

J

Sent from my iPhone

> On Apr 29, 2020, at 10:44 AM, Mabel Uyeda <MUyeda@oceansideca.org> wrote:
>
> **MAR LADO LIFT STATION:**
> When will you be able to run pump test?
> 2 pumps running: What is the flow? and if you can get a pressure read on discharge pipe.
> 1 pump running = 900 gpm
>
> Thank you!
> Mabel

APPENDIX D

ONSITE SEWER SYSTEM ANALYSIS
PROPOSED OCEAN KAMP PROJECT FLOWS
PLUS MAR LADO LIFT STATION FLOW

DATE: 7/1/2021

SEWER STUDY SUMMARY

FOR: West Ocean Kamp Onsite Sewer - Prop. Pipes & Flows Plus Mar Lado SLS 1 Pump

SHT 1 OF 1

JOB NUMBER: 921-003

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	COMMENTS
					IN-LINE	TOTAL					M.G.D.	C.F.S.								
20	19		2.5	120	300	300	56	16,800	3.500	58,800	0.059	0.091	8	0.50	0.049317	0.14684	0.220	0.1283	1.60	MF Residential - 120 Dus
19	18		2.5	100	250	550	56	30,800	2.750	84,700	0.085	0.131	8	0.50	0.071040	0.17646	0.265	0.1664	1.77	MF Residential - 100 Dus
18	61		2.5	100	250	800	56	44,800	2.750	123,200	0.123	0.191	8	0.50	0.103331	0.21401	0.321	0.2176	1.97	MF Residential - 100 DUs
21	61		1.79	100	179	179	56	10,002	3.500	35,006	0.035	0.054	8	2.00	0.014680	0.08128	0.122	0.0547	2.23	Hotel - 100 Rooms, Private Sewer Main
61	17		0.00	10	0	979	56	54,802	2.750	150,704	0.151	0.233	8	0.50	0.126400	0.23798	0.357	0.2517	2.08	
17	16		2.50	100	250	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	MF Residential - 100 DUs
16	15		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
15	14		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
14	13		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
58	13		1.79	150	268	268	56	15,002	3.500	52,508	0.053	0.081	8	2.00	0.022020	0.09893	0.148	0.0728	2.51	Hotel - 150 Rooms, Private Sewer Main
13	12		0.00	100	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
12	11		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
11	22		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
22	23		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
23	201		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
201	24		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
24	25		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
25	26		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	8	0.50	0.175721	0.28470	0.427	0.3200	2.28	
33	31		17.86	3.4	61	61	56	3,400	3.500	11,900	0.012	0.018	8	1.00	0.007057	0.05730	0.086	0.0327	1.27	Commercial - 3.4 acres, Private Sewer Main
32	31		1.79	50	89	89	56	5,001	3.500	17,503	0.018	0.027	8	1.00	0.010380	0.06889	0.103	0.0429	1.42	Hotel - 50 Rooms, Private Sewer Main
31	30		17.86	3	61	211	56	11,801	3.500	41,303	0.041	0.064	8	1.00	0.024495	0.10416	0.156	0.0784	1.83	Commercial - 3.4 Acres, Private Sewer Main
35	34		17.86	3.5	62	62	56	3,500	3.500	12,250	0.012	0.019	8	1.00	0.007265	0.05811	0.087	0.0334	1.28	Commercial - 3.5 Acres, Private Sewer Main
34	30		0.00	0	0	62	56	3,500	3.500	12,250	0.012	0.019	8	1.00	0.007265	0.05811	0.087	0.0334	1.28	Private Sewer Main
30	29		86.45	3.1	268	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	Wave Pool - 3.1 Acres, Private Sewer Main
29	28		0.00	0	0	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	Private Sewer Main
36	28		3.00	3,686	11057	11057	56	619,200	2.000	1,238,400	1.238	1.916	12	0.65	0.308981	0.59748	0.597	0.4895	3.91	860 gpm Mar Lado SLS flow - 1 Pump
28	27		0.00	0	0	11598	56	649,508	2.000	1,299,017	1.299	2.010	12	1.00	0.261302	0.53788	0.538	0.4309	4.66	
27	26		0.00	0	0	11598	56	649,508	2.000	1,299,017	1.299	2.010	12	1.00	0.261302	0.53788	0.538	0.4309	4.66	
26	101		0.00	0	0	13095	56	733,312	2.000	1,466,625	1.467	2.269	12	1.70	0.226268	0.49301	0.493	0.3858	5.88	
101	102		0.00	0	0	13095	56	733,312	2.000	1,466,625	1.467	2.269	12	1.70	0.226268	0.49301	0.493	0.3858	5.88	
102	103		0.00	0	0	13095	56	733,312	2.000	1,466,625	1.467	2.269	12	1.70	0.226268	0.49301	0.493	0.3858	5.88	

Total EDUs	Total Pop.	Min Slope	Max dn/D
4,529	13095	0.50	0.60

DATE: 7/1/2021

SEWER STUDY SUMMARY

FOR: West Ocean Kamp Onsite Sewer - Prop. Pipes & Flows Plus Mar Lado SLS 2 Pumps

SHT 1 OF 1

JOB NUMBER: 921-003

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

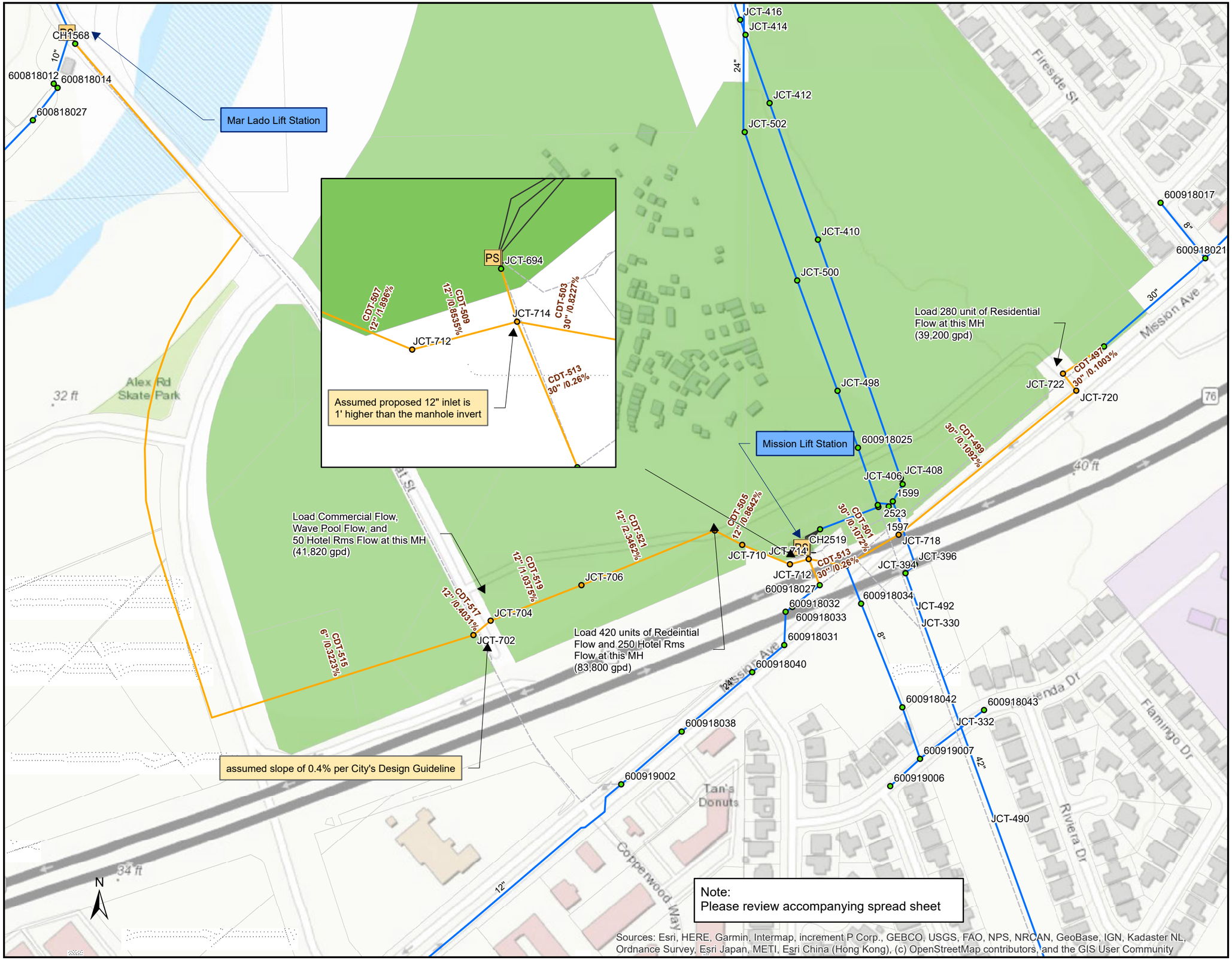
FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	COMMENTS
					IN-LINE	TOTAL					M.G.D.	C.F.S.								
20	19		2.5	120	300	300	56	16,800	3.500	58,800	0.059	0.091	8	0.50	0.049317	0.14684	0.220	0.1283	1.60	MF Residential - 120 Dus
19	18		2.5	100	250	550	56	30,800	2.750	84,700	0.085	0.131	8	0.50	0.071040	0.17646	0.265	0.1664	1.77	MF Residential - 100 Dus
18	61		2.5	100	250	800	56	44,800	2.750	123,200	0.123	0.191	8	0.50	0.103331	0.21401	0.321	0.2176	1.97	MF Residential - 100 DUs
21	61		1.79	100	179	179	56	10,002	3.500	35,006	0.035	0.054	8	2.00	0.014680	0.08128	0.122	0.0547	2.23	Hotel - 100 Rooms, Private Sewer Main
61	17		0.00	10	0	979	56	54,802	2.750	150,704	0.151	0.233	8	0.50	0.126400	0.23798	0.357	0.2517	2.08	
17	16		2.50	100	250	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	MF Residential - 100 DUs
16	15		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
15	14		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
14	13		0.00	0	0	1229	56	68,802	2.500	172,004	0.172	0.266	8	0.50	0.144264	0.25549	0.383	0.2770	2.16	
58	13		1.79	150	268	268	56	15,002	3.500	52,508	0.053	0.081	8	2.00	0.022020	0.09893	0.148	0.0728	2.51	Hotel - 150 Rooms, Private Sewer Main
13	12		0.00	100	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
12	11		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
11	22		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
22	23		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
23	201		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.26714	0.321	0.2146	2.18	
201	24		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
24	25		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
25	26		0.00	0	0	1497	56	83,804	2.500	209,510	0.210	0.324	10	0.50	0.096917	0.25877	0.311	0.2079	2.25	
33	31		17.86	3.4	61	61	56	3,400	3.500	11,900	0.012	0.018	8	1.00	0.007057	0.05730	0.086	0.0327	1.27	Commercial - 3.4 acres, Private Sewer Main
32	31		1.79	50	89	89	56	5,001	3.500	17,503	0.018	0.027	8	1.00	0.010380	0.06889	0.103	0.0429	1.42	Hotel - 50 Rooms, Private Sewer Main
31	30		17.86	3	61	211	56	11,801	3.500	41,303	0.041	0.064	8	1.00	0.024495	0.10416	0.156	0.0784	1.83	Commercial - 3.4 Acres, Private Sewer Main
35	34		17.86	3.5	62	62	56	3,500	3.500	12,250	0.012	0.019	8	1.00	0.007265	0.05811	0.087	0.0334	1.28	Commercial - 3.5 Acres, Private Sewer Main
34	30		0.00	0	0	62	56	3,500	3.500	12,250	0.012	0.019	8	1.00	0.007265	0.05811	0.087	0.0334	1.28	Private Sewer Main
30	29		86.45	3.1	268	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	Wave Pool - 3.1 Acres, Private Sewer Main
29	28		0.00	0	0	541	56	30,308	2.750	83,348	0.083	0.129	8	1.00	0.049431	0.14701	0.221	0.1285	2.26	Private Sewer Main
36	28		3.00	4,929	14786	14786	56	828,000	2.000	1,656,000	1.656	2.562	15	0.65	0.227879	0.61872	0.495	0.3878	4.23	1,150 gpm Mar Lado SLS flow - 2 Pumps
28	27		0.00	0	0	15327	56	858,308	2.000	1,716,617	1.717	2.656	15	1.00	0.190447	0.55841	0.447	0.3395	5.01	
27	26		0.00	0	0	15327	56	858,308	2.000	1,716,617	1.717	2.656	15	1.00	0.190447	0.55841	0.447	0.3395	5.01	
26	101		0.00	0	0	16823	56	942,112	2.000	1,884,225	1.884	2.916	12	1.70	0.290694	0.57462	0.575	0.4666	6.25	
101	102		0.00	0	0	16823	56	942,112	2.000	1,884,225	1.884	2.916	12	1.70	0.290694	0.57462	0.575	0.4666	6.25	
102	103		0.00	0	0	16823	56	942,112	2.000	1,884,225	1.884	2.916	12	1.70	0.290694	0.57462	0.575	0.4666	6.25	

Total EDUs	Total Pop.	Min Slope	Max dn/D
5,772	16823	0.50	0.57

APPENDIX E

WATER UTILITIES DEPARTMENT
SEWER SYSTEM HYDRAULIC MODEL
UPSTREAM OF MISSION AVENUE LIFT STATION

Pipe ID	From MH	To MH	From Invert (ft)	To Invert (ft)	Length (ft)	Diameter (in)	Slope (%)	ADWF (mgd)	d/D	PWWF (mgd)	d/D	Comments
757	600918021	600918023	18.47	17.94	371.1	30	0.143	2.862	0.335	5.506	0.484	
CDT-523	600918023	JCT-722	17.94	17.47	136.2	30	0.345	2.862	0.346	5.505	0.511	
CDT-497	JCT-722	JCT-720	17.47	17.41	59.8	30	0.1	2.901	0.401	5.595	0.585	Estimate inverts through interpolation of existing upstream and downstream manholes' inverts
CDT-499	JCT-720	JCT-718	17.41	16.72	631.8	30	0.109	2.901	0.39	5.595	0.554	Estimate inverts through interpolation of existing upstream and downstream manholes' inverts
CDT-501	JCT-718	600918028	16.72	16.54	168.0	30	0.107	2.901	0.308	5.594	0.428	Estimate inverts through interpolation of existing upstream and downstream manholes' inverts
CDT-503	600918028	JCT-714	16.54	15.67	105.8	30	0.823	2.934	0.289	5.701	0.447	Estimate inverts through interpolation of existing upstream and downstream manholes' inverts
CDT-513	600918027	JCT-714	15.8	15.67	50.0	30	0.26	0.408	0.316	2.475	0.544	Estimate inverts through interpolation of existing upstream and downstream manholes' inverts
CDT-511	JCT-714	JCT-694	15.67	15.6	26.4	30	0.266	3.621	0.327	9.548	0.544	Estimate inverts through interpolation of existing upstream and downstream manholes' inverts
CDT-517	JCT-702	JCT-704	32.95	32.7	62.0	12	0.403	0.156	0.215	1.297	0.674	Flow from Mar Lado LS
CDT-519	JCT-704	JCT-706	32.7	29.9	269.9	12	1.038	0.198	0.183	1.49	0.538	Inverts based on the Project's tentative map dated 03/12/20
CDT-521	JCT-706	JCT-708	29.9	20.54	399.1	12	2.346	0.198	0.21	1.49	0.592	Inverts based on the Project's tentative map dated 03/12/20
CDT-505	JCT-708	JCT-710	20.54	19.8	85.6	12	0.864	0.282	0.23	1.671	0.623	Inverts based on the Project's tentative map dated 03/12/20
CDT-507	JCT-710	JCT-712	19.8	17.1	142.4	12	1.896	0.282	0.224	1.671	0.592	Inverts based on the Project's tentative map dated 03/12/20
CDT-509	JCT-712	JCT-714	17.1	15.64	53.9	12	0.854	0.282	0.246	1.67	0.668	Assumed inlet invert is 1' higher to the manhole invert of the 30" connection



Legend

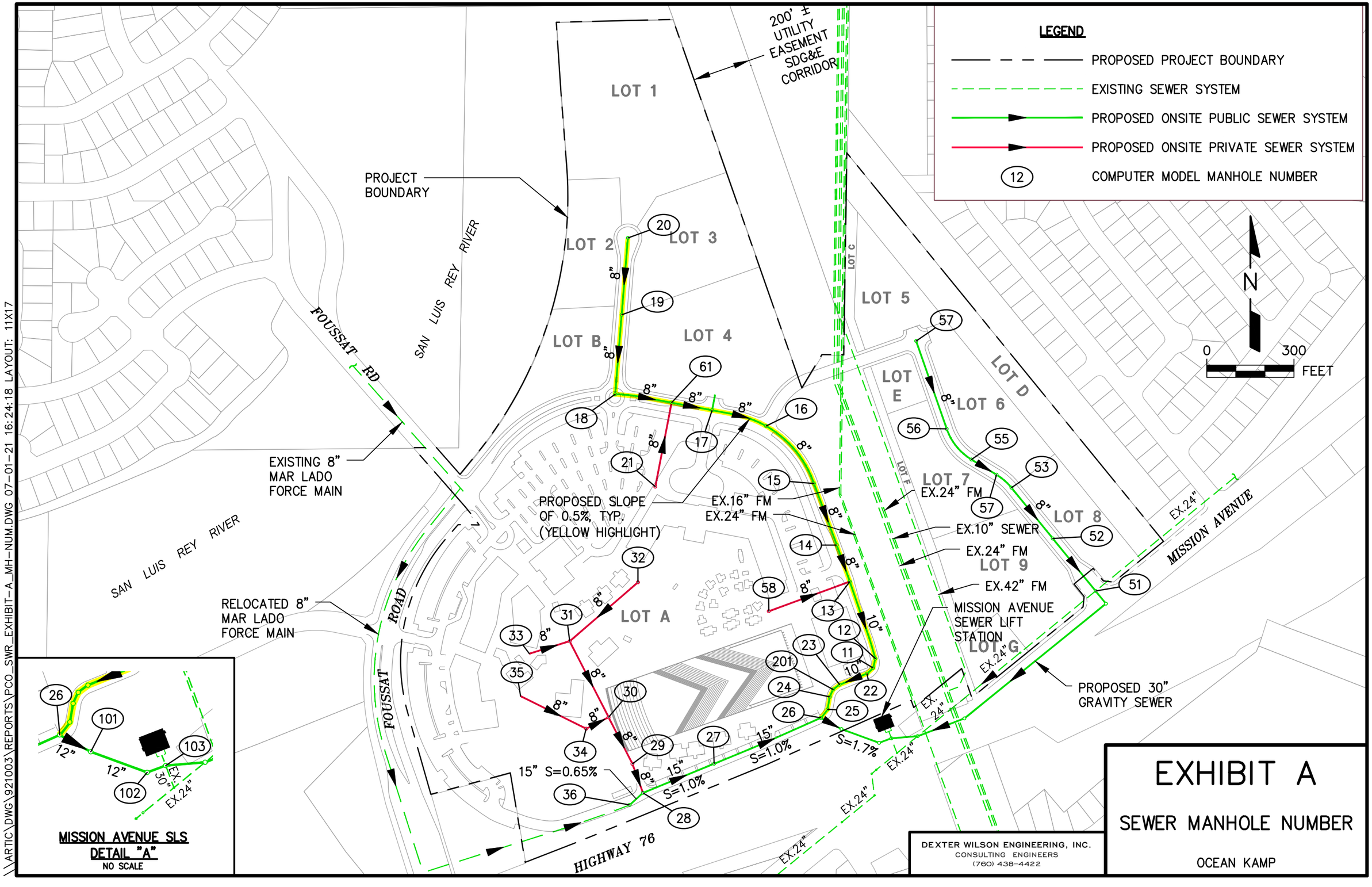
- PS — Modeled Lift Station
- Modeled MH
- Proposed MH
- Modeled Conduit
- Proposed Conduit
- Inactive Conduit
- City Parcel
- Ocean Kamp

Infrastructure ENGINEERING CORPORATION

City of Oceanside
Ocean Kamp Sewer Utility Impact Study

Ocean Kamp Proposed Sewer System

Figure 1



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