HYDROLOGY G16/D53 2 PLANS

G16/D53

2 PLANS

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

July 3, 1984

Mr. Richard T. Williams
Denny-Gross & Associates, Inc.
2400 Comanche Road N.E.
Albuquerque, New Mexico 87107

RE: REVISED GRADING & DRAINAGE PLAN FOR LOT 3D CUTTER INDUSTRIAL PARK (G16-D53) RECEIVED JUNE 11, 1984.

Dear Rick,

The above referenced plan, dated June 8, 1984 is approved.

Please attach a copy of this approved plan to the construction set prior to release of the building permit.

Also, prior to release of the "Certificate of Occupancy" please provide a copy of the recorded plat removing the lot line.

If I can be of further assistance, please contact me at 766-7644.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, P.E.
City/County Flood Plain Admin.

BJG/cl

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

May 30, 1984

Mr. Richard Williams
Denney-Gross & Associates, Inc.
2400 Comanche Road NE
Albuquerque, NM 87107

REF: GRADING AND DRAINAGE PLAN FOR LOT 3D CUTTER INDUSTRIAL PARK (G16-D53)
RECEIVED MAY 2, 1984

Dear Rick:

I have reviewed the above referenced submittal and forward the following comments:

A. The drainage analysis is approved for what was done. However, off-site flows adjacent to the site were not addressed. Will there be any existing off-site flows entering or crossing the site?

B. For drainage across the lotlines, a plat will have to be prepared and filed to remove the lotlines or a recorded drainage covenent to run with each lot for this purpose will need to be submitted.

The following comments pertain to the grading plan and are based on the DPM Checklist:

1. Spot elevations and/or contours for existing conditions should be provided, extending a minimum of 25 feet beyond the property to adequately show the site and its' relationship with adjacent properties.

2. Elevations should be provided for all existing on and off-site structures, within the 25' with the MSL designation.

3. Show all existing and proposed easements and right-of-ways with dimensions and purpose.

4. Proposed spot elevations and/or contours should be super-imposed over existing to show how the site is to be developed and how it will interface with the existing topography of the adjacent properties.

5. Required spot elevations for standard City drivepad, if appropriate.

6. Indicate street names adjacent to site.

7. An erosion control plan is required. If construction is to take place during the months of July, August or September then the 10 year storm will have to be addressed.

Should you have any questions or comments, please contact me at 766-7644.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, PE
City/County Flood Plain Admin.

BJG:mrk

DENNEY-GROSS & ASSOCIATES, INC.
CONSULTING ENGINEERS
2400 COMANCHE ROAD, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0696

June 11, 1984

RECEIVED
JUN 08 19
HYDROLOGY SECT.

G16 D28
D53

Mr. Billy J. Goolsby, P.E.
City of Albuquerque
Design Hydrology Section
123 Central N.W.
Albuquerque, NM 87102

Re: Grading and Drainage Plan for Lot 3D, Cutter Industrial Park (G16-D53)
DGA Job No. 740.12

Dear Mr. Goolsby:

Thank you for your comments dated May 30, 1984 regarding subject project.

Specific responses to your comments are as follows.

A. About 2.1 cfs will be accepted onto the site from the east. There is a ridge line about 130 feet east of the site. The contributing drainage area comprises 0.45 acres. Please see the attached calculations and map.

B. A replat of the affected lots is pending.

1. Offsite spot elevations have been provided.

2. MSL elevations have been provided for all existing, proposed, and offsite structures within 25' of the site.

3. Existing easements have been shown.

4. No response.

5. No new drivepad is proposed for this project.

6. The street name has been indicated adjacent to the site.

7. The area of the site is less than one acre. Grading will be less than 500 cubic yards. The site is not within or adjacent to a watercourse defined as a major facility. Therefore, no erosion control plan will be submitted. The following note is included on the plan: "Contractor to insure that no sediment resulting from construction operations is deposited on public right-of-way."

Please contact me should you require additional information.

Very truly yours,

RTWilliams

Richard T. Williams, P.E.

RTW/cbk

Enclosures

INFORMATION SHEET

PROJECT TITLE Drainage Plan 3322 Columbia Drive N.E. TYPE OF SUBMITTAL Drainage Plan

ZONE ATLAS PAGE NO. G16-Z D29 D53 CITY ADDRESS 3322 Columbia Drive N.E.

LEGAL DESCRIPTION See Below

ENGINEERING FIRM DENNEY-GROSS & ASSOC. CONTACT Richard T. Williams, P.E.

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

OWNER Robert Davis, Randall Davis and Larry Davis, A Partnership CONTACT Larry Davis

ADDRESS 2100 Aztec N.E. PHONE 884-0696

ARCHITECT Jim Miller & Associates CONTACT Jim Miller

ADDRESS 2819 Richmond N.E. PHONE 884-1255

SURVEYOR DENNEY-GROSS & ASSOCIATES CONTACT Steven L. Youtsey, L.S.

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

CONTRACTOR Bob Davis Masonry CONTACT Larry Davis

ADDRESS 2100 Aztec Road N.E. PHONE 884-2048

PRE-DESIGN MEETING:

X YES
__ NO
X COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

__ SKETCH PLAT APPROVAL
__ PRELIMINARY PLAT APPROVAL
__ SITE DEVELOPMENT PLAN APPROVAL
__ FINAL PLAT APPROVAL
__ BUILDING PERMIT APPROVAL
__ CERTIFICATE OF OCCUPANCY APPROVAL
__ ROUGH GRADING PERMIT APPROVAL
__ GRADING/PAVING PERMIT APPROVAL
X OTHER Drainage (SPECIFY)

RECEIVED JUN 06 1984 HYDROLOGY SECTION

DATE SUBMITTED: JUNE 11, 1984

BY: RTWilliams
Richard T. Williams, P.E.

LEGAL DESCRIPTION: Lots 3D, 3E, and 3F of the land division of Lot 3, Unit 5, subdivision of a portion of Cutter Industrial Park, Bernalillo County, New Mexico, Plat filed July 20, 1973.

DENNEY - GROSS & ASSOCIATES, INC.
ENGINEERS SURVEYORS PLANNERS
2400 COMANCHE ROAD N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0695

LOCATION LOT 3D CUTTER INDUSTRIAL PARK
PROJ. NO. 740.12
DATE JUN 8, 1984
DESIGNER RTW
PAGE 1

ANALYSIS of OFFSITE FLOWS

A = 130' x 150' = 19,500 SF = 0.45 AC

HYDROLOGIC SOIL GROUP - B (from REPORT)

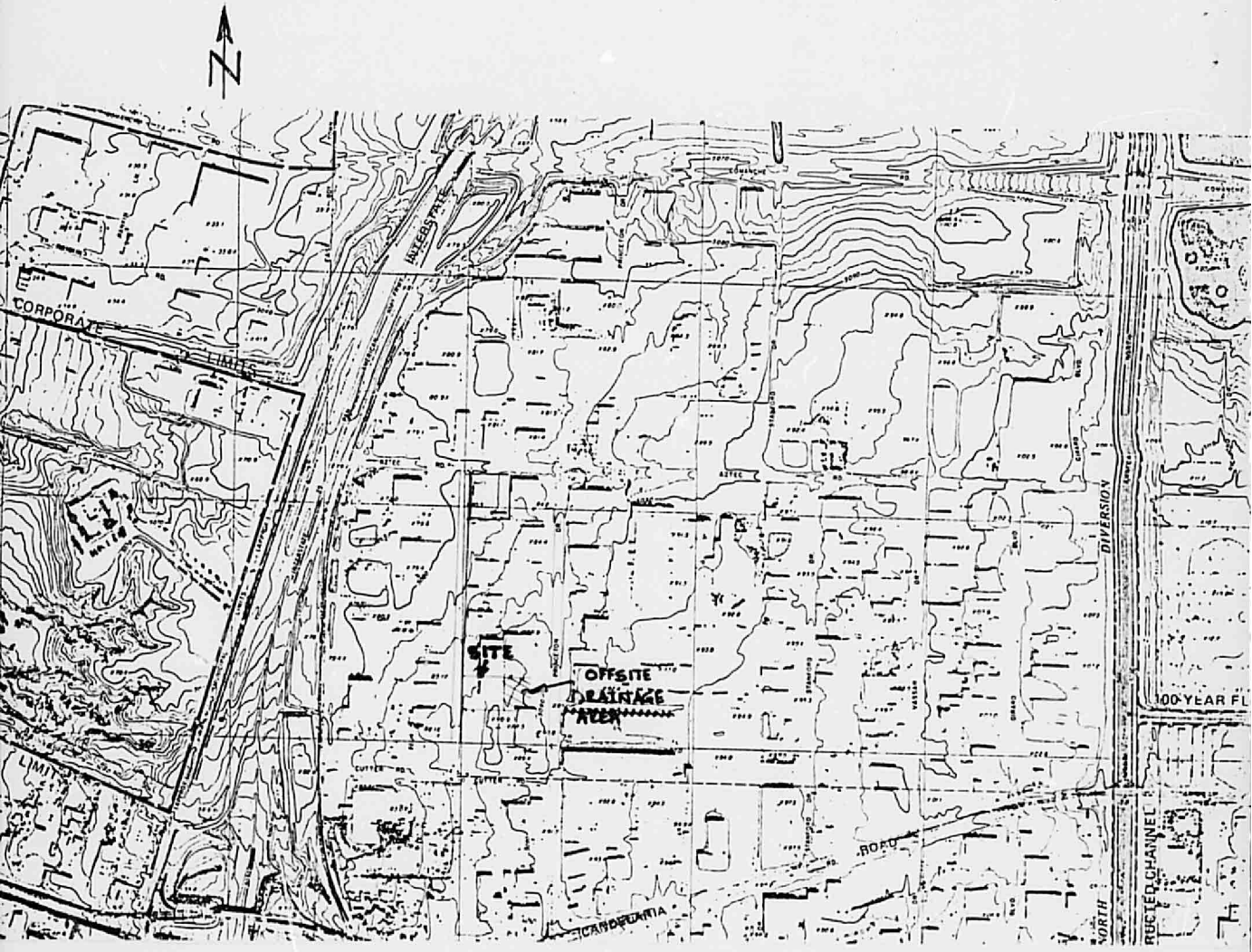
ASSUME FULL DEVELOPMENT (C = 1.00)

ASSUME t_c = 10 MIN

R = 2.2"

$I = 2.2 \div 6.84 \times 10^{-0.51} = 4.65$

$Q_{100} = CIA = 1.00(4.65)(0.45) = 2.1$ CFS


N
CORPORATE
LIMITS
INTERSTATE
SITE
OFFSITE
DRAINAGE
AREA
100 YEAR FL
DIVERSION
CHANNEL
ROAD
CANDELARIA

DENNEY - GROSS & ASSOCIATES, INC.
2400 COMANCHE ROAD N.E.
ALBUQUERQUE, N.M. 87107
TELEPHONE: (505) 884-0696

LETTER OF TRANSMITTAL

DATE April 30, 1984	F.D JOB NO. 740.12
ATTENTION Billy J. Goolsby, P.E.	
REASON	

TO City of Albuquerque
Design Hydrology Section
P.O. Box 1293
Albuquerque, NM 87103

GENTLEMEN:

WE ARE SENDING YOU ☐ ATTACHED ☐ UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS:

☐ SHOP DRAWINGS ☐ PRINTS ☐ PLANS ☐ PROJECT ESTIMATE ☐ SPECIFICATIONS
☐ COPY OF LETTER ☐ CHANGE ORDER ☒ Drainage Plans

COPIES	DATE	NO.	DESCRIPTION
2	4-30-84		Drainage Report for Lot 3-D, Unit 5, Cutter Industrial Park, 3322 Columbia Drive N.E. (Bob Davis Masonry)

THESE ARE TRANSMITTED as checked below.

☒ FOR APPROVAL ☐ APPROVED AS SUBMITTED ☐ RETURN ____ COPIES FOR DISTRIBUTION
☐ FOR YOUR USE ☐ APPROVED AS NOTED ☐ RETURN ____ SIGNED ORIGINALS
☐ AS REQUESTED
☐ FOR REVIEW AND COMMENT ☐ _____
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

RECEIVED
MAY 02 1984
DRAINAGE SECTION

REMARKS

If you have any questions, please feel free to call our office at your convenience.

COPY TO _____

SIGNED: RTWilliams
Richard T. Williams, P.E.

RTW/cbk

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

HYDROLOGY SECTION PROJ. NO. G-16 DATE: 4/6/84

PLANNING DIVISION NO. _____

CONFERENCE RECAP

SUBJECT: Lot 3-D Cutter Industrial Park

	WHO	REPRESENTING
ATTENDANCE:	Rick Williams	
	Billy Goolsby	

FINDINGS: ① Approved Grading & Drainage plan required prior to release of building permit

② Site is not located in a flood hazard area. Discharge to be determined by downstream capacity.

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 G. Goolsby SIGNED: R W Williams

TITLE: CE/Hydrology TITLE: _____

DATE: 4/6/84 DATE: APR 6 1984

DRAINAGE REPORT

For

3322 Columbia Drive N.E.

Prepared For:

Bob Davis Masonry

April 1984

DGA JOB NO. 740.12

Prepared By:

DENNEY-GROSS & ASSOCIATES, INC.
Consulting Engineers
2400 Comanche Road, N.E.
Albuquerque, New Mexico 87107

RECEIVED
MAY 05 1984
HYDROLOGY SECTION

INFORMATION SHEET

PROJECT TITLE Drainage Plan 3322 Columbia Drive N.E. TYPE OF SUBMITTAL Drainage Plan

ZONE ATLAS PAGE NO. G16-Z CITY ADDRESS 3322 Columbia Drive N.E.

LEGAL DESCRIPTION See Below

ENGINEERING FIRM Denney-Gross & Assoc. CONTACT Richard T. Williams, P.E.

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

OWNER Robert Davis, Randall Davis, and Larry Davis, A Partnership CONTACT Larry Davis

ADDRESS 2100 Aztec N.E. PHONE 884-2048

ARCHITECT Jim Miller & Associates CONTACT Jim Miller

ADDRESS 2819 Richmond N.E. PHONE 884-1255

SURVEYOR Denney-Gross & Associates CONTACT Steven L. Youtsey, L.S.

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

CONTRACTOR Bob Davis Masonry CONTACT Larry Davis

ADDRESS 2100 Aztec Road N.E. PHONE 884-2048

PRE-DESIGN MEETING:

X YES
___ NO
X COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
___ GRADING/PAVING PERMIT APPROVAL
X OTHER Drainage (SPECIFY)

DATE SUBMITTED: APR 30, 1984

BY: RTWilliams
Richard T. Williams, P.E.

RECEIVED
MAY 02 1984
PROJECT STUDY

LEGAL DESCRIPTION:

Lots 3D, 3E, and 3F of the land division of Lot 3, Unit 5, subdivision of a portion of Cutter Industrial Park, Bernalillo County, New Mexico, Plat Filed July 20, 1973.

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

HYDROLOGY SECTION PROJ. NO. G-16 DATE: 4/6/84

PLANNING DIVISION NO. _____

CONFERENCE RECAP

SUBJECT: Lot 3-D Cuttar Industrial Park

WHO	REPRESENTING
ATTENDANCE: Rick Williams	
Billy Goolsby	

FINDINGS: ① Approved Grading & Drainage plan required prior to release of building permit.
② Site is not located in a flood hazard area. Discharge to be determined by downstream capacity.

Copy of recap

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: R W Williams

TITLE: CE/Hydrology TITLE: _____

DATE: 4/6/84 DATE: APR 6, 1984

I, Richard T. Williams, hereby certify that the enclosed documents and drawings were prepared under my supervision and are true and correct to the best of my knowledge and belief.

RTWilliams

New Mexico Professional Engineer No. 7309

RICHARD T. WILLIAMS
NEW MEXICO
7309
REGISTERED PROFESSIONAL ENGINEER

I N D E X

	Page No.
INTRODUCTION	1
DESCRIPTION.	1
RUNOFF	3
CONCLUSIONS	6
APPENDIX A - Calculations	
FIGURE 1 - Drainage Area Schematic	
FIGURE 2 - 6 Hour - 100 Year Runoff Hydrograph	
TABLE 1 - Flow Rates, Times, & Amounts	
TABLE 2 - Combined Flows vs. Time	
FLOOD HAZARD MAP	
SOIL SURVEY MAP	
PLATE 1 - Existing Conditions	
PLATE 2 - Proposed Conditions	

DRAINAGE PLAN

Lot 3-D, Unit 5 of Cutter Industrial Park
3322 Columbia Drive N.E.
(Bob Davis Masonry, Inc.)

INTRODUCTION:

In effect, Lot 3-D is the southern one-third of a single lot with a common owner, composed of Lots 3-D, 3-E, and 3-F. In the same sense, the combined lot is the second from the northeast corner of Cutter Road and Columbia Drive, Albuquerque, New Mexico. (See Figure 1 and the site plan)

Currently, 3-E is fully paved and serves as access and parking for an industrial specialties business on Lot 3-F. Both those lots are essentially impervious and both have been the subject of a previous Drainage Report (DGA #596.11, 1982). Lot 3-D is used as open storage.

Development plans call for a new building across the back of Lots 3-D and 3-E abutting the existing building on 3-F (See Site Plan). Since 3-E and 3-F are already impervious, only the drainage from Lot 3-D is the subject of this report. The report calls for site grading with free discharge into Columbia Drive on the basis of minimal impact and shared drainage where free discharge is already permitted.

DESCRIPTION:

Lot 3-D is 50' wide by 170' deep. It contains an area of 8940 sq. ft. or 0.205 acre. Currently, the only imper-

vious area is one 240 sq. ft. pad for a garbage dumpster. 3-D slopes at about 1.6% from the high point in the southeast corner to the driveway at Columbia in the northwest corner of the lot. Lot 3-D is higher than lots to the east and north and will remain so after development, except for roof shared with Lot 3-E. 3-D is slightly lower than Lot 3-C to the south but the flow there is along a paved swale sloping away from 3-D. Thus, 3-D experienced no off-site flows.

Lot 3-D is included in the drainage area schematized in Figure 1, which is based on contours from the Flood Boundary Map. The outlet of the watershed is a pair of 24" concrete pipe culverts crossing Pan American (I-25 Frontage Road) at Aztec Road. These culverts have a capacity of approximately 30 cfs per barrel (HEC 5 & 10). The drainage area is approximately 100 acres and lies roughly between Pan American on the west, Aztec on the north, AMAFCA North Diversion Channel on the ~~east~~, and Cutter Road on the south. Lot 3-D is at the upstream end of subarea 3: at least part of the lot to the south drains to Cutter Road instead of to Aztec.

All soils in the drainage area are of the Wink-Embudo type, as determined from Soil Conservation Service Maps and are of SCS hydrologic soil group B (SCS Soil Survey of Bernalillo County, Map 21, page 44, 82-83). Wink Soils, the

major component, are deep, well-drained soils found on unconsolidated alluvium. In urban areas they are used for community development. They typically have > 15% exchangeable sodium, are calcareous and mildly alkaline, and are found on slopes of 0-15%. Embudo soils are gravelly fine sandy loam formed from decomposed granite. In association with Wink soils, they are usually found in depressions.

The design storm for runoff calculations is the 6 hour - 100 year event. For this drainage area the cumulative volume is 2.2 inches (DPM V2 PL 22.2 D-1). Based on the Flood Boundary and Floodway Map for Albuquerque, New Mexico (panel 23), lot 3-D is not in a 100 year flood hazard area.

RUNOFF:

Included in the Appendix are calculations for runoff from Lot 3-D before and after development. These calculations follow the guidelines in Development Process Manual, Volume 2. Under existing conditions the site is almost completely pervious and

$$Q_{p,100} = 0.33 \text{ cfs existing}$$

Under proposed conditions the east end of the lot will be built upon and the western part will be paved. That is, the

site will be almost completely impervious and

$$Q_{p,100} = 0.95 \text{ cfs proposed}$$

This is a change of only 0.62 cfs and is the result of development affecting unified Lot 3-D/3-E/3-F.

Because 3-D is currently allowed free discharge, because the increase in discharge is small, and also because the fully developed sister lots have been permitted free discharge by the City since 1982, it is proposed to continue free discharge from 3-D onto Columbia.

To direct the runoff properly, the site will be graded as shown on the plans. The roof of the new building will drain toward the west. Generally, flow is west across the lot and slightly north, toward the drivepad on Columbia and toward the existing paved swale on Lot 3-E. West of the proposed building, the entire lot will be paved, with the possible exception of some landscaping near the street.

For downstream conditions, drainage subareas were analyzed by the "rational" method. The several flows were combined to produce an outflow hydrograph for Aztec Road at Pan American. This is shown in Figure 2 along with street and culvert capacities. The data for the hydrograph are presented in Tables 1 and 2. The calculations (with references) are included in the appendix; generally the methods are those of DPM Vol. 2 previously cited.

The total flow line represents combined flow for all

areas except 5 and 7, neither of which flows into Aztec. It can be seen that with or without development, Lot 3-D produces a very small portion of the total, and that the difference is about the width of the line in Figure 2.

The position of the runoff hydrograph for Lot 3-D deserves some comment. For single drainage areas or subareas DPM Vol. 2 specifies a triangular hydrograph where time of peak flow is the time of concentration. Physically, the time of concentration is the time required for runoff from the most distant point of a watershed to contribute to the downstream end. Since Lot 3-D is very nearly the upstream end of Area (3) for the combined hydrograph, its time to peak must be approximately the same as for Area (3). The offset from the start of flow in Area (3) may also be viewed as representing travel time in Columbia Drive.

Figure 2 also shows street and culvert capacities. Street capacities are based on a maximum depth of 0.87' - slightly above curb height. Actual capacity may be greater if adjoining topography permits. Only Area (3) flows in Columbia Drive and thus Columbia is adequate at all times.

Aztec Road capacity is inadequate for large flows. However, at peak flow overall, Aztec is over capacity by approximately 70 cfs of which 21 is attributable to Area (3), while at Area (3) peak flow Aztec is only over capacity by roughly 10 cfs. Area (3) and Lot 3-D are not the real problem.

Culvert capacity is obviously inadequate even though 60 cfs is a generous estimate based on conditions of inlet control and 5' of head water for the double 24" culverts. (HEC 5 & 10) The situation is worse when flows from Areas 5 and 7 (approximately 33 cfs, not shown) are considered. Again, however, the conditions at Lot 3-D have no meaningful impact on the severity of the problem.

CONCLUSIONS:

Lot 3-D is a small lot. Proposed development increases a small amount of existing runoff by an amount which is negligible compared to the total flows involved. Furthermore, Lot 3-D is the sister lot to adjoining Lots 3-E and 3-F which are permitted free discharge for fully impervious conditions under a previous drainage plan. Proposed development affects all three lots.

Runoff should be directed by site grading to flow west and slightly north. Free discharge should be allowed to Columbia at the existing drivepad.

REFERENCES

Development Process Manual, Volume 2, 1982, City of Albuquerque, New Mexico.

BPR HEC: Bureau of Public Roads Hydraulic Engineering Circular, U.S. Department of Transportation, Federal Highway Administration (formerly Bureau of Public Roads), Washington, D.C.

#5 Hydraulic Charts for the Selectional Highway Culverts (1965).

#10 Capacity Charts for the Hydraulic Design of Highway Culverts.

Soil Survey of Bernalillo County, New Mexico, U.S. Department of Agriculture, Soil Conservation Service.

Flood Boundary and Floodway Map 10-14-83, Albuquerque New Mexico, Panel 23, National Flood Insurance Program, Federal Emergency Management Agency.

LOT 3-D RUNOFF

Area: 178.5 x 50 = 8940 sq. ft. = 0.205 Ac

Soil: Wink-Embudo SCS Soil Survey Map 21
: Soil Group B SCS Soil Survey Page 83

Rain: 6 hr-100 yr Volume = 2.2" = 0.183' DPM V2 PL 22.2 D-2

Existing Conditions

Impervious = 0.7% (Bare except for dumpster pad)
C = 0.35 DPM V2 PL 22.2 C-1
Vol. Runoff = (0.35)(0.183)(8940) = 574 ft^3
Lh = 180' el. change = 3.4' S = 0.019
$Tc=0.0078\ L^{0.77}\ S^{-0.385}$ DPM V2 Sec 22.2 Page 3
= 1.96 min approx 2.0 min
Use Tc = 10 min to calc I DPM V2 Sec 22.2 Page 4
I=2.11 x 2.2 = 4.64 in/hr DPM V2 PL 22.2 D-1
Q_{p100} = CIA = (0.35)(4.64)(0.205)=(1.62)(0.205)
= 0.33 cfs

Proposed Conditions - same references

Impervious approx 100% (Minor landscaping only)
C = 1.00
Vol. Runoff = (1.00)(0.183)(8940) = 1639 ft^3
Tc = 1.96 min use 10 min
I = 4.64
Q_{p100} = (1.00)(4.64)(0.205)
= 0.95 cfs

Change in Qp100 = 0.62 cfs

Contributing Flows - See Figure 1 for Areas

Drainage Area (1 & 2) Lh = Length, Hydraulic = longest flow path

Lh = 3600' To Aztec & Princeton

El. Change = 5108.0 - 5080 = 28.0'

S = 28/3600 = 0.0078 = 0.78%

Tc = $.0078\ (L^{.77})/(S^{.385})$ = 27.7 use 28 minutes DPM V2 Sec. 22.2 p 3-4

I = 1.25 x 2.2 = 2.75 in/hr DPM V2 P1 22.2 D-1 & P1 22.2 D-2

A = 71.94 Ac = 2750000 ft^2

Soil: Wink - Embudo, Hydrologic Group B
: SCS Soil Survey of Bernalillo County, NM, Map 21 & pp 42 & 82-83
: 70% Impervious - Site View Judgement

C = 0.69 DPM V2 P1 22.2 C-1

Q_{p100}= CIA = (0.69)(2.75)(71.94) = 136.5 cfs DPM V2

Drainage Area (3) Includes Lot 3-D

Lh = 1400' To Aztec & Columbia

El. Change = 5090.6 - 5078.6 = 12.0

S = 12/1400 = 0.0086 = 0.86%

Tc = $.0078\ (1400^{0.77})/(.0086^{.385})$ = 12.89 use 13 minutes

I = 1.9 x 2.2 = 4.18 for Tc < 10 min., use Tc = 10 to Calc I

Soil Group B, 70% Impervious

C = 0.69

Q_{p100}= (0.69)(4.18)(A)

A = 440,000 ft^2 = 10.10 Ac

Qp = (0.69)(4.18)(10.10) = 29.13 cfs

CONTRIBUTING FLOWS CONTINUED - SEE FIGURE 1

Drainage Area (4)

lh = 650 to Aztec 200' E of Pan American

S use 0.008 = 0.8% Assumed

$Tc = .0078\ (650^{0.77})(.008^{0.385}) = 7.33$ minutes
Use tc min = 10 minutes to get I: DPM V2 Sec 22.2 p 4
I = 2.11 x 2.2 = 4.64

A = 208,000 ft^2 = 4.775 Ac use 4.78 Ac

C = 0.69

Q_{p100}= (0.69)(4.64)(4.78) = 15.30 cfs

Drainage Area (5) Drains to Pan American & thence to Culvert
No Contribution Directly to Aztec

Lh use 200 ft

S = 0.008 Assumed

Tc = 2.96 min. use 3.0 minutes

I = 4.64 in/hr

A = 32,000 ft^2 = 0.735 Ac

C = 0.69

Q_{p100}= 2.35 cfs

Drainage Area (6)

Lh = 350 ft To Aztec (S. Side) 150' E of Pan American

S = 0.008 Assumed

Tc = 4.65 min. use 4.7 minutes

I = 4.64

C = 0.69

A = 60,000 ft^2 = 1.377 Ac

Q_{p100}= 4.41 cfs

CONTRIBUTING FLOWS CONTINUED - SEE FIGURE 1

Drainage Area (7) - Flows only to double 2' concrete pipe culvert under Pan American at Aztec.

Lh use 1300 ft

S use 0.8% = 0.008 Assumed

Tc = 12.51

I = 2 x 2.2 = 4.4

C = 0.69

A = 435,000 ft^2 = 9.99 Ac

Qp = 30.33

STREET CAPACITIES

Columbia Drive Lot 3-D N. to Aztec

W = 40'
S = (5085.0 - 5079.5)/1100
= 0.0050
D = 0.87
Qmax = 90 cfs DPM V2 PL 22.3 D-2

Aztec Road Princeton W. to Columbia

W = 44' (measured)
S = (5082.5 - 5078.5)/400
= 0.010
D = 0.87'
Qmax: use average for 40' and 48'
Q max = 135 cfs DPM V2 PL 22.3 D-2 and D-3

Aztec Road Columbia W. to Pan American

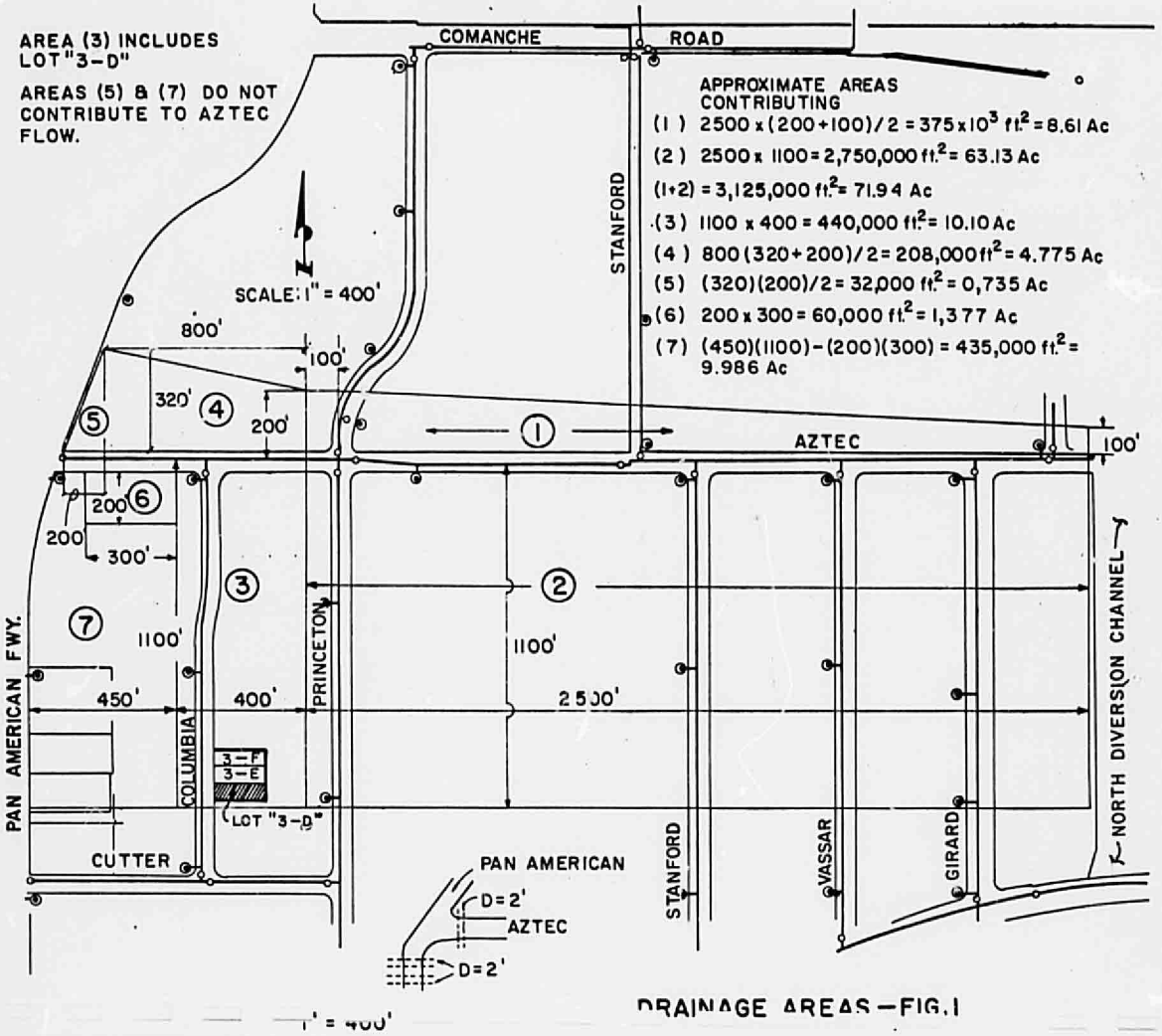
W = 44' (measured)
S = (2.05/350) (Field Survey 4-18-84)
= 0.0059
Qmax: use average for 40' and 48'
Qmax = 102 cfs DPM V2 PL 22.3 D-2 and D-3

Culvert Flow - 24" Barrel (HEC 5 & 10)

1 Barrel across Aztec Qmax use 30 cfs
2 Barrels across Pan American Qmax use 60 cfs

FIGURE 1

Drainage Area Schematic



DRAINAGE AREAS—FIG. 1

FIGURE 2

6 Hr - 100 Year Runoff Hydrograph

FIGURE 2
100 YEAR RUNOFF HYDROGRAPH
AZTEC ROAD N.E. EAST OF PAN AMERICAN FWY.

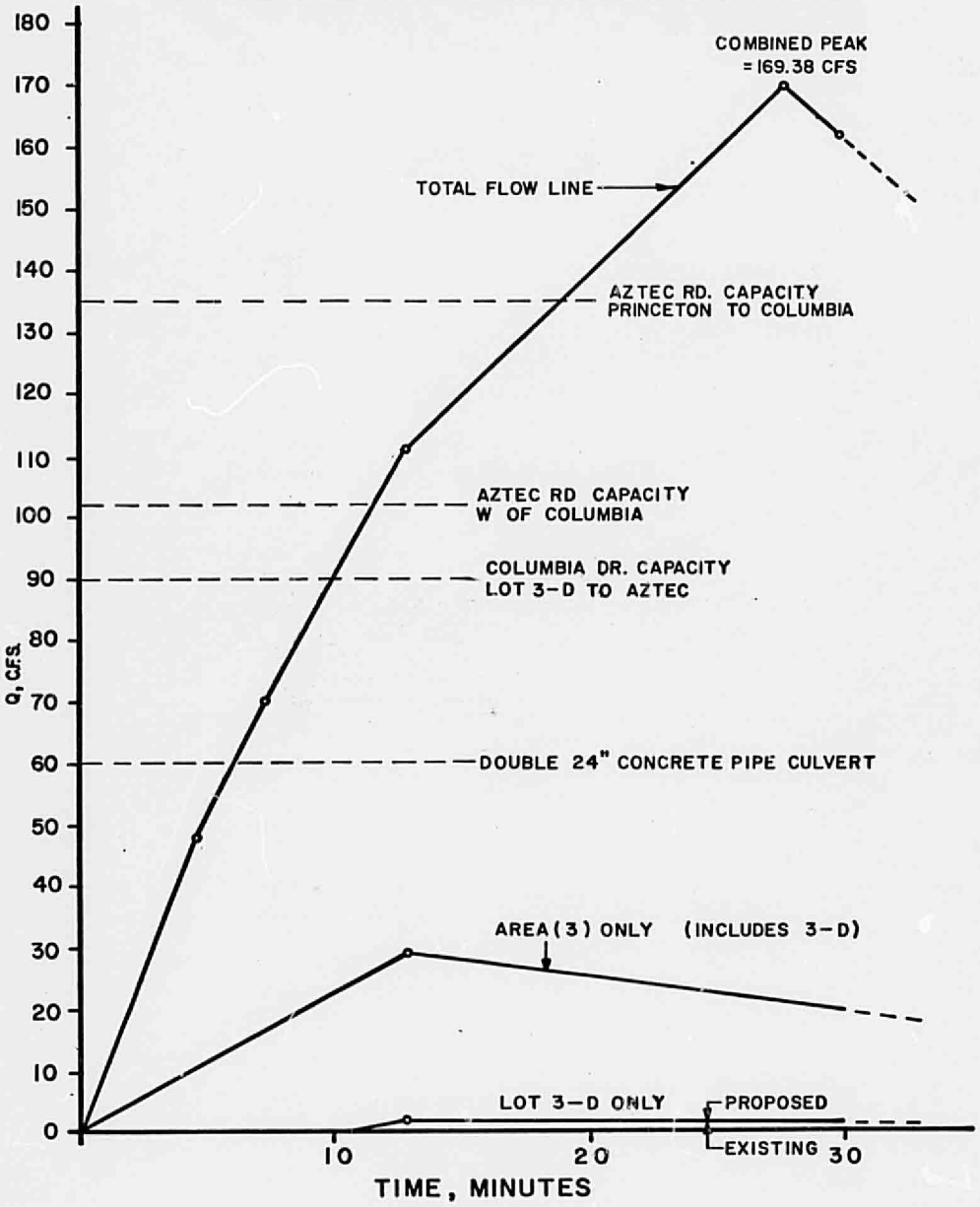


TABLE 1

Flow Rates, Times, & Amounts

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Flow Rates, Times, & Amounts
Areas 5 & 7 Affect Culverts Only

AREA	Qp100 CFS	Tc, MINUTES ACTUAL, CALC I		C	AREA Ft2	RUNOFF Ft3	T RUNOFF MINUTES
(1 & 2)	136.5	27.7		0.69	2,750,000	347,875	85
(3)	29.13	12.9		0.69	440,000	55,660	64
(4)	15.30	7.3	10	0.69	208,000	26,312	57
(5)	2.35	3.0	10	0.69	32,000	4,048	57
(6)	4.41	4.7	10	0.69	60,000	7,590	57
(7)	30.33	12.51		0.69	435,000	55,028	60
Lot 3-D Proposed	0.95	1.96	10	1.00	8,940	1,639	58

TABLE 2

Combined Flows vs. Time

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Combined Flows vs. Time

AREA	4.7	7.3	12.9	27.7	30
1 & 2	23.16	35.97	63.57	136.50	131.02
(3)	10.61	16.48	29.13	20.69	19.38
(4)	9.85	15.30	13.58	9.02	8.31
(6)	4.41	4.19	3.72	2.47	2.28
Lot 3-D Proposed	-0-	-0-	0.98	0.70	0.66
TOTAL	48.03	71.94	110.95	169.38	161.65
AREA 5 Qp=2.35 Tc=3.0	[illegible]8	2.16	1.92	1.28	1.18
AREA 7 Qp=30.33 Tc= 12.5	11.39	17.7	30.06	19.97	18.40

Notes: Areas 5 & 7 Flow Only To Culverts

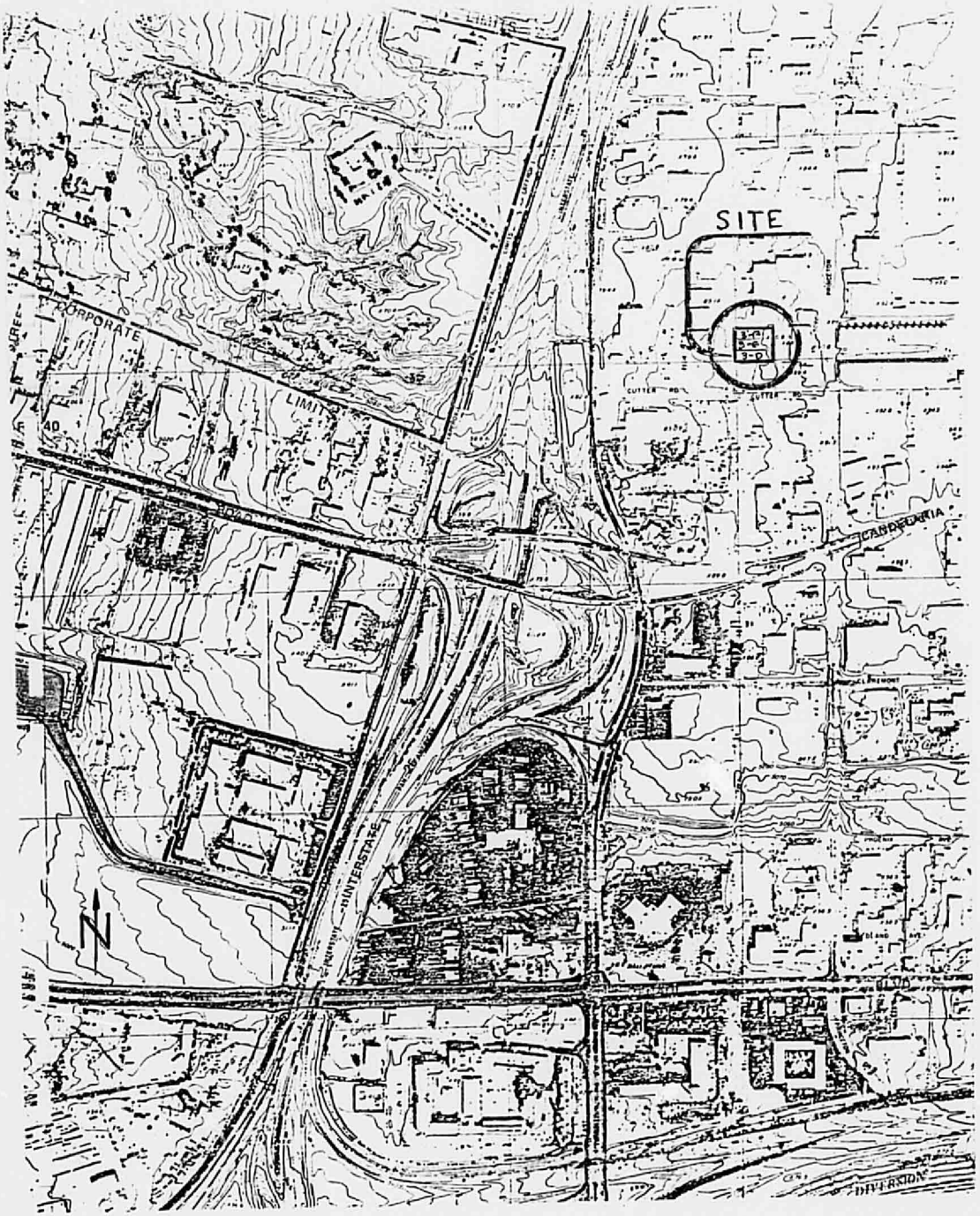
: Area (3) Includes Lot 3-D

: Qp (3) Includes 0.59 cfs for 3-D by % Area (3-D Double Counted)

: 3-D & Area 3 Peak at Same Time, Since 3-D is Upstream End of Area 3

FLOOD HAZARD MAP

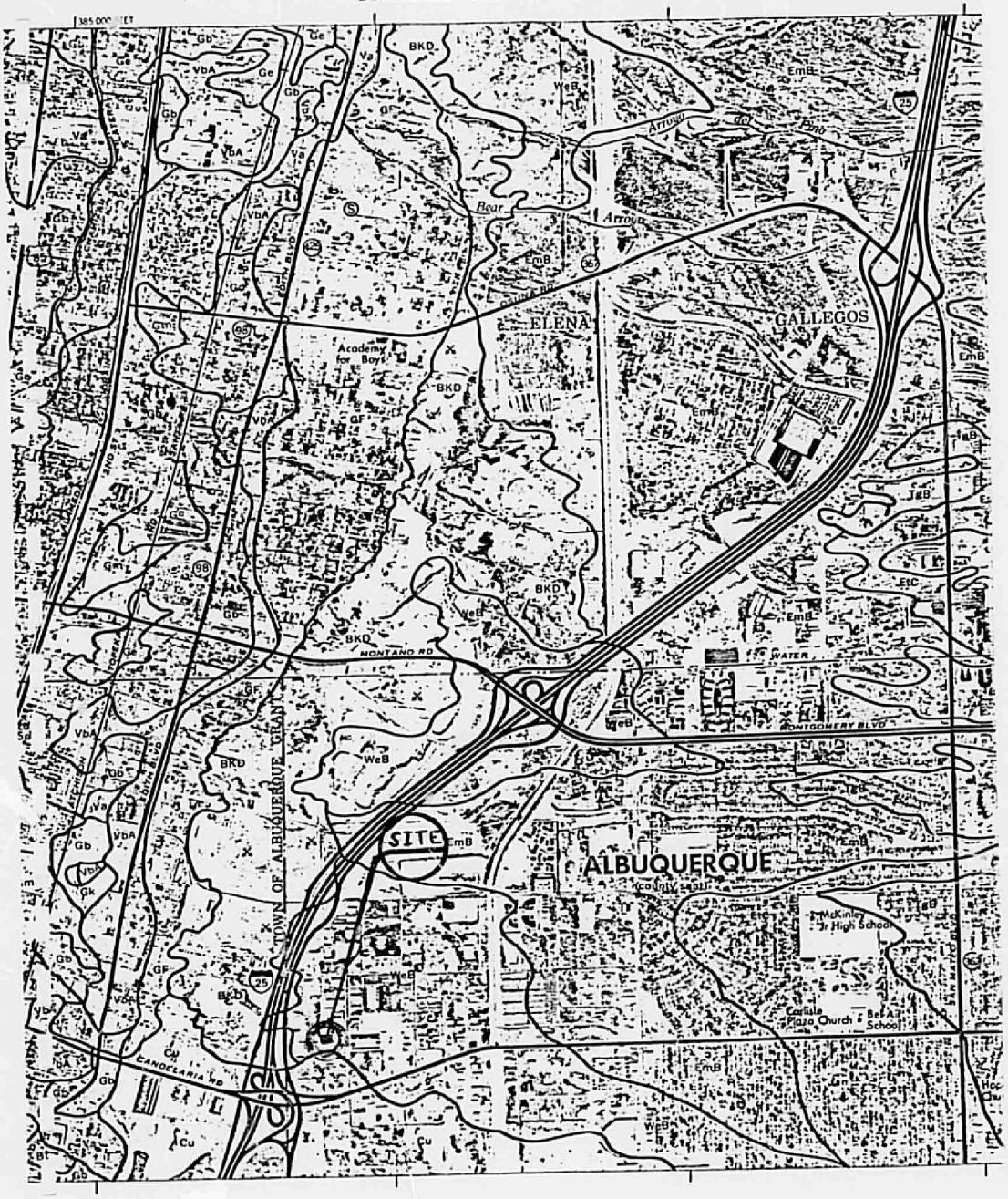
Panel 23


SITE
CORPORATE
LIMIT
CANDELARIA
INTERSTATE
DIVERSION

SOIL SURVEY MAP

Map 21

BERNALILLO COUNTY, AND PARTS OF SANDOVAL AND VALENCIA COUI



1 5 5 2