SEMS-RM DOCID # 1164847

CITY OF
MOUNTAIN VIEW
CALIFORNIA

ENGINEERING STUDY

ON THE

EAST TRUNK SEWER

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INTRODUCTION AND SCOPE OF STUDY

The increase in residential and industrial development activities in the City areas east of Stevens Creek is resulting in sewage wastes volumes approaching the capacity of the existing trunk sewer facilities. The construction of the East Trunk Sewer from the Sewage Treatment Plant to the intersection of Fairchild Drive and Whisman Road will provide for the adequate collection and transportation of these wastes. The purpose of this engineering study is to determine the capacity requirements, most feasible location, and estimated construction cost of the East Trunk Sewer.

The basic scheme for the East Trunk Sewer was developed by Brown and Caldwell and is outlined in the 1957 report on "City of Mountain View Water, Sewerage, and Drainage Survey." The lower portion of this trunk sewer was again considered and discussed in the "Engineering Study on Main Collector Sewers to serve the Central North Area," a report prepared by Paul L. Adamson in 1963. The present study represents a re-examination of these previous studies in light of recent trends of development and a refined and more specifically detailed consideration of the entire East Trunk Sewer.

CONTRIBUTING SERVICE AREA

For purposes of investigation, the contributing service areas of the proposed trunk sewer have been arbitrarily divided into two general areas, i.e., those areas south of Bayshore Freeway and those areas north of Bayshore Freeway.

The areas south of Bayshore Freeway that will be contributing wastes to the East Trunk Sewer are outlined on Plate 1. These areas comprise that portion of the Mountain View planning area lying east of Stevens Creek Freeway, a total area of approximately two square miles.

The service areas north of Bayshore Freeway are bounded by Stevens Creek, Moffett Field Naval Air Station, and the salt pond dikes, and are outlined on Plate 2. In addition, the East Trunk Sewer will intercept flows from the Easterly Collector Sewer and the Stierlin Trunk Sewer; the service areas and flows from these sewers are more particularly delineated and described in the aforementioned engineering study on Main Collector Sewers for the Central North Area (1963).

The original concept (1957) of the East Trunk Sewer did not include provision for serving the Naval Air Station, and due to the uncertainties involved and lack of adequate information, the Naval Air Station was not included within the service areas established in this report. However, should it be desired to consider a proposal for acceptance of the Naval Station sewage wastes into the City system prior to the final design and construction of the East Trunk Sewer, it is believed that a re-examination and revised preliminary plan could be accomplished with little difficulty, assuming adequate flow data is supplied by the Navy.

DESIGN CRITERIA

The design criteria used in this engineering study are listed in the Appendix and are consistent with the recent standard practices of the Engineering Division of the City of Mountain View.

SEWAGE FLOW CHARACTERISTICS

The contributing areas south of Bayshore Freeway consist predominantly of existing and projected multiresidential and industrial land uses. Individual areas of common projected use are outlined and designated on Plate 1. The projected land uses are based upon a review of the City's Preliminary General Plan, Precise Neighborhood Plans, Zoning Map, and expected trends in development. The letter prefix, A, B, or C, has been applied

to each zone to indicate the existing sewage collection pattern; sewage flows from contributing areas with the prefix A enter the existing trunk sewer system on Evandale Avenue at Whisman Road, flows from B areas enter at Evandale and Tyrella Avenues, and the C area flows enter in the Moffett Boulevard and Emily Drive vicinity. The individual areas and their respective projected land use and population data are itemized in Table 1.

In assigning projected densities to the individual contributing areas of multi-family residential character, no attempt was made to differentiate between the various living unit density requirements as set forth under the present zoning ordinance. A high density of 70 persons per acre was applied to all projected multi-family residential areas in order to preclude capacity deficiencies resulting from possible rezoning of low and medium multiresidential land to a more intensified use.

The service areas north of Bayshore Freeway have been considered as potential industrial lands. Inasmuch as the design criteria for wastes discharge from industrial developments represents a relatively high equivalent domestic flow, it is believed that this assumption is a conservative and reasonable one.

EXISTING SEWERAGE FACILITIES

At the present time sewage wastes from the contributing areas south of Bayshore Freeway are being collected and transported by an existing trunk system which discharges into the Stierlin Road Trunk. The main sewer collectors are located on Tyrella Avenue and Whisman Road and are intercepted by the Evandale Trunk Sewer which crosses Stevens Creek and discharges into the Stierlin Road Trunk at Terra Bella Avenue. The carrying capacity of the Evandale Trunk between Whisman Road and Moffett Boulevard has been calculated at 2.6 c.f.s., which is insufficient to carry the expected flow of 7.1 c.f.s. west of Whisman Road and 14.3 c.f.s. west of Tyrella Avenue.

Industrial wastes from the major portion of the Ellis-Middlefield area is now being lifted into the Evandale Trunk by means of a temporary pump station located at the intersection of Whisman Road and Fairchild Drive. The capacity of the temporary pump station has recently been doubled to 1000 gallons per minute reflecting the increase in industrial development in the area. The construction of the East Trunk Sewer will eliminate the need for this pump station, thus reducing annual maintenance and operation costs and obviating the need to provide for additional pumping capacity as the flows increase.

There are no municipal sanitary sewers within the service area north of Bayshore Freeway.

THE PROPOSED PLAN

The preliminary plan for the East Trunk Sewer is shown on Plate 2. The plan has been developed to provide for the interception and transportation of the wastes originating in the area south of the Bayshore Freeway (thus relieving the existing trunk sewers including the Stierlin Trunk), and to provide the basic unit for gravity sewer service for the lands north of Bayshore Freeway.

The principal geographic features of the area through which the East Trunk Sewer is proposed to be located are essentially the same as has been described in the 1963 report on the North Central Area Collector Sewers. In general, the relief is relatively flat and at low elevations. The land slopes toward the Bay at a decreasing rate of incline from elevation 40 at Fairchild Drive and Whisman Road to an elevation slightly below mean sea level near the salt pond dikes.

The alignment of the Phase 1 portion of the proposed project was approved by the City Council on May 11, 1964, following consideration of alternate routes from the sewage treatment plant to the east side of Stevens Creek. The Stierlin Road Trunk Sewer flows are to be intercepted by means of a relief sewer aligned along the existing right-of-way and prolongation of Stierlin Road. The proposed Easterly Collector Sewer can be intercepted by the East Trunk Sewer at an appropriate location approximately midway between Stierlin Road and Stevens Creek.

The alignment of the Phase 2 portion of the proposed project is recommended as shown on Plate 2 in consideration of the following items:

1. The proposed alignment is direct and centrally located within the large undeveloped areas in the northeastern portion of service area. This provides for the construction of future collector sewers at depths which are consistent with standard City practices (assuming Minimum Elevation Ordinance No. 175,608 remains in effect).

2. Property lines and existing rights-of-way are followed extensively. Property severance is kept to a minimum, only one parcel is actually divided by the routing.

3. The Fairchild Drive route is preferred over that of Evandale Avenue due to potential utility conflicts and location of existing preparatory connection facilities at Whisman Road.

The crossing of Bayshore Freeway will require extensive jacking operations. It is envisioned that the 300 feet of casing can be placed by jacking from each side of the freeway to an open pit located in the median strip area. Should the Division of Highways refuse to allow an open pit, an alternate crossing has been delineated which provides for a shorter length of casing (200 feet) but involves acquiring an easement on the Naval Reservation.

Initial connections to the East Trunk Sewer are proposed at Tyrella Avenue, Fairchild Drive, Whisman Road, and Stierlin Road Extension. Future connections will include the Easterly Collector, Moffett Boulevard, and local collectors to serve the northern areas as they develop.

Although capacity allowance in the East Trunk Sewer design provides for the acceptance of sewage from the "C" areas as shown on Plate 1, it is proposed to continue to sewer this area by means of the Evandale-Terra Bella Trunk Sewer in order to keep this line active. Should it appear desirable in the future to abandon the Evandale-Terra Bella Trunk between the west side of Stevens Creek Freeway and Moffett Boulevard, interception of the flow from the

"C" areas can be accomplished by a connection to the East Trunk Sewer at Moffett Boulevard and Fairchild Drive as shown on Plate 2.

PRELIMINARY ESTIMATE OF CONSTRUCTION COSTS

A preliminary estimate of the construction cost of the East Trunk Sewer is included in the Appendix of this report, a summary of which is itemized below:

Phase 1 Construction and Contingency	$ 369,160.
Phase 2 Construction and Contingency	418,050
Total Construction and Contingency	$ 787,210

The preliminary estimate includes costs for connections at Stierlin Road, Tyrella Avenue, Fairchild Drive, and Whisman Road, and includes allowance for appurtenant items such as manholes, street resurfacing, etc. Land acquisition costs, engineering, and incidental expenses have not been included in the estimate.

SUMMARY

The proposed preliminary plan for the East Trunk Sewer as presented herein represents a recommended scheme for providing a trunk sewer facility to intercept and transport existing and projected wastes volumes from the eastern service area of the City's sanitary sewer system. The plan also provides for the future development of the northeastern baylands. Although capacity for sewage discharges from Moffett Field has not been provided in this plan, it is envisioned that the alignment of the trunk sewer would not be altered by such an arrangement and that redesign of the lower portion of the East Trunk Sewer can be accomplished by supplemental investigation prior to actual construction.

APPENDIX

DESIGN CRITERIA

Ave. Industrial and Commercial Discharge	2000 g. p. a. d.
Peak Industrial and Commercial Discharge	6000 g. p. a. d.
Ave. Domestic (Residential) Discharge	70 g. p. c. d.
Peak Domestic Discharge:	
Varies in accordance to the curve incorporated in the "Standard Design Criteria" of the City of Mountain View, as employed in 1964.	
Allowance for Infiltration	1000 g. p. a. d.
Minimum Velocity (Full or Half Full)	2 f. p. s.
Roughness Coefficient (Manning "n")	0.013
Minimum Ground Elevation (Req'd)	5.5 M. V. Datum
Minimum Bldg. Slab Elevation	7.2

EAST TRUNK SEWER

PRELIMINARY QUANTITIES AND CONSTRUCTION ESTIMATE

PHASE 1 (Includes Stierlin Road Relief Sewer)

1900	Lin. Ft.	39" RCP (Ave. Depth 18')	@	65.00	$123,500
1400	"	36" " " " 15'	@	42.00	58,800
2850	"	33" " " " 14'	@	38.00	108,300
1800	"	21" VCP " " 10'	@	25.00	45,000
					335,600
		Contingency (10%)			33,560
		Total Phase 1 Construction			369,160

PHASE 2 (Includes Tyrella, Whisman, and Fairchild Connections)

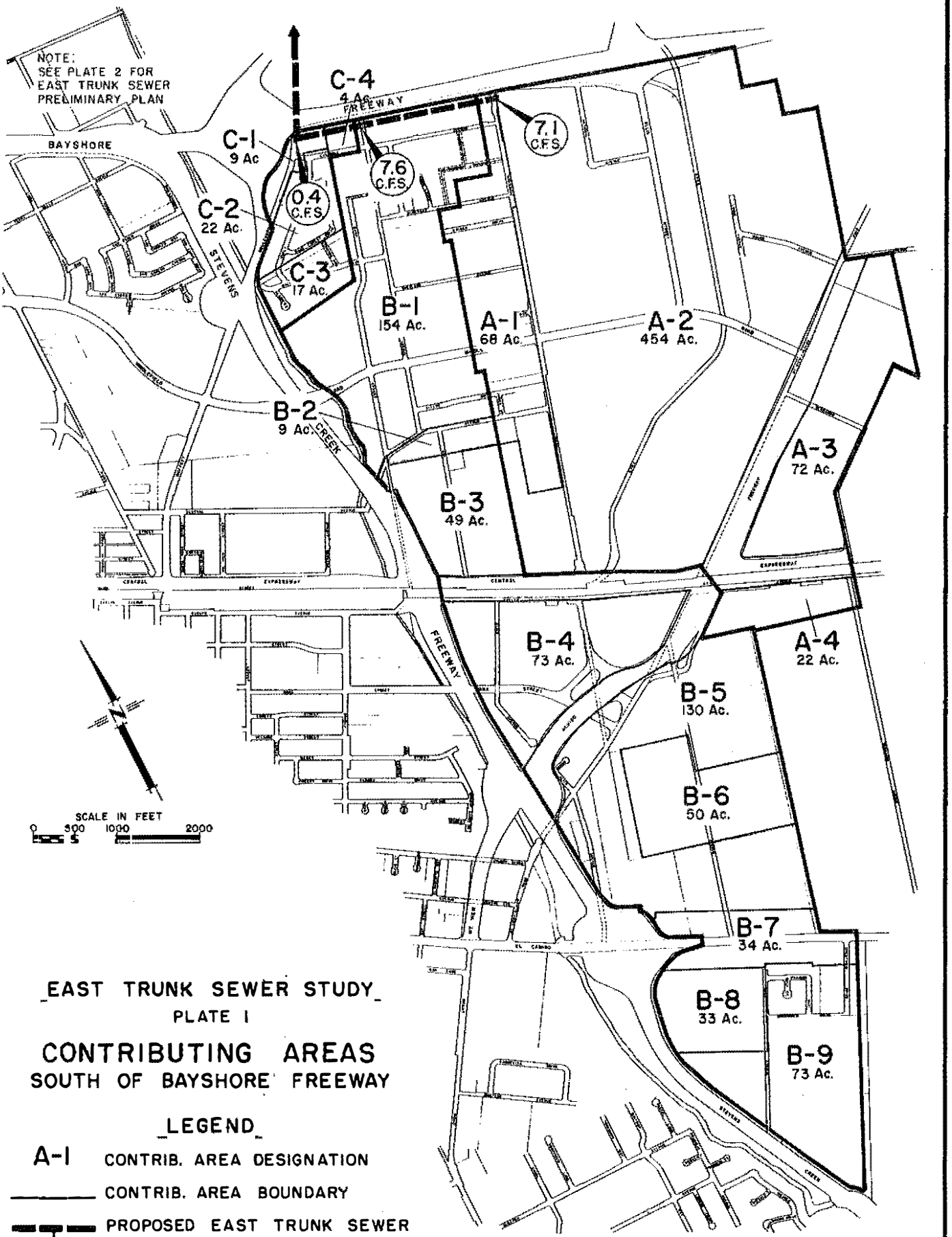
1700	Lin. Ft.	33" RCP (Ave. Depth 12')	@	36.00	61,200
3150	Lin. Ft.	27" VCP " " 12'	@	27.00	85,050
2000	Lin. Ft.	24" " " " 14'	@	28.00	56,000
2200	"	24" " " " 17'	@	35.00	77,000
1600	"	24" " " " 16'	@	33.00	52,800
375	"	18" " " " 16'	@	26.00	9,750
375	"	15" " " " 14'	@	22.00	8,250
Freeway Crossing (Casing and Jacking)					30,000
					380,050
		Contingency (10%)			38,000
		Total Phase 2 Construction			418,050

TOTAL PRELIMINARY CONSTRUCTION, PHASES 1 & 2 $787,210

TABLE 1

PROJECTED LAND USE, POPULATIONS, AND SEWAGE FLOWS
FROM CONTRIBUTING AREAS SOUTH OF BAYSHORE FREEWAY

Area No.	Acres	Projected Development	Density Per Acre	Population	Ave. Dom. Flow-MGD	Peak Dom. Flow-MGD	Ave. Ind. & Coml. Flow	Peak Ind. & Coml. Flow	Infilt. Flow	Total Peak MGD	Total Peak CFS
A-1	68	Multires.	70	4760	.33		-		.07		
A-2	454	Industrial	-	-	-		.91		.45		
A-3	72	Industrial	-	-	-		.14		.07		
A-4	22	Industrial	-	-	-		.04		.02		
Total Entering at Whisman				4760	.33	.66	1.09	3.27	.61	4.54	7.1
B-1	154	Multires.	70	10780	.76		-		.16		
B-2	9	Multires.	70	630	.04		-		.01		
B-3	49	Industrial	-	-	-		.10		.05		
B-4	73	Industrial	-	-	-		.15		.07		
B-5	130	Multires.	70	9100	.64		-		.13		
B-6	50	Singleres.	15	750	.05		-		.05		
B-7	34	Commercial	-	-	-		.07		.04		
B-8	33	Multires.	70	2310	.16		-		.03		
B-9	73	Multires.	70	5110	.36		-		.07		
Total Entering at Tyrella				28680	2.01	3.28	.32	.96	.61	4.85	7.6
C-1	9	Commercial	-	-	-		.02		.01		
C-2	22	Singleres.	15	330	.02		-		.02		
C-3	17	Multires.	70	1190	.08		-		.02		
C-4	4	Multires.	70	280	.02		-		.00		
Total Entering at Moffett				1800	.13	.31	.02	.06	.05	0.42	0.7
East Trunk Q At Bayshore Fwy.				35240	2.47	3.95	1.43	4.29	1.27	9.51	14.8



EAST TRUNK SEWER STUDY

PLATE I

CONTRIBUTING AREAS
SOUTH OF BAYSHORE FREEWAY

LEGEND

A-1 CONTRIB. AREA DESIGNATION

CONTRIB. AREA BOUNDARY

PROPOSED EAST TRUNK SEWER

7.6 C.F.S. DESIGN SEWAGE FLOW ENTERING EAST TRUNK SEWER

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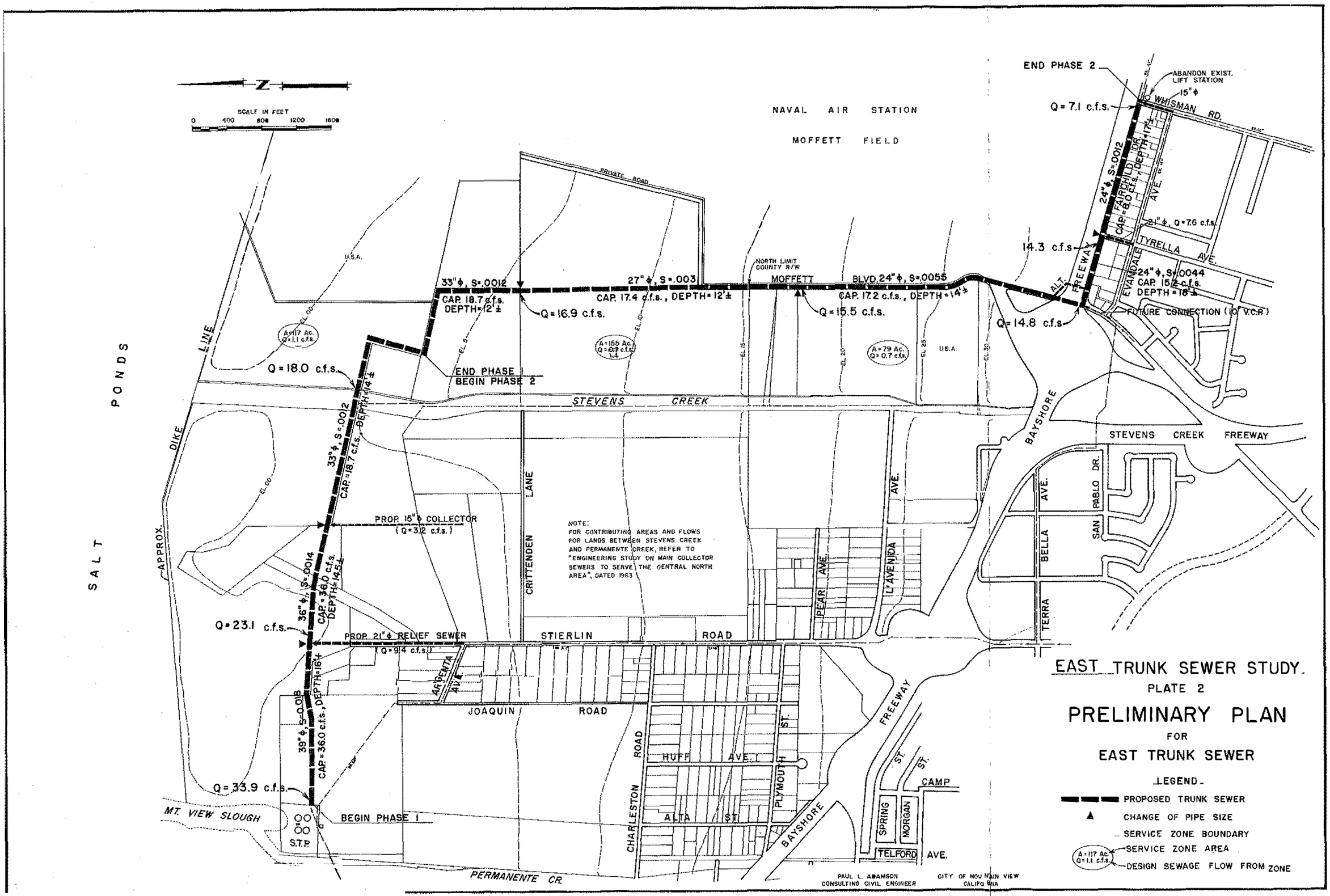
CITY OF MOUNTAIN VIEW
CALIFORNIA


N
SCALE IN FEET
0 400 800 1200 1600
NAVAL AIR STATION
MOFFETT FIELD
PRIVATE ROAD
U.S.A.
SALT PONDS
APPROX. DIKE LINE
MT. VIEW SLOUGH
S.T.P.
PERMANENTE CR.
STEVENS CREEK
END PHASE 2
ABANDON EXIST. LIFT STATION
15" ϕ
Q = 7.1 c.f.s.
WHISMAN RD.
24" ϕ, S=.0012
CAP. 14.0 c.f.s., DEPTH=17'±
FAIRCHILD DR.
AVE.
15" ϕ, Q=7.6 c.f.s.
TYRELLA AVE.
14.3 c.f.s.
ALT. FREEWAY
EVANDALE
24" ϕ, S=.0044
CAP. 15.2 c.f.s.
DEPTH=18'±
FUTURE CONNECTION (10" V.C.P.)
Q=14.8 c.f.s.
33" ϕ, S=.0012
CAP. 18.7 c.f.s.
DEPTH=12'±
Q=16.9 c.f.s.
27" ϕ, S=.003
CAP. 17.4 c.f.s., DEPTH=12'±
NORTH LIMIT COUNTY R/W
MOFFETT BLVD. 24" ϕ, S=.0055
CAP. 17.2 c.f.s., DEPTH=14'±
Q=15.5 c.f.s.
A=117 Ac. Q=1.1 c.f.s.
A=155 Ac. Q=0.7 c.f.s.
A=79 Ac. Q=0.7 c.f.s.
EL. 00
EL. 5
EL. 10
EL. 15
EL. 20
EL. 25
EL. 30
Q=18.0 c.f.s.
END PHASE 1
BEGIN PHASE 2
33" ϕ, S=.0012
CAP.=18.7 c.f.s., DEPTH=14'±
PROP. 15" ϕ COLLECTOR
(Q=3.2 c.f.s.)
36" ϕ, S=.0014
CAP.=36.0 c.f.s.
DEPTH=14.5'±
Q=23.1 c.f.s.
PROP. 21" ϕ RELIEF SEWER
(Q=9.4 c.f.s.)
39" ϕ, S=.0018
CAP.=36.0 c.f.s., DEPTH=16'±
Q=33.9 c.f.s.
BEGIN PHASE 1
NOTE:
FOR CONTRIBUTING AREAS AND FLOWS FOR LANDS BETWEEN STEVENS CREEK AND PERMANENTE CREEK, REFER TO "ENGINEERING STUDY ON MAIN COLLECTOR SEWERS TO SERVE THE CENTRAL NORTH AREA", DATED 1963
CRITTENDEN LANE
STIERLIN ROAD
JOAQUIN ROAD
ARGENTA AVE.
PEAR AVE.
L'AVENIDA AVE.
BAYSHORE FREEWAY
STEVENS CREEK FREEWAY
SAN PABLO DR.
BELLA AVE.
TERRA
CHARLESTON ROAD
HUFF AVE.
ALTA ST.
PLYMOUTH ST.
CAMP ST.
SPRING ST.
MORGAN ST.
TELFORD AVE.
EAST TRUNK SEWER STUDY
PLATE 2
PRELIMINARY PLAN
FOR
EAST TRUNK SEWER
LEGEND
PROPOSED TRUNK SEWER
CHANGE OF PIPE SIZE
SERVICE ZONE BOUNDARY
SERVICE ZONE AREA
DESIGN SEWAGE FLOW FROM ZONE
A=117 Ac.
Q=1.1 c.f.s.
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