HYDROLOGY M16/D3 ONE PLAN

M 16/D3

1 PLAN

Adam, Hamlyn, Anderson / consulting engineers inc.

4751 North Fifteenth Street
4055 Montgomery Blvd. N.E.
216 North Chippewa Place

Phoenix, Arizona 85014
Albuquerque, NM 87110
Chandler, Arizona 85224

602-264-1397
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PRINCIPALS:
CARL H. ADAM, P.E.
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ASSOCIATE:
FRED E. GOLDMAN, P.E.

January 13, 1981

M14D3

RECEIVED
JAN 1 1981
CITY ENGINEER

Mr. Bruno Conegliano
Assistant City Engineer - Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico

Dear Sir:

Submitted herewith are two copies of Drainage Report for 2434 Baylor Drive S.E. for your review and comment.

Very truly yours,

Jean J. Bordenave

Jean J. Bordenave
Vice President

COMMENTS ON DRAINAGE REPORT FOR 2434 BAYLOR DR. S.E.
F.J. AGUIRRE 2-4-81

DRAINAGE REPORT

SECTION UPLAND DRAINAGE, 2ND SENTENCE,
"... STORM WATERS ACCUMULATED ON ADJACENT LOTS, EAST AND WEST, ARE DIVERTED TO EXISTING DRAINAGE STRUCTURE IN ALAMO AVENUE...." HOW WILL THESE FLOWS BE DIVERTED TO ALAMO?

SECTION INTERNAL DRAINAGE, 1ST SENTENCE
"THE SITE PRESENTLY DRAINS TO THE ADJACENT PROPERTY TO THE EAST AND SOUTH TO AN EXISTING DRAINAGE STRUCTURE LOCATED IN ALAMO AVENUE...." THE GRADING PLAN SHOWS THE FLOW PATTERN TO THE WEST AND NOT THE EAST.

SECTION INTERNAL DRAINAGE, 2ND SENTENCE
"... "REGRADING AND FUTURE BUILDING CONSTRUCTION WILL PREVENT FLOWS FROM ENTERING THE PROPERTY TO THE EAST...." I BELIEVE THEY MEAN THE WEST.

GRADING PLANS

ITEMS NEEDED ON THE GRADING PLAN:

(1) LEGEND

OVER

✓ (2) DATUM

(3) NOTES DEFINING ASPHALT, SIDEWALKS, PLANTING AREA, AND ANY AREAS WHOSE DEFINITION WOULD INCREASE CLARITY.

✓ (4) DIRECTION OF ROOF DRAINAGE INCLUDING CANALES, GUTTERS AND DOWNSPOUTS

(5) CURB + SIDEWALK ELEVATIONS.

✓ (6) THE APPROVED DESIGN BY THE A.C.E. DESIGN FOR THE CATCH BASIN CONVERSION AND THE 12" DIA CORR METAL PIPE CONNECTION TO THE CATCH BASIN

(7) INDICATE THE PROPOSED DRIVEPADS

✓ (8) INDICATE TYPE OF POND BOTTOM, ASPHALT, SOD, SOUTHWESTERN LANDSCAPING, etc. IF POND BOTTOM IS TO REMAIN PERVIOUS A SOIL INVESTIGATION WILL BE REQUIRED TO DETERMINE THE ADEQUACY OF THE FOUNDATION FOR THE CLOSE PROXIMITY PONDING

(9) CONTOURS VERY CONFUSING

(11) THE PROPOSED AND EXISTING GRADES ARE HARD TO READ.

(12) I SUGGEST YOU ROUTE THE RUNOFF INTERCEPTED BY THE RETAINING WALL AROUND THE WALL AND OUT THRU THE DRIVEWAY.

(13) WHAT IS TO BE CONSTRUCTED HERE?

SEE CORRESPONDING NUMBER AND CIRCLED IN RED ON GRADING PLAN

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

February 27, 1981

Mr. Jake Bordenaue
Adam, Hamlyn, Anderson
Consulting Engineers, Inc.
4055 Montgomery Blvd. N.E.
Albuquerque, NM 87110

Re: DRAINAGE REPORT FOR 2434 BAYLOR DR. S.E.

Dear Mr. Borneaue:

The drainage reports for the referenced address is approved, however, the following items must be included or addressed on the construction plans when submitting for a building permit:

1) An approved construction detail by the A.C.E.-Design for:

   A) The proposed conversion from a Double "C" Catch Basin to a Double "D" Catch Basin

   B) The proposed connection into the catch basin located on Alamo Avenue S.E.

   C) The proposed connection into the curb on Baylor Dr. S.E.

2) Include in the legend the symbol for the roof drain.

Also, to insure the moisture barrier is constructed per your design, I strongly recommend that you certify said construction. Please inform us if your client agrees to this arrangement.

If you have any questions about this matter, please feel free to contact me at 766-7644.

Sincerely,

Fred J. Aguirre, P.E.
Civil Engineer

FJA:pp

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

HYDROLOGY SECTION PROJ. NO. M-16 03 DATE: 7/6/84

PLANNING DIVISION NO. _____

CONFERENCE RECAP

SUBJECT: Utility Building Airport Ind. Park

ATTENDANCE: WHO	REPRESENTING
Vic Chavez	Chavez-Grieves
Jackie McDowell	"
Billy Goolsby	City

FINDINGS: ① Approved Drainage Plan as update to existing to show proposed Modification
② Site discharge contributes to a downstream flood hazard zone. Controlled discharge required or analysis to show that downstream capacity axists.

*Please provide a copy of recap w/submittal.

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Billy J. Goolsby SIGNED: Victor Chavez

TITLE: CE/Hydrology TITLE: Proj. Eng.

DATE: 7/6/84 DATE: 7/6/84

DRAINAGE REPORT

FOR

2434 BAYLOR DRIVE S.E.

ALBUQUERQUE, NEW MEXICO

RECEIVED
JAN 13 1981
CITY ENGINEER

Prepared by:

Adam, Hamlyn, Anderson
Consulting Engineers, Inc.
4055 Montgomery Blvd. N.E.
Albuquerque, New Mexico 87109

Prepared for:

Jaynes Corporation
2906 Broadway N.E.
Albuquerque, New Mexico 87106

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR NO 5110 NEW MEXICO JEAN J. BORDENAVE

Jean J. Bordenave N.M.P.E. & L.S. #5110

TABLE OF CONTENTS

	Page
PURPOSE	1
LOCATION AND TERRAIN	1
UPLAND DRAINAGE	1
INTERNAL DRAINAGE	2
CONCLUSION	2
APPENDIX A	
COMPUTATIONS	
APPENDIX B	
RAINFALL CHARTS	
PLATE I	
LOCATION MAP	
PLATE II	
FLOOD HAZARD BOUNDARY MAP	
PLATE III	
GRADING AND DRAINAGE PLAN	

DRAINAGE REPORT

FOR

2434 BAYLOR DRIVE S.E.

ALBUQUERQUE, NEW MEXICO

PURPOSE

The purpose of this report is to provide a method of construction which will comply with AMAFCA drainage requirements and the City Drainage Policy dated November, 1979.

LOCATION AND TERRAIN

The tract is located in the southeast quadrant of the City of Albuquerque on Baylor Drive S.E. and extends south to Alamo Avenue S.E. (See Plate I for exact location.)

The site slopes southwesterly at approximately 5.5 percent for the first half of the site, then flattens to a slope of approximately 0.4 percent for one hundred and seventy feet. The most southerly portion of the site drops steeply at a slope of approximately 16.0 percent in about twenty-five feet.

UPLAND DRAINAGE

The site is bordered on the north by Baylor Drive S.E. and on the south by Alamo Avenue. Storm waters accumulated on adjacent lots, east and west, are diverted to existing drainage structures in Alamo Avenue.

It should be pointed out, however, that erosion protection will be required along the east property line to prevent possible undermining of slope structure. (See Plate III for details.)

INTERNAL DRAINAGE

The site presently drains to the adjacent property to the West and south to an existing drainage structure located in Alamo Avenue. Regrading and future building construction will prevent flows from entering the property to the West, and all minor flows will be allowed to flow directly to Alamo Avenue. Parking lot swales will direct flows to a catch basin, and from there they will be conveyed in a 12" CMP to an existing drainage structure in Alamo Avenue. The detention basins are sized for the difference in volume between the 100 year, 6 hour, natural and developed conditions. The controlled outlets are sized such that the peak outflow rate is less than the 5 year natural runoff rate.

CONCLUSION

Development of the site will significantly reduce present runoff rates from the tract. Peak outflow after development for the 100 year storm will be approximately 70 percent of the peak outflow from the 5 year storm prior to development. This is accomplished through sizing of the controlled outlet to make maximum use of the required volume provided.

APPENDIX A

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT BAYLOR DRIVE	JOB NO. C8068 DATE: 12/26/80 BY: JJB	SHT. NO. 1 OF

EXISTING CONDITION - 5 YEAR STORM AREA A-1 & A-2

Time of Concentration

Use 5 min.

Peak Runoff Rate

from Appendix B Rainfall Chart - 5 year

$i = 3.84$ in/hr

$Q = (0.4)(3.84)(59{,}145/43560)$

$= 2.1$ cfs

DEVELOPED CONDITION - 100 YEAR STORM AREA A-1 & A-2

Direct Runoff

Area A-1

6,485 # Asphalt ∴ $C = 0.95$

Use $t_c = 5$ min.

$i = 7.08$ in/hr from Appendix B Rainfall Chart - 100 year

$Q = (0.95)(7.08)(6{,}485/43560)$

$= 1.0$ cfs < 2.1 cfs from 5 year

Detained Runoff

Volume Requirement

Area A-1 + A-2

6,485 + 46,420 = 52,905 # Asphalt & Roof

100 year, 6 hr developed $(52905)(0.95)(2.4/12) = 10{,}052\ ft^3$

100 year, 6 hr existing $(52{,}905)(0.4)(2.4/12) = 4{,}232\ ft^3$

Volume required $5{,}820\ ft^3$

Volume Provided

Elev.	Area #		Depth'	Volume, ft^3
25.5	4			
		892	0.5	446
26.0	1,780			
		3,615	1.0	3,615
27.0	5450			
		6,530	0.5	3,265
27.5	7610			

Total Volume $7{,}326\ ft^3$

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT BAYLOR DRIVE	JOB NO. C8068 DATE: 12/26/80 BY: JJB	SHT. NO. 2 OF

DEVELOPED CONDITION (cont.)

Incremental Inflow $(46420)(0.95)/12 \times \text{Rainfall} = 3{,}675\ \text{Rainfall}$

Incremental Outflow
$= (0.6\ A\ \sqrt{2gd})t$

where A = orifice x-sectional area, ft^2
d = head on orifice, ft.
t = time, sec.
g = acceleration due to gravity = 32 ft/sec/sec

Note
@ pond depth = 0ft
orifice head = 3ft

Use 3.5" ϕ Orifice

Time	Rainfall	Runoff Volume	Storage Depth		Increm. Outflow	Accum. Outflow	Storage
min.	inches	ft^3	ft		ft^3	ft^3	ft^3
0	0	0	0	3.78			
5	0.59	2168	0.56	4.19	137	137	2031
10	0.92	3381	0.81	4.5[illegible]	145	282	3099
15	1.17	4300	0.97	4.6[illegible]	148	430	3870
20	1.32	4851	0.04	4.58	149	579	4272
25	1.48	5439	0.11	4.64	151	730	4709
30	1.62	5954	0.17	4.71	152	882	5072
40	1.84	6762	0.25	4.77	307	1189	5573
50	1.97	7239	0.28	4.78	309	1498	5741
60	2.05	7533	0.27		309	1807	5726

Orifice Equation $C_a\sqrt{2g(d+3)}$, Catch Basin Grate Equation $C_a\sqrt{2gd}$

Use clogging factor = 2 for grate.

$(0.6)(0.0491)\sqrt{2g(d+3)} = 0.2357\sqrt{d+3}$; $(2)(0.6)(2.57)\sqrt{2gd} = 24.75\sqrt{d}$,

$\sqrt{d+3} = 104.6954\sqrt{d}$, $d+3 = 10{,}961.13d$, $3 = 10{,}960.13d$, $d = 0.0003'$

for any depth greater than 0.0003' the capacity of the grate is greater than twice the capacity of the outlet orifice.

Peak Runoff Rate

time	min	5	10	15	20	25	30	40	50	60
direct	cfs	1.00	0.78	0.66	0.57	0.51	0.46	0.39	0.33	0.29
detained	cfs	0.46	0.48	0.49	0.50	0.51	0.51	0.51	0.52	0.52
total	cfs	1.46	1.26	1.15	1.07	1.02	0.97	0.90	0.85	0.81

5 Year Peak = 2.1 cfs

100 Year Dev. Peak = 1.5 cfs

EXISTING CONDITION – 5 YEAR STORM AREA A-3

Time of Concentration

Use 5 min.

Peak Runoff Rate

from Appendix B Rainfall Chart - 5 year

$i = 3.84$ in/hr

$Q = (0.4)(3.84)(6240/43560) = 0.22$ cfs

DEVELOPED CONDITION – 100 YEAR STORM AREA A-3

Detained Runoff

Volume Requirement

1664 + 4576 = 6240 □ Asphalt + Roof

100 year, 6hr developed $(6240)(0.95)(2.4/12) = 1186\ ft^3$

100 year, 6hr existing $(6240)(0.40)(2.4/12) = 499\ ft^3$

Volume Required = $687\ ft^3$

Volume Provided

Elev	Area □		Depth'	Volume, ft^3
31.0	60			
		196	1.0	196
32.0	332			
		570	1.0	570
33.0	808			

Total Volume $766\ ft^3$

Incremental Inflow $(6240)(0.95)/12 \times$ Rainfall = 494

Incremental Outflow =

$(0.6 A \sqrt{2gd})t$

where: A = orifice x-sectional area, ft^2.

d = head on orifice, ft.

t = time, seconds

g = acceleration due to gravity = (32 ft/sec/sec)

Note:

@ pond depth = 0 ft

orifice head = 0 ft

Use 1½" ϕ Orifice

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT BAYLOR DRIVE	JOB NO. C8068 DATE: 1/6/81 BY: FPK	SHT. NO. 4 OF

Use $1\frac{1}{2}$" ϕ Orifice

Time	Rainfall	Runoff Volume	Storage Depth		Increm outflow	Accum. outflow	Storage
min	inches	ft^3	ft. head		ft^3	ft^3	ft^3
0	0	0		1.10			
5	0.59	291	0.20	1.55	19	19	272
10	0.92	454	0.49	1.58	21	40	414
15	1.17	578	0.66	1.70	22	62	516
20	1.32	652	0.73	1.77	23	85	567
25	1.48	731	0.81	1.85	24	109	622
30.	1.62	800	0.88	1.92	24	133	667
40	1.84	909	0.95	1.96	49	182	727
50	1.97	973	0.97	1.97	50	232	741
60	2.05	1013	0.97		50	282	731

Peak Runoff Rate

time	min.	5	10	15	20	25	30	40	50	60
detained	cfs	0.06	0.07	0.07	0.08	0.08	0.08	0.08	0.08	[illegible]

APPENDIX B

PRECIPITATION DATA

ALBUQUERQUE, SAN PEDRO BLVD WEST

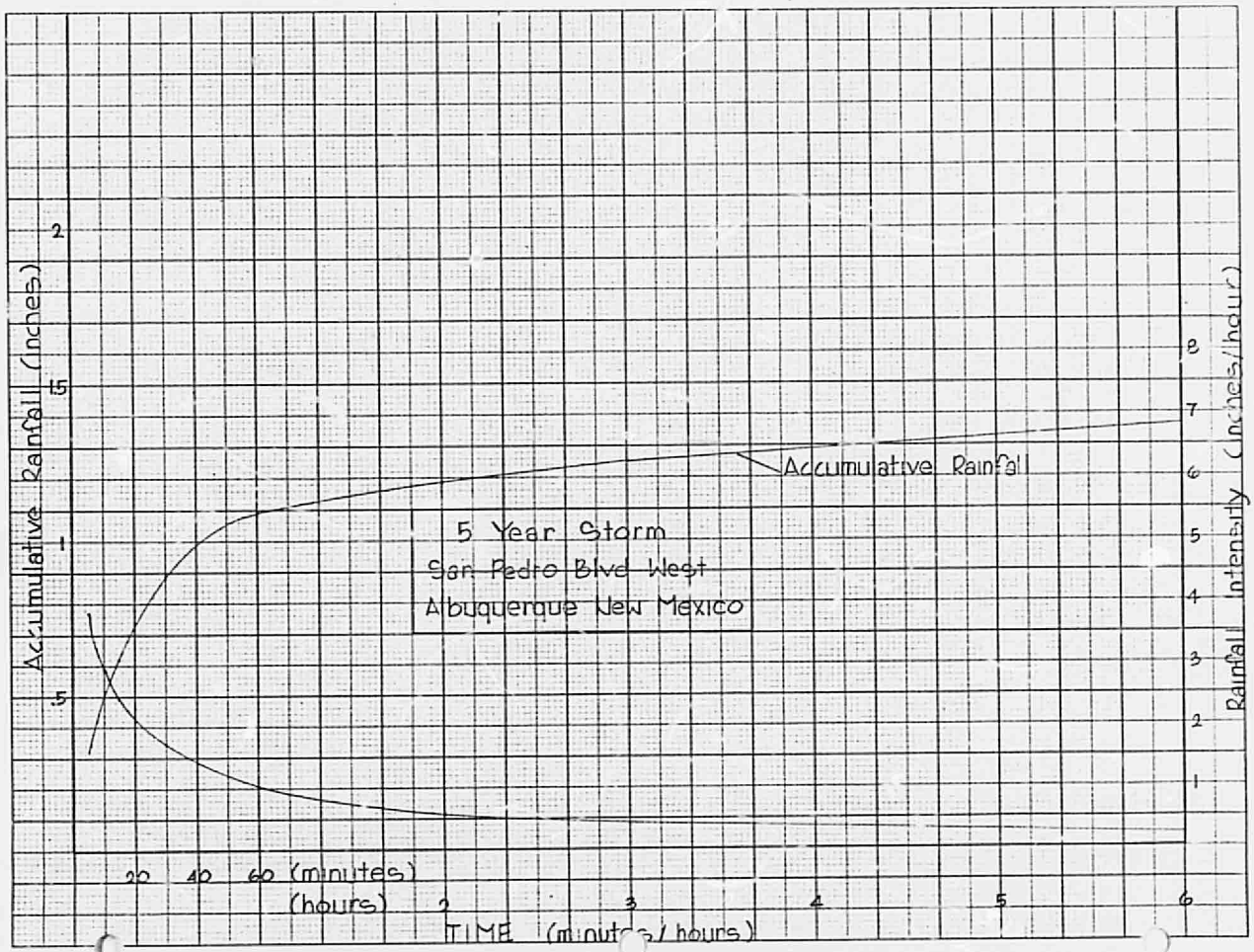
from NOAA Atlas 2, Volume IV, New Mexico

Recur. Inter.	Duration	min / hour	5	10	15	30	1	2	3	6	12	24
2 Year	Rainfall	inches	0.23	0.36	0.45	0.62	0.79	0.88	0.94	1.05	1.18	1.3
	Intensity	inches/hour	2.76	2.16	1.80	1.24	0.79	0.44	0.31	0.18	0.10	0.05
5 Year	Rainfall	inches	0.32	0.49	0.62	0.86	1.09	1.18	1.24	1.35	1.50	1.65
	Intensity	inches/hour	3.84	2.94	2.48	1.72	1.09	0.55	0.41	0.23	0.13	0.07
10 Year	Rainfall	inches	0.37	0.58	0.73	1.02	1.29	1.40	1.47	1.6	1.75	1.9
	Intensity	inches/hour	4.44	3.48	2.92	2.04	1.29	0.70	0.49	0.27	0.15	0.08
25 Year	Rainfall	inches	0.46	0.71	0.89	1.24	1.57	1.68	1.76	1.9	2.13	2.35
	Intensity	inches/hour	5.52	4.26	3.56	2.48	1.57	0.84	0.59	0.32	0.18	0.10
50 Year	Rainfall	inches	0.52	0.81	1.03	1.43	1.81	1.94	2.03	2.2	2.40	2.6
	Intensity	inches/hour	6.24	4.86	4.12	2.86	1.81	0.97	0.68	0.37	0.20	0.11
100 Year	Rainfall	inches	0.59	0.92	1.17	1.62	2.05	2.17	2.25	2.4	2.60	2.8
	Intensity	inches/hour	7.08	5.52	4.68	3.24	2.05	1.09	0.75	0.4	0.22	0.12

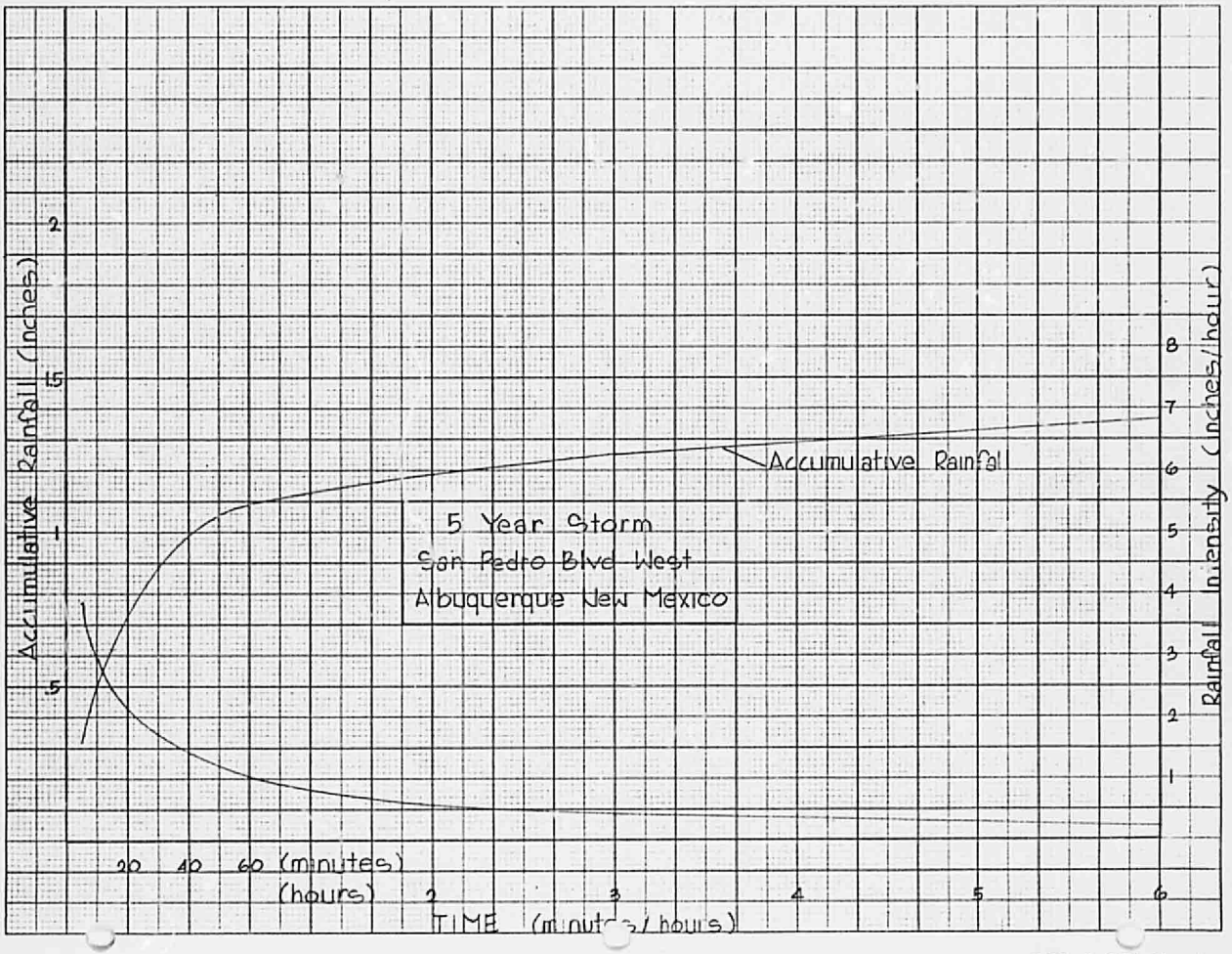
2 year 1 hour = $-0.011 + 0.942(1.05^2/1.3) = 0.79$ in.

100 year 1 hour = $0.494 + 0.755(2.4^2/2.8) = 2.05$ in.

3 hour = 0.569 (6 hour) + 0.431 (1 hour)
2 hour = 0.341 (6 hour) + 0.659 (1 hour)
30 min = 0.79 (1 hour)
15 min = 0.57 (1 hour)
10 min = 0.45 (1 hour)
5 min = 0.29 (1 hour)



KEUFFEL & ESSER CO. N.Y.



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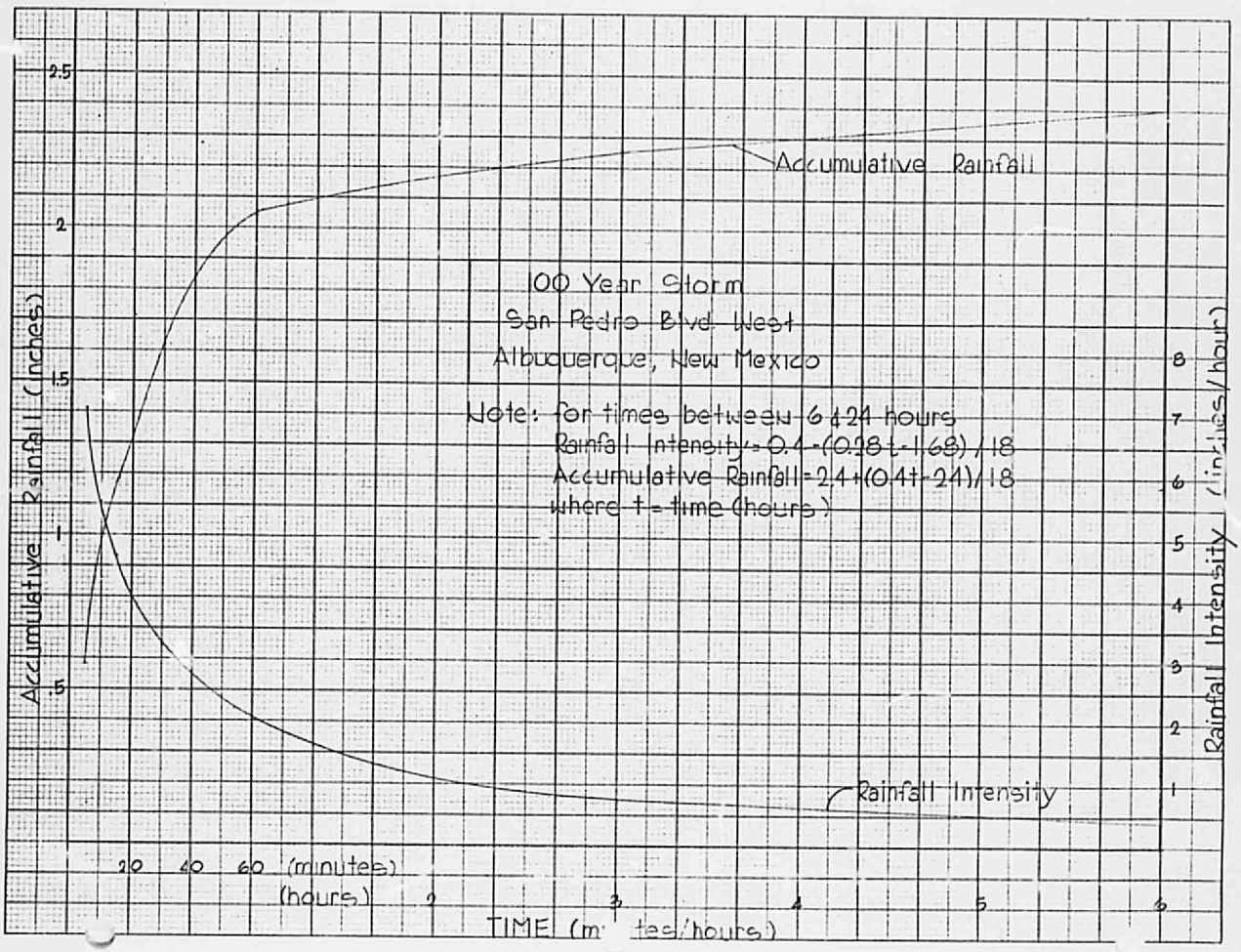

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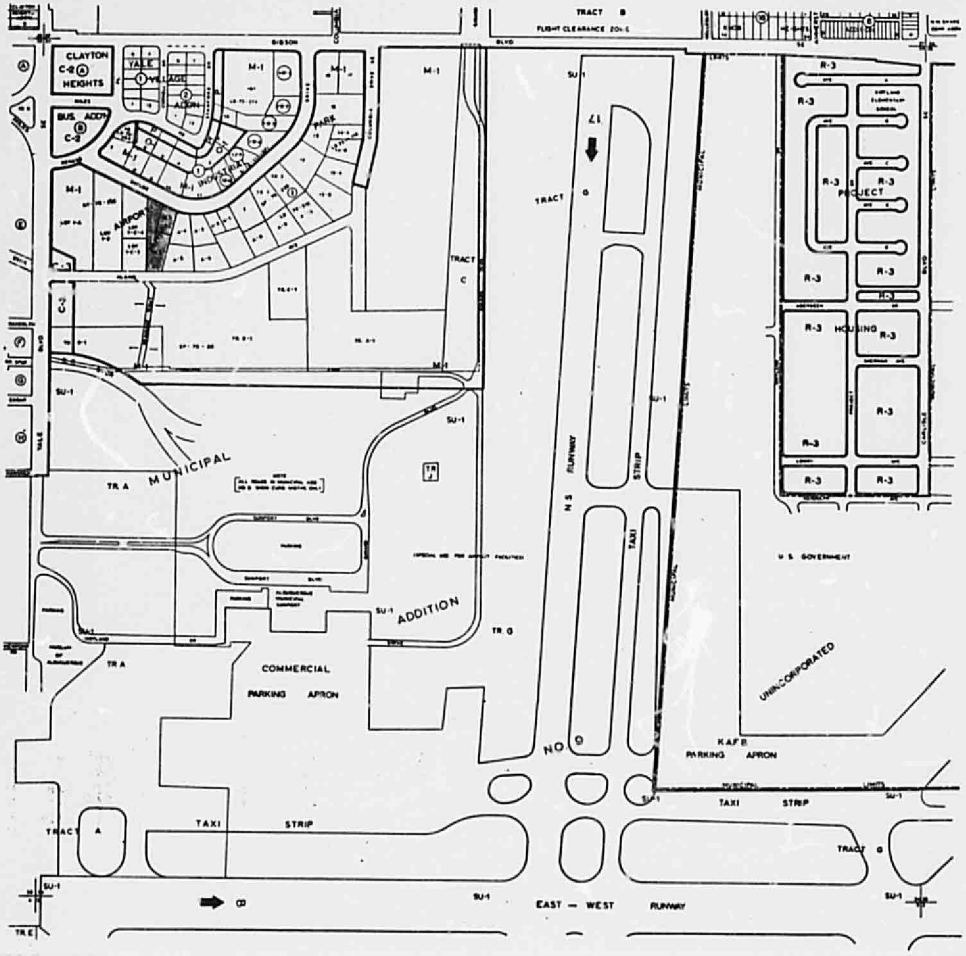

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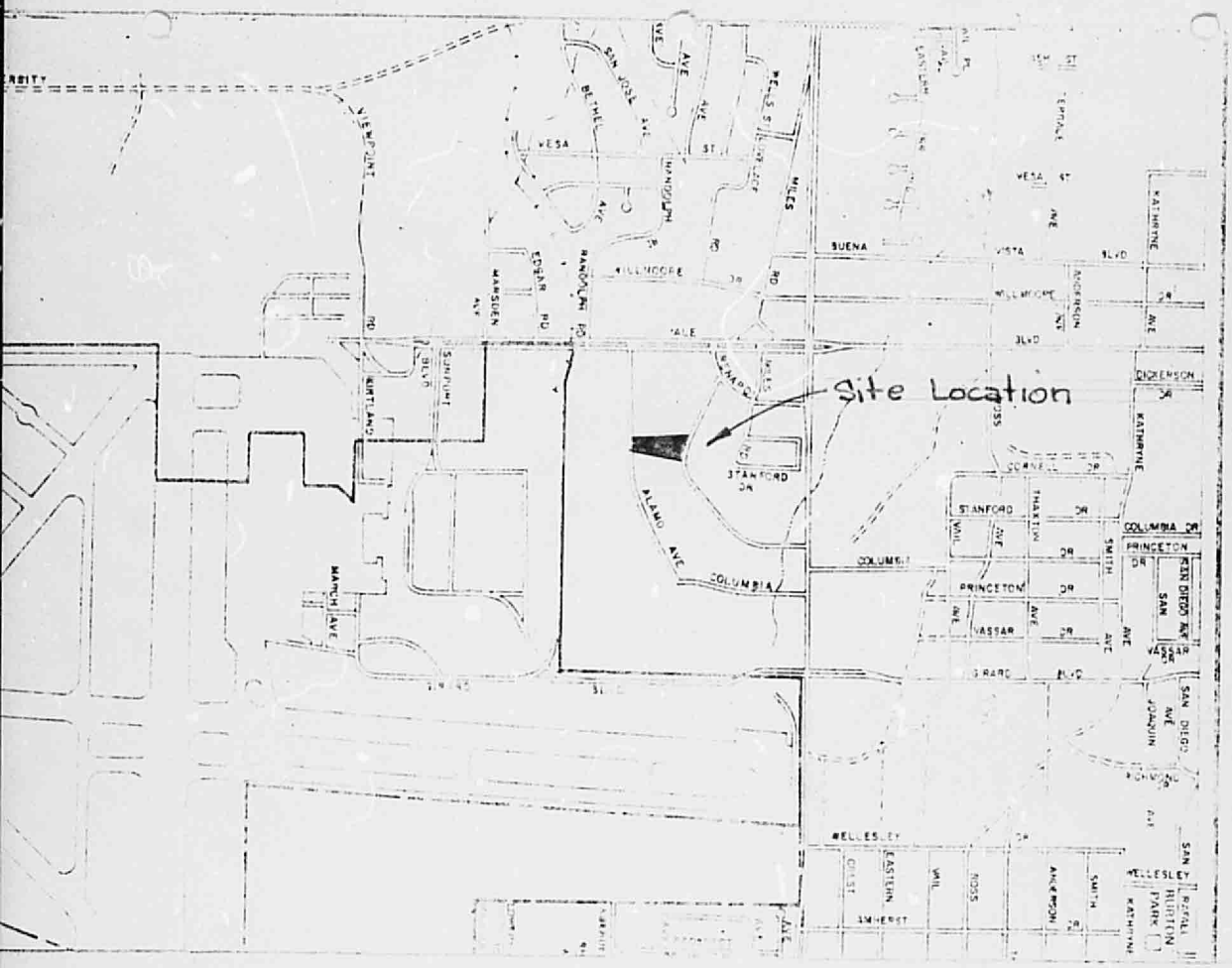
PLATE I



FLOOD HAZARD MAP PLATE II