

**APPENDIX P**  
*Master Sewer Study*



# **DEXTER WILSON ENGINEERING, INC.**

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CONSULTING ENGINEERS

**MASTER SEWER STUDY  
FOR  
THE TRAILS AT  
CARMEL MOUNTAIN RANCH PROJECT  
IN THE CITY OF SAN DIEGO**

November 12, 2020

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FOR  
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Job No. 736-018

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EXHIBIT B	POWAY SUB-BASINS MANHOLE DIAGRAM

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November 12, 2020

736-018

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Attention: Jonathan P. Frankel, Project Manager

Subject: Sewer Study for The Trails at Carmel Mountain Ranch Project in the City of San Diego

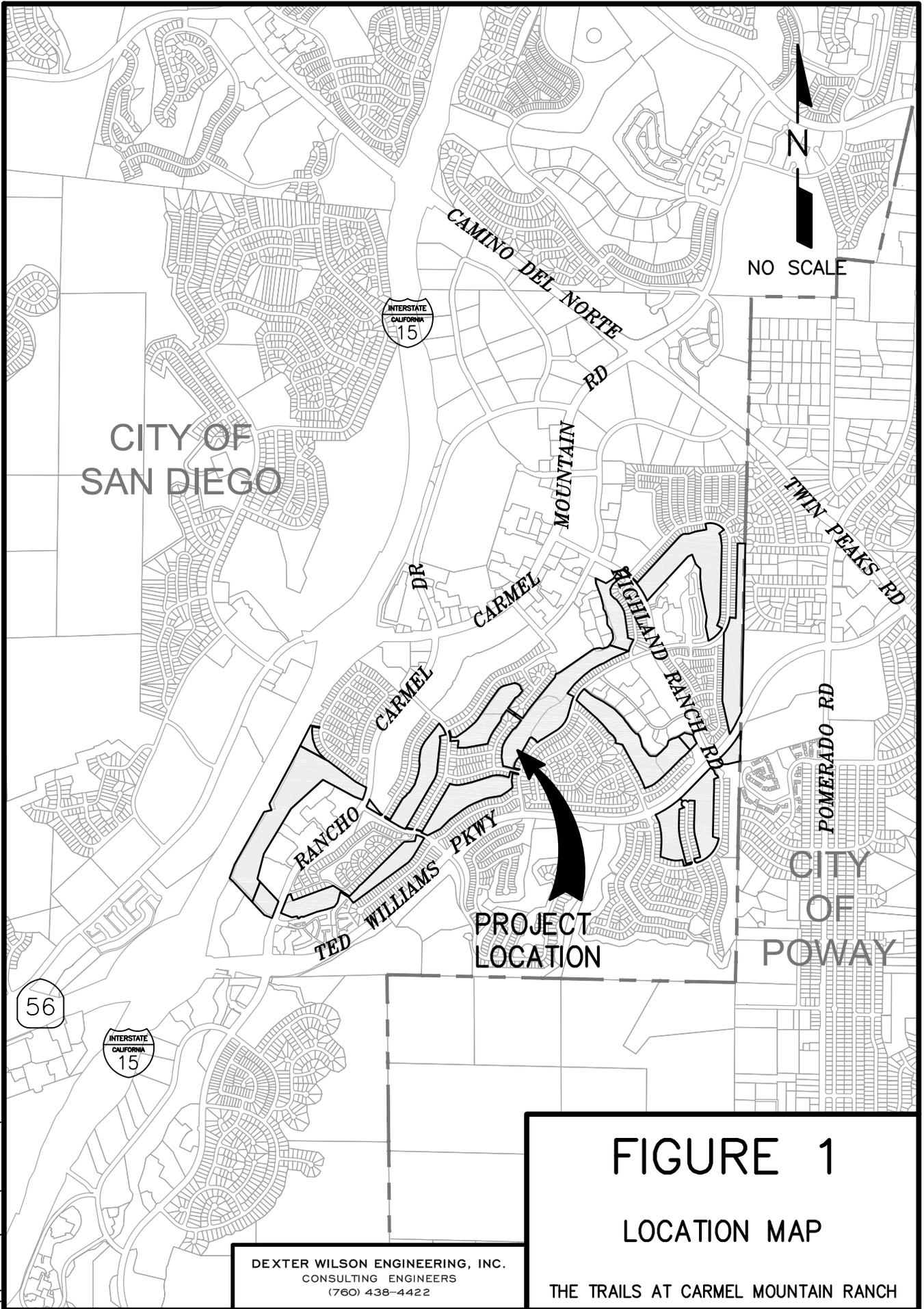
### **Introduction**

The Trails at Carmel Mountain Ranch project (The Trails project) is located in the City of San Diego, east of Interstate 15, north of Ted Williams Parkway, and south of Camino Del Norte. The project proposes to redevelop the existing 18-hole Carmel Mountain Ranch Golf Course which was closed in 2018. Public and private streets and drives will provide access throughout the project. Figure 1 provides a location map for the project.

Figure 2 provides a layout of the project. As shown in Figure 2 each golf course hole will be referred to as a "Unit." The project encompasses 164.21 acres and proposes to redevelop the site with a maximum of 1,200 residential dwelling units, a commercial lot, park space, buffer area, and open space. Elevations on the project range from approximately 542 feet to 802 feet. The project's high point is located in Unit 9 and the low point is located in Unit 5.

This sewer study report will address the available capacity of the offsite gravity public sewer system downstream of The Trails project which includes a trunk sewer, two public sewer flow meters, and local gravity sewers between these facilities and the project.

\\ARTIC\DWG\736018\CMR\_FIGURE-1\_VICMAP.DWG 10-26-20 12:17:28 LAYOUT: 8X11



# FIGURE 1

## LOCATION MAP

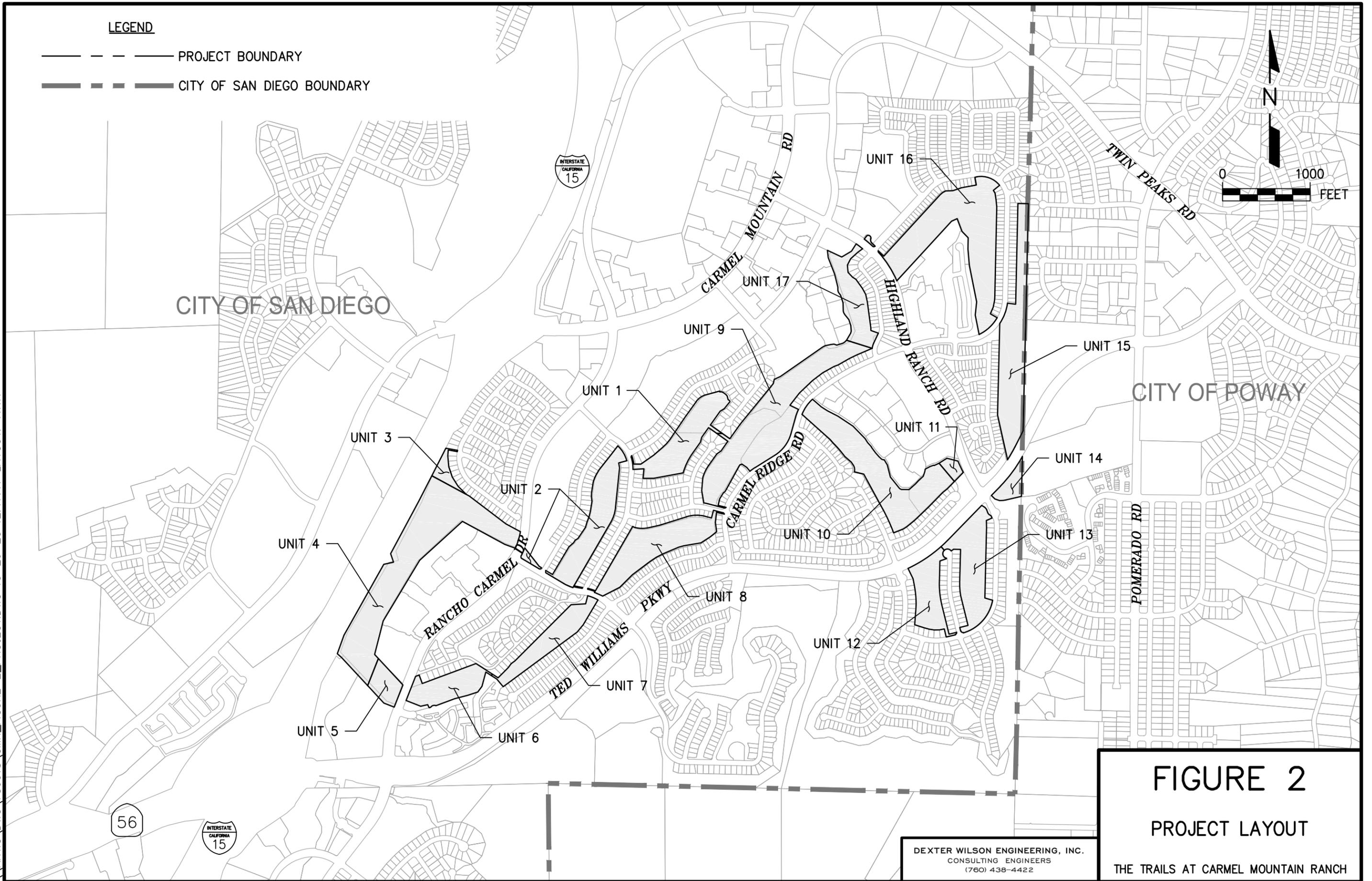
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THE TRAILS AT CARMEL MOUNTAIN RANCH

\\ARTIC\DWG\736018\CMR\_FIGURE-2\_PROJECT.DWG 10-26-20 12:17:17 LAYOUT: 11X17

**LEGEND**

- — — — — PROJECT BOUNDARY
- — — — — CITY OF SAN DIEGO BOUNDARY



**FIGURE 2**

**PROJECT LAYOUT**

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THE TRAILS AT CARMEL MOUNTAIN RANCH



### **Community Plan**

The project proposes a General Plan/Community Plan Amendment, Master Planned Development Permit with Design Guidelines, Rezone and associated permits and entitlements to allow for the redevelopment of the closed Carmel Mountain Ranch Country Club and associated 18-hole golf course into a series of new infill residential neighborhoods to allow for a total of 1,200 multi-family homes, a commercial parcel, and a mix of open space and recreational uses, including approximately 6 miles of trails. The project proposes residential land uses on approximately 52 acres that would range in density from 14.5 to 43.5 dwelling units per acre. Open space uses would be identified for approximately 112 acres of the proposed project site.

The proposed project site has a land use designation of Private Recreation-Golf Course. The proposed amendment would redesignate land to a mix of Low-Medium Density Residential, Medium Density Residential, Community Commercial, Open Space-Parks, and Other Open Space uses.

### **Rezone**

Development of the residential neighborhoods will be implemented through a zone amendment and a Master Planned Development Permit which includes Design Guidelines. Density will be limited by the applicable City-wide zoning. Neighborhoods zoned RM-1-1 and RM-1-3 would include two- and three-story townhomes, with two or three bedrooms. Neighborhoods zoned RM-2-4 through RM-3-7 would include three- and four-story apartments, with studios, one, two and three bedrooms. One parcel will be zoned CC-2-1 for a small commercial development. Three parks will be zoned OP. Some property will retain its AR-1-1 zone.

**Project Description**

The Trails project will have 17 Units. Units 1, 2, 5, 6, 7, 8, 9, 10, 13, 16, and 17 will consist of a mixture of residential units, a commercial lot, park space, buffer area, and open space. The remaining Units, Units 3, 4, 11, 12, 14, and 15, will solely consist of open space.

The Trails project proposes a maximum of 1,200 residential units. Table 1 presents a land use summary for The Trails project.

<b>TABLE 1 THE TRAILS PROJECT LAND USE SUMMARY</b>			
<b>Unit</b>	<b>Land Use</b>	<b>Gross Acres</b>	<b>Dwelling Units</b>
1	Residential Development	5.10	66
	Open Space/Buffer	2.84	-
	Open Space	0.78	-
2	Residential Development	4.16	87
	Open Space/Buffer	2.67	-
	Open Space	3.08	-
3	Open Space	1.36	-
4	Open Space	25.27	-
5	Residential Development	2.29	78
	Buffer	0.47	-
6	Residential Development	3.42	128
	Open Space/Buffer	2.41	-
7	Park	3.38	-
	Open Space	3.07	-
8	Residential Development	6.9	98
	Open Space/Buffer	3.54	-
	Open Space	0.48	-
9	Residential Development	11.1	300
	Open Space/Buffer	3.21	-
	Open Space	5.44	-
10	Residential Development	10.07	200
	Open Space/Buffer	5.27	-

<b>TABLE 1 THE TRAILS PROJECT LAND USE SUMMARY</b>			
<b>Unit</b>	<b>Land Use</b>	<b>Gross Acres</b>	<b>Dwelling Units</b>
11	Open Space	0.9	-
12	Open Space	6.07	-
13	Park	1.9	-
	Open Space	7.36	-
14	Open Space	1.86	-
15	Open Space	13.6	-
16	Residential Development	4.75	123
	Park	2.58	-
	Open Space/Buffer	2.36	-
	Open Space	10.25	-
17	Residential Development	3.29	120
	Commercial Development	0.27	-
	Open Space/Buffer	2.25	-
	Open Space	0.46	-
<b>TOTAL</b>		<b>164.21</b>	<b>1,200</b>

### Sewer System Design Criteria

The design criteria used for the evaluation of the public offsite sewerage system impacts by The Trails project are based on the 2015 City of San Diego Sewer Design Guide (Sewer Design Guide). The City’s Sewer Field Book was used for verification and confirmation of existing wastewater facilities surrounding the project. As-Built drawings were used as necessary to obtain slopes of existing sewer lines.

### Sewer Generation Rates

Sewage generation estimates for The Trails project were developed in accordance with the Sewer Design Guide and are based on population. For residential units, a population density of 3.5 persons per dwelling unit was used to estimate population. For the proposed commercial lot in Unit 17 an equivalent population factor of 43.7 persons per net acre was used to estimate population. Per Section 1.3.2.2 of the Sewer Design Guide, a generation

rate of 80 gallons per capita per day (gpcpd) is used to determine average dry weather flow (ADWF). Therefore, the sewage generation factors for the proposed residential units and the proposed commercial lot were determined to be 280 gallons per day per dwelling unit and 3,056 gallons per day per net acre, respectively.

Table 2 presents the projected average dry weather sewer flows for each Unit within The Trails project using the sewage generation factors described above.

<b>TABLE 2 THE TRAILS PROJECT AVERAGE DRY WEATHER SEWER FLOWS</b>			
<b>Unit</b>	<b>Description</b>	<b>Sewage Generation Factor</b>	<b>Average Dry Weather Flow, gpd</b>
1	66 dwelling units	280 gpd/DU	18,480
2	87 dwelling units	280 gpd/DU	24,360
3	0	0	0
4	0	0	0
5	78 dwelling units	280 gpd/DU	21,840
6	128 dwelling units	280 gpd/DU	35,840
7	0	0	0
8	98 dwelling units	280 gpd/DU	27,440
9	300 dwelling units	280 gpd/DU	84,000
10	200 dwelling units	280 gpd/DU	56,000
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	123 dwelling units	280 gpd/DU	34,440
17	120 dwelling units	280 gpd/DU	33,600
	0.27 commercial acres	3,056 gpd/acre	825
<b>TOTAL</b>			<b>336,825</b>

### **Peaking Factors**

The peaking factor for peak dry weather flow (PDWF) is dependent upon the equivalent population in the area upstream of, and including, the reach being analyzed. Figure 1-1 from the Sewer Design Guide was used to determine the peak dry weather peaking factor for each reach of pipe being analyzed for The Trails project.

### **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 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 which is the value specified in Section 1.3.3.1 of the Sewer Design Guide.

### **Depth and Velocity of Flow in Gravity Sewers**

Gravity sewer lines are designed to convey peak wet weather flow. Pipes that are 15-inches in diameter and smaller are designed to convey this flow with a maximum depth-to-diameter (d/D) ratio of 0.50. Pipes that are 18-inches in diameter and larger are designed for a maximum d/D ratio of 0.75. Gravity sewer lines are designed to maintain a minimum velocity of 2.0 feet per second at peak wet weather flow to prevent the deposition of solids.

### **Existing Sewer System**

Figure 3 at the back of this report presents the existing sewer facilities in the vicinity of The Trails project and identifies five existing sewer sub-basins. The three sub-basins on the west side of the project (Chicarita 1, 2, and 3) will flow west to Chicarita Trunk Sewer #90. The two sub-basins on the east side of the project (PO5 and PO3M) will flow east to the City of Poway.

**Chicarita Sub-Basins.** The three sub-basins on the west side of the project are a part of a larger basin that flows into the Chicarita Trunk Sewer. Figure 4 presents a schematic of the Chicarita Trunk Sewer. The existing trunk sewer is located just east of Interstate 15 and flows south from Carmel Mountain Road to Poway Road. The 18-inch diameter line increases in size to a 24-inch diameter line in Sabre Springs Parkway and decreases in size to an 18-inch diameter line just before Poway Road. Flows from this trunk sewer are ultimately conveyed to the North City Water Reclamation Plant.

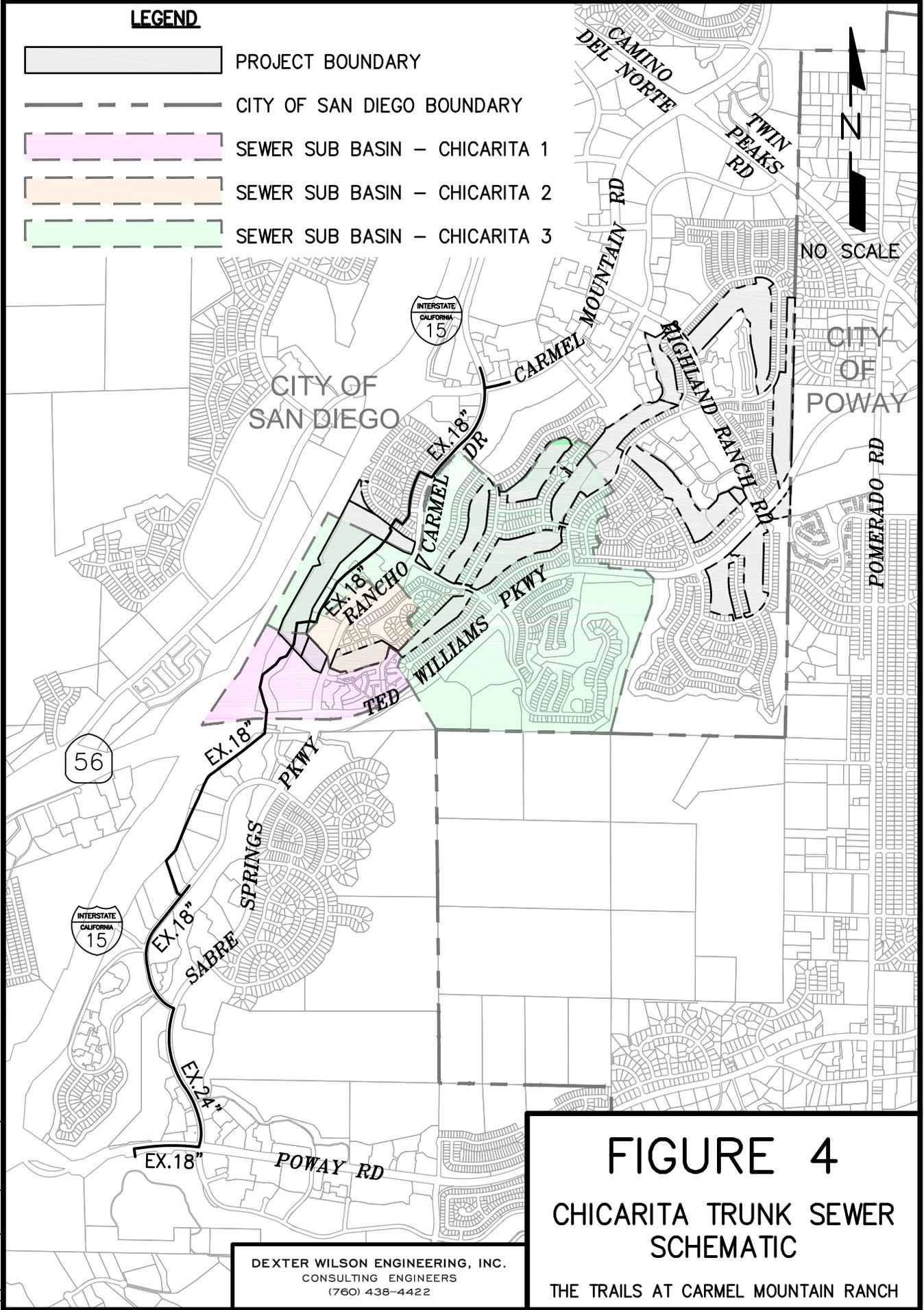
Units 1, 2, 3, 4, 5, 6, 7, 8, and the west side of Unit 9 are located within the Chicarita Sub-basins. Unit 5 is located within the Chicarita 1 Sub-basin, Unit 6 is located within the Chicarita 2 Sub-basin, and Units 1, 2, 8, and the west side of Unit 9 are located within the Chicarita 3 Sub-basin. Units 3, 4, and 7 will consist of park space or open space and will therefore not generate any sewer flows.

**Poway Sub-Basins.** The two sewer sub-basins on the east side of the project, PO5 and PO3M, flow east to the City of Poway through Exchange Meters PO5 and PO3M, respectively. Due to the location of some areas of the City of San Diego's sewerage system there is an existing Sewage Transportation Agreement between the City of San Diego and the City of Poway that allows the City of San Diego to use a portion of the City of Poway Municipal Sewerage System to transport its sewage to the San Diego Metropolitan Sewerage System.

Units 10, 11, 12, 13, 14, 15, 16, 17, and the east side of Unit 9 are located within the Poway Sub-basins. Units 16, 17, and the east side of Unit 9 are located within the PO5 Sub-basin, and Unit 10 is located within the PO3M Sub-basin. Available capacity for each of these exchange meters is addressed later in this report. Units 11, 12, 13, 14, and 15 will consist of park space or open space and will therefore not generate any sewer flows.

**LEGEND**

-  PROJECT BOUNDARY
-  CITY OF SAN DIEGO BOUNDARY
-  SEWER SUB BASIN - CHICARITA 1
-  SEWER SUB BASIN - CHICARITA 2
-  SEWER SUB BASIN - CHICARITA 3



\\ARTIC\DWG\736018\CMR\_SWR\_FIGURE-4\_TRNKSWR.DWG 10-26-20 13:17:29 LAYOUT: 8X11

**FIGURE 4**

**CHICARITA TRUNK SEWER SCHEMATIC**

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## **Overview of Proposed Sewer Facilities**

Proposed sewer facilities for The Trails project will consist of private sewer facilities internal to each Unit. Each Unit will have a public sewer lateral that will convey sewer flow into the existing public sewer system except for Unit 5 and Unit 10 which propose private sewer laterals. When private facilities are proposed to be constructed within a City of San Diego easement or in the Public Right-of-Way, an Encroachment Maintenance and Removal Agreement (EMRA) is required. Since Unit 5 and Unit 10 are proposing private sewer laterals within the Public Right-of-Way, one such agreement is required for each of these laterals.

Figure 5 at the back of this report presents the proposed sewer system. A total of ten connections will be made to existing public sewer lines. The private onsite sewer system for Unit 9 will be designed to allow the west side of Unit 9 to flow west in Carmel Ridge Road within the Chicarita 3 Sub-basin, and the east side of Unit 9 to flow east in Carmel Ridge Road within the PO5 Sub-basin. Units 2, 17, and the east side of Unit 9 will connect to the existing public sewer system at existing sewer manholes while Units 1, 5, 6, 8, 10, 16, and the west side of Unit 9 will connect to the existing public sewer system at proposed sewer manholes. Sewage will ultimately be conveyed to either the Chicarita Trunk Sewer or a Poway Exchange Meter, as previously described. Flows from The Trails project will enter the Chicarita Trunk Sewer at three separate locations.

As shown in Figure 5, two reaches of public sewer will need to be upgraded to accommodate the proposed development per the sewer analyses presented in this report. Also shown on Figure 5 is a force main discharge manhole for Unit 5 since this Unit will require a private sewer lift station. Flow from the proposed private force main discharge manhole in Unit 5 will flow by gravity in a private sewer line to the east into Ranch Carmel Drive and south in Rancho Carmel Drive in a public sewer line to an existing public sewer. Private onsite sewer systems are briefly discussed in a later section.

## **Public Sewer System Analysis**

The public sewer system analysis consists of calculating peak dry weather flows within all segments of the public sewer system that will be affected by the proposed development. The existing public sewer system was analyzed under existing flows and under existing flows plus proposed flows.

Sewage generation for existing development in the vicinity of The Trails project was estimated based on Sewer Design Guide factors for the Chicarita Sub-basins and existing sewer meter data for the Poway Sub-basins using the number of dwelling units connecting to each reach of analyzed sewer. The analyses presented in this section assume 210 dwelling units from Unit 9 flow west in Carmel Ridge Road and 90 dwelling units from Unit 9 flow east in Carmel Ridge Road (300 dwelling units total) unless otherwise noted.

The average sewage flow generated by The Trails project is presented in Table 2. Total average flow from The Trails project in the Chicarita Sub-basins is 186,760 gpd (assumes 210 dwelling units from Unit 9 flow west). Total average flow from The Trails project in the PO3M and PO5 Sub-basins is 150,065 gpd (assumes 90 dwelling units from Unit 9 flow east).

Existing gravity sewer pipe sizes and slopes for all five sewer sub-basins were obtained from City as-built drawings.

**Chicarita Sub-Basins.** The public sewer system analysis for the Chicarita Sub-basins consists of the local sewers downstream of the project between the project and the Chicarita Trunk Sewer. The analysis includes existing 8-inch and 10-inch diameter sewer pipelines.

**Existing Flow Analysis Results - Existing System.** Appendix A presents the results for the existing sewer system under existing flows. Exhibit A presents a Manhole Diagram for the system.

The results for this analysis indicate that under existing flows, the existing sewer system has a maximum depth-to-diameter ratio of 0.51 which occurs in the 10-inch sewer line located in a private street west of Shoal Creek Drive between Manhole 404 and Manhole 400. Flow velocities for the analyzed portion of the public sewer system under existing flows range from a low of 1.5 fps to a maximum of 7.5 fps.

**Existing Plus Project Flow Analysis Results - Existing System.** Appendix B presents the results for the existing sewer system under existing flows plus buildout project flows. Exhibit A presents a Manhole Diagram for the system.

Unit 5 will require a private sewer lift station, therefore a pumped flow of 46 gpm is included in the spreadsheet in the sewer reach between Manhole 620 and Manhole 616 in the Chicarita 1 Sub-Basin (Unit 5: 78 dwelling units x 280 gpd/DU x 3.0 PF = 65,520 gpd = 45.5 gpm; use 46 gpm). The results for this analysis indicate that under existing flows plus proposed flows the existing sewer system will see an increase in the maximum depth-to-diameter ratio from 0.51 to 0.61 (Manhole 404 to Manhole 400) which is greater than the allowable d/D ratio of 0.50 for sewer lines 15 inches in diameter and smaller. All other reaches of existing 8-inch and 10-inch sewer have a d/D ratio less than 0.50. Flow velocities for the offsite sewer system under existing flows plus proposed flows range from a low of 2.2 fps to a maximum of 8.1 fps.

**Existing Plus Project Flow Analysis Results - Proposed System.** As shown in Appendix B, the d/D ratio in the sewer reaches from Manhole 404 to Manhole 400 has a d/D ratio greater than 0.50. In order to accommodate the proposed development the sewer reach from Manhole 404 to Manhole 400, which corresponds to an existing 10-inch public sewer located in a private street west of Shoal Creek Drive, must be upsized to a 12-inch line. This improvement is shown on Figure 5.

Appendix C presents the results of the proposed sewer system under existing flows plus buildout project flows. The results indicate that the d/D ratio in the sewer reach from Manhole 404 to Manhole 400 reduces from 0.61 to 0.46 with a 12-inch diameter sewer line. Under this analysis all reaches of sewer within the Chicarita Sub-Basins have a d/D ratio less than 0.50. Flow velocities for the offsite sewer system under existing flows plus proposed flows range from a low of 2.2 fps to a maximum of 8.1 fps.

**Poway Sub-Basins.** The public sewer system analysis for the Poway Sub-Basins consists of the local sewers downstream of the project between the project and Sewer Exchange Meters PO3M and PO5. The analysis includes existing 8-inch and 12-inch diameter sewer pipelines. To the extent any required improvements impact existing sewer facilities in the City of Poway, Applicant shall coordinate any such improvements with the City of Poway during final design.

Existing flows for each sub-basin were determined using flow meter data for the Poway Sub-basins. This is an acceptable methodology for the Poway Sub-basins per the email correspondence with the City of San Diego included in Appendix D. The existing sewer flow meter data provided by the City of San Diego Public Utilities Department for the PO3M and PO5 Sub-Basins and their corresponding basin areas are presented in Appendix E.

**PO3M Sub-Basin Sewage Generation Factor.** As shown in Appendix E, the sewer basin for Exchange Meter PO3M had an average daily flow of 0.1198 mgd or 119,800 gpd from July, 1 2018 to June 30, 2019. This sewer basin consists of 596 residential units. The remaining land use within the basin consists of landscape area that does not contribute to sewage generation. Using the number of residential units and the metered average daily flow, the sewage generation rate for the existing residential units in the area is determined to be 201 gallons per day per dwelling unit, which corresponds to a dwelling unit density of 2.52 persons per dwelling unit ( $201 \text{ gpd/DU} / 80 \text{ gpcpd} = 2.52$ ). This sewage generation factor was used to develop sewage generation estimates for existing development in the PO3M Sub-basin.

**PO5 Sub-Basin Sewage Generation Factor.** The PO5 Sub-basin consists of a total of 1,034 dwelling units and non-residential land use. The non-residential land use area was estimated and converted into equivalent dwelling units using Table 1-1 in the City Sewer Design Guide. The results are presented below.

Industrial Area:  $51.9 \text{ Gross Ac} \times 0.8 \text{ Net Ac/Gross Ac} \times 17.9 \text{ DU/Net Ac} = 743.2 \text{ EDUs}$   
Commercial Area:  $4.6 \text{ Gross Ac} \times 0.8 \text{ Net Ac/Gross Ac} \times 12.5 \text{ DU/Net Ac} = 46 \text{ EDUs}$   
School Area:  $9.6 \text{ Gross Ac} \times 0.8 \text{ Net Ac/Gross Ac} \times 8.9 \text{ DU/Net Ac} = 68.4 \text{ EDUs}$   
Total EDUs: 857.6 EDUs

Therefore, there are a total of 1,891.6 dwelling units (1,304 DU + 857.6 EDUs) in the PO5 Sub-basin. As shown in Appendix E, the sewer basin for Exchange Meter PO5 had an average daily flow of 0.2548 mgd or 254,800 gpd from July, 1 2018 to June 30, 2019. Using the number of dwelling units and the metered average daily flow, the sewage generation rate for the existing dwelling units in the area is determined to be 135 gallons per day per dwelling unit, which corresponds to a dwelling unit density of 1.69 persons per dwelling unit ( $135 \text{ gpd/DU} / 80 \text{ gpcpd} = 1.69$ ). This sewage generation factor was used to develop sewage generation estimates for existing development in the PO5 Sub-basin.

The non-residential land use equivalent dwelling units were added to the sewer reach at Manhole 144 (Carmel Ridge Road) in the sewer calculation spreadsheets for the PO5 Sub-basin. Appendix E identifies the portion of the PO5 Sub-basin that flows into Manhole 144.

**Existing Flow Analysis Results - Existing System.** Appendix F presents the results for the existing sewer system under existing flows. Exhibit B presents a Manhole Diagram for the system.

The results for this analysis indicate that under existing flows, the existing sewer system has a maximum depth-to-diameter ratio of 0.42 which occurs in the 12-inch sewer lines located between Carmel Ridge Road and Exchange Meter PO5 in Unit 14 (Manhole 120 and Manhole 100). Flow velocities for the analyzed portion of the public sewer system under existing flows range from a low of 1.3 fps to a maximum of 8.9 fps.

**Existing Plus Project Flow Analysis Results - Existing System.** Appendix G presents the results for the existing sewer system under existing flows plus buildout project flows. Exhibit B presents a Manhole Diagram for the system.

The results for this analysis indicate that under existing flows plus proposed flows the existing sewer reach from Manhole 120 to Manhole 100 will see an increase in the depth-to-diameter ratio from 0.42 to 0.49. The greatest depth of flow occurs between Manhole 248 and Manhole 240 because of the addition of 200 dwelling units from Unit 10. Under existing flows the 8-inch sewer reaches between Manhole 248 and Manhole 240 were at d/D ratios of 0.39. Under existing flows plus proposed flows, the d/D ratios increase to 0.52 which exceeds the allowable d/D ratio of 0.50 for sewer lines 15 inches in diameter and smaller. Flow velocities for the offsite sewer system under existing flows plus proposed flows range from a low of 2.3 fps to a maximum of 9.7 fps.

**Existing Plus Project Flow Analysis Results - Proposed System.** As shown in Appendix G, the d/D ratios in the sewer reaches from Manhole 248 to Manhole 240 increase from 0.39 to 0.52 when the project is added to the existing sewer system. In order to accommodate the proposed development the sewer reaches from Manhole 248 to Manhole 240, which correspond to two reaches of existing 8-inch public sewer located in Lindamere Lane, must be upsized. Additionally, the 8-inch sewer reaches downstream of Manhole 240, from Manhole 240 to Manhole 200, are required to be upsized as a 10-inch diameter pipe

cannot flow into a smaller 8-inch diameter pipe (see Section 2.3.6.2 of the 2015 Sewer Design Guide). Therefore, 10-inch sewer lines are proposed in Lindamere Lane and Esprit Avenue as shown on Figure 5.

Appendix H presents the results of the proposed sewer system under existing flows plus project flows. The results indicate that the d/D ratio in the sewer reaches from Manhole 248 to Manhole 240 reduce from 0.52 to 0.37 with the proposed 10-inch diameter sewer line. Under this analysis all reaches of sewer within the Poway Sub-Basins have a d/D ratio less than 0.50. Flow velocities for the offsite sewer system under existing flows plus proposed flows range from a low of 2.3 fps to a maximum of 9.7 fps.

**Sewer Exchange Meter Capacities.** As previously mentioned, there is an agreement in place that allows the City of San Diego to discharge sewage into the Poway Municipal Sewerage System for transportation to the San Diego Metropolitan Sewerage System. An excerpt from this agreement is provided in Appendix I that outlines the City of San Diego's Capacity Rights. Per the excerpt, there are four meters, including Exchange Meters PO3M and PO5 that have a total capacity right of 3.67 mgd at average daily flow. The City of San Diego Public Utilities Department provided meter data from July 1, 2018 to June 30, 2019 for all four of these meters (see Appendix I).

As previously mentioned, Unit 10 will gravity flow into Exchange Meter PO3M, and Units 16, 17, and the east side of Unit 9 will gravity flow into Exchange Meter PO5. Table 3 presents the total existing and proposed flow for the sewer exchange meter areas.

<b>TABLE 3 THE TRAILS PROJECT EXCHANGE METER CAPACITY</b>	
<b>Description</b>	<b>Average Flow, mgd</b>
<b>Existing Flow</b>	
PO1 Meter	0.4106
PO3M Meter	0.1198
PO5 Meter	0.2548
Stone Canyon	0.1927
<b>Existing Flow Subtotal</b>	<b>0.9778</b>

<b>TABLE 3 THE TRAILS PROJECT EXCHANGE METER CAPACITY</b>	
<b>Description</b>	<b>Average Flow, mgd</b>
<b>Project Flow</b>	
East Side of Unit 9 (90 DUs)	0.0252
Unit 10	0.0560
Unit 16	0.0344
Unit 17	0.0344
<b>Project Flow Subtotal</b>	<b>0.1500</b>
<b>Existing + Project Flow Total</b>	<b>1.1278</b>

Based on the analysis presented in Table 3, there is sufficient available capacity in Sewer Exchange Meters PO3M and PO5 to serve the proposed development because 1.1278 mgd is well under the allowable capacity of 3.67 mgd.

**Additional Public Sewer System Analyses.** Additional analyses were performed to determine the maximum number of dwelling units that can gravity flow from Units 9 and 10. As previously mentioned, Unit 9 sewer flows will be conveyed east and west in Rancho Carmel Drive. Unit 10 flows are proposed to flow south into Chestnut Hill Lane. A total of 300 dwelling units are proposed for Unit 9, and 200 dwelling units are proposed for Unit 10.

**Unit 9 Maximum Flow West in Carmel Ridge Road.** An additional analysis shows that a maximum of 250 dwelling units from Unit 9 can flow west in Carmel Ridge Road within the proposed Chicarita 3 Sub-basin sewer system without additional sewer upgrades. Under this scenario, the remaining 50 dwelling units in Unit 9 would flow east in Carmel Ridge Road within the PO5 Sub-basin (which is less than the 110 dwelling unit maximum presented in the next sub-section). Results for this analysis are provided in Appendix J.

The results indicate that at 250 dwelling units the d/D ratios in the proposed system (see Figure 5) are less than 0.5. Flow velocities within the Chicarita 3 Sub-basin for this scenario range from 2.4 fps to 8.1 fps. If more than 250 dwelling units from Unit 9 flow west in Carmel Ridge Road, then approximately 1,400 LF of 8-inch diameter sewer will need to be upsized to 10-inch diameter sewer in Stoney Gate Place and Shoal Creek Drive (see Manhole 428 to

Manhole 408 on Exhibit A). If 250 dwelling units or less from Unit 9 flow west in Carmel Ridge Road, then this upgrade is not required. Figure J-1 in Appendix J presents the required improvements for this scenario.

**Unit 9 Maximum Flow East in Carmel Ridge Road.** An additional analysis shows that a maximum of 110 dwelling units from Unit 9 can flow east in Carmel Ridge Road within the existing PO5 Sub-basin sewer system without additional sewer upgrades. Under this scenario, the remaining 190 dwelling units in Unit 9 would flow west in Carmel Ridge Road within the Chicarita 3 Sub-basin (which is less than the 250 dwelling unit maximum presented in the previous sub-section). Results for this analysis are provided in Appendix K.

The results indicate that at 110 dwelling units the d/D ratios in the proposed sewer system (see Figure 5) are less than 0.5. Flow velocities within the PO5 Sub-basin for this scenario range from 2.5 to 9.7 fps. If more than 110 dwelling units from Unit 9 flow east in Carmel Ridge Road, then approximately 800 LF of 12-inch diameter sewer will need to be upsized to 15-inch diameter sewer southeast of Carmel Ridge Road (see Manhole 124 to Manhole 100 on Exhibit B). If 110 dwelling units or less from Unit 9 flow east in Carmel Ridge Road, then this upgrade is not required. Figure K-1 in Appendix K presents the required improvements for this scenario.

**Unit 10 Maximum Flow South in Chestnut Hill Lane.** Figure 5 shows a public sewer system improvement in Lindamere Lane and Esprit Avenue. An additional analysis shows that if Unit 10 has 165 dwelling units or less flowing south into Chestnut Hill Lane, then this upgrade is not required. Results for this analysis are provided in Appendix L.

As shown in the results, the d/D ratios in the existing PO3M Sub-basin system are less than 0.5 when 165 dwelling units or less flow south from Unit 10 into Chestnut Hill Lane. Flow velocities within the PO3M Sub-basin for this scenario range from 2.3 fps to 8.0 fps. If more than 165 dwelling units flow south into Chestnut Hill Lane from Unit 10, then the public sewer improvement shown on Figure 5 will be required. Figure L-1 in Appendix L presents the required improvements for this scenario.

### **Chicarita Trunk Sewer Analysis**

The Chicarita Trunk Sewer analysis presented in the following paragraphs addresses the available sewer capacity in the Chicarita Trunk Sewer downstream of the project. Sewer flows from The Trails project will enter the trunk sewer at three locations.

**Chicarita Trunk Sewer Downstream Capacity.** The City of San Diego Sewer Modeling Group provided Year 2025 City of San Diego Wet Weather Flow Hydraulic Model Results for TS #90 – Chicarita Creek. These results are provided in Appendix M along with facility sequence number maps provided by the City. By taking City of San Diego Sewer Modeling Group data for Year 2025 flows within the Chicarita Trunk Sewer and adding The Trails project build-out sewer flows (Units 1, 2, 3, 4, 5, 6, 7, 8, and 9), the analysis determines where there is available capacity within the Chicarita Trunk Sewer for The Trails project. The Chicarita Trunk Sewer is made up of 18-inch and 24-inch pipe downstream of The Trails project.

As-built drawings were obtained from the City of San Diego to verify the City’s sewer model pipeline slopes and diameters. Some sections of the trunk sewer did not have as-built drawings readily available as they are considered “Critical Infrastructure” by the City of San Diego. The as-built drawings that were readily available from the City of San Diego are provided in Appendix N for reference.

There are discrepancies in sewer pipe slopes between the As-Built drawings for segments of the existing Chicarita Trunk Sewer and the City’s sewer model. The pipe sizes are the same in both data sets throughout the trunk sewer. The offsite sewer analysis provided in this report is based on the As-Built sewer slopes (where available) and the City model output data Year 2025 peak wet weather flows. Pipe slopes from the City’s sewer model and pipe slopes from the as-built drawings are both presented on the sewer analysis spreadsheet in Appendix O. Appendix O contains the results of the analysis described above and facility sequence number maps provided by the City.

The results indicate that the maximum d/D in the Chicarita Trunk Sewer when adding The Trails project build-out flows is 0.68 d/D well under the allowable d/D of 0.75 for sewer lines with a diameter of 18 inches or greater.

Flow velocities in the pipeline range from 3.7 fps to 25.9 fps. There are four sewer segments with velocities that exceed 10 fps and each have a slope greater than 4.5 percent. Only one sewer reach exceeds a velocity of 13.7 fps and this sewer reach has a sewer slope of 42.4 percent. All four sewer segments with flow velocities that exceed 10 fps are 18-inch diameter pipelines.

The conclusion is that The Trails project's sewage flows can be accommodated in the existing Chicarita Trunk Sewer downstream of The Trails project without any upgrades based on Year 2025 wet weather sewage flow in the Chicarita Trunk Sewer.

### **Onsite Private Sewer Systems**

Figure 5 at the back of this report presents the proposed private sewer system points of connection. All proposed facilities will connect to public City of San Diego sewer pipelines. As previously described, Units 1, 2, 5, 6, 8, and the west side of Unit 9 are within a Chicarita Sub-Basin and will flow west to the Chicarita Trunk Sewer. Units 10, 16, 17, and the east side of Unit 9 are within the Poway Sub-Basins and will flow east to the City of Poway for transportation to the San Diego Metropolitan Sewerage System.

A majority of The Trails project can be served internally by a gravity sewer system with the exception of Unit 5 and Unit 10.

**Unit 5.** Due to grading constraints, a lift station will be required for Unit 5. The lift station will pump sewage into a private discharge manhole near the southeast corner of Unit 5. Sewage pumped into the discharge manhole will flow east by gravity in a private sewer lateral to a public sewer manhole within and adjacent to the existing Right-of-Way (sewer lateral will require an EMRA). The sewage will then be conveyed to the existing 8-inch sewer south of Unit 5 via a new public gravity main. It is recommended that the private sewer lift station designer use an activated carbon filter at the end of the Wet Well Vent to minimize the potential for sewage odors in the vicinity of the private sewer lift station. In addition, water service and power should be routed to the lift station site for use with a Vapex fogger odor control system, which can be installed at a later date if necessary.

**Unit 10.** Unit 10 is proposed to gravity to the existing 8-inch sewer in Chestnut Hill Lane. To do so, a 14-foot wide private sewer easement will be required. If the private sewer easement is obtained, then the private sewer easement will need to be recorded prior to approval of the public improvement drawings (sewer lateral will require an EMRA). If a private easement cannot be obtained for the proposed gravity sewer for Unit 10, then Unit 10 will require a private lift station to pump sewage to Carmel Ridge Road. Should a private sewer lift station be required, an odor control system similar to Unit 5 should be implemented.

**Unit 10 Sewer Service Alternative.** As mentioned above, if a private easement cannot be obtained for the proposed gravity sewer for Unit 10 then this Unit will need a private lift station to pump sewage to Carmel Ridge Road. To do so the sewage will be pumped through a force main from the private lift station to a private discharge manhole near the northern boundary of Unit 10. The flow from this manhole would be conveyed into the existing 8-inch sewer fronting the north end of Unit 10 by way of a private gravity main which will require an EMRA with the City of San Diego. The existing 8-inch sewer fronting the north end of Unit 10 in Carmel Ridge Road conveys flow east towards Exchange Meter PO5. The alternative Unit 10 point of connection is shown on Figure 5.

The peak pumped flow from Unit 10 is approximately 70 gpm (Unit 10: 120 dwelling units x 280 gpd/DU x 3.0 PF = 100,800 gpd = 0.1008 mgd = 70 gpm). Replacing the Unit 10 flow in Table 3 (0.0560 mgd) with 0.1008 mgd results in a total flow of 1.1726 mgd to the exchange meters. Therefore, there is sufficient available capacity in the exchange meters to handle this sewer service alternative for Unit 10 as the total flow to the exchange meters is well under the allowable capacity of 3.67 mgd.

The effects of pumping sewage from Unit 10 east in Carmel Ridge Road were analyzed and this analysis is provided in Appendix P. Exhibit B presents a Manhole Diagram for the system. The results of this analysis indicate that under existing plus proposed flows, the maximum depth to diameter ratio in the existing PO5 sewer system increases from 0.42 (see Appendix F) to 0.54 from Manhole 120 to Manhole 100. This reach of sewer corresponds to an existing 12-inch sewer line located between Carmel Ridge Road and Exchange Meter PO5 in Unit 14. Flow velocities for the analyzed portion of the public sewer system under existing flows range from a low of 2.4 fps to a maximum of 10.0 fps. This indicates the existing 12-inch diameter sewer main between Manhole 124 and Manhole 100 must be upsized to a 15-

inch diameter sewer main if the sewage generated in Unit 10 is pumped to Carmel Ridge Road (Manhole 124 to Manhole 120 must be upsized due to velocity). Figure P-1 in Appendix P presents the required improvements for this scenario.

The onsite private sewer systems internal to each Unit of The Trails project will be designed in the future as individual Units proceed with their site development plans. These systems will be designed to maintain a minimum of one (1) percent slope to meet plumbing code standards. Alternatively, the private sewer systems within each Unit may be designed in accordance with the City of San Diego Sewer Design Guide.

### **Conclusions and Recommendations**

The following conclusions and recommendations are summarized based on the sewer system analysis prepared for The Trails at Carmel Mountain Ranch development project in the City of San Diego.

1. The City of San Diego will provide sewer service to The Trails project, consisting of a maximum of 1,200 dwelling units, a commercial lot, park space, buffer area, and open space.
2. The Trails project is located within five sewer sub-basins. There are three Chicarita Sub-basins and two Poway Sub-basins. The Chicarita Sub-basins flow west to the existing Chicarita Trunk Sewer #90. The Poway Sub-basins flow east to the City of Poway.
3. Existing sewer flow metering data from the City of San Diego was used to develop sewage generation factors for the PO3M and PO5 sub-basins within the Poway Sub-basins. The PO3M sewer analyses use a sewage generation rate of 201 gpd/DU which corresponds to a dwelling unit density of 2.52 persons per dwelling unit ( $201 \text{ gpd/DU} / 80 \text{ gpcpd} = 2.52$ ). The PO5 sewer analyses use a sewage generation rate of 135 gpd/DU which corresponds to a dwelling unit density of 1.69 persons per dwelling unit ( $135 \text{ gpd/DU} / 80 \text{ gpcpd} = 1.69$ ).

4. The private onsite sewer system for Unit 9 will be designed to allow the west side of Unit 9 to flow west in Carmel Ridge Road within the Chicarita 3 Sub-basin, and the east side of Unit 9 to flow east in Carmel Ridge Road within the PO5 Sub-basin.
5. This Master Sewer Study presents several public sewer system alternatives for The Trails project. Prior to the issuance of a building permit for any development unit, applicant shall prepare and submit a final sewer study which identifies all required improvements and phasing.
6. To the extent any required improvements impact existing sewer facilities in the City of Poway, applicant shall coordinate any such improvements with the City of Poway during final design.
7. Figure 5 presents the proposed sewer system. Two reaches of sewer will need to be upgraded in order to accommodate The Trails project.
8. The public sewer improvements shown on Figure 5 are based on sewer analyses which assume 210 dwelling units from Unit 9 flow west in Carmel Ridge Road and the remaining 90 dwelling units from Unit 9 flow east in Carmel Ridge Road.
9. The results of the public sewer system analysis for the Chicarita Sub-basins indicate that in order to accommodate the proposed development the sewer reach from Manhole 404 to Manhole 400 (on Exhibit A), which corresponds to an existing 10-inch public sewer located in a private street west of Shoal Creek Drive, must be upsized to a 12-inch line. This improvement is shown on Figure 5. Figure C-1 shows the same improvements as Figure 5 and is provided in Appendix C for reference.
10. The results of the public sewer system analysis for the Poway Sub-basins indicate that in order to accommodate the proposed development the sewer reaches from Manhole 248 to Manhole 200, which correspond to reaches of existing 8-inch public sewer located in Lindamere Lane and Esprit Avenue, must be upsized. A 10-inch line is proposed as shown on Figure 5. Figure C-1 shows the same improvements as Figure 5 and is provided in Appendix C for reference.

11. If the Unit 9 sewer flow split is modified, a maximum of 250 dwelling units from Unit 9 may flow west in Carmel Ridge Road (remaining 50 dwelling units will flow east in Carmel Ridge Road) without additional public sewer system improvements. If more than 250 units flow west in Carmel Ridge Road from Unit 9, then the sewer reaches from Manhole 428 to Manhole 408 (on Exhibit A) will need to be upsized from 8-inch diameter pipe to 10-inch diameter pipe. The analyses for this scenario and a figure showing the required improvements (Figure J-1) are provided in Appendix J.
12. If the Unit 9 sewer flow split is modified, a maximum of 110 dwelling units from Unit 9 may flow east in Carmel Ridge Road (remaining 190 dwelling units will flow west in Carmel Ridge Road) without additional public sewer system improvements. If more than 110 units flow east in Carmel Ridge Road from Unit 9, then the sewer reaches from Manhole 124 to Manhole 100 (see Exhibit B) will need to be upsized from 12-inch diameter pipe to 15-inch diameter pipe. The analyses for this scenario and a figure showing the required improvements (Figure K-1) are provided in Appendix K.
13. Figure 5 shows a public sewer system improvement in Lindamere Lane and Esprit Avenue. This improvement is not necessary if 165 dwelling units or less from Unit 10 flow south in Chestnut Hill Lane. The analyses for this scenario and a figure showing the required improvements (Figure L-1) are provided in Appendix L.
14. Sewer Exchange Meters PO3M and PO5 for flow from the City of San Diego to the City of Poway have available capacity for the build-out of Units 10, 16, 17, and the east side of Unit 9 of The Trails project.
15. The existing Chicarita Trunk Sewer downstream of The Trails project has available capacity for the build-out of The Trails project based on Year 2025 peak wet weather sewer flows.
16. Proposed sewer facilities for The Trails project will consist of private sewer facilities internal to each Unit.
17. Unit 5 will require a private sewer lift station onsite. An EMRA with the City of San Diego will be required for the proposed private sewer lateral that is proposed to be within the Public Right-of-Way.

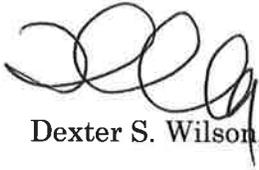
18. Unit 10 may require a private sewer lift station onsite depending on the outcome of private easement negotiations.
19. If the Unit 10 private sewer easement is obtained, then the private sewer easement will need to be recorded prior to approval of the public improvement drawings. An EMRA with the City of San Diego will be required for the portion of the pipeline within the Public Right-of-Way.
20. If the Unit 10 private sewer easement is not obtained, then a private sewer lift station will be required to convey sewage east in Carmel Ridge Road. An EMRA with the City of San Diego will be required for the proposed private sewer lateral that is proposed to be within the Public Right-of-Way. This alternative will require the existing 12-inch sewer reaches from Manhole 124 to Manhole 100 (see Exhibit B) to be upgraded to 15-inch diameter sewer. The analyses for this scenario and a figure showing the required improvements (Figure P-1) are provided in Appendix P.
21. Private gravity sewer systems for each unit will be designed to maintain a minimum of one (1) percent slope to meet plumbing code standards. Alternatively, the private sewer systems within the Planning Areas may be designed in accordance with the City of San Diego Sewer Design Guide.
22. New public sewer lines shall be designed to meet all requirements of the City of San Diego Public Utilities Department Sewer Design Guide, May 2015, or latest edition. Final design will be reflected on the improvement plans and sewer system calculations to be submitted for review and approval.

Jonathan Frankel  
November 12, 2020  
The Trails Master Sewer Study

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If you have any questions regarding the information or conclusions and recommendations presented in this report, please do not hesitate to contact the undersigned.

Dexter Wilson Engineering, Inc.



Dexter S. Wilson, P.E.

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Attachments



**APPENDIX A**

**CHICARITA SUB-BASINS  
EXISTING FLOW  
CALCULATION SPREADSHEET RESULTS  
EXISTING SEWER SYSTEM**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at Carmel Mountain Ranch - Chicarita Sub-Basins - Existing Flow  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
<b>CHICARITA 3 SUB-BASIN</b>																					
	480	476		3.5	10.00	35.0	35.0	80	2,800	4.000	11,200	0.011	0.017	8	1.9	0.004844	0.04798	0.072	0.0252	1.55	
	476	472		3.5	27.00	94.5	129.5	80	10,360	4.000	41,440	0.041	0.064	8	6.7	0.009467	0.06596	0.099	0.0403	3.58	
	472	468		3.5	76.00	266.0	395.5	80	31,640	3.348	105,941	0.106	0.164	8	5.6	0.026646	0.10852	0.163	0.0832	4.44	
	468	464		3.5	9.00	31.5	427.0	80	34,160	3.243	110,792	0.111	0.171	8	10.8	0.020041	0.09453	0.142	0.0681	5.67	
	464	460		3.5	12.00	42.0	469.0	80	37,520	3.103	116,437	0.116	0.180	8	4.2	0.033857	0.12198	0.183	0.0984	4.12	
	460	420		3.5	9.00	31.5	500.5	80	40,040	3.000	120,103	0.120	0.186	8	3.8	0.036685	0.12681	0.190	0.1041	4.02	
	452	448		3.5	12.00	42.0	42.0	80	3,360	4.000	13,440	0.013	0.021	8	10.0	0.002521	0.03522	0.053	0.0160	2.93	
	448	444		3.5	14.00	49.0	91.0	80	7,280	4.000	29,120	0.029	0.045	8	10.5	0.005330	0.05016	0.075	0.0269	3.77	
	444	440		3.5	11.00	38.5	129.5	80	10,360	4.000	41,440	0.041	0.064	8	9.0	0.008192	0.06154	0.092	0.0364	3.97	
	440	436		3.5	67.00	234.5	364.0	80	29,120	3.453	100,561	0.101	0.156	8	1.9	0.042930	0.13703	0.206	0.1163	3.01	
	436	432		3.5	17.00	59.5	423.5	80	33,880	3.255	110,279	0.110	0.171	8	5.0	0.029249	0.11361	0.170	0.0888	4.32	
	432	428		3.5	17.00	59.5	483.0	80	38,640	3.057	118,110	0.118	0.183	8	1.0	0.070047	0.17519	0.263	0.1647	2.50	
	428	424		3.5	16.00	56.0	539.0	80	43,120	2.968	127,959	0.128	0.198	8	0.5	0.107322	0.21830	0.327	0.2236	1.99	
	424	420		3.5	367.40	1285.9	1824.9	80	145,992	2.315	337,974	0.338	0.523	8	6.7	0.077611	0.18462	0.277	0.1773	6.64	
	420	416		3.5	44.00	154.0	2479.4	80	198,352	2.213	438,903	0.439	0.679	8	3.4	0.140344	0.25171	0.378	0.2715	5.63	
	416	412		3.5	0.00	0.0	2479.4	80	198,352	2.213	438,903	0.439	0.679	8	5.9	0.107164	0.21813	0.327	0.2234	6.84	
	412	408		3.5	416.00	1456.0	3935.4	80	314,832	2.056	647,439	0.647	1.002	8	5.6	0.162842	0.27291	0.409	0.3026	7.45	
	408	404		3.5	0.00	0.0	3935.4	80	314,832	2.056	647,439	0.647	1.002	10	2.6	0.131338	0.30360	0.364	0.2587	5.58	
	404	400		3.5	0.00	0.0	3935.4	80	314,832	2.056	647,439	0.647	1.002	10	0.8	0.236773	0.42235	0.507	0.3998	3.61	
<b>CHICARITA 2 SUB-BASIN</b>																					
	512	508		3.5	61.00	213.5	213.5	80	17,080	3.955	67,551	0.068	0.105	8	1.8	0.029861	0.11474	0.172	0.0901	2.61	
	508	504		3.5	56.00	196.0	409.5	80	32,760	3.302	108,163	0.108	0.167	8	0.9	0.066879	0.17113	0.257	0.1594	2.36	
	504	500		3.5	0.00	0.0	409.5	80	32,760	3.302	108,163	0.108	0.167	8	0.9	0.066879	0.17113	0.257	0.1594	2.36	
<b>CHICARITA 1 SUB-BASIN</b>																					
	620	616		3.5	162.00	567.0	567.0	80	45,360	2.944	133,547	0.134	0.207	10	2.0	0.030889	0.14581	0.175	0.0923	3.22	
	616	612		3.5	0.00	0.0	567.0	80	45,360	2.944	133,547	0.134	0.207	10	3.0	0.025220	0.13208	0.159	0.0800	3.72	
	612	608		3.5	0.00	0.0	567.0	80	45,360	2.944	133,547	0.134	0.207	10	3.0	0.025220	0.13208	0.159	0.0800	3.72	
	608	604		3.5	0.00	0.0	567.0	80	45,360	2.944	133,547	0.134	0.207	10	6.4	0.017267	0.11002	0.132	0.0614	4.85	
	604	600		3.5	0.00	0.0	567.0	80	45,360	2.944	133,547	0.134	0.207	10	0.5	0.061777	0.20557	0.247	0.1507	1.98	

Total EDUS  
1,403.4

Min Slope  
0.50

Max dn/D  
0.51

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

**APPENDIX B**

**CHICARITA SUB-BASINS  
EXISTING PLUS PROPOSED FLOW  
CALCULATION SPREADSHEET RESULTS  
EXISTING SEWER SYSTEM**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - Chicarita Sub-Basins - Existing System - Existing plus Proposed Flow  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
<b>CHICARITA 3 SUB-BASIN</b>																					
	480	476		3.5	76.00	266.0	266.0	80	21,280	3.780	80,438	0.080	0.124	8	1.9	0.034793	0.12358	0.185	0.1003	2.79	Unit 1, 66 dwelling units
	476	472		3.5	27.00	94.5	360.5	80	28,840	3.465	99,931	0.100	0.155	8	6.7	0.022828	0.10068	0.151	0.0746	4.66	
	472	468		3.5	76.00	266.0	626.5	80	50,120	2.895	145,077	0.145	0.224	8	5.6	0.036489	0.12648	0.190	0.1037	4.87	
	468	464		3.5	9.00	31.5	658.0	80	52,640	2.868	150,989	0.151	0.234	8	10.8	0.027312	0.10983	0.165	0.0846	6.21	
	464	460		3.5	12.00	42.0	700.0	80	56,000	2.833	158,667	0.159	0.246	8	4.2	0.046136	0.14202	0.213	0.1224	4.51	
	460	420		3.5	9.00	31.5	731.5	80	58,520	2.807	164,271	0.164	0.254	8	3.8	0.050176	0.14811	0.222	0.1299	4.40	
	452	448		3.5	222.00	777.0	777.0	80	62,160	2.769	172,131	0.172	0.266	8	10.0	0.032282	0.11923	0.179	0.0952	6.29	Unit 9, 210 dwelling units
	448	444		3.5	14.00	49.0	826.0	80	66,080	2.711	179,143	0.179	0.277	8	10.5	0.032788	0.12015	0.180	0.0963	6.48	
	444	440		3.5	11.00	38.5	864.5	80	69,160	2.653	183,499	0.183	0.284	8	9.0	0.036276	0.12611	0.189	0.1033	6.19	
	440	436		3.5	67.00	234.5	1099.0	80	87,920	2.470	217,189	0.217	0.336	8	1.9	0.092718	0.20228	0.303	0.2013	3.76	
	436	432		3.5	17.00	59.5	1158.5	80	92,680	2.458	227,835	0.228	0.353	8	5.0	0.060428	0.16262	0.244	0.1483	5.35	
	432	428		3.5	17.00	59.5	1218.0	80	97,440	2.446	238,377	0.238	0.369	8	1.0	0.141374	0.25272	0.379	0.2730	3.04	
	428	424		3.5	16.00	56.0	1274.0	80	101,920	2.435	248,196	0.248	0.384	8	0.5	0.208168	0.31331	0.470	0.3627	2.38	
	424	420		3.5	465.40	1628.9	2902.9	80	232,232	2.153	499,983	0.500	0.774	8	6.7	0.114815	0.22616	0.339	0.2348	7.41	Unit 8, 98 dwelling units
	420	416		3.5	44.00	154.0	3788.4	80	303,072	2.071	627,711	0.628	0.971	8	3.4	0.200717	0.30685	0.460	0.3530	6.19	
	416	412		3.5	87.00	304.5	4092.9	80	327,432	2.045	669,715	0.670	1.036	8	5.9	0.163519	0.27354	0.410	0.3035	7.68	Unit 2, 87 dwelling units
	412	408		3.5	416.00	1456.0	5548.9	80	443,912	1.968	873,638	0.874	1.352	8	5.6	0.219735	0.32319	0.485	0.3775	8.06	
	408	404		3.5	0.00	0.0	5548.9	80	443,912	1.968	873,638	0.874	1.352	10	2.6	0.177224	0.35757	0.429	0.3220	6.05	
	404	400		3.5	0.00	0.0	5548.9	80	443,912	1.968	873,638	0.874	1.352	10	0.8	0.319495	0.50885	0.611	0.5026	3.87	
<b>CHICARITA 2 SUB-BASIN</b>																					
	512	508		3.5	189.00	661.5	661.5	80	52,920	2.865	151,638	0.152	0.235	8	1.8	0.067031	0.17132	0.257	0.1596	3.31	Unit 6, 128 dwelling units
	508	504		3.5	56.00	196.0	857.5	80	68,600	2.664	182,733	0.183	0.283	8	0.9	0.112987	0.22426	0.336	0.2321	2.74	
	504	500		3.5	0.00	0.0	857.5	80	68,600	2.664	182,733	0.183	0.283	8	0.9	0.112987	0.22426	0.336	0.2321	2.74	
<b>CHICARITA 1 SUB-BASIN</b>																					
	620 <sup>(A)</sup>	616		3.5	162.00	567.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	2.0	0.046209	0.17767	0.213	0.1225	3.63	Unit 5, 78 dwelling units (pumped)
	616	612		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	3.0	0.037730	0.16069	0.193	0.1061	4.19	
	612	608		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	3.0	0.037730	0.16069	0.193	0.1061	4.19	
	608	604		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	6.4	0.025832	0.13366	0.160	0.0814	5.47	
	604	600		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	0.5	0.092419	0.25243	0.303	0.2009	2.22	

Total EDUS  
1,992.4

Min Slope  
0.50

Max dn/D  
0.61

Notes:  
 A. 46 gpm of pumped flow added to peak flow (Unit 5: 78DU \* 280 gpd/DU \* 3.0 PF = 65,520 gpd = 45.5 gpm; use 46 gpm (66,240 gpd))

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

**APPENDIX C**

**CHICARITA SUB-BASINS  
EXISTING PLUS PROPOSED FLOW  
CALCULATION SPREADSHEET RESULTS  
PROPOSED SEWER SYSTEM  
AND  
FIGURE C-1**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - Chicarita Sub-Basins - Proposed System - Existing plus Proposed Flow  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
<b>CHICARITA 3 SUB-BASIN</b>																					
	480	476		3.5	76.00	266.0	266.0	80	21,280	3.780	80,438	0.080	0.124	8	1.9	0.034793	0.12358	0.185	0.1003	2.79	Unit 1, 66 dwelling units
	476	472		3.5	27.00	94.5	360.5	80	28,840	3.465	99,931	0.100	0.155	8	6.7	0.022828	0.10068	0.151	0.0746	4.66	
	472	468		3.5	76.00	266.0	626.5	80	50,120	2.895	145,077	0.145	0.224	8	5.6	0.036489	0.12648	0.190	0.1037	4.87	
	468	464		3.5	9.00	31.5	658.0	80	52,640	2.868	150,989	0.151	0.234	8	10.8	0.027312	0.10983	0.165	0.0846	6.21	
	464	460		3.5	12.00	42.0	700.0	80	56,000	2.833	158,667	0.159	0.246	8	4.2	0.046136	0.14202	0.213	0.1224	4.51	
	460	420		3.5	9.00	31.5	731.5	80	58,520	2.807	164,271	0.164	0.254	8	3.8	0.050176	0.14811	0.222	0.1299	4.40	
	452	448		3.5	222.00	777.0	777.0	80	62,160	2.769	172,131	0.172	0.266	8	10.0	0.032282	0.11923	0.179	0.0952	6.29	Unit 9, 210 dwelling units
	448	444		3.5	14.00	49.0	826.0	80	66,080	2.711	179,143	0.179	0.277	8	10.5	0.032788	0.12015	0.180	0.0963	6.48	
	444	440		3.5	11.00	38.5	864.5	80	69,160	2.653	183,499	0.183	0.284	8	9.0	0.036276	0.12611	0.189	0.1033	6.19	
	440	436		3.5	67.00	234.5	1099.0	80	87,920	2.470	217,189	0.217	0.336	8	1.9	0.092718	0.20228	0.303	0.2013	3.76	
	436	432		3.5	17.00	59.5	1158.5	80	92,680	2.458	227,835	0.228	0.353	8	5.0	0.060428	0.16262	0.244	0.1483	5.35	
	432	428		3.5	17.00	59.5	1218.0	80	97,440	2.446	238,377	0.238	0.369	8	1.0	0.141374	0.25272	0.379	0.2730	3.04	
	428	424		3.5	16.00	56.0	1274.0	80	101,920	2.435	248,196	0.248	0.384	8	0.5	0.208168	0.31331	0.470	0.3627	2.38	
	424	420		3.5	465.40	1628.9	2902.9	80	232,232	2.153	499,983	0.500	0.774	8	6.7	0.114815	0.22616	0.339	0.2348	7.41	Unit 8, 98 dwelling units
	420	416		3.5	44.00	154.0	3788.4	80	303,072	2.071	627,711	0.628	0.971	8	3.4	0.200717	0.30685	0.460	0.3530	6.19	
	416	412		3.5	87.00	304.5	4092.9	80	327,432	2.045	669,715	0.670	1.036	8	5.9	0.163519	0.27354	0.410	0.3035	7.68	Unit 2, 87 dwelling units
	412	408		3.5	416.00	1456.0	5548.9	80	443,912	1.968	873,638	0.874	1.352	8	5.6	0.219735	0.32319	0.485	0.3775	8.06	
	408	404		3.5	0.00	0.0	5548.9	80	443,912	1.968	873,638	0.874	1.352	10	2.6	0.177224	0.35757	0.429	0.3220	6.05	
	404	400		3.5	0.00	0.0	5548.9	80	443,912	1.968	873,638	0.874	1.352	12	0.8	0.196478	0.45471	0.455	0.3475	3.89	
<b>CHICARITA 2 SUB-BASIN</b>																					
	512	508		3.5	189.00	661.5	661.5	80	52,920	2.865	151,638	0.152	0.235	8	1.8	0.067031	0.17132	0.257	0.1596	3.31	Unit 6, 128 dwelling units
	508	504		3.5	56.00	196.0	857.5	80	68,600	2.664	182,733	0.183	0.283	8	0.9	0.112987	0.22426	0.336	0.2321	2.74	
	504	500		3.5	0.00	0.0	857.5	80	68,600	2.664	182,733	0.183	0.283	8	0.9	0.112987	0.22426	0.336	0.2321	2.74	
<b>CHICARITA 1 SUB-BASIN</b>																					
	620 <sup>(A)</sup>	616		3.5	162.00	567.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	2.0	0.046209	0.17767	0.213	0.1225	3.63	Unit 5, 78 dwelling units (pumped)
	616	612		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	3.0	0.037730	0.16069	0.193	0.1061	4.19	
	612	608		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	3.0	0.037730	0.16069	0.193	0.1061	4.19	
	608	604		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	6.4	0.025832	0.13366	0.160	0.0814	5.47	
	604	600		3.5	0.00	0.0	567.0	80	45,360	2.944	199,787	0.200	0.309	10	0.5	0.092419	0.25243	0.303	0.2009	2.22	

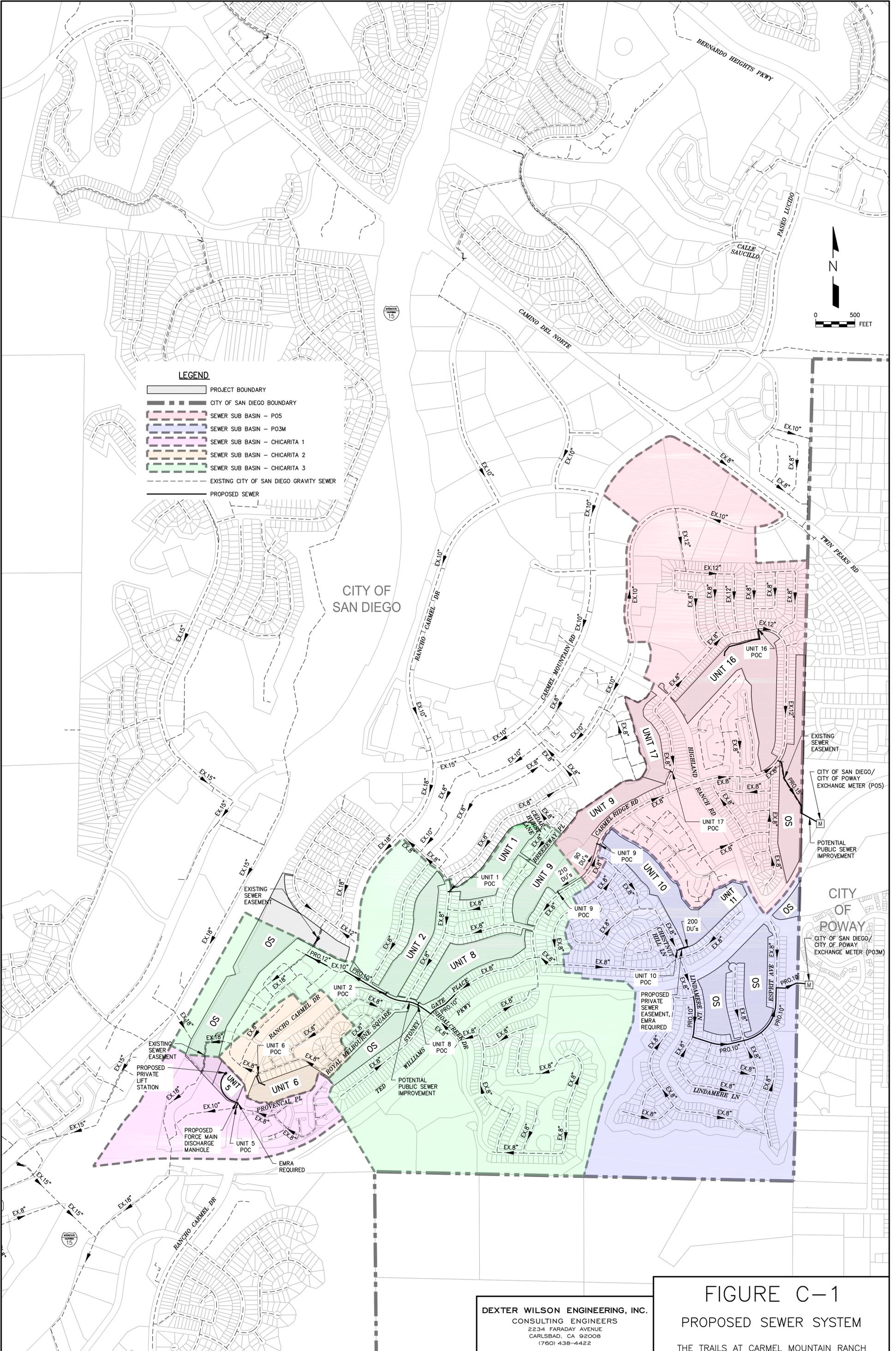
Total EDUS  
1,992.4

Min Slope  
0.50

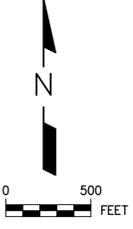
Max dn/D  
0.48

Notes:  
 A. 46 gpm of pumped flow added to peak flow (Unit 5: 78DU \* 280 gpd/DU \* 3.0 PF = 65,520 gpd = 45.5 gpm; use 46 gpm (66,240 gpd))

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D



CITY OF SAN DIEGO



**LEGEND**

- PROJECT BOUNDARY
- CITY OF SAN DIEGO BOUNDARY
- SEWER SUB BASIN - PO3M
- SEWER SUB BASIN - CHICARITA 1
- SEWER SUB BASIN - CHICARITA 2
- SEWER SUB BASIN - CHICARITA 3
- EXISTING CITY OF SAN DIEGO GRAVITY SEWER
- PROPOSED SEWER

**FIGURE C-1**

**PROPOSED SEWER SYSTEM**

THE TRAILS AT CARMEL MOUNTAIN RANCH

DEXTER WILSON ENGINEERING, INC.  
 CONSULTING ENGINEERS  
 2234 FARADAY AVENUE  
 CARLSBAD, CA 92008  
 (760) 438-4422

**APPENDIX D**

**EMAIL CORRESPONDENCE WITH THE  
CITY OF SAN DIEGO  
RE: EXISTING SEWER METER DATA**

## Fernando Fregoso

---

**From:** Nguyen, Gary <NguyenVH@sandiego.gov>  
**Sent:** Wednesday, May 6, 2020 5:07 PM  
**To:** 'MEscobarEck@atlantissd.com'  
**Cc:** Wilson, Leonard; Kathi Riser; 'Marina Wurst (marina@projectdesign.com)'; Itkin, Irina; Peterson, Jeff; Doringo, Edric; Jonathan Frankel; Fernando Fregoso  
**Subject:** RE: CMR- The Trails TIA , PTS 3625519

Marcela,

The purpose of this email is to clarify the City's acceptance of subject sewer study's methodology on calculating the density for population/dwelling unit (DU). The sewer study proposes to use existing sewer flow meter data which is acceptable, but only for the sewer basins that have metered sewer flow data to the City of Poway. These sewer basins are shown in Figure 3 and are labeled PO3M and PO5. Therefore, the sewer flow meter data can only be applied to PO3M and PO5 sewer basins (Exhibit B) since these basins are the only basins that measure sewer flows to the City of Poway. Based on the sewer study calculations, 2.52 population/DU is the value for the PO3M sewer basin and is acceptable for PO3M sewer basin only. Therefore, the sewer study needs to calculate the population/DU for PO5 sewer basin based on the sewer flow meter data for PO5. The other three sewer basins, Chicarita 1-3 (Appendix B-G) need to follow the Sewer Design Guide, 3.5 population/DU.

I hope this clarifies PUD – Water and Sewer Development Review comments on the subject sewer study. Feel free to contact me if there are questions, or if you require additional clarification.

Please let us know if a meeting is still needed.

Thank you,

**GARY NGUYEN**

Assistant Engineer - Civil  
Development Services Department  
Water and Sewer Development Review

T: (619) 446-5454

[NguyenVH@sandiego.gov](mailto:NguyenVH@sandiego.gov)

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Visit [sandiego.gov/dsd](http://sandiego.gov/dsd) to keep up-to-date with DSD's operational and program updates. You can also stay informed about the City's response to COVID-19 by visiting the [City's COVID-19 information page](#).

**DSD Email Updates**

Visit [sandiego.gov/dsd-email](http://sandiego.gov/dsd-email) to receive the latest operational updates from DSD directly into your email inbox.



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**APPENDIX E**

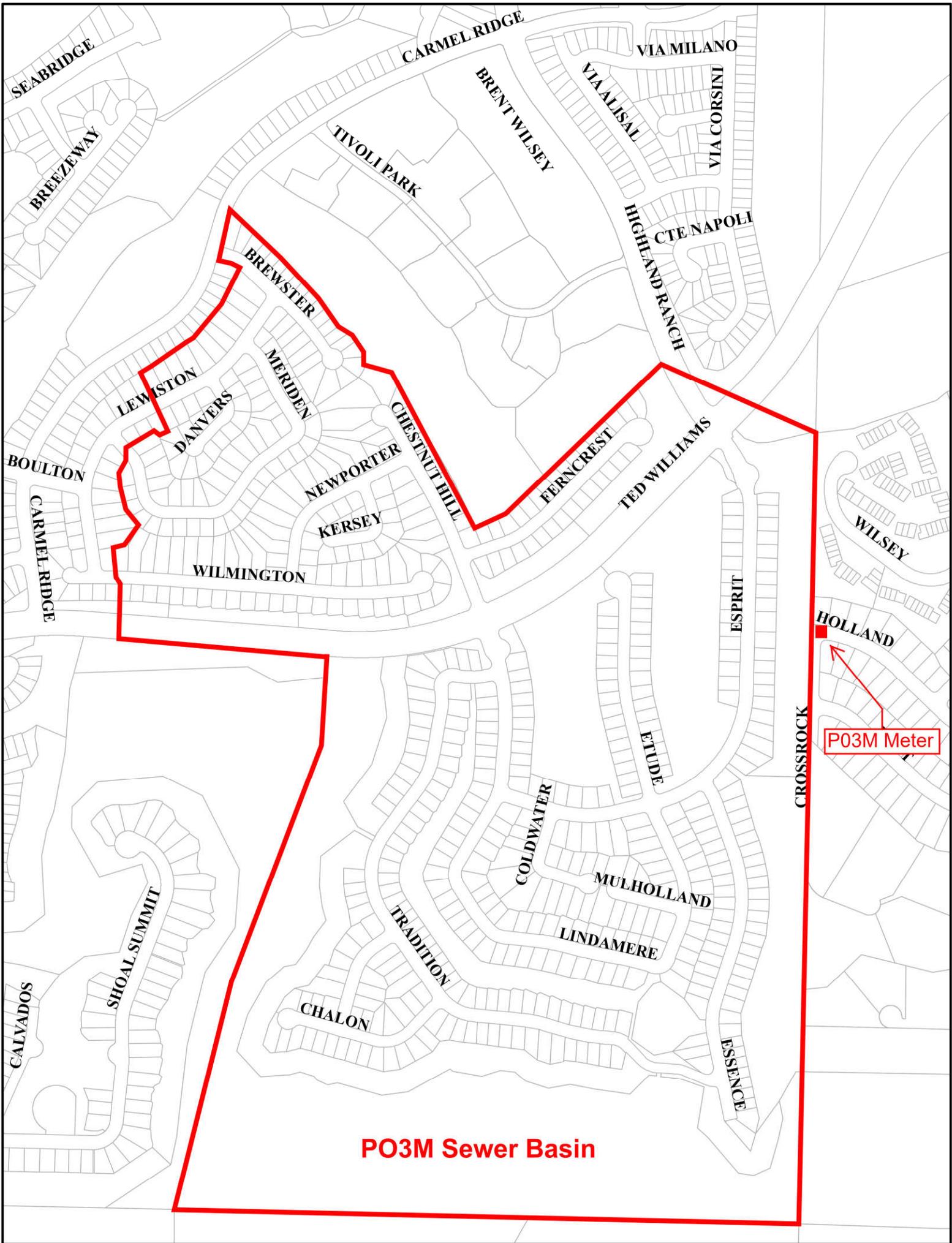
**CITY OF SAN DIEGO EXCHANGE METER DATA  
(PO3M AND PO5) AND PO3M SEWER BASIN**

PO3M

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Rain days Jan-19	Rain days Feb-19	Mar-19	Apr-19	May-19	Jun-19	
1	0.129	0.119	0.125	0.116	0.112	0.130	0.135	0.114	0.113	0.113	0.109	0.114	
2	0.118	0.125	0.119	0.111	0.114	0.135	0.122	0.143	0.129	0.106	0.102	0.130	
3	0.114	0.115	0.142	0.116	0.128	0.119	0.117	0.157	0.136	0.111	0.098	0.114	
4	0.122	0.130	0.118	0.112	0.126	0.114	0.120	0.144	0.116	0.110	0.112	0.110	
5	0.120	0.132	0.112	0.114	0.114	0.115	0.122	0.161	0.112	0.109	0.123	0.109	
6	0.116	0.116	0.112	0.126	0.111	0.120	0.134	0.161	0.117	0.124	0.109	0.108	
7	0.124	0.112	0.111	0.141	0.114	0.131	0.115	0.144	0.117	0.127	0.102	0.107	
8	0.136	0.118	0.125	0.118	0.111	0.131	0.116	0.133	0.117	0.111	0.104	0.124	
9	0.117	0.115	0.136	0.117	0.112	0.141	0.108	0.134	0.129	0.109	0.102	0.130	
10	0.119	0.117	0.117	0.113	0.124	0.120	0.111	0.133	0.144	0.107	0.098	0.106	
11	0.117	0.130	0.114	0.116	0.127	0.116	0.107	0.112	0.118	0.111	0.114	0.102	
12	0.115	0.142	0.113	0.109	0.124	0.114	0.124	0.106	0.119	0.112	0.119	0.108	
13	0.117	0.124	0.112	0.123	0.113	0.115	0.131	0.108	0.119	0.118	0.105	0.106	
14	0.137	0.118	0.111	0.129	0.111	0.113	0.116	0.166	0.119	0.122	0.105	0.105	
15	0.131	0.118	0.128	0.113	0.109	0.134	0.120	0.189	0.114	0.104	0.104	0.120	
16	0.116	0.120	0.134	0.112	0.112	0.138	0.130	0.182	0.125	0.104	0.108	0.120	
17	0.115	0.122	0.117	0.116	0.121	0.123	0.132	0.168	0.134	0.104	0.104	0.109	
18	0.112	0.127	0.112	0.111	0.126	0.114	0.138	0.160	0.116	0.098	0.122	0.108	
19	0.114	0.138	0.111	0.118	0.111	0.116	0.144	0.141	0.109	0.108	0.127	0.106	
20	0.109	0.122	0.113	0.137	0.117	0.115	0.136	0.135	0.116	0.121	0.104	0.103	
21	0.126	0.123	0.110	0.141	0.122	0.120	0.129	0.147	0.113	0.121	0.104	0.106	
22	0.134	0.120	0.123	0.117	0.131	0.128	0.115	0.162	0.111	0.108	0.105	0.114	
23	0.117	0.113	0.134	0.113	0.121	0.121	0.113	0.166	0.128	0.104	0.108	0.121	
24	0.120	0.114	0.114	0.117	0.129	0.126	0.115	0.170	0.135	0.108	0.108	0.105	
25	0.117	0.124	0.112	0.122	0.141	0.127	0.105	0.142	0.119	0.102	0.119	0.102	
26	0.110	0.137	0.113	0.115	0.126	0.124	0.121	0.126	0.114	0.102	0.116	0.102	
27	0.117	0.113	0.107	0.124	0.114	0.118	0.132	0.120	0.116	0.114		0.102	
28	0.126	0.110	0.109	0.139	0.112	0.117	0.113	0.116	0.109	0.128		0.105	
29	0.138	0.108	0.127	0.119	0.116	0.123	0.109		0.109	0.107		0.115	
30	0.125	0.108	0.139	0.111	0.119	0.121	0.109		0.127	0.108		0.117	
31	0.116	0.106		0.112		0.127	0.108		0.132		0.103		
Avg (mgd)	0.1208	0.1205	0.1190	0.1193	0.1189	0.1228	0.1209	0.1443	0.1204	0.1110	0.1087	0.1109	0.1198
Total (mg)	3.7440	3.7360	3.5700	3.6980	3.5680	3.8060	3.7470	4.0400	3.7320	3.3310	3.3687	3.3280	43.6687
Max	0.138	0.142	0.142	0.141	0.141	0.141	0.144	0.189	0.144	0.128	0.127	0.130	
Min	0.109	0.106	0.107	0.109	0.109	0.113	0.105	0.106	0.109	0.098	0.098	0.102	

Partial data removed	
5/27/2019	0.141
5/28/2019	
5/29/2019	
5/30/2019	0.146

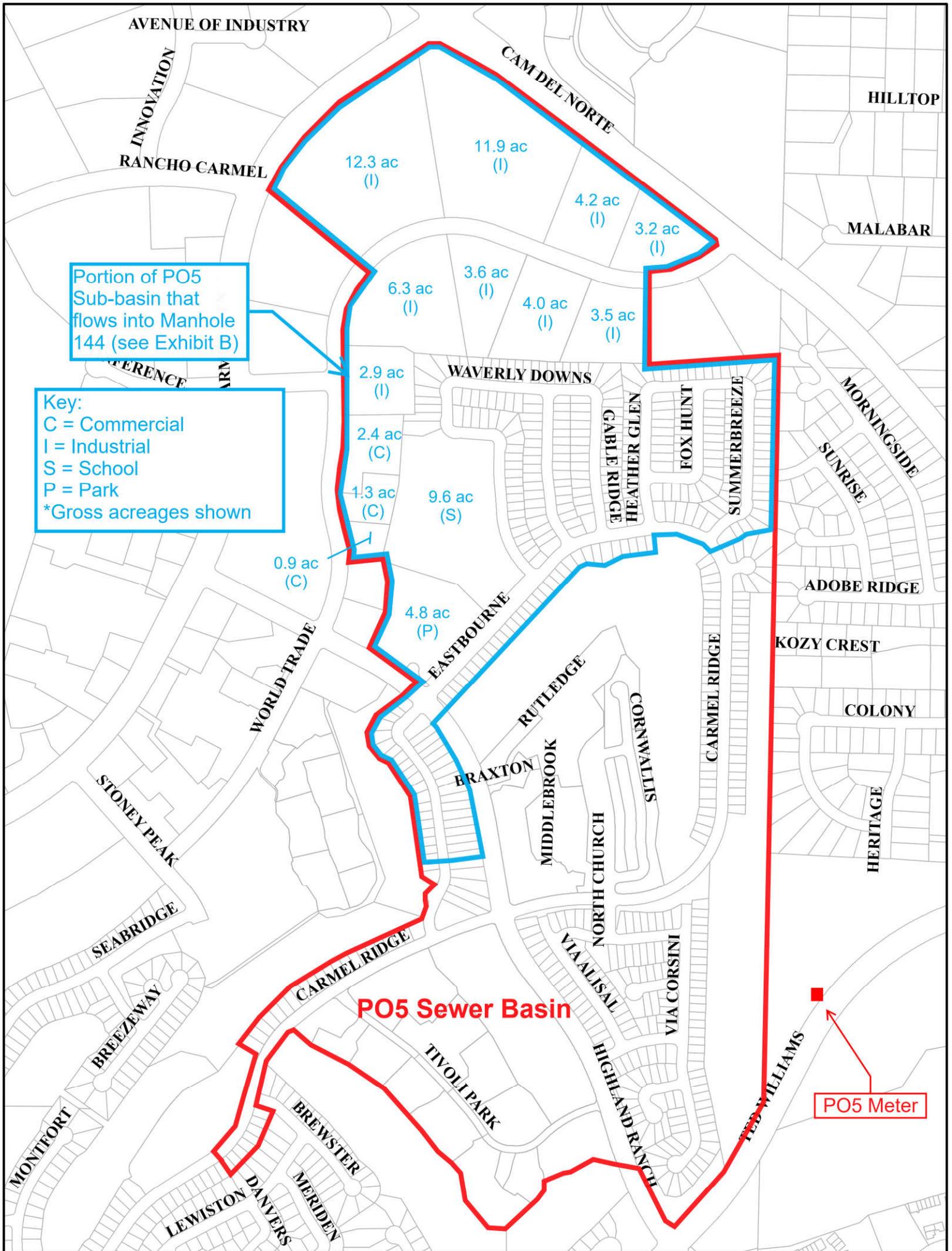
Average daily flow between July 1, 2018 and June 30, 2019



PO5

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Rain days Jan-19	Rain days Feb-19	Mar-19	Apr-19	May-19	Jun-19	
1	0.160	0.230	0.188	0.249	0.226	0.265	0.255	0.258	0.293	0.288	0.255	0.251	
2	0.204	0.216	0.163	0.253	0.245	0.271	0.260	0.329	0.301	0.291	0.260	0.250	
3	0.200	0.220	0.187	0.253	0.233	0.259	0.254	0.352	0.311	0.283	0.253	0.248	
4	0.201	0.219	0.180	0.250	0.224	0.254	0.247	0.337	0.293	0.273	0.257	0.248	
5	0.220	0.211	0.215	0.248	0.231	0.260	0.249	0.373	0.284	0.280	0.257	0.243	
6	0.207	0.229	0.231	0.229	0.232	0.287	0.277	0.351	0.293	0.278	0.261	0.252	
7	0.209	0.226	0.228	0.230	0.243	0.313	0.251	0.305	0.299	0.285	0.261	0.250	
8	0.216	0.207	0.223	0.226	0.242	0.272	0.250	0.284	0.294	0.272	0.258	0.254	
9	0.225	0.204	0.235	0.234	0.232	0.266	0.256	0.279	0.293	0.267	0.245	0.266	
10	0.217	0.196	0.231	0.234	0.217	0.266	0.264	0.294	0.305	0.272	0.255	0.246	
11	0.209	0.344	0.233	0.225	0.222	0.252	0.255	0.270	0.290	0.272	0.249	0.242	
12	0.202	0.377	0.236	0.221	0.220	0.250	0.277	0.264	0.318	0.256	0.255	0.245	
13	0.193	0.226	0.238	0.233	0.227	0.252	0.267	0.269	0.296	0.249	0.259	0.241	
14	0.206	0.232	0.235	0.237	0.237	0.244	0.297	0.534	0.287	0.245	0.255	0.246	
15	0.210	0.229	0.230	0.231	0.237	0.247	0.275	0.466	0.285	0.243	0.246	0.248	
16	0.202	0.225	0.236	0.227	0.237	0.254	0.284	0.388	0.273	0.243	0.253	0.243	
17	0.197	0.229	0.227	0.221	0.233	0.250	0.310	0.351	0.287	0.239	0.239	0.240	
18	0.210	0.229	0.232	0.222	0.234	0.251	0.318	0.345	0.288	0.233	0.246	0.247	
19	0.215	0.243	0.233	0.219	0.256	0.245	0.296	0.324	0.281	0.234	0.276	0.237	
20	0.218	0.245	0.243	0.222	0.247	0.247	0.284	0.322	0.294	0.255	0.261	0.230	
21	0.208	0.259	0.251	0.227	0.267	0.248	0.280	0.371	0.295	0.260	0.259	0.235	
22	0.209	0.260	0.278	0.224	0.232	0.244	0.274	0.369	0.282	0.274	0.250	0.225	
23	0.223	0.238	0.306	0.227	0.246	0.235	0.270	0.326	0.283	0.266	0.252	0.252	
24	0.230	0.229	0.250	0.219	0.243	0.238	0.266	0.324	0.296	0.264	0.236	0.238	
25	0.213	0.207	0.220	0.227	0.250	0.258	0.259	0.320	0.290	0.276	0.242	0.244	
26	0.212	0.214	0.227	0.226	0.273	0.248	0.254	0.310	0.290	0.262	0.244	0.242	
27	0.222	0.217	0.221	0.224	0.246	0.249	0.264	0.305	0.287	0.260	0.252	0.254	
28	0.212	0.226	0.241	0.229	0.244	0.246	0.268	0.301	0.290	0.271	0.253	0.239	
29	0.215	0.218	0.245	0.226	0.264	0.238	0.259		0.288	0.256	0.258	0.247	
30	0.228	0.220	0.247	0.227	0.280	0.246	0.254		0.295	0.265	0.252	0.251	
31	0.231	0.213		0.221		0.260	0.270		0.304		0.248		
Avg (mgd)	0.2105	0.2335	0.2303	0.2304	0.2407	0.2553	0.2692	0.3329	0.2924	0.2637	0.2531	0.2451	0.2548
Total (mg)	6.5240	7.2380	6.9100	7.1410	7.2200	7.9150	8.3440	9.3210	9.0650	7.9120	7.8470	7.3540	92.7910
Max	0.231	0.377	0.306	0.253	0.280	0.313	0.318	0.534	0.318	0.291	0.276	0.266	
Min	0.160	0.196	0.163	0.219	0.217	0.235	0.247	0.258	0.273	0.233	0.236	0.225	

Average daily flow between July 1, 2018 and June 30, 2019



**APPENDIX F**

**POWAY SUB-BASINS  
EXISTING FLOW  
CALCULATION SPREADSHEET RESULTS  
EXISTING SEWER SYSTEM**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

JOB NUMBER: 736-018

FOR: The Trails at CMR - Poway Sub-Basins - Existing System - Existing Flow  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

LINE	FROM	TO	POP. PER D.U. <sup>(A)</sup>	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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
					IN-LINE	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																				
	196	192	1.69	4	6.8	6.8	80	541	4.000	2,163	0.002	0.003	8	5.1	0.000566	0.01731	0.026	0.0056	1.34	
	192	188	1.69	4	6.8	13.5	80	1,082	4.000	4,326	0.004	0.007	8	5.1	0.001133	0.02409	0.036	0.0091	1.65	
	188	184	1.69	0	0.0	13.5	80	1,082	4.000	4,326	0.004	0.007	8	5.1	0.001133	0.02409	0.036	0.0091	1.65	
	184	180	1.69	11	18.6	32.1	80	2,569	4.000	10,275	0.010	0.016	8	5.1	0.002691	0.03629	0.054	0.0167	2.14	
	180	172	1.69	11	18.6	50.7	80	4,056	4.000	16,224	0.016	0.025	8	5.1	0.004248	0.04508	0.068	0.0230	2.45	
	176	172	1.69	8	13.5	13.5	80	1,082	4.000	4,326	0.004	0.007	8	5.1	0.001133	0.02409	0.036	0.0091	1.65	
	172	168	1.69	8	13.5	77.7	80	6,219	4.000	24,877	0.025	0.038	8	10.0	0.004666	0.04718	0.071	0.0246	3.52	
	168	164	1.69	0	0.0	77.7	80	6,219	4.000	24,877	0.025	0.038	8	4.9	0.006651	0.05572	0.084	0.0314	2.76	
	164	162	1.69	0	0.0	77.7	80	6,219	4.000	24,877	0.025	0.038	8	5.0	0.006598	0.05551	0.083	0.0312	2.77	
	162	158	1.69	0	0.0	77.7	80	6,219	4.000	24,877	0.025	0.038	8	4.7	0.006798	0.05629	0.084	0.0319	2.72	
	158	154	1.69	380	642.2	719.9	80	57,595	2.817	162,229	0.162	0.251	8	5.8	0.039847	0.13208	0.198	0.1103	5.12	
	154	150	1.69	0	0.0	719.9	80	57,595	2.817	162,229	0.162	0.251	8	1.8	0.072730	0.17863	0.268	0.1693	3.34	
	150	124	1.69	148	250.1	970.1	80	77,605	2.530	196,335	0.196	0.304	8	3.7	0.060864	0.16322	0.245	0.1490	4.59	
	144 <sup>(B)</sup>	140	1.69	1,259.6	2128.7	2128.7	80	170,298	2.273	387,059	0.387	0.599	12	0.4	0.123105	0.35198	0.352	0.2469	2.43	
	140	136	1.69	25	42.3	2171.0	80	173,678	2.264	393,277	0.393	0.609	12	0.4	0.125083	0.35497	0.355	0.2498	2.44	
	136	132	1.69	18	30.4	2201.4	80	176,112	2.256	397,360	0.397	0.615	12	0.4	0.126381	0.35694	0.357	0.2517	2.44	
	132	128	1.69	18	30.4	2231.8	80	178,545	2.249	401,564	0.402	0.621	12	3.9	0.040694	0.20022	0.200	0.1120	5.55	
	128	124	1.69	5	8.5	2240.3	80	179,221	2.248	402,883	0.403	0.623	12	0.8	0.089495	0.29792	0.298	0.1963	3.18	
	124	120	1.69	0	0.0	3210.3	80	256,826	2.119	544,294	0.544	0.842	12	11.7	0.031981	0.17800	0.178	0.0946	8.90	
	120	116	1.69	0	0.0	3210.3	80	256,826	2.119	544,294	0.544	0.842	12	0.4	0.173114	0.42353	0.424	0.3165	2.66	
	116	112	1.69	0	0.0	3210.3	80	256,826	2.119	544,294	0.544	0.842	12	0.4	0.173114	0.42353	0.424	0.3165	2.66	
	112	108	1.69	0	0.0	3210.3	80	256,826	2.119	544,294	0.544	0.842	12	0.4	0.173114	0.42353	0.424	0.3165	2.66	
	108	104	1.69	0	0.0	3210.3	80	256,826	2.119	544,294	0.544	0.842	12	0.4	0.173114	0.42353	0.424	0.3165	2.66	
	104	100	1.69	0	0.0	3210.3	80	256,826	2.119	544,294	0.544	0.842	12	0.4	0.173114	0.42353	0.424	0.3165	2.66	Existing PO5 Basin ADWF = 0.2548 mgd
<b>PO3M SUB-BASIN</b>																				
	256	252	2.52	232	584.6	584.6	80	46,771	2.929	137,015	0.137	0.212	8	0.5	0.114918	0.22627	0.339	0.2349	2.03	
	252	248	2.52	2	5.0	589.7	80	47,174	2.925	137,998	0.138	0.214	8	0.5	0.115742	0.22712	0.341	0.2361	2.03	
	248	244	2.52	99	249.5	839.2	80	67,133	2.691	180,672	0.181	0.280	8	0.5	0.151534	0.26238	0.394	0.2871	2.19	
	244	240	2.52	10	25.2	864.4	80	69,149	2.653	183,484	0.183	0.284	8	0.5	0.153892	0.26459	0.397	0.2904	2.20	
	240	236	2.52	22	55.4	919.8	80	73,584	2.580	189,861	0.190	0.294	8	2.5	0.071938	0.17761	0.266	0.1679	3.94	
	236	232	2.52	25	63.0	982.8	80	78,624	2.517	197,912	0.198	0.306	8	7.4	0.043148	0.13738	0.206	0.1167	5.90	
	232	228	2.52	0	0.0	982.8	80	78,624	2.517	197,912	0.198	0.306	8	7.3	0.043383	0.13775	0.207	0.1172	5.88	
	228	224	2.52	89	224.3	1207.1	80	96,566	2.449	236,451	0.236	0.366	8	2.5	0.087989	0.19688	0.295	0.1939	4.25	
	224	220	2.52	85	214.2	1421.3	80	113,702	2.396	272,402	0.272	0.421	8	2.7	0.099241	0.20955	0.314	0.2114	4.49	
	220	216	2.52	9	22.7	1444.0	80	115,517	2.391	276,225	0.276	0.427	8	1.0	0.163820	0.27381	0.411	0.3039	3.16	
	216	212	2.52	23	58.0	1501.9	80	120,154	2.380	285,919	0.286	0.442	8	2.0	0.119904	0.23139	0.347	0.2422	4.11	
	212	204	2.52	0	0.0	1501.9	80	120,154	2.380	285,919	0.286	0.442	8	10.2	0.053225	0.15263	0.229	0.1356	7.34	
	204	200	2.52	0	0.0	1501.9	80	120,154	2.380	285,919	0.286	0.442	8	1.6	0.134057	0.24555	0.368	0.2626	3.79	Existing PO3M Basin ADWF = 0.1198 mgd

Total EDUS  
2,465.6

Min Slope  
0.40

Max dn/D  
0.42

Notes:

- A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU. PO3M Sub-Basin = 201 gpd/DU / 80 gpcpd = 2.52 persons/DU.
- B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

**APPENDIX G**

**POWAY SUB-BASINS  
EXISTING PLUS PROPOSED FLOW  
CALCULATION SPREADSHEET RESULTS  
EXISTING SEWER SYSTEM**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

JOB NUMBER: 736-018

FOR: The Trails at CMR - Poway Sub-Basins - Existing System - Existing plus Proposed Flow  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																							
	196	192	1.69	4	3.5	90	6.8	315.0	321.8	80	25,741	3.594	92,516	0.093	0.143	8	3.7	0.028486	0.11213	0.168	0.0872	3.70	Unit 9, 90 dwelling units
	192	188	1.69	4	3.5	0	6.8	0.0	328.5	80	26,282	3.572	93,867	0.094	0.145	8	10.0	0.017604	0.08882	0.133	0.0622	5.25	
	188	184	1.69	0	3.5	0	0.0	0.0	328.5	80	26,282	3.572	93,867	0.094	0.145	8	10.0	0.017604	0.08882	0.133	0.0622	5.25	
	184	180	1.69	11	3.5	0	18.6	0.0	347.1	80	27,769	3.510	97,458	0.097	0.151	8	10.0	0.018278	0.09042	0.136	0.0638	5.32	
	180	172	1.69	11	3.5	0	18.6	0.0	365.7	80	29,256	3.448	100,865	0.101	0.156	8	10.0	0.018917	0.09194	0.138	0.0654	5.37	
	176 <sup>(C)</sup>	172	1.69	8	3.5	123	13.5	430.5	444.0	80	35,522	3.187	113,193	0.113	0.175	8	5.1	0.029639	0.11433	0.171	0.0896	4.40	Unit 17, 120 dwelling units, 0.27 comm acres
	172	168	1.69	8	3.5	0	13.5	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	10.0	0.033536	0.12143	0.182	0.0978	6.37	
	168	164	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	4.9	0.047811	0.14456	0.217	0.1255	4.96	
	164	162	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	5.0	0.047427	0.14398	0.216	0.1248	4.99	
	162	158	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	4.7	0.048866	0.14616	0.219	0.1275	4.88	
	158	154	1.69	380	3.5	0	642.2	0.0	1465.4	80	117,235	2.387	279,830	0.280	0.433	8	5.8	0.068733	0.17350	0.260	0.1625	5.99	
	154	150	1.69	0	3.5	0	0.0	0.0	1465.4	80	117,235	2.387	279,830	0.280	0.433	8	1.8	0.125453	0.23702	0.356	0.2503	3.89	
	150	124	1.69	148	3.5	0	250.1	0.0	1715.6	80	137,245	2.337	320,726	0.321	0.496	8	3.7	0.099426	0.20975	0.315	0.2117	5.27	
	144 <sup>(B)</sup>	140	1.69	1,259.6	3.5	123	2128.7	430.5	2559.2	80	204,738	2.204	451,258	0.451	0.698	12	0.4	0.143524	0.38218	0.382	0.2760	2.53	Unit 16, 123 dwelling units
	140	136	1.69	25	3.5	0	42.3	0.0	2601.5	80	208,118	2.199	457,737	0.458	0.708	12	0.4	0.145584	0.38512	0.385	0.2789	2.54	
	136	132	1.69	18	3.5	0	30.4	0.0	2631.9	80	210,552	2.189	460,818	0.461	0.713	12	0.4	0.146564	0.38652	0.387	0.2802	2.54	
	132	128	1.69	18	3.5	0	30.4	0.0	2662.3	80	212,985	2.183	464,848	0.465	0.719	12	3.9	0.047108	0.21524	0.215	0.1242	5.79	
	128	124	1.69	5	3.5	0	8.5	0.0	2670.8	80	213,661	2.181	465,962	0.466	0.721	12	0.8	0.103508	0.32130	0.321	0.2179	3.31	
	124	120	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	11.7	0.041869	0.20302	0.203	0.1142	9.65	
	120	116	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	116	112	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	112	108	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	108	104	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	104	100	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
<b>PO3M SUB-BASIN</b>																							
	256	252	2.52	232	3.5	200	584.6	700.0	1284.6	80	102,771	2.433	250,050	0.250	0.387	8	0.5	0.209723	0.31464	0.472	0.3647	2.39	Unit 10, 200 dwelling units
	252	248	2.52	2	3.5	0	5.0	0.0	1289.7	80	103,174	2.432	250,927	0.251	0.388	8	0.5	0.210459	0.31526	0.473	0.3656	2.39	
	248	244	2.52	99	3.5	0	249.5	0.0	1539.2	80	123,133	2.372	292,092	0.292	0.452	8	0.5	0.244985	0.34499	0.517	0.4105	2.48	
	244	240	2.52	10	3.5	0	25.2	0.0	1564.4	80	125,149	2.367	296,243	0.296	0.458	8	0.5	0.248467	0.34789	0.522	0.4148	2.49	
	240	236	2.52	22	3.5	0	55.4	0.0	1619.8	80	129,584	2.356	305,305	0.305	0.472	8	2.5	0.115679	0.22706	0.341	0.2361	4.50	
	236	232	2.52	25	3.5	0	63.0	0.0	1682.8	80	134,624	2.343	315,483	0.315	0.488	8	7.4	0.068780	0.17356	0.260	0.1626	6.75	
	232	228	2.52	0	3.5	0	0.0	0.0	1682.8	80	134,624	2.343	315,483	0.315	0.488	8	7.3	0.069155	0.17405	0.261	0.1632	6.73	
	228	224	2.52	89	3.5	0	224.3	0.0	1907.1	80	152,566	2.299	350,795	0.351	0.543	8	2.5	0.130539	0.24210	0.363	0.2576	4.74	
	224	220	2.52	85	3.5	0	214.2	0.0	2121.3	80	169,702	2.274	385,874	0.386	0.597	8	2.7	0.140581	0.25194	0.378	0.2719	4.94	
	220	216	2.52	9	3.5	0	22.7	0.0	2144.0	80	171,517	2.271	389,481	0.389	0.603	8	1.0	0.230989	0.33251	0.499	0.3917	3.46	
	216	212	2.52	23	3.5	0	58.0	0.0	2201.9	80	176,154	2.256	397,430	0.397	0.615	8	2.0	0.166667	0.27645	0.415	0.3078	4.50	
	212	204	2.52	0	3.5	0	0.0	0.0	2201.9	80	176,154	2.256	397,430	0.397	0.615	8	10.2	0.073983	0.18022	0.270	0.1714	8.07	
	204	200	2.52	0	3.5	0	0.0	0.0	2201.9	80	176,154	2.256	397,430	0.397	0.615	8	1.6	0.186340	0.29417	0.441	0.3341	4.14	

Total EDUS  
2,465.6

Total EDUS  
446

Min Slope  
0.40

Max dn/D  
0.52

Notes:

- A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU. PO3M Sub-Basin = 201 gpd/DU / 80 gpcpd = 2.52 persons/DU.
- B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.
- C. 0.27 proposed commercial acres converted to EDUs (0.27 acres \* 3,056 gpd/acre / 280 gpd/EDU = 2.95 EDUs; use 3 EDUs).

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

**APPENDIX H**

**POWAY SUB-BASINS  
EXISTING PLUS PROPOSED FLOW  
CALCULATION SPREADSHEET RESULTS  
PROPOSED SEWER SYSTEM**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

JOB NUMBER: 736-018

FOR: The Trails at CMR - Poway Sub-Basins - Proposed System - Existing plus Proposed Flow  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																							
	196	192	1.69	4	3.5	90	6.8	315.0	321.8	80	25,741	3.594	92,516	0.093	0.143	8	3.7	0.028486	0.11213	0.168	0.0872	3.70	Unit 9, 90 dwelling units
	192	188	1.69	4	3.5	0	6.8	0.0	328.5	80	26,282	3.572	93,867	0.094	0.145	8	10.0	0.017604	0.08882	0.133	0.0622	5.25	
	188	184	1.69	0	3.5	0	0.0	0.0	328.5	80	26,282	3.572	93,867	0.094	0.145	8	10.0	0.017604	0.08882	0.133	0.0622	5.25	
	184	180	1.69	11	3.5	0	18.6	0.0	347.1	80	27,769	3.510	97,458	0.097	0.151	8	10.0	0.018278	0.09042	0.136	0.0638	5.32	
	180	172	1.69	11	3.5	0	18.6	0.0	365.7	80	29,256	3.448	100,865	0.101	0.156	8	10.0	0.018917	0.09194	0.138	0.0654	5.37	
	176 <sup>(C)</sup>	172	1.69	8	3.5	123	13.5	430.5	444.0	80	35,522	3.187	113,193	0.113	0.175	8	5.1	0.029639	0.11433	0.171	0.0896	4.40	Unit 17, 120 dwelling units, 0.27 comm acres
	172	168	1.69	8	3.5	0	13.5	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	10.0	0.033536	0.12143	0.182	0.0978	6.37	
	168	164	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	4.9	0.047811	0.14456	0.217	0.1255	4.96	
	164	162	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	5.0	0.047427	0.14398	0.216	0.1248	4.99	
	162	158	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	178,817	0.179	0.277	8	4.7	0.048866	0.14616	0.219	0.1275	4.88	
	158	154	1.69	380	3.5	0	642.2	0.0	1465.4	80	117,235	2.387	279,830	0.280	0.433	8	5.8	0.068733	0.17350	0.260	0.1625	5.99	
	154	150	1.69	0	3.5	0	0.0	0.0	1465.4	80	117,235	2.387	279,830	0.280	0.433	8	1.8	0.125453	0.23702	0.356	0.2503	3.89	
	150	124	1.69	148	3.5	0	250.1	0.0	1715.6	80	137,245	2.337	320,726	0.321	0.496	8	3.7	0.099426	0.20975	0.315	0.2117	5.27	
	144 <sup>(B)</sup>	140	1.69	1,259.6	3.5	123	2128.7	430.5	2559.2	80	204,738	2.204	451,258	0.451	0.698	12	0.4	0.143524	0.38218	0.382	0.2760	2.53	Unit 16, 123 dwelling units
	140	136	1.69	25	3.5	0	42.3	0.0	2601.5	80	208,118	2.199	457,737	0.458	0.708	12	0.4	0.145584	0.38512	0.385	0.2789	2.54	
	136	132	1.69	18	3.5	0	30.4	0.0	2631.9	80	210,552	2.189	460,818	0.461	0.713	12	0.4	0.146564	0.38652	0.387	0.2802	2.54	
	132	128	1.69	18	3.5	0	30.4	0.0	2662.3	80	212,985	2.183	464,848	0.465	0.719	12	3.9	0.047108	0.21524	0.215	0.1242	5.79	
	128	124	1.69	5	3.5	0	8.5	0.0	2670.8	80	213,661	2.181	465,962	0.466	0.721	12	0.8	0.103508	0.32130	0.321	0.2179	3.31	
	124	120	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	11.7	0.041869	0.20302	0.203	0.1142	9.65	
	120	116	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	116	112	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	112	108	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	108	104	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
	104	100	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	712,579	0.713	1.103	12	0.4	0.226637	0.49346	0.493	0.3863	2.85	
<b>PO3M SUB-BASIN</b>																							
	256	252	2.52	232	3.5	200	584.6	700.0	1284.6	80	102,771	2.433	250,050	0.250	0.387	8	0.5	0.209723	0.31464	0.472	0.3647	2.39	Unit 10, 200 dwelling units
	252	248	2.52	2	3.5	0	5.0	0.0	1289.7	80	103,174	2.432	250,927	0.251	0.388	8	0.5	0.210459	0.31526	0.473	0.3656	2.39	
	248	244	2.52	99	3.5	0	249.5	0.0	1539.2	80	123,133	2.372	292,092	0.292	0.452	10	0.5	0.135118	0.30823	0.370	0.2641	2.46	
	244	240	2.52	10	3.5	0	25.2	0.0	1564.4	80	125,149	2.367	296,243	0.296	0.458	10	0.5	0.137038	0.31059	0.373	0.2668	2.47	
	240	236	2.52	22	3.5	0	55.4	0.0	1619.8	80	129,584	2.356	305,305	0.305	0.472	10	2.5	0.063801	0.20898	0.251	0.1542	4.41	
	236	232	2.52	25	3.5	0	63.0	0.0	1682.8	80	134,624	2.343	315,483	0.315	0.488	10	7.4	0.037935	0.16111	0.193	0.1065	6.60	
	232	228	2.52	0	3.5	0	0.0	0.0	1682.8	80	134,624	2.343	315,483	0.315	0.488	10	7.3	0.038142	0.16154	0.194	0.1069	6.57	
	228	224	2.52	89	3.5	0	224.3	0.0	1907.1	80	152,566	2.299	350,795	0.351	0.543	10	2.5	0.071997	0.22211	0.267	0.1680	4.65	
	224	220	2.52	85	3.5	0	214.2	0.0	2121.3	80	169,702	2.274	385,874	0.386	0.597	10	2.7	0.077536	0.23066	0.277	0.1771	4.85	
	220	216	2.52	9	3.5	0	22.7	0.0	2144.0	80	171,517	2.271	389,481	0.389	0.603	10	1.0	0.127399	0.29874	0.358	0.2531	3.43	
	216	212	2.52	23	3.5	0	58.0	0.0	2201.9	80	176,154	2.256	397,430	0.397	0.615	10	2.0	0.091923	0.25173	0.302	0.2001	4.43	
	212	204	2.52	0	3.5	0	0.0	0.0	2201.9	80	176,154	2.256	397,430	0.397	0.615	10	10.2	0.040804	0.16707	0.200	0.1122	7.89	
	204	200	2.52	0	3.5	0	0.0	0.0	2201.9	80	176,154	2.256	397,430	0.397	0.615	10	1.6	0.102773	0.26676	0.320	0.2168	4.08	

Total EDUS  
2,465.6

Total EDUS  
446

Min Slope  
0.40

Max dn/D  
0.49

Notes:

- A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU. PO3M Sub-Basin = 201 gpd/DU / 80 gpcpd = 2.52 persons/DU.
- B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.
- C. 0.27 proposed commercial acres converted to EDUs (0.27 acres \* 3,056 gpd/acre / 280 gpd/EDU = 2.95 EDUs; use 3 EDUs).

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

**APPENDIX I**

**EXCERPT FROM  
SEWAGE TRANSPORTATION AGREEMENT BETWEEN  
THE CITY OF SAN DIEGO AND THE CITY OF POWAY  
AND  
SAN DIEGO PO METER DATA**

**Exhibit A: Contract Capacity**

Point of In-Flow	Name	Coverage Area/ Source of Flow	Flow Measurement Type	City of San Diego Capacity Rights
PO 1	Camino del Norte	Areas of Bernardo Heights	Flow Meter	Combined Average Daily Flow (ADF) 3.67 MGD <sup>1</sup>
PO 3	Holland Canyon	Areas of Carmel Mountain	Flow Meter	
PO 5	Highland Ranch	Areas of Carmel Mountain	Flow Meter	
Stone Canyon	Stone Canyon	Areas of Bernardo Heights	House Count	
PO 4	Eastview Court	Areas of Scripps Ranch	Flow Meter	ADF Capacity 1.69 MGD <sup>1</sup>
PO 6	Stonebridge	Stonebridge Estates area of Scripps Ranch	Flow Meter	ADF Capacity 0.435 MGD/ Peak Capacity 0.860 MGD <sup>2</sup>

<sup>1</sup> Per "Second Amendment to Pomerado Relief Trunk Sewer Agreement" adopted in 1989.

<sup>2</sup> Based on 2001 engineering studies.

Exhibit B: Facilities Used by City of San Diego

S.D.  
COUNTY

**City of Poway  
Metering Station Mains**

**Sewer Mains**

A	E	I	M	Q
B	F	J	N	R
C	G	K	O	S
D	H	L	P	Other

**Sewer Features**

Manhole	Breaking Manhole	Meter Station
Boundary Manhole	Overflow Manhole	Lift Station

This information was prepared for the City of San Diego and is not to be used for any other purpose without the express written consent of the City of San Diego.

**Stone Canyon**

Point of Entry from  
SD Pump Station 75

Point of Entry

Point of Entry

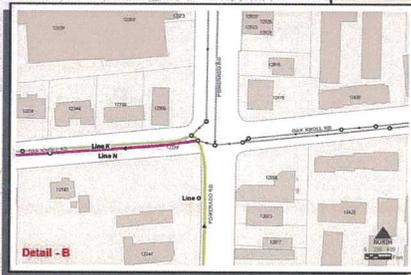
**PO1**

**PO5**

Point of Entry

**P03M**

Point of Entry



**P02**

**P01C**  
**P01D**  
**P01E**

Point of Entry

**P04**

**P06**

Point of Entry



PO3M

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Rain days Jan-19	Rain days Feb-19	Mar-19	Apr-19	May-19	Jun-19	
1	0.129	0.119	0.125	0.116	0.112	0.130	0.135	0.114	0.113	0.113	0.109	0.114	
2	0.118	0.125	0.119	0.111	0.114	0.135	0.122	0.143	0.129	0.106	0.102	0.130	
3	0.114	0.115	0.142	0.116	0.128	0.119	0.117	0.157	0.136	0.111	0.098	0.114	
4	0.122	0.130	0.118	0.112	0.126	0.114	0.120	0.144	0.116	0.110	0.112	0.110	
5	0.120	0.132	0.112	0.114	0.114	0.115	0.122	0.161	0.112	0.109	0.123	0.109	
6	0.116	0.116	0.112	0.126	0.111	0.120	0.134	0.161	0.117	0.124	0.109	0.108	
7	0.124	0.112	0.111	0.141	0.114	0.131	0.115	0.144	0.117	0.127	0.102	0.107	
8	0.136	0.118	0.125	0.118	0.111	0.131	0.116	0.133	0.117	0.111	0.104	0.124	
9	0.117	0.115	0.136	0.117	0.112	0.141	0.108	0.134	0.129	0.109	0.102	0.130	
10	0.119	0.117	0.117	0.113	0.124	0.120	0.111	0.133	0.144	0.107	0.098	0.106	
11	0.117	0.130	0.114	0.116	0.127	0.116	0.107	0.112	0.118	0.111	0.114	0.102	
12	0.115	0.142	0.113	0.109	0.124	0.114	0.124	0.106	0.119	0.112	0.119	0.108	
13	0.117	0.124	0.112	0.123	0.113	0.115	0.131	0.108	0.119	0.118	0.105	0.106	
14	0.137	0.118	0.111	0.129	0.111	0.113	0.116	0.166	0.119	0.122	0.105	0.105	
15	0.131	0.118	0.128	0.113	0.109	0.134	0.120	0.189	0.114	0.104	0.104	0.120	
16	0.116	0.120	0.134	0.112	0.112	0.138	0.130	0.182	0.125	0.104	0.108	0.120	
17	0.115	0.122	0.117	0.116	0.121	0.123	0.132	0.168	0.134	0.104	0.104	0.109	
18	0.112	0.127	0.112	0.111	0.126	0.114	0.138	0.160	0.116	0.098	0.122	0.108	
19	0.114	0.138	0.111	0.118	0.111	0.116	0.144	0.141	0.109	0.108	0.127	0.106	
20	0.109	0.122	0.113	0.137	0.117	0.115	0.136	0.135	0.116	0.121	0.104	0.103	
21	0.126	0.123	0.110	0.141	0.122	0.120	0.129	0.147	0.113	0.121	0.104	0.106	
22	0.134	0.120	0.123	0.117	0.131	0.128	0.115	0.162	0.111	0.108	0.105	0.114	
23	0.117	0.113	0.134	0.113	0.121	0.121	0.113	0.166	0.128	0.104	0.108	0.121	
24	0.120	0.114	0.114	0.117	0.129	0.126	0.115	0.170	0.135	0.108	0.108	0.105	
25	0.117	0.124	0.112	0.122	0.141	0.127	0.105	0.142	0.119	0.102	0.119	0.102	
26	0.110	0.137	0.113	0.115	0.126	0.124	0.121	0.126	0.114	0.102	0.116	0.102	
27	0.117	0.113	0.107	0.124	0.114	0.118	0.132	0.120	0.116	0.114		0.102	
28	0.126	0.110	0.109	0.139	0.112	0.117	0.113	0.116	0.109	0.128		0.105	
29	0.138	0.108	0.127	0.119	0.116	0.123	0.109		0.109	0.107		0.115	
30	0.125	0.108	0.139	0.111	0.119	0.121	0.109		0.127	0.108		0.117	
31	0.116	0.106		0.112		0.127	0.108		0.132		0.103		
Avg (mgd)	0.1208	0.1205	0.1190	0.1193	0.1189	0.1228	0.1209	0.1443	0.1204	0.1110	0.1087	0.1109	0.1198
Total (mg)	3.7440	3.7360	3.5700	3.6980	3.5680	3.8060	3.7470	4.0400	3.7320	3.3310	3.3687	3.3280	43.6687
Max	0.138	0.142	0.142	0.141	0.141	0.141	0.144	0.189	0.144	0.128	0.127	0.130	
Min	0.109	0.106	0.107	0.109	0.109	0.113	0.105	0.106	0.109	0.098	0.098	0.102	

Partial data removed	
5/27/2019	0.141
5/28/2019	
5/29/2019	
5/30/2019	0.146

Average daily flow between July 1, 2018 and June 30, 2019

PO5

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Rain days Jan-19	Rain days Feb-19	Mar-19	Apr-19	May-19	Jun-19	
1	0.160	0.230	0.188	0.249	0.226	0.265	0.255	0.258	0.293	0.288	0.255	0.251	
2	0.204	0.216	0.163	0.253	0.245	0.271	0.260	0.329	0.301	0.291	0.260	0.250	
3	0.200	0.220	0.187	0.253	0.233	0.259	0.254	0.352	0.311	0.283	0.253	0.248	
4	0.201	0.219	0.180	0.250	0.224	0.254	0.247	0.337	0.293	0.273	0.257	0.248	
5	0.220	0.211	0.215	0.248	0.231	0.260	0.249	0.373	0.284	0.280	0.257	0.243	
6	0.207	0.229	0.231	0.229	0.232	0.287	0.277	0.351	0.293	0.278	0.261	0.252	
7	0.209	0.226	0.228	0.230	0.243	0.313	0.251	0.305	0.299	0.285	0.261	0.250	
8	0.216	0.207	0.223	0.226	0.242	0.272	0.250	0.284	0.294	0.272	0.258	0.254	
9	0.225	0.204	0.235	0.234	0.232	0.266	0.256	0.279	0.293	0.267	0.245	0.266	
10	0.217	0.196	0.231	0.234	0.217	0.266	0.264	0.294	0.305	0.272	0.255	0.246	
11	0.209	0.344	0.233	0.225	0.222	0.252	0.255	0.270	0.290	0.272	0.249	0.242	
12	0.202	0.377	0.236	0.221	0.220	0.250	0.277	0.264	0.318	0.256	0.255	0.245	
13	0.193	0.226	0.238	0.233	0.227	0.252	0.267	0.269	0.296	0.249	0.259	0.241	
14	0.206	0.232	0.235	0.237	0.237	0.244	0.297	0.534	0.287	0.245	0.255	0.246	
15	0.210	0.229	0.230	0.231	0.237	0.247	0.275	0.466	0.285	0.243	0.246	0.248	
16	0.202	0.225	0.236	0.227	0.237	0.254	0.284	0.388	0.273	0.243	0.253	0.243	
17	0.197	0.229	0.227	0.221	0.233	0.250	0.310	0.351	0.287	0.239	0.239	0.240	
18	0.210	0.229	0.232	0.222	0.234	0.251	0.318	0.345	0.288	0.233	0.246	0.247	
19	0.215	0.243	0.233	0.219	0.256	0.245	0.296	0.324	0.281	0.234	0.276	0.237	
20	0.218	0.245	0.243	0.222	0.247	0.247	0.284	0.322	0.294	0.255	0.261	0.230	
21	0.208	0.259	0.251	0.227	0.267	0.248	0.280	0.371	0.295	0.260	0.259	0.235	
22	0.209	0.260	0.278	0.224	0.232	0.244	0.274	0.369	0.282	0.274	0.250	0.225	
23	0.223	0.238	0.306	0.227	0.246	0.235	0.270	0.326	0.283	0.266	0.252	0.252	
24	0.230	0.229	0.250	0.219	0.243	0.238	0.266	0.324	0.296	0.264	0.236	0.238	
25	0.213	0.207	0.220	0.227	0.250	0.258	0.259	0.320	0.290	0.276	0.242	0.244	
26	0.212	0.214	0.227	0.226	0.273	0.248	0.254	0.310	0.290	0.262	0.244	0.242	
27	0.222	0.217	0.221	0.224	0.246	0.249	0.264	0.305	0.287	0.260	0.252	0.254	
28	0.212	0.226	0.241	0.229	0.244	0.246	0.268	0.301	0.290	0.271	0.253	0.239	
29	0.215	0.218	0.245	0.226	0.264	0.238	0.259		0.288	0.256	0.258	0.247	
30	0.228	0.220	0.247	0.227	0.280	0.246	0.254		0.295	0.265	0.252	0.251	
31	0.231	0.213		0.221		0.260	0.270		0.304		0.248		
Avg (mgd)	0.2105	0.2335	0.2303	0.2304	0.2407	0.2553	0.2692	0.3329	0.2924	0.2637	0.2531	0.2451	0.2548
Total (mg)	6.5240	7.2380	6.9100	7.1410	7.2200	7.9150	8.3440	9.3210	9.0650	7.9120	7.8470	7.3540	92.7910
Max	0.231	0.377	0.306	0.253	0.280	0.313	0.318	0.534	0.318	0.291	0.276	0.266	
Min	0.160	0.196	0.163	0.219	0.217	0.235	0.247	0.258	0.273	0.233	0.236	0.225	

Average daily flow between July 1, 2018 and June 30, 2019

	Stone Canyon
EDU > > >	727.140
July	5.861
August	5.861
September	5.861
October	5.861
November	5.861
December	5.861
January	5.861
February	5.861
March	5.861
April	5.861
May	5.861
June	5.861
Total (MG)	70.333
MGD	0.193

← Average daily flow

1=EDU is 260 Gallons

**APPENDIX J**

**CALCULATION SPREADSHEET RESULTS  
UNIT 9 MAXIMUM FLOW  
WEST IN CARMEL RIDGE ROAD  
AND  
FIGURE J-1**

DATE: 11/12/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - Chicarita 3 Sub-Basin - Proposed System and Flow - Unit 9 Max West  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
<b>CHICARITA 3 SUB-BASIN</b>																					
	480	476		3.5	76.00	266.0	266.0	80	21,280	3.780	80,438	0.080	0.124	8	1.9	0.034793	0.12358	0.185	0.1003	2.79	Unit 1, 66 dwelling units
	476	472		3.5	27.00	94.5	360.5	80	28,840	3.465	99,931	0.100	0.155	8	6.7	0.022828	0.10068	0.151	0.0746	4.66	
	472	468		3.5	76.00	266.0	626.5	80	50,120	2.895	145,077	0.145	0.224	8	5.6	0.036489	0.12648	0.190	0.1037	4.87	
	468	464		3.5	9.00	31.5	658.0	80	52,640	2.868	150,989	0.151	0.234	8	10.8	0.027312	0.10983	0.165	0.0846	6.21	
	464	460		3.5	12.00	42.0	700.0	80	56,000	2.833	158,667	0.159	0.246	8	4.2	0.046136	0.14202	0.213	0.1224	4.51	
	460	420		3.5	9.00	31.5	731.5	80	58,520	2.807	164,271	0.164	0.254	8	3.8	0.050176	0.14811	0.222	0.1299	4.40	
	452	448		3.5	262.00	917.0	917.0	80	73,360	2.583	189,489	0.189	0.293	8	10.0	0.035538	0.12485	0.187	0.1018	6.48	Unit 9, 250 dwelling units (maximum)
	448	444		3.5	14.00	49.0	966.0	80	77,280	2.534	195,828	0.196	0.303	8	10.5	0.035841	0.12537	0.188	0.1024	6.66	
	444	440		3.5	11.00	38.5	1004.5	80	80,360	2.499	200,792	0.201	0.311	8	9.0	0.039694	0.13182	0.198	0.1100	6.35	
	440	436		3.5	67.00	234.5	1239.0	80	99,120	2.442	242,071	0.242	0.375	8	1.9	0.103340	0.21402	0.321	0.2177	3.87	
	436	432		3.5	17.00	59.5	1298.5	80	103,880	2.430	252,460	0.252	0.391	8	5.0	0.066959	0.17123	0.257	0.1595	5.51	
	432	428		3.5	17.00	59.5	1358.0	80	108,640	2.413	262,105	0.262	0.406	8	1.0	0.155446	0.26605	0.399	0.2925	3.12	
	428	424		3.5	16.00	56.0	1414.0	80	113,120	2.397	271,171	0.271	0.420	8	0.5	0.227438	0.32962	0.494	0.3873	2.44	
	424	420		3.5	465.40	1628.9	3042.9	80	243,432	2.136	519,900	0.520	0.804	8	6.7	0.119388	0.23086	0.346	0.2415	7.50	Unit 8, 98 dwelling units
	420	416		3.5	44.00	154.0	3928.4	80	314,272	2.057	646,508	0.647	1.000	8	3.4	0.206728	0.31206	0.468	0.3608	6.24	
	416	412		3.5	87.00	304.5	4232.9	80	338,632	2.038	690,252	0.690	1.068	8	5.9	0.168534	0.27818	0.417	0.3103	7.74	Unit 2, 87 dwelling units
	412	408		3.5	416.00	1456.0	5688.9	80	455,112	1.962	893,132	0.893	1.382	8	5.6	0.224638	0.32735	0.491	0.3838	8.10	
	408	404		3.5	0.00	0.0	5688.9	80	455,112	1.962	893,132	0.893	1.382	10	2.6	0.181179	0.36198	0.434	0.3272	6.08	
	404	400		3.5	0.00	0.0	5688.9	80	455,112	1.962	893,132	0.893	1.382	12	0.8	0.200862	0.46047	0.460	0.3532	3.91	

Total EDUS  
1,625.4

Min Slope  
0.50

Max dn/D  
0.49

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

DATE: 11/12/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - PO5 Sub-Basin - Existing System, Proposed Flow - Unit 9 Max West  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																							
	196	192	1.69	4	3.5	50	6.8	175.0	181.8	80	14,541	4.000	58,163	0.058	0.090	8	3.7	0.017909	0.08954	0.134	0.0629	3.22	Unit 9, 50 dwelling units
	192	188	1.69	4	3.5	0	6.8	0.0	188.5	80	15,082	4.000	60,326	0.060	0.093	8	10.0	0.011314	0.07181	0.108	0.0456	4.61	
	188	184	1.69	0	3.5	0	0.0	0.0	188.5	80	15,082	4.000	60,326	0.060	0.093	8	10.0	0.011314	0.07181	0.108	0.0456	4.61	
	184	180	1.69	11	3.5	0	18.6	0.0	207.1	80	16,569	3.976	65,883	0.066	0.102	8	10.0	0.012356	0.07488	0.112	0.0485	4.73	
	180	172	1.69	11	3.5	0	18.6	0.0	225.7	80	18,056	3.914	70,677	0.071	0.109	8	10.0	0.013255	0.07738	0.116	0.0509	4.84	
	176 <sup>(C)</sup>	172	1.69	8	3.5	123	13.5	430.5	444.0	80	35,522	3.187	113,193	0.113	0.175	8	5.1	0.029639	0.11433	0.171	0.0896	4.40	Unit 17, 120 dwelling units, 0.27 comm acres
	172	168	1.69	8	3.5	0	13.5	0.0	683.2	80	54,659	2.847	155,631	0.156	0.241	8	10.0	0.029188	0.11350	0.170	0.0887	6.11	
	168	164	1.69	0	3.5	0	0.0	0.0	683.2	80	54,659	2.847	155,631	0.156	0.241	8	4.9	0.041612	0.13494	0.202	0.1138	4.76	
	164	162	1.69	0	3.5	0	0.0	0.0	683.2	80	54,659	2.847	155,631	0.156	0.241	8	5.0	0.041278	0.13441	0.202	0.1131	4.79	
	162	158	1.69	0	3.5	0	0.0	0.0	683.2	80	54,659	2.847	155,631	0.156	0.241	8	4.7	0.042530	0.13640	0.205	0.1155	4.69	
	158	154	1.69	380	3.5	0	642.2	0.0	1325.4	80	106,035	2.422	256,856	0.257	0.397	8	5.8	0.063090	0.16624	0.249	0.1530	5.85	
	154	150	1.69	0	3.5	0	0.0	0.0	1325.4	80	106,035	2.422	256,856	0.257	0.397	8	1.8	0.115153	0.22651	0.340	0.2353	3.80	
	150	124	1.69	148	3.5	0	250.1	0.0	1575.6	80	126,045	2.365	298,082	0.298	0.461	8	3.7	0.092406	0.20193	0.303	0.2009	5.17	
	144 <sup>(B)</sup>	140	1.69	1,259.6	3.5	123	2128.7	430.5	2559.2	80	204,738	2.204	451,258	0.451	0.698	12	0.4	0.143524	0.38218	0.382	0.2760	2.53	Unit 16, 123 dwelling units
	140	136	1.69	25	3.5	0	42.3	0.0	2601.5	80	208,118	2.199	457,737	0.458	0.708	12	0.4	0.145584	0.38512	0.385	0.2789	2.54	
	136	132	1.69	18	3.5	0	30.4	0.0	2631.9	80	210,552	2.189	460,818	0.461	0.713	12	0.4	0.146564	0.38652	0.387	0.2802	2.54	
	132	128	1.69	18	3.5	0	30.4	0.0	2662.3	80	212,985	2.183	464,848	0.465	0.719	12	3.9	0.047108	0.21524	0.215	0.1242	5.79	
	128	124	1.69	5	3.5	0	8.5	0.0	2670.8	80	213,661	2.181	465,962	0.466	0.721	12	0.8	0.103508	0.32130	0.321	0.2179	3.31	
	124	120	1.69	0	3.5	0	0.0	0.0	4246.3	80	339,706	2.038	692,213	0.692	1.071	12	11.7	0.040673	0.20017	0.200	0.1119	9.57	
	120	116	1.69	0	3.5	0	0.0	0.0	4246.3	80	339,706	2.038	692,213	0.692	1.071	12	0.4	0.220160	0.48533	0.485	0.3780	2.83	
	116	112	1.69	0	3.5	0	0.0	0.0	4246.3	80	339,706	2.038	692,213	0.692	1.071	12	0.4	0.220160	0.48533	0.485	0.3780	2.83	
	112	108	1.69	0	3.5	0	0.0	0.0	4246.3	80	339,706	2.038	692,213	0.692	1.071	12	0.4	0.220160	0.48533	0.485	0.3780	2.83	
	108	104	1.69	0	3.5	0	0.0	0.0	4246.3	80	339,706	2.038	692,213	0.692	1.071	12	0.4	0.220160	0.48533	0.485	0.3780	2.83	
	104	100	1.69	0	3.5	0	0.0	0.0	4246.3	80	339,706	2.038	692,213	0.692	1.071	12	0.4	0.220160	0.48533	0.485	0.3780	2.83	

Total EDUS  
1,869.6

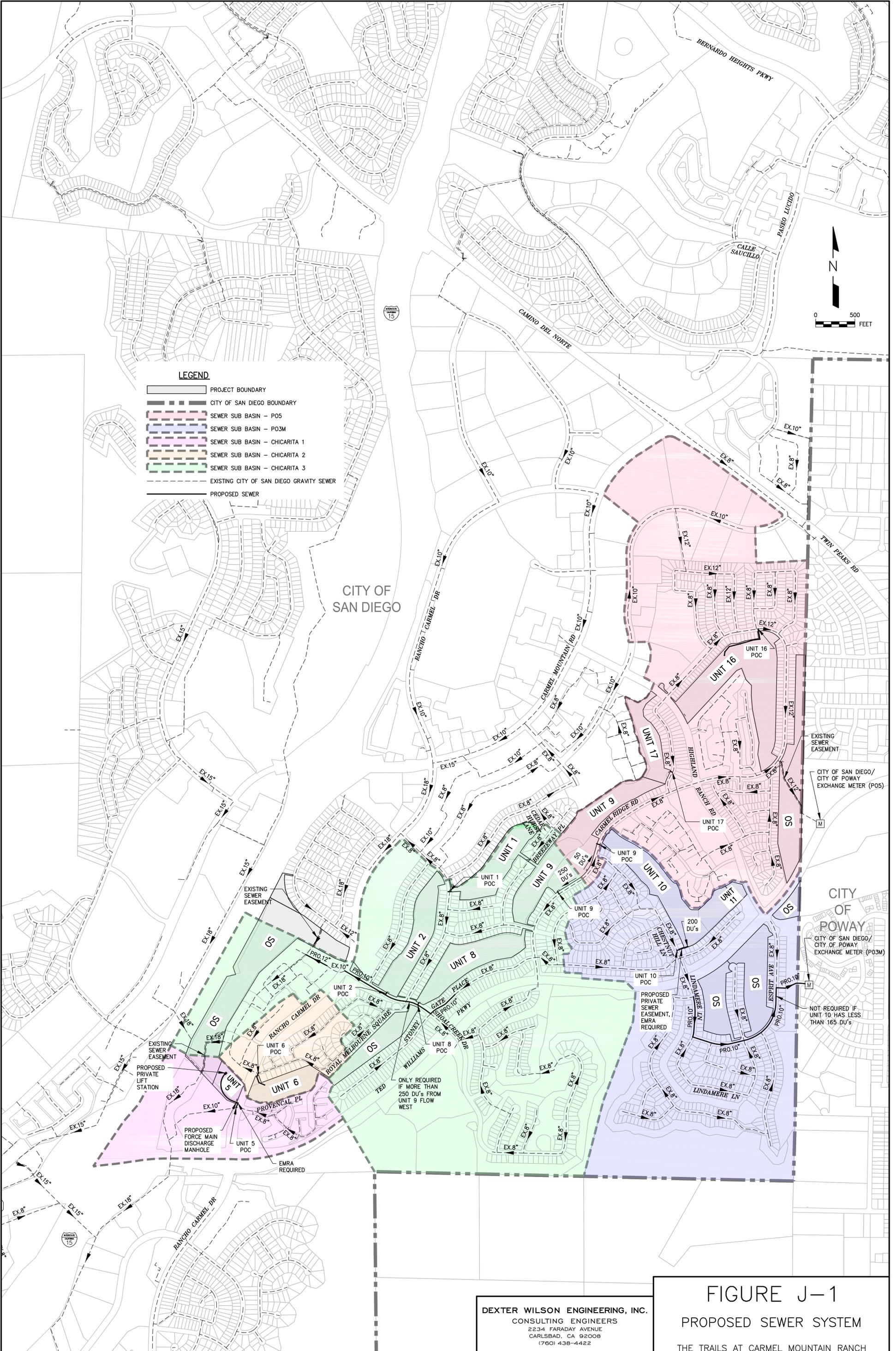
Total EDUS  
246

Min Slope  
0.40

Max dn/D  
0.48

- Notes:  
 A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU.  
 B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.  
 C. 0.27 proposed commercial acres converted to EDUs (0.27 acres \* 3,056 gpd/acre / 280 gpd/EDU = 2.95 EDUs; use 3 EDUs).

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D



**LEGEND**

- PROJECT BOUNDARY
- CITY OF SAN DIEGO BOUNDARY
- SEWER SUB BASIN - P05
- SEWER SUB BASIN - P03M
- SEWER SUB BASIN - CHICARITA 1
- SEWER SUB BASIN - CHICARITA 2
- SEWER SUB BASIN - CHICARITA 3
- EXISTING CITY OF SAN DIEGO GRAVITY SEWER
- PROPOSED SEWER

CITY OF SAN DIEGO



EXISTING SEWER EASEMENT  
CITY OF SAN DIEGO/  
CITY OF POWAY  
EXCHANGE METER (P05)

CITY OF POWAY  
CITY OF SAN DIEGO/  
CITY OF POWAY  
EXCHANGE METER (P03M)

PROPOSED PRIVATE SEWER EASEMENT, EMRA REQUIRED

NOT REQUIRED IF UNIT 10 HAS LESS THAN 165 DU'S

ONLY REQUIRED IF MORE THAN 250 DU'S FROM UNIT 9 FLOW WEST

**FIGURE J-1**

**PROPOSED SEWER SYSTEM**

THE TRAILS AT CARMEL MOUNTAIN RANCH

**DEXTER WILSON ENGINEERING, INC.**  
CONSULTING ENGINEERS  
2234 FARADAY AVENUE  
CARLSBAD, CA 92008  
(760) 438-4422

**APPENDIX K**

**CALCULATION SPREADSHEET RESULTS  
UNIT 9 MAXIMUM FLOW  
EAST IN CARMEL RIDGE ROAD  
AND  
FIGURE K-1**

DATE: 11/12/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - PO5 Sub-Basin - Existing System, Proposed Flow - Unit 9 Max East  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																							
	196	192	1.69	4	3.5	110	6.8	385.0	391.8	80	31,341	3.361	105,330	0.105	0.163	8	3.7	0.032432	0.11950	0.179	0.0955	3.84	Unit 9, 110 dwelling units (maximum)
	192	188	1.69	4	3.5	0	6.8	0.0	398.5	80	31,882	3.338	106,429	0.106	0.165	8	10.0	0.019960	0.09436	0.142	0.0679	5.46	
	188	184	1.69	0	3.5	0	0.0	0.0	398.5	80	31,882	3.338	106,429	0.106	0.165	8	10.0	0.019960	0.09436	0.142	0.0679	5.46	
	184	180	1.69	11	3.5	0	18.6	0.0	417.1	80	33,369	3.276	109,326	0.109	0.169	8	10.0	0.020504	0.09556	0.143	0.0692	5.50	
	180	172	1.69	11	3.5	0	18.6	0.0	435.7	80	34,856	3.214	112,039	0.112	0.173	8	10.0	0.021012	0.09669	0.145	0.0704	5.54	
	176 <sup>(C)</sup>	172	1.69	8	3.5	123	13.5	430.5	444.0	80	35,522	3.187	113,193	0.113	0.175	8	5.1	0.029639	0.11433	0.171	0.0896	4.40	Unit 17, 120 dwelling units, 0.27 comm acres
	172	168	1.69	8	3.5	0	13.5	0.0	893.2	80	71,459	2.610	186,519	0.187	0.289	8	10.0	0.034981	0.12390	0.186	0.1007	6.45	
	168	164	1.69	0	3.5	0	0.0	0.0	893.2	80	71,459	2.610	186,519	0.187	0.289	8	4.9	0.049871	0.14766	0.221	0.1294	5.02	
	164	162	1.69	0	3.5	0	0.0	0.0	893.2	80	71,459	2.610	186,519	0.187	0.289	8	5.0	0.049470	0.14707	0.221	0.1286	5.05	
	162	158	1.69	0	3.5	0	0.0	0.0	893.2	80	71,459	2.610	186,519	0.187	0.289	8	4.7	0.050970	0.14929	0.224	0.1314	4.94	
	158	154	1.69	380	3.5	0	642.2	0.0	1535.4	80	122,835	2.373	291,477	0.291	0.451	8	5.8	0.071594	0.17717	0.266	0.1674	6.06	
	154	150	1.69	0	3.5	0	0.0	0.0	1535.4	80	122,835	2.373	291,477	0.291	0.451	8	1.8	0.130674	0.24223	0.363	0.2578	3.94	
	150	124	1.69	148	3.5	0	250.1	0.0	1785.6	80	142,845	2.323	331,812	0.332	0.513	8	3.7	0.102862	0.21351	0.320	0.2169	5.32	
	144 <sup>(B)</sup>	140	1.69	1,259.6	3.5	123	2128.7	430.5	2559.2	80	204,738	2.204	451,258	0.451	0.698	12	0.4	0.143524	0.38218	0.382	0.2760	2.53	Unit 16, 123 dwelling units
	140	136	1.69	25	3.5	0	42.3	0.0	2601.5	80	208,118	2.199	457,737	0.458	0.708	12	0.4	0.145584	0.38512	0.385	0.2789	2.54	
	136	132	1.69	18	3.5	0	30.4	0.0	2631.9	80	210,552	2.189	460,818	0.461	0.713	12	0.4	0.146564	0.38652	0.387	0.2802	2.54	
	132	128	1.69	18	3.5	0	30.4	0.0	2662.3	80	212,985	2.183	464,848	0.465	0.719	12	3.9	0.047108	0.21524	0.215	0.1242	5.79	
	128	124	1.69	5	3.5	0	8.5	0.0	2670.8	80	213,661	2.181	465,962	0.466	0.721	12	0.8	0.103508	0.32130	0.321	0.2179	3.31	
	124	120	1.69	0	3.5	0	0.0	0.0	4456.3	80	356,506	2.027	722,703	0.723	1.118	12	11.7	0.042464	0.20444	0.204	0.1154	9.69	
	120	116	1.69	0	3.5	0	0.0	0.0	4456.3	80	356,506	2.027	722,703	0.723	1.118	12	0.4	0.229857	0.49739	0.497	0.3903	2.87	
	116	112	1.69	0	3.5	0	0.0	0.0	4456.3	80	356,506	2.027	722,703	0.723	1.118	12	0.4	0.229857	0.49739	0.497	0.3903	2.87	
	112	108	1.69	0	3.5	0	0.0	0.0	4456.3	80	356,506	2.027	722,703	0.723	1.118	12	0.4	0.229857	0.49739	0.497	0.3903	2.87	
	108	104	1.69	0	3.5	0	0.0	0.0	4456.3	80	356,506	2.027	722,703	0.723	1.118	12	0.4	0.229857	0.49739	0.497	0.3903	2.87	
	104	100	1.69	0	3.5	0	0.0	0.0	4456.3	80	356,506	2.027	722,703	0.723	1.118	12	0.4	0.229857	0.49739	0.497	0.3903	2.87	

Total EDUS  
1,869.6

Total EDUS  
246

Min Slope  
0.40

Max dn/D  
0.49

- Notes:  
 A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU.  
 B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.  
 C. 0.27 proposed commercial acres converted to EDUs (0.27 acres \* 3,056 gpd/acre / 280 gpd/EDU = 2.95 EDUs; use 3 EDUs).

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

DATE: 11/12/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - Chicarita 3 Sub-Basin - Proposed System and Flow - Unit 9 Max East  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

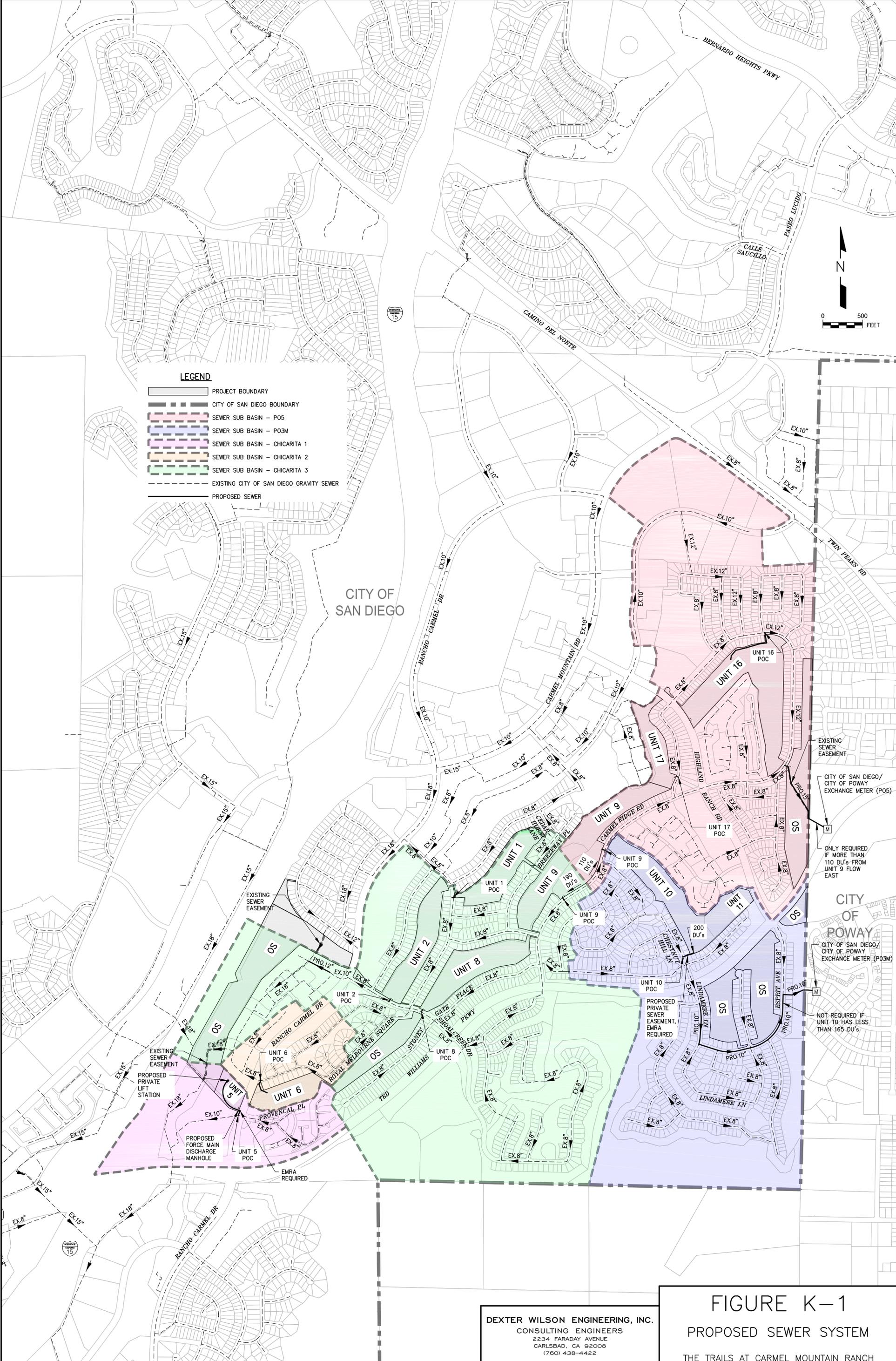
LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
<b>CHICARITA 3 SUB-BASIN</b>																					
	480	476		3.5	76.00	266.0	266.0	80	21,280	3.780	80,438	0.080	0.124	8	1.9	0.034793	0.12358	0.185	0.1003	2.79	Unit 1, 66 dwelling units
	476	472		3.5	27.00	94.5	360.5	80	28,840	3.465	99,931	0.100	0.155	8	6.7	0.022828	0.10068	0.151	0.0746	4.66	
	472	468		3.5	76.00	266.0	626.5	80	50,120	2.895	145,077	0.145	0.224	8	5.6	0.036489	0.12648	0.190	0.1037	4.87	
	468	464		3.5	9.00	31.5	658.0	80	52,640	2.868	150,989	0.151	0.234	8	10.8	0.027312	0.10983	0.165	0.0846	6.21	
	464	460		3.5	12.00	42.0	700.0	80	56,000	2.833	158,667	0.159	0.246	8	4.2	0.046136	0.14202	0.213	0.1224	4.51	
	460	420		3.5	9.00	31.5	731.5	80	58,520	2.807	164,271	0.164	0.254	8	3.8	0.050176	0.14811	0.222	0.1299	4.40	
	452	448		3.5	262.00	917.0	917.0	80	73,360	2.583	189,489	0.189	0.293	8	10.0	0.035538	0.12485	0.187	0.1018	6.48	Unit 9, 190 dwelling units
	448	444		3.5	14.00	49.0	966.0	80	77,280	2.534	195,828	0.196	0.303	8	10.5	0.035841	0.12537	0.188	0.1024	6.66	
	444	440		3.5	11.00	38.5	1004.5	80	80,360	2.499	200,792	0.201	0.311	8	9.0	0.039694	0.13182	0.198	0.1100	6.35	
	440	436		3.5	67.00	234.5	1239.0	80	99,120	2.442	242,071	0.242	0.375	8	1.9	0.103340	0.21402	0.321	0.2177	3.87	
	436	432		3.5	17.00	59.5	1298.5	80	103,880	2.430	252,460	0.252	0.391	8	5.0	0.066959	0.17123	0.257	0.1595	5.51	
	432	428		3.5	17.00	59.5	1358.0	80	108,640	2.413	262,105	0.262	0.406	8	1.0	0.155446	0.26605	0.399	0.2925	3.12	
	428	424		3.5	16.00	56.0	1414.0	80	113,120	2.397	271,171	0.271	0.420	8	0.5	0.227438	0.32962	0.494	0.3873	2.44	
	424	420		3.5	465.40	1628.9	3042.9	80	243,432	2.136	519,900	0.520	0.804	8	6.7	0.119388	0.23086	0.346	0.2415	7.50	Unit 8, 98 dwelling units
	420	416		3.5	44.00	154.0	3928.4	80	314,272	2.057	646,508	0.647	1.000	8	3.4	0.206728	0.31206	0.468	0.3608	6.24	
	416	412		3.5	87.00	304.5	4232.9	80	338,632	2.038	690,252	0.690	1.068	8	5.9	0.168534	0.27818	0.417	0.3103	7.74	Unit 2, 87 dwelling units
	412	408		3.5	416.00	1456.0	5688.9	80	455,112	1.962	893,132	0.893	1.382	8	5.6	0.224638	0.32735	0.491	0.3838	8.10	
	408	404		3.5	0.00	0.0	5688.9	80	455,112	1.962	893,132	0.893	1.382	10	2.6	0.181179	0.36198	0.434	0.3272	6.08	
	404	400		3.5	0.00	0.0	5688.9	80	455,112	1.962	893,132	0.893	1.382	12	0.8	0.200862	0.46047	0.460	0.3532	3.91	

Total EDUS  
1,625.4

Min Slope  
0.50

Max dn/D  
0.49

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D



**APPENDIX L**

**CALCULATION SPREADSHEET RESULTS  
UNIT 10 MAXIMUM FLOW  
SOUTH IN CHESTNUT HILL LANE  
AND  
FIGURE L-1**

DATE: 10/23/2020

**SEWER STUDY SUMMARY**

FOR: The Trails at CMR - PO3M Sub-Basin - Existing System, Proposed Flow - Unit 10 Max South  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO3M SUB-BASIN</b>																							
	256	252	2.52	232	3.5	165	584.6	577.5	1162.1	80	92,971	2.458	228,483	0.228	0.354	8	0.5	0.191635	0.29888	0.448	0.3411	2.33	Unit 10, 165 dwelling units
	252	248	2.52	2	3.5	0	5.0	0.0	1167.2	80	93,374	2.457	229,380	0.229	0.355	8	0.5	0.192387	0.29954	0.449	0.3421	2.33	
	248	244	2.52	99	3.5	0	249.5	0.0	1416.7	80	113,333	2.397	271,621	0.272	0.420	8	0.5	0.227815	0.32993	0.495	0.3877	2.44	
	244	240	2.52	10	3.5	0	25.2	0.0	1441.9	80	115,349	2.392	275,871	0.276	0.427	8	0.5	0.231380	0.33283	0.499	0.3922	2.45	
	240	236	2.52	22	3.5	0	55.4	0.0	1497.3	80	119,784	2.381	285,151	0.285	0.441	8	2.5	0.108043	0.21908	0.329	0.2247	4.42	
	236	232	2.52	25	3.5	0	63.0	0.0	1560.3	80	124,824	2.368	295,576	0.296	0.457	8	7.4	0.064440	0.16800	0.252	0.1553	6.63	
	232	228	2.52	0	3.5	0	0.0	0.0	1560.3	80	124,824	2.368	295,576	0.296	0.457	8	7.3	0.064791	0.16845	0.253	0.1559	6.60	
	228	224	2.52	89	3.5	0	224.3	0.0	1784.6	80	142,766	2.323	331,658	0.332	0.513	8	2.5	0.123418	0.23497	0.352	0.2474	4.67	
	224	220	2.52	85	3.5	0	214.2	0.0	1998.8	80	159,902	2.290	366,196	0.366	0.567	8	2.7	0.133412	0.24491	0.367	0.2617	4.87	
	220	216	2.52	9	3.5	0	22.7	0.0	2021.5	80	161,717	2.287	369,869	0.370	0.572	8	1.0	0.219357	0.32287	0.484	0.3770	3.42	
	216	212	2.52	23	3.5	0	58.0	0.0	2079.4	80	166,354	2.279	379,188	0.379	0.587	8	2.0	0.159017	0.26937	0.404	0.2974	4.44	
	212	204	2.52	0	3.5	0	0.0	0.0	2079.4	80	166,354	2.279	379,188	0.379	0.587	8	10.2	0.070587	0.17588	0.264	0.1657	7.97	
	204	200	2.52	0	3.5	0	0.0	0.0	2079.4	80	166,354	2.279	379,188	0.379	0.587	8	1.6	0.177787	0.28656	0.430	0.3227	4.09	

Total EDUS
596.0

Total EDUS
165

Min Slope
0.50

Max dn/D
0.49

Notes:  
 A. Based on City sewer flow meter data. PO3M Sub-Basin = 201 gpd/DU / 80 gpcpd = 2.52 persons/DU.

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D



**APPENDIX M**

**CITY OF SAN DIEGO  
TRUNK SEWER #90  
SEWER MODEL RESULTS  
AND  
FACILITY SEQUENCE NUMBER MAPS**

CITY OF SAN DIEGO  
HYDRAULIC MODEL RESULTS TABLE  
TRUNK SEWER 90 - CHICARITA CREEK  
2025 WWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL EL. (FT)	MAX. EGL EL. (FT)	HGL DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
47475	K03N32.1	K03N33	637.46	633.67	641.70	0.025	15	150	2.11	2.37	15.8	633.87	633.94	7.83	0.17	6.64	2.6
47473	K03N33.1	K03N30	633.67	632.51	639.00	0.007	15	168	0.97	4.18	27.9	632.86	632.87	6.14	0.17	3.47	5.0
47472	K03N29.1	K03N30	638.65	632.50	639.00	0.015	15	400	2.11	4.30	28.7	632.86	632.93	6.14	0.36	5.18	6.9
47457	K03N30.1	K03N17	632.50	630.42	646.40	0.004	17	520	2.54	4.19	24.6	630.77	630.87	15.63	0.50	3.69	13.4
47456	K03N17.1	K03N226	630.42	628.30	637.30	0.004	18	532	2.64	3.98	22.1	628.63	628.74	8.67	0.50	4.29	11.6
47650	K03N226.1	K03N227	628.30	607.00	617.00	0.061	18	349	5.28	2.89	16.0	607.24	607.67	9.76	0.62	16.76	3.7
47609	K03N227.1	K03N182	607.00	590.60	605.60	0.066	18	248	3.82	3.62	20.1	590.90	591.13	14.70	0.62	17.47	3.6
47610	K03N182.1	K03N181	590.60	586.69	591.70	0.020	18	200	3.24	4.05	22.5	587.03	587.19	4.67	0.62	9.49	6.6
47611	K03N181.1	K03N183	586.69	582.60	590.60	0.010	18	409	3.77	4.05	22.5	582.94	583.16	7.66	0.63	6.79	9.3
47617	K03N183.1	K03N184	582.60	578.27	590.60	0.017	18	253	3.70	3.70	20.5	578.58	578.79	12.02	0.62	8.88	7.0
47618	K03N184.1	K03N190	578.27	574.73	589.70	0.017	18	206	3.70	3.69	20.5	575.04	575.25	14.66	0.62	8.89	7.0
47616	K03N190.1	K03N189	573.72	568.49	588.50	0.040	18	131	2.74	5.25	29.2	568.93	569.05	19.57	0.76	13.59	5.6
47620	K03N189.1	K03N192	568.49	567.86	579.90	0.004	18	153	2.90	5.21	28.9	568.29	568.43	11.61	0.80	4.36	18.3
47621	K03N192.1	K03N191	567.86	567.73	579.70	0.004	18	32	3.04	5.04	28.0	568.15	568.29	11.55	0.80	4.32	18.4
47622	K03N191.1	K03N195	567.73	564.57	576.10	0.011	18	285	3.51	4.55	25.3	564.95	565.14	11.15	0.80	7.15	11.1
47623	K03N195.1	K03N197	564.57	564.08	577.60	0.008	18	62	2.96	5.19	28.8	564.51	564.65	13.08	0.80	6.04	13.2
47275	K03N197.1	K02N2	564.08	562.42	570.40	0.008	18	207	3.96	5.19	28.8	562.85	563.10	7.55	1.08	6.08	17.8
47261	K02N2.1	K02N5	562.42	556.90	566.90	0.017	18	325	4.80	4.53	25.1	557.28	557.64	9.62	1.08	8.85	12.2
47262	K02N5.1	J02N92	556.90	554.56	564.80	0.019	18	125	4.40	4.82	26.8	554.96	555.26	9.84	1.08	9.29	11.6
41235	J02N92.1	J02N94	554.56	551.72	560.50	0.015	18	195	4.16	5.04	28.0	552.14	552.41	8.36	1.09	8.19	13.3
41234	J02N94.1	J02N95	551.72	550.73	559.73	0.012	18	85	4.15	5.05	28.0	551.15	551.42	8.58	1.09	7.31	14.9
41230	J02N95.1	J02N78	550.73	544.04	558.40	0.012	18	579	4.34	4.89	27.2	544.45	544.74	13.95	1.09	7.29	14.9
41228	J02N78.1	J02N97	544.04	542.53	552.30	0.014	18	104	4.49	4.89	27.1	542.94	543.25	9.36	1.13	8.17	13.8
41227	J02N97.1	J02N77	542.33	540.72	545.20	0.007	18	230	3.84	5.46	30.4	541.17	541.40	4.03	1.13	5.68	19.8
41211	J02N77.1	J02N76	540.52	538.89	545.90	0.005	18	327	3.37	6.01	33.4	539.39	539.57	6.51	1.12	4.79	23.5
5473697	J02N76.1	J02N464	538.89	538.42	546.60	0.011	18	42	2.19	8.47	47.1	539.12	539.20	7.48	1.12	7.18	15.7
41212	J02N464.1	J02N75	538.42	537.03	541.50	0.009	18	154	5.40	8.47	47.0	537.74	538.19	3.76	2.85	6.45	44.2
41213	J02N75.1	J02N74	537.03	536.11	541.10	0.010	18	92	5.66	8.16	45.3	536.79	537.29	4.31	2.85	6.78	42.0
41214	J02N74.1	J02N73	536.11	533.38	539.20	0.031	18	88	6.91	7.02	39.0	533.96	534.71	5.24	2.85	11.96	23.8
41215	J02N73.1	J02N72	533.38	527.09	536.90	0.020	18	321	6.83	7.08	39.3	527.68	528.40	9.22	2.85	9.50	30.0
41216	J02N72.1	J02N143	527.09	523.58	535.40	0.019	18	184	6.84	7.07	39.3	524.17	524.90	11.23	2.85	9.37	30.4
41277	J02N143.1	J02N142	523.58	517.80	535.40	0.023	18	254	5.05	8.91	49.5	518.54	518.94	16.86	2.85	10.25	27.8
41278	J02N142.1	J02N141	517.80	517.01	523.20	0.008	18	100	5.17	8.90	49.5	517.75	518.17	5.45	2.91	6.03	48.2
41319	J02N141.1	J02N139	517.01	513.32	519.95	0.009	18	412	4.55	9.89	55.0	514.14	514.47	5.81	2.91	6.42	45.3
41276	J02N139.1	J02N124	513.32	510.68	519.70	0.006	18	454	4.01	11.14	61.9	511.61	511.86	8.09	2.94	5.18	56.9
41263	J02N124.1	J02N123	510.68	508.69	513.70	0.004	18	497	4.03	11.02	61.2	509.61	509.86	4.09	2.94	4.29	68.5
41262	J02N123.1	J02N122	508.68	507.67	516.16	0.004	18	258	4.59	9.86	54.8	508.49	508.82	7.67	2.94	4.25	69.2
5591280	J02N122.1	J02N466	507.17	505.12	514.91	0.016	18	127	6.95	8.50	47.2	505.83	506.58	9.09	3.69	8.64	42.7
41260	J02N466.1	J02N120	505.12	502.94	510.90	0.016	18	135	7.01	8.44	46.9	503.64	504.41	7.26	3.69	8.64	42.7
40870	J02N120.1	J01N16	502.91	495.84	503.80	0.014	18	488	6.68	8.80	48.9	496.57	497.27	7.23	3.71	8.17	45.4

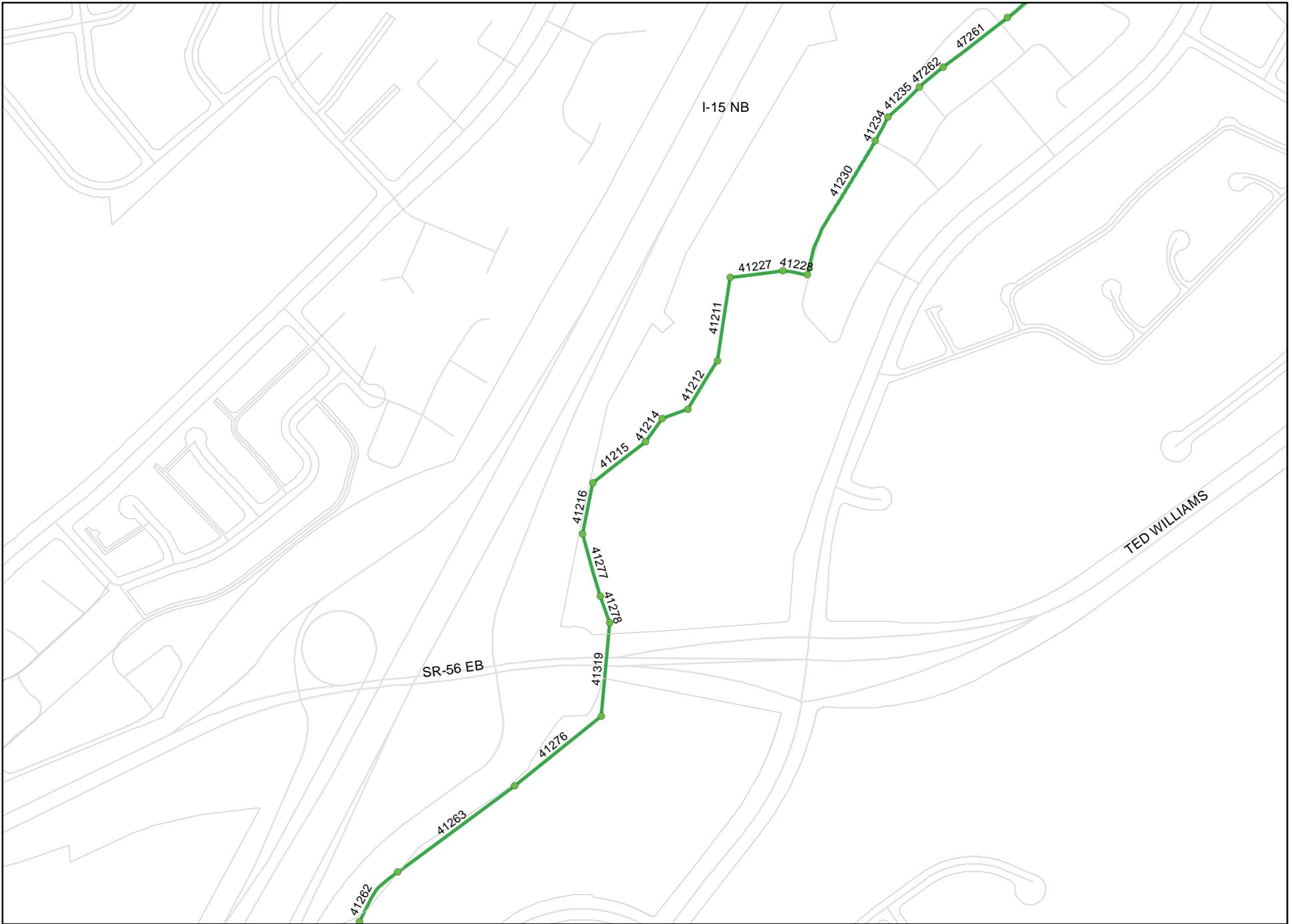
CITY OF SAN DIEGO  
HYDRAULIC MODEL RESULTS TABLE  
TRUNK SEWER 90 - CHICARITA CREEK  
2025 WWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL EL. (FT)	MAX. EGL EL. (FT)	HGL DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5344885	J01N16.1	J01N346	495.84	490.21	501.20	0.014	18	388	6.56	8.93	49.6	490.95	491.62	10.25	3.71	8.17	45.4
5344884	J01N346.1	J01N347	490.21	487.44	500.60	0.014	18	204	6.56	8.94	49.6	488.19	488.85	12.41	3.71	7.92	46.9
5344889	J01N347.1	J01N348	487.44	480.38	493.10	0.014	18	521	6.42	9.09	50.5	481.14	481.78	11.96	3.71	7.91	46.9
5344891	J01N348.1	J01N349	480.38	479.35	489.80	0.014	18	76	4.59	12.00	66.7	480.35	480.68	9.45	3.71	7.91	46.9
5443722	J01N19.1	J01N349	481.09	479.35	489.80	0.010	18	174	0.92	11.99	66.6	480.35	480.36	9.45	0.25	6.79	3.6
40992	J01N349.1	J01N396	479.35	479.28	489.80	0.005	18	14	5.16	11.58	64.4	480.25	480.66	9.55	4.01	4.59	87.4
40874	J01N396.1	J01N20	479.28	477.00	483.48	0.012	18	195	6.39	9.77	54.3	477.82	478.45	5.67	4.01	7.35	54.6
40993	J01N20.1	J01N384	476.96	476.71	483.23	0.010	18	25	6.00	10.21	56.7	477.56	478.12	5.67	4.01	6.76	59.4
40875	J01N384.1	J01N385	476.71	474.14	480.63	0.010	18	260	6.00	10.21	56.7	474.99	475.55	5.64	4.01	6.75	59.4
40994	J01N385.1	J01N146	474.14	473.07	479.55	0.010	18	108	6.08	10.11	56.2	473.91	474.49	5.64	4.01	6.75	59.4
40995	J01N146.1	J01N387	473.02	471.42	477.92	0.014	18	117	6.96	9.06	50.3	472.17	472.93	5.74	4.01	7.95	50.5
40996	J01N387.1	J01N123	471.42	467.59	474.06	0.015	18	259	6.98	9.04	50.2	468.34	469.10	5.72	4.01	8.26	48.6
40983	J01N123.1	J01N122	467.41	441.20	448.15	0.076	18	346	12.15	6.05	33.6	441.71	444.00	6.44	4.10	18.68	21.9
40934	J01N122.1	J01N76	440.88	427.42	436.89	0.045	18	302	10.36	6.81	37.8	427.99	429.66	8.90	4.10	14.34	28.6
40935	J01N76.1	J01N77	427.22	416.70	425.40	0.027	18	388	8.75	7.79	43.3	417.35	418.54	8.05	4.14	11.18	37.0
40944	J01N77.1	J01N84	416.17	410.25	419.40	0.015	18	400	7.14	9.70	53.9	411.06	411.85	8.34	4.48	8.26	54.2
40945	J01N84.1	J01N85	410.16	406.05	419.00	0.008	24	490	4.38	12.06	50.2	407.05	407.35	11.94	4.48	13.38	33.4
41055	J01N85.1	J01S39	406.03	405.30	424.73	0.003	24	213	4.39	12.04	50.2	406.30	406.60	18.43	4.48	8.56	52.3
41057	J01S39.1	J01S41	405.28	403.86	430.24	0.003	24	410	4.37	12.07	50.3	404.87	405.16	25.37	4.47	8.60	52.0
5525948	J01S41.1	J01S43	403.84	402.83	424.39	0.003	24	296	4.38	12.05	50.2	403.84	404.13	20.55	4.47	8.55	52.3
5017845	J01S43.1	J01SD6	402.81	402.04	414.00	0.003	24	225	4.35	12.13	50.5	403.05	403.34	10.95	4.47	8.57	52.2
41062	J01SD6.1	J01S45	402.04	401.72	411.00	0.003	24	92	4.81	11.35	47.3	402.66	403.03	8.34	4.55	8.57	53.1
41064	J01S45.1	J01S48	401.49	394.53	407.37	0.064	18	109	12.15	6.59	36.6	395.08	397.37	12.29	4.60	17.15	26.8
41066	J01S48.1	J01S49	394.00	386.07	397.30	0.025	18	324	8.58	8.56	47.6	386.78	387.93	10.52	4.60	10.63	43.2
41067	J01S49.1	J01S50	385.85	377.07	386.00	0.027	18	330	7.88	9.20	51.1	377.84	378.80	8.16	4.60	11.07	41.5
41048	J01S50.1	J01S37	376.97	372.74	380.00	0.013	18	328	6.85	10.25	57.0	373.59	374.32	6.41	4.60	7.71	59.7
41047	J01S37.1	J01S292	372.67	334.97	339.40	0.321	18	117	20.50	4.52	25.1	335.35	341.88	4.05	4.60	38.49	12.0
5198943	J01S292.1	J01S293	334.97	321.24	330.50	0.348	24	39	12.31	10.40	43.3	322.11	324.46	8.39	4.60	86.25	5.3
41123	J01S293.1	J01S118	320.92	320.76	328.76	0.006	27	27	3.18	15.64	57.9	322.06	322.22	6.70	4.63	15.38	30.1

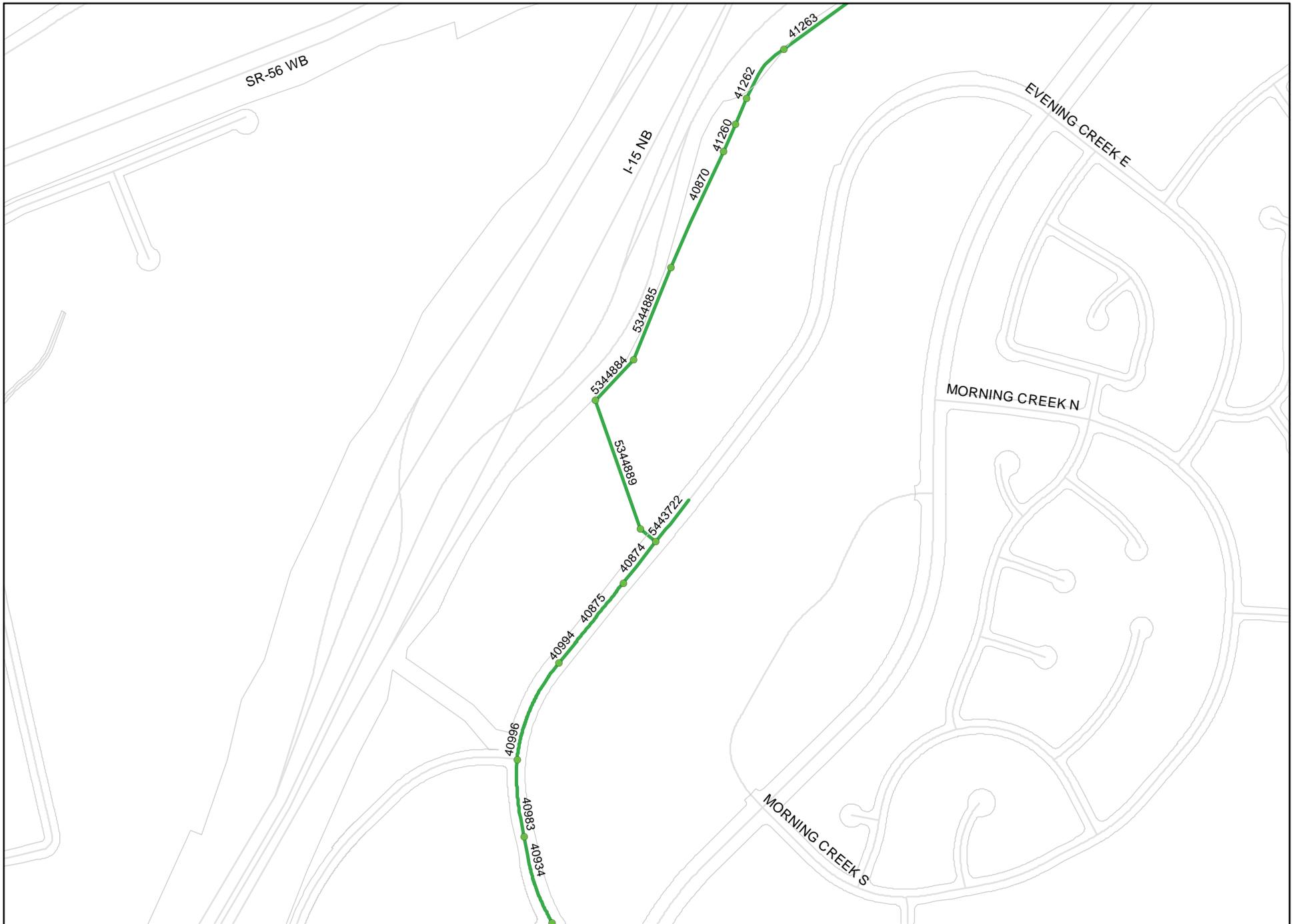
TOTAL LENGTH (MILES):	3.15	LENGTH OF PIPE - d/D < 50% (MILES):	2.00	LENGTH OF PIPE - Q/CAP < 50% (MILES):	2.42
LENGTH WEIGHTED Q/CAP:	32.2	LENGTH OF PIPE - d/D 50 - 75% (MILES):	1.15	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	0.73
LENGTH WEIGHTED d/D:	40.6	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.00
LENGTH WEIGHTED HGL BELOW RIM (FT):	9.79	LENGTH OF PIPE - d/D > 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00



CHICARITA TS (#90) MAP 1 (UPSTREAM)



CHICARITA TS (#90) MAP 2 (MID SECTION)



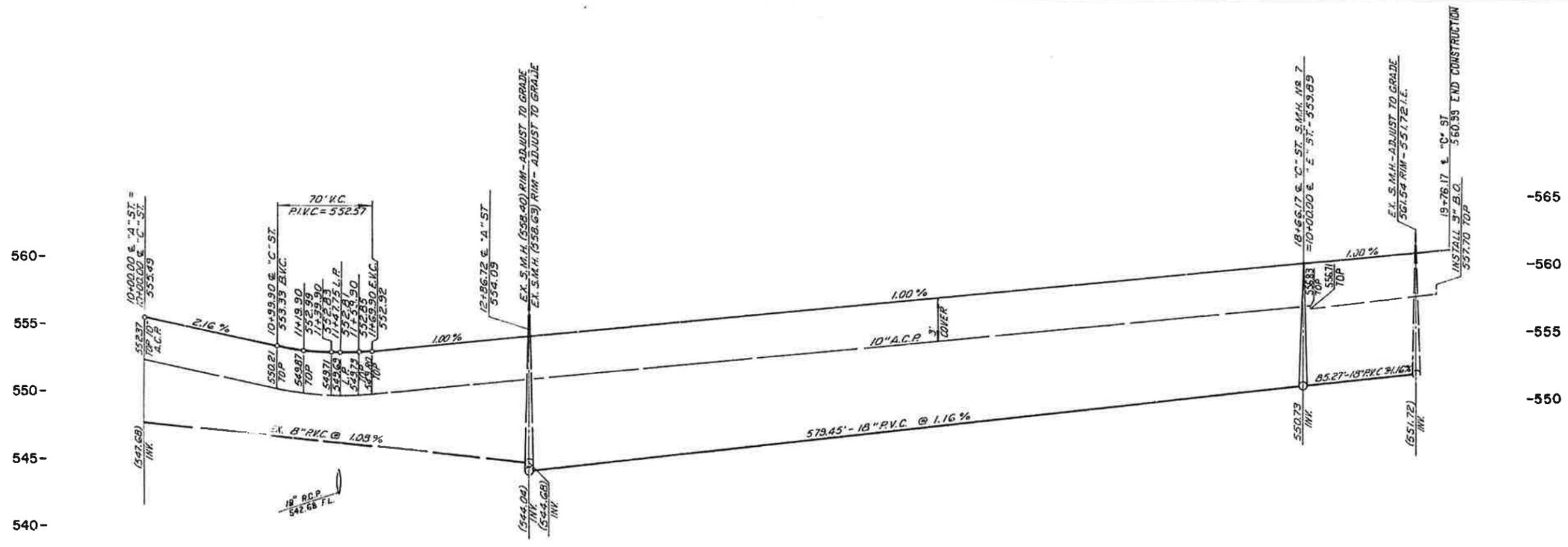
CHICARITA TS (#90) MAP 3 (MID SECTION)



CHICARITA TS (#90) MAP 4 (DOWNSTREAM)

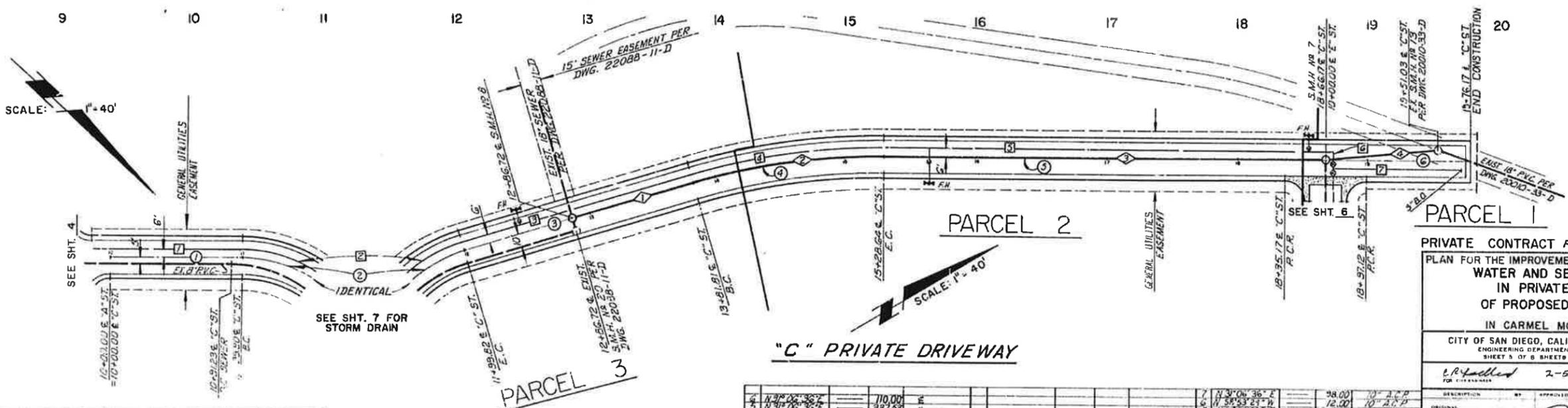
**APPENDIX N**

**CHICARITA TRUNK SEWER  
AS-BUILT DRAWINGS**



**PROFILE SCALE**  
 HORIZ. 1"=40'  
 VERT. 1"=4'

SCALE: 1"=40'



NO.	B/E	REMARKS	NO.	B/E	REMARKS	NO.	B/E	REMARKS
1	N 30° 06' 36" E	110.00	7	N 30° 06' 36" E	38.00	10	A.C.P.	
2	N 31° 06' 36" E	300.00	8	N 31° 06' 36" E	12.00	11	A.C.P.	
3	N 32° 06' 36" E	146.88	9	N 32° 06' 36" E	341.53	12	A.C.P.	
4	N 33° 06' 36" E	146.88	10	N 33° 06' 36" E	146.88	13	A.C.P.	
5	N 34° 06' 36" E	146.88	11	N 34° 06' 36" E	146.88	14	A.C.P.	
6	N 35° 06' 36" E	146.88	12	N 35° 06' 36" E	146.88	15	A.C.P.	
7	N 36° 06' 36" E	146.88	13	N 36° 06' 36" E	146.88	16	A.C.P.	
8	N 37° 06' 36" E	146.88	14	N 37° 06' 36" E	146.88	17	A.C.P.	
9	N 38° 06' 36" E	146.88	15	N 38° 06' 36" E	146.88	18	A.C.P.	
10	N 39° 06' 36" E	146.88	16	N 39° 06' 36" E	146.88	19	A.C.P.	
11	N 40° 06' 36" E	146.88	17	N 40° 06' 36" E	146.88	20	A.C.P.	

**PRIVATE CONTRACT PERMIT W3270-1**  
**PLAN FOR THE IMPROVEMENT OF:**  
**WATER AND SEWER FACILITIES**  
**IN PRIVATE DRIVEWAYS**  
**OF PROPOSED PARCEL MAP**  
 IN CARMEL MOUNTAIN RANCH #64

CITY OF SAN DIEGO, CALIFORNIA  
 ENGINEERING DEPARTMENT  
 SHEET 5 OF 8 SHEETS

DATE: 2-5-87

AS BUILT

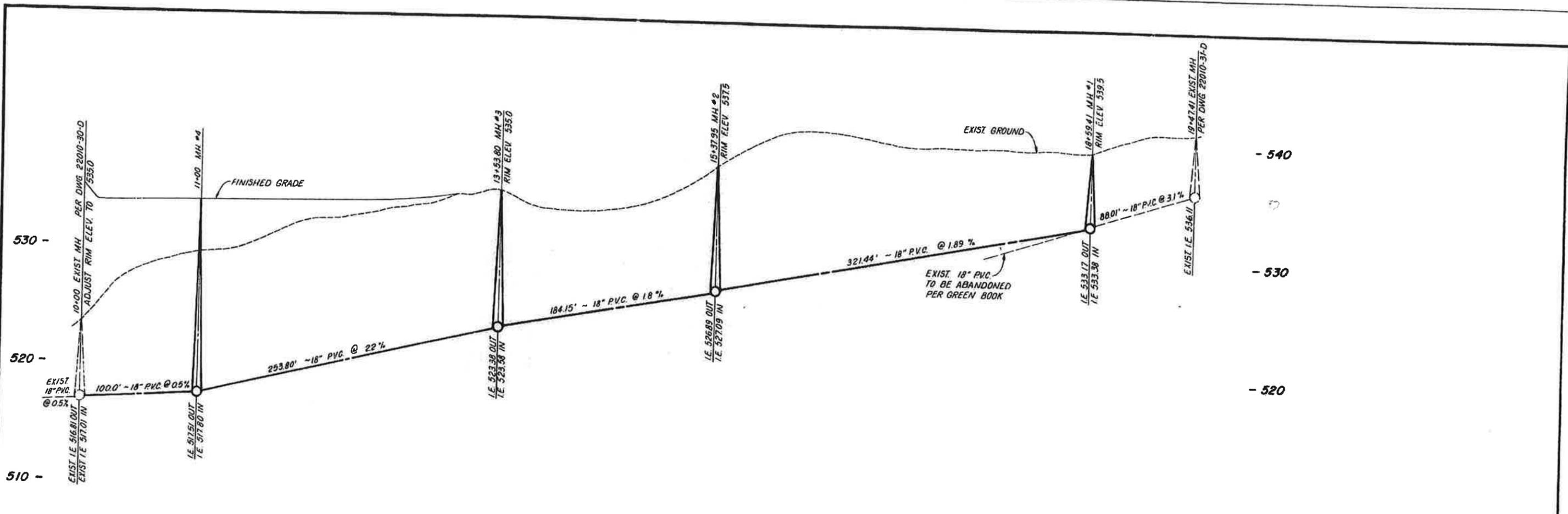
294-1743

23436-5-D

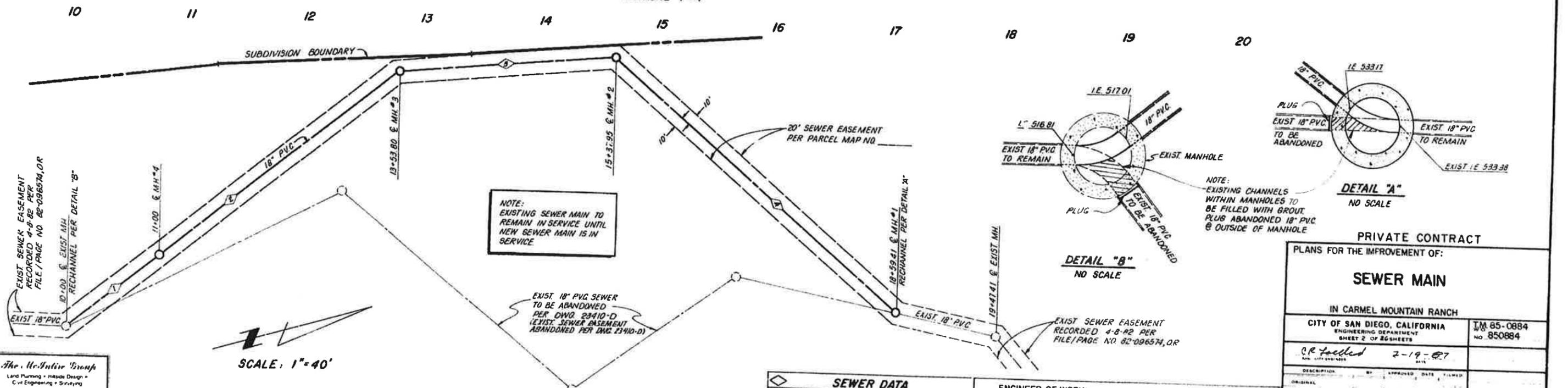
**ENGINEER OF WORK**  
 [Signature]  
 DATE: 11 Dec 86

**THE MCINTIRE GROUP**  
 Land Planning • Hillside Design  
 Civil Engineering • Surveying  
 954 Avenida Encinas, Suite 210  
 Carlsbad, CA 92008  
 (619) 431-6444

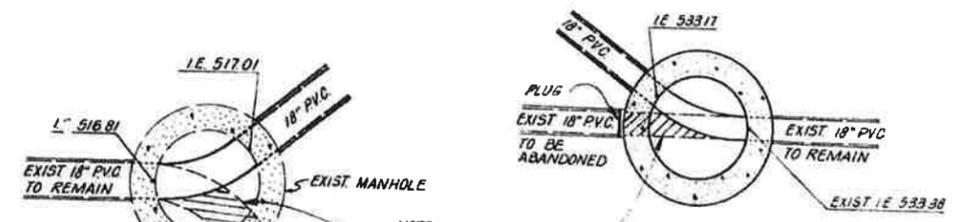
**AS BUILT**



**PROFILE SCALE**  
 HORIZONTAL 1" = 40'  
 VERTICAL 1" = 4'



SCALE: 1" = 40'



NO.	D / BEARING	R	L	REMARKS
1	N 22° 33' 11" W		100.00'	18" PVC
2	N 22° 33' 11" W		253.80'	
3	N 10° 48' 09" E		184.15'	
4	N 59° 50' 50" E		321.44'	

ENGINEER OF WORK: *Leroy C. Bodas*  
 DATE: 11/2/86  
 EXPIRES 9-30-89  
 RCE 22312

**The McEntire Group**  
 Land Planning • Mass Design •  
 Civil Engineering • Surveying

**PRIVATE CONTRACT**  
 PLANS FOR THE IMPROVEMENT OF:  
**SEWER MAIN**  
 IN CARMEL MOUNTAIN RANCH

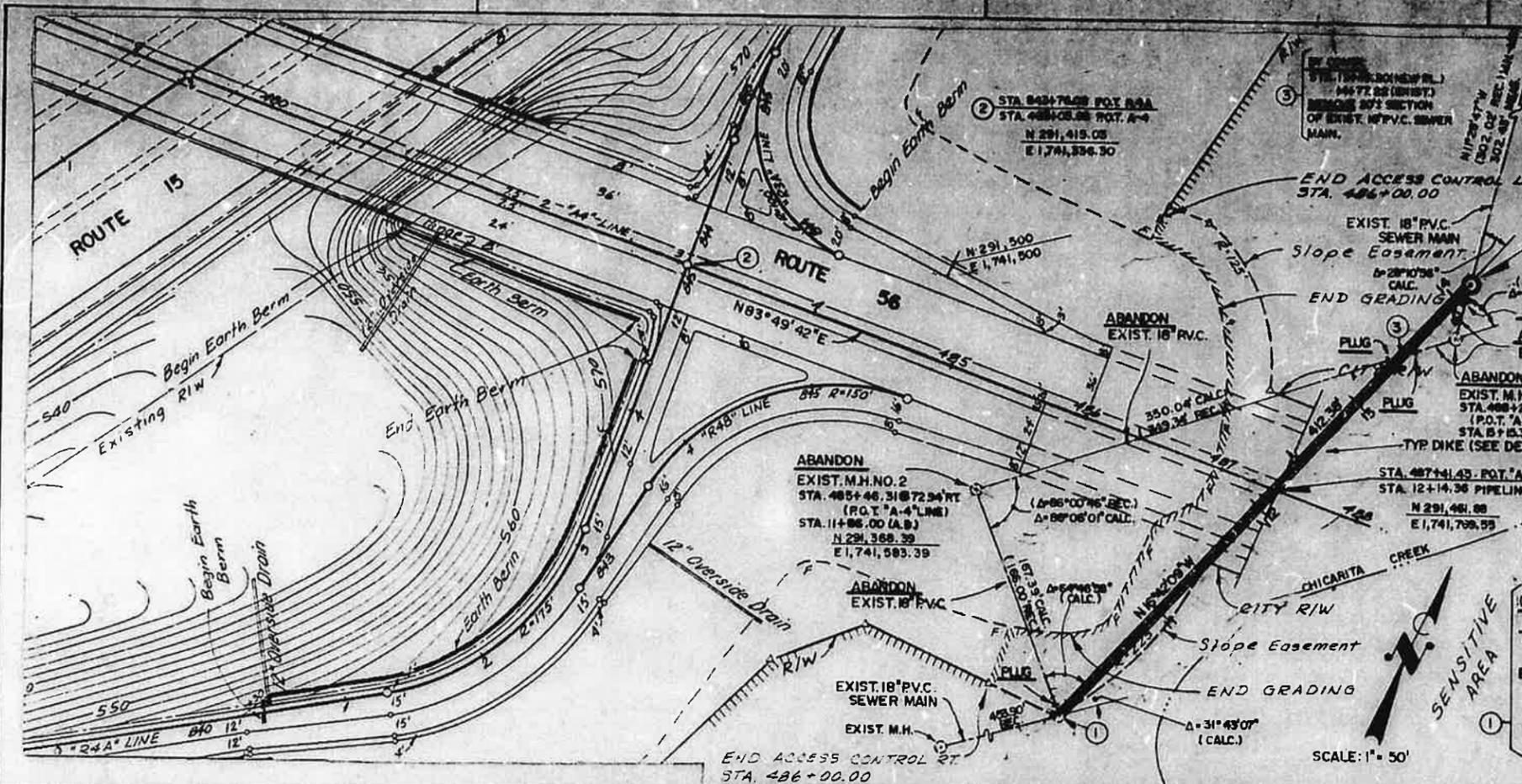
CITY OF SAN DIEGO, CALIFORNIA  
 ENGINEERING DEPARTMENT  
 SHEET 2 OF 26 SHEETS

IM 85-0884  
 NO. 850884

C.R. Faeled 2-19-87  
 CIVIL ENGINEER

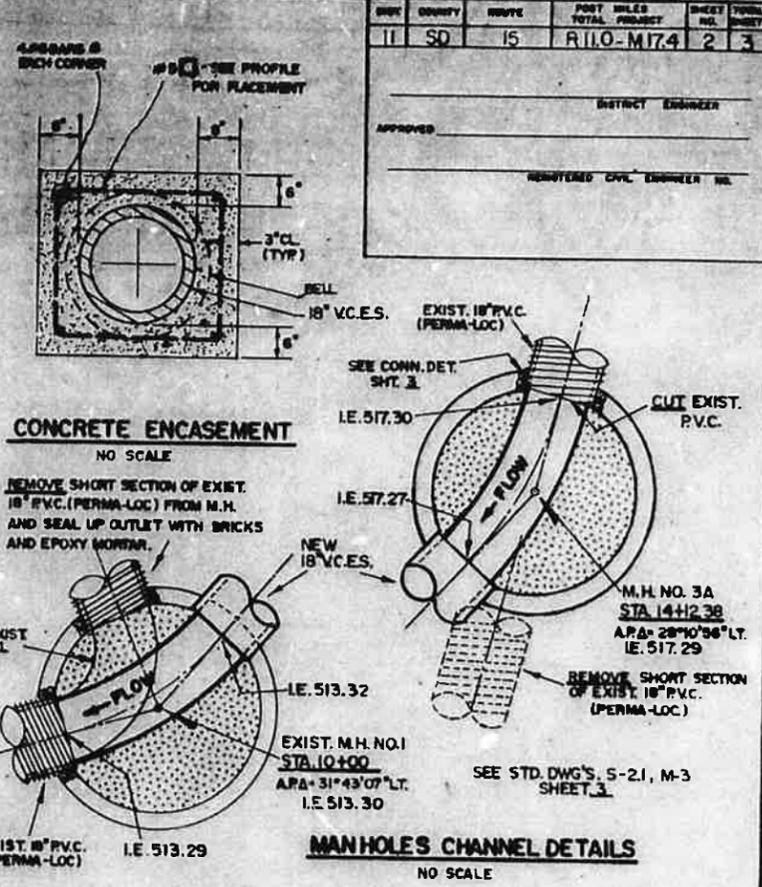
DATE STARTED: 10-86  
 DATE COMPLETED: 10-8-93

294-1743  
 23289-2-D  
 PROJECT NO. 1081



**CONNECTION NO. 2**  
 BY CONTR:  
 STA. 486+48 @ 82.44' LT. (P.O.T. 'A-4' LINE)  
 EQ- STA. 486+48 @ 82.44' LT. (P.O.T. 'A-4' LINE)  
 STA. 487+14.43 @ 12+14.36 PIPELINE  
 N 291,481.88 E 1,741,799.99  
 (P.O.T. 'A-4' LINE)  
 STA. 487+14.43 @ 12+14.36 PIPELINE  
 N 291,481.88 E 1,741,799.99  
 (P.O.T. 'A-4' LINE)  
 STA. 487+14.43 @ 12+14.36 PIPELINE  
 N 291,481.88 E 1,741,799.99  
 (P.O.T. 'A-4' LINE)

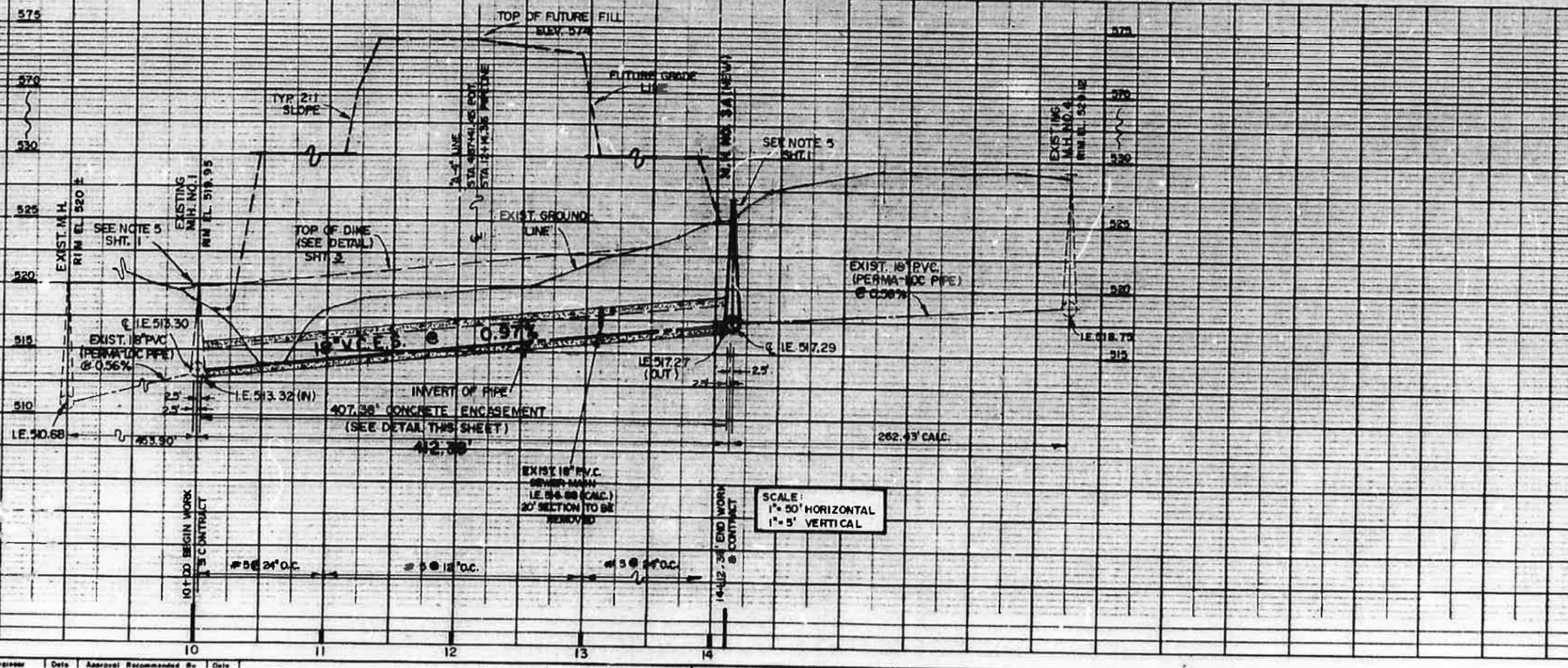
**CONNECTION NO. 1**  
 BY CONTR:  
 STA. 486+58.13 @ 197.51 RT. (P.O.T. 'A-4' LINE)  
 EQ- STA. 10+00 @ 10+00 (PIPELINE)  
 STA. 85+50.26 BK. (M.H. NO. 25)  
 (BOTH STAS. ARE PER AS BUILTS)  
 RECHANNEL & CONNECT TO EXIST. M.H. NO. 1



DATE	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	15	RILO-M174	2	3

DISTRICT ENGINEER  
 APPROVED  
 REGISTERED CIVIL ENGINEER NO.

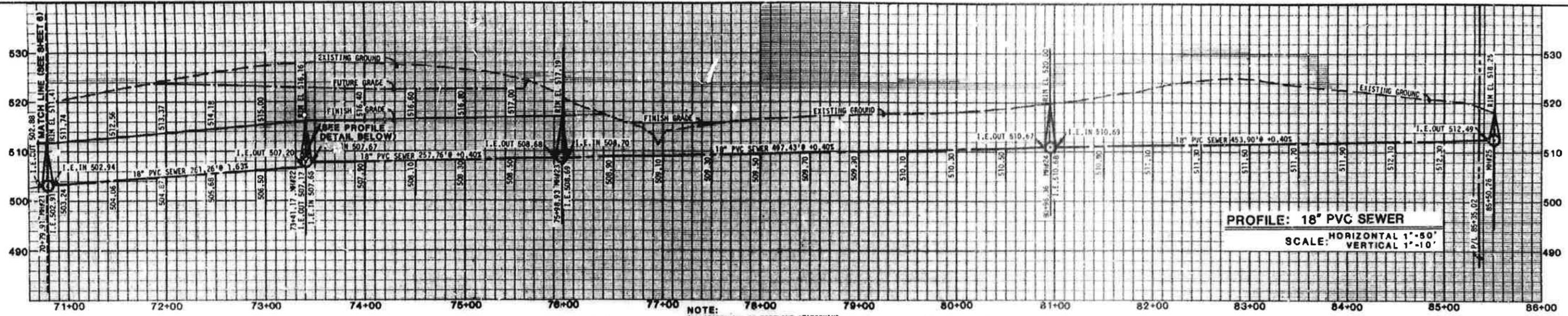
END ACCESS CONTROL PT. STA. 486+00.00  
 SCALE: 1" = 50'



SCALE:  
 1" = 50' HORIZONTAL  
 1" = 5' VERTICAL

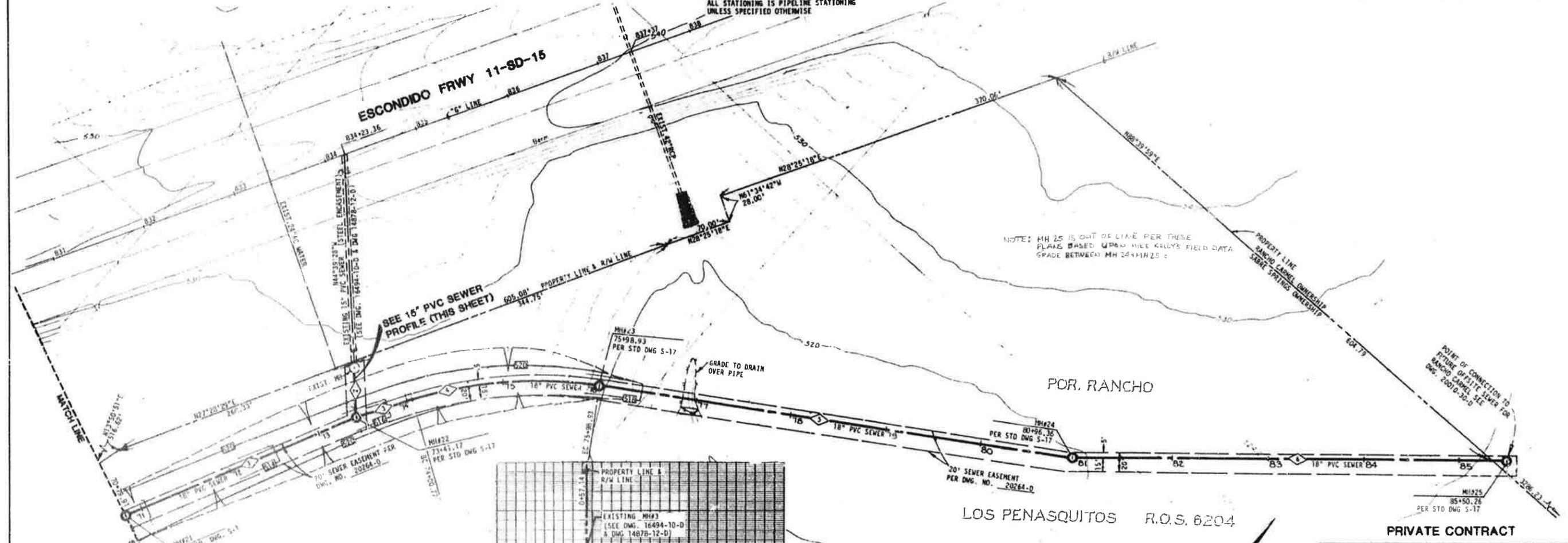
SEWER MAIN RELOCATION ALONG I-15

CITY OF SAN DIEGO, CALIFORNIA UTILITIES DEPARTMENT SHEET 2 OF 3 SHEETS		E.R.O. NO. 76681
UTILITY DIRECTOR	DATE	ENGINEERING DEPARTMENT
BY	APPROVED	DATE
ORIGINAL	JEC/JB	9-27-85
CONSTRUCTION RECORD		CONTROL CERTIFICATION
CONTRACTOR		292-1741
DATE STARTED		LAMBERT COORDINATES
DATE COMPLETED		22316-2 -D

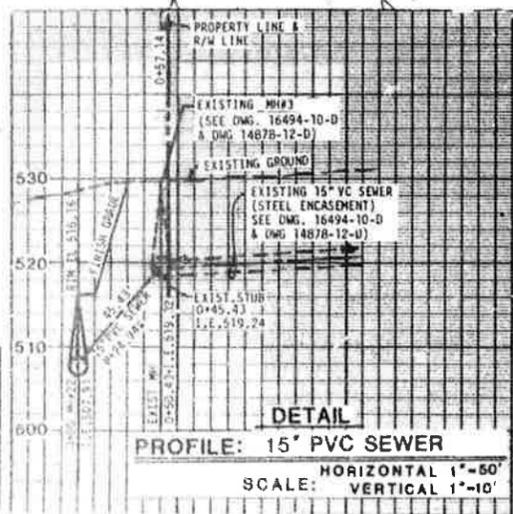


NOTE: ALL STATIONING IS PIPELINE STATIONING UNLESS SPECIFIED OTHERWISE

PROFILE: 18" PVC SEWER  
SCALE: HORIZONTAL 1"=50'  
VERTICAL 1"=10'

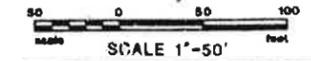


NOTE: MH 25 IS OUT OF LINE PER THESE PLANS BASED UPON WILE KALYS FIELD DATA GRADE BETWEEN MH 24+MH 25



DETAIL  
PROFILE: 15" PVC SEWER  
SCALE: HORIZONTAL 1"=50'  
VERTICAL 1"=10'

COURSE	SEWER MAIN CENTER LINE DATA			
	DELTA BEARING	RADIUS	ARC DISTANCE	NOTES
1	N24°45'10"E		261.26'	18" PVC SEWER
2	N47°39'28"W		45.43'	15" PVC SEWER
3	N31°11'30"E		59.60'	18" PVC SEWER
4	D=25°13'50"	450.00'	198.16'	
5	N56°25'20"E		47.43'	
6	N48°09'36"		453.90'	



"AS-BUILT"  
NORMAN B. KASUBUCHI, RCE 31829  
CIVIL DESIGN GROUP, LTD.

BENCH MARK  
RANCHO PENASQUITOS BLVD & VIA DEL SUR, NEBP, ELEV 527.596  
DATUM: MEAN SEA LEVEL

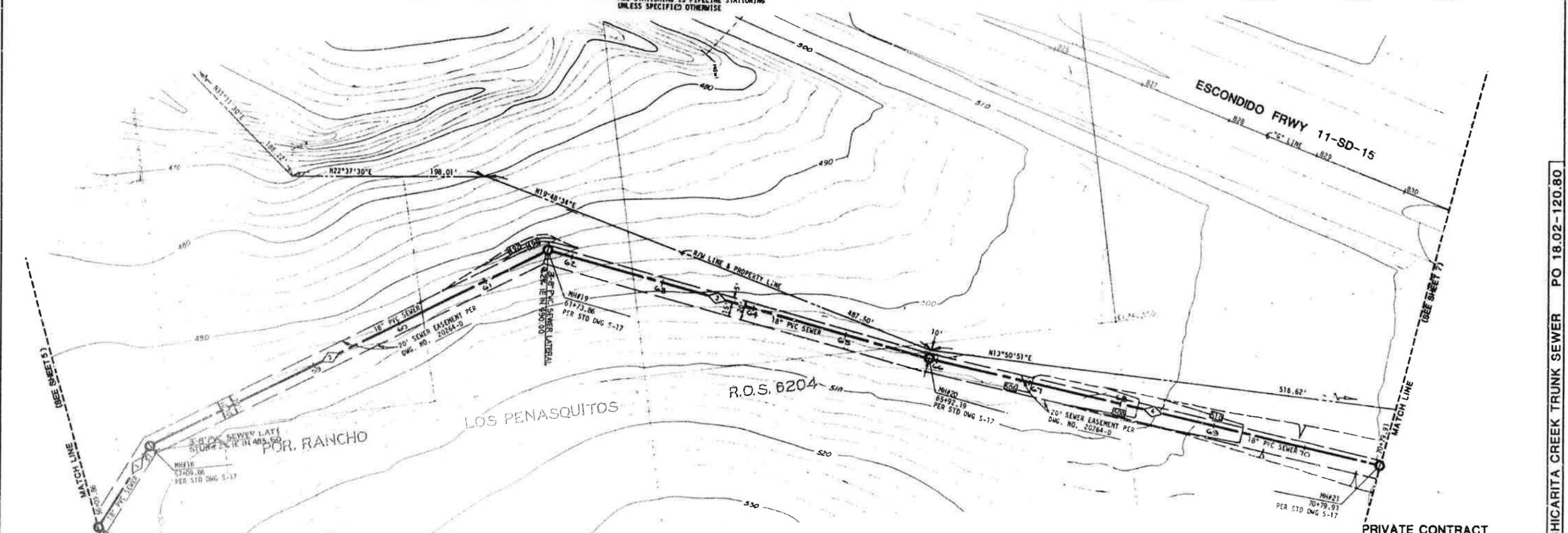
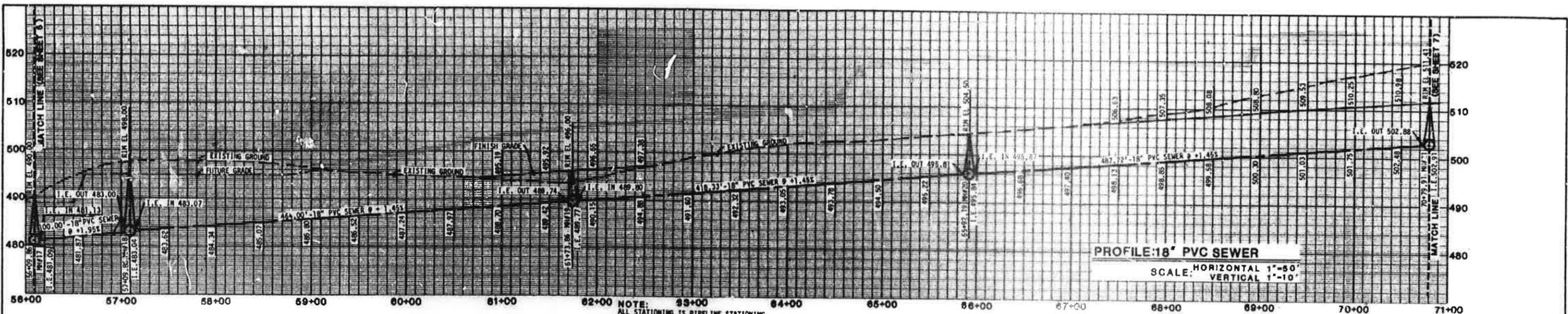
PRIVATE CONTRACT

IMPROVEMENT & GRADING PLAN FOR:  
**CHICARITA CREEK TRUNK SEWER**  
STA. 70+79.91 TO STA. 85+50.26

CITY OF SAN DIEGO CALIFORNIA	T.M. NO. 78-124
SHEET 9 OF 9 SHEETS	W.O. NO. 71427
DATE: 6-10-92	
DESCRIPTION: CHICARITA CREEK TRUNK SEWER	APPROVED: [Signature]
DATE: 6-10-92	DATE: 6-10-92
CONTRACTOR: HAM BROS.	DATE STARTED: 7-14-91
INSPECTOR: GARDNER	DATE COMPLETED: 10-8-91

1995-9-0

NO.	DATE	BY	DESCRIPTION
1	1-2-92	AEM	CITY CORRECTIONS
2	4-17-92	KRH	CITY CORRECTIONS
3	4-17-92	KRH	REVISIONS BY INVENTORY (PC)
4	1-27-92	JAC	CITY CORRECTIONS
5	12-1-91	PWW	CITY CORRECTIONS
6	10-10-91	1011	CITY CORRECTIONS

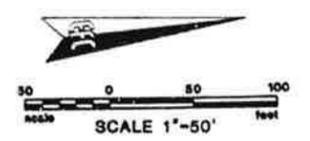


PREPARATION AND REVISION LOG

NO.	DATE	BY	DESCRIPTION
1	0-12-95	A.G.M.	CITY CORRECTIONS
2	1-1-95	K.C.U.	CITY CORRECTIONS
3	4-2-95	W.M.A.	Radius gate in PVC sewer (10' x 10')
4	1-27-96	T.A.C.	CITY CORRECTIONS
5	11-1-96	D.J.W.	CITY CORRECTIONS
6	8-16-96	W.H.L.	CITY CORRECTIONS

SEWER MAIN CENTER LINE DATA

Delta	BEARING	RADIUS	ARC DISTANCE	NOTES
1	N51°21'11"W	100.00'	100.00'	18" PVC SEWER
2	S1°18'06"W	464.00'	464.00'	
3	S22°32'09"E	418.33'	418.33'	
4	S15°48'30"E	287.72'	287.72'	



**"AS-BUILT"**  
*Norman S. Kabubuchi*  
 NORMAN S. KABUBUCHI RCE 31829  
 CIVIL DESIGN GROUP, LTD.

**BENCH MARK**  
 RANCHO PENASQUITOS BLVD & VIA DEL SUR, R.C.P., ELEV 522.596  
 DATUM: MEAN SEA LEVEL

IMPROVEMENT & GRADING PLAN FOR:  
**CHICARITA CREEK TRUNK SEWER**  
 STA. 56+09.86 TO STA. 70+79.91

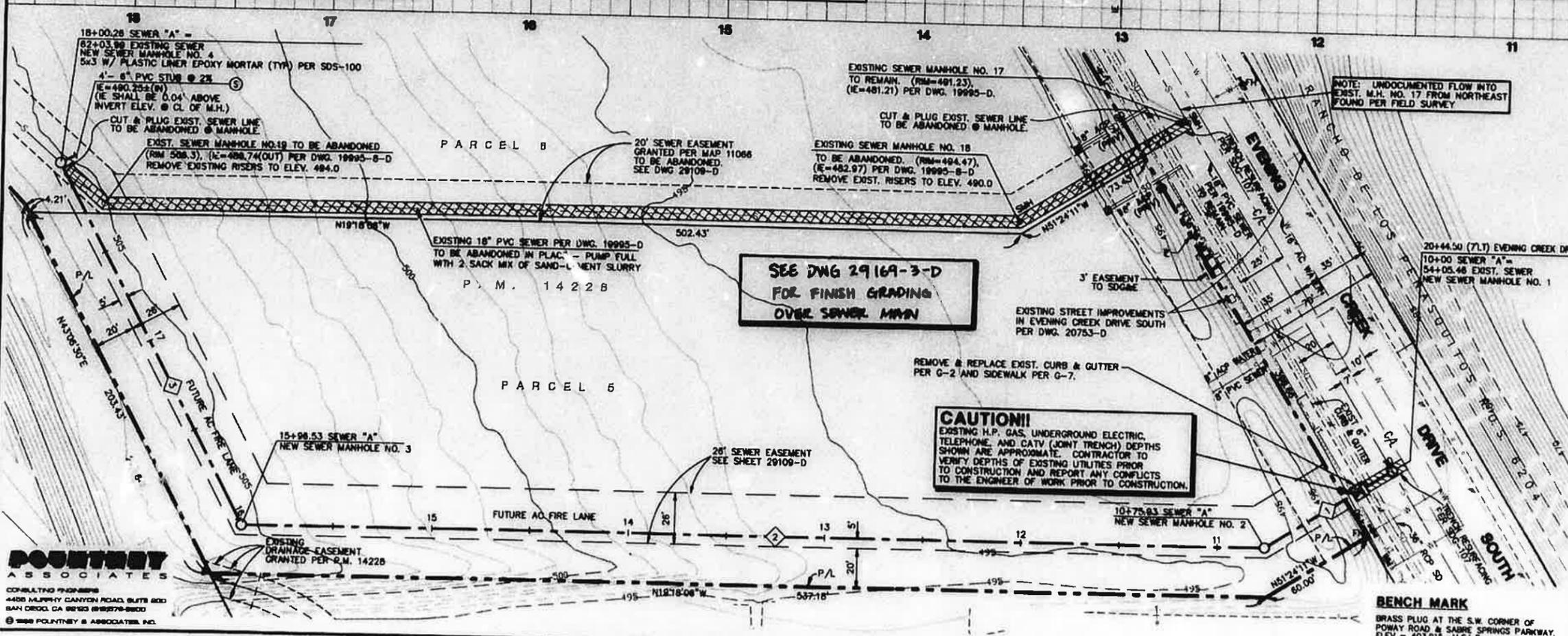
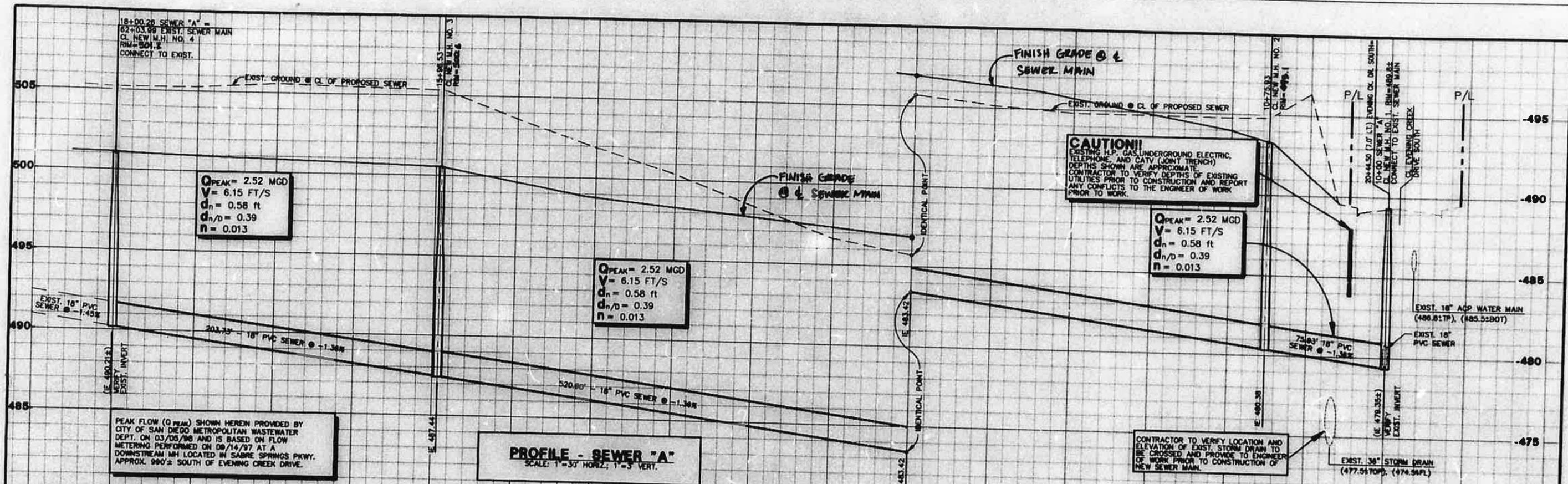
CITY OF SAN DIEGO, CALIFORNIA  
 SHEET 8 OF 9 SHEETS  
 T.M. NO. 78-124  
 W.O. NO. 71427

DATE: 5-18-95  
 FOR CITY ENGINEER: [Signature]  
 DATE: [Signature]

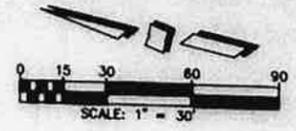
CONTRACTOR: HAN BROS. DATE: 10-14-93  
 INSPECTOR: GARDNER DATE: 11-5-93

19995-8-D

CHICARITA CREEK TRUNK SEWER PO 18.02-120.80



SEWER DATA				
NO.	BEARING	RADIUS	LENGTH	COMMENTS
1	N51°24'11"W	--	75.93'	18" PVC
2	N19°18'08"W	--	520.60'	18" PVC
3	N43°08'30"E	--	203.73'	18" PVC



**ENGINEER OF WORK**  
*Joseph G. Cresto*  
 JOSEPH G. CRESTO R.C.E. 45601 DATE: APR 14, 1998

**REGISTERED PROFESSIONAL ENGINEER**  
 JOSEPH G. CRESTO  
 No. 45601  
 Exp. 12-31-98  
 CIVIL  
 STATE OF CALIFORNIA

**PRIVATE CONTRACT**  
**IMPROVEMENT PLAN FOR:**  
**CHICARITA CREEK TRUNK SEWER RELOCATION**  
 PARCELS 5 & 6, PARCEL MAP 14228

CITY OF SAN DIEGO, CALIFORNIA  
 ENGINEERING DEPARTMENT  
 SHEET 2 OF 3 SHEETS  
 W.C. NO. 980035

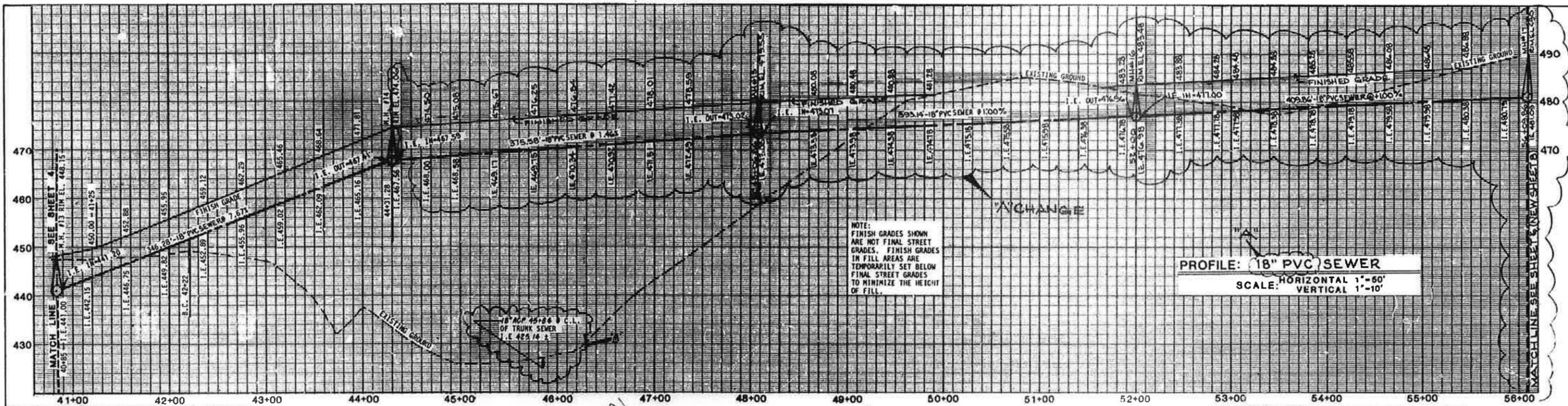
DESCRIPTION	BY	APPROVED	DATE	FILED
AS-BUILT	PIA	PIA	4/15/98	1928-6299

BRASS PLUG AT THE S.W. CORNER OF POWAY ROAD & SABRE SPRINGS PARKWAY. ELEV. = 403.915 M.S.L.D.

CONTRACTOR: KOLL CONSULTANTS DATE STARTED: 4/15/98  
 INSPECTOR: D. MANILA DATE COMPLETED: 4/15/98

1928-6299  
 288-1739  
 29108-2-D

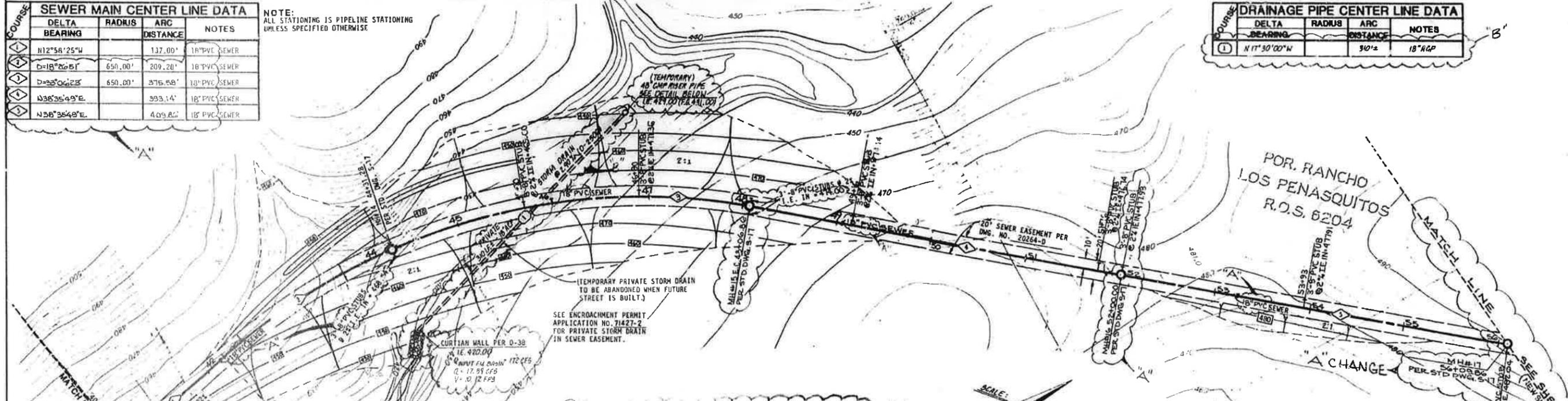
**POUNTEY ASSOCIATES**  
 CONSULTING PROFESSIONALS  
 4400 MURPHY CANYON ROAD, SUITE 300  
 SAN DIEGO, CA 92123 (619) 578-8800  
 © 1998 POUNTEY & ASSOCIATES, INC.



SEWER MAIN CENTER LINE DATA				
COURSE	DELTA BEARING	RADIUS	ARC DISTANCE	NOTES
1	N12°58'25"W		137.00'	18" PVC SEWER
2	D=18" R=51'	650.00'	209.20'	18" PVC SEWER
3	D=22°00'23"	650.00'	376.58'	18" PVC SEWER
4	N38°35'49"E		393.14'	18" PVC SEWER
5	N58°35'49"E		409.80'	18" PVC SEWER

NOTE: ALL STATIONING IS PIPELINE STATIONING UNLESS SPECIFIED OTHERWISE

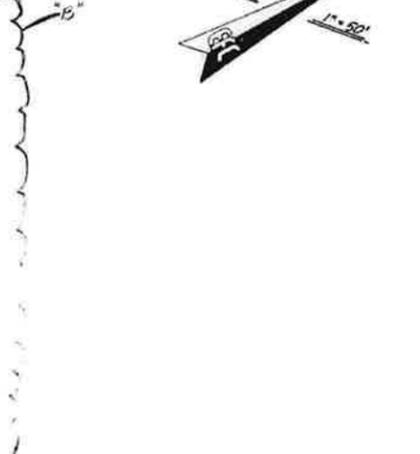
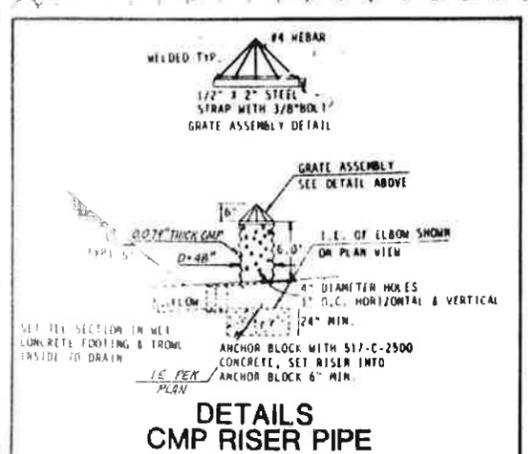
DRAINAGE PIPE CENTER LINE DATA				
COURSE	DELTA BEARING	RADIUS	ARC DISTANCE	NOTES
1	N11°30'00"W		90'±	18" RGP



NO.	DATE	BY	DESCRIPTION
1	6-30-83	RAM	"B" CHANGE
2	6-7-81	KEM	ADD CONNECTIONS
3	4-6-82	WILL	"A" CHANGE
4	1-21-83	TAG	CITY CONNECTIONS
5	12-8-81	RAM	CITY CONNECTIONS
6	9/5/81	DR	REVISIONS

NO.	DATE	BY	DESCRIPTION
1	2-11-82	E. F. COOK	PREPARATION AND REVISION LOG



"AS-BUILT"  
*Norman B. Kasubuchi*  
 NORMAN B. KASUBUCHI RCE 31829 DATE  
 CIVIL DESIGN GROUP, LTD.

BENCH MARK  
 RANCHO PENASQUITOS BLVD & VIA  
 DEL SUD, NECP, ELEV 522.596  
 DATUM: MEAN SEA LEVEL

IMPROVEMENT & GRADING PLAN FOR:				
CHICARITA CREEK TRUNK SEWER				
STA. 40+85.00 TO STA. 56+00.00				
CITY OF SAN DIEGO CALIFORNIA		T.M. NO. 79-124		
SHEET 5 OF 9 SHEETS		W.O. NO. 71427		
C.R. Leach		2-24-82		
FOR CITY ENGINEER		DATE		
DESCRIPTION	BY	APPROVED	DATE	FILED
"A" CHANGE	EFC	<i>[Signature]</i>	6-18-82	
"B" CHANGE	EFC	<i>[Signature]</i>	9-18-82	
AS-BUILT	CR	<i>[Signature]</i>	10-8-84	
CONTRACTOR: HAM BROS.		DATE PLOTTED: 1-10-83		
INSPECTOR: GARDNER		DATE COMPLETED: 10-8-84		
				284-1739
				LABRETT COORDINATOR
				19995-5-D

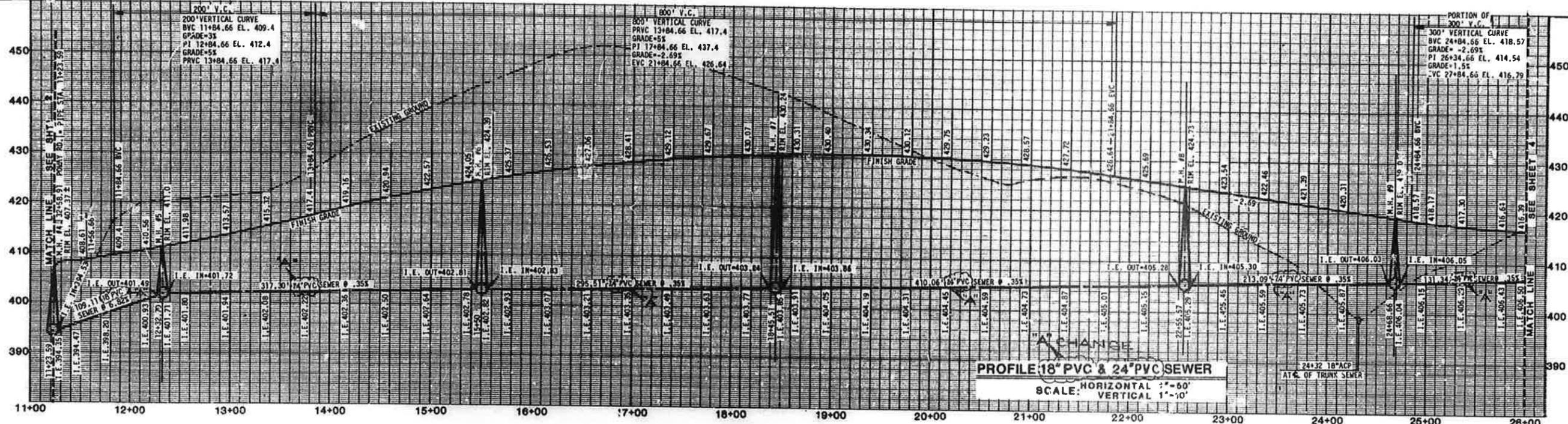
CHICARITA CREEK TRUNK SEWER PO 18.02-12L.80

EFC E. F. COOK & ASSOCIATES, LTD.

E. F. COOK  
 P.O. 18.02-120.83  
 2-11-82  
 PREPARATION AND REVISION LOG

"B" CHANGE - REVISE STORM DRAIN ALIGNMENT  
 - CMP RISER PIPE DETAILS  
 "A" CHANGE - REVISE SEWER GRADE STA 44+31.28 TO STA 56+09.86  
 - SUBSTITUTE 18" PVC FOR 18" RGP STA 40+85 TO STA 48+06.86  
 - SUBSTITUTE 24" RGP FOR 18" RGP STA 48+06.86 TO STA 56+09.86



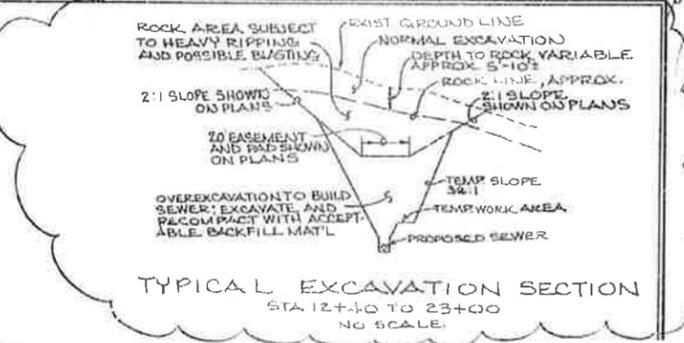
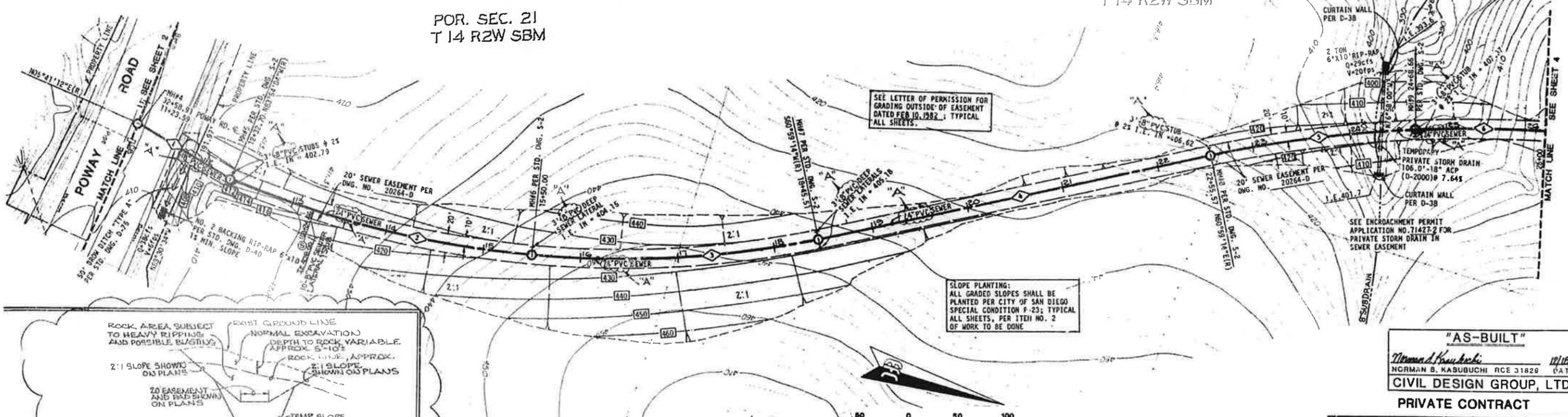


PROFILE: 18" PVC & 24" PVC SEWER  
 SCALE: HORIZONTAL 1"=60'  
 VERTICAL 1"=10'

NOTE:  
 ALL STATIONING IS PIPELINE STATIONING  
 UNLESS SPECIFIED OTHERWISE

POR. SEC. 16  
 T 14 R 2 W SBM

POR. SEC. 21  
 T 14 R 2 W SBM



Course	SEWER MAIN CENTER LINE DATA			
	DELTA BEARING	RADIUS	ARC DISTANCE	NOTES
1	N14°00'03"E		109.11'	18" PVC SEWER
2	D=18°10'43"	1000'	317.30'	24" PVC SEWER
3	D=16°55'54"	1000'	295.51'	"
4	S29°00'46"E		410.06'	"
5	D=9°23'30"	1300'	213.09'	"
6	D=5°47'19"	1300'	131.34'	24" PVC SEWER

"AS-BUILT"  
 Norman S. Kasubuchi  
 NORMAN S. KASUBUCHI RCE 31828 DATE 12/18/89  
 CIVIL DESIGN GROUP, LTD.  
 PRIVATE CONTRACT

IMPROVEMENT & GRADING PLAN FOR:  
 CHICARITA CREEK TRUNK SEWER  
 STA. 11+23.59 TO STA. 26+00.00

CITY OF SAN DIEGO, CALIFORNIA		T.M. NO. 78-124	
SHEET 3 OF 9 SHEETS		W.O. NO. 71427	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	C.R. DeLoraine		2-24-82
"A" CHANGE	EFC		12-18-89
CONTRACTOR	DATE STARTED	DATE COMPLETED	
AL QUILL	11-18-89	10-8-89	
INSPECTOR	GARDNER		

NO.	DATE	BY	DESCRIPTION
1	4-5-82	WLL	"A" CHANGES
2	1-23-82	TAG	CITY CORRECTIONS
3	2-2-82	WLL	REVISIONS
4	9/18/81	WLL	REVISIONS
5	11/21/81	WLL	REVISIONS
6	11/21/81	WLL	REVISIONS

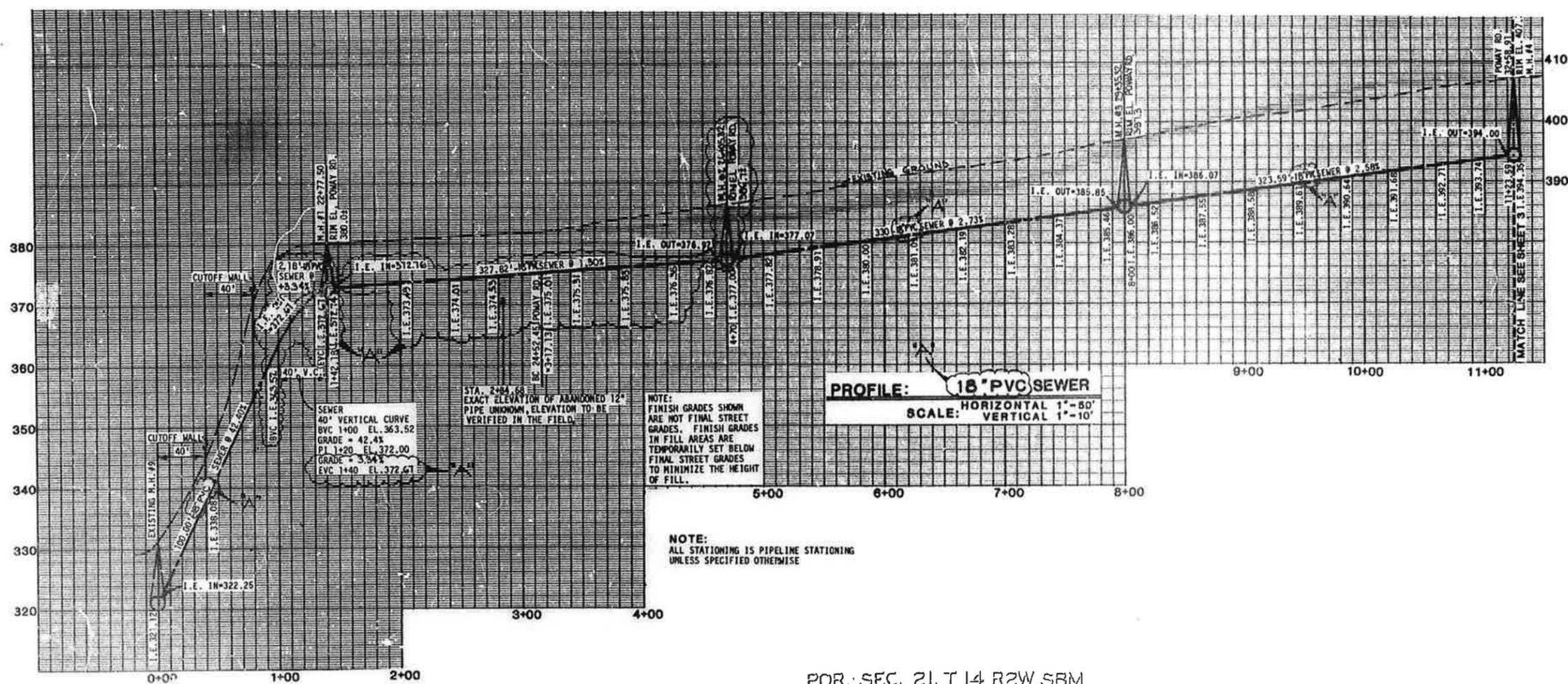
PREPARATION AND REVISION LOG

EFC E. F. COOK & ASSOCIATES, LTD.

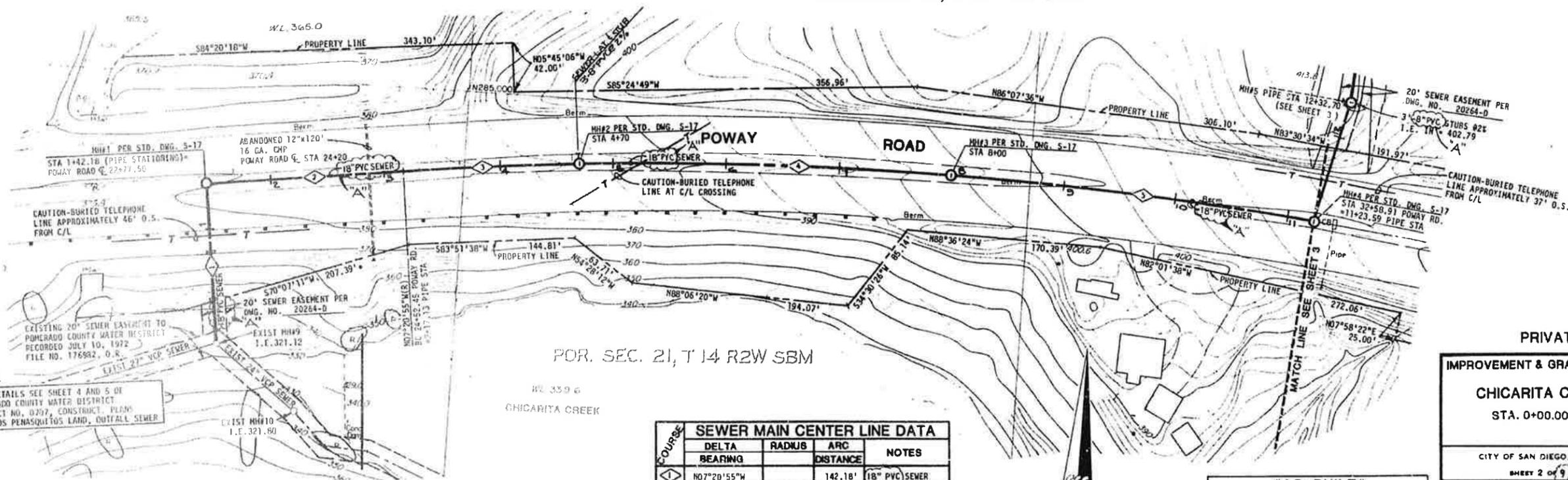
BENCH MARK  
 RANCHO PENASQUITOS BLVD & VIA  
 DEL SUD NEBP, ELEV 522.596  
 DATUM: MEAN SEA LEVEL

"A" CHANGE - SUBSTITUTE 24" PVC FOR 24" VC STA 12+32.70 TO STA 26+00  
 - SUBSTITUTE 18" PVC FOR 21" VC STA 11+23.59 TO STA 12+32.70

CHICARITA CREEK TRUNK SEWER PO 18.02-120.80



POR. SEC. 21, T 14 R2W SBM



POR. SEC. 21, T 14 R2W SBM

COURSE	SEWER MAIN CENTER LINE DATA			NOTES
	DELTA BEARING	RADIUS	ARC DISTANCE	
1	N07°20'55\"W		142.18'	18\" PVC SEWER
2	N82°39'05\"E		174.95'	"
3	D=02°30'09\"	3500'	152.87'	"
4	D=05°24'08\"	3500'	330.00'	"
5	D=05°17'50\"	3500'	523.59'	18\" PVC SEWER



**"AS-BUILT"**  
*Norman S. Kasubuch* 12/18/84  
 NORMAN S. KASUBUCH, RCE 31820 DATE  
**CIVIL DESIGN GROUP, LTD.**

**BENCH MARK**  
 RANCHO PENASQUITOS BLVD & VIA DEL SID, NEBP, ELEV 522.596  
 DATUM: MEAN SEA LEVEL

PRIVATE CONTRACT

IMPROVEMENT & GRADING PLAN FOR:  
**CHICARITA CREEK TRUNK SEWER**  
 STA. 0+00.00 TO STA. 11+23.59

CITY OF SAN DIEGO, CALIFORNIA		SHEET 2 OF 9 SHEETS		T.M. NO. 78-124
C.R. Lockard		2-24-82		W.O. NO. 71427
DESCRIPTION	BY	APPROVED	DATE	FILED
ORIGINAL	EFC			
A CHANGE	EFC			
AS BUILT	CDE			
CONTRACTOR HAM BROS				DATE STARTED 7-14-84
INSPECTOR GARDNER				DATE COMPLETED 10-8-84

"A" CHANGE - SUBSTITUTE 18" PVC FOR 21" VC SEWER FROM STA. 0+00 TO STA. 11+23.59  
 REVISE SEWER PROFILE - STA 1+42.18 TO STA 4+73

NO.	DATE	BY	DESCRIPTION
1	6-7-82	KEN	CITY CORRECTIONS
2	9-9-82	WALL	"A" CHANGE
3	1-27-84	TAG	CITY CORRECTIONS
4	12-8-84	RAMS	CITY CORRECTIONS
5	11-14-84	WALL	CITY CORRECTIONS
6	11-14-84	WALL	CITY CORRECTIONS
7	11-14-84	WALL	CITY CORRECTIONS

PREPARATION AND REVISION LOG

**EFC** E. F. COOK & ASSOCIATES, LTD.  
 PLANNING ENGINEERING ARCHITECTURE

CHICARITA CREEK TRUNK SEWER PO 18.02-120.80

**APPENDIX O**

**CHICARITA TRUNK SEWER  
CALCULATION SPREADSHEET RESULTS  
AND  
FACILITY SEQUENCE NUMBER MAPS**

DATE: 1/28/2020

**SEWER STUDY SUMMARY**

FOR: Chicarita Creek Sewer 2025 WWF per City Model plus Project Flows  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

JOB NUMBER: 736-018

FACILITY SEQUENCE NUMBER	LINE	FROM	TO	EXISTING TRUNK SEWER PEAK FLOW (gpd)	PROJECT PEAK FLOW (gpd)	COMBINED PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	CITY MODEL SLOPE (%)	AS-BUILT DRWAING SLOPE (%)	DEPTH K' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	COMMENTS
							M.G.D.	C.F.S.									
47275	K03N197.1	K03N197	K02N2	1,080,900	385,700	1,466,600	1.467	2.269	18	0.80	-	0.111756	0.50169	0.334	0.2302	4.38	Units 1, 2, 8, and 9/18, 551 dwelling units
47261	K02N2.1	K02N2	K02N5	1,080,800	385,700	1,466,500	1.467	2.269	18	1.70	-	0.076761	0.41308	0.275	0.1759	5.73	
47262	K02N5.1	K02N5	J02N92	1,080,800	385,700	1,466,500	1.467	2.269	18	1.87	-	0.073139	0.40309	0.269	0.1700	5.93	
41235	J02N92.1	J02N92	J02N94	1,089,200	385,700	1,474,900	1.475	2.282	18	1.46	-	0.083367	0.43089	0.287	0.1865	5.44	
41234	J02N94.1	J02N94	J02N95	1,089,200	385,700	1,474,900	1.475	2.282	18	1.16	1.16	0.093430	0.45694	0.305	0.2025	5.01	
41230	J02N95.1	J02N95	J02N78	1,089,100	385,700	1,474,800	1.475	2.282	18	1.15	1.16	0.093423	0.45692	0.305	0.2024	5.01	
41228	J02N78.1	J02N78	J02N97	1,125,200	475,300	1,600,500	1.601	2.477	18	1.45	-	0.090734	0.45009	0.300	0.1983	5.55	Unit 6, 128 dwelling units
41227	J02N97.1	J02N97	J02N77	1,125,100	475,300	1,600,400	1.600	2.476	18	0.70	-	0.130466	0.54456	0.363	0.2575	4.27	
41211	J02N77.1	J02N77	J02N76	1,124,800	475,300	1,600,100	1.600	2.476	18	0.50	-	0.154722	0.59709	0.398	0.2915	3.77	
5473697	J02N76.1	J02N76	J02N464	1,124,500	475,300	1,599,800	1.600	2.475	18	1.12	-	0.102906	0.48050	0.320	0.2170	5.07	
41212	J02N464.1	J02N464	J02N75	2,848,600	475,300	3,323,900	3.324	5.143	18	0.90	-	0.238891	0.76477	0.510	0.4028	5.67	
41213	J02N75.1	J02N75	J02N74	2,848,600	475,300	3,323,900	3.324	5.143	18	1.00	-	0.226696	0.74030	0.494	0.3863	5.92	
41214	J02N74.1	J02N74	J02N73	2,848,600	475,300	3,323,900	3.324	5.143	18	3.10	3.10	0.128801	0.54088	0.361	0.2552	8.96	
41215	J02N73.1	J02N73	J02N72	2,848,300	475,300	3,323,600	3.324	5.143	18	1.96	1.89	0.164941	0.61842	0.412	0.3054	7.48	
41216	J02N72.1	J02N72	J02N143	2,848,100	475,300	3,323,400	3.323	5.142	18	1.91	1.80	0.169004	0.62688	0.418	0.3110	7.35	
41277	J02N143.1	J02N143	J02N142	2,848,000	475,300	3,323,300	3.323	5.142	18	2.28	2.20	0.152866	0.59317	0.395	0.2889	7.91	
41278	J02N142.1	J02N142	J02N141	2,911,200	540,820	3,452,020	3.452	5.341	18	0.79	0.50	0.333073	0.94139	0.628	0.5188	4.58	Unit 5, 78 dwelling units (pumped)
41319	J02N141.1	J02N141	J02N139	2,910,600	540,820	3,451,420	3.451	5.341	18	0.90	0.97	0.239091	0.76517	0.510	0.4031	5.89	
41276	J02N139.1	J02N139	J02N124	2,944,700	540,820	3,485,520	3.486	5.393	18	0.58	0.56	0.317779	0.91271	0.608	0.5005	4.79	
41263	J02N124.1	J02N124	J02N123	2,941,400	540,820	3,482,220	3.482	5.388	18	0.40	0.40	0.375645	1.02567	0.684	0.5724	4.18	
41262	J02N123.1	J02N123	J02N122	2,940,700	540,820	3,481,520	3.482	5.387	18	0.39	0.40	0.375569	1.02551	0.684	0.5723	4.18	
5591280	J02N122.1	J02N122	J02N466	3,688,800	540,820	4,229,620	4.230	6.545	18	1.62	1.63	0.226026	0.73907	0.493	0.3855	7.55	
41260	J02N466.1	J02N466	J02N120	3,688,600	540,820	4,229,420	4.229	6.544	18	1.62	1.63	0.226016	0.73905	0.493	0.3855	7.55	
40870	J02N120.1	J02N120	J01N16	3,710,200	540,820	4,251,020	4.251	6.578	18	1.45	1.45	0.240858	0.76848	0.512	0.4053	7.21	
5344885	J01N16.1	J01N16	J01N346	3,710,100	540,820	4,250,920	4.251	6.578	18	1.45	1.45	0.240852	0.76847	0.512	0.4053	7.21	
5344884	J01N346.1	J01N346	J01N347	3,709,900	540,820	4,250,720	4.251	6.577	18	1.36	1.36	0.248682	0.78315	0.522	0.4151	7.04	
5344889	J01N347.1	J01N347	J01N348	3,709,700	540,820	4,250,520	4.251	6.577	18	1.36	1.36	0.248670	0.78313	0.522	0.4151	7.04	
5344891	J01N348.1	J01N348	J01N349	3,709,500	540,820	4,250,320	4.250	6.577	18	1.36	1.36	0.248659	0.78311	0.522	0.4151	7.04	
5443722	J01N19.1	J01N349	J01N349	247,200	540,820	788,020	0.788	1.219	18	1.00	1.00	0.053764	0.34520	0.230	0.1366	3.97	
40992	J01N349.1	J01N349	J01N396	4,011,400	540,820	4,552,220	4.552	7.044	18	0.47	1.00	0.310581	0.89921	0.599	0.4915	6.37	
40874	J01N396.1	J01N396	J01N20	4,011,300	540,820	4,552,120	4.552	7.044	18	1.17	1.00	0.310574	0.89920	0.599	0.4915	6.37	
40993	J01N20.1	J01N20	J01N384	4,011,200	540,820	4,552,020	4.552	7.044	18	0.99	1.00	0.310567	0.89919	0.599	0.4915	6.37	
40875	J01N384.1	J01N384	J01N385	4,011,100	540,820	4,551,920	4.552	7.043	18	0.99	1.00	0.310560	0.89918	0.599	0.4915	6.37	
40994	J01N385.1	J01N385	J01N146	4,011,100	540,820	4,551,920	4.552	7.043	18	0.99	1.00	0.310560	0.89918	0.599	0.4915	6.37	
40995	J01N146.1	J01N146	J01N387	4,010,900	540,820	4,551,720	4.552	7.043	18	1.37	1.00	0.310547	0.89915	0.599	0.4914	6.37	
40996	J01N387.1	J01N387	J01N123	4,010,600	540,820	4,551,420	4.551	7.043	18	1.48	1.46	0.256993	0.79874	0.532	0.4255	7.36	
40983	J01N123.1	J01N123	J01N122	4,098,100	540,820	4,638,920	4.639	7.178	18	7.57	7.67	0.114280	0.50761	0.338	0.2340	13.63	
40934	J01N122.1	J01N122	J01N76	4,097,900	540,820	4,638,720	4.639	7.178	18	4.46	4.54	0.148533	0.58400	0.389	0.2830	11.27	
40935	J01N76.1	J01N76	J01N77	4,141,500	540,820	4,682,320	4.682	7.245	18	2.71	2.86	0.188899	0.66700	0.445	0.3375	9.54	
40944	J01N77.1	J01N77	J01N84	4,476,500	540,820	5,017,320	5.017	7.763	18	1.48	1.50	0.279497	0.84093	0.561	0.4536	7.61	
40945	J01N84.1	J01N84	J01N85	4,475,500	540,820	5,016,320	5.016	7.762	24	0.84	1.50	0.129754	0.72398	0.362	0.2565	7.56	
41055	J01N85.1	J01N85	J01S39	4,475,100	540,820	5,015,920	5.016	7.761	24	0.34	0.35	0.268595	1.09399	0.547	0.4400	4.41	
41057	J01S39.1	J01S39	J01S41	4,473,900	540,820	5,014,720	5.015	7.759	24	0.35	0.35	0.268531	1.09383	0.547	0.4399	4.41	
5525948	J01S41.1	J01S41	J01S43	4,473,300	540,820	5,014,120	5.014	7.759	24	0.34	0.35	0.268499	1.09375	0.547	0.4399	4.41	
5017845	J01S43.1	J01S43	J01SD6	4,473,000	540,820	5,013,820	5.014	7.758	24	0.34	0.35	0.268483	1.09371	0.547	0.4399	4.41	
41062	J01SD6.1	J01SD6	J01S45	4,549,000	540,820	5,089,820	5.090	7.876	24	0.35	0.35	0.272552	1.10388	0.552	0.4449	4.43	
41064	J01S45.1	J01S45	J01S48	4,596,000	540,820	5,136,820	5.137	7.948	18	6.38	6.82	0.134200	0.55279	0.369	0.2628	13.44	
41066	J01S48.1	J01S48	J01S49	4,595,900	540,820	5,136,720	5.137	7.948	18	2.45	2.58	0.218186	0.72420	0.483	0.3755	9.41	
41067	J01S49.1	J01S49	J01S50	4,595,400	540,820	5,136,220	5.136	7.947	18	2.66	2.73	0.212087	0.71247	0.475	0.3677	9.61	
41048	J01S50.1	J01S50	J01S37	4,602,700	540,820	5,143,520	5.144	7.959	18	1.29	1.30	0.307780	0.89396	0.596	0.4880	7.25	
41047	J01S37.1	J01S37	J01S292	4,603,400	540,820	5,144,220	5.144	7.960	18	32.14	42.40	0.053900	0.34562	0.230	0.1368	25.85	

Note:  
 See Appendix K for as-built drawings

Min Slope
0.35

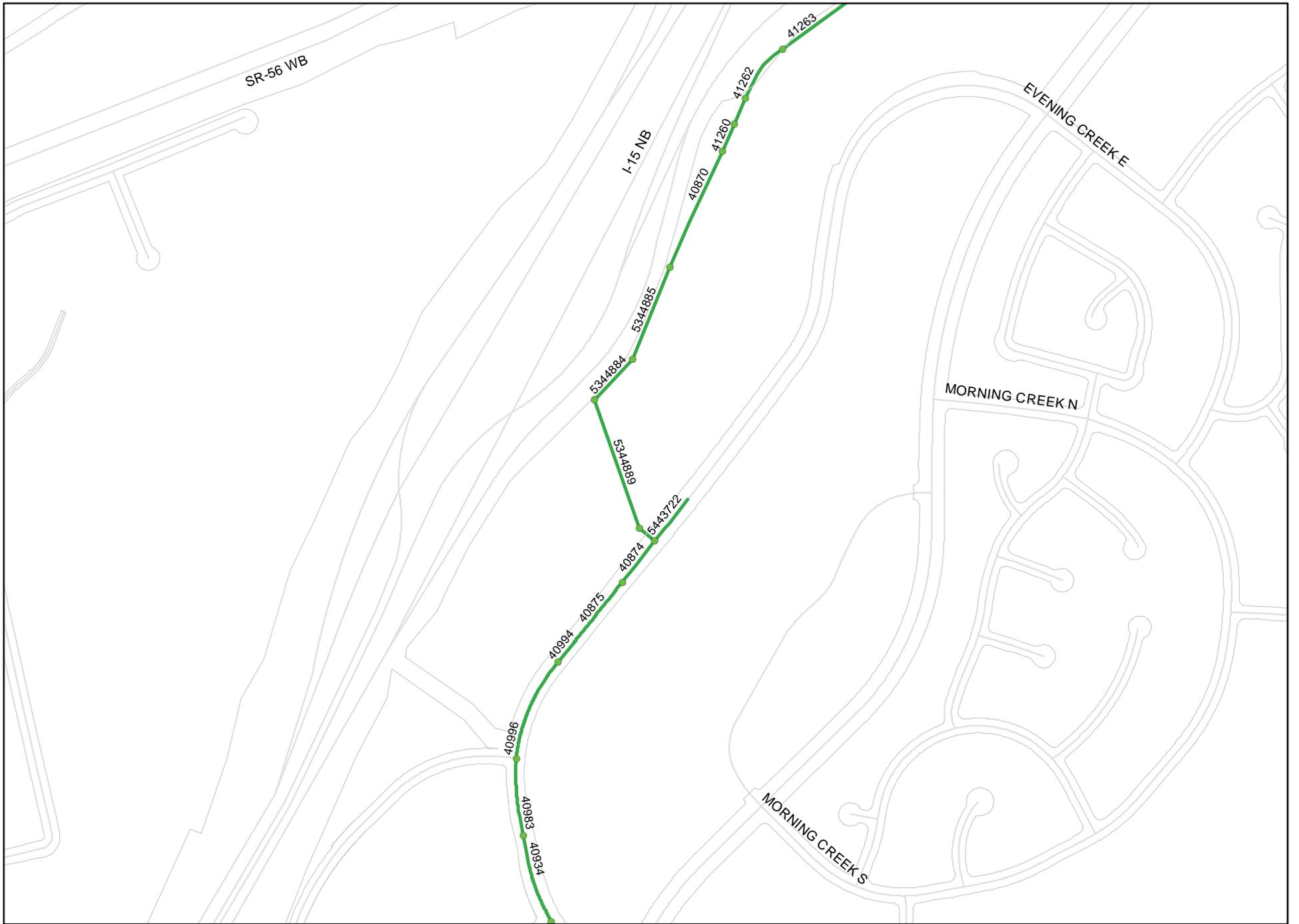
Max dn/D
0.68

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D



CHICARITA TS (#90) MAP 1 (UPSTREAM)





CHICARITA TS (#90) MAP 3 (MID SECTION)



CHICARITA TS (#90) MAP 4 (DOWNSTREAM)

**APPENDIX P**

**UNIT 10 SEWER SERVICE ALTERNATIVE  
EXISTING PLUS PROPOSED FLOW  
CALCULATION SPREADSHEET RESULTS  
EXISTING SEWER SYSTEM  
AND  
FIGURE P-1**

DATE: 11/12/2020

**SEWER STUDY SUMMARY**

JOB NUMBER: 736-018

FOR: The Trails at CMR - Unit 10 Pump Alternative - Existing plus Proposed Flow - Existing System  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																							
	196	192	1.69	4	3.5	90	6.8	315.0	321.8	80	25,741	3.594	92,516	0.093	0.143	8	3.7	0.028486	0.11213	0.168	0.0872	3.70	Unit 9, 90 dwelling units
	192	188	1.69	4	3.5	0	6.8	0.0	328.5	80	26,282	3.572	93,867	0.094	0.145	8	10.0	0.017604	0.08882	0.133	0.0622	5.25	
	188 <sup>(D)</sup>	184	1.69	0	3.5	0	0.0	0.0	328.5	80	26,282	3.572	194,667	0.195	0.301	8	1.0	0.115451	0.22682	0.340	0.2357	2.88	Unit 10/11, 120 dwelling units (pumped)
	184	180	1.69	11	3.5	0	18.6	0.0	347.1	80	27,769	3.510	198,258	0.198	0.307	8	10.0	0.037182	0.12764	0.191	0.1051	6.57	
	180	172	1.69	11	3.5	0	18.6	0.0	365.7	80	29,256	3.448	201,665	0.202	0.312	8	10.0	0.037821	0.12870	0.193	0.1063	6.60	
	176 <sup>(C)</sup>	172	1.69	8	3.5	123	13.5	430.5	444.0	80	35,522	3.187	113,193	0.113	0.175	8	5.1	0.029639	0.11433	0.171	0.0896	4.40	Unit 17, 120 dwelling units, 0.27 comm acres
	172	168	1.69	8	3.5	0	13.5	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	10.0	0.052441	0.15147	0.227	0.1341	7.26	
	168	164	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	4.9	0.074763	0.18117	0.272	0.1727	5.64	
	164	162	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	5.0	0.074162	0.18044	0.271	0.1717	5.67	
	162	158	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	4.7	0.076411	0.18317	0.275	0.1753	5.55	
	158	154	1.69	380	3.5	0	642.2	0.0	1465.4	80	117,235	2.387	380,630	0.381	0.589	8	5.8	0.093492	0.20315	0.305	0.2026	6.54	
	154	150	1.69	0	3.5	0	0.0	0.0	1465.4	80	117,235	2.387	380,630	0.381	0.589	8	1.8	0.170643	0.28013	0.420	0.3132	4.23	
	150	124	1.69	148	3.5	0	250.1	0.0	1715.6	80	137,245	2.337	421,526	0.422	0.652	8	3.7	0.130674	0.24223	0.363	0.2578	5.69	
	144 <sup>(B)</sup>	140	1.69	1,259.6	3.5	123	2128.7	430.5	2559.2	80	204,738	2.204	451,258	0.451	0.698	12	0.4	0.143524	0.38218	0.382	0.2760	2.53	Unit 16, 123 dwelling units
	140	136	1.69	25	3.5	0	42.3	0.0	2601.5	80	208,118	2.199	457,737	0.458	0.708	12	0.4	0.145584	0.38512	0.385	0.2789	2.54	
	136	132	1.69	18	3.5	0	30.4	0.0	2631.9	80	210,552	2.189	460,818	0.461	0.713	12	0.4	0.146564	0.38652	0.387	0.2802	2.54	
	132	128	1.69	18	3.5	0	30.4	0.0	2662.3	80	212,985	2.183	464,848	0.465	0.719	12	3.9	0.047108	0.21524	0.215	0.1242	5.79	
	128	124	1.69	5	3.5	0	8.5	0.0	2670.8	80	213,661	2.181	465,962	0.466	0.721	12	0.8	0.103508	0.32130	0.321	0.2179	3.31	
	124	120	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	12	11.7	0.047792	0.21680	0.217	0.1255	10.03	
	120	116	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	12	0.4	0.258697	0.53462	0.535	0.4276	2.94	
	116	112	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	12	0.4	0.258697	0.53462	0.535	0.4276	2.94	
	112	108	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	12	0.4	0.258697	0.53462	0.535	0.4276	2.94	
	108	104	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	12	0.4	0.258697	0.53462	0.535	0.4276	2.94	
	104	100	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	12	0.4	0.258697	0.53462	0.535	0.4276	2.94	

Total EDUS  
1,891.6

Total EDUS  
246

Min Slope  
0.40

Max dn/D  
0.53

- Notes:
- A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU.
  - B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.
  - C. 0.27 proposed commercial acres converted to EDUs (0.27 acres \* 3,056 gpd/acre / 280 gpd/EDU = 2.95 EDUs; use 3 EDUs).
  - D. 70 gpm of pumped flow added to peak flow (Unit 10: 120DU \* 280 gpd/DU \* 3.0 PF = 100,800 gpd = 70 gpm).

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D

DATE: 11/12/2020

**SEWER STUDY SUMMARY**

JOB NUMBER: 736-018

FOR: The Trails at CMR - Unit 10 Pump Alternative - Existing plus Proposed Flow - Proposed System  
 BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1  
 REFER TO PLAN SHEET:

LINE	FROM	TO	EXISTING POP. PER D.U. <sup>(A)</sup>	EXISTING IN-LINE EDUs	PROJECT POP. PER D.U.	PROJECT 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' <sup>(1)</sup>	dn (feet)	dn/D <sup>(2)</sup>	C <sub>a</sub> for Velocity <sup>(3)</sup>	VELOCITY (f.p.s.)	NOTES
							EX. IN-LINE	PROJECT	TOTAL					M.G.D.	C.F.S.								
<b>PO5 SUB-BASIN</b>																							
	196	192	1.69	4	3.5	90	6.8	315.0	321.8	80	25,741	3.594	92,516	0.093	0.143	8	3.7	0.028486	0.11213	0.168	0.0872	3.70	Unit 9, 90 dwelling units
	192	188	1.69	4	3.5	0	6.8	0.0	328.5	80	26,282	3.572	93,867	0.094	0.145	8	10.0	0.017604	0.08882	0.133	0.0622	5.25	
	188 <sup>(D)</sup>	184	1.69	0	3.5	0	0.0	0.0	328.5	80	26,282	3.572	194,667	0.195	0.301	8	1.0	0.115451	0.22682	0.340	0.2357	2.88	Unit 10/11, 120 dwelling units (pumped)
	184	180	1.69	11	3.5	0	18.6	0.0	347.1	80	27,769	3.510	198,258	0.198	0.307	8	10.0	0.037182	0.12764	0.191	0.1051	6.57	
	180	172	1.69	11	3.5	0	18.6	0.0	365.7	80	29,256	3.448	201,665	0.202	0.312	8	10.0	0.037821	0.12870	0.193	0.1063	6.60	
	176 <sup>(C)</sup>	172	1.69	8	3.5	123	13.5	430.5	444.0	80	35,522	3.187	113,193	0.113	0.175	8	5.1	0.029639	0.11433	0.171	0.0896	4.40	Unit 17, 120 dwelling units, 0.27 comm acres
	172	168	1.69	8	3.5	0	13.5	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	10.0	0.052441	0.15147	0.227	0.1341	7.26	
	168	164	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	4.9	0.074763	0.18117	0.272	0.1727	5.64	
	164	162	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	5.0	0.074162	0.18044	0.271	0.1717	5.67	
	162	158	1.69	0	3.5	0	0.0	0.0	823.2	80	65,859	2.715	279,617	0.280	0.433	8	4.7	0.076411	0.18317	0.275	0.1753	5.55	
	158	154	1.69	380	3.5	0	642.2	0.0	1465.4	80	117,235	2.387	380,630	0.381	0.589	8	5.8	0.093492	0.20315	0.305	0.2026	6.54	
	154	150	1.69	0	3.5	0	0.0	0.0	1465.4	80	117,235	2.387	380,630	0.381	0.589	8	1.8	0.170643	0.28013	0.420	0.3132	4.23	
	150	124	1.69	148	3.5	0	250.1	0.0	1715.6	80	137,245	2.337	421,526	0.422	0.652	8	3.7	0.130674	0.24223	0.363	0.2578	5.69	
	144 <sup>(B)</sup>	140	1.69	1,259.6	3.5	123	2128.7	430.5	2559.2	80	204,738	2.204	451,258	0.451	0.698	12	0.4	0.143524	0.38218	0.382	0.2760	2.53	Unit 16, 123 dwelling units
	140	136	1.69	25	3.5	0	42.3	0.0	2601.5	80	208,118	2.199	457,737	0.458	0.708	12	0.4	0.145584	0.38512	0.385	0.2789	2.54	
	136	132	1.69	18	3.5	0	30.4	0.0	2631.9	80	210,552	2.189	460,818	0.461	0.713	12	0.4	0.146564	0.38652	0.387	0.2802	2.54	
	132	128	1.69	18	3.5	0	30.4	0.0	2662.3	80	212,985	2.183	464,848	0.465	0.719	12	3.9	0.047108	0.21524	0.215	0.1242	5.79	
	128	124	1.69	5	3.5	0	8.5	0.0	2670.8	80	213,661	2.181	465,962	0.466	0.721	12	0.8	0.103508	0.32130	0.321	0.2179	3.31	
	124	120	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	15	11.7	0.026359	0.20242	0.162	0.0825	9.76	
	120	116	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	15	0.4	0.142680	0.47621	0.381	0.2748	2.93	
	116	112	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	15	0.4	0.142680	0.47621	0.381	0.2748	2.93	
	112	108	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	15	0.4	0.142680	0.47621	0.381	0.2748	2.93	
	108	104	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	15	0.4	0.142680	0.47621	0.381	0.2748	2.93	
	104	100	1.69	0	3.5	0	0.0	0.0	4386.3	80	350,906	2.031	813,379	0.813	1.259	15	0.4	0.142680	0.47621	0.381	0.2748	2.93	

Total EDUS  
1,891.6

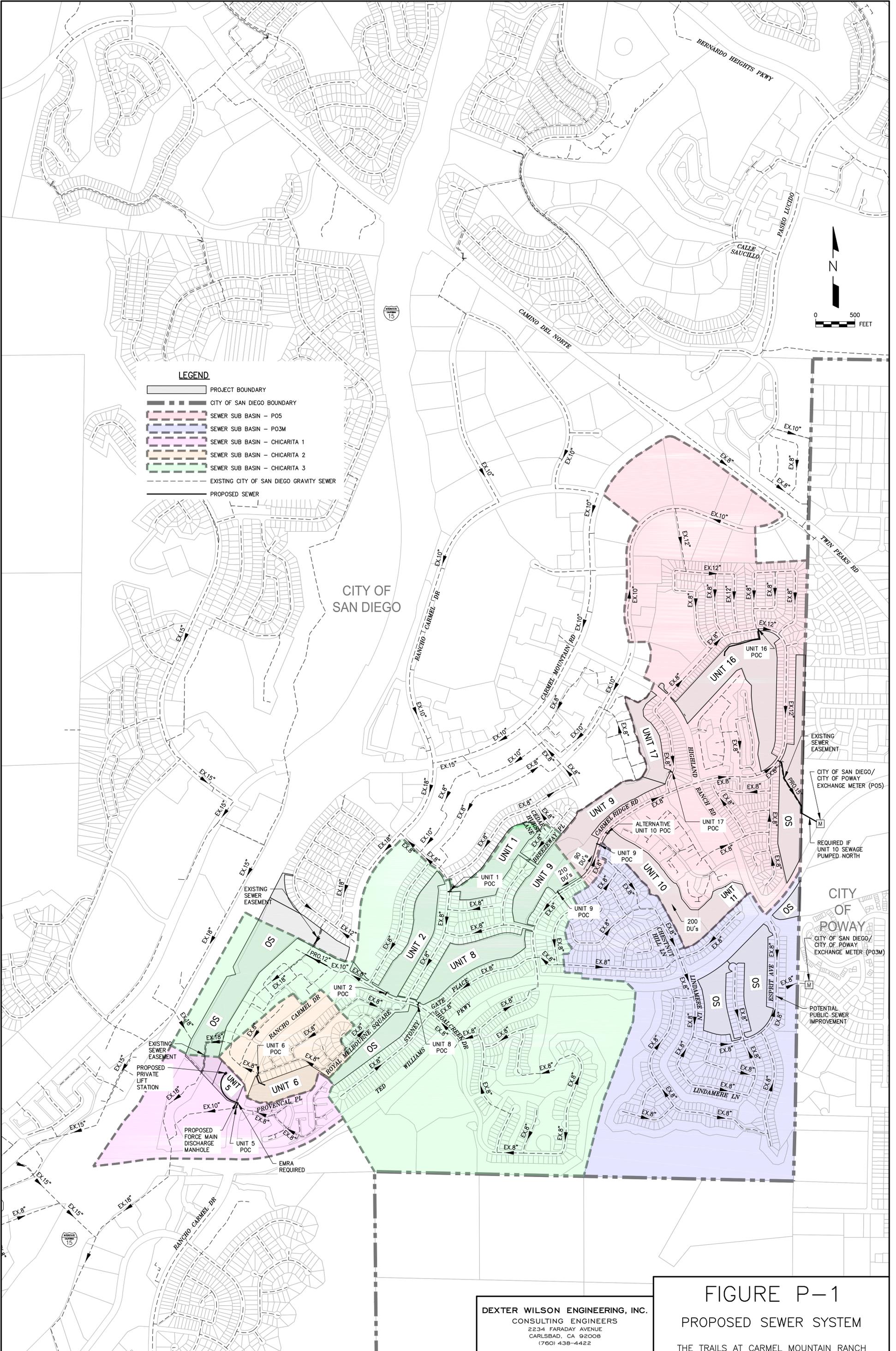
Total EDUS  
246

Min Slope  
0.40

Max dn/D  
0.42

- Notes:
- A. Based on City sewer flow meter data. PO5 Sub-Basin = 135 gpd/DU / 80 gpcpd = 1.69 persons/DU.
  - B. 857.6 EDUs added to account for non-residential land use upstream of Manhole 144.
  - C. 0.27 proposed commercial acres converted to EDUs (0.27 acres \* 3,056 gpd/acre / 280 gpd/EDU = 2.95 EDUs; use 3 EDUs).
  - D. 70 gpm of pumped flow added to peak flow (Unit 10: 120DU \* 280 gpd/DU \* 3.0 PF = 100,800 gpd = 70 gpm).

1 K' based on n = 0.013  
 2 dn/D using K' in Brater King Table 7-14  
 3 From Brater King Table 7-4 based on dn/D



**LEGEND**

- PROJECT BOUNDARY
- CITY OF SAN DIEGO BOUNDARY
- SEWER SUB BASIN - P05
- SEWER SUB BASIN - P03M
- SEWER SUB BASIN - CHICARITA 1
- SEWER SUB BASIN - CHICARITA 2
- SEWER SUB BASIN - CHICARITA 3
- EXISTING CITY OF SAN DIEGO GRAVITY SEWER
- PROPOSED SEWER

CITY OF SAN DIEGO



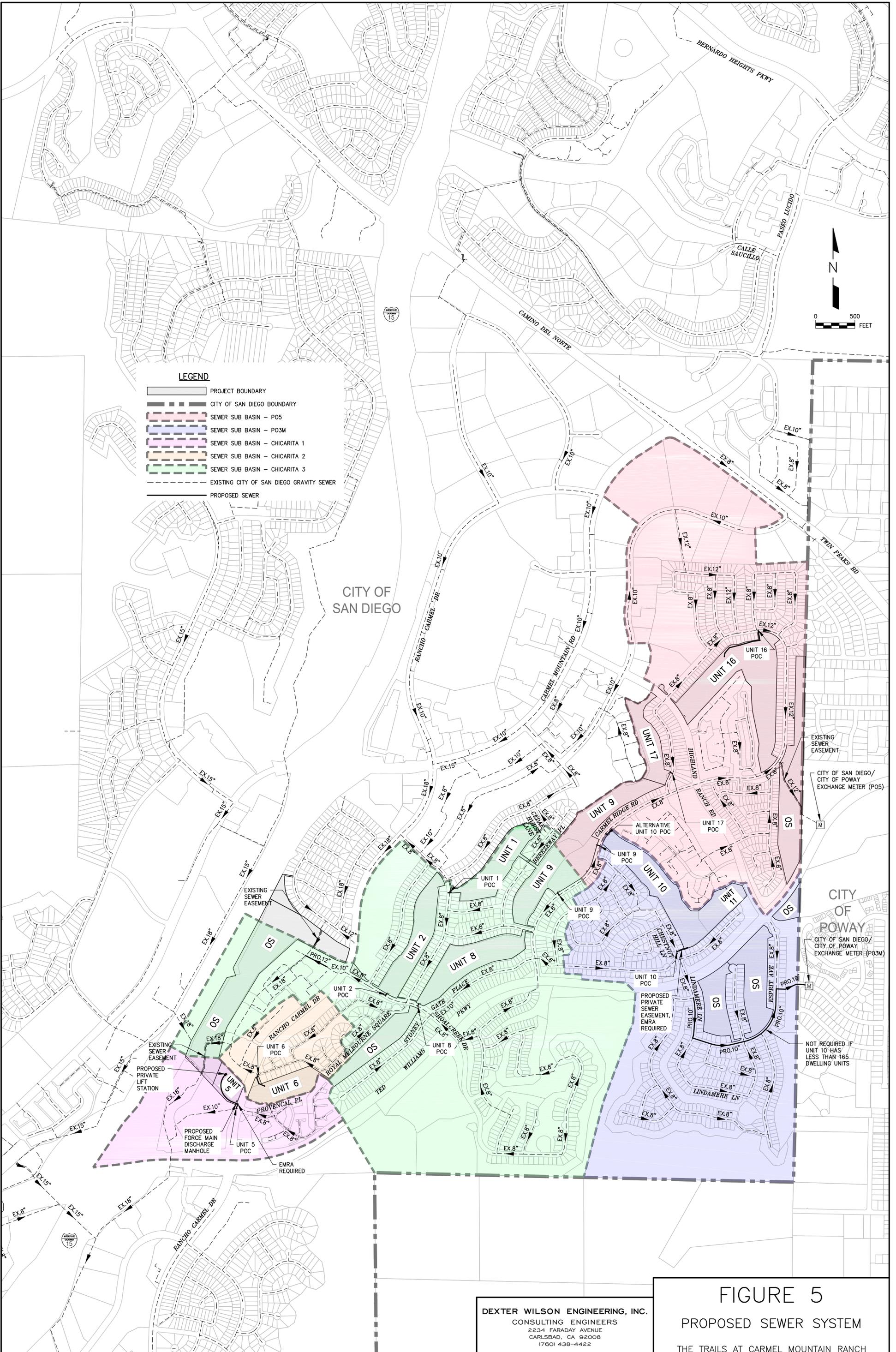
**FIGURE P-1**

**PROPOSED SEWER SYSTEM**

THE TRAILS AT CARMEL MOUNTAIN RANCH

DEXTER WILSON ENGINEERING, INC.  
 CONSULTING ENGINEERS  
 2234 FARADAY AVENUE  
 CARLSBAD, CA 92008  
 (760) 438-4422





**LEGEND**

- PROJECT BOUNDARY
- CITY OF SAN DIEGO BOUNDARY
- SEWER SUB BASIN - PO5
- SEWER SUB BASIN - PO3M
- SEWER SUB BASIN - CHICARITA 1
- SEWER SUB BASIN - CHICARITA 2
- SEWER SUB BASIN - CHICARITA 3
- EXISTING CITY OF SAN DIEGO GRAVITY SEWER
- PROPOSED SEWER

CITY OF SAN DIEGO



EXISTING SEWER EASEMENT  
CITY OF SAN DIEGO/  
CITY OF POWAY  
EXCHANGE METER (PO5)

CITY OF POWAY  
CITY OF SAN DIEGO/  
CITY OF POWAY  
EXCHANGE METER (PO3M)

EXISTING SEWER EASEMENT  
PROPOSED PRIVATE LIFT STATION  
PROPOSED FORCE MAIN DISCHARGE MANHOLE  
EMRA REQUIRED

PROPOSED PRIVATE SEWER EASEMENT, EMRA REQUIRED

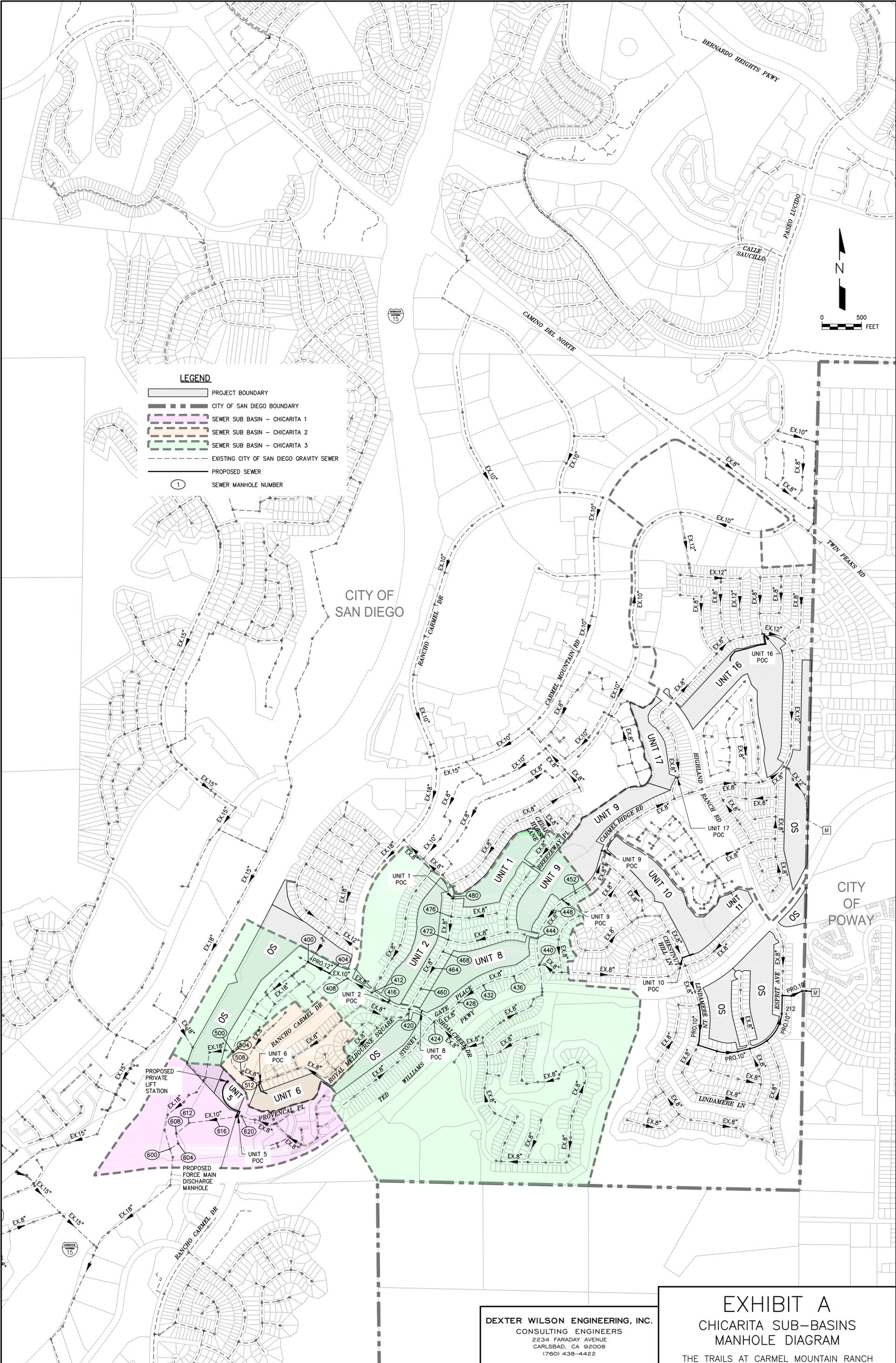
NOT REQUIRED IF UNIT 10 HAS LESS THAN 165 DWELLING UNITS

**DEXTER WILSON ENGINEERING, INC.**  
CONSULTING ENGINEERS  
2234 FARADAY AVENUE  
CARLSBAD, CA 92008  
(760) 438-4422

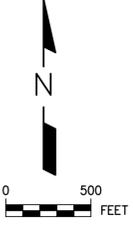
**FIGURE 5**  
**PROPOSED SEWER SYSTEM**  
THE TRAILS AT CARMEL MOUNTAIN RANCH

**EXHIBIT A**

**CHICARITA SUB-BASINS  
MANHOLE DIAGRAM**



CITY OF SAN DIEGO



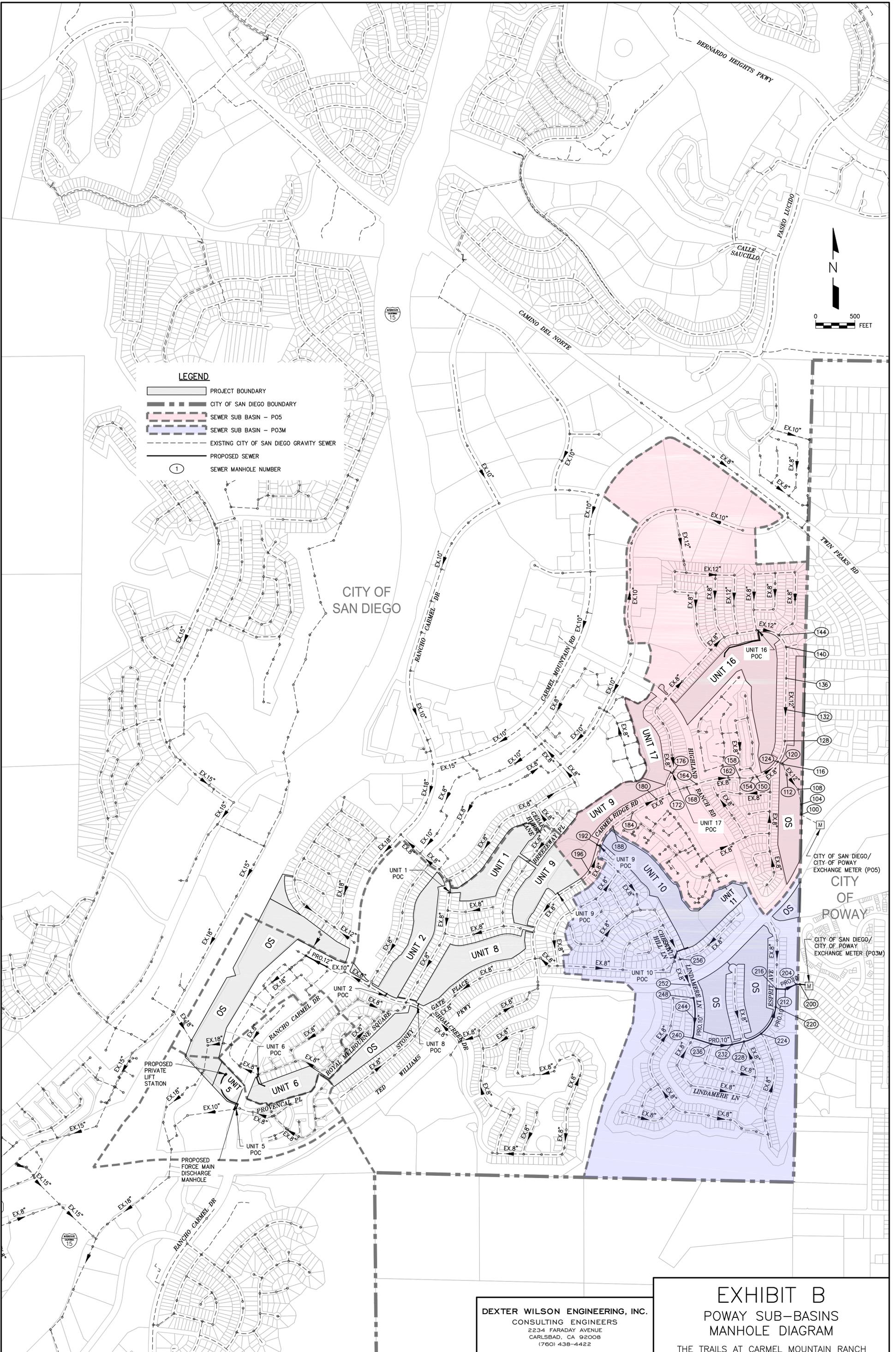
- LEGEND**
- PROJECT BOUNDARY
  - CITY OF SAN DIEGO BOUNDARY
  - SEWER SUB BASIN - CHICARITA 1
  - SEWER SUB BASIN - CHICARITA 2
  - SEWER SUB BASIN - CHICARITA 3
  - EXISTING CITY OF SAN DIEGO GRAVITY SEWER
  - PROPOSED SEWER
  - SEWER MANHOLE NUMBER

**EXHIBIT A**  
**CHICARITA SUB-BASINS**  
**MANHOLE DIAGRAM**  
 THE TRAILS AT CARMEL MOUNTAIN RANCH

DEXTER WILSON ENGINEERING, INC.  
 CONSULTING ENGINEERS  
 2234 FARADAY AVENUE  
 CARLSBAD, CA 92008  
 (760) 438-4422

**EXHIBIT B**

**POWAY SUB-BASINS  
MANHOLE DIAGRAM**



**LEGEND**

- PROJECT BOUNDARY
- CITY OF SAN DIEGO BOUNDARY
- SEWER SUB BASIN - PO5
- SEWER SUB BASIN - PO3M
- EXISTING CITY OF SAN DIEGO GRAVITY SEWER
- PROPOSED SEWER
- SEWER MANHOLE NUMBER



CITY OF SAN DIEGO

CITY OF SAN DIEGO/  
CITY OF POWAY  
EXCHANGE METER (PO5)  
**CITY OF POWAY**

CITY OF SAN DIEGO/  
CITY OF POWAY  
EXCHANGE METER (PO3M)

**DEXTER WILSON ENGINEERING, INC.**  
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**EXHIBIT B**  
**POWAY SUB-BASINS**  
**MANHOLE DIAGRAM**  
 THE TRAILS AT CARMEL MOUNTAIN RANCH