

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 10, 2003

Ron Bohannan Tierra West, LLC 8509 Jefferson NE Albuquerque, New Mexico 87113

RE: Grading and Drainage Report for West Bluff (H11-D49A) Dated April 1, 2003

Dear Mr. Bohannan:

The above referenced plan received April 2, 2003 is approved for Work Order by Hydrology at DRC.

This site requires a National Pollution Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Public works Hydrology section at 768-3654 (Charles Caruso) or 768-3645 (Brian Wolf).

If you have any questions please contact me at 924-3982.

~ //

Sincerely,

Carlos A. Montoya

City Floodplain Administrator

C: Charles Caruso, Hydrology Public Works

DRAINAGE AND TRANSPORTATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE:	West Bluff Townhomes	ZONE MAP/	DRG. FILE #:	H-11/D49A
DRB 1 1001004/100100	D5	WORK ORD	ER #:	665181
LEGAL DESCRIPTION	I: Lots 1 through 9 of the West Bluff Center Subdi	vision		
CITY ADDRESS:	Alamogordo Dr. between Ouray Rd. and Ian Av			
	· · · · · · · · · · · · · · · · · · ·	OONTAOT.		, , , , , , , , , ,
ENGINEERING FIRM:				ANNAN OR SARA LAVY
ADDRESS:	8509 Jefferson NE	PHONE:	(505) 858-3100	· ·· <u>-,,,,</u>
CITY, STATE:	Albuquerque, NM	_ ZIP CODE:	87113	· · · · · · · · · · · · · · · · · · ·
OWNER:	West Bluff Center LLC	CONTACT	Paul Silverman	≠ 1
ADDRESS:	4408 Canyon Court NE	PHONE:	(505) 294-8625	
CITY, STATE:	4400 Carryon Court NL	ZIP CODE:	1000/201-0020	· · · · · · · · · · · · · · · · · · ·
	· F		•	•
ARCHITECT:		CONTACT:		
ADDRESS:	· · · · · · · · · · · · · · · · · ·	PHONE:		<u> </u>
CITY, STATE:		ZIP CODE:		······································
SURVEYOR:	Precision Surveys	CONTACT:	Larry Medrano	•
ADDRESS:	8414 Jefferson NE	PHONE:	856-5700	· · · · · · · · · · · · · · · · · · ·
CITY, STATE:	Albuquerque, NM	ZIP CODE:	87113	<u> </u>
· · · · · · · · · · · · · · · · · · ·				
CONTRACTOR:		CONTACT:		<u> </u>
ADDRESS:		PHONE:		<u>t.</u>
CITY, STATE:	•	ZIP CODE:		
DRAINAGE PL CONCEPTUAL X GRADING PLAN EROSION CON ENGINEER'S C CLOMR/LOMR TRAFFIC CIRCUENCE ENGINEERS CE	PORT AN 1st SUBMITTAL, <i>REQUIRES TCL or equal</i> LAN RESUBMITTAL GRADING & DRAINAGE PLAN	PRELIMINA S. DEV. PL S. DEV. PL SECTOR P FINAL PLA FOUNDATI X BUILDING CERTIFICA CERTIFICA GRADING I PAVING PE	ACIAL GUARAN ARY PLAT APPRO AN FOR SUB'D. A AN FOR BLDG. P LAN APPROVAL T APPROVAL ON PERMIT APPROV ATE OF OCCUPAL TE OF OCCUPAL PERMIT APPROV ERMIT APPROVAL CERMIT APPROVAL CERMIT APPROVAL CERMIT APPROVAL CERMIT APPROVAL CERMIT APPROVAL	TEE RELEASE DVAL APPROVAL PERMIT APPROVAL ROVAL /AL NCY (PERM.) NCY (TEMP.) /AL L
WAS A PRE-DESIGN CO YES X NO COPY PROVIDE	ONFERENCE ATTENDED: ED			APR 0 2 2003 HYDROLOGY SECTION
DATE SUBMITTED:	4/2/2003	BY:	Jonathan Niski	

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of sumbittal may be required based on the following:

- 1. Conceptual Grading and Drainage Plans Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
- 2. Drainage Plans: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
- 3. Drainage Report Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

8509 Jefferson NE Albuquerque, NM 87113 (505) 858-3100 fax (505) 858-1118

twllc@tierrawestllc.com 1-800-245-3102

April 2, 2003

Carlos Montoya, PE
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

RE: Re-submittal of West Bluff Town Homes Grading Plan

Dear Mr. Montoya:

Attached please find an updated Drainage Report and Grading and Drainage Plan for the West Bluff Townhomes. The site was originally approved on May 4, 2001 and I attached a copy of the approval letter. It has been over a year since that approval and we are requesting an updated approval. No changes have been made to the Grading and Drainage Plan or Drainage Report.

Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Sara Lavy, P.E.

Enclosure

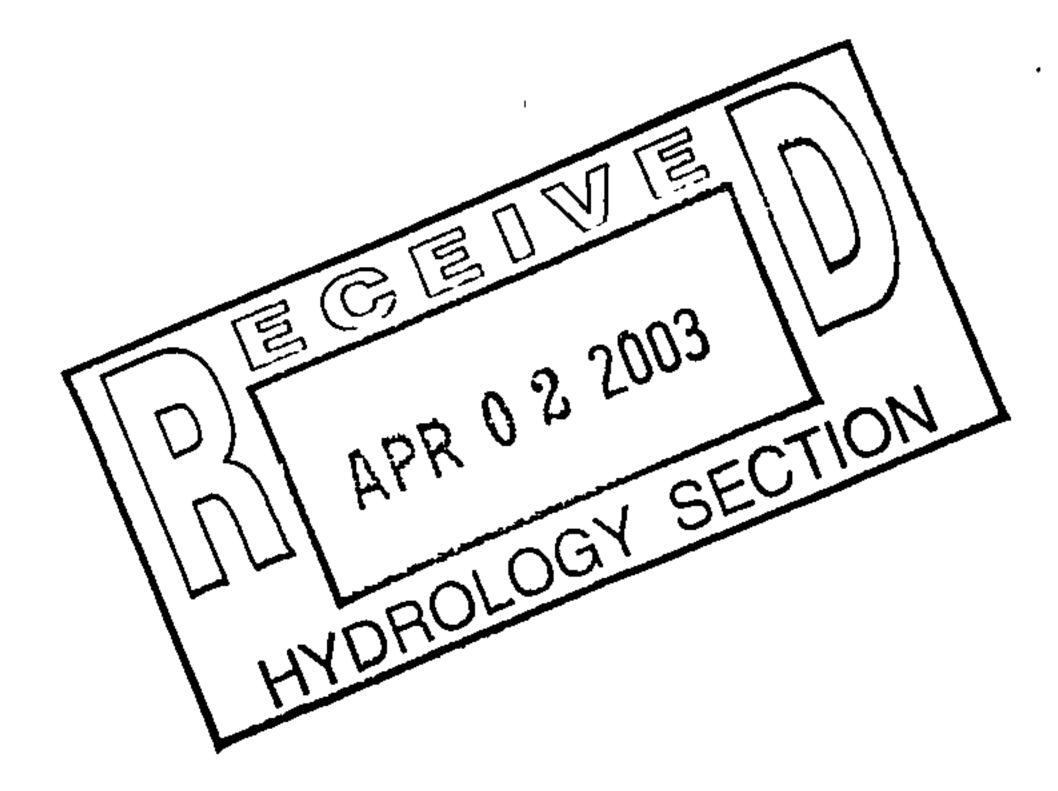
CC:

Paul Silverman

JN: 200087

scl

200087: 20087 carlos Montoya Itr.doc







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

May 4, 2001

Ronald R. Bohannan, P.E. Tierra West, LLC 8509 Jefferson NE Albuquerque, NM 87113

RE: WEST BLUFF TOWNHOUSES (H11-D49A). Resubmittal OF GRADING AND DRAINAGE PLAN FOR PRELIMINARY PLAT AND FINAL PLAT, AND FOR GRADING PERMIT APPROVALS. ENGINEER'S STAMP DATED APRIL 11, 2001. ORIGINAL STAMPED MARCH 7, 2001.

Dear Mr.Bohannan:

Based on the information provided on your April 18, 2001 resubmittal, the above referenced project is approved for Preliminary and Final Plats and for Grading Permit.

When submitting for Building Permit, please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.

Hydrology

c: Terri Martin File

DRAINAGE REPORT

for

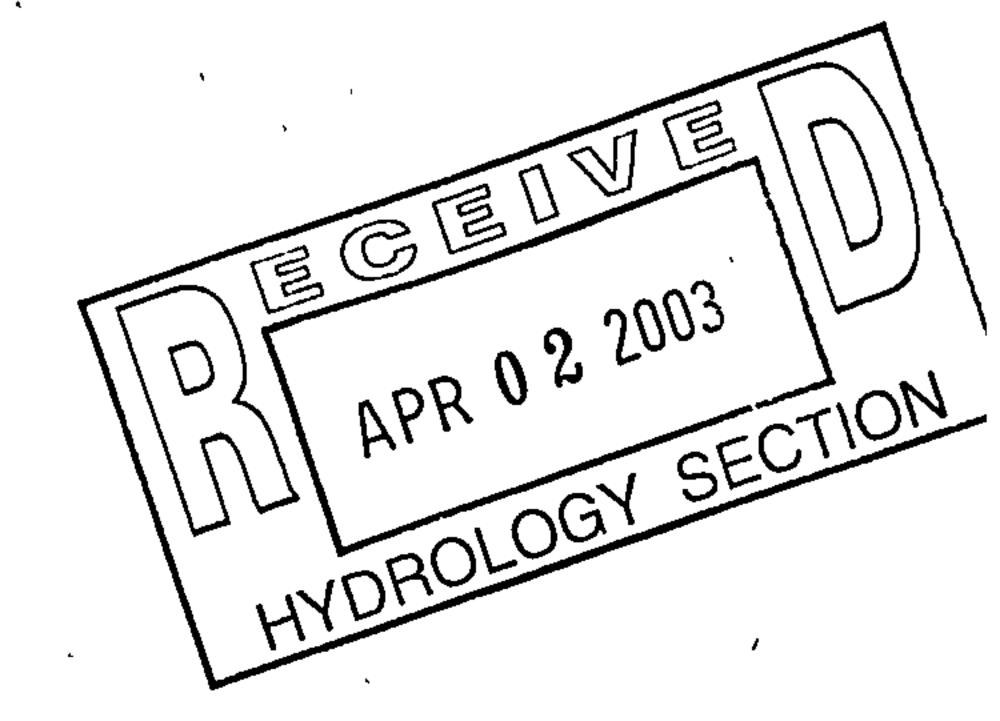
West Bluff Town Homes

Prepared by

Tierra West, LLC 8509 Jefferson NE Albuquerque, New Mexico 87113

Prepared for

West Bluff Center, LLC 4408 Canyon Court NE Albuquerque, New Mexico 87111-3010



March 2001

Registro 3769

Ronald R. Bohannan P.E. No. 9868

I certify that this report was prepared under my supervision, and I am a registered professional engineer in the state of New Mexico in good standing.

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Location

West Bluff Town Homes is a proposed nine unit town home subdivision. It is located on Alamogordo Drive NW between Ouray Road and Ian Avenue. The site is shown on the attached Zone Atlas Map H-11 and contains approximately 0.5354 acres. The legal description of the property is Lots 1 through 9 of the West Bluff Center Subdivision. The purpose of this report is to provide the drainage analysis and management plan for the subdivision.

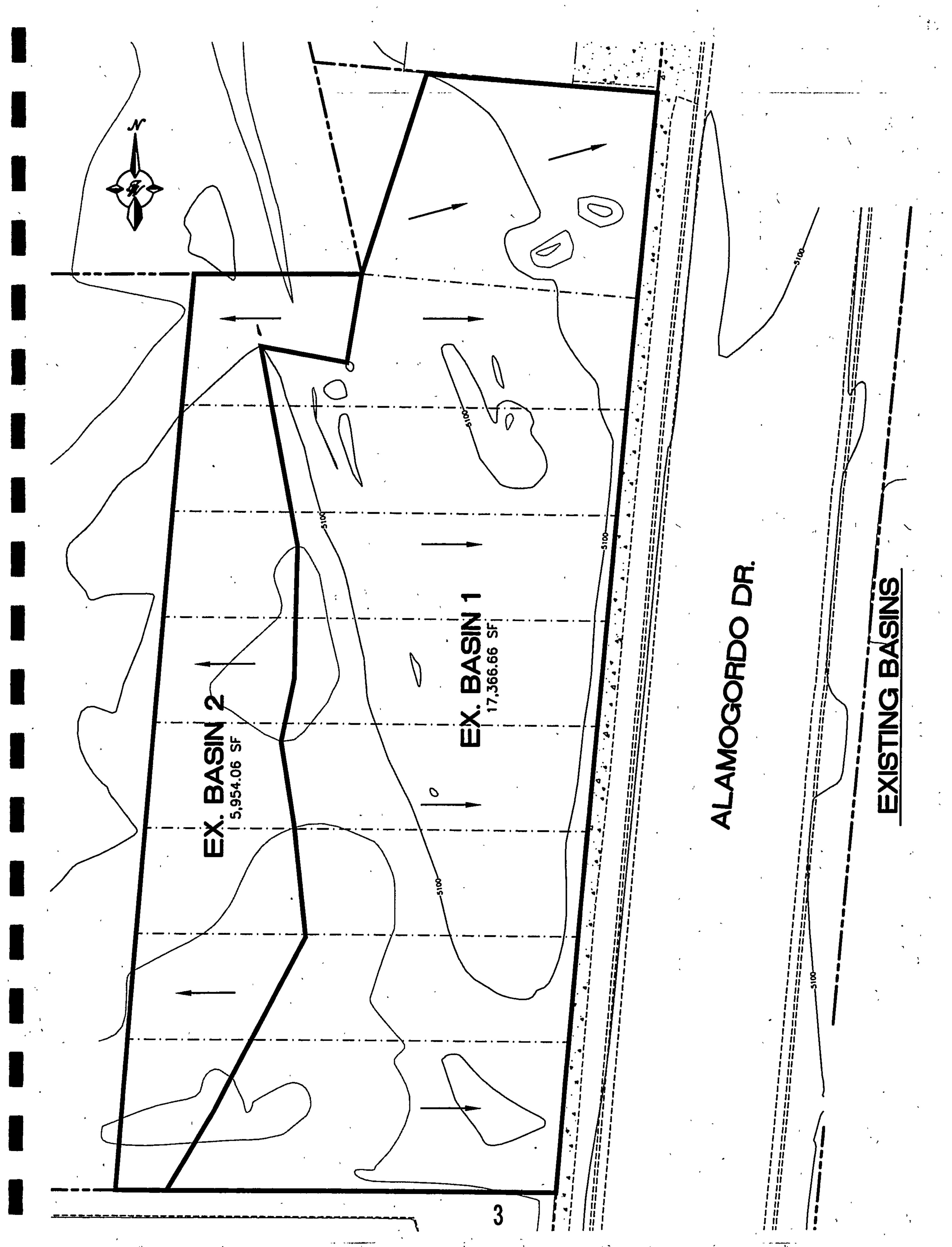
Existing Drainage Conditions

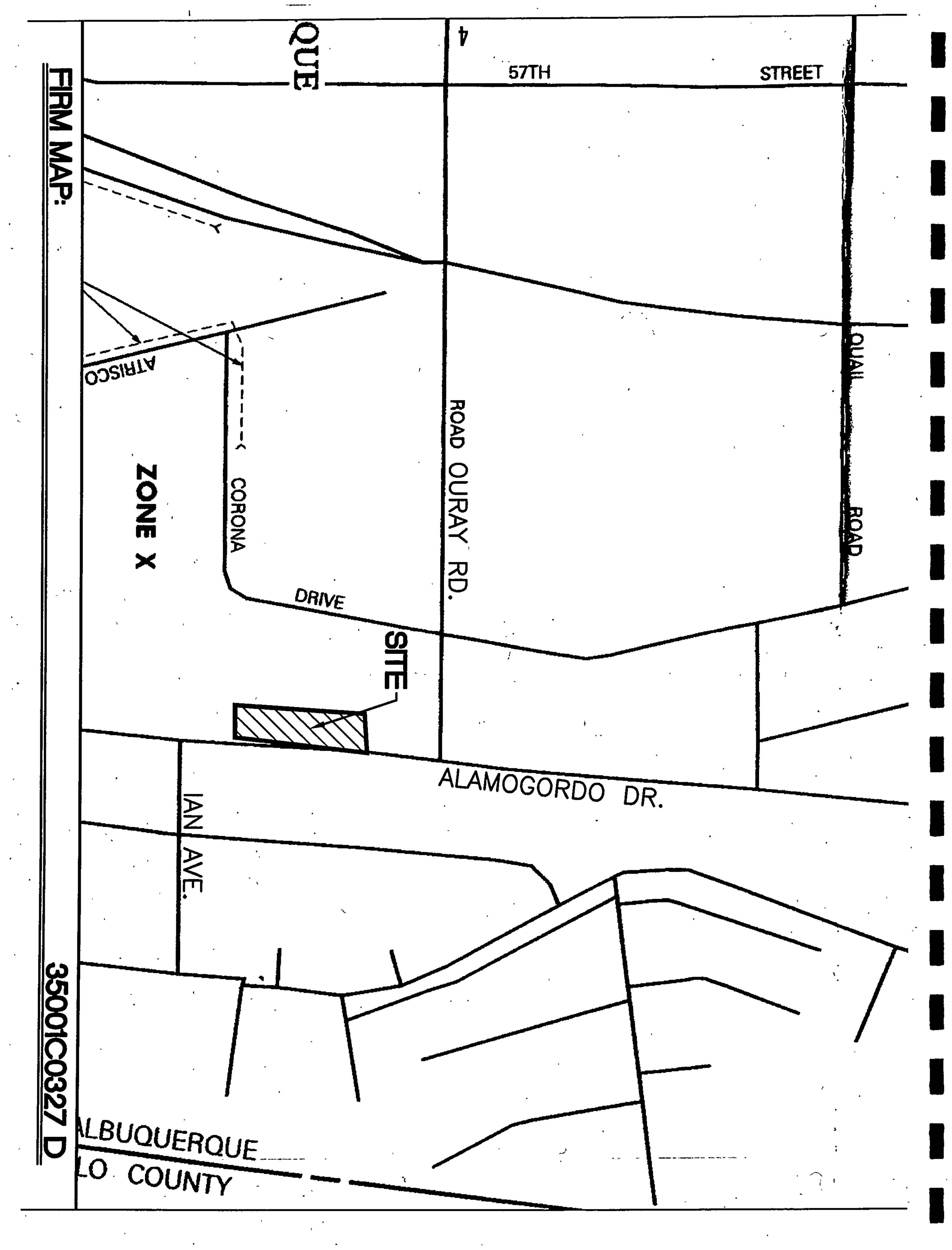
The site is currently undeveloped. As shown on the attached exhibit, there are two existing basins on the site. Basin 1 sheet flows east with an undeveloped discharge rate of 0.83 cfs towards Alamogordo Drive. Based on the drainage report filed for the Western Estates Subdivision in H11-D54, see attached appendix, the West Bluff Town Homes site falls within Basin A and has been accounted for in the downstream analysis. The flows from Alamogordo Drive NW drain to an existing channel built under City Project #5509.81 at Bridges Avenue. The channel, with a capacity for 70.50 cfs, then flows into the West Bluff Outfall. Basin 2 sheet flows west with an undeveloped discharge rate of 0.28 cfs to an undeveloped tract of land. There are existing buildings to the north and south of the site but no off-site flows enter our site from either location.

FIRM Map and Soil Conditions

The site is located on FIRM Map 35001C0327 D as shown on the attached excerpt. The map shows that the site does not lie in a flood zone.

The site contains one soil from the Soil Conservation Service Soil Survey of Bernalillo County. It is a Bluepoint loamy fine sand which has slow runoff and a severe hazard of soil blowing. The surface layer of the soil ranges from sand to clay.



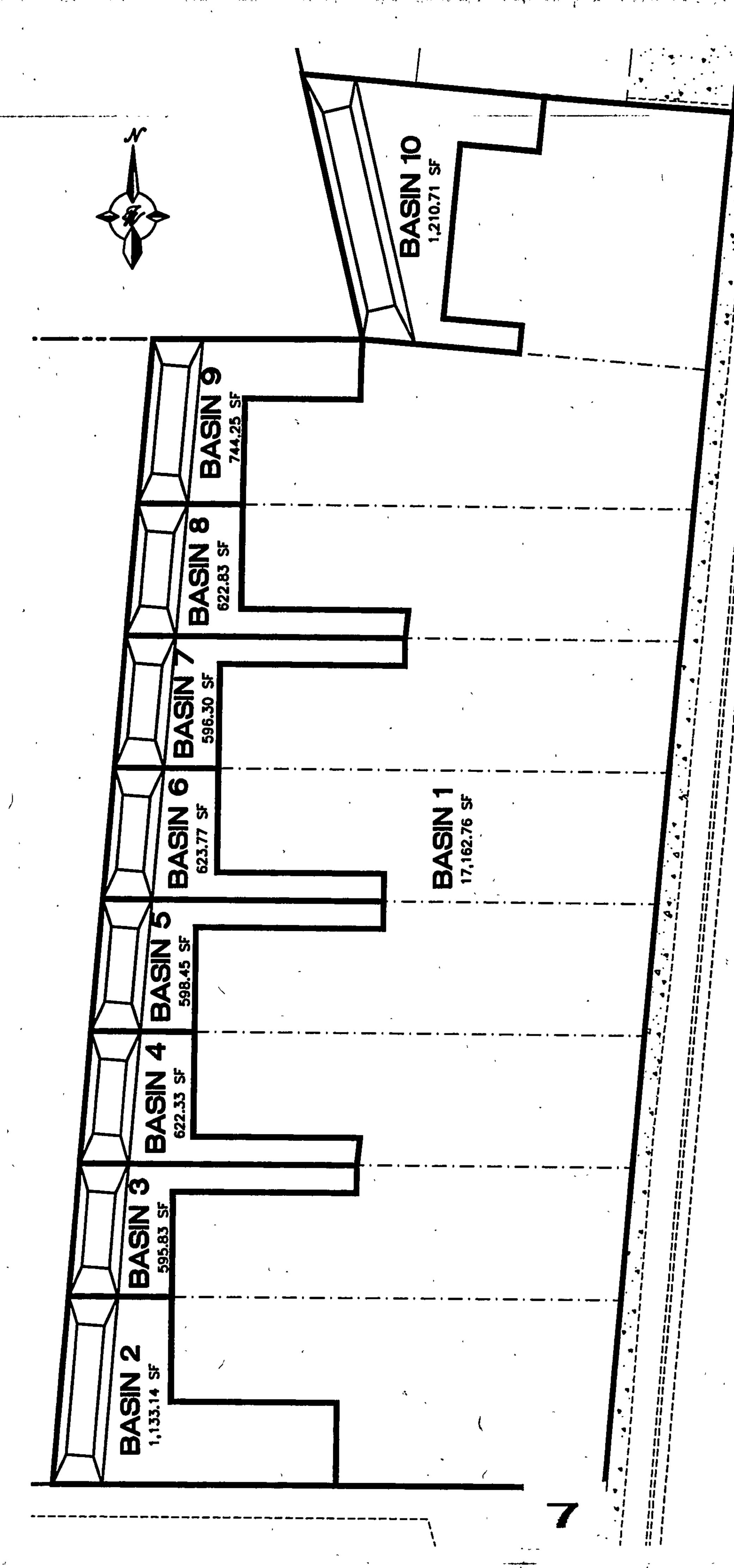


On-Site Drainage Management Plan

Most of the site will drain to Alamogordo Drive with each lot containing a rear yard pond. The roofs for each unit will drain to the front of the pad, which is included in Basin 1. The rear yard ponds are required due to the flatness of the site and the design of the town homes. This solution conforms to an approved Grading and Drainage Report filed by Brasher & Lorenz, Inc. for Pal Estates (H11-D49) on June 7, 1995, which allows for free discharge from the site. Based on the drainage report for the Western Estates Subdivision in H11-D54, Alamogordo Drive NW has the capacity for the free discharge from the site.

As shown on the attached Developed Basins Exhibit, there are 10 proposed basins on the site, which account for each of the rear yard ponds. The developed flow from Basin 1, which includes the front yard of each lot and the roofs of the town homes, will free discharge into Alamorgordo Drive at a rate of 1.54 cfs. Basins 2 through 10 are located in the rear of each lot and include only the flow that falls in the rear yard. All rear yard ponds were designed for the 10day, 100-year volume. As mentioned previously, all roof drainage will be designed to flow to the front of the building by either a pitched roof or by rain gutters. We have included a Pond Summary Table at the end of the report that includes the following information: Basin 2 has a required 10-day, 100-year volume requirement of 0.001452 ac-ft. The pond for this basin has a capacity for 0.001611 ac-ft. Basins 3 through 8 have a required 10-day, 100-year volume requirement of 0.000800 ac-ft. each. The ponds for these basins have a capacity for 0.00818 ac-ft. each. Basin 9 has a required 10-day, 100-year volume requirement of 0.000954 ac-ft. The pond for this basin has a capacity for 0.001044 ac-ft. Basin 10 has a required 10-day, 100year volume requirement of 0.001552 ac-ft. The pond for this basin had a capacity for 0.001778 ac-ft. If at some time in the future the ponds become filled with debris, the resulting 0.32 cfs will free discharge into Alamogordo Drive NW.

In the event of an emergency or a storm greater than a 100-year event Basins 2 through 10 will sheet flow into to Basin 1 and these flows will continue to free discharge into Alamogordo Drive.



ALAMOGORDO DR.

DEVEL OPED BASINS

Weighted E Method

Undeveloped On-Site Basins

P		<u> </u>			··	·· - · · · · · · · · · · · · · · · · ·						100-Year			10-Year	
Basin	Area	Area	Treat	ment A	Treatm	ent B	Treatr	nent C	Treat	ment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
	(sf)	(acres)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(ac-ft)	(ac-ft)	cfs	(ac-ft)	(ac-ft)	cfs
1	17,367	0.40	50%	0.20	0%	0.00	50%	0.1993457	0%	0.00	0.715	0.024	0.83	0.260	0.009	0.34
2	5,954	0.14	50%	0.07	0%	0.00	50%	0.0683425	0%	0.00	0.715	0.008	0.28	0.260	0.003	0.12
Total	23,321	0.54								,		0.032	1.11		0.012	0.46

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Excess Pr	ecipitation,	E (inches)
Zone 1	100-Year	10 - Year
Ea	0.44	0.08
Ε _b	0.67	0.22
Ec	0.99	0.44
Ed	1.97	1.24

Peak	Discharge (d	fs/acre)
Zone 1	100-Year	10 - Year
Q	1.29	0.24
Q _b	2.03	0.76
Qc	2.87	1.49
Q	4.37	2.89

Weighted E Method

Developed On-Site Basins

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	Flow	S		1 54	20.0	300	200	3 6	3 6	3 5	3 6	200	0.06
ear, 10-Day		(ac-ft)		0.094759	0.001452	-	• 1	•	•	0.00000	• •	• •	•
100-Year,	Weighted E			1 710	╬╌	╅	670	670	270	670	2/2	670	670
	Flow	SES		0.54	000	000	800		200	200	200	200	0.00
2-Year, 6-Hr	Volume	(ac-ft)		0.019	0000	0.000	000	200	2000		0000	0000	0.000
2-1	Weighted E			0.578	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
	Flow	cfs		0.97	0.02	0.01	0.01	0.01	0 0	0.01	0.01	0.01	0.02
10-Year, 6-Hr	Volume	(ac-ft)		0.034	0.000	0.000	0000	0000	0000	0000	0000	0.000	0.001
10	Weighted E			1.036	0.220	0.220	0.220	0.220	0 220	0.220	0.220	0.220	0.220
•	Flow	cfs		1.54	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	90.0
100-Year, 6-Hr	Volume	(ac-ft)		0.056	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002
100	Weighted E			1.710	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670
	tment D	(acres)	•	0.32	0.00	0.00	0.00	00.0	00.0	00.0	0.00	0.00	0.00
	Treat	%		80%	%0	%	%0	%	%	%	%	%0	%
	nt C	(acres)		0	0	0	0	0	0	0	0	0	0
	Treatment C	%	_	%0	%0	%0	%0	%6	%0	%	%0	%0	%0
	Treatment B	(acres)		0.08	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03
	Treat	%	-	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	nent A	(acres)		0	0	0	0	0		0	0	_	0
	Treatm	%		%0	%0	%0	%0	%0	% 0	%0	%0	%0	%0
	Area	(acres)		0.39	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03
	Area	(st)		17,163	1,133	969	622	598	624	969	623	744	1,211
	Basin			1	2	3	4	5	9		8	6	10

POND SUMMARY

-	BASIN 2	BASINS 3-8	BASIN 9	BASIN 10
Area of Pond Top (SF)	306.85	216.60	265.96	437.51
Area of Pond Bottom (SF)	118.47	68.33	97.70	182.25
Depth of Pond (FT)	0.33	0.25	0.25	0.25
Volume (CF)	70.18	35.62	45.46	77.47
Volume (AC-FT)	0.001611	0.000818	0.001044	0.001778
		, , <u>, , , , , , , , , , , , , , , , , </u>		
Volume Required (CF)	63.25	34.85	41.56	67.61
Volume Required (AC-FT)	0.001452	0.000800	0.000954	0.001552
Volume Provided (CF)	70.18	35.62	45.46	77.47
Volume Provided (AC-FT)	0.001611	0.000818	0.001044	0.001778

VOLUME OF POND

V=(At + Ab)/2 * D

At = Area of Top

Ab= Area of Bottom

D = Depth

DOWNSTREAM ANALYSIS

The Western Estates Subdivision is an infill project located adjacent to a developed residential area. The 1.9 acre site represents approximately 9% of a 20.4 acre basin that drains to the West Bluff Outfall System (the Outfall). Developed runoff from the project site will discharge into Alamagordo Drive. Alamagordo Drive conveys developed runoff from the local residential properties, together with runoff from the project site to the West bluff Outfall. Developed runoff enters the Outfall from a paved public channel (see pages 5 & 6) and 24 inch storm drain. The storm drain makes a direct connection to the Outfall system as it parallels I-40, just west of the Rio Grande River. The Outfall consists of an underground box conduit with a concrete channel located on the surface which conveys surface flow from the I-40 right-of-way.

As shown by the street capacity calculations, under existing conditions Alamagordo carries 45.5 cfs which results in a street depth of 0.68 feet. The proposed development will increase the flowrate to 50.4 cfs with a street depth of 0.71 feet. Development of this property results in a 4% increase in street depth. Street flows are anticipated to exceed curb height by 0.04 feet, but will remain within the public right-of-way. The street slope of 0.2% results in a velocity of 2.5 fps. The development of the project site will increase the flow rate approximately 4.9 cfs, or 7% over existing conditions.

Flow depths in the outfall channel are 0.98 feet under existing conditions and 1.02 under developed conditions. The existing channel cross-section provides a 6-inch channel invert and 6 inch concrete curbs, for a total channel depth of 1.0 foot. Sufficient horizontal and vertical depths are present outside the channel edges to convey flows which over top the channel curbs. The inlet to the Outfall system consists of a 24 inch RCP storm drain which makes direct connection to the underground conduit. As shown by the attached nomograph (see page 8), the 24 inch storm drain has a capacity of approximately 22 cfs, leaving the remaining runoff (48.5 cfs) to exit over the headwall and enter the Outfall channel along I-40. This condition is present under existing conditions.

Portions of the downstream improvements are to be reconstructed with this project in order to improve downstream capacity. Meetings with City of Albuquerque Hydrology staff have resulted in a policy for this project where certain improvements will be provided with the construction of Western Estates, with the remaining improvements to be provided by future developments. The following schedule is proposed which will provide reconstruction of the downstream channel:

Western Estates Subdivision will provide the Following:

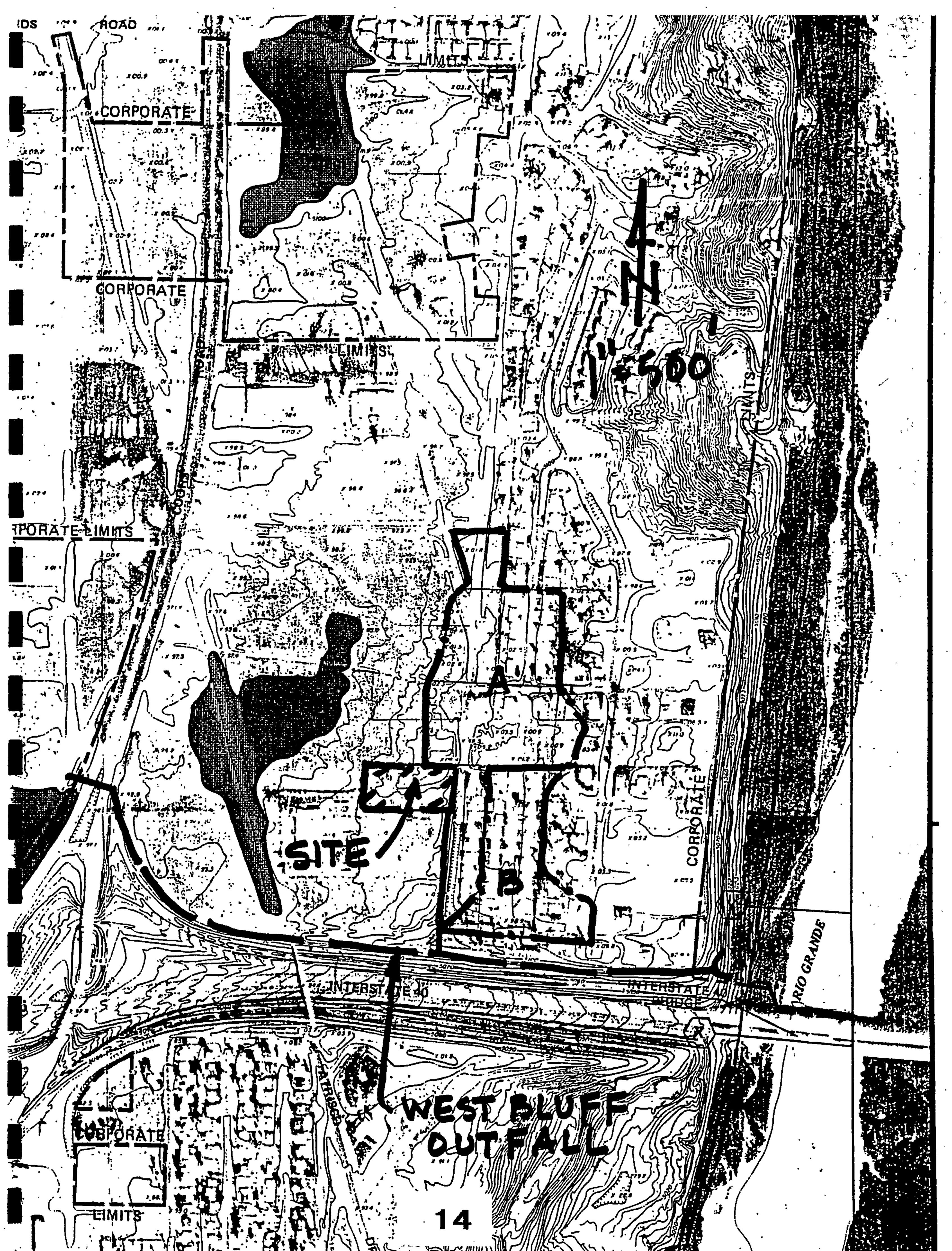
 Reconstruct the channel inlet at the intersection of Alamagordo and Bridges to improve channel inlet hydraulics and provide capacity for predicted developed flows. 2. Reconstruct the inlet to the West Bluff Outfall at the channel terminus to provide capacity for predicted developed flows.

Future developments will provide the following:

1. Reconstruct the existing channel section between the reconstructed channel inlet and the channel outfall to provide additional sidewall height, per DPM criteria.

Western Estates Subdivision will provide downstream improvements as outlined above. Complete details and calculations are provided to demonstrate system capacities.

	; \	1	HYDROL	OGY - H	YMO			
Precipital	tion Zone	1				P360 = 2	.20 inche	es
BASIN	AREA	Aa	Ab	Ac	Ad	E	Q100	VOL100
-	acres	acres	acres	acres	acres	inches	cfs	af
EXISTING	CONDITIO	N:				,		
SITE	1.93	1.93	`			0.44	2.5	0.0708
A	12.60	0.00	3.15	3.15	6.30	1.40	43.0	1.4700
В	5.90	0.00	1.48	1.48	2.94	1.40	20.1	0.6883
DEVELOP	ED CONDI	TION:						
SITE	1.93	- 0.00	0.29	0.24	1.40	1.65	7.4	0.2654
<u>A</u>	12.60	0.00	3.15	3.15	6.30	1.40	43.0	1.4700
В	5.90	0.00	1.48	1.48	2.94	1.40	20.1	0.6883
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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 2, 2001

Ron Bohannan, PE Tierra West, LLC 8509 Jefferson NE Albuquerque, NM 87113

Re: West Bluff Townhomes, Revised Grading Plan Engineer's Stamp dated 5-26-01 (H11/D49A)

Dear Mr. Bohannan,

Based upon the information provided in your submittal dated 6-8-01, the above referenced Plan is approved for Final Plat action by the DRB.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE

Sr. Engineer, Hydrology

C: file

DRAINAGE INFORMATION SHEET

H-11/049A

PROJEC	T TITLE:	West Bluff Townho	mes		ZONE AT	LAS/DRNG	. FILE #:	H-11 / D49 A	
DRB #:	1001004		<u> </u>	WORK (ORDER #:				
LEGAL D	ESCRIPTI	ON: Lots 1 thr	ough 9 of the W	est Bluff	Center Sub	division			
CITY AD	DRESS:	Alamogordo Dr.	between Ouray	Rd. and I	an Ave.				
ENGINE	ERING FIR	M: TIERRA WI	EST, LLC	<u>C</u>	CONTACT:		Ronald R. Bo	phannan or Sara Lavy	
ADD	RESS:	8509 Jefferson NE, Alb	ouquerque NM 8711.	3	PHON	IE:	(505) 858-	-3100	
OWNER:		West Bluff Cente	r LLC	, <u>C</u>	CONTACT:		Paul Silve	erman	
, ADD	RESS:	4408 Canyon Court NE			PHON	IE:	(505) 294-	-8625	
ARCHITE	ECT:	·	*	<u> </u>	CONTACT:				
ADD	RESS:		·	·	PHON	lE:			·
SURVEY	OR:	Precision Survey	' S	C	CONTACT:		Larry Med	drano	
ADD	RESS:	2929 Coors Blvd NW S	Suite 309		PHON	1 E:	(505)839-	<i>0569</i>	
CONTRA	CTOR:			<u>C</u>	ONTACT:		, <u> </u>		<u> </u>
ADD	RESS:				PHON	1E:			
TYPE OF	SUBMITT	AL:		•	CHECK TY		PROVAL S		
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	_	EPTUAL GRADING	& DRAINAGE	PLAN	· · · · · · · · · · · · · · · · · · ·			SUB'D. APPROVAL	
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PRE-DES	SIGN MEET	TING:			X	GRADING	PERMIT	APPROVAL	
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	DA	TE SUBMITTED:		06/07/01		OTHER		宣(C) [写[] JUN 0 8 2001	
			· · · · · · · · · · · · · · · · · · ·	<u>- · · · · · · · · · · · · · · · · · · ·</u>			I FIZA	COCY SELL	

BY: Jonathan Niski

8509 Jefferson NE Albuquerque, NM 87113 (505) 858-3100 fax (505) 858-1118 e-mail: twdms@aol.com 1-800-245-3102

June 6, 2001

Bradley L. Bingham, PE City of Albuquerque Sr. Engineer, Hydrology P. O. Box 1293 Albuquerque, NM 87103 AIIDYAA

RE: Re-submittal of West Bluff Town Homes Grading Plan

Dear Bradley:

Attached you will find a new Grading and Drainage Plan for the West Bluff Townhomes. You approved the drainage report on April 4, 2001 with the engineer's stamp date of 3-12-01. We request approval for the drainage of this site with the new Grading and Drainage Plan described below.

We added a CMU block wall around the site and wall details that were not originally shown on the Grading and Drainage Plan. This addition does not affect the site's drainage and the drainage report was not changed. Please file this Grading and Drainage plan with that report so the latest drawing is on file.

Should you have any questions regarding this matter, please do not hesitate to contact me.

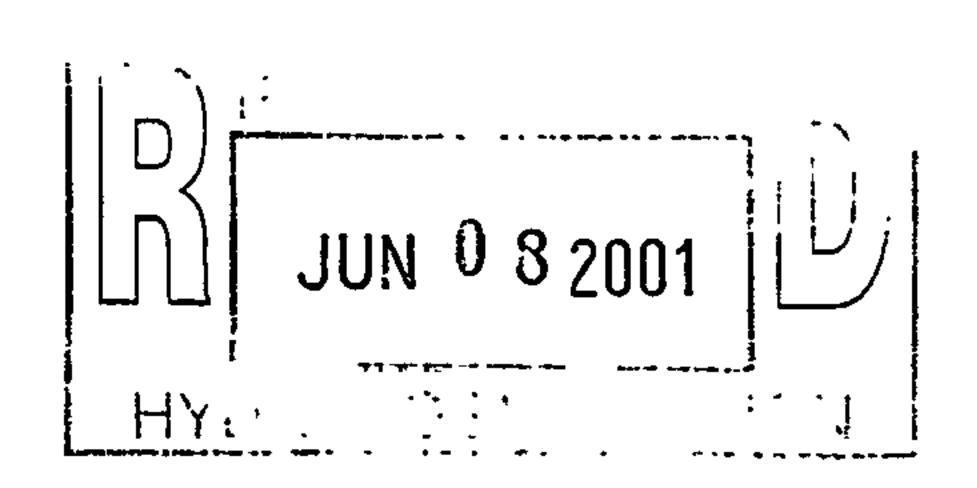
Sincerely,

Ronald R. Bohannan, P.E.

Enclosure

cc: Paul Silverman

JN: 200087 RRB/jdn



200087:20087Brad060401.wpd



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 4, 2001

Ronald R. Bohannan, P.E. Tierra West, LLC 8509 Jefferson NE Albuquerque, NM 87113

RE: WEST BLUFF TOWNHOUSES (H11-D49A). Resubmittal OF GRADING AND DRAINAGE PLAN FOR PRELIMINARY PLAT AND FINAL PLAT, AND FOR GRADING PERMIT APPROVALS. ENGINEER'S STAMP DATED APRIL 11, 2001. ORIGINAL STAMPED MARCH 7, 2001.

Dear Mr.Bohannan:

Based on the information provided on your April 18, 2001 resubmittal, the above referenced project is approved for Preliminary and Final Plats and for Grading Permit.

When submitting for Building Permit, please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E

Hydrology

c: Terri Martin

DRAINAGE INFORMATION SHEET

PROJECT			iff Townhomes		ZONE AT	LAS/DRN	G. FILE #:	H-11 / D49 A	,	
-	1001004 / 1001005	-	EPC #:	WOR	K ORDER #:	1			•	
LEGAL DE	SCRIPTIO	ON:	Lots 1 through	h 9 of the West BI	uff Center Sul	bdivision			, ,	ı
CITY ADDR	RESS:	Alamog	gordo Dr. betw	veen Ouray Rd. ar	d lan Ave.	_		•		-
ENGINEER	ING FIRM	Vi :	TIERRA WEST, I	LLC	CONTACT:		Ronald R. Bol	hannan or Sara Lavy		
ADDR	ESS:	8509 Jeff	erson NE, Albuque.	rque NM 87113	PHO	NE:	(505) 858-	3100		
OWNER:	• .	West B	luff Center LL	C	CONTACT:		Paul Silve	rman	•	. .
ADDR	ESS:	4408 Can	yon Court NE	•	PHO	NE:	(505) 294-8	8625	-	,
ARCHITEC	T :		.*	,	CONTACT:		,	•	-	
ADDR	ESS:			•	PHO	NE:	•	,		
SURVEYOR	₹:	Precisi	on Surveys	•	CONTACT:		Larry Med	rano	> -	
ADDR	ESS:	2929 Coo	rs Blvd NW Suite 3	309	PHO	NE:	(505)839-0	569	.* *	
CONTRAC	TOR:		,		CONTACT:			-	*	
ADDR	ESS:				PHO	NE:		-	\ ^	,
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X	DRAINA	AGE RE	PORT			SKETCH	H PLAN APP	PROVAL		
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•		I						ì -		

DV: tomothem Alimbi

04/11/01

BY: Jonathan Niski

DATE SUBMITTED:

8509 Jefferson NE Albuquerque, NM 87113 (505) 858-3100 fax (505) 858-1118

e-mail: twdms@aol.com 1-800-245-3102

April 17, 2001

Bradley L. Bingham, PE City of Albuquerque Sr. Engineer, Hydrology P. O. Box 1293 Albuquerque, NM 87103

RE: Re-submittal of West Bluff Town Homes Drainage Report

H11/D49A

Dear Bradley:

I have addressed the comments you made on the West Bluff Town Homes Subdivision as follows:

- 1. Backyard ponds are allowable but you cannot get credit for them in the total amount that will drain to the street. It is possible that these ponds could get filled in the future. Therefore, all 10 developed basins must be added together to discuss the capacity of Alamogordo.

 A sentence was added in the On-Site Drainage Management Plan section stating that if the ponds become filled with debris the resulting 0.32 cfs will free discharge into Alamogordo Drive and was restated in the Summary on page six.
- 2. Please describe where the system your project drains to and what capacity is available. We added a note in the Existing Drainage Conditions on page two stating that the flows drain to a channel at Alamogordo Drive and Bridges Avenue. The channel was designed for 70.50 cfs and the analysis included this site in the calculations. The site has capcity to serve the lots and we have included this statement on page eleven.

Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

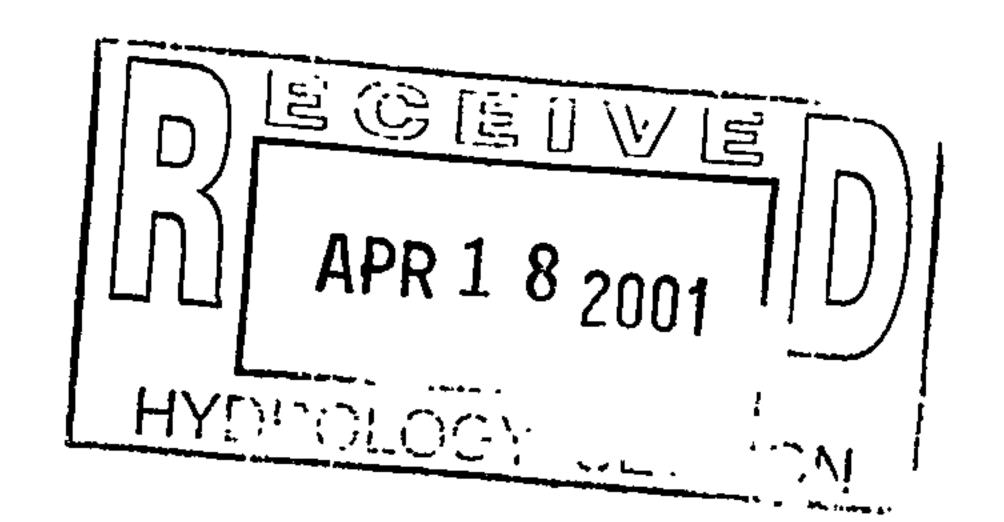
Ronald R. Bohannan, P.E.

Enclosures

Cc: Paul Silverman

JN: 200087 RRB/jdn

200087brad.wpd



DRAINAGE REPORT

for

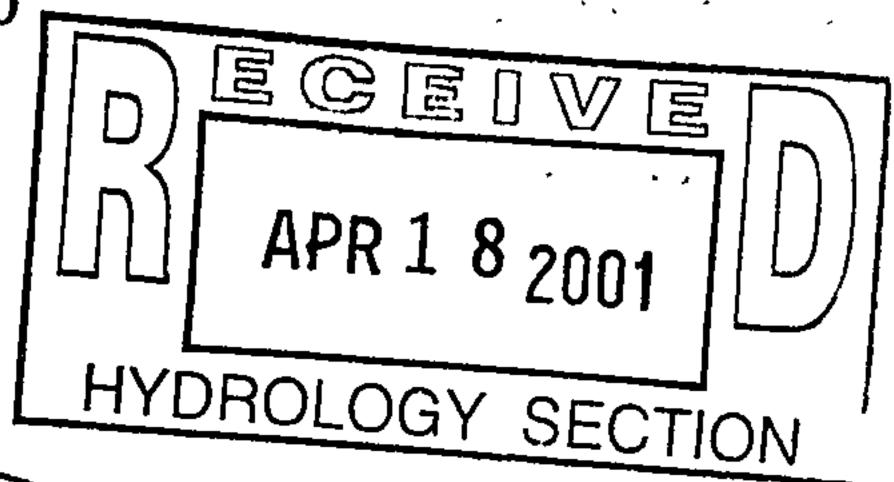
West Bluff Town Homes

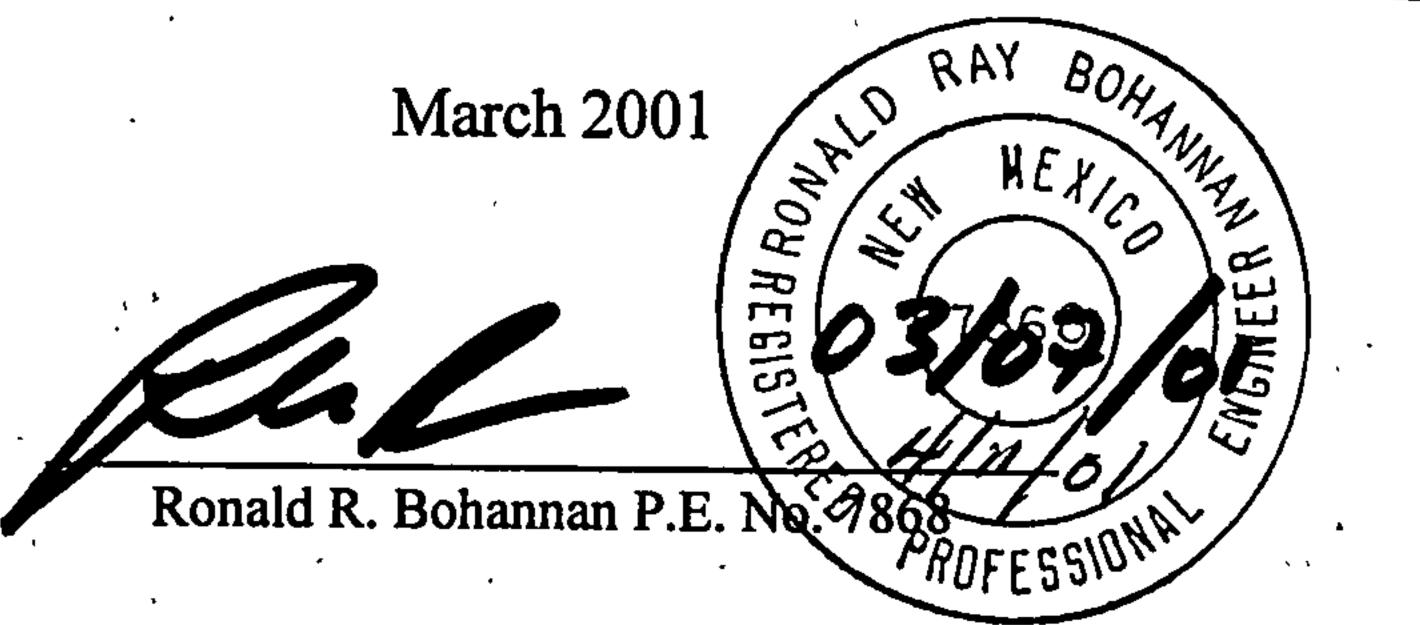
Prepared by

Tierra West, LLC 8509 Jefferson NE Albuquerque, New Mexico 87113

Prepared for

West Bluff Center, LLC 4408 Canyon Court NE Albuquerque, New Mexico 87111-3010

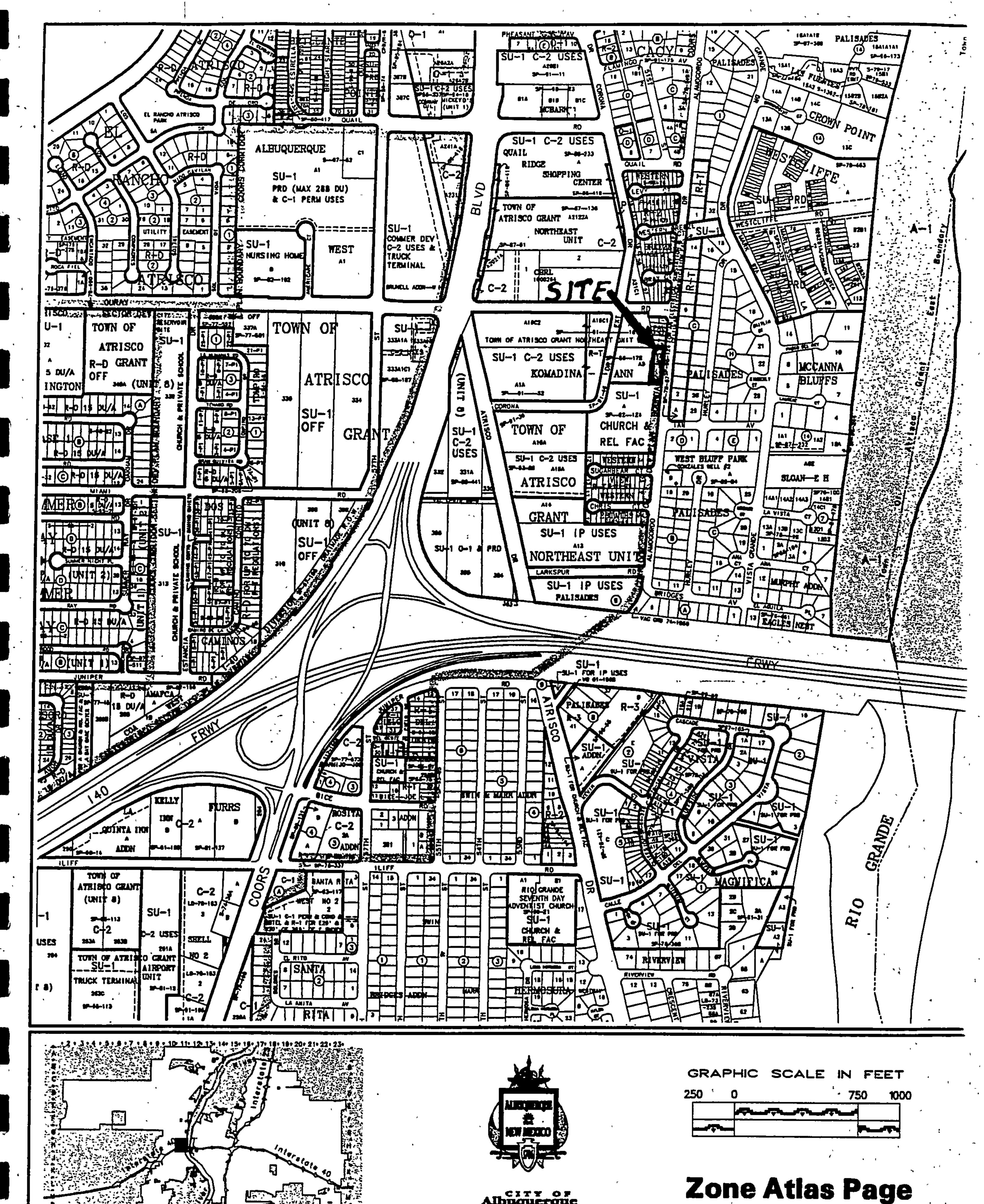




I certify that this report was prepared under my supervision, and I am a registered professional engineer in the state of New Mexico in good standing.

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Albuquerque

becarque Georgette Informetten System

PLANNING DEPARTMENT

C Copyright 2000

Map Amended through July 28, 2000

Location

West Bluff Town Homes is a proposed nine unit town home subdivision. It is located on Alamogordo Drive NW between Ouray Road and Ian Avenue. The site is shown on the attached Zone Atlas Map H-11 and contains approximately 0.5354 acres. The legal description of the property is Lots 1 through 9 of the West Bluff Center Subdivision. The purpose of this report is to provide the drainage analysis and management plan for the subdivision.

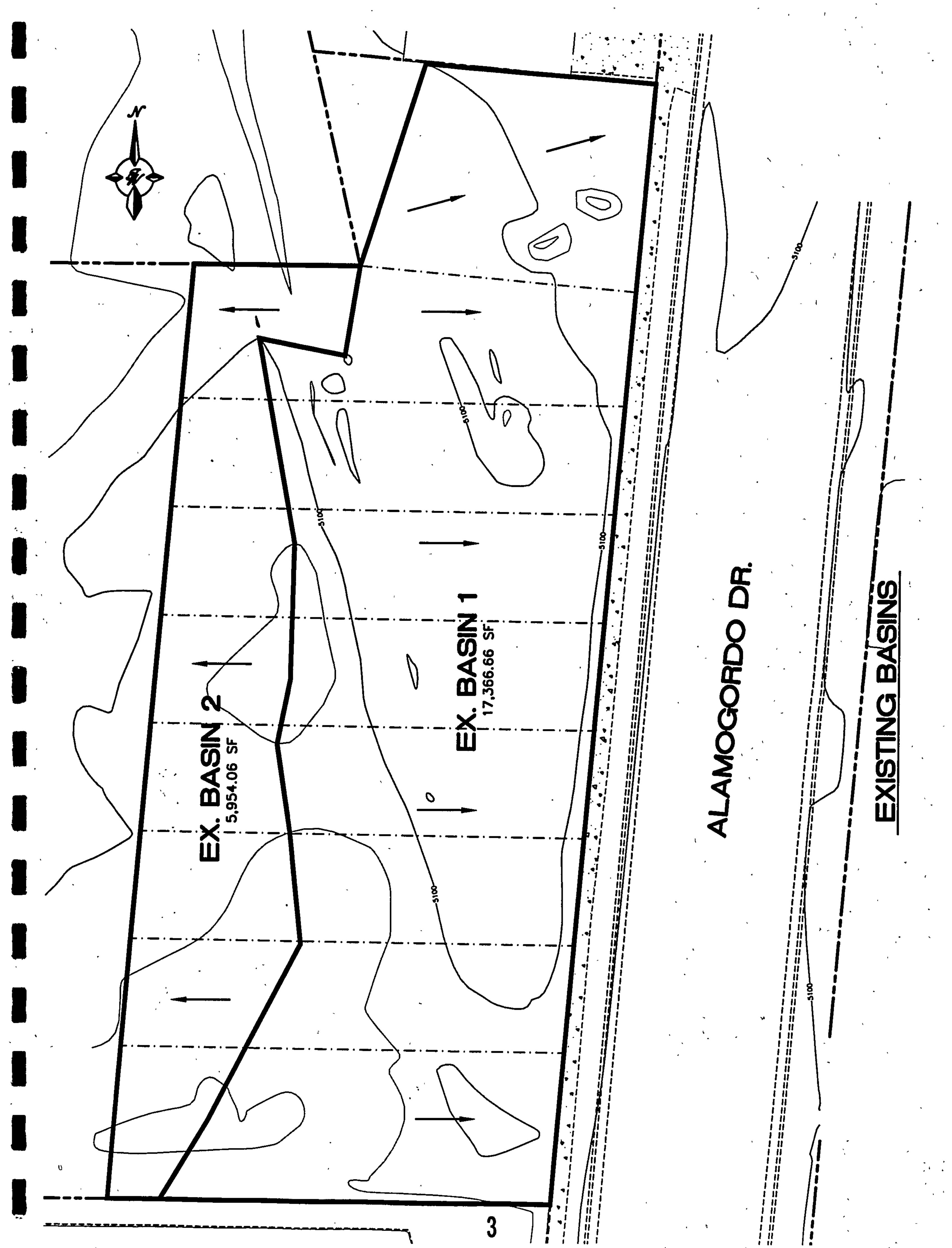
Existing Drainage Conditions

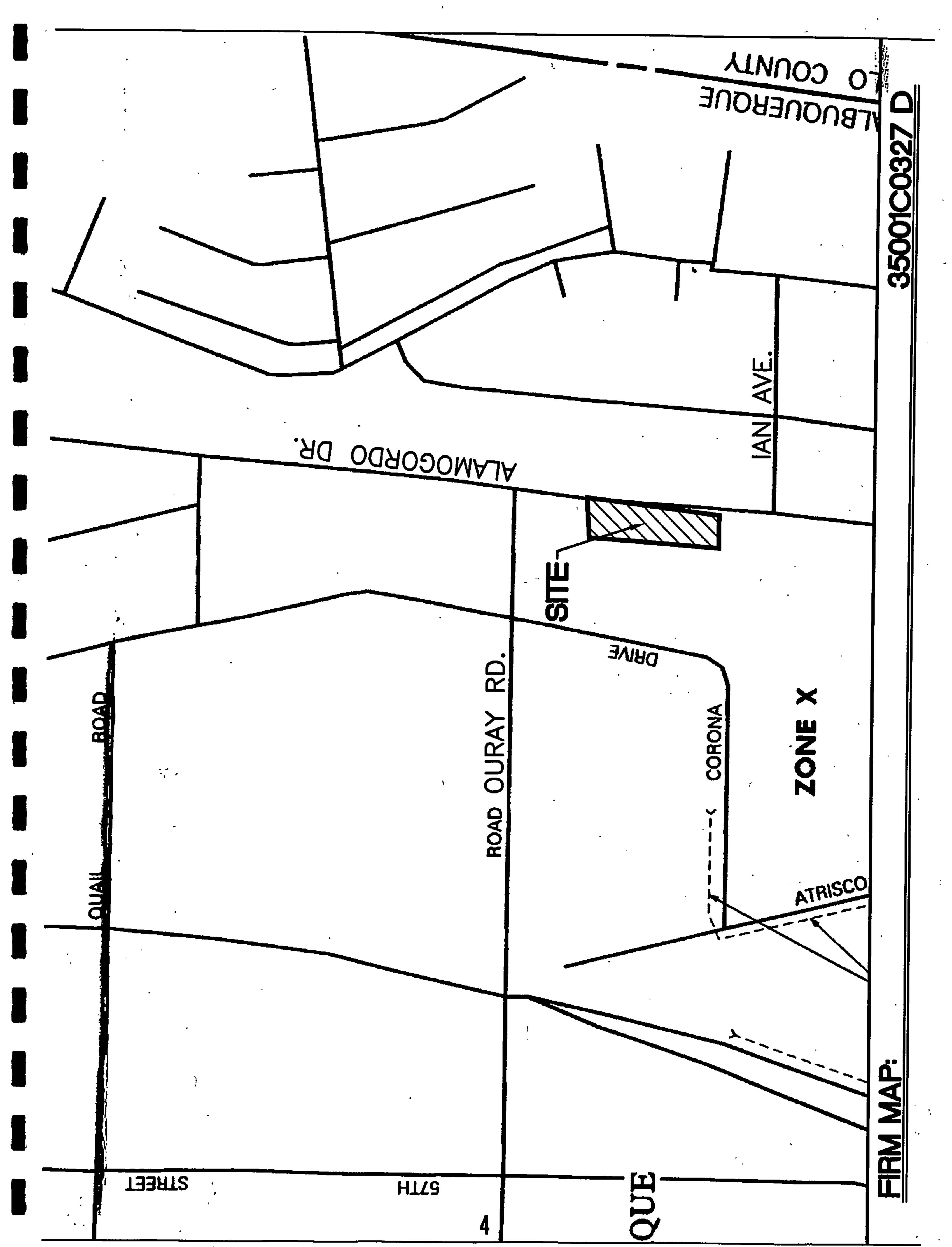
The site is currently undeveloped. As shown on the attached exhibit, there are two existing basins on the site. Basin 1 sheet flows east with an undeveloped discharge rate of 0.83 cfs towards Alamogordo Drive. Based on the drainage report filed for the Western Estates Subdivision in H11-D54, see attached appendix, the West Bluff Town Homes site falls within Basin A and has been accounted for in the downstream analysis. The flows from Alamogordo Drive NW drain to an existing channel built under City Project #5509.81 at Bridges Avenue. The channel, with a capacity for 70.50 cfs, then flows into the West Bluff Outfall. Basin 2 sheet flows west with an undeveloped discharge rate of 0.28 cfs to an undeveloped tract of land. There are existing buildings to the north and south of the site but no off-site flows enter our site from either location.

FIRM Map and Soil Conditions

The site is located on FIRM Map 35001C0327 D as shown on the attached excerpt. The map shows that the site does not lie in a flood zone.

The site contains one soil from the Soil Conservation Service Soil Survey of Bernalillo County. It is a Bluepoint loamy fine sand which has slow runoff and a severe hazard of soil blowing. The surface layer of the soil ranges from sand to clay.





On-Site Drainage Management Plan

Most of the site will drain to Alamogordo Drive with each lot containing a rear yard pond. The roofs for each unit will drain to the front of the pad, which is included in Basin 1. The rear yard ponds are required due to the flatness of the site and the design of the town homes. This solution conforms to an approved Grading and Drainage Report filed by Brasher & Lorenz, Inc. for Pal Estates (H11-D49) on June 7, 1995, which allows for free discharge from the site. Based on the drainage report for the Western Estates Subdivision in H11-D54, Alamogordo Drive NW has the capacity for the free discharge from the site.

As shown on the attached Developed Basins Exhibit, there are 10 proposed basins on the site, which account for each of the rear yard ponds. The developed flow from Basin 1, which includes the front yard of each lot and the roofs of the town homes, will free discharge into Alamorgordo Drive at a rate of 1.54 cfs. Basins 2 through 10 are located in the rear of each lot and include only the flow that falls in the rear yard. All rear yard ponds were designed for the 10day, 100-year volume. As mentioned previously, all roof drainage will be designed to flow to the front of the building by either a pitched roof or by rain gutters. We have included a Pond Summary Table at the end of the report that includes the following information: Basin 2 has a required 10-day, 100-year volume requirement of 0.001452 ac-ft. The pond for this basin has a capacity for 0.001611 ac-ft. Basins 3 through 8 have a required 10-day, 100-year volume requirement of 0.000800 ac-ft. each. The ponds for these basins have a capacity for 0.00818 ac-ft. each. Basin 9 has a required 10-day, 100-year volume requirement of 0.000954 ac-ft. The pond for this basin has a capacity for 0.001044 ac-ft. Basin 10 has a required 10-day, 100year volume requirement of 0.001552 ac-ft. The pond for this basin had a capacity for 0.001778 ac-ft. If at some time in the future the ponds become filled with debris, the resulting 0.32 cfs will free discharge into Alamogordo Drive NW.

In the event of an emergency or a storm greater than a 100-year event Basins 2 through 10 will sheet flow into to Basin 1 and these flows will continue to free discharge into Alamogordo Drive.

Summary

Basin 1 will discharge a total of 1.54 cfs into Alamogordo Drive while Basins 2 through 10 will have the flows contained in rear yard ponds. If needed, Basins 2 through 10 will overflow into Basin 1 by sheet flowing through the side yards. The flows, 1.86 cfs total, will continue to free discharge into Alamogordo Drive.

ALAMOGORDO DE

DEVEL OPED BASINS

Weighted E Method

Undeveloped On-Site Basins

Basin	A-22-2	A	T 1			<u> </u>		· · · · · · · · · · · · · · · · · · ·				100-Year	••		10-Year	
Dasiii	Area	Area	reat	ment A	Treatm	ent B	Treatn	nent C	Treat	ment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
	(st)	(acres)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(ac-ft)	(ac-ft)	cfs	(ac-ft)	(ac-ft)	_
1	17,367	0.40	50%	0.20	0%	0.00	50%	0.1993457	0%		0.715	0.024	0.83			cfs
2	5,954	0.14	50%	0.07	0%	0.00		0.0683425	0%					0.260	0.009	0.34
Total	23,321	0.54				0.00	0070	0.0000420	0.70	0.00	0.715	0.008	0.28	0.260	0.003	0.12
10(0)	20,021	0.04								. <u> </u>	·	0.032	1.11		0.012	0.46

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Excess Precipitation, E (inches)								
Zone 1	100-Year	10 - Year						
E.	0.44	0.08						
Eρ	0.67	0.22						
Ec	0.99	0.44						
Ed	1.97	1.24						

Peak Discharge (cfs/acre)						
Zone 1	100-Year	10 - Year				
Q,	1.29	0.24				
Q _b	2.03	0.76				
Qc	2.87	1.49				
Q _d	4.37	2.89				

leighted E Method

Developed On-Site Basins

			Flow	- Je	25		1 5.4	5.	0.05	0 0	3.5	0.03	000	3.5	0.03	000	20.0	0.03	
100-Year, 10-Day			E Volume		71.25		0 094759		7 0.001452	0.000764	50000	0.000797	0 000768	•	0.000800	0.000784	1	0.000/99	
	400		Weighted E				1 710	02.0	0.0/0	0.670		0.670	0.670		0.670	0.670		0.6/0	
			Flow	SE SE			0.54	2	3.5	000		0.00	00 0		0.00	000	2	0.00	
	2-Year, 6-Hr		Volume	(ac-₩)			0.019	500	3	0000	0000	0.000	0.000	200	0.000	0.000	500	33.5	
	2-7		Weighted E				0.578	0.010		0.010	070	0.010	0.010	0 0	210.0	0.010	0 0 0	2	
			¥0.	cfs			0.97	0.02		0.01	0 0	2	0.01	0.04	2	0.01	0.01		
11 0 227	tu-rear, b-Hr		ACIDIO A	(ac-ft)			0.034	0.000	200	0.000	0000	• •	0.000	0000		0.000	0000	, .	
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		Elmu		SIS		1 5.4	5	0.05	0.02	30.0	0.03	8	0.03	0.03	500	20.02	0.03	0 0	
100-Year 6-Hr	110 (120)	Volume		(47-11)	_	0.058	3	0.001	0.001		0.001	500	3	0.001	0.00	33.5	0.001	0.00	
1 65.		Weighted E				1 710	200	0.0/0	0.670		0.6/0	0.670	2 2 3	0.6/0	0.670		0.6/0	0.670	
		ment D	(acres)			0.32	200	3.5	800	8	3.0	000	8	3.0	00.0	2	3	00.00	
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	I reatment A	F	% (8cres)		0%0		0%0	0%		0%0	1%0		0 0.%∩	%0		0%0	%		
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POND SUMMARY

,	BASIN 2	BASINS 3-8	BASIN 9	BASIN 10
	•	,		
Area of Pond Top (SF)	306.85	216.60	265.96	437.51
Area of Pond Bottom (SF)	118.47	68.33	97.70	182.25
Depth of Pond (FT)	0.33	0.25	0.25	0.25
Volume (CF)	70.18	35.62	45.46	77.47
Volume (AC-FT)	-0.001611	0.000818	0.001044	0.001778
Volume Required (CF)	63.25	34.85	41.56	67.61
Volume Required (AC-FT)		l li		0.001552
Volume Provided (CF)	70.18			77.47
Volume Provided (AC-FT)		0.000818	•	0.001778

VOLUME OF POND

V=(At + Ab)/2 * D

At = Area of Top

Ab= Area of Bottom

D = Depth

DOWNSTREAM ANALYSIS

The Western Estates Subdivision is an infill project located adjacent to a developed residential area. The 1.9 acre site represents approximately 9% of a 20.4 acre basin that drains to the West Bluff Outfall System (the Outfall). Developed runoff from the project site will discharge into Alamagordo Drive. Alamagordo Drive conveys developed runoff from the local residential properties, together with runoff from the project site to the West bluff Outfall. Developed runoff enters the Outfall from a paved public channel (see pages 5 & 6) and 24 inch storm drain. The storm drain makes a direct connection to the Outfall system as it parallels I-40, just west of the Rio Grande River. The Outfall consists of an underground box conduit with a concrete channel located on the surface which conveys surface flow from the I-40 right-of-way.

As shown by the street capacity calculations, under existing conditions Alamagordo carries 45.5 cfs which results in a street depth of 0.68 feet. The proposed development will increase the flowrate to 50.4 cfs with a street depth of 0.71 feet. Development of this property results in a 4% increase in street depth. Street flows are anticipated to exceed curb height by 0.04 feet, but will remain within the public right-of-way. The street slope of 0.2% results in a velocity of 2.5 fps. The development of the project site will increase the flow rate approximately 4.9 cfs, or 7% over existing conditions.

Flow depths in the outfall channel are 0.98 feet under existing conditions and 1.02 under developed conditions. The existing channel cross-section provides a 6-inch channel invert and 6 inch concrete curbs, for a total channel depth of 1.0 foot. Sufficient horizontal and vertical depths are present outside the channel edges to convey flows which over top the channel curbs. The inlet to the Outfall system consists of a 24 inch RCP storm drain which makes direct connection to the underground conduit. As shown by the attached nomograph (see page 8), the 24 inch storm drain has a capacity of approximately 22 cfs, leaving the remaining runoff (48.5 cfs) to exit over the headwall and enter the Outfall channel along I-40. This condition is present under existing conditions.

Portions of the downstream improvements are to be reconstructed with this project in order to improve downstream capacity. Meetings with City of Albuquerque Hydrology staff have resulted in a policy for this project where certain improvements will be provided with the construction of Western Estates, with the remaining improvements to be provided by future developments. The following schedule is proposed which will provide reconstruction of the downstream channel:

Western Estates Subdivision will provide the Following:

1. Reconstruct the channel inlet at the intersection of Alamagordo and Bridges to improve channel inlet hydraulics and provide capacity for predicted developed flows.

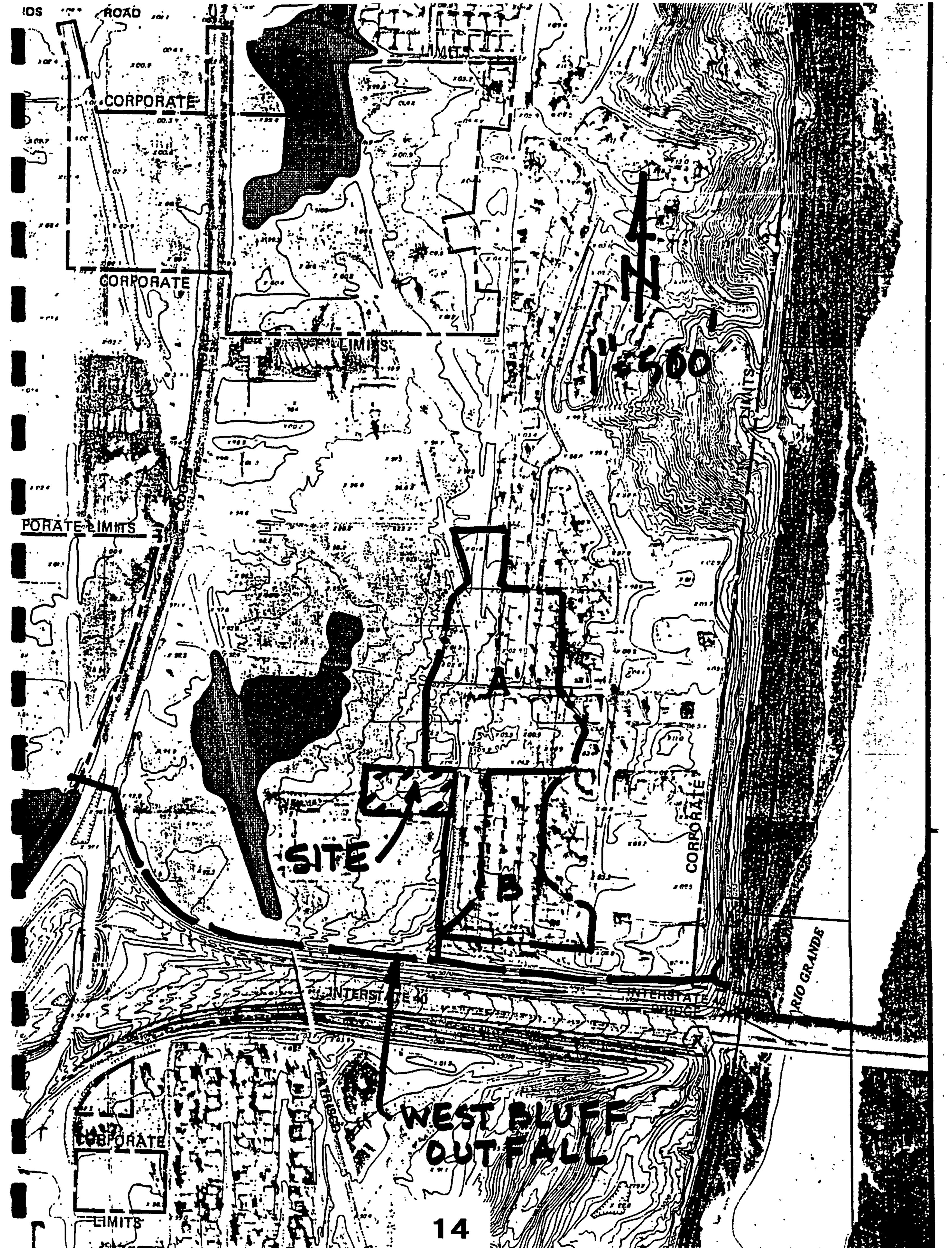
2. Reconstruct the inlet to the West Bluff Outfall at the channel terminus to provide capacity for predicted developed flows.

Future developments will provide the following:

1. Reconstruct the existing channel section between the reconstructed channel inlet and the channel outfall to provide additional sidewall height, per DPM criteria.

Western Estates Subdivision will provide downstream improvements as outlined above. Complete details and calculations are provided to demonstrate system capacities.

•			HYDROL	OGY - H	YMO]		
Precipita	tion Zone				,	P360 = 2	.20 inche	es
BASIN	AREA	Aa	Ab	Ac .	Ad	E	Q100	VOL100
	acres	acres	acres	acres	acres	inches	cfs	af
EXISTING	CONDITIO	N:						
	4 00	4 00						
SITE	1.93	1.93				0.44	2.5	0.0708
A	12.60	0.00	3.15	3.15	6.30	1.40	43.0	1.4700
В	5.90	0.00	1.48	1.48	2.94	1.40	20.1	0.6883
DEVELOP	ED CONDI	TION:			,		•	
SITE	1.93	0.00	0.29	0.24	1.40	1.65	7.4	0.2654
A	12.60	0.00	3.15	3.15	6.30	1.40	43.0	1.4700
		•					70.0	1.7700
В	5.90	0.00	1.48	1.48	2.94	1.40	20.1	0.6883
								,
					, <u> </u>		<u> </u>	
1								
								·





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

April 4, 2001

Ron Bohannan, PE Tierra West, LLC 8509 Jefferson NE Albuquerque, NM 87113

West Bluff Townhomes, Drainage Report Re:

Engineer's Stamp dated 3-7-01 (H11/D49A)

Dear Mr. Bohannan,

Based upon the information provided in your submittal dated 3-12-01, the above referenced site is approved for Preliminary Plat action by the DRB. Prior to Final Plat, please address the following comments.

- Backyard ponds are allowable but you cannot get credit for them in the total. amount that will drain to the street. It is possible that these ponds could get filled in the future. Therefore, all 10 developed basins must be added together to discuss the capacity of Alamogordo.
- Please describe where the system your project drains to and what capacity is available.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradly L. Bingham, PE

Bradley L. Bingham, PE

Sr. Engineer, Hydrology

file

DRAINAGE INFORMATION SHEET

PROJEC	TITLE:	West Bluff Townhor	nes	ZONE	ATLAS/DRN	NG. FILE #: <u>H-11 / D49 A</u>
DRB #:	1001004		WOR	K ORDER #	‡:	
LEGALI	DESCRIPT	ION: Lots 1 thro	ugh 9 of the West Blu	ıff Center S	Subdivision	
CITY AD	DRESS:	Alamogordo Dr. b	etween Ouray Rd. an	d lan Ave.		
ENGINE	ERING FIR	M: TIERRA WES	ST, LLC	CONTAC	T:	Ronald R. Bohannan or Sara Lavy
ADE	DRESS:	8509 Jefferson NE, Albu	querque NM 87113	PH	ONE:	(505) 858-3100
OWNER:	•	West Bluff Center	LLC	CONTACT	Γ:	Paul Silverman
ADE	PRESS:	4408 Canyon Court NE		PH	ONE:	(505) 294-8625
ARCHITE	ECT:			CONTACT	Γ:	
ADD	PRESS:			PH	ONE:	
SURVEY	OR:	Precision Surveys	•	CONTACT	- :	Larry Medrano
· ADD	RESS:	2929 Coors Blvd NW Sui	te 309 .	PH6	ONE:	(505)839-0569
CONTRA	CTOR:			CONTACT	•	
ADD	RESS:		•	PHO	ONE:	**
	•					-
TVDE OF						
ITPEOF	SUBMITT	4L:		CHECK 1	YPE OF AP	PROVAL SOUGHT:
<u> </u>	DRAINA	GE REPORT			SKETCH	PLAN APPROVAL
	DRAINA	GE PLAN		X	PRELIMI	NARY PLAT APPROVAL
· · · ·	CONCE	PTUAL GRADING &	DRAINAGE PLAN	· ————————————————————————————————————	_ \$. DEV. I	PLAN FOR SUB'D. APPROVAL
<u>X</u>	GRADIN	IG PLAN			S. DEV. I	PLAN FOR BLDG. PERMIT APPROVAL
<u></u>	EROSIC	N CONTROL PLAN			SECTOR	PLAN APPROVAL
· · · · · · · · · · · · · · · · · · ·	ENGINE	ER'S CERTIFICATION	ON	<u>X</u>	FINAL PI	LAT APPROVAL
<u> </u>	OTHER		•		FOUNDA	TION PERMIT APPROVAL
	_				BUILDIN	G PERMIT APPROVAL
PRE-DESI	IGN MEETI	NG:			CERTIFIC	CATE OF OCCUPANCY APPROVAL
	YES			<u>X</u>	GRADING	G PERMIT APPROVAL
X	NO				PAVING	PERMIT APPROVAL
	COPY P	ROVIDED			S. A. D. D	RAINAGE REPORT
			•	- <u> </u>	DRAINA	SE REQUIREMENTS
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	DATE	SUBMITTED:	03/08/01		HYD	ROLOGY SECTION

BY: Jonathan Niski

DRAINAGE REPORT

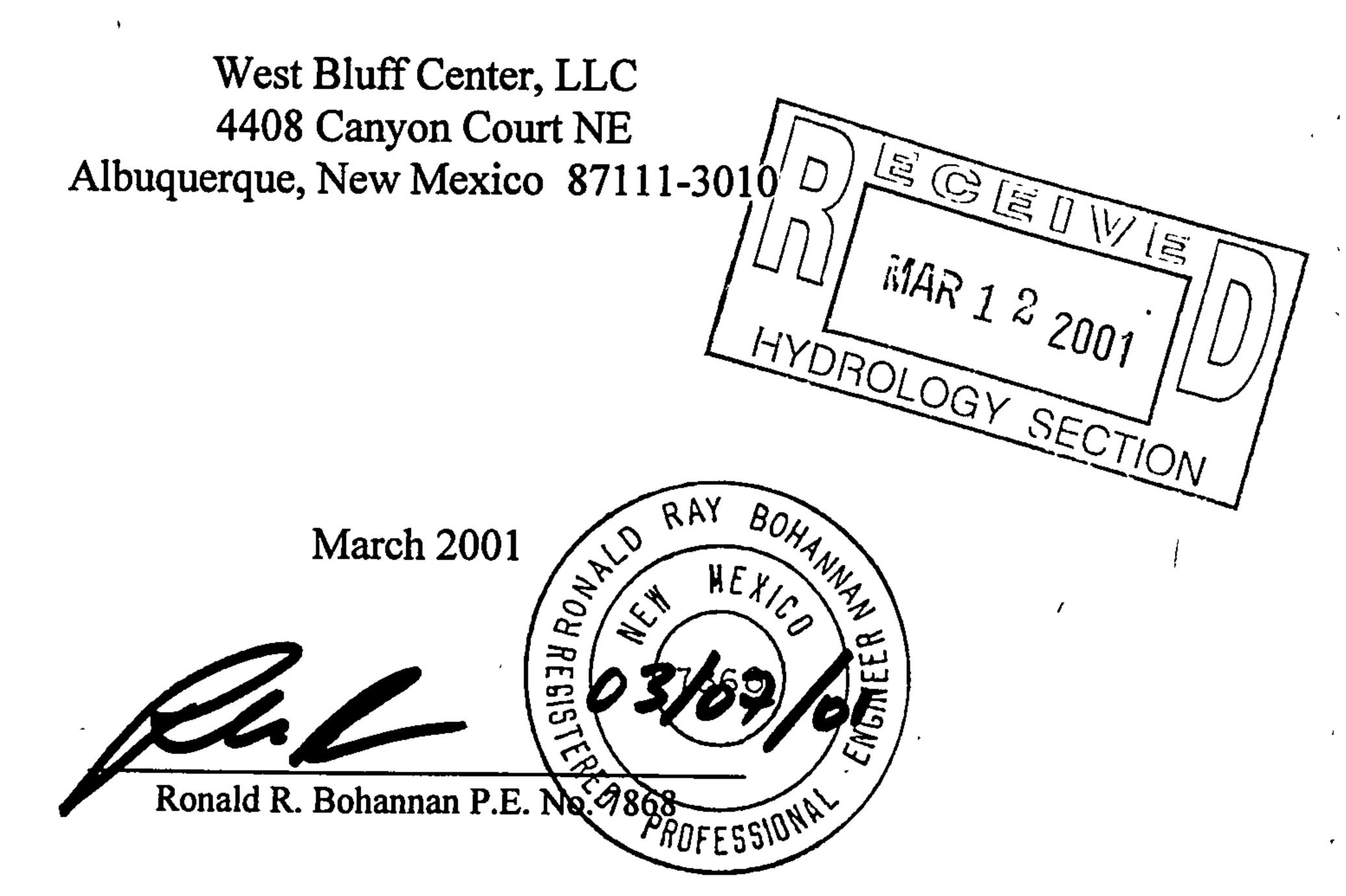
for

West Bluff Town Homes

Prepared by

Tierra West, LLC 8509 Jefferson NE Albuquerque, New Mexico 87113

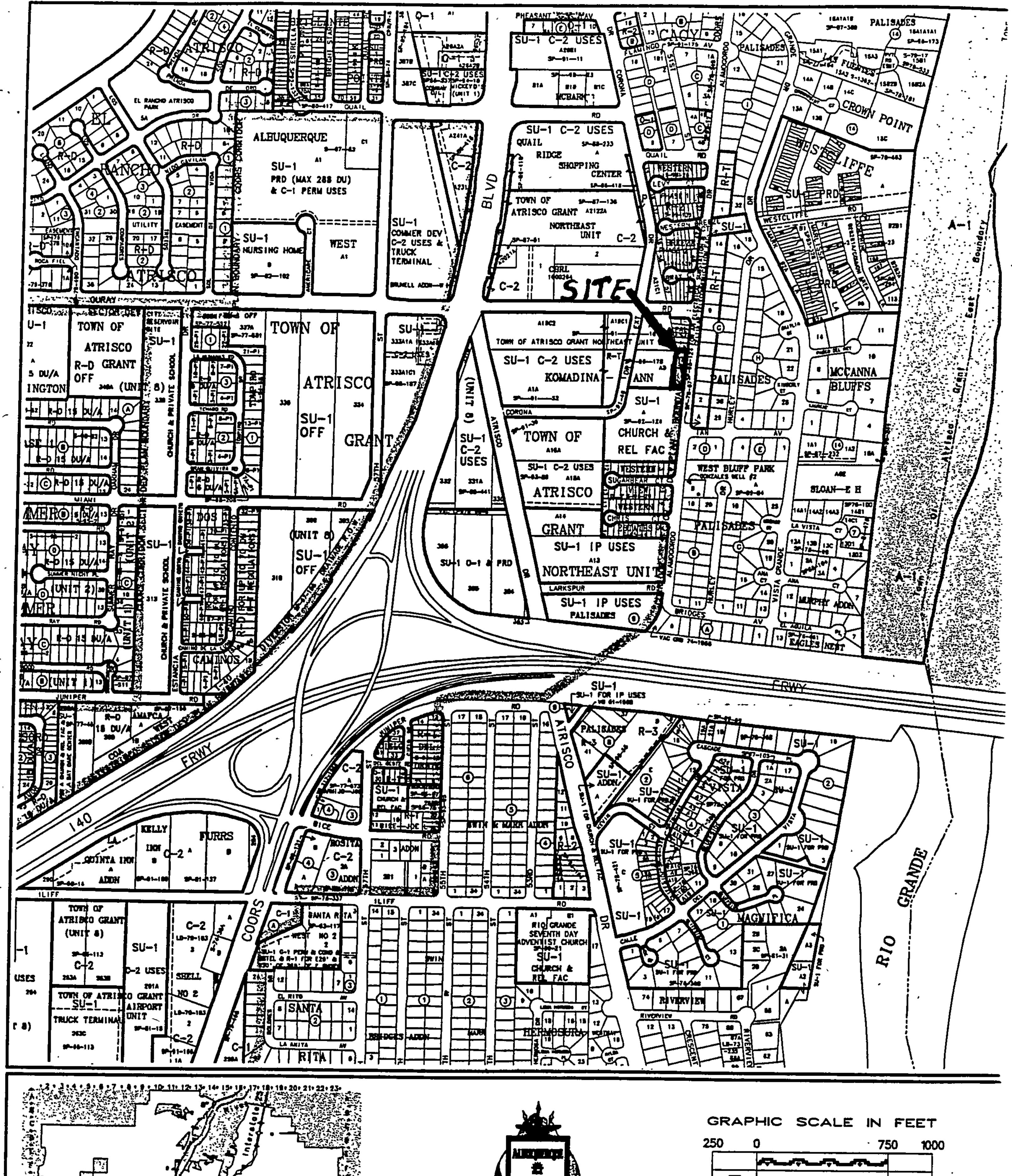
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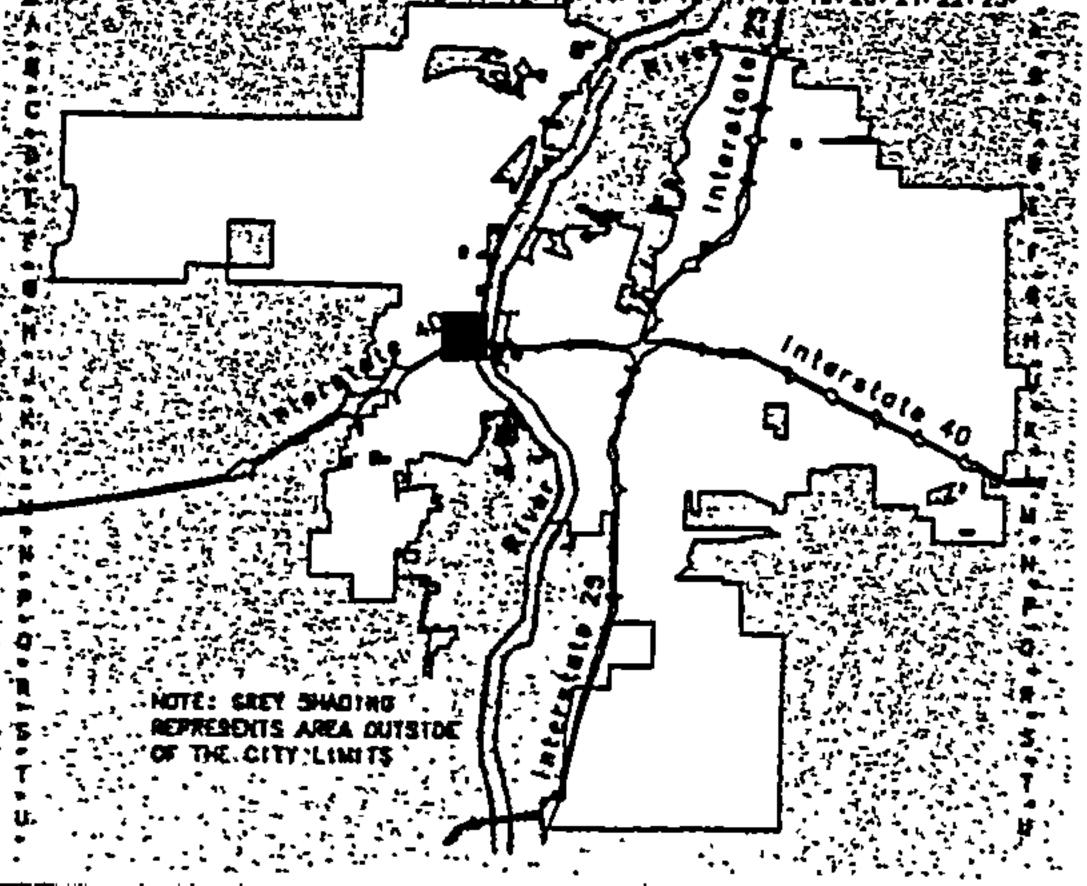


I certify that this report was prepared under my supervision, and I am a registered professional engineer in the state of New Mexico in good standing.

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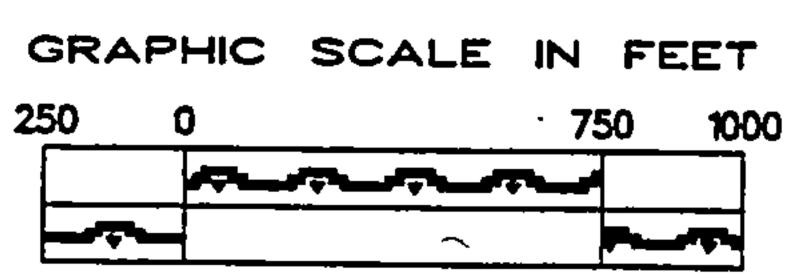




Albuquerque

PLANNING DEPARTMENT

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Zone Atlas Page

H-11-Z

Map Amended through July 28, 2000

Location

West Bluff Town Homes is a proposed nine unit townhome subdivision. It is located on Alamogordo Drive NW between Ouray Road and Ian Avenue. The site is shown on the attached Zone Atlas Map H-11 and contains approximately 0.5354 acres. The legal description of the property is Lots 1 through 9 of the West Bluff Center Subdivision. The purpose of this report is to provide the drainage analysis and management plan for the subdivision.

Existing Drainage Conditions

The site is currently undeveloped. As shown on the attached exhibit, there are two existing basins on the site. Basin 1 sheet flows east with an undeveloped discharge rate of 0.83 cfs towards Alamogordo Drive Basin 2 sheet flows west with an undeveloped discharge rate of 0.28 cfs to an undeveloped tract of land. There are existing buildings to the north and south of the site but no off-site flows enter our site from either location.

FIRM Map and Soil Conditions

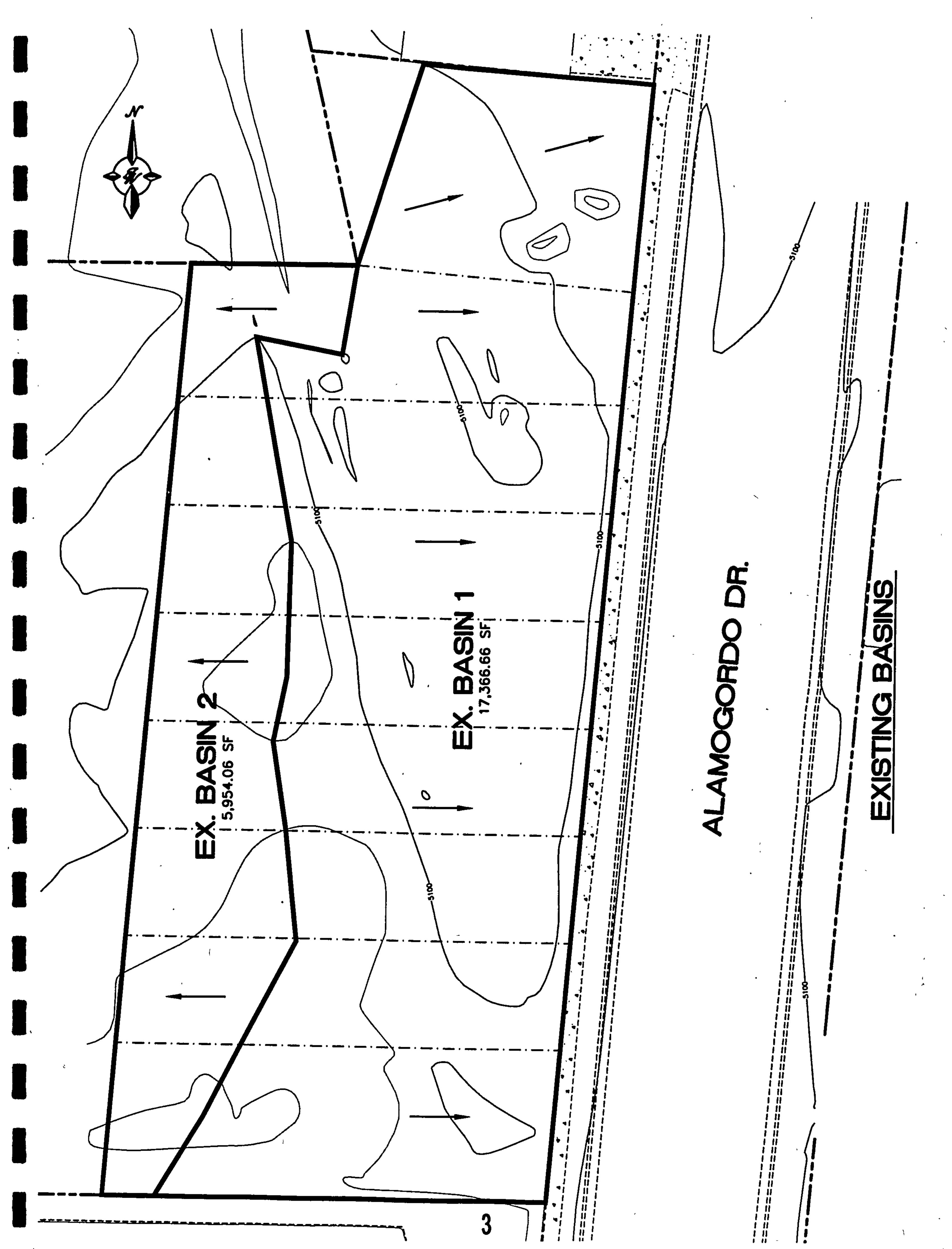
The site is located on FIRM Map 35001C0327 D as shown on the attached excerpt. The map shows that the site does not lie in a flood zone.

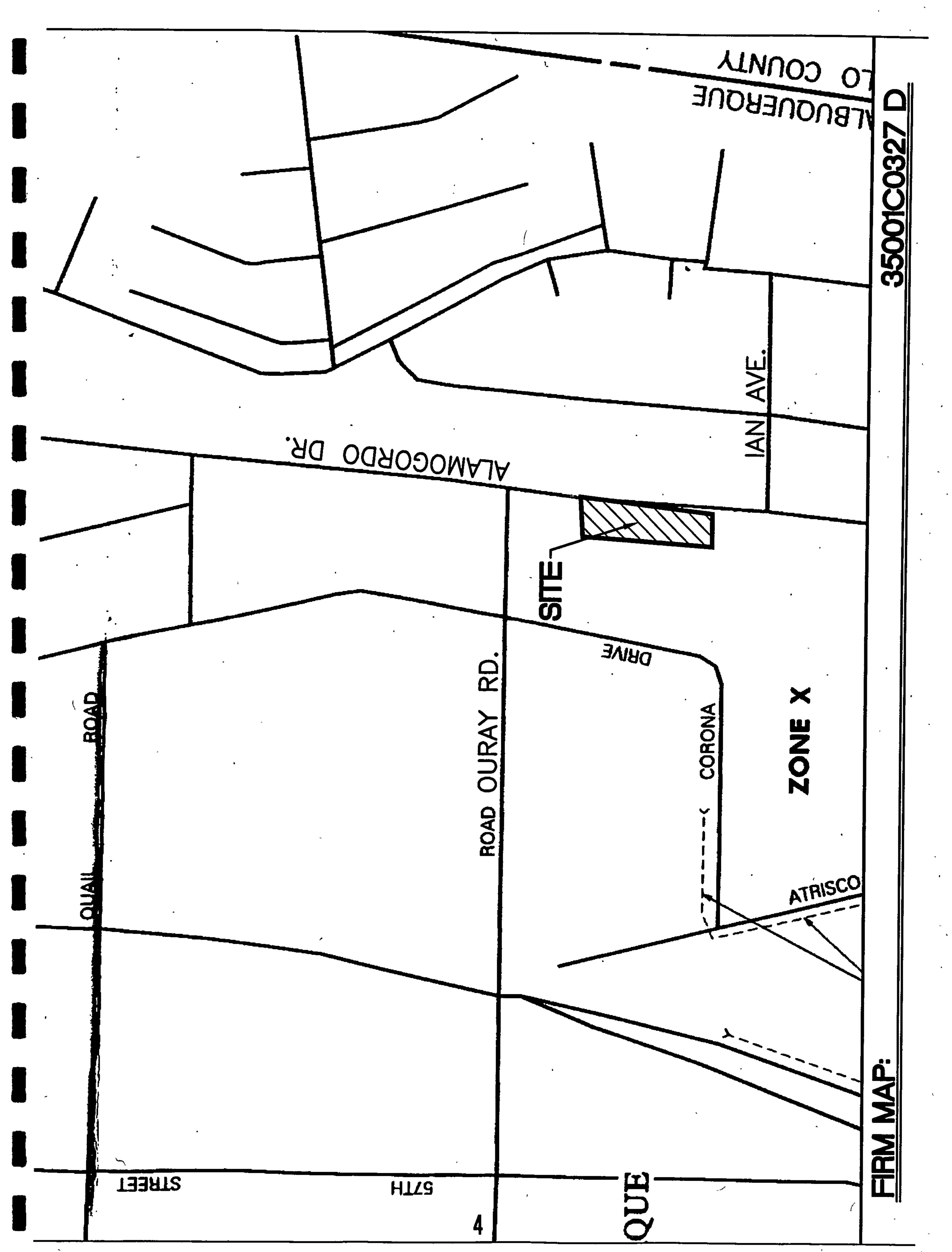
The site contains one soil from the Soil Conservation Service Soil Survey of Bernalillo County. It is a Bluepoint loamy fine sand which has slow runoff and a severe hazard of soil blowing. The surface layer of the soil ranges from sand to clay.

On-Site Drainage Management Plan

Most of the site will drain to Alamogordo Drive with each lot containing a rear yard pond.

The roofs for each unit will drain to the front of the pad, which is included in Basin 1. The rear yard ponds are required due to the flatness of the site and the design of the town homes. This solution conforms to an approved Grading and Drainage Report filed by Brasher & Lorenz, Inc.





for Pal Estates (H11-D49) on June 7, 1995, which allows for free discharge from the site.

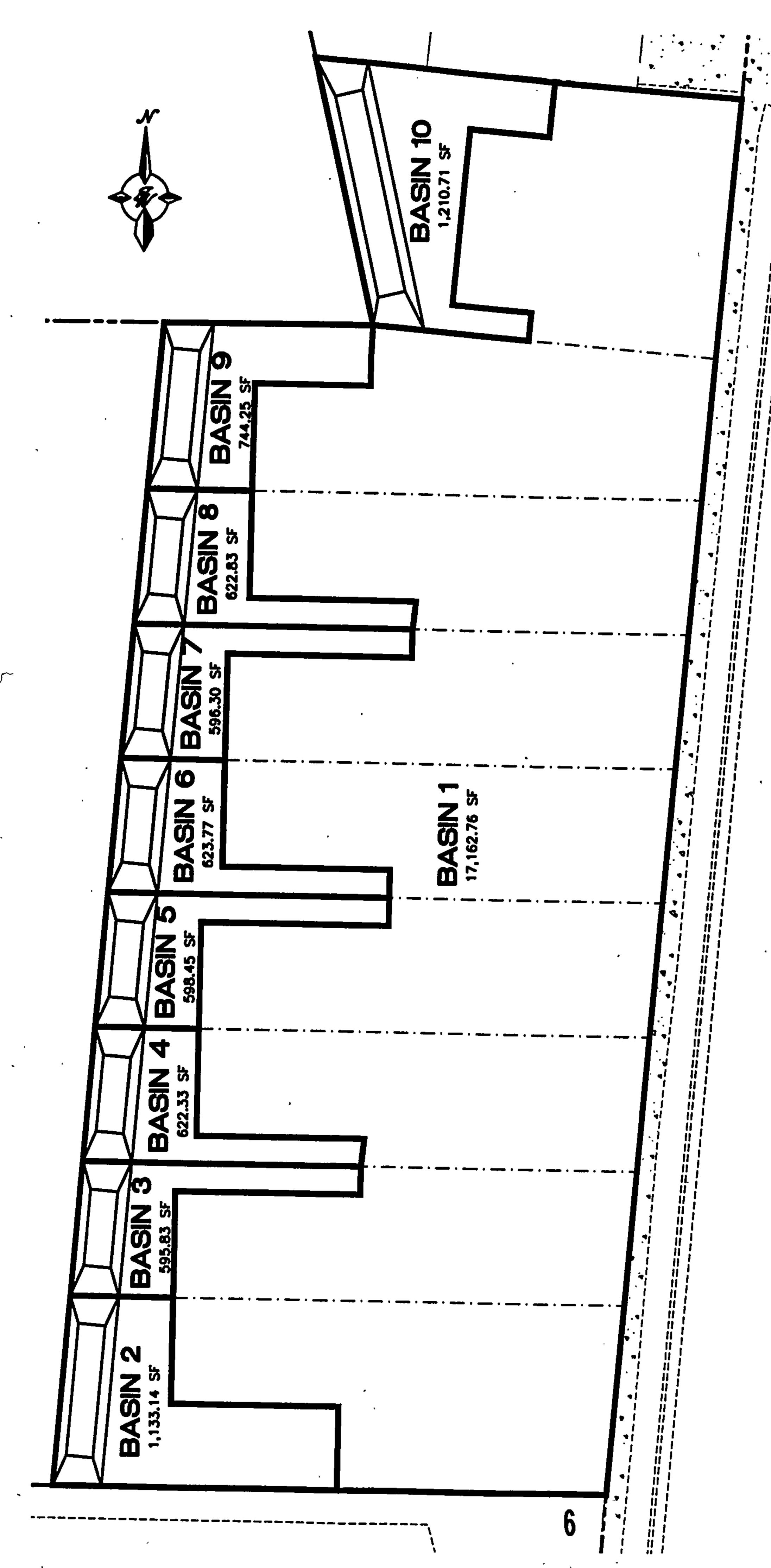
As shown on the attached Developed Basins Exhibit, there are 10 proposed basins on the site, which account for each of the rear yard ponds. The developed flow from Basin 1, which includes the front yard of each lot and the roofs of the town homes, will free discharge into Alamorgordo Drive at a rate of 1.54 cfs. Basins 2 through 10 are located in the rear of each lot and include only the flow that falls in the rear yard. All rear yard ponds were designed for the 10-day, 100-year volume. As mentioned previously, all roof drainage will be designed to flow to the front of the building by either a pitched roof or by rain gutters. We have included a Pond Summary Table at the end of the report that includes the following information: Basin 2 has a required 10-day, 100-year volume requirement of 0.001452 ac-ft. The pond for this basin has a capacity for 0.001611 ac-ft. Basins 3 through 8 have a required 10-day, 100-year volume requirement of 0.000800 ac-ft. each. The ponds for these basins have a capacity for 0.00818 ac-ft. each. Basin 9 has a required 10-day, 100-year volume requirement of 0.000954 ac-ft.

The pond for this basin has a capacity for 0.001044 ac-ft. Basin 10 has a required 10-day, 100-year volume requirement of 0.000778 ac-ft.

In the event of an emergency or a storm greater than a 100-year event Basins 2 through 10 will sheet flow into to Basin 1 and these flows will continue to free discharge into Alamogordo Drive.

Summary

Basin 1 will discharge a total of 1.54 cfs into Alamogordo Drive while Basins 2 through 10 will have the flows contained in rear yard ponds. If needed, Basins 2 through 10 will overflow into Basin 1 by sheet flowing through the side yards. The flows will continue to free discharge into Alamogordo Drive.



ALAMOQOHDO DA

DEVEL OPED BASINS

Weighted E Method

Undeveloped On-Site Basins

Basin	Area	Area	Troo	ment A	Trooler	1						100-Year			10-Year	·
	(sf)				Treatm		<u>reatr</u>	nent C	Treat	ment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
		(acres)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(ac-ft)	(ac-ft)	cfs			_
1	17,367	0.40	50%	0.20	0%	0.00	50%	0.1993457	0%					(ac-ft)	(ac-ft)	cfs
2	5,954	0.14	50%		0%							0.024	0.83	0.260	0.009	0.34
Total	23,321	0.54		0.07	<u> </u>	0.00	50%	0.0683425	0%	0.00	0.715	0.008	0.28	0.260	0.003	0.12
. 0101	20,021	0.54										0.032	1.11		0.012	0.46

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Excess P	recipitation,	E (inches)
Zone 1	100-Year	10 - Year
E	0.44	0.08
Eb	0.67	0.22
Ec	0.99	- 0.44
Ed	1.97	1.24

Peak	Discharge (d	fs/acre)
Zone 1	100-Year	10 - Year
Q _a	1.29	0.24
Q _b	2.03	0.76
Q _c	2.87	1.49
Q _d	4.37	2.89

Weighted E Method

Developed On-Site Basins

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		5		וחוופזורש	TEAL	i reathent D	l reatment C		Treatm	Rent D	Weighted E	Volume	Flow	Wainhtad F	Volume	Flow	Wainhtad E	Volume		18/ozahana	1/2 1	
	(st)	(acres)	%	(acres)	%	(acres)	%	(ACTRS)	8	(acros)		(4 00)	4				I panifica.	Aciding.	ASIL.	a panubiass	- DEDICA	
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+	903		80		833	- I	85	0	0%	0.00	0.670	0.001	0.03	0.220	0.000	0.01	0.010	0000	000	0.670	0.000707	0.03
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							200	5	P P	30.0	0.070	0.002	0.06	0.220	0.001	0.02	0.010	0.000	0.00	0.670	0.001552	90.0
								•														

POND SUMMARY

	BASIN 2	BASINS 3-8	BASIN 9	BASIN 10
Area of Pond Top (SF)	306.85	216.60	265.96	127 51
Area of Pond Bottom (SF)	118.47	68.33	97.70	437.51 182.25
Depth of Pond (FT)	0.33	0.25	0.25	0.25
Volume (CF) Volume (AC-FT)	70.18	35.62	45.46	77.47
Volume (AC-Fi)	0.001611	0.000818	0.001044	0.001778
Volume Required (CF)	63.25	34.85	41.56	67.61
Volume Required (AC-FT)	0.001452	0.000800	0.000954	0.001552
Volume Provided (CF)	70.18	35.62	45.46	77.47
Volume Provided (AC-FT)	0.001611	0.000818	0.001044	0.001778

VOLUME OF POND

V=(At + Ab)/2 * D

At = Area of Top

Ab= Area of Bottom

D = Depth