HYDROLOGY E20/D9 NO PLANS

E20/D9

NO Plans

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

July 8, 1980

E-20-D9

Mr. Kent Whitman
Community Science Corp.
P.O. Box 1328
Corrales, New Mexico 87048

Reference: Fairway Estates Unit 2

Dear Mr. Whitman:

The drainage report for Fairway Estates Unit 2 is conceptually compatible with City and AMAFCA requirements. Final approval will be withheld however, until the following items are addressed:

1. An approved plat must be submitted. This plat should contain all necessary easements. See comment Number 2 on letter dated September 20, 1979, from Bruno Conegliano to you, where applicable.

2. An interim drainage plan, covering the period up to completion of all downstream drainage facilities, must be submitted. This should contain a grading plan with pad elevations and include provisions for a detention and desilting basin in sub area 11. Any effect on surrounding properties, notably to the north and west, due to grade changes should be discussed in full.

If you have any questions on the above, please feel free to contact me.

Very truly yours,

Fred J. Aguirre

Fred J. Aguirre
Civil Engineer

FJA/lc
xc: Richard Leonard, AMAFCA
Drainage File

affiliated mortgage & development company amdec

a wholly owned subsidiary of Albuquerque Federal Savings and Loan Association

6400 uptown blvd., n.e.
albuquerque, new mexico

mailing address
p. o. box 25000
albuquerque, new mexico 87125

RECEIVED

JUN 30 1980

CITY ENGINEER

E20-D9

AM - 493

June 26, 1980

Mr. Richard S. Heller, P.E.
City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: Revetment and Retaining Wall Protection for Village Greens and Fairway Estates at Tanoan on the Arroyo del Pino.

Dear Dick;

Attached please find a copy of my May 22, 1980 letter transmitting subject plans to your office for review.

It is my understanding that last year sometime the City requested, and AMDeC agreed, to submit the results of the Colorado State University (CSU) study and final construction plans as required by the CSU study to the City for review.

I further understand the main reason the City made this request was because they wanted to assure itself that the subject drainage facilities would protect adjustment private property from flood damage during the runoff from the 100 year storm.

Pursuant to our discussion this afternoon (see attached Memorandum to File) subject construction plans are acceptable as submitted once Community Sciences, Inc. makes minor modifications on some of the construction notes, and they (Community Sciences, Inc.) certifies these plans are in compliance with the recommendations in the CSU study.

Also as you requested, I shall instruct Mr. Robert Gondek our field engineer, to have the contractor on these facilities obtain a building permit from the City. I will also have Mr. Gondek coordinate with your office to insure your inspector has the opportunity to inspect

the revetments and retaining walls before concrete is poured.

If you are in agreement with the contents of this letter, please sign below and return a copy of this letter to me for our file.

Thank you for your time and assistance in this regard.

Sincerely,

AFFILIATED MORTGATE & DEVELOPMENT COMPANY

Allan L. Whitesel

Allan L. Whitesel
Chief Engineer

cc. file
Mr. Robert Gondek
Mr. Kent Whitman

Agreed:

RSH

Richard S. Heller, P.E.
City Engineer

Date: 6/30/80

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

September 20, 1979

F20-09

Mr. Kent Whitman
Community Sciences Corporation
P. O. Box 1328
Corrales, New Mexico 87048

SUBJECT: DRAINAGE REPORT FOR FAIRWAY ESTATES SUBDIVISION UNIT 2 AND PRESLEY HOMES SUBDIVISION TANOAN

Dear Mr. Whitman:

Following a review of the drainage plan in our offices regarding the referenced subdivisions, the following comments are made:

1. The drainage report indicates that no control of the run-off will be exercised either in terms of retention or detention. This approach is not consistent with the AMAFCA Policy Resolution nor with the conditions of the existing drainage facilities west of the subdivision.

2. No plat has been submitted indicating the exact boundary of the two properties object of this study. It is my assumption that the property line along the north boundary line coincides with the south boundary line of San Antonio Road and that the PNM easement is part of this property. If this is the case, drainage easements will have to be dedicated over the swale north of sub-area 7 and 8. Similarly, a right-of-way must be dedicated over the natural water courses collecting the flows from sub-areas 13, 14 and 15 and over the ponding areas which will be provided to detain the ten-year flows emanating from drainage areas just mentioned. Also, public drainage easements must be reserved over the swales indicated in sub-areas 10 and 11. Some of these drainage easements (i.e., proposed swale in sub-area 11) may be temporary in nature and may revert to the owner if and when a change in land use will occur. All these swales must be designed and constructed for non-erosive flow conditions and either gravel or grass protection needs to be supplied to prevent and minimize sediment mobilization.

3. Wherever swales are indicated inside and within blocks of lots, private drainage easements must be dedicated and adequate means to prevent mobilization of sediment and the deposition of it

on private or public streets must be prevented. There appears to be a conflict between street drainage and lot drainage in sub-area 12.

4. A detention and desilting area must be supplied for sub-area 11 upstream of the inlet and must be maintained by the developer until a change in land use occurs.

5. An overall inflow and outflow hydrograph for the pond at the northwest corner of the property must be supplied, an easement must be secured west of Ventura Road from the west property line of Ventura to the North Pino Arroyo, and a channel developed to carry the flow from the arroyo. In all cases where a swale covered by drainage easement is indicated, plan, profile and cross-sections of the facilities will have to be supplied to this office. Please note that at all locations where riprap is indicated, filter cloth must be supplied under the riprap.

If you have any questions on the above, please don't hesitate to contact my office.

Very truly yours,

Bruno Conegliano
Asst. City Engineer - Hydrology

BC:bm
CC: R. E. Leonard, AMAFCA
R. S. Heller
Drainage File

FAIRWAY ESTATES SUBDIVISION
DRAINAGE MANAGEMENT PLAN

Prepared For:

Affiliated Mortgage and Development Company

Prepared By:

Community Sciences Corporation

May 1979

Kent M. Whitman, P.E.

P.O. Box 1324
Corrales, New Mexico 87048
(505) 897-0880

SURVEYING
ENGINEERING
LAND PLANNING

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A) Purpose and Scope

Affiliated Mortgage and Development Company (AMDeC) is currently planning development of Fairway Estates, Unit 1, a subdivision of approximately 55 acres lying adjacent to and North of the Arroyo del Pino. The purpose of this report is to present a drainage management plan for the proposed subdivision which is acceptable to the City of Albuquerque and to the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA).

B) Site Location and Topography

Fairway Estates, Unit 1, is located in Northeast Albuquerque. Access to the subdivision is provided from Academy Road N.E., approximately 400 feet East of its intersection with Denali Road N.E. The subdivision lies North of Academy Road N.E. and the Tanoan Golf Course between the future extensions of Ventura and Eubank Boulevards (see Plate 1).

The land slopes from East to West at an average rate of 4% - 5%. Soils consist mostly of alluvial sands and silts, and decomposed granite is the major soil constituent.

C) Design Criteria

1) Engineering Parameters

In accordance with AMAFCA and City of Albuquerque requirements all hydrological analysis is based on 100 year frequency accumulated rainfall figures as presented in NOAA Atlas #2. Rate calculations are based on the one-hour rainfall figure of 2.3" since this results in greater peak rates of runoff than the six-hour figure in the hydrograph procedure used.

Runoff coefficients were estimated by calculation of composite values based on anticipated land uses. These calculations have resulted in C factors of 0.5 for offsite areas and 0.61 for onsite areas.

2) Flood Control Regulations

The drainage plan presented in this report has been designed to comply with the 1972 AMAFCA Resolution and City of Albuquerque Drainage Policy. These regulations require that subdivisions be designed such that no flooding of private properties will occur during any storm up to the 100 year frequency event. In addition, the 1972 AMAFCA 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.

A hydrological and hydraulic analysis of the entire Pino Basin through AMDeC property has been conducted by this firm in conjunction with Leonard Rice and Associates of Denver and submitted to the City and to AMAFCA. This study showed that no significant increase in runoff rates will occur on this basin if free discharge is allowed, thereby indicating compliance with the Resolution. Volume considerations on major arroyo systems East of the AMAFCA North 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 full flow velocities in the various streets at approximated gradients.

Hydrographs (and consequently peak flow rates) were developed by use of the Bureau of Reclamation Triangular Hydrograph method. This method simulates the runoff characteristics of a watershed by development of a series of short duration triangular hydrographs at short intervals relative to storm duration - finally summing the individual hydrographs into one "curve" for the entire duration of the storm. The equivalent to the runoff coefficient in the BOR Procedure is a parameter called the Curve Number (Cn). Based on percent of rainfall actually running off for a given Cn value, an equation was developed to convert C composite into Cn. This equation is written:

$$Cn = 5.42 + Ln / .056$$

Table 1 summarizes the hydrological data and peak flows for the project.

E) Offsite Drainage

The aforementioned Study by Rice and Associates and this firm indicated that by maintaining certain minimum finished floor elevations (via earth filling where necessary adjacent to the Tanoan Golf Course Fairways) the Pino floodplain can be confined to these fairways. The minimum elevations appropriate for Fairway Estates are shown on Plate 2 and will be incorporated into the project grading plan. Since the Study is based on main flow release at Eubank Boulevard into the South fork of the arroyo, a temporary diversion will be constructed to accomplish this end until such time as the Eubank crossing is completed.

In addition, in order to comply with the requirements of the Rice/Community Sciences Corporation Study, the embankment at the Subdivision property line adjacent to Sections 32 and 33 will be excavated to the flowline of the arroyo for approximately an additional 40 feet of width.

Plate 2 shows an area of approximately 49 acres draining toward the Eastern boundary of the site. Flows from this watershed will be diverted around the site and into the main Pino via swales, filling operations, and existing channel definition.

F) Onsite Drainage

Plate 3 illustrates the various drainage basins into which the site can be divided. Since the site will be left in as close to its' natural state as possible, lot line swales have been specified where necessary to prevent cross lot drainage. Several perimeter lots will drain directly onto fairways. Internal lots form four basic basin systems and these will drain via the street system to easement channels or directly to the Pino Basin. Table 2 specifies the channel geometry required to convey the design flows. All channels will be grassed surfaces maintained by the Tanoan Country Club or Fairway Estates Home Owner's Association.

TABLE 1 - HYDROLOGICAL DATA

Area/Point Designation	Area (Square Miles)	Areas Contributing	Gross Area Square Miles		Coefficient of Runoff	Time of Concentration (hours)	Peak Flow Rate (cfs)
0-1	.022	0-1	.022	14.08	0.5	0.18	32
0-2	.054	0-1, 0-2	.076	48.64	0.5	0.27	95
A	.0150	A	.0150	9.60	0.61	0.13	30
B	.0052	B	.0052	3.33	0.61	0.12	11
C	.0093	C	.015	9.6	0.61	0.13	18
D	.0200	D	.02	12.80	0.61	0.17	36
E	0.6 acres	E	0.6 acres		0.61	<.10	2
				55.93		.10	

TABLE 2 - CHANNEL GEOMETRICS

Area/Point Designation	Easement Width	Entrance Opening Width	Channel Width	Channel Depth	Inverted Crown	Minimum Slope
B	N/A	20'	14'	0.5'	0.1'	0.02
C	20'	20'	14'	0.5'	0.1'	0.02
D	30'	30'	20'	0.5'	0.15'	0.02
E & F	10'	5'	5'	0.5'	none	0.02

NOTE: Dimensions are based on a grassed surface having an n factor of 0.03.

APPENDIX A

Sample Calculations

(1) Required Channel Section & Freeboard for Channel Section B

Q = 95 cfs

SS_1 = 8

SS_2 = 8

BW = 20'

slope = .03

n = .025

Depth (from Manning) = 0.6'

Velocity = 6.5 fps

∴ Freeboard = 0.6' + 1.0 = 1.6'

(2) Required Diversion @ Ebank

Q = 758 cfs

SS_1 = 3

SS_2 = 3

BW = 30'

slope (min.) = .01

n = .025

Depth (from Manning) = 2.3'

Velocity = 9.1 fps

∴ Required Berm Height = $2.3 + 9.1^2/64.4 = 3.6$ say 4 feet

(3) Required Channel Section - Type A

Q = 32

SS_1 = 8

SS_2 = 8

BW = 0

slope = 0.005 (min.)

n = 0.025

Depth (from Manning) = 1.2' minimum

(4) Composite C - Lot Areas

Typical Lot acreage = 0.3 acre = 13068 S.F.

Hardsurfacing @ C = 0.95 = 4480 S.F. = 34%

SW Landscaping @ C = 0.65 = 22%

Lawn @ C = 0.25 = 22%

Earth @ C = 0.4 = 22%

C comp. = (.34 x .95) + (.22 x .65) + (.22 x .25) + (.22 x .4) = 0.61

(5) Street Capacity - 24' Street - 0.1' Above top of Curb

Crown = 0.24'

Minimum Slope = 1.8%

n = 0.015 (asphalt)

Q (from Manning) $= \frac{A\ (1.49)\ R^{2/3}\ s^{1/2}}{n}$ = 44 cfs > 18

(6) Street Capacity - 30' Street - 0.1' Above Top of Curb

Crown = 0.3'

Minimum Slope = 1%

n = 0.015 (asphalt)

Q (from Manning) = 36 cfs = peak for area D

(7) Required Entrance Depth - Channel @ D

Q = 36 cfs

channel width = 30' Inverted Crown = 0.15'

yc = .43'

Vc = 3.37 fps

Ponding depth = .43 + 1.7 ($3.37^2/64.4$) = 0.73' = 0.25' above curb height taking inverted crown into account.

(8) Required Entrance Depth - Channel @ 13

Q = 11 cfs

channel width = 20' Inverted Crown = 0.1

yc = 0.26'

Vc = 2.6

Ponding depth = 0.26 + 1.7 ($2.6^2/64.4$) = 0.44' = curb height taking inverted crown into account.

(9) Required Entrance Depth - Channel @ C

Q = 18 cfs

channel width = 20' Inverted Crown = 0.1

yc = 0.34'

Vc = 3.06

Ponding depth = 0.34 + 1.7 ($3.06^2/64.4$) = 0.59' = 0.2' above curb height taking inverted crown into account.

(10) Flow Capacity - 14' Channel

n = 0.03 (sod)

slope = .02 (minimum)

sideslopes = 6

width = 14'

depth = 0.5'

inverted crown = 0.1'

Q (from Manning) = 38 cfs > 18

(11) Flow Capacity - 20' Channel

n = 0.03 (sod)

slope = .02 (minimum)

sideslopes = 6

width = 20'

depth = 0.5'

inverted crown = 0.15'

Q (from Manning) = 57 cfs > 36

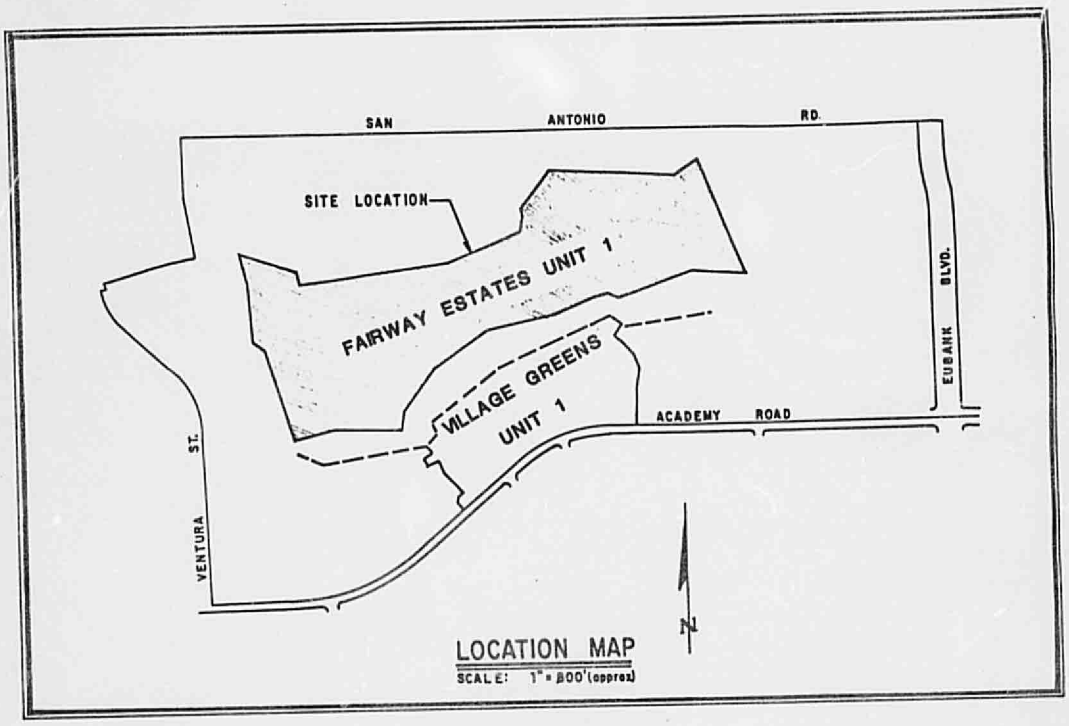

PLATE 1
LOCATION MAP
FAIRWAY ESTATES UNIT 1