Appendix F Sewer Study

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RECEIVED
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PLANNING DIV

SEWER SYSTEM HYDRAULIC ANALYSIS
FOR
AMWAY SITE AT BUENA PARK
VTTM 19419
5600 BEACH BLVD
BUENA PARK, CA 90621
APN NO. 066-572-08

RICK Job Number 20101

Carson P. Edgington RCE 76519

Prepared By:

RICK

5620 Friars Road

San Diego, California 92110

(619) 291-0707

Prepared For:

City of Buena Park

Public Works Department

6650 Beach Blvd.

Buena Park, California 90621

September 2, 2025

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Appendix C- Sewer Generation Factor Guidelines

Appendix D- Hydraulic Analysis Reports

Appendix E- Existing City Sewer Plans

Section 1: Introduction

1.1 Purpose of Study

The purpose of this report is to evaluate the impact of the proposed private sewer mains and public sewer connections for the proposed site development as it relates to the existing sewer condition that currently serves the Amway Site. It is not for recommendations for sewer upgrades but to determine if the Amway Site triggers any deficiencies in the existing City of Buena Park sewer system with the sewer flows from the development.

1.2 Project Description

The project site is located on the northeast side of Beach Boulevard and Dr. Sam Way in the City of Buena Park. This development consists of 50 residential affordable housing units and 231 residential townhouse units as shown in the Site Plan, Appendix A. Below is a summary breakdown of housing units by lateral connection:

Lateral Connection 1: 146 Residential Units
Lateral Connection 2: 135 Residential Units

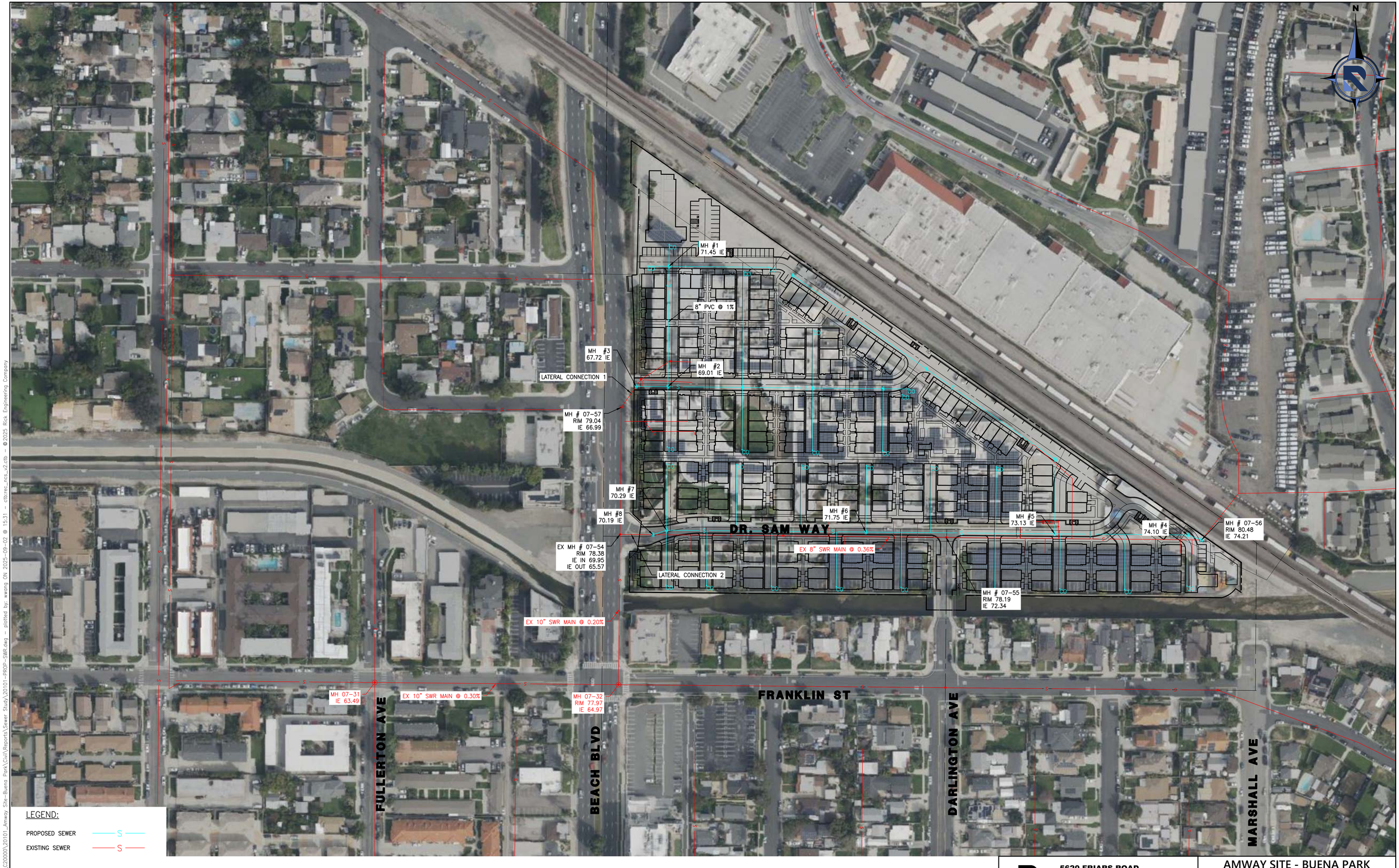
1.3 Existing and Proposed Conditions

Existing Conditions:

The existing sewer flow from the Amway site that will be removed flows into the public sewer main in Dr. Sam Way in and Beach Boulevard in 8” sewer mains. From the intersection, existing flows transition to a 10” pipe and continue south through Beach Boulevard into Frankin Street. From there, the sewer flows west in a 10” sewer main.

Proposed Conditions:

The proposed sewer conveys sewer flows from multifamily residential units into the existing 8” sewer lateral connections to the Amway site at Beach Blvd at MH 07-57, and replaces the sewer main in Dr. Sam Way to serve the site into the existing lateral, which ties into MH 07-54 in Beach Blvd.



LEGEND:

PROPOSED SEWER ——— S ———

EXISTING SEWER ——— S ———

80 40 0 80 160

GRAPHIC SCALE: 1"=80'

RICK

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AMWAY SITE - BUENA PARK

SEWER FLOW NODE DIAGRAM

PROJECT NO:	20101	SCALE:	1"=80'
DRAWN BY:	WW	DATE:	9/2/2025

C:\RICK\Projects\C20000\20101_Amway Site-Buena Park\Civil\Reports\Sewer Study\20101-PROP-SWR.dwg - plotted by: wwong ON 2025-09-02 @ 15:31 - ctb:rec_ncs_v2.ctb - © 2025 Rick Engineering Company

Section 2: Design Methodology

Under the direction of the City of Buena Park, sewer metering was conducted at two locations by ADS Environmental Services. The first location was at MH 07-55, the intersection of Dr. Sam Way and Darlington Avenue. This data would show the existing flows upstream from the site. The second location was at MH 07-31, the intersection of Fullerton Avenue and Franklin Street. This data would show the existing flows downstream from our site. The data provided in the ADS report, shown in Appendix B, shows real data on existing flows being generated prior to the development introducing any proposed flows. Note that MH 07-55 captures some of the existing site flow as MH 07-56 contains the end of a siphon system and is unable to be monitored, and MH 07-31 includes flows from the existing site and other developments as well so the study will be a more conservative assessment.

The results are shown in Appendix B and show that the existing system has capacity for the proposed development. Table 1 summarizes the existing City sewer flow results from the ADS monitoring report. At its peak, the city's 10" sewer main on Franklin Street is flowing at 37%.

The proposed development sewer flow contributions to the existing City public sewer were determined using a sewer generation factor per direction of the City of Buena Park as shown in email attached in Appendix C. The wastewater generation factor of 250 gallons per day (GPD) per dwelling unit was used in this analysis. The proposed additional average sewer flows were converted to cubic feet per second (cfs), with a peak factor (PF) of 2.0 to determine the estimated peak sewer flow for this development as shown in Table 2.

Next, the flow depth was calculated through the public sewer system using Manning's equation. Sewer flow analysis table using King's handbook of hydraulics is summarized in Table 4. The equation used to determine flows with King's handbook is as follows:

$$K = \frac{Q_n}{d^{\frac{8}{3}} S^{\frac{1}{2}}}$$

The results from the Flow Monitoring Study and the proposed additional sewer flows were then input into Hydraulic Toolbox 5.4 computer program to analyze the effects on the City sewer capacity. To provide a conservative approach, the maximum or peak measured depth were used

rather than the calculated quantity from the flow monitoring study. The results of the hydraulic analysis are found in Appendix D – Hydraulic Analysis Reports (Hydraulic Toolbox 5.4 Results Tables).

The existing sewer as-built plans for Franklin Street and Beach Boulevard were obtained from the City of Buena Park Sewer Service Division website, maps attached in Appendix E.

Conclusion

This sewer system capacity study was completed to determine the anticipated wastewater flow demands that will be produced by the development per the Preliminary Site Plan attached in Appendix A and determine if the existing City sewers in the vicinity have the capacity to accept the additional development flows.

The city of Buena Park existing 8” and 10” sewer mains were determined to have a peak depth of 4.45” and 4.70”, respectively, and a maximum sewer flow of 0.317 cfs and 0.444 cfs. The public sewer mains are flowing at 44% and 37% in the existing condition. Note that the flow monitor placements for this study are unable to fully isolate the existing site with the nearest manholes we were able to access upstream and downstream, so the study is more conservative. The proposed development will add a total additional 0.217 cfs peak flow. The combined flow results in a peak flow of 0.655 cfs at 55% full in the 10” sewer main downstream, as summarized in Table 3.

Based on our analysis there is sufficient capacity available in the existing City sewer mains to accept the anticipated flow of the Amway site.

Table 1
City of Buena Park
Amway Site
Existing Sewer Flow Summary

Street Name	Manhole No.	ADS Manhole No.	Item	Pipe Diameter (in)	Depth (in)	Velocity (ft/s)	Flow (mgd)	Flow (cfs)	Percent Full (%)
Dr. Sam Way	07-55	BP07-55		8					
			Average		3.31	1.21	0.109	0.169	
			Minimum		2.20	0.80	0.040	0.062	
			Maximum		4.45	1.61	0.205	0.317	44%
Franklin St	07-31	BP07-31		10					
			Average		3.50	1.46	0.164	0.254	
			Minimum		2.37	1.02	0.067	0.104	
			Maximum		4.70	1.80	0.287	0.444	37%

Table 2
City of Buena Park
Amway Site
Proposed Sewer Flows

Lateral No.	Manhole No.	Use Type	No. of Units	Average Daily Flow (gpd/unit)	Total Daily Flow (gpd)	Total Flow (cfs)	Peaking Factor	Total Peak Flow (cfs)
1	1, 2, 3, 07-57	Multi Residential	138	250	34500	0.05	2	0.11
2	07-56, 4, 5, 6, 7, 8, 07-54	Multi Residential	135	250	33750	0.05	2	0.10

Table 3
City of Buena Park
Amway Site
Existing and Proposed Sewer Flow Summary

Street Name	Manhole No.	ADS Manhole No.	Item	Pipe Diameter (in)	Depth (in)	Velocity (ft/s)	Flow (cfs)	Percent Full (%)
Dr. Sam Way	07-55	BP07-55	Existing	8	4.45	1.61	0.317	44%
			Proposed Flow	8			0.104	
			Total	8	4.79	1.93	0.421	58%
Franklin St	07-31	BP07-31	Existing	10	4.70	1.80	0.444	37%
			Proposed Flow	10			0.217	
			Total	10	5.76	2.02	0.661	55%

Table 4

City of Buena Park

Amway Site

Sewer Flow Analysis

	Upstream MH	Downstream MH							Peak Design Flow							
LINE	From MH	To MH	Diameter	Upstream DU's	In Line Du's*	Total Du's	GPD per DU	ADWF (gpd)	Dry Weather Peaking	PDWF $(gpd)^2$	Peak Dry Weather Flow	Slope (%)	dn (FT)	dn/D	Rh	Velocity (fps)
L1	1	2	6	77.0	69	146	250.0	36,500	2.00	73,000.00	0.11	1.00	0.15	0.30	0.09	2.24
L2	2	3	6	146.0	0	146	250.0	36,500	2.00	73,000.00	0.11	2.00	0.13	0.25	0.07	2.86
L3	3	07-57	8	146.0	0	146	360.0	52,560	2.00	105,120.00	0.16	1.41	0.15	0.23	0.09	2.73
L4	07-57	07-54	8	146.0	0	146	360.0	52,560	2.00	105,120.00	0.16	0.55	0.19	0.29	0.11	1.95
L5	07-56	4	8	-	-	-	-	-	-	-	0.32	0.36	0.31	0.46	0.16	2.01
L6	4	5	8	0.0	44	44	250.0	11,000	2.00	22,000.00	0.35	0.36	0.33	0.49	0.17	2.06
L7	5	6	8	44.0	40	84	360.0	30,240	2.00	60,480.00	0.41	0.36	0.36	0.54	0.17	2.15
L8	6	7	8	84.0	51	135	360.0	48,600	2.00	97,200.00	0.47	0.36	0.39	0.59	0.18	2.21
L9	7	8	8	135.0	0	135	360.0	48,600	2.00	97,200.00	0.47	0.36	0.39	0.59	0.18	2.21
L10	8	07-54	8	135.0	0	135	360.0	48,600	2.00	97,200.00	0.47	0.36	0.39	0.59	0.18	2.21
L10	07-54	07-32	10	281.0	0	281	360.0	101,160	2.00	202,320.00	0.63	0.20	0.49	0.59	0.23	1.91
L11	07-32	07-31	10	281.0	0	281	360.0	101,160	2.00	202,320.00	0.76	0.30	0.48	0.58	0.23	2.33

APPENDIX A

Site Plan

Legend

1. Property Line
2. Parking Space - 9'x20'
3. Accessible Parking Space
4. Trash Enclosure
5. Accessible Path of Travel
6. Accessible Ground Floor Unit
8. Affordable Units
9. Transformers
10. Setback Line
11. Electrical Cabinet and Fire Riser

Overall Site Summary		
Gross Site Area	*13.750 Acres*	(599,105 SqFt)
Affordable Units	*50 du*	(0.85 Ac/36,908 SqFt)
Townhome / Duplex Units	*231 du*	(12.9 Ac/562,197 SqFt)
Total Dwelling Units	281 du	
Gross Density	20.4 Du/Ac	
Product Type	3 Story Duplex / Townhomes | Affordable Bldg	
Occupancy Type	CRC Townhomes & 2 Family Dwelling	
Construction Type	Towns / Duplex: Type VB | Affordable: VA	
Sprinkler Type	Towns/Duplex: NFPA 13D | Affordable: NFPA 13	
Building Height	Towns / Duplex: 39' | Affordable: 48'	
Front Setback	19' Required | 20' Proposed	
Side / Rear Setback	10' Required | 10' Proposed	

Overall Building Summary				
Building Type	Quantity	Bldg Footprint Area	Gross Bldg Area	Total Area
Building A3 - Affordable	1	10,900 sf	31,460 sf	31,460 sf
Product B - 4 Plex | Bldg A	3	3,179 sf	9,598 sf	28,794 sf
Product B - 5 Plex | Bldg B	9	3,758 sf	11,618 sf	104,562 sf
Product B - 5 Plex | Bldg C	3	3,978 sf	12,063 sf	36,189 sf
Product B - 6 Plex | Bldg D	7	4,526 sf	13,986 sf	97,902 sf
Product C - Duets	58	1,689 sf	4,957 sf	287,506 sf
Product C - Duet Single	1	872 sf	4,140 sf	4,140 sf
Pool Building	1	437 sf	437 sf	437 sf
Total	83	197,146 sf 32.9%		590,990 sf
FAR				0.99
Lot Coverage			34.9%	209,306 sf

Plan Summary						
Plan	Beds	Net Unit Area	Quantity	%	Total Net Area	Avg. Unit Size
Affordable - P1	1	400 sf	44	15.7%		
Affordable - P2	2	469 sf	6	2.1%		
Subtotal A Affordable			50	18%		
B Townhomes - P1	2	1,238 sf	16	5.7%		
B Townhomes - P2	3	1,523 sf	16	5.7%		
B Townhomes - P3	3	1,646 sf	35	12.5%		
B Townhomes - P4	4	1,863 sf	47	16.7%		
Subtotal B Townhomes			114	41%		
C Duets - P1	3	1,694 sf	59	21.0%		
C Duets - P2	4	1,947 sf	58	20.6%		
Subtotal C Duets			117	42%		
Total			281	100%	422,633 sf	1,504 sf

Unit Mix	Quantity	%
Affordable 1 Bedroom Total	44	15.7%
Affordable 2 Bedroom Total	6	2.1%
2 Bedroom Total	16	5.7%
3 Bedroom Total	110	39.1%
4 Bedroom Total	105	37.4%
Total	281	100.0%

Parking Summary (per State Density Bonus Law)			
Parking Required	Quantity	Ratio Req'd	Spaces Req'd
Affordable - P1	57	*1.00 Spaces/Unit*	57
Affordable - P2	3	*1.00 Spaces/Unit*	3
2 Bed	16	*1.50 Spaces/Unit*	24
3 Bed	110	*1.50 Spaces/Unit*	165
4 Bed	105	*2.50 Spaces/Unit*	263
Total Residential Parking Req'd		1.82 Spaces/Unit	512
Parking Provided		Ratio Provided	Spaces Provided
Garage Spaces		1.64	462
On Site / Guest Spaces		0.37	*105*
Total Residential Parking Provided		2.02	567
Accessible Parking Required		Ratio Req'd	Spaces Req'd
Resident Open Spaces	105	5%	6

Open Space Summary		
Private Balcony Open Space (6'x6' min.)	5,973 sf	21 sf/Unit
Private Ground Floor Open Space 10x10	3,574 sf	13 sf/Unit
Common Open Space	170,792 sf	608 sf/Unit
Total Open Space Provided	180,339 sf	642 sf/Unit

Enhanced Elevations
Privacy Duets
1 / B — Building Number / Building Type
101 / P1 — Unit Number / Plan Type

APPENDIX B

ADS Flow Monitoring Report

Amway Sewer Flow Monitoring, Buena Park 2025

Final Report Submitted to **Rick Engineering**
August 29, 2025

ADS ENVIRONMENTAL SERVICES

340 The Bridge Street, Suite 204
Huntsville, AL 35806

800-633-7246
www.adsenv.com

August 29, 2025

Carson P. Edgington, P.E.
Rick Engineering
5620 Friars Road
San Diego, CA 92110

SUBJECT: Amway Sewer Flow Monitoring, Buena Park 2025

Dear Carson P. Edgington,

ADS is pleased to submit the report for the Amway Sewer Flow Monitoring, Buena Park 2025 completed on behalf of Rick Engineering. The metering was conducted at two (2) location(s). The study was conducted during the period of Saturday, 26 July 2025 to Friday, 08 August 2025.

The report contains depth, velocity, and quantity hydrographs as well as daily long tables for the metering period. An Excel file containing depth, quantity, and velocity entities for the monitoring location in 5-minute format was provided previously.

In addition, we would be happy to further explain any details about the report that may seem unclear. Should you have any questions or comments, you may contact the Project Manager, Paul Mitchell at (714)920-5518.

It has been our pleasure to be of service to you in the performance of this project. Thank you for choosing ADS products and services to meet your flow monitoring needs.

Sincerely,
ADS ENVIRONMENTAL SERVICES

Latisha Bennett
Senior Hydraulic Data Analyst

Amway Sewer Flow Monitoring, Buena Park 2025

Prepared For:

Carson P. Edgington, PE
Rick Engineering
5620 Friars Road
San Diego, CA 92110

Prepared By:

ADS, LLC
340 The Bridge Street, Suite 204
Huntsville, AL 35806

Scope and Methodology

Introduction

Rick Engineering entered into an agreement with ADS Environmental Services to conduct flow monitoring at two (2) locations in Buena Park, CA. The study was scheduled for a period of two (2) weeks. Once in place, the flow monitoring equipment was used to measure depth, velocity, and to quantify flows. The objective of this study was to confirm flows for planning purposes.

Project Scope

The scope of this study involved using a flow monitor to quantify wastewater flow at the designated location for the 2 weeks period. Specifically, the study included the following key components.

- Investigate the proposed flow-monitoring site for adequate hydraulic conditions
- Flow monitor installation
- Flow monitor confirmations and data collections
- Flow data analysis

Equipment installation was completed on July 25, 2025. The monitoring period began on July 26, 2025, and was completed on August 8, 2025. Upon completion of the study, the equipment was removed from the system by August 15, 2025.

Flow Monitoring Equipment

The ADS Triton+ monitor was selected for this project. This flow monitor is an area velocity flow monitor that uses both the Continuity and Manning's equations to measure flow.

The ADS Triton+ monitor consists of data acquisition sensors and a battery-powered microcomputer. The microcomputer includes a processor unit, data storage, and an on-board clock to control and synchronize the sensor recordings. The monitor was programmed to acquire and store depth of flow and velocity readings at 5-minute intervals.

The Triton+ monitor features cross-checking using multiple technologies in each sensor for continuous running of comparisons and tolerances. The Triton+ monitor can support two (2) sets of sensors. The sensor option used for this project was:

The Peak Combo Sensor installed at the bottom of the pipe includes three types of data acquisition technologies.

The ***up looking ultrasonic depth*** uses sound waves from two independent transceivers to measure the distance from the sensor upward toward the flow surface; applying the speed of sound in the water and the temperature measured by sensor to calculate depth.

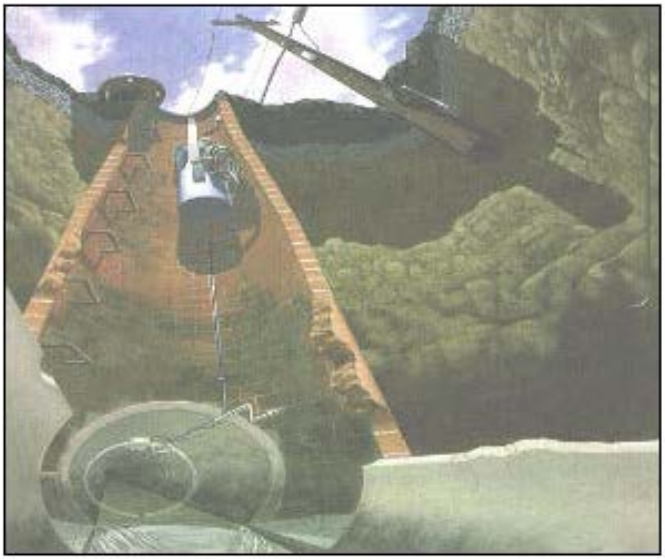
The ***pressure depth*** is calculated by using a piezo-resistive crystal to determine the difference between hydrostatic and atmospheric pressure. The pressure sensor is temperature compensated and vented to the atmosphere through a desiccant filled breather tube.

To obtain ***peak velocity*****,** the sensor sends an ultrasonic signal at an angle upward through the widest cross-section of the oncoming flow. The signal is reflected by suspended particles, air bubbles, or organic matter with a frequency shift proportional to the velocity of the reflecting objects. The reflected signal is received by the sensor and processed using digital spectrum analysis to determine the peak flow velocity.

Installation

Installation of flow monitoring equipment typically proceeds in four steps. First, the site is investigated for safety and to determine physical and hydraulic suitability for the flow monitoring equipment. Second, the equipment is physically installed at the selected location. Third, the monitor is tested to assure proper operation of the velocity and depth of flow sensors and verify that the monitor clock is operational and synchronized to the master computer clock. Fourth, the depth and velocity sensors are confirmed, and line confirmations are performed.

In pipes up to 42 inches in diameter, the sensors were mounted on expandable stainless-steel rings, inserted at least a foot upstream into influent pipes and tightened against the inside walls of the pipes. Influent pipe installations reduce the influences of turbulence and backwater often caused by changes in channel geometry in manholes.



Data Collection, Confirmation, and Quality Assurance

Data collects were done remotely via wireless connect on a weekly basis. As needed, during the monitoring period, field crews visit each monitoring location to verify proper monitor operation and document field conditions. The following quality assurance steps are taken to assure the integrity of the collected data:

Measure power supplies: monitors were powered by dry cell battery packs. Voltages were recorded and battery packs replaced, as necessary. Separate batteries provided back-up power to memory allowing primary batteries to be replaced without loss of data.

Clock synchronization: Field crews synchronized monitor clocks to master clocks.

Confirm depth and velocity readings: Field crews descended into meter manholes to manually measure depths and velocities and compare the meter readings to confirm that they agreed. The site met the criteria for confirmation for depth and velocity unless noted otherwise in the site commentary section. They also measured silt levels, if any, in the inverts of the pipes. Silt areas were subtracted from flow areas to compute true areas of flow.

Confirm average velocities through cross-sectional velocity profiles: Since ADS velocity sensors measure peak velocity, field crews collected cross-sectional velocity profiles in order to develop a relationship between peak and average velocity in lines that meet the hydraulic criteria.

Upload and Review Data: Data collected from the monitors were uploaded and reviewed by a Data Analyst for completeness, outliers, and deviations in the flow patterns, which indicate system anomalies or equipment failure.

Flow Quantification Methods

There are two main equations used to measure open channel flow: the ***Continuity Equation*** and the ***Manning Equation.*** The Continuity Equation, which is considered the most accurate, can be used if both depth of flow and velocity are available. In cases where velocity measurements are not available or not practical to obtain, the Manning Equation can be used to estimate velocity from the depth data based on certain physical characteristics of the pipe (i.e., the slope and roughness of the pipe being measured). However, the Manning equation assumes uniform, steady flow hydraulic conditions with non-varying roughness, which are typically invalid assumptions in most sanitary sewers. The Continuity Equation was used exclusively for this study.

Continuity Equation

The Continuity Equation states that the flow quantity (Q) is equal to the wetted area (A) multiplied by the average velocity (V) of the flow.

$$Q = A * V$$

This equation is applicable in a variety of conditions including backwater, surcharge, and reverse flow.

Data Analysis and Presentation

Data Analysis

A flow monitor is typically programmed to collect data at 5-minute intervals throughout the monitoring period. The monitor stores raw data consisting of (1) the ultrasonic depth, (2) the peak velocity and (3) the pressure depth. The data is imported into ADS's proprietary software and is examined by a data analyst to verify its integrity. The data analyst also reviews the daily field reports and site visit records to identify conditions that would affect the collected data.

Velocity profiles and the line confirmation data developed by the field personnel are reviewed by the data analyst to identify inconsistencies and verify data integrity. Velocity profiles are reviewed and an average to peak velocity ratio is calculated for the site. This ratio is used in converting the peak velocity measured by the sensor to the average velocity used in the Continuity equation. The data analyst selects which depth sensor entity will be used to calculate the final depth information. Silt levels present at each site visit are reviewed and representative silt levels established.

Occasionally the velocity sensor's performance may be compromised resulting in invalid readings sporadically during the monitoring period. This is generally caused by excessive debris (silt) blocking the sensor's crystals, shallow flows (~< 1") that may drop below the top of the sensor or very clear flows lacking the particles needed to measure rate. In order to use the Continuity equation to quantify the flow during these periods, a Data Analyst and/or Engineer will use the site's historical pipe curve (depth vs. velocity) data along with valid field confirmations to reconstitute and replace the false velocity recordings with expected velocity readings for a given historical depth along the curve.

Selections for the above parameters can be constant or can change during the monitoring period. While the data analysis process is described in a linear manner, it often requires an iterative approach to accurately complete.

Data Presentation

This type of flow monitoring project generates a large volume of data. To facilitate review of the data, results have been provided in graphical and tabular formats. The flow data is presented graphically in the form of scattergraphs and hydrographs. Hydrographs are based on fifteen-minute averaging. Tables are provided in daily average format. These tables show the flow rate for each day, along with the daily minimum and maximums, the times they were observed, the total daily flow, and total flow for the month (or monitoring period). The following explanation of terms may aid in interpretation of the flow data table and hydrograph.

DEPTH - Final calculated depth measurement (in inches)

QUANTITY - Final calculated flow rate (in MGD)

VELOCITY - Final calculated flow velocity (in feet per second)

REPORT TOTAL - Total volume of flow recorded for the indicated time period (in MG)

BP07-31

Site Commentary

SITE INFORMATION

Pipe	Round (10 in H)
Silt	0.00 (in)

OBSERVATIONS

The site functioned under normal conditions during the study period. No surcharge conditions were experienced at this location.

This location is downstream of location BP07-55. A review of the balancing details indicates no problem.

Average flow depth, velocity, and quantity data observed during **Saturday, 26 July 2025 to Friday, 08 August 2025**, along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	**DFINAL (in)**	**VFINAL (ft/s)**	**QFINAL (MGD - Total MG)**
Average	3.50	1.46	0.164
Minimum	2.37	1.02	0.067
Maximum	4.70	1.80	0.287
Min Time	08/03/2025 4:45:00 AM	07/31/2025 3:25:00 AM	08/03/2025 4:45:00 AM
Max Time	07/30/2025 9:45:00 PM	07/28/2025 9:40:00 PM	07/30/2025 9:50:00 PM

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Values in the Observed Flow Conditions are based on the none average.

Values in the graphical reports are based on the fifteen minutes average.

Values in the tabular report are based on the none average.

DATA UPTIME

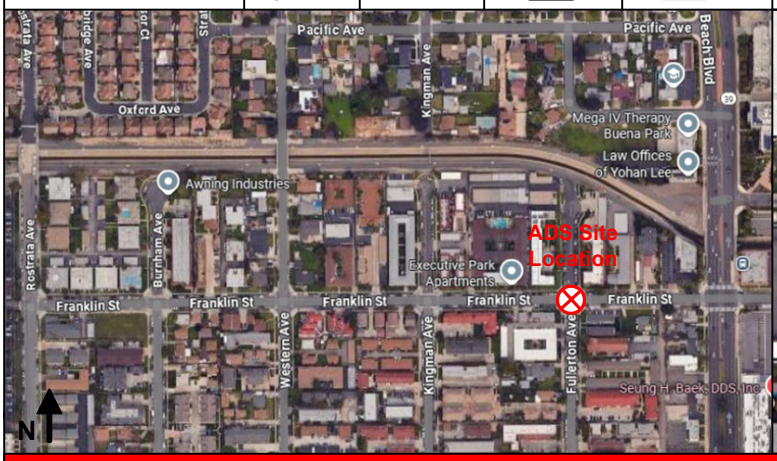
Data uptime observed during **Saturday, 26 July 2025 to Friday, 08 August 2025** is provided in the following table:

Percent Uptime	
DFINAL (in)	100
VFINAL (ft/s)	100
QFINAL (MGD - Total MG)	100

ADS Site Report

Quality Form

Project Name: Buena.Rick.TFM.CA25	**City:** Buena Park	**Agency:** Buena Park	**FM Initials:** VM
Site Name: BP07-31	**Install Date:** 07/24/2025	**Monitor Type**	Peak Doppler
Address/Location: Fullerton Ave & Franklin St		**Monitor Model**	Triton +
		Data Acquisition	Manual/Wireless Collect
		Manhole ID	07-31
Access: Drive	**Type of System:** Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	10.00 "
		Pipe Width:	10.00 "



Investigation Information:

Date/Time of Investigation:	07/24/2025 @ 03:40 AM
Site Hydraulics:	Good Straight through flow
Upstream Input: (L/S, P/S)	--
Upstream Manhole:	Not Investigated
Downstream Manhole:	Not investigated
Depth of Flow:	3.00 " +/- 0.25"
Range (Air DOF):	+/-
Peak Velocity:	1.42 fps
Silt:	0.00 Inches

Manhole Information:

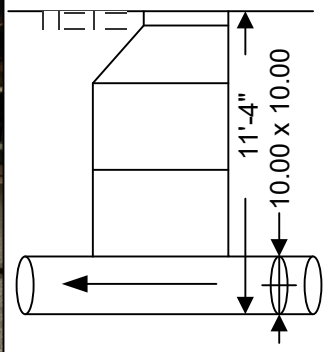
Manhole Depth:	11'-4"
Manhole Material / Condition	Brick/Good
Pipe Material / Condition:	VCP/Good

Land Use:	Residential	Commercial	Industrial	Other
	[x]	[ ]	[ ]	[ ]

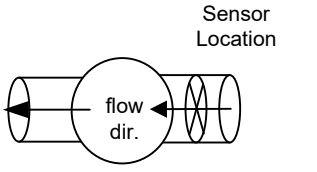
Oxygen: 20.9	**H2S:** 0	**LEL:** 0	**CO:** 0

Safety Notes:

2 man crew required and one blower is to be operated at all times.



Cross Section



Plan

Installation Information

Installation Type:	Standard
Sensors Devices:	Ultrasonic/Velocity/Pressure
Surcharge Height:	0
Rain Gauge Zone:	

Backup	**Yes**	**No**	**?**	**Distance**
Trunk	[ ]	[x]	[ ]	
Lift / Pump Station	[ ]	[x]	[ ]	
WWTP	[ ]	[x]	[ ]	
Other	[ ]	[x]	[ ]	

Additional Site Information / Comments:

Standard Traffic Control with No Safety Concerns

Hydrograph Report

BP07-31

Flow Monitor

BP07-31

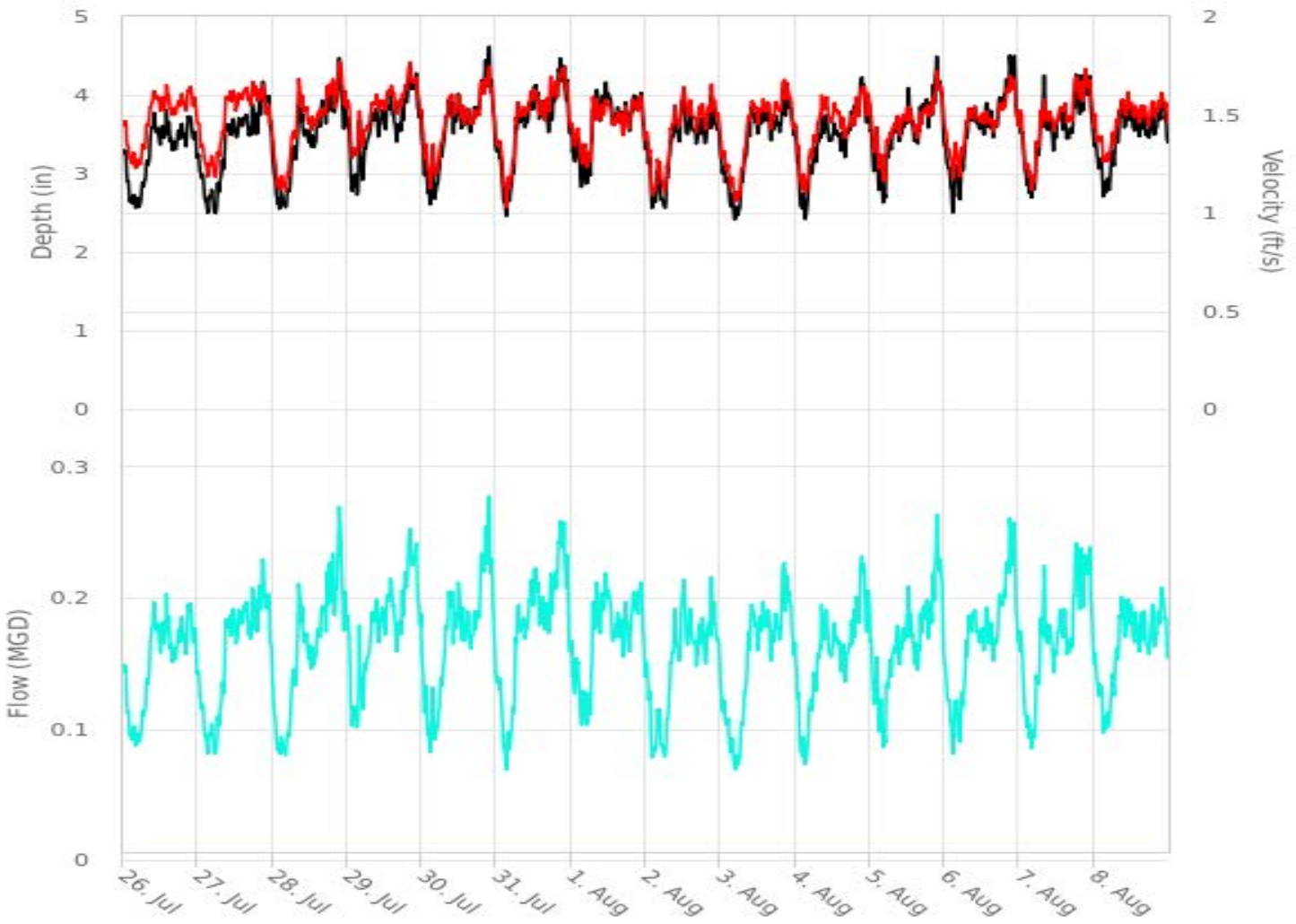
Pipe Height
10.00
in

Report Period

07/26/2025
To
08/08/2025

Legend

DFINAL
VFINAL
QFINAL



Scattergraph Report

BP07-31

Flow Monitor

BP07-31

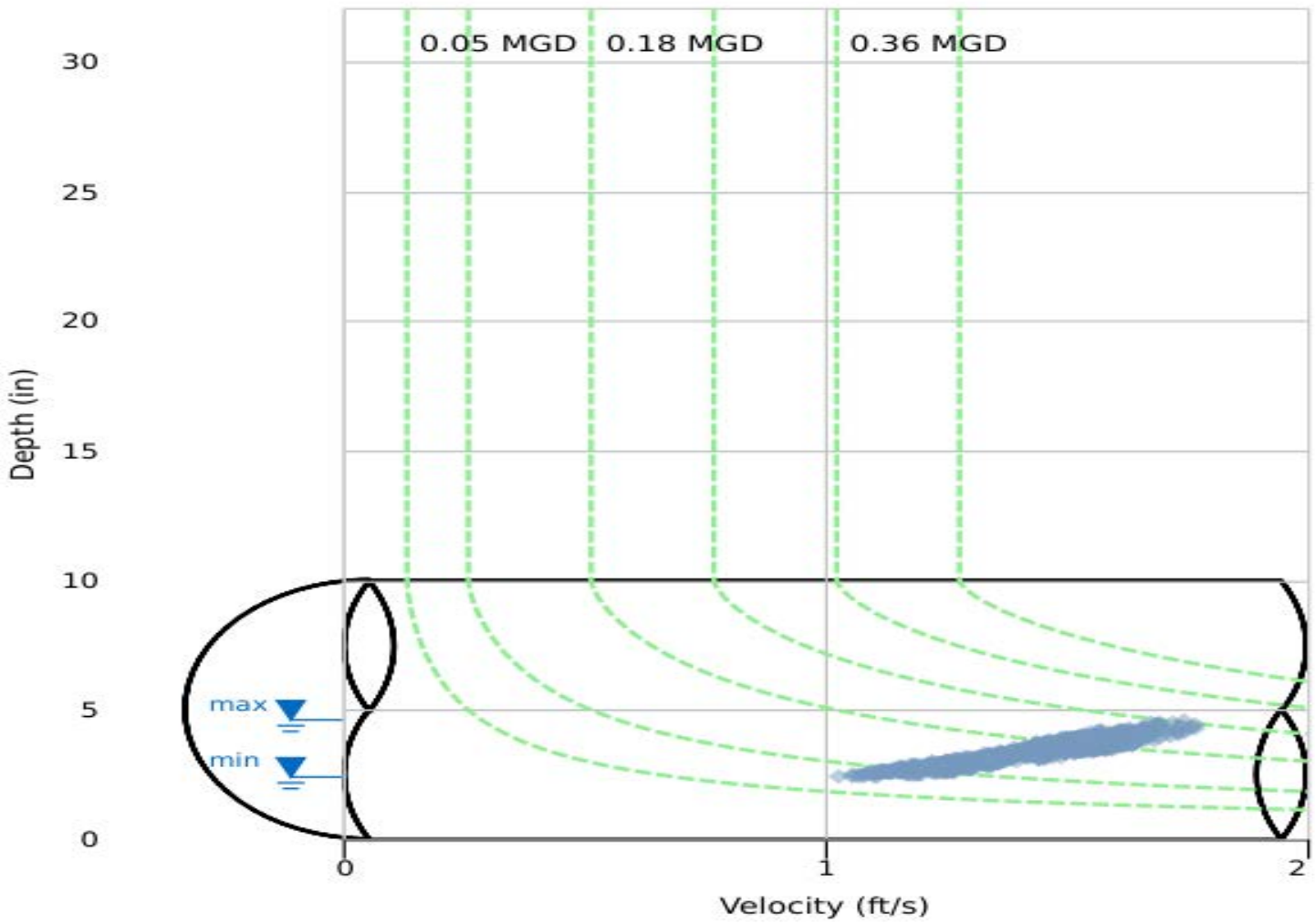
Pipe Height
10.00
in

Report Period

07/26/2025
To
08/08/2025

Legend

DFINAL - VFINAL
Iso-Q™
Min-Max Depth



Daily Tabular Report

07/26/2025 00:00 - 08/08/2025 23:59
BP07-31 Pipe: Round (10 in H), Silt 0.00 in

	DFINAL (in)					VFINAL (ft/s)					QFINAL (MGD - Total MG)					
Date	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total
07/26/2025	04:30	2.54	14:05	3.81	3.28	04:00	1.22	14:10	1.66	1.48	04:30	0.086	14:05	0.204	0.151	0.151
07/27/2025	05:55	2.48	21:05	4.18	3.37	05:55	1.16	17:40	1.68	1.48	05:55	0.079	21:05	0.232	0.158	0.158
07/28/2025	02:25	2.52	21:40	4.55	3.46	02:30	1.06	21:40	1.80	1.46	02:30	0.075	21:40	0.281	0.162	0.162
07/29/2025	03:25	2.70	20:20	4.34	3.62	02:45	1.25	20:25	1.80	1.54	03:25	0.099	20:20	0.258	0.179	0.179
07/30/2025	03:00	2.56	21:45	4.70	3.60	03:00	1.08	21:50	1.77	1.47	03:00	0.077	21:50	0.287	0.171	0.171
07/31/2025	03:25	2.45	20:30	4.48	3.64	03:25	1.02	21:50	1.76	1.49	03:25	0.068	21:50	0.266	0.176	0.176
08/01/2025	03:15	2.78	11:10	4.19	3.62	05:10	1.23	07:10	1.72	1.46	03:15	0.101	07:10	0.223	0.170	0.170
08/02/2025	02:10	2.52	21:20	4.04	3.37	02:15	1.07	21:15	1.67	1.41	02:10	0.075	21:15	0.223	0.151	0.151
08/03/2025	04:45	2.37	20:30	4.11	3.39	04:45	1.05	20:30	1.68	1.42	04:45	0.067	20:30	0.230	0.153	0.153
08/04/2025	03:25	2.38	21:35	4.27	3.43	03:25	1.09	23:25	1.67	1.44	03:25	0.070	21:35	0.237	0.157	0.157
08/05/2025	04:25	2.60	21:30	4.53	3.57	05:05	1.14	21:35	1.73	1.45	05:05	0.083	21:30	0.267	0.167	0.167
08/06/2025	02:55	2.47	22:30	4.56	3.59	02:55	1.15	21:10	1.71	1.46	02:55	0.078	21:10	0.264	0.168	0.168
08/07/2025	02:45	2.68	20:00	4.37	3.59	04:05	1.11	21:15	1.75	1.47	04:05	0.085	18:15	0.249	0.170	0.170
08/08/2025	03:10	2.67	09:30	4.01	3.49	04:55	1.24	10:55	1.69	1.47	03:10	0.095	21:45	0.210	0.163	0.163

07/26/2025 00:00 - 08/08/2025 23:59

	DFINAL (in)	VFINAL (ft/s)	QFINAL (MGD - Total MG)
Total			2.294
Average	3.50	1.46	0.164

BP07-55

Site Commentary

SITE INFORMATION

Pipe	Round (8 in H)
Silt	0.00 (in)

OBSERVATIONS

The site functioned under normal conditions during the study period. No surcharge conditions were experienced at this location.

This location is upstream of location BP07-31. See location B. 07-31 for balancing details.

Average flow depth, velocity, and quantity data observed during **Saturday, 26 July 2025 to Friday, 08 August 2025**, along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	**DFINAL (in)**	**VFINAL (ft/s)**	**QFINAL (MGD - Total MG)**
Average	3.31	1.21	0.109
Minimum	2.20	0.80	0.040
Maximum	4.45	1.61	0.205
Min Time	08/06/2025 3:35:00 AM	07/31/2025 3:00:00 AM	08/06/2025 3:40:00 AM
Max Time	07/30/2025 9:40:00 PM	08/04/2025 9:25:00 PM	07/30/2025 9:40:00 PM

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Values in the Observed Flow Conditions are based on the none average.

Values in the graphical reports are based on the fifteen minutes average.

Values in the tabular report are based on the none average.

DATA UPTIME

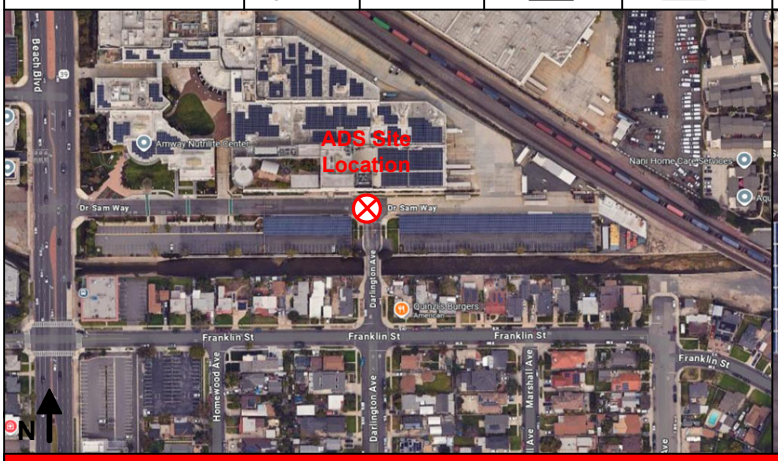
Data uptime observed during **Saturday, 26 July 2025 to Friday, 08 August 2025** is provided in the following table:

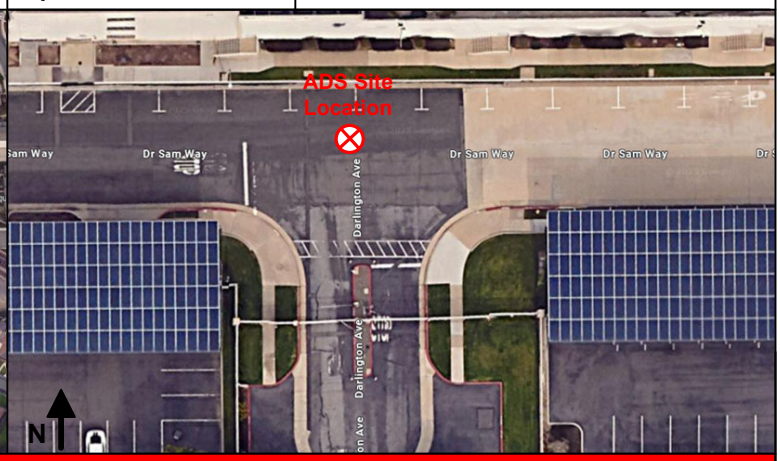
Percent Uptime	
DFINAL (in)	100
VFINAL (ft/s)	100
QFINAL (MGD - Total MG)	100

ADS Site Report

Quality Form

Project Name: Buena.Rick.TFM.CA25	**City:** Buena Park	**Agency:** Buena Park	**FM Initials:** VM
Site Name: BP07-55	**Install Date:** 07/25/2025	**Monitor Type**	Peak Doppler
Address/Location: 5600 Beach Blvd.		**Monitor Model**	Triton +
		Data Acquisition	Manual/Wireless Collect
		Manhole ID	07-55
Access: Drive	**Type of System:** Sanitary [X] Storm [ ] Combined [ ]	**Pipe Height:**	8.00 "
		Pipe Width:	8.00 "





Investigation Information:

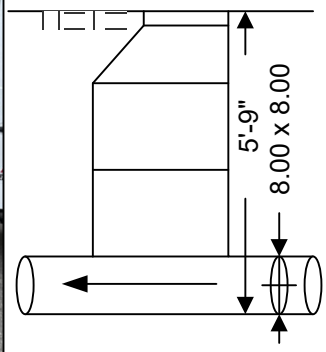
Date/Time of Investigation:	07/25/2025 @ 09:20 AM
Site Hydraulics:	Good Straight through flow
Upstream Input: (L/S, P/S)	--
Upstream Manhole:	Not Investigated
Downstream Manhole:	Not investigated
Depth of Flow:	3.38 " +/- 0.25"
Range (Air DOF):	+/-
Peak Velocity:	1.49 fps
Silt:	0.00 Inches

Manhole Information:

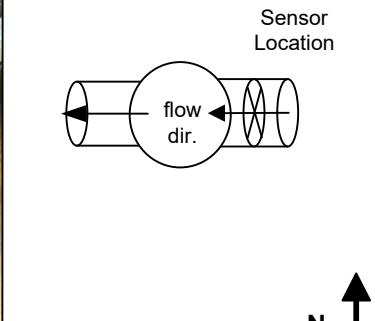
Manhole Depth:	5'-9"						
Manhole Material / Condition	PreCast/Good						
Pipe Material / Condition:	VCP/Good						
Land Use:	Residential [ ]	Commercial [ ]	Industrial [X]	Other [ ]			
Oxygen: 20.9	**H2S:** 0	**LEL:** 0	**CO:** 0				

Safety Notes:

2 man crew required and one blower is to be operated at all times.



Cross Section



Plan

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard	Trunk	[ ]	[x]	[ ]	
Sensors Devices:	Ultrasonic/Velocity/Pressure	Lift / Pump Station	[ ]	[x]	[ ]	
Surcharge Height:	0	WWTP	[ ]	[x]	[ ]	
Rain Gauge Zone:		Other	[ ]	[x]	[ ]	

Additional Site Information / Comments:

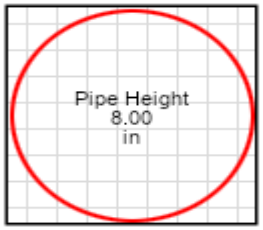
Standard Traffic Control with No Safety Concerns

Hydrograph Report

BP07-55

Flow Monitor

BP07-55



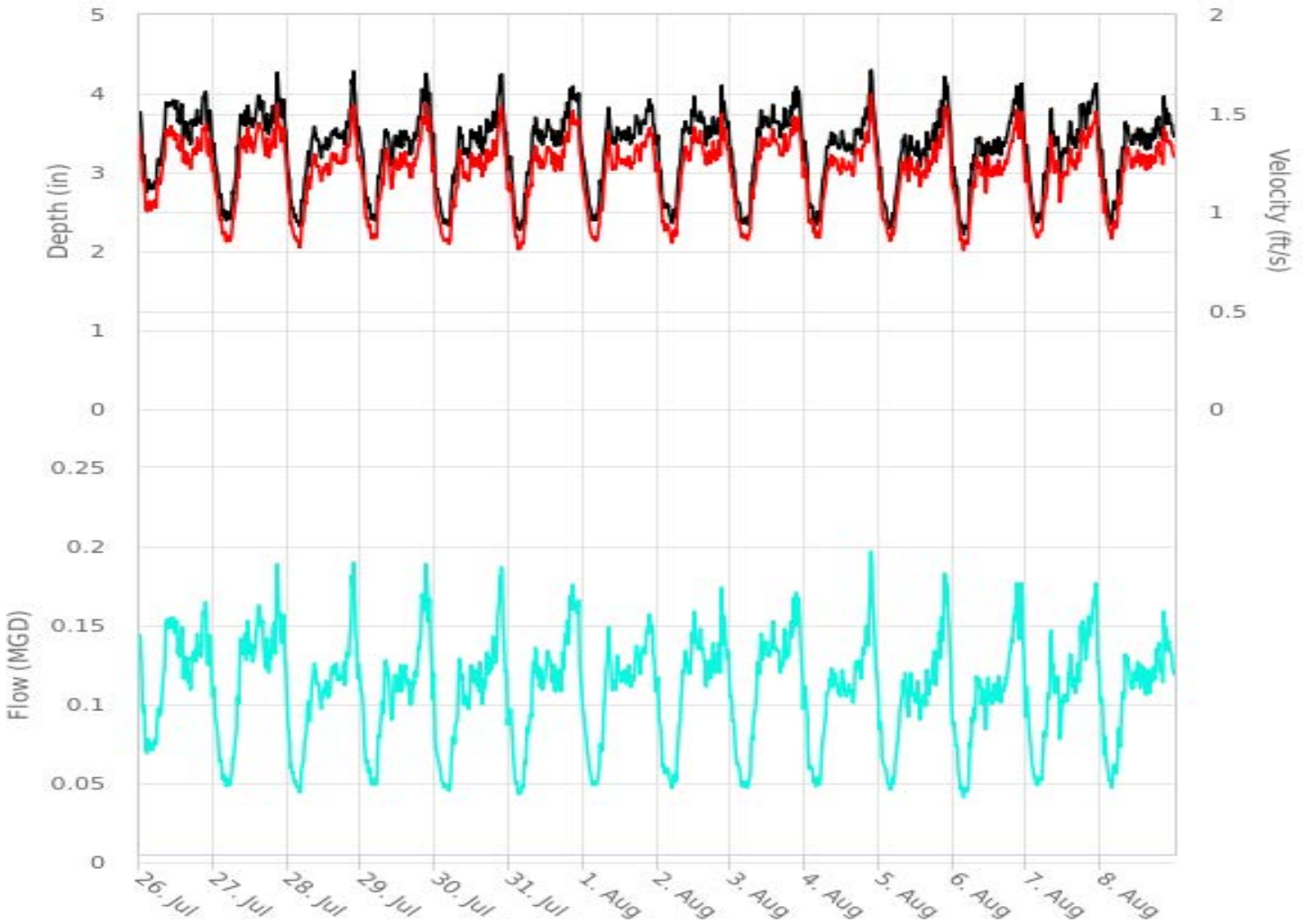
Report Period

07/26/2025
To
08/08/2025

Legend

DFINAL
VFINAL
QFINAL

ADS ENVIRONMENTAL SERVICES



Scattergraph Report

BP07-55

Flow Monitor

BP07-55

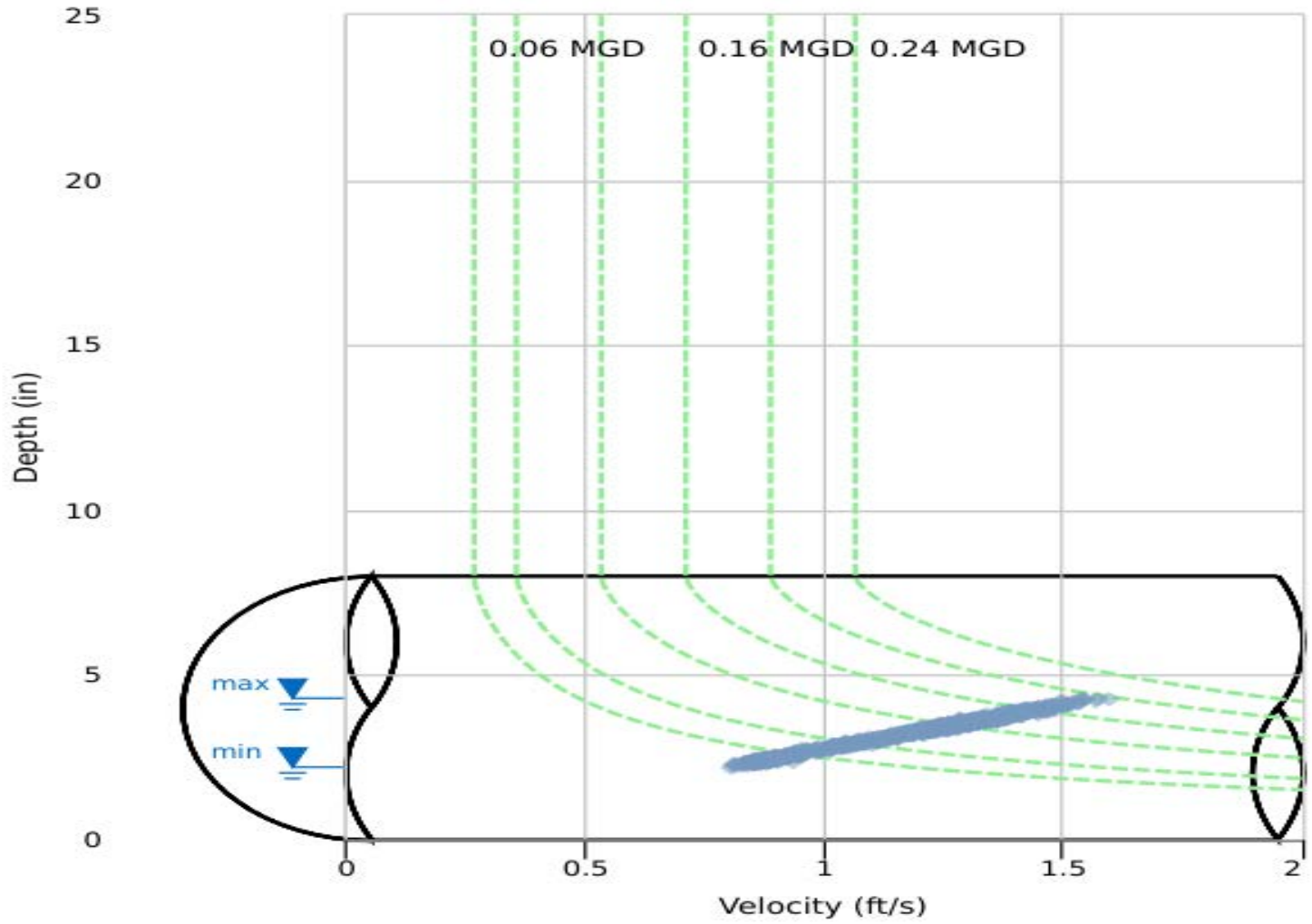
Pipe Height
8.00
in

Report Period

07/26/2025
To
08/08/2025

Legend

DFINAL - VFINAL
Iso-Q™
Min-Max Depth



Daily Tabular Report

07/26/2025 00:00 - 08/08/2025 23:59
BP07-55 Pipe: Round (8 in H), Silt 0.00 in

	DFINAL (in)					VFINAL (ft/s)					QFINAL (MGD - Total MG)					
Date	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total
07/26/2025	02:30	2.72	21:40	4.05	3.49	02:25	0.97	09:15	1.45	1.27	02:30	0.066	21:40	0.166	0.122	0.122
07/27/2025	04:10	2.37	20:40	4.35	3.39	04:15	0.84	20:45	1.56	1.23	04:15	0.047	20:40	0.194	0.116	0.116
07/28/2025	04:10	2.30	21:30	4.32	3.26	04:10	0.80	21:30	1.55	1.18	04:10	0.043	21:30	0.192	0.105	0.105
07/29/2025	05:00	2.37	21:10	4.32	3.30	03:30	0.86	21:10	1.57	1.20	05:00	0.048	21:10	0.195	0.108	0.108
07/30/2025	04:40	2.31	21:40	4.45	3.25	04:40	0.83	21:40	1.59	1.18	04:40	0.045	21:40	0.205	0.105	0.105
07/31/2025	03:30	2.26	20:55	4.17	3.32	03:00	0.80	20:50	1.53	1.21	03:00	0.042	20:55	0.181	0.111	0.111
08/01/2025	03:25	2.39	21:30	3.94	3.31	04:35	0.85	21:45	1.43	1.20	04:10	0.048	21:40	0.158	0.108	0.108
08/02/2025	04:40	2.35	21:05	4.15	3.33	04:55	0.83	21:05	1.52	1.21	04:55	0.046	21:05	0.179	0.110	0.110
08/03/2025	05:15	2.33	21:20	4.17	3.34	05:15	0.85	21:25	1.49	1.23	05:15	0.046	21:25	0.177	0.113	0.113
08/04/2025	03:40	2.33	21:20	4.41	3.27	04:55	0.86	21:25	1.61	1.21	03:40	0.047	21:20	0.205	0.107	0.107
08/05/2025	03:35	2.28	21:20	4.24	3.22	03:45	0.85	21:50	1.54	1.19	03:35	0.045	21:25	0.187	0.104	0.104
08/06/2025	03:35	2.20	22:25	4.19	3.23	03:40	0.80	20:50	1.58	1.18	03:40	0.040	20:50	0.186	0.104	0.104
08/07/2025	03:10	2.35	22:35	4.18	3.30	03:10	0.87	22:40	1.53	1.21	03:10	0.048	22:35	0.180	0.109	0.109
08/08/2025	03:35	2.33	20:35	4.01	3.28	03:45	0.85	21:15	1.44	1.20	03:40	0.047	20:35	0.162	0.107	0.107

07/26/2025 00:00 - 08/08/2025 23:59

	DFINAL (in)	VFINAL (ft/s)	QFINAL (MGD - Total MG)
Total			1.530
Average	3.31	1.21	0.109

APPENDIX C

Sewer Generation Factor Guidelines

William Wang

From: Guzman, Hector <hguzman@buenapark.com>
Sent: Tuesday, August 26, 2025 5:20 PM
To: William Wang
Cc: Carson Edgington; Scott Patton
Subject: RE: GP-25-1 Amway Site Sewer Study

Good afternoon William,

I know we had a placeholder of 300 GPD per dwelling, but after discussing with our Sewer Superintendent, you can go ahead and use 250 GPD while keeping the peak factor at 2. That should be sufficient. Please let me know if you have any questions.

Best regards,

Hector

Hector Guzman
Assistant Engineer
Public Works Department
P: (714) 562-3688
hguzman@buenapark.com
www.buenapark.com
6650 Beach Blvd. | Buena Park, CA | 90621

City Hall Offices are closed every Friday.

From: William Wang <wwang@rickengineering.com>
Sent: Tuesday, August 26, 2025 2:27 PM
To: Guzman, Hector <hguzman@buenapark.com>
Cc: Carson Edgington <cedgington@rickengineering.com>; Scott Patton <spatton@rickengineering.com>
Subject: GP-25-1 Amway Site Sewer Study

Hello Hector,

ADS has completed the sewer monitoring and we are working to prepare the sewer study for the next resubmittal. I couldn't locate the proposed GPD requirement in my emails so I believe we spoke on the phone about this, could you please confirm that we are to use 300 GPD per dwelling unit for our study?

Could you also please confirm if we are to apply a peaking factor to this flow rate to determine peak flow? I saw in another report that 2.0 was used, is this typical?

Please let me know if you have any questions or would like to discuss. Thank you!

William Wang PE

APPENDIX D

Hydraulic Analysis Reports

Hydraulic Analysis Report

Project Data

Project Title: Amway

Designer: Rick Engineering Company

Project Date: Tuesday, September 2, 2025

Project Units: U.S. Customary Units

Channel Analysis: 07-55 With Proposed Flows

Input Parameters

Channel Type: Circular

Pipe Diameter 0.67 ft

Longitudinal Slope: 0.0036 ft/ft

Manning's n: 0.0130

Flow 0.4210 cfs

Result Parameters

Depth 0.3646 ft

Area of Flow 0.1954 ft^2

Wetted Perimeter 1.1100 ft

Hydraulic Radius 0.1761 ft

Average Velocity 2.1543 ft/s

Top Width 0.6641 ft

Froude Number: 0.6999

Critical Depth 0.3026 ft

Critical Velocity 2.7320 ft/s

Critical Slope: 0.0068 ft/ft

Critical Top Width 0.66 ft

Calculated Max Shear Stress 0.0819 lb/ft^2

Calculated Avg Shear Stress 0.0395 lb/ft^2

Channel Analysis: 07-31 With Proposed Flows

Input Parameters

Channel Type: Circular

Pipe Diameter 0.83 ft

Longitudinal Slope: 0.0030 ft/ft

Manning's n: 0.0130

Flow 0.6550 cfs

Result Parameters

Depth 0.4391 ft

Area of Flow 0.2913 ft^2

Wetted Perimeter 1.3537 ft

Hydraulic Radius 0.2152 ft

Average Velocity 2.2484 ft/s

Top Width 0.8318 ft

Froude Number: 0.6695

Critical Depth 0.3559 ft

Critical Velocity 2.9480 ft/s

Critical Slope: 0.0062 ft/ft

Critical Top Width 0.82 ft

Calculated Max Shear Stress 0.0822 lb/ft^2

Calculated Avg Shear Stress 0.0403 lb/ft^2

APPENDIX E

Existing Sewer Plans

STANTON AVE.

MARSHALL ST.

DARLINGTON AVE.

HOMEWOOD AVE.

GRAND AVE.

FULLERTON AVE.

KINGMAN AVE.

BURNHAM AVE.

ROSTRATA AVE.

HIGHLAND AVE.

WESTERN AVE.

ATCHISON TOPEKA & SANTA FE RY.

SOUTHERN PACIFIC RY.

EMERY STREET

HOLT ST.

FRANK STREET

LIN ST.

COMMONWEALTH AVE.

MANCHESTER AVE.

VIRGINIA AVE.

MISSION STREET

FULLERTON AVE.

KINGMAN AVE.

FIRST ST.

SECOND ST.

FIFTH ST.

SEVENTH ST.

EIGHTH ST.

NINTH ST.

TENTH ST.

ELEVENTH ST.

COURT ST.

MELROSE AVE.

ORANGETHORPE AVENUE

SEE ATTACHED SHEET 28

~LEGEND:~

On this Sheet: ⓒ Indicates Standard LAMPHOLE

Indicates Standard Manhole see Sheet

Drop Manhole " " 2

Flusher " " " 2

Letters used to Designate Lines

Small Numbers in Circles show Sheet Number

On Plan: Chimneys to be Constructed

Sewer Line to be Constructed

On Profile:

Indicates Elevation of Ground Surface

0.30% Sewer Invert

BUENA PARK SANITARY DIST. OF ORANGE COUNTY CALIF.
SPECIAL PLANS No 1
SANITARY SEWERS
Scale: 1"=300' FEB. 1928
Sheet 1 of 32

F-37

BUENA PARK SANITARY DISTRICT
OF
ORANGE COUNTY, CALIFORNIA
SPECIAL PLANS Nº 1
SANITARY SEWERS

Scales (Hor: 1"=50'
(Ver: 1"=10'

February 1928
Sheet Nº 6 of 32

F-38

DIAMOND ALKALI CO. CHICAGO
DIAMOND "A" BRAND VITRIFIED SEWER PIPE
THE FREDERICK POST CO. CHICAGO

APPROVED
CHIEF ENGINEER
DRAFTSMAN
TRACED
CHECKED
QUANTITIES
CHECKED
REVISIONS
BLUE PRINTS
MADE
STAMPED
FILED
BOOK
PAGE
SHEET

0.00 Drop Manhole No 7 — 0+45 8" — 1+47 8" — 2+35 8" 0.20% — 3+25 8" — 4+15 8" — 5+25 8" — 6+25 8" 0.20% — 7+25 8" — 8+25 8" — 9+25 8" — 10+25 8" 0.20% — 11+25 8" — 12+25 8" — 13+25 8" — 14+25 8" — 15+25 8" Drop Manhole No 16

54.27 — 55.15 — 56.92 — 56.31 — 69.81 — 54.21 — 0.80%

C 79 78 77 76 B 51 50 49 48 A V W X Y — TRACT — 1 2 3 K — TRACT

91.03 — 94.69 — 94.69 — 93.75 — 93.75 — 135

LINE "B-g" — Drop Manhole No 7 — FRANKLIN — Man hole No 31 — KLINN — Manhole No 32 — STREET — AVENUE — LINE "G-a" — Drop Manhole No 16

438.76' ~ 10" Sewer — LINE "G" — 435' ~ 10" Sewer — 493' ~ 10" Sewer — 8" Sewer

WESTERN AVE. — LINE "B" — 189.38 — 189.38 — 80 — 779 — 75 — N°

KINGMAN AVENUE — 187.5 — 187.5 — 52 — MM 21-39 — 47

FULLERTON AVE. — 240 — 24 — N° 72

GRAND — 120 — 23 — 2 — 22 — 120 — MM — N° 10 — 9 — 21-14,15 — 65

0.30% — 64.27 — 65.85 — 67.50 — 0.30%

1 2 3 4 5 6 K 7 8 9 10 11 12 — TRACT — 1 2 3 4 5 6 L 7 8 9 10 11 — MM 21-14,15

Manhole No 33 — DARLINGTON AVE. — Manhole No 18 — Flush — EASTERN (STANTON) AVE.

FRANKLIN — 660' ~ 8" Sewer — LINE "G" — STREET — 550' ~ 8" Sewer — 66.35

HOMEWOOD AVENUE — 10 — 9 — 20 — 19 — 135 — 135 — 10 — 9 — 20 — 19 — DARLING — 135 — 135 — 10 — 9 — 20 — 19 — MARSHALL AVE. — 135 — 135 — 10 — 9 — 20 — 19 — 119 — 113.3 — 10 — 9 — 20 — 19 — EASTERN (STANTON) AVE.

BUENA PARK SANITARY DISTRICT
OF
ORANGE COUNTY, CALIFORNIA
SPECIAL PLANS N° 9
SANITARY SEWER

Scales: Hor: 1"-50'
Vert: 1"-10'

February
Sheet N° 15
of
32