



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 27, 2002

Ronald R. Bohannon, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

Re: DESERT PINE SUBDIVISION UNIT 3 (L-9/D24B)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 10/19/2001
Engineers Certification dated 12/24/2002

Dear Mr. Bohannon:

Based upon the information provided in your Engineers Certification submittal dated 12/24/2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If I can be of further assistance, please contact me at 924-3981.

Sincerely,

Teresa A. Martin

Hydrology Plan Checker

Development & Bldg. Ser. Division

Bob

c: Arlene Portillo, COA--Project # 655583
File

DRAINAGE AND TRANSPORTATION SHEET

(REV. 1/11/2002)

PROJECT TITLE: Desert Pine Subdivision Unit 3 ZONE MAP/DRG. FILE #: L9/D24B
DRB #: 1001536 EPC #: _____ WORK ORDER #: 6555.83

LEGAL DESCRIPTION: Desert Pine Subdivision, Unit 3
CITY ADDRESS: North of Gemstone Road, between 98th Street and 94 Street

ENGINEERING FIRM: Tierra West, LLC CONTACT: RONALD R. BOHANNAN OR SARA LAVY
ADDRESS: 8509 Jefferson NE PHONE: (505) 858-3100
CITY, STATE: Albuquerque, NM ZIP CODE: 87113

OWNER: KB Home CONTACT: Jeff Dorwart
ADDRESS: 4921 Alexander Blvd, NE Suite B PHONE: (505) 344-9400
CITY, STATE: Albuquerque, NM ZIP CODE: 87107

ARCHITECT: N/A CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich
ADDRESS: 4800 Juan Tabo NE, Suite D PHONE: (505) 844-1990
CITY, STATE: Albuquerque, NM ZIP CODE: 87111

CONTRACTOR: Construction Contract Management CONTACT: Scott Davis
ADDRESS: 8019 Edith Blvd. NE PHONE: (505) 844-1990
CITY, STATE: Albuquerque, NM ZIP CODE: 87113

CHECK TYPE OF SUBMITTAL:

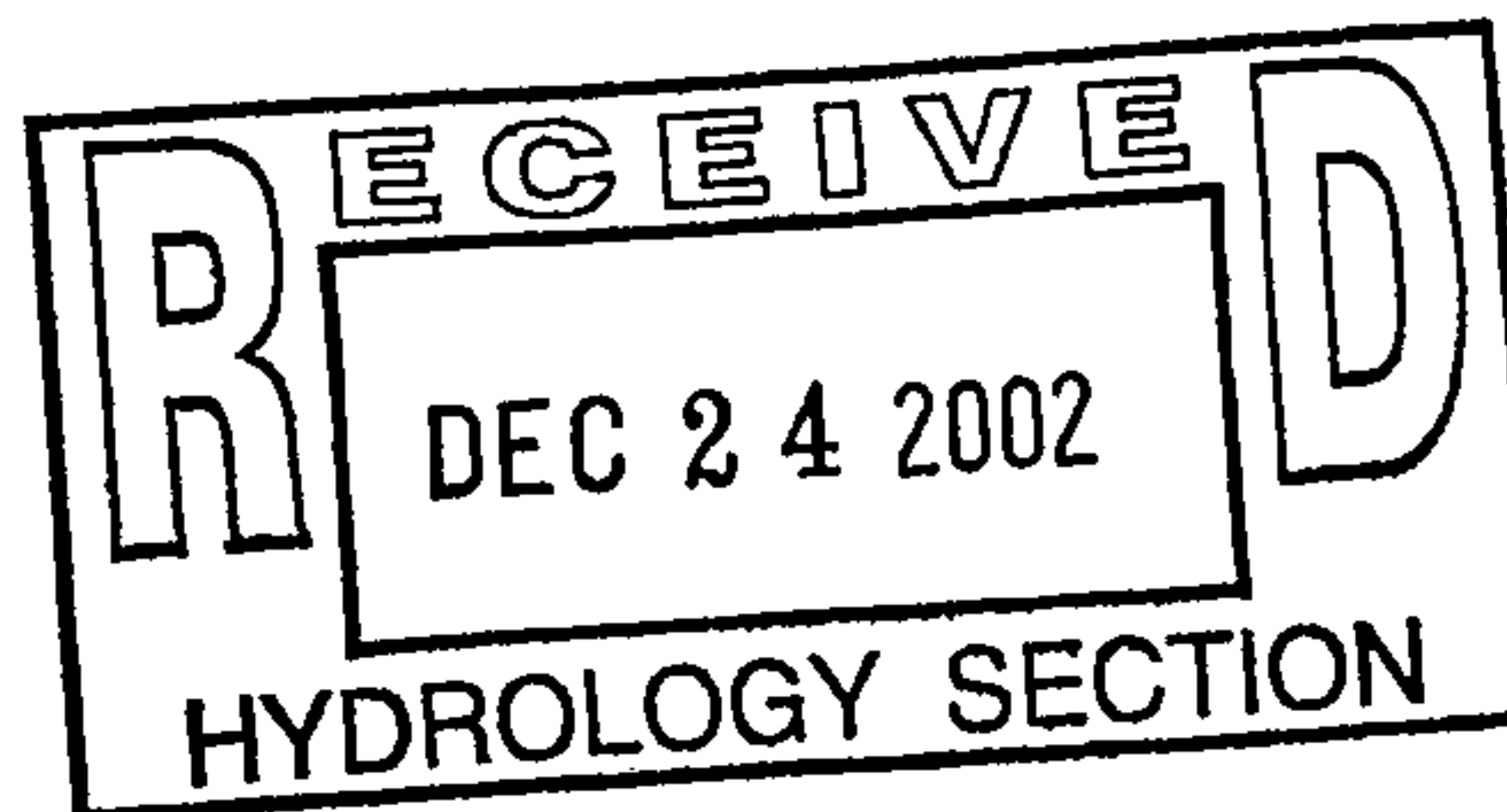
- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANACIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☒ NO
- ☐ COPY PROVIDED



DATE SUBMITTED: 12/24/2002 BY: Ronald Wright (259-5635)

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 submittal 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
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.



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 19, 2001

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

**RE: Grading and Drainage Plan For Desert Pine Phase III (L9-D24B) Dated
October 19, 2001**

Dear Mr. Bohannan:

The above referenced drainage plan received October 23, 2001 is approved. Based upon the information in your submittal the above referenced drainage plan is approved for Preliminary Plat and Site Development for subdivision action by the DRB. The drainage portion of the Infrastructure List For Phase III should be the same for Phase II. An item that should be eliminated for DRC is the use of the optional typical side yard grading section.

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

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

DRAINAGE INFORMATION SHEET

L-9/D24B

PROJECT TITLE: Desert Pine Phase # PL.3
 DRB #: _____ EPC #: _____

ZONE ATLAS/DRNG. FILE #: L-9
 WORK ORDER #: _____

LEGAL DESCRIPTION Lot 36B, Town of Atrisco Grant, Unit 2
 CITY ADDRESS: East of 98th Street, between Sunset Gardens and Eucariz

ENGINEERING FIRM: TIERRA WEST, LLC
 ADDRESS: 8509 JEFFERSON NE
 CITY, STATE: ALBUQUERQUE, NM

CONTACT: RONALD R. BOHANNAN OR SARA LAVY
 PHONE: (505) 858-3100
 ZIP CODE: 87113

OWNER: _____
 ADDRESS: _____
 CITY, STATE: _____

CONTACT: _____
 PHONE: _____
 ZIP CODE: _____

ARCHITECT: _____
 ADDRESS: _____
 CITY, STATE: _____

CONTACT: _____
 PHONE: _____
 ZIP CODE: _____

SURVEYOR: Precision Surveys
 ADDRESS: 8414-D Jefferson Street, NE
 CITY, STATE: ALBUQUERQUE, NM

CONTACT: LARRY MEDRANO
 PHONE: (505) 856-5700
 ZIP CODE: 87113

CONTRACTOR: _____
 ADDRESS: _____
 CITY, STATE: _____

CONTACT: _____
 PHONE: _____
 ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
- ☐ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☒ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ OTHER

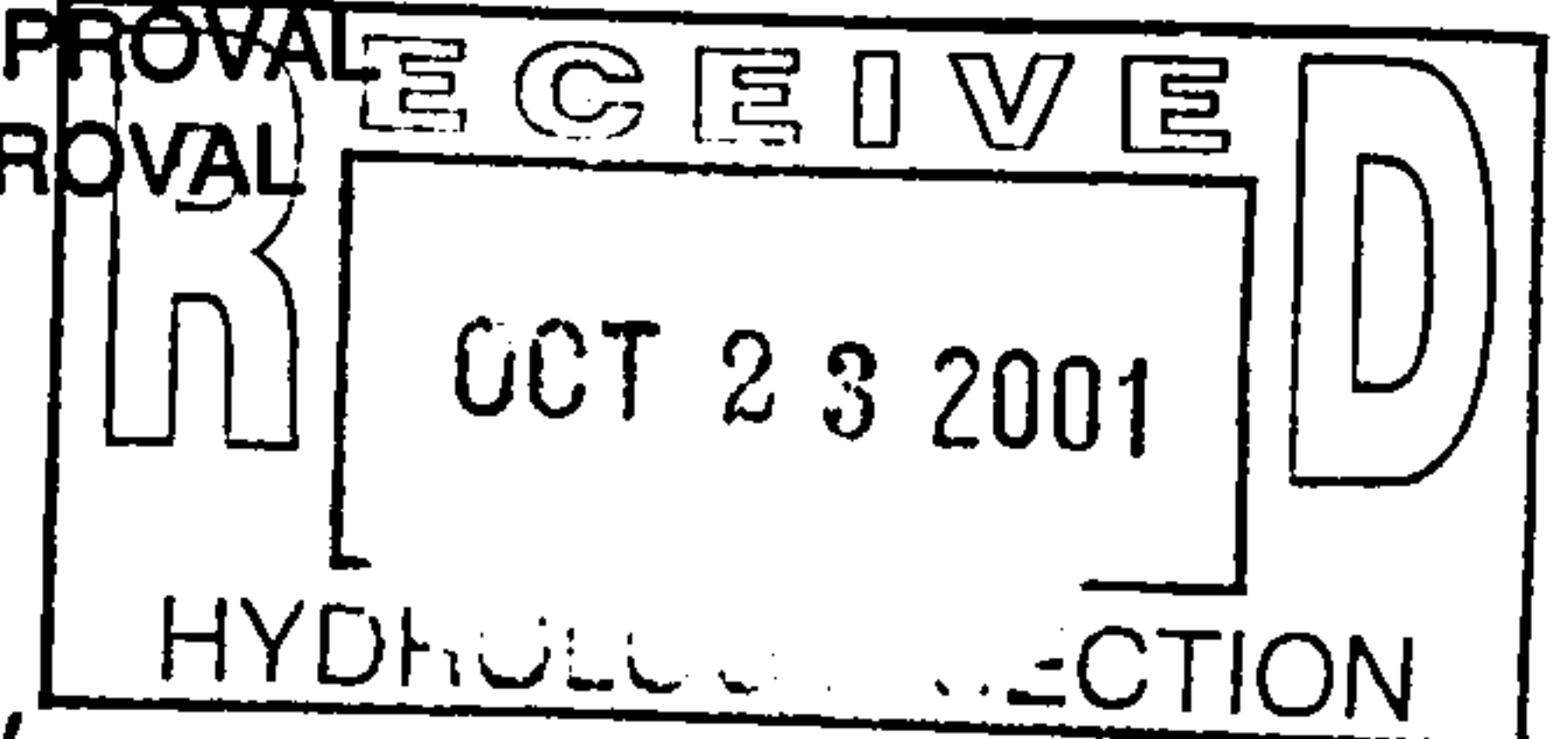
WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☒ NO
- ☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SIA / FINANACIAL GUARANTEE RELEASE
- ☒ PRELIMINARY PLAT APPROVAL
- ☒ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVA
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- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY APPROVAL
- ☒ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

DATE SUBMITTED: 10/18/01 BY: Sara Lavy



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 submittal 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.

MASTER DRAINAGE PLAN

for

C-9/D24B

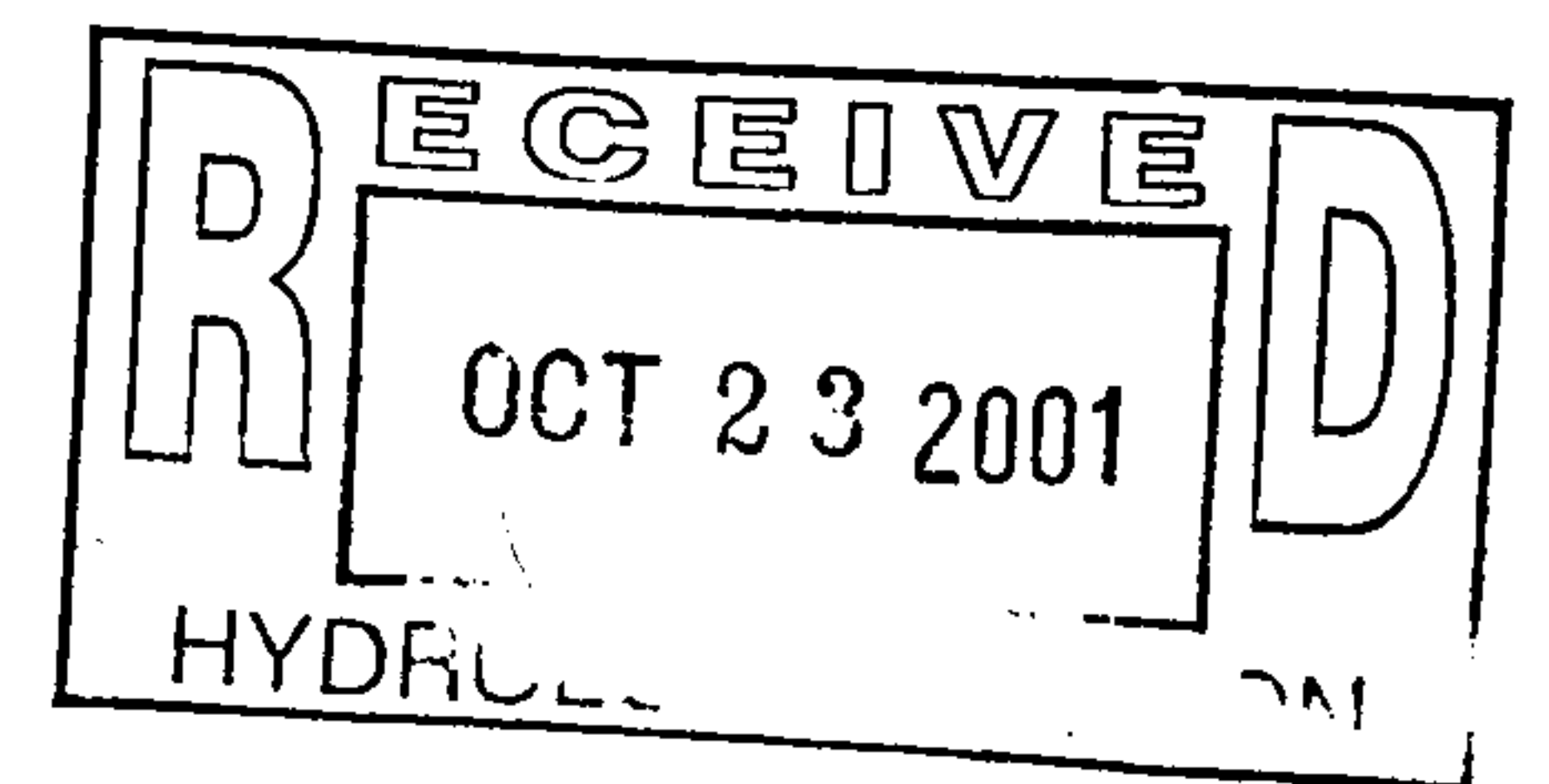
Desert Pine Subdivision III

Prepared by

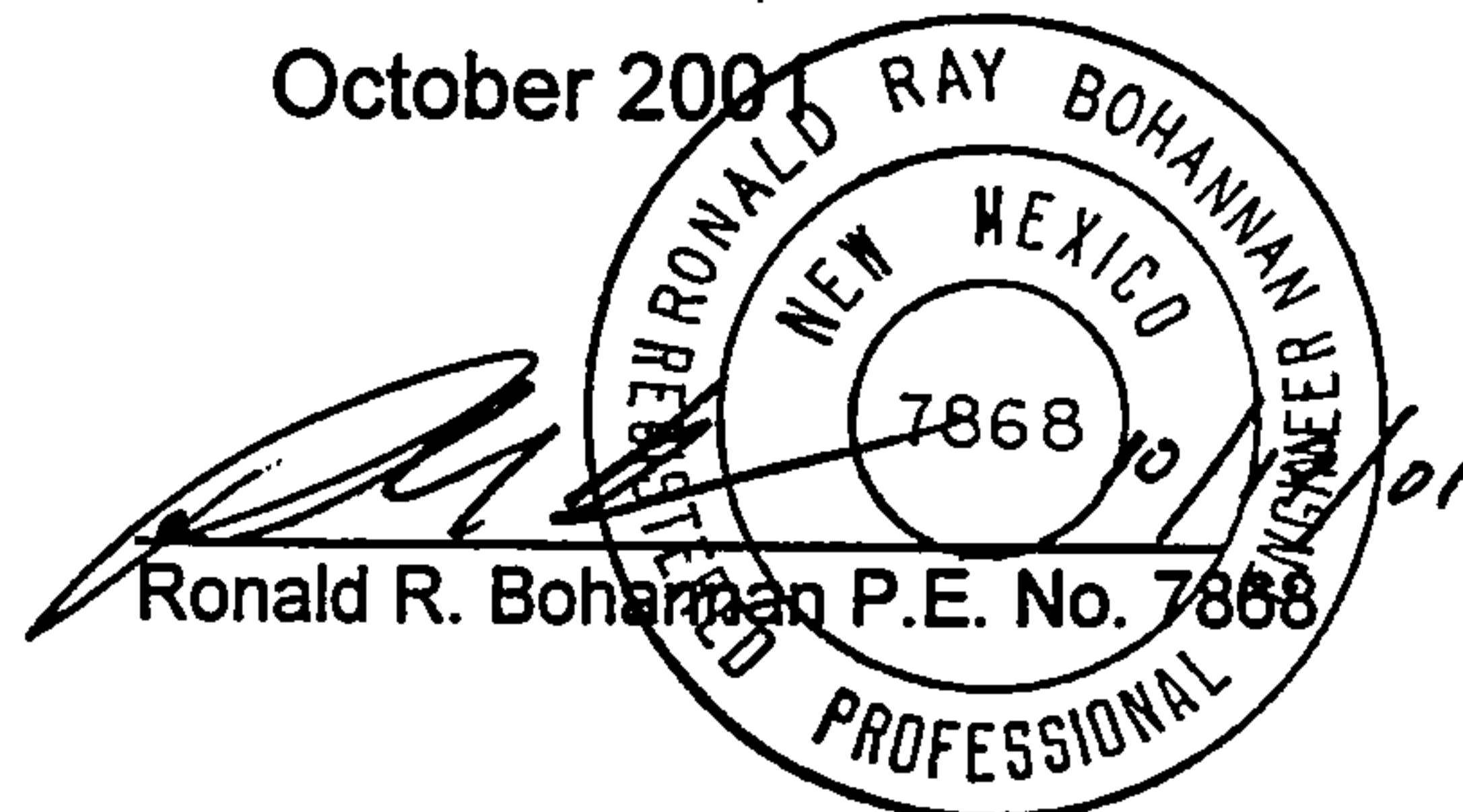
Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

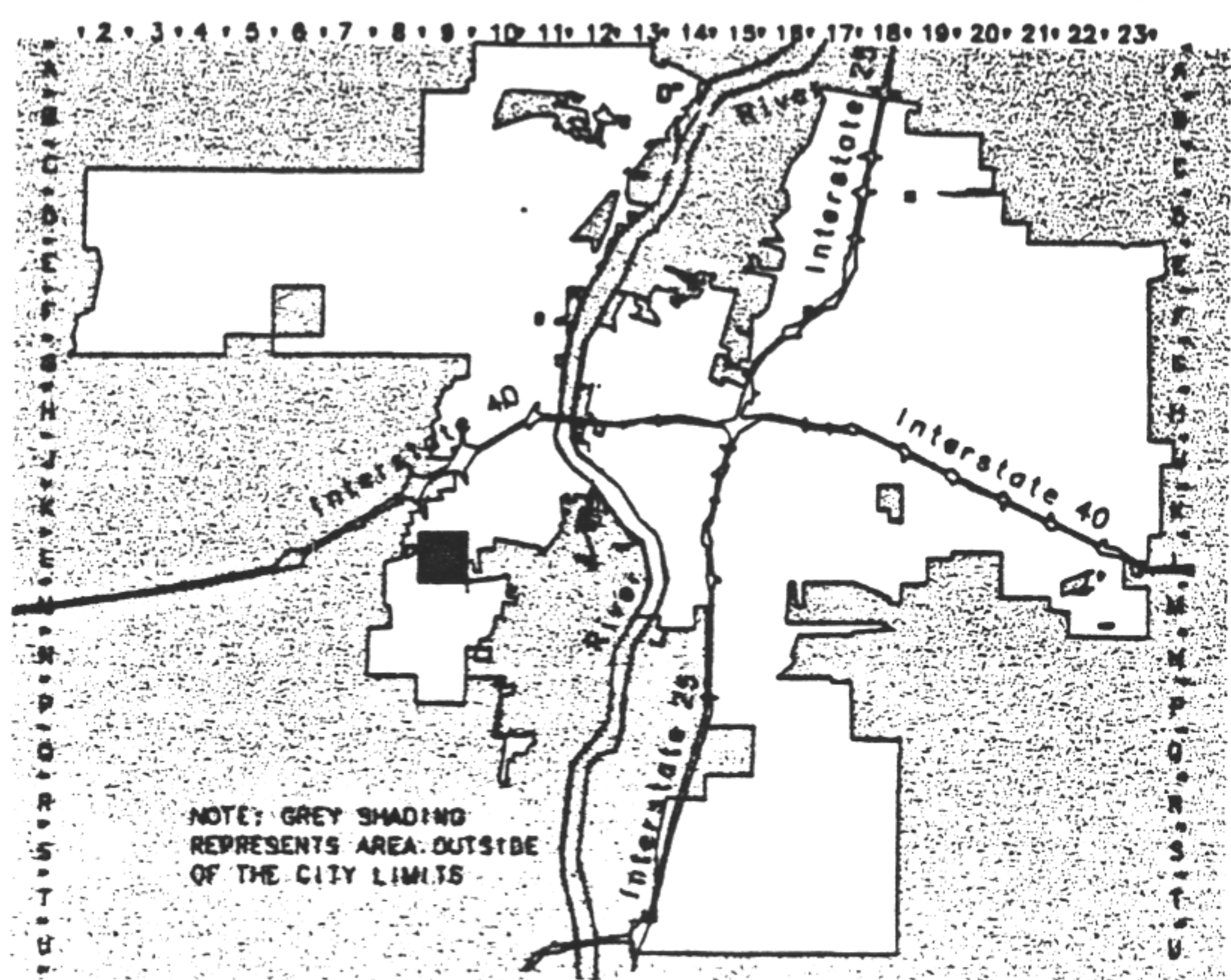
Prepared for

KB Home
4921 Alexander Blvd, NE Suite B
Albuquerque, New Mexico 87107



October 2001



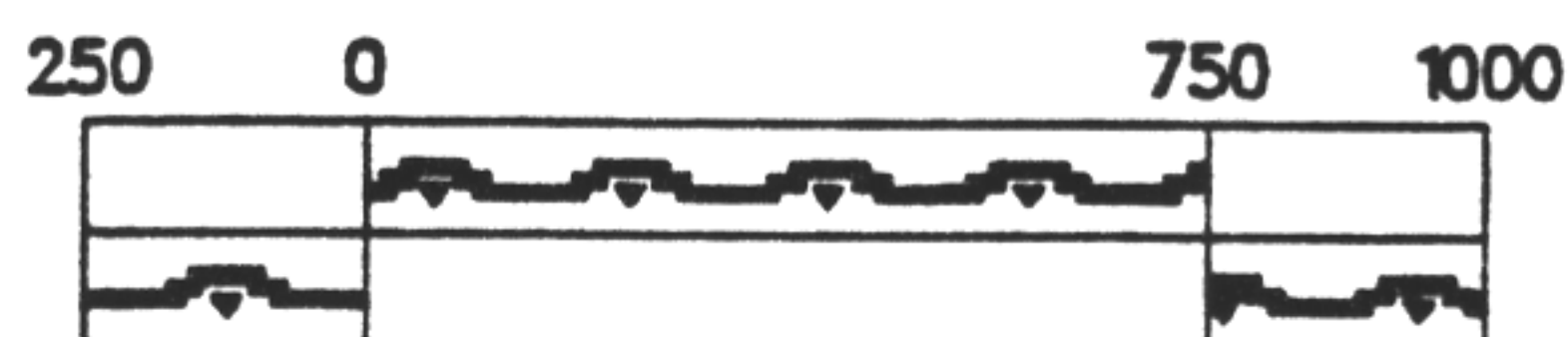


CITY OF
Albuquerque

Albuquerque Geographic Information System
PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET



Zone Atlas Page

L-9-Z

Map Amended through August 15, 2000

Location

Desert Pine Subdivision Phase III is a proposed 14 unit single family subdivision. It is approximately 1.5 acres located east of 98th Street between Sunset Gardens and Eucariz Roads. The site is shown on the attached Zone Atlas Map L-9. 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. The natural slope of the site is from west to east at approximately 3%. Desert Pine Subdivisions I and II surround the site and prevent any offsite flows from entering from the north, south or east. Ninety-eight Street is located to the west and diverts offsite flows from the west.

FIRM Map and Soil Conditions

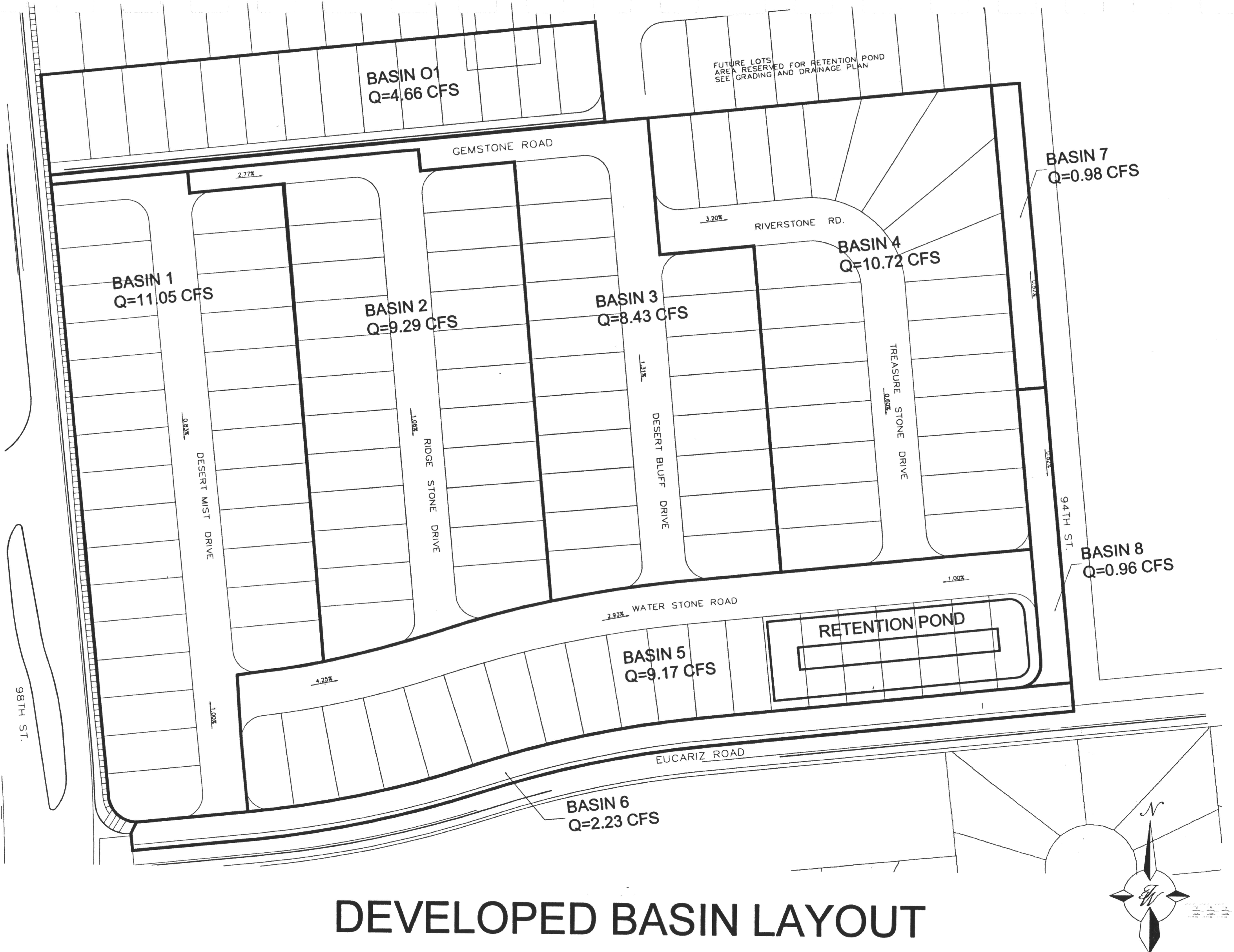
The site is located on FIRM Map section 35001C0328 D as shown on the attached excerpt. This map shows that the site does not lie within any 100-year flood plains.

The site contains one soil type from the Soil Conservation Service Soil Survey of Bernalillo County. The soil found on the site is a Pajarito loamy fine sand and has slow runoff, severe hazard of soil blowing and permeability is moderately rapid.

On-Site Drainage Management Plan

The drainage improvements for this site will be constructed with Desert Pine II. All adjacent infrastructure will be constructed with Phase II. The drainage for Phase III was originally analyzed in the Phase I report and programmed to drain to the retention pond built with Phase I. The new layout prevents that concept, and Phase III will now drain to Phase II. I have included the relevant calculations from Phase II, with revisions to show that Phase III will not impact the construction. The pond and storm drains are adequately designed to accept the flows from Phase III.

Phase III has a developed runoff of 4.66 cfs and will drain south to the adjacent Gemstone Road. The flow will be carried through Desert Pine II to the new storm drain system. A temporary



retention pond will contain the flows until the permanent improvements are constructed with SAD 222. SAD 222 is currently under construction and is expected to be complete before Phase II. If this occurs, the temporary retention pond will not be necessary.

Runoff Calculations

DESERT PINE I - Weighted E Method

Developed On-Site Basins

Basin	Area (sf)	Area (acres)									100-Year			10-Year			100-Year, 10-Day		
			Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)									
A	60,268	1.38	0%	0	50%	0.69	0%	0.00	50%	0.69	1.320	0.152	4.43	0.730	0.084	2.52	1.320	0.237	4.43
B	86,736	1.99	0%	0	50%	1.00	0%	0.00	50%	1.00	1.320	0.219	6.37	0.730	0.121	3.63	1.320	0.341	6.37
C	157,741	3.62	0%	0	50%	1.81	0%	0.00	50%	1.81	1.320	0.398	11.59	0.730	0.220	6.61	1.320	0.620	11.59
D	116,636	2.68	0%	0	50%	1.34	0%	0.00	50%	1.34	1.320	0.295	8.57	0.730	0.163	4.89	1.320	0.459	8.57
E	100,507	2.31	0%	0	50%	1.15	0%	0.00	50%	1.15	1.320	0.254	7.38	0.730	0.140	4.21	1.320	0.395	7.38
F1	47,317	1.09	0%	0	50%	0.54	0%	0.00	50%	0.54	1.320	0.119	3.48	0.730	0.066	1.98	1.320	0.186	3.48
F2	44,276	1.02	0%	0	50%	0.51	0%	0.00	50%	0.51	1.320	0.112	3.25	0.730	0.062	1.85	1.320	0.174	3.25
G	51,301	1.18	0%	0	50%	0.59	0%	0.00	50%	0.59	1.320	0.130	3.77	0.730	0.072	2.15	1.320	0.202	3.77
H	71,971	1.65	0%	0	50%	0.83	0%	0.00	50%	0.83	1.320	0.182	5.29	0.730	0.101	3.02	1.320	0.283	5.29
Total	736,752	16.91		0.00		8.46		0.00		8.46	11.880	1.860	54.12	6.570	1.029	30.87	11.880	2.896	54.12

Undeveloped Basins

Basin	Area (sf)	Area (acres)									100-Year			10-Year			100-Year, 10-Day		
			Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)									
Onsite	736,752	16.91	0%	0	100%	16.91	0%	0.00	0%	0.00	0.670	0.944	34.33	0.220	0.310	12.85	0.670	0.944	34.33

Interim Basins

Basin	Area (sf)	Area (acres)									100-Year			10-Year			100-Year, 10-Day		
			Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)									
A1 - Half Street	33,119	0.76	0%	0	0%	0.00	5%	0.04	95%	0.72	1.921	0.122	3.27	1.200	0.076	2.14	1.921	0.210	3.27
A2 - Half Street	27,577	0.63	0%	0	0%	0.00	5%	0.03	95%	0.60	1.921	0.101	2.72	1.200	0.063	1.79	1.921	0.175	2.72
OS-1	63,442	1.46	0%	0	100%	1.46	0%	0	0%	0.00	0.670	0.081	2.96	0.220	0.027	1.11	0.670	0.081	2.96

Developed Off-Site Basins

											100-Year			10-Year			100-Year, 10-Day		
Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)									
A1	86,577	1.99	0%	0	0%	0.00	5%	0.10	95%	1.89	1.921	0.318	8.54	1.200	0.199	5.60	1.921	0.549	8.54
A2	50,492	1.16	0%	0	0%	0.00	5%	0.06	95%	1.10	1.921	0.186	4.98	1.200	0.116	3.27	1.921	0.320	4.98
A3	37,830	0.87	0%	0	0%	0.00	5%	0.04	95%	0.83	1.921	0.139	3.73	1.200	0.087	2.45	1.921	0.240	3.73
1	63,442	1.46	0%	0	50%	0.73	0%	0.00	50%	0.73	1.320	0.160	4.66	0.730	0.089	2.66	1.320	0.249	4.66
2	214,976	4.94	0%	0	50%	2.47	0%	0.00	50%	2.47	1.320	0.543	15.79	0.730	0.300	9.01	1.320	0.845	15.79
3	213,220	4.89	0%	0	50%	2.45	0%	0.00	50%	2.45	1.320	0.538	15.66	0.730	0.298	8.93	1.320	0.838	15.66
4	234,616	5.39	0%	0	50%	2.69	0%	0.00	50%	2.69	1.320	0.592	17.24	0.730	0.328	9.83	1.320	0.922	17.24
Total	901,152	20.69		0		8.34		0.20		12.15		2.477	70.60		1.416	41.75		3.965	70.60

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 _a	0.44	0.08
E _b	0.67	0.22
E _c	0.99	0.44
E _d	1.97	1.24

Peak Discharge (cfs/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

Depth (in) at 100-Year Storm	
	Zone 1
P ₃₆₀	2.2
P ₁₄₄₀	2.66
P _{4days}	3.12
P _{10days}	3.67

DESERT PINE II - Weighted E Method

Developed On-Site Basins

Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		100-Year, 6-Hr			10-Year, 6-Hr			100-Year, 10-Day		
			%	(acres)	%	(acres)	%	(acres)	%	(acres)	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs
1	150,473	3.45	0%	0	50%	1.73	0%	0	50%	1.73	1.320	0.380	11.05	0.730	0.210	6.30	1.320	0.592	11.05
2	126,488	2.90	0%	0	50%	1.45	0%	0	50%	1.45	1.320	0.319	9.29	0.730	0.177	5.30	1.320	0.497	9.29
3	114,733	2.63	0%	0	50%	1.32	0%	0	50%	1.32	1.320	0.290	8.43	0.730	0.160	4.81	1.320	0.451	8.43
4	145,946	3.35	0%	0	50%	1.68	0%	0	50%	1.68	1.320	0.369	10.72	0.730	0.204	6.11	1.320	0.574	10.72
5	124,854	2.87	0%	0	50%	1.43	0%	0	50%	1.43	1.320	0.315	9.17	0.730	0.174	5.23	1.320	0.491	9.17
6	30,390	0.70	0%	0	50%	0.35	0%	0	50%	0.35	1.320	0.077	2.23	0.730	0.042	1.27	1.320	0.119	2.23
7	9,759	0.22	0%	0	0%	0.00	0%	0	100%	0.22	1.970	0.037	0.98	1.240	0.023	0.65	1.970	0.064	0.98
8	9,595	0.22	0%	0	0%	0.00	0%	0	100%	0.22	1.970	0.036	0.96	1.240	0.023	0.64	1.970	0.063	0.96
Total	712,237	16.35		0		7.95				8.40		1.823	52.84		1.014	30.31		2.851	52.84

Undeveloped On-Site Basins

Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		100-Year, 6-Hr			10-Year, 6-Hr			100-Year, 10-Day		
			%	(acres)	%	(acres)	%	(acres)	%	(acres)	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs
U-1	712,237	16.35	0%	0	100%	16.35	0%	0	0%	0.00	0.670	0.913	33.19	0.220	0.300	12.43	0.670	0.913	33.19

Equations for Weighted E Method:

Weighted E = $E_a \cdot A_a + E_b \cdot A_b + E_c \cdot A_c + E_d \cdot A_d$ / (Total Area)

Volume = Weighted D * Total Area

Flow = $Q_a \cdot A_a + Q_b \cdot A_b + Q_c \cdot A_c + Q_d \cdot A_d$

Volume (10-day) = $V_{360} + A_d \cdot (P_{10days} - P_{360}) / 12$ in/ft

Excess Precipitation, E (inches)		
Zone 1	100-Year	10 - Year
E _a	0.44	0.08
E _b	0.67	0.22
E _c	0.99	0.44
E _d	1.97	1.24

Peak Discharge (cfs/acre)		
Zone 1	100-Yea	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

Depth (in) at 100-Year Storm	
	Zone 1
P ₃₆₀	2.2
P ₁₄₄₀	2.66
P _{4days}	3.12
P _{10days}	3.67

Calculations

Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
L1	30	1	4.91	0.625	41.13	26.66	5.43
L2	36	1	7.07	0.75	66.88	53.32	7.54
L3	54	0.212	15.90	1.125	90.79	67.65	4.25
L4	54	0.212	15.90	1.125	90.79	120.97	7.61
L5	18	1	1.77	0.375	10.53	2.23	1.26
L6	36	1	7.07	0.75	66.88	53.32	7.54

L3 = Phase 1 including 94th Street and Sunset Gardens

L4 = 67.65 + 53.32 = 120.97

L6 = Basins 1-5 and O1 = 53.32 cfs

* Pipe flowing under pressure, see Phase 1 for calculations.

Manning's Equation:

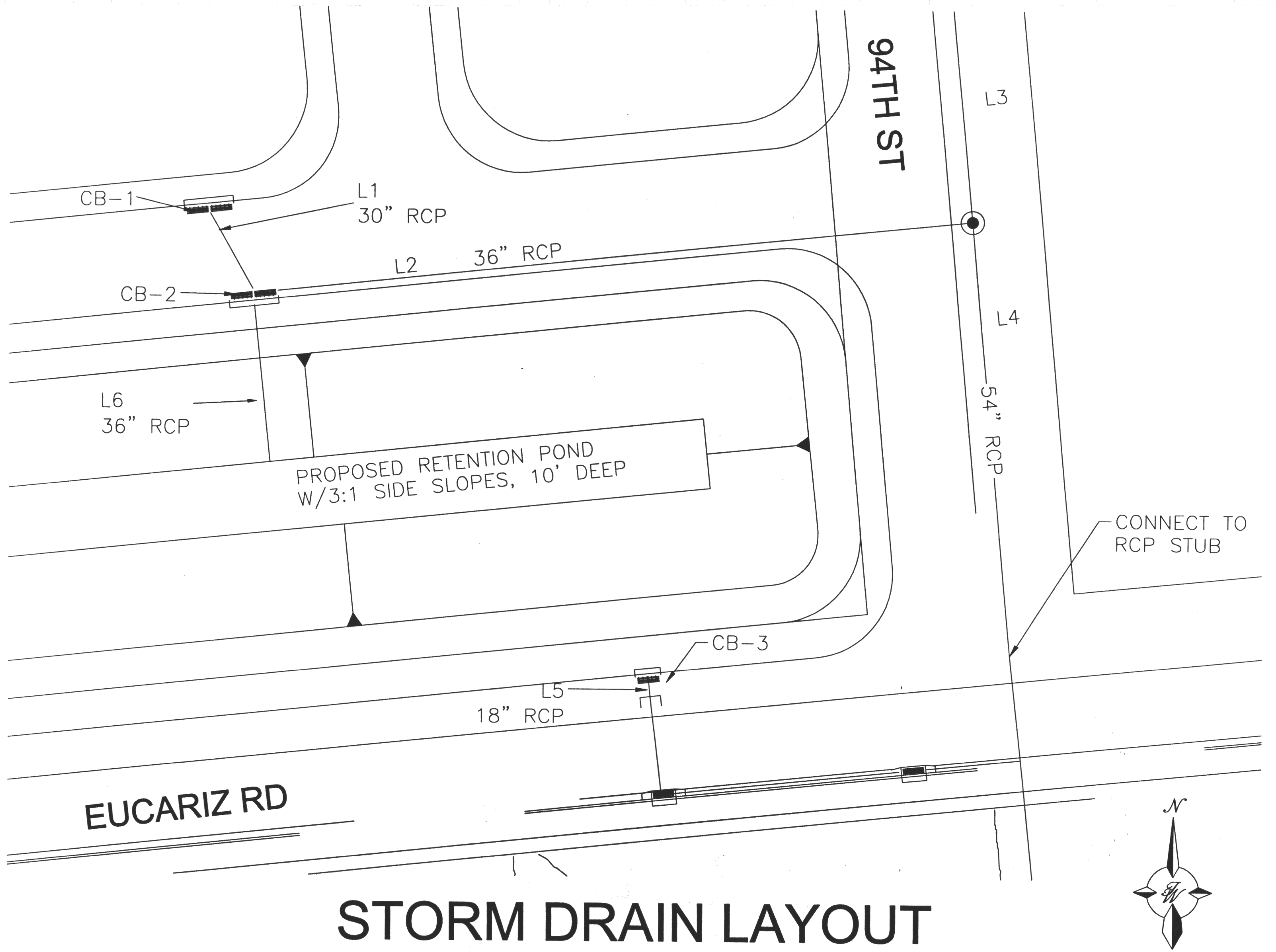
$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$

A = Area

R = D/4

S = Slope

n = 0.013



STORM DRAIN LAYOUT

POND SUMMARY

DESERT PINE II TEMPORARY RETENTION POND

	POND 1
Area of Pond Top (SF)	22566.5
Area of Pond Bottom (SF)	4963.19
Depth of Pond (FT)	10.00
Volume (CF)	137,648.45
Volume (AC-FT)	3.1600
Volume Required (CF)	135,036.00
Volume Required (AC-FT)	3.1000
Volume Provided (CF)	137,648.45
Volume Provided (AC-FT)	3.1600

Pond 1 includes developed basins 1-8 and O1

VOLUME OF POND

$$V=(At + Ab)/2 * D$$

At = Area of Top

Ab= Area of Bottom

D = Depth

CAPACITY OF DOUBLE 'C' STORM DROP INLET

Capacity of the grate:

$$\begin{aligned} L &= 88.75" - 2(6" \text{ ends}) - 6" \text{ center piece} - 14(\frac{1}{2}" \text{ middle bars}) \\ &= 63.75" \\ &= 5.3125' \end{aligned}$$

$$\begin{aligned} W &= 25.5" - 13(\frac{1}{2}" \text{ middle bars}) \\ &= 19" \\ &= 1.583' \end{aligned}$$

$$\begin{aligned} \text{Area} &= 1.583' \times 5.3125' \\ &= 8.41 \text{ ft}^2 \end{aligned}$$

$$\begin{aligned} \text{Effective Area} &= 8.41 - 8.41 (0.5 \text{ clogging factor}) \\ &= 4.21 \text{ ft}^2 \text{ at the grate} \end{aligned}$$

Orifice Equation

$$Q = CA \sqrt{2gH}$$

$$Q = 0.6 \times 4.21 \times \sqrt{2 \times 32.2 \times 0.67}$$

$$Q = 16.59 \text{ cfs}$$

Capacity of the throat:

$$\begin{aligned} L &= 88\text{-}\frac{3}{4}" \\ &= 7.3958' \end{aligned}$$

Weir Equation

$$Q = CLH^{(3/2)}$$

$$Q = 2.95 \times 7.3958 \times 0.67^{(3/2)}$$

$$Q = 11.97 \text{ cfs}$$

Total Capacity:

$$Q = 16.59_{\text{grate}} + 11.97_{\text{throat}}$$

$$Q = 28.56 \text{ cfs}$$

$$\text{Flow required} = 53.32/2 = 26.66 \text{ cfs}$$

26.66 cfs < 28.56 cfs : Double C inlet has capacity



ANALYSIS POINT EXHIBIT

Street Capacity Calculations

AP-3 with Q=13.09

Desert Bluff Drive

28' F-F Street Section with 4" curb

Slope= 1.31%

For water depths less than 0.0625 feet

Y= Water depth
Area = $16 \cdot Y^2$
P= $\text{SQRT}(1025 \cdot Y^2) + Y$
n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.010	0.002	0.33	0.00	0.00	0.00	0.29	0.00	0.50	0.0037
0.020	0.006	0.66	0.01	0.00	0.01	0.45	0.01	0.57	0.0089
0.025	0.010	0.83	0.01	0.01	0.01	0.53	0.01	0.59	0.0118
0.035	0.020	1.16	0.02	0.01	0.03	0.66	0.02	0.62	0.0179
0.045	0.032	1.49	0.02	0.03	0.05	0.78	0.04	0.65	0.0245
0.052	0.043	1.72	0.03	0.04	0.07	0.86	0.04	0.66	0.0294
0.060	0.058	1.98	0.03	0.05	0.11	0.95	0.06	0.68	0.0351
0.063	0.063	2.06	0.03	0.06	0.12	0.97	0.06	0.69	0.0369

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.064	2.09	0.03	0.06	0.12	0.97	0.06	0.68	0.0371
0.100	0.173	3.98	0.04	0.21	0.43	1.24	0.12	0.69	0.0595
0.130	0.311	5.51	0.06	0.46	0.92	1.47	0.19	0.72	0.0825
0.160	0.495	7.04	0.07	0.84	1.69	1.71	0.27	0.75	0.1079
0.200	0.810	9.08	0.09	1.62	3.24	2.00	0.40	0.79	0.1441
0.255	1.374	11.88	0.12	3.26	6.52	2.37	0.61	0.83	0.1974
0.279	1.666	13.10	0.13	4.21	8.43	2.53	0.71	0.84	0.2215
0.303	1.983	14.31	0.14	5.31	10.62	2.68	0.81	0.86	0.2459

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
A3= $A2 + Y2 \cdot 14$
P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.990	14.31	0.14	5.34	10.69	2.69	0.81	0.86	0.2468
0.304	2.002	14.31	0.14	5.40	10.80	2.70	0.82	0.86	0.2485
0.305	2.022	14.31	0.14	5.49	10.97	2.71	0.83	0.87	0.2511
0.310	2.088	14.31	0.15	5.79	11.57	2.77	0.86	0.88	0.2597
0.313	2.123	14.32	0.15	5.95	11.90	2.80	0.88	0.88	0.2643
0.322	2.249	14.32	0.16	6.55	13.09	2.91	0.94	0.90	0.2809
0.330	2.368	14.33	0.17	7.13	14.26	3.01	0.99	0.92	0.2967

Street Capacity Calculations

AP-6 with Q=42.60 cfs
 Water Stone Road
 28' F-F Street Section with 8" curb
 Slope= 2.93%

For water depths less than 0.125 feet

Y= Water depth
 Area = $8 \cdot Y^2$
 P= $\text{SQRT}(257 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.42	0.00	0.74	0.007
0.02	0.00	0.34	0.01	0.00	0.00	0.67	0.01	0.83	0.016
0.04	0.01	0.68	0.02	0.01	0.03	1.06	0.04	0.93	0.036
0.06	0.03	1.02	0.03	0.04	0.08	1.39	0.08	1.00	0.060
0.08	0.05	1.36	0.04	0.09	0.17	1.68	0.13	1.05	0.085
0.1	0.08	1.70	0.05	0.16	0.31	1.95	0.19	1.09	0.111
0.12	0.12	2.04	0.06	0.25	0.51	2.20	0.26	1.12	0.139
0.125	0.13	2.13	0.06	0.28	0.57	2.26	0.28	1.13	0.146

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.30	0.60	2.21	0.29	1.08	0.144
0.16	0.23	3.91	0.06	0.50	1.01	2.23	0.36	0.98	0.157
0.2	0.42	5.95	0.07	1.05	2.11	2.54	0.51	1.00	0.200
0.24	0.69	8.00	0.09	1.99	3.99	2.91	0.70	1.05	0.255
0.28	1.04	10.04	0.10	3.41	6.82	3.29	0.92	1.10	0.316
0.32	1.47	12.08	0.12	5.38	10.75	3.67	1.17	1.14	0.381
0.34	1.71	13.10	0.13	6.59	13.18	3.85	1.31	1.16	0.415
0.365	2.05	14.37	0.14	8.34	16.68	4.08	1.49	1.19	0.458

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365
 A3= $A2 + Y2^2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	8.82	17.64	4.17	1.54	1.21	0.474
0.400	2.54	14.41	0.18	11.91	23.82	4.70	1.88	1.31	0.567
0.48	3.60	14.48	0.25	21.30	42.60	5.92	2.82	1.51	0.807
0.50	3.94	14.51	0.27	24.67	49.34	6.27	3.13	1.56	0.883
0.54	4.50	14.55	0.31	30.74	61.48	6.84	3.69	1.64	1.011
0.58	5.06	14.59	0.35	37.32	74.63	7.38	4.28	1.71	1.141
0.63	5.76	14.64	0.39	46.22	92.43	8.03	5.06	1.78	1.304
0.667	6.27	14.67	0.43	53.27	106.53	8.49	5.66	1.83	1.427