HYDROLOGY E20/D11 ONE PLAN

E20/D11

1 Plan

Adam, Hamlyn, Anderson / consulting engineers inc.

4751 North Fifteenth Street, Phoenix, Arizona 85014 — 602-264-1397
4055 Montgomery Blvd. N.E., Albuquerque, NM 87109 — 505-881-1808
216 North Chippewa Place, Chandler, Arizona 85224 — 602-899-1345

PRINCIPALS:
CARL H. ADAM, P.E.
RICHARD L. HAMLYN, P.E.
JAMES D. ANDERSON, P.E.
DOYLE L. WISTE, P.E.
JAKE BORDENAVE, P.E.

ASSOCIATE:
FRED E. GOLDMAN, P.E.

05125

May 5, 1981

City Of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Attn: Richard Heller, City Engineer

AHA JOB NO. 8031

Re: Proposal for Village Greens West

Dear Mr. Heller:

Submitted herewith are prints of the proposed Storm Sewer Outfall from Village Greens West at Tanoan.

Please review the plan so that I may meet with you to discuss the proposed construction.

It is desirable that construction be completed on this project as soon as possible, as summer rains may damage existing construction.

Sincerely,

Jean J. Bordenave

Jean J. Bordenave, P.E.
Vice President

cc: Allan Whitesel, AMDeC
Chuck Easterling, City Hall
Rich Leonard, AMAFCA

JJB/ccl

RECEIVED
MAY 06 1981
CITY ENGINEER

VERBAL OK GIVEN WITH CME CONDITIONS.

check - who will maintain this pipe system?

Please respond

RSH ERA
LRO LRO
CDS
DES
INSP
HYDRO CME
ADM
SUR
COUN
SEC
FILE
RETURN

Reply to: ☐ Phoenix ☐ Chandler ☒ Albuquerque

FILE
HYDRO FILE
L.R.F.
cy F22-D5
E20-D11

M E M O T O F I L E:

FROM: Allan Whitesel

DATE: March 24, 1981

SUB: Meeting with City Engineering

IN ATTN: Dick Heller, Chuck Easterly, Jake Bordenave and Allan Whitesel

This morning we met in Dick's office to discuss above projects. The following was agreed to:

I. Village Greens West

Once AMDeC supplies the City with a copy of a private drainage easement from the end of the 54" RCP storm sewer pipe to the Pino Arroyo, the City will sign the plat.

II. Prospectors Ridge

Chuck and Dick both concurred that the recent B-H hydraulic intersection calculations were acceptable and the plans would be approved as submitted, and discussed at our last meeting, except Chuck stated he probably would like to see a concrete valley gutter across the knuckle at the southwest corner of Prospectors Ridge.

DICK DID NOT APPROVE OR (DISAPROVE). CME

Dick said, he would issue work orders for Phase IA as soon as they were submitted to him.

AW/rb
cc: Jake Bordenave
Dick Heller
Chuck Easterly
Mike Emery
Ron Booth

RECEIVED
APR 06 1981
CITY ENGINEER

T. T. Burnett Engineering, Inc.
Consulting Engineers
4055 MONTGOMERY BLVD. N.E., SUITE A
ALBUQUERQUE, NEW MEXICO 87109

TELEPHONE
(505) 883-3013

RECEIVED
MAY 15 1980
CITY ENGINEER

May 13, 1980

E20-D11

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

Dear Sir:

Affiliated Mortgage and Development Company (AMDEC) is contemplating development of Village Greens West at Tanoan. It is proposed that both the "Estate" type streets and "Mountable Curb - Roll Type" will be used. In compliance with your Design Memorandum No. 10, Effective Date: May 1, 1980, T. T. Burnett Engineering, Inc., Consulting Engineers for AMDEC, requests your approval for the above mentioned construction.

Please be advised that streets will be constructed as private streets.

Very truly yours,

Frank Krim

Frank Krim
Engineering Technician

APPROVED
CITY OF ALBUQUERQUE
Municipal Development Department

RSHeller 5/16/80
City Engineer Date

Subject to NO FRONT YARD PONDING
NO SIDEWALK ADJACENT TO CURB RSH

DRAINAGE REPORT

FOR

VILLAGE GREENS WEST

OCTOBER 1980

RECEIVED
OCT 30 1980
CITY ENGINEER

Prepared By:
T. T. Burnett Engineering, Inc.
4055 Montgomery Blvd. NE
Albuquerque, New Mexico 87109

Prepared For
AMDeC
6400 Uptown Blvd. NE
Albuquerque, New Mexico 87110

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
NO. 5110
NEW MEXICO
JEAN J. BORDENAVE

Jean J. Bordenave, N. M. P. E. & L. S. #5110

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SITE LOCATION AND TOPOGRAPHY	1
DESIGN CRITERIA	2
COMPUTATION PROCEDURE	2
PROPOSED DEVELOPMENT	2
OFF-SITE DRAINAGE	2

APPENDIX A - DRAINAGE CALCULATIONS

PLATE 1 - See Appendix A, Page 3

PLATE 2 - See Appendix A, Page 14

PLATE 3 - See Appendix A, Page 15

PLATE 4 - See Pocket

DRAINAGE REPORT

FOR

VILLAGE GREENS WEST

PURPOSE AND SCOPE

Affiliated Mortgage and Development Company (AMDeC) is currently planning development of Village Greens West, a subdivision of approximately 12 acres which is adjacent to and south of Tanoan Golf Course. The purpose of this report is to present a drainage management plan for the proposed subdivision area which is acceptable to the City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA).

SITE LOCATION AND TOPOGRAPHY

Village Greens West is located in the northeast quadrant of Albuquerque, where the subdivision lies north of Academy Road NE, and south of the Tanoan Golf Course. Access to the subdivision is provided via Academy Road NE, approximately 400 feet east of the intersection of Denali Road NE. (See Plate 2 for exact location.)

The land along the southern perimeter of the property slopes steeply to the north at varying degrees of 4% - 7% to about one hundred sixty feet inside the property line. The grades level out and then turn to the west at approximately 3%. Soils consist of alluvial sands and silts, and decomposed granite is the major soil constituent. A light growth of native grasses, cacti and small brush dominates the area.

DESIGN CRITERIA

In accordance with AMAFCA and City of Albuquerque requirements, all hydrological analysis is based on 100 year frequency rainfall figures as presented in Gordon Herkenhoff & Associates' "Intensity Duration Frequency Curves".

COMPUTATION PROCEDURE

The "Rational Method", Q = CIA, was used to establish computations shown herein.

PROPOSED DEVELOPMENT

Village Greens West will be developed as a townhouse subdivision with a density of approximately 4.72 dwelling units per acre. The lots will vary in width from 48 to 50 feet and in depth from 115 to 150 feet. Dwellings will be in the range of 2,500 square feet in area. Street widths will vary from 36 feet back-to-back to 28 feet back-to-back.

OFF-SITE DRAINAGE

Surface flows of 23 cfs and storm sewered flows of 169 cfs, which enter the site from Village Greens, Unit One, can be safely conveyed through the subdivision without any adverse effects. An additional 66 cfs is also entering the site from an existing drop structure on Academy Boulevard, just west of the southeast corner of the subdivision. The proposed design provides for a 36" reinforced concrete pipe to carry the 66 cfs and a 54" reinforced concrete pipe to handle the combination of these flows to an outlet at the northeast corner of the subdivision where they will surface flow into the Pino Arroyo. (See Storm Drain data, Appendix A, Page 1.)

APPENDIX A

DRAINAGE CALCULATIONS

Street Capacities

1. Street Capacity @ minimum slope of 1.55%
   Width 32' F-F
   Crown 0.32'
   S 0.0155
   n 0.02
   d 0.52
   d 0.52 (.2 Surcharge)
   Q = 50.00 cfs @ V = 4.00 fps
2. Street Capacity @ minimum slope of 1.00%
   Width 30' F-F
   Crown 0.30'
   S 0.0100
   n 0.02
   d 0.33
   Q = 12.44 cfs @ V = 2.30 fps

3. Street Capacity @ minimum Slope of 1.00%
   Width 28' F-F
   Crown 0.28'
   S 0.0100
   n 0.02
   d 0.33
   Q = 12.8 A V = 2.45 fps

4. Street Capacity @ minimum slope of .50%
   Width 28' F-F
   Crown 0.28'
   S 0.005
   n 0.02
   d 0.33
   Q = 9.00 cfs @ V - 1.73 fps

5. Street Capacity @ minimum slope of 1.24%
   Width 28' F-F
   Crown 0.28'
   S 0.0124
   n 0.02
   d 0.33
   Q = 14.20 cfs @ V = 2.73 fps

Storm Drain Diameter and Slope

a) Q = 66.0 cfs (Academy Road outfall)
   Diameter = 36" S = 0.0426 ft/ft V = 19.48 fps
   Full Capacity 137.67 cfs

b) Q = 235.00 cfs (Existing outfall @ Subdivision Unit boundary)
   Diameter = 54" S = 0.0200 ft/ft V = 17.49 fps
   Full Capacity 278.11

LOT DRAINAGE - 48' LOTS (NON-PONDED)

Typical lot 48' x 120 (W/28' R.O.W.)

Existing Conditions

Area (Sq.Ft.)	C	Effec. Area
(48')(120' + 28/2)= 6432	0.40	2572

Developed Condition (Street Drainage)

	Area	(Sq.Ft.)	C	Effec. Area
Street	(12.6')(48')	605.76	0.90	545.18
S/W	(4')(48')	192.00	0.90	172.80
Driveway	(18')(21')	378.00	0.90	340.20
F.Yard	(2 areas)	630.00	0.40	252.00
S.Yard	(6')(60')	360.00	0.40	144.00
Roof	(42')(60')	2520.00	0.90	2268.00
R.Yard	(32.9')(48')	1580.00	0.40	632.00
Patio	(10')(10')	100.00	0.90	90.00
F.Planter	(1.4')(48')	66.24	0.40	26.50
		6432.00		4470.68

EFFEC. AREA = 4470.68
TOTAL AREA = 6432.00

4470.68 ÷ 6432.00 = 70

USE COMPOSITE C = 70

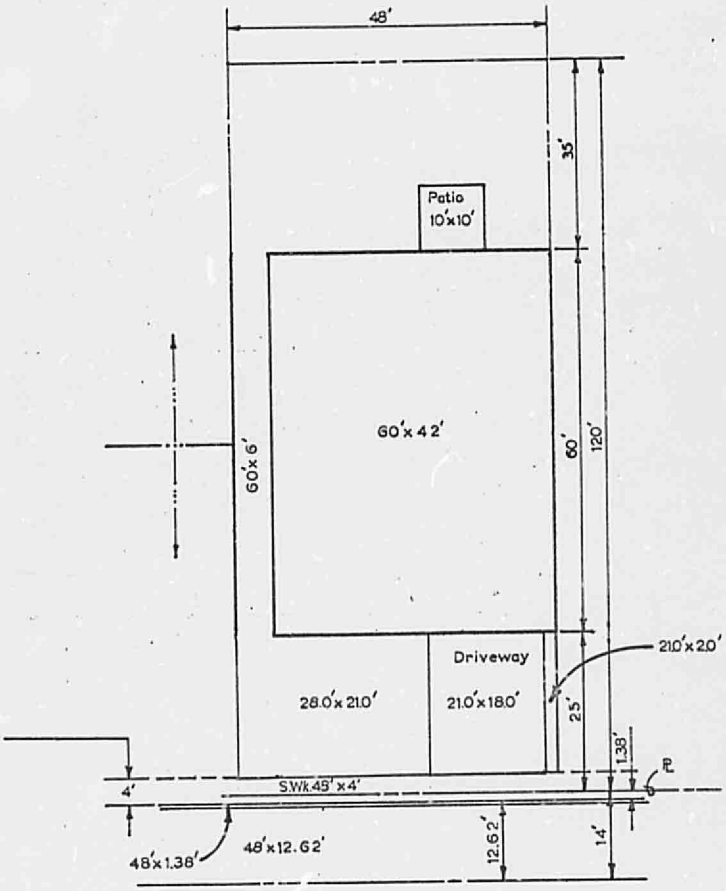
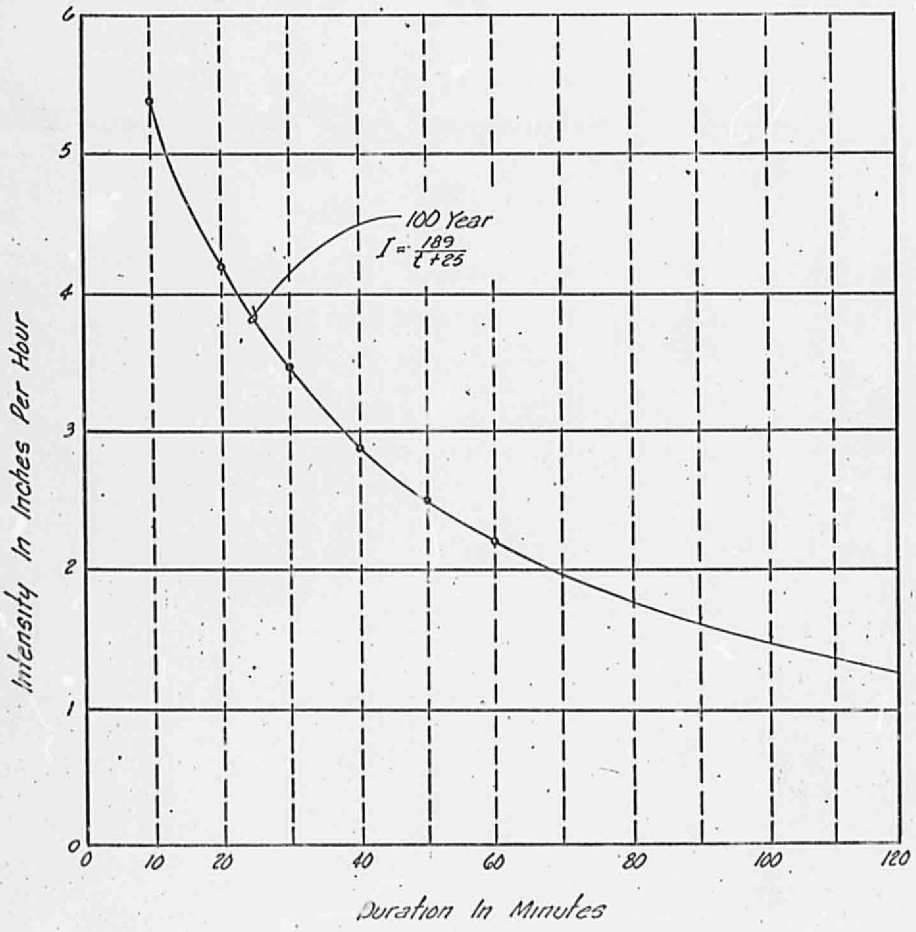


PLATE : I
Typical Lot Layout


100 Year
$I = \frac{189}{t+25}$
Intensity In Inches Per Hour
Duration In Minutes
0
1
2
3
4
5
6
0
10
20
40
60
80
100
120

DRAINAGE COMPS.

PROJECT _____ NAME VILLAGE GREENS WEST

BASIN _____ AC/LOT _____

BASED ON RATIONAL METHOD Q=CIA

Q = Design peak runoff rate in c.f.s.
C = Runoff coefficient
A = Watershed area in acres

I = Rainfall Intensity in in./hr. for 100 year storm. Intensity - duration relationship: APPENDIX =

STREET	FROM	TO	NO. of LOTS	A acres	C	AC	ΣAC	T min.	I in./hr.	Q c.f.s.	Slope %	Length ft.	Vel. ft./sec	ΔT min.	Allow. Q	NOTES
	OFF-SITE			5.2	0.77	4.00		10.0	5.7	23.0						
		A-1		0.3	0.70	0.21		4.6	6.4	1.3	1.55	77.00	4.0	0.32	32.7	
	Σ OFF-SITE & A-1						4.21	10.3	5.7	24.0						
	A-2			1.2	0.70	0.84		10.6	5.3	4.5	1.51	144.91	4.1		15.3	
	Σ 0.5, A-1 & A-2						5.05	10.3	5.7	28.8						
	A-3			0.3	0.70	0.21		6.2	6.1	1.3	1.00	245	3.3	1.20	6.2*	*1/2 Street capacity
		A-4		1.7	0.70	1.19		11.3	5.2	6.2	2.24 0.50	111.91 152.63	5.0 2.4	0.37 0.92	49.2	
	Σ A-3 & A-4						1.40	17.5	4.4	6.2						
		A-5		0.45	0.70	0.67		6.3	6.0	4.0	2.08	275	4.6	1.0	44.0	
	Σ OFF-SITE A-1 & A-5						7.12	16.6	4.5	32.0	2					
	A-6			1.96	0.70	1.37		13.3	4.9	6.7	1.00 1.24	325 150	2.3 2.6	2.36 0.96		
		A-7		3.35	0.70	2.35		11.6	5.2	12.2	1.24 2.62	242.6 156.0	3.7 5.4	1.12 0.46		
	Σ A-6 & A-7						3.72	24.9	3.8	14.1						
	A-8			0.82	0.70	0.57		7.0	5.9	3.4	2.08	226.4	4.6	1.18		
	Σ OFF-SITE A-1 to A-8						11.41	23.6	3.9	44.5						

RUNOFF COMPUTATIONS

Sheet No._____

Project: Village Greens West

Drainage Area No. A-1

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 77 S = 0.0155

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 4.0 ft/sec; Time = $\frac{77}{4.0 \times 60}$ = 0.32 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{____}{____ \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{____}{____ \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{____}{____ \times 60}$ = _____ min.

Total Accumulation Time: T = 0.32 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

RUNOFF COMPUTATIONS

Sheet No._____

Project: Village Greens West

Drainage Area No._____

Area = A-2 acres

Maximum Overland Flow L =_____ S =_____

Maximum Channel Flow

Channel No. 1 L = 144.91 S = 0.0151

Channel No. 2 L =_____ S =_____

Channel No. 3 L =_____ S =_____

Channel No. 4 L =_____ S =_____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 4.1 ft/sec; Time = $\frac{144.91}{4.1 \times 60}$ = 0.59 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 0.59 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date:_____

Comp. by:_____

Checked by:_____

10-10-80

RUNOFF COMPUTATIONS

Sheet No._____

Project: Village Greens West

Drainage Area No. A-3

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 245 S = 0.0100

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 3.3 ft/sec; Time = $\frac{245}{3.3 \times 60}$ = 1.24 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = _____ min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

RUNOFF COMPUTATIONS

Sheet No. _____

Project: Village Greens West

Drainage Area No. A-4

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 111.91 S = 0.0224

Channel No. 2 L = 132.63 S = 0.0050

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 5.0 ft/sec; Time = $\frac{111.91}{5.0 \times 60}$ = .37 min.

Channel No. 2 Flow:

Velocity = 2.4 ft/sec; Time = $\frac{132.63}{2.4 \times 60}$ = .92 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 1.29 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

RUNOFF COMPUTATIONS

Sheet No._____

Project: Village Greens West

Drainage Area No. A-5

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 275' S = 0.0208

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 4.6 ft/sec; Time = $\frac{275}{4.6 \times 60}$ = 1.0 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 1.0 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

RUNOFF COMPUTATIONS

Sheet No._____

Project: Village Greens West

Drainage Area No. A-6

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 325 S = 0.0100

Channel No. 2 L = 150 S = 0.0124

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.3 ft/sec; Time = $\frac{325}{2.3 \times 60}$ = 2.36 min.

Channel No. 2 Flow:

Velocity = 2.6 ft/sec; Time = $\frac{150}{2.6 \times 60}$ = 0.96 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 3.32 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

RUNOFF COMPUTATIONS

Sheet No. _____

Project: Village Greens West

Drainage Area No. A-7

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 249.38 S = 0.0124

Channel No. 2 L = 150.00 S = 0.0262

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 3.7 ft/sec; Time = $\frac{249.38}{3.7 \times 60}$ = 1.12 min.

Channel No. 2 Flow:

Velocity = 5.4 ft/sec; Time = $\frac{150}{5.4 \times 60}$ = .46 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 1.58 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

RUNOFF COMPUTATIONS

Sheet No._____

Project: Village Greens West

Drainage Area No. A-8

Area = _____ acres

Maximum Overland Flow L = _____ S = _____

Maximum Channel Flow

Channel No. 1 L = 326.36 S = 0.0208

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Channel No. 4 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 4.6 ft/sec; Time = $\frac{326.36}{4.6 \times 60}$ = 1.18 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 4 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 1.18 min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

10-10-80

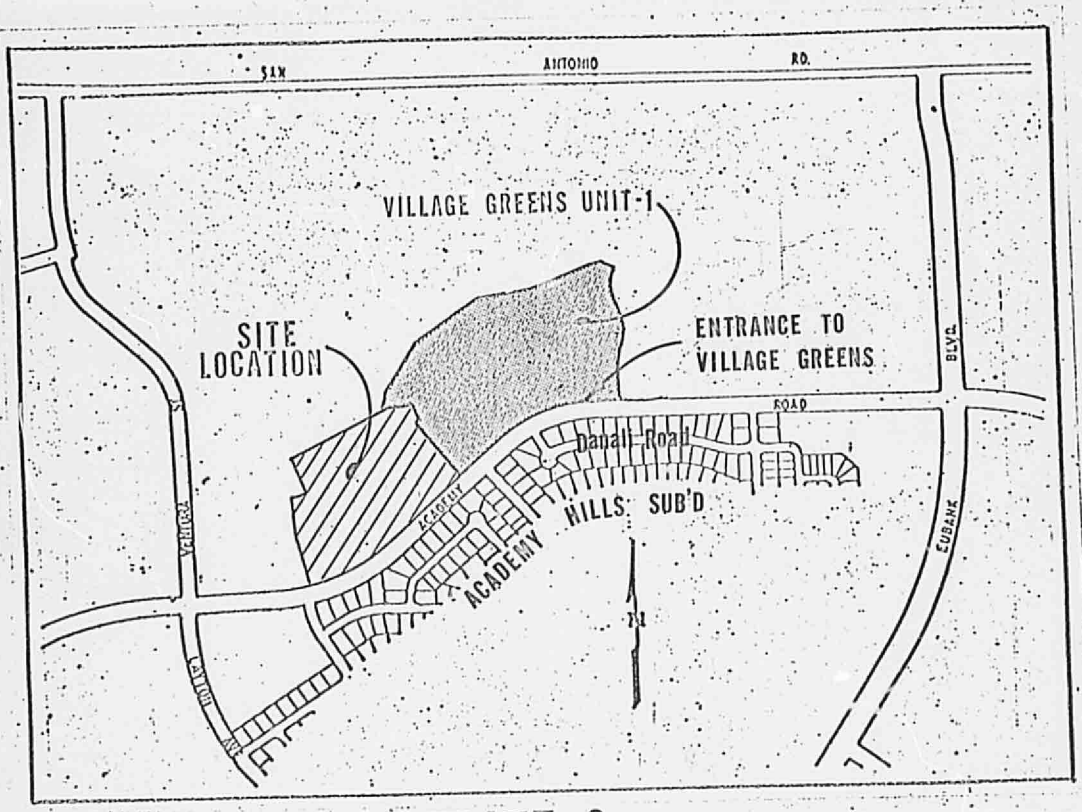


PLATE: 2
VICINITY MAP
VILLAGE GREENS WEST

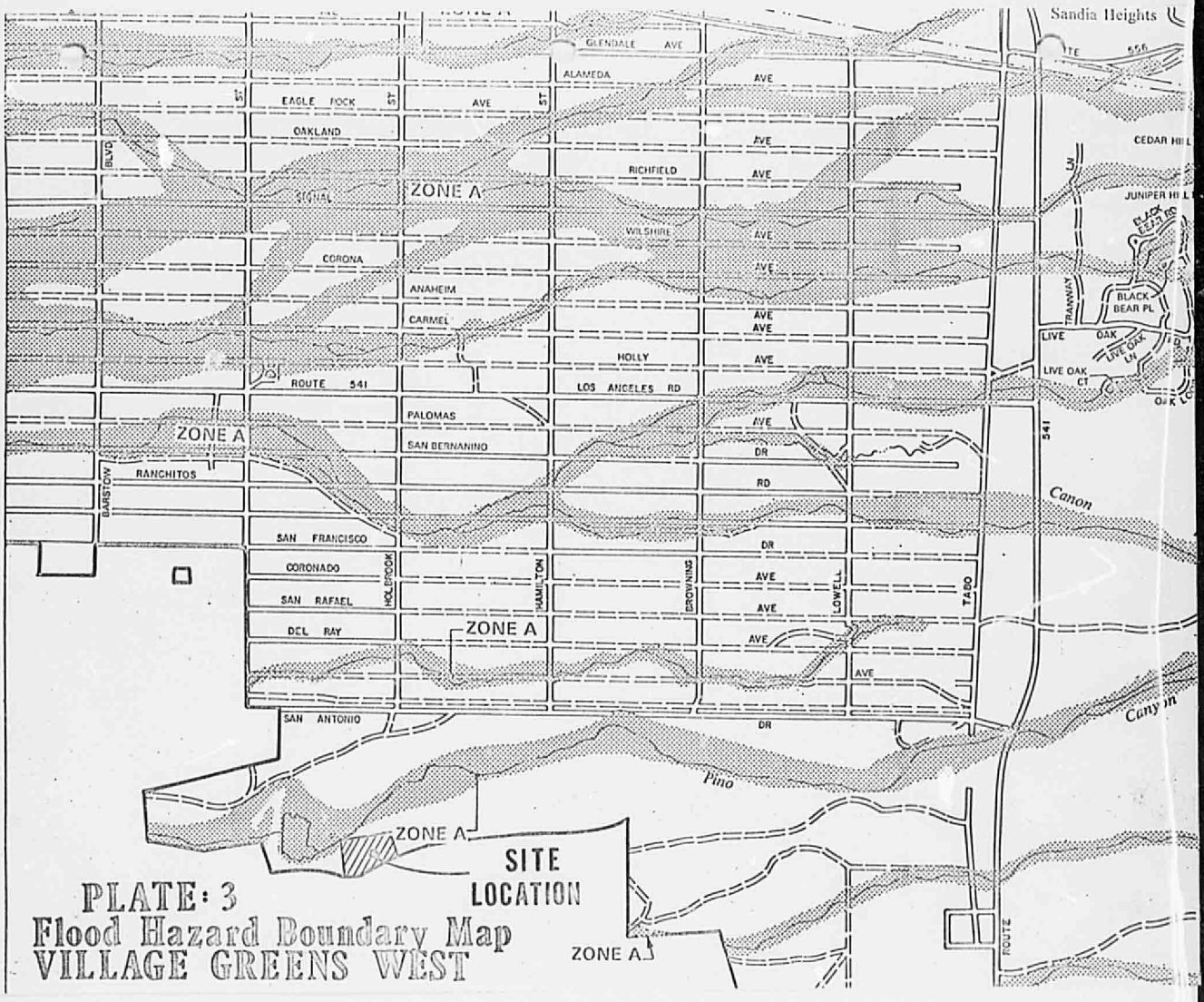
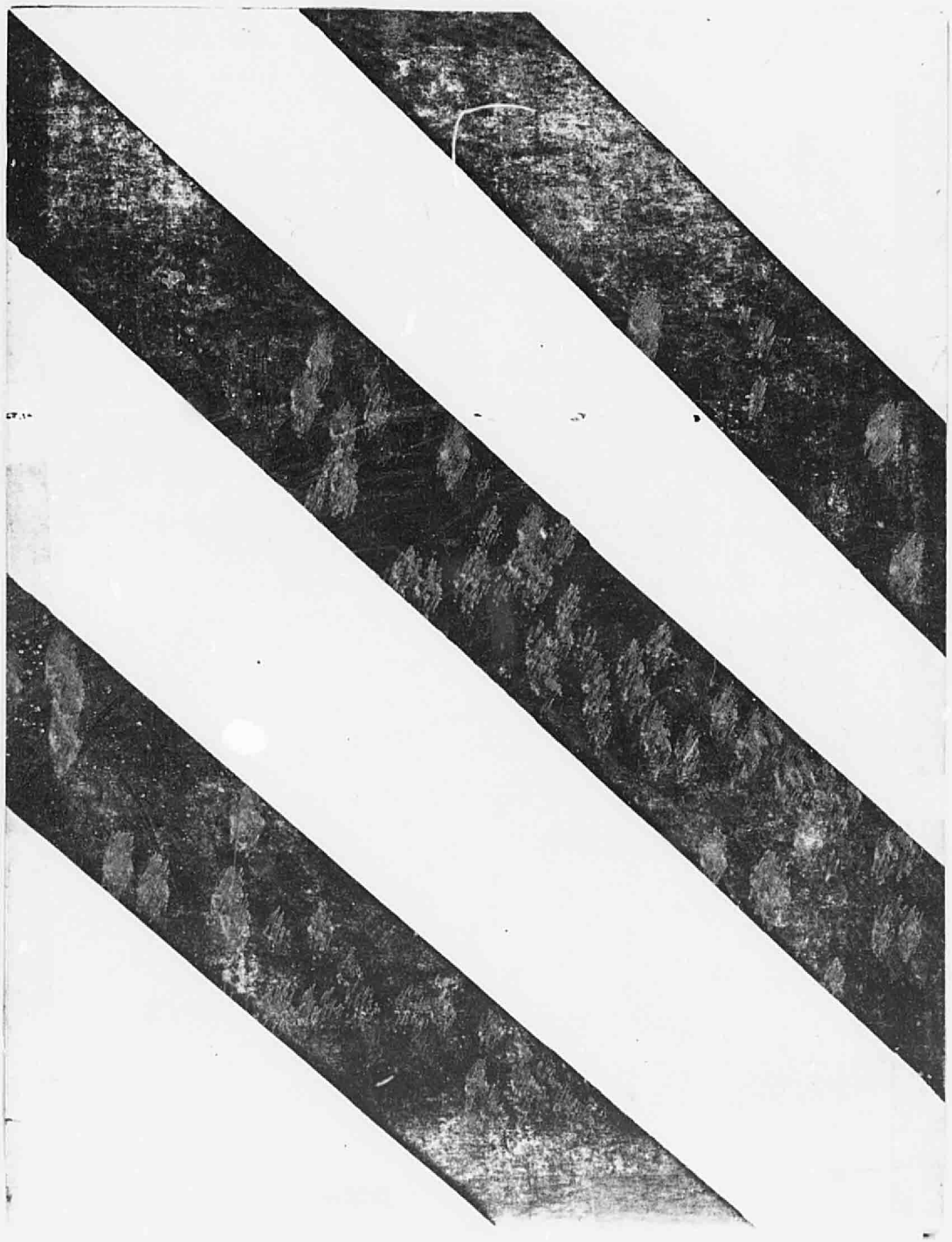



PLATE: 3
Flood Hazard Boundary Map
VILLAGE GREENS WEST