HYDROLOGY

F13/D3

F13/D3

CIMINO

COMPOUND

1 PLAN

STORM DRAINAGE STUDY
RELATIVE TO DEVELOPMENT OF
CIMINO COMPOUND
ALBUQUERQUE, NEW MEXICO

JUNE 1973

MAC CORNACK AND BURNS
Consulting Engineers, Inc.
Albuquerque, New Mexico

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MacCORNACK & BURNS
CONSULTING ENGINEERS, INC.
1517 GIRARD BLVD., N.E. — SUITE D
ALBUQUERQUE, NEW MEXICO 87106

JAMES A. MacCORNACK, P.E.
FRED BURNS, P.E.

(505) 266-7789

June 11, 1973

Hap Crawford Realty, Ltd.
725 Lomas, NW
Albuquerque, N. M. 87102

Gentlemen:

Transmitted herewith is the "Storm Drainage Study Relative to Development of Cimino Compound, Albuquerque, New Mexico". This study comprises a comprehensive analysis in accordance with the requirements of Resolution No. 1972-2, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), and of the City of Albuquerque.

Thank you for the opportunity of participating in your project.

Respectfully submitted,

MacCORNACK & BURNS
Consulting Engineers, Inc.

Fred Burns

Fred Burns, P.E.
New Mexico Registration No. 4000

JFB:mt

STORM DRAINAGE STUDY
RELATIVE TO DEVELOPMENT OF
CIMINO COMPOUND
ALBUQUERQUE, NEW MEXICO

1. PURPOSE This report is to present those data relative to estimation of the quantity and proposed means of proper handling of storm runoff drainage as it is related to development of the Cimino Compound housing complex, Albuquerque, New Mexico

2. SCOPE This report is to establish criteria and means of construction such that development of the proposed complex will be protected from storm runoff and, further, will not create increased flooding potential for contiguous properties.

3. LOCATION The land area under study of this report is located within the Elena Gallegos Grant being tracts 94B1, 94B2, 94B3, 94B4, 94B5, 94B6, 94B7, 95, and 96, Middle Rio Grande Conservancy District, Map No. 31, Bernalillo County, New Mexico, all within Section 31, T11N, R3E, N.M.P.M., comprising an approximate total land area of ten acres. The tract is bounded on the east by Rio Grande Boulevard NW, on the south by Cimino Road NW, on the west by the Duranes Lateral, and on the north by Dietz Farms subdivision boundary.

4. EXISTING DRAINAGE CONDITIONS

a. General The tract under consideration is presently undeveloped, except for a house and outbuildings on the eastern-most tract along Rio Grande Boulevard NW. The remainder of the area has been under cultivation and irrigation in the immediate past.

b. Topography The tract is located in the valley floor of the Rio Grande at a distance of approximately one-fourth mile east of the east bank levee. The land area is essentially flat and level. The surface soils are silty

sands and sandy clays, being recent alluvial deposits most probably altered by two or more centuries of tilling. The tract is bounded on the west by the Duranes Irrigation Lateral which is elevated approximately six feet. It is bounded on the north by a local irrigation ditch elevated approximately three to four feet. There are no significant topographic or geologic features unusual to the general area.

c. Rio Grande The tract under study is located within the historic flood plain of the Rio Grande; however, the Corps of Engineers has developed flood control facilities which include riverside levees and floor control dams which are rated for a standard project flood (in excess of a 100-year storm). The levees in the reach of the study area are designed to pass 40,000 cfs; however, with the flood control dams of Jemez, Galisteo, Abiqui, and Cochiti (under construction), the river flow in the reach will probably be regulated to 7,000 cfs or less. There will be no consideration of a major Rio Grande Flood by the study of this report.

d. Drainage Areas The location of the property is in an essentially level, agricultural area with the attendant complex of irrigation and drainage cancels which precludes surface runoff from one area to another. The area under consideration is not subjected to storm runoff from contiguous areas and, therefore, will be studied for on-site precipitation only.

5. PROPOSED DRAINAGE PLANS

a. Criteria

(1) General Resolution No. 1972-2, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA). Even though the area of this report is outside of the designated boundaries of the AMAFCA, the applicable provisions will be met.

(2) Project Storm 100-year intensity, frequency-duration as shown on the curve of Chart 1, "1963 Master Plan of Drainage for the City of Albuquerque and Environs," as prepared by the Gordon Herkenhoff and Associates, Inc., Consulting Engineers.

b. Runoff from Surrounding Areas The north and west boundaries of the study area are protected by raised irrigation ditches. The east boundary is Rio Grande Boulevard NW, which provides an effective waterblock. The south boundary has a raised irrigation ditch along the westerly 220 feet, and the remainder of the boundary slopes away from the tract which will also preclude drainage onto the property. With the property thus protected on all boundaries, the possibility of storm runoff from adjacent properties is negligible and will not be further considered by this report.

c. Flood Protection The area of the tract is proposed to be drained to a swale located along the longitudinal axis of the property, which will drain to the west. A ponding area will be located at the western extremity of the drainage swale. The combination of the swale and the pond area will be used to percolate and to evaporate all of the internal precipitation runoff.

The calculations, layout, and field test results are included in the Appendix of this report.

6. CONCLUSIONS AND RECOMMENDATIONS On the basis of the study of this report, the following recommendations are proposed.

a. Provide drainage and ponding for all internal drainage as shown in the Appendix of this report.

b. Maintain the waterblocking affect created by the irrigation ditches bounding the property.

It is concluded that when the above-listed recommendations are implemented, the proposed housing development, "Cimino Compound," will not create a flood threat to surrounding properties and that the development itself will not have a flooding potential.

The major flood threat of the main stem Rio Grande is minimal because of the extensive works and control exercised by the Corps of Engineers.

Respectfully submitted,

MAC CORNACK AND BURNS
Consulting Engineers, Inc.

Fred Burns

Fred Burns, P. E.
New Mexico Registration No. 4000

McMillan & Associates, Inc.

Consulting Materials Engineers
Laboratory Testing and Field Investigation

Benny E. McMillan, P.E.
President

Telephone (505) 345-3681

2501 Candelaria Road, N.E.
Albuquerque, New Mexico 87107

June 25, 1973

MacCornack & Burns
1517 Girard Blvd., N.E.
Albuquerque, New Mexico

Job No. E73-1051

Attention: Mr. Fred Burns

Re: Percolation Tests
Cimino Compound
Albuquerque, New Mexico

Gentlemen:

As you requested, we have conducted soil percolation tests on the referenced project located on Rio Grande Boulevard, N.E., Albuquerque, New Mexico. The tests were performed to provide criteria for the design of surface water ponding areas for site drainage.

Two test borings were drilled to a depth of 15 feet below existing grade and used for percolation testing. The logs of these borings are attached. The soil classifications presented are based upon field examination by the engineer and visual classification procedures outlined in the Unified Soil Classification System. The test borings were drilled with a CME-55 truck mounted drill rig utilizing 6-1/2 inch hollow stem auger.

Boring No. 1 was located in the center of the exercise track at the west end of the project, and Boring No. 2 was

located north of the recreation area near the center of the project.

The test borings indicate a surface layer of fine grained, low plasticity soil 3 to 5 feet in depth underlain with silty sand to the full depth of the borings. No ground water was encountered in either boring at the time of drilling.

The results of the percolation tests after a 24 hour pre-soak period are as follows:

Boring No.	Depth (Feet)	Percolation Rate (Minutes per Inch)
1	15	6
2	15	5

Should you have any questions pertaining to this report, please do not hesitate to call.

Respectfully submitted,

Benny E. McMillan, P.E.

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
NO. 3730
BENNY E. McMILLAN

bls

Copies: Addressee (4)

PROJECT Cimino Compound

JOB NO. E73-1051 DATE 6-13-73

LOG OF TEST BORING NO. 1

RIG TYPE CME-55 124

BORING TYPE 6-1/2" Hollow Stem Auger

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								CL-ML	slightly moist	CLAYEY SILT, low plasticity, trace very fine sand, light brown
5								SM	slightly moist	SAND, nonplastic, predominately fine to medium, fairly clean sand, trace gravel at 13-1/2 - 15', brown
10										
15										Stopped auger at 15'

GROUND WATER

DEPTH	HOUR	DATE
	none	

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.
T – 3" O.D. thin-walled Shelby tube.

SERGENT, HAUSKINS & BECKWITH

CONSULTING SOIL AND FOUNDATION ENGINEERS
PHOENIX • FLAGSTAFF • EL PASO

PROJECT Cimino Compound

JOB NO. E73-1051 DATE 6-13-73

LOG OF TEST BORING NO. 2

RIG TYPE CME-55 124

BORING TYPE 6-1/2" Hollow Stem Auger

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	slightly moist	SILT, some sand, low plasticity, brown
								CL-ML	slightly moist	CLAYEY SILT, low plasticity, trace very fine sand, light brown
5								SM	slightly moist	SILTY SAND, low plasticity, nonplastic, brown
10								SM	slightly moist becomes coarser with depth	SAND, nonplastic, relatively clean, predominately fine to medium, light brown
15										Stopped auger at 15'

GROUND WATER

DEPTH	HOUR	DATE
	none	

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.
T – 3" O.D. thin-walled Shelby tube.

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Job CIMINO COMPOUND Sheet No. 1 of
Subject DRAINAGE STUDY Job No. 73-89
Client HAP CRAWFORD By Burns Date 6/4/73
MAC CORNACK & BURNS Consulting Engineers, Inc., Albuquerque, NM

APPENDIX

A. General: The rational method will be utilized to establish Runoff Quantity.

$$Q = CiA$$

$C = 0.70$

$A = 10$ ac.

B. Overland Flow Time

Distance = 1460

Slope = 0.4 %

$$T = \frac{1460}{500} \times 22 = \underline{\underline{64.24 \text{ min}}}$$

C. Rainfall Intensity

100 year frequency - 64 min Duration

$$I = \frac{189}{t+25} = \frac{189}{89} = \underline{\underline{2.12 \text{ in/hr}}}$$

D. Quantity

$$Q = CiA$$

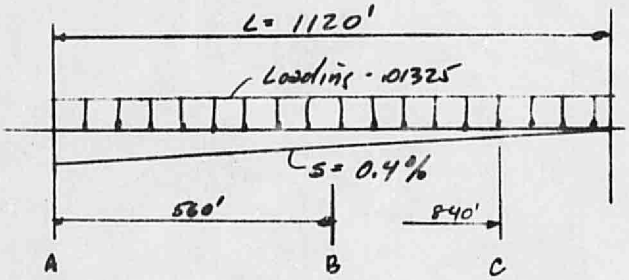
$$= 0.70 \times 2.12 \times 10$$

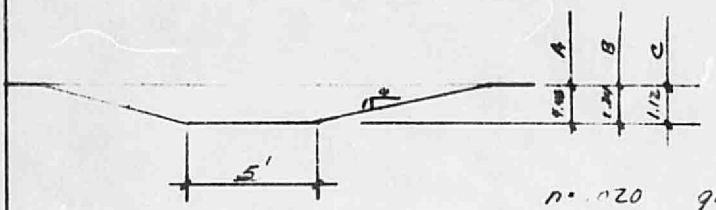
$$= \underline{14.84 \text{ cfs}}$$

Job CIMINO COMPOUND Sheet No. 2 of
Subject DRAINAGE STUDY Job No. 73-87
Client HAP CRAWFORD By Burns Date 6/18/73
MAC CORNACK & BURNS Consulting Engineers, Inc., Albuquerque, NM

APPENDIX

E: Drainage Swale: Loading = $\frac{14.84}{1120} = .01325$ cfs/ft





n = .020 grass-lined

Section A

Q = 14.84 cfs $\frac{Qn}{b^{8/3}S^{1/2}} = \frac{14.84 \times .02}{73.1 \times .04^{1/2}} = .0642$

$\frac{y_0}{b} = .135$ $y_0 = .135 \times 5 = .68$ → A = 5.26

V = $\frac{14.84}{5.26}$ = 2.83 ft/sec

Section B

Q = 7.42 cfs → y_0 = 0.34

A = 2.16

V = $\frac{7.42}{2.16}$ = 3.44 ft/sec

Section C

Q = 3.71 cfs y_0 = 0.17

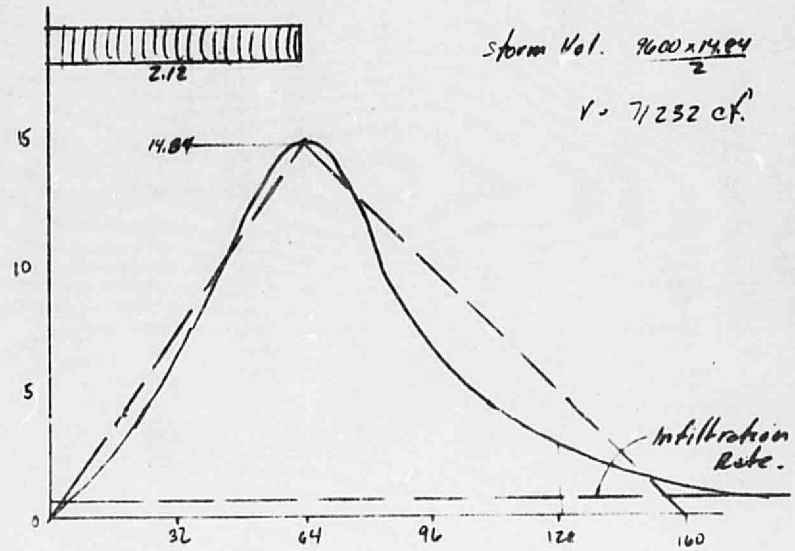
A = 0.97 V = 3.82 ft/sec

Job CIMINO COMPOUND Sheet No. 3 of 3
Subject DRAINAGE STUDY Job No. 73-39
Client HAP CRAWFORD By Burns Date 6/18/73
MAC CORNACK & BURNS Consulting Engineers, Inc., Albuquerque, NM

APPENDIX

F. Determine Volume of Design Storm

Design Storm 2.12 in/hr for 64 min.



w/ storage Depth = 6.0'

$$\text{Area} = \frac{71232}{6} = 11872 \text{ ft}^2$$

infiltration Rate = 1"/6 min = 1/360 sec. →

allowable Rate of Application = 2.26 gpd/ft²

$$\frac{2.26}{7.4805} = 0.302 \text{ cfd/ft}^2 =$$

$$11872 \times .302 = 3586 \text{ cf/day} = 0.042 \text{ cfs}$$

Detention Time: $\frac{71232}{3586} = 20$ days

1860