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Larry Read

From: Larry Read [lread@readengineering.com]

Sent: Tuesday, August 16, 2011 12:02 PM

To: 'Cherne, Curtis '

Cc: 'Adil R'

Subject: Paradise RV Park

Curtis

I added Basin 950 which includes the truck wash and Leonidas Lane. The total area is 4.2 acres and I modeled it using A=0%, B=8%, C=7%. And D=85%. The total discharge is 22.6 cfs.

Putting that into the storm drain model, the pipe from the south corner of the truck wash south to Volcano Rd will be a 24" storm drain (sized as gravity flow – HGL is at the crown of the pipe). The distance is 600'.

The 42" from Volcano/Leonidas Lane intersection to the pond has sufficient additional capacity for the extra 22.6 cfs so that size is still valid.

If you have any questions, please let me know.

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10/1/2012

PRELIMINARY DRAINAGE REPORT

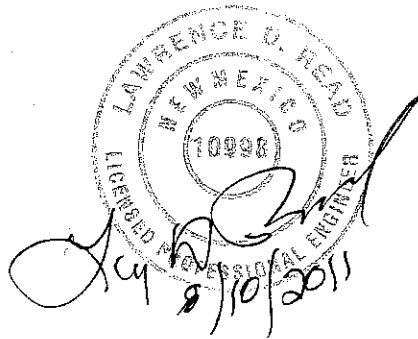
for

PARADISE RV PARK - PHASE I

ALBUQUERQUE, NEW MEXICO

June 2011

Revised August 2011



Prepared by
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LOCATION & DESCRIPTION

The proposed Phase I site is approximately a 4.61 acre parcel located north of Volcano Road NE and west of Leonidas Lane NW as shown on the Vicinity Map. The 'L' shaped parcel is proposed to provide 66 RV parking spaces (for rent) and a community center/office building. Phase II of this development will be west of the Phase I development (on Lot 5) and adjacent to the future 102nd Street NW.

EXISTING DRAINAGE

The existing slope is from northwest to southeast at approximately 2.5 to 3% slopes. The drainage scheme is predominantly shallow sheet flow with minor rivulets starting to form as the flows concentrate in the lower sections of the drainage basins.

Previous preliminary designs (prepared by Raymond Macy, PE in 1998 Appendix F) placed a retention basin at the south end of the constructed portion of Leonidas Lane. This pond not only holds the runoff from Leonidas Lane south of Avalon but also the runoff from a small arroyo that, in the undeveloped state, collects runoff from Basin 300 and Basin 900.

In addition to this small pond, a two cell, regional pond (98th Street Pond) was built on the south side of Volcano south of this site . The pond was built as part of the Amole del Norte Storm Diversion Facilities, Tierra Bayita Project as designed by Greiner Engineering (COA Project # 407692) in 1995. Most of the runoff from this project site and Basins 300 thru 900 will ultimately be directed to this pond via storm drains.

Currently the runoff generated on site sheet flow to the east southeast where it crosses Leonidas Lane generally toward the Amole del Norte ponds discussed above. There currently is no infrastructure is Volcano Road.

In order to reconcile the drainage basin boundaries and hydrologic analyses in this report to previous drainage master plans, we compared the basins to those presented in both the Amole Channel "Future Developed Conditions" Drainage Basin Map prepared by Mark Goodwin & Associates in 2004 (Appendix E) and the Amole Hubbell Drainage Management Plan prepared by Greiner Engineering in 1995 (Appendix D). In the case of the Mark Goodwin report (Appendix E), the western boundary of Basin 600 in this report matched very closely. In the case of the Greiner report, all Basins in this report very closely match Greiner's (Appendix D) except they are cut off at Interstate 40 due to the construction of the I-40 pond system which eliminated contributory runoff from north of I-40. See the Drainage Basin Comparison Map in Appendix D.

The land treatment percentages used in this report were extracted from the Greiner report (March 1995). Using the Goodwin (7-3-04) report, the land treatment percentages used were based on the existing A-1 zoning changing to RA-1 (residential agricultural) with a density of 2 du/acre (Figure II-1 and Table II-4). These land treatment percentages seem appropriate for the proposed zoning.

PROPOSED CONDITIONS

The proposed drainage scheme for Phase I of the Paradise RV Park generally follows the existing direction. The runoff is conveyed in the proposed gravel and paved streets in a northwest to southeast direction. The proposed development intends to complete construction of Leonidas Lane from it's current termination at the north side of this site south of connect to Volcano Road at the southeast corner of this site. A proposed inlet system where the south access to the RV Park meets Leonidas Lane will intercept most of the runoff generated onsite and convey it to the Amole del Norte ponds south of Volcano Road and this site. The intent is to direct the developed runoff from this site into the landscape areas along Leonidas Lane to allow some infiltration before the flow overtop the curb and are intercepted in the proposed inlet system in Leonidas Lane.

Since the existing onsite pond will no longer be needed to handle flows from Leonidas Lane once the road is completed, we propose to relocate to the northwest (in the Phase II area - Parcel 5) along the small arroyo flowline to intercept offsite flows before they enter the Phase I development area.

Due to large runoff generated offsite, a storm drain system is anticipated to collect the runoff and convey it to the Amole del Norte ponds to the south of this site. Although the full routing of this system is beyond the scope of this report, a portion of the storm drain system will undoubtedly be required in Volcano Road along the southern boundary of this site. As such, this report has located and sized a trunk storm drain line in Volcano Road from the future 110th Street to the Amole del Norte ponds based on the drainage basins shown on the Drainage Basin Map. In addition, it has modeled north/south sections of future storm drains in 102nd, 106th, and 100th Streets between Volcano and Avalon.

FLOODPLAIN STATUS

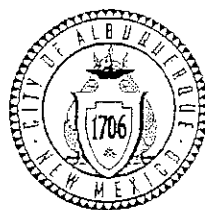
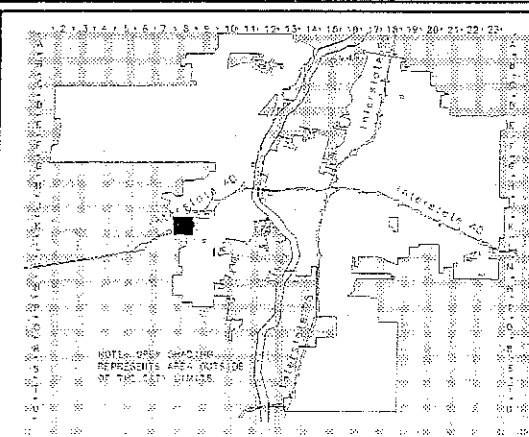
This project, as shown on FEMA Flood Insurance Rate Map Panel 35001C0328 G, September 26, 2008, shows that this site is in a Zone X, areas of 100-year flooding with average depths of less than 1 foot or with drainage areas of less than 1 square mile.

METHODOLOGY

The hydrology for this project was analyzed using the 2009 release of the AHYMO-S4.01a computer modeling program as developed by Anderson Hydro. All procedures are in accordance with those shown in the January 1993 release of the City of Albuquerque Development Process Manual, Section 22.2.

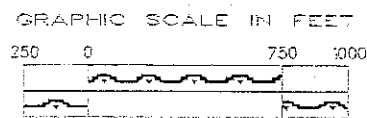
The specific values used for this analysis are as follows:

- Precipitation Zone 1
- Design Storm 100-year, 6-hour duration
i = 2.20 inches



A G I S
Albuquerque Geographic Information System
PLANNING DEPARTMENT

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Zone Atlas Page

K-8-Z

Map Amended through March 08, 2005

MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0328G

FIRM

FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS

PANEL 328 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE CITY OF	350002	0328	G
BERNALILLO COUNTY	350001	0328	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

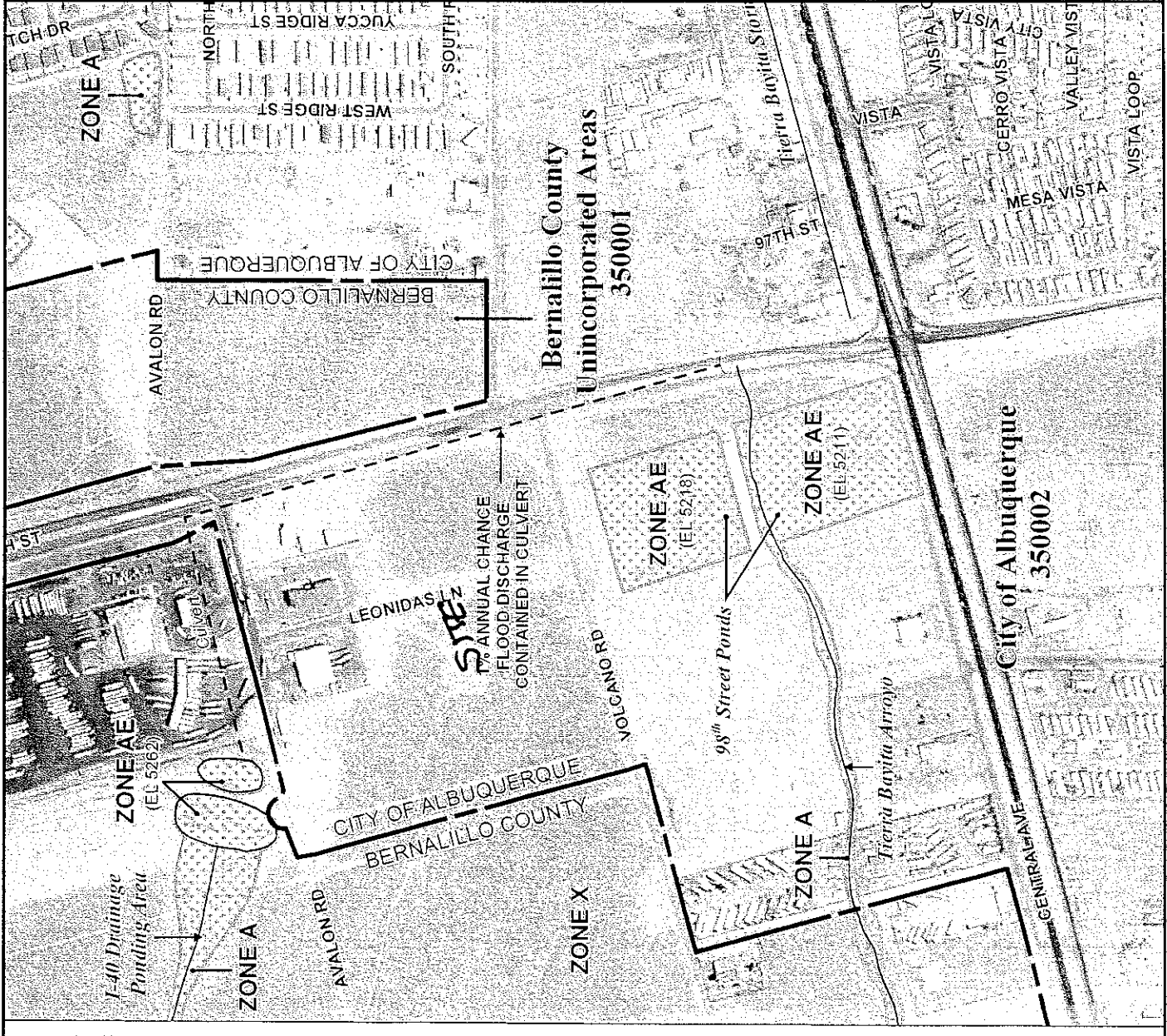


MAP NUMBER
35001C0328G

MAP REVISED
SEPTEMBER 26, 2008

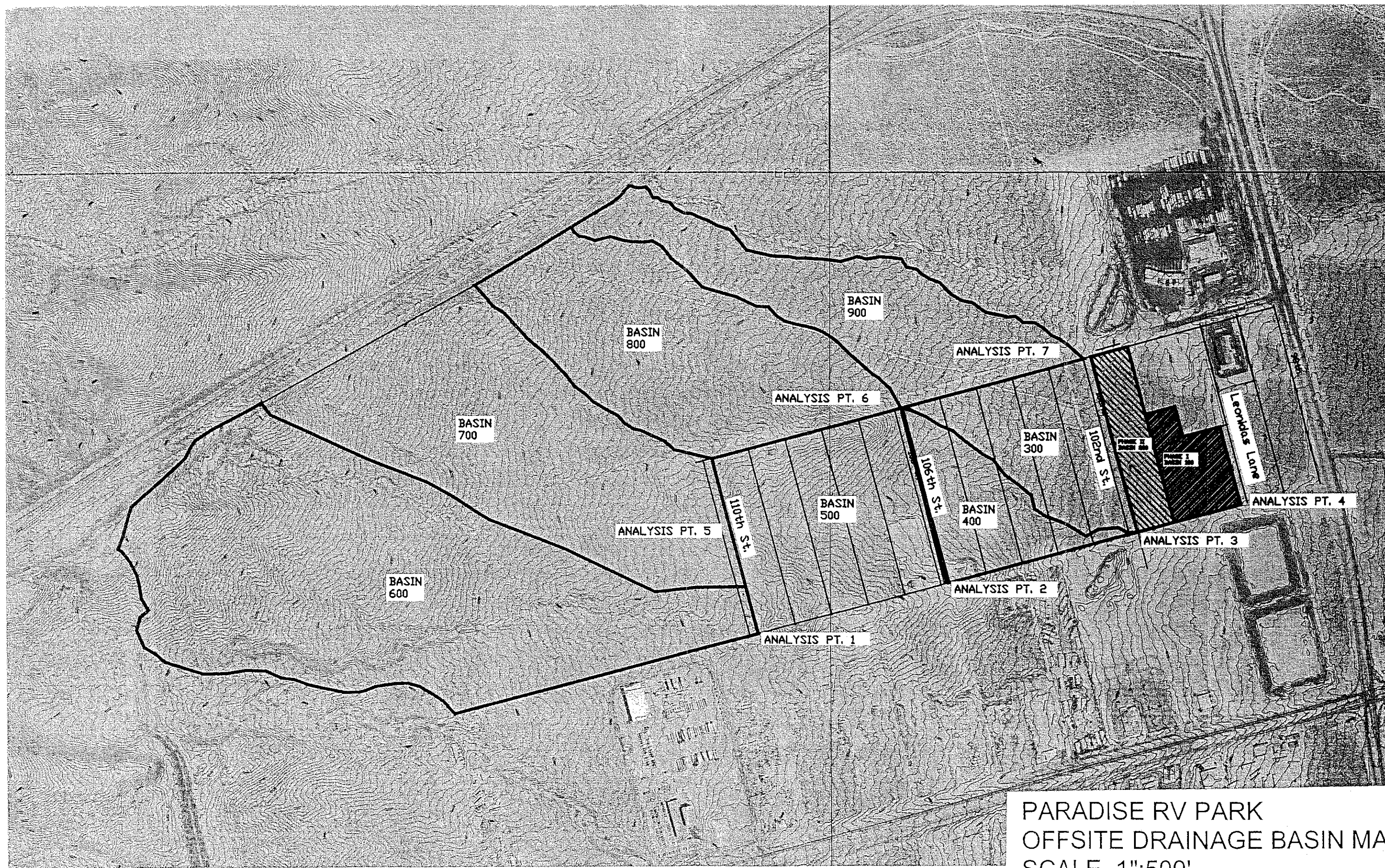
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPENDIX A

Drainage Basin Map



APPENDIX B

AHYMO Analysis

AHYMO PROGRAM (AHYMO-S4)

- Version: S4.01a - Rel: 01a

RUN DATE (MON/DAY/YR) = 08/08/2011

START TIME (HR:MIN:SEC) = 12:12:51

USER NO. = AHYMO_Temp User:20122010

INPUT FILE = C:\acad projects\Rizvy\RV Park - Avalon\input2.dat

START TIME=0 PUNCH=0 PRINT LINES=6
*S COMPUTE 100 YR. 6 HR. HYDROGRAPHS FOR PARADISE RV PARK
*S AHYMO INPUT.DAT - HYMO PER JAN 1993 DPM REVISIONS
*S -----

RAINFALL TYPE=-1 RAIN QUAR=0 RAIN ONE=1.87 RAIN SIX=2.20
RAIN DAY=2.66 DT=0.03

6-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
DT = 0.030000 HOURS END TIME = 6.000000 HOURS

*S -----
*S COMPUTE RUNOFF FOR UNDEVELOPED CONDITIONS ON-SITE BASINS
*S -----
*S BASIN 100 PHASE I
COMPUTE NM HYD ID=1 HYD NO= 100.0 DA=0.00715 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0 TP=-.13
RAIN=-1

K = 0.159632HR TP = 0.130000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
UNIT PEAK = 15.045 CFS UNIT VOLUME = 0.9987 B = 273.54 P60 = 1.8700
AREA = 0.007150 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=1 CODE=10

PARTIAL HYDROGRAPH 100.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	0.900	0.0	2.700	0.2
0.300	0.0	1.200	0.0	3.000	0.1
0.600	0.0	1.500	7.9	3.300	0.1

RUNOFF VOLUME = 0.64271 INCHES = 0.2451 ACRE-Feet
PEAK DISCHARGE RATE = 8.35 CFS AT 1.530 HOURS BASIN AREA = 0.0072 SQ. MI.

*S BASIN 200 PHASE II
COMPUTE NM HYD ID=2 HYD NO= 200.0 DA=0.00798 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0 TP=-.13
RAIN=-1

K = 0.159632HR TP = 0.130000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
UNIT PEAK = 16.791 CFS UNIT VOLUME = 0.9988 B = 273.54 P60 = 1.8700
AREA = 0.007980 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD

ID=2

CODE=10

PARTIAL HYDROGRAPH 200.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	0.900	0.0	1.800	2.5	2.700	0.2	3.600	0.0	3.900	0.0	4.200	0.0		
0.300	0.0	1.200	0.0	2.100	0.7	3.000	0.1	3.900	0.0						
0.600	0.0	1.500	8.9	2.400	0.4	3.300	0.1								

RUNOFF VOLUME = 0.64271 INCHES = 0.2735 ACRE-Feet
 PEAK DISCHARGE RATE = 9.31 CFS AT 1.530 HOURS BASIN AREA = 0.0080 SQ. MI.

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 COMPUTE RUNOFF FROM UNDEVELOPED CONDITIONS OFF-SITE BASINS

*S BASIN 300
 COMPUTE NM HYD

ID=3 HYD NO= 300.0 DA=0.0232 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.22
 RAIN=-1

K = 0.270146HR TP = 0.220000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
 UNIT PEAK = 28.846 CFS UNIT VOLUME = 0.9994 B = 273.54 P60 = 1.8700
 AREA = 0.023200 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD

ID=3

CODE=10

HYDROGRAPH FROM AREA 300.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.500	12.1	3.000	0.8	4.500	0.1	6.000	0.0	6.300	0.0	6.600	0.0		
0.300	0.0	1.800	11.8	3.300	0.5	4.800	0.1	6.300	0.0						
0.600	0.0	2.100	3.9	3.600	0.4	5.100	0.1	6.600	0.0						
0.900	0.0	2.400	1.6	3.900	0.3	5.400	0.0								
1.200	0.0	2.700	1.1	4.200	0.2	5.700	0.0								

RUNOFF VOLUME = 0.64271 INCHES = 0.7952 ACRE-Feet
 PEAK DISCHARGE RATE = 17.56 CFS AT 1.620 HOURS BASIN AREA = 0.0232 SQ. MI.

*S
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*S

*S BASIN 400
 COMPUTE NM HYD

ID=4 HYD NO= 400.0 DA=0.0168 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.171
 RAIN=-1

K = 0.209977HR TP = 0.171000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
 UNIT PEAK = 26.874 CFS UNIT VOLUME = 0.9993 B = 273.54 P60 = 1.8700
 AREA = 0.016800 SQ MI IA = 0.63000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=4 CODE=10

HYDROGRAPH FROM AREA 400.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.200	0.0	2.400	0.2
0.300	0.0	1.500	13.2	2.700	0.1
0.600	0.0	1.800	7.3	3.000	0.1
0.900	0.0	2.100	1.8	3.300	0.0

RUNOFF VOLUME = 0.64271 INCHES = 0.5759 ACRE-FEET
 PEAK DISCHARGE RATE = 15.73 CFS AT 1.560 HOURS BASIN AREA = 0.0168 SQ. MI.

*S
 *S BASIN 500
 COMPUTE NM HYD

ID=5 HYD NO= 500.0 DA=0.0393 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.16
 RAIN=-1

K = 0.196470HR TP = 0.160000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
 UNIT PEAK = 67.188 CFS UNIT VOLUME = 0.9997 B = 273.54 P60 = 1.8700
 AREA = 0.039300 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=5 CODE=10

OUTFLOW HYDROGRAPH RESERVOIR 500.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.200	0.0	2.400	0.3
0.300	0.0	1.500	33.8	2.700	0.2
0.600	0.0	1.800	16.0	3.000	0.1
0.900	0.0	2.100	4.0	3.300	0.1

RUNOFF VOLUME = 0.64271 INCHES = 1.3471 ACRE-FEET
 PEAK DISCHARGE RATE = 39.01 CFS AT 1.560 HOURS BASIN AREA = 0.0393 SQ. MI.

*S
 *S BASIN 600
 COMPUTE NM HYD

ID=6 HYD NO= 600.0 DA=0.1191 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.13
 RAIN=-1

K = 0.153027HR TP = 0.130000HR K/TP RATIO = 1.177133 SHAPE CONSTANT, N = 3.014069
 UNIT PEAK = 259.25 CFS UNIT VOLUME = 0.9999 B = 282.97 P60 = 1.8700
 AREA = 0.119100 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=6 CODE=10

HYDROGRAPH FROM AREA 600.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.200	0.0	3.600	0.4
0.300	0.0	1.500	135.8	3.900	0.2
0.600	0.0	1.800	36.3	4.200	0.1
0.900	0.0	2.100	10.8	4.500	0.1

RUNOFF VOLUME = 0.64271 INCHES = 4.0824 ACRE-FEET
 PEAK DISCHARGE RATE = 142.64 CFS AT 1.530 HOURS BASIN AREA = 0.1191 SQ. MI.

*S
 *S BASIN 700
 COMPUTE NM HYD

ID=7 HYD NO= 700.0 DA=0.0744 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.50
 RAIN=-1

K = 0.608627HR TP = 0.500000HR K/TP RATIO = 1.217254 SHAPE CONSTANT, N = 2.922704
 UNIT PEAK = 40.989 CFS UNIT VOLUME = 0.9996 B = 275.46 P60 = 1.8700
 AREA = 0.074400 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=7 CODE=10

HYDROGRAPH FROM AREA 700.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	3.000	5.5	9.000	0.1
0.300	0.0	3.300	3.3	9.300	0.1
0.600	0.0	3.600	2.4	9.600	0.1
0.900	0.0	3.900	2.0	9.900	0.1
1.200	0.0	4.200	1.7	10.200	0.1
1.500	6.9	4.500	1.4	10.500	0.1
1.800	25.1	4.800	1.2	10.800	0.0
2.100	23.0	5.100	1.0	11.100	0.0
2.400	14.7	5.400	0.9	11.400	0.0
2.700	9.0	5.700	0.7	11.700	0.0

RUNOFF VOLUME = 0.64271 INCHES = 2.5502 ACRE-FEET
 PEAK DISCHARGE RATE = 26.08 CFS AT 1.890 HOURS BASIN AREA = 0.0744 SQ. MI.

*S BASIN 800
 COMPUTE NM HYD

ID=8 HYD NO= 800.0 DA=0.0570 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.216
 RAIN=-1

K = 0.265234HR TP = 0.216000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
 UNIT PEAK = 72.194 CFS UNIT VOLUME = 0.9997 B = 273.54 P60 = 1.8700
 AREA = 0.057000 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=8 CODE=10

HYDROGRAPH FROM AREA 800.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.800	28.9	3.600	0.9	5.400	0.1
0.300	0.0	2.100	9.4	3.900	0.6	5.700	0.1
0.600	0.0	2.400	3.9	4.200	0.4	6.000	0.0
0.900	0.0	2.700	2.7	4.500	0.3	6.300	0.0
1.200	0.0	3.000	1.8	4.800	0.2	6.600	0.0
1.500	30.8	3.300	1.3	5.100	0.1	6.900	0.0

RUNOFF VOLUME = 0.64271 INCHES = 1.9538 ACRE-FEET
 PEAK DISCHARGE RATE = 43.83 CFS AT 1.620 HOURS BASIN AREA = 0.0570 SQ. MI.

*S BASIN 900
 COMPUTE NM HYD

ID=9 HYD NO= 900.0 DA=0.0389 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0 TP=-.293
 RAIN=-1

K = 0.359785HR TP = 0.293000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899626
 UNIT PEAK = 36.316 CFS UNIT VOLUME = 0.9996 B = 273.54 P60 = 1.8700
 AREA = 0.038900 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=9 CODE=10

HYDROGRAPH FROM AREA 900.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.100	9.5	4.200	0.5	6.300	0.1
0.300	0.0	2.400	4.1	4.500	0.4	6.600	0.1
0.600	0.0	2.700	2.1	4.800	0.3	6.900	0.0
0.900	0.0	3.000	1.6	5.100	0.2	7.200	0.0
1.200	0.0	3.300	1.2	5.400	0.2	7.500	0.0
1.500	11.8	3.600	0.9	5.700	0.1	7.800	0.0
1.800	20.4	3.900	0.7	6.000	0.1	8.100	0.0

RUNOFF VOLUME = 0.64271 INCHES = 1.3334 ACRE-FEET
PEAK DISCHARGE RATE = 22.62 CFS AT 1.680 HOURS BASIN AREA = 0.0389 SQ. MI.

*S -----
*S COMPUTE RUNOFF FOR DEVELOPED CONDITIONS ON-SITE BASINS
*S -----

*S BASIN 100 PHASE I
COMPUTE NM HYD ID=11 HYD NO= 101.0 DA=0.00715 SQ MI
PER A=0 PER B=5 PER C=76 PER D=19 TP=-.13
RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 5.4996 CFS UNIT VOLUME = 0.9980 B = 526.28 P60 = 1.8700
AREA = 0.001359 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.104758HR TP = 0.130000HR K/TP RATIO = 0.805834 SHAPE CONSTANT, N = 4.441710
UNIT PEAK = 17.090 CFS UNIT VOLUME = 0.9994 B = 383.62 P60 = 1.8700
AREA = 0.005792 SQ MI IA = 0.35926 INCHES INF = 0.85593 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=11 CODE=10

PARTIAL HYDROGRAPH 101.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.500	15.5	4.500	0.0
0.300	0.0	1.800	3.8	4.800	0.0
0.600	0.0	2.100	1.0	5.100	0.0
0.900	0.0	2.400	0.4	5.400	0.0
1.200	0.6	2.700	0.1	5.700	0.0

RUNOFF VOLUME = 1.23690 INCHES = 0.4717 ACRE-FEET
PEAK DISCHARGE RATE = 15.75 CFS AT 1.530 HOURS BASIN AREA = 0.0072 SQ. MI.

*S -----
*S BASIN 200 PHASE II
COMPUTE NM HYD ID=12 HYD NO= 201.0 DA=0.00798 SQ MI
PER A=0 PER B=5 PER C=76 PER D=19 TP=-.13
RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 6.1380 CFS UNIT VOLUME = 0.9983 B = 526.28 P60 = 1.8700
AREA = 0.001516 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.104758HR TP = 0.130000HR K/TP RATIO = 0.805834 SHAPE CONSTANT, N = 4.441710
 UNIT PEAK = 19.074 CFS UNIT VOLUME = 0.9995 B = 383.62 P60 = 1.8700
 AREA = 0.006464 SQ MI IA = 0.35926 INCHES INF = 0.85593 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=12 CODE=10

PARTIAL HYDROGRAPH 201.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.500	17.3	3.000	0.1
0.300	0.0	1.800	4.2	3.300	0.0
0.600	0.0	2.100	1.1	3.600	0.0
0.900	0.0	2.400	0.4	3.900	0.0
1.200	0.7	2.700	0.1	4.200	0.0

RUNOFF VOLUME = 1.23690 INCHES = 0.5264 ACRE-FEET
 PEAK DISCHARGE RATE = 17.57 CFS AT 1.530 HOURS BASIN AREA = 0.0080 SQ. MI.

*S -----
 *S DEVELOPED FLOW TO LEONIDAS LANE
 *S ANALYSIS POINT 4
 *S -----

ADD HYD ID=24 HYD NO = 240 ID I = 11 ID II = 12
 PRINT HYD ID=24 CODE = 10

PARTIAL HYDROGRAPH 240.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.500	32.9	3.000	0.1
0.300	0.0	1.800	8.0	3.300	0.0
0.600	0.0	2.100	2.2	3.600	0.0
0.900	0.0	2.400	0.8	3.900	0.0
1.200	1.3	2.700	0.3	4.200	0.0

RUNOFF VOLUME = 1.23686 INCHES = 0.9981 ACRE-FEET
 PEAK DISCHARGE RATE = 33.32 CFS AT 1.530 HOURS BASIN AREA = 0.0151 SQ. MI.

*S -----
 *S -----
 *S COMPUTE RUNOFF FROM DEVELOPED CONDITIONS OFF-SITE BASINS
 *S -----

*S BASIN 300
 *S WITHIN BASIN 801.2 GREINER 1995
 COMPUTE NM HYD ID=13 HYD NO= 301.0 DA=0.0232 SQ MI
 PER A=0 PER B=18 PER C=19 PER D=63 TP=-.22

RAIN=-1

K = 0.119000HR TP = 0.220000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 34.964 CFS UNIT VOLUME = 0.9997 B = 526.28 P60 = 1.8700
AREA = 0.014616 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.194897HR TP = 0.220000HR K/TP RATIO = 0.885895 SHAPE CONSTANT, N = 4.004627
UNIT PEAK = 13.870 CFS UNIT VOLUME = 0.9991 B = 355.48 P60 = 1.8700
AREA = 0.008584 SQ MI IA = 0.42297 INCHES INF = 1.03432 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=13 CODE=10

HYDROGRAPH FROM AREA 301.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.800	26.8	3.600	0.3	5.400	0.2	7.200	0.0
0.300	0.0	2.100	8.4	3.900	0.2	5.700	0.2	7.500	0.0
0.600	0.0	2.400	3.6	4.200	0.1	6.000	0.2		
0.900	0.0	2.700	1.6	4.500	0.1	6.300	0.1		
1.200	3.8	3.000	0.8	4.800	0.1	6.600	0.0		
1.500	31.6	3.300	0.4	5.100	0.1	6.900	0.0		

RUNOFF VOLUME = 1.58678 INCHES = 1.9634 ACRE-Feet
PEAK DISCHARGE RATE = 45.61 CFS AT 1.620 HOURS BASIN AREA = 0.0232 SQ. MI.

*S BASIN 400

*S WITHIN BASIN 801.2 GREINER 1996

COMPUTE NM HYD ID=14 HYD NO= 401.0 DA=0.0168 SQ MI
PER A=0 PER B=18 PER C=19 PER D=63 TP=-.171

RAIN=-1

K = 0.093195HR TP = 0.171000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 32.574 CFS UNIT VOLUME = 0.9997 B = 526.28 P60 = 1.8700
AREA = 0.010584 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.151488HR TP = 0.171000HR K/TP RATIO = 0.885895 SHAPE CONSTANT, N = 4.004627
UNIT PEAK = 12.922 CFS UNIT VOLUME = 0.9990 B = 355.48 P60 = 1.8700
AREA = 0.006216 SQ MI IA = 0.42297 INCHES INF = 1.03432 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=14 CODE=10

HYDROGRAPH FROM AREA 401.00

TIME	FLOW	TIME	FLOW	TIME	FLOW
------	------	------	------	------	------

HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS
0.000	0.0	1.500	32.7	3.000	0.3	4.500	0.1	6.000	0.2
0.300	0.0	1.800	15.1	3.300	0.2	4.800	0.1	6.300	0.0
0.600	0.0	2.100	4.7	3.600	0.1	5.100	0.1	6.600	0.0
0.900	0.0	2.400	1.9	3.900	0.1	5.400	0.1	6.900	0.0
1.200	3.7	2.700	0.7	4.200	0.1	5.700	0.1	7.200	0.0

RUNOFF VOLUME = 1.58678 INCHES = 1.4217 ACRE-Feet
 PEAK DISCHARGE RATE = 37.60 CFS AT 1.560 HOURS BASIN AREA = 0.0168 SQ. MI.

 *S DEVELOPED FLOW TO ANALYSIS POINT 3 BASINS 300 AND 400
 *S
 ADD HYD ID=25 HYD NO = 250 ID I = 13 ID II = 14
 PRINT HYD ID=25 CODE = 10

PARTIAL HYDROGRAPH 250.00

TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW
HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS
0.000	0.0	1.800	41.9	3.600	0.4	5.400	0.3
0.300	0.0	2.100	13.1	3.900	0.2	5.700	0.3
0.600	0.0	2.400	5.5	4.200	0.2	6.000	0.4
0.900	0.1	2.700	2.4	4.500	0.2	6.300	0.1
1.200	7.5	3.000	1.2	4.800	0.2	6.600	0.0
1.500	64.3	3.300	0.6	5.100	0.2	6.900	0.0

RUNOFF VOLUME = 1.58676 INCHES = 3.3851 ACRE-Feet
 PEAK DISCHARGE RATE = 81.71 CFS AT 1.590 HOURS BASIN AREA = 0.0400 SQ. MI.

 *S
 *S BASIN 500
 *S WITHIN BASIN 801.2 GREINER 1995
 COMPUTE NM HYD ID=15 HYD NO= 501.0 DA=0.0393 SQ MI
 PER A=0 PER B=3 PER C=30 PER D=67 TP=-.16
 RAIN=-1

K = 0.087200HR TP = 0.160000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 86.608 CFS UNIT VOLUME = 0.9999 B = 526.28 P60 = 1.8700
 AREA = 0.026331 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.129814HR TP = 0.160000HR K/TP RATIO = 0.811334 SHAPE CONSTANT, N = 4.408176
 UNIT PEAK = 30.925 CFS UNIT VOLUME = 0.9996 B = 381.52 P60 = 1.8700
 AREA = 0.012969 SQ MI IA = 0.36364 INCHES INF = 0.86818 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=15 CODE=10

OUTFLOW HYDROGRAPH RESERVOIR 501.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.500	86.2	3.000	0.7	4.500	0.2	6.000	0.4	7.200	0.0
0.300	0.0	1.800	34.6	3.300	0.3	4.800	0.2	6.300	0.1		
0.600	0.0	2.100	10.7	3.600	0.2	5.100	0.3	6.600	0.0		
0.900	0.1	2.400	4.3	3.900	0.2	5.400	0.3	6.900	0.0		
1.200	9.8	2.700	1.5	4.200	0.2	5.700	0.3				

RUNOFF VOLUME = 1.65978 INCHES = 3.4789 ACRE-Feet
 PEAK DISCHARGE RATE = 94.30 CFS AT 1.560 HOURS BASIN AREA = 0.0393 SQ. MI.

*S BASIN 600
 *S IS BASIN 801.3 GREINER 1995
 COMPUTE NM HYD ID=16 HYD NO= 601.0 DA=0.1191 SQ MI
 PER A=0 PER B=21 PER C=22 PER D=57 TP=-.13
 RAIN=-1

K = 0.071786HR TP = 0.130000HR K/TP RATIO = 0.552203 SHAPE CONSTANT, N = 6.988081
 UNIT PEAK = 271.91 CFS UNIT VOLUME = 1.000 B = 520.69 P60 = 1.8700
 AREA = 0.067887 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.113773HR TP = 0.130000HR K/TP RATIO = 0.875175 SHAPE CONSTANT, N = 4.057445
 UNIT PEAK = 141.42 CFS UNIT VOLUME = 1.000 B = 358.98 P60 = 1.8700
 AREA = 0.051213 SQ MI IA = 0.42326 INCHES INF = 1.03512 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=16 CODE=10

HYDROGRAPH FROM AREA 601.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.500	288.9	3.000	1.2	4.500	0.5	6.000	1.0	7.200	0.0
0.300	0.0	1.800	80.3	3.300	0.6	4.800	0.6	6.300	0.1		
0.600	0.0	2.100	23.6	3.600	0.4	5.100	0.7	6.600	0.0		
0.900	0.9	2.400	9.2	3.900	0.4	5.400	0.8	6.900	0.0		
1.200	29.6	2.700	2.9	4.200	0.4	5.700	0.9				

RUNOFF VOLUME = 1.52689 INCHES = 9.6987 ACRE-Feet
 PEAK DISCHARGE RATE = 290.28 CFS AT 1.530 HOURS BASIN AREA = 0.1191 SQ. MI.

*S BASIN 700
 *S IS BASIN 108.2 GREINER 1995

ID=17 HYD NO= 701.0 DA=0.0744 SQ MI
PER A=0 PER B=18 PER C=19 PER D=63 TP=-.50
RAIN=-1

```

K = 0.44178HR      TP = 0.50000HR      K/TP RATIO = 0.883574      SHAPE CONSTANT, N = 4.016033
UNIT PEAK = 19.613 CFS      UNIT VOLUME = 0.9993      B = 356.24      P60 = 1.8700
AREA = 0.027528 SQ MI      IA = 0.42297 INCHES      INF = 1.03432 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

```

HYDROGRAPH FROM AREA "701.00"

TIME		FLOW		TIME		FLOW		TIME		FLOW		TIME		FLOW	
HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS	HRS	CFS
0.000	0.0	2.400	33.4	4.800	1.4	7.200	0.2	9.600	0.0						
0.300	0.0	2.700	15.7	5.100	1.2	7.500	0.1	9.900	0.0						
0.600	0.0	3.000	8.8	5.400	1.0	7.800	0.1	10.200	0.0						
0.900	0.0	3.300	5.9	5.700	1.0	8.100	0.1	10.500	0.0						
1.200	1.6	3.600	4.2	6.000	0.9	8.400	0.0								
1.500	18.9	3.900	3.1	6.300	0.8	8.700	0.0								
1.800	80.6	4.200	2.3	6.600	0.5	9.000	0.0								
2.100	69.5	4.500	1.8	6.900	0.3	9.300	0.0								

RUNOFF VOLUME = 1.58678 INCHES = 6.2963 ACRE-FEET
PEAK DISCHARGE RATE = 87.05 CFS AT 1.890 HOURS BASIN AREA = 0.0744 SQ. MI.

*SY WITHIN BASIN 108. J GREINER 1995

```

COMPUTE NM HYD
ID=18 HYD NO= 801.0 DA=0.0570 SQ MI
PER A=0 PER B=17 PER C=13 PER D=70 TP=216
RAIN=-1

```

```

K = 0.194618HR    TP = 0.216000HR    K/TP RATIO = 0.901008    SHAPE CONSTANT, N = 3.933025
UNIT PEAK = 27.763 CFS    UNIT VOLUME = 0.9996    B = 350.68    P60 = 1.8700
AREA = 0.017100 SQ MI    IA = 0.43500 INCHES    INF = 1.06800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

```

```
PRINT HYD ID=18 CODE=10
```

HYDROGRAPH FROM AREA 801.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.800	66.6	3.600	0.6	5.400	0.4
0.300	0.0	2.100	21.3	3.900	0.4	5.700	0.5
0.600	0.0	2.400	9.0	4.200	0.3	6.000	0.6
0.900	0.1	2.700	4.0	4.500	0.3	6.300	0.2
1.200	10.7	3.000	2.0	4.800	0.4	6.600	0.1
1.500	82.7	3.300	1.0	5.100	0.4	6.900	0.0

RUNOFF VOLUME = 1.65042 INCHES = 5.0173 ACRE-FEET
 PEAK DISCHARGE RATE = 116.45 CFS AT 1.620 HOURS BASIN AREA = 0.0570 SQ. MI.

*S BASIN 900
 *S WITHIN BASIN 108.1 GREINER 1995
 COMPUTE NM HYD ID=19 HYD NO= 901.0 DA=0.0389 SQ MI
 PER A=0 PER B=17 PER C=13 PER D=70 TP=-.293
 RAIN=-1

K = 0.159685HR TP = 0.293000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 48.909 CFS UNIT VOLUME = 0.9998 B = 526.28 P60 = 1.8700
 AREA = 0.027230 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

K = 0.263995HR TP = 0.293000HR K/TP RATIO = 0.901008 SHAPE CONSTANT, N = 3.933025
 UNIT PEAK = 13.968 CFS UNIT VOLUME = 0.9990 B = 350.68 P60 = 1.8700
 AREA = 0.011670 SQ MI IA = 0.43500 INCHES INF = 1.06800 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.030000

PRINT HYD ID=19 CODE=10

HYDROGRAPH FROM AREA 901.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.800	56.7	3.600	0.9	5.400	0.3
0.300	0.0	2.100	20.6	3.900	0.6	5.700	0.3
0.600	0.0	2.400	8.4	4.200	0.4	6.000	0.4
0.900	0.0	2.700	4.3	4.500	0.3	6.300	0.2
1.200	4.3	3.000	2.4	4.800	0.3	6.600	0.1
1.500	33.2	3.300	1.4	5.100	0.3	6.900	0.0

RUNOFF VOLUME = 1.65042 INCHES = 3.4241 ACRE-FEET
 PEAK DISCHARGE RATE = 67.22 CFS AT 1.680 HOURS BASIN AREA = 0.0389 SQ. MI.

*S

*S-----

*S-----

*S RUNOFF TO TEMPORARY POND ON PHASE II SITE

*S-----

ADD HYD ID=21 HYD NO = 202 ID I = 2 ID II = 3
ADD HYD ID=22 HYD NO = 201 ID I = 21 ID II = 8
ADD HYD ID=23 HYD NO = 203 ID I = 22 ID II = 9
PRINT HYD ID=23 CODE = 10

PARTIAL HYDROGRAPH 203.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.100	23.5	4.200	1.1	6.300	0.1	8.400	0.0
0.300	0.0	2.400	10.0	4.500	0.8	6.600	0.1	8.700	0.0
0.600	0.0	2.700	6.1	4.800	0.6	6.900	0.1	9.000	0.0
0.900	0.0	3.000	4.3	5.100	0.4	7.200	0.0		
1.200	0.0	3.300	3.0	5.400	0.3	7.500	0.0		
1.500	63.6	3.600	2.2	5.700	0.2	7.800	0.0		
1.800	63.7	3.900	1.5	6.000	0.2	8.100	0.0		

RUNOFF VOLUME = 0.64270 INCHES = 4.3560 ACRE-FEET
PEAK DISCHARGE RATE = 89.98 CFS AT 1.620 HOURS BASIN AREA = 0.1271 SQ. MI.

*S-----

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 12:12:51

[illegible]

[illegible]

PROJECT: _____

LARRY READ & ASSOCIATES, Inc. CALCULATIONS

Civil Engineers

DATE: _____

By: _____ Pg: _____ of _____

Basin 100 - Phase 1 Use $t_c = 12 \text{ min} > t_p = 0.13 \text{ hr}$ Basin 200 - Phase 2 Use $t_c = 12 \text{ min} > t_p = 0.13 \text{ hr}$ Basin 300 - $\Delta e/cv = 44'$ $L = 1478$ $S = 0.0298$

$$t_c = (L/v) / 3600$$

$$v = 10 * K * \sqrt{S} \quad K = 0.7$$

$$v = 10 * 0.7 * \sqrt{0.0298} = 1.21$$

$$t_c = (1478 / 1.21) / 3600 = 0.339 \text{ hr}$$

$$t_p = 2/3 t_c = 0.224 \text{ hr}$$

Basin 400 $\Delta e/cv = 46'$ $L = 1250$ $S = 0.0368$

$$v = 10 * 0.7 * \sqrt{0.0368} = 1.34$$

$$t_c = (1250 / 1.34) / 3600 = 0.259$$

$$t_p = 2/3 t_c = 0.171 \text{ hr}$$

Basin 500 $\Delta e/cv = 34'$ $L = 1085$ $S = 0.0313$

$$v = 10 * 0.7 * \sqrt{0.0313} = 1.24$$

$$t_c = (1085 / 1.24) / 3600 = 0.243$$

$$t_p = 2/3 t_c = 0.16 \text{ hr}$$

PROJECT: _____

LARRY READ & ASSOCIATES, Inc. CALCULATIONS

Civil Engineers

DATE: _____

By: _____ Pg: _____ of _____

$$\text{Basin 600 } \Delta \text{ elev} = 180' \quad L = 3575 \quad S = 0.050$$

$$V = 10 + 3 + \sqrt{0.050} = 6.71$$

$$t_c = (3575 / 6.71) / 3600 = 0.148$$

$$t_p = \frac{2}{3} t_c = 0.098 \text{ hr} = 45 \text{ sec } 0.13 \text{ hr}$$

$$\text{Basin 700 } \Delta \text{ elev} = 138' \quad L = 2712 \quad S = 0.051$$

$$V = 10 + 1 + \sqrt{0.051} = 2.26$$

$$t_c = (2712 / 2.26) / 3600 = 0.753$$

$$t_p = \frac{2}{3} t_c = 0.50 \text{ hr}$$

$$\text{Basin 800 } \Delta \text{ elev} = 102' \quad L = 2416 \quad S = 0.042$$

$$V = 10 + 1 + \sqrt{0.042} = 2.05$$

$$t_c = (2416 / 2.05) / 3600 = 0.327$$

$$t_p = \frac{2}{3} t_c = 0.216 \text{ hr}$$

$$\text{Basin 900 } \Delta \text{ elev} = 96' \quad L = 2914 \quad S = 0.033$$

$$V = 10 + 1 + \sqrt{0.033} = 1.82$$

$$t_c = (2914 / 1.82) / 3600 = 0.445$$

$$t_p = \frac{2}{3} t_c = 0.293 \text{ hr}$$

PROJECT: _____

LARRY READ & ASSOCIATES, Inc. CALCULATIONS
Civil Engineers

DATE: _____

By: _____ Pg: _____ of _____

100

200

300 - 0.0232 $\frac{\text{sq mi}}{\text{mi}}$

400 - 0.0168 $\frac{\text{sq mi}}{\text{mi}}$

500 - 0.0393 $\frac{\text{sq mi}}{\text{mi}}$

600 0.1171 $\frac{\text{sq mi}}{\text{mi}}$

700 0.0744 $\frac{\text{sq mi}}{\text{mi}}$

800 0.0570 $\frac{\text{sq mi}}{\text{mi}}$

900 0.0387 $\frac{\text{sq mi}}{\text{mi}}$

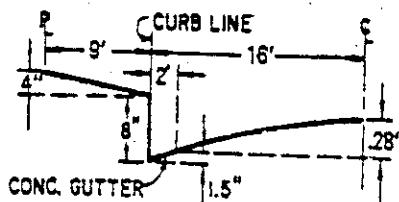
APPENDIX C

Storm Drain Analysis

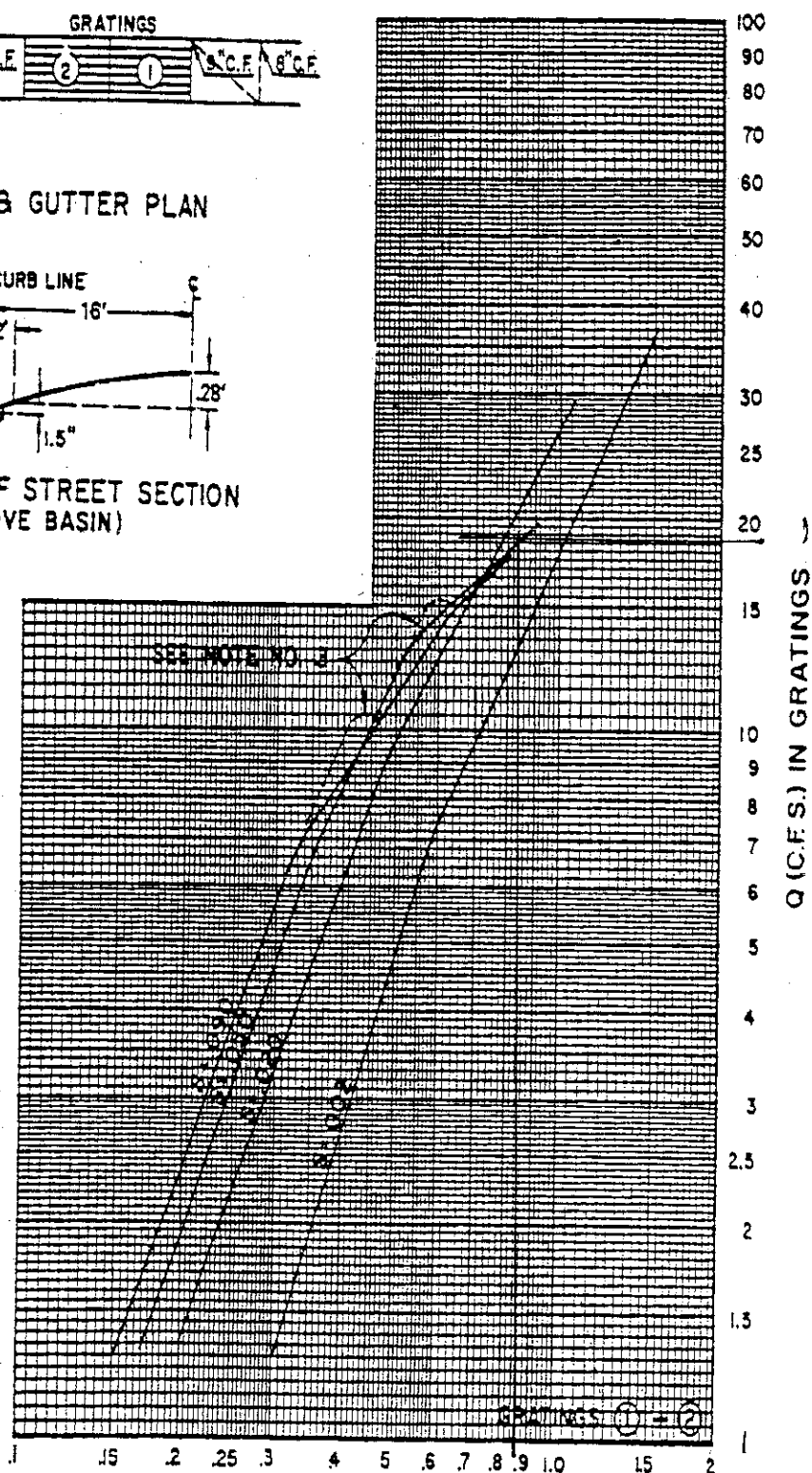
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION (ABOVE BASIN)

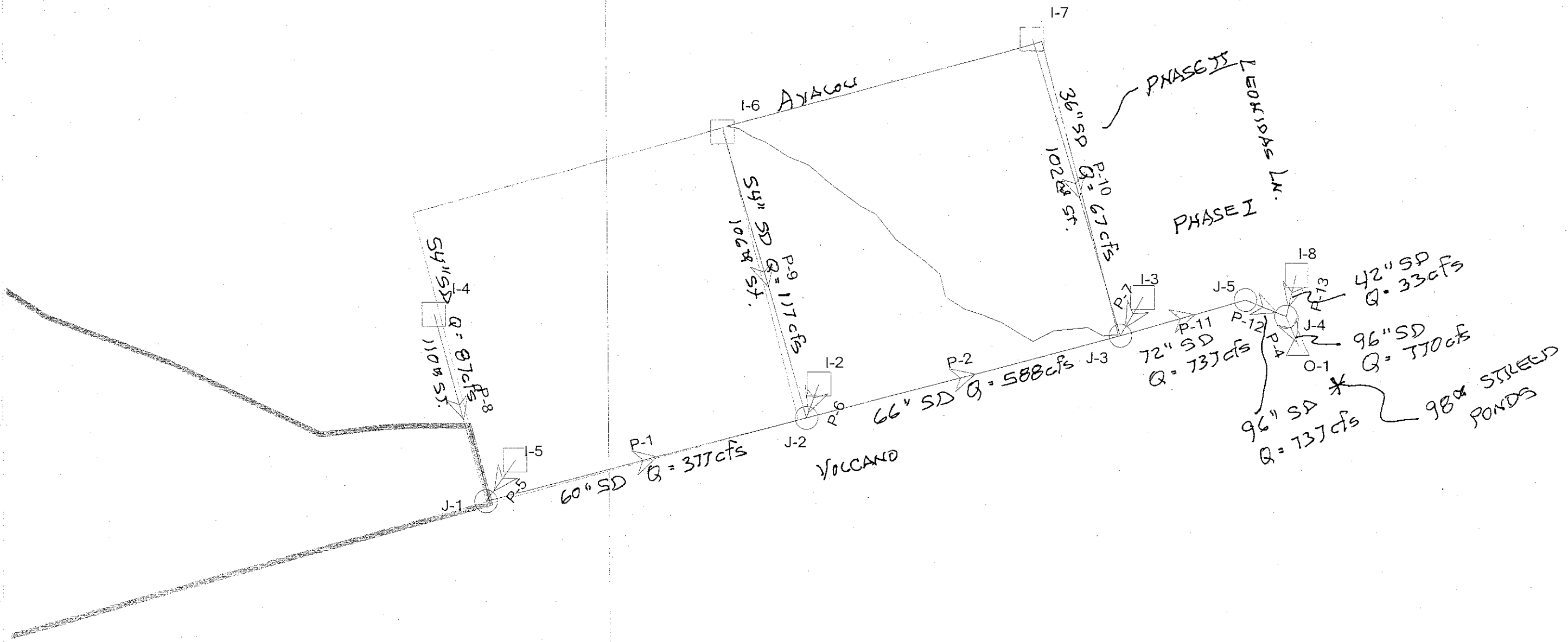


D=DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

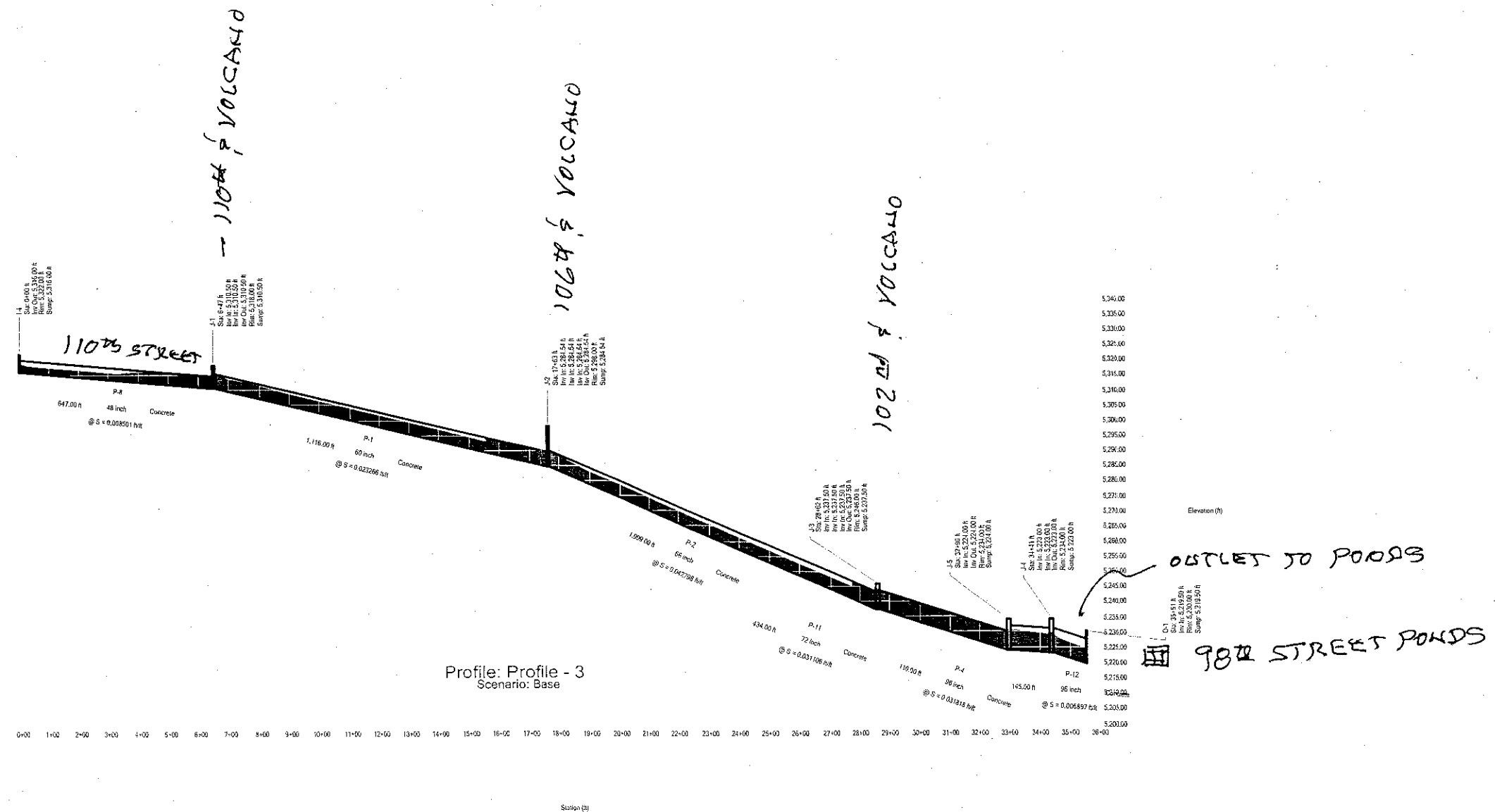
PLATE 22.3 D-6

Roadway $S = 1.7\%$ avg.
 $Q_{int.} \approx 18.5 \text{ cfs} \Rightarrow 2 \text{ double "C"}$
 $\text{Clogging} \approx 50\% - \text{USE } 4 \text{ double "C"}$

Scenario: Base



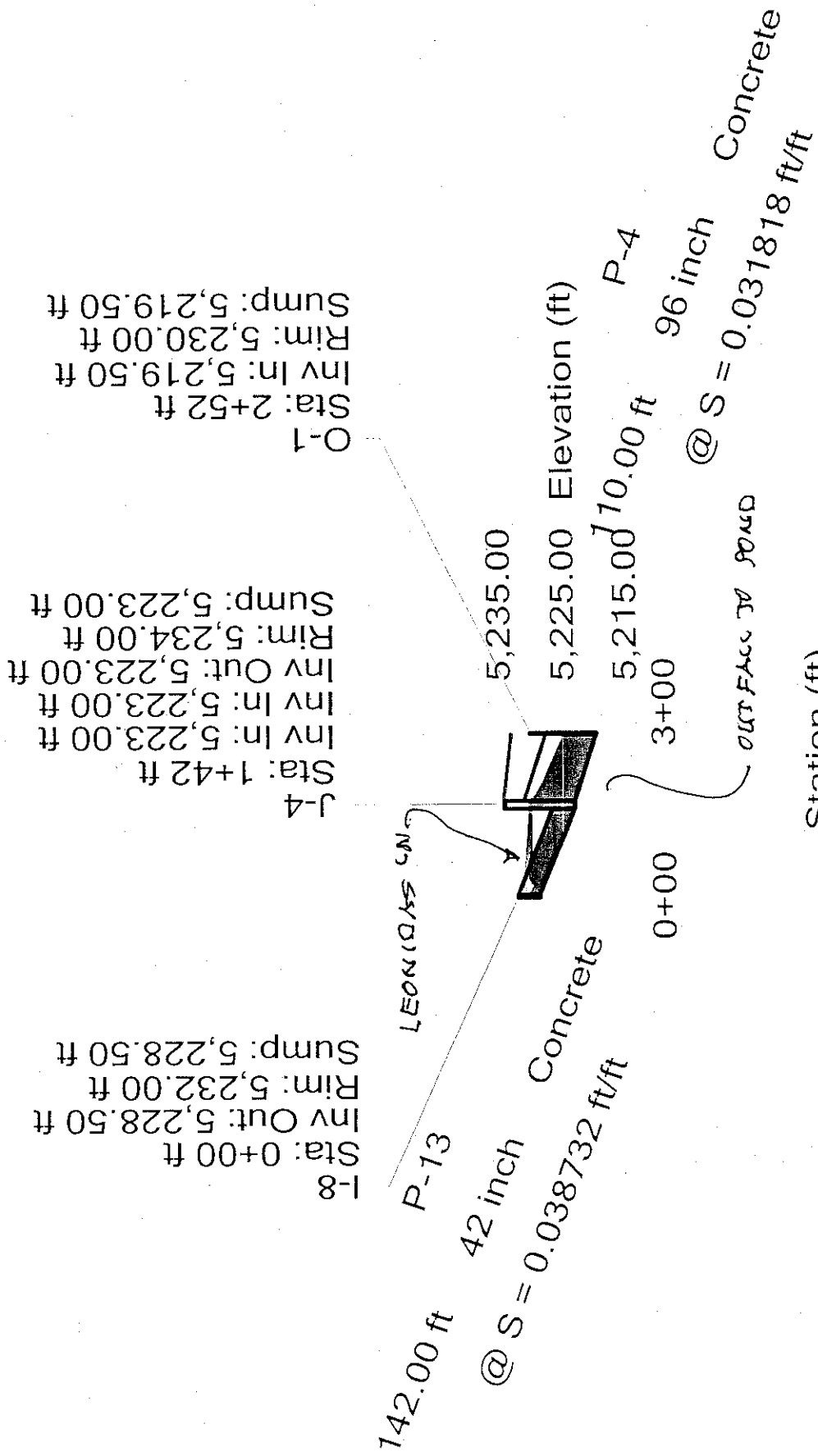
Profile
Scenario: Base



Profile
Scenario: Base

Profile: Profile - 4

Scenario: Base



Profile
Scenario: Base

Profile: Profile - 5

Scenario: Base

I-6
Sta: 0+00 ft
Inv Out: 5,289.50 ft
Rim: 5,296.00 ft
Sump: 5,289.50 ft

106th STREET

P-9

993.00 ft 54 inch Concrete

@ S = 0.005000 ft/ft

AVACON

WOLCANO

J-2

Sta: 9+93 ft

Inv In: 5,284.54 ft
Inv In: 5,284.54 ft
Inv In: 5,284.54 ft
Inv Out: 5,284.54 ft
Rim: 5,298.00 ft
Sump: 5,284.54 ft

5,300.00

5,290.00 Elevation (ft)

5,280.00

0+00 2+00 4+00 6+00 8+00 10+00

Station (ft)

Profile
Scenario: Base

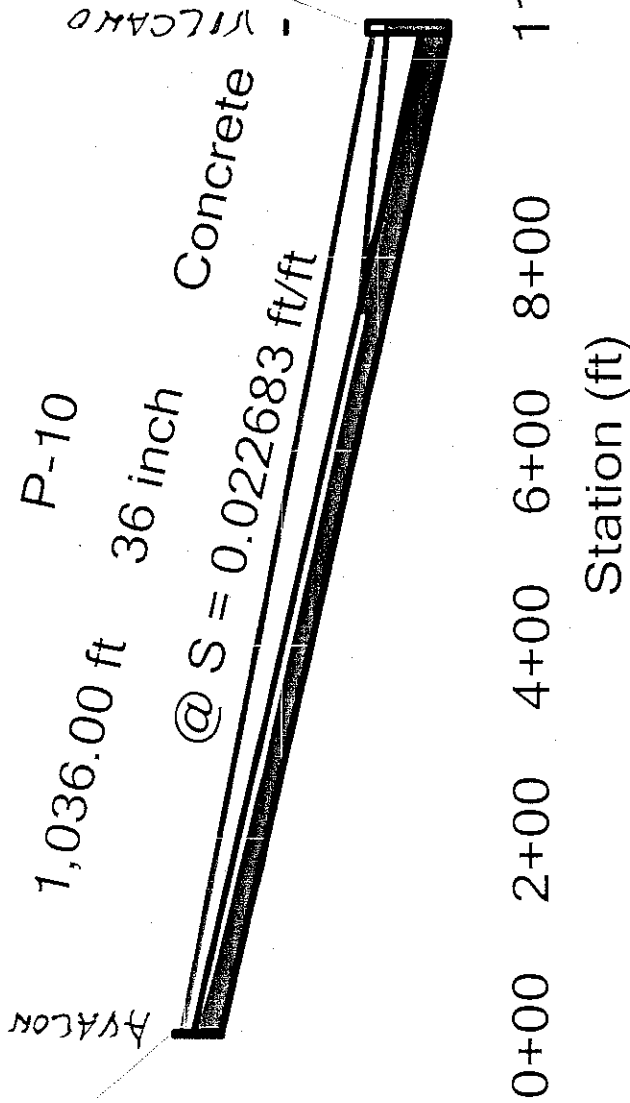
Profile: Profile - 6

Scenario: Base

102nd STREET

I-7
Sta: 0+00 ft
Inv Out: 5,261.00 ft
Rim: 5,266.00 ft
Sump: 5,261.00 ft

J-3
Sta: 10+36 ft
Inv In: 5,237.50 ft
Inv In: 5,237.50 ft
Inv In: 5,237.50 ft
Inv Out: 5,237.50 ft
Rim: 5,246.00 ft
Sump: 5,237.50 ft



Scenario: Base

Combined Pipe\Node Report

Label	Up. Node	Dn. Node	L (ft)	Size	Q Full (cfs)	Avg. v (ft/s)	Up. Invert (ft)	Dn. Invert (ft)	S (ft/ft)
P-4	J-4	O-1	110.00	96 inch	1,626.84	31.92	5,223.00	5,219.50	0.031818
P-1	J-1	J-2	1,116.00	60 inch	397.24	23.02	5,310.50	5,284.54	0.023266
P-2	J-2	J-3	1,099.00	66 inch	694.67	32.80	5,284.54	5,237.50	0.042798
P-5	I-5	J-1	170.00	60 inch	410.56	22.67	5,313.00	5,310.50	0.014706
P-6	I-2	J-2	115.00	48 inch	475.74	29.48	5,292.00	5,284.54	0.064913
P-7	I-3	J-3	149.00	48 inch	186.05	6.50	5,240.00	5,237.50	0.016779
P-8	I-4	J-1	647.00	48 inch	132.43	11.25	5,316.00	5,310.50	0.008501
P-9	I-6	J-2	993.00	54 inch	139.04	9.79	5,289.50	5,284.54	0.005000
P-10	I-7	J-3	1,036.00	36 inch	100.45	15.23	5,261.00	5,237.50	0.022683
P-11	J-3	J-5	434.00	72 inch	746.90	26.07	5,237.50	5,224.00	0.031106
P-12	J-5	J-4	145.00	96 inch	757.40	17.17	5,224.00	5,223.00	0.006897
P-13	I-8	J-4	142.00	42 inch	197.99	15.26	5,228.50	5,223.00	0.038732

Scenario: Base

Node Report

Label	Known Flow (cfs)	Total System Flow (cfs)	Ground Elevation (ft)	Rim Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Local Intensity (in/hr)	Local Rational Flow (cfs)
O-1		770.10	5,230.00	5,230.00	5,223.00	5,223.00		
J-4		770.10	5,234.00	5,234.00	5,229.95	5,229.95		
J-5		737.10	5,234.00	5,234.00	5,230.83	5,230.83		
J-1		377.40	5,318.00	5,318.00	5,315.36	5,315.36		
J-2		588.20	5,298.00	5,298.00	5,289.96	5,289.96		
J-3		737.10	5,246.00	5,246.00	5,243.98	5,243.98		
I-5	290.30	290.30	5,320.00	5,320.00	5,317.63	5,317.63	0.00	0.00
I-2	94.30	94.30	5,298.00	5,298.00	5,294.94	5,294.94	0.00	0.00
I-3	81.70	81.70	5,246.00	5,246.00	5,244.46	5,244.46	0.00	0.00
I-4	87.10	87.10	5,322.00	5,322.00	5,318.83	5,318.83	0.00	0.00
I-6	116.50	116.50	5,296.00	5,296.00	5,293.02	5,293.02	0.00	0.00
I-7	67.20	67.20	5,266.00	5,266.00	5,263.62	5,263.62	0.00	0.00
I-8	33.00	33.00	5,232.00	5,232.00	5,230.28	5,230.28	0.00	0.00

Scenario: Base

Pipe Report

Label	Upstream Node	Downstream Node	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description	Velocity In (ft/s)
P-4	J-4	O-1	770.10	110.00	0.031818	96 inch	0.013	1,626.84	5,223.00	5,219.50	5,234.00	5,230.00	3.00	2.50	5,229.95	5,224.47		16.61
P-1	J-1	J-2	377.40	1,116.00	0.023266	60 inch	0.013	397.24	5,310.50	5,284.54	5,318.00	5,298.00	2.50	8.47	5,315.36	5,289.96		19.38
P-2	J-2	J-3	588.20	1,099.00	0.042798	66 inch	0.013	694.67	5,284.54	5,237.50	5,298.00	5,246.00	7.97	3.00	5,289.96	5,243.98		24.82
P-5	I-5	J-1	290.30	170.00	0.014706	60 inch	0.010	410.56	5,313.00	5,310.50	5,320.00	5,318.00	2.00	2.50	5,317.63	5,315.36		15.29
P-6	I-2	J-2	94.30	115.00	0.064913	48 inch	0.010	475.74	5,292.00	5,284.54	5,298.00	5,298.00	2.00	9.47	5,294.94	5,289.96		9.51
P-7	I-3	J-3	81.70	149.00	0.016779	48 inch	0.013	186.05	5,240.00	5,237.50	5,246.00	5,246.00	2.00	4.50	5,244.46	5,243.98		6.50
P-8	I-4	J-1	87.10	647.00	0.008501	48 inch	0.013	132.43	5,316.00	5,310.50	5,322.00	5,318.00	2.00	3.50	5,318.83	5,315.36		9.17
P-9	I-6	J-2	116.50	993.00	0.005000	54 inch	0.013	139.04	5,289.50	5,284.54	5,296.00	5,298.00	2.00	8.97	5,293.02	5,289.96		8.73
P-10	I-7	J-3	67.20	1,036.00	0.022683	36 inch	0.013	100.45	5,261.00	5,237.50	5,266.00	5,246.00	2.00	5.50	5,263.62	5,243.98		10.27
P-11	J-3	J-5	737.10	434.00	0.031106	72 inch	0.013	746.90	5,237.50	5,224.00	5,246.00	5,234.00	2.50	4.00	5,243.98	5,230.83		26.07
P-12	J-5	J-4	737.10	145.00	0.006897	96 inch	0.013	757.40	5,224.00	5,223.00	5,234.00	5,234.00	2.00	3.00	5,230.83	5,229.95		16.13
P-13	I-8	J-4	33.00	142.00	0.038732	42 inch	0.013	197.99	5,228.50	5,223.00	5,232.00	5,234.00	0.00	7.50	5,230.28	5,229.95		6.72

APPENDIX D

***Amole del Norte Diversion Facilities
Tierra Bayita Drainage Facilities
Greiner Engineering 1995***



PARADISE RV PARK
BASIN COMPARISON
SCALE 1":800'

LEGEND
—— THIS REPORT
—— GREINER 1995

Greiner June 1995

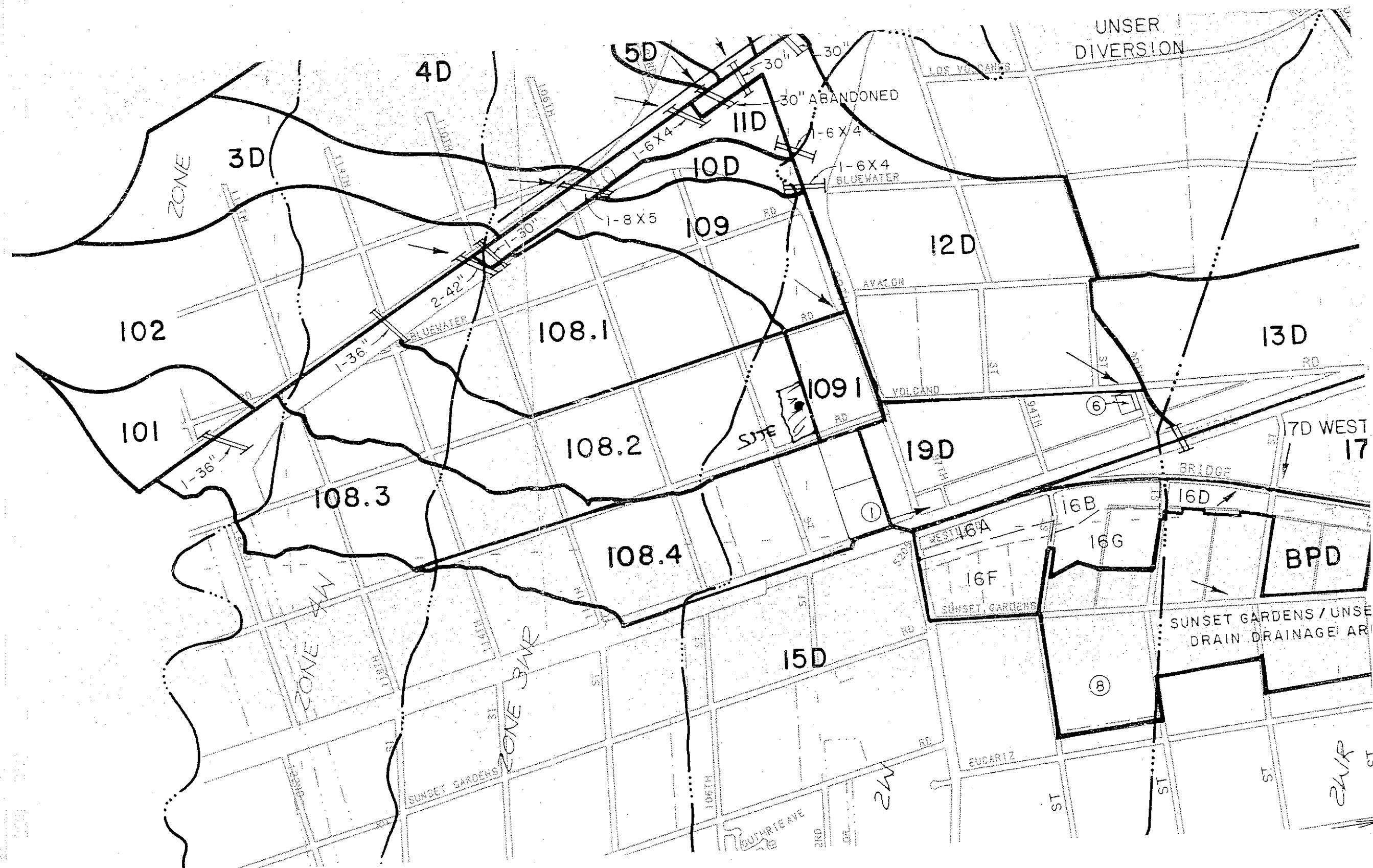
Tables showing undeveloped and developed contributing basins and their characteristics are shown below.

ULTIMATE DEVELOPMENT BASIN INFORMATION						
Basin	Area (Sq. Mi.)	Time of Concentration (hours)	Ultimate Land Treatment			
			A	B	C	D
(percent)						
101	0.0260	0.20	0	100*	0	0
102	0.2810	0.30	15	30*	24	31
108.1	0.1713	0.20	0	17	13	70
108.2	0.1710	0.24	0	18	19	63
108.3	0.1478	0.26	0	21	22	57
108.4	0.1426	0.20	0	15	15	70
109	0.0720	0.21	0	5	13	82
109.1	0.0495	0.20	0	3	12	85**

* Undeveloped land with slopes steeper than 10%.

** Land treatments based on preliminary construction plans.

EXISTING BASIN INFORMATION						
Basin	Area (Sq. Mi.)	Time of Concentration (hours)	Existing Land Treatment			
			A	B	C	D
(percent)						
101	0.0260	0.20	0	100*	0	0
102	0.2810	0.30	15	30*	24	31
108.1	0.1467	0.20	98	0	0	2
108.2	0.1631	0.20	98	0	0	2
108.3	0.1942	0.32	75	0	15	10
108.4	0.0644	0.20	55	0	30	15
109	0.1803	0.29	95	0	0	5



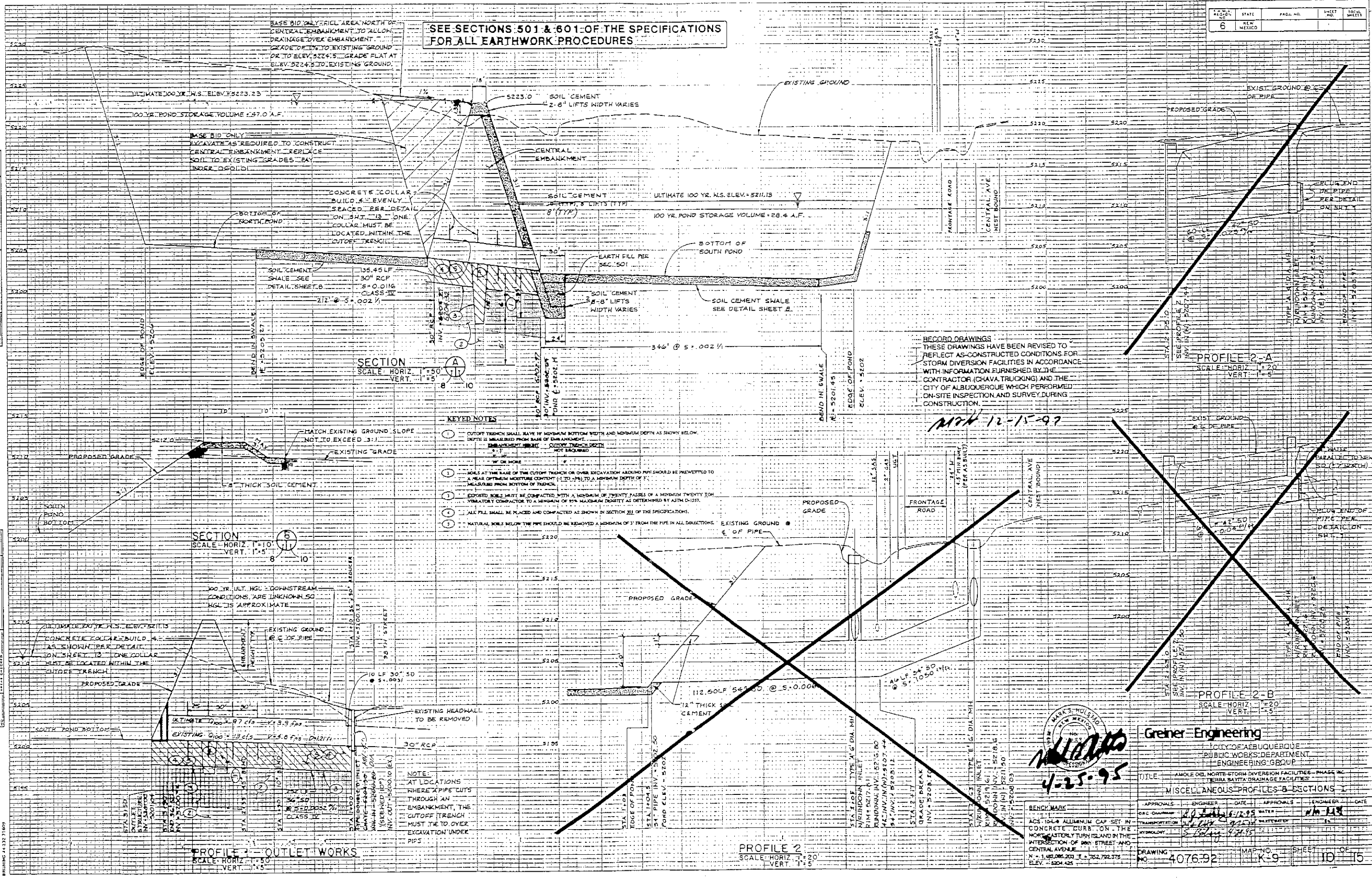
REGION	STATE	PAGE NO.	SHEET NO.	TOTAL SHEETS
6	NEW MEXICO			

SEE SECTIONS 501 & 601 OF THE SPECIFICATIONS FOR ALL EARTHWORK PROCEDURES

DATE	BY	REVISION

DATE	BY	REVISION

RECEIVED
OFFICE OF STATE ENGINEER
SANTITO, NEW MEXICO



RECORD DRAWINGS
THESE DRAWINGS HAVE BEEN REVISED TO REFLECT AS-CONSTRUCTED CONDITIONS FOR STORM DIVERSION FACILITIES IN ACCORDANCE WITH INFORMATION FURNISHED BY THE CONTRACTOR (CHAVA TRUCKING) AND THE CITY OF ALBUQUERQUE WHICH PERFORMED ON-SITE INSPECTION AND SURVEY DURING CONSTRUCTION.

12-15-97

4-25-95

Greiner Engineering
CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: ANOLE DEL NORTE STORM DIVERSION FACILITIES - PHASE I
MISCELLANEOUS PROFILES & SECTIONS

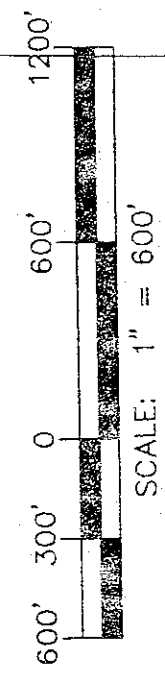
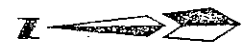
APPROVALS: ENGINEER: DATE: 4/25/95
TRANSPORTATION: DATE: 4/25/95
HYDROLOGY: DATE: 4/25/95

DRAWING NO: 4076.92 MAP NO: K-9 SHEET NO: 15

BRUNING 41232 11/6/99

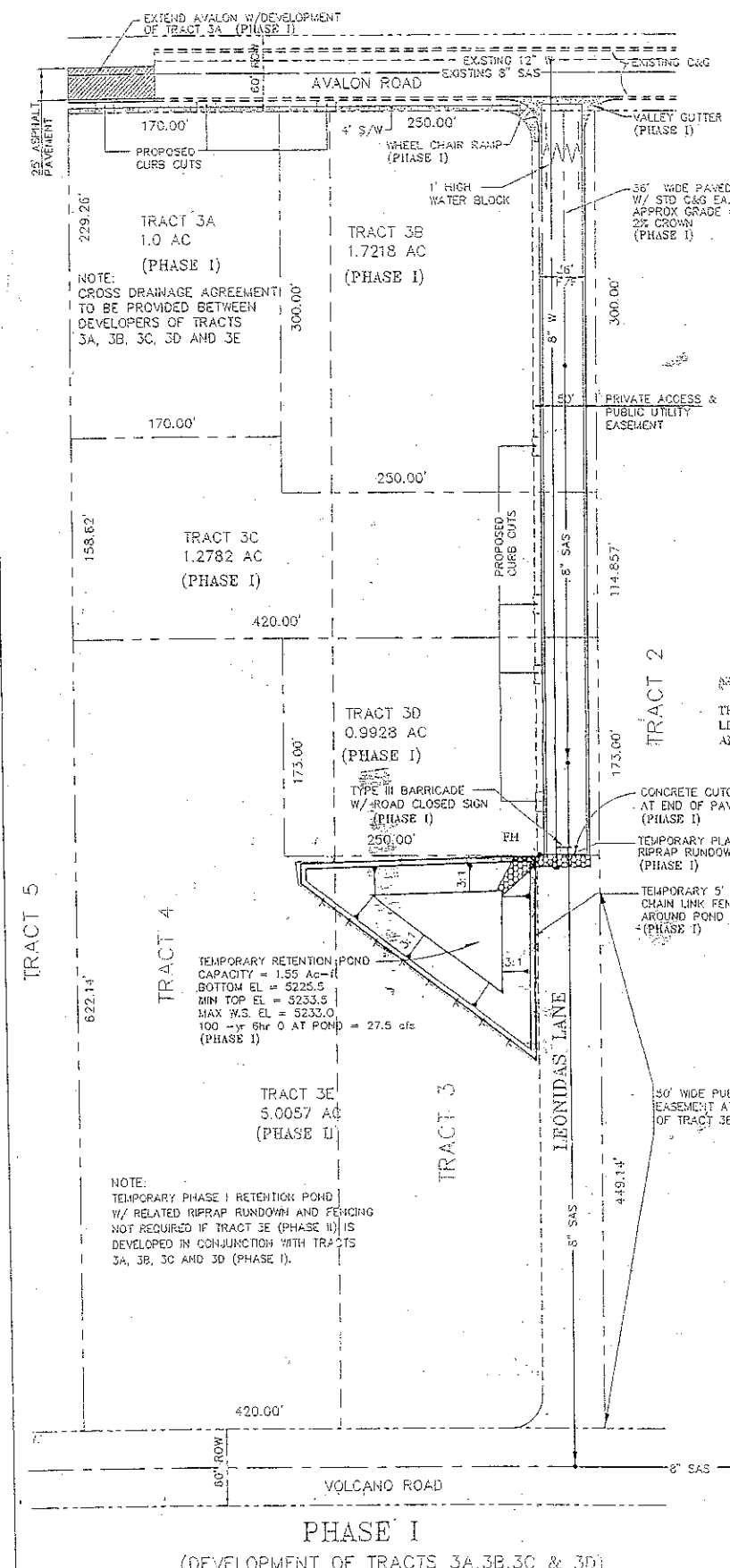
APPENDIX E

Amole Hubbell Drainage Management Plan Amole Channel Drainage Basin Map



APPENDIX F

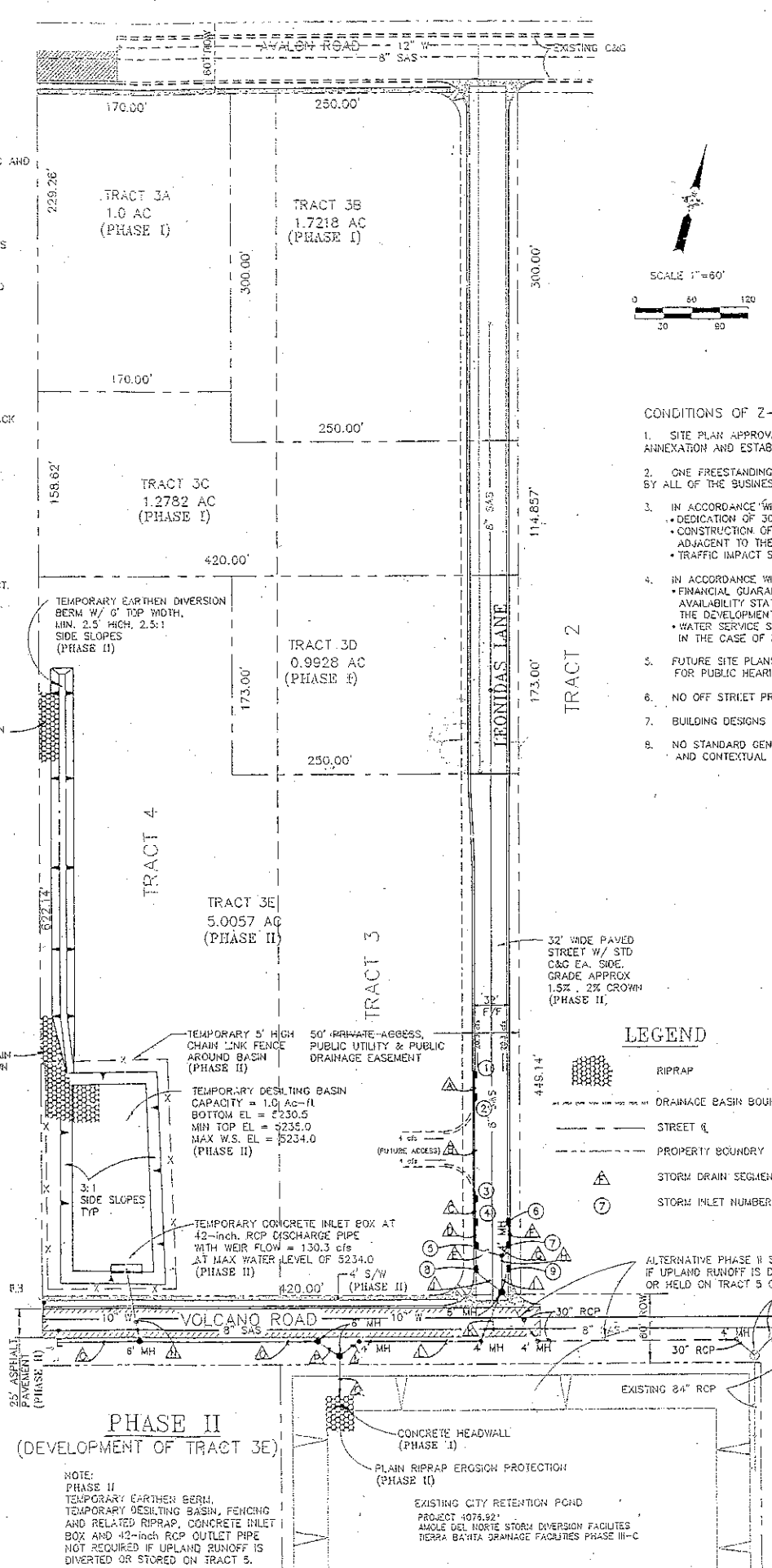
Ray Macy Development Plan 1998



- STRE PLAN NOTES:**
- PROPOSED USES
TRACT 3A-RESTAURANT OR SERVICE STATION AND CONVENIENCE STORE OR OTHER ACCEPTABLE C-2 USE.
TRACT 3B-MOTEL OR OTHER ACCEPTABLE C-2 USE.
TRACT 3C-MOTEL OR OTHER ACCEPTABLE C-2 USE.
TRACT 3D-TRUCK WASH, CAR WASH OR OTHER ACCEPTABLE C-2 USE.
TRACT 3E-RV CAMPGROUND OR OTHER ACCEPTABLE C-2 USE.
 - ACCESS
VEHICULAR INGRESS AND EGRESS TO TRACTS 3A, 3B, 3C AND 3D FROM EITHER AVALON OR THE PRIVATE ACCESS EASEMENT VIA AVALON AT LOCATION SHOWN. CROSS ACCESS EASEMENTS WILL BE GRANTED BETWEEN TRACTS 3A, 3B, 3C AND 3D WHEN SUBDIVIDED. ACCESS TO TRACT 3E WILL BE FROM THE 50' PRIVATE ACCESS EASEMENT AT THE EAST SIDE OF THE PROPERTY. VEHICULAR ACCESS TO THE TRACT 3E PRIVATE ACCESS EASEMENT WILL BE FROM EITHER AVALON RD. OR VOLCANO RD.
PEDESTRIAN INGRESS AND EGRESS SHALL BE PROVIDED IN THE SITE PLAN FOR BUILDING PERMIT WITH EACH LOT TO MINIMIZE CONFLICT WITH VEHICULAR TRAFFIC.
 - MAXIMUM BUILDING HEIGHT
BUILDINGS WILL NOT EXCEED 26' IN HEIGHT EXCEPT IN ACCORDANCE WITH SECTION 14-16-2-15(C) OF THE ZONING CODE.
 - MINIMUM BUILDING SETBACK
THERE SHALL BE A FRONT AND A CORNER SIDE YARD SETBACK OF NOT LESS THAN FIVE FEET AND A SETBACK OF 11 FEET FROM THE JUNCTION OF A DRIVEWAY OR ALLEY AND A PUBLIC SIDEWALK OR PLANNED PUBLIC SIDEWALK LOCATION.
 - MAXIMUM TOTAL DWELLING UNITS
TRACT 3A NOT APPLICABLE
TRACT 3B NOT APPLICABLE
TRACT 3C NOT APPLICABLE
TRACT 3D NOT APPLICABLE
TRACT 3E NOT APPLICABLE
 - MAXIMUM FLOOR AREA RATIO
EXACT FLOOR AREA RATIOS WILL BE DETERMINED WITH THE SITE PLAN FOR BUILDING PERMIT FOR EACH TRACT. THE FOLLOWING FLOOR AREA RATIOS ARE CONSIDERED REPRESENTATIVE:
TRACT 3A: 0.20
TRACT 3B: 0.45
TRACT 3C: 0.60
TRACT 3D: 0.15
TRACT 3E: 0.10 (EXCLUDES RV UNITS)

PIPE SEGMENT	DIA.	Q (cfs)
A	18	7.3
B	21	14.9
C	24	22.5
D	24	29.0
E	27	33.4
F	18	5.6
G	18	9.9
H	30	43.3
I	18	2.5
J	18	2.5
K	30	48.3
L	30	48.3
M	30	48.3
N	42	130.3
O	66	350
P	66	350
Q	66	350

PHASE II STORM DRAINS AND INLETS



- CONDITIONS OF Z-97-83/AX-97-5**
- SITE PLAN APPROVAL IS CONTINGENT UPON CITY COUNCIL APPROVAL OF THE COMPARISON REQUEST FOR ANNEXATION AND ESTABLISHMENT OF SU-1 ZONING FOR C-2 USES AND A CAMPGROUND.
 - ONE FREESTANDING SIGN THAT IS LIMITED TO 26 FEET IN HEIGHT AND 75 FEET IN SIGN AREA TO BE SHARED BY ALL OF THE BUSINESSES ON THE SITE IS ALLOWED.
 - IN ACCORDANCE WITH COMMENTS OF THE PUBLIC WORKS DEPARTMENT TRANSPORTATION DEVELOPMENT OFFICE:
• DEDICATION OF 30 FEET OF RIGHT-OF-WAY FROM THE EXISTING CENTERLINE ON VOLCANO AND AVALON ROADS
• CONSTRUCTION OF 25 FEET OF PAVEMENT, STANDARD CURB AND GUTTER, AND A 4' SIDEWALK, TO BE PLACED ADJACENT TO THE PROPERTY LINE, FOR VOLCANO AND AVALON ROADS
• TRAFFIC IMPACT STUDY WITH THE APPLICATION FOR ANY SITE PLAN FOR BUILDING PERMIT REQUESTS.
 - IN ACCORDANCE WITH COMMENTS OF THE PUBLIC WORKS DEPARTMENT UTILITY DEVELOPMENT OFFICE:
• FINANCIAL GUARANTEES ARE REQUIRED FOR PUBLIC INFRASTRUCTURE IDENTIFIED IN THE WATER AND SEWER AVAILABILITY STATEMENT OF APRIL 28, 1997 AS A CONDITION OF SITE PLAN AND/OR PLAT APPROVAL BY THE DEVELOPMENT REVIEW BOARD.
• WATER SERVICE SHALL BE LIMITED TO STRUCTURES WITH FINISH FLOOR ELEVATIONS BELOW 5255' MSL. IN THE CASE OF MULTI-STORY BUILDINGS, THE HIGHEST FLOOR MUST BE BELOW 5255' MSL.
 - FUTURE SITE PLANS FOR BUILDING PERMITS SHALL BE DELEGATED TO THE DEVELOPMENT REVIEW BOARD FOR PUBLIC HEARING.
 - NO OFF STREET PREMISE SIGNS SHALL BE PERMITTED.
 - BUILDING DESIGNS AND MATERIALS SHALL BE ARCHITECTURALLY COMPATIBLE.
 - NO STANDARD GENERIC FRANCHISE DESIGN BUILDINGS SHALL BE PERMITTED. DESIGN SHALL BE INNOVATED AND CONTEXTUAL TO SOUTHWESTERN ARCHITECTURE PER THE WEST-SIDE STRATEGIC PLAN.

Development Review Board Member Approval

Michael D. ...
Transportation Development
Date: 5-12-98

Roger A. ...
Utility Development
Date: 5-12-98

Edward A. ...
Parks & General Services
Date: 5-12-98

Frank J. ...
City Engineer/AM/FCA
Date: 9-29-98

Kim L. ...
DRB Chairman
Date: 9/29/98



SITE PLAN FOR SUBDIVISION PHASED DEVELOPMENT (PHASES I & II) SU-1 FOR C-2 USES AND CAMPGROUND TRACTS 3A, 3B, 3C, 3D AND 3E, ROW 2, UNIT A, WEST OF WESTLAND TOWN OF ATRISCO GRANT