HYDROLOGY G16/D14 FOUR PLANS

G 16/ D 14

4 PLANS

DRAINAGE REPORT

FOR

LOTS 17, 18, 19 AND 20 OF THE

INDIAN ACRES SUBDIVISION

ALBUQUERQUE, NEW MEXICO

MAURER, SERAFINI AND MEURER, INC.
2405 Wyoming Boulevard, S.E.
Albuquerque, New Mexico 87110
(505) 262-1938

DRAINAGE REPORT

FOR

LOTS 17, 18, 19 AND 20 OF THE

INDIAN ACRES SUBDIVISION

ALBUQUERQUE, NEW MEXICO

Prepared By

Meurer, Serafini and Meurer, Inc.
2601 Wyoming Blvd. N.E.
Albuquerque, New Mexico
87112

(505) 292-1936

June, 1979

(Revised July 3, 1979)

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DRAINAGE REPORT

INDIAN ACRES SUBDIVISION

PURPOSE AND SCOPE

The Sierra Realty, Ltd., is planning on developing Lots 17, 18, 19 and 20 in Tract 3 of the Indian Acres Subdivision (Map G-16) situated in the northeast quadrant of metropolitan Albuquerque. The purpose of the report is to present a plan for controlling surface runoff from said lots in a manner acceptable to the Albuquerque Metropolitan Arroyo Flood Control Authority and the Albuquerque City Engineer's office.

SITE LOCATION AND TOPOGRAPHY

The Indian Acres Subdivision, Tract 3, Lots 17, 18, 19 and 20 is located in the northeast quadrant of Albuquerque on Tulane Drive N.E., at the intersection of Cherokee Road N.E. The surrounding terrain (Tract 3) is generally undeveloped land; however, all roads have been constructed and City utilities installed.

The soil of the site is generally comprised of disintegrated granite. The natural ground slopes gently from the southeast to the northwest. Ground cover consists mainly of native grasses.

DESIGN CRITERIA

In analyzing the storm runoff, the Rational Formula, Q = CIA is used.

Where:

Q = Runoff quantity in cubic feet/second.

A = Contributing area in acres.

I = Intensity in inches/hour for a duration equal to the time of accumulation (duration) measured in minutes and obtained from Figure II. (Note: Where a Time Concentration [Tc] is less than 10 minutes from Figure II, the intensity value derived from a Tc equal to 10 minutes is employed.)

C = Runoff Coefficient (No Unit). This coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception which all affect the time distribution and peak rate of unoff.

ESTIMATED RUNOFF UNDEVELOPED STATE:

Drainage within the boundary of the site is basically overland sheet flow. The total runoff in the undeveloped site forms the basis for comparison with the flow in the developed state. Most of the drainage naturally exits the area along the west side of the property. The construction of improved roads which border the site prohibit off-site flows from entering the subdivision from the north, south and east.

The following table shows the flow calculations for the undeveloped conditions.

TABLE 1

Runoff in Undeveloped State Q = CIA

Drainage Basin	Elev.	Length of Flow	TC Min.	I-100 yr. In./Hr.	C	Area Ac.	Q C.F.S.
Onsite	5.8'	222	10	5.4	0.40	.7365	1.59
Offsite	None						

ESTIMATED RUNOFF DEVELOPED STATE

As development occurs, the area of impervious surfaces increases and thereby the amount of runoff also increases. To offset this increase, onsite restrictions of flows must be incorporated into the development. While this can take different forms, the most practical solution for this type of development is to utilize on-lot ponding. The contributing area to the backyard ponding includes the backyard, side yard, and in all cases, the full roof area. The area drained to the street includes the front yard, parking area, and sidewalk-parkway areas. This approach will satisfy A.M.A.F.C.A.'s requirement that the runoff rate from the developed tract not exceed the runoff rate from the tract in its natural state.

The runoff coefficient factors are as follows:

Streets, Walks and Drives	C = 0.90
Roofs	C = 0.90
Lawns, Sandy Soils (Average 2 to 7%)	C = 0.40

TABLE 2

Runoff in Developed State

Onsite

A	Q = CIA = (.87)(7.0)(.0360) =	.25 cfs
B	Q = CIA = (.87)(7.0)(.0360) =	.25 cfs
C	Q = CIA = (0.87)(7.0)(.0360) =	.25 cfs
D	Q = CIA = (0.87)(7.0)(.0509) =	.36 cfs

See Appendix 1

EXPLANATION OF RESULTS

Undeveloped Runoff:

Onsite - Total Flow = 1.59 cfs

Developed Runoff:

Onsite - Total Flow = .86 cfs

As shown above, the development of this project, including lot ponding, will substantially decrease the storm runoff over that occurring in the natural undeveloped state.

RECOMMENDATIONS

The following recommendations are made to enable the developer on this site and the local government to complete this project within the design criteria:

1. The location of ponding areas in each lot will vary to best handle runoff. Lot ponding volumes were calculated based on the total roof of the buildings draining to the rear yard. Calculations are incorporated into the back of this report. In no case should ponded waters be allowed to stand against the wall or house foundation.
2. Ponds should average 1 foot deep and the minimum surface should not be less than 13 percent of the total area drained into the pond. Note: For those lots which lack the area to provide 13 percent of total area, ponds will be 1 foot deep. All lots on the site should be ponded.
3. Flows within the streets of the development are distributed so that no one street assumes a critical burden in carrying

capacities. However, no street should be graded at less than 0.36 percent slope in order to insure adequate carrying capacities.

SUMMARY

The subject property, by utilizing backyard ponding, will contribute no more surface runoff to surrounding areas than that which existed before development.

Prepared by:

Frank Krim

Frank Krim

Approved by:

Jeryl D. Hart, Jr., P.E.
N.M.P.E. No. 6788

6/14/79

JERYL D. HART, JR.
NEW MEXICO
6788
REGISTERED PROFESSIONAL ENGINEER

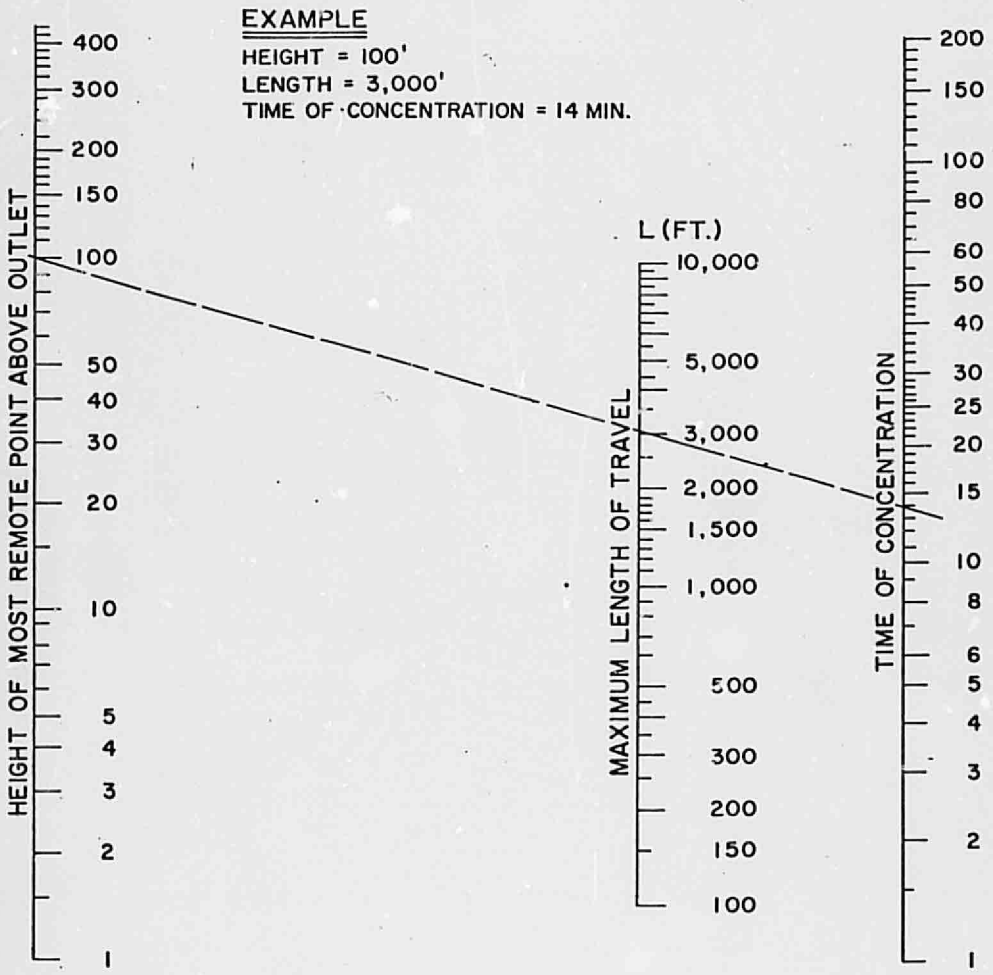
CAT 7/2/79

SUBDIVISION INDIAN ACRES SUB'D. LOTS 17,18,19 & 20
LOCATION INTERSECTION OF TULANE & CHEROKEE
JOB NO.
DESIGN STORM 100 YR. RECURRENCE INTERVAL
MAJOR STORM ____ YR.
COMPUTATIONS BY F.K. DATE 6-8-79

APPENDIX #1

RUNOFF COMPUTATIONS
(Rational Method)

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
A	.0413			.87	0.0360		2.0	7.0	.252								
B	.0413			.87	0.0360		2.0	7.0	.252								
C	.0413			.87	0.0360		2.0	7.0	.252				.36				STREET WILL HANDLE FLOWS
Σ A, B, & C						0.1080	5.0	6.3	.6804								
D	.0585			.87	0.0509		2.0	7.0	.3563								
Σ A-D						0.1589	MIN 10.0	5.40	.8581				3.1				STREET WILL HANDLE FLOWS

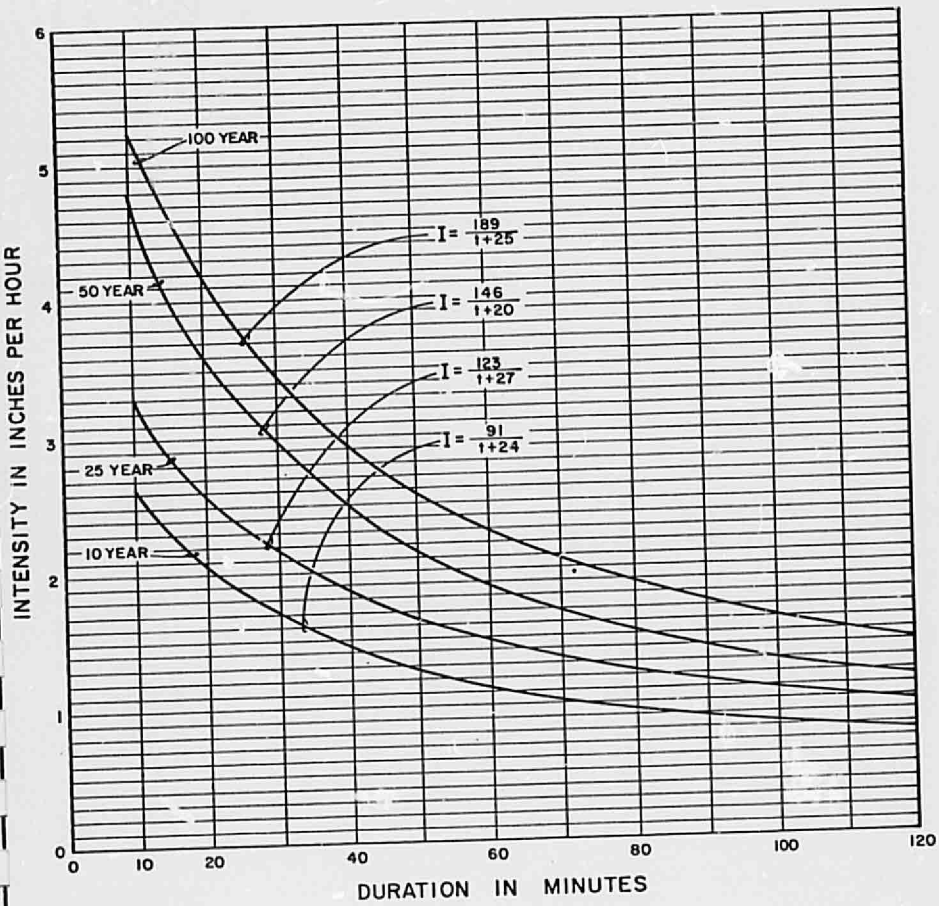


BASED ON STUDY BY: P.Z. KIRPICH
CIVIL ENGINEERING, VOL. 10, NO. 6, JUNE 1940, p, 332

REPRINTED FROM "DESIGN OF ROADSIDE DRAINAGE CHANNELS - HYDRAULIC ENGINEERING CIRCULAR NO. 6", APRIL 1962, U.S. DEPT.

TIME OF CONCENTRATION OF SMALL DRAINAGE BASINS

FIGURE - #1



MASTER PLAN OF DRAINAGE
PREPARED BY:
GORDON HERKENHOFF & ASSOCIATES
ALBUQUERQUE, NEW MEXICO

INTENSITY DURATION FREQUENCY CURVES
(ALBUQUERQUE AREA, 1961)

FIGURE - II

50' R.O.W. 32' FACE-FACE 8" CURB 8" CROWN .2' OVERFLOW

N	A	P	S	S1/2	R	R2/3	V	Q
.0165	15.3611	51.3731	.0050	.0707	.2990	.4472	2.8545	43.8477
.0165	15.3611	51.3731	.0100	.1000	.2990	.4472	420368	62.0100
.0165	15.3611	51.3731	.0150	.1225	.2990	.4472	4.9441	75.9464
.0165	15.3611	51.3731	.0200	.1414	.2990	.4472	5.7089	87.6954
.0165	15.3611	51.3731	.0250	.1581	.2990	.4472	6.3828	98.0464
.0165	15.3611	51.3731	.0300	.1732	.2990	.4472	6.9920	107.4045
.0165	15.3611	51.3731	.0350	.1871	.2990	.4472	7.5522	116.0101
.0165	15.3611	51.3731	.0400	.2000	.2990	.4472	8.0736	124.0200

50' R.O.W. 32' FACE-FACE 8" CURB 6" CROWN .2' OVERFLOW

N	A	P	S	S1/2	R	R2/3	V	Q
.0165	18.9167	51.3569	.0050	.0707	.3633	.5138	3.2801	62.0482
.0165	18.9167	51.3569	.0100	.1000	.3683	.5138	4.6387	87.7494
.0165	18.9167	51.3569	.0150	.1225	.3683	.5138	5.6813	107.4706
.0165	18.9167	51.3569	.0200	.1414	.3683	.5138	6.5602	124.0964
.0165	18.9167	51.3569	.0250	.1581	.3683	.5138	7.3345	138.7439
.0165	18.9167	51.3569	.0300	.1732	.3683	.5138	8.0345	151.9864
.0165	18.9167	51.3569	.0350	.1871	.3683	.5138	8.6783	164.1640
.0165	18.9167	51.3569	.0400	.2000	.3683	.5138	9.2775	175.4988

50' R.O.W. 32' FACE-FACE 8" CURB 4" CROWN .2' OVERFLOW

N	A	P	S	S1/2	R	R2/3	V	Q
.0165	22.4722	51.3453	.0050	.0707	.4377	.5765	3.6797	82.6903
.0165	22.4722	51.3453	.0100	.1000	.4377	.5765	5.2038	116.9417
.0165	22.4722	51.3453	.0150	.1225	.4377	.5765	6.3734	143.2238
.0165	22.4722	5123453	.0200	.1414	.4377	.5765	7.3593	165.3806
.0165	22.4722	51.3453	.0250	.1581	.4377	.5765	8.2280	184.9011
.0165	22.4722	51.3453	.0300	.1732	.4377	.5765	9.0133	202.5490
.0165	22.4722	51.3453	.0350	.1871	.4377	.5765	9.7355	218.7760
.0165	22.4722	51.3453	.0400	.2000	.4377	.5765	10.4077	233.8835

50' R.O.W. 32' FACE-FACE 8" CURB 2" CROWN .2' OVERFLOW

N	A	P	S	S1/2	R	R2/3	V	Q
.0165	26.0278	51.3384	.0050	.0707	.5070	.6358	4.0585	105.6346
.0165	26.0278	51.3384	.0100	.1000	.5070	.6358	5.7396	149.3901
.0165	26.0278	51.3384	.0150	.1225	.5070	.6358	7.0296	182.9648
.0165	26.0278	51.3384	.0200	.1414	.5070	.6358	8.1171	211.2696
.0165	26.0278	51.3384	.0250	.1581	.5070	.6358	9.0752	236.2066
.0165	26.0278	51.3384	.0300	.1732	.5070	.6358	9.9414	258.7513
.0165	26.0278	51.3384	.0350	.1871	.5070	.6358	10.7379	279.4834
.0165	26.0278	51.3384	.0400	.2000	.5070	.6358	11.4793	298.7803

FIG III

Lots 17, 18 & 19

Ponding Requirements

Full Roof Area	(0.9)	35 x 50 =	1750 ft^2
Patio Area	(0.9)(2ea)	10 x 10 x 2	200 ft^2
Front Walk	(0.9)		299 ft^2
Rear Lawn Area	(0.4)	40 x 60 = 2400-200 =	2200 ft^2
Front Yard	(0.4)	24.75 x 28 (2 ea)	1386 ft^2
Side Yards	(0.4)(2ea)		390 ft^2
Total Area Draining to Pond			6225.00

Runoff Coefficient

Impervious Area:

$$C = \frac{0.90 \quad 2249}{6225} \quad 0.33$$

Pervious Area:

$$C = \frac{0.40 \quad 3976}{6225} \quad \frac{0.26}{0.59}$$

Composite C =

Pond Volume Requirements:

100-year storm precipitation = 2.4 inches

Volume = Runoff Coefficient x Area x Precipitation

V = 2.4/12 x .59 x 6225 = 734.55 ft^3

Depth of Pond 1.0' (12")

Minimum area of pond = 734.55 ft^2

Pond area as a percentage of area drained = 12%

Lot 20

Ponding Requirements

Full Roof Area	(0.9)	35 x 50 =	1 70 ft^2
Patio Area	(0.9)(2ea)	10 x 10	200 ft^2
Front Walk	(0.9)		420 ft^2
Rear Lawn Area	(0.4)		1240 ft^2
Front Yard	(0.4)		725 ft^2
Side Yards	(0.4)(2ea)		715 ft^2
Total Area Draining to Pond			5050 ft^2

Runoff Coefficient

Impervious Area:

$$C = \frac{0.90 \quad 2370}{5050} = 0.42$$

Pervious Area:

$$C = \frac{0.40 \quad 2680}{5050} = 0.21$$

Composite C = 0.63

Pond Volume Requirements:

100-year storm precipitation = 2.4 inches

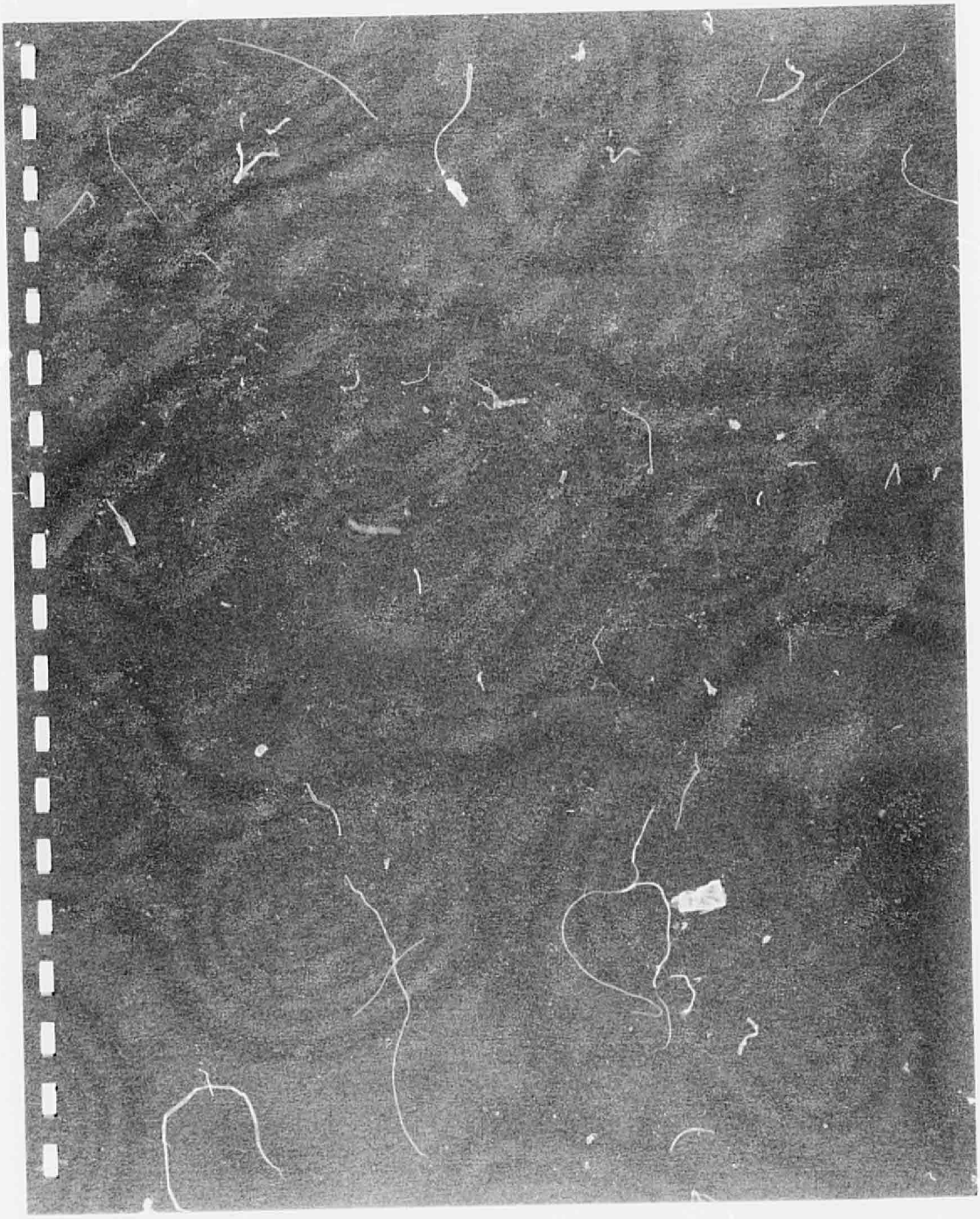
Volume = Runoff Coefficient x Area x Precipitation

V = 2.4/12 x .63 x 5050 = 636.3 ft^3

Depth of Pond (1.0') (12")

Minimum area of pond = 636.3 ft^2

Pond area as a percentage of area drained = 13%



Drangfile
Indian Acres
Lots 17-20

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

July 6, 1979

Mr. Frank Krim
Meurer, Serafini & Meurer, Inc.
2601 Wyoming Blvd. N.E., Suite F
Albuquerque, N.M. 87110

Re: Indian Acres Subdivision, Lots 17-20
Revised Drainage Report dated July 3, 1979

Dear Mr. Krim:

This is to confirm our telephone conversation this morning with Ron Senac, Sierra, to advise that your above-referenced report has been reviewed and the concepts outlined agree in principle with AMAFCA Resolution 72-2 and current City drainage practices and is therefore approved.

Very truly yours,

Bruno Conegliano
Assistant City Engineer/Hydrology

BC/ms

cc - Richard Heller, City Engineer
Rich Leonard, AMAFCA
Drainage File

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

RECEIVED
JUL 05 1979
CITY ENGINEER

July 3, 1979

Mr. Bruno Conegliano
Assistant City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Your letter of June 18, 1979, Subject,
Indian Acres Subdivision

Dear Bruno:

Corrections and/or additions, as outlined in your letter referenced above, have been made to our original drainage study for the Indian Acres Subdivision and corrected copies are submitted herewith.

Also furnished is a copy of the area "Flood Hazard Boundary Map" as revised on 2/14/78. It should be noted that the area under consideration for this project is not in a flood hazard area. In addition all finished floor elevations have been raised an average of a foot and a half (1.5') above the high curb elevation which would preclude any possible flooding of dwellings.

If I may be of any further assistance concerning this matter please feel free to call me.

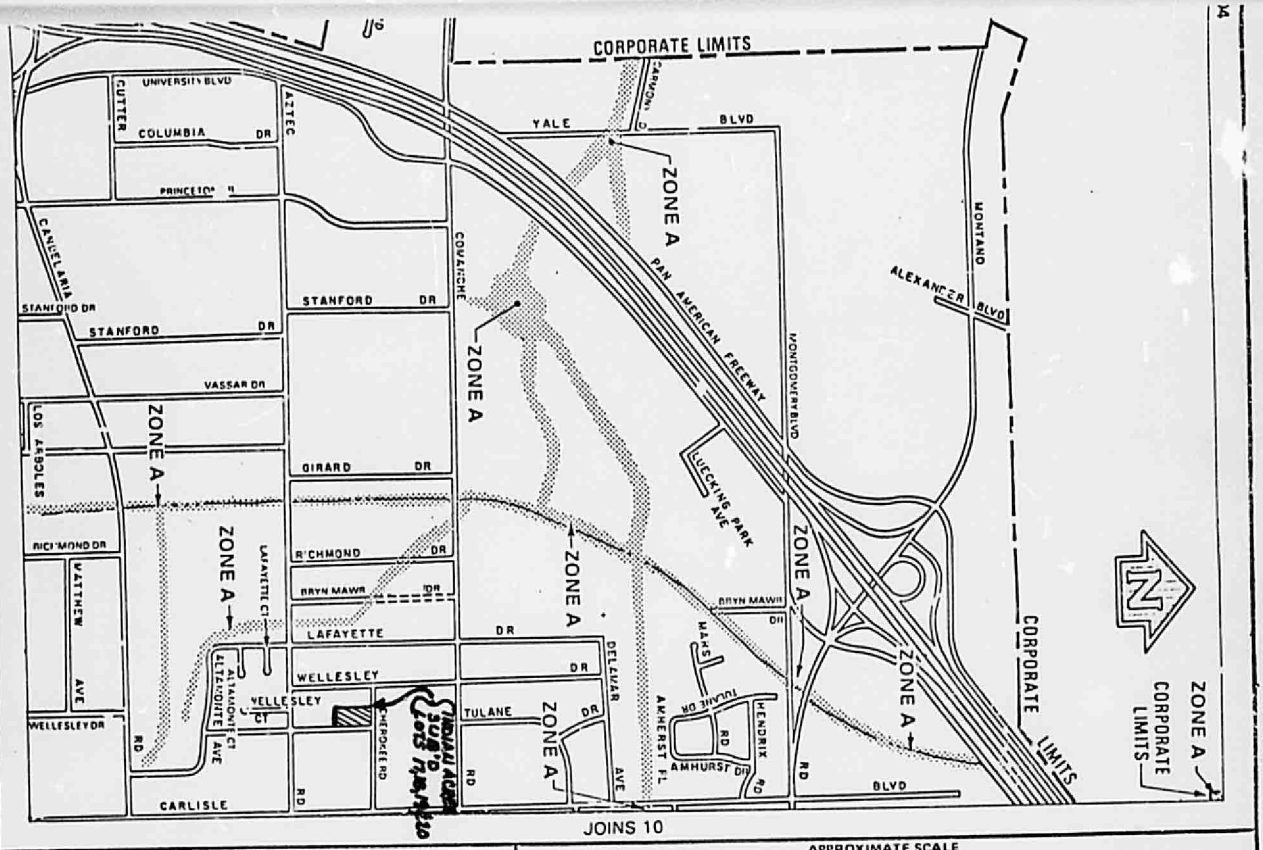
Sincerely,

Frank Krim

Frank Krim
Project Engineer

FK/lf

cc - Richard Heller, City Engineer
Richard Leonard, AMAFCA
Fred Aguitte, Asst. Hydrology Engineer



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF ALBUQUERQUE, NM
(BERNALILLO CO.)

APPROXIMATE SCALE
1000 0 1000 2000 3000 FEET

FLOOD HAZARD BOUNDARY MAP

MAP REVISED
2/14/78

09

MEURER, SERAFINI AND MEURER, INC.
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110

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JUL 05 1979
CITY ENGINEER

Mr. Bruno Conegliano
Assistant City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

MEURER, SERAFINI AND MEURER, INC.

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JUL 05 1979

CITY ENGINEER

July 3, 1979

Mr. Bruno Conegliano
Assistant City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Your letter of June 18, 1979, Subject,
Indian Acres Subdivision

Dear Bruno:

Corrections and/or additions, as outlined in your letter referenced above, have been made to our original drainage study for the Indian Acres Subdivision and corrected copies are submitted herewith.

Also furnished is a copy of the area "Flood Hazard Boundary Map" as revised on 2/14/78. It should be noted that the area under consideration for this project is not in a flood hazard area. In addition all finished floor elevations have been raised an average of a foot and a half (1.5') above the high curb elevation which would preclude any possible flooding of dwellings.

If I may be of any further assistance concerning this matter please feel free to call me.

Sincerely,

Frank Krim

Frank Krim
Project Engineer

FK/lf

cc - Richard Heller, City Engineer
Richard Leonard, AMAFCA
Fred Aguitte, Asst. Hydrology Engineer

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

MAYOR
David Rusk

June 18, 1979

Mr. Jeryl D. Hart, Jr.
Meurer, Serafini & Meurer, Inc.
2601 Wyoming Blvd. N.E., Suite F
Albuquerque, New Mexico 87110

Re: Indian Acres Subdivision

Dear Mr. Hart:

I have reviewed the drainage report for the referenced project and I find a discrepancy between the reported values for the areas draining to the ponds and the values that I have obtained from the drawing supplied. More specifically, I obtain a value of 6180 sq. ft. vs the reported 4817 sq. ft. Either the drawings or the computations are incorrect. Please supply corrected or consistent information.

Secondly, it will be expedient if the finished grading plan were supplied at the same time so that expeditious granting of the building permits can be provided. It appears that the "existing topography" was simply derived from the ortho-photo maps. If the streets are in place, as is indicated on Page 1 of the report, a certain amount of regrading must have been performed and the actual topography must be supplied;in particular, the curb elevation along the property and the elevation of the property line must be provided. The question arises because of the last sentence in the recommendations which seems to indicate that the streets would be regraded. In any case it is my observation that a retaining wall may be necessary not only between Lots 19 and 20 but also between Lot 20 and the property to the west.

In general, it is requested that in the preparation of the drainage reports, a vicinity map be supplied (zone atlas page with an outline of the tract under consideration, a copy of the ortho-photo map and a copy of the pertinent Flood Hazard Boundary Map to help expedite the review process. I want also to stress that the potential existence of localized flooding conditions must be reviewed and the rationale for the specification of the finished floor elevations has to be included, in order to comply with the requirements of the National Flood Insurance Program.

If you need to discuss these matters further, please do not hesitate to call me.

Very truly yours,

Bruno Conegliano
Assistant City Engineer/Hydrology

BC/fs

cc - Richard Heller, City Engineer
Richard Leonard, AMAFCA
Fred Aguirre, Asst. Hydrology Engineer
Drainage File

MEURER, SERAFINI AND MEURER, INC.

CONSULTING ENGINEERS • SURVEYORS • PLANNERS

2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

June 15, 1979

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JUN 15 1979

CITY ENGINEER

Mr. Bruno Conegliano
Asst. City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87110

Re: Indian Acres Subdivision

Dear Bruno:

Attached are three copies of the drainage study for Lots 17, 18, 19 and 20, Tract #3, of Indian Acres Subdivision for your review and subsequent approval.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Frank Krim

Frank Krim
Project Engineer
FK:dw

cc: Ron Senac, w/attachment