CITY OF ALBUQUERQUE

December 2, 2005

Mr. David Soule, PE
RIO GRANDE ENGINEERING
1606 Central Ave. SE, Suite 201
Albuquerque, NM 87106

RE: WILSHILRE ESTATES (C-20/D55)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 12/06/2004
Engineers Certification dated 12/01/2005

Dear David:

Based upon the information provided in your Engineer's Certification Submittal dated 12/01/2005, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, you can contact me at 924-3982

Sincerely,

Arlene V. Portillo

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

C: Marilyn Maldonado, COA# 753581
File

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE REPORT

For

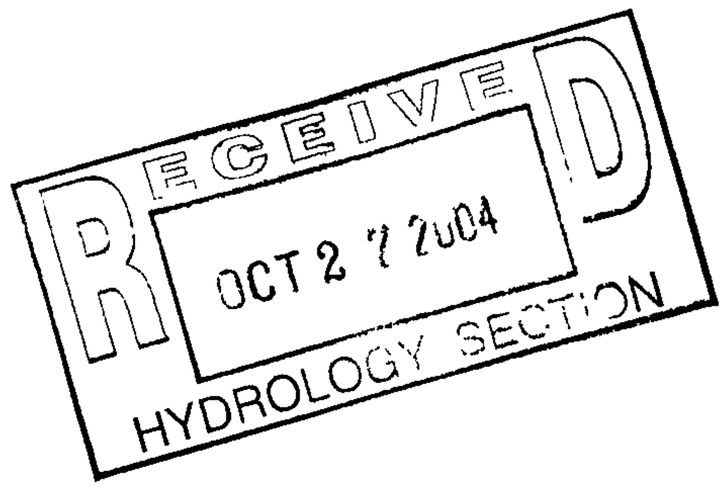
WILSHIRE ESTATE SUBDIVISION
Albuquerque, New Mexico

Prepared by

Rio Grande Engineering
3500 Comanche Blvd. NE
Albuquerque, New Mexico 87107

October 2004

David Soule P.E. No. 14522



PURPOSE

The purpose of this report is to provide the Drainage Management Plan for the development of the Wilshire Estates Subdivision. This plan will be utilized for the development of the subject property as a 12-lot single family residential subdivision. This plan was prepared in accordance with the City of Albuquerque's Development Process Manual. This report will demonstrate that the proposed improvements do not adversely affect the surrounding properties, nor the upstream or downstream facilities.

INTRODUCTION

The subject of this report, as shown on the Exhibit A, is a 3-acre parcel of land located on the south side of Wilshire Avenue between Holbrook Boulevard and Ventura Boulevard. The site is located in the Far Northeast area of Albuquerque. The legal description of this site is Lots 1, 2, 3 of Block 16, Tract 3, Unit 3 North Albuquerque Acres. As shown on FIRM map 35001C141F, the entire site lies within flood zone X. The site is currently undeveloped.

The site is located within basin 923 as described in the North Albuquerque Acres Master Drainage Plan (NAAMDP) and as shown on Appendix C. Minor upstream flows enter the site along the eastern boundary. The site currently drains from the east to the west, discharging directly into the Ventura Boulevard Right-of-Way. Once the flows enter into Ventura they are conveyed south and captured by an inlet locate at the southwest corner of this site. The development of this site must be in conformance to the governing North Albuquerque Acres Master Drainage Plan.

EXISTING CONDITIONS

The site is currently undeveloped. The site is covered with native grasses; there are signs of minor impact from human activities. The site slopes from east to west at a typical 4% slope. Minor flows enter the site from the eastern boundary. As described within the NAAMDP and shown on in Appendix C, this site is located within the Domingo Baca drainage basin. As shown in Appendix A, the site currently discharges 7.72 cfs directly to the Ventura Boulevard. This flow is conveyed south to an existing inlet locate at the southern edge of this property.

PROPOSED CONDITIONS

This site is located within the boundaries of the North Albuquerque Acres Master Drainage Plan (NAAMDP). The development of this site will be in conformance to this Plan. As shown in the NAAMDP, this site is located within Basin 923. As shown in Appendix C, this site is allowed to free discharge based upon the land treatments listed in Table A-1. Based upon the developed conditions assumptions this site is allowed to discharge 13.14 cfs. This site is required to build its portion of the surrounding storm drainage system, which is based upon the flow rates specified within the NAAMDP. The storm drain in Ventura is to be a 36" RCP with a 91 cfs capacity, and the storm drain within Wilshire is to be a ~~30~~ 36" RCP with a capacity of 42cfs. Based upon conversation with the City Engineer, these pipes have been increased in size to what is shown on the grading plan. As shown in Appendix B, the storm drains have adequate capacity for the flow rates specified within the NAAMDP. We recommend the upstream pond not be eliminated until the Holbrook diversion is constructed.

The development of this site shall include the construction of a single Cul-de-sac and 12 individual single-family residential lots. The lots will be graded to free discharge to the roadways which will drain to the west where the flows are captured by a single-grated type-A inlet. This inlet will connect to the Ventura Boulevard storm drain via an 18" RCP. As shown in Appendix B, the

inlet, storm drain and Cul-de-sac were designed to accommodate the entire flow. The upland flows will be directed to the north along the eastern wall. As shown in Appendix A, the site is predicted to discharge 12.22 cfs. The proposed improvements within Ventura are being coordinated with Tierra West. It is anticipated that the storm drain improvements will be constructed with the adjacent Desert Vista subdivision, yet the will be financially guaranteed with this project.

SUMMARY AND RECOMMENDATIONS

This site is an undeveloped portion of land located directly adjacent to the La Cueva Arroyo. The development of this project will consist of 12 single family residential lots. This site is located within the boundaries of the North Albuquerque Acres Master Drainage Plan. The proposed discharge resulting from this development is 12.22 cfs. The allowable discharge for fully developed onsite conditions is 13.14 cfs. The surrounding adjacent storm drain infrastructure is being constructed with this development.

The proposed site development does not adversely affect the upstream or downstream facilities. The site was designed in conformance to City of Albuquerque Drainage Policy. Therefore, we request approval of the site-grading plan. Since public improvements will be constructed a work order and Subdivision Improvement Agreement will be required. Since this site encompasses more than 1 acre, a NPDES permit will be required prior to any construction activity.

Weighted E Method

Existing Basins

											100-Year		
Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)			
onsite	130680.00	3.000	60%	1.8	10%	0.300	20%	0.6	10%	0.300	0.982	0.246	7.72

Proposed Developed Basins

											100-Year, 6-hr.			10-day
Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Volume (ac-ft)
			%	(acres)	%	(acres)	%	(acres)	%	(acres)				
Proposed	130680.00	3.000	2%	0.06	8%	0.240	12%	0.36	68%	2.040	1.846	0.462	12.22	0.734
Allowable	130680.00	3.000	0%	0	20%	0.600	10%	0.3	70%	2.100	1.965	0.491	13.14	0.771

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Where for 100-year, 6-hour storm

Ea= 0.66	Qa= 1.87
Eb= 0.92	Qb= 2.6
Ec= 1.29	Qc= 3.45
Ed= 2.36	Qd= 5.02

Street Capacity Calculations

Ventura Court

24' F-F Street Section with 4" curb

Slope= 0.04

For water depths less than 0.0625 feet

Y=	Water depth
Area =	16*Y^2
P=	SQRT(1025*Y^2) + Y
=	0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.33	0.00	0.00	0.00	0.50	0.01	0.88	0.00844
0.02	0.0064	0.66	0.01	0.01	0.01	0.79	0.02	0.99	0.01974
0.025	0.01	0.83	0.01	0.01	0.02	0.92	0.02	1.03	0.02593
0.035	0.0196	1.16	0.02	0.02	0.05	1.15	0.04	1.09	0.03908
0.045	0.0324	1.49	0.02	0.04	0.09	1.36	0.06	1.13	0.05307
0.052	0.043264	1.72	0.03	0.07	0.13	1.50	0.08	1.16	0.06327
0.06	0.0576	1.98	0.03	0.10	0.19	1.65	0.10	1.19	0.07528
0.0625	0.0625	2.06	0.03	0.11	0.21	1.70	0.11	1.20	0.07911

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1=	Y-0.0625
A2=	A1 + 2*Y1 + 25*Y1^2
P2=	P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.063506	2.09	0.03	0.11	0.22	1.70	0.11	1.20	0.07958
0.1	0.172656	3.98	0.04	0.37	0.75	2.16	0.22	1.20	0.1274
0.13	0.311406	5.51	0.06	0.80	1.60	2.58	0.33	1.26	0.1754
0.16	0.495156	7.04	0.07	1.48	2.95	2.98	0.48	1.31	0.22763
0.2	0.810156	9.08	0.09	2.83	5.66	3.49	0.70	1.38	0.30179
0.207	0.873506	9.43	0.09	3.13	6.25	3.58	0.74	1.39	0.31519
0.2612	**1.446942**	**12.20**	**0.12**	**6.11**	**12.21**	**4.22**	**1.10**	**1.46**	**0.42259**
0.3025	1.9825	14.31	0.14	9.28	18.56	4.68	1.42	1.50	0.50806

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2=	Y - 0.3025
A3=	A2 + Y2*14
P3=	P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.31	0.14	9.34	18.67	4.69	1.42	1.50	0.50984
0.3039	2.0021	14.31	0.14	9.43	18.87	4.71	1.43	1.51	0.51304
0.3062	2.0343	14.31	0.14	9.69	19.37	4.76	1.46	1.52	0.52123
0.31	2.0875	14.31	0.15	10.11	20.22	4.84	1.50	1.53	0.53478
0.3125	2.1225	14.32	0.15	10.39	20.79	4.90	1 53	1.54	0.5437
0.32	2.2275	14.32	0.16	11.26	22.52	5.06	1.62	1.57	0.5705
0.3317	2.3913	14.34	0.17	12.67	25.34	5.30	1.76	1.62	0.61244
0.333	2.4095	14.34	0.17	12.83	25.66	5.32	1.77	1.63	0.61711

For water depths greater than 0.333 ft but less than 0.513 ft

Y3=	Y - 0.333
A4=	A3 + 13 * Y3 + 25 * Y3^2
P4=	P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4356	14.44	0.17	13.00	26.00	5.34	1.79	1.63	0.62048
0.3601	2.78016	15.69	0.18	15.33	30.66	5.51	1.99	1.62	0.66414
0.38	3.075725	16.69	0.18	17.42	34.83	5.66	2.15	1.62	0.70039
0.38946	3.223173	17.16	0.19	18.48	36.96	5.73	2.23	1.62	0.71807
0.4603	4.469532	20.70	0.22	28.12	56.24	6.29	2.90	1.63	0.85827
0.504	5.363525	22.89	0.23	35.64	71.28	6.64	3.35	1.65	0.9504
0.513	5.5595	23.34	0.24	37.35	74.70	6.72	3.45	1.65	0.96982

Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
1(easment)	18	4.02	1.77	0.375	19.61	12.22	6.92
2(s. ventura)	48	1	12.57	1	133.74	91.00	7.24
3(n. ventura	48	1.03	12.57	1	135.73	91.00	7.24
4(wilshire)	36	3.81	7.07	0.75	121.22	42.00	5.94

Manning's Equation:

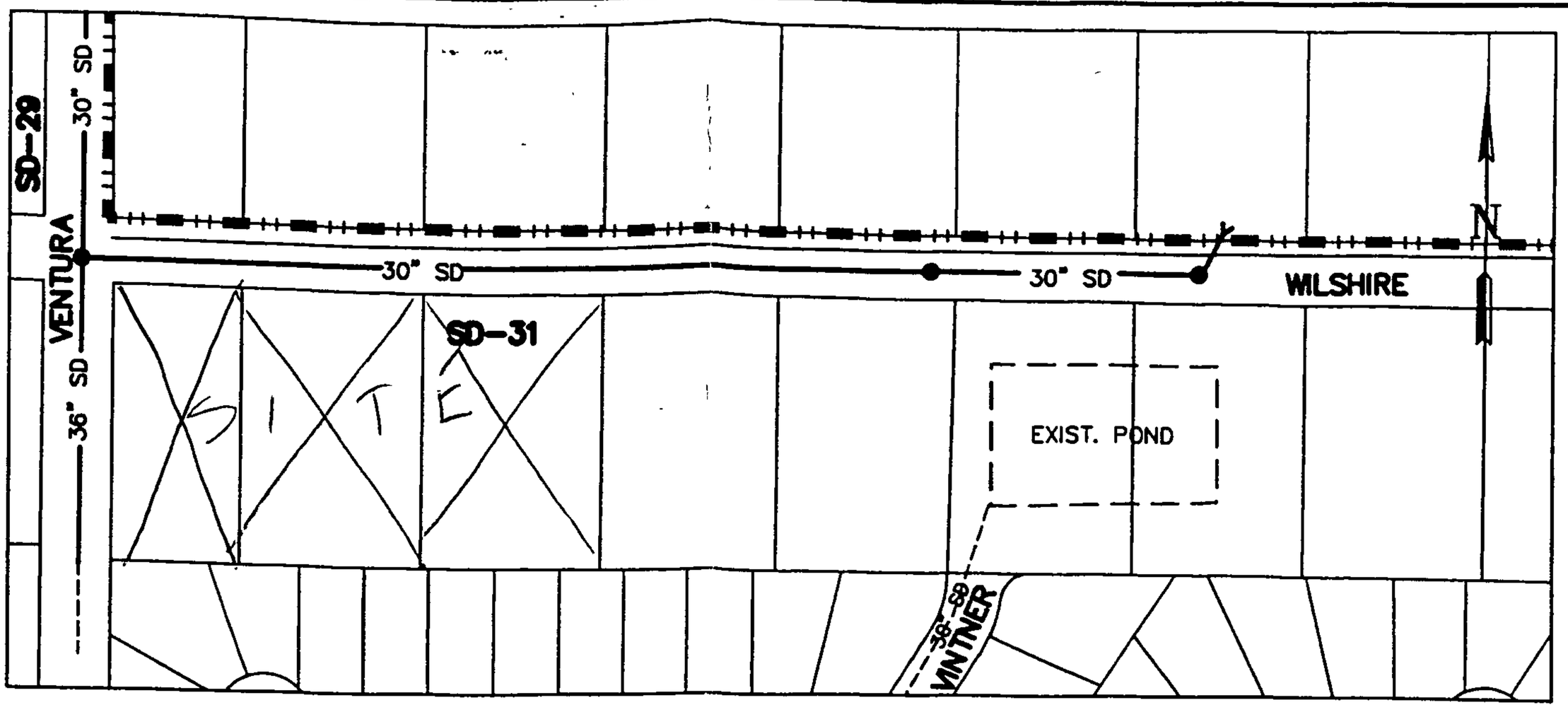
Q = 1.49/n * A * R^(2/3) * S^(1/2)

A = Area
R = D/4
S = Slope
n = 0.014

TABLE A-1 (cont.)

NORTH DOMINGO BACA SUB-BASIN CHARACTERISTICS

Basin ID	Hydrologic Condition	Basin Area (mi^2)	Land Treatment (%)				TP (hrs)
			A	B	C	D	
920.1	Existing	.0202	70	10	10	10	.133
	Future	.0202	22	23	38	17	.133
920	Existing	.0431	83	2	5	10	.147
	Future	.0431	22	23	38	17	.147
922	Existing	.021	30	15	40	15	.19
	Future	.021	22	23	38	17	.19
922.1	Existing	.007	66	17	0	17	.133
	Future	.007	0	34	16	50	.133
922.2	Existing	.0148	0	30	30	40	.133
	Future	.0148	0	30	30	40	.133
922.3	Existing	.0415	0	30	30	40	.133
	Future	.0415	0	30	30	40	.133
923	Existing	.007	60	10	20	10	.133
	Future	.007	0	20	10	70	.133
926.2	Future	.0470	0	40	20	40	.133
926.1	Existing	.012	22	23	38	17	.133
	Future	.012	0	34	16	50	.133
926	Existing	.0375	50	0	25	25	.133
	Future	.0578	0	25	15	60	.133
925.2	Existing	.014	96	0	2	2	.133
	Future	.0094	0	34	16	50	.133
925.1	Existing	.064	0	34	16	50	.133
	Future	.064	0	34	16	50	.133
925.3	Existing	.0105	0	34	16	50	.133
	Future	.0105	0	34	16	50	.133
925.4	Existing	.0370	0	20	30	50	.133
	Future	.0370	0	20	30	50	.133
924.1	Existing	.019	95	0	3	2	.133
	Future	.019	0	34	16	50	.133



WILSHIRE: RESIDENTIAL
EXISTING R/W: 60'
FUTURE R/W: 38'

20 A 1.75" DISK LOCATED AT THE
VENTURA AVE. AND ANAHEIM ON A DROP
(DRANT OF THAT INTERSECTION
10-97)

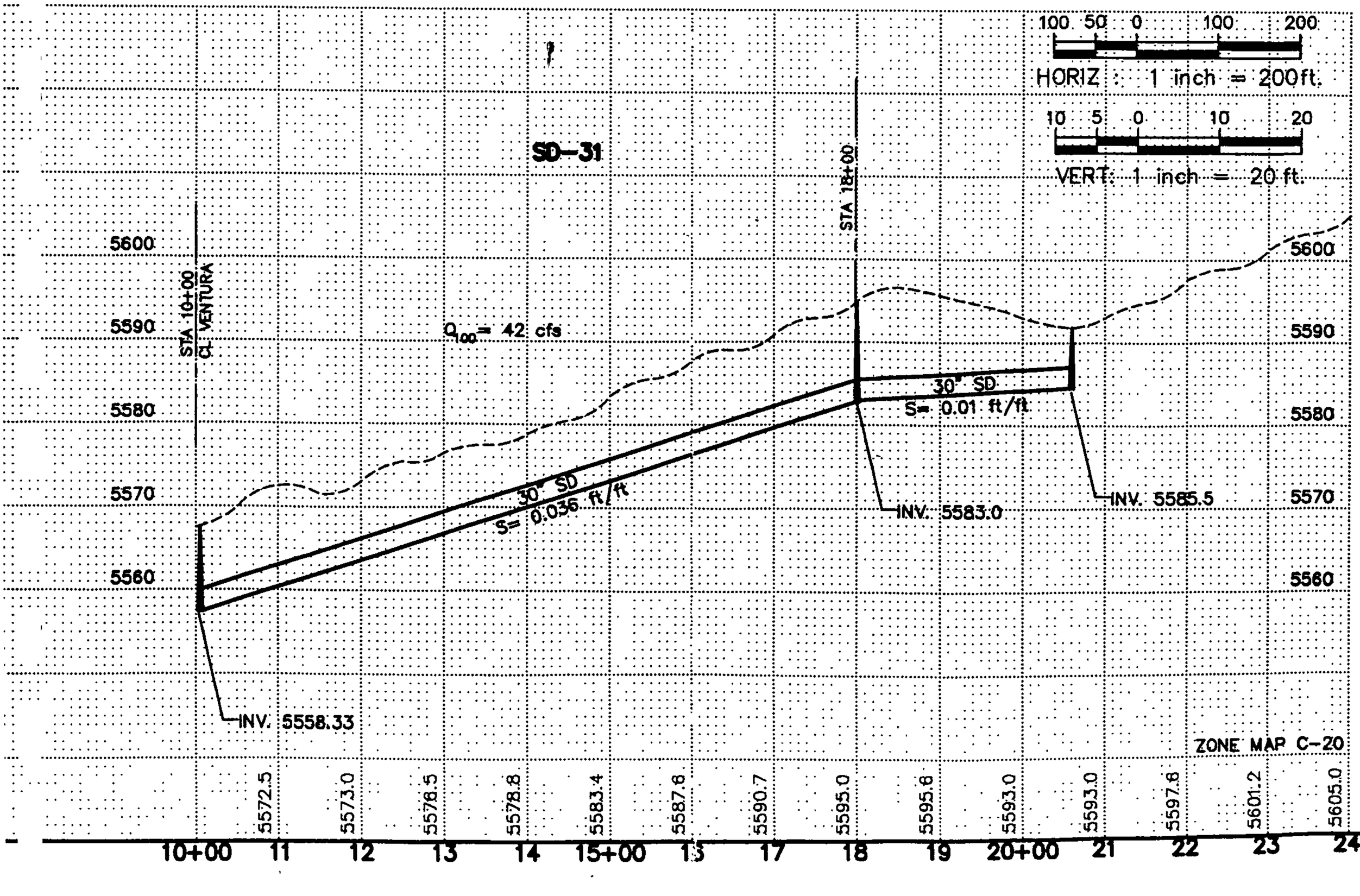
WILSHIRE

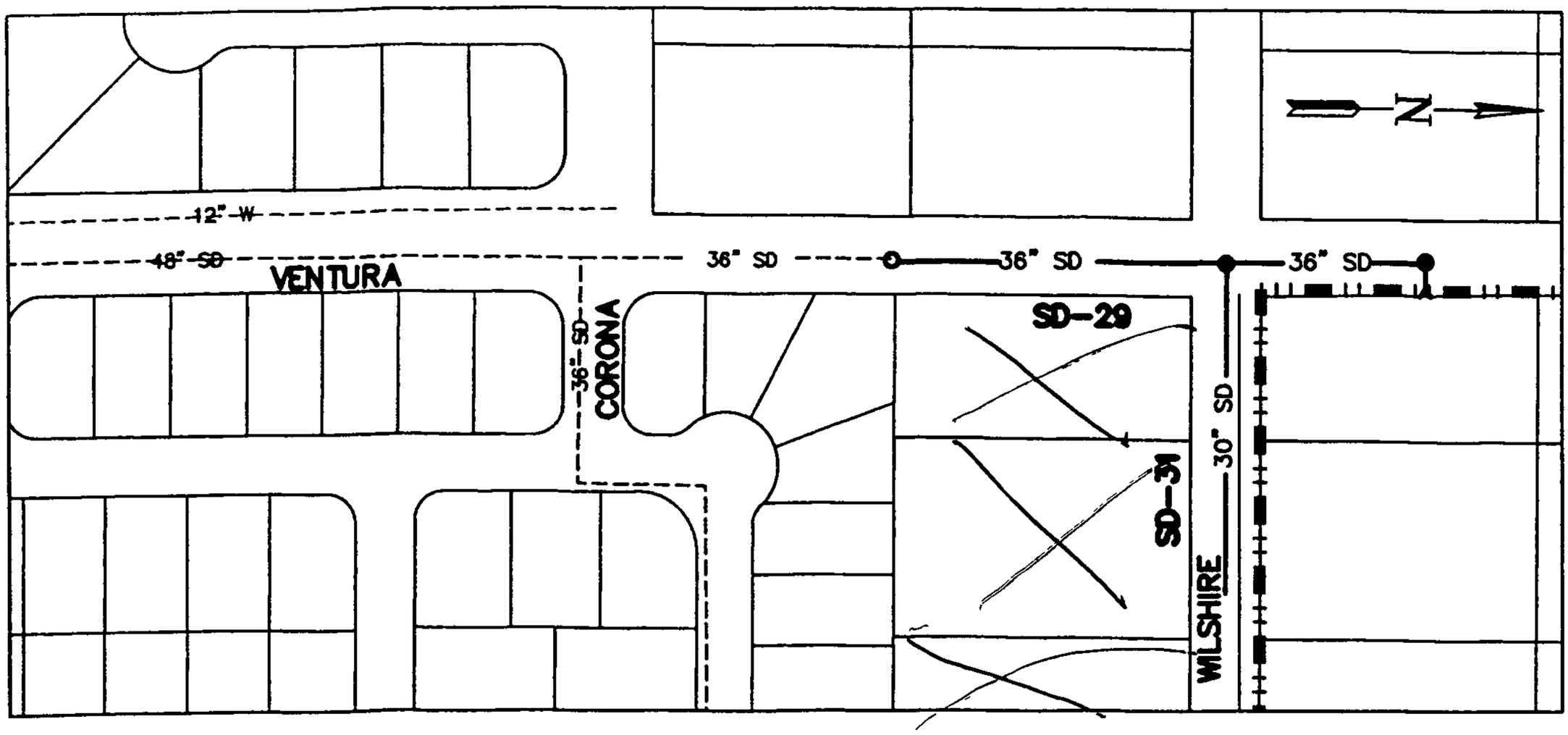
FIGURE 6J

Resource Technology, Inc.

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

NAA MASTER DRAINAGE PLAN
VENTURA STORM DRAIN
SD-29 SD-31

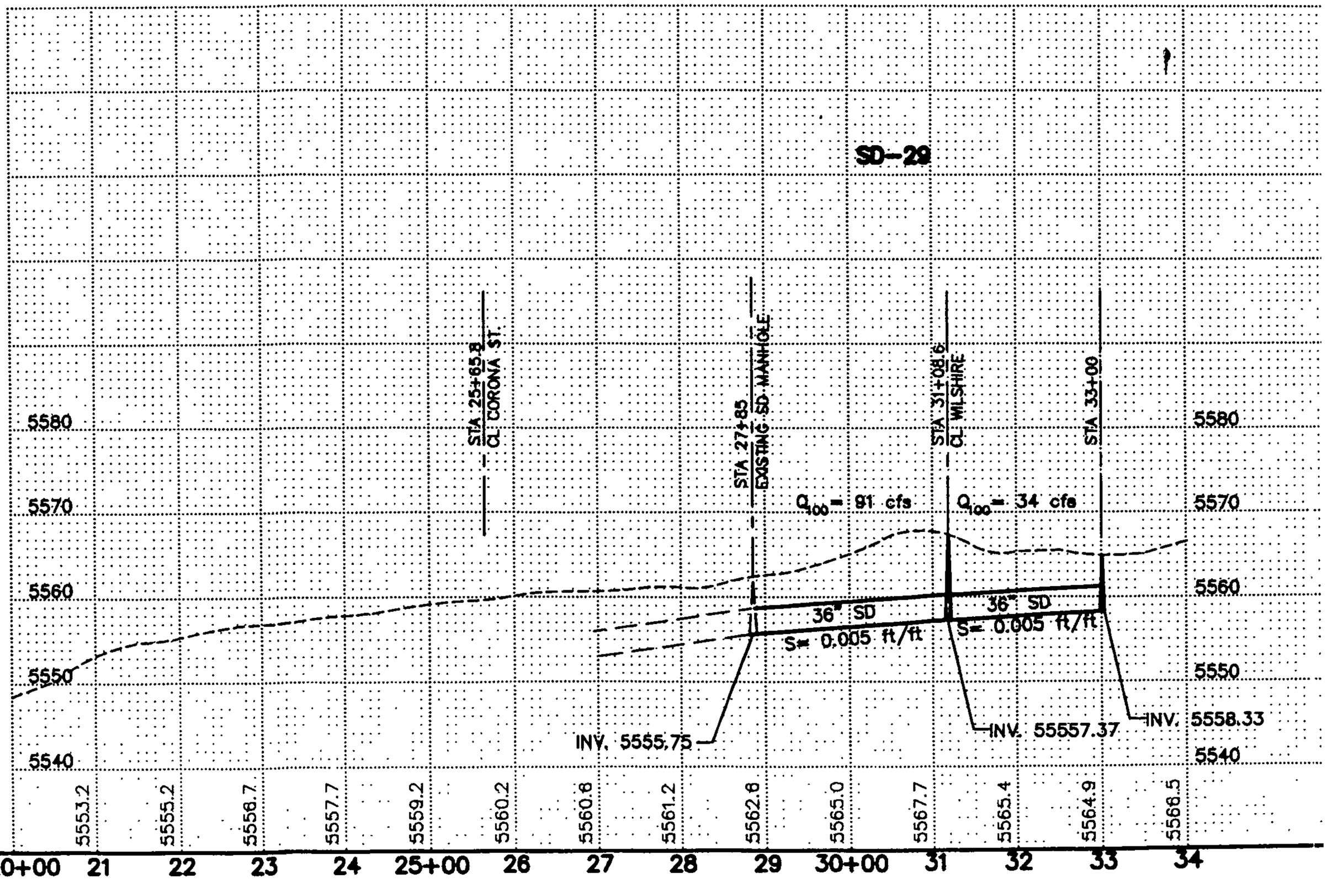




VENTURA: MINOR ARTERIAL
EXISTING R/W: 60'
FUTURE R/W: 86'

BENCHMARK: 5-C
INTERSECTION OF
INLET IN THE NNE
ELEV. = 5552.709

VENTURA



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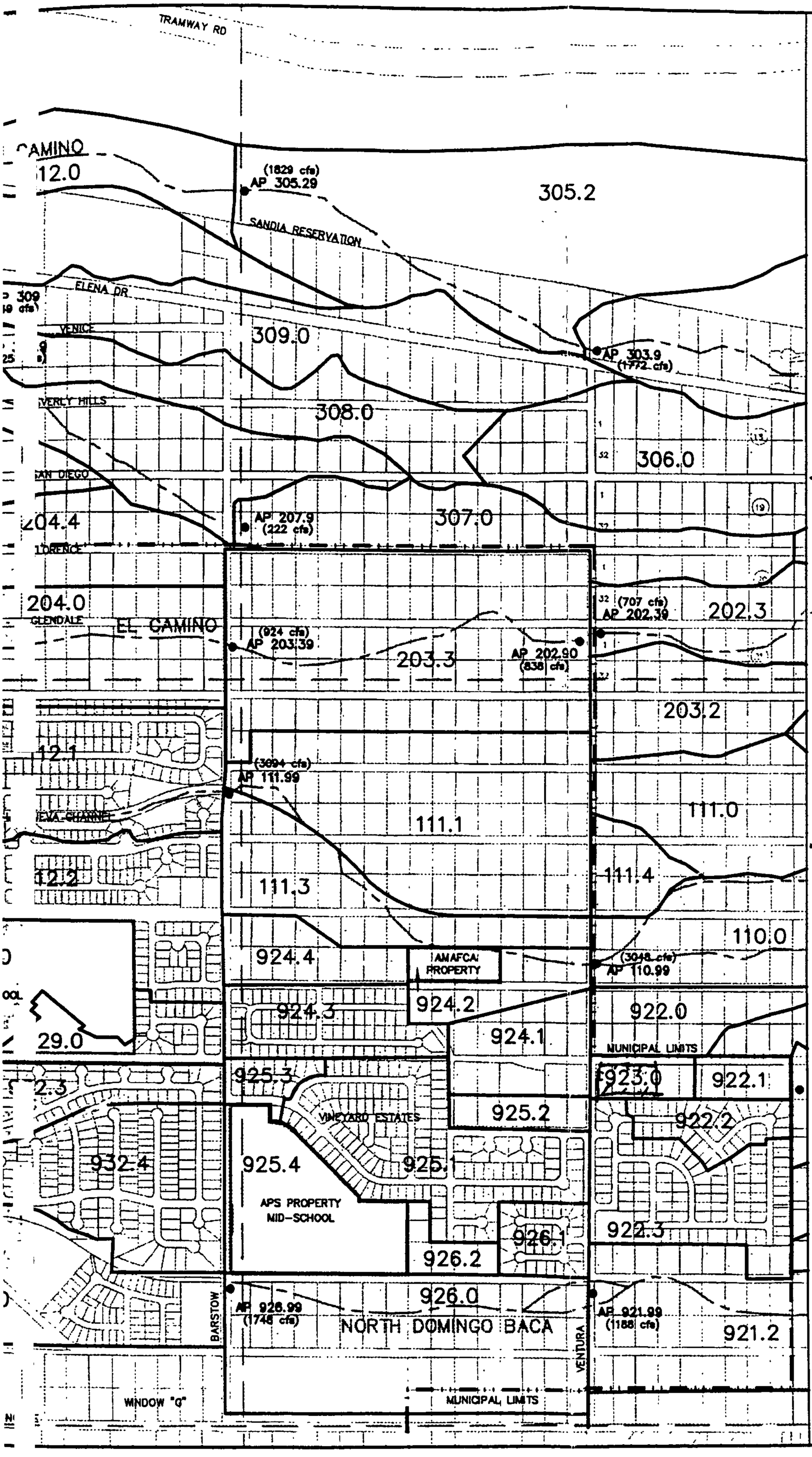


NORTH ALBUQUERQUE ACRES MASTER DRAINAGE PLAN

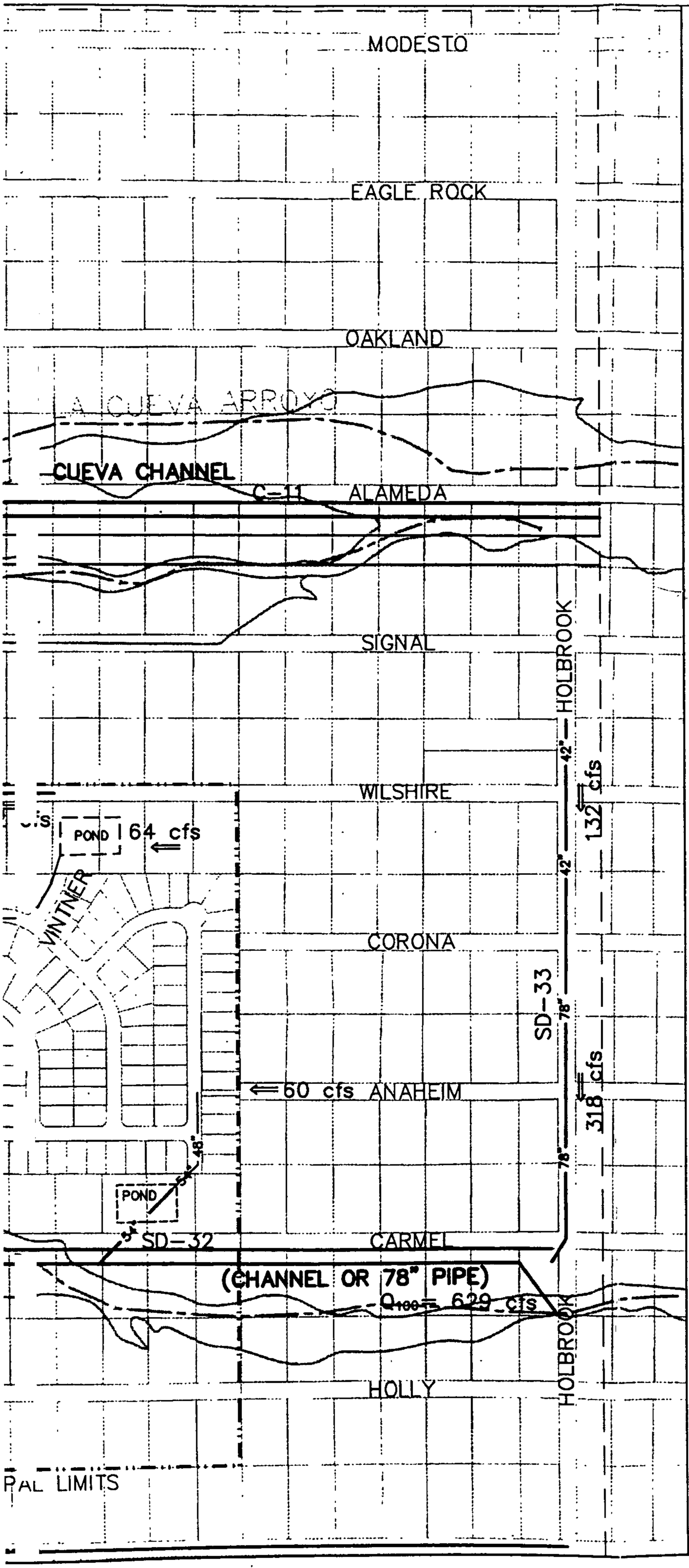
FUTURE CONDITION

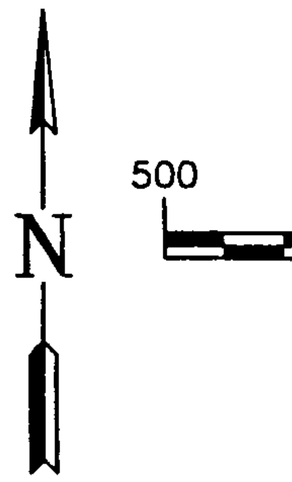
FIGURE 4A

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

CITY OF Albuquerque

Resource Technology, Inc.
Civil Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning
1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@nmsa.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400





LEGEND

- MUNICIPAL LIMITS
- EXISTING PLATTING
- EXISTING ARROYO FLOW PATH
- 10" W — EXISTING WATER LINE
- 10" SAS — EXISTING SANITARY SEWER
- 12" VHP — EXISTING GAS LINE
- 78" — EXISTING STORM DRAIN
- 54" — PROPOSED STORM DRAIN
- CHANNEL — PROPOSED CHANNEL
- PROPOSED STRUCTURE OR ROAD
- PROPOSED DIKE
- #5 / AV-5 — POTENTIAL AVULSION

NOTE:
All flow rates shown are future condition 100-year.

NORTH ALBUQUERQUE ACRES
MASTER DRAINAGE PLAN

STORM DRAIN FACILITIES
C-20

FIGURE 5F

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

CITY OF Albuquerque

Resource Technology, Inc.
Civil Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning
1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@nmia.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400

SD-8

MODESTO

EAGLE ROCK

143 cfs

48"

SD-28

OAKLAND

LA CUEVA ARROYO

Q_{100}= 3048 cfs

LA CUEVA CHANNEL

C-4 CHANNEL

C-11 ALAMEDA

PROPOSED ALAMEDA AMAFCA PROPERTY

DIKE

SD-30

SIGNAL

64 cfs

42"

SD-27

POND

SD-29

34 cfs

36"

WILSHIRE

ALMADEN VALLEY

30"

SD-31

42 cfs

POND

64 cfs

91 cfs

VINTNER

79 cfs

CORONA

201 cfs

293 cfs

48"

54"

POND

60 cfs ANAHEIM

POND

C-6 CHANNEL

SD-32

CARMEL

Q_{100}= 1188 cfs

Q_{100}= 700 cfs

(CHANNEL OR 78" PIPE)

Q_{100}= 629 cfs

ARROYO

VENTURA

HOLLY

MUNICIPAL LIMITS

SD-33