



SEWER ANALYSIS REPORT

RELATED BRISTOL SPECIFIC PLAN

SANTA ANA, CALIFORNIA

PREPARED FOR

*Related California Residential, LLC
18201 Von Karman Avenue, Suite 900
Irvine, California 92612*

FUSCOE ENGINEERING, INC.

*16795 Von Karman, Suite 100
Irvine, California 92606
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PROJECT MANAGER

Oriana Slasor, P.E.

DATE PREPARED: February 2023

PROJECT NUMBER: 622.015.02

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Santa Ana, CA

PREPARED FOR

RELATED CALIFORNIA RESIDENTIAL, LLC
18201 VON KARMAN, SUITE 900
IRVINE, CA 92612

PREPARED BY

FUSCOE ENGINEERING, INC.
16795 VON KARMAN AVE
IRVINE, CA 92606
949.474.1960



FEBRUARY 2023

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1.0 INTRODUCTION

1.1 Purpose of the Study

The purpose of this sewer analysis report is to calculate and compare the sanitary sewer (wastewater) flows for pre- and post-development for the proposed Related Bristol Specific Plan project, located near the intersection of MacArthur Boulevard and Bristol Street in the City of Santa Ana, California. Additionally, the report provides recommendations for sewer infrastructure for the proposed project condition.

The results of the analyses will assist the public agencies with allocating and incorporating the discharge locations and proposed infrastructure for the wastewater design to accommodate the proposed development. The sewer generation calculations have been provided in cubic-feet per second (cfs) and include the theoretical existing flows (pre-development) along with the theoretical proposed flows (post-development), as requested by the Orange County Sanitation District (OCSD) and city of Santa Ana (COSA).

The ultimate goals of the study include obtaining a letter/statement from OCSD that would allow the proposed discharges to be conveyed from the project site to the OCSD sewer systems, along with determining the proposed sewer sizing and alignment. The OCSD letter would be provided to the COSA, along with the proposed wastewater flows and allocated discharge locations of the proposed development.

1.2 Existing Site Description

The site is bordered by MacArthur Boulevard to the north, Sunflower Avenue to the south, Bristol Street to the east, and Plaza Drive and existing commercial development to the west. A location map is included in this report on the following page, as Figure 1.

The existing 41-acre-site consists of a shopping center with various retail establishments, which comprises approximately 465,000 square feet of commercial/retail development. An ALTA of the project site is included in Appendix 1 of this report.

1.3 Project Description

The project proposes to demolish the existing shopping center and related infrastructure, and construct the proposed Related Bristol mixed-use development, with up to 3,750 multi-family residential units; 350,000 square feet of commercial uses; a 250-key hotel; a senior living/continuum of care with 200 units, and approximately 13 acres of open space. Underground and above-ground parking will be provided.

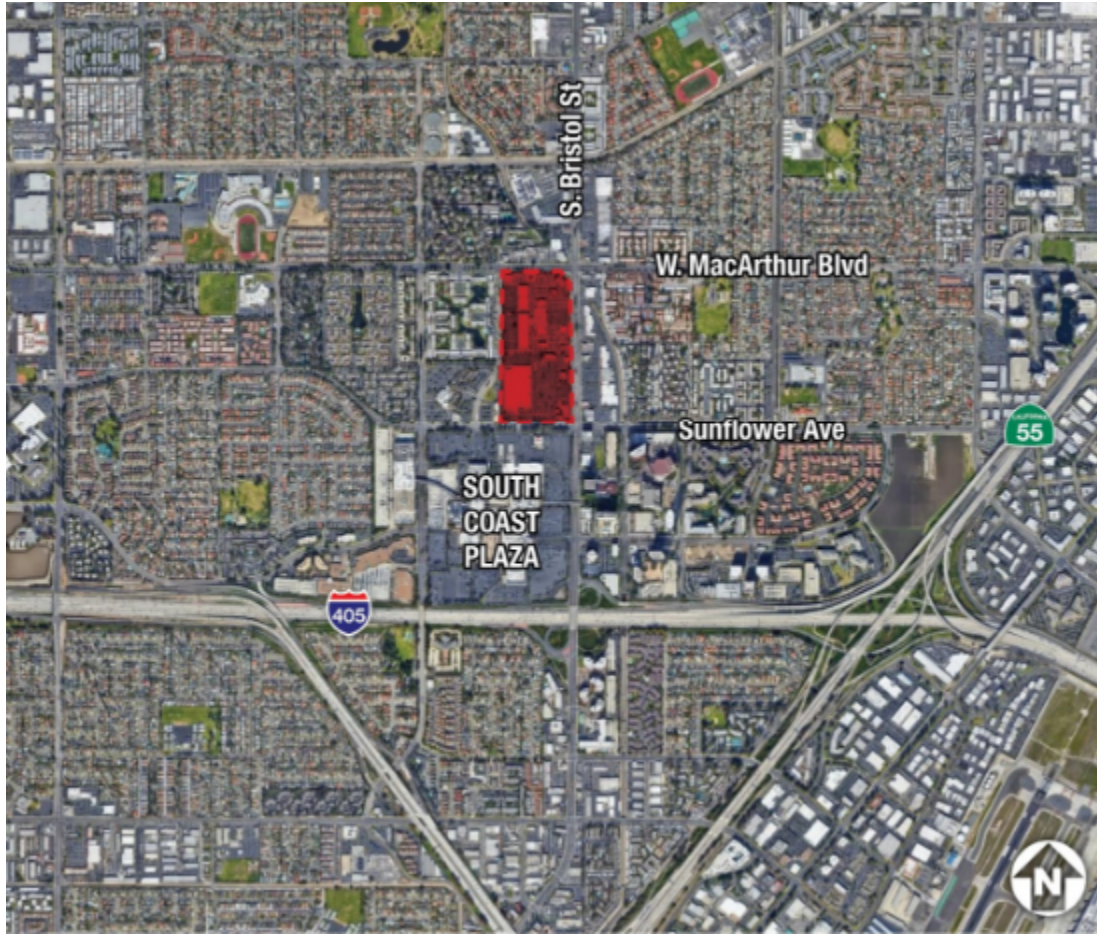


Figure 1 – Location Map

1.4 Existing Sewer Facilities

An existing 78-inch OCSD trunk sewer line is present in Sunflower Avenue, with a smaller OCSD line (up to 15-inch-diameter) in Plaza Drive. The OCSD line in Plaza Drive is approximately 15 feet deep, and drains southerly, and connects to the OCSD line in Sunflower Avenue. The OCSD line in Sunflower Avenue is approximately 20 feet deep, and drains westerly, toward Bear Street.

There is a private 8-inch sewer line along the southerly boundary of the property, which drains westerly, toward an existing city-owned 8-inch sewer line. The city's sewer line continues westerly in (the sidewalk) along Sunflower Avenue, and the wastewater ultimately drains to the existing 78-inch OCSD trunk sewer at Bear Street, westerly of Plaza Drive.

In addition to the private sewer system that drains to the city-owned 8-inch sewer main, discussed above, there is an existing 8-inch private sewer lateral at the southeast corner of the project, at Sunflower Avenue and Bristol Street, that drains directly into the OCSD 78-inch sewer main.

The city of Santa Ana owns and maintains a network of systems within and surrounding the property. These sewer systems connect to the following mainline systems:

- 15-inch OCSD sewer system in Plaza Drive
- 8-inch COSA sewer system in Sunflower Avenue from project site to Bear Street.
- 78-inch OCSD sewer system in Sunflower Avenue

The atlas maps show that there are no wastewater flows coming into the onsite sewer system from offsite. Sewer atlas maps are included in this report as Appendix 2. Sewer as-built plans are included in this report as Appendix 3.

1.5 Proposed Sewer Facilities

Although the existing OCSD sewer line in Plaza Drive includes three manholes with stub-outs for sewer laterals, it is anticipated that the proposed development, blocks/lots fronting Plaza Drive, would not be able to connect to these existing stub-outs or laterals, based on discussions with city staff, along with lack of capacity in the existing OCSD sewer line in Plaza Drive. Therefore, the onsite wastewater generated by the proposed project will be conveyed internally, within private sewer lines, toward the central north-south roadway. From there the wastewater will be conveyed southerly, within proposed private sewer system, to Sunflower Avenue. At Sunflower Avenue, the sewer system will become public (city of Santa Ana; COSA).

At Sunflower Avenue the new city system would become public (COSA) at a new manhole at the street right-of-way. The new city sewer line will continue straight, to drain to the existing OCSD sewer line with a new manhole. The city new manhole would be per COSA standards. The new OCSD manhole installed in the existing 78" sewer line would be per OCSD standards, which include joining at pipe soffits.

Based on sewer hydraulics, is estimated that the onsite sewer main, along with the new COSA sewer would be 18-inch diameter.

The existing private sewer infrastructure along the southerly property boundary, along with onsite portions of COSA 8-inch sewer line, are expected to be removed. The project is not anticipating to drain any wastewater discharges to the city sewer main downstream of this private sewer. The city has requested that a new terminal manhole be installed westerly of the southwest project corner.

Lastly, as mentioned previously, there is an existing private sewer lateral that connects to the OCSD 78-inch sewer main near Sunflower Avenue/Bristol Street intersection. Based on discussions with city staff, this lateral may not be utilized by the project. However, due to site constraints, there is an option to drain a small portion of the project at the southeast corner of the property to an existing manhole in the 78-inch OCSD sewer main, just west of Bristol Street.

All existing sewer connections will be abandoned and/or removed per COSA standards after installations of the new manhole connection at the OCSD trunk sewer.

The proposed sewer exhibit layout is included as Appendix 7 of this report.

2.0 METHODOLOGY & RESULTS

2.1 Design Criteria

Based on discussions and correspondence with Daniel Lee at OCSD, Fuscoe was directed to use COSA criteria for the sewer analysis. The COSA design criteria includes coefficients to determine wastewater flows, and also flow-depth criteria based on sewer pipe diameter. The design criteria is included in Appendix 4 of this report.

2.2 Sewer Generation Calculations

Based on the COSA design criteria, along with the proposed condition project program, the existing and proposed condition sewer generation flows were calculated. The sewer generation calculations, along with the project program table, are included in Appendix 5, and the results are presented below.

Existing Condition:

Average Flow = 0.0534 cfs; Peak Flow = 0.160 cfs

Proposed Condition:

Average Flow = 1.177 cfs; Peak Flow = 3.530 cfs

2.3 Flow Depth Capacities of Existing Sewer Systems

The Kutter flow-depth calculator was used to determine the hydraulic capacities of the existing sewer infrastructure. The criteria that was used to determine maximum flow-depth is based on city of Santa Ana criteria. The following are the hydraulic capacities of the existing sewer systems. The calculations are included in Appendix 6 of this report.

OCSD 15-inch sewer system in Plaza Drive

- Maximum Depth (3/4-full): 1.99 cfs

OCSD 78-inch sewer system in Sunflower Avenue

- Maximum Depth (3/4-full): 96.80 cfs

COSA (8-inch sewer) at southwest of site

- Maximum Depth (1/2-full): 0.366 cfs

2.4 Flow Depth Capacities of Proposed Sewer System

The Kutter flow-depth calculator was used to determine the hydraulic sizing of the proposed COSA sewer line to be installed within the public roadway. The criteria that was used to determine maximum flow-depth (3/4-inch full for pipe diameters greater than 15 inches) is based on COSA criteria. Also, a minimum slope of 0.22 is permitted for pipes with diameters 12" and greater. The following is the criteria used to evaluate the sewer sizing. The proposed project peak wastewater amount is 3.530 cfs.

- Drop in manhole for straight sections (no angles) not required per COSA design standards; straight-through slope allowed through manholes
- Invert elevation at the proposed manhole in Sunflower Avenue at Plaza Drive: 20.5 +/- (NAVD88)
- Invert elevation at upstream end of onsite sewer (to obtain 6.5 feet of cover): 25.5 (NAVD88)
- Proposed COSA sewer main in Sunflower Avenue: 90 lineal feet
- Proposed Onsite Private sewer: 1944 lineal feet
- Total length of sewer main: 2,034 lineal feet
- Proposed minimum slope: 0.22%
- Rise in elevation at proposed slope of 0.22%: 4.5 feet
- Rise in elevation to provide minimum 7 feet of cover (4.5 feet; slope=0.22%)
- Rise in elevation to provide minimum 6.5 feet of cover (5.0 feet; slope=0.24%)
- Proposed sewer diameter: 12" – 18"
- Proposed capacity of 12" sewer main (upstream reach) at 1/2-full and with minimum slope of 0.22% is 0.793 cfs
- Proposed depth in 18" sewer main for project flows with minimum slope of 0.22%: 64%-full

The flow-depth calculations are included in Appendix 6 of this report.

3.0 CONCLUSIONS

Summary

As stated previously, there are no offsite sewer systems discharging into the project site. Therefore, the proposed onsite system will only be required to convey wastewater generated from the project to the offsite sewer system in the public roadway. The wastewater from the site will be discharged into the OCSD sewer in Sunflower Avenue, southerly of the project.

The proposed sewer exhibit is included in this report as Appendix 7. The proposed wastewater allocations are discussed in the following paragraphs.

Existing 15-inch Sewer in Plaza Drive

The analyses show that the existing 15-inch OCSD sewer does not have sufficient hydraulic capacity to accept wastewater discharges from the proposed project without upgrades to the existing system. In addition to existing connections from this property, this sewer line also currently accepts wastewater from city sewer systems in MacArthur Boulevard to the north, along with wastewater from the property to the west of Plaza Drive. For this reason, along with discussions with COSA and OCSD, the decision was made to not connect to this sewer line. The existing onsite connections (stub-outs) will be removed/capped per COSA standards.

Existing 78-inch Sewer in Sunflower Avenue

Based on correspondence with Daniel Lee of OCSD, the existing 78-inch sewer in Sunflower Avenue does have the capacity to accept the wastewater from the proposed development. After discussions, meetings, and correspondence with OCSD and COSA, the decision was made to allow a new OCSD manhole directly south of the project. This would require the onsite sewer system to discharge to a new COSA manhole at the southerly driveway/right-of-way, and then the COSA sewer will extend from that manhole to a proposed new manhole in the OCSD sewer main. The extent of the new COSA sewer main will be from the COSA manhole at the right-of-way to the new manhole connection at OCSD. Additionally, due to site constraints, there is the option to drain a small portion of the site the southeast corner to an existing OCSD manhole, west of Bristol Street.

Private & Public Sewer Systems

Based on discussions with the COSA, the onsite sewer systems will be private, with the proposed sewer line becoming a public COSA sewer where the onsite sewer exits the site at the southerly main driveway. The existing onsite sewer infrastructure will be abandoned and removed per COSA standards. The COSA sewer alignment in Sunflower Avenue will connect directly to a new manhole in the OCSD 78" sewer main mid-block, with the option to drain a small portion of the project at the southeast corner to an existing OCSD manhole.

4.0 APPENDICES

- Appendix 1 – ALTA Survey
- Appendix 2 – Annotated Sewer Atlas Maps
- Appendix 3 – Sewer As-Built Plans
- Appendix 4 – Design Criteria
- Appendix 5 – Sewer Generation Calculations
- Appendix 6 – Flow-Depth Calculations
- Appendix 7 – Proposed Condition Sewer Exhibit

Appendix 1

ALTA Survey

ALTA/NSPS LAND TITLE SURVEY

ASSESSOR PARCEL NUMBER:

412-131-12 412-131-13 412-131-14 412-131-16 412-131-17
412-131-22 412-131-24 412-131-25 412-131-26

RECORD OWNER:

GREENVILLE RANCH, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, SUCCESSOR BY CONVERSION OF, AND WHO ACQUIRE TITLE AS, GREENVILLE RANCH PARTNERSHIP, A CALIFORNIA GENERAL PARTNERSHIP, AS TO AN UNDIVIDED 47.4048% INTEREST;

MCG BRISTOL WEST, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, AS TO AN UNDIVIDED 17.5317% INTEREST; AND

BSG WEST BRISTOL, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, AS TO AN UNDIVIDED 35.0635% INTEREST

TITLE INFORMATION:

THE TITLE INFORMATION SHOWN HEREON IS PER COMMITMENT FOR TITLE INSURANCE ORDER NO. 00606073-988-DN1, COMMITMENT DATE: JUNE 9, 2022, AS PREPARED BY TICOR TITLE, NEWPORT BEACH, CA

TITLE OFFICER: DAVID NOBLE
TELEPHONE: (714) 289-3300
EMAIL: DAVID.NOBLE@TICORTITLE.COM

NO RESPONSIBILITY OF CONTENT, COMPLETENESS OR ACCURACY OF SAID REPORT IS ASSUMED BY THIS MAP OR THE SURVEYOR.

LEGAL DESCRIPTION:

PARCEL 1:

PARCELS 1 AND 2, IN THE CITY OF SANTA ANA, COUNTY OF ORANGE, STATE OF CALIFORNIA, AS SHOWN ON A MAP FILED IN BOOK 40, PAGES 5 AND 6 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, CALIFORNIA.

EXCEPTING FROM SAID PARCEL 2 THAT PORTION THEREOF CONVEYED TO THE CITY OF SANTA ANA BY DEED RECORDED MAY 17, 1972 IN BOOK 10130, PAGE 417, OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:

BEGINNING AT THE WESTERLY TERMINUS OF THAT CERTAIN COURSE IN THE NORTHERLY BOUNDARY OF PARCEL 2 OF SAID MAP THAT READS NORTH 89° 03' 58" WEST 74.47 FEET; THENCE CONTINUING ALONG SAID NORTHERLY BOUNDARY NORTH 86° 12' 27" WEST 75.11 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 30.00 FEET, A RADIAL AT SAID POINT BEARS NORTH 39° 01' 25" WEST; THENCE CONTINUING ALONG SAID NORTHERLY BOUNDARY SOUTHWESTERLY 5.30 FEET ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 10° 07' 33" TO A POINT ON A LINE PARALLEL WITH AND 59.00 FEET SOUTHERLY FROM THE CENTERLINE OF MAC ARTHUR BOULEVARD AS SHOWN ON SAID MAP, A RADIAL AT SAID POINT BEARS NORTH 49° 08' 58" WEST; THENCE LEAVING SAID CURVE ALONG SAID PARALLEL LINE SOUTH 89° 03' 58" EAST A DISTANCE OF 78.76 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

PARCELS 1, 2, 3 AND 4 IN THE CITY OF SANTA ANA, COUNTY OF ORANGE, STATE OF CALIFORNIA, AS SHOWN ON A MAP FILED IN BOOK 79, PAGES 19 AND 20 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

TITLE EXCEPTIONS:

ITEMS SHOWN AS (1) HAVE BEEN PLOTTED ON THE SURVEY.

A TAXES

B INTENTIONALLY DELETED.

C THE LIEN OF SUPPLEMENTAL TAXES

1 WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT DISCLOSED BY THE PUBLIC RECORDS.

2 RIGHTS OF METRO TOWN SQUARE, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY UNDER THAT CERTAIN GROUND LEASE DATED JANUARY 1, 1971, AS AMENDED AND ASSIGNED (THE "MASTER GROUND LEASE"), RECORDED JUNE 18, 1971, AS INSTRUMENT NO. 17690, IN BOOK 9884, PAGE 59, OFFICIAL RECORDS. (NOTHING TO PLOT)

3 EASEMENT GRANTED TO THE CITY OF SANTA ANA, A MUNICIPAL CORPORATION, FOR UTILITIES RECORDED DECEMBER 13, 1971, IN BOOK 9922, PAGE 406, OF OFFICIAL RECORDS, AS SHOWN ON THE ALTA/NSPS SURVEY PREPARED BY FUSCOE ENGINEERING, BEARING JOB NUMBER : 0622-015-01, DATED DECEMBER 16, 2020 (THE "SURVEY")

4 THE OWNERSHIP OF SAID LAND DOES NOT INCLUDE RIGHTS OF ACCESS TO OR FROM THE STREET, HIGHWAY, OR FREEWAY ABUTTING SAID LAND, SUCH RIGHTS HAVING BEEN RELINQUISHED BY THE DOCUMENT RECORDED OCTOBER 06, 1971, IN BOOK 9833, PAGE 863, AND RECORDED JANUARY 11, 1972, IN BOOK 9960, PAGE 617, BOTH OF OFFICIAL RECORDS.

5 INTENTIONALLY DELETED.

6 MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED RECIPROCAL EASEMENT AGREEMENT RECORDED MARCH 29, 1972, IN BOOK 10056, PAGE 904, OF OFFICIAL RECORDS; AN AGREEMENT TO MODIFY THE TERMS AND PROVISIONS OF THE SAID DOCUMENT, AS THEREIN PROVIDED RECORDED OCTOBER 24, 1983, AS INSTRUMENT NO. 83-467794, OF OFFICIAL RECORDS. (NOT PLOTTABLE FROM RECORD)

7 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY FOR PUBLIC UTILITIES RECORDED APRIL 06, 1972, IN BOOK 10069, PAGE 620, OF OFFICIAL RECORDS; AN AGREEMENT RELATED TO THE USE OF SAID EASEMENT RECORDED MAY 23, 1973 IN BOOK 10711, PAGE 594, OFFICIAL RECORDS. (SECOND DOCUMENT ILLEGIBLE - SEE **SURVEYOR'S NOTE **)

8 RIGHTS OF PACIFIC SOUTHWEST REALTY COMPANY, A DELAWARE CORPORATION, AS ASSIGNED TO BANK OF AMERICA NATIONAL TRUST AND SAVINGS ASSOCIATION, UNDER THAT CERTAIN LEASE AND UNRECORDED ASSIGNMENT OF LEASE DATED AS OF AUGUST 1, 1992, RECORDED APRIL 17, 1972, IN BOOK 10083, PAGE 678, OF OFFICIAL RECORDS.

9 EASEMENT GRANTED TO THE CITY OF SANTA ANA FOR TRAFFIC SIGNAL CONTROL RECORDED JUNE 09, 1972, IN BOOK 10165, PAGE 989, OF OFFICIAL RECORDS.

10 EASEMENT GRANTED TO THE CITY OF SANTA ANA FOR TRAFFIC SIGNAL CONTROL RECORDED JUNE 14, 1972, IN BOOK 10172, PAGE 774, OF OFFICIAL RECORDS.

11 RIGHTS OF MARINA FEDERAL SAVINGS AND LOAN ASSOCIATION, UNDER THAT CERTAIN LEASE RECORDED JUNE 22, 1972, IN BOOK 10185, PAGE 834, OF OFFICIAL RECORDS.

12 EASEMENT GRANTED TO THE CITY OF SANTA ANA FOR PUBLIC UTILITY EASEMENTS AND NON-EXCLUSIVE SURFACE ACCESS EASEMENTS RECORDED JULY 17, 1972, IN BOOK 10226, PAGE 372, OF OFFICIAL RECORDS. A PARTIAL QUITCLAIM RECORDED JULY 10, 1974 IN BOOK 11192, PAGE 803, OF OFFICIAL RECORDS.

13 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION, FOR PUBLIC UTILITIES RECORDED AUGUST 11, 1972, IN BOOK 10270, PAGE 676, OF OFFICIAL RECORDS.

14 MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED GRANT OF EASEMENT AND AGREEMENT RECORDED MAY 23, 1973, IN BOOK 10711, PAGE 602, OF OFFICIAL RECORDS.

15 EASEMENT GRANTED TO THE CITY OF SANTA ANA FOR UNDERGROUND PUBLIC UTILITIES AND NON-EXCLUSIVE SURFACE EASEMENTS RECORDED JUNE 29, 1973, IN BOOK 10778, PAGE 551, OF OFFICIAL RECORDS.

16 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY FOR PUBLIC UTILITIES RECORDED DECEMBER 05, 1973, IN BOOK 11013, PAGE 939, OF OFFICIAL RECORDS.

17 EASEMENT FOR EXCLUSIVE UNDERGROUND EASEMENT AND NON-EXCLUSIVE SURFACE EASEMENT RECORDED JULY 5, 1974, IN BOOK 11189, PAGE 594, OFFICIAL RECORDS.

18 INTENTIONALLY DELETED.

19 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY, FOR EITHER OR BOTH UNDERGROUND LINES, CONDUITS, INCLUDING ABOVE-GROUND APPURTENANT FIXTURES IN BOOK 11213, PAGE 884, OFFICIAL RECORDS.

20 EASEMENT GRANTED TO FIRST WESTERN BANK AND TRUST COMPANY, A CORPORATION AND WINMAR COMPANY, INC., A CALIFORNIA CORPORATION FOR INGRESS AND EGRESS RECORDED NOVEMBER 25, 1974, IN BOOK 11293, PAGE 1389, OF OFFICIAL RECORDS.

21 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY FOR PUBLIC UTILITIES RECORDED JUNE 22, 1976, IN BOOK 11782, PAGE 1826, OF OFFICIAL RECORDS.

22 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY FOR PUBLIC UTILITIES RECORDED JULY 25, 1977, IN BOOK 12305, PAGE 415, OF OFFICIAL RECORDS.

23 INTENTIONALLY DELETED.

24 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION, FOR PUBLIC UTILITIES RECORDED SEPTEMBER 04, 1984, AS INSTRUMENT NO. 84-368919, OF OFFICIAL RECORDS. (EVIDENCE OF POSSIBLE TERMINATION-10/31/2005)

25 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION, FOR PUBLIC UTILITIES RECORDED DECEMBER 04, 1984, AS INSTRUMENT NO. 84-504314, OF OFFICIAL RECORDS.

26 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION, FOR PUBLIC UTILITIES RECORDED DECEMBER 17, 1986, AS INSTRUMENT NO. 86-622569, OF OFFICIAL RECORDS.

27 INTENTIONALLY DELETED.

28 INTENTIONALLY DELETED.

29 EASEMENT GRANTED TO THE CITY OF SANTA ANA, A MUNICIPAL CORPORATION, FOR PUBLIC STREET AND HIGHWAY RECORDED AUGUST 10, 1998, AS INSTRUMENT NO. 1998-0518243, OF OFFICIAL RECORDS.

30 RIGHTS OF BED BATH & BEYOND, INC. A NEW YORK CORPORATION, UNDER THAT CERTAIN LEASE RECORDED AUGUST 27, 1999, AS INSTRUMENT NO. 19990624380, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

31 RIGHTS OF THE VONS COMPANIES, INC. A MICHIGAN CORPORATION, UNDER THAT CERTAIN LEASE RECORDED MAY 04, 2000, AS INSTRUMENT NO. 20000231624, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

32 RIGHTS OF JACK IN THE BOX INC., A DELAWARE CORPORATION, FORMERLY KNOWN AS FOODMAKER, INC. A DELAWARE CORPORATION, UNDER THAT CERTAIN LEASE RECORDED OCTOBER 27, 2000, AS INSTRUMENT NO. 20000581634, OF OFFICIAL RECORDS.

33 RIGHTS OF HOLIDAY SPA HEALTH CLUBS OF CALIFORNIA, A CALIFORNIA CORPORATION D/B/A BALLY TOTAL FITNESS, UNDER THAT CERTAIN LEASE RECORDED NOVEMBER 09, 2000, AS INSTRUMENT NO. 20000612909, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

34 EASEMENT GRANTED TO THE CITY OF SANTA ANA, A MUNICIPAL CORPORATION, FOR PUBLIC SERVICES RECORDED DECEMBER 07, 2000, AS INSTRUMENT NO. 20000666346, OF OFFICIAL RECORDS.

TITLE EXCEPTIONS (CONTINUED):

35 EASEMENT GRANTED TO SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION, FOR PUBLIC UTILITIES RECORDED JANUARY 23, 2001, AS INSTRUMENT NO. 20010038838, OF OFFICIAL RECORDS.

36 MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED RESTRICTIVE USE COVENANT RECORDED JANUARY 26, 2001, AS INSTRUMENT NO. 20010047854, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

37 RIGHTS OF MCDONALD'S CORPORATION, A DELAWARE CORPORATION, SUCCESSOR IN INTEREST TO FRANCHISE REALTY INTERSTATE CORPORATION, AN ILLINOIS CORPORATION, UNDER THAT CERTAIN LEASE RECORDED DECEMBER 19, 2002, AS INSTRUMENT NO. 2002001162352, OF OFFICIAL RECORDS.

38 INTENTIONALLY DELETED.

39 RIGHTS OF T.J. MAXX OF CA, LLC, A DELAWARE LIMITED LIABILITY COMPANY, UNDER THAT CERTAIN LEASE RECORDED FEBRUARY 16, 2007, AS INSTRUMENT NO. 2007000106080, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

40 RIGHTS OF ROYAL STREET COMMUNICATIONS CALIFORNIA, LLC, A DELAWARE LIMITED LIABILITY COMPANY, UNDER THAT CERTAIN LEASE RECORDED OCTOBER 19, 2010, AS INSTRUMENT NO. 2010000546786, OF OFFICIAL RECORDS.

MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED ASSIGNMENT AND ASSUMPTION OF ROOFTOP LEASE AGREEMENT RECORDED JANUARY 17, 2014, AS INSTRUMENT NO. 201400021199, OF OFFICIAL RECORDS.

MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED ASSIGNMENT AND ASSUMPTION OF ROOFTOP LEASE AGREEMENT RECORDED JANUARY 24, 2014, AS INSTRUMENT NO. 201400030624, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

41 INTENTIONALLY DELETED.

42 RIGHTS OF HOBBY LOBBY STORES, INC., AN OKLAHOMA CORPORATION, UNDER THAT CERTAIN LEASE RECORDED NOVEMBER 14, 2018, AS INSTRUMENT NO. 2018000428791, OF OFFICIAL RECORDS. (NOTHING TO PLOT)

43 INTENTIONALLY DELETED.

44 ANY RIGHTS OF THE PARTIES IN POSSESSION OF A PORTION OF, OR ALL OF, SAID LAND, WHICH RIGHTS ARE NOT DISCLOSED BY THE PUBLIC RECORDS.

45 INTENTIONALLY DELETED.

46 INTENTIONALLY DELETED.

47 ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING MATTERS DISCLOSED BY SURVEY,

JOB NO.: 0622-015-01
DATED: DECEMBER 16, 2020
PREPARED BY: FUSCOE ENGINEERING
MATTERS SHOWN: NONE

48 INTENTIONALLY DELETED.

49 INTENTIONALLY DELETED.

50 INTENTIONALLY DELETED.

51 TERMS, COVENANTS, CONDITIONS AND AGREEMENTS CONTAINED IN A MASTER GROUND LEASE MADE BY AND BETWEEN FIRST WESTERN BANK AND TRUST COMPANY, LESSOR ("LANDLORD"), AND WINMAR COMPANY, INC., LESSEE, DATED JANUARY 1, 1971, A MEMORANDUM OF WHICH WAS RECORDED ON JUNE 18, 1971 AS DOCUMENT NO. 17690 IN BOOK 9884 PAGE 59 (AS AMENDED, THE "GROUND LEASE") WHICH, IN ARTICLE XXII OF THE GROUND LEASE, AFFORDS THE LESSEE A RIGHT OF FIRST OFFER (THE "RIGHT OF FIRST OFFER") TO PURCHASE THE LEASEHOLD ESTATE.

52 TERMS, COVENANTS, CONDITIONS AND AGREEMENTS CONTAINED IN A RESTATED AND AMENDED GROUND SUBLEASE MADE BY AND BETWEEN METRO TOWN SQUARE, LLC, LESSOR ("LANDLORD"), AND SDC/PACIFIC/YOUNGMAN - SANTA ANA, LESSEE, DATED NOVEMBER 2, 2004, (AS AMENDED, THE "GROUND SUBLEASE") WHICH, IN SECTION 20 OF THE GROUND SUBLEASE, AFFORDS THE LANDLORD A RIGHT OF FIRST OFFER (THE "RIGHT OF FIRST OFFER") TO PURCHASE THE LEASEHOLD ESTATE. TENANT SHALL HAVE THE OPTION THROUGH LANDLORD TO PURCHASE THE LAND FROM THE GROUND OWNER.

53 AN OPTION TO GROUND LEASE SAID LAND WITH CERTAIN TERMS, COVENANTS, CONDITIONS AND PROVISIONS AS SET FORTH THEREIN.

OPTIONOR: GREENVILLE RANCH, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, SUCCESSOR BY CONVERSION OF, AND WHO ACQUIRE TITLE AS, GREENVILLE RANCH PARTNERSHIP, A CALIFORNIA GENERAL PARTNERSHIP, AS TO AN UNDIVIDED 47.4048% INTEREST; MCG BRISTOL WEST, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, AS TO AN UNDIVIDED 17.5317% INTEREST; AND BSG WEST BRISTOL, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, AS TO AN UNDIVIDED 35.0635% INTEREST

OPTIONEE: RCR BRISTOL, LLC, A DELAWARE LIMITED LIABILITY COMPANY
DISCLOSED BY: A MEMORANDUM
RECORDING DATE: _____, 2021
RECORDING NO: _____ OF OFFICIAL RECORDS

54 NOTWITHSTANDING THE EXCEPTION TO COVERAGE SET FORTH ABOVE AT EXCEPTION NO. 52, THIS POLICY INSURES AGAINST LOSS SUSTAINED BY REASON OF A FINAL, NON-APPEALABLE COURT ORDER THAT DIVESTS THE INSURED OF ITS TITLE OR FORCES THE SALE OF ANY PORTION OF THE LAND TO SUB LESSEE IN ANY LITIGATION OR ADVERSE MATTER THAT MAY BE COMMENCED BY THE SUB LESSEE ASSERTING (I) FAILURE TO COMPLY WITH THE ALLEGED SUB LESSEE'S PURCHASE RIGHTS UNDER EXCEPTION 52 IN RELATION TO THE TRANSACTION VESTING TITLE IN THE INSURED OR (II) A DEFAULT UNDER THE GROUND SUBLEASE FOR THE FAILURE TO COMPLY WITH REQUIREMENTS OF SECTION 20 WITH REGARD TO THE TRANSACTION VESTING TITLE IN THE INSURED; PROVIDED, HOWEVER, THAT ANY SUCH LITIGATION WILL BE PROSECUTED OR DEFENDED AT THE EXPENSE OF THE INSURED BY COUNSEL SATISFACTORY TO THE COMPANY IN ITS REASONABLE DISCRETION AND PROVIDED FURTHER THAT THE COMPANY SHALL HAVE NO LIABILITY FOR ANY AMOUNT PAYABLE IN SETTLEMENT OF ANY SUCH CLAIM NOT PREVIOUSLY APPROVED BY THE COMPANY, WHICH APPROVAL SHALL NOT BE UNREASONABLY WITHHELD.

55 ANY LIEN, OR RIGHT TO A LIEN, FOR SERVICES, LABOR OR MATERIAL UNLESS SUCH LIEN IS SHOWN BY THE PUBLIC RECORDS, AT DATE OF POLICY OR UNLESS SUCH LIEN RESULTS FROM SERVICES, LABOR OR MATERIALS CONTRACTED BY, OR ON BEHALF OF, THE PARTIES IN WHICH TITLE TO THE LAND IS VESTED, AS REFLECTED IN PARAGRAPH 3 OF SCHEDULE A ATTACHED HERETO.

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HORIZONTAL COORDINATE DATUM (BASIS OF COORDINATES):

THE BEARINGS AND COORDINATES SHOWN HEREON ARE BASED UPON THE CALIFORNIA COORDINATE SYSTEM OF 1983, CCS83, ZONE VI, (2017.50 EPOCH) IN ACCORDANCE WITH THE CALIFORNIA PUBLIC RESOURCES CODE, SECTION 8801-8819. SAID BEARINGS AND COORDINATES ARE BASED LOCALLY UPON FIELD-OBSERVED TIES TO THE FOLLOWING CALIFORNIA SPATIAL REFERENCE NETWORK, OR EQUIVALENT STATIONS:

REFERENCED CSRC STATIONS				
STATION	NORTHING (Y)	EASTING (X)	HEIGHT	ACCURACY
FVPK	2188769.57	6048756.26	-35.603	FIRST ORDER
SACY	2218016.19	6061432.27	-34.713	FIRST ORDER

MAPPING ANGLE AND GRID FACTOR						
POINT	NORTHING (Y)	EASTING (X)	MAPPING ANGLE	CF	HEIGHT	ELEV
10002	2202229.53	6064244.72	-00°53'55.4532"	0.99997449	-81.891'	33.18'

NOTES: DISTANCES AND COORDINATE DISTANCES SHOWN, UNLESS OTHERWISE NOTED, ARE IN TERMS OF THE U.S. SURVEY FOOT. AS USED IN TABLES ABOVE, ELEVATION REFERS TO THE CALIFORNIA ORTHOMETRIC HEIGHTS OF 1988 ("CON88") OR EQUIVALENT OF THE POINT WHERE THE MAPPING ANGLE (CONVERGENCE ANGLE) AND COMBINATION FACTOR (CF) WERE CALCULATED IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 ("NAVD88") AND HEIGHT REFERS TO THE VERTICAL VALUE OF THE CALIFORNIA GEODETIC COORDINATE OR EQUIVALENT ELLIPSOID HEIGHT (FROM GEOID12B) USED TO CALCULATE THE COMBINATION FACTOR. IN THE EVENT THAT THE CALCULATIONS ARE NOT PERFORMED AT A "REAL" POINT IN THE SURVEY, THERE MAY BE NO STATION OR ELEVATION TO LIST.

DISTANCES SHOWN HEREON ARE GRID DISTANCES. TO APPROXIMATE CCS83 GRID DISTANCES MULTIPLY THE DISTANCES BY THE COMBINATION FACTOR PROVIDED HEREON.

BENCH MARK STATEMENT:

THE CONTOURS AND ELEVATIONS SHOWN HEREON ARE BASED ON THE FOLLOWING BENCH MARK:

BM NO.: SA-292-77 ELEV.: 33.607' (COUNTY OF ORANGE BENCH MARK)
DATUM: NAVD 88 YEAR LEVELLED: 2010
DESCRIPTION: FOUND 3 3/4" OCS ALUMINUM BENCHMARK DISK STAMPED "SA-292-77", SET IN THE NORTHWEST CORNER OF A 4FT. BY 7.5FT. CATCH BASIN. MONUMENT IS LOCATED ON THE SOUTH SIDE OF MACARTHUR BOULEVARD, 270 FT. WESTERLY OF THE CENTERLINE OF BEAR STREET, 10.5 FT. WESTERLY OF LIGHT POLE "#2061786E", AND 0.8 FT. BEHIND CURB FACE. MONUMENT IS SET LEVEL WITH SIDEWALK.

CONTOUR INTERVAL=1'

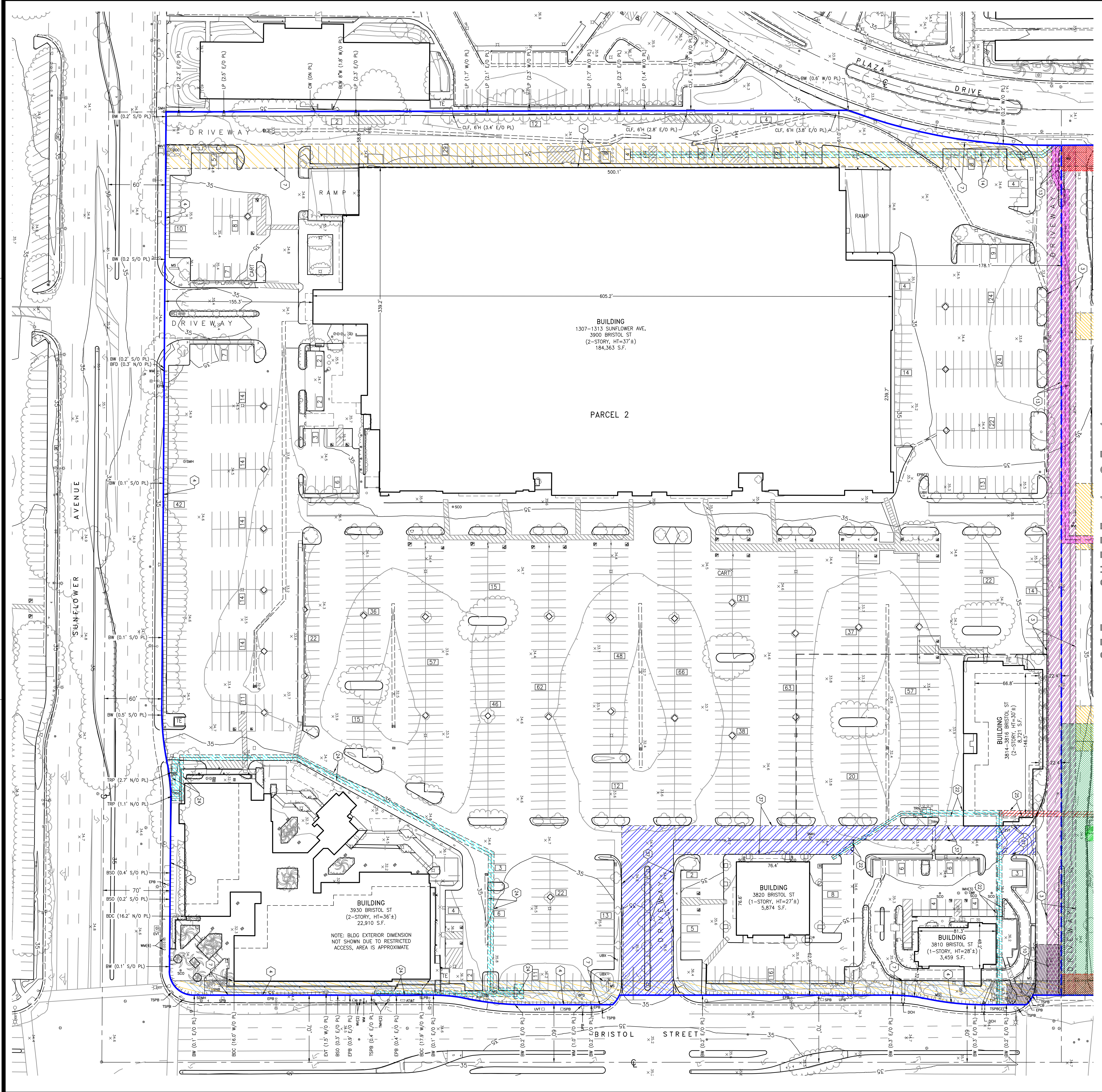
TOPOGRAPHY NOTE:

THE TOPOGRAPHIC INFORMATION SHOWN HEREON WAS COMPILED PHOTOGRAMMETRICALLY FROM AERIAL PHOTOGRAPHY DATED 01/30/2020.

ACCURACY STATEMENT:

THE SURVEY CONTROL MEETS 2-CM (0.06-FT) HORIZONTAL AND VERTICAL LOCAL AND NETWORK ACCURACY STANDARDS PER FGDC GEOSPATIAL POSITIONING ACCURACY STANDARDS PART 2 (FGDC-STD-007.2-1998) AT 95% CONFIDENCE LEVEL.

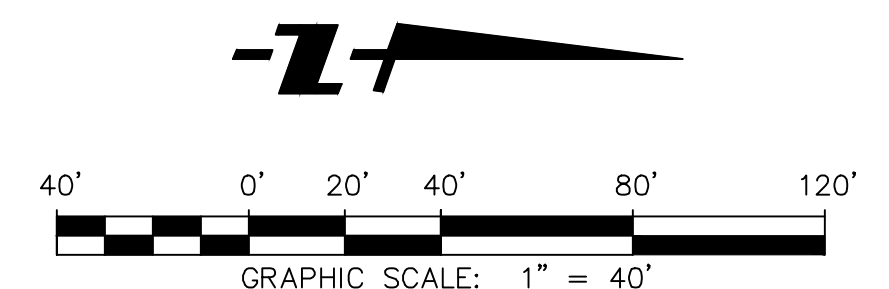
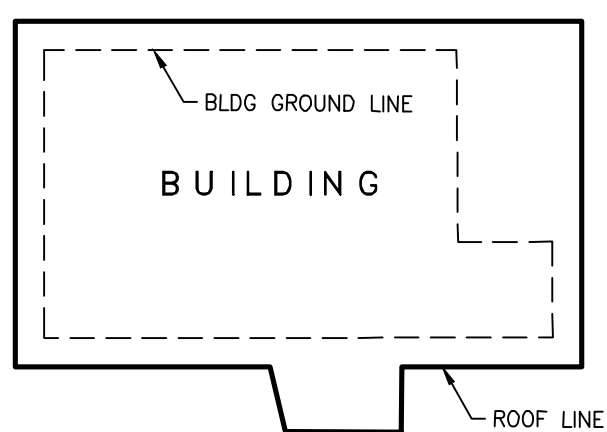
THE AERIAL TOPOGRAPHIC HORIZONTAL DATA SET WAS PRODUCED TO MEET ASPRS POSITIONAL ACCURACY STANDARDS FOR DIGITAL GEOSPATIAL DATA (2014) FOR A 12.5-CM (0.41-FT) RMSE / RMSEY HORIZONTAL ACCURACY CLASS WHICH EQUATES TO POSITIONAL HORIZONTAL ACCURACY = +/-30.6-CM (1.00-FT) A 95% CONFIDENCE LEVEL.



- LINE LEGEND:**
- SUBJECT PROPERTY LINES
 - CENTERLINES
 - EASEMENT LINES
 - UNDERLYING PARCEL LINES
 - REPORT PARCEL LINES
 - ADJACENT PROPERTY LINES
 - RELINQUISHED ACCESS RIGHTS
 - FEMA FLOOD ZONE BOUNDARY
 - CITY BOUNDARY

- AT&T - AT&T PANEL BOX
- BDC - BUILDING CORNER
- BFD - BACKFLOW DEVICE
- BLW - BLOCK WALL
- BSO - BUS STOP SHELTER OVERHANG
- BW - BACK OF WALK
- CLF - CHAIN LINK FENCE
- COMM - COMMUNICATION PULLBOX
- CONC - CONCRETE
- CW - CONCRETE WALK
- DCH - DRAINAGE CHANNEL
- EBX - ELECTRIC BOX
- EM - ELECTRIC METER
- EPB - ELECTRIC PULLBOX
- E/O - EAST OF
- EVT - ELECTRIC VAULT
- FDC - FIRE DEPARTMENT CONNECTION
- HT - HEIGHT
- IMH - INTERCEPTOR MANHOLE
- N/O - NORTH OF
- NSA - NO STREET ADDRESS INDICATED
- PCB - PEDESTRIAN CROSSING BUTTON
- PV - POST INDICATOR VALVE
- PL - PROPERTY LINE
- S/O - SOUTH OF
- SCO - SEWER CLEANOUT
- SMH - SEWER MANHOLE
- SNB - SIGNBOARD
- SPB - SPECTRUM PULLBOX
- TE - TRASH ENCLOSURE
- TMH - TELEPHONE MANHOLE
- TRN - TRANSFORMER
- TRP - TRANSFORMER PAD
- TSPB - TRAFFIC SIGNAL PULLBOX
- UBX - UTILITY BOX
- UMH - UNKNOWN MANHOLE
- UPB - UTILITY PULLBOX
- UVT - UTILITY VAULT
- VT - VENT
- W/O - WEST OF
- WM - WATER METER
- WV - WATER VALVE
- WVT - WATER VAULT
- XX - STANDARD PARKING COUNT

- x - CHAIN LINK FENCE
- - HANDICAP SIGN
- - GRATED INLET
- - FIRE HYDRANT
- - LIGHTPOLE
- - MANHOLE
- - MASONRY WALL
- ☼ - PALM TREE
- - SPOT ELEVATION
- - STREET LIGHT
- - STREET SIGN
- - TRAFFIC LIGHT
- - TRAFFIC SIGNAL POLE
- - TREE
- - VALVE



SEE SHEET 4 OF 4

BUILDING
3930 BRISTOL ST
(2-STORY, HT=36'±)
22,910 S.F.
NOTE: BLDG EXTERIOR DIMENSION NOT SHOWN DUE TO RESTRICTED ACCESS, AREA IS APPROXIMATE

BUILDING
3820 BRISTOL ST
(1-STORY, HT=27'±)
5,874 S.F.

BUILDING
3810 BRISTOL ST
(1-STORY, HT=28'±)
3,459 S.F.

NO.	DATE	REVISION

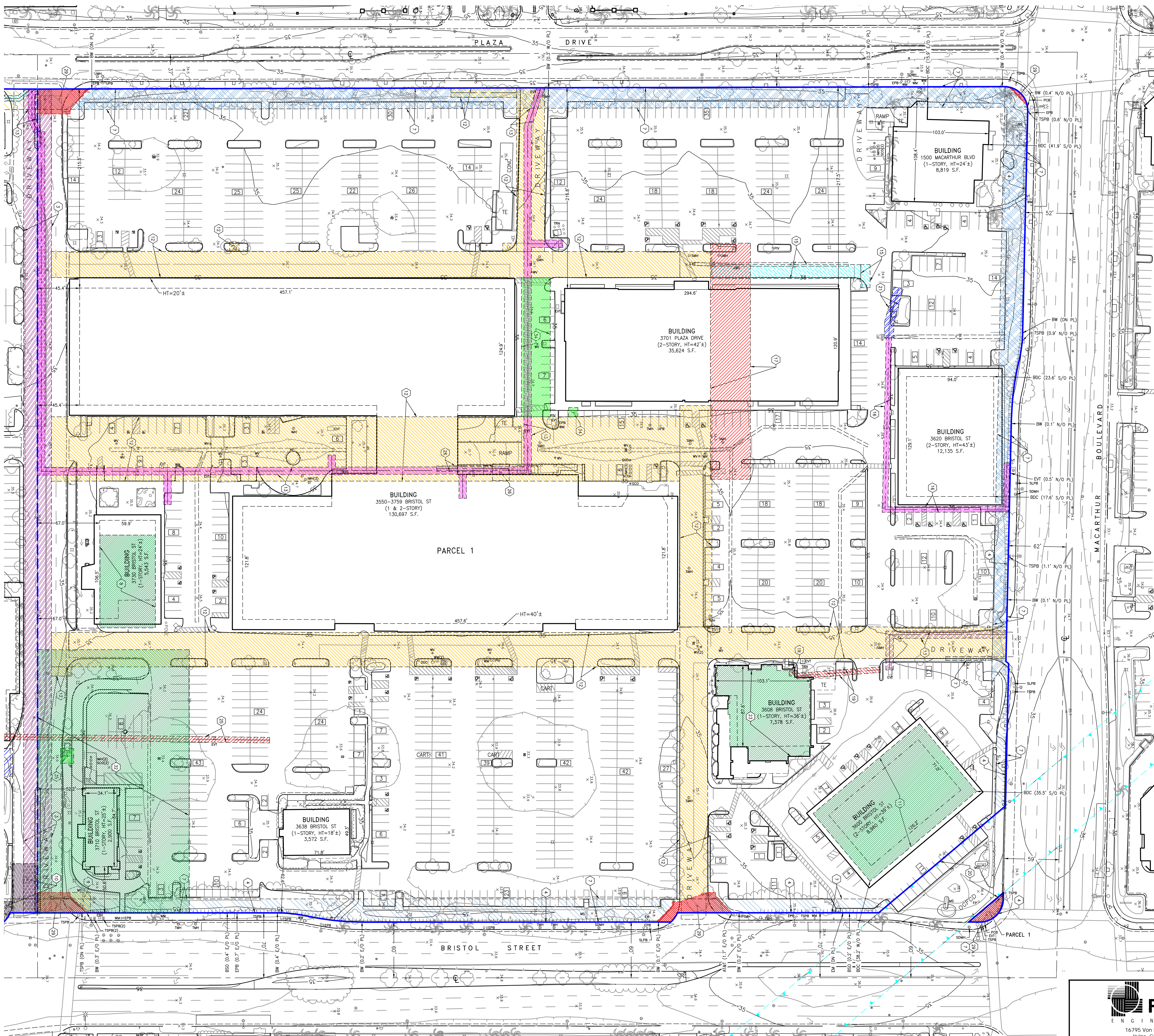
FEI REFERENCE:

DATE: December 16, 2020
FN: 0622-015ALT
JN: 0622-015-01
DRAWN BY: JMS/JBF
CHECKED BY: KRT
SHEET 3 OF 4

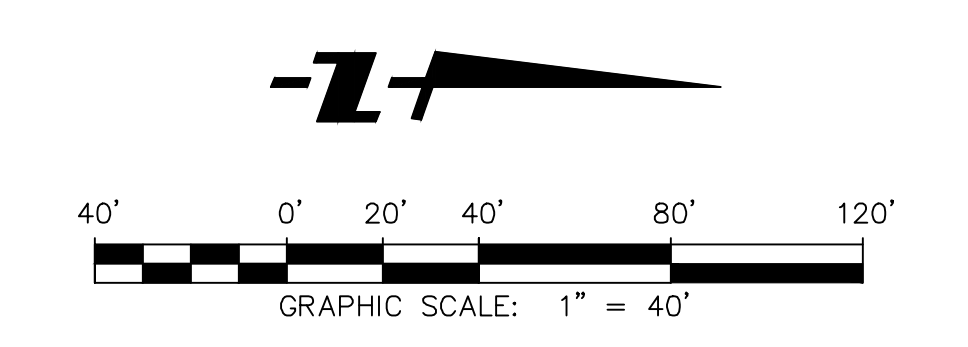
FUSCOE
ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92660
tel 949.474.1960 • fax 949.474.5315
www.fuscoe.com

ALTA/NSPS LAND TITLE SURVEY
of: BRISTOL COMMONS
SOUTH BRISTOL STREET
SANTA ANA, CALIFORNIA
for: RELATED CALIFORNIA
18201 VON KARMAN AVE; SUITE 900
IRVINE, CALIFORNIA

SEE SHEET 3 OF 4



NOTE: SEE LEGEND ON SHEET 3



NO.	DATE	REVISION

DATE: December 16, 2020
 FN: 0622-015ALT
 JN: 0622-015-01
 DRAWN BY: JMS/JBF
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 SHEET 4 OF 4

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 16795 Von Karman, Suite 100
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 tel 949.474.1960 • fax 949.474.5315
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Appendix 2

Annotated Sewer Atlas Maps

DRAWING NUMBER

1841

DRAWING NUMBER

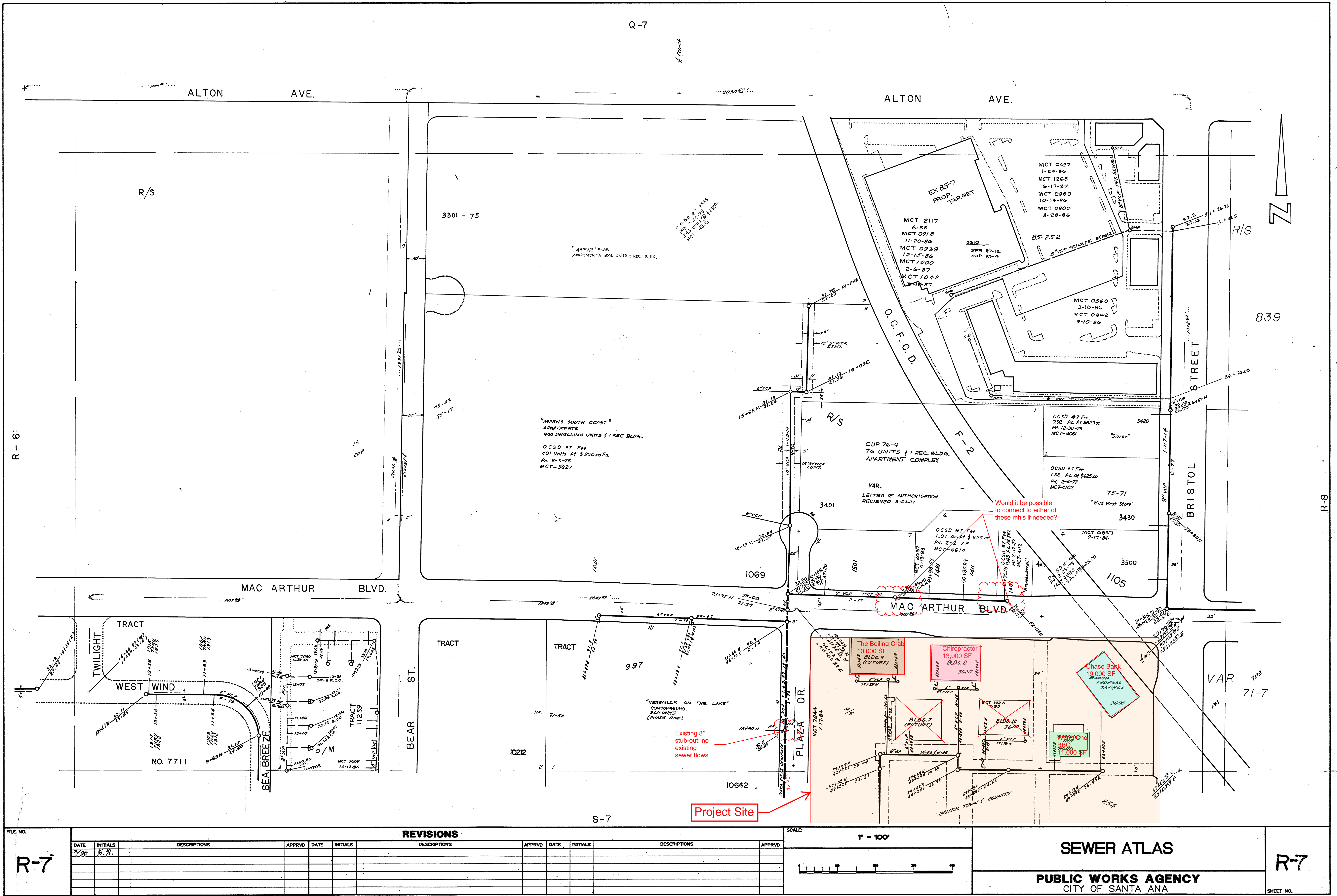
ATLAS

DRAWING NUMBER

SEWER

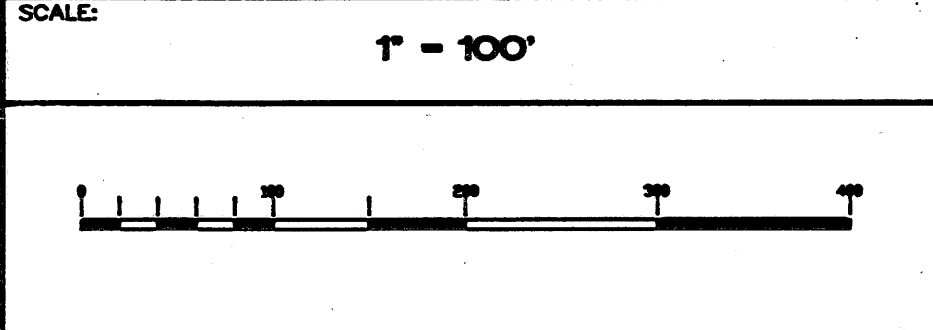
DRAWING NUMBER

R-7



FILE NO. R-7

DATE	INITIALS	DESCRIPTIONS	APPRVD	DATE	INITIALS	DESCRIPTIONS	APPRVD	DATE	INITIALS	DESCRIPTIONS	APPRVD
3/20	B.H.										



SEWER ATLAS
PUBLIC WORKS AGENCY
 CITY OF SANTA ANA

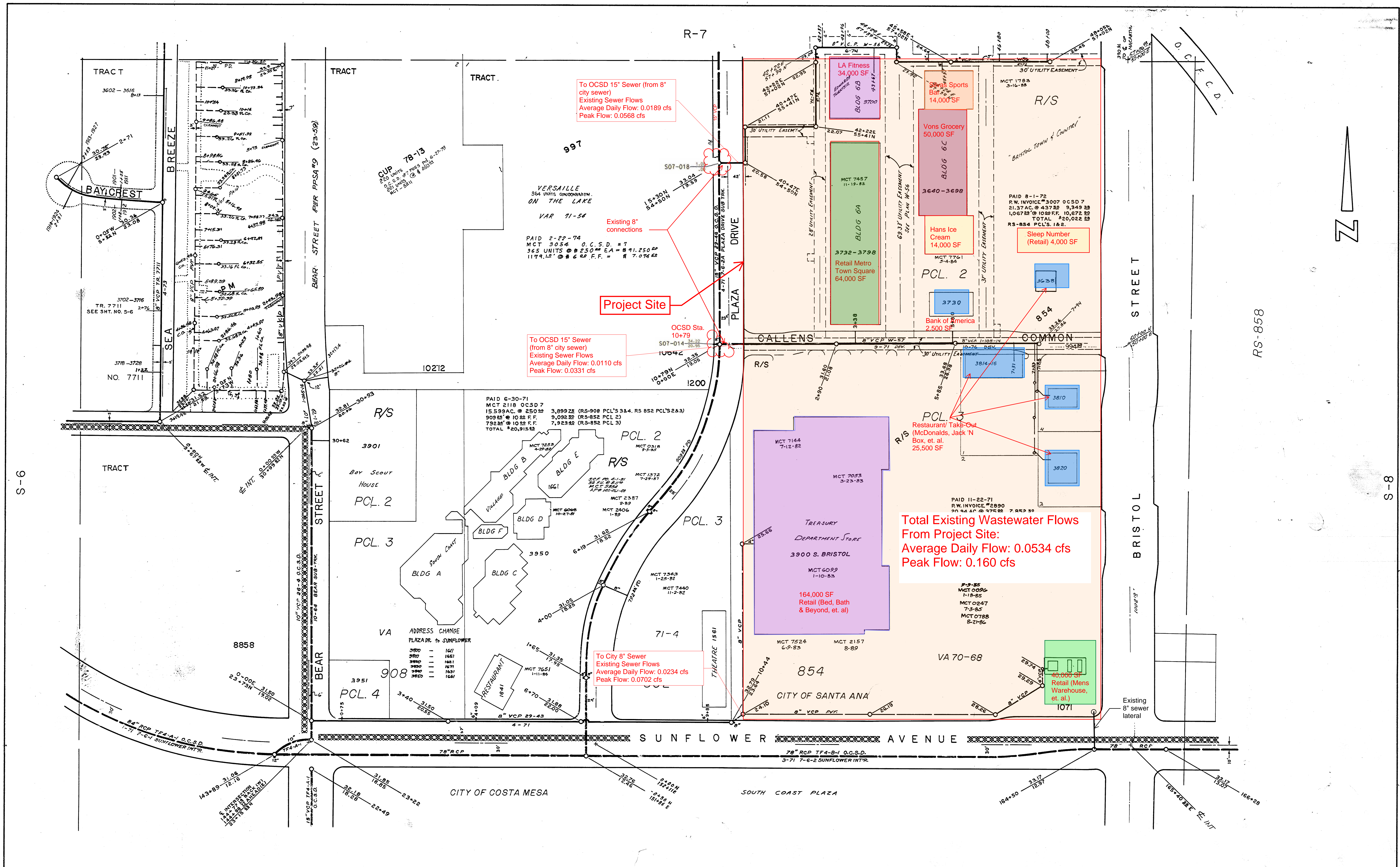
R-7
SHEET NO.

DRAWING NUMBER
101

DRAWING NUMBER
ATLAS

DRAWING NUMBER
SEWER

DRAWING NUMBER
S-7



FILE NO.	DATE	INITIALS	DESCRIPTIONS	APPRVD	DATE	INITIALS	DESCRIPTIONS	APPRVD	DATE	INITIALS	DESCRIPTIONS	APPRVD
S-7	3/90	BJ/TJ										
	3/92	T.P.	CHANGE ADDRESSES FROM PLAZA DR. TO SUNFLOWER									

REVISIONS

SCALE: 1" = 100'

SEWER ATLAS

PUBLIC WORKS AGENCY

CITY OF SANTA ANA

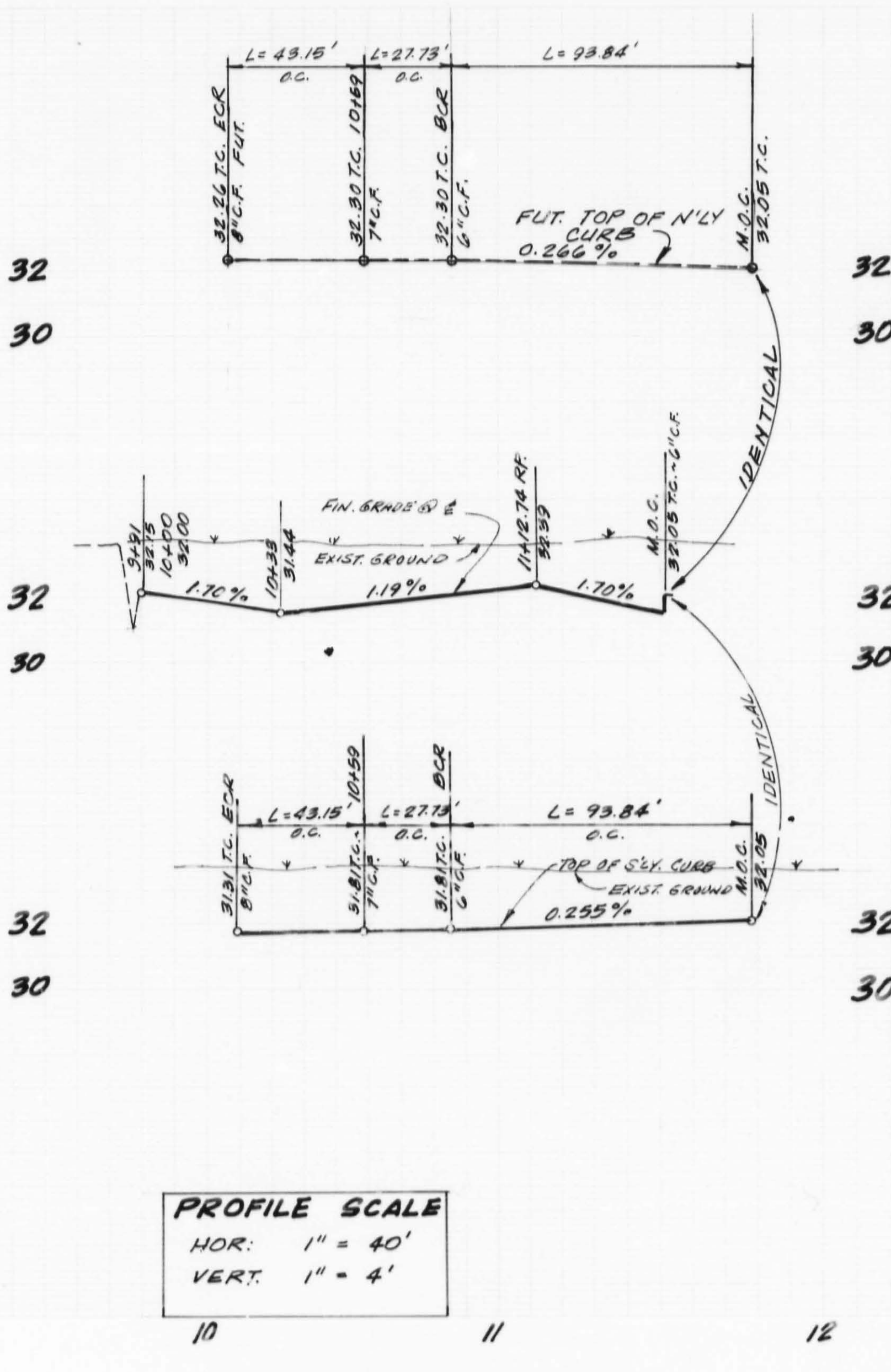
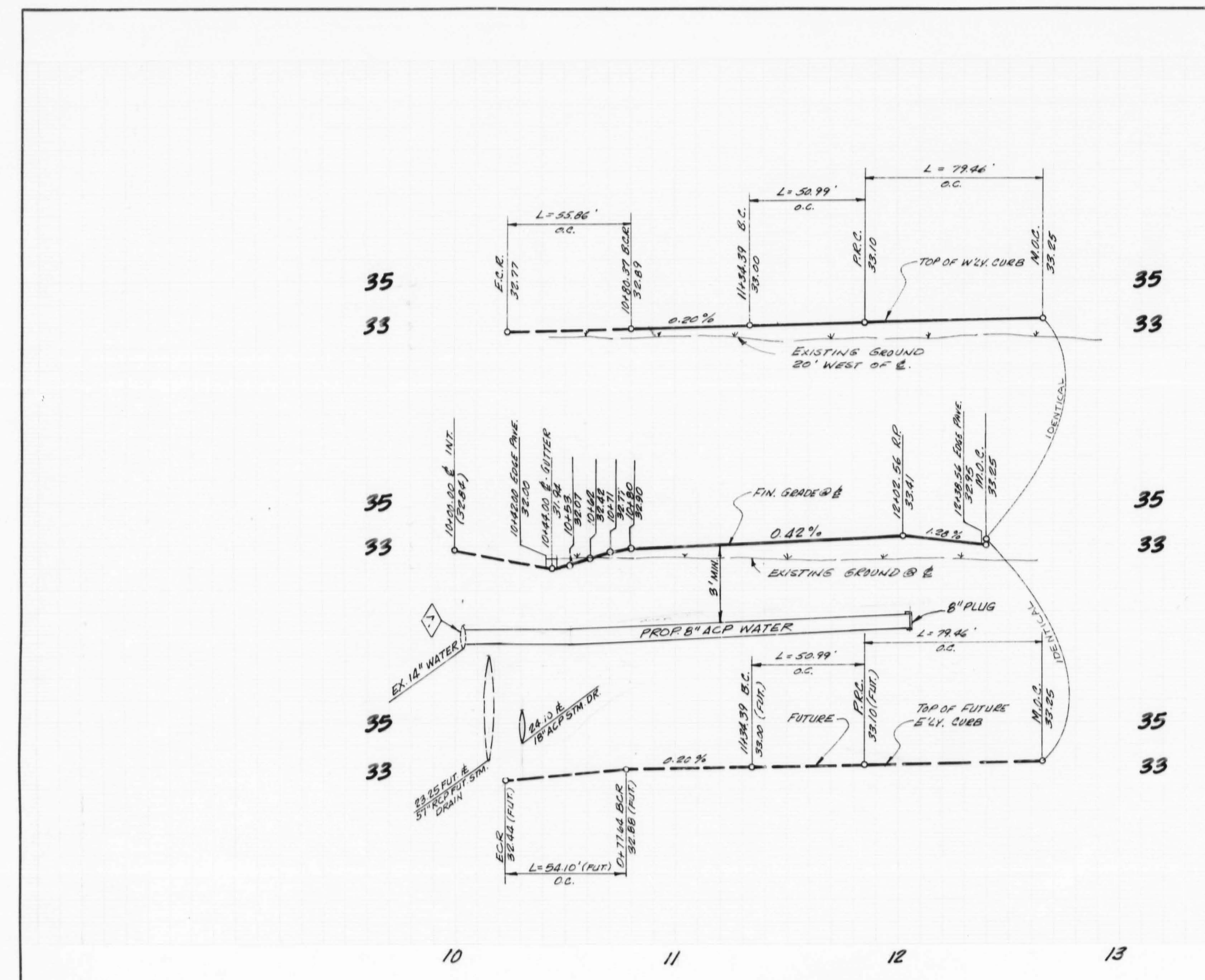
SHEET NO. S-7

Appendix 3

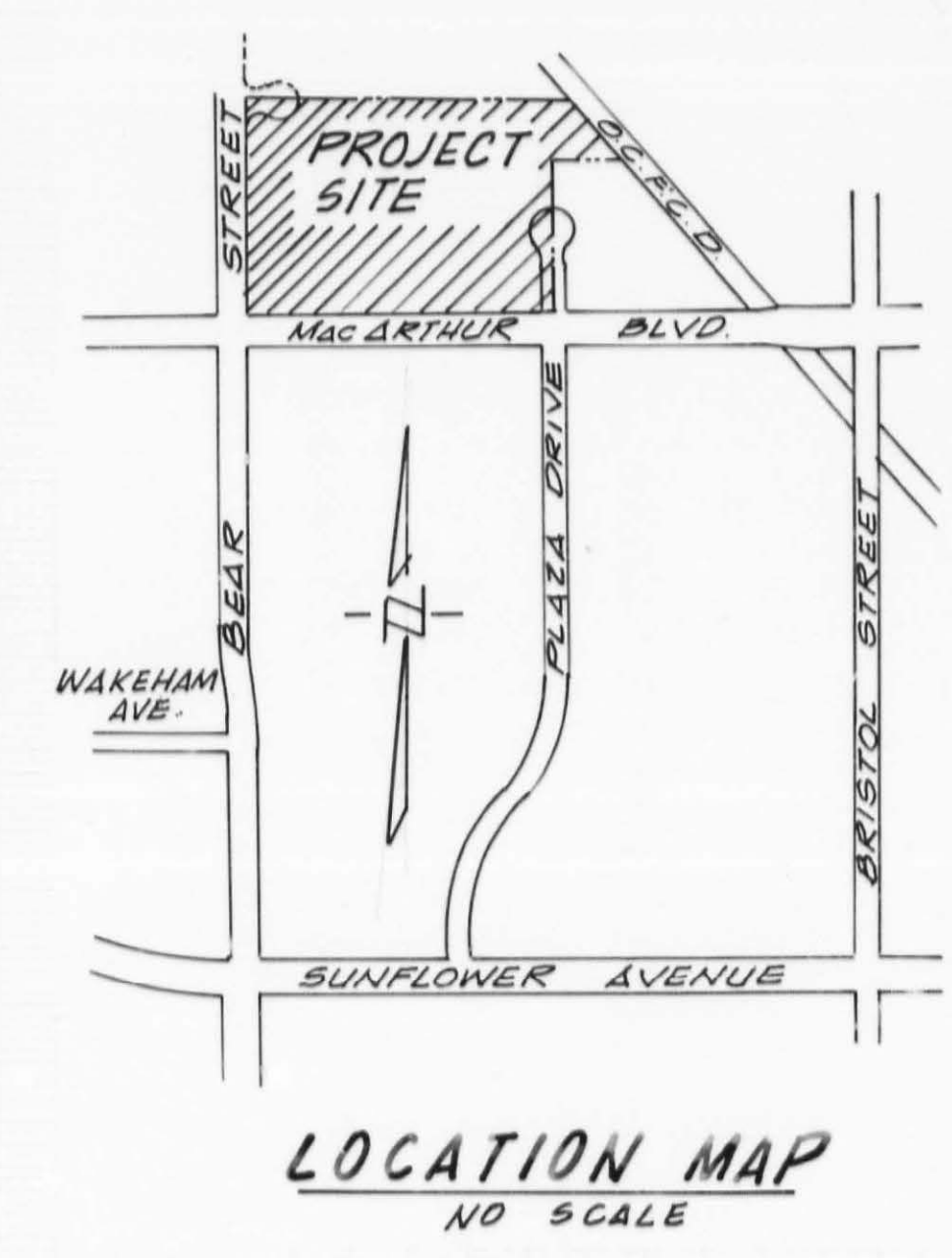
Sewer As-Built Plans



ST. IMP. PLAZA DR. FROM MACARTHUR DR. TO 250' NORTH & ST. A. BEAR ST. 150' EAST. 1 of 6

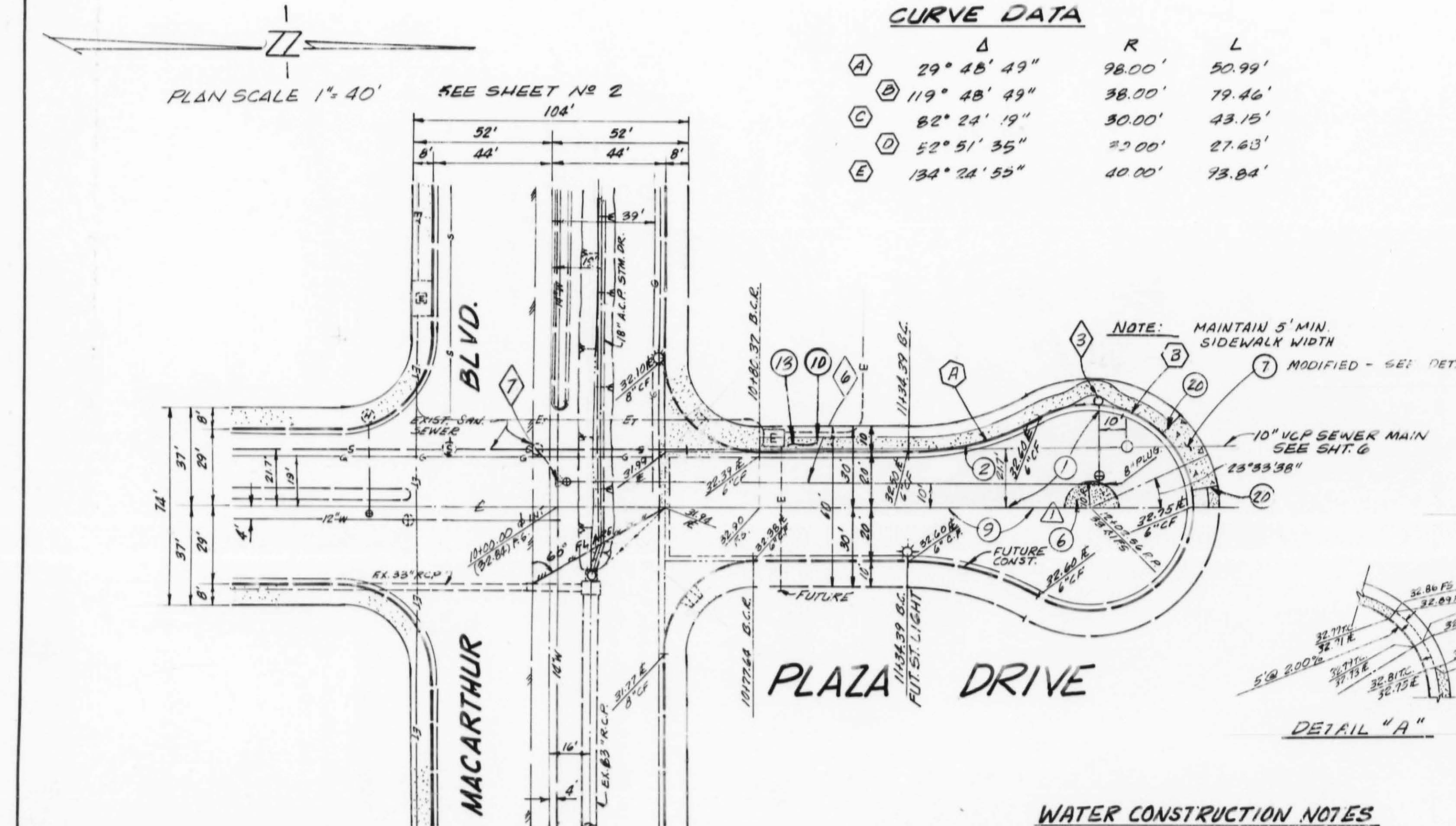


PROFILE SCALE
HOR: 1" = 40'
VERT: 1" = 4'

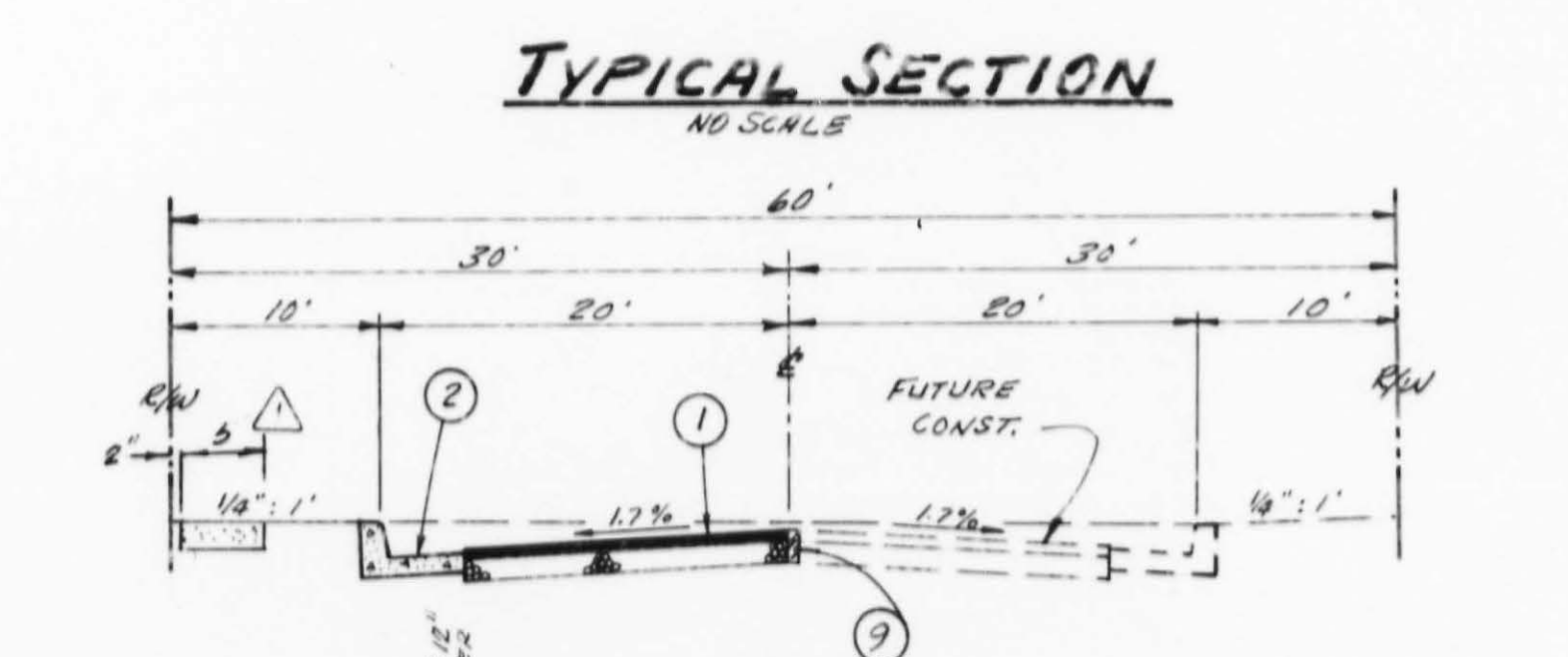


GENERAL NOTES

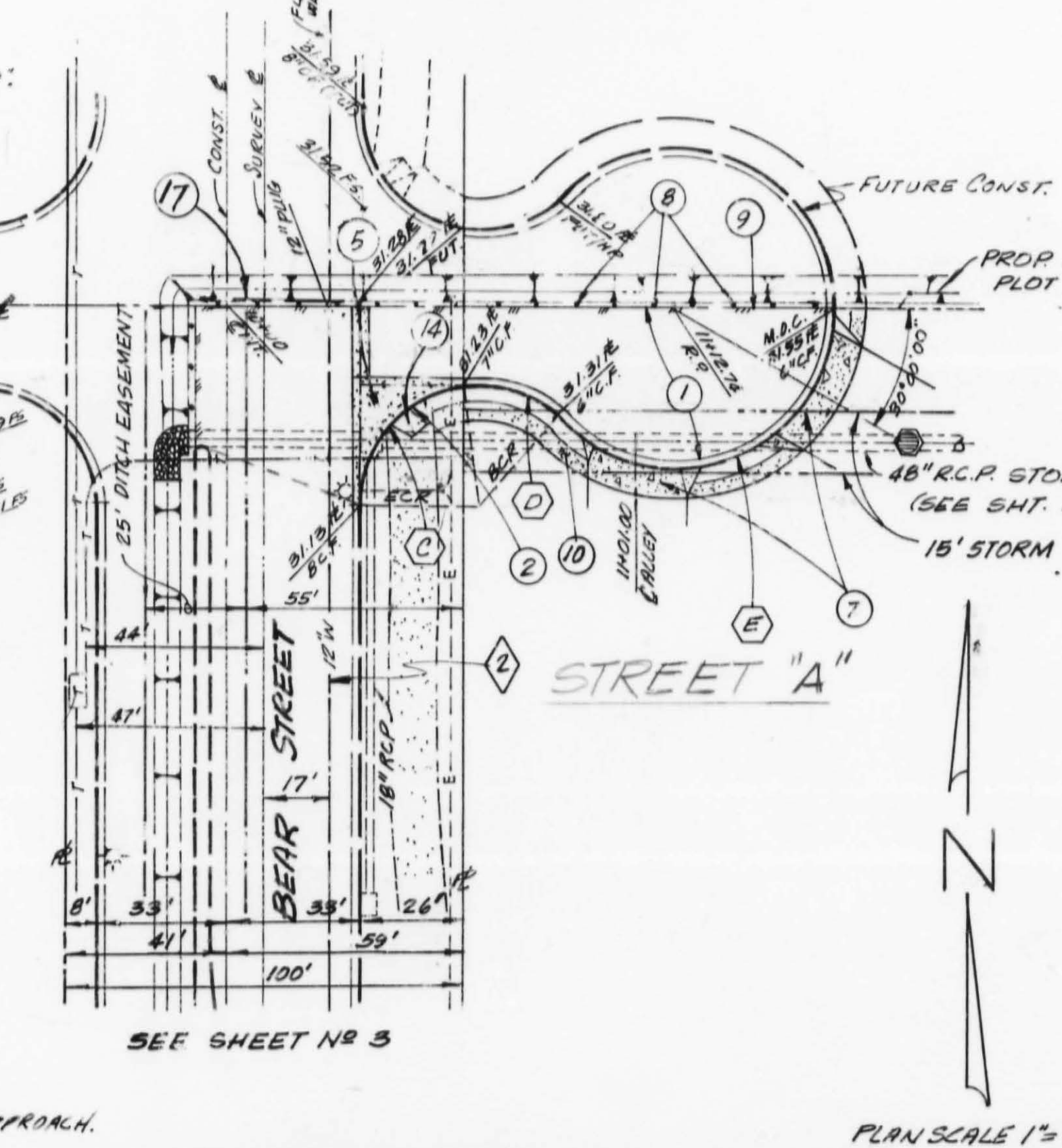
- 1. ALL WORK SHOWN HEREON SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROVISIONS OF THE A.C.C. (A.P.W.A.) STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION...
2. WITHIN 24 HOURS AFTER FINAL SURFACING IS PLACED, ALL MANHOLE AND DRIVE BOX FRAMES AND COVERS SHALL BE ADJUSTED BY THE DEVELOPER TO FINISH GRADE...
3. PAVEMENT SHALL BE COVERED WITH PREPARED TYPE ASPHALT EMULSION...
4. FEATHER AC WHERE MEETING EXISTING PAVEMENT A MINIMUM OF 10 FEET OR AS DIRECTED BY THE CITY ENGINEER...
5. THE ENGINEER FOR THE SUBDIVIDER SHALL PROVIDE NUBS IN THE STREET FOR FINISH SUBGRADE AND FINISHED GRADE AT THE CROWN, AT ALL POINTS WHERE ELEVATIONS ARE SHOWN ON THE PLANS AND AT ANY ADDITIONAL POINTS REQUIRED BY THE CITY ENGINEER...
6. AT THE TIME OF CONTRACTING THE EMBANKMENT SOIL AND PREPARING SUBGRADE, IF THE MOISTURE CONTENT IS SUCH THAT THE SPECIFIED RELATIVE COMPRESSION RATIO CANNOT BE OBTAINED OR THE SUBGRADE IS VULNERABLE, THE FOLLOWING REMEDIAL ACTION SHOULD BE PROVIDED:
a) REMOVE EXCESS MOISTURE BY SCARIFYING AND AERATING, OR
b) EXCAVATE UNSTABLE AREAS AND BACKFILL WITH SUITABLE MATERIAL OR BASE, OR
c) INCREASE THE AGRICULTURAL R-45E SECTION, OR
d) STABILIZE THE BASEMENT SOIL WITH SUITABLE ADDITIVES, OR
e) PROVIDE AN ALTERNATE METHOD SUITABLE TO THE CITY ENGINEER.
7. WATER MAINS AND SERVICES ARE TO BE INSTALLED BY THE CITY OF SANTA ANA AFTER THE CURB AND GUTTER IS CONSTRUCTED AND BEFORE THE BASE UNDER THE AC SURFACING IS LAID...
8. THE SUBDIVIDER SHALL RELOCATE ANY EXISTING PUBLIC UTILITIES LOCATED IN A DEDICATED RIGHT OF WAY AS REQUIRED BY THE CITY ENGINEER.
9. 6" V.C.P. STUB CONNECTIONS SHALL BE CONSTRUCTED FROM CUMBER MIN AT STA. 121+9.97 AND STA. 124+67.64. THE DEVELOPER IS TO FURNISH THE CITY THE LOCATION OF EACH CONNECTION.
10. ALL V.C.P. JOINTS SHALL BE PLASTIC MECHANICAL COMPRESSION JOINTS OR BANDSEALS. USE FULL DEPTH HEADER FOR VERTICAL FACES OF "CC" CONSTRUCTION.
11. IT SHALL BE THE RESPONSIBILITY OF THE SEWER CONTRACTOR TO EXPOSE ALL JOINT POINTS TO THE EXISTING SEWER AND TO HAVE THE LOCATION ELEVATION VERIFIED BY THE PRIVATE CIVIL ENGINEER PRIOR TO ANY SEWER STAKES BEING FURNISHED.
12. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL FLOW LINE ELEVATIONS AT ALL SEWER MANHOLES VERIFIED BY THE PRIVATE CIVIL ENGINEER PRIOR TO ANY PIPE BACKFILL "AS BUILT" FROM LINE ELEVATIONS ARE TO BE SUBMITTED TO THE CITY PRIOR TO ANY BOND RELEASE.
13. THE CONTRACTOR SHALL NOTIFY THE PRIVATE CIVIL ENGINEER 24 HOURS IN ADVANCE FOR ANY UTILITY STAKING.
14. ANY PERMANENT BARRICADE OR SAFETY SIGN ERUPTED ON THE PLANS AND CONSIDERED NECESSARY BY THE ENGINEER SHALL BE INSTALLED BY THE DEVELOPER AT NO COST TO THE CITY.



CURVE DATA table with columns for curve number, angle, radius, and length.



- CONSTRUCTION NOTES:
1. CONST. PER TYP. SECT. ON THIS SHEET, 3" AC OVER 10" AB.
2. CONST. TYPE A-2 CURB & GUTTER PER STD. PLAN 101.
3. CONST. DRIVE APPROACH PER STD. PLAN 112.
4. INSTALL PAVEMENT EDGES @ 5' O.C.
5. INSTALL 2" x 4" REDWOOD HEADER.
6. CONST. PCC SIDEWALK PER STD. PLAN 104.
7. PLANT 15 GALLON TREES - TYPE PER ENGINEER.
8. CONST. WHEELCHAIR RAMP PER STD. PLAN 121.
9. CONNECT TO EXIST. 18" CROSS W/18" 1/2" REDUCER.
10. INSTALL 12" R.C.P. WATER LINE.
11. INSTALL FIRE HYDRANT PER STD. PLAN 103.
12. INSTALL 8" A.C. WATER MAIN.
13. CONNECT TO EXISTING 16" A.C. WATER MAIN WITH 12" x 18" TAPPING GLEYS.
14. RAMP SIDEWALK TO MEET DRIVEWAY APPROACH PER ENGINEER.



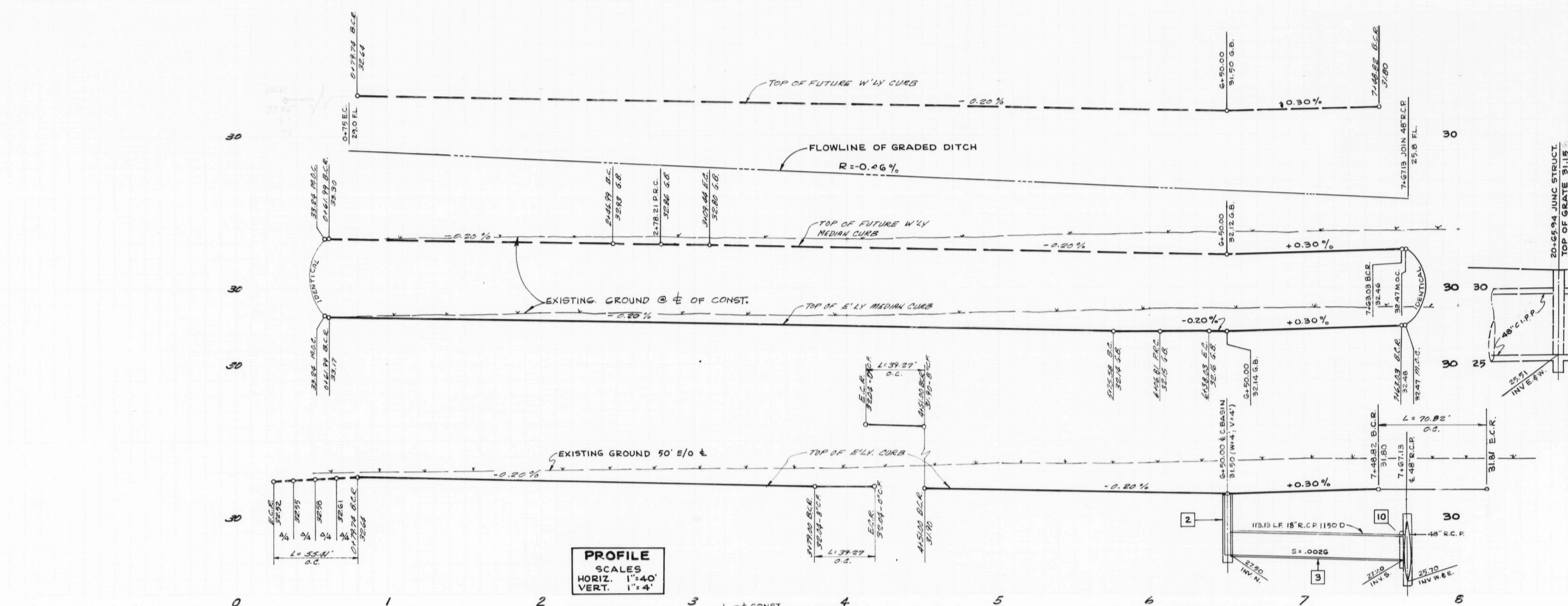
REVISIONS table with columns for number, date, initials, description, and approved.

REFERENCES table with columns for title, book, page, and date.

TOUPS CORPORATION - CONSULTING ENGINEERS
1010 N. MAIN ST., SANTA ANA, CALIF. 92701 - TEL. 835-4447

ST. IMP. & TITLE SHEET
PLAZA DR. - FROM MACARTHUR TO 250' NORTH.
STREET 'A' - FROM BEAR ST. TO 150' EAST.
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA
SHEET NO. 1 OF 6

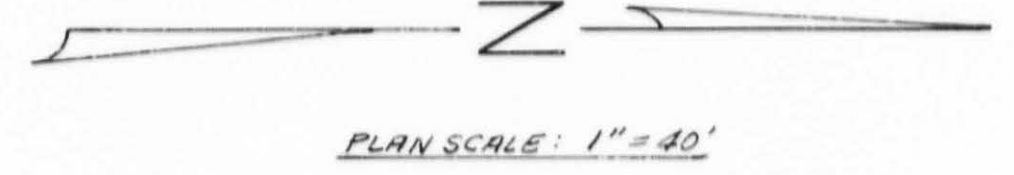
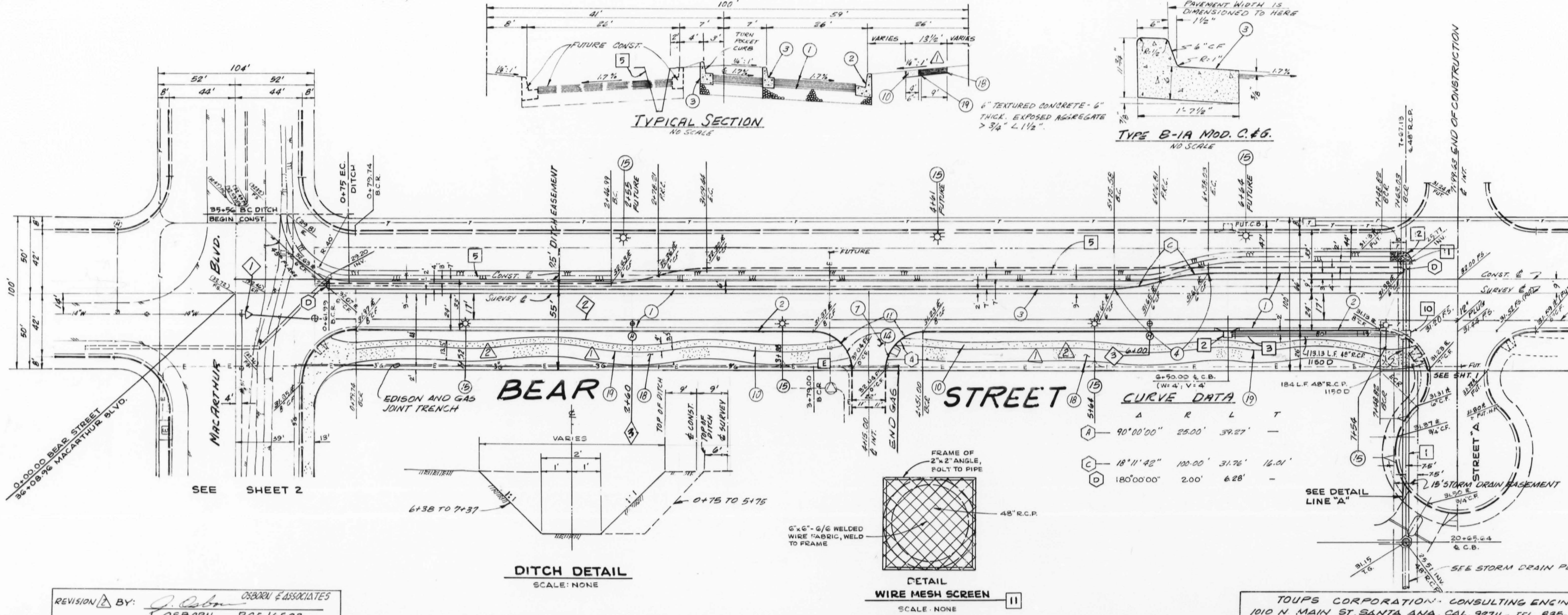
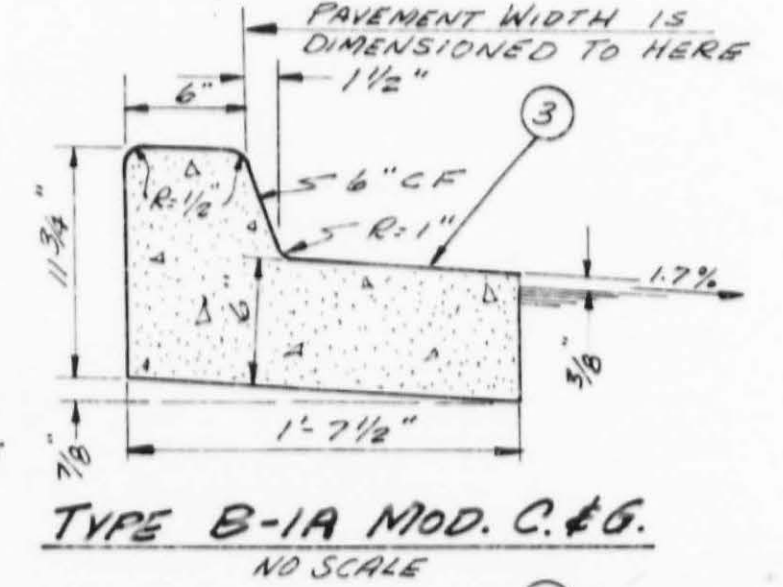
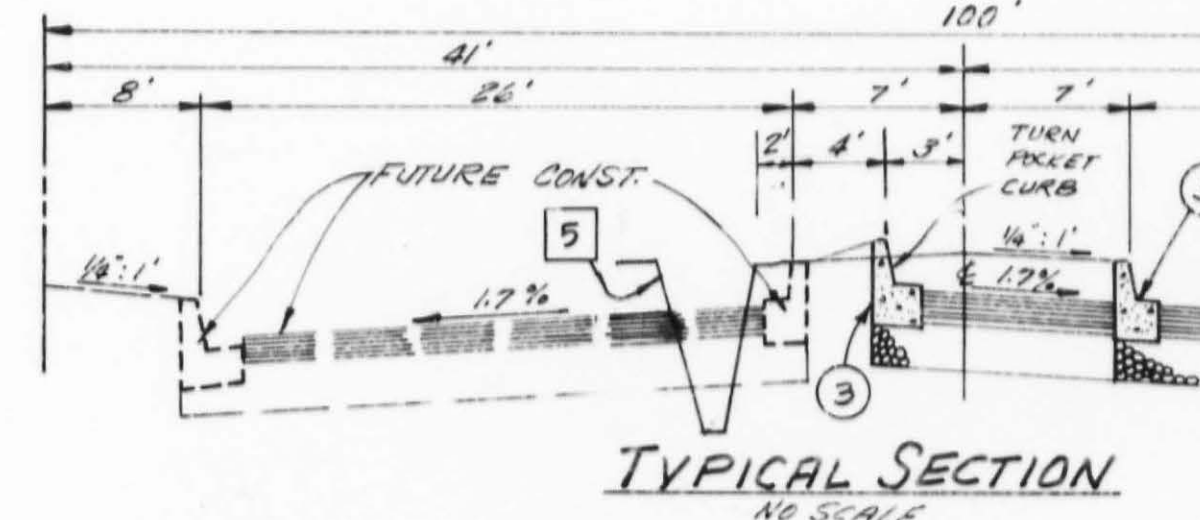
SI 4 S.D. IMP. BEAR ST. TO 800' NORTH 3 of 6
 1-90-14 MacArthur Blvd. To 800' North



DETAIL LINE "A"

PROFILE SCALES
 HORIZ. 1"=40'
 VERT. 1"=4'

PROFILE SCALES
 HORIZ. 1"=40'
 VERT. 1"=4'



- CONSTRUCTION NOTES**
- CONST. PER TYPICAL SECT. THIS SHEET 4" AC/18" AB
 - CONST. TYPE B-1A MOD. C.&G. PER STD. PLAN 101.
 - CONST. TYPE B-1A MODIFIED C.&G. PER DETAIL THIS SHEET.
 - CONST. STD. MEDIAN TURN POCKET PER STD. PLAN 118.
 - CONST. DRIVE APPROACH PER STD. PL. 112 B.
 - CONST. R.C. SIDEWALK PER STD. PL. 104.
 - CONST. TRANSITION CURB FROM 8" C.F. TO 0" C.F.
 - CONST. 20,000 LUM. UNDERGROUND SERVICE ST. LIGHT
 - CONST. WHEEL CHAIR RAMP PER STD. PL. 121
 - CONST. PER TYP. SECTION THIS SHEET 2" AC/18" AB
 - CONST. PER TYP. SECTION THIS SHEET 6" TEXTURED CONC. - 6" THK.

- STORM DRAIN CONSTRUCTION NOTES**
- CONST. STORM DRAIN, SIZE 4" D" AS SHOWN. (SEE SPEC'S ON SHEET 5)
 - CONST. TYPE "C" CATCH BASIN PER STANDARD PLANS 303, 305 & 309 A.
 - PLACE CONNECTOR PIPE, SIZE 4" D" AS SHOWN
 - CONST. DITCH PER TYPICAL SECTION THIS SHEET AND ELEVATIONS SHOWN ON PLAN
 - FILL & COMPACT EXIST. DITCH AND PLACE TEMP. 5" AC/4" A.B.
 - CONST. JUNCTION STRUCTURE PER DETAIL ON SHEET 5.
 - CONST. WIRE MESH SCREEN PER DETAIL THIS SHEET.
 - INSTALL ROCK FACING, 18" THICK IN DITCH

- WATER CONSTRUCTION NOTES**
 (BY CITY FORCES)
- CONNECT TO EXIST. 18" CROSS 1/4" x 1/2" REDUCER
 - INSTALL 18" S.C. WATER MAIN
 - INSTALL FIRE HYDRANT PER STD. PLAN 403

REVISION BY: J. Osborn
 J. OSBORN RCE 16583

NUMBER	DATE	INITIALS	DESCRIPTION	APP'D.
1	12-28-76	JRG	REVISED SIDEWALK AND NOTES 18 AND 19	BS
2	7-28-77	JAF	REVISED SIDEWALK AND BIKEPATH ON EAST SIDE OF BEAR STR.	

REFERENCES
BENCH MARK: OCS TAG SO END EAST HWY. DRAIN CHANNEL CROSSING BRISTOL - EL. 39.01
T.O.M. MON. & BRISTOL & MACARTHUR - EL. 31.37
TOPO: BOOK 44 PP 16-19
LEVELS: BOOK 44 PP 16-18
MANUALS: 21-57
DRYVILLE: 1-28-79
DRYVILLE: 1-18-78
DRYVILLE: 1-28-79
DRYVILLE: 1-27-78

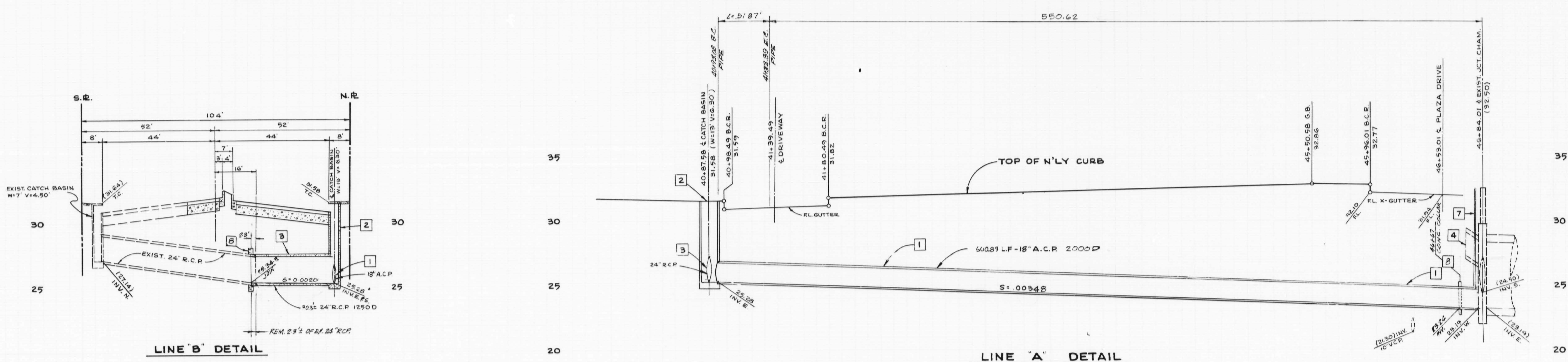
TOUPS CORPORATION - CONSULTING ENGINEERS
 100 N. MAIN ST., SANTA ANA, CAL. 92711 - TEL. 835-4447

DESIGNED	DATE
DG	5/76
DRAWN	5/76
CHECKED	8/76
R/W APPROVED	1/76
RECOMMENDED	1/76
APPROVED	8-6-76

STREET & STORM DRAIN IMPROVEMENTS
BEAR STREET
 FROM MACARTHUR BLVD. TO 800' NORTH
DEPARTMENT OF PUBLIC WORKS
 CITY OF SANTA ANA SHEET NO. 3 OF 6

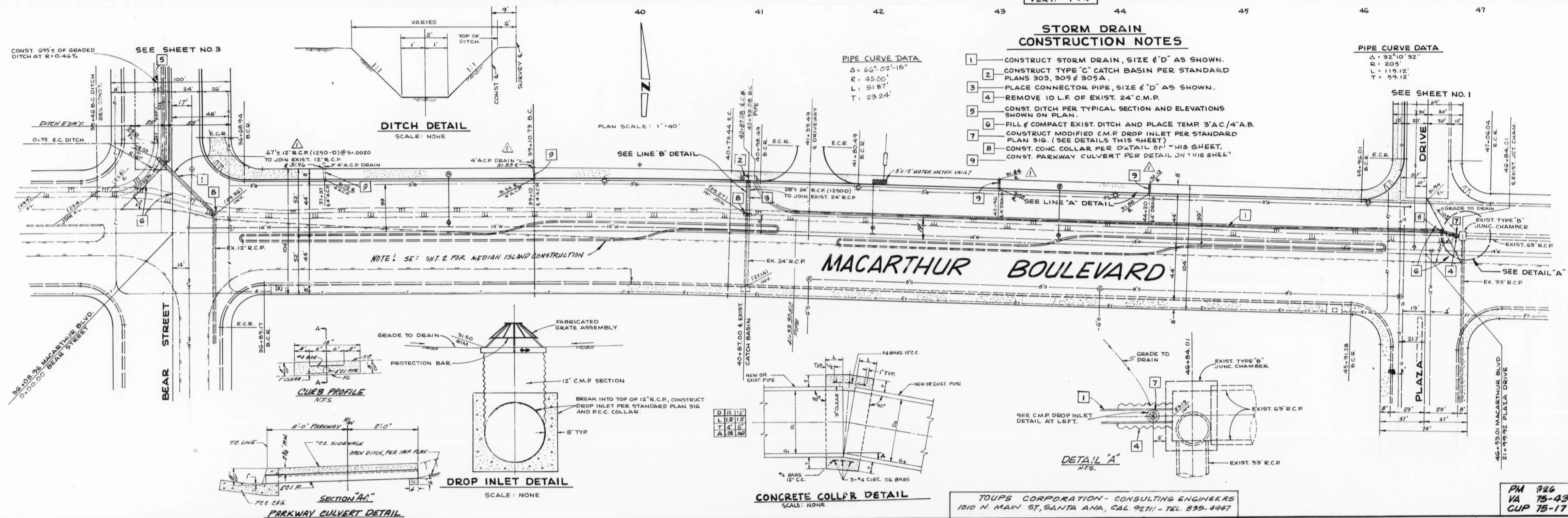
PM 926
 VA 75-43
 CLIP 75-17

S.D. IMP. MAC ARTHUR BLVD. TEMP. S.D. FROM BEAR ST. TO PLAZA DRIVE
 1-90-14
 4 of 6
 MT 10/77



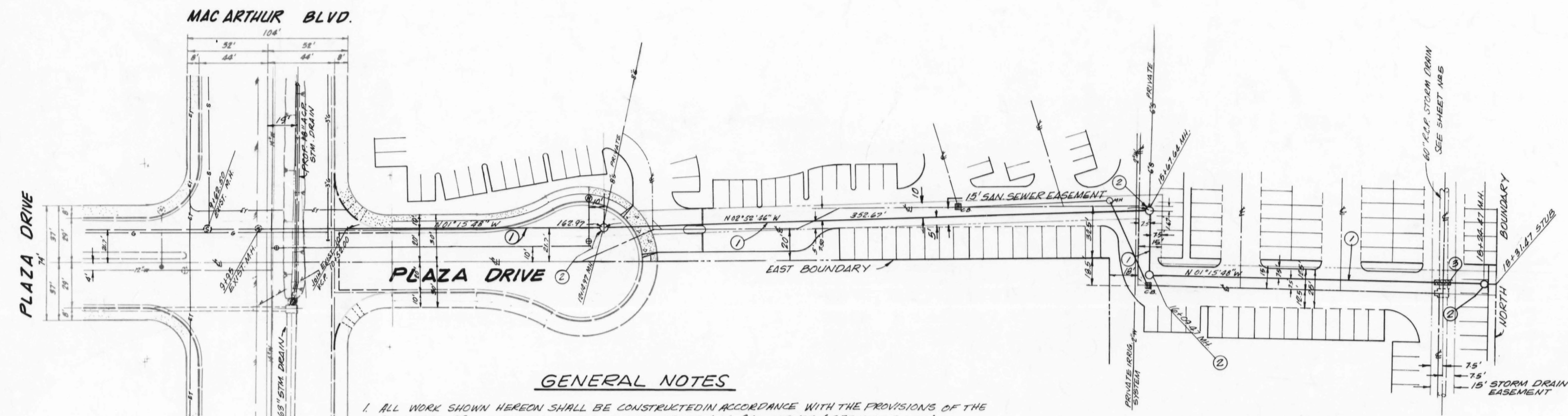
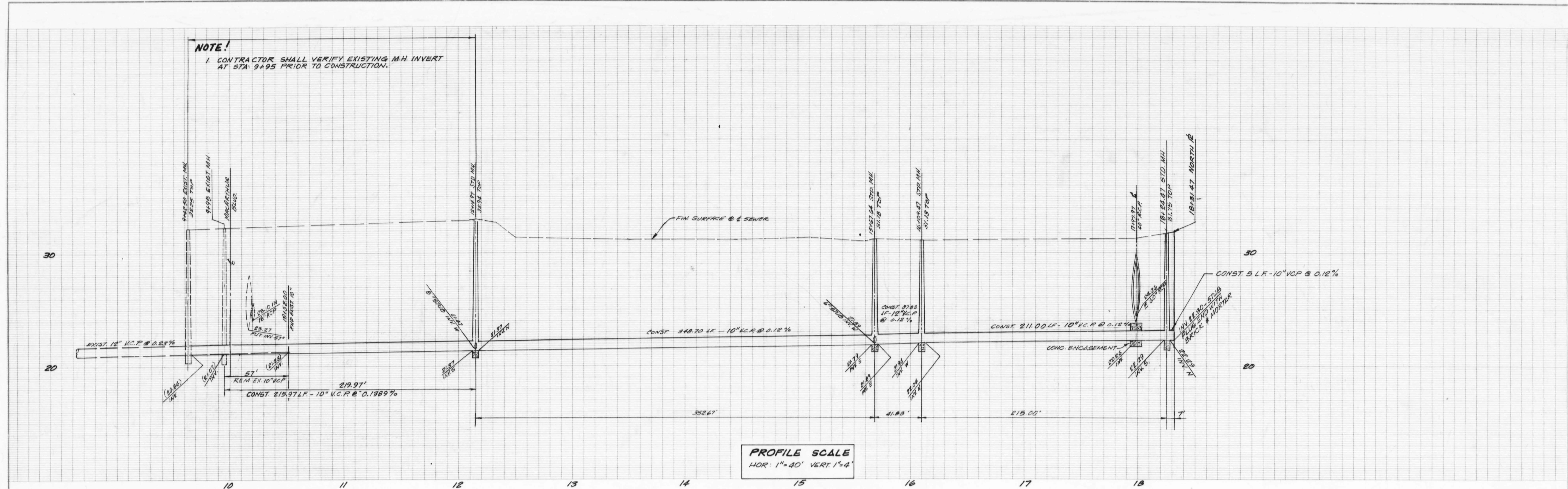
PROFILE SCALES
 HORIZ. 1" = 20'
 VERT. 1" = 4'

PROFILE SCALES
 HORIZ. 1" = 40'
 VERT. 1" = 4'



REVISIONS				REFERENCES				TOUPEL CORPORATION - CONSULTING ENGINEERS		STORM DRAIN IMPROVEMENTS	
NUMBER	DATE	INITIALS	DESCRIPTION	APP'D	BENCH MARK:	TOPO:	DESIGNED	DATE	MACARTHUR BOULEVARD		
1	10-22-76	T.S.	ADDED @ STA. 39+10.73 & 37-31. REVISED @ STA. 42+96 & 44+20	SS	OCS TAG 50. END EAST HWY. DRAIN CHANNEL CROSSING BRISTOL - EL. 329.01	BOOK 44 PP 16-19 BOOK 44 PP 16-19 29-57	TS	5/16	TEMP. STORM DRAIN FROM BEAR ST. TO PLAZA DRIVE		
					T.S.M. MAIN @ BRISTOL @ MACARTHUR - EL. 311.97	DRY FILE: 1-36-79 DRY FILE: 1-36-79 DRY FILE: 1-36-79	AS	8/76	DEPARTMENT OF PUBLIC WORKS		
							R/W	8/76	CITY OF SANTA ANA		
							RECOMMENDED	8-76	SHEET NO. 4 OF 6		
							APPROVED	8-76			
							DIRECTOR OF PUBLIC WORKS				

1-90-14
 SEWER IMP.
 PLAZA DRIVE :
 Mac Arthur Blvd. To 800' North
 60 of 6
 00 E 10 177



NOTE!
 1. CONTRACTOR SHALL VERIFY EXISTING M.H. INVERT AT STA. 9+95 PRIOR TO CONSTRUCTION.

PROFILE SCALE
 HOR: 1" = 40' VERT: 1" = 4'

GENERAL NOTES

1. ALL WORK SHOWN HEREON SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROVISIONS OF THE STANDARD SPECIFICATIONS OF THE CITY OF SANTA ANA, CALIFORNIA (SEE NOTE 2 OF 3).
2. 8" V.C.P. & 6" V.C.P. STUB CONNECTIONS SHALL BE CONSTRUCTED FROM SEWER M.H. AT STA. 12+49.7 AND STA. 18+47.7. THE DEVELOPER TO FURNISH THE CITY THE LOCATION OF THE HOUSE CONNECTION FOR EACH BLDG.
3. ALL VCP JOINTS SHALL BE PLASTIC MECHANICAL COMPRESSION JOINTS OR BAND SEALS.
4. IT SHALL BE THE RESPONSIBILITY OF THE SEWER CONTRACTOR TO EXPOSE ALL JOINT POINTS TO EXISTING SEWERS AND TO HAVE THE LOCATION AND ELEVATION VERIFIED BY THE ENGINEER PRIOR TO ANY SEWER STAKES BEING FURNISHED.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL FLOW LINE ELEVATIONS AT ALL SEWER MANHOLES VERIFIED BY THE PRIVATE CIVIL ENGINEER PRIOR TO PLACEMENT OF ANY PIPE BACKFILL.

PRIVATE ENGINEERS NOTICE TO CONTRACTOR

UTILITIES SHOWN ON THESE PLANS ARE CORRECT AND ACCURATE TO THE EXTENT OF AVAILABLE RECORDS AND KNOWLEDGE. THE CONTRACTOR HOWEVER IS REQUIRED TO TAKE STEPS TO ASCERTAIN THE EXACT LOCATION OF ALL UNDERGROUND FACILITIES PRIOR TO DOING WORK THAT MAY DAMAGE SUCH FACILITIES OR INTERFERE WITH THEIR SERVICE.

CONSTRUCTION NOTES

1. CONST. 10" V.C.P.
2. CONST. MANHOLE PER STD. PLAN 201.
3. CONST. CONC. SEWER ENCASUREMENT PER STD. PLAN 203 DETAIL B.

ORANGE COUNTY SANITATION DISTRICT NO. 7 NOTES

1. ALL WORK PERFORMED ON THE DISTRICT'S FACILITIES SHALL COMPLY WITH THE DISTRICT STANDARD SPECS AND PERMIT REQUIREMENTS.
2. INSPECTION SERVICES: NOTIFY THE DISTRICTS ENGINEERING DEPT. A MINIMUM OF 24 HRS PRIOR TO COMMENCEMENT OF ANY WORK ON THE FACILITIES. CALL (714) 540-2910.
3. CROWNS OF CONNECTING LATERALS OR STUBS SHALL MATCH THE CROWNS OF THE DISTRICTS TRUNK OR SUB-TRUNK SEWER.
4. ANY DAMAGE TO THE DISTRICTS MANHOLE OR STRUCTURE SHALL BE REPAIRED TO THE SATISFACTION OF THE DISTRICT AT THE CONTRACTOR'S EXPENSE.
5. WORK NOT DONE IN THE PRESENCE OF THE DISTRICTS INSPECTOR IS SUBJECT TO REJECTION.
6. ANY CONNECTION TO THE DISTRICTS EXISTING MANHOLES SHALL BE DONE BY CORE DRILLING, CHANNELIZING THE SHELLES AND EPOXYING THE EXPOSED SURFACES.

PLAN SCALE
 1" = 40'

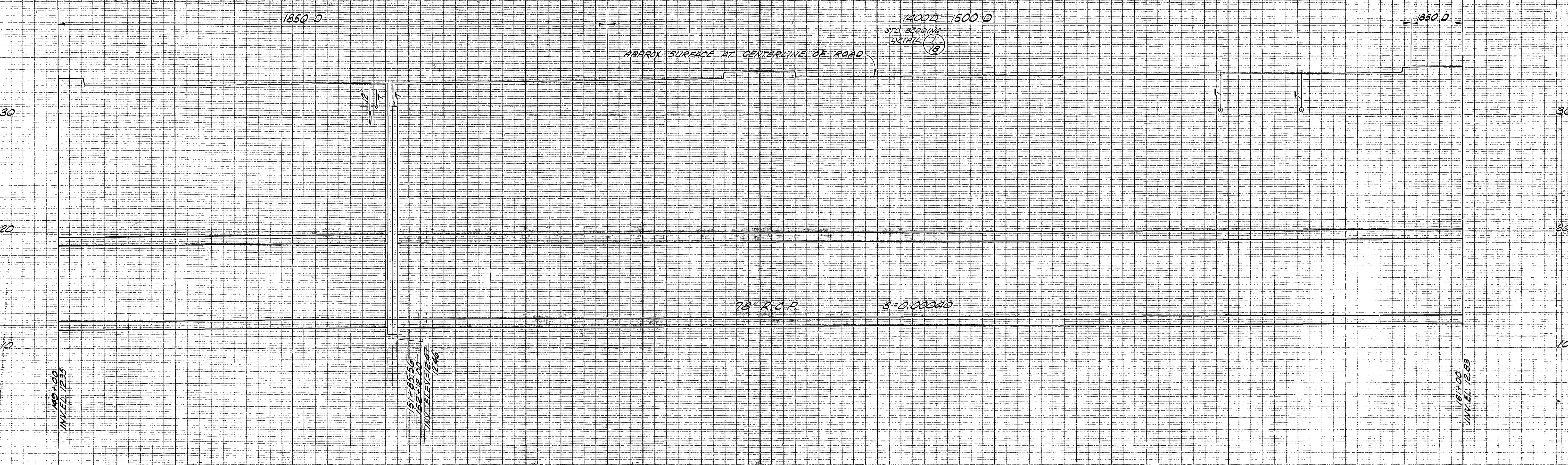
REVISIONS			
NUMBER	DATE	INITIALS	DESCRIPTION
1-90-14			

REFERENCES	
BENCH MARK: OCS TAG 50 END EAST HWY. DRAIN CHANNEL CROSSING BRISTOL - EL. 33.01	TOPO: BOOK 44 PP 16-19 LEVELS: BOOK 44 PP 12-19
T.B.N. MON. & BRISTOL & MACARTHUR - EL. 31.37	MANHOLE: 87-57 DRY FILE: 1-38-9 DRY FILE: 1-13-12 DRY FILE: 1-34-9 DRY FILE: 1-37-14

TOUPS CORPORATION - CONSULTING ENGINEERS 1010 N. MAIN ST., SANTA ANA, CAL. 92701 - TEL. 835-4447	
DESIGNED: RM	DATE
DRAWN: D.G.	
CHECKED: BS 2/11/76	8/76
R/W APPROVED: [Signature]	8/76
RECOMMENDED: [Signature]	8-76
APPROVED: [Signature]	8-6-76
DIRECTOR OF PUBLIC WORKS - SEE 1086	

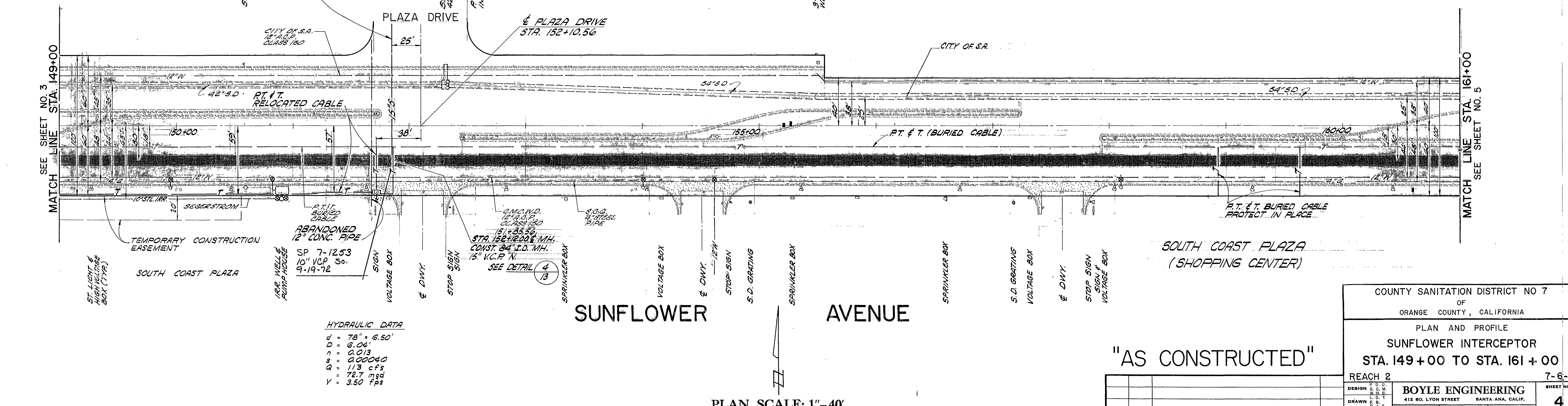
SEWER IMPROVEMENTS
PLAZA DRIVE
 FROM MACARTHUR BLVD. TO 800' NORTH.
DEPARTMENT OF PUBLIC WORKS
 CITY OF SANTA ANA
 SHEET NO. 6 OF 6

PM 926
 VA 75-43
 CUP 75-17



NOTE: P.T. & T. BURIED CABLE FOUND TO VARY FROM 24.5' S. OF & AT STA. 145+65 TO 18' S. OF & AT STA. 151+72. CABLE RELOCATED BY P.T. & T. AS SHOWN

PROFILE SCALES
 HORIZONTAL 1" = 40'
 VERTICAL 1" = 4'



HYDRAULIC DATA

d	= 78" x 6.50'
n	= 0.013
s	= 0.00040
Q	= 113 cfs
V	= 72.7 mgd
Y	= 3.50 fps

PLAN SCALE: 1" = 40'

"AS CONSTRUCTED"

COUNTY SANITATION DISTRICT NO 7
 OF
 ORANGE COUNTY, CALIFORNIA

PLAN AND PROFILE
 SUNFLOWER INTERCEPTOR
 STA. 149+00 TO STA. 161+00

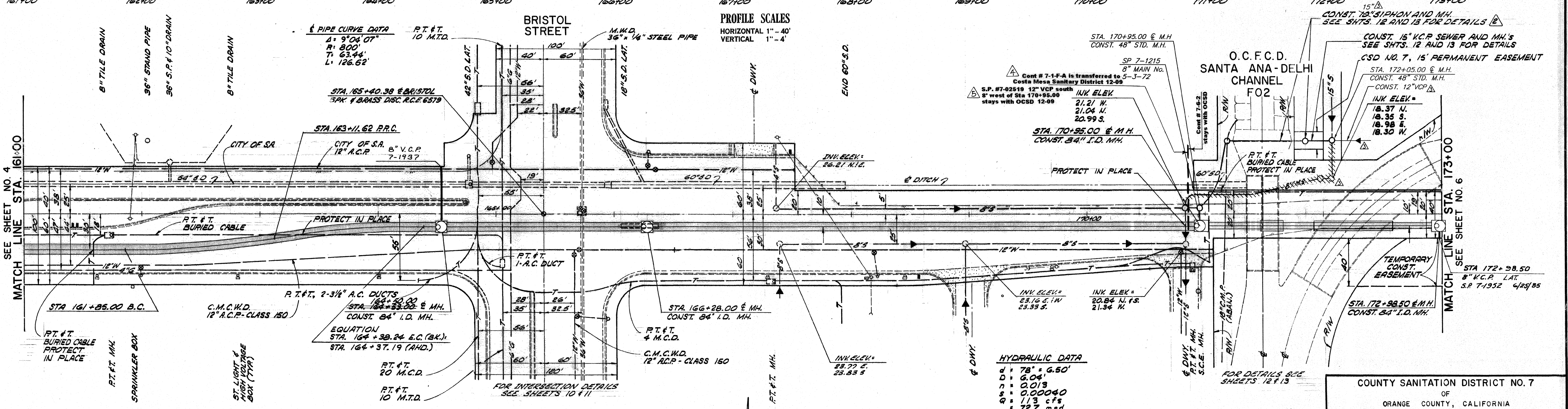
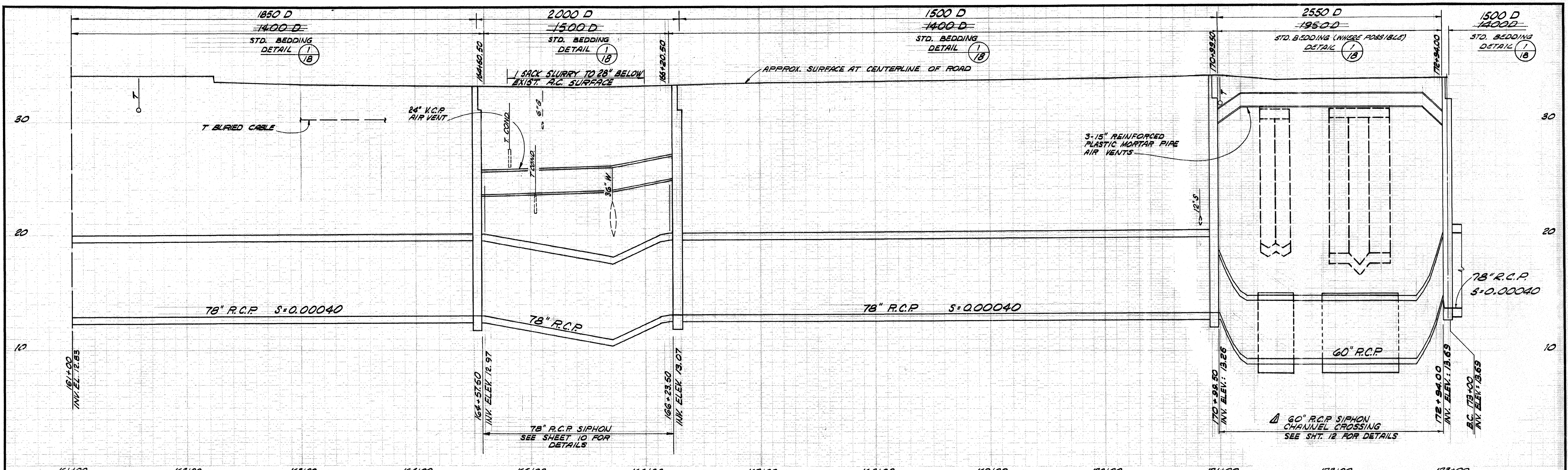
REACH 2

BOYLE ENGINEERING
 412 SO. LYON STREET SANTA ANA, CALIF.

DATE MAR '71
 F.S. X-28 01-2919-07-00 D-1644 A

7-6-2
 SHEET NO. 4
 OF 21 SHEETS

REV.	DATE	DESCRIPTION	APP.



HYDRAULIC DATA

d = 78" x 6.50'
 D = 6.04'
 n = 0.013
 S = 0.00040
 Q = 11.3 cfs
 V = 72.7 m/s
 V = 3.50 fps

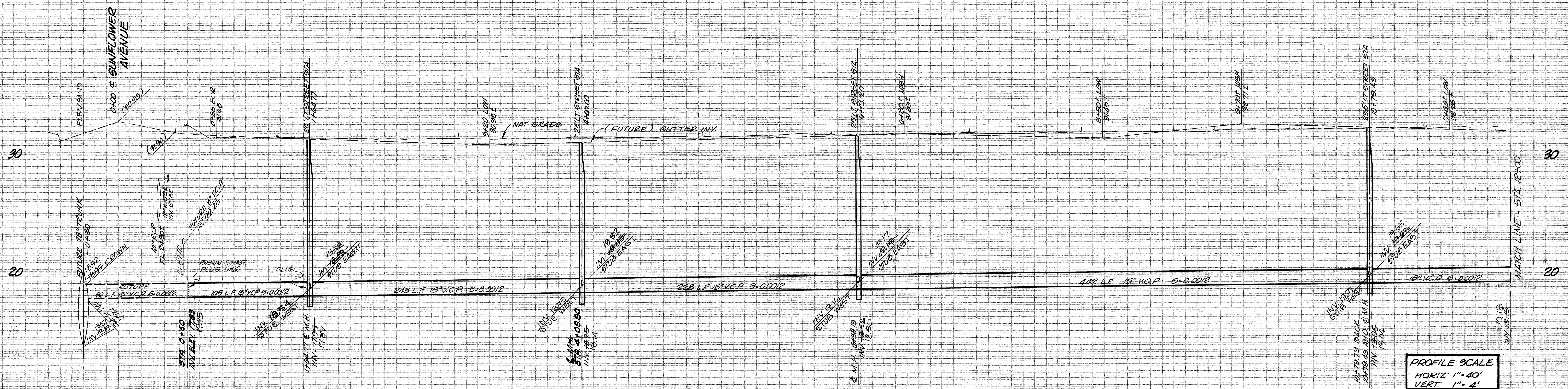
"AS CONSTRUCTED"

COUNTY SANITATION DISTRICT NO. 7
 OF
 ORANGE COUNTY, CALIFORNIA
 PLAN AND PROFILE
 SUNFLOWER INTERCEPTOR
 STA. 161+00 TO STA. 173+00

REV.	DATE	DESCRIPTION	APP.
1	12/09	ADDED S.P.# 7-02519	
2	12/09	TRANSFER 71-FA TO CMSD	
3	6/1/07	CHANGE PIPE SIZE, REMOVE PIPE SEGMENT, ADD NEW PIPE	
4	4/17/11	ADDED 10" SIPHON AND M.H.	CH
5	4-18-11	SIPHON REVISED TO CLEAR FUTURE CULVERTS	CH

REACH 2
 BOYLE ENGINEERING
 412 SO. LYON STREET
 SANTA ANA, CALIF.
 DATE MAR '71
 P.B. X-28

PLAN SCALE: 1"=40'

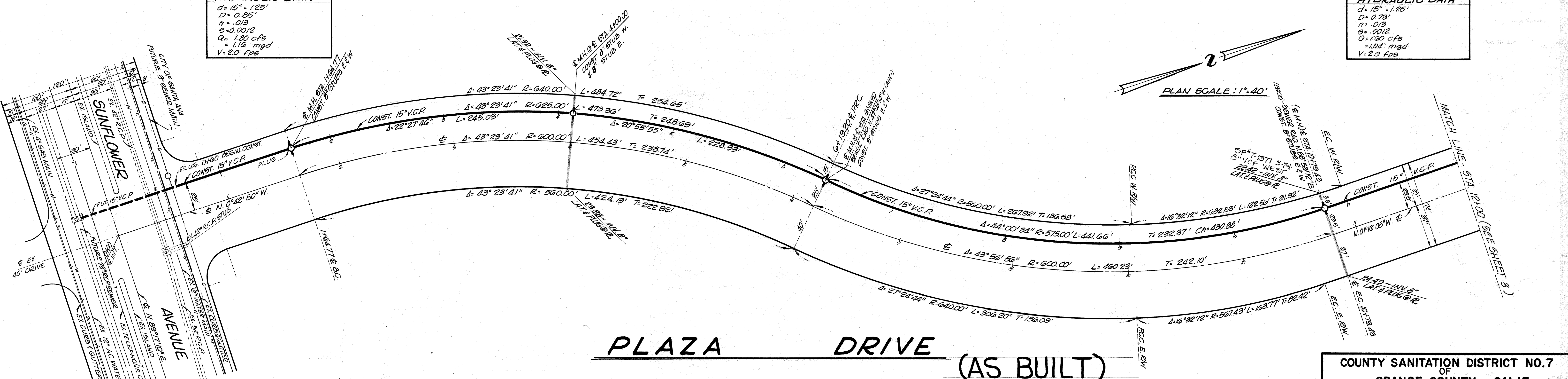


HYDRAULIC DATA

$d = 15" = 1.25'$
 $D = 0.85'$
 $n = 0.13$
 $S = 0.0012$
 $Q = 1.80$ cfs
 $V = 1.16$ mgd
 $V = 2.0$ fps

HYDRAULIC DATA

$d = 15" = 1.25'$
 $D = 0.79'$
 $n = 0.13$
 $S = 0.0012$
 $Q = 1.60$ cfs
 $V = 1.04$ mgd
 $V = 2.0$ fps



PLAZA DRIVE (AS BUILT)

REVISIONS

NO.	DATE	ITEM
2	10-21-71	"AS BUILT" INV. ELEV. F.C.Z.
1	9-15-71	"AS BUILT" - SHOW LATERALS

TOUPS ENGINEERING, INC.
 CONSULTING CIVIL ENGINEERS
 1801 N. COLLEGE AVE.
 SANTA ANA CALIF. 92701-4431

DES. P.N.B. SCALE AS SHOWN DATE
 DR. D.M. JOB NO.
 CH. Q.M. J.W.B. F.B. NO. 07 2 PAGE 75/76

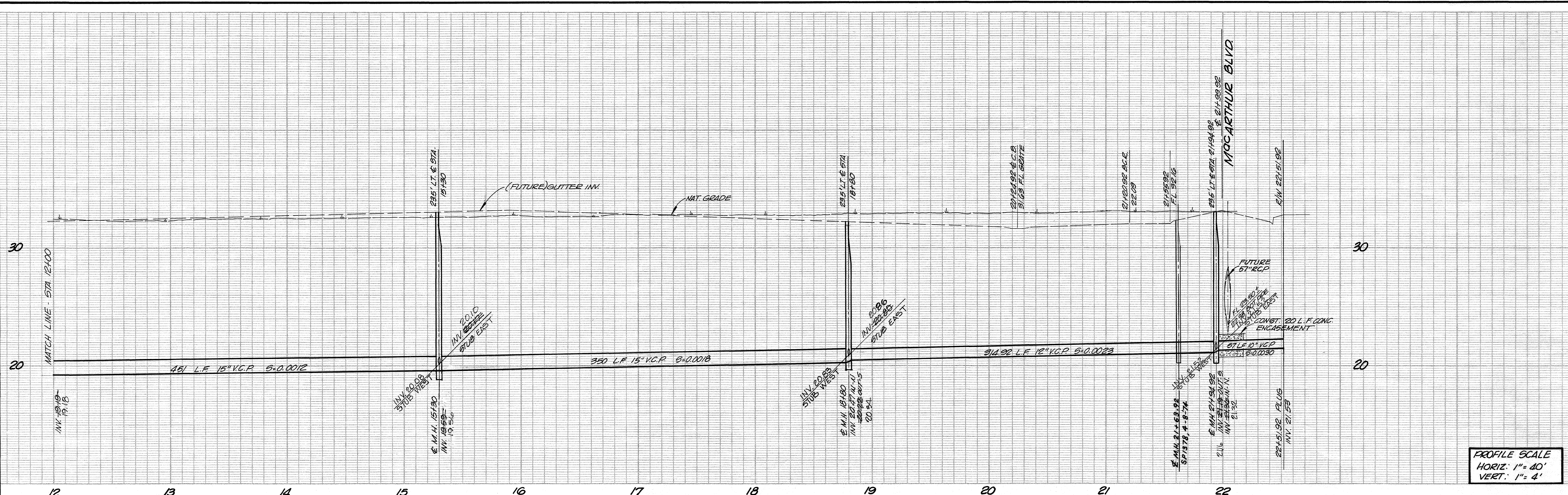
APPROVED: *Yerrane K. Parry* R.C.E. 14010

COUNTY SANITATION DISTRICT NO. 7 OF ORANGE COUNTY, CALIF.

CLIENT: **SOUTH COAST PLAZA AND TOWN CENTER**
 PROJECT: **PLAZA DRIVE SUBTRUNK SEWER REACH 39**

SHEET TITLE: **PLAN AND PROFILE FROM STA. 0+55 TO STA. 12+00**

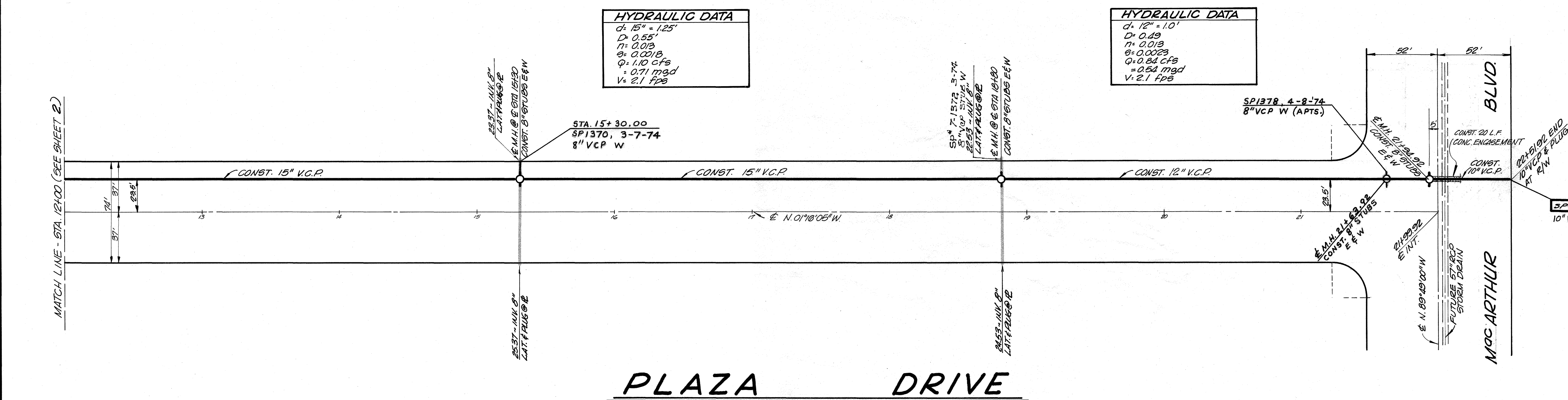
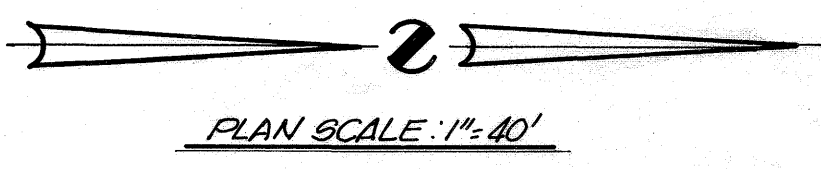
SHEET NO. **2** OF **3** SHEETS



PROFILE SCALE
 HORIZ: 1" = 40'
 VERT: 1" = 4'

HYDRAULIC DATA
 d: 15" = 1.25'
 D: 0.55'
 n: 0.013
 S: 0.0018
 Q: 1.10 cfs
 V: 0.71 mgd
 V: 2.1 fps

HYDRAULIC DATA
 d: 12" = 1.0'
 D: 0.49'
 n: 0.013
 S: 0.0023
 Q: 0.84 cfs
 V: 0.54 mgd
 V: 2.1 fps



PLAZA DRIVE

(AS BUILT)

REVISIONS		
NO.	DATE	ITEM
2	10-27-71	"AS BUILT" INV. ELEV. F.C.Z.
1	9-15-71	"AS BUILT" - SHOW LATERALS

TOUPS ENGINEERING, INC.
 CONSULTING CIVIL ENGINEERS
 1801 N. COLLEGE AVE.
 SANTA ANA CALIF. 92701-4431

COUNTY SANITATION DISTRICT NO. 7
 OF
 ORANGE COUNTY, CALIF.
 CLIENT: SOUTH COAST PLAZA AND TOWN CENTER
 PROJECT: PLAZA DRIVE SUBTRUNK SEWER REACH 39
 SHEET TITLE: PLAN AND PROFILE FROM STA. 12+00 TO STA. 22+51.92
 SHEET NO. 3 OF 3 SHEETS
 REV. 1

SUNFLOWER AVE: BEAR ST TO PLAZA DR.

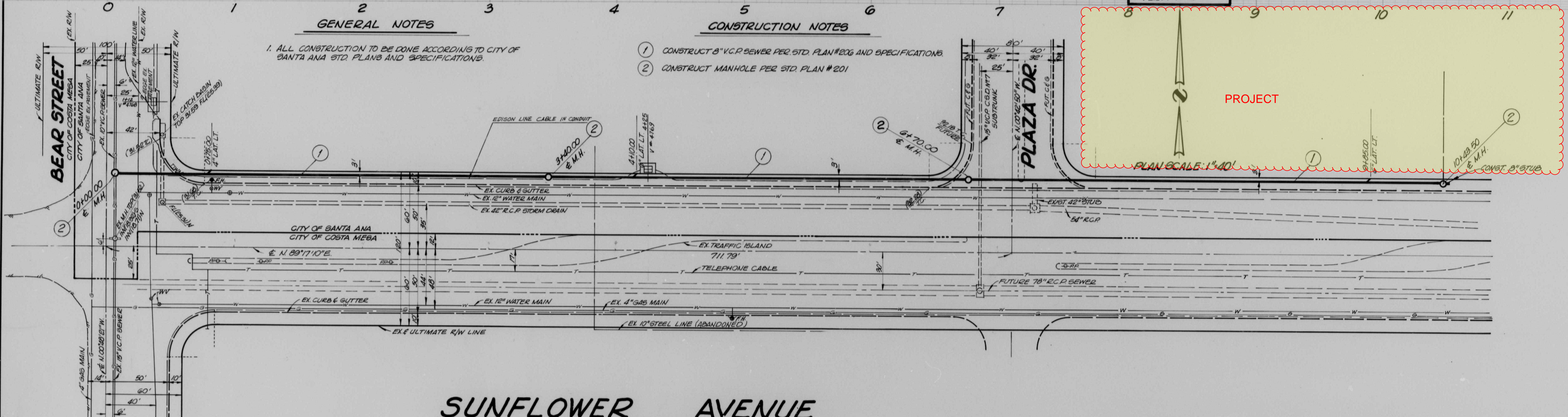
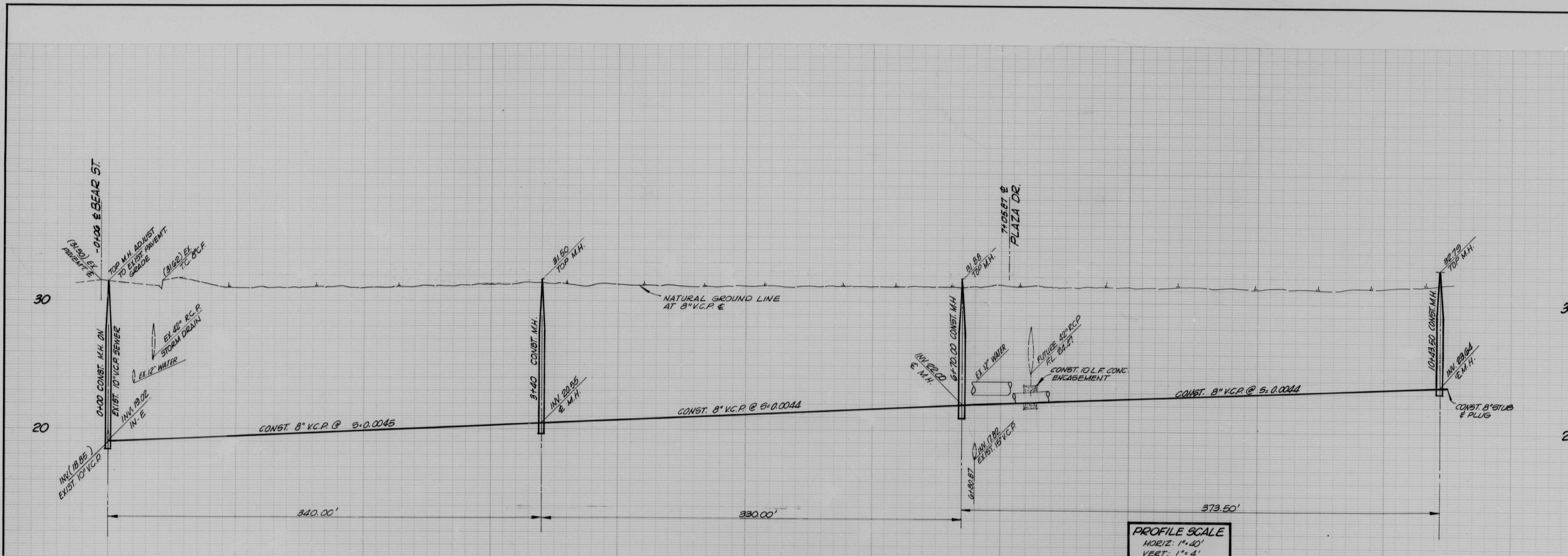
SS IMP

VA: 91.4

HF: 29-43

1 OF 1

4/91



GENERAL NOTES

CONSTRUCTION NOTES

1. ALL CONSTRUCTION TO BE DONE ACCORDING TO CITY OF SANTA ANA STD. PLANS AND SPECIFICATIONS.

1. CONSTRUCT 8" V.C.P. SEWER PER STD. PLAN #206 AND SPECIFICATIONS.
2. CONSTRUCT MANHOLE PER STD. PLAN #201.

SUNFLOWER AVENUE

REVISIONS			
NUMBER	DATE	INITIALS	DESCRIPTION
1	4-30-71	MB	CORRECTED LOCATION'S OF SANTA ANA WATER MAINS

REFERENCES	
BENCH MARK:	ELEV. 35.91
58-SA 23-G	MON. ON E & E ALTON & BRISTOL (BELOW SURFACE IN CAPPED WALL)

TOUPS ENGINEERING, INC. CONSULTING CIVIL ENGINEERS - 1801 N. COLLEGE AVE., SANTA ANA CALIF. 714 541-4431		VA 71-4
PREPARED UNDER THE SUPERVISION OF TERRANCE R. BARRY DESIGNED: P.M.B. DRAWN: D.M. CHECKED: E.H. R/W APPROVED: RECOMMENDED: B.M. APPROVED: [Signature] ASSISTANT DIRECTOR OF PUBLIC WORKS		4-22-71 R.C.E. NO. 0010 4-15-71 4-18-71 4-71 4-29-71 SHEET NO. 1 OF 1
SANITARY SEWER SUNFLOWER AVENUE BEAR STREET TO PLAZA DRIVE DEPARTMENT OF PUBLIC WORKS CITY OF SANTA ANA		

29-43

29-43

PLAZA DR. SUBTRUNK SEWER : CONTRACT # 7-6-2A
 SUNFLOWER AVE TO MACARTHUR BLVD
 CCSD # 7
 HF: 29-46
 1 OF 3
 4/71

CONSTRUCTION PLANS
FOR THE

PLAZA DRIVE SUBTRUNK SEWER
REACH 39

CONTRACT NO. 7-6-2A

FROM
SUNFLOWER AVENUE
TO
M^{AC}ARTHUR BLVD.

COUNTY SANITATION DISTRICT NO. 7
OF
ORANGE COUNTY, CALIFORNIA

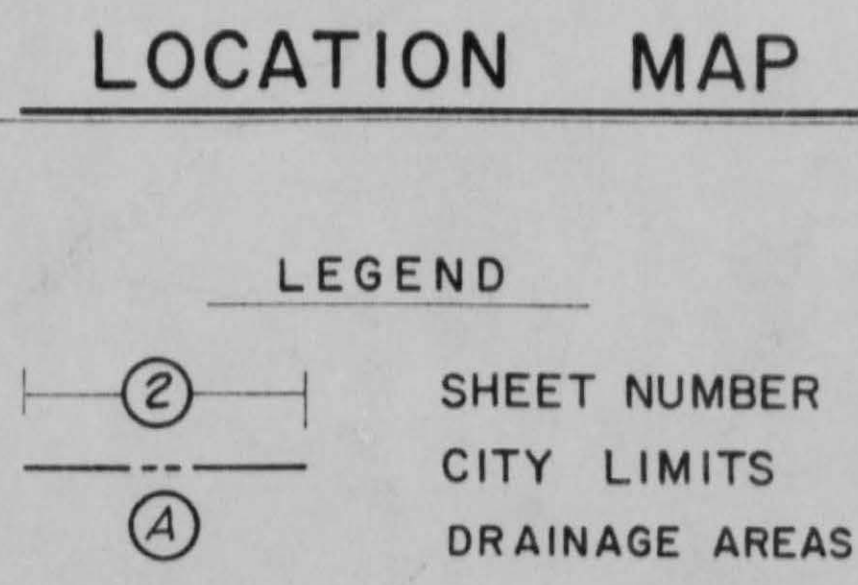
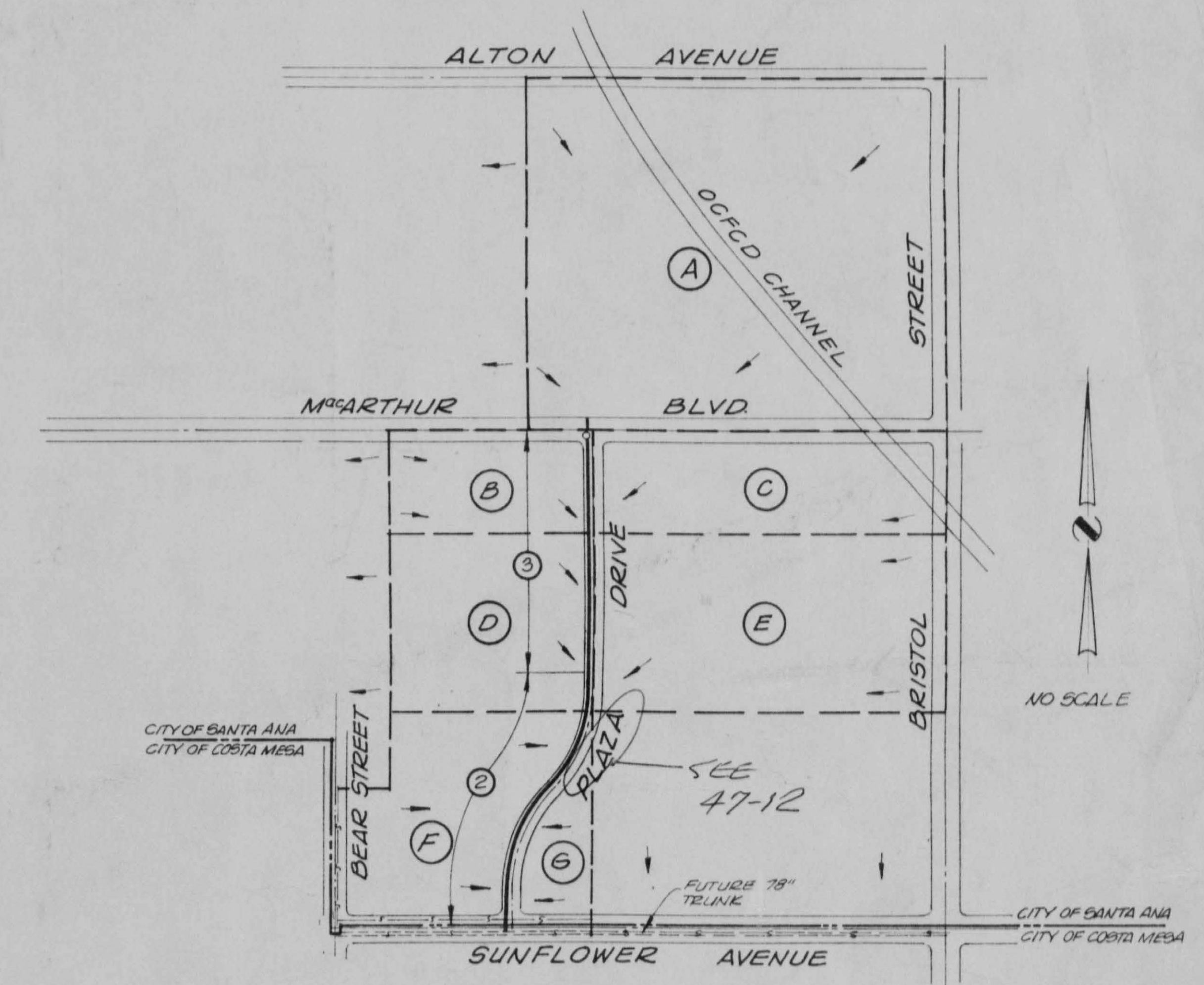
SHEET INDEX	
SHEET NO	DESCRIPTION
1	TITLE SHEET & INDEX TO DRAWINGS
2	PLAN & PROFILE - STA. 0+55 TO 12+00
3	PLAN & PROFILE - STA. 12+00 TO 22+51.92

LEGEND
THE FOLLOWING SYMBOLS AND ABBREVIATIONS HAVE BEEN USED UNLESS OTHERWISE NOTED

	INSTALL SEWER PIPE (SIZE & TYPE AS INDICATED)
	INSTALL STANDARD MANHOLE
	EXISTING WATER LINE (SIZE AS INDICATED)
	EXISTING CURB & GUTTER
	RIGHT OF WAY LINE (R/W)
	FLOW LINE
	FUTURE LINE
	INVERT ELEVATION
	MANHOLE
	SLOPE IN FEET PER FOOT
	STATION
	VITRIFIED CLAY PIPE

- GENERAL NOTES**
- ALL CONSTRUCTION SHALL CONFORM TO THE 1967 C.S.D. NO. 7 "STANDARD SPECIFICATION FOR THE CONSTRUCTION OF SANITARY SEWERS"
 - PIPE BEDDING SHALL BE TYPE 1 PER C.S.D. NO. 7 STANDARD DETAIL DRAWING S-5. BEDDING MATERIAL SHALL BE 3/4 INCH MAXIMUM CRUSHED ROCK PER C.S.D. NO. 7 STANDARD

PREPARED BY
TOUPS ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
1801 N. COLLEGE AVE.
SANTA ANA CALIF. 92701-4431



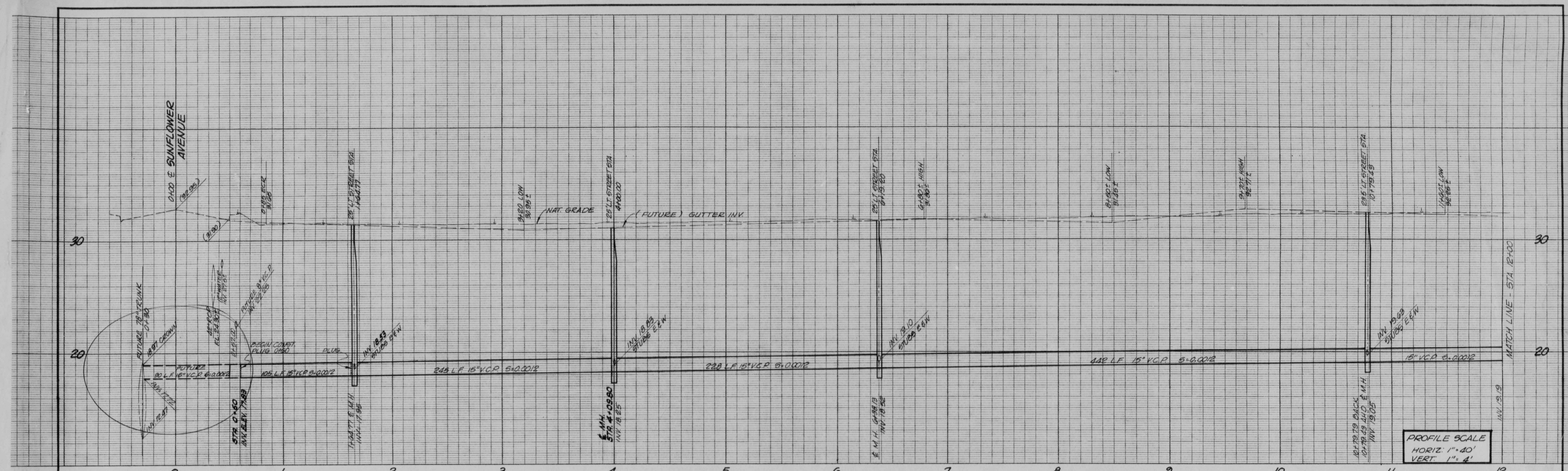
BENCH MARK:
C.S.A. UNDERGROUND MONUMENT @ INT. OF BRISTOL STREET & ALTON AVENUE
BENCH MARK NO. 459
C.S.D. NO. 7 DATUM, ELEV: 92.16

CITY OF SANTA ANA
APPROVED *Ronald E. Wood* DIRECTOR PUBLIC WORKS
R.C.E. NO. 9879

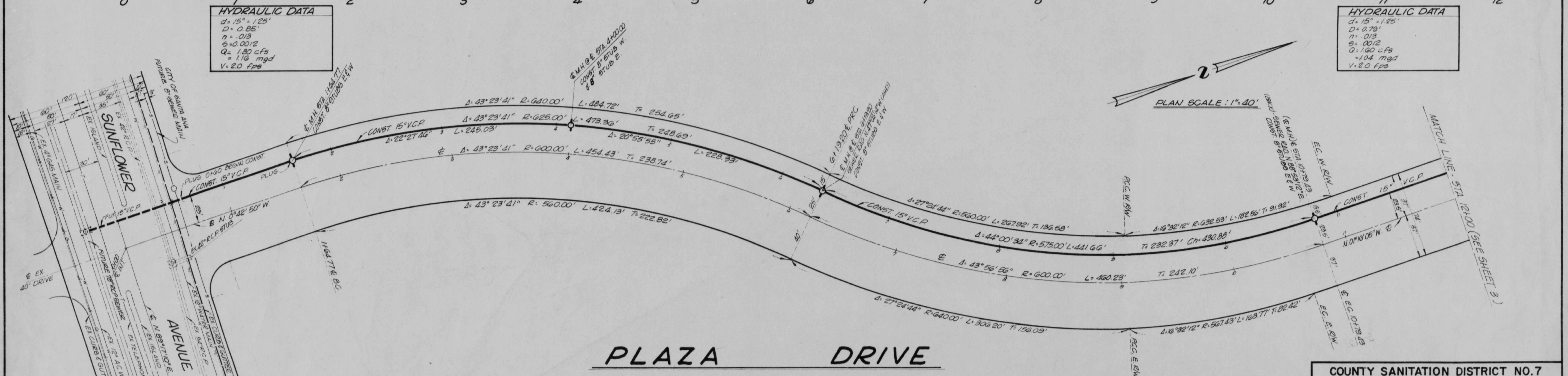
TOUPS ENGINEERING, INC.
APPROVED *Terrance K. Barry* R.C.E. NO. 14010
TERRANCE K. BARRY

COUNTY SANITATION DISTRICT NO. 7 OF ORANGE COUNTY
APPROVED *Conrad Hohener, Jr.* R.C.E. NO. 10951
CONRAD HOHENER, JR.

SOUTH COAST PLAZA AND TOWN CENTER
 PLAZA DR SUBSTANK SEWER
 PLAZA DR - SUNFLOWER AVE.
 4/1/71
 4 OF 3
 HF: 29-46
 29-46



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



PLAN SCALE: 1" = 40'

HYDRAULIC DATA
 D = 15" = 1.25'
 S = 0.0012
 n = 0.013
 Q = 1.00 cfs
 V = 1.67 mgd
 V = 2.0 Fps

HYDRAULIC DATA
 D = 15" = 1.25'
 S = 0.0012
 n = 0.013
 Q = 1.00 cfs
 V = 1.67 mgd
 V = 2.0 Fps

PLAZA DRIVE

REVISIONS		
NO.	DATE	ITEM

TOUPS ENGINEERING, INC.
 CONSULTING CIVIL ENGINEERS
 1801 N. COLLEGE AVE.
 SANTA ANA CALIF. 92701-4431

COUNTY SANITATION DISTRICT NO. 7
 OF
 ORANGE COUNTY, CALIF.
 CLIENT: SOUTH COAST PLAZA AND TOWN CENTER
 PROJECT: PLAZA DENE SUBSTANK SEWER REACH 39
PLAN AND PROFILE
 FROM STA. 0+55 TO STA. 12+00
 SHEET NO. 2 OF 3 SHEETS
 REV.

DES. PNB SCALE AS SHOWN DATE
 DR. D.M. JOB NO. DATE
 CH. G.M. F.B. NO. BT 2 PAGE 7576 SHEET TITLE
 APPROVED: *Yvonne K. Barry* RCE 14010 FILE

MJE SURP/13

29-46

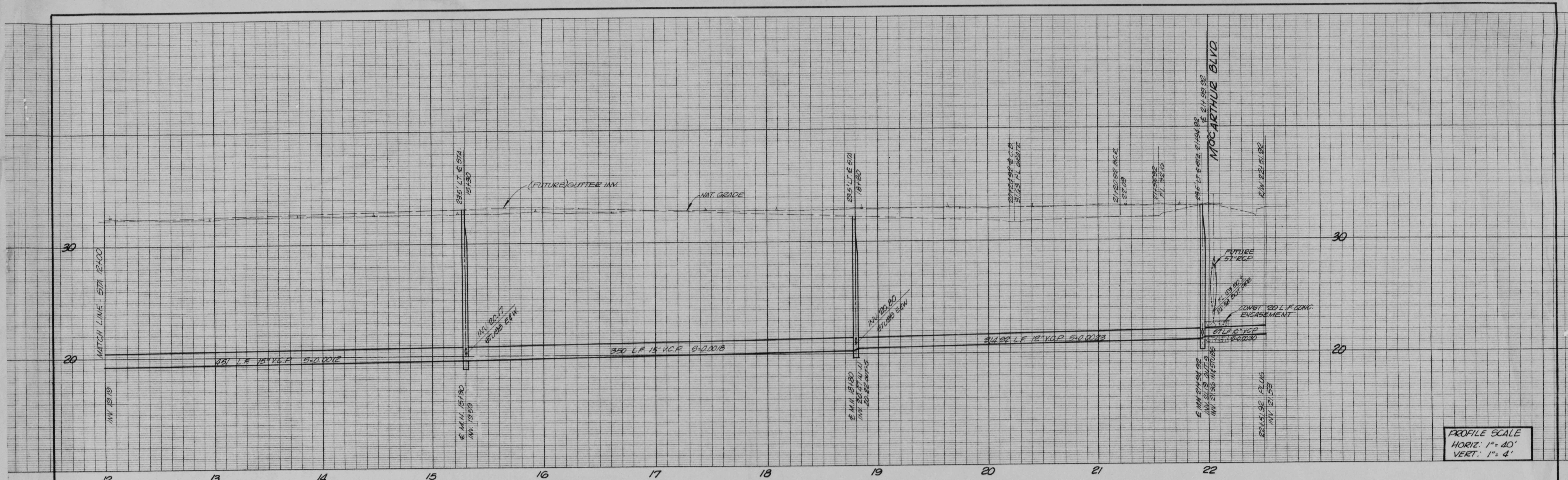
Plaza Drive - MacArthur V.R. Blvd

3 OF 3

4/71

HF: 29-46

29-46



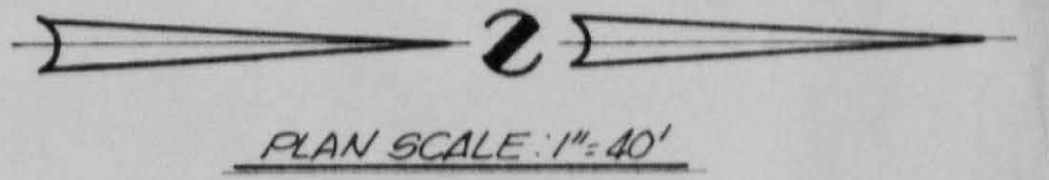
PROFILE SCALE
 HORIZ. 1" = 40'
 VERT. 1" = 4'

HYDRAULIC DATA

d. 15" = 1.25'
D 0.55'
n 0.013
S 0.0013
Q 1.10 CFS
V 0.71 mps
V 2.1 fps

HYDRAULIC DATA

d. 12" = 1.0'
D 0.49
n 0.013
S 0.0023
Q 0.84 CFS
V 0.64 mps
V 2.1 fps



MATCH LINE - STA 12+00 (SEE SHEET 2)

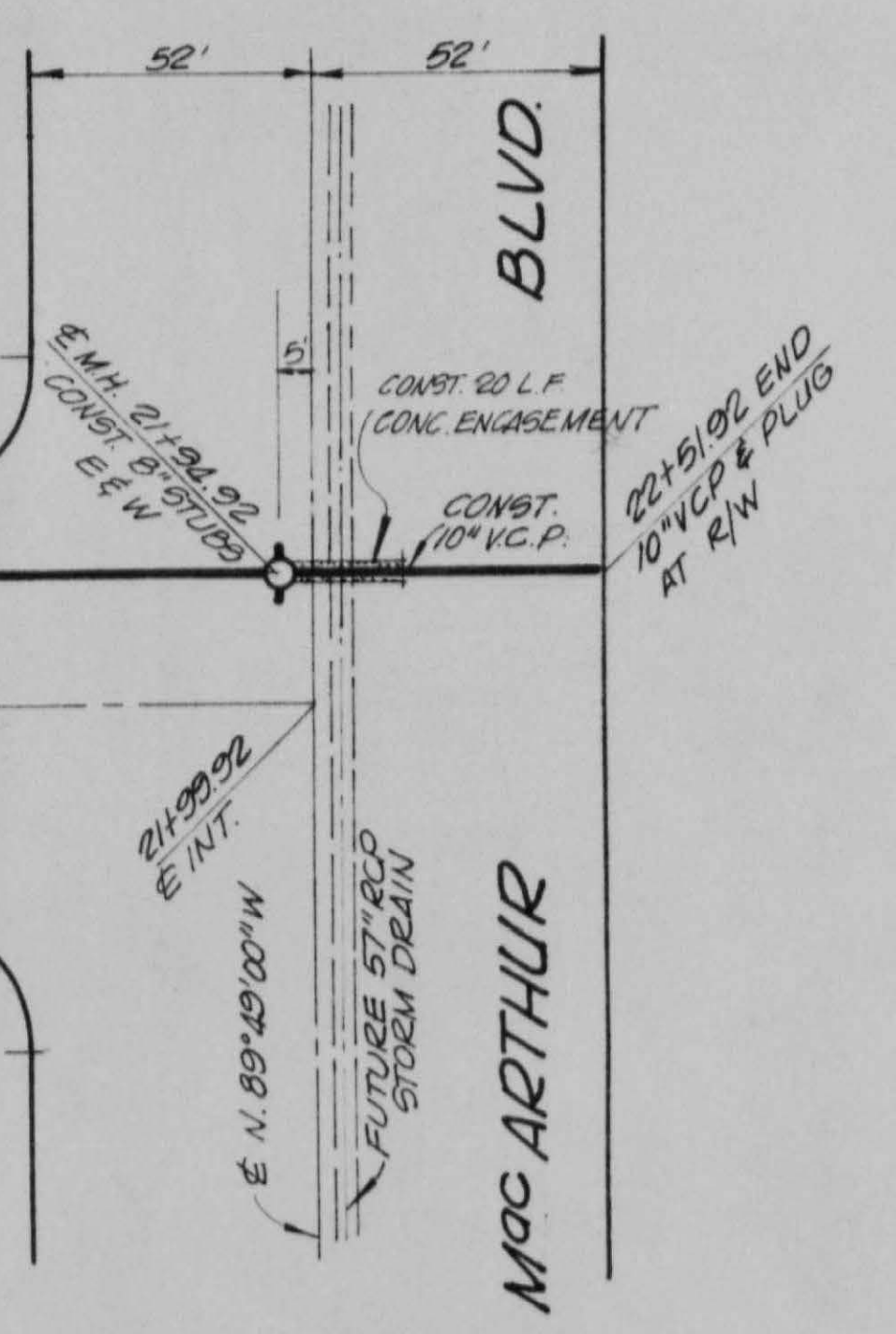
CONST. 15" V.C.P.

CONST. 15" V.C.P.

CONST. 12" V.C.P.

Show stationing on this sheet as was done on sheet #2 in plan view

PLAZA DRIVE



COUNTY SANITATION DISTRICT NO. 7
 OF
 ORANGE COUNTY, CALIF.

REVISIONS	
NO.	DATE

TOUPS ENGINEERING, INC.
 CONSULTING CIVIL ENGINEERS
 1801 N COLLEGE AVE
 SANTA ANA CALIF. 92701-4431

CLIENT SOUTH COAST PLAZA AND TOWN CENTER
 PROJECT PLAZA DRIVE SUBTRUNK SEWER REACH 39

DES. P.N.B. SCALE 1/8" = 1'-0" DATE 1/15/70
 DR. D.M. JOB NO. 14010
 CH. J.L. FB. NO. DT 2 PAGE 75-76

SHEET TITLE PLAN AND PROFILE
 FROM STA. 12+00 TO STA. 22+51.92
 SHEET NO. 3 OF 3 SHEETS

APPROVED *Gene K. Barry* R.C.E. 14010

FILE R.C.E. 14010

MIF 5/MAR/73

29-46

Appendix 4

Design Criteria

SECTION 300

DESIGN CRITERIA, SEWER FACILITIES

300.1 GENERAL

The following sections are design criteria to be used in the design of sewer facilities for the City of Santa Ana. The Applicant (developer/builder) and his engineer shall be responsible to ensure that designs submitted are in accordance with the City's Municipal Code, these Design Guidelines, and the City's Standard Plans and Specifications. Where the Standard Plans and Specifications are silent, the design and installation of the sewer mains and manholes shall conform to the Standard Specifications for Public Works Construction, current edition.

300.2 MINIMUM SIZE

The City of Santa Ana will not accept for maintenance any sewer main smaller than 8 inches in diameter.

300.3 MINIMUM AND MAXIMUM SLOPE DESIGN

All sewers shall be designed and constructed to provide a mean velocity of not less than two (2) feet per second (fps) when flowing half-full at the estimated peak flow. Peak flows shall be calculated using Manning's formula with an "n" value of 0.013. The following are minimum slopes by pipe size:

<u>Sewer Size (inches)</u>	<u>Minimum Slope in Feet per 100 Feet</u>
8	0.40
10	0.28
12	0.22

These are absolute minimum slopes. Sewers shall be designed to provide steeper slopes whenever possible up to the stated maximum slope. The maximum allowable slope shall be the slope which generates a maximum flow velocity of eight (8) fps at the peak flow rate.

The maximum slope for sewer laterals is forty (40%) percent. The desirable maximum is ten (10%) percent.

The maximum slope for sewer main lines is 20 (20%) percent. The desirable maximum is ten (10%) percent.

Under special conditions, the Applicant may request slopes of less than the minimums stated. The Applicant must submit this request along with back-up data and calculations to show that the depth of flow at the design average flow will be 0.3 of the pipe diameter or greater. The Applicant must also submit computations to show the depths of flow at minimum and average rates of flow. The request shall also detail the reasons why the normal minimum slopes cannot be achieved. The request and supporting data will be reviewed by the City.

300.4 FLOW DESIGN CRITERIA

300.4.1 Sewerage Flows

All design flows shall be based on the Applicant’s (developer/builder) estimated sewerage generation rates for the proposed use, application, establishment, commercial, industry or development or re-development project. The following average sewage flow coefficients can be used as a guide to estimate the sewerage generation for some of the more common land uses:

<u>Land Use Classification</u>	<u>Average Sewerage Flow Coefficient</u>
Low Density Residential (8 du/ac max)	0.0032 cfs/acre
Medium Density Residential (15 du/ac max)	0.0045 cfs/acre
Med/High Density Residential (35 du/ac max)	0.0105 cfs/acre
Med. Urban Center Residential (60 du/ac max)	0.0180 cfs/acre
Urban Center Residential (90 du/ac max)	0.0270 cfs/acre
Mixed Use Corridor (130 du/ac max)	0.0400 cfs/acre
Commercial	0.0050 cfs/acre = 1.147842056932966e-7 cfs/SF
Industrial	0.0060 cfs/acre
Schools	25 gals/day per student
Medical Center	0.0250 cfs/acre
Hospital	1,000 gals/day per bed

Note: medium/high density residential calculations equate to 0.0003 cfs/dwelling unit

300.4.2 Peak Flows

The peak flow is assumed to be 3.0 times the average sewage flow.

300.4.3 Design Criteria

Design peak flows in pipelines 12 inches in diameter and smaller are to be limited to approximately d/D = 0.5 (½ of full depth). Pipes over 12 inches in diameter are to be limited to approximately d/D = 0.75 (¾ of full depth) at design peak flows.

300.5 TYPE OF PIPE

All sewer mains shall be vitrified clay pipe (VCP) or PVC SDR-26 pipe. All other pipe materials require special review and approval from the Water Resources Division. Sewer pipe material shall remain constant (continuous) between manholes. Transitioning between pipe material types (such as VCP to PVC), and size changes, may only be done at manholes.

All sewer laterals shall be either extra strength VCP or SDR-26 PVC pipe. The material used for construction of sewer laterals shall match the materials of construction for the adjacent sewer main to which they are connected.

City of Los Angeles
SEWAGE FACILITIES CHARGE
SEWAGE GENERATION FACTOR FOR
RESIDENTIAL AND COMMERCIAL CATEGORIES

EFFECTIVE DATE: April 6, 2012

Line No.	FACILITY DESCRIPTION	PROPOSED SGF IN GPD	BOD (mg/l)	SS (mg/l)
1	Acupuncture Office/Clinic	120/1,000 Gr SF	265	275
2	Arcade - Video Games	50/1,000 Gr SF	265	275
3	Auditorium (a)	3/Seat	265	275
4	Auto Parking (a)	20/1,000 Gr SF	265	275
5	Auto Mfg., Service Maintenance (b)	Actual	1,260	1,165
6	Bakery	280/1,000 Gr SF	3,020	2,540
7	Bank: Headquarters	120/1,000 Gr SF	265	275
8	Bank: Branch	50/1,000 Gr SF	265	275
9	Ballroom	350/1,000 Gr SF	265	275
10	Banquet Room	350/1,000 Gr SF	265	275
11	Bar: Cocktail, Fixed Set (a) (c)	15/Seat	265	275
12	Bar: Juice, No Baking Facilities (d)	720/1,000 Gr SF	265	275
13	Bar: Juice, with Baking Facilities (d)	720/1,000 Gr SF	265	275
14	Bar: Cocktail, Public Table Area (c)	720/1,000 Gr SF	265	275
15	Barber Shop	120/1,000 Gr SF	265	275
16	Barber Shop (s)	15/Stall	265	275
17	Beauty Parlor	425/1,000 Gr SF	265	275
18	Beauty Parlor (s)	50/Stall	265	275
19	Bldg. Const/Field Office (e)	120/Office	265	275
20	Bowling Alley: Alley, Lanes & Lobby Area	50/1,000 Gr SF	265	275
21	Bowling Facility: Arcade/Bar/Restaurant/Dancing	Total	Average	Average
22	Cafeteria: Fixed Seat	30/Seat	1,000	600
23	Car Wash: Automatic (b)	Actual	265	285
24	Car Wash: Coin Operated Bays (b)	Actual	265	285
25	Car Wash: Hand Wash (b)	Actual	265	285
26	Car Wash: Counter & Sales Area	50/1,000 Gr SF	265	275
27	Chapel: Fixed Seat	3/Seat	265	275
28	Chiropractic Office	120/1,000 Gr SF	265	275
29	Church: Fixed Seat	3/Seat	265	275
30	Church School: Day Care/Elem	9/Occupant	265	275
31	Church School: One Day Use (s)	9/Occupant	265	275
32	Cocktail Lounge: Fixed Seat (f)	15/Seat	265	275
33	Coffee House: No Food Preparation (d)	720/1,000 Gr SF	265	275
34	Coffee House: Pastry Baking Only (d)	720/1,000 Gr SF	265	275
35	Coffee House: Serves Prepared Food (d)	25/Seat	1,000	600
36	Cold Storage: No Sales (g)	30/1,000 Gr SF	265	275
37	Cold Storage: Retail Sales (g)	50/1,000 Gr SF	265	275
38	Comfort Station: Public	80/Fixture	265	275
39	Commercial Use (a)	50/1,000 Gr SF	265	275
40	Community Center	3/Occupant	265	275
41	Conference Room of Office Bldg.	120/1,000 Gr SF	265	275
42	Counseling Center (h)	120/1,000 Gr SF	265	275
43	Credit Union	120/1,000 Gr SF	265	275
44	Dairy	Average Flow	1,510	325
45	Dairy: Barn	Average Flow	1,510	325
46	Dairy: Retail Area	50/1,000 Gr SF	265	275
47	Dancing Area (of Bars or Nightclub) (c)	350/1,000 Gr SF	265	275
48	Dance Studio (i)	50/1,000 Gr SF	265	275
49	Dental Office/Clinic	250/1,000 Gr SF	265	275

City of Los Angeles
SEWAGE FACILITIES CHARGE
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EFFECTIVE DATE: April 6, 2012

Line No.	FACILITY DESCRIPTION	PROPOSED SGF IN GPD	BOD (mg/l)	SS (mg/l)
50	Doughnut Shop	280/1,000 Gr SF	1,000	600
51	Drug Rehabilitation Center (h)	120/1,000 Gr SF	265	275
52	Equipment Booth	30/1,000 Gr SF	265	275
53	Film Processing (Retail)	50/1,000 Gr SF	265	275
54	Film Processing (Industrial)	Actual	265	275
55	Food Processing Plant (b)	Actual	2,210	1,450
56	Gas Station: Self Service	100/W.C.	265	275
57	Gas Station: Four Bays Max	430/Station	1,950	1,175
58	Golf Course Facility: Lobby/Office/Restaurant/Bar	Total	700	450
59	Gymnasium: Basketball, Volleyball (k)	200/1,000 Gr SF	265	275
60	Hanger (Aircraft)	50/1,000 Gr SF	265	275
61	Health Club/Spa (k)	650/1,000 Gr SF	265	275
62	Homeless Shelter	70/Bed	265	275
63	Hospital	70/Bed	820	1,230
64	Hospital: Convalescent (a)	70/Bed	265	275
65	Hospital: Animal	300/1,000 Gr SF	820	1,230
66	Hospital: Psychiatric	70/Bed	265	275
67	Hospital: Surgical (a)	360/Bed	265	275
68	Hotel: Use Guest Rooms Only (a)	120/Room	265	275
69	Jail	85/Inmate	265	275
70	Kennel: Dog Kennel/Open	100/1,000 Gr SF	265	275
71	Laboratory: Commercial	250/1,000 Gr SF	265	275
72	Laboratory: Industrial	Actual	265	275
73	Laundromat	185/Machine	550	370
74	Library: Public Area	50/1,000 Gr SF	265	275
75	Library: Stacks, Storage	30/1,000 Gr SF	265	275
76	Lobby of Retail Area (l)	50/1,000 Gr SF	265	275
77	Lodge Hall	3/Seat	265	275
78	Lounge (l)	50/1,000 Gr SF	265	275
79	Machine Shop (No Industrial Waste Permit Required) (b)	50/1,000 Gr SF	265	275
80	Machine Shop (Industrial)	Actual	265	275
81	Mfg or Industrial Facility (No IW Permit Required) (b)	50/1,000 Gr SF	265	275
82	Mfg or Industrial Facility (Industrial)	Actual	265	275
83	Massage Parlor	250/1,000 Gr SF	265	275
84	Medical Building (a)	225/1,000 Gr SF	265	275
85	Medical: Lab in Hospital	250/1,000 Gr SF	340	275
86	Medical Office/Clinic	250/1,000 Gr SF	265	275
87	Mini-Mall (No Food)	50/1,000 Gr SF	265	275
88	Mortuary: Chapel	3/Seat	265	275
89	Mortuary: Embalming	300/1,000 Gr SF	800	800
90	Mortuary: Living Area	50/1,000 Gr SF	265	275
91	Motel: Use Guest Room Only (a)	120/Room	265	275
92	Museum: All Area	30/1,000 Gr SF	265	275
93	Museum: Office Over 15%	120/1,000 Gr SF	265	275
94	Museum: Sales Area	50/1,000 Gr SF	265	275
95	Office Building (a)	120/1,000 Gr SF	265	275
96	Office Bldg w/Cooling Tower	170/1,000 Gr SF	265	275
97	Plating Plant (No IW Permit Required) (b)	50/1,000 Gr SF	265	275
98	Plating Plant (Industrial) (b)	Actual	265	275

City of Los Angeles
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Line No.	FACILITY DESCRIPTION	PROPOSED SGF IN GPD	BOD (mg/l)	SS (mg/l)
99	Pool Hall (No Alcohol)	50/1,000 Gr SF	265	275
100	Post Office: Full Service (m)	120/1,000 Gr SF	265	275
101	Post Office: Private Mail Box Rental	50/1,000 Gr SF	265	275
102	Prisons	175/Inmate	265	275
103	Residential Dorm: College or Residential (n)	70/Student	265	275
104	Residential: Boarding House	70/Bed	265	275
105	Residential: Apt - Bachelor (a)	75/DU	265	275
106	Residential: Apt - 1 BDR (a) (o)	110/DU	265	275
107	Residential: Apt - 2 BDR (a) (o)	150/DU	265	275
108	Residential: Apt - 3 BDR (a) (o)	190/DU	265	275
109	Residential: Apt - >3 BDR (o)	40/BDR	265	275
110	Residential: Condo - 1 BDR (o)	110/DU	265	275
111	Residential: Condo - 2 BDR (o)	150/DU	265	275
112	Residential: Condo - 3 BDR (o)	190/DU	265	275
113	Residential: Condo - >3 BDR (o)	40/BDR	265	275
114	Residential: Duplex/Towhhouse - 1 BR (o)	110/DU	265	275
115	Residential: Duplex/Towhhouse - 2 BR (o)	150/DU	265	275
116	Residential: Duplex/Towhhouse - 3 BR (o)	190/DU	265	275
117	Residential: Duplex/Towhhouse - >3 BR (o)	40/BDR	265	275
118	Residential: SFD - 1 BR (o)	140/DU	265	275
119	Residential: SFD - 2 BR (o)	185/DU	265	275
120	Residential: SFD - 3 BR (o)	230/DU	265	275
121	Residential: SFD - >3 BR (o)	45/BDR	265	275
122	Residential Room Addition: Bedroom (o)	45/BDR	265	275
123	Residential Room Conversion: Into a Bedroom (o)	45/BDR	265	275
124	Residential: Mobile Home	Same as Apt	265	275
125	Residential: Artist (2/3 Area)	75/DU	265	275
126	Residential: Artist Residence	75/DU	265	275
127	Residential: Guest Home w/ Kitchen	Same as Apt	265	275
128	Residential: Guest Home w/o Kitchen	45/BDR	265	275
129	Rest Home	70/Bed	555	490
130	Restaurant: Drive-In	50/Stall	1000	600
131	Restaurant: Drive-In Seating Area	25/Seat	1000	600
132	Restaurant: Fast Food Indoor Seat	25/Seat	1000	600
133	Restaurant: Fast Food Outdoor Seat	25/Seat	1000	600
134	Restaurant: Full Service Indoor Seat (a)	30/Seat	1000	600
135	Restaurant: Full Service Outdoor Seat	30/Seat	1000	600
136	Restaurant: Take Out	300/1,000 Gr SF	1000	600
137	Retail Area (greater than 100,000 SF)	50/1,000 Gr SF	265	275
138	Retail Area (less than 100,000 SF)	25/1,000 Gr SF	265	275
139	Rifle Range: Shooting Stalls/Lanes, Lobby	50/1,000 Gr SF	265	275
140	Rifle Range Facility: Bar/Restaurant	Total	Average	Average
141	School: Arts/Dancing/Music (i)	11/Student	265	275
142	School: Elementary/Jr. High (a) (p)	9/Student	265	275
143	School: High School (a) (p)	11/Student	265	275
144	School: Kindergarten (s)	9/Student	265	275
145	School: Martial Arts (i)	9/Student	265	275
146	School: Nursery-Day Care (p)	9/Child	265	275
147	School: Special Class (p)	9/Student	265	275

City of Los Angeles
SEWAGE FACILITIES CHARGE
SEWAGE GENERATION FACTOR FOR
RESIDENTIAL AND COMMERCIAL CATEGORIES

EFFECTIVE DATE: April 6, 2012

<i>Line No.</i>	FACILITY DESCRIPTION	PROPOSED SGF IN GPD	BOD (mg/l)	SS (mg/l)
148	School: Trade or Vocational (p)	11/Student	265	275
149	School: Training (p)	11/Student	265	275
150	School: University/College (a) (p)	16/Student	265	275
151	School: Dormitory (a) (n)	70/Student	265	275
152	School: Stadium, Pavilion	3/Seat	265	275
153	Spa/Jacuzzi (Commercial with backwash filters)	Total	265	275
154	Storage: Building/Warehouse	30/1,000 Gr SF	265	275
155	Storage: Self-Storage Bldg	30/1,000 Gr SF	265	275
156	Store: Ice Cream/Yogurt	25/1,000 Gr SF	1000	600
157	Store: Retail (l)	50/1,000 Gr SF	265	275
158	Studio: Film/TV - Audience Viewing Room (q)	3/Seat	265	275
159	Studio: Film/TV - Regular Use Indoor Filming Area (q)	50/1,000 Gr SF	265	275
160	Studio: Film/TV - Ind. Use Film Process/Machine Shop (q)	50/1,000 Gr SF	265	275
161	Studio: Film/TV - Ind. Use Film Process/Machine Shop	Total	265	275
162	Studio: Recording	50/1,000 Gr SF	265	275
163	Swimming Pool (Commercial with backwash filters)	Total	265	275
164	Tanning Salon: Independent, No Shower (r)	50/1,000 Gr SF	265	275
165	Tanning Salon: Within a Health Spa/Club	640/1,000 Gr SF	265	275
166	Theater: Drive-In	6/Vehicle	265	275
167	Theater: Live/Music/Opera	3/Seat	265	275
168	Theater: Cinema	3/Seat	265	275
169	Tract: Commercial/Residential	1/Acre	265	275
170	Trailer: Const/Field Office (e)	120/Office	265	275
171	Veterinary Clinic/Office	250/1,000 Gr SF	265	275
172	Warehouse	30/1,000 Gr SF	265	275
173	Warehouse w/ Office	Total	265	275
174	Waste Dump: Recreational	400/Station	2650	2750
175	Wine Tasting Room: Kitchen	200/1,000 Gr SF	265	275
176	Wine Tasting Room: All Area	50/1,000 Gr SF	265	275

Appendix 5

Sewer Generation Calculations

RELATED BRISTOL - Existing Condition Sewer Generation - (CREDIT)

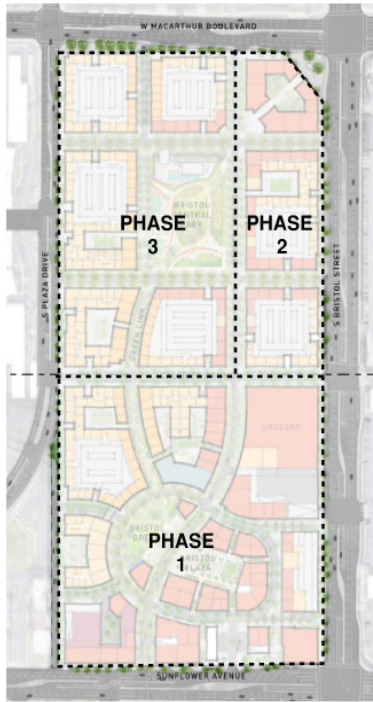
Description	square feet of amenities or retail/commercial	unit flow rate (cfs/sf)	average wastewater flow (cfs)	peak wastewater flow (cfs) (3x avg.)
Boiling Crab Restaurant	10000	1.1478E-07	0.001148	0.00344
Chiropractor	13000	1.1478E-07	0.001492	0.00448
Chase Bank	19000	1.1478E-07	0.002181	0.00654
Wang Cho BBQ	11000	1.1478E-07	0.001263	0.00379
L.A. Fitness	34000	1.1478E-07	0.003903	0.01171
Silvas Sports Bar	14000	1.1478E-07	0.001607	0.00482
Vons Grocery	50000	1.1478E-07	0.005739	0.01722
Hans Ice Cream	14000	1.1478E-07	0.001607	0.00482
Total to S07-018 in Plaza Drive (north of Callens Common) OCSD Sta. 15+30	165000		0.0189	0.0568
Retail Metro Town Square	64000	1.1478E-07	0.00735	0.02204
Bank of America	2500	1.1478E-07	0.00029	0.00086
Sleep Number	4000	1.1478E-07	0.00046	0.00138
Restaurants/Take-Out (McDonalds, Jack n Box, et. al.)	25500	1.1478E-07	0.00293	0.00878
Total to S07-014 in Plaza Drive (at intersection w/ Callens Common) OCSD Sta. 10+79	96000		0.0110	0.0331
				0.00000
Retail (Men's Warehouse, et al)	40000	1.1478E-07	0.0046	0.01377
Retail (Bed, Bath & Beyond et. al.)	164000	1.1478E-07	0.0188	0.05647
Total to exist. 8" City of S.A. sewer, drains into OCSD at Bear Street	204000		0.0234	0.0702
Total SF	465000		Average (cfs)	Peak (cfs)
Total Existing Wastewater Flow (cfs)			0.0534	0.160

RELATED BRISTOL

ENTITLEMENT PARCEL PHASING AND PROGRAM

1,100

Phase	Parcel	Program	Baseline Resi. Unit Count	%	Entitlement Resi. Unit Count	Entitlement Resi. GSF	Baseline Retail GSF	Entitlement Retail GSF	Baseline Hotel Key Count	Entitlement Hotel Key Count	Baseline Senior Living Count	Entitlement Senior Living Count	Amenity Building
3	Parcel 1	Residential/Retail	262	8%	293	322,035	-	-	-	-	-	-	
3	Parcel 2	Residential/Retail	253	8%	283	310,973	2,600	15,000	-	-	-	-	
2	Parcel 3	Residential/Retail	100	3%	112	122,914	-	25,000	-	-	-	-	
3	Parcel 4	Amenity	-	0%	-	-	-	5,000	-	-	-	-	16,000
3	Parcel 5	Bristol Central Park	-	0%	-	-	-	-	-	-	-	-	
3	Parcel 6	Residential	404	12%	451	496,573	2,300	-	-	-	-	-	
2	Parcel 7	Residential/Retail	409	12%	457	502,719	-	25,000	-	-	-	-	
3	Parcel 8	Residential	220	7%	246	270,411	-	-	-	-	-	-	
3	Parcel 9	Residential	220	7%	246	270,411	-	15,000	-	-	-	-	
2	Parcel 10	Residential/Retail	257	8%	287	315,889	-	15,000	-	-	-	-	
1	Parcel 11	Residential	347	10%	388	426,512	-	5,000	-	-	-	-	
1	Parcel 12	Residential/Retail	229	7%	256	281,473	6,900	6,900	-	-	-	-	
1	Parcel 13	Coterie Senior Living	-	0%	-	-	3,100	5,100	-	-	170	200	
1	Parcel 14	Residential/Retail	351	10%	392	431,429	70,400	70,000	-	-	-	-	
1	Parcel 15	Residential/Retail	130	4%	145	159,788	-	7,500	-	-	-	-	
1	Parcel 16	Bristol Green	-	0%	-	-	8,000	8,000	-	-	-	-	
1	Parcel 17	Bristol Plaza	-	0%	-	-	-	-	-	-	-	-	
1	Parcel 18	Retail	-	0%	-	-	45,000	45,000	-	-	-	-	
1	Parcel 19	Residential/Retail	99	3%	111	121,685	10,900	11,000	-	-	-	-	
1	Parcel 20	Retail	-	0%	-	-	74,600	75,000	-	-	-	-	
1	Parcel 21	Hotel, Serviced Apts	75	2%	84	92,186	16,500	16,500	200	250	-	-	
	Parcel 22 23	Streets & Misc Common Area	-	0%	-	-	-	-	-	-	-	-	
TOTAL			3,356	100%	3,750	4,125,000	240,300	350,000	200	250	170	200	16,000



	Resi	Retail
Phase 1	1,376	250,000
Phase 2	856	65,000
Phase 3	1,519	35,000
Total	3,750	350,000

RELATED BRISTOL - Proposed Condition Sewer Generation										
Description	number of residential units	square feet of amenities or retail/commercial	hospitality (key count)	senior care center (square feet)	unit flow rate (cfs/du)	commercial unit flow rate (cfs/sf)	hospitality flow (120 gpd/room)	senior care (70 gpd/bed)	average wastewater flow (cfs)	peak wastewater flow (cfs) (3x avg.)
Entitlement Block 1	293	0			0.0003	1.1478E-07			0.088	0.264
Entitlement Block 2	283	15000			0.0003	1.1478E-07			0.087	0.260
Entitlement Block 3	112	25000			0.0003	1.1478E-07			0.036	0.109
Blocks 1, 2, & 3									0.211	0.633
Entitlement Block 4	0	21000			0.0003	1.1478E-07			0.002	0.007
Entitlement Block 5	0	0			0.0003	1.1478E-07			0.000	0.000
Entitlement Block 6	451	0			0.0003	1.1478E-07			0.135	0.406
Entitlement Block 7	457	25000			0.0003	1.1478E-07			0.140	0.420
Blocks 4, 5, 6, & 7									0.278	0.833
Entitlement Block 8	246	0			0.0003	1.1478E-07			0.074	0.221
Entitlement Block 9	246	15000			0.0003	1.1478E-07			0.076	0.227
Entitlement Block 10	287	15000			0.0003	1.1478E-07			0.088	0.263
Entitlement Block 11	388	5000			0.0003	1.1478E-07			0.117	0.351
Entitlement Block 12	256	6900			0.0003	1.1478E-07			0.078	0.233
Entitlement Block 13	0	5100	0	200	0.0003	1.1478E-07	0.000186	0.000108	0.022	0.067
Entitlement Block 14	196	70000			0.0003	1.1478E-07			0.067	0.201
Entitlement Block 15	145	7500			0.0003	1.1478E-07			0.044	0.133
Blocks 8, 9, 10,11, 12, 13, 14, 15									0.565	1.695
Entitlement Block 16	0	8000			0.0003	1.1478E-07			0.001	0.003
Entitlement Block 17	0	0	0	0	0.0003	1.1478E-07	0.000186	0.000108	0.000	0.000
Entitlement Block 18	0	45000	0	0	0.0003	1.1478E-07	0.000186	0.000108	0.005	0.015
Entitlement Block 20	0	75000	0	0	0.0003	1.1478E-07	0.000186	0.000108	0.009	0.026
Entitlement Block 21	84	16500	250		0.0003	1.1478E-07	0.000186		0.074	0.221
Blocks 16, 17, 18, 20, 21									0.088	0.265
Entitlement Block 19	111	11000	0	0	0.0003	1.1478E-07	0.000186	0.000108	0.035	0.104
Block 19									0.035	0.104

Total Proposed Project Wastewater Flow (cfs)	Average (cfs)	Peak (cfs)
	1.177	3.530

1/2-full capacity of existing city 8" (s=0.0044) = 0.366 cfs
3/4-full capacity of existing city 15" (s=0.0012) = 1.993 cfs

1/2 full capacity 8" swr (s=0.01) = 0.604 cfs
1/2 full capacity 8" swr (s=0.02) = 0.854 cfs

Appendix 6

Flow-Depth Calculations

PROPOSED 18" SEWER LINE W/ ALL ONSITE PROJECT FLOWS

***Cells that are highlighted can be changed**

GIVEN:

$Q_{given} = 3.530$ cfs <== Discharge
 $n = 0.013$ <== Roughness coefficient
 $S = 0.0022$ <== Slope V:H
 $r = 0.750$ ft <== Radius

TRIAL DEPTH:

$h = 11.343$ in <== Vary this depth to get $Q_{assume} = Q_{given}$
 0.945 ft

CALCULATIONS:

$\beta = 105.09$ degree

$R = 0.426$ ft

64%-full

$C = 98.260$

$V = 3.009$ ft/sec

$A = 1.173$ sq. ft.

$Q_{assume} = 3.530$ cfs

$Q_{half\ full} = 2.42$ cfs

$Q_{3/4\ full} = 4.47$ cfs

RESULT:

$(Q_{given} - Q_{assume}) / Q_{given} \% = 0\%$ <===== **OK**

Flow Depth (in) = 11.343

Capacity d/r = 126.03%

$Q_{capacity} = 4.468$ cfs

Capacity $Q_{given} / Q_{capacity} = 79.01\%$

$(Q_{half\ full} = 2.42$ cfs
 $\beta_{half\ full} = 90.000$ degree
 $R_{half\ full} = 0.375$ ft
 $C_{half\ full} = 95.346$ ft
 $A_{half\ full} = 0.884$ sq. ft.
 $V_{half\ full} = 2.739$ ft/sec)

$(Q_{3/4\ full} = 4.47$ cfs
 $\beta_{3/4\ full} = 120.00$ degree
 $R_{3/4\ full} = 0.453$ ft
 $C_{3/4\ full} = 99.605$ ft
 $A_{3/4\ full} = 1.422$ sq. ft.
 $V_{3/4\ full} = 3.143$ ft/sec)

Capacity of Existing OCSD 15" Sewer in Plaza Drive

***Cells that are highlighted can be changed**

GIVEN:

Q _{given} =	1.993	cfs	<i><== Discharge</i>
n=	0.013		<i><== Roughness coefficient</i>
S=	0.0012		<i><== Slope V:H</i>
r=	0.625	ft	<i><== Radius</i>

TRIAL DEPTH:

h=	11.250	in	<i><== Vary this depth to get Q_{assume} = Q_{given}</i>
		0.938 ft	

CALCULATIONS:

beta= 120.00 degree

R= 0.377 ft

C= 94.911

V= 2.019 ft/sec

A= 0.987 sq. ft.

Q_{assume} = 1.993 cfs

Q_{halffull} = 1.08 cfs

Q_{3/4full} = 1.99 cfs

RESULT:

(Q_{given}-Q_{assume}) / Q_{given} %= 0% **<===== OK**

Flow Depth (in) = 11.250

Capacity d/r = 150.00%

Q_{capacity} = 1.993 cfs

Capacity Q_{given}/Q_{capacity} = 99.98%

(Q_{halffull} = 1.08 cfs
beta_{halffull} = 90.000 degree
R_{halffull} = 0.313 ft
C_{halffull} = 90.643 ft
A_{halffull} = 0.614 sq. ft.
V_{halffull} = 1.757 ft/sec)

(Q_{3/4full} = 1.99 cfs
beta_{3/4full} = 120.00 degree
R_{3/4full} = 0.377 ft
C_{3/4full} = 94.911 ft
A_{3/4full} = 0.987 sq. ft.
V_{3/4full} = 2.019 ft/sec)

Capacity of Existing 8" Sewer in Sunflower Avenue

***Cells that are highlighted can be changed**

GIVEN:

Q _{given} =	0.366	cfs	<== Discharge
n=	0.013		<== Roughness coefficient
S=	0.0044		<== Slope V:H
r=	0.333	ft	<== Radius

TRIAL DEPTH:

h=	4.000	in	<== Vary this depth to get Q _{assume} = Q _{given}
		0.333 ft	

CALCULATIONS:

beta= 90.00 degree

R= 0.167 ft

C= 77.387

V= 2.096 ft/sec

A= 0.175 sq. ft.

Q_{assume} = 0.366 cfs

Q_{half full} = 0.37 cfs

Q_{3/4 full} = 0.68 cfs

RESULT:

(Q_{given}-Q_{assume}) / Q_{given} %= 0% <===== **OK**

Flow Depth (in) = 4.000

Capacity d/r = 100.00%

Q_{capacity} = 0.366 cfs

Capacity Q_{given}/Q_{capacity} = 99.91%

(Q_{half full} = 0.37 cfs
 beta_{half full} = 90.000 degree
 R_{half full} = 0.167 ft
 C_{half full} = 77.431 ft
 A_{half full} = 0.175 sq. ft.
 V_{half full} = 2.099 ft/sec)

(Q_{3/4 full} = 0.68 cfs
 beta_{3/4 full} = 120.00 degree
 R_{3/4 full} = 0.201 ft
 C_{3/4 full} = 81.585 ft
 A_{3/4 full} = 0.281 sq. ft.
 V_{3/4 full} = 2.427 ft/sec)

Capacity of 12" Sewer (private line - upper reach)

***Cells that are highlighted can be changed**

GIVEN:

Q _{given} =	0.793	cfs	<== Discharge
n=	0.013		<== Roughness coefficient
S=	0.0022		<== Slope V:H
r=	0.500	ft	<== Radius

TRIAL DEPTH:

h=	6.000	in	<== Vary this depth to get Q _{assume} = Q _{given}
		0.500 ft	

CALCULATIONS:

beta= 90.00 degree

R= 0.250 ft

C= 86.118

V= 2.020 ft/sec

A= 0.393 sq. ft.

Q_{assume} = 0.793 cfs

Q_{half full} = 0.79 cfs

Q_{3/4 full} = 1.47 cfs

RESULT:

(Q_{given}-Q_{assume}) / Q_{given} % = 0% <===== **OK**

Flow Depth (in) = 6.000

Capacity d/r = 100.00%

Q_{capacity} = 0.793 cfs

Capacity Q_{given}/Q_{capacity} = 99.99%

(Q_{half full} = 0.79 cfs
 beta_{half full} = 90.000 degree
 R_{half full} = 0.250 ft
 C_{half full} = 86.118 ft
 A_{half full} = 0.393 sq. ft.
 V_{half full} = 2.020 ft/sec)

(Q_{3/4 full} = 1.47 cfs
 beta_{3/4 full} = 120.00 degree
 R_{3/4 full} = 0.302 ft
 C_{3/4 full} = 90.394 ft
 A_{3/4 full} = 0.632 sq. ft.
 V_{3/4 full} = 2.329 ft/sec)

Capacity of Existing OCSD 78" Sewer in Sunflower Avenue

***Cells that are highlighted can be changed**

GIVEN:

Q _{given} =	96.805	cfs	<== Discharge
n=	0.013		<== Roughness coefficient
S=	0.0004		<== Slope V:H
r=	3.250	ft	<== Radius

TRIAL DEPTH:

h=	58.500	in	<== Vary this depth to get Q _{assume} = Q _{given}
		4.875 ft	

CACULATIONS:

beta= 120.00 degree

R= 1.961 ft

C= 129.476

V= 3.626 ft/sec

A= 26.696 sq. ft.

Q_{assume} = 96.805 cfs

Q_{halffull} = 53.14 cfs

Q_{3/4full} = 96.80 cfs

RESULT:

(Q_{given}-Q_{assume}) / Q_{given} %= 0% <===== **OK**

Flow Depth (in) = 58.500

Capacity d/r = 150.00%

Q_{capacity} = 96.805 cfs

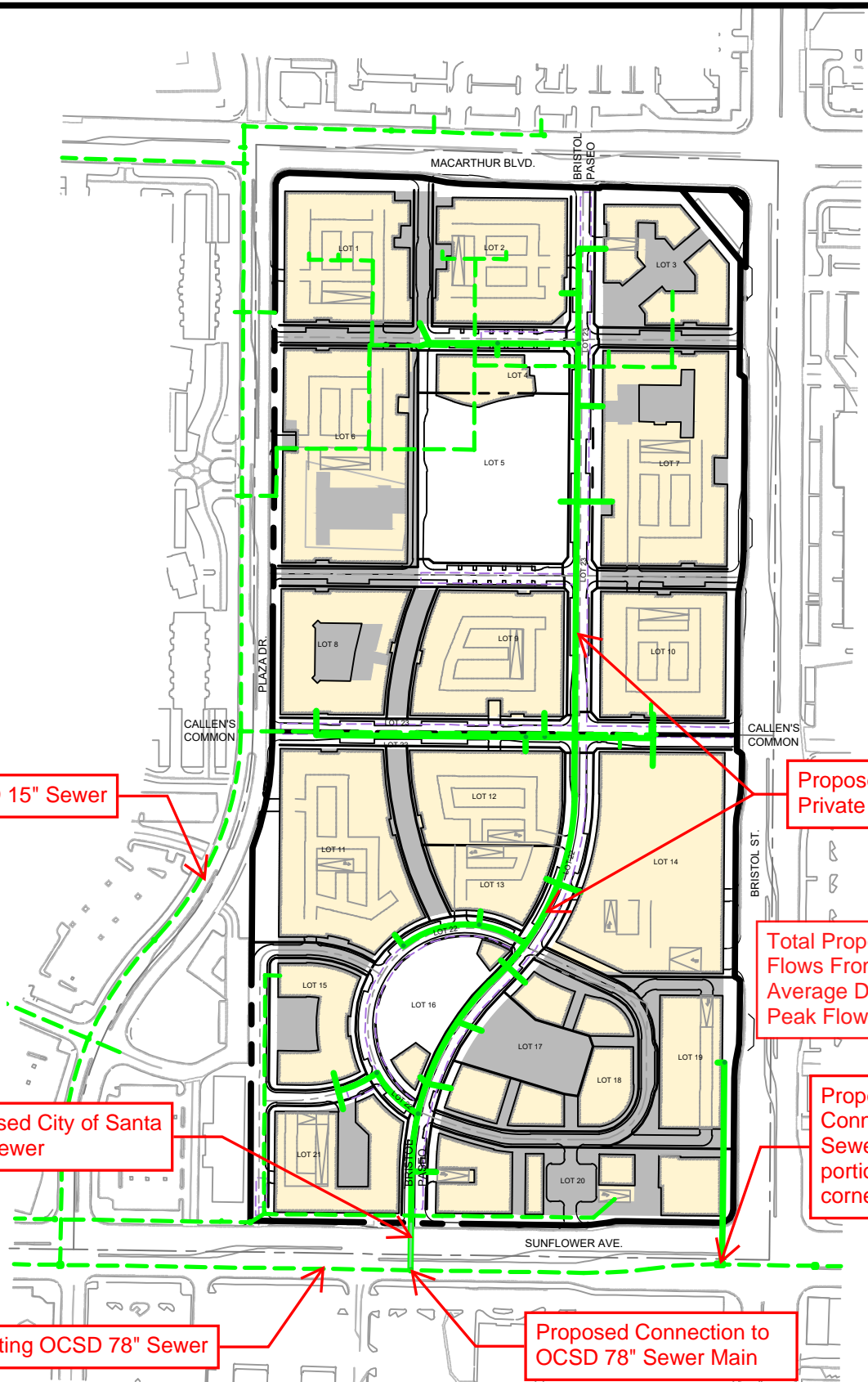
Capacity Q_{given}/Q_{capacity} = 100.00%

(Q_{halffull} = 53.14 cfs
 beta_{halffull} = 90.000 degree
 R_{halffull} = 1.625 ft
 C_{halffull} = 125.624 ft
 A_{halffull} = 16.592 sq. ft.
 V_{halffull} = 3.203 ft/sec)

(Q_{3/4full} = 96.80 cfs
 beta_{3/4full} = 120.00 degree
 R_{3/4full} = 1.961 ft
 C_{3/4full} = 129.476 ft
 A_{3/4full} = 26.696 sq. ft.
 V_{3/4full} = 3.626 ft/sec)

Appendix 7

Proposed Condition Sewer Exhibit



Existing OCSD 15" Sewer

Proposed Onsite Private Sewer

Total Proposed Wastewater Flows From Project Site:
Average Daily Flow: 1.175 cfs
Peak Flow: 3.530 cfs

Proposed City of Santa Ana Sewer

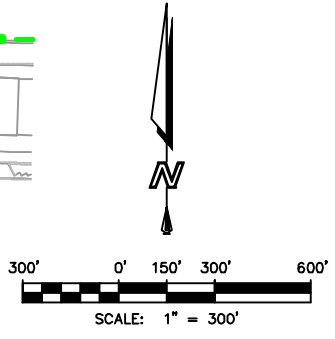
Proposed Optional Connection to OCSD 78" Sewer Main (for small portion at southeast corner (Lot 19))

Existing OCSD 78" Sewer

Proposed Connection to OCSD 78" Sewer Main

LEGEND:

	PROJECT BOUNDARY		BUILDING HATCH
	LOT LINE		PARKING BELOW GRADE
	PROPOSED SEWER		
	EXISTING SEWER		



**RELATED
BRISTOL SEWER
EXHIBIT**