APPENDIX K

SEWER STUDY
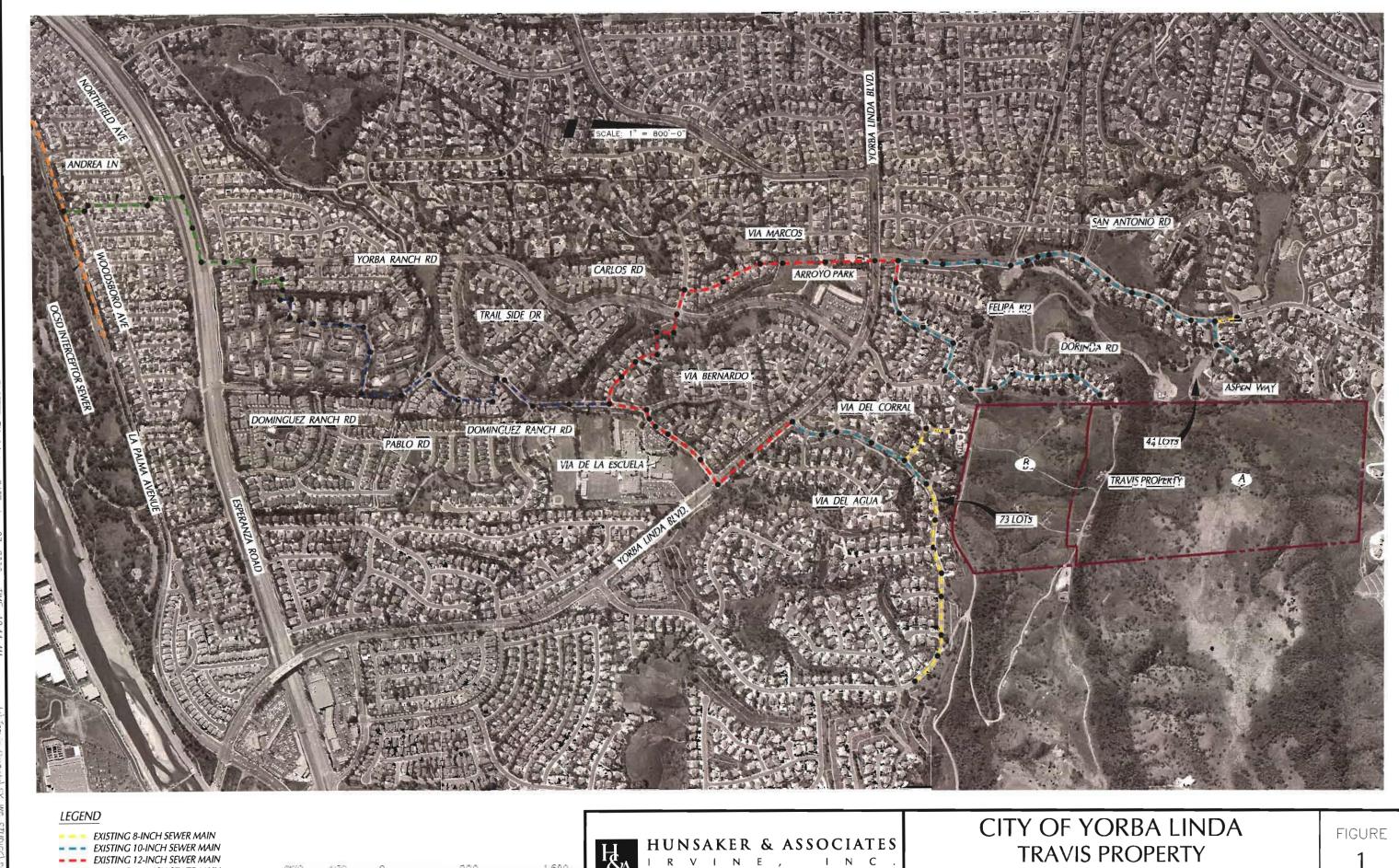
REPORT OF THE EVALUATION
OF THE
CITY OF YORBA LINDA
SEWER SYSTEM
FOR THE
PROPOSED DEVELOPMENT
TRAVIS PROPOERTY

Prepared For:

Sage Community Group, Inc.
3 Corporate Plaza, Suite 102
Newport Beach, CA 92660
(949) 644-3514

Prepared By:

Hunsaker & Associates Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949) 583-1010

John R. Gass, P.E.

June 7, 2006
W.O. 2454-3

SCALE: 1" = 800'-0"

NORTHFIELD AVE
ANDREA LN
WOODSBORO AVE
OCSD INTERCEPTOR SEWER
LA PALMA AVENUE
ESPERANZA ROAD
YORBA RANCH RD
TRAIL SIDE DR
DOMINGUEZ RANCH RD
PABLO RD
DOMINGUEZ RANCH RD
VIA DE LA ESCUELA
YORBA LINDA BLVD.
VIA MARCOS
CARLOS RD
ARROYO PARK
VIA BERNARDO
VIA DEL CORRAL
VIA DEL AGUA
YORBA LINDA BLVD.
SAN ANTONIO RD
FELIPA RD
DORINDA RD
ASPEN WAY
44 LOTS
TRAVIS PROPERTY
73 LOTS
A
B

LEGEND

- EXISTING 8-INCH SEWER MAIN
- EXISTING 10-INCH SEWER MAIN
- EXISTING 12-INCH SEWER MAIN
- EXISTING 15-INCH SEWER MAIN
- EXISTING 18-INCH SEWER MAIN
- EXISTING OCSD INTERCEPTOR SEWER

800 400 0 800 1600
GRAPHIC SCALE: 1" = 800'

HUNSAKER & ASSOCIATES
I R V I N E ,   I N C .
PLANNING   ■   ENGINEERING   ■   SURVEYING
Three Hughes   ■   Irvine, CA 92618   ■   PH: (949) 583-1010   ■   FX: (949) 583-0759

CITY OF YORBA LINDA
TRAVIS PROPERTY
SEWER SYSTEM SCHEMATIC

W/O No. 2454-3   DATE: 6/7/06

FIGURE
1

1. INTRODUCTION

The purposed development consists of 117 single-family home sites east of San Antonio Road within the City's Sewer Improvement District 1. Forty-four homes will be served by an existing City sewer system that begins at the easterly limit of Aspen Way, thence south through existing sewer mains to the Orange County Sanitation District (OCSD) trunk sewer in La Palma Avenue. The remaining seventy-three homes will be served from the City's existing sewer system in Via Del Agua, thence south through existing sewer mains to the OCSD trunk sewer in La Palma Avenue.

Two sewer drainage study areas were created to analyze the impact of the Travis Propoerty on the existing sewer systems. Study Area A was used to analyze the impact on the City's existing sewer system along San Antonio Road to the intersection of Via Bernardo and Dominguez Ranch Road. Study Area B was used to analyze the impact on the City's existing sewer mains in Via Del Agua to the intersection of Via Bernardo and Dominguez Ranch Road. Study Area A and B share the same alignment from the intersection of Via Bernardo and Dominguez Ranch Road to the OCSD trunk sewer in La Palma Avenue

2. Methodology

The modeling of the existing conditions consisted of creating a base map of the proposed development and adjacent areas draining into the trunk sewers (See Figure 1). The existing sewer system was modeled using information found on the City of Yorba Linda master plan titled, "Master Plan of Sewers, East Yorba Linda Area" dated February 1983. This analysis should be re-evaluated if these conditions have change or new information becomes available. Any interpretation of the information presented in this report should be referred to H&A to ensure the integrity of the results.

3. Flow Analysis

The existing sewer flows were taken from the aforementioned City Master Plan of the sewer study areas. Proposed Dwellings were assumed to have an average daily contribution to the system of 250 gallons of wastewater per day.

These flow coefficients are comparable to the flow coefficients used by The Sanitation Districts of Orange County, District No. 7. This report will use the District No. 7 peak-to-average flow relationship algorithm being:

$$Q_{peak} = 1.84(Q_{avg})^{0.92} \text{ where Q is in [cfs]}$$

Where: Q_{avg} = 250 gpd/du for residential dwellings

4. Hydraulic Model

Mannings Equation was used to model the existing sewer systems. All calculations area based on a friction factor of n=0.013, all pipe sizes are limited to flowing ¾ full at peak flows, and the slopes found within the City Master Plan.

The calculations include an analysis of the existing systems, and an analysis of the existing systems with the proposed development's contributions.

5. Results

After calculating the capacity of the existing systems and the existing system including the proposed development it has been concluded that the existing system has the capacity to handle the additional waste created by the proposed development without requiring any changes to the existing system. This includes the collector sewer mains from both sewer study areas.

CALCULATIONS

Travis Property - Yorba Linda

Existing Sewer System Analysis

Existing Flows not including project flows

Study Area	Pipe No.	Next Pipe	Pipe Dia (in)	Slope (ft/ft)	Peak Flow (cfs)	Velocity (ft/s)	Calc'd D/d	Agency Max D/d	Flow @ Max D/d (cfs)
A	61	62	10	0.0024	0.078	1.14	0.18	0.75	0.98
	62	63	12	0.0072	1.405	3.79	0.48	0.75	2.75
	63	64	12	0.0024	1.429	2.48	0.69	0.75	1.59
	64	49	15	0.0054	1.481	3.44	0.39	0.75	4.32
B	60	42	10	0.0024	0.946	2.22	0.73	0.75	0.98
	42	40	12	0.0034	1.031	2.64	0.50	0.75	1.89
	40	45	12	0.0120	1.624	4.75	0.45	0.75	3.55
	45	47	12	0.0580	1.629	8.43	0.30	0.75	7.81
	47	50	12	0.0080	1.636	4.09	0.51	0.75	2.90
	50	49	12	0.0028	1.716	2.72	0.75	0.75	1.71
A & B	49	53	15	0.0054	3.140	4.14	0.60	0.75	4.32
	53	54	15	0.0050	3.181	4.03	0.62	0.75	4.16
	54	56	18	0.0050	5.311	4.58	0.63	0.75	6.76
	56	83	18	0.0040	6.020	4.26	0.75	0.75	6.05
	83	OCSD	18	0.0059	7.374	5.19	0.75	0.75	7.37

Note:
>   For discription of pipe numbers, please refer to City of Yorba Linda Master Plan titled,
>   "Master Plan of Sewers, East Yorba Linda Area" dated February 1983.

Travis Property - Yorba Linda

Existing Sewer System Analysis

Existing Flows + 0.453 cfs (project flows)

Study Area	Pipe No.	Next Pipe	Pipe Dia (in)	Slope (ft/ft)	Peak Flow (cfs)	Velocity (ft/s)	Calc'd D/d	Agency Max D/d	Flow @ Max D/d (cfs)
A	61	62	10	0.0024	0.139	1.37	0.25	0.75	0.98
	62	63	12	0.0072	1.454	3.82	0.49	0.75	2.75
	63	64	12	0.0024	1.478	2.49	0.71	0.75	1.59
	64	49	15	0.0054	1.530	3.45	0.39	0.75	4.32
B	60	42	10	0.0024	0.976	2.23	0.75	0.75	0.98
	42	40	12	0.0034	1.062	2.66	0.51	0.75	1.89
	40	45	12	0.0120	1.653	4.77	0.46	0.75	3.55
	45	47	12	0.0580	1.658	8.49	0.30	0.75	7.81
	47	50	12	0.0080	1.665	4.12	0.52	0.75	2.90
	50	49	12	0.0028	1.745	2.72	0.76	0.75	1.71
A & B	49	53	15	0.0054	3.214	4.16	0.60	0.75	4.32
	53	54	15	0.0050	3.254	4.04	0.63	0.75	4.16
	54	56	18	0.0050	5.381	4.59	0.63	0.75	6.76
	56	83	18	0.0040	6.089	4.26	0.75	0.75	6.05
	83	OCSD	18	0.0059	7.442	5.20	0.76	0.75	7.37

Note:
    For discription of pipe numbers, please refer to City of Yorba Linda Master Plan titled, "Master Plan of Sewers, East Yorba Linda Area" dated February 1983.