2400 Highland Avenue

Rialto, CA

September 30, 2022

Kimley»Horn

Table of Contents

1. Introduction & Purpose 3
2. Design Criteria 4
3. Flow Analysis 5
    Existing Sewer Facilities 5
    Proposed Sewer Facilities 5
    Alternative Designs 7
4. Sewer System Capacity 8
    Sewer Lift Station 8
    Caltrans Right Of Way 8
5. Conclusions 9

Figures

Figure 1 : Project Location 3

Tables

Table 1: Existing Tributary Population Estimate 5

Table 2: Proposed Wastewater Flows 6

Table 3: Proposed Sewer Hydraulics 8

Attachments

- Attachment A: Existing and Proposed Sewer Exhibit
- Attachment B: Proposed Wastewater Flows and Sewer Hydraulics Tables
- Attachment C: Flow Master Calculations
- Attachment D: Pepper Ave Record Drawing and Map Books
- Attachment E: Excerpts from City of Rialto Sewer Policy

Abbreviations

FPS	Feet Per Second
GPM	Gallons per Minute
I	Interstate
SCE	Southern California Edison
AC	Acre
APN	Assessor's Parcel Number
VCP	Vitrified Clay Pipe
PVC	Polyvinyl Chloride Pipe
CFS	Cubic Feet Per Second
City	City of Rialto, CA
IN	Inch
MGD	Million Gallons per Day
No.	Number
MH	Manhole

To: City of Rialto
150 S Palm Ave
Rialto, CA 92376

From: Taylor Thorig, P.E..
Kimley-Horn and Associates, Inc.

Date: September 30, 2022

Subject: 2400 Highland Avenue: Sewer Feasibility Analysis

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1. Introduction & Purpose

The 2400 Highland Avenue development (Project) is proposing to construct a 1.1 million SF industrial facility with site parking, trailer parking, site amenities, and infrastructure to support the site. The site is approximately 101-acres. The site is currently in use by Vulcan Materials as a sand and aggregate mine. The site will be brought back to grade prior to the end of their lease in 2025. The Project is located in north Rialto, CA, near the intersection of East Highland Ave and Pepper Ave. East of the site is Lytle Creek. The Project location and surrounding vicinity are depicted in **Figure 1**.

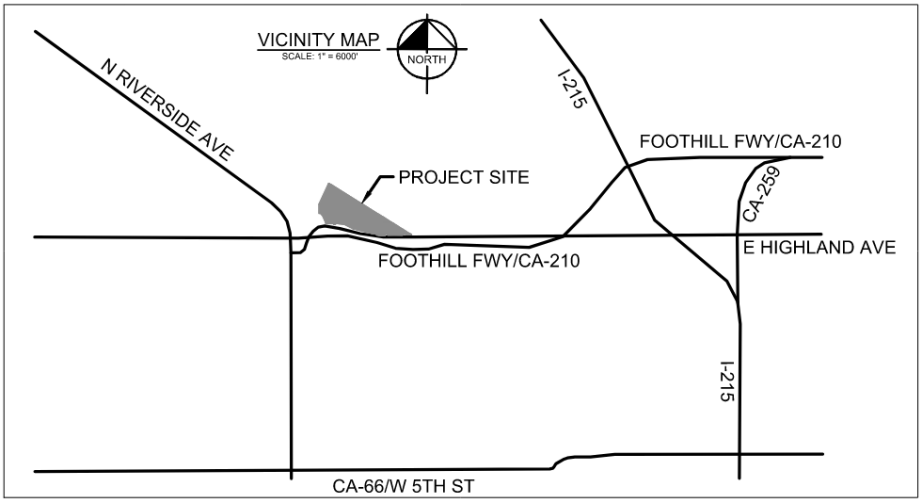


Figure 1 : Project Location

The goal of this analysis was to:

- Calculate the total sewage generation from the site
- Preliminarily size the proposed on-site gravity sewer system according to published design standards

- Determine where the on-site sewer could discharge to the public sewer system
- Determine the need for any off-site improvements

2. Design Criteria

The City of Rialto has a sewer policy for use in the design of sanitary sewer facilities within the City of Rialto. The following sewer policy design guidelines are the predominant requirements in the hydraulic design and analysis of the sanitary sewer. Excerpts from The City of Rialto sewer policy is provided as **Attachment E**. the following reference documents and tools were utilized in the preparation of this sewer study:

- City of Rialto Sewer Policy and Procedures
- City of Rialto Sewer System Mapbook (April 2013)
- City of Rialto Zoning Map
- City of Rialto Standard Drawings (2015)
- Bentley Systems FlowMaster 10.03.00.03 (released March 20, 2020)

Pipe slopes are set to ensure minimum scour velocity and to prevent wear due to excessive flow velocity. To achieve this, minimum pipe slopes are established according to pipe diameter. These criteria are presented below.

1. Depth of flow is less than or equal to 0.5 for pipes less than 12-inches in diameter
2. Minimum design velocity is 2 feet per second.
3. Maximum design velocity is 10 feet per second.
4. N=0.013 for VCP or N=0.011 for PVC/ABS
5. Minimum pipe diameter is 8-inches.
6. Peak Design flow per Rialto's Equation is calculated as $Q_d = 3.6(Q_a)^{0.85}$, where Q_d = Design flow rate and Q_a = Average flow rate.
7. Minimum pipe diameter is 8 inches.
8. Recommended depth of lateral at property line is 4 feet.
9. Light Industrial = 1928 gal/ac
10. Typical manhole spacing 300 to 500 feet.
11. VCP is the only material approved for City Sewers.
12. In areas with high potential for hydrogen sulfide gas, manholes shall be PVC lines. Typical locations are sewers with 7% or greater slopes, where changes in slope between sewers is 5% or more, drop manholes, force main discharge manholes, and all mains larger that 15" diameter.

Peak flows are accommodated by ensuring the peak dry weather flows do not exceed maximum depths of flow established by the City of Rialto. As shown in **Table 3**, the maximum depths of flow (d/D) are 0.5 for pipes less than 15 inches in diameter.

Flow depths are determined using Manning's formula:

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

Where Q is the peak dry weather flow (cfs), n is Manning's number, A is the pipe cross sectional area in (ft^2), R is the hydraulic radius (feet), and S is the pipe slope (ft/ft).

3. Flow Analysis

Existing Sewer Facilities

All potential sewer connections are located south of the project site across Highland Ave and I-210 and Rialto's sewer system generally flows south to the Rialto Wastewater Treatment Plant (WWTP). Three primary sewer conveyances run south in Sycamore Ave, Acacia Avenue, and Pepper Avenue. No existing sewer infrastructure currently exists in Highland Ave.

A capped 12" VCP Sewer not currently in service exists in Pepper Ave. The sewer was constructed ahead of a planned development along Pepper Ave. As-built record drawings dated 2011 show a "future sewer lift station" and existing 10" force main connecting to the gravity sewer in Winchester Drive.

Reference **Attachment D** for map books and as-builts.

Proposed Sewer Facilities

The total acreage of the site is 101.3-acres. KH anticipates that the project site will be light industrial with a corresponding flow factor of 1928 gal/ac. The proposed on-site sewer system will consist of a series of pipes picking up various building laterals. There will be a guard shack on-site that will have a restroom. The guard shack will likely require the longest run of pipe and therefore dictate the sewer design.

Wastewater flows are based on land use development type and flow rate by land use. Land use development types are assigned a zoning factor. These factors are provided by City of Hollister Design Standards and are shown in **Table 1**.

Table 1: Existing Tributary Population Estimate

Zoning Factors[1]	
Light Industrial	1928 gal/day/acre
Commercial	1928 gal/day/acre
Open Space	0 gal/day/acre

1: City of Rialto Sewer Policy

Using the design criteria in **Section 2** and the peak flow of 234-GPM, the proposed on-site pipe diameter is 8-inches.

At the right-of-way, a manhole would be provided to transition from private sewer to public sewer. New public sewer lines would be constructed in North Pepper Avenue and connect to the existing 12-inch sewer just south of the I-210 and North Pepper Avenue interchange. **Exhibit A** depicts the improvements.

Existing utilities in the area consist of water and gas. The two waterlines are 16-inch and 30-inch in diameter and are owned by West Valley Water District (WVWD). They reside on the west and south side of North Pepper Avenue and East Highland Avenue, respectively. The gas line is 6-inches in diameter and is owned

by Southern California Edison. The gas line resides on the east and north side of North Pepper Avenue and East Highland Avenue, respectively.

The gravity sewer proposed in North Pepper Avenue would be installed 5-feet east of the road centerline to match the alignment of the existing sewer at a depth of 1282.5 feet. The proposed sewer would have to cross the 16-inch waterline and 6-inch gas line. The depth of these utilities is unknown. Potholing should be performed to determine if there would be a vertical conflict. All proposed sewer have been designed in accordance with the City of Rialto Sewer Policy. Proposed gravity sewer manholes are spaced every 300-feet according to City standards and gravity mains adhere to the requirements summarized in Section 2 of this report.

The existing 12-inch gravity sewer in North Pepper Avenue is capped at a location designated for a future sewer lift station that is approximately 1,800-feet south of the I-210 and North Pepper Avenue interchange. The lift station will pump sewage through approximately 1,000 feet of existing 10-inch PVC force main running south in Pepper Avenue to an existing manhole where it will discharge to the gravity sewer system near Winchester Drive.

An analysis showing the calculated sewage generation rates from the Project and tributary areas is presented in **Table 2**. Detailed sewage generation calculations are provided in **Attachment B.**

Table 2: Proposed Wastewater Flows

MH	Land Use	Area (AC)	Flow Factor (GPD/AC)	Average Flow (GPD)	Average Flow (GPM)	Design Flow (GPM)
MH #9	Light Industrial	101.3 AC	1928	195306	136	234
MH #7	Commercial	7.4 AC	1928	14267	10	25
MH #5	Commercial	2.6 AC	1928	5071	4	10
MH #5	Commercial	4.5 AC	1928	8676	6	17
MH #4	Commercial	11.6 AC	1928	22442	16	37
MH #4	Commercial	2.0 AC	1928	3856	3	8
MH #3	Light Industrial	14.6 AC	1928	28149	20	45
MH #1	Light Industrial	9.8 AC	1928	18894	13	32
MH #1	Commercial	13.7 AC	1928	26414	18	43
Total	-	-	-	323,075	224	451

Alternative Designs

Two alternative designs were considered in this study: connecting at Sycamore Ave and connecting at Acacia Ave. In both alternatives, a private on site lift station would be proposed near the site's driveway to pump water west along Highland drive and discharge along the southern property boundary.

The Sycamore Lift Station alternative considered discharging to the existing Rialto sewer system at the intersection of Oakdale Ave and Highland Ave (MH 171-4 on Sewer System Mapbook) which would allow it to utilize the existing sewer siphon to cross I-210. However, as of September 2022 the Sycamore Lift Sewer Lift Station is currently undergoing upgrades and the upgraded lift station will not have capacity for flow from the 2400 Highland Avenue project. The improved capacity of the Lift Station is 560 GPM, while the 234 GPM flow from this project would increase inflow at the Sycamore Lift Station to 660 GPM in the near-term scenario, and 690 GPM at buildout. This alternative was not selected as the upgraded lift station will not have capacity to accept flow from this project.

The Acacia alternative also involved a force main discharging from the Southern boundary of the property along Highland Ave. This design alternative would have involved trenchless sewer construction using jack and bore methods to cross the Caltrans easement and connect to the existing city system at the intersection of Easton Ave and Acacia Ave (MH 171-19 on Sewer System Mapbook). This alternative was not selected due to the increased cost of trenchless sewer construction methods, and the need for an on site sewer lift station to connect to the existing downstream system.

4. Sewer System Capacity

The results of sewer hydraulic calculations are presented in **Table 3**. Bentley FlowMaster was used calculate velocity and flow depth, employing the Manning friction method as discussed in Section 2. Complete Flow Master program output is provided in **Attachment C.**

Table 3: Proposed Sewer Hydraulics

Segment		Pipe		Design Flow (GPM)	Cumulative Design Flow (GPM)	Velocity (FPS)	Flow Depth	
Start	End	Size (IN)	Slope (%)				d(IN)	d/D
MH #9	MH #8	8	1.00%	234	234	3.34	3.7	0.46
MH #8	MH #7	8	1.51%	0	234	3.83	3.3	0.41
MH #7	MH #6	8	1.45%	25	259	3.93	3.5	0.44
MH #6	MH #5	12	0.72%	0	259	2.97	3.6	0.30
MH #5	MH #4	12	0.72%	27	286	3.05	3.7	0.31
MH #4	MH #3	12	0.72%	45	332	3.18	4.0	0.33
MH #3	MH #2	12	0.72%	45	377	3.29	4.3	0.36
MH #2	MH #1	12	0.72%	0	377	3.29	4.3	0.36
MH #1	MH #1	12	0.72%	75	451	3.29	4.3	0.36

Attachment B contains the full hydraulic calculations.

Sewer Lift Station

A sewer lift station will need to be constructed prior to this 2400 Highland Ave site being developed as well as the planned industrial and commercial developments along Pepper Ave. The lift station is estimated to need to convey approximately 451 GPM of wastewater, 234 GPM of which is from this Highland site. Further analysis of the sewer lift station requirements and downstream existing 10” force main will be required as these development plans progress.

Caltrans Right Of Way

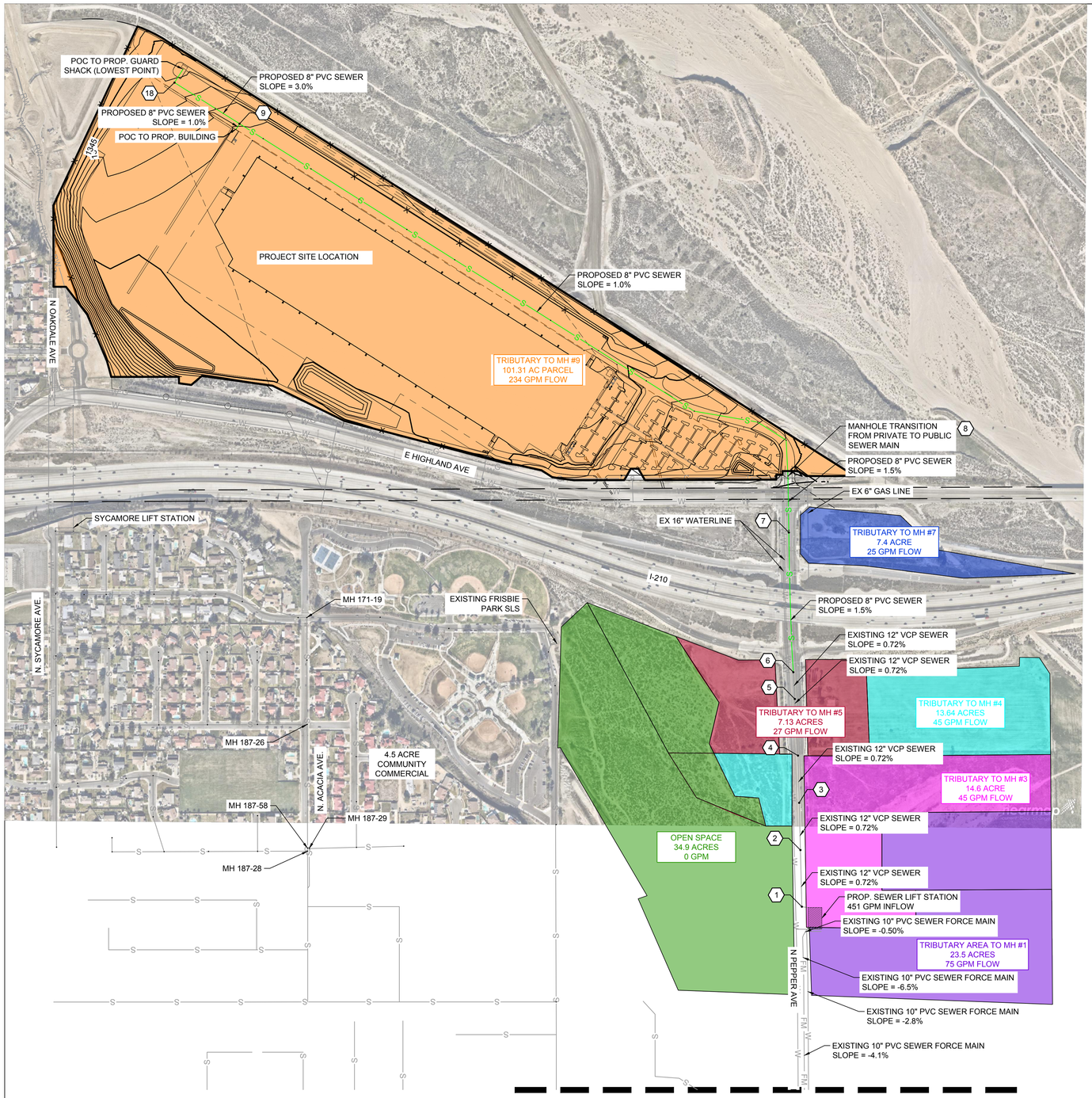
The project hopes to be granted approval from Caltrans to use conventional utility trenching methods to install the proposed 8” sewer in the Caltrans Easement across Pepper Ave. This portion of the I-210 easement is a bridge over Pepper but Caltrans typically requires utilities across their easement to use trenchlessjack-and-bore or tunnelling to install a sleeved portion of sewer across the Caltrans easement. This method of installation would have a more difficult time matching the existing sewer invert and may cause the replacement of some sewer in Pepper Ave.

5. Conclusions

Based on the calculations, 8-inch diameter sewer lines will be designed to run within the Project Area, discharging to an existing 12” gravity sewer pipe in Pepper Ave which will run to the lift station. The calculations for the on-site sewer indicate that the minimum velocity of 2 FPS was achieved in all pipes. The d/D flow depth ratio also remained below 0.5 all pipes.

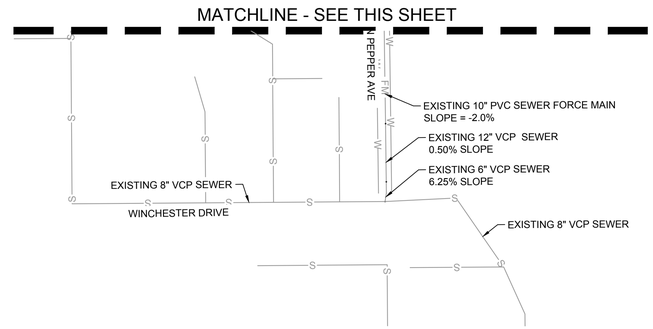
Taylor Martinet Thorig, P.E.
C 93239 Exp. 3/31/24

ATTACHMENT A: EXISTING AND PROPOSED CONDITIONS SEWER EXHIBIT



LEGEND

- MAJOR CONTOUR LABEL — XXX
- PROPOSED SEWER LATERAL — S
- PROPERTY LINE
- EXISTING FORCE MAIN — FM
- EXISTING SEWER LATERAL — S
- TRIBUTARY TO MH #9 (ONSITE)
- TRIBUTARY TO MH #7
- TRIBUTARY TO MH #5
- TRIBUTARY TO MH #4
- TRIBUTARY TO MH #3
- TRIBUTARY TO MH #1
- OPEN SPACE
- MANHOLE (MH) — #



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2400 HIGHLAND AVE

EXISTING AND PROPOSED SEWER EXHIBIT
RIALTO, CA

NORTH

GRAPHIC SCALE IN FEET
0 150 300 600

JOB NO.: 195425001
DATE: 2023/11/09

ATTACHMENT B: PROPOSED WASTEWATER FLOWS AND SEWER HYDRAULICS TABLES

MH	Land Use	Area (AC)	Flow Factor	Average Flow (GPD)	Average Flow (GPM)	Design Flow (GPM)
MH #9	Light Industrial	101.3 AC	1928 GPD/AC	195306	136	234
MH #7	Commercial	7.4 AC	1928 GPD/AC	14267	10	25
MH #5	Commercial	2.6 AC	1928 GPD/AC	5071	4	10
MH #5	Commercial	4.5 AC	1928 GPD/AC	8676	6	17
MH #4	Commercial	11.6 AC	1928 GPD/AC	22442	16	37
MH #4	Commercial	2.0 AC	1928 GPD/AC	3856	3	8
MH #3	Light Industrial	14.6 AC	1928 GPD/AC	28149	20	45
MH #1	Light Industrial	9.8 AC	1928 GPD/AC	18894	13	32
MH #1	Commercial	13.7 AC	1928 GPD/AC	26414	18	43
Total	-	167.6 AC	-	323,075	224	451

MH	Area (AC)	Average Flow	Design Flow (GPM)
MH #1	23.5	31.5	75
MH #3	14.6	19.5	45
MH #4	13.6	18.3	45
MH #5	7.1	9.5	27
MH #7	7.4	9.9	25
MH #9	101.3	135.6	234
Total	167.6	224	451

Segment		Pipe		Design Flow (GPM)	Cumulative Design Flow (GPM)	Velocity (FPS)	Flow Depth	
Start	End	Dia (IN)	Slope (%)				d(IN)	d/D
MH #9	MH #8	8	1.00%	234	234	3.34	3.7	0.46
MH #8	MH #7	8	1.51%	0	234	3.83	3.3	0.41
MH #7	MH #6	8	1.45%	25	259	3.93	3.5	0.44
MH #6	MH #5	12	0.72%	0	259	2.97	3.6	0.30
MH #5	MH #4	12	0.72%	27	286	2.70	3.7	0.31
MH #4	MH #3	12	0.72%	45	332	3.18	4.0	0.33
MH #3	MH #2	12	0.72%	45	377	3.29	4.3	0.36
MH #2	MH #1	12	0.72%	0	377	3.29	4.3	0.36
MH #1	MH #1	12	0.72%	75	451	3.29	4.3	0.36

ATTACHMENT C: FLOW MASTER CALCULATIONS

Worksheet for MH #5 to MH #4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.720	%
Diameter	12.0	in
Discharge	286.00	gal/min

Results		
Normal Depth	3.7	in
Flow Area	0.2	ft²
Wetted Perimeter	1.2	ft
Hydraulic Radius	2.1	in
Top Width	0.93	ft
Critical Depth	4.0	in
Percent Full	31.2	%
Critical Slope	0.564	%
Velocity	3.05	ft/s
Velocity Head	0.14	ft
Specific Energy	0.46	ft
Froude Number	1.132	
Maximum Discharge	1,459.52	gal/min
Discharge Full	1,356.81	gal/min
Slope Full	0.032	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	31.2	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.7	in
Critical Depth	4.0	in
Channel Slope	0.720	%
Critical Slope	0.564	%

Worksheet for MH #6 to MH #5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.720	%
Diameter	12.0	in
Discharge	259.00	gal/min

Results		
Normal Depth	3.6	in
Flow Area	0.2	ft²
Wetted Perimeter	1.2	ft
Hydraulic Radius	2.0	in
Top Width	0.91	ft
Critical Depth	3.8	in
Percent Full	29.6	%
Critical Slope	0.563	%
Velocity	2.97	ft/s
Velocity Head	0.14	ft
Specific Energy	0.43	ft
Froude Number	1.133	
Maximum Discharge	1,459.52	gal/min
Discharge Full	1,356.81	gal/min
Slope Full	0.026	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	29.6	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.6	in
Critical Depth	3.8	in
Channel Slope	0.720	%
Critical Slope	0.563	%

Worksheet for MH #7 to MH #6

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.450	%
Diameter	8.0	in
Discharge	259.00	gal/min

Results		
Normal Depth	3.5	in
Flow Area	0.1	ft²
Wetted Perimeter	1.0	ft
Hydraulic Radius	1.8	in
Top Width	0.66	ft
Critical Depth	4.3	in
Percent Full	43.7	%
Critical Slope	0.726	%
Velocity	3.93	ft/s
Velocity Head	0.24	ft
Specific Energy	0.53	ft
Froude Number	1.471	
Maximum Discharge	702.51	gal/min
Discharge Full	653.07	gal/min
Slope Full	0.228	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	43.7	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.5	in
Critical Depth	4.3	in
Channel Slope	1.450	%
Critical Slope	0.726	%

Worksheet for MH #8 to MH #7

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.510	%
Diameter	8.0	in
Discharge	234.00	gal/min

Results		
Normal Depth	3.3	in
Flow Area	0.1	ft²
Wetted Perimeter	0.9	ft
Hydraulic Radius	1.7	in
Top Width	0.66	ft
Critical Depth	4.1	in
Percent Full	40.9	%
Critical Slope	0.707	%
Velocity	3.88	ft/s
Velocity Head	0.23	ft
Specific Energy	0.51	ft
Froude Number	1.513	
Maximum Discharge	716.90	gal/min
Discharge Full	666.44	gal/min
Slope Full	0.186	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	40.9	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.3	in
Critical Depth	4.1	in
Channel Slope	1.510	%
Critical Slope	0.707	%

Worksheet for MH #9 to MH #8

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.000	%
Diameter	8.0	in
Discharge	234.00	gal/min

Results		
Normal Depth	3.7	in
Flow Area	0.2	ft²
Wetted Perimeter	1.0	ft
Hydraulic Radius	1.9	in
Top Width	0.66	ft
Critical Depth	4.1	in
Percent Full	45.9	%
Critical Slope	0.708	%
Velocity	3.34	ft/s
Velocity Head	0.17	ft
Specific Energy	0.48	ft
Froude Number	1.213	
Maximum Discharge	583.40	gal/min
Discharge Full	542.34	gal/min
Slope Full	0.186	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	45.9	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.7	in
Critical Depth	4.1	in
Channel Slope	1.000	%
Critical Slope	0.708	%

Worksheet for MH #18 to MH #9

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	3.000	%
Diameter	8.0	in
Discharge	234.00	gal/min

Results		
Normal Depth	2.7	in
Flow Area	0.1	ft²
Wetted Perimeter	0.8	ft
Hydraulic Radius	1.5	in
Top Width	0.63	ft
Critical Depth	4.1	in
Percent Full	34.0	%
Critical Slope	0.707	%
Velocity	4.97	ft/s
Velocity Head	0.38	ft
Specific Energy	0.61	ft
Froude Number	2.152	
Maximum Discharge	1,010.48	gal/min
Discharge Full	939.37	gal/min
Slope Full	0.186	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	34.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.7	in
Critical Depth	4.1	in
Channel Slope	3.000	%
Critical Slope	0.707	%

Worksheet for MH #2 to MH #1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.720	%
Diameter	12.0	in
Discharge	377.00	gal/min

Results		
Normal Depth	4.3	in
Flow Area	0.3	ft²
Wetted Perimeter	1.3	ft
Hydraulic Radius	2.4	in
Top Width	0.96	ft
Critical Depth	4.6	in
Percent Full	36.0	%
Critical Slope	0.571	%
Velocity	3.29	ft/s
Velocity Head	0.17	ft
Specific Energy	0.53	ft
Froude Number	1.127	
Maximum Discharge	1,459.52	gal/min
Discharge Full	1,356.81	gal/min
Slope Full	0.056	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	36.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.3	in
Critical Depth	4.6	in
Channel Slope	0.720	%
Critical Slope	0.571	%

Worksheet for MH #3 to MH #2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.720	%
Diameter	12.0	in
Discharge	377.00	gal/min

Results		
Normal Depth	4.3	in
Flow Area	0.3	ft²
Wetted Perimeter	1.3	ft
Hydraulic Radius	2.4	in
Top Width	0.96	ft
Critical Depth	4.6	in
Percent Full	36.0	%
Critical Slope	0.571	%
Velocity	3.29	ft/s
Velocity Head	0.17	ft
Specific Energy	0.53	ft
Froude Number	1.127	
Maximum Discharge	1,459.52	gal/min
Discharge Full	1,356.81	gal/min
Slope Full	0.056	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	36.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.3	in
Critical Depth	4.6	in
Channel Slope	0.720	%
Critical Slope	0.571	%

Worksheet for MH #4 to MH #3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.720	%
Diameter	12.0	in
Discharge	332.00	gal/min

Results		
Normal Depth	4.0	in
Flow Area	0.2	ft²
Wetted Perimeter	1.2	ft
Hydraulic Radius	2.3	in
Top Width	0.95	ft
Critical Depth	4.3	in
Percent Full	33.7	%
Critical Slope	0.568	%
Velocity	3.18	ft/s
Velocity Head	0.16	ft
Specific Energy	0.49	ft
Froude Number	1.129	
Maximum Discharge	1,459.52	gal/min
Discharge Full	1,356.81	gal/min
Slope Full	0.043	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

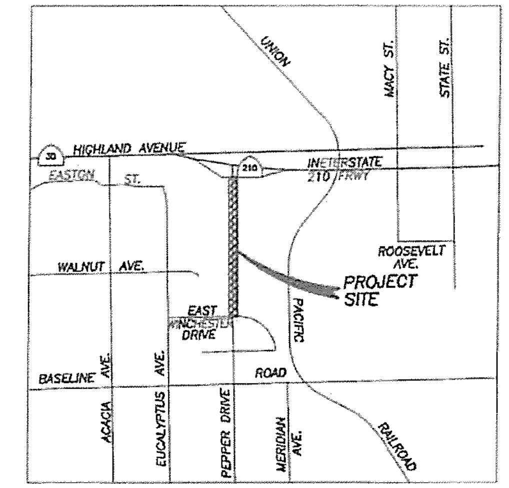
GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	33.7	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.0	in
Critical Depth	4.3	in
Channel Slope	0.720	%
Critical Slope	0.568	%

ATTACHMENT D: PEPPER AVE RECORD DRAWING AND MAP BOOKS

CITY OF RIALTO

PEPPER AVENUE
SEWER IMROVEMENT PLANS

FROM WINCHESTER AVENUE TO STATE ROUTE 210



VICINITY MAP
N.T.S.

SEWER GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH CITY OF RIALTO STANDARD DRAWINGS, STANDARD SPECIAL PROVISIONS, AND THE LATEST EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, WITH SUPPLEMENTS. ANY VARIATION FROM OR EXCEPTION TO THE STANDARDS OR FOLLOWING GENERAL NOTES MUST BE APPROVED BY THE CITY.

2. ALL MAINLINE SEWERS SHALL BE VCP BELL AND SPIGOT. RESIDENTIAL LATERALS SHALL BE 4" VCP BELL AND SPIGOT. COMMERCIAL LATERALS SHALL BE 6" MINIMUM VCP BELL AND SPIGOT. NO SUBSTITUTIONS ALLOWED.

3. THE CONTRACTOR SHALL NOTIFY THE CITY OF RIALTO ENGINEERING DEPARTMENT AT LEAST 48 HOURS PRIOR TO THE START OF ANY PHASE OF CONSTRUCTION AND 24 HOURS PRIOR TO THE NEED OF INSPECTION.

4. EXCAVATION AND TRENCH WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE STATE CONSTRUCTION SAFETY ORDERS. THE CONTRACTOR SHALL BE REQUIRED TO SHOW THAT A PERMIT FROM THE DIVISION OF INDUSTRIAL SAFETY HAS BEEN OBTAINED BEFORE SEWER CONSTRUCTION PERMIT CAN BE ISSUED.

5. MANHOLE COVERS SHALL BE LEFT AT LEAST 6" BELOW SUB GRADE AND BROUGHT TO FINAL GRADE UPON COMPLETION OF PAVING.

6. FOUR-INCH (4") V.C.P. SEWER LATERAL CONNECTIONS SHALL BE LAID TO GRADE AS ESTABLISHED BY THE ENGINEER SO THAT THE 4" V.C.P. WILL HAVE A MINIMUM COVER OF FOUR (4') TO THE TOP OF PIPE AT PROPERTY LINE AND SHALL HAVE A MINIMUM GRADE OF 2%. ALL SEWER LATERALS SHALL BE LAID 90 DEGREES TO THE MAIN LINE. CONSTRUCTION SHALL BE PER CITY STANDARD DRAWING 103. NO LATERAL SHALL BE PLACED UNDER ANY DRIVEWAY APPROACH OR DRIVEWAY.

7. ALL COMPACTION SHALL BE PERFORMED AS SHOWN ON CITY OF RIALTO STANDARD NO. 110 AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT EDITION AND ADDENDUMS.

8. ALL VITRIFIED CLAY PIPE JOINTS TO BE TYPE D OR TYPE G AS SPECIFIED IN THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT ADDITION.

9. FINAL AIR TESTING FOR PIPELINE LEAKAGE SHALL BE MADE IN THE PRESENCE OF THE CITY INSPECTOR AFTER BACKFILL AND COMPACTION HAVE BEEN COMPLETED BY THE CONTRACTOR AND INSPECTED, APPROVED AND ACCEPTED BY THE CITY.

10. ALL SEWER LINES TO BE BALLED IN THE PRESENCE OF THE CITY INSPECTOR AFTER FINAL TESTING AND MANHOLE COVERS HAVE BEEN BROUGHT TO GRADE UPON COMPLETION OF PAVING. BALLING MUST BE COMPLETED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO OCCUPANCY RELEASES BEING ISSUED.

11. THE DEVELOPER'S ENGINEER SHALL FURNISH A COMPLETE SET OF "AS-BUILT" PLANS ON ORIGINAL MYLARS TO THE CITY AT THE COMPLETION OF THE SEWER WORK AND PRIOR TO PAVING OF STREETS, SHOWING LOCATION OF WYES AND END OF HOUSE LATERALS AT THE PROPERTY LINE.

12. SAND BEDDING SHALL BE S.E. MIN. 30, 4" UNDER THE PIPE, AND 12" OF COLORED SAND OVER THE TOP OF PIPE UNLESS OTHERWISE NOTED ON PLANS. COLOR TO BE APPROVED BY FIELD INSPECTOR PRIOR TO LAYING.

13. THE CURB AND GUTTER SHALL BE "ETCHED" SHOWING LATERAL LOCATIONS: "S" FOR SEWER, "G" FOR GAS, "E" FOR ELECTRICAL; AND "W" FOR WATER.

14. STATE LAW (SB3019) REQUIRES THE CONTRACTOR TO CONTACT UNDERGROUND SERVICE ALERT (USA) AND OBTAIN AN IDENTIFICATION NUMBER PRIOR TO THE ISSUANCE OF THE CITY'S ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY USA TWO FULL WORKING DAYS (48 HOURS MINIMUM) IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES.

15. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A PERMIT TO WORK WITHIN THE PUBLIC RIGHT OF WAY, FROM THE CITY OF RIALTO DEVELOPMENT SERVICES DEPARTMENT.

16. DRIVE APPROACH CENTERLINES SHALL BE STAKED WHEN SEWER LINES ARE STAKED.

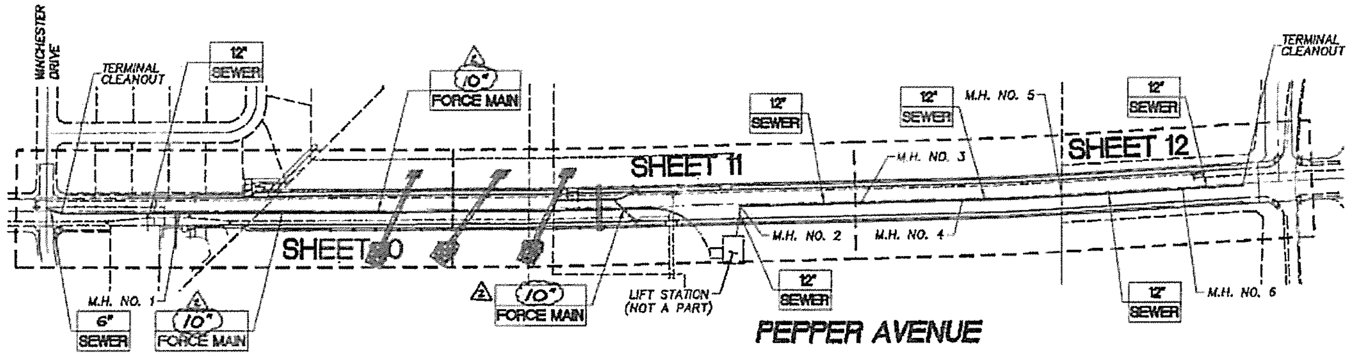
17. NO TRENCH BACKFILL SHALL TAKE PLACE WITHOUT PRIOR APPROVAL OF THE CITY'S INSPECTOR.

18. STREET TRENCHING, BACKFILLING AND PAVEMENT REPAIRS SHALL BE IN ACCORDANCE WITH CITY OF RIALTO STANDARD DRAWING NO. 64.

19. APPROVAL OF THESE PLANS BY THE CITY OR ITS AGENTS DOES NOT RELIEVE THE ENGINEER AND THE APPLICANT FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE PLAN REVISIONS SHALL BE PROMPTLY SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.

20. ALL NEW SANITARY SEWERS SHALL BE VIDEOTAPED, WITH TAPE SUPPLIED TO CITY ENGINEER, PRIOR TO CITY'S ACCEPTANCE OF ANY NEW SEWER.

21. ALL SANITARY SEWER APPURTENANCES SHALL BE ABANDONED, RELOCATED AND/OR UPGRADED PER THE DIRECTION OF THE CITY INSPECTOR, PER CITY OF RIALTO STANDARDS, REGARDLESS IF SHOWN ON PLANS OR NOT.



INDEX MAP
1"=200'

CITY OF RIALTO CONSTRUCTION INSPECTION HOURS

7:00A.M. TO 5:00P.M. – MONDAY THROUGH THURSDAY

SEWER LEGEND

- - - - - - - -	EXISTING SEWER MAIN LINE OR PROPOSED BY OTHERS
————	SEWER MAIN LINE
——o——	PROPOSED SEWER MANHOLE
——o——	EXISTING SEWER MANHOLE
E——	TEMPORARY END PLUG
(shaded)	SAWCUT, REMOVE AND REPLACE EXISTING PAVEMENT

NOTICE TO CONTRACTORS

ALL UNDERGROUND UTILITIES OR STRUCTURES REPORTED BY THE OWNER OR OTHERS, AND THOSE SHOWN ON THE RECORDS EXAMINED, ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THIS PLAN ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS.

ALL CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK SHOWN ON OR RELATED TO THESE PLANS SHALL CONDUCT THEIR OPERATIONS SO THAT ALL EMPLOYEES ARE PROVIDED A SAFE PLACE TO WORK AND THE PUBLIC IS PROTECTED. ALL CONTRACTORS AND SUBCONTRACTORS SHALL COMPLY WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF LABOR, AND WITH THE STATE OF CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS' "CONSTRUCTION SAFETY ORDERS".

THE CIVIL ENGINEER SHALL NOT BE RESPONSIBLE IN ANY WAY FOR THE CONTRACTORS' AND SUBCONTRACTORS' COMPLIANCE WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF LABOR OR WITH THE STATE OF CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS" "CONSTRUCTION SAFETY ORDERS".

CONTRACTOR FURTHER AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

THE ESTIMATED QUANTITIES HEREON ARE ONLY FOR THE PURPOSE OF OBTAINING THE NECESSARY PERMITS, AND AEI-CASC ENGINEERING DOES NOT GUARANTEE THE ACCURACY OF THE ESTIMATED QUANTITIES. THE CONTRACTOR SHALL PERFORM HIS OWN QUANTITY TAKEOFF BEFORE SUBMITTING A BID FOR ANY PORTION OF THE IMPROVEMENTS COVERED BY THESE PLANS.
CONTACT ALL UTILITY COMPANIES AS REQUIRED 48 HOURS PRIOR TO EXCAVATION. CONTACT UNDERGROUND SERVICE ALERT (USA) AT 1-800-422-4133 TWO WORKING DAYS PRIOR TO START OF CONSTRUCTION.

UTILITY PURVEYORS

ELECTRIC COMPANY:
SOUTHERN CALIFORNIA EDISON
7951 REDWOOD AVENUE
FONTANA, CA. 92336
ATTENTION: SHAWN T. BURT
TELEPHONE: (909) 357-6212

GAS COMPANY:
SOUTHERN CALIFORNIA GAS COMPANY
18231 VALLEY BOULEVARD
FONTANA, CA 92335
ATTENTION: STEVE ROBLES
TELEPHONE: (909) 428-8407

SEWER:
CITY OF RIALTO
150 SOUTH PALM AVENUE
RIALTO, CA 92376
ATTENTION: JAIME CRUZ
TELEPHONE: (909) 820-3532

WATER:
WEST VALLEY WATER DISTRICT
855 W. BASELINE
RIALTO, CA 92377
ATTENTION: LON TSAI
TELEPHONE: (909) 875-1804

TELEPHONE COMPANY:
AT&T
1265 VAN BUREN AVENUE
ANAHEIM, CA 92807
ATTENTION: SUSAN MORGAN
TELEPHONE: (714) 666-5401

CATV COMPANY:
TIME WARNER CABLE
1205 DUPONT AVENUE
ONTARIO, CA 91761
ATTENTION: BRUCE DEWESE
TELEPHONE: (909) 975-3385

SEWER CONSTRUCTION NOTES

- (38) INSTALL BACKWATER DEVICE.
- (39) INSTALL SEWER TERMINAL CLEAN-OUT PER CITY OF RIALTO STANDRARD NO. 102.
- (40) INSTALL 12" V.C.P. SEWER. (GRAVITY)
- △ (41) INSTALL 10" P.V.C. SEWER FORCE MAIN.
- (42) INSTALL TEMPORARY END PLUG.
- (43) INSTALL 48" DIA SEWER MANHOLE PER CITY OF RIALTO STD. NO. 101.
- (44) SAWCUT, REMOVE AND REPLACE EXISTING PAVEMENT. PER CITY OF RIALTO STANDARD NO. 64.
- (45) INSTALL MODIFIED 48" DIAMETER SEWER DROP MANHOLE PER CITY STD. 101 AND DETAIL ON SHEET 10.
- (46) INSTALL SEWER LATERAL WITH "WYE" PER CITY OF RIALTO STD. NO. 103, PROVIDE CLEANOUT PER STD. NO. 102, AND CONNECT SERVICE TO RESIDENCE. (FIELD VERIFY CONNECTION LOCATION)
- (47) INSTALL TEMPORARY 6" V.C.P. SEWER (GRAVITY).
- (48) BORE INTO THE EXISTING MANHOLE TO FIT A 6" SEWER LATERAL PER SPPWC STD. PLAN 208-2.
- (49) PUMP, DISCONNECT, REMOVE, AND DISPOSE EXISTING SEPTIC TANK, AND BACKFILL BEFORE CONNECTING TO THE PROPOSED SEWER SYSTEM. (FIELD VERIFY)

INDEX OF SHEETS

SHEET	DESCRIPTION
9	TITLE SHEET/VICINITY MAP/INDEX MAP
10	PEPPER AVENUE SEWER PLAN & PROFILE – STA. 10+02.00 TO STA. 20+00.00
11	PEPPER AVENUE SEWER PLAN & PROFILE – STA 20+00.00 TO STA. 30+00.00
12	PEPPER AVENUE SEWER PLAN & PROFILE – STA 30+00.00 TO STA. 39+53.97

DIGALERT
DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

MARK	REVISIONS	APPR.	DATE
△	REVISED SEWER FORCE MAIN FROM 6" TO 10", PLAN & PROFILE		

DESIGNED BY: LB DRAWN BY: OS CHECKED BY: SH

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER STEVE J. HOSFORD NO. 42280 EXP. 03/31/12 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:
STEVE J. HOSFORD, R.C.E. NO. 42280, EXP. 03/31/2012 — DATE 7-13-11

APPROVED BY:
AHMAD R. ANSARI, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 51318, EXPIRES 6-30-12 — DATE 7/19/11

AEI-CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500, COLTON, CA 92324

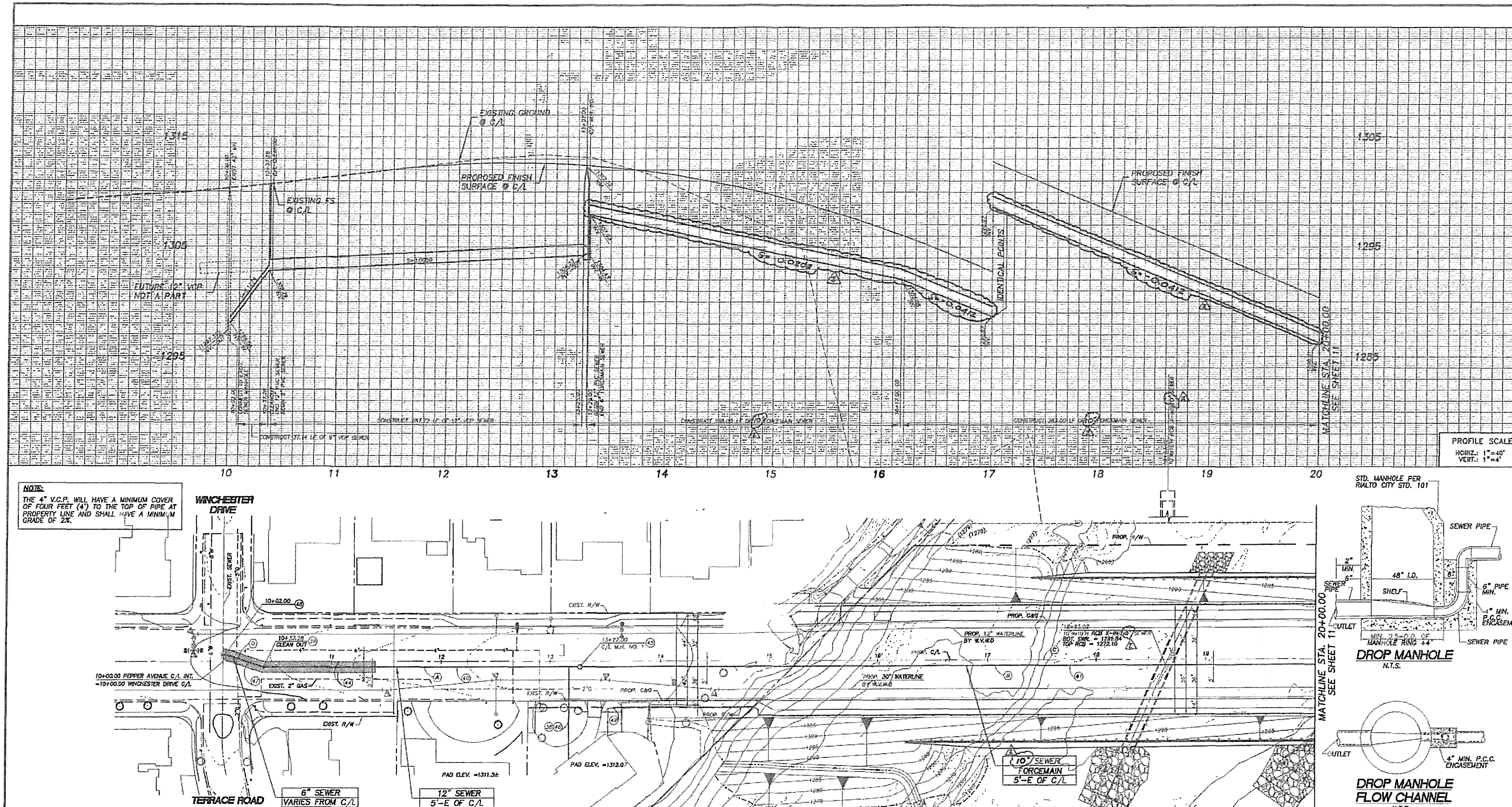
BENCH MARK: "NAVD 88" ELEVATION 1285.62 (FEET)
AT THE NORTH SIDE OF HIGHLAND AVENUE AND WEST END OF LYTLE CREEK BRIDGE #54-422 1967, 38 FEET NORTH OF HIGHLAND, 160 FEET EAST OF TWIN POWER POLE #1859152E AND #1859151E, IN TOP OF WALK NEAR RAIL; 2 MILES WEST ALONG HIGHLAND FROM SF. RAILROAD TRACKS AT HIGHLAND OVER-CROSSING.

CITY OF RIALTO
SEWER IMPROVEMENT PLANS
PEPPER AVENUE
TITLE SHEET

FOR CITY OF RIALTO

9 OF 22 SHEETS

PLAN NO.



CONSTRUCTION NOTES

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PEPPER AVENUE

LINE DATA

	DELTA/BEARING	RADIUS	LEN/DIST.	TANGENT
A	N00°11'40"W	–	289.72'	–
B	N00°11'40"W	–	673.00'	–
C	N00°11'40"W	–	1000.00'	–
D	N17°39'36"E	–	39.14'	–

GRAPHIC SCALE
40 0 20 40 80
1" = 40'

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MARK	REVISIONS	APPR.	DATE
1	REVISED SEWER FORCE MAIN SEWER SIZE FROM 6" TO 10" PLAN & PROFILE		

DESIGNED BY: LB DRAWN BY: GS CHECKED BY: SH

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER
STEVE J. HOSFORD
NO. 42280
EXP. 03/31/12
CIVIL
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:
STEVE J. HOSFORD, R.C.E. NO. 42280, EXP. 03/31/2012 — DATE 7-13-11

APPROVED BY:
AHMAD R. ANSARI, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 51518, EXPIRES 6-30-12 — DATE 7/13/11

AEI-CASC CONSULTING

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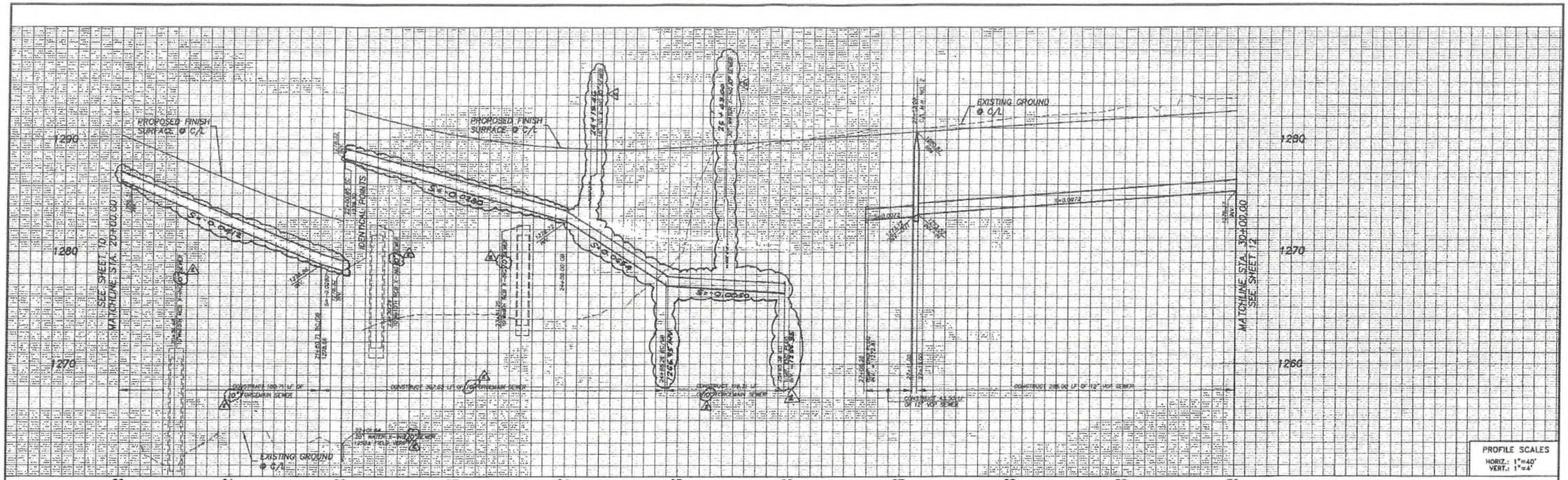
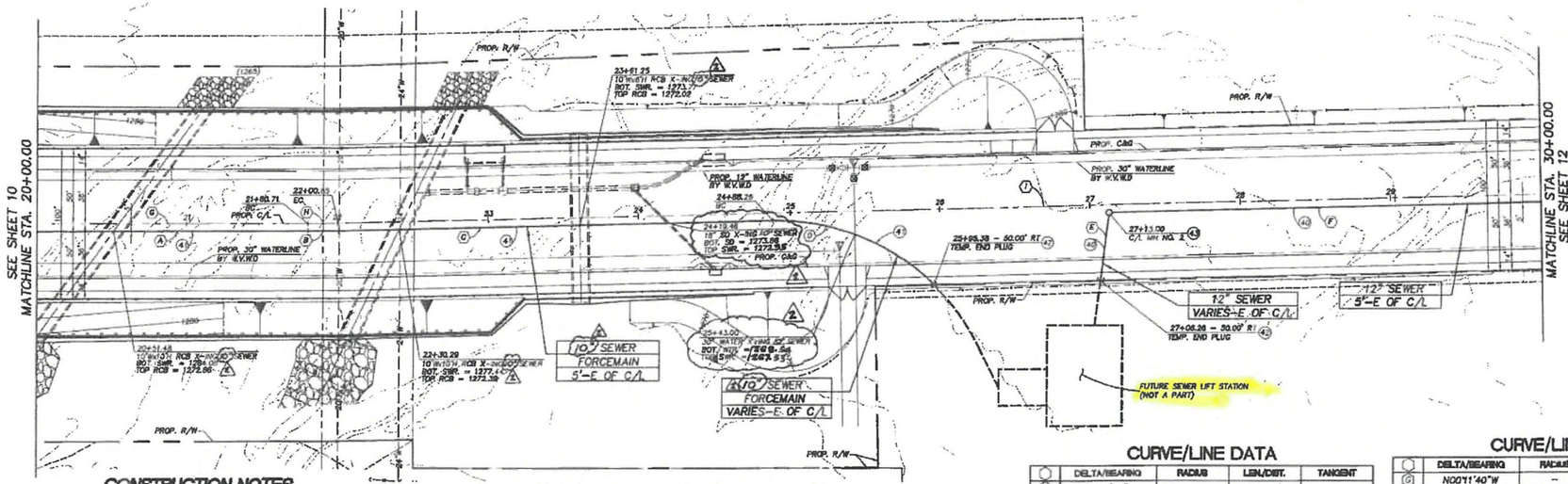
CITY OF RIALTO
SEWER IMPROVEMENT PLANS
PEPPER AVENUE
STA. 10+02.00 TO STA. 20+00.00

FOR: CITY OF RIALTO

10 OF 22 SHEETS

PLAN NO.





CONSTRUCTION NOTES

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(41) INSTALL 10" P.V.C. SEWER FORCE MAIN.
(42) INSTALL TEMPORARY END PLUG.
(43) INSTALL 48" DIA SEWER MANHOLE PER CITY OF RIALTO STD. NO. 101

CURVE/LINE DATA

	DELTA/BEARING	RADIUS	LEN./DIST.	TANGENT
(A)	N00°11'40"W	–	180.71'	–
(B)	01°05'15"	1005.00'	20.24'	10.12'
(C)	N01°20'55"W	–	287.41'	–
(D)	45°34'23"	150.00'	119.31'	63.01'
(E)	N82°50'09"W	–	45.50'	–
(F)	N01°20'55"W	–	287.00'	–

CURVE/LINE DATA

	DELTA/BEARING	RADIUS	LEN./DIST.	TANGENT
(G)	N00°11'40"W	–	180.71'	–
(H)	01°09'15"	1000.00'	20.14'	10.07'
(I)	N01°20'55"W	–	799.15'	–

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

GRAPHIC SCALE
0 20 40 80
1" = 40'

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TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	BY	DATE
A	REVISED SEWER FORCE MAIN SIZE FROM 8" TO 10" PLAN & PROFILE	MK	11/30/11

DESIGNED BY: LB DRAWN BY: DS CHECKED BY: S.H.

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER STEVE J. HOSFORD NO. 42280 EXP. 03/31/12 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:
STEVE J. HOSFORD, R.C.E. NO. 42280, EXP. 03/31/2012 — DATE 7-18-11

APPROVED BY:
AHMAD R. ANSARI, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 51316, EXPIRES 6-30-12 — DATE 7/18/11

AEI CASC CONSULTING
897 SOUTH VAN LEAR SUITE 200
COLTON, CA 92324
PH. (909) 370-0797 FAX (909) 783-0108

BENCH MARK: "NAVD 88" ELEVATION 1285.62 (FEET)
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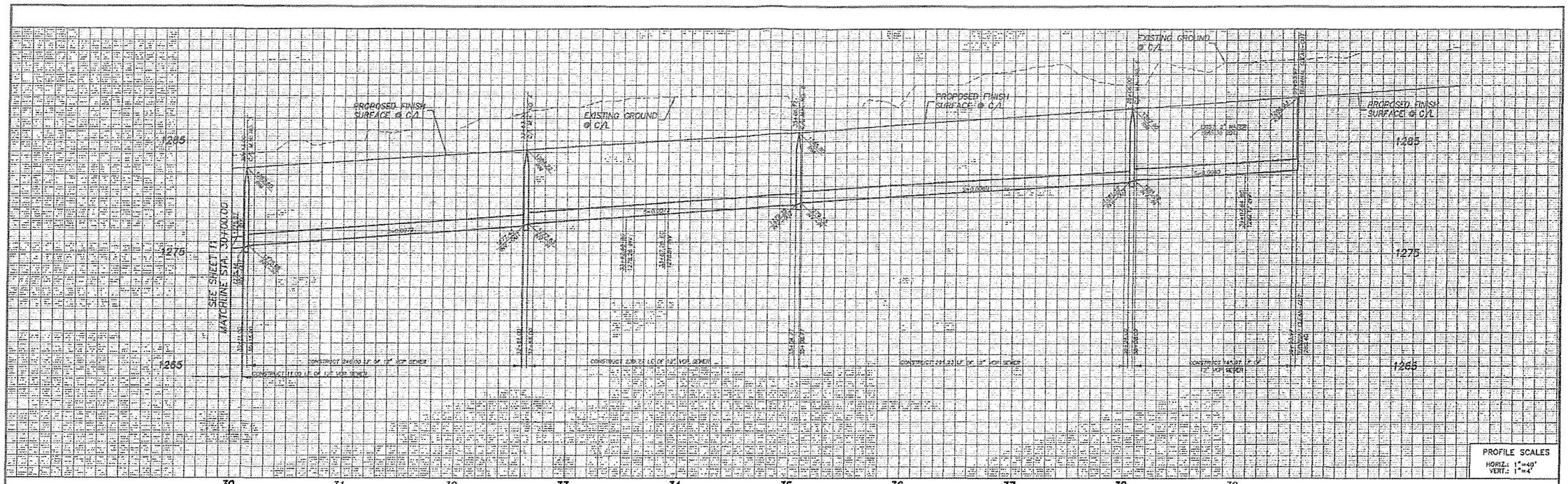
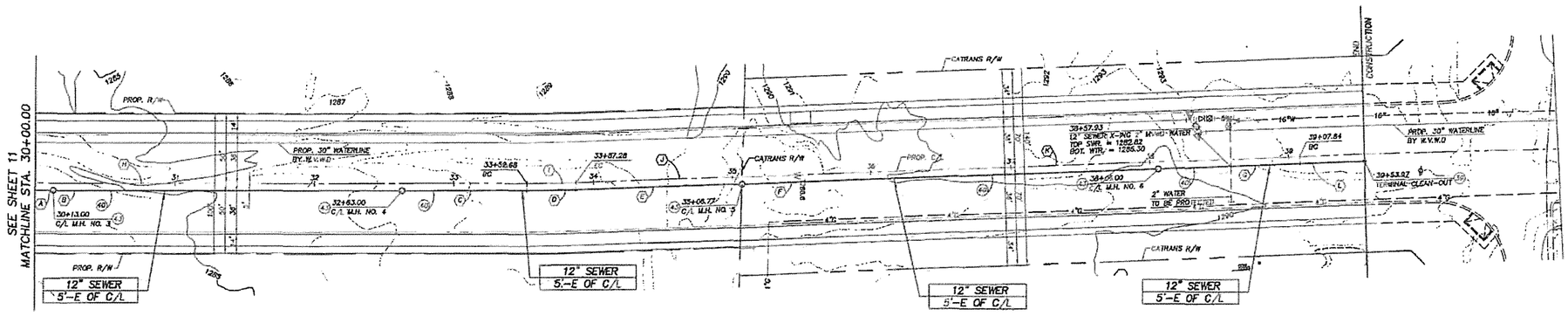
CITY OF RIALTO
SEWER IMPROVEMENT PLANS
PEPPER AVENUE
STA. 20+00.00 TO STA. 30+00.00

FOR: CITY OF RIALTO

11 OF 22 SHEETS

PLAN NO. _____





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

CURVE/LINE DATA

	DELTA/BEARING	RADIUS	LEN/DIST.	TANGENT
(A)	N01°20'55"W	–	13.00'	–
(B)	N01°20'55"W	–	250.00'	–
(C)	N01°20'55"W	–	89.88'	–
(D)	01°58'57"	1005.00'	34.77'	17.39'
(E)	N03°19'52"W	–	119.49'	–
(F)	N03°19'52"W	–	299.23'	–
(G)	N03°19'52"W	–	101.84	–
(H)	N01°20'55"W	–	352.68'	–
(I)	01°58'57"	1000.00'	34.60'	17.30'
(J)	N03°19'52"W	–	119.77'	–
(K)	N03°19'52"W	–	392.95'	–
(L)	00°09'55"	15995.00'	46.12'	23.06'

PEPPER AVENUE

CONSTRUCTION NOTES

(39) INSTALL SEWER TERMINAL CLEAN-OUT PER CITY OF RIALTO STANDRARD NO. 102.
(40) INSTALL 12" V.C.P. SEWER.
(43) INSTALL 48" DIA SEWER MANHOLE PER CITY OF RIALTO STD. NO. 101

GRAPHIC SCALE
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1" = 40'

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A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

MARK	REVISIONS	APPR.	DATE

DESIGNED BY: LB DRAWN BY: CS CHECKED BY: SH

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER STEVE J. HOSFORD NO. 42280 EXP. 03/31/12 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:
STEVE J. HOSFORD, R.C.E. NO. 42280, EXP. 03/31/2012 — DATE 7-28-11

APPROVED BY:
AHMAD R. ANSARI, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 51518, EXPIRES 6-30-12 — DATE 7/19/11

AEI CASC CONSULTING
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COLTON, CA 92324
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BENCH MARK: "NAVD 88" ELEVATION 1255.62 (FEET)
AT THE NORTH SIDE OF HIGHLAND AVENUE AND WEST END OF LYTLE CREEK BRIDGE #54-422 1957, 38 FEET NORTH OF HIGHLAND, 150 FEET EAST OF TWIN 'POWER POLE #18559152E AND #18591151E, IN TOP OF WALK NEAR RAIL.
2 MILES WEST ALONG HIGHLAND FROM SF. RAILROAD TRACKS AT HIGHLAND OVER-CROSSING.

CITY OF RIALTO
SEWER IMPROVEMENT PLANS
PEPPER AVENUE
STA. 30+00.00 TO STA. 39+53.97

12 OF 22 SHEETS

FOR CITY OF RIALTO

PLAN NO.

CITY OF RIALTO
CALIFORNIA

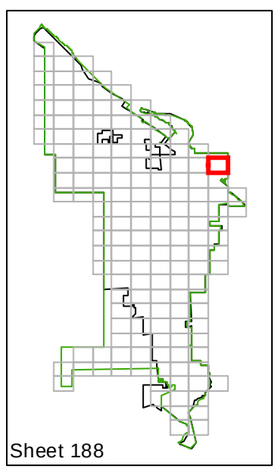
Waste Water Network

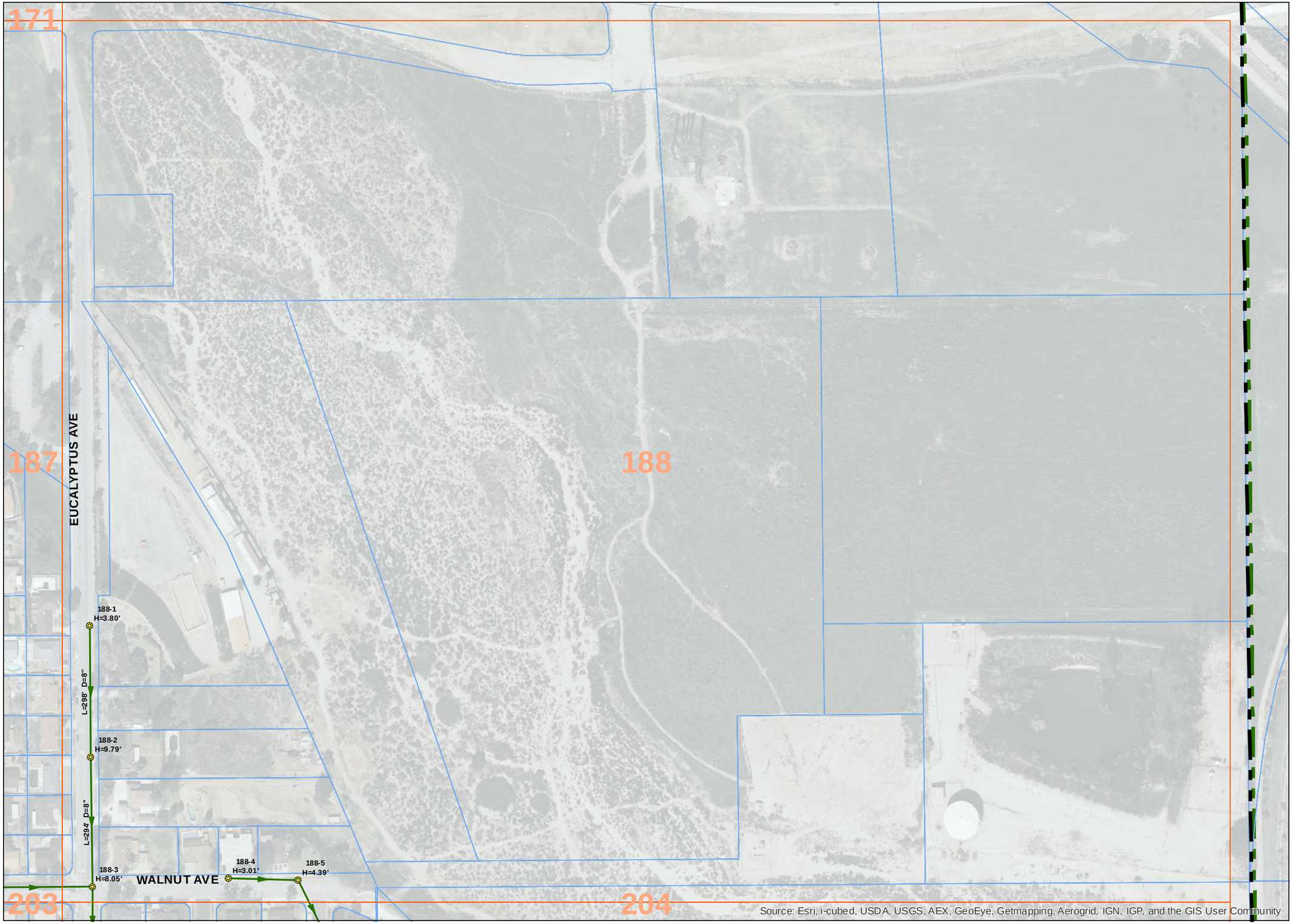
Legend

- Manholes
- Pumps
- Force_Mains
- SewerLines
- Municipal Boundary
- Sewer District Boundary

NORTH

0 100 200 Feet





CITY OF RIALTO
CALIFORNIA

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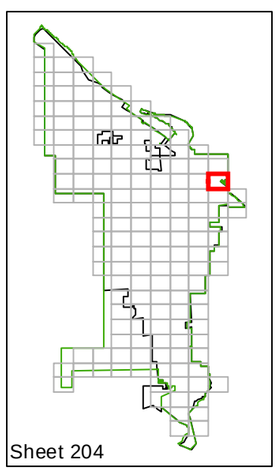

Sheet 204

CITY OF RIALTO
CALIFORNIA

Waste Water Network

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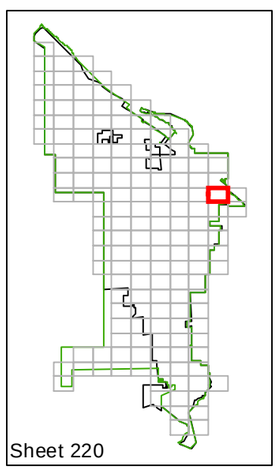
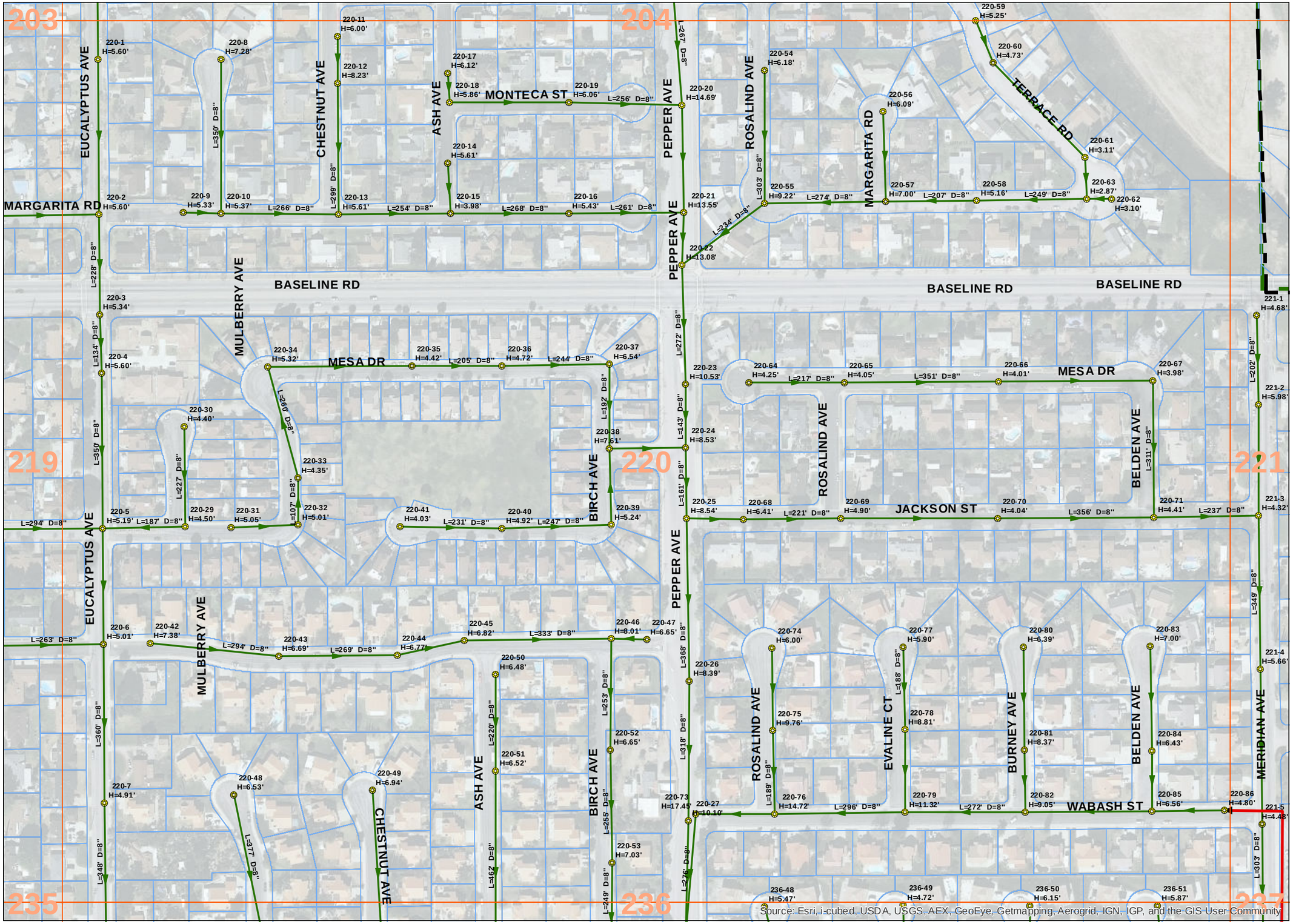


Sheet 220



ATTACHMENT E: EXCERPTS FROM CITY OF RIALTO SEWER POLICY

CITY OF RIALTO

DEPARTMENT OF PUBLIC WORKS
SEWER POLICY & PROCEDURES

TABLE OF CONTENTS

DIVISION I Authority

DIVISION II Design Criteria for Main Lines (under 15" in diameter)

DIVISION III Design Criteria for Trunk Lines (15" in diameter & over)
- A. Table A

DIVISION IV Guidelines for Plan Preparation & Format
- A. Plan Requirements
- B. Notes

DIVISION V Testing & Inspection

DIVISION VI Sewer Plan Check List

DIVISION I AUTHORITY

It is the intent of this policy statement to provide guidelines and acceptable practices to be used for the design and/or modification of sewer systems within the City of Rialto. It is intended to clarify and join together the Standard Specifications for Public Works Construction Code and Municipal Code, as well as accepted practices and Design Standards making a general reference guide.

Criteria set forth herein is for the design of City Sewer Systems to be dedicated to the City for operation and maintenance. Guidelines shall also be used for private on-site sewer mains.

Authority for connection or construction of public sewers is contained in the City of Rialto Municipal Code in Sections 12.08 "Sewer System" Section 12.2 & 12.27 "Prohibitions and Limitations on Wastewater discharged, and Wastewater Treatment Plan" and Section 17.20.080 "Improvements." These code sections establish the criteria, fees, policies and discharge limitations for the sewer system. They in turn refer to council resolutions that establish the specific charges for services. As the resolutions setting fees are from time to time changed, please contact the public counter in the Engineering Section for the current fee structure.

In addition to the Municipal Code and its authority, the City has conducted two separate master sewer plan studies and reports. This information is on file in the office of the Director of Public Works/City Engineer and contains information on the capacity, size and future needs of the system. It may be used as a guideline for both alignment and size of proposed sewer lines as well as indicating deficiencies in the present system that may require correction prior to development and/or connection to the system.

The Director of Public Works/City Engineer must review and approve all sewer plans prior to construction and approved plans are required prior to the recordation of Final Maps. Permits for lateral connections to the existing sewer are obtained from the Public Works Section.

All developments must secure sewer capacity rights for disposal at the treatment plant prior to approval of the plans. Information on sewer capacity rights can be obtained from the Public Works Department.

All development must connect to the City sewer system. Septic systems must be approved by Building and Safety with concurrence by Regional Water Quality Control Board.

Developments within San Bernardino Valley Water District or Fontana Water District shall contact San Bernardino Water or Fontana Water for connection information. On-site mains shall be approved by the City of Rialto.

DIVISON II DESIGN CRIERIA FOR MAIN LINE SEWERS (under 15" dia.)

1. Pipe shall be designed to flow at 0.50 or less at design flow.

2. Minimum design velocity shall be 2 feet per second.
3. Maximum design velocity shall not exceed 10 feet per second.

4. N= 0.013 for VCP or N = 0.011 PVC/ABS unless other values approved in advance. VCP is the only material approved for City sewers.

5. Depth from surface to flow line 8 feet (desirable design depth that may be modified by special field conditions).

6. Recommended depth of lateral at property line is 4 feet.

7. Minimum pipe diameter is 8 inches.

8. 6-inch diameter sewers are permitted providing they serve no more than 24 units, extend no more than 500 feet and there is no possibility of further extension beyond the 500 foot limit and normal design criteria for grade and velocity are met.

9. Design flow is calculated as $Q_d = 3.6(Q_a)^{.85}$ were Q_d = Design Q and Q_a = Average flow.

10. Average flows are as contained in Table A.

11. Typical manhole spacing 300 to 500 feet with considerations made for line size, alignment and site topography.

12. Clean outs may be permitted at the end of 8-inch and smaller lines as a temporary measure provided the clean out is not more than 150 feet from the downstream manhole, and there are no immediate plans for extension of the sewer line.

13. Drop manholes are not permitted unless no other solution exists and approval is obtained from the Director of Public Works/City Engineer.

14. Preferred location for sewers is 5 feet north or 5 feet east of centerline of streets.

15. All sewers shall be contained in street right-of-way or, if necessary, in a dedicated easement (minimum width 10 feet).

16. A minimum of 0.10' fall shall be provided across the manhole base unless slope requires greater fall.

17. Curved sewers may be considered provided they conform to minimum radius of 250'. Manholes will be required at the B.C. and the E.C> of the curved section as well as normal spacing along the curve.

18. For sewers increasing in size, the sulfide grades shall match across the manhole.

19. Sewers to extend across full frontage of development if there is the possibility of future extension.

20. All recommendations of the State Department of Health Services relative to crossing and parallel lines with water supply lines shall be complied with.

21. Laterals and main connections shall be at 90° angle unless approved otherwise. Use standard WYE connection. Laterals shall be no closer than 4 feet to a manhole or another WYE connection.

22. Supplemental size or capacity may be required based on the City Master Plan or other design considerations.

23. Backflow devise required where floor elevation is below or equal to the rim of upstream manhole. Cleanout shall be installed immediately downstream of the backflow device.

24. Private on-site mains are private sewers serving more than one legally defined lot or unit and where the units are accessed by legally defined private roads or streets.

25. Private lateral systems are private sewer systems that fall entirely within a single legally defined lot that is not served by private streets or roads. Private lateral systems shall be constructed in conformance with the Uniform Plumbing Code and must be submitted for review, approval, and permit.

26. Manholes less than 12' deep shall have inside diameter of 48". Manholes deeper than 12' or on lines larger than 15" diameter shall have an inside diameter of 60".

27. Manholes are required at change of slope, change of direction, intersections of mains and at beginning and end of lines.

28. In areas with high potential for hydrogen sulfide gas, manholes shall be PVC lines. Typical locations are sewers with 7% or greater slope, where changes in slope between sewers is 5% or more, drop manholes, force main discharge manholes, and all mains larger than 15" diameter.

DIVISION III DESIGN CRITERIA FOR TRUNK SEWERS (15 inch dia. and over)

1. Pipe designed to flow at .750 at design flow.

2. Minimum velocity is 2 feet per second.

3. Maximum design velocity is 10 feet per second unless abrasive characteristics and pipe materials are established to preclude erosion.

4. Minimum design slope 0.0008 (must meet design velocity requirements).

5. N = .013 for VCP N = 0.011 for PVC unless otherwise approved. UCP is the only approved material for city sewers.

6. Minimum depth from surface to top of pipe is 7.5 feet. Special field conditions may permit adjustments but it must be approved prior to submittal of design drawings.

7. Lateral connections to individual units are not permitted.

8. Design flow is calculated as $Q_d = 3.6(Q_a).85$ where Q_d = design flow and Q_a = Average flow.

9. Average flows by type of development are contained in Table A.

10. Manhole spacing is 500 to 1000 feet depending on grade, line size, connections and flow rates.

11. Sewers to be in dedicated street right of way or easements. Minimum easement width to be 10 feet wider than pipe diameter.

12. At changes in pipe diameter, sulfide grades are to match.

13. All recommendations of the State Department of Health Services relative to crossings and parallel lines with water supply lines shall be complied with.

14. Parallel water and sewer lines shall have a minimum of 10 feet separation (outside of pipe to outside of pipe).

15. Siphons are not permitted without specific approval and only in cases where no other solutions are possible. Criteria for design will be decided on a case by case basis.

16. Lift stations or pump stations are not permitted without approval and will be evaluated on a case by case basis. They should be avoided if at all possible. Approved lift stations shall also provide for operation and maintenance by Assessment District or other approved method.

17. Supplemental size or capacity may be required based on the City Master Plan or other design considerations.

18. Connection to existing systems may be denied if the system is beyond design capacity or connection would pose a threat to the health and safety of the community.

19. Curved sewers may be considered that conform to minimum radius 250 feet and will require manholes at the E.C. and B.C. additionally, curved sections must maintain integrity of the joints and maintain normal manhole spacing.

20. Sewers must be extended across the full frontage of the development if there is a possibility for future extension of the line.

21. Manhole shall have 60" inside diameter.

22. Manholes are required at changes of slope, changes in direction, intersection of lines and at beginning and end of lines.

23. In areas with high potential for hydrogen-sulfide gas, manholes shall be PVC lines. Typical locations are sewers with 7% or greater slope, where change in slope between sewer is 5% or more, drop manholes, force main discharge manholes and all mains 15" in diameter or larger.

TABLE "A"

ATTACHED

AVERAGE FLOWS

DU = DWELLING UNIT

Land Use Designation	Description	DU/Acre	Persons/AC	Gallons	CFS/AC
R-1	Residential	1	2.6	69.72/per/day	.000282
R-2	Residential	2	5.2		.000563
R-3	Residential	3	7.8		.000845
R-4	Residential	4	10.4		.001130
R-6	Residential	6	15.6		.001690
R-8	Residential	8	20.8		.002250
R-11	Residential	11	28.6		.003100
R-14	Residential	14	36.4		.003940
R-15	Residential	15	39.0		.004220
R-20	Residential	20	52.0		.005630
R-30	Residential	30	78.0		.008450
E	Elementary School	--	---	1285 gal/ac	.002000
J	Junior High School	--	---		.002000
S	Senior High School	--	---	1607 gal/ac	.002000
JC	Junior College	--	---		.002500
SC	Colleges and Universities	--	---		.002500
(E)	Proposed Elementary School	--	---	1285 gal/ac	.002000
(J)	Proposed Junior High School	--	---		.002000
(S)	Proposed Senior High School	--	---		.002000
C	Commercial	--	---	1928 gal/ac	.003000
RC	Retail Core (Central City)	--	---	3856 gal/ac	.006000
LI	Light Industrial	--	---	1928 gal/ac	.003000
GI	General Industrial	--	---	3214 gal/ac	.005000
HI	Heavy Industrial	--	---	3214 gal/ac	.005000
A	Airport	--	---	642.8 gal/ac	.001000
H	Hospital	--	---	5142 gal/ac	.008000
OS	Open Space	--	---		.000000