APPENDIX K

Sewer Service Analysis

DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

PRIVATE SEWER SYSTEM ANALYSIS
FOR THE
CYPRESS POINT PROJECT
IN THE CITY OF OCEANSIDE

March 19, 2021

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

PRIVATE SEWER SYSTEM ANALYSIS
FOR THE
CYPRESS POINT PROJECT
IN THE CITY OF OCEANSIDE

March 19, 2021

Prepared by:

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Job No. 750-006

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March 19, 2021

750-006

Concordia Homes
380 Stevens Avenue, Suite 307
Solana Beach, CA 92075

Attention: Jeb Hall, Principal

Subject: Onsite Private Sewer System Analysis for the Cypress Point Project in the City of Oceanside

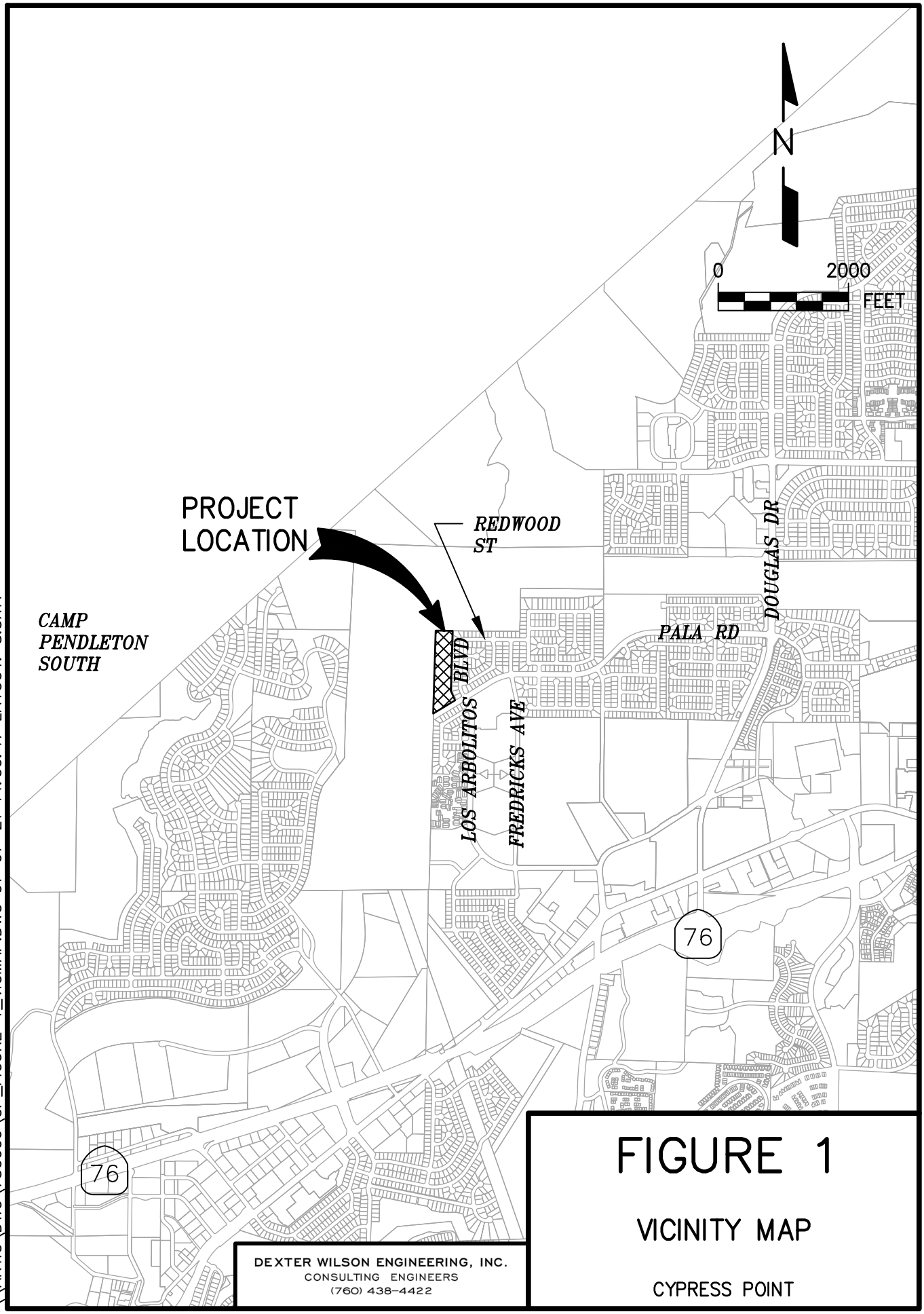
Introduction

This letter-report provides a public sewer system analysis for the Cypress Point project in the City of Oceanside (City). This letter-report will present the recommended onsite sizing of new private sewer infrastructure, as well as the sizing of extensions of the existing public system to the project site. We will also present recommendations of sewer services.

The Cypress Point project is located on the north side of Pala Road, just west of Los Arbolitos Boulevard. The project is proposing a residential development that includes 54 single-family units on a 7.38 acre site. A vicinity map for the project is provided in Figure 1.

Sewer System Design Criteria

Sewer system planning and design criteria for the Cypress Point project are based on Section 3 of the City of Oceanside Design and Construction Manual, revised August 1, 2017 and City design requirements established for the project.



\\ARTIC\DWG\750006\CP_FIGURE-1_VICMAP.DWG 01-07-21 14:00:47 LAYOUT: 8.5X11

FIGURE 1

VICINITY MAP

CYPRESS POINT

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422

Sewer Generation Rates and Peaking Factor. Section 3 of the City of Oceanside Design and Construction Manual, revised August 1, 2017 was used to develop average sewer flow for the Cypress Point project.

Daily sewer generation rates based on land use are identified in the City's Design and Construction Manual. These values will be used to analyze the impact of the project's wastewater generation. The sewer generation rates for the Cypress Point project are presented in Table 1.

TABLE 1
CITY OF OCEANSIDE
SEWER GENERATION RATES

Land Use	Generation Rate
Low Density Residential	170 gpd/DU

For residential developments with a population less than 500 the City's Design and Construction Manual requires a peaking factor of 3.5 to convert average dry weather flow to peak wet weather flow.

Manning's "n". The gravity sewer analysis is performed using a computer program which uses the Manning Equation for all of its calculations. The Manning's "n" used by the computer program 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 which corresponds with the recommended value in the City's design manual.

Depth and Velocity of Flow in Gravity Sewers. Gravity sewer lines are designed to convey peak wet weather flow. Pipes that are 8-inches in diameter and smaller are designed to convey this flow with a maximum depth-to-diameter (d/D) ratio of 0.50. For gravity sewer lines the design criteria for minimum velocity is 2.0 feet per second at peak flow or a minimum slope of 1.6%.

Due to the flat topography of the site, and to maintain consistency with the neighboring homes and infrastructure, the project will be designed with a minimum slope of 0.35%. Acceptance by the City of this design criteria exception (as well as others related to preparation of construction plans) can be found in Appendix A.

Estimated Sewer Flows for the Cypress Point Project

Based on the sewage generation factors presented in Table 1 the estimated average sewer generation for the project is calculated in Table 2.

TABLE 2
CYPRESS POINT
ESTIMATED AVERAGE SEWER FLOW

Land Use	Land Use Description	Sewer Generation Factor	Units	Average Sewer Flow, gpd
Residential	Low Density	170 gpd/EDU	54	9,180
TOTAL				**9,180 (6 gpm)**

As previously mentioned, a peaking factor of 3.5 is used for this analysis. Thus, the peak daily sewage flow for the Cypress Point project is 32,130 gpd (22 gpm).

Existing Sewer System

Figure 2 presents a schematic of the existing public sewer system in the vicinity of the project. As shown in Figure 2, the existing public sewer system consists of 8-inch diameter sewer lines in Pala Road and in Los Arbolitos Road. The sewer in Pala Road joins the Los Arbolitos sewer at the intersection of the streets and then flow continues south in Los Arbolitos Boulevard in a 12-inch sewer. This sewer flows south to Mission Avenue and then to the Mission Avenue Lift Station.

SAN LUIS REY RIVER

N

0 150 FEET

EX.24" FORCE MAIN

EX.10" FORCE MAIN

EX.24" FORCE MAIN

EX.24" FORCE MAIN

EX. FORCE MAIN

EX.42" FORCE MAIN

REDWOOD ST

EX.8" S=0.32%

LOS ARBOLITOS BLVD

EX.8" S=0.32%

EX.8" S=0.32%

EX.8" S=0.32%

EX.8" S=0.32%

EX.8"

EX.8" S=0.32%

EX.8" S=0.32%

PONDEROSA DR

EX.8" S=0.32%

EX.8" S=0.32%

PALA RD

EX.42"

EX. FORCE MAIN

EX.6"

EX.6"

LOS ARBOLITOS BLVD

EX.12"

LEGEND

PROJECT BOUNDARY

EXISTING PUBLIC GRAVITY SEWER LINE

EXISTING PUBLIC FORCE MAIN LINE

FIGURE 2

EXISTING SEWER FACILITIES

CYPRESS POINT

Several force mains and outfalls also run through the project and adjacent to the project. On the west side of the project, there is the 24-inch San Luis Rey Land Outfall and the 24-inch Mission Avenue Lift Station Force Main along with another 24-inch force main and a 10-inch force main. On the east side of the project is the 42" Buena Lift Station Force Main and space reserved for future sewers.

Proposed Sewer Facilities

Figure 3 presents a schematic of the proposed sewer system for the Cypress Point project. All onsite sewer facilities for the project are proposed to be private. As shown in Table 2, the projected average flow from the site will be 9,180 gpd (6 gpm) and the projected peak flow is 32,130 gpd (22 gpm).

Each home within the Cypress Point project will also have its own sewer lateral. The minimum sewer lateral size per the City of Oceanside Design and Construction Manual is 4-inches. The maximum capacity of a 4-inch service lateral at a 2 percent slope per the 2019 California Plumbing Code (CPC) is 216 drainage fixture units (DFUs). Each home within the project has an estimated drainage fixture unit count of 24 DFUs per the CPC, so a 4-inch lateral is sufficient for each home within the Cypress Point project. Appendix B provides the calculations supporting the sewer lateral sizing.

Sewer System Analysis

To analyze the Cypress Point project's proposed sewer system, a sewer system analysis was conducted. The analysis of the sewer system is provided in Appendix C. Exhibit A presents the Manhole Diagram for the proposed sewer analysis.

\\ARTIC\DWG\750006\CP_SWR_FIGURE-3_PROSWR.DWG 01-07-21 15:06:47 LAYOUT: 11X17

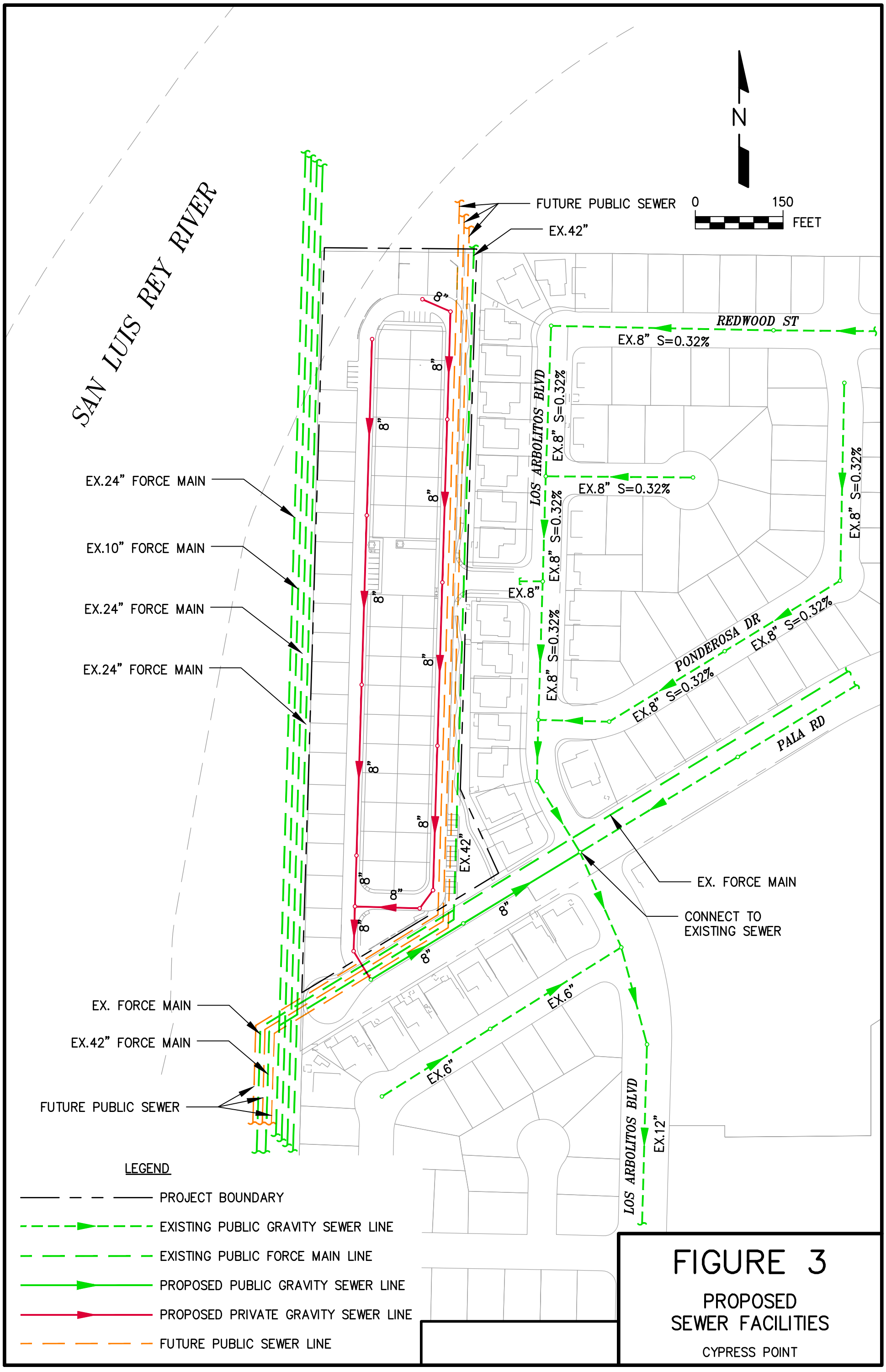


FIGURE 3

PROPOSED SEWER FACILITIES

CYPRESS POINT

The results of the analysis indicate that the maximum depth-to-diameter (d/D) ratio within the Cypress Point project is 0.18 under proposed peak flow conditions. This occurs in the proposed 8-inch sewer that connects to the existing stub in Pala Road. None of the analyzed sewer reaches exceed the maximum d/D design criteria of 0.5. The minimum velocity within the project is 0.44 fps and the maximum velocity is 1.18 fps. As previously stated, the project has received an exception from the City of Oceanside from the minimum velocity requirement of 2 fps as documented in Appendix A.

Conclusions

The following conclusions have been made related to providing sewer service to the Cypress Point property.

1. The Cypress Point project will receive sewer service from the City of Oceanside.

2. The proposed private sewer system for the Cypress Point project is presented in Figure 3.

3. The private onsite sewer system will consist of all 8-inch sewer mains. All individual house laterals shall be 4-inch.

4. 8-inch public sewer to serve the project will be constructed from the intersection of Los Arbolitos Boulevard and Pala Road, west to the connection of the private system.

5. An analysis of the proposed sewer system was conducted (Appendix C) and the results indicate that the maximum depth-to-diameter ratio that is expected to occur in the proposed sewers is 0.18 during peak flow conditions which is less than the maximum allowable depth-to-diameter ratio of 0.5 for an 8-inch sewer.

6. The sewer system analysis results indicate that the minimum velocity that is expected to occur in the proposed sewers during the peak daily flow condition is 0.44 fps.

7. The proposed sewer system shall be designed and constructed in accordance with the guidelines, standards, and approved materials of the City of Oceanside or as otherwise specified in Appendix A.

Thank you for the opportunity to provide sewer system planning services for the Cypress Point project. Please feel free to contact us to further discuss any aspect of the information presented in this letter-report.

Dexter Wilson Engineering, Inc.

Natalie Fraschetti, P.E.

NF:KH:ah

Attachments

APPENDIX A

EMAIL CORRESPONDENCE FROM CITY STAFF REGARDING SEWER DESIGN

Oceanside Water Utilities Department
Comments are in "Red"
-M. Uyeda 12/8/20

Cypress Point - Sewer/Water Design Summary

DESIGN GUIDELINE		ISSUE	DESCRIPTION of REQUEST
DESIGN EXCEPTIONS REQUESTED - OUTSTANDING ITEMS			
3.2.I	Where 2 FPS is not attainable, a minimum slope of 1.6% shall be used.	Due to the flatness of existing grades on the site and depth of the existing sewer point of connection, the site cannot be graded to meet the 1.6% slope requirement. Also, in order to get the sewer across the existing 42" Sewer Force Main, the sewer in Pala Road needs to be 0.35% as well. The 2 FPS cannot be accomplished in this portion of the sewer main extension to the site.	**Requesting the sewer main slope be 0.35%**. Without this reduced slope, the site would need to be raised on average about 7 feet, with the upstream portion of the site needing to be raised by about 13 feet. This would put the pads 13 feet above the existing grades of homes along the project's easterly property line. The second point of access from Aspen Street would not be achievable as the street is not long enough to make up the required grade change. The project would lose about 30% of the units proposed. City will accept provided it is a private sewer system.
3.2 I	Where velocities are 2.0 FPS or greater the following design criteria will govern: Pipe Diameter - 8 inches Minimum Slope - 0.50%	Due to the flatness of existing grades on the site and depth of the existing sewer point of connection, the 0.5% grade cannot be met.	**Requesting a slope of 0.35% on all sewer mains.** The only available point of connection for the sewer that has a path to the site around the existing 42" Sewer Force Main is the manhole at the intersection of Los Arbolitos and Pala Road. The sewer then continues west on Pala Road to the proposed project driveway, the only location where a gravity main can cross the exsting 42" Sewer Force Main and serve the site. The sewer is proposed to be at a slope of 0.35% instead of the 0.5% to keep the sewer invert as low as possible to maintain the maximum amount of cover over the pipe. The neighboring subdivision has a sewer grade of 0.32% in Los Arbolitos and Spruce Court, a cul-de-sac serving 10 detached homes. Again the finish grades on Pala Road cannot be rasied from those proposed as the current design allows for emergency surface flow if the proposed storm drain system was to fail. City will accept provided it is a private sewer system.

DESIGN GUIDELINE		ISSUE	DESCRIPTION of REQUEST
3.2.H.4	Minimum cover for sewer main shall be 6 feet below finish grade, unless otherwise approved by the Water Utilities Director.	Due to the flatness of existing grades on the site and depth of the existing sewer point of connection, the 6-foot of required cover cannot be met for portions of the project. Note: Pala Road cannot be raised any further as the current grades are set to allow for emergency overflow of storm water runoff in the event the underground storm water facility fails.	**Requesting the cover of over the sewer main to be 4.5 feet.** The cover that is achievable is about 5.0 feet in Pala Road and 4.5 feet for the on-site mains. The sewer in Pala Road is bucking grade because the only available spot to cross the existing 42" Sewer Force Main is near the west end of Pala Road, at which point the sewer enters the project. City will accept provided it is a private sewer system.
3.6.B.d.	PVC pipes shall not have slopes less than 2%. The maximum diameter shall be 24 inches. A PVC application may be allowed for a slope of less than 2% provided that the length of each section does not exceed 14 feet, a minimum 2 FPS velocity is maintained, or as approved by the Water Utilities Director.	Due to the flatness of existing grades on the site and depth of the existing sewer point of connection, the site cannot be graded to meet the slope requirement.	Project proposes to use PVC pipe. **Please clarify** whether the proposed grade of 0.35% is affected by this Guideline. City will accept provided it is a private sewer system.
Std Dwg S-3	House Connection depth 5' Min. cover to top of curb measured at PL.	Due to the flatness of existing grades on the site and depth of the existing sewer point of connection, the depth of 5' Min cannot be met at all locations.	**Requesting the sewer lateral cover to top of curb be reduced to approximately 4.5 feet.** City will accept provided it is a private sewer system. Based on discussions, development should be able to meet sewer lateral slope requirement.
3.4	Drop of sewer lateral to main.	Cannot determine what the City minimum standard is for drop to the main.	Requesting clarification of the required drop to the main. **Project is requesting no more than 0.5 feet drop to the main.** Refer to OSD S-3 on City's website. If you are referring to drop at connection to main, it shows lateral dropping at 45 degrees into main. Based on SDR-35 4" fitting, the drop is about 0.75 ft (9in).

DESIGN GUIDELINE		ISSUE	DESCRIPTION of REQUEST
2.4 - D	Minimum depth of cover required: 36 inches for 12-inch mains and smaller.	Due to the flatness of the existing site and the sewer constraints the 36 inch cover cannot be met at all locations.	**Requesting minimum depth of cover of 30 inches (2.5 ft) for water mains.** This may be possible for an 8" main where top of gate valve nut, but would probably present a problem for mains 10" or larger. Provide detail showing cover above nut for proposed water main size prior to acceptance of 2.5 ft of cover above public water main.
2.7 - F	All services for water meters, fire protection, fire hydrants, air vacuum and release valve assemblies, and blow off assemblies shall have a minimum of 3-feet of cover.	Due to the flatness of existing grades on the site and depth of the existing sewer point of connection, the 3-foot of required cover cannot be met for portions of the project.	**Requesting the cover over the proposed on-site water main be reduced to minimum of 2.5-feet in portions of the project area.** City will accept this modification. Where service line is in landscaped or unpaved are, the public service line shall be sleeved with PVC pipe 2x diameter of carrier pipe.
DESIGN EXCEPTIONS RESOLVED IN STAFF DISCUSSIONS - TO BE CONFIRMED			
3.2.H.2.	Street: Sewer main locations shall be located in the center of the street.	Due to the inclusion of various City Sewer Mains the project's public sewer main within easterly on-site street cannot be at the centerline of the street.	**Requesting the sewer main be located off of centerline on the easterly on-site street** to accomodated other City-proposed Utilities. City will accept provided it is a private sewer system.
		On the westerly on-site street the sewer cannot be on the centerline and keep the proposed water 5 feet from face of curb. Water line needs to be in this location to keep the proposed valves out of the gutter area. Adequate clearance from f/c to avoid removal of curb & gutter should water main need repair or replacement.	**Requesting the sewer main be located off centerline on the westerly on-site street** to allow 5-foot width from the water main to the edge of gutter for valves. City will accept provided it is a private sewer system.
3.2.L and 2.4.J	Where water and sewer mains are located within the same easement, the miniumum easement size shall be 30 feet wide.	The on-site street width from curb to curb is 28 feet.	**Requesting a 28 foot wide easement** (curb face to curb face) and pop out easments for water meters, blow-offs, Fire Hydrants and other misc appurtances. Assuming only water main will be public and sewer is private, the min public water easement width is 20-ft wide. Extend beyond curb face to include all public services/appurtenances to avoid easement pop outs that would provide less flexibility with location changes in design.

DESIGN GUIDELINE		ISSUE	DESCRIPTION of REQUEST
3.3.C.8	Prohibited location of Manholes: Within any area subject to Flooding.	The project is shown in the FEMA flood zone. The flood elevations in Pala Road indicate that the sewer manholes in the Pala Road will be lower than the flood elevations.	The site and the neighboring sites have been protected from flooding with the construction of the levy; however the Agencies have not completed the LOMR and therefore the site technically remains in a flood area. The project lots will be graded to raise homes out of the flood zone, but not the sewer manholes in Pala Road. Unless the manholes are in unpaved area and outside of access road, sewer manhole will not need to be raised but shall have water proofing.
2.4 - N	No Building foundations will be allowed within 10 feet of the outside edge of a City easement	The project proposes houses pushed to the front of the lot (10 ft behind curb face). The water easement pop outs will be closer than 10 feet to the building foundations.	**Requesting that the water pop out easements be allowed within the 10 foot setback of building foundations.** These popouts contain water meters and fire hydrants only - no mains. The mains will meet the required 10 feet clear of building footings. Provide a min clearance of 10' from outside of water main to building foundation. Provide a minimum 5' clearance from water meter and FH services.
2.6 - C	All fire hydrant lines shall be provided with a shut off valve at the main, and shall conform in all aspects to the Oceanside Standard Drawing.	Due to the inclusion of various City Sewer Mains and the proposed public sewer main within easterly on-site street, the water main was forced to be 1.85 feet from the edge of gutter. This condition would put the valve in the gutter area.	**Requesting the valve for the hydrants on the easterly on-site street be placed in the sidewalk area.** Per last meeting, the outside of the FH valve can may infringe on the edge of gutter by 1" to 1.5". This is preferred over placement of shutoff valve in sidewalk. Valve can shall not be located near in flow line of gutter.
2.10	Waterlines shall be offset 10 feet to the south or 10 feet to the east of the centerline of the street.	Due to the inclusion of various City sewer mains and the project's public sewer main within easterly on-site street the water main cannot be in the desired location. The water main was forced to be 1.85 feet from the edge of gutter. On the westerly on-site street the water cannot be located on the easterly side of the street due to the configuration of the numerous utilites at Pala Road.	**Requesting the water main be located west of the centerline:** **- I**n the easterly on-site street and at 1.85 feet off of the edge of gutter (3.35 feet from face of curb). - In the westerly on-site street. Submit a more detailed cross section showing all existing, proposed, and future utilities for City to review. City would provide some allowance here, but additional information is needed for specific dimension.

DESIGN GUIDELINE		ISSUE	DESCRIPTION of REQUEST
	Clearance Requirements between utilities	The storm drain invert elevations are set by the elevation at the discharge point. This was set as low as possible, with the pipes coming back at 0.35% and could not get under the existing 42" SWR FM at the proposed cul-de-sac. This means the storm drain needs to go over the FM, raising the pipe significantly. The street grade in Pala Road is bucking grade as the existing street was left so low and was left as surface flow runoff and sump was required just west of Pala Road and Los Arbolitos. If the surface flow was carried to the proposed cul-de-sac there would not be enough cover over the existing 42" SWR FM to get water and sewer over.	**Requesting Clearance Exceptions between Utilities**: 1. Need 0.5 ft clearance between the existing 42" Sewer FM and the proposed storm drain. Storm drain will be over the sewer main. 2. Need to have the water main dip under the storm drain west of the intersection of Pala Road and Los Arbolitos. 3. Need 0.5 ft clearance between the proposed 8" sewer and the 8" water at the intersection of Aspen Street and easterly on-site street. 1. Special design will be required to show ex 42" FM is properly protected and supported where SD will cross over 42" FM with just 0.5 ft of clearance OD to OD. Provision for City to be able to repair or rehab 42" FM should also be taken into consideration in design. 2. Submit detail of crossing in design showing proposed depth of water main for review. City may allow crossing depending upon overall depth of water main. This would require additional air vac/release valve at high point(s), and preferably a FH instead of blow off assembly at local low point.

3. This vertical clearance of 0.5 ft between water and sewer would be acceptable provided design ensures proper support and fill between the two pipes, adequate cover over each pipe, and the design meets State Water Resources Control Board separation requirements. This can be addressed in more detail during design phase.

1, 2, and 3. This may require submittal of design to State Water Resources Control Board, Division of Drinking Water for a waiver to design requirements.

APPENDIX B

SEWER LATERAL SIZING

Project Name	Cypress Point
Job Number	750-006
Date	3/17/2021

Drainage Fixture Units

The basis for the Drainage Fixture Units is the 2019 California Plumbing Code.

	All Plans						
	Private		Public		Assembly		
		FIXTURE		FIXTURE		FIXTURE	TOTAL
DESCRIPTION	QUANTITY	UNITS EACH	QUANTITY	UNITS EACH	QUANTITY	UNITS EACH	FIXTURE UNITS
BATHTUB OR COMB B/S	1	2		2			2
CLOTHES WASHER, DOM	1	3		3		3	3
DISHWASHER, DOMESTIC	1	2		2		2	2
DRINKING FOUNTAIN		0.5		0.5		1	0
FOOD WASTE GRINDER, COMM				3		3	0
FLOOR DRAIN		2		2		2	0
SHOWER	1	2		2		2	2
LAVATORY	4	1		1		1	4
COMM SINK W/FOOD WASTE				3		3	0
KITCHEN SINK DOMESTIC	1	2		2			2
LAUNDRY SINK		2		2		2	0
SERVICE OR MOP BASIN				3		3	0
URINAL		2		2		5	0
WATER CLOSET 1.6 GRAVITY	3	3		4		6	9
WATER CLOSET 1.6 FLUSHOM		3		4		6	0
							0
							0
							0
							0
TOTAL DRAINAGE FIXTURES							24

APPENDIX C

SEWER SYSTEM ANALYSIS
PROPOSED SEWER SYSTEM

DATE: 12/11/2020

SEWER STUDY SUMMARY

FOR: Cypress Point Sewer System

SHT 1 OF 1

JOB NUMBER: 750-006

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET:

LINE	FROM	TO	LENGTH (ft)	EDUs SERVED		SEWAGE PER EDU/DAY (gpd/EDU)	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.)
				IN-LINE	TOTAL					M.G.D.	C.F.S.							
	32	30	61.8	2.0	2.0	170	340	3.500	1,190	0.001	0.002	8	0.35	0.001193	0.02472	0.037	0.0094	0.44
	30	28	184.4	3.0	5.0	170	850	3.500	2,975	0.003	0.005	8	0.35	0.002982	0.03813	0.057	0.0179	0.58
	28	26	278.7	4.0	9.0	170	1,530	3.500	5,355	0.005	0.008	8	0.35	0.005368	0.05033	0.075	0.0271	0.69
	26	24	279.4	5.0	14.0	170	2,380	3.500	8,330	0.008	0.013	8	0.35	0.008351	0.06209	0.093	0.0368	0.79
	24	22	247.1	4.0	18.0	170	3,060	3.500	10,710	0.011	0.017	8	0.35	0.010736	0.07000	0.105	0.0440	0.85
	22	20	45.2	0.0	18.0	170	3,060	3.500	10,710	0.011	0.017	8	0.35	0.010736	0.07000	0.105	0.0440	0.85
	20	10	110.7	2.0	20.0	170	3,400	3.500	11,900	0.012	0.018	8	0.35	0.011929	0.07369	0.111	0.0473	0.88
	18	16	301.4	10.0	10.0	170	1,700	3.500	5,950	0.006	0.009	8	0.35	0.005965	0.05300	0.079	0.0291	0.71
	16	14	289.8	10.0	20.0	170	3,400	3.500	11,900	0.012	0.018	8	0.35	0.011929	0.07369	0.111	0.0473	0.88
	14	12	292.0	11.0	31.0	170	5,270	3.500	18,445	0.018	0.029	8	0.35	0.018491	0.09093	0.136	0.0643	1.00
	12	10	87.0	2.0	33.0	170	5,610	3.500	19,635	0.020	0.030	8	0.35	0.019683	0.09374	0.141	0.0672	1.02
	10	8	76.6	1.0	54.0	170	9,180	3.500	32,130	0.032	0.050	8	0.35	0.032209	0.11909	0.179	0.0951	1.18
	8	6	56.7	0.0	54.0	170	9,180	3.500	32,130	0.032	0.050	8	0.35	0.032209	0.11909	0.179	0.0951	1.18
	6	4	184.8	0.0	54.0	170	9,180	3.500	32,130	0.032	0.050	8	0.35	0.032209	0.11909	0.179	0.0951	1.18
	4	2	233.9	0.0	54.0	170	9,180	3.500	32,130	0.032	0.050	8	0.35	0.032209	0.11909	0.179	0.0951	1.18

Total EDUs	Min Slope	Max dn/D	Min Velocity
54.00	0.35	0.18	0.44

EXHIBIT A

\\ARTIC\DWG\750006\CP_SWR_EXHIBIT-A_MANHOLE DIAGRAM.DWG 01-07-21 15:06:54 LAYOUT: 11X17

SAN LUIS REY RIVER

N

0 150 FEET

REDWOOD ST

EX.8" S=0.32%

LOS ARBOLITOS BLVD

EX.8" S=0.32%

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EX.8" S=0.32%

PONDEROSA DR

EX.8" S=0.32%

EX.8" S=0.32%

PALA RD

EX.8" S=0.32%

EX.42"

EX.6"

EX.6"

LOS ARBOLITOS BLVD

EX.12"

CONNECT TO EXISTING SEWER

32 18 30 28 16 26 14 24 12 22 20 10 8 6 4 2

8"

LEGEND

- PROJECT BOUNDARY
- EXISTING PUBLIC GRAVITY SEWER LINE
- EXISTING PUBLIC FORCE MAIN LINE
- PROPOSED PUBLIC GRAVITY SEWER LINE
- PROPOSED PRIVATE GRAVITY SEWER LINE
- FUTURE PUBLIC SEWER LINE
- (2) COMPUTER MODEL MH NUMBER

EXHIBIT A

SEWER MANHOLE DIAGRAM

CYPRESS POINT