DR63: 5

GOLF COURSE ROAD
DRAINAGE SYSTEM ANALYSIS

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INTRODUCTION

This report is an amendment to the final drainage report for the Golf Course Road Widening Project from Southern Boulevard to Westside Boulevard. It outlines the hydrologic and hydraulic analysis performed to provide the City of Rio Rancho with a capacity analysis and recommendations for adequately conveying runoff within the corridor using the assumptions of free discharge from the full depth commercial properties along the west side of the roadway as identified in the Black Arroyo Watershed Management Plan (BLWMP) prepared for Southern Sandoval County Arroyo Flood Control Authority. The analysis provides adjusted hydrology for modified drainage basins as shown in the BLWMP and the hydraulic analysis of the storm drain system to handle the ultimate developed conditions. A basin boundary map showing the limits of the analysis is included on Plate 1.

The purpose of the analysis is to model the existing storm drain system as-built with the Golf Course Road widening project and identify the capacity for conveyance of the ultimate conditions model as defined in the BLWMP.

DRAINAGE CRITERIA

Drainage requirements of the City of Rio Rancho were the basis of analysis for this drainage report. The following is a section taken from the City's drainage criteria stated in the City Health, Safety and Sanitation Ordinance, Article 8-7-7.

8.7.7

B. The 100-year design storm runoff shall not exceed a depth of 0.87 feet at any point within the street right-of-way, or 0.2 feet above top of curb, in any street or enter private property, built in compliance with appropriate regulations, from a street, except in recorded drainage or flood control easements or rights-of-way (or historic channels and watercourses where easements of rights-of-way can be obtained).

C. The 10-year design storm runoff shall not exceed a depth of 0.5 feet in any arterial street and shall flow such that one (1) twelve-foot (12-foot) driving lane in each direction is free of flowing or standing water. The 10-year design storm runoff shall not exceed a depth of 0.5 feet in any collector street. Arterial and collector streets that are in the State Highway system may require more stringent drainage criteria.

D. The product of depth times velocity shall not exceed 6.5 at any location in any street in the event of a 10-year design storm (with velocity calculated as the average velocity measured in feet per second and depth measured at the gutter flow line in feet).

The storm drain design is based on the criteria that the hydraulic grade line be kept below the grate and manhole cover elevations.

Based on the final drainage report for the Golf Course Road Widening Project a 6-percent bulking factor is used in the hydrologic analysis. This allows for a conservative system to convey full runoff with possible sediment loading within the system

EXISTING CONDITIONS

Golf Course road was recently widened to a 4/5 lane section with eight-inch standard curb and gutter. The normal crown in the existing roadway ranges between 1.5% and 2.0%. Plate 2 is a detail of the existing typical roadway section.

A storm drain system was installed with pipe size varying from 30" to 48" RCP pipe. The captured runoff then drains through the 23rd Street ponds, along an earth channel, and finally into the east branch of the Blacks Arroyo which conveys flow to the Black Detention Dam Facility. Plate 3 shows the existing system.

The majority of the lots along the west side of Golf Course are still undeveloped. The parcels that have been developed are commercially owned. The businesses consist of a large storage facility, various churches and other small business including a daycare and doctor's clinic. According to the City's zoning map, these adjacent (west) lots are zoned either commercial or residential/special use. The basins affecting the runoff in the roadway are moderately sloped and no evidence of concentrated flow is present. The residential lots along the east side of the roadway are fully developed and provide a small percentage of the runoff in Golf Course Road.

Drainage Basins

Delineation of the drainage basins was completed in accord with the analysis of the BLWMP. The drainage basin map is provided in Plate 1 in the back of this report.

In order to meet future requirements of the ultimate developed conditions we assume that the lots adjacent to the west side of Golf Course Road would be entirely commercial. For the basins east of golf course we have assumed 6 du's per acre to be conservative. For the purposes of this report we have also assumed that all lots within the basin boundaries delineated for this report will have free discharge. Table 1A is a summary of the land treatment types used in the analysis for each of the contributing basins. The Ahymo summary and input files can be found in Appendix A.

Table 1A
Basin Land Treatment Types
Ultimate Developed Conditions

Basin	Area (sq. mi.)	Land Treatment Percentages			
		A	B	C	D
1W	0.00794	0.0	10	0	90.0
1E	0.00300	0.0	25.0	15.0	60.0
2WU	0.00803	0.0	10	0	90.0
2EU	0.00225	0.0	25.0	15.0	60.0
2WL	0.00580	0.0	10	0	90.0
2EL	0.00180	0.0	25.0	15.0	60.0
3WU	0.01230	0.0	10	0	90.0
3EU	0.00375	0.0	25.0	15.0	60.0
3WL	0.00803	0.0	10	0	90.0
3EL	0.00268	0.0	25.0	15.0	60.0
4W	0.00546	0.0	10	0	90.0
4E	0.00140	0.0	25.0	15.0	60.0

5W	0.00470	0.0	10	0	90.0
5E	0.00190	0.0	25.0	15.0	60.0
6W	0.00290	0.0	10	0	90.0
6E	0.00170	0.0	25.0	15.0	60.0
7W	0.00940	0.0	15	5	80.0
7E	0.00107	0.0	25.0	15.0	60.0
8W	0.00296	0.0	10	0	90.0
8E	0.00960	0.0	25.0	15.0	60.0
9W	0.00323	0.0	10	0	90.0
9E	0.01300	0.0	25.0	15.0	60.0
10W	0.00320	0.0	10	0	90.0
10E	0.01950	0.0	25.0	15.0	60.0

Description of the land treatment allocations taken from the City of Albuquerque DPM, Section 22.2 (1997):

***Land Treatment A**: Soil uncompacted by human activity with 0 to 10 percent slopes. Native grasses, weeds and shrubs in typical densities with minimal disturbance to grading, groundcover and infiltration capacity. Croplands. Unlined arroyos.*

***Land Treatment B**: Irrigated lawns, parks and golf courses with 0 to 10 percent slopes. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes greater than 10 percent and less than 20 percent.*

***Land Treatment C**: Soil compacted by human activity. Minimal vegetation. Unpaved parking, roads, trails. Most vacant lots. Gravel or rock on plastic (desert landscaping). Irrigated lawns and parks with slopes greater than 10 percent. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes at 20 percent or greater. Native grass, weed and shrub areas with clay or clay loam soils and other soils of very low permeability as classified by SCS Hydrologic Soil Group D.*

***Land Treatment D**: Impervious areas, pavement and roofs.*

The drainage basins shown on Plate 1 were confirmed using available mapping and field visits. No other offsite basins are contributing to the flow in Golf Course Road. Flows from the north are intercepted by Southern Boulevard and conveyed east toward NMSR 528.

Structures

Analysis of all inlets installed with the Golf Course Road widening project is included in the analysis to add the maximum flow at each inlet and convey the by-pass flow in the roadway.

The existing pond on 20th Street outflows into the Golf Course Road system. We assume that neither the existing flow rates nor the outflow pipe size would change in the future. Therefore, in both analyses, the flow rate added to the system at 22nd Street was approximately 60-cfs. The hydrograph used in the AHYMO analysis was taken directly from the model used in the BLWMP.

Methodology

The method of analysis was the AHYMO Computer Program (Anderson, 1997). The Type II rainfall distribution specified in the model assumes a "24-hour rainfall distribution based on NOAA Atlas 2 with peak intensity at 1.4 hours." A minimum time of concentration (t_c) of 10 minutes was used to calculate the time to peak (T_p) for each basin ($T_p = 2/3\ t_c$). A sediment bulk factor of 1.06 was used to simulate the effects of increased flow rates caused by the movement of sediment with the runoff. A copy of the input and summary files for each case are included in Appendix A.

The following table is a summary of the peak discharge and volume rates for each sub-basin.

Table 2A
100-Year Values
Ultimate Conditions Discharge

Basin	Area (sq. mi.)	100-Year Event	
		Peak Discharge (cfs)	Runoff Volume (ac-ft)
1W	0.00794	21.9	1.022
1E	0.00300	7.4	0.306
2WU	0.00803	22.1	1.034
2EU	0.00225	5.6	0.230
2WL	0.00580	16.0	0.747
2EL	0.00180	4.5	0.184
3WU	0.01230	33.8	1.583
3EU	0.00375	9.3	0.383
3WL	0.00803	22.1	1.034
3EL	0.00268	6.6	0.273
4W	0.00546	15.0	0.703
4E	0.00140	3.5	0.143
5W	0.00470	12.9	0.605
5E	0.00190	4.7	0.194
6W	0.00290	8.0	0.373
6E	0.00170	4.2	0.173
7W	0.00940	24.8	1.121
7E	0.00107	2.7	0.109
8W	0.00296	8.2	0.381
8E	0.00960	23.7	0.980
9W	0.00323	8.9	0.416
9E	0.01300	32.0	0.385
20th St. Pond	0.13340	59.1	9.968
10W	0.00320	8.8	0.412
10E	0.01950	48.1	1.990

Table 2B
100-Year
Ultimate Conditions Discharge

Analysis Point		100-Year Event	
			Peak Discharge (cfs)
AP1	Chianti Road Diversion		58
AP9	To Storm Drain in Westside		243

The storm drain analysis was prepared using the Hydraflow Storm Sewers 2000 computer program. With this program, the runoff values obtained from the AHYMO output have been input to evaluate the hydraulic grade line for the pipe system. The 100-year models were run with the constraint that the hydraulic grade elevations stay below the manhole cover and inlet grate elevations. The inlet capacity files and hydraulic grade line models can be found in Appendix B.

DISCUSSION

The existing storm water conveyance system in Golf Course Road was designed to handle the runoff for the 100 year event. The design assumed fully developed roadway flow and historic flow from the adjacent offsite basins. This system works as designed with these assumptions. The report states that to allow for discharge rates above these assumptions diversion pipes would be required to convey flows west to the East Branch Channel. See Plate 3 for the existing system.

Significant development west of Golf Course Road is currently in design and construction requiring a detailed look at what diversion structures are necessary to allow for the free discharge of future developments. WCI has prepared a detailed analysis of the ultimate conditions allowing free discharge from the adjacent properties to evaluate the requirements for the future system to be installed with the current development.

CONCLUSION

The analysis of the existing Golf Course Road system for the ultimate conditions looked at the capacity of the existing pipe and inlet system. During this analysis it was noted that the inlets have a greater capacity than the conveyance pipes from the inlets to the main line. Based on this information, we modeled the system with two options. Option 1 (GC100ULT) assumed that improvements would be made to the conveyance system to match the capacity of the inlets. The second option (GC100ULTmod) assumed that the system would remain as constructed today.

In both options the system failed with the full flow being carried by the Golf Course Road system alone. Each of the systems were then modified with a full diversion of pipe flow at Chianti Road. With this modification both systems operate with the HGL below the top of inlet and with the street flow contained within the curb and gutter.

We recommend that the system improvements for the ultimate developed condition include the diversion of the pipe flows at Chianti Road. The design for the diversion at Chianti Road should be a storm drain

pipe from Golf Course Road to the East Branch Channel sized for the possible discharge of 58 cfs. In addition the original model allowed for a by pass flow of 8 cfs to the City of Albuquerque portion of the roadway. To meet this requirement, using the data from option 2, additional inlets located upstream of Westside Boulevard to capture approximately 35 cfs are required.

A system is currently being proposed to convey the discharge from the existing pipe outlets at 23rd Street to the east branch channel. The proposed storm drain parallels Golf Course road to Westside Boulevard. The line then turns west in Westside Boulevard and terminates at the East Branch Channel. We recommend this Westside Boulevard storm drain system be designed to carry the total pipe flow from the Golf Course Road systems, the additional 35 cfs and the Westside Boulevard flows. The system would include a 60 - 66 inch mainline with the installation of 2 type "A" inlets and 3 type "C" inlets in Golf Course Road upstream of Westside Boulevard. If the system is designed per these recommendations it is not required to divert the flows from the Golf Course Road system at 18th Street to meet the current City requirements as described above.

Appendix A
Ahymo Files

Ultimate
Conditions

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*S GOLF COURSE ROAD HYDROLOGY
*S AHYMO MODEL TO CALCULATE RUNOFF BASED ON PROPOSED CONDITIONS (MODIFIED TO
*s REPRESENT ULTIMATE CONDITIONS AS SHOWN IN THE blwmp BY dsa 3/07/06)
*S ON GOLF COURSE ROAD FROM SOUTHERN BLVD SOUTH TO 23RD STREET DETENTION PONDS
*S THIS MODEL ASSUMES THAT ALL LOTS ADJACENT TO THE WEST SIDE OF GOLF COURSE
*S WILL BE DEVELOPED AS COMMERCIAL LOTS AND THAT ON-SITE DETENTION WILL BE
*S REQUIRED TO CONTROL RUNOFF ABOVE HISTORICAL VALUES.

*S DRAINAGE BASIN DELINEATIONS WERE MADE IN ACCORDANCE WITH THE BLACKS ARROYO
*S DRAINAGE MASTER PLAN TO BE COMPLETED FOR SSCAFCA.  BULKING FACTOR ADDED IN
*S ACCORDANCE WITH SSCAFCA REQUIREMENTS FOR THE BLACKS ARROYO ANALYSIS.

*S**************************************************************************
*S********** 100-YEAR STORM ************************************************
*S**************************************************************************
*

START               TIME=0.0 HR PUNCH CODE=0


*EACH STORM INPUT DATA FOLLOWS

RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
                    RAIN ONE=1.80 IN     RAIN SIX=2.21 IN
                    RAIN DAY=2.7 IN      DT=0.05 HRS

*TWO YEAR STORM DATA
*RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
*                    RAIN ONE=0.739 IN   RAIN SIX=0.925 IN
*                    RAIN DAY=1.075 IN   DT=0.05 HRS
*FIVE YEAR STORM DATA
*RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.001 IN   RAIN SIX=1.250 IN
*                    RAIN DAY=1.475 IN   DT=0.05 HRS
*TEN YEAR STORM DATA
*RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.184 IN   RAIN SIX=1.450 IN
*                    RAIN DAY=1.700 IN   DT=0.05 HRS
*TWENTY FIVE YEAR STORM DATA
*RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.394 IN   RAIN SIX=1.825 IN
*                    RAIN DAY=2.100 IN   DT=0.05 HRS
*FIFTY YEAR STORM DATA
*RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.604 IN   RAIN SIX=2.000 IN
*                    RAIN DAY=2.350 IN   DT=0.05 HRS
*HUNDRED YEAR STORM DATA
*RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.878 IN   RAIN SIX=2.225 IN
*                    RAIN DAY=2.700 IN   DT=0.05 HRS


*S******************BEGIN AP 1*********************************************


*S1
SEDIMENT BULK       CODE=1   BULK FACTOR=1.06


*S1A
COMPUTE NM HYD      ID=1        HYD NO=1W       AREA=0.00794 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1
*S2
COMPUTE NM HYD      ID=2        HYD NO=1E       AREA=0.003 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1


*FOR THIS MODEL, SPLIT BASIN 2W INTO UPPER (U) AND LOWER (L) BASINS
*S3
COMPUTE NM HYD      ID=3        HYD NO=2WU      AREA=0.00803 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 2WU BASIN AND 1W BASIN
*S4
ADD HYD             ID=4        HYD NO=1W2WU    IDS=1 AND 3

*S5  PLOT
PLOT HYD            ID=1   ID=3   Q SCALE=0   T SCALE=0

*S6
COMPUTE NM HYD      ID=5        HYD NO=2EU      AREA=0.00225 SQ MI
                    PER A=0     PER B=15        PER C=25.0      PER D=60.0
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 2EU BASIN AND 1E BASIN
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*S7
ADD HYD             ID=6        HYD NO=1E2EU    IDS=2 AND 5

*S8  PLOT
PLOT HYD            ID=2   ID=5   Q SCALE=0   T SCALE=0

*S9
COMPUTE NM HYD      ID=7        HYD NO=2WL      AREA=0.0058 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1


*COMBINE FLOW FROM 2WU BASIN AND 2WL BASIN
*S10
ADD HYD             ID=8        HYD NO=AP1W     IDS=4 AND 7

*S11  PLOT
PLOT HYD            ID=4   ID=7   Q SCALE=0   T SCALE=0

*S12
COMPUTE NM HYD      ID=9        HYD NO=2EL      AREA=0.0018 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 2EU BASIN AND 2EL BASIN
*S13
ADD HYD             ID=10       HYD NO=AP1E     IDS=6 AND 9

*S14  PLOT
PLOT HYD            ID=6   ID=9   Q SCALE=0   T SCALE=0

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD          ID=8        Q=49            ID I=11    HYD NO=AP1WSD
                                                ID II=12   HYD NO=AP1WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S16
DIVIDE HYD          ID=10       Q=9             ID I=13    HYD NO=AP1ESD
                                                ID II=14   HYD NO=AP1EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S17
ADD HYD             ID=15       HYD NO=AP1SD    IDS=11 AND 13

*S18  PLOT
PLOT HYD            ID=11   ID=13   Q SCALE=0   T SCALE=0

*ROUTE INTERCEPTED FLOW THROUGH AP2 IN 30" PIPE TO AP2
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.015
                     DIA=2.5 FT N=0.013
*S19
ROUTE MCUNGE        ID=16   HYD NO=AP1R   INFLOW ID=15
                    DT=0.0 HR   LENGTH=1170 FT
                    NS=0   SLOPE=0.0150   MATCODE=0
                    REGCODE=0   CCODE=0
*S*****************Note Flow Routed to East Branch Channel Down Chianti**********
*S*****************END AP 1*************************************************
*S*****************BEGIN AP 2***********************************************

*FOR THIS MODEL, SPLIT BASIN 3W INTO UPPER (U) AND LOWER (L) BASINS
*S20
COMPUTE NM HYD      ID=17       HYD NO=3WU      AREA=0.0123 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*TOTAL SURFACE FLOW AT AP2
ADD HYD             ID=7        HYD NO=AP2W     IDS=12 AND 17

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD          ID=7        Q=19.9          ID I=50    HYD NO=AP2WSD
                                                ID II=51   HYD NO=AP2WST

*ROUTE INTERCEPTED FLOW THROUGH AP2 IN 30" PIPE TO AP3
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.04
                     DIA=2.5 FT N=0.013
*S19
ROUTE MCUNGE        ID=53   HYD NO=AP2R   INFLOW ID=50
                    DT=0.0 HR   LENGTH=770 FT
                    NS=0   SLOPE=0.040   MATCODE=0
                    REGCODE=0   CCODE=0

*S*****************END AP 2*************************************************
*S*****************BEGIN AP 3***********************************************

*S21
COMPUTE NM HYD      ID=18       HYD NO=3EU      AREA=0.00375 SQ MI
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                    PER A=0      PER B=15        PER C=25         PER D=60
                    TP=0.111 HR          MASS RAIN=-1
*S22
COMPUTE NM HYD      ID=19        HYD NO=3WL      AREA=0.00803 SQ MI
                    PER A=0      PER B=10        PER C=0          PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 3WU BASIN AND 3WL BASIN
*S23
ADD HYD             ID=20        HYD NO=3WU3WL   IDS=51 AND 19

*S25
COMPUTE NM HYD      ID=21        HYD NO=3EL  AREA=0.00268 SQ MI
                    PER A=0      PER B=15        PER C=25         PER D=60
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 3EL BASIN AND 3EU BASIN
*S26
ADD HYD             ID=22        HYD NO=3EU3EL   IDS=18 AND 21

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD          ID=20        Q=20            ID I=50    HYD NO=AP3WSD
                                                 ID II=55   HYD NO=AP3WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S16
DIVIDE HYD          ID=22        Q=11            ID I=56    HYD NO=AP3ESD
                                                 ID II=57   HYD NO=AP3EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S17
ADD HYD             ID=58        HYD NO=AP3CSD   IDS=50 AND 56

*COMBINE INTERSEPTED FLOW WITH ROUTED FLOW FROM AP2
*S17
ADD HYD             ID=56        HYD NO=AP3SD    IDS=53 AND 58

*ROUTE INTERCEPTED FLOW THROUGH AP3 IN 36" PIPE TO AP4
COMPUTE RATING CURVE CID=1       VS NO=1 CODE=-1 SLP=0.018
                     DIA=3.0 FT N=0.013
*S19
ROUTE MCUNGE        ID=59   HYD NO=AP3R   INFLOW ID=56
                    DT=0.0 HR   LENGTH=514 FT
                    NS=0   SLOPE=0.018   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 3*****************************************************
*S******************BEGIN AP 4****************************************************

*S28
COMPUTE NM HYD      ID=23        HYD NO=4W       AREA=0.00546 SQ MI
                    PER A=0      PER B=10        PER C=0          PER D=90
                    TP=0.111 HR MASS RAIN=-1


*COMBINE FLOW FROM 4W BASIN AND 3WL BASIN
*S29
ADD HYD             ID=24        HYD NO=3WL4W    IDS=55 AND 23

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD          ID=24        Q=12.5          ID I=60    HYD NO=AP4WSD
                                                 ID II=61   HYD NO=AP4WST

*COMBINE INTERCEPTED FLOW FROM WEST SIDE OF ROADWAY IN STORM DRAIN
*S17
ADD HYD             ID=62        HYD NO=AP4SD    IDS=59 AND 60

*ROUTE INTERCEPTED FLOW THROUGH AP2 IN 36" PIPE TO AP3
COMPUTE RATING CURVE CID=1       VS NO=1 CODE=-1 SLP=0.0525
                     DIA=3.0 FT N=0.013
*S19
ROUTE MCUNGE        ID=53   HYD NO=AP2R   INFLOW ID=62
                    DT=0.0 HR   LENGTH=600 FT
                    NS=0   SLOPE=0.0525   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 4*****************************************************
*S******************BEGIN AP 5****************************************************

*S31
COMPUTE NM HYD      ID=25        HYD NO=4E       AREA=0.0014 SQ MI
                    PER A=0.0    PER B=15        PER C=25         PER D=60
                    TP=0.111 HR MASS RAIN=-1


*COMBINE FLOW FROM 4E BASIN AND STREET FLOW
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*S32
ADD HYD             ID=26       HYD NO=3EL4E    IDS=57 AND 25

*S34
COMPUTE NM HYD      ID=27       HYD NO=5W       AREA=0.0047 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE STREET FLOW FROM 4W BASIN AND 5W BASIN
*S35
ADD HYD             ID=28       HYD NO=AP5W     IDS=61 AND 27

*S37
COMPUTE NM HYD      ID=29       HYD NO=5E       AREA=0.0019 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE FLOW FROM 4E BASIN AND 5E BASIN
*S38
ADD HYD             ID=30       HYD NO=AP5E     IDS=26 AND 29

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S40
DIVIDE HYD          ID=28       Q=14.0          ID I=31    HYD NO=AP5WSD
                                                ID II=32   HYD NO=AP5WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S41
DIVIDE HYD          ID=30       Q=13.2          ID I=33    HYD NO=AP5ESD
                                                ID II=34   HYD NO=AP5EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S42
ADD HYD             ID=35       HYD NO=AP5EAP2W IDS=31 AND 33

*COMBINE INTERCEPTED FLOW FROM AP 5 AND ROUTED FLOW FROM AP 4 IN STORM DRAIN
*S44
ADD HYD             ID=36       HYD NO=AP5SD    IDS=53 AND 35

*ROUTE INTERCEPTED FLOW THROUGH AP6 IN 42" PIPE TO 19TH STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.0400
                     DIA=3.5 FT N=0.013

*S46
ROUTE MCUNGE        ID=37   HYD NO=AP619   INFLOW ID=36
                    DT=0.0 HR   LENGTH=550 FT
                    NS=0    SLOPE=0.0400   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 5*****************************************************
*S******************BEGIN AP 6****************************************************

*S47
COMPUTE NM HYD      ID=1        HYD NO=6W       AREA=0.0029 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR         MASS RAIN=-1
*S48
COMPUTE NM HYD      ID=2        HYD NO=6E       AREA=0.0017 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE STREET FLOW FROM 5W BASIN AND 6W BASIN
*S35
ADD HYD             ID=63       HYD NO=AP6W     IDS=32 AND 1

*COMBINE FLOW FROM 5E BASIN AND 6E BASIN
*S38
ADD HYD             ID=30       HYD NO=AP6E     IDS=34 AND 2

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S40
DIVIDE HYD          ID=63       Q=11.0          ID I=65    HYD NO=AP6WSD
                                                ID II=66   HYD NO=AP6WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S41
DIVIDE HYD          ID=30       Q=3.75          ID I=67    HYD NO=AP6ESD
                                                ID II=68   HYD NO=AP6EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S42
ADD HYD             ID=64       HYD NO=AP6CSD   IDS=65 AND 67

*COMBINE INTERCEPTED FLOW FROM AP 6 AND ROUTED FLOW FROM AP 5 IN STORM DRAIN
*S44
ADD HYD             ID=36       HYD NO=AP6SD    IDS=37 AND 64

*ROUTE INTERCEPTED FLOW THROUGH AP7 IN 48" PIPE TO 21ST STREET
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COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.0060
                     DIA=4.0 FT N=0.013
*S46
ROUTE MCUNGE         ID=37   HYD NO=AP721   INFLOW ID=36
                     DT=0.0 HR   LENGTH=1200 FT
                     NS=0   SLOPE=0.006   MATCODE=0
                     REGCODE=0   CCODE=0

*S******************END AP 6*****************************************************
*S******************BEGIN AP 7****************************************************

*S49
COMPUTE NM HYD       ID=3        HYD NO=7W       AREA=0.0094 SQ MI
                     PER A=0     PER B=10        PER C=0         PER D=90
                     TP=0.111 HR         MASS RAIN=-1

*COMBINE STREET FLOW FROM 6W BASIN AND 7W BASIN
*S50
ADD HYD              ID=4        HYD NO=7W6W     IDS=66 AND 3

*S52
COMPUTE NM HYD       ID=5        HYD NO=7E       AREA=0.00107 SQ MI
                     PER A=0     PER B=15        PER C=25        PER D=60
                     TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 7E BASIN AND 6E BASIN
*S53
ADD HYD              ID=6        HYD NO=6E7E     IDS=68 AND 5

*S55
COMPUTE NM HYD       ID=7        HYD NO=8W       AREA=0.00296 SQ MI
                     PER A=0     PER B=10        PER C=0         PER D=90
                     TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 7W BASIN AND 8W BASIN
*S56
ADD HYD              ID=8        HYD NO=7W8W     IDS=4 AND 7

*S58
COMPUTE NM HYD       ID=9        HYD NO=8E       AREA=0.0096 SQ MI
                     PER A=0     PER B=15        PER C=25        PER D=60
                     TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 8E BASIN AND 7E BASIN
*S59
ADD HYD              ID=10       HYD NO=7E8E     IDS=6 AND 9

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S40
DIVIDE HYD           ID=8        Q=34            ID I=65    HYD NO=AP7WSD
                                                 ID II=66   HYD NO=AP7WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S41
DIVIDE HYD           ID=10       Q=12.5          ID I=67    HYD NO=AP7ESD
                                                 ID II=68   HYD NO=AP7EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S42
ADD HYD              ID=64       HYD NO=AP7CSD   IDS=65 AND 67

*COMBINE INTERCEPTED FLOW FROM AP 7 AND ROUTED FLOW FROM AP 6 IN STORM DRAIN
*S44
ADD HYD              ID=36       HYD NO=AP7SD    IDS=37 AND 64

*ROUTE INTERCEPTED FLOW THROUGH AP8 IN 48" PIPE TO 21ST STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.0060
                     DIA=4.0 FT N=0.013
*S46
ROUTE MCUNGE         ID=37   HYD NO=AP822   INFLOW ID=36
                     DT=0.0 HR   LENGTH=550 FT
                     NS=0   SLOPE=0.006   MATCODE=0
                     REGCODE=0   CCODE=0

*S******************END AP 7*****************************************************
*S******************BEGIN AP 8****************************************************

*S64
COMPUTE NM HYD       ID=13       HYD NO=9E       AREA=0.013 SQ MI
                     PER A=0.0   PER B=15        PER C=25        PER D=60
                     TP=0.111 HR MASS RAIN=-1

DIVIDE HYD           ID=13       Q=21            ID I=80    HYD NO=AP822SD
                                                 ID II=81   HYD NO=AP822ST

*S******************20TH STREET POND MODEL***************************************
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*S INSERT PUNCH HYDROGRAPH FROM BLACKS ARROYO DMP FOR 20TH STREET POND AND
*S DISCHARGE INTO EXISTING 48" PIPE.  ASSUME THAT IMPROVEMENTS WILL BE MADE
*S TO CONTROL FLOW RATE IN PIPE WITH FUTURE DEVELOPMENTS.


*S70
RECALL HYD          ID=17  HYD=530.92 DT=  .050000 HRS DA=    .1334 SQ MI
                    PEAK=     59.067CFS  RO= 1.4014 INCHES  NO PTS=521
                    FLOW RATES
                          .000       .000       .000       .000       .000
                          .000       .000       .000       .000       .000
                          .000       .000       .000       .000       .000
                          .000       .000       .000       .000       .002
                          .024       .115       .336       .715      1.336
                         2.663      5.861     13.602     27.907     41.771
                        49.812     54.633     56.785     57.779     58.336
                        58.671     58.878     58.996     59.053     59.067
                        59.051     59.013     58.955     58.878     58.780
                        58.665     58.537     58.399     58.254     58.104
                        57.950     57.792     57.632     57.468     57.301
                        56.948     56.041     54.691     53.253     51.799
                        50.251     48.349     46.167     39.633     28.145
                        17.708     10.958      7.134      4.975      3.754
                         2.991      2.461      2.101      1.856      1.684
                         1.545      1.428      1.339      1.274      1.224
                         1.183      1.148      1.120      1.095      1.073
                         1.054      1.037      1.023      1.010       .999
                          .989       .980       .972       .966       .961
                          .958       .956       .955       .955       .956
                          .955       .956       .956       .956       .957
                          .960       .963       .968       .974       .979
                          .984       .989       .996      1.003      1.011
                         1.019      1.028      1.036      1.042      1.050
                         1.058      1.068      1.076      1.085      1.094
                         1.104      1.113      1.121      1.127      1.129
                         1.129      1.128      1.128      1.127      1.126
                         1.125      1.122      1.118      1.114      1.110
                         1.108      1.105      1.103      1.101      1.097
                         1.093      1.088      1.085      1.082      1.079
                         1.076      1.072      1.067      1.062      1.059
                         1.055      1.052      1.050      1.048      1.046
                         1.043      1.039      1.036      1.034      1.031
                         1.027      1.023      1.020      1.017      1.013
                         1.009      1.005      1.002       .999       .997
                          .995       .993       .991       .988       .985
                          .982       .979       .976       .973       .971
                          .968       .965       .962       .960       .957
                          .953       .950       .947       .944       .941
                          .940       .938       .936       .933       .930
                          .927       .924       .922       .921       .918
                          .915       .912       .910       .908       .907
                          .904       .900       .896       .893       .891
                          .890       .888       .885       .883       .881
                          .880       .879       .878       .876       .872
                          .869       .866       .864       .863       .862
                          .859       .856       .853       .851       .849
                          .847       .846       .844       .842       .839
                          .836       .833       .831       .829       .828
                          .827       .826       .825       .822       .819
                          .818       .816       .815       .812       .810
                          .807       .805       .803       .802       .800
                          .799       .797       .795       .793       .792
                          .791       .790       .788       .786       .783
                          .780       .778       .776       .775       .773
                          .772       .771       .770       .767       .765
                          .763       .762       .760       .758       .757
                          .756       .754       .753       .753       .751
                          .749       .746       .744       .742       .741
                          .740       .738       .736       .734       .733
                          .732       .730       .728       .727       .727
                          .727       .726       .724       .722       .721
                          .719       .717       .715       .712       .710
                          .709       .708       .707       .705       .703
                          .702       .700       .700       .698       .697
                          .695       .694       .694       .693       .691
                          .689       .688       .687       .686       .684
                          .683       .682       .681       .680       .679
                          .678       .676       .673       .672       .671
                          .671       .671       .670       .668       .667
                          .665       .664       .663       .661       .659
                          .656       .654       .653       .653       .653
                          .652       .651       .649       .647       .646
                          .645       .644       .643       .642       .642
                          .641       .639       .638       .637       .636
                          .635       .634       .633       .633       .632
                          .630       .629       .628       .627       .626
                          .625       .624       .621       .620       .619
                          .618       .618       .617       .615       .613
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                    .612        .610        .609        .610        .611
                    .611        .609        .607        .604        .603
                    .602        .602        .602        .602        .601
                    .600        .598        .597        .596        .595
                    .593        .593        .592        .592        .590
                    .588        .587        .586        .586        .585
                    .584        .583        .581        .580        .580
                    .579        .578        .578        .577        .577
                    .576        .575        .574        .572        .571
                    .571        .570        .569        .569        .568
                    .567        .565        .564        .563        .563
                    .563        .562        .560        .558        .557
                    .556        .556        .557        .557        .557
                    .556        .555        .554        .553        .550
                    .547        .546        .545        .544        .545
                    .545        .545        .544        .542        .541
                    .541        .541        .540        .539        .538
                    .538        .537        .530        .509        .473
                    .427        .377        .328        .283        .243
                    .207        .176        .149        .127        .107
                    .090        .076        .064        .054        .045
                    .038        .032        .026        .022        .018
                    .015        .013        .011        .009        .007
                    .006        .005        .004        .004        .003
                    .003        .002        .002        .002        .001
                    .001

*COMBINE STORM DRAIN FLOW FROM 20 ST POND TO SD AT 22ND STREET
*S71
ADD HYD             ID=18       HYD NO=AP8POND  IDS=37 AND 17
ADD HYD             ID=82       HYD NO=AP822ND  IDS=80 AND 18

*ROUTE COMBINED STORM DRAIN FLOW THROUGH AP9 IN 54" PIPE TO 23RD STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.05
                     DIA=4.5 FT N=0.013
*S72
ROUTE MCUNGE        ID=19   HYD NO=AP9SD   INFLOW ID=82
                    DT=0.0 HR   LENGTH=600 FT
                    NS=0   SLOPE=0.05   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 8*****************************************************
*S******************BEGIN AP 9****************************************************

*S61
COMPUTE NM HYD      ID=11       HYD NO=9W       AREA=0.00323 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 9W BASIN AND 8W BASIN
*S62
ADD HYD             ID=12       HYD NO=8W9W     IDS=66 AND 11

*S67
COMPUTE NM HYD      ID=15       HYD NO=10E      AREA=0.0195 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

*S73
COMPUTE NM HYD      ID=20       HYD NO=10W      AREA=0.0032 SQ MI
                    PER A=0     PER B=10                PER C=0         PER D=90
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE FLOW FROM 10W BASIN AND 9W BASIN
*S74
ADD HYD             ID=21       HYD NO=9W10W    IDS=12 AND 20

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S79
DIVIDE HYD          ID=21       Q=38            ID I=24    HYD NO=AP9WSD
                                                ID II=25   HYD NO=AP9WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S80
DIVIDE HYD          ID=68       Q=40            ID I=26    HYD NO=AP9ESD
                                                ID II=27   HYD NO=AP9EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S81
ADD HYD             ID=28       HYD NO=AP9EAP3W IDS=24 AND 26

*COMBINE INTERCEPTED FLOW FROM AP 3 AND ROUTED FLOW FROM AP 2 IN STORM DRAIN
*S83
ADD HYD             ID=29       HYD NO=AP9SD    IDS=19 AND 28

*S******************END AP 9*****************************************************

FINISH
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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =03/20/2006
INPUT FILE = c:\AHYMO_97\GC100ULT.TXT 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 GOLF COURSE ROAD HYDROLOGY											
*S AHYMO MODEL TO CALCULATE RUNOFF BASED ON PROPOSED CONDITIONS (MODIFIED TO											
*s REPRESENT ULTIMATE CONDITIONS AS SHOWN IN THE blwmp BY dsa 3/07/06)											
*S ON GOLF COURSE ROAD FROM SOUTHERN BLVD SOUTH TO 23RD STREET DETENTION PONDS											
*S THIS MODEL ASSUMES THAT ALL LOTS ADJACENT TO THE WEST SIDE OF GOLF COURSE											
*S WILL BE DEVELOPED AS COMMERCIAL LOTS AND THAT ON-SITE DETENTION WILL BE											
*S REQUIRED TO CONTROL RUNOFF ABOVE HISTORICAL VALUES.											
*S DRAINAGE BASIN DELINEATIONS WERE MADE IN ACCORDANCE WITH THE BLACKS ARROYO											
*S DRAINAGE MASTER PLAN TO BE COMPLETED FOR SSCAFCA. BULKING FACTOR ADDED IN											
*S ACCORDANCE WITH SSCAFCA REQUIREMENTS FOR THE BLACKS ARROYO ANALYSIS.											
*S**********											
*S********** 100-YEAR STORM **********											
*S**********											
START											TIME= .00
RAINFALL TYPE= 2											RAIN24= 2.700
*S**********BEGIN AP 1**********											
*S1											
SEDIMENT BULK											PK BF = 1.06
*S1A											
COMPUTE NM HYD	1W	-	1	.00794	21.85	1.022	2.41367	1.500	4.300	PER IMP=	90.00
*S2											
COMPUTE NM HYD	1E	-	2	.00300	7.41	.306	1.91328	1.500	3.857	PER IMP=	60.00
*S3											
COMPUTE NM HYD	2WU	-	3	.00803	22.10	1.034	2.41367	1.500	4.300	PER IMP=	90.00
*S4											
ADD HYD	1W2WU	1& 3	4	.01597	43.95	2.056	2.41363	1.500	4.300		
*S5 PLOT											
*S6											
COMPUTE NM HYD	2EU	-	5	.00225	5.56	.230	1.91328	1.500	3.859	PER IMP=	60.00
*S7											
ADD HYD	1E2EU	2& 5	6	.00525	12.96	.536	1.91318	1.500	3.858		
*S8 PLOT											
*S9											
COMPUTE NM HYD	2WL	-	7	.00580	15.96	.747	2.41367	1.500	4.301	PER IMP=	90.00
*S10											
ADD HYD	AP1W	4& 7	8	.02177	59.92	2.802	2.41363	1.500	4.300		
*S11 PLOT											
*S12											
COMPUTE NM HYD	2EL	-	9	.00180	4.45	.184	1.91328	1.500	3.862	PER IMP=	60.00
*S13											
ADD HYD	AP1E	6& 9	10	.00705	17.41	.719	1.91316	1.500	3.859		
*S14 PLOT											
*S15											
DIVIDE HYD	AP1WSD	8	11	.02109	49.00	2.715	2.41363	1.450	3.630		
	AP1WST	and	12	.00068	10.92	.087	2.41363	1.500	25.195		
*S16											
DIVIDE HYD	AP1ESD	10	13	.00602	9.00	.614	1.91316	1.400	2.337		
	AP1EST	and	14	.00103	8.41	.105	1.91316	1.500	12.730		
*S17											

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
ADD HYD	AP1SD	11&13	15	.02711	58.00	3.329	2.30255	1.450	3.343		
*S18 PLOT											
*S19											
ROUTE MCUNGE	AP1R	15	16	.02711	57.67	3.325	2.29956	1.550	3.324	CCODE =	.2
*S**********Note Flow Routed to East Branch Channel Down Chianti*********											

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*S******************END AP 1*****************************************************
*S******************BEGIN AP 2***************************************************
*S20
COMPUTE NM HYD             3WU   -    17       .01230        33.84       1.583      2.41367    1.500     4.299 PER IMP=  90.00
ADD HYD                   AP2W 12&17   7       .01298        44.76       1.670      2.41365    1.500     5.389
*S15
DIVIDE HYD              AP2WSD    7   50       .01106        19.90       1.423      2.41365    1.400     2.812
                        AP2WST  and   51       .00192        24.86        .247      2.41365    1.500    20.220
*S19
ROUTE MCUNGE              AP2R   50   53       .01106        19.90       1.423      2.41277    1.450     2.812 CCODE =     .1
*S******************END AP 2*****************************************************
*S******************BEGIN AP 3***************************************************
*S21
COMPUTE NM HYD             3EU    -   18       .00375         9.25        .383      1.91328    1.500     3.856 PER IMP=  60.00
*S22
COMPUTE NM HYD             3WL    -   19       .00803        22.10       1.034      2.41367    1.500     4.300 PER IMP=  90.00
*S23
ADD HYD                3WU3WL 51&19   20       .00995        46.96       1.281      2.41363    1.500     7.373
*S25
COMPUTE NM HYD             3EL    -   21       .00268         6.62        .273      1.91328    1.500     3.859 PER IMP=  60.00
*S26
ADD HYD                3EU3EL 18&21   22       .00643        15.87        .656      1.91320    1.500     3.857
*S15
DIVIDE HYD              AP3WSD   20   50       .00812        20.00       1.045      2.41364    1.400     3.850
                        AP3WST  and   55       .00183        26.96        .236      2.41364    1.500    22.972
*S16
DIVIDE HYD              AP3ESD   22   56       .00598        11.00        .611      1.91320    1.400     2.872
                        AP3EST  and   57       .00045         4.87        .046      1.91320    1.500    17.070
*S17
ADD HYD                AP3CSD 50&56   58       .01410        31.00       1.656      2.20127    1.400     3.435
*S17
ADD HYD                 AP3SD 53&58   56       .02516        50.90       3.078      2.29419    1.450     3.161
*S19
ROUTE MCUNGE              AP3R   56   59       .02516        50.90       3.072      2.28993    1.500     3.161 CCODE =     .1
*S******************END AP 3*****************************************************
*S******************BEGIN AP 4***************************************************
*S28
COMPUTE NM HYD              4W    -   23       .00546        15.03        .703      2.41367    1.500     4.302 PER IMP=  90.00
*S29
ADD HYD                 3WL4W 55&23   24       .00729        41.99        .939      2.41363    1.500     8.995
*S15
DIVIDE HYD              AP4WSD   24   60       .00537        12.50        .691      2.41363    1.450     3.637
                        AP4WST  and   61       .00192        29.49        .248      2.41363    1.500    23.960
*S17
ADD HYD                 AP4SD 59&60   62       .03053        63.40       3.764      2.31166    1.500     3.245
*S19
ROUTE MCUNGE              AP2R   62   53       .03053        63.40       3.764      2.31166    1.500     3.245 CCODE =     .0
*S******************END AP 4*****************************************************

                                FROM  TO                  PEAK       RUNOFF                 TIME TO    CFS     PAGE =   3
                   HYDROGRAPH    ID   ID        AREA    DISCHARGE    VOLUME      RUNOFF      PEAK      PER
COMMAND        IDENTIFICATION   NO.  NO.      (SQ MI)     (CFS)     (AC-FT)    (INCHES)    (HOURS)    ACRE     NOTATION

*S******************BEGIN AP 5***************************************************
*S31
COMPUTE NM HYD              4E    -   25       .00140         3.46        .143      1.91328    1.500     3.866 PER IMP=  60.00
*S32
ADD HYD                 3EL4E 57&25   26       .00185         8.34        .188      1.91310    1.500     7.056
*S34
COMPUTE NM HYD              5W    -   27       .00470        12.94        .605      2.41367    1.500     4.302 PER IMP=  90.00
*S35
ADD HYD                  AP5W 61&27   28       .00662        42.43        .853      2.41361    1.500    10.010
*S37
COMPUTE NM HYD              5E    -   29       .00190         4.70        .194      1.91328    1.500     3.862 PER IMP=  60.00
*S38
ADD HYD                  AP5E 26&29   30       .00375        13.03        .382      1.91313    1.500     5.436
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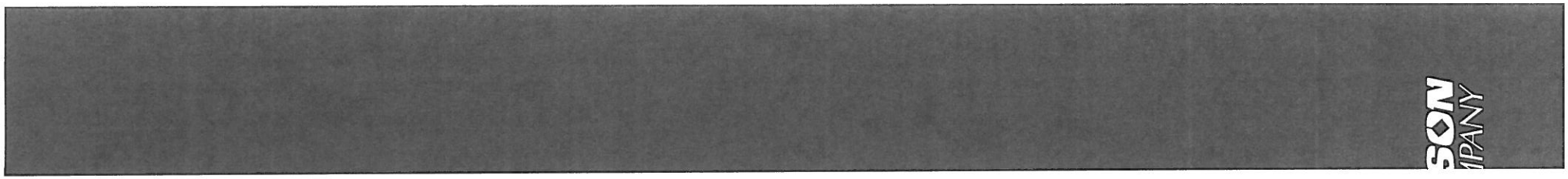
*S40
DIVIDE HYD          AP5WSD   28   31        .00486        14.00         .625      2.41361    1.450     4.506
                    AP5WST  and   32        .00177        28.43         .228      2.41361    1.500    25.125
*S41
DIVIDE HYD          AP5ESD   30   33        .00375        13.03         .382      1.91313    1.500     5.436
                    AP5EST  and   34        .00000          .00         .000       .00000    -.050      .000
*S42
ADD HYD           AP5EAP2W 31&33  35        .00860        27.03        1.007      2.19564    1.500     4.911
*S44
ADD HYD             AP5SD 53&35   36        .03913        90.43        4.771      2.28616    1.500     3.611
*S46
ROUTE MCUNGE        AP619    36   37        .03913        90.43        4.771      2.28616    1.500     3.611 CCODE =       .0
*S*****************END AP 5*************************************************
*S*****************BEGIN AP 6************************************************
*S47
COMPUTE NM HYD        6W     -     1        .00290         7.99         .373      2.41367    1.500     4.305 PER IMP=   90.00
*S48
COMPUTE NM HYD        6E     -     2        .00170         4.20         .173      1.91328    1.500     3.863 PER IMP=   60.00
*S35
ADD HYD             AP6W  32& 1   63        .00467        36.42         .601      2.41360    1.500    12.191
*S38
ADD HYD             AP6E  34& 2   30        .00170         4.20         .173      1.91312    1.500     3.863
*S40
DIVIDE HYD          AP6WSD   63   65        .00310        11.00         .399      2.41360    1.450     5.551
                    AP6WST  and   66        .00157        25.42         .202      2.41360    1.500    25.273
*S41
DIVIDE HYD          AP6ESD   30   67        .00167         3.75         .170      1.91312    1.450     3.515
                    AP6EST  and   68        .00003          .45         .003      1.91312    1.500    21.429
*S42
ADD HYD             AP6CSD 65&67  64        .00476        14.75         .569      2.23845    1.450     4.838
*S44
ADD HYD             AP6SD  37&64   36        .04389       105.18        5.340      2.28098    1.500     3.744
*S46
ROUTE MCUNGE        AP721    36   37        .04389       103.58        5.332      2.27754    1.500     3.687 CCODE =       .2
*S*****************END AP 6*************************************************
*S*****************BEGIN AP 7************************************************
*S49
COMPUTE NM HYD        7W     -     3        .00940        25.87        1.210      2.41367    1.500     4.300 PER IMP=   90.00
*S50
```

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
ADD HYD	7W6W	66& 3	4	.01097	51.29	1.412	2.41364	1.500	7.304	
*S52										
COMPUTE NM HYD	7E	-	5	.00107	2.65	.109	1.91328	1.500	3.869	PER IMP= 60.00
*S53										
ADD HYD	6E7E	68& 5	6	.00110	3.10	.113	1.91308	1.500	4.395	
*S55										
COMPUTE NM HYD	8W	-	7	.00296	8.16	.381	2.41367	1.500	4.305	PER IMP= 90.00
*S56										
ADD HYD	7W8W	4& 7	8	.01393	59.44	1.793	2.41363	1.500	6.667	
*S58										
COMPUTE NM HYD	8E	-	9	.00960	23.67	.980	1.91328	1.500	3.853	PER IMP= 60.00
*S59										
ADD HYD	7E8E	6& 9	10	.01070	26.77	1.092	1.91323	1.500	3.909	
*S40										
DIVIDE HYD	AP7WSD	8	65	.01237	34.00	1.593	2.41363	1.450	4.294	
	AP7WST	and	66	.00156	25.44	.201	2.41363	1.500	25.492	
*S41										
DIVIDE HYD	AP7ESD	10	67	.00889	12.50	.907	1.91323	1.400	2.198	
	AP7EST	and	68	.00182	14.27	.185	1.91323	1.500	12.271	
*S42										
ADD HYD	AP7CSD	65&67	64	.02126	46.50	2.499	2.20447	1.450	3.418	
*S44										

ADD HYD	AP7SD	37&64	36	.06515	150.08	7.831	2.25369	1.500	3.600	
*S46										
ROUTE MCUNGE	AP822	36	37	.06515	132.32	7.686	2.21207	1.500	3.173	CCODE = .2
*S******************END AP 7**********										
*S******************BEGIN AP 8**********										
*S64										
COMPUTE NM HYD	9E	-	13	.01300	32.05	1.327	1.91328	1.500	3.852	PER IMP= 60.00
DIVIDE HYD	AP822SD	13	80	.01190	21.00	1.215	1.91326	1.400	2.757	
	AP822ST	and	81	.00110	11.05	.112	1.91326	1.500	15.740	
*S******************20TH STREET POND MODEL**********										
*S INSERT PUNCH HYDROGRAPH FROM BLACKS ARROYO DMP FOR 20TH STREET POND AND										
*S DISCHARGE INTO EXISTING 48" PIPE. ASSUME THAT IMPROVEMENTS WILL BE MADE										
*S TO CONTROL FLOW RATE IN PIPE WITH FUTURE DEVELOPMENTS.										
*S70										
RECALL HYD	530.92	-	17	.13340	59.07	9.968	1.40108	1.950	.692	
*S71										
ADD HYD	AP8POND	37&17	18	.19855	185.91	17.654	1.66719	1.550	1.463	
ADD HYD	AP822ND	80&18	82	.21045	206.91	18.869	1.68110	1.550	1.536	
*S72										
ROUTE MCUNGE	AP9SD	82	19	.21045	206.91	18.869	1.68110	1.550	1.536	CCODE = .0
*S******************END AP 8**********										
*S******************BEGIN AP 9**********										
*S61										
COMPUTE NM HYD	9W	-	11	.00323	8.90	.416	2.41367	1.500	4.303	PER IMP= 90.00
*S62										
ADD HYD	8W9W	66&11	12	.00479	34.34	.617	2.41360	1.500	11.203	
*S67										
COMPUTE NM HYD	10E	-	15	.01950	48.07	1.990	1.91328	1.500	3.852	PER IMP= 60.00
*S73										

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	10W	-	20	.00320	8.81	.412	2.41367	1.500	4.303	PER IMP= 90.00
*S74										
ADD HYD	9W10W	12&20	21	.00799	43.15	1.028	2.41360	1.500	8.439	
*S79										
DIVIDE HYD	AP9WSD	21	24	.00774	38.00	.996	2.41360	1.450	7.671	
	AP9WST	and	25	.00025	5.15	.032	2.41359	1.500	32.231	
*S80										
DIVIDE HYD	AP9ESD	68	26	.00182	14.27	.185	1.91323	1.500	12.271	
	AP9EST	and	27	.00000	.00	.000	.00000	-.050	.000	
*S81										
ADD HYD	AP9EAP3W	24&26	28	.00956	52.27	1.182	2.31844	1.500	8.546	
*S83										
ADD HYD	AP9SD	19&28	29	.22001	255.41	20.051	1.70879	1.500	1.814	
*S******************END AP 9**********										
FINISH										

Modified Ultimate
Conditions



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*S GOLF COURSE ROAD HYDROLOGY
*S AHYMO MODEL TO CALCULATE RUNOFF BASED ON PROPOSED CONDITIONS (MODIFIED TO
*s REPRESENT ULTIMATE CONDITIONS AS SHOWN IN THE blwmp BY dsa 3/07/06)
*S ON GOLF COURSE ROAD FROM SOUTHERN BLVD SOUTH TO 23RD STREET DETENTION PONDS
*S THIS MODEL ASSUMES THAT ALL LOTS ADJACENT TO THE WEST SIDE OF GOLF COURSE
*S WILL BE DEVELOPED AS COMMERCIAL LOTS AND THAT ON-SITE DETENTION WILL BE
*S REQUIRED TO CONTROL RUNOFF ABOVE HISTORICAL VALUES.

*S DRAINAGE BASIN DELINEATIONS WERE MADE IN ACCORDANCE WITH THE BLACKS ARROYO
*S DRAINAGE MASTER PLAN TO BE COMPLETED FOR SSCAFCA.  BULKING FACTOR ADDED IN
*S ACCORDANCE WITH SSCAFCA REQUIREMENTS FOR THE BLACKS ARROYO ANALYSIS.

*S*************************************************************************
*S********** 100-YEAR STORM ***********************************************
*S*************************************************************************
*

START               TIME=0.0 HR PUNCH CODE=0


*EACH STORM INPUT DATA FOLLOWS

RAINFALL            TYPE=2      RAIN QUARTER=0.0 IN
                    RAIN ONE=1.80 IN    RAIN SIX=2.21 IN
                    RAIN DAY=2.7 IN     DT=0.05 HRS

*TWO YEAR STORM DATA
*RAINFALL            TYPE=2     RAIN QUARTER=0.0 IN
*                    RAIN ONE=0.739 IN  RAIN SIX=0.925 IN
*                    RAIN DAY=1.075 IN  DT=0.05 HRS
*FIVE YEAR STORM DATA
*RAINFALL            TYPE=2     RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.001 IN  RAIN SIX=1.250 IN
*                    RAIN DAY=1.475 IN  DT=0.05 HRS
*TEN YEAR STORM DATA
*RAINFALL            TYPE=2     RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.184 IN  RAIN SIX=1.450 IN
*                    RAIN DAY=1.700 IN  DT=0.05 HRS
*TWENTY FIVE YEAR STORM DATA
*RAINFALL            TYPE=2     RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.394 IN  RAIN SIX=1.825 IN
*                    RAIN DAY=2.100 IN  DT=0.05 HRS
*FIFTY YEAR STORM DATA
*RAINFALL            TYPE=2     RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.604 IN  RAIN SIX=2.000 IN
*                    RAIN DAY=2.350 IN  DT=0.05 HRS
*HUNDRED YEAR STORM DATA
*RAINFALL            TYPE=2     RAIN QUARTER=0.0 IN
*                    RAIN ONE=1.878 IN  RAIN SIX=2.225 IN
*                    RAIN DAY=2.700 IN  DT=0.05 HRS


*S******************BEGIN AP 1*************************************************


*S1
SEDIMENT BULK       CODE=1   BULK FACTOR=1.06


*S1A
COMPUTE NM HYD      ID=1        HYD NO=1W       AREA=0.00794 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1
*S2
COMPUTE NM HYD      ID=2        HYD NO=1E       AREA=0.003 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1


*FOR THIS MODEL, SPLIT BASIN 2W INTO UPPER (U) AND LOWER (L) BASINS
*S3
COMPUTE NM HYD      ID=3        HYD NO=2WU      AREA=0.00803 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 2WU BASIN AND 1W BASIN
*S4
ADD HYD             ID=4        HYD NO=1W2WU    IDS=1 AND 3

*S5  PLOT
PLOT HYD            ID=1   ID=3   Q SCALE=0   T SCALE=0

*S6
COMPUTE NM HYD      ID=5        HYD NO=2EU      AREA=0.00225 SQ MI
                    PER A=0     PER B=15        PER C=25.0      PER D=60.0
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 2EU BASIN AND 1E BASIN
```

```
*S7
ADD HYD             ID=6        HYD NO=1E2EU    IDS=2 AND 5

*S8  PLOT
PLOT HYD            ID=2   ID=5   Q SCALE=0   T SCALE=0

*S9
COMPUTE NM HYD      ID=7        HYD NO=2WL      AREA=0.0058 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1


*COMBINE FLOW FROM 2WU BASIN AND 2WL BASIN
*S10
ADD HYD             ID=8        HYD NO=AP1W     IDS=4 AND 7

*S11  PLOT
PLOT HYD            ID=4   ID=7   Q SCALE=0   T SCALE=0

*S12
COMPUTE NM HYD      ID=9        HYD NO=2EL      AREA=0.0018 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 2EU BASIN AND 2EL BASIN
*S13
ADD HYD             ID=10       HYD NO=AP1E     IDS=6 AND 9

*S14  PLOT
PLOT HYD            ID=6   ID=9   Q SCALE=0   T SCALE=0

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD          ID=8        Q=32            ID I=11    HYD NO=AP1WSD
                                                ID II=12   HYD NO=AP1WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S16
DIVIDE HYD          ID=10       Q=11            ID I=13    HYD NO=AP1ESD
                                                ID II=14   HYD NO=AP1EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S17
ADD HYD             ID=15       HYD NO=AP1SD    IDS=11 AND 13

*S18  PLOT
PLOT HYD            ID=11   ID=13   Q SCALE=0   T SCALE=0

*S*************************************************************************
*S****ROUTE INTERCEPTED FLOW THROUGH DOWN CHIANTI (13TH STREET) IN 30" PIPE
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.015
                     DIA=2.5 FT N=0.013
*S19
ROUTE MCUNGE        ID=16   HYD NO=AP1R   INFLOW ID=15
                    DT=0.0 HR   LENGTH=1170 FT
                    NS=0   SLOPE=0.0150   MATCODE=0
                    REGCODE=0   CCODE=0
*S*************************************************************************
*S******************END AP 1*****************************************************
*S******************BEGIN AP 2****************************************************

*FOR THIS MODEL, SPLIT BASIN 3W INTO UPPER (U) AND LOWER (L) BASINS
*S20
COMPUTE NM HYD      ID=17       HYD NO=3WU      AREA=0.0123 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*TOTAL SURFACE FLOW AT AP2
ADD HYD             ID=7        HYD NO=AP2W     IDS=12 AND 17

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD          ID=7        Q=20            ID I=50    HYD NO=AP2WSD
                                                ID II=51   HYD NO=AP2WST

*ROUTE INTERCEPTED FLOW THROUGH AP2 IN 30" PIPE TO AP3
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.04
                     DIA=2.5 FT N=0.013
*S19
ROUTE MCUNGE        ID=53   HYD NO=AP2R   INFLOW ID=50
                    DT=0.0 HR   LENGTH=770 FT
                    NS=0   SLOPE=0.040   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 2*****************************************************
*S******************BEGIN AP 3****************************************************

*S21
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```
COMPUTE NM HYD       ID=18       HYD NO=3EU      AREA=0.00375 SQ MI
                     PER A=0     PER B=15        PER C=25        PER D=60
                     TP=0.111 HR         MASS RAIN=-1
*S22
COMPUTE NM HYD       ID=19       HYD NO=3WL      AREA=0.00803 SQ MI
                     PER A=0     PER B=10        PER C=0         PER D=90
                     TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 3WU BASIN AND 3WL BASIN
*S23
ADD HYD              ID=20       HYD NO=AP3W     IDS=51 AND 19

*S25
COMPUTE NM HYD       ID=21       HYD NO=3EL  AREA=0.00268 SQ MI
                     PER A=0     PER B=15        PER C=25        PER D=60
                     TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM AP1E BASIN AND 3EU BASIN
*S26
ADD HYD              ID=81       HYD NO=AP1E3EU  IDS=18 AND 14

*COMBINE FLOW FROM 3EL BASIN AND 3EU BASIN
*S26
ADD HYD              ID=22       HYD NO=AP3E     IDS=81 AND 21

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD           ID=20       Q=20            ID I=50    HYD NO=AP3WSD
                                                 ID II=55   HYD NO=AP3WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S16
DIVIDE HYD           ID=22       Q=12            ID I=56    HYD NO=AP3ESD
                                                 ID II=57   HYD NO=AP3EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S17
ADD HYD              ID=58       HYD NO=AP3CSD   IDS=50 AND 56

*COMBINE INTERSEPTED FLOW WITH ROUTED FLOW FROM AP2
*S17
ADD HYD              ID=56       HYD NO=AP3SD    IDS=53 AND 58

*ROUTE INTERCEPTED FLOW THROUGH AP3 IN 36" PIPE TO AP4
COMPUTE RATING CURVE CID=1       VS NO=1 CODE=-1 SLP=0.018
                     DIA=3.0 FT N=0.013
*S19
ROUTE MCUNGE         ID=59   HYD NO=AP3R   INFLOW ID=56
                     DT=0.0 HR   LENGTH=514 FT
                     NS=0   SLOPE=0.018   MATCODE=0
                     REGCODE=0   CCODE=0

*S******************END AP 3*****************************************************
*S******************BEGIN AP 4***************************************************

*S28
COMPUTE NM HYD       ID=23       HYD NO=4W       AREA=0.00546 SQ MI
                     PER A=0     PER B=10        PER C=0         PER D=90
                     TP=0.111 HR MASS RAIN=-1


*COMBINE FLOW FROM 4W BASIN AND 3WL BASIN
*S29
ADD HYD              ID=24       HYD NO=3WL4W    IDS=55 AND 23

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S15
DIVIDE HYD           ID=24       Q=12.5          ID I=60    HYD NO=AP4WSD
                                                 ID II=61   HYD NO=AP4WST

*COMBINE INTERCEPTED FLOW FROM WEST SIDE OF ROADWAY IN STORM DRAIN
*S17
ADD HYD              ID=62       HYD NO=AP4SD    IDS=59 AND 60

*ROUTE INTERCEPTED FLOW THROUGH AP2 IN 36" PIPE TO AP3
COMPUTE RATING CURVE CID=1       VS NO=1 CODE=-1 SLP=0.0525
                     DIA=3.0 FT N=0.013
*S19
ROUTE MCUNGE         ID=53   HYD NO=AP2R   INFLOW ID=62
                     DT=0.0 HR   LENGTH=600 FT
                     NS=0   SLOPE=0.0525   MATCODE=0
                     REGCODE=0   CCODE=0

*S******************END AP 4*****************************************************
*S******************BEGIN AP 5***************************************************

*S31
COMPUTE NM HYD       ID=25       HYD NO=4E       AREA=0.0014 SQ MI
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```
                    PER A=0.0   PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1


*COMBINE FLOW FROM 4E BASIN AND STREET FLOW
*S32
ADD HYD             ID=26       HYD NO=3EL4E    IDS=57 AND 25

*S34
COMPUTE NM HYD      ID=27       HYD NO=5W       AREA=0.0047 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE STREET FLOW FROM 4W BASIN AND 5W BASIN
*S35
ADD HYD             ID=28       HYD NO=AP5W     IDS=61 AND 27

*S37
COMPUTE NM HYD      ID=29       HYD NO=5E       AREA=0.0019 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE FLOW FROM 4E BASIN AND 5E BASIN
*S38
ADD HYD             ID=30       HYD NO=AP5E     IDS=26 AND 29

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S40
DIVIDE HYD          ID=28       Q=14            ID I=31    HYD NO=AP5WSD
                                                ID II=32   HYD NO=AP5WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S41
DIVIDE HYD          ID=30       Q=12            ID I=33    HYD NO=AP5ESD
                                                ID II=34   HYD NO=AP5EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S42
ADD HYD             ID=35       HYD NO=AP5EAP2W IDS=31 AND 33

*COMBINE INTERCEPTED FLOW FROM AP 5 AND ROUTED FLOW FROM AP 4 IN STORM DRAIN
*S44
ADD HYD             ID=36       HYD NO=AP5SD    IDS=53 AND 35

*ROUTE INTERCEPTED FLOW THROUGH AP6 IN 42" PIPE TO 19TH STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.0400
                     DIA=3.5 FT N=0.013

*S46
ROUTE MCUNGE        ID=37   HYD NO=AP619   INFLOW ID=36
                    DT=0.0 HR   LENGTH=550 FT
                    NS=0   SLOPE=0.0400   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 5*****************************************************
*S******************BEGIN AP 6***************************************************

*S47
COMPUTE NM HYD      ID=1        HYD NO=6W       AREA=0.0029 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR         MASS RAIN=-1
*S48
COMPUTE NM HYD      ID=2        HYD NO=6E       AREA=0.0017 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE STREET FLOW FROM 5W BASIN AND 6W BASIN
*S35
ADD HYD             ID=63       HYD NO=AP6W     IDS=32 AND 1

*COMBINE FLOW FROM 5E BASIN AND 6E BASIN
*S38
ADD HYD             ID=30       HYD NO=AP6E     IDS=34 AND 2

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S40
DIVIDE HYD          ID=63       Q=11            ID I=65    HYD NO=AP6WSD
                                                ID II=66   HYD NO=AP6WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S41
DIVIDE HYD          ID=30       Q=4             ID I=67    HYD NO=AP6ESD
                                                ID II=68   HYD NO=AP6EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S42
ADD HYD             ID=64       HYD NO=AP6CSD   IDS=65 AND 67
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*COMBINE INTERCEPTED FLOW FROM AP 6 AND ROUTED FLOW FROM AP 5 IN STORM DRAIN
*S44
ADD HYD             ID=36       HYD NO=AP6SD    IDS=37 AND 64

*ROUTE INTERCEPTED FLOW THROUGH AP7 IN 48" PIPE TO 21ST STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.0060
                     DIA=4.0 FT N=0.013
*S46
ROUTE MCUNGE        ID=37   HYD NO=AP721   INFLOW ID=36
                    DT=0.0 HR   LENGTH=1200 FT
                    NS=0   SLOPE=0.006   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 6*****************************************************
*S******************BEGIN AP 7****************************************************

*S49
COMPUTE NM HYD      ID=3        HYD NO=7W       AREA=0.0094 SQ MI
                    PER A=0     PER B=15        PER C=5         PER D=80
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE STREET FLOW FROM 6W BASIN AND 7W BASIN
*S50
ADD HYD             ID=4        HYD NO=7W6W     IDS=66 AND 3

*S52
COMPUTE NM HYD      ID=5        HYD NO=7E       AREA=0.00107 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 7E BASIN AND 6E BASIN
*S53
ADD HYD             ID=6        HYD NO=6E7E     IDS=68 AND 5

*S55
COMPUTE NM HYD      ID=7        HYD NO=8W       AREA=0.00296 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 7W BASIN AND 8W BASIN
*S56
ADD HYD             ID=8        HYD NO=AP7W     IDS=4 AND 7

*S58
COMPUTE NM HYD      ID=9        HYD NO=8E       AREA=0.0096 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 8E BASIN AND 7E BASIN
*S59
ADD HYD             ID=10       HYD NO=AP7E     IDS=6 AND 9

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S40
DIVIDE HYD          ID=8        Q=20            ID I=65    HYD NO=AP7WSD
                                                ID II=66   HYD NO=AP7WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S41
DIVIDE HYD          ID=10       Q=11            ID I=67    HYD NO=AP7ESD
                                                ID II=68   HYD NO=AP7EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S42
ADD HYD             ID=64       HYD NO=AP7CSD   IDS=65 AND 67

*COMBINE INTERCEPTED FLOW FROM AP 7 AND ROUTED FLOW FROM AP 6 IN STORM DRAIN
*S44
ADD HYD             ID=36       HYD NO=AP7SD    IDS=37 AND 64

*ROUTE INTERCEPTED FLOW THROUGH AP8 IN 48" PIPE TO 21ST STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.0060
                     DIA=4.0 FT N=0.013
*S46
ROUTE MCUNGE        ID=37   HYD NO=AP822   INFLOW ID=36
                    DT=0.0 HR   LENGTH=550 FT
                    NS=0   SLOPE=0.006   MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 7*****************************************************
*S******************BEGIN AP 8****************************************************

*S64
COMPUTE NM HYD      ID=13       HYD NO=9E       AREA=0.013 SQ MI
                    PER A=0.0   PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

DIVIDE HYD          ID=13       Q=16            ID I=80    HYD NO=AP822SD
```

*S******************20TH STREET POND MODEL************************************

*S INSERT PUNCH HYDROGRAPH FROM BLACKS ARROYO DMP FOR 20TH STREET POND AND
*S DISCHARGE INTO EXISTING 48" PIPE. ASSUME THAT IMPROVEMENTS WILL BE MADE
*S TO CONTROL FLOW RATE IN PIPE WITH FUTURE DEVELOPMENTS.

*S70
RECALL HYD ID=17 HYD=530.92 DT= .050000 HRS DA=   .1334 SQ MI
PEAK=   59.067CFS RO= 1.4014 INCHES NO PTS=521
FLOW RATES

.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.002
.024	.115	.336	.715	1.336
2.663	5.861	13.602	27.907	41.771
49.812	54.633	56.785	57.779	58.336
58.671	58.878	58.996	59.053	59.067
59.051	59.013	58.955	58.878	58.780
58.665	58.537	58.399	58.254	58.104
57.950	57.792	57.632	57.468	57.301
56.948	56.041	54.691	53.253	51.799
50.251	48.349	46.167	39.633	28.145
17.708	10.958	7.134	4.975	3.754
2.991	2.461	2.101	1.856	1.684
1.545	1.428	1.339	1.274	1.224
1.183	1.148	1.120	1.095	1.073
1.054	1.037	1.023	1.010	.999
.989	.980	.972	.966	.961
.958	.956	.955	.955	.956
.955	.956	.956	.956	.957
.960	.963	.968	.974	.979
.984	.989	.996	1.003	1.011
1.019	1.028	1.036	1.042	1.050
1.058	1.068	1.076	1.085	1.094
1.104	1.113	1.121	1.127	1.129
1.129	1.128	1.128	1.127	1.126
1.125	1.122	1.118	1.114	1.110
1.108	1.105	1.103	1.101	1.097
1.093	1.088	1.085	1.082	1.079
1.076	1.072	1.067	1.062	1.059
1.055	1.052	1.050	1.048	1.046
1.043	1.039	1.036	1.034	1.031
1.027	1.023	1.020	1.017	1.013
1.009	1.005	1.002	.999	.997
.995	.993	.991	.988	.985
.982	.979	.976	.973	.971
.968	.965	.962	.960	.957
.953	.950	.947	.944	.941
.940	.938	.936	.933	.930
.927	.924	.922	.921	.918
.915	.912	.910	.908	.907
.904	.900	.896	.893	.891
.890	.888	.885	.883	.881
.880	.879	.878	.876	.872
.869	.866	.864	.863	.862
.859	.856	.853	.851	.849
.847	.846	.844	.842	.839
.836	.833	.831	.829	.828
.827	.826	.825	.822	.819
.818	.816	.815	.812	.810
.807	.805	.803	.802	.800
.799	.797	.795	.793	.792
.791	.790	.788	.786	.783
.780	.778	.776	.775	.773
.772	.771	.770	.767	.765
.763	.762	.760	.758	.757
.756	.754	.753	.753	.751
.749	.746	.744	.742	.741
.740	.738	.736	.734	.733
.732	.730	.728	.727	.727
.727	.726	.724	.722	.721
.719	.717	.715	.712	.710
.709	.708	.707	.705	.703
.702	.700	.700	.698	.697
.695	.694	.694	.693	.691
.689	.688	.687	.686	.684
.683	.682	.681	.680	.679
.678	.676	.673	.672	.671
.671	.671	.670	.668	.667
.665	.664	.663	.661	.659
.656	.654	.653	.653	.653
.652	.651	.649	.647	.646
.645	.644	.643	.642	.642

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                    .641        .639        .638        .637        .636
                    .635        .634        .633        .633        .632
                    .630        .629        .628        .627        .626
                    .625        .624        .621        .620        .619
                    .618        .618        .617        .615        .613
                    .612        .610        .609        .610        .611
                    .611        .609        .607        .604        .603
                    .602        .602        .602        .602        .601
                    .600        .598        .597        .596        .595
                    .593        .593        .592        .592        .590
                    .588        .587        .586        .586        .585
                    .584        .583        .581        .580        .580
                    .579        .578        .578        .577        .577
                    .576        .575        .574        .572        .571
                    .571        .570        .569        .569        .568
                    .567        .565        .564        .563        .563
                    .563        .562        .560        .558        .557
                    .556        .556        .557        .557        .557
                    .556        .555        .554        .553        .550
                    .547        .546        .545        .544        .545
                    .545        .545        .544        .542        .541
                    .541        .541        .540        .539        .538
                    .538        .537        .530        .509        .473
                    .427        .377        .328        .283        .243
                    .207        .176        .149        .127        .107
                    .090        .076        .064        .054        .045
                    .038        .032        .026        .022        .018
                    .015        .013        .011        .009        .007
                    .006        .005        .004        .004        .003
                    .003        .002        .002        .002        .001
                    .001

*COMBINE STORM DRAIN FLOW FROM 20 ST POND TO SD AT 22ND STREET
*S71
ADD HYD             ID=18       HYD NO=AP8POND  IDS=37 AND 17
ADD HYD             ID=82       HYD NO=AP822ND  IDS=80 AND 18

*ROUTE COMBINED STORM DRAIN FLOW THROUGH AP9 IN 54" PIPE TO 23RD STREET
COMPUTE RATING CURVE CID=1      VS NO=1 CODE=-1 SLP=0.05
                     DIA=4.5 FT N=0.013
*S72
ROUTE MCUNGE        ID=19   HYD NO=AP9SD   INFLOW ID=82
                    DT=0.0 HR   LENGTH=600 FT
                    NS=0    SLOPE=0.05    MATCODE=0
                    REGCODE=0   CCODE=0

*S******************END AP 8*****************************************************
*S******************BEGIN AP 9****************************************************

*S61
COMPUTE NM HYD      ID=11       HYD NO=9W       AREA=0.00323 SQ MI
                    PER A=0     PER B=10        PER C=0         PER D=90
                    TP=0.111 HR MASS RAIN=-1

*COMBINE FLOW FROM 9W BASIN AND 8W BASIN
*S62
ADD HYD             ID=12       HYD NO=8W9W     IDS=66 AND 11

*S67
COMPUTE NM HYD      ID=15       HYD NO=10E      AREA=0.0195 SQ MI
                    PER A=0     PER B=15        PER C=25        PER D=60
                    TP=0.111 HR MASS RAIN=-1

*COMBINE BYPASS FLOW FROM 9E BASIN AND 10E BASIN
*S68
ADD HYD             ID=16       HYD NO=AP9E     IDS=68 AND 81

*S73
COMPUTE NM HYD      ID=20       HYD NO=10W      AREA=0.0032 SQ MI
                    PER A=0     PER B=10                PER C=0         PER D=90
                    TP=0.111 HR         MASS RAIN=-1

*COMBINE FLOW FROM 10W BASIN AND 9W BASIN
*S74
ADD HYD             ID=21       HYD NO=AP9W     IDS=12 AND 20

*DIVIDE WEST FLOW BETWEEN STORM DRAIN AND STREET
*S79
DIVIDE HYD          ID=21       Q=28            ID I=24    HYD NO=AP9WSD
                                                ID II=25   HYD NO=AP9WST

*DIVIDE EAST FLOW BETWEEN STORM DRAIN AND STREET
*S80
DIVIDE HYD          ID=16       Q=20            ID I=26    HYD NO=AP9ESD
                                                ID II=27   HYD NO=AP9EST

*COMBINE INTERCEPTED FLOW FROM EAST AND WEST SIDES OF ROADWAY IN STORM DRAIN
*S81
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ADD HYD              ID=28       HYD NO=AP9EAP9W IDS=24 AND 26

*COMBINE INTERCEPTED FLOW FROM AP 9 AND ROUTED FLOW FROM AP 8 IN STORM DRAIN
*S83
ADD HYD              ID=29       HYD NO=AP9SD    IDS=19 AND 28


*S******************END AP 9*************************************************

FINISH
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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =03/16/2006
INPUT FILE = c:\AHYMO_97\GC100ULT.TXT 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
*S GOLF COURSE ROAD HYDROLOGY										
*S AHYMO MODEL TO CALCULATE RUNOFF BASED ON PROPOSED CONDITIONS (MODIFIED TO										
*s REPRESENT ULTIMATE CONDITIONS AS SHOWN IN THE blwmp BY dsa 3/07/06)										
*S ON GOLF COURSE ROAD FROM SOUTHERN BLVD SOUTH TO 23RD STREET DETENTION PONDS										
*S THIS MODEL ASSUMES THAT ALL LOTS ADJACENT TO THE WEST SIDE OF GOLF COURSE										
*S WILL BE DEVELOPED AS COMMERCIAL LOTS AND THAT ON-SITE DETENTION WILL BE										
*S REQUIRED TO CONTROL RUNOFF ABOVE HISTORICAL VALUES.										
*S DRAINAGE BASIN DELINEATIONS WERE MADE IN ACCORDANCE WITH THE BLACKS ARROYO										
*S DRAINAGE MASTER PLAN TO BE COMPLETED FOR SSCAFCA. BULKING FACTOR ADDED IN										
*S ACCORDANCE WITH SSCAFCA REQUIREMENTS FOR THE BLACKS ARROYO ANALYSIS.										
*S**********										
*S********** 100-YEAR STORM **********										
*S**********										
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.700
*S**********BEGIN AP 1**********										
*S1										
SEDIMENT BULK										PK BF = 1.06
*S1A										
COMPUTE NM HYD	1W	-	1	.00794	21.85	1.022	2.41367	1.500	4.300	PER IMP= 90.00
*S2										
COMPUTE NM HYD	1E	-	2	.00300	7.41	.306	1.91328	1.500	3.857	PER IMP= 60.00
*S3										
COMPUTE NM HYD	2WU	-	3	.00803	22.10	1.034	2.41367	1.500	4.300	PER IMP= 90.00
*S4										
ADD HYD	1W2WU	1& 3	4	.01597	43.95	2.056	2.41363	1.500	4.300	
*S5 PLOT										
*S6										
COMPUTE NM HYD	2EU	-	5	.00225	5.56	.230	1.91328	1.500	3.859	PER IMP= 60.00
*S7										
ADD HYD	1E2EU	2& 5	6	.00525	12.96	.536	1.91318	1.500	3.858	
*S8 PLOT										
*S9										
COMPUTE NM HYD	2WL	-	7	.00580	15.96	.747	2.41367	1.500	4.301	PER IMP= 90.00
*S10										
ADD HYD	AP1W	4& 7	8	.02177	59.92	2.802	2.41363	1.500	4.300	
*S11 PLOT										
*S12										
COMPUTE NM HYD	2EL	-	9	.00180	4.45	.184	1.91328	1.500	3.862	PER IMP= 60.00
*S13										
ADD HYD	AP1E	6& 9	10	.00705	17.41	.719	1.91316	1.500	3.859	
*S14 PLOT										
*S15										
DIVIDE HYD	AP1WSD	8	11	.01907	32.00	2.455	2.41363	1.400	2.622	
	AP1WST	and	12	.00270	27.92	.348	2.41363	1.500	16.143	
*S16										
DIVIDE HYD	AP1ESD	10	13	.00639	11.00	.652	1.91316	1.400	2.691	
	AP1EST	and	14	.00066	6.41	.068	1.91316	1.500	15.132	
*S17										

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
ADD HYD	AP1SD	11&13	15	.02546	43.00	3.106	2.28804	1.400	2.639	
*S18 PLOT										
*S**********										
*S****ROUTE INTERCEPTED FLOW THROUGH DOWN CHIANTI (13TH STREET) IN 30" PIPE										
*S19										

```
ROUTE MCUNGE            AP1R   15   16        .02546        43.00        3.104      2.28628    1.450    2.639 CCODE =      .1
*S*****************************************************************************************
*S******************END AP 1*****************************************************
*S******************BEGIN AP 2****************************************************
*S20
COMPUTE NM HYD           3WU    -   17        .01230        33.84        1.583      2.41367    1.500    4.299 PER IMP=  90.00
ADD HYD                AP2W 12&17    7        .01500        61.76        1.931      2.41365    1.500    6.432
*S15
DIVIDE HYD           AP2WSD     7   50        .01108        20.00        1.427      2.41365    1.400    2.820
                     AP2WST   and   51        .00392        41.76         .505      2.41365    1.500   16.648
*S19
ROUTE MCUNGE            AP2R   50   53        .01108        20.00        1.426      2.41276    1.450    2.820 CCODE =      .1
*S******************END AP 2*****************************************************
*S******************BEGIN AP 3****************************************************
*S21
COMPUTE NM HYD           3EU    -   18        .00375         9.25         .383      1.91328    1.500    3.856 PER IMP=  60.00
*S22
COMPUTE NM HYD           3WL    -   19        .00803        22.10        1.034      2.41367    1.500    4.300 PER IMP=  90.00
*S23
ADD HYD                AP3W 51&19   20        .01195        63.86        1.538      2.41364    1.500    8.350
*S25
COMPUTE NM HYD           3EL    -   21        .00268         6.62         .273      1.91328    1.500    3.859 PER IMP=  60.00
*S26
ADD HYD             AP1E3EU 18&14   81        .00441        15.67         .450      1.91320    1.500    5.548
*S26
ADD HYD                AP3E 81&21   22        .00709        22.28         .724      1.91320    1.500    4.910
*S15
DIVIDE HYD           AP3WSD    20   50        .00819        20.00        1.054      2.41364    1.400    3.816
                     AP3WST   and   55        .00376        43.86         .484      2.41364    1.500   18.221
*S16
DIVIDE HYD           AP3ESD    22   56        .00615        12.00         .627      1.91320    1.400    3.051
                     AP3EST   and   57        .00095        10.28         .097      1.91320    1.500   16.985
*S17
ADD HYD              AP3CSD 50&56   58        .01433        32.00        1.681      2.19907    1.400    3.488
*S17
ADD HYD                AP3SD 53&58   56        .02542        52.00        3.107      2.29222    1.450    3.197
*S19
ROUTE MCUNGE            AP3R   56   59        .02542        52.00        3.101      2.28781    1.500    3.197 CCODE =      .1
*S******************END AP 3*****************************************************
*S******************BEGIN AP 4****************************************************
*S28
COMPUTE NM HYD           4W     -   23        .00546        15.03         .703      2.41367    1.500    4.302 PER IMP=  90.00
*S29
ADD HYD              3WL4W 55&23   24        .00922        58.89        1.187      2.41363    1.500    9.979
*S15
DIVIDE HYD           AP4WSD    24   60        .00538        12.50         .692      2.41363    1.400    3.632
                     AP4WST   and   61        .00384        46.39         .495      2.41363    1.500   18.860
*S17
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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
ADD HYD	AP4SD	59&60	62	.03079	64.50	3.793	2.30975	1.500	3.273	
*S19										
ROUTE MCUNGE	AP2R	62	53	.03079	64.50	3.793	2.30975	1.500	3.273	CCODE = .0

```
*S******************END AP 4*****************************************************
*S******************BEGIN AP 5****************************************************
*S31
COMPUTE NM HYD           4E     -   25        .00140         3.46         .143      1.91328    1.500    3.866 PER IMP=  60.00
*S32
ADD HYD              3EL4E 57&25   26        .00235        13.75         .239      1.91312    1.500    9.156
*S34
COMPUTE NM HYD           5W     -   27        .00470        12.94         .605      2.41367    1.500    4.302 PER IMP=  90.00
*S35
ADD HYD                AP5W 61&27   28        .00854        59.33        1.100      2.41362    1.500   10.851
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*S37										
COMPUTE NM HYD	5E	-	29	.00190	4.70	.194	1.91328	1.500	3.862	PER IMP= 60.00
*S38										
ADD HYD	AP5E	26&29	30	.00425	18.44	.433	1.91314	1.500	6.787	
*S40										
DIVIDE HYD	AP5WSD	28	31	.00504	14.00	.649	2.41362	1.400	4.336	
	AP5WST	and	32	.00350	45.33	.450	2.41362	1.500	20.247	
*S41										
DIVIDE HYD	AP5ESD	30	33	.00376	12.00	.384	1.91314	1.450	4.986	
	AP5EST	and	34	.00049	6.44	.050	1.91314	1.500	20.722	
*S42										
ADD HYD	AP5EAP2W	31&33	35	.00881	26.00	1.033	2.19989	1.450	4.614	
*S44										
ADD HYD	AP5SD	53&35	36	.03960	90.50	4.827	2.28532	1.500	3.571	
*S46										
ROUTE MCUNGE	AP619	36	37	.03960	90.50	4.827	2.28532	1.500	3.571	CCODE = .0
*S**********END AP 5**********										
*S**********BEGIN AP 6**********										
*S47										
COMPUTE NM HYD	6W	-	1	.00290	7.99	.373	2.41367	1.500	4.305	PER IMP= 90.00
*S48										
COMPUTE NM HYD	6E	-	2	.00170	4.20	.173	1.91328	1.500	3.863	PER IMP= 60.00
*S35										
ADD HYD	AP6W	32& 1	63	.00640	53.32	.824	2.41361	1.500	13.021	
*S38										
ADD HYD	AP6E	34& 2	30	.00219	10.65	.223	1.91312	1.500	7.610	
*S40										
DIVIDE HYD	AP6WSD	63	65	.00342	11.00	.440	2.41361	1.400	5.032	
	AP6WST	and	66	.00298	42.32	.384	2.41361	1.500	22.170	
*S41										
DIVIDE HYD	AP6ESD	30	67	.00169	4.00	.172	1.91313	1.450	3.704	
	AP6EST	and	68	.00050	6.65	.051	1.91312	1.500	20.827	
*S42										
ADD HYD	AP6CSD	65&67	64	.00510	15.00	.612	2.24812	1.450	4.593	
*S44										
ADD HYD	AP6SD	37&64	36	.04470	105.50	5.438	2.28108	1.500	3.688	
*S46										
ROUTE MCUNGE	AP721	36	37	.04470	104.83	5.430	2.27765	1.500	3.664	CCODE = .2
*S**********END AP 6**********										

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
*S**********BEGIN AP 7**********										
*S49										
COMPUTE NM HYD	7W	-	3	.00940	24.82	1.121	2.23579	1.500	4.126	PER IMP= 80.00
*S50										
ADD HYD	7W6W	66& 3	4	.01238	67.14	1.505	2.27860	1.500	8.472	
*S52										
COMPUTE NM HYD	7E	-	5	.00107	2.65	.109	1.91328	1.500	3.869	PER IMP= 60.00
*S53										
ADD HYD	6E7E	68& 5	6	.00157	9.30	.160	1.91309	1.500	9.260	
*S55										
COMPUTE NM HYD	8W	-	7	.00296	8.16	.381	2.41367	1.500	4.305	PER IMP= 90.00
*S56										
ADD HYD	AP7W	4& 7	8	.01534	75.29	1.886	2.30464	1.500	7.668	
*S58										
COMPUTE NM HYD	8E	-	9	.00960	23.67	.980	1.91328	1.500	3.853	PER IMP= 60.00
*S59										
ADD HYD	AP7E	6& 9	10	.01117	32.97	1.140	1.91323	1.500	4.612	
*S40										
DIVIDE HYD	AP7WSD	8	65	.01104	20.00	1.357	2.30464	1.400	2.830	
	AP7WST	and	66	.00430	55.29	.529	2.30464	1.500	20.085	
*S41										
DIVIDE HYD	AP7ESD	10	67	.00854	11.00	.871	1.91323	1.350	2.014	

	AP7EST	and	68	.00263	21.97	.269	1.91323	1.500	13.038	
*S42										
ADD HYD	AP7CSD	65&67	64	.01958	31.00	2.228	2.13398	1.400	2.474	
*S44										
ADD HYD	AP7SD	37&64	36	.06428	135.83	7.658	2.23388	1.500	3.302	
*S46										
ROUTE MCUNGE	AP822	36	37	.06428	125.78	7.541	2.19960	1.550	3.057	CCODE = .2
*S**********END AP 7**********										
*S**********BEGIN AP 8**********										
*S64										
COMPUTE NM HYD	9E	-	13	.01300	32.05	1.327	1.91328	1.500	3.852	PER IMP= 60.00
DIVIDE HYD	AP822SD	13	80	.01098	16.00	1.121	1.91326	1.400	2.276	
	AP822ST	and	81	.00202	16.05	.206	1.91326	1.500	12.445	
*S**********20TH STREET POND MODEL**********										
*S INSERT PUNCH HYDROGRAPH FROM BLACKS ARROYO DMP FOR 20TH STREET POND AND										
*S DISCHARGE INTO EXISTING 48" PIPE. ASSUME THAT IMPROVEMENTS WILL BE MADE										
*S TO CONTROL FLOW RATE IN PIPE WITH FUTURE DEVELOPMENTS.										
*S70										
RECALL HYD	530.92	-	17	.13340	59.07	9.968	1.40108	1.950	.692	
*S71										
ADD HYD	AP8POND	37&17	18	.19768	180.41	17.509	1.66073	1.550	1.426	
ADD HYD	AP822ND	80&18	82	.20866	196.41	18.630	1.67403	1.550	1.471	
*S72										
ROUTE MCUNGE	AP9SD	82	19	.20866	196.41	18.630	1.67403	1.550	1.471	CCODE = .0
*S**********END AP 8**********										
*S**********BEGIN AP 9**********										
*S61										
COMPUTE NM HYD	9W	-	11	.00323	8.90	.416	2.41367	1.500	4.303	PER IMP= 90.00
*S62										

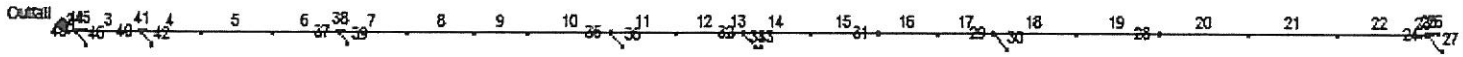
COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 5 NOTATION
ADD HYD	8W9W	66&11	12	.00753	64.19	.945	2.35137	1.500	13.317	
*S67										
COMPUTE NM HYD	10E	-	15	.01950	48.07	1.990	1.91328	1.500	3.852	PER IMP= 60.00
*S68										
ADD HYD	AP9E	68&81	16	.00465	38.02	.474	1.91324	1.500	12.781	
*S73										
COMPUTE NM HYD	10W	-	20	.00320	8.81	.412	2.41367	1.500	4.303	PER IMP= 90.00
*S74										
ADD HYD	AP9W	12&20	21	.01073	73.00	1.356	2.36992	1.500	10.629	
*S79										
DIVIDE HYD	AP9WSD	21	24	.00787	28.00	.995	2.36992	1.450	5.557	
	AP9WST	and	25	.00286	45.00	.361	2.36992	1.500	24.605	
*S80										
DIVIDE HYD	AP9ESD	16	26	.00328	20.00	.335	1.91324	1.450	9.530	
	AP9EST	and	27	.00137	18.02	.140	1.91324	1.500	20.567	
*S81										
ADD HYD	AP9EAP9W	24&26	28	.01115	48.00	1.330	2.23565	1.450	6.725	
*S83										
ADD HYD	AP9SD	19&28	29	.21982	242.50	19.960	1.70252	1.550	1.724	
*S**********END AP 9**********										
FINISH										

Appendix B
Hydraulic Calculations

All Report

Label	Worksheet Type	Discharge (cfs)	Depth (ft)	Slope (ft/ft)	Mannings Coefficient	Diameter (in)	Velocity (ft/s)	Flow Type	Headwater Elevation (ft)	Crest Elevation (ft)	Centroid Elevation (ft)	Tailwater Elevation (ft)	Intercepted Flow (cfs)	Spread (ft)	Gutter Width (ft)	Gutter Cross Slope (ft/ft)	Road Cross Slope (ft/ft)
AP1E - Type A	Combinatic	17.40	0.32	).013900	0.013		4.66						10.15	21.88	2.00	).020000	).015000
AP1W - Type A	Combinatic	59.92	0.56	).013900	0.013		6.92						22.87	29.09	2.00	).020000	).020000
AP1W - Type C	Combinatic	36.60	0.48	).013900	0.013		6.19						15.59	24.18	2.00	).020000	).020000
AP1W - Type C	Combinatic	20.90	0.38	).013900	0.013		5.36						11.28	19.60	2.00	).020000	).020000
AP2W - Type A	Combinatic	43.30	0.53	).009700	0.013		5.54						20.06	27.55	2.00	).020000	).020000
AP3E - Type A	Combinatic	22.30	0.38	).009700	0.013		4.33						11.86	25.70	2.00	).020000	).015000
AP3W - Type A	Combinatic	45.30	0.54	).009700	0.013		5.60						20.59	28.02	2.00	).020000	).020000
AP4W - Type A	Combinatic	39.00	0.37	).055000	0.013		10.45						12.63	19.14	2.00	).020000	).020000
AP5E - Type A -	Combinatic	17.04	0.27	).040000	0.013		6.95						9.16	17.79	2.00	).020000	).015000
AP5E - Type C -	Combinatic	7.20	0.20	).040000	0.013		5.67						5.06	12.85	2.00	).020000	).015000
AP5W - Type A	Combinatic	39.33	0.39	).040000	0.013		9.27						14.44	20.38	2.00	).020000	).020000
AP6E - Type A	Combinatic	6.25	0.20	).022000	0.013		4.21						4.12	13.64	2.00	).020000	).015000
AP6W - Type A	Combinatic	32.32	0.41	).022000	0.013		7.02						11.33	21.18	2.00	).020000	).020000
AP7E - Type A	Combinatic	28.07	0.45	).005700	0.013		3.76						11.08	30.97	2.00	).020000	).015000
AP7W - Type A	Combinatic	54.64	0.63	).005700	0.013		4.80						24.13	33.22	2.00	).020000	).020000
AP7W - Type C	Combinatic	30.10	0.36	).040000	0.013		8.77						11.45	18.43	2.00	).020000	).020000
AP8E - Type C	Combinatic	15.00	0.33	).010000	0.013		4.04						8.12	22.02	2.00	).020000	).015000
AP923RD - Type	Combinatic	24.00	0.41	).010000	0.013		4.78						13.88	21.96	2.00	).020000	).020000
AP9E - Type A	Combinatic	29.00	0.31	).050000	0.013		8.69						11.39	20.84	2.00	).020000	).015000
AP9E - Type A -	Combinatic	17.00	0.26	).050000	0.013		7.56						8.79	17.04	2.00	).020000	).015000
AP9W - Type A	Combinatic	36.35	0.37	).050000	0.013		9.89						12.86	18.97	2.00	).020000	).020000
AP9W - Type A	Combinatic	13.60	0.25	).050000	0.013		7.63						8.07	13.12	2.00	).020000	).020000
AP9W - Type C	Combinatic	23.20	0.32	).050000	0.013		8.93						9.52	16.03	2.00	).020000	).020000
AP9W - Type C	Combinatic	5.35	0.18	).050000	0.013		6.12						4.17	9.25	2.00	).020000	).020000
AP9W - Type C	Combinatic	1.50	0.11	).050000	0.013		4.36						1.49	5.74	2.00	).020000	).020000

Hydraflow Plan View



Project File: GCULT100mod.stm	No. Lines: 46	03-20-2006

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	Inserted Line	242.6	60 c	40.0	5193.00	5193.18	0.450	5198.00*	5198.35*	1.42	5199.77	End
2	Inserted Line	242.6	60 c	29.0	5193.28	5194.42	3.932	5199.77*	5200.02*	1.42	5201.45	1
3	Inserted Line	226.1	54 c	291.0	5194.92	5210.36	5.306	5201.45	5214.55	n/a	5214.55	2
4	Inserted Line	197.1	54 c	267.0	5210.46	5224.59	5.292	5215.50	5228.62	1.07	5228.62	3
5	Inserted Line	138.1	48 c	320.0	5225.09	5230.75	1.769	5229.42	5234.25	n/a	5234.25	4
6	Inserted Line	138.1	48 c	296.0	5230.85	5233.78	0.990	5234.85	5237.28	n/a	5237.28	5
7	Inserted Line	110.1	48 c	304.0	5233.88	5235.51	0.536	5238.27*	5240.05*	0.48	5240.53	6
8	Inserted Line	110.1	48 c	304.0	5235.61	5237.76	0.707	5240.53*	5242.32*	0.48	5242.80	7
9	Inserted Line	110.1	42 c	238.0	5238.26	5239.53	0.534	5242.80*	5245.65*	0.81	5246.46	8
10	Inserted Line	110.1	42 c	367.0	5239.63	5241.79	0.589	5246.46*	5250.86*	0.81	5251.67	9
11	Inserted Line	93.90	42 c	295.0	5241.89	5256.24	4.864	5252.23	5259.21	n/a	5259.21	10
12	Inserted Line	93.90	36 c	256.0	5256.74	5264.77	3.137	5259.74	5267.64	n/a	5267.64	11
13	Inserted Line	93.90	36 c	39.0	5264.87	5266.16	3.308	5267.87	5269.03	n/a	5269.03	12
14	Inserted Line	67.80	36 c	303.0	5266.26	5279.76	4.455	5270.43	5282.39	n/a	5282.39	13
15	Inserted Line	67.80	36 c	300.0	5279.86	5295.61	5.250	5282.86	5298.24	n/a	5298.24	14
16	Inserted Line	54.80	36 c	264.0	5295.71	5301.37	2.144	5298.96	5303.73	n/a	5303.73	15
17	Inserted Line	54.80	36 c	250.0	5301.47	5303.99	1.008	5304.47	5306.35	n/a	5306.35	16
18	Inserted Line	20.40	30 c	367.0	5304.49	5318.92	3.932	5307.39	5320.43	n/a	5320.43 j	17
19	Inserted Line	20.40	30 c	370.0	5319.02	5323.06	1.092	5321.52	5324.57	n/a	5324.57 j	18
20	Inserted Line	0.40	30 c	400.0	5323.16	5327.46	1.075	5325.66	5327.67	n/a	5327.67 j	19
21	Inserted Line	0.40	30 c	400.0	5327.56	5335.75	2.047	5330.06	5335.96	n/a	5335.96 j	20
22	Inserted Line	0.40	30 c	367.0	5335.85	5343.02	1.954	5338.35	5343.23	n/a	5343.23 j	21
23	Inserted Line	0.40	30 c	32.0	5343.12	5343.63	1.593	5345.62	5345.62	0.00	5345.62	22
24	Inserted Line	32.00	24 c	11.0	5343.68	5343.90	1.998	5345.68	5345.90	1.13	5347.03	23
25	Inserted Line	24.00	24 c	25.0	5344.00	5344.50	2.000	5347.74*	5348.02*	0.64	5348.65	24
26	Inserted Line	12.00	18 c	25.0	5344.60	5345.10	2.000	5348.84*	5349.17*	0.43	5349.60	25
27	Inserted Line	11.40	18 c	94.0	5343.72	5345.60	2.000	5345.62	5346.89	n/a	5346.89 j	23
28	Inserted Line	20.00	18 c	11.0	5326.12	5326.34	1.998	5327.62*	5328.02*	1.39	5329.41	19
29	Inserted Line	21.00	18 c	11.0	5307.05	5307.27	2.002	5308.55*	5308.99*	1.54	5310.53	17
30	Inserted Line	13.40	18 c	84.0	5306.20	5307.88	2.000	5307.70	5309.25	n/a	5309.25 j	17
31	Inserted Line	13.00	18 c	11.0	5297.17	5297.39	2.002	5299.05*	5299.22*	0.59	5299.81	15
32	Inserted Line	14.80	18 c	11.0	5267.72	5267.94	1.998	5270.77*	5270.99*	0.76	5271.75	13

Project File: GCULT100mod.stm | Number of lines: 46 | Run Date: 03-20-2006

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
33	Inserted Line	11.30	18 c	82.0	5267.84	5269.48	2.000	5271.22*	5272.17*	0.38	5272.55	13
34	Inserted Line	6.00	18 c	25.0	5269.58	5270.97	5.561	5273.01*	5273.09*	0.11	5273.20	33
35	Inserted Line	11.70	18 c	11.0	5251.03	5251.25	2.002	5253.03*	5253.16*	0.48	5253.64	10
36	Inserted Line	4.50	18 c	75.0	5250.20	5251.70	2.000	5253.61*	5253.75*	0.06	5253.81	10
37	Inserted Line	19.00	18 c	11.0	5237.88	5238.10	2.002	5239.38*	5239.74*	1.26	5241.00	6
38	Inserted Line	8.00	18 c	25.0	5238.20	5238.70	2.000	5242.48*	5242.62*	0.22	5242.85	37
39	Inserted Line	9.00	18 c	61.0	5237.61	5238.83	2.000	5239.11	5239.98	n/a	5239.98 j	6
40	Inserted Line	18.00	18 c	11.0	5216.32	5216.54	2.002	5217.82*	5218.14*	1.13	5219.27	3
41	Inserted Line	10.00	18 c	25.0	5216.64	5217.24	2.400	5220.39*	5220.62*	0.35	5220.96	40
42	Inserted Line	12.00	18 c	70.0	5216.61	5218.01	2.000	5218.11	5219.33	n/a	5219.33 j	3
43	Inserted Line	10.50	24 c	11.0	5197.88	5198.00	1.092	5203.65*	5203.67*	0.12	5203.79	2
44	Inserted Line	9.00	24 c	25.0	5198.10	5199.79	6.760	5203.84*	5203.88*	0.09	5203.97	43
45	Inserted Line	5.00	18 c	25.0	5199.89	5201.38	5.959	5203.97*	5204.03*	0.07	5204.10	44
46	Inserted Line	8.00	18 c	73.0	5197.44	5199.84	3.288	5203.50*	5203.93*	0.19	5204.12	2

Project File: GCULT100mod.stm | Number of lines: 46 | Run Date: 03-20-2006

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

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	60	245.6	5193.00	5198.00	5.00	19.63	12.51	2.43	5200.43	0.889	40.0	5193.18	5198.36	5.00	19.63	12.51	2.43	5200.79	0.889	0.889	0.356	0.60	1.46
2	60	245.6	5193.28	5199.82	5.00	19.63	12.51	2.43	5202.25	0.889	29.0	5194.42	5200.08	5.00	19.63	12.51	2.43	5202.51	0.889	0.889	0.258	0.60	1.46
3	54	227.1	5194.92	5201.53	4.50	15.44	14.28	3.17	5204.71	1.334	291	5210.36	5214.56	4.20**	15.44	14.71	3.36	5217.92	1.153	1.244	n/a	0.40	1.35
4	54	197.1	5210.46	5215.53	4.50	15.01	12.40	2.39	5217.92	1.005	267	5224.59	5228.62	4.03**	15.01	13.13	2.68	5231.30	0.889	0.947	n/a	0.40	1.07
5	48	138.1	5225.09	5229.42	4.00	11.66	10.99	1.88	5231.30	0.925	320	5230.75	5234.25	3.50**	11.66	11.84	2.18	5236.43	0.837	0.881	n/a	0.40	n/a
6	48	138.1	5230.85	5234.85	4.00*	11.66	10.99	1.88	5236.73	0.925	296	5233.78	5237.28	3.50**	11.66	11.84	2.18	5239.46	0.837	0.881	n/a	0.40	n/a
7	48	110.1	5233.88	5238.27	4.00	12.56	8.76	1.19	5239.46	0.588	304	5235.51	5240.05	4.00	12.57	8.76	1.19	5241.25	0.587	0.588	1.786	0.40	0.48
8	48	110.1	5235.61	5240.53	4.00	12.56	8.76	1.19	5241.73	0.588	304	5237.76	5242.32	4.00	12.57	8.76	1.19	5243.51	0.587	0.588	1.786	0.40	0.48
9	42	110.1	5238.26	5242.80	3.50	9.62	11.45	2.04	5244.83	1.198	238	5239.53	5245.65	3.50	9.62	11.44	2.04	5247.68	1.198	1.198	2.851	0.40	0.81
10	42	110.1	5239.63	5246.46	3.50	9.62	11.45	2.04	5248.50	1.198	367	5241.79	5250.86	3.50	9.62	11.44	2.04	5252.90	1.198	1.198	4.396	0.40	0.81
11	42	93.90	5241.89	5252.23	3.50	9.62	9.76	1.48	5253.71	0.871	295	5256.24	5259.21	2.97**	8.70	10.80	1.81	5261.02	0.824	0.847	n/a	0.40	n/a
12	36	93.90	5256.74	5259.74	3.00*	6.96	13.29	2.74	5262.49	1.983	256	5264.77	5267.64	2.87**	6.96	13.48	2.83	5270.47	1.723	1.853	n/a	0.40	n/a
13	36	93.90	5264.87	5267.87	3.00*	6.96	13.29	2.74	5270.62	1.983	39.0	5266.16	5269.03	2.87**	6.96	13.48	2.83	5271.86	1.723	1.853	n/a	0.40	n/a
14	36	67.80	5266.26	5270.43	3.00	6.57	9.59	1.43	5271.86	1.034	303	5279.76	5282.39	2.63**	6.57	10.32	1.66	5284.05	0.933	0.984	n/a	0.40	n/a
15	36	67.80	5279.86	5282.86	3.00*	6.57	9.59	1.43	5284.29	1.034	300	5295.61	5298.24	2.63**	6.57	10.32	1.66	5299.90	0.933	0.984	n/a	0.40	n/a
16	36	54.80	5295.71	5298.96	3.00	7.07	7.75	0.93	5299.90	0.675	264	5301.37	5303.73	2.36**	5.96	9.19	1.31	5305.04	0.731	0.703	n/a	0.40	n/a
17	36	54.80	5301.47	5304.47	3.00*	7.07	7.75	0.93	5305.41	0.675	250	5303.99	5306.35	2.36**	5.96	9.19	1.31	5307.66	0.731	0.703	n/a	0.40	n/a
18	30	20.40	5304.49	5307.39	2.50	4.91	4.16	0.27	5307.66	0.248	367	5318.92	5320.43	1.51**	3.10	6.58	0.67	5321.10	0.538	0.393	n/a	0.40	0.27
19	30	20.40	5319.02	5321.52	2.50*	4.91	4.16	0.27	5321.79	0.248	370	5323.06	5324.57	1.51**	3.10	6.58	0.67	5325.24	0.538	0.393	n/a	0.40	0.27
20	30	0.40	5323.16	5325.66	2.50*	4.91	0.08	0.00	5325.66	0.000	400	5327.46	5327.67	0.21**	0.20	2.00	0.06	5327.73	0.443	0.222	n/a	0.40	0.02
21	30	0.40	5327.56	5330.06	2.50*	4.91	0.08	0.00	5330.06	0.000	400	5335.75	5335.96	0.21**	0.20	2.00	0.06	5336.02	0.443	0.222	n/a	0.40	0.02

Project File: GCMODULT100.stm | Number of lines: 23 | Run Date: 03-20-2006

Notes: * Crown depth assumed.; ** Critical depth.; j-Line contains hyd. jump.

Hydraulic Grade Line Computations

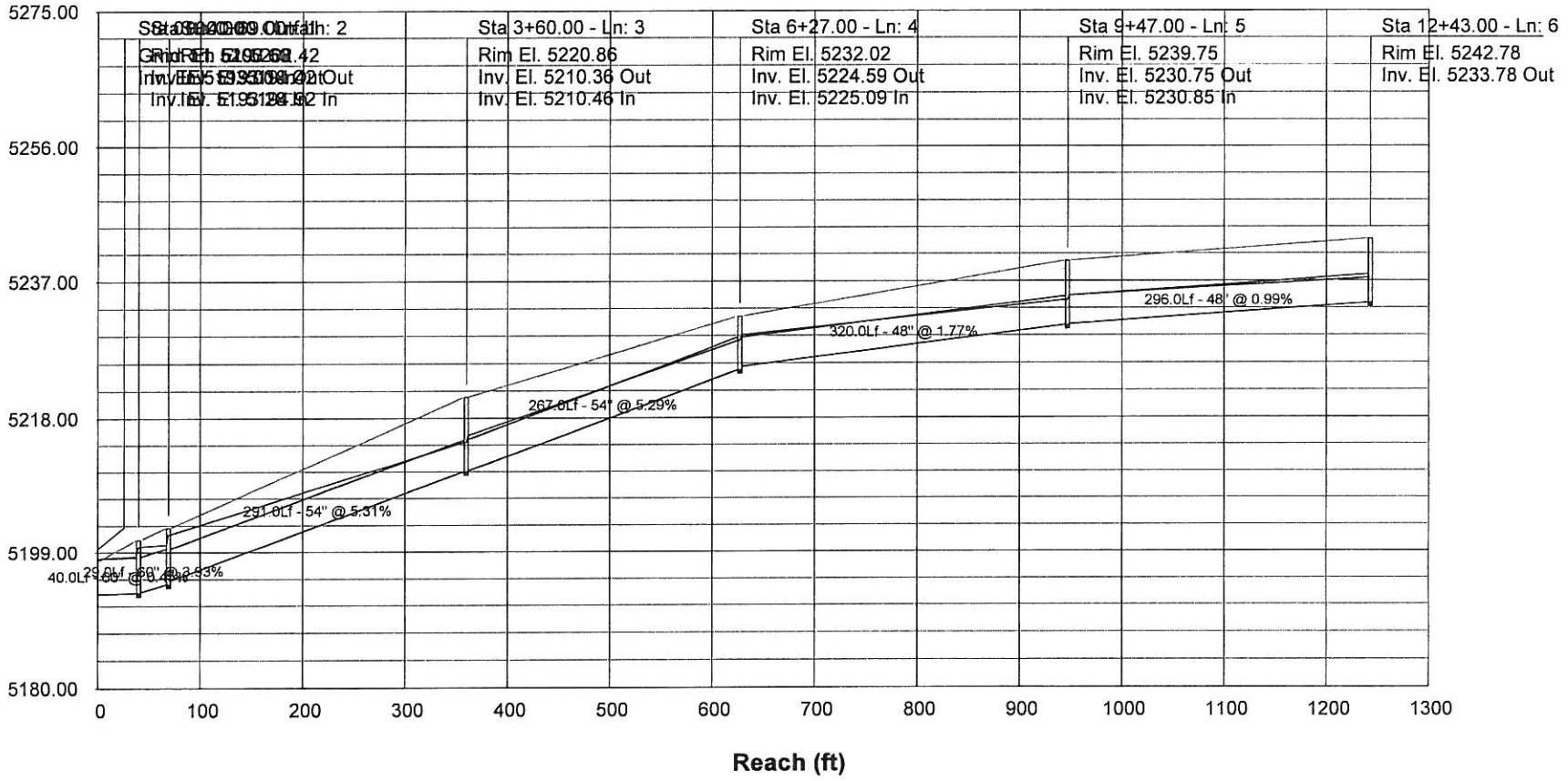
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
22	30	0.40	5335.85	5338.35	2.50*	4.91	0.08	0.00	5338.35	0.000	367	5343.02	5343.23	0.21**	0.20	2.00	0.06	5343.29	0.443	0.222	n/a	0.40	0.02
23	30	0.40	5343.12	5345.62	2.50*	4.91	0.08	0.00	5345.62	0.000	32.0	5343.63	5345.62	1.99	4.19	0.10	0.00	5345.62	0.000	0.000	0.000	0.40	0.00

Project File: GCMODULT100.stm | Number of lines: 23 | Run Date: 03-20-2006

Notes: * Crown depth assumed.; ** Critical depth.; j-Line contains hyd. jump.

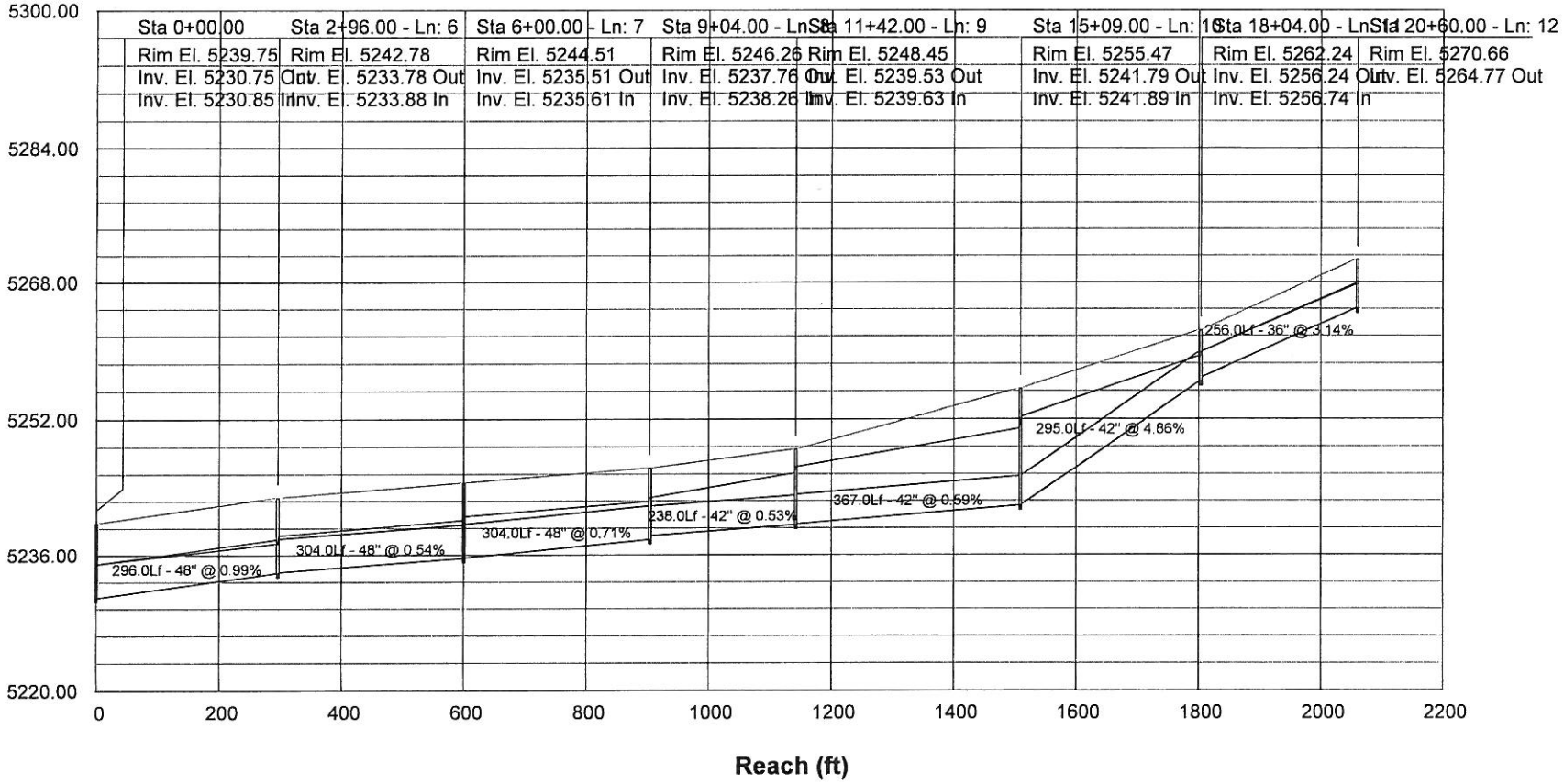
Storm Sewer Profile

Proj. file: GCULT100mod.stm



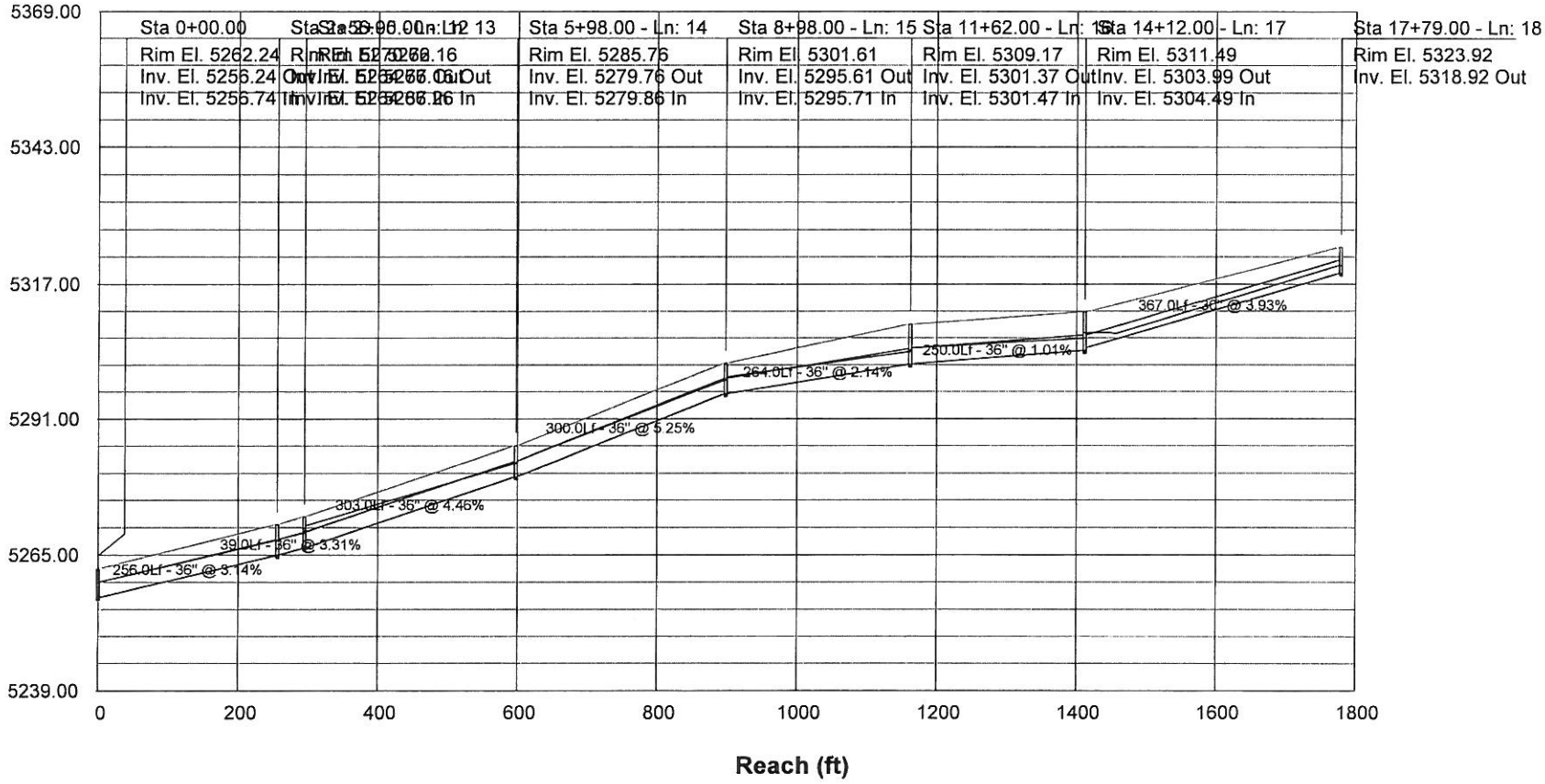
Storm Sewer Profile

Proj. file: GCULT100mod.stm



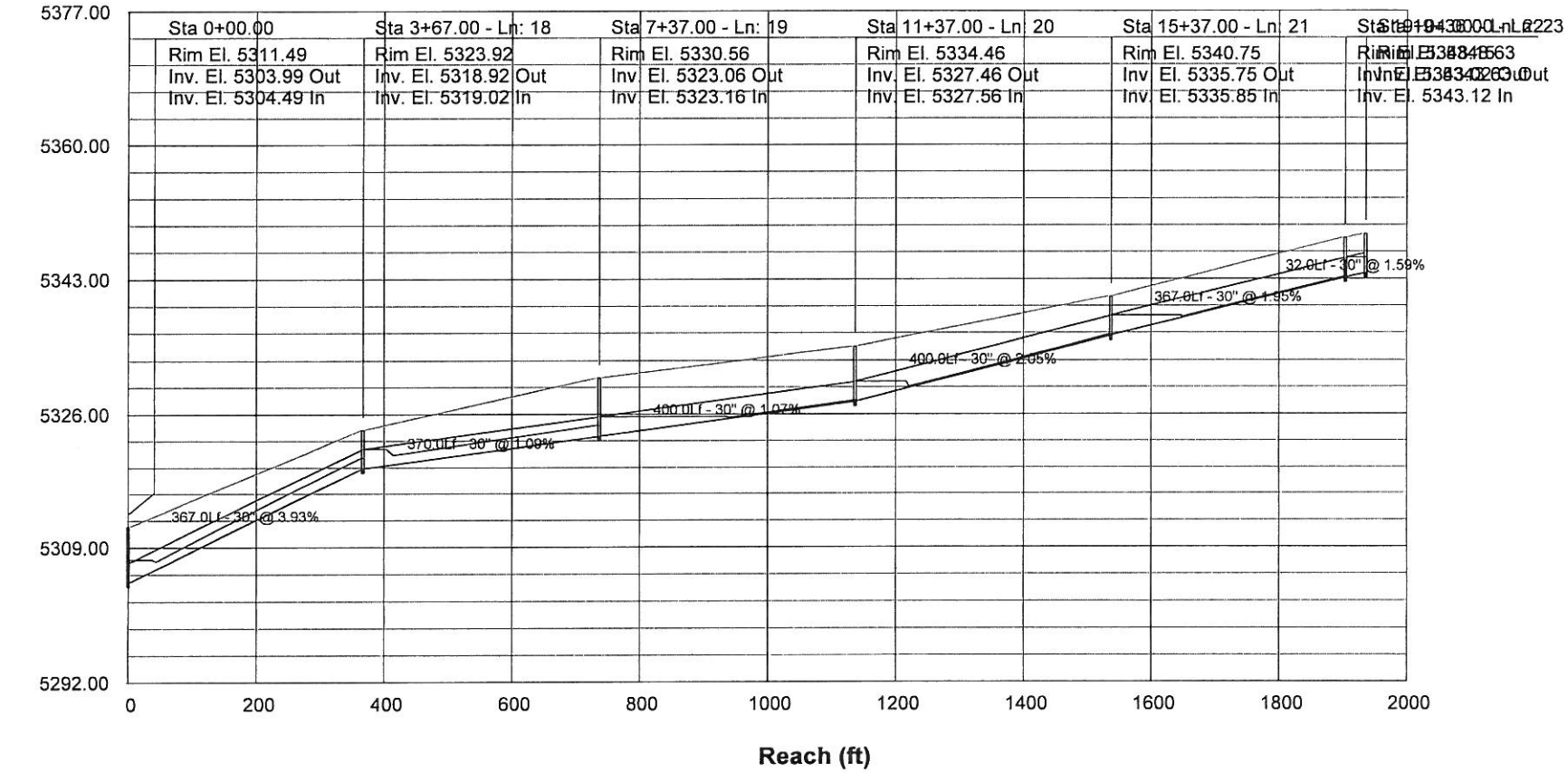
Storm Sewer Profile

Proj. file: GCULT100mod.stm

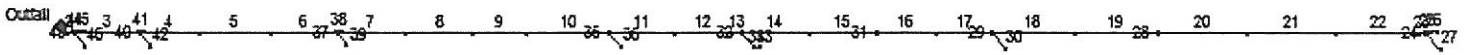


Storm Sewer Profile

Proj. file: GCULT100mod.stm



Hydraflow Plan View



Project File: GC100ULT.stm	No. Lines: 46	03-20-2006

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	Inserted Line	262.0	60 c	40.0	5193.00	5193.18	0.450	5198.00*	5198.41*	1.66	5200.07	End
2	Inserted Line	262.0	60 c	29.0	5193.28	5194.42	3.932	5200.07*	5200.36*	1.66	5202.02	1
3	Inserted Line	241.5	54 c	291.0	5194.92	5210.36	5.306	5202.02	5214.61	n/a	5214.61	2
4	Inserted Line	211.5	54 c	267.0	5210.46	5224.59	5.292	5215.61	5228.70	1.20	5228.70	3
5	Inserted Line	152.5	48 c	320.0	5225.09	5230.75	1.769	5229.41	5234.37	1.01	5234.37	4
6	Inserted Line	152.5	48 c	296.0	5230.85	5233.78	0.990	5234.85*	5238.19*	0.92	5239.10	5
7	Inserted Line	106.5	48 c	304.0	5233.88	5235.51	0.536	5240.28*	5241.95*	0.45	5242.40	6
8	Inserted Line	106.5	48 c	304.0	5235.61	5237.76	0.707	5242.40*	5244.07*	0.45	5244.51	7
9	Inserted Line	106.5	42 c	238.0	5238.26	5239.53	0.534	5244.51*	5247.18*	0.76	5247.94	8
10	Inserted Line	106.5	42 c	367.0	5239.63	5241.79	0.589	5247.94*	5252.06*	0.76	5252.82	9
11	Inserted Line	91.50	42 c	295.0	5241.89	5256.24	4.864	5253.32	5259.17	0.70	5259.17	10
12	Inserted Line	91.50	36 c	256.0	5256.74	5264.77	3.137	5259.74	5267.63	1.08	5267.63	11
13	Inserted Line	91.50	36 c	39.0	5264.87	5266.16	3.308	5267.87	5269.02	1.08	5269.02	12
14	Inserted Line	63.50	36 c	303.0	5266.26	5279.76	4.455	5270.46	5282.30	0.62	5282.30	13
15	Inserted Line	63.50	36 c	300.0	5279.86	5295.61	5.250	5282.86	5298.15	0.62	5298.15	14
16	Inserted Line	51.50	36 c	264.0	5295.71	5301.37	2.144	5298.86	5303.66	0.49	5303.66	15
17	Inserted Line	51.50	36 c	250.0	5301.47	5303.99	1.008	5304.47	5306.28	0.49	5306.28	16
18	Inserted Line	20.50	30 c	367.0	5304.49	5318.92	3.932	5307.24	5320.43	n/a	5320.43 j	17
19	Inserted Line	20.50	30 c	370.0	5319.02	5323.06	1.092	5321.52	5324.57	n/a	5324.57 j	18
20	Inserted Line	0.50	30 c	400.0	5323.16	5327.46	1.075	5325.66	5327.70	n/a	5327.70 j	19
21	Inserted Line	0.50	30 c	400.0	5327.56	5335.75	2.047	5330.06	5335.99	n/a	5335.99 j	20
22	Inserted Line	0.50	30 c	367.0	5335.85	5343.02	1.954	5338.35	5343.26	n/a	5343.26 j	21
23	Inserted Line	0.50	30 c	32.0	5343.12	5343.63	1.593	5345.62	5345.62	0.00	5345.62	22
24	Inserted Line	48.00	24 c	11.0	5343.68	5343.90	1.998	5345.68*	5346.18*	2.54	5348.72	23
25	Inserted Line	37.00	24 c	25.0	5344.00	5344.50	2.000	5350.19*	5350.86*	1.51	5352.37	24
26	Inserted Line	22.00	18 c	25.0	5344.60	5345.10	2.000	5352.37*	5353.47*	1.45	5354.91	25
27	Inserted Line	10.00	18 c	94.0	5343.72	5345.60	2.000	5345.62	5346.81	n/a	5346.81 j	23
28	Inserted Line	20.00	18 c	11.0	5326.12	5326.34	1.998	5327.62*	5328.02*	1.39	5329.41	19
29	Inserted Line	20.00	18 c	11.0	5307.05	5307.27	2.002	5308.55*	5308.95*	1.39	5310.34	17
30	Inserted Line	11.00	18 c	84.0	5306.20	5307.88	2.000	5307.70	5309.15	n/a	5309.15 j	17
31	Inserted Line	12.00	18 c	11.0	5297.17	5297.39	2.002	5298.97*	5299.12*	0.50	5299.62	15
32	Inserted Line	14.00	18 c	11.0	5267.72	5267.94	1.998	5270.74*	5270.94*	0.68	5271.62	13

Project File: GC100ULT.stm | Number of lines: 46 | Run Date: 03-20-2006

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
33	Inserted Line	14.00	18 c	82.0	5267.84	5269.48	2.000	5270.74*	5272.20*	0.59	5272.78	13
34	Inserted Line	5.00	18 c	25.0	5269.58	5270.97	5.561	5273.63*	5273.69*	0.07	5273.77	33
35	Inserted Line	11.00	18 c	11.0	5251.03	5251.25	2.002	5254.12*	5254.24*	0.42	5254.67	10
36	Inserted Line	4.00	18 c	75.0	5250.20	5251.70	2.000	5254.65*	5254.76*	0.05	5254.80	10
37	Inserted Line	35.00	18 c	11.0	5237.88	5238.10	2.002	5239.38*	5240.60*	4.27	5244.87	6
38	Inserted Line	24.00	18 c	25.0	5238.20	5238.70	2.000	5248.10*	5249.41*	2.01	5251.42	37
39	Inserted Line	11.00	18 c	61.0	5237.61	5238.83	2.000	5240.79*	5241.46*	0.36	5241.82	6
40	Inserted Line	20.00	18 c	11.0	5216.32	5216.54	2.002	5217.82*	5218.22*	1.39	5219.61	3
41	Inserted Line	12.00	18 c	25.0	5216.64	5217.24	2.400	5220.89*	5221.21*	0.50	5221.72	40
42	Inserted Line	11.00	18 c	70.0	5216.61	5218.01	2.000	5218.11	5219.28	n/a	5219.28 j	3
43	Inserted Line	14.50	24 c	11.0	5197.88	5198.00	1.092	5204.46*	5204.50*	0.23	5204.74	2
44	Inserted Line	13.00	24 c	25.0	5198.10	5199.79	6.760	5204.80*	5204.88*	0.19	5205.07	43
45	Inserted Line	9.00	18 c	25.0	5199.89	5201.38	5.959	5205.07*	5205.25*	0.24	5205.50	44
46	Inserted Line	8.00	18 c	73.0	5197.44	5199.84	3.288	5204.47*	5204.90*	0.19	5205.09	2

Project File: GC100ULT.stm | Number of lines: 46 | Run Date: 03-20-2006

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

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	60	262.0	5193.00	5198.00	5.00	19.63	13.35	2.77	5200.77	1.012	40.0	5193.18	5198.41	5.00	19.63	13.34	2.77	5201.17	1.012	1.012	0.405	0.60	1.66
2	60	262.0	5193.28	5200.07	5.00	19.63	13.35	2.77	5202.84	1.012	29.0	5194.42	5200.36	5.00	19.63	13.34	2.77	5203.13	1.012	1.012	0.293	0.60	1.66
3	54	241.5	5194.92	5202.02	4.50	15.57	15.19	3.59	5205.61	1.509	291	5210.36	5214.61	4.25**	15.57	15.51	3.74	5218.36	1.304	1.406	n/a	0.40	n/a
4	54	211.5	5210.46	5215.61	4.50	15.24	13.30	2.75	5218.36	1.157	267	5224.59	5228.70	4.11**	15.24	13.88	3.00	5231.70	1.008	1.082	n/a	0.40	1.20
5	48	152.5	5225.09	5229.41	4.00	11.96	12.14	2.29	5231.70	1.128	320	5230.75	5234.37	3.62**	11.96	12.75	2.53	5236.90	0.988	1.058	n/a	0.40	1.01
6	48	152.5	5230.85	5234.85	4.00*	12.56	12.14	2.29	5237.14	1.128	296	5233.78	5238.19	4.00	12.57	12.14	2.29	5240.48	1.127	1.127	3.337	0.40	0.92
7	48	106.5	5233.88	5240.28	4.00	12.56	8.48	1.12	5241.39	0.550	304	5235.51	5241.95	4.00	12.57	8.48	1.12	5243.07	0.550	0.550	1.671	0.40	0.45
8	48	106.5	5235.61	5242.40	4.00	12.56	8.48	1.12	5243.51	0.550	304	5237.76	5244.07	4.00	12.57	8.48	1.12	5245.18	0.550	0.550	1.671	0.40	0.45
9	42	106.5	5238.26	5244.51	3.50	9.62	11.07	1.91	5246.42	1.121	238	5239.53	5247.18	3.50	9.62	11.07	1.91	5249.09	1.121	1.121	2.668	0.40	0.76
10	42	106.5	5239.63	5247.94	3.50	9.62	11.07	1.91	5249.85	1.121	367	5241.79	5252.06	3.50	9.62	11.07	1.91	5253.96	1.121	1.121	4.113	0.40	0.76
11	42	91.50	5241.89	5253.32	3.50	9.62	9.51	1.41	5254.73	0.827	295	5256.24	5259.17	2.93**	8.60	10.64	1.76	5260.93	0.798	0.813	n/a	0.40	0.70
12	36	91.50	5256.74	5259.74	3.00*	6.95	12.95	2.61	5262.35	1.883	256	5264.77	5267.63	2.86**	6.95	13.17	2.70	5270.33	1.632	1.758	n/a	0.40	1.08
13	36	91.50	5264.87	5267.87	3.00*	6.95	12.95	2.61	5270.48	1.883	39.0	5266.16	5269.02	2.86**	6.95	13.17	2.70	5271.72	1.632	1.758	n/a	0.40	1.08
14	36	63.50	5266.26	5270.46	3.00	7.07	8.99	1.26	5271.72	0.907	303	5279.76	5282.30	2.54**	6.38	9.95	1.54	5283.84	0.859	0.883	n/a	0.40	0.62
15	36	63.50	5279.86	5282.86	3.00*	7.07	8.99	1.26	5284.12	0.907	300	5295.61	5298.15	2.54**	6.38	9.95	1.54	5299.69	0.859	0.883	n/a	0.40	0.62
16	36	51.50	5295.71	5298.86	3.00	7.07	7.29	0.83	5299.69	0.597	264	5301.37	5303.66	2.29**	5.78	8.91	1.23	5304.89	0.691	0.644	n/a	0.40	0.49
17	36	51.50	5301.47	5304.47	3.00*	7.07	7.29	0.83	5305.30	0.597	250	5303.99	5306.28	2.29**	5.78	8.91	1.23	5307.51	0.691	0.644	n/a	0.40	0.49
18	30	20.50	5304.49	5307.24	2.50	4.91	4.18	0.27	5307.51	0.250	367	5318.92	5320.43	1.51**	3.11	6.60	0.68	5321.11	0.539	0.394	n/a	0.40	n/a
19	30	20.50	5319.02	5321.52	2.50*	4.91	4.18	0.27	5321.79	0.250	370	5323.06	5324.57	1.51**	3.11	6.60	0.68	5325.25	0.539	0.394	n/a	0.40	n/a
20	30	0.50	5323.16	5325.66	2.50*	4.91	0.10	0.00	5325.66	0.000	400	5327.46	5327.70	0.24**	0.24	2.13	0.07	5327.77	0.432	0.216	n/a	0.40	0.03
21	30	0.50	5327.56	5330.06	2.50*	4.91	0.10	0.00	5330.06	0.000	400	5335.75	5335.99	0.24**	0.24	2.13	0.07	5336.06	0.432	0.216	n/a	0.40	0.03

Project File: GC100ULT.stm | Number of lines: 46 | Run Date: 03-20-2006

Notes: * Crown depth assumed.; ** Critical depth.; j-Line contains hyd. jump.

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	30	0.50	5335.85	5338.35	2.50*	4.91	0.10	0.00	5338.35	0.000	367	5343.02	5343.26	0.24**	0.24	2.13	0.07	5343.33	0.432	0.216	n/a	0.40	0.03
23	30	0.50	5343.12	5345.62	2.50*	4.91	0.10	0.00	5345.62	0.000	32.0	5343.63	5345.62	1.99	4.19	0.12	0.00	5345.62	0.000	0.000	0.000	0.40	0.00
24	24	48.00	5343.68	5345.68	2.00*	3.14	15.28	3.63	5349.31	4.506	11.0	5343.90	5346.18	2.00	3.14	15.28	3.63	5349.81	4.504	4.505	0.496	0.70	2.54
25	24	37.00	5344.00	5350.19	2.00	3.14	11.78	2.16	5352.35	2.677	25.0	5344.50	5350.86	2.00	3.14	11.78	2.16	5353.02	2.676	2.677	0.669	0.70	1.51
26	18	22.00	5344.60	5352.37	1.50	1.77	12.45	2.41	5354.78	4.391	25.0	5345.10	5353.47	1.50	1.77	12.45	2.41	5355.88	4.389	4.390	1.098	0.60	1.45
27	18	10.00	5343.72	5345.62	1.50	1.77	5.66	0.50	5346.12	0.907	94.0	5345.60	5346.81	1.21**	1.52	6.56	0.67	5347.48	0.938	0.923	n/a	0.60	0.40
28	18	20.00	5326.12	5327.62	1.50*	1.77	11.32	1.99	5329.61	3.629	11.0	5326.34	5328.02	1.50	1.77	11.32	1.99	5330.01	3.627	3.628	0.399	0.70	1.39
29	18	20.00	5307.05	5308.55	1.50*	1.77	11.32	1.99	5310.54	3.629	11.0	5307.27	5308.95	1.50	1.77	11.32	1.99	5310.94	3.627	3.628	0.399	0.70	1.39
30	18	11.00	5306.20	5307.70	1.50*	1.77	6.23	0.60	5308.30	1.098	84.0	5307.88	5309.15	1.27**	1.59	6.91	0.74	5309.89	1.045	1.071	n/a	0.60	0.45
31	18	12.00	5297.17	5298.97	1.50	1.77	6.79	0.72	5299.69	1.306	11.0	5297.39	5299.12	1.50	1.77	6.79	0.72	5299.83	1.306	1.306	0.144	0.70	0.50
32	18	14.00	5267.72	5270.74	1.50	1.77	7.92	0.98	5271.72	1.778	11.0	5267.94	5270.94	1.50	1.77	7.92	0.98	5271.91	1.777	1.778	0.196	0.70	0.68
33	18	14.00	5267.84	5270.74	1.50	1.77	7.92	0.98	5271.72	1.778	82.0	5269.48	5272.20	1.50	1.77	7.92	0.98	5273.17	1.777	1.778	1.458	0.60	0.59
34	18	5.00	5269.58	5273.63	1.50	1.77	2.83	0.12	5273.76	0.227	25.0	5270.97	5273.69	1.50	1.77	2.83	0.12	5273.82	0.227	0.227	0.057	0.60	0.07
35	18	11.00	5251.03	5254.12	1.50	1.77	6.23	0.60	5254.73	1.098	11.0	5251.25	5254.24	1.50	1.77	6.22	0.60	5254.85	1.097	1.098	0.121	0.70	0.42
36	18	4.00	5250.20	5254.65	1.50	1.77	2.26	0.08	5254.73	0.145	75.0	5251.70	5254.76	1.50	1.77	2.26	0.08	5254.83	0.145	0.145	0.109	0.60	0.05
37	18	35.00	5237.88	5239.38	1.50*	1.77	19.81	6.10	5245.48	11.113	11.0	5238.10	5240.60	1.50**	1.77	19.81	6.10	5246.70	11.109	11.111	1.222	0.70	4.27
38	18	24.00	5238.20	5248.10	1.50	1.77	13.58	2.87	5250.97	5.226	25.0	5238.70	5249.41	1.50	1.77	13.58	2.87	5252.28	5.224	5.225	1.306	0.70	2.01
39	18	11.00	5237.61	5240.79	1.50	1.77	6.23	0.60	5241.39	1.098	61.0	5238.83	5241.46	1.50	1.77	6.22	0.60	5242.06	1.097	1.098	0.669	0.60	0.36
40	18	20.00	5216.32	5217.82	1.50*	1.77	11.32	1.99	5219.81	3.629	11.0	5216.54	5218.22	1.50	1.77	11.32	1.99	5220.21	3.627	3.628	0.399	0.70	1.39
41	18	12.00	5216.64	5220.89	1.50	1.77	6.79	0.72	5221.61	1.306	25.0	5217.24	5221.21	1.50	1.77	6.79	0.72	5221.93	1.306	1.306	0.327	0.70	0.50
42	18	11.00	5216.61	5218.11	1.50*	1.77	6.23	0.60	5218.71	1.098	70.0	5218.01	5219.28	1.27**	1.59	6.91	0.74	5220.02	1.045	1.071	n/a	0.60	0.45

Project File: GC100ULT.stm | Number of lines: 46 | Run Date: 03-20-2006

Notes: * Crown depth assumed.; ** Critical depth.; j-Line contains hyd. jump.

Hydraulic Grade Line Computations

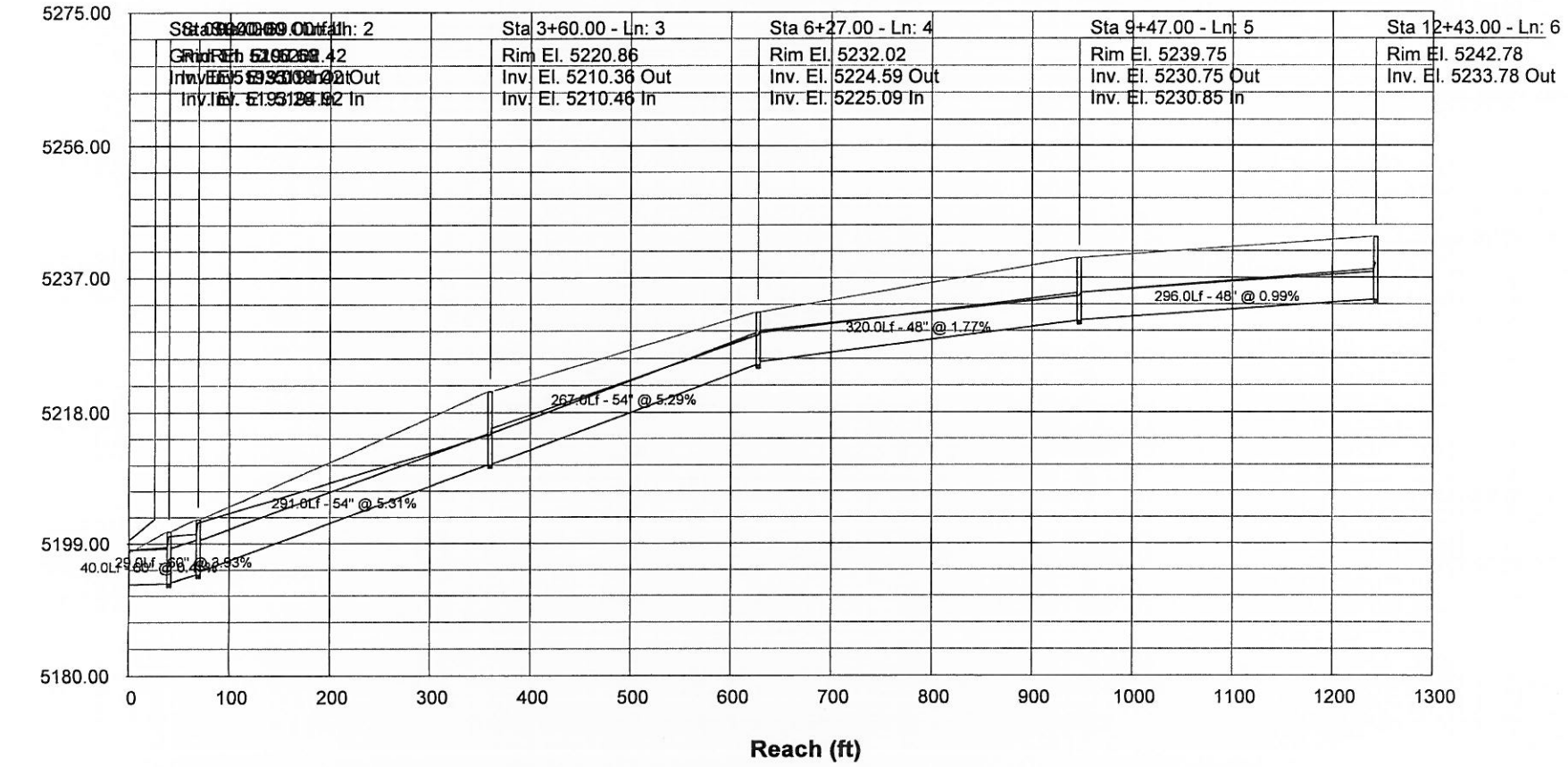
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
43	24	14.50	5197.88	5204.46	2.00	3.14	4.62	0.33	5204.79	0.411	11.0	5198.00	5204.50	2.00	3.14	4.62	0.33	5204.84	0.411	0.411	0.045	0.70	0.23
44	24	13.00	5198.10	5204.80	2.00	3.14	4.14	0.27	5205.07	0.331	25.0	5199.79	5204.88	2.00	3.14	4.14	0.27	5205.15	0.330	0.330	0.083	0.70	0.19
45	18	9.00	5199.89	5205.07	1.50	1.77	5.09	0.40	5205.47	0.735	25.0	5201.38	5205.25	1.50	1.77	5.09	0.40	5205.66	0.735	0.735	0.184	0.60	0.24
46	18	8.00	5197.44	5204.47	1.50	1.77	4.53	0.32	5204.79	0.581	73.0	5199.84	5204.90	1.50	1.77	4.53	0.32	5205.21	0.580	0.581	0.424	0.60	0.19

Project File: GC100ULT.stm | Number of lines: 46 | Run Date: 03-20-2006

Notes: * Crown depth assumed.; ** Critical depth.; j-Line contains hyd. jump.

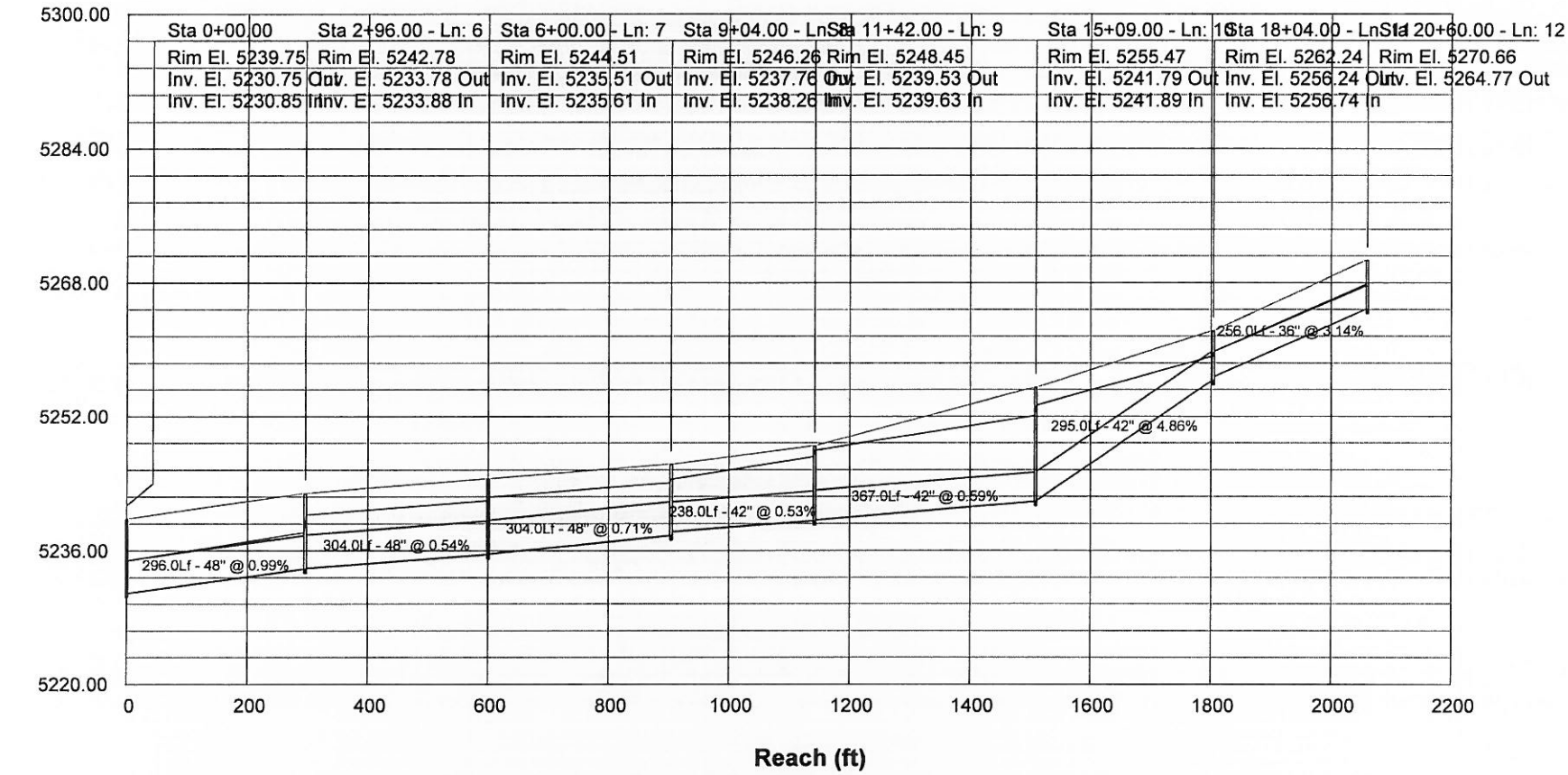
Storm Sewer Profile

Proj. file: GC100ULT.stm



Storm Sewer Profile

Proj. file: GC100ULT.stm



Storm Sewer Profile

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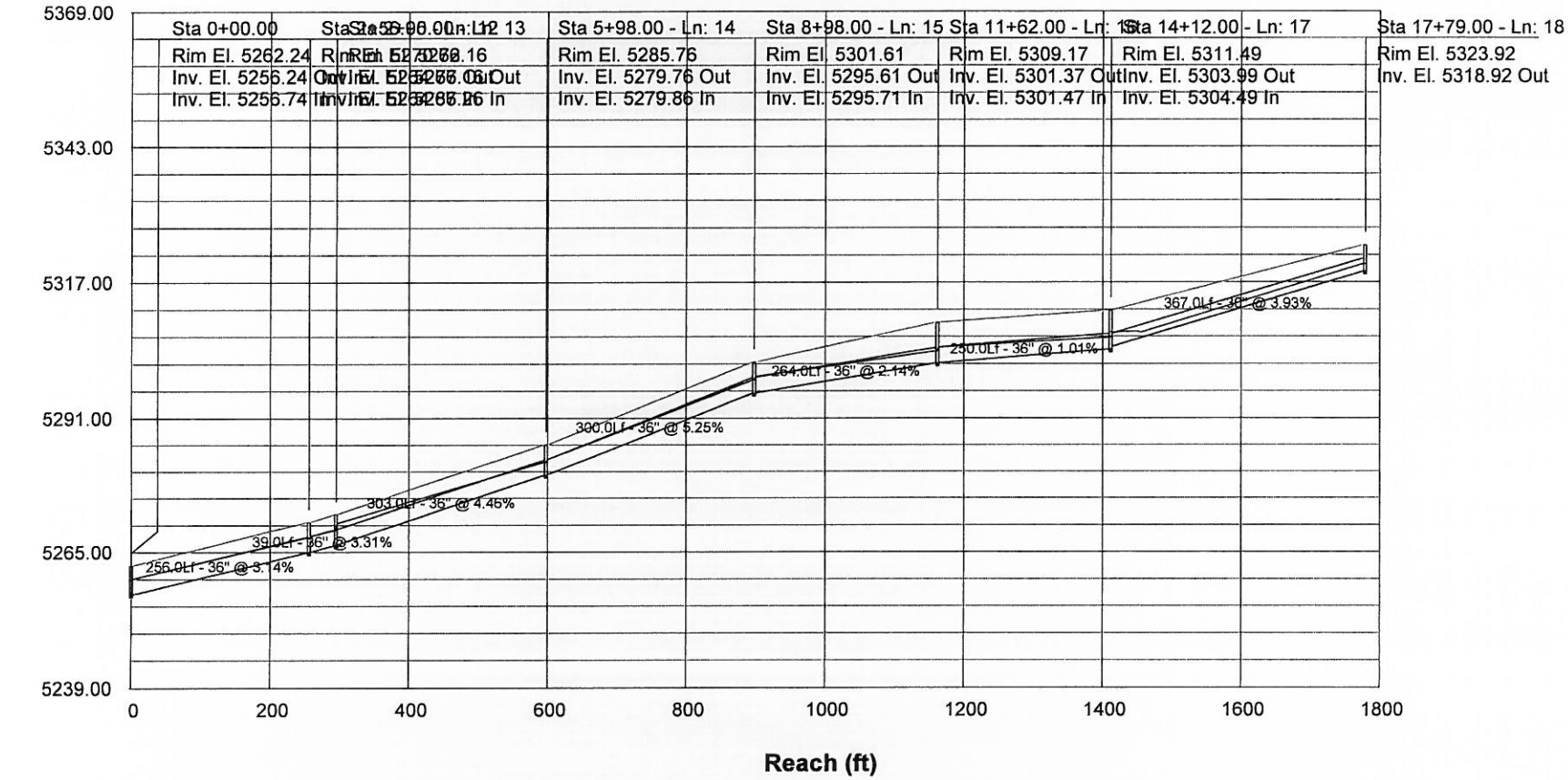

Storm Sewer Profile

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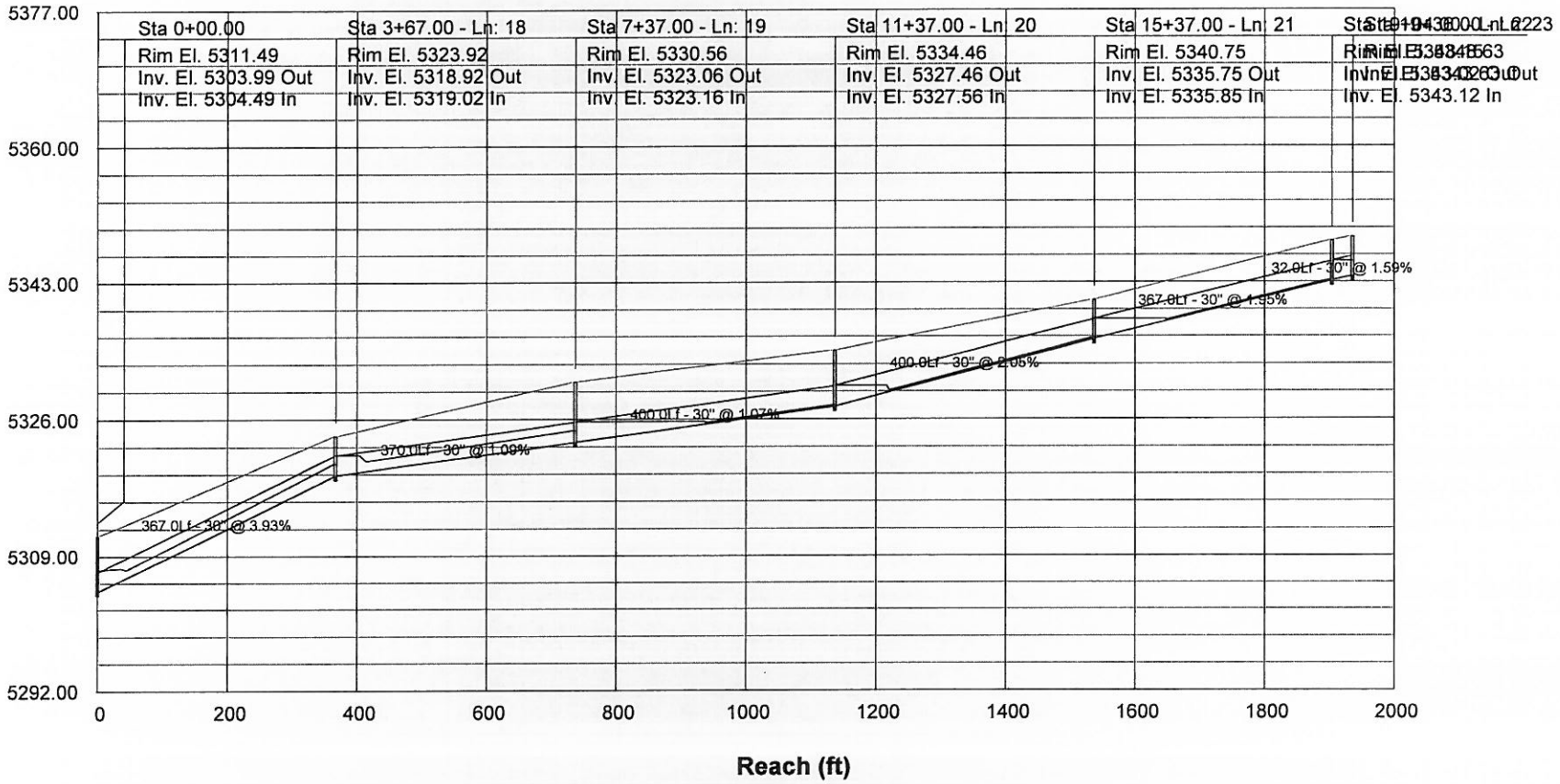

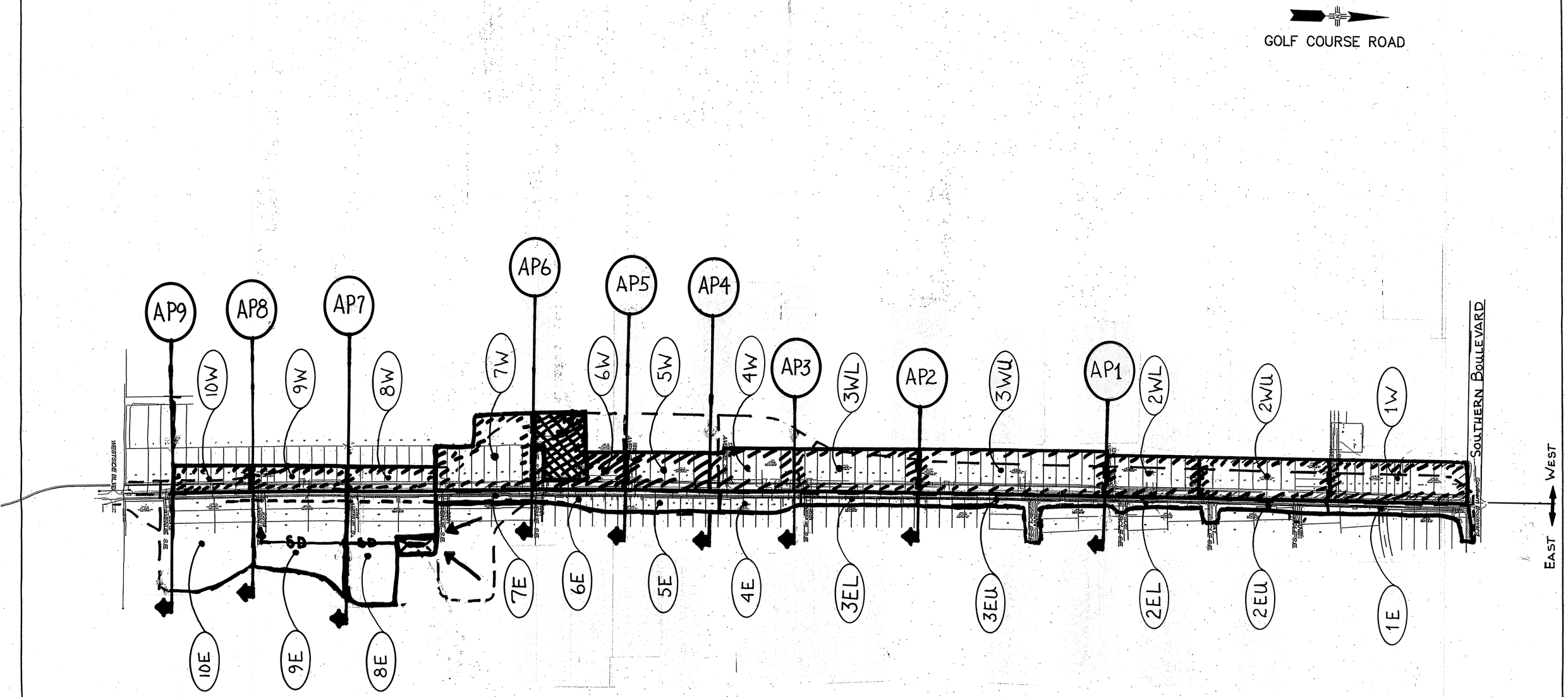

Analysis Point	Pipe Flow Ultimate	Street Flow East	Street Flow West	Pipe Flow Modified	Street Flow East	Street Flow West
AP1	43	6.4	28	58	8.4	10.9
AP2	20	15.6	41.8	24.9	17.6	25
AP3	52	10.3	43.9	50.9	4.9	27
AP4	64.5	13.6	46.4	63.4	8.4	29.5
AP5	90.5	6.44	45.3	90.4	0	28.4
AP6	105.5	6.7	42.3	105.2	1	24.4
AP7	135.8	22	55.3	150.08	14.3	25.4
AP8	196.4	54	64.3	206.91	46.6	34.4
AP9	242.5	18	45	255.41	0	5.2

1" = 300'

CITY OF RIO RANCHO
PUBLIC WORKS DEPARTMENT

GOLF COURSE RD.
DRAINAGE REPORT
BASIN MAP

N.M. Project No.

Sheet PLATE 1

GOLF COURSE ROAD

Scale: 1"=300'

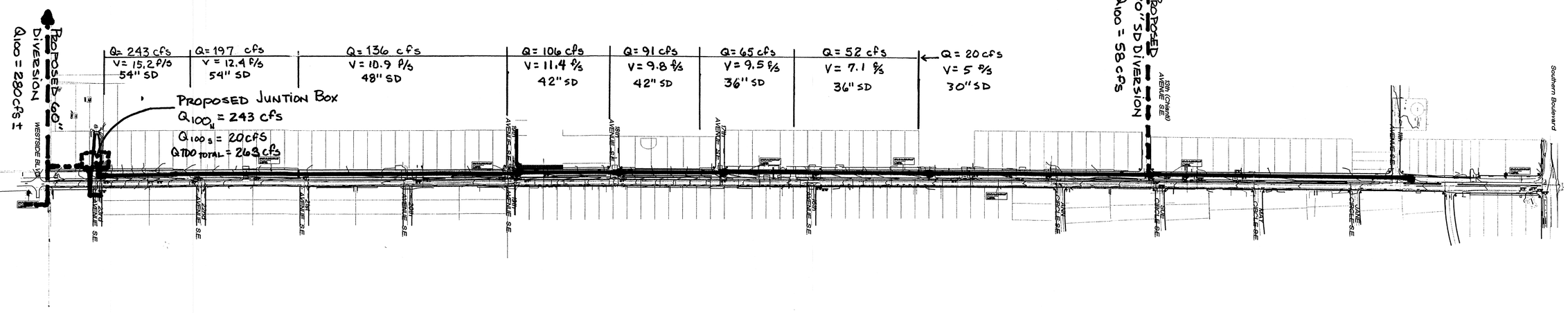

PLATE 3

CITY OF RIO RANCHO
PUBLIC WORKS DEPARTMENT

GOLF COURSE RD.

DRAINAGE REPORT

SYSTEM MAP

Plate 3

N.M. Project No.

Sheet
PLATE 3