M16/D10

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3 Plans

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LETTER OF TRANSMITTAL

DATE 1/9/79 JOB NO.

ATTENTION

RE:

RECEIVED
JAN 10 1979

TO Bruno Canedo
City Engineering

GENTLEMEN:

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via CITY ENGINEERING following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☒ Drainage Study

COPIES	DATE	NO.	DESCRIPTION
2			Drainage Manggement Plan for Newport Business Park East
			Frank
			Has been Recorded?
			Need File
			Thanks

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit ____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit ____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO Kane Harvey - Cradlock

SIGNED: Kent M. Whitman

FORM 240-3 Available from AVERY Townsend, Mass. 01469

If enclosures are not as noted, kindly notify us at once.

DRAINAGE MANAGEMENT PLAN

for

NEWPORT BUSINESS PARK EAST

Prepared For:

Craddock Development Company

Prepared By:

Community Sciences Corporation

January 8, 1979

Kent M. Whitman, P.E.

SURVEYING
ENGINEERING
LAND PLANNING

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A) PURPOSE AND SCOPE

Craddock Development Company is currently planning development of a 9.40 acre parcel in Southeast Albuquerque into a commercial office/warehouse complex known as Newport Business Park East. The purpose of this report is to present a drainage management plan for this development which is acceptable to the City of Albuquerque and to the Albuquerque Metropolitan Arroyo Flood Control Authority.

B) SITE LOCATION AND TOPOGRAPHY

Newport Business Park East is located just East of Newport Business Park on Yale Boulevard S.E. and Alamo Drive S.E. (see Location Map - Plate 1). The ground slopes from East to West at an average slope of 3% and silty sand is the predominant soil type.

C) DESIGN CRITERIA

1. Engineering Parameters:

For calculation of runoff rates and required storage volumes, a C of 0.4 has been assumed for undeveloped areas. A composite C of 0.83 was calculated for the site in the developed state. Volume calculations are based on the 100 year - 6 hour rainfall of 2.4" (0.2') per AMAFCA requirements.

Rate of runoff calculations have been based on the frequency - intensity - duration relationship for a 100 year storm as presented by Gordon Herkenhoff and Associates in their 1963 Master Plan of Drainage for the City of Albuquerque. This relationship is expressed by the following equation: $I = 189/(Tc+25)$.

2. Flood Control Regulations:

The drainage plan presented in this report has been designed to comply with the 1972 AMAFCA Resolution in regard to rate of runoff leaving the Site. That Resolution has been interpreted to say that the rate of runoff allowed to leave the Site after development shall be no greater than the rate running off prior to development. Volume considerations on major arroyo systems East of the AMAFCA South Diversion Channel are not considered critical.

D) COMPUTATIONAL PROCEDURES

Appendix A contains samples of the various types of hydraulic calculations performed. Proposed conveyance swales were sized based on the Manning Equation for Uniform Flow. Times of concentration were estimated based upon the Kirpich Nomagraph for Overland Flow and were found to be < 10 minutes in all cases. Inlet capacities are based on the oriface equation while roof outlet flow rates are based on a specially derived formula for Zurn controlled outlet drains provided by the manufacturer.

E) OFFSITE DRAINAGE

Two small offsite basins contribute runoff to the Site. These were taken from a previously conducted report entitled "Drainage Report for Newport Business Park" by A and E Engineering, and the reader is referred to that report for illustration. The runoff from these areas will be directed through the swale system of the project and into the proposed detention/infiltration pond as shown on Plate 2.

F) ONSITE DRAINAGE

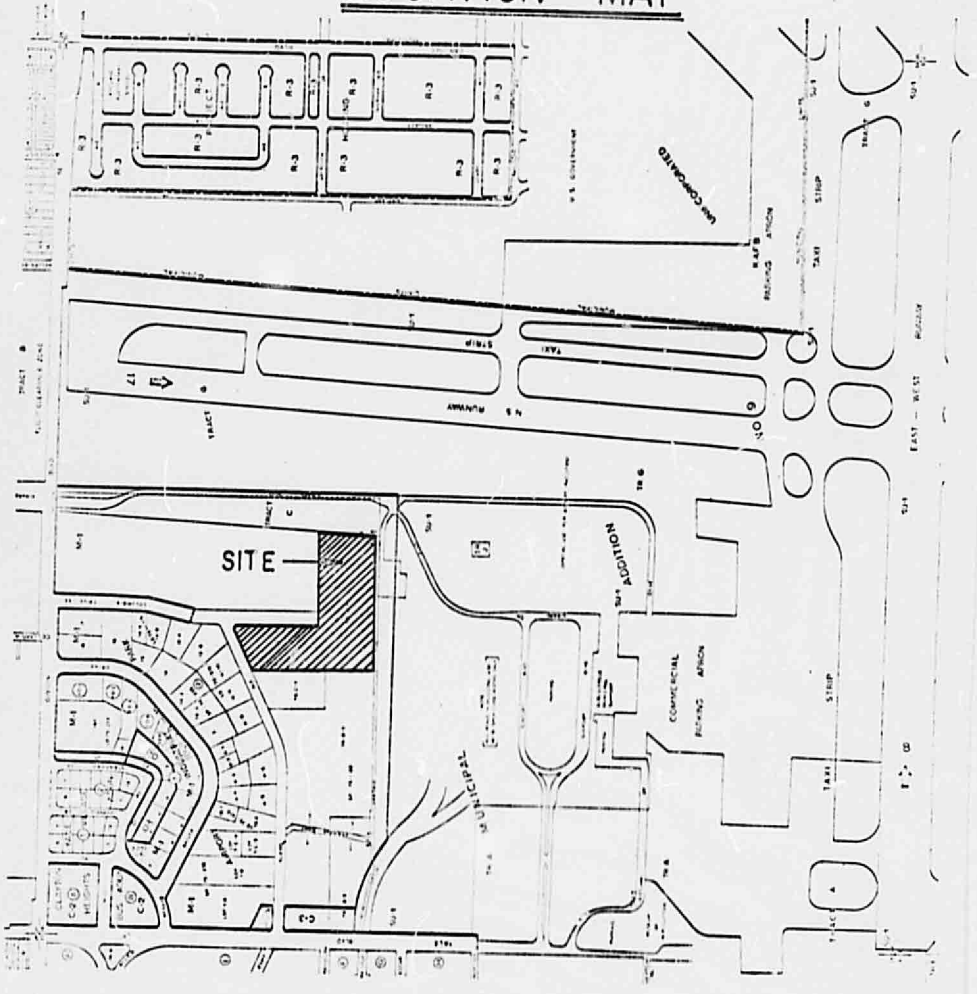
Plate 2 illustrates the proposed drainage scheme. Ponding requirements will be met through a combination of roof and surface ponding. Roof ponds will be drained through use of Zurn Z-105 controlled flow outlets. These outlets will detain roof runoff for 13 hours - well past the storm's peak.

In addition an 18,400 CF retention/infiltration pond will be constructed at the West end of the Site. Virtually all runoff will be directed into this pond to allow for as much infiltration of nuisance flows as possible. Any overflow from very large storms will spill back into the driveway to be conveyed Westward through Newport Business Park.

Area A will drain into a Type D inlet with an 18" outlet pipe which will convey flows beneath the driveway and into the pond. Area B will drain via swales into the main driveway where a rip rap rundown will divert flows into the pond. Area C will drain directly into the pond via parking lot swales.

PLATE 1

LOCATION MAP



Appendix A - Calculations

1) Composite C

Gross Area = 9.36 acres
Area hardsurfaced @ C = 0.95 = 7.41 acres = 79%
Area in grass and perviously landscaped @ C = 0.25 = 0.55 acres = 6%

Area left natural @ C = 0.4 = 1.4 acres = 15%

Ccomp = (.79 x .95) + (.06 x .25) + (.15 x .4)
= 0.83

2) Required Ponding Volume

R = 2.4" = 0.2'
Cdev = 0.83
Cnat = 0.40
A = 9.36 acres

Vol = 0.2 (0.83 - 0.40) (9.36)(43,560) = 35,064 CF

3) Volume Available

a) Roof Detention Ponding

Volume = 0.95 (0.2) (123,200) = 23,400 CF

b) Infiltration Retention Pond

$$\text{Volume} = \frac{(40+(3x3)) \times (90+(3x3)) + (40x90)}{2} \times 3$$

= 14,796 CF
Total Volume = 38,196 CF > 35,064

4) Flow Rate - Point 1

a) Uncontrolled Runoff

A = 1.22 acres
I = 5.4 inches/hour
C = 0.83

Q = CIA = 5.45 CFS

b) Roof Runoff

outlets = 4
peak discharge/outlet = .054 CFS
peak discharge = 4x0.054 = 0.22 CFS

Q Total = 5.7 CFS

5) Flow Rate - Point 2

a) Uncontrolled Runoff

A = 3.33 acres
I = 5.4 inches/hour
C = 0.83

Q = CIA = 14.92

b) Roof Runoff

outlets = 8
peak discharge/outlet = 0.054 CFS
peak discharge = 8x0.054 = 0.43 CFS

c) Offsite Runoff

A = 3.6 acres
I = 5.4 inches/hour
C = 0.4

Q = CIA = 7.77 CFS

Q Total = 23.1 CFS

6) Flow Rate - Point 3

A = 2.5 acres
I = 5.4 inches/hour
C = 0.4

Q = CIA = 5.4 CFS

7) Flow Capacity Section A

BW = 0
sideslopes = 30
slope = 0.005

depth = 0.33'
n = 0.015

$$Q = A \frac{(1.49)}{n} R^{2/3} S^{1/2} = 6.9 \text{ CFS} > 5.4$$

8) Flow Capacity Section B

BW = 0
SS = 40
slope = 0.02
depth = 0.5'
n = 0.015

$$Q = (0.5)\ A \frac{1.49}{n} R^{2/3} S^{1/2} = 27.7 \text{ CFS} > 23.1$$

9) Flow Capacity Section C

BW = 0
SS = 20
slope = 0.005
depth = 0.5'
n = 0.015

$$Q = (0.5)\ A \frac{1.49}{n} R^{2/3} S^{1/2} = 6.9 > 5.7$$

10) Capacity Type D Inlet

h = 0.5'
C = 0.65
net area grate = 4.14 SF

$$Q = CA \sqrt{2gh}$$
$$= 15.3 > 5.7$$

11) Number of Roof Outlets Required

A = 123,200 SF
t = 43,200 sec
h = 0.2'

$$n = \frac{A}{.267\ t} \left[3.178 + \ln h\right]$$
$$= 17$$

12) Drain Time - Roof Ponds

$$t = \frac{A}{.267\ n}\ \left[3.178 + \ln h\right]$$

$h = 0.2'$
n = # of notches = 16
A = roof area = 123,200 SF

t = 45,236 sec = 12.6 hours