CITY OF ALBUQUERQUE

December 1, 2005

Mr. James D. Hughes, PE
MARK GOODWIN & ASSOCIATES
P.O. Box 90606
Albuquerque, NM 87199

RE: RAYO DEL SOL SUBDIVISION, UNIT 2 (M-10/D9)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 11/03/2003
Approved Engineers Stamp dated 08/15/2003
Engineers Certification dated 09/06/2005

Dear Doug:

As per Brad Bingham, PE, based upon the information provided in your Engineer's Certification Submittal dated 09/06/2005, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, you may contact Brad Bingham at 924-3986. I can be reached at 924-3982.

Sincerely,

Arlene V. Portillo

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

C: Marilyn Maldonado, COA# 579484
File

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Rayo del Sol Subdivision Unit 2
DRB #: 97-82 EPC#: _____

ZONE MAP/DRG. FILE #: M10/D9
WORK ORDER#: 579484

LEGAL DESCRIPTION: A Portion of Valley West
CITY ADDRESS: Arenal Road between Coors Road and Unser Blvd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA
ADDRESS: PO Box 90606
CITY, STATE: Albuquerque, NM

CONTACT: James D. Hughes, PE
PHONE: 828-2200
ZIP CODE: 87199

OWNER: GSR Group
ADDRESS: 6605 Uptown Blvd.NE, Suite 300
CITY, STATE: Albuquerque, NM

CONTACT: Rick Walker
PHONE: 883-4848
ZIP CODE: 87110-4212

ARCHITECT: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE:
ZIP CODE: _____

SURVEYOR: ALS, Inc.
ADDRESS: P.O. Box 30701
CITY, STATE: Albuquerque, NM

CONTACT: Tim Aldrich
PHONE: 884-1990
ZIP CODE: 87190

CONTRACTOR: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal***
- ☐ DRAINAGE PLAN RESUBMITTAL
- ☐ 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 / FINANCIAL 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)

RECEIVED
SEP 06 2005
HYDROLOGY SECTION

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED

DATE SUBMITTED: 9-6-05

BY: James D. Hughes, PE

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope ot 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 Plan**: 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.

MARK GOODWIN & ASSOCIATES, PA

LETTER OF TRANSMITTAL

TO: City Hydrology **DATE:** September 6, 2005

xc: Rick Walker, GSR Group

Gilbert Lovato, K-Ram Roofing **RE:** **Rayo Del Sol Unit 2**

ITEMS BEING TRANSMITTED

1	Engineers Certification
1	Drainage Information Sheet

- ☐ FOR YOUR USE
- ☐ AS YOU REQUESTED
- ☐ FOR YOUR RECORDS
- ☐ FOR YOUR COMMENTS

Notes:

Extra Copy provided to developer for Disclosure to Home Builders.

RECEIVED
SEP 0 6 2005
HYDROLOGY SECTION

PROJECT ENGINEER: James D. Hughes, PE

Whitney L. Phillips

P.O. Box 90606 ♦ Albuquerque, NM 87199 ♦ (505) 828-2200 ♦ (505) 797-9539 fax

CITY OF
Albuquerque

July 27, 1998

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: Grading and Drainage Plan for Rayo del Sol Subdivision (M10/D9), Engineer's Stamp Dated 8/15/97.

Dear Mr. Hughes:

The Letter of Map Revision (LOMR) which was issued by the Federal Emergency Management Agency on July 17, 1998 removed the floodplain from this subdivision. Therefore, rough grading will be allowed in Unit 2, per the approved Grading and Drainage plan referenced above.

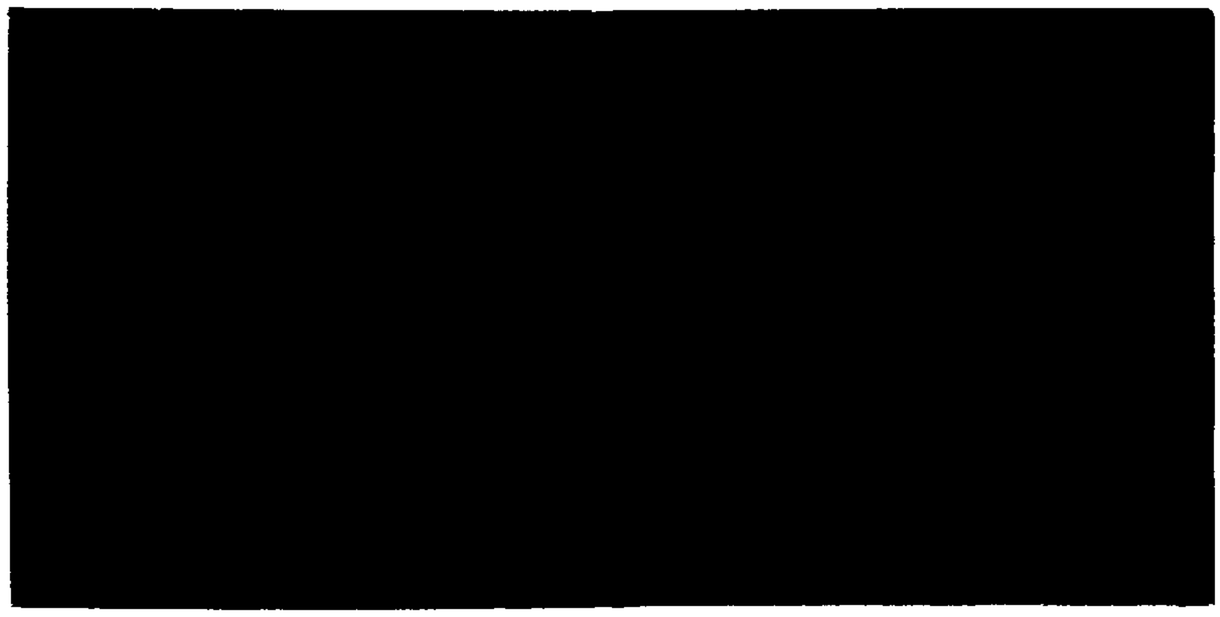
A topsoil disturbance permit is required before any grading may occur within this Unit. The Grading and Drainage Certification is required prior to release of financial guarantees.

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

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Larry Caudill, City Environmental Health
File



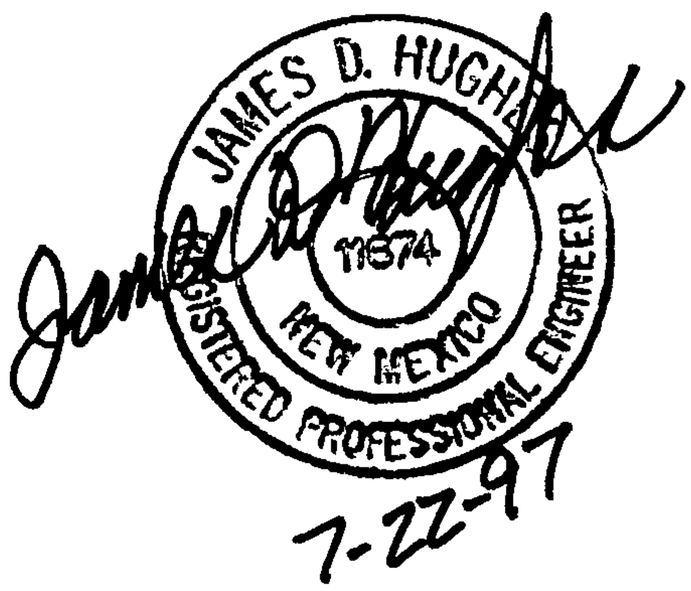
MARK GOODWIN
& ASSOCIATES
CONSULTING ENGINEERS

DRAINAGE REPORT
for
RAYO del SOL SUBDIVISION

RECEIVED
JUL 22 1997
HYDROLOGY SECTION

Prepared For

Thunder Development Ltd.
225 Chamisa
Los Alamos, NM 87544



June 1997
Revised July 1997

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rayo del Sol Subdivision ZONE ATLAS/DRNG,FILE#: M-10

DRB #: 97-82 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Valley West

CITY ADDRESS: Arenal Road between Coors Road and Unser Blvd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: James D. Hughes, PE

ADDRESS: PO Box 9060 Albuquerque, NM 87199 PHONE: 828-2200

OWNER: Thunder Development Ltd. CONTACT: Tom Joseph

ADDRESS: 225 Chamisa Los Alamos, NM 87544 PHONE: 622-0649

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 Albuquerque, NM 87190 PHONE: 884-1990

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- _____ DRAINAGE PLAN
- _____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- X EROSION CONTROL PLAN
- _____ ENGINEER'S CERTIFICATION
- X OTHER - Infrastructure List

PRE-DESIGN MEETING:

- _____ YES
- _____ NO
- _____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- _____ SKETCH PLAT APPROVAL
- X PRELIMINARY PLAT APPROVAL
- _____ S. DEV. PLAN FOR SUB'D APPROVAL
- _____ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
- _____ SECTOR PLAN APPROVAL
- X FINAL PLAT APPROVAL
- _____ FOUNDATION PERMIT APPROVAL
- _____ BUILDING PERMIT APPROVAL
- _____ CERTIFICATION OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- _____ PAVING PERMIT APPROVAL
- _____ S.A.D. DRAINAGE REPORT
- _____ DRAINAGE REQUIREMENTS
- _____ OTHER _____ (Specify)

DATE SUBMITTED: _____

BY: _____
James D. Hughes, PE

RECEIVED
JUL 22 1997
HYDROLOGY SECTION

TABLE OF CONTENTS

I. Purpose of Report

II. Existing Conditions

III. Proposed Management Plan

LIST OF CALCULATIONS AND EXHIBITS

- Street Flow Summary Table
- Inlets on Grade
- Inlets in Sump
- Emergency Overflow
- Pond Volume Calculations
  - Pond #1 Existing
  - Pond #1 Proposed
  - Pond #2 Existing
  - Pond #2 Proposed
- Summary of Hydrology Table
- Basin Map
- AHYMO
  - Summary Output 10 year Pre-development
  - Summary Output 100 year Pre-development
  - Summary Output 10 year Post-development
  - Summary Output 100 year Post-development
  - Summary Output 10 year Post-development with Park Offices
  - Summary Output 100 year Post-development with Park Offices
  - Input Data 100 year Post-development
  - Output Data 100 year Post-development

PURPOSE

The purpose of this report is to demonstrate the adequacy of proposed drainage to allow this site to be subdivided into 137 single-family detached residential lots (zoned R-LT), and associated public drainage infrastructure can be constructed and turned over to the City of Albuquerque for maintenance. This is not a County subdivision, but a County permit is required for construction on County public property.

EXISTING CONDITIONS

The project comprises an on-site area of 19.5203 acres within the City of Albuquerque, that slopes from west to east at approximately 1-2%. It is bounded on the west by the Amole del Norte channel which prevents all off-site flows from entering this site. It is bounded on the east by Tom Tenorio Park (a Bernalillo County park) that provides retention ponds to handle both its own drainage and the drainage from this site. It is bounded on the north by Arenal Road, a major arterial road (the extension of Unser to Coors). And finally, it is bounded on the south by undeveloped land with no drainage across this boundary. A flood plain, zone AO (depth 1') is mapped near the northern edge of Unit 2, per Flood Insurance Rate Map (FIRM) panel 337, effective September 20, 1996.

The Amole del Norte channel eliminated all of the drainage to the flood plain when the channel was constructed in 1980, but the amended conditions have not yet been properly documented to the Federal Emergency Management Administration (FEMA). Approximately 18 acres of flood plain (zones AO and AE) are also incorrectly indicated on the Park, per the same FIRM.

PROPOSED MANAGEMENT PLAN

There are no upstream off-site flows. On-site flows are collected by the streets to a low point in the north west quadrant of the site where they are collected in a City storm sewer which conveys the flows underground through the adjacent County Park (in drainage easements dedicated to the City of Albuquerque) to the existing 5.5' deep, County maintained retention ponds, which are to be deepened 2.5' by this development, to accommodate not only the developed flows form this site, but also a future 3 acre office development in the park.

A County public drainage easement will encompass the ponds. It will be fenced to minimize the liability that the standing water might pose. The City will maintain the pipes and the rip-rap in the ponds and will have access to the ponds via the main park entrance road and asphalt rundowns into the two ponds, leaving only the vegetation maintenance to the County.

The floodplain is to be removed by a LOMR from FEMA prior to development of Unit 2.

This development will provide documentation of the existing Amole del Norte channel to FEMA as necessary to receive a LOMR removing the floodplain prior to final plat approval of any lots within the floodplain. The LOMR request will be made separately and is not addressed in this report.

CALCULATIONS AND EXHIBITS

TABLE 1 — STREET DRAINAGE CAPACITIES

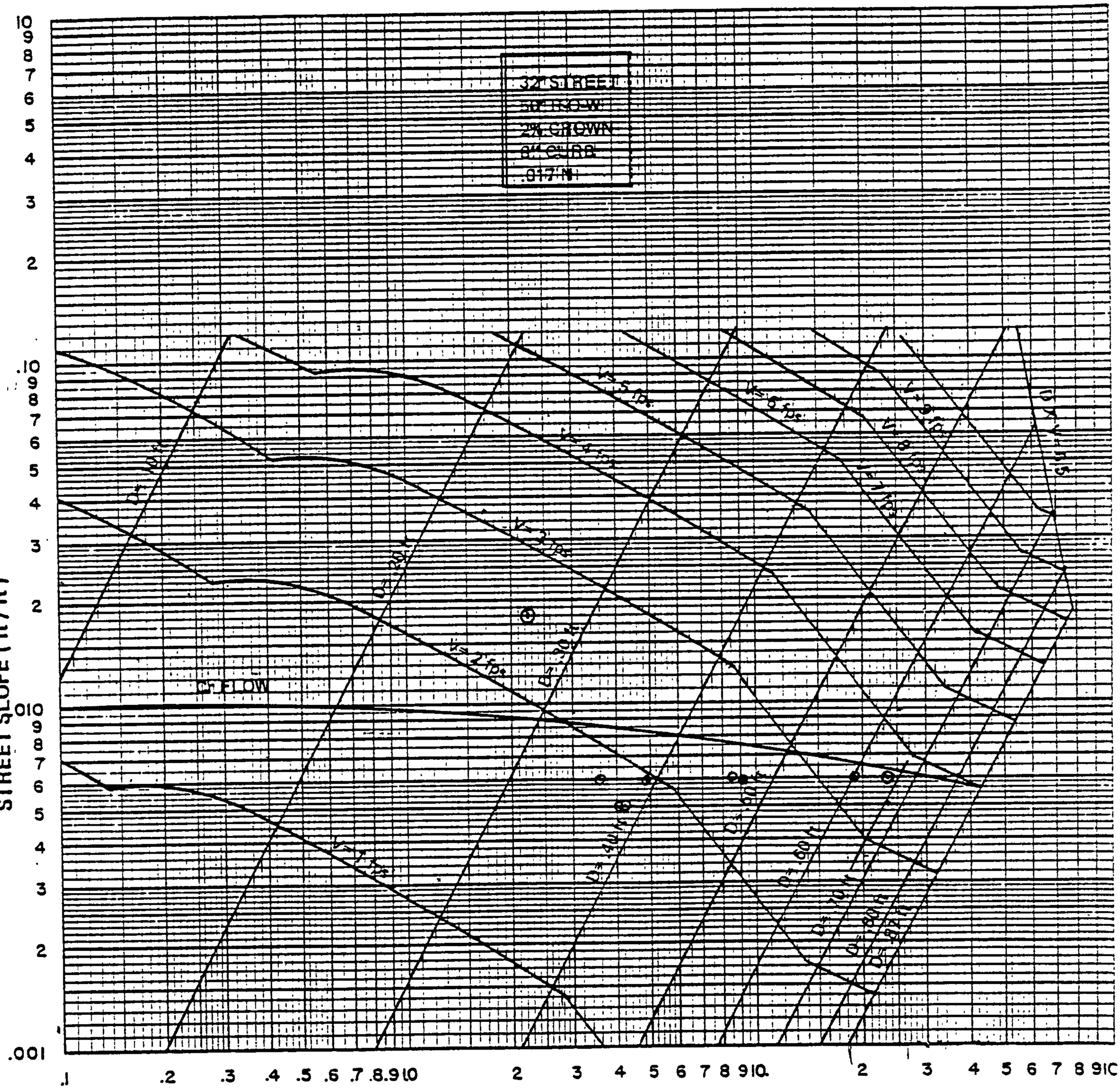
Basin No.	Area Ac.	% of Total	100 Year Flow (cfs)		Curb Type / Slope	Flow Depth ft. (1)	Velocity fps	Energy Depth ft. (2)
			Increment.	Cumm.				
1	2.09	11.00	7.22	—	Roll / 0.60%	0.30	1.8	0.35
2	2.83	14.89	9.78	—	Roll / 0.60%	0.33	2.0	0.39
3	2.90	15.26	10.02	—	Roll / 0.60%	0.33	2.0	0.39
4	2.86	15.05	9.88	—	Roll / 0.59%	0.33	2.0	0.39
5	6.13	32.26	21.17	48.29	Std. / 0.59%	0.66	3.6	0.86
6	2.19	11.53	7.56	17.34	Std. / 0.60%	0.46	2.4	0.55
Total	19.00	100	65.63	65.63	—	—	—	—
			10 Year Flow (cfs)					
102	2.4	100	4.49	—	Std. / 1.80%	0.27(3)	—	—

(1) *flow depths are taken from Plate 22.3 D-1 of the DPM and reduced by 3/4" for roll curb types to account for the difference in gutter depression. Allowable depths may not exceed curb heights which are 0.33' for roll curb and gutter and 0.67' for standard curb and gutter.*

(2) *Energy depth is calculated as flow depth plus energy head. Allowable depths are 0.18' above top of curb, unless the street section is modified to contain the additional height within the right-of-way.*

(3) *Spread of water for 10 year flows in Arenal is 9.25' allowing 0.125' across first 2' from curb face (1.5" gutter) and 0.145' rise across the next 7.25' at 2.0%. This meets DPM criteria for arterial streets leaving one of the two lanes open.*

STREET CAPACITY



REV. 3-83

PLATE 22.3 D-1

INLETS ON GRADE (#1,2, 5 AND 6)

INLET #	DEPTH[1] FT.	SLOPE[1] (%)	Q APPROACH (cfs)	Q INTERCEPTED[2] (cfs)	BY-PASS (cfs)
1	0.66	0.6	24.15	9.6	14.55
2	0.66	0.6	24.14	9.6	14.54
5	0.46	0.6	8.67	3.3	5.37
6	0.46	0.6	8.67	3.3	5.37
TOTAL			65.63	25.80	39.83

(1) From Table 1
(2) From Plate 22.3 D-6

INLETS IN SUMP (#3 & 4)

TYPE 'A' AND 'C' DOUBLE GRATE INLETS

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right-of-way elevation. The length of the double grate facing the street is 6.5'± and the depth is 0.725' at the lip of the gutter. The sides are each 2' long (4' total) and the average depth is 0.892'*. From the weir equation:*

$$\text{(Front) } Q_{cap} = 3.0 \times 6.5' \times 0.725^{1.5} = 12.40 \text{ cfs}$$
$$\text{(Sides) } Q_{cap} = 3.0 \times 4.0' \times 0.892^{1.5} = 10.11 \text{ cfs}$$
$$\text{(Total) } Q_{cap} = 12.04 \text{ cfs} + 10.11 \text{ cfs} = 22.15 \text{ cfs}$$

* Note: *These depths assume standard 8" curb with the right-of-way 9' behind the curb and 0.18' above the top of curb.*

The 100-year flow to the sump inlets is 39.83 cfs. There are two sump inlets with a combined capacity of 44.30 cfs thus providing a safety factor that would allow 10% of the inlets to clog without exceeding the normal design criteria. For HGL calculations, each inlet is assumed to take one half of the 100-year flow (19.92 cfs each).

EMERGENCY OVERFLOW

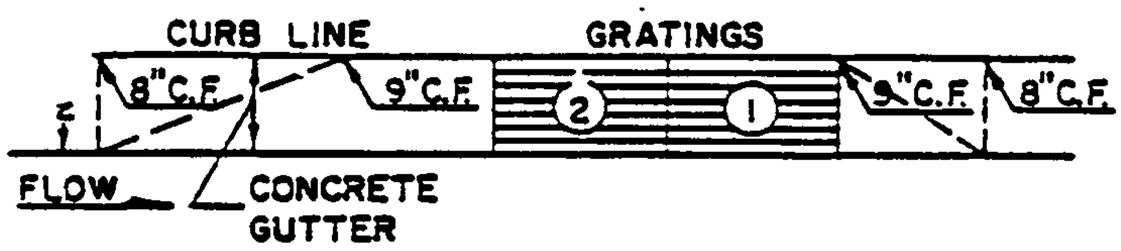
The sump has a 25' wide emergency overflow spillway designed to handle the 100-year flow (65.63 cfs) from this entire development in the event that the storm sewer system failed completely. The depth of flow in the emergency overflow spillway is given by the broad crested weir equation as:

$$\text{Emergency overflow } Q = 65.63 \text{ cfs} = 2.7 \times 25' \times (\text{depth})^{1.5}$$
$$\text{depth} = 0.98'$$

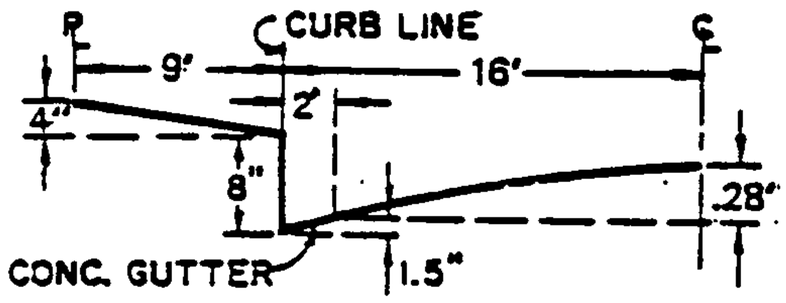
This depth is measured above the right-of-way elevation. The pads in the sump area are set 1.5' above the right-of-way, thus allowing 6"± for construction tolerances. The emergency overflow swale is at a 0.5% slope, 25' wide, and has the following capacity at a 0.98 depth:

$$\text{(from Manning's) } Q_{cap} = (1.486/0.03) \times (25' \times 0.98') \times (0.98)^{0.67} \times (0.005)^{0.5} = 84.66 \text{ cfs} > 65.63 \text{ cfs (OK)}$$

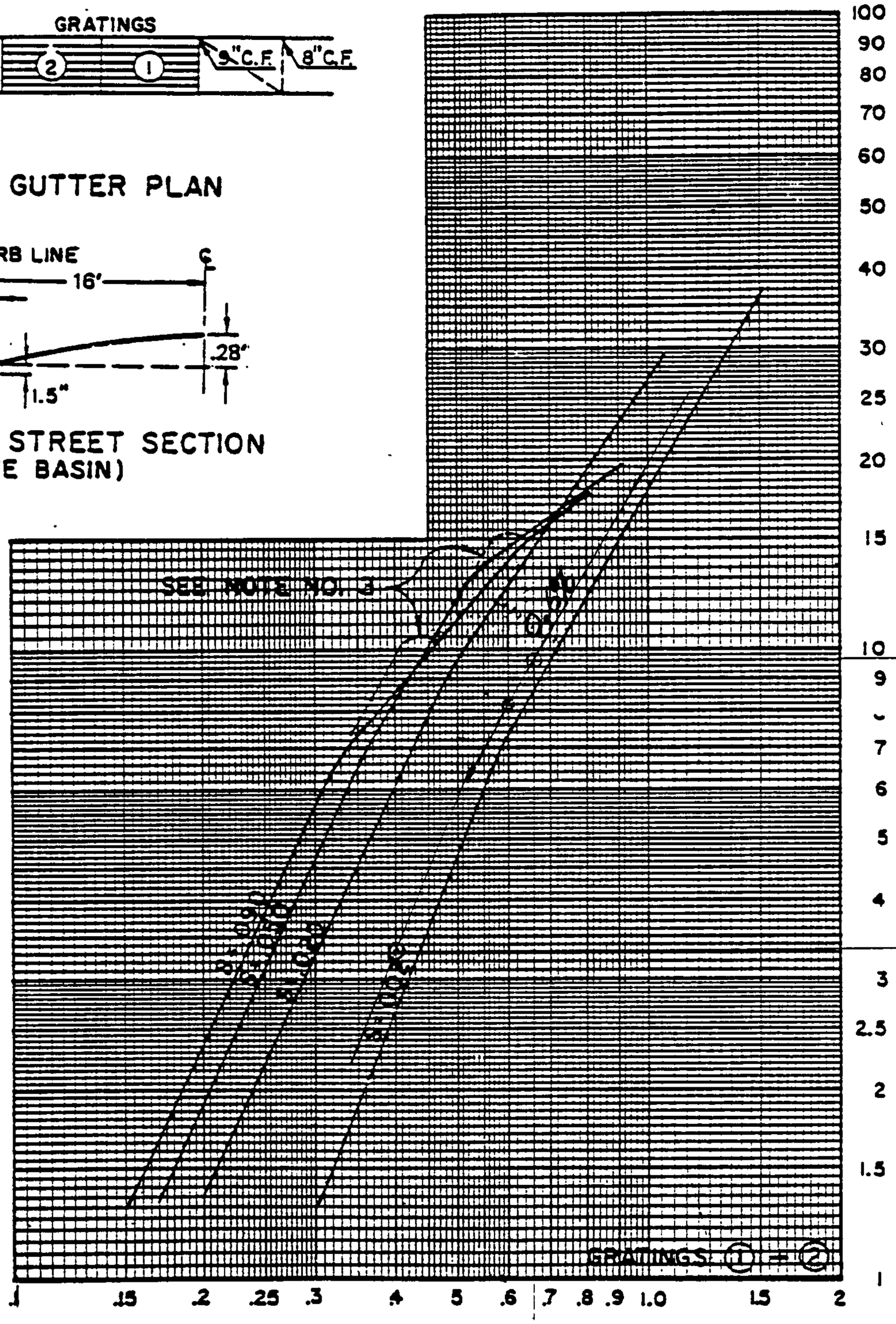
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

POND-2 Version: 4.01
S/N: 88020607

POND #2 (EXISTING)

CALCULATED 06-18-1997 09:12:31
DISK FILE : C:TEN2EX .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
71.50	0.00	0.00	0.00	0.00	0.00
72.00	1,250.00	0.03	0.03	0.00	0.00
74.00	6,125.00	0.14	0.23	0.16	0.16
76.00	20,250.00	0.46	0.86	0.57	0.73
76.71	*I*	0.65	1.66	0.39	1.13
76.91	*I*	0.70	1.74	0.53	1.26
77.00	*I*	0.73	1.78	0.59	1.33
78.00	46,000.00	1.06	2.22	1.48	2.22

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

POND #1(existing)

CALCULATED 06-18-1997 09:11:31
DISK FILE : C:TEN1EX .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
71.50	0.00	0.00	0.00	0.00	0.00
72.00	4,750.00	0.11	0.11	0.02	0.02
74.00	24,125.00	0.55	0.91	0.61	0.62
76.00	40,375.00	0.93	2.20	1.46	2.09
76.71	*I*	1.09	3.02	0.71	2.80
76.91	*I*	1.13	3.08	0.94	3.02
77.00	50,250.00	1.15	3.11	1.04	3.13
78.00	70,500.00	1.62	4.14	1.38	4.51

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

PONDS 1 & 2 COMBINED (EXISTING)

CALCULATED 06-18-1997 09:10:05
DISK FILE : C:TEN3 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume * (acre-ft)	Volume Sum (acre-ft)
71.50	0.00	0.00	0.00	0.00	0.00
72.00	6,000.00	0.14	0.14	0.02	0.02
74.00	30,250.00	0.69	1.14	0.76	0.78
76.00	60,625.00	1.39	3.07	2.05	2.83
76.71	*I*	1.73	4.68	1.11	3.94
76.91	*I*	1.84	4.83	1.46	4.29
77.00	82,050.00	1.88	4.89	1.63	4.46
78.00	116,500.00	2.67	6.80	2.27	6.73

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

POND #1 (DEVELOPED)

CALCULATED 06-18-1997 09:30:42
DISK FILE : C:TEN1 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume * (acre-ft)	Volume Sum (acre-ft)
69.00	0.00	0.00	0.00	0.00	0.00
70.00	21,000.00	0.48	0.48	0.16	0.16
74.00	*I*	0.82	1.93	2.57	2.73
76.00	44,500.00	1.02	2.21	4.41	4.57
76.44	*I*	1.08	3.15	0.46	5.03
76.71	*I*	1.11	3.20	0.76	5.33
76.85	*I*	1.13	3.23	0.92	5.49
77.00	50,250.00	1.15	3.26	1.09	5.66
78.00	70,500.00	1.62	4.14	1.38	7.04

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
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Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

POND #2 (DEVELOPED)

CALCULATED 06-18-1997 09:29:44
DISK FILE : C:TEN2 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
69.00	0.00	0.00	0.00	0.00	0.00
70.00	6,000.00	0.14	0.14	0.05	0.05
74.00	14,000.00	0.32	0.67	0.89	0.94
76.00	20,250.00	0.46	1.17	0.78	1.72
76.44	*I*	0.57	1.56	0.23	1.95
76.71	*I*	0.65	1.66	0.39	2.11
76.85	*I*	0.69	1.72	0.49	2.21
77.00	*I*	0.73	1.78	0.59	2.31
78.00	46,000.00	1.06	2.22	1.48	3.20

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

PONDS 1 & 2 COMBINED (DEVELOPED)

CALCULATED 06-18-1997 09:26:57
DISK FILE : C:TEN3 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume * (acre-ft)	Volume Sum (acre-ft)
69.00	0.00	0.00	0.00	0.00	0.00
70.00	27,000.00	0.62	0.62	0.21	0.21
74.00	49,719.00	1.14	2.60	3.47	3.68
76.00	64,750.00	1.49	3.93	2.62	6.30
76.44	*I*	1.66	4.71	0.69	6.99
76.71	*I*	1.76	4.87	1.15	7.45
76.85	*I*	1.82	4.95	1.40	7.70
77.00	82,050.00	1.88	5.04	1.68	7.98
78.00	116,500.00	2.67	6.80	2.27	10.25

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

HYDROLOGY

For street capacities we need to determine the runoff generated from the on-site drainage area and the Arenal right-of-way. For ponding volumes on the park we need the 10 day, 100 year runoff including the park drainage areas. No flow crosses Arenal Road from the north and Basin 102 includes 0.5 acres of the on-site area (entrance road) and a 15' wide slope from the park because the land south of Arenal is approximately 5' higher than the road. Runoff in the south half of Arenal Road meets arterial drainage standards without storm sewer.

Most of the existing pavement (3± ac) in the park is in basin 103 and an additional 3± acres is conservatively estimated for future development of a Park Office building and associated facilities.

D. MARK GOODWIN & ASSOCIATES

100 YEAR PRECIPITATION

(from Figures D, E and F and Eq. 28 of DPM 22.2)

P_{60} = 1.92", P_{360} = 2.25", P_{1440} = 2.66", P_{10days} = 10.0-[24.9/(2.66")$^{1.4}$] = 3.67"

SUMMARY OF HYDROLOGY

(from AHYMO and Equation 9 and Table 3 of DPM Sec. 22.2)

Basin No.	Area (Ac.)	Area (Sq.Mi.)	Tc (min.)	Tp (hr.)	Land Treatments (%)				100 Year			10 Year Q (cfs)
					A	B	C	D	Q (cfs)	V_{360} (Ac.ft.)	V_{10day} (Ac.ft.)	
101	19.0	0.02969	12	0.133	0	35	13	52	65.63	2.256	3.425	38.10
102	2.4	0.00375	12	0.133	0	40	15	45	7.94	0.268	0.396	4.49
103	28.7	0.04484	20	0.222	30	50	10	10	43.35	1.872	2.211	17.36
104	12.3	0.01922	20	0.222	0	83	10	7	20.16	0.846	0.947	8.37
Total	—	0.09750							135.97	5.751	6.981	68.32
103 *	28.7	0.04484	20	0.222	20	50	10	20	51.10	2.249	2.928	23.72
Total									132.87	5.618	7.696	68.96
101 **	19.0	0.02969	20	0.222	100	0	0	0	2.35	0.744	0.744	5.43
Total									92.36	3.730	4.298	33.70

* *With future Park Office Development*

** *Pre-developed with no Park Office Development*

	Volume	Elevation
Pre-Volume	4.298	76.91
Post-Volume	6.981	76.44
Post with park Volume	7.696	76.85

CORPORATE LIMITS

SAN JOSE DE ARMIJO CEMETARY

ARENAL ROAD

SAN JOSE ARENAL

CORPORATE LIMITS

SU-1

SCHOOL

RM 61

VALLEY WEST

SU-1 PRD

102

101

103

104

SITE of SUBDIVISION

CORPORATE LIMITS

COORS BLVD.

LOGAN H. V.

RD

Scale: 1" = 500'

Basin Map

100-YR, Pre-development

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten99pre.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.250
COMPUTE NM HYD	101.00	-	3	.02969	26.35	.744	.47013	1.532	1.387	PER IMP= .00
COMPUTE NM HYD	102.00	-	2	.00375	7.94	.268	1.33881	1.499	3.310	PER IMP= 45.00
COMPUTE NM HYD	103.00	-	1	.04484	43.35	1.872	.78290	1.598	1.511	PER IMP= 10.00
ADD HYD	103.20	1& 2	1	.04859	49.15	2.140	.82579	1.598	1.581	
ADD HYD	103.30	1& 3	1	.07828	73.08	2.884	.69089	1.565	1.459	
COMPUTE NM HYD	104.00	-	2	.01922	20.16	.846	.82527	1.598	1.639	PER IMP= 7.00
ADD HYD	104.10	1& 2	1	.09750	92.36	3.730	.71738	1.565	1.480	
FINISH										

100-YR, POST-Development

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten99.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.250
COMPUTE NM HYD	101.00	-	3	.02969	65.63	2.256	1.42467	1.499	3.454	PER IMP= 52.00
COMPUTE NM HYD	102.00	-	2	.00375	7.94	.268	1.33881	1.499	3.310	PER IMP= 45.00
COMPUTE NM HYD	103.00	-	1	.04484	43.35	1.872	.78290	1.598	1.511	PER IMP= 10.00
ADD HYD	103.20	1& 2	1	.04859	49.15	2.140	.82579	1.598	1.581	
ADD HYD	103.30	1& 3	1	.07828	108.62	4.396	1.05293	1.532	2.168	
COMPUTE NM HYD	104.00	-	2	.01922	20.16	.846	.82527	1.598	1.639	PER IMP= 7.00
ADD HYD	104.10	1& 2	1	.09750	125.85	5.242	1.00805	1.532	2.017	
FINISH										

100-YR, POST-Development Plus Park Offices

AHYMO SUMMARY TABLE (AHYM0194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten99p.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.250
COMPUTE NM HYD	101.00	-	3	.02969	65.63	2.256	1.42467	1.499	3.454	PER IMP=	52.00
COMPUTE NM HYD	102.00	-	2	.00375	7.94	.268	1.33881	1.499	3.310	PER IMP=	45.00
COMPUTE NM HYD	103.00	-	1	.04484	51.10	2.249	.94024	1.598	1.781	PER IMP=	20.00
ADD HYD	103.20	1& 2	1	.04859	56.91	2.516	.97099	1.598	1.830		
ADD HYD	103.30	1& 3	1	.07828	115.64	4.772	1.14306	1.532	2.308		
COMPUTE NM HYD	104.00	-	2	.01922	20.16	.846	.82527	1.598	1.639	PER IMP=	7.00
ADD HYD	104.10	1& 2	1	.09750	132.87	5.618	1.08041	1.532	2.129		
FINISH											

10-YR, PRE-Development

AHYMO SUMMARY TABLE (AHYM0194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten10pre.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.500
COMPUTE NM HYD	101.00	-	3	.02969	5.43	.152	.09596	1.532	.286	PER IMP= .00
COMPUTE NM HYD	102.00	-	2	.00375	4.49	.146	.73051	1.499	1.869	PER IMP= 45.00
COMPUTE NM HYD	103.00	-	1	.04484	17.36	.743	.31063	1.598	.605	PER IMP= 10.00
ADD HYD	103.20	1& 2	1	.04859	20.59	.889	.34302	1.598	.662	
ADD HYD	103.30	1& 3	1	.07828	25.72	1.041	.24931	1.565	.513	
COMPUTE NM HYD	104.00	-	2	.01922	8.37	.339	.33035	1.598	.681	PER IMP= 7.00
ADD HYD	104.10	1& 2	1	.09750	33.70	1.379	.26528	1.565	.540	
FINISH										

10-YR, POST-Development, Plus Park Offices

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten10p.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.500
COMPUTE NM HYD	101.00	-	3	.02969	38.10	1.265	.79873	1.499	2.005	PER IMP= 52.00
COMPUTE NM HYD	102.00	-	2	.00375	4.49	.146	.73051	1.499	1.869	PER IMP= 45.00
COMPUTE NM HYD	103.00	-	1	.04484	23.72	1.027	.42955	1.598	.827	PER IMP= 20.00
ADD HYD	103.20	1& 2	1	.04859	26.96	1.173	.45276	1.598	.867	
ADD HYD	103.30	1& 3	1	.07828	61.93	2.438	.58397	1.532	1.236	
COMPUTE NM HYD	104.00	-	2	.01922	8.37	.339	.33035	1.598	.681	PER IMP= 7.00
ADD HYD	104.10	1& 2	1	.09750	68.96	2.777	.53397	1.532	1.105	
FINISH										

10-YR, POST-Development

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten10.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	PAGE = 1
START											TIME= .00
RAINFALL TYPE= 1											RAIN6= 1.500
COMPUTE NM HYD	101.00	-	3	.02969	38.10	1.265	.79873	1.499	2.005	PER IMP= 52.00	
COMPUTE NM HYD	102.00	-	2	.00375	4.49	.146	.73051	1.499	1.869	PER IMP= 45.00	
COMPUTE NM HYD	103.00	-	1	.04484	17.36	.743	.31063	1.598	.605	PER IMP= 10.00	
ADD HYD	103.20	1& 2	1	.04859	20.59	.889	.34302	1.598	.662		
ADD HYD	103.30	1& 3	1	.07828	56.32	2.154	.51586	1.532	1.124		
COMPUTE NM HYD	104.00	-	2	.01922	8.37	.339	.33035	1.598	.681	PER IMP= 7.00	
ADD HYD	104.10	1& 2	1	.09750	63.36	2.492	.47929	1.532	1.015		
FINISH											

10-YR, POST Development, Input

```
START                   TIME=0.0
***** TENORIO SUBDIVISION
***** 10-YEAR 6-HOUR STORM EVENT
***** JUNE 4, 1997
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.28 IN RAIN SIX=1.50 IN
                        RAIN DAY=1.77 IN DT=0.0333 HR
COMPUTE NM HYD          ID=3 HYD NO=101.0 AREA=0.02969 SQ MI
                        PER A=0 PER B=35 PER C=13 PER D=52
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=3 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=102.0 AREA=0.00375 SQ MI
                        PER A=0 PER B=40 PER C=15 PER D=45
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
COMPUTE NM HYD          ID=1 HYD NO=103.0 AREA=0.04484 SQ MI
                        PER A=30 PER B=50 PER C=10 PER D=10
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.2 ID=1 & 2
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.3 ID=1 & 3
PRINT HYD               ID=1 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=104.0 AREA=0.01922 SQ MI
                        PER A=0 PER B=83 PER C=10 PER D=7
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
ADD HYD                 ID=1 HYD NO=104.1 ID=1 & 2
PRINT HYD               ID=1 CODE=1
FINISH
```

100-YR, POST-Development, Input

```
START                   TIME=0.0
***** TENORIO SUBDIVISION
***** 100-YEAR 6-HOUR STORM EVENT
***** JUNE 4, 1997
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.92 IN RAIN SIX=2.25 IN
                        RAIN DAY=2.66 IN DT=0.0333 HR
COMPUTE NM HYD          ID=3 HYD NO=101.0 AREA=0.02969 SQ MI
                        PER A=0 PER B=35 PER C=13 PER D=52
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=3 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=102.0 AREA=0.00375 SQ MI
                        PER A=0 PER B=40 PER C=15 PER D=45
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
COMPUTE NM HYD          ID=1 HYD NO=103.0 AREA=0.04484 SQ MI
                        PER A=30 PER B=50 PER C=10 PER D=10
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.2 ID=1 & 2
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.3 ID=1 & 3
PRINT HYD               ID=1 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=104.0 AREA=0.01922 SQ MI
                        PER A=0 PER B=83 PER C=10 PER D=7
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
ADD HYD                 ID=1 HYD NO=104.1 ID=1 & 2
PRINT HYD               ID=1 CODE=1
FINISH
```

100-YR Post Development Detailed Output

```
    AHYMO PROGRAM (AHYMO194) - AHAFCA Hydrologic Model - January, 1994
          RUN DATE (MON/DAY/YR) = 06/12/1997
          START TIME (HR:MIN:SEC) = 16:32:07      USER NO.= M_GOODWN.101
          INPUT FILE = ten99.dat

START                 TIME=0.0
***** TENORIO SUBDIVISION
***** 100-YEAR 6-HOUR STORM EVENT
***** JUNE 4, 1997
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.92 IN RAIN SIX=2.25 IN
                      RAIN DAY=2.66 IN DT=0.0333 HR

                   COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                   DT =     .033300 HOURS       END TIME =     5.994000 HOURS
                      .0000   .0016   .0032   .0049   .0065   .0083   .0100
                      .0118   .0137   .0156   .0175   .0195   .0216   .0237
                      .0259   .0281   .0304   .0328   .0353   .0378   .0404
                      .0432   .0460   .0489   .0520   .0552   .0586   .0621
                      .0658   .0697   .0739   .0791   .0848   .0908   .1033
                      .1320   .1762   .2399   .3268   .4412   .5872   .7690
                      .9911  1.2043  1.2918  1.3654  1.4308  1.4902  1.5449
                     1.5957  1.6431  1.6876  1.7294  1.7689  1.8062  1.8415
                     1.8749  1.9066  1.9367  1.9653  1.9924  1.9998  2.0056
                     2.0112  2.0165  2.0215  2.0264  2.0310  2.0355  2.0398
                     2.0439  2.0479  2.0518  2.0556  2.0593  2.0628  2.0663
                     2.0697  2.0729  2.0762  2.0793  2.0824  2.0853  2.0883
                     2.0912  2.0940  2.0967  2.0994  2.1021  2.1047  2.1072
                     2.1098  2.1122  2.1147  2.1171  2.1194  2.1217  2.1240
                     2.1263  2.1285  2.1307  2.1328  2.1349  2.1370  2.1391
                     2.1411  2.1432  2.1451  2.1471  2.1490  2.1510  2.1529
                     2.1547  2.1566  2.1584  2.1602  2.1620  2.1638  2.1655
                     2.1673  2.1690  2.1707  2.1724  2.1740  2.1757  2.1773
                     2.1789  2.1805  2.1821  2.1837  2.1852  2.1868  2.1883
                     2.1898  2.1913  2.1928  2.1943  2.1958  2.1972  2.1987
                     2.2001  2.2015  2.2029  2.2043  2.2057  2.2071  2.2085
                     2.2098  2.2112  2.2125  2.2138  2.2151  2.2165  2.2178
                     2.2190  2.2203  2.2216  2.2229  2.2241  2.2254  2.2266
                     2.2278  2.2290  2.2303  2.2315  2.2327  2.2339  2.2350
                     2.2362  2.2374  2.2385  2.2397  2.2409  2.2420  2.2431
                     2.2443  2.2454  2.2465  2.2476  2.2487  2.2498

COMPUTE NM HYD        ID=3 HYD NO=101.0 AREA=0.02969 SQ MI
                      PER A=0 PER B=35 PER C=13 PER D=52
                      TP=0.1333 HR MASS RAINFALL=-1

     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545009      SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =    60.953    CFS   UNIT VOLUME =     .9992       B =   526.28       P60 = 1.9200
     AREA =       .015439 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300


     K =    .124347HR     TP =    .133300HR     K/TP RATIO =    .932837      SHAPE CONSTANT, N =  3.791866
```

UNIT PEAK = 36.462 CFS UNIT VOLUME = .9999 B = 341.05 P60 = 1.9200
AREA = .014251 SQ MI IA = .45937 INCHES INF = 1.13625 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=3 CODE=0

PARTIAL HYDROGRAPH 101.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.432	46.2	2.864	.8	4.296	.2	5.728	.3
.033	.0	1.465	59.0	2.897	.8	4.329	.2	5.761	.3
.067	.0	1.499	65.6	2.930	.7	4.362	.2	5.794	.3
.100	.0	1.532	63.6	2.964	.7	4.396	.2	5.827	.3
.133	.0	1.565	56.1	2.997	.6	4.429	.2	5.861	.3
.167	.0	1.598	47.5	3.030	.6	4.462	.2	5.894	.3
.200	.0	1.632	40.2	3.064	.6	4.495	.2	5.927	.3
.233	.0	1.665	34.5	3.097	.5	4.529	.2	5.961	.3
.266	.0	1.698	30.0	3.130	.5	4.562	.2	5.994	.3
.300	.0	1.732	26.6	3.163	.5	4.595	.2	6.027	.3
.333	.0	1.765	23.8	3.197	.5	4.629	.2	6.061	.3
.366	.0	1.798	21.4	3.230	.4	4.662	.2	6.094	.2
.400	.0	1.832	19.4	3.263	.4	4.695	.2	6.127	.2
.433	.0	1.865	17.7	3.297	.4	4.729	.2	6.160	.1
.466	.0	1.898	16.3	3.330	.4	4.762	.2	6.194	.1
.500	.0	1.931	15.1	3.363	.4	4.795	.2	6.227	.1
.533	.0	1.965	14.0	3.397	.4	4.828	.3	6.260	.1
.566	.0	1.998	13.1	3.430	.4	4.862	.3	6.294	.0
.599	.0	2.031	12.2	3.463	.4	4.895	.3	6.327	.0
.633	.0	2.065	11.1	3.496	.3	4.928	.3	6.360	.0
.666	.0	2.098	9.5	3.530	.3	4.962	.3	6.394	.0
.699	.0	2.131	7.8	3.563	.3	4.995	.3	6.427	.0
.733	.0	2.165	6.3	3.596	.3	5.028	.3	6.460	.0
.766	.0	2.198	5.2	3.630	.3	5.062	.3	6.493	.0
.799	.0	2.231	4.4	3.663	.3	5.095	.3	6.527	.0
.832	.0	2.264	3.8	3.696	.3	5.128	.3	6.560	.0
.866	.0	2.298	3.4	3.730	.3	5.161	.3	6.593	.0
.899	.0	2.331	3.1	3.763	.3	5.195	.3	6.627	.0
.932	.0	2.364	2.8	3.796	.3	5.228	.3	6.660	.0
.966	.0	2.398	2.5	3.829	.3	5.261	.3	6.693	.0
.999	.0	2.431	2.3	3.863	.3	5.295	.3	6.727	.0
1.032	.0	2.464	2.1	3.896	.3	5.328	.3	6.760	.0
1.066	.0	2.497	1.9	3.929	.3	5.361	.3	6.793	.0
1.099	.0	2.531	1.8	3.963	.3	5.395	.3	6.826	.0
1.132	.0	2.564	1.6	3.996	.3	5.428	.3	6.860	.0
1.166	.1	2.597	1.5	4.029	.3	5.461	.3	6.893	.0
1.199	.7	2.631	1.4	4.063	.3	5.494	.3	6.926	.0
1.232	2.4	2.664	1.3	4.096	.3	5.528	.3	6.960	.0
1.265	5.2	2.697	1.2	4.129	.3	5.561	.3	6.993	.0
1.299	8.9	2.731	1.1	4.162	.3	5.594	.3	7.026	.0
1.332	14.1	2.764	1.0	4.196	.2	5.628	.3	7.060	.0
1.365	21.9	2.797	.9	4.229	.2	5.661	.3		
1.399	32.8	2.830	.9	4.262	.2	5.694	.3		

RUNOFF VOLUME = 1.42467 INCHES = 2.2559 ACRE-FEET
PEAK DISCHARGE RATE = 65.63 CFS AT 1.499 HOURS BASIN AREA = .0297 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=102.0 AREA=0.00375 SQ MI
PER A=0 PER B=40 PER C=15 PER D=45
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.6623 CFS UNIT VOLUME = .9975 B = 526.28 P60 = 1.9200
AREA = .001688 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .124301HR TP = .133300HR K/TP RATIO = .932488 SHAPE CONSTANT, N = 3.793345
UNIT PEAK = 5.2785 CFS UNIT VOLUME = .9977 B = 341.15 P60 = 1.9200
AREA = .002063 SQ MI IA = .45909 INCHES INF = 1.13545 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=0

PARTIAL HYDROGRAPH 102.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.332	1.6	2.664	.1	3.996	.0	5.328	.0
.033	.0	1.365	2.5	2.697	.1	4.029	.0	5.361	.0
.067	.0	1.399	3.8	2.731	.1	4.063	.0	5.395	.0
.100	.0	1.432	5.5	2.764	.1	4.096	.0	5.428	.0
.133	.0	1.465	7.1	2.797	.1	4.129	.0	5.461	.0
.167	.0	1.499	7.9	2.830	.1	4.162	.0	5.494	.0
.200	.0	1.532	7.7	2.864	.1	4.196	.0	5.528	.0
.233	.0	1.565	6.8	2.897	.1	4.229	.0	5.561	.0
.266	.0	1.598	5.8	2.930	.1	4.262	.0	5.594	.0
.300	.0	1.632	4.9	2.964	.1	4.296	.0	5.628	.0
.333	.0	1.665	4.2	2.997	.1	4.329	.0	5.661	.0
.366	.0	1.698	3.6	3.030	.1	4.362	.0	5.694	.0
.400	.0	1.732	3.2	3.064	.1	4.396	.0	5.728	.0
.433	.0	1.765	2.8	3.097	.1	4.429	.0	5.761	.0
.466	.0	1.798	2.5	3.130	.1	4.462	.0	5.794	.0
.500	.0	1.832	2.3	3.163	.1	4.495	.0	5.827	.0
.533	.0	1.865	2.1	3.197	.1	4.529	.0	5.861	.0
.566	.0	1.898	1.9	3.230	.0	4.562	.0	5.894	.0
.599	.0	1.931	1.7	3.263	.0	4.595	.0	5.927	.0
.633	.0	1.965	1.6	3.297	.0	4.629	.0	5.961	.0
.666	.0	1.998	1.5	3.330	.0	4.662	.0	5.994	.0
.699	.0	2.031	1.4	3.363	.0	4.695	.0	6.027	.0
.733	.0	2.065	1.3	3.397	.0	4.729	.0	6.061	.0
.766	.0	2.098	1.1	3.430	.0	4.762	.0	6.094	.0
.799	.0	2.131	.9	3.463	.0	4.795	.0	6.127	.0
.832	.0	2.165	.7	3.496	.0	4.828	.0	6.160	.0
.866	.0	2.198	.6	3.530	.0	4.862	.0	6.194	.0
.899	.0	2.231	.5	3.563	.0	4.895	.0	6.227	.0

.932	.0	2.264	.5	3.596	.0	4.928	.0	6.260	.0
.966	.0	2.298	.4	3.630	.0	4.962	.0	6.294	.0
.999	.0	2.331	.4	3.663	.0	4.995	.0	6.327	.0
1.032	.0	2.364	.3	3.696	.0	5.028	.0	6.360	.0
1.066	.0	2.398	.3	3.730	.0	5.062	.0	6.394	.0
1.099	.0	2.431	.3	3.763	.0	5.095	.0	6.427	.0
1.132	.0	2.464	.2	3.796	.0	5.128	.0	6.460	.0
1.166	.0	2.497	.2	3.829	.0	5.161	.0	6.493	.0
1.199	.1	2.531	.2	3.863	.0	5.195	.0	6.527	.0
1.232	.3	2.564	.2	3.896	.0	5.228	.0	6.560	.0
1.265	.6	2.597	.2	3.929	.0	5.261	.0	6.593	.0
1.299	1.0	2.631	.2	3.963	.0	5.295	.0		

RUNOFF VOLUME = 1.33881 INCHES = .2678 ACRE-FEET
PEAK DISCHARGE RATE = 7.94 CFS AT 1.499 HOURS BASIN AREA = .0038 SQ. MI.

COMPUTE NM HYD ID=1 HYD NO=103.0 AREA=0.04484 SQ MI
PER A=30 PER B=50 PER C=10 PER D=10
TP=0.2222 HR MASS RAINFALL=-1

K = .121099HR TP = .222200HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.620 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.9200
AREA = .004484 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .231277HR TP = .222200HR K/TP RATIO = 1.040852 SHAPE CONSTANT, N = 3.391670
UNIT PEAK = 56.727 CFS UNIT VOLUME = .9998 B = 312.34 P60 = 1.9200
AREA = .040356 SQ MI IA = .53333 INCHES INF = 1.34333 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 103.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	30.7	2.997	1.4	4.495	.2	5.994	.1
.033	.0	1.532	37.3	3.030	1.3	4.529	.2	6.027	.1
.067	.0	1.565	41.6	3.064	1.3	4.562	.2	6.061	.1
.100	.0	1.598	43.4	3.097	1.2	4.595	.2	6.094	.1
.133	.0	1.632	43.0	3.130	1.2	4.629	.2	6.127	.1
.167	.0	1.665	41.0	3.163	1.1	4.662	.2	6.160	.1
.200	.0	1.698	37.9	3.197	1.1	4.695	.2	6.194	.1
.233	.0	1.732	34.4	3.230	1.0	4.729	.2	6.227	.1
.266	.0	1.765	30.7	3.263	1.0	4.762	.2	6.260	.1
.300	.0	1.798	27.3	3.297	.9	4.795	.2	6.294	.0
.333	.0	1.832	24.1	3.330	.9	4.828	.2	6.327	.0
.366	.0	1.865	21.3	3.363	.8	4.862	.1	6.360	.0
.400	.0	1.898	18.8	3.397	.8	4.895	.1	6.394	.0
.433	.0	1.931	16.6	3.430	.8	4.928	.1	6.427	.0
.466	.0	1.965	14.7	3.463	.7	4.962	.1	6.460	.0

.500	.0	1.998	13.1	3.496	.7	4.995	.1	6.493	.0
.533	.0	2.031	11.7	3.530	.7	5.028	.1	6.527	.0
.566	.0	2.065	10.4	3.563	.6	5.062	.1	6.560	.0
.599	.0	2.098	9.3	3.596	.6	5.095	.1	6.593	.0
.633	.0	2.131	8.2	3.630	.6	5.128	.1	6.627	.0
.666	.0	2.165	7.2	3.663	.5	5.161	.1	6.660	.0
.699	.0	2.198	6.4	3.696	.5	5.195	.1	6.693	.0
.733	.0	2.231	5.7	3.730	.5	5.228	.1	6.727	.0
.766	.0	2.264	5.1	3.763	.5	5.261	.1	6.760	.0
.799	.0	2.298	4.7	3.796	.5	5.295	.1	6.793	.0
.832	.0	2.331	4.3	3.829	.4	5.328	.1	6.826	.0
.866	.0	2.364	4.0	3.863	.4	5.361	.1	6.860	.0
.899	.0	2.398	3.7	3.896	.4	5.395	.1	6.893	.0
.932	.0	2.431	3.5	3.929	.4	5.428	.1	6.926	.0
.966	.0	2.464	3.3	3.963	.4	5.461	.1	6.960	.0
.999	.0	2.497	3.1	3.996	.3	5.494	.1	6.993	.0
1.032	.0	2.531	3.0	4.029	.3	5.528	.1	7.026	.0
1.066	.0	2.564	2.8	4.063	.3	5.561	.1	7.060	.0
1.099	.0	2.597	2.6	4.096	.3	5.594	.1	7.093	.0
1.132	.0	2.631	2.5	4.129	.3	5.628	.1	7.126	.0
1.166	.0	2.664	2.4	4.162	.3	5.661	.1	7.159	.0
1.199	.0	2.697	2.3	4.196	.3	5.694	.1	7.193	.0
1.232	.1	2.731	2.1	4.229	.3	5.728	.1	7.226	.0
1.265	.3	2.764	2.0	4.262	.3	5.761	.1	7.259	.0
1.299	.7	2.797	1.9	4.296	.2	5.794	.1	7.293	.0
1.332	1.4	2.830	1.8	4.329	.2	5.827	.1	7.326	.0
1.365	3.4	2.864	1.7	4.362	.2	5.861	.1	7.359	.0
1.399	7.5	2.897	1.7	4.396	.2	5.894	.1		
1.432	14.1	2.930	1.6	4.429	.2	5.927	.1		
1.465	22.5	2.964	1.5	4.462	.2	5.961	.1		

RUNOFF VOLUME = .78290 INCHES = 1.8723 ACRE-FEET
PEAK DISCHARGE RATE = 43.35 CFS AT 1.598 HOURS BASIN AREA = .0448 SQ. MI.

ADD HYD ID=1 HYD NO=103.2 ID=1 & 2
PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 103.20

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	38.6	2.997	1.5	4.495	.2	5.994	.1
.033	.0	1.532	45.0	3.030	1.4	4.529	.2	6.027	.1
.067	.0	1.565	48.4	3.064	1.3	4.562	.2	6.061	.1
.100	.0	1.598	49.2	3.097	1.3	4.595	.2	6.094	.1
.133	.0	1.632	47.9	3.130	1.2	4.629	.2	6.127	.1
.167	.0	1.665	45.2	3.163	1.2	4.662	.2	6.160	.1
.200	.0	1.698	41.6	3.197	1.1	4.695	.2	6.194	.1
.233	.0	1.732	37.6	3.230	1.1	4.729	.2	6.227	.1
.266	.0	1.765	33.6	3.263	1.0	4.762	.2	6.260	.1
.300	.0	1.798	29.8	3.297	1.0	4.795	.2	6.294	.0
.333	.0	1.832	26.4	3.330	.9	4.829	.2	6.327	.0

.366	.0	1.865	23.4	3.363	.9	4.862	.2	6.360	.0
.400	.0	1.898	20.7	3.397	.8	4.895	.2	6.394	.0
.433	.0	1.931	18.4	3.430	.8	4.928	.2	6.427	.0
.466	.0	1.965	16.3	3.463	.8	4.962	.2	6.460	.0
.500	.0	1.998	14.6	3.496	.7	4.995	.2	6.493	.0
.533	.0	2.031	13.1	3.530	.7	5.028	.2	6.527	.0
.566	.0	2.065	11.7	3.563	.7	5.062	.2	6.560	.0
.599	.0	2.098	10.3	3.596	.6	5.095	.2	6.593	.0
.633	.0	2.131	9.1	3.630	.6	5.128	.2	6.627	.0
.666	.0	2.165	7.9	3.663	.6	5.161	.2	6.660	.0
.699	.0	2.198	7.0	3.696	.5	5.195	.2	6.693	.0
.733	.0	2.231	6.2	3.730	.5	5.228	.2	6.727	.0
.766	.0	2.264	5.6	3.763	.5	5.261	.1	6.760	.0
.799	.0	2.298	5.1	3.796	.5	5.295	.1	6.793	.0
.832	.0	2.331	4.7	3.829	.5	5.328	.1	6.826	.0
.866	.0	2.364	4.3	3.863	.4	5.361	.1	6.860	.0
.899	.0	2.398	4.0	3.896	.4	5.395	.1	6.893	.0
.932	.0	2.431	3.8	3.929	.4	5.428	.1	6.926	.0
.966	.0	2.464	3.6	3.963	.4	5.461	.1	6.960	.0
.999	.0	2.497	3.3	3.996	.4	5.494	.1	6.993	.0
1.032	.0	2.531	3.2	4.029	.4	5.528	.1	7.026	.0
1.066	.0	2.564	3.0	4.063	.4	5.561	.1	7.060	.0
1.099	.0	2.597	2.8	4.096	.3	5.594	.1	7.093	.0
1.132	.0	2.631	2.7	4.129	.3	5.628	.1	7.126	.0
1.166	.0	2.664	2.5	4.162	.3	5.661	.1	7.159	.0
1.199	.1	2.697	2.4	4.196	.3	5.694	.1	7.193	.0
1.232	.4	2.731	2.3	4.229	.3	5.728	.1	7.226	.0
1.265	.9	2.764	2.1	4.262	.3	5.761	.1	7.259	.0
1.299	1.7	2.797	2.0	4.296	.3	5.794	.1	7.293	.0
1.332	3.0	2.830	1.9	4.329	.3	5.827	.1	7.326	.0
1.365	5.8	2.864	1.8	4.362	.3	5.861	.1	7.359	.0
1.399	11.3	2.897	1.7	4.396	.3	5.894	.1		
1.432	19.7	2.930	1.7	4.429	.2	5.927	.1		
1.465	29.6	2.964	1.6	4.462	.2	5.961	.1		

RUNOFF VOLUME = .82579 INCHES = 2.1400 ACRE-FEET
PEAK DISCHARGE RATE = 49.15 CFS AT 1.598 HOURS BASIN AREA = .0486 SQ. MI.

ADD HYD ID=1 HYD NO=103.3 ID=1 & 3
PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 103.30

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	104.2	2.997	2.1	4.495	.5	5.994	.5
.033	.0	1.532	108.6	3.030	2.0	4.529	.5	6.027	.5
.067	.0	1.565	104.5	3.064	1.9	4.562	.5	6.061	.4
.100	.0	1.598	96.6	3.097	1.8	4.595	.5	6.094	.4
.133	.0	1.632	88.1	3.130	1.7	4.629	.5	6.127	.3
.167	.0	1.665	79.7	3.163	1.6	4.662	.5	6.160	.2
.200	.0	1.698	71.6	3.197	1.6	4.695	.4	6.194	.2

.233	.0	1.732	64.1	3.230	1.5	4.729	.4	6.227	.1
.266	.0	1.765	57.4	3.263	1.4	4.762	.4	6.260	.1
.300	.0	1.798	51.2	3.297	1.4	4.795	.4	6.294	.1
.333	.0	1.832	45.8	3.330	1.3	4.828	.4	6.327	.1
.366	.0	1.865	41.1	3.363	1.3	4.862	.4	6.360	.1
.400	.0	1.898	37.0	3.397	1.2	4.895	.4	6.394	.1
.433	.0	1.931	33.5	3.430	1.1	4.928	.4	6.427	.0
.466	.0	1.965	30.4	3.463	1.1	4.962	.4	6.460	.0
.500	.0	1.998	27.7	3.496	1.1	4.995	.4	6.493	.0
.533	.0	2.031	25.3	3.530	1.0	5.028	.4	6.527	.0
.566	.0	2.065	22.8	3.563	1.0	5.062	.4	6.560	.0
.599	.0	2.098	19.9	3.596	.9	5.095	.4	6.593	.0
.633	.0	2.131	16.9	3.630	.9	5.128	.4	6.627	.0
.666	.0	2.165	14.2	3.663	.9	5.161	.4	6.660	.0
.699	.0	2.198	12.2	3.696	.8	5.195	.4	6.693	.0
.733	.0	2.231	10.6	3.730	.8	5.228	.4	6.727	.0
.766	.0	2.264	9.4	3.763	.8	5.261	.4	6.760	.0
.799	.0	2.298	8.5	3.796	.8	5.295	.4	6.793	.0
.832	.0	2.331	7.9	3.829	.7	5.328	.4	6.826	.0
.866	.0	2.364	7.1	3.863	.7	5.361	.4	6.860	.0
.899	.0	2.398	6.6	3.896	.7	5.395	.4	6.893	.0
.932	.0	2.431	6.1	3.929	.7	5.428	.4	6.926	.0
.966	.0	2.464	5.7	3.963	.7	5.461	.4	6.960	.0
.999	.0	2.497	5.3	3.996	.6	5.494	.4	6.993	.0
1.032	.0	2.531	4.9	4.029	.6	5.528	.4	7.026	.0
1.066	.0	2.564	4.6	4.063	.6	5.561	.4	7.060	.0
1.099	.0	2.597	4.3	4.096	.6	5.594	.4	7.093	.0
1.132	.0	2.631	4.0	4.129	.6	5.628	.4	7.126	.0
1.166	.1	2.664	3.8	4.162	.6	5.661	.4	7.159	.0
1.199	.8	2.697	3.6	4.196	.6	5.694	.4	7.193	.0
1.232	2.7	2.731	3.4	4.229	.5	5.728	.4	7.226	.0
1.265	6.0	2.764	3.2	4.262	.5	5.761	.4	7.259	.0
1.299	10.6	2.797	3.0	4.296	.5	5.794	.4	7.293	.0
1.332	17.1	2.830	2.8	4.329	.5	5.827	.4	7.326	.0
1.365	27.7	2.864	2.7	4.362	.5	5.861	.4	7.359	.0
1.399	44.1	2.897	2.5	4.396	.5	5.894	.4		
1.432	65.8	2.930	2.4	4.429	.5	5.927	.4		
1.465	88.6	2.964	2.3	4.462	.5	5.961	.5		

RUNOFF VOLUME = 1.05293 INCHES = 4.3959 ACRE-FEET
PEAK DISCHARGE RATE = 108.62 CFS AT 1.532 HOURS BASIN AREA = .0783 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=104.0 AREA=0.01922 SQ MI
PER A=0 PER B=83 PER C=10 PER D=7
TP=0.2222 HR MASS RAINFALL=-1

K = .121099HR TP = .222200HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.1865 CFS UNIT VOLUME = .9963 B = 526.28 P60 = 1.9200
AREA = .001345 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .213965HR TP = .222000HR K/TP RATIO = .962940 SHAPE CONSTANT, N = 3.668963
UNIT PEAK = 26.744 CFS UNIT VOLUME = .9996 B = 332.46 P60 = 1.9200
AREA = .017875 SQ MI IA = .48387 INCHES INF = 1.20484 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD 1D=2 CODE=0

PARTIAL HYDROGRAPH 104.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.399	3.3	2.797	.8	4.196	.1	5.594	.0
.033	.0	1.432	6.3	2.830	.8	4.229	.1	5.628	.0
.067	.0	1.465	10.2	2.864	.8	4.262	.1	5.661	.0
.100	.0	1.499	14.1	2.897	.7	4.296	.1	5.694	.0
.133	.0	1.532	17.2	2.930	.7	4.329	.1	5.728	.0
.167	.0	1.565	19.3	2.964	.6	4.362	.1	5.761	.0
.200	.0	1.598	20.2	2.997	.6	4.396	.1	5.794	.0
.233	.0	1.632	20.0	3.030	.6	4.429	.1	5.827	.0
.266	.0	1.665	19.1	3.064	.5	4.462	.1	5.861	.0
.300	.0	1.698	17.7	3.097	.5	4.495	.1	5.894	.0
.333	.0	1.732	16.1	3.130	.5	4.529	.1	5.927	.0
.366	.0	1.765	14.4	3.163	.5	4.562	.1	5.961	.0
.400	.0	1.798	12.8	3.197	.4	4.595	.1	5.994	.0
.433	.0	1.832	11.2	3.230	.4	4.629	.1	6.027	.0
.466	.0	1.865	9.9	3.263	.4	4.662	.1	6.061	.0
.500	.0	1.898	8.6	3.297	.4	4.695	.1	6.094	.0
.533	.0	1.931	7.5	3.330	.4	4.729	.1	6.127	.0
.566	.0	1.965	6.6	3.363	.3	4.762	.1	6.160	.0
.599	.0	1.998	5.7	3.397	.3	4.795	.1	6.194	.0
.633	.0	2.031	5.0	3.430	.3	4.828	.1	6.227	.0
.666	.0	2.065	4.4	3.463	.3	4.862	.1	6.260	.0
.699	.0	2.098	3.9	3.496	.3	4.895	.0	6.294	.0
.733	.0	2.131	3.4	3.530	.3	4.928	.0	6.327	.0
.766	.0	2.165	3.0	3.563	.2	4.962	.0	6.360	.0
.799	.0	2.198	2.7	3.596	.2	4.995	.0	6.394	.0
.832	.0	2.231	2.5	3.630	.2	5.028	.0	6.427	.0
.866	.0	2.264	2.2	3.663	.2	5.062	.0	6.460	.0
.899	.0	2.298	2.0	3.696	.2	5.095	.0	6.493	.0
.932	.0	2.331	1.9	3.730	.2	5.128	.0	6.527	.0
.966	.0	2.364	1.8	3.763	.2	5.161	.0	6.560	.0
.999	.0	2.398	1.6	3.796	.2	5.195	.0	6.593	.0
1.032	.0	2.431	1.5	3.829	.2	5.228	.0	6.627	.0
1.066	.0	2.464	1.5	3.863	.2	5.261	.0	6.660	.0
1.099	.0	2.497	1.4	3.896	.2	5.295	.0	6.693	.0
1.132	.0	2.531	1.3	3.929	.1	5.328	.0	6.727	.0
1.166	.0	2.564	1.2	3.963	.1	5.361	.0	6.760	.0
1.199	.0	2.597	1.2	3.996	.1	5.395	.0	6.793	.0
1.232	.0	2.631	1.1	4.029	.1	5.428	.0	6.826	.0
1.265	.1	2.664	1.0	4.063	.1	5.461	.0	6.860	.0
1.299	.2	2.697	1.0	4.096	.1	5.494	.0	6.893	.0
1.332	.5	2.731	.9	4.129	.1	5.528	.0	6.926	.0
1.365	1.4	2.764	.9	4.162	.1	5.561	.0		

RUNOFF VOLUME = .82527 INCHES = .8460 ACRE-FEET
PEAK DISCHARGE RATE = 20.16 CFS AT 1.598 HOURS BASIN AREA = .0192 SQ. MI.

ADD HYD ID=1 HYD NO=104.1 ID=1 & 2
PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 104.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	118.3	2.997	2.7	4.495	.5	5.994	.5
.033	.0	1.532	125.9	3.030	2.6	4.528	.5	6.027	.5
.067	.0	1.565	123.8	3.064	2.5	4.562	.5	6.061	.5
.100	.0	1.598	116.8	3.097	2.3	4.595	.5	6.094	.4
.133	.0	1.632	108.1	3.130	2.2	4.629	.5	6.127	.3
.167	.0	1.665	98.8	3.163	2.1	4.662	.5	6.160	.2
.200	.0	1.698	89.3	3.197	2.0	4.695	.5	6.194	.2
.233	.0	1.732	80.2	3.230	1.9	4.729	.5	6.227	.2
.266	.0	1.765	71.7	3.263	1.8	4.762	.5	6.260	.1
.300	.0	1.798	64.0	3.297	1.7	4.795	.5	6.294	.1
.333	.0	1.832	57.0	3.330	1.7	4.828	.5	6.327	.1
.366	.0	1.865	50.9	3.363	1.6	4.862	.5	6.360	.1
.400	.0	1.898	45.6	3.397	1.5	4.895	.5	6.394	.1
.433	.0	1.931	41.0	3.430	1.5	4.928	.5	6.427	.1
.466	.0	1.965	37.0	3.463	1.4	4.962	.5	6.460	.0
.500	.0	1.998	33.4	3.496	1.3	4.995	.5	6.493	.0
.533	.0	2.031	30.3	3.530	1.3	5.028	.5	6.527	.0
.566	.0	2.065	27.3	3.563	1.2	5.062	.5	6.560	.0
.599	.0	2.098	23.7	3.596	1.2	5.095	.5	6.593	.0
.633	.0	2.131	20.4	3.630	1.1	5.129	.5	6.627	.0
.666	.0	2.165	17.2	3.663	1.1	5.161	.5	6.660	.0
.699	.0	2.198	14.9	3.696	1.0	5.195	.5	6.693	.0
.733	.0	2.231	13.1	3.730	1.0	5.228	.5	6.727	.0
.766	.0	2.264	11.7	3.763	1.0	5.261	.5	6.760	.0
.799	.0	2.298	10.6	3.796	.9	5.295	.5	6.793	.0
.832	.0	2.331	9.7	3.829	.9	5.328	.5	6.826	.0
.866	.0	2.364	8.9	3.863	.9	5.361	.5	6.860	.0
.899	.0	2.398	8.2	3.896	.9	5.395	.5	6.893	.0
.932	.0	2.431	7.6	3.929	.9	5.428	.5	6.926	.0
.966	.0	2.464	7.1	3.963	.8	5.461	.5	6.960	.0
.999	.0	2.497	6.6	3.996	.8	5.494	.5	6.993	.0
1.032	.0	2.531	6.2	4.029	.8	5.528	.5	7.026	.0
1.066	.0	2.564	5.8	4.063	.7	5.561	.5	7.060	.0
1.099	.0	2.597	5.5	4.096	.7	5.594	.5	7.093	.0
1.132	.0	2.631	5.1	4.129	.7	5.628	.5	7.126	.0
1.166	.1	2.664	4.8	4.162	.7	5.661	.5	7.159	.0
1.199	.8	2.697	4.6	4.196	.7	5.694	.5	7.193	.0
1.232	2.8	2.731	4.3	4.229	.6	5.728	.5	7.226	.0
1.265	6.1	2.764	4.1	4.262	.6	5.761	.5	7.259	.0
1.299	10.8	2.797	3.8	4.296	.6	5.794	.5	7.293	.0
1.332	17.6	2.830	3.6	4.329	.6	5.827	.5	7.326	.0
1.365	29.1	2.864	3.4	4.362	.6	5.861	.5	7.359	.0

1.399	47.3	2.897	3.2	4.396	.6	5.894	.5
1.432	72.2	2.930	3.1	4.429	.6	5.927	.5
1.465	98.8	2.964	2.9	4.462	.6	5.961	.5

RUNOFF VOLUME = 1.00805 INCHES = 5.2418 ACRE-FEET
PEAK DISCHARGE RATE = 125.85 CFS AT 1.532 HOURS BASIN AREA = .0975 SQ. MI.

FINISH

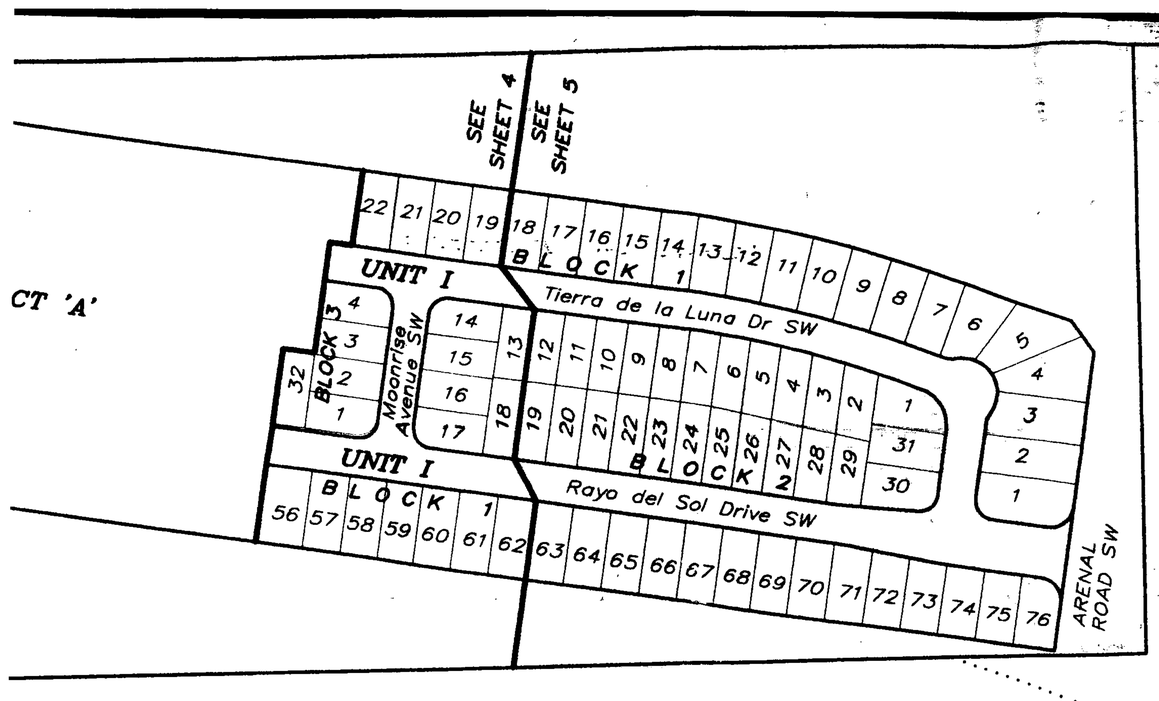
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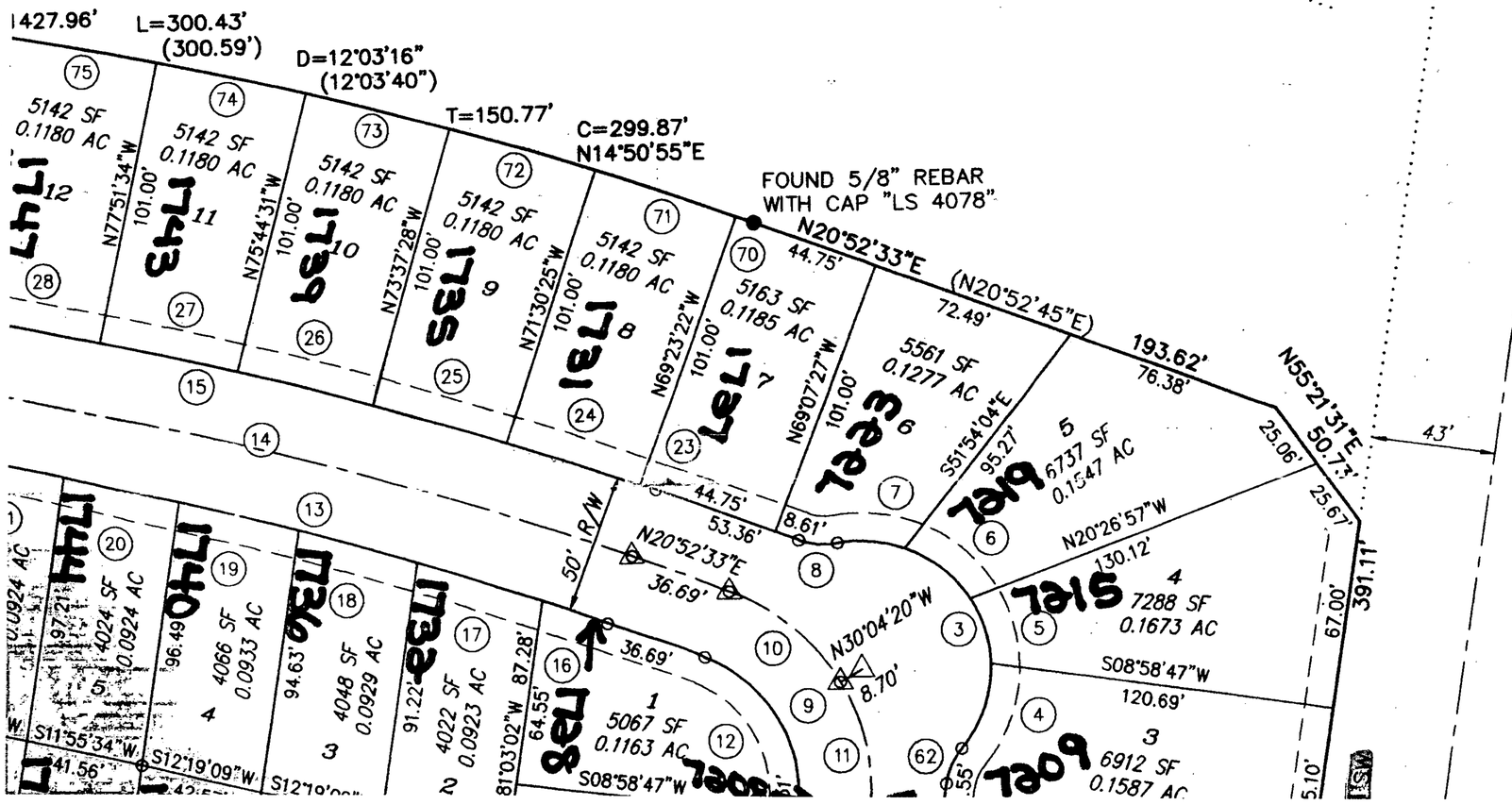
M-10 Final

PLAT FOR
RAYO del SOL SUBDIVISION UNIT 1
WITHIN THE
TOWN OF ATRISCO GRANT
PROJECTED SECTION 34
TOWNSHIP 10 NORTH, RANGE 2 EAST, NMPM
CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO
MAY 1997

98C 271 (5)

1998112785
5102669
Page: 5 of 6
09/03/1998 11:23A
Bk-98C Pg-271
Judy D. Woodward Bern. Co. PLAT R 32.00





50' 25' 0 50' 100'
SCALE: 1" = 50'

NOTES: (continued)

14. A 10' Private Drainage Easement is centered on all common side lot lines and on rear lot lines where they abut the side yard of the adjacent lot.

15. Each lot shall have a minimum of 1200 sq. ft. of on-site OPEN SPACE to meet the R-LT Zoning requirement.

1740 Rayo Del Sol
Tempe Valleyos
841-8152
M10-D9

982 sheet 3

TOM TENORIO PARK
BERNALILLO COUNTY
(DOC. #7374075)

25' PUBLIC DRAINAGE EASEMENT (SEE NOTES ON SHEET 2)

S08°48'52"W (S08°49'06"W)

1761.62'

S81°01'13"E

63.09'

62.91'

30.09'

99.48'

137.95'

96.48'

55.10'

50.00'

34.93'

193.62'

N55°21'50"E

25.06'

76.38'

(N20°52'33"E)

72.49'

N20°52'33"E

44.75'

1289.83'

N12°17'16"E

547.79'

501.45'

381.39'

331.51'

1073.36'

N08°49'17"E

748.68'

1065.95'

S08°48'52"W

SEE SHEET 4

UNIT I

Sierra de la Luna Drive SW

10' PUE

66' R/W

50' R/W

S81°01'13"E

N20°52'33"E

N30°04'20"W

N69°27'27"W

N69°23'22"W

N71°30'25"W

N27°37'28"W

N75°44'31"W

N81°03'02"W

N81°11'08"W

S81°03'02"E

N05°20'28"E

S13°49'39"W

S12°19'09"W

S11°55'34"W

S08°58'47"W

N08°48'52"E

S10°11'13"E

N20°26'57"W

S55°54'04"E

S08°48'52"W

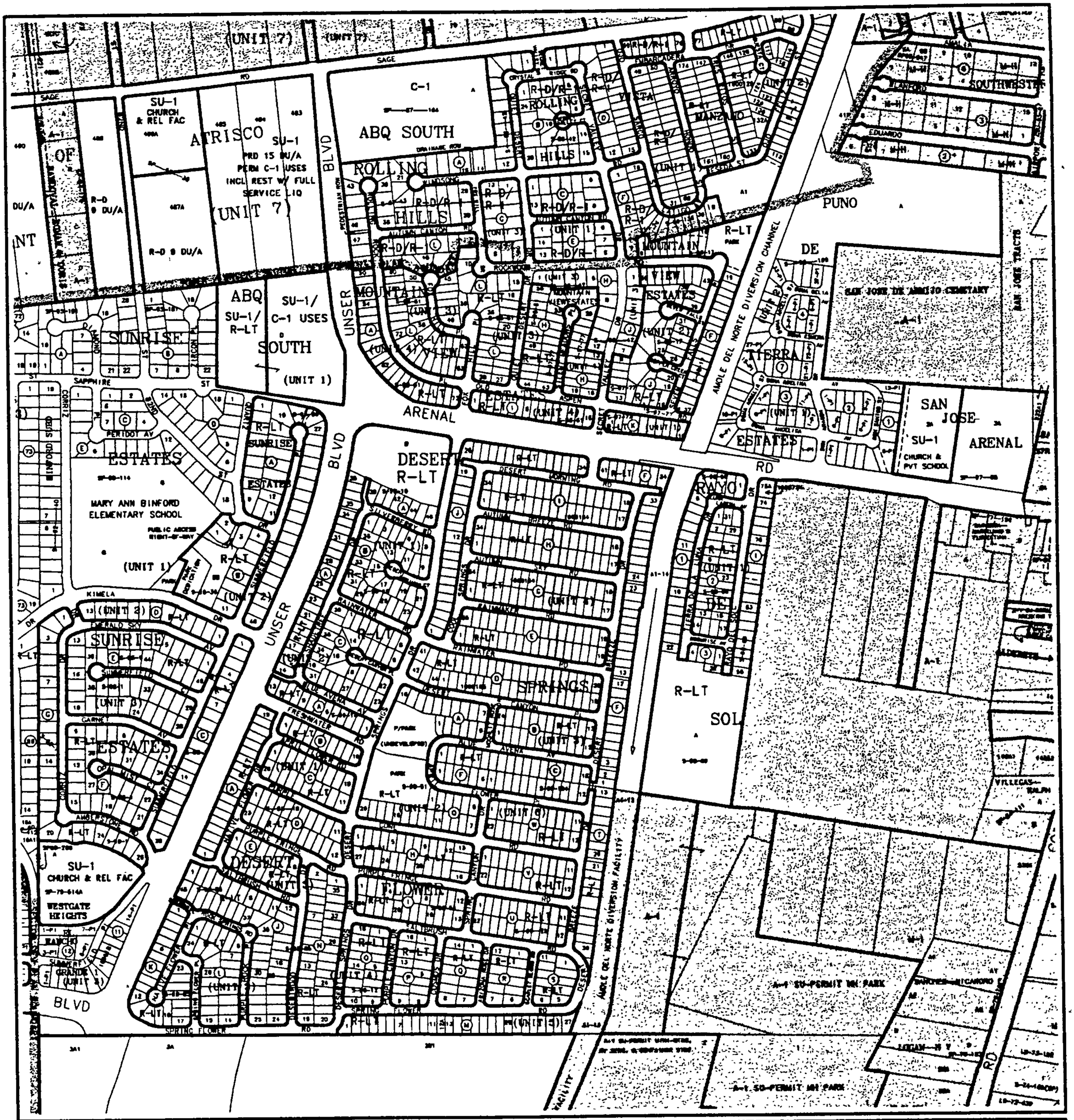
Sierra del Sol Drive SW

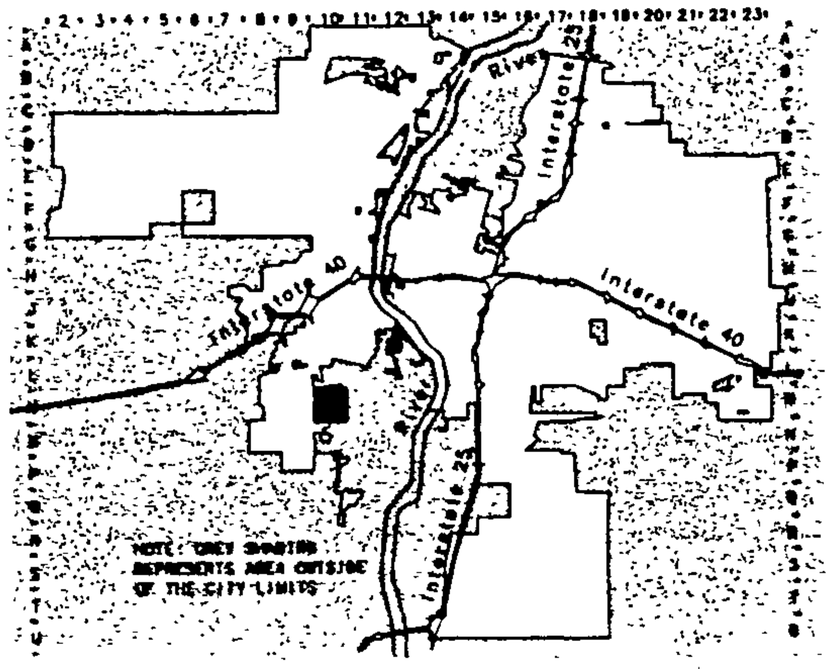
Sierra de la Luna Drive SW

Bolo Circle NW

Bolo Circle NW

Bolo Circle N





CITY OF
Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

M-10-Z

Map Amended through July 18, 2001



GIS PRODUCT REFERENCE: OPTIONS FOR ADDRESS: 1740 RAYO DEL SOL DR SW #5 07 02 PWPRV PWDCAM #EE.GRA

Grant, projected Section
Principal Meridian, City
A PORTION OF VALLEY
d plat filed for record in
New Mexico on April 17,
CATED PORTION OF PARCEL
the same is shown and
e of the County
982 in Bk. D165A, Pgs.
follows:

escribed tract, said point
Del Norte Diversion
aid R.O.W MAP filed for
lo County, New Mexico on
ence the Albuquerque
1" W, 3251.76 feet;

48'52" W, 1761.62 feet
o the southeast corner,
ORGE SENA as described

ommon with the north line
RISES, LTD as described in
he County Clerk of Bernalillo
A, Pg. 945, to the southwest
line of said Amole Del Norte

17" E, 1239.11 feet to a

he right, whose radius is
and whose chord bears

the northwest corner;

a point,
f Arendal Road SW;

g and

TOWN OF ATRISCO GRANT,

NTS AS SHOWN AND TO

NOTES

1. Bearings are grid based on the New Mexico State Plane Coordinate System (Central Zone).

2. Distances are ground distances.

3. Bearings and distances in parenthesis are record.

4. Basis of boundary are the following plats of record entitled:

"VALLEY WEST", (04-17-80, C16-144)

WARRANTY DEED "MESA ENTERPRISES, LIMITED", (04-23-80, BK. D118A-PG. 945)

WARRANTY DEED " AMOLE DEL NORTE DIVERSION FACILITY", (07-13-82, BK. D165-A, PGS. 615-619)

"BERNALILLO COUNTY", (DOC. #7374075)

"LANDS OF GEORGE SENA", (REC: 84-34038)

all being records of Bernalillo County, New Mexico.

5. Field Survey performed March, 1997.

6. Unless otherwise noted all points are "SET 5/8" REBAR with cap "ALS LS 7719".

7. Title Report: Albuquerque Title Company, File No.: 148610VM (Effective date March 25, 1997)

9. City of Albuquerque, New Mexico Zone: RL-T

10. The 25 foot Public Drainage Easement is for the purposes of Underground Storm Sewer, and Emergency Over-flow Surface Storm Drainage, from Rayo del Sol Drive SW to Tom Tenorio Park. Maintenance of the Landscaping within the easement shall be the responsibility of the owner of Lot 66, Block 1. Grading in the easement shall be maintained in substantial compliance with approved Grading Plan and no trees are allowed in the easement. The City of Albuquerque is responsible for maintaining the underground storm sewer.

11. City of Albuquerque Water and Sanitary Sewer Service to RAYO del SOL SUBDIVISION must be verified and coordinated with the Public Works Department, City of Albuquerque.

12. In the event grantor constructs any improvements within the public waterline and sanitary sewer line easements as shown hereon, the City has the right to enter upon Grantor's property at any time and perform whatever inspection, installation, maintenance, repair, modification or removal ("Work") it deems appropiate without liability to the City. If the Work affects any Improvements or Encroachments made by the Grantor, the City will not be financially or otherwise responsible for the rebuilding or repairing of Improvements or Encroachments. If, in the opinion of the City, the Work to be performed by the City could endanger the structural integrity or otherwise damage the Improvements or Encroachments, the Grantor shall, at its own expense, take whatever protective measures are required to safeguard the Improvements or Encroachments.



GIS PRODUCT REFERENCE: OPTIONS FOR ADDRESS: 1740 RAYO DEL SOL DR SW 05 07 02 PWPRV PWDCAM #WWGRA

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted ~~8/20/97~~
Prelim. Plat Approved 9-3-97
Prelim. Plat Expires 9-18-98

⚠1 Revised 6-30-98 9-3-97

Figure 12

EXHIBIT "A"
To Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Rayo del Sol Subdivision
Units 1 and 2

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider responsibility. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

UNIT I

NOTE: Unit I must precede Unit 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
48' FF	Res Pvmt (22' FF each way) Std C & G 4' Sdwk (both sides)(1) 4' Median	Rayo del Sol Dr	Luna Ladera Ave	Arenal Rd
25' FF	½ section arterial pvmt Std C & G (S side) Temp transitions per Design 6' Sdwk (S side)	Arenal Rd	E Property line	CL Amole del Norte culvert
*	Median Curb	Arenal Rd	E Property line	CL Amole del Norte culvert
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Tierra de la Luna Dr	Lot 4, Blk3	Luna Ladera Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Moonrise Ave	Tierra de la Luna Dr	Rayo del Sol Dr
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Rayo del Sol Dr	Lot 56, Blk 1	Luna Ladera Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
Per Design	Temp left turn lane w/ pvmt widening/striping	Arenal Rd	@ Rayo del Sol Dr	
N/A	Street lights per DPM			

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted ~~8/20/97~~ 9-3-97
Prelim. Plat Approved 9-3-97
Prelim. Plat Expires _____

Revised 6-30-98

Size	Type Improvement	Location	From	To
WATER				
30"	Waterline (3) Δ 6-30-98	Bridge Blvd	Airport Drive	Amole Del Norte Diversion Channel
30"	Waterline (3) Δ 6-30-98	Amole Del Norte Diversion Channel	Bridge Blvd.	Arenal Rd
10"	Waterline	Arenal Rd	W Property line	E Property line
10"	Waterline	Rayo del Sol Dr	Phase II	Arenal Rd
6"	Waterline	Tierra de la Luna Dr	Phase II	Luna Ladera Ave
6"	Waterline	Moonrise Ave	Rayo del Sol Dr	Tierra de la Luna Dr
6"	Waterline	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
SANITARY SEWER				
8"	SAS	Rayo del Sol Dr	Phase II	Arenal Rd
8"	SAS	Moonrise Ave	Tieera de la Luna Dr	Rayo del Sol Dr,
8"	SAS	Tierra de la Luna Dr	Phase II	Luna Ladera Ave
8"	SAS	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
STORM DRAINAGE				
18-36"	Storm Sewer	public drainage esmts on lot 66, blk 1 & Tenorio Park	Rayo del Sol Dr	County retention areas in park
Temp. Div. Ditch		Amole R/W	Arenal Rd. South Ditch	Amole Channel

Engineer's Certification for private Grading and Drainage per DPM for Release of SIA and Financial Guarantees. ~~Financial Guarantee is not required for this item.~~

Δ Revised 6-30-98 9-3-97

D.R.B. Case No. 97-82
D.R.C. Project No.
Date Submitted ~~8/20/97~~
Prelim. Plat Approved 9.3.97
Prelim. Plat Expires

UNIT 2

NOTE: Unit 1 must precede Unit 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
32' FF	Res Pvmt Roll C & G[2] 4' Sdwk[1]	Tierra de la Luna Dr	Lot 23, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G[2] 4' Sdwk[1]	Rayo del Sol Dr	Lot 55, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G[2] 4' Sdwk[1]	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
N/A	Res street lights	per DPM		
STORM DRAINAGE				
10'	Trail per DPM	20' Esmt Lot 35, Blk 1	Tierra de la Luna Dr	Amole del Norte R/W
10'	Trail per DPM	20' R/W btw lots 43&44 blk 1	Rayo del Sol Dr	Tom Tenorio Park
WATER				
10"	Waterline	Rayo del Sol Dr	Phase I	Luna Azul Ave
6"	Waterline	Tierra de la Luna Dr	Phase I	Luna Azul Ave
6"	Waterline	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
10"	Waterline	20' Pedestrian access and water right-of-way btw Lots 43 & 44, Blk 1	Rayo del Sol Dr	exist 10" waterline @ S. Property line
SANITARY SEWER				
8"	SAS	Tierra de la Luna Dr	Phase I	Luna Azul Ave
8"	SAS	Rayo del Sol Dr	Phase I	Luna Azul Ave
8"	SAS	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr

Engineer's Certification for private Grading and Drainage per DPM for Release of SIA and Financial Guarantees. ~~Financial Guarantee is not required for this item.~~

No Final Plat approval, or grading will be allowed in Unit 2 until the Letter of Map Revision is received from FEMA.

A Revised 6-30-98 9-3-97

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted ~~8/20/97~~
Prelim. Plat Approved 9.3.97
Prelim. Plat Expires _____

(1) Construction of all interior 4' sidewalks is to be deferred until after construction of individual home, and is to be financially guaranteed separately.

(2) Standard C& G will be used in place of roll C & G where required for drainage purposes.

A (3) THE CIP # 5431.92 CONSTRUCTION MUST BE COMPLETED AND ACCEPTED BY THE CITY OF ALBUQUERQUE PRIOR TO RELEASE OF SUBDIVISION IMPROVEMENTS AGREEMENT. (NOT TO BE FINANCIALLY GUARANTEED)
Modified Procedure "C" ~~(cash in lieu of construction)~~

Stormdrain to include manholes, inlets, riprap and outfall.

Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

Sanitary sewer to include manholes and service connections.

⚠1 AMENDMENT #1
6-30-98

Prepared By: James D. Hughes

Print Name: James D. Hughes, PE

Firm: Mark Goodwin & Associates, PA

* * * \

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

June 11, 1998

Ms. Laura Bitner
Michael J. Baker Jr., Inc.
3601 Eisenhower Ave, Suite 600
Alexandria, VA 22304

Re: The Amole del Norte @ Rayo del Sol Subdivision (Case No. 98-06-781P)

Dear Ms. Bitner:

Enclosed please find a Drainage Basin Map and AHYMO model on disk prepared for the "Existing Conditions" as prepared by Richard Stockton, PE, of Leedshill-Herkenhoff, Inc., in association with a project that they were doing for AMAFCA. This portion of the work was never acted on or approved by the local government agencies, but it appears to be the only comprehensive model in existence that accurately accounts for the timing of the peaks for the entire watershed of the Amole del Norte Channel.

AMAFCA's project evaluated the ability of the Huble and Amole Detention Basins to accommodate the increased flows from future ultimate development of the watersheds. It did not include a study of the adequacy of the City-owned and maintained Amole del Norte Channel.

I will attempt to get Richard Stockton's opinion on the accuracy of the currently mapped AE elevation of 4997 for the Amole. Additional information will be faxed separately regarding the sedimentation issues. You should have already received a copy of the Drainage Report for Rayo del Sol subdivision which identifies the new ponding limits east of the Amole.

Please call if you have any questions.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

James D. Hughes, PE
Senior Engineer

JDH/sb

xc: Susan Calongne — Flood Plain Administrator
Kurt Browning — AMAFCA
Richard Stockton — Leedshill-Herkenhoff, Inc.

f:\\amole\baker sub

LETTER OF TRANSMITTAL

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

DATE 7/8/98 JOB NO.

ATTENTION Susan Calcagno

RE: Rayo del Sol

TO One Stop

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Letter
1			Soil Survey
1			Hydrolic Calcs
1			AHYMO Summary & Input Data

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval

☐ For your use ☐ Approved as noted ☐ Submit_____copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Enclosed please find the sediment transport calcs and AHYMO model and submitted to FEMA for the LOMR on the Amole Del Norte Channel.

XC: Richard Stockton @ Leedshill-Herkenhoff, Inc.
Kurt Browning @ AMAFCA

COPY TO Kyle Dethlefsen 7/9/98

SIGNED: James D. Hughes

If enclosures are not as noted, kindly notify us at once.

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

July 8, 1998

Ms. Laura Bitner
Michael Baker Jr. Inc.
3601 Eisenhower Ave., Suite 600
Alexandria, Virginia 22304

Re: Case No. 98-06-781P, Rayo Del Sol Subdivision

Dear Ms. Bitner:

I talked with Kurt Browning, PE at AMAFCA about the Amole detention basin. He said the concrete overflow spillway elevation is at about 4997.0 and is 350 feet long. Under 100yr conditions the basin fills up and spills over the primary spillway into the concrete channel that drains to the Huble Lake. He and I speculate that the currently mapped firm elevation of 4997 is not changed by the current studies (Note that the dam top elevation appears to be at about 5002.4) . But he could not offer supporting evidence at this time because their study is on going and the results are not yet accepted by the AMAFCA board.

I also talked to the Flood Plain Administrator Susan Calongne. We discussed the possibility of adding further map changes above the Amole del Norte Channel at Arenal Rd to this request. She said that they would be handled separately by those subdivision developments west of the Amole, and though the storm sewer is constructed in Arenal Rd they don't have as built plans yet.

So please have FEMA write a LOMR removing only the portion of the flood plain east of the Amole del Norte Channel.

Please call if you have any questions or concerns.

Sincerely,

MARK GOODWIN & ASSOCIATES, PE

James D. Hughes, PE
Senior Engineer

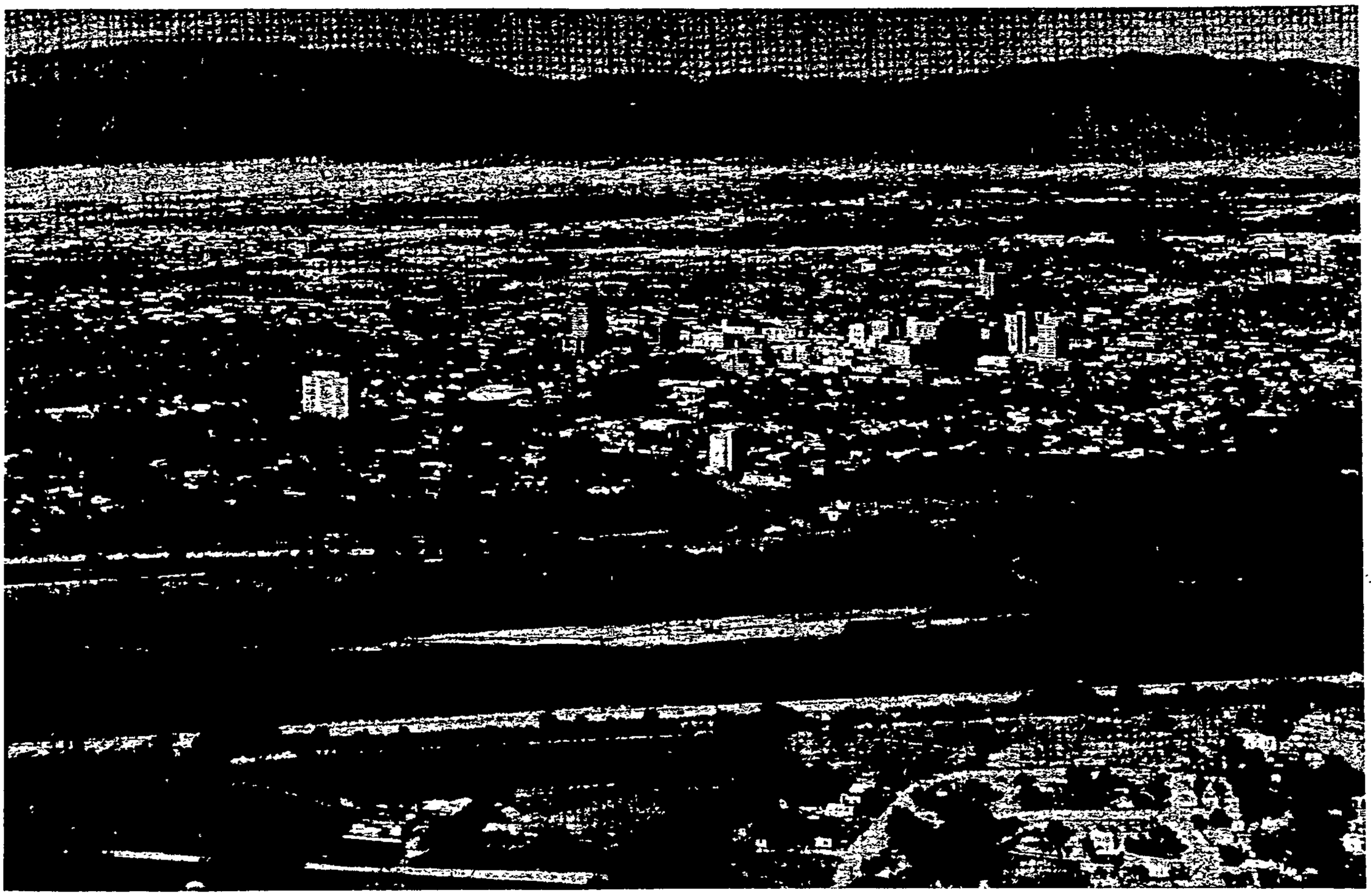
JDH/st

xc: Susan Calongne
Kurt Browning

f \\rayodel sol\Amole.wpd

SOIL SURVEY OF

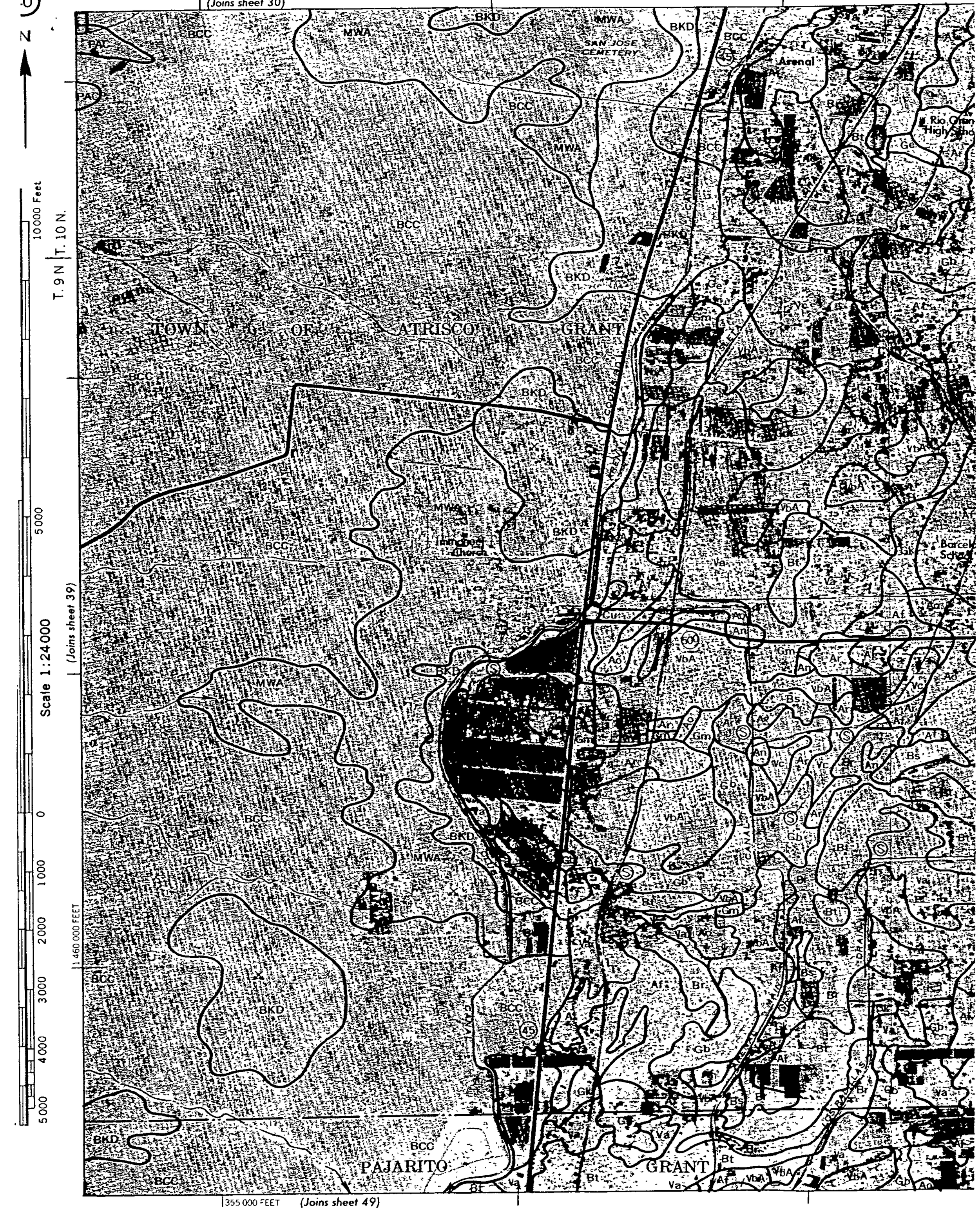
Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico



United States Department of Agriculture
Soil Conservation Service and Forest Service
and
United States Department of the Interior
Bureau of Indian Affairs and Bureau of Land Management
in cooperation with
New Mexico Agriculturai Experiment Station


(Joins sheet 20)
BCC
MWA
PAC
BKD
TOWN OF ATRISCO GRANT
John F. Adams High School
Lowland School
Alamosa School
SANTA CLARA CEMETERY
(40)
(448)
(45)
(66)
(Joins sheet 29)
(Joins sheet 40)
1 480 000 FEET
355 000 FEET
0 Scale 1:24000 5000
10000 Feet

BERNALILLO COUNTY, AND PARTS OF SANDOVAL AND VALE



West of the Rio Puerco, Badland consists of weathered soft shale and weakly consolidated sandstone, siltstone, and conglomerate. Included in mapping are mainly areas of Shingle and Kim soils.

In the foothills, Badland is mainly weathered soft shale, but commonly has a thin mantle of limestone, sandstone, granite, gneiss, or schist. Included in mapping is mainly Borolls-Rock outcrop association, very steep.

Permeability is variable, runoff is rapid to very rapid, and the hazard of water erosion is severe. Active geologic erosion is prevalent.

Badland is used for watershed and has limited use for wildlife habitat. Dryland capability subclass VIIIe.

Bluepoint Series

The Bluepoint series consists of deep, somewhat excessively drained soils that formed in sandy alluvial and eolian sediments on alluvial fans and terraces. Slopes are 1 to 15 percent. The native vegetation is principally mesa dropseed and Indian ricegrass and some giant dropseed and black grama. Elevations range from 4,850 to 6,000 feet. The mean annual precipitation is 7 to 10 inches, the mean annual air temperature is 58° to 60° F, and the frost-free season is 165 to 195 days. Bluepoint soils are associated with Kokan, Latene, Madurez, and Wink soils.

In a representative profile, the surface layer is pale brown loamy fine sand about 8 inches thick. The underlying material to a depth of 60 inches or more is pale brown and light yellowish brown loamy sand. The soil is slightly calcareous and mildly alkaline or moderately alkaline.

Permeability is rapid. Available water capacity is 4 to 5.5 inches. Effective rooting depth is 60 inches or more.

Bluepoint soils are used for range, irrigated crops, watershed, wildlife habitat, and community development.

Representative profile of Bluepoint loamy fine sand, 1 to 9 percent slopes, 30 feet west of the El Paso Natural Gas Pipeline Road, northeast corner of sec. 5, T. 11 N., R. 2 E.

A1—0 to 8 inches, pale brown (10YR 6/3) loamy fine sand, brown (10YR 5/3) moist; single grained; loose; many fine and very fine roots and interstitial pores; slightly calcareous; mildly alkaline; clear, wavy boundary.

C1—8 to 20 inches, pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; massive; slightly hard, very friable; few very fine and fine roots; many very fine interstitial pores; slightly calcareous; moderately alkaline; clear, wavy boundary.

C2—20 to 60 inches, light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable; few fine and very fine roots; many very fine interstitial pores; slightly calcareous in spots; mildly alkaline.

The A horizon has value of 5 to 7 dry and 4 to 6 moist and chroma of 2 to 4. It is sand, loamy fine sand, and loamy sand. The C horizon has hue of 5YR to 10YR, value of 5 or 6 dry and 4 or 5 moist, and chroma of 3 or 4. It is loamy sand or loamy fine sand. Gravel content ranges from 0 to 15 percent throughout the profile.

Where mapping units BCC and Bd3 occur west of the Rio Puerco, the mean annual temperature is a few degrees cooler than is defined as the range for the series. This difference, however, does not alter use and management.

Bb—Bluepoint fine sand, hummocky. This gently rolling to r lling soil is on the piedmont east of the Rio Puerco and in areas near basalt flows. It occurs as low dunes 8 to 50 feet high of reworked sand. The windward side is generally a blowout, and the leeward side is low dunes. Areas generally are 15 to 100 acres in size. Vegetation is sparse. Slopes are 5 to 15 percent.

This soil has a profile similar to that described as representative of the series, but the surface layer differs in texture.

Runoff is slow. The hazard of soil blowing is severe.

This soil is used for range, watershed, wildlife habitat, and recreation. Dryland capability subclass VIIe; native plant community 2.

BcA—Bluepoint loamy fine sand, 1 to 3 percent slopes. This nearly level soil is along the margin of the irrigated Rio Grande Valley. It has a profile similar to that described as representative of the series, but on about 10 percent of the acreage the surface layer is fine sand. Included in mapping are areas of Pajarito and Vinton soils, which make up about 10 percent of the unit.

Runoff is slow, and the hazard of soil blowing is severe.

This soil is used for irrigated alfalfa, row crops, and pasture. It is also used for wildlife habitat and community development. Irrigated capability unit IIIe–11.

BCC—Bluepoint loamy fine sand, 1 to 9 percent slopes. This soil is nearly level to moderately sloping. It has the profile described as representative of the series, but on about 10 percent of the acreage the surface layer is sand. Included in mapping are areas of Madurez, Pajarito, and Wink soils, which make up about 15 percent of the unit.

Runoff is slow, and the hazard of soil blowing is severe.

This soil is used for range, watershed, wildlife habitat, recreation, and community development. Dryland capability subclass VIIe; native plant community 2.

Bd3—Bluepoint-Wink, severely eroded complex. This mapping unit is about 45 percent a Bluepoint loamy fine sand that has 3 to 15 percent slopes and 35 percent a severely eroded Wink sandy loam that has 5 to 15 percent slopes (fig. 3).

The Bluepoint soil is in low swales and drainageways where runoff is slow but the hazard of soil blowing is severe. The Wink soil occurs as eroded remnants of narrow ridges where runoff is rapid and the hazard of water erosion is severe. It has a profile similar to that described as representative of the Wink series, but the surface layer is sandy loam and the soil is severely eroded.

Included in this unit in mapping are areas of Vinton, Penistaja, and Kokan soils, which make up about 15 percent of the unit. Also included are areas where the upper 30 inches of the soil is 10 to 15 percent gravel.

This mapping unit is used for watershed, wildlife habitat, and range. Dryland capability subclass VIIe; native plant community 2 for Bluepoint soil and 6 for Wink soil.

BKD—Bluepoint-Kokan association, hilly. This mapping unit is about 50 percent a Bluepoint loamy fine sand that has 5 to 15 percent slopes and 40 percent a Kokan gravelly sand that has 15 to 40 percent slopes. The gently rolling to rolling Bluepoint soil is on fans between gravelly ridges of the hilly to steep Kokan soil.

The Kokan soil has the profile described as representative of the Kokan series. On about 10 percent of the acreage, however, it has a high lime layer in the substratum.

TABLE 7.—*Engineering classification*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soils. Because the to other series that appear in the first column of this table. The

Soil series and map symbols	Depth to—		Depth from surface	USDA texture of representative profile	Classification		Coarse fraction greater than 3 inches
	Bedrock	Seasonal high water table			Unified	AASHTO	
	Feet	*Feet*	*Inches*				*Percent*
Agua: Af, Ag	>5	[1] >5	0–10	Loam or silty clay loam.	CL–ML or CL	A–4 or A–6	
			10–24	Loam and very fine sandy loam.	CL–ML or SM	A–4	
			24–60	Fine sand	SP or SP–SM	A–3	
Agua variant: Ah	>5	[1] 1–3	0–13	Loam	CL–ML or CL	A–4 or A–6	
			13–30	Loamy very fine sand.	SM or ML	A–4	
			30–60	Sand	SP or SP–SM	A–3	
*Akela: AkC No valid estimates for Rock outcrop part.	0. 5–1. 5	>5	0–15	Cobbly sandy loam and gravelly sandy loam.	GM or SM	A–1 or A–2	15–50
			15	Bedrock.			
Alemeda: AmB	1. 5–3. 5	>5	0–9	Sandy loam and loam.	SM, SC, or SC–SM	A–2 or A–4	
			9–26	Gravelly, cobbly, and very cobbly sandy loam.	SM, SC, or SC–SM	A–2 or A–4	15–55
			26	Bedrock.			
Anapra: An, Ao	>5	[1] >5	0–8	Silt loam or silty clay loam.	CL–ML or CL	A–4 or A–6	
			8–24	Clay loam	CL–ML or CL	A–6	
			24–60	Sand	SP or SP–SM	A–3	
Armijo: Ar	>5	>5	0–8	Clay loam	CL–ML or CL	A–6	
			8–46	Clay	CL, MH, or CH	A–7	
			46–67	Loamy sand	SP–SM or SM	A–3 or A–2	
Badland: Ba No valid estimates; material too variable.	>5	>5					
*Bluepoint: Bb, BcA, BCC, Bd3, BKD For Wink part of Bd3, see Wink series; for Kokan part of BKD, see Kokan series.	>5	>5	0–60	Loamy fine sand and loamy sand.	SP–SM or SM	A–3 or A–2	
Bond Mapped only with Rock outcrop and Penistaja soils.	1–1. 5	>5	0–18	Sandy clay loam	SC–SM or SC	A–2, A–4, or A–6	0–15
			18	Bedrock.			
*Borolls: BOF No valid estimates; material too variable.	1–5	>5					

See footnotes at end of table.

and estimated properties

soils in such mapping units can have different properties and limitations, it is necessary to follow carefully the instructions for referring symbol>means more than; the symbol <means less than]

Percentage passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Salinity	Shrink-swell potential	Risk of corrosion to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)								Uncoated steel	Concrete
						Inches per hour	*Inches per inch of soil*	*pH*	*Millimhos per centimeter at 25° C*			
-------	100	85–100	60–90	20–35	5–15	0. 6–2. 0	0. 16–0. 20	7. 9–8. 4	1–4	Moderate---	Moderate---	Low.
-------	100	70–95	45–70	15–25	0–5	0. 6–2. 0	0. 13–0. 17	7. 9–8. 4	1–4	Low-------	Moderate---	Low.
-------	100	50–90	0–10	[2]NP	NP	6. 0–20. 0	0. 05–0. 07	7. 9–8. 4	0–1	Low-------	Low-------	Low.
-------	100	85–100	60–90	20–35	5–15	0. 2–2. 0	0. 13–0. 15	8. 5–9. 0	4–8	Moderate---	High-------	Low.
-------	100	90–95	40–60	NP	NP	0. 6–2. 0	0. 08–0. 10	8. 5–9. 0	4–8	Low-------	High-------	Low.
-------	100	50–90	0–10	NP	NP	6. 0–20. 0	0. 05–0. 07	7. 9–8. 4	1–4	Low-------	High-------	Low.
40–70	25–60	20–45	15–30	NP	NP	0. 6–2. 0	0. 05–0. 10	7. 9–8. 4	0–1	Low-------	High-------	Low.
90–100	90–100	85–95	30–50	15–25	0–10	0. 6–2. 0	0. 14–0. 18	7. 9–8. 4	2–4	Low-------	Moderate---	Low.
65–85	60–80	50–75	20–45	20–30	5–10	0. 6–2. 0	0. 07–0. 11	7. 9–8. 4	2–4	Low-------	Moderate---	Low.
-------	100	90–100	75–90	20–35	5–15	0. 2–0. 6	0. 19–0. 21	7. 9–8. 4	1–4	Low to moderate.	Moderate---	Low.
-------	100	90–100	75–85	25–40	10–20	0. 2–0. 6	0. 19–0. 21	7. 9–8. 4	1–4	Moderate---	Moderate---	Low.
-------	100	50–90	0–10	NP	NP	6. 0–20. 0	0. 05–0. 07	7. 9–8. 4	0–1	Low-------	Low-------	Low.
-------	100	90–100	75–85	25–35	10–15	0. 2–0. 6	0. 17–0. 19	7. 9–8. 4	1–4	Moderate---	High-------	Low.
-------	100	90–100	85–100	40–60	20–30	<0. 06	0. 12–0. 14	7. 9–8. 4	1–4	High-------	High-------	Low.
-------	100	50–90	5–20	NP	NP	6. 0–20. 0	0. 05–0. 07	7. 9–8. 4	1–4	Low-------	Low-------	Low.
	90–100	85–100	70–95	5–20	NP	NP	6. 0–20. 0	0. 07–0. 09	7. 4–8. 4	0–1	Low-------	Low-------	Low.
	85–100	80–100	65–90	25–50	20–35	5–15	0. 2–0. 6	0. 12–0. 14	7. 9–8. 4	0–1	Moderate---	Moderate---	Low.

see log plot

$D_{50} = 0.18$ mm

For suspended sediment concentrations less than about 4 percent by weight, the original derivation provides reasonable results for most conditions. Einstein and Chien (1955) however, found that the vertical distribution of sands in the water column deviates significantly from that predicted by the original Einstein method for suspended sediment concentrations above approximately 4 percent, The concentration profile becomes progressively more uniform with depth with increasing concentration. Based on their experimental results, they suggested a correction for the exponent on the concentration profile equation to partially compensate for the differences. Subsequent investigators (Chien and Wan, 1965; Ordonez, 1970; Lavelle and Thacker, 1978, van Rijn, 1984; Woo, 1985 and Woo et al., 1988) considered the effects of fall velocity reduction, fluid viscosity, and fluid density on the suspended sand concentration profile. The work of Woo (1985) and Woo et al. (1988) resulted in a complex differential equation that appears to account for the significant changes in fluid characteristics with increasing sediment concentration, and converges to essentially the same solution as obtained from Rouse's (1937) equation at low concentrations. Results obtained from the application of this relationship match the available measured data well.

Mussetter (1993, in-press) linked Woo's (1985) relationship for computing the suspended sediment concentration with the MPM bed-load equation to obtain a method for computing bed material load in streams carrying high concentrations of suspended sediment. Results obtained from this method were compared with the results from other available relations and, to the extent possible, measured sediment yield data. This comparison indicates that the new method may provide more realistic results over the range of flow and sediment transport conditions encountered in arroyos in the Albuquerque area.

The MPM-Woo method was used to estimate bed material transport capacities for a broad range of hydraulic and bed material conditions (see **Table 3.6**) typical of the Albuquerque area. The results of these computations were then used to develop the following power function relation using multiple regression:

$$q_s = aV^b\ Y^c\ (1-C_f/10^6)^d \qquad (3.41)$$

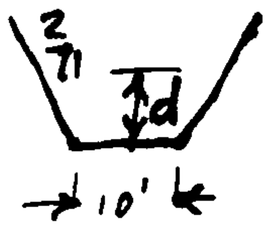
$a_e = 0.09$
$b_e = 1.62$
$c_e = 0.85$
$d_e = -0.95$

Table 3.6. Range of Conditions for which Equation 3.41 was Developed.

q (cfs)	V (vps)	Y (ft)	S_o	C_f (ppm)	D_{50} (mm)
1	1.9	0.3	0.005	0	0.2
80*	20.8*	7.2*	0.04*	60,000*	4.0*

$$Q = \frac{1.49}{0.15} A R^{2/3} \sqrt{S_o}$$

Sand Bottom



$$A = (10+2d)d = 10d+2d^2 \qquad P = 10+4d$$

Q V W

where q_s = unit width **bed material** load in cfs/ft
V = average velocity in fps
Y = hydraulic depth in feet A/Topwidth
C_f = fine sediment (silt and clay) concentration by weight.
S_o = channel slope

Values for the coefficient (a) and exponents (b, c, and d) are shown in **Figure 3.10** as a function of the median bed material size. **In applying Equation 3.41, the predicted bed material concentration (C_s) should not exceed the maximum concentration given by the equation:**

$$C_{s_{max}} = 510{,}000 - 65{,}000\ D_{50} \qquad (3.42)$$

where D_{50} = medium bed material size in mm
C_s = computed from the relation:

$$C_s = \frac{2.65 \times 10^6 Q_s}{(Q + 2.65Q_s)} \qquad (3.43)$$

and

Bottom Width

$$Q_s = q_s W \qquad (3.44)$$

When C_{smax}, as given by Equation 3.42 is exceeded, non-Newtonian flow conditions are indicated and the assumptions upon which Equation 3.41 (and the other bed material transport equations presented in this Design Guide) is based are no longer valid. For these conditions, procedures applicable for non-Newtonian fluids (e.g., mudflows) should be considered.

Note that Equation 3.41 predicts bed material load only; the total sediment load is computed by adding the bed material and fine sediment loads, where the fine sediment load is computed from:

$$Q_{s_f} = \frac{C_f Q}{2.65 \times 10^6} \qquad (3.45)$$

and the total sediment load is given by:

Note that no washed bed sand exists at any of the points of concintrated flow. The old natural channel bottoms have been wiped out by development activities, so there are an inordinantly high number of fine particles in the existing bed, hence the low D_{50}

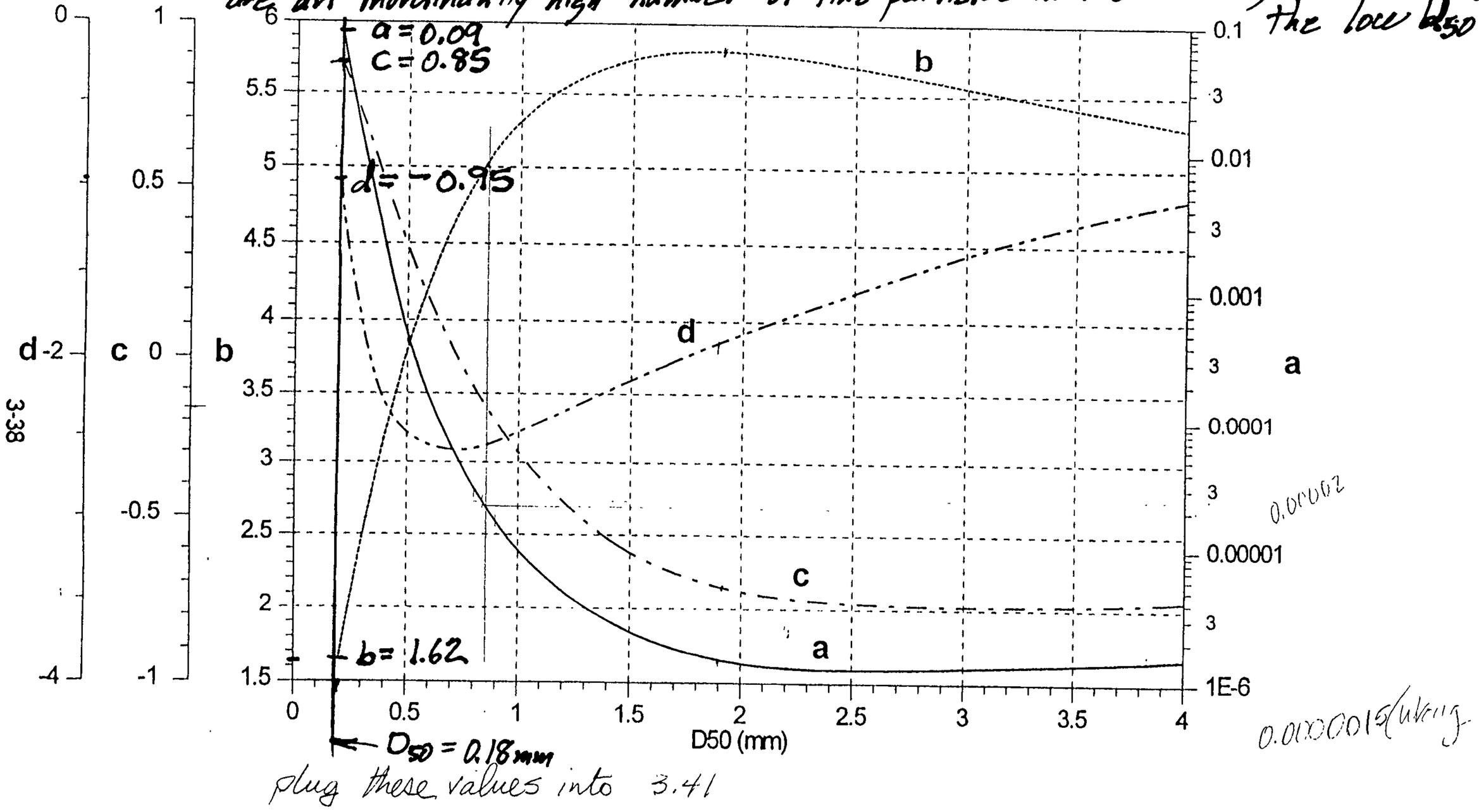


Figure 3.10. Coefficient and exponents for Equation 3.41, developed using MPM-Woo method.

% by weight

100
90
80
70
60
50
40
30
20
10
0

$D_{50} = 0.18$ mm

10.0 MM 1.0 MM 0.1 MM 0.01 MM

DIETZGEN CORPORATION
MADE IN U.S.A.

NO. 340-LS10 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
5 CYCLES X 10 DIVISIONS PER INCH

UPPER MAIN CHANNEL

slope= 0.0036 ft/ft n= 0.02

Depth ft	Q cfs	V fps	Width ft	Area sf	Perimeter ft	R ft
1.00	47.22	3.93	14.00	12.00	14.47	0.83
2.00	161.96	5.78	18.00	28.00	18.94	1.48
3.00	345.30	7.19	22.00	48.00	23.42	2.05
4.00	604.06	8.39	26.00	72.00	27.89	2.58
5.00	945.79	9.46	30.00	100.00	32.36	3.09
6.00	1378.08	10.44	34.00	132.00	36.83	3.58
7.00	1908.34	11.36	38.00	168.00	41.30	4.07
8.00	2543.80	12.23	42.00	208.00	45.78	4.54

LOWER MAIN CHANNEL

slope= 0.00067 ft/ft n= 0.02

Depth ft	Q cfs	V fps	Width ft	Area sf	Perimeter ft	R ft
1.00	20.37	1.70	14.00	12.00	14.47	0.83
2.00	69.87	2.50	18.00	28.00	18.94	1.48
3.00	148.96	3.10	22.00	48.00	23.42	2.05
4.00	260.59	3.62	26.00	72.00	27.89	2.58
5.00	408.02	4.08	30.00	100.00	32.36	3.09
6.00	594.51	4.50	34.00	132.00	36.83	3.58
7.00	823.27	4.90	38.00	168.00	41.30	4.07
8.00	1097.41	5.28	42.00	208.00	45.78	4.54
9.00	1419.96	5.63	46.00	252.00	50.25	5.02
10.00	1793.88	5.98	50.00	300.00	54.72	5.48
11.00	2222.03	6.31	54.00	352.00	59.19	5.95
12.00	2707.23	6.64	58.00	408.00	63.67	6.41
13.00	3252.22	6.95	62.00	468.00	68.14	6.87

BASIN # 35208+35209

slope= 0.013 ft/ft n= 0.045

Depth ft	Q cfs	V fps	Width ft	Area sf	Perimeter ft	R ft
0.10	0.32	0.81	4.00	0.40	4.00	0.10
0.20	2.06	1.29	8.00	1.60	8.00	0.20
0.30	6.07	1.69	12.00	3.60	12.00	0.30
0.40	13.08	2.04	16.00	6.40	16.00	0.40
0.50	23.72	2.37	20.00	10.00	20.00	0.50
0.60	38.57	2.68	24.00	14.40	24.00	0.60
0.70	58.18	2.97	28.00	19.60	28.00	0.70
0.80	83.06	3.24	32.00	25.60	32.00	0.80
0.90	113.72	3.51	36.00	32.40	36.00	0.90
1.00	150.60	3.77	40.00	40.00	40.00	1.00
1.10	194.19	4.01	44.00	48.40	44.00	1.10
1.20	244.90	4.25	48.00	57.60	48.00	1.20
1.30	303.17	4.48	52.00	67.60	52.00	1.30

BASIN # 33007

slope= 0.012 ft/ft n= 0.045

Depth	Q	V	Width	Area	Perimeter	R
ft	cfs	fps	ft	sf	ft	ft
0.20	0.31	0.78	4.00	0.40	4.00	0.10
0.40	1.98	1.24	8.00	1.60	8.00	0.20
0.60	5.84	1.62	12.00	3.60	12.00	0.30
0.80	12.57	1.96	16.00	6.40	16.00	0.40
1.00	22.79	2.28	20.00	10.00	20.00	0.50
1.20	37.06	2.57	24.00	14.40	24.00	0.60
1.40	55.90	2.85	28.00	19.60	28.00	0.70
1.60	79.81	3.12	32.00	25.60	32.00	0.80
1.80	109.25	3.37	36.00	32.40	36.00	0.90
2.00	144.70	3.62	40.00	40.00	40.00	1.00
2.20	186.57	3.85	44.00	48.40	44.00	1.10
2.40	235.29	4.08	48.00	57.60	48.00	1.20
2.60	291.28	4.31	52.00	67.60	52.00	1.30

slope= 0.0007 ft/ft n= 0.045

Depth	Q	V	Width	Area	Perimeter	R
ft	cfs	fps	ft	sf	ft	ft
0.20	0.08	0.19	4.00	0.40	4.00	0.10
0.40	0.48	0.30	8.00	1.60	8.00	0.20
0.60	1.41	0.39	12.00	3.60	12.00	0.30
0.80	3.04	0.47	16.00	6.40	16.00	0.40
1.00	5.50	0.55	20.00	10.00	20.00	0.50
1.20	8.95	0.62	24.00	14.40	24.00	0.60
1.40	13.50	0.69	28.00	19.60	28.00	0.70
1.60	19.27	0.75	32.00	25.60	32.00	0.80
1.80	26.39	0.81	36.00	32.40	36.00	0.90
2.00	34.95	0.87	40.00	40.00	40.00	1.00
2.20	45.06	0.93	44.00	48.40	44.00	1.10
2.40	56.83	0.99	48.00	57.60	48.00	1.20
2.60	70.35	1.04	52.00	67.60	52.00	1.30

(s16.66H
AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/26/1998
INPUT FILE = AMOLE DAT USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION

START TIME= .00

*S**********
*S REVISED: 6/25/98 BY JAMES D. HUGHES @ D. MARK GOODWIN AND ASSOC.
*S**********
*S WE ADDED BASINS 33004 AND 33007 TOGETHER BEFORE
*S ENTERING THE AMOLE, ADDING SEDIMENT TRANSPORT CALCULATIONS ON
*S THAT INFLOW HYDROGRAPH AT SAGE (NOT AT ARENAL ROAD AS PREVIOUSLY
*S MODELED), THEN ADDING A CHECK ON THE TRANSPORT CAPACITY OF THE MAIN
*S CANAL AT 3 PLACES; ONE JUST BELOW SAGE, THE SECOND WHERE THE
*S CHANNEL SLOPE FLATTENS FROM A 0.36% TO 0.07% SLOPE JUST BELOW ARENAL
*S ROAD AND THE THIRD ABOUT 1000' UPSTREAM OF RIO BRAVO. THE UNLINED
*S ROAD SIDE DITCHES AT SAGE THE SINGLE LARGEST SOURCE OF SEDIMENT.
*S BASINS 33001 AND 33002 SHEET FLOW INTO THE CHANNEL WITH NO BED
*S MATERIAL TRANSPORTED INTO THE CHANNEL. BASIN 35001 HAS BEEN
*S DEVELOPED. BOTH BASIN 35001 AND THE SUNRISE ESTATES BASIN DUMP THEIR
*S DEVELOPED FLOWS INTO THE AMOLE CHANNEL IN LINED FACILITIES AND
*S CONTRIBUTE NO BED MATERIAL. BASINS 35208 AND 35209 EACH CONTRIBUTE
*S VERY SMALL QUANTITIES OF SEDIMENT. THE CHANNEL IS BUILT 2' HIGHER
*S THAN THE UPSTREAM NATURAL GROUND ELEVATIONS AT BASIN 35302 AND A
*S LINED RUNDOWN DRAINS THE NATURAL DEPRESSION INTO THE CHANNEL, SO
*S BASIN 35302 CONTRIBUTES NO SIGNIFICANT BED MATERIAL. SIMILAR
*S DEPRESSIONS EXIST AT BASINS 35306 AND 35207, SO NO BED MATERIAL ENERS
*S THERE EITHER. BASIN 35304 IS DEVELOPED WITH LINED FACILITIES DELIVERING
*S RUNOFF TO THE CHANNEL SO NO SEDIMENT THERE EITHER.
*S
*S AMOLE DEL NORTE WATERSHED
*S
*S
*S 100-YR, 6-HR STORM WITH SEDIMENT
*S FILE NAME: AN100E1A.DAT (EXISTING CONDITIONS)
*S BY: RICHARD STOCKTON PEER REVIEWED BY: DEBORAH DIXON
*S LAST REVISION: 05-31-96
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE TIERRA BAYITA
*S BASIN, TOWER/SAGE BASIN AND THE SOUTH AMOLE DEL NORTE BASIN. FLOWS FROM
*S THESE BASINS ARE CONVEYED TO AMOLE DETENTION FACILITY VIA THE AMOLE DEL
*S NORTE CHANNEL. THIS MODEL TAKES TWO INFLOW HYDROGRAPHS DERIVED FROM MODELS
*S FOR THE TIERRA BAYITA CHANNEL AND FROM THE UNSER DIVERSION/ATRISCO BUSINESS
*S PARK, RESPECTIVELY. THE TIERRA BAYITA MODEL WAS DEVELOPED BY GREINER (AND AC
*S BY THE CITY), TO DETERMINE THE SYSTEM CAPACITY OF ALL MAJOR FACILITIES WITHIN
*S TIERRA BAYITA BASIN. GREINER'S MODEL INCLUDES THE UNSER DIVERSION SYSTEM AND
*S SAD 214 POND MODIFICATIONS, AS DESIGNED BY EASTERLING AND ASSOCIATES (AND ACC
*S BY THE AMAFCA), BY RECALLING THE OUTFLOW HYDROGRAPH FROM THE UNSER DIVERSION
*S ADDITIONALLY, EASTERING'S MODEL INCLUDES THE ATRISCO BUSINESS PARK DEVELOPMEN
*S THE MODEL'S OUTFLALL IS INTO THE NORTH/SOUTH COORS DETENTION FACILITY, AS IS

```
*S THE TIERRA BAYITA CHANNEL.  DUE TO THE NUMBER OF AVAILABLE STORED HYDROGRAPHS
*S (MAX=10) FOR THIS PROJECT, THE TIERRA BAYITA AND UNSER DIVERSION MODELS WERE
*S COMBINED.
*S
*S THE EXISTING CONDITION TOWER/SAGE BASIN IN THE RUN WAS DEVELOPED BY LH.
*S
*S INCLUDED IN THE SOUTH AMOLE DEL NORTE BASIN, IS THE SUNSET ESTATES DEVELOPMEN
*S DEVELOPED BY FRED ARFMAN.  THIS RUN WAS MODIFIED TO REFLECT EXISTING CONDITIO
*S THE REMAINED OF THE SOUTH AMOLE DEL NORTE BASIN MODEL WAS DEVELOPED BY LH AND
*S IS CONTAINED HEREIN.
*S
*S SINCE THE ABOVE MENTIONED MODELS WERE FOR DEVELOPED CONDITIONS, THE
*S MODELS WERE RENAMED AND MODIFIED TO REFLECT EXISTING CONDITIONS.  LOCATIONS
*S OF THE INLETS INTO THE NORTH/SOUTH COORS DETENTION FACILITY AND THE AMOLE DEL
*S NORTE CHANNEL WERE DETERMINED FROM AS-BUILT DRAWINGS   BASIN DIVIDES WERE
*S DETERMINED FROM NOVEMBER 1995 AREIAL, TOPOGRAPHICAL MAPS AND PREVIOUS STUDIES
*S
*S NOTE: AN "E" (EXISTING) HAS BEEN PLACED IN FRONT OF EACH SUB-BASIN HYDROGRAPH
*S       DESIGNATION DUE TO THE LIMITATIONS OF AHYMO.
*S
*S ANALYSIS ASSUMPTIONS:
*S 1. ALL LAND IN THIS BASIN IS MODELED AS EXISTING CONDITION.
*S
*S 2. EXISTING DEVELOPMENTS WITH RETENTION PONDS ARE MODELED TO DISCHARGE
*S    FLOWS EQUIVALANT TO HISTORIC FLOW RATES.  THIS IS ACHIEVED BY ADJUSTING
*S    THE LAND TREATMENT FACTORS TO PRE-DEVELOPMENT NUMBERS.
*S
*S 3  IN BASIN 33006, THERE ARE TWO NATURAL DEPRESSIONS.  THEY ARE MODELED AS
*S    A SINGLE DETENTION BASIN.
*S
*S 4. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE ARROYO EXISTING CONDITIONS MODEL
*S    AA100E1A.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE & HUBBELL SY
*S
*S 5. A BULKING FACTOR OF 15% HAS BEEN ADDED TO EACH UNDEVELOPED SUB-BASIN AND
*S    A BULKING FACTOR OF 6% HAS BEEN ADDED TO EACH DEVELOPED SUB-BASIN LIKELY
*S    TO PRODUCE SEDIMENT.  A BULKING FACTOR OF 3% HAS BEEN ADDED TO EACH
*S    DEVELOPED SUB-BASIN THAT WOULD PROBIBLY PRODUCE SEDIMENT, SUCH AS PARKS
*S    AND SCHOOL PLAY GROUNDS.   AND, NO BULKING FACTOR FOR WELL DEFINED RESIDEN
*S    DEVELOPMENTS.
*S
*S100 YEAR 6HR STORM EXISTING CONDITION
```

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
RAINFALL TYPE= 1										RAIN6=	2.200
*S RECALL HYDROGRAPH FROM THE TIERRA BAYITA BASIN											
RECALL HYD	TB100E1A.HYD	-	2	3.06610	1462.57	95.849	.58614	1 716	.745		
*S RECALL HYDROGRAPH FROM THE ATRISCO BUSINESS PARK											
RECALL HYD	290.23	-	3	.35930	275.21	21.192	1.10592	1.617	1.197		
*S ADD THE TWO RECALLED HYDROGRAPHS											
ADD HYD	NPOND.IN	2& 3	4	3.42540	1715.71	117.041	.64066	1.716	.783		
*S ROUTE FLOWS THROUGH THE NORTH POND. PRIMARY SPILLWAY=24" PIPE											
*S AND OVER FLOW SPILLWAY IS WEIR FLOW INTO SOUTH POND											
ROUTE RESERVOIR	NPOND.OUT	4	12	3.42540	1713.43	115.670	.63316	1.716	.782	AC-FT=	6.792
*S BASINS 30413 TO 30416 ARE A PART OF THE TIERRA BAYITA BASIN, BUT DO NOT											
*S FLOW INTO THE TIERRA BAYITA CHANNEL. THE FLOW FROM THESE SUB-BASINS											
*S (300** SERIES) GOES INTO THE SOUTH POND OF THE N/S COORS DETENTION FACILITY.											
*S THEREFORE, CALCULATE THE FLOW FROM THESE BASINS.											
*S BASIN 30413 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E30413	-	2	.10110	85.29	3.245	.60175	1.584	1.318	PER IMP=	5.00
*S ROUTE THE COMBINED FLOWS TO 1100 FEET EAST OF 86TH STREET.											
ROUTE	E30413.5	2	11	.10110	51.29	3.245	.60175	1.716	.793		
*S BASIN 30414 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E30414	-	2	.13400	79.18	4.023	.56292	1.650	.923	PER IMP=	2.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 30413.5 TO THE FLOW FROM SUB-BASIN 30414											
ADD HYD	E30414.1 11& 2		3	.23510	129 36	7.268	.57961	1.683	.860		
*S ROUTE THE COMBINED FLOWS TO STINSON STREET.											
ROUTE	E30414.5	3	11	.23510	56.94	7.265	.57941	1.947	.378		
*S BASIN 30415 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E30415	-	2	.11080	55.96	3.961	.67037	1.782	.789	PER IMP=	4.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 30414.5 TO THE FLOW FROM SUB-BASIN 30415											
ADD HYD	E30415.1 11& 2		3	.34590	108.87	11.227	.60855	1.848	.492		
*S ROUTE THE COMBINED FLOWS TO THE SOUTH POND OF THE N/S COORS DET. FAC.											
ROUTE	E30415.5	3	11	.34590	101.08	11.226	.60853	1.980	.457		
*S BASIN 30416 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E30416	-	2	.06890	98.73	3.682	1.00195	1.551	2.239	PER IMP=	14.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 30415.5 TO THE FLOW FROM SUB-BASIN 30416											
ADD HYD	E30416.1 11& 2		3	.41480	127.59	14.908	.67388	1.881	.481		
*S ADD THE COMBINED FLOW FROM SUB-BASIN 30416.1 TO THE NORTH POND OUTFLOW											
ADD HYD	SPOND.IN 12& 3		4	3.84020	1833.20	130.578	.63755	1.716	746		
*S ROUTE COMBINED FLOW THROUGH THE SOUTH POND WITH THE ROUTE RESERVOIR.											
*S THE FLOW FROM HYDROGRAPH SPOND.OUT IS AP36.											
ROUTE RESERVOIR	SPOND.OUT	4	12	3.84020	731.02	130.361	.63649	2.178	.297	AC-FT=	42.654
*S HYD NO. SPOND.OUT IS ***** AP 36.1 *****											
DIVIDE HYD	TO.ADN	12	20	3.84020	731.02	130.361	.63649	2.178	.297		
	TO.COORS AND		50	.00000	.00	.000	00000	-.033	.000		
*S THE FLOW FROM HYDROGRAPH TO.COORS IS THE FLOW SPILLING OUT OF THE											

```
*S NORTH/SOUTH COORS DETENTION FACILITY ONTO COORS ROAD.
*S ROUTE THE OUTFLOW FROM THE NORTH/SOUTH COORS DETENTION FACILITY INTO
*S THE AMOLE DEL NORTE CHANNEL TO SAN YGNACIO.
ROUTE              BEGIN.ADN   20   12       3.84020       729.83     130.251       .63596    2.178     .297
*S END TIERRA BAYITA BASIN
*S BEGIN CALCULATION OF THE TOWER/SAGE BASIN (330** SERIES)
*S BASIN 33001 IS CURRENTLY PARTIALLY UNDEVELOPED
SEDIMENT BULK                                                                                    PK BF =    1.15
COMPUTE NM HYD        E33001    -     2        .04830        55.08       2.189       .84975    1.551    1.782 PER IMP=  17.00
*S ADD THE FLOW FROM BASIN 33001 TO THE FLOW IN THE AMOLE DEL NORTE AT SAN YGNAC
ADD HYD             E33001.1 12& 2    3       3.88850       737.28     132.440       .63861    2.178     .296
*S HYD NO. E33001.1 IS ***** AP 36 *****
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE N/S COORS POND
*S TO JUST UPSTREAM OF SAGE.
```

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
ROUTE	E33001.5	3	12	3.88850	736.60	132.338	.63812	2.211	.296		
*S BASIN 33002 IS CURRENTLY PARTIALLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33002	-	2	03440	39.52	1.392	.75863	1.551	1.795	PER IMP=	6.00
*S ADD THE FLOW FROM BASIN 33002 TO THE FLOW IN THE AMOLE DEL NORTE AT SAGE											
ADD HYD	E33002.1 12&	2	3	3.92290	740.11	133.729	.63918	2.211	.295		
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM SAGE TO JUST DOWNSTREAM											
*S OF THE SAGE CROSSING.											
ROUTE	E33002.5	3	13	3.92290	740.17	133.705	.63906	2.211	.295		
*S BASIN 33003 IS CURRENTLY PARTIALLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33003	-	2	.02660	32.66	1.039	.73255	1.551	1.919	PER IMP=	2.00
*S ROUTE THE FLOW TO SAGE AND THE AMOLE DEL NORTE CHANNEL.											
ROUTE	E33003.5	2	11	.02660	16.61	1.039	.73256	1.683	.976		
*S BASIN 33004 IS CURRENTLY PARTIALLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33004	-	2	.05480	73.55	2.078	.71092	1.518	2.097	PER IMP=	3.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33003.5 TO THE FLOW FROM SUB-BASIN 33004											
ADD HYD	E33004.1 11&	2	9	.08140	81.89	3.117	.71798	1.518	1.572		
*S BASIN 33005 IS CURRENTLY PARTIALLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33005	-	2	.08110	58.08	2.921	.67541	1.650	1.119	PER IMP=	6.00
*S ROUTE THE FLOW FROM SUB-BASIN 33005 TO 200 FEET WEST OF 86TH STREEET.											
ROUTE	E33005.5	2	11	.08110	44.76	2.921	.67542	1.782	.862		
*S BASIN 33006 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33006	-	2	.08660	85.01	2.770	.59983	1.551	1.534	PER IMP=	.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33005.5 TO THE FLOW FROM SUB-BASIN 33006											
ADD HYD	E33006.1 11&	2	3	.16770	102.97	5.692	.63638	1.617	.959		
*S ROUTE THE COMBINED FLOWS IN SAN YGANICO TO THE NATURAL DEPRESSION											
*S IN SUB-BASIN 33007.											
ROUTE	E33006.5	3	11	.16770	43.44	5.692	.63638	1.881	.405		
*S BASIN 33007 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33007	-	2	.33920	168.65	11.033	.60988	1.782	.777	PER IMP=	2.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33006.5 TO THE FLOW FROM SUB-BASIN 33007											
ADD HYD	E33007.1 11&	2	3	.50690	209.72	16.725	.61864	1.815	.646		
*S MODEL THE NATURAL DEPRESSION IN SUB-BASIN 33007 WITH THE ROUTE RESERVOIR											
ROUTE RESERVOIR	E33007.8	3	8	.50690	133.36	12.144	.44918	2.112	.411	AC-FT=	6.658
*S BASIN 33008 IS CURRENTLY UNDEVELOPED											
SEDIMENT BULK										PK BF =	1.15
COMPUTE NM HYD	E33008	-	2	.01320	13.49	.450	.63895	1.551	1.597	PER IMP=	5.00
*S BASIN 33009 IS CURRENTLY DEVELOPED WITH A DETENTION POND, THEREFORE MODEL											
*S AT HISTORIC OR PRE-DEVELOPMENT LEVELS.											
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR											
COMPUTE NM HYD	E33009	-	3	.02310	22.25	.622	.50524	1.518	1 505	PER IMP=	00
*S ADD THE FLOW FROM SUB-BASIN 33008 TO THE FLOW FROM SUB-BASIN 33009											

```
ADD HYD             E33009.1  2& 3   4         .03630        35.46       1.072       .55385    1.518    1.527
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 33009 1 IN SAGE TO BLAZICK STREET
*S
ROUTE               E33009.5    4   11         .03630        30.12       1.072       .55387    1.584    1.297
*S BASIN 33010 IS CURRENTLY DEVELOPED, BUT NO DETENTION POND, THEREFORE MODEL
*S AS DEVELOPED WITH FREE DISCHARGE.
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR
COMPUTE NM HYD        E33010    -     2         .01800        35.71       1.224      1.27547    1.518    3.100 PER IMP=  34.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33009.5 TO THE FLOW FROM SUB-BASIN 33010
ADD HYD             E33009.1 11& 2   3         .05430        61.92       2.297       .79306    1.551    1.782
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 33009.1 IN SAGE FROM BLAZICK STREET
*S TO 90TH STREET.
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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	E33010.5	3	11	05430	61.94	2.297	.79307	1.584	1.782	
*S BASIN 33011 IS CURRENTLY DEVELOPED WITH A DETENTION POND, THEREFORE MODEL										
*S AT HISTORIC OR PRE-DEVELOPMENT LEVELS.										
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR										
COMPUTE NM HYD	E33011	-	2	.03720	30.46	1.002	.50524	1.551	1.280	PER IMP= .00
*S ROUTE THE FLOW FROM SUB-BASIN 33011 IN SUNCREST ROAR, TO 90TH, THEN TO SAGE.										
ROUTE	E33011.5	2	12	.03720	28.47	1.002	.50525	1.584	1.196	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33011 5 TO THE ROUTED FLOW										
*S FROM SUB-BASIN 33010.5										
ADD HYD	E33011.1	11&12	3	.09150	90.41	3.299	.67605	1.584	1.544	
*S ROUTE THE COMBINED ROUTED FLOW FROM SUB-BASIN 33011.5 IN SAGE										
*S FROM 90TH STREET TO 200 FEET WEST OF 86TH STREET.										
ROUTE	E33011.6	3	11	.09150	88.18	3.299	.67605	1.617	1.506	
*S BASIN 33012 IS CURRENTLY DEVELOPED WITH A DETENTION POND, THEREFORE MODEL										
*S AT HISTORIC OR PRE-DEVELOPMENT LEVELS.										
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR										
COMPUTE NM HYD	E33012	-	2	.05330	31.35	1.436	.50524	1.617	.919	PER IMP= .00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33011.6 TO THE FLOW FROM SUB-BASIN 33012										
ADD HYD	E33012.1	11& 2	3	.14480	119.54	4.735	.61318	1.617	1.290	
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 33012.1 IN SAGE FROM 200 FEET WEST										
*S OF 86TH STREET TO 500 FEET EAST OF UNSER (EXTENDED).										
ROUTE	E33012.5	3	11	.14480	84.57	4.735	.61318	1.716	.913	
*S ADD THE RESERVOIR ROUTED FLOW FROM SUB-BASIN 33007.8 TO THE ROUTED FLOW										
*S FROM SUB-BASIN 33012.5										
ADD HYD	E33012.3	8&11	12	.65170	171.96	16.879	.48562	2.079	.412	
*S ADD THE COMBINED FLOWS FROM SUB-BASIN 33007.8 TO THE FLOW										
*S FROM SUB-BASIN 33004 FOR THE TOTAL FLOW APPROCHING THE AMOLE @ SAGE										
ADD HYD	E33012.3	9&12	11	.73310	187.93	19.996	.51142	2.046	.401	
*S calculate the volume of the sediment transport capacity of sage in its										
*S existing unlined state										
SEDIMENT TRANSP	E33012.3	11	SED ID = 2		PEAK CONC.(PPM-w) =	352395	TOTAL SED.(TONS) =	13549.29		
*S ADD THE TOTAL FLOW IN SAGE @ THE AMOLE CHANNEL TO THE FLOW IN THE CANNEL										
*S ABOVE SAGE FOR THE TOTAL FLOW IN THE MAIN CHANNEL BELOW SAGE.										
ADD HYD	E33012.3	11&13	12	4.65600	914.24	153.701	.61896	2.145	.307	
*S calculate the volume of the sediment transport capacity										
*S IN THE MAIN CHANNEL BELOW SAGE.										
SEDIMENT TRANSP	E33012.3	12	SED ID = 1		PEAK CONC.(PPM-w) =	444761	TOTAL SED.(TONS) =	151517.00		
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE SAGE CROSSING										
*S TO JUST UPSTREAM OF THE ARENAL CROSSING.										
ROUTE	E33004.5	12	9	4.65600	908.22	153.470	.61803	2.211	.305	
*S**********										
*S END TOWER/SAGE BASIN *** BEGIN SOUTH AMOLE DEL NORTE BASIN (350** SERIES)										
*S**********										
*S BASIN 35001 IS MOSTLY DEVELOPED										
SEDIMENT BULK									PK BF =	1.03
COMPUTE NM HYD	E35001	-	2	.18000	352.88	11.737	1 22261	1.518	3.063	PER IMP= 40.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33004.5 (TOTAL FLOW IN AMOLE DEL NORTE										

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*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35001.
ADD HYD              E35001.1  9& 2  13       4.83600       937.28      165.207       .64054     2.145      .303
*S RECALL THE EXISTING CONDITIONS HYDROGRAPH FROM THE SUNSET ESTATES MODEL.
RECALL HYD       DN100E1A.DAT   -     2        .57580       733.87       26.086       .84943     1.551     1.991
*S ADD THE RECALLED HYDROGRAPH TO THE COMBINED FLOW FROM SUB-BASIN 35001.2.
*S THIS IS THE TOTAL FLOW IN THE AMOLE DEL NORTE.
*S HYD NO. E35001.3 IS ***** AP 38 *****
ADD HYD              E35001.3 13& 2   3       5.41180      1188.97      191.293       .66276     1.551      .343
*S calculate the volume of the sediment transport capacity
*S IN THE MAIN CHANNEL BELOW ARENAL RD.
SEDIMENT TRANSP      E35001.3    3       SED ID =  3              PEAK CONC.(PPM-w) =    347290  TOTAL SED.(TONS) =  125638.20
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE ARENAL CROSSING
*S TO THE 5400 FEET NORTH OF THE AMOLE DETENTION FACILITY.
```

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	E35001.5	3	11	5.41180	1144.15	191.146	.66226	1.584	.330	
*S BASIN 35208 IS CURRENTLY UNDEVELOPED										
SEDIMENT BULK										PK BF = 1 15
COMPUTE NM HYD	E35208	-	2	.07330	71.48	3.005	76857	1.584	1.524	PER IMP= 15.00
*S calculate the volume of the sediment transport capacity										
*S in the undefined (40:1 width to depth) natural side channel (35208)										
SEDIMENT TRANSP	E35208	2	SED ID = 4			PEAK CONC.(PPM-w) =	335819	TOTAL SED.(TONS) =		1890.23
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35001.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35208.										
ADD HYD	E35208.1 11& 2	3		5.48510	1215.64	194.151	.66368	1.584	.346	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 5362 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 4807 _FEET NORTH OF THE AMOLE DETENTION FACIL										
ROUTE	E35208.5	3	11	5.48510	1208.12	194.096	.66349	1.617	.344	
*S BASIN 35209 IS CURRENTLY UNDEVELOPED										
SEDIMENT BULK										PK BF = 1 15
COMPUTE NM HYD	E35209	-	2	.04070	28.70	1.126	.51855	1.584	1.102	PER IMP= .00
*S calculate the volume of the sediment transport capacity										
*S in the undefined (40:1 width to depth) natural side channel (35209)										
SEDIMENT TRANSP	E35209	2	SED ID = 5			PEAK CONC.(PPM-w) =	316241	TOTAL SED.(TONS) =		650.42
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35208.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35209.										
ADD HYD	E35209.1 11& 2	3		5.52580	1236.15	195.221	.66242	1.617	.350	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 4807 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 3625 FEET NORTH OF THE AMOLE DETENTION FACILI										
ROUTE	E35209.5	3	12	5.52580	1192.99	195.072	.66191	1.650	.337	
*S BASIN 35301 IS CURRENTLY UNDEVELOPED										
SEDIMENT BULK										PK BF = 1.15
COMPUTE NM HYD	E35301	-	2	.14200	121.66	4.839	.63895	1.584	1.339	PER IMP= 5.00
*S ROUTE THE FLOW FROM SUB-BASIN 35301 TO 3625 FEET NORTH										
*S OF THE AMOLE DETENTION FACILITY.										
ROUTE	E35301.5	2	11	.14200	88.97	4.839	.63895	1.716	.979	
*S BASIN 35302 IS CURRENTLY UNDEVELOPED										
SEDIMENT BULK										PK BF = 1.15
COMPUTE NM HYD	E35302	-	2	.16360	129.42	5.561	.63738	1.617	1.236	PER IMP= 3.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35301.5 TO THE FLOW FROM SUB-BASIN 35302.										
ADD HYD	E35302.1 11& 2	3		.30560	209.95	10.400	.63810	1.650	1.073	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35209.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35302.1.										
ADD HYD	E35302.2 12& 3	4		5.83140	1402.94	205.472	.66067	1.650	.376	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 3625 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 2125 FEET NORTH OF THE AMOLE DETENTION FACILI										
ROUTE	E35302.5	4	12	5.83140	1369.43	205.304	.66012	1.716	.367	
*S BASIN 35303 IS CURRENTLY UNDEVELOPED										
SEDIMENT BULK										PK BF = 1.15
COMPUTE NM HYD	E35303	-	2	.09640	81.36	2.833	.55112	1.551	1.319	PER IMP= .00
*S ROUTE THE FLOW FROM SUB-BASIN 35303 TO 2300 FEET NORTH										
*S OF THE AMOLE DETENTION FACILITY.										

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ROUTE              E35303.5    2   11        .09640        60.52       2.833       .55112    1.650     .981
*S BASIN 35304 IS CURRENTLY DEVELOPED WITH MINIMAL VEGETATION.
SEDIMENT BULK                                                                                          PK BF =    1.06
COMPUTE NM HYD       E35304    -     2        .09850       219.37       8.783      1.67186    1.551    3.480 PER IMP=  60.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35303.5 TO THE FLOW FROM SUB-BASIN 35304.
ADD HYD            E35304.1 11& 2   3        .19490       258.51      11.616      1.11752    1.584    2.072
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35302.5 (TOTAL FLOW IN AMOLE DEL NORTE
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35302.1.
ADD HYD            E35304.2 12& 3   4       6.02630      1564.23      216.920       .67492    1.683     .406
*S calculate the volume of the sediment transport capacity
*S IN THE MAIN CHANNEL 1000' ABOVE BLAKE RD.
SEDIMENT TRANSP    E35304.2    4       SED ID =  6              PEAK CONC.(PPM-w) =   353362  TOTAL SED.(TONS) =  145122.90
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 2125 FEET NORTH OF
*S THE AMOLE DETENTION FACILITY TO 1325 FEET NORTH OF THE AMOLE DETENTION FACILI
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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	E35304.5	4	12	6.02630	1546 11	216.837	.67466	1.716	.401	
*S BASIN 35305 IS CURRENTLY UNDEVELOPED										
SEDIMENT BULK										PK BF = 1.15
COMPUTE NM HYD	E35305	-	2	.08410	59.54	2.388	.53244	1.584	1.106	PER IMP= .00
*S ROUTE THE FLOW FROM SUB-BASIN 35305 TO 1100 FEET NORTH										
*S OF THE AMOLE DETENTION FACILITY.										
ROUTE	E35305.5	2	11	.08410	46.45	2.388	.53244	1.683	.863	
*S BASIN 35306 IS CURRENTLY PARTIALY DEVELOPED WITH MINIMAL VEGETATION.										
SEDIMENT BULK										PK BF = 1.06
COMPUTE NM HYD	E35306	-	2	.09480	157.80	5.485	1.08480	1.551	2.601	PER IMP= 3.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35305.5 TO THE FLOW FROM SUB-BASIN 35306.										
ADD HYD	E35306.1 11&	2	3	.17890	186.74	7.873	.82513	1.584	1.631	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35304.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35306.1.										
ADD HYD	E35304.2 12&	3	4	6.20520	1697.86	224.710	.67900	1.683	.428	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 1325 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO THE AMOLE DETENTION FACILITY.										
ROUTE	E35306.5	4	12	6.20520	1655.49	224.581	.67861	1.716	.417	
*S BASIN 35307 IS CURRENTLY PARTIALY DEVELOPED WITH MINIMAL VEGETATION.										
SEDIMENT BULK										PK BF = 1.06
COMPUTE NM HYD	E35307	-	2	.09730	147.37	6.327	1.21930	1.617	2.367	PER IMP= 20.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35306.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35307.										
*S HYD NO. AN100E1A.HYD IS ***** AP 39 *****										
ADD HYD	AN100E1A.HYD 12&	2	3	6.30250	1774.76	230.908	.68695	1.716	.440	
*S THE COMBINED FLOW FROM SUB-BASIN AN100E1A IS THE TOTAL FLOW INTO THE AMOLE										
*S DETENTION FACILITY.										
FINISH										

(s10H

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START                0.0 HOURS    PC=0   PL=-1
*S*************************************************************************
*S REVISED:  6/25/98 BY JAMES D. HUGHES @ D. MARK GOODWIN AND ASSOC.
*S*************************************************************************
*S WE ADDED BASINS 33004 AND 33007 TOGETHER BEFORE
*S ENTERING THE AMOLE, ADDING SEDIMENT TRANSPORT CALCULATIONS ON
*S THAT INFLOW HYDROGRAPH AT SAGE (NOT AT ARENAL ROAD AS PREVIOUSLY
*S MODELED), THEN ADDING A CHECK ON THE TRANSPORT CAPACITY OF THE MAIN
*S CANAL AT 3 PLACES; ONE JUST BELOW SAGE, THE SECOND WHERE THE
*S CHANNEL SLOPE FLATTENS FROM A 0.36% TO 0.07% SLOPE JUST BELOW ARENAL
*S ROAD AND THE THIRD ABOUT 1000' UPSTREAM OF RIO BRAVO.  THE UNLINED
*S ROAD SIDE DITCHES AT SAGE THE SINGLE LARGEST SOURCE OF SEDIMENT.
*S BASINS 33001 AND 33002 SHEET FLOW INTO THE CHANNEL WITH NO BED
*S MATERIAL TRANSPORTED INTO THE CHANNEL.  BASIN 35001 HAS BEEN
*S DEVELOPED. BOTH BASIN 35001 AND THE SUNRISE ESTATES BASIN DUMP THEIR
*S DEVELOPED FLOWS INTO THE AMOLE CHANNEL IN LINED FACILITIES AND
*S CONTRIBUTE NO BED MATERIAL.  BASINS 35208 AND 35209 EACH CONTRIBUTE
*S VERY SMALL QUANTITIES OF SEDIMENT.  THE CHANNEL IS BUILT 2' HIGHER
*S THAN THE UPSTREAM NATURAL GROUND ELEVATIONS AT BASIN 35302 AND A
*S LINED RUNDOWN DRAINS THE NATURAL DEPRESSION INTO THE CHANNEL, SO
*S BASIN 35302 CONTRIBUTES NO SIGNIFICANT BED MATERIAL.  SIMILAR
*S DEPRESSIONS EXIST AT BASINS 35306 AND 35207, SO NO BED MATERIAL ENERS
*S THERE EITHER.  BASIN 35304 IS DEVELOPED WITH LINED FACILITIES DELIVERING
*S RUNOFF TO THE CHANNEL SO NO SEDIMENT THERE EITHER.
*S
*S      AMOLE DEL NORTE WATERSHED
*S
*S
*S 100-YR, 6-HR STORM WITH SEDIMENT
*S FILE NAME: AN100E1A.DAT  (EXISTING CONDITIONS)
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: DEBORAH DIXON
*S LAST REVISION: 05-31-96
*************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE TIERRA BAYITA
*S BASIN, TOWER/SAGE BASIN AND THE SOUTH AMOLE DEL NORTE BASIN.  FLOWS FROM
*S THESE BASINS ARE CONVEYED TO AMOLE DETENTION FACILITY VIA THE AMOLE DEL
*S NORTE CHANNEL.  THIS MODEL TAKES TWO INFLOW HYDROGRAPHS DERIVED FROM MODELS
*S FOR THE TIERRA BAYITA CHANNEL AND FROM THE UNSER DIVERSION/ATRISCO BUSINESS
*S PARK, RESPECTIVELY.  THE TIERRA BAYITA MODEL WAS DEVELOPED BY GREINER (AND ACCEPTED
*S BY THE CITY), TO DETERMINE THE SYSTEM CAPACITY OF ALL MAJOR FACILITIES WITHIN THE
*S TIERRA BAYITA BASIN.  GREINER'S MODEL INCLUDES THE UNSER DIVERSION SYSTEM AND
*S SAD 214 POND MODIFICATIONS, AS DESIGNED BY EASTERLING AND ASSOCIATES (AND ACCEPTED
*S BY THE AMAFCA), BY RECALLING THE OUTFLOW HYDROGRAPH FROM THE UNSER DIVERSION MODEL.
*S ADDITIONALLY, EASTERING'S MODEL INCLUDES THE ATRISCO BUSINESS PARK DEVELOPMENT.
*S THE MODEL'S OUTFLALL IS INTO THE NORTH/SOUTH COORS DETENTION FACILITY, AS IS
*S THE TIERRA BAYITA CHANNEL.  DUE TO THE NUMBER OF AVAILABLE STORED HYDROGRAPHS
*S (MAX=10) FOR THIS PROJECT, THE TIERRA BAYITA AND UNSER DIVERSION MODELS WERE
*S COMBINED.
*S
*S THE EXISTING CONDITION TOWER/SAGE BASIN IN THE RUN WAS DEVELOPED BY LH.
*S
*S INCLUDED IN THE SOUTH AMOLE DEL NORTE BASIN, IS THE SUNSET ESTATES DEVELOPMENT
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*S DEVELOPED BY FRED ARFMAN.  THIS RUN WAS MODIFIED TO REFLECT EXISTING CONDITIONS.
*S THE REMAINED OF THE SOUTH AMOLE DEL NORTE BASIN MODEL WAS DEVELOPED BY LH AND
*S IS CONTAINED HEREIN.
*S
*S SINCE THE ABOVE MENTIONED MODELS WERE FOR DEVELOPED CONDITIONS, THE
*S MODELS WERE RENAMED AND MODIFIED TO REFLECT EXISTING CONDITIONS.  LOCATIONS
*S OF THE INLETS INTO THE NORTH/SOUTH COORS DETENTION FACILITY AND THE AMOLE DEL
*S NORTE CHANNEL WERE DETERMINED FROM AS-BUILT DRAWINGS.  BASIN DIVIDES WERE
*S DETERMINED FROM NOVEMBER 1995 AREIAL, TOPOGRAPHICAL MAPS AND PREVIOUS STUDIES.
*S
*S NOTE: AN "E" (EXISTING) HAS BEEN PLACED IN FRONT OF EACH SUB-BASIN HYDROGRAPH
*S       DESIGNATION DUE TO THE LIMITATIONS OF AHYMO.
*S
**********************************************************************
*S ANALYSIS ASSUMPTIONS:
**********************************************************************
*S 1. ALL LAND IN THIS BASIN IS MODELED AS EXISTING CONDITION.
*S
*S 2. EXISTING DEVELOPMENTS WITH RETENTION PONDS ARE MODELED TO DISCHARGE
*S    FLOWS EQUIVALANT TO HISTORIC FLOW RATES.  THIS IS ACHIEVED BY ADJUSTING
*S    THE LAND TREATMENT FACTORS TO PRE-DEVELOPMENT NUMBERS.
*S
*S 3. IN BASIN 33006, THERE ARE TWO NATURAL DEPRESSIONS.  THEY ARE MODELED AS
*S    A SINGLE DETENTION BASIN.
*S
*S 4. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE ARROYO EXISTING CONDITIONS MODEL
*S    AA100E1A.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE & HUBBELL SYSTEM.
*S
*S 5. A BULKING FACTOR OF 15% HAS BEEN ADDED TO EACH UNDEVELOPED SUB-BASIN AND
*S    A BULKING FACTOR OF 6% HAS BEEN ADDED TO EACH DEVELOPED SUB-BASIN LIKELY
*S    TO PRODUCE SEDIMENT.  A BULKING FACTOR OF 3% HAS BEEN ADDED TO EACH
*S    DEVELOPED SUB-BASIN THAT WOULD PROBIBLY PRODUCE SEDIMENT, SUCH AS PARKS
*S    AND SCHOOL PLAY GROUNDS.   AND, NO BULKING FACTOR FOR WELL DEFINED RESIDENTIAL
*S    DEVELOPMENTS.
*S
**********************************************************************
*S100 YEAR 6HR STORM EXISTING CONDITION
RAINFALL .            TYPE=1  0.0  1.87  2.20  2.66    DT=0.033
** 10 YEAR 6HR STORM EXISTING CONDITION
**RAINFALL            TYPE=1  0.0  1.25  1.47  1.77    DT=0.033
**  2 YEAR 6HR STORM EXISTING CONDITION
**RAINFALL            TYPE=1  0.0  0.74  0.95  1.15    DT=0.033
**********************************************************************
*S RECALL HYDROGRAPH FROM THE TIERRA BAYITA BASIN
RECALL HYD          ID=2  HYD=TB100E1A.HYD
                    DT=   .033000 HRS   DA=   3.0661 SQ MI
                    PEAK=   1462.566CFS  RO=   .5861 INCHES  NO PTS=600
                    FLOW RATES
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
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.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	000	.000	.000	.000
.002	.056	.405	1.666	4.837
11.142	22.754	48.254	108.729	216.695
363.708	564.512	792.261	1004.915	1189.479
1338.989	1436.353	1462.566	1423.734	1342.885
1241.760	1138.217	1038.517	946.710	864.053
787.279	720.911	664.053	610.685	562.965
519.360	476.723	436.800	402.519	373.337
347.203	325.083	306.193	288.899	273.659
259.919	246.881	234.961	224.413	214 932
206.154	198.087	190.705	183.178	175.774
169.393	163.671	158.286	153.087	147.901
142.932	138.380	134.096	129.883	125.213
118.441	108.084	94.944	81.423	71.862
66.291	62.204	58.965	56.099	53.284
50.646	48.373	46.494	44.902	43.475
42.140	40.873	39.671	38.530	37.442
36.399	35.401	34.447	33.532	32.652
31.804	30.988	30.204	29.452	28.755
28.117	27.489	26.856	26.241	25.654
25.095	24.565	24.066	23.601	23.169
22.761	22.370	21.993	21.634	21.295
20.975	20.673	20.390	20.125	19.877
19.645	19.428	19.224	19.032	18.853
18 685	18.531	18.388	18.256	18.135
18.024	17.922	17.829	17.744	17.666
17.593	17.527	17.468	17.416	17.371
17.334	17.302	17.274	17.251	17.232
17.217	17.206	17.198	17.194	17.194
17.199	17.207	17.217	17.231	17.247
17.267	17.289	17.313	17.337	17.349
17.328	17.249	17.101	16.896	16.659
16.414	16.178	15.957	15.747	15.545
15.348	15.154	14.963	14.776	14.593
14.417	14.248	14.089	13.939	13.800
13.671	13.553	13.445	13.348	13.259
13.179	13.107	13.042	12.985	12.934
12.888	12.848	12.813	12.782	12.755
12.732	12.712	12.695	12.680	12.668
12.657	12.649	12.643	12.638	12.634
12.632	12.631	12.630	12.631	12.632
12.634	12.636	12.639	12.642	12.646
12.650	12.654	12.659	12.664	12.669
12.674	12.679	12.685	12.690	12.696
12.702	12.708	12.714	12.720	12.726
12.732	12.738	12.744	12.750	12.755
12.761	12.766	12.772	12.777	12.782
12.787	12.792	12.797	12.802	12.806
12.810	12.815	12.819	12.822	12.826

12.830	12.833	12.837	12.840	12.843
12.846	12.848	12.851	12.853	12.856
12.858	12.860	12.862	12.863	12.865
12.866	12.868	12.869	12.870	12.871
12.872	12.873	12.873	12.874	12.874
12.874	12.874	12.874	12.874	12.874
12.874	12.873	12.873	12.872	12.872
12.871	12.870	12.869	12.868	12.866
12.865	12.864	12.862	12.860	12.859
12.857	12.855	12.853	12.851	12 849
12.847	12.845	12.842	12.840	12.837
12.835	12.832	12.830	12.827	12.824
12.821	12.818	12.815	12.812	12.809
12 806	12.803	12.799	12.796	12.793
12.789	12.786	12.782	12.778	12.775
12.771	12.767	12.764	12.760	12.756
12.752	12.748	12.744	12.740	12.736
12.732	12.728	12.724	12.719	12.715
12.711	12.707	12.702	12.698	12.693
12.689	12 685	12.680	12.676	12.671
12 666	12.662	12.657	12.652	12.648
12.643	12.638	12.633	12.629	12.624
12.619	12.614	12.609	12.604	12.599
12.594	12.589	12.584	12.579	12.574
12.569	12.564	12.559	12.554	12.548
12.543	12.538	12.533	12.528	12.522
12.517	12.512	12.507	12.501	12.496
12.491	12.486	12.480	12.475	12.470
12.464	12.459	12.454	12.448	12.443
12.437	12.432	12.427	12.421	12.416
12.410	12.405	12.399	12.394	12.389
12.383	12.378	12.372	12.367	12.361
12.355	12.350	12.344	12.338	12.332
12.326	12.320	12.314	12.308	12.301
12.295	12.289	12.282	12.275	12.269
12.262	12.255	12.248	12.241	12.234
12.227	12.220	12.213	12.206	12.199
12.192	12.185	12.178	12.170	12.163
12.156	12.149	12.142	12.135	12.127
12.120	12.113	12.106	12.099	12.091
12.084	12.077	12.070	12.062	12.055
12.048	12.041	12.034	12.026	12.019
12.012	12.005	11.998	11.991	11.983
11.976	11.969	11.962	11.955	11.947
11.940	11.933	11.926	11.919	11.912
11.904	11.897	11.890	11.883	11.876
11.869	11.861	11.854	11.847	11.840
11.833	11.826	11.819	11.812	11.804
11.797	11.790	11.783	11.776	11.769
11.762	11.755	11.748	11.741	11.734
11.726	11.719	11.712	11.705	11.698
11.691	11.684	11.677	11.670	11.663

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                        11.656     11.649     11 642     11.635     11.628
                        11.621     11.614     11.607     11.600     11.593
                        11.586     11.579     11.572     11.565     11.558
                        11.551     11.544     11.537     11.530     11.523
                        11.516     11.509     11.502     11.495     11 488
                        11.481     11.474     11 467     11 460     11.453
                        11.446     11.440     11.433     11.426     11.419
                        11.412     11.405     11.398     11.391     11.384
                        11.377     11 371     11.364     11.357     11.350
                        11.343     11.336     11.329     11 323     11.316
                        11.309     11.302     11.295     11.288     11.282
                        11.275     11.268     11.261     11.254     11.247
                        11.241     11.234     11.227     11.220     11.213
PRINT HYD              ID=2  CODE=1
*
*S RECALL HYDROGRAPH FROM THE ATRISCO BUSINESS PARK
RECALL HYD          ID= 3 HYD=      290.23 DT=  .033000 HRS DA=     .3593 SQ MI
                    PEAK=    275.207CFS  RO= 1.1058 INCHES  NO PTS=600
                    FLOW RATES
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .000       .000       .000       .000       .000
                           .003       .064       .358      1.159      2.834
                          6.407     14.070     29.725     59.997    106.504
                        162.617    212.727    247.409    267.077    275.207
                        274.318    265.122    253.145    242.562    232.236
                        221.609    211.194    200.958    191.025    181.728
                        173.252    165.324    157.794    150.330    142.340
                        133.244    123.070    112.960    103.668     95.026
                         87.131     79.952     73.490     67.913     62.920
                         58.265     54.168     50.625     47.499     44.573
                         41.672     38.928     36.621     34.692     32.810
                         31.076     29.580     28.197     26.877     25.573
                         24.314     23.134     21.988     20.893     19.916
                         18.964     18.044     17.287     16.644     16.042
                         15.466     14.907     14.380     13.888     13.425
                         12.987     12.569     12.167     11.777     11.402
                         11.047     10.713     10.398     10.099      9.804
                          9.507      9.229      8.987      8.770      8.558
                          8.326      8.066      7.847      7.672      7.504
                          7.353      7.213      7.075      6.942      6.816
                          6.696      6.583      6.478      6.380      6.287
                          6.201      6.119      6.042      5.970      5.902
                          5.839      5.779      5.724      5.673      5.626
                          5.581      5.540      5 500      5.462      5.427
                          5.395      5.366      5.340      5.315      5.292
                          5.272      5.254      5.237      5.222      5.208
                          5.195      5.184      5.174      5.166      5.161
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5.157	5.152	5.148	5.146	5.145
5.144	5.143	5.143	5.144	5.146
5.149	5.152	5.156	5.160	5.165
5.171	5.177	5.184	5.188	5.178
5.143	5.083	5.007	4.924	4.842
4.768	4.701	4.641	4.585	4.530
4.475	4.421	4.366	4.311	4.255
4.200	4.144	4.089	4.034	3.980
3.928	3.877	3.829	3.782	3.736
3.692	3 649	3.608	3.569	3.532
3.497	3.463	3.431	3.400	3.371
3.344	3.317	3.292	3.268	3.245
3.224	3.203	3.184	3.166	3.148
3.132	3.116	3.101	3.087	3.073
3.060	3.048	3.036	3.025	3.014
3.004	2.994	2.985	2.976	2.967
2.959	2.951	2.944	2.937	2.930
2.923	2.917	2.911	2.905	2.899
2.894	2.888	2.883	2.878	2.873
2.868	2.863	2.859	2.854	2.850
2.846	2.841	2.837	2.833	2.829
2.825	2.821	2.817	2.813	2.809
2.806	2.802	2.799	2.795	2.791
2.788	2.784	2.780	2.776	2.772
2.769	2.765	2.761	2.757	2.752
2.748	2.744	2.740	2.735	2 731
2.726	2.721	2.717	2.712	2.707
2.702	2.697	2.693	2.688	2.683
2.678	2.673	2.668	2.664	2.659
2.654	2.649	2.644	2.640	2.635
2.630	2.626	2.621	2.616	2.611
2.607	2.602	2.597	2.593	2.588
2.583	2.579	2.574	2.569	2.565
2.561	2.556	2.552	2.547	2.542
2.538	2.534	2.529	2.525	2.520
2.516	2.512	2.507	2.503	2.499
2.494	2.490	2.485	2.481	2.477
2.472	2.468	2.464	2.459	2.455
2.451	2.447	2.442	2.438	2.434
2.430	2.425	2.421	2.417	2.412
2.408	2.404	2.400	2.396	2.392
2.387	2.383	2 379	2.375	2.371
2.367	2.362	2.358	2.354	2.350
2.346	2.342	2.338	2.334	2.330
2.326	2.322	2.317	2.313	2.309
2.305	2.301	2.297	2.293	2.289
2.285	2.281	2.277	2.273	2.269
2.265	2.261	2.257	2.253	2.250
2 246	2.242	2.238	2.234	2.230
2.226	2.222	2.218	2.215	2.211
2.207	2.203	2.199	2.196	2.192
2.188	2.184	2.180	2.176	2.173

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                    2.169     2.165     2.161     2.158     2.154
                    2.150     2.146     2.142     2.138     2.135
                    2.131     2.127     2.123     2.120     2.116
                    2.112     2.108     2.105     2.101     2.097
                    2.093     2.090     2.086     2.082     2.079
                    2.075     2.072     2.068     2.064     2.061
                    2.057     2.054     2.050     2.046     2.043
                    2.039     2.036     2.032     2.029     2.025
                    2.021     2.018     2.014     2.010     2.006
                    2.001     1.997     1.993     1.988     1.984
                    1.979     1.975     1.971     1.967     1.964
                    1.960     1.956     1.952     1.949     1.946
                    1.942     1.939     1.935     1.932     1.929
                    1.925     1.922     1 919     1.915     1.912
                    1.909     1.906     1.903     1.899     1.896
                    1.893     1.890     1.886     1.883     1.880
                    1.876     1.873     1.870     1.866     1.863
                    1.860     1.856     1.853     1.849     1.845
                    1.841     1.837     1.833     1.828     1.824
                    1.820     1.815     1.810     1.805     1.799
                    1.793     1.788     1.782     1.776     1.770
                    1.763     1.757     1.751     1.745     1.739
                    1.732     1.726     1.720     1.714     1.708
                    1.702     1.695     1.689     1.683     1.677
                    1.671     1.665     1.659     1.653     1.647
                    1.641     1.635     1.629     1.623     1.617
                    1.612     1.606     1.600     1.594     1.588
                    1.583     1.577     1.571     1.565     1.560
                    1.554     1.549     1.543     1.537     1.532
                    1.526     1.521     1.515     1.510     1.504
                    1.499     1.493     1.488     1.482     1.477
                    1.472     1.466     1.461     1.455     1.450
                    1.444     1.439     1.434     1.428     1.423
                    1.418     1.413     1.408     1.403     1.398
                    1.392     1.387     1.382     1.377     1.372
PRINT HYD           ID=3  CODE=1
*
*S ADD THE TWO RECALLED HYDROGRAPHS
ADD HYD             ID=4  HYD=NPOND.IN  I=2  II=3
PRINT HYD           ID=4  CODE=1
*S ROUTE FLOWS THROUGH THE NORTH POND.  PRIMARY SPILLWAY=24" PIPE
*S AND OVER FLOW SPILLWAY IS WEIR FLOW INTO SOUTH POND.
ROUTE RESERVOIR     ID=12  HYD=NPOND.OUT IN=4  CODE=2
                    OUTFLOW         STORAGE         ELEV
                    0               0               20
                    12              1.26            22
                    26              2.74            24
                    34              4.4             26
                    445             5 3             27
                    1193            6.24            28
                    2164            7.27            29
                    3313            8.44            30
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                        4618            9 72            31
PRINT HYD               ID=12  CODE=1
*
*S BASINS 30413 TO 30416 ARE A PART OF THE TIERRA BAYITA BASIN, BUT DO NOT
*S FLOW INTO THE TIERRA BAYITA CHANNEL.  THE FLOW FROM THESE SUB-BASINS
*S (300** SERIES) GOES INTO THE SOUTH POND OF THE N/S COORS DETENTION FACILITY.
*S THEREFORE, CALCULATE THE FLOW FROM THESE BASINS.
*
*S BASIN 30413 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK           CODE=1  BF=1.15
COMPUTE NM HYD          ID=2  HYD=E30413  AREA=0.1011  SQ MI
                        A=93  B=0  C=2  D=5
                        TP=0.185  HR  MASSRAIN=-1
PRINT HYD               ID=2  CODE=1
*S ROUTE THE COMBINED FLOWS TO 1100 FEET EAST OF 86TH STREET.
COMPUTE RATING CURVE    CID=1  VN=1  NS=1  MIN EL=100  MAX EL=103
                        CS=0.02  FS=0.02  N=0.03  DIST=46
                        DIST    EL      DIST    EL
                        0       103     3       100
                        43      100     46      103
COMPUTE TRAVEL TIME     ID=11  RN=1  NVS=1  L=3225  S=0.02
ROUTE                   ID=11  HYD=E30413.5  INFLOW ID=2  DT=0.0
PRINT HYD               ID=11  CODE=1
*S BASIN 30414  IS CURRENTLY UNDEVELOPED
SEDIMENT BULK           CODE=1  BF=1.15
COMPUTE NM HYD          ID=2  HYD=E30414  AREA=0.1340  SQ MI
                        A=93  B=0  C=5  D=2
                        TP=0.268  HR  MASSRAIN=-1
PRINT HYD               ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 30413.5 TO THE FLOW FROM SUB-BASIN 30414
ADD HYD                 ID=3  HYD=E30414.1  I=11  II=2
PRINT HYD               ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS TO STINSON STREET.
COMPUTE RATING CURVE    CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                        CS=0.003  FS=0.003  N=0.03  DIST=101
                        DIST    EL      DIST    EL
                        0       101     1       100
                        100     100     101     101
COMPUTE TRAVEL TIME     ID=11  RN=1  NVS=1  L=3400  S=0.003
ROUTE                   ID=11  HYD=E30414.5  INFLOW ID=3  DT=0.0
PRINT HYD               ID=11  CODE=1
*S BASIN 30415  IS CURRENTLY UNDEVELOPED
SEDIMENT BULK           CODE=1  BF=1.15
COMPUTE NM HYD          ID=2  HYD=E30415  AREA=0.1108 SQ MI
                        A=76  B=0  C=20  D=4
                        TP=0.393  HR  MASSRAIN=-1
PRINT HYD               ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 30414.5 TO THE FLOW FROM SUB-BASIN 30415
ADD HYD                 ID=3  HYD=E30415.1  I=11  II=2
PRINT HYD               ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS TO THE SOUTH POND OF THE N/S COORS DET. FAC.
COMPUTE RATING CURVE    CID=1  VN=1  NS=1  MIN EL=100  MAX EL=103
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                          CS=0.028  FS=0.028  N=0.03  DIST=270
                          DIST     EL      DIST     EL
                          0        103     135      100
                          270      103
COMPUTE TRAVEL TIME       ID=11  RN=1  NVS=1  L=1850  S=0.028
ROUTE                     ID=11  HYD=E30415.5  INFLOW ID=3  DT=0.0
PRINT HYD                 ID=11  CODE=1
*S BASIN 30416 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK             CODE=1  BF=1.15
COMPUTE NM HYD            ID=2  HYD=E30416  AREA=0.0689  SQ MI
                          A=39  B=0  C=47  D=14
                          TP=0.181  HR  MASSRAIN=-1
PRINT HYD                 ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 30415.5 TO THE FLOW FROM SUB-BASIN 30416
ADD HYD                   ID=3  HYD=E30416.1  I=11  II=2
PRINT HYD                 ID=3  CODE=1
*S ADD THE COMBINED FLOW FROM SUB-BASIN 30416.1 TO THE NORTH POND OUTFLOW
ADD HYD                   ID=4  HYD=SPOND.IN  I=12  II=3
PRINT HYD                 ID=4  CODE=1
*S ROUTE COMBINED FLOW THROUGH THE SOUTH POND WITH THE ROUTE RESERVOIR.
*S THE FLOW FROM HYDROGRAPH SPOND.OUT IS AP36.
PRINT HYD                 ID=4  CODE=1
ROUTE RESERVOIR           ID=12  HYD=SPOND.OUT IN=4  CODE=2
                          OUTFLOW          STORAGE          ELEV
                          0                0                16
                          223              3.69             18
                          389              9.85             20
                          445              18.13            22
                          450              27.06            24
                          600              36.60            26
                          840              47.69            28
                          900              60.81            30
                          960              63.50            31
                          2104             75.00            32
                          5951             82.00            33
*S HYD NO. SPOND.OUT IS ***** AP 36.1 *****
PRINT HYD                 ID=12  CODE=1
DIVIDE HYD                ID=12  Q=960  ID=20  HYD=TO.ADN
                                         ID=50  HYD=TO.COORS
PRINT HYD                 ID=20  CODE=1
*S THE FLOW FROM HYDROGRAPH TO.COORS IS THE FLOW SPILLING OUT OF THE
*S NORTH/SOUTH COORS DETENTION FACILITY ONTO COORS ROAD.
PRINT HYD                 ID=50  CODE=1
*
*S ROUTE THE OUTFLOW FROM THE NORTH/SOUTH COORS DETENTION FACILITY INTO
*S THE AMOLE DEL NORTE CHANNEL TO SAN YGNACIO.
COMPUTE RATING CURVE      CID=1  VN=1  NS=1  MIN EL=100  MAX EL=107
                          CS=0.0038  FS=0.0038  N=0.014  DIST=38
                          DIST     EL      DIST     EL
                          0        107     14       100
                          24       100     38       107
COMPUTE TRAVEL TIME       ID=12  RN=1  NVS=1  L=1159  S=0.0038
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ROUTE                    ID=12  HYD=BEGIN.ADN  INFLOW ID=20  DT=0.0
PRINT HYD                ID=12  CODE=1
**********************************************************************
*S END TIERRA BAYITA BASIN
*S BEGIN CALCULATION OF THE TOWER/SAGE BASIN (330** SERIES)
**********************************************************************
*S BASIN 33001 IS CURRENTLY PARTIALLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33001  AREA=0.0483 SQ MI
                         A=73  B=0  C=10  D=17
                         TP=0.184  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE FLOW FROM BASIN 33001 TO THE FLOW IN THE AMOLE DEL NORTE AT SAN YGNACIO.
ADD HYD                  ID=3  HYD=E33001 1  I=12  II=2
*S HYD NO. E33001 1 IS ***** AP 36 *****
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE N/S COORS POND
*S TO JUST UPSTREAM OF SAGE.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=107
                         CS=0.0038  FS=0.0038  N=0.014  DIST=38
                         DIST    EL      DIST    EL
                         0       107     14      100
                         24      100     38      107
COMPUTE TRAVEL TIME      ID=12  RN=1  NVS=1  L=1085  S=0.0038
ROUTE                    ID=12  HYD=E33001.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=12  CODE=1
*S BASIN 33002 IS CURRENTLY PARTIALLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33002  AREA=0.0344  SQ MI
                         A=64  B=0  C=30  D=6
                         TP=0.172  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE FLOW FROM BASIN 33002 TO THE FLOW IN THE AMOLE DEL NORTE AT SAGE
ADD HYD                  ID=3  HYD=E33002.1  I=12  II=2
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM SAGE TO JUST DOWNSTREAM
*S OF THE SAGE CROSSING
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=107
                         CS=0.0038  FS=0.0038  N=0.014  DIST=38
                         DIST    EL      DIST    EL
                         0       107     14      100
                         24      100     38      107
COMPUTE TRAVEL TIME      ID=13  RN=1  NVS=1  L=255  S=0.0038
ROUTE                    ID=13  HYD=E33002.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=13  CODE=1
*S BASIN 33003 IS CURRENTLY PARTIALLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33003  AREA=0.0266 SQ MI
                         A=60  B=0  C=38  D=2
                         TP=0.157  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ROUTE THE FLOW TO SAGE AND THE AMOLE DEL NORTE CHANNEL.
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COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.029  FS=0.029  N=0.03  DIST=201
                         DIST     EL       DIST     EL
                         0        101      1        100
                         200      100      201      101
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=1370  S=0.029
ROUTE                    ID=11  HYD=E33003.5  INFLOW ID=2  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 33004 IS CURRENTLY PARTIALLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33004  AREA=0.0548 SQ MI
                         A=66  B=0  C=31  D=3
                         TP=0.133  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33003.5 TO THE FLOW FROM SUB-BASIN 33004
ADD HYD                  ID= 9  HYD=E33004.1  I=11  II=2
PRINT HYD                ID=9  CODE=1
*S BASIN 33005 IS CURRENTLY PARTIALLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33005  AREA=0.0811 SQ MI
                         A=80  B=0  C=14  D=6
                         TP=0.261  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ROUTE THE FLOW FROM SUB-BASIN 33005 TO 200 FEET WEST OF 86TH STREEET.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=102
                         CS=0.0154  FS=0.0154  N=0.03  DIST=54
                         DIST     EL       DIST     EL
                         0        102      2        100
                         52       100      54       102
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=1950  S=0.0154
ROUTE                    ID=11  HYD=E33005.5  INFLOW ID=2  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 33006 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33006  AREA=0.0866 SQ MI
                         A=80  B=0  C=20  D=0
                         TP=0.164  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33005.5 TO THE FLOW FROM SUB-BASIN 33006
ADD HYD                  ID=3  HYD=E33006.1  I=11  II=2
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS IN SAN YGANICO TO THE NATURAL DEPRESSION
*S IN SUB-BASIN 33007.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.0106  FS=0.0106  N=0.03  DIST=301
                         DIST     EL       DIST     EL
                         0        101      1        100
                         300      100      301      101
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=3020  S=0.0106
ROUTE                    ID=11  HYD=E33006.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 33007 IS CURRENTLY UNDEVELOPED
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SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33007  AREA=0.3392  SQ MI
                         A=83  B=0  C=15  D=2
                         TP=0.397  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33006.5 TO THE FLOW FROM SUB-BASIN 33007
ADD HYD                  ID=3  HYD=E33007.1  I=11  II=2
PRINT HYD                ID=3  CODE=1
*S MODEL THE NATURAL DEPRESSION IN SUB-BASIN 33007 WITH THE ROUTE RESERVOIR
ROUTE RESERVOIR          ID=8  HYD=E33007.8 IN=3  CODE=2
                         OUTFLOW          STORAGE          ELEV
                         0.1              0.11             72
                         0.2              1.96             74
                         0.3              4.93             75
                         400              10.12            76
PRINT HYD                ID=8  CODE=1
*
*
*S BASIN 33008 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E33008  AREA=0.0132 SQ MI
                         A=85  B=0  C=10  D=5
                         TP=0.157  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S BASIN 33009 IS CURRENTLY DEVELOPED WITH A DETENTION POND, THEREFORE MODEL
*S AT HISTORIC OR PRE-DEVELOPMENT LEVELS
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR
COMPUTE NM HYD           ID=3  HYD=E33009  AREA=0.0231 SQ MI
                         A=100  B=0  C=0  D=0
                         TP=0.133  HR  MASSRAIN=-1
PRINT HYD                ID=3  CODE=1
*S ADD THE FLOW FROM SUB-BASIN 33008 TO THE FLOW FROM SUB-BASIN 33009
ADD HYD                  ID=4  HYD=E33009.1  I=2  II=3
PRINT HYD                ID=4  CODE=1
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 33009.1 IN SAGE TO BLAZICK STREET
*S
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.0157  FS=0.0157  N=0.017  DIST=40
                         DIST    EL      DIST    EL
                         0       101     4       100
                         36      100     40      101
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=1270  S=0.0157
ROUTE                    ID=11  HYD=E33009.5  INFLOW ID=4  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 33010 IS CURRENTLY DEVELOPED, BUT NO DETENTION POND, THEREFORE MODEL
*S AS DEVELOPED WITH FREE DISCHARGE.
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR
COMPUTE NM HYD           ID=2  HYD=E33010  AREA=0.0180  SQ MI
                         A=0  B=66  C=0  D=34
                         TP=0.146  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33009.5 TO THE FLOW FROM SUB-BASIN 33010
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ADD HYD                  ID=3  HYD=E33009.1  I=11  II=2
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 33009.1 IN SAGE FROM BLAZICK STREET
*S TO 90TH STREET.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.016  FS=0.016  N=0.017  DIST=40
                         DIST    EL      DIST    EL
                         0       101     4       100
                         36      100     40      101
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=375  S=0.016
ROUTE                    ID=11  HYD=E33010.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 33011 IS CURRENTLY DEVELOPED WITH A DETENTION POND, THEREFORE MODEL
*S AT HISTORIC OR PRE-DEVELOPMENT LEVELS.
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR
COMPUTE NM HYD           ID=2  HYD=E33011  AREA=0.0372 SQ MI
                         A=100  B=0  C=0  D=0
                         TP=0.160  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ROUTE THE FLOW FROM SUB-BASIN 33011 IN SUNCREST ROAR, TO 90TH, THEN TO SAGE.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.0086  FS=0.0086  N=0.017  DIST=40
                         DIST    EL      DIST    EL
                         0       101     4       100
                         36      100     40      101
COMPUTE TRAVEL TIME      ID=12  RN=1  NVS=1  L=700  S=0.0086
ROUTE                    ID=12  HYD=E33011.5  INFLOW ID=2  DT=0.0
PRINT HYD                ID=12  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33011.5 TO THE ROUTED FLOW
*S FROM SUB-BASIN 33010.5
ADD HYD                  ID=3  HYD=E33011.1  I=11  II=12
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED ROUTED FLOW FROM SUB-BASIN 33011.5 IN SAGE
*S FROM 90TH STREET TO 200 FEET WEST OF 86TH STREET.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.012  FS=0.012  N=0.017  DIST=40
                         DIST    EL      DIST    EL
                         0       101     4       100
                         36      100     40      101
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=830  S=0.012
ROUTE                    ID=11  HYD=E33011.6  INFLOW ID=3  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 33012 IS CURRENTLY DEVELOPED WITH A DETENTION POND, THEREFORE MODEL
*S AT HISTORIC OR PRE-DEVELOPMENT LEVELS.
*S GENERATION OF SEDIMENT IS UNLIKELY, THEREFORE NO BULKING FACTOR
COMPUTE NM HYD           ID=2  HYD=E33012  AREA=0.0533 SQ MI
                         A=100  B=0  C=0  D=0
                         TP=0.229  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33011.6 TO THE FLOW FROM SUB-BASIN 33012
ADD HYD                  ID=3  HYD=E33012.1  I=11  II=2
PRINT HYD                ID=3  CODE=1
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*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 33012.1 IN SAGE FROM 200 FEET WEST
*S OF 86TH STREET TO 500 FEET EAST OF UNSER (EXTENDED).
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                         CS=0.0072 FS=0.0072  N=0.017  DIST=40
                         DIST     EL      DIST     EL
                         0        101     4        100
                         36       100     40       101
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=2900  S=0.0072
ROUTE                    ID=11  HYD=E33012.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=11  CODE=1
*S ADD THE RESERVOIR ROUTED FLOW FROM SUB-BASIN 33007.8 TO THE ROUTED FLOW
*S FROM SUB-BASIN 33012.5
ADD HYD                  ID=12  HYD=E33012.3  I=8  II=11
PRINT HYD                ID=12  CODE=1
*S ADD THE COMBINED FLOWS FROM SUB-BASIN 33007.8 TO THE FLOW
*S FROM SUB-BASIN 33004 FOR THE TOTAL FLOW APPROCHING THE AMOLE @ SAGE
ADD HYD                  ID=11  HYD=E33012.3  I=9  II=12
PRINT HYD                ID=11  CODE=1
*S calculate the volume of the sediment transport capacity of sage in its
*S existing unlined state
SEDIMENT TRANS           ID=11   IDS=2   CODE=1
                         a=0.09   b=1.62   c=0.85   d=-0.95   NUMBER WASH=1
                         WASH CONCINTRATION=1000PPM  NUMBER SECTIONS=13
                         FLOW       VELOCITY        WIDTH
                         (cfs)      (fps)           (ft)
                            0.31    0.78            4.
                            1.98    1.24            8.
                            5.84    1.62            12.
                           12.57    1.96            16.
                           22.79    2.28            20.
                           37.06    2.57            24.
                           55.90    2.85            28.
                           79.81    3.12            32.
                          109.25    3.37            36.
                          144.70    3.62            40.
                          186.57    3.85            44.
                          235.29    4.08            48.
                          291.28    4.31            52.
*S ADD THE TOTAL FLOW IN SAGE @ THE AMOLE CHANNEL TO THE FLOW IN THE CANNEL
*S ABOVE SAGE FOR THE TOTAL FLOW IN THE MAIN CHANNEL BELOW SAGE.
ADD HYD                  ID=12  HYD=E33012.3  I=11 II=13
PRINT HYD                ID=12  CODE=1
*S calculate the volume of the sediment transport capacity
*S IN THE MAIN CHANNEL BELOW SAGE.
SEDIMENT TRANS           ID=12   IDS=1   CODE=1
                         a=0.09   b=1.62   c=0.85   d=-0.95   NUMBER WASH=1
                         WASH CONCINTRATION=1000PPM  NUMBER SECTIONS=8
                         FLOW       VELOCITY        WIDTH
                         (cfs)      (fps)           (ft)
                           47.22    3.93            14.
                          161.96    5.78            18.
                          345.30    7.19            22.
```

```
                          604.06    8.39            26.
                          945.79    9.46            30.
                         1378.08   10.44            34.
                         1908.34   11.36            38.
                         2543.80   12.23            42.
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE SAGE CROSSING
*S TO JUST UPSTREAM OF THE ARENAL CROSSING.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=107
                         CS=0.0036  FS=0.0036  N=0.014  DIST=38
                         DIST     EL      DIST     EL
                         0        107     14       100
                         24       100     38       107
COMPUTE TRAVEL TIME      ID=9  RN=1  NVS=1  L=2335  S=0.0036
ROUTE                    ID=9  HYD=E33004.5  INFLOW ID=12  DT=0.0
PRINT HYD                ID=9  CODE=1
*S*************************************************************************
*S END TOWER/SAGE BASIN *** BEGIN SOUTH AMOLE DEL NORTE BASIN (350** SERIES)
*S*************************************************************************
*S BASIN 35001 IS MOSTLY DEVELOPED
SEDIMENT BULK            CODE=1  BF=1.03
COMPUTE NM HYD           ID=2  HYD=E35001  AREA=0.1800 SQ MI
                         A=20  B=20  C=20  D=40
                         TP=0.1333 HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 33004.5 (TOTAL FLOW IN AMOLE DEL NORTE
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35001.
ADD HYD                  ID=13  HYD=E35001.1  I=9  II=2
PRINT HYD                ID=13  CODE=1
*
*S RECALL THE EXISTING CONDITIONS HYDROGRAPH FROM THE SUNSET ESTATES MODEL.
RECALL HYD           ID= 2  HYD=DN100E1A.DAT
                     DT=  .033000 HRS   DA=     .5758 SQ MI
                     PEAK=    733.870CFS  RO=  .8494 INCHES  NO PTS=271
                     FLOW RATES
                          .000      .000      .000      .000      .000
                          .000      .000      .000      .000      .000
                          .000      .000      .000      .000      .000
                          .000      .000      .000      .000      .000
                          .000      .000      .000      .000      .000
                          .000      .000      .000      .000      .000
                          .000      .000      .000      .000      .000
                          .027      .466     1.970     5.032    10.385
                        20.485    42.592    98.101   213.138   392.677
                       569.263   688.464   733.870   719.063   666.681
                       594.545   536.877   471.381   391.232   331.967
                       286.633   249.467   218.408   192.601   171.897
                       155.982   143.121   132.990   122.754   111.114
                        99.090    87.377    76.744    67.779    60.246
                        53.930    48.723    44.347    40.537    37.193
                        34.289    31.755    29.494    27.441    25.514
                        23.664    21.906    20.322    18.949    17.731
                        16.618    15.585    14.615    13.687    12.811
```

11.994	11 241	10.562	9.945	9.380
8.858	8.374	7.926	7.509	7.119
6.746	6.388	6.057	5.742	5.442
5.177	4 941	4.723	4.523	4 338
4.167	4.006	3.856	3.718	3.591
3.470	3.358	3.254	3.156	3.064
2.978	2.896	2.818	2.744	2.675
2 610	2.550	2.495	2.443	2.395
2.352	2.312	2.274	2.239	2.206
2.176	2.148	2.123	2.099	2.075
2.052	2.033	2.018	2.002	1.985
1.971	1.962	1.952	1.947	1.945
1.943	1.942	1.944	1.946	1.948
1.948	1.954	1.960	1.965	1.970
1.975	1.980	1.989	2.000	2.009
2.017	2.025	2.034	2.043	2.053
2.060	2.070	2.081	2.093	2 105
2.116	2.128	2.143	2.157	2.171
2.185	2.200	2.214	2.206	2.152
2.055	1.920	1.767	1.620	1.495
1.388	1.294	1.207	1.127	1.051
.980	.914	.852	.794	.740
.689	.642	.597	.555	.516
.480	.446	.414	.384	.356
.330	.306	.283	.262	.242
.223	.205	.189	.175	.161
.148	.136	.124	.114	.105
.096	.088	.080	.073	.067
.061	.056	.051	.046	042
.038	.035	.032	.029	.026
.024	.022	.020	.018	.016
.015	.013	.012	.011	.010
.009	.008	.007	.006	.005
.005	.004	.004	.004	.003
.003	003	.002	.002	.002
.002	.002	.001	.001	.001
.001				

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PRINT HYD                ID=2  CODE=1
*S ADD THE RECALLED HYDROGRAPH TO THE COMBINED FLOW FROM SUB-BASIN 35001.2.
*S THIS IS THE TOTAL FLOW IN THE AMOLE DEL NORTE.
*S HYD NO. E35001.3 IS ***** AP 38 *****
ADD HYD                  ID=3  HYD=E35001.3  I=13  II=2
PRINT HYD                ID=3  CODE=1
*S calculate the volume of the sediment transport capacity
*S IN THE MAIN CHANNEL BELOW ARENAL RD.
SEDIMENT TRANS           ID=3   IDS=3   CODE=1
                         a=0.09   b=1.62   c=0.85   d=-0.95   NUMBER WASH=1
                         WASH CONCINTRATION=1000PPM  NUMBER SECTIONS=13
                         FLOW       VELOCITY        WIDTH
                         (cfs)      (fps)           (ft)
                           20.37    1.70            14.
                           69.87    2.50            18.
```

```
                          148.96    3.10            22.
                          260.59    3.62            26.
                          408 02    4.08            30.
                          594.51    4.50            34.
                          823.27    4.90            38.
                         1097.41    5.28            42.
                         1419.96    5.63            46.
                         1793.88    5.98            50.
                         2222.03    6.31            54.
                         2707.23    6.64            58.
                         3252.22    6.95            62.
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE ARENAL CROSSING
*S TO THE 5400 FEET NORTH OF THE AMOLE DETENTION FACILITY.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=110
                         CS=0.0024  FS=0.0024  N=0.014  DIST=50
                         DIST     EL      DIST     EL
                         0        110     20       100
                         30       100     50       110
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=1475  S=0.0024
ROUTE                    ID=11  HYD=E35001.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 35208 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E35208  AREA=0.0733  SQ MI
                         A=85  B=0  C=0  D=15
                         TP=0.198  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S calculate the volume of the sediment transport capacity
*S in the undefined (40:1 width to depth) natural side channel (35208)
SEDIMENT TRANS           ID=2   IDS=4   CODE=1
                         a=0.09   b=1.62   c=0.85   d=-0.95   NUMBER WASH=1
                         WASH CONCINTRATION=1000PPM  NUMBER SECTIONS=13
                         FLOW       VELOCITY        WIDTH
                         (cfs)      (fps)           (ft)
                            0.32    0.81             4.
                            2.06    1.29             8.
                            6.07    1.69            12.
                           13.08    2.04            16.
                           23.72    2.37            20.
                           38.57    2.68            24.
                           58.18    2.97            28.
                           83.06    3.24            32.
                          113.72    3.51            36.
                          150.60    3.77            40.
                          194.19    4.01            44.
                          244.90    4.25            48.
                          303.17    4.48            52.
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35001.5 (TOTAL FLOW IN AMOLE DEL NORTE
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35208.
ADD HYD                  ID=3  HYD=E35208.1  I=11  II=2
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 5362 FEET NORTH OF
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*S THE AMOLE DETENTION FACILITY TO 4807 _FEET NORTH OF THE AMOLE DETENTION FACILITY.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=110
                         CS=0.0024  FS=0.0024  N=0.014  DIST=50
                         DIST     EL       DIST     EL
                         0        110      20       100
                         30       100      50       110
COMPUTE TRAVEL TIME      ID=11  RN=1  NVS=1  L=555  S=0.0024
ROUTE                    ID=11  HYD=E35208.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=11  CODE=1
*S BASIN 35209 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E35209  AREA=0.0407 SQ MI
                         A=97  B=0  C=3  D=0
                         TP=0.195  HR  MASSRAIN=-1
PRINT HYD                ID=2  CODE=1
*S calculate the volume of the sediment transport capacity
*S in the undefined (40:1 width to depth) natural side channel (35209)
SEDIMENT TRANS           ID=2   IDS=5   CODE=1
                         a=0.09   b=1.62   c=0.85   d=-0.95   NUMBER WASH=1
                         WASH CONCINTRATION=1000PPM  NUMBER SECTIONS=13
                         FLOW       VELOCITY        WIDTH
                         (cfs)      (fps)           (ft)
                            0.32    0.81             4.
                            2.06    1.29             8.
                            6.07    1.69            12.
                           13.08    2.04            16.
                           23.72    2.37            20.
                           38.57    2.68            24.
                           58.18    2.97            28.
                           83.06    3.24            32.
                          113.72    3.51            36.
                          150.60    3.77            40.
                          194.19    4.01            44.
                          244.90    4.25            48.
                          303.17    4.48            52.
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35208.5 (TOTAL FLOW IN AMOLE DEL NORTE
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35209.
ADD HYD                  ID=3  HYD=E35209.1  I=11  II=2
PRINT HYD                ID=3  CODE=1
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 4807 FEET NORTH OF
*S THE AMOLE DETENTION FACILITY TO 3625 FEET NORTH OF THE AMOLE DETENTION FACILITY.
COMPUTE RATING CURVE     CID=1  VN=1  NS=1  MIN EL=100  MAX EL=110
                         CS=0.0015  FS=0.0015  N=0.014  DIST=50
                         DIST     EL       DIST     EL
                         0        110      20       100
                         30       100      50       110
COMPUTE TRAVEL TIME      ID=12  RN=1  NVS=1  L=1182  S=0.0015
ROUTE                    ID=12  HYD=E35209.5  INFLOW ID=3  DT=0.0
PRINT HYD                ID=12  CODE=1
*S BASIN 35301 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK            CODE=1  BF=1.15
COMPUTE NM HYD           ID=2  HYD=E35301  AREA=0.1420  SQ MI
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                          A=85  B=0  C=10  D=5
                          TP=0.203  HR  MASSRAIN=-1
PRINT HYD                 ID=2  CODE=1
*S ROUTE THE FLOW FROM SUB-BASIN 35301 TO 3625 FEET NORTH
*S OF THE AMOLE DETENTION FACILITY.
COMPUTE RATING CURVE      CID=1  VN=1  NS=1  MIN EL=100 MAX EL=104
                          CS=0 0183  FS=0.0183  N=0.03  DIST=38
                          DIST     EL       DIST     EL
                          0        104      4        100
                          34       100      38       104
COMPUTE TRAVEL TIME       ID=11  RN=1  NVS=1  L=3000  S=0.0183
ROUTE                     ID=11  HYD=E35301.5  INFLOW ID=2  DT=0.0
PRINT HYD                 ID=11  CODE=1
*S BASIN 35302 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK             CODE=1  BF=1.15
COMPUTE NM HYD            ID=2  HYD=E35302  AREA=0.1636 SQ MI
                          A=80  B=0  C=17  D=3
                          TP=0.230  HR  MASSRAIN=-1
PRINT HYD                 ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35301.5 TO THE FLOW FROM SUB-BASIN 35302.
ADD HYD                   ID=3  HYD=E35302.1  I=11  II=2
PRINT HYD                 ID=3  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35209.5 (TOTAL FLOW IN AMOLE DEL NORTE
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35302.1.
ADD HYD                   ID=4  HYD=E35302.2  I=12  II=3
PRINT HYD                 ID=4  CODE=1
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 3625 FEET NORTH OF
*S THE AMOLE DETENTION FACILITY TO 2125 FEET NORTH OF THE AMOLE DETENTION FACILITY
COMPUTE RATING CURVE      CID=1  VN=1  NS=1  MIN EL=100  MAX EL=111
                          CS=0.0017  FS=0.0017  N=0.014  DIST=53
                          DIST     EL       DIST     EL
                          0        111      23       100
                          33       100      53       111
COMPUTE TRAVEL TIME       ID=12  RN=1  NVS=1  L=1500  S=0.0017
ROUTE                     ID=12  HYD=E35302.5  INFLOW ID=4  DT=0.0
PRINT HYD                 ID=12  CODE=1
*S BASIN 35303 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK             CODE=1  BF=1.15
COMPUTE NM HYD            ID=2  HYD=E35303  AREA=0.0964  SQ MI
                          A=90  B=0  C=10  D=0
                          TP=0.175  HR  MASSRAIN=-1
PRINT HYD                 ID=2  CODE=1
*S ROUTE THE FLOW FROM SUB-BASIN 35303 TO 2300 FEET NORTH
*S OF THE AMOLE DETENTION FACILITY.
COMPUTE RATING CURVE      CID=1  VN=1  NS=1  MIN EL=100  MAX EL=101
                          CS=0.0181  FS=0.0181  N=0.03  DIST=26
                          DIST     EL       DIST     EL
                          0        101      1        100
                          25       100      26       101
COMPUTE TRAVEL TIME       ID=11  RN=1  NVS=1  L=2420  S=0.0181
ROUTE                     ID=11  HYD=E35303.5  INFLOW ID=2  DT=0.0
PRINT HYD                 ID=11  CODE=1
```

```
*S BASIN 35304 IS CURRENTLY DEVELOPED WITH MINIMAL VEGETATION.
SEDIMENT BULK           CODE=1  BF=1.06
COMPUTE NM HYD          ID=2  HYD=E35304  AREA=0.0985  SQ MI
                        A=0  B=0  C=40  D=60
                        TP=0.175  HR  MASSRAIN=-1
PRINT HYD               ID=2  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35303.5 TO THE FLOW FROM SUB-BASIN 35304.
ADD HYD                 ID=3  HYD=E35304.1  I=11  II=2
PRINT HYD               ID=3  CODE=1
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35302.5 (TOTAL FLOW IN AMOLE DEL NORTE
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35302.1.
ADD HYD                 ID=4  HYD=E35304.2  I=12  II=3
PRINT HYD               ID=4  CODE=1
*S calculate the volume of the sediment transport capacity
*S IN THE MAIN CHANNEL 1000' ABOVE BLAKE RD.
SEDIMENT TRANS          ID=4   IDS=6   CODE=1
                        a=0.09   b=1.62   c=0.85   d=-0.95   NUMBER WASH=1
                        WASH CONCINTRATION=1000PPM  NUMBER SECTIONS=13
                        FLOW       VELOCITY        WIDTH
                        (cfs)      (fps)           (ft)
                          20.37    1.70            14.
                          69.87    2.50            18.
                         148.96    3.10            22.
                         260.59    3.62            26.
                         408.02    4.08            30.
                         594.51    4.50            34.
                         823.27    4.90            38.
                        1097.41    5.28            42.
                        1419.96    5.63            46.
                        1793.88    5.98            50.
                        2222.03    6.31            54.
                        2707.23    6.64            58.
                        3252.22    6.95            62.

*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 2125 FEET NORTH OF
*S THE AMOLE DETENTION FACILITY TO 1325 FEET NORTH OF THE AMOLE DETENTION FACILITY.
COMPUTE RATING CURVE    CID=1  VN=1  NS=1  MIN EL=100  MAX EL=113.5
                        CS=0.0016  FS=0.0016  N=0.014  DIST=71
                        DIST    EL      DIST    EL
                        0       113.5   30.5    100
                        40.5    100     71      113.5
COMPUTE TRAVEL TIME     ID=12  RN=1  NVS=1  L=800  S=  0.0016
ROUTE                   ID=12  HYD=E35304.5  INFLOW ID=4  DT=0.0
PRINT HYD               ID=12  CODE=1
*S BASIN 35305 IS CURRENTLY UNDEVELOPED
SEDIMENT BULK           CODE=1  BF=1.15
COMPUTE NM HYD          ID=2  HYD=E35305  AREA=0.0841 SQ MI
                        A=94  B=0  C=6  D=0
                        TP=0.203  HR  MASSRAIN=-1
PRINT HYD               ID=2  CODE=1
*S ROUTE THE FLOW FROM SUB-BASIN 35305 TO 1100 FEET NORTH
*S OF THE AMOLE DETENTION FACILITY.
```

BERNALILLO COUNTY GRANT OF
PUBLIC MAINTENANCE EASEMENT
FOR DRAINAGE FACILITY TO
The City of Albuquerque, a New Mexico Municipal Corporation.

Pursuant to the County of Bernalillo and City of Albuquerque, New Mexico Master Utility Easement and Right-of-Way Agreement dated August 20, 1990;

THIS AGREEMENT is made and entered into this _____ day of _____, 1998, by and between the County of Bernalillo, a political subdivision of the State of New Mexico, hereinafter referred to as the "County", and the City of Albuquerque, a New Mexico Municipal Corporation, hereinafter referred to as the "City".

SECTION 1. GRANT OF EASEMENT. There is hereby granted to the City an exclusive right, license, privilege, and easement to maintain, repair, replace and remove a drainage facility for the diversion and/or storage of water along, under, across, on and about the real property described in Exhibit 1 attached hereto "Easement", together with the right to remove trees, bushes, and undergrowth and any other obstacles upon said easement with the consent of the County.

SECTION 1A: An easement within Section 24, township 10 North, Range 2 East, N.M.P.M. Bernalillo County, New Mexico, being within LANDS OF BERNALILLO COUNTY (TOM TENORIO PARK) as the same described in the WARRANTY DEED filed in the Office of the County Clerk of Bernalillo County, New Mexico as document number 7374075 and being more particularly described on the attached EXHIBIT 1.

SECTION 2. BINDING OF COUNTY'S PROPERTY. This Grant and other provisions of this Easement constitute covenants running with title to the property for the benefit of the City and its successors and assigns until terminated.

SECTION 3. QUIET ENJOYMENT. This Grant of Easement is subject to the County's reserved right to full use and enjoyment of the property. In the event the City's exercise of its rights granted herein result in damage to any of the County's uses of the property and improvements thereon, the City shall restore the uses or improvements to the condition which existed immediately prior to said damage.

SECTION 4. LIABILITY. As part of consideration for the Grant of this Easement, the City agrees, subject to the immunities and limitations of the New Mexico Tort Claims Act §41-4-1 et. seq., to be liable for any event or action arising from the City's use of said easement for the purpose herein set forth.

Done this ____ day of _____, 1998.

The Board of Commissioners of the County of Bernalillo grants to the City an exclusive right, license, privilege, and easement to construct, install, maintain, repair, modify, replace and remove a storm sewer and drainage facility for the diversion and/or storage of water along, under, across, on and about the real property described in Exhibit 1 attached to this agreement.

BOARD OF COUNTY COMMISSIONERS:

_____
Tom Rutherford, Chairman

_____
Barbara J. Seward, Vice Chair

_____
Steve Gallegos, Member

_____
Les Houston, Member

_____
Ken Sanchez, Member

APPROVED AS TO FORM ONLY:

_____
County Attorney

ATTEST:

_____
County Clerk

CITY OF ALBUQUERQUE:

ACCEPTED:

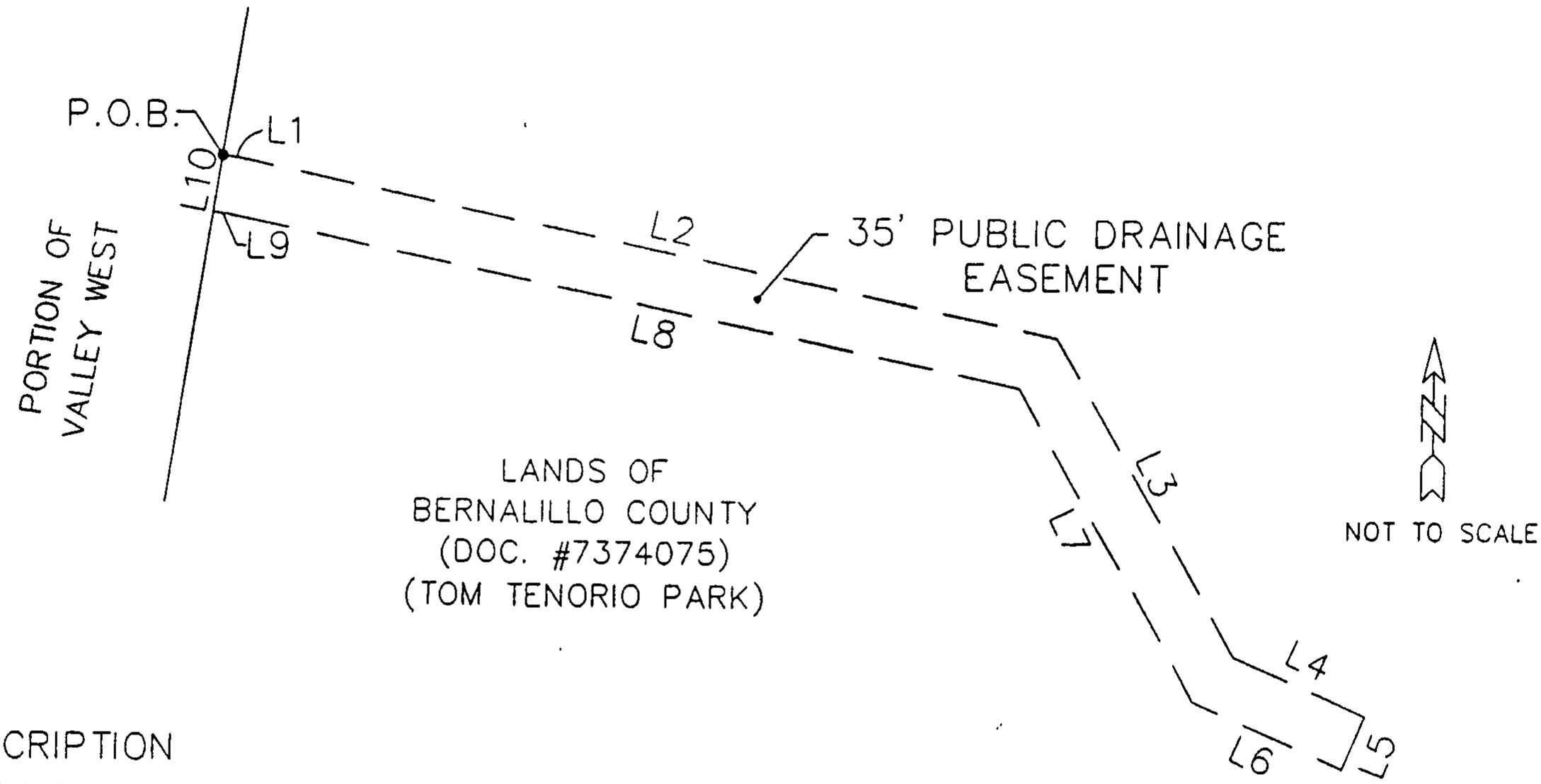
_____
City Engineer

Dated: _____

EXHIBIT FOR
CITY OF ALBUQUERQUE
35' PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S81°11'08"E	10.39'
L2	S77°57'13"E	508.47'
L3	S29°29'34"E	221.95'
L4	S66°55'28"E	89.01'
L5	S23°04'32"W	35.00'
L6	N66°55'28"W	100.87'
L7	N29°29'34"W	218.05'
L8	N77°57'13"W	491.73'
L9	N81°11'08"W	9.40'
L10	N08°48'52"E	35.00'

PURPOSE OF EASEMENT:
UNDERGROUND STORM SEWER AND SURFACE DRAINAGE.



DESCRIPTION

A 35' PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLC COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1-M10" bears N 41°00'07" W, 3571.94 feet;

THENCE S 81°11'08" E, 10.39 feet to a point;

THENCE S 77°57'13" E, 508.47 feet to a point;

THENCE S 29°29'34" E, 221.95 feet to a point;

THENCE S 66°55'28" E, 89.01 feet to a point,

THENCE S 23°04'32" W, 35.00 feet to a point;

THENCE N 66°55'28" W, 100.87 feet to a point;

THENCE N 29°29'34" W, 218.05 feet to a point;

THENCE N 77°57'13" W, 491.73 feet to a point,

THENCE N 81°11'08" W, 9.40 feet to a point,

THENCE N 08°48'52" E, 35.00 feet to the point of beginning and containing 0.6628 acres more or less.

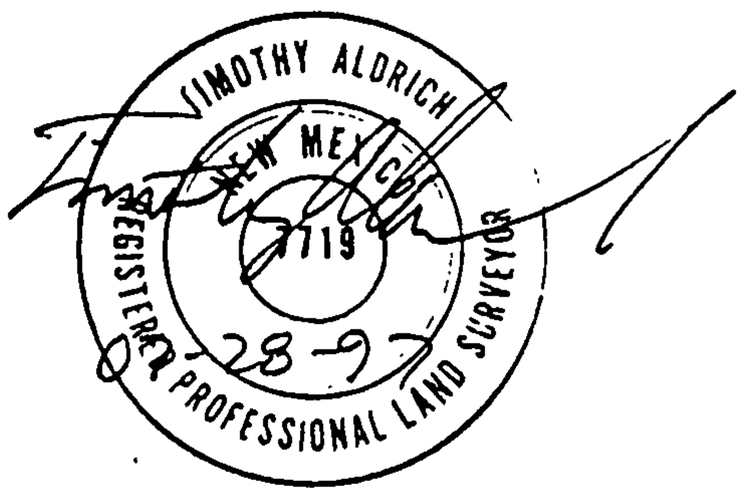
TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
07-28-92

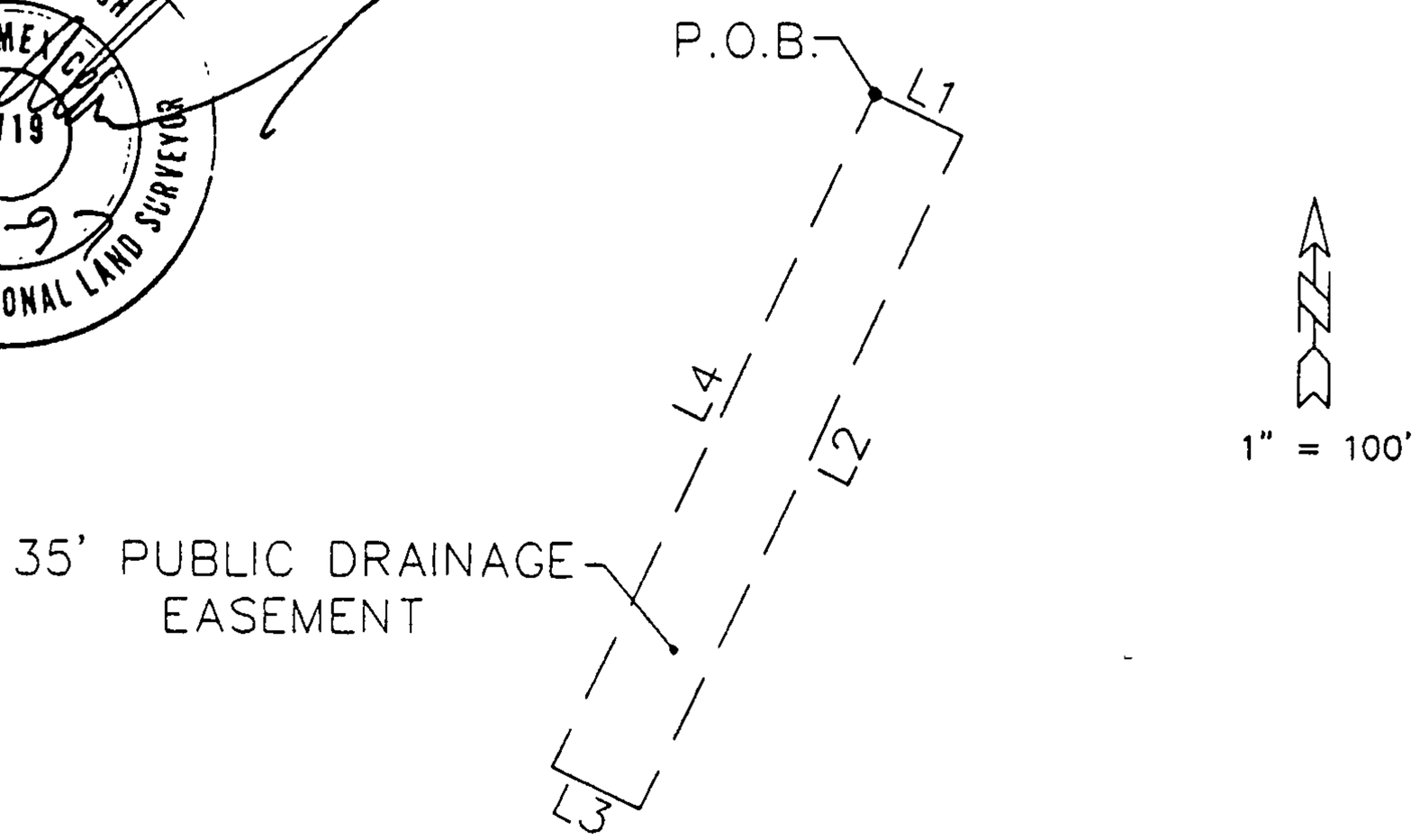
EXHIBIT "A"

EXHIBIT FOR
CITY OF ALBUQUERQUE
35' PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S64°47'23"E	35.00'
L2	S25°12'37"W	268.36'
L3	N64°47'23"W	35.00'
L4	N25°12'37"E	268.36'

PURPOSE OF EASEMENT:
UNDERGROUND STORM SEWER
AND SURFACE DRAINAGE.





DESCRIPTION

A 35' PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1–M10" bears N 42°47'55" W, 4433.16 feet,

THENCE S 64°47'23" E, 35.00 feet to a point;

THENCE S 25°12'37" W, 268.36 feet to a point;

THENCE N 64°47'23" W, 35.00 feet to a point;

THENCE N 25°12'37" E, 268.36 feet to the point of beginning and containing 0.2156 acres more or less

EXHIBIT "B" :

2 of 2
Sheet ~~3 of 3~~

PUBLIC MAINTENANCE ACCESS EASEMENT

This grant of Easement, between Bernalillo County, a policital subdivision of the State of New Mexico, ("Grantor"), and the City of Albuquerque, a New Mexico municipal corporation ("City"), whose address is P.O. Box 1293 Albuquerque, New Mexico 87103.

1. Grant of Easement .The Grantor grants to the City an exclusive permanent easement for the purpose of ingress and egress, to access and maintain drainage facilities through the property described on Exhibit A attached hereto ("Property").

2. Warranties . Grantor covenants and warrants that it is the owner in fee simple of the Property and that is has a good lawful right to convey the Property or any part thereof and that the Grantor will forever warrant and defend the title to the Property against all claims from all persons or entities.

3. Binding on Grantor's Property. The grant and other provisions of this Easement constitute covenants running with title to the Property for the benefit of the City and its successors and assigns until terminated.

Witness my hand and seal this _____ day of _____, 1997.

GRANTOR:

By:_____
Its:_____
Dated:_____

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledge before me on _____, 199___ by _____, _____ of _____, on behalf of the _____.

My Commission Expires:

_____

_____
Notary Public

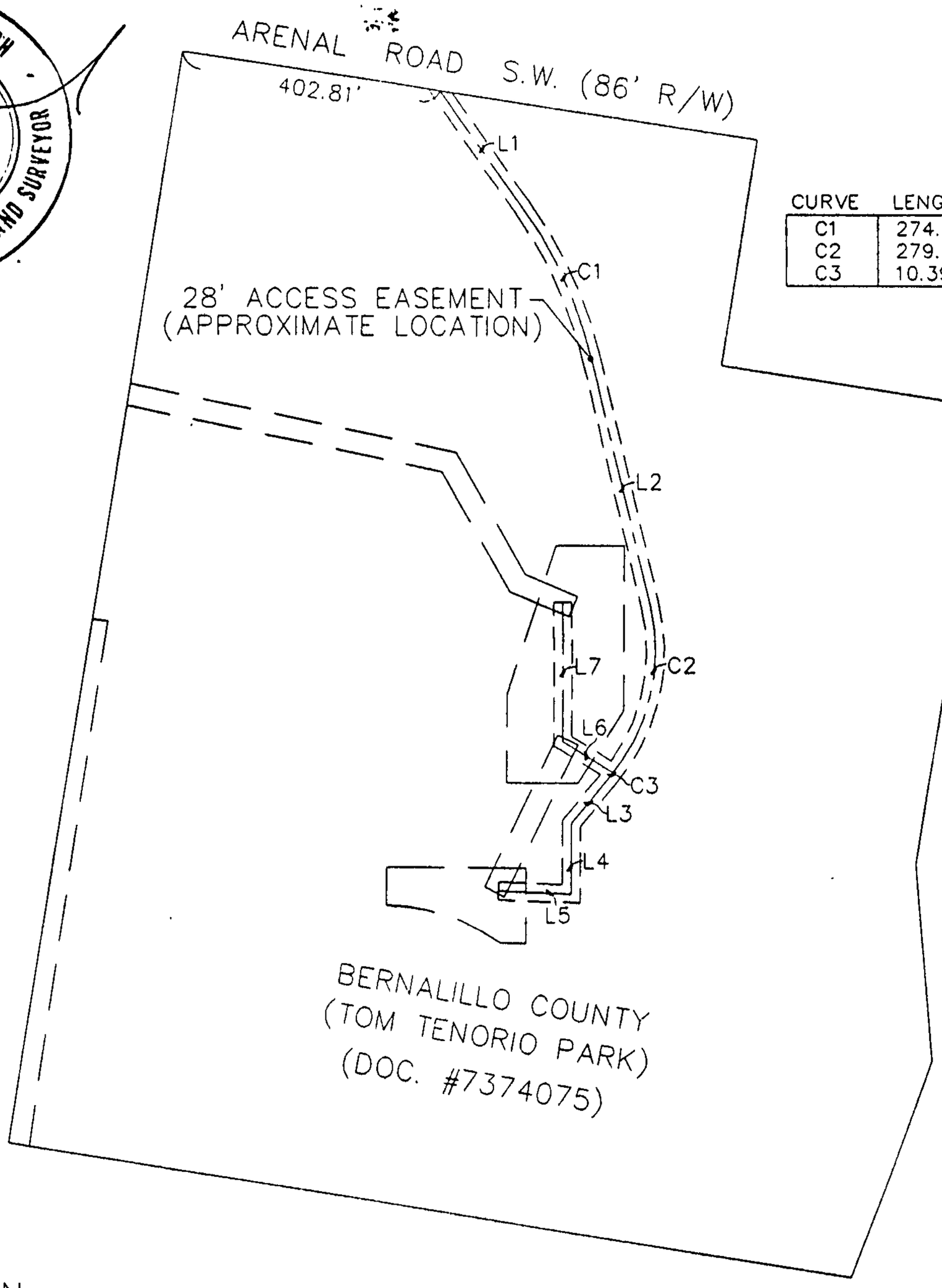
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EXHIBIT FOR
CITY OF ALBUQUERQUE
28' ACCESS EASEMENT

PURPOSE OF EASEMENT:
MAINTENANCE EQUIPMENT
AND INSPECTION ACCESS

LINE	DIRECTION	DISTANCE
L1	S34°52'45"E	227.01'
L2	S13°08'01"E	393.80'
L3	S38°50'56"W	94.13'
L4	S00°07'50"W	111.70'
L5	N88°09'58"W	113.99'
L6	N57°42'30"W	93.63'
L7	N00°16'39"W	221.31'

TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
10-28-97



1" = 300'

CURVE	LENGTH	DELTA	RADIUS
C1	274.66'	22°28'52"	700.00'
C2	279.94'	50°07'22"	320.00'
C3	10.39'	01°51'36"	320.00'

DESCRIPTION

A 28' CITY OF ALBUQUERQUE ACCESS EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being approximately located hereon.

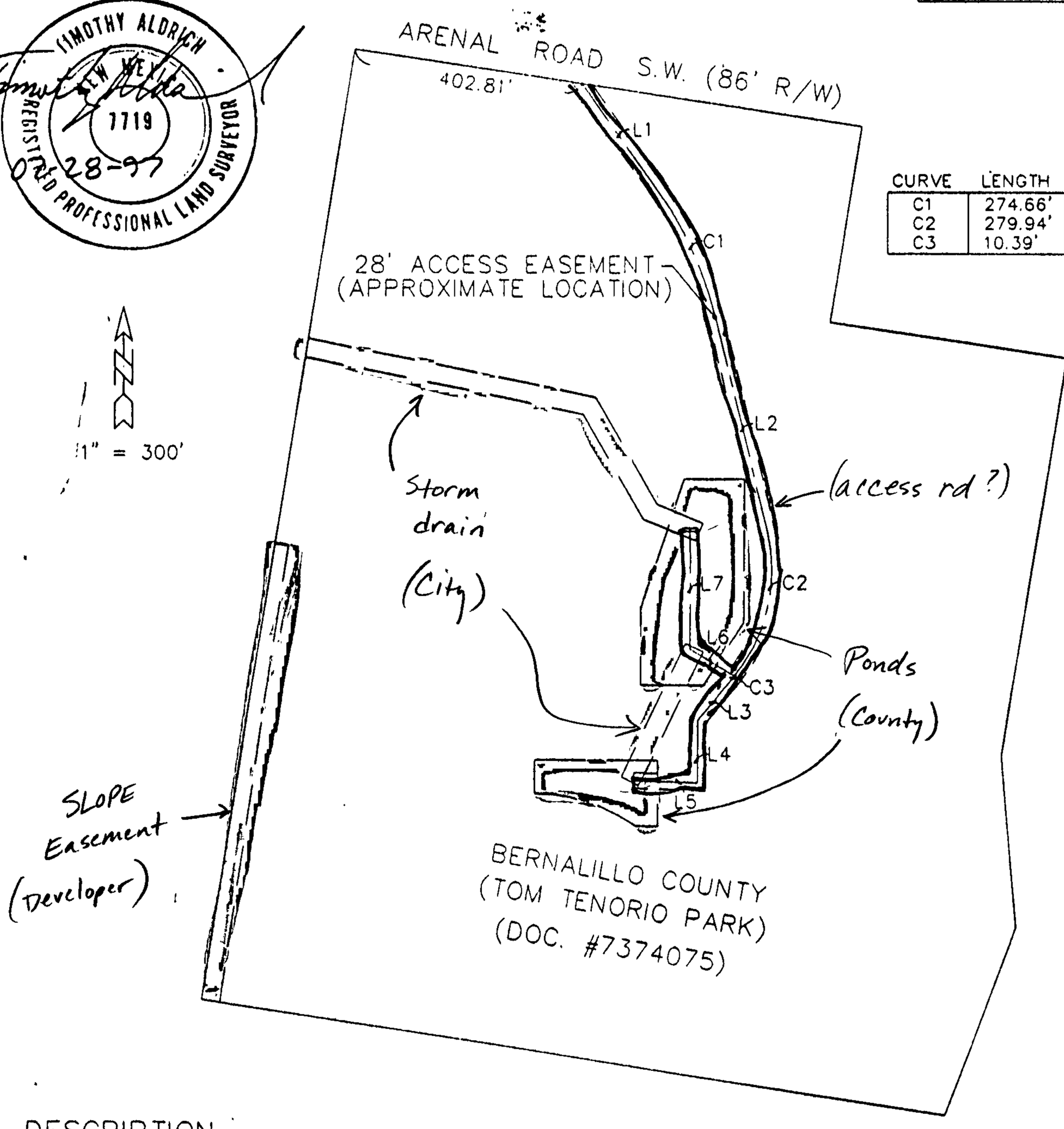
EXHIBIT "A"

EXHIBIT FOR
CITY OF ALBUQUERQUE
28' ACCESS EASEMENT

PURPOSE OF EASEMENT:
MAINTENANCE EQUIPMENT
AND INSPECTION ACCESS

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TIMOTHY ALDRICH
NEW MEXICO
1719
REGISTERED PROFESSIONAL LAND SURVEYOR
28-97



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EXHIBIT "A"

BERNALILLO COUNTY GRANT OF
PUBLIC MAINTENANCE EASEMENT
FOR DRAINAGE FACILITY TO
The City of Albuquerque, a New Mexico Municipal Corporation.

Pursuant to the County of Bernalillo and City of Albuquerque, New Mexico Master Utility Easement and Right-of-Way Agreement dated August 20, 1990;

THIS AGREEMENT is made and entered into this _____ day of _____, 1998, by and between the County of Bernalillo, a political subdivision of the State of New Mexico, hereinafter referred to as the "County", and the City of Albuquerque, a New Mexico Municipal Corporation, hereinafter referred to as the "City".

SECTION 1. GRANT OF EASEMENT. There is hereby granted to the City an exclusive right, license, privilege, and easement to maintain, repair, replace and remove a drainage facility for the diversion and/or storage of water along, under, across, on and about the real property described in Exhibit 1 attached hereto "Easement", together with the right to remove trees, bushes, and undergrowth and any other obstacles upon said easement with the consent of the County.

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SECTION 4. LIABILITY. As part of consideration for the Grant of this Easement, the City agrees, subject to the immunities and limitations of the New Mexico Tort Claims Act §41-4-1 et. seq., to be liable for any event or action arising from the City's use of said easement for the purpose herein set forth.

ROUTING & REQUEST

Please...

- ☐ Read
- ☐ Handle
- ☐ Approve

And...

- ☐ Forward
- ☐ Return
- ☐ Keep or Recycle
- ☐ Review with Me

To: Susan Calongne

Your Copy

From: Kevin Curran

Date: 4-22-98

Post-it® 7664 ©3M 1995

Done this ____ day of _____, 1998.

The Board of Commissioners of the County of Bernalillo grants to the City an exclusive right, license, privilege, and easement to construct, install, maintain, repair, modify, replace and remove a storm sewer and drainage facility for the diversion and/or storage of water along, under, across, on and about the real property described in Exhibit 1 attached to this agreement.

BOARD OF COUNTY COMMISSIONERS:

_____
Steve D. Gallegos, Chairman

_____
Ken Sanchez, Vice Chairman

_____
Les Houston, Member

_____
Tom Rutherford, Member

_____
Barbara J. Seward, Member

APPROVED AS TO FORM ONLY:

_____
County Attorney

ATTEST:

_____
County Clerk

CITY OF ALBUQUERQUE:

ACCEPTED:

_____
City Engineer

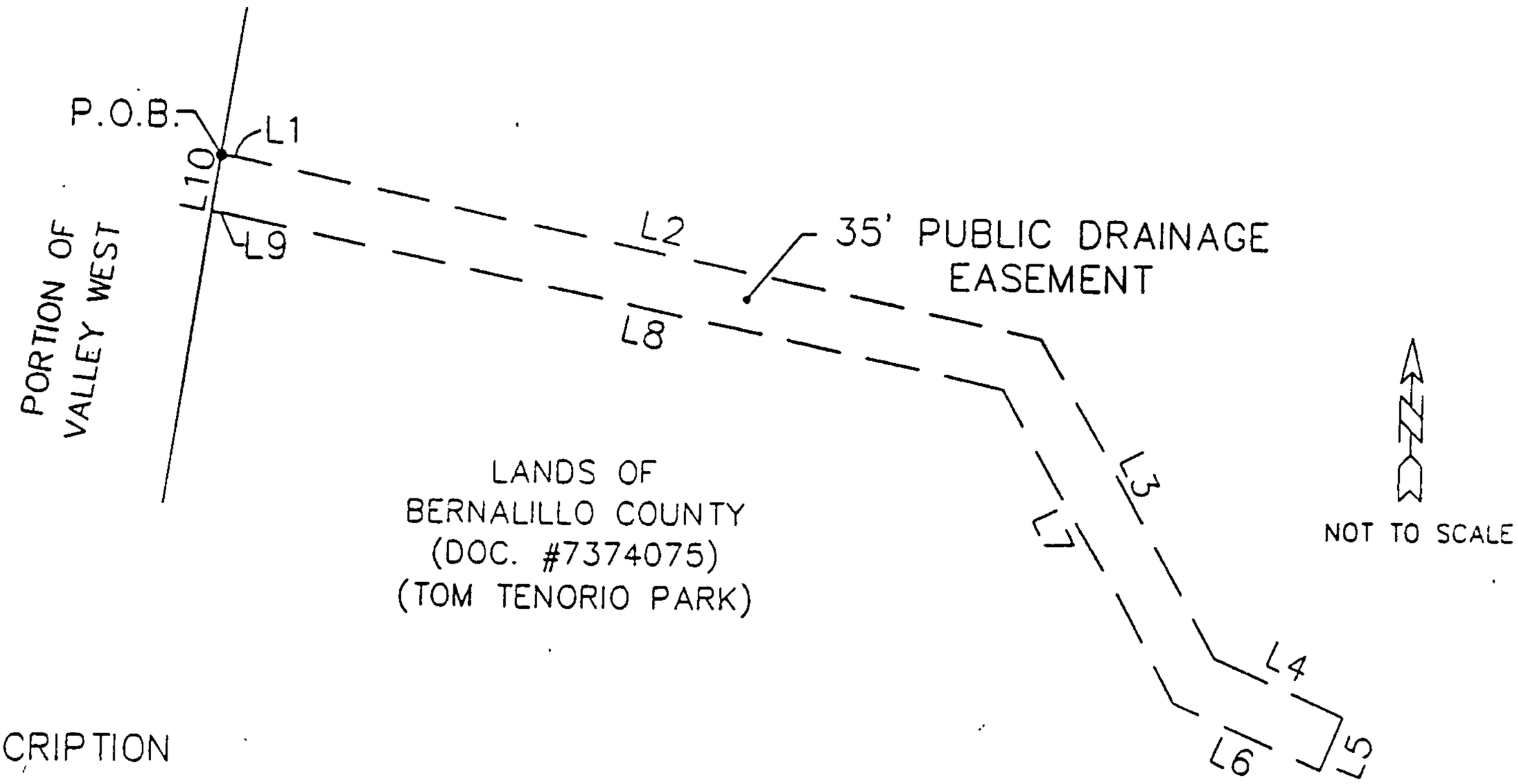
Dated: _____

EXHIBIT FOR

CITY OF ALBUQUERQUE
35' PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S81°11'08"E	10.39'
L2	S77°57'13"E	508.47'
L3	S29°29'34"E	221.95'
L4	S66°55'28"E	89.01'
L5	S23°04'32"W	35.00'
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L8	N77°57'13"W	491.73'
L9	N81°11'08"W	9.40'
L10	N08°48'52"E	35.00'

PURPOSE OF EASEMENT:
UNDERGROUND STORM SEWER
AND SURFACE DRAINAGE.



DESCRIPTION

A 35' PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED, filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

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THENCE N 66°55'28" W, 100.87 feet to a point;

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THENCE N 77°57'13" W, 491.73 feet to a point,

THENCE N 81°11'08" W, 9.40 feet to a point,

THENCE N 08°48'52" E, 35.00 feet to the point of beginning and containing 0.6628 acres more or less.

TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
8-28-92

EXHIBIT "A"

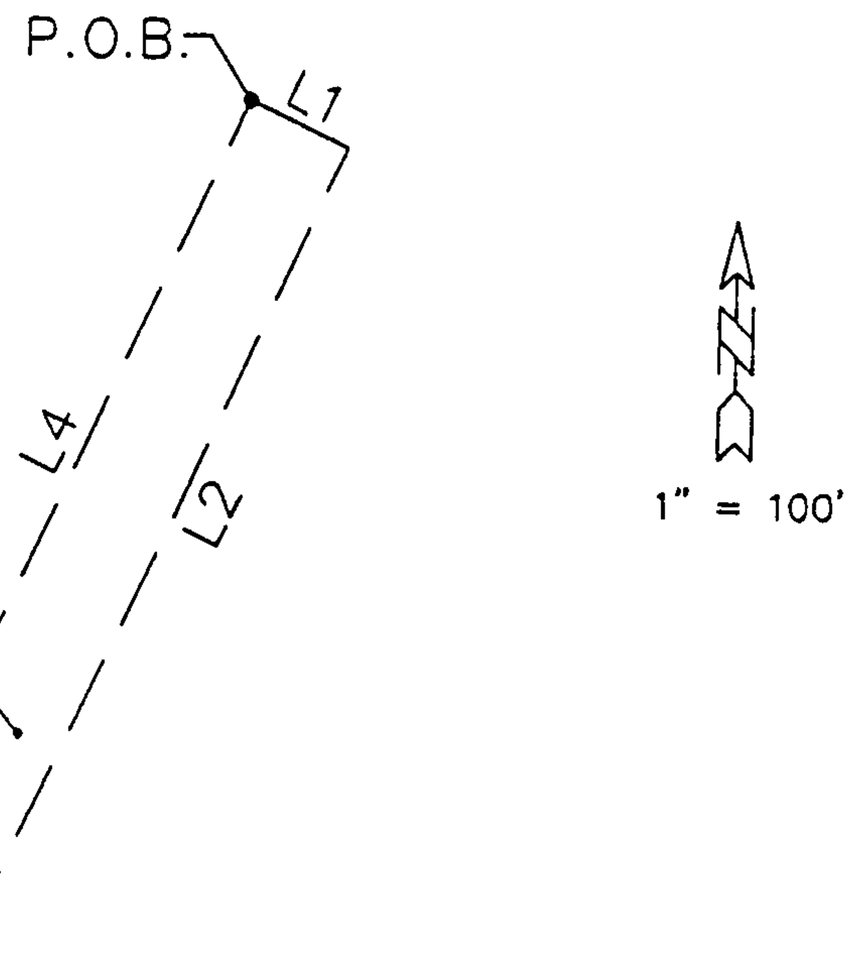
1 of 2
Sheet 2 of 3

EXHIBIT FOR
CITY OF ALBUQUERQUE
35' PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S64°47'23"E	35.00'
L2	S25°12'37"W	268.36'
L3	N64°47'23"W	35.00'
L4	N25°12'37"E	268.36'

PURPOSE OF EASEMENT:
UNDERGROUND STORM SEWER AND SURFACE DRAINAGE.

TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
28-97



DESCRIPTION

A 35' PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

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EXHIBIT "A" :

2 of 2
Sheet ~~3 of 3~~

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 8, 2000

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: ***Grading and Drainage Certification Plan for Unit 1 of the Rayo del Sol Subdivision (M10/D9), Submitted for Release of Financial Guarantees, Engineer's Certification Stamp Dated 12/29/99.***

Dear Mr. Hughes:

Based on the attached memo from Roger Paul, the County has accepted the pond improvements in Tom Tenorio Park that were constructed with this subdivision. Since the above referenced plan was adequate to satisfy the Grading and Drainage Certification requirement, it appears that all drainage requirements have now been met for the release of financial guarantees for Rayo Del Sol Subdivision Unit 1.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-97-82, City Project No. 579481
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

10/11

M101.D9

CHECK

BERNALILLO COUNTY PUBLIC WORKS DIVISION

MEMORANDUM

DATE: June 8, 2000
TO: **Susan Calongne, P.E.**
FROM: **Roger Paul, P.E.** RAP
SUBJECT: **Rayo del Sol Subdivision**

CC: Doug Hughes, P.E.

Please recall that the Bernalillo County Public Works Division, Development Review Section, inspected the construction of improvements within the Tom Tenorio Park related to drainage infrastructure for the Rayo del Sol Subdivision, Unit 1. Although the work was "green-tagged", the design didn't fully accommodate an erosion problem from existing flow into one of the ponds. After discussions with Doug Hughes, the project engineer at Mark Goodwin & Associates, we agreed to some remedial work to place additional erosion protection at the pond.

These discussions identified remedial work to resolve the erosion problem that consisted of construction a rip rap rundown. That work has been completed and was reviewed and approved by a BCPWD inspector on June 7, 2000. Therefore, the obligations of the developer related to the use of and construction within Tom Tenorio Park in conjunction with the Rayo del Sol Subdivision, Unit 1 are complete.

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

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

December 29, 1999

Mr. Dave Mitchell
Bernalillo County
Public Works Department
2400 Broadway SE
Albuquerque, NM 87102

Re: Rayo del Sol Subdivision, Unit 1 As-Built Certification

Dear Mr. Mitchell:

The grading on Tom Tenorio Park in association with the above referenced project is complete in substantial compliance with the approved plans (see as-built sheet 20 of 24 attached). Please provide a letter stating the counties acceptance of the two ponds as constructed. The storm pipes are to be maintained by the City, and separate certifications for them and the subdivision grading have been submitted to the City.

Please call if you have any questions or concerns.

Sincerely,

MARK GOODWIN & ASSOCIATES, PA

James D. Hughes, PE
Senior Engineer

JDH/sw

xc: Roger Paul - Bernalillo County Public Works
Brad Catanach - Bernalillo County Public Works
John Slown - Bernalillo County Parks Department
Tom Joseph - Developer
Susan Calongne - Flood Plain Administrator

f:\\rayodel.sol\engincrt.ltr

BERNALILLO COUNTY

PERMIT APPLICATION

☒ NEW SUBMITTAL

☐ RESUBMITTAL

TODAY'S DATE: 12-29-99

PWD (Use for all PWD permits EXCEPT Street Excavation)

CASE NO.

OWNER

OWNER	Thunder Development Ltd.	PHONE	771-8758
MAILING ADDRESS	3 Calle Pinon	CITY Placitas	ZIP 87043

AGENT

AGENT / CONTRACTOR	Mark Goodwin & Associates	PHONE	828-2200
MAILING ADDRESS	P.O. Box 90606	CITY Albuq.	ZIP 87199
STATE LICENSE NO	EXP DATE	VOLUME	CLASS
ARCHITECT/ENGINEER	James D. Hughes, PE	LICENSE NO	PHONE

SITE INFORMATION

SITE ADDRESS and/or DIRECTIONS	Arenal Rd. between Coors Rd. and Unser Blvd ZONE ATLAS NO.: M-10
LEGAL DESCRIPTION:	A portion of Valley West
UNIFORM PROPERTY CODE (UPC No.)	1 0 1 0 0 5 5 3 6 9 2 3 4 4 0 1 6 2 PROPERTY SIZE IN ACRES
EXISTING BUILDING(S) AND USE	
PROPOSED BUILDING(S)	

TYPE OF SUBMITTAL

- ☐ REPLAT
- ☐ MINOR SUBDIVISION
- ☐ MAJOR SUBDIVISION
- ☐ CONSTRUCTION DRAWINGS
- ☐ GRADING & DRAINAGE PLAN
- ☒ AS-CONSTRUCTED GRADING & DRAINAGE PLAN
- ☐ VARIANCE REQUEST
- ☐ LAND DIVISION
- ☐ TRAFFIC IMPACT ANALYSIS / TRAFFIC STUDY
- ☐ INFRASTRUCTURE LIST / DESIGN REVIEW
- ☐ SPECIAL USE PERMIT
- ☐ BARRICADING PERMIT
- ☐ BUILDING PERMIT
- ☐ INSPECTION
- ☐ OTHER (Specify)

The issuance of a permit or a review or approval of plan specifications, computations, and shop drawings, shall not be interpreted to be a permit for, or an approval of any variance or violation of any of the provisions of any COUNTY or STATE codes, ordinances, standards, or policies. Nor shall such issuance of a permit or approval of plans, specifications, computations, and shop drawings prevent any authorized COUNTY representative or COUNTY inspector form thereafter requiring the correction of errors in said plans, specifications, computations, or shop drawings or from stopping construction operations which are being carried on thereunder when in violation of any COUNTY or STATE codes, ordinances, standards, or policies.

☐ Owner ☒ Agent ☐ Contractor Signature James D. Hughes Date 12-29-99

COUNTY

BERNALILLO COUNTY USE ONLY

C/R's		TOTAL FEE:	
		Receipt No.:	
		Received By:	

Brad Catanach
<bradc@mercury.bernco.gov>

05/18/00 04:21 PM

To: "Susan Calongne (E-mail)" <scalongne@cabq.gov>

cc:

Subject: FW: Puno de Tierra, PWD-98-26

Call Doug accepted by Co?

susan release the financial guarantees for Puno de Tierra.

> -----Original Message-----
> From: David Mitchell
> Sent: Thursday, May 18, 2000 10:39 AM
> To: Brad Catanach; Roger Paul
> Cc: Tim West; Hugh A. O'neall; Grady Cashwell
> Subject: RE: Puno de Tierra, PWD-98-26
>
> Brad-
> I thought this had been inspected and accepted quite some time ago. I do
> not know if documentation was generated.
> Dave
> -----Original Message-----
> From: Brad Catanach
> Sent: Thursday, May 18, 2000 10:26 AM
> To: Roger Paul
> Cc: David Mitchell
> Subject: FW: Puno de Tierra, PWD-98-26
>
> Can we have Grady go out and look at this case, Dave you may want to have
> one of your guys look at it since you guys are maintaining it.
>
> -----Original Message-----
> From: SCalongne@cabq.gov [SMTP:SCalongne@cabq.gov]
> Sent: Thursday, May 18, 2000 9:32 AM
> To: Brad Catanach
> Subject: Puno de Tierra, PWD-98-26
>
> Brad,
> The certification plan for this subdivision just came in for release of
> financial guarantees. Since their pond is located in Tom Tenorio park, I
> need to know if the pond has been accepted by the County before I release
> everything.
> Please let me know.
> Thanks,
> Susan

City of Albuquerque

January 14, 2000

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: ***Grading and Drainage Certification Plan for Unit 1 of the Rayo del Sol Subdivision (M10/D9), Submitted for Release of Financial Guarantees, Engineer's Certification Stamp Dated 12/29/99.***

Dear Mr. Hughes:

Although the above referenced plan is adequate for the Grading and Drainage Certification requirement, financial guarantees for Rayo Del Sol Unit 1 may not be released until the County has accepted the ponds that were constructed in their park. Please provide a copy of the County's approval letter with your resubmittal.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-97-82, City Project No. 579481
Brad Catanach, P.E., Bernalillo County Public Works Division
Tom Joseph, Thunder Development Ltd.
File

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

April 29, 1998

Mr. Kevin J. Curran
Assistant City Attorney
City of Albuquerque Legal Department
P.O. Box 1293
Albuquerque, NM 87103

Re: Rayo del Sol Subdivision (DRB-97-82/CPN 579481)

Dear Mr. Curran:

On behalf of Thunder Development Ltd., Co., I request that the work order for construction of infrastructure associated with the referenced subdivision be released by your office.

Last Friday it was agreed the work order currently being withheld could be released if an additional condition relating to the conveyance of the outstanding drainage easement was added to the preliminary plat approval. The condition would have to be satisfied before final plat approval of the subdivision.

In accordance with the specific language of the new condition issued by DRB (attached), Thunder Development hereby acknowledges and agrees to the additional condition. Thunder Development further acknowledges and agrees that final plat approval and filing with the Bernalillo County Clerk shall be withheld until the City of Albuquerque receives a drainage easement from the County of Bernalillo in form and content acceptable to the city.

Please contact me if I can be of further assistance.

Sincerely,

MARK GOODWIN & ASSOCIATES, PA

John M MacKenzie

John M. MacKenzie, PE
Senior Engineer

JMM/st

Mark Goodwin P.E. 4/29/98
Thunder Development, Ltd., Co. *Date*

f:\rayodel.sol\comments.10

Ordinance, the next working day is considered as the deadline for filing the

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rayo del Sol Subdivision ZONE ATLAS/DRNG,FILE#: M-10

DRB #: 97-82 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Valley West

CITY ADDRESS: Arenal Road between Coors Road and Unser Blvd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: James D. Hughes, PE

ADDRESS: PO Box 9060 Albuquerque, NM 87199 PHONE: 828-2200

OWNER: Thunder Development Ltd. CONTACT: Tom Joseph

ADDRESS: 225 Chamisa Los Alamos, NM 87544 PHONE: 622-0649

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 Albuquerque, NM 87190 PHONE: 884-1990

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
_X_ ENGINEER'S CERTIFICATION
_____ OTHER - Infrastructure List

PRE-DESIGN MEETING:

_____ YES
_____ NO
_____ COPY PROVIDED

Infrastructure list dated 9-3-99 revised 6-30-99

DATE SUBMITTED: 12-29-99

BY: James D. Hughes
James D. Hughes, PE

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL
_____ 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
_____ CERTIFICATION OF OCCUPANCY APPROVAL
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ S.A.D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
_____ OTHER Release Financial Guarantees (Specify)

RECEIVED
DEC 30 1999
HYDROLOGY SECTION

RECEIVED
DEC 03 1999
HYDROLOGY SECTION

Call Brad
dc w/ County
Letter ready

County
Not ready
To accept
ponds
1-14-00

LETTER OF TRANSMITTAL

M-10/D009

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

DATE 12/29/99 JOB NO.

ATTENTION Susan Calongne

RE: Rayo del Sol Subdivision Unti 1
Only

TO City of Albuquerque
Hydrology Department

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☒ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Engineer's Certification for Grading & Drainage
1			Drainage Information Sheet

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☐ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS This certification is for Unit 1 only. Unit 2 grading is substantially complete but the retaining walls are missing and the surveyor has not provided me with as-built for Unit 2.

A separate certification was transmitted to Bernalillo County Public Works for the ponds on Tenorio Park. All appears to be in order.

This engineer's certification is the only thing holding up the Unit 1 close out package and the subsequent release of the financial guarantees.

COPY TO Tom Joseph
Brad Catanach
Dave Mitchell

SIGNED: Dany Hughes

If enclosures are not as noted, kindly notify us at once.

BERNALILLO COUNTY GRANT OF
PUBLIC MAINTENANCE EASEMENT
FOR DRAINAGE FACILITY TO
The City of Albuquerque, a New Mexico Municipal Corporation.

Pursuant to the County of Bernalillo and City of Albuquerque, New Mexico Master Utility Easement and Right-of-Way Agreement dated August 20, 1990;

THIS AGREEMENT is made and entered into this _____ day of _____, 1998, by and between the County of Bernalillo, a political subdivision of the State of New Mexico, hereinafter referred to as the "County", and the City of Albuquerque, a New Mexico Municipal Corporation, hereinafter referred to as the "City".

SECTION 1. GRANT OF EASEMENT. There is hereby granted to the City an exclusive right, license, privilege, and easement to maintain, repair, replace and remove a drainage facility for the diversion and/or storage of water along, under, across, on and about the real property described in Exhibit 1 attached hereto "Easement", together with the right to remove trees, bushes, and undergrowth and any other obstacles upon said easement with the consent of the County.

SECTION 1A: An easement within Section 24, township 10 North, Range 2 East, N.M.P.M. Bernalillo County, New Mexico, being within LANDS OF BERNALILLO COUNTY (TOM TENORIO PARK) as the same described in the WARRANTY DEED filed in the Office of the County Clerk of Bernalillo County, New Mexico as document number 7374075 and being more particularly described on the attached EXHIBIT 1.

SECTION 2. BINDING OF COUNTY'S PROPERTY. This Grant and other provisions of this Easement constitute covenants running with title to the property for the benefit of the City and its successors and assigns until terminated, pursuant to Section 13, Paragraph 4 of the County of Bernalillo and City of Albuquerque, New Mexico Master Utility Easement and Right-of-Way Agreement dated August, 20, 1990.

SECTION 3. QUIET ENJOYMENT. This Grant of Easement is subject to the County's reserved right to full use and enjoyment of the property. In the event the City's exercise of its rights granted herein result in damage to any of the County's uses of the property and improvements thereon, the City shall restore the uses or improvements to the condition which existed immediately prior to said damage.

SECTION 4. LIABILITY. As part of consideration for the Grant of this Easement, the City agrees, subject to the immunities and limitations of the New Mexico Tort Claims Act §41-4-1 et. seq., to be liable for any event or action arising from the City's use of said easement for the purpose herein set forth.

Done this ____ day of _____, 1998.

The Board of Commissioners of the County of Bernalillo grants to the City an exclusive right, license, privilege, and easement to construct, install, maintain, repair, modify, replace and remove a storm sewer and drainage facility for the diversion and/or storage of water along, under, across, on and about the real property described in Exhibit 1 attached to this agreement.

BOARD OF COUNTY COMMISSIONERS:

_____
Steve D. Gallegos, Chairman

_____
Ken Sanchez, Vice Chairman

_____
Les Houston, Member

_____
Tom Rutherford, Member

_____
Barbara J. Seward, Member

APPROVED AS TO FORM ONLY:

_____
County Attorney

ATTEST:

_____
County Clerk

CITY OF ALBUQUERQUE:

ACCEPTED:

_____
City Engineer

Dated: _____

10-29-01
2:30

FIGURE 6
CITY OF ALBUQUERQUE
NOTICE OF D.R.C. MEETING
10-23-01
(DATE)

DRB NO: _____
PROJECT NO: 579483
ZONE ATLAS: M-10

(2)

PROJECT NAME: Raya del Sol Subd. Phase 2A W/L Improvements
LOCATION: on Raya del Sol Dr. of Arenal Rd SW

TYPE OF PROJECT: AHBA X CIP ____ PWC ____ SAD ____ ALL PRIVATE ____

Contact Person: Steve Knee **Phone:** 255-7802

Firm: ABQ Eng. Inc. M10/D9 was SUSAN

COA Poject Mang: N/A **Phone:** _____

Department: NO adverse comments

X Scheduled with the D.R.C. on 10-29-01 at 2:30 Plaza Del Sol/2nd Fl.
____ No DRC Meeting Scheduled. Please return any comments by _____

The Project Is Scheduled For:

/ / Design Report Review
/ / Pre-Design Meeting
/X/ Preliminary Plan Review
/ / Final Plan Review
/ / Signoff of Plans
/ / _____

The Project Relates To:

/X/ Water / / San. Sewer / / Paving / / Storm Drainage / / ____

The Attached Package Includes:

/D/ Drawings /S/ Spec's /E/ Estimate /R/ Report /M/ Memo Only

Indicated below are the Departments/Divisions that have received project documents and/or are invited to attend. It will be the Project Managers responsibility to notify consulting engineering firms of date and time of scheduled meetings.

/D/ DRC Chairman	Project Review Section	All Drawings
/D/ Traffic Repres.	Transportation Development	All Drawings
/D/ Utility Dev.	Utility Design	All AHBA Drawings
/ / Utility Dev.(Billy G.)	Utility Design	All CIP Drawings
/D/ Hydro. Repres. M 10/29/01	Hydrology	All Drawings
/D/ Const. Repres.	Construction	All Drawings
/D/ Dave Harmon	Traffic Operations	All Drawings
/D/ Doug Dailey	Water (Shutoff Plan)	All Water Shutoff
/D/ Parks Repres.	Parks & Recreation	ALL Landscaping
/ / Andre Houle	Street Maintenance	All Paving
/ / Tom Murphy	Transit Department	All Drawings
/D/ Joe Luehring	Construction Coordinator	CIP/Memo
/ / Jim Fink	Line Maintenance	CIP & SAS/Memo
/ / George Gee	City Architect	Arch. Drawings
/ / Tom Ellis	Park Management	Parks/Community Ctrs/APS
/ / Gene Bustamante	General Services Dept.	Arch. Drawings
/ / Greg Smith	PWD/Legal	Specs Only
/ / Richard Sertich	Planning Department	CIP/Memos
/ / CIP Project Manager	CIP	CIP/Memos
/ / Donald Bartlett	Risk Management	Arch. Drawings
/ / _____	_____	_____
/ / _____	_____	_____
/M/ Master Scheduler	Project Review Section	All Memos

10-23-01 1:10 Notified Steve of DRC dds-48 & Steve by phone

DRC NOTIC. UPD 10/15/2001

579483

City of Albuquerque

March 10, 2000

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: ***Grading and Drainage Certification Plan for Unit 1 of the Rayo del Sol Subdivision (M10/D9), Submitted for Release of Financial Guarantees***

Dear Mr. Hughes:

On February 16, 2000, additional information was provided to my office regarding the request for the release of Financial Guarantees for the above referenced subdivision. Per my previous letter, financial guarantees for Rayo Del Sol Unit 1 may not be released until Bernalillo County has accepted the ponds that were constructed in their park.

County staff cannot issue the approval letter until they have received the required "As-constructed" plan for the ponds. After that plan is complete, please provide a copy of this plan along with the County's approval letter with your resubmittal.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-97-82, City Project No. 579481
Brad Catanach, P.E., Bernalillo County Public Works Division
Tom Joseph, Thunder Development Ltd.
(File)

ROUTING & REQUEST

Please...

- [x] Read
- [ ] Handle
- [ ] Approve

And...

- [ ] Forward
- [ ] Return
- [ ] Keep or Recycle
- [ ] Review with Me

To: Susan

most recent

copy

From: Ken

Date: _____

Post-it® 7664 ©3M 1995

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rayo del Sol Subdivision ZONE ATLAS/DRNG,FILE#: M10/D9

DRB #: 97-82 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Valley West

CITY ADDRESS: Arenal Road between Coors Road and Unser Blvd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: James D. Hughes, PE

ADDRESS: PO Box 9060 Albuquerque, NM 87199 PHONE: 828-2200

OWNER: Thunder Development Ltd. CONTACT: Tom Joseph

ADDRESS: 225 Chamisa Los Alamos, NM 87544 PHONE: 622-0649

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 Albuquerque, NM 87190 PHONE: 884-1990

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- _____ DRAINAGE PLAN
- _____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- X EROSION CONTROL PLAN
- _____ ENGINEER'S CERTIFICATION
- X OTHER - Infrastructure List

PRE-DESIGN MEETING:

- _____ YES
- _____ NO
- _____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- _____ SKETCH PLAT APPROVAL
- ~~_____~~ 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
- _____ CERTIFICATION OF OCCUPANCY APPROVAL
- ~~_____~~ GRADING PERMIT APPROVAL
- _____ PAVING PERMIT APPROVAL
- _____ S.A.D. DRAINAGE REPORT
- _____ DRAINAGE REQUIREMENTS
- ✓ OTHER RoFG (Specify)

DATE SUBMITTED: 2-16-00

BY: James D. Hughes
James D. Hughes, PE

RECEIVED
FEB 16 2000
HYDROLOGY SECTION

City of Albuquerque

January 14, 2000

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: ***Grading and Drainage Certification Plan for Unit 1 of the Rayo del Sol Subdivision (M10/D9), Submitted for Release of Financial Guarantees, Engineer's Certification Stamp Dated 12/29/99.***

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If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-97-82, City Project No. 579481
Brad Catanach, P.E., Bernalillo County Public Works Division
Tom Joseph, Thunder Development Ltd.
File

RECEIVED
FEB 16 2000
HYDROLOGY SECTION

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

BERNALILLO COUNTY PUBLIC WORKS DEPARTMENT
PUBLIC INSPECTION

DATE 2/15/00 DESCRIPTION OF WORK Pond

APPROVED

LOCATION [illegible] PERMIT NO. 99-449

CONTRACTOR [illegible] TIME 11:00

PH. # [illegible] INSPECTOR [illegible]

RECEIVED
FEB 16 2000
HYDROLOGY SECTION

facsimile
TRANSMITTAL

to: Susan Calongne
fax #: 924-3864
re: Rayo del Sol, DRB 97-82, City Project #579481, Drainage File #M10/D9
date: February 16, 2000
pages: 4, including this cover sheet.

Attached please find:

1. Drainage Information Sheet

2. Copy of conditional approval of "Engineer's Certification"

3. Copy of Green Tag issued by Bernalillo County indicating acceptance of the ponds on Tenorio Park

PLEASE RELEASE THE FINANCIAL GUARANTEES

RECEIVED
FEB 16 2000
HYDROLOGY SECTION

From the desk of...

JAMES D. HUGHES, PE
Senior Engineer
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

(505) 828-2200
Fax: (505) 797-9539

City of Albuquerque

January 14, 2000

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

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Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-97-82, City Project No. 579481
Brad Catanach, P.E., Bernalillo County Public Works Division
Tom Joseph, Thunder Development Ltd.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rayo del Sol Subdivision ZONE ATLAS/DRNG,FILE#: M10/D9

DRB #: 97-82 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Valley West

CITY ADDRESS: Arenal Road between Coors Road and Unser Blvd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: James D. Hughes, PE

ADDRESS: PO Box 9060 Albuquerque, NM 87199 PHONE: 828-2200

OWNER: Thunder Development Ltd. CONTACT: Tom Joseph

ADDRESS: 225 Chamisa Los Alamos, NM 87544 PHONE: 622-0649

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 Albuquerque, NM 87190 PHONE: 884-1990

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- X EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- X OTHER - Infrastructure List

PRE-DESIGN MEETING:

- ____ YES
- ____ NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- X PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D APPROVAL
- ____ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- X FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATION OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ____ OTHER _____ (Specify)

DATE SUBMITTED: 2-16-00

BY: James D. Hughes
James D. Hughes, PE


APPROVED



Roger Paul
<rogerp@mercury.bernco.gov>

02/18/00 11:01 AM

To: "'SCalongne@cabq.gov'" <SCalongne@cabq.gov>, Brad Catanach <bradc@mercury.bernco.gov>

cc: David Mitchell <DaveM@mercury.bernco.gov>, Grady Cashwell <gradyc@mercury.bernco.gov>

Subject: RE: Rayo Del Sol Subdivision

Grady Cashwell went to the site with a Mark Goodwin inspector and issued the green tag because the improvements matched the design. However, he noted some erosion occurring on the northeast corner of the main pond from the road bar ditch. I spoke with Doug Hughes and he's going to get with the developer (who's currently working on Phase 2 of Rayo del Sol) to get some erosion protection placed at this corner. When that is done, I'll have them submit the required "As-constructed" G & D and we can send the approval letter at that time.....RAP

-----Original Message-----
From: SCalongne@cabq.gov [SMTP:SCalongne@cabq.gov]
Sent: Thursday, February 17, 2000 11:30 AM
To: Brad Catanach; Roger Paul
Subject: Rayo Del Sol Subdivision

Hey guys,
The Rayo del Sol subdivision is in for release of financial guarantees.
They already certified their on-site grading, but at that time, the County
still had issues with the ponds located in Tom Tenorio park. Before the
financial guarantees will be released, the City needs a copy of the
approval letter from the County.
Doug Hughes faxed over a poor copy of the County's green tag, but Terri
Martin needs a letter.
So I told Doug I'd ask you to write him a letter. Ok?
Later,
Susan



Brad Catanach <bradc@mercury.bernco.gov>

02/17/00 11:44 AM

To: "'SCalongne@cabq.gov'" <SCalongne@cabq.gov>

cc: Roger Paul <rogerp@mercury.bernco.gov>, David Mitchell <DaveM@mercury.bernco.gov>

Subject: RE: Rayo Del Sol Subdivision

NO, Doug has not submitted a plan for the ponds in Tom Tenorio Park. We also need concurrence from Parks and Rec. which Hughes has not done.

> -----Original Message-----
> From: SCalongne@cabq.gov [SMTP:SCalongne@cabq.gov]
> Sent: Thursday, February 17, 2000 11:30 AM
> To: Brad Catanach; Roger Paul
> Subject: Rayo Del Sol Subdivision
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> Martin needs a letter.
> So I told Doug I'd ask you to write him a letter. Ok?
> Later,
> Susan

facsimile
TRANSMITTAL

to: Susan Calongne
fax #: 924-3864
re: Rayo del Sol, DRB 97-82, City Project #579481, Drainage File #M10/D9
date: February 16, 2000
pages: 4, including this cover sheet.

Attached please find:

1. Drainage Information Sheet

2. Copy of conditional approval of "Engineer's Certification"

3. Copy of Green Tag issued by Bernalillo County indicating acceptance of the ponds on Tenorio Park

PLEASE RELEASE THE FINANCIAL GUARANTEES

From the desk of...

JAMES D. HUGHES, PE
Senior Engineer
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

(505) 828-2200
Fax: (505) 797-9539

County of Bernalillo

State of New Mexico

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2400 BROADWAY, S.E.
ALBUQUERQUE, NEW MEXICO 87102
PUBLIC WORKS (505) 848-1500

DAVID K. ANDERSON, ASSESSOR
JUDY D. WOODWARD, CLERK
THOMAS J. MESCALL, PROBATE JUDGE
JOE BOWDICH, SHERIFF
ORLANDO VIGIL, TREASURER

May 19, 1997

John M. MacKenzie, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: Conceptual Grading and Drainage Plan for Tenorio Park Subdivision (M10/D9) (PWD-97-70), Received April 30, 1997.

Dear Mr. MacKenzie:

Prior to approval of the above referenced conceptual plan, the following comments must be addressed:

1. Although the concept of discharging developed flows into Tom Tenorio Park is acceptable to County Public Works, you must obtain a letter of concurrence from the County Parks Department. Any construction within the park must be coordinated with County Parks.

2. Will easements be required for the storm drain through the park? Who will maintain this storm drain? Is an outfall structure proposed? Who will maintain this structure?

3. The existing FEMA floodplain has not been removed, therefore, a Letter of Map Revision (LOMR) will be required for this subdivision. The LOMR requirement will be added to the Infrastructure List and must be obtained prior to release of financial guarantees.

This plan was not given a City review. Prior to City review and approval, a complete submittal must be made. The plans must be stamped and signed by an engineer. The supplemental calculations must also be stamped and signed. These should be bound in a report. The ultimate street grades for Arenal road must be provided. Do you propose to drain Arenal through your site? Street, inlet, sidewalk culvert, swale and storm drain capacity calculations must be provided.

If you should have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Roger Paul, Bernalillo County Public Works Division
File

CITY OF
Albuquerque
Public Works Department

July 10, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: Drainage Report and Grading and Drainage Plan for Rayo del Sol Subdivision (M10/D9) (PWD-97-70), Submitted for Preliminary and Final Plat and Rough Grading Approval, Engineer's Stamp Dated 6/19/97.

Dear Mr. Hughes:

Prior to approval for Preliminary Plat action, the following comments must be addressed:

1. The public drainage easement for the storm drain located in Tom Tenorio Park must be in place, and concurrence from County Parks is required, prior to Preliminary Plat action.

2. A Letter of Map Revision (LOMR) from FEMA is required for this subdivision. The report must address how the LOMR will be obtained. Until this issue is resolved, Preliminary Plat will not be granted. Also, please show the limits of the existing FEMA floodplain on the Grading and Drainage plan.

3. After discussions with the City Engineer regarding erosion problems in subdivisions near this site, the rear yard slopes proposed on this plan are unacceptable. Please examine the proposed elevations and provide retaining walls where necessary.

4. Typically, the use of inlets in a sump condition is not acceptable to the City Engineer. To remedy this, please extend the storm drains north and south so that inlets capture the runoff before it ponds at the low spot in Rayo Del Sol Drive.

5. The Grading and Drainage Plan must show the existing off-site grades adjacent to the property. It is unclear how the proposed grades around the perimeter of the subdivision relate to the existing grades.

6. The Grading and Drainage Plan must clearly show the existing property lines for this subdivision. It appears that off-site grading is proposed on the east side of the subdivision to slope towards the County park. If this is the case, slope easements may be required from the County. How much runoff will be directed onto the park from the trail in the southeast corner of the subdivision?

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

7. On the west side of the subdivision, where is the limit of the Amole channel right-of-way? It appears that there is a basin which drains towards the maintenance road at 2%, 6% and 9% slopes. Are these slopes existing or proposed? Are they allowed? Please quantify the flows. Who owns and maintains this property?

8. Provide the ultimate street design for Arenal Road, including ultimate street grades, proposed curb and gutter and storm drains, if required. Show all off-site basins and provide all analyses.

9. More information is needed to show how flows from basin 102 get into the park. The land treatments used for this basin had a low percentage of treatment D for this roadway. Please revise.

10. On the typical lot layout, please indicate that all roof drains are towards the street.

11. The street capacity calculations did not address the potential for hydraulic jumps at the intersections. How does the runoff from basins 1, 3 and 6 make the 90 degree turn from Moonrise to Rayo Del Sol without impacting private property?

12. The infrastructure List must include the Grading and Drainage Certification requirement for Unit 2.

13. The report did not address phasing. Since the storm drain system is to be constructed with Unit 1, please be aware that Unit 2 cannot be built until Unit 1 is built and accepted.

Since the ponds are located within the County Park, any comments regarding the pond capacities will be made by County Public Works and will not be reviewed by my office. If you should have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Roger Paul, Bernalillo County Public Works Division
Tom Joseph, Thunder Development Ltd.
File

CITY OF
Albuquerque

August 28, 1997

Martin J. Chávez, Mayor

James D. Hughes, P.E.
Mark Goodwin & Associates
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: Drainage Report and Grading and Drainage Plan for Rayo del Sol Subdivision (M10/D9) (PWD-97-111), Submitted for Preliminary and Final Plat and Rough Grading Approval.

Dear Mr. Hughes:

Based on the information provided in the submittals of July 22, 1997 through August 27, 1997, the Drainage Report dated July 22, 1997 and the Grading and Drainage Plan dated August 15, 1997 are approved for Preliminary Plat action.

As discussed yesterday, the Infrastructure List must include the temporary diversion ditch into the Amole del Norte channel. The Infrastructure List must also state that no Final Plat approval, or grading will be allowed in Unit 2 until the Letter of Map Revision is received from FEMA.

Rough grading will be allowed in Unit 1 only. A topsoil disturbance permit is required before any grading may occur. The portion of Unit 2 that is not located within the floodplain may be used as the stockpile area, however, no fill material will be allowed in the existing floodplain.

If you should have any questions, please call me at 924-3982.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Fred Aguirre, DRB #97-82
Larry Caudill, City Environmental Health
Brad Catanach, Bernalillo County Public Works Division
Tom Joseph, Thunder Development Ltd.
File

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

August 18, 1997

Ms. Susan Calongne
Hydrology Division
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Re: Rayo del Sol Subdivision — DRB Agenda #4

Dear Ms. Calongne:

As requested, please find attached a Master Drainage Plan for Arenal Road between the Amole del Norte Diversion Channel and Coors Raod. After speaking to Bob Fogelsong, Jim Boardman and Frank Williams, the only plan available is a two year old Environmental Assessment for the "Arenal Road / Coors Road Intersection" project which is currently on hold according to County Project Manager, Frank Williams. The Environmental Assessment identified improvements at the Amole Channel that were to be constructed in conjunction with the County's intersection project which are no longer pertinent due to recent development upstream of the Amole Channel. The Environmental Assessment also identifies the outfall from the intersection as a proposed detention facility discharging at reduced rates to the Arenal Main Canal. No further plans for this drainage could be found.

The original drainage report shows this site and it's associated Arenal Road frontage improvements draining to Tom Tenorio Park, and the attached Arenal Road drainage plan shows that the Arenal Road frontage may be diverted at a later date to the downstream Arenal Road masterplanned storm sewer. The arterial street has surface drainage capacity per DPM requirements down to the upstream end of the masterplanned storm sewer, as shown in the street capacity calculations in the original report. Thus, there is no need for storm sewer in Arenal Road adjacent to Rayo del Sol Subdivision.

Please feel free to contact our office.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

James D. Hughes, PE
Senior Engineer

JDH/sb

xc: Brad Caranach — Bernalillo County Public Works
Frank Williams — Bernalillo County Public Works
John Andrews — Andrews, Asbury and Robert
Fred Aguirre — City of Albuquerque Hydrology

f:\rayodel sol\resubmit.drb

AUG 18 1997
HYDROLOGY SECTION

ARENAL RD. DRAINAGE PLAN

JAMES D. HUGHES
11674
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

CORPORATE LIMITS

AMALIA ROAD

SOUTHWESTERN BLVD

SAN JOSE DE ARMIJO CEMETARY

SAN JOSE ARENAL

SOUTH RAILROAD AVENUE

AMOLE DEL NORTE DIVERSION CHANNEL

NORTH DIVERSION FACILITY

Scale: 1" = 500'

202

203

204

102

LEGEND

PIPE

BASIN

PIPE CAPACITY SUMMARY TABLE

ARENAL ROAD

PIPE #	CONTRIB BASINS	Q100 (cfs)	SIZE (inch)	LENGTH (ft)	SLOPE %	CAPACITY (cfs)	VELOCITY (fps)
1[A]	102, 202	73.38	36	750	1.30	76.00	10.40
2	102, 202, 203	130.63	42	700	1.70	131.20	13.60
3[B]	102, 202, 203, 204	156.11+	54	700+	1.00+	196.70	9.80

(A) Note that the street has capacity for surface drainge to the point where the storm sewer begins as shown in the street capacity calculation in the original report. Basin #102 may either drain to Tom Tenario Park or to the downstream Arenal Road Storm Sewer.

(B) Additional drainage from Coors may need to be included at the time of final pipe sizing. The details of location, HGL, etc., are currently undetermined and are beyond the scope of this study. (See separate "Coors/Arenal Intersection Environmental Assessment" available from Frank Williams with Bernalillo County Public Works.)

f:\\raydel.sol\summary.tbl

SUMMARY OF OFF-SITE HYDROLOGY
ARENAL ROAD

BASIN	AREA		GROUND COVER - %				Q100[4]	
	(AC)	(SQ. MI)	A	B	C	D	INCRIM (cfs)	CUMM (cfs)
202[1]	18.4	0.02875	0.00	32.00	11.00	57.00	65.43	73.38
203[2]	17.8	0.02781	3.65	41.74	10.11	44.50	57.25	130.63
204[3]	7.5	0.01172	13.67	13.67	20.47	52.19	25.48	156.11
102	2.4	0.00375	0.00	40.00	15.00	45.00	7.94	7.94

(1) Basin 202 is in the City limits, is zoned SU-1 and is assumed to be developed at 9 du/ac (57% impervious).

(2) Basin 203 contains 11.5± acres in City limites, zoned SU-1, including an existing school/church, and 2.6± acres in the County, zoned A-1 (25% impervious), and 3.7± acres of park and cemetary (10% impervious).

(3) Basin 204 is all in the County and contains 4.1 acres, zoned A-1, and 3.4± acres zoned C-1 (85% impervious).

(4) Developed Tc for such small basins was assumed to be 12 mins.

COMPOSITE CALCULATIONS

DESCRIPTION	AREA (Ac)	GROUND COVER			
		A	B	C	D
	BASIN 203				
SU-1	11.50	0.00	30.00	10.00	60.00
A-1	2.60	25.00	25.00	25.00	25.00
Park/Cemetary	3.70	0.00	90.00	0.00	10.00
Composite 203	17.80	3.65	41.74	10.11	44.50
	BASIN 204				
A-1	4.10	25.00	25.00	25.00	25.00
C-1	3.40	0.00	0.00	15.00	85.00
Composite 204	7.50	13.67	13.67	20.47	52.19

f:\\raydel.sol\summary.tbl

County of Bernalillo

State of New Mexico

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JUAN R. VIGIL, COUNTY MANAGER

2400 BROADWAY, S.E.
ALBUQUERQUE, NEW MEXICO 87102
PUBLIC WORKS (505) 848-1500

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JUDY D. WOODWARD, CLERK
THOMAS J. MESCALL, PROBATE JUDGE
JOE BOWDICH, SHERIFF
ORLANDO VIGIL, TREASURER

FAX TRANSMISSION

DATE: 13 Aug 97

TO: Doug Hughes

FROM: Frank Williams, BCPWD

FAX #: 797-9539

Number of Pages 5 including cover letter.

Fax Transmit Number: (505) 848-1510

Remarks:

Doug, Atch are pages from Coors/Arena Intersection EA per our 12 Aug discussion. I'll call you when I can better discuss drainage Master Plan.

Frank

County of Bernalillo
Public Works Division
(505) 848-1500

848-1572

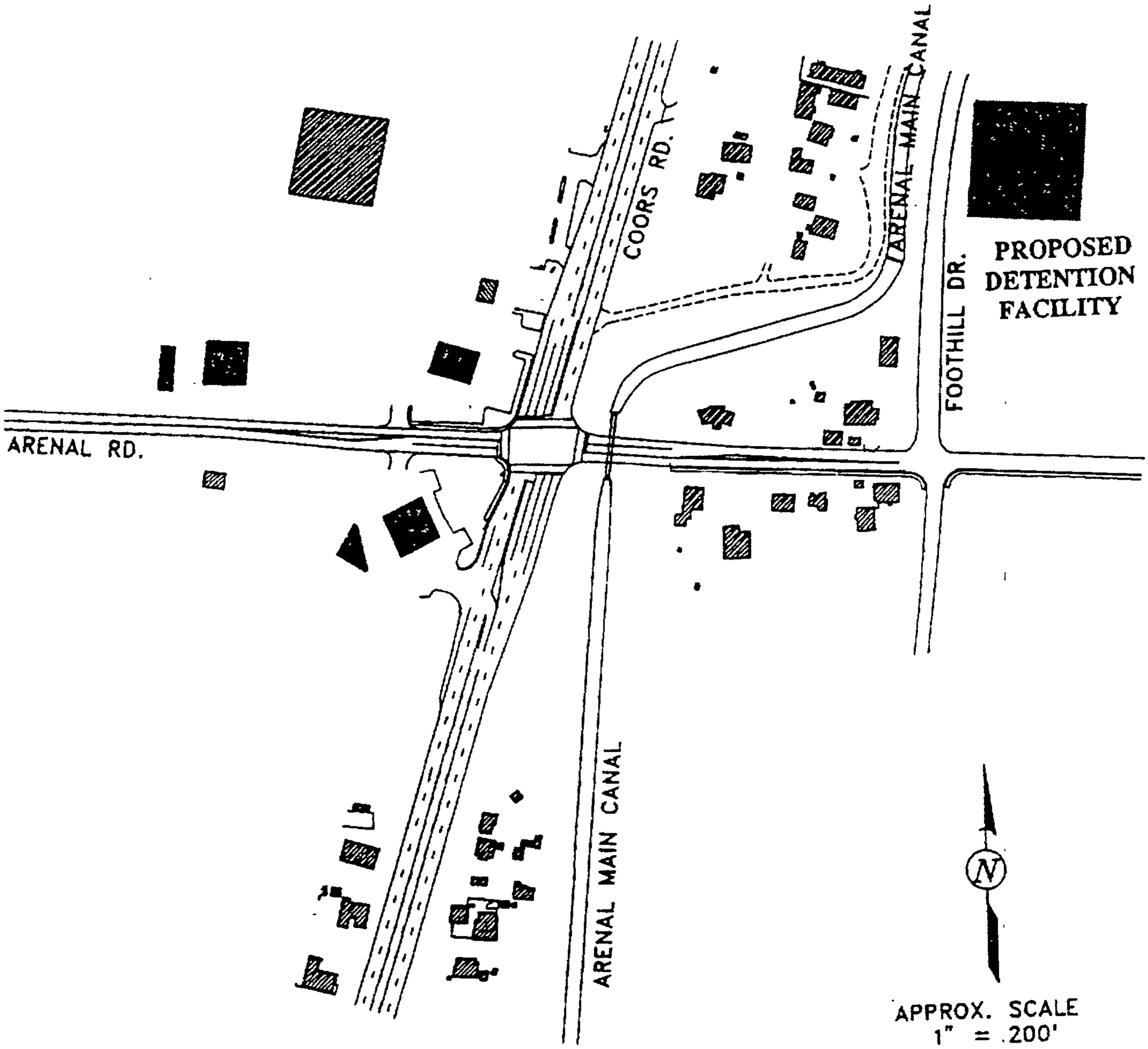


Exhibit 2-5
Arenal Road/Coors Road Intersection
Approximate Location of Proposed Detention Facility

Road are also listed as exceptions to the general right of way standards. From Coors Road west to Unser Boulevard, Arenal Road is listed as a principal arterial. However, this section of Arenal Road also requires 156 feet right of way width. Arenal Road east of Coors Road is classified as a collector in the LRMSP.

The Arenal Road/Coors Road study area was included in a previous study conducted in 1989. The Gibson West Corridor Study (GWCS) considered the possibility of Arenal Road serving as the major arterial connecting the southwest quadrant of Albuquerque to Interstate 25. Due to a lack of funding, no progress toward implementing any of the alternatives identified in the GWCS has been made. The current proposal to improve the Arenal Road/Coors Road intersection addresses only safety, drainage, and transit and traffic operations deficiencies of the intersection; therefore, the current project is unable to plan for any of the alternatives identified in the GWCS. Each of the GWCS alternatives increases the roadway capacity and changes the existing alignment so dramatically that the intersection would require extensive reconstruction if any of these alternatives were implemented. However, according to the City of Albuquerque's Transportation Development Division, the cost and controversies associated with implementing the GWCS recommendations (the building of an additional bridge over the Rio Grande River and the relocation of more property owners than any other transportation project in the State of New Mexico), make the probability of implementation of any of the alternatives discussed in the GWCS in the foreseeable future low.

3.2.1 Policies And Plans - Impacts

No-Build Alternative

The proposed improvements to the intersection of Arenal Road and Coors Road are contained within the 1994 Transportation Plan for the Albuquerque Metropolitan Area; therefore, the no-build alternative would not be consistent with the stated transportation policies and goals of the program.

Build Alternative

The proposed improvements to the intersection of Arenal Road and Coors Road are contained within the 1994 Transportation Plan for the Albuquerque Metropolitan Area. Therefore, the build alternative would be consistent with the plan and its stated transportation policies and goals.

3.3 Drainage - Existing Conditions

Drainage in the vicinity of the Arenal Road/Coors Road intersection is heavily impacted by off-site runoff that develops on the steeper mesa slopes to the west of the study area and then flows east to the intersection in small roadway ditches. These flows, in major rainfall events, move down Arenal Road, cross Coors Road, deposit sediments in the intersection, and then continue into the Arenal Main Canal, severely eroding the Canal banks in the process.

The upper, western limit of the Arenal Road/Coors Road intersection drainage basin is formed by the Amole del Norte flood control channel (see Exhibit 1-2). Arenal Road runoff enters the Amole Channel through drop inlets. The southern limit of the drainage basin is formed by the Tom Tenorio runoff detention

and recreation area. Runoff from Arenal Road is funneled into the Tom Tenorio facility by a small earthen diversion ditch.

The inlets into both the Amole Channel and the Tom Tenorio facility may be defeated by heavy rainfall events. The drop inlets to the Amole Channel may be closed by sedimentation during these events and the earthen ditch diverting runoff into the Tom Tenorio facility may be bypassed or leveled by heavy runoff. When these inlets are defeated, greater flows to the Arenal Road/Coors Road intersection result. Because of the likelihood of heavy runoff circumventing the existing inflow structures, higher capacity rundowns and permanent concrete culverts, respectively, are needed at the Amole Channel and Tom Tenorio detention facility.

Although not a portion of the proposed improvements to the Arenal Road/Coors Road intersection, improvements will be made to the inlet structures upstream from the intersection. Bernalillo County will construct higher capacity rundowns at the Amole Channel and will replace the existing earthen diversion ditch at the Tom Tenorio facility with a permanent concrete culvert. These improvements will be made as a separate, but concurrent, County project. Completion of these improvements will lessen the off-site storm water runoff impact to the Arenal Road/Coors Road intersection.

The Arenal Main Canal is also an important drainage facility within the study area. Although the Canal was designed and built in the 1930s as an earthen-banked irrigation facility, the Canal has been functioning as a drainage facility as well. As was described earlier, runoff from several small off-site basins collect along the Arenal roadway and then flow east to the intersection. These flows, in heavy rainfall events, move down Arenal Road, cross Coors Road, and then continue into the Arenal Canal. The addition of concrete walls and a floor to the Canal in 1978 slowed the erosion of the Canal proper, but the earthen banks surrounding the Canal continue to erode during these events.

3.3.1 Drainage - Impacts

No-Build Alternative

The no-build alternative would maintain the existing drainage of the intersection. However, a separate County drainage project would construct higher capacity rundowns and permanent concrete culverts to the upstream drainage facilities (Amole del Norte Channel and Tom Tenorio detention facility) west of the intersection, thereby greatly reducing off-site flow to the intersection. Although this project will mitigate much of the off-site flow to the intersection, heavy rainfall events would continue to cause sediments to deposit in the intersection and may still result in damage to the intersection. In addition, flows would continue to discharge into the Arenal Main Canal, further eroding the earthen banks surrounding the Canal.

Build Alternative

The following discussion of the build alternative assumes that existing off-site flows arising west of the intersection have been reduced by a separate County drainage project . This project will construct higher

capacity rundowns at the Amole Channel and will replace the existing earthen diversion ditch at the Tom Tenorio facility with a permanent concrete culvert.

As a part of the intersection improvements, on-site roadway runoff would be controlled by roadway curb and gutter, collected by inlets into a storm sewer collection system and deposited into a detention facility. The detention facility would allow for collection of the runoff and settling of sediments prior to controlled discharge. The detention facility is described in greater detail in Section 3.11.

3.4 Land Use - Existing Conditions

Land uses adjacent to the Coors Road and Arenal Road intersection are a mixture of single family residences, commercial use and irrigation facilities. Much of the property adjacent to the roadway is currently undeveloped. The existing land use is shown in Exhibit 3-2.

The zoning of the study area is mixed. Much of the land west of the intersection is zoned for agricultural uses. East of the Arenal Main Canal, single family residential zoning occurs with some interspersed special use (e.g. automobile repair) zoning. Commercial properties (a restaurant and a gasoline station/convenience store) are located on the northwest and southwest corners of the intersection, respectively. The Arenal Main Canal flows beneath Arenal Road and parallels Coors Road to the south.

3.4.1 Land Use - Impacts

No-Build Alternative

Because the existing land uses would not be changed under the no-build alternative, impacts to land use would not occur under.

Build Alternative

Although no relocations would occur as a result of the project, limited additional right of way or easements would be required for the intersection improvements and land would be acquired for construction of the detention facilities. To construct the dedicated right turn lane and sidewalk for the southbound Coors Road approach, additional right of way or sidewalk easement would be required from the Blake's Lotaburger property. In addition, to provide adequate handicap access to the intersection sidewalks and crosswalks, and to extend the sidewalk further south than it currently exists, additional right of way or sidewalk easement would be needed on the southwest corner of the intersection currently occupied by the Giant Gasoline Station. The additional right of way or easements would be located in areas of both properties that is currently landscaped and no loss of parking or access to the properties would result. However, property owners will be compensated for the acquisition of easements or right of way or the removal of landscaping.

The total amount of land needed in additional right of way or easements at the intersection would be less than 2,000 square feet. In addition, the loss of landscaped area on the east side of Blake's Lotaburger may be replaced by land on the south side which would not be used for Arenal Road improvements. Both Blake's Lotaburger and the Giant Gasoline Station/Convenience Store may benefit from improved pedestrian and bicycle access to their facilities resulting from these improvements.

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
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e-mail: dmg@swcp.com

RECEIVED
AUG 21 1997
HYDROLOGY SECTION

August 20, 1997

Ms. Susan Calongne
Hydrology Division
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Re: Rayo del Sol Subdivision — Arenal Road Master Plan

Dear Ms. Calongne:

In a discussion with John Andrews late yesterday, it was brought to my attention that a more detailed drainage plan for Arenal Rd was developed in conjunction with the Environmental Assessment and has already been approved by County Public Works. The 2 year old plan was only recently approved by County Public Works. John Andrews, the author of the plan, will provide you with a copy for your records.

As I now understand that plan, a new pond east of Coors Blvd and north Arenal Rd is to be slowly drained by pumping into the Arenal Main Canal. The difficulties of handling the drainage at that intersection are to be minimized by diverting as much drainage as possible, including all of Basin 202, into Tom Tenorio Park. However, the plan does not address ponding specifics in the park.

In light of this new information I have revised the Rayo del Sol Master Plan of Arenal Rd and ask that the plan as previously prepared by John Andrews and approved by County Public Works be accepted by the City for preliminary plat approval for Rayo del Sol Subdivision leaving the specific details to be worked out as a matter of final construction plan approval.

We would like to begin grading Rayo del Sol Subdivision soon after preliminary plat approval. With the understanding that the floodplain is protected until the LOMR is approved by FEMA. A temporary ditch needs to be constructed from Arenal Rd on the west side of the Amole del Norte Diversion Channel because as John Andrews stated in the Environmental Assessment, the existing inlets are inadequate to handle high flows. The temporary ditch must be constructed and certified as "As Built" prior to the application to FEMA.

The original version of this drainage plan was submitted on June 19 ,1997, to both the City of Albuquerque and County Public Works. The first comments were received from the City July 10, 1997. We met on July 14, 1997, to agree on how the comments were to be addressed, and the revisions were resubmitted on July 22, 1997. Additional comments were received from County Public Works on July 22, 1997, that were addressed by submitting the four park easements to both City and County on July 29, 1997, and by supplying additional information to County Public Works as requested.

The project was deferred by the DRB at meetings, on July 15 and 29, and August 5, 1997. We had a joint meeting with City maintenance, County Public Works, Parks, you and me on August 7, 1997, at which time you requested two things:

1. *A commitment from County Public Works or Parks to maintain the ponds and limit the City's liability to the water in the pipes.*

2. *A master drainage plan for Arenal Rd between the Amole del Norte Channel and Coors Blvd.*

County Public Works offered verbal commitments to maintain the ponds on August 14, 1997. Our search for the elusive Arenal Master Plan ended on August 18, 1997, when we submitted our own version of a master plan. Again we were deferred on August 19 and if we don't all put our heads together now it may be deferred again on August 26. I am doing my best to provide everything you asked for in a timely manner and ask that you do the same to avoid another deferral.

Please feel free to contact our office if you have any questions.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

James D. Hughes, PE
Senior Engineer

JDH/sb

xc: *Brad Catanach — Bernalillo County Public Works*
John Andrews — Andrews, Asbury and Robert
Frank Williams — Bernalillo County Public Works
John Slone — Parks, Design and Development, CIP
RJ Schaefer — RJ Schaefer Realty
Tom Joseph — Thunder Development Ltd., Co.

f:\\rayodel.sol\arenal.mp

SUMMARY OF OFF-SITE HYDROLOGY
ARENAL ROAD

BASIN	AREA		GROUND COVER - %				Q100[4]	
	(AC)	(SQ. MI)	A	B	C	D	INCRIM (cfs)	CUMM (cfs)
102	2.4	0.00375	0.00	40.00	15.00	45.00	7.94	7.94
202[1]	21.9	0.03422	0.00	37.39	8.77	53.84	75.81	83.75[5]
203[2]	14.3	0.02234	4.55	34.54	11.82	49.09	47.65	47.65
204[3]	7.5	0.01172	13.67	13.67	20.47	52.19	25.48	73.13

(1) Basin 202 contains 19.2 acres in the City limits, zoned SU-1 and is assumed to be developed at 9 du/ac (60% impervious). It includes 2.7 acres of County park.

(2) Basin 203 contains 10.4± acres in City limites, zoned SU-1, including an existing school/church, and 2.6± acres in the County, zoned A-1 (25% impervious), and 1.3± acres of cemetary (10% impervious).

(3) Basin 204 is all in the County and contains 4.1 acres, zoned A-1, and 3.4± acres zoned C-1 (85% impervious).

(4) Developed Tc for such small basins was assumed to be 12 mins.

(5) V_{100} is 2.621 ac/ft in 6 hr and 4.01 ac/ft in 10 dyas for Basin 202.

COMPOSITE CALCULATIONS

DESCRIPTION	AREA (Ac)	GROUND COVER			
		A	B	C	D
	BASIN 202				
SU-1	19.20	0.00	30.00	10.00	60.00
Park	2.70	0.00	90.00	0.00	10.00
Composite 202	21.90	0.00	37.39	8.77	53.84
	BASIN 203				
SU-1	10.40	0.00	30.00	10.00	60.00
A-1	2.60	25.00	25.00	25.00	25.00
Cemetary	1.30	0.00	90.00	0.00	10.00
Composite 203	14.30	4.55	34.54	11.82	49.09
	BASIN 204				
A-1	4.10	25.00	25.00	25.00	25.00
C-1	3.40	0.00	0.00	15.00	85.00
Composite 204	7.50	13.67	13.67	20.47	52.19

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PIPE CAPACITY SUMMARY TABLE

ARENAL ROAD

PIPE #	CONTRIB BASINS	Q100 (cfs)	SIZE (inch)	LENGTH (ft)	SLOPE %	CAPACITY (cfs)	VELOCITY (fps)
1[A]	102, 202	73.38	42	700	1.1	105.5	11.0
2	203	47.65	30	700	1.7	53.5	10.9
3[B]	203, 204	73.13+	42	700+	1.0+	100.6	10.5

(A) Note that the street has capacity for surface drainge to the point where the storm sewer goes into Tenorio Park.

(B) Additional drainage from Coors may need to be included at the time of final pipe sizing. The details of location, HGL, etc., are currently undetermined and are beyond the scope of this study. (See separate "Coors/Arenal Intersection Environmental Assessment" available from Frank Williams with Bernalillo County Public Works.)

f:\\raydel.sol\summary.tbl

ARENAL RD. DRAINAGE PLAN

CORPORATE LIMITS

JAMES D. HUGHES 11874 REGISTERED PROFESSIONAL ENGINEER NEW MEXICO

8-15-97

Rev 8-20-97 JDH

CORPORATE LIMITS

AMALIA ROAD

SOUTHWESTERN SKIES ADDN

SAN JOSE DE ARNIO CEMETARY

Scale: 1" = 500'

SAN JOSE ARENAL

ROAD

SU-1 CHURCH & SCHOOL

CORPORATE LIMITS

202

203

204

102

101

RM-6L

C-1

A-1

SU-1 PRD

RAYO DEL SOL

AMOLE DEL NORTE

SAN JOSE DRIVE

SAAVEDRA CEMETARY

ARENAL ROAD

Prop Pond

ALDERETE NICOLAS BLVD

CANAL

NORTH DIVERSION FACILITY

LEGEND

PIPE

BASIN

PRIVATE SLOPE EASEMENT

This grant of Easement, between Bernalillo County, a policital subdivision of the State of New Mexico, ("Grantor"), and Great Western Land Company, a New Mexico General partnership, as the owner of the adjacent property/ adjoining property ("Grantee"), whose address is 225 Chamisa, Los Alamos, NM 87544.

1. Grant of Easement .The Grantor grants to the Grantee an exclusive permanent easement for a slope on, over, across and through the property described on Exhibit A attached hereto ("Property"), together with the right to the Grantee to operate, maintain, repair, replace, and construct the slope and the right to remove trees, bushes, undergrowth and any other obstacles upon the Property if the Grantee determines they interfere with the appropriate use of the easement.

2. Warranties . Grantor covenants and warrants that it is the owner in fee simple of the Property and that is has a good lawful right to convey the Property or any part thereof and that the Grantor will forever warrant and defend the title to the Property against all claims from all persons or entities.

3. Binding on Grantor's Property. The grant and other provisions of this Easement constitute covenants running with title to the Property for the benefit of the Grantee and its successors and assigns until terminated.

Witness my hand and seal this _____ day of _____, 1997.

GRANTOR:

By:_____
Its:_____
Dated:_____

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledge before me on _____, 199___ by _____, _____ of _____, on behalf of the _____.

My Commission Expires:

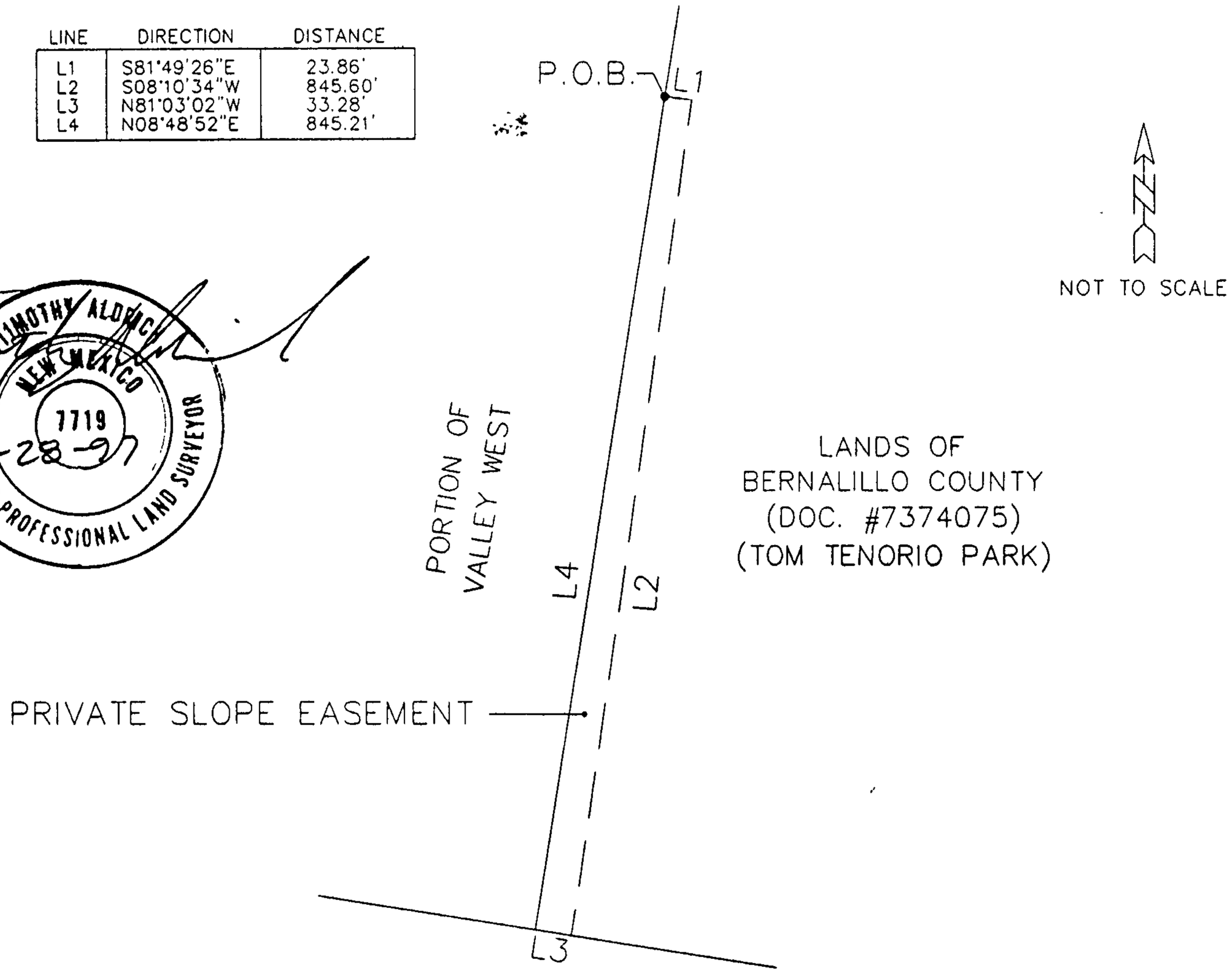
_____ _____
Notary Public

f \\rayodel.sol\easement.1

EXHIBIT FOR
PRIVATE SLOPE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S81°49'26"E	23.86'
L2	S08°10'34"W	845.60'
L3	N81°03'02"W	33.28'
L4	N08°48'52"E	845.21'





DESCRIPTION

A PRIVATE SLOPE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows.

BEGINNING at the northwest corner of the herein described easement from whence the Albuquerque Control Survey Monument "1-M10" bears N 36°39'09" W, 3828.16 feet;

THENCE S 81°49'26" E, 23.86 feet to the northeast corner;

THENCE S 08°10'34" W, 845.60 feet to the southeast corner;

THENCE N 81°03'02" W, 33.28 feet to the southwest corner,

THENCE N 08°48'52" E, 845.21 feet to the point of beginning and containing 0.5544 acres more or less.

EXHIBIT "A"

GRANT OF EASEMENT
FLOODWAY AND STORM DRAINAGE WORKS

Bernalillo County, a political subdivision of the State of New Mexico ("Grantor"), being the owner(s) of the property described herein, for good and valuable consideration, the receipt of which is hereby acknowledge, does grant, bargain, sell and convey unto the Bernalillo County, a political subdivision of the State of New Mexico, and its successors and assigns, the permanent right and easement for drainage, flood control and conveyance of storm water and the construction, reconstruction, operation and maintenance of, and access to such facilities on, in, under, over and across the following described real estate:

The land in which the foregoing rights and easements are granted is located within a Tract of land situate within the east ½ of Section 34 and the west ½ of Section 35, Township 10 North, Range 2 East, NMPM, within the Town of Atrisco Grant, Bernalillo County, New Mexico in Bernalillo County, New Mexico and is more particularly described in Exhibit "A" attached hereto and incorporated herein by reference.

Except by written approval of Bernalillo County, no fence, wall, building or other obstruction may be placed or maintained in said easement and there shall be no alteration of the grades of contours in said easement. The granting of this easement shall not obligate Bernalillo County to maintain natural arroyos, drainage channels, or facilities that do not meet the standards of Bernalillo County for design, construction, and maintainability; nor shall this granting require the protection of property lying outside of the easement granted. Bernalillo County shall only maintain property and/or improvements that is specifically agrees, by written agreement filed for public record, to maintain. Unless specifically agrees, by such written agreement, to maintain property and/or improvements, such maintenance responsibility shall remain with the Grantor, its successors or assigns. Landscaping or maintenance work, by the Grantor, within the easement hereby conveyed shall not alter the present flowline, capacity, or permeability of the present flood way area, except in an emergency. If emergency work is performed, Grantor shall notify Bernalillo County as soon as practical thereafter . Bernalillo County will then determine if the emergency work can remain or must be removed or modified. Safe Locations for structures built on lands adjacent to the rights and easements described herein may be substantially outside of the described area.

TO HAVE AND HOLD the said right and easement for the uses and purposes aforesaid, unto Bernalillo County, it successors and assigns, forever, except that any portion of the easement granted herein shall revert to the Grantor, its successors or assigns, as and to the extent said portion is declared unnecessary for flood control or drainage by the Board of Directors of Albuquerque Metropolitan Arroyo Control Authority. Any reversion shall be conveyed by quitclaim deed.

THERE IS RESERVED to the Grantor, its successors and assigns, the right to use said lands for open space and landscaping, such open space and landscaping shall not interfere with the rights and easements granted to Bernalillo County. Other purposes, which will not interfere with the rights and easements hereby granted, may be permitted, provided that Grantor obtains Bernalillo County written licensed approval of such use, not to be unreasonably withheld.

WITNESS my (our) _____ hand(s) and seal(s) this _____ day of _____, 199__.

GRANTOR(s):_____
BY:_____
TITLE:_____

ACKNOWLEDGMENT: Individual(s)

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 199____,
by_____

My commission expires:

_____ _____
(Seal) Notary Public

ACKNOWLEDGMENT: Corporation

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 199____,
by _____ as _____
of _____, a _____
corporation, on behalf of said corporation.

My commission expires:

_____ _____
(Seal) Notary Public

ACKNOWLEDGMENT: Partnership

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 199____,
by _____ as _____
of _____, a _____
partnership, on behalf of said partnership.

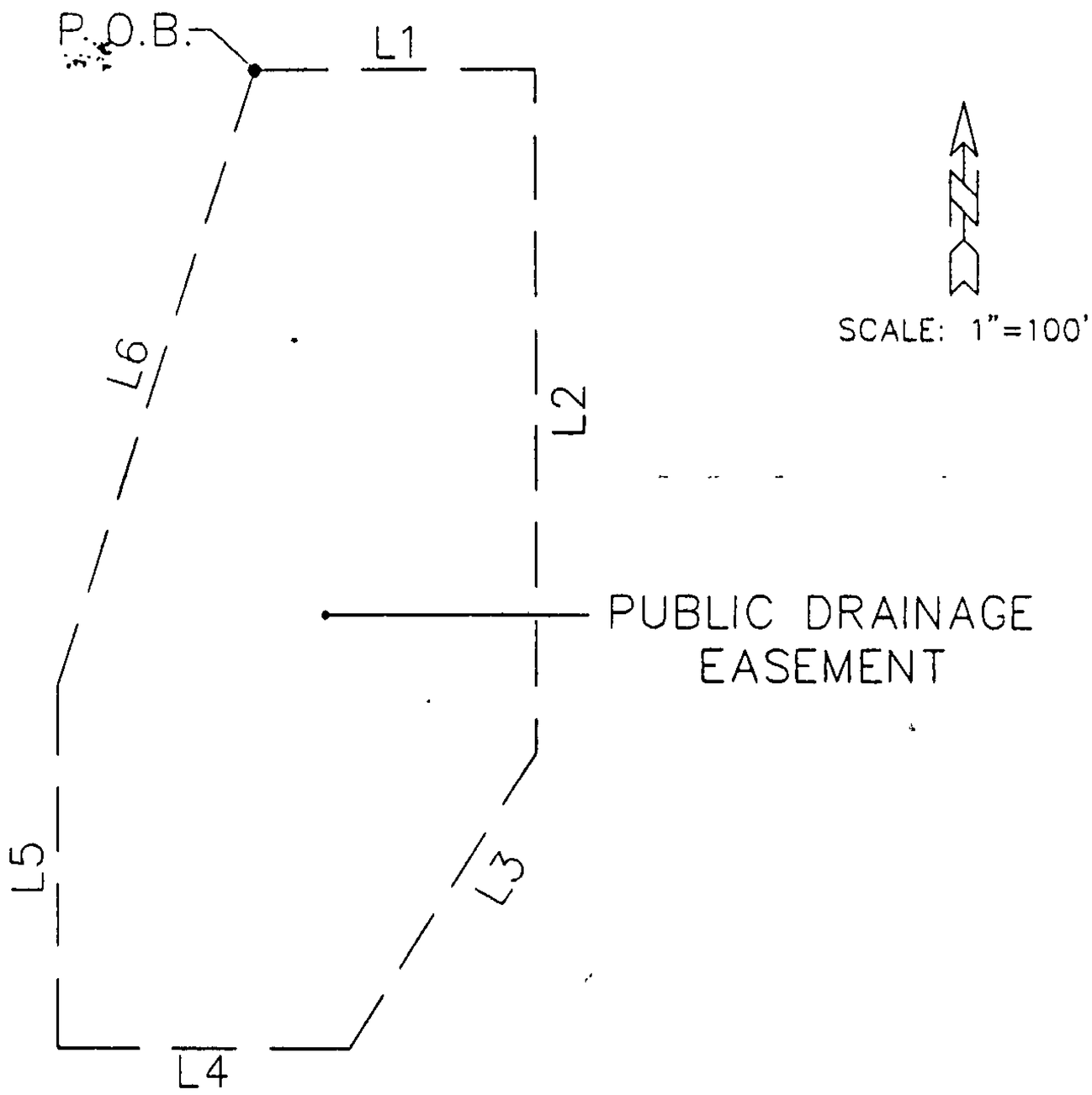
My commission expires:

_____ _____
(Seal) Notary Public

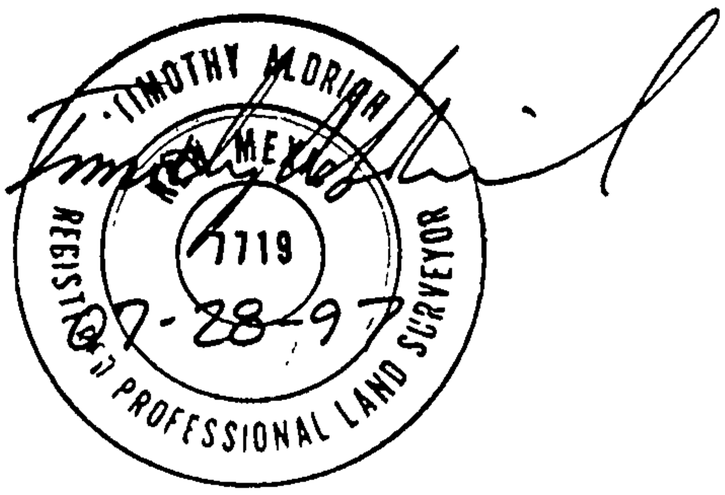
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EXHIBIT FOR
BERNALILLO COUNTY
PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	N90°00'00"E	106.57'
L2	S00°00'00"W	263.41'
L3	S31°18'23"W	135.49'
L4	N90°00'00"W	112.31'
L5	N00°00'00"E	141.51'
L6	N17°45'52"E	249.57'



SCALE: 1"=100'



DESCRIPTION

A PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows:

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1-M10" bears N 45°33'36" W, 4213.37 feet;

THENCE N 90°00'00" E, 106.57 feet to a point;

THENCE S 00°00'00" W, 263.41 feet to a point;

THENCE S 31°18'23" W, 135.49 feet to a point;

THENCE N 90°00'00" W, 112.31 feet to a point;

THENCE N 00°00'00" E, 141.51 feet to a point;

THENCE N 17°45'52" E, 249.57 feet to the point of beginning and containing 1.2892 acres more or less.

EXHIBIT "A"

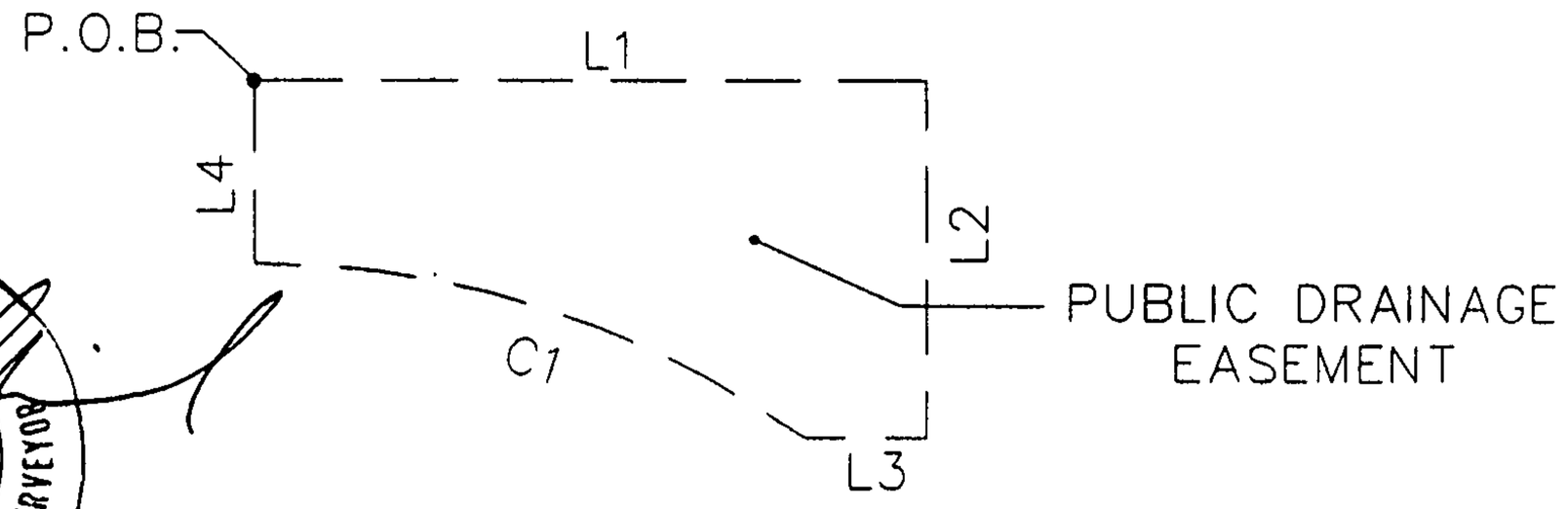
EXHIBIT FOR
BERNALILLO COUNTY
PUBLIC DRAINAGE EASEMENT

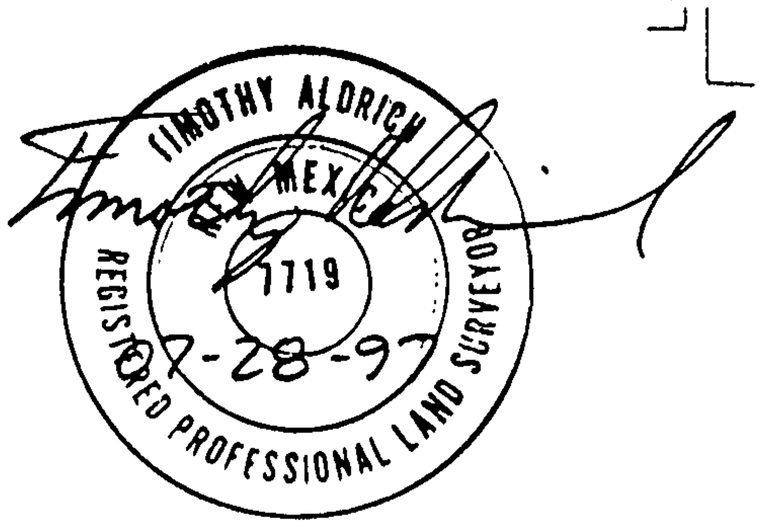
CURVE	LENGTH	DELTA	RADIUS	TANGENT	DIRECTION	CHORD
C1	192 91'	35°52'42"	308 06'	99 73'	N71°58'53"W	189.77'

LINE	DIRECTION	DISTANCE
L1	N90°00'00"E	220.47'
L2	S00°00'00"E	119.29'
L3	S90°00'00"W	40 00'
L4	N00°00'00"W	60.59'

N

SCALE: 1"=100'





DESCRIPTION

A PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows:

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1–M10" bears N 38°21'30" W, 4419.16 feet;

THENCE N 90°00'00" E, 220.47 feet to a point;

THENCE S 00°00'00" E, 119.29 feet to a point;

THENCE S 90°00'00" W, 40.00 feet to a point on curve;

THENCE 192.91 feet along a curve to the left, whose radius is 308.06 feet through a central angle of 35°52'42" and whose chord bears N 71°58'53" W, 189.77 feet to a point on tangent;

THENCE N 00°00'00" W, 60.59 feet to the point of beginning and containing 0.4385 acres more or less.

EXHIBIT "B"

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 7/29/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Figure 12

EXHIBIT "A"
To Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Rayo del Sol Subdivision

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider responsibility. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

UNIT I

NOTE: Unit I must precede Unit 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
48' FF	Res Pvmt Std C & G 4' Sdwk (both sides)(1) 4' Median	Rayo del Sol Dr	Luna Ladera Ave	Arenal Rd
25' FF	½ section arterial pvmt Std C & G (S side) Asphalt curb (N side) 6' Sdwk (S side)	Arenal Rd	E Property line	W Property line
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Tierra de la Luna Dr	Lot 4, Blk3	Luna Ladera Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Moonrise Ave	Tierra de la Luna Dr	Rayo del Sol Dr
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Rayo del Sol Dr	Lot 54, Blk 1	Luna Ladera Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
Per Design	Temp left turn lane w/ pvmt widening/striping	Arenal Rd	@ Rayo del Sol Dr	

RECEIVED
JUL 29 1997
HYDROLOGY SECTION

County needs to review
need approval from
Co. parks
- need approval from
City Atty.

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 7/29/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

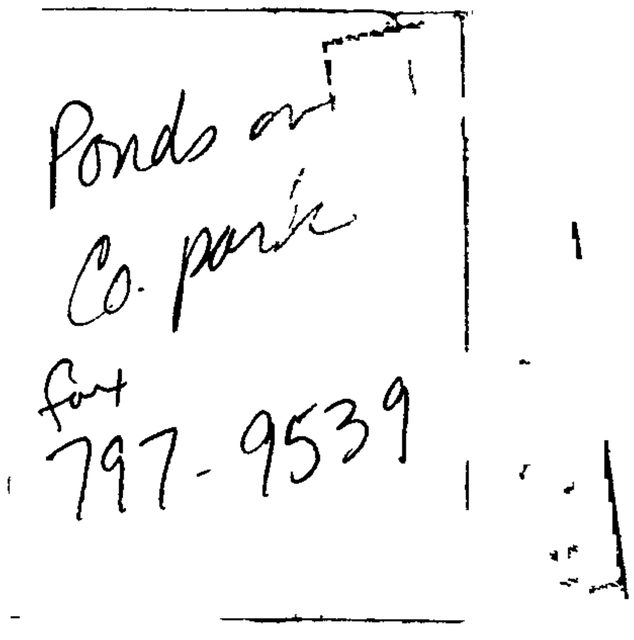
Size	Type Improvement	Location	From	To
WATER				
30"	Waterline	Bridge Blvd	Airport Drive	Amole Del Norte Diversion Channel
30"	Waterline	Amole Del Norte Diversion Channel	Bridge Blvd.	Arenal Rd
10"	Waterline	Arenal Rd	W Property line	E Property line
10"	Waterline	Rayo del Sol Dr	Lot 56, Blk 1	Arenal Rd
6"	Waterline	Tierra de la Luna Dr	Lot 4, Blk 3	Luna Ladera Ave
6"	Waterline	Moonrise Ave	Rayo del Sol Dr	Tierra de la Luna Dr
6"	Waterline	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
SANITARY SEWER				
8"	SAS	Rayo del Sol Dr	Lot 54, Blk 1	Arenal Rd ~~Rayo del Sol Dr~~
8"	SAS	Moonrise Ave	Tieera de la Luna Dr	Rayo del Sol Dr
8"	SAS	Tierra de la Luna Dr	Lot 4, Blk 3	Luna Ladera Ave
8"	SAS	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
STORM DRAINAGE				
~~Per~~ 36" Design	Storm Sewer	public drainage esmts on lot ~~54~~ 66, blk 1 & Tenorio Park	Rayo del Sol Dr	County retention areas in park

Ok including manholes, inlets, etc.

* Engineer's Certification for private Grading and Drainage per DPM (both Units) for Release of SIA and Financial Guarantees. ~~Financial Guarantee is not required for this item.~~

{pond improvements (riprap, sundown, grading, etc.)
{30" RCP between ponds

must go through City Work Order process. The As-built information will be included with the grading & drainage certification


Ponds on
Co. park
for
797-9539

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 7/29/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

UNIT 2

NOTE: Unit 1 must precede Unit 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Tierra de la Luna Dr	Lot 23, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Rayo del Sol Dr	Lot 55, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
WATER				
10"	Waterline	Rayo del Sol Dr	Lot 55, Blk 1	Luna Azul Ave
6"	Waterline	Tierra de la Luna Dr	Lot 4, Blk 3	Luna Azul Ave
6"	Waterline	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
10"	Waterline	20' Pedestrian access and water right-of-way btw Lots 43 & 44, Blk 1	Rayo del Sol Dr	~~exist 10" waterline~~, S. Property Line
SANITARY SEWER				
8"	SAS	Tierra de la Luna Dr	Lot 23, Blk 1	Luna Azul Ave
8"	SAS	Rayo del Sol Dr	Lot 55, Blk 1	Luna Azul Ave
8"	SAS	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr

* cert. note

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 7/29/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

(1) Construction of all interior 4' sidewalks is to be deferred until after construction of individual home, and is to be financially guaranteed separately.
(2) Standard C& G will be used in place of roll C & G where required for drainage purposes.

Stormdrain to include manholes, inlets, riprap and outfall.

Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

Sanitary sewer to include manholes and service connections.

Prepared By: _____

Print Name: James D. Hughes, PE

Firm: Mark Goodwin & Associates, PA

* * * *

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

RECEIVED
JUL 29 1997
HYDROLOGY SECTION

July 30, 1997

Ms. Susan Calongne
Hydrology Department
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Re: Rayo del Sol Subdivision, Revised Drainage Report (M10/D9) (PWD 97-20)

Dear Ms. Calongne:

The comments made in your July 10, 1997, letter have been addressed as follows:

1. *Attached, please find the concurrence letter from County Parks and Recreation and a draft copy of four different easements. The appraisal, required by Parks, will take 2 months to complete and is required prior to the County signing the easements. Thus we are asking that you review and approve the easements, so we can get the appraisal started, and that you approve the preliminary plat and Drainage Report with the condition that the easements be in place prior to Final Plat approval for Unit 1.*

2. *The limits of the floodplain are shown on the grading plan and, as we discussed, the Unit 2 final plat will not be approved until FEMA removes the floodplain with a LOMR. The owner understands this and has authorized us to proceed in the preparation of a LOMR application which we have already started. This should be a condition of approval on Unit II plat and not an infrastructure list item. (See Attached Infrastructure List)*

3. *Rear yard slopes are eliminated in favor of retaining walls.*

4. *Additional inlets are shown on the plan, upstream from the sump.*

5. *Existing spot elevations are at every lot corner.*

6. *Property lines are shown with a different line type (phantom) to distinguish them from the other features on the grading plan. The slopes on the park are contained within one of the attached easements.*

7. *As we discussed a berm between the Amole del Norte maintenance road and this subdivision is to be removed by the grading of this project (ie., within the Amole del Norte right-of-way, see section C-C) and the right-of-way drains to the channel, so there is no off-site basin.*

8. *As discussed, the Amole del Norte Diversion Channel intercepts all upstream drainage in Arenal Rd. Table 1 summarizes the drainage design for Arenal adjacent to this site and the drainage "Basin Map" shows that off-site flows form the north don't impact Arenal.*

9. *As discussed, Basin 102 flows into the park in a very deep ditch. Basin 102 includes only the south half of the Arenal right-of-way plus a strip of land 15' to the south of the right-of-way which will be needed for a slope because Arenal is generally about 4' below the natural terrain to the south. Ultimately, three lanes and a 6' sidewalk (42' impervious width) will be in the 93' wide basin. Thus the impervious is estimated at 45% and the slope accounts for the 15% land treatment C.*

10. *As discussed, the typical lot detail stipulates that all side and rear yard swales drain to the streets (ie., no rear yard ponds).*

---

11. As discussed, we are using the energy grade line as a conservative estimate of the hydraulic jumps and Table 1 shows them all to be contained.

12. The infrastructure list, also attached, includes the Certification for "both units" with Unit 1.

13. The divide between Unit 1 and 2, is on the grading plan, and a note stating that Unit 1 must precede Unit 2 has been added to the infrastructure list.

14. The grading and drainage plan was substantially changed to accommodate the DRB comments on the sanitary sewer.

15. The specifics of access, rip-rap and maintenance to the ponds were reviewed with Glen Jergenson and will hopefully alleviate some preliminary concerns expressed by County Public Works.

16. The NOI is attached.

Please feel free to contact our office if you have any questions.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

James D. Hughes, PE
Senior Engineer

JDH/sb

xc:Brad Catanach, County Public Works

f:\\rayodel.sol\comments.no2

County of Bernalillo

State of New Mexico

BOARD OF COUNTY COMMISSIONERS
TOM RUTHERFORD, CHAIR
DISTRICT 3
BARBARA J. SEWARD, VICE CHAIR
DISTRICT 4
KEN SANCHEZ, MEMBER
DISTRICT 1
STEVE D. GALLEGOS, MEMBER
DISTRICT 2
LES HOUSTON, MEMBER
DISTRICT 5
JUAN R. VIGIL, COUNTY MANAGER

ONE CIVIC PLAZA, N.W.
ALBUQUERQUE, NEW MEXICO 87102
ADMINISTRATION (505) 768-4000
COMMISSION (505) 768-4217
FAX (505) 768-4329

DAVID K. ANDERSON, ASSESSOR
JUDY D. WOODWARD, CLERK
THOMAS J. MESCALL, PROBATE JUDGE
JOE BOWDICH, SHERIFF
ORLANDO VIGIL, TREASURER

July 8, 1997

John M. MacKenzie, PE
D. Mark Goodwin & Associates, P. A.
P. O. Box 90606
Albuquerque, New Mexico 87199

Re: Rayo del Sol Subdivision

Dear Mr. MacKenzie:

Thank you for the additional materials regarding drainage from the Rayo del Sol Subdivision that you provided with your letter dated July 3, 1997. This information has allayed most of the Bernalillo County Parks and Recreation Department's concerns regarding use of lands within Tom Tenorio Park for conveyance and ponding of storm water flows from the subdivision.

Based upon these materials, the proposed drainage facilities and easements should be acceptable to Parks and Recreation, pending final approval by the Bernalillo County Public Works Department. Additionally, once the comparison appraisal is complete, we will have to establish an acceptable payment to the County for consideration of the easements granted.

I look forward to continuing to work with you toward a mutually beneficial drainage easement agreement. Please feel free to contact me at 222-3603, at any time.

Sincerely,

John Slown, Park Planner
BERNALILLO COUNTY PARKS AND RECREATION DEPARTMENT

Cc: Art DeLaCruz, Director
Joanne Caffery, Land Superintendent
Terry Nighbert, County Real Estate Manager

Have Parties
& PWD
approved
new easement
locations?

PUBLIC MAINTENANCE ACCESS EASEMENT

This grant of Easement, between Bernalillo County, a policital subdivision of the State of New Mexico, ("Grantor"), and the City of Albuquerque, a New Mexico municipal corporation ("City"), whose address is P.O. Box 1293 Albuquerque, New Mexico 87103.

1. Grant of Easement .The Grantor grants to the City an exclusive permanent easement for the purpose of ingress and egress, to access and maintain drainage facilities through the property described on Exhibit A attached hereto ("Property").

2. Warranties . Grantor covenants and warrants that it is the owner in fee simple of the Property and that is has a good lawful right to convey the Property or any part thereof and that the Grantor will forever warrant and defend the title to the Property against all claims from all persons or entities.

3. Binding on Grantor's Property. The grant and other provisions of this Easement constitute covenants running with title to the Property for the benefit of the City and its successors and assigns until terminated.

Witness my hand and seal this _____ day of _____, 1997.

GRANTOR:

By:_____
Its:_____
Dated:_____

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledge before me on _____, 199___
by _____, _____ of _____,
on behalf of the _____.

My Commission Expires:

_____

_____
Notary Public

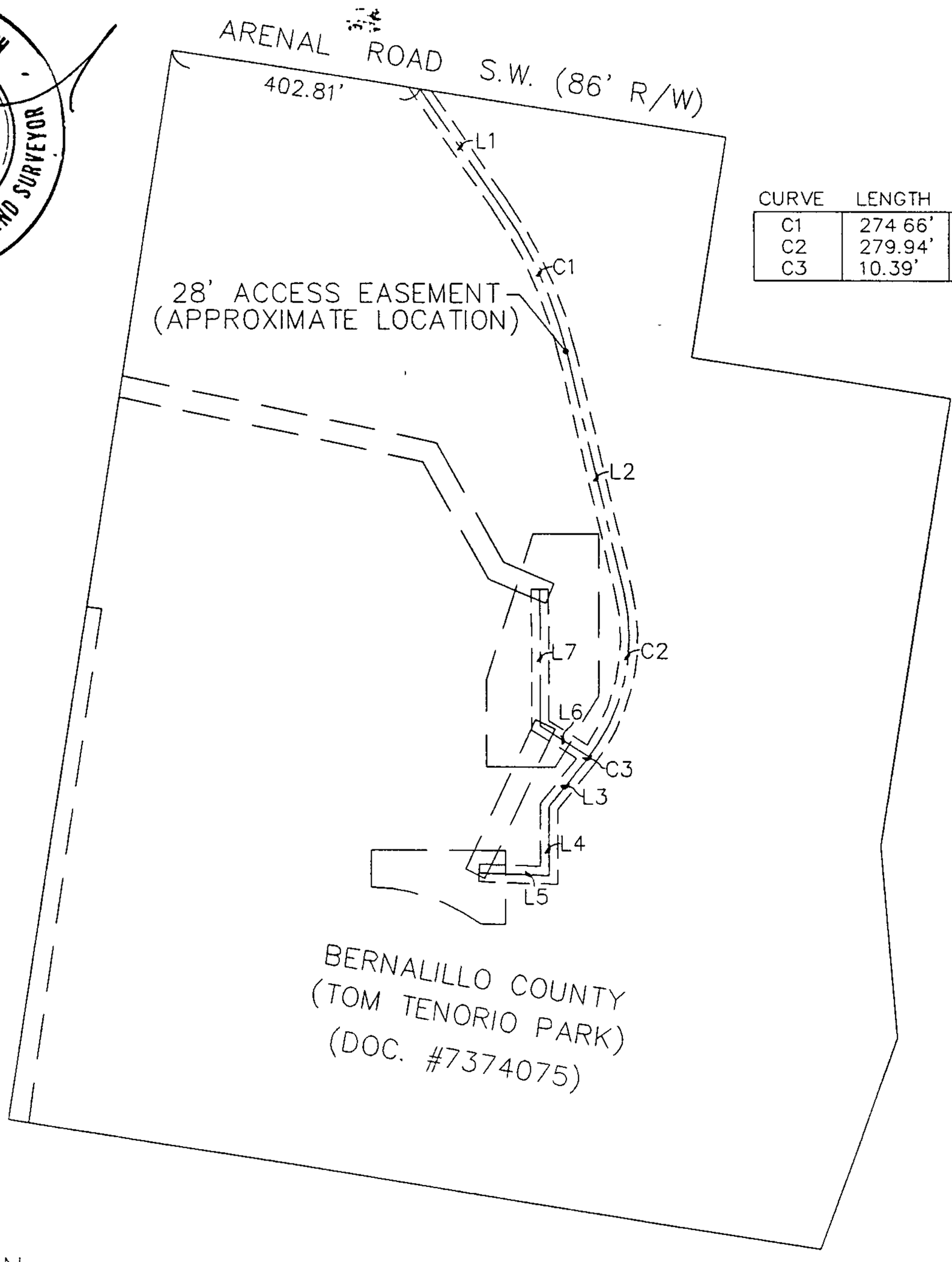
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EXHIBIT FOR
CITY OF ALBUQUERQUE
28' ACCESS EASEMENT

PURPOSE OF EASEMENT:
MAINTENANCE EQUIPMENT
AND INSPECTION ACCESS

LINE	DIRECTION	DISTANCE
L1	S34°52'45"E	227 01'
L2	S13°08'01"E	393 80'
L3	S38°50'56"W	94 13'
L4	S00°07'50"W	111 70'
L5	N88°09'58"W	113 99'
L6	N57°42'30"W	93 63'
L7	N00°16'39"W	221 31'

TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
10-28-97



1" = 300'

CURVE	LENGTH	DELTA	RADIUS
C1	274 66'	22°28'52"	700 00'
C2	279.94'	50°07'22"	320 00'
C3	10.39'	01°51'36"	320.00'

DESCRIPTION

A 28' CITY OF ALBUQUERQUE ACCESS EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being approximately located hereon.

EXHIBIT "A"

PRIVATE SLOPE EASEMENT

This grant of Easement, between Bernalillo County, a policital subdivision of the State of New Mexico, ("Grantor"), and Great Western Land Company, a New Mexico General partnership, as the owner of the adjacent property/ adjoining property ("Grantee"), whose address is 225 Chamisa, Los Alamos, NM 87544.

1. Grant of Easement .The Grantor grants to the Grantee an exclusive permanent easement for a slope on, over, across and through the property described on Exhibit A attached hereto ("Property"), together with the right to the Grantee to operate, maintain, repair, replace, and construct the slope and the right to remove trees, bushes, undergrowth and any other obstacles upon the Property if the Grantee determines they interfere with the appropriate use of the easement.

2. Warranties . Grantor covenants and warrants that it is the owner in fee simple of the Property and that is has a good lawful right to convey the Property or any part thereof and that the Grantor will forever warrant and defend the title to the Property against all claims from all persons or entities.

3. Binding on Grantor's Property. The grant and other provisions of this Easement constitute covenants running with title to the Property for the benefit of the Grantee and its successors and assigns until terminated.

Witness my hand and seal this _____ day of _____, 1997.

GRANTOR:

By:_____
Its:_____
Dated:_____

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledge before me on _____, 199___ by _____, _____ of _____, on behalf of the _____.

My Commission Expires:

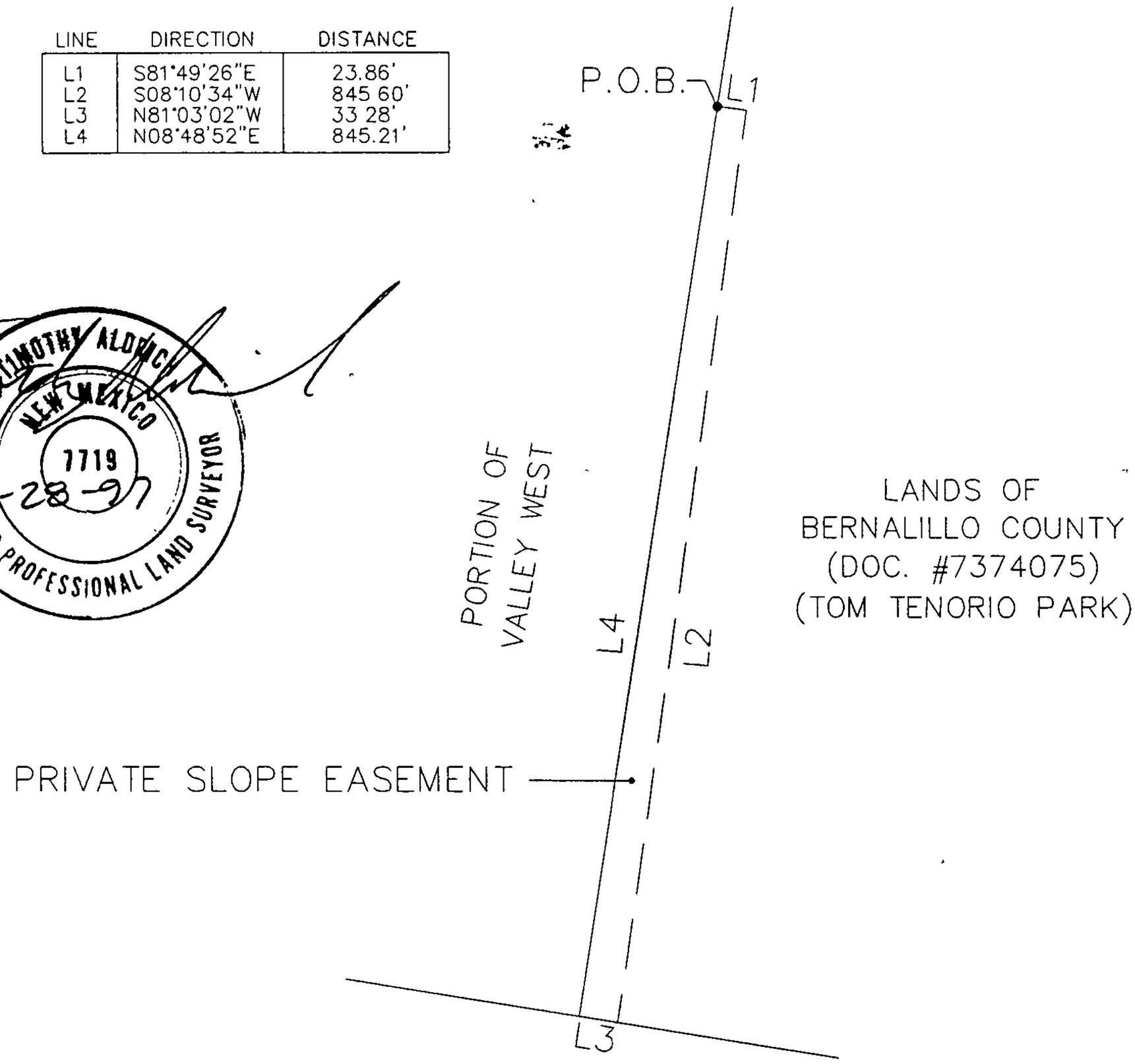
_____ _____
Notary Public

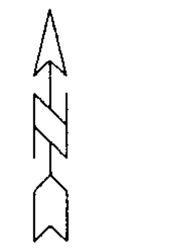
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EXHIBIT FOR
PRIVATE SLOPE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S81°49'26"E	23.86'
L2	S08°10'34"W	845.60'
L3	N81°03'02"W	33.28'
L4	N08°48'52"E	845.21'







NOT TO SCALE

DESCRIPTION

A PRIVATE SLOPE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

BEGINNING at the northwest corner of the herein described easement from whence the Albuquerque Control Survey Monument "1-M10" bears N 36°39'09" W, 3828.16 feet,

THENCE S 81°49'26" E, 23.86 feet to the northeast corner,

THENCE S 08°10'34" W, 845.60 feet to the southeast corner,

THENCE N 81°03'02" W, 33.28 feet to the southwest corner,

THENCE N 08°48'52" E, 845.21 feet to the point of beginning and containing 0.5544 acres more or less.

EXHIBIT "A"

PUBLIC DRAINAGE EASEMENT

This grant of Easement, between Bernalillo County, a policital subdivision of the State of New Mexico, ("Grantor"), and the City of Albuquerque, a New Mexico municipal corporation ("City"), whose address is P.O. Box 1293 Albuquerque, New Mexico 87103.

1. Grant of Easement .The Grantor grants to the City an exclusive permanent public drainage easement for a storm sewer & emergency surface overflow path ("Public Improvement") on, over, across and through the property described on Exhibit A & B attached hereto ("Property"), together with the right to the City to operate, maintain, repair, replace, and construct the Public Improvement and the right to remove trees, bushes, undergrowth and any other obstacles upon the Property if the City determines they interfere with the appropriate use of the easement.

2. Warranties . Grantor covenants and warrants that it is the owner in fee simple of the Property and that is has a good lawful right to convey the Property or any part thereof and that the Grantor will forever warrant and defend the title to the Property against all claims from all persons or entities.

3. Binding on Grantor's Property. The grant and other provisions of this Easement constitute covenants running with title to the Property for the benefit of the City and its successors and assigns until terminated.

Witness my hand and seal this _____ day of _____, 1997.

GRANTOR:

By:_____
Its:_____
Dated:_____

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledge before me on _____, 199___ by _____, _____ of _____, on behalf of the _____.

My Commission Expires:

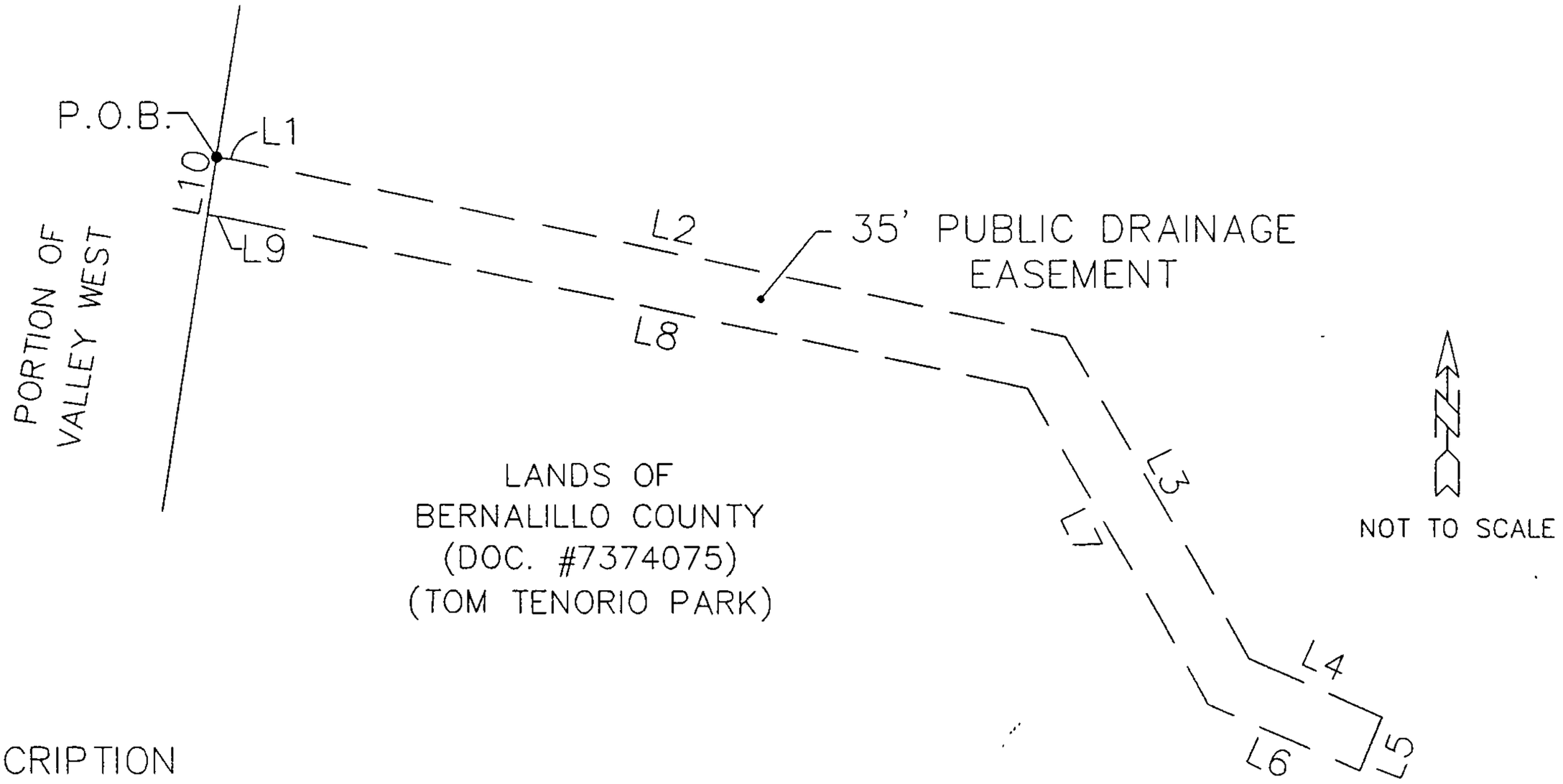
_____ _____
Notary Public

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EXHIBIT FOR
CITY OF ALBUQUERQUE
35' PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S81°11'08"E	10.39'
L2	S77°57'13"E	508.47'
L3	S29°29'34"E	221.95'
L4	S66°55'28"E	89.01'
L5	S23°04'32"W	35.00'
L6	N66°55'28"W	100.87'
L7	N29°29'34"W	218.05'
L8	N77°57'13"W	491.73'
L9	N81°11'08"W	9.40'
L10	N08°48'52"E	35.00'

PURPOSE OF EASEMENT.
UNDERGROUND STORM SEWER
AND SURFACE DRAINAGE



DESCRIPTION

A 35' PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows.

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1-M10" bears N 41°00'07" W, 3571.94 feet,

THENCE S 81°11'08" E; 10.39 feet to a point,

THENCE S 77°57'13" E, 508.47 feet to a point,

THENCE S 29°29'34" E, 221.95 feet to a point;

THENCE S 66°55'28" E, 89.01 feet to a point,

THENCE S 23°04'32" W, 35.00 feet to a point,

THENCE N 66°55'28" W, 100.87 feet to a point;

THENCE N 29°29'34" W, 218.05 feet to a point;

THENCE N 77°57'13" W, 491.73 feet to a point,

THENCE N 81°11'08" W, 9.40 feet to a point,

THENCE N 08°48'52" E, 35.00 feet to the point of beginning and containing 0.6628 acres more or less

TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
07-28-97

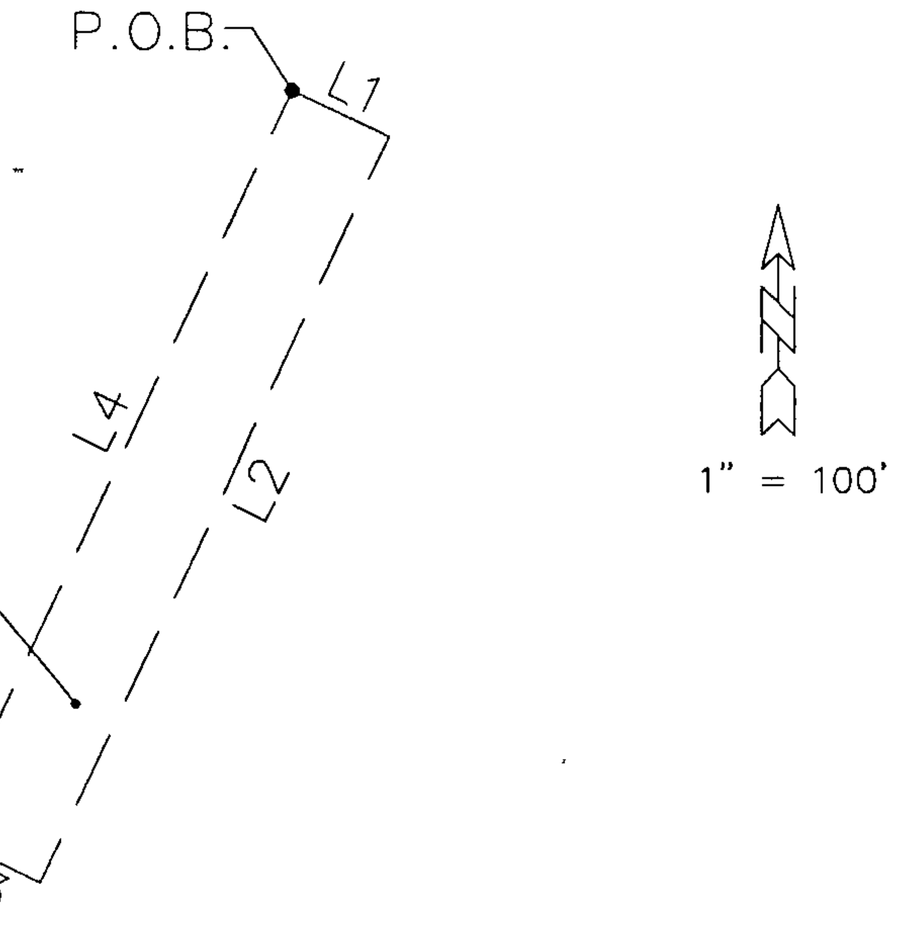
EXHIBIT "A"

EXHIBIT FOR
CITY OF ALBUQUERQUE
35' PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	S64°47'23"E	35 00'
L2	S25°12'37"W	268 36'
L3	N64°47'23"W	35 00'
L4	N25°12'37"E	268 36'

PURPOSE OF EASEMENT:
UNDERGROUND STORM SEWER AND SURFACE DRAINAGE.

TIMOTHY ALDRICH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
28-97



DESCRIPTION

A 35' PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1–M10" bears N 42°47'55" W, 4433 16 feet;

THENCE S 64°47'23" E, 35.00 feet to a point;

THENCE S 25°12'37" W, 268.36 feet to a point,

THENCE N 64°47'23" W, 35.00 feet to a point,

THENCE N 25°12'37" E, 268 36 feet to the point of beginning and containing 0 2156 acres more or less

EXHIBIT "B"

GRANT OF EASEMENT
FLOODWAY AND STORM DRAINAGE WORKS

Bernalillo County, a political subdivision of the State of New Mexico ("Grantor"), being the owner(s) of the property described herein, for good and valuable consideration, the receipt of which is hereby acknowledge, does grant, bargain, sell and convey unto the Bernalillo County, a political subdivision of the State of New Mexico, and its successors and assigns, the permanent right and easement for drainage, flood control and conveyance of storm water and the construction, reconstruction, operation and maintenance of, and access to such facilities on, in, under, over and across the following described real estate:

The land in which the foregoing rights and easements are granted is located within a Tract of land situate within the east ½ of Section 34 and the west ½ of Section 35, Township 10 North, Range 2 East, NMPM, within the Town of Atrisco Grant, Bernalillo County, New Mexico in Bernalillo County, New Mexico and is more particularly described in Exhibit "A" attached hereto and incorporated herein by reference.

Except by written approval of Bernalillo County, no fence, wall, building or other obstruction may be placed or maintained in said easement and there shall be no alteration of the grades of contours in said easement. The granting of this easement shall not obligate Bernalillo County to maintain natural arroyos, drainage channels, or facilities that do not meet the standards of Bernalillo County for design, construction, and maintainability; nor shall this granting require the protection of property lying outside of the easement granted. Bernalillo County shall only maintain property and/or improvements that is specifically agrees, by written agreement filed for public record, to maintain. Unless specifically agrees, by such written agreement, to maintain property and/or improvements, such maintenance responsibility shall remain with the Grantor, its successors or assigns. Landscaping or maintenance work, by the Grantor, within the easement hereby conveyed shall not alter the present flowline, capacity, or permeability of the present flood way area, except in an emergency. If emergency work is performed, Grantor shall notify Bernalillo County as soon as practical thereafter . Bernalillo County will then determine if the emergency work can remain or must be removed or modified. Safe Locations for structures built on lands adjacent to the rights and easements described herein may be substantially outside of the described area.

TO HAVE AND HOLD the said right and easement for the uses and purposes aforesaid, unto Bernalillo County, it successors and assigns, forever, except that any portion of the easement granted herein shall revert to the Grantor, its successors or assigns, as and to the extent said portion is declared unnecessary for flood control or drainage by the Board of Directors of Albuquerque Metropolitan Arroyo Control Authority. Any reversion shall be conveyed by quitclaim deed.

THERE IS RESERVED to the Grantor, its successors and assigns, the right to use said lands for open space and landscaping, such open space and landscaping shall not interfere with the rights and easements granted to Bernalillo County. Other purposes, which will not interfere with the rights and easements hereby granted, may be permitted, provided that Grantor obtains Bernalillo County written licensed approval of such use, not to be unreasonably withheld.

WITNESS my (our) _____ hand(s) and seal(s) this _____ day of _____, 199__.

GRANTOR(s):_____
BY:_____
TITLE:_____

ACKNOWLEDGMENT: Individual(s)

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 199____,
by_____

My commission expires:

_____ _____
(Seal) Notary Public

ACKNOWLEDGMENT: Corporation

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 199____,
by _____ as _____
of _____, a _____
corporation, on behalf of said corporation.

My commission expires:

_____ _____
(Seal) Notary Public

ACKNOWLEDGMENT: Partnership

STATE OF NEW MEXICO)
)ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 199____,
by _____ as _____
of _____, a _____
partnership, on behalf of said partnership.

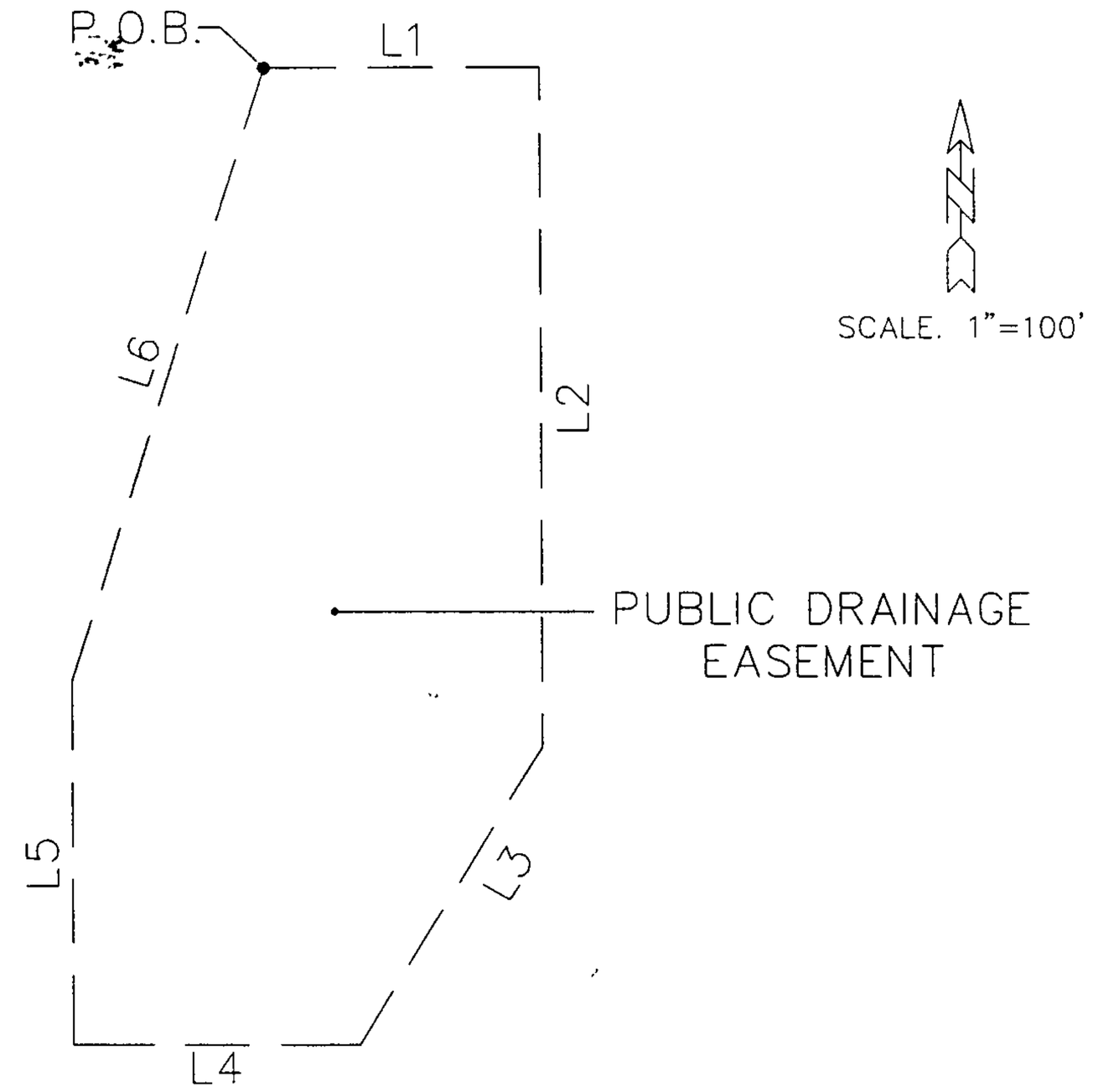
My commission expires:

_____ _____
(Seal) Notary Public

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EXHIBIT FOR
BERNALILLO COUNTY
PUBLIC DRAINAGE EASEMENT

LINE	DIRECTION	DISTANCE
L1	N90°00'00"E	106 57'
L2	S00°00'00"W	263 41'
L3	S31°18'23"W	135 49'
L4	N90°00'00"W	112 31'
L5	N00°00'00"E	141 51'
L6	N17°45'52"E	249 57'



SCALE. 1"=100'

TIMOTHY MORIAH
NEW MEXICO
7719
REGISTERED PROFESSIONAL LAND SURVEYOR
7-28-97

DESCRIPTION

A PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1–M10" bears N 45°33'36" W, 4213.37 feet,

THENCE N 90°00'00" E, 106 57 feet to a point;

THENCE S 00°00'00" W, 263.41 feet to a point;

THENCE S 31°18'23" W, 135.49 feet to a point,

THENCE N 90°00'00" W, 112 31 feet to a point,

THENCE N 00°00'00" E, 141.51 feet to a point;

THENCE N 17°45'52" E, 249.57 feet to the point of beginning and containing 1.2892 acres more or less.

EXHIBIT "A"

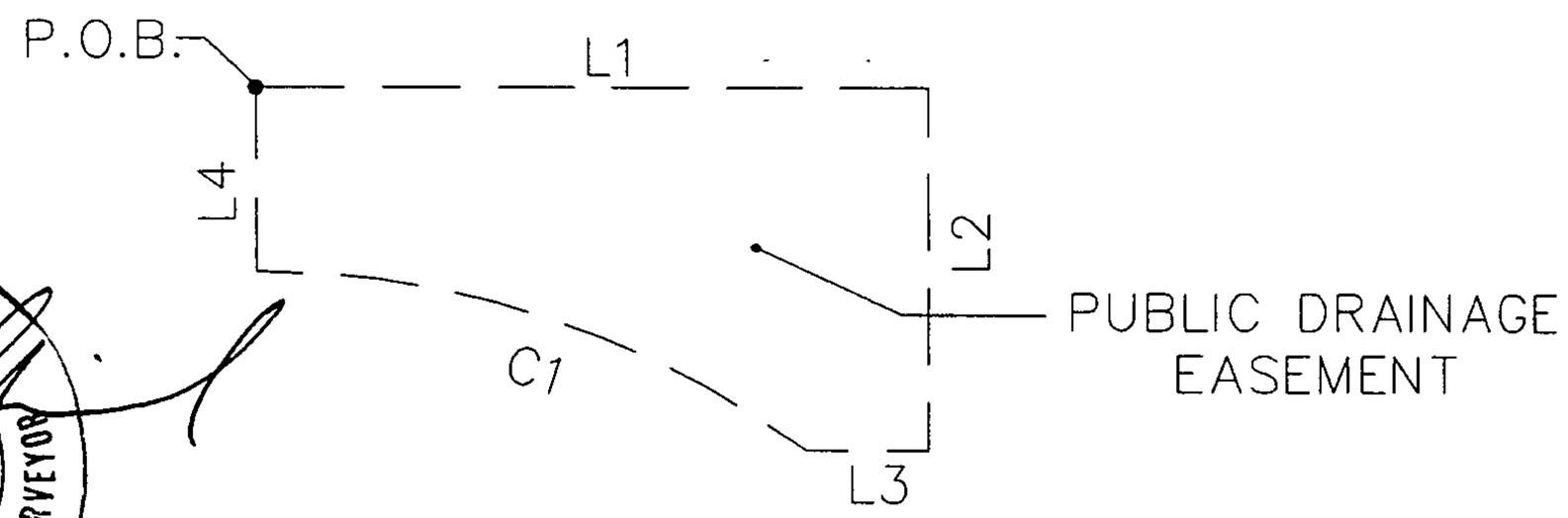
EXHIBIT FOR
BERNALILLO COUNTY
PUBLIC DRAINAGE EASEMENT

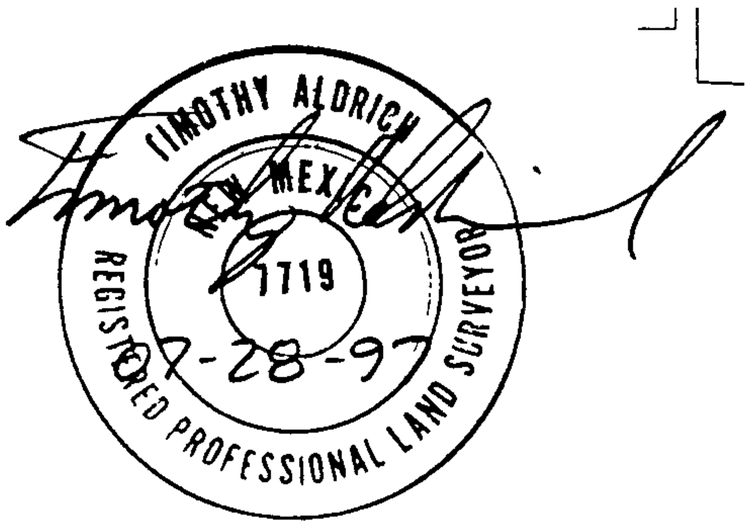
CURVE	LENGTH	DELTA	RADIUS	TANGENT	DIRECTION	CHORD
C1	192 91'	35°52'42"	308 06'	99 73'	N71°58'53"W	189 77'

LINE	DIRECTION	DISTANCE
L1	N90°00'00"E	220.47'
L2	S00°00'00"E	119 29'
L3	S90°00'00"W	40 00'
L4	N00°00'00"W	60 59'

N

SCALE 1"=100'





DESCRIPTION

A PUBLIC DRAINAGE EASEMENT within the Town of Atrisco Grant, projected Section 34, Township 10 North, Range 2 East, New Mexico Principal Meridian, Bernalillo County, New Mexico being within LANDS OF BERNALILLO COUNTY, (TOM TENORIO PARK) as the same is described in WARRANTY DEED filed in the office of the County Clerk of Bernalillo County, New Mexico as Document #7374075 and being more particularly described as follows.

BEGINNING at a point of the herein described easement from whence the Albuquerque Control Survey Monument "1–M10" bears N 38°21'30" W, 4419.16 feet,

THENCE N 90°00'00" E, 220 47 feet to a point;

THENCE S 00°00'00" E, 119.29 feet to a point;

THENCE S 90°00'00" W, 40.00 feet to a point on curve;

THENCE 192.91 feet along a curve to the left, whose radius is 308.06 feet through a central angle of 35°52'42" and whose chord bears N 71°58'53" W, 189.77 feet to a point on tangent;

THENCE N 00°00'00" W, 60 59 feet to the point of beginning and containing 0.4385 acres more or less.

EXHIBIT "B"

See Reverse for Instructions

Form Approved OMB No. 2040-0086
Approval Expires 8-31-98

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the NPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a NPDES permit issued for storm water discharges associated with industrial activity in the State identified in Section II of this form. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Facility Operator Information

Name: Thunder Development Co Phone: 5058914363

Address: 225 Chamisa Status of Owner/Operation: [ ]

City: Los Alamos State: NM ZIP Code: 87544

II. Facility/Site Location Information

Name: Rayo del Sol Subdivision

Is the Facility Located on Indian Lands? (Y or N): [N]

Address: On Arenal Rd at Tom Tenorio Park

City: Albuquerque State: NM ZIP Code: 87120

Latitude: Longitude: Quarter: Section: Township: Range:

III. Site Activity Information

MS4 Operator Name: None

Receiving Water Body: Rio Grande

If You are Filing as a Co-permittee, Enter Storm Water General Permit Number: N/A

Are There Existing Quantitative Data? (Y or N): [N]

Is the Facility Required to Submit Monitoring Data? (1, 2, or 3): [1]

SIC or Designated Activity Code: Primary: 60 2nd: 3rd: 4th:

If This Facility is a Member of a Group Application, Enter Group Application Number:

If You Have Other Existing NPDES Permits, Enter Permit Numbers: N/A

IV. Additional Information Required for Construction Activities Only

Project Start Date: 08/15/97

Completion Date: 12/15/97

Estimated Area to be Disturbed (in Acres): 19.5ac

Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans? (Y or N): [Y]

V. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: James D. Hughes

Date: 07/29/97

Signature: James D. Hughes

EPA Form 3510-6 (9-92)

Instructions - EPA Form 3510-7
Notice of Termination (NOT) of Coverage Under The NPDES General Permit for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing NPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, contact the Storm Water Hotline at (703) 821-4823.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means (i) president secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing , production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0 5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460 or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

FAX

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
DEVELOPMENT AND BUILDING SERVICES
CENTER (ONE STOP SHOP)
600 2ND STREET - PLAZA DEL SOL- 2ND FLOOR W
FAX NO. 924-3864

DATE: 7-31-97

TIME: _____

No. of Pages: _____
(Including Cover Page)

To: Doug Hughes

From: Susan Calongne

Comments: Mark-up for Rayo del Sol Subd.

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 7/29/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Size	Type Improvement	Location	From	To
WATER				
30"	Waterline	Bridge Blvd	Airport Drive	Amole Del Norte Diversion Channel
30"	Waterline	Amole Del Norte Diversion Channel	Bridge Blvd.	Arenal Rd
10"	Waterline	Arenal Rd	W Property line	E Property line
10"	Waterline	Rayo del Sol Dr	Lot 56, Blk 1	Arenal Rd
6"	Waterline	Tierra de la Luna Dr	Lot 4, Blk 3	Luna Ladera Ave
6"	Waterline	Moonrise Ave	Rayo del Sol Dr	Tierra de la Luna Dr
6"	Waterline	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
SANITARY SEWER				
8"	SAS	Rayo del Sol Dr	Lot 54, Blk 1	Arenal Rd ~~Rayo del Sol Dr~~
8"	SAS	Moonrise Ave	Tieera de la Luna Dr	Rayo del Sol Dr
8"	SAS	Tierra de la Luna Dr	Lot 4, Blk 3	Luna Ladera Ave
8"	SAS	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
STORM DRAINAGE				
~~Per~~ 36" ~~Design~~	Storm Sewer	public drainage esmts on lot ~~54~~ 66 blk 1 & Tenorio Park	Rayo del Sol Dr	County retention areas in park

Ok including manholes, inlets, etc.

* Engineer's Certification for private Grading and Drainage per DPM (both Units)for Release of SIA and Financial Guarantees. ~~Financial Guarantee is not required for this item.~~

{pond improvements (riprap, rundown, grading, etc.)
30" RCP between ponds

must go through City Work Order process The As-built information will be included with the grading & drainage certification

LETTER OF TRANSMITTAL

D. Mark Goodwin & Associates, P.A.
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200

DATE Aug. 20, 1997 JOB NO.

ATTENTION

RE: Rayo del Sol Subd.

TO Susan Calongne
City / County Flood Plain Ad.
COA

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Revised infrastructure list

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval

☐ For your use ☐ Approved as noted ☐ Submit_____copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Per comments from meeting on 8/19/97, for approval ~~on~~ @ DRB 8/26/97

RECEIVED
AUG 20 1997
HYDROLOGY SECTION

COPY TO_____

SIGNED: James D. Hughes PE

If enclosures are not as noted, kindly notify us at once.

LETTER OF TRANSMITTAL

D. Mark Goodwin & Associates, P.A.
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200

DATE Aug. 20, 1997 JOB NO.

ATTENTION

RE: Rayo del Sol Subd.

TO Susan Calongne
City / County Flood Plain Adm.
COA

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Revised Infrastructure list

THESE ARE TRANSMITTED as checked below:

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☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Per comments from meeting on 8/19/97, for approval @ DRB 8/26/97

COPY TO _____

SIGNED: James D. Hughes PE

If enclosures are not as noted, kindly notify us at once.

Bernalillo County
Public Works Division
2400 Broadway Ave SE Albuquerque, NM 87102

MARK GOODWIN & ASSOC
P O BOX 90606
ALBUQUERQUE NM 87199
ARENAL RD
TOM TENORIO PARK

27-Aug-97

Case Number

PWD - 97 - 111

Dear Applicant;

Attached are the Public Works Division comments regarding your building permit application.
Should you require further information, please contact Hoss Foster or Jim Best at 848-1502.

Development Review Engineer

cc:
Agent
Case File
Zoning, Building, Planning Dept.
Molzen-Corbin Associates
Other: _____

RECEIVED
AUG 27 1997
HYDROLOGY SECTION

Bernalillo County Public Works Division
Case File Comments

Case Number PWD 97 111

Date	Functional Area

18-Jul-97 DRAN

1. The storm sewer inverts are well below the pond base. This will cause sediment to build up in the pipes and structures thus creating a maintenance problem. There seems to be adequate slope to construct the pipe inverts at or above pond base elevations. Erosion protection may be necessary at the pipe outfalls.

2. With a change in the location of the storm sewer exiting the subdivision, please submit appropriate changes for hydrology and storm sewer calculations.

3. Pond #2 has a capacity up to elevation 78, however the plan shows its capacity to elevation 74. Please clarify location of elevation 78.

4. Pond #2 shows to have a capacity of 3.2 ac-ft and it receives approximately 3 cfs more than pond #1. The 100 year 10 day volume is 7.7 ac-ft, therefore pond #2 would receive more than half of the 7.7 ac-ft? Please advise.

Date	Functional Area

15-Aug-97 DRAN

The designed retention ponds are approved on a conceptual basis. Prior to issuance of a building permit an approved grading and drainage plan for the retention ponds and storm drain system will be required. Please address the following comments in the next submittal.

1. Please provide calculations and profiles of the revised storm drain system. If the pond sizes have changed please provide updated calculations.

2. Pond #2, please show elevation 76 contour or spots on the south side of the pond.

3. A 10 ft. by 10 ft. concrete pad shall be placed on the invert of both ponds. Maintenance crews will use the pads as an elevation standard when excavating silts.

4. Please provide an access ramp to a constructed bench along the west side of Pond #1. The bench will be at the same elevation as the top of the east slope (approximate elevation 76) and shall be constructed of a basecourse material suitable for a tracked or wheeled excavator in bearing and width.

5. Security fencing shall be provided around both ponds.

6. The proposed master plan by Mark Goodwin and Assoc. for Arenal Road is in compliance with the Environmental Assement. This EA was completed by Andrews, Asbery, and Roberts and accepted by Bernalillo County.

MEMORANDUM

BERNALILLO COUNTY PARKS AND RECREATION DEPARTMENT

August 26, 1997

To: Roger Paul, Development Review
Bernalillo County Public Works Department

From: Art DeLaCruz, Director John Slown, for ADLC

Subject: Use of Ponds at Tom Tenorio Park to receive storm water drainage from Rayo del Sol Subdivision

Cc: Tim West, Operations and Maintenance Director, Bernalillo County Public Works Department
Joanne Caffrey, Land Superintendent
John Slown, Park Planner
John MacKenzie, D. Mark Goodwin and Associates, Inc.

The Bernalillo County Parks and Recreation Department has reviewed the proposal by D. Mark Goodwin and Associates to modify existing storm water ponds at Tom Tenorio Park. The modified ponds would receive storm water runoff from the proposed Rayo del Sol Subdivision. The project includes two storm drain pipe easements operated and maintained by the City of Albuquerque, and modification of two existing drainage ponds. The Rayo del Sol developer would construct all improvements to County Public Works specifications. All maintenance of the ponds, including fencing, would be the responsibility of the County Public Works Department.

While final details regarding cost considerations for use of the easements on a County Park, and any reduction of future potential uses of the park which might result, still need to be resolved, the Bernalillo County Parks and Recreation Department supports the conceptual framework of the proposed Rayo del Sol storm water drainage management plan.

facsimile
TRANSMITTAL

to: Susan Cologne - City Hydrology
fax #: (505) 924-3864
re: Rayo del Sol Subdivision
date: August 28, 1997
pages: 1, including this cover sheet.

As we discussed yesterday, when I dropped off the approval letters from Bernalillo County Public Works and Parks & Recreation Department, you are now ready to write the approval letter for:

1. Drainage Report Approval including the report dated 7/22/97, the Grading Plan dated 8/15/97 and the Arenal Rd.. Drainage Plan dated 8/22/97.

2. Preliminary Plat & Infrastructure List Approval with the provision that a "Temporary Diversion Ditch" from Arenal Rd. to the Amole Channel be added to the Infrastructure List.

3. Rough Grading Approval with the condition that no grading is allowed in the flood plain until after FEMA issues a letter of Map Revision, LOMR.

4. Unit 1 Final Plat approval.

5. Prior to Unit 2 Final Plat Approval the Floodplain must be removed by a LOMR.

Given our current understanding of the Amole's impact on the Flood Plain I ask that you exercise your prerogative as Flood Plain Administrator and allow grading the Floodplain, prior to the LOMR. Unit 1 earthwork is all excavation and Unit 2 is all compacted fill. To grade Unit 1 we must pickup 13,000 CY and put it somewhere. The plan was to put it where it goes in the floodplain in Unit 2. But, we will instead have to stock pile it in Unit 2. If Unit 2 had 13,000 CY of excavation in it then we would simply delay that excavation until we could place it in its permanent location in the floodplain thus avoiding double handling of that material. But there is 0.00 CY of excavation in Unit 2 so it will cost about $20,000 extra to delay the placement of fill in the floodplain , and I frankly don't see any way that fill could adversely impact anyone since the Amole Channel is in place.

From the desk of...

James D. Hughes, PE
Senior Engineer
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

(505) 828-2200
Fax: (505) 797-9539

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 8/20/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Figure 12

EXHIBIT "A"
To Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Rayo del Sol Subdivision

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider responsibility. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

UNIT I

NOTE: Unit I must precede Unit 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
48' FF	Res Pvmt (22' FF each way) Std C & G 4' Sdwk (both sides)(1) 4' Median	Rayo del Sol Dr	Luna Ladera Ave	Arenal Rd
25' FF	½ section arterial pvmt Std C & G (S side) Temp transitions per Design 6' Sdwk (S side)	Arenal Rd	E Property line	CL Amole del Norte culvert
*	Median Curb	Arenal Rd	E Property line	CL Amole del Norte culvert
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Tierra de la Luna Dr	Lot 4, Blk3	Luna Ladera Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Moonrise Ave	Tierra de la Luna Dr	Rayo del Sol Dr
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Rayo del Sol Dr	Lot 56, Blk 1	Luna Ladera Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
Per Design	Temp left turn lane w/ pvmt widening/striping	Arenal Rd	@ Rayo del Sol Dr	
N/A	Street lights per DPM			

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 8/20/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Size	Type Improvement	Location	From	To
WATER				
30"	Waterline	Bridge Blvd	Airport Drive	Amole Del Norte Diversion Channel
30"	Waterline	Amole Del Norte Diversion Channel	Bridge Blvd.	Arenal Rd
10"	Waterline	Arenal Rd	W Property line	E Property line
10"	Waterline	Rayo del Sol Dr	Phase II	Arenal Rd
6"	Waterline	Tierra de la Luna Dr	Phase II	Luna Ladera Ave
6"	Waterline	Moonrise Ave	Rayo del Sol Dr	Tierra de la Luna Dr
6"	Waterline	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
SANITARY SEWER				
8"	SAS	Rayo del Sol Dr	Phase II	Arenal Rd
8"	SAS	Moonrise Ave	Tieera de la Luna Dr	Rayo del Sol Dr
8"	SAS	Tierra de la Luna Dr	Phase II	Luna Ladera Ave
8"	SAS	Luna Ladera Ave	Tierra de la Luna Dr	Rayo del Sol Dr
STORM DRAINAGE				
18-36"	Storm Sewer	public drainage esmts on lot 66, blk 1 & Tenorio Park	Rayo del Sol Dr	County retention areas in park

Temp diversion Amole del Norte Row Arenal Amole

Engineer's Certification for private Grading and Drainage per DPM for Release of SIA and Financial Guarantees. Financial Guarantee is not required for this item.

D.R.B. Case No. 97-82
D.R.C. Project No. _____
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(1) Construction of all interior 4' sidewalks is to be deferred until after construction of individual home, and is to be financially guaranteed separately.
(2) Standard C& G will be used in place of roll C & G where required for drainage purposes.

* Modified Procedure "C" (cash-in-lieu of construction)

Stormdrain to include manholes, inlets, riprap and outfall.

Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

Sanitary sewer to include manholes and service connections.

Prepared By: _____

Print Name: James D. Hughes, PE

Firm: Mark Goodwin & Associates, PA

* * * \

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 8/20/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

UNIT 2

NOTE: Unit 1 must precede Unit 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Tierra de la Luna Dr	Lot 23, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Rayo del Sol Dr	Lot 55, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
N/A	Res street lights	per DPM		
STORM DRAINAGE ?				
10'	Trail per DPM	20' Esmt Lot 35, Blk 1	Tierra de la Luna Dr	Amole del Norte R/W
10'	Trail per DPM	20' R/W btw lots 43&44 blk 1	Rayo del Sol Dr	Tom Tenorio Park
WATER				
10"	Waterline	Rayo del Sol Dr	Phase I	Luna Azul Ave
6"	Waterline	Tierra de la Luna Dr	Phase I	Luna Azul Ave
6"	Waterline	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
10"	Waterline	20' Pedestrian access and water right-of-way btw Lots 43 & 44, Blk 1	Rayo del Sol Dr	exist 10" waterline @ S. Property line
SANITARY SEWER				
8"	SAS	Tierra de la Luna Dr	Phase I	Luna Azul Ave
8"	SAS	Rayo del Sol Dr	Phase I	Luna Azul Ave
8"	SAS	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr

Engineer's Certification for private Grading and Drainage per DPM for Release of SIA and Financial Guarantees. Financial Guarantee is not required for this item.

LOMR Required for Final Plat

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

August 15, 1997

Ms. Susan Calongne
City/County Flood Plain Administrator, DRB
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Re: Rayo del Sol Subdivision; DRB 97-82, Agenda Item #4

Dear Ms. Calongne:

Enclosed please find the revised plat, the revised grading plan (dated 8/15/97) and the revised infrastructure list (dated 8/15/97).

This week I met with Richard Dourte to review the Arenal Road alignment and I received the preliminary commitment form Bernalillo County Public Works to maintain the sediment and erosion in the ponds on Tom Tenorio Park. The master drainage plan for Arenal shows no need for storm sewer within this project's frontage.

The only change to the plat and grading plan is the correction for the Arenal Road alignment, where the south right-of-way line has been shifted 35' north (to the same location as the original 86' right-of-way, thus increasing the portion of parcel A-2-2 to be vacated). This allowed the addition of one more lot at the northeast corner of the subdivision, now totaling 139 lots.

The infrastructure list has been revised in accordance with Transportation comments received at the 8/5/97 hearing.

Please contact our office if you have any additional questions or comments.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

James D. Hughes, PE
Senior Engineer

JDH/sb

Attachments; as stated

f:\\rayodel.sol\comments.no3

RECEIVED
AUG 15 1997
HYDROLOGY SECTION

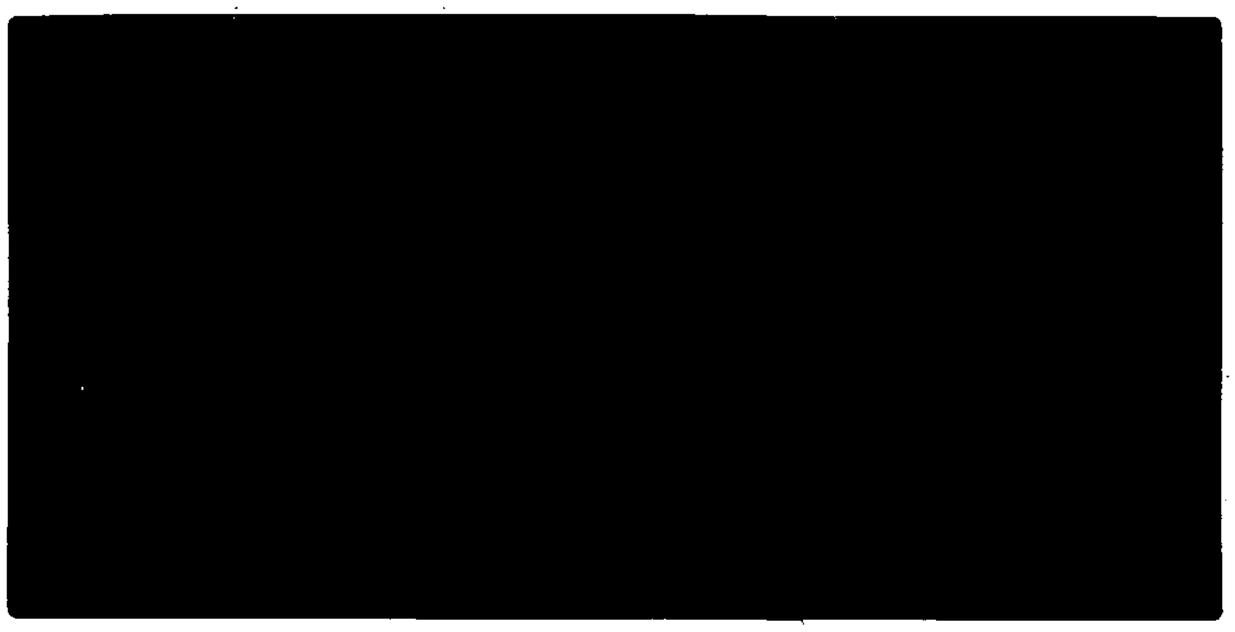
8-7-97 Rayo del Sol

Who maintains ponds? not parks PWD? not City
fencing recommended - must be maintained
Co liable for ponds - indemnification
developer could vegetate ponds
5:1 side slopes

Glenn, John Hoover, SC, Doug, Brad

Prelim Plat - need to know who maintains ponds

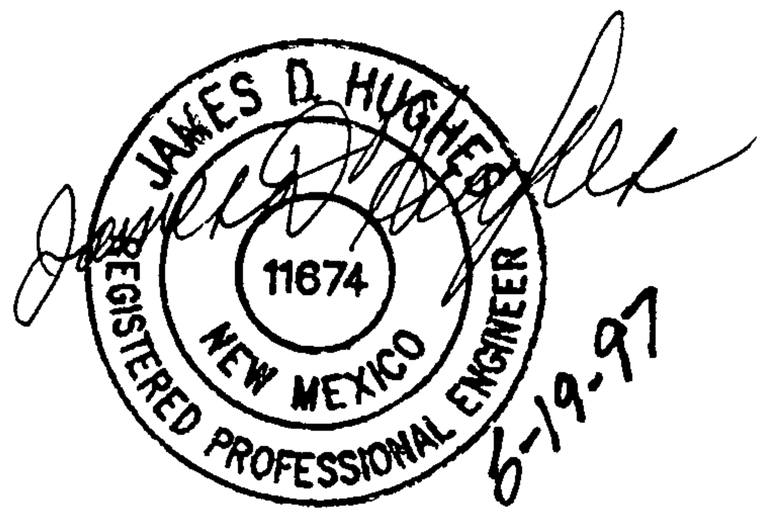
Arenal ultimate SD



DRAINAGE REPORT
for
RAYO del SOL SUBDIVISION

Prepared For

Thunder Development Ltd.
225 Chamisa
Los Alamos, NM 87544



June 1997

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rayo del Sol Subdivision ZONE ATLAS/DRNG,FILE#: M-10/09

DRB #: 97-82 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Valley West

CITY ADDRESS: Arenal Road between Coors Road and Unser Blvd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: James D. Hughes, PE

ADDRESS: PO Box 9060 Albuquerque, NM 87199 PHONE: 828-2200

OWNER: Thunder Development Ltd. CONTACT: Tom Joseph

ADDRESS: 225 Chamisa Los Alamos, NM 87544 PHONE: 622-0649

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 Albuquerque, NM 87190 PHONE: 884-1990

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

_____ DRAINAGE PLAN

_____ CONCEPTUAL GRADING & DRAINAGE PLAN

X GRADING PLAN

X EROSION CONTROL PLAN

_____ ENGINEER'S CERTIFICATION

X OTHER - Infrastructure List

PRE-DESIGN MEETING:

_____ YES

_____ NO

_____ COPY PROVIDED

RECEIVED
JUL 19 2007
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL

X PRELIMINARY PLAT APPROVAL

_____ S. DEV. PLAN FOR SUB'D APPROVAL

_____ S. DEV. PLAN FOR BLDG PERMIT APPROVAL

_____ SECTOR PLAN APPROVAL

X FINAL PLAT APPROVAL - easements

_____ FOUNDATION PERMIT APPROVAL

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATION OF OCCUPANCY APPROVAL

X GRADING PERMIT APPROVAL

_____ PAVING PERMIT APPROVAL

_____ S.A.D. DRAINAGE REPORT

_____ DRAINAGE REQUIREMENTS

_____ OTHER _____ (Specify)

DATE SUBMITTED: _____

BY: _____
James D. Hughes, PE

TABLE OF CONTENTS

I. Purpose of Report

II. Project Description

III. Scope of Report

A. On-Site Compliance with DPM
1. Street Surface Drainage
2. Storm Inlets (Sump)
3. Emergency Overflow (Sump)
4. Storm Sewer (P&P and HGL)

B. Off-Site Downstream Capacity
1. Existing Park Conditions
2. Developed Park Conditions

IV. Summary

LIST OF CALCULATIONS AND EXHIBITS

- Street Flow Summary Table
- Sump Inlet and Emergency Overflow Calculations
- Storm Sewer Profile, 2 sheets
- Pond Volume Calculations
  - Pond #1 Existing
  - Pond #1 Proposed
  - Pond #2 Existing
  - Pond #2 Proposed
- Summary of Hydrology Table
- Basin Map
- AHYMO
  - Summary Output 10 year Pre-development
  - Summary Output 100 year Pre-development
  - Summary Output 10 year Post-development
  - Summary Output 100 year Post-development
  - Summary Output 10 year Post-development with Park Offices
  - Summary Output 100 year Post-development with Park Offices
  - Input Data 100 year Post-development
  - Output Data 100 year Post-development

LETTER OF TRANSMITTAL

D. Mark Goodwin & Associates, P.A.
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200

DATE 7/30/97 JOB NO.

ATTENTION

RE: Rayo del Sol

TO Susan Calongne
Hydrology

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION

THESE ARE TRANSMITTED as checked below:

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☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

RECEIVED
JUL 29 1997
HYDROLOGY SECTION

COPY TO _____

SIGNED: Doug Hughes, PE

If enclosures are not as noted, kindly notify us at once.

M-10-0009

LETTER OF TRANSMITTAL

D. Mark Goodwin & Associates, P.A.
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

TO COA Hydrology

DATE 7-22-97 JOB NO.

ATTENTION Susan

RE: Revised Drainage Report for Rayo Del Sol Subdivision

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			1 Copy of Report

THESE ARE TRANSMITTED as checked below:

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☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Received

RECEIVED
JUL 22 1997
LAND DEVELOPMENT SECTION

COPY TO Kyle Smith 7/22/97

SIGNED: Doug Boyle

If enclosures are not as noted, kindly notify us at once.

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 6/19/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Figure 12

EXHIBIT "A"
To Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Rayo del Sol Subdivision

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider responsibility. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

UNIT I

Size	Type Improvement	Location	From	To
TRANSPORTATION				
48' FF	Res Pvmt Std C & G 4' Sdwk (both sides)	Rayo del Sol Dr	Tierra de la Luna Dr	Arenal Rd
25' FF	½ section arterial pvmt Std C & G (S side) Asphalt curb (N side) 6' Sdwk (S side)	Arenal Rd	E Property line	W Property line
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Tierra de la Luna Dr	Lot 4, Blk3	Rayo del Sol Dr
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Moonrise Ave	Tierra de la Luna Dr	Rayo del Sol Dr
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk (both sides)(1)	Rayo del Sol Dr	Lot 54, Blk 1	Tierra de la Luna Dr
40' R	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Cul-de-sac, N end Tierra de la Luna Dr		
40' R	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Cul-de-sac, N end Rayo del Sol Dr		

need ultimate Street design. Is storm drain required?

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 6/19/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Size	Type Improvement	Location	From	To
WATER				
10"	Waterline	Arenal Rd (N of pvmt)	W Property line	E Property line
10"	Waterline	Rayo del Sol Dr	Lot 54, Blk 1	Arenal Rd
6"	Waterline	Tierra de la Lunsa Dr	Lot 4, Blk 3	Rayo del Sol Dr
6"	Waterline	Moonrise Ave	Rayo del Sol Dr	Tierra de la Luna Dr
SANITARY SEWER				
8"	SAS	Rayo del Sol Dr	Lot 54, Blk 1	Cul-de-sac @ N end of Rayo del Sol Dr
8"	SAS	35" SAS Esmt Lt 73, Bk 1	Rayo del Sol Dr	Arenal Rd
8"	SAS	Moonrise Ave	Tieera de la Luna Dr	Rayo del Sol Dr
8"	SAS	Tierra de la Luna Dr	Lot 4, Blk 3	Lot 73, Blk 1
STORM DRAINAGE				
Per ~~Design~~ Sizes	Storm Sewer	on Rayo del Sol drive ? ~~Luna Azul~~ Ave and public drainage esmts on lot 54, blk 1 & Tenorio Park	Rayo del Sol Dr	County retention areas in park

Engineer's Certification for private Grading and Drainage per DPM (both Units) for Release of SIA and Financial Guarantees.
Financial Guarantee is not required for this item.
LOMR must be received from FEMA prior to financial guarantee release.

UNIT 2

Size	Type Improvement	Location	From	To
TRANSPORTATION				
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Tierra de la Luna Dr	Lot 21, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Rayo del Sol Dr	Lot 53, Blk 1	Luna Azul Ave
32' FF	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
40' R	Res Pvmt Roll C & G(2) 4' Sdwk(1)	Cul-de-sac, S end	Tierra de la Luna Dr	

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 6/19/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Size	Type Improvement	Location	From	To
40' R	Res Pvmt Roll C & G[2] 4' Sdwk[1]	Cul-de-sac, S end Rayo del Sol Dr		
WATER				
10"	Waterline	Rayo del Sol Dr	Lot 53, Blk 1	Luna Azul Ave
6"	Waterline	Tierra de la Luna Dr	Lot 22, Blk 1	Luna Azul Ave
6"	Waterline	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr
10"	Waterline	20' Pedestrian access and btw lots 41 & 42, blk 1 water right-of-way	Rayo del Sol Dr	S Property line
SANITARY SEWER				
8"	SAS	Tierra de la Luna Dr	Lot 22, Blk 1	Luna Azul Ave
8"	SAS	Rayo del Sol Dr	Lot 53, Blk 1	Luna Azul Ave
8"	SAS	Luna Azul Ave	Rayo del Sol Dr	Tierra de la Luna Dr

(1) Construction of all interior 4' sidewalks is to be deferred until after construction of individual home, and is to be financially guaranteed separately.
(2) Standard C& G will be used in place of roll C & G where required for drainage purposes.

Stormdrain to include manholes, inlets, riprap and outfall.

Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

Sanitary sewer to include manholes and service connections.

Grading & drn. Cert. required for Unit 2
LOMR required for Unit 2

Cannot build unit 2 w/out Unit 1 in place

D.R.B. Case No. 97-82
D.R.C. Project No. _____
Date Submitted 6/19/97
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Prepared By: James D. Hughes

Print Name: James D. Hughes, PE

Firm: Mark Goodwin & Associates, PA

* * * *

Case Routing Slip

20-Jun-97 | PWD - 97 - 111 | Category: Submittal

Applicant Name: TOM JOSEPH
Applicant Category: Owner
Application Date: 20-Jun-97
Due Date: 11-Jul-97

	Owner Info	Agent Info	Egr/Svy Info
Name	TOM JOSEPH	Mark Goodwin & Assoc.	
Address	225 CHAMISA	PO Box 90606	
City	LOS ALAMOS	Albuquerque	
State	NM	NM	
ZIP	87544	87199	
Ph		505-828-2206	

Legal Description: TOM TENOVIO PARK
UPC:
Street Address: TOM TENOVIO PARK
Submittal Type: Grading & Drainage Plan

Comments Required From:

DRAN ✓ DRE ☐ ENGA ☐ INSP ☐ TRAF ☐ UTIL ☐ OTHE ☐

Amafca FP
6/23/97 6/23/97

RECEIVED
JUN 23 1997
HYDROLOGY SECTION

RECEIVED
JUN 30 1997
HYDROLOGY SECTION

BERNALILLO COUNTY

PERMIT APPLICATION

☒ NEW SUBMITTAL

☐ RESUBMITTAL

TODAY'S DATE.

PWD (Use for all PWD permits EXCEPT Street Excavation)

CASE NO: PWD-97-111

OWNER

OWNER	Tom Joseph	PHONE			
MAILING ADDRESS	225 Chamisa	CITY	Los Alamos	ZIP	87544

AGENT

AGENT / CONTRACTOR	Mark Goodwin & Assoc.	PHONE	828-2200		
MAILING ADDRESS	PO Box 90606	CITY	ABQ	ZIP	87199
STATE LICENSE NO	11674.	EXP DATE	VOLUME	CLASS	
ARCHITECT/ENGINEER	James D. Hughes	LICENSE NO	11674	PHONE	828-2200

SITE INFORMATION

SITE ADDRESS and/or DIRECTIONS	West Side of Tom Tenorio Park at Arenal Rd. SW	ZONE ATLAS NO.:	M-10
LEGAL DESCRIPTION	Tom Tenorio Park		
UNIFORM PROPERTY CODE (UPC No):	1 01 00 55 36 92 34 40 16 Z	PROPERTY SIZE IN ACRES:	19.5 ac.
EXISTING BUILDING(S) AND USE.	None		
PROPOSED BUILDING(S)	N/A		

TYPE OF SUBMITTAL

- ☐ REPLAT
- ☐ MINOR SUBDIVISION
- ☐ MAJOR SUBDIVISION
- ☐ CONSTRUCTION DRAWINGS
- ☒ GRADING & DRAINAGE PLAN
- ☐ AS-CONSTRUCTED GRADING & DRAINAGE PLAN
- ☐ VARIANCE REQUEST
- ☐ LAND DIVISION
- ☐ TRAFFIC IMPACT ANALYSIS / TRAFFIC STUDY
- ☐ INFRASTRUCTURE LIST / DESIGN REVIEW
- ☐ SPECIAL USE PERMIT
- ☐ BARRICADING PERMIT
- ☐ BUILDING PERMIT
- ☐ INSPECTION
- ☐ OTHER (Specify):

RECEIVED JUN 23 1997 HYDROLOGY SECTION

RECEIVED JUN 20 1997 HYDROLOGY SECTION

The issuance of a permit or a review or approval of plan specifications, computations, and shop drawings, shall not be interpreted to be a permit for, or an approval of any variance or violation of any of the provisions of any COUNTY or STATE codes, ordinances, standards, or policies. Nor shall such issuance of a permit or approval of plans, specifications, computations, and shop drawings prevent any authorized COUNTY representative or COUNTY inspector form thereafter requiring the correction of errors in said plans, specifications, computations. or shop drawings or from stopping construction operations which are being carried on thereunder when in violation of any COUNTY or STATE codes, ordinances, standards. or policies.

☐ Owner ☒ Agent ☐ Contractor Signature James D Hughes Date 6-18-97

COUNTY

BERNALILLO COUNTY USE ONLY

C/R's		TOTAL FEE.	
		Receipt No.:	
		Received By:	

Easement granted
& Parks concurrence prior to PP

PURPOSE

The purpose of this report is to demonstrate the adequacy of proposed drainage to allow this site to be subdivided into 137 single-family detached residential lots (zoned R-LT), and associated public drainage infrastructure can be constructed and turned over to the City of Albuquerque for maintenance. This is not a County subdivision, but a County permit is required for construction on County public property.

PROJECT DESCRIPTION

need County concurrence

The project comprises an on-site area of 19.5203 acres within the City of Albuquerque, that slopes from west to east at approximately 1-2%. It is bounded on the west by the Amole del Norte channel which prevents all off-site flows from entering this site. It is bounded on the east by Tom Tenorio Park (a Bernalillo County park) that provides retention ponds to handle both its own drainage and the drainage from this site. It is bounded on the north by Arenal Road, a major arterial road (the extension of Unser to Coors). And finally, it is bounded on the south by undeveloped land with no drainage across this boundary. A flood plain, zone AO (depth 1') is mapped near the northern edge of Unit 2, per Flood Insurance Rate Map (FIRM) panel 337, effective September 20, 1996.

The Amole del Norte channel eliminated all of the drainage to the flood plain when the channel was constructed in 1980, but the amended conditions have not yet been properly documented to the Federal Emergency Management Administration (FEMA). Approximately 18 acres of flood plain (zones AO and AE) are also incorrectly indicated on the Park, per the same FIRM.

map revision required

SCOPE OF REPORT

On-Site Compliance

The 100 year surface drainage in the streets is designed to keep normal depth at or below top of curb and to contain the energy grade elevation within the right-of-way, as illustrated on Table 1—"Street Drainage Capacities." Additionally, the drainage for the 10 year storm will leave more than one lane unobstructed by surface drainage per DPM requirements for arterial streets.

not allowed per City Engineer

Four type double A inlets each with double grates and single throats are located at the low point in the subdivision (ie., in a sump) and provide a safety factor beyond DPM criteria that would allow 26% of the inlets to clog without over-topping the curb.

Emergency overflow for the sump inlets is provided by a swale within the 25' public drainage easement on lot 54, block 1. If the primary storm sewer system were to completely fail the entire 100 year peak flow would travel over the sidewalk and through the swale and all of the house pads would still be 6" above the ponded water in the streets.

Storm sewer (30" and 36" RCP) conveys the 100 year peak flows form the sump in this development to the retention ponds in the county park in accordance with DPM criteria. The storm sewer will be located in easements to be granted to the City of Albuquerque for maintenance of the underground pipes.

Off-Site Downstream Capacity

The existing retention ponds in the park accommodate the total pre-developed volume of runoff from the storm having a recurrence interval of 100 years and a 10 day duration, at a ponding depth of about 5.5'

With this development the ponds are to be deepened an additional 2.5' to accommodate the developed runoff from the same storm. The surface area of the ponds will actually be decreased by lowering the pond elevation.

Pond maintenance by the County Parks Departments should be limited to maintaining the grass, weeds and other vegetation in the pond just like the rest of the park. No significant erosion or sedimentation is expected. The pond sides were reduced to 5:1 slopes to accommodate park maintenance equipment.

Emergency overflow from the ponds is not expected but City overflow requirements are met by allowing excess runoff to cross the park road in the low spot and through emergency overflow culverts to the low spot in the northeast corner of the park.

Standing water in public areas may pose a potential safety hazard, so the ponds should be fenced off from the public to minimize the liability.

SUMMARY

In summary, the proposed development will pose no significant adverse impact to either on-site or off-site.

CALCULATIONS AND EXHIBITS

TABLE 1 — STREET DRAINAGE CAPACITIES

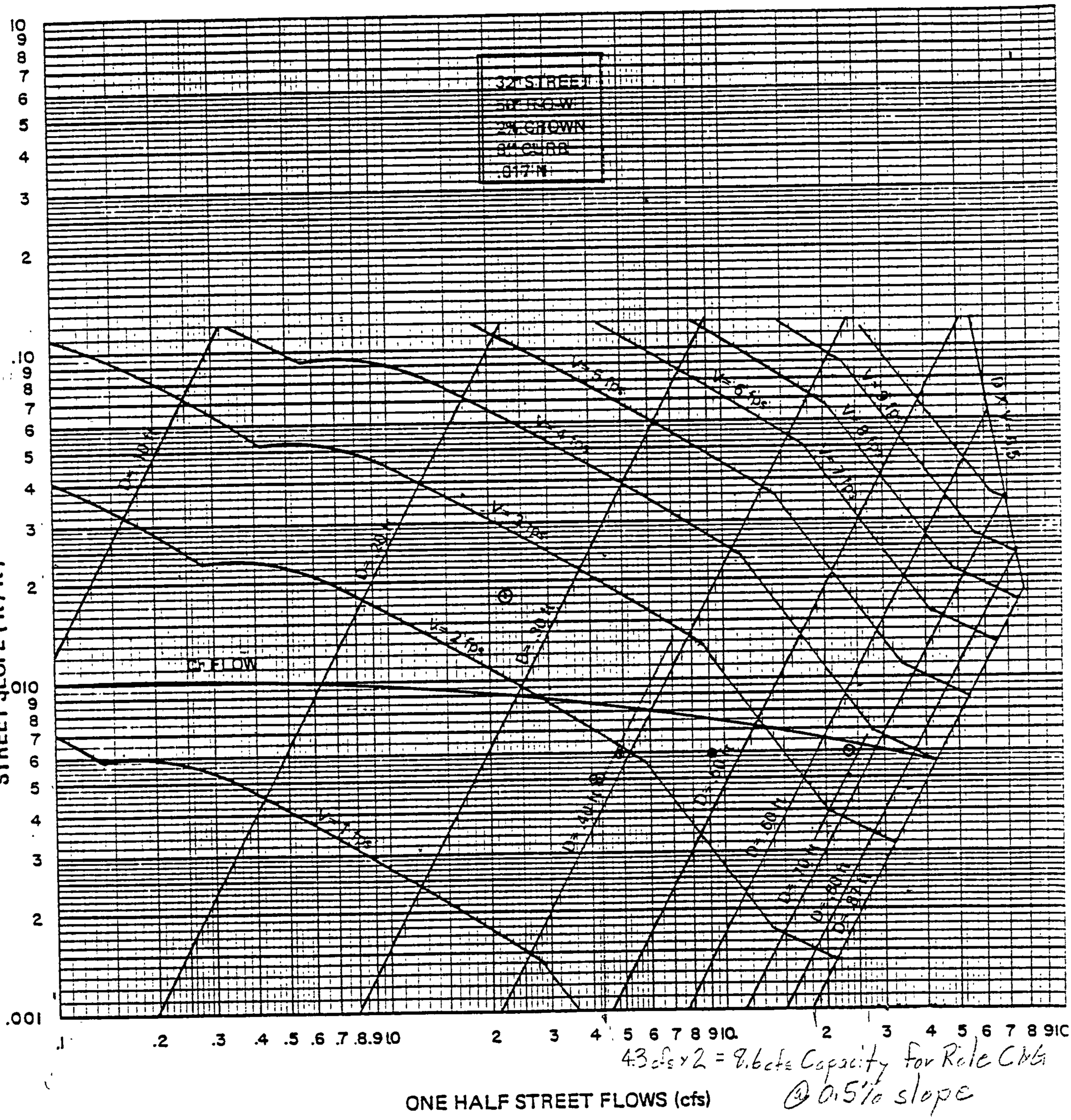
Basin No.	Area Ac.	% of Total	100 Year Flow (cfs)		Curb Type / Slope	Flow Depth ft. (1)	Velocity fps	Energy Depth ft.(2)
			Increment.	Cumm.				
1	2.41	12.68	8.32	—	Roll / 0.50%	0.32	1.8	0.37
2	2.43	12.79	8.39	—	Roll / 0.50%	0.33	1.8	0.38
3	2.35	12.37	8.12	—	Roll / 0.50%	0.32	1.8	0.37
4	2.86	15.05	9.88	—	Roll / 0.59%	0.33	2.0	0.39
5	2.58	13.58	8.92	18.80	Std. / 0.59%	0.47	2.5	0.57
6	6.37	33.53	22.00	46.83	Std. / 0.60%	0.65	3.6	0.85
Total	19.00	100	65.63	65.63	—	—	—	—
			10 Year Flow (cfs)					
102	2.4	100	4.49	—	Std. / 1.80%	0.27(3)	—	—

(1) *flow depths are taken from Plate 22.3 D-1 of the DPM and reduced by 3/4" for roll curb types to account for the difference in gutter depression. Allowable depths may not exceed curb heights which are 0.33' for roll curb and gutter and 0.67' for standard curb and gutter.*

(2) *Energy depth is calculated as flow depth plus energy head. Allowable depths are 0.18' above top of curb, unless the street section is modified to contain the additional height within the right-of-way.*

(3) *Spread of water for 10 year flows in Arenal is 9.25' allowing 0.125' across first 2' from curb face (1.5" gutter) and 0.145' rise across the next 7.25' at 2.0%. This meets DPM criteria for arterial streets leaving one of the two lanes open.*

STREET CAPACITY



43 cfs x 2 = 8.6 cfs Capacity for Rule CMG @ 0.5% slope

REV. 3-83

PLATE 22.3 D-1

SUMP INLET CAPACITIES

TYPE 'A' AND 'C' DOUBLE GRATE INLETS

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right-of-way elevation. The length of the double grate facing the street is 6.5'± and the depth is 0.725' at the lip of the gutter. The sides are each 2' long (4' total) and the average depth is 0.892'*. From the weir equation:*

(Front) $Q_{cap} = 3.0 \times 6.5' \times 0.725^{1.5} = 12.40$ *cfs*
(Sides) $Q_{cap} = 3.0 \times 4.0' \times 0.892^{1.5} = 10.11$ *cfs*
(Total) $Q_{cap} = 12.04$ *cfs + 10.11 cfs = 22.15 cfs*

* Note: *These depths assume standard 8" curb with the right-of-way 9' behind the curb and 0.18' above the top of curb.*

The 100-year flow to the sump inlets is 65.63 cfs. There are four sump inlets with a combined capacity of 88.60 cfs thus providing a safety factor that would allow 26% of the inlets to clog without exceeding the normal design criteria. For HGL calculations, each inlet is assumed to take one quarter of the 100-year flow (16.41 cfs each). The sump has a 25' wide emergency overflow spillway designed to handle the 100-year flow (65.63 cfs) from this entire development in the event that the storm sewer system failed completely. The depth of flow in the emergency overflow spillway is given by the broad crested weir equation as:

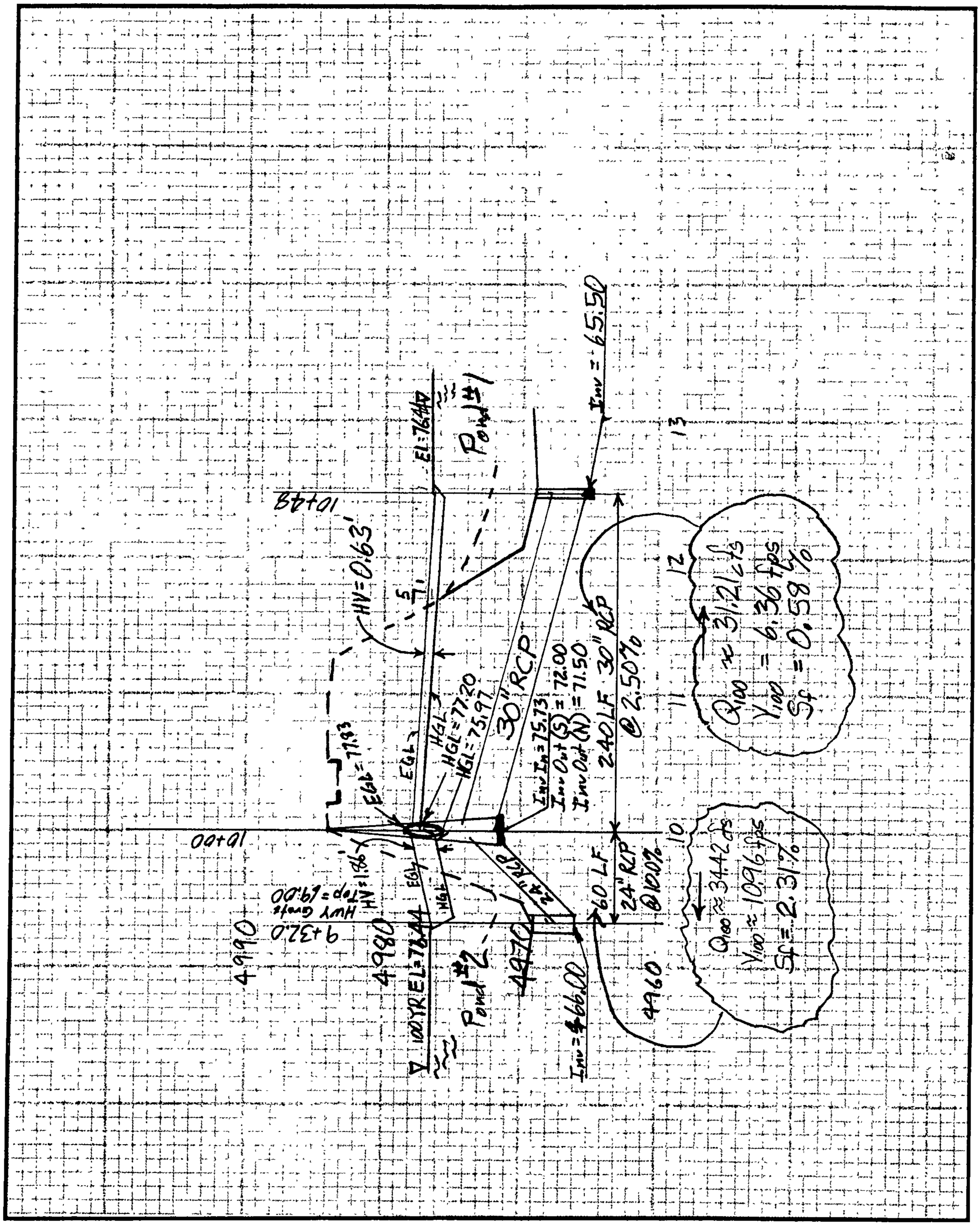
Emergency overflow $Q = 65.63$ *cfs* $= 2.7 \times 25' \times (depth)^{1.5}$
depth = 0.98'

This depth is measured above the right-of-way elevation. The pads in the sump area are set 1.5' above the right-of-way, thus allowing 6"± for construction tolerances. The emergency overflow swale is at a 0.5% slope, 25' wide, and has the following capacity at a 0.98 depth:

(from Manning's) $Q_{cap} = (1.486/0.03) \times (25' \times 0.98') \times (0.98)^{0.67} \times (0.005)^{0.5} = 84.66$ *cfs > 65.63 cfs (OK)*

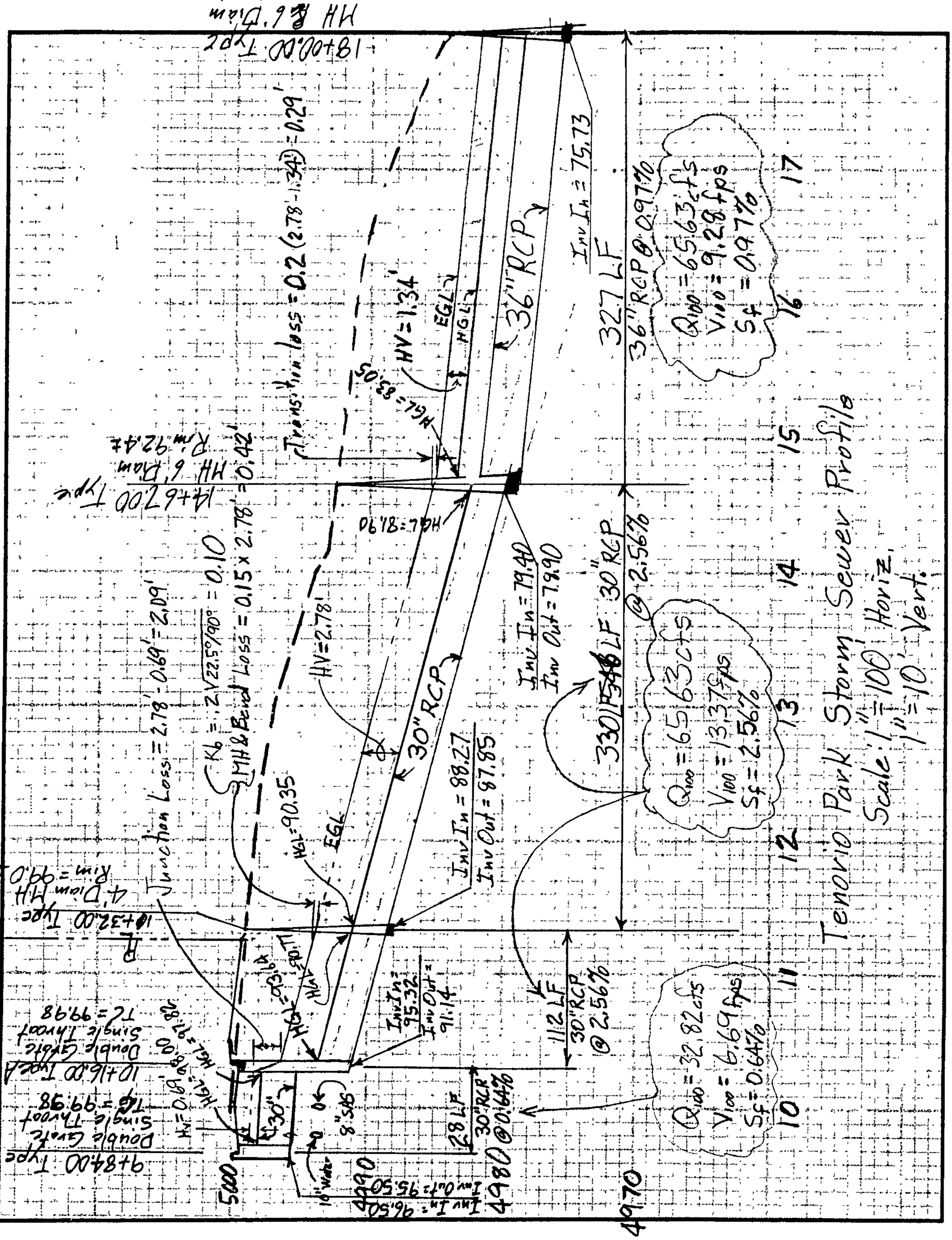
D. MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS & SURVEYORS

PROJECT _____
SUBJECT _____
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET ____ OF ____



D. MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS & SURVEYORS

PROJECT _____
SUBJECT _____
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET ____ OF ____



D. MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS & SURVEYORS

PROJECT _____
SUBJECT _____
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET ____ OF ____

Where flow Splits and goes to the two seperate ponds, it is assumed that the two ponds will either be at the same elevation when the Peak occours or that the Peak will occoure ~~at~~ before the ponds fill up to the 100yr. elevation. Either way the HGL and EGL above the 36" RCP will not be significantly affected. As a worst case assumption the two ponds are assumed to be at the peak 100yr.-10day elevation of 76.44, and the flow split will adjust to a situation where the energy loss in the 24" outfall pipe will be equal to the energy loss in the 30" outfall pipe thus resulting in one common energy grade elevation in the 36" RCP.

The minor losses are relatively small compared to the friction losses and they are assumed to be equal in the two branches.

Q_1 = Peak flow into Pond #1
Q_2 = Peak flow into Pond #2
$Q_1 = 65.63 \text{ cfs} - Q_2$

$S_f = (Q/K)^2$
$HL = S_f \times \text{Length}$

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PROJECT _____
SUBJECT _____
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET ___ OF ___

$$HL_1 = HL_2$$

$$Sf_1 \times 240' = Sf_2 \times 60'$$

$$\left(\frac{Q_1}{K_1}\right)^2 \times 240' = \left(\frac{Q_2}{K_2}\right)^2 \times 60'$$

$$\frac{(65.63-Q_2)^2}{(410.1)^2} \times 240' = \frac{(Q_2)^2}{(226.2)^2} \times 60'$$

$$0.00143 \times (65.63-Q_2)^2 = 0.001173 \times Q_2^2$$

$$(65.63-Q_2)^2 = 0.8217 \times Q_2^2$$

$$4307.3 - 131.26 Q_2 + Q_2^2 - 0.8217 Q_2^2 = 0.0$$

$$4307.3 - 131.26 Q_2 + 0.1783 Q_2^2 = 0.0$$

$$24,162.98 - 736.34 Q_2 + Q_2^2 = 0.0$$

$$135,548.98 - 736.34 Q_2 + Q_2^2 = 111,386.0$$

$$(\pm 368.17 \pm Q_2)^2 = 111,386.0$$

$$Q_2 = 34.42 \text{ cfs}$$

$$Q_1 = 31.21 \text{ cfs}$$

POND-2 Version: 4.01
S/N: 88020607

POND #2 (EXISTING)

CALCULATED 06-18-1997 09:12:31
DISK FILE : C:TEN2EX .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume * (acre-ft)	Volume Sum (acre-ft)
71.50	0.00	0.00	0.00	0.00	0.00
72.00	1,250.00	0.03	0.03	0.00	0.00
74.00	6,125.00	0.14	0.23	0.16	0.16
76.00	20,250.00	0.46	0.86	0.57	0.73
76.71	*I*	0.65	1.66	0.39	1.13
76.91	*I*	0.70	1.74	0.53	1.26
77.00	*I*	0.73	1.78	0.59	1.33
78.00	46,000.00	1.06	2.22	1.48	2.22

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

POND #1(existing)

CALCULATED 06-18-1997 09:11:31
DISK FILE : C:TEN1EX .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume * (acre-ft)	Volume Sum (acre-ft)
71.50	0.00	0.00	0.00	0.00	0.00
72.00	4,750.00	0.11	0.11	0.02	0.02
74.00	24,125.00	0.55	0.91	0.61	0.62
76.00	40,375.00	0.93	2.20	1.46	2.09
76.71	*I*	1.09	3.02	0.71	2.80
76.91	*I*	1.13	3.08	0.94	3.02
77.00	50,250.00	1.15	3.11	1.04	3.13
78.00	70,500.00	1.62	4.14	1.38	4.51

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

PONDS 1 & 2 COMBINED (EXISTING)

CALCULATED 06-18-1997 09:10:05
DISK FILE : C:TEN3 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (acre-ft)	Volume Sum (acre-ft)
71.50	0.00	0.00	0.00	0.00	0.00
72.00	6,000.00	0.14	0.14	0.02	0.02
74.00	30,250.00	0.69	1.14	0.76	0.78
76.00	60,625.00	1.39	3.07	2.05	2.83
76.71	*I*	1.73	4.68	1.11	3.94
76.91	*I*	1.84	4.83	1.46	4.29
77.00	82,050.00	1.88	4.89	1.63	4.46
78.00	116,500.00	2.67	6.80	2.27	6.73

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

POND #1 (DEVELOPED)

CALCULATED 06-18-1997 09:30:42
DISK FILE : C:TEN1 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume * (acre-ft)	Volume Sum (acre-ft)
69.00	0.00	0.00	0.00	0.00	0.00
70.00	21,000.00	0.48	0.48	0.16	0.16
74.00	*I*	0.82	1.93	2.57	2.73
76.00	44,500.00	1.02	2.21	4.41	4.57
76.44	*I*	1.08	3.15	0.46	5.03
76.71	*I*	1.11	3.20	0.76	5.33
76.85	*I*	1.13	3.23	0.92	5.49
77.00	50,250.00	1.15	3.26	1.09	5.66
78.00	70,500.00	1.62	4.14	1.38	7.04

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

POND #2 (DEVELOPED)

CALCULATED 06-18-1997 09:29:44
DISK FILE : C:TEN2 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (acre-ft)	Volume Sum (acre-ft)
69.00	0.00	0.00	0.00	0.00	0.00
70.00	6,000.00	0.14	0.14	0.05	0.05
74.00	14,000.00	0.32	0.67	0.89	0.94
76.00	20,250.00	0.46	1.17	0.78	1.72
76.44	*I*	0.57	1.56	0.23	1.95
76.71	*I*	0.65	1.66	0.39	2.11
76.85	*I*	0.69	1.72	0.49	2.21
77.00	*I*	0.73	1.78	0.59	2.31
78.00	46,000.00	1.06	2.22	1.48	3.20

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

PONDS 1 & 2 COMBINED (DEVELOPED)

CALCULATED 06-18-1997 09:26:57
DISK FILE : C:TEN3 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (acre-ft)	Volume Sum (acre-ft)
69.00	0.00	0.00	0.00	0.00	0.00
70.00	27,000.00	0.62	0.62	0.21	0.21
74.00	49,719.00	1.14	2.60	3.47	3.68
76.00	64,750.00	1.49	3.93	2.62	6.30
76.44	*I*	1.66	4.71	0.69	6.99
76.71	*I*	1.76	4.87	1.15	7.45
76.85	*I*	1.82	4.95	1.40	7.70
77.00	82,050.00	1.88	5.04	1.68	7.98
78.00	116,500.00	2.67	6.80	2.27	10.25

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

HYDROLOGY

For street capacities we need to determine the runoff generate from the on-site drainage area and the Arenal right-of-way. For ponding volumes on the park we need the 10 day, 100 year runoff including the park drainage areas. No flow crosses Arenal Road form the north and Basin 102 includes 0.5 acres of the on-site area (entrance road), ½ lot either side, and 15' wide 3"1 slope) and a 15' wide slope from the park because the land south of Arenal is approximately 5' higher than the road. Runoff in the south half of Arenal Road meets arterial drainage standards without storm sewer.

Most of the existing pavement (3± ac) in the park is in basin 103 and an additional 3± ac is conservatively estimated for future development of a Park Office building and associated facilities.

D. MARK GOODWIN & ASSOCIATES

100 YEAR PRECIPITATION

(from Figures D, E and F and Eq. 28 of DPM 22.2)

P_{60} = 1.92", P_{360} = 2.25", P_{1440} = 2.66", P_{10days} = 10.0-[24.9/(2.66")$^{1.4}$] = 3.67"

SUMMARY OF HYDROLOGY

(from AHYMO and Equation 9 and Table 3 of DPM Sec. 22.2)

Basin No.	Area (Ac.)	Area (Sq.Mi.)	Tc (min.)	Tp (hr.)	Land Treatments (%)				100 Year			10 Year Q (cfs)
					A	B	C	D	Q (cfs)	V_{360} (Ac.ft.)	V_{10day} (Ac.ft.)	
101	19.0	0.02969	12	0.133	0	35	13	52	65.63	2.256	3.425	38.10
102	2.4	0.00375	12	0.133	0	40	15	45	7.94	0.268	0.396	4.49
103	28.7	0.04484	20	0.222	30	50	10	10	43.35	1.872	2.211	17.36
104	12.3	0.01922	20	0.222	0	83	10	7	20.16	0.846	0.947	8.37
Total	—	0.09750							135.97	5.751	6.981	68.32
103 *	28.7	0.04484	20	0.222	20	50	10	20	51.10	2.249	2.928	23.72
Total									132.87	5.618	7.696	68.96
101 **	19.0	0.02969	20	0.222	100	0	0	0	2.35	0.744	0.744	5.43
Total									92.36	3.730	4.298	33.70

* *With future Park Office Development*

** *Pre-developed with no Park Office Development*

	Volume	Elevation
Pre-Volume	4.298	76.91
Post-Volume	6.981	76.44
Post with park Volume	7.696	76.85

CORPORATE LIMITS

SAN JOSE DE ARMIJO CEMETARY

ARENAL ROAD

SAN JOSE ARENAL

CORPORATE SU-1 LIMITS

102

101

103

SU-1 PRD

SITE of SUBDIVISION

CORPORATE LIMIT

ARROYO DEL NORTE DIVERSION CHAN

ARROYO DEL NORTE DIVERSION CHAN

COORS BLVD.

LOGAN--H V

RD

Scale: 1" = 500'

Basin Map

100-YR, Pre-development.

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten99pre.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	PAGE = 1
START											TIME= .00
RAINFALL TYPE= 1											RAIN6= 2.250
COMPUTE NM HYD	101.00	-	3	.02969	26.35	.744	.47013	1.532	1.387	PER IMP= .00	
COMPUTE NM HYD	102.00	-	2	.00375	7.94	.268	1.33881	1.499	3.310	PER IMP= 45.00	
COMPUTE NM HYD	103.00	-	1	.04484	43.35	1.872	.78290	1.598	1.511	PER IMP= 10.00	
ADD HYD	103.20	1& 2	1	.04859	49.15	2.140	.82579	1.598	1.581		
ADD HYD	103.30	1& 3	1	.07828	73.08	2.884	.69089	1.565	1.459		
COMPUTE NM HYD	104.00	-	2	.01922	20.16	.846	.82527	1.598	1.639	PER IMP= 7.00	
ADD HYD	104.10	1& 2	1	.09750	92.36	3.730	.71738	1.565	1.480		
FINISH											

100-YR, POST-Development

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten99.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.250
COMPUTE NM HYD	101.00	-	3	.02969	65.63	2.256	1.42467	1.499	3.454	PER IMP=	52.00
COMPUTE NM HYD	102.00	-	2	.00375	7.94	.268	1.33881	1.499	3.310	PER IMP=	45.00
COMPUTE NM HYD	103.00	-	1	.04484	43.35	1.872	.78290	1.598	1.511	PER IMP=	10.00
ADD HYD	103.20	1& 2	1	.04859	49.15	2.140	.82579	1.598	1.581		
ADD HYD	103.30	1& 3	1	.07828	108.62	4.396	1.05293	1.532	2.168		
COMPUTE NM HYD	104.00	-	2	.01922	20.16	.846	.82527	1.598	1.639	PER IMP=	7.00
ADD HYD	104.10	1& 2	1	.09750	125.85	5.242	1.00805	1.532	2.017		
FINISH											

100-YR, POST-Development Plus Park Offices

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten99p.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.250
COMPUTE NM HYD	101.00	-	3	.02969	65.63	2.256	1.42467	1.499	3.454	PER IMP=	52.00
COMPUTE NM HYD	102.00	-	2	.00375	7.94	.268	1.33881	1.499	3.310	PER IMP=	45.00
COMPUTE NM HYD	103.00	-	1	.04484	51.10	2.249	.94024	1.598	1.781	PER IMP=	20.00
ADD HYD	103.20	1& 2	1	.04859	56.91	2.516	.97099	1.598	1.830		
ADD HYD	103.30	1& 3	1	.07828	115.64	4.772	1.14306	1.532	2.308		
COMPUTE NM HYD	104.00	-	2	.01922	20.16	.846	.82527	1.598	1.639	PER IMP=	7.00
ADD HYD	104.10	1& 2	1	.09750	132.87	5.618	1.08041	1.532	2.129		
FINISH											

10-YR, PRE-Development

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten10pre.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	PAGE = 1
START											TIME= .00
RAINFALL TYPE= 1											RAIN6= 1.500
COMPUTE NM HYD	101.00	-	3	.02969	5.43	.152	.09596	1.532	.286	PER IMP= .00	
COMPUTE NM HYD	102.00	-	2	.00375	4.49	.146	.73051	1.499	1.869	PER IMP= 45.00	
COMPUTE NM HYD	103.00	-	1	.04484	17.36	.743	.31063	1.598	.605	PER IMP= 10.00	
ADD HYD	103.20	1& 2	1	.04859	20.59	.889	.34302	1.598	.662		
ADD HYD	103.30	1& 3	1	.07828	25.72	1.041	.24931	1.565	.513		
COMPUTE NM HYD	104.00	-	2	.01922	8.37	.339	.33035	1.598	.681	PER IMP= 7.00	
ADD HYD	104.10	1& 2	1	.09750	33.70	1.379	.26528	1.565	.540		
FINISH											

10-YR, POST-Development, Plus Park Offices

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten10p.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.500
COMPUTE NM HYD	101.00	-	3	.02969	38.10	1.265	.79873	1.499	2.005	PER IMP=	52.00
COMPUTE NM HYD	102.00	-	2	.00375	4.49	.146	.73051	1.499	1.869	PER IMP=	45.00
COMPUTE NM HYD	103.00	-	1	.04484	23.72	1.027	.42955	1.598	.827	PER IMP=	20.00
ADD HYD	103.20	1& 2	1	.04859	26.96	1.173	.45276	1.598	.867		
ADD HYD	103.30	1& 3	1	.07828	61.93	2.438	.58397	1.532	1.236		
COMPUTE NM HYD	104.00	-	2	.01922	8.37	.339	.33035	1.598	.681	PER IMP=	7.00
ADD HYD	104.10	1& 2	1	.09750	68.96	2.777	.53397	1.532	1.105		
FINISH											

LETTER OF TRANSMITTAL

D. Mark Goodwin & Associates, P.A.
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

TO City of Albuquerque
Hydrology @ One Stop Shop

DATE 6-18-97 JOB NO. 9701D
ATTENTION Susan Colongne
RE: Rayo Del Sol Subdivision
DRB 97-82
next to
Tom Tenorio Park

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Drainage Report w/ Grading Plan & Drain Info Sheet +
			Infrastructure List

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☐ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS DRB meeting is on July 15.
Floodplain to be removed by seperate application
Storm Sewer Esm'ts to be granted to City on Park.
Park Maintenance Agreement for Ponds in progress.

COPY TO 1 - to C.O.A.
2 to County Public Works
1 to County Parks
1 Office Copy

SIGNED: Darby Haughts

If enclosures are not as noted, kindly notify us at once.

10-YR, POST-Development

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/12/1997
INPUT FILE = ten10.dat USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.500
COMPUTE NM HYD	101.00	-	3	.02969	38.10	1.265	.79873	1.499	2.005	PER IMP=	52.00
COMPUTE NM HYD	102.00	-	2	.00375	4.49	.146	.73051	1.499	1.869	PER IMP=	45.00
COMPUTE NM HYD	103.00	-	1	.04484	17.36	.743	.31063	1.598	.605	PER IMP=	10.00
ADD HYD	103.20	1& 2	1	.04859	20.59	.889	.34302	1.598	.662		
ADD HYD	103.30	1& 3	1	.07828	56.32	2.154	.51586	1.532	1.124		
COMPUTE NM HYD	104.00	-	2	.01922	8.37	.339	.33035	1.598	.681	PER IMP=	7.00
ADD HYD	104.10	1& 2	1	.09750	63.36	2.492	.47929	1.532	1.015		
FINISH											

10-YR, POST Development, Input

```
START                   TIME=0.0
***** TENORIO SUBDIVISION
***** 10-YEAR 6-HOUR STORM EVENT
***** JUNE 4, 1997
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.28 IN RAIN SIX=1.50 IN
                        RAIN DAY=1.77 IN DT=0.0333 HR
COMPUTE NM HYD          ID=3 HYD NO=101.0 AREA=0.02969 SQ MI
                        PER A=0 PER B=35 PER C=13 PER D=52
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=3 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=102.0 AREA=0.00375 SQ MI
                        PER A=0 PER B=40 PER C=15 PER D=45
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
COMPUTE NM HYD          ID=1 HYD NO=103.0 AREA=0.04484 SQ MI
                        PER A=30 PER B=50 PER C=10 PER D=10
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.2 ID=1 & 2
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.3 ID=1 & 3
PRINT HYD               ID=1 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=104.0 AREA=0.01922 SQ MI
                        PER A=0 PER B=83 PER C=10 PER D=7
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
ADD HYD                 ID=1 HYD NO=104.1 ID=1 & 2
PRINT HYD               ID=1 CODE=1
FINISH
```

100-YR, POST-Development, Input

```
START                   TIME=0.0
***** TENORIO SUBDIVISION
***** 100-YEAR 6-HOUR STORM EVENT
***** JUNE 4, 1997
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.92 IN RAIN SIX=2.25 IN
                        RAIN DAY=2.66 IN DT=0.0333 HR
COMPUTE NM HYD          ID=3 HYD NO=101.0 AREA=0.02969 SQ MI
                        PER A=0 PER B=35 PER C=13 PER D=52
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=3 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=102.0 AREA=0.00375 SQ MI
                        PER A=0 PER B=40 PER C=15 PER D=45
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
COMPUTE NM HYD          ID=1 HYD NO=103.0 AREA=0.04484 SQ MI
                        PER A=30 PER B=50 PER C=10 PER D=10
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.2 ID=1 & 2
PRINT HYD               ID=1 CODE=1
ADD HYD                 ID=1 HYD NO=103.3 ID=1 & 3
PRINT HYD               ID=1 CODE=1
COMPUTE NM HYD          ID=2 HYD NO=104.0 AREA=0.01922 SQ MI
                        PER A=0 PER B=83 PER C=10 PER D=7
                        TP=0.2222 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1
ADD HYD                 ID=1 HYD NO=104.1 ID=1 & 2
PRINT HYD               ID=1 CODE=1
FINISH
```

% D Low

100-YR Post Development Detailed Output

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 06/12/1997
         START TIME (HR:MIN:SEC) = 16:32:07      USER NO.= M_GOODWN.I01
         INPUT FILE = ten99.dat

START                TIME=0.0
***** TENORIO SUBDIVISION
***** 100-YEAR 6-HOUR STORM EVENT
***** JUNE 4, 1997
RAINFALL,            TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.92 IN RAIN SIX=2.25 IN
                     RAIN DAY=2.66 IN DT=0.0333 HR

                  COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =     .033300 HOURS        END TIME =     5.994000 HOURS
                     .0000   .0016   .0032   .0049   .0065   .0083   .0100
                     .0118   .0137   .0156   .0175   .0195   .0216   .0237
                     .0259   .0281   .0304   .0328   .0353   .0378   .0404
                     .0432   .0460   .0489   .0520   .0552   .0586   .0621
                     .0658   .0697   .0739   .0791   .0848   .0908   .1033
                     .1320   .1762   .2399   .3268   .4412   .5872   .7690
                     .9911  1.2043  1.2918  1.3654  1.4308  1.4902  1.5449
                    1.5957  1.6431  1.6876  1.7294  1.7689  1.8062  1.8415
                    1.8749  1.9066  1.9367  1.9653  1.9924  1.9998  2.0056
                    2.0112  2.0165  2.0215  2.0264  2.0310  2.0355  2.0398
                    2.0439  2.0479  2.0518  2.0556  2.0593  2.0628  2.0663
                    2.0697  2.0729  2.0762  2.0793  2.0824  2.0853  2.0883
                    2.0912  2.0940  2.0967  2.0994  2.1021  2.1047  2.1072
                    2.1098  2.1122  2.1147  2.1171  2.1194  2.1217  2.1240
                    2.1263  2.1285  2.1307  2.1328  2.1349  2.1370  2.1391
                    2.1411  2.1432  2.1451  2.1471  2.1490  2.1510  2.1529
                    2.1547  2.1566  2.1584  2.1602  2.1620  2.1638  2.1655
                    2.1673  2.1690  2.1707  2.1724  2.1740  2.1757  2.1773
                    2.1789  2.1805  2.1821  2.1837  2.1852  2.1868  2.1883
                    2.1898  2.1913  2.1928  2.1943  2.1958  2.1972  2.1987
                    2.2001  2.2015  2.2029  2.2043  2.2057  2.2071  2.2085
                    2.2098  2.2112  2.2125  2.2138  2.2151  2.2165  2.2178
                    2.2190  2.2203  2.2216  2.2229  2.2241  2.2254  2.2266
                    2.2278  2.2290  2.2303  2.2315  2.2327  2.2339  2.2350
                    2.2362  2.2374  2.2385  2.2397  2.2409  2.2420  2.2431
                    2.2443  2.2454  2.2465  2.2476  2.2487  2.2498

COMPUTE NM HYD       ID=3 HYD NO=101.0 AREA=0.02969 SQ MI
                     PER A=0 PER B=35 PER C=13 PER D=52
                     TP=0.1333 HR MASS RAINFALL=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    60.953    CFS   UNIT VOLUME =     .9992       B =    526.22       P60 = 1.9200
    AREA =       .015439 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300


    K =    .124347HR     TP =    .133300HR     K/TP RATIO =    .932837      SHAPE CONSTANT, N =  3.791866
```

UNIT PEAK = 36.462 CFS UNIT VOLUME = .9999 B = 341.05 P60 = 1.3200
AREA = .014251 SQ MI TA = .45937 INCHES INF = 1.13625 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=3 CODE=0

PARTIAL HYDROGRAPH 101.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.432	46.2	2.864	.8	4.296	.2	5.728	.3
.033	.0	1.465	59.0	2.897	.8	4.329	.2	5.761	.3
.067	.0	1.499	65.6	2.930	.7	4.362	.2	5.794	.3
.100	.0	1.532	63.6	2.964	.7	4.396	.2	5.827	.3
.133	.0	1.565	56.1	2.997	.6	4.429	.2	5.861	.3
.167	.0	1.598	47.5	3.030	.6	4.462	.2	5.894	.3
.200	.0	1.632	40.2	3.064	.6	4.495	.2	5.927	.3
.233	.0	1.665	34.5	3.097	.5	4.529	.2	5.961	.3
.266	.0	1.698	30.0	3.130	.5	4.562	.2	5.994	.3
.300	.0	1.732	26.6	3.163	.5	4.595	.2	6.027	.3
.333	.0	1.765	23.8	3.197	.5	4.629	.2	6.061	.3
.366	.0	1.798	21.4	3.230	.4	4.662	.2	6.094	.2
.400	.0	1.832	19.4	3.263	.4	4.695	.2	6.127	.2
.433	.0	1.865	17.7	3.297	.4	4.729	.2	6.160	.1
.466	.0	1.898	16.3	3.330	.4	4.762	.2	6.194	.1
.500	.0	1.931	15.1	3.363	.4	4.795	.2	6.227	.1
.533	.0	1.965	14.0	3.397	.4	4.828	.3	6.260	.1
.566	.0	1.998	13.1	3.430	.4	4.862	.3	6.294	.0
.599	.0	2.031	12.2	3.463	.4	4.895	.3	6.327	.0
.633	.0	2.065	11.1	3.496	.3	4.928	.3	6.360	.0
.666	.0	2.098	9.5	3.530	.3	4.962	.3	6.394	.0
.699	.0	2.131	7.8	3.563	.3	4.995	.3	6.427	.0
.733	.0	2.165	6.3	3.596	.3	5.028	.3	6.460	.0
.766	.0	2.198	5.2	3.630	.3	5.062	.3	6.493	.0
.799	.0	2.231	4.4	3.663	.3	5.095	.3	6.527	.0
.832	.0	2.264	3.8	3.696	.3	5.128	.3	6.560	.0
.866	.0	2.298	3.4	3.730	.3	5.161	.3	6.593	.0
.899	.0	2.331	3.1	3.763	.3	5.195	.3	6.627	.0
.932	.0	2.364	2.8	3.796	.3	5.228	.3	6.660	.0
.966	.0	2.398	2.5	3.829	.3	5.261	.3	6.693	.0
.999	.0	2.431	2.3	3.863	.3	5.295	.3	6.727	.0
1.032	.0	2.464	2.1	3.896	.3	5.328	.3	6.760	.0
1.066	.0	2.497	1.9	3.929	.3	5.361	.3	6.793	.0
1.099	.0	2.531	1.8	3.963	.3	5.395	.3	6.826	.0
1.132	.0	2.564	1.6	3.996	.3	5.428	.3	6.860	.0
1.166	.1	2.597	1.5	4.029	.3	5.461	.3	6.893	.0
1.199	.7	2.631	1.4	4.063	.3	5.494	.3	6.926	.0
1.232	2.4	2.664	1.3	4.096	.3	5.528	.3	6.960	.0
1.265	5.2	2.697	1.2	4.129	.3	5.561	.3	6.993	.0
1.299	8.9	2.731	1.1	4.162	.3	5.594	.3	7.026	.0
1.332	14.1	2.764	1.0	4.196	.2	5.628	.3	7.060	.0
1.365	21.9	2.797	.9	4.229	.2	5.661	.3		
1.399	32.8	2.830	.9	4.262	.2	5.694	.3		

RUNOFF VOLUME = 1.42467 INCHES = 2.2559 ACRE-FEET
PEAK DISCHARGE RATE = 65.63 CFS AT 1.499 HOURS BASIN AREA = .0037 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=102.0 AREA=0.00375 SQ MI
PER A=0 PER B=40 PER C=15 PER D=45
TP=0.1333 HR MASS RAINFALL=-1

K = .072619HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.6623 CFS UNIT VOLUME = .9975 B = 526.23 P60 = 1.9200
AREA = .001688 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .124301HR TP = .133300HR K/TP RATIO = .932488 SHAPE CONSTANT, N = 3.793345
UNIT PEAK = 5.2785 CFS UNIT VOLUME = .9977 B = 341.15 P60 = 1.9200
AREA = .002063 SQ MI IA = .45909 INCHES INF = 1.13545 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=0

PARTIAL HYDROGRAPH 102.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.332	1.6	2.664	.1	3.996	.0	5.328	.0
.033	.0	1.365	2.5	2.697	.1	4.029	.0	5.361	.0
.067	.0	1.399	3.8	2.731	.1	4.063	.0	5.395	.0
.100	.0	1.432	5.5	2.764	.1	4.096	.0	5.428	.0
.133	.0	1.465	7.1	2.797	.1	4.129	.0	5.461	.0
.167	.0	1.499	7.9	2.830	.1	4.162	.0	5.494	.0
.200	.0	1.532	7.7	2.864	.1	4.196	.0	5.528	.0
.233	.0	1.565	6.8	2.897	.1	4.229	.0	5.561	.0
.266	.0	1.598	5.8	2.930	.1	4.262	.0	5.594	.0
.300	.0	1.632	4.9	2.964	.1	4.296	.0	5.628	.0
.333	.0	1.665	4.2	2.997	.1	4.329	.0	5.661	.0
.366	.0	1.698	3.6	3.030	.1	4.362	.0	5.694	.0
.400	.0	1.732	3.2	3.064	.1	4.396	.0	5.728	.0
.433	.0	1.765	2.8	3.097	.1	4.429	.0	5.761	.0
.466	.0	1.798	2.5	3.130	.1	4.462	.0	5.794	.0
.500	.0	1.832	2.3	3.163	.1	4.495	.0	5.827	.0
.533	.0	1.865	2.1	3.197	.1	4.529	.0	5.861	.0
.566	.0	1.898	1.9	3.230	.0	4.562	.0	5.894	.0
.599	.0	1.931	1.7	3.263	.0	4.595	.0	5.927	.0
.633	.0	1.965	1.6	3.297	.0	4.629	.0	5.961	.0
.666	.0	1.998	1.5	3.330	.0	4.662	.0	5.994	.0
.699	.0	2.031	1.4	3.363	.0	4.695	.0	6.027	.0
.733	.0	2.065	1.3	3.397	.0	4.729	.0	6.061	.0
.766	.0	2.098	1.1	3.430	.0	4.762	.0	6.094	.0
.799	.0	2.131	.9	3.463	.0	4.795	.0	6.127	.0
.832	.0	2.165	.7	3.496	.0	4.828	.0	6.160	.0
.866	.0	2.198	.6	3.530	.0	4.862	.0	6.194	.0
.899	.0	2.231	.5	3.563	.0	4.895	.0	6.227	.0

.932	.0	2.264	.5	3.596	.0	4.929	.0	6.260	.0
.966	.0	2.298	.4	3.630	.0	4.962	.0	6.294	.0
.999	.0	2.331	.4	3.663	.0	4.995	.0	6.327	.0
1.032	.0	2.364	.3	3.696	.0	5.028	.0	6.360	.0
1.066	.0	2.398	.3	3.730	.0	5.062	.0	6.394	.0
1.099	.0	2.431	.3	3.763	.0	5.095	.0	6.427	.0
1.132	.0	2.464	.2	3.796	.0	5.128	.0	6.460	.0
1.166	.0	2.497	.2	3.829	.0	5.161	.0	6.493	.0
1.199	.1	2.531	.2	3.863	.0	5.195	.0	6.527	.0
1.232	.3	2.564	.2	3.896	.0	5.228	.0	6.560	.0
1.265	.6	2.597	.2	3.929	.0	5.261	.0	6.593	.0
1.299	1.0	2.631	.2	3.963	.0	5.295	.0		

RUNOFF VOLUME = 1.33881 INCHES - .1078 ACRE-FEET
PEAK DISCHARGE RATE = 7.94 CFS AT 1.499 HOURS BASIN AREA .0038 SQ. MI.

COMPUTE NM HYD ID=1 HYD NO=103.0 AREA=0.04484 SQ MI
PER A=30 PER B=50 PER C=10 PER D=10
TP=0.2222 HR MASS RAINFALL=-1

K = .121099HR TP = .222200HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.620 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.9200
AREA = .004484 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .231277HR TP = .222200HR K/TP RATIO = 1.040852 SHAPE CONSTANT, N = 3.301670
UNIT PEAK = 56.727 CFS UNIT VOLUME = .9998 B = 312.34 P60 = 1.9200
AREA = .040356 SQ MI IA = .53333 INCHES INF = 1.34333 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 103.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	30.7	2.997	1.4	4.495	.2	5.994	.1
.033	.0	1.532	37.3	3.030	1.3	4.529	.2	6.027	.1
.067	.0	1.565	41.6	3.064	1.3	4.562	.2	6.061	.1
.100	.0	1.598	43.4	3.097	1.2	4.595	.2	6.094	.1
.133	.0	1.632	43.0	3.130	1.2	4.629	.2	6.127	.1
.167	.0	1.665	41.0	3.163	1.1	4.662	.2	6.160	.1
.200	.0	1.698	37.9	3.197	1.1	4.695	.2	6.194	.1
.233	.0	1.732	34.4	3.230	1.0	4.729	.2	6.227	.1
.266	.0	1.765	30.7	3.263	1.0	4.762	.2	6.260	.1
.300	.0	1.798	27.3	3.297	.9	4.795	.2	6.294	.0
.333	.0	1.832	24.1	3.330	.9	4.828	.2	6.327	.0
.366	.0	1.865	21.3	3.363	.8	4.862	.1	6.360	.0
.400	.0	1.898	18.8	3.397	.8	4.895	.1	6.394	.0
.433	.0	1.931	16.6	3.430	.8	4.928	.1	6.427	.0
.466	.0	1.965	14.7	3.463	.7	4.962	.1	6.460	.0

.500	.0	1.998	13.1	3.496	.7	4.995	.1	6.493	.0
.533	.0	2.031	11.7	3.530	.7	5.028	.1	6.527	.0
.566	.0	2.065	10.4	3.563	.6	5.062	.1	6.560	.0
.599	.0	2.098	9.3	3.596	.6	5.095	.1	6.593	.0
.633	.0	2.131	8.2	3.630	.6	5.128	.1	6.627	.0
.666	.0	2.165	7.2	3.663	.5	5.161	.1	6.660	.0
.699	.0	2.198	6.4	3.696	.5	5.195	.1	6.693	.0
.733	.0	2.231	5.7	3.730	.5	5.228	.1	6.727	.0
.766	.0	2.264	5.1	3.763	.5	5.261	.1	6.760	.0
.799	.0	2.298	4.7	3.796	.5	5.295	.1	6.793	.0
.832	.0	2.331	4.3	3.829	.4	5.328	.1	6.826	.0
.866	.0	2.364	4.0	3.863	.4	5.361	.1	6.860	.0
.899	.0	2.398	3.7	3.896	.4	5.395	.1	6.893	.0
.932	.0	2.431	3.5	3.929	.4	5.428	.1	6.926	.0
.966	.0	2.464	3.3	3.963	.4	5.461	.1	6.960	.0
.999	.0	2.497	3.1	3.996	.3	5.494	.1	6.993	.0
1.032	.0	2.531	3.0	4.029	.3	5.528	.1	7.026	.0
1.066	.0	2.564	2.8	4.063	.3	5.561	.1	7.060	.0
1.099	.0	2.597	2.6	4.096	.3	5.594	.1	7.093	.0
1.132	.0	2.631	2.5	4.129	.3	5.628	.1	7.126	.0
1.166	.0	2.664	2.4	4.162	.3	5.661	.1	7.159	.0
1.199	.0	2.697	2.3	4.196	.3	5.694	.1	7.193	.0
1.232	.1	2.731	2.1	4.229	.3	5.728	.1	7.226	.0
1.265	.3	2.764	2.0	4.262	.3	5.761	.1	7.259	.0
1.299	.7	2.797	1.9	4.296	.2	5.794	.1	7.293	.0
1.332	1.4	2.830	1.8	4.329	.2	5.827	.1	7.326	.0
1.365	3.4	2.864	1.7	4.362	.2	5.861	.1	7.359	.0
1.399	7.5	2.897	1.7	4.396	.2	5.894	.1		
1.432	14.1	2.930	1.6	4.429	.2	5.927	.1		
1.465	22.5	2.964	1.5	4.462	.2	5.961	.1		

RUNOFF VOLUME = .78290 INCHES = 1.8723 ACRE-FEET
PEAK DISCHARGE RATE = 43.35 CFS AT 1.598 HOURS BASIN AREA = .0448 SQ. MI.

ADD HYD ID=1 HYD NO=103.2 ID=1 & 2
PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 103.20

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	38.6	2.997	1.5	4.495	.2	5.994	.1
.033	.0	1.532	45.0	3.030	1.4	4.529	.2	6.027	.1
.067	.0	1.565	48.4	3.064	1.3	4.562	.2	6.061	.1
.100	.0	1.598	49.2	3.097	1.3	4.595	.2	6.094	.1
.133	.0	1.632	47.9	3.130	1.2	4.629	.2	6.127	.1
.167	.0	1.665	45.2	3.163	1.2	4.662	.2	6.160	.1
.200	.0	1.698	41.6	3.197	1.1	4.695	.2	6.194	.1
.233	.0	1.732	37.6	3.230	1.1	4.729	.2	6.227	.1
.266	.0	1.765	33.6	3.263	1.0	4.762	.2	6.260	.1
.300	.0	1.798	29.8	3.297	1.0	4.795	.2	6.294	.0
.333	.0	1.832	26.4	3.330	.9	4.829	.2	6.327	.0

.366	.0	1.865	23.4	3.363	.9	4.862	.2	6.360	.0
.400	.0	1.898	20.7	3.397	.8	4.895	.2	6.394	.0
.433	.0	1.931	18.4	3.430	.8	4.928	.2	6.427	.0
.466	.0	1.965	16.3	3.463	.8	4.962	.2	6.460	.0
.500	.0	1.998	14.6	3.496	.7	4.995	.2	6.493	.0
.533	.0	2.031	13.1	3.530	.7	5.028	.2	6.527	.0
.566	.0	2.065	11.7	3.563	.7	5.062	.2	6.560	.0
.599	.0	2.098	10.3	3.596	.6	5.095	.2	6.593	.0
.633	.0	2.131	9.1	3.630	.6	5.128	.2	6.627	.0
.666	.0	2.165	7.9	3.663	.6	5.161	.2	6.660	.0
.699	.0	2.198	7.0	3.696	.5	5.195	.2	6.693	.0
.733	.0	2.231	6.2	3.730	.5	5.228	.2	6.727	.0
.766	.0	2.264	5.6	3.763	.5	5.261	.1	6.760	.0
.799	.0	2.298	5.1	3.796	.5	5.295	.1	6.793	.0
.832	.0	2.331	4.7	3.829	.5	5.328	.1	6.826	.0
.866	.0	2.364	4.3	3.863	.4	5.361	.1	6.860	.0
.899	.0	2.398	4.0	3.896	.4	5.395	.1	6.893	.0
.932	.0	2.431	3.8	3.929	.4	5.428	.1	6.926	.0
.966	.0	2.464	3.6	3.963	.4	5.461	.1	6.960	.0
.999	.0	2.497	3.3	3.996	.4	5.494	.1	6.993	.0
1.032	.0	2.531	3.2	4.029	.4	5.528	.1	7.026	.0
1.066	.0	2.564	3.0	4.063	.4	5.561	.1	7.060	.0
1.099	.0	2.597	2.8	4.096	.3	5.594	.1	7.093	.0
1.132	.0	2.631	2.7	4.129	.3	5.628	.1	7.126	.0
1.166	.0	2.664	2.5	4.162	.3	5.661	.1	7.159	.0
1.199	.1	2.697	2.4	4.196	.3	5.694	.1	7.193	.0
1.232	.4	2.731	2.3	4.229	.3	5.728	.1	7.226	.0
1.265	.9	2.764	2.1	4.262	.3	5.761	.1	7.259	.0
1.299	1.7	2.797	2.0	4.296	.3	5.794	.1	7.293	.0
1.332	3.0	2.830	1.9	4.329	.3	5.827	.1	7.326	.0
1.365	5.8	2.864	1.8	4.362	.3	5.861	.1	7.359	.0
1.399	11.3	2.897	1.7	4.396	.3	5.894	.1		
1.432	19.7	2.930	1.7	4.429	.2	5.927	.1		
1.465	29.6	2.964	1.6	4.462	.2	5.961	.1		

RUNOFF VOLUME = .82579 INCHES = 2.1400 ACRE-FEET
PEAK DISCHARGE RATE = 49.15 CFS AT 1.598 HOURS BASIN AREA = .0486 SQ. MI.

ADD HYD ID=1 HYD NO=103.3 ID=1 & 3
PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 103.30

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	104.2	2.997	2.1	4.495	.5	5.994	.5
.033	.0	1.532	108.6	3.030	2.0	4.529	.5	6.027	.5
.067	.0	1.565	104.5	3.064	1.9	4.562	.5	6.061	.4
.100	.0	1.598	96.6	3.097	1.8	4.595	.5	6.094	.4
.133	.0	1.632	88.1	3.130	1.7	4.629	.5	6.127	.3
.167	.0	1.665	79.7	3.163	1.6	4.662	.5	6.160	.2
.200	.0	1.698	71.6	3.197	1.5	4.695	.4	6.194	.2

.233	.0	1.732	54.1	3.230	1.5	4.729	.4	6.227	.1
.266	.0	1.765	57.1	3.263	1.1	4.762	.4	6.260	.1
.300	.0	1.798	51.2	3.297	1.4	4.795	.4	6.294	.1
.333	.0	1.832	45.9	3.330	1.3	4.829	.4	6.327	.1
.366	.0	1.865	41.1	3.363	1.3	4.862	.4	6.360	.1
.400	.0	1.898	37.0	3.397	1.2	4.895	.4	6.394	.1
.433	.0	1.931	33.5	3.430	1.1	4.928	.4	6.427	.0
.466	.0	1.965	30.4	3.463	1.1	4.962	.4	6.460	.0
.500	.0	1.998	27.7	3.496	1.1	4.995	.4	6.493	.0
.533	.0	2.031	25.3	3.530	1.0	5.029	.4	6.527	.0
.566	.0	2.065	22.9	3.563	1.0	5.062	.4	6.560	.0
.599	.0	2.098	19.1	3.596	.9	5.095	.1	6.593	.0
.633	.0	2.131	16.9	3.630	.9	5.128	.4	6.627	.0
.666	.0	2.165	14.2	3.663	.9	5.161	.4	6.660	.0
.699	.0	2.198	12.2	3.696	.8	5.195	.4	6.693	.0
.733	.0	2.231	10.6	3.730	.8	5.228	.4	6.727	.0
.766	.0	2.264	9.4	3.763	.8	5.261	.1	6.760	.0
.799	.0	2.298	8.5	3.796	.8	5.295	.4	6.793	.0
.832	.0	2.331	7.8	3.829	.7	5.328	.4	6.826	.0
.866	.0	2.364	7.1	3.863	.7	5.361	.4	6.860	.0
.899	.0	2.398	6.6	3.896	.7	5.395	.4	6.893	.0
.932	.0	2.431	6.1	3.929	.7	5.428	.4	6.926	.0
.966	.0	2.464	5.7	3.963	.7	5.461	.4	6.960	.0
.999	.0	2.497	5.3	3.996	.6	5.494	.4	6.993	.0
1.032	.0	2.531	4.9	4.029	.6	5.528	.4	7.026	.0
1.066	.0	2.564	4.6	4.063	.6	5.561	.4	7.060	.0
1.099	.0	2.597	4.3	4.096	.6	5.594	.4	7.093	.0
1.132	.0	2.631	4.0	4.129	.6	5.628	.1	7.126	.0
1.166	.1	2.664	3.8	4.162	.6	5.661	.4	7.159	.0
1.199	.8	2.697	3.6	4.196	.6	5.694	.4	7.193	.0
1.232	2.7	2.731	3.4	4.229	.5	5.728	.4	7.226	.0
1.265	6.0	2.764	3.2	4.262	.5	5.761	.4	7.259	.0
1.299	10.6	2.797	3.0	4.296	.5	5.794	.4	7.293	.0
1.332	17.1	2.830	2.8	4.329	.5	5.827	.4	7.326	.0
1.365	27.7	2.864	2.7	4.362	.5	5.861	.4	7.359	.0
1.399	44.1	2.897	2.5	4.396	.5	5.894	.4		
1.432	65.8	2.930	2.4	4.429	.5	5.927	.4		
1.465	88.6	2.964	2.3	4.462	.5	5.961	.5		

RUNOFF VOLUME = 1.05293 INCHES = 4.3959 ACRE-FEET
PEAK DISCHARGE RATE = 108.62 CFS AT 1.532 HOURS BASIN AREA = .0783 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=104.0 AREA=0.01922 SQ MI
PER A=0 PER B=83 PER C=10 PER D=7
TP=0.2222 HR MASS RAINFALL=-1

K = .121099HR TP = .222200HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106120
UNIT PEAK = 3.1865 CFS UNIT VOLUME = .9963 B = 526.28 P60 = 1.9200
AREA = .001345 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .213965HR TP = .222700HR K/TP RATIO .960710 SHAPE CONSTANT, N = 3.668963
UNIT PEAK = 26.744 CFS UNIT VOLUME = .9990 - L = 332.46 P60 = 1.9100
AREA = .017875 SQ MI IA = .48387 INCHES INF = 1.20484 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=0

PARTIAL HYDROGRAPH 104.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.399	3.3	2.797	.8	4.196	.1	5.594	.0
.033	.0	1.432	6.3	2.830	.8	4.229	.1	5.628	.0
.067	.0	1.465	10.2	2.864	.8	4.262	.1	5.661	.0
.100	.0	1.499	14.1	2.897	.7	4.296	.1	5.694	.0
.133	.0	1.532	17.2	2.930	.7	4.329	.1	5.728	.0
.167	.0	1.565	19.3	2.964	.6	4.362	.1	5.761	.0
.200	.0	1.598	20.2	2.997	.6	4.396	.1	5.794	.0
.233	.0	1.632	20.0	3.030	.6	4.429	.1	5.827	.0
.266	.0	1.665	19.1	3.064	.5	4.462	.1	5.861	.0
.300	.0	1.698	17.7	3.097	.5	4.495	.1	5.894	.0
.333	.0	1.732	16.1	3.130	.5	4.529	.1	5.927	.0
.366	.0	1.765	14.4	3.163	.5	4.562	.1	5.961	.0
.400	.0	1.798	12.8	3.197	.4	4.595	.1	5.994	.0
.433	.0	1.832	11.2	3.230	.4	4.629	.1	6.027	.0
.466	.0	1.865	9.9	3.263	.4	4.662	.1	6.061	.0
.500	.0	1.898	8.6	3.297	.4	4.695	.1	6.094	.0
.533	.0	1.931	7.5	3.330	.4	4.729	.1	6.127	.0
.566	.0	1.965	6.6	3.363	.3	4.762	.1	6.160	.0
.599	.0	1.998	5.7	3.397	.3	4.795	.1	6.194	.0
.633	.0	2.031	5.0	3.430	.3	4.828	.1	6.227	.0
.666	.0	2.065	4.4	3.463	.3	4.862	.1	6.260	.0
.699	.0	2.098	3.9	3.496	.3	4.895	.0	6.294	.0
.733	.0	2.131	3.4	3.530	.3	4.928	.0	6.327	.0
.766	.0	2.165	3.0	3.563	.2	4.962	.0	6.360	.0
.799	.0	2.198	2.7	3.596	.2	4.995	.0	6.394	.0
.832	.0	2.231	2.5	3.630	.2	5.028	.0	6.427	.0
.866	.0	2.264	2.2	3.663	.2	5.062	.0	6.460	.0
.899	.0	2.298	2.0	3.696	.2	5.095	.0	6.493	.0
.932	.0	2.331	1.9	3.730	.2	5.128	.0	6.527	.0
.966	.0	2.364	1.8	3.763	.2	5.161	.0	6.560	.0
.999	.0	2.398	1.6	3.796	.2	5.195	.0	6.593	.0
1.032	.0	2.431	1.5	3.829	.2	5.228	.0	6.627	.0
1.066	.0	2.464	1.5	3.863	.2	5.261	.0	6.660	.0
1.099	.0	2.497	1.4	3.896	.2	5.295	.0	6.693	.0
1.132	.0	2.531	1.3	3.929	.1	5.328	.0	6.727	.0
1.166	.0	2.564	1.2	3.963	.1	5.361	.0	6.760	.0
1.199	.0	2.597	1.2	3.996	.1	5.395	.0	6.793	.0
1.232	.0	2.631	1.1	4.029	.1	5.428	.0	6.826	.0
1.265	.1	2.664	1.0	4.063	.1	5.461	.0	6.860	.0
1.299	.2	2.697	1.0	4.096	.1	5.494	.0	6.893	.0
1.332	.5	2.731	.9	4.129	.1	5.528	.0	6.926	.0
1.365	1.1	2.764	.9	4.163	.1	5.561	.0		

RUNOFF VOLUME = .82527 INCHES = .8460 ACRE-FEET
PEAK DISCHARGE RATE = 20.16 CFS AT 1.530 HOURS BASIN AREA = .0102 SQ. MI.

ADD HYD ID=1 HYD NO=104.1 ID=1 & 2
PRINT HYD ID=1 CODE=0

PARTIAL HYDROGRAPH 104.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.499	118.3	2.997	2.7	4.495	.5	5.994	.5
.033	.0	1.532	125.9	3.030	2.6	4.529	.5	6.027	.5
.067	.0	1.565	123.8	3.064	2.5	4.562	.5	6.061	.5
.100	.0	1.598	116.8	3.097	2.3	4.595	.5	6.094	.4
.133	.0	1.632	108.1	3.130	2.2	4.629	.5	6.127	.3
.167	.0	1.665	98.8	3.163	2.1	4.662	.5	6.160	.2
.200	.0	1.698	89.3	3.197	2.0	4.695	.5	6.194	.2
.233	.0	1.732	80.2	3.230	1.9	4.729	.5	6.227	.2
.266	.0	1.765	71.7	3.263	1.8	4.762	.5	6.260	.1
.300	.0	1.798	64.0	3.297	1.7	4.795	.5	6.294	.1
.333	.0	1.832	57.0	3.330	1.7	4.829	.5	6.327	.1
.366	.0	1.865	50.9	3.363	1.6	4.862	.5	6.360	.1
.400	.0	1.898	45.6	3.397	1.5	4.895	.5	6.394	.1
.433	.0	1.931	41.0	3.430	1.5	4.928	.5	6.427	.1
.466	.0	1.965	37.0	3.463	1.4	4.962	.5	6.460	.0
.500	.0	1.998	33.4	3.496	1.3	4.995	.5	6.493	.0
.533	.0	2.031	30.3	3.530	1.3	5.028	.5	6.527	.0
.566	.0	2.065	27.2	3.563	1.2	5.062	.5	6.560	.0
.599	.0	2.098	23.7	3.596	1.2	5.095	.5	6.593	.0
.633	.0	2.131	20.3	3.630	1.1	5.128	.5	6.627	.0
.666	.0	2.165	17.2	3.663	1.1	5.161	.5	6.660	.0
.699	.0	2.198	14.9	3.696	1.0	5.195	.5	6.693	.0
.733	.0	2.231	13.1	3.730	1.0	5.228	.5	6.727	.0
.766	.0	2.264	11.7	3.763	1.0	5.261	.5	6.760	.0
.799	.0	2.298	10.6	3.796	.9	5.295	.5	6.793	.0
.832	.0	2.331	9.7	3.829	.9	5.328	.5	6.826	.0
.866	.0	2.364	8.9	3.863	.9	5.361	.5	6.860	.0
.899	.0	2.398	8.2	3.896	.9	5.395	.5	6.893	.0
.932	.0	2.431	7.6	3.929	.8	5.428	.5	6.926	.0
.966	.0	2.464	7.1	3.963	.8	5.461	.5	6.960	.0
.999	.0	2.497	6.6	3.996	.8	5.494	.5	6.993	.0
1.032	.0	2.531	6.2	4.029	.8	5.528	.5	7.026	.0
1.066	.0	2.564	5.8	4.063	.7	5.561	.5	7.060	.0
1.099	.0	2.597	5.5	4.096	.7	5.594	.5	7.093	.0
1.132	.0	2.631	5.1	4.129	.7	5.628	.5	7.126	.0
1.166	.1	2.664	4.8	4.162	.7	5.661	.5	7.159	.0
1.199	.8	2.697	4.6	4.196	.7	5.694	.5	7.193	.0
1.232	2.8	2.731	4.3	4.229	.6	5.728	.5	7.226	.0
1.265	6.1	2.764	4.1	4.262	.6	5.761	.5	7.259	.0
1.299	10.8	2.797	3.8	4.296	.6	5.794	.5	7.293	.0
1.332	17.6	2.830	3.6	4.329	.6	5.827	.5	7.326	.0
1.365	29.1	2.864	3.4	4.362	.6	5.861	.5	7.359	.0

1.399	47.3	2.897	3.2	4.396	.6	5.894	.5
1.432	72.2	2.930	3.1	4.429	.6	5.927	.6
1.465	98.8	2.964	2.9	4.462	.6	5.961	.5

RUNOFF VOLUME = 1.00805 INCHES = 5.2418 ACRE-FEET
PEAK DISCHARGE RATE = 125.85 CFS AT 1.532 HOURS BASIN AREA = .0975 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 16:32:10

DRAINAGE INFORMATION SHEET

City a County

PROJECT TITLE: Tenorio Park Subdivision ZONE ATLAS/DRNG.FILE#: M-10/D9

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Easterly portion of Valley West

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: John M. MacKenzie PE

ADDRESS: PO Box 90606 ABQ 87199 PHONE: 345-2010

OWNER: Tom Joseph CONTACT: Tom Joseph

ADDRESS: 225 Chamisa, Los Alamos, NM 87544 PHONE: 662-0649

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT

_____ DRAINAGE PLAN

__X__ CONCEPTUAL GRADING & DRAINAGE PLAN

_____ GRADING PLAN

_____ EROSION CONTROL PLAN

_____ ENGINEER'S CERTIFICATION

_____ OTHER

PRE-DESIGN MEETING:

_____ YES

__X__ NO

_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL

__X__ 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

_____ CERTIFICATION OF OCCUPANCY APPROVAL

_____ GRADING PERMIT APPROVAL

_____ PAVING PERMIT APPROVAL

_____ S.A.D. DRAINAGE REPORT

_____ DRAINAGE REQUIREMENTS

_____ OTHER _____ (Specify)

DATE SUBMITTED: 4/23/97

BY: John M. MacKenzie
John M. MacKenzie PE

don't copy Kurt

RECEIVED
APR 24 1997
HYDROLOGY SECTION

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

April 18, 1997

Mr. Roger Paul, DRE
Bernalillo County Public Works Dept.
2400 Broadway SE
Albuquerque, NM 87102

Re: Tenorio Park Subdivision

Dear Mr. Paul:

As you recall, we are proposing to discharge developed runoff into the Tom Tenorio Park from a planned residential subdivision located upstream of the park and in the City of Albuquerque. We're hoping to take advantage of the excess storage capacity we feel now exists in the park area after construction of the City's Amole del Norte Channel cut-off upstream flows.

The plans and calculations submitted herewith are intended only to develop a measure of understanding between the County and the developer. We consider the on-site runoff calculations to be well-finalized, but the rest of our plan remains somewhat conceptual.

The primary intent of this submittal is to allow for the County Parks and Recreation Department to feel comfortable with our development objective and promote further discussion on outstanding issues. We would also like you to generate comments as necessary so we may further refine our plan and help us prepare for final submittal. Because this is in a flood plain, we will send a copy to Susan Calongne.

If I can be of further assistance please contact me.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

John M. MacKenzie, PE

JMM/sb

b:\tenorio\discharge.ltr

RECEIVED
APR 30 1997
HYDROLOGY SECTION

CORPORATE LIMITS

ZONE AO
(DEPTH 1)

SITE

ROAD

RM61

Arenal

ZONE AO
(DEPTH 1)

CORPORATE LIMITS

ZONE X

ROAD

BOULEVARD

ZONE AO
(DEPTH 1)

ZONE AE
(EL. 4981)

CITY OF ALBUQUERQUE
BERNALILLO COUNTY

Map #
350001C0337

BERNALILLO COUNTY
UNINCORPORATED AREAS
350001

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 9 NORTH, RANGE 2 EAST AND TOWNSHIP 10 NORTH, RANGE 2 EAST.

COORS

FOOTHILL

TELESFOR DRIVE

CANAL STREET

CITY OF ALBUQUERQUE
350002

CORPORATE LIMITS

SHIPMAN ROAD

Canal

ERVIEN LANE

ZONE X

TOWNHOMES R-D

(UNIT 7) (UNIT 7)

SAGE

SU-1 CHURCH & REL FAC

ATRISCO SU-1 PRD 15 DU/A PERM C-1 USES INCL REST W/ FULL SERVICE LIQ

(UNIT 7)

R-D 9 DU/A

C-1

ABQ SOUTH

R-D R-1

R-D R-1

GARCIA—JOSE F

R-D R-1

SOUTH WEST

TOWN OF ATRISCO GRANT

SANDOVAL—ROMAN & DORIS

ARENAL

R-D R-1

SAN JOSE DE ARMIJO CEMETARY

AMOLE DEL NORTE DIVERSION CHANNEL

(UNIT NO 3)

VISTA NUEVA

SU-1 PRD

MARY ANN PINFORD ELEMENTARY SCHOOL

SAN JOSE ARENAL

SU-1

RD

ABQ SOUTH UNIT 1

SU-1 PRD

VALLEY WEST

SU-1 PRD

SU-1 PRD

SITE

SU-1 CHURCH & REL FAC

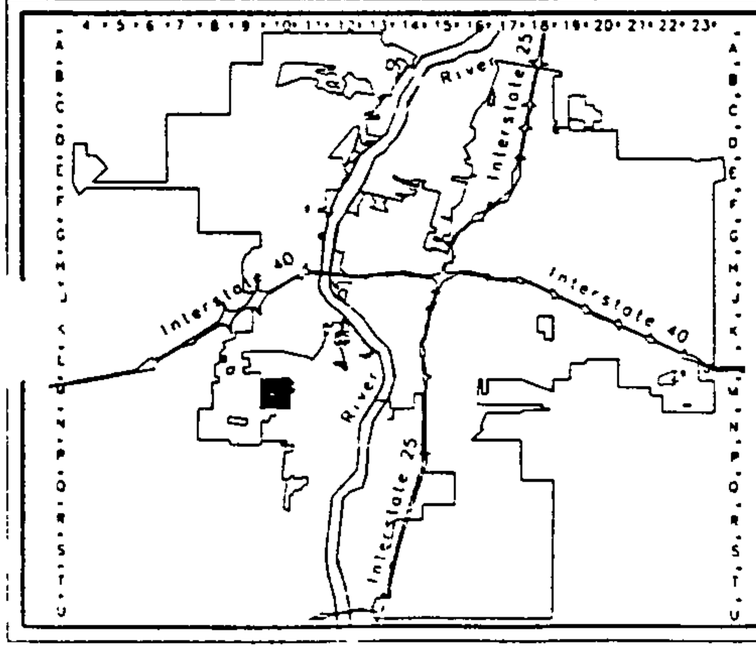
WESTGATE HEIGHTS

SECTION PLAN BOUNDARY

AMOLE DEL NORTE DIVERSION FACILITY

LOGAN—H V

RD



North

750 375 0 750

Scale, 1" = 750'

A buquerque G eographic I nformation S ystem

City of Albuquerque

© Planning Department July 04, 1993

LEGAL DESCRIPTION

T10N

R2E

SEC 34

UNIFORM PROPERTY CODE

1-010-055

M-10-Z

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Tenorio Park
SUBJECT Drainage
BY MG DATE 4/10/97
CHECKED _____ DATE _____
SHEET 1 OF ____

This site comprises an on-site area of 19.5203 Ac. Currently undeveloped that drains to Tom Tenorio Park (County). The existing Arnold del Norte Channel prevents any off-site flows from entering this site.

The drainage concept is to surface drain the subdivision to a low point via streets and concrete channels then to collect all flows in a storm drain for conveyance to the park. Arenal Rd. improvements will also need to be collected.

For street and channel capacities we will need to determine the run-off generated from 2 on-site Drainage Areas and the Arenal R/W.

Total ON-Site Area = 19.5203 Ac.
Area of D.A. 1 = 7.808 Ac.
Area of D.A. 2 = 11.712 Ac.
Area of D.A. 3 (Arenal) = 0.868 Ac.

Precip. Zone = 1 P_6 = 2.20 in. P_{24} = 2.66 in.

Land Treatments D.A. 1 & D.A. 2

Treatment A = 0
Treatment B = 35%
Treatment C = 13%
Treatment D = 52%

Land Treatment D.A. 3

Treatment A = 0
Treatment B = 0
Treatment C = 5%
Treatment D = 95%

Per Attached AHYMO

D.A. 1 Q_{100} = 26.16 cfs Vol.$_{100}$ = 39,095 C.F.

D.A 2 Q_{100} = 39.23 cfs Vol.$_{100}$ = 58,631 C.F.

D.A. 3 Q_{100} = 3.74 cfs Vol.$_{100}$ = 6042 CF

On-Site UN-Developed Q_{100} = 25.32 cfs Vol.$_{100}$ = 31,124 C.F.

BERNALILLO COUNTY

PERMIT APPLICATION

PWD (Use for all PWD permits EXCEPT Street Excavation)

[X] NEW SUBMITTAL

[ ] RESUBMITTAL

TODAY'S DATE: April 21,1997

CASE NO: PWS-97-70

OWNER

OWNER	Tom Joseph	PHONE	(505) 662-0649
MAILING ADDRESS	225 Chamisa	CITY	Los Alamos ZIP 87544

AGENT

AGENT / CONTRACTOR	Mark Goodwin & Associates, PA	PHONE	(505) 345-2010
MAILING ADDRESS	PO Box 90606	CITY	ABQ ZIP 87199
STATE LICENSE NO	EXP DATE	VOLUME	CLASS
ARCHITECT/ENGINEER	John M. MacKenzie PE	LICENSE NO	11619 PHONE (505) 345-2010

SITE INFORMATION

SITE ADDRESS and/or DIRECTIONS: Easterly portion of Valley West

ZONE ATLAS NO.: M-10

LEGAL DESCRIPTION: TENORIO PARK SUBD

UNIFORM PROPERTY CODE (UPC No.): 1 0 1 0 0 5 5 3 6 9 2 3 4 4 0 1 6 2

PROPERTY SIZE IN ACRES: 20

EXISTING BUILDING(S) AND USE: none

PROPOSED BUILDING(S): 145 single family dwellings

TYPE OF SUBMITTAL

- [ ] REPLAT
- [ ] MINOR SUBDIVISION
- [ ] MAJOR SUBDIVISION
- [ ] CONSTRUCTION DRAWINGS
- [XX] GRADING & DRAINAGE PLAN Conceptual
- [ ] AS-CONSTRUCTED GRADING & DRAINAGE PLAN
- [ ] VARIANCE REQUEST
- [ ] LAND DIVISION
- [ ] TRAFFIC IMPACT ANALYSIS / TRAFFIC STUDY
- [ ] INFRASTRUCTURE LIST / DESIGN REVIEW
- [ ] SPECIAL USE PERMIT
- [ ] BARRICADING PERMIT
- [ ] BUILDING PERMIT
- [ ] INSPECTION
- [ ] OTHER (Specify)

The issuance of a permit or a review or approval of plan specifications, computations, and shop drawings, shall not be interpreted to be a permit for, or an approval of any variance or violation of any of the provisions of any COUNTY or STATE codes. ordinances. standards, or policies. Nor shall such issuance of a permit or approval of plans. specifications. computations, and shop drawings prevent any authorized COUNTY representative or COUNTY inspector form thereafter requiring the correction of errors in said plans, specifications. computations. or shop drawings or from stopping construction operations which are being carried on thereunder when in violation of any COUNTY or STATE codes, ordinances, standards. or policies.

[ ] Owner [X] Agent [ ] Contractor Signature John M. MacKenzie Date 4/23/97

COUNTY

BERNALILLO COUNTY USE ONLY

C/R's:

TOTAL FEE.

Receipt No.:

Received By:

RECEIVED APR 30 1997 HYDROLOGY SECTION

c:\ PWD App-Rev November 17 1995

Case Routing Slip

23-Apr-97	PWD	97	70	Category:	Submittal

Legal Description:	TENORIO PARK SUBD
UPC:	
Street Address:	VALLEY WEST
Submittal Type:	Grading & Drainage Plan

Comments Required From:

DRAN	☑	**DRE**	☐	**ENGA**	☐
DNPS	☐	**TRAF**	☐	**UTIL**	☐
OTHE	☐				

Applicant Name:	TOM JOSEPH	**Application Date:**	23-Apr-97
Applicant Category:	Owner	**Due Date:**	14-May-97

	Owner Info	Agent Info	Egr/Svy Info
Name	TOM JOSEPH	MARK GOODWIN & ASS	
Address	225 CHAMISA	P O BOX 90606	
City	LOS ALAMOS	ALBUQUERQUE	
State	NM	NM	
ZIP	87544	87199	
Ph	662-0649	345-2010	

FPA
4-24-97

Original
4-24-97

RECEIVED
APR 30 1997
HYDROLOGY SECTION

```
START                TIME=0.0
***** HYDROGRAPH FOR THE SUBDIVISION TENORIO PARK
***** SITE IS LOCATED AT THE SOUTHEAST CORNER OF
***** THE AMOLE CHANNEL AND ARENAL.  THERE ARE THREE
***** DRAINAGE BASINS FOR THE DEVELOPMENT.

RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN DT=0.03333 HR

*EXISTING CONDITIONS FOR ON-SITE PROPERTY
*NO OFF-SITE PROPERTY INCLUDED
COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.0305005 SQ MI
                     PER A=100.00  PER B=0.00  PER C=0.00  PER D=0.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1

*PROPOSED CONDITIONS

*DRAINAGE BASIN 1
COMPUTE NM HYD       ID=2 HYD NO=101.2 AREA=0.0122 SQ MI
                     PER A=0.00  PER B=35.00  PER C=13.00  PER D=52.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1

*DRAINAGE BASIN 2
COMPUTE NM HYD       ID=3 HYD NO=101.3 AREA=0.0183 SQ MI
                     PER A=0.00  PER B=35.00  PER C=13.00  PER D=52.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=3 CODE=1

*DRAINAGE BASIN 3
COMPUTE NM HYD       ID=4 HYD NO=101.4 AREA=0.0013563 SQ MI
                     PER A=0.00  PER B=0.00  PER C=5.00  PER D=95.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=4 CODE=1

FINISH
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```
     AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
          RUN DATE (MON/DAY/YR) = 04/10/1997
          START TIME (HR:MIN:SEC) = 05:35:14      USER NO.= M_GOODWN.I01
          INPUT FILE = TENRIOPK.DAT


START                    TIME=0.0

***** HYDROGRAPH FOR THE SUBDIVISION TENORIO PARK

***** SITE IS LOCATED AT THE SOUTHEAST CORNER OF

***** THE AMOLE CHANNEL AND ARENAL.  THERE ARE THREE

***** DRAINAGE BASINS FOR THE DEVELOPMENT.


RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN

                         RAIN ONE=1.87 IN RAIN SIX=2.20 IN

                         RAIN DAY=2.66 IN DT=0.03333 HR


                    COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS
     2 - PEAK AT 1.40 HR.
                              DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                                 .0000   .0016   .0033   .0050   .0067   .0085   .0103
                                 .0122   .0141   .0160   .0180   .0201   .0222   .0243
                                 .0266   .0289   .0312   .0337   .0362   .0388   .0415
                                 .0443   .0472   .0502   .0534   .0567   .0601   .0637
                                 .0675   .0715   .0758   .0809   .0865   .0924   .1050
                                 .1334   .1771   .2398   .3254   .4379   .5814   .7600
                                 .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
```

1.5600	1.6061	1.6493	1.6900	1.7284	1.7646	1.7989
1.8314	1.8623	1.8915	1.9193	1.9456	1.9518	1.9576
1.9630	1.9682	1.9732	1.9780	1.9825	1.9869	1.9912
1.9953	1.9993	2.0031	2.0068	2.0104	2.0140	2.0174
2.0207	2.0240	2.0272	2.0303	2.0333	2.0363	2.0392
2.0420	2.0448	2.0475	2.0502	2.0528	2.0554	2.0580
2.0605	2.0629	2.0653	2.0677	2.0700	2.0723	2.0746
2.0768	2.0790	2.0812	2.0833	2.0855	2.0875	2.0896
2.0916	2.0936	2.0956	2.0976	2.0995	2.1014	2.1033
2.1051	2.1070	2.1088	2.1106	2.1124	2.1141	2.1159
2.1176	2.1193	2.1210	2.1227	2.1244	2.1260	2.1276
2.1292	2.1308	2.1324	2.1340	2.1355	2.1371	2.1386
2.1401	2.1416	2.1431	2.1446	2.1460	2.1475	2.1489
2.1504	2.1518	2.1532	2.1546	2.1560	2.1573	2.1587
2.1600	2.1614	2.1627	2.1640	2.1654	2.1667	2.1680
2.1692	2.1705	2.1718	2.1731	2.1743	2.1756	2.1768
2.1780	2.1792	2.1804	2.1817	2.1829	2.1840	2.1852
2.1864	2.1876	2.1887	2.1899	2.1910	2.1922	2.1933
2.1944	2.1956	2.1967	2.1978	2.1989	2.2000	

*EXISTING CONDITIONS FOR ON-SITE PROPERTY

*NO OFF-SITE PROPERTY INCLUDED

COMPUTE NM HYD ID=1 HYD NO=101.1 AREA=0.0305005 SQ MI

PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764

UNIT PEAK = 62.590 CFS UNIT VOLUME = .9994 B = 273.54 P60 = 1.8700

AREA = .030501 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D

T = .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = .43925 INCHES = .7145 ACRE-FEET
PEAK DISCHARGE RATE = 25.32 CFS AT 1.533 HOURS BASIN AREA = .0305 SQ. MI.

*PROPOSED CONDITIONS

*DRAINAGE BASIN 1

COMPUTE NM HYD ID=2 HYD NO=101.2 AREA=0.0122 SQ MI

PER A=0.00 PER B=35.00 PER C=13.00 PER D=52.00

TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420

UNIT PEAK = 25.046 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.8700

AREA = .006344 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D

T = .033330

K = .124187HR TP = .133300HR K/TP RATIO = .931637 SHA
PE CONSTANT, N = 3.796975
UNIT PEAK = 14.998 CFS UNIT VOLUME = .9994 B = 341.
40 P60 = 1.8700
AREA = .005856 SQ MI IA = .45937 INCHES INF = 1.13625
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = 1.37941 INCHES = .8975 ACRE-FEET
PEAK DISCHARGE RATE = 26.16 CFS AT 1.500 HOURS BASIN AREA =
.0122 SQ. MI.

*DRAINAGE BASIN 2

COMPUTE NM HYD ID=3 HYD NO=101.3 AREA=0.0183 SQ MI

PER A=0.00 PER B=35.00 PER C=13.00 PER D=52.00

TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHA
PE CONSTANT, N = 7.106420
UNIT PEAK = 37.570 CFS UNIT VOLUME = .9991 B = 526.
28 P60 = 1.8700
AREA = .009516 SQ MI IA = .10000 INCHES INF = .04000

INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

K = .124187HR TP = .133300HR K/TP RATIO = .931637 SHA
PE CONSTANT, N = 3.796975
UNIT PEAK = 22.497 CFS UNIT VOLUME = .9997 B = 341.
40 P60 = 1.8700
AREA = .008784 SQ MI IA = .45937 INCHES INF = 1.13625
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 101.30

RUNOFF VOLUME = 1.37941 INCHES = 1.3463 ACRE-FEET
PEAK DISCHARGE RATE = 39.23 CFS AT 1.500 HOURS BASIN AREA =
.0183 SQ. MI.

*DRAINAGE BASIN 3

COMPUTE NM HYD ID=4 HYD NO=101.4 AREA=0.0013563 SQ MI

PER A=0.00 PER B=0.00 PER C=5.00 PER D=95.00

TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHA

PE CONSTANT, N = 7.106420
UNIT PEAK = 5.0870 CFS UNIT VOLUME = .9973 B = 526.
28 P60 = 1.8700
AREA = .001288 SQ MI IA = .10000 INCHES INF = .04000
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHA
PE CONSTANT, N = 4.514851
UNIT PEAK = .19746 CFS UNIT VOLUME = .9365 B = 388.
14 P60 = 1.8700
AREA = .000068 SQ MI IA = .35000 INCHES INF = .83000
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

PRINT HYD ID=4 CODE=1

PARTIAL HYDROGRAPH 101.40

RUNOFF VOLUME = 1.91693 INCHES = .1387 ACRE-FEET
PEAK DISCHARGE RATE = 3.74 CFS AT 1.500 HOURS BASIN AREA =
.0014 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 05:35:16

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Tenorio Park
SUBJECT Drainage
BY MG DATE 4/10/97
CHECKED _____ DATE _____
SHEET 10 OF ____

The concrete channel that Drains D.A.1 to D.A.2 has a slope = 0.67% & Q = 26.16 cfs

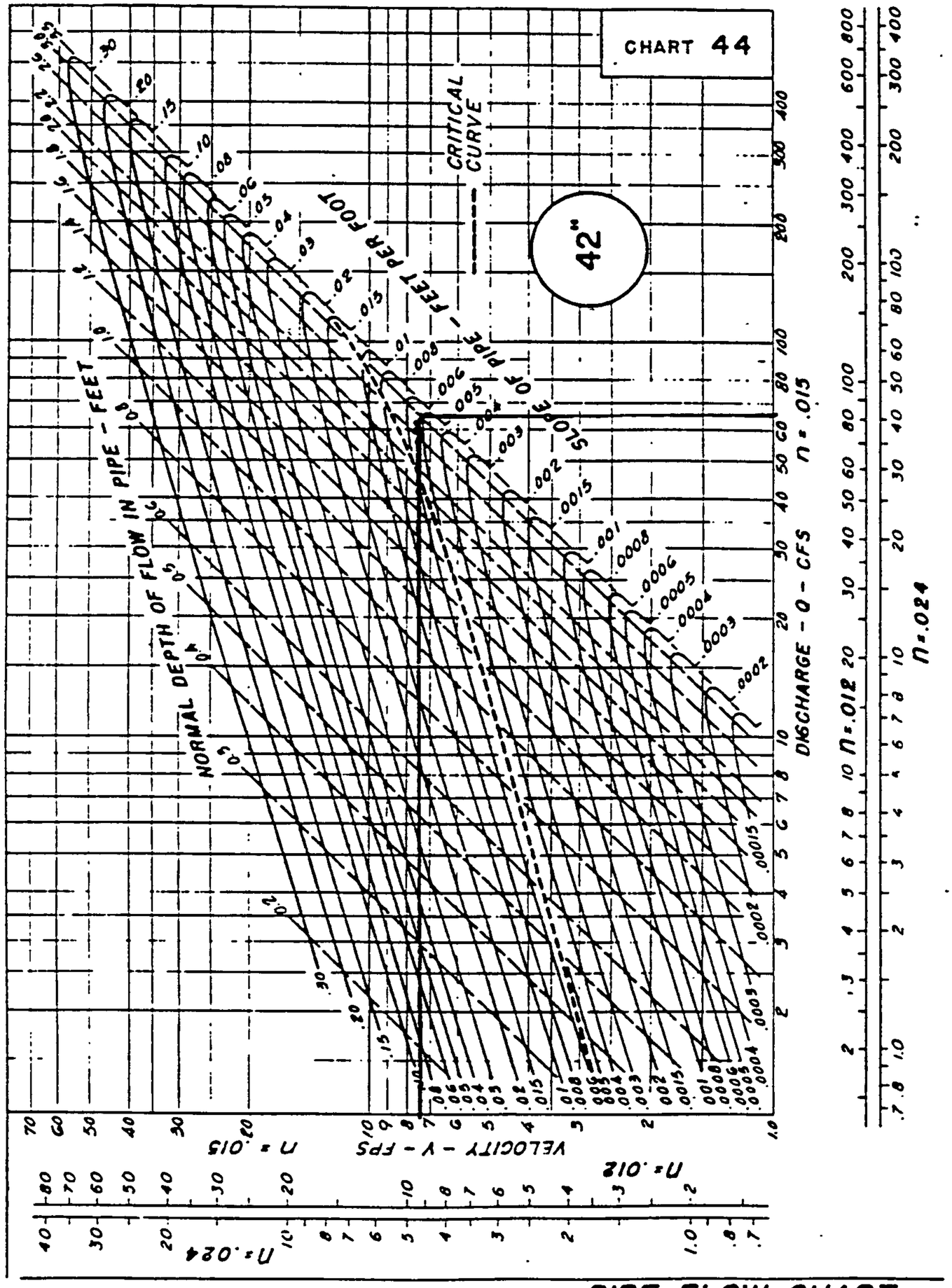
$\Longrightarrow$ b = 10', d = 0.53' use 0.67'

We will place inlets for storm Drain in a sump condition but will provide a concrete channel emergency outfall to Park

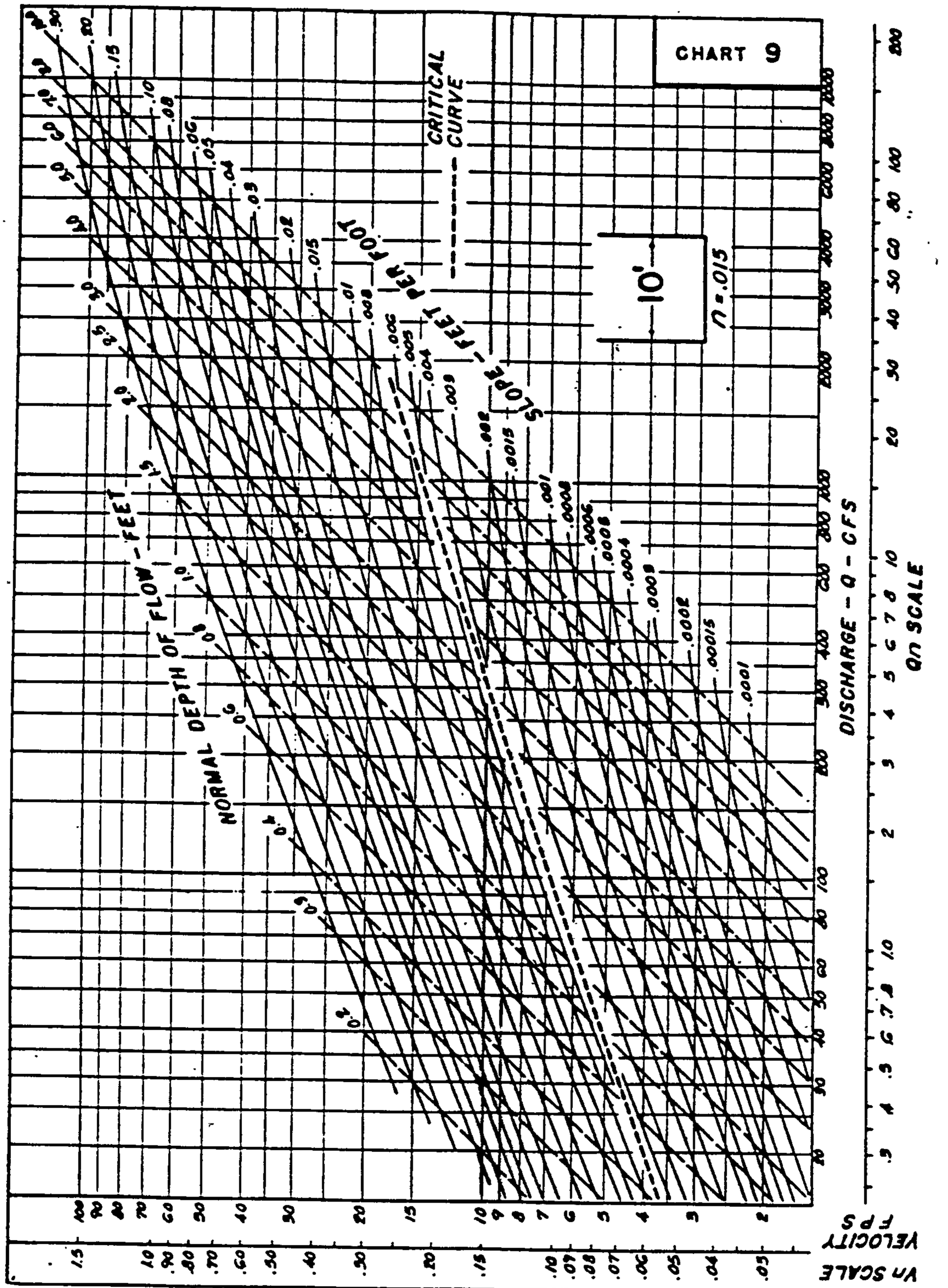
Q(Actual) = D.A. 1 + D.A. 2 = 65.39 cfs

Assuming 0.50% slope we need a 42" RCP SD
This will be verified at work order

Conc. Channel b = 10' d = 1.0'



PIPE FLOW CHART
42-INCH DIAMETER


CHART 9
CRITICAL
CURVE
NORMAL DEPTH OF FLOW - FEET
DISCHARGE - Q - CFS
On SCALE
VELOCITY FPS
Vn SCALE
CHANNEL CHART
VERTICAL b = 10 FT.

CORPORATE LIMITS

ZONE AO
(DEPTH 1)

SITE ?

ROAD

RM61

Arenal

ZONE AO
(DEPTH 1)

ZONE X

CORPORATE LIMITS

BOULEVARD

ROAD

ZONE AO
(DEPTH 1)

ZONE AE
(EL 4981)

ZC

CITY OF ALBUQUERQUE
BERNALILLO COUNTY

COORS

FOOTHILL

TELESFOR DRIVE

Map #
350010C0337

BERNALILLO COUNTY
UNINCORPORATED AREAS
350001

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 9 NORTH, RANGE 2 EAST AND TOWNSHIP 10 NORTH, RANGE 2 EAST.

CANAL STREET

SHIPMAN ROAD

STREET

CORPORATE LIMITS

CITY OF ALBUQUERQUE
350002

ERVIEN LANE

Canal

APR 2 4 1997

ZONE X

ACE

TOWNHOMES R-D

(UNIT 7) (UNIT 7)

SU-1 CHURCH & REL FAC

ATRISCO SU-1 PRD 15 DU/A PERM C-1 USES INCL REST W/ FULL SERVICE LIQ

(UNIT 7)

C-1

ABQ SOUTH

R-D R-1

R-D R-1

GARCIA--JOSE F

R-D R-1

SOUTH WEST

TOWN OF GRANT

SANDOVAL--ROMAN & DORIS

R-D 9 DU/A

TOWN & UNSER SECTOR DEVELOPMENT PLAN BOUNDARY

R-D R-1

AMOLE DEL NORTE DIVERSION CHANNEL

SAN JOSE DE ARMIJO CEMETARY

(UNIT NO 3)

VISTA NUEVA

RIMFORD SUBD

MARY ANN RINFORD ELEMENTARY SCHOOL

SAN JOSE ARENAL

SU-1

SU-1 PRD

ABQ SOUTH UNIT 1

VALLEY WEST

SU-1 PRD

SU-1 PRD

SITE

RIO BRAVO

SU-1 CHURCH & REL FAC

WESTGATE HEIGHTS

SECTOR PLAN BOUNDARY

Ldn 60

AMOLE DEL NORTE DIVERSION FACILITY

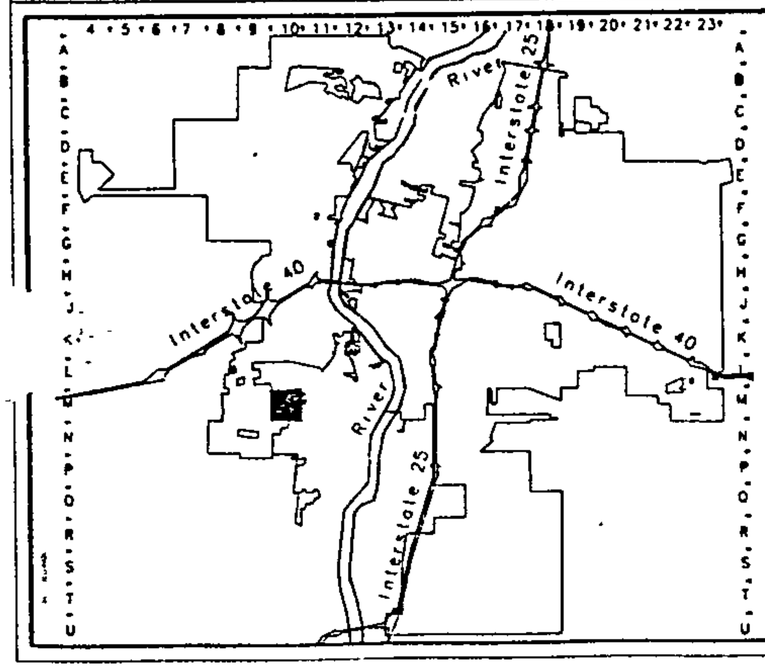
Ldn 60

Ldn 60

SANCHEZ--NICANDRO E

LOGAN--H V

RD



North

750 375 0 750

Scale 1" = 750'

A buquerque G eographic I nformation S ystem

City of Albuquerque

© Planning Department July 04, 1993

APR 2 4 1997

LEGAL DESCRIPTION

T10N

R2E

SEC 34

UNIFORM PROPERTY CODE

1-010-055

M-10-Z

BERNALILLO COUNTY

PERMIT APPLICATION

PWD (Use for all PWD permits EXCEPT Street Excavation)

[X] NEW SUBMITTAL

[ ] RESUBMITTAL

TODAY'S DATE April 21,1997

CASE NO:

OWNER

OWNER	Tom Joseph	PHONE	(505) 662-0649
MAILING ADDRESS	225 Chamisa	CITY	Los Alamos
		ZIP	87544

AGENT

AGENT / CONTRACTOR	Mark Goodwin & Associates, PA	PHONE	(505) 345-2010
MAILING ADDRESS	PO Box 90606	CITY	ABQ
		ZIP	87199
STATE LICENSE NO.	EXP DATE	VOLUME	CLASS
ARCHITECT/ENGINEER	John M. MacKenzie PE	LICENSE NO	11619
		PHONE	(505) 345-2010

SITE INFORMATION

SITE ADDRESS and/or DIRECTIONS: Easterly portion of Valley West

ZONE ATLAS NO.: M-10

LEGAL DESCRIPTION

UNIFORM PROPERTY CODE (UPC No): 1 0 1 0 0 5 5 3 6 9 2 3 4 4 0 1 6 2

PROPERTY SIZE IN ACRES. 20

EXISTING BUILDING(S) AND USE: none

PROPOSED BUILDING(S): 145 single family dwellings

TYPE OF SUBMITTAL

- [ ] REPLAT
- [ ] MINOR SUBDIVISION
- [ ] MAJOR SUBDIVISION
- [ ] CONSTRUCTION DRAWINGS
- [XX] GRADING & DRAINAGE PLAN — Conceptual
- [ ] AS-CONSTRUCTED GRADING & DRAINAGE PLAN
- [ ] VARIANCE REQUEST
- [ ] LAND DIVISION
- [ ] TRAFFIC IMPACT ANALYSIS / TRAFFIC STUDY
- [ ] INFRASTRUCTURE LIST / DESIGN REVIEW
- [ ] SPECIAL USE PERMIT
- [ ] BARRICADING PERMIT
- [ ] BUILDING PERMIT
- [ ] INSPECTION
- [ ] OTHER (Specify):

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APR 24 1997
HYDROLOGY SECTION

The issuance of a permit or a review or approval of plan specifications, computations, and shop drawings, shall not be interpreted to be a permit for, or an approval of any variance or violation of any of the provisions of any COUNTY or STATE codes. ordinances, standards, or policies. Nor shall such issuance of a permit or approval of plans, specifications, computations, and shop drawings prevent any authorized COUNTY representative or COUNTY inspector form thereafter requiring the correction of errors in said plans, specifications, computations, or shop drawings or from stopping construction operations which are being carried on thereunder when in violation of any COUNTY or STATE codes, ordinances, standards. or policies.

[ ] Owner [X] Agent [ ] Contractor Signature John M. MacKenzie Date 4/23/97

COUNTY

BERNALILLO COUNTY USE ONLY

C/R's:		TOTAL FEE:	
		Receipt No.:	
		Received By:	

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

April 18, 1997

Mr. Roger Paul, DRE
Bernalillo County Public Works Dept.
2400 Broadway SE
Albuquerque, NM 87102

Re: Tenorio Park Subdivision

Dear Mr. Paul:

As you recall, we are proposing to discharge developed runoff into the Tom Tenorio Park from a planned residential subdivision located upstream of the park and in the City of Albuquerque. We're hoping to take advantage of the excess storage capacity we feel now exists in the park area after construction of the City's Amole del Norte Channel cut-off upstream flows.

The plans and calculations submitted herewith are intended only to develop a measure of understanding between the County and the developer. We consider the on-site runoff calculations to be well-finalized, but the rest of our plan remains somewhat conceptual.

The primary intent of this submittal is to allow for the County Parks and Recreation Department to feel comfortable with our development objective and promote further discussion on outstanding issues. We would also like you to generate comments as necessary so we may further refine our plan and help us prepare for final submittal. Because this is in a flood plain, we will send a copy to Susan Calongne.

If I can be of further assistance please contact me.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

John M. MacKenzie, PE

JMM/sb

b.\tenorio\discharge.ltr

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APR 24 1997
HYDROLOGY SECTION

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Tenorio Park
SUBJECT Drainage
BY MG DATE 4/10/97
CHECKED _____ DATE _____
SHEET 1 OF ____

This site comprises an on-site area of 19.5203 Ac. Currently undeveloped that drains to Tom Tenorio Park (County). The existing Arnold del Norte Channel prevents any off-site flows from entering this site.

The drainage concept is to surface drain the subdivision to a low point via streets and concrete channels then to collect all flows in a storm drain for conveyance to the park. Arenal Rd. improvements will also need to be collected.

For street and channel capacities we will need to determine the run-off generated from 2 on-site Drainage Areas and the Arenal R/W.

Total on-site Area = 19.5205 Ac.
Area of D.A. 1 = 7.808 Ac.
Area of D.A. 2 = 11.712 Ac.
Area of D.A. 3 (Arenal) = 0.868 Ac.

Precip. Zone = 1 P_6 = 2.20 in. P_{24} = 2.66 in.

Land Treatments D.A. 1 & D.A. 2

Treatment A = 0
Treatment B = 35%
Treatment C = 13%
Treatment D = 52%

RECEIVED
APR 24 1997
HYDROLOGY SECTION

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Tenorio Park
SUBJECT Drainage
BY MG DATE 4/10/97
CHECKED _____ DATE _____
SHEET 2 OF ____

Land Treatment D.A. 3

Treatment A = 0
Treatment B = 0
Treatment C = 5%
Treatment D = 95%

Per Attached AHYMO

D.A. 1	Q_{100} = 26.16 cfs	$Vol._{100}$ = 39,095 C.F.
D.A. 2	Q_{100} = 39.23 cfs	$Vol._{100}$ = 58,631 C.F.
D.A. 3	Q_{100} = 3.74 cfs	$Vol._{100}$ = 6042 C.F.
ON-Site UN-Developed	Q_{100} = 25.32 cfs	$Vol._{100}$ = 31,124 C.F.

RECEIVED
APR 24 1997
HYDROLOGY SECTION

```
START                TIME=0.0
***** HYDROGRAPH FOR THE SUBDIVISION TENORIO PARK
***** SITE IS LOCATED AT THE SOUTHEAST CORNER OF
***** THE AMOLE CHANNEL AND ARENAL.  THERE ARE THREE
***** DRAINAGE BASINS FOR THE DEVELOPMENT.

RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN DT=0.03333 HR

*EXISTING CONDITIONS FOR ON-SITE PROPERTY
*NO OFF-SITE PROPERTY INCLUDED
COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.0305005 SQ MI
                     PER A=100.00  PER B=0.00  PER C=0.00  PER D=0.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1

*PROPOSED CONDITIONS

*DRAINAGE BASIN 1
COMPUTE NM HYD       ID=2 HYD NO=101.2 AREA=0.0122 SQ MI
                     PER A=0.00  PER B=35.00  PER C=13.00  PER D=52.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1

*DRAINAGE BASIN 2
COMPUTE NM HYD       ID=3 HYD NO=101.3 AREA=0.0183 SQ MI
                     PER A=0.00  PER B=35.00  PER C=13.00  PER D=52.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=3 CODE=1

*DRAINAGE BASIN 3
COMPUTE NM HYD       ID=4 HYD NO=101.4 AREA=0.0013563 SQ MI
                     PER A=0.00  PER B=0.00  PER C=5.00  PER D=95.00
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=4 CODE=1

FINISH
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RECEIVED
APR 24 1997
HYDROLOGY SECTION

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 04/10/1997
START TIME (HR:MIN:SEC) = 05:35:14 USER NO.= M_GOODWN.I01
INPUT FILE = TENRIOPK.DAT

START TIME=0.0

***** HYDROGRAPH FOR THE SUBDIVISION TENORIO PARK

***** SITE IS LOCATED AT THE SOUTHEAST CORNER OF

***** THE AMOLE CHANNEL AND ARENAL. THERE ARE THREE

***** DRAINAGE BASINS FOR THE DEVELOPMENT.

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN

RAIN ONE=1.87 IN RAIN SIX=2.20 IN

RAIN DAY=2.66 IN DT=0.03333 HR

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS
2 - PEAK AT 1.40 HR.

DT = .033330 HOURS END TIME = 5.999400 HOURS

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.0122	.0141	.0160	.0180	.0201	.0222	.0243
.0266	.0289	.0312	.0337	.0362	.0388	.0415
.0443	.0472	.0502	.0534	.0567	.0601	.0637
.0675	.0715	.0758	.0809	.0865	.0924	.1050
.1334	.1771	.2398	.3254	.4379	.5814	.7600
.9780	1.1804	1.2649	1.3363	1.3997	1.4575	1.5106

RECEIVED
APR 24 1997
HYDROLOGY SECTION

1.5600	1.6061	1.6493	1.6900	1.7284	1.7646	1.7989
1.8314	1.8623	1.8915	1.9193	1.9456	1.9518	1.9576
1.9630	1.9682	1.9732	1.9780	1.9825	1.9869	1.9912
1.9953	1.9993	2.0031	2.0068	2.0104	2.0140	2.0174
2.0207	2.0240	2.0272	2.0303	2.0333	2.0363	2.0392
2.0420	2.0448	2.0475	2.0502	2.0528	2.0554	2.0580
2.0605	2.0629	2.0653	2.0677	2.0700	2.0723	2.0746
2.0768	2.0790	2.0812	2.0833	2.0855	2.0875	2.0896
2.0916	2.0936	2.0956	2.0976	2.0995	2.1014	2.1033
2.1051	2.1070	2.1088	2.1106	2.1124	2.1141	2.1159
2.1176	2.1193	2.1210	2.1227	2.1244	2.1260	2.1276
2.1292	2.1308	2.1324	2.1340	2.1355	2.1371	2.1386
2.1401	2.1416	2.1431	2.1446	2.1460	2.1475	2.1489
2.1504	2.1518	2.1532	2.1546	2.1560	2.1573	2.1587
2.1600	2.1614	2.1627	2.1640	2.1654	2.1667	2.1680
2.1692	2.1705	2.1718	2.1731	2.1743	2.1756	2.1768
2.1780	2.1792	2.1804	2.1817	2.1829	2.1840	2.1852
2.1864	2.1876	2.1887	2.1899	2.1910	2.1922	2.1933
2.1944	2.1956	2.1967	2.1978	2.1989	2.2000	

*EXISTING CONDITIONS FOR ON-SITE PROPERTY

*NO OFF-SITE PROPERTY INCLUDED

COMPUTE NM HYD ID=1 HYD NO=101.1 AREA=0.0305005 SQ MI

PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764

UNIT PEAK = 62.590 CFS UNIT VOLUME = .9994 B = 273.54 P60 = 1.8700

AREA = .030501 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D

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HYDROLOGY SECTION

T = .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = .43925 INCHES = .7145 ACRE-FEET
PEAK DISCHARGE RATE = 25.32 CFS AT 1.533 HOURS BASIN AREA = .0305 SQ. MI.

*PROPOSED CONDITIONS

*DRAINAGE BASIN 1

COMPUTE NM HYD ID=2 HYD NO=101.2 AREA=0.0122 SQ MI

PER A=0.00 PER B=35.00 PER C=13.00 PER D=52.00

TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420

UNIT PEAK = 25.046 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.8700

AREA = .006344 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D

T = .033330

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HYDROLOGY SECTION

K = .124187HR TP = .133300HR K/TP RATIO = .931637 SHA
PE CONSTANT, N = 3.796975
UNIT PEAK = 14.998 CFS UNIT VOLUME = .9994 B = 341.
40 P60 = 1.8700
AREA = .005856 SQ MI IA = .45937 INCHES INF = 1.13625
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = 1.37941 INCHES = .8975 ACRE-FEET
PEAK DISCHARGE RATE = 26.16 CFS AT 1.500 HOURS BASIN AREA =
.0122 SQ. MI.

*DRAINAGE BASIN 2

COMPUTE NM HYD ID=3 HYD NO=101.3 AREA=0.0183 SQ MI

PER A=0.00 PER B=35.00 PER C=13.00 PER D=52.00

TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHA
PE CONSTANT, N = 7.106420
UNIT PEAK = 37.570 CFS UNIT VOLUME = .9991 B = 526.
28 P60 = 1.8700
AREA = .009516 SQ MI IA = .10000 INCHES INF = .04000

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APR 2 4 1997
HYDROLOGY SECTION

```
 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T =    .033330


        K =    .124187HR     TP =    .133300HR     K/TP RATIO =    .931637      SHA
PE CONSTANT, N =  3.796975
        UNIT PEAK =    22.497    CFS    UNIT VOLUME =     .9997         B =    341.
40      P60 = 1.8700
        AREA =        .008784 SQ MI     IA =     .45937 INCHES     INF =    1.13625
 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T =    .033330

     PRINT HYD             ID=3 CODE=1

                                          PARTIAL HYDROGRAPH   101.30

        RUNOFF VOLUME =      1.37941 INCHES      =        1.3463 ACRE-FEET
        PEAK DISCHARGE RATE =       39.23 CFS  AT    1.500 HOURS    BASIN AREA =
    .0183 SQ. MI.


     *DRAINAGE BASIN 3

COMPUTE NM HYD       ID=4 HYD NO=101.4 AREA=0.0013563 SQ MI

                     PER A=0.00  PER B=0.00  PER C=5.00  PER D=95.00

                     TP=0.1333 HR MASS RAINFALL=-1

K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHA
```


APR 2 4 1997

PE CONSTANT, N = 7.106420
UNIT PEAK = 5.0870 CFS UNIT VOLUME = .9973 B = 526.
28 P60 = 1.8700
AREA = .001288 SQ MI IA = .10000 INCHES INF = .04000
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHA
PE CONSTANT, N = 4.514851
UNIT PEAK = .19746 CFS UNIT VOLUME = .9365 B = 388.
14 P60 = 1.8700
AREA = .000068 SQ MI IA = .35000 INCHES INF = .83000
INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - D
T = .033330

PRINT HYD ID=4 CODE=1

PARTIAL HYDROGRAPH 101.40

RUNOFF VOLUME = 1.91693 INCHES = .1387 ACRE-FEET
PEAK DISCHARGE RATE = 3.74 CFS AT 1.500 HOURS BASIN AREA =
.0014 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 05:35:16

RECEIVED
APR 2 4 1997

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Tenorio Park
SUBJECT Drainage
BY MG DATE 4/10/97
CHECKED _____ DATE _____
SHEET 10 OF ____

The concrete channel that drains D.A.1 to D.A.2 has a slope = 0.67% & Q = 26.16 cfs

$\Longrightarrow$ b = 10', d = 0.53' use 0.67'

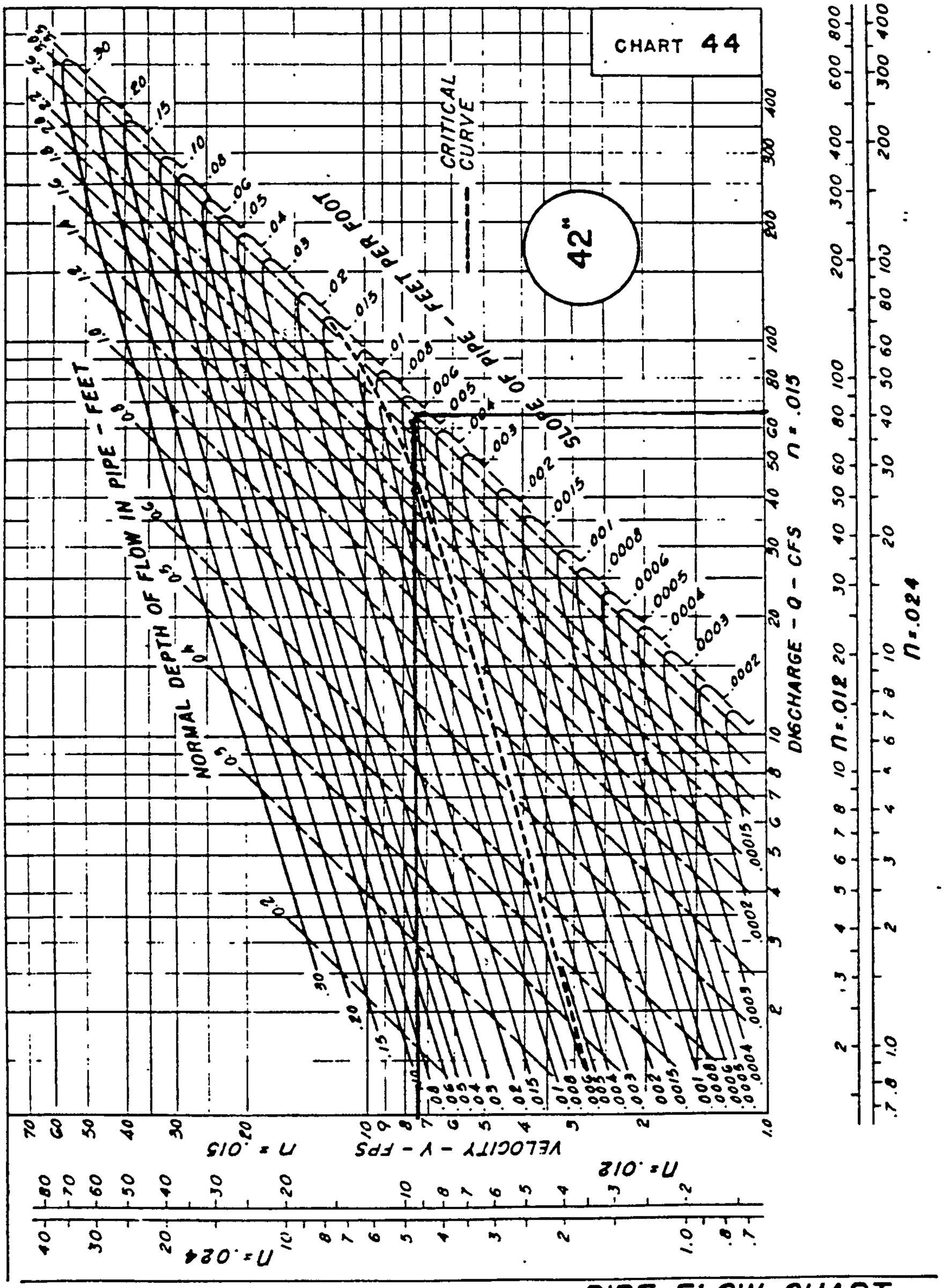
We will place inlets for storm drain in a sump condition but will provide a concrete channel emergency outfall to Park

Q(Actual) = D.A.1 + D.A.2 = 65.39 cfs

Assuming 0.50% slope we need a 42" RCP SD
This will be verified at work order

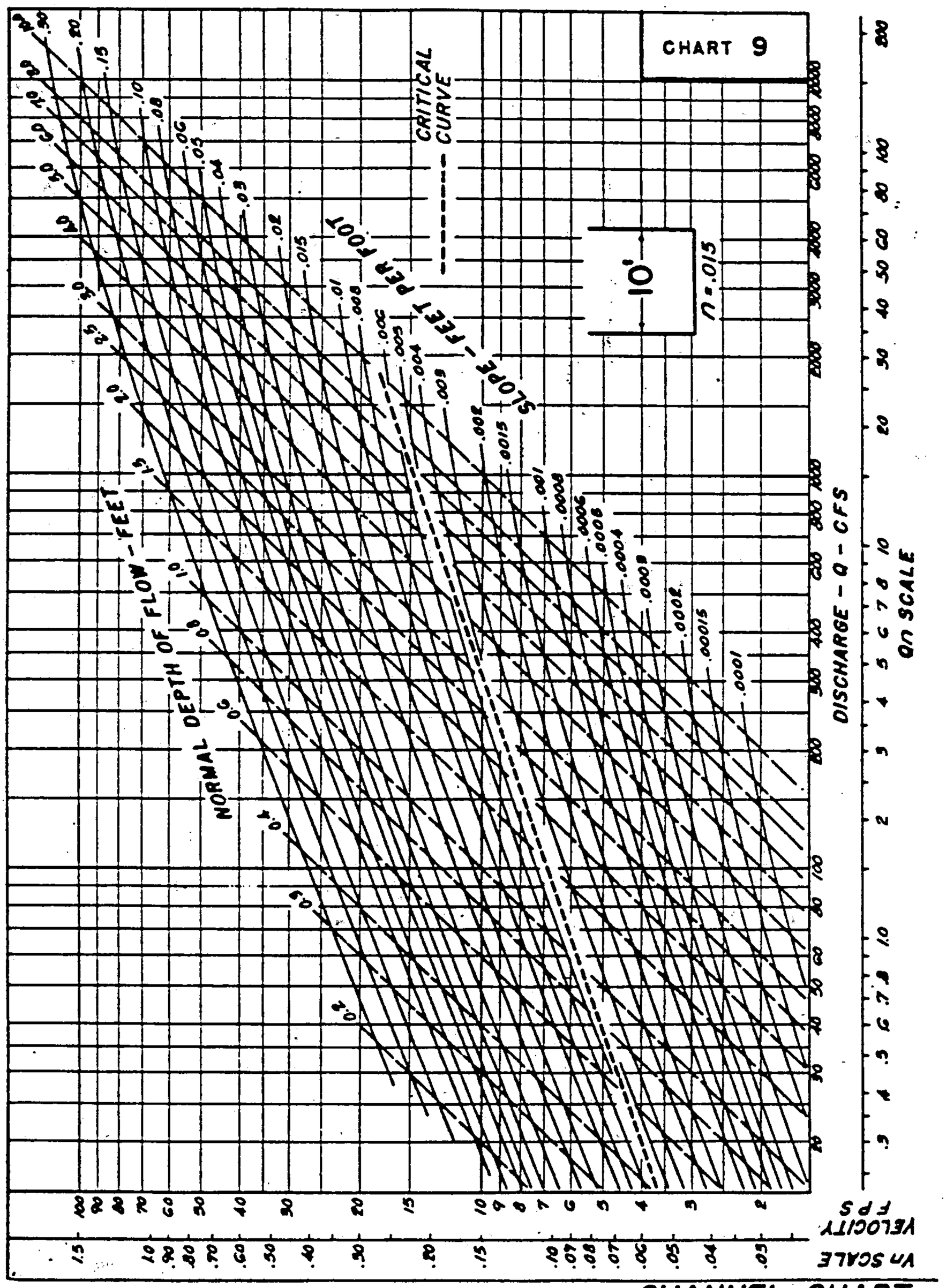
Conc. Channel b = 10' d = 1.0'

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HYDROLOGY SECTION



PIPE FLOW CHART
42-INCH DIAMETER

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CHANNEL CHART
VERTICAL b = 10 FT.

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