Drainage Study
“the Nest”

Lots 13-17, Block 1 Map No. 991

4033 Lamont Street
San Diego, California 92109

Prepared for:
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January 15, 2021

PTS No. 676545

Introduction

This project involves the demolition of all existing improvements on the property located at 4033 Lamont Street (multi-family residential) and the construction of 18 residential apartment units with parking garage, utilities, treatment BMPs and landscaping.

The attached drainage area maps are from a topographic survey by Christensen Engineering & Surveying, dated April 02, 2020. As shown on the pre-construction drainage area map, drainage from the site is by surface flow and is urban in character. Prior to construction site runoff flows southeasterly onto the unnamed alley (0.88 cfs for the 100-yr storm). No offsite run-on flows through the project site. The project prior to development is multi-residential with no drainage conveyance system nor runoff treatment.

Following construction, total site runoff remains the same. Runoff to Lamont Street increases by 0.78 cfs and to the alley decreases by the same volume. The ultimate collection of runoff into the public storm drain system remains the same (at the NW curb inlet at Fortuna Avenue and Morrell Street). The site has 8,115 sf of imperviousness existing and a proposed 11,429 of imperviousness, following development, a change from 58.0% to 83.6% area of imperviousness.

Impervious area runoff will be treated by two raised standard Filterra units due to the site being hydromodification exempt and being classified a non-infiltration site. The site is required to treat 1.5 times the flow based runoff (weight adjusted runoff coefficient) times 0.2 in/hr times the area flowing to the Filterra units). After treatment, runoff is conveyed to a curb outlet in Lamont Street. The required retention element of the project is achieved through flow from 521 sf of the entry surface runoff flowing over 523 sf of landscaping in 12” amended soil along the westerly boundary of the project, discharging to Lamont Street by sheet flow. The project discharges runoff to a hardened conveyance system that discharges to an exempt water body (Mission Bay). Runoff flows onto Lamont then flows southerly to Fortuna Avenue and then easterly to a curb inlet at the northwesterly corner of Fortuna Avenue and Morrell Street. From the curb inlet the runoff flows southerly in a 24” RCP to a curb inlet at the southerly intersection of Fortuna Avenue and Morrell Street, then southerly in a 30” RCP to Crown Point Drive where it turns southwesterly continuing approximately 210’ to a cleanout and then turns southeasterly to discharge through an outlet to

Mission Bay that is lower than the 100-yr BFE of 8'. It discharges from a 30" pipe at an elevation of 2.50' NGVD29 which equates to 4.59' NAVD88.

Section 404 of CWA regulates the discharge of dredged or fill material into waters of the United States. Section 404 is regulated by the Army Corps of Engineers. Section 401 of CWA requires that the State provide certification that any activity authorized under Section 404 is in compliance with effluent limits, the state's water quality standards, and any other appropriate requirements of state law. Section 401 is administered by the State Regional Water Quality Control Board. The project does not require a Federal CWA Section 404 permit nor Section 401 Certification because it does not cause dredging or filling in waters of the United States and is in compliance with the State Water Quality Standards. See separate SWQMP.

The Rational Method was used to calculate the anticipated flow for the 100-year storm return frequency event using the method outlined in the City of San Diego Drainage Design Manual.

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the engineer of work for this Project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the business and professions code, and that the design is consistent with current standards. I understand that the check of project drawings and specifications by the City of San Diego is confined to review only and does not relieve me, as engineer of work, of my responsibilities for project design

_____ 01-15-21

Antony K. Christensen Date
RCE 54021 Exp. 12-31-21
JN A2020-52

Calculations

1. Intensity Calculation

From the City of San Diego Drainage Design Manual, Figure A-4
Tc = Time of concentration

$Tc = (1.8\ (1.1-C)\ D^{1/2})/S^{1/3}$

Since the difference in elevation is 3' (31.3'-28.3') and the distance traveled is 155', S=1.9%. C = 0.70 (portion of site exposed to rainfall is multi-residential.

Tc = 7.4 minutes.

From Figure A-1

I_{100} = 3.9 inches

2. Coefficient Determination

Pre-Construction:

From Table A-1 for Multi-Family residential:

C= 0.70

Post-Construction:

From Table A-1 for Multi-Family residential:

C= 0.70

3. Volume calculations

Q = CIA

Areas of Drainage

Pre-Construction

Area draining easterly to alley	PC = 0.3211 Ac

Post-Construction

Area of building and planters draining to cleanout and pumped to curb outlet	BP= 0.2532 Ac
Area at rear draining to alley by sheet flow	RP= 0.0300 Ac
Area at front draining to Lamont St by sheet flow	FP = 0.0307 Ac
Area at alley dedication flowing on alley	AD= 0.0072 Ac

Pre-Construction

Q_{100PC} = (0.70) (3.9) (0.3211)

Q_{100PC} = 0.88 cfs

Post-Construction

Q_{100BP} = (0.70) (3.9) (0.2532)
Q_{100RP} = (0.70) (3.9) (0.0300)
Q_{100FP} = (0.70) (3.9) (0.0307)
Q_{100AD} = (0.70) (3.9) (0.0072)

Q_{100BP} = 0.69 cfs
Q_{100RP} = 0.08 cfs

Q_{100FP} = 0.09 cfs
Q_{100AD} = 0.02 cfs

Q_{TOTAL} = 0.88 cfs

4. Discussion

Due to no change in use the total calculated runoff is expected to be unchanged (0.88 cfs leaving the site). Runoff to the alley will decrease by 0.78 cfs and increase to Lamont Street by the same volume. The ultimate collection of runoff into the public storm drain system remains the same (at the NW curb inlet at Fortuna Avenue and Morrell Street).

Runoff from area BP is conveyed to a cleanout equipped with a pump to convey it to the curb outlet that outlets to Lamont Street. The pump will be sized at the time of ministerial permit processing.

The volume of runoff conveyed to the curb outlet is 0.69 cfs and its velocity is will be 2.7 fps. See attached printout.

5. Water Quality Treatment

The site is categorized as non-infiltration and hydromodification exempt so qualifies for treatment with a proprietary biofiltration unit. The following depicts the calculations:

Northerly Filterra Unit

A=6,251 sf = 0.1435 ac
I = 0.2 in/hr
C=0.9 for runoff treatment

Q = CIA(1.5)
Q = 0.9*0.2*0.1435*1.5
Q = 0.0387 cfs

4’ x 6’ Filterra is capable of treating 0.0556 cfs and so is adequate

Q_{100} = (0.70) (3.9) (0.1435)
Q_{100} = 0.39 cfs

Filterra unit with 6” bypass is adequate (capable of conveying 0.6 cfs).

Southerly Filterra Unit

A=4,201 sf = 0.0964 ac
I = 0.2 in/hr
C=0.9 for runoff treatment

Q = CIA(1.5)
Q = 0.9*0.2*0.0964*1.5
Q = 0.0260 cfs

4’ x 4’ Filterra is capable of treating 0.0370 cfs and so is adequate

Q_{100} = (0.70) (3.9) (0.0964)
Q_{100} = 0.26 cfs

Filterra unit with 6” bypass is adequate (capable of conveying 0.6 cfs).

APPENDIX

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

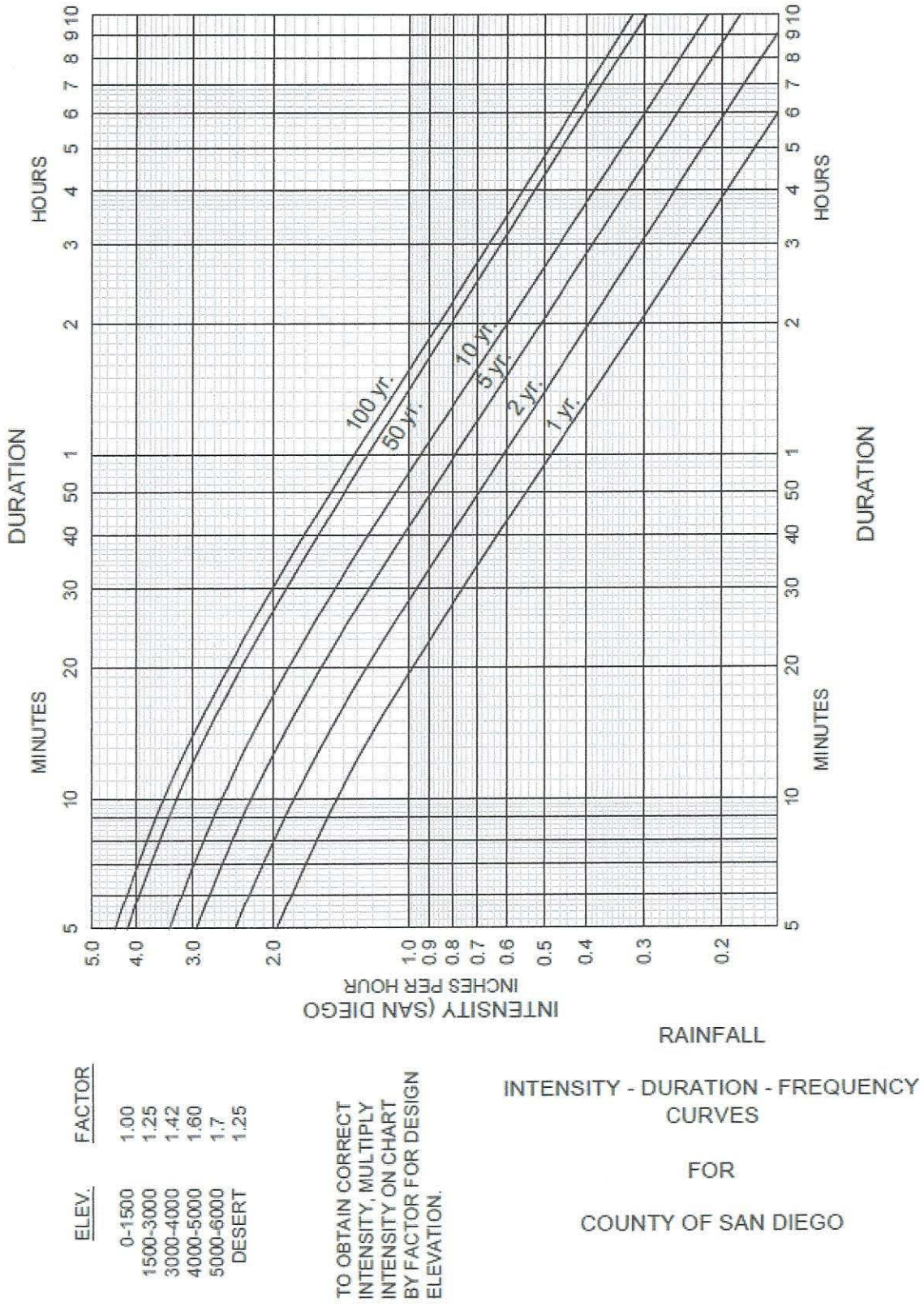


Figure A-1. Intensity-Duration-Frequency Design Chart

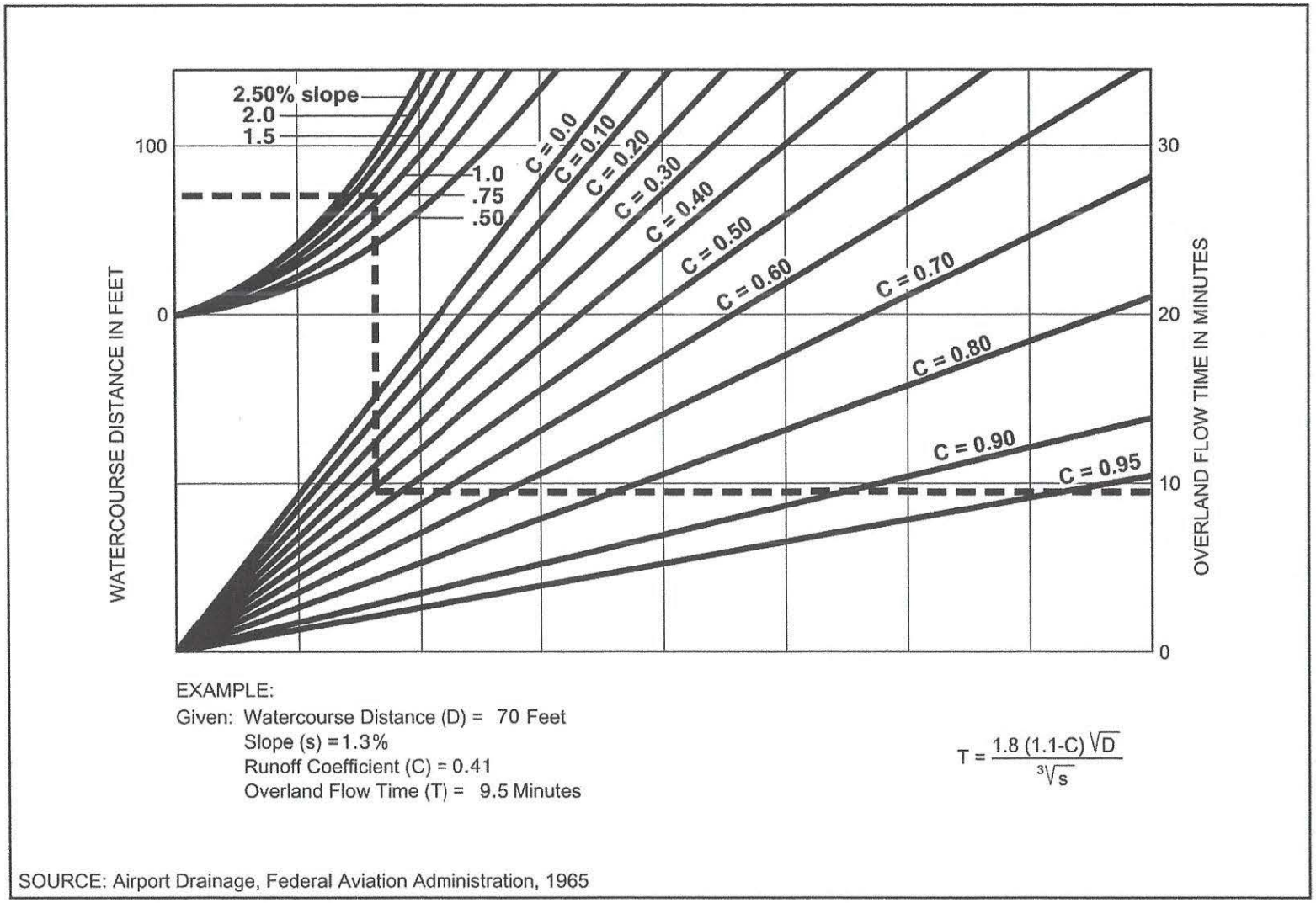
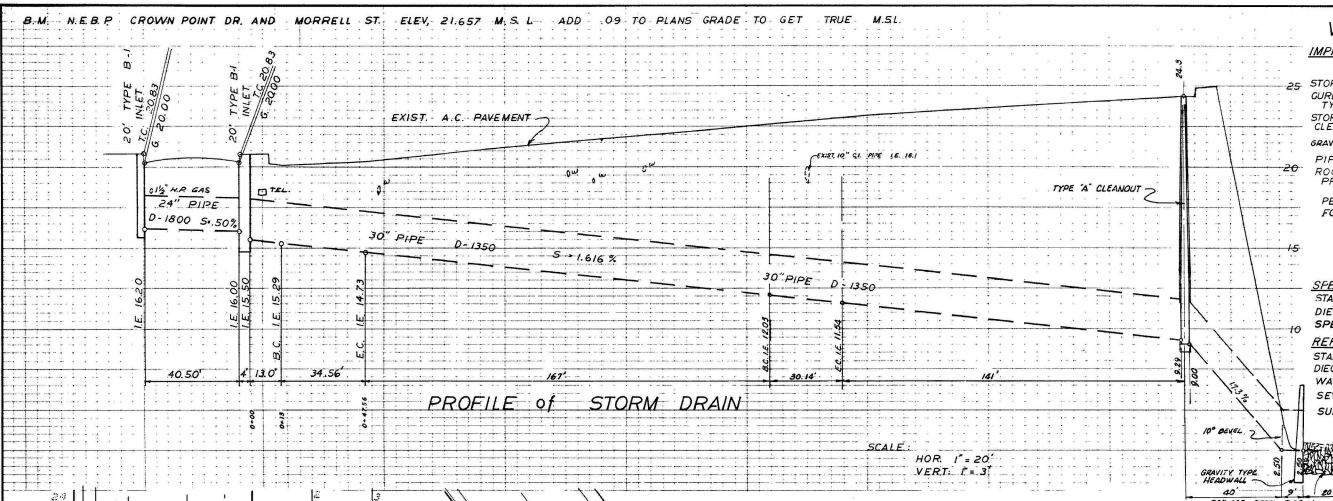


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

Type of conveyance is a: Curb Outlet
Depth of channel equals .25 Feet
Bottom Width Equals 3
Side slope equals .01
Slope of conveyance equals 1.5 %
Roughness equals .013
Flow quantity equals .6931499 CFS
Area equals .2610757 Square Feet
Velocity equals 2.642912 FPS
Depth of flow equals .087 Feet

B.M. N.E.B.P. CROWN POINT DR. AND MORRELL ST. ELEV. 21.657 M.S.L. ADD .09 TO PLANS GRADE TO GET TRUE M.S.L.



WORK TO BE DONE

IMPROVEMENT	STD. DWGS. VOL. 71-1	LEGEND
STORM DRAIN	D-3,	=====
CURB INLET APRON TYPE B-1	D-16, D-4, D-5, D-6, D-37, D-9	
STORM DRAIN CLEANOUT-TYPE A	D-4, D-11, D-9	
GRAVITY TYPE HEADWALL	D-1 D-9	
PIPE COLLAR	D-14	
ROCK SLOPE PROTECTION		
PEDESTRIAN RAMP FOR THE HANDICAPPED	G-60-T (REV. 4-18-76)	

SPECIFICATIONS

STANDARD SPECIFICATIONS OF THE CITY OF SAN DIEGO DOCUMENT NO. 727731 FILED 4-14-69 SPECIAL SPECIFICATION NO. 4108

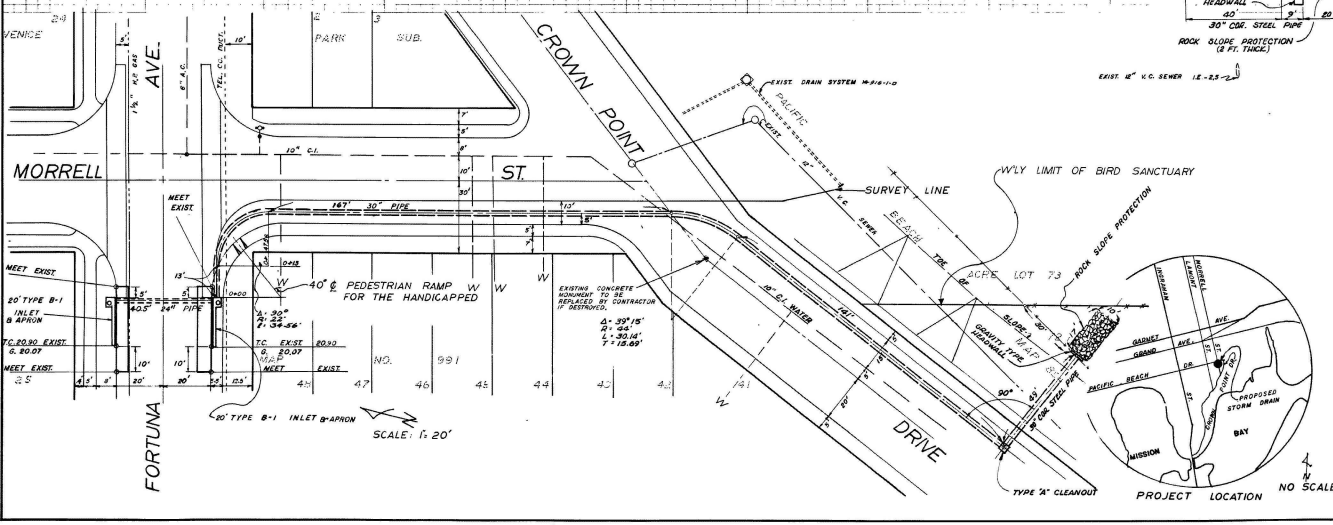
REFERENCE DRAWINGS

STANDARD DRAWINGS OF THE CITY OF SAN DIEGO DOCUMENT NO. 735691 FILED 4-26-71

WATER 3744 W
SEWER 1816-D

SURVEY NOTES:
CHIEF: HATCH
INDEX: 228-1698

W.O. NO. 117354
DATE:



BEFORE EXCAVATING, VERIFY LOCATION OF UNDERGROUND UTILITIES - CONTACT

GAS & ELECTRIC CO.	235-6333
TELEPHONE CO. & FIRE ALARM	298-0595
WATER & SEWER	236-5650
COMMUNICATIONS DIVISION	236-5505
BUILDINGS AND IRRIGATION	236-5500

CITY CONTRACT

MORRELL STREET DRAIN

CITY OF SAN DIEGO, CALIFORNIA
DEPARTMENT OF TRANSPORTATION
SHEET 1 OF 1 SHEETS

W.O. NO. 117354

CHIEF ENGINEER — DATE 5-31-76 — DIRECTOR — DATE 6/14/76

DESCRIPTION	BY	APPROVED, DATE	FILMED
ORIGINAL	M.G.		

DESIGN ENGINEER

CONTROL CERTIFICATION: 228 - 1698
LAMBERT COORDINATES

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

16763 -D

DRAINAGE AREA MAPS

PRE-DEVELOPMENT DRAINAGE AREA MAP

PRE-CONSTRUCTION DRAINAGE AREA MAP

AREA PC (RED)
0.3211 AC
FLOWS TO ALLEY
BY SHEET FLOW

CHICO STREET

LAMONT STREET

ALLEY

LOT 13

LOT 14

LOT 15

LOT 16

LOT 17

STOP

Ground Cleaned

N 75°30'14" E 116.20

N 14°29'46" W 43.00

N 14°29'46" W 12.20

N 75°30'14" E 116.20

N 14°29'46" W 43.00

N 06°10'46" W 10.73

N 14°29'46" W 12.20

8" PVC SEWER PER DWG 22705-12-3

1-#2 HP GAS SHOWN ON DWG 22705-12-3

8" AC WATER PER DWG 1650-8-3

RW

MH

POST-DEVELOPMENT DRAINAGE AREA MAP

POST-CONSTRUCTION DRAINAGE AREA MAP

AREA RP (BLUE)
0.0300 AC
FLOWS TO ALLEY
BY SHEET FLOW

AREA BP (RED)
0.2532 AC
FLOWS TO TYPE A-4
CATCH BASIN AND THEN
TO CURB OUTLET

AREA AD (GREEN)
0.0072 AC
FLOWS ON ALLEY
BY SHEET FLOW

AREA FP (CYAN)
0.0307 AC
FLOWS TO LAMONT
BY SHEET FLOW

CHICO STREET

LAMONT STREET

ALLEY

LOT 13

LOT 14

LOT 15

LOT 16

LOT 17

31.0 FF
30.25 PAD

N 75°30'14" E 107.50'

N 75°30'14" E 119.20'

N 14°29'46" W 43.00'

N 14°29'46" W 70.73'

8" PVC SEWER PER DWG 22780-14-D

8" AC WATER PER DWG 1600-8-D

Ground Obscured