HYDROLOGY G17/D11 2 PLANS

G17/D11

2 PLANS

MSM
Consultants
Inc
2601 Wyoming Boulevard, N.E. Suite F
Albuquerque, New Mexico 87112-1097
(505) 292-1936

A Member of the SP Group
of Professional Service Companies
Engineering, Surveying, Planning,
and Energy Management

RECEIVED
MAY 24 1982
CITY ENGINEER

May 20, 1982

Brian Burnett
Hydrology Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Certification for Harrigan's Restaurant

Dear Brian:

Pursuant to your letter dated May 13, 1982, I have field inspected the above referenced site. In general, the construction relating to drainage has been accomplished in accordance with the approved drainage plan prepared by our office dated August 28, 1981, however, several minor deviations were observed.

The minor deviations and required corrective measures are as follows:

1. Exit driveway west of the building; The storm water run off from this area was not routed to the pond as the approved plan shows. This run off, by approval from your office is directly discharged to Montgomery via the new curb cut constructed by the City.

   No correction is required as this was approved by your office.

2. Roof drains on east side of the building; There are three drains located on this side of the building. The discharge from the two northerly most drains is directed to the landscaped area between the building and the parking area. It appears that there is a minimum amount of fall across this landscaped area to parking lot. Potentially, during a large storm event, water could stand next to the building for a time before running off.

One of the following recommendations will need to be implemented to correct this potential problem: a) Construct a one (1) foot wide by six (6) inch deep concrete swale from the roof drain discharge points to the wheelchair curb cut or b) Install a minimum four (4) inch diameter conduit from the drains to the parking area. Either of these two recommendations will provide positive and direct drainage of the roof run off away from the building.

MSM Consultants, Inc.

Again we feel that the drainage related construction has been accomplished in conformance to the approved plan and that implementation of either recommendation to correct the drainage on the east side of the building will bring the project up to standards.

We have greatly appreciated your cooperativeness and help with this project. If there are any questions, please feel free to call.

Sincerely,

MSM CONSULTANTS, INC.

Jim Leymon

Jim Leymon, P.E.
Project Manager

JL:jsc

cc: Charles Daboub Design

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

May 13, 1982

Mr. Jim Leymon
M.S.M. Consultants, Inc.
2601 Wyoming Blvd. N.E.
Albuquerque, N.M. 87112

RE: CERTIFICATION FOR HARRIGAN'S RESTAURANT

Dear Jim:

A recent field inspection of the referenced site revealed that several deviations from the approved drainage plan have taken place during construction. More specifically, the roof drains on the east side of the building have been constructed such that runoff will concentrate near the entrance way.

This office requests that the construction relating to drainage be certified by your firm. A letter indicating either compliance with the approved plan or the necessary changes to bring the project up to standards will be satisfactory.

If you have any questions, please call.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

MSM
Consultants
Inc
2601 Wyoming Boulevard, N.E. Suite F
Albuquerque, New Mexico 87112-1097
(505) 292-1936

A Member of the SP Group
of Professional Service Companies
Engineering, Surveying, Planning,
and Energy Management

March 23, 1982

Mr. Brian G. Burnett
Civil Engineer/Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Harrigan's Restaurant Drainage Report Revision

Dear Brian:

Transmitted herewith are three (3) copies of the revised Drainage and Grading Plan for the subject project for your approval. Pond outlet pipe elevations have been revised to match the design on City Drawing No. 1393 for the deceleration lane.

Very truly yours,

MSM CONSULTANTS, INC.

Dan Grochowski

Dan Grochowski
Project Engineer

Enclosure

cc: Charles Daboub w/enclosure

DG/lb

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

March 18, 1982

Mr. Dan Grohowski
M.S.M. Consultants, Inc.
2601 Wyoming Blvd. NE, Suite F
Albuquerque, N.M. 87112

RE: HARRIGAN'S RESTAURANT DRAINAGE REPORT REVISION

Dear Dan:

I have enclosed a copy of the approved turning lane detail along Montgomery Blvd. N.E. It appears that some minor revisions will be required to the drainage plan so that two designs "jive".

I apologize for you having to change the plans a second time. If I can help in any way, please call.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

Enclosure

MUNICIPAL DEVELOPMENT DEPARTMENT
Richard S. Heller, P.E., City Engineer ENGINEERING DIVISION Telephone (505) 766-7467

POSITIVE POND DISCHARGE

Q_5 = 1.46 cfs $A_{max.}$ = 0.22 ft.²

(SEE CALC'S SHT. 5 OF 6, ORIGINAL REPORT.)

USE 1-4" PIPE A = 0.09 ft.² O.K.

POND VOLUME

VOL. REQ'D = 4712 ft.³

(SEE CALC'S SHT. 3 OF 6, ORIGINAL REPORT.)

LANDSCAPED POND (BY AVE. END AREA)

TOP - 442 ft.²

BOTTOM - 198 ft.²

AVE. - 320 ft.²

V = 320 × 1.5 = 480 ft.³

PARKING LOT POND V = 4313 ft.³

(SEE CALC'S SHT. 6 OF 6, ORIGINAL REPORT.)

O.K.

TOTAL POND VOLUME 480 + 4313 = 4793 ft³ > 4712 ft³

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

G17 - D11

March 4, 1982

Mr. Dan Grochowski
M.S.M. Consultants
2601 Wyoming Blvd. N.E.
Albuquerque, N.M. 87112

RE: HARRIGAN'S RESTAURANT DRAINAGE REPORT

Dear Dan:

As you know, Traffic Engineering has requested that a deceleration lane be placed west of the restaurant entrance. Associated with this lane is the curb return next to the pond. Dave Harmon of Traffic Engineering has indicated on the enclosed plan the proposed configuration.

Since the pond configuration, available capacity, and outlet scheme are affected, we are requesting that a revision be made to the drainage plan. It appears that the parking area could be used to accommodate the displaced runoff volume resulting from a reduction in the pond size. It has also been brought to my attention that stability problems may occur in the pond due to the fact that the slopes intersect at a point. We may want to put a top width (i.e., create a berm) to insure stability.

It is our understanding that the architect, Mr. Charles Daboub, will be granting approval for you to proceed with these changes. We hope to meet with you in person in order to expedite the design and review process.

Very truly yours,

BGB

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

cc: Mr. Charles Daboub
Mr. Dave Harmon
Mr. Jim Achen

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

G17-D11

October 5, 1981

Mr. Jim Leymon
Meurer, Serafini, Meurer Consultants, Inc.
2601 Wyoming Blvd. N.E., Suite F
Albuquerque, New Mexico 87112

Re: HARRIGAN'S RESTAURANT DRAINAGE REPORT

Dear Jim:

The referenced drainage report is hereby approved based on the submittal of September 28, 1981. Please see that copies of the revised plan (dated 9/28/81) are placed in the construction sets. Mr. Fred Aguirre will sign off for hydrology when this is done.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/fs

MSM CONSULTANTS, INC.

Engineering • Planning • Surveying/Energy Management

2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87112 • (505) 292-1936

September 28, 1981

RECEIVED
SEP 29 1981
CITY ENGINEER

Mr. Brian Burnett
Civil Engineer/Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Harrigan's Restaurant Drainage Report

Dear Brian:

We respond to the comments in your letter of September 21, 1981, which you made after initial review of subject report. A copy of your letter is attached for your reference.

1. Offsite grading is not an alternative. It can be seen from existing contours and the proposed finish floor elevation that the finish floor will be above the existing grade which slopes to the west at approximately 2%. This natural slope will prevent ponding next to the building.
2. A vicinity map has been added to the Drainage and Grading Plan.
3. It can be seen from the proposed finish floor elevations and proposed top of curb spot elevations that the ground will slope away from the building providing discharge of roof runoff away from the building.
4. Additional elevations have been added as requested.
5. A blank copy of the standard city drainage covenant has been sent to the owners for their completion.

Two copies of the revised drainage and grading plan are enclosed for your use.

Very truly yours,

MSM CONSULTANTS, INC.

Dan Grochowski

Dan Grochowski
Project Engineer

DG:jsc

Enc.

cc: Mr. Charles Daboub w/enc.
Mr. Marc Redus & Mr. David Frazier w/enc.

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

G17-D11

September 21, 1981

Mr. Daniel Grochowski
MSM Consultants, Inc.
2601 Wyoming Blvd. N.E.
Albuquerque, New Mexico 87112

Re: HARRIGAN'S RESTAURANT DRAINAGE REPORT

Dear Dan:

An initial review of the referenced drainage report has resulted in the comments listed below. The numbers indicated refer to the Drainage Report (DR) and Construction Plan (CP) Checklists.

1. DR #11 - Per our conversation of last week, it may be appropriate to construct a swale along the edge of the building to prevent the off-site flows from ponding next to the building. Since the area to the south of the structure will be developed at a later date, the swale would be a temporary measure.

2. DR #18 & CP #3 - Please place a vicinity map on the Drainage and Grading Plan.

3. DR #21D & CP #17 - Will there be any means of discharging roof runoff from the landscaped areas?

4. DR #21K & CP #15 - Please submit additional elevations in the vicinity of the drivepad to insure that the property line elevation is one foot above the flowline elevation.

5. DR #23 - A completed drainage covenant wil be required for approval of the drainage report.

If I can be of further help on these matters, please call.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/fs
8465A

cc: Mr. Charles Daboub
Mr. Marc Redus
Mr. David Frazier

DRAINAGE REPORT FOR
HARRIGAN'S RESTAURANT SITE
ALBUQUERQUE, NEW MEXICO

SEPTEMBER, 1981

PREPARED FOR:

CHARLES DABOUB DESIGN
4255 LBJ SUITE 139
DALLAS, TEXAS 75244

MEURER, BREAIN AND MEURER, INC.
Systems Planning Corporation

2601 Wyoming Boulevard, N.E.
Albuquerque, New Mexico 87112
(505) 292-1936

DRAINAGE REPORT FOR
HARRIGAN'S RESTAURANT SITE
ALBUQUERQUE, NEW MEXICO

RECEIVED
SEP 0 4 1981
ENGINEERING

PREPARED FOR:

CHARLES DABOUB DESIGN
4255 LBJ SUITE 139
DALLAS, TEXAS 75234

SEPTEMBER, 1981

PREPARED BY:

MSM CONSULTANTS, INC.
2601 WYOMING BLVD. NE
ALBUQUERQUE, NEW MEXICO 87112

PREPARED BY:

Daniel Grochowski
Design Engineer

REVIEWED BY:

Jim Leymon
Project Engineer

APPROVED BY:

Carl A. Tebbens
Vice President

CARL A. TEBBENS
NO. 6309
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

I. PURPOSE AND SCOPE

The purpose and scope of this report is to present the results of a drainage analysis and a grading plan for the Harrigan's Restaurant site on Montgomery Blvd. N.E., in Albuquerque, New Mexico in accordance with City of Albuquerque requirements.

II. SITE LOCATION AND DESCRIPTION

The presently undeveloped site is l on the south side of Montgomery Blvd., approximately 600 feet west of San Mateo Blvd. It is bounded on the north by Montogmery Blvd., on the east by the Alpha-Beta Supercenter and on the south and west by undeveloped land. The land generally falls to the northwest at a slope of approximately 2%.

III. General

In its undeveloped state, rainfall on the site runs off in overland sheet-flows from southeast to northwest to the gutter on the south side of Montgomery Blvd. After development of Harrigan's Restaurant, this pattern of runoff will continue. Before its release to Montgomery, the storm water will collect in detention ponds with outlets sized to prevent a flow to Montogmery greater than in the undeveloped state. The site is not located in a flood hazard area (See Exhibit III).

The site was previously included in a Development Plan Approval request to the Environmental Planning Commission by Lincoln Road Ltd., in June of this year. No special drainage requirements were imposed at that time. The site is zoned C-2.

IV. OFFSITE DRAINAGE

Historically offsite runoff entered the site from the east and southeast. Development of the Alpha-Beta store on the east boundary of the site cut-off all runoff from the east. A pond adjoins the eastern boundary (See Exhibit II), which, along with grades sloped away from the Harrigan's site and an outlet pipe from the pond to the storm sewer in Montgomery, prevents all water from the east from entering the site.

A small portion of undeveloped land to the south continues to drain across the site in sheet flows. Development of the site will not prevent the offsite runoff from entering and crossing the site at its present locations. All offsite runoff flows to the gutter in Montgomery Blvd. at present and will continue to do so after site development.

The downstream collection facility is a storm sewer in Montgomery. This facility cannot accept any flows greater than the undeveloped Q. As a result ponding is required for those flows created by development.

V. ONSITE DRAINAGE

All onsite runoff currently drains to Montgomery Blvd., in sheet flows. Development of the site will increase the Q_{100} from 3.10 cfs. to 6.35 cfs. As stated earlier, no additional flows can be allowed in the storm sewer in Montgomery, therefore, detention ponding is required for the site.

The undeveloped runoff volume is 4488 $ft.^3$ and developed is 9200 $ft.^3$ The ponding requirement as per the November 1979 Interim Drainage Guidelines is 4712 $ft.^3$ The two ponds as shown on the Drainage

and Grading Plan provide 4725 ft.^{3} of storage. Maximum pond depth is 18 in. The parking lot pond bottom is asphalt lined with concrete curb sidewalls. Its overspill is located in the north curb. A 4 in. outlet pipe provides positive discharge from the parking lot pond to the landscaped area below. The landscaped area pond bottom consists of 6 in. of 3 in. to 6 in. cobbles which provides a permanent basin to retain small nuisance flows. The sides of the pond shall be landscaped at 2 to 1 max. slopes. The pond overspill shall also be landscaped with a curb cut provided in the exit lane to prevent the flow of water behind the curb. Two 4 in. outlet pipes which extend through the exit lane curb provide positive discharge from the landscaped pond. Drainage into the pond is through a curb cut at the southwest corner of the pond and from the 4 in. parking lot pond outlet.

All drainage leaves the site at Montgomery Blvd.

VI. DESIGN CRITERIA

The Rational Method, Q=CIA, is used to determine runoff flows where Q is the runoff quantity in cubic feet per second, C is the runoff coefficient, I is the intensity in inches per hour and A is the contributing area in acres. Velocities and depths were found using Manning's Formula $V = \frac{1.486}{n} (HR)^{2/3} (S)^{1/2}$, where V is the velocity in feet per second, n is the roughness coefficient, HR is the hydraulic radius and S is the slope. The HR is equal to the cross-sectional area divided by the wetted perimeter. Pond outlet pipes are sized using the orifice equation $Q = C A\sqrt{2gH}$, where Q is the flow in cubic feet per second, C is the discharge coefficient, A is the cross-sectional area and H is the elevation

difference from the center of the pipe outlet to the pond liquid surface. The overspills are sized using the weir equation, $Q = C L H^{2/2}$, where Q is the flow in cubic feet per second, C is the weir coefficient, L is the weir length in feet and H is the elevation difference between the top of the weir and the liquid surface.

Runoff volumes are based on the 6-hour, 100-year rainfall of 2.4 in. (See Exhibit VII).

VII. CONCLUSION AND RECOMMENDATIONS

The drainage and grading plan contained herein conforms to the requirements for the City of Albuquerque and should be approved by the City Hydrology Engineer. In addition the following is recommended:

1. Construct the drainage improvements as shown on the attached Drainage and Grading Plan.
2. Maximum slopes on the site shall be 3 to 1 except in the landscaped pond where slopes shall not exceed 2 to 1.
3. Ponds and landscaping shall be maintained by the owner in accordance with a recorded drainage covenant.
4. The bottom of the landscaped pond shall consist of 6 in. of 3 in.- 6 in. cobbles to provide a permanent retention basin for nuisance flows.
5. Erosion control landscaping shall be used in the landscaped strip between the parking lot pond overspill and the sidewalk.

APPENDIX A
CALCULATIONS

MEURER - SERAFINI - MEURER, INC. **ALBUQUERQUE, N.M.**

By DJG Date 8/26/91 PROJECT HARRIGAN'S RESTAURANT sheet No. 1 of 6

Checked By____ Date____ OFFSITE - DRAINAGE Job No. 0690148

AREA - 24310 ft.^{2} = 0.56 Ac.

C = 0.4 (UNDEVELOPED)

L (TO FARTHEST REACH) = 396 ft. H = 8 ft. S = 2.0%

V = 1.4 fps (SEE EXHIBIT V)

T_c = 396 / 1.4 = 283 sec. = 4.7 min. USE 10 min.

I_{10} = 3.9 in/hr. I_{100} = 6.0 in/hr.

Q_{10} = 0.4 (3.9) 0.56 = 0.87 cfs

Q_{100} = 0.4 (6.0) 0.56 = 1.34 cfs

VELOCITY & DEPTH N/A (ALL FLOWS ARE SHEET FLOWS)

AREA - 150' x 374' = 56100 ft.^{2} = 1.29 Ac.

UNDEVELOPED

C = 0.4

L (TO FARTHEST REACH) = 403 ft. H = 8 ft. S = 2.0%

V = 1.4 fps (SEE EXHIBIT V)

T_c = 403/1.4 = 288 sec. = 4.8 min. USE 10 min.

I_{10} = 3.9 in/hr I_{100} = 6.0 in/hr.

Q_{10} = 0.4 (1.29) 3.9 = 2.01 cfs

Q_{100} = 0.4 (1.29) 6.0 = 3.10 cfs

SEE EXHIBIT VII

VOL. = 0.4 (56100) (2.4/12) = 4488 ft.^{3}

DEVELOPED

COMPOSITE C

ROOF & PAVEMENT 46570/56100 x 0.9 = 0.75

LANDSCAPED 9530/56100 x 0.4 = 0.07

TOTAL 0.82

L (TO FARTHEST REACH) = 400 ft. H = 8 ft. $K = \sqrt{\frac{L^3}{H}} = \sqrt{\frac{400^3}{8}}$ = 2828.43

$T_c = 0.0078\,K^{0.77} = 0.0078(2828.43)^{0.77}$ = 3.6 min. USE 10 min.

I_{10} = 3.9 in/hr. I_{100} = 6.0 in/hr.

Q_{10} = 0.82 (3.9) 1.29 = 4.13 cfs

Q_{100} = 0.82 (6.0) 1.29 = 6.35 cfs

SEE EXHIBIT VII

VOL. = 0.82 (56100) (2.4/12) = 9200 ft.^{3}

PONDING REQUIREMENT

$DEV_V - UNDEV_V = REQ_V$

$9200 - 4488 = \underline{\underline{4712 \text{ ft.}^3}}$

DRAINAGE AREAS

(A) AREA - 41774 ft^2 = 0.96 Ac.

COMPOSITE C

ROOF & PAVEMENT - 34594/41774 × 0.9 = 0.75

LANDSCAPED - 7180/41774 × 0.4 = 0.07

TOTAL 0.82

T_c = USE 10 min I_{10} = 3.9 in/hr. I_{100} = 6.0 in/hr.

Q_{10} = 0.82 (3.9) 0.96 = 3.07 cfs

Q_{100} = 0.82 (6.0) 0.96 = 4.72 cfs

USING MANNING'S FORMULA FOR A TRIANGULAR SHAPED DITCH:

SIDE SLOPES - 1%

SLOPE - 2%

n = 0.018 (FOR ASPHALT PAVEMENT)

V_{10} = 1.87 fps d_{10} = 0.13 ft.

V_{100} = 2.08 fps d_{100} = 0.15 ft

(B) AREA - 10276 $ft.^2$ = 0.24 Ac.

COMPOSITE C

ROOF & PAVEMENT - 8376/10276 × 0.9 = 0.73

LANDSCAPED - 1900/10276 × 0.4 = 0.07

TOTAL 0.80

T_c = USE 10 min. I_{10} = 3.9 in/hr. I_{100} = 6.0 in/hr.

Q_{10} = 0.80 (3.9) 0.24 = 0.75 cfs

Q_{100} = 0.80 (6.0) 0.24 = 1.15 cfs

USING MANNING'S FORMULA FOR A TRIANGULAR SHAPED DITCH:

SIDE SLOPES -- 1%

SLOPE -- 2%

n = 0.015 (FOR ASPHALT PAVEMENT)

V_{10} = 1.31 fps d_{10} = 0.08 ft.

V_{100} = 1.46 fps d_{100} = 0.09 ft.

(C) AREA - 4050 ft.^{2} = 0.09 Ac.

COMPOSITE C

PAVEMENT - 3600/4050 x 0.9 = 0.80

LANDSCAPED - 450/4050 x 0.4 = 0.04

TOTAL 0.84

T_c = USE 10 min. I_{10} = 3.9 in/hr. I_{100} = 6.0 in/hr.

Q_{10} = 0.84 (3.9) 0.09 = 0.29 cfs

Q_{100} = 0.84 (6.0) 0.09 = 0.45 cfs

USING MANNING'S FORMULA FOR A TRIANGULAR SHAPED DITCH

SIDE SLOPES - 1%

SLOPE - 2%

n = 0.015 (FOR ASPHALT PAVEMENT)

V_{10} = 1.04 fps d_{10} = 0.05 ft.

V_{100} = 1.16 fps d_{100} = 0.06 ft.

POSTIVE DISCHARGE REQUIREMENT

Q_5 (UNDEVELOPED)

T_c = USE 10 min

5-YR. 10 min. STORM -- 0.47 ∴ I = 0.47 (6) = 2.82 in/hr.

Q_5 = 0.4 (2.82) 1.29 = 1.46 cfs

POND OUTLET CALCULATIONS (BOTH POND:)

$Q_{max.}$ 1.46 cfs

PARKING LOT POND:

USING THE ORIFICE EQUATION; $Q = CA\sqrt{2gH}$

$C = 0.62$ (FOR A SHARP-EDGED FLUSH INLET) $H = 2.83$

$$A_{max.} = \frac{1.46}{0.62\sqrt{2(32.2)2.83}} = 0.17 \text{ ft.}^2$$

4" PIPE $A = 0.09$ ft.^{2} O.K.

6" PIPE $A = 0.20$ ft.^{2} N.G. USE 4" PIPE

LANDSCAPED POND:

$H = 1.83$

$$A_{max} = \frac{1.46}{0.62\sqrt{2(32.2)1.83}} = 0.22$$

6" PIPE $A = 0.20$ ft.^{2} O.K.

8" PIPE $A = 0.35$ ft.^{2} N.G.

2 - 4" PIPES $A = 0.18$ ft.^{2} O.K. USE 2-4" PIPES

(BECAUSE OF INSERTION IN CURB)

POND OVERSPILL CALCULATIONS (BOTH POND:)

$Q_{MIN.} = 6.35$ cfs

PARKING LOT POND:

USING THE WEIR EQUATION; $Q = CLH^{3/2}$

$C = 4.1$ (FOR SHARP CRESTED WEIR)

TRY $L = 90$ ft. $H^{3/2} = \frac{6.35}{4.1(90)}$ $H = 0.067$ ft. < 0.07 ft. O.K.

LANDSCAPED POND

TRY 10 ft. $H^{3/2} = \frac{6.35}{4.1\,(10)}$ $H = 0.29$ ft. < 0.30 ft. O.K.

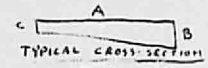
CURB CUT CALCULATION

$Q_{MIN.} = 0.45$ cfs

TRY 1 ft. $H^{3/2} = \frac{0.45}{4.1\,(1.0)}$ $H = 0.23$ ft. < 0.50 ft. O.K.

POND VOLUME CALCULATIONS (BOTH PONDS)

PARKING LOT POND (BY CROSS-SECTIONAL AVERAGE END AREA)



TYPICAL CROSS-SECTION

AREA = A $\frac{B+C}{2}$

		A	B	C	AREA	AVE	x 15
EAST	0	20	0	0	0	3.3	49.50
	15	30	0.44	0	6.6	8.725	130.88
	30	35	0.62	0	10.85	12.725	190.88
	45	40	0.73	0	14.6	17.42	261.30
	60	44	0.86	0.06	23.24	22.99	344.85
	75	44	0.97	0.20	25.74	29.04	435.60
	90	44	1.14	0.33	32.34	34.54	518.10
	105	44	1.21	0.46	36.74	39.27	589.05
	120	44	1.32	0.58	41.8	50.625	759.38
	135	42	1.45	0	59.45	51.96	779.40
	150				44.47		
					19.125	11.875	178.13
WEST	165	25	0.37	0	4.625		
						SUBTOTAL	4237.07
			WEST OF 165				76.25
						SUBTOTAL	4313 ft.^{3}

15' INCREMENTS

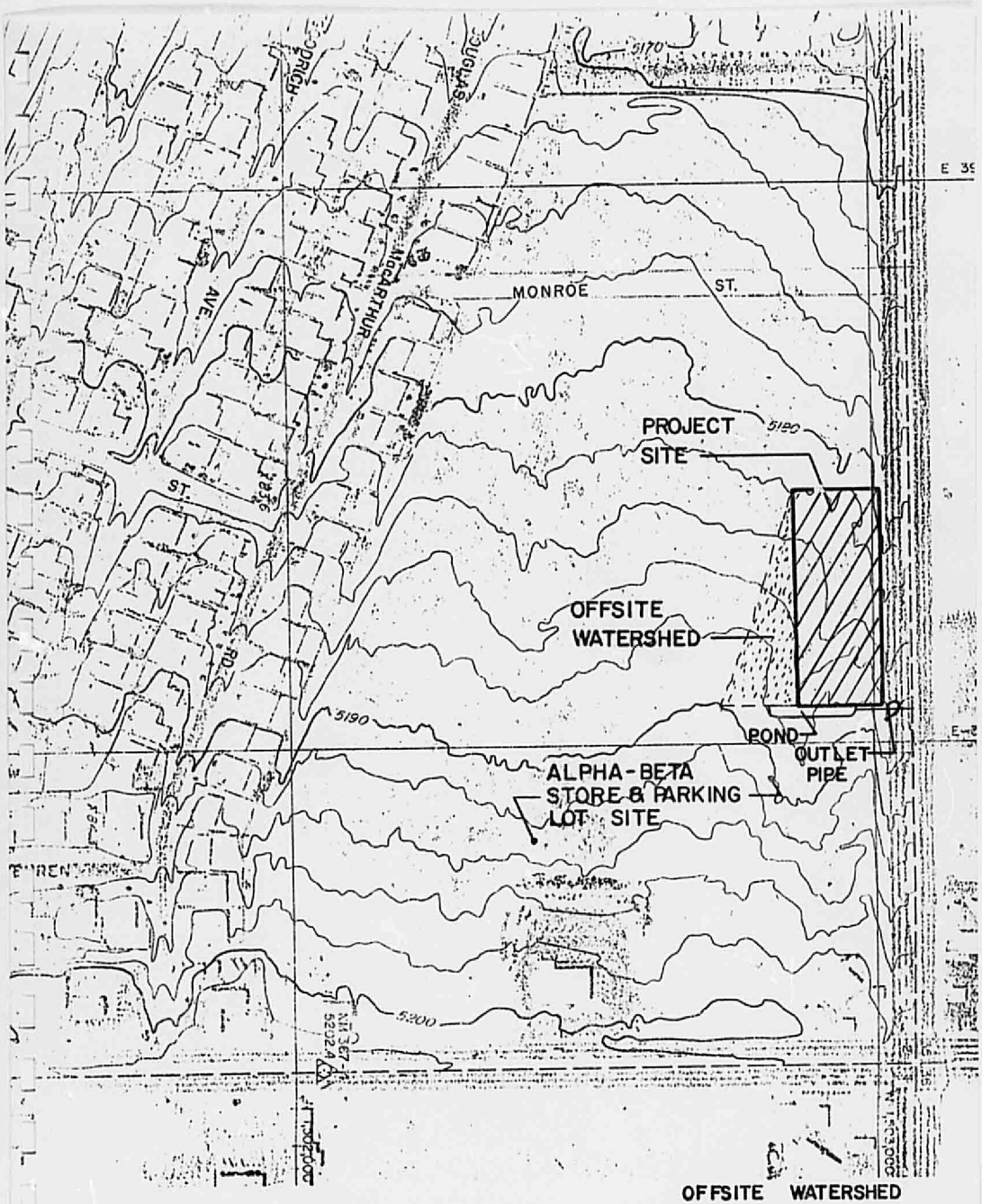
LANDSCAPED POND (BY AVE. END AREA)

TOP - 376.20
BOTTOM - 173.52
AVE 274.86 x 1.5 = 412 ft.^{3}

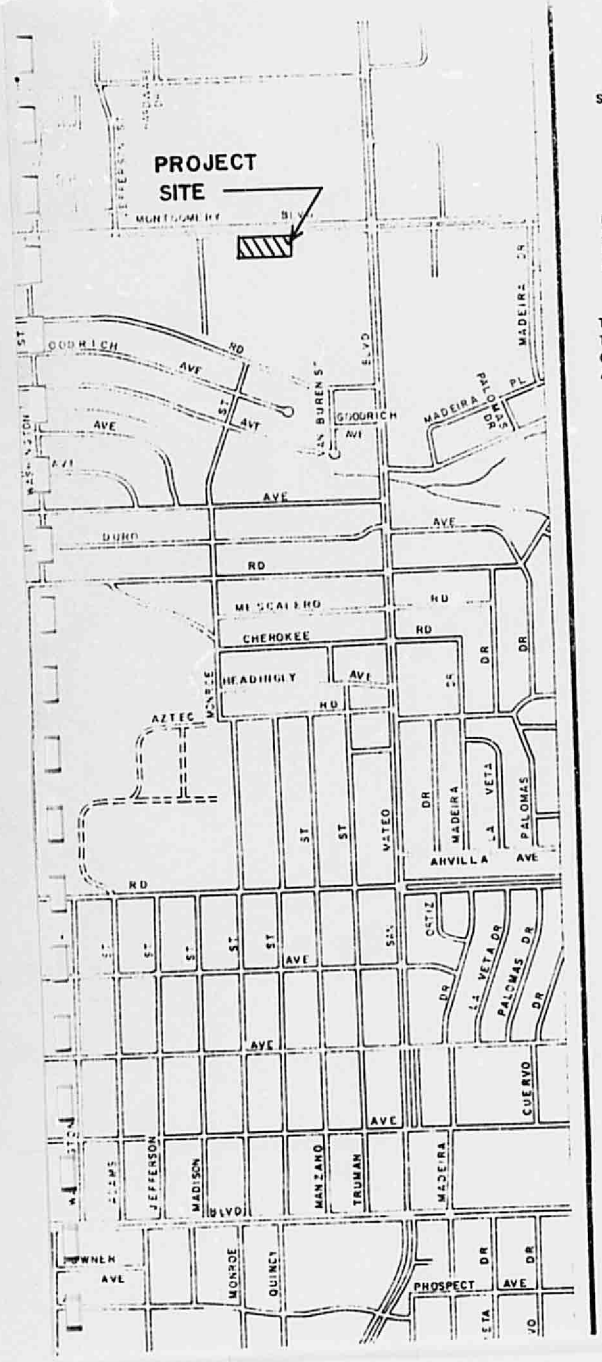
TOTAL 4725 ft.^{3} > 4712 ft.^{3} O.K.

APPENDIX B
EXHIBITS

ZONE ATLAS MAP
EXHIBIT I



OFFSITE WATERSHED
EXHIBIT II



KEY TO MAP

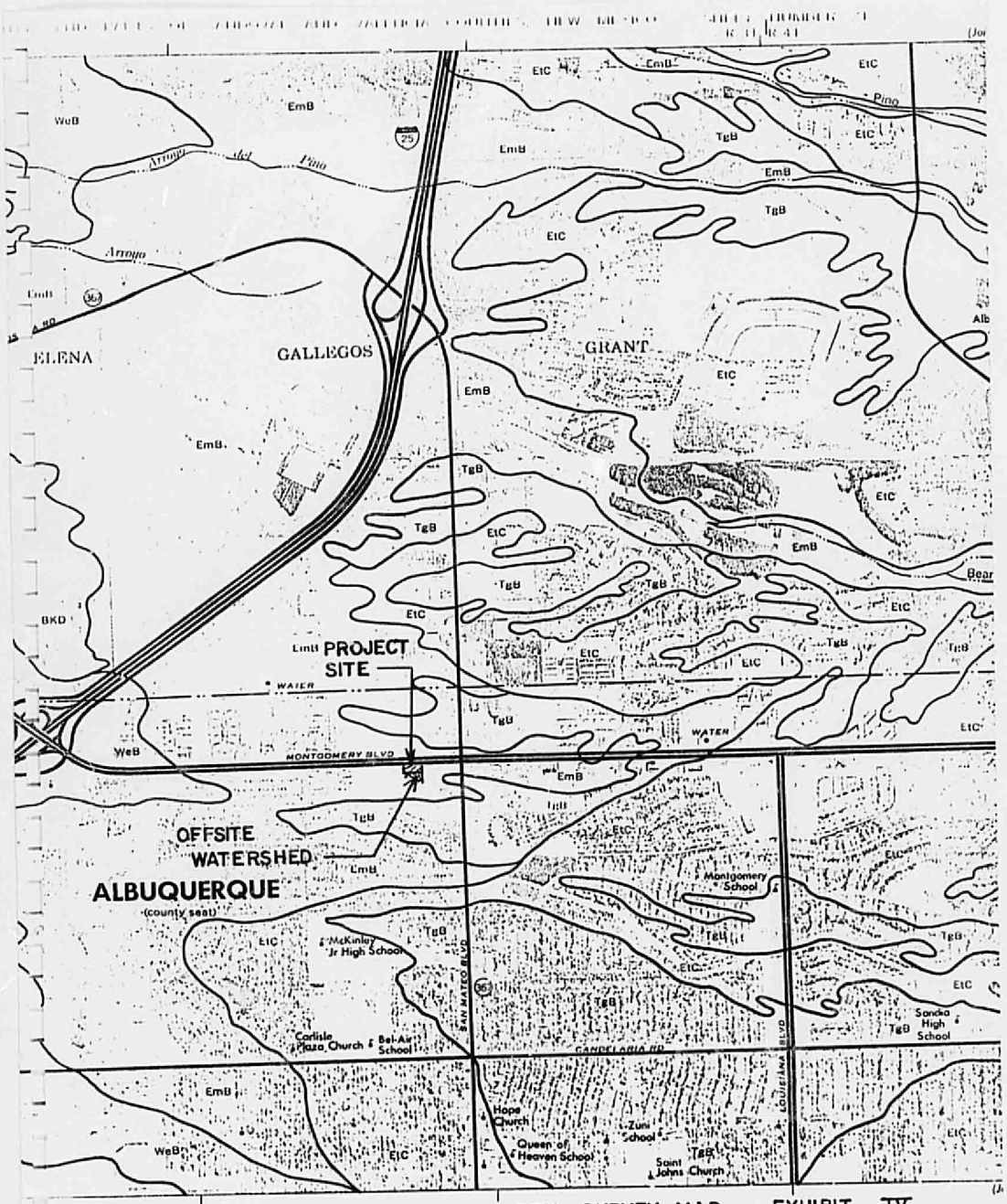
SPECIAL FLOOD HAZARD AREA — ZONE A

Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.

TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872

FLOOD HAZARD BOUNDARY MAP

EXHIBIT III



SOIL SURVEY MAP EXHIBIT IV

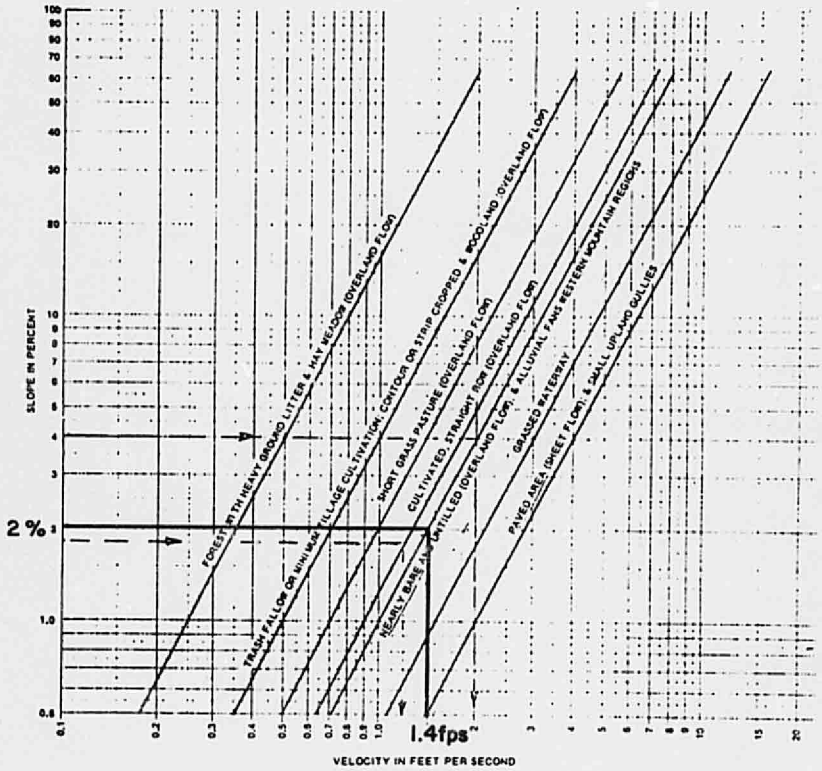


Figure 2-3 -Velocities for upland method of estimating T_c

EXHIBIT V

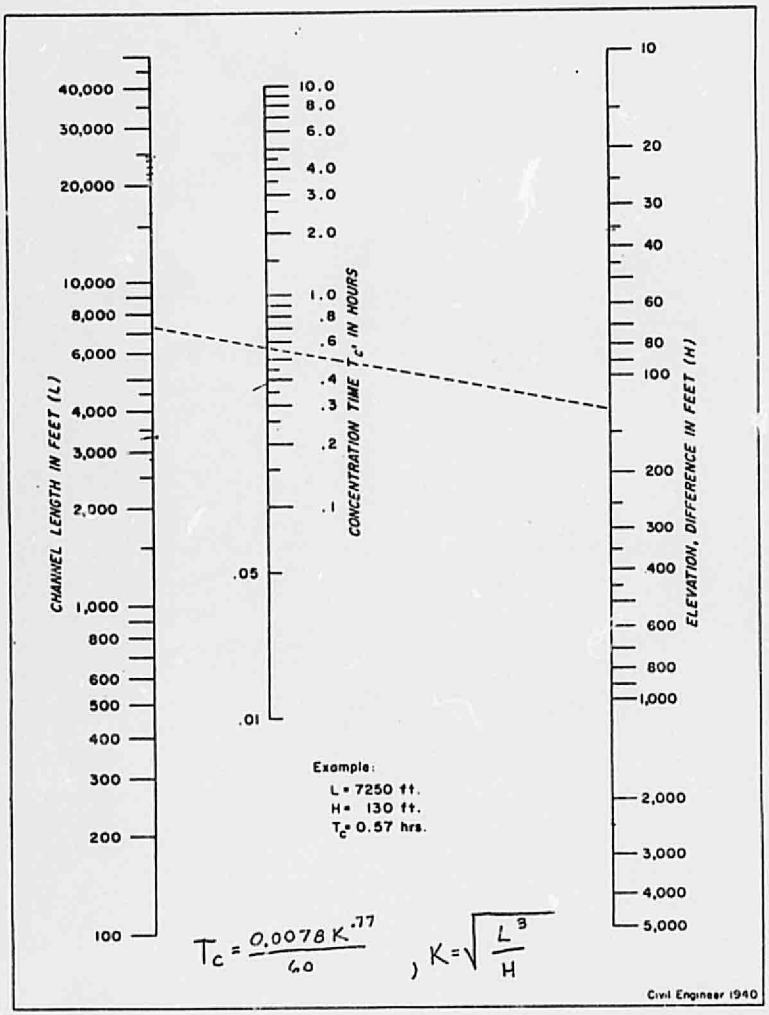


Figure 2-2 --- Nomograph to Determine Time of Concentration

EXHIBIT VI

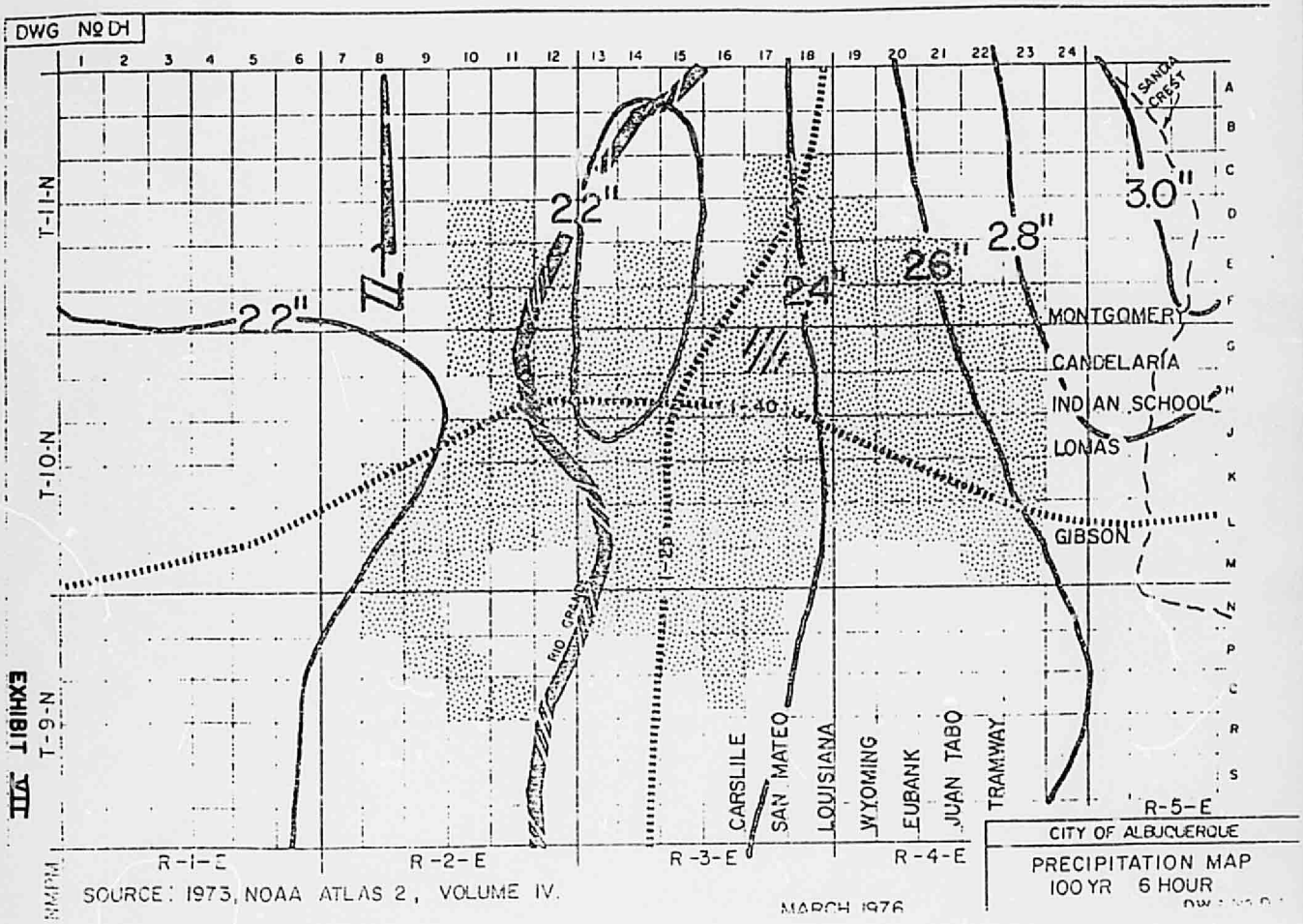

DWG Nº DH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
A B C D E F G H J K L M N P Q R S
T-11-N
T-10-N
T-9-N
R-1-E
R-2-E
R-3-E
R-4-E
R-5-E
22"
22"
24"
26"
28"
30"
SANDIA CREST
MONTGOMERY
CANDELARIA
INDIAN SCHOOL
LOMAS
GIBSON
I-40
I-25
RIO GRANDE
CARSLILE
SAN MATEO
LOUISIANA
WYOMING
EUBANK
JUAN TABO
TRAMWAY
NMPM
SOURCE: 1973, NOAA ATLAS 2, VOLUME IV.
MARCH 1976
CITY OF ALBUQUERQUE
PRECIPITATION MAP
100 YR 6 HOUR

EXHIBIT VII

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

DRAINAGE REPORT INFORMATION SHEET

PROJECT TITLE Harrigan's Restaurant & Bar

ZONE ATLAS PAGE NO. 6-17 CITY ADDRESS

LEGAL ADDRESS Vista Grande Land Co.

ENGINEERING FIRM MSA Consultants, Inc. CONTACT Jim Lemon

ADDRESS 2601 Wyoming NE, Albuq, NM 87112 PHONE 292-1936

OWNER CONTACT

ADDRESS PHONE

ARCHITECT/~~SURVEYOR~~ Charles Dreams Design CONTACT Charles Dreams

ADDRESS 6255 LBJ, Suite 139, Dallas, Texas 75240 PHONE (214) 367-4345

DATE SUBMITTED

BY