COFFEY ENGINEERING, INC.

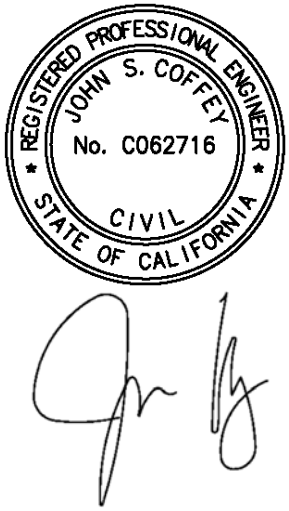
Sewer Study
32nd and Broadway

1000 Block 32nd Street
San Diego, CA 92102
APN: 539-563-06, 07, 10

(PTS No. 637438)

Prepared For:

32nd and Broadway, LLC
and
The City of San Diego



November 4, 2020

9666 BUSINESSPARK, SUITE 210 SAN DIEGO, CA 92131 PHONE: (858) 831-0111 FAX: (858) 831-0179

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Project Description

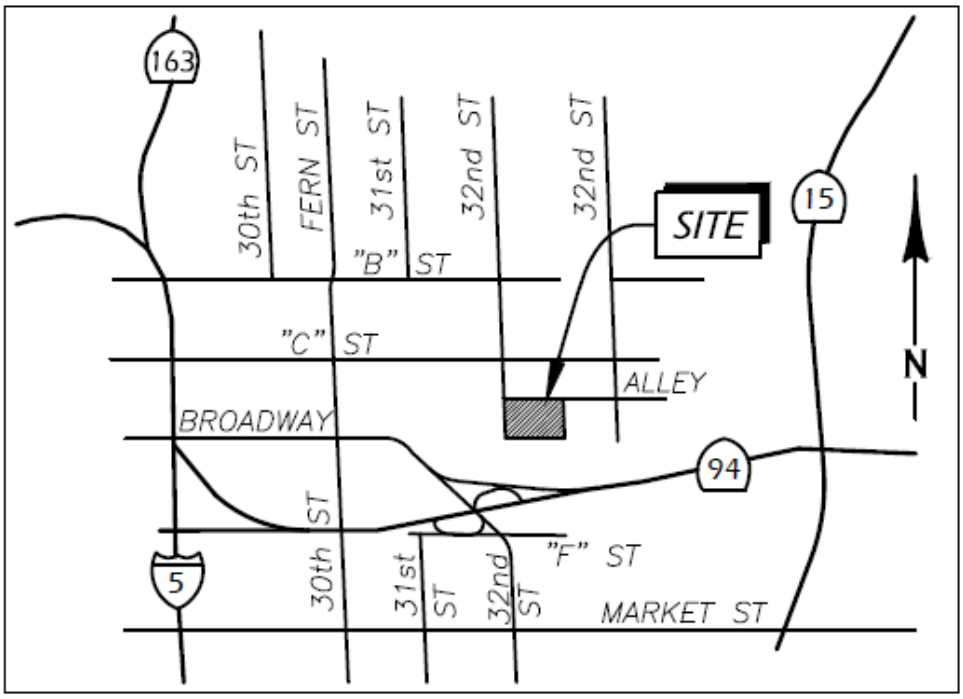
This sewer study has been prepared to analyze the sewer capacity for the new downstream system, and its ability to accommodate the effluent service load from the proposed project described hereon. The project site is located at the intersection of 32nd Street and Broadway Street (APN 539-563-06, -07, and -10). This sewer study estimates the preliminary sewer flow rates anticipated from the proposed development and presents hydraulic calculations for the proposed sewer facilities.

The 1.211-acre site is located approximately 2,000 feet west of the I-15 and I-94 intersection, on the northerly side of the I-94. The site is located in zone RM-1-1 (Residential Multiple Unit) and is currently vacant. The proposed development will include 38 units.

As the site is vacant there is no existing sewer lateral servicing the property. The proposed sewer system will connect to an existing 12" VC sewer via a new manhole southeast of the site. The private sewer system will be designed per City of San Diego Sewer Guidelines.

Just south of the proposed connection, the existing 12" VC Main reduces to an 8" VCES sewer where it crosses under the 94 freeway. This study will include an analysis of total existing and proposed flow characteristics in the 8-inch line.

VICINITY MAP



VICINITY MAP

THOMAS BROS. MAP 1289–F3

NO SCALE

Design Criteria

The design for this sewer study was completed per the design criteria listed in the City of San Diego's Sewer Design Guide, dated May, 2015. All gravity sewers have been designed to convey peak wet weather flow. Per the City of San Diego Sewer Design Guide, all sewers have been designed to convey this flow when flowing half full. Manning's Equation with an "n" value of 0.013 was used to size all gravity sewers, with a value of 0.011 used for the proposed private PVC sewer. All sewers were designed to maintain a minimum velocity of 2 feet per second (ft/sec) at design capacity, or a minimum slope of 1%, per the design manual. The newly proposed sewer line will be located inside of a proposed 25' sewer and drain easement.

On-Site/Off-site Sewer Flow Projections

The on-site sewer flows projections were determined using the proposed number of units for the site. This has been combined with the existing surrounding area sewer flows to determine post-construction flows. The existing off-site sewer influence area has been determined to be a roughly 200-acre area consisting of a mix of Residential and Commercial Areas (see Appendix A – Exhibit 'B' 32nd and Broadway – Existing Sewer Influence Area (200 acres)).

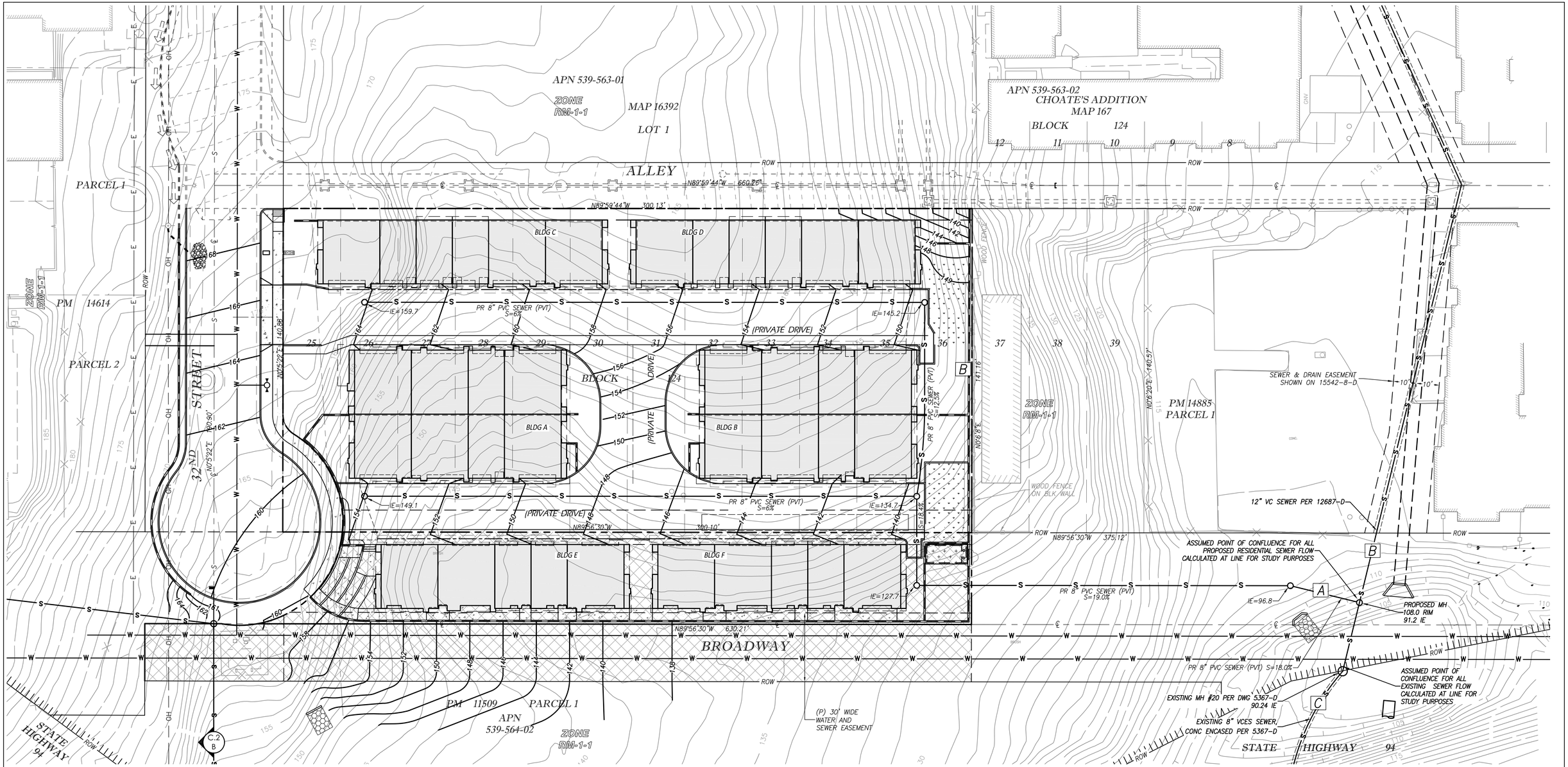
Conclusions

The total sewer system peak wet weather flow (after the connection to the existing 12" main) will increase by 0.060 cfs, which represents a 3.3% increase from the pre-development flow rate of 1.809 cfs. Prior to the construction of the proposed project, the peak flow within the 8" line under the I-94 (after the 12" reduces to 8" south of the project) is carried at a depth ratio (dn/D) of 0.73. The project will increase this ratio to 0.74.

If a 12" PVC sewer is constructed southward under the I-94, the peak flow depth would be 0.38' at a velocity of 6.81 fps, with a depth ratio (dn/D) to 0.38.

If a 15" PVC sewer is constructed southward under the I-94, the peak flow depth would be 0.35' at a velocity of 6.69 fps, with a depth ratio (dn/D) to 0.28.

Appendix A –Sewer Study Map for 32nd and Broadway/Tributary Sewer Area



N

20 0 20 40 60

SCALE: 1"=20'

COFFEY ENGINEERING, INC.
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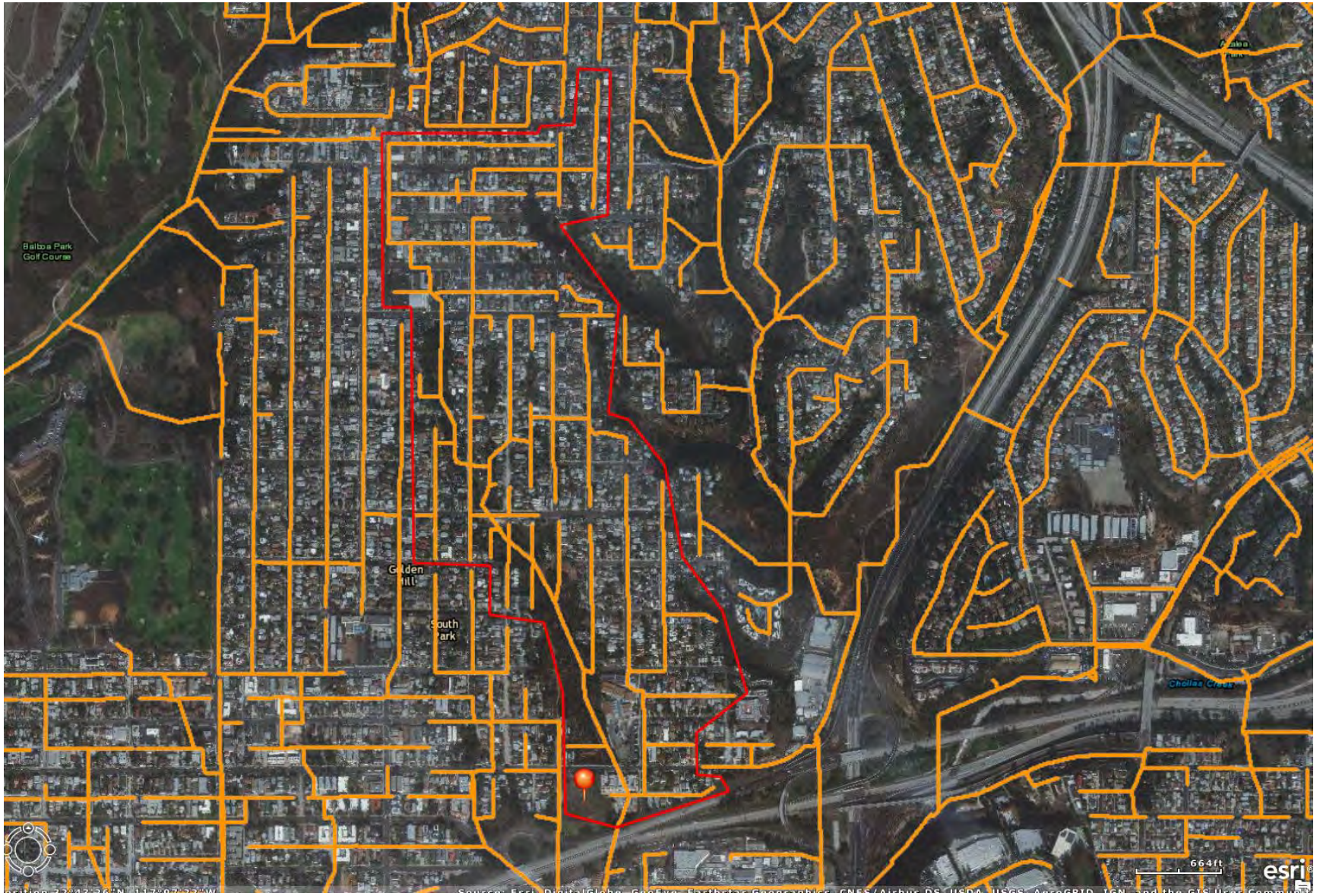
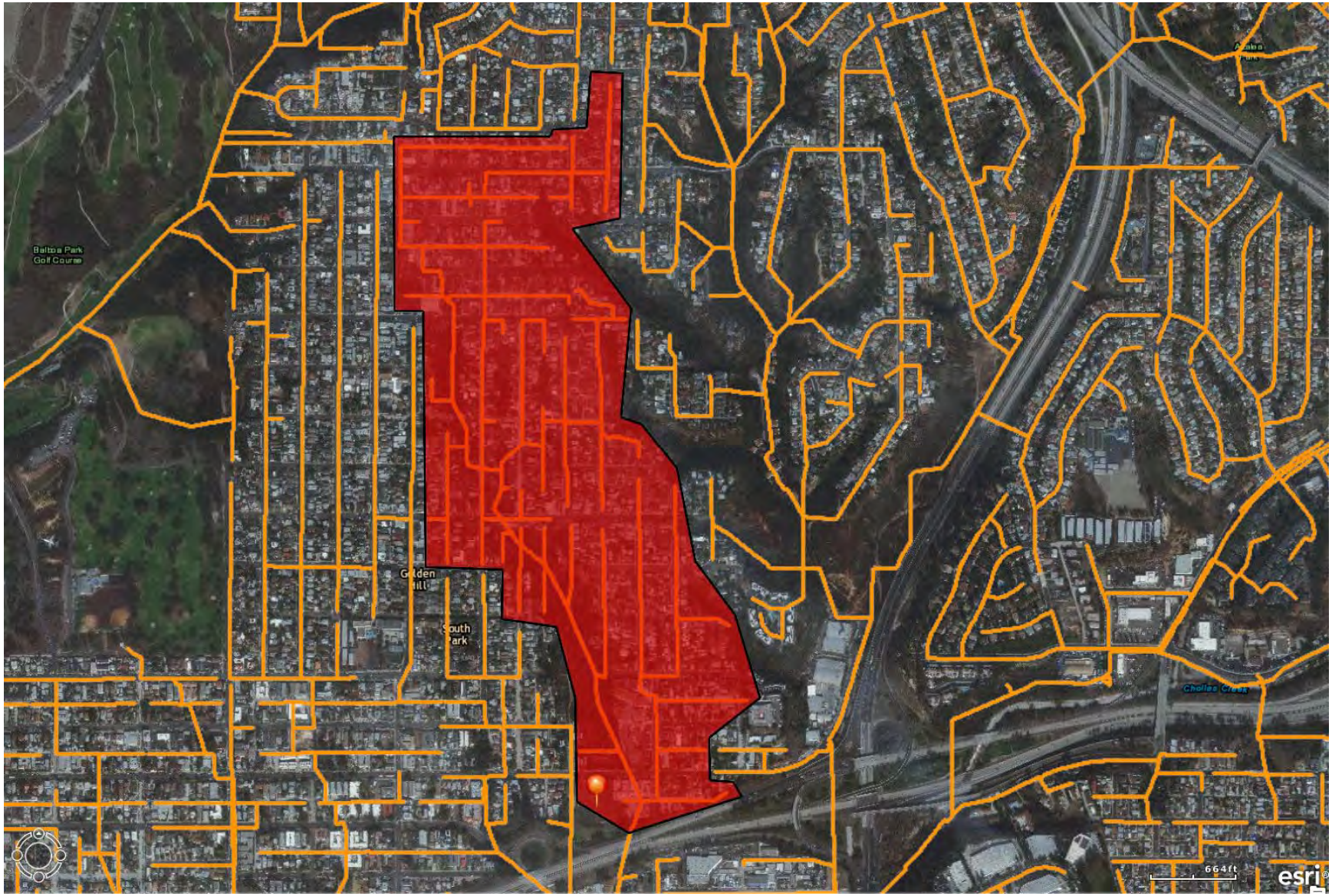
32ND AND BROADWAY
PROPOSED SEWER EXHIBIT
1000 Block 32nd Street
San Diego, CA 92103
APN: 539-563-06, 07, 10

Exhibit 'B'

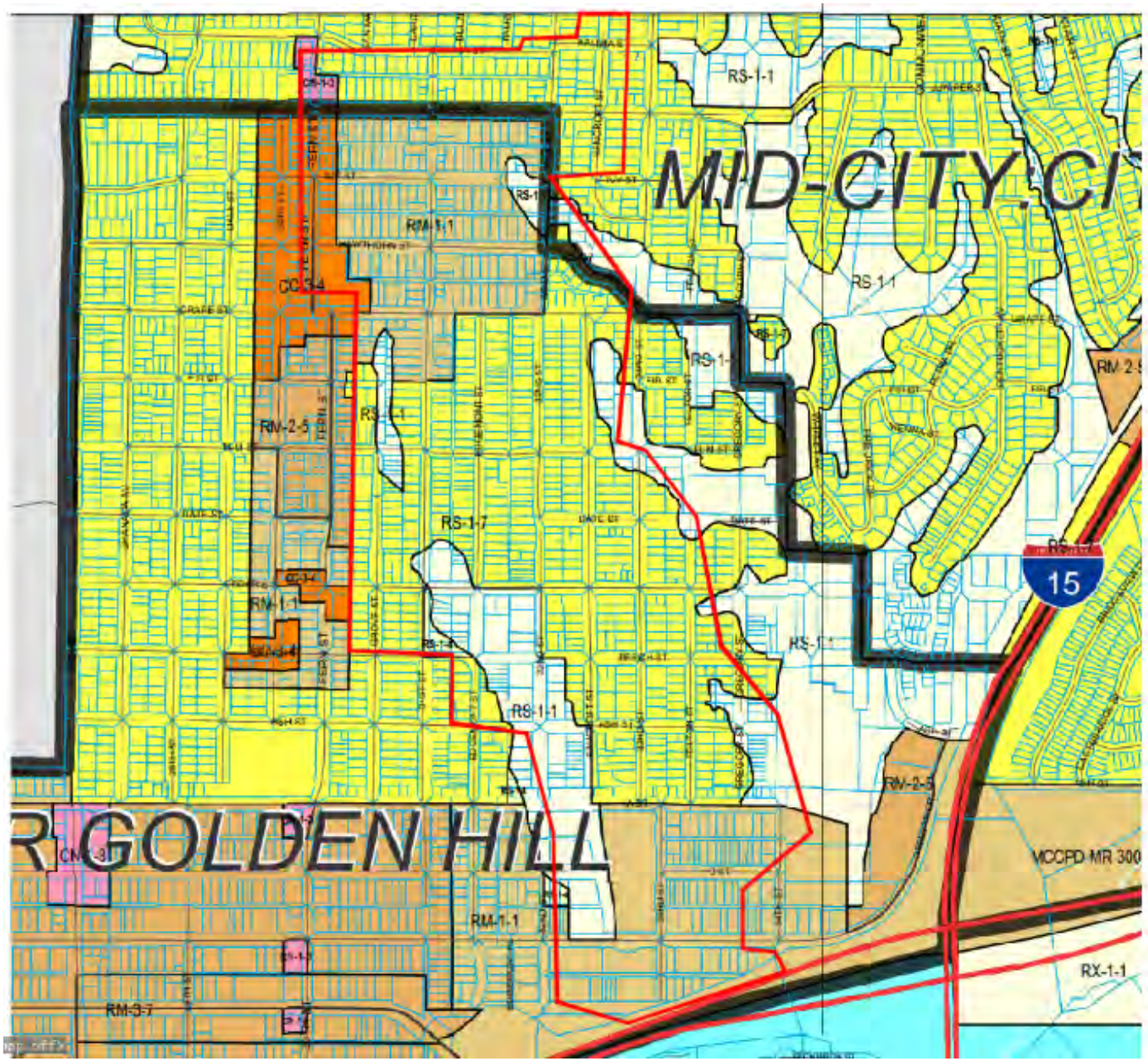


32nd and Broadway - Existing Sewer Influence Area (200 acres)



32nd and Broadway- Sewer (200 acres)

32nd and Broadway- Zoning Map



Appendix B – Sewer Study Design Criteria

32nd and Broadway Sewer Study Summary

PROPOSED SEWER GENERATION BY LAND USE

Line	From MH	To MH	Zone	Area (sf)	Area (Acres)	Density Conversion (Table 1-1)	Calculated DU per Plans	Population per DU	Equivalent Population Served	Avg. Dry Weather Flow (gpd)	Dry Weather Peaking Factor	Wet Weather Peaking Factor	Peak Wet Weather Flow (Design Flow)			Line Size D (in)	Design Slope (%)	Normal Depth d_n (ft)	d_n/D	Velocity (ft/sec)
									In-Line				gpd	mgd	cfs					
A	N/A	N/A	RM-1-1	54326	1.25	Not Used	38.00	3.2	121.6	9728.0	4.00	1.0	38912	0.039	0.06	8	18	0.047	0.0705	5.57
				54326	1.25				121.6	9728.0	4.00	1.0	38912	0.039	0.060	8	18	0.047	0.0705	5.57

EXISTING SEWER GENERATION BY LAND USE

Line	From MH	To MH	Zone	Area (sf)	Area (Acres)	Density Conversion (Table 1-1)	Calculated DU per Table 1-1 Sewer Design Guide	Population per DU	Equivalent Population Served	Avg. Dry Weather Flow (gpd)	Dry Weather Peaking Factor	Wet Weather Peaking Factor	Peak Wet Weather Flow (Design Flow)			Line Size D (in)	Design Slope (%)	Normal Depth d_n (ft)	d_n/D	Velocity (ft/sec)
									In-Line				gpd	mgd	cfs					
B	N/A	N/A	RS-1-7	4486680	103	Not Used	927	3.5	3244.5	259560.0	2.12	1.0	550267	0.550	0.850					
			RM-1-1	2543904	58.4	Not Used	876	3.2	2803.2	224256.0	2.17	1.0	486636	0.487	0.753					
			RS-1-1	1324224	30.4	Not Used	30.4	3.5	106.4	8512.0	4.00	1.0	34048	0.034	0.053					
			CN-1-3	54885.6	1.26	43.7	Not Used	Not Used	55.06	4405.0	4.00	1.0	17620	0.018	0.027					
			CC-3-4	252648	5.8	43.7	Not Used	Not Used	253.46	20276.8	3.83	1.0	77660	0.078	0.12					
			RS-1-4	35719.2	0.82	Not Used	3.28	3.5	11.48	918.4	4.00	1.0	3674	0.004	0.006					
				8698061	199.68				6474.102	517928.16	1.93	1.0	1169904	1.169904	1.809	12	2.75			

876 Assumed 15 DU per acre per San Diego Municipal Code Section 131.0406
3.2 Assumed 3.2 Population per DU per Table 1-1 of San Diego Sewer Design Guide

Total Flow Rate on Existing 8" VC Sewer Pipe

Line	From MH	To MH	Zone	Area (sf)	Area (Acres)	Density Conversion (Table 1-1)	Calculated DU per Table 1-1 Sewer Design Guide	Population per DU	Equivalent Population Served	Avg. Dry Weather Flow (gpd)	Dry Weather Peaking Factor	Wet Weather Peaking Factor	Peak Wet Weather Flow (Design Flow)			Line Size D (in)	Design Slope (%)	Normal Depth d_n (ft)	d_n/D	Velocity (ft/sec)
									In-Line				gpd	mgd	cfs					
C	20	19	N/A	8752387	200.93				6595.7	527656.16	1.92	1.0	1208816	1.209	1.869	8	2.89	0.5	0.74	6.69

Pipe Flow

Radius	Arc Length
0.333333333	1.361108011

Theta (Deg)	Theta (Rad)	Wetted Perimeter
233.9572334	4.083324032	0.199669927

Pre-Development Flow Q=1.809 cfs (Total) w/ existing 8" Sewer under I-94

Diameter (inches)	Manning N	**MANUAL** Input of 'N' Value
8	11.Closed Conduit - Clay (sewer)	0.013

Slope (FT/FT)	Q (CFS)	$Q_{MAX\ (Dia\&\%)}$
0.0289	1.809	2.22

Depth (feet)	Depth/Diameter
0.48455	72.6829%

Velocity (ft/sec)	Velocity Head (feet)
6.656311078	0.687988776

Area
0.271772337

Critical Depth	Critical Slope

Critical Velocity	Froude Number

Pipe Flow

Radius	Arc Length
0.333333333	0.357429071

Theta (Deg)	Theta (Rad)	Wetted Perimeter
61.43753167	1.072287212	0.030152192

Post-Development Flow Q=0.060 cfs (Line A) from site

Diameter (inches)	Manning N	
	1.Closed Conduit - PVC	**MANUAL** Input of 'N' Value
8	0.011	

Slope (FT/FT)	Q (CFS)	$Q_{MAX\ (Dia\&\%)}$
0.18	0.060	6.54

Depth (feet)	Depth/Diameter
0.04677	7.0157%

Velocity (ft/sec)	Velocity Head (feet)
5.567271817	0.481281296

Area
0.01077727

Critical Depth	Critical Slope

Critical Velocity	Froude Number

Pipe Flow

Radius	Arc Length
0.333333333	1.391365923

Theta (Deg)	Theta (Rad)	Wetted Perimeter
239.1581854	4.174097769	0.200948965

Post-Development Flow Q=1.869 cfs (Total) w/ existing 8" Sewer under I-94

Diameter (inches)	Manning N: 11.Closed Conduit - Clay (sewer)	MANUAL Input of 'N' Value
8	0.013	

Slope (FT/FT)	Q (CFS)	$Q_{MAX\ (Dia\&\%)}$
0.0289	1.869	2.22

Depth (feet)	Depth/Diameter
0.49787	74.6812%

Velocity (ft/sec)	Velocity Head (feet)
6.684706636	0.693871162

Area
0.279593542

Critical Depth	Critical Slope

Critical Velocity	Froude Number

Pipe Flow

Radius	Arc Length
0.5	1.329981983

Theta (Deg)	Theta (Rad)	Wetted Perimeter
152.4047089	2.659963967	0.206463395

Post-Development Flow Q=1.869 cfs (Total) w/ 12" Sewer Upgrade under I-94

Diameter (inches)	Manning N 11.Closed Conduit - Clay (sewer)	**MANUAL** Input of 'N' Value
12	0.013	

Slope (FT/FT)	Q (CFS)	$Q_{MAX\ (Dia\&\%)}$
0.0289	1.869	6.53

Depth (feet)	Depth/Diameter
0.38075	38.0753%

Velocity (ft/sec)	Velocity Head (feet)
6.806448259	0.719374812

Area
0.274592596

Critical Depth	Critical Slope

Critical Velocity	Froude Number

Pipe Flow

Radius	Arc Length
0.625	1.390507793

Theta (Deg)	Theta (Rad)	Wetted Perimeter
127.4723647	2.224812469	0.201023347

Post-Development Flow Q=1.869 cfs (Total) w/ 15" Sewer Upgrade under I-94

Diameter (inches)	Manning N 11.Closed Conduit - Clay (sewer)	**MANUAL** Input of 'N' Value
15	0.013	

Slope (FT/FT)	Q (CFS)	$Q_{MAX\ (Dia\&\%)}$
0.0289	1.869	11.84

Depth (feet)	Depth/Diameter
0.34843	27.8748%

Velocity (ft/sec)	Velocity Head (feet)
6.68635613	0.694213638

Area
0.279524531

Critical Depth	Critical Slope

Critical Velocity	Froude Number

streets, in accordance with Council Policies 400-13 and 400-14 (ATTACHMENT 1).

c. As development or redevelopment occurs, existing sewers in environmentally-sensitive areas shall be relocated to streets or other appropriate areas where possible (Ref. Municipal Code §144.0240(a)).

d. Where an existing canyon sewer main has capacity to serve a new development, the number of sewer mains penetrating the canyon from a new development shall be limited. This shall require coordination with other new developments wanting to access the same canyon sewer main. Sewer main access roads shall be provided to the point of connection and to the extent of all new manholes, and shall be coordinated with other access requirements, such as equestrian, pedestrian, multiple-use recreational trails, or storm water detention/retention/remediation facilities. However, all sewer access in canyons or other environmentally-sensitive lands shall be designed in conformance with Council Policies 400-13 and 400-14 (ATTACHMENT 1).

e. To assist in determining where to direct sewer flow or where new sewer facilities may be located within canyons and environmentally-sensitive lands, a cost-benefit analysis shall be conducted per Council Policy 400-14 (ATTACHMENT 1).

f. Sewer access roads that penetrate into canyons shall not exceed the maximum allowable slope (Ref. Subsection 3.2.3.4c) and shall be aligned along the centerline of the sewer main as much as practicable.

g. To assist in determining where new sewer facilities and sewer access roads may be located within canyons and environmentally-sensitive lands, a sewer maintenance plan shall be prepared in accordance with Council Policy 400-13 (ATTACHMENT 1).

1.3 PLANNING STUDY

1.3.1 General Requirements

For a new development and/or redevelopment, a sewer planning study for new sewer facilities shall be prepared, as directed by the Senior Civil Engineer, to demonstrate that there are no negative impacts on the existing sewer system. A minimum of three (3) copies of the planning study shall be submitted, each stamped and wet/electronically signed by a Civil Engineer registered in the State of California. Each study shall be bound and formatted in accordance with this *Sewer Design Guide* and/or the *Clean Water Program (CWP) Guidelines*.

The final approved sewer study shall also be submitted electronically in PDF format.

For new development, the planning study must be approved prior to approval of the tentative map. The study shall include all items listed in the minimum intake standards for sewer studies and subsequent reviews shall include an explanation for each review comment.

1.3.1.1 Capacity

For new development and/or redevelopment, the planning study shall address the capacity of all sewer collection and trunk sewer systems that will be impacted downstream of the new development and/or redevelopment and shall demonstrate that sewer capacity is available in those systems to accommodate the new development and/or redevelopment (refer to Section 1.7). Authorization and approval to impact any downstream sewer system must be obtained from the reviewing Senior Civil Engineer. If such downstream sewer system has already been identified as critical or sub-critical in a monitoring report, the Senior Civil Engineer may require additional field monitoring to determine if adequate capacity is available.

For an existing development and/or redevelopment, the planning study shall address the existing capacity within the existing sewer collection system, and identify all existing facilities whose capacity will be exceeded by projected sewage flows.

Where available capacity will be exceeded, the planning study shall propose upsizing of sewer facilities in accordance with Subsection 1.3.3.

Where applicable, the DESIGN ENGINEER shall incorporate into the community's existing master sewer plan, including zoning changes and other specific plans, the proposed sewer system amendments resulting from the drainage basin evaluation.

1.3.1.2 Drainage Basin

The planning study shall address the sewage generating potential of the entire drainage basin where the development is located. It shall also include current topographic maps of the entire drainage basin and any and all adjacent new developments for which a planning study has not yet been submitted and/or approved. The maps shall demonstrate that no adjacent development, including potential and existing pumped lands outside of the drainage basin and any lands outside of the incorporated boundaries of the City of San Diego with potential to be served but where no current master sewerage plan exists, will be precluded from obtaining sewer service. The planning study shall also show all proposed sewer system alignments (superimposed on planned

street alignments) and all potential points of entry of sewage from surrounding lands.

1.3.1.3 Depth of Mains

The planning study shall clearly identify all existing and/or proposed facilities which will exceed standard depths for sewer mains as defined in Subsection 2.2.1.5. In cases where proposed sewers will exceed 15 feet in depth, a request for design deviation (ATTACHMENT 2) must be submitted to the Water and Sewer Development Review Senior Civil Engineer with the Sewer Planning Study. A design deviation will only be approved in exceptional cases and when adequate justification is provided. Mains more than 20 feet deep shall also require approval from the Wastewater Collection Division Senior Civil Engineer.

1.3.1.4 Existing Studies

The City of San Diego maintains an extensive library of sewer planning studies which were prepared for lands throughout the City. These studies are available for review at the Water and Sewer Development Section, Public Utilities Department. All studies are catalogued by subdivision or trunk sewer name. Logs of sewer flow study analyses for recently monitored trunk sewers and a map of sewers which meet the Regional Water Quality Control Board (RWQCB) criteria for being critical or sub-critical may also be viewed. In addition, information regarding proposed CIP projects within the vicinity of a given project may be requested. In many cases, an addendum or reference to one of the existing planning studies may be acceptable in lieu of an independent study. Concurrent with the preparation of planning studies for sewers proposed to connect to existing canyon sewer mains, a study of flow redirection per Council Policy 400-13 and a cost-benefit analysis per Council Policy 400-14 shall be prepared (Refer to ATTACHMENT 1). An existing analysis of redirection of flows and a cost-benefit analysis, as required by Council Policies 400-13 and 400-14 respectively, may be available for reference for various existing canyon sewers.

1.3.2 Flow Estimation

1.3.2.1 Land Use

Present or future allowable land use, whichever results in higher equivalent population, shall be used to generate potential sewage flows.

1.3.2.2 Flow Determination

Flow definitions and calculation procedures are listed below. All calculations shall be tabulated for each sewer main section (manhole to manhole) in the

format shown on Figure 1-2.

Equivalent Population: The equivalent population shall be calculated from zoning information (Ref. Section 1.6). For major new facilities such as high rise apartment buildings, flow rates (assuming one lateral) shall be checked based on the most current, adopted edition of the Uniform Plumbing Code. The most conservative flow rate shall govern.

Daily Per Capita Sewer Flow: The sewer flow for the equivalent population shall be 80 gallons per capita per day (gpcd).

Average Dry Weather Flow (ADWF): Equivalent populations shall be used to calculate the average dry weather flow. The average dry weather flow for each sewer main reach (manhole to manhole) shall be determined by multiplying the total accumulated equivalent population contributing to that reach by 80 gallons per capita per day:

Average Dry Weather Flow = (80 gpcpd) x (Equivalent Population)

Peaking Factor for Dry Weather Flow (PFDWF): The peaking factor is the ratio of peak dry weather flow to average dry weather flow. It is dependent upon the equivalent population within a tributary area. The tributary area is the area upstream of, and including, the current reach for the total flow in each reach of pipe. Figure 1-1, consisting of the table prepared by Holmes and Narver in 1960, shall be used to determine peaking factors for each tributary area. In no instance shall the dry weather flow peaking factor be less than 1.5.

Peak Dry Weather Flow (PDWF): The peak dry weather flow for each sewer main reach shall be determined by multiplying the average dry weather flow by the appropriate peaking factor (Note that peak dry weather flows are not algebraically cumulative as routed through the sewer system, i.e. the peak dry weather flow at any point shall be based on the equivalent population in the basin to that point (Ref. Figure 1-2).

Peak Dry Weather Flow = (Average Dry Weather Flow) x (Dry Weather Flow Peaking Factor)

Peaking Factor for Wet Weather Flow (PFWWF): The peaking factor for wet weather flow is the ratio of peak wet weather flow to peak dry weather flow. It is basin-specific and shall be based on essential information available at the time of the planning study. Information such as historical rainfall/sewage flow data, land use, soil data, pipe/manhole age, materials and conditions, groundwater elevations (post development), inflow and infiltration (I/I) studies, size, slope and densities of the drainage basin, etc., should be utilized in the wet weather analysis to estimate the peaking factor for wet weather. Upward adjustments shall be made in areas with expected high inflow and

infiltration (i.e. high ground water or in areas with lush landscaping schemes). Flow meters are installed throughout the City's sewer system. Flow data collected from these meters are available upon request. The objective of this analysis is to quantify the magnitude of peak wet weather flow with a 10-year return period on a statistical basis.

The Senior Civil Engineer overseeing the preparation of the planning study shall coordinate with the City Sewer Modeling Group for approval of the peaking factors to be used for design.

Peak Wet Weather Flow (PWWF): The peak wet weather flow (or design flow) for a gravity sewer main reach shall be determined by multiplying the peak dry weather flow (ref. Figure 1-2) by the appropriate wet weather peaking factor. The peak wet weather flow is the design flow for a gravity sewer main. It is determined at any point in the system based on the associated upstream average dry weather flow in the basis to that point times the peaking factor for wet weather.

Peak Wet Weather Flow = (Peak Dry Weather Flow) x (Wet Weather Peaking Factor)

1.3.3 Pipe Sizing Criteria

1.3.3.1 Hydraulic Requirements

Manning's formula for open-channel flows shall be used to calculate flows in gravity sewer mains. Manning's coefficient of roughness "n" shall be assumed to be 0.013 for all types of sewer pipe. Sewer grades shall be designed for velocities of 3 to 5 feet per second (fps) where possible. This is extremely important in areas where peak flow will not be achieved for many years. The minimum allowable velocity is 2 fps at calculated peak dry weather flow, excluding infiltration. Sewer mains that do not sustain 2 fps at peak flows shall be designed to have a minimum slope of 1 percent. Additional slope may be required by the Senior Civil Engineer where fill of varied depth is placed below the pipe in order to provide adequate slope after expected settlement occurs. The maximum allowable velocity shall be 10 fps and shall be avoided by adjusting slopes, by increasing the pipe diameter, or by utilizing a vertical curve transition to lower velocities per subsections 2.2.4 and 2.2.9.4. If the Senior Civil Engineer approves a velocity greater than 10 fps, the pipe shall be upgraded to SDR 18 PVC (standard dimension ratio polyvinyl chloride), concrete-encased VC (vitrified clay), or PVC sheet-lined reinforced concrete pipe.

1.3.3.2 Slope

Slope shall be calculated as the difference in elevation at each end of the pipe divided by the horizontal length of the pipe, and shall be a constant value between manholes.

1.3.3.3 Ratio of Depth of Flow to Pipe Diameter (d_n/D)

New sewer mains 15 inches and smaller in diameter shall be sized to carry the projected peak wet weather flow at a depth not greater than half of the inside diameter of the pipe (d_n/D not to exceed 0.5). New sewer mains 18 inches and larger shall be sized to carry the projected peak wet weather flow at a depth of flow not greater than 3/4 of the inside diameter of the pipe (d_n/D not to exceed 0.75).

1.3.3.4 Minimum Pipe Sizes

The size of a sewer pipe is defined as the inside diameter of the pipe. Sewer mains shall be a minimum of 8 inches in diameter in residential areas, and a minimum of 10 inches in commercial, industrial, and high-rise building areas.

1.3.4 Sewer Study Exhibit Criteria

The DESIGN ENGINEER's sewer study exhibits shall be used to evaluate hydraulics and to establish minimum street and easement widths. Therefore, these documents need to reflect depths and separation of mains from other utilities and improvements. Refer to the Minimum Intake Standards for Sewer Studies in Subsection 1.8.

1.3.5 Private On-Site Wastewater Treatment and Reuse

Refer to Attachment 6 for permitting guidelines of private on-site wastewater treatment and reuse in the City of San Diego.

1.4 SEPARATION OF MAINS

1.4.1 Horizontal Separation

1.4.1.1 Wet Utilities

The separation of water, sewer, reclaimed water mains, and storm drains shall comply with the *State of California Department of Health Services Criteria for the Separation of Water Mains and Sanitary Sewers*. At least 10 feet of horizontal separation shall be maintained between the nearest outer surfaces of sewer lines and potable water mains. More stringent separation requirements

may be necessary if unusual conditions, such as high groundwater levels or large diameter mains, exist (Ref. State of California "Blue Book"). If a horizontal separation of 10 feet or other requirement is not possible, a deviation from standards may be permitted by the City provided the structural integrity of both the pipe and the pipe joints is upgraded in accordance with the *State of California Department of Health Services Criteria for the Separation of Water Mains and Sanitary Sewers - Special Provisions*, and provided it has been reviewed and written approval has been obtained from the California Department of Health Services, Drinking Water Field Operations Branch. This deviation is not applicable for subdivisions, or where sewers are placed in new streets. Lateral connections to sewer mains typically do not meet the upgraded joint requirements for reduced separation. All installations of sewer mains which fail to comply with the basic separation standards must be reviewed and approved by the State of California Department of Health Services. For separation from curbs, see Subsection 2.2.5.2. For separation from structures, see Subsections 2.2.5.8 and 2.2.5.9.

1.4.1.2 Separation for Dry Utility Pipes and Cable Conduits

Other utility pipes, conduits, and cable lines shall be governed by their respective franchise agreement with the City of San Diego. A minimum 10-foot horizontal separation is desirable between sewer mains and any other utility infrastructure. Separations of less than 10 feet must be approved by the Senior Civil Engineer of Water and Sewer Development Section, Public Utilities Department. Additional separation may be required for sewer mains which exceed 10 feet in depth. The DESIGN ENGINEER shall consider the relative depth of adjacent utilities and the stability of the soils where the sewer shall be constructed when designing the separation from other utilities. Refer to San Diego Regional Standard Drawing (SDRSD) M-22 and City of San Diego Drawing SDM-111 for standard locations of utilities in streets.

1.4.2 Vertical Separation

1.4.2.1 Shallow Mains, General

Shallow mains require a special design. Review and written approval is required from the California Department of Health Services, Drinking Water Field Operations Branch for deviations from vertical separation requirements for water and sewer utilities. For mains less than 4 feet deep, special design shall be required for live and dead loads and vertical cyclical deflections which shall include an evaluation to demonstrate zero deflection in the pavement.

1.4.2.2 Parallel Mains

Potable water, reclaimed water, and sewer mains shall be located at various

depths below the ground surface, in order of descending water quality. Potable water pipelines shall be located above both reclaimed water pipes and sewer mains, and reclaimed water mains shall be located above sewer mains. A minimum vertical separation of one foot shall be provided between the top and bottom surfaces of the pipes in the same street or easement.

1.4.2.3 Crossing Mains

A minimum vertical separation of 12 inches shall be provided between the top and bottom surfaces of crossing utility conduits and shall comply with the *State of California Department of Health Services Criteria for the Separation of Water Mains and Sanitary Sewers*. Separation measurements shall be taken from the outer most surface of any pipeline protection (i.e. concrete encasement or steel sleeve) which may be installed. Where the vertical separation is less than 12 inches, a request for design deviation (ATTACHMENT 2), with justification, shall be submitted for review. If approved, for pipes 12 inches or less in diameter, a 12-inch sand cushion, or alternatively a minimum 6-inch sand cushion with 1 inch neoprene pad shall be used. Separations of less than 7 inches will not be allowed by the City. For skewed main crossings, see Subsection 2.2.6. Mains crossing large facilities shall evaluate deflection across the span, changes in hydraulics due to change of slope, shear forces, and special joint designs to account for pipe movement.

1.5 PUMP STATION PLANNING CRITERIA

If at all possible, the construction of a sewer pump station is to be avoided. However, in cases where constraints such as topography and environmentally sensitive habitat dictate, a pump station may be necessary (Ref. Council Policies 400-13 and 400-14 – ATTACHMENT 1). The DESIGN ENGINEER shall analyze the planning area for the sewer system to minimize the number of units to be pumped and to design the shortest possible force main. In cases where only a small tributary area is to be served by a pump station, the City will accept the facility as public only if it can be shown that the capitalized cost of facility replacement and maintenance will not exceed 50 percent of the standard sewer fees for the area to be served. Otherwise, the pump station must be privately owned, maintained and operated. In cases where a pump station will be a public facility, specific criteria for the design, construction, and operational testing of sewer pump stations are given in Chapter 7.

1.5.1 Pump Station Design Capacity

The Pump Station Design Capacity shall be calculated as follows:

Pump Station Design Capacity (PSDC): Pump stations shall be designed to pump the calculated peak wet weather flow from the upstream tributary area.

Pump Station Reserve Capacity Factor (PSRCF): This is a safety factor that takes into account that service pumps will generally not be operating at their

full intended design capacity due to mechanical wear and the subsequent loss of efficiency, and increases in force main friction loss due to the deposition of solids and grit. The reserve capacity factor shall be 1.0 if two (2) hours emergency storage (Ref. Subsection 7.2.6.7) or six hours emergency storage (Ref. Subsection 7.2.7) are provided. Where this storage is not provided in design, then a reserve capacity factor greater than 1.0 shall be used and an appropriate factor shall be evaluated for approval, on a case-by-case basis, by the Wastewater Collections Division Senior Civil Engineer.

Pump Station Design Capacity = (Peak Wet Weather Flow) x (Pump Station Reserve Capacity Factor)

1.5.2 Private Pump Stations

Private pump stations (privately-owned and operated) serving more than one lot shall not be located in the public right-of-way. The capacity for private pump stations shall be determined in the same manner as for public pump stations. Station wet well detention times shall not exceed 4 hours. A planning study for the pump station outlining capacity of the pumps, equivalent dwelling units (EDU) served, capacity of the wet well, detention times, length and size of the force main, and provision of any odor control equipment shall be submitted for review to Water and Sewer Development Review, Public Utilities Department. Private pump stations shall require separate structural, mechanical, and electrical permits from the City of San Diego, Development Services Department, Building Review Division. However, private pump station plans are not reviewed for compliance with City of San Diego Sewer Design Guide Chapter 7 criteria. As such, it shall be the responsibility of the DESIGN ENGINEER to ensure that all private pump stations are adequately sized, have sufficient redundant measures (dual force mains, back-up power supply, auto dialer alarm system to a licensed plumber with 24-hour response, etc.), and comply with all applicable local, state, and federal regulations. In the design of such facilities, the DESIGN ENGINEER shall utilize sound engineering judgment to provide for an adequate design for any potential failure during the service life of the pump station. If a developer elects to construct a private sewer system including a sewer pump station, then a letter of agreement must be executed over all lots served in the subdivision if the pump station will serve two or more lots. A copy of this agreement is available at the City Plan Check Counter and the City Website http://www.sandiego.gov/mwwd/business/sewer. Also required is a recorded copy of the CC&R's for the home or business owners association, outlining the responsibility and maintenance requirements for the shared private improvements.

1.6 ZONE - DENSITY CONVERSIONS

Table 1-1 shall be used in planning studies to determine the equivalent

population for a given land use. These tabulated figures represent a general case analysis. When more accurate or detailed information, such as fixture unit counts, is available, Table 1-1 shall not be used. For more information on the requirements of the zones shown in Table 1-1, refer to Chapter 13 of the City of San Diego Municipal Code.

1.7 REQUIRED CAPACITY IN EXISTING SEWER SYSTEMS DOWNSTREAM OF NEW FACILITIES

1.7.1 Required Capacity Downstream of New Gravity Sewers

For a new development, the projected peak wet weather flow from the proposed system (ref. Subsection 1.3.2.2) will be added to the field measured maximum flow in the downstream sewer to determine if the projected d_n/D is in compliance with the depth criterion described in Subsection 1.3.3.3. If this criterion is not met, a comprehensive sewer study of the area shall be prepared.

The downstream system shall be studied to the point in the system where the projected peak wet weather flow from the proposed new development is less than 10% of the total flow. All sewers to this point are required to carry the total flow per the depth criterion described in the above paragraph. The existing system to be studied shall not be less than two pipe reaches (i.e. manhole to manhole) from the point of discharge of the new development into the existing system.

1.7.2 Required Capacity Downstream of New Pump Stations

In developed lands, the discharge of the pump station design capacity from the proposed new development will be added to the field measured maximum flow in the existing downstream sewer to determine if the projected d_n/D will comply with the depth criteria described in Subsection 1.3.3.3. If these criteria are not met, a comprehensive sewer study of the area shall be prepared.

The sewer system downstream of the pump station shall be designed for cyclical pumping operation (i.e. on-off pumping). Use the design discharge capacity of the pump station for the tributary area. As a rule of thumb, the cyclical effect in single family residential may be considered negligible when the pump station's discharge is less than 10% of the total flow. For other density types consult with the Senior Engineer. All sewers to this point are required to carry the total flow per the depth criterion described in the above paragraph. The proposed new system shall discharge at a point not less than two pipe reaches (i.e. manhole to manhole) away the existing system.

1.7.3 Odor Control

The DESIGN ENGINEER shall design the wastewater system so that objectionable odors are not discharged into the atmosphere or through plumbing vents. Odors are caused by organic biologic activity and the location of the problematic area in the system is not always predictable.

The DESIGN ENGINEER shall account for the possibility of odors developing as the subdivisions build out including setting right of way aside that has good access for the locations of odor control equipment. The developer will modify the system up to one year after final occupancy of the drainage basin.

Some of the properties that impact odor may include the following:

- sewage detention times
- force main discharge points
- submerged flow at siphons
- locations with turbulent flow
- flat slopes
- type of discharge content including industrial waste discharge
- temperature and weather conditions

Odor control may include chemical injection such as calcium nitrate or other approved chemicals, or installation of an activated carbon system, or both.

1.8 MINIMUM INTAKE STANDARDS FOR SEWER STUDIES

At a minimum, include the following items on the exhibit and within the body of all wastewater planning studies for new sewer development projects:

a. Internal order numbers, tentative map numbers, and any discretionary permit numbers [i.e. Conditional Use Permit (CUP), Planned Residential Development (PRD), or Planned Industrial Development (PID)].

b. Project name.

c. Vicinity map.

d. Scale of sufficient size to accommodate the details required by this list. Minimum Scale will be 1 inch = 100 feet.

e. Reference drawing numbers for existing sewer mains.

f. Limits of the project area.

g. Streets with names or distinguishing labels and dimensions.

h. All existing and proposed utilities with adequate separation, whether in streets, side yards, or canyon slopes. Cross sections shall show dry and wet utilities.

i. Existing and proposed sewer mains labeled as public or private.

j. Deviation requests for all sewer mains which exceed standard depths.

k. All existing and proposed "sewer access" easements. Indicate whether these will be permanent, to be abandoned after construction, or will be dedicated.

l. Paved width of all easements and connections to streets and manholes.

m. Typical bench section for limits of easement width and paving.

n. Topography of the entire drainage basin and the proposed development.

o. Elevations for existing and proposed grades throughout the project area. A reference copy of the proposed grading plans may be provided instead, if applicable.

p. Manhole numbers and reach or pipe segment numbers for ease of comparison with the flow data in the Sewer Study Summary (Figure 1-2). Label all points of connection where project flows discharge to existing facilities and, where applicable, to the terminus of the study area. For off-site sewer mains, show information for a minimum of two reaches upstream and downstream in accordance with Subsection 1.7.1. Also identify all existing sewer mains in the Remarks column of Figure 1-2 - Sewer Study Summary.

q. Pipes labeled with size, type, flow direction, and slope.

r. Manholes, within the limits of the project area, shown with rim elevation and invert elevation. Note that sewer depth information is more critical where the mains are not at standard depths (refer to section 2.2.1.5), where they are located in easements, where off-site flows join the project area, or where grading is proposed over existing facilities.

s. Number of Dwelling Units per Pipe Reach. Equivalent dwelling units per each reach shall be identified from the most upstream manhole to the downstream end of the project boundary.

t. Land use areas labeled as single family residential, multi-family residential, commercial, industrial, schools, parks, open space, multiple habitat preservation area (MHPA), multiple species conservation program area (MSCP), stream beds or 100-year flood area.

u. Location of all proposed pump stations. Label all pump stations as public or private. For public pump stations, show access roads and lots as dedicated in fee title to the City of San Diego. All pipe systems upstream of private pump stations shall be clearly labeled "private".

v. Location of any sewer facilities proposed in canyons and environmentally sensitive lands. Show any required sewer access roads in order to implement the Sewer Maintenance Plan to be developed as part of the planning study (refer to Council Policy 400-13 - ATTACHMENT 1).

w. List any documents or studies that are incorporated by reference into the report. Do not include copies of the reports in the sewer study if they are part of the Public Utilities Department's Library.

x. Master plan of the project area, when requested.

y. As-built plans of existing facilities where any point of connection is planned.

z. Flow metering data, when requested.

TABLE 1-1
CITY OF SAN DIEGO SEWER DESIGN GUIDE
DENSITY CONVERSIONS

Zone	Maximum Density (DU/Net Ac)	Population per DU	Equivalent Population (Pop/Net Ac)
AR-1-1, RE-1-1	0.1	3.5	0.4
RE-1-2	0.2	3.5	0.7
AR-1-2, RE-1-3	1	3.5	3.5
RS-1-1, RS-1-8	1	3.5	3.5
RS-1-2, RS-1-9	2	3.5	7.0
RS-1-3, RS-1-10	3	3.5	10.5
RS-1-4, RS-1-11	4	3.5	14.0
RS-1-5, RS-1-12	5	3.5	17.5
RS-1-6, RS-1-13	7	3.5	24.5
RS-1-7, RS-1-14	9	3.5	31.5
RX-1-1	11	3.4	37.4
RT-1-1	12	3.3	39.6
RX-1-2, RT-1-2, RU-1-1	14	3.2	44.8
RT-1-3, RM-1-2	17	3.1	52.7
RT-1-4	20	3.0	60.0
RM-1-3	22	3.0	66.0
RM-2-4	25	3.0	75.0
RM-2-5	29	3.0	87.0
RM-2-6	35	2.8	98.0
RM-3-7, RM-5-12	43	2.6	111.8
RM-3-8	54	2.4	129.6
RM-3-9	73	2.2	160.6
RM-4-10	109	1.8	196.2
RM-4-11	218	1.5	327.0

TABLE 1-1
CITY OF SAN DIEGO SEWER DESIGN GUIDE
DENSITY CONVERSIONS (Continued)

Zone	Maximum Density (DU / Net Ac)	Population Per DU	Equivalent Population (Pop/Net Ac)
Schools/Public	8.9	3.5	31.2
Offices	10.9	3.5	38.2*
Commercial/Hotels	12.5	3.5	43.7*
Industrial	17.9	3.5	62.5*
Hospital	42.9	3.5	150.0*

Figures with asterisk (*) represent equivalent population per floor of the building.

Definitions:
DU = Dwelling Units
Ac = Acreage
Pop = Population

Net Acreage is the developable lot area excluding areas that are dedicated as public streets in acres. Gross Area is the entire area in acres of the drainage basin, including lots, streets, etc.

For undeveloped areas, assume Net Acreage = 0.8 x Gross Area in Acres

For developed areas, calculate actual Net Acreage.

Tabulated figures are for general case. The tabulated figures shall not be used if more accurate figures are available.

Population is based on actual equivalent dwelling units (EDU) or the maximum estimate obtained from zoning.

Conversion of Fixture Units to Equivalent Dwelling Units (EDU): The Water Meter Data Card, maintained by the Development Services Department, contains a table of plumbing fixtures that should be used for determining the equivalent dwelling units (EDU's) for the purpose of estimating the rate of wastewater generation in residential, commercial, or industrial areas. Currently, the basis for conversion is: 20 fixtures = 1 EDU and 1 EDU = 280 gallons of wastewater per day.

In high rise building areas, flow rates shall be based on the most current, adopted edition of the applicable Plumbing Code, assuming one lateral per area. The most conservative flow rate shall govern.

PUBLIC UTILITIES DEPARTMENT

PEAKING FACTOR FOR SEWER FLOWS
(Dry Weather)

Ratio of Peak to Average Flow*
Versus Tributary Population

Population	Ratio of Peak to Average Flow	Population	Ratio of Peak to Average Flow
200	4.00	4,800	2.01
500	3.00	5,000	2.00
800	2.75	5,200	1.99
900	2.60	5,500	1.97
1,000	2.50	6,000	1.95
1,100	2.47	6,200	1.94
1,200	2.45	6,400	1.93
1,300	2.43	6,900	1.91
1,400	2.40	7,300	1.90
1,500	2.38	7,500	1.89
1,600	2.36	8,100	1.87
1,700	2.34	8,400	1.86
1,750	2.33	9,100	1.84
1,800	2.32	9,600	1.83
1,850	2.31	10,000	1.82
1,900	2.30	11,500	1.80
2,000	2.29	13,000	1.78
2,150	2.27	14,500	1.76
2,225	2.25	15,000	1.75
2,300	2.24	16,000	1.74
2,375	2.23	16,700	1.73
2,425	2.22	17,400	1.72
2,500	2.21	18,000	1.71
2,600	2.20	18,900	1.70
2,625	2.19	19,800	1.69
2,675	2.18	21,500	1.68
2,775	2.17	22,600	1.67
2,850	2.16	25,000	1.65
3,000	2.14	26,500	1.64
3,100	2.13	28,000	1.63
3,200	2.12	32,000	1.61
3,500	2.10	36,000	1.59
3,600	2.09	38,000	1.58
3,700	2.08	42,000	1.57
3,800	2.07	49,000	1.55
3,900	2.06	54,000	1.54
4,000	2.05	60,000	1.53
4,200	2.04	70,000	1.52
4,400	2.03	90,000	1.51
4,600	2.02	100,000+	1.50

***Based on formula:** **Peak Factor = $6.2945 \times (pop)^{-0.1342}$**
(Holmes & Narver, 1960)

FIGURE 1-1

Appendix C – As-Built Plans

BROADWAY

SR-94 WB

SR-94 EB

30TH ST

31ST ST

30TH PL

E ST

F ST

G ST

EDGEMONT PL

32ND ST

33RD ST

PICKWICK ST

PM 15919

PM 21058

PM 14885

PM 15293

PM 13675

PM 14096

MAP 5357

BLK 94

BLK 95

BLK 96

BLK 114

BLK 124

BLK 125

BLK 126

BLK 127

PAR 1

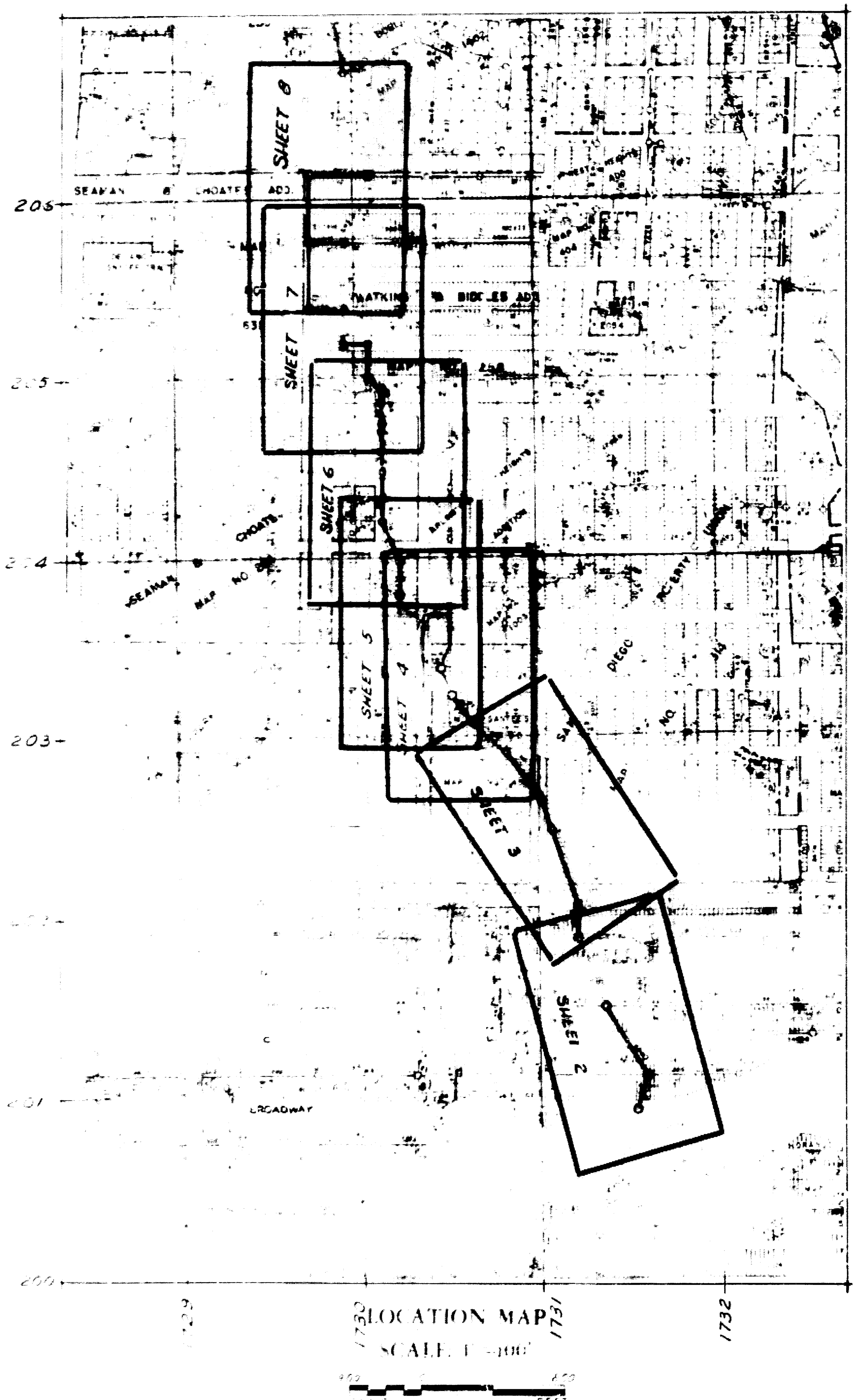
PAR 2

PAR 3

City of San Diego Public Utilities
Water & Wastewater

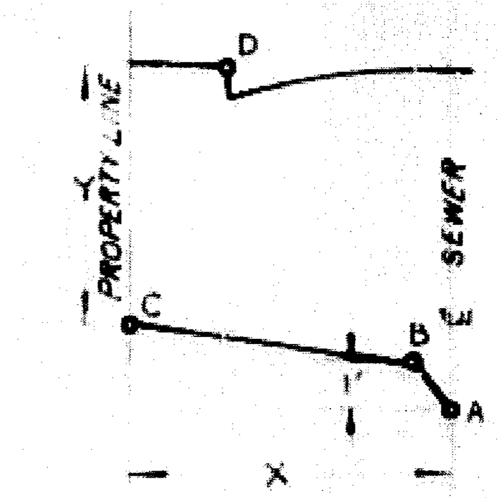
City of San Diego
PUBLIC UTILITIES
Water & Wastewater

CITY CONTRACT
SANITARY SEWER RELOCATIONS
incident to State Highway 94
between 18th St. and Home Ave.
CITY OF SAN DIEGO
ENGINEERING DEPARTMENT
SHEET 3 OF 5 SHEETS
WO NO 21570
AS BUILT
CONSTRUCTION RECORD
3/31/58
7-21-58
CONTR R.M. & S.
INSP P. Knudsen
FIELD BOOK H-22 9/30/57 28 Sheets
1/13/58
Alloway
5367-D
REDUCED PLAN
USE SCALE BELOW
4" ON ORIGINAL SCALE
"F" ST.
21 ST.
22 ND
23 RD
24 TH
STATE HIGHWAY RIGHT OF WAY
MAKE CONNECTION
To Exist. M.H.
Construct M.H. over Exist. 6" Sewer
287.54'
265.47'
205.79'
8" V.C.E.S.
M.H. No.10
M.H. No.11
M.H. No.12
Exist. A.C. Pavement
85' Concrete Encasement
CURVE DATA
"C" ST.
33 RD
34 TH
CHOATE'S ADDITION
Block 147
ALLEY
M.H. No.13
M.H. No.14
224'
6" SEWER
Exist. Sewer on ¢ Alley to here from 34th St.
BROADWAY
ST.
MAKE CONNECTION
Construct M.H. over Exist. 8" Sewer
M.H. No.20
HWY.
R/W
CHOATE'S ADDITION
Block 125
PICKWICK ST.
33 RD
"E" - ST.
M.H. No.19
FEDERAL BLVD.
M.H. No.18
M.H. No.17
32 ND
"E" ST.
Scale 1" = 50'
438.22'
STATE HWY. R/W
ALLEY
EL. 90
EL. 80
EL. 70
EL. 60
EL. 50
PROPOSED FILL (HWY 94 WEST BOUND)
EXISTING ACCESS ROAD
EXISTING N.W. OUTER CONN.
EXIST. FEDERAL BLVD.
NEW CONCRETE BACKFILL PER DETAIL "A"
Exist. 21" V.C.E.S. Sewer
Exist. Conc. Encasement
PROFILE SCALE
Horiz: 1" = 80'
Vert: 1" = 8'
220'
163.85'
DETAIL "A"
BROADWAY
35TH ST.
MAKE CONNECTION
To Exist. 21" Sewer
Construct M.H. over Exist. 6" Sewer
M.H. No.16
M.H. No.15
PICKWICK ST.
STATE HWY. R/W
BLK. 2 ORANGE PARK
SEE INSERT
Exist. 21" Sewer
PROFILE 5369-D
INSERT
Scale: 1" = 10'
PICKWICK ST.
ST. HWY.
Lot 1, Blk 2
ORANGE PARK
M.H. No.15 Type "A" per 115-E8



GRAPE ST AND GROVE ST SEWER MAIN REPLACEMENT

(JUNIPER ST. TO HWY. 94)



TYPICAL SEWER LATERAL PROFILE
(SEE TABLE BELOW)

LATERAL NO	ELEVATIONS A	B	C	D	FEET X	Y	REMARKS
1	174 45	175 45	185 70	191 70	15	6 00	
2	174 66	175 66	189 00	195 00	15	6 00	
3	174 79	175 79	189 50	195 50	15	6 00	
4	175 24	176 24	192 60	198 60	15	6 00	
5	176 63	177 63	192 20	198.20	15	6 00	
6	177 29	178 25	188 50	194 50	15	6 00	
7	181 66	182 66	183 50	189 50	8 00	6 00	
8							
9	260 67	261 67	275 00	281 00	10	6 00	
10	261 62	262 62	271 80	277 80	10	6 00	
11	272 47	273 47	281 10	287 10	30	6.00	
12	272 67	273 63	281 60	287 60	30	6 00	
13							
14							
15	281 09	282 09	282 29	287 00	10	4 71	
16	280 98	281.98	282.18	287 10	10	4.92	
17	287 59	288 59	288 79	294 70	10	5.91	
18	287 90	288 90	289 10	294.80	10	5.70	
19							
20	271.83	271.50			78		
21							
22	272.18	273.18		286.1	30		
23	275.72	276.05		287.0	14		
24	287.45	288.45		294.7	10		

SEWER LATERAL TABLE

RETIREMENT

3 834 LIN. FT. 8" CONC. SEWER MAIN PER FIELD BOOK 901, PAGES 32 TO 37. (1913)
1,494 LIN. FT 6" CONC. SEWER MAIN PER FIELD BOOK 901, PAGES 67, 68, 72, 76, 77 & 78. (1913)
790 LIN. FT 8" CONC SEWER MAIN PER FIELD BOOK 474, PAGE 76. (1913)
289 LIN. FT. 9" CONC SEWER MAIN PER FIELD BOOK 474, PAGE 47. (1913)
32 LIN. FT. 8" V.C. SEWER MAIN PER 9849-D. (1961)

NOTE:

THE QUANTITIES OF SEWER LATERAL CONNECTIONS, SEWER LATERAL EXTENSIONS, AND SEWER LATERALS SHOWN ON THE PLANS AND IN THE BID PROPOSAL MAY VARY. WHERE EXISTING SEWER LATERALS ARE FOUND TO BE OF CONCRETE, OR OF OTHER MATERIAL IN POOR CONDITION, A REPLACEMENT WITH VITRIFIED CLAY PIPE WILL BE MADE. SEE THE SPECIAL SPECIFICATIONS FOR MORE DETAILS.

THOSE STREETS WITHIN THIS PROJECT DESIGNATED AS MAJOR OR SECONDARY STREETS AND HIGHWAYS ARE:- C STREET, CEDAR STREET, GRAPE STREET, FERN STREET, JUNIPER STREET AND 30TH STREET.

PAVEMENT REPLACEMENT SHALL NOT BE LESS THAN 7 INCHES THICK FOR THESE STREETS AND NOT LESS THAN 5 INCHES THICK FOR ALL OTHERS.

WHERE EASEMENTS IN PRIVATE PROPERTY ARE NARROW, OR NO WIDTH IS INDICATED THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS WITH THE OWNER IF HIS CONSTRUCTION OPERATIONS WILL REQUIRE EXCESSIVE WIDTH. THE PROVISIONS FOR PROTECTION AND RESTORATION IN SECTION 1.29.02 OF THE STANDARD SPECIFICATIONS SHALL APPLY.

THE CONTRACTOR MUST REPLACE ANY MONUMENTS DESTROYED BY CONSTRUCTION.

BEFORE EXCAVATING, VERIFY LOCATION OF UNDERGROUND UTILITIES CONTACT:

GAS & ELECTRIC CO.	232 4252	EXT. 1658
TELEPHONE CO.	298 0595	
WATER & SEWER	236 5650	
BLDGS. & ELECT.	236 5505	
FIRE ALARM	234 6154	

WORK TO BE DONE SCHEDULE

IMPROVEMENTS	CITY STANDARD DRAWINGS VOL. 68-1	LEGEND
CONCRETE MANHOLE	M-6, S-3, M-23	MH
VITRIFIED CLAY PIPE SEWER MAIN	S-1	10" V.C.
SEWER LATERAL CONNECTION	S-22 S-23	C/1
HOUSE CONNECTION	" "	H/1
SEWER LATERAL	" "	S/1
JACKED SEWER MAIN (STEEL ENCASED)		JACKED SECTION
CONCRETE BACKFILL	S-28	
CONCRETE CRADLE	S-3	
CONCRETE ENCASEMENT	S-…	
SEWER MAIN DROP CONNECTION	S-20 …	NOTED ON PLANS, & SHEET 7
FOUNDATION ROCK	AS DIRECTED BY THE ENGINEER	
IMPORTED CLASS 'D' BACKFILL		
ADDITIONAL CLASS 'A' BACKFILL		

SPECIFICATIONS

CITY OF SAN DIEGO STANDARD SPECIFICATIONS DOCUMENT NO. 72773, …
CITY OF SAN DIEGO STANDARD DRAWINGS DOCUMENT NO. 726… …

SPECIAL SPECIFICATIONS NO. 2485

DATUM: MEAN SEA LEVEL

BENCH MARKS:
S.W. B.P. 33RD ST. & MARKET STREET, EL. …
S.E. B.P. 33RD ST. & C ST., EL. 129.763
S.W. B.P. BEECH ST. & BANCROFT ST., EL. 217…
S.E. B.P. BEECH ST. & 31ST ST., EL. 206.…
S.W. B.P. GROVE ST. & CEDAR ST., EL. 231.59
N.E. B.P. GRAPE ST. & 31ST ST., EL. 274.67
N.W. B.P. FERN ST. & HAWTHORNE ST., EL. 283.…
N.W. B.P. FERN ST. & IVY ST., EL. 290.09
N.E. B.P. FERN ST. & JUNIPER ST., EL. 289.…

REFFRENCES:

SEWER MAPS NOS. 200-1731, 202-1731, 202-1728, …
WATER GATE BOOK H-20, H-21, I-21, I-22
TELEPHONE SHEET 402
GAS BOOK 3, PAGES 22, 47, 48, 64, 65, …
BOOK 5, PAGES 221, 229 AND 234
FIELD NOTES: 200-1731, DATED 2/3/67, PER WEST, …
200-1731, DATED 3/9/67, PER WEST, 204-1728, DATED …
204-1728, DATED 5/16/67 PER WEST AND …

IMPROVEMENTS

SEWER 215-D, 216-D, 217-D, 218-D, 2746-D, 5367-…
WATER 9065-165-D, 9865-D, 11112-50, 11622-70, 6338-… …
DRAINAGE 2746-D, 1099-BL, 7893-L, 10512-L, …
PAVING 2746-D, 1090-L, 5402-L, 7893-L, 10512-L, …

C.I.P. 44-009

CITY CONTRACT

APPROVALS

CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT
SHEET 1 OF 8 SHEETS

UTILITIES DIRECTOR DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL		Coburn	2/…	
"AS BUILT"		Coburn	4/30/…	

CONTRACTOR HAM BROS. DATE STARTED 3-12-70
INSPECTOR H. MILLS DATE COMPLETED 4-8-71

W.O. NO. 47125

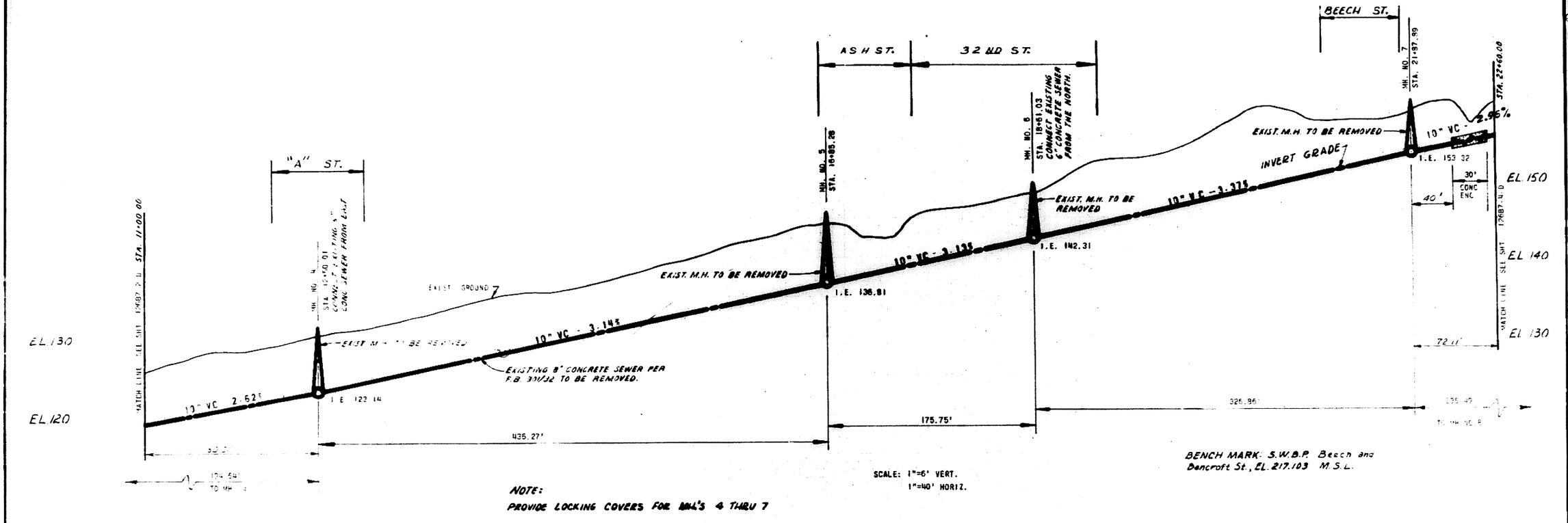
200-1731
LAMBERT COORDINATES

12487-1-D

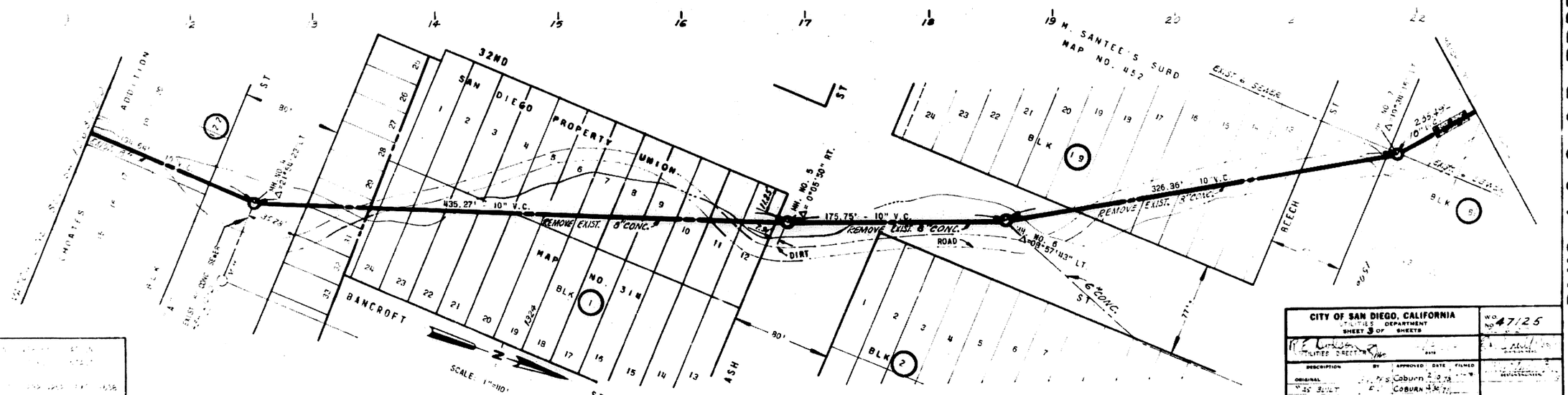
AS BUILT

GRAPE AND GROVE SEWER REPLACEMENT


BLKS. 12, 123 & 124, CHOATES ADDITION
NOTE:
The contractor shall construct these manholes not located in a public thoroughfare to eighteen inches above the natural ground.
"C" STREET
"B" STREET
ALLEY
MH. NO. 2
STA. 6+34.33
CONNECT TO EXIST. 10" V.C. CONNECT EXISTING 6" SEWERS FROM EAST AND WEST
MH. NO. 3
STA. 10+55.37
CONNECT TO EXIST. 10" V.C.
STA 11+00.00
EXIST. GROUND
EXIST. M.H. TO BE REMOVED
EXIST. 10" VC - 2.54%
INVERT GRADE
24" R.C.P.
I.E. 107.40
I.E. 107.23
I.E. 96.24
I.E. 118.04
EXIST. 8" CONC. SEWER PER F.B. 901/32 TO BE REMOVED
12" V.C. 2.68%
EL 120
EL 110
EL 100
EL 90
162.00'
130' CONC. BACKFILL
414.18'
416.18'
418.33'
420.99'
(420.99' EXIST. 10" V.C. NOT TO BE REPLACED)
44.63'
TO MH. 4
SCALE: 1" = 6' VERT.
1" = 40' HORIZ.
BENCH MARK S.W.B.P. 33rd and C St. EL 129.763 M.S.L.
NOTE:
PROVIDE LOCKING COVERS FOR MH.'S 1 THRU 3
BEFORE EXCAVATING, VERIFY LOCATION OF UNDERGROUND UTILITIES - CONTACT:
GAS & ELECTRIC CO. 232-4252, EXT. 1658
TELEPHONE CO. 298-0595
WATER & SEWER 236-5650
BLDGS. & ELECT. 236-5505
FIRE ALARM 234-6154
32ND STREET
33RD STREET
CHOATES ADDITION
EXIST. 6" SEWER
EXIST. 6" SEWER PER 215-D
10" V.C. EXIST.
DIRT ROAD
REMOVE EXIST. 8" CONC.
60" R.C.P.
MH. NO. 2 Δ=1°25'50" LT
SCALE: 1"=40'
GRAPE STREET AND GROVE STREET SEWER MAIN REPLACEMENT
12" & 10" V.C. SEWER MAINS
CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT
SHEET 2 OF SHEETS
W.O. NO. 47125
UTILITIES DIRECTOR
ORIGINAL
"AS BUILT"
Coburn 2/10/70
Coburn 4/30/71
200-1731
CONTRACTOR HAM BROS.
INSPECTOR H. MILLS
DATE STARTED 8-12-70
DATE COMPLETED 4-8-71
12687-2-D
AS BUILT



NOTE:
PROVIDE LOCKING COVERS FOR MH'S 4 THRU 7



GRAPE STREET AND GROVE STREET
SEWER MAIN REPLACEMENT
10" V.C. SEWER MAIN

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC UTILITIES DEPARTMENT
SHEET 3 OF SHEETS

WO No. 47125

DESCRIPTION	BY	APPROVED	DATE	FILED
ORIGINAL		M.S. Coburn	2-9-78	
AS BUILT		M.S. COBURN	4-26-78	

CONTRACTOR HAM BROS
INSPECTOR M. MILLS
DATE STARTED 3-2-78
DATE COMPLETED 4-3-78

12687-3-D

BLKS. 1 & 2, S.D. PROP. UNION - BLK. 19, M. SANTEE S SUBD.