3Roots San Diego Project
Environmental Impact Report

SCH No. 2018041065; Project No. 587128

Appendix O

Sewer Study

June 2019

DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

SEWER STUDY
FOR THE
3ROOTS PROJECT IN THE
CITY OF SAN DIEGO

December 20, 2018

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

From: Itkin, Irina
To: Andrew Oven
Subject: FW: 3-Roots sewer study PTS #587128
Date: Wednesday, May 01, 2019 3:03:35 PM

Andrew,
See the e-mail below dated April 26.
I sanded to you, but attachment with subject is too big.
I detached the attachment and send to you again.

Thank you,

Irina Itkin
Assistant Engineer-Civil
Water and Sewer Development Review
Development Services
1222 First Avenue, MS 401
San Diego CA 92101
(619) 446-5422

From: Itkin, Irina
Sent: Friday, April 26, 2019 3:34 PM
To: Andrew Oven <Andrew@dwilsoneng.com>
Cc: Wilson, Leonard <LLWilson@sandiego.gov>; Zounes, WilliamJ. <WZounes@sandiego.gov>
Subject: 3-Roots PTS #587128

Andrew,

We have completed our review of the revised 3-Roots sewer study, dated December 20, 2018 The subject sewer study is accepted by the Water and Sewer Development Review Section of the Development Services Department.

Copy attached.

Thank you,

Irina Itkin
Assistant Engineer-Civil
Water and Sewer Development Review
Development Services
1222 First Avenue, MS 401
San Diego CA 92101
(619) 446-5422

SEWER STUDY
FOR THE
3ROOTS PROJECT IN THE
CITY OF SAN DIEGO

December 20, 2018

Prepared for:

3ROOTS
by Mesa Canyon Community Partners

12-20-2018

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
760-438-4422

Job No. 537-012

TABLE OF CONTENTS

PAGE NO.

APPENDICES

LIST OF TABLES

PAGE NO.

LIST OF FIGURES

EXHIBITS

DEXTER WILSON ENGINEERING, INC.

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ANDREW M. OVEN, P.E.
STEPHEN M. NIELSEN, P.E.
NATALIE J. FRASCHETTI, P.E.
STEVEN J. HENDERSON, P.E.

December 20, 2018 537-012

Project Design Consultants
701 B Street, Suite 800
San Diego, CA 92101

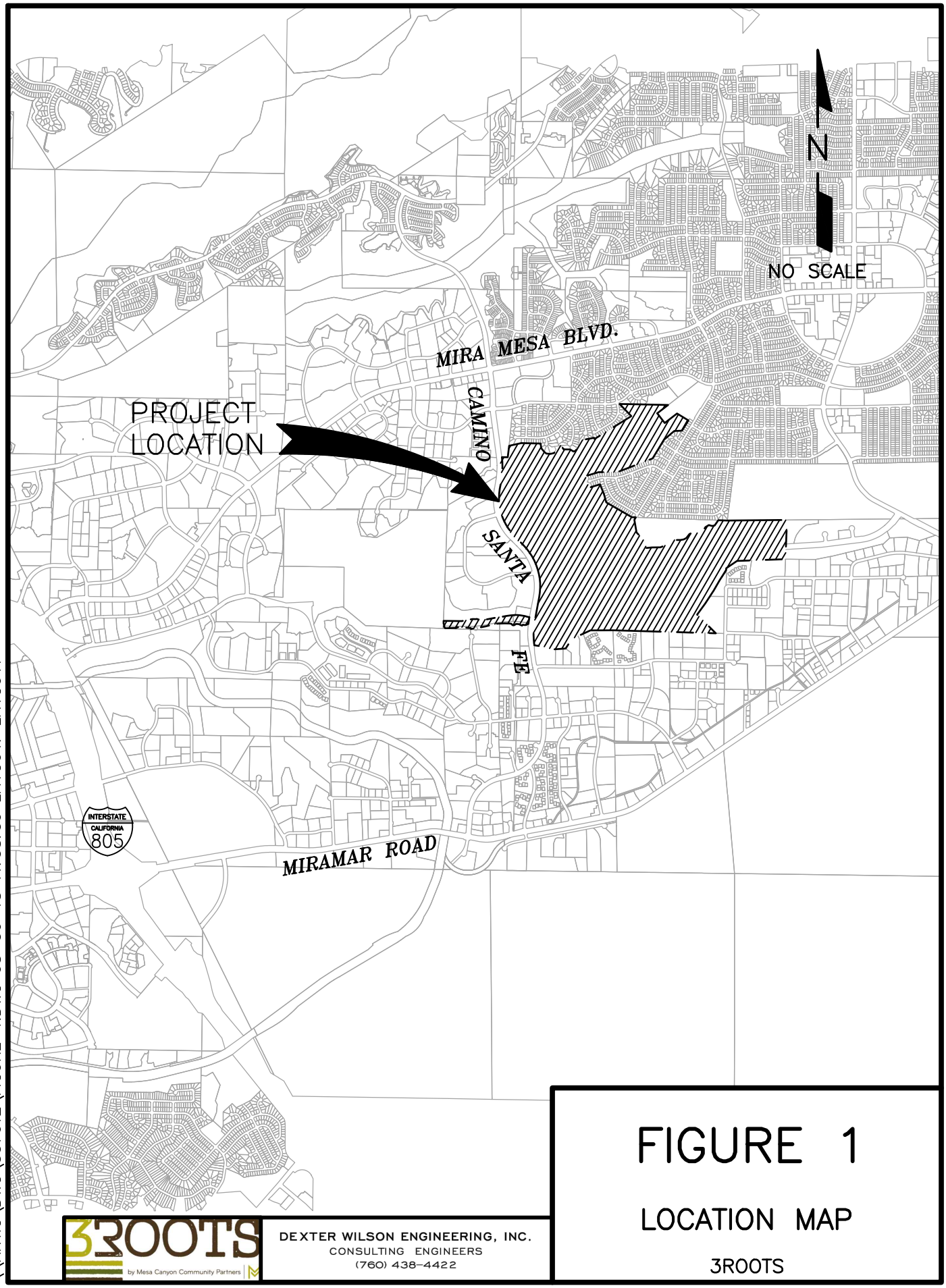
Attention: Greg Shields, P.E., Chief Executive Officer

Subject: Sewer Study for the 3Roots Project in the City of San Diego

Introduction

The 3Roots project is located in the City of San Diego, east of Camino Santa Fe, south of Mira Mesa Boulevard, and north of Miramar Road. Access to the project will be from Camino Santa Fe on the west and Carroll Canyon Road on the east. Public and private streets and drives will provide access throughout the project. As part of the project, Carroll Canyon Road will be constructed from the easterly terminus to the intersection with Camino Santa Fe. Figure 1 provides a vicinity map for the project.

The project encompasses approximately 412.9 acres and proposes to develop the site with a maximum of 1,800 residential dwelling units, a 10.8 acre commercial area, a 1.7 acre transit center, and several parks totaling 38.7 acres. Elevations on the project range from approximately 258 feet to 334 feet. Topography of the project site slopes generally from a high point on the east end downwards towards the west.



\\ARTIC\DWG\537012\FIGURE-1.DWG 08-30-18 11:38:59 LAYOUT: LAYOUT1

3ROOTS
by Mesa Canyon Community Partners

DEXTER WILSON ENGINEERING, INC.
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FIGURE 1

LOCATION MAP

3ROOTS

The 3Roots project will receive sewer service from the City of San Diego. This letter report will address the sizing of the gravity sewer lines within the 3Roots development, as well as the available capacity of the offsite gravity sewer system downstream of the 3Roots project.

Sewer System Design Criteria

The design criteria used for the evaluation of the onsite and offsite sewerage system impacts by the 3Roots 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 slope of existing sewer lines.

Sewer Generation Rates

Sewage generation estimates were developed in accordance with the Sewer Design Guide and are based on population. Table 1-1 from the Sewer Design Guide was used to estimate the population for the 3Roots project. Section 1.3.2.2 of the Sewer Design Guide uses a generation rate of 80 gallons per capita per day (gpcpd) to determine average dry weather flow (ADWF).

Dwelling unit density, net area, and dwelling unit information for each planning area was provided by the project civil engineer from the 3Roots project Specific Plan document, an excerpt of which is included in Appendix A. This data, along with Table 1-1 in the Sewer Design Guide, was used to determine the population for each planning area.

For residential planning areas, unit density and dwelling unit information was used to estimate population. For the commercial area and transit center, net area and equivalent population factors were used to estimate population. The population estimates and the generation rate of 80 gpcpd were used to estimate the average dry weather flow (ADWF) for each of these planning areas.

Sewage generation for the community park was estimated using a similar approach as described above for the commercial and transit center. Net area was used together with the School/Park Zone category from the City's Design Guide. The net area for the community parks was estimated to be approximately ten percent of the gross area of the parks. Not all community parks will have facilities that generate sewage flow such as restrooms and concession stands.

Table 1 presents the projected average dry weather sewer flows for each planning area within the 3Roots project. Figure 2 presents the project's planning areas.

TABLE 1
3ROOTS PROJECT
AVERAGE DRY WEATHER SEWER FLOWS

Planning Area	Dwelling Unit Density, DU/ac	Net Area, ac	Dwelling Units	Unit Density, Pop./DU	Equivalent Population, Pop./Net ac	Total Population	Average Dry Weather Flow, gpd
PA1	16.2	3.5	56	3.1	-	173.6	13,888
PA2	12.2	6.4	78	3.2	-	249.6	19,968
PA3	5.7	13.7	78	3.5	-	273.0	21,840
PA4	6.5	8.3	54	3.5	-	189.0	15,120
PA5	11.6	12.1	141	3.3	-	465.3	37,224
PA6	8.4	6.3	53	3.5	-	185.5	14,840
PA7	16.2	4.1	66	3.1	-	204.6	16,368
PA8	23.1	5.1	118	3.0	-	354.0	28,320
PA9	14.8	4.6	68	3.1	-	210.8	16,864
PA10	13.5	4.5	61	3.2	-	195.2	15,616
PA11	21.0	4.0	85	3.0	-	255.0	20,400
PA12	43.4	4.2	180	2.4	-	432.00	34,560
PA13	59.0	4.1	243	2.2	-	534.60	42,768
PA14	41.6	4.5	186	2.6	-	483.60	38,688
PA15	17.2	4.4	76	3.0	-	228.0	18,240
PA16	13.0	6.1	80	3.2	-	256.0	20,480
PA17	19.6	4.8	94	3.0	-	282.0	22,560
PA18	12.4	6.7	83	3.2	-	265.6	21,248
PA19	-	10.8	-	-	43.7	472.0	37,757
PA20	-	1.7	-	-	31.2	53.0	4,243
Community Park[1]	-	3.8	-	-	31.2	118.6	9,485
TOTAL		**123.7**	**1,800**			**5,881.0**	**470,477**

1. Net area for the community parks is estimated to be 10 percent of total park acreage.

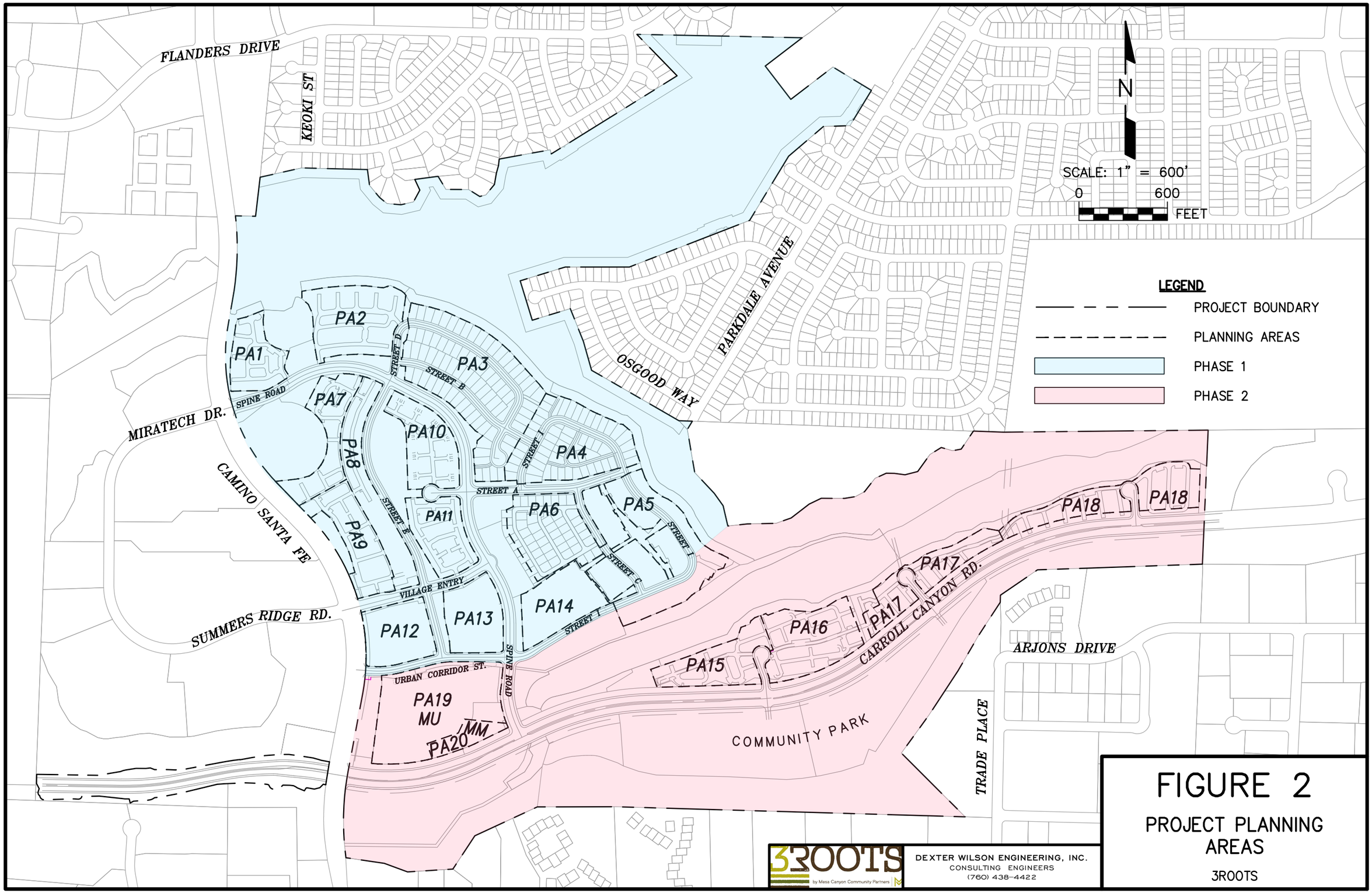

FIGURE 2

PROJECT PLANNING AREAS

3ROOTS

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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 3Roots project. The peaking factor for PDWF is the ratio of PDWF to ADWF. The dry weather peaking factor for the 3Roots project is 1.95 based on a total project population of 5,881 people.

The peak dry weather flow for the 3Roots project is 917,430 gpd.

The peaking factor for peak wet weather flow (PWWF) for the 3Roots project is not being used for the analysis of the onsite gravity sewer system. The onsite system will be sized based on Peak Dry Weather Flow. The analysis of the offsite Carroll Canyon Trunk Sewer System is being provided by the City of San Diego Sewer Modeling Group; they will be using the peaking factors which they have incorporated into their sewer model for PWWF.

Manning's "n"

The gravity sewer analyses are made using a computer program which uses the Manning Equation for all of its calculations. The Manning's "n" used by the computer program is held as a constant for all depths in a circular conduit. The value of Manning's "n" used for this study is 0.013 which 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 larger than 18-inches in diameter 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. At upstream-most segments of gravity sewer, slopes are set a one (1) percent minimum since the desired flow velocity of 2 fps may not be achievable because of few homes connected.

3Roots Project Phasing

The 3Roots project is proposed to be constructed in two phases. The first phase will be the areas north of Carroll Canyon Creek and will include Planning Areas 1 through 14. The second phase includes the areas south of Carroll Canyon Creek including Carroll Canyon Road and Planning Areas 15 through 20. Figure 2 shows the extents of the two development phases.

Phase 1 encompasses a total of 1,467 dwelling units in Planning Areas 1 through 14. Average dry weather flow from Phase 1 will be 336,464 gpd.

Phase 2 includes the balance of the 3Roots development project. Total dwelling units in Phase 2 include 333 units in Planning Areas 15 through 19. Phase 2 also includes Planning Area 19 which is commercial, Planning Area 20 which is transit oriented, and the Community Park south of Carroll Canyon Road. Average dry weather flow from Phase 2 will be 134,013 gpd.

Existing Sewer System

Figure 3 presents the existing sewer facilities in the vicinity of the 3Roots project. The existing public sewer system includes the Carroll Canyon Trunk Sewer #49 and the Mira Mesa Trunk Sewer #42. Camino Santa Fe has existing collector sewers along the west boundary of the 3Roots project site.

Carroll Canyon Trunk Sewer. The Carroll Canyon Trunk sewer is in the southern portion of the project and enters the project boundary on the east as an existing 21-inch diameter line. The 21-inch diameter line increases in size to a 27-inch dimeter line and exits the 3Roots project near the southwest corner of the project boundary.

Mira Mesa Trunk Sewer. The Mira Mesa Trunk Sewer #42 is an existing gravity sewer system that flows through the 3Roots project site. It is located in Parkdale Avenue and extends far to the northeast. Within the 3Roots site, it flows southwest along an existing sewer easement and connects to the Carroll Canyon Trunk Sewer #49 about 1,800 feet east of Camino Santa Fe.

The 3Roots project is proposing to re-align the portion of the Mira Mesa Trunk Sewer that traverses the project site. It will be relocated into proposed public streets and become part of the onsite public sewer collection system. Planning Areas 4, 5, 6, 10, 12, 13, and 14 will flow into the relocated Mira Mesa Trunk Sewer.

The relocated portion of the Mira Mesa Trunk Sewer within the 3Roots project is being sized to accommodate ultimate flows (Year 2050) from its service area (north and east of the 3Roots project) plus the sewer flows contributed by the 3Roots project.

At its new southern terminus, the relocated Mira Mesa Trunk Sewer within the 3Roots project will be connected to the relocated Carroll Canyon Trunk Sewer in Carroll Canyon Road.

\\ARTIC\DWG\537012\SEWER\FIGURE-3-EX-S.DWG 12-12-18 08:24:02 LAYOUT: LAYOUT

MIRA MESA BOULEVARD

FLANDERS DRIVE

MIRATECH DR.

CAMINO SANTA FE

SUMMERS RIDGE ROAD

PARKDALE AVENUE

MESA RIM TRUNK SEWER #104

MIRA MESA TRUNK SEWER #42

CARROLL CANYON TRUNK SEWER #49

REHCO ROAD

TRADE STREET

CARROLL ROAD

ARJONS DRIVE

VULCAN PROPERTY (STONE CREEK)

LEGEND

PROJECT BOUNDARY

EXISTING SEWER

N

SCALE: 1"=800'

0 800 FEET

FIGURE 3

EXISTING SEWER SYSTEM

3ROOTS

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Overview of Proposed Sewer Service

Onsite sewer facilities for the 3Roots project are proposed to be a combination of public and private facilities. The onsite gravity sewer system flows generally east to west.

Sewer Sub-Basins. The project is divided into three sewer sub-basins; a north portion of the 3Roots project flows to Camino Santa Fe at Miratech Drive and flows north to the existing 15-inch Mesa Rim Trunk Sewer #104. Planning Areas 1, 2, and parts of 3, 7, and 8 are within the North Sub-Basin.

The west-central portion of the project connects to Camino Santa Fe at Summers Ridge Road. From this point sewage flows south in Camino Santa Fe and connects to the Carroll Canyon Trunk Sewer. Planning Areas 9, 11, and parts of 7, and 8 comprise what is referred to as the Central Sub-Basin.

The third and largest sub-basin flows south to Carroll Canyon Road and directly into the Carroll Canyon Trunk Sewer at several locations. This sub-basin is called the South Sub-Basin.

Figure 4 shows the sub-basins and the average flow generated within each sub-basin.

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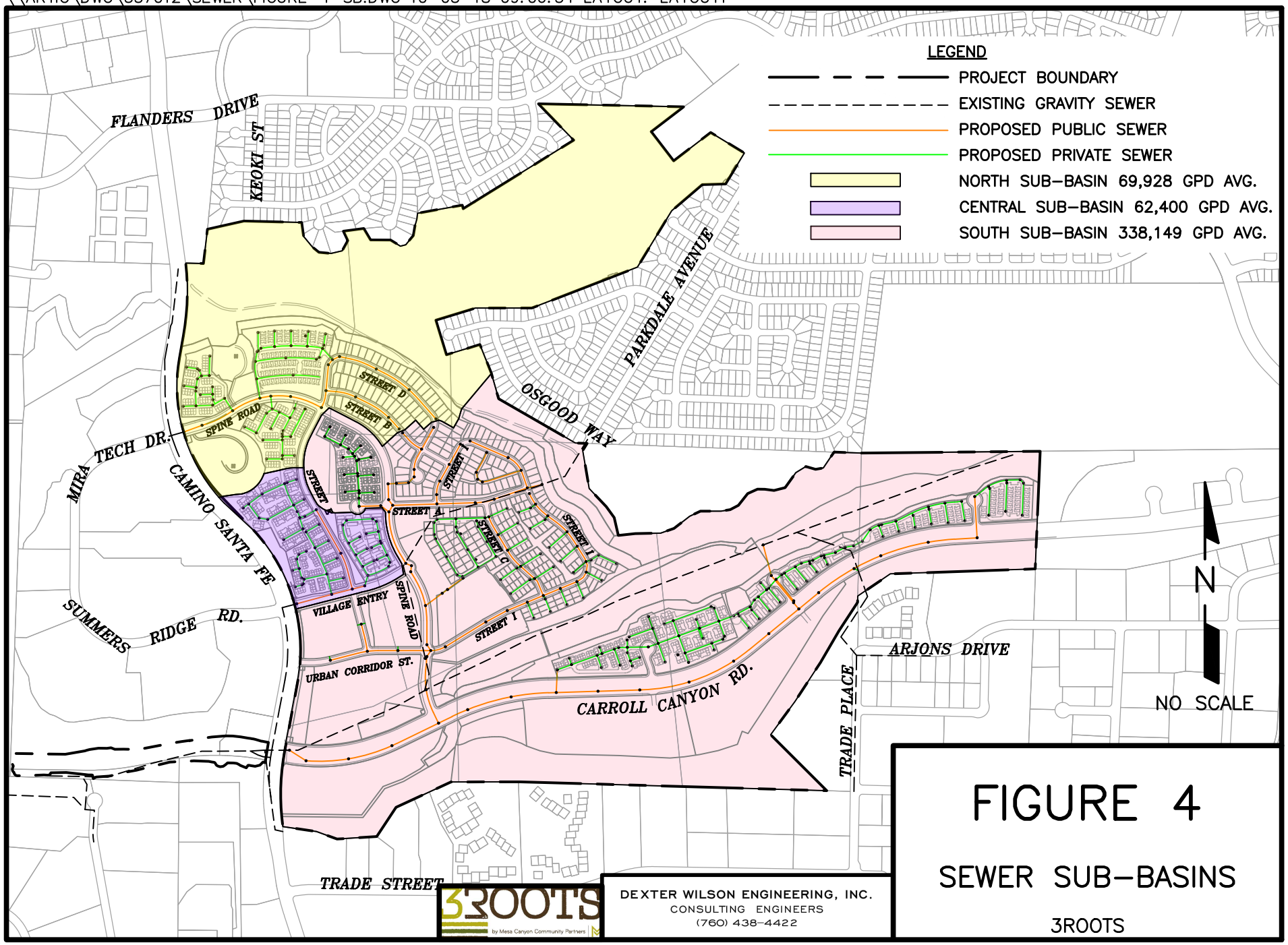

FIGURE 4

SEWER SUB-BASINS

3ROOTS

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Onsite Sewer System. Figure 5 presents the proposed sewer system configuration and pipe sizing for the onsite sewer system to serve the 3Roots project. The project's onsite sewer system will be composed of 8-inch through 30-inch gravity sewer piping. The entire 3Roots project can be served by a gravity sewer system. No public or private sewer lift stations are needed for the 3Roots project.

The onsite sewer system includes the relocation of two existing trunk sewers. The majority of the existing Carroll Canyon Trunk Sewer through the 3Roots project will be relocated into the future Carroll Canyon Road. As it is relocated, it will be installed at its ultimate required pipe size. Only the eastern-most reaches of the existing Carroll Canyon Trunk Sewer are not proposed to be replaced because these segments of the existing trunk sewer are not impacted by the proposed development. Since these eastern-most segments are not in the way of stream bed improvements being done by the 3Roots project and the 3Roots project is not connecting any new flows to these segments, they will remain in place.

The Mira Mesa Trunk Sewer #42 will be relocated within public streets through the 3Roots project. This existing sewer is 30-inch diameter at the east end of Street A where it will be connected to a proposed 24" gravity sewer. The relocation of the Mira Mesa Trunk Sewer will extend all the way to the Carroll Canyon Trunk Sewer. As shown on Figure 5, the downstream-most segments of the existing Mira Mesa Trunk Sewer are 24-inch diameter. The portions of the existing Mira Mesa Trunk Sewer that are being relocated into public streets are proposed to be 24-inch diameter. As will be discussed later, the sewer analysis shows that 24-inch pipe is adequate to convey ultimate peak wet weather flows from the Mira Mesa Trunk Sewer plus the 3Roots project flows.

Onsite Public Sewer System Slopes. For the 3Roots project Tentative Map submittal, onsite sewer line slopes have been calculated. The onsite sewer analysis presented in this report is based on the tentative map sewer slopes. Depth of sewer lines has also been determined based on the tentative map design; manhole inverts, rim elevations, and depths are provided on the exhibits related to the onsite analyses which will be discussed later in this report.

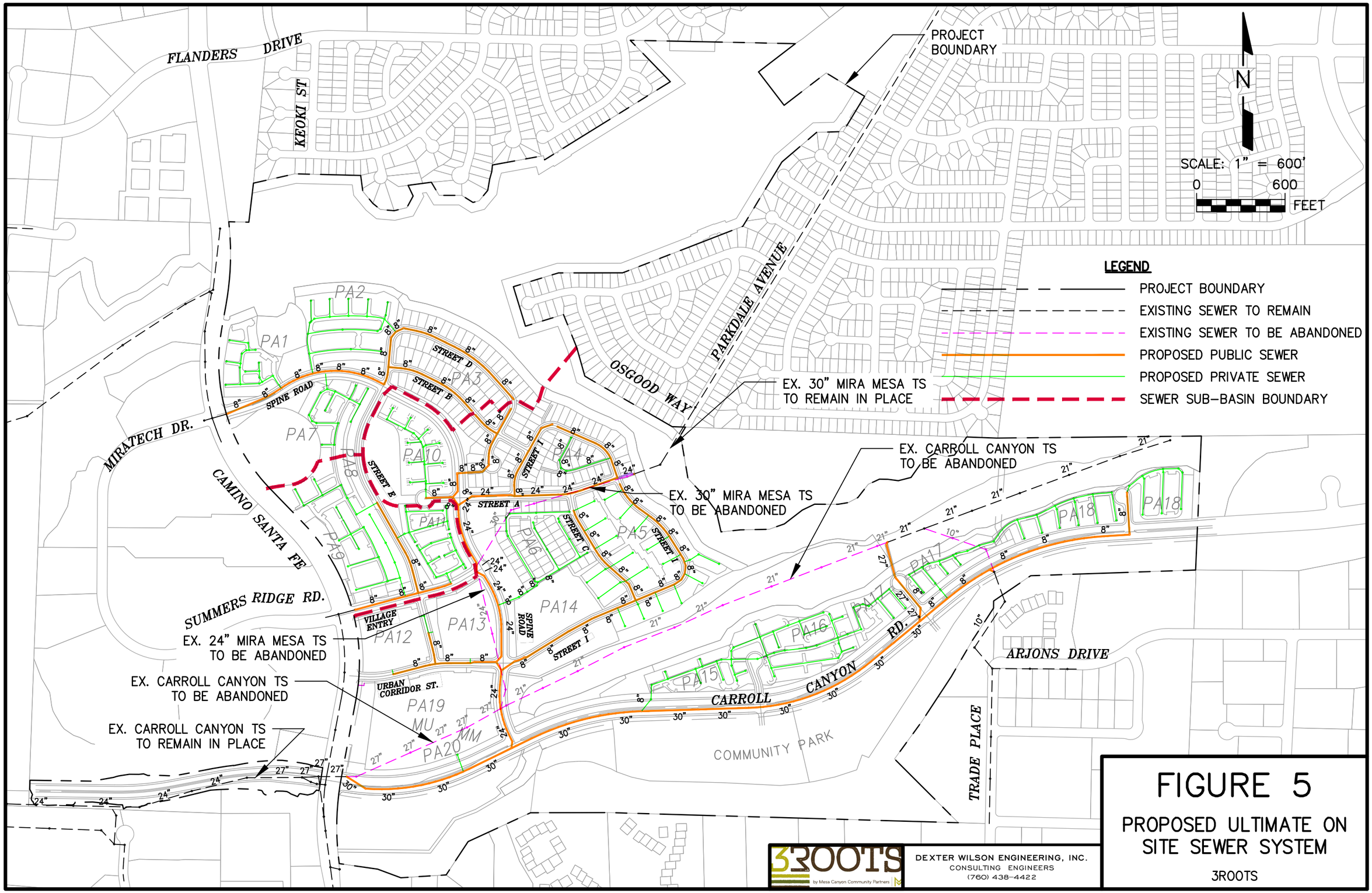

FIGURE 5

PROPOSED ULTIMATE ON SITE SEWER SYSTEM

3ROOTS

3ROOTS by Mesa Canyon Community Partners

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
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Onsite Private Sewer System Slopes. Many of the Planning Areas are proposed to have private onsite sewer systems. 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 the Planning Areas may be designed in accordance with the City of San Diego Sewer Design Guide.

Onsite Sewer System Analysis

The onsite sewer analysis consists of calculating peak dry weather flows within all segments of the onsite public sewer for the 3Roots project. As indicated earlier, gravity sewer slopes for the onsite proposed sewers are based on the tentative map design. Flow in each sewer segment is calculated using the dwelling units in each Planning Area and average sewage flow generated in Table 1.

Offsite Flows Conveyed Through the 3Roots Project. The onsite sewer analysis consists not only of the 3Roots project flows generated from the proposed land uses, but also includes flow in existing sewers which flow through the property. There are two such flow contributors to the 3Roots onsite sewer system. First is the Carroll Canyon Trunk Sewer #49 and second is the Mira Mesa Trunk Sewer #42.

The Year 2050 peak wet weather flow from the Carroll Canyon Trunk Sewer upstream of the 3Roots project is added to the 3Roots onsite system analysis at Planning Area 17 (see Figures 2 and 5) where the existing Carroll Canyon Trunk Sewer is being diverted south through Planning Area 17 into its new alignment in Carroll Canyon Road. The Year 2050 peak wet weather flow from the Mira Mesa Trunk Sewer is added to the 3Roots onsite system at the east end of Street A located between Planning Area 4 and Planning Area 5 (see Figures 2 and 5).

The City of San Diego provided sewer model output data that was used as the basis for flows upstream of the 3Roots project. The City model data for peak wet weather flow in the Carroll Canyon TS and the Mira Mesa TS are provided in Appendix B. Also in Appendix B are the City model peak wet weather flows for the Mesa Rim Trunk Sewer #104. The flows in this trunk sewer are used to model the offsite Mesa Rim Trunk Sewer to ensure adequate capacity for the 3Roots North Sub-Basin.

The Year 2050 PWWF scenarios were used for flow in the existing trunk sewers so that the gravity sewer line sizes through the 3Roots project would be based on ultimate expected offsite sewer flows.

Onsite Analysis. The 3Roots project onsite sewer analyses are divided into three separate analyses corresponding to the three sub-basins within the project as shown in Figure 4. The following paragraphs will provide a discussion of each analysis.

South Sub-Basin Analysis. The South Sub-Basin is the largest of the three sub-basins within the 3Roots project. This sub-basin collects flows from the Mira Mesa Trunk Sewer, the Carroll Canyon Trunk Sewer, and the 3Roots project.

Flow from the Mira Mesa Trunk Sewer is obtained from the Year 2050 City Sewer Model output in Appendix B. The maximum peak wet weather flow at the end of the Mira Mesa Trunk Sewer model output is 8.388 mgd. This value is included at the connection point for the Mira Mesa Trunk Sewer relocation at the east end of Street A. In the sewer calculation spreadsheet, it is at Manhole 53A.

Flow in the Carroll Canyon Trunk Sewer is obtained from the Year 2050 City Sewer Model output in Appendix B. The Year 2050 peak wet weather flow in the Carroll Canyon Trunk Sewer at the point where the sewer relocation begins is 9.362 mgd. This is at Manhole 33 which is a new diversion manhole on the Carroll Canyon Trunk Sewer 21" sewer.

Another flow input obtained from the Year 2050 City Sewer Model output in Appendix B is the flow from Arjons Drive into the sewer line in Carroll Canyon Road east of the Carroll Canyon Trunk Sewer. The peak wet weather flow used in the analysis is 0.145 mgd input at Manhole 25.

The spreadsheet calculation for the South Sub-Basin is provided in Appendix C. Gravity sewer pipe sizes have been adjusted in the spreadsheet so that maximum depth/diameter does not exceed 0.64. The Manhole Number Diagram is presented as Exhibit A.1. Required pipe sizes are shown in Exhibit A.1 and on Figure 5.

Velocities in the relocated Mira Mesa Trunk Sewer have been kept as low as practical. Because of the drop in elevation from the north-central end of the 3Roots project to the south end there are segments of the relocated Mira Mesa Trunk Sewer which flow up to 13.6 fps. In the relocated Carroll Canyon Trunk Sewer maximum velocities are 10.2 fps.

The Mira Mesa Trunk Sewer is proposed to be reduced in diameter from 30-inch to 24-inch based on the Year 2050 peak wet weather flow from the City model and the proposed sewer slopes for the relocated pipe in public streets through the 3Roots project.

The Carroll Canyon Trunk Sewer to be relocated in Carroll Canyon Road is 27-inch and 30-inch based on Year 2050 peak wet weather sewer flows.

Central Sub-Basin Analysis. The Central Sub-Basin connects to the existing 10-inch sewer line in Camino Santa Fe and flows south to the Carroll Canyon Trunk Sewer. Flow from existing development along Summers Ridge Road also connects to this existing 10-inch gravity sewer line in Camino Santa Fe and is accounted for in the spreadsheet calculations presented in Appendix D. The Manhole Number Diagram is presented as Exhibit A.2.

The onsite public sewers serving the Central Sub-Basin are sized at 8-inch diameter. The spreadsheet calculation in Appendix D shows that the maximum depth-to-diameter for the onsite proposed public sewer system flows at 0.26 d/D.

With the addition of the 3Roots Central Sub-Basin build-out flows, the existing 10-inch offsite sewer in Camino Santa Fe flows at a maximum of 0.42 d/D.

North Sub-Basin Analysis. The North Sub-Basin connects to the existing 10-inch sewer line in Camino Santa Fe and flows north to the Mesa Rim Trunk Sewer #104. Flow from existing development along Miratech Drive also connects to this existing 10-inch gravity sewer line in Camino Santa Fe and is accounted for in the spreadsheet calculations presented in Appendix E. The Manhole Number Diagram is presented as Exhibit A.3.

The onsite public sewers serving the North Sub-Basin are sized at 8-inch diameter. The spreadsheet calculation in Appendix E shows that the maximum depth-to-diameter for the onsite proposed public sewer system flows at 0.42 d/D.

Two manholes and thus the corresponding sewer segments in the North Sub-Basin of the 3Roots project are very close to the minimum allowable depth (5 feet) per the City Sewer Design Guide. This cannot be avoided in order to meet the invert elevation of the existing 10-inch sewer in Camino Santa Fe and Miratech Drive. Sewer slopes and depths have been adjusted to maintain a minimum of one percent slope or 2 fps flow velocity while trying to maintain the minimum desirable depth of cover.

With the addition of the 3Roots North Sub-Basin build-out flows, the existing 10-inch offsite sewer in Camino Santa Fe flows at a maximum of 0.35 d/D.

The spreadsheet analysis presented in Appendix E for the North Sub-Basin extends the analysis into the Mesa Rim Trunk Sewer #104. This sewer flows west from Camino Santa Fe north of Miratech Drive to the Carroll Canyon Trunk Sewer #49. The flows in the Mesa Rim Trunk Sewer were obtained from the City Year 2050 Model run for Mesa Rim Trunk Sewer; this data is presented in Appendix B as mentioned earlier in this report.

The existing Mesa Rim Trunk Sewer consists of 12-inch, 15-inch, and 18-inch gravity sewers. With the addition of the 3Roots North Sub-Basin peak wet weather flows, the 12-inch segment flows at a maximum of 0.26 d/D, the 15-inch segment flows at a maximum of 0.24 d/D, and the 18-inch segment flows at a maximum of 0.24 d/D.

3Roots Project Offsite Sewer Analysis - Carroll Canyon Trunk Sewer

The offsite sewer system analysis for the 3Roots project encompasses the Carroll Canyon Trunk Sewer to the west of Camino Santa Fe. The availability of sewer capacity in the downstream Carroll Canyon Trunk Sewer will be addressed in the following paragraphs.

Existing Carroll Canyon Trunk Sewer Downstream Capacity. The offsite sewer analysis posits that the build-out of the 3Roots project will precede the construction of any other large development project within the Carroll Canyon Trunk Sewer Basin. By taking City of San Diego Sewer Modeling Group data for existing flows within the Carroll Canyon Trunk Sewer and adding the 3Roots project build-out sewer flows, the analysis determines the existing capacity within the Carroll Canyon Trunk Sewer.

Appendix F contains the calculations described above. The baseline data for the peak wet weather flows in the Carroll Canyon Trunk Sewer is the Year 2012 City of San Diego Hydraulic Model Results for TS #49 – Carroll Canyon. These results are presented at the beginning of Appendix F. Following the City model output data is a comparison table summarizing the size, slope, PWWF, and d/D for the existing Year 2012 sewer flows and the Year 2012 flows plus the build-out flow from the 3Roots project.

The results show that the maximum d/D in the existing Carroll Canyon Trunk Sewer when adding the 3Roots project build-out flows is 0.72 d/D. Therefore, the conclusion that is evident is that the 3Roots project's sewage flows can be accommodated in the existing Carroll Canyon Trunk Sewer downstream of the 3Roots project without any system upgrades based on current sewage flow (sewer model flow) in the Carroll Canyon Trunk Sewer.

3Roots Proposed Development Schedule. Next, we consider the development schedule for the 3Roots project. The project proponent has provided the following summary of the development schedule for the 3Roots project.

Phase 1:
Building permits begin September 2019;
June/July 2020 occupancies begin.
Fully occupied by July 2022.

Phase 2:
Building permits begin January 2021;
December 2021 occupancies begin.
Fully occupied by December 2023. This includes all commercial land use.

Based on the above development schedule timeline, it is anticipated that the 3Roots project will be constructed and occupied prior to any other large development in the Carroll Canyon Trunk Sewer Basin. Provided that there is flow capacity in the existing Carroll Canyon Trunk Sewer, the 3Roots project can proceed with making connections to the sewer system. At any time if sewer flows result in a segment or segments of the downstream Carroll Canyon Trunk Sewer exceeding its design capacity, that segment or segments will need to be upgraded to ultimate required size before additional occupancies are permitted for the 3Roots development project.

Carroll Canyon Trunk Sewer Flow Monitoring. The analysis of existing flows in the Carroll Canyon Trunk Sewer plus the build-out flow from the 3Roots project shows that there is existing sewer capacity for the entire 3Roots development project. This is based in part on the expectation that the 3Roots project will precede any other large development project in the Carroll Canyon Trunk Sewer Basin.

In order to confirm that there is available sewer capacity for the entire 3Roots project, the 3Roots project will perform sewer flow monitoring of the Carroll Canyon Trunk Sewer at strategic locations along the trunk sewer to the west of the 3Roots development. The particular locations for sewer flow monitoring will be coordinated with the City of San Diego Development Services Department and the City's Sewer Modeling Group.

The flow monitoring to be performed by the 3Roots project is proposed to be scheduled as follows:

1. The first sewer flow monitoring effort will be completed in the first quarter of Year 2019.
2. The second sewer flow monitoring effort will be performed prior to the 100th occupancy within the 3Roots project.
3. Subsequent flow sewer flow monitoring will be done at every 500th occupancy or every 9 months, whichever of these two milestones occurs first.

4. Thus, at a minimum, sewer monitoring will be done prior to the 600th, 1,100th, and 1,600th occupancy.

Sewer flow monitoring will be used to confirm the actual flow in the Carroll Canyon Trunk Sewer. Adding build-out flows from the 3Roots development project to the existing measured flows will allow the 3Roots project to gauge the potential that flows from the 3Roots project could result in downstream sewer segments flowing over design capacity. This will enable the 3Roots project to plan, design, and construct offsite sewer improvements in a timely manner and if necessary so as to not impact their ability to continue obtaining occupancies.

Each time a flow monitoring effort is completed, the 3Roots project will provide a summary report to the City of San Diego Development Services Department as an addendum to this sewer study. In addition to providing the flow monitoring data for this City's use, the addendum report will address the available sewer capacity in the downstream Carroll Canyon Trunk Sewer and identify which if any reaches will be over design capacity under build-out of the 3Roots development.

Offsite Sewer Upgrades

The City's Year 2050 sewer model identifies the ultimate gravity sewer pipe sizes needed for the Carroll Canyon Trunk Sewer in order to accommodate ultimate peak wet weather flows for the build-out of the entire Carroll Canyon Sewer Basin. Upgrade of any segment of the Carroll Canyon Trunk Sewer will be done to these line sizes. These ultimate pipe sizes are being used for the portions of the Carroll Canyon Trunk Sewer which are being relocated within the 3Roots project area as part of the realignment and construction of Carroll Canyon Road east of Camino Santa Fe.

Conclusions and Recommendations

The following conclusions and recommendations are summarized based on the sewer system analysis prepared for the proposed 3Roots development project in the Carroll Canyon area of the City of San Diego.

1. The 3Roots project, consisting of a maximum of 1,800 dwelling units and commercial, transit, and park uses will gravity sewer to the existing Carroll Canyon Trunk Sewer #49.

2. The 3Roots project comprises three sewer sub-basins; the North Sub-Basin connects to existing sewer in Camino Santa Fe at Miratech Drive and flows north to the existing Mesa Rim Trunk Sewer #104 which flows to the Carroll Canyon Trunk Sewer. The Central Sub-Basin connects to the existing sewer in Camino Santa Fe at Summers Ridge Road and flows south to the Carroll Canyon Trunk Sewer. The South Sub-Basin connects directly to the Carroll Canyon Trunk Sewer at multiple locations.

3. The onsite gravity sewer system within the 3Roots project is designed to convey Mira Mesa Trunk Sewer #42 Year 2050 peak wet weather flows entering from the northeast of the project boundary, and Carroll Canyon Trunk Sewer #49 peak wet weather flows coming from east of the 3Roots project.

4. Onsite gravity sewer mains within the 3Roots project are 8" diameter except for those reaches carrying the Mira Mesa Trunk Sewer flows and Carroll Canyon Trunk Sewer flows. The Mira Mesa Trunk Sewer flows necessitate the onsite gravity sewer within the 3Roots project to be upsized to 24-inch diameter.

5. Several reaches of the existing Carroll Canyon Trunk Sewer within the 3Roots project will be re-aligned as part of the 3Roots project development. All new segments of the Carroll Canyon Trunk Sewer will be installed based on the ultimate sewer line sizes as determined by the onsite sewer analysis included in this sewer study and confirmed by the City of San Diego Year 2050 sewer modeling for the Carroll Canyon Trunk Sewer or any subsequent sewer modeling prepared by the City prior to the construction of the realigned trunk sewer.

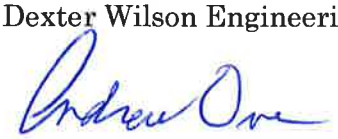
6. The existing Carroll Canyon Trunk Sewer downstream of the 3Roots project has available capacity for the build-out of the 3Roots project based on Year 2012 sewer flows as modeled by the City.

7. The 3Roots project will perform sewer flow monitoring of the downstream Carroll Canyon Trunk Sewer prior to and during the project construction in order to confirm the available sewer capacity in the Carroll Canyon Trunk Sewer. Each sewer flow monitoring effort will result in an addendum to this sewer study providing an updated analysis of the available sewer capacity in the Carroll Canyon Trunk Sewer.

8. New 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.

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.



Andrew Oven, P.E.

AO:sg

Attachments

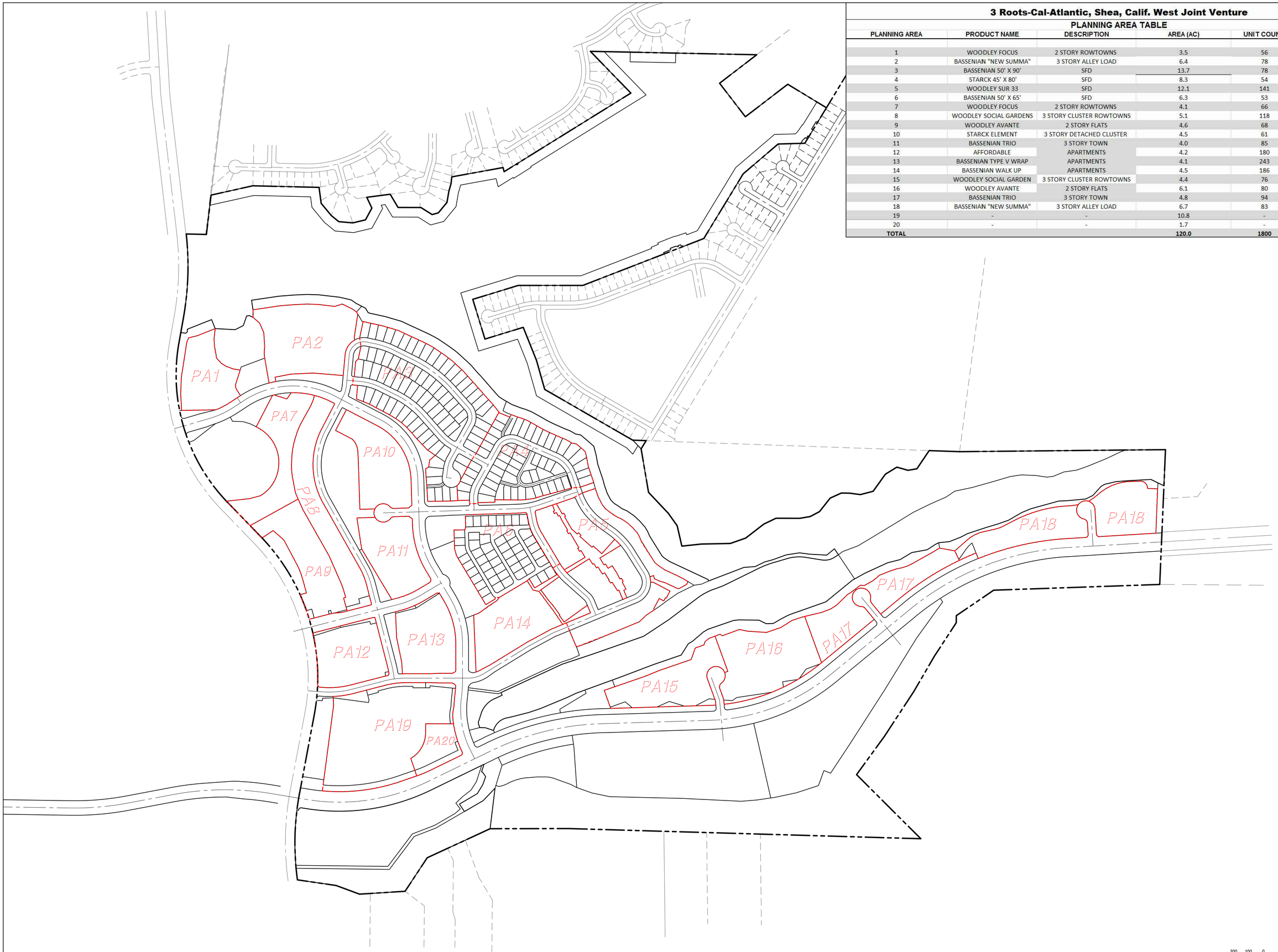
APPENDIX A

PLANNING AREA LAND USE SUMMARY

3 Roots-Cal-Atlantic, Shea, Calif. West Joint Venture

PLANNING AREA TABLE

PLANNING AREA	PRODUCT NAME	DESCRIPTION	AREA (AC)	UNIT COUNT	DENSITY
1	WOODLEY FOCUS	2 STORY ROWTOWNS	3.5	56	16.2
2	BASSENIAN "NEW SUMMA"	3 STORY ALLEY LOAD	6.4	78	12.2
3	BASSENIAN 50' X 90'	SFD	13.7	78	5.7
4	STARCK 45' X 80'	SFD	8.3	54	6.5
5	WOODLEY SUR 33	SFD	12.1	141	11.6
6	BASSENIAN 50' X 65'	SFD	6.3	53	8.4
7	WOODLEY FOCUS	2 STORY ROWTOWNS	4.1	66	16.2
8	WOODLEY SOCIAL GARDENS	3 STORY CLUSTER ROWTOWNS	5.1	118	23.1
9	WOODLEY AVANTE	2 STORY FLATS	4.6	68	14.8
10	STARCK ELEMENT	3 STORY DETACHED CLUSTER	4.5	61	13.5
11	BASSENIAN TRIO	3 STORY TOWN	4.0	85	21.0
12	AFFORDABLE	APARTMENTS	4.2	180	43.4
13	BASSENIAN TYPE V WRAP	APARTMENTS	4.1	243	59.0
14	BASSENIAN WALK UP	APARTMENTS	4.5	186	41.6
15	WOODLEY SOCIAL GARDEN	3 STORY CLUSTER ROWTOWNS	4.4	76	17.2
16	WOODLEY AVANTE	2 STORY FLATS	6.1	80	13.0
17	BASSENIAN TRIO	3 STORY TOWN	4.8	94	19.6
18	BASSENIAN "NEW SUMMA"	3 STORY ALLEY LOAD	6.7	83	12.4
19	-	-	10.8	-	
20	-	-	1.7	-	
TOTAL			**120.0**	**1800**	



N

200 100 0 200 400 600

SCALE: 1"=200'

PLANNING AREA EXHIBIT
2018-10-03

3ROOTS by Mesa Canyon Community Partners

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800 San Diego, CA 92101
619.235.6471 Tel 619.234.0349 Fax

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APPENDIX B

CITY OF SAN DIEGO
YEAR 2050 SEWER MODEL RESULTS

CARROLL CANYON TRUNK SEWER #49
MIRA MESA TRUNK SEWER #42
MESA RIM TRUNK SEWER #104

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 49 - CARROLL CANYON
2050 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)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)	
36877	I05S126.1	H05S129	405.94	398.14	442.00	0.007	21	1,200	5.41	10.98	52.3	399.06	399.51	42.95	2.54	4.447	8.26	53.8	
32098	H05S129.1	H05S128	397.74	389.61	423.50	0.027	18	300	8.95	8.08	44.9	390.28	391.53	33.22	2.54	4.445	11.18	39.8	
32097	H05S128.1	H05S127	389.61	377.51	415.00	0.034	18	360	9.53	7.70	42.8	378.15	379.56	36.85	2.54	4.446	12.45	35.7	
32096	H05S127.1	H05S126	377.51	365.42	396.00	0.034	18	360	6.61	10.26	57.0	366.28	366.95	29.73	2.54	4.446	12.44	35.7	
32095	H05S126.1	H05S125	365.42	359.30	379.30	0.017	18	360	7.58	10.26	57.0	360.16	361.05	19.15	2.95	5.092	8.85	57.5	Stone Creek #1
32094	H05S125.1	H05S124	359.30	353.18	372.20	0.017	18	360	7.58	10.26	57.0	354.04	354.93	18.17	2.95	5.092	8.85	57.5	
32093	H05S124.1	H05S122	353.18	347.06	372.10	0.017	18	360	7.43	10.42	57.9	347.93	348.79	24.17	2.95	5.093	8.85	57.5	
32090	H05S122.1	H05S121	347.06	340.94	371.90	0.017	18	360	7.64	10.42	57.9	341.81	342.72	30.09	3.05	5.240	8.85	59.2	
32089	H05S121.1	H05S120	340.94	334.82	356.80	0.017	18	360	7.64	10.42	57.9	335.69	336.60	21.11	3.05	5.240	8.85	59.2	
32088	H05S120.1	H05S158	334.82	328.70	346.70	0.017	18	360	7.64	10.42	57.9	329.57	330.48	17.13	3.05	5.240	8.85	59.2	
32126	H05S158.1	H05S157	328.70	322.58	338.00	0.017	18	360	7.51	10.57	58.7	323.46	324.34	14.54	3.05	5.240	8.85	59.2	
32125	H05S157.1	H05S156	322.58	318.85	341.60	0.016	18	235	7.70	10.36	57.5	319.71	320.64	21.89	3.05	5.239	8.55	61.3	
5544249	H05S156.1	H05S227	318.85	318.40	344.00	0.017	21	26	6.21	11.27	53.7	319.34	319.94	24.66	3.08	5.264	13.41	39.3	
5544270	H05S227.1	H05S228	318.40	318.23	344.00	0.020	21	9	5.54	12.37	58.9	319.26	319.74	24.74	3.08	5.264	14.49	36.3	
5544271	H05S228.1	H05S226	318.23	310.83	333.20	0.013	21	575	7.73	12.16	57.9	311.84	312.77	21.36	4.22	7.214	11.62	62.1	Stone Creek #2
5544251	H05S226.1	H05S225	310.83	310.66	333.00	0.020	21	9	7.83	12.02	57.3	311.66	312.62	21.34	4.22	7.214	14.49	49.8	
32122	H05S225.1	H05S153	310.66	307.53	327.50	0.015	21	214	7.46	12.52	59.6	308.57	309.44	18.93	4.22	7.213	12.40	58.2	
32121	H05S153.1	H05S152	307.53	303.07	324.10	0.012	21	360	7.63	12.29	58.5	304.09	305.00	20.01	4.22	7.211	11.40	63.3	
5543808	H05S152.1	H05S220	303.07	301.68	325.10	0.014	21	100	7.32	12.73	60.6	302.74	303.57	22.36	4.22	7.211	12.07	59.7	
32120	H05S220.1	H05S151	301.68	298.60	319.60	0.012	21	260	7.35	12.68	60.4	299.66	300.50	19.94	4.22	7.208	11.15	64.6	
5544208	H05S151.1	H05S222	298.60	296.81	320.20	0.012	21	145	6.19	14.94	71.1	298.06	298.65	22.15	4.22	7.209	11.39	63.3	
5544214	H05S222.1	H05S223	296.81	294.29	317.76	0.007	21	336	6.19	14.93	71.1	295.53	296.13	22.23	4.22	7.210	8.87	81.3	
5544215	H05S223.1	G05S216	294.29	292.10	312.70	0.008	21	292	6.33	14.59	69.5	293.32	293.94	19.38	4.22	7.211	8.88	81.2	
5544213	G05S216.1	G05S217	292.10	287.05	304.00	0.029	21	175	7.30	12.77	60.8	288.11	288.94	15.89	4.22	7.211	17.41	41.4	
26040	G05S217.1	G05S170	287.05	285.21	300.20	0.012	21	150	6.05	15.34	73.0	286.49	287.06	13.71	4.22	7.212	11.33	63.7	
26039	G05S170.1	G05S169	285.21	280.75	297.80	0.012	21	360	7.68	15.35	73.1	282.03	282.95	15.77	5.34	9.243	11.40	81.1	Stone Creek #3
26038	G05S169.1	G05S168	280.75	276.34	297.80	0.012	21	355	7.68	15.36	73.1	277.62	278.54	20.18	5.34	9.245	11.42	81.0	
26037	G05S168.1	G05S167	276.34	271.79	290.80	0.012	21	367	7.68	15.36	73.1	273.07	273.99	17.73	5.34	9.246	11.40	81.1	
26036	G05S167.1	G05S166	271.79	267.33	285.30	0.012	21	360	7.56	15.48	73.7	268.62	269.51	16.68	5.34	9.246	11.40	81.1	
26047	G05S166.1	G05S178	267.33	263.01	281.00	0.012	21	360	7.56	15.48	73.7	264.30	265.19	16.70	5.34	9.246	11.22	82.4	
26048	G05S178.1	G05S179	263.01	258.69	276.70	0.012	21	360	7.16	16.56	78.9	260.07	260.87	16.63	5.34	9.243	11.22	82.4	
26049	G05S179.1	G05S180	258.69	255.09	287.10	0.010	21	360	7.49	15.90	75.7	256.42	257.29	30.69	5.42	9.303	10.24	90.8	Begin 3Roots Diversion
26064	G05S180.1	G05S201	255.09	250.82	281.80	0.012	21	356	7.52	15.58	74.2	252.12	253.00	29.68	5.42	9.304	11.22	82.9	
26065	G05S201.1	G05S202	250.82	246.50	274.50	0.012	21	360	7.57	15.58	74.2	247.80	248.69	26.70	5.47	9.362	11.22	83.4	CCTS flowing into 3Roots Project
26066	G05S202.1	G05S203	246.50	242.18	268.20	0.012	21	360	7.57	15.58	74.2	243.48	244.37	24.72	5.47	9.362	11.22	83.4	
26067	G05S203.1	G05S204	242.18	237.86	263.90	0.012	21	360	7.57	21.79	103.8	239.68	240.57	24.22	5.47	9.362	11.22	83.4	
26085	G05S204.1	G06S7	237.86	233.52	250.50	0.012	21	361	7.89	38.50	183.3	236.73	237.70	13.77	5.47	9.346	11.23	83.2	
26084	G06S7.1	G06S4	233.52	228.68	243.50	0.014	21	355	7.43	61.45	292.6	233.80	234.66	9.70	5.47	9.258	11.96	77.4	To be abandoned
26083	G06S4.1	G06S3	228.68	223.43	234.40	0.020	27	269	7.12	96.74	358.3	231.49	232.28	2.91	10.20	17.646	27.97	63.1	
26082	G06S3.1	G06S2	223.43	221.33	244.30	0.007	27	280	7.41	92.66	343.2	229.05	229.91	15.25	10.62	18.288	17.34	105.5	

Delta = 8.388 mgd = MMTS Flow into CCTS

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 49 - CARROLL CANYON
2050 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)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)	
26081	G06S2.1	G06S1	221.33	218.99	235.00	0.008	27	312	7.43	88.27	326.9	226.35	227.20	8.65	10.62	18.262	17.34	105.3	
26080	G06S1.1	F06S52	218.99	215.84	239.80	0.008	27	420	7.44	82.81	306.7	222.74	223.60	17.06	10.62	18.240	17.34	105.2	
20645	F06S52.1	F06S51	215.84	212.99	235.00	0.007	27	380	7.41	77.84	288.3	219.48	220.33	15.52	10.62	18.218	17.34	105.1	
20644	F06S51.1	F06S50	212.99	210.98	231.00	0.008	27	268	7.33	74.00	274.1	217.15	217.98	13.85	10.62	18.199	17.34	105.0	End 3Roots Diversion
20643	F06S50.1	F06S49	210.98	210.18	227.20	0.007	27	107	7.37	71.68	265.5	216.15	217.00	11.05	10.62	18.187	17.34	104.9	
20642	F06S49.1	F06S48	210.18	207.33	214.30	0.007	27	380	7.69	65.40	242.2	212.78	213.70	1.52	10.91	18.477	17.34	106.6	3Roots #1
20641	F06S48.1	F06S47	207.33	201.31	214.30	0.016	24	381	9.30	59.63	248.5	206.28	207.62	8.02	10.91	18.469	18.38	100.5	
20635	F06S47.1	F06S42	201.31	195.37	215.40	0.016	24	380	8.56	53.02	220.9	199.79	200.93	15.61	10.91	18.463	18.28	101.0	
20634	F06S42.1	F06S41	195.37	193.10	206.10	0.009	24	246	9.53	30.50	127.1	195.64	197.05	10.46	10.91	18.462	14.05	131.4	
20632	F06S41.1	F06S39	193.10	188.47	199.50	0.023	24	204	9.49	41.95	174.8	191.97	193.36	7.53	10.91	18.458	22.03	83.8	
20629	F06S39.1	F06S36	188.47	181.56	193.60	0.016	24	440	9.50	33.73	140.6	184.37	185.77	9.23	10.91	18.459	18.33	100.7	
20622	F06S36.1	F06S30	181.56	175.61	192.60	0.016	24	376	9.57	26.63	111.0	177.83	179.25	14.77	10.91	18.455	18.40	100.3	
20623	F06S30.1	F06S31	175.61	169.49	188.50	0.016	24	376	9.68	21.60	90.0	171.29	172.75	17.21	10.97	18.523	18.66	99.3	
20624	F06S31.1	F06S32	169.49	165.44	182.40	0.011	27	372	8.69	21.10	78.1	167.20	168.37	15.20	10.97	18.520	20.89	88.7	
20625	F06S32.1	F06S33	165.44	161.31	177.30	0.011	27	376	8.40	21.95	81.3	163.14	164.24	14.16	10.97	18.521	20.98	88.3	
20626	F06S33.1	F06S34	161.31	157.65	171.70	0.010	27	360	8.49	21.82	80.8	159.47	160.59	12.23	10.97	18.522	20.19	91.7	
20597	F06S34.1	F06S7	157.65	153.95	167.00	0.010	27	370	8.62	21.38	79.2	155.73	156.89	11.27	10.97	18.521	20.02	92.5	
20598	F06S7.1	F06S8	153.95	149.80	163.10	0.011	27	386	9.01	20.46	75.8	151.51	152.77	11.60	10.97	18.523	20.76	89.2	
20599	F06S8.1	F06S9	149.80	144.22	162.20	0.014	27	385	8.36	26.28	97.3	146.41	147.50	15.79	11.48	19.210	24.10	79.7	3Roots #2
20600	F06S9.1	E06S91	144.22	140.44	157.40	0.010	27	390	8.33	26.36	97.6	142.64	143.72	14.76	11.48	19.189	19.71	97.4	
16390	E06S91.1	E06S90	140.44	136.83	150.80	0.010	27	372	8.36	25.99	96.3	139.00	140.08	11.80	11.56	19.272	19.72	97.7	
16389	E06S90.1	E06S89	136.83	133.67	149.70	0.010	27	326	8.43	25.27	93.6	135.78	136.88	13.92	11.56	19.257	19.71	97.7	
16388	E06S89.1	E06S88	133.67	128.79	145.80	0.010	27	496	8.41	25.49	94.4	130.91	132.01	14.89	11.56	19.233	19.86	96.8	
16384	E06S88.1	E06S81	128.79	125.90	145.80	0.010	27	294	8.41	25.19	93.3	128.00	129.10	17.80	11.56	19.217	19.85	96.8	
16383	E06S81.1	E06S68	125.90	122.06	143.10	0.010	27	391	8.37	25.08	92.9	124.15	125.24	18.95	11.56	19.196	19.84	96.8	
16370	E06S68.1	E06S65	122.06	119.59	137.60	0.010	27	251	8.41	24.30	90.0	121.62	122.71	15.99	11.62	19.262	19.86	97.0	
16376	E06S65.1	E06S77	119.59	114.28	136.30	0.010	27	540	8.78	22.75	84.3	116.18	117.37	20.12	11.65	19.288	19.85	97.2	
16378	E06S77.1	E06S76	114.28	111.77	131.80	0.013	27	187	8.34	26.86	99.5	114.01	115.09	17.79	11.69	19.342	23.19	83.4	
16379	E06S76.1	E06S75	111.77	108.36	125.40	0.010	27	341	8.46	26.33	97.5	110.55	111.67	14.85	11.69	19.332	20.02	96.6	
16351	E06S75.1	E06S51	108.36	105.06	121.10	0.010	27	330	8.33	27.02	100.1	107.31	108.39	13.79	11.69	19.325	20.02	96.5	
16350	E06S51.1	E06S50	105.06	102.20	118.20	0.010	27	286	8.41	26.56	98.4	104.41	105.51	13.79	11.69	19.319	20.02	96.5	
16349	E06S50.1	E06S49	102.20	98.46	123.50	0.010	27	367	8.35	27.05	100.2	100.71	101.80	22.79	11.69	19.309	20.21	95.5	
16348	E06S49.1	E06S47	98.46	94.93	111.90	0.010	27	365	8.40	26.90	99.6	97.17	98.27	14.73	11.69	19.301	19.69	98.0	
16345	E06S47.1	E06S42	94.93	90.94	107.90	0.010	27	390	8.24	27.84	103.1	93.26	94.32	14.64	11.72	19.335	20.25	95.5	
16340	E06S42.1	E06S41	90.94	87.93	104.00	0.010	27	301	8.36	26.35	97.6	90.13	91.21	13.87	11.96	19.619	20.02	98.0	
16339	E06S41.1	E06S103	87.93	84.16	104.20	0.011	27	352	8.73	23.39	86.6	86.11	87.29	18.09	12.49	20.296	20.72	98.0	
16397	E06S103.1	E06S102	84.16	82.30	104.20	0.008	30	248	7.91	22.63	75.4	84.19	85.16	20.01	12.49	20.296	22.96	88.4	
16396	E06S102.1	E06S101	82.30	79.67	93.70	0.007	30	356	8.17	21.95	73.2	81.50	82.54	12.20	12.49	20.304	22.79	89.1	
12318	E06S101.1	D06S51	79.67	77.04	97.00	0.009	30	304	7.42	24.90	83.0	79.12	79.97	17.89	12.49	20.301	24.66	82.3	

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 49 - CARROLL CANYON
2050 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)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
12317	D06S51.1	D06S52	77.04	74.88	94.90	0.007	30	332	7.41	24.97	83.2	76.96	77.81	17.94	12.51	20.314	21.39	95.0
12358	D06S52.1	D06S124	74.88	72.71	92.70	0.006	30	335	7.39	24.95	83.2	74.79	75.64	17.91	12.51	20.304	21.34	95.1
12310	D06S124.1	D06S125	72.71	71.25	86.30	0.006	30	225	7.42	24.70	82.3	73.31	74.16	12.99	12.51	20.306	21.36	95.1
12309	D06S125.1	D06S129	71.25	69.00	89.00	0.006	30	347	7.44	24.61	82.0	71.05	71.91	17.95	12.53	20.318	21.35	95.2
12308	D06S129.1	D06S127	69.00	66.75	78.80	0.007	30	345	7.42	24.68	82.3	68.81	69.66	9.99	12.52	20.310	21.41	94.9
12307	D06S127.1	D06S126	66.75	64.51	82.50	0.006	30	345	7.42	24.65	82.2	66.56	67.42	15.94	12.52	20.306	21.36	95.1
12306	D06S126.1	D06S130	64.51	62.17	82.20	0.006	30	361	7.42	24.60	82.0	64.22	65.08	17.98	12.52	20.300	21.35	95.1
12304	D06S130.1	D06S37	62.17	59.79	76.80	0.007	30	365	7.42	24.58	81.9	61.84	62.69	14.96	12.56	20.353	21.41	95.1
12303	D06S37.1	D06S36	59.79	57.77	82.80	0.006	30	311	7.45	24.26	80.9	59.79	60.65	23.01	12.57	20.361	21.37	95.3
12302	D06S36.1	D06S131	57.77	55.77	68.80	0.006	30	308	7.80	22.99	76.6	57.69	58.63	11.11	12.57	20.363	21.36	95.3
12300	D06S131.1	D06S33	55.77	50.30	69.30	0.018	30	308	10.84	17.22	57.4	51.74	53.56	17.57	12.57	20.363	35.33	57.6
12299	D06S33.1	D06S31	50.30	44.84	56.80	0.018	30	308	7.43	25.00	83.3	46.92	47.78	9.88	12.57	20.359	35.30	57.7
12298	D06S31.1	D06S32	44.84	42.53	55.50	0.007	30	355	7.42	25.03	83.4	44.62	45.47	10.88	12.56	20.347	21.39	95.1
12297	D06S32.1	D05S82	42.53	40.23	55.20	0.006	30	355	7.42	24.96	83.2	42.31	43.17	12.89	12.57	20.343	21.34	95.3
12244	D05S82.1	D05S83	40.23	38.21	54.20	0.007	30	310	7.41	24.94	83.1	40.29	41.14	13.91	12.57	20.337	21.40	95.0
12245	D05S83.1	D05S84	38.21	36.20	49.20	0.006	30	310	7.41	24.80	82.7	38.27	39.12	10.93	12.57	20.331	21.35	95.2
12246	D05S84.1	D05S86	36.20	34.18	45.20	0.007	30	310	7.40	24.72	82.4	36.24	37.09	8.96	12.58	20.346	21.40	95.1
6269194	D05S86.1	D05S95	34.18	32.46	45.20	0.006	30	265	7.40	24.42	81.4	34.50	35.35	10.71	12.58	20.346	21.36	95.3
12248	D05S95.1	D05S94	32.46	30.77	43.80	0.007	30	260	7.49	23.99	80.0	32.77	33.64	11.03	12.58	20.353	21.38	95.2
12249	D05S94.1	D05S93	30.77	29.55	40.60	0.005	33	255	7.31	22.46	68.1	31.42	32.25	9.18	12.58	20.353	23.65	86.1
12224	D05S93.1	D05S61	29.55	27.51	37.50	0.006	33	348	7.57	21.79	66.0	29.33	30.22	8.17	12.58	20.352	26.17	77.8
12225	D05S61.1	D05S62	27.51	16.56	37.60	0.115	33	95	19.01	10.64	32.3	17.45	23.06	20.15	12.59	20.360	116.06	17.5
12223	D05S62.1	D05S63	16.56	14.09	36.10	0.088	33	28	19.20	10.57	32.0	14.97	20.70	21.13	12.59	20.360	101.53	20.1

TOTAL LENGTH (MILES):	6.26	LENGTH OF PIPE - d/D < 50% (MILES):	0.15	LENGTH OF PIPE - Q/CAP < 50% (MILES):	0.26
LENGTH WEIGHTED Q/CAP:	83.9	LENGTH OF PIPE - d/D 50 - 75% (MILES):	2.10	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	1.26
LENGTH WEIGHTED d/D:	102.3	LENGTH OF PIPE - d/D 75 - 100% (MILES):	2.75	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	3.99
LENGTH WEIGHTED HGL BELOW RIM (FT):	17.57	LENGTH OF PIPE - d/D > 100% (MILES):	1.25	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.75

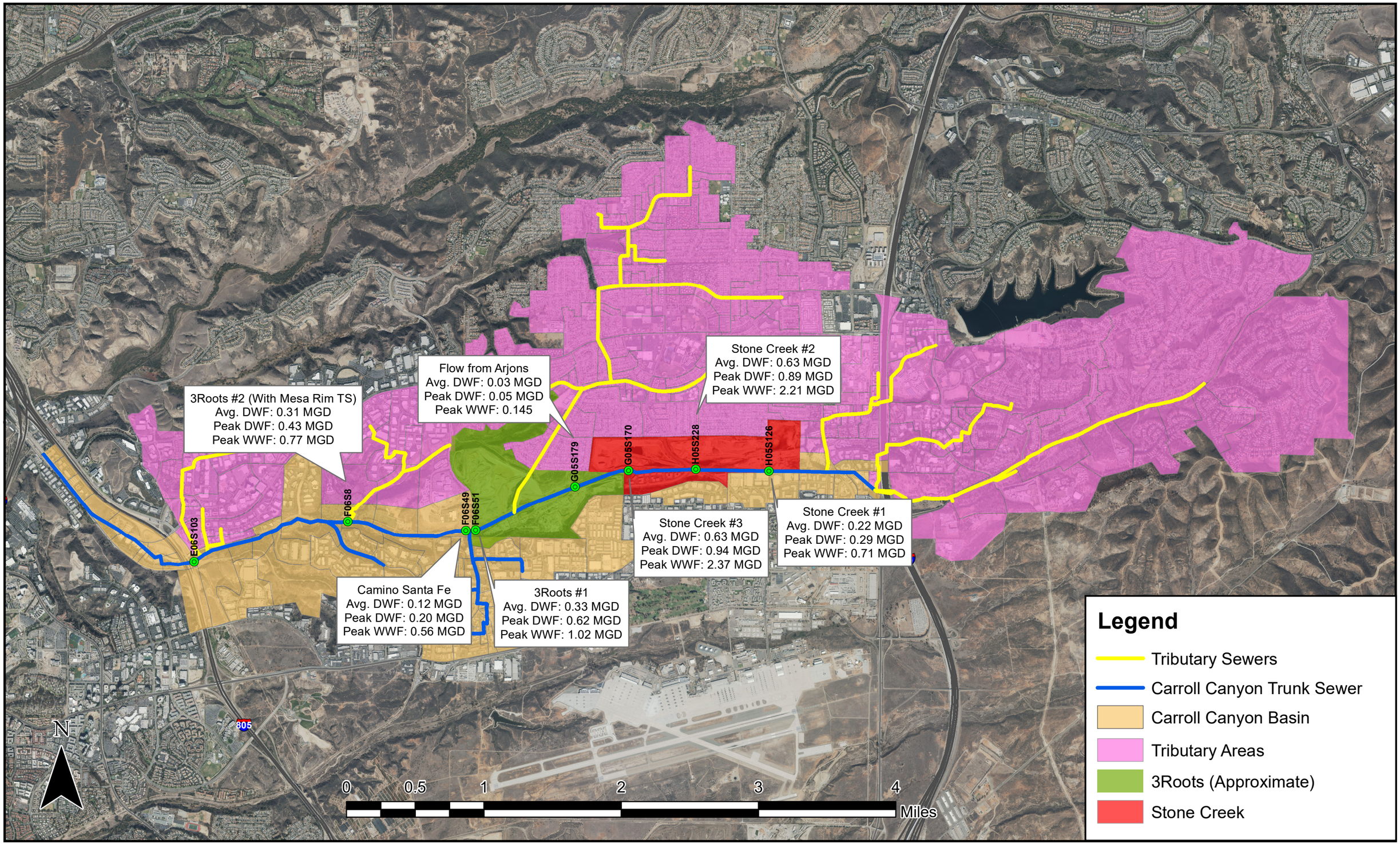
Public Utilities

TS 049 Carroll Canyon

Public Utilities

TS 049 Carroll Canyon

Carroll Canyon Trunk Sewer Map



CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 42 - MIRA MESA
2050 WWF ALTERNATIVE 2

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 (%)
25795	G04S285.1	G04S284	390.41	388.54	411.50	0.005	11	359	2.48	3.48	31.6	388.83	388.93	22.67	0.29	1.32	21.8
25807	G04S284.1	G04S301	388.54	384.56	408.60	0.006	14	663	2.39	3.22	23.0	384.83	384.92	23.77	0.29	2.69	10.7
25810	G04S301.1	G04S323	384.56	382.60	406.60	0.007	14	290	2.28	3.58	25.6	382.90	382.98	23.70	0.32	2.86	11.2
25832	G04S323.1	G04S324	382.60	381.18	405.20	0.005	14	312	1.16	5.89	42.1	381.67	381.69	23.53	0.32	2.34	13.6
25833	G04S324.1	G04S326	381.18	380.68	399.70	0.002	14	331	1.77	5.87	41.9	381.17	381.22	18.53	0.49	1.35	35.9
25834	G04S326.1	G04S327	380.68	380.31	395.30	0.002	14	246	2.16	5.05	36.1	380.73	380.80	14.57	0.49	1.35	36.0
25835	G04S327.1	G04S328	380.31	379.23	387.20	0.003	14	417	1.58	6.38	45.5	379.76	379.80	7.44	0.48	1.77	27.4
25793	G04S328.1	G04S278	379.23	378.63	387.60	0.002	15	399	1.85	6.40	42.7	379.16	379.22	8.44	0.60	1.62	36.9
25791	G04S278.1	G04S277	378.63	378.17	388.20	0.002	15	306	1.84	6.47	43.1	378.71	378.76	9.49	0.60	1.62	37.3
25790	G04S277.1	G04S272	378.17	377.66	387.70	0.002	15	337	1.64	7.24	48.2	378.26	378.31	9.44	0.62	1.62	38.1
25776	G04S272.1	G04S271	377.66	377.57	387.60	0.002	15	60	3.39	5.84	39.0	378.06	378.23	9.54	0.97	1.62	59.9
25777	G04S271.1	G04S269	377.57	376.25	387.60	0.165	15	8	1.19	18.33	122.2	377.78	377.80	9.82	0.98	16.96	5.8
36737	I04S79.1	I04S76	457.23	456.63	476.60	0.004	12	151	1.14	1.78	14.9	456.78	456.80	19.82	0.05	1.45	3.7
36736	I04S76.1	H04S232	456.63	455.83	472.80	0.004	12	199	1.41	1.63	13.6	455.97	456.00	16.83	0.06	1.46	4.0
31870	H04S232.1	H04S231	455.83	455.45	463.50	0.007	11	53	1.13	1.97	17.9	455.61	455.63	7.89	0.06	1.55	3.8
31866	H04S231.1	H04S234	455.45	454.43	467.40	0.003	11	296	1.35	1.82	16.5	454.58	454.61	12.82	0.06	1.07	5.8
31859	H04S234.1	H04S235	454.43	453.54	467.50	0.005	11	185	1.08	2.14	19.5	453.72	453.74	13.78	0.06	1.27	4.9
31860	H04S235.1	H04S237	453.54	453.03	467.50	0.003	11	167	1.56	1.80	16.4	453.18	453.22	14.32	0.07	1.01	7.1
31856	H04S237.1	H04S238	453.03	452.54	462.50	0.007	11	73	0.84	3.47	31.5	452.83	452.84	9.67	0.07	1.50	4.8
31853	H04S238.1	H04S239	452.54	451.93	459.90	0.002	11	249	1.84	3.14	28.6	452.19	452.24	7.71	0.19	0.90	20.5
31855	H04S239.1	H04S219	451.93	451.74	458.70	0.006	11	30	1.94	3.58	32.5	452.04	452.10	6.66	0.23	1.45	16.1
31842	H04S219.1	H04S216	451.74	450.85	457.90	0.004	11	225	2.38	3.22	29.3	451.12	451.21	6.78	0.25	1.15	21.6
31836	H04S216.1	H04S215	450.85	450.60	456.60	0.008	11	33	2.57	3.06	27.8	450.85	450.96	5.75	0.25	1.59	15.6
31806	H04S215.1	H04S180	450.60	447.17	455.20	0.016	11	216	2.66	3.02	27.5	447.42	447.53	7.78	0.25	2.30	11.0
31805	H04S180.1	H04S179	447.17	446.76	454.80	0.011	11	38	2.24	3.54	32.2	447.05	447.13	7.75	0.27	1.90	14.1
31802	H04S179.1	H04S177	446.76	445.48	453.50	0.005	11	256	2.45	3.40	30.9	445.76	445.86	7.74	0.27	1.29	21.3
31799	H04S177.1	H04S176	445.48	444.01	450.00	0.008	11	186	2.14	3.75	34.1	444.32	444.39	5.68	0.27	1.62	16.9
31798	H04S176.1	H04S168	444.01	443.69	450.00	0.005	11	70	2.17	3.85	35.0	444.01	444.09	5.99	0.29	1.23	23.5
31796	H04S168.1	H04S167	443.69	442.85	450.90	0.004	11	209	2.50	3.48	31.7	443.14	443.24	7.76	0.29	1.16	25.0
31795	H04S167.1	H04S166	442.85	425.30	450.30	0.358	11	49	1.29	5.75	52.2	425.78	425.80	24.52	0.29	10.93	2.7
31791	H04S166.1	H04S323	425.30	424.04	444.00	0.002	14	534	1.23	8.98	64.1	424.79	424.81	19.21	0.58	1.69	34.1
31936	H04S323.1	H04S320	424.04	424.03	437.00	0.000	14	330	2.97	4.53	32.4	424.41	424.54	12.59	0.57	0.19	300.6
31931	H04S320.1	H04S317	424.03	421.67	442.70	0.012	14	205	2.58	5.66	40.4	422.14	422.24	20.56	0.67	3.73	18.1
31930	H04S317.1	H04S327	421.67	419.90	437.90	0.003	14	520	1.85	7.38	52.7	420.52	420.57	17.38	0.67	2.03	33.3
31925	H04S327.1	H04S311	419.90	418.45	440.50	0.003	14	426	2.98	7.38	52.7	419.07	419.20	21.43	1.10	2.03	54.2
31923	H04S311.1	H04S286	418.45	417.09	439.10	0.003	14	400	2.94	7.46	53.3	417.71	417.85	21.39	1.10	2.03	54.1
31898	H04S286.1	H04S285	417.09	415.68	440.70	0.003	14	426	3.01	7.29	52.1	416.29	416.43	24.41	1.10	2.00	54.9
31896	H04S285.1	H04S283	415.68	414.28	438.30	0.003	14	400	2.88	7.62	54.4	414.92	415.04	23.38	1.09	2.05	53.3
31895	H04S283.1	H04S281	414.28	413.38	434.40	0.005	14	180	3.07	8.75	62.5	414.11	414.26	20.29	1.37	2.46	55.8

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 42 - MIRA MESA
2050 WWF ALTERNATIVE 2

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 (%)
31893	H04S281.1	H04S279	413.38	412.48	431.50	0.005	14	179	3.77	8.77	62.6	413.21	413.43	18.29	1.70	2.46	69.0
31891	H04S279.1	G04S250	412.48	410.82	422.80	0.005	14	332	3.75	8.77	62.7	411.55	411.77	11.25	1.70	2.46	69.2
25765	G04S250.1	G04S248	410.82	409.93	419.90	0.005	14	178	4.17	8.03	57.4	410.60	410.87	9.30	1.71	2.46	69.7
25764	G04S248.1	G04S246	409.93	406.72	418.70	0.035	14	92	7.55	5.09	36.3	407.14	408.03	11.56	1.71	6.49	26.4
25762	G04S246.1	G04S245	406.72	395.96	414.00	0.036	14	299	7.63	5.06	36.2	396.38	397.29	17.62	1.72	6.59	26.1
25760	G04S245.1	G04S243	395.96	377.75	402.80	0.043	14	426	2.41	17.01	121.5	379.17	379.26	23.63	1.73	7.18	24.1
31748	H04S121.1	H04S120	456.94	447.92	468.90	0.153	10	59	4.51	3.56	35.6	448.22	448.53	20.68	0.51	5.54	9.2
31746	H04S120.1	H04S118	447.92	443.11	464.10	0.015	14	321	3.44	3.71	26.5	443.42	443.60	20.68	0.50	4.25	11.9
31745	H04S118.1	H04S117	443.11	437.11	455.10	0.015	14	400	3.77	3.71	26.5	437.42	437.64	17.68	0.55	4.25	13.0
31744	H04S117.1	H04S51	437.11	431.11	443.10	0.015	14	400	3.32	4.06	29.0	431.45	431.62	11.65	0.55	4.25	13.0
31683	H04S51.1	H04S50	431.11	430.79	441.80	0.019	14	17	1.70	6.66	47.5	431.35	431.39	10.46	0.55	4.77	11.6
31681	H04S50.1	H04S49	430.79	430.24	444.20	0.002	14	268	3.13	5.09	36.3	430.66	430.82	13.54	0.71	1.57	45.1
31680	H04S49.1	H04S48	430.24	430.02	444.00	0.014	14	16	2.62	5.81	41.5	430.50	430.61	13.50	0.71	4.07	17.4
31678	H04S48.1	H04S47	430.02	429.16	450.20	0.004	14	243	2.38	6.33	45.2	429.69	429.78	20.51	0.72	2.07	34.9
31676	H04S47.1	H04S46	429.16	428.48	449.50	0.003	14	259	2.55	6.14	43.9	428.99	429.09	20.51	0.74	1.78	41.7
31674	H04S46.1	H04S45	428.48	427.60	447.60	0.003	14	258	2.70	6.24	44.6	428.12	428.23	19.48	0.80	2.03	39.6
31673	H04S45.1	H03S400	427.60	426.43	446.40	0.003	14	346	2.77	6.22	44.4	426.95	427.07	19.45	0.82	2.02	40.7
31582	H03S400.1	H03S399	426.43	425.07	439.10	0.003	14	400	2.74	6.29	44.9	425.59	425.71	13.51	0.82	2.03	40.6
31581	H03S399.1	H03S398	425.07	423.71	429.70	0.003	14	400	2.77	6.29	44.9	424.24	424.35	5.47	0.83	2.03	41.2
31580	H03S398.1	H03S397	423.71	422.36	431.40	0.003	14	400	2.66	6.49	46.4	422.90	423.01	8.50	0.83	2.02	41.3
31574	H03S397.1	H03S384	422.36	420.99	429.00	0.003	14	402	2.66	6.75	48.2	421.55	421.66	7.45	0.88	2.03	43.2
31573	H03S384.1	H03S383	420.99	419.42	433.40	0.003	14	460	2.98	6.45	46.1	419.96	420.09	13.44	0.93	2.03	45.6
31570	H03S383.1	H03S373	419.42	417.87	436.90	0.004	14	400	2.33	7.82	55.9	418.52	418.61	18.38	0.93	2.16	42.8
31567	H03S373.1	H03S366	417.87	416.73	433.70	0.003	14	390	2.98	7.38	52.7	417.34	417.48	16.36	1.10	1.88	58.4
25467	H03S366.1	G03S263	416.73	415.37	427.40	0.003	14	400	2.90	7.53	53.8	416.00	416.13	11.40	1.10	2.03	54.1
25463	G03S263.1	G03S264	415.37	414.55	427.40	0.003	14	240	2.98	7.53	53.8	415.18	415.32	12.22	1.13	2.03	55.5
25462	G03S264.1	G03S265	414.55	414.01	423.00	0.003	14	160	3.63	6.49	46.4	414.55	414.75	8.45	1.14	2.02	56.3
25461	G03S265.1	G03S267	414.01	388.66	428.40	0.253	14	100	1.98	10.98	78.4	389.58	389.64	38.82	1.14	17.49	6.5
31529	H03S344.1	H03S343	402.69	401.50	409.50	0.006	12	198	3.36	5.82	48.5	401.98	402.16	7.52	0.82	1.79	45.9
31530	H03S343.1	H03S339	401.50	399.40	407.40	0.006	12	350	3.30	5.88	49.0	399.89	400.06	7.51	0.82	1.78	45.7
31531	H03S339.1	H03S338	399.40	398.25	406.30	0.006	12	192	3.37	5.88	49.0	398.74	398.92	7.56	0.83	1.78	46.8
31540	H03S338.1	H03S337	398.25	397.42	405.40	0.006	12	138	2.87	6.69	55.7	397.98	398.11	7.42	0.83	1.79	46.7
25421	H03S337.1	G03S229	397.42	396.62	402.60	0.003	14	268	2.53	6.87	49.1	397.19	397.29	5.41	0.85	1.90	44.9
25420	G03S229.1	G03S228	396.62	395.80	405.80	0.003	14	273	2.84	6.54	46.7	396.35	396.47	9.46	0.90	1.90	47.1
25419	G03S228.1	G03S226	395.80	394.99	410.00	0.003	15	269	2.08	8.01	53.4	395.66	395.73	14.34	0.90	2.29	39.1
25516	G03S226.1	G03S225	394.99	394.74	409.70	0.002	14	125	2.41	7.89	56.3	395.40	395.49	14.30	0.96	1.55	62.0
25416	G03S225.1	G03S224	394.74	394.37	409.70	0.003	15	148	1.68	10.19	68.0	395.22	395.26	14.48	0.96	2.09	46.1

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 42 - MIRA MESA
2050 WWF ALTERNATIVE 2

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 (%)
25353	G03S127.1	G03S165	401.65	401.00	412.00	0.005	15	130	-0.01	2.23	14.9	401.19	401.19	10.81	0.00	2.95	0.0
25352	G03S165.1	G03S160	401.00	400.26	412.30	0.003	15	224	1.27	2.40	16.0	400.46	400.48	11.84	0.10	2.40	4.3
25347	G03S160.1	G03S158	400.26	399.47	409.50	0.003	15	241	1.50	2.40	16.0	399.67	399.70	9.83	0.12	2.39	5.1
25344	G03S158.1	G03S157	399.47	399.29	410.30	0.003	15	55	1.50	2.40	16.0	399.49	399.53	10.81	0.12	2.39	5.1
25345	G03S157.1	G03S156	399.29	398.17	410.20	0.003	15	338	1.53	2.36	15.7	398.37	398.40	11.83	0.12	2.40	5.1
25346	G03S156.1	G03S155	398.17	396.88	407.90	0.004	15	368	1.36	2.55	17.0	397.09	397.12	10.81	0.12	2.47	4.9
25367	G03S155.1	G03S154	396.88	396.19	407.90	0.003	15	266	0.30	7.59	50.6	396.82	396.82	11.08	0.12	2.13	5.8
30975	H02S261.1	H02S262	416.09	415.06	427.10	0.004	11	258	1.69	3.19	29.0	415.33	415.37	11.77	0.17	1.15	15.0
30989	H02S262.1	H02S277	415.06	413.66	429.70	0.004	11	350	1.94	3.22	29.3	413.93	413.99	15.77	0.20	1.15	17.5
30988	H02S277.1	H02S275	413.66	413.45	429.70	0.004	11	55	1.97	3.19	29.0	413.72	413.78	15.98	0.20	1.13	17.9
30986	H02S275.1	H02S274	413.45	412.37	430.40	0.004	11	267	1.59	3.71	33.7	412.68	412.72	17.72	0.20	1.16	17.3
31275	H02S274.1	H03S90	412.37	411.82	432.80	0.004	11	135	2.44	3.36	30.5	412.10	412.19	20.70	0.27	1.17	23.1
31273	H03S90.1	H03S89	411.82	409.33	426.30	0.008	11	329	2.30	3.49	31.8	409.62	409.70	16.68	0.27	1.59	16.9
31272	H03S89.1	H03S88	409.33	407.60	424.60	0.005	11	346	2.30	3.49	31.7	407.89	407.97	16.71	0.27	1.29	20.7
31271	H03S88.1	H03S11	407.60	406.47	422.50	0.005	11	226	1.70	4.38	39.8	406.83	406.88	15.67	0.27	1.29	20.7
31622	H03S11.1	H03S10	406.47	406.11	416.10	0.006	11	62	2.21	5.15	46.8	406.54	406.61	9.56	0.43	1.39	31.1
31268	H03S10.1	H03S9	406.11	405.90	421.90	0.003	11	66	2.28	5.14	46.7	406.33	406.41	15.57	0.45	1.03	43.3
31269	H03S9.1	H03S7	405.90	405.33	421.30	0.003	11	178	2.22	5.25	47.7	405.77	405.85	15.53	0.45	1.03	43.1
31264	H03S7.1	H03S6	405.33	404.72	419.70	0.003	11	190	2.24	5.33	48.5	405.17	405.24	14.54	0.46	1.03	44.5
31228	H03S6.1	H03S5	404.72	403.48	417.50	0.003	11	389	2.37	5.21	47.4	403.92	404.00	13.58	0.47	1.03	45.6
31229	H03S5.1	H03S21	403.48	402.66	417.50	0.003	12	256	1.70	6.78	56.5	403.23	403.27	14.27	0.50	1.30	38.5
31231	H03S21.1	H03S22	402.66	401.86	412.90	0.003	12	252	2.59	6.82	56.8	402.43	402.53	10.47	0.77	1.30	59.5
31232	H03S22.1	G03S151	401.86	401.08	409.10	0.003	12	243	3.37	5.62	46.9	401.55	401.72	7.55	0.79	1.30	60.2
25374	G03S151.1	G03S152	401.08	399.15	406.20	0.007	15	267	2.86	5.82	38.8	399.64	399.76	6.57	0.81	3.55	22.9
25365	G03S152.1	G03S153	399.15	398.61	404.60	0.005	15	100	3.38	5.82	38.8	399.09	399.27	5.51	0.96	3.07	31.4
25366	G03S153.1	G03S154	398.61	396.19	407.90	0.023	15	106	2.39	7.59	50.6	396.82	396.91	11.08	0.96	6.31	15.3
25368	G03S154.1	G03S146	396.19	395.51	406.50	0.003	15	261	2.68	7.61	50.8	396.14	396.25	10.36	1.08	2.13	50.8
25369	G03S146.1	G03S145	395.51	394.88	403.90	0.003	15	245	2.54	7.95	53.0	395.54	395.64	8.36	1.08	2.12	51.1
25371	G03S145.1	G03S224	394.88	394.37	409.70	0.003	15	196	1.91	10.20	68.0	395.22	395.28	14.48	1.09	2.13	51.3
25415	G03S224.1	G03S223	394.37	393.36	402.40	0.003	18	388	3.13	10.18	56.5	394.21	394.36	8.19	2.08	3.46	60.0
25414	G03S223.1	G03S222	393.36	392.69	410.70	0.003	18	259	3.71	8.90	49.4	393.43	393.65	17.27	2.09	3.45	60.5
25412	G03S222.1	G03S231	392.69	392.27	411.30	0.004	18	97	3.53	9.39	52.2	393.05	393.25	18.25	2.12	4.47	47.5
25431	G03S231.1	G03S242	392.27	390.43	428.40	0.003	18	541	3.53	9.37	52.1	391.21	391.40	37.19	2.12	3.96	53.5
25440	G03S242.1	G03S267	390.43	388.66	428.40	0.003	18	520	2.92	10.98	61.0	389.58	389.71	38.82	2.12	3.96	53.4
25454	G03S267.1	G03S270	388.66	386.87	394.90	0.004	20	447	3.26	13.34	66.7	387.98	388.15	6.92	3.24	5.69	56.9
25450	G03S270.1	G03S274	386.87	385.97	394.00	0.002	20	410	3.00	14.31	71.6	387.16	387.30	6.84	3.23	4.21	76.8
25634	G03S274.1	G04S155	385.97	385.06	405.10	0.002	20	486	3.01	14.46	72.3	386.26	386.40	18.83	3.28	3.89	84.4

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 42 - MIRA MESA
2050 WWF ALTERNATIVE 2

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 (%)
25633	G04S155.1	G04S156	385.06	384.90	400.90	0.002	20	73	3.29	14.46	72.3	386.11	386.27	14.79	3.59	4.21	85.2
25611	G04S156.1	G04S157	384.90	384.50	407.50	0.002	20	188	3.32	14.35	71.7	385.70	385.87	21.80	3.59	4.15	86.5
25610	G04S157.1	G04S364	384.50	383.94	409.90	0.002	20	250	3.29	14.55	72.7	385.15	385.32	24.75	3.60	4.26	84.6
25609	G04S364.1	G04S159	383.94	383.84	407.80	0.002	20	45	3.35	14.49	72.5	385.05	385.22	22.75	3.66	4.24	86.3
25607	G04S159.1	G04S367	383.84	383.33	412.30	0.002	20	235	3.42	14.21	71.1	384.51	384.70	27.79	3.66	4.19	87.3
25604	G04S367.1	G04S164	383.33	382.97	415.00	0.002	20	158	3.57	13.65	68.3	384.11	384.30	30.89	3.66	4.29	85.2
25696	G04S164.1	G04S167	382.97	382.77	418.80	0.002	21	89	3.64	13.26	63.1	383.87	384.08	34.93	3.76	4.85	77.4
25594	G04S167.1	G04S80	382.77	381.36	423.40	0.003	20	483	3.62	13.78	68.9	382.51	382.71	40.89	3.75	4.86	77.2
25593	G04S80.1	G04S202	381.36	380.57	422.60	0.002	24	462	3.00	14.28	59.5	381.76	381.90	40.84	3.75	6.05	62.0
25723	G04S202.1	G04S216	380.57	379.65	411.70	0.002	23	540	3.22	13.74	59.7	380.79	380.96	30.91	3.75	5.39	69.5
25732	G04S216.1	G04S227	379.65	379.04	411.70	0.002	24	360	3.33	13.02	54.2	380.12	380.30	31.58	3.74	6.02	62.2
25729	G04S227.1	G04S237	379.04	378.78	401.80	0.002	24	155	3.88	11.54	48.1	379.74	379.98	22.06	3.74	5.99	62.5
25753	G04S237.1	G04S243	378.78	377.75	402.80	0.004	23	255	2.65	17.00	73.9	379.17	379.28	23.63	3.91	8.30	47.1
25758	G04S243.1	G04S266	377.75	377.10	384.10	0.001	29	520	3.12	16.86	58.1	378.50	378.66	5.60	5.56	8.56	65.0
25781	G04S266.1	G04S268	377.10	376.61	383.60	0.001	29	347	2.93	17.79	61.4	378.09	378.23	5.51	5.57	9.10	61.2
25778	G04S268.1	G04S269	376.61	376.25	387.60	0.001	29	290	2.82	18.33	63.2	377.78	377.90	9.82	5.57	8.53	65.2
26073	G04S269.1	G05S64	376.25	375.49	417.50	0.001	29	525	3.17	18.86	65.0	377.06	377.22	40.44	6.47	9.21	70.2
25934	G05S64.1	G05S62	375.49	374.80	386.80	0.001	29	550	3.18	18.84	65.0	376.37	376.53	10.43	6.47	8.58	75.4
25929	G05S62.1	G05S59	374.80	374.50	386.50	0.001	29	240	3.23	18.71	64.5	376.06	376.22	10.44	6.48	8.56	75.7
25930	G05S59.1	G05S32	374.50	373.81	410.80	0.001	30	550	3.20	18.53	61.8	375.35	375.51	35.45	6.55	9.39	69.7
25907	G05S32.1	G05S48	373.81	373.12	397.10	0.001	30	550	3.30	17.98	59.9	374.62	374.79	22.48	6.54	9.39	69.7
25915	G05S48.1	G05S46	373.12	372.52	411.50	0.001	30	485	5.11	12.99	43.3	373.60	374.01	37.90	6.73	9.32	72.1

Rehab Pt Repair Replace

TOTAL LENGTH (MILES):	6.92	LENGTH OF PIPE - d/D < 50% (MILES):	3.62	LENGTH OF PIPE - Q/CAP < 50% (MILES):	3.97
LENGTH WEIGHTED Q/CAP:	45.3	LENGTH OF PIPE - d/D 50 - 75% (MILES):	3.20	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	2.28
LENGTH WEIGHTED d/D:	48.3	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.02	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.61
LENGTH WEIGHTED HGL BELOW RIM (FT):	17.25	LENGTH OF PIPE - d/D > 100% (MILES):	0.08	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.06

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 104 - MESA RIM
2050 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)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5500180	F05S120.1	F05S39	272.00	236.66	242.50	0.099	12	357	5.04	4.27	35.6	237.02	237.41	5.48	0.41	0.817	7.25	11.3
20532	F05S39.1	F05S73	236.66	224.41	237.00	0.030	12	409	6.14	4.26	35.5	224.77	225.35	12.24	0.48	0.991	3.99	24.8
20564	F05S73.1	F05S72	224.00	212.00	235.00	0.015	15	800	4.43	4.87	32.5	212.41	212.71	22.59	0.48	0.989	5.11	19.4
20563	F05S72.1	F05S83	212.00	204.81	214.00	0.013	15	539	4.44	4.86	32.4	205.22	205.52	8.79	0.48	0.989	4.82	20.5
20573	F05S83.1	F05S84	204.41	194.04	203.00	0.020	18	519	5.16	4.78	26.5	194.44	194.85	8.56	0.72	1.253	9.60	13.0
20567	F05S84.1	F05S76	193.64	182.00	202.60	0.024	18	491	4.74	5.09	28.3	182.42	182.77	20.18	0.73	1.258	10.45	12.0
20566	F05S76.1	F05S75	182.00	172.07	190.00	0.016	18	640	4.87	5.09	28.3	172.49	172.86	17.51	0.74	1.289	8.46	15.2
20565	F05S75.1	F05S74	172.07	166.30	183.10	0.017	18	333	4.93	5.04	28.0	166.72	167.10	16.38	0.74	1.289	8.94	14.4
20590	F05S74.1	F06S1	166.30	162.35	176.30	0.017	18	238	4.66	5.27	29.3	162.79	163.13	13.51	0.75	1.296	8.75	14.8
20591	F06S1.1	F06S2	162.35	159.90	169.40	0.013	18	188	4.66	8.36	46.5	160.60	160.93	8.80	0.75	1.295	7.75	16.7
5526638	F06S2.1	F06S3	159.90	158.60	166.90	0.017	18	78	4.60	22.99	127.7	160.52	160.84	6.38	0.75	1.288	8.77	14.7
20593	F06S3.1	F06S4	158.60	156.80	173.60	0.014	18	130	4.58	43.84	243.5	160.45	160.78	13.15	0.75	1.313	7.99	16.4
20594	F06S4.1	F06S5	156.80	154.90	174.80	0.014	18	139	4.57	65.84	365.8	160.39	160.71	14.41	0.75	1.355	7.94	17.1
20595	F06S5.1	F06S6	154.90	152.91	171.90	0.014	18	147	4.32	88.88	493.8	160.32	160.61	11.58	0.75	1.378	7.90	17.4
20596	F06S6.1	F06S8	152.91	149.80	163.10	0.011	18	284	1.20	124.67	692.6	160.19	160.21	2.91	0.75	1.434	7.11	20.2

TOTAL LENGTH (MILES):	1.00	LENGTH OF PIPE - d/D < 50% (MILES):	0.85	LENGTH OF PIPE - Q/CAP < 50% (MILES):	1.00
LENGTH WEIGHTED Q/CAP:	16.7	LENGTH OF PIPE - d/D 50 - 75% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	0.00
LENGTH WEIGHTED d/D:	95.1	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):	13.68	LENGTH OF PIPE - d/D > 100% (MILES):	0.15	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

APPENDIX C

3ROOTS ONSITE SEWER ANALYSIS
SOUTH SUB-BASIN
CALCULATION SPREADSHEET RESULTS

DATE: 12/20/2018

JOB NUMBER: 537-012

SEWER STUDY SUMMARY

FOR: 3Roots South Sub-Basin PDWF plus City Year 2050 Offsite Flows

BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1

REFER TO PLAN SHEET:

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' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	Notes
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
	PA4-17	PA4-16	281.5	3.5	10.00	35.0	35.0	80	2,800	4.000	11,200	0.011	0.017	8	1.07	0.006421	0.05482	0.082	0.0306	1.27	PA4 10 DUs @ 3.5
	PA4-16	PA4-15	144.0	3.5	3.00	10.5	45.5	80	3,640	4.000	14,560	0.015	0.023	8	4.72	0.003975	0.04365	0.065	0.0219	2.31	PA4 3 DUs @ 3.5
	PA4-21	PA4-20	172.4	3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	1.16	0.001232	0.02512	0.038	0.0097	0.81	PA4 2 DUs @ 3.5
	PA4-20	PA4-19	55.0	3.5	3.00	10.5	17.5	80	1,400	4.000	5,600	0.006	0.009	8	1.82	0.002462	0.03485	0.052	0.0157	1.24	PA4 3 DUs @ 3.5
	PA4-19	PA4-18	41.9	3.5	3.00	10.5	28.0	80	2,240	4.000	8,960	0.009	0.014	8	6.44	0.002094	0.03233	0.048	0.0141	2.22	PA4 3 DUs @ 3.5
	PA4-18	PA4-15	312.7	3.5	12.00	42.0	70.0	80	5,600	4.000	22,400	0.022	0.035	8	0.99	0.013352	0.07764	0.116	0.0511	1.53	PA4 12 DUs @ 3.5
	PA4-15	MH-52	144.0	3.5	2.00	7.0	122.5	80	9,800	4.000	39,200	0.039	0.061	8	4.31	0.011198	0.07145	0.107	0.0453	3.01	
	MH-53A	MH-53	29.3	2.8	0.00	68938.0	69060.5	80	5,524,840	1.521	8,402,958	8.403	13.002	24	1.03	0.262855	1.07964	0.540	0.4328	7.51	<— Mira Mesa TS input 8.388 mgd
	MH-53	MH-52	89.6	2.8	0.00	0.0	69060.5	80	5,524,840	1.521	8,402,958	8.403	13.002	24	1.00	0.266203	1.08801	0.544	0.4370	7.44	
	MH-52	MH-51	270.3	2.8	0.00	0.0	69060.5	80	5,524,840	1.521	8,402,958	8.403	13.002	24	0.70	0.318174	1.21793	0.609	0.5010	6.49	
	MH-51	MH-50	149.3	2.8	0.00	0.0	69060.5	80	5,524,840	1.521	8,402,958	8.403	13.002	24	0.74	0.309455	1.19614	0.598	0.4901	6.63	
	MH-50	MH-49	296.3	2.8	0.00	0.0	69060.5	80	5,524,840	1.521	8,402,958	8.403	13.002	24	2.03	0.186838	0.88384	0.442	0.3347	9.71	
	PA4-14	PA4-13	78.1	3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	2.56	0.001245	0.02527	0.038	0.0097	1.20	PA4 3 DUs @ 3.5
	PA4-13	PA4-12	178.8	3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	4.47	0.000943	0.02211	0.033	0.0080	1.46	PA4 3 DUs @ 3.5
	PA4-12	PA4-11	148.1	3.5	4.00	14.0	24.5	80	1,960	4.000	7,840	0.008	0.012	8	1.35	0.004002	0.04379	0.066	0.0220	1.24	PA4 4 DUs @ 3.5
	PA4-11	PA4-10	107.8	3.5	4.00	14.0	38.5	80	3,080	4.000	12,320	0.012	0.019	8	11.13	0.002190	0.03310	0.050	0.0146	2.95	PA4 4 DUs @ 3.5
	PA4-10	MH-49	72.3	3.5	5.00	17.5	56.0	80	4,480	4.000	17,920	0.018	0.028	8	1.38	0.009047	0.06450	0.097	0.0390	1.60	PA4 5 DUs @ 3.5
	MH-49	MH-48	24.9	3.2	0.00	0.0	69116.5	80	5,529,320	1.521	8,409,463	8.409	13.012	24	1.61	0.209960	0.94451	0.472	0.3650	8.91	
	MH-48	MH-47	264.7	3.2	0.00	0.0	69116.5	80	5,529,320	1.521	8,409,463	8.409	13.012	24	0.60	0.343933	1.28267	0.641	0.5322	6.11	
	MH-47	MH-42	112.2	3.2	0.00	0.0	69116.5	80	5,529,320	1.521	8,409,463	8.409	13.012	24	1.12	0.251733	1.05183	0.526	0.4189	7.77	
	PA3-22	PA3-21	192.0	3.5	4.00	14.0	14.0	80	1,120	4.000	4,480	0.004	0.007	8	1.04	0.002605	0.03576	0.054	0.0163	0.95	PA3 4 DUs @ 3.5
	PA3-23	PA3-21	194.5	3.5	6.00	21.0	21.0	80	1,680	4.000	6,720	0.007	0.010	8	1.03	0.003935	0.04344	0.065	0.0218	1.07	PA3 6 DUs @ 3.5
	PA3-21	PA3-20	170.0	3.5	1.00	3.5	38.5	80	3,080	4.000	12,320	0.012	0.019	8	2.35	0.004763	0.04762	0.071	0.0249	1.72	PA3 1 DU @ 3.5
	PA3-20	PA3-19	57.3	3.5	3.00	10.5	49.0	80	3,920	4.000	15,680	0.016	0.024	8	1.75	0.007021	0.05716	0.086	0.0326	1.67	PA3 3 DUs @ 3.5
	PA3-19	PA3-18	61.9	3.5	3.00	10.5	59.5	80	4,760	4.000	19,040	0.019	0.029	8	1.62	0.008872	0.06390	0.096	0.0384	1.72	PA3 3 DUs @ 3.5
	PA3-18	PA3-17	94.4	3.5	2.00	7.0	66.5	80	5,320	4.000	21,280	0.021	0.033	8	2.12	0.008668	0.06319	0.095	0.0378	1.96	PA3 2 DUs @ 3.5
	PA3-17	MH-45	76.9	3.5	0.00	0.0	66.5	80	5,320	4.000	21,280	0.021	0.033	8	6.50	0.004950	0.04846	0.073	0.0256	2.89	
	MH-45	MH-44	122.2	3.5	0.00	0.0	66.5	80	5,320	4.000	21,280	0.021	0.033	8	1.64	0.009855	0.06725	0.101	0.0414	1.79	
	MH-44	MH-43	52.2	3.5	0.00	0.0	66.5	80	5,320	4.000	21,280	0.021	0.033	8	1.92	0.009108	0.06472	0.097	0.0392	1.89	
	MH-46	MH-43	181.2	3.2	61.00	195.2	195.2	80	15,616	4.000	62,464	0.062	0.097	8	1.10	0.035321	0.12448	0.187	0.1013	2.15	
	MH-43	MH-42	66.1	2.8	0.00	0.0	261.7	80	20,936	3.801	79,578	0.080	0.123	8	7.56	0.017165	0.08777	0.132	0.0611	4.53	
	MH-42	MH-41	420.4	2.8	0.00	0.0	69378.2	80	5,550,256	1.521	8,439,851	8.440	13.059	24	3.21	0.149233	0.78066	0.390	0.2839	11.50	
	MH-41	MH-40	57.1	2.8	0.00	0.0	69378.2	80	5,550,256	1.521	8,439,851	8.440	13.059	24	2.63	0.164869	0.82436	0.412	0.3053	10.69	
	MH-40	MH-39	57.9	2.8	0.00	0.0	69378.2	80	5,550,256	1.521	8,439,851	8.440	13.059	24	2.59	0.166137	0.82788	0.414	0.3071	10.63	
	MH-39	MH-38	221.4	2.8	0.00	0.0	69378.2	80	5,550,256	1.521	8,439,851	8.440	13.059	24	3.39	0.145217	0.76919	0.385	0.2784	11.73	
	MH-38	MH-37	349.3	3.5	53.00	185.5	69563.7	80	5,565,096	1.520	8,461,385	8.461	13.093	24	3.24	0.148919	0.77977	0.390	0.2835	11.55	PA6 53 DUs @ 3.5
	MH-37	MH-36	51.3	3.2	0.00	0.0	69563.7	80	5,565,096	1.520	8,461,385	8.461	13.093	24	3.12	0.151756	0.78776	0.394	0.2874	11.39	
	MH-62	MH-61	293.8	2.4	90.00	216.0	216.0	80	17,280	3.953	68,314	0.068	0.106	8	1.02	0.040115	0.13253	0.199	0.1108	2.15	PA12 90 DUs @ 2.4

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' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	Notes
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
	MH-63	MH-61	215.3	2.4	90.00	216.0	216.0	80	17,280	3.953	68,314	0.068	0.106	8	4.18	0.019816	0.09404	0.141	0.0675	3.52	PA12 90 DUs @ 2.4
	MH-61	MH-60	237.1	2.2	243.00	534.6	966.6	80	77,328	2.535	196,057	0.196	0.303	8	1.27	0.103178	0.21385	0.321	0.2174	3.14	PA13 243 DUs @ 2.2
	MH-60	MH-59	31.5	2.2	0.00	472.0	1438.6	80	115,088	2.393	275,369	0.275	0.426	8	1.27	0.144916	0.25611	0.384	0.2779	3.45	PA19 472 population
	MH-59	MH-36	145.7	2.2	0.00	0.0	1438.6	80	115,088	2.393	275,369	0.275	0.426	8	1.03	0.160917	0.27113	0.407	0.3000	3.20	
	MH-36	MH-35	66.7	3.2	0.00	0.0	71002.3	80	5,680,184	1.519	8,631,039	8.631	13.355	24	2.40	0.176498	0.85621	0.428	0.3210	10.40	
	PA5-23	PA5-22	40.1	3.3	4.00	13.2	13.2	80	1,056	4.000	4,224	0.004	0.007	8	1.00	0.002505	0.03513	0.053	0.0159	0.92	PA5 4 DUs @ 3.3
	PA5-22	PA5-21	120.0	3.3	8.00	26.4	39.6	80	3,168	4.000	12,672	0.013	0.020	8	1.00	0.007515	0.05909	0.089	0.0342	1.29	PA5 8 DUs @ 3.3
	PA5-21	PA5-20	131.0	3.3	6.00	19.8	59.4	80	4,752	4.000	19,008	0.019	0.029	8	0.99	0.011330	0.07186	0.108	0.0457	1.45	PA5 6 DUs @ 3.3
	PA5-20	PA5-19	200.1	3.3	7.00	23.1	82.5	80	6,600	4.000	26,400	0.026	0.041	8	1.20	0.014293	0.08025	0.120	0.0536	1.71	PA5 7 DUs @ 3.3
	PA5-19	PA5-18	146.2	3.3	11.00	36.3	118.8	80	9,504	4.000	38,016	0.038	0.059	8	2.81	0.013450	0.07792	0.117	0.0514	2.57	PA5 11 DUs @ 3.3
	PA5-18	PA5-17	56.4	3.3	8.00	26.4	145.2	80	11,616	4.000	46,464	0.046	0.072	8	4.61	0.012834	0.07621	0.114	0.0498	3.25	PA5 8 DUs @ 3.3
	PA5-17	PA5-16	27.6	3.3	0.00	0.0	145.2	80	11,616	4.000	46,464	0.046	0.072	8	3.62	0.014483	0.08076	0.121	0.0541	2.99	
	PA5-16	PA5-15	55.6	3.3	7.00	23.1	168.3	80	13,464	4.000	53,856	0.054	0.083	8	3.60	0.016834	0.08699	0.130	0.0603	3.11	PA5 7 DUs @ 3.3
	PA5-15	PA5-14	47.3	3.3	3.00	9.9	178.2	80	14,256	4.000	57,024	0.057	0.088	8	2.12	0.023227	0.10151	0.152	0.0755	2.63	PA5 3 DUs @ 3.3
	PA5-14	PA5-13	59.4	3.3	2.00	6.6	184.8	80	14,784	4.000	59,136	0.059	0.092	8	1.68	0.027058	0.10933	0.164	0.0841	2.45	PA5 2 DUs @ 3.3
	PA5-13	PA5-12	138.0	3.3	7.00	23.1	207.9	80	16,632	3.980	66,201	0.066	0.102	8	2.90	0.023055	0.10116	0.152	0.0751	3.07	PA5 7 DUs @ 3.3
	PA5-12	PA5-11	142.5	3.3	11.00	36.3	244.2	80	19,536	3.859	75,396	0.075	0.117	8	1.05	0.043637	0.13815	0.207	0.1177	2.23	PA5 11 DUs @ 3.3
	MH-82	MH-81	156.3	3.3	7.00	23.1	23.1	80	1,848	4.000	7,392	0.007	0.011	8	1.28	0.003875	0.04312	0.065	0.0215	1.19	PA5 7 DUs @ 3.3
	MH-81	MH-80	23.0	3.3	8.00	26.4	49.5	80	3,960	4.000	15,840	0.016	0.025	8	8.70	0.003185	0.03940	0.059	0.0188	2.93	PA5 8 DUs @ 3.3
	MH-80	PA5-26	161.8	3.3	8.00	26.4	75.9	80	6,072	4.000	24,288	0.024	0.038	8	3.09	0.008194	0.06154	0.092	0.0364	2.33	PA5 8 DUs @ 3.3
	PA5-26	PA5-25	142.9	3.3	16.00	52.8	128.7	80	10,296	4.000	41,184	0.041	0.064	8	2.80	0.014597	0.08106	0.122	0.0544	2.63	PA5 16 DUs @ 3.3
	PA5-25	PA5-24	28.8	3.3	0.00	0.0	128.7	80	10,296	4.000	41,184	0.041	0.064	8	3.47	0.013112	0.07698	0.115	0.0505	2.84	
	PA5-24	PA5-11	121.0	3.3	17.00	56.1	184.8	80	14,784	4.000	59,136	0.059	0.092	8	1.24	0.031495	0.11777	0.177	0.0936	2.20	PA5 17 DUs @ 3.3
	PA5-11	PA5-10	133.5	3.3	6.00	19.8	448.8	80	35,904	3.177	114,079	0.114	0.177	8	2.62	0.041798	0.13524	0.203	0.1141	3.48	PA5 6 DUs @ 3.3
	PA5-10	MH-58	167.4	3.3	5.00	16.5	465.3	80	37,224	3.122	116,226	0.116	0.180	8	5.97	0.028211	0.11159	0.167	0.0866	4.67	PA5 5 DUs @ 3.3
	MH-58	MH-57	188.2	2.6	186.00	483.6	948.9	80	75,912	2.553	193,811	0.194	0.300	8	5.31	0.049881	0.14768	0.222	0.1294	5.22	PA14 186 DUs @ 2.6
	MH-57	MH-56	350.5	2.8	0.00	0.0	948.9	80	75,912	2.553	193,811	0.194	0.300	8	2.85	0.068086	0.17267	0.259	0.1614	4.18	
	MH-56	MH-55	11.9	2.8	0.00	0.0	948.9	80	75,912	2.553	193,811	0.194	0.300	8	8.42	0.039612	0.13169	0.198	0.1098	6.14	
	MH-55	MH-54	71.8	2.8	0.00	0.0	948.9	80	75,912	2.553	193,811	0.194	0.300	8	4.18	0.056221	0.15683	0.235	0.1409	4.79	
	MH-54	MH-35	109.0	2.8	0.00	0.0	948.9	80	75,912	2.553	193,811	0.194	0.300	8	1.38	0.097846	0.20803	0.312	0.2093	3.22	
	MH-35	MH-34	256.2	2.8	0.00	0.0	71951.2	80	5,756,096	1.519	8,743,656	8.744	13.529	24	5.00	0.123877	0.70629	0.353	0.2480	13.64	
	MH-34	MH-14A	242.3	2.8	0.00	0.0	71951.2	80	5,756,096	1.519	8,743,656	8.744	13.529	24	4.91	0.125007	0.70972	0.355	0.2497	13.55	
	MH-14A	MH-14	46.3	2.8	0.00	0.0	71951.2	80	5,756,096	1.519	8,743,656	8.744	13.529	24	4.97	0.124250	0.70742	0.354	0.2486	13.61	<— MMTS connects to CCTS
	MH-29	MH-28	286.9	3.2	43.00	137.6	137.6	80	11,008	4.000	44,032	0.044	0.068	8	1.26	0.023264	0.10159	0.152	0.0756	2.03	PA18 43 DUs @ 3.2
	MH-28	MH-27	380.3	3.2	0.00	0.0	137.6	80	11,008	4.000	44,032	0.044	0.068	8	1.29	0.022992	0.10103	0.152	0.0750	2.04	
	MH-27	MH-26	380.7	3.2	0.00	0.0	137.6	80	11,008	4.000	44,032	0.044	0.068	8	1.02	0.025857	0.10697	0.160	0.0814	1.88	
	MH-26	MH-25	229.5	3.2	0.00	0.0	137.6	80	11,008	4.000	44,032	0.044	0.068	8	1.26	0.023264	0.10159	0.152	0.0756	2.03	
	MH-25	MH-24	344.8	3.2	0.00	775.0	912.6	80	73,008	2.589	189,047	0.189	0.293	8	1.07	0.108388	0.21945	0.329	0.2252	2.92	<— Arjons Dr input 0.145 mgd PWWF
	MH-24	MH-23	248.0	3	96.70	290.1	1202.7	80	96,216	2.450	235,716	0.236	0.365	8	13.67	0.037810	0.12868	0.193	0.1063	7.72	PA18 40@3.2 + PA17 54@3.0 = 96.7@3.0
	MH-33	MH-32	17.0	2.8	0.00	78017.0	78017.0	80	6,241,360	1.516	9,461,855	9.462	14.641	27	1.77	0.164575	0.92648	0.412	0.3049	9.48	<— Carroll Cyn TS input 9.362 mgd
	MH-32	MH-31	233.9	2.8	0.00	0.0	78017.0	80	6,241,360	1.516	9,461,855	9.462	14.641	27	0.64	0.273691	1.24507	0.553	0.4464	6.48	
	MH-31	MH-30	271.0	2.8	0.00	0.0	78017.0	80	6,241,360	1.516	9,461,855	9.462	14.641	27	0.52	0.303633	1.32928	0.591	0.4828	5.99	
	MH-30	MH-23	89.1	2.8	0.00	0.0	78017.0	80	6,241,360	1.516	9,461,855	9.462	14.641	27	0.67	0.267494	1.22764	0.546	0.4386	6.59	<— Crossover to new CCTS in Carroll Canyon Road
	MH-23	MH-22	237.0	2.8	0.00	0.0	79219.7	80	6,337,576	1.515	9,603,907	9.604	14.860	30	0.38	0.272214	1.37879	0.552	0.4445	5.35	
	MH-22	MH-21	344.9	2.8	0.00	0.0	79219.7	80	6,337,576	1.515	9,603,907	9.604	14.860	30	0.35	0.283641	1.41450	0.566	0.4582	5.19	
	MH-21	MH-20	381.2	2.8	0.00	0.0	79219.7	80	6,337,576	1.515	9,603,907	9.604	14.860	30	0.37	0.275868	1.39021	0.556	0.4491	5.29	

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' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	Notes
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
	MH-20	MH-19	387.4	2.8	0.00	0.0	79219.7	80	6,337,576	1.515	9,603,907	9.604	14.860	30	0.34	0.287782	1.42744	0.571	0.4630	5.14	
	MH-19	MH-18	322.5	2.8	0.00	118.6	79338.3	80	6,347,064	1.515	9,617,908	9.618	14.882	30	0.37	0.276270	1.39147	0.557	0.4496	5.30	Community Park 118.6 population
	MH-18	MH-17	383.6	2.8	0.00	0.0	79338.3	80	6,347,064	1.515	9,617,908	9.618	14.882	30	0.36	0.280081	1.40338	0.561	0.4542	5.24	
	PA15-10	MH-17	102.8	3	201.30	603.9	603.9	80	48,312	2.915	140,834	0.141	0.218	8	4.28	0.040373	0.13295	0.199	0.1114	4.40	PA15 76@3.0 + PA16 80@3.2 + PA17 40@3.0
	MH-17	MH-16	289.3	2.8	0.00	0.0	79942.2	80	6,395,376	1.515	9,689,186	9.689	14.992	30	1.80	0.126184	0.89161	0.357	0.2514	9.54	
	MH-16	MH-15	350.5	2.8	0.00	0.0	79942.2	80	6,395,376	1.515	9,689,186	9.689	14.992	30	1.80	0.126184	0.89161	0.357	0.2514	9.54	
	MH-15	MH-14	248.2	2.8	0.00	0.0	79942.2	80	6,395,376	1.515	9,689,186	9.689	14.992	30	1.99	0.120009	0.86811	0.347	0.2424	9.90	
	MH-14	MH-13	361.7	2.8	0.00	0.0	151893.4	80	12,151,472	1.500	18,227,208	18.227	28.204	30	1.41	0.268204	1.36626	0.547	0.4395	10.27	<— Begin MMTS and CCTS combined flows
	MH-13	MH-12	351.0	2.8	0.00	53.0	151946.4	80	12,155,712	1.500	18,233,568	18.234	28.213	30	1.40	0.269254	1.36954	0.548	0.4408	10.24	PA20 53 population
	MH-12	MH-11	329.6	2.8	0.00	0.0	151946.4	80	12,155,712	1.500	18,233,568	18.234	28.213	30	1.06	0.309438	1.49512	0.598	0.4900	9.21	
	MH-11	MH-10	151.9	2.8	0.00	0.0	151946.4	80	12,155,712	1.500	18,233,568	18.234	28.213	30	0.99	0.320191	1.52872	0.611	0.5035	8.97	<— 3Roots connection to Ex. CCTS at Camino Santa Fe and Carroll Canyon Rd.
					Total EDUS		Total Pop.								Min Slope			Max dn/D		Max Vel.	
					1,278.0		151,946								0.34			0.64		13.64	
																				Min Vel.	
																				0.81	

* Calculated by converting flows into equivalent population at 80 gpd/person; flows are identified in "Notes" column
* Mira Mesa TS relocation
* Carroll Canyon TS relocation

APPENDIX D

3ROOTS ONSITE SEWER ANALYSIS
CENTRAL SUB-BASIN
CALCULATION SPREADSHEET RESULTS

DATE: 12/13/2018

JOB NUMBER: 537-012

SEWER STUDY SUMMARY

FOR: 3Roots Onsite Central Subbasin Plus Year 2050 Flows in Camino Santa Fe

BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 1

REFER TO PLAN SHEET:

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' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)	Notes
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
	MH-70	MH-69	275.1	3.1	49.00	151.9	151.9	80	12,152	4.000	48,608	0.049	0.075	8	1.02	0.028544	0.11224	0.168	0.0873	1.94	PA7 22 DUs & PA8 27 DUs
	MH-69	MH-68	111.6	3	27.00	81.0	232.9	80	18,632	3.890	72,485	0.072	0.112	8	1.08	0.041366	0.13455	0.202	0.1133	2.23	Portion of PA11 27 DUs @ 3.0
	MH-68	MH-66	291.2	3	0.00	0.0	232.9	80	18,632	3.890	72,485	0.072	0.112	8	1.79	0.032131	0.11895	0.178	0.0949	2.66	
	MH-67	MH-66	232.4	3	58.00	174.0	174.0	80	13,920	4.000	55,680	0.056	0.086	8	1.03	0.032538	0.11970	0.180	0.0958	2.02	PA11 58 DUs @ 3.0
	MH-66	MH-65	90.3	2.8	0.00	0.0	406.9	80	32,552	3.310	107,758	0.108	0.167	8	1.00	0.063908	0.16732	0.251	0.1544	2.43	
	MH-65	MH-64	352.8	3.1	123.00	381.3	788.2	80	63,056	2.760	174,024	0.174	0.269	8	2.34	0.067469	0.17188	0.258	0.1604	3.78	PA9 68 DUs & PA8 55 DUs
																					Central Basin Total
	MH-61	SDMH-7	115.0	2.8	0.00	0.0	788.2	80	63,056	2.760	174,024	0.174	0.269	10	3.10	0.032330	0.14914	0.179	0.0953	4.07	Existing sewer
	SDMH-7	SDMH-8	399.0	2.8	0.00	1712.5	2500.7	80	200,056	2.210	442,110	0.442	0.684	10	3.60	0.076218	0.22866	0.274	0.1750	5.63	Summers Ridge Rd input 0.137 mgd
	SDMH-8	SDMH-9	395.0	2.8	0.00	0.0	2500.7	80	200,056	2.210	442,110	0.442	0.684	10	2.40	0.093347	0.25374	0.304	0.2023	4.87	Existing sewer
	SDMH-9	SDMH-10	378.0	2.8	0.00	0.0	2500.7	80	200,056	2.210	442,110	0.442	0.684	10	0.70	0.172846	0.35264	0.423	0.3161	3.12	Existing sewer
	SDMH-10	SDMH-10A	58.0	2.8	0.00	5162.5	7663.2	80	613,056	1.885	1,155,341	1.155	1.788	12	20.60	0.051204	0.22445	0.224	0.1318	13.56	So. Camino Santa Fe input 0.413 mgd
	SDMH-10A	SDMH-11	42.0	2.8	0.00	0.0	7663.2	80	613,056	1.885	1,155,341	1.155	1.788	12	20.80	0.050957	0.22391	0.224	0.1314	13.61	Existing sewer
	SDMH-11	F06S49	68.0	2.8	0.00	0.0	7663.2	80	613,056	1.885	1,155,341	1.155	1.788	12	17.30	0.055875	0.23453	0.235	0.1403	12.74	Existing sewer

Total EDUS	Total Pop.	Min Slope	Max dn/D	Max Vel.	Min Vel.
257.0	7,663	0.70	0.42	13.61	1.94

* Calculated by converting flows into equivalent population at 80 gpd/person; flows are identified in "Notes" column

Build-out flow from Summers Ridge Drive is 0.137 mgd avg. dry weather
In this anlysis, estimate of flow from south is 3 times that from the north, or 0.413 mgd

APPENDIX E

3ROOTS ONSITE SEWER ANALYSIS
NORTH SUB-BASIN
CALCULATION SPREADSHEET RESULTS

DATE: 12/14/2018

SEWER STUDY SUMMARY

FOR: 3Roots Onsite North Basin PDWF plus Year 2050 Offsite Flows

SHT 1 OF 1

JOB NUMBER: 537-012

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET:

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' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	Notes
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
	PA3-13	PA3-12	306.02	3.5	13.00	45.5	45.5	80	3,640	4.000	14,560	0.015	0.023	8	0.98	0.008723	0.06338	0.095	0.0380	1.33	PA3 13 DUs @ 3.5
	PA3-12	PA3-11	301.17	3.5	12.00	42.0	87.5	80	7,000	4.000	28,000	0.028	0.043	8	1.00	0.016606	0.08642	0.130	0.0598	1.63	PA3 12 DUs @ 3.5
	PA3-11	PA3-10	301.65	3.5	11.00	38.5	126.0	80	10,080	4.000	40,320	0.040	0.062	8	1.33	0.020735	0.09608	0.144	0.0697	2.01	PA3 11 DUs @ 3.5
	PA3-10	MH-80	59.24	3.2	0.00	0.0	126.0	80	10,080	4.000	40,320	0.040	0.062	8	1.01	0.023794	0.10270	0.154	0.0768	1.83	
	MH-80	MH-79	50.49	3.2	20.00	64.0	190.0	80	15,200	4.000	60,800	0.061	0.094	8	0.99	0.036240	0.12605	0.189	0.1032	2.05	PA2 20 DUs @ 3.2
	MH-79	MH-78	201.24	2.8	0.00	0.0	190.0	80	15,200	4.000	60,800	0.061	0.094	8	0.99	0.036240	0.12605	0.189	0.1032	2.05	PA3 13 DUs @ 3.5
	PA3-16	PA3-15	68.64	3.5	7.00	24.5	24.5	80	1,960	4.000	7,840	0.008	0.012	8	2.91	0.002726	0.03651	0.055	0.0168	1.62	PA3 7 DUs @ 3.5
	PA3-15	PA3-14	301.58	3.5	8.00	28.0	52.5	80	4,200	4.000	16,800	0.017	0.026	8	0.99	0.010014	0.06774	0.102	0.0419	1.40	PA3 8 DUs @ 3.5
	PA3-14	MH-78	235.04	3.5	8.00	28.0	80.5	80	6,440	4.000	25,760	0.026	0.040	8	1.02	0.015127	0.08247	0.124	0.0558	1.61	PA3 8 DUs @ 3.5
	MH-78	MH-77	123.34	2.8	0.00	0.0	270.5	80	21,640	3.765	81,475	0.081	0.126	8	0.89	0.051219	0.14966	0.224	0.1319	2.15	
	MH-77	MH-76	258.53	3	36.00	108.0	378.5	80	30,280	3.405	103,103	0.103	0.160	8	0.77	0.069684	0.17472	0.262	0.1641	2.19	Portion of PA8 36 DUs @ 3.0
	MH-76	MH-75	157.18	2.8	0.00	0.0	378.5	80	30,280	3.405	103,103	0.103	0.160	8	0.83	0.067118	0.17143	0.257	0.1598	2.25	
	MH-75	MH-74	85.75	3.1	44.00	136.4	514.9	80	41,192	2.988	123,065	0.123	0.190	8	0.58	0.095835	0.20580	0.309	0.2062	2.08	Portion of PA7 44DUs @ 3.1
	MH-74	MH-73	238.96	3.2	58.00	185.6	700.5	80	56,040	2.833	158,757	0.159	0.246	8	0.67	0.115027	0.22638	0.340	0.2351	2.35	PA2 58 DUs @ 3.2
	MH-73	MH-72	133.09	3.1	56.00	173.6	874.1	80	69,928	2.639	184,530	0.185	0.286	8	0.68	0.132714	0.24423	0.366	0.2607	2.46	PA1 56 DUs @ 3.1
	MH-72	MH-71	278.05	2.8	0.00	0.0	874.1	80	69,928	2.639	184,530	0.185	0.286	8	0.41	0.170914	0.28037	0.421	0.3136	2.05	North Basin Total

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' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	12/14/2018 Notes Page 2
						IN-LINE	TOTAL					M.G.D.	C.F.S.								
	MH-71	SDMH-23	98	2.8	0.00	0.0	874.1	80	69,928	2.639	184,530	0.185	0.286	10	1.00	0.060359	0.20316	0.244	0.1482	2.78	
	`	SDMH-24	383	3.5	0.00	1217.2	2091.3	80	167,304	2.278	381,090	0.381	0.590	10	3.30	0.068620	0.21670	0.260	0.1623	5.23	
	SDMH-24	SDMH-25	202	2.8	0.00	0.0	2091.3	80	167,304	2.278	381,090	0.381	0.590	10	1.00	0.124654	0.29527	0.354	0.2492	3.41	
	SDMH-25	SDMH-26	268	2.8	0.00	0.0	2091.3	80	167,304	2.278	381,090	0.381	0.590	10	1.00	0.124654	0.29527	0.354	0.2492	3.41	
	SDMH-26	SDMH-26A	9	2.8	0.00	0.0	2091.3	80	167,304	2.278	381,090	0.381	0.590	10	32.15	0.021984	0.12357	0.148	0.0727	11.68	
	SDMH-26A	F05S39	236	2.8	0.00	1593.6	3684.9	80	294,792	2.082	613,613	0.614	0.949	12	15.36	0.031494	0.17665	0.177	0.0936	10.15	
	F05S39	F05S73	409	2.8	0.00	0.0	3684.9	80	294,792	2.082	613,613	0.614	0.949	12	3.00	0.071263	0.26512	0.265	0.1668	5.69	
	F05S73	F05S72	800	2.8	0.00	0.0	3684.9	80	294,792	2.082	613,613	0.614	0.949	15	1.55	0.054680	0.29005	0.232	0.1382	4.40	
	F05S72	F05S83	539	2.8	0.00	0.0	3684.9	80	294,792	2.082	613,613	0.614	0.949	15	1.33	0.059030	0.30135	0.241	0.1458	4.17	
	F05S83	F05S84	524	2.8	0.00	1626.0	5310.9	80	424,870	1.983	842,351	0.842	1.303	18	2.00	0.040638	0.30013	0.200	0.1119	5.18	
	F05S84	F05S76	491	2.8	0.00	0.0	5310.9	80	424,870	1.983	842,351	0.842	1.303	18	2.32	0.037731	0.28924	0.193	0.1061	5.46	
	F05S76	F05S75	640	2.8	0.00	143.3	5454.2	80	436,332	1.973	860,908	0.861	1.332	18	1.50	0.047958	0.32577	0.217	0.1258	4.71	
	F05S75	F05S74	333	2.8	0.00	0.0	5454.2	80	436,332	1.973	860,908	0.861	1.332	18	1.64	0.045866	0.31863	0.212	0.1219	4.86	
	F05S74	F06S1	238	2.8	0.00	0.0	5454.2	80	436,332	1.973	860,908	0.861	1.332	18	1.52	0.047642	0.32469	0.216	0.1252	4.73	
	F06S1	F06S2	188	2.8	0.00	0.0	5454.2	80	436,332	1.973	860,908	0.861	1.332	18	1.12	0.055501	0.35063	0.234	0.1397	4.24	
	F06S2	F06S3	70	2.8	0.00	0.0	5454.2	80	436,332	1.973	860,908	0.861	1.332	18	1.24	0.052747	0.34182	0.228	0.1347	4.39	
	F06S3	F06S4	130	2.8	0.00	96.9	5551.0	80	444,084	1.968	873,938	0.874	1.352	18	1.18	0.054890	0.34872	0.232	0.1386	4.34	
	F06S4	F06S5	139	2.8	0.00	165.9	5717.0	80	457,357	1.961	897,024	0.897	1.388	18	1.12	0.057829	0.35790	0.239	0.1437	4.29	
	F06S5	F06S6	147	2.8	0.00	87.7	5804.6	80	464,370	1.958	909,151	0.909	1.407	18	1.12	0.058611	0.36034	0.240	0.1451	4.31	
	F06S6	F06S8	284	2.8	0.00	213.5	6018.1	80	481,447	1.949	938,387	0.938	1.452	18	1.14	0.059963	0.36448	0.243	0.1475	4.38	

Total EDUS	Total Pop.	Min Slope	Max dn/D	Max Vel
273.0	874	0.41	0.42	11.68

Min Vel
1.33

* Calculated by converting flows into equivalent population at 80 gpd/person

Miratech Dr. Equivalent Population				
Acres Developed (Acres)	Conversion Factor (DU/Acre)	Equivalent Dwelling Units	Population Per DU	Population
2.73	14.4	39.312	3.5	137.592
6.82	14.4	98.208	3.5	343.728
14.6	14.4	210.24	3.5	735.84
			Total:	1217.16

APPENDIX F

3ROOTS BUILD-OUT
PEAK WET WEATHER FLOW
WITH YEAR 2012 FLOWS IN
CARROLL CANYON TRUNK SEWER

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 49 - CARROLL CANYON
2012 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 (%)
26037	G05S168.1	G05S167	276.34	271.79	290.80	0.012	21	367	6.92	10.38	49.5	272.66	273.40	18.14	5.30	11.40	46.5
26036	G05S167.1	G05S166	271.79	267.33	285.30	0.012	21	360	6.86	10.45	49.8	268.20	268.93	17.10	5.30	11.40	46.5
26047	G05S166.1	G05S178	267.33	263.01	281.00	0.012	21	360	6.86	10.45	49.8	263.88	264.61	17.12	5.30	11.22	47.3
26048	G05S178.1	G05S179	263.01	258.69	276.70	0.012	21	360	6.55	10.84	51.6	259.59	260.26	17.11	5.30	11.22	47.3
26049	G05S179.1	G05S180	258.69	255.09	287.10	0.010	21	360	6.68	10.80	51.4	255.99	256.68	31.11	5.38	10.24	52.6
26064	G05S180.1	G05S201	255.09	250.82	281.80	0.012	21	356	6.89	10.54	50.2	251.70	252.44	30.10	5.38	11.22	48.0
26065	G05S201.1	G05S202	250.82	246.50	274.50	0.012	21	360	6.93	10.54	50.2	247.38	248.13	27.12	5.42	11.22	48.3
26066	G05S202.1	G05S203	246.50	242.18	268.20	0.012	21	360	6.93	10.54	50.2	243.06	243.80	25.14	5.42	11.22	48.3
26067	G05S203.1	G05S204	242.18	237.86	263.90	0.012	21	360	6.94	10.54	50.2	238.74	239.49	25.16	5.42	11.22	48.3
26085	G05S204.1	G06S7	237.86	233.52	250.50	0.012	21	361	6.95	10.53	50.1	234.40	235.15	16.10	5.42	11.23	48.3
26084	G06S7.1	G06S4	233.52	228.68	243.50	0.014	21	355	5.15	13.48	64.2	229.80	230.22	13.70	5.42	11.96	45.3
26083	G06S4.1	G06S3	228.68	223.43	234.40	0.020	27	269	7.24	18.10	67.0	224.94	225.75	9.46	13.25	27.96	47.4
26082	G06S3.1	G06S2	223.43	221.33	244.30	0.007	27	280	7.29	18.09	67.0	222.84	223.66	21.46	13.34	17.33	76.9
26081	G06S2.1	G06S1	221.33	218.99	235.00	0.007	27	312	7.29	18.08	67.0	220.50	221.32	14.50	13.34	17.33	76.9
26080	G06S1.1	F06S52	218.99	215.84	239.80	0.007	27	420	7.29	18.09	67.0	217.35	218.17	22.45	13.34	17.33	76.9
20645	F06S52.1	F06S51	215.84	212.99	235.00	0.008	27	380	7.27	18.12	67.1	214.50	215.32	20.50	13.34	17.33	76.9
20644	F06S51.1	F06S50	212.99	210.98	231.00	0.007	27	268	7.19	18.37	68.0	212.51	213.31	18.49	13.33	17.33	76.9
20643	F06S50.1	F06S49	210.98	210.18	227.20	0.008	27	107	7.14	18.47	68.4	211.72	212.51	15.48	13.33	17.33	76.9
20642	F06S49.1	F06S48	210.18	207.33	214.30	0.008	27	380	7.49	18.04	66.8	208.83	209.70	5.47	13.64	17.33	78.7
20641	F06S48.1	F06S47	207.33	201.31	214.30	0.016	24	381	9.27	16.33	68.1	202.67	204.01	11.63	13.64	18.38	74.2
20635	F06S47.1	F06S42	201.31	195.37	215.40	0.016	24	380	7.58	20.95	87.3	197.12	198.01	18.28	13.65	18.28	74.7
20634	F06S42.1	F06S41	195.37	193.10	206.10	0.009	24	246	7.87	19.83	82.6	194.75	195.71	11.35	13.66	14.04	97.3
20632	F06S41.1	F06S39	193.10	188.47	199.50	0.023	24	204	9.29	16.32	68.0	189.83	191.17	9.67	13.65	22.03	62.0
20629	F06S39.1	F06S36	188.47	181.56	193.60	0.016	24	440	9.31	16.28	67.8	182.91	184.26	10.68	13.64	18.32	74.4
20622	F06S36.1	F06S30	181.56	175.61	192.60	0.016	24	376	9.34	16.21	67.6	176.96	178.32	15.64	13.63	18.39	74.1
20623	F06S30.1	F06S31	175.61	169.49	188.50	0.016	24	376	9.14	16.65	69.4	170.88	172.18	17.62	13.71	18.65	73.5
20624	F06S31.1	F06S32	169.49	165.44	182.40	0.011	27	372	8.33	16.55	61.3	166.82	167.90	15.58	13.71	20.88	65.6
20625	F06S32.1	F06S33	165.44	161.31	177.30	0.011	27	376	8.02	17.17	63.6	162.74	163.74	14.56	13.71	20.98	65.3
20626	F06S33.1	F06S34	161.31	157.65	171.70	0.010	27	360	8.17	16.94	62.7	159.06	160.10	12.64	13.71	20.18	67.9
20597	F06S34.1	F06S7	157.65	153.95	167.00	0.010	27	370	8.25	16.72	61.9	155.34	156.40	11.66	13.70	20.02	68.5
20598	F06S7.1	F06S8	153.95	149.80	163.10	0.011	27	386	8.43	16.36	60.6	151.16	152.27	11.94	13.70	20.75	66.0
20599	F06S8.1	F06S9	149.80	144.22	162.20	0.014	27	385	8.17	17.95	66.5	145.72	146.75	16.49	14.83	24.10	61.5
20600	F06S9.1	E06S91	144.22	140.44	157.40	0.010	27	390	8.14	18.02	66.7	141.94	142.97	15.46	14.83	19.70	75.2
16390	E06S91.1	E06S90	140.44	136.83	150.80	0.010	27	372	8.19	18.03	66.8	138.33	139.38	12.47	14.93	19.72	75.7
16389	E06S90.1	E06S89	136.83	133.67	149.70	0.010	27	326	8.23	17.96	66.5	135.17	136.22	14.53	14.93	19.71	75.8
16388	E06S89.1	E06S88	133.67	128.79	145.80	0.010	27	496	8.22	17.97	66.5	130.29	131.34	15.51	14.93	19.85	75.2
16384	E06S88.1	E06S81	128.79	125.90	145.80	0.010	27	294	8.22	17.97	66.5	127.40	128.45	18.40	14.93	19.84	75.3
16383	E06S81.1	E06S68	125.90	122.06	143.10	0.010	27	391	8.20	18.01	66.7	123.56	124.61	19.54	14.93	19.84	75.3
16370	E06S68.1	E06S65	122.06	119.59	137.60	0.010	27	251	8.24	18.01	66.7	121.09	122.15	16.51	15.00	19.86	75.5
16376	E06S65.1	E06S77	119.59	114.28	136.30	0.010	27	540	8.51	17.52	64.9	115.74	116.87	20.56	15.01	19.85	75.6
16378	E06S77.1	E06S76	114.28	111.77	131.80	0.013	27	187	8.18	18.18	67.3	113.28	114.32	18.52	15.05	23.19	64.9
16379	E06S76.1	E06S75	111.77	108.36	125.40	0.010	27	341	8.29	17.97	66.5	109.86	110.92	15.54	15.05	20.02	75.2
16351	E06S75.1	E06S51	108.36	105.06	121.10	0.010	27	330	8.18	18.18	67.4	106.57	107.61	14.52	15.05	20.02	75.2
16350	E06S51.1	E06S50	105.06	102.20	118.20	0.010	27	286	8.23	18.08	67.0	103.71	104.76	14.49	15.05	20.02	75.2
16349	E06S50.1	E06S49	102.20	98.46	123.50	0.010	27	367	8.21	18.13	67.1	99.97	101.02	23.53	15.05	20.21	74.5
16348	E06S49.1	E06S47	98.46	94.93	111.90	0.010	27	365	8.23	18.08	67.0	96.44	97.49	15.46	15.05	19.68	76.5
16345	E06S47.1	E06S42	94.93	90.94	107.90	0.010	27	390	8.09	18.40	68.2	92.48	93.49	15.42	15.08	20.24	74.5
16340	E06S42.1	E06S41	90.94	87.93	104.00	0.010	27	301	8.10	18.65	69.1	89.48	90.50	14.52	15.25	20.02	76.2

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 49 - CARROLL CANYON
2012 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 (%)
16339	E06S41.1	E06S103	87.93	84.16	104.20	0.011	27	352	8.32	19.03	70.5	85.75	86.82	18.45	15.95	20.71	77.0
16397	E06S103.1	E06S102	84.16	82.30	104.20	0.008	30	248	7.58	19.08	63.6	83.89	84.78	20.31	15.95	22.96	69.5
16396	E06S102.1	E06S101	82.30	79.67	93.70	0.007	30	356	7.69	18.76	62.5	81.23	82.15	12.47	15.95	22.78	70.0
12318	E06S101.1	D06S51	79.67	77.04	97.00	0.009	30	304	7.22	19.71	65.7	78.68	79.49	18.32	15.95	24.66	64.7
12317	D06S51.1	D06S52	77.04	74.88	94.90	0.007	30	332	7.22	19.72	65.7	76.52	77.33	18.38	15.96	21.38	74.6
12358	D06S52.1	D06S124	74.88	72.71	92.70	0.006	30	335	7.21	19.74	65.8	74.35	75.16	18.35	15.96	21.33	74.8
12310	D06S124.1	D06S125	72.71	71.25	86.30	0.006	30	225	7.22	19.73	65.8	72.89	73.70	13.41	15.96	21.35	74.7
12309	D06S125.1	D06S129	71.25	69.00	89.00	0.006	30	347	7.23	19.70	65.7	70.64	71.45	18.36	15.98	21.35	74.8
12308	D06S129.1	D06S127	69.00	66.75	78.80	0.007	30	345	7.23	19.72	65.7	68.39	69.20	10.41	15.97	21.41	74.6
12307	D06S127.1	D06S126	66.75	64.51	82.50	0.006	30	345	7.22	19.73	65.8	66.16	66.97	16.34	15.97	21.36	74.8
12306	D06S126.1	D06S130	64.51	62.17	82.20	0.006	30	361	7.22	19.72	65.7	63.81	64.62	18.39	15.97	21.34	74.8
12304	D06S130.1	D06S37	62.17	59.79	76.80	0.007	30	365	7.23	19.75	65.8	61.44	62.25	15.37	16.01	21.41	74.8
12303	D06S37.1	D06S36	59.79	57.77	82.80	0.006	30	311	7.24	19.74	65.8	59.41	60.23	23.38	16.01	21.36	75.0
12302	D06S36.1	D06S131	57.77	55.77	68.80	0.006	30	308	7.39	19.39	64.6	57.39	58.23	11.41	16.02	21.36	75.0
12300	D06S131.1	D06S33	55.77	50.30	69.30	0.018	30	308	10.38	14.68	48.9	51.52	53.20	17.78	16.02	35.33	45.3
12299	D06S33.1	D06S31	50.30	44.84	56.80	0.018	30	308	7.24	19.74	65.8	46.48	47.30	10.32	16.02	35.29	45.4
12298	D06S31.1	D06S32	44.84	42.53	55.50	0.007	30	355	7.23	19.76	65.9	44.18	44.99	11.32	16.02	21.38	74.9
12297	D06S32.1	D05S82	42.53	40.23	55.20	0.006	30	355	7.24	19.74	65.8	41.87	42.69	13.33	16.02	21.34	75.1
12244	D05S82.1	D05S83	40.23	38.21	54.20	0.007	30	310	7.23	19.76	65.9	39.86	40.67	14.34	16.02	21.40	74.9
12245	D05S83.1	D05S84	38.21	36.20	49.20	0.006	30	310	7.24	19.75	65.8	37.85	38.66	11.35	16.02	21.34	75.1
12246	D05S84.1	D05S86	36.20	34.18	45.20	0.007	30	310	7.23	19.77	65.9	35.83	36.64	9.37	16.04	21.40	75.0
6269194	D05S86.1	D05S95	34.18	32.46	45.20	0.006	30	265	7.22	19.80	66.0	34.11	34.92	11.09	16.04	21.36	75.1
12248	D05S95.1	D05S94	32.46	30.77	43.80	0.006	30	260	7.08	20.22	67.4	32.46	33.23	11.34	16.04	21.37	75.0
12249	D05S94.1	D05S93	30.77	29.55	40.60	0.005	33	255	6.64	19.87	60.2	31.21	31.89	9.39	16.04	23.64	67.8
12224	D05S93.1	D05S61	29.55	27.51	37.50	0.006	33	348	7.10	18.79	56.9	29.08	29.86	8.42	16.03	26.17	61.3
12225	D05S61.1	D05S62	27.51	16.56	37.60	0.115	33	95	17.54	9.50	28.8	17.35	22.13	20.25	16.04	116.04	13.8
12223	D05S62.1	D05S63	16.56	14.09	36.10	0.088	33	28	17.70	9.44	28.6	14.88	19.75	21.22	16.04	101.51	15.8

TOTAL LENGTH (MILES):	4.68	LENGTH OF PIPE - d/D < 50% (MILES):	0.29	LENGTH OF PIPE - Q/CAP < 50% (MILES):	0.87
LENGTH WEIGHTED Q/CAP:	68.2	LENGTH OF PIPE - d/D 50 - 75% (MILES):	4.27	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	2.17
LENGTH WEIGHTED d/D:	63.7	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.12	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	1.63
LENGTH WEIGHTED HGL BELOW RIM (FT):	16.21	LENGTH OF PIPE - d/D > 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

Public Utilities

TS 049 Carroll Canyon

Public Utilities

TS 049 Carroll Canyon

DATE: 7/8/2018

SEWER STUDY SUMMARY

FOR: 3Roots Project Plus City of San Diego Offsite Sewer Year 2012 PWWF

SHT 1 OF 2

JOB NUMBER: 537-012

BY: Dexter Wilson Engineering, Inc.

					EXISTING YEAR 2012		EXISTING PLUS 3ROOTS			
FROM	TO	LENGTH (ft)	LINE SIZE (inches)	DESIGN SLOPE (%)	PEAK WWF (gpd)	dn/D	PEAK WWF (gpd)	INCREASE IN FLOW (gpd)	dn/D	Notes
F06S51.1	F06S50	380.0	27	0.75	13,330,000	0.66	13,330,000	0	0.66	
F06S50.1	F06S49	268.0	27	0.75	13,330,000	0.66	14,715,752	1,385,752	0.71	3Roots Connection at Carroll Canyon Trunk Sewer - add 1,385,751 gpd PWWF
F06S49.1	F06S48	106.7	27	0.75	13,640,000	0.67	15,025,752	1,385,752	0.72	
F06S48.1	F06S47	380.0	27	0.75	13,640,000	0.67	15,025,752	1,385,752	0.72	
F06S47.1	F06S42	381.0	24	1.58	13,650,000	0.65	15,035,752	1,385,752	0.69	
F06S42.1	F06S41	380.0	24	1.56	13,660,000	0.65	15,045,752	1,385,752	0.70	
F06S41.1	F06S39	246.0	24	1.57	13,660,000	0.65	15,045,752	1,385,752	0.70	
F06S39.1	F06S36	440.0	24	1.57	13,660,000	0.65	15,045,752	1,385,752	0.70	
F06S36.1	F06S30	376.0	24	1.58	13,660,000	0.65	15,045,752	1,385,752	0.69	
F06S30.1	F06S31	376.0	24	1.63	13,710,000	0.64	15,095,752	1,385,752	0.69	
F06S31.1	F06S32	372.0	27	1.09	13,710,000	0.60	15,095,752	1,385,752	0.63	
F06S32.1	F06S33	376.0	27	1.10	13,710,000	0.59	15,095,752	1,385,752	0.63	
F06S33.1	F06S34	360.0	27	1.02	13,710,000	0.61	15,095,752	1,385,752	0.65	
F06S34.1	F06S7	370.0	27	1.00	13,710,000	0.61	15,095,752	1,385,752	0.65	
F06S7.1	F06S8	386.0	27	1.08	13,710,000	0.60	15,095,752	1,385,752	0.64	
F06S8.1	F06S9	385.0	27	1.45	14,830,000	0.57	16,434,327	1,604,327	0.61	3Roots Connection at Mesa Rim Trunk Sewer - add 218,576 gpd PWWF
F06S9.1	E06S91	390.0	27	0.97	14,830,000	0.65	16,434,327	1,604,327	0.70	
E06S91.1	E06S90	372.0	27	0.97	14,930,000	0.66	16,534,327	1,604,327	0.71	
E06S90.1	E06S89	326.0	27	0.97	14,930,000	0.66	16,534,327	1,604,327	0.71	
E06S89.1	E06S88	496.0	27	0.98	14,930,000	0.65	16,534,327	1,604,327	0.70	
E06S88.1	E06S81	294.0	27	0.98	14,930,000	0.65	16,534,327	1,604,327	0.70	
E06S81.1	E06S68	391.0	27	0.98	14,930,000	0.65	16,534,327	1,604,327	0.70	
E06S68.1	E06S65	251.0	27	0.98	15,000,000	0.65	16,604,327	1,604,327	0.70	
E06S65.1	E06S77	540.0	27	0.98	15,010,000	0.66	16,614,327	1,604,327	0.70	
E06S77.1	E06S76	187.0	27	1.34	15,050,000	0.59	16,654,327	1,604,327	0.63	
E06S76.1	E06S75	341.0	27	1.00	15,050,000	0.65	16,654,327	1,604,327	0.70	
E06S75.1	E06S51	330.0	27	1.00	15,050,000	0.65	16,654,327	1,604,327	0.70	
E06S51.1	E06S50	286.0	27	1.00	15,050,000	0.65	16,654,327	1,604,327	0.70	
E06S50.1	E06S49	367.0	27	1.02	15,050,000	0.65	16,654,327	1,604,327	0.70	
E06S49.1	E06S47	365.0	27	0.97	15,050,000	0.66	16,654,327	1,604,327	0.71	
E06S47.1	E06S42	390.0	27	1.02	15,080,000	0.65	16,684,327	1,604,327	0.70	
E06S42.1	E06S41	301.0	27	1.00	15,250,000	0.66	16,854,327	1,604,327	0.71	
E06S41.1	E06S103	352.0	27	1.07	15,950,000	0.66	17,554,327	1,604,327	0.71	
E06S103.1	E06S102	248.0	30	0.75	15,950,000	0.62	17,554,327	1,604,327	0.66	
E06S102.1	E06S101	356.0	30	0.74	15,950,000	0.62	17,554,327	1,604,327	0.66	
E06S101.1	D06S51	304.0	30	0.87	15,950,000	0.59	17,554,327	1,604,327	0.63	
D06S51.1	D06S52	332.0	30	0.65	15,960,000	0.65	17,564,327	1,604,327	0.70	
D06S52.1	D06S124	335.0	30	0.65	15,960,000	0.65	17,564,327	1,604,327	0.70	
D06S124.1	D06S125	225.0	30	0.65	15,960,000	0.65	17,564,327	1,604,327	0.70	
D06S125.1	D06S129	347.0	30	0.65	15,980,000	0.65	17,584,327	1,604,327	0.70	

FROM	TO	LENGTH (ft)	LINE SIZE (inches)	DESIGN SLOPE (%)	PEAK WWF (gpd)	dn/D	PEAK WWF (gpd)	INCREASE IN FLOW (gpd)	dn/D	Notes
D06S129.1	D06S127	345.0	30	0.65	15,980,000	0.65	17,584,327	1,604,327	0.70	
D06S127.1	D06S126	345.0	30	0.65	15,980,000	0.65	17,584,327	1,604,327	0.70	
D06S126.1	D06S130	361.0	30	0.65	15,980,000	0.65	17,584,327	1,604,327	0.70	
D06S130.1	D06S37	365.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D06S37.1	D06S36	311.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D06S36.1	D06S131	308.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D06S131.1	D06S33	308.0	30	1.78	16,020,000	0.48	17,624,327	1,604,327	0.50	
D06S33.1	D06S31	308.0	30	1.77	16,020,000	0.48	17,624,327	1,604,327	0.50	
D06S31.1	D06S32	355.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D06S32.1	D05S82	355.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D05S82.1	D05S83	310.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D05S83.1	D05S84	310.0	30	0.65	16,020,000	0.65	17,624,327	1,604,327	0.70	
D05S84.1	D05S86	310.0	30	0.65	16,040,000	0.65	17,644,327	1,604,327	0.70	
D05S86.1	D05S95	265.0	30	0.65	16,040,000	0.65	17,644,327	1,604,327	0.70	
D05S95.1	D05S94	260.0	30	0.65	16,040,000	0.65	17,644,327	1,604,327	0.70	
D05S94.1	D05S93	255.0	33	0.48	16,040,000	0.61	17,644,327	1,604,327	0.65	
D05S93.1	D05S61	348.0	33	0.59	16,040,000	0.57	17,644,327	1,604,327	0.61	
D05S61.1	D05S62	95.0	33	11.53	16,040,000	0.26	17,644,327	1,604,327	0.27	
D05S62.1	D05S63	28.0	33	8.82	16,040,000	0.27	17,644,327	1,604,327	0.29	

Max dn/D
0.67

Max dn/D
0.72

EXHIBIT A.1

SOUTH SUB-BASIN
MANHOLE NUMBER DIAGRAM

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-43	306.5	298.0	8.5
MH-44	306.9	299.0	7.9
MH-45	308.8	301.0	7.8
PA3-17	317.8	306.0	11.8
PA3-18	316.9	308.0	8.9
PA3-19	316.3	309.0	7.3
PA3-20	317.5	310.0	7.5
PA3-21	320.9	314.0	6.9
PA3-22	326.0	316.0	10.0
PA3-23	323.8	316.0	7.8

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
PA3-22	PA3-21	8	1.04%	192.00
PA3-23	PA3-21	8	1.03%	194.53
PA3-21	PA3-20	8	2.35%	169.99
PA3-20	PA3-19	8	1.75%	57.30
PA3-19	PA3-18	8	1.62%	61.89
PA3-18	PA3-17	8	2.12%	94.44
PA3-17	MH-45	8	6.50%	76.89
MH-45	MH-44	8	1.64%	122.15
MH-44	MH-43	8	1.92%	52.21

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-42	305.5	293.0	12.5
MH-47	304.8	294.0	10.8
MH-48	309.4	295.6	13.8
MH-49	309.3	296.0	13.3
MH-50	315.8	302.0	13.8
MH-51	318.6	303.1	15.5
MH-52	324.2	305.0	19.2
MH-53	326.1	305.9	20.2
MH-53A	329.0	306.2	22.8
PA4-10	311.1	297.0	14.1
PA4-11	316.1	309.0	7.1
PA4-12	323.0	311.0	12.0
PA4-13	330.1	319.0	11.1
PA4-14	330.1	321.0	9.1
PA4-15	325.6	311.2	14.4
PA4-16	327.1	318.0	9.1
PA4-17	330.3	321.0	9.3
PA4-18	321.3	314.3	7.0
PA4-19	323.7	316.7	7.0
PA4-20	329.7	318.0	11.7
PA4-21	329.7	320.0	9.7

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
PA4-17	PA4-16	8	1.07%	281.45
PA4-16	PA4-15	8	4.72%	144.03
PA4-21	PA4-20	8	1.16%	172.41
PA4-20	PA4-19	8	2.37%	54.96
PA4-19	PA4-18	8	5.72%	41.92
PA4-18	PA4-15	8	0.99%	312.65
PA4-15	MH-52	8	4.31%	143.99
MH-53A	MH-53	24	1.03%	29.25
MH-53	MH-52	24	1.00%	89.59
MH-52	MH-51	24	0.70%	270.26
MH-51	MH-50	24	0.74%	149.28
MH-50	MH-49	24	2.03%	296.30
PA4-14	PA4-13	8	2.56%	78.13
PA4-13	PA4-12	8	4.47%	178.81
PA4-12	PA4-11	8	1.35%	148.13
PA4-11	PA4-10	8	11.13%	107.79
PA4-10	MH-49	8	1.38%	72.29
MH-49	MH-48	24	1.61%	24.90
MH-48	MH-47	24	0.60%	264.70
MH-47	MH-42	24	1.12%	112.17

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-35	270.1	254.5	15.6
MH-54	269.6	256.0	13.6
MH-55	269.8	259.0	10.8
MH-56	270.0	260.0	10.0
MH-57	284.0	270.0	14.0
MH-58	291.7	280.0	11.7
MH-80	316.7	305.0	11.7
MH-81	320.3	307.0	13.3
MH-82	316.5	309.0	7.5
PA5-10	298.2	290.0	8.2
PA5-11	303.3	293.5	9.8
PA5-12	306.7	295.0	11.7
PA5-13	309.3	299.0	10.3
PA5-14	310.8	300.0	10.8
PA5-15	311.8	301.0	10.8
PA5-16	312.9	303.0	9.9
PA5-17	313.1	304.0	9.1
PA5-18	314.6	306.6	8.0
PA5-19	317.7	310.7	7.0
PA5-20	320.8	313.1	7.7
PA5-21	322.1	314.4	7.7
PA5-22	323.3	315.6	7.7
PA5-23	323.7	316.0	7.7
PA5-24	305.9	295.0	10.9
PA5-25	306.9	296.0	10.9
PA5-26	311.5	300.0	11.5

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
PA5-23	PA5-22	8	1.00%	40.12
PA5-22	PA5-21	8	1.00%	119.97
PA5-21	PA5-20	8	0.99%	131.03
PA5-20	PA5-19	8	1.20%	200.09
PA5-19	PA5-18	8	2.81%	146.15
PA5-18	PA5-17	8	4.61%	56.44
PA5-17	PA5-16	8	3.62%	27.63
PA5-16	PA5-15	8	3.60%	55.56
PA5-15	PA5-14	8	2.12%	47.26
PA5-14	PA5-13	8	1.68%	59.42
PA5-13	PA5-12	8	2.90%	138.00
PA5-12	PA5-11	8	1.05%	142.51
MH-82	MH-81	8	1.28%	156.28
MH-81	MH-80	8	8.70%	23.00
MH-80	PA5-26	8	3.09%	161.81
PA5-26	PA5-25	8	2.80%	142.93
PA5-25	PA5-24	8	3.47%	28.78
PA5-24	PA5-11	8	1.24%	120.95
PA5-11	PA5-10	8	2.62%	133.49
PA5-10	MH-58	8	5.97%	167.38
MH-58	MH-57	8	5.31%	188.24
MH-57	MH-56	8	2.85%	350.47
MH-56	MH-55	8	8.42%	11.87
MH-55	MH-54	8	4.18%	71.78
MH-54	MH-35	8	1.38%	109.02

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-36	271.4	256.1	15.3
MH-37	271.6	257.7	13.9
MH-38	285.2	269.0	16.2
MH-39	293.4	276.5	16.9
MH-40	294.6	278.0	16.6
MH-41	295.0	279.5	15.5
MH-42	305.5	293.0	12.5
MH-43	306.4	298.0	8.4
MH-46	306.6	300.0	6.6

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
MH-46	MH-43	8	1.10%	181.22
MH-43	MH-42	8	7.56%	66.13
MH-42	MH-41	24	3.21%	420.44
MH-41	MH-40	24	2.63%	57.14
MH-40	MH-39	24	2.59%	57.93
MH-39	MH-38	24	3.39%	221.36
MH-38	MH-37	24	3.24%	349.28
MH-37	MH-36	24	3.12%	51.28

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-14	262.9	237.8	25.1
MH-14A	263.2	239.3	23.9
MH-34	262.1	247.8	14.3
MH-35	270.1	254.5	15.6
MH-36	271.4	256.1	15.3
MH-59	270.3	257.6	12.7
MH-60	270.7	258.0	12.7
MH-61	273.1	261.0	12.1
MH-62	271.5	264.0	10.4
MH-63	280.4	270.0	10.4

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
MH-63	MH-61	8	4.18%	215.25
MH-62	MH-61	8	1.02%	293.80
MH-61	MH-60	8	1.27%	237.07
MH-60	MH-59	8	1.27%	31.48
MH-59	MH-36	8	1.03%	145.69
MH-36	MH-35	24	2.40%	66.66
MH-35	MH-34	24	5.00%	256.18
MH-34	MH-14A	24	4.91%	242.26
MH-14A	MH-14	24	4.97%	46.26

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-10	253.5	212.5	41.0
MH-11	252.9	214.0	38.9
MH-12	254.3	217.5	36.8
MH-13	258.9	222.4	36.5
MH-14	262.9	227.5	35.4
MH-14A	263.2	229.8	33.4
MH-15	266.2	233.2	33.0
MH-16	269.7	239.5	30.2
MH-17	272.7	244.7	28.0
MH-18	276.5	246.1	30.4
MH-19	280.2	247.3	32.9
MH-20	284.4	248.6	35.8
MH-21	288.1	250.0	38.1
MH-22	291.9	251.2	40.7
MH-23	296.6	252.1	44.4
PA15-10	272.5	249.1	23.4

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
MH-23	MH-22	30	0.38%	237.00
MH-22	MH-21	30	0.35%	344.87
MH-21	MH-20	30	0.37%	381.23
MH-20	MH-19	30	0.34%	387.42
MH-19	MH-18	30	0.37%	322.49
MH-18	MH-17	30	0.36%	383.62
PA15-10	MH-17	8	4.28%	102.79
MH-17	MH-16	30	1.80%	289.33
MH-16	MH-15	30	1.80%	350.59
MH-15	MH-14	30	1.99%	286.55
MH-14	MH-13	30	1.41%	361.65
MH-13	MH-12	30	1.40%	350.96
MH-12	MH-11	30	1.06%	329.59
MH-11	MH-10	30	0.99%	151.94

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-23	296.6	252.1	44.5
MH-24	301.6	286.0	15.6
MH-25	308.4	289.7	18.7
MH-26	311.4	292.6	18.8
MH-27	315.2	296.5	18.7
MH-28	319.1	301.4	17.7
MH-29	317.1	305.0	12.1
MH-30	297.4	252.7	44.7
MH-31	299.0	254.1	44.9
MH-32	270.1	255.6	14.5
MH-33	269.8	255.9	13.9

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
MH-29	MH-28	8	1.26%	286.85
MH-28	MH-27	8	1.29%	380.26
MH-27	MH-26	8	1.02%	380.69
MH-26	MH-25	8	1.26%	229.47
MH-25	MH-24	8	1.07%	344.78
MH-24	MH-23	8	13.67%	248.04
MH-33	MH-32	27	1.77%	16.95
MH-32	MH-31	27	0.64%	233.86
MH-31	MH-30	27	0.52%	270.95
MH-30	MH-23	27	0.67%	89.10

N

SCALE: 1" = 250'

0 250 FEET

LEGEND

- PROJECT BOUNDARY
- EXISTING SEWER TO REMAIN
- EXISTING SEWER TO BE ABANDONED
- PROPOSED PUBLIC SEWER
- PROPOSED PRIVATE SEWER
- PA4–19 COMPUTER MODEL MANHOLE NUMBER
- SEWER SUB–BASIN BOUNDARY
- FLOW ARROW

EX. 30" MIRA MESA TS TO REMAIN IN PLACE

EX. CARROLL CANYON TS TO BE ABANDONED

EX. 30" MIRA MESA TS TO BE ABANDONED

EX. 24" MIRA MESA TS TO BE ABANDONED

EX. CARROLL CANYON TS TO REMAIN IN PLACE

EX. CARROLL CANYON TS TO BE ABANDONED

MIRATECH DRIVE

CAMINO SANTA FE

SUMMERS RIDGE RD.

REHCO ROAD

TRADE STREET

OSGOOD WAY

PARKDALE AVENUE

ARJONS DRIVE

CARROLL CANYON RD.

SPINE ROAD

STREET A

STREET B

STREET C

STREET D

STREET E

STREET F

STREET G

STREET H

STREET I

VILLAGE ENTRY

URBAN CORRIDOR ST.

PA1 PA2 PA3 PA4 PA5 PA6 PA7 PA8 PA9 PA10 PA11 PA12 PA13 PA14 PA15 PA16 PA17 PA18 PA19 MU PA20 MU

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

3ROOTS
by Mesa Canyon Community Partners

EXHIBIT A.1
SOUTH SUB–BASIN MANHOLE NUMBER DIAGRAM
3ROOTS

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EXHIBIT A.2

CENTRAL SUB-BASIN
MANHOLE NUMBER DIAGRAM

N

SCALE: 1" = 250'

0 250 FEET

LEGEND

- PROJECT BOUNDARY
- EXISTING SEWER TO REMAIN
- EXISTING SEWER TO BE ABANDONED
- PROPOSED PUBLIC SEWER
- PROPOSED PRIVATE SEWER
- MH-62 — COMPUTER MODEL MANHOLE NUMBER
- SEWER SUB-BASIN BOUNDARY
- FLOW ARROW

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-64	289.2	271.7	17.5
MH-65	290.7	279.9	10.8
MH-66	289.4	280.8	8.6
MH-67	290.2	283.2	7.0
MH-68	291.2	286.0	5.2
MH-69	295.0	287.2	7.8
MH-70	296.9	290.0	6.9

PIPE INFORMATION				
FROM	TO	SIZE	CALC SLOPE	LENGTH
MH-70	MH-69	8	1.02%	275.11
MH-69	MH-68	8	1.08%	111.62
MH-68	MH-66	8	1.79%	291.14
MH-67	MH-66	8	1.03%	232.39
MH-66	MH-65	8	1.00%	90.27
MH-65	MH-64	8	2.34%	352.80

MIRATECH DRIVE
CAMINO SANTA FE
SUMMERS RIDGE RD.
REHCO ROAD
TRADE STREET
OSGOOD WAY
PARKDALE AVENUE
CARROLL CANYON RD.
COMMUNITY PARK
ARJONS DRIVE
TRADE PLACE

PA1 PA2 PA3 PA4 PA5 PA6 PA7 PA8 PA9 PA10 PA11 PA12 PA13 PA14 PA15 PA16 PA17 PA18 PA19 MU PA20 MM

SPINE ROAD
STREET A
STREET B
STREET C
STREET D
STREET E
STREET F
STREET G
STREET H
STREET I
VILLAGE ENTRY
URBAN CORRIDOR ST.

MH-64 MH-65 MH-66 MH-67 MH-68 MH-69 MH-70
SDMH-7 SDMH-8 SDMH-9 SDMH-10 SDMH-11 SDMH-10A
F06S49
DRAWING NO. 31390-D

EX. 30" MIRA MESA TS TO REMAIN IN PLACE
EX. 30" MIRA MESA TS TO BE ABANDONED
EX. CARROLL CANYON TS TO BE ABANDONED
EX. 24" MIRA MESA TS TO BE ABANDONED
EX. CARROLL CANYON TS TO REMAIN IN PLACE
EX. CARROLL CANYON TS TO BE ABANDONED

DEXTER WILSON ENGINEERING, INC.
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CARLSBAD, CA 92008
(760) 438-4422

3ROOTS by Mesa Canyon Community Partners

EXHIBIT A.2

CENTRAL SUB-BASIN MANHOLE NUMBER DIAGRAM

3ROOTS

EXHIBIT A.3

NORTH SUB-BASIN
MANHOLE NUMBER DIAGRAM

LEGEND

- PROJECT BOUNDARY
- EXISTING SEWER TO REMAIN
- EXISTING SEWER TO BE ABANDONED
- PROPOSED PUBLIC SEWER
- PROPOSED PRIVATE SEWER
- MH-73 — COMPUTER MODEL MANHOLE NUMBER
- SEWER SUB-BASIN BOUNDARY
- FLOW ARROW

N

SCALE: 1" = 250'

0 250 FEET

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
MH-71	304.8	295.1	9.7
MH-72	301.1	296.2	4.9
MH-73	302.5	297.1	5.4
MH-74	304.8	298.7	6.1
MH-75	305.7	299.2	6.5
MH-76	307.2	300.5	6.7
MH-77	309.7	302.5	7.2
MH-78	309.6	303.6	6.0
MH-79	312.9	305.6	7.3
MH-80	313.9	306.1	7.8
PA3-10	314.7	306.7	8.0
PA3-11	319.9	310.7	9.2
PA3-12	325.0	313.7	11.3
PA3-13	328.0	316.7	11.3
PA3-14	314.5	306.0	8.5
PA3-15	322.1	309.0	13.1
PA3-16	323.6	311.0	12.6

PIPE INFORMATION				
FROM	TO	SIZE	SLOPE	LENGTH
PA3-13	PA3-12	8.0	0.98%	306.02
PA3-12	PA3-11	8.0	1.00%	301.17
PA3-11	PA3-10	8.0	1.33%	301.65
PA3-10	MH-76	8.0	1.01%	59.24
MH-80	MH-79	8.0	0.99%	50.49
MH-79	MH-78	8.0	0.99%	201.24
PA3-16	PA3-15	8.0	2.91%	68.64
PA3-15	PA3-14	8.0	0.99%	301.58
PA3-14	MH-78	8.0	1.02%	235.04
MH-78	MH-77	8.0	0.89%	123.34
MH-77	MH-76	8.0	0.77%	258.53
MH-76	MH-75	8.0	0.83%	157.18
MH-75	MH-74	8.0	0.58%	85.75
MH-74	MH-73	8.0	0.67%	238.96
MH-73	MH-72	8.0	0.68%	133.09
MH-72	MH-71	8.0	0.41%	278.05

SDMH-26A
SDMH-26
12"
F05S39
10"
SDMH-25
SDMH-24
SDMH-23
DRAWING NO. 31390-D
12"
F05S73
15"
F05S72
15"
F05S83
18"
F05S84
18"
F05S76
18"
F05S75
18"
F05S74
18"
F06S1
18"
F06S2
F06S3
18"
F06S4
18"
F06S5
18"
F06S6
18"
F06S7
EX. MESA RIM TS #104
TO REMAIN IN PLACE
EX. CARROLL CANYON TS
#49
MIRATECH DRIVE
FENTON ROAD
FENTON ROAD
SUMMERS RIDGE RD.
CAMINO SANTA FE
REHCO ROAD
PARKDALE AVENUE
OSGOOD WAY
CARROLL CANY
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
PA19 MU
PA20 MM
MH-71
MH-72
MH-73
MH-74
MH-75
MH-76
MH-77
MH-78
MH-79
MH-80
PA3-10
PA3-11
PA3-12
PA3-13
PA3-14
PA3-15
PA3-16
SPINE ROAD
STREET A
STREET B
STREET C
STREET D
STREET E
STREET F
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EX. 30" MIRA MESA TS
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TO BE ABANDONED
EX. CARROLL CANYON TS
TO REMAIN IN PLACE
EX. CARROLL CANYON TS
TO BE ABANDONED

3ROOTS
by Mesa Canyon Community Partners

EXHIBIT A.3
NORTH SUB-BASIN MANHOLE NUMBER DIAGRAM
3ROOTS

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