



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 17, 1999

Ronald R. Bohanan, P.E.
Tierra West, LLC
4421 McLeod NE
Suite D
Albuquerque, NM 87109

RE: 700 MONTANO SUBDIVISION (F14-D36). DRAINAGE REPORT AND GRADING PLAN FOR PRELIMINARY PLAT, BUILDING PERMIT, AND GRADING PERMIT APPROVALS. ENGINEER'S STAMP DATED JANUARY 12, 1999.

Dear Mr. Bohanan:

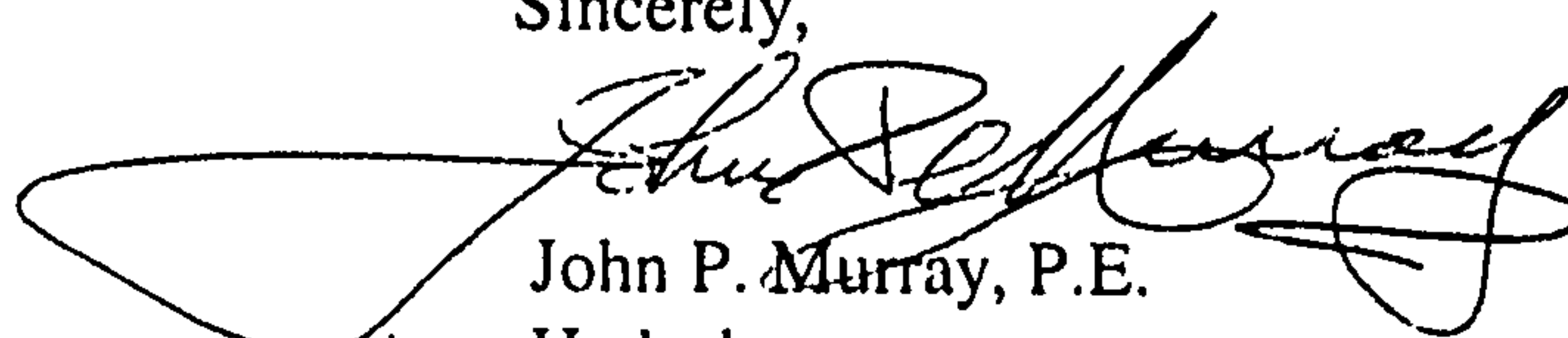
Based on the information provided in your January 19, 1999 submittal, City Hydrology has the following comments:

The G&D Plan is entitled "Javier Estates."

The review by the City's Consultant revealed a number of discrepancies in the plans and calculations. (See also enclosed letter by A-E dated 2/3/99.) The report cites two (2) detention ponds while the plan indicates only one (1). Most of the calculation concerns are with those of the pond(s). The problem may be with editing, i.e., the narrative was not kept abreast of the plan changes.

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

Sincerely,



John P. Murray, P.E.
Hydrology

c: Andrew Garcia
✓File

SMITH ENGINEERING COMPANY
A Full Service Engineering Company

February 3, 1999

Mr. Fred Aguirre, P.E.
Hydrologist
City of Albuquerque
Public Works Department
P.O. Box 1293
Albuquerque, NM 87103

RE: Drainage Report for 700 Montano Subdivision
including the
Grading & Drainage Plan for Javier Estates
Tierra Est, LLC, (Stamped by Ron Bohannon, P.E. 1-12-99)

Request Approvals for:
Preliminary Plat,
Building Permit
Grading Permit

Drainage File F-14 / DO46

SEC Job No. #198624.b29

Dear Mr. Aguirre,

Smith Engineering Company (SEC) is please to review the reference submittal. The scope of the project includes a grading and drainage plat for a small residential subdivision.

My Comments are as follows:

1. The Drainage Report text indicates that the project is to have two detention ponds as do some small figures in the report. The grading plan only shows 1 pond. This must be corrected.
2. The report text indicates the ponds were sized to handle the 100-yr. 10-day storm. The AHYMO model does not simulate this, nor are any calculations presented external to the model to substantiate this. (The AHYMO model was only run for a 6-hour storm.)
3. Page 13 - Pond Calculations - There are only calculations presented for 1 pond. In addition, even assuming only 1 pond as shown on the 24"X36" grading plan. There appear to be numerous errors on this pond calculation sheet as compared to the pond information shown on the grading plan. The apparent errors are as follows:
 - A. Maximum ponding depth shown on calc. sheet is listed as 1.25 . The AHYMO

SMITH ENGINEERING COMPANY
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reservoir routing summary indicates the maximum water surface elevation as 4972.86 and the invert of the pond is shown as 4969.9. Therefore, the maximum water depth is 2.96 feet.

Therefore, a fence is required due to the depth. That is not shown.

B. The bottom pond elevation on the calc. sheet is shown to be 4968. That is 1.9 feet deeper than the pond as the grate elevation is shown as 4969.9. The pond volume calculations are therefore over estimated.

C. The bottom pond area is listed as 3,646 sq ft. I measured the 4970 contour which is the lowest contour in the pond bottom and computed only 1200 sq ft. Therefore, again the pond volume calculations are over estimated.

D. The calculation sheet has errors in the "D" column. (there appear to be some typos in the numbers listed). Is this column suppose to be the incremental depth?

E. What is the source of the Volume formulas presented on this sheet? I am not sure that the formulas are correct?

F. It would appear that the site design changed, and the pond calculations and AHYMO model were not revised, nor was the report text, to match the grading plan.

Pond

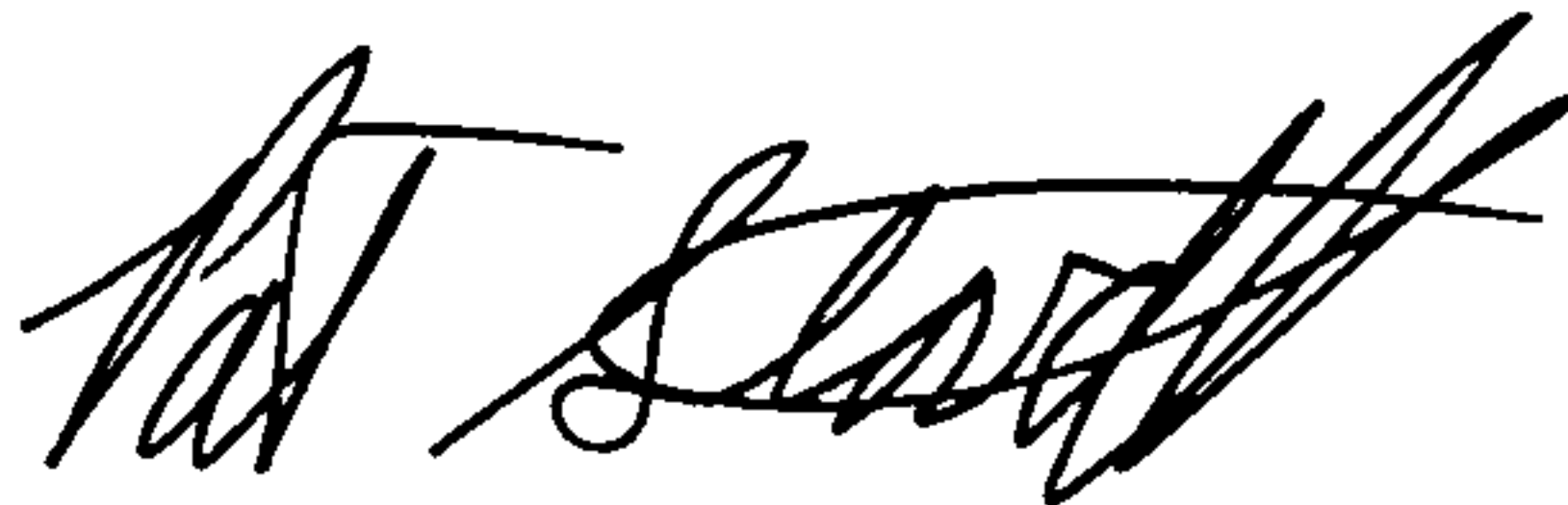
1. The pond freeboard is not discussed.
2. Is a 12"RCP allowed from the pond to connect into the 60"RCP in Montano Rd.

Grading Plan

1. No temporary or permanent COA benchmarks are shown or referenced.

Sincerely,

Pat Stovall, P.E.
Smith Engineering Company



O:\100\198624B\b29.

DRAINAGE INFORMATION SHEET

PROJECT TITLE:	<u>700 Montano</u>	ZONE ATLAS/DRNG. FILE #:	<u>F-14 / D046</u>
DRB #:	<u></u>	EPC #:	<u></u>
WORK ORDER #:	<u></u>		
LEGAL DESCRIPTION:	<u>Lot 6A, North Fourth Street, Homesite Addition</u>		
CITY ADDRESS:	<u>SE Corner of Research Rd & Eubank Blvd.</u>		
ENGINEERING FIRM:	<u>TIERRA WEST LLC</u>	CONTACT:	<u>RONALD R. BOHANNAN OR SHAHAB BLAZAR</u>
ADDRESS:	<u>4421 McLEOD RD., NE SUITE D, ABQ, 87109</u>	PHONE:	<u>(505) 883-7592</u>
OWNER:	<u>Dave Gonzales</u>	CONTACT:	<u>Dave Gonzales</u>
ADDRESS:	<u>5925 Edick NE</u>	PHONE:	<u>(505) 345-7200</u>
ARCHITECT:	<u></u>	CONTACT:	<u></u>
ADDRESS:	<u></u>	PHONE:	<u></u>
SURVEYOR:	<u>Precision Surveys</u>	CONTACT:	<u>Larry Medrano</u>
ADDRESS:	<u>ERR</u>	PHONE:	<u>(505) 856-5700</u>
CONTRACTOR:	<u></u>	CONTACT:	<u></u>
ADDRESS:	<u></u>	PHONE:	<u></u>

TYPE OF SUBMITTAL:

☒	DRAINAGE REPORT
☐	DRAINAGE PLAN
☐	CONCEPTUAL GRADING & DRAINAGE PLAN
☒	GRADING PLAN
☐	EROSION CONTROL PLAN
☐	ENGINEER'S CERTIFICATION
☐	OTHER

PRE-DESIGN MEETING:

☐	YES
☒	NO
☐	COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

☐	SKETCH PLAN 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
☐	CERTIFICATE OF OCCUPANCY APPROVAL
☒	GRADING PERMIT APPROVAL
☐	PAVING PERMIT APPROVAL
☐	S. A. D. DRAINAGE REPORT
☐	DRAINAGE REQUIREMENTS
☐	OTHER <u></u> (SPECIFY)

DATE SUBMITTED: 1/18/99

BY: Ronald R. Bohannon

RECEIVED
JAN 19 1999
HYDROLOGY SECTION

DRAINAGE REPORT
FOR

700 Montano Subdivision

Prepared by:



Tierra West, LLC
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

January, 1999

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

Job No. 980059

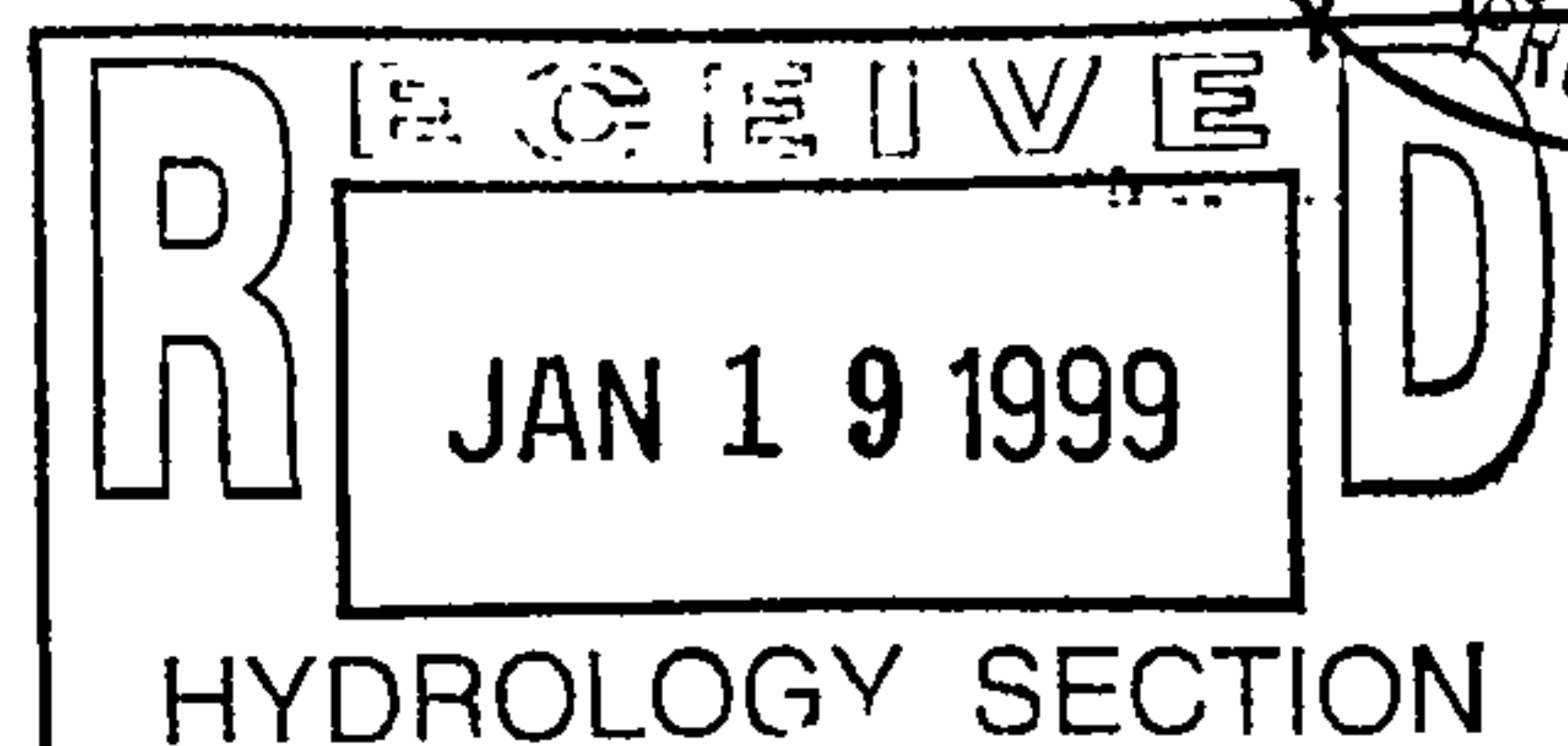


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AHYMO SUMMARY OUTPUT

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(Under proposed conditions 100 and 10-Year Storm)

AHYMO INPUT FILE (100-year & 10-year Storm)
AHYMO SUMMARY OUTPUT

SECTION VI - AHYMO FILES FOR PONDING
(Under proposed conditions 100-Year Storm)

AHYMO INPUT FILE
AHYMO SUMMARY OUTPUT
OUTPUT FILE

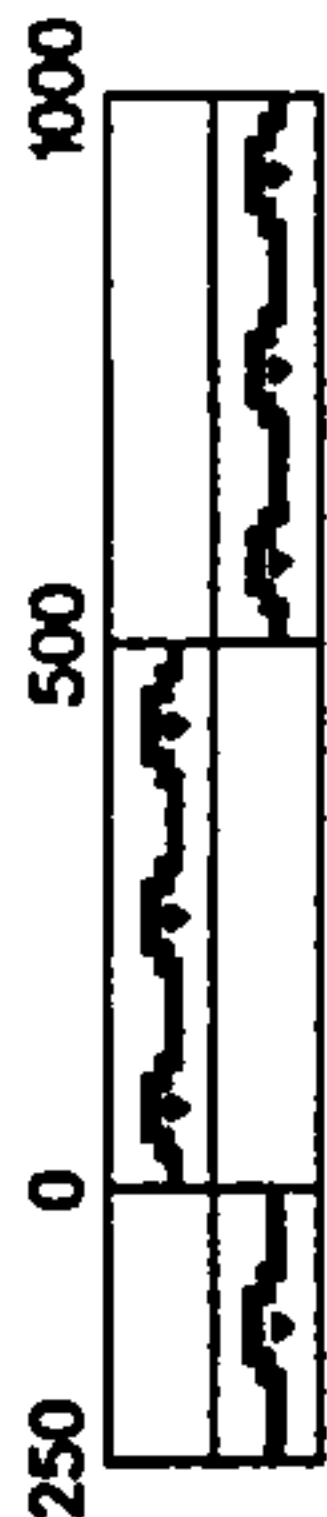
SECTION VII - INFRASTRUCTURE LIST CALCULATIONS

Infrastructure List

MAP POCKET

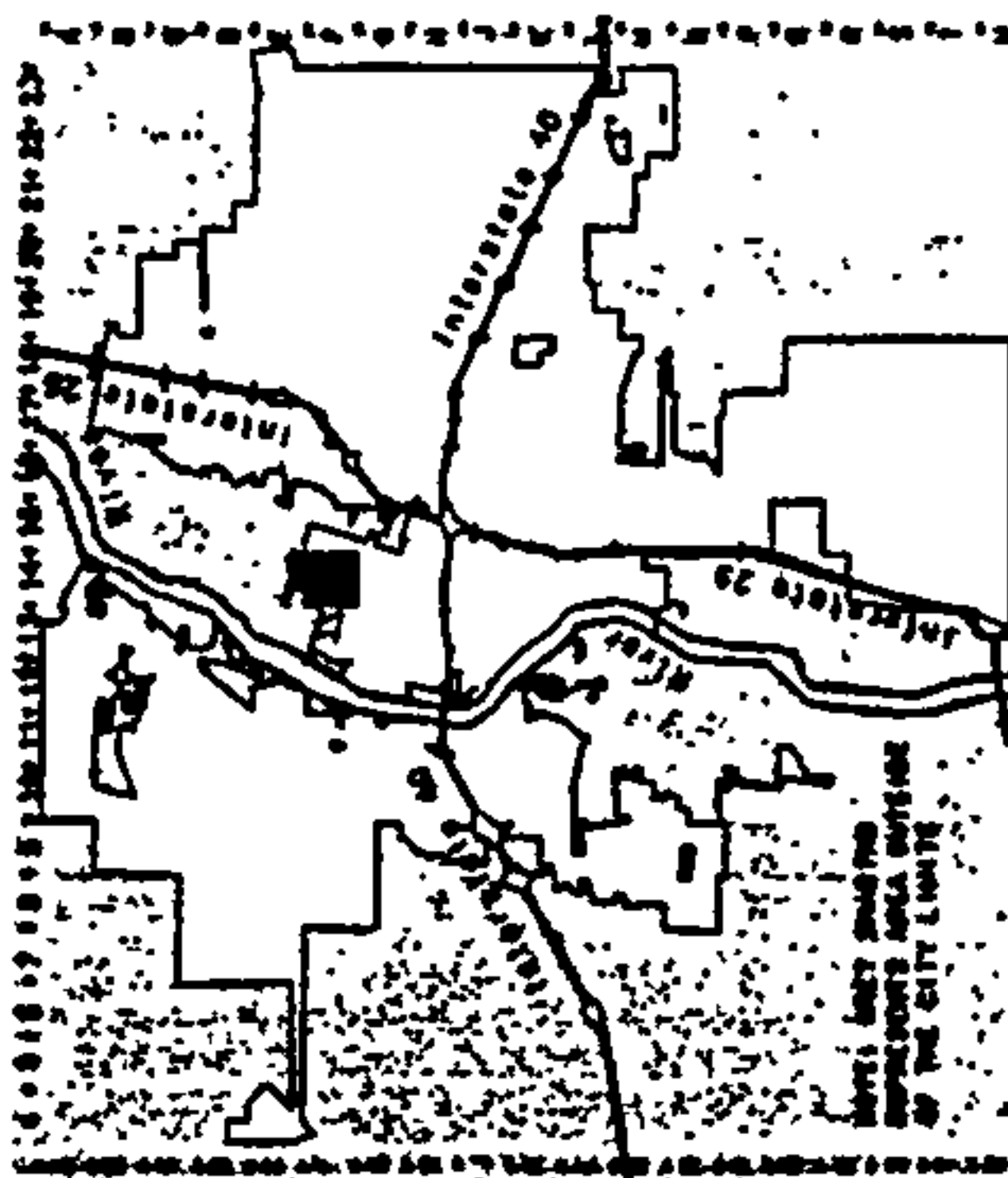
Grading And Drainage Plan

GRAPHIC SCALE IN FEET



City of Albuquerque
Planning Department
 Copyright 1997

Map Amended through February 14, 1997



LEGAL DESCRIPTION

T11N
 R2E
 SEC 32

UNIFORM PROPERTY CODE
 1-04-001

F-14-Z



Location

Lot 6A, of the North Fourth Street Homesites Addition, is located at 700 Montano on the south side of the road, approximately 600 feet east of Ninth Street. This tract contains 2.03 acres on which the owners are proposing to develop a single family subdivision containing 11 lots. See attached Zone Atlas page number F-14 for exact location.

Purpose

The purpose of this drainage report is to present a grading and drainage solution for the 11-lot single family subdivision. We are requesting rough grading approval, grading for building permit, preliminary, and final plat approval.

Existing Drainage Conditions

The site is bordered on three sides by existing residential lots, and these lot effectively contain all their internal flows and eliminate any off-site flow entering the site. The site is a typical North Valley development that is very flat with little, if any, movement of storm water. This Tract has an existing house that will remain on the site. Under the existing conditions, this lot generates a 100-year storm runoff of 3.99 cfs that flows south.

Flood Plain and Soil Condition

The site is on FIRM Map No. 35001C0119 D, as shown on the attached excerpt. The map shows that most of the site falls within the 500-year flood plain, but outside any 100-year flood plain.

The site contains one soil type, Gila Loam (Gd), as showed on the Soil Map (sheet # 20) from the Soil Conservation Service Survey of Bernalillo County. The Gila Loam consists of deep, well-drained soils that formed in recent alluvium on the flood plains along Rio Grande and Rio Puerco. This level of soil is in the irrigated Rio Grande Valley. The runoff in this soil is slow and the hazard of water erosion is slight. This soil is used for irrigated alfalfa, row crops, and pasture. This soil is also used for wildlife habitat and community development. See attached soil map for site location.

Proposed Conditions and On-Site Drainage Management Plan

The site has been designed to drain to the main street then to two ponds located in the common areas. The ponds have been designed so they can retain the runoff for a 100-year, 10-day storm volume (0.264 ac-ft) until the storm sewer pipe in Montano Road is operational.

The storm sewer pipe is in place, but it lacks a lift station to convey the water to the Rio Grande. The lift station is under construction and will take approximately one year to construct. Once the lift station is in place, we will discharge the pond at a confined flow rate of 0.50 cfs per acre (for a total allowable discharge of 1.04 cfs). The pond has been set to discharge the runoff at a total discharge rate of 0.91 cfs which is less than 1.04 cfs allowable.

The developed flow from the site will drain at a proposed runoff of 7.68 cfs to the two ponds A and B as shown on the grading and drainage plan. From there, we will detain the runoff and discharge it at a flow rate of 0.91 cfs. We will install a four-inch orifice opening at

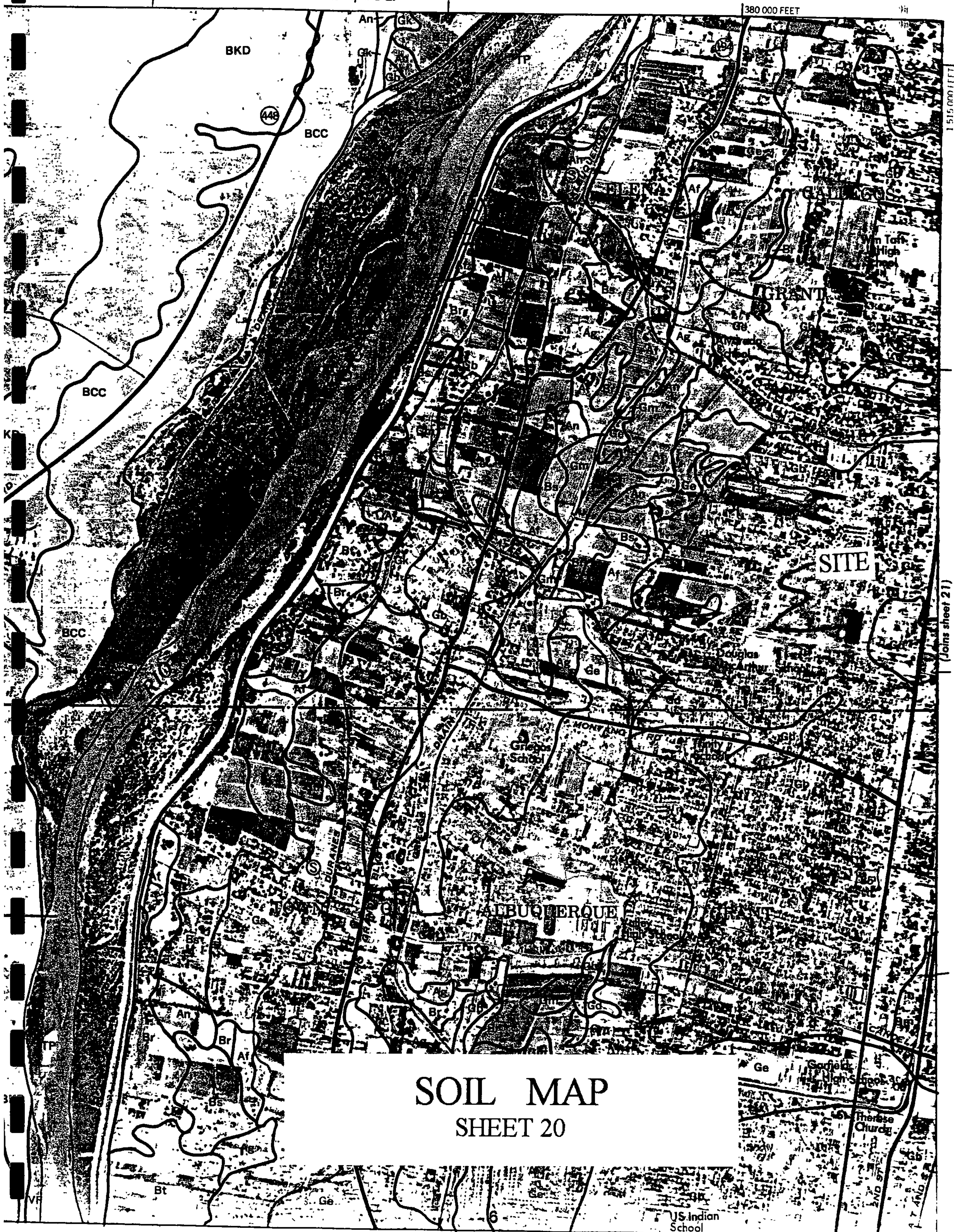
where computed

} only shows
1 pond

the outlet of the inlet in Pond B to control the runoff to the allowable discharge. The two ponds will be connected with an eight-inch pipe, in order for both ponds to act as one pond.



Flood Insurance Rate Map
35001C 0119 D



Emergency Conditions

In case of an emergency, the runoff will overflow the pond and drain to Montano Road through the emergency spillway located at the entrance of the subdivision. See the grading plan for emergency overflow locations. The water block at the entrance is lower than the proposed house pads (as well as doubling as the emergency overflow). Any event greater than the 100-year storm will drain out of the entrance without flooding any of the buildings.

Calculations

We used the City of Albuquerque, Development Process Manual, Section 22.2, Hydrology Section, revised January 1993, to calculate the runoff. See section II of this report for Summary Table for runoff results. See also Sections IV, V, and VI of this report for AHYMO input and output files for runoff and ponding calculations.

Infrastructure List

We have shown all the work within the right-of-way on the infrastructure list (see section VI for infrastructure list). We will tie to this existing 60" RCP into Montano Road with a 12" RCP. We will also call out the detention ponds as a separate item on the infrastructure list to be completed and certified prior to release of financial guarantees.

Section II

Runoff Calculations

RUNOFF DRAINAGE DATA

The site is @ Zone 2

LAND TREATMENT

Proposed

B = 20.00 %

C = 20.00 %

D = 60.00 %

Existing

B = 100 %

DEPTH (INCHES) @ 100-YEAR STORM

$P_{60} = 2.01$ inches

$P_{360} = 2.35$ inches

$P_{1440} = 2.75$ inches

DEPTH (INCHES) @ 10-YEAR STORM

$P_{60} = 2.01 \times 0.667$
 $= 1.34$ inches

$P_{360} = 1.57$

$P_{1440} = 1.83$

See the summary output from AHYMO calculations.

Also see the following summary tables.

RUNOFF SUMMARY TABLE

DRAINAGE BASIN			
BASIN	AREA (SF)	AREA (AC)	AREA (MI ²)
1	90285.72	2.0727	0.003239

BASINS RUNOFF CALCULATION RESULTS UNDER PROPOSED CONDITIONS

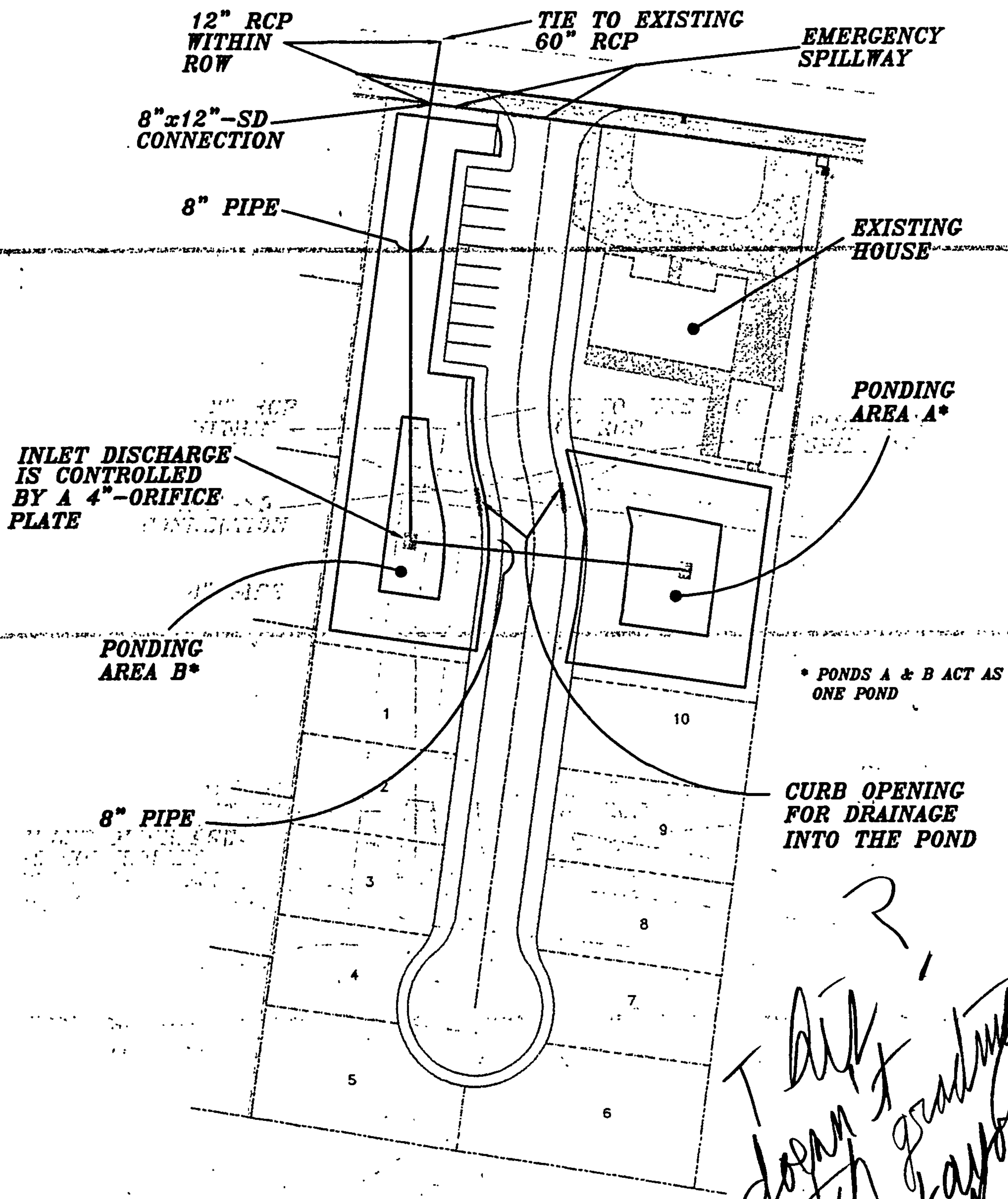
BASIN	Q-100 CFS	Q-10 CFS
1	7.68	4.55

BASINS RUNOFF CALCULATION RESULTS UNDER EXISTING CONDITIONS

BASIN	Q-100 CFS	Q-10 CFS
1	3.99	1.41

Section III

Ponding Calculations



PONDING LOCATIONS

POND VOLUME CALCULATIONS

Volume = $6.94 * D$ (from bottom of the inlet to the top of inlet)

Inlet Depth = 4.00'

Ab - Bottom Of The Pond Surface Area (Top of the inlet)

At - Top Of The Pond Surface Area

D - Water Depth (From top of inlet)

Dt - Total Pond Depth (From top of inlet to maximum water depth)

C - Change In Surface Area / Water Depth

Volume = $Ab * D + 0.5 * C * D^2$

$C = (At - Ab) / Dt$

Ab = 3,646.00 SF

At = 17,907.00 SF

Dt = 1.25 FT

Dia = 4 IN

Radius = 2 IN = 0.1667 ft

C = 11408.80 FT / LF-DEPTH

(Ponding depth from top of the inlet to maximum ponding depth)

H (FT)	D (FT)	VOLUME (AC-FT)	Q (CFS)	FULL ELEV.
0.00	0.00	0.00000	0.00	5068.00
2.00	2.00	0.00032	0.57	5070.00
4.00	4.00	0.00064	0.82	5072.00
4.25	0.25	0.02975	0.85	5072.25
4.50	0.50	0.07523	0.87	5072.50
4.75	0.75	0.13707	0.90	5072.75
5.00	1.00	0.21529	0.92	5073.00
5.25	1.25	0.30988	0.95	5073.25

$Q = CA\sqrt{2gH}$

C = 0.60

A = πr^2

g = 32.2

H = water depth, measured from the center of the orifice plate

VOLUMES ARE NOT CORRECT

Total Depth of Pond can only be 73.25

- 69.90

3.35

Section IV

**AHYMO
FILES**

**(Under Existing Conditions,
100-year, 10-year Storm)**


```
*****
*                                *
*    RENAISSANCE TRACT 3        *
*                                *
*****
*    100-YEAR, 6-HR STORM (UNDER EXISTING CONDITIONS)    *
*                                *
*****
START          TIME=0.0
*
RAINFALL       TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=2.01 IN RAIN SIX=2.35 IN
               RAIN DAY=2.75 IN DT=0.03333 HR
*-----BASIN 1
COMPUTE NM HYD  ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
               PER A=80.00 PER B=10.00 PER C=0.00 PER D=10.00
               TP=-0.1333 HR MASS RAINFALL=-1
*
*****
*    10-YEAR, 6-HR STORM (UNDER EXISTING CONDITIONS)    *
*                                *
*****
START          TIME=0.0
*
RAINFALL       TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=1.34 IN RAIN SIX=1.57 IN
               RAIN DAY=1.83 IN DT=0.03333 HR
*-----BASIN 1
COMPUTE NM HYD  ID=1 HYD NO=111.0 AREA=0.003239 SQ MI
               PER A=80.00 PER B=10.00 PER C=0.00 PER D=10.00
               TP=-0.1333 HR MASS RAINFALL=-1
*
FINISH
```


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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	101.00	-	1	.00324	3.99	.123	.71137	1.533	1.924	PER IMP= 10.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.570
COMPUTE NM HYD	111.00	-	1	.00324	1.41	.045	.25946	1.500	.679	PER IMP= 10.00
FINISH										

Section V

**AHYMO
FILES**

**(Under Proposed Conditions,
100-year, 10-day Storm)**

}
AHYMO still
says "TYPE
rainfall 1"

* RENAISSANCE TRACT 3 *

100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=2.01 IN RAIN SIX=2.35 IN
RAIN DAY=2.75 IN DT=0.03333 HR

-----BASIN 1
COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
TP=-0.1333 HR MASS RAINFALL=-1

10-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=1.34 IN RAIN SIX=1.57 IN
RAIN DAY=1.83 IN DT=0.03333 HR

-----BASIN 1
COMPUTE NM HYD ID=1 HYD NO=111.0 AREA=0.003239 SQ MI
PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
TP=-0.1333 HR MASS RAINFALL=-1

*
FINISH

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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	101.00	-	1	.00324	7.68	.264	1.52600	1.500	3.704	PER IMP= 50.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.570
COMPUTE NM HYD	111.00	-	1	.00324	4.55	.148	.85936	1.500	2.195	PER IMP= 50.00
FINISH										

Section VI

**AHYMO
FILES**

**(Under Proposed Conditions,
100-year, 10-day Storm)**

* RENAISSANCE TRACT 3 *

100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=2.01 IN RAIN SIX=2.35 IN
RAIN DAY=2.75 IN DT=0.03333 HR

COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
TP=-0.1333 HR MASS RAINFALL=-1

*

ROUTE RESERVOIR	ID=2 HYD NO=501.1 INFLOW ID=1 CODE=24
OUTFLOW(CFS)	STORAGE(AC-FT) ELEVATION(FT)
0.00	0.00000 4968.00
0.57	0.00032 4970.00
0.82	0.00064 4972.00
0.85	0.02975 4972.25
0.87	0.07523 4972.50
0.90	0.13707 4972.75
0.92	0.21529 4973.00
0.95	0.30988 4973.25

FINISH

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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	101.00	-	1	.00324	7.68	.264	1.52600	1.500	3.704	PER IMP= 50.00
ROUTE RESERVOIR	501.10	1	2	.00324	.91	.264	1.52825	2.133	.439	AC-FT= .173
FINISH										

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 08/18/1998
START TIME (HR:MIN:SEC) = 10:02:24 USER NO.= R_BOHANN.I01
INPUT FILE = 9859PD

* RENAISSANCE TRACT 3 *

* 100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

*

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01 IN RAIN SIX=2.35 IN
 RAIN DAY=2.75 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	.0049	.0066	.0084	.0102
.0120	.0139	.0158	.0178	.0199	.0219	.0241
.0263	.0286	.0309	.0333	.0358	.0384	.0411
.0439	.0467	.0497	.0529	.0561	.0596	.0631
.0669	.0709	.0751	.0807	.0866	.0930	.1066
.1371	.1840	.2514	.3434	.4644	.6186	.8106
1.0449	1.2624	1.3533	1.4300	1.4982	1.5602	1.6174
1.6704	1.7200	1.7664	1.8102	1.8514	1.8904	1.9273
1.9622	1.9953	2.0268	2.0566	2.0850	2.0915	2.0976
2.1033	2.1088	2.1140	2.1191	2.1239	2.1285	2.1329
2.1373	2.1414	2.1454	2.1494	2.1531	2.1568	2.1604
2.1639	2.1673	2.1706	2.1739	2.1771	2.1802	2.1832
2.1862	2.1891	2.1919	2.1947	2.1975	2.2002	2.2028
2.2054	2.2080	2.2105	2.2130	2.2154	2.2178	2.2202
2.2225	2.2248	2.2270	2.2293	2.2315	2.2336	2.2358
2.2379	2.2399	2.2420	2.2440	2.2460	2.2480	2.2500
2.2519	2.2538	2.2557	2.2576	2.2594	2.2612	2.2631
2.2648	2.2666	2.2684	2.2701	2.2718	2.2735	2.2752
2.2769	2.2785	2.2802	2.2818	2.2834	2.2850	2.2866
2.2881	2.2897	2.2912	2.2928	2.2943	2.2958	2.2973
2.2987	2.3002	2.3017	2.3031	2.3045	2.3060	2.3074
2.3088	2.3102	2.3115	2.3129	2.3143	2.3156	2.3169
2.3183	2.3196	2.3209	2.3222	2.3235	2.3248	2.3261
2.3273	2.3286	2.3298	2.3311	2.3323	2.3335	2.3348
2.3360	2.3372	2.3384	2.3396	2.3408	2.3419	2.3431
2.3443	2.3454	2.3466	2.3477	2.3488	2.3500	

*-----

COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
 PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.3939 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 2.0100
AREA = .001620 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947
UNIT PEAK = 4.2703 CFS UNIT VOLUME = .9974 B = 351.48 P60 = 2.0100
AREA = .001620 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR

*

ROUTE RESERVOIR	ID=2	HYD NO=501.1	INFLOW ID=1	CODE=24
	OUTFLOW(CFS)	STORAGE(AC-FT)	ELEVATION(FT)	
	0.00	0.00000	4968.00	
	0.57	0.00032	4970.00	
	0.82	0.00064	4972.00	
	0.85	0.02975	4972.25	
	0.87	0.07523	4972.50	
	0.90	0.13707	4972.75	
	0.92	0.21529	4973.00	
	0.95	0.30988	4973.25	

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	4968.00	.000	.00
.80	.00	4968.00	.000	.00
1.60	5.53	4972.62	.105	.88
2.40	.29	4972.83	.163	.91
3.20	.05	4972.65	.112	.89
4.00	.03	4972.40	.057	.86
4.80	.03	4972.02	.003	.82
5.60	.03	4968.11	.000	.03
6.40	.00	4968.01	.000	.00
PEAK DISCHARGE = .909 CFS - PEAK OCCURS AT HOUR 2.13				
MAXIMUM WATER SURFACE ELEVATION =		4972.864		
MAXIMUM STORAGE =		.1726 AC-FT	INCREMENTAL TIME= .033330HRS	

PLAN SHOWS
WSE @
4971.42

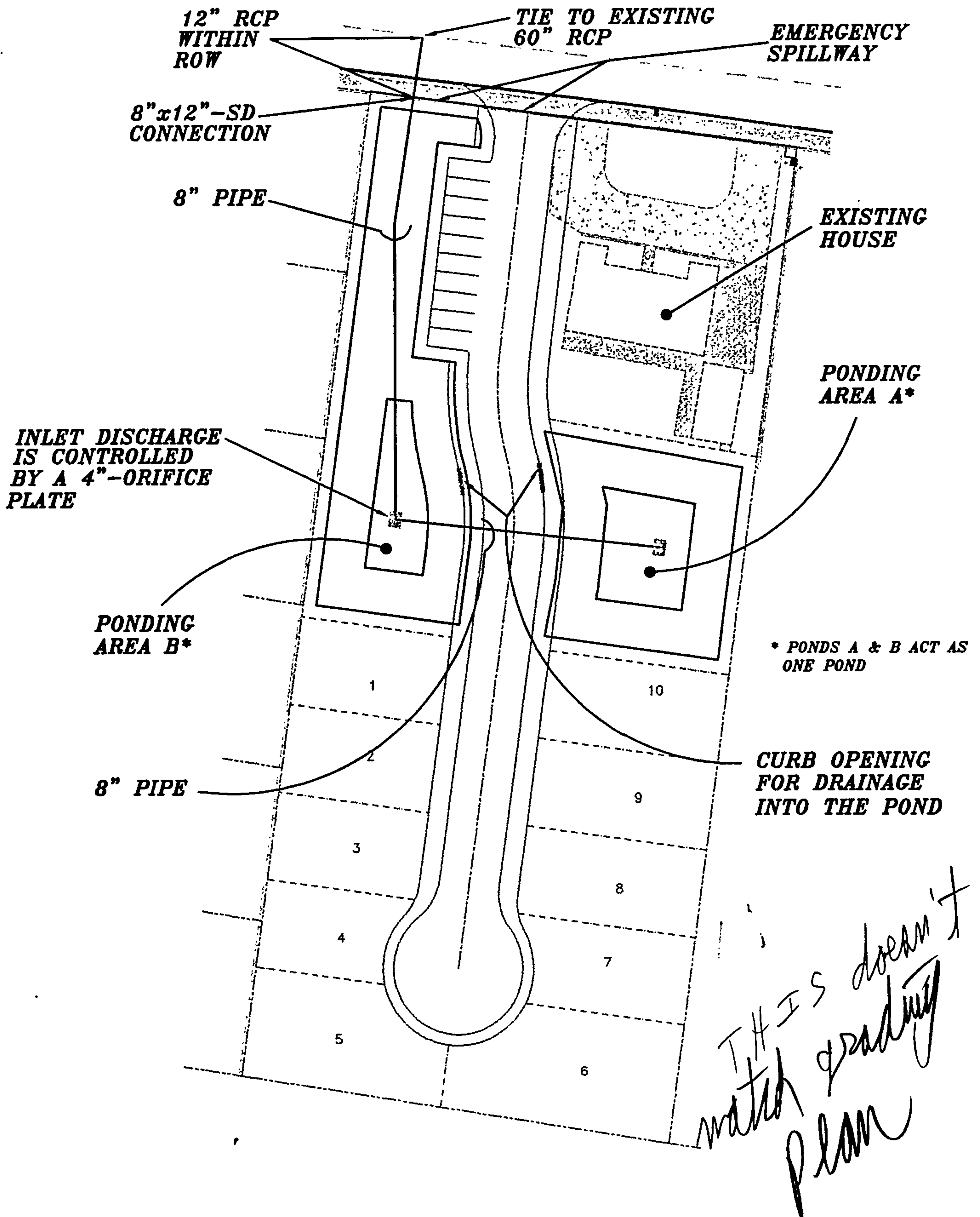
*

*

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 10:02:24



PONDING LOCATIONS

DRAINAGE INFORMATION SHEET

PROJECT TITLE: 700 Montano ZONE ATLAS/DRNG. FILE #: F-14

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Lot 6A, North Fourth Street, Homesite Addition

CITY ADDRESS: SE Corner of Research Rd & Eubank Blvd.

ENGINEERING FIRM: TIERRA WEST LLC CONTACT: RONALD R. BOHANNAN OR SHAHAB BLAZAR

ADDRESS: 4421 McLEOD RD., NE SUITE D, ABQ, 87109 PHONE: (505) 883-7592

OWNER: Dave Gonzales CONTACT: Dave Gonzales

ADDRESS: 5925 Edith NE PHONE: (505) 345-7200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: Precision Surveys CONTACT: Larry Medrano

ADDRESS: ERR PHONE: (505) 856-5700

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT

☐ DRAINAGE PLAN

☐ CONCEPTUAL GRADING & DRAINAGE PLAN

☒ GRADING PLAN

☐ EROSION CONTROL PLAN

☐ ENGINEER'S CERTIFICATION

☐ OTHER

PRE-DESIGN MEETING:

☐ YES

☒ NO

☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAN 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

☐ CERTIFICATE OF OCCUPANCY APPROVAL

☒ GRADING PERMIT APPROVAL

☐ PAVING PERMIT APPROVAL

☐ S. A. D. DRAINAGE REPORT

☐ DRAINAGE REQUIREMENTS

☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: 1/18/99

BY: Ronald R. Bohannon

DRAINAGE REPORT
FOR

700 Montano Subdivision

Prepared by:



Tierra West, LLC
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

January, 1999

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

Job No. 980059

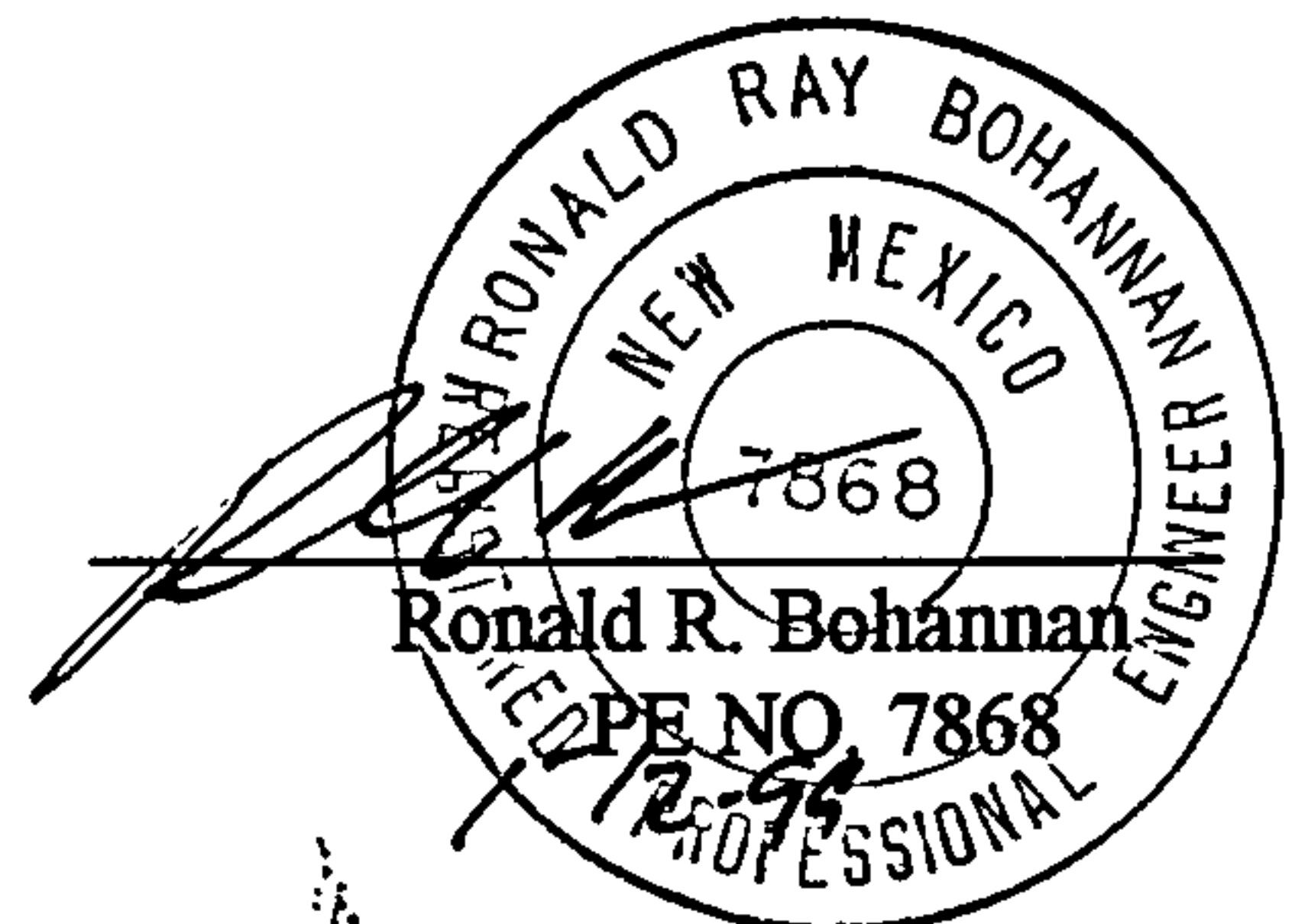


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AHYMO SUMMARY OUTPUT

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(Under proposed conditions 100-Year Storm)

AHYMO INPUT FILE
AHYMO SUMMARY OUTPUT
OUTPUT FILE

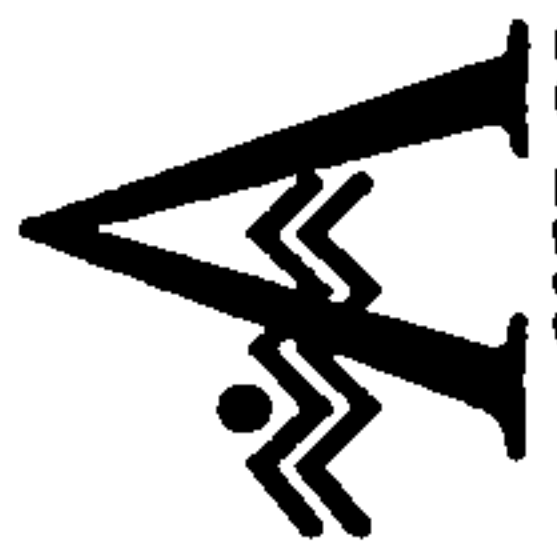
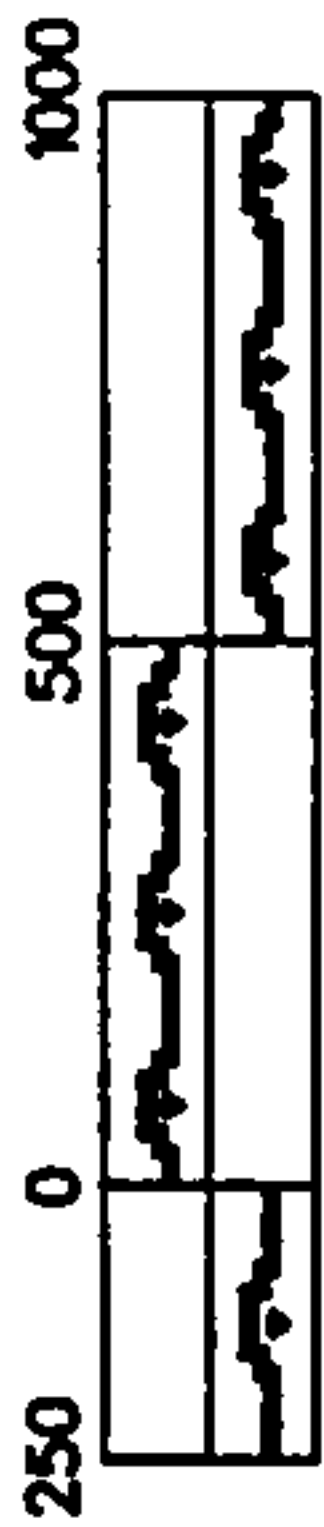
SECTION VII - INFRASTRUCTURE LIST CALCULATIONS

Infrastructure List

MAP POCKET

Grading And Drainage Plan

GRAPHIC SCALE IN FEET

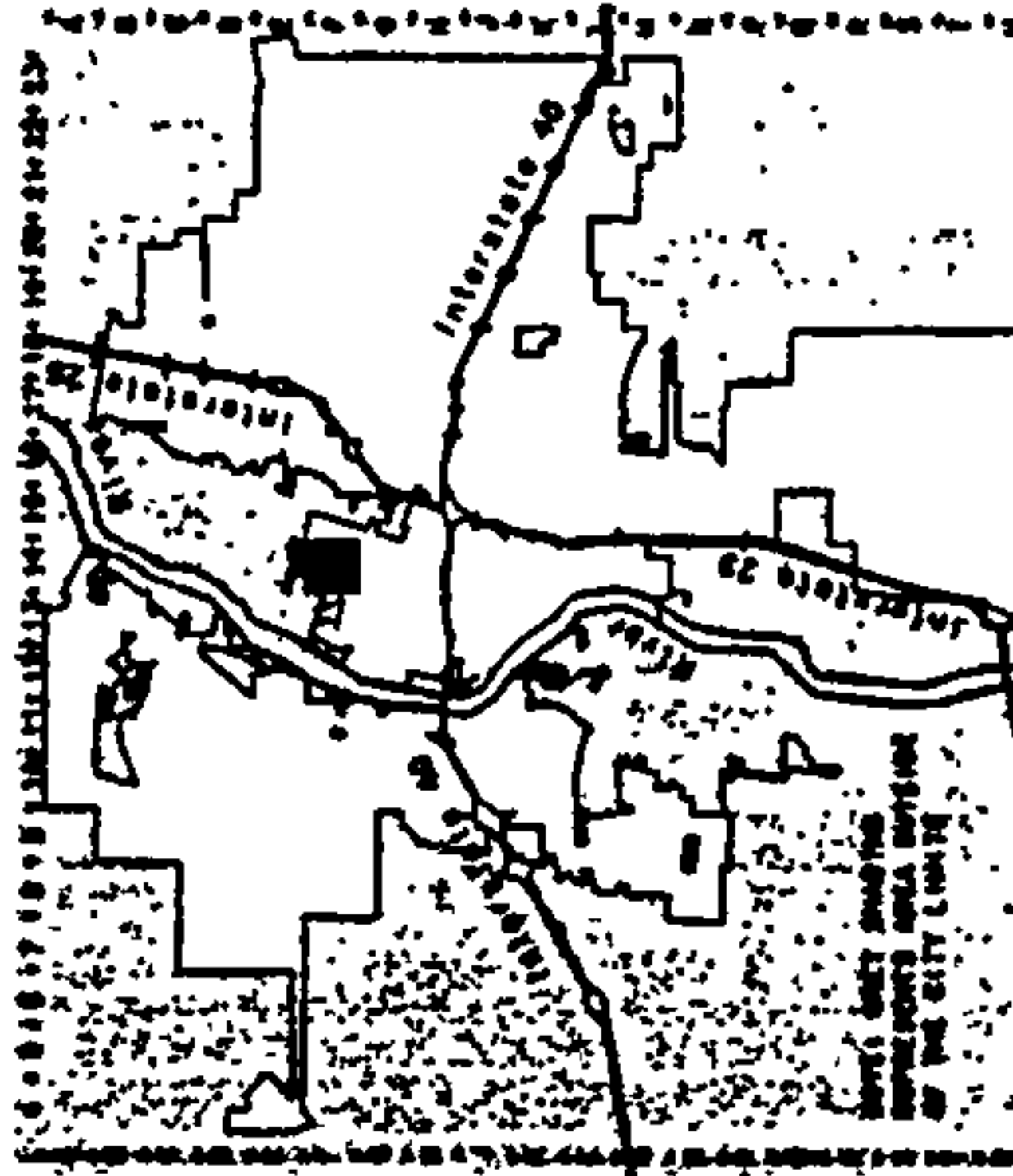


CITY OF
ALBUQUERQUE

AGIS
ALBUQUERQUE
PLANNING DEPARTMENT

© Copyright 1997

Map Amended through February 14, 1997



LEGAL DESCRIPTION

T11N
R3E
SEC 32

UNIFORM PROPERTY CODE
1-014-001

F-14-Z



Location

Lot 6A, of the North Fourth Street Homesites Addition, is located at 700 Montano on the south side of the road, approximately 600 feet east of Ninth Street. This tract contains 2.03 acres on which the owners are proposing to develop a single family subdivision containing 11 lots. See attached Zone Atlas page number F-14 for exact location.

Purpose

The purpose of this drainage report is to present a grading and drainage solution for the 11-lot single family subdivision. We are requesting rough grading approval, grading for building permit, preliminary, and final plat approval.

Existing Drainage Conditions

The site is bordered on three sides by existing residential lots, and these lot effectively contain all their internal flows and eliminate any off-site flow entering the site. The site is a typical North Valley development that is very flat with little, if any, movement of storm water. This Tract has an existing house that will remain on the site. Under the existing conditions, this lot generates a 100-year storm runoff of 3.99 cfs that flows south.

Flood Plain and Soil Condition

The site is on FIRM Map No. 35001C0119 D, as shown on the attached excerpt. The map shows that most of the site falls within the 500-year flood plain, but outside any 100-year flood plain.

The site contains one soil type, Gila Loam (Gd), as showed on the Soil Map (sheet # 20) from the Soil Conservation Service Survey of Bernalillo County. The Gila Loam consists of deep, well-drained soils that formed in recent alluvium on the flood plains along Rio Grande and Rio Puerco. This level of soil is in the irrigated Rio Grande Valley. The runoff in this soil is slow and the hazard of water erosion is slight. This soil is used for irrigated alfalfa, row crops, and pasture. This soil is also used for wildlife habitat and community development. See attached soil map for site location.

Proposed Conditions and On-Site Drainage Management Plan

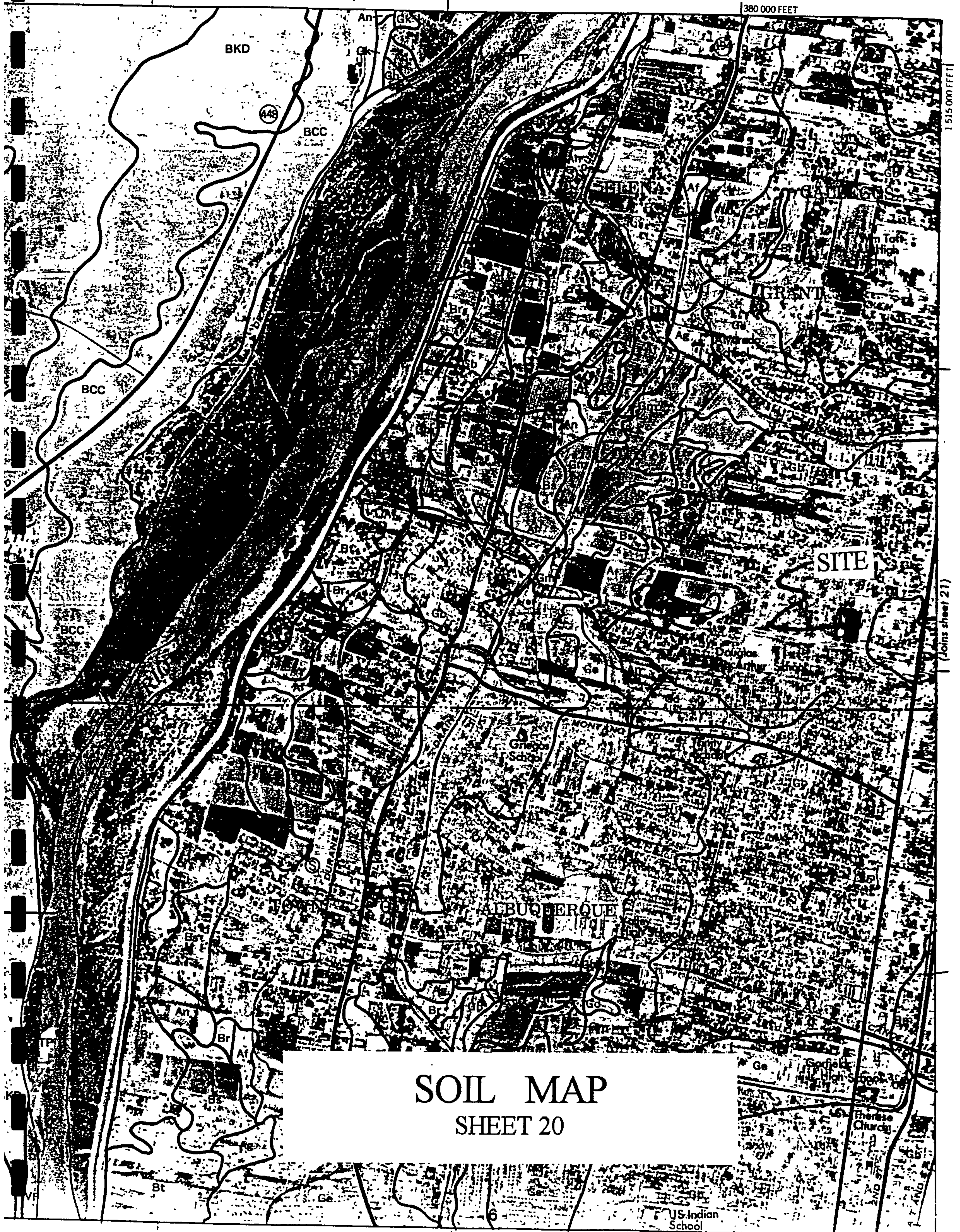
The site has been designed to drain to the main street then to two ponds located in the common areas. The ponds have been designed so they can retain the runoff for a 100-year, 10-day storm volume (0.264 ac-ft) until the storm sewer pipe in Montano Road is operational. The storm sewer pipe is in place, but it lacks a lift station to convey the water to the Rio Grande. The lift station is under construction and will take approximately one year to construct. Once the lift station is in place, we will discharge the pond at a confined flow rate of 0.50 cfs per acre (for a total allowable discharge of 1.04 cfs). The pond has been set to discharge the runoff at a total discharge rate of 0.91 cfs which is less than 1.04 cfs allowable.

The developed flow from the site will drain at a proposed runoff of 7.68 cfs to the two ponds A and B as shown on the grading and drainage plan. From there, we will detain the runoff and discharge it at a flow rate of 0.91 cfs. We will install a four-inch orifice opening at

the outlet of the inlet in Pond B to control the runoff to the allowable discharge. The two ponds will be connected with an eight-inch pipe, in order for both ponds to act as one pond.



Flood Insurance Rate Map
35001C 0119 D



Emergency Conditions

In case of an emergency, the runoff will overflow the pond and drain to Montano Road through the emergency spillway located at the entrance of the subdivision. See the grading plan for emergency overflow locations. The water block at the entrance is lower than the proposed house pads (as well as doubling as the emergency overflow). Any event greater than the 100-year storm will drain out of the entrance without flooding any of the buildings.

Calculations

We used the City of Albuquerque, Development Process Manual, Section 22.2, Hydrology Section, revised January 1993, to calculate the runoff. See section II of this report for Summary Table for runoff results. See also Sections IV, V, and VI of this report for AHYMO input and output files for runoff and ponding calculations.

Infrastructure List

We have shown all the work within the right-of-way on the infrastructure list (see section VI for infrastructure list). We will tie to this existing 60" RCP into Montano Road with a 12" RCP. We will also call out the detention ponds as a separate item on the infrastructure list to be completed and certified prior to release of financial guarantees.

Section II

Runoff Calculations

RUNOFF DRAINAGE DATA

The site is @ Zone 2

LAND TREATMENT

Proposed

B = 20.00 %

C = 20.00 %

D = 60.00 %

Existing

B = 100 %

DEPTH (INCHES) @ 100-YEAR STORM

$P_{60} = 2.01$ inches

$P_{360} = 2.35$ inches

$P_{1440} = 2.75$ inches

DEPTH (INCHES) @ 10-YEAR STORM

$P_{60} = 2.01 \times 0.667$
 $= 1.34$ inches

$P_{360} = 1.57$

$P_{1440} = 1.83$

See the summary output from AHYMO calculations.

Also see the following summary tables.

RUNOFF SUMMARY TABLE

DRAINAGE BASIN			
BASIN	AREA (SF)	AREA (AC)	AREA (MI ²)
1	90285.72	2.0727	0.003239

BASINS RUNOFF CALCULATION RESULTS UNDER PROPOSED CONDITIONS

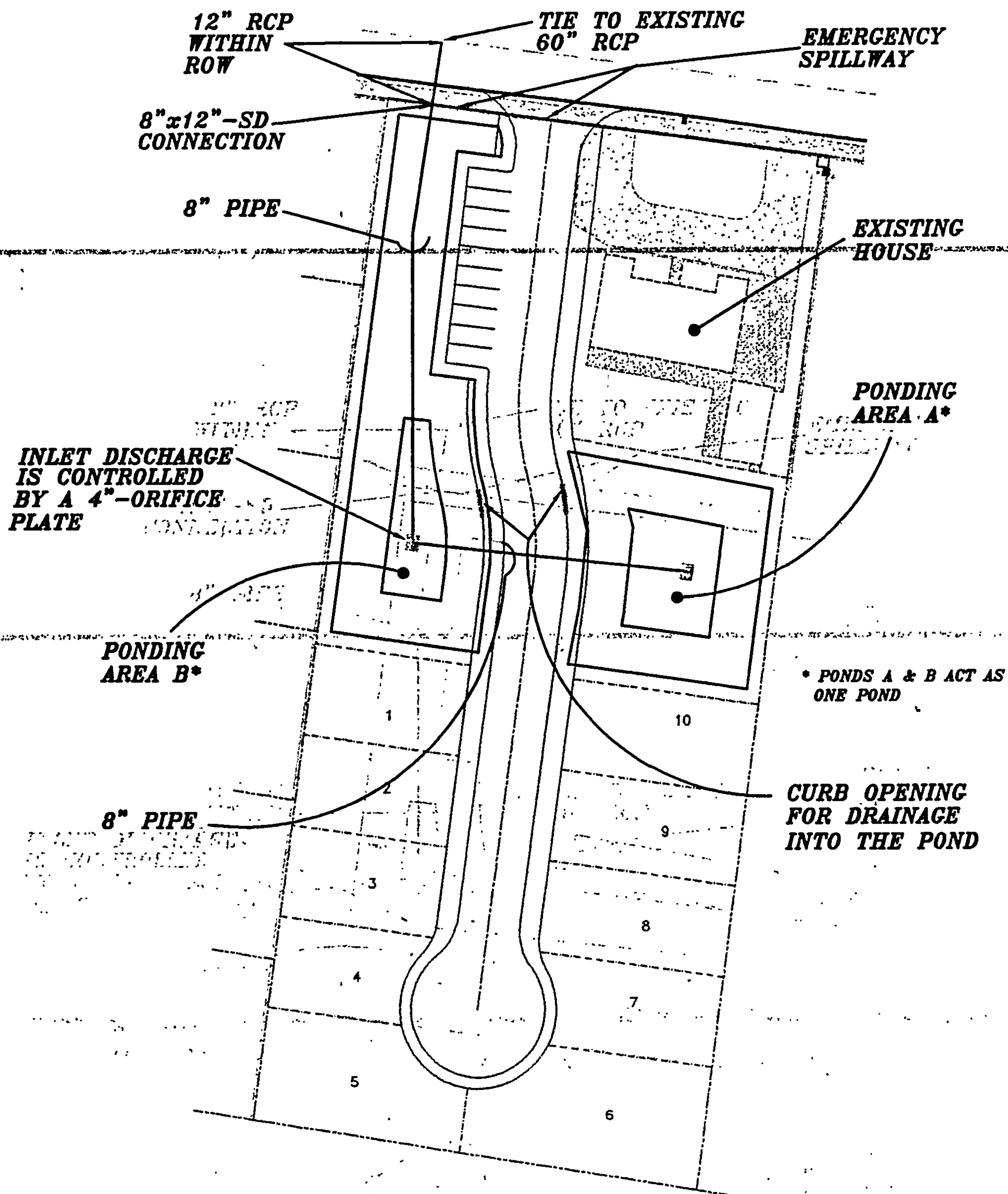
BASIN	Q-100 CFS	Q-10 CFS
1	7.68	4.55

BASINS RUNOFF CALCULATION RESULTS UNDER EXISTING CONDITIONS

BASIN	Q-100 CFS	Q-10 CFS
1	3.99	1.41

Section III

Ponding Calculations



PONDING LOCATIONS

POND VOLUME CALCULATIONS

Volume = $6.94 * D$ (from bottom of the inlet to the top of inlet)

Inlet Depth = 4.00'

Ab - Bottom Of The Pond Surface Area (Top of the inlet)

At - Top Of The Pond Surface Area

D - Water Depth (From top of inlet)

Dt - Total Pond Depth (From top of inlet to maximum water depth)

C - Change In Surface Area / Water Depth

Volume = $Ab * D + 0.5 * C * D^2$

$C = (At - Ab) / Dt$

Ab = 3,646.00 SF

At = 17,907.00 SF

Dt = 1.25 FT

(Ponding depth from top of the inlet to maximum ponding depth)

Dia = 4 IN

Radius = 2 IN

C = 11408.80 FT / LF-DEPTH

H (FT)	D (FT)	VOLUME (AC-FT)	Q (CFS)	FULL ELEV.
0.00	0.00	0.00000	0.00	5068.00
2.00	2.00	0.00032	0.57	5070.00
4.00	4.00	0.00064	0.82	5072.00
4.25	0.25	0.02975	0.85	5072.25
4.50	0.50	0.07523	0.87	5072.50
4.75	0.75	0.13707	0.90	5072.75
5.00	1.00	0.21529	0.92	5073.00
5.25	1.25	0.30988	0.95	5073.25

$Q = CA\sqrt{2gH}$

C = 0.60

$A = \pi r^2$

g = 32.2

H = water depth, measured from the center of the orifice plate

Section IV

**AHYMO
FILES**

**(Under Existing Conditions,
100-year, 10-year Storm)**

* RENAISSANCE TRACT 3 *

* 100-YEAR, 6-HR STORM (UNDER EXISTING CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=2.01 IN RAIN SIX=2.35 IN
RAIN DAY=2.75 IN DT=0.03333 HR

-----BASIN 1

COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
PER A=80.00 PER B=10.00 PER C=0.00 PER D=10.00
TP=-0.1333 HR MASS RAINFALL=-1

*

* 10-YEAR, 6-HR STORM (UNDER EXISTING CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=1.34 IN RAIN SIX=1.57 IN
RAIN DAY=1.83 IN DT=0.03333 HR

-----BASIN 1

COMPUTE NM HYD ID=1 HYD NO=111.0 AREA=0.003239 SQ MI
PER A=80.00 PER B=10.00 PER C=0.00 PER D=10.00
TP=-0.1333 HR MASS RAINFALL=-1

*

FINISH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM TO		AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1	
		ID NO.	ID NO.							NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.350
COMPUTE NM HYD	101.00	-	1	.00324	3.99	.123	.71137	1.533	1.924	PER IMP=	10.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.570
COMPUTE NM HYD	111.00	-	1	.00324	1.41	.045	.25946	1.500	.679	PER IMP=	10.00
FINISH											

Section V

**AHYMO
FILES**

**(Under Proposed Conditions,
100-year, 10-day Storm)**

* RENAISSANCE TRACT 3 *

100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=2.01 IN RAIN SIX=2.35 IN
RAIN DAY=2.75 IN DT=0.03333 HR

-----BASIN 1
COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
TP=-0.1333 HR MASS RAINFALL=-1

* 10-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=1.34 IN RAIN SIX=1.57 IN
RAIN DAY=1.83 IN DT=0.03333 HR

-----BASIN 1
COMPUTE NM HYD ID=1 HYD NO=111.0 AREA=0.003239 SQ MI
PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
TP=-0.1333 HR MASS RAINFALL=-1

*
FINISH

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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	101.00	-	1	.00324	7.68	.264	1.52600	1.500	3.704	PER IMP= 50.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.570
COMPUTE NM HYD	111.00	-	1	.00324	4.55	.148	.85936	1.500	2.195	PER IMP= 50.00
FINISH										

Section VI

**AHYMO
FILES**

**(Under Proposed Conditions,
100-year, 10-day Storm)**

* RENAISSANCE TRACT 3 *

100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=2.01 IN RAIN SIX=2.35 IN
RAIN DAY=2.75 IN DT=0.03333 HR

COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
TP=-0.1333 HR MASS RAINFALL=-1

*
ROUTE RESERVOIR ID=2 HYD NO=501.1 INFLOW ID=1 CODE=24

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEVATION(FT)
0.00	0.00000	4968.00
0.57	0.00032	4970.00
0.82	0.00064	4972.00
0.85	0.02975	4972.25
0.87	0.07523	4972.50
0.90	0.13707	4972.75
0.92	0.21529	4973.00
0.95	0.30988	4973.25

FINISH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM	TO	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1
		ID NO.	ID NO.							NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	101.00	-	1	.00324	7.68	.264	1.52600	1.500	3.704	PER IMP= 50.00
ROUTE RESERVOIR	501.10	1	2	.00324	.91	.264	1.52825	2.133	.439	AC-FT= .173
FINISH										

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
 RUN DATE (MON/DAY/YR) = 08/18/1998
 START TIME (HR:MIN:SEC) = 10:02:24 USER NO.= R_BOHANN.I01
 INPUT FILE = 9859PD

* RENAISSANCE TRACT 3 *

* 100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

START TIME=0.0

*

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01 IN RAIN SIX=2.35 IN
 RAIN DAY=2.75 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	.0049	.0066	.0084	.0102
.0120	.0139	.0158	.0178	.0199	.0219	.0241
.0263	.0286	.0309	.0333	.0358	.0384	.0411
.0439	.0467	.0497	.0529	.0561	.0596	.0631
.0669	.0709	.0751	.0807	.0866	.0930	.1066
.1371	.1840	.2514	.3434	.4644	.6186	.8106
1.0449	1.2624	1.3533	1.4300	1.4982	1.5602	1.6174
1.6704	1.7200	1.7664	1.8102	1.8514	1.8904	1.9273
1.9622	1.9953	2.0268	2.0566	2.0850	2.0915	2.0976
2.1033	2.1088	2.1140	2.1191	2.1239	2.1285	2.1329
2.1373	2.1414	2.1454	2.1494	2.1531	2.1568	2.1604
2.1639	2.1673	2.1706	2.1739	2.1771	2.1802	2.1832
2.1862	2.1891	2.1919	2.1947	2.1975	2.2002	2.2028
2.2054	2.2080	2.2105	2.2130	2.2154	2.2178	2.2202
2.2225	2.2248	2.2270	2.2293	2.2315	2.2336	2.2358
2.2379	2.2399	2.2420	2.2440	2.2460	2.2480	2.2500
2.2519	2.2538	2.2557	2.2576	2.2594	2.2612	2.2631
2.2648	2.2666	2.2684	2.2701	2.2718	2.2735	2.2752
2.2769	2.2785	2.2802	2.2818	2.2834	2.2850	2.2866
2.2881	2.2897	2.2912	2.2928	2.2943	2.2958	2.2973
2.2987	2.3002	2.3017	2.3031	2.3045	2.3060	2.3074
2.3088	2.3102	2.3115	2.3129	2.3143	2.3156	2.3169
2.3183	2.3196	2.3209	2.3222	2.3235	2.3248	2.3261
2.3273	2.3286	2.3298	2.3311	2.3323	2.3335	2.3348
2.3360	2.3372	2.3384	2.3396	2.3408	2.3419	2.3431
2.3443	2.3454	2.3466	2.3477	2.3488	2.3500	

*-----

COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.003239 SQ MI
 PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 6.3939 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 2.0100
 AREA = .001620 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947
 UNIT PEAK = 4.2703 CFS UNIT VOLUME = .9974 B = 351.48 P60 = 2.0100
 AREA = .001620 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR

*

ROUTE RESERVOIR	ID=2	HYD NO=501.1	INFLOW ID=1	CODE=24
	OUTFLOW(CFS)	STORAGE(AC-FT)	ELEVATION(FT)	
	0.00	0.00000	4968.00	
	0.57	0.00032	4970.00	
	0.82	0.00064	4972.00	
	0.85	0.02975	4972.25	
	0.87	0.07523	4972.50	
	0.90	0.13707	4972.75	
	0.92	0.21529	4973.00	
	0.95	0.30988	4973.25	

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	4968.00	.000	.00
.80	.00	4968.00	.000	.00
1.60	5.53	4972.62	.105	.88
2.40	.29	4972.83	.163	.91
3.20	.05	4972.65	.112	.89
4.00	.03	4972.40	.057	.86
4.80	.03	4972.02	.003	.82
5.60	.03	4968.11	.000	.03
6.40	.00	4968.01	.000	.00

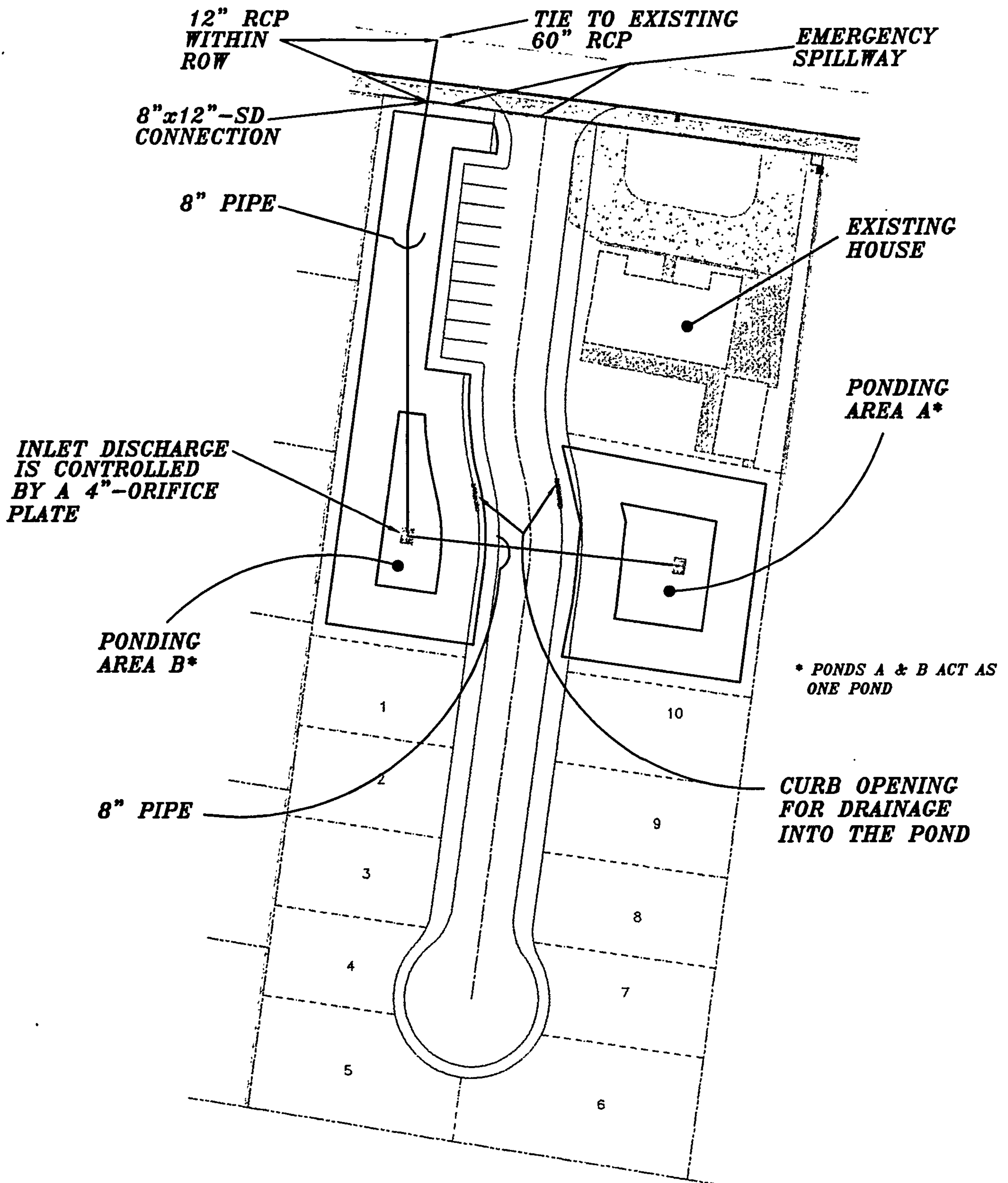
PEAK DISCHARGE = .909 CFS - PEAK OCCURS AT HOUR 2.13
 MAXIMUM WATER SURFACE ELEVATION = 4972.864
 MAXIMUM STORAGE = .1726 AC-FT INCREMENTAL TIME= .033330HRS

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FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 10:02:24



PONDING LOCATIONS