CITY OF
Albuquerque

August 15, 1996

Martin J. Chávez, Mayor

Scott McGee
Isaacson & Arfman
129 Monroe St. NE
Albuquerque, NM 87108

RE: ENGINEER CERTIFICATION FOR FINANCIAL GUARANTEE RELEASE ON PHASE I & II WINDSOR ESTATES (H10-D13) CERTIFICATION STATEMENT DATED 8/9/96.

Dear Mr. McGee:

Based on the information provided on your August 9, 1996 submittal, Engineer Certification for financial guarantee release is acceptable.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
File

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

August 2, 1995

Scott M. McGee
Isaacson & Arfman
128 Monroe NE
Albuquerque, NM 87108

RE: REVISED DRAINAGE PLAN FOR TRADITIONS SUBDIVISION PHASES 1 & 2 (H10-D13) PHASE I, ENGINEER STAMP DATED 6/28/95 PHASE II DATED 7/27/95.

Dear Mr. McGee:

Based on the information provided on your July 28, 1995 resubmittal, the above referenced sites are approved for Work Order.

Please be advised that prior to Financial Guarantee release, Engineer Certification per the D.P.M. checklist will be required.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
File

CITY OF
Albuquerque

May 8, 1996

Martin J. Chávez, Mayor

Scott McGee
Isaacson & Arfman
129 Monroe St. NE
Albuquerque, NM 87108

RE: REVISED DRAINAGE PLAN FOR WINDSOR ESTATES SUBDIVISION
PHASES 1 & 2 (H10-D13) PHASE I, ENGINEER STAMP DATED 4/19/96
PHASE II DATED 4/19/96.

Dear Mr. McGee:

Based on the information provided on your April 23, 1996 resubmittal, the above referenced sites are approved for Work Order.

Please be advised that prior to Financial Guarantee release, Engineer Certification per the D.P.M. checklist will be required.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
File

ALBUQUERQUE NEW MEXICO 1706

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 11, 1995

Scott McGee
Isaacson & Arfman
129 Monroe St. NE
Albuquerque, NM 87108

RE: REVISED DRAINAGE PLAN FOR TRADITIONS SUBDIVISION (H10-D13) ENGINEER'S STAMP DATED 5/3/95.

Dear Mr. McGee:

Based on the information provided on your May 4, 1995 resubmittal, listed are some concerns that will need to be addressed prior to final approval:

1. Lots 41-43 Phase II must be drained. No retention ponds are allowed per Ordinance.

2. Additional information along with a P. & P. of the proposed storm sewer on Ladera Dr. indicate the H.G.L. & the E.G.L.

3. Parks and Recreation has a concern on vehicular and pedestrian traffic on the lots adjacent to the bike trail Right-of-Way.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
File

Bernie

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N.E. - ALBUQUERQUE, N.M. 87107
TELEPHONE (505) 884-2215

March 25, 1995

Mr. Scott McGee, P.E.
Isaacson & Arfman, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108

RE: Traditions Subdivision Drainage Report dated 2-28-95
(received 3-17-95)

Dear Scott:
We understand that City Hydrology is reviewing this development, however we have a few comments:

1. Although the drainage onto the bike trail is not large, coordination with the trails people should take place in order to convey this to the east in an acceptable manner.

2. Please send us a print of the plat showing the creation of this bike trail.

3. I am not familiar with the pressure pipe program you have used. How are losses accounted for? Depths? It appears that some elevations are incorrect and the changes in pressure as you proceed upstream. A plot of EGL and HGL would be helpful including an explanation of the pressures labeled as constant data. (We don't want manholes popping or inlets flowing.) Seeing that this is really outside AMAFCA's review, I will defer to the City for confirmation.

4. If the three eastern lots cannot be drained to the street and a new connection to Dam 14 is proposed, AMAFCA approval will be required, including the construction drawings.

Should you have any questions, do not hesitate to call me.

Sincerly,
AMAFCA

Kurt Browning, P.E.
Drainage Engineer

cc Bernie Montoya, COA PWD Hydrology

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

March 28, 1995

Scott McGee
Isaacson & Arfman
129 Monroe St. NE
Albuquerque, NM 87108

RE: DRAINAGE PLAN FOR TRADITIONS SUBDIVISION (H10-D13)
ENGINEER'S STAMP DATED 2/28/95.

Dear Mr. McGee:

Based on the information provided on your March 1, 1995 submittal, the above referenced site is approved for Preliminary Plat and Grading.

Please be advised that prior to Building Permit and Work Order release, the following must be addressed:

1. Address how you will route the off-site run-off from the north along the bike trail. concurrence from Parks and Recreation will be required.

2. Address the capacity of Ladera Sr. NW and what effect the additional run-off will create.

3. Detail of proposed run down from Brambleberry Place towards Ladera Dr.

4. Identify which rear yards will drain to street and how.

5. Indicate location of proposed inlets on Ladera Dr. NW.

6. Typical side yard detail to identify how flows from each adjacent lot will be routed to the front.

7. All developed run-off must be routed out through the drive pads. Your typical lot design does not indicate this.

If I can be further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

c: Andrew Garcia
File

DRAINAGE REPORT

FOR

WINDSOR ESTATES
PHASES 1 & 2

ALBUQUERQUE NEW MEXICO
APRIL 1996

Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108

SCOTT M. McGEE NEW MEXICO 10519 REGISTERED PROFESSIONAL ENGINEER

Scott M McGee 4-22-96

Scott M. McGee, P.E. Date

I. INTRODUCTION

Windsor Estates is a proposed two-phase 91-lot residential subdivision on 16.247 acres. Present zoning is R-D which will remain unchanged. The proposed development will blend with the existing single-family detached residences to the south and west. Proposed lot sizes result in a density of 5.6 dwelling units per acre.

See Vicinity Map in Appendix.

A recent minor subdivision split Tract 5-A along the extension of the centerline of Laurelwood Parkway NW (to be named Laurelwood Place). The easterly portion, Tract 5-A-2, is the subject site. The remaining 14.8848 acres (Tract 5-A-1) is not part of this proposed development.

II. EXISTING SITE CONDITIONS

A. Flood Hazard--This site is not shown to be within an established flood hazard area as shown on the FIRM Panel 21. The Mirehaven Diversion to the Ladera Channel abuts the property along the north. 100-year flooding is shown to be confined to this constructed facility.

B. Soils--From the SCS Soil Survey of Bernalillo County, these Bluepoint and Pajarito loamy fine sands are classified as Hydrologic Soil Group 'A' and 'B' soils.

C. Topography--Located on the west side of Albuquerque, this land slopes generally from west to east at 2 to 4 percent. Drainage courses are undefined and the site drains as overland sheetflow to Ladera Drive NW.

D. Offsite Flows--Offsite flows presently enter the site from both the north and west.

A forty-foot wide strip of land, from the north property line to the top of the AMAFCA berm, sheetflows onto the site. These flows will be carried east within the adjacent twenty-foot trail right-of-way and then will be accepted onto Stoneham Place near the cul-de-sac at its eastern end. A small portion of this area, at its east end, will continue to overland sheetflow to the adjacent Ladera No. 13 detention pond.

The offsite area to the west, approximately 5.2 acres, is undeveloped. This upland area presently sheetflows runoff through the site and on to Ladera Drive NW. The proposed extension of Laurelwood Place, at the site's west end, will intercept these flows and carry them to Ladera Drive NW. A proposed rearyard wall behind Lots 1-5 will direct flows south toward Ladera Drive, which is the historical outfall point.

III. ONSITE DRAINAGE MANAGEMENT

Proposed subdivision grading requires building pads to be elevated above the adjacent street (see Grading & Drainage Plans in pocket). All developed flows will be required to flow toward the street. Backyards will drain to the street where lots are on the "upland" side of the street. Several lots will have backyards that are lower than the adjacent street in order to minimize retaining wall heights at the rear of the lots. Water that falls in these backyard areas will be ponded in the backyard, while developed flows will be routed to the street. All developed flows will be carried onsite by the proposed interior roadways.

The Windsor Estates 100-year discharge is 56.8 cfs (see hydrology calculations for Basins A, B, and C in Appendix), which is discharged to Ladera Drive NW at three different points. Lakewood Avenue carries approximately 24.1 cfs, Knightsway Avenue carries 25.5 cfs, while a drainage rundown will carry 12.5 cfs (7.2 onsite plus 5.3 cfs offsite) from the Stoneham Place cul-de-sac to Ladera

Drive NW. The backyard ponding areas will have no discharge, but no credit is given for this area.

Public streets are proposed with a 28-foot width between the face of curbs. Standard 8-inch curb and gutter sections along with mountable curbs will be used. DPM Plate 22.3 D-1 was used (32-foot street half-capacity), to determine flow depths for interior streets. This plate is accurate up to a flow depth of 0.36 feet (road crown height above flowline for a 28-foot street), and is conservative for a mountable curb up to a 0.33 feet depth.

Both Kingsway and Castlerock Courts have a 100-year discharge of 5.6 cfs. Proposed street grades range from 1.4 to 3.0 percent, which results in a maximum flow depth of 0.28-0.30 feet. At the intersections of these cul-de-sacs with Braveheart Drive, the curb will transition from mountable to standard through the wheelchair ramps shown.

Braveheart Drive will carry a 100-year flow of 17.8 cfs at a maximum depth of 0.45 feet to Lakewood Avenue. Flow velocity is on the order of 2.7 fps when it reaches Lakewood Avenue and is carried to Ladera Drive. Lakewood Avenue is proposed to be 36-feet wide at this point and carries a 100-year flow of 24.1 cfs (see appendix calculations for Drainage Basin 'A'). This corresponds to a flow depth of 0.48 feet and a velocity of 3.0 fps at a 1 percent street slope.

Buckingham Court has a 100-year discharge of 7.5 cfs resulting in a flow depth of 0.33 feet at 2.1 fps. At the intersection of Stoneham Place and Buckingham Court a transition will be made from mountable curb to standard curb and gutter through the wheelchair ramps. Stoneham Place will carry 22.0 cfs where it meets Knightsway Avenue at a maximum flow depth of 0.47 feet. Knightsway Avenue is proposed to be 36-feet wide and will convey a 100-year flow of 25.5 cfs at a maximum depth of 0.48 feet (see appendix calculations for Drainage Basin 'B'.

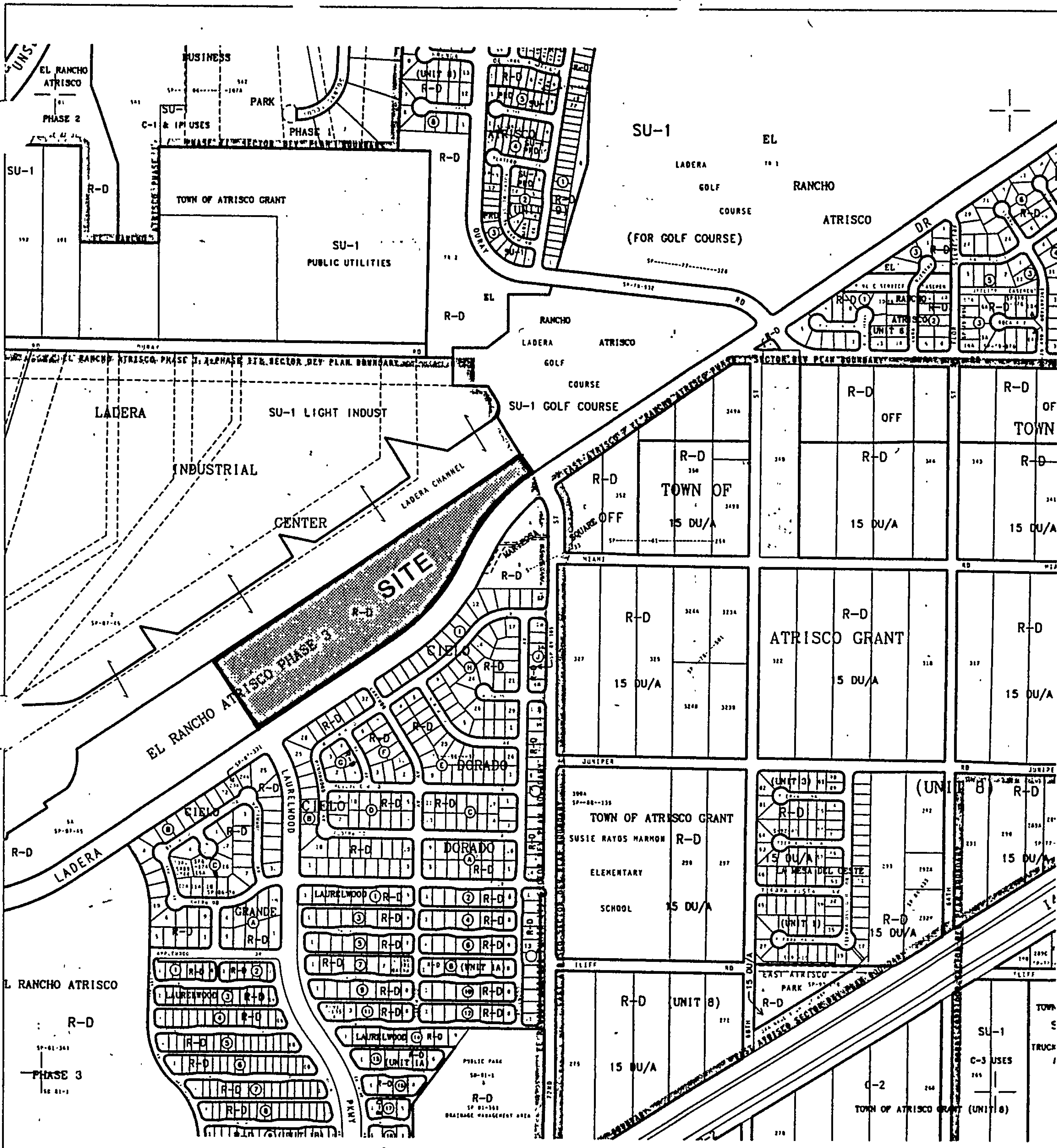
Where Stoneham Place runs east of Knightsway Avenue it will carry a 100-year flowrate of 12.5 cfs (7.2 onsite plus 5.3 offsite per appendix calculations). This flow will be carried overland through a 6-foot wide drainage rundown from the east end cul-de-sac to Ladera Drive.

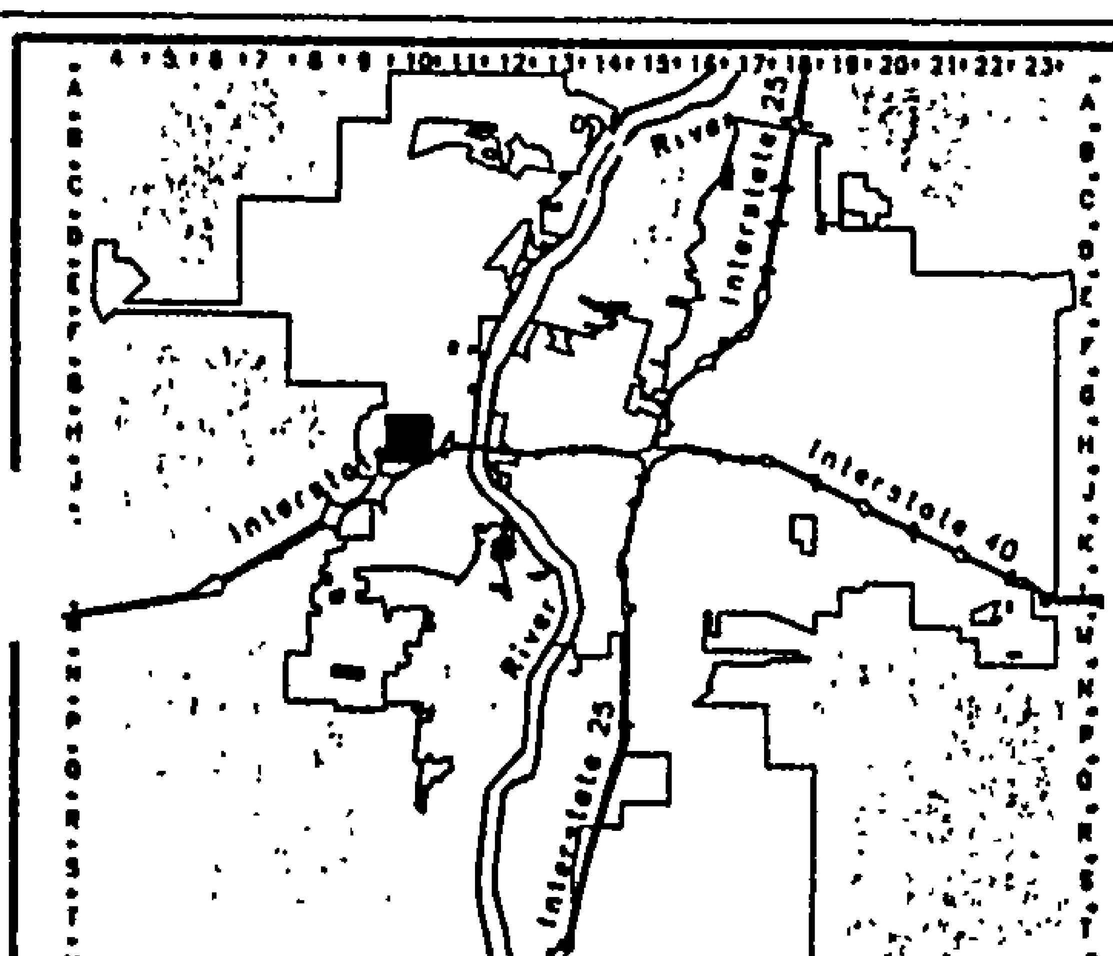
IV. DOWNSTREAM CAPACITY

Special Assessment District (SAD) No. 212 included the construction of a 24"-42" storm drain as part of Ladera Drive NW. The design accounted for development of this site, but under 1983 hydrology criteria. The critical design premise was to maintain one "dry" lane in each direction on this arterial street.

The subsequent changes in area hydrology now indicate an increase in the developed 100-year runoff from this site of 52 percent (see Appendix calculations). Record drawings indicate the hydraulic grade line for the SAD flowrate was at or near the top of the storm drain pipe. Proposed improvements include adding several new catch basins in the north curb line of Ladera Drive NW to accept this additional runoff. Additional storm drain capacity can be demonstrated using pressure flow analysis per Chapter 22 of the DPM.

APPENDIX





North

750 375 0 750

Scale: 1" = 750'

Albuquerque Geographic Information System
City of Albuquerque

LEGAL DESCRIPTION

T10N
R2E
SEC 10

1

UNIFORM PROPERTY CODE

1-010-059

H-10-Z

RUNOFF CALCULATIONS

Project: Windsor Estates **Analysis Point #** (PHASE 1) BASIN 'A'

Zone 1

Drainage Area

Planimeter Rdg. 5,566 x .015 x Map Scale² 60 ² ÷ 43560

A = 6.90 acres

Peak Discharge (cfs/acre) N(D.U.'s/AC) = $\frac{91}{16.247}$ = 5.6

Land Treatment %D = $7\sqrt{(5.6)^2+(5)(5.6)}$ = 54

	0.00	A	x	1.29	=	0
(21.7%)	1.50	B	x	2.03	=	3.0
(24.3%)	1.67	C	x	2.87	=	4.8
(54%)	3.73	D	x	4.37	=	16.3
	(6.90 AC)	Total		100 -YR	Q =	24.1 cfs

Volume of Runoff

Land Treatment

	A	x		=	
1.50	B	x	0.67	=	1.00
1.67	C	x	0.99	=	1.65
3.73	D	x	1.97	=	7.35
	Total		100 -YR	V =	10.00 ÷ 12 = 0.833 ac-ft

(10/91)

RUNOFF CALCULATIONS

Project: Windsor Estates **Analysis Point #** (PHASE 2) BASIN 'B'

Zone 1

Drainage Area

Planimeter Rdg. 5,880 x .015 x Map Scale² 60 ² ÷ 43560

A = 7.29 acres

Peak Discharge (cfs/acre)

Land Treatment

	0	A	x	1.29	= 0
(21.7%)	1.59	B	x	2.03	= 3.2
(24.3%)	1.77	C	x	2.87	= 5.1
(54%)	3.93	D	x	4.37	= 17.2
		Total		100 -YR	Q = 25.5 cfs

Volume of Runoff

Land Treatment

	A	x		=
1.59	B	x	0.67	= 1.07
1.77	C	x	0.99	= 1.75
3.93	D	x	1.97	= 7.74
	Total		100 -YR	V = 10.56 ÷ 12 = 0.880 ac-ft

(10/91)

RUNOFF CALCULATIONS

(PHASE 2)

Project: Windsor Estates **Analysis Point #** BASIN 'C'

Zone 1

Drainage Area

Planimeter Rdg. 1.659 x .015 x Map Scale² 60 ² ÷ 43560

A = 2.06 acres

Peak Discharge (cfs/acre)

Land Treatment

0	A	x	1.29	=	0
(21.7%) 0.45	B	x	2.03	=	0.9
(24.3%) 0.50	C	x	2.87	=	1.4
(54%) 1.11	D	x	4.37	=	4.9
(2.06 AC)	Total		100 -YR	Q =	7.2 cfs

Volume of Runoff

Land Treatment

	A	x		=	
0.45	B	x	0.67	=	0.30
0.50	C	x	0.99	=	0.50
1.11	D	x	1.97	=	2.19
	Total		100 -YR	V =	2.99 ÷ 12 = 0.249 ac-ft

(10/91)

RUNOFF CALCULATIONS

Project: Windsor Estates **Analysis Point #** OFFSITE AREA

AREA BETWEEN NORTH PROPERTY LINE & TOP OF ADJACENT AMAFCA BERM **Zone** 1

Drainage Area A = (40')(2017')/43560

Planimeter Rdg. ________ x .015 x Map Scale² ________² ÷ 43560

A = 1.85 acres

Peak Discharge (cfs/acre)

Land Treatment

	A	x		=	
	B	x		=	
1.85	C	x	2.87	=	5.3
	D	x		=	
	Total		100 -YR	Q =	5.3 cfs

Volume of Runoff

Land Treatment

OFFSITE FLOW ENTERS SITE ALONG EAST END OF BRAMBLEBERRY PL (EAST OF LOT 40) & EXITS THROUGH CUL-DE-SAC & RUNDOWN TO LADERA DRIVE (BASIN 'C')

	A	x		=	
	B	x		=	
1.85	C	x	0.99	=	1.83
	D	x		=	
	Total		100 -YR	V =	1.83 ÷ 12 = 0.153 ac-ft

(10/91)


OURAY
FIELD
RETENTION DAM No. 13
08-006-77
SH. 13
LADERA
DRAINAGE
EASEMENT
EARTHEN CHANNEL
B=100' SS=2:1
08-006-77
SITE
EARTHEN CHANNEL
B=120' SS=2:1
08-006-77
MIAMI
72ND
ST.
S341
S35'
S441
S442
S531
S532
S533
S621
S611
S711
266' 30" RCP
S=0.0092
26-1577-86
SH. 6
371' 70" RCP
S=0.0073
26-1577-86
SH. 6
194' 30" RCP
S=0.0076
26-1577-86
SH. 6
260' 30" RCP
S=0.0135
26-1577-86
SH. 6
309' 24" RCP
S=0.0264
26-1577-86
SH. 6
380' 24" RCP
S=0.0184
26-1577-86
SH. 6
367' 24" RCP
S=0.0142
26-1577-86
SH. 6
481' 24" RCP
S=0.0146
26-1577-86
SH. 6
LADERA DRIVE
SD REACH
LADERA
LAURELWOOD
PARKWAY
SHERWOOD
DR.
LYNWOOD
DR.
APPLEWOOD
LN.
MAPLEWOOD
DR.
PINEWOOD
DR.
PARKWOOD
DR.
RANCHWOOD
DR.
385' 22' CHANNEL LINING
S=0.0039
26-1577-86
SH. 24
STARWOOD
DR.
SANDLEWOOD
DR
DETENTION POND
26-1577-86
SH. 20
676' 24" RC
26-1577-8
SH. 24

6

H-10

STORM DRAIN ANALYSIS SUMMARY

REACH	MH # FROM - TO	DIA (IN)	L (FT)	SAD#212 Q (CFS)	PRESSURE FLOW CAPACITY (CFS)	ADDITIONAL AVAILABLE CAPACITY (CFS)
A	351 - POND	42	204	61.0	91.8	30.8
B	341 - 351	42	130	61.0	85.7	24.7
C	441 - 341	30	266	45.7	56.9	11.2
D	442 - 441	30	371.4	45.7	53.0	7.3
E	531 - 442	30	198.2	39.6	48.2	8.6
F	532 - 531	30	200.2	39.6	48.2	8.6
G	533 - 532	24	307.8	32.2	41.0	8.8
H	621 - 533	24	379.6	24.6	34.8	10.2
I	611 - 621	24	387	16.4	37.9	21.5

ISAACSON & ARFMAN, P.A.

SUBJECT LADERA DR NW JOB NO. 848

BY SM DATE 2/24/95 SHEET NO. 7 OF

LADERA DRIVE CATCH BASIN DATA

STA	TYPE	CONNECTOR PIPE (IN)	AS-BUILT SLOPE (%)	CONNECTOR PIPE CAPACITY (CFS)	RECORD Q INTERCEPT (CFS)	ADDITIONAL AVAILABLE CONNECTOR PIPE CAPACITY
27+00	SNGL 'A'	18	1.67	13.6	7.6	6.0
30+18	SNGL 'A'	18	3.66	20.1	7.4	12.7
34+17	DBL 'C'	18	1.60	13.3	6.1	7.2
40+43	SNGL 'A'	18	3.13	18.6	9.2	9.4

1995 HYDROLOGY (NO CONSIDERATION FOR ROUTING EFFECTS)

BASIN	AREA	Q_{100} (CFS)
A	6.90	24.1
B	7.29	25.5
C	2.06	7.2
North ½ R/W of Ladera Drive	2.86	9.7 *
	19.11	66.5

DISCHARGE PER ACRE ∴ $= \frac{66.5 \text{ CFS}}{19.11 \text{ AC}} =$ **3.48 CFS/ACRE**

SAD No. 212 HYDROLOGY (1983)

RATIONAL METHOD (Q = CIA) USED WITH:

C = 0.74 (80% IMPERVIOUS ASSUMED)
I = 3.08 IN/HR

FOR OVERLAPPING AREA: DISCHARGE/ACRE $= \frac{79.0 \text{ CFS}}{34.7 \text{ AC}} =$ 2.28 CFS/AC

1995 HYDROLOGY REPRESENTS A 52.6% INCREASE

$\frac{3.48}{2.28} = 1.526$

* R/W COMPOSITE DISCHARGE COEFFICIENT BASED ON:

31.5'	PAVING, C&G, & SW	(52.5% D)
18.0'	LANDSCAPING	(30.0% B)
10.5'	BARK ON PLASTIC	(17.5% C)
60' (= ½ of 120' R/W)		100%

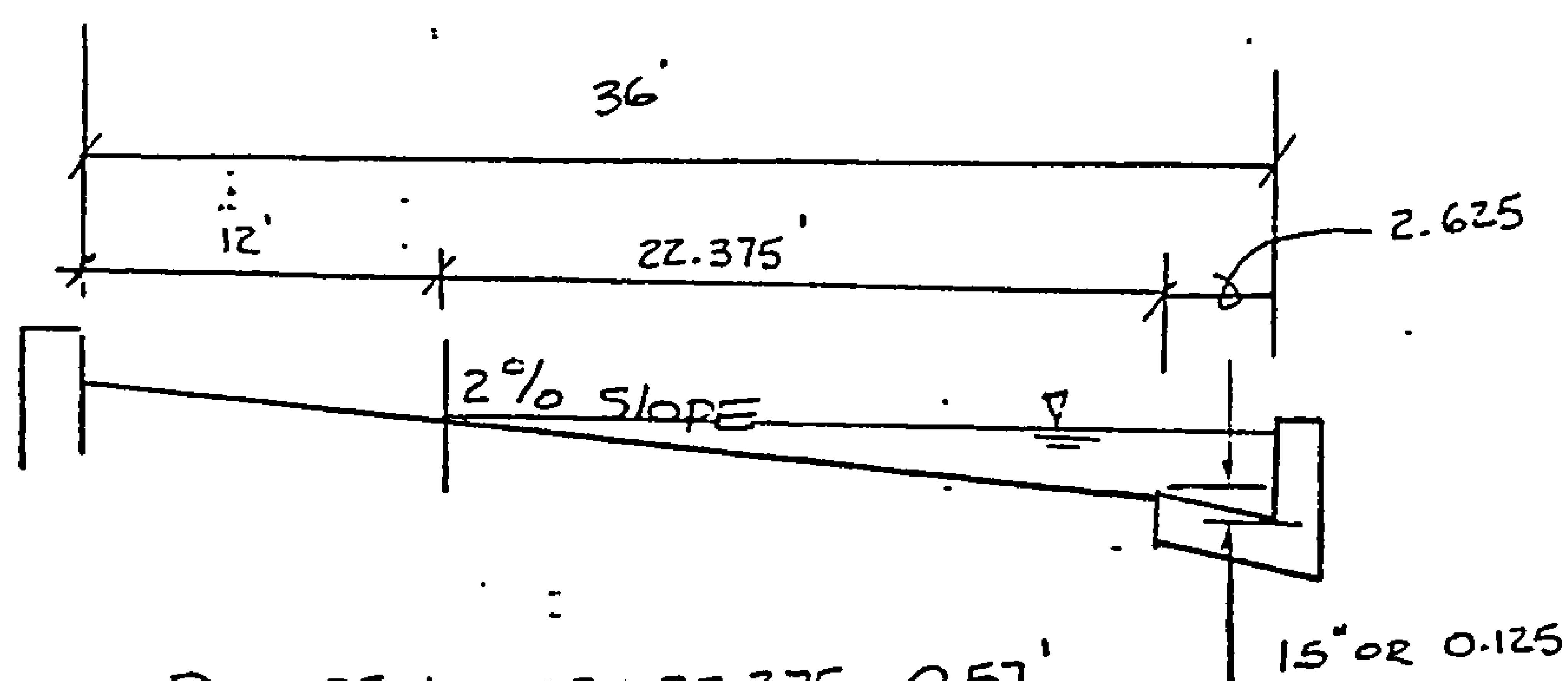
COMPOSITE COEFFICIENT = (.30)(2.03) + (.175)(2.87) + (.525)(4.37) = 3.406

VI. CALCULATIONS:

A. Storm Sewer System In Ladera Boulevard

"Exhibit A" shows Area 2 broken up into a number of sub-areas which drain to the proposed inlets on Ladera. One driving lane in each direction must remain open in the event of a 10-year storm.

1. Road Carrying Capacity (Ultimate Development)



$D = .125 + .02 \times 22.375 = 0.57'$

Road Slopes	Max. Road Carrying Capacity
0.0160	25.4 cfs
0.0220	29.0 cfs
0.0083	18.0 cfs
0.0176	26.0 cfs
0.0086	18.0 cfs
0.0177	26.0 cfs
0.0162	25.0 cfs
0.0250	31.0 cfs
0.0067	16.0 cfs
0.0198	28.0 cfs

2. Storm Sewer Calculations

Composite Runoff Coefficient: It is assumed that Area 2 will be developed to be 80% impervious, Type "B" soil (see Sector Plan).

C = 0.74 per Plate 22.2 C-1

Storm Intensity: The storm intensity is obtained using the City of Albuquerque Development Process Manual, Plates 22.2 B-1, 22.2 B-2, 22.2 D-2, and 22.2 D-1, all of which are enclosed.

Inlet Capacity: Inlet capacities were determined using the Grating Capacity Curves in the Development Process Manual, Plates 22.3 D-6 & 22.3 D-5 which are enclosed.

Hydraulic Grade Line Calculation: See Table IIA and IIB.

LADERA STORM SEWER SYSTEM DRAINAGE CALCULATIONS

1. Area 2A

Area: 10.5 acres

Longest Path: 1120' on roadway @ average slope of 1.5%
350' on paved area @ average slope of 1.0%

Tc = 1120/(3.3)(60) + 350/(1.35)(60) = 10.4 min.

I_{10} = 2.0 x 2.2 x .657 = 2.89 in/hr

C = 0.74 Soil Type "B" (Sector Plan) 80% Impervious Plate 22.2 C-1

Q_{10} = CIA = (.74)(2.89)(10.5) = 22 cfs

Road Carrying Capacity @ d = 0.57, S = .0176 = 26 cfs

Single "A" Inlet Capacity @ d = 0.53, S = .0176 = 8.2 cfs

22/10.5 = 2.095 cfs/AC

Solution: Construct 1 - Single "A" inlet near station 14+50 and send remaining 13.8 cfs (22-8.2) down Ladera. Peak flow rate in storm sewer from Station 14+50 to 19+50 is 8.2 cfs

2. Area 2A, 2B1

Area = 10.5 + 4.7 = 15.2 acres

Longest Path: 1460' on roadway @ average slope of 1.5%

350' on paved area at average slope of 1.0%

30.9/15.2 = 2.033 cfs/AC

Tc = 1460/(3.3)(60) + 4.32 = 11.7 min.

I_{10} = 1.9 x 2.2 x .657 = 2.75 in/hr

C = 0.74

Q_{10} = CIA = 0.74 x 2.75 x 15.2 = 30.9 cfs

Street Flow: 30.9 cfs - 8.2 cfs (flow in pipe) = 22.7 cfs

Road Carrying Capacity @ d = 0.57, S = 0.0177 = 26 cfs

Single "A" Inlet Capacity @ d = 0.53, S = 0.0177 = 8.2 cfs

Solution: Construct 1 - Single "A" inlet near Station 19+50 and send remaining 14.5 cfs (22.7-8.2) down Ladera. Peak flow rate in storm sewer from Station 19+50 to 23+25 is 16.4 cfs.

3. Area 2A, 2B1, 2B2

Area = 10.5 + 4.7 + 4.8 = 20 acres

Longest Path: 1835' on roadway @ average slope of 1.5%

Longest Path: 350' on paved area at average slope of 1.0%

Tc = 1835/(3.3)(60) + 4.32 = 13.6 min.

39.5/20 = 1.975 cfs/Ac

I_{10} = 1.85 x 2.2 x .657 = 2.67 in/hr

C = 0.74

Q_{10} = CIA = (.74)(2.67)(20) = 39.5 cfs

Street Flow: 39.5 cfs - 16.4 cfs (flow in pipe) = 23.1 cfs

Road Carrying Capacity @ d = 0.57, S = 0.0177 = 26 cfs

Single "A" Inlet Capacity @ d = 0.53, S = 0.0177 = 8.2 cfs

Solution: Construct 1 = Single "A" inlet near Station 23+25 and send remaining 14.9 cfs (23.1-8.2) down Ladera. Peak flow rate in storm sewer from Station 23+25 to 27+18 is 24.6 cfs.

4. Areas 2A, 2B1, 2B2, 2C1

Area = 20 + 3.4 = 23.4 acres

43.8/23.4 = 1.872 cfs/Ac

Longest Path: 2230' on roadway @ average slope of 1.5%
350' on paved area at average slope of 1.0%

Tc = 2230/(3.3)(60) + 4.32 = 15.57

I_{10} = 1.75 x 2.2 x .657 = 2.53 in/hr

C = 0.74

Q_{10} = CIA = (0.74)(2.53)(23.4) = 43.8 cfs

Street Flow = 43.8 - 24.6 = 19 cfs

Road Carrying Capacity @ d = 0.57, S = 0.0162 = 25 cfs

Single "A" Inlet Capacity @ d = .51, S = 0.0162 = 7.6 cfs

Solution: Construct 1 - Single "A" inlet near station 27+18 and send remaining 11.4 cfs (19-7.6) down Ladera. Peak flow rate in storm sewer from Station 27+18 to 30+18 is 32.2 cfs.

5. Areas 2A, 2B1, 2B2, 2C1, 2C2

A = 23.4 + 3.4 = 26.8 acres

Longest Path: 2530' on roadway @ average slope of 1.7%

350' on paved area @ average slope of 1.0%

Tc = 2530/(3.55)(60) + 4.32 = 16.2 min.

I_{10} = 1.65 x 2.2 x .657 = 2.39 in/hr

$\frac{47.4}{26.8}$ = 1.769 cfs/AC

Q_{10} = CIA = (0.74)(2.39)(26.8) = 47.4 cfs

Street Flow = 47.4 - 32.2 = 15.2 cfs

Road Carrying Capacity @ d = 0.57, S = .0198 = 28 cfs

Single "A" Inlet Capacity @ d = 0.47, S = .0198 = 7.4 cfs

Solution: Construct 1 - Single "A" inlet near Station 30+18 and send remaining 7.8 cfs (15.2-7.4) down Ladera. Peak flow rate in storm sewer from Station 30+18 to 34+18 is 39.6 cfs.

6. Areas 2A, 2B1, 2B2, 2C1, 2C2, 2D

A = 26.8 + 4.5 = 31.3 acres

Longest Path: 2930' on roadway @ average slope of 1.7%

350' on paved area @ average slope of 1.0%

Tc = 2930/(3.55)(60) + 4.32 = 18.1 min.

$I_{10} = 1.6 \times 2.2 \times .657 = 2.31$ in/hr

$\frac{53.5}{31.3} = 1.709$ cfs/AC

$Q_{10} = CIA = (.74)(2.31)(31.3) = 53.5$ cfs

Street Flow = 53.5 - 39.6 = 13.9 cfs

Road Carrying Capacity @ d = 0.57, S = .0067 = 16.0 cfs

Single "A" Inlet Capacity @ d = 0.52, S = .0067 = 6.1 cfs

Solution: Construct 1 - Single "A" inlet near Station 34+18 and send remaining 7.8 cfs (13.9-6.1) down Ladera. Peak flow rate in storm sewer from Station 34+18 to 40+40 is 45.7 cfs.

7. Areas 2A, 2B1, 2B2, 2C1, 2C2, 2D, 2F

A = 31.3 + 3.4 = 34.7 acres

$\frac{79.0}{34.7} = 2.277$ cfs/AC

Longest Path = 3530' on roadway @ average slope of 1.5%

350' on paved area @ average slope of 1.0%

Tc = 3530/(3.3)(60) + 4.32 = 22.15 min.

$I_{100} = 1.2 \times 2.2 = 3.08$ in/hr

$Q_{100} = CIA = (.74)(3.08)(34.7) = 79.0$ cfs

Street Flow = 79.0 - 45.7 = 33.3 cfs

Single "A" Inlet Capacity @ d = 0.69, S = .0067 = 9.2 cfs

Solution: Construct 1 - Single "A" inlet near Station 40+40 and send remaining 24.1 cfs (33.3-9.2) down Ladera. Ladera Drive will be dry at this location during the 10-year storm, the 24.1 cfs will result during the 100-year storm.

8. Area 2G (SE ½ of Ladera R/W) Unser to 72nd

A = 6 acres

Longest Path = 4040' on roadway @ average slope of 1.5%

Tc = 4040/(3.3)(60) = 20.4 min.

I_{10} = 1.5 x 2.2 x .657 = 2.17 in/hr

Q_{10} = CIA = .74 x 2.17 x 6 = 9.63 cfs

Q_{100} = CIA = .74 x 3.30 x 6 = 14.65 cfs

Road Carrying Capacity @ d = 0.57, S = .0067 = 16.0 cfs

Single "A" Inlet Capacity @ d = 0.53, S = .0067 = 6.1 cfs

Solution: Construct 1 - Single "A" inlet near Station 40+40 and send remaining 9.9 cfs (16.0-6.1) down Ladera. Peak flow rate in storm sewer from Station 40+40 to 41+70 is 61 cfs.

1995
½ R/W width = 60'
31.5' Paving/SW ≈ 52.5% D
18' Landscp = 30% B
Rem. 10.5' = 17.5% C
Composite R Factor = 3.406
Q = (6.0 acres)(3.406 cfs/ac) = 20.4 cfs

9. Area 2H

A = 13.5 acres

Longest Path = 1500' on roadway @ average slope of 1.15%

Tc = 1500/(2.9)(60) = 8.6 ∿ 10.0 min.

I_{100} = 2.15 x 2.2 = 4.73 in/hr

C = 0.60 (based on 55% impervious, Type "B" Soil)

Q_{100} = CIA = (0.60)(4.73)(13.5) = 38.3 cfs

Solution: Construct stub to souther right-of-way line at Station 41+70 for peak 100-year flow of 38.3 cfs. Peak flow rate in storm sewer from Station 41+70 to Ladera Basin is 99.3 cfs (61+38.3).

$Q_{42"} = \frac{1.49}{.015}\pi(1.75)^2(.875)^{2/3}S^{1/2} = 874.3 S^{1/2}$