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

September 11, 2003

Steve Metro
Wilson & Company
4900 Lang Avenue NE
Albuquerque, New Mexico 87109

RE: Drainage Report for SAD 227 (E-10, D-10) Dated June 12, 2003

Dear Mr. Metro:

The above referenced drainage report received July 24, 2003 is approved.

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

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

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

SAD 227
Unser Boulevard Middle Section
Drainage Report

Prepared for

Volcano Cliffs
Property Owners Association

Prepared by

Wilson & Company, Inc.
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Steven J. Metro, P.E.
June 2003

WILSON
&COMPANY

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Purpose of Study

The Volcano Cliffs property Owners Association proposed to develop a Special Assessment District (SAD 227) to provide public and private infrastructure for units 2, 5 and 24 of the Volcano Cliffs Subdivision, Albuquerque, New Mexico. The purpose of this report is to develop a drainage plan for the design and construction of the storm drain infrastructure required to convey the off-site and on-site flows generated by the improvements anticipated as a result of SAD 227.

Site Description

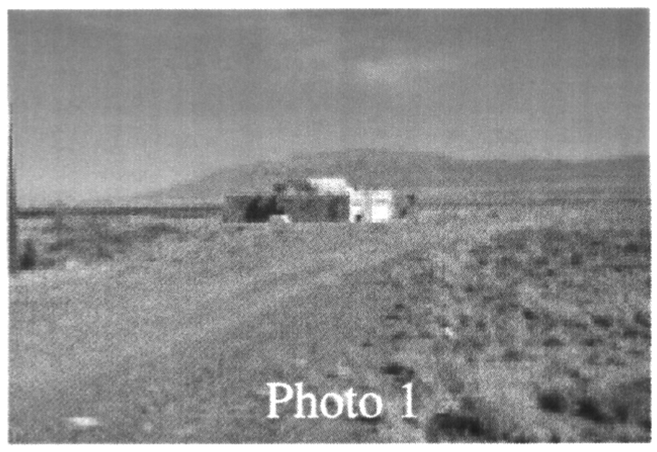


Photo 1

The proposed project site is currently undeveloped land with the exception of a house near the south fork of the south branch of the Boca Negra Arroyo (see photo 1). The site is located above the escarpment west of the Petroglyph National Park on the west side of Albuquerque. The proposed site is bounded by 81st Street on the west and the proposed Unser Boulevard along the east boundary. The area is approximately 140 acres sloping from west to east. The site has significant off-site flows discharging at 3 locations along 81st Street. These are designated as the Monte Carlo, the South Fork of the South Branch of the Boca Negra Arroyo and the North Fork of the South branch of the Boca Negra Arroyo. The site currently discharges to the park property with flows being conveyed to the Boca Negra Arroyo and the San Antonio Arroyo. A project vicinity map is shown on Figure 1 on the following page.

Methodology

Wilson & Company will utilize the hydrologic and hydraulic methods and guidelines as described in Section 22.2 of the City of Albuquerque Development Process Manual (DPM). The hydrology for the project has been prepared using the AHYMO 97 computer modeling software. Hydraulic calculations have been prepared using a combination of Flowmaster, Hydraflow and hand calculation methods. Inlets calculations were done by hand and included in Appendix B. The 100-year 24-hour event has been used as the design storm for this project.

Existing Conditions

The undeveloped property is comprised of a portion of 3 significant drainage basins located along the upper edge of the escarpment. The discharge of these basins is conveyed by the arroyo identified as listed below:

1. Monte Carlo (off-site basin 100)
2. South Fork of the South Branch of the Boca Negra Arroyo (off-site basin 80,81,82 and portions of 79)
3. North Fork of the South Branch of the Boca Negra Arroyo (off-site basin 83 and portions of 79)

The Monte Carlo offsite flow drains to the San Antonio Arroyo. The South and North Forks of the South Branch of the Boca Negra Arroyo both discharge to the Boca Negra Arroyo.

The south and north forks are currently shallow earthen channels. The south fork is conveyed under 81st street through a 60 inch CMP culvert. (See Photo 2) The north fork flows across 81st with no structures. (See Photo 3)

A drainage basin map delineating the areas generating off-site flows is shown on Plate 1, "Offsite Basin Boundary Map".

The National Park Service staff has requested that the stormwater be collected and piped down the escarpment to protect the Petroglyph National Park. Included in Appendix E are existing Flood and Soils maps.

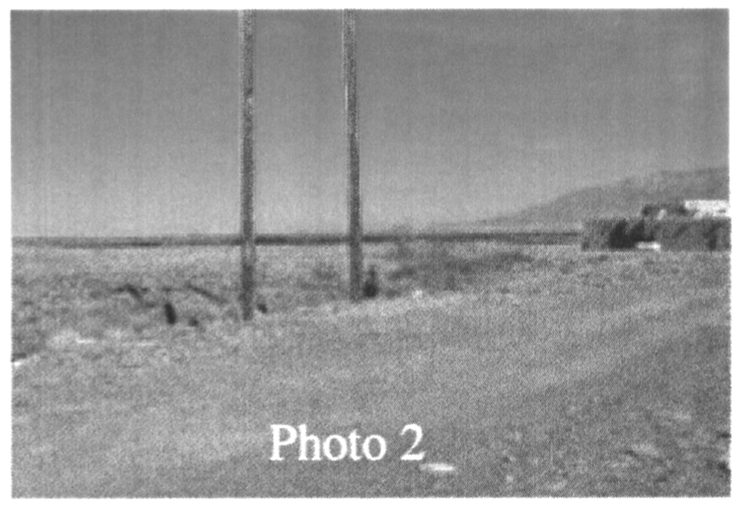


Photo 2

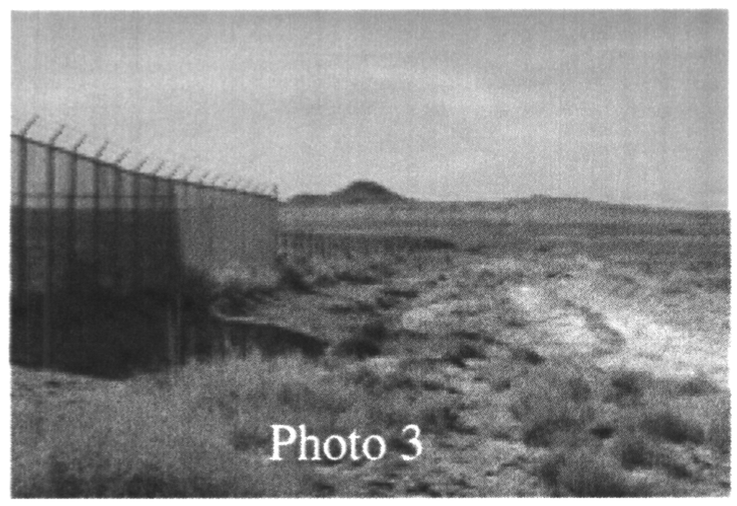


Photo 3

Proposed Conditions

The proposed SAD 227 will construct the public and private infrastructure required to develop residential lots within the project boundaries (streets, water, sewer, drainage, electric, gas, telephone and cable). All construction will be in public right-of-way and easements. No mass grading will be completed with this project.

Off –site flows will be conveyed through the site as follows:

- The Monte Carlo off-site flows will be combined with the south half of the sub-division and collected in a storm drain system. The Storm drain will be discharged to the San Antonio Arroyo. The project peak discharge from basin 100 is 71 cfs. The discharge is held to 37.5 cfs by the 36" culvert at 81st street utilizing approximately 2.5 ac-ft of detention at that location.
- The South Fork of the South Branch of the Boca Negra Arroyo will be conveyed through a 72" RCP culvert under 81st street and then continue in 72" RCP under Emerald Dr. through the sub-division. Approximately 366 cfs will be conveyed through the site and discharged to the Boca Negra Arroyo. This system does not carry any developed flows. No flow from the SAD is discharged to the system.
- The North Fork of the South Branch of the Boca Negra Arroyo will be conveyed through a 60" RCP under 81st street and then a 60" RCP under Onyx Dr. and into Unser Blvd and combine with the rest of the subdivision flow to the structure at Montano.

The existing flow patterns will be maintained with the construction of this project. The off-site basins consist of open space and private properties. The private property is assumed to develop as 8 DUs per acre. Flows will not be transferred between basins. All offsite flow values will be maintained at existing conditions to minimize the impact on the Petroglyph National Park.

On-site flows will be handled with curb inlets and curb and gutter per SAD 227 Resolution 1 and will be captured at identified locations using City of Albuquerque's Type A and C grate inlets and a storm drain system to collect and convey the runoff to the proper down stream facility. The grate capacity calculations are included in Appendix A. Figure 2 on the following page illustrates the street typical sections proposed for this project.

An architectural review committee for the property owners association will control and monitor the lot development. The onsite basins will be designed with 3 DU's per acre with the majority of the land left in its natural condition per resolution 1 of SAD 227.

Unser Boulevard Middle Section Drainage System

The drainage system for SAD 227 is connected the proposed Unser Boulevard system. The middle section has been included in the on-site basin analysis under the proposed conditions model. The proposed overall drainage system is included on included on Plates 2,3, and 4 included with this report. The Unser system will include inlets located at approximately 500' intervals conveying flows to the 60" conveyance within the ROW. The system conveys approximately 400 cfs to the San Antonio Arroyo system at Montano Road. The Montano structure has capacity for the 400cfs discharge.

Conclusion

The existing down stream facilities have the capacity to accept the developed flows and historical off-site flows as determined by this project. The flows will be conveyed to the San Antonio Arroyo and the Boca Negra Arroyo through storm drains with the capacity to convey the offsite flows through the project.

The hydrologic analysis and hydraulic analysis can be found in the Appendices in the end of this report.

Pg 4 MISSING! see SAD Guidelines which allow for cross lot drainage.

Hydrology:

The existing hydrology for this area is included in the AMAFCA "Boca Negra – Mariposa Arroyo Hydrologic & Hydraulic Analysis Summary Report" prepared by Resource Technology, Inc. (Reference 1). The existing conditions run off for the study area are tabulated below.

Basin and Analysis Point	Existing Q100 cfs	Developed Q100 cfs
Boca Negra Arroyo:		
S. Leg Boca Negra at 81st Street (offsite)	366	366
N. Leg Boca Negra at 81st Street (offsite)	229	229
Combined Boca Negra at Escarpment (offsite & onsite)	576	366
San Antonio Arroyo:		
Monte Carlo (100) at 81st Street (offsite)	71	71
Discharge at Montano	135	399

The table below shows the land treatment and runoff within the SAD. See Plates 2, 3, and 4 for locations of the basins.

Basin	Area (ac)	A	B	C	D	Q (cfs)
1	11.1	12%	15%	39%	34%	25
2	3.4	12%	15%	39%	34%	9
3	4.6	12%	15%	39%	34%	12
4	8.6	12%	15%	39%	34%	8
5	5.4	12%	15%	39%	34%	14
6	2.8	12%	15%	39%	34%	7
7	6.8	12%	15%	39%	34%	18
8	4.7	12%	15%	39%	34%	12
9	2.1	12%	15%	39%	34%	4
10	2.5	12%	15%	39%	34%	5
11	9.2	12%	15%	39%	34%	24
A1	3.1	12%	15%	39%	34%	8
A2	8.2	12%	15%	39%	34%	22
A3	9.7	12%	15%	39%	34%	25
A4a	10	12%	15%	39%	34%	20
A4b	5.7	12%	15%	39%	34%	13
A4c	3.1	12%	15%	39%	34%	8
A5	8.2	95%	5%	0%	0%	14
A6	63	0%	100%	0%	0%	51
A7	5.9	12%	15%	39%	34%	15
A8	4.7	12%	15%	39%	34%	10

COMP. SJ Metro

CK.

DATE 5-15-03

WILSON & COMPANY

LOC. ABQ

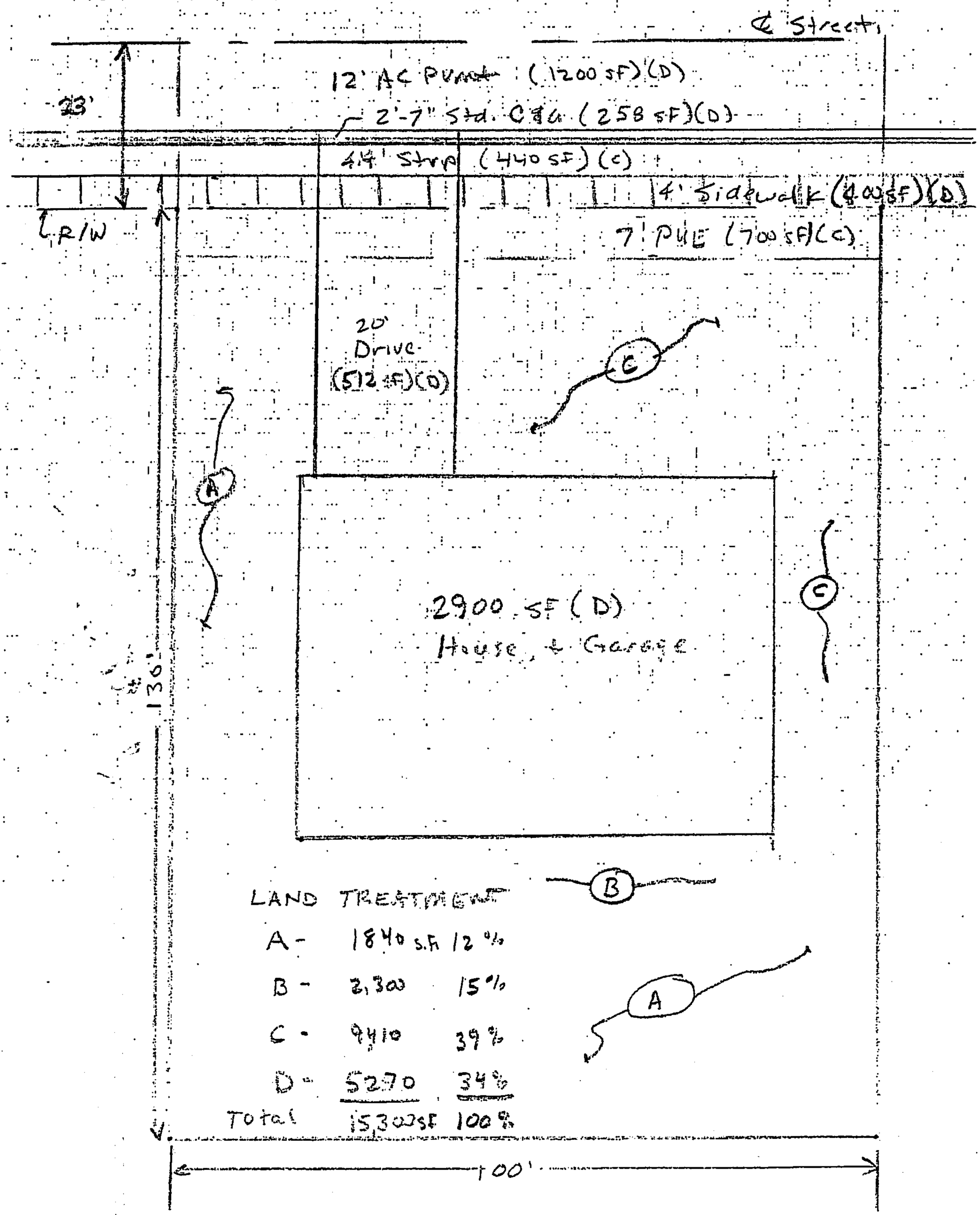
FILE X1218025

PROJ. SAD 227

SHEET 1

SUBJ. Typical Lot Layout

OF 1



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COMMAND            IDENTIFICATION NO.  NO.     (SQ MI)    (CFS)      (AC-FT)    (INCHES)    (HOURS)   ACRE      NOTATION

*S                 SAD 227 Volcano Cliffs DRAINAGE BASIN
*S                 Wilson & Company PROJECT #X1218025
START                                                                                                   TIME=       .00
LOCATION                          BERNALILLO COUNTY
*S100YR RAINFALL
RAINFALL  TYPE= 1                                                                                       RAIN6=    2.110
*S COMPUTE BASIN 1  - BASIN AT KIMBERLITE
COMPUTE NM HYD          1.00   -     1        .01700      24.55       .968     1.06766     1.550     2.256 PER IMP=  34.00
*S COMPUTE BASIN 2  - BASIN AT POPO
COMPUTE NM HYD          2.00   -     2        .00530       8.91       .302     1.06766     1.500     2.626 PER IMP=  34.00
ADD HYD                  MH3  1& 2  12        .02230      32.51      1.270     1.06764     1.550     2.278
*S ROUTE 2 THROUGH 36" PIPE TO MH 3
ROUTE MCUNGE            2.10   12    2        .02230      32.33      1.266     1.06479     1.550     2.265 CCODE =     .2
*S ROUTE 1 AND 2 THROUGH 48" PIPE TO MH 4
ROUTE MCUNGE           12.10   13   12        .02230      32.41      1.268     1.06652     1.550     2.271 CCODE =     .1
*S COMPUTE BASIN 3  - BASIN AT MAUNA LOA
COMPUTE NM HYD          3.00   -     3        .00720      12.09       .410     1.06766     1.500     2.624 PER IMP=  34.00
ADD HYD                  MH4 12& 3  13        .02950      43.22      1.678     1.06676     1.550     2.289
*S ROUTE UPSTREAM AND 3 THROUGH 48" PIPE TO MH 5
ROUTE MCUNGE           13.10   14   13        .02950      43.22      1.675     1.06491     1.550     2.289 CCODE =     .2
*S COMPUTE BASIN 4  - BASIN SOUTH HALF OF VICTORIA
COMPUTE NM HYD          4.00   -     4        .00720       8.08       .410     1.06766     1.650     1.753 PER IMP=  34.00
ADD HYD                  MH5 13& 4  14        .03670      50.41      2.085     1.06542     1.550     2.146
*S ROUTE UPSTREAM AND 4 THROUGH 48" PIPE TO MH 6
ROUTE MCUNGE           14.10   15   14        .03670      48.35      2.076     1.06080     1.600     2.059 CCODE =     .2
*S COMPUTE BASIN 5  - BASIN SOUTH HALF OF KIBO
COMPUTE NM HYD          5.00   -     5        .00840      14.11       .478     1.06766     1.500     2.624 PER IMP=  34.00
ADD HYD                  MH6 14& 5  15        .04510      60.18      2.555     1.06205     1.550     2.085
*S ROUTE UPSTREAM AND 5 THROUGH 48" PIPE
ROUTE MCUNGE           15.10   16   15        .04510      58.19      2.546     1.05827     1.600     2.016 CCODE =     .2
*S COMPUTE BASIN 6  - BASIN NORTH HALF OF KIBO
COMPUTE NM HYD          6.00   -     6        .00440       7.39       .251     1.06766     1.500     2.626 PER IMP=  34.00
ADD HYD                  MH7 15& 6  16        .04950      64.74      2.796     1.05909     1.550     2.043
*S ROUTE UPSTREAM AND 6 THROUGH 48" PIPE
ROUTE MCUNGE           16.10   17   16        .04950      62.50      2.780     1.05316     1.600     1.973 CCODE =     .2
*S COMPUTE BASIN 7  - BASIN NORTH HALF OF VICTORIA
COMPUTE NM HYD          7.00   -     7        .01060      17.80       .604     1.06766     1.500     2.623 PER IMP=  34.00
ADD HYD                  MH7 16& 7  17        .06010      77.87      3.384     1.05570     1.550     2.025
*S ROUTE UPSTREAM AND 7 THROUGH 54" PIPE
ROUTE MCUNGE           17.10   18   17        .06010      75.49      3.373     1.05242     1.550     1.963 CCODE =     .2
*S COMPUTE BASIN 8  - BASIN AT MONTE CARLO
COMPUTE NM HYD          8.00   -     8        .00730      12.26       .416     1.06766     1.500     2.624 PER IMP=  34.00
ADD HYD                  MH7 17& 8  18        .06740      86.45      3.789     1.05406     1.550     2.004
*S COMPUTE BASIN 100  - BASIN WEST OF 81ST
COMPUTE NM HYD        100.00   -    98        .33000      70.70      6.285      .35708     1.900      .335 PER IMP=    .00
ROUTE RESERVOIR         hole   98   99        .33000      37.45      6.285      .35707     2.350      .177 AC-FT=    2.495
*S COMPUTE BASIN 101  - BASIN WEST OF 81ST
COMPUTE NM HYD        101.00   -    98        .38000     157.72      7.237      .35708     1.650      .649 PER IMP=    .00
*S COMPUTE BASIN 102  - BASIN WEST OF 81ST
COMPUTE NM HYD        102.00   -    98        .06400      29.78      1.219      .35708     1.550      .727 PER IMP=    .00
*S ROUTE OFFSITE basin 100 THROUGH 36" PIPE
ROUTE MCUNGE           97.10   98   97        .06400      29.75      1.215      .35607     1.600      .726 CCODE =     .1
ADD HYD                  MH7 18&97  18        .13140     113.65      5.004      .71409     1.600     1.351
*S ROUTE UPSTREAM, OFFSITE, AND 8 THROUGH 60" PIPE
ROUTE MCUNGE           18.10   19   18        .13140     113.48      4.996      .71283     1.600     1.349 CCODE =     .1
*S COMPUTE BASIN A1  - BASIN AT KEYENTA PL
COMPUTE NM HYD            A2   -    31        .00500       8.40       .285     1.06766     1.500     2.626 PER IMP=  34.00
*S COMPUTE BASIN 9  - BASIN AT CASA BLANCA
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COMPUTE NM HYD          9.00   -     9        .00300        4.03        .171      1.06766    1.550    2.097 PER IMP=  34.00
*S ADD A1 AND 9 BEFORE ROUTING IN 60" PIPE
ADD HYD                A19 31& 9   9        .00800       11.93        .456      1.06758    1.500    2.330
ADD HYD                MH7 18& 9  19        .13940      123.27       5.451       .73319    1.600    1.382
*S ROUTE UPSTREAM AND 9 THROUGH 60" PIPE
ROUTE MCUNGE          19.10   19   18        .13940      122.59       5.443       .73215    1.600    1.374 CCODE =      .2
*S COMPUTE BASIN 10  - BASIN AT MARIGOLD CT
COMPUTE NM HYD        10.00   -    10        .00300        5.05        .171      1.06766    1.500    2.628 PER IMP=  34.00
ADD HYD                MH7 19&10  20        .14240      126.81       5.622       .74023    1.600    1.391
*S ROUTE UPSTREAM AND 10 THROUGH 60" PIPE
ROUTE MCUNGE          20.10   21   20        .14240      126.02       5.611       .73885    1.600    1.383 CCODE =      .2
*S COMPUTE BASIN A3  - BASIN AT CASA BLANCA DR
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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
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COMPUTE NM HYD	A3	-	33	.01500	25.18	.854	1.06766	1.500	2.623	PER IMP= 34.00
*S COMPUTE BASIN 11 - BASIN AT MARIGOLD DRIVE										
COMPUTE NM HYD	11.00	-	11	.01400	23.50	.797	1.06766	1.500	2.623	PER IMP= 34.00
*S ADD A3 TO BASIN 11										
ADD HYD	MH7	33&11	11	.02900	48.68	1.651	1.06765	1.500	2.623	
ADD HYD	MH7	20&11	21	.17140	161.19	7.263	.79448	1.550	1.469	
COMPUTE NM HYD	83.00	-	83	1.08000	228.40	23.374	.40579	1.950	.330	PER IMP= 1.00
*S ROUTE BASIN 83 THROUGH 60" PIPE										
ROUTE MCUNGE	83.10	84	83	1.08000	228.30	23.361	.40558	2.000	.330	CCODE = .1
*S COMPUTE BASIN A2 - BASIN AT FUJI CT										
COMPUTE NM HYD	22.00	-	22	.01280	21.49	.729	1.06766	1.500	2.623	PER IMP= 34.00
ADD HYD	83A2	22&83	22	1.09280	231.79	24.090	.41333	2.000	.331	
*S COMPUTE BASIN A7 - BASIN BETWEEN JADE AND RIM ROCK PL										
COMPUTE NM HYD	A7	-	38	.00900	15.11	.512	1.06766	1.500	2.624	PER IMP= 34.00
ADD HYD	83A2	38&22	38	1.10180	234.25	24.603	.41868	2.000	.332	
*S COMPUTE BASIN A8 - BASIN BETWEEN 81ST AND UNSER NORTH OF RIM ROCK PLACE										
COMPUTE NM HYD	A8	-	39	.00700	9.98	.399	1.06766	1.550	2.228	PER IMP= 34.00
ADD HYD	83A2	39&38	22	1.10880	236.46	25.001	.42277	2.000	.333	
*S COMPUTE BASIN A5 - BASIN AT ONYX DRIVE										
COMPUTE NM HYD	35.00	-	35	.00090	2.18	.089	1.86135	1.500	3.788	PER IMP= 100.00
*S COMPUTE BASIN A6 - BASIN AT ONYX COURT										
COMPUTE NM HYD	36.00	-	36	.00050	1.21	.050	1.86135	1.500	3.795	PER IMP= 100.00
ADD HYD	36.10	35&36	36	.00140	3.40	.139	1.86095	1.500	3.791	
ADD HYD	22.50	22&36	22	1.11020	237.31	25.140	.42459	2.000	.334	
*S COMPUTE BASIN A4a - BASIN AT RIM ROCK(WEST BASIN)										
COMPUTE NM HYD	A4A	-	34	.01560	28.14	1.096	1.31687	1.500	2.818	PER IMP= 54.00
*S UNSER BASIN										
COMPUTE NM HYD	U1	-	60	.00300	7.26	.298	1.86135	1.500	3.779	PER IMP= 100.00
*S ADD WEST RIMROCK BASINS AND UNSER BASIN										
ADD HYD	AC	34&60	37	.01860	35.39	1.393	1.40466	1.500	2.973	
*S COMPUTE BASIN A4B - BASIN AT RIM ROCK(EAST BASIN)										
COMPUTE NM HYD	A4B	-	35	.00890	12.94	.507	1.06766	1.550	2.272	PER IMP= 34.00
*S ADD WEST AND EAST RIMROCK BASINS										
ADD HYD	AC	37&35	37	.02750	47.72	1.900	1.29558	1.500	2.711	
*S ROUTE EAST WEST AND U1 BASINS THROUGH 36" PIPE										
ROUTE MCUNGE	U1RR	38	37	.02750	46.86	1.894	1.29169	1.550	2.663	CCODE = .2
*S COMPUTE BASIN A4c - BASIN AT RIM ROCK(SOUTH BASIN)										
COMPUTE NM HYD	A4C	-	36	.00500	7.97	.285	1.06766	1.500	2.490	PER IMP= 34.00
*S ADD RIM ROCK BASINS										
ADD HYD	AC	37&36	37	.03250	54.41	2.179	1.25719	1.550	2.616	
COMPUTE NM HYD	U2	-	61	.00250	6.05	.248	1.86135	1.500	3.780	PER IMP= 100.00
COMPUTE NM HYD	U3	-	62	.00140	3.39	.139	1.86135	1.500	3.784	PER IMP= 100.00
*S ADD UNSER BASINS										
ADD HYD	AC	61&62	61	.00390	9.44	.387	1.86121	1.500	3.781	
*S ADD UNSER BASINS TO RIM ROCK BASINS										
ADD HYD	AC	61&37	37	.03640	62.62	2.566	1.32191	1.550	2.688	
ADD HYD	37.50	22&37	37	1.14660	252.43	27.706	.45307	1.950	.344	
ROUTE MCUNGE	37.10	38	37	1.14660	252.43	27.706	.45307	1.950	.344	CCODE = .0
ADD HYD	83A2	37&21	23	1.31800	327.96	34.969	.49747	1.650	.389	

ROUTE MCUNGE	23.10	24	23	1.31800	327.96	34.969	.49747	1.650	.389	CCODE = .0
COMPUTE NM HYD	U4	-	63	.00130	3.15	.129	1.86135	1.500	3.784	PER IMP= 100.00
COMPUTE NM HYD	U5	-	64	.00120	2.91	.119	1.86135	1.500	3.784	PER IMP= 100.00
ADD HYD	U45	63&64	24	.00250	6.05	.248	1.86114	1.500	3.784	
ADD HYD	U45	23&24	25	1.32050	331.63	35.217	.50005	1.600	.392	
ROUTE MCUNGE	23.10	25	23	1.32050	331.63	35.217	.50005	1.600	.392	CCODE = .0
COMPUTE NM HYD	U6	-	65	.00080	1.94	.079	1.86135	1.500	3.788	PER IMP= 100.00
COMPUTE NM HYD	U7	-	66	.00080	1.94	.079	1.86135	1.500	3.788	PER IMP= 100.00
ADD HYD	U45	65&66	24	.00160	3.88	.159	1.86102	1.500	3.788	
ADD HYD	U45	23&24	25	1.32210	334.24	35.376	.50170	1.600	.395	
ROUTE MCUNGE	U3	25	23	1.32210	334.24	35.376	.50170	1.600	.395	CCODE = .0
COMPUTE NM HYD	U8	-	67	.00070	1.70	.069	1.86135	1.500	3.791	PER IMP= 100.00
COMPUTE NM HYD	U9	-	68	.00070	1.70	.069	1.86135	1.500	3.791	PER IMP= 100.00
ADD HYD	U45	67&68	24	.00140	3.40	.139	1.86094	1.500	3.791	
ADD HYD	U45	23&24	25	1.32350	336.52	35.515	.50314	1.600	.397	
ROUTE MCUNGE	U3	25	23	1.32350	336.52	35.515	.50314	1.600	.397	CCODE = .0
COMPUTE NM HYD	U10	-	69	.00072	1.75	.071	1.86135	1.500	3.791	PER IMP= 100.00
COMPUTE NM HYD	U11	-	70	.00073	1.77	.072	1.86135	1.500	3.791	PER IMP= 100.00
COMPUTE NM HYD	51.00	-	51	.01280	2.27	.380	.55600	2.350	.277	PER IMP= .00
ADD HYD	U45	69&70	24	.00145	3.52	.144	1.86094	1.500	3.791	
ADD HYD	U45	24&51	26	.01425	3.67	.523	.68878	1.500	.403	
ADD HYD	U45	26&23	25	1.33775	339.31	36.038	.50512	1.600	.396	

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 MCUNGE	U3	25	23	1.33775	338.81	36.040	.50514	1.600	.396	CCODE = .2
COMPUTE NM HYD	U12	-	71	.00250	6.05	.248	1.86135	1.500	3.780	PER IMP= 100.00
COMPUTE NM HYD	U13	-	72	.00580	14.02	.576	1.86135	1.500	3.778	PER IMP= 100.00
COMPUTE NM HYD	52.00	-	52	.09000	50.57	1.751	.36482	1.550	.878	PER IMP= .00
ADD HYD	U45	71&72	24	.00830	20.07	.824	1.86128	1.500	3.779	
ADD HYD	U45	24&52	26	.09830	68.04	2.575	.49117	1.550	1.081	
ADD HYD	U45	26&23	25	1.43605	399.14	38.615	.50418	1.600	.434	

FINISH

(s0p10h4099T1&16D

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =06/11/2003
INPUT FILE = sbnrev.dat USER NO.= AHYMO-C-9803c01UNMLIB-AH

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
*S BN100EX.TXT = EXISTING CONDITION RTI MODEL FOR THE BOCA NEGRA SYSTEM										
START										TIME= .00
LOCATION		BERNALILLO COUNTY								
*S**********										
*S100 YEAR 24HR STORM EXISTING CONDITION										
RAINFALL TYPE= 2										RAIN24= 2.660
*S *** THE FOLLOWING SUBBASINS ARE THE "MAIN" BRANCH OF THE BASIN ***										
*S										
START										TIME= .00
*S ******** BASINS THAT CURRENTLY DRAIN TO THE SOUTH BRANCH **********										
*S										
COMPUTE NM HYD	60.00	-	1	.35400	115.70	6.742	.35708	1.700	.511	PER IMP= .00
*S										
COMPUTE NM HYD	62.00	-	2	.20000	66.29	3.809	.35708	1.700	.518	PER IMP= .00
ADD HYD	62.70	1& 2	7	.55400	181.99	10.550	.35708	1.700	.513	
ROUTE MCUNGE	63.50	7	5	.55400	166.73	10.152	.34361	2.250	.470	CCODE = .1
*S										
COMPUTE NM HYD	63.00	-	1	.97300	395.30	18.530	.35708	1.650	.635	PER IMP= .00
ADD HYD	63.80	1& 5	8	1.52700	395.30	28.682	.35219	1.650	.404	
*S										
COMPUTE NM HYD	64.00	-	1	.30500	240.44	6.477	.39815	1.500	1.232	PER IMP= 2.00
ADD HYD	64.90	1& 8	9	1.83200	561.72	35.159	.35984	1.550	.479	
ROUTE MCUNGE	65.50	9	5	1.83200	504.21	34.414	.35222	2.000	.430	CCODE = .1
*S										
COMPUTE NM HYD	65.00	-	1	.33800	210.53	6.437	.35708	1.550	.973	PER IMP= .00
ADD HYD	65.70	1& 5	7	2.17000	528.11	40.851	.35298	1.950	.380	
*S										
COMPUTE NM HYD	66.00	-	1	2.44900	304.06	52.002	.39814	2.350	.194	PER IMP= 2.00
ADD HYD	66.80	1& 7	8	4.61900	771.36	92.853	.37692	2.000	.261	
ROUTE MCUNGE	67.50	8	5	4.61900	767.59	92.823	.37680	2.000	.260	CCODE = .2
COMPUTE NM HYD	67.00	-	1	.10900	57.28	3.867	.66516	1.650	.821	PER IMP= 15.00
ADD HYD	67.90	1& 5	9	4.72800	796.71	96.689	.38344	2.000	.263	
*S										
COMPUTE NM HYD	68.00	-	1	.46700	137.53	9.405	.37761	1.750	.460	PER IMP= 1.00
ADD HYD	68.70	1& 9	7	5.19500	895.09	106.094	.38292	2.000	.269	
ROUTE MCUNGE	69.60	7	6	5.19500	875.15	105.875	.38213	2.250	.263	CCODE = .2
*S										
COMPUTE NM HYD	69.00	-	1	.61500	165.66	15.081	.45977	1.850	.421	PER IMP= 5.00
ADD HYD	69.80	1& 6	8	5.81000	989.05	120.956	.39035	2.200	.266	
ROUTE MCUNGE	73.MH	8	5	5.81000	984.38	120.917	.39022	2.300	.265	CCODE = .2
*S										
COMPUTE NM HYD	73.00	-	1	.72300	174.49	15.472	.40124	1.850	.377	PER IMP= 2.00
ROUTE MCUNGE	74.60	1	6	.72300	167.72	15.254	.39559	2.700	.362	CCODE = .1
*S										
COMPUTE NM HYD	74.00	-	1	.64700	205.05	17.496	.50704	1.800	.495	PER IMP= 7.00
ADD HYD	74.90	1& 6	9	1.37000	210.15	32.750	.44822	2.650	.240	
COMPUTE NM HYD	75.00	-	1	.86500	240.43	23.391	.50704	1.900	.434	PER IMP= 7.00
*S										
ADD HYD	74.70	1& 9	7	2.23500	442.41	56.142	.47099	1.850	.309	
*S										

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 = 2 NOTATION
COMPUTE NM HYD	79.00	-	1	.41100	121.93	9.006	.41087	1.800	.464	PER IMP= .00
ADD HYD	79.80	1& 7	8	2.64600	562.71	65.148	.46165	1.850	.332	
*S ROUTE 79.8 THROUGH THE PLAYA OF SUBBASIN 79										
ROUTE RESERVOIR	PLAY79	8	4	2.64600	.01	.023	.00017	1.650	.000	AC-FT= 76.000

ROUTE MCUNGE	80.60	4	6	2.64600	.01	.022	.00016	3.200	.000	CCODE =	.2
*S											
COMPUTE NM HYD	80.00	-	1	.78000	198.17	17.789	.42763	1.900	.397	PER IMP=	.00
ADD HYD	80.70	1& 6	7	3.42600	198.17	17.811	.09748	1.900	.090		
*S											
COMPUTE NM HYD	81.00	-	1	.55000	156.88	11.461	.39072	1.800	.446	PER IMP=	.00
ADD HYD	81.80	1& 7	8	3.97600	349.80	29.273	.13804	1.850	.137		
ROUTE MCUNGE	82.50	8	5	3.97600	346.54	29.223	.13781	2.300	.136	CCODE =	.1
*S											
COMPUTE NM HYD	82.00	-	1	.28000	112.83	5.835	.39072	1.650	.630	PER IMP=	.00
ADD HYD	82.90	1& 5	9	4.25600	365.65	35.057	.15445	2.300	.134		
*S											
FINISH											

Hydrology:

The table below shows the land treatment and runoff within Unser Blvc. See Plates , 3, and 4 for locations of the basins.

Basin	Area (ac)	A	B	C	D	Q (cfs)
U1	2.2	0%	0%	0%	100%	7
U2	1.7	0%	0%	0%	100%	6
U3	0.9	0%	0%	0%	100%	3
U4	0.8	0%	0%	0%	100%	3
U5	0.8	0%	0%	0%	100%	3
U6	0.6	0%	0%	0%	100%	2
U7	0.6	0%	0%	0%	100%	2
U8	0.5	0%	0%	0%	100%	2
U9	0.5	0%	0%	0%	100%	2
U10	0.5	0%	0%	0%	100%	2
U11	0.5	0%	0%	0%	100%	2
U12	1.6	0%	0%	0%	100%	6
U13	3.7	0%	0%	0%	100%	14

U1
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.006100 ft/ft			
Elevation range: 0.00 ft to 2.07 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			
Discharge	7.26 cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.42	ft
Flow Area	2.37	ft²
Wetted Perimeter	11.76	ft
Top Width	11.34	ft
Height	0.42	ft
Critical Depth	0.45	ft
Critical Slope	0.004263	ft/ft
Velocity	3.07	ft/s
Velocity Head	0.15	ft
Specific Energy	0.56	ft
Froude Number	1.18	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

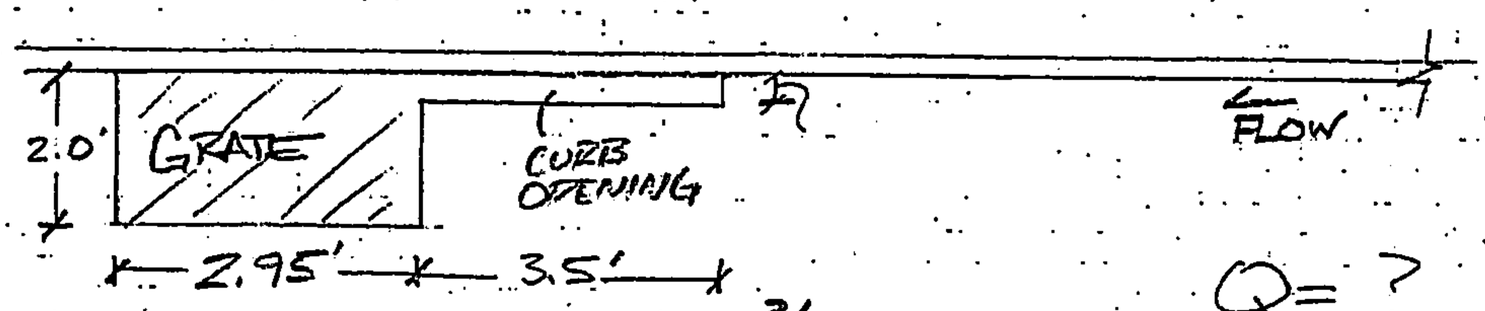
SUBJ. BASIN: U1 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = C L H^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



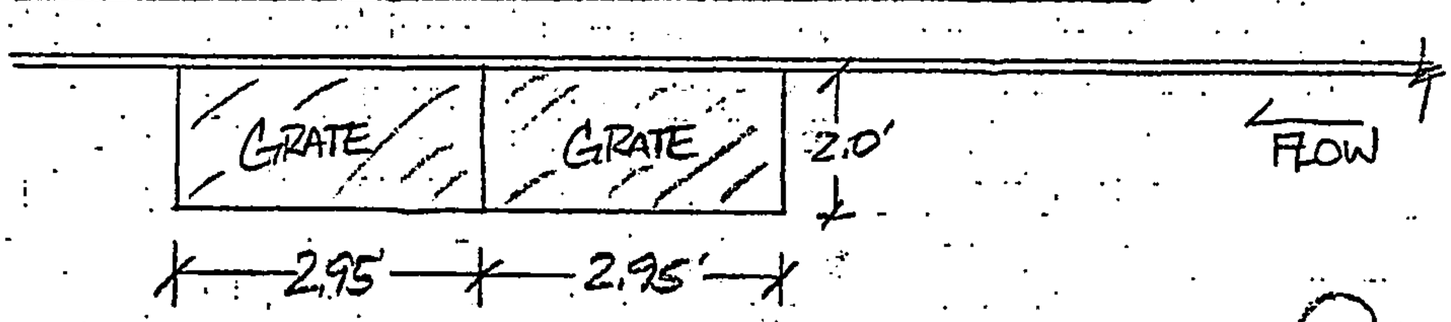
$Q = (3.0)(8.45)(0.42')^{3/2}$

$Q = 6.9$ cfs < BASIN U1 Q = 7.26

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.42'

PASS THRU 0.36 cfs

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95 + 2)(0.42)^{3/2}$

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9

$Q = 4$ cfs > 0.36 (Remain Q) H = 0.42

USE 1 TYPE "A" INLET, 1 "SINGE C" FOR BASIN U1

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U2
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.006100 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 6.05 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.39	ft
Flow Area	2.07	ft²
Wetted Perimeter	10.99	ft
Top Width	10.59	ft
Height	0.39	ft
Critical Depth	0.42	ft
Critical Slope	0.004368	ft/ft
Velocity	2.93	ft/s
Velocity Head	0.13	ft
Specific Energy	0.52	ft
Froude Number	1.17	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

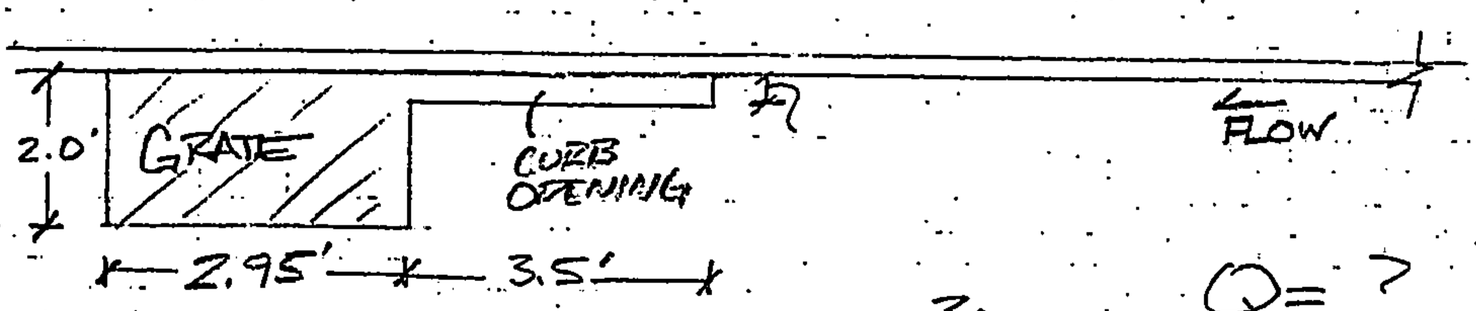
SUBJ. BASIN: U2 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



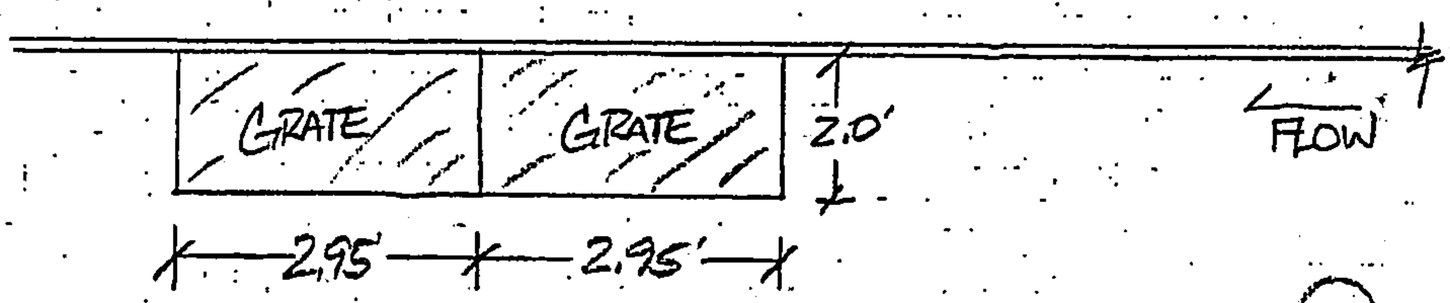
$Q = (3.0)(8.45)(0.39')^{3/2}$

$Q = 6.17$ cfs > BASIN U2 $Q = 6.05$ cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.39'

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1 - Type "A" FOR BASIN U2

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U3
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 3
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.006100 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 3.39 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.31	ft
Flow Area	1.34	ft²
Wetted Perimeter	8.84	ft
Top Width	8.52	ft
Height	0.31	ft
Critical Depth	0.33	ft
Critical Slope	0.004719	ft/ft
Velocity	2.53	ft/s
Velocity Head	0.10	ft
Specific Energy	0.41	ft
Froude Number	1.13	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

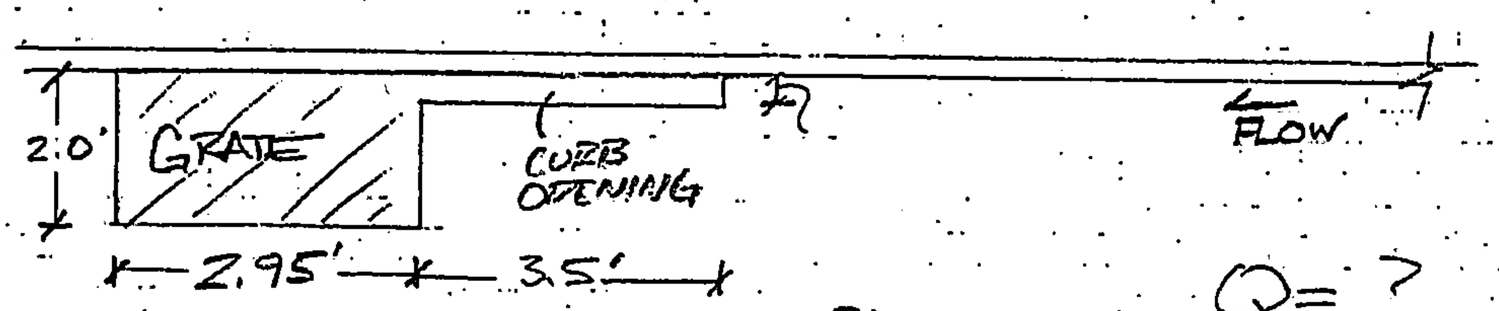
SUBJ. BASIN: U3 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET

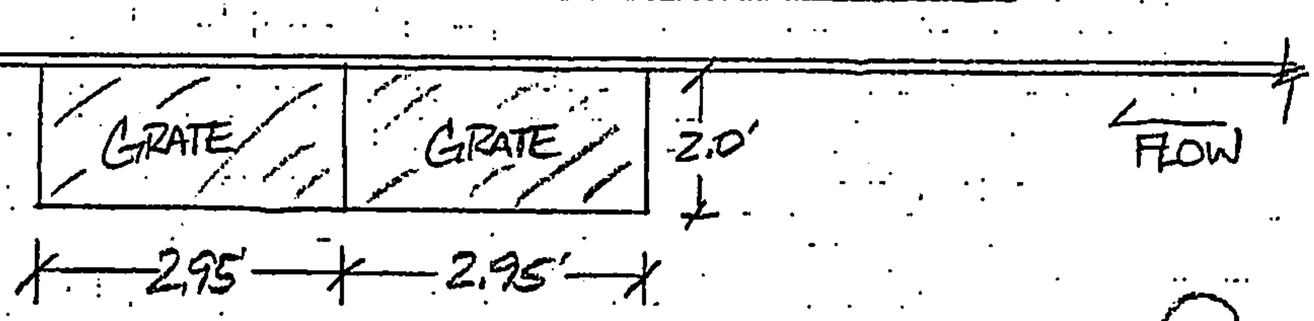


$Q = (3.0)(8.45)(0.31')^{3/2}$

$Q = 4.38$ cfs > BASIN U3 3.59 cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.31'

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1 TYPE "A" INLET for BASIN U3

TED ON RECYCLED PAPER

U4
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 3.15 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.20	ft
Flow Area	0.54	ft^2
Wetted Perimeter	5.62	ft
Top Width	5.41	ft
Height	0.20	ft
Critical Depth	0.32	ft
Critical Slope	0.004765	ft/ft
Velocity	5.84	ft/s
Velocity Head	0.53	ft
Specific Energy	0.73	ft
Froude Number	3.26	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

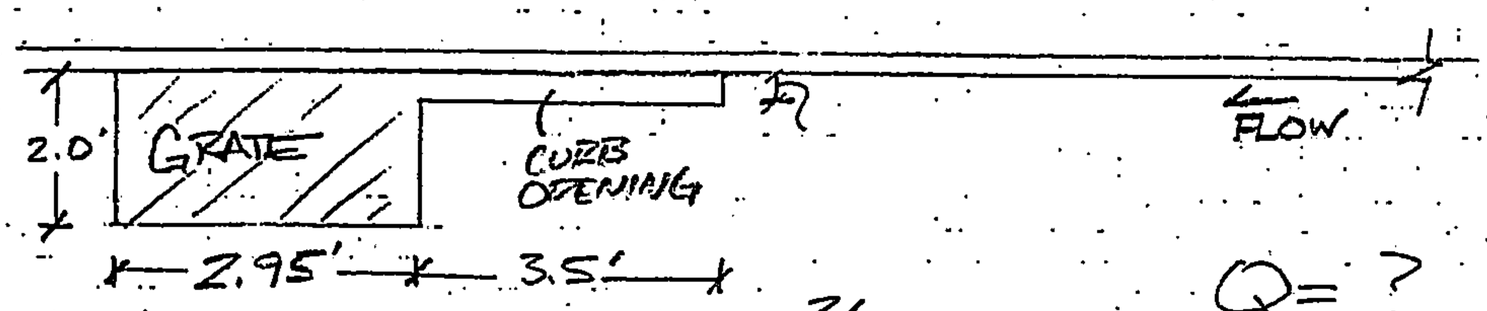
SUBJ. BASIN: U4 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



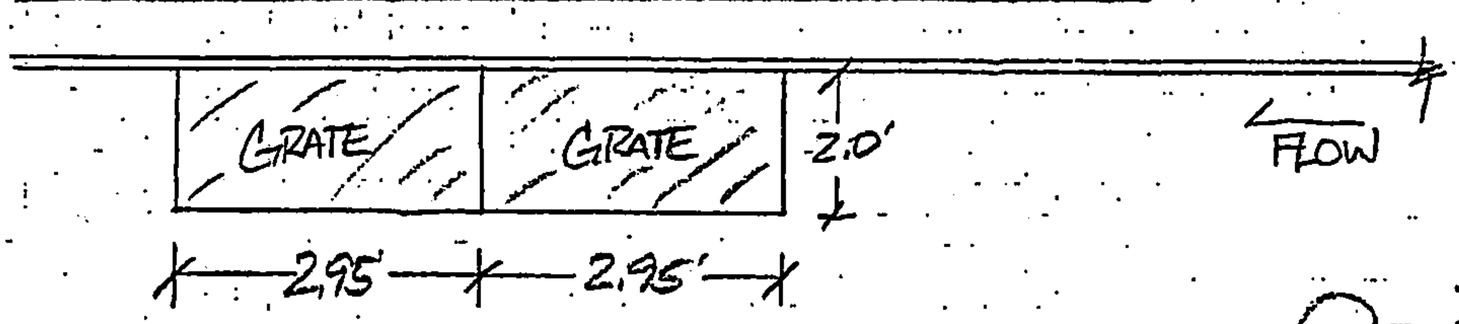
$Q = (3.0)(8.45)(0.20)^{3/2}$

$Q = 2.27$ cfs < BASIN U4 Q = 3.15

PASS THRU = 0.88

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.20'

TYPE "Double C" STORM INLET



$Q = 3.0(2.95 + 2.0)(0.2)^{3/2}$

$Q = 1.33$ cfs > 0.88 cfs

OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

USE 1 - Type "A" & 1 - Type "SINGLE C"
FOR BASIN U4

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U5
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope	0.059200 ft/ft				
Elevation range: 0.00 ft to 2.07 ft.					
Station (ft)	Elevation (ft)		Start Station	End Station	Roughness
0.00	0.67		0.00	38.00	0.013
0.00	0.00				
38.00	1.40				
38.00	2.07				
Discharge	2.91	cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.19	ft
Flow Area	0.51	ft²
Wetted Perimeter	5.45	ft
Top Width	5.25	ft
Height	0.19	ft
Critical Depth	0.31	ft
Critical Slope	0.004816	ft/ft
Velocity	5.72	ft/s
Velocity Head	0.51	ft
Specific Energy	0.70	ft
Froude Number	3.24	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

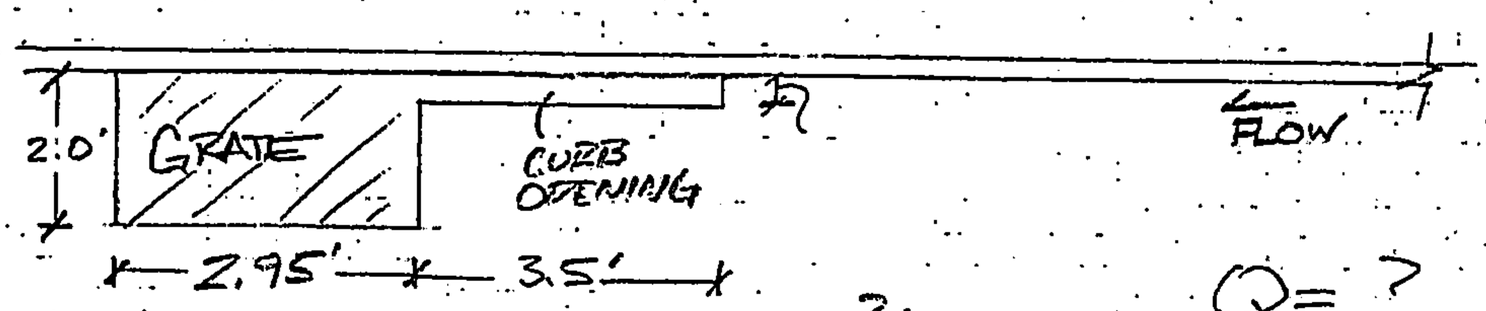
SUBJ. BASIN: U5 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



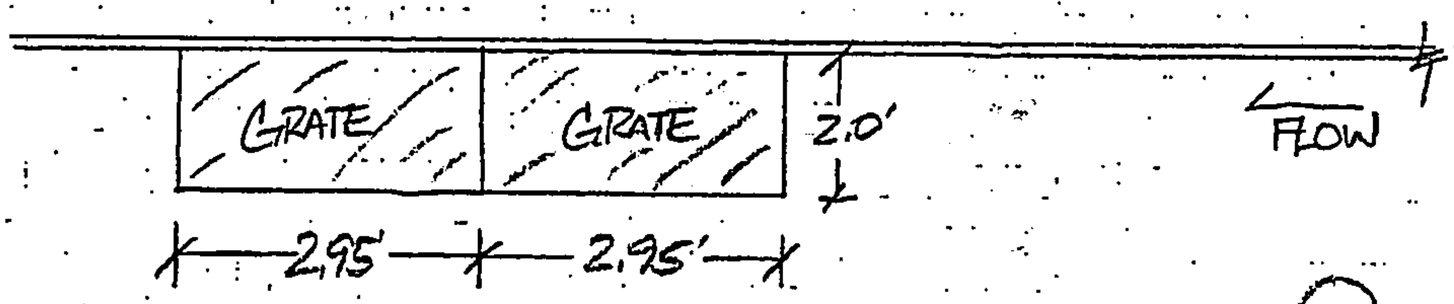
$Q = (3.0)(8.45)(0.19)^{3/2}$

$Q = 2.09 <$ BASIN U5 $Q = 2.9$ cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.19'

PASSTHRU = 0.82

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95 + 2.0)(0.19')^{3/2}$

$Q = 1.23 >$ PASS THRU $Q = 0.82$ cfs

OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.19'

USE 1-TYPE "A" & 1-TYPE "SINGE C"
FOR BASIN U5

D ON RECYCLED PAPER

U6
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.059200 ft/ft			
Elevation range: 0.00 ft to 1.43 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			
Discharge	1.94 cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.13	ft
Flow Area	0.43	ft^2
Wetted Perimeter	6.72	ft
Top Width	6.58	ft
Height	0.13	ft
Critical Depth	0.21	ft
Critical Slope	0.005392	ft/ft
Velocity	4.47	ft/s
Velocity Head	0.31	ft
Specific Energy	0.44	ft
Froude Number	3.07	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

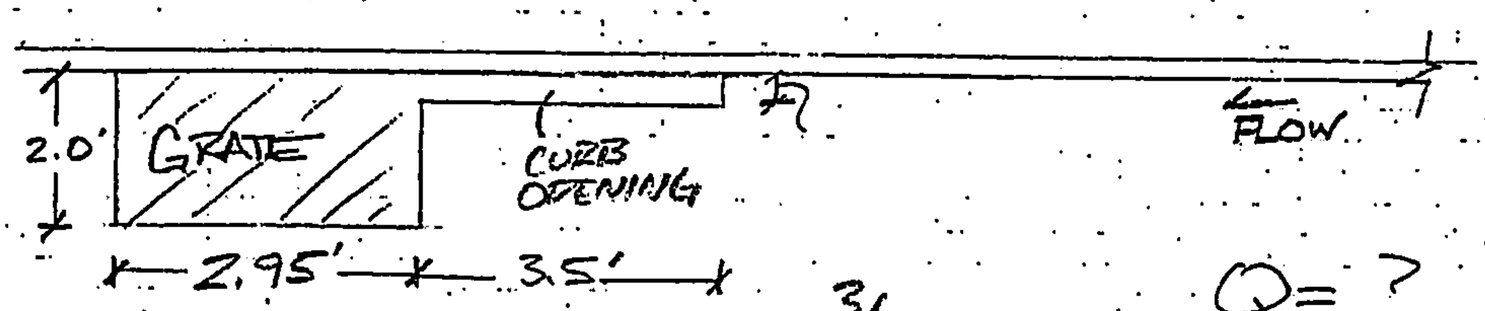
SUBJ. BASIN: U6 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



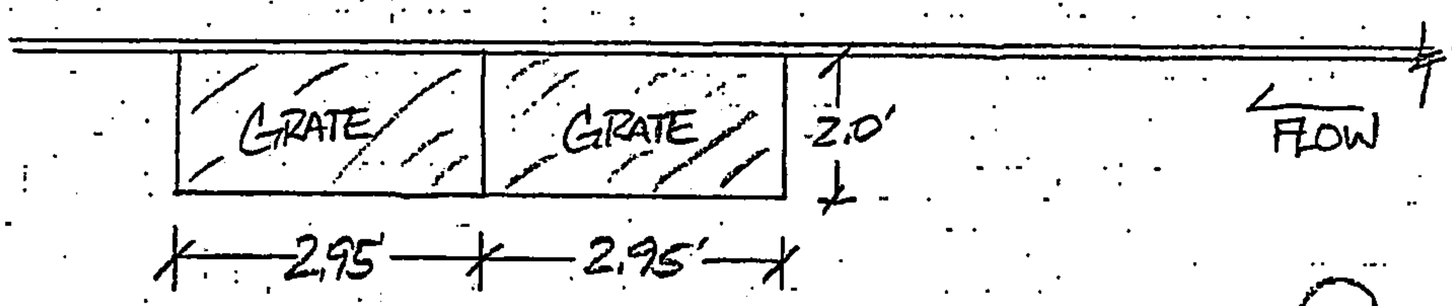
$Q = (3.0)(8.45)(0.13)^{3/2}$

$Q = 1.18$ cfs < BASIN U6 $Q = \underline{1.94}$ cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.13'

PASS THRU = 0.76 cfs

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95 + 2.0)(0.13)^{3/2}$

$Q = 0.7$ cfs ≈ 0.76 cfs
OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.13

USE 1 - TYPE "A" & 1 - TYPE "SINGLE C"
FOR BASIN U6

10 OH RECYCLED PAPER

U7
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 7
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 1.43 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			

Discharge 1.94 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.13	ft
Flow Area	0.43	ft²
Wetted Perimeter	6.72	ft
Top Width	6.58	ft
Height	0.13	ft
Critical Depth	0.21	ft
Critical Slope	0.005392	ft/ft
Velocity	4.47	ft/s
Velocity Head	0.31	ft
Specific Energy	0.44	ft
Froude Number	3.07	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

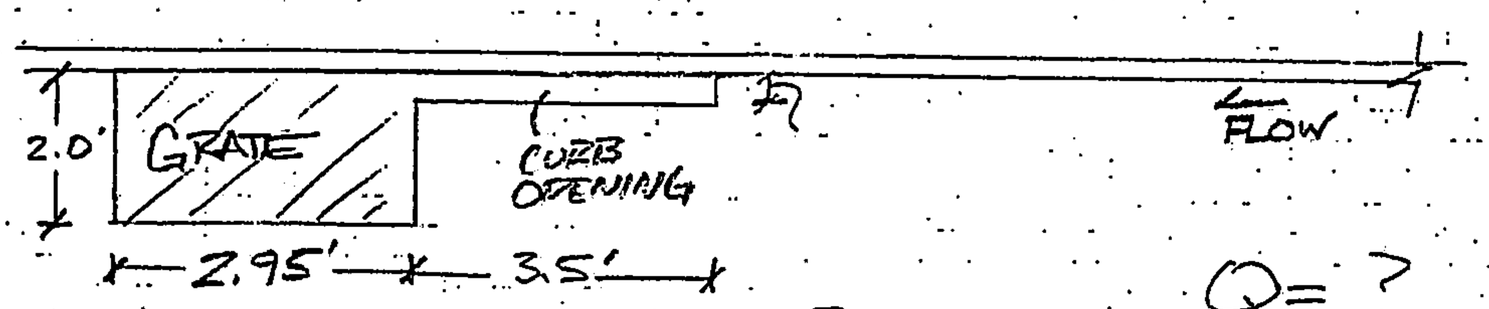
SUBJ. BASIN: U7 OF

CAPACITY OF GRATE INLETS AS WEIRS

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

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



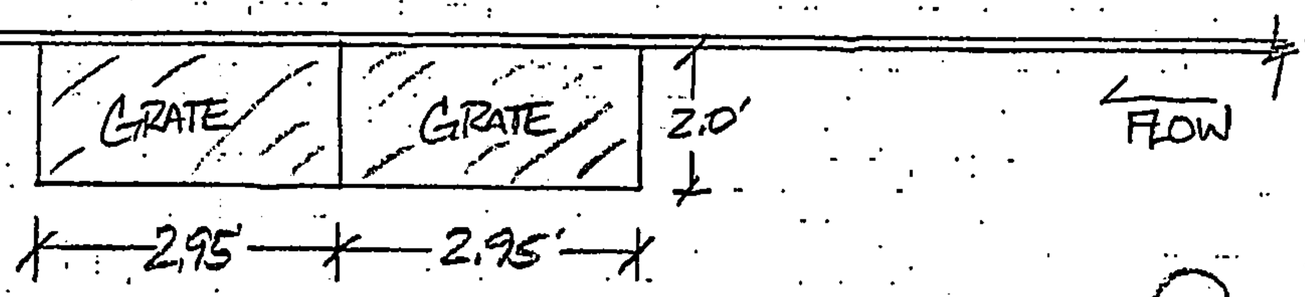
$Q = (3.0)(8.45)(0.13)^{3/2}$

$Q = 1.18 <$ BASIN U7 $Q = 1.94$ cfs

PASS THRU = 0.76 cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.13

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95 + 2.0)(0.13)^{3/2}$

$Q = 0.70$ cfs ≈ 0.76

OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.13

USE 1-TYPE "A" & 1-TYPE SINGLE "C"
FOR BASIN U7

ED ON RECYCLED PAPER

U8
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 1.70 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.34	ft^2
Wetted Perimeter	4.46	ft
Top Width	4.30	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005174	ft/ft
Velocity	5.00	ft/s
Velocity Head	0.39	ft
Specific Energy	0.55	ft
Froude Number	3.13	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

SUBJ. BASIN: U8 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

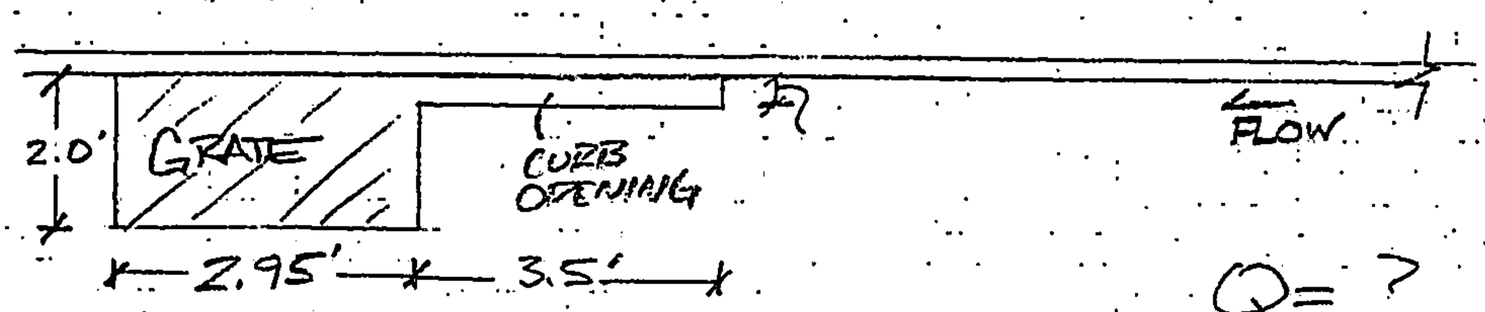
Q = Discharge (cfs)

C = Discharge Coefficient

L = Effective Length of Crest (ft)

H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



$Q = (3.0)(8.45)(0.16)^{3/2}$

$Q = 1.62 <$ BASIN U8 $Q = 1.70$ cfs

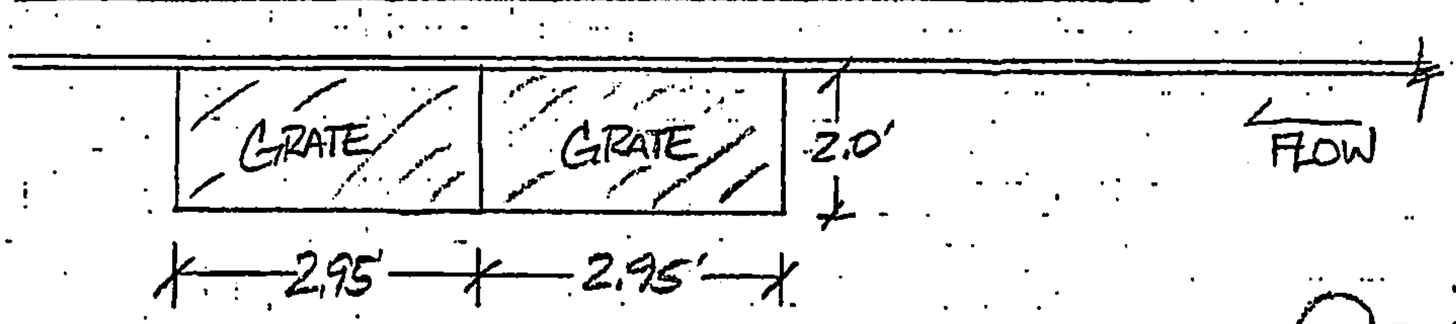
Q = ?

C = 3.0

L = 3.5 + 2.95 + 2.0 = 8.45

H = 0.16'

TYPE "Double C" STORM INLET



Q = ?

C = 3.0

L = (2.95 x 2) + 2.0 = 7.9

H =

Q =

Q =

USE 1 - TYPE "A" INLET FOR BASIN U8

ED ON RECYCLED PAPER

U9
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 9
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 1.70 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.34	ft^2
Wetted Perimeter	4.46	ft
Top Width	4.30	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005174	ft/ft
Velocity	5.00	ft/s
Velocity Head	0.39	ft
Specific Energy	0.55	ft
Froude Number	3.13	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

SUBJ. BASIN: 49 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

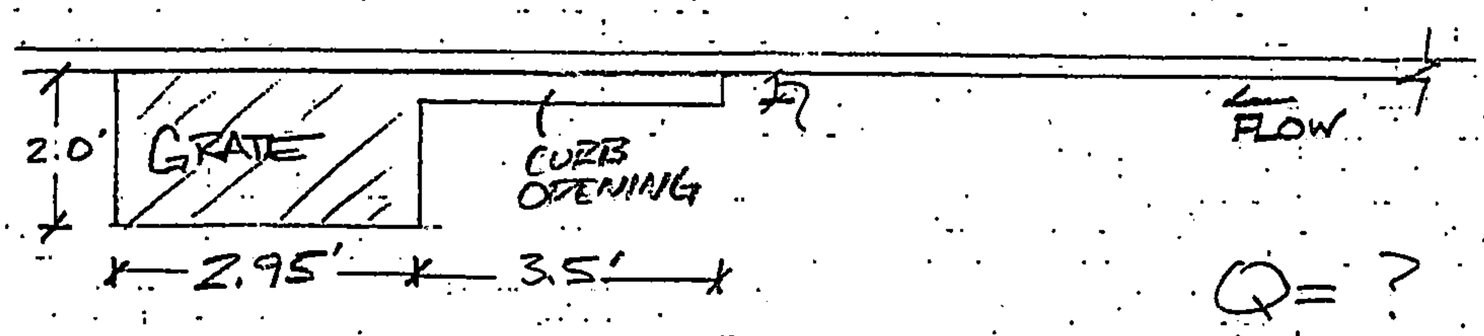
Q = Discharge (cfs)

C = Discharge Coefficient

L = Effective Length of Crest (ft)

H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



$Q = ?$

$C = 3.0$

$L = 3.5 + 2.95 + 2.0 = 8.45$

$H = 0.16'$

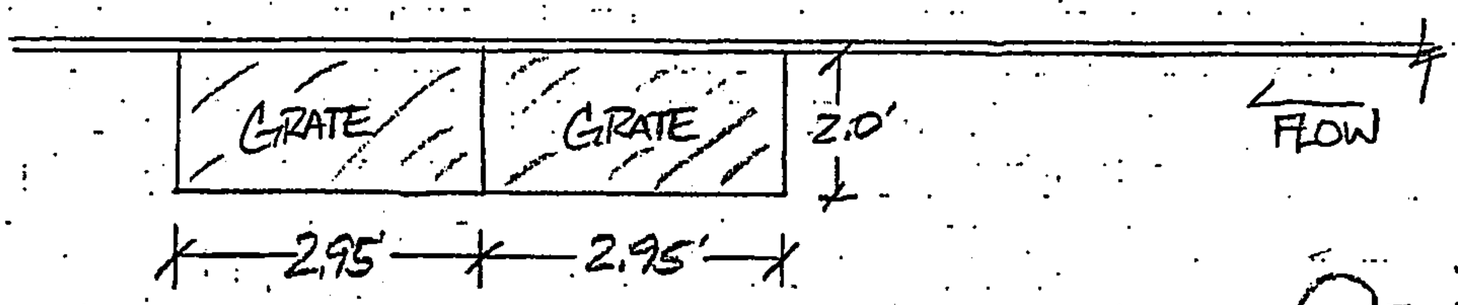
$Q = (3.0)(8.45)(0.16)^{3/2}$

$Q = 1.62$ cfs <

BASIN 49
Q = 1.70 cfs

OK

TYPE "Double C" STORM INLET



$Q = ?$

$C = 3.0$

$L = (2.95 \times 2) + 2.0 = 7.9$

$H =$

$Q =$

$Q =$

USE 1-TYPE "A" INLET
FOR BASIN 49

ED ON RECYCLED PAPER

U10
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 10
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 1.75 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.35	ft^2
Wetted Perimeter	4.51	ft
Top Width	4.34	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005153	ft/ft
Velocity	5.04	ft/s
Velocity Head	0.39	ft
Specific Energy	0.55	ft
Froude Number	3.14	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

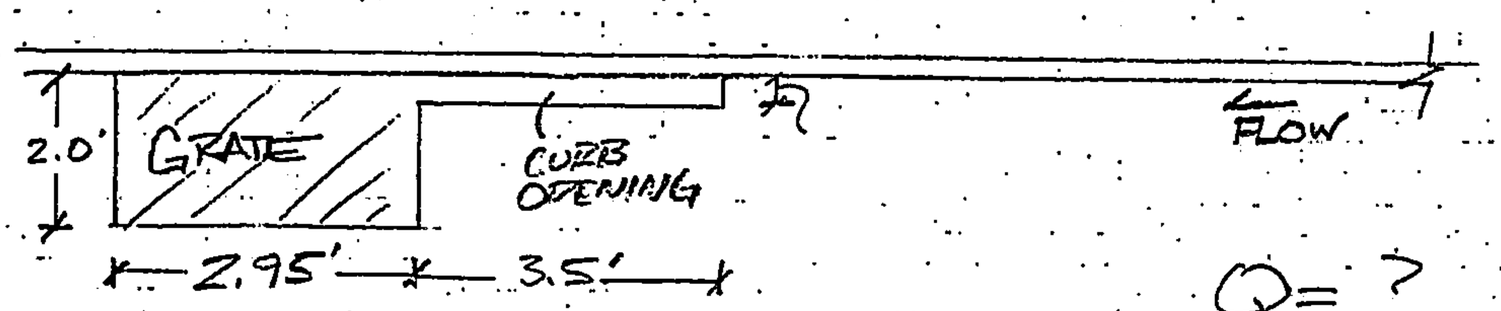
SUBJ. BASIN: U10 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



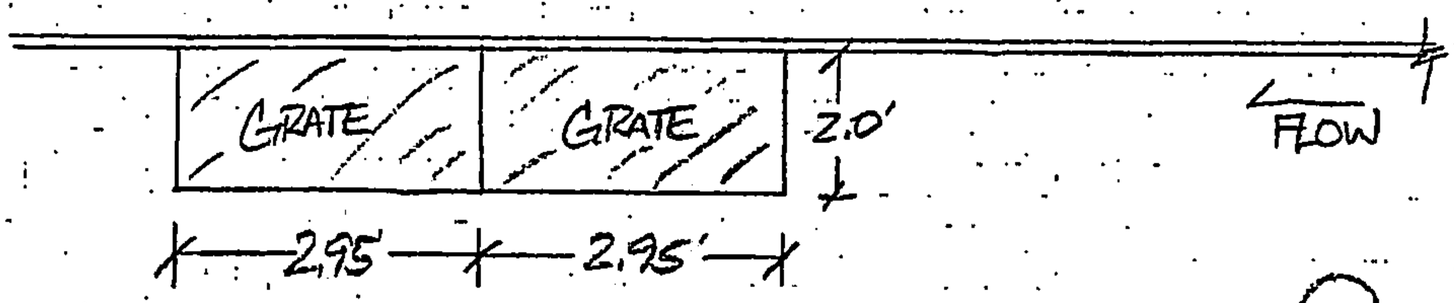
$Q = (3.0)(8.45)'(0.16)^{3/2}$

$Q = 1.62$ < BASIN U10 Q = 1.75 cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.16

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1-TYPE "A" INLET FOR BASIN U10

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U11
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 11
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope	0.059200 ft/ft				
Elevation range: 0.00 ft to 2.07 ft.					
Station (ft)	Elevation (ft)		Start Station	End Station	Roughness
0.00	0.67		0.00	38.00	0.013
0.00	0.00				
38.00	1.40				
38.00	2.07				
Discharge	1.77	cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.35	ft^2
Wetted Perimeter	4.52	ft
Top Width	4.36	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005145	ft/ft
Velocity	5.05	ft/s
Velocity Head	0.40	ft
Specific Energy	0.56	ft
Froude Number	3.14	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

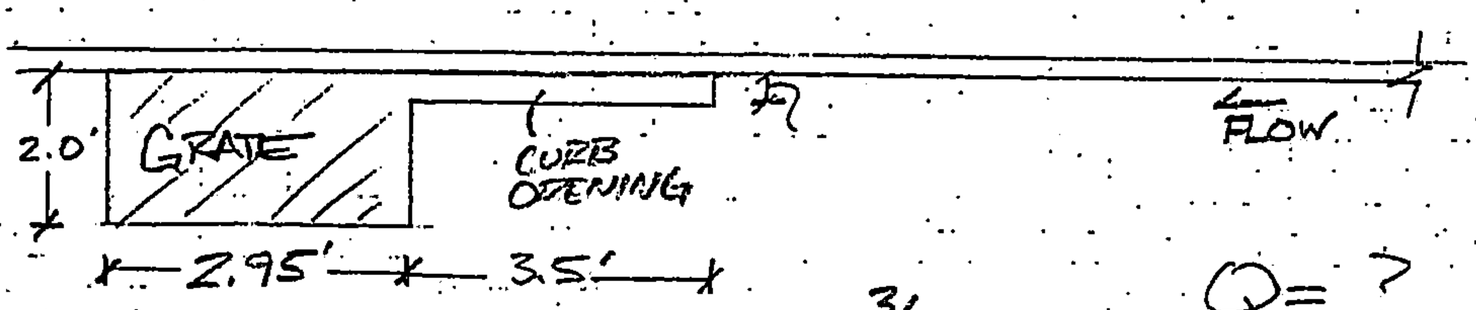
SUBJ. BASIN: U11 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



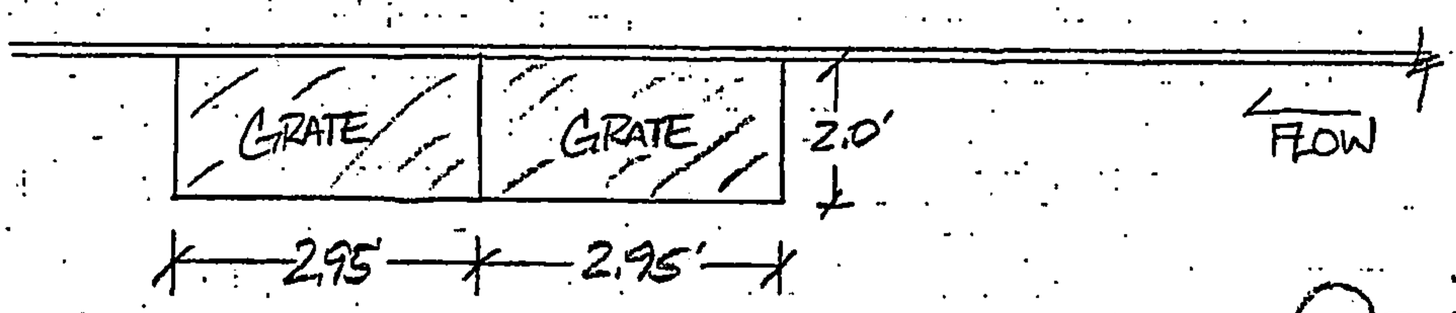
$Q = (3.0)(8.45)(0.16)^{3/2}$

$Q = 1.62$ cfs < BASIN U11 $Q = 1.77$ cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.16

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1-TYPE "A" INLET FOR BASIN U11

U12
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 12
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.021800 ft/ft			
Elevation range: 0.00 ft to 1.43 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			
Discharge	6.05 cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.24	ft
Flow Area	1.48	ft^2
Wetted Perimeter	12.41	ft
Top Width	12.16	ft
Height	0.24	ft
Critical Depth	0.33	ft
Critical Slope	0.004634	ft/ft
Velocity	4.09	ft/s
Velocity Head	0.26	ft
Specific Energy	0.50	ft
Froude Number	2.07	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

SUBJ. BASIN: U12 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

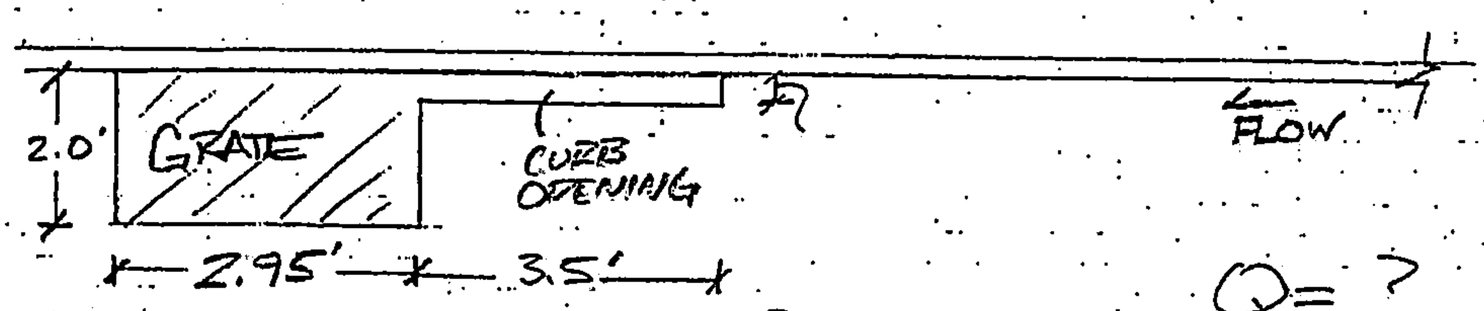
Q = Discharge (cfs)

C = Discharge Coefficient

L = Effective Length of Crest (ft)

H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



$Q = (3.0)(8.45)(0.24)^{3/2}$

$Q = 2.98$ cfs < BASIN U12 Q = 6.05

NG PASS THRU = 3.07 cfs

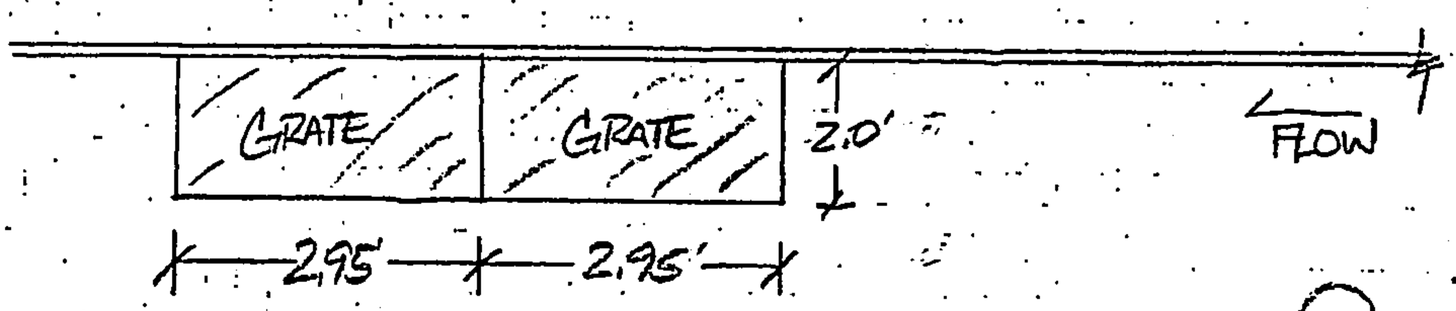
Q = ?

C = 3.0

L = 3.5 + 2.95 + 2.0 = 8.45

H = 0.24'

TYPE "Double C" STORM INLET



$Q = (3.0)(7.9)(0.24)^{3/2}$

$Q = 2.8 \sim 3.07$

OK

Q = ?

C = 3.0

L = (2.95 x 2) + 2.0 = 7.9

H = 0.24

USE 1-TYPE "A" & 1-TYPE "DOUBLE C"

INLETS FOR BASIN U12

ED ON RECYCLED PAPER

U13
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 13
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.021800 ft/ft

Elevation range: 0.00 ft to 1.43 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			

Discharge 14.02 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.33	ft
Flow Area	2.78	ft²
Wetted Perimeter	17.01	ft
Top Width	16.67	ft
Height	0.33	ft
Critical Depth	0.46	ft
Critical Slope	0.004143	ft/ft
Velocity	5.04	ft/s
Velocity Head	0.40	ft
Specific Energy	0.73	ft
Froude Number	2.18	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

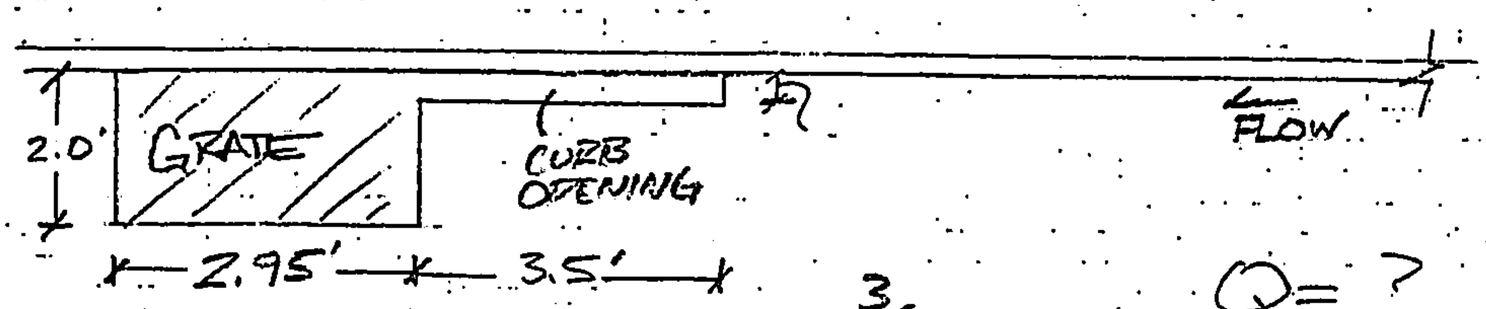
SUBJ. BASIN: U13 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



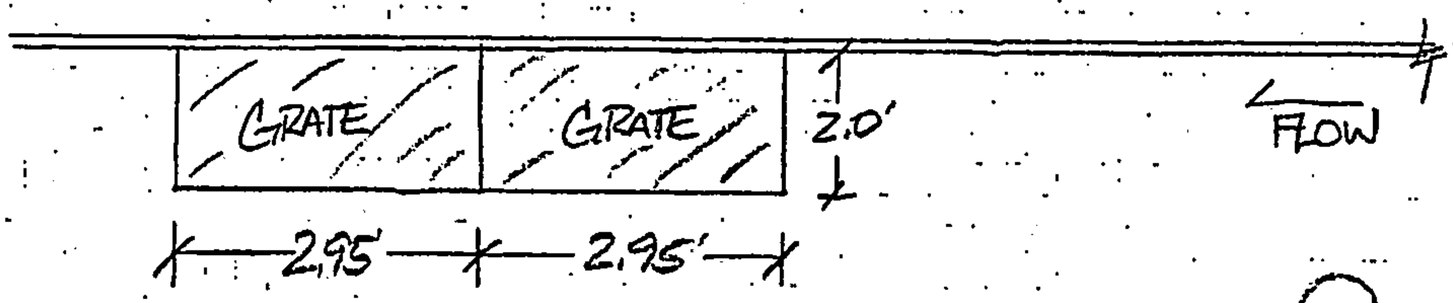
$Q = 3.0(8.45)(0.33)^{3/2}$

$Q = 4.81$ cfs < BASIN U13 Q: 14.62

NO; PASS THRU 9.21 cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.33'

TYPE "Double C" STORM INLET



$Q = (3)[(7.9) \times 2](0.33)^{3/2}$

$Q = 9$ cfs ≈ 9.21 OK

Q = ?
C = 3.0
L = (2.95 × 2) + 2.0 = 7.9
H = 0.33

USE 1 - TYPE "A" & 2 - TYPE "Double C" INLETS FOR BASIN U13

ID ON RECYCLED PAPER

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

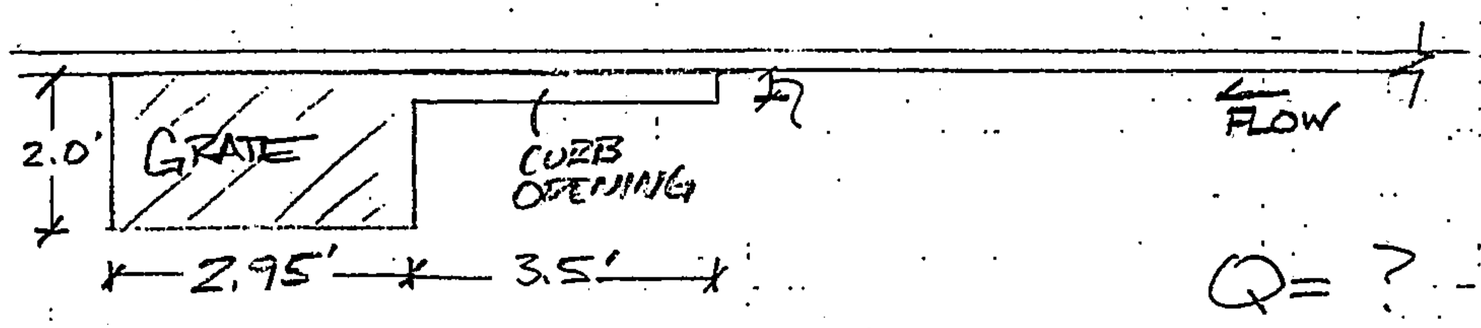
SUBJ. BASIN: OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

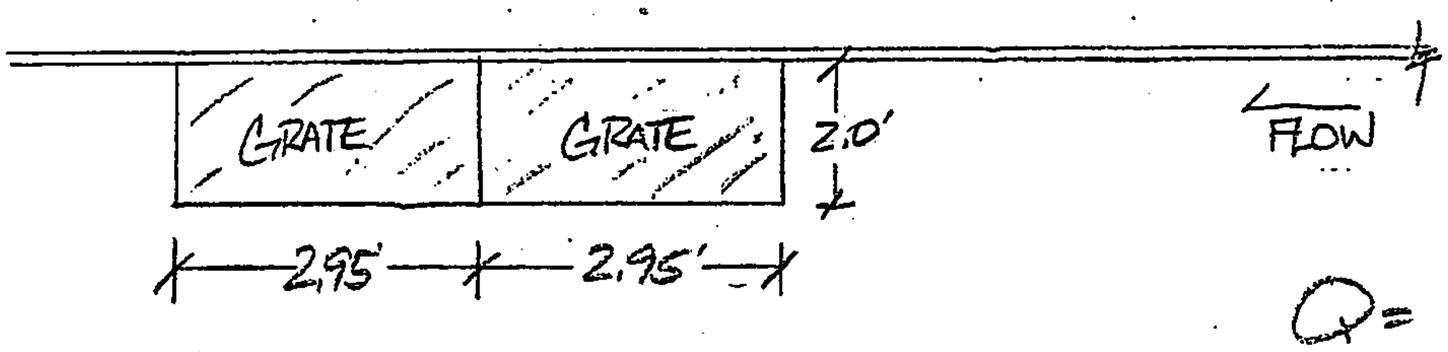
TYPE "A" STORM INLET



Q =
Q =

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H =

TYPE "Double C" STORM INLET



Q =
Q =

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

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COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

SUBJ. BASIN: OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

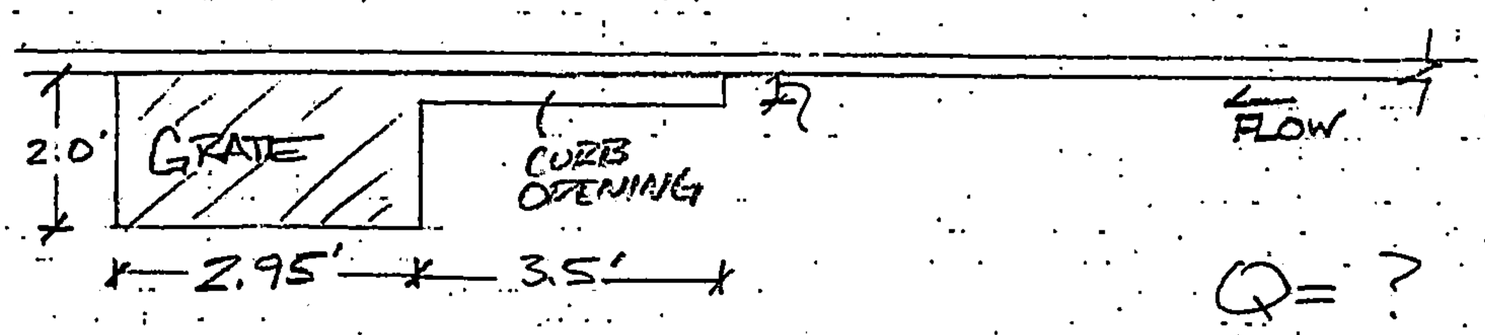
Q = Discharge (cfs)

C = Discharge Coefficient

L = Effective Length of Crest (ft)

H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



Q =

Q =

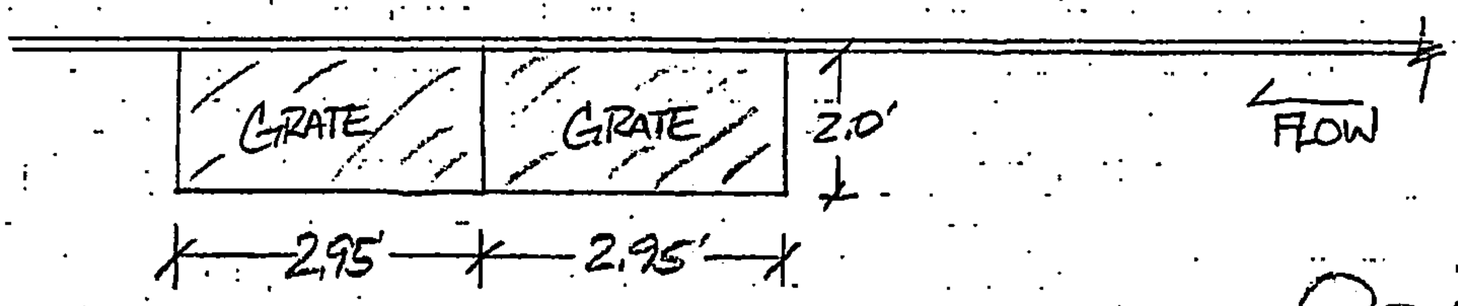
Q = ?

C = 3.0

L = 3.5 + 2.95 + 2.0 = 8.45

H =

TYPE "Double C" STORM INLET



Q =

Q =

Q = ?

C = 3.0

L = (2.95 x 2) + 2.0 = 7.9

H =

D ON RECYCLED PAPER

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

SUBJ. BASIN: OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

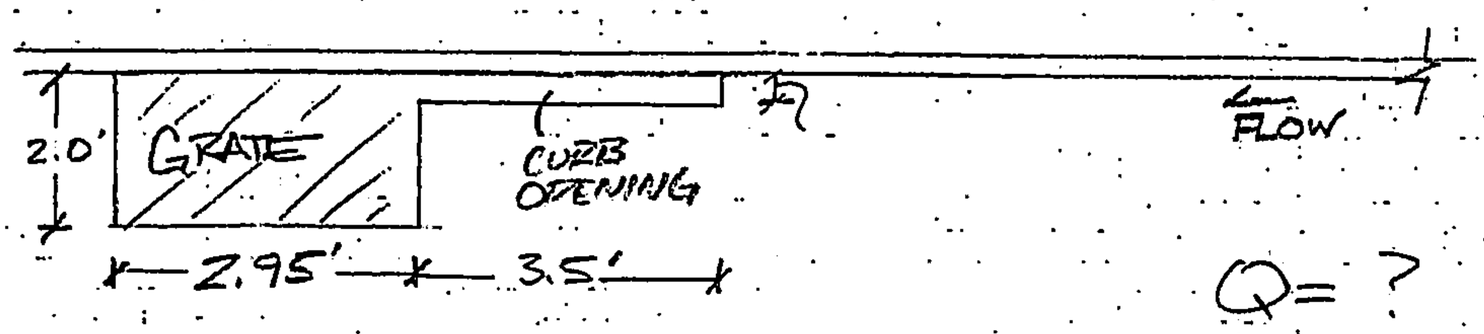
Q = Discharge (cfs)

C = Discharge Coefficient

L = Effective Length of Crest (ft)

H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



Q =

Q =

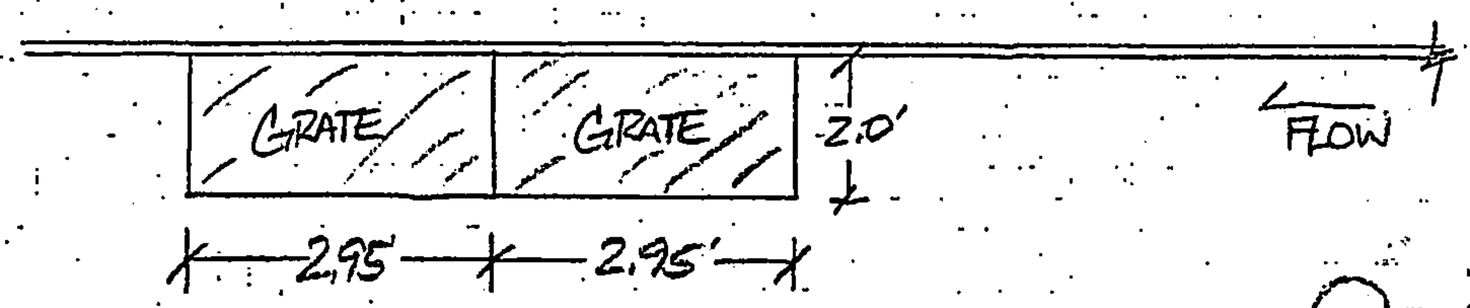
Q = ?

C = 3.0

L = 3.5 + 2.95 + 2.0 = 8.45

H =

TYPE "Double C" STORM INLET



Q =

Q =

Q = ?

C = 3.0

L = (2.95 x 2) + 2.0 = 7.9

H =

COMP. SJM

CK. DSA

DATE 6-11-03

WILSON & COMPANY

LOC. AQ

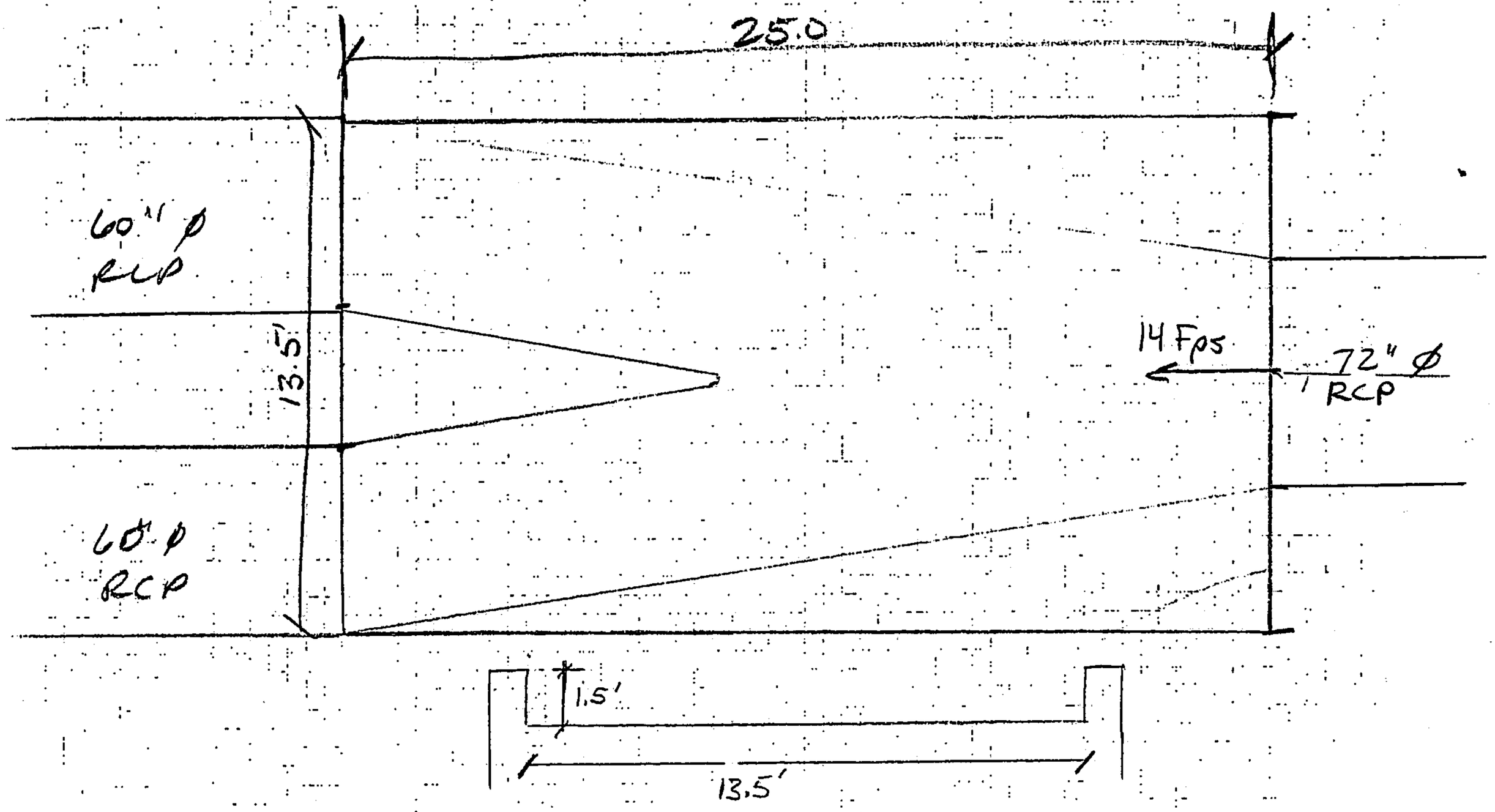
PROJ. SAD 227

SUBJ. 72" & 2-60" Trans. Struct. Calcs

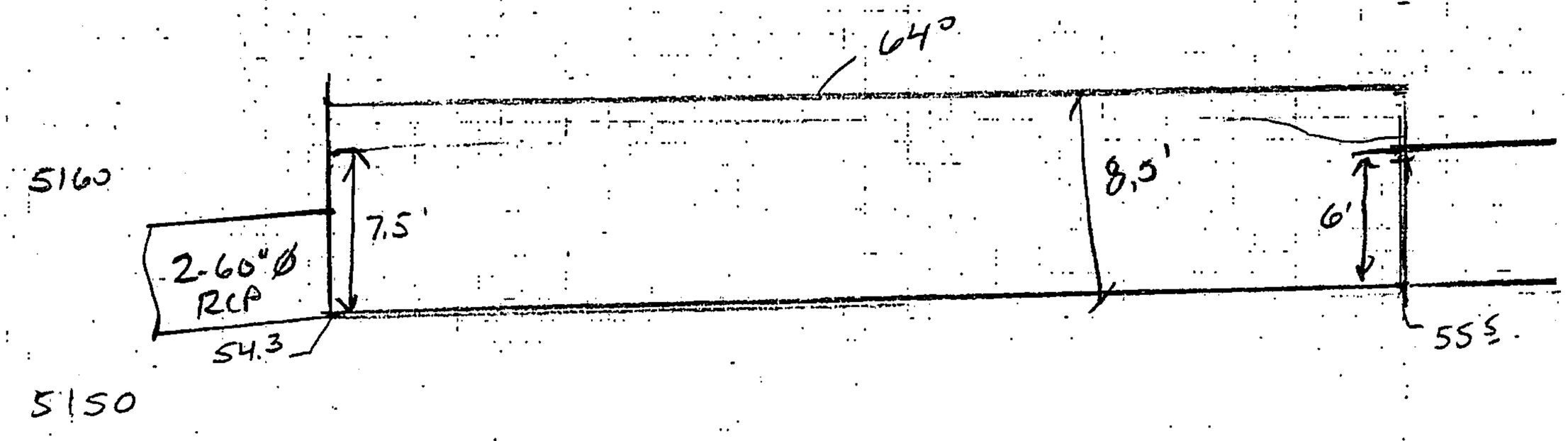
FILE X1218025

SHEET 1

OF 1



$$Q = CLH^{3/2} = 3(13.5)(1.5)^{3/2} = 74.4 \text{ cfs}$$



$$F = \frac{V_1}{\sqrt{g y_1}} = \frac{14}{\sqrt{32.2(6)}} = 1.0$$

From Fig 15-4 Chow $\frac{L}{y_2} = 4.0$ $L = 25$ $y_2 = 6.25 < 7.5 < 8.5'$

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Unser Boulevard Transition Structure
COA Project # 707391

TRANSITION STRUCTURE CALCULATIONS

Structure - 1-72" Pipe to 2-60" Pipes

TW (ft.)	3.95	(W.S. Elev - Min. Ch. Elev.) from Hydraflc
D (ft.)	6	
Q (cfs)	400	
V (fps)	14	

TW/D	0.7		
Q/D^2.5	4.5		
Yo/D	0.88	From Table 20.5	
Yo (ft.)	5.28		=(Yo/D)*D
Ao (ft.^2)	23.81		
Vo (fps)	16.80		=Q/Ao
	(Calc'd)	(Design) (HEC-RAS)	
Froude, Fr	1.29	n/a	=Vo/((gYo)^0.5)
Dist. To Ya, L	14		
(in multiples of D)	2.3		
Ya/Yo (Fig. 20.3)	0.22		
Brink Depth, Ya	1.2		=(Ya/Yo)(Yo)
	(radians)	(degrees)	
Opt. Flare Angle	0.4	23.2	
Design Flare Angle	0.26	15.0	
	(Calc'd)	(Design)	
Dnstrm Ave. Depth	3.95		(from HEC-RAS)
Initial Width, Wo	6		
W2	10		
Length	4.7	14.0	

Hydraulic Analysis:

A hydraulic analysis for the developed flows was done for the Boca Negra Arroyos using HEC-RAS. The following parameters were used in the analysis:

1. South Leg Boca Negra Arroyo (South Branch)
   Q100 Existing and Developed = 366 c.f.s.
   N = .013 for RCP Pipe
   Bulking 10 percent
   HGL completed based on Hydroflow and COA Design Manual

2. North Leg Boca Negra Arroyo (South Branch)
   Q100 Existing = 229 c.f.s.
   N = .013 for RCP Pipe
   Bulking 10 percent
   HGL completed based on Hydroflow and COA Design Manual

3. SAD 227 Storm Drain System
   Q100 = 180 c.f.s max., See Plates 2 and 3
   N = 0.013 RCP Pipe
   See Plates 2, 3, and 4 for Layout
   HGL completed based on Hydroflow and COA Design Manual

Single C

Height	Length	Area	Q oriface	Q weir
0	5.00	6.00	0	0
0.08	5.00	6.00	9.31	0.360844
0.17	5.00	6.00	13.17	1.020621
0.25	5.00	6.00	16.13	1.875
0.33	5.00	6.00	18.63	2.886751
0.42	5.00	6.00	20.82	4.034358
0.50	5.00	6.00	22.81	5.303301
0.58	5.00	6.00	24.64	6.682923
0.67	5.00	6.00	26.34	8.164966
0.75	5.00	6.00	27.94	9.742786
0.83	5.00	6.00	29.45	11.41089

50% clogging factor 14.72
50% at 8" depth 13.17
Qweir= C*Length*Height^(3/2)
Qoriface=C*Area*Sqrt(2*g*Height)

C oriface=0.67
C wier=3

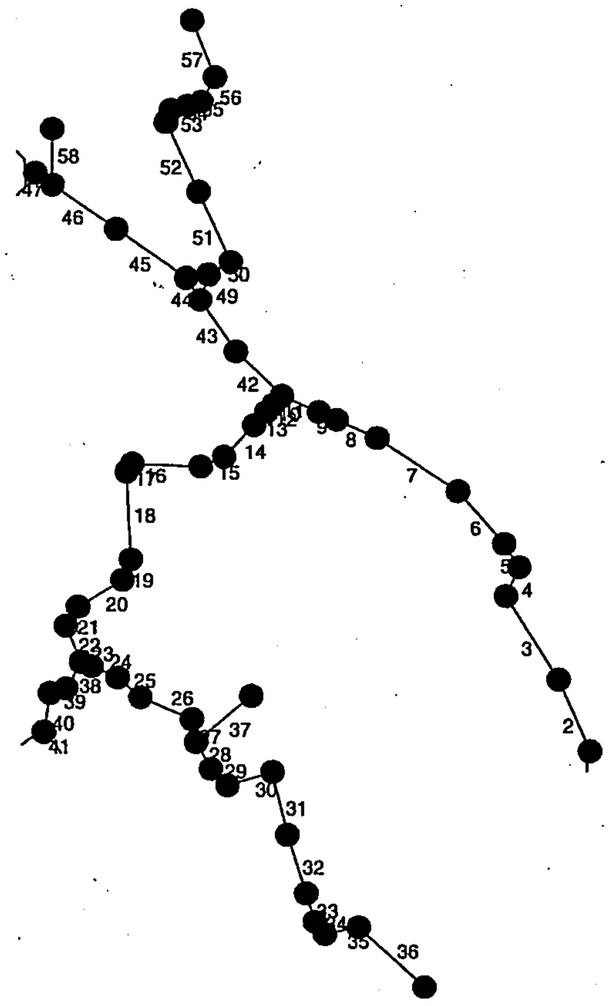
Double C

Height	Length	Area	Q oriface	Q weir
0	8.00	12.00	0	0
0.08	8.00	12.00	18.63	0.57735
0.17	8.00	12.00	26.34	1.632993
0.25	8.00	12.00	32.26	3
0.33	8.00	12.00	37.25	4.618802
0.42	8.00	12.00	41.65	6.454972
0.50	8.00	12.00	45.62	8.485281
0.58	8.00	12.00	49.28	10.69268
0.67	8.00	12.00	52.68	13.06395
0.75	8.00	12.00	55.88	15.58846
0.83	8.00	12.00	58.90	18.25742

50% clogging factor 29.45
50% at 8" depth 26.34
Qweir= C*Length*Height^(3/2)
Qoriface=C*Area*Sqrt(2*g*Height)

C oriface=0.67
C wier=3

Hydraflow Plan View



Project file: oops.stm	IDF file: sampleFHA.IDF	No. Lines: 58	06-12-2003

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	72	399.0	5155.00	5161.00	6.00	28.27	14.11	3.10	5164.10	0.888	40.0	5155.29	5161.36	6.00	28.27	14.11	3.10	5164.45	0.887	0.888	0.355	0.30	0.93
2	72	399.0	5155.30	5162.29	6.00	28.27	14.11	3.10	5165.38	0.888	379	5158.03	5165.65	6.00	28.27	14.11	3.10	5168.75	0.887	0.888	3.364	0.30	0.93
3	60	399.0	5159.04	5166.58	5.00	19.63	20.32	6.42	5173.00	2.348	484	5173.20	5178.09	4.89**	19.52	20.44	6.49	5184.58	2.091	2.219	N/A	0.30	1.95
4	60	399.0	5173.60	5180.04	5.00	19.63	20.32	6.42	5186.46	2.348	156	5181.01	5185.90	4.89**	19.52	20.44	6.49	5192.39	2.091	2.219	N/A	0.00	0.00
5	60	399.0	5181.41	5185.90	4.49	18.57	21.48	7.18	5193.07	2.071	136	5187.83	5192.72	4.89**	19.52	20.44	6.49	5199.21	2.091	2.081	N/A	0.30	1.95
6	60	399.0	5188.60	5194.67	5.00	19.63	20.32	6.42	5201.09	2.348	352	5221.67	5226.56	4.89**	19.52	20.44	6.49	5233.05	2.091	2.219	N/A	0.30	1.95
7	60	399.0	5222.28	5228.51	5.00	19.63	20.32	6.42	5234.93	2.348	497	5250.17	5255.06	4.89**	19.52	20.44	6.49	5261.55	2.091	2.219	N/A	0.30	1.95
8	60	399.0	5250.52	5257.01	5.00	19.63	20.32	6.42	5263.43	2.348	232	5257.52	5262.41	4.89**	19.52	20.44	6.49	5268.90	2.091	2.219	N/A	0.30	1.95
9	60	399.0	5258.14	5264.36	5.00	19.63	20.32	6.42	5270.78	2.348	100	5269.56	5274.45	4.89**	19.52	20.44	6.49	5280.94	2.091	2.219	N/A	0.00	0.00
10	60	399.0	5270.27	5274.45	4.18	17.52	22.77	8.06	5282.51	2.270	209	5280.76	5285.65	4.89**	19.52	20.44	6.49	5292.14	2.091	2.181	N/A	0.00	0.00
11	60	195.0	5281.03	5285.65	4.62	18.95	10.29	1.65	5287.29	0.486	62.0	5283.20	5287.10	3.90**	16.42	11.87	2.19	5289.29	0.619	0.552	N/A	0.30	0.66
12	60	195.0	5283.52	5287.76	4.24	17.74	10.99	1.88	5289.64	0.531	54.0	5285.36	5289.26	3.90**	16.42	11.87	2.19	5291.45	0.619	0.575	N/A	0.00	0.00
13	60	155.0	5285.46	5289.26	3.80	16.00	9.69	1.46	5290.72	0.414	90.0	5303.46	5306.94	3.47**	14.56	10.64	1.76	5308.70	0.515	0.464	N/A	0.00	0.00
14	60	145.0	5303.92	5308.15	4.23*	17.72	8.18	1.04	5309.19	0.294	221	5304.57	5308.80	4.23	17.73	8.18	1.04	5309.84	0.293	0.294	0.649	0.00	0.00
15	60	145.0	5304.60	5308.82	4.22*	17.68	8.20	1.05	5309.87	0.295	132	5304.99	5309.21	4.22	17.67	8.21	1.05	5310.25	0.295	0.295	0.390	0.30	0.31
16	60	140.0	5305.01	5309.52	4.51	18.65	7.51	0.88	5310.40	0.254	362	5306.08	5310.40	4.32	18.04	7.76	0.94	5311.34	0.266	0.260	0.940	0.30	0.28
17	60	140.0	5306.10	5310.68	4.58	18.85	7.43	0.86	5311.54	0.251	50.0	5306.23	5310.81	4.58	18.84	7.43	0.86	5311.67	0.251	0.251	0.126	0.30	0.26
18	60	140.0	5306.26	5311.07	4.81	19.38	7.22	0.81	5311.88	0.252	424	5307.53	5312.08	4.55	18.76	7.46	0.87	5312.95	0.252	0.252	1.069	0.30	0.26
19	60	122.0	5307.63	5312.34	4.71	19.18	6.36	0.63	5312.97	0.190	108	5307.86	5312.54	4.68	19.11	6.38	0.63	5313.18	0.190	0.190	0.205	0.30	0.19
20	60	116.0	5307.88	5312.73	4.85	19.47	5.96	0.55	5313.28	0.175	267	5308.49	5313.17	4.68	19.10	6.07	0.57	5313.74	0.171	0.173	0.462	0.30	0.17
21	60	116.0	5308.51	5313.34	4.83	19.43	5.97	0.55	5313.90	0.174	112	5308.75	5313.53	4.78	19.33	6.00	0.56	5314.09	0.172	0.173	0.194	0.30	0.17

Project File: oops.stm	IDF File: sampleFHA.IDF	Total number of lines: 58	Run Date: 06-12-2003

NOTES: Initial tailwater elevation = 5161 (ft) , * Normal depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
22	60	116.0	5308.77	5313.70	4.93	19.58	5.92	0.55	5314.25	0.180	188	5309.19	5314.02	4.83	19.43	5.97	0.55	5314.58	0.174	0.177	0.333	0.30	0.17
23	54	76.00	5309.21	5314.19	4.50	15.90	4.78	0.36	5314.54	0.149	59.0	5309.33	5314.28	4.50	15.90	4.78	0.36	5314.63	0.149	0.149	0.088	0.30	0.11
24	54	76.00	5309.83	5314.38	4.50	15.90	4.78	0.36	5314.74	0.149	146	5310.12	5314.60	4.48	15.89	4.78	0.36	5314.95	0.140	0.145	0.211	0.30	0.11
25	48	64.00	5310.14	5314.70	4.00	12.56	5.09	0.40	5315.11	0.199	154	5310.45	5315.01	4.00	12.57	5.09	0.40	5315.41	0.199	0.199	0.306	0.30	0.12
26	48	60.00	5310.95	5315.13	4.00	12.56	4.78	0.35	5315.48	0.175	290	5311.53	5315.64	4.00	12.57	4.77	0.35	5315.99	0.174	0.175	0.506	0.30	0.11
27	48	60.00	5311.63	5315.74	4.00	12.56	4.78	0.35	5316.10	0.175	110	5311.85	5315.93	4.00	12.57	4.77	0.35	5316.29	0.174	0.175	0.192	0.00	0.00
28	48	57.00	5311.95	5315.93	3.98	12.56	4.54	0.32	5316.25	0.149	150	5312.25	5316.15	3.90	12.48	4.57	0.32	5316.47	0.139	0.144	0.216	0.30	0.10
29	48	57.00	5312.35	5316.24	3.89	12.47	4.57	0.32	5316.57	0.139	118	5312.58	5316.40	3.82	12.36	4.61	0.33	5316.73	0.137	0.138	0.163	0.00	0.00
30	48	57.00	5312.68	5316.40	3.72	12.18	4.68	0.34	5316.74	0.136	245	5313.17	5316.71	3.54	11.77	4.84	0.36	5317.08	0.141	0.138	0.339	0.30	0.11
31	42	48.00	5313.67	5316.82	3.15	9.13	5.26	0.43	5317.25	0.200	309	5314.29	5317.44	3.15	9.12	5.26	0.43	5317.87	0.200	0.200	0.619	0.30	0.13
32	42	41.00	5314.39	5317.57	3.18	9.18	4.46	0.31	5317.88	0.145	300	5314.99	5317.99	3.00	8.78	4.67	0.34	5318.33	0.154	0.150	0.449	0.30	0.10
33	36	31.00	5315.49	5318.09	2.60	6.51	4.76	0.35	5318.44	0.198	144	5315.78	5318.38	2.60	6.50	4.77	0.35	5318.73	0.198	0.198	0.285	0.30	0.11
34	36	31.00	5315.88	5318.48	2.60	6.51	4.76	0.35	5318.83	0.198	79.0	5316.04	5318.64	2.60	6.50	4.77	0.35	5318.99	0.198	0.198	0.157	0.00	0.00
35	36	31.00	5316.14	5318.74	2.60*	6.50	4.77	0.35	5319.09	0.198	181	5316.50	5319.10	2.60	6.50	4.77	0.35	5319.45	0.198	0.198	0.359	0.30	0.11
36	36	24.00	5316.60	5319.20	2.60	6.51	3.69	0.21	5319.41	0.119	451	5317.50	5319.75	2.25	5.69	4.21	0.28	5320.03	0.155	0.137	0.617	0.30	0.08
37	24	3.00	5313.20	5315.93	2.00	3.14	0.96	0.01	5315.95	0.018	365	5313.89	5316.00	2.00	3.14	0.95	0.01	5316.01	0.018	0.018	0.064	0.30	0.00
38	36	30.00	5316.33	5317.70	1.37*	3.15	9.53	1.41	5319.11	1.103	148	5317.99	5319.74	1.75**	4.27	7.03	0.77	5320.50	0.493	0.798	N/A	0.30	0.23
39	36	30.00	5318.06	5319.97	1.91	4.74	6.33	0.62	5320.59	0.378	90.0	5319.02	5320.77	1.75**	4.27	7.03	0.77	5321.53	0.493	0.435	N/A	0.30	0.23
40	36	30.00	5319.09	5321.00	1.91	4.74	6.33	0.62	5321.62	0.378	187	5321.18	5322.93	1.75**	4.27	7.03	0.77	5323.69	0.493	0.435	N/A	0.00	0.00
41	36	30.00	5321.25	5322.93	1.68	4.06	7.39	0.85	5323.77	0.561	39.0	5322.00	5323.75	1.75**	4.27	7.03	0.77	5324.51	0.493	0.527	N/A	0.50	0.38
42	60	204.0	5283.52	5285.73	2.21*	8.38	24.36	9.22	5294.96	3.762	324	5295.85	5299.85	4.00	16.82	12.12	2.29	5302.13	0.643	2.203	7.137	0.30	0.69

Project File: oops.stm	IDF File: sampleFHA.IDF	Total number of lines: 58	Run Date: 06-12-2003

NOTES: Initial tailwater elevation = 5161 (ft) , * Normal depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
43	60	204.0	5296.05	5300.53	4.48	18.56	10.99	1.88	5302.41	0.542	313	5299.10	5303.09	3.99**	16.78	12.15	2.30	5305.38	0.646	0.594	N/A	0.30	0.69
44	60	184.0	5299.18	5303.78	4.60	18.89	9.74	1.48	5305.25	0.433	128	5306.68	5310.47	3.79**	15.95	11.54	2.07	5312.54	0.587	0.510	N/A	0.30	0.62
45	60	184.0	5306.78	5311.09	4.31	17.99	10.23	1.63	5312.71	0.461	437	5311.89	5315.68	3.79**	15.95	11.54	2.07	5317.75	0.587	0.524	N/A	0.30	0.62
46	60	184.0	5311.99	5316.30	4.31	17.99	10.23	1.63	5317.92	0.461	396	5316.48	5320.27	3.79**	15.95	11.54	2.07	5322.34	0.587	0.524	N/A	0.00	0.00
47	60	180.0	5316.58	5320.27	3.69	15.52	11.60	2.09	5322.36	0.598	105	5318.30	5322.04	3.74**	15.77	11.41	2.02	5324.07	0.576	0.587	N/A	0.00	0.00
48	60	180.0	5318.50	5322.04	3.54	14.88	12.09	2.27	5324.32	0.659	54.0	5326.50	5330.25	3.74**	15.77	11.41	2.02	5332.27	0.576	0.618	N/A	0.50	1.01
49	36	20.00	5302.88	5304.24	1.36*	3.13	6.40	0.64	5304.88	0.500	129	5303.53	5304.96	1.43	3.33	6.00	0.56	5305.52	0.421	0.460	0.594	0.00	0.00
50	36	20.00	5303.63	5304.99	1.36*	3.13	6.40	0.64	5305.63	0.500	131	5304.29	5305.72	1.43	3.33	6.00	0.56	5306.28	0.421	0.460	0.603	0.00	0.00
51	36	20.00	5304.39	5305.74	1.35*	3.08	6.49	0.65	5306.39	0.520	375	5306.35	5307.78	1.43**	3.31	6.04	0.57	5308.34	0.428	0.474	N/A	0.00	0.00
52	36	20.00	5306.45	5307.80	1.35*	3.08	6.49	0.65	5308.45	0.520	375	5308.41	5309.84	1.43**	3.31	6.04	0.57	5310.40	0.428	0.474	N/A	0.00	0.00
53	36	10.00	5308.51	5309.84	1.33	3.01	3.32	0.17	5310.01	0.138	66.0	5308.83	5309.85	1.02	2.11	4.75	0.35	5310.20	0.370	0.254	0.168	0.00	0.00
54	36	10.00	5308.93	5309.85	0.92	1.82	5.48	0.47	5310.31	0.550	90.0	5313.37	5314.38	1.01**	2.09	4.80	0.36	5314.74	0.380	0.465	N/A	0.00	0.00
55	36	10.00	5313.47	5314.42	0.95*	1.92	5.20	0.42	5314.84	0.477	76.0	5313.84	5314.86	1.02	2.11	4.75	0.35	5315.21	0.370	0.423	0.322	0.00	0.00
56	36	10.00	5313.94	5315.04	1.10*	2.34	4.26	0.28	5315.32	0.274	138	5314.32	5315.42	1.10	2.35	4.25	0.28	5315.70	0.272	0.273	0.377	0.00	0.00
57	36	10.00	5314.42	5315.42	1.00	2.07	4.84	0.36	5315.79	0.390	297	5315.90	5316.91	1.01**	2.09	4.80	0.36	5317.27	0.380	0.385	N/A	0.00	0.00
58	18	4.00	5317.00	5320.27	1.50	1.77	2.26	0.08	5320.35	0.145	268	5322.00	5322.76	0.76**	0.90	4.43	0.30	5323.07	0.547	0.346	N/A	0.00	0.00

Project File: oops.stm	IDF File: sampleFHA.IDF	Total number of lines: 58	Run Date: 06-12-2003

NOTES: Initial tailwater elevation = 5161 (ft) , * Normal depth assumed., ** Critical depth assumed.

Table
Rating Table for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\227.fm2
Worksheet	STREET FLOW standard curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Water Surface Elevation	10.20 ft

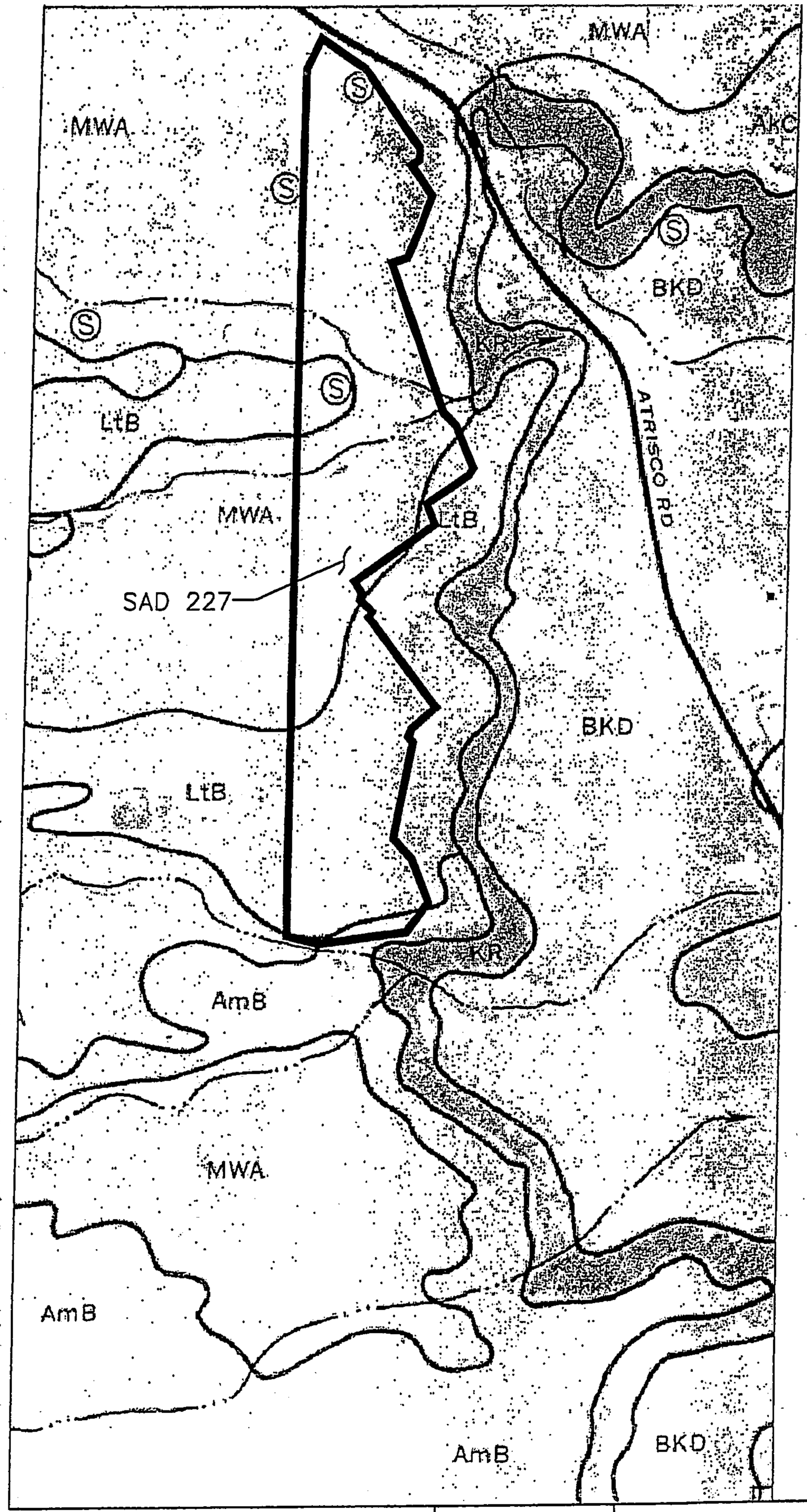
Input Data			
	Minimum	Maximum	Increment
Channel Slope	0.005000	0.030000	0.001000 ft/ft

Rating Table

Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)
0.005000	0.020	24.90
0.006000	0.020	27.28
0.007000	0.020	29.47
0.008000	0.020	31.50
0.009000	0.020	33.41
0.010000	0.020	35.22
0.011000	0.020	36.94
0.012000	0.020	38.58
0.013000	0.020	40.15
0.014000	0.020	41.67
0.015000	0.020	43.13
0.016000	0.020	44.55
0.017000	0.020	45.92
0.018000	0.020	47.25
0.019000	0.020	48.54
0.020000	0.020	49.81
0.021000	0.020	51.04
0.022000	0.020	52.24
0.023000	0.020	53.41
0.024000	0.020	54.56
0.025000	0.020	55.68
0.026000	0.020	56.79
0.027000	0.020	57.87
0.028000	0.020	58.93
0.029000	0.020	59.97
0.030000	0.020	61.00

Street Flow Capacity Table

Street	Q100 (cfs)	Grade %)	Capacity (cfs)
Cliff	25	0.5	25
Popo	9	0.7	30
Mauna Loa	12	0.7	30
Victoria (S)	8	0.5	25
Kibo (S)	10	0.5	25
Shiprock	4	0.5	25
Kibo (N)	7	1	35
Victoria (N)	18	1.2	38
Monte Carlo	12	0.5	25
Casa Blanca (S)	14	0.5	25
Marigold	30	1	35
Casa Blanca (N)	16	1.5	43
Emerald	16	1.2	38
Jade	16	1.4	42
Onyx Dr.	8	1.5	43
Onyx Ct.	2	0.5	25
Rim Rock Dr.	20	0.9	33
Rim Rock Pl.	20	0.5	25



WILSON & COMPANY
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SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-8021

SAD 227

SOIL MAP

DESIGN X.X.X.	WCEA NO. X1218025	DATE JAN 2003	
DRAWN X.X.X.	PROJECT NO. N/A	SHEET NO. 1 OF 1	
CHECK X.X.X.			

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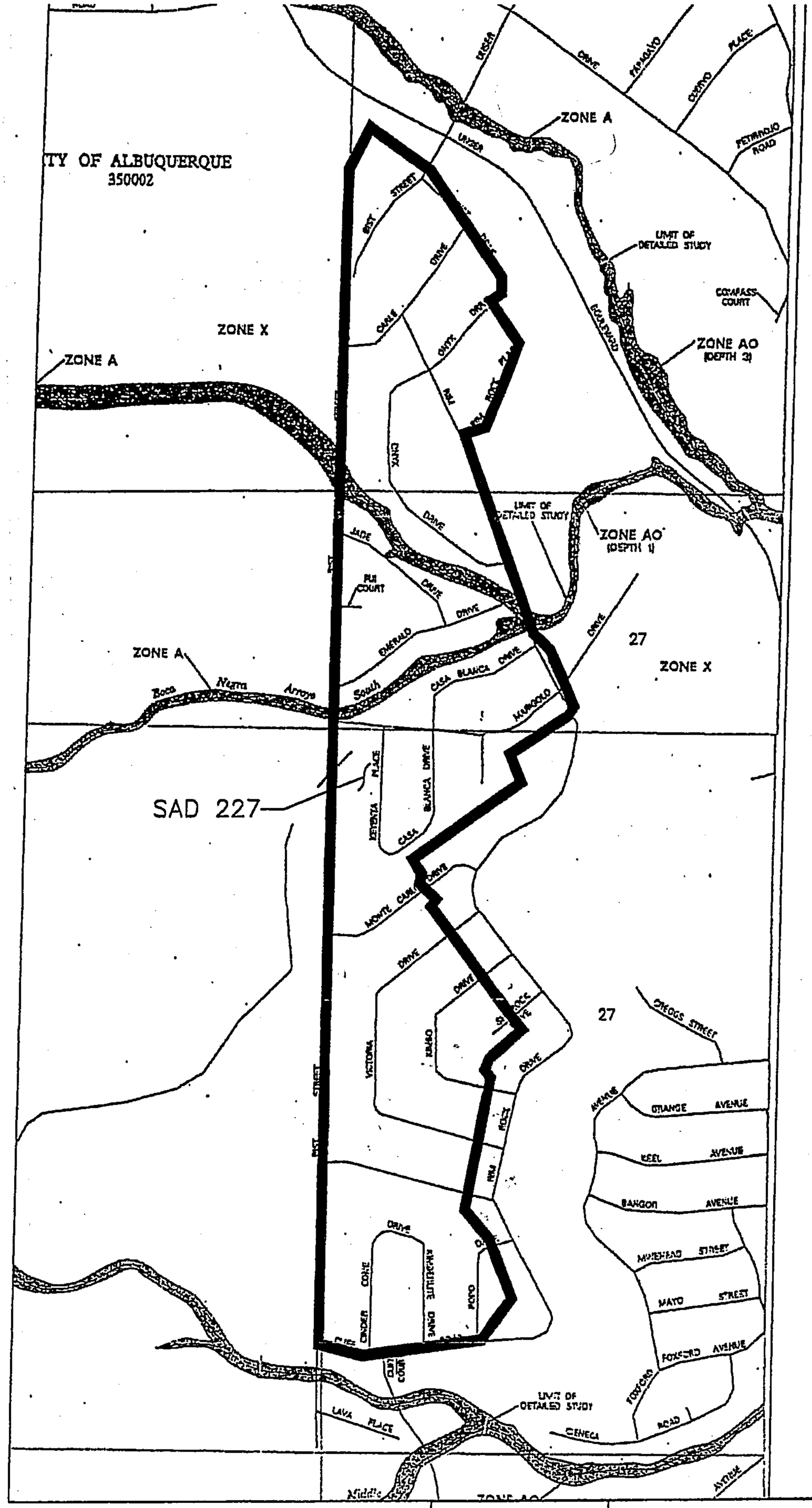

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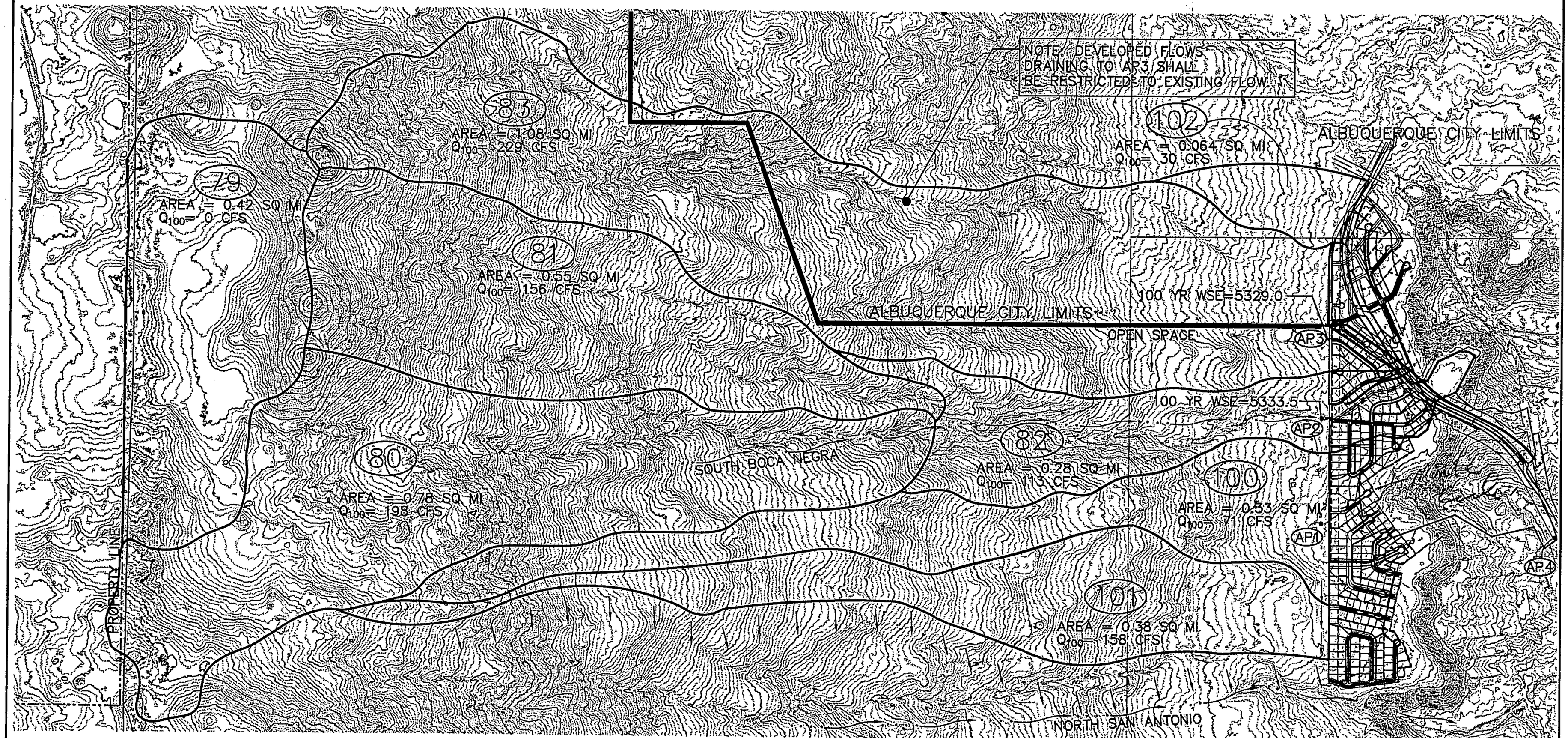
SAD 227

FLOOD MAP

DESIGN X.X.X.	WCEA NO. X1218025	DATE JAN 2003	
DRAWN X.X.X.	PROJECT NO. N/A	SHEET NO. 1 OF 1	
CHECK X.X.X.			



BASIN SUMMARY						
			PROPOSED		EXISTING	
BASIN	AREA (sq mi)	AREA (ac)	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)
80	0.78	500	198	17.80	198	17.80
81	0.55	352	156	11.50	156	11.50
82	0.28	180	113	5.80	113	5.80
83	1.06	691	229	23.40	229	23.40
100	0.33	211	71	6.29	71	6.29
101	0.38	243	158	7.23	158	7.23
102	0.06	41	30	1.20	30	1.20

ANALYSIS POINT SUMMARY						
		PROPOSED			EXISTING	
AP NO.	DESCRIPTION	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)	VOL100 STORED (ac-ft)	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)
1	MONTE CARLO	37.5	6.29	2.5	71	6.29
2	SOUTH BRANCH OF THE BOCA NEOGRA ARROYA	366	35.0		366	35.0
3	NORTH BRANCH OF THE BOCA NEOGRA ARROYO	280	23.4		280	23.4
4	DISCHARGE AT MONTANO	399			135	

LEGEND

5070 — EXISTING INTERMEDIATE CONTOUR

5071 — EXISTING INDEX CONTOUR

80 — BASIN ID

EXISTING BASIN BOUNDARY

N

GRAPHIC SCALE

(IN FEET)
1 inch = 600 ft.

WCEA #X1218025
MONTH 2003

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CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OFFSITE BASIN BOUNDARY MAP

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707391	X-XX	PLATE 1

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POND
100 YR WSELEV 5324.80
Q_{100}=37.50CFS

81st STREET

CINDER CONE DRIVE

KIMBERLITE DRIVE

POPO DRIVE

MAUNA LOA DRIVE

VICTORIA DRIVE

KIBO DRIVE

BIM ROCK COURT

BIM ROCK DRIVE

MONTE VISTA DRIVE

CASABLANCA DRIVE

1 11.1 Ac. 25 cfs

2 3.4 Ac. 9 cfs

3 4.6 Ac. 12 cfs

4 8.6 Ac. 8 cfs

5 5.4 Ac. 14 cfs

6 2.8 Ac. 7 cfs

7 6.8 Ac. 18 cfs

8 4.7 Ac. 12 cfs

9 2.1 Ac. 4 cfs

10 2.5 Ac. 5 cfs

A1 3.1 Ac. 8.4 cfs

MATCH LINE
SEE SHEET PLATE 3

LEGEND

5070	EXISTING INTERMEDIATE CONTOUR
5071	EXISTING INDEX CONTOUR
■	PROPOSED SINGLE TYPE "C" INLET
▬	PROPOSED BASIN BOUNDARY
(80)	BASIN ID

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

WCEA #X1218025
JUNE 2003

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ROBERT S. MACLANE
NEW MEXICO
15565
LICENSED PROFESSIONAL ENGINEER

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707391	D-10, E-10	PLATE 2

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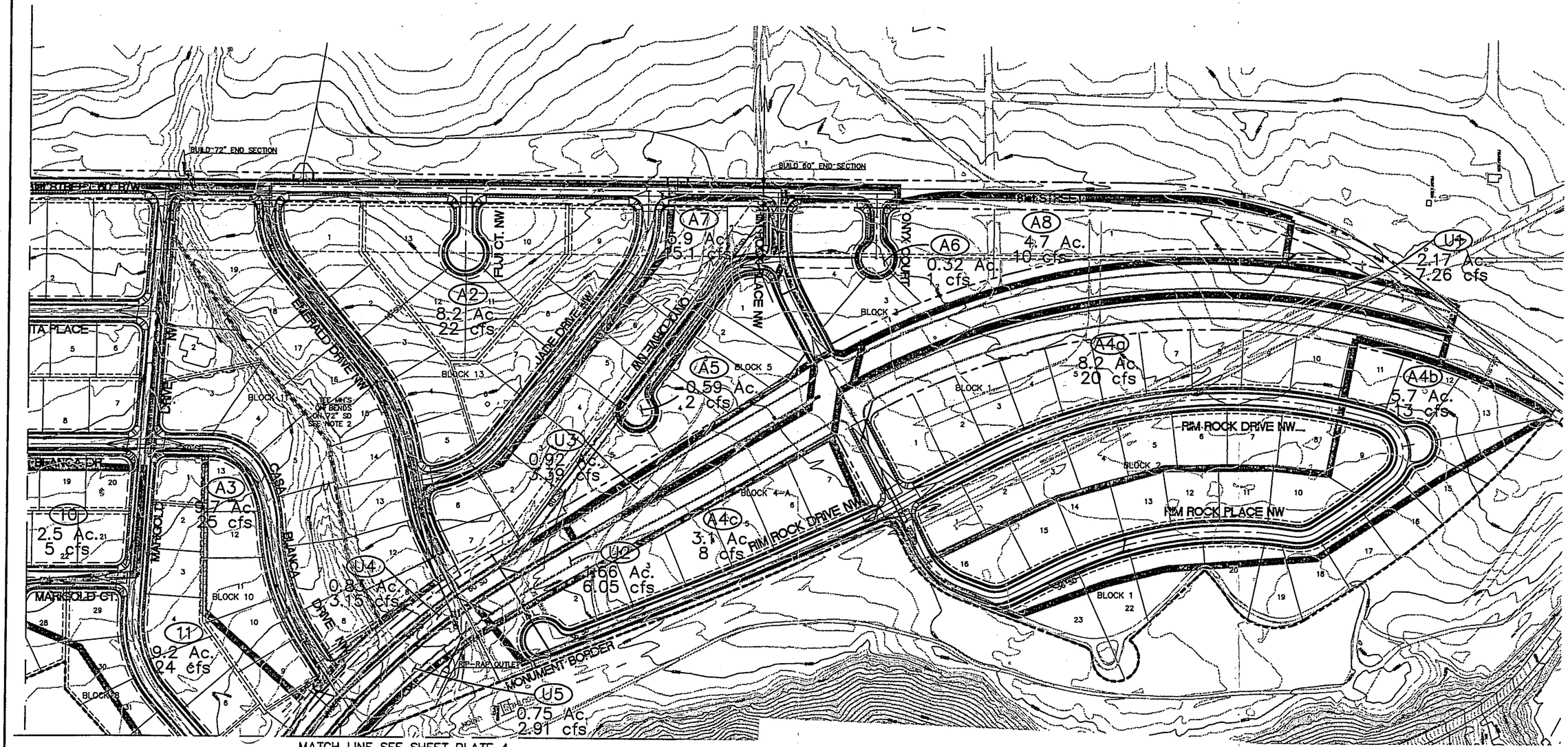

MATCH LINE SEE SHEET PLATE 4

MATCH LINE SEE SHEET PLATE 2

LEGEND

5070	EXISTING INTERMEDIATE CONTOUR
5071	EXISTING INDEX CONTOUR
■	PROPOSED SINGLE TYPE "C" INLET
	PROPOSED BASIN BOUNDARY
(80)	BASIN ID

GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

NOTE:
1. ALL SOTRM DRAIN IN UNSER BLVD. SHALL BE CONSTRUCTED WITH THE UNSER PROJECT.
2. THE BENDS IN THE 72" STORM DRAIN SHALL BE INCLUDED IN THE BID ITEM 910.029 "72" RCP, CL III"ONSE SEPARATE PROJECT WILL BE MADE FOR BENDS.

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PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707391	D-10, E-10	PLATE 3

WCEA #X1218025
JUNE 2003

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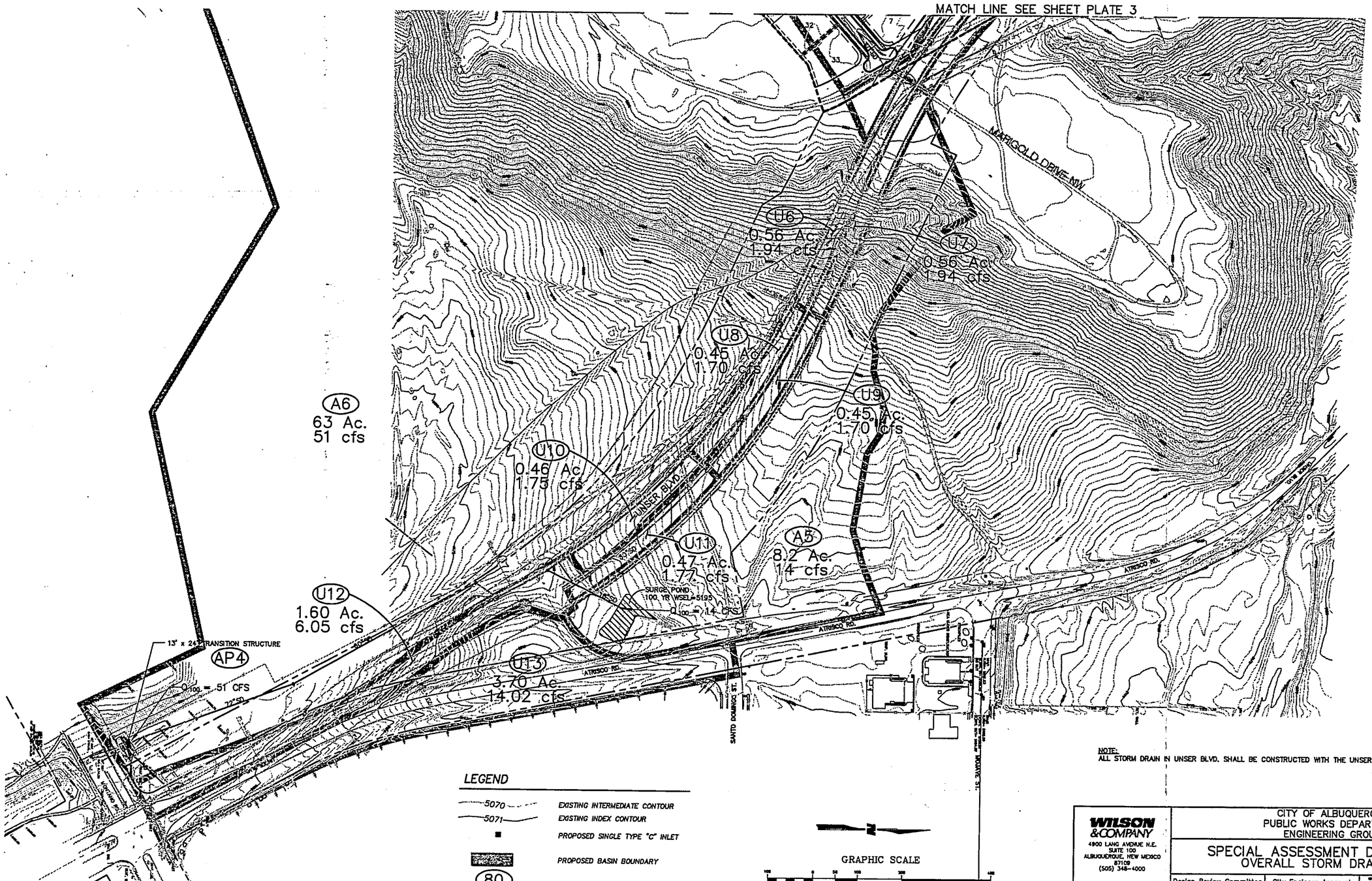

NOTE:
ALL STORM DRAIN IN UNSER BLVD. SHALL BE CONSTRUCTED WITH THE UNSER PROJECT.

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SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707391	D-10, E-10	PLATE 4

WCEA #X1218025
JUNE 2003

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SAD 227 Development Guidelines:

Development shall be in accordance with Special Assessment District 227 Resolutions and Ordinances adopted by the City Council of Albuquerque, the Northwest Mesa Escarpment Plan, West Side Strategic Plan, City Zoning Ordinance and existing Subdivision Covenants. The intent of the Design Guidelines is to maintain existing views and the open feeling of the area, reasonably minimize disturbance of the area, maintain a landscape of native plants, and construct buildings that blend with the surrounding environment. These design guidelines consider the West Side Strategic Plan and the Northwest Mesa Escarpment Plan in the following stated requirements:

Application: Plans and other documentation for review are required to be submitted to the Architectural Review Committee (the "Committee").

Building Envelope: The building envelope is defined as that area of the lot exclusive of building setbacks and the area dedicated as open space.

Building:

1. Setbacks- Buildings are to conform to the following minimum setbacks: 25 feet-front lot line setback; 15 feet side and rear lot line setback. Variances to setbacks will be considered for lots with public utility easements granted for SAD 227 utilities.
2. Height- Maximum building height is 15 feet above grade. The height of a pitched roof is measured at a point midway between the wall top plate and the ridge.
3. Exterior Color- Exterior building colors are to comply with color list in the NW Mesa Escarpment Plan or equivalent.
4. Glazing and roofing- highly reflective or glaring glass is prohibited.
5. Exterior Lighting- Height of luminaries shall not exceed 20'-0". Light fixtures shall be shielded such that light is directed downward and is not directly visible from a distance greater than 1,000 feet.
6. Roof mounted equipment shall be fully screened from horizontal view.

Construction:

1. A site plan showing building perimeters and locations and defining the required open space is to be included in the submittal of plans for review by the Architectural Review Committee.
2. The property owner or builder is required to have and use a covered metal container for construction debris and waste for the duration of construction.

Grading & Drainage:

1. Grading plans shall demonstrate cut and fill has been kept to a minimum unless the excavation reduces the profile of construction in a way that materially improves the site plan.
2. To minimize grading of the existing ground surface, cross-lot drainage is allowed and downstream properties will carry the flow to the street as required and shown on the approved drainage plan.
3. Buildings are to be sited so that storm water drains away from the structure.
4. Storm water will not be allowed to accumulate, potentially causing flooding problems to downstream properties.

SAD 227 Development Guidelines:

Landscaping:

1. Private Open Space: Approximately 30% of the lot area is to be private open space. Landscape plants used in the private open space are to be species and varieties contained on the NW Escarpment Plan Plant List or the City's Xeriscape plant list current at the time of application. The open space area may include active utility easements and side yard utility easements that contain maintenance roads.
2. Areas expected to be disturbed and streetscapes are to be designated on the site plan submitted to the Committee.

Utility Easements:

Maintenance roads shall be left accessible for maintenance purposes and not be impeded by structures.

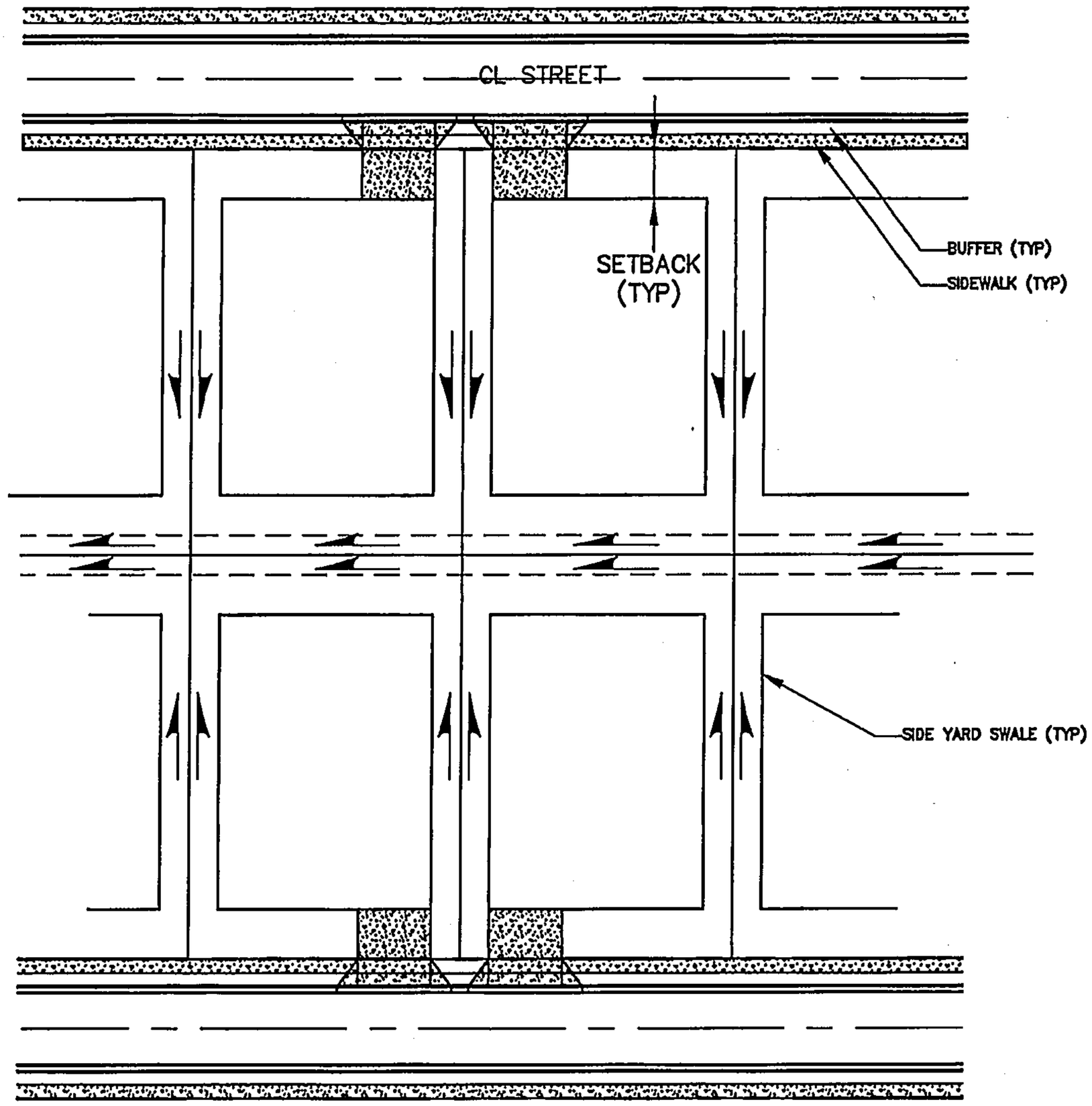
Walls/ fences:

1. Solid walls or fences are not allowed on property lines that are coincident with the Petroglyph National Monument boundary.
2. Chain-link or other shiny metal fencing is not allowed.
3. Maximum height of walls or fences shall be 6 feet above grade.
4. Colors of walls or fences shall comply with the color list contained in the NW Mesa Escarpment Plan.
5. The Committee will encourage perimeter walls on side and rear lot lines to be built centered on the property line to avoid un-maintained space between properties.
6. The Committee will encourage shared-wall agreements between adjacent property owners where appropriate.

The following will be included in the restrictive covenants for Unser Cliffs, but do not apply to Volcano Cliffs Units 2 & 5:

Walls along Unser Boulevard right-of-way (Lots 1-13, Bk.1, Lots 1-4, Bk. 3, Lots 1-5 & 7-11, Bk. 5, Unser Cliffs):

1. If the owner(s) of a lot with a side or rear property line coincident with the Unser Boulevard right-of-way elects to construct a wall along the coincident property line, the wall(s) will be of a consistent material, construction, height, texture and color: Split face concrete masonry unit construction; maximum 6'0" height above grade; split-face facing Unser Boulevard; color to be Crego Tan.
2. Unser roadway/lot cross-sections will be utilized to determine noise lines and evaluate minimum wall heights and views. The alternative of berms and landscaping (native plant/ xeriscaping) or a combination of berms with lower height CMU walls will be considered.
3. Cost-effective walls- Walls constructed by property owners will be of standard, readily available materials and construction (see #2). If non-standard materials or block-outs for artistic panels are required, the additional cost of the non-standard materials and/or construction of the artistic panels will be provided by the CoA (paid through 1% for Arts.)



TYPICAL LOT GRADING

NTS

NOTE:
PAD ELEVATION SHALL BE 1' ABOVE HIGH SIDE
TOP OF CURB

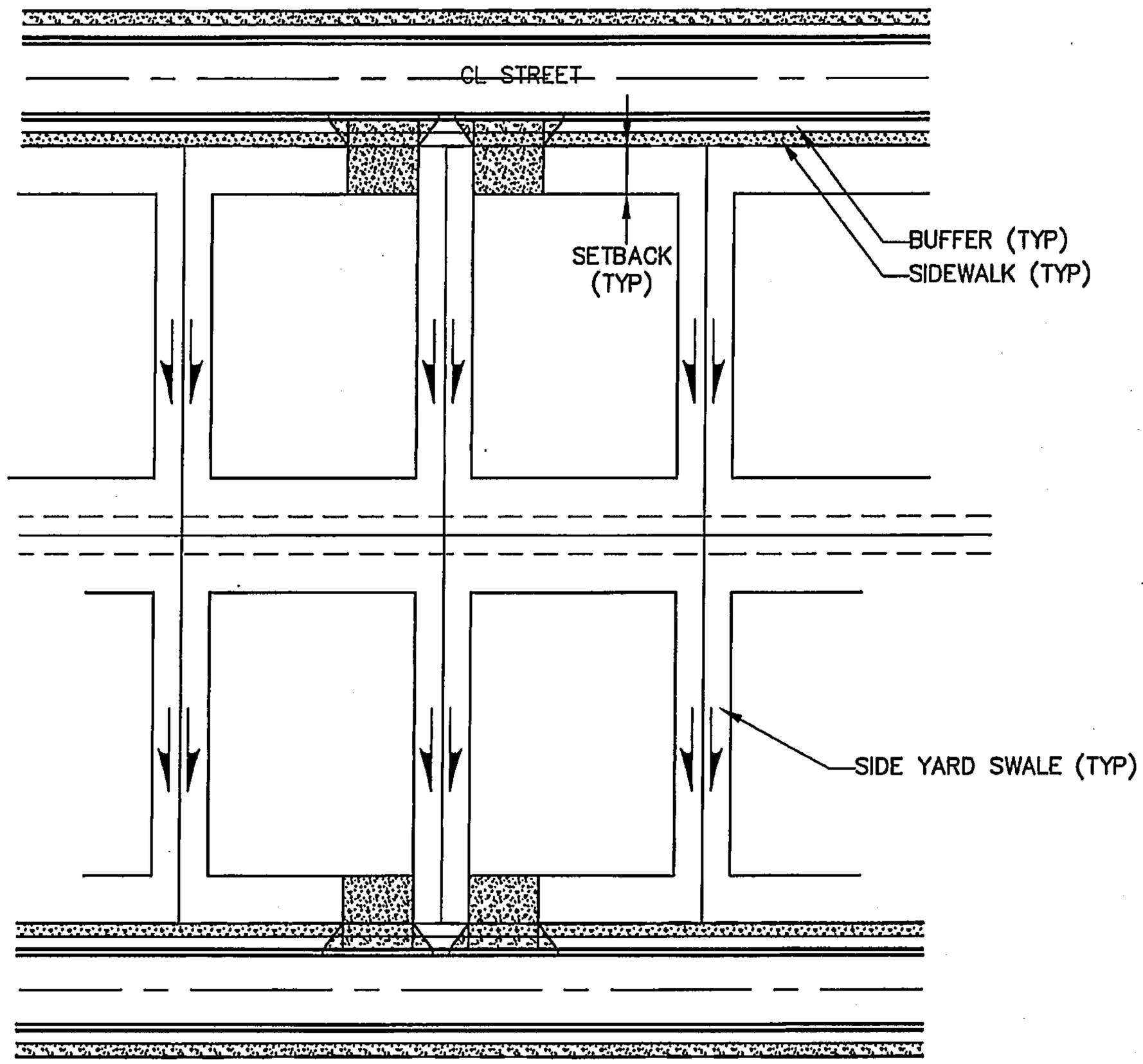
WCEA # 0840010400
DECEMBER 2011

WILSON & COMPANY

SPECIAL ASSESSMENT DISTRICT 228

TYPICAL LOT GRADING
CROSS-LOT DRAINAGE

DSGN. XXX	DRAWN XXX	CK. XXX
City Project No. 693391	Zone Map No. D-10, D-11	SHEET 1 OF 2



TYPICAL LOT GRADING

NTS

NOTE:
PAD ELEVATION SHALL BE 1' ABOVE HIGH SIDE TOP OF CURB

WCEA # 0840010400
DECEMBER 2011

WILSON & COMPANY

SPECIAL ASSESSMENT DISTRICT 228

TYPICAL LOT GRADING
CROSS-LOT DRAINAGE

DSGN. XXX	DRAWN XXX	CK. XXX
City Project No. 693391	Zone Map No. D-10, D-11	SHEET 2 OF 2

Cherne, Curtis

From: Metro, Steven J. <Steve.Metro@wilsonco.com>
Sent: Tuesday, January 29, 2013 2:02 PM
To: Cherne, Curtis
Cc: pkoskelo@yahoo.com; DAVID HEIL
Subject: RE: SAD 227 lot drainage

Curtis – 81st Street is high and should cut off any offsite flows on Fuji. Also the street flow are contained in the public infrastructure. The architectural review committee is to review the Emerald lot development to make sure it will let the upper historic flows pass.
If a block wall is constructed the owner should leave blocks out to allow flows from the above lot. The architectural review committee will need to look at lot drainage to allow for above cross lot drainage. I have cc'd the Presidents of the Molten Rock Neighborhood Association and the VCPOA so they can expand on what they are doing. I am not sure who is on the architectural review committee.
Steve Metro

From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Tuesday, January 29, 2013 1:44 PM
To: Metro, Steven J.
Subject: SAD 227 lot drainage

Steve,
Good afternoon.
I received a call from a home owner out at SAD 227 concerning grading and drainage at 8005 Fuji Ct NW. The caller lives at 8005 Emerald Dr NW and is concerned about offsite flows entering his property. I read your drainage report and reviewed the plat. Is it fair to say that developed lots should expect to receive historic offsite flows? If so, should people leave blocks out of there walls to receive these offsite flows?

The ACC reviews the plans and an engineered g & d is not required. How do I help homeowners from receiving greater than historic flows?

Thanks,

Curtis

****

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CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

HYDROLOGY DEVELOPMENT SECTION
DEVELOPMENT REVIEW BOARD MEMO

DRB PROJECT NO: 1002798 **AGENDA ITEM NO: 4**

SUBJECT:

Site Plan for Building Permit

ENGINEERING COMMENTS:

Hydrology can approve the site plan. Provide drainage calculations on the drainage plan when submitting for plan for building permit approval.

RESOLUTION/COMMENTS:

SIGNED:
Curtis Cherne
Hydrology Section
City Engineer Designee
AMAFCA Designee
924-3986

DATE: 4-30-14

Rudy

Charlie
505-331-7001

DFD033
5/13/14

check report

Kathryn

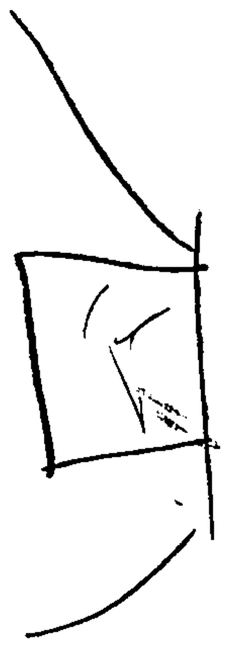
① SAD 227 report — how obtain

② — try to find bldg permit —

emerald Dr NW

off of east st

behind is ~~sucki~~ ct
fuji



10-12
4W

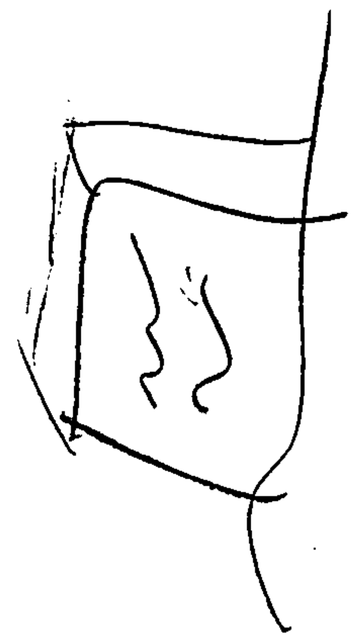
bldg new home — 0005 Emerald ct

Charlie

fuji - ct

site out Jan williams
Bob clark of custer homes

SAD 227



Spoke w/ Patricia at The properties

[illegible]

[illegible]

[illegible]

Cherne, Curtis

From: Metro, Steven J. [Steve.Metro@wilsonco.com]
Sent: Tuesday, January 29, 2013 2:02 PM
To: Cherne, Curtis
Cc: pkoskelo@yahoo.com; DAVID HEIL
Subject: RE: SAD 227 lot drainage

Curtis – 81st Street is high and should cut off any offsite flows on Fuji. Also the street flow are contained in the public infrastructure. The architectural review committee is to review the Emerald lot development to make sure it will let the upper historic flows pass.
If a block wall is constructed the owner should leave blocks out to allow flows from the above lot. The architectural review committee will need to look at lot drainage to allow for above cross lot drainage. I have cc'd the Presidents of the Molten Rock Neighborhood Association and the VCPOA so they can expand on what they are doing. I am not sure who is on the architectural review committee.
Steve Metro

From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Tuesday, January 29, 2013 1:44 PM
To: Metro, Steven J.
Subject: SAD 227 lot drainage

Steve,
Good afternoon.
I received a call from a home owner out at SAD 227 concerning grading and drainage at 8005 Fuji Ct NW. The caller lives at 8005 Emerald Dr NW and is concerned about offsite flows entering his property. I read your drainage report and reviewed the plat. Is it fair to say that developed lots should expect to receive historic offsite flows? If so, should people leave blocks out of there walls to receive these offsite flows?

The ACC reviews the plans and an engineered g & d is not required. How do I help homeowners from receiving greater than historic flows?

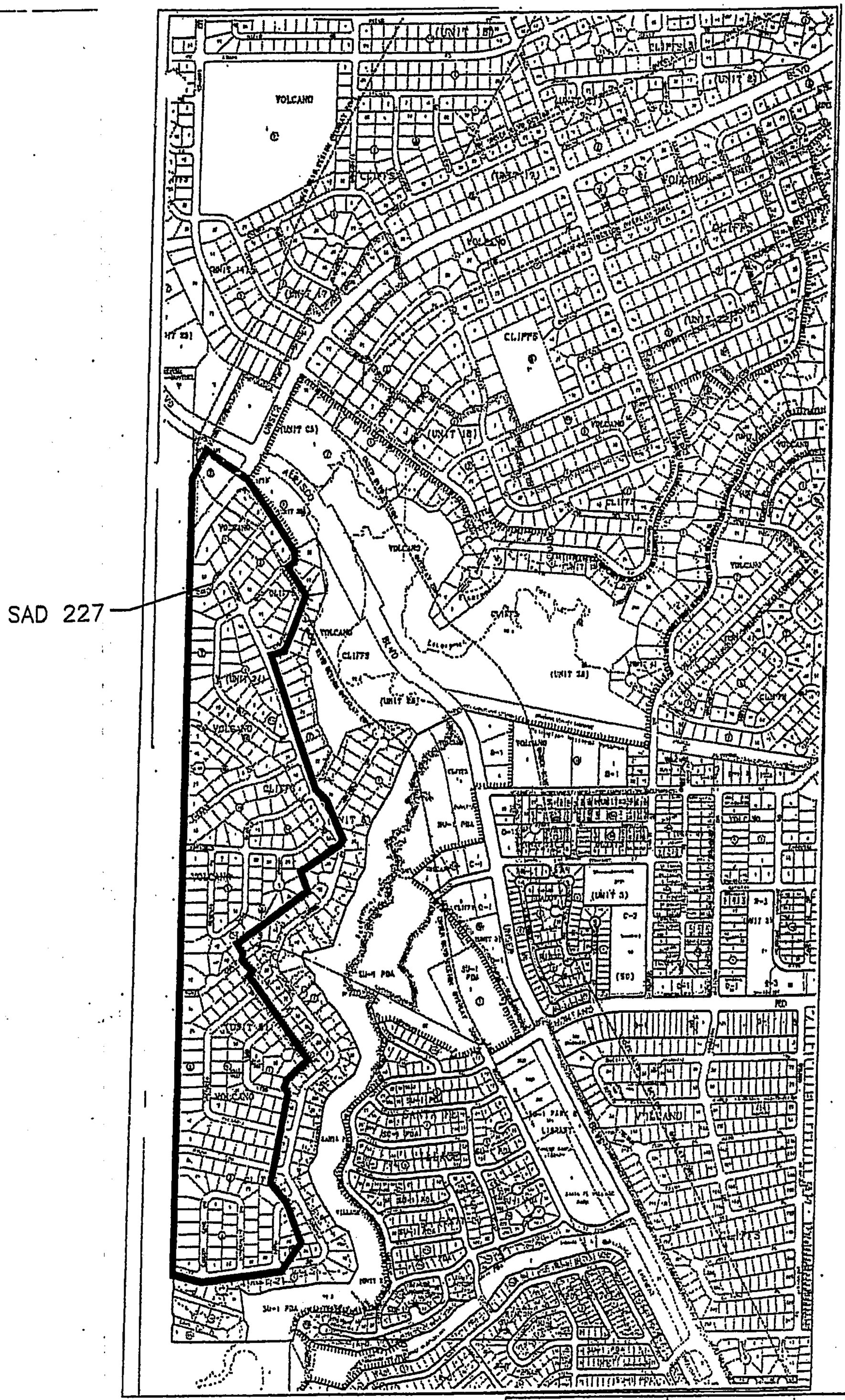
Thanks,

Curtis

****

Confidential/Proprietary Note:

The information in this email is confidential and may be legally privileged. Access to this email by anyone other than the intended addressee is unauthorized. If you are not the intended recipient of this message, any review, disclosure, copying, distribution, retention, or any action taken or omitted to be taken in reliance on it is prohibited and may be unlawful. If you are not the intended recipient, please reply to or forward a copy of this message to the sender and delete the message, any attachments, and any copies thereof from your system. Thank you.


SAD 227
VOLCANO
CLIFFS
(UNIT 6)
(UNIT 2)
(UNIT 7)
(UNIT 8)
(UNIT 3)
(UNIT 5)
(UNIT 1)
(UNIT 4)
(UNIT 9)
(UNIT 10)
(UNIT 11)
(UNIT 12)
(UNIT 13)
(UNIT 14)
(UNIT 15)
(UNIT 16)
(UNIT 17)
(UNIT 18)
(UNIT 19)
(UNIT 20)
(UNIT 21)
(UNIT 22)
(UNIT 23)
(UNIT 24)
(UNIT 25)
(UNIT 26)
(UNIT 27)
(UNIT 28)
(UNIT

CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development Review Services

Richard J. Berry, Mayor

October 2, 2014

David Soule, P.E.
Rio Grande Engineering
P.O. Box 93924
Albuquerque, NM 87199

RE: **Hurt Residence, Lot 11, Block 5 Unser Cliffs**
Grading and Drainage Plan
Engineer's Stamp Date 10-1-14 (File: E10D025)

Dear Mr. Soule:

Development in SAD 227 is to comply with the **SAD 227, Unser Boulevard Middle Section Drainage Report** (Wilson & Co, 2003) which states: "an architectural review committee for the property owners association will control and monitor the lot development". Therefore the **SAD 227 Development Guidelines** are enforced by the architectural review committee, and includes the Grading and Drainage guidelines. In general, the Guidelines allow for cross-lot drainage and the downstream properties are to carry the flow to the street. Cut and fill is to be kept to a minimum.

Grading and Drainage Plans and a formal review from hydrology will generally not be required for SAD 227 unless there is potential for upstream or downstream properties to be adversely affected. Nonetheless, the architectural review committee should be reviewing all lots for adherence to the guidelines.

Based upon the information provided in your submittal received 9-30-14, this lot discharges runoff to public ROW/easements and not into adjacent lots, and does not require a formal review from hydrology. Since a Grading and Drainage plan has been submitted, Hydrology has reviewed the submittal anyhow. Based upon our review, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan in the construction sets when submitting for a building permit.

If you have any questions, you can contact me at 924-3695.

No HOLDS!

No Eng. Cert. REQ'D unless Reviewer feels necessary.

Sincerely,

Rita T. H

Rita Harmon, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage file
c.pdf: via Email: Recipient, Monica Ortiz

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

331-7000

Charlie Morgan SAD 227 - Downy Mont

Arc committee - don't enforce code

General Building code
and
Land disturbance

- SAD engineer - ?

800S Fuji Ct

charlie.morgan@elpaso.com

F

6400 Prairie Ave NE

98 is Find geek

Curb is at 100

bringing dirt in

pay attention to bill

Send e-mail
to Land

Current DRC
Project Number:_____

FIGURE 12

Date Submitted: 6/11/12
Date Site Plan Approved:_____
Date Preliminary Plat Approved:_____
Date Preliminary Plat Expires:_____
DRB Project No: 1009046
DRB Application No.:_____

INFRASTRUCTURE LIST

EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

Sawmill Crossing, Unit I
PROPOSED NAME OF PLAT AND/OR SITE DEVELOPMENT PLAN

Tract B-1-A-2, Duke City Lumber Company
EXISTING LEGAL DESCRIPTION PRIOR TO PLATTING ACTION

Following is a summary of PUBLIC/PRIVATE infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
			PAVING						
		12'-16' F-E	Perm Pvmt (South Side)	Aspen Ave	W. Terminus of Aspen	NE corner Tract B	/	/	/
			C&G (South Side)						
		4'	Sidewalk (South Side)						
		26' FF	Res Pvmt	Band Saw Dr.	W. Terminus Band Saw	Timber Dr.	/	/	/
			C&G (both sides)						
		4'	Sidewalk (both sides Deferred) (1)						
		30' FF	Res Pvmt	Timber Dr.	Aspen Ave.	Band Saw Pl.	/	/	/
			C&G (both sides)						
		4'	Sidewalk (both sides)						
		4'	Sidewalk	South Side of Tract C	Bandsaw Pl. Terminus	Tract B	/	/	/
		4'	Sidewalk	Band Saw Pl.	Lot 1	Lot 64	/	/	/
		4'	Sidewalk	Band Saw Pl.	Lot 72	Tract B	/	/	/
		6'	Sidewalk	Tract D	Bandsaw Pl.	Tract B	/	/	/
			RR Crossing per NMDOT Stds.	Aspen Ave. @ Timber Drive			/	/	/
			A tri-party agreement (Developer, City of Albuquerque, and DOT) is required for RR crossing						
			WATER						
		12"	Waterline	Timber Dr.	Aspen Ave.	Band Saw Pl.	/	/	/
		6"	Waterline	Band Saw Pl.	W. Terminus Band Saw	Timber Dr.	/	/	/
		6"	Waterline	S. Side of Tract C	Band Saw Pl. Terminus	Tract B	/	/	/
			SANITARY SEWER						
		8"	Sanitary Sewer	Lot 5 SAS Easement	60" Off-Site Intercepter	Band Saw Pl.	/	/	/
		8"	Sanitary Sewer	Band Saw Pl.	Lot 5 SAS Easement	Lumberton Dr.	/	/	/
		8"	Sanitary Sewer	Lumberton Dr.	Band Saw Pl.	Aspen Ave.	/	/	/
		8"	Remove Existing SAS	Aspen Ave.	Lumberton Dr.	NE Corner of Site	/	/	/

8005 Fuji ct NW

See - form

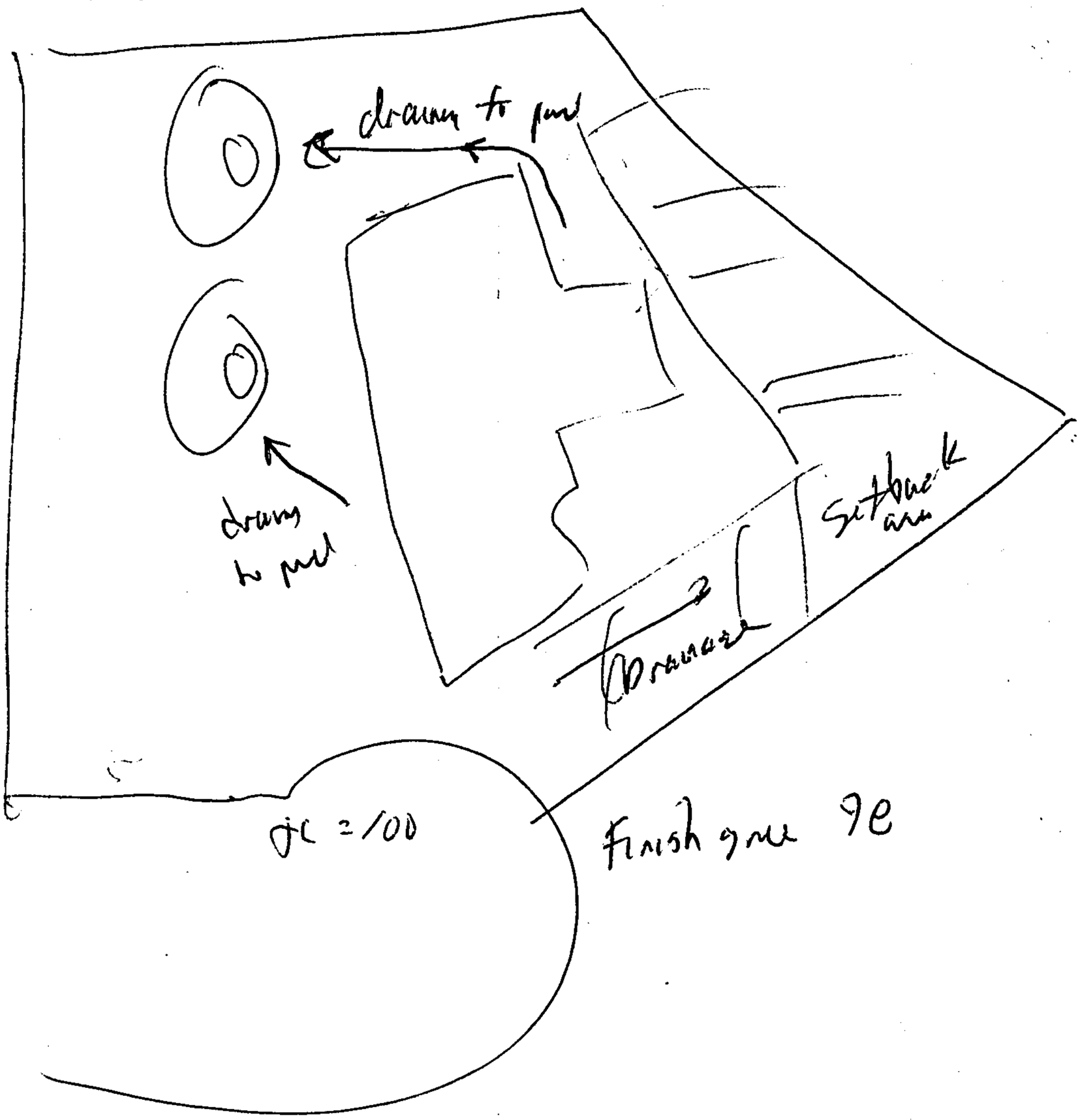
11. Grading cut and fill to be kept to a minimum ✓

12. Drainage to Engineers plan ✓

Clark Custom homes@ cable one.net

235-1332

Bob Clark



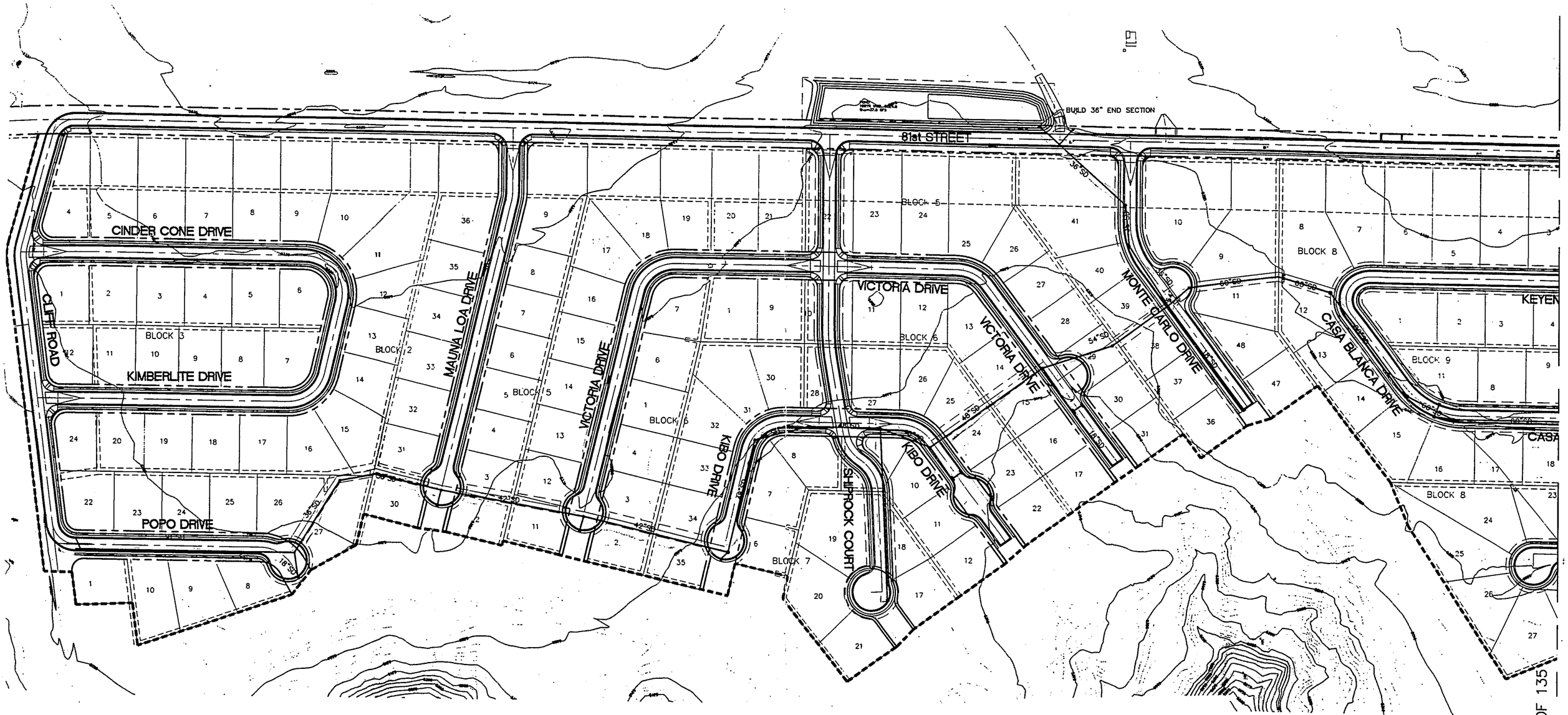
Finish grade 9e

ACTIVITY REPORT

TIME : 01/28/2013 10:48
NAME : CITY OF ALBUQUERQUE
FAX : 9243971
TEL :
SER.# : BROA8J764005

NO.	DATE	TIME	FAX NO./NAME	DURATION	PAGE(S)	RESULT	COMMENT	
#007	01/24	08:59	98893548	01:06	02	OK	TX	ECM
	01/24	09:13	5058228152	22	02	OK	RX	ECM
	01/24	09:17		32	01	OK	RX	ECM
	01/24	09:19		34	02	OK	RX	ECM
#008	01/24	09:32	PNM	15	01	OK	TX	ECM
	01/24	10:14	505 883 8224	14	01	OK	RX	ECM
#009	01/24	11:08	PNM	15	01	OK	TX	ECM
	01/24	11:26	5058214214	17	01	OK	RX	ECM
	01/24	11:59	5053435430	55	01	OK	RX	ECM
	01/24	12:52		28	01	OK	RX	ECM
	01/24	14:48	5058228152	14	01	OK	RX	ECM
	01/24	14:52	5057972322	30	01	OK	RX	ECM
#010	01/24	14:57	PNM	14	01	OK	TX	ECM
	01/24	15:05	505 866 8839	27	01	OK	RX	
	01/24	15:09	15058887610	18	01	OK	RX	ECM
	01/24	16:30	505 866 8839	31	01	OK	RX	
	01/25	06:46	5055082903	21	01	OK	RX	ECM
	01/25	08:14	505 352 6014	01:26	01	OK	RX	
#011	01/25	08:31	PNM	32	03	OK	TX	ECM
	01/25	08:33		38	01	OK	RX	ECM
	01/25	08:53	5058228152	20	03	OK	RX	ECM
#012	01/25	09:02	95082903	00	00	BUSY	TX	
#013	01/25	09:34	93493833	20	01	OK	TX	
	01/25	09:44		24	01	OK	RX	
	01/25	10:51	5054048586	26	01	OK	RX	ECM
#014	01/25	10:56	93450593	42	04	OK	TX	ECM
#015	01/25	12:55	PNM	23	01	OK	TX	ECM
	01/25	13:19		01:04	02	OK	RX	ECM
	01/25	13:23	505 880 8676	27	01	OK	RX	ECM
	01/25	13:25	5058228152	22	02	OK	RX	ECM
#016	01/25	13:38	PNM	13	01	OK	TX	ECM
	01/25	14:26		37	01	OK	RX	ECM
	01/25	14:35	5059906604	01:00	01	OK	RX	
	01/25	14:47	15058887610	16	01	OK	RX	ECM
	01/25	14:50	5058770246	16	01	OK	RX	ECM
#017	01/25	14:52	PNM	17	01	OK	TX	ECM
	01/25	14:56	5058228152	13	01	OK	RX	ECM
	01/25	15:13		46	01	OK	RX	ECM
#018	01/25	15:34	PNM	19	02	OK	TX	ECM
	01/25	17:00	5052860954	29	02	OK	RX	ECM
	01/28	05:55		01:21	01	OK	RX	ECM
	01/28	06:37	15058887610	01:00	03	OK	RX	ECM
	01/28	06:44	5054048586	01:51	06	OK	RX	ECM
	01/28	07:40		23	01	OK	RX	ECM
	01/28	08:09	505 503 7977	22	01	OK	RX	ECM
	01/28	08:13		33	01	OK	RX	ECM
	01/28	09:25	8987245	27	01	OK	RX	ECM
#019	01/28	09:41	PNM	13	01	OK	TX	ECM
	01/28	09:57	5058228152	27	02	OK	RX	ECM
	01/28	10:48		20	01	OK	RX	ECM

BUSY: BUSY/NO RESPONSE
NG : POOR LINE CONDITION / OUT OF MEMORY
CV : COVERPAGE
POL : POLLING
RET : RETRIEVAL



LEGEND

5070	EXISTING INTERMEDIATE CONTOUR
5071	EXISTING INDEX CONTOUR
■	PROPOSED SINGLE TYPE "C" INLET

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

WCEA #X1218025
JUNE 2003

WILSON & COMPANY
4900 LANG AVENUE N.E.
SUITE 100
ALBUQUERQUE, NEW MEXICO
87109
(505) 348-4000

ROBERT S. MACLAKE NEW MEXICO 15565 LICENSED PROFESSIONAL ENGINEER 6-30-03

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
707391	D-10, E-10	13	135

X:\X1218025\M\SHEETS\81250PBBM01.dwg 6/29/2003 10:06:24 AM MDT

BUILD 72" END SECTION

BUILD 60" END SECTION

81st STREET

FUJI CT. NW

EMERALD DRIVE NW

JADE DRIVE NW

ONYX DRIVE NW

RIM ROCK PLACE NW

ONYX COURT

MARGOLD DRIVE NW

CASA BLANCA DRIVE NW

UNSER BLVD.

RIM ROCK DRIVE NW

RIM ROCK PLACE NW

MONUMENT BORDER

RIP-RAP OUTLET

SEE MH'S ON BENDS ON 72" SD SEE NOTE 2

BLOCK 1

BLOCK 2

BLOCK 3

BLOCK 4-A

BLOCK 5

BLOCK 8

BLOCK 10

BLOCK 11

BLOCK 13

MATCH LINE SEE SHEET 15 OF 135

SEE SHEET 13 OF 135

NOTE:
1. ALL STORM DRAIN IN UNSER BLVD. SHALL BE CONSTRUCTED WITH THE UNSER PROJECT.
2. THE BENDS IN THE 72" STORM DRAIN SHALL BE INCLUDED IN THE BID ITEM 910.029 "72" RCP, CL III"ONSE SEPARATE PROJECT WILL BE MADE FOR BENDS.

LEGEND

5070	EXISTING INTERMEDIATE CONTOUR
5071	EXISTING INDEX CONTOUR
■	PROPOSED SINGLE TYPE "C" INLET

GRAPHIC SCALE

100 0 50 100 200 500

(IN FEET)
1 inch = 100 ft.

WCEA #X1218025
JUNE 2003

WILSON & COMPANY
4900 LANG AVENUE N.E.
SUITE 100
ALBUQUERQUE, NEW MEXICO
87109
(505) 348-4000

ROBERT S. MACLAREN NEW MEXICO 15565 LICENSED PROFESSIONAL ENGINEER 6-30-03

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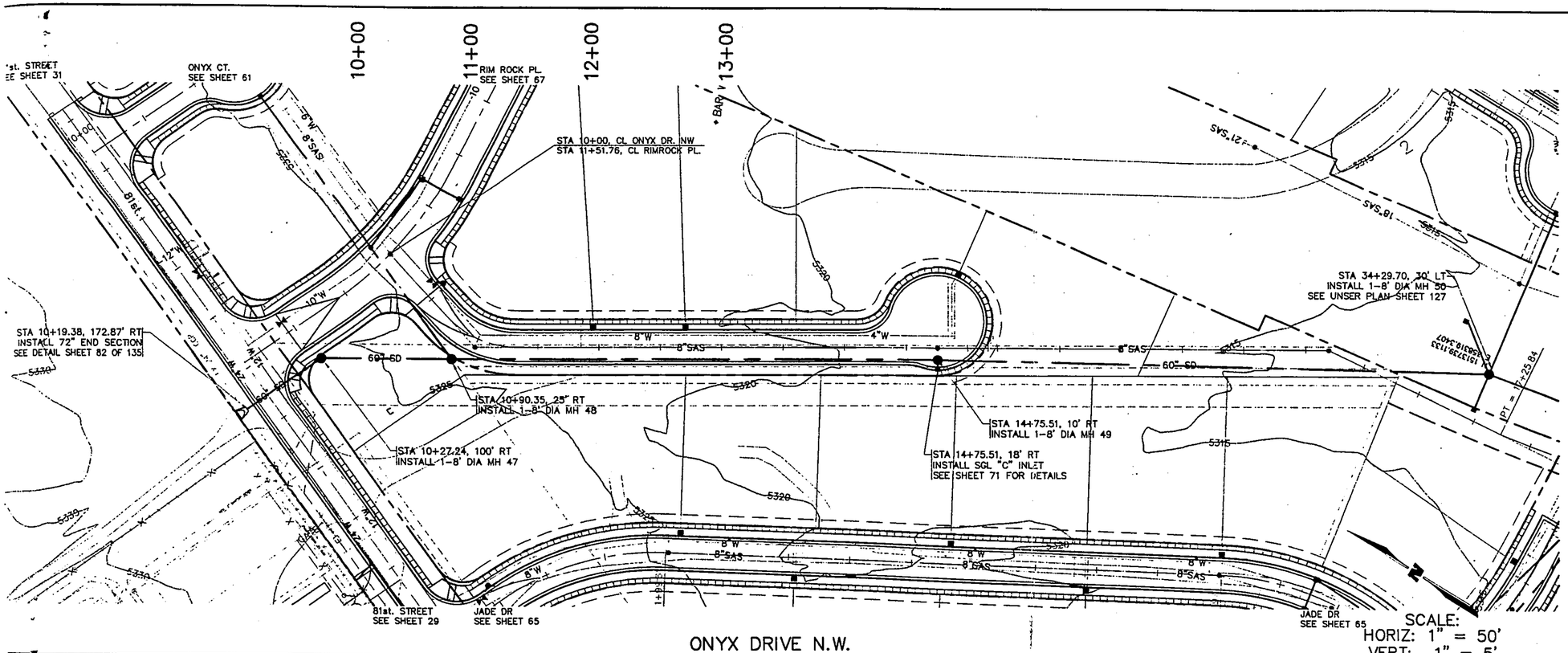

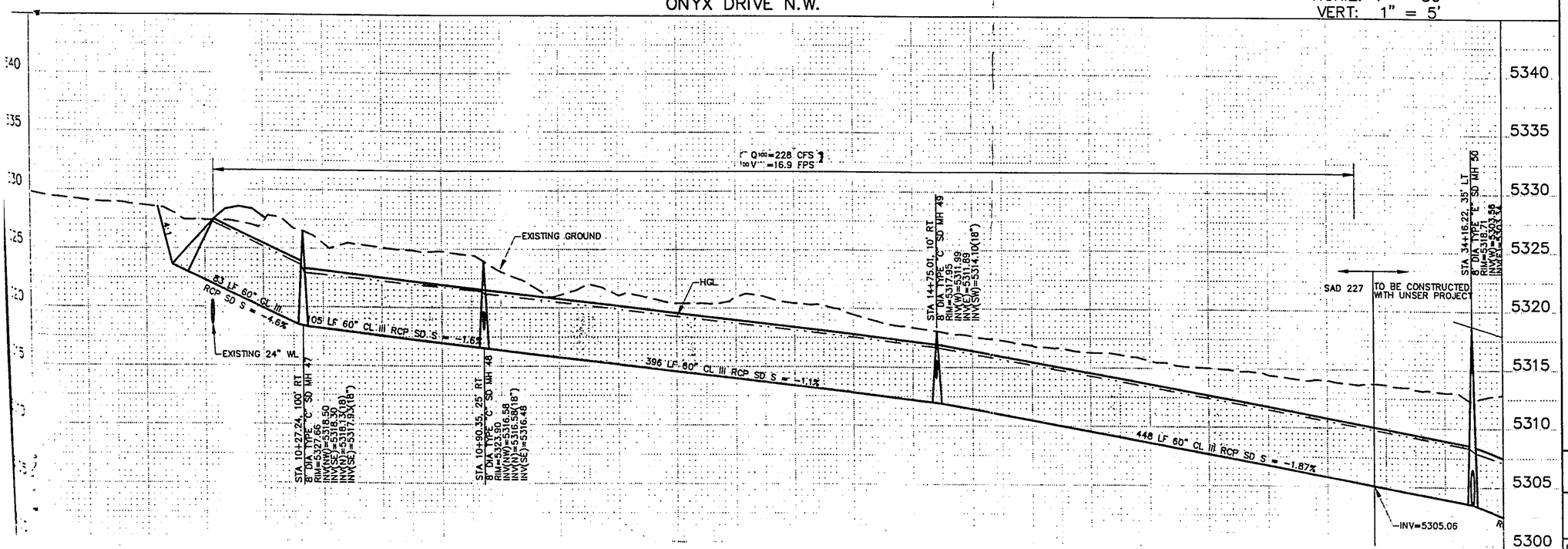

AS-BUILT INFORMATION

CONTRACTOR
WORK STAKED BY — DATE
INSPECTOR'S ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE
MICRO-FILM INFORMATION
REVIEWED BY — DATE

BENCH MARKS

ACS BRASS CAP, STAMPED "3-E10 1969"
SET IN TOP OF CONCRETE POST PROJECTING 0.30 FT. ABOVE GROUND. LOCATED APPROX. 178' SE. OF THE INTERSECTION OF RIM ROCK DR. NW AND MARIGOLD DR. NW
(NAD 1927), X 358813.84, Y 1512565.54
ELEVATION = 5316.10 FT (NGVD 1929)

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

REMARKS

REVISIONS

NO.	DATE	BY

WILSON & COMPANY, ENGINEERS & ARCHITECTS
DESIGNED BY SAM DATE MAY 03

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
STORM DRAIN PLAN & PROFILE
ONYX DRIVE N.W.

Design Review Committee | City Engineer Approval | Update | Mo / Yr

Cherne, Curtis

From: Cherne, Curtis

Sent: Wednesday, January 30, 2013 4:20 PM

To: Connor, Francis J.

Cc: 'charlie.morgan@elpaso.com'

Subject: residential construction at 8005 Fuji Ct NE

Francis,
Charlie Morgan, the resident at 8005 Emerald Dr NW, contacted me concerning the amount of fill being imported to construct the newly permitted home at 8005 Fuji Ct NW. I have reviewed the building permit set. The finished floor is to be at 98 and the top of curb on Fuji Ct is at 100 (roughly). Charlie insists that the pad is being constructed 1 foot above the top of curb or at 101, which is 3 feet higher than what the plans show.

Per the SAD drainage report the architectural committee is to enforce how the lots are developed and a grading plan is not required.

As you are aware, Hydrology does not inspect fill on lots during construction. Is this something that Building and Safety looks at prior to approving footings?

I informed Charlie that lots in SAD 227 are to expect and receive stormwater flows from uphill neighbors at or near historic amounts.

Charlie is copied in this e-mail.

Curtis

PLAT :

Volcano Cliffs UNIT 5 is platted is in Book D3, page 175, Nov. 1, 1967

Block 11 has a drainage easement running through the rear side of the lots.

No dimension is shown, but it is scaled at about 50' wide, with 25' on each side of the property line.

Can't block drainage easement, not even with a wrought iron fence. Not even with an opening. No pipes, etc.

Needs to be open to be maintained.

See letter to David Soule in E10D025, Arch committee needs to review G&D plans.

CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development Review Services

Richard J. Berry, Mayor

October 2, 2014

David Soule, P.E.
Rio Grande Engineering
P.O. Box 93924
Albuquerque, NM 87199

RE: **Hurt Residence, Lot 11, Block 5 Unser Cliffs**
Grading and Drainage Plan
Engineer's Stamp Date 10-1-14 (File: E10D025)

Dear Mr. Soule:

Development in SAD 227 is to comply with the **SAD 227, Unser Boulevard Middle Section Drainage Report** (Wilson & Co, 2003) which states: "an architectural review committee for the property owners association will control and monitor the lot development". Therefore the **SAD 227 Development Guidelines** are enforced by the architectural review committee, and includes the Grading and Drainage guidelines. In general, the Guidelines allow for cross-lot drainage and the downstream properties are to carry the flow to the street. Cut and fill is to be kept to a minimum.

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Based upon the information provided in your submittal received 9-30-14, this lot discharges runoff to public ROW/easements and not into adjacent lots, and does not require a formal review from hydrology. Since a Grading and Drainage plan has been submitted, Hydrology has reviewed the submittal anyhow. Based upon our review, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan in the construction sets when submitting for a building permit.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Rita Harmon, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage file
c.pdf: via Email: Recipient, Monica Ortiz

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

E10D025_BP_Appr.doc

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: HURT RESIDENCE Building Permit #: _____ City Drainage #: E10-D025

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: LLOT 11, BLOCK 5 UNSER CLIFFS

City Address: MARIGOLD

Engineering Firm: RIO GRANDE ENGINEERING Contact: DAVID SOULE

Address: PO BOX 93924, ALBUQUERQUE, NM 87199

Phone#: 505.321.9099 Fax#: 505.872.0999 E-mail: DAVID@RIOGRANDEENGINEERING.COM

Owner: DR HURT Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Architect: NA Contact: PETER BUTTERFIELD

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Surveyor: CONSTRUCTION SURVEY, INC Contact: DAVID ACOSTA

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Contractor: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN 1st SUBMITTAL
- x DRAINAGE PLAN RESUBMITTAL
- ____ CONCEPTUAL G & D PLAN
- x GRADING PLAN
- ____ EROSION & SEDIMENT CONTROL PLAN (ESC)
- ____ ENGINEER'S CERT (HYDROLOGY)
- ____ CLOMR/LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEER'S CERT (TCL)
- ____ ENGINEER'S CERT (DRB SITE PLAN)
- ____ ENGINEER'S CERT (ESC)
- ____ SO-19
- ____ OTHER (SPECIFY)

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ____ SIA/FINANCIAL GUARANTEE RELEASE
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D APPROVAL
- ____ S. DEV. FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY (PERM)
- ____ CERTIFICATE OF OCCUPANCY (TCL TEMP)
- ____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- X GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- ____ GRADING CERTIFICATION
- ____ SO-19 APPROVAL
- ____ ESC PERMIT APPROVAL
- ____ ESC CERT. ACCEPTANCE
- ____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED: ____ Yes X No ____ Copy Provided

DATE SUBMITTED: 9/30/14 By: _____

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

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 subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre than are part of a larger common plan of development

Monica Ortiz

SAD 227
Unser Boulevard Middle Section
Drainage Report

Prepared for

Volcano Cliffs
Property Owners Association

Prepared by

Wilson & Company, Inc.
4900 Lang Ave NE
Albuquerque NM 87109
(505) 348-4000
(505) 348-4055 Fax

Steven J. Metro, P.E.
June 2003

WILSON
& COMPANY

Complete
SAD 227 DMP
as of 7/2015
Electronic Copy has been
uploaded to the Hydrology
K: Drive

SAD 227
Unser Boulevard Middle Section
Drainage Report

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June 2003

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Albuquerque, NM 87109
P.O. Box 94000 87199-4000
505-348-4000

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Riuo Rancho
Salina
San Bernardino
Wichita

Wilson & Company
Latin America, LLC

12 June 2003

Mr. Carlos Montoya
City Floodplain Administrator
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Response to 30 May 2003 Letter
WCEA File: X1-218-025

Dear Mr. Montoya:
The following paragraphs describe the resolution of your comments in the 30 May 2003 letter regarding the SAD 227 Drainage Report.

Plate 1:

1. The basins have been revised to follow the existing contours, see Plate 1.
2. The basins have been revised and all flows have been updated, see Plate 1.
3. A meeting was held with the property owners and development was coordinated, all parties agreed with the plan included in this report

Plate 2:

1. All routing calculations are included in the AHYMO model in Appendix A.
2. All ponding information is included in Plate 2 and Open Space has agreed with the ponding plan

Plate 3:

1. As per the meeting with the upstream property owners it was agreed to hold flows to existing values
2. 100 year water surface elevations are shown on Plate 1

Plate 4:

1. Overland runoff flow will enter the structure through a weir on top of the structure, calculations are included in Appendix D.

If you have any further questions, please don't hesitate to contact us.
Wilson & Company, Inc.

Steven J Metro, P.E. & P.S.

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

RECEIVED
JUN 03 2003
WILSON AND COMPANY
MAILROOM

May 30, 2003

Steve Metro
Wilson & Company
4900 Lang Avenue NE
Albuquerque, New Mexico 87109

RE: Drainage Report for SAD 227 (E-10, D-10) Dated May 15, 2003

Dear Mr. Metro:

I have reviewed the referenced Drainage Report and forward the following comments.

Plate 1 comments:

1. Please explain why the drainage basin does not follow the contours above basin 100.
2. The contours south of basin 100 also shows runoff going to AP 1. This flow is not included in AP 1.
3. Basin 83 A is going to be developed in the future. Runoff from this basin needs to be passed through you development for developed discharges. Please coordinate with these property owners.

Plate 2 comments:

1. Please submit routing calculation to show how the runoff was routed through the storm drain. The runoff in the storm drain is lower than what is produced for the development and off site flows.
2. AP 1 is not at the low point. How will runoff enter the storm drain? If runoff is going to be backed up an AP 1 please show the 100-year water surface. Does Open Space agree with this ponding?

Plate 3 comments:

1. AP 3 needs to pass developed flows from the upstream basin.
2. Please show the 100-year water surface at AP 2 and 3. Does Open Space agree with the ponding?

Plate 4 comments:

1. How does the overland runoff enter the storm drain at Montano? Please show the calculations. Please show the proposed contours at Montano Road where the storm drain enters.

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

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

WILSON & COMPANY

4900 Lang Ave. NE
Albuquerque, NM 87109
P.O. Box 94000 87199-4000
505-348-4000

Albuquerque
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Wichita

Wilson & Company
Latin America, LLC

15 May 2003

Mr. Carlos Montoya
City Floodplain Administrator
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Response to 5 May 2003 Letter
WCEA File: X1-218-025

Dear Mr. Montoya:
The following paragraphs describe the resolution of your comments in the 5 May 2003 letter regarding the SAD 227 Drainage Report.

1. Per our discussion, item 1 was addressed by showing the open space and developed flow limitations on the offsite Flows (Plate 1) to match existing conditions.

2. The graphics were revised to show the runoff on Unser. The Petroglyph Park flows in the South Branch of the Boca Negra Arroyo will be reduced to only the southern flows from the open space area above 81st Street (off site basis 80, 81, 872 and portions of 79). The portion of the south branch storm drain that crosses Unser Boulevard will be included in the Unser Drainage Report. A section was added to this drainage report to identify the Unser drainage items to be addressed.

3. The discussion on 8 DU's per acre and bio swales were deleted from the report.

4. A typical lot was added to Appendix A to show typical lot land treatment (house, street, sidewalk, driveway) and to verify the percentages of Land Treatments A, B, C and D.

5. The inlet calculation table was checked for weir length (2' gutter plus 3' throat opening), area (3' x 2' less grate), and the equations (weir and orifice). Since all the inlets are in a sump – only the orifice equation is needed for a single Type C inlet with an opening of 2.25 sq. ft. (3' x 0.75') with a 50% clogged grate (2.0 sq. ft.) and

an equation of $Q=CA(2gh)^{1/2}$. This equation gives a capacity of 16.7 cfs for an H = 0.67 ft. A double C inlet has a capacity of 32 cfs in a sump. All the inlets will be single C inlets except for the inlet at the end of Marigold Drive which will be a double C inlet.

6. The Plans include the street grade and the storm drain easements. This project has no mass grading per agreements with the District's Councilor. The lot drainage and pad elevations will be submitted with a building plan to the Volcano Cliffs Architectural Review Committee. This Committee will check the building plan to assure the requirements in the NW Mesa Escarpment Plan and the SAD Resolutions are met. Wilson & Company will assist the Committee in checking the lot drainage and pad elevations.

7. A street flow table with maximum street flows (100-year) and capacities (for design grade) was added to Appendix A. The only street that is close to capacity is Cliff Road near Popo Drive where the street flow is 25 cfs and the street grade is 0.5%, which is near capacity.

8. The collection points west of 81st Street include end sections for the 36", 60" and 72" RCPs with a 20' x 40' wire enclosed rip rap inlet pad. This work ill be done on public right-of-way and no easements are required. Details for these collection points are included in the Plans.

9. The 100-year runoff depth in Unser Boulevard will be addressed by ASCG (Unser design engineers) with the Unser Drainage Report. A section was added to the SAD 227 Drainage Report to address Unser drainage items.

10. & 11. An overall drainage plan was added to the graphics. This plan shows the stationing on the storm drains.

If you have any further questions, please do not hesitate to contact us.

WILSON & COMPANY, INC.

Steven J. Metro, P.E. & P.S.
SAD 227 Engineer

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

May 5, 2003

Dan Aguirre
Wilson & Company
4900 Lang Avenue NE
Albuquerque, New Mexico 87109

RE: Drainage Report for SAD 227 (E-10, D-10) Dated April 4, 2003

Dear Mr. Aguirre:

I have reviewed the referenced Drainage Report and forward the following comments.

1. Please submit a map showing the ownership of the upstream basins above the SAD area. Please show roads and the future drainage basins. The upstream runoff basins should follow the developed property lines and not existing drainage basins. The runoff should be calculated for developed flows and the hydraulic structures through the SAD should be designed for onsite and offsite developed flows.
2. Please show what part of the runoff will be directed through the Monument property and what part of the runoff will be sent down the Unser storm drain. Please submit drainage easements and approval from the Petroglyph Park.
3. Page 3 of the report indicates 8 DU's per acre and bio swales yet this changes in pages 4 and 5.
4. Please submit a typical lot that shows the house, street, sidewalk, and driveway. This should correspond with Appendix A land treatment table.
5. Please review the inlet calculation table. Please check lengths, areas and the equations.
6. The subdivision plans needs the following added. Please show street grades, show finish floor elevations, please indicate how the lots will drain, and submit private and public drainage easements.
7. Please show depth of flow for the 100-year runoff in the streets.
8. Please show details for all the collection points west of 81st street. Please show the hydraulic calculations. Will there be a need for easements for these collection points?
9. Indicate the 100-year runoff in Unser Boulevard, and the depth of flow.
10. Please give more details on the outfall for the storm drain in Unser Boulevard. Please show the structure that restricts the flow downstream.

11. Please station the storm drain on the plan and in the profile sheet.

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

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

Table of Contents

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Methodology....1
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Appendix B, Hydraulic and Hydraflow Analysis
Appendix C, Soil and flood Maps
Appendix D, Unser Blvd Hydrology and Inlet and Structure Calculations

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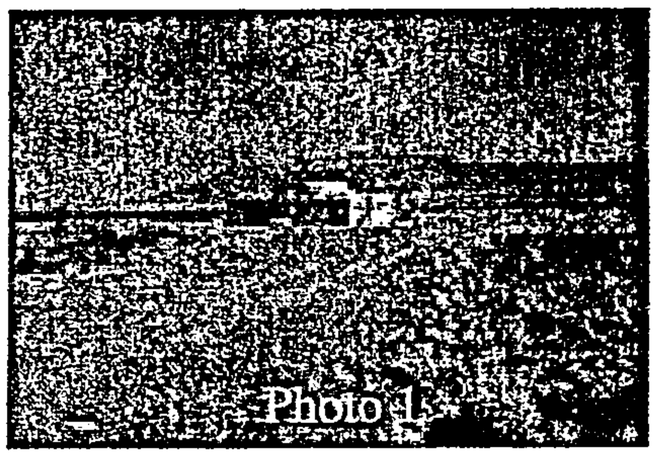
Plate 1, Offsite Basin Boundary Map
Plate 2, Overall Storm Drain Plan
Plate 3, Overall Storm Drain Plan
Plate 4, Overall Storm Drain Plan

Purpose of Study

The Volcano Cliffs property Owners Association proposed to develop a Special Assessment District (SAD 227) to provide public and private infrastructure for units 2, 5 and 24 of the Volcano Cliffs Subdivision, Albuquerque, New Mexico. The purpose of this report is to develop a drainage plan for the design and construction of the storm drain infrastructure required to convey the off-site and on-site flows generated by the improvements anticipated as a result of SAD 227.

Site Description



The proposed project site is currently undeveloped land with the exception of a house near the south fork of the south branch of the Boca Negra Arroyo (see photo 1). The site is located above the escarpment west of the Petroglyph National Park on the west side of Albuquerque. The proposed site is bounded by 81st Street on the west and the proposed Unser Boulevard along the east boundary. The area is approximately 140 acres sloping from west to east. The site has significant off-site flows discharging at 3 locations along 81st Street. These are designated as the Monte Carlo, the South Fork of the South Branch of the Boca Negra Arroyo and the North Fork of the South branch of the Boca Negra Arroyo. The site currently discharges to the park property with flows being conveyed to the Boca Negra Arroyo and the San Antonio Arroyo. A project vicinity map is shown on Figure 1 on the following page.

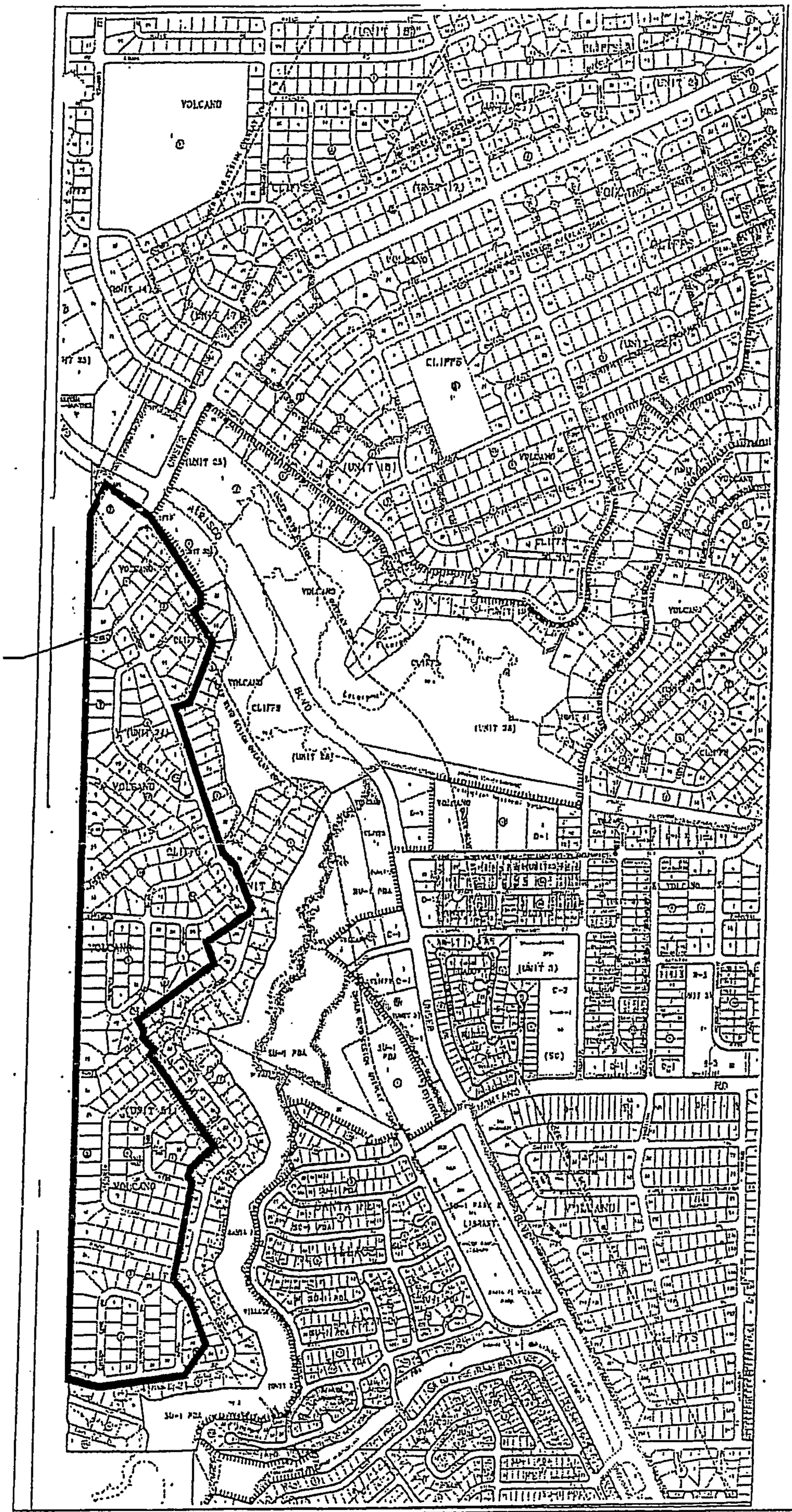
Methodology

Wilson & Company will utilize the hydrologic and hydraulic methods and guidelines as described in Section 22.2 of the City of Albuquerque Development Process Manual (DPM). The hydrology for the project has been prepared using the AHYMO 97 computer modeling software. Hydraulic calculations have been prepared using a combination of Flowmaster, Hydraflow and hand calculation methods. Inlets calculations were done by hand and included in Appendix B. The 100-year 24-hour event has been used as the design storm for this project.

Existing Conditions

The undeveloped property is comprised of a portion of 3 significant drainage basins located along the upper edge of the escarpment. The discharge of these basins is conveyed by the arroyo identified as listed below:

1. Monte Carlo (off-site basin 100)
2. South Fork of the South Branch of the Boca Negra Arroyo (off-site basin 80,81,82 and portions of 79)
3. North Fork of the South Branch of the Boca Negra Arroyo (off-site basin 83 and portions of 79)


SAD 227
VOLCANO
CLIFFS
(UNIT 18)
(UNIT 28)
(UNIT 31)
(UNIT 35)
(UNIT 51)
(UNIT 53)
(UNIT 55)
(UNIT 57)
(UNIT 61)
(UNIT 63)
(UNIT 65)
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(UNIT 79)
(UNIT 81)
(UNIT 83)
(UNIT 85)
(UNIT 87)
(UNIT 89)
(UNIT 91)
(UNIT 93)
(UNIT 95)
(UNIT 97)
(UNIT 99)
(UNIT

The Monte Carlo offsite flow drains to the San Antonio Arroyo. The South and North Forks of the South Branch of the Boca Negra Arroyo both discharge to the Boca Negra Arroyo.

The south and north forks are currently shallow earthen channels. The south fork is conveyed under 81st street through a 60 inch CMP culvert. (See Photo 2) The north fork flows across 81st with no structures. (See Photo 3)

A drainage basin map delineating the areas generating off-site flows is shown on Plate 1, "Offsite Basin Boundary Map".

The National Park Service staff has requested that the stormwater be collected and piped down the escarpment to protect the Petroglyph National Park. Included in Appendix E are existing Flood and Soils maps.

Photo 2

Photo 3

Proposed Conditions

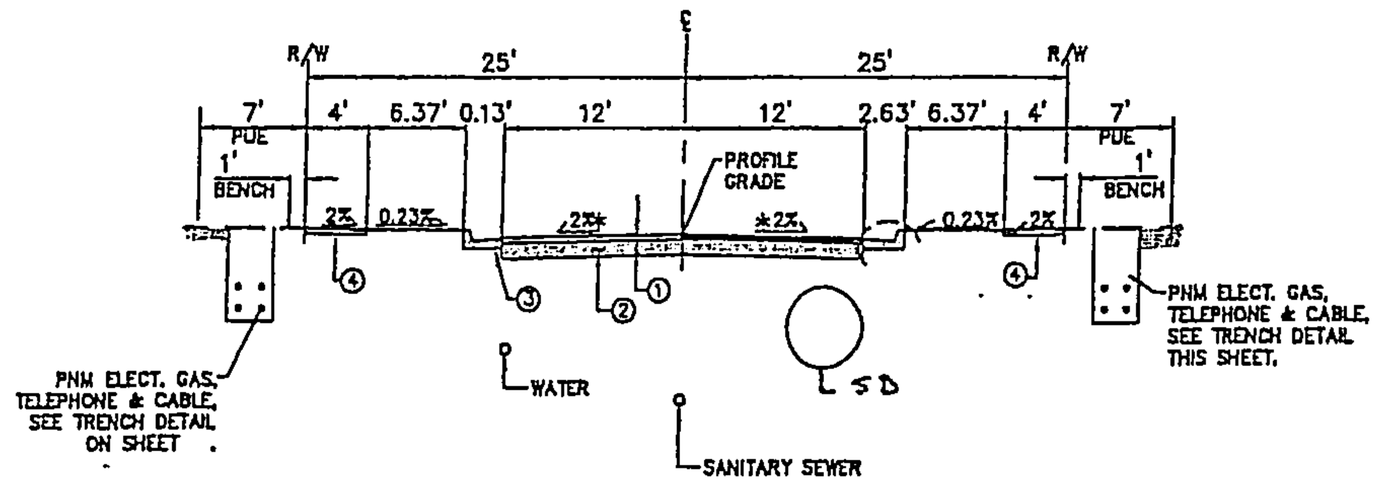
The proposed SAD 227 will construct the public and private infrastructure required to develop residential lots within the project boundaries (streets, water, sewer, drainage, electric, gas, telephone and cable). All construction will be in public right-of-way and easements. No mass grading will be completed with this project.

Off –site flows will be conveyed through the site as follows:

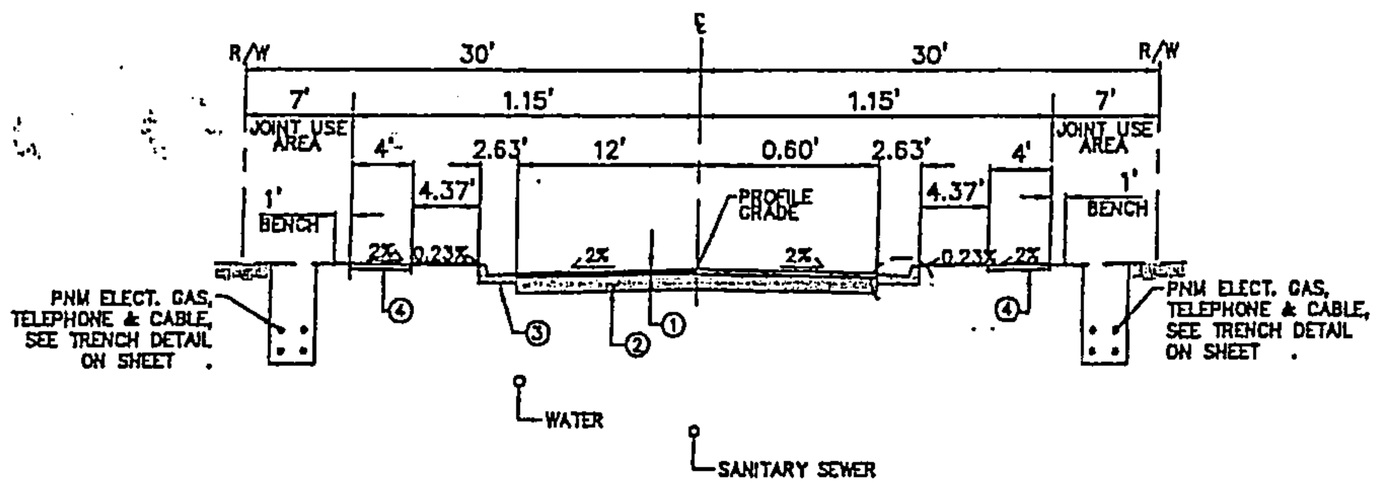
- The Monte Carlo off-site flows will be combined with the south half of the sub-division and collected in a storm drain system. The Storm drain will be discharged to the San Antonio Arroyo. The project peak discharge from basin 100 is 71 cfs. The discharge is held to 37.5 cfs by the 36" culvert at 81st street utilizing approximately 2.5 ac-ft of detention at that location.
- The South Fork of the South Branch of the Boca Negra Arroyo will be conveyed through a 72" RCP culvert under 81st street and then continue in 72" RCP under Emerald Dr. through the sub-division. Approximately 366 cfs will be conveyed through the site and discharged to the Boca Negra Arroyo. This system does not carry any developed flows. No flow from the SAD is discharged to the system.
- The North Fork of the South Branch of the Boca Negra Arroyo will be conveyed through a 60" RCP under 81st street and then a 60" RCP under Onyx Dr. and into Unser Blvd and combine with the rest of the subdivision flow to the structure at Montano.

The existing flow patterns will be maintained with the construction of this project. The off-site basins consist of open space and private properties. The private property is assumed to develop as 8 DUs per acre. Flows will not be transferred between basins. All offsite flow values will be maintained at existing conditions to minimize the impact on the Petroglyph National Park.

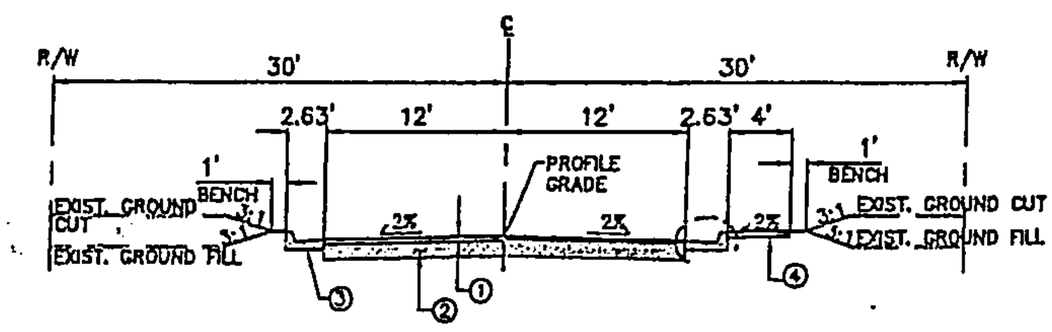
On-site flows will be handled with curb inlets and curb and gutter per SAD 227 Resolution 1 and will be captured at identified locations using City of Albuquerque's Type A and C grate inlets and a storm drain system to collect and convey the runoff to the proper down stream facility. The grate capacity calculations are included in Appendix A. Figure 2 on the following page illustrates the street typical sections proposed for this project.



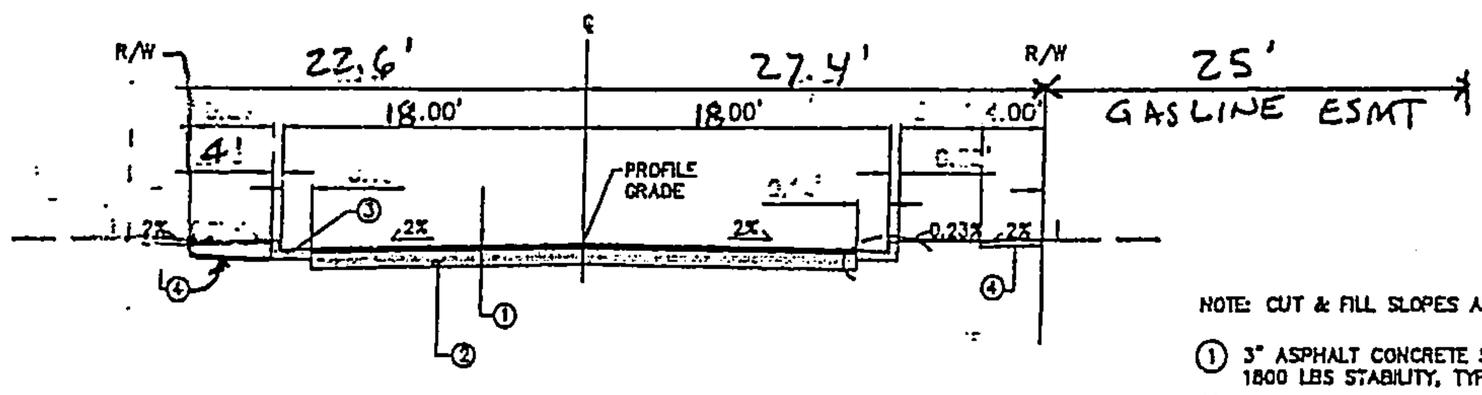
TYPICAL SECTION – 50' R/W



TYPICAL SECTION – 60' R/W



81st STREET



RIM ROCK PLACE
STA. 10+14 to STA. 17+23

NOTE: CUT & FILL SLOPES ARE 3:1 AFTER BENCH.

1. 3" ASPHALT CONCRETE SURFACE COURSE 1800 LBS STABILITY, TYPE B GRADATION
2. 12" SUBGRADE PREP. COMPACTED TO 95% ASTM-D-1957 WITHIN 2% OPTIMUM MOISTURE
3. STANDARD CURB & GUTTER PER COA STD DWG 2415
4. 4' OFFSET SIDEWALK PER COA STD DWG 2430

FIGURE 2

WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-8021

SAD 227

MISCELLANEOUS TYPICAL SECTIONS

DESIGN	X.X.X.	WCEA NO.	X1218025	DATE	JAN 2003
DRAWN	X.X.X.	PROJECT NO.		SHEET NO.	

Public\PROJECTS\X1218025\M\Drainage\B125TYPSEC.dwg 02/10/2003 08:43:11 AM MST

034

An architectural review committee for the property owners association will control and monitor the lot development. The onsite basins will be designed with 3 DU's per acre with the majority of the land left in its natural condition per resolution 1 of SAD 227.

Unser Boulevard Middle Section Drainage System

The drainage system for SAD 227 is connected the proposed Unser Boulevard system. The middle section has been included in the on-site basin analysis under the proposed conditions model. The proposed overall drainage system is included on included on Plates 2,3, and 4 included with this report. The Unser system will include inlets located at approximately 500' intervals conveying flows to the 60" conveyance within the ROW. The system conveys approximately 400 cfs to the San Antonio Arroyo system at Montano Road. The Montano structure has capacity for the 400cfs discharge.

Conclusion

The existing down stream facilities have the capacity to accept the developed flows and historical off-site flows as determined by this project. The flows will be conveyed to the San Antonio Arroyo and the Boca Negra Arroyo through storm drains with the capacity to convey the offsite flows through the project.

The hydrologic analysis and hydraulic analysis can be found in the Appendices in the end of this report.

Reference Data:

1. Boca Negra – Mariposa Arroyo Hydrologic & Hydraulic Analysis
   Prepared for AMAFCA by Resource Technology, Inc., 2002
   (Establishes offsite flows)

2. Unser Storm Drain System to San Antonio Arroyo
   (Establishes the Allowable flows for the SAD to the Unser System)

3. Unser Boulevard Corridor Study & Record of Decision
   (Permits free discharge of Boca Negra Arroyo South Branch)

4. Resolution 1, SAD 227
   (Sets guidelines for proposed SAD)

Appendix A

Hydrology and AHYMO Analysis

Hydrology:

The existing hydrology for this area is included in the AMAFCA "Boca Negra – Mariposa Arroyo Hydrologic & Hydraulic Analysis Summary Report" prepared by Resource Technology, Inc. (Reference 1). The existing conditions run off for the study area are tabulated below.

Basin and Analysis Point	Existing Q100 cfs	Developed Q100 cfs
Boca Negra Arroyo:		
S. Leg Boca Negra at 81st Street (offsite)	366	366
N. Leg Boca Negra at 81st Street (offsite)	229	229
Combined Boca Negra at Escarpment (offsite & onsite)	576	366
San Antonio Arroyo:		
Monte Carlo (100) at 81st Street (offsite)	71	71
Discharge at Montano	135	399

The table below shows the land treatment and runoff within the SAD. See Plates 2, 3, and 4 for locations of the basins.

Basin	Area (ac)	A	B	C	D	Q (cfs)
1	11.1	12%	15%	39%	34%	25
2	3.4	12%	15%	39%	34%	9
3	4.6	12%	15%	39%	34%	12
4	8.6	12%	15%	39%	34%	8
5	5.4	12%	15%	39%	34%	14
6	2.8	12%	15%	39%	34%	7
7	6.8	12%	15%	39%	34%	18
8	4.7	12%	15%	39%	34%	12
9	2.1	12%	15%	39%	34%	4
10	2.5	12%	15%	39%	34%	5
11	9.2	12%	15%	39%	34%	24
A1	3.1	12%	15%	39%	34%	8
A2	8.2	12%	15%	39%	34%	22
A3	9.7	12%	15%	39%	34%	25
A4a	10	12%	15%	39%	34%	20
A4b	5.7	12%	15%	39%	34%	13
A4c	3.1	12%	15%	39%	34%	8
A5	8.2	95%	5%	0%	0%	14
A6	63	0%	100%	0%	0%	51
A7	5.9	12%	15%	39%	34%	15
A8	4.7	12%	15%	39%	34%	10

COMP. SJ Metro

CK.

DATE 5-15-03

WILSON & COMPANY

LOC. AGO

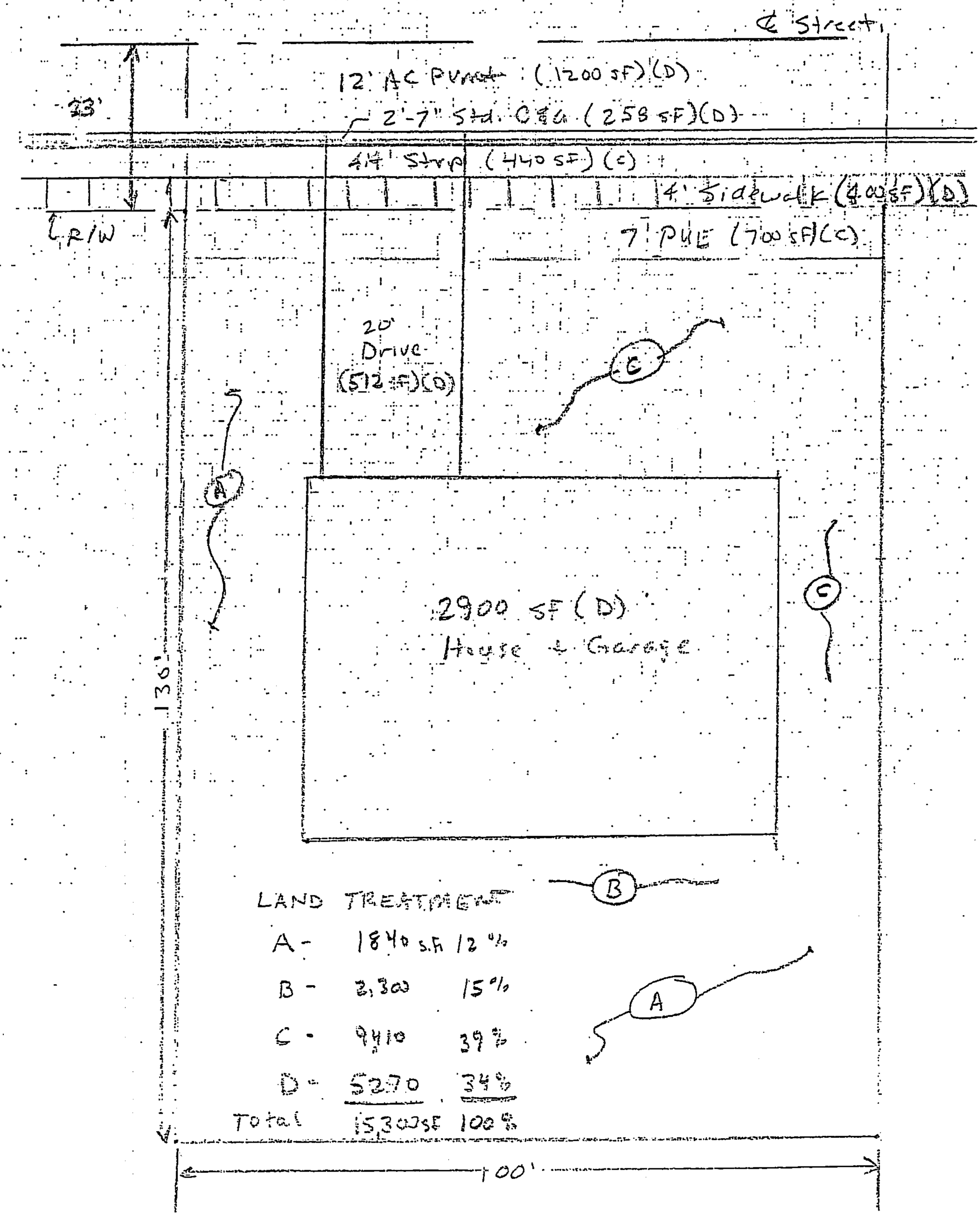
PROJ. SAO 227

SUBJ. Typical Lot Layout

FILE X1218025

SHEET 1

OF 1



LAND TREATMENT

A -	1840 s.f.	12 %
B -	2,300	15 %
C -	9,410	39 %
D -	5270	34 %
Total	15,300 SF	100 %

```
*S              SAD 227 Volcano Cliffs DRAINAGE BASIN
*S              Wilson & Company PROJECT #X1218025

START                 TIME=0.0 PUNCH CODE=0  PRINT LINE=-6
LOCATION              BERNALILLO COUNTY
*S100YR RAINFALL
RAINFALL              TYPE=1  RAIN QUARTER=0   RAIN ONE=1.64
                      RAIN SIX=2.11  RAIN DAY=0  DT=0.05


*S COMPUTE BASIN 1  - BASIN AT KIMBERLITE

COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.005  K=0.7
                      LENGTH=250 FT   SLOPE=0.01  K=2.0

COMPUTE NM HYD        ID=1   HYD NO=1  DA=.017 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=1 CODE=0

* ROUTE 1 THROUGH 30" PIPE TO MH 3
*
*COMPUTE RATING CURVE   CID=1   VS NO=1 CODE=-1 SLP=0.003
*                       DIA=2.5 FT      N=0.013
*
*ROUTE MCUNGE          ID=1     HYD NO=1.1  INFLOW ID=1
*                      DT=0.0   L=156 FT   NS=0   SLOPE=0.003
*                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
*PRINT HYD             ID=1   CODE=1
*
*
*S COMPUTE BASIN 2  - BASIN AT POPO

COMPUTE LT TP         LCODE=1  NK=1  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.01  K=0.7

COMPUTE NM HYD        ID=2  HYD NO=2  DA=.0053 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=2 CODE=0

ADD HYD               ID=12  HYD NO=MH3  ID I=1 ID II=2

PRINT HYD             ID=12  CODE=1

*S ROUTE 2 THROUGH 36" PIPE TO MH 3

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.0032
                        DIA=3.0 FT      N=0.013

ROUTE MCUNGE          ID=2     HYD NO=2.1  INFLOW ID=12
                      DT=0.0   L=642 FT   NS=0   SLOPE=0.0032
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD             ID=2   CODE=1

*ADD HYD              ID=12  HYD NO=MH3  ID I=1 ID II=2
*
*PRINT HYD            ID=12  CODE=1

*S ROUTE 1 AND 2 THROUGH 48" PIPE TO MH 4

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.002
                        DIA=4 FT        N=0.013

ROUTE MCUNGE          ID=12     HYD NO=12.1  INFLOW ID=12
                      DT=0.0   L=200 FT   NS=0   SLOPE=0.002
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD             ID=12   CODE=1

*S COMPUTE BASIN 3  - BASIN AT MAUNA LOA

COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.01  K=0.7
                      LENGTH=250 FT   SLOPE=0.01  K=2.0

COMPUTE NM HYD        ID=3  HYD NO=3  DA=.0072 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=3 CODE=0
```

```
ADD HYD              ID=13  HYD NO=MH4 ID I=12 ID II=3

PRINT HYD            ID=13  CODE=1

*S ROUTE UPSTREAM AND 3 THROUGH 48" PIPE TO MH 5

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.002
                        DIA=4 FT        N=0.013

ROUTE MCUNGE         ID=13     HYD NO=13.1  INFLOW ID=13
                     DT=0.0   L=300 FT   NS=0   SLOPE=0.002
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=13  CODE=1

*S COMPUTE BASIN 4  - BASIN SOUTH HALF OF VICTORIA

COMPUTE LT TP        LCODE=1  NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.003  K=0.7
                     LENGTH=300 FT   SLOPE=0.002  K=2.0

COMPUTE NM HYD       ID=4  HYD NO=4  DA=.0072 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=4 CODE=0

ADD HYD              ID=14  HYD NO=MH5 ID I=13 ID II=4

PRINT HYD            ID=14  CODE=1

*S ROUTE UPSTREAM AND 4 THROUGH 48" PIPE TO MH 6

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.002
                        DIA=4 FT        N=0.013

ROUTE MCUNGE         ID=14     HYD NO=14.1  INFLOW ID=14
                     DT=0.0   L=653 FT   NS=0   SLOPE=0.002
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=14  CODE=1

*S COMPUTE BASIN 5  - BASIN SOUTH HALF OF KIBO

COMPUTE LT TP        LCODE=1  NK=1  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.01  K=0.7

COMPUTE NM HYD       ID=5  HYD NO=5  DA=.0084 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=5 CODE=0

ADD HYD              ID=15  HYD NO=MH6 ID I=14 ID II=5

PRINT HYD            ID=15  CODE=1

*S ROUTE UPSTREAM AND 5 THROUGH 48" PIPE

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.002
                        DIA=4 FT        N=0.013

ROUTE MCUNGE         ID=15     HYD NO=15.1  INFLOW ID=15
                     DT=0.0   L=284 FT   NS=0   SLOPE=0.002
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=15  CODE=1

*S COMPUTE BASIN 6  - BASIN NORTH HALF OF KIBO

COMPUTE LT TP        LCODE=1  NK=1  ISLOPE=-1
                     LENGTH=320 FT   SLOPE=0.025  K=0.7

COMPUTE NM HYD       ID=6  HYD NO=6  DA=.0044 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=6 CODE=0

ADD HYD              ID=16  HYD NO=MH7 ID I=15 ID II=6

PRINT HYD            ID=16  CODE=1

*S ROUTE UPSTREAM AND 6 THROUGH 48" PIPE

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.002
                        DIA=4 FT        N=0.013
```

```
ROUTE MCUNGE          ID=16     HYD NO=16.1  INFLOW ID=16
                      DT=0.0   L=288 FT   NS=0   SLOPE=0.002
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD             ID=16  CODE=1


*S COMPUTE BASIN 7  - BASIN NORTH HALF OF VICTORIA

COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.0125  K=0.7
                      LENGTH=160 FT   SLOPE=0.0188  K=2.0

COMPUTE NM HYD        ID=7  HYD NO=7  DA=.0106 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=7 CODE=0

ADD HYD               ID=17  HYD NO=MH7 ID I=16 ID II=7

PRINT HYD             ID=17  CODE=1

*S ROUTE UPSTREAM AND 7 THROUGH 54" PIPE

COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.002
                         DIA=4.5 FT      N=0.013

ROUTE MCUNGE          ID=17     HYD NO=17.1  INFLOW ID=17
                      DT=0.0   L=340 FT   NS=0   SLOPE=0.002
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD             ID=17  CODE=1


*S COMPUTE BASIN 8  - BASIN AT MONTE CARLO

COMPUTE LT TP         LCODE=1  NK=1  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.0175  K=0.7

COMPUTE NM HYD        ID=8  HYD NO=8  DA=.0073 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=8 CODE=0

ADD HYD               ID=18  HYD NO=MH7 ID I=17 ID II=8

PRINT HYD             ID=18  CODE=1


*S COMPUTE BASIN 100  - BASIN WEST OF 81ST

COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                      LENGTH=400 FT    SLOPE=0.04   K=0.7
                      LENGTH=1600 FT   SLOPE=0.049  K=2.0
                      LENGTH=11000 FT  SLOPE=0.033  K=3.0
                      Kn=.033  CN=.65
COMPUTE NM HYD        ID=98   HYD NO=100  DA=.33 SQ MI
                      A=100  B=0  C=0  D=0
                      TP=0.0 MASSRAIN=-1
PRINT HYD             ID=98 CODE=0


ROUTE RESERVOIR   ID=99  HYD= hole INFLOW ID= 98 code = 1

                         OUTFLOW(CFS)  STORAGE (AC FT) Elevation
                               0.00          0                     5321.5
                               1.14          0.224                 5322
                               9.44          0.920                 5323
                              23.63          1.740                 5324
                              40.83          2.680                 5325
                              56.09          3.870                 5326

PRINT HYD             ID=3  CODE=0


*S COMPUTE BASIN 101  - BASIN WEST OF 81ST

COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                      LENGTH=400 FT    SLOPE=0.025  K=0.7
                      LENGTH=1600 FT   SLOPE=0.033  K=2.0
                      LENGTH=3300 FT   SLOPE=0.025  K=3.0
                      Kn=.033  CN=.65
COMPUTE NM HYD        ID=98   HYD NO=101  DA=.38 SQ MI
                      A=100  B=0  C=0  D=0
                      TP=0.0 MASSRAIN=-1
```

```
PRINT HYD            ID=98 CODE=0


*S COMPUTE BASIN 102  - BASIN WEST OF 81ST

COMPUTE LT TP        LCODE=1  NK=3  ISLOPE=-1
                     LENGTH=400 FT    SLOPE=0.03   K=0.7
                     LENGTH=1600 FT   SLOPE=0.019  K=2.0
                     LENGTH=600 FT    SLOPE=0.017  K=3.0

COMPUTE NM HYD       ID=98   HYD NO=102  DA=.064 SQ MI
                     A=100  B=0  C=0  D=0
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=98 CODE=0


*S ROUTE OFFSITE basin 100 THROUGH 36" PIPE

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.0168
                        DIA=3 FT        N=0.013

ROUTE MCUNGE         ID=97     HYD NO=97.1  INFLOW ID=98
                     DT=0.0   L=525 FT   NS=0   SLOPE=0.0168
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=97  CODE=1

ADD HYD              ID=18  HYD NO=MH7 ID I=18 ID II=97

PRINT HYD            ID=18  CODE=1

*S ROUTE UPSTREAM, OFFSITE, AND 8 THROUGH 60" PIPE

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.003
                        DIA=5 FT        N=0.013

ROUTE MCUNGE         ID=18     HYD NO=18.1  INFLOW ID=18
                     DT=0.0   L=425 FT   NS=0   SLOPE=0.003
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=18  CODE=1


*S COMPUTE BASIN A1  - BASIN AT KEYENTA PL

COMPUTE LT TP        LCODE=1  NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0150  K=0.7


COMPUTE NM HYD       ID=31  HYD NO=A2  DA=.005 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=31 CODE=0


*S COMPUTE BASIN 9  - BASIN AT CASA BLANCA


COMPUTE LT TP        LCODE=1  NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.005  K=0.7
                     LENGTH=290 FT   SLOPE=0.0034  K=2.0

COMPUTE NM HYD       ID=9  HYD NO=9  DA=.003 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=9 CODE=0

*S ADD A1 AND 9 BEFORE ROUTING IN 60" PIPE

ADD HYD              ID=9  HYD NO=A19 ID I=31  ID II=9
PRINT HYD            ID=9   CODE=1

ADD HYD              ID=19  HYD NO=MH7 ID I=18 ID II=9

PRINT HYD            ID=19  CODE=1

*S ROUTE UPSTREAM AND 9 THROUGH 60" PIPE

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.003
                        DIA=5 FT        N=0.013
```

```
ROUTE MCUNGE          ID=18     HYD NO=19.1  INFLOW ID=19
                      DT=0.0   L=412 FT   NS=0   SLOPE=0.003
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD             ID=19  CODE=1

*S COMPUTE BASIN 10  - BASIN AT MARIGOLD CT

COMPUTE LT TP         LCODE=1  NK=1  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.015  K=0.7

COMPUTE NM HYD        ID=10  HYD NO=10  DA=.003 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=10 CODE=0

ADD HYD               ID=20  HYD NO=MH7 ID I=19 ID II=10

PRINT HYD             ID=20  CODE=1

*S ROUTE UPSTREAM AND 10 THROUGH 60" PIPE

COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.003
                         DIA=5.0 FT      N=0.013

ROUTE MCUNGE          ID=20     HYD NO=20.1  INFLOW ID=20
                      DT=0.0   L=480 FT   NS=0   SLOPE=0.003
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD             ID=20  CODE=1


*S COMPUTE BASIN A3  - BASIN AT CASA BLANCA DR

COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.0175  K=0.7
                      LENGTH=700 FT   SLOPE=0.0200  K=2.0

COMPUTE NM HYD        ID=33  HYD NO=A3  DA=.015 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=33 CODE=0


*S COMPUTE BASIN 11  - BASIN AT MARIGOLD DRIVE

COMPUTE LT TP         LCODE=1  NK=1  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.015  K=1.0
                      LENGTH=1000 FT   SLOPE=0.015  K=2.0

COMPUTE NM HYD        ID=11  HYD NO=11  DA=.014 SQ MI
                      A=12  B=15  C=39  D=34
                      TP=0.0 MASSRAIN=-1

PRINT HYD             ID=11 CODE=0

*S  ADD A3 TO BASIN 11
ADD HYD               ID=11  HYD NO=MH7 ID I=33 ID II=11
PRINT HYD             ID=11  CODE=1


ADD HYD               ID=21  HYD NO=MH7 ID I=20 ID II=11

PRINT HYD             ID=21  CODE=1

*********************************End SAD 227 Basins*****************************************************

**** SUB-BASIN 83 ****
*
COMPUTE LT TP         LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                      NK=3  ISLOPE=-1
                      LENGTH=400 FT   SLOPE=0.036 K=0.7
                      LENGTH=1600 FT  SLOPE=0.036 K=2.0
                      LENGTH=13574 FT   SLOPE=0.036 K=3.0
                      Kn=.033  CN=.75
COMPUTE NM HYD        ID=83  HYD NO=83   DA= 1.08 SQ MI
                      PER A=89 PER B=0  PER C=10  PER D=1
                      TP=0.0   MASSRAIN=-1
PRINT HYD             ID=83   CODE=1


*S ROUTE BASIN 83 THROUGH 60" PIPE
```

```
COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.01
                        DIA=5.0 FT      N=0.013

ROUTE MCUNGE        ID=83     HYD NO=83.1  INFLOW ID=83
                    DT=0.0   L=1393 FT   NS=0   SLOPE=0.01
                    MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD           ID=83  CODE=1


*S COMPUTE BASIN A2  - BASIN AT FUJI CT

COMPUTE LT TP       LCODE=1  NK=2  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.0275  K=0.7
                    LENGTH=600 FT   SLOPE=0.0117  K=2.0

COMPUTE NM HYD      ID=22  HYD NO=22  DA=.0128 SQ MI
                    A=12  B=15  C=39  D=34
                    TP=0.0 MASSRAIN=-1

PRINT HYD           ID=22 CODE=0

ADD HYD             ID=22  HYD NO=83A2 ID I=22 ID II=83

PRINT HYD           ID=22  CODE=1


*S COMPUTE BASIN A7  - BASIN BETWEEN JADE AND RIM ROCK PL

COMPUTE LT TP       LCODE=1  NK=2  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.02    K=0.7
                    LENGTH=600 FT   SLOPE=0.01    K=2.0

COMPUTE NM HYD      ID=38  HYD NO=A7  DA=.009 SQ MI
                    A=12  B=15  C=39  D=34
                    TP=0.0 MASSRAIN=-1

PRINT HYD           ID=38 CODE=0

ADD HYD             ID=38  HYD NO=83A2 ID I=38 ID II=22

PRINT HYD           ID=38  CODE=1

*S COMPUTE BASIN A8  - BASIN BETWEEN 81ST AND UNSER NORTH OF RIM ROCK PLACE

COMPUTE LT TP       LCODE=1  NK=2  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.0075  K=0.7
                    LENGTH=600 FT   SLOPE=0.01    K=2.0

COMPUTE NM HYD      ID=39  HYD NO=A8  DA=.007 SQ MI
                    A=12  B=15  C=39  D=34
                    TP=0.0 MASSRAIN=-1

PRINT HYD           ID=39 CODE=0

ADD HYD             ID=22  HYD NO=83A2 ID I=39 ID II=38

PRINT HYD           ID=22  CODE=1


*S COMPUTE BASIN A5  - BASIN AT ONYX DRIVE

COMPUTE LT TP       LCODE=1  NK=2  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.01    K=2.0

COMPUTE NM HYD      ID=35  HYD NO=35  DA=.0009 SQ MI
                    A=0  B=0  C=0  D=100
                    TP=0.0 MASSRAIN=-1

PRINT HYD           ID=35 CODE=0


*S COMPUTE BASIN A6  - BASIN AT ONYX COURT

COMPUTE LT TP       LCODE=1  NK=2  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.01    K=2.0


COMPUTE NM HYD      ID=36  HYD NO=36  DA=.0005 SQ MI
                    A=0  B=0  C=0  D=100
                    TP=0.0 MASSRAIN=-1

PRINT HYD           ID=36 CODE=0

ADD HYD             ID=36  HYD NO=36.1 ID I=35 ID II=36
```

```
PRINT HYD            ID=36  CODE=1

ADD HYD              ID=22  HYD NO=22.5 ID I=22 ID II=36

PRINT HYD            ID=22  CODE=1

*S COMPUTE BASIN A4a  - BASIN AT RIM ROCK(WEST BASIN)

COMPUTE LT TP        LCODE=1  NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0076  K=1.0
                     LENGTH=600 FT  SLOPE=0.0076  K=2.0

COMPUTE NM HYD       ID=34  HYD NO=A4A  DA=.0156 SQ MI
                     A=7  B=10  C=29  D=54
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=34 CODE=0

*s      UNSER BASIN

********* U1 ********************
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0061 K=2.0
                     LENGTH=900 FT  SLOPE=0.0061 K=3.0
                     Kn=.021  CN=.5

COMPUTE NM HYD       ID=60  HYD NO=U1   DA= 0.003 SQ MI
                     PER A=0 PER B=0  PER C=0  PER D=100
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=60   CODE=1


*S      ADD WEST RIMROCK BASINS AND UNSER BASIN

ADD HYD              ID=37  HYD NO=AC   ID I=34 ID II=60
PRINT HYD            ID=37  CODE=0


*S COMPUTE BASIN A4B  - BASIN AT RIM ROCK(EAST BASIN)

COMPUTE LT TP        LCODE=1  NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.005  K=1.0
                     LENGTH=500 FT  SLOPE=0.005  K=2.0

COMPUTE NM HYD       ID=35  HYD NO=A4B  DA=.0089 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=35 CODE=0


*S      ADD WEST AND EAST RIMROCK BASINS

ADD HYD              ID=37  HYD NO=AC   ID I=37 ID II=35
PRINT HYD            ID=37  CODE=0


*S ROUTE EAST WEST AND U1 BASINS THROUGH 36" PIPE

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.005
                        DIA=3.0 FT      N=0.013

ROUTE MCUNGE         ID=37     HYD NO=U1RR  INFLOW ID=37
                     DT=0.0   L=821 FT   NS=0   SLOPE=0.005
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=37  CODE=0


*S COMPUTE BASIN A4c  - BASIN AT RIM ROCK(SOUTH BASIN)

COMPUTE LT TP        LCODE=1  NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0071  K=1.0
                     LENGTH=600 FT  SLOPE=0.0094  K=2.0

COMPUTE NM HYD       ID=36  HYD NO=A4C  DA=.005 SQ MI
                     A=12  B=15  C=39  D=34
                     TP=0.0 MASSRAIN=-1

PRINT HYD            ID=36 CODE=0

*s ADD RIM ROCK BASINS

ADD HYD              ID=37  HYD NO=AC   ID I=37 ID II=36
PRINT HYD            ID=37  CODE=0
```

```
********* U2 ********************
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0061 K=2.0
                     LENGTH=575 FT  SLOPE=0.0061 K=3.0
                     Kn=.021  CN=.5

COMPUTE NM HYD       ID=61  HYD NO=U2   DA= 0.0025 SQ MI
                     PER A=0 PER B=0  PER C=0  PER D=100
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=61   CODE=1

********* U3 ********************
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0061 K=2.0
                     LENGTH=220 FT  SLOPE=0.0061 K=3.0
                     Kn=.021  CN=.5

COMPUTE NM HYD       ID=62  HYD NO=U3   DA= 0.0014 SQ MI
                     PER A=0 PER B=0  PER C=0  PER D=100
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=62   CODE=1

*s ADD UNSER BASINS

ADD HYD              ID=61  HYD NO=AC   ID I=61 ID II=62
PRINT HYD            ID=61  CODE=0


*s ADD UNSER BASINS TO RIM ROCK BASINS

ADD HYD              ID=37  HYD NO=AC   ID I=61 ID II=37
PRINT HYD            ID=37  CODE=0

ADD HYD              ID=37  HYD NO=37.5 ID I=22 ID II=37
PRINT HYD            ID=37  CODE=1

*****Route in Unser Storm Drain****
COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.02
                         DIA=5.0 FT      N=0.013

ROUTE MCUNGE         ID=37     HYD NO=37.1  INFLOW ID=37
                     DT=0.0   L=300 FT   NS=0   SLOPE=0.02
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=37  CODE=1

ADD HYD              ID=23  HYD NO=83A2 ID I=37 ID II=21

PRINT HYD            ID=23  CODE=1

***Route Through Remainder of Basin U4******

COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.0536
                         DIA=5.0 FT      N=0.013

ROUTE MCUNGE         ID=23     HYD NO=23.1  INFLOW ID=23
                     DT=0.0   L=280 FT   NS=0   SLOPE=0.0536
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD            ID=23  CODE=1

********* U4 ********************
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0061 K=2.0
                     LENGTH=470 FT  SLOPE=0.0592 K=3.0
                     Kn=.021  CN=.5

COMPUTE NM HYD       ID=63  HYD NO=U4   DA= 0.0013 SQ MI
                     PER A=0 PER B=0  PER C=0  PER D=100
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=63   CODE=1


********* U5 ********************
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0592 K=2.0
                     LENGTH=200 FT  SLOPE=0.0592 K=3.0
                     Kn=.021  CN=.5

COMPUTE NM HYD       ID=64  HYD NO=U5   DA= 0.0012 SQ MI
```

```
                    PER A=0 PER B=0  PER C=0  PER D=100
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=64   CODE=1

ADD HYD             ID=24  HYD NO=U45 ID I=63 ID II=64

PRINT HYD           ID=24  CODE=1

ADD HYD             ID=25  HYD NO=U45 ID I=23 ID II=24

PRINT HYD           ID=25  CODE=1

***Route Through Basin U6 and U7******

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.06
                        DIA=5.0 FT      N=0.013

ROUTE MCUNGE        ID=23     HYD NO=23.1  INFLOW ID=25
                    DT=0.0   L=560 FT   NS=0   SLOPE=0.06
                    MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD           ID=23  CODE=1

********* U6 ********************
COMPUTE LT TP       LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.0592 K=2.0
                    LENGTH=150 FT  SLOPE=0.0592 K=3.0
                    Kn=.021  CN=.5

COMPUTE NM HYD      ID=65  HYD NO=U6   DA= 0.0008 SQ MI
                    PER A=0 PER B=0  PER C=0  PER D=100
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=65   CODE=1

********* U7 ********************
COMPUTE LT TP       LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.0592 K=2.0
                    LENGTH=150 FT  SLOPE=0.0592 K=3.0
                    Kn=.021  CN=.5

COMPUTE NM HYD      ID=66  HYD NO=U7   DA= 0.0008 SQ MI
                    PER A=0 PER B=0  PER C=0  PER D=100
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=66   CODE=1

ADD HYD             ID=24  HYD NO=U45 ID I=65 ID II=66

PRINT HYD           ID=24  CODE=1

ADD HYD             ID=25  HYD NO=U45 ID I=23 ID II=24

PRINT HYD           ID=25  CODE=1

***Route Through Basin U8 and U9******

COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.06
                        DIA=5.0 FT      N=0.013

ROUTE MCUNGE        ID=23     HYD NO=U3  INFLOW ID=25
                    DT=0.0   L=400 FT   NS=0   SLOPE=0.06
                    MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD           ID=23  CODE=1

********* U8 ********************
COMPUTE LT TP       LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.0592 K=3.0
                    Kn=.021  CN=.5

COMPUTE NM HYD      ID=67  HYD NO=U8   DA= 0.0007 SQ MI
                    PER A=0 PER B=0  PER C=0  PER D=100
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=67   CODE=1

********* U9 ********************
COMPUTE LT TP       LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.0592 K=3.0
                    Kn=.021  CN=.5

COMPUTE NM HYD      ID=68  HYD NO=U9   DA= 0.0007 SQ MI
                    PER A=0 PER B=0  PER C=0  PER D=100
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                        TP=0.0   MASSRAIN=-1
PRINT HYD               ID=68   CODE=1

ADD HYD                 ID=24  HYD NO=U45 ID I=67 ID II=68

PRINT HYD               ID=24  CODE=1

ADD HYD                 ID=25  HYD NO=U45 ID I=23 ID II=24

PRINT HYD               ID=25  CODE=1

***Route Through Basin U10 and U11******

COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.06
                         DIA=5.0 FT      N=0.013

ROUTE MCUNGE            ID=23     HYD NO=U3  INFLOW ID=25
                        DT=0.0   L=380 FT   NS=0   SLOPE=0.06
                        MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD               ID=23  CODE=1

********* U10 ********************
COMPUTE LT TP           LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                        NK=3  ISLOPE=-1
                        LENGTH=350 FT   SLOPE=0.0592 K=3.0
                        Kn=.021  CN=.5

COMPUTE NM HYD          ID=69  HYD NO=U10   DA= 0.00072 SQ MI
                        PER A=0 PER B=0  PER C=0  PER D=100
                        TP=0.0   MASSRAIN=-1
PRINT HYD               ID=69   CODE=1


********* U11 ********************
COMPUTE LT TP           LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                        NK=3  ISLOPE=-1
                        LENGTH=400 FT   SLOPE=0.0592 K=3.0
                        Kn=.021  CN=.5

COMPUTE NM HYD          ID=70  HYD NO=U11   DA= 0.00073 SQ MI
                        PER A=0 PER B=0  PER C=0  PER D=100
                        TP=0.0   MASSRAIN=-1
PRINT HYD               ID=70   CODE=1

**** SUB-BASIN NORTH OF PROPOSED UNSER (A5)****
*
COMPUTE LT TP           LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                        NK=2  ISLOPE=-1
                        LENGTH=400 FT   SLOPE=0.2 K=0.7
                        LENGTH=1200 FT  SLOPE=0.4 K=2.0

                        Kn=.033  CN=.5
COMPUTE NM HYD          ID=51  HYD NO=51   DA= 0.0128 SQ MI
                        PER A=0 PER B=100  PER C=0  PER D=0
                        TP=1.0   MASSRAIN=-1
PRINT HYD               ID=51   CODE=1


ADD HYD                 ID=24  HYD NO=U45 ID I=69 ID II=70

PRINT HYD               ID=24  CODE=1

ADD HYD                 ID=26  HYD NO=U45 ID I=24 ID II=51

PRINT HYD               ID=26  CODE=1

ADD HYD                 ID=25  HYD NO=U45 ID I=26 ID II=23

PRINT HYD               ID=25  CODE=1

***Route Through Basin U12 and U13******

COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.054
                         DIA=5.0 FT      N=0.013

ROUTE MCUNGE            ID=23     HYD NO=U3  INFLOW ID=25
                        DT=0.0   L=1300 FT   NS=0   SLOPE=0.054
                        MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0

PRINT HYD               ID=23  CODE=1

********* U12 ********************
COMPUTE LT TP           LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                        NK=3  ISLOPE=-1
                        LENGTH=400 FT   SLOPE=0.0592 K=2.0
                        LENGTH=700 FT  SLOPE=0.0218 K=3.0
                        Kn=.021  CN=.5
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```
COMPUTE NM HYD       ID=71  HYD NO=U12  DA= 0.0025 SQ MI
                     PER A=0 PER B=0  PER C=0  PER D=100
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=71   CODE=1

********* U13 ********************
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.0592 K=2.0
                     LENGTH=950 FT  SLOPE=0.0218 K=3.0
                     Kn=.021  CN=.5

COMPUTE NM HYD       ID=72  HYD NO=U13  DA= 0.0058 SQ MI
                     PER A=0 PER B=0  PER C=0  PER D=100
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=72   CODE=1

**** SUB-BASIN SOUTH OF PROPOSED UNSER (A6)****
*
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.025 K=0.7
                     LENGTH=1600 FT  SLOPE=0.091 K=1.0
                     LENGTH=860 FT   SLOPE=0.016 K=2.0
                     Kn=.033  CN=.5

COMPUTE NM HYD       ID=52  HYD NO=52   DA= 0.090 SQ MI
                     PER A=95 PER B=5  PER C=0  PER D=0
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=52   CODE=1

ADD HYD              ID=24  HYD NO=U45 ID I=71 ID II=72

PRINT HYD            ID=24  CODE=1

ADD HYD              ID=26  HYD NO=U45 ID I=24 ID II=52

PRINT HYD            ID=26  CODE=1

ADD HYD              ID=25  HYD NO=U45 ID I=26 ID II=23

PRINT HYD            ID=25  CODE=1

FINISH
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▯(s16.67h8.5v0T▯&l8D
   AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                    - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =06/12/2003
   INPUT FILE = sad227.dat                                                             USER NO.= AHYMO-C-9803c01UNMLIB-AH

                                 FROM  TO                  PEAK        RUNOFF                TIME TO    CFS      PAGE =   1
                     HYDROGRAPH   ID   ID        AREA    DISCHARGE     VOLUME      RUNOFF     PEAK     PER
   COMMAND         IDENTIFICATION  NO.  NO.     (SQ MI)    (CFS)      (AC-FT)    (INCHES)  (HOURS)   ACRE      NOTATION

   *S              SAD 227 Volcano Cliffs DRAINAGE BASIN
   *S              Wilson & Company PROJECT #X1218025
   START                                                                                                  TIME=       .00
   LOCATION                        BERNALILLO COUNTY
   *S100YR RAINFALL
   RAINFALL  TYPE= 1                                                                                      RAIN6=    2.110
   *S COMPUTE BASIN 1  - BASIN AT KIMBERLITE
   COMPUTE NM HYD          1.00   -     1        .01700       24.55       .968     1.06766    1.550    2.256 PER IMP=  34.00
   *S COMPUTE BASIN 2  - BASIN AT POPO
   COMPUTE NM HYD          2.00   -     2        .00530        8.91       .302     1.06766    1.500    2.626 PER IMP=  34.00
   ADD HYD                  MH3  1& 2  12        .02230       32.51      1.270     1.06764    1.550    2.278
   *S ROUTE 2 THROUGH 36" PIPE TO MH 3
   ROUTE MCUNGE            2.10   12    2        .02230       32.33      1.266     1.06479    1.550    2.265 CCODE =     .2
   *S ROUTE 1 AND 2 THROUGH 48" PIPE TO MH 4
   ROUTE MCUNGE           12.10   13   12        .02230       32.41      1.268     1.06652    1.550    2.271 CCODE =     .1
   *S COMPUTE BASIN 3  - BASIN AT MAUNA LOA
   COMPUTE NM HYD          3.00   -     3        .00720       12.09       .410     1.06766    1.500    2.624 PER IMP=  34.00
   ADD HYD                  MH4 12& 3  13        .02950       43.22      1.678     1.06676    1.550    2.289
   *S ROUTE UPSTREAM AND 3 THROUGH 48" PIPE TO MH 5
   ROUTE MCUNGE           13.10   14   13        .02950       43.22      1.675     1.06491    1.550    2.289 CCODE =     .2
   *S COMPUTE BASIN 4  - BASIN SOUTH HALF OF VICTORIA
   COMPUTE NM HYD          4.00   -     4        .00720        8.08       .410     1.06766    1.650    1.753 PER IMP=  34.00
   ADD HYD                  MH5 13& 4  14        .03670       50.41      2.085     1.06542    1.550    2.146
   *S ROUTE UPSTREAM AND 4 THROUGH 48" PIPE TO MH 6
   ROUTE MCUNGE           14.10   15   14        .03670       48.35      2.076     1.06080    1.600    2.059 CCODE =     .2
   *S COMPUTE BASIN 5  - BASIN SOUTH HALF OF KIBO
   COMPUTE NM HYD          5.00   -     5        .00840       14.11       .478     1.06766    1.500    2.624 PER IMP=  34.00
   ADD HYD                  MH6 14& 5  15        .04510       60.18      2.555     1.06205    1.550    2.085
   *S ROUTE UPSTREAM AND 5 THROUGH 48" PIPE
   ROUTE MCUNGE           15.10   16   15        .04510       58.19      2.546     1.05827    1.600    2.016 CCODE =     .2
   *S COMPUTE BASIN 6  - BASIN NORTH HALF OF KIBO
   COMPUTE NM HYD          6.00   -     6        .00440        7.39       .251     1.06766    1.500    2.626 PER IMP=  34.00
   ADD HYD                  MH7 15& 6  16        .04950       64.74      2.796     1.05909    1.550    2.043
   *S ROUTE UPSTREAM AND 6 THROUGH 48" PIPE
   ROUTE MCUNGE           16.10   17   16        .04950       62.50      2.780     1.05316    1.600    1.973 CCODE =     .2
   *S COMPUTE BASIN 7  - BASIN NORTH HALF OF VICTORIA
   COMPUTE NM HYD          7.00   -     7        .01060       17.80       .604     1.06766    1.500    2.623 PER IMP=  34.00
   ADD HYD                  MH7 16& 7  17        .06010       77.87      3.384     1.05570    1.550    2.025
   *S ROUTE UPSTREAM AND 7 THROUGH 54" PIPE
   ROUTE MCUNGE           17.10   18   17        .06010       75.49      3.373     1.05242    1.550    1.963 CCODE =     .2
   *S COMPUTE BASIN 8  - BASIN AT MONTE CARLO
   COMPUTE NM HYD          8.00   -     8        .00730       12.26       .416     1.06766    1.500    2.624 PER IMP=  34.00
   ADD HYD                  MH7 17& 8  18        .06740       86.45      3.789     1.05406    1.550    2.004
   *S COMPUTE BASIN 100  - BASIN WEST OF 81ST
   COMPUTE NM HYD        100.00   -    98        .33000       70.70      6.285      .35708    1.900     .335 PER IMP=    .00
   ROUTE RESERVOIR         hole   98   99        .33000       37.45      6.285      .35707    2.350     .177 AC-FT=    2.495
   *S COMPUTE BASIN 101  - BASIN WEST OF 81ST
   COMPUTE NM HYD        101.00   -    98        .38000      157.72      7.237      .35708    1.650     .649 PER IMP=    .00
   *S COMPUTE BASIN 102  - BASIN WEST OF 81ST
   COMPUTE NM HYD        102.00   -    98        .06400       29.78      1.219      .35708    1.550     .727 PER IMP=    .00
   *S ROUTE OFFSITE basin 100 THROUGH 36" PIPE
   ROUTE MCUNGE           97.10   98   97        .06400       29.75      1.215      .35607    1.600     .726 CCODE =     .1
   ADD HYD                 MH7 18&97  18        .13140      113.65      5.004      .71409    1.600    1.351
   *S ROUTE UPSTREAM, OFFSITE, AND 8 THROUGH 60" PIPE
   ROUTE MCUNGE           18.10   19   18        .13140      113.48      4.996      .71283    1.600    1.349 CCODE =     .1
   *S COMPUTE BASIN A1  - BASIN AT KEYENTA PL
   COMPUTE NM HYD            A2   -    31        .00500        8.40       .285     1.06766    1.500    2.626 PER IMP=  34.00
   *S COMPUTE BASIN 9  - BASIN AT CASA BLANCA
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COMPUTE NM HYD          9.00   -     9        .00300        4.03        .171      1.06766    1.550    2.097 PER IMP=  34.00
*S ADD A1 AND 9 BEFORE ROUTING IN 60" PIPE
ADD HYD                  A19 31& 9   9        .00800       11.93        .456      1.06758    1.500    2.330
ADD HYD                  MH7 18& 9  19        .13940      123.27       5.451       .73319    1.600    1.382
*S ROUTE UPSTREAM AND 9 THROUGH 60" PIPE
ROUTE MCUNGE           19.10   19   18        .13940      122.59       5.443       .73215    1.600    1.374 CCODE =      .2
*S COMPUTE BASIN 10  - BASIN AT MARIGOLD CT
COMPUTE NM HYD         10.00   -    10        .00300        5.05        .171      1.06766    1.500    2.628 PER IMP=  34.00
ADD HYD                  MH7 19&10  20        .14240      126.81       5.622       .74023    1.600    1.391
*S ROUTE UPSTREAM AND 10 THROUGH 60" PIPE
ROUTE MCUNGE           20.10   21   20        .14240      126.02       5.611       .73885    1.600    1.383 CCODE =      .2
*S COMPUTE BASIN A3  - BASIN AT CASA BLANCA DR
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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
COMPUTE NM HYD	A3	-	33	.01500	25.18	.854	1.06766	1.500	2.623	PER IMP= 34.00
*S COMPUTE BASIN 11 - BASIN AT MARIGOLD DRIVE										
COMPUTE NM HYD	11.00	-	11	.01400	23.50	.797	1.06766	1.500	2.623	PER IMP= 34.00
*S ADD A3 TO BASIN 11										
ADD HYD	MH7	33&11	11	.02900	48.68	1.651	1.06765	1.500	2.623	
ADD HYD	MH7	20&11	21	.17140	161.19	7.263	.79448	1.550	1.469	
COMPUTE NM HYD	83.00	-	83	1.08000	228.40	23.374	.40579	1.950	.330	PER IMP= 1.00
*S ROUTE BASIN 83 THROUGH 60" PIPE										
ROUTE MCUNGE	83.10	84	83	1.08000	228.30	23.361	.40558	2.000	.330	CCODE = .1
*S COMPUTE BASIN A2 - BASIN AT FUJI CT										
COMPUTE NM HYD	22.00	-	22	.01280	21.49	.729	1.06766	1.500	2.623	PER IMP= 34.00
ADD HYD	83A2	22&83	22	1.09280	231.79	24.090	.41333	2.000	.331	
*S COMPUTE BASIN A7 - BASIN BETWEEN JADE AND RIM ROCK PL										
COMPUTE NM HYD	A7	-	38	.00900	15.11	.512	1.06766	1.500	2.624	PER IMP= 34.00
ADD HYD	83A2	38&22	38	1.10180	234.25	24.603	.41868	2.000	.332	
*S COMPUTE BASIN A8 - BASIN BETWEEN 81ST AND UNSER NORTH OF RIM ROCK PLACE										
COMPUTE NM HYD	A8	-	39	.00700	9.98	.399	1.06766	1.550	2.228	PER IMP= 34.00
ADD HYD	83A2	39&38	22	1.10880	236.46	25.001	.42277	2.000	.333	
*S COMPUTE BASIN A5 - BASIN AT ONYX DRIVE										
COMPUTE NM HYD	35.00	-	35	.00090	2.18	.089	1.86135	1.500	3.788	PER IMP= 100.00
*S COMPUTE BASIN A6 - BASIN AT ONYX COURT										
COMPUTE NM HYD	36.00	-	36	.00050	1.21	.050	1.86135	1.500	3.795	PER IMP= 100.00
ADD HYD	36.10	35&36	36	.00140	3.40	.139	1.86095	1.500	3.791	
ADD HYD	22.50	22&36	22	1.11020	237.31	25.140	.42459	2.000	.334	
*S COMPUTE BASIN A4a - BASIN AT RIM ROCK(WEST BASIN)										
COMPUTE NM HYD	A4A	-	34	.01560	28.14	1.096	1.31687	1.500	2.818	PER IMP= 54.00
*S UNSER BASIN										
COMPUTE NM HYD	U1	-	60	.00300	7.26	.298	1.86135	1.500	3.779	PER IMP= 100.00
*S ADD WEST RIMROCK BASINS AND UNSER BASIN										
ADD HYD	AC	34&60	37	.01860	35.39	1.393	1.40466	1.500	2.973	
*S COMPUTE BASIN A4B - BASIN AT RIM ROCK(EAST BASIN)										
COMPUTE NM HYD	A4B	-	35	.00890	12.94	.507	1.06766	1.550	2.272	PER IMP= 34.00
*S ADD WEST AND EAST RIMROCK BASINS										
ADD HYD	AC	37&35	37	.02750	47.72	1.900	1.29558	1.500	2.711	
*S ROUTE EAST WEST AND U1 BASINS THROUGH 36" PIPE										
ROUTE MCUNGE	U1RR	38	37	.02750	46.86	1.894	1.29169	1.550	2.663	CCODE = .2
*S COMPUTE BASIN A4c - BASIN AT RIM ROCK(SOUTH BASIN)										
COMPUTE NM HYD	A4C	-	36	.00500	7.97	.285	1.06766	1.500	2.490	PER IMP= 34.00
*S ADD RIM ROCK BASINS										
ADD HYD	AC	37&36	37	.03250	54.41	2.179	1.25719	1.550	2.616	
COMPUTE NM HYD	U2	-	61	.00250	6.05	.248	1.86135	1.500	3.780	PER IMP= 100.00
COMPUTE NM HYD	U3	-	62	.00140	3.39	.139	1.86135	1.500	3.784	PER IMP= 100.00
*S ADD UNSER BASINS										
ADD HYD	AC	61&62	61	.00390	9.44	.387	1.86121	1.500	3.781	
*S ADD UNSER BASINS TO RIM ROCK BASINS										
ADD HYD	AC	61&37	37	.03640	62.62	2.566	1.32191	1.550	2.688	
ADD HYD	37.50	22&37	37	1.14660	252.43	27.706	.45307	1.950	.344	
ROUTE MCUNGE	37.10	38	37	1.14660	252.43	27.706	.45307	1.950	.344	CCODE = .0
ADD HYD	83A2	37&21	23	1.31800	327.96	34.969	.49747	1.650	.389	

ROUTE MCUNGE	23.10	24	23	1.31800	327.96	34.969	.49747	1.650	.389	CCODE = .0
COMPUTE NM HYD	U4	-	63	.00130	3.15	.129	1.86135	1.500	3.784	PER IMP= 100.00
COMPUTE NM HYD	U5	-	64	.00120	2.91	.119	1.86135	1.500	3.784	PER IMP= 100.00
ADD HYD	U45	63&64	24	.00250	6.05	.248	1.86114	1.500	3.784	
ADD HYD	U45	23&24	25	1.32050	331.63	35.217	.50005	1.600	.392	
ROUTE MCUNGE	23.10	25	23	1.32050	331.63	35.217	.50005	1.600	.392	CCODE = .0
COMPUTE NM HYD	U6	-	65	.00080	1.94	.079	1.86135	1.500	3.788	PER IMP= 100.00
COMPUTE NM HYD	U7	-	66	.00080	1.94	.079	1.86135	1.500	3.788	PER IMP= 100.00
ADD HYD	U45	65&66	24	.00160	3.88	.159	1.86102	1.500	3.788	
ADD HYD	U45	23&24	25	1.32210	334.24	35.376	.50170	1.600	.395	
ROUTE MCUNGE	U3	25	23	1.32210	334.24	35.376	.50170	1.600	.395	CCODE = .0
COMPUTE NM HYD	U8	-	67	.00070	1.70	.069	1.86135	1.500	3.791	PER IMP= 100.00
COMPUTE NM HYD	U9	-	68	.00070	1.70	.069	1.86135	1.500	3.791	PER IMP= 100.00
ADD HYD	U45	67&68	24	.00140	3.40	.139	1.86094	1.500	3.791	
ADD HYD	U45	23&24	25	1.32350	336.52	35.515	.50314	1.600	.397	
ROUTE MCUNGE	U3	25	23	1.32350	336.52	35.515	.50314	1.600	.397	CCODE = .0
COMPUTE NM HYD	U10	-	69	.00072	1.75	.071	1.86135	1.500	3.791	PER IMP= 100.00
COMPUTE NM HYD	U11	-	70	.00073	1.77	.072	1.86135	1.500	3.791	PER IMP= 100.00
COMPUTE NM HYD	51.00	-	51	.01280	2.27	.380	.55600	2.350	.277	PER IMP= .00
ADD HYD	U45	69&70	24	.00145	3.52	.144	1.86094	1.500	3.791	
ADD HYD	U45	24&51	26	.01425	3.67	.523	.68878	1.500	.403	
ADD HYD	U45	26&23	25	1.33775	339.31	36.038	.50512	1.600	.396	

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 MCUNGE	U3	25	23	1.33775	338.81	36.040	.50514	1.600	.396	CCODE = .2
COMPUTE NM HYD	U12	-	71	.00250	6.05	.248	1.86135	1.500	3.780	PER IMP= 100.00
COMPUTE NM HYD	U13	-	72	.00580	14.02	.576	1.86135	1.500	3.778	PER IMP= 100.00
COMPUTE NM HYD	52.00	-	52	.09000	50.57	1.751	.36482	1.550	.878	PER IMP= .00
ADD HYD	U45	71&72	24	.00830	20.07	.824	1.86128	1.500	3.779	
ADD HYD	U45	24&52	26	.09830	68.04	2.575	.49117	1.550	1.081	
ADD HYD	U45	26&23	25	1.43605	399.14	38.615	.50418	1.600	.434	
FINISH										

(s0p10h4099TM&l6D

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*S BN100EX.TXT = EXISTING CONDITION RTI MODEL FOR THE BOCA NEGRA SYSTEM
* RESOURCE TECHNOLOGY, INC.  FEBRUARY 2002
* THIS EXISTING CONDITIONS MODEL HAS A SEDIMENT BULKING FACTOR OF 5%
*  FOR UPSTREAM BASINS
*
START                TIME=0.0  PUNCH CODE=0 PRINT CODE=0
LOCATION             BERNALILLO COUNTY
*
* RAINFALL FROM NOAA ATLAS 2
*
* THESE VALUES WERE REDUCED FOR AREA BY 12%, 5% AND 3% FOR 1, 6, AND 24 HOUR
*S*****************************************************************************
*S100 YEAR 24HR STORM EXISTING CONDITION
RAINFALL              TYPE=2  0.0  1.64  2.11  2.66    DT=0.05
* *S 10 YEAR 24HR STORM EXISTING CONDITION
* RAINFALL             TYPE=2  0.0  1.08  1.41  1.78    DT=0.05
*S   ***  THE FOLLOWING SUBBASINS ARE THE "MAIN" BRANCH OF THE BASIN ***
*S
START                TIME=0.0  PUNCH CND/LAG TIME METHOD
*S  ******** BASINS THAT CURRENTLY DRAIN TO THE SOUTH BRANCH ************
*S
*
**** SUB-BASIN 60 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.023 K=0.7
                     LENGTH=1600 FT  SLOPE=0.023 K=2.0
                     LENGTH=5302 FT   SLOPE=0.023 K=3.0
                     Kn=.033  CN=.6
COMPUTE NM HYD       ID=1  HYD NO=60   DA= 0.354 SQ MI
                     PER A=100 PER B=0  PER C=0  PER D=0
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
*S
*
**** SUB-BASIN 62 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.017 K=0.7
                     LENGTH=1600 FT  SLOPE=0.017 K=2.0
                     LENGTH=3327 FT   SLOPE=0.017 K=3.0
                     Kn=.033  CN=.5
COMPUTE NM HYD       ID=2  HYD NO=62   DA= 0.2 SQ MI
                     PER A=100 PER B=0  PER C=0  PER D=0
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=2   CODE=1
*
* ADD 61 AND 62
ADD HYD              ID=7   HYD NO=62.7 ID I=1 ID II=2
PRINT HYD            ID=7   CODE=1
*
* ROUTE 62.7 THRU 63 IN NATURAL ARROYO TO 63.5
COMPUTE RATING CURVE  CID=1   VS NO=1   NO SEGS=1
                      MIN ELEV=5859.65  MAX ELEV=5864.7
                      CH SLOPE=0.005    FP SLOPE=0.005
                      N=0.035           DIST=40.0
                      DIST  ELEV    DIST  ELEV
                        0   5859.9   16.8 5860.14
                       60.9 5859.65 110.5 5859.74
                      159.1 5861.14 220.7 5859.76
                      277.5 5860.73 500   5864.7
ROUTE MCUNGE         ID=5   HYD NO=63.5  INFLOW ID=7
                     DT=0.0   L=5500 FT   NS=0   SLOPE=0.005
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
PRINT HYD            ID=5   CODE=1
*S
*
**** SUB-BASIN 63 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.029 K=0.7
                     LENGTH=1600 FT  SLOPE=0.029 K=2.0
                     LENGTH=3849 FT   SLOPE=0.029 K=3.0
                     Kn=.033  CN=.6
COMPUTE NM HYD       ID=1  HYD NO=63   DA= 0.973 SQ MI
                     PER A=100 PER B=0  PER C=0  PER D=0
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
* ADD 63 AND 63.5 TO GET 63.8
ADD HYD              ID=8   HYD NO=63.8 ID I=1 ID II=5
PRINT HYD            ID=8   CODE=1
*
*S
```

```
*
**** SUB-BASIN 64 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.025 K=0.7
                     LENGTH=650 FT  SLOPE=0.025 K=2.0
                     Kn=.033  CN=.5
COMPUTE NM HYD       ID=1  HYD NO=64   DA= 0.305 SQ MI
                     PER A=98 PER B=0  PER C=0  PER D=2
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
* ADD 64 AND 63.8 TO GET 64.9
ADD HYD              ID=9   HYD NO=64.9 ID I=1 ID II=8
PRINT HYD            ID=9   CODE=1
*
* ROUTE 64.9 THRU 65 IN NATURAL ARROYO TO  65.5
COMPUTE RATING CURVE  CID=1   VS NO=1   NO SEGS=1
                      MIN ELEV=5859.65  MAX ELEV=5864.7
                      CH SLOPE=0.005    FP SLOPE=0.005
                      N=0.035           DIST=500.0
                      DIST  ELEV    DIST  ELEV
                        0   5859.9   16.8 5860.14
                       60.9 5859.65 110.5 5859.74
                      159.1 5861.14 220.7 5859.76
                      277.5 5860.73 500   5864.7
ROUTE MCUNGE         ID=5   HYD NO=65.5 INFLOW ID=9
                     DT=0.0   L=3300 FT   NS=0   SLOPE=0.005
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
PRINT HYD            ID=5   CODE=1
*S
*
**** SUB-BASIN 65 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=2  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.023 K=0.7
                     LENGTH=1600 FT  SLOPE=0.023 K=2.0
                     LENGTH=4669 FT  SLOPE=0.023 K=3.0
COMPUTE NM HYD       ID=1  HYD NO=65   DA= 0.338 SQ MI
                     PER A=100 PER B=0  PER C=0  PER D=0
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
* ADD 65 AND 65.5 TO GET 65.7
ADD HYD              ID=7   HYD NO=65.7 ID I=1 ID II=5
PRINT HYD            ID=7   CODE=1
*
*S
*
**** SUB-BASIN 66 ****
*
COMPUTE LT TP        LCODE=1  USDI BUREAU OF RECLAMATION LAG TIME EQUATION
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.012 K=0.7
                     LENGTH=1600 FT  SLOPE=0.012 K=2.0
                     LENGTH=25869 FT   SLOPE=0.012 K=3.0
                     Kn=.033  CN=.6
COMPUTE NM HYD       ID=1  HYD NO=66   DA= 2.449 SQ MI
                     PER A=98 PER B=0  PER C=0  PER D=2
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
* ADD 66 AND 65.7 TO GET 66.8
ADD HYD              ID=8   HYD NO=66.8 ID I=1 ID II=7
PRINT HYD            ID=8   CODE=1
*
* ROUTE 66.8 THRU 67 IN NATURAL ARROYO TO  67.5
COMPUTE RATING CURVE  CID=1   VS NO=1   NO SEGS=1
                      MIN ELEV=0        MAX ELEV=10.0
                      CH SLOPE=0.005    FP SLOPE=0.005
                      N=0.035           DIST=40.0
                      DIST  ELEV    DIST  ELEV
                       0.0 10.0     10.0  0.0
                      30.0  0.0     40.0 10.0
ROUTE MCUNGE         ID=5   HYD NO= 67.5 INFLOW ID=8
                     DT=0.0   L=980 FT   NS=0   SLOPE=0.005
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
PRINT HYD            ID=5   CODE=1
*
*
**** SUB-BASIN 67 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT.   SLOPE=0.012 K=0.7
                     LENGTH=1600 FT  SLOPE=0.012 K=2.0
```

```
                    LENGTH=4000 FT  SLOPE=0.012 K=3.0
COMPUTE NM HYD      ID=1  HYD NO=67   DA= 0.109 SQ MI
                    PER A=85 PER B=0  PER C=0  PER D=15
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=1   CODE=1
*
* ADD 67 AND 67.5 TO GET 67.9
ADD HYD             ID=9   HYD NO=67.9 ID I=1 ID II=5
PRINT HYD           ID=9   CODE=1
*
*S
*
**** SUB-BASIN 68 ****
*
COMPUTE LT TP       LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.012 K=0.7
                    LENGTH=1600 FT  SLOPE=0.012 K=2.0
                    LENGTH=5041 FT   SLOPE=0.012 K=3.0
                    Kn=.033  CN=.5
COMPUTE NM HYD      ID=1  HYD NO=68   DA= 0.467 SQ MI
                    PER A=99 PER B=0  PER C=0  PER D=1
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=1   CODE=1
*
* ADD 68 AND 67.9 TO GET 68.7
ADD HYD             ID=7   HYD NO=68.7 ID I=1 ID II=9
PRINT HYD           ID=7   CODE=1
*
* ROUTE 68.7 THRU 69 IN NATURAL ARROYO TO  69.6
COMPUTE RATING CURVE  CID=1   VS NO=1   NO SEGS=1
                      MIN ELEV=0        MAX ELEV=10.0
                      CH SLOPE=0.006    FP SLOPE=0.006
                      N=0.035           DIST=40.0
                      DIST  ELEV    DIST  ELEV
                       0.0 10.0     10.0  0.0
                      30.0  0.0     40.0 10.0
ROUTE MCUNGE        ID=6   HYD NO=69.6 INFLOW ID=7
                    DT=0.0   L=7500 FT   NS=0   SLOPE=0.006
                    MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
PRINT HYD           ID=6   CODE=1
*
*S
*
**** SUB-BASIN 69 ****
*
COMPUTE LT TP       LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.006 K=0.7
                    LENGTH=1600 FT  SLOPE=0.006 K=2.0
                    LENGTH=4600 FT   SLOPE=0.006 K=3.0
                    Kn=.033  CN=.6
COMPUTE NM HYD      ID=1  HYD NO=69   DA= 0.615 SQ MI
                    PER A=95 PER B=0  PER C=0  PER D=5
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=1   CODE=1
*
* ADD 69 AND 69.6 TO GET 69.8
ADD HYD             ID=8   HYD NO=69.8 ID I=1 ID II=6
PRINT HYD           ID=8   CODE=1
*
* ROUTE 69.8 THRU 73 IN NATURAL ARROYO TO 73.5
COMPUTE RATING CURVE  CID=1   VS NO=1   NO SEGS=1
                      MIN ELEV=0        MAX ELEV=10.0
                      CH SLOPE=0.007    FP SLOPE=0.007
                      N=0.035           DIST=40.0
                      DIST  ELEV    DIST  ELEV
                       0.0 10.0     10.0  0.0
                      30.0  0.0     40.0 10.0
ROUTE MCUNGE        ID=5   HYD NO=73.MH INFLOW ID=8
                    DT=0.0   L=2300 FT   NS=0   SLOPE=0.007
                    MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
PRINT HYD           ID=5   CODE=1
*
*S
*
**** SUB-BASIN 73 ****
*
COMPUTE LT TP       LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                    NK=3  ISLOPE=-1
                    LENGTH=400 FT   SLOPE=0.007 K=0.7
                    LENGTH=1600 FT  SLOPE=0.007 K=2.0
                    LENGTH=6840 FT   SLOPE=0.007 K=3.0
                    Kn=.033  CN=.5
COMPUTE NM HYD      ID=1  HYD NO=73   DA= 0.723 SQ MI
                    PER A=97 PER B=0  PER C=1  PER D=2
                    TP=0.0   MASSRAIN=-1
PRINT HYD           ID=1   CODE=1
```

```
*
* ADD 73 AND 73.5 TO GET 73.9 **********COMMENT OUT ADD*******
*ADD HYD              ID=9   HYD NO=.9 ID I=1 ID II=5
*PRINT HYD            ID=9   CODE=1
*
* ROUTE 73 THRU 74 IN NATURAL ARROYO TO 74.6 ZHU
COMPUTE RATING CURVE  CID=1   VS NO=1   NO SEGS=1
                      MIN ELEV=5772.87  MAX ELEV=5775.9
                      CH SLOPE=0.008    FP SLOPE=0.008
                      N=0.035           DIST=500.0
                      DIST  ELEV    DIST  ELEV
                        0   5775.9  145   5774.02
                      181.1 5774.51 250   5772.87
                      276.6 5773.3  304.5 5773.09
                      450.2 5774.36 500   5775.3
ROUTE MCUNGE         ID=6   HYD NO=74.6 INFLOW ID=1
                     DT=0.0   L=5300 FT   NS=0   SLOPE=0.008
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
PRINT HYD            ID=6   CODE=1
*
*S
*
**** SUB-BASIN 74 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.008 K=0.7
                     LENGTH=1600 FT  SLOPE=0.008 K=2.0
                     LENGTH=5500 FT   SLOPE=0.008 K=3.0
                     Kn=.033  CN=.5
COMPUTE NM HYD       ID=1  HYD NO=74   DA= 0.647 SQ MI
                     PER A=91 PER B=0  PER C=2  PER D=7
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
* ADD 74 AND 74.6 TO GET 74.9
ADD HYD              ID=9   HYD NO=74.9 ID I=1 ID II=6
PRINT HYD            ID=9   CODE=1
*
**** SUB-BASIN 75 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME TRANSITION METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.008 K=0.7
                     LENGTH=1600 FT  SLOPE=0.008 K=2.0
                     LENGTH=9800 FT   SLOPE=0.008 K=3.0
                     Kn=.033  CN=.4
COMPUTE NM HYD       ID=1  HYD NO=75   DA= 0.865 SQ MI
                     PER A=91 PER B=0  PER C=2  PER D=7
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
*S
* ADD 75 AND 74.9 TO GET 74.7
ADD HYD              ID=7   HYD NO=74.7 ID I=1 ID II=9
PRINT HYD            ID=7   CODE=1
*
*S
*
**** SUB-BASIN 79 ****
*
COMPUTE LT TP        LCODE=1  UPLAND/LAG TIME METHOD
                     NK=3  ISLOPE=-1
                     LENGTH=400 FT   SLOPE=0.006 K=0.7
                     LENGTH=1600 FT  SLOPE=0.006 K=2.0
                     LENGTH=1300 FT   SLOPE=0.006 K=3.0
                     Kn=.033  CN=.6
COMPUTE NM HYD       ID=1  HYD NO=79   DA= 0.411 SQ MI
                     PER A=84 PER B=1  PER C=15  PER D=0
                     TP=0.0   MASSRAIN=-1
PRINT HYD            ID=1   CODE=1
*
* ADD 79  AND 74.7 TO GET 79.8
ADD HYD              ID=8   HYD NO=79.8 ID I=1 ID II=7
PRINT HYD            ID=8   CODE=1
*
*S ROUTE 79.8 THROUGH THE PLAYA OF SUBBASIN 79
ROUTE RESERVOIR       ID=4  HYD=PLAY79  INFLOW ID=8 CODE=3
                      OUTFLOW(CFS)   STORAGE(AC FT)   ELEV(FT)
                      0              0                56
                      0.01           4.5              58
                      0.01           42.              60
                      0.01           59.              60.5
                      0.01           76.              61
                      210            120.             62
                      350            170              63
*
* ROUTE PLAYA79 THRU 80 IN NATURAL ARROYO TO 80.6
```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =06/11/2003
INPUT FILE = sbnrev.dat USER NO.= AHYMO-C-9803c01UNMLIB-AH

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
*S BN100EX.TXT = EXISTING CONDITION RTI MODEL FOR THE BOCA NEGRA SYSTEM											
START										TIME=	.00
LOCATION		BERNALILLO COUNTY									
*S**********											
*S100 YEAR 24HR STORM EXISTING CONDITION											
RAINFALL TYPE= 2										RAIN24=	2.660
*S *** THE FOLLOWING SUBBASINS ARE THE "MAIN" BRANCH OF THE BASIN ***											
*S											
START										TIME=	.00
*S ******** BASINS THAT CURRENTLY DRAIN TO THE SOUTH BRANCH **********											
*S											
COMPUTE NM HYD	60.00	-	1	.35400	115.70	6.742	.35708	1.700	.511	PER IMP=	.00
*S											
COMPUTE NM HYD	62.00	-	2	.20000	66.29	3.809	.35708	1.700	.518	PER IMP=	.00
ADD HYD	62.70	1& 2	7	.55400	181.99	10.550	.35708	1.700	.513		
ROUTE MCUNGE	63.50	7	5	.55400	166.73	10.152	.34361	2.250	.470	CCODE =	.1
*S											
COMPUTE NM HYD	63.00	-	1	.97300	395.30	18.530	.35708	1.650	.635	PER IMP=	.00
ADD HYD	63.80	1& 5	8	1.52700	395.30	28.682	.35219	1.650	.404		
*S											
COMPUTE NM HYD	64.00	-	1	.30500	240.44	6.477	.39815	1.500	1.232	PER IMP=	2.00
ADD HYD	64.90	1& 8	9	1.83200	561.72	35.159	.35984	1.550	.479		
ROUTE MCUNGE	65.50	9	5	1.83200	504.21	34.414	.35222	2.000	.430	CCODE =	.1
*S											
COMPUTE NM HYD	65.00	-	1	.33800	210.53	6.437	.35708	1.550	.973	PER IMP=	.00
ADD HYD	65.70	1& 5	7	2.17000	528.11	40.851	.35298	1.950	.380		
*S											
COMPUTE NM HYD	66.00	-	1	2.44900	304.06	52.002	.39814	2.350	.194	PER IMP=	2.00
ADD HYD	66.80	1& 7	8	4.61900	771.36	92.853	.37692	2.000	.261		
ROUTE MCUNGE	67.50	8	5	4.61900	767.59	92.823	.37680	2.000	.260	CCODE =	.2
COMPUTE NM HYD	67.00	-	1	.10900	57.28	3.867	.66516	1.650	.821	PER IMP=	15.00
ADD HYD	67.90	1& 5	9	4.72800	796.71	96.689	.38344	2.000	.263		
*S											
COMPUTE NM HYD	68.00	-	1	.46700	137.53	9.405	.37761	1.750	.460	PER IMP=	1.00
ADD HYD	68.70	1& 9	7	5.19500	895.09	106.094	.38292	2.000	.269		
ROUTE MCUNGE	69.60	7	6	5.19500	875.15	105.875	.38213	2.250	.263	CCODE =	.2
*S											
COMPUTE NM HYD	69.00	-	1	.61500	165.66	15.081	.45977	1.850	.421	PER IMP=	5.00
ADD HYD	69.80	1& 6	8	5.81000	989.05	120.956	.39035	2.200	.266		
ROUTE MCUNGE	73.MH	8	5	5.81000	984.38	120.917	.39022	2.300	.265	CCODE =	.2
*S											
COMPUTE NM HYD	73.00	-	1	.72300	174.49	15.472	.40124	1.850	.377	PER IMP=	2.00
ROUTE MCUNGE	74.60	1	6	.72300	167.72	15.254	.39559	2.700	.362	CCODE =	.1
*S											
COMPUTE NM HYD	74.00	-	1	.64700	205.05	17.496	.50704	1.800	.495	PER IMP=	7.00
ADD HYD	74.90	1& 6	9	1.37000	210.15	32.750	.44822	2.650	.240		
COMPUTE NM HYD	75.00	-	1	.86500	240.43	23.391	.50704	1.900	.434	PER IMP=	7.00
*S											
ADD HYD	74.70	1& 9	7	2.23500	442.41	56.142	.47099	1.850	.309		
*S											

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 = 2
COMPUTE NM HYD	79.00	-	1	.41100	121.93	9.006	.41087	1.800	.464	PER IMP=	.00
ADD HYD	79.80	1& 7	8	2.64600	562.71	65.148	.46165	1.850	.332		
*S ROUTE 79.8 THROUGH THE PLAYA OF SUBBASIN 79											
ROUTE RESERVOIR	PLAY79	8	4	2.64600	.01	.023	.00017	1.650	.000	AC-FT=	76.000

ROUTE MCUNGE	80.60	4	6	2.64600	.01	.022	.00016	3.200	.000	CCODE =	.2
*S											
COMPUTE NM HYD	80.00	-	1	.78000	198.17	17.789	.42763	1.900	.397	PER IMP=	.00
ADD HYD	80.70	1& 6	7	3.42600	198.17	17.811	.09748	1.900	.090		
*S											
COMPUTE NM HYD	81.00	-	1	.55000	156.88	11.461	.39072	1.800	.446	PER IMP=	.00
ADD HYD	81.80	1& 7	8	3.97600	349.80	29.273	.13804	1.850	.137		
ROUTE MCUNGE	82.50	8	5	3.97600	346.54	29.223	.13781	2.300	.136	CCODE =	.1
*S											
COMPUTE NM HYD	82.00	-	1	.28000	112.83	5.835	.39072	1.650	.630	PER IMP=	.00
ADD HYD	82.90	1& 5	9	4.25600	365.65	35.057	.15445	2.300	.134		
*S											
FINISH											

Appendix B

Hydraulic, HEC-RAS, and Hydraflow Analysis

Hydraulic Analysis:

A hydraulic analysis for the developed flows was done for the Boca Negra Arroyos using HEC-RAS. The following parameters were used in the analysis:

1. South Leg Boca Negra Arroyo (South Branch)
   Q100 Existing and Developed = 366 c.f.s.
   N = .013 for RCP Pipe
   Bulking 10 percent
   HGL completed based on Hydroflow and COA Design Manual

2. North Leg Boca Negra Arroyo (South Branch)
   Q100 Existing = 229 c.f.s.
   N = .013 for RCP Pipe
   Bulking 10 percent
   HGL completed based on Hydroflow and COA Design Manual

3. SAD 227 Storm Drain System
   Q100 = 180 c.f.s max., See Plates 2 and 3
   N = 0.013 RCP Pipe
   See Plates 2, 3, and 4 for Layout
   HGL completed based on Hydroflow and COA Design Manual

Single C

Height	Length	Area	Q oriface	Q weir
0	5.00	6.00	0	0
0.08	5.00	6.00	9.31	0.360844
0.17	5.00	6.00	13.17	1.020621
0.25	5.00	6.00	16.13	1.875
0.33	5.00	6.00	18.63	2.886751
0.42	5.00	6.00	20.82	4.034358
0.50	5.00	6.00	22.81	5.303301
0.58	5.00	6.00	24.64	6.682923
0.67	5.00	6.00	26.34	8.164966
0.75	5.00	6.00	27.94	9.742786
0.83	5.00	6.00	29.45	11.41089

50% clogging factor 14.72
50% at 8" depth 13.17
Qweir= C*Length*Height^(3/2)
Qoriface=C*Area*Sqrt(2*g*Height)

C oriface=0.67
C wier=3

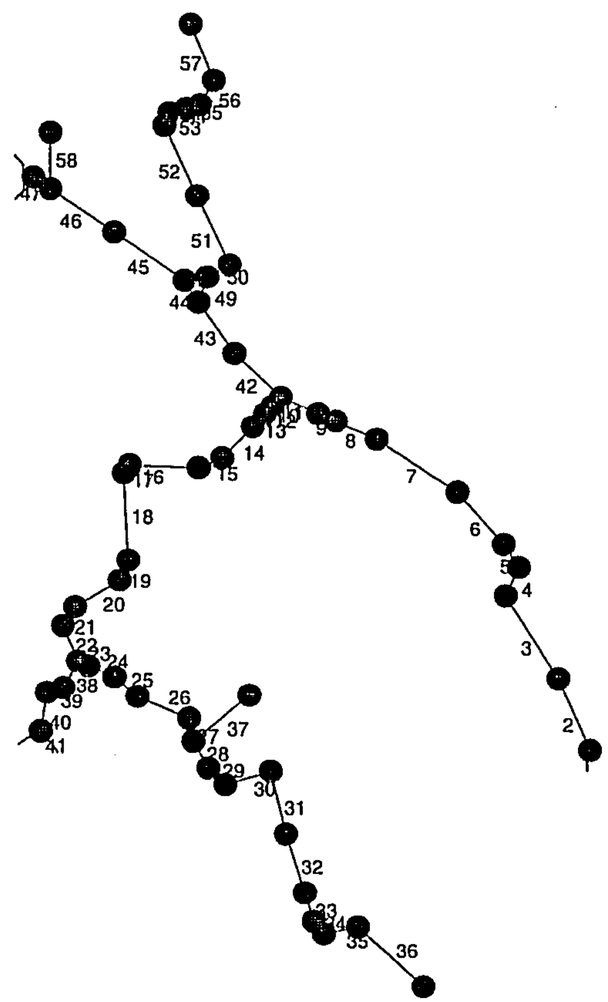
Double C

Height	Length	Area	Q oriface	Q weir
0	8.00	12.00	0	0
0.08	8.00	12.00	18.63	0.57735
0.17	8.00	12.00	26.34	1.632993
0.25	8.00	12.00	32.26	3
0.33	8.00	12.00	37.25	4.618802
0.42	8.00	12.00	41.65	6.454972
0.50	8.00	12.00	45.62	8.485281
0.58	8.00	12.00	49.28	10.69268
0.67	8.00	12.00	52.68	13.06395
0.75	8.00	12.00	55.88	15.58846
0.83	8.00	12.00	58.90	18.25742

50% clogging factor 29.45
50% at 8" depth 26.34
Qweir= C*Length*Height^(3/2)
Qoriface=C*Area*Sqrt(2*g*Height)

C oriface=0.67
C wier=3

Hydraflow Plan View



Project file: oops.stm	IDF file: sampleFHA.IDF	No. Lines: 58	06-12-2003

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	72	399.0	5155.00	5161.00	6.00	28.27	14.11	3.10	5164.10	0.888	40.0	5155.29	5161.36	6.00	28.27	14.11	3.10	5164.45	0.887	0.888	0.355	0.30	0.93
2	72	399.0	5155.30	5162.29	6.00	28.27	14.11	3.10	5165.38	0.888	379	5158.03	5165.65	6.00	28.27	14.11	3.10	5168.75	0.887	0.888	3.364	0.30	0.93
3	60	399.0	5159.04	5166.58	5.00	19.63	20.32	6.42	5173.00	2.348	484	5173.20	5178.09	4.89**	19.52	20.44	6.49	5184.58	2.091	2.219	N/A	0.30	1.95
4	60	399.0	5173.60	5180.04	5.00	19.63	20.32	6.42	5186.46	2.348	156	5181.01	5185.90	4.89**	19.52	20.44	6.49	5192.39	2.091	2.219	N/A	0.00	0.00
5	60	399.0	5181.41	5185.90	4.49	18.57	21.48	7.18	5193.07	2.071	136	5187.83	5192.72	4.89**	19.52	20.44	6.49	5199.21	2.091	2.081	N/A	0.30	1.95
6	60	399.0	5188.60	5194.67	5.00	19.63	20.32	6.42	5201.09	2.348	352	5221.67	5226.56	4.89**	19.52	20.44	6.49	5233.05	2.091	2.219	N/A	0.30	1.95
7	60	399.0	5222.28	5228.51	5.00	19.63	20.32	6.42	5234.93	2.348	497	5250.17	5255.06	4.89**	19.52	20.44	6.49	5261.55	2.091	2.219	N/A	0.30	1.95
8	60	399.0	5250.52	5257.01	5.00	19.63	20.32	6.42	5263.43	2.348	232	5257.52	5262.41	4.89**	19.52	20.44	6.49	5268.90	2.091	2.219	N/A	0.30	1.95
9	60	399.0	5258.14	5264.36	5.00	19.63	20.32	6.42	5270.78	2.348	100	5269.56	5274.45	4.89**	19.52	20.44	6.49	5280.94	2.091	2.219	N/A	0.00	0.00
10	60	399.0	5270.27	5274.45	4.18	17.52	22.77	8.06	5282.51	2.270	209	5280.76	5285.65	4.89**	19.52	20.44	6.49	5292.14	2.091	2.181	N/A	0.00	0.00
11	60	195.0	5281.03	5285.65	4.62	18.95	10.29	1.65	5287.29	0.486	62.0	5283.20	5287.10	3.90**	16.42	11.87	2.19	5289.29	0.619	0.552	N/A	0.30	0.66
12	60	195.0	5283.52	5287.76	4.24	17.74	10.99	1.88	5289.64	0.531	54.0	5285.36	5289.26	3.90**	16.42	11.87	2.19	5291.45	0.619	0.575	N/A	0.00	0.00
13	60	155.0	5285.46	5289.26	3.80	16.00	9.69	1.46	5290.72	0.414	90.0	5303.46	5306.94	3.47**	14.56	10.64	1.76	5308.70	0.515	0.464	N/A	0.00	0.00
14	60	145.0	5303.92	5308.15	4.23*	17.72	8.18	1.04	5309.19	0.294	221	5304.57	5308.80	4.23	17.73	8.18	1.04	5309.84	0.293	0.294	0.649	0.00	0.00
15	60	145.0	5304.60	5308.82	4.22*	17.68	8.20	1.05	5309.87	0.295	132	5304.99	5309.21	4.22	17.67	8.21	1.05	5310.25	0.295	0.295	0.390	0.30	0.31
16	60	140.0	5305.01	5309.52	4.51	18.65	7.51	0.88	5310.40	0.254	362	5306.08	5310.40	4.32	18.04	7.76	0.94	5311.34	0.266	0.260	0.940	0.30	0.28
17	60	140.0	5306.10	5310.68	4.58	18.85	7.43	0.86	5311.54	0.251	50.0	5306.23	5310.81	4.58	18.84	7.43	0.86	5311.67	0.251	0.251	0.126	0.30	0.26
18	60	140.0	5306.26	5311.07	4.81	19.38	7.22	0.81	5311.88	0.252	424	5307.53	5312.08	4.55	18.76	7.46	0.87	5312.95	0.252	0.252	1.069	0.30	0.26
19	60	122.0	5307.63	5312.34	4.71	19.18	6.36	0.63	5312.97	0.190	108	5307.86	5312.54	4.68	19.11	6.38	0.63	5313.18	0.190	0.190	0.205	0.30	0.19
20	60	116.0	5307.88	5312.73	4.85	19.47	5.96	0.55	5313.28	0.175	267	5308.49	5313.17	4.68	19.10	6.07	0.57	5313.74	0.171	0.173	0.462	0.30	0.17
21	60	116.0	5308.51	5313.34	4.83	19.43	5.97	0.55	5313.90	0.174	112	5308.75	5313.53	4.78	19.33	6.00	0.56	5314.09	0.172	0.173	0.194	0.30	0.17

Project File: oops.stm	IDF File: sampleFHA.IDF	Total number of lines: 58	Run Date: 06-12-2003

NOTES: Initial tailwater elevation = 5161 (ft) , * Normal depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
22	60	116.0	5308.77	5313.70	4.93	19.58	5.92	0.55	5314.25	0.180	188	5309.19	5314.02	4.83	19.43	5.97	0.55	5314.58	0.174	0.177	0.333	0.30	0.17
23	54	76.00	5309.21	5314.19	4.50	15.90	4.78	0.36	5314.54	0.149	59.0	5309.33	5314.28	4.50	15.90	4.78	0.36	5314.63	0.149	0.149	0.088	0.30	0.11
24	54	76.00	5309.83	5314.38	4.50	15.90	4.78	0.36	5314.74	0.149	146	5310.12	5314.60	4.48	15.89	4.78	0.36	5314.95	0.140	0.145	0.211	0.30	0.11
25	48	64.00	5310.14	5314.70	4.00	12.56	5.09	0.40	5315.11	0.199	154	5310.45	5315.01	4.00	12.57	5.09	0.40	5315.41	0.199	0.199	0.306	0.30	0.12
26	48	60.00	5310.95	5315.13	4.00	12.56	4.78	0.35	5315.48	0.175	290	5311.53	5315.64	4.00	12.57	4.77	0.35	5315.99	0.174	0.175	0.506	0.30	0.11
27	48	60.00	5311.63	5315.74	4.00	12.56	4.78	0.35	5316.10	0.175	110	5311.85	5315.93	4.00	12.57	4.77	0.35	5316.29	0.174	0.175	0.192	0.00	0.00
28	48	57.00	5311.95	5315.93	3.98	12.56	4.54	0.32	5316.25	0.149	150	5312.25	5316.15	3.90	12.48	4.57	0.32	5316.47	0.139	0.144	0.216	0.30	0.10
29	48	57.00	5312.35	5316.24	3.89	12.47	4.57	0.32	5316.57	0.139	118	5312.58	5316.40	3.82	12.36	4.61	0.33	5316.73	0.137	0.138	0.163	0.00	0.00
30	48	57.00	5312.68	5316.40	3.72	12.18	4.68	0.34	5316.74	0.136	245	5313.17	5316.71	3.54	11.77	4.84	0.36	5317.08	0.141	0.138	0.339	0.30	0.11
31	42	48.00	5313.67	5316.82	3.15	9.13	5.26	0.43	5317.25	0.200	309	5314.29	5317.44	3.15	9.12	5.26	0.43	5317.87	0.200	0.200	0.619	0.30	0.13
32	42	41.00	5314.39	5317.57	3.18	9.18	4.46	0.31	5317.88	0.145	300	5314.99	5317.99	3.00	8.78	4.67	0.34	5318.33	0.154	0.150	0.449	0.30	0.10
33	36	31.00	5315.49	5318.09	2.60	6.51	4.76	0.35	5318.44	0.198	144	5315.78	5318.38	2.60	6.50	4.77	0.35	5318.73	0.198	0.198	0.285	0.30	0.11
34	36	31.00	5315.88	5318.48	2.60	6.51	4.76	0.35	5318.83	0.198	79.0	5316.04	5318.64	2.60	6.50	4.77	0.35	5318.99	0.198	0.198	0.157	0.00	0.00
35	36	31.00	5316.14	5318.74	2.60*	6.50	4.77	0.35	5319.09	0.198	181	5316.50	5319.10	2.60	6.50	4.77	0.35	5319.45	0.198	0.198	0.359	0.30	0.11
36	36	24.00	5316.60	5319.20	2.60	6.51	3.69	0.21	5319.41	0.119	451	5317.50	5319.75	2.25	5.69	4.21	0.28	5320.03	0.155	0.137	0.617	0.30	0.08
37	24	3.00	5313.20	5315.93	2.00	3.14	0.96	0.01	5315.95	0.018	365	5313.89	5316.00	2.00	3.14	0.95	0.01	5316.01	0.018	0.018	0.064	0.30	0.00
38	36	30.00	5316.33	5317.70	1.37*	3.15	9.53	1.41	5319.11	1.103	148	5317.99	5319.74	1.75**	4.27	7.03	0.77	5320.50	0.493	0.798	N/A	0.30	0.23
39	36	30.00	5318.06	5319.97	1.91	4.74	6.33	0.62	5320.59	0.378	90.0	5319.02	5320.77	1.75**	4.27	7.03	0.77	5321.53	0.493	0.435	N/A	0.30	0.23
40	36	30.00	5319.09	5321.00	1.91	4.74	6.33	0.62	5321.62	0.378	187	5321.18	5322.93	1.75**	4.27	7.03	0.77	5323.69	0.493	0.435	N/A	0.00	0.00
41	36	30.00	5321.25	5322.93	1.68	4.06	7.39	0.85	5323.77	0.561	39.0	5322.00	5323.75	1.75**	4.27	7.03	0.77	5324.51	0.493	0.527	N/A	0.50	0.38
42	60	204.0	5283.52	5285.73	2.21*	8.38	24.36	9.22	5294.96	3.762	324	5295.85	5299.85	4.00	16.82	12.12	2.29	5302.13	0.643	2.203	7.137	0.30	0.69

Project File: oops.stm	IDF File: sampleFHA.IDF	Total number of lines: 58	Run Date: 06-12-2003

NOTES: Initial tailwater elevation = 5161 (ft) , * Normal depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
43	60	204.0	5296.05	5300.53	4.48	18.56	10.99	1.88	5302.41	0.542	313	5299.10	5303.09	3.99**	16.78	12.15	2.30	5305.38	0.646	0.594	N/A	0.30	0.69
44	60	184.0	5299.18	5303.78	4.60	18.89	9.74	1.48	5305.25	0.433	128	5306.68	5310.47	3.79**	15.95	11.54	2.07	5312.54	0.587	0.510	N/A	0.30	0.62
45	60	184.0	5306.78	5311.09	4.31	17.99	10.23	1.63	5312.71	0.461	437	5311.89	5315.68	3.79**	15.95	11.54	2.07	5317.75	0.587	0.524	N/A	0.30	0.62
46	60	184.0	5311.99	5316.30	4.31	17.99	10.23	1.63	5317.92	0.461	396	5316.48	5320.27	3.79**	15.95	11.54	2.07	5322.34	0.587	0.524	N/A	0.00	0.00
47	60	180.0	5316.58	5320.27	3.69	15.52	11.60	2.09	5322.36	0.598	105	5318.30	5322.04	3.74**	15.77	11.41	2.02	5324.07	0.576	0.587	N/A	0.00	0.00
48	60	180.0	5318.50	5322.04	3.54	14.88	12.09	2.27	5324.32	0.659	54.0	5326.50	5330.25	3.74**	15.77	11.41	2.02	5332.27	0.576	0.618	N/A	0.50	1.01
49	36	20.00	5302.88	5304.24	1.36*	3.13	6.40	0.64	5304.88	0.500	129	5303.53	5304.96	1.43	3.33	6.00	0.56	5305.52	0.421	0.460	0.594	0.00	0.00
50	36	20.00	5303.63	5304.99	1.36*	3.13	6.40	0.64	5305.63	0.500	131	5304.29	5305.72	1.43	3.33	6.00	0.56	5306.28	0.421	0.460	0.603	0.00	0.00
51	36	20.00	5304.39	5305.74	1.35*	3.08	6.49	0.65	5306.39	0.520	375	5306.35	5307.78	1.43**	3.31	6.04	0.57	5308.34	0.428	0.474	N/A	0.00	0.00
52	36	20.00	5306.45	5307.80	1.35*	3.08	6.49	0.65	5308.45	0.520	375	5308.41	5309.84	1.43**	3.31	6.04	0.57	5310.40	0.428	0.474	N/A	0.00	0.00
53	36	10.00	5308.51	5309.84	1.33	3.01	3.32	0.17	5310.01	0.138	66.0	5308.83	5309.85	1.02	2.11	4.75	0.35	5310.20	0.370	0.254	0.168	0.00	0.00
54	36	10.00	5308.93	5309.85	0.92	1.82	5.48	0.47	5310.31	0.550	90.0	5313.37	5314.38	1.01**	2.09	4.80	0.36	5314.74	0.380	0.465	N/A	0.00	0.00
55	36	10.00	5313.47	5314.42	0.95*	1.92	5.20	0.42	5314.84	0.477	76.0	5313.84	5314.86	1.02	2.11	4.75	0.35	5315.21	0.370	0.423	0.322	0.00	0.00
56	36	10.00	5313.94	5315.04	1.10*	2.34	4.26	0.28	5315.32	0.274	138	5314.32	5315.42	1.10	2.35	4.25	0.28	5315.70	0.272	0.273	0.377	0.00	0.00
57	36	10.00	5314.42	5315.42	1.00	2.07	4.84	0.36	5315.79	0.390	297	5315.90	5316.91	1.01**	2.09	4.80	0.36	5317.27	0.380	0.385	N/A	0.00	0.00
58	18	4.00	5317.00	5320.27	1.50	1.77	2.26	0.08	5320.35	0.145	268	5322.00	5322.76	0.76**	0.90	4.43	0.30	5323.07	0.547	0.346	N/A	0.00	0.00

Project File: oops.stm	IDF File: sampleFHA.IDF	Total number of lines: 58	Run Date: 06-12-2003

NOTES: Initial tailwater elevation = 5161 (ft) , * Normal depth assumed., ** Critical depth assumed.

Table
Rating Table for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\227.fm2
Worksheet	STREET FLOW standard curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Water Surface Elevation	10.20 ft

Input Data			
	Minimum	Maximum	Increment
Channel Slope	0.005000	0.030000	0.001000 ft/ft

Rating Table

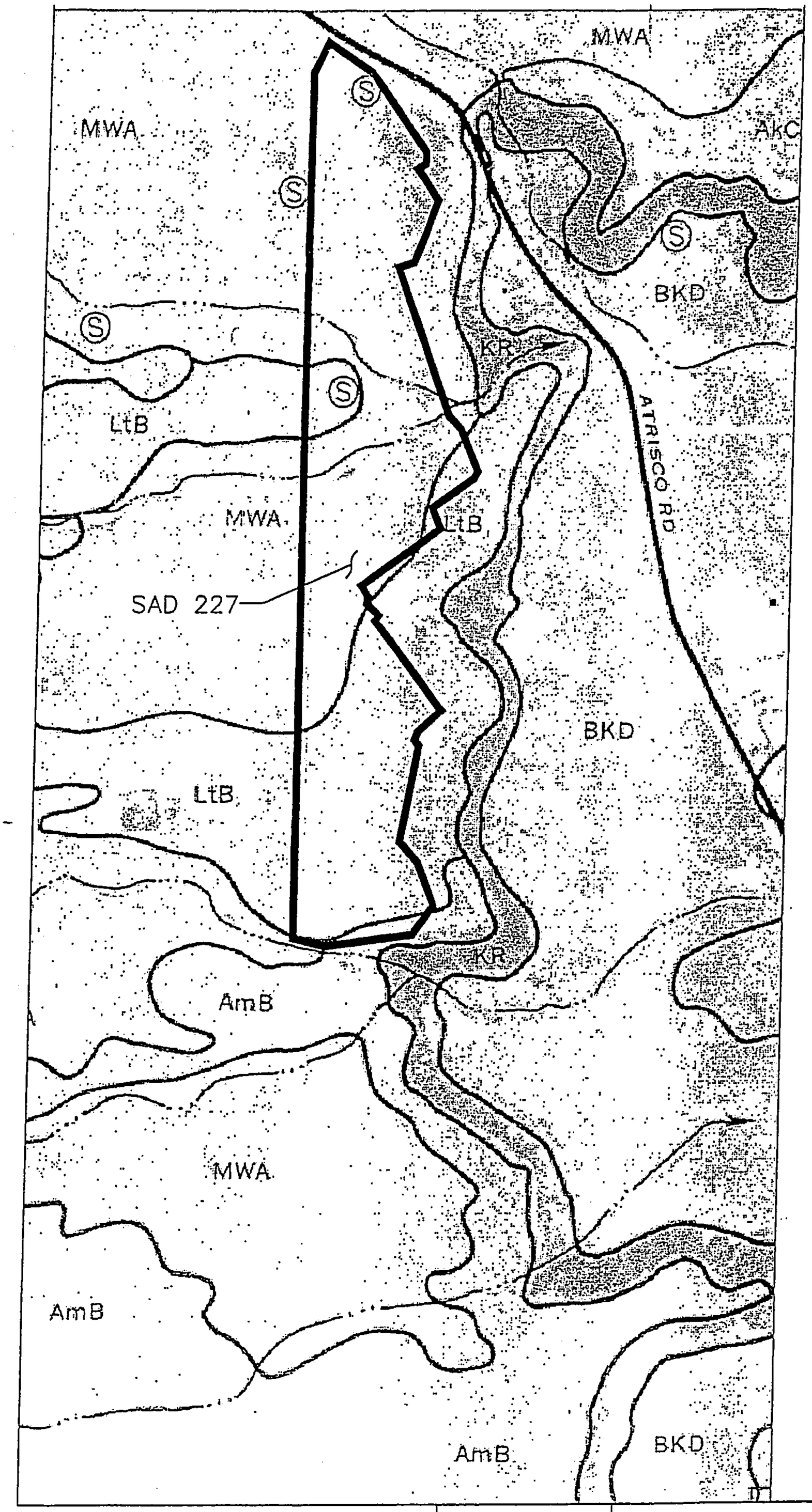
Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)
0.005000	0.020	24.90
0.006000	0.020	27.28
0.007000	0.020	29.47
0.008000	0.020	31.50
0.009000	0.020	33.41
0.010000	0.020	35.22
0.011000	0.020	36.94
0.012000	0.020	38.58
0.013000	0.020	40.15
0.014000	0.020	41.67
0.015000	0.020	43.13
0.016000	0.020	44.55
0.017000	0.020	45.92
0.018000	0.020	47.25
0.019000	0.020	48.54
0.020000	0.020	49.81
0.021000	0.020	51.04
0.022000	0.020	52.24
0.023000	0.020	53.41
0.024000	0.020	54.56
0.025000	0.020	55.68
0.026000	0.020	56.79
0.027000	0.020	57.87
0.028000	0.020	58.93
0.029000	0.020	59.97
0.030000	0.020	61.00

Street Flow Capacity Table

Street	Q100 (cfs)	Grade %)	Capacity (cfs)
Cliff	25	0.5	25
Popo	9	0.7	30
Mauna Loa	12	0.7	30
Victoria (S)	8	0.5	25
Kibo (S)	10	0.5	25
Shiprock	4	0.5	25
Kibo (N)	7	1	35
Victoria (N)	18	1.2	38
Monte Carlo	12	0.5	25
Casa Blanca (S)	14	0.5	25
Marigold	30	1	35
Casa Blanca (N)	16	1.5	43
Emerald	16	1.2	38
Jade	16	1.4	42
Onyx Dr.	8	1.5	43
Onyx Ct.	2	0.5	25
Rim Rock Dr.	20	0.9	33
Rim Rock Pl.	20	0.5	25

Appendix C

Soil and Flood Maps

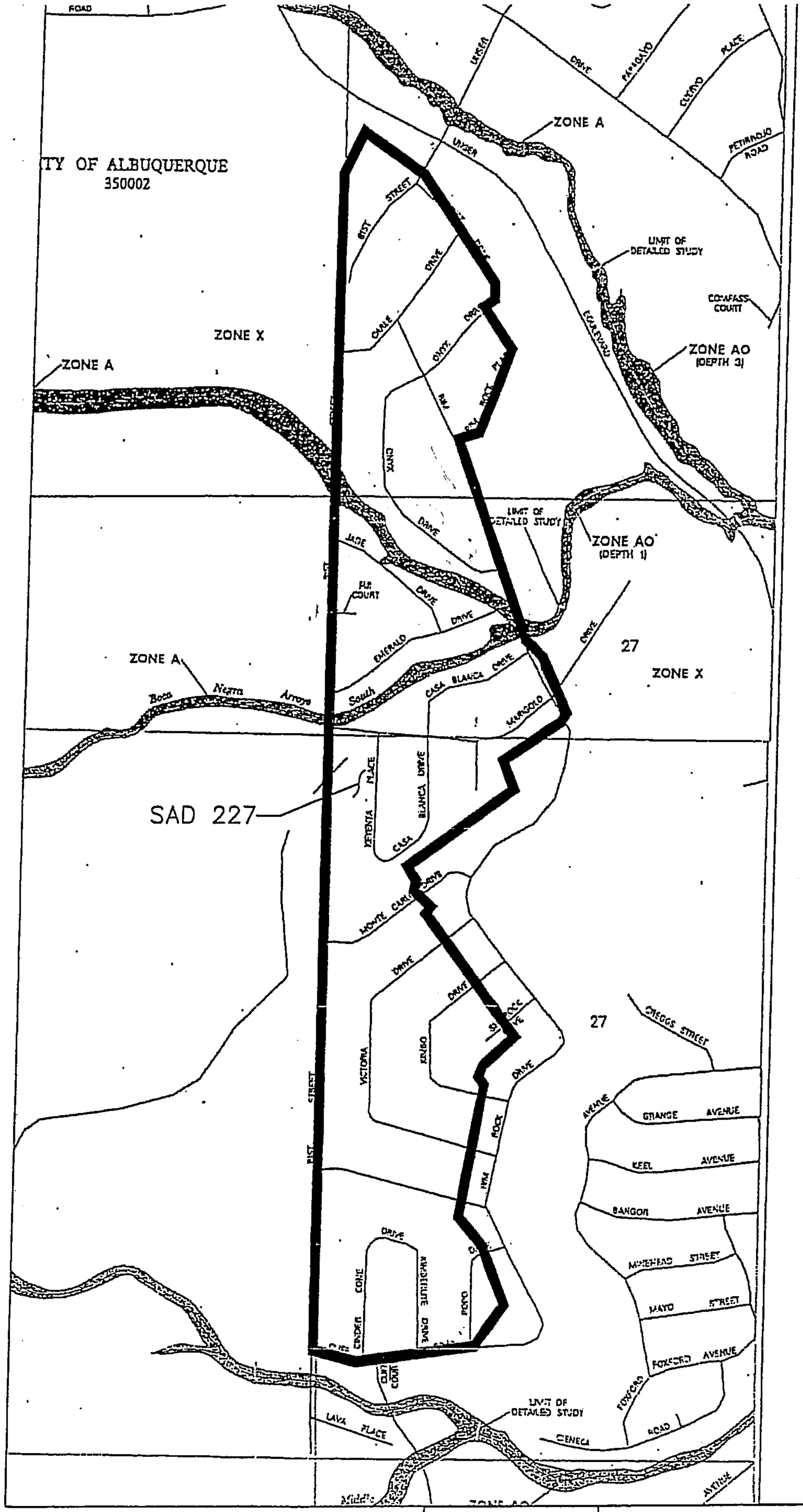


WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-8021

SAD 227

SOIL MAP

DESIGN X.X.X.	WCEA NO. X1218025	DATE JAN 2003	
DRAWN X.X.X.	PROJECT NO. N/A	SHEET NO. 1 OF 1	
CHECK X.X.X.			



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SAD 227

FLOOD MAP

DESIGN X.X.X.	WCEA NO. X1218025	DATE JAN 2003	
DRAWN X.X.X.	PROJECT NO. N/A	SHEET NO. 1 OF 1	
CHECK X.X.X.			

Appendix D

Unser Blvd Hydrology and Inlet and Structure Calculations

Hydrology:

The table below shows the land treatment and runoff within Unser Blvc. See Plates , 3, and 4 for locations of the basins.

Basin	Area (ac)	A	B	C	D	Q (cfs)
U1	2.2	0%	0%	0%	100%	7
U2	1.7	0%	0%	0%	100%	6
U3	0.9	0%	0%	0%	100%	3
U4	0.8	0%	0%	0%	100%	3
U5	0.8	0%	0%	0%	100%	3
U6	0.6	0%	0%	0%	100%	2
U7	0.6	0%	0%	0%	100%	2
U8	0.5	0%	0%	0%	100%	2
U9	0.5	0%	0%	0%	100%	2
U10	0.5	0%	0%	0%	100%	2
U11	0.5	0%	0%	0%	100%	2
U12	1.6	0%	0%	0%	100%	6
U13	3.7	0%	0%	0%	100%	14

U1
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope	0.006100 ft/ft				
Elevation range: 0.00 ft to 2.07 ft.					
Station (ft)	Elevation (ft)		Start Station	End Station	Roughness
0.00	0.67		0.00	38.00	0.013
0.00	0.00				
38.00	1.40				
38.00	2.07				
Discharge	7.26	cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.42	ft
Flow Area	2.37	ft^2
Wetted Perimeter	11.76	ft
Top Width	11.34	ft
Height	0.42	ft
Critical Depth	0.45	ft
Critical Slope	0.004263	ft/ft
Velocity	3.07	ft/s
Velocity Head	0.15	ft
Specific Energy	0.56	ft
Froude Number	1.18	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

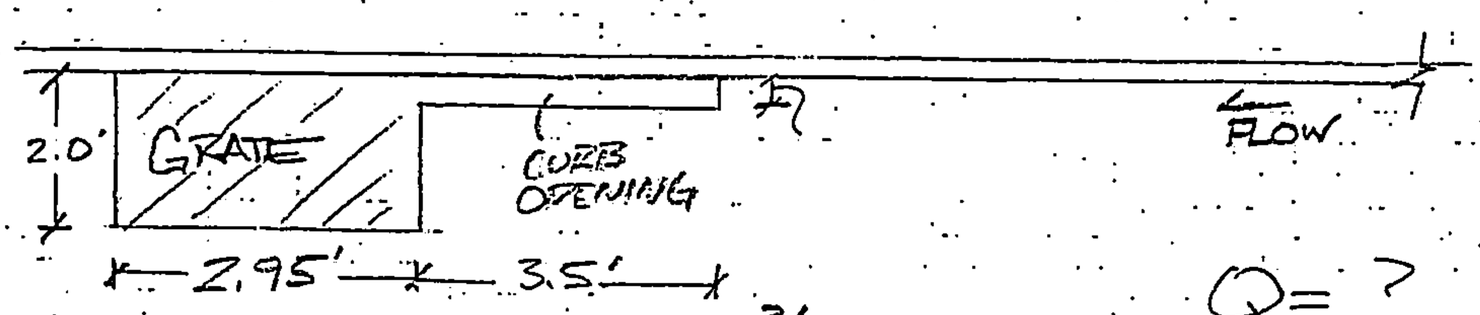
SUBJ. BASIN: U1 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



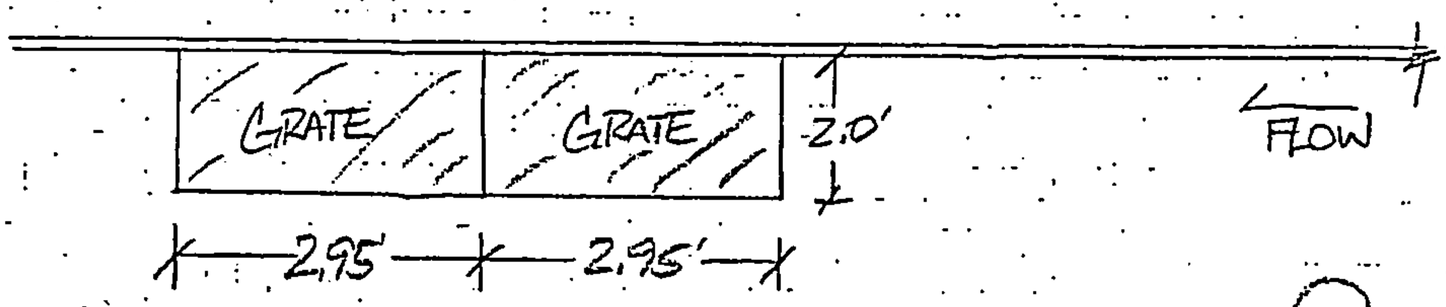
$Q = (3.0)(8.45)(0.42)^{3/2}$

$Q = 6.9$ cfs < BASIN U1 Q = 7.26

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.42'

PASS THRU 0.36 cfs

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95+2)(0.42)^{3/2}$

$Q = 4$ cfs > 0.36 (Remain Q)

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.42

USE 1 TYPE "A" INLET, 1 "SINGE C" FOR BASIN U1

U2
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.006100 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 6.05 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.39	ft
Flow Area	2.07	ft²
Wetted Perimeter	10.99	ft
Top Width	10.59	ft
Height	0.39	ft
Critical Depth	0.42	ft
Critical Slope	0.004368	ft/ft
Velocity	2.93	ft/s
Velocity Head	0.13	ft
Specific Energy	0.52	ft
Froude Number	1.17	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

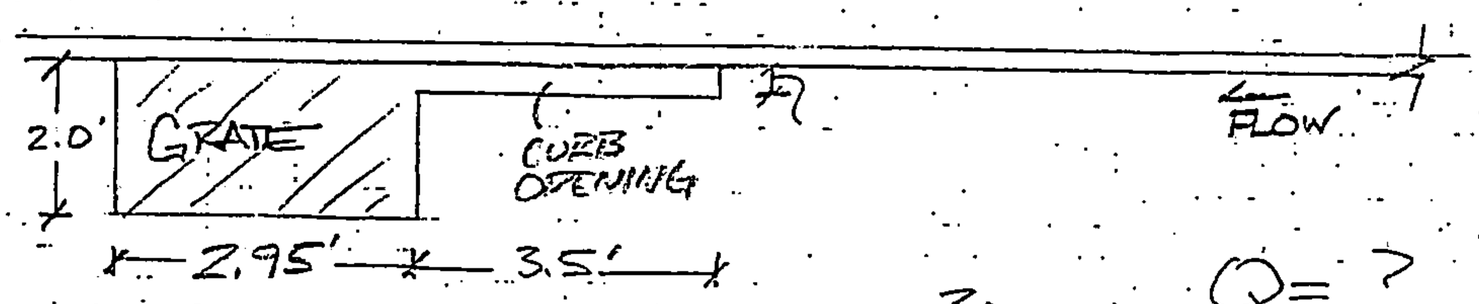
SUBJ. BASIN: U2 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



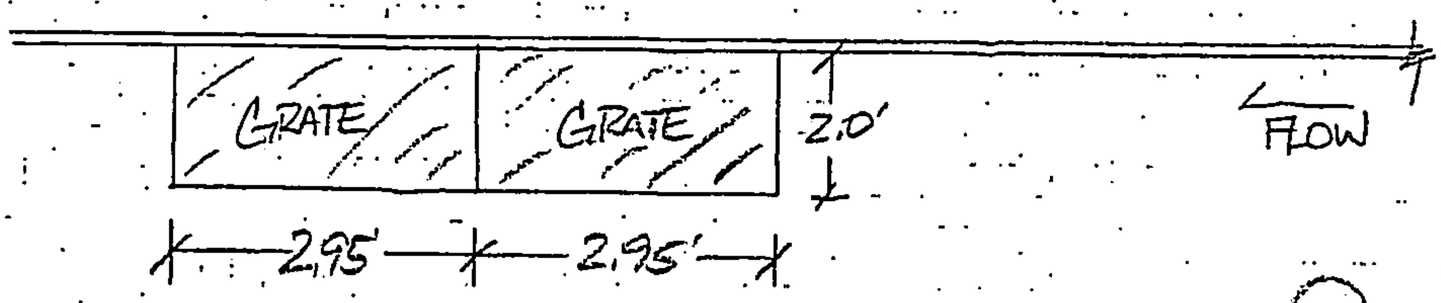
$Q = (3.0)(8.45)(0.39')^{3/2}$

$Q = 6.17$ cfs > BASIN U2 $Q = 6.05$ cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.39'

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1 - Type "A" FOR BASIN U2

U3
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 3
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.006100 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 3.39 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.31	ft
Flow Area	1.34	ft²
Wetted Perimeter	8.84	ft
Top Width	8.52	ft
Height	0.31	ft
Critical Depth	0.33	ft
Critical Slope	0.004719	ft/ft
Velocity	2.53	ft/s
Velocity Head	0.10	ft
Specific Energy	0.41	ft
Froude Number	1.13	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

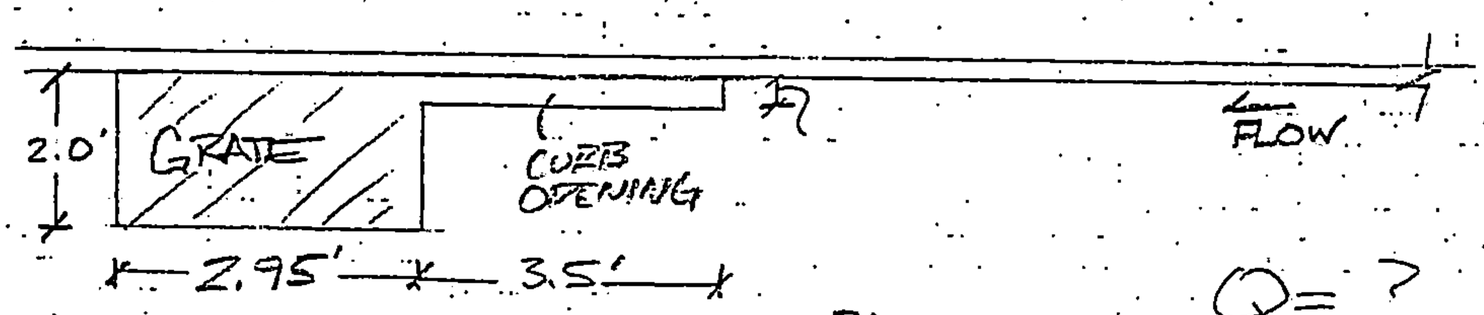
SUBJ. BASIN: U3 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET

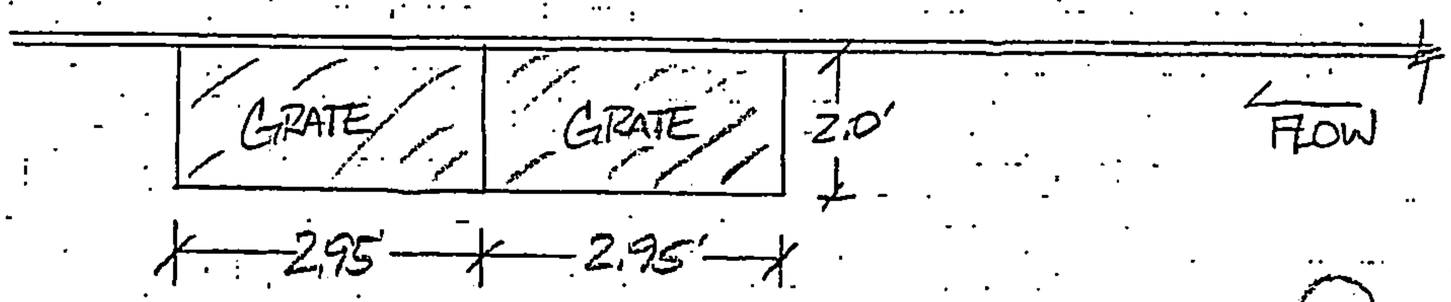


$Q = (3.0)(8.45)(0.31')^{3/2}$

$Q = 4.38$ cfs > BASIN U3 3.39 cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.31'

TYPE "Double C" STORM INLET



Q =

Q =

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

USE 1 TYPE "A" INLET for BASIN U3

U5
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 2.91 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.19	ft
Flow Area	0.51	ft²
Wetted Perimeter	5.45	ft
Top Width	5.25	ft
Height	0.19	ft
Critical Depth	0.31	ft
Critical Slope	0.004816	ft/ft
Velocity	5.72	ft/s
Velocity Head	0.51	ft
Specific Energy	0.70	ft
Froude Number	3.24	

Flow is supercritical.

U6
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 1.43 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			

Discharge 1.94 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.13	ft
Flow Area	0.43	ft²
Wetted Perimeter	6.72	ft
Top Width	6.58	ft
Height	0.13	ft
Critical Depth	0.21	ft
Critical Slope	0.005392	ft/ft
Velocity	4.47	ft/s
Velocity Head	0.31	ft
Specific Energy	0.44	ft
Froude Number	3.07	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

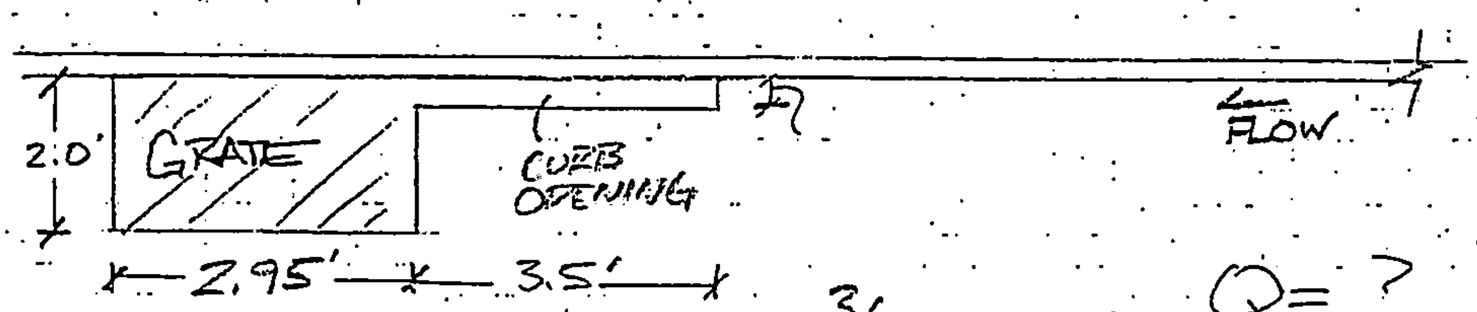
SUBJ. BASIN: U6 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



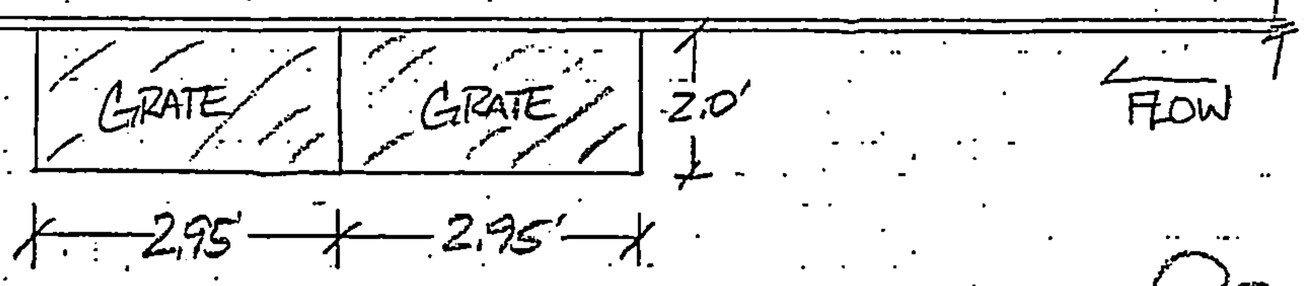
$Q = (3.0)(8.45)(0.13)^{3/2}$

$Q = 1.18$ cfs < BASIN U6 $Q = \underline{1.94}$ cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.13'

PASS THRU = 0.76 cfs

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95 + 2.0)(0.13)^{3/2}$

$Q = 0.7$ cfs $\approx$ 0.76 cfs

OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.13

USE 1 - TYPE "A" & 1 - TYPE "SINGLE C"

FOR BASIN U6

U7
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 7
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 1.43 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			

Discharge 1.94 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.13	ft
Flow Area	0.43	ft^2
Wetted Perimeter	6.72	ft
Top Width	6.58	ft
Height	0.13	ft
Critical Depth	0.21	ft
Critical Slope	0.005392	ft/ft
Velocity	4.47	ft/s
Velocity Head	0.31	ft
Specific Energy	0.44	ft
Froude Number	3.07	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

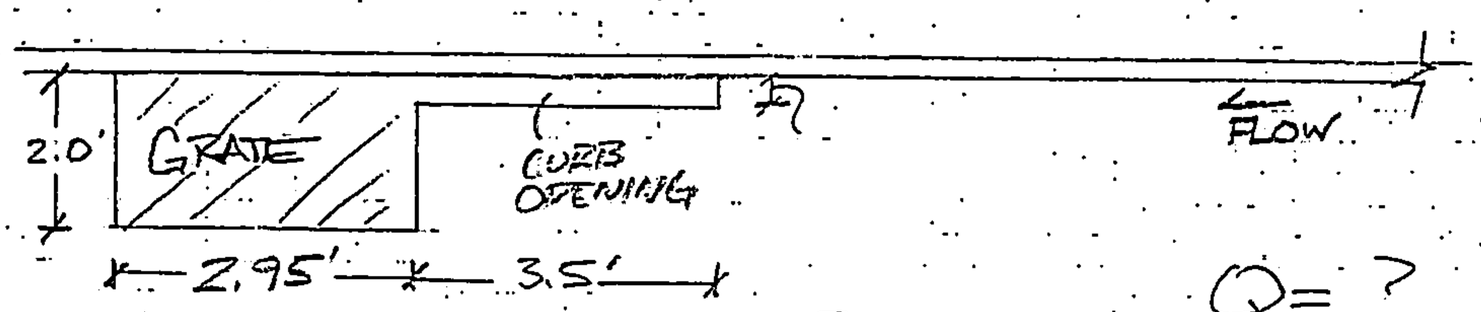
SUBJ. BASIN: U7 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



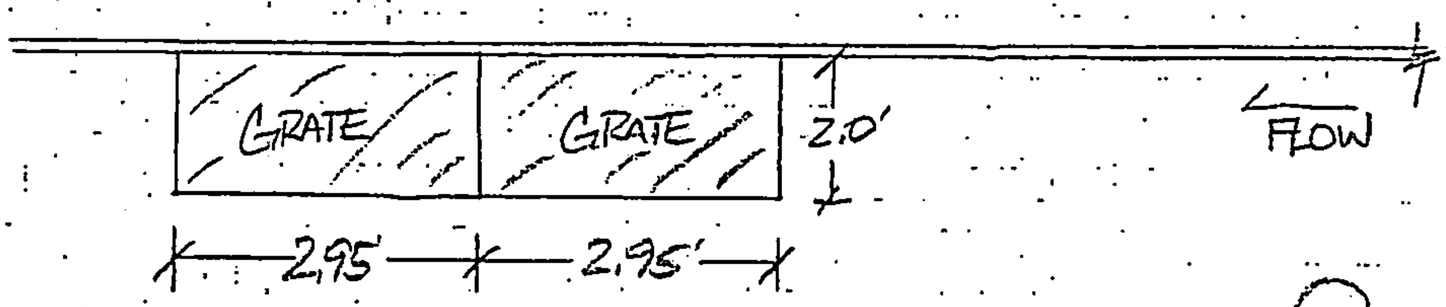
$Q = (3.0)(8.45)(0.13)^{3/2}$

$Q = 1.18 <$ BASIN U7 $Q = 1.94$ cfs

PASS THRU = 0.76 cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.13

TYPE "Double C" STORM INLET



$Q = (3.0)(2.95 + 2.0)(0.13)^{3/2}$

$Q = 0.70$ cfs ≈ 0.76 OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.13

USE 1-TYPE "A" & 1-TYPE SINGLE "C" FOR BASIN U7

U8
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 1.70 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.34	ft^2
Wetted Perimeter	4.46	ft
Top Width	4.30	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005174	ft/ft
Velocity	5.00	ft/s
Velocity Head	0.39	ft
Specific Energy	0.55	ft
Froude Number	3.13	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

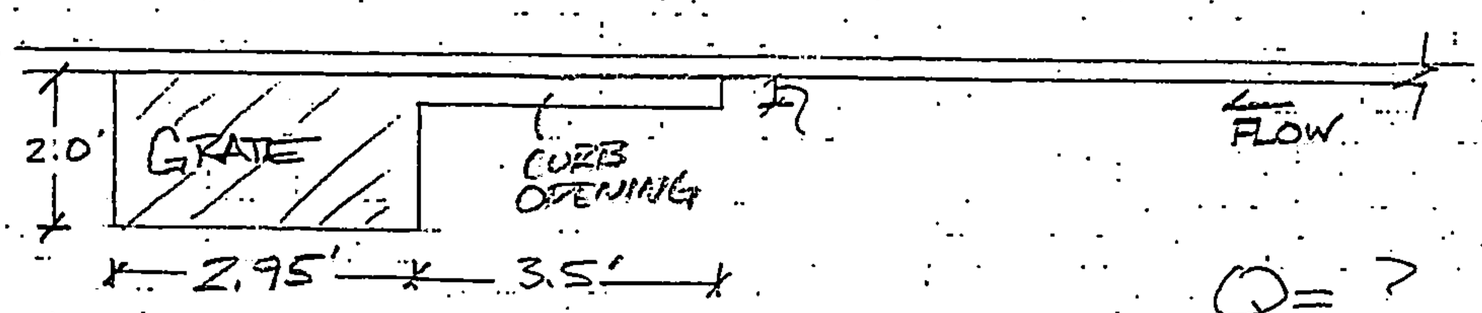
SUBJ. BASIN: U8 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET

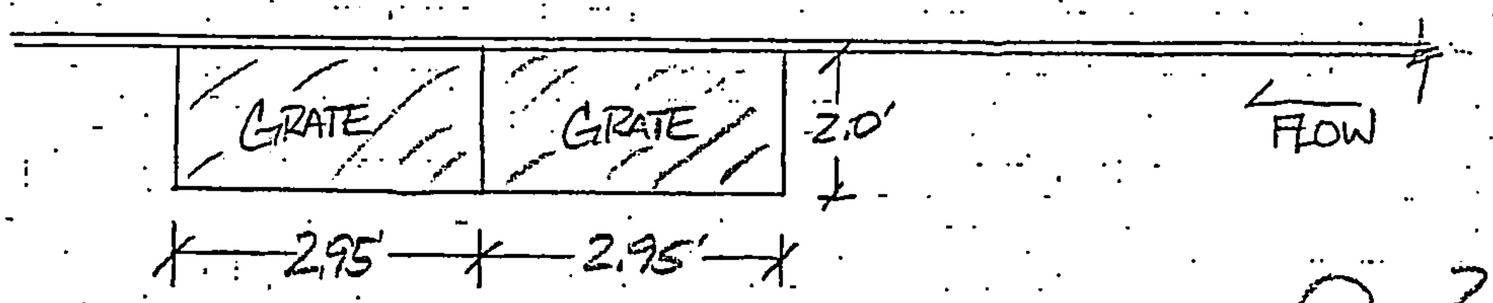


$Q = ?$
$C = 3.0$
$L = 3.5 + 2.95 + 2.0 = 8.45$
$H = 0.16'$

$Q = (3.0)(8.45)(0.16)^{3/2}$

$Q = 1.62$ < BASIN U8 $Q = 1.70$ cfs

TYPE "Double C" STORM INLET



$Q = ?$
$C = 3.0$
$L = (2.95 \times 2) + 2.0 = 7.9$
$H =$

$Q =$

$Q =$

USE 1-TYPE "A" INLET FOR BASIN U8

U9
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 9
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.059200 ft/ft			
Elevation range: 0.00 ft to 2.07 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			
Discharge	1.70 cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.34	ft²
Wetted Perimeter	4.46	ft
Top Width	4.30	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005174	ft/ft
Velocity	5.00	ft/s
Velocity Head	0.39	ft
Specific Energy	0.55	ft
Froude Number	3.13	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

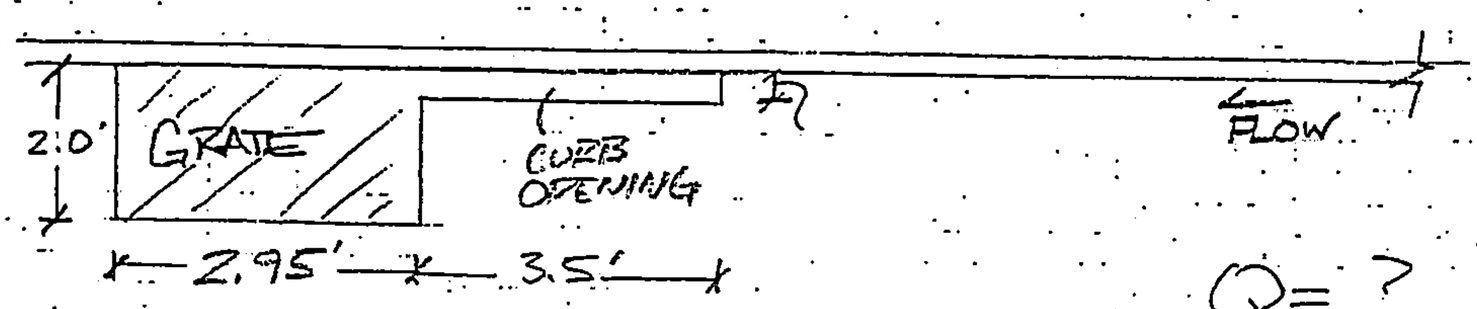
SUBJ. BASIN: 49 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



$Q = (3.0)(8.45)(0.16)^{3/2}$

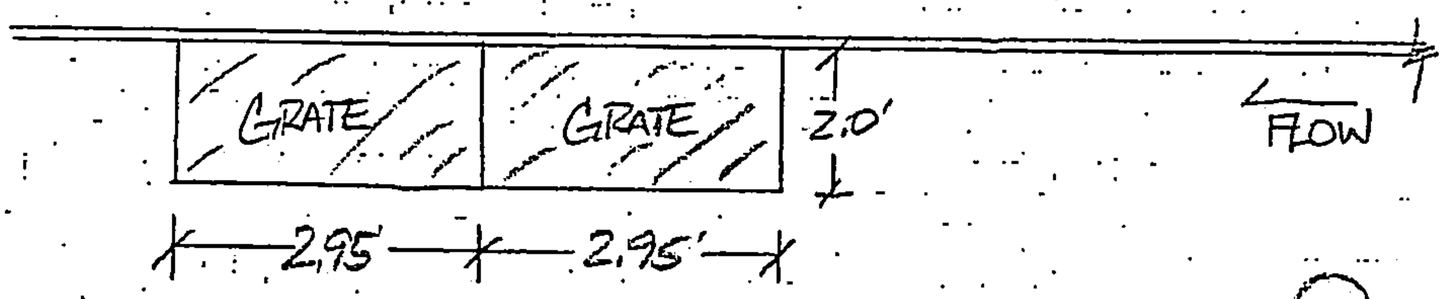
$Q = 1.62$ cfs <

BASIN 49
Q = 1.70 cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.16'

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1-TYPE "A" INLET
FOR BASIN 49

U10
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 10
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 1.75 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.35	ft²
Wetted Perimeter	4.51	ft
Top Width	4.34	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005153	ft/ft
Velocity	5.04	ft/s
Velocity Head	0.39	ft
Specific Energy	0.55	ft
Froude Number	3.14	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

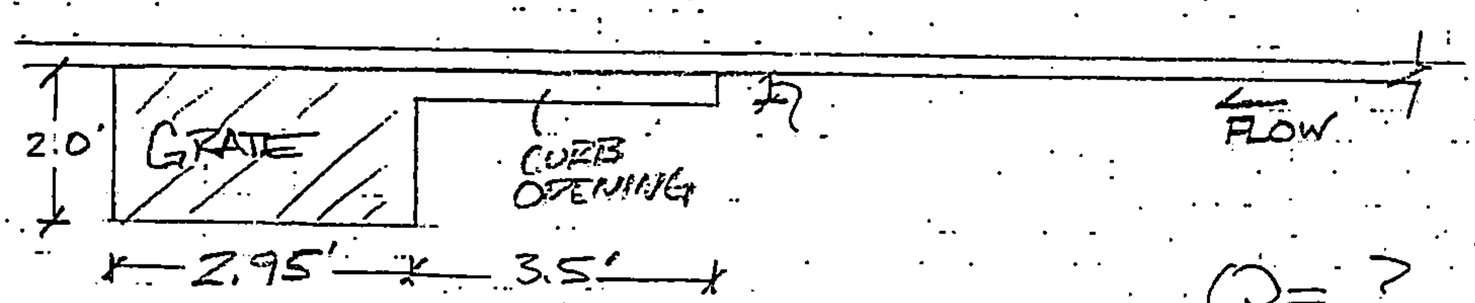
SUBJ. BASIN: U10 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



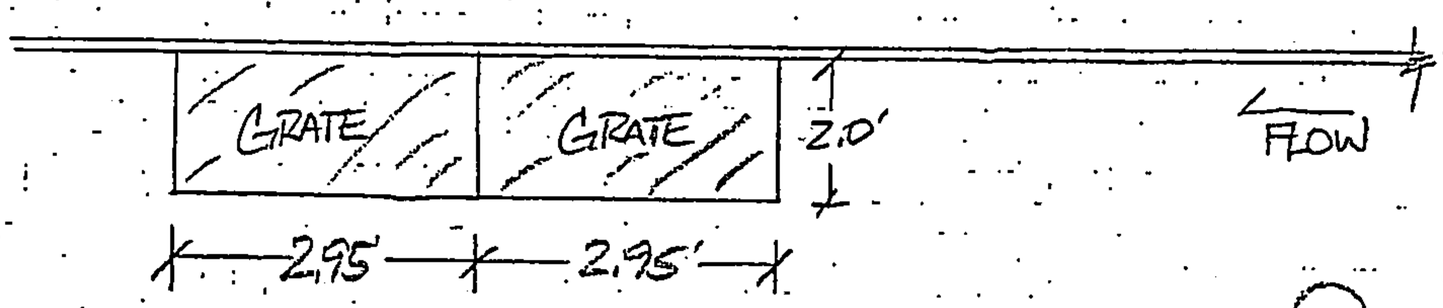
$Q = (3.0)(8.45)'(0.16)^{3/2}$

$Q = 1.62$ < BASIN U10 Q = 1.75 cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.16

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1-TYPE "A" INLET FOR BASIN U10

U11
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 11
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.059200 ft/ft

Elevation range: 0.00 ft to 2.07 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	1.40			
38.00	2.07			

Discharge 1.77 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.16	ft
Flow Area	0.35	ft^2
Wetted Perimeter	4.52	ft
Top Width	4.36	ft
Height	0.16	ft
Critical Depth	0.25	ft
Critical Slope	0.005145	ft/ft
Velocity	5.05	ft/s
Velocity Head	0.40	ft
Specific Energy	0.56	ft
Froude Number	3.14	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

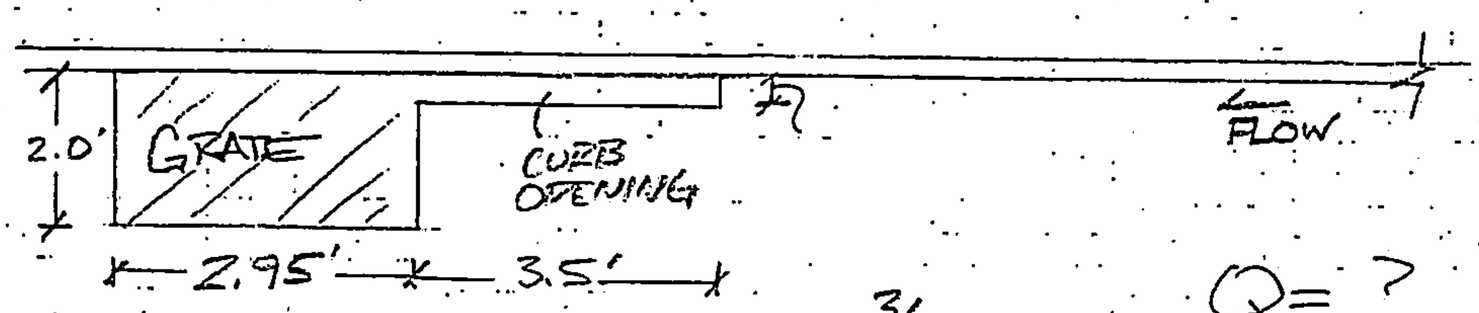
SUBJ. BASIN: U11 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



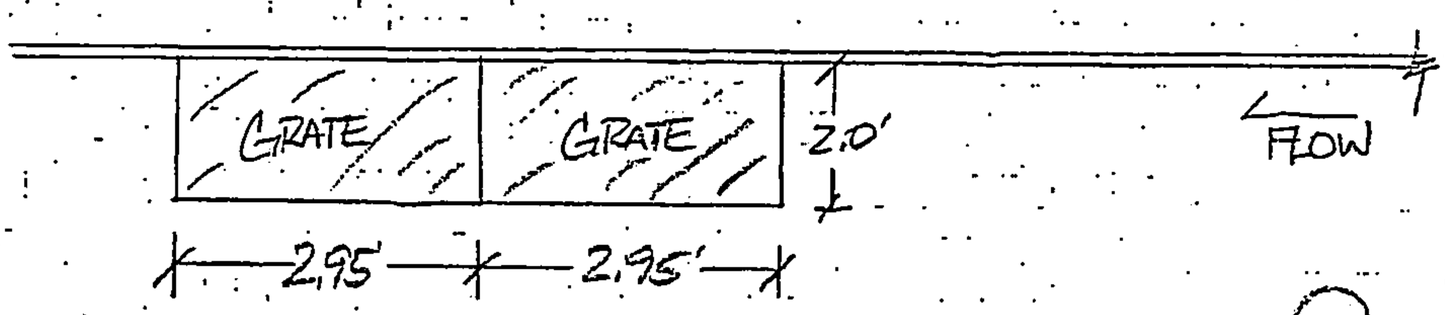
$Q = (3.0)(8.45)(0.16)^{3/2}$

$Q = 1.62$ cfs < BASIN U11 $Q = 1.77$ cfs

OK

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.16

TYPE "Double C" STORM INLET



Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H =

Q =

Q =

USE 1-TYPE "A" INLET FOR BASIN U11

U12
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 12
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.021800 ft/ft

Elevation range: 0.00 ft to 1.43 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	38.00	0.013
0.00	0.00			
38.00	0.76			
38.00	1.43			

Discharge 6.05 cfs

Results

Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.24	ft
Flow Area	1.48	ft^2
Wetted Perimeter	12.41	ft
Top Width	12.16	ft
Height	0.24	ft
Critical Depth	0.33	ft
Critical Slope	0.004634	ft/ft
Velocity	4.09	ft/s
Velocity Head	0.26	ft
Specific Energy	0.50	ft
Froude Number	2.07	

Flow is supercritical.

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

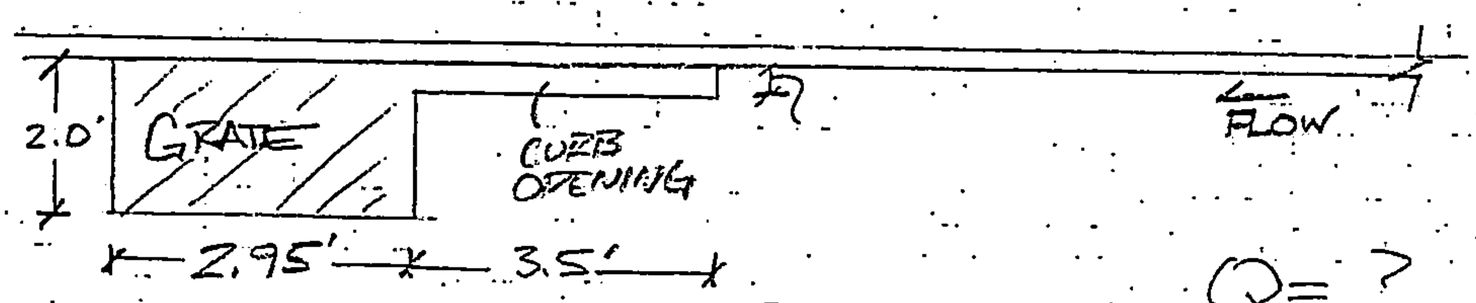
SUBJ. BASIN: U12 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of FLOW ABOVE Elevation OF CREST (ft)

TYPE "A" STORM INLET



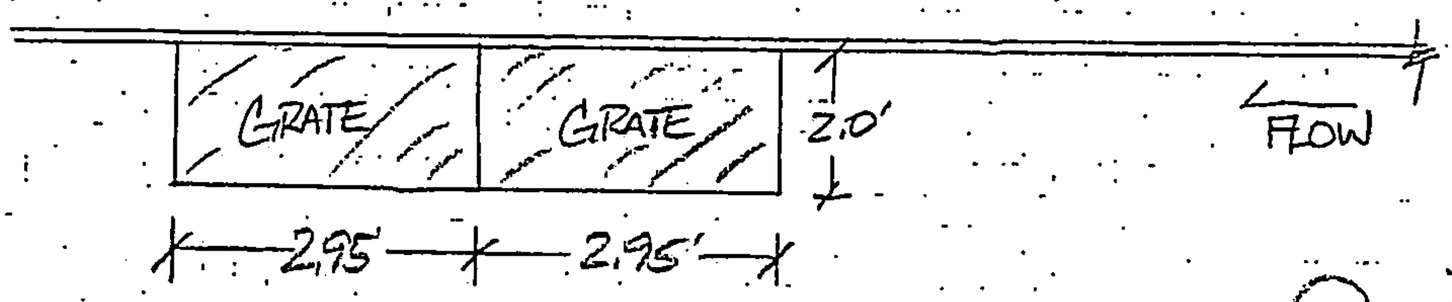
$Q = ?$
$C = 3.0$
$L = 3.5 + 2.95 + 2.0 = 8.45$
$H = 0.24'$

$Q = (3.0)(8.45)(0.24)^{3/2}$

$Q = 2.98$ cfs < BASIN U12 Q = 6.05

NG PASS THRU = 3.07 cfs

TYPE "Double C" STORM INLET



$Q = ?$
$C = 3.0$
$L = (2.95 \times 2) + 2.0 = 7.9$
$H = 0.24$

$Q = (3.0)(7.9)(0.24)^{3/2}$

$Q = 2.8 \sim 3.07$

OK

USE 1-TYPE "A" & 1-TYPE "DOUBLE C"

INLETS FOR BASIN U12

U13
Worksheet for Irregular Channel

Project Description	
Project File	x:\public\projects\x1218025\m\drainage\flowmaster\unser.fm2
Worksheet	U 13
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope	0.021800 ft/ft				
Elevation range: 0.00 ft to 1.43 ft.					
Station (ft)	Elevation (ft)		Start Station	End Station	Roughness
0.00	0.67		0.00	38.00	0.013
0.00	0.00				
38.00	0.76				
38.00	1.43				
Discharge	14.02	cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.33	ft
Flow Area	2.78	ft^2
Wetted Perimeter	17.01	ft
Top Width	16.67	ft
Height	0.33	ft
Critical Depth	0.46	ft
Critical Slope	0.004143	ft/ft
Velocity	5.04	ft/s
Velocity Head	0.40	ft
Specific Energy	0.73	ft
Froude Number	2.18	
Flow is supercritical.		

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

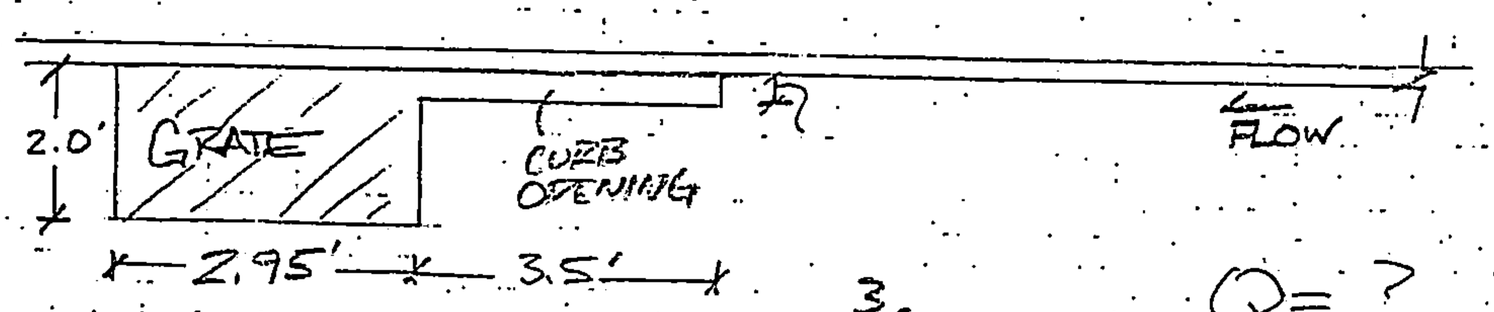
SUBJ. BASIN: U13 OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = CLH^{3/2}$

Q = Discharge (cfs)
C = Discharge Coefficient
L = Effective Length of Crest (ft)
H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



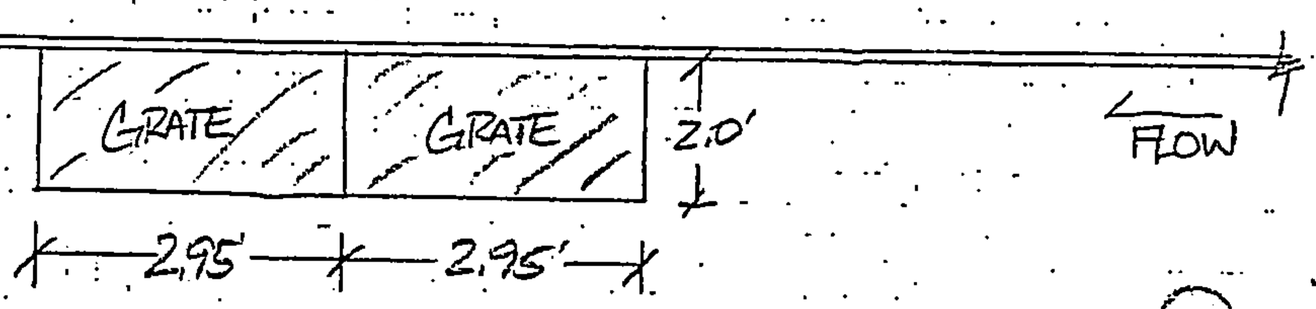
$Q = 3.0(8.45)(0.33)^{3/2}$

$Q = 4.81$ cfs < BASIN U13 Q: 14.62

NG; PASS THRU 9.21 cfs

Q = ?
C = 3.0
L = 3.5 + 2.95 + 2.0 = 8.45
H = 0.33'

TYPE "Double C" STORM INLET



$Q = (3)[(7.9) \times 2](0.33)^{3/2}$

$Q = 9$ cfs ≈ 9.21 OK

Q = ?
C = 3.0
L = (2.95 x 2) + 2.0 = 7.9
H = 0.33

USE 1 - TYPE "A" & 2 - TYPE "Double C" INLETS FOR BASIN U13

COMP. SJS

CK.

DATE 6/03

WILSON & COMPANY

LOC. Albuquerque, NM FILE

PROJ. SAD 227 SHEET

SUBJ. BASIN: OF

CAPACITY OF GRATE INLETS AS WEIRS

$Q = C L H^{3/2}$

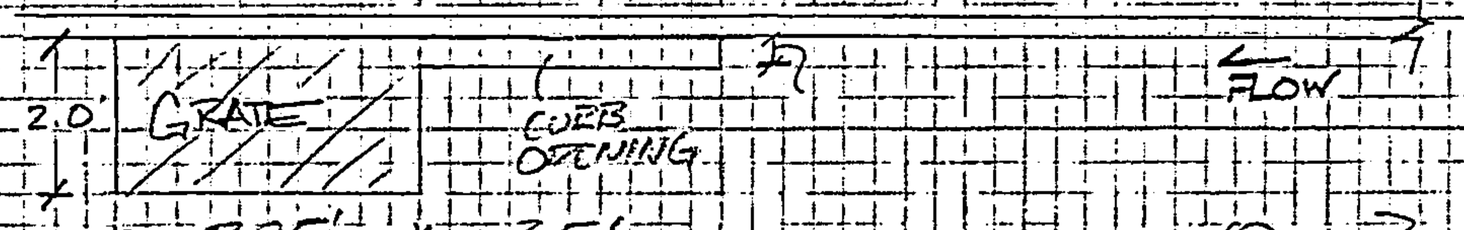
Q = Discharge (cfs)

C = Discharge Coefficient

L = Effective Length of Crest (ft)

H = Depth of Flow Above Elevation of Crest (ft)

TYPE "A" STORM INLET



Q = ?

C = 3.0

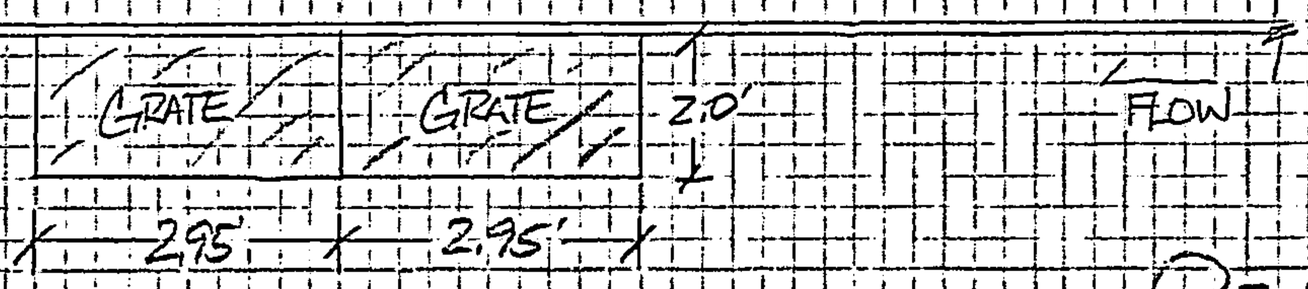
L = 3.5 + 2.95 + 2.0 = 8.45

H =

Q =

Q =

TYPE "Double C" STORM INLET



Q = ?

C = 3.0

L = (2.95 x 2) + 2.0 = 7.9

H =

Q =

Q =

COMP. SJM

CK. DSA

DATE 6-11-03

WILSON & COMPANY

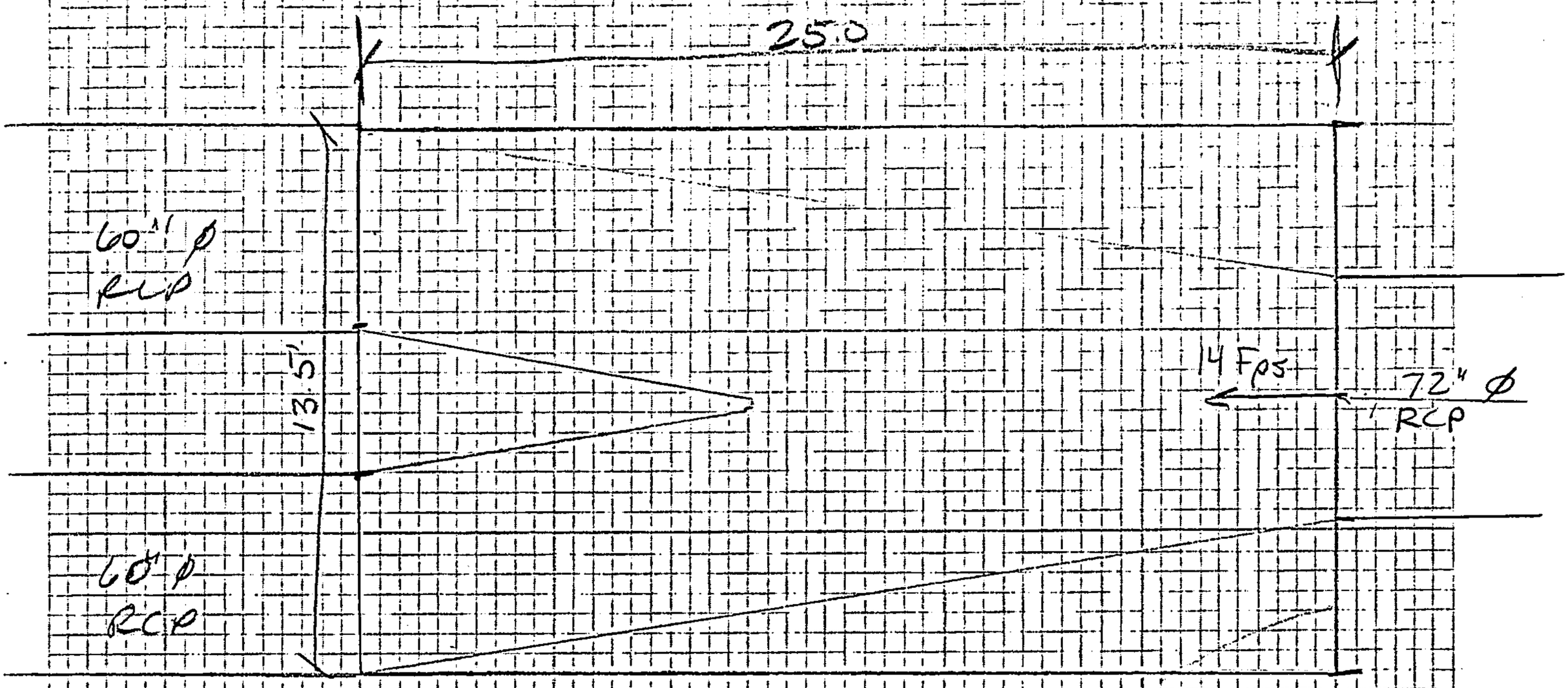
LOC. ACQ

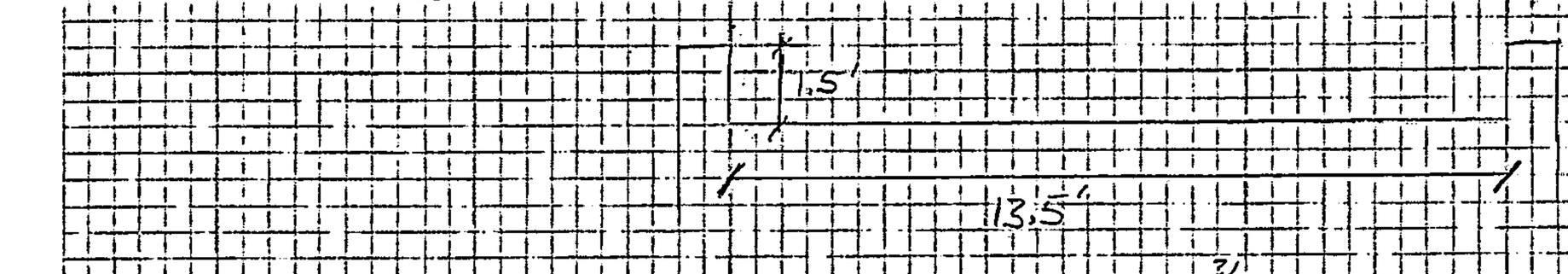
PROJ. SAO 227

SUBJ. 72" / 2-60" Trans. Struct. Calcs

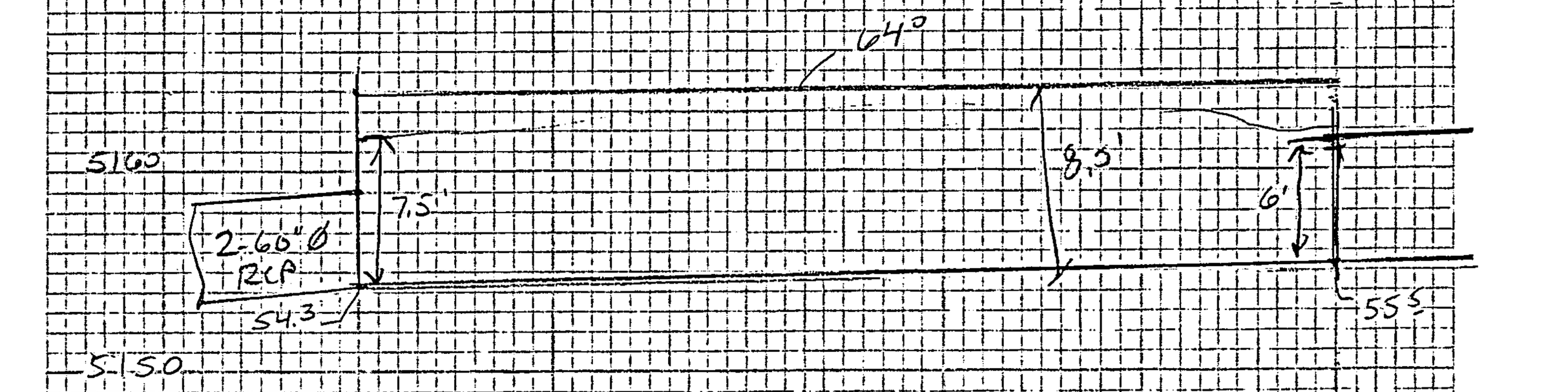
FILE X1218025

SHEET 1 OF 1





$$Q = CLH^{3/2} = 3(13.5)(1.5)^{3/2} = 74.4 \text{ cfs}$$



$$F = \frac{V_1}{\sqrt{g y_1}} = \frac{14}{\sqrt{32.2(6)}} = 1.0$$

From Fig. 15-4 Chow $\frac{L}{y_2} = 4.0$ $L = 25$ $y_2 = 6.25 < 7.5 < 8.5'$

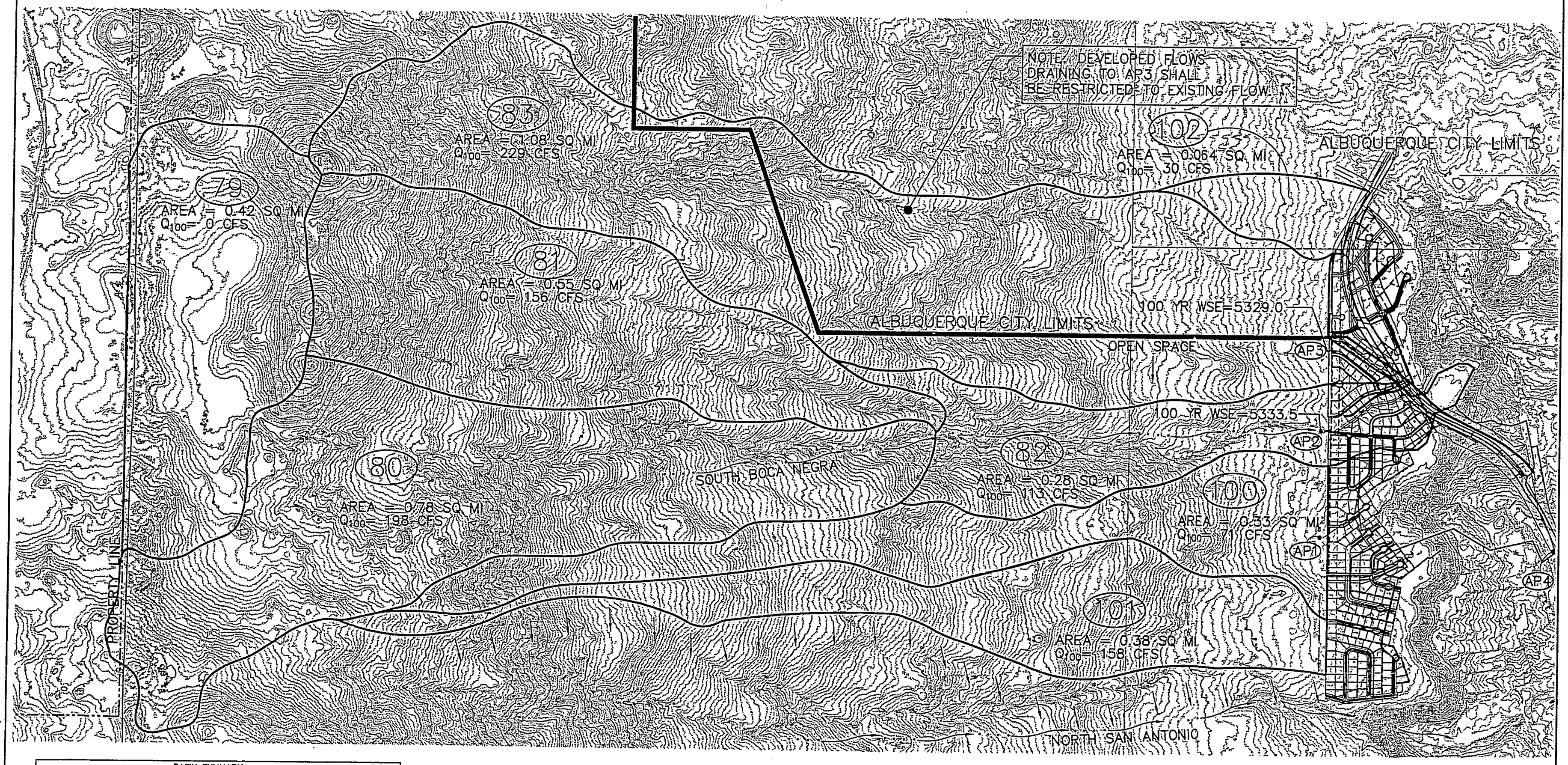
Unser Boulevard Transition Structure
COA Project # 707391

TRANSITION STRUCTURE CALCULATIONS

Structure - 1-72" Pipe to 2-60" Pipes

TW (ft.)	3.95	(W.S. Elev - Min. Ch. Elev.) from Hydraflc
D (ft.)	6	
Q (cfs)	400	
V (fps)	14	

TW/D	0.7		
Q/D^2.5	4.5		
Yo/D	0.88		From Table 20.5
Yo (ft.)	5.28		=(Yo/D)*D
Ao (ft.^2)	23.81		
Vo (fps)	16.80		=Q/Ao
	(Calc'd)	(Design) (HEC-RAS)	
Froude, Fr	1.29	n/a	=Vo/((gYo)^0.5)
Dist. To Ya, L	14		
(in multiples of D)	2.3		
Ya/Yo (Fig. 20.3)	0.22		
Brink Depth, Ya	1.2		=(Ya/Yo)(Yo)
	(radians)	(degrees)	
Opt. Flare Angle	0.4	23.2	
Design Flare Angle	0.26	15.0	
	(Calc'd)	(Design)	
Dnstrm Ave. Depth	3.95		(from HEC-RAS)
Initial Width, Wo	6		
W2	10		
Length	4.7	14.0	



BASIN SUMMARY						
			PROPOSED		EXISTING	
BASIN	AREA (sq mi)	AREA (ac)	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)
80	0.78	500	198	17.80	198	17.80
81	0.55	352	156	11.50	156	11.50
82	0.28	180	113	5.80	113	5.80
83	1.08	691	229	23.40	229	23.40
100	0.33	211	71	6.29	71	6.29
101	0.38	243	158	7.23	158	7.23
102	0.06	41	30	1.20	30	1.20

ANALYSIS POINT SUMMARY						
		PROPOSED			EXISTING	
AP NO.	DESCRIPTION	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)	VOL100 STORED (ac-ft)	Q100 24 hr (cfs)	VOL100 24 hr (ac-ft)
1	MONTE CARLO	37.5	6.29	2.5	71	6.29
2	SOUTH BRANCH OF THE BOCA NEOGRA ARROYA	366	35.0		366	35.0
3	NORTH BRANCH OF THE BOCA NEOGRA ARROYO	260	23.4		260	23.4
4	DISCHARGE AT MONTANO	399			135	

LEGEND

5070 — EXISTING INTERMEDIATE CONTOUR

5071 — EXISTING INDEX CONTOUR

80 — BASIN ID

EXISTING BASIN BOUNDARY

N

GRAPHIC SCALE

600 0 300 600 1,200 2,400

(IN FEET)
1 inch = 600 ft.

WCEA #X1218025
MONTH 2003

WILSON & COMPANY
4900 LANG AVENUE N.E.
SUITE 100
ALBUQUERQUE, NEW MEXICO
87109
(505) 348-4000

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OFFSITE BASIN BOUNDARY MAP

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707301		PLATE 1

X:\Public\PROJECTS\X1218025\U\SHEETS\8125DRWU01.dwg 6/12/2003 10:07:08 AM MDT

POND
100 YR WSELEV 5324.80
Q_{100}=37.50CFS

81st STREET BUILD 36" END SECTION

CINDER CONE DRIVE
KIMBERLITE DRIVE
CLIFF ROAD
POPO DRIVE
PIMROCK DRIVE
MAUNA LOA DRIVE
VICTORIA DRIVE
KIBO DRIVE
SHERBROOK COURT
MONTE CARLO DRIVE
CASAMBLANCA DRIVE
KEYEN
CASA

1 11.1 Ac. 25 cfs
2 3.4 Ac. 9 cfs
3 4.6 Ac. 12 cfs
4 8.6 Ac. 8 cfs
5 5.4 Ac. 14 cfs
6 2.8 Ac. 7 cfs
7 6.8 Ac. 18 cfs
8 4.7 Ac. 12 cfs
9 2.1 Ac. 4 cfs
10 2.5 Ac. 5 cfs
A1 3.1 Ac. 8.4 cfs

MATCH LINE
SEE SHEET PLATE 3

LEGEND

5070	EXISTING INTERMEDIATE CONTOUR
5071	EXISTING INDEX CONTOUR
■	PROPOSED SINGLE TYPE "C" INLET
	PROPOSED BASIN BOUNDARY
(80)	BASIN ID

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

WCEA #X1218025
JUNE 2007

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ROBERT S. MACLAKE
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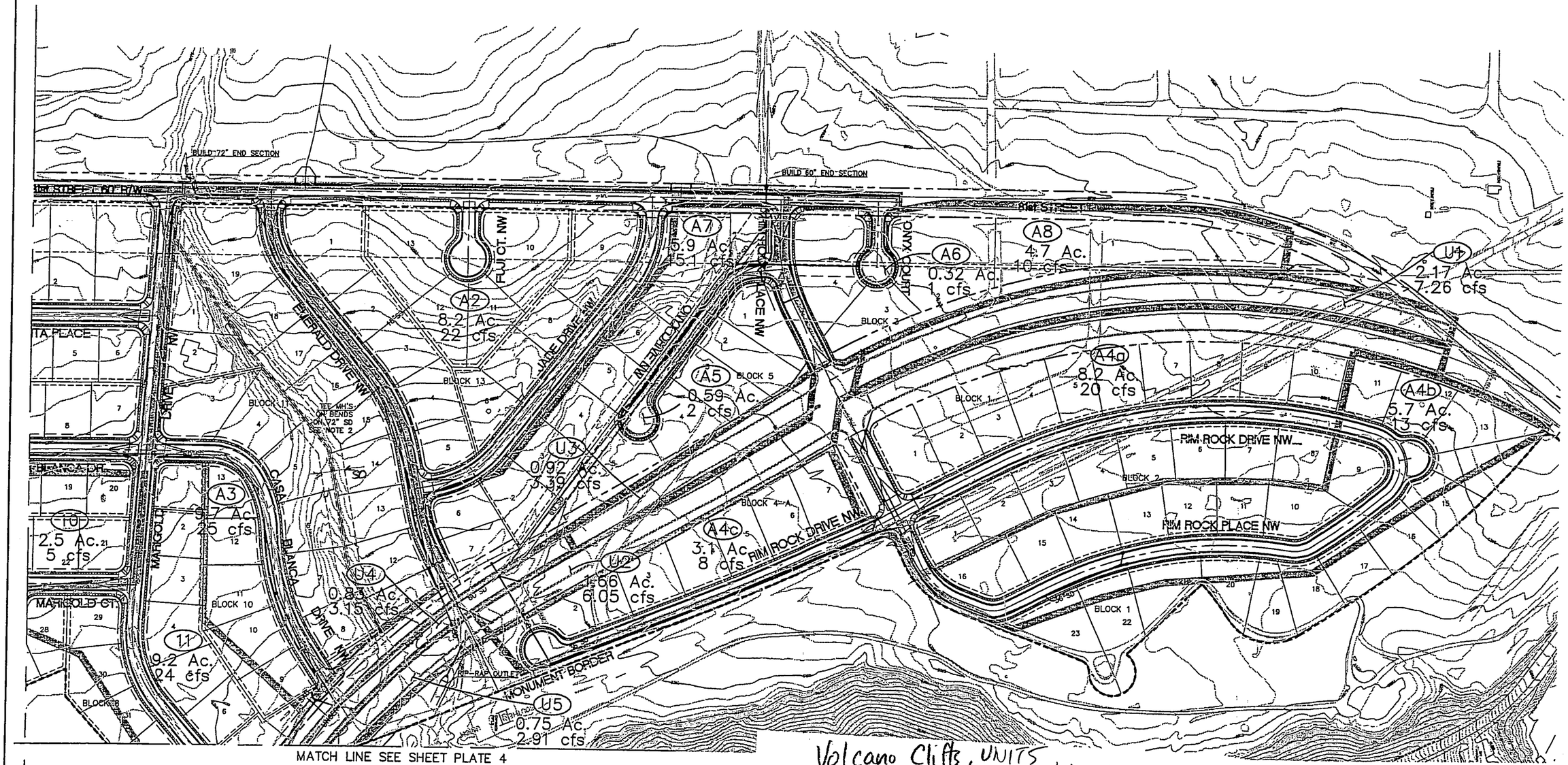
LICENSED PROFESSIONAL ENGINEER

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707301	D-13, E-13	PLATE 2



MATCH LINE SEE SHEET PLATE 4

MATCH LINE
SEE SHEET PLATE 2

Volcano Cliffs, UNIT 5
Book D3-175 - Nov 1, 1967
~ 50' wide drainage easement
- 25' on each side

NOTE:
1. ALL SOTRM DRAIN IN UNSER BLVD. SHALL BE CONSTRUCTED WITH THE UNSER PROJECT.
2. THE BENDS IN THE 72" STORM DRAIN SHALL BE INCLUDED IN THE BID ITEM 910.029 72" RCP, CL III"ONSE SEPARATE PROJECT WILL BE MADE FOR BENDS.

LEGEND

5070	EXISTING INTERMEDIATE CONTOUR
5071	EXISTING INDEX CONTOUR
■	PROPOSED SINGLE TYPE "C" INLET
	PROPOSED BASIN BOUNDARY
(80)	BASIN ID

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

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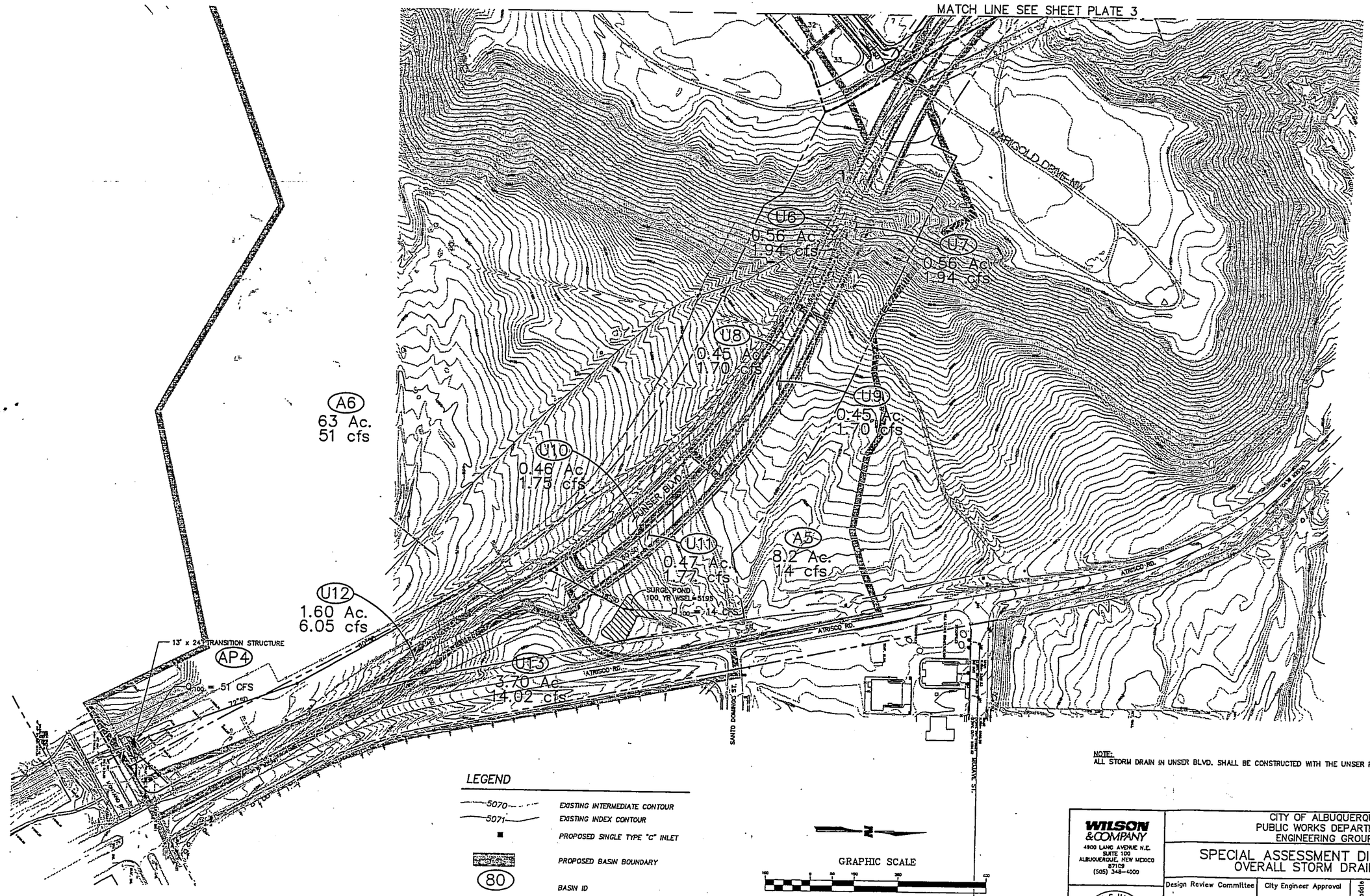
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No. | Zone Map No. | Sheet PLATE 3

WCEA #X1218025



NOTE:
ALL STORM DRAIN IN UNSER BLVD. SHALL BE CONSTRUCTED WITH THE UNSER PROJECT.

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PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

SPECIAL ASSESSMENT DISTRICT 227
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet
707701		PLATE 4

WCEA #X1218025

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