COE & VAN LOO
CONSULTANTS, INC.

CITY OF PHOENIX
STREET TRANSPORTATION DEPARTMENT
DESIGN & CONSTRUCTION MANAGEMENT DIVISION
PARTNERING WITH
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FINAL DESIGN DRAINAGE REPORT
23RD AVENUE & ROESER ROAD DETENTION BASIN AND OUTFALL STORM DRAIN
PROJECT NUMBER ST83120034

April 22, 2005

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
7561
CHARLES DEE SCOTT
Date Signed 4-22-05
ARIZONA U.S.A.

23rd Avenue and Roeser Road Detention Basin Site

CVL Project No.: 04-7059-02

www.cvlci.com

PHOENIX
4550 N. 12th St.
Phoenix, AZ 85014
Phone: 602.264.6831
Fax: 602.264.0928

LAS VEGAS
6280 S. Valley View Blvd., Ste. 200
Las Vegas, NV 89118
Phone: 702.368.3008
Fax: 702.368.0047

DENVER
7901 E. Belleview, Ste. 150
Englewood, CO 80111
Phone: 720.482.9526
Fax: 720.482.9546

23Avenue & Roeser Road Detention Basin and Outfall Storm Drain

CONTENTS

DESCRIPTION		PAGE
1. INTRODUCTION AND LOCATION		
1.1	Preliminary Design Report by HDR Engineers	1
1.2	Update HEC-1 model and final design Results	2
2. PROJECT DESCRIPTION		
2.1	Drainage Areas	4
2.2	Sub-Areas, Concentration Points and Diversions	4
2.3	Existing Drainage Facilities in Project Area	6
3. PROPOSED RUNOFF DISCHARGE FLOW MANAGEMENT		
3.1	HEC-1 Model Update Characteristics	9
3.2	Surface Flow into Retention Basin	11
3.3	Energy and Hydraulic Grade Lines	12
3.4	Backflow Potential	12
4. PROPOSED CATCH BASINS		13
5. FINISHED FLOOR ELEVATIONS		14
6. DETENTION BASIN OVERFLOW		14
FIGURES		
Figure 1 - Location Map and Drainage Improvements		3
Figure 2 - Concentration Points and Drainage Areas		5
TABLES		
Table I	Baseline Road / 43rd Avenue System	1
Table II-A	27th Avenue / Roeser Road Storm Drain System (Preliminary Report)	1
Table II-B	27th Avenue / Roeser Road Detention Basin (Preliminary Report)	2
Table III-A	27th Avenue / Roeser Road Storm Drain System (Final Report)	2 & 12
Table III-B	27th Avenue / Roeser Road Detention Basin (Final Report)	2 & 12
Table IV	Existing Conditions Drainage Areas	4
Table V	Future Conditions Drainage Areas	4
Table VI	Salt River 10-year Water Surface Elevation	6
Table VII	Detention Basin, Stage Discharge and Stage Storage	10
Table VIII	HEC-1 Simulation Output	10
Table IX	Catch Basin Location and Type	13
APPENDICES		
Appendix A	HEC-1 Input/Output	
Appendix B	Hydraulic Grade Line	
Appendix C	Catch Basin Calculations (Spread Sheets)	

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 7561
CHARLES DEE SCOTT
Date Signed 4/22/05
ARIZONA, U.S.A.

CITY OF PHOENIX
STREET TRANSPORTATION DEPARTMENT
DESIGN & CONSTRUCTION MANAGEMENT DIVISION
PARTNERING WITH
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FINAL DESIGN DRAINAGE REPORT
23RD AVENUE & ROESER ROAD DETENTION BASIN AND OUTFALL STORM DRAIN
PROJECT NUMBER ST83120034

1. INTRODUCTION AND LOCATION

1.1 Preliminary Design Report By HDR Engineers

The major, construction components of this project were proposed as a part of the ***Preferred Focus Alternative*** as set forth in the ***Preliminary Design Report***[1] that presents a study of the area bounded on the north by the Salt River, and on the south by South Mountain Park, between 43rd Avenue and 7th Avenue. Said Preliminary Design Report is based on the data developed for that area by the Flood Control District of Maricopa County (**FCDMC**) in their 1991 South Phoenix/Laveen Area Drainage Master Plan Study (**ADMS**) including mapping, a 100-year existing condition hydrologic model, and delineation of the extent of flooding along the Maricopa Drain.

Two storm drain systems were presented in the preferred focus alternative, the Baseline Road/43rd Avenue system, and the 27th Avenue/Roeser Road system. The Baseline Road/ 43rd Avenue system components are listed in the following Table I and shown on Figure 1.

TABLE-I Baseline Road/43rd Avenue System – Proposed in Preliminary Design Report				
Storm Drains			**Detention Basins**	
Location	**Size**	**Outflow**	**Location**	**Capacity**
43rd Ave	3-7x10 RCB	954 cfs	43rd Ave & Southern	129 acre-feet
Baseline Rd	114"to 78"	854 cfs	27th Ave & Baseline	134 acre-feet
7th Ave	66"	300 cfs	27th Ave & Lateral 13	66 acre-feet
27th Ave	36"to 60"	172 cfs	Dobbins Rd/Golf Course	Not shown
39th Ave	Not shown	Not shown	7th Ave South of Dobbins	Intercept 270 cfs

The 27th Avenue/Roeser Road drainage system components proposed in the Preliminary Design Report are listed in the following Tables II-A and II-B.

TABLE II-A 27th Avenue/Roeser Road Drainage System Storm Drain Pipes Proposed in Preliminary Report					
Location	**From**	**To**	**Size**	**Flow**	**Max Depth**
27th Ave	Broadway Rd	Roeser Rd	108-inch	515 cfs	Not Determined
27th Ave	Roeser Rd	Southern Ave	90-inch	513 cfs	Not Determined
Roeser Rd	27th Ave	23rd Ave	42-inch	37 cfs	Not Determined

[1] SOUTH PHOENIX/LAVEEN DRAINAGE IMPROVEMENT PROJECT, PRELIMINARY DESIGN REPORT, July 1997, HDR Engineering.

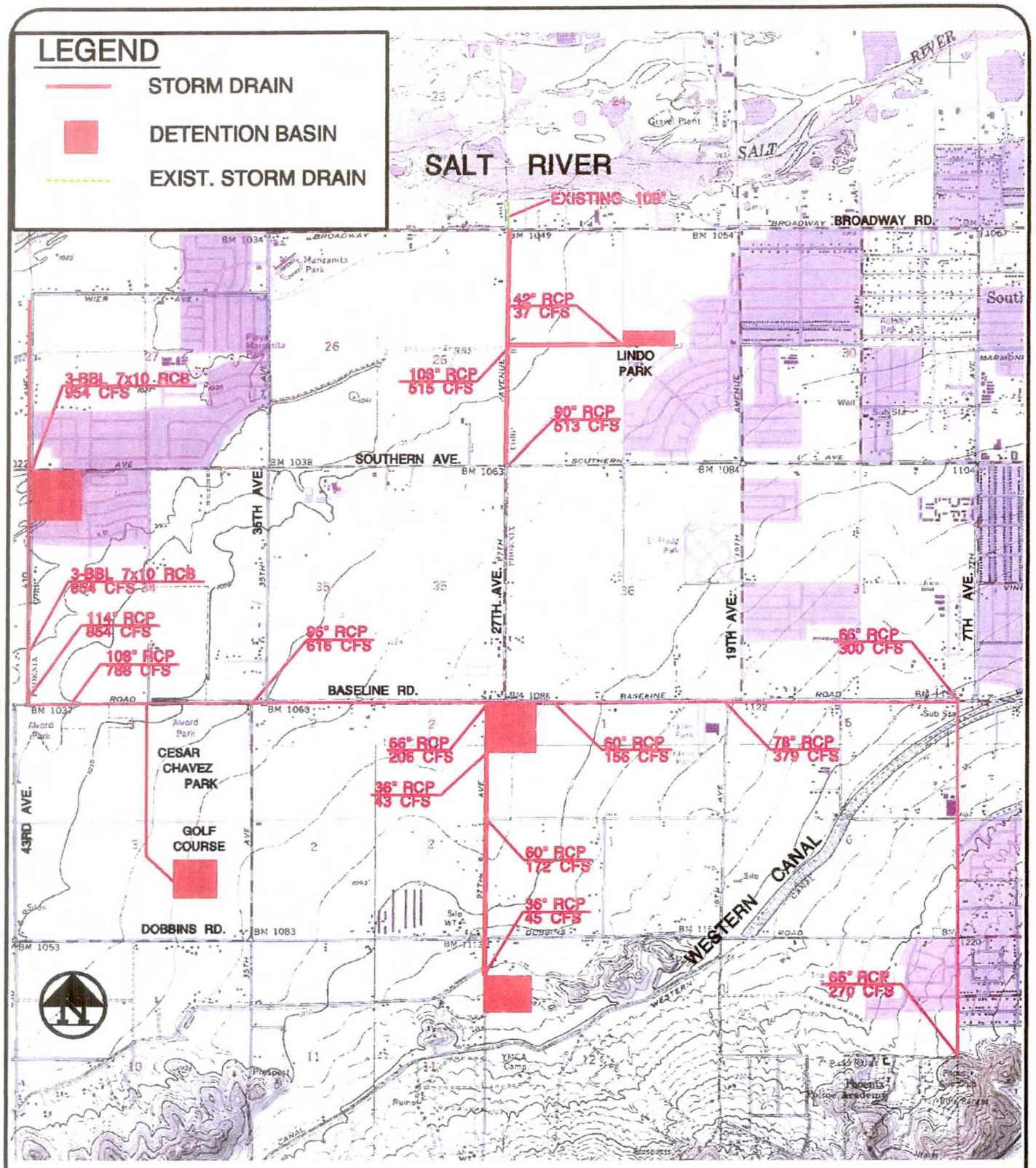
TABLE II-B 27th Avenue/Roeser Road Drainage System Detention Basin Proposed in Preliminary Report				
Location	**Size**	**Peak W.S. Elev**	**Capacity**	**Max Water Depth**
23rd Ave & Roeser Rd	10-acres	Not Determined	29 acre-feet	5 to 7 feet

1.2 Update HEC-1 Model and Final Design Results

The focus of this drainage design report is to establish the sizes of the 23rd Avenue & Roeser Road drainage components. The final design results of the major improvement components consist of the 27th Avenue/Roeser Road drainage system shown in Tables III-A and III-B, and also on Figure 2. The FCDMC provided the HEC-1, existing conditions model previously developed in the ADMP; and Coe & Van Loo (CVL) updated that model to include future conditions land-use in those sub-basins with undeveloped parcels, and existing conditions land-use in those sub-basins that were developed subsequent to model preparation. The updated model also includes the hydrographs routed through proposed storm drain pipes. Additional concentration points where added to size the storm drain pipes and combine hydrographs. The stage discharge/curve and stage/storage curve for the 23rd Avenue & Roeser Road detention basin was developed and added to the model. The final design and calculations for sizing the various project components as shown in Tables III-A and III-B are the basis for the proposed drainage improvements shown on the construction plans. The proposed drainage facilities consist of ½ mile of 78-inch pipe, ½ mile of 60-inch pipe, ½ mile of 42-inch pipe; and a detention basin site of 11.8 acres. The detention basin site is north of and adjacent to Lindo Park (a City park); therefore, detention basin improvements include landscaping and park amenities that blend with Lindo Park.

TABLE III-A 27th Avenue/Roeser Road Drainage System Storm Drain Pipes Proposed in Final Design Report					
Location	**From**	**To**	**Size**	**Flow**	**Max Depth**
27th Ave	Broadway Rd	Roeser Rd	78-inch	227 cfs	23-feet
27th Ave	Roeser Rd	Southern Ave	60-inch	167 cfs	22-feet
Roeser Rd	27th Ave	23rd Ave	42-inch	64 cfs	18-feet

TABLE III-B 27th Avenue/Roeser Road Drainage System Detention Basin Proposed in Final Design Report				
Location	**Size**	**Peak W.S. Elev**	**Capacity**	**Max Water Depth**
23rd Ave & Roeser Rd	11.8-acres	1050.47	28 acre-feet	6.5-feet



SCALE: 1" = 3000'

PRELIMINARY DESIGN REPORT FACILITIES	23RD & ROESER ROAD	JOB NO 047059
4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE	FIGURE 1

N:LLCJOBS-047059-LAND-LOCATIONMAP

2. PROJECT DESCRIPTION

2.1 Drainage Areas (Sub-Basins)

Drainage areas tributary to the 27th Avenue and Roeser Road drainage system are shown on Figure 2. Each sub-basin's size and current land-use is listed in Table IV for the existing conditions model. The current existing conditions reflect that considerable development has occurred since the Preliminary Design Report was completed in 1997. The result is more precipitation runoff is retained by interim development, thus reducing runoff flows from that of 1997.

TABLE IV Existing Conditions Drainage Areas				
Area	Areas in Square Miles by Land-Use			
Designation	Residential	Minor Development	Agricultural	Total
BR19C	0.0007	0.0320	0.3573	0.390
SA19C	0.4300	0.0100	0.0400	0.480
SA27C	0.3010	-	0.3220	0.623
CR23C	0.5100	0.0600	0.0100	0.580
RR27C	0.1200	0.1200	0.2400	0.480

Each sub-basin's size and land-use are listed in the Table V for the future conditions model.

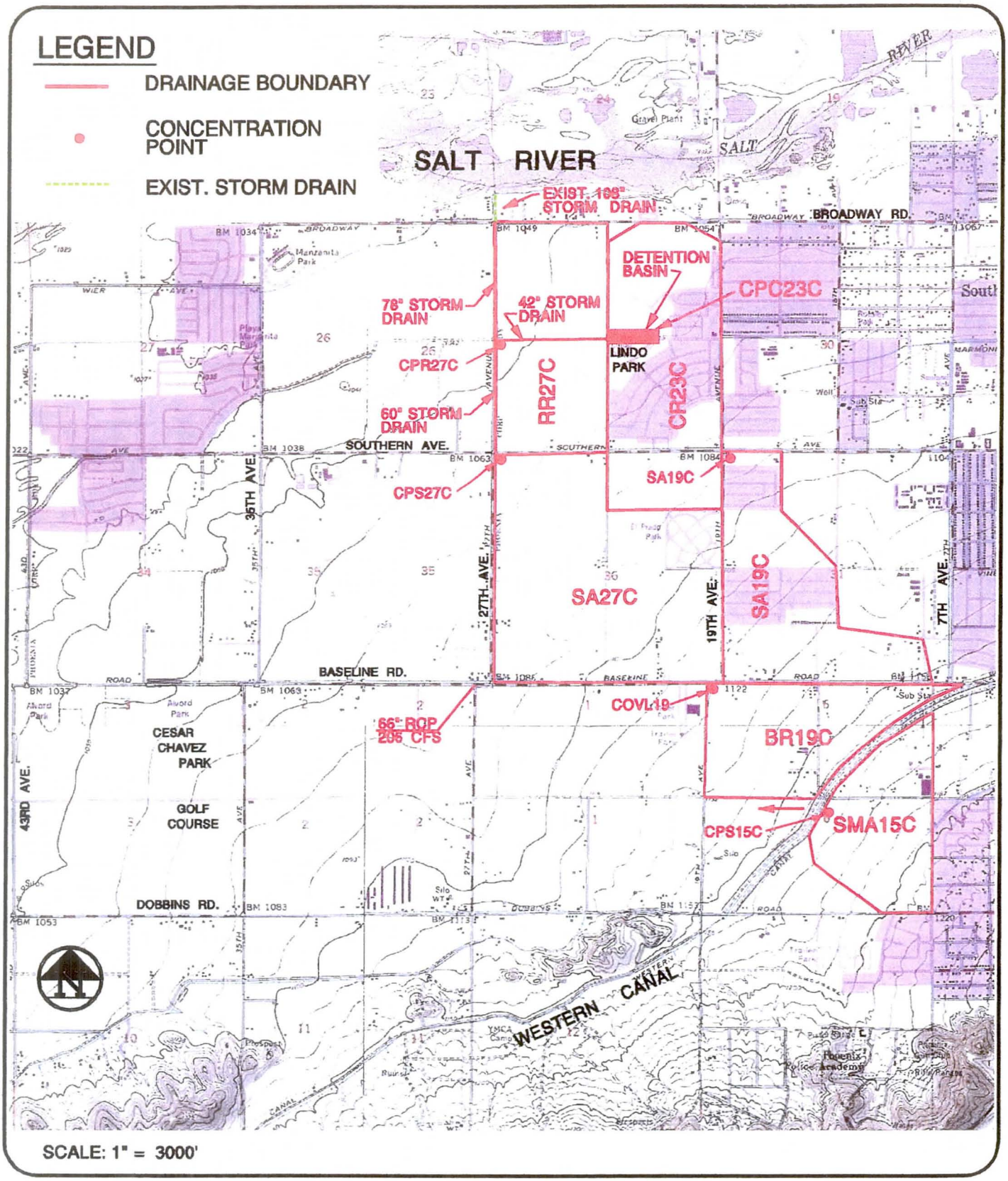
TABLE V Future Conditions Drainage Areas				
Area	Areas in Square Miles by Land-Use			
Designation	Residential	Minor Development	Agricultural	Total
BR19C	0.3600	0.0300	-	0.390
SA19C	0.4700	0.0100	-	0.480
SA27C	0.5630	0.0600	-	0.623
CR23C	0.5100	0.0700	-	0.580
RR27C	0.3800	0.1000	-	0.480

2.2 Sub-Basins, Concentration Points and Diversions

Drainage area designations and concentration point designations were assigned in the Preliminary Design Report. These same designations were used in the Preliminary HEC-1 model and are used here in this Final Design Drainage Report and its associated HEC-1 model.

The upper most drainage area of this basin is designated **SMA15C**. Runoff discharges flow in a northwest direction to the Western Canal where they are diverted along the canal and concentrate at **CPS15C** which is located just south of South Mountain Avenue at the Western Canal. From this concentration point flows are to the west and they bypass the 27th Avenue/Roeser Road system.

The most remote, contributing Sub-area is **BR19C**; it is located between Baseline Road and South Mountain Avenue and bounded by 19th Avenue on the west and the Western Canal on the east. Flows from this sub-area concentrate at 19th Avenue and Baseline. No designation was assigned to this concentration point in the Preliminary Drainage Report, but the HEC-1 model list it as **COVL19**. At this point 50 cfs is diverted into the future Baseline Road storm drain and the flow continues northwesterly into sub-area SA27C.



DRAINAGE SYSTEM	23RD & ROESER ROAD	JOB NO 047059
4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE	FIGURE 2

N:LLCJOBS-047059-LAND-LOCATIONMAP2

Sub-area **SA27C** is located between Southern Avenue, Baseline Road, 27th Avenue, and 19th Avenue. The flow from this sub-area concentrates at 27th Avenue and Southern, and the point is designated **CPS27C**. At this concentration point, runoff flows will be intercepted by the proposed 60-inch, 27th Avenue storm drain. Future storm drains in 27th Avenue south of Southern Avenue and in Southern Avenue east of 27th Avenue will intercept and route flows to the proposed 60-inch, 27th Avenue storm drain. During the interim period, a portion of the surface-flow will reach the intersection and be intercepted by catch basins that connect to the 27th Avenue storm drain.

Sub-area **SA19C** is located north of Baseline Road and east of 19th Avenue. The flow from this sub-area concentrates at 19th Avenue and Southern Avenue; this point is designated **SA19C**. At this point 70 cfs is diverted into the existing 19th Avenue storm drain.

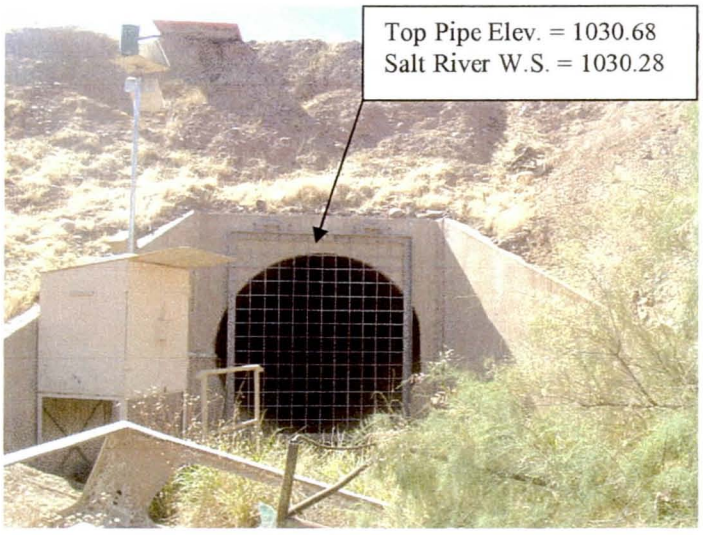
The flowby from **SA19C** continues northwesterly into sub-area **CR23C**, and surface flows concentrate at the proposed 23rd Avenue/Roeser Road detention basin. This point is designated **CPC23C.** Sub-area **CR23C** is located north of Alta Vista Road and east of 27th Avenue.

The last sub-area is located between Broadway Road, Southern Avenue, 27th Avenue and 23rd Avenue; it is designated **RR27C**. Surface flows from this sub-area concentrate at a low point in the intersection of 27th Avenue and Roeser Road. This concentration point is designated **CPR27C**.

2.3 Existing Drainage Facilities in Project Area

There are existing storm drain pipes in Broadway Road from ¼ mile east of 23rd Avenue to 27th Avenue, in 19th Avenue from Baseline to the Salt River, and in 27th Avenue from Broadway Road to the Salt River. The 19th Avenue storm drain size varies from 36-inch to 57-inch; the Broadway Road storm drain size varies from 24-inch to 36-inch; and the 27th Avenue storm drain is 108-inch.

The 108-inch, 27th Avenue storm drain outfall at the Salt River is shown in the photo. An existing measurement, recording and warning device can also be seen in the photo.



Potentially, flows in the Salt River could control the 27th Avenue storm drain hydraulic grade line. The City's hydraulic gradient criteria are that the 27th Avenue 100-year event hydraulic grade line shall match into the Salt River 10-year event water surface.

Peak discharges together with the Salt River HEC-RAS model were provided by the FCDMC. Table VI shows the results.

TABLE VI SALT RIVER PEAK DISCHARGE & WATER SURFACE ELEVATION

Location		10-year	River	Water Surface
Conc. Point	Major X-Street	Discharge	Station	Elevation
CP-111	Central Avenue	53,000 cfs	210.46	1030.28

The top of 108-inch pipe elevation at its outlet is 1030.68 as compared to the 10-year discharge water surface elevation of 1030.28; therefore, the hydraulic grade line for the 27th Avenue storm drain begins at the top of outlet pipe. This can be seen on the hydraulic grade line spread sheet in Appendix B.

Salt River Project open ditch - This ditch, shown in the photo, existed at the inception of the project design period. It is located between Broadway Road and Roeser Road. This ditch routes offsite surface flows westerly around the north side of Weston Park subdivision from 23rd Avenue to 27th Avenue. At 27th Avenue, it appears that overflow from the ditch will pass over its south bank into an existing detention basin that was constructed as part of the Weston Park improvements.

27th Avenue Looking Easterly at SRP ditch

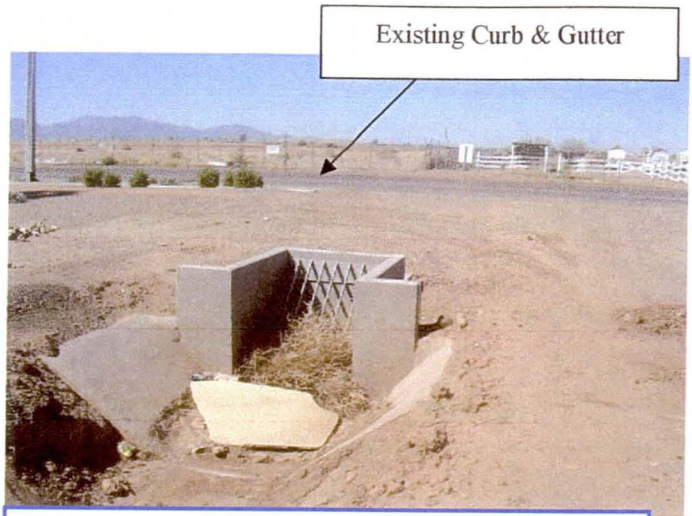
In recent months, the SRP ditch has been replaced with an irrigation pipeline. At 23rd Avenue, this SRP pipeline intercepts flows from a north-south earthen channel. Said channel carries flows that pass through the proposed detention basin site. An 18-inch pipe that connects to the east-west SRP irrigation pipeline is positioned in the west wing of the headwall shown in the photo. However, its limited capacity restricts the earthen channel flow. The headwall trash rack is covered with debris and partially full of water; therefore, the 18-inch pipe is not visible.

Looking Northwest at SRP's Irrigation Headwall

The north-south earthen channel, as shown on the left in the photo is adjacent to a concrete lined SRP irrigation delivery ditch. The ditch extends along 23rd Avenue from the detention basin site at Roeser Road to a point about ¼-mile north of Roeser Road. This channel defines the historical flow pattern on the downstream side of the detention basin site. Therefore, the proposed detention basin overflow discharge will continue to follow along said SRP drainage channel from Roeser Road to said SRP headwall.

23rd Avenue, ¼-mile North of Roeser Road Looking South

Grayson Square, a new residential subdivision currently under construction, is located between 27th Avenue and 23rd Avenue, and is adjacent to the SRP Irrigation ditch shown in the photo at the headwall. As previously stated, during recent construction activities this ditch has been replaced with a new pipeline. The offsite subdivision improvements include extending the existing curb and gutter, shown in the photo, northerly along the east side of 27th Avenue. Curb cuts will be made in the extended curb & gutter, and catch basins constructed as a part of the City's storm drain project.



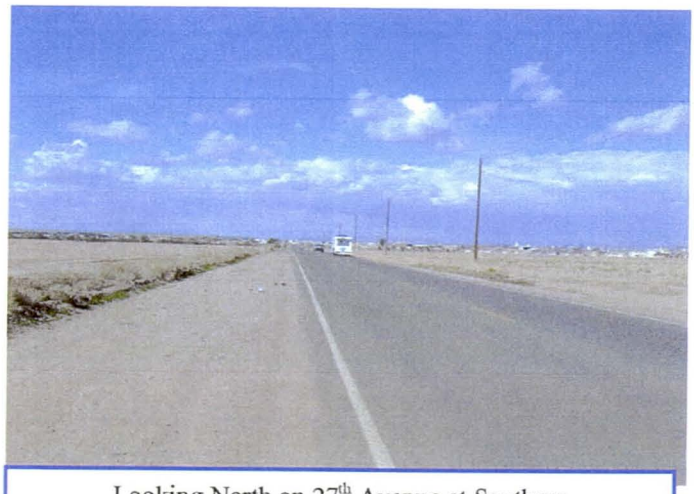
¼ -Mile North of Roeser Road, Looking West at SRP Headwall & 27th Avenue

The existing detention basin, shown in the photo, is located north of Roeser Road along the east side of 27th Avenue. The existing catch basin shown on the north side of Roeser Road is at the low point of the project; Broadway Road and Southern Avenue are both at a higher elevation than is Roeser Road. It currently catches gutter discharges from both 27th Avenue and Roeser Road

New catch basins will be located along 27th Avenue to catch the right-of-way drainage. Right-of-way surface flows will be routed into the proposed 60/78-inch storm drain in 27th Avenue.

27th Avenue near Southern Looking Northerly

Twenty Seventh Avenue at Southern Avenue is a concentration point, and runoff flows will be intercepted by the proposed 60-inch, 27th Avenue storm drain at this location. Future storm drains in 27th Avenue south of Southern Avenue and in Southern Avenue east of 27th Avenue will intercept and route flows to the proposed 60-inch, 27th Avenue storm drain. During the interim period, a portion of the surface-flow will reach 27th Avenue south of Southern Avenue and be intercepted by catch basins that connect to the 60-inch, 27th Avenue storm drain.



Looking North on 27th Avenue at Southern

Barcelona, a new residential subdivision currently under construction, is located west of 27th Avenue between Roeser Road and Southern Avenue. This project will construct new curb and gutter, and widen the west side of the 27th Avenue pavement. Curb cuts will be made and catch basins constructed along the west side of 27th Avenue as a part of the City's storm drain project. These new catch basins will be designed to drain the 27th Avenue right-of-way.

3. PROPOSED RUNOFF DISCHARGE FLOW MANAGEMENT

3.1 HEC-1 Model Update Characteristics

The Corp of Engineers' HEC-1 Flood Hydrograph Package was initially modeled for existing conditions by the FCDMC in 1991, and further developed by HDR Engineers in 1996 and 1997 including the future conditions model. Since 1997 the FCDMC has made several revisions to the HEC-1 model reflecting more recent drainage improvements. At the inception of this project's design period, the FCDMC provided CVL with the existing conditions model. CVL updated the model to include current land-use where development has occurred since 1997; Also, CVL generated a future conditions model by changing agricultural parcels and vacant parcels to that future land-use shown in the City's General Plan. The future conditions model was completed by adding the proposed 78-inch and 60-inch storm drains in 27th Avenue, the 42-inch storm drain in Roeser Road, and the 23rd Avenue / Roeser Road detention basin. Simulations were prepared for the future conditions 100-year return frequency, and the existing conditions 25-year and 100-year return frequencies.

The HEC-1 components were prepared and arranged as follows:

1. Calculate hydrograph for sub-area BR19C at 19th Avenue & Baseline Road, concentration point COVL19.
2. At COVL19, divert 50 cfs into the future Baseline Road storm drain.
3. Route sub-area BR19C hydrograph across sub-area SA27C to 27th Avenue and Southern Avenue, concentration point CPS27C.
4. Calculate hydrograph for sub-area SA27C at 27th Avenue and Southern, concentration point CPS27C.
5. Combine routed hydrograph with sub-area SA27C hydrograph at concentration point CPS27C.
6. Route combined hydrograph in proposed 60-inch storm drain from 27th Avenue and Southern Avenue (CPS27C) to 27th Avenue and Roeser Road, concentration point CPR27C.

Start new series:

1. Calculate hydrograph for sub-area SA19C at 19th Avenue and Southern Avenue, concentration point SA19C.
2. At SA19C, divert 70 cfs into the existing 19th Avenue storm drain.
3. Route the sub-area SA19C hydrograph across sub-area CR23C to the 23rd Avenue/Roeser Road detention basin, concentration point CPC23C.
4. Calculate hydrograph for sub-area CR23C at said detention basin, concentration point CPC23C.

5. Combine routed hydrograph with sub-area CR23C hydrograph at concentration point CPC23C.
6. Route detention basin outflow hydrograph from the 23rd Avenue/Roeser Road detention basin to 27th Avenue and Roeser Road, concentration point CPR27C.
7. Calculate hydrograph for sub-area RR27C at 27th Avenue and Roeser Road, concentration point CPR27C.
8. Combine routed hydrographs for 60-inch and 42-inch storm drains with sub-area RR27C hydrograph at concentration point CPR27C.

Detention basin Capacity, stage storage and stage outflow is shown in the following Table VII:

TABLE VII DETENTION BASIN CHARACTERISTICS		
Water Surface Elevation	**Stage Storage acre-feet**	**Stage Outflow cfs**
1045.00	0.01	2.37
1046.00	0.16	9.86
1047.00	1.05	21.29
1048.00	2.92	35.31
1049.00	7.85	50.55
1050.00	15.55	61.69
1051.00	23.95	64.21
1052.00	32.98	66.64
1053.00	42.63	68.98
1054.00	52.64	71.24

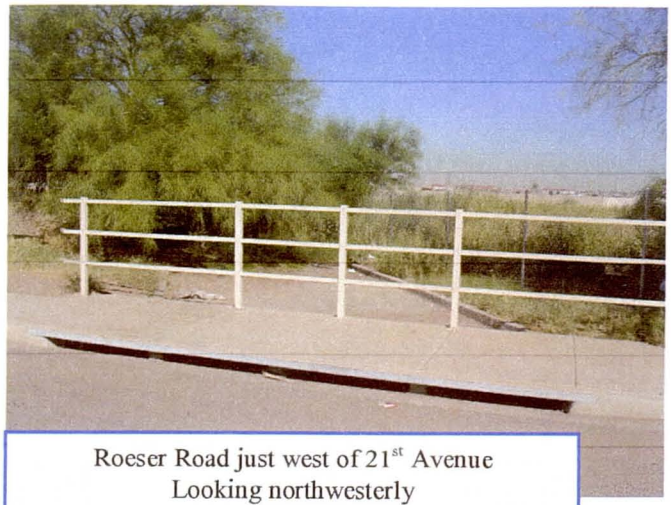
The detention basin outflow values correspond to a 42-inch outlet pipe.

The HEC-1 Simulation Output is included in Appendix A and the results are summarized as follows in Table VIII:

TABLE VIII		HEC-1 Models - Peak Runoff Discharge in cfs			
HEC-1 Component		**Existing Conditions**		**Future Conditions**	
Sub-Area	**Conc. Point**	**25-year**	**100-year**	**25-year**	**100-year**
BR19C	COVL19	199	352	0	182
SA27C & BR19C	**CPS27C**	**70**	**428**	**0**	**167**
SA27C & BR19C	CPR27C	341	632	0	168
SA19C	SA19C	367	615	297	615
SA19C & CR23C	CPC23C	539	840	65	361
All	**CPR27C**	**397**	**690**	**25**	**227**

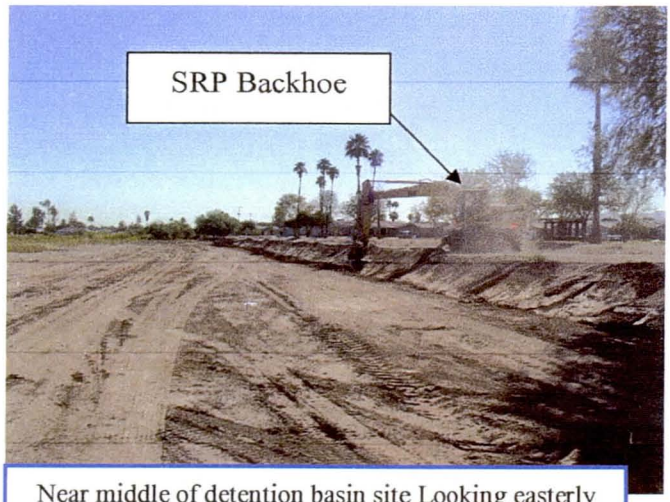
3.2 Surface Flows into Detention Basin

The scupper shown in the photo is located on the north side of Roeser Road just west of 21st Avenue; the outflow apron directs runoff discharges into an existing drainage-way or ditch that is located on the proposed detention basin site. The ditch is maintained by Salt River Project, and their ditch cleaning operation can be seen in the second photo.



Roeser Road just west of 21st Avenue
Looking northwesterly

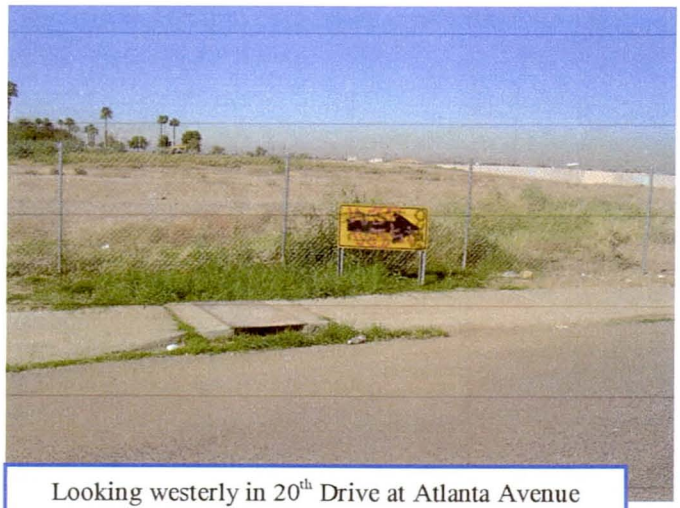
The existing drainage-way is located along the north side of Lindo Park or the south side of the detention basin site. This ditch directs runoff discharges to 23rd Avenue at the west end of the detention basin site where it turns north along 23rd Avenue. This drainage-way is located along the east side of a Salt River Project delivery ditch, and it is relatively high preventing runoff discharges from migrating to the west along the old Maricopa Drain swale.



Near middle of detention basin site Looking easterly

A second scupper shown in the photo is located in 20th Drive at Atlanta Avenue which just north of Roeser Road. The hydraulic capacity of this scupper is much less than the one in Roeser Road. Flows exceeding the scupper capacity will pass over the top of curb and move westerly into the detention basin site.

Detention Basin Low Flow Channel – A low flow channel is proposed in the detention basin. It will start on the west end of the basin at the outflow structure, extend the full length of the basin to the easterly end at 20th Drive, and intercept runoff discharges from the two existing scuppers. The low flow channel is designed with a capacity to carry nuisance flows though the basin. It is 20-feet wide and 1-foot deep. The low flow channel is routed around the northerly side of the basin to allow space for a soccer field near the center of the basin.



Looking westerly in 20th Drive at Atlanta Avenue

3.3 Energy and Hydraulic Grade Lines

Tables III-A and III-B are repeated here for convenience of identifying the proposed storm drains' sizes and the discharge flows they were designed to carry.

TABLE III-A 27th Avenue/Roeser Road Drainage System Storm Drain Pipes Proposed in Final Design Report					
Location	**From**	**To**	**Size**	**Flow**	**Max Depth**
27th Ave	Broadway Rd	Roeser Rd	78-inch	227 cfs	23-feet
27th Ave	Roeser Rd	Southern Ave	60-inch	167 cfs	22-feet
Roeser Rd	27th Ave	23rd Ave	42-inch	64 cfs	18-feet

TABLE III-B 27th Avenue/Roeser Road Drainage System Detention Basin Proposed in Final Design Report				
Location	**Size**	**Peak W.S. Elev**	**Capacity**	**Max Water Depth**
23rd Ave & Roeser Rd	11.8-acres	1050.47	28 acre-feet	6.5-feet

Hydraulic grade and energy grade Line elevations are calculated with and shown on the spread sheet in Appendix B. The hydraulic grade line is also shown on the Project Profile sheets which are a part of the construction plans. The energy losses were calculated in accordance with those equations presented in the FCD's Draft Drainage Design Manual[2]. Elevations are shown at the upstream and downstream ends of each reach of pipe and structure.

Pipe friction losses are computed by Manning's Equation with n = 0.013 for concrete pipe, which is equation (4.4) in the manual: $h_f = S_f L = n^2V^2 / 2.208R^{4/3}$

Pipe enlargement losses are according to Manual Equation 4.7 and K_e taken from Tables 4.3a and 4.3b: $h_e = Ke(V_1^2 - V_2^2)/2g$

Junction losses calculated by the Thompson Equation (Manual Equation 4.10a) where the change in hydraulic grade line: $\Delta y = ((Q_2V_2 - Q_1V_1 - Q_3V_3\cos\theta)/g)/((A_1+A_2)/2)$

Bend losses are according to Manual Equation 4.12: $h_b = k_bV^2/2g$

Manhole riser losses are according to Manual Equation 4.11: $h_{mh} = .05\ V^2/2g$

Pipe curve losses are calculated by Manual Equations 4.13 and 4.14: $h_b = k_bV^2/2g$ & $k_b = 0.0033\Delta$

3.4 Backflow Potential at 23rd Avenue and Roeser Road Detention Basin

The existing ground at 27th Avenue and Southern is at elevation 1062.5 and the existing 42-inch outlet pipe invert at the 23rd Avenue and Roeser Road detention basin is at 1044.1; the elevation difference is 18.4-feet.

If downstream clogging or restrictions were to occur in the 78-inch storm drain, during a large storm event, runoff discharges can potentially backflow into the detention basin.

[2] Flood Control District of Maricopa County, **Draft** Drainage Design Manual, Volume II Hydraulics, September 2003.

4.0 PROPOSED CATCH BASINS

Catch Basin Locations

Catch basins are shown on the plans at the locations indicated in the following Table IV. Catch Basin calculations are included in Appendix C.

TABLE IX – Catch Basin Locations and Type			
West Side of 27th Avenue		East Side of 27th Avenue	
Plan Station	Standard Detail	Plan Station	Standard Detail
38+60	P1569-1	10+91	P1572
43+50	"	19+03	P1569-1
53+20	"	24+00	"
59+38	"	35+50	"
		37+06	P1570 Double
		47+00	P1570 Single
		53+28	P1570 Double

Catch Basin Drainage Areas

The drainage areas consist of 27th Avenue, ½-Street, right-of-way and the land use categories are dirt, pavement, sidewalk, curb & gutter, and landscaping.

Runoff Coefficients

For landscaped areas, the runoff coefficients value of 0.60 corresponding to the 2 -10 year frequency and land use code "DL1" was selected from Table 3.2[3]. Also, the runoff coefficient value of 0.35 for undeveloped desert (dirt) was taken from that same Table 3.2. For curb, gutter, pavement and sidewalk, the runoff coefficient value of 0.95 corresponding to the 2 – 10 year frequency and land use of paved streets was selected from the Section 6.2.2 Table[4]. A weighted Coefficient calculation for each catch basin drainage area is included on the catch basin spread sheets in Appendix C.

Time of Concentration (T_c) and Intensity (i)

Time of Concentration was calculated by equation 3.2[5], $T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$. The watershed resistance coefficient K_b= m log A + b, where A is the drainage area in acres. Both m and b was selected from Table 3.1, page 3-3, corresponding to Type A – residential. L = longest flow path (taken as gutter length) in miles. S = water course slope (taken as average gutter slope) in feet/mile.

The rainfall intensity (i) is in inches/hour, and the minimum intensity of 10 minutes is in accordance with the *City of Phoenix Storm Water Policies and Standards, March 2004, page 6-5.* The *PREFRE* program was used to calculate D-D-F statistics and the intensity curves are included in Appendix C. For runoff calculations (*Q=CiA*), Intensity values were selected for the 10-year storm event in accordance with *Flood Control District of Maricopa County, Drainage Design Manual, Volume I Hydrology, January 28, 1996, page 2-3.*

---

[3] Flood Control District of Maricopa County, **Draft** Drainage Design Manual, Volume I Hydrology, November 2003, page 3-5.
[4] City of Phoenix Storm Water Policies and Standards, March 2004, page 6-4.
[5] Flood Control District of Maricopa County, Drainage Design Manual, Volume I Hydrology, November 2003, page 3-2.

Street Capacity

The gutter carrying hydraulic capacity is estimated by the modified Manning's equation 3.1[6], $Q_t = (0.56/n)S_x^{1.67}S^{0.5}T^{2.67}$. As shown on the spread sheet in Appendix C, superposition was used to calculate the hydraulic capacity of the composite roadway section. The spread "T" corresponding to the runoff Q plus flowby from the upstream catch basin is calculated. The future half street width to face of curb is 34-feet. During the design storm event one dry lane in each direction must be maintained. Therefore, the maximum spread is limited to 22-feet.

Catch Basin Capacity

Catch basins called for on the plans are City of Phoenix Standard P1569-1. Opening length for depressed curb opening catch basins is estimated by equation (3.7)[7], $L_T = 0.6Q^{0.42}S^{0.3}(1/nS_e)^{0.6}$. Equivalent cross slope was calculated using equation (3.6)[7], $S_e = S_x+S_w E_o$, and E_o was calculated but the values are the same as given in Figure 3.23 in the same reference. Efficiency was calculated using equation (3.5) in the same reference. These calculations are tabulated on the spread sheets in Appendix C.

Connector Pipe Hydraulic Gradient (H. G.)

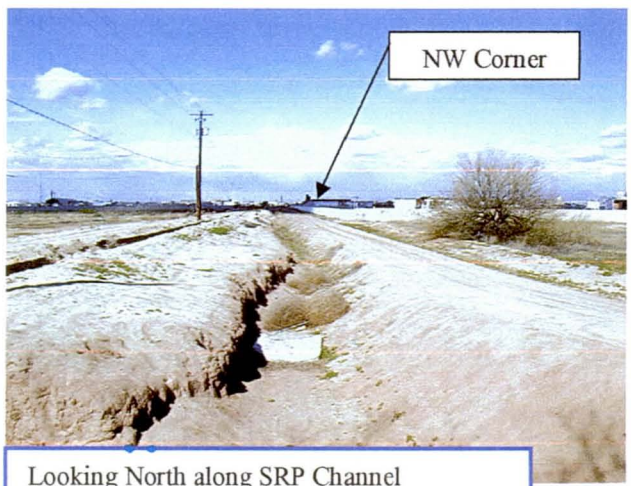
The water surfaces in the catch basins were set at 8-inches below normal gutter elevation. The 8-inches include 6-inches of freeboard below depressed gutter plus 2-inches of depressed gutter. The upstream H.G. elevation is set at a vertical distance below the catch basin water surface equal to 1.5 $V^2/2g$ which accounts for entrance loss and velocity head. Velocity is calculated for the pipe flowing full, where V=Q/A. Q is the runoff flow plus flowby from the upstream catch basin. The H.G. slope S_f is calculated by Manning's equation with n = 0.015. The spread sheet consisting of these calculations is included in Appendix C.

5.0 FINISHED FLOOR ELEVATION NEAR DETENTION BASIN

The subdivision east of the detention basin (Braewood South) has one lot adjacent to the detention basin, lot 97, and its floor elevation is 1056.87. A second lot, lot 96, is near the detention basin and is separated from it by 20th Drive; its floor elevation is 1056.72. The peak water surface elevation for the design storm is 1050.5 and the overflow at the west end of the basin is set at 1052.0 which provides over 4-feet of elevation difference between the house floor and the overflow weir surface.

6.0 DETENTION BASIN OVERFLOW

The northwest corner is the low point on the outside perimeter of the basin. The detention basin grading plan shows a weir overflow along the west side of the detention basin. The weir elevation is set at 1052.0 and the high water elevation for the design storm is 1050.5. This provides 1.5 feet of vertical excess detention basin capacity.



Looking North along SRP Channel

[6] Flood Control District of Maricopa County, Drainage Design Manual, Volume II Hydraulics, January 26, 1996, page 3-6.
[7] Flood Control District of Maricopa County, Drainage Design Manual, Volume II Hydraulics, January 26, 1996, page 3-18.

As previously stated under section 2.3, *Existing Drainage Facilities* on page 7, the proposed detention basin overflow discharge will continue to follow along the SRP drainage channel in 23rd Avenue from Roeser Road to the SRP headwall located about ¼ mile north of Roeser Road. This is the historic drainage pattern. If detention basin overflow were to occur, discharges will follow this SRP channel northerly to said SRP headwall where the relatively small pipe (18-inch) will intercept the flow. If the overflow were to exceed the capacity of the pipe the channel will tend to overflow on the east side and water will pond in the area around the SRP headwall.

At SRP Headwall, looking south along SRP Drainage Channel in 23rd Avenue.

APPENDIX A

```
*************************************                                    -----------------------------------------
                                    *                                    *                                       *
FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                    *    U.S. ARMY CORPS OF ENGINEERS       *
          JUN   1998                *                                    *    HYDROLOGIC ENGINEERING CENTER      *
        VERSION 4.1                 *                                    *          609 SECOND STREET            *
                                    *                                    *       DAVIS, CALIFORNIA 95616         *
RUN DATE   09NOV04  TIME  09:59:52  *                                    *           (916) 756-1104              *
                                    *                                    *                                       *
*************************************                                    *****************************************

                                    X     X  XXXXXXX   XXXXX           X
                                    X     X  X        X     X         XX
                                    X     X  X        X                X
                                    XXXXXXX  XXXX     X        XXXXX   X
                                    X     X  X        X                X
                                    X     X  X        X     X          X
                                    X     X  XXXXXXX   XXXXX         XXX

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID    LAVEEN ADMS (FINAL HEC-1) 100-YR 24-HR STORM          CBA FILE # 40916-02-30
  2           ID    HIDDEN VALLEY WATERSHED/CHAMPION DRAIN WATERSHED
  3           ID                                                        DATE: SEPTEMBER 12,2000
  4           ID                                                        FINAL: NOVEMBER 2002
  5           ID    24-HOUR SCS TYPE II RAINFALL
  6           ID
  7           ID    REVISED SCHEMATIC TO INCLUDE FLOWS IN BOTH 43RD AVE. BASINS
  8           ID
  9           ID
 10           ID
 11           ID    ******************************************************************************
 12           ID
 13           ID   FOLLOWING REVISIONS BY AMIR MOTAMEDI, STEVEN TUCKER, FCDMD, 8/29/02
 14           ID   1- REMOVED THE PROPOSED BASIN ON NE CORNER OF BASELINE AND 43RD AVE PER PPM
 15           ID   2- REMOVED DUPLICATE RR35C3
 16           ID   3- CORRECTED THE LENGTH FOR THE REMAINING RR35C3
 17           ID   4- CORRECTED THE REACH LENGTH AND SLOPE FOR RR35C2
 18           ID   5- CORRECTED THE 43RD AVE. STORM DRAIN CAPACITY TO 294
 19           ID   6- CORRECTED THE RATING CURVE FOR THE 43RD AVE BASIN AT BASELINE RD
 20           ID   7- PLEASE NOTE: RAINFALL AREAL REDUCTION IS FOR ENTIRE WATERSHED. FOR DESIGN
 21           ID   OF LACC ONLY.  NOT TO BE USED FOR ANY OTHER DESIGN W/O PROPER MODIFICATION
 22           ID    ****************************************************************************
 23           ID
 24           ID
 25           ID    ******************************************************************************
 26           ID    FLOOD INSURANCE STUDY UPDATE
 27           ID    INCLUDE PHYSICAL CHANGES IN THE WATERSHED AS OF MARCH 2000
 28           ID    INCLUDED THE FOLLOWING FACILITIES:
 29           ID      UPSTREAM OF 43RD AVE.  - EXISTING LANDUSE
 30           ID         1- 43RD AVENUE STORM DRAIN, 1000 FT NORTH OF BASELINE TO SALT RIVER
 31           ID         2- CESAR CHAVEZ GOLF COURSE, 35TH AVENUE AND DOBBINS
 32           ID         3- BASELINE STORMDRAIN, FROM 7TH AVE TO 43RD AVE.
 33           ID         4- 43RD AVE DETENTION BASIN AT SOUTHERN AVE.
 34           ID
 35           ID      DOWNSTREAM OF 43RD AVE. - EXISTING LANDUSE
 36           ID         PLAN 2 - PROPOSED CHANNEL
 37           ID
 38           ID    CHANGES BY H&H BRANCH, FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 39           ID    8/29/02   INPUT FILE NAME LB2DR1.DAT
 40           ID
 41           ID  ******************************************************************************
 42           ID  UPDATED BY CVL, OCTOBER 2004
 43           ID  FCD CONTRACT #2003A004
 44           ID  COP CONTRACT #ST83120028
 45           ID  INPUT FILE NAME LAVEEN_FUTURE_CVL.DAT
 46           ID  *INCLUDES FUTURE CONDITIONS DEVELOMENT WITH 100-YR, 2 HR RETENTION FOR
 47           ID  SUB-BASINS BR19C, SA27C, SA19C, RR27C, AND CR23C
 48           ID  *INCLUDES THE FOLLOWING FACICITIES
 49           ID  1.  23RD AVENUE AND ROESER DETENTION BASIN
 50           ID  2.  42" STORM DRAIN FROM DETENTION BASIN TO 27TH AVENUE
 51           ID  3.  60" STORM DRAIN TO ROUTE FLOWS FROM SA27C ALONG 27TH AVENUE TO ROESER RD.
 52           ID  4.  78" STORM DRAIN TO ROUTE FLOWS FROM 27TH AVE AND ROESER TO THE SALT RIVER
 53           ID
 54           ID  ******************************************************************************
 55           ID
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  56          ID
              *DIAGRAM
  57          IT       5                    500
  58          IO       5       0

  59          KK   IR62B
  60          KM  SUB-BASIN  IR62B -LAND USE - AGRICULTURE;MINOR DEVELOPMENT
  61          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
  62          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .97
  63          BA    .550
  64          IN      30
  65          KM  RAINFALL DEPTH OF 4.20 WAS SPACIALLY REDUCED AS SHOWN ON THE PB RECORD
  66          PB   4.074
  67          KM  THE FOLLOWING PC RECORDS REPRESENT A 24-HR SCS TYPE II STORM
  68          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
  69          PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
  70          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
  71          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
  72          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
  73          LG    .500    .000   5.000    .371    .000
  74          UC    .850    .594
  75          UA       0       3       9      18      28      42      59      73      87      92
  76          UA     100
              *

  77          KK   DR43C
  78          KM  SUB-BASIN DR43C -LAND USE- AGRICULTURE, DESERT HILLS; MINOR DEVELOPMENT
  79          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
  80          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
  81          BA    .940
  82          IN      30
  83          KM  RAINFALL DEPTH OF 4.2 WAS SPACIALLY REDUCED AS SHOWN ON THE PB RECORD
  84          PB   3.780
  85          KM  THE FOLLOWING PC RECORDS REPRESENTS A 24-HR SCS TYPE II STORM
  86          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
  87          PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
  88          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
  89          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
  90          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
  91          LG    .360    .053   4.450    .391  20.000
  92          UC    .617    .325
  93          UA       0       3       5       8      12      20      43      75      90      96
  94          UA     100
              *

  95          KK  DDR43C
  96          KM  SPLIT FLOW.RESULTANT HYDROGRAPH IS THE ESTIMATED FLOW THAT DRAINS THE TO WEST
  97          KM  0F THE SOUTHWEST CORNER OF 43RD AVENUE AND DOBBINS ROAD
  98          DT  RDR43C
  99          DI       0      50     100     119     300     500     600     800     900
 100          DQ       0      50     100     119     181     381     481     681     781
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 101          KK  ROA51B
 102          KM  ROUTE SPLIT FLOW FROM SUB-BASIN DR43B TO COMPUTATION POINT COA51B (1ST REACH)
 103          RS      10    ELEV    1041
 104          RC    0.07    0.07    0.07    2790  0.0042
 105          RX       0     300     440     480     560     590     615     640
 106          RY    1042    1041    1041    1041    1041    1041    1041    1042
              *

 107          KK  ROA51B
 108          KM  ROUTE SPLIT FLOW FROM SUB-BASIN DR43B TO COMPUTATION POINT COA51B (2ND REACH)
 109          RS      24    ELEV      -1
 110          RC   0.065   0.065   0.065    3600  0.0017
 111          RX       0      90     320     490     690    1060    1950    1960
 112          RY    1038  1037.8  1037.4    1037    1037  1037.1  1037.8    1038
              *

 113          KK   OA51B
 114          KM  SUB-BASIN  OA51B-LAND USE - AGRICULTURE, RURAL DEVELOPMENT
 115          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 116          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .97
 117          BA   1.370
 118          IN      30
 119          KM  RAINFALL DEPTH OF 4.2 WAS SPACIALLY REDUCED AS SHOWN ON THE PB RECORD
 120          PB   4.074
 121          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 122          PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 123          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 124          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 125          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 126          LG    .360    .098   5.300    .312    10.0
 127          UC   0.883    .320
 128          UA       0       3       9      18      28      42      59      73      87      92
 129          UA     100
              *

 130          KK  COA51B
 131          KM  COMBINE ROUTED SPLIT FLOW FROM SUB-BASIN DR43C TO RUNOFF FROM SUB-BASIN
 132          KM   OA51B
 133          HC       2
              *

 134          KK  DFO51B
 135          KM  RATE CHANNEL CROSS-SECTION AT CONCENTRATION POINT OA51B FOR SPLIT FLOW.
 136          KM  DIVERTED FLOW IS ROUTED THROUGH CHAMPION DRAIN WATERSHED
 137          DT  DOA55C
 138          DI       0       8      24      93     219     461     852    1384
 139          DQ       0       4      11      43     102     262     479     735
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 140          KK   RE55B
 141          KM  ROUTE SPLIT FLOW FROM SUB-BASIN OA51B TO COMPUTATION POINT CRE55B
 142          RS      18    ELEV      -1
 143          RC    0.07    0.07    0.07    3840  0.0013
 144          RX       0      30     370     530     680     860    1120    1260
 145          RY    1032    1030  1029.7  1029.4  1029.2    1029  1028.8    1031
              *

 146          KK   ER55B
 147          KM  SUB-BASIN ER55B-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
 148          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 149          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .97
 150          BA    .250
 151          LG    .500    .000   7.800    .150    .000
 152          UC    .983    .669
 153          UA       0       3       9      18      28      42      59      73      87      92
 154          UA     100
              *

 155          KK  CER55B
 156          KM  COMBINE ROUTED DIVERTED FLOW FROM SUB-BASIN OA51B TO RUNOFF FROM SUBASIN
 157          KM   ER55B
 158          HC       2
              *

 159          KK   RE59B
 160          KM  ROUTE FLOW FROM COMPUTATION POINT CRE55B TO COMPUTATION POINT CER59B
 161          RS       7    ELEV      -1
 162          RC    0.07    0.07    0.07    2600   0.002
 163          RX       0      30      50      90     180     270     360     860
 164          RY  1026.5    1024    1024    1024    1025  1025.3  1025.5  1026.5
              *

 165          KK   ER59B
 166          KM  SUB-BASIN ER59B-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
 167          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 168          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .97
 169          BA    .280
 170          LG    .500    .000   3.790    .454    .000
 171          UC    .933    .586
 172          UA       0       3       9      18      28      42      59      73      87      92
 173          UA     100
              *

 174          KK  CER59B
 175          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CRE55B TO RUNOFF FROM SUBASIN
 176          KM   ER59B
 177          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 178          KK  RIR63B
 179          KM  ROUTE FLOW FROM COMPUTATION POINT CER59B TO COMPUTATION POINT CIR63B. NOTE
 180          KM  END POINTS OF CROSSECTION WERE ADJUSTED SO THAT FLOW WOULD BE CONTAINED
 181          KM  WITHIN THE GIVEN ROUTING REACH
 182          RS       7    ELEV      -1
 183          RC    0.07    0.07    0.07    3100   0.002
 184          RX       0      40      80     120     160     210     290     360
 185          RY  1022.7    1020  1019.7  1019.7    1020  1020.2  1020.9  1022.7
              *

 186          KK   IR63B
 187          KM  SUB-BASIN IR63B-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
 188          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 189          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .97
 190          BA    .130
 191          LG    .500    .000   3.500    .470    .000
 192          UC    .767    .647
 193          UA       0       3       9      18      28      42      59      73      87      92
 194          UA     100
              *

 195          KK  CIR63B
 196          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CER59B AND RUNOFF OF SUB-BASINS
 197          KM  IR63B AND IR62B
 198          HC       3
              *

 199          KK  DIR63B
 200          KM  COMPUTATION POINT CIR63B IS LOCATED ON THE WESTERN EDGE OF THE STUDY AREA
 201          KM  WHICH IS BOUNDED BY A CONCRETE IRRIGATION CANAL AND EARTHEN ROADWAY. THE
 202          KM  EARTHEN ROADWAY HAS A CAPACITY OF APPROXIMATELY 45 CFS BEFORE THE
 203          KM  IRRIGATION  CANAL IS OVERTOPPED AND FLOW CONTINUES ITS NATURAL FLOW
 204          KM  PATH TO THE WEST. THE DIVERTED FLOW OF APPROXIMATELY 45 CFS IS ROUTED
 205          KM  TO THE CHAMPION DRAIN WATERSHED
 206          DT  RIR63B
 207          DI       0      45     100     200     400     600     800
 208          DQ       0      45      45      45      45      45      45
              *

 209          KK    CBDE
 210          KM  BASIN EAST OF CENTRAL 7th AVE FROM BASELINE TO NORTH OF DOBBINS
 211          BA    0.17
 212          LG     .35     .25     4.3     .33       9
 213          UC     .65     .65
 214          UA       0       3       9      18      28      42      59      73      87      92
 215          UA     100
              *

 216          KK    OVL7
 217          KM  DIVERT FLOWS IN BASELINE STORMDRAIN
 218          DT   BLSD7
 219          DI       0     250    1000   10000
 220          DQ       0     250     250     250
              *
              * WITHOUT 7TH AVE STORMDRAIN THERE ALL THE FLOWS FROM CBDE WILL ENTER INTO
              * BASELINE STORMDRAIN, THEREFORE THERE IS NO OVERLAND ROUTING NEEDED.
              *
              * KK ROVL7
              * KM      Route overland flows in roadside ditch to BR19C (BASELINE & 19TH AVE)
              * RD  5200   0.008   0.030            TRAP    10.0    20.0
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 221          KK   BR19C
 222          KM  SUB-BASIN BR19C-LAND USE - 100% DEVELOPED (MODIFIED BY CVL)
 223          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 224          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 225          BA    .390
 226          LG    0.25    0.27   4.050    .619      30
 227          UC    0.26     0.1
 228          UA       0       5      16      30      65      77      84      90      94      97
 229          UA     100
              *

 230          KK  RETB19
 231          KM  RETAIN 100-YR 2-HR VOLUME FROM BASIN BR19C (ADDED BY CVL, VOLUME IS 80% OF REQ
 232          DT  RETB19      29
 233          DI       0    3000
 234          DQ       0    3000
              *

 235          KK   OVL19
 236          KM  THE CAPACITY OF THE BASELINE STORMDRAIN IS 300 CFS, 250 CFS IS ALREADY IN THE
 237          KM  THE STORMDRAIN FROM 7TH AVE, THEREFORE THERE IS ONLY ROOM FOR AN EXTRA 50 CFS
 238          DT  BLSD19
 239          DI       0      50    1000
 240          DQ       0      50      50
              *

 241          KK  COVL19
 242          KM  COMBINE THE OVERLAND FLOWS FROM 19TH AVE AND 7TH AVE
 243          HC       2
              *

 244          KK  ROVL19
 245          KM  ROUTE FLOW FROM SUB-BASIN BR19C TO COMPUTATION POINT CPS27C
 246          RS      33    ELEV      -1
 247          RC   0.070   0.070   0.070    7400  0.0077    1086
 248          RX       0     730    1080    1340    1710    2380    2850    3350
 249          RY    1086  1085.9  1085.7  1085.5    1085  1085.6  1085.6    1086
              *

 250          KK   SA27C
 251          KM  SUB-BASIN SA27C-LAND USE -  100% DEVELOPED (MODIFIED BY CVL)
 252          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 253          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 254          BA    .623
 255          LG    0.25    0.25   3.520    .476      30
 256          UC    0.47    0.27
 257          UA       0       5      16      30      65      77      84      90      94      97
 258          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 259          KK  RETA27
 260          KM  RETAIN 100-YR 2-HR VOLUME FROM BASIN SA27C (ADDED BY CVL, USING ONLY 80% OF RE
 261          DT  RETA27      51
 262          DI       0    3000
 263          DQ       0    3000
              *

 264          KK  CPS27C
 265          KM  COMBINE ROUTED FLOW FROM SUB-BASIN BR19C TO RUNOFF FROM SUB-BASIN SA27C
 266          HC       2
              *

 267          KK  RRS27C
 268          KM  ROUTE FLOW FROM CONCENTRATION POINT CPS27C TO CONCENTRATION POINT CP27R IN 60"
              * KO 1 2
 269          RD    2660  0.0045   0.012            CIRC       5
              *

 270          KK   SA19C
 271          KM  !!!!!!! START CHAMPION DRAIN WATERSHED  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
 272          KM  SUB-BASIN SA19C-LAND USE- URBAN,AGRICULTURE
 273          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 274          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 275          BA    .480
 276          IN      30
 277          KM  RAINFALL DEPTH OF 4.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 278          PB   3.780
 279          KM  THE FOLLOWING PC RECORD USED A 24-HOUR SCS TYPE II STORM
 280          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 281          PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 282          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 283          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 284          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 285          LG   0.25    0.25   3.750    .484      30
 286          UC   0.31    0.17
 287          UA      0       5      16      30      65      77      84      90      94      97
 288          UA    100
              *

 289          KK  RET19C
 290          KM  RETAIN 100-YR 2-HR VOLUME FROM BASIN SA19C (ADDED BY CVL, USING 80% OF RETENTI
 291          DT  RET19C    11.6
 292          DI       0    3000
 293          DQ       0    3000
              *

 294          KK  DSA19C
 295          KM  DIVERT CAPACITY OF STORMDRAIN AT CONCENTRARION POINT
 296          DT   SA19C
 297          DI      10      30      70     100     200     300
 298          DQ      10      30      70      70      70      70
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 299          KK  RR23C1
 300          KM  ROUTE FLOW FROM SUB-BASIN SA19C TO COMPUTATION POINT CPC23C ( 1ST REACH )
 301          RS       4    ELEV      -1
 302          RC   0.035   0.035   0.035    1200  0.0083    1076
 303          RX       0      50     120     220    1020    1080    1180    1250
 304          RY    1076  1075.8  1075.8  1075.8  1075.8  1075.8  1075.8    1076
              *

 305          KK  RR23C2
 306          KM  ROUTE FLOW FROM SUB-BASIN SA19C TO COMPUTATION POINT CPC23C ( 2ND REACH )
 307          RS       8    ELEV      -1
 308          RC   0.100   0.100   0.100    1600  0.0088    1066
 309          RX       0     150     560     820    1230    1470    1700    1870
 310          RY    1066    1064    1064  1063.6  1063.5    1064    1064    1066
              *

 311          KK  RR23C3
 312          KM  ROUTE FLOW FROM SUB-BASIN SA19C TO COMPUTATION POINT CPC23C ( 3RD REACH )
 313          RS      10    ELEV      -1
 314          RC   0.070   0.070   0.070    1900  0.0053    1056
 315          RX       0      40     110     590    1210    1490    1770    2040
 316          RY    1058    1054    1054  1052.8  1052.8    1054  1054.8    1056
              *

 317          KK   CR23C
 318          KM  SUB-BASIN CR23C-LAND USE- 100% DEVELOPED (MOFIEIED BY CVL)
 319          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 320          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 321          BA    .580
 322          LG   0.25    0.23     6.2    0.21      30
 323          UC   0.36    0.16
 324          UA       0       5      16      30      65      77      84      90      94      97
 325          UA     100
              *

 326          KK  RET23C
 327          KM  RETAIN 100-YR 2-HR VOLUME FROM BASIN CR23C (ADDED BY CVL, USING 80% OF REQUIRE
 328          DT  RET23C    43.4
 329          DI       0    3000
 330          DQ       0    3000
              *

 331          KK  CPC23C
 332          KM  COMBINE ROUTED FLOW FROM SUB-BASIN SA19C TO RUNOFF FROM SUB-BASIN CR23C
 333          HC       2
              *
              *

 334          KK   STR23
 335          KM  PROPOSED BASIN AT THE CORNER OF 23RD AVE AND ROESER (ADDED BY CVL)
 336          KM  USING 42" RGRCP OUTLET W/ INLET CONTROL
              * KO 1 2
 337          RS       1    STOR
 338          SV       0       3       8      24      43
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 339          SQ       0   21.29   50.55   64.04   68.82
 340          SE       0    1047    1049    1051    1053
              *

 341          KK  RSTR23
 342          KM  ROUTE DISCHARGE TO 27TH AVENUE (ADDED BY CVL)
              * KO 1 2
 343          RD    2713   0.005   0.012            CIRC     3.5
              *

 344          KK   RR27C
 345          KM  SUB-BASIN RR27C-LAND USE- 100% DEVELOPED (MODIFIED BY CVL)
 346          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 347          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 348          BA    .480
 349          LG    0.25    0.25   3.780    .432      30
 350          UC     0.3    0.11
 351          UA       0       5      16      30      65      77      84      90      94      97
 352          UA     100
              *

 353          KK  RET27C
 354          KM  RETAIN 100-YR 2-HR VOLUME FROM BASIN RR27C (ADDED BY CVL)
 355          DT  RET27C      36
 356          DI       0    3000
 357          DQ       0    3000
              *

 358          KK  CPR27C
 359          KM  COMBINE ROUTED FLOW FROM SUB-BASIN BR19C TO RUNOFF FROM SUB-BASIN SA27C
 360          KM  ADDED BY CVL
 361          HC       3
              *

 362          KK  RCR27C
 363          KM  ROUTE COMBINED HYDROGRAPHS THROUGH 108" RGRCP TO 27TH AND BROADWAY
 364          KM  ADDED BY CVL
              * KO 1 2
 365          RD    2520   0.005   0.012            CIRC     6.5
              *

 366          KK  RCR27C
 367          KM  ROUTE HYDROGRAPH THROUGH EXISTING 108" STORMDRAIN TO SALT RIVER (ADDED BY CVL)
              * KO 1 2
 368          RD    1560  0.0017   0.012            CIRC     6.5
              *

 369          KK    SM5C
 370          KM  SUB-BASIN SM5C-LAND USE-URBAN
 371          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 372          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 373          BA    .200
 374          LG    .200    .349   4.300    .555  18.000
 375          UC    .383    .355
 376          UA       0       5      16      30      65      77      84      90      94      97
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 377          UA     100
              *

 378          KK    RSM7
 379          KM  ROUTE FLOW FROM SUB-BASIN SM5C TO COMPUTATION POINT CPS15C
 380          RS      10    ELEV      -1
 381          RC   0.070   0.070   0.070    4000  0.0145
 382          RX       0     110     180     270     330     420     510     600
 383          RY    1180    1179  1178.5    1178    1178  1178.5    1179    1180

 384          KK  SMA15C
 385          KM  SUB-BASIN SMA15C-LAND USE- URBAN,AGRICULTURE
 386          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 387          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 388          BA    .360
 389          LG    .400    .045   3.700    .547    .000
 390          UC    .417    .292
 391          UA       0       3       9      18      28      42      59      73      87      92
 392          UA     100

 393          KK  CPS15C
 394          KM  COMBINE ROUTED FLOW FROM SUB-BASIN SM5C WITH RUNOFF FROM SUB-BASIN SMA15C
 395          HC       2

 396          KK  RSM19C
 397          KM  ROUTE FLOW FROM SUB-BASIN SA15C TO COMPUTATION POINT CPS19C
 398          RS       4    ELEV
 399          RC   0.070   0.070   0.070    2030    0.01    1140
 400          RX       0      50     110     160     210     260     350     430
 401          RY    1140  1139.5  1139.2  1139.2  1139.2  1139.2  1139.5    1140

 402          KK  SMA19C
 403          KM  SUB-BASIN SMA19C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
 404          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 405          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 406          BA    .156
 407          LG    .500    .000   4.200    .777    .000
 408          UC    .833   1.212
 409          UA       0       3       9      18      28      42      59      73      87      92
 410          UA     100

 411          KK  CPS19C
 412          KM  COMBINE ROUTED FLOW FROM SUB-BASIN SMA15C TO RUNOFF FROM SUB-BASIN SMA19C
 413          HC       2

 414          KK  RRB27C
 415          KM  ROUTE FLOW FROM COMPUTATION POINT CPS19C TO COMPUTATION POINT CPB27C
 416          RS      22    ELEV      -1
 417          RC   0.070   0.070   0.070    7400  0.0090    1110
 418          RX       0     260     550     770     920    1170    1320    1500
 419          RY    1110    1109    1109    1108    1108  1107.8    1108    1110
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 420          KK    SM1C
 421          KM  SUB-BASIN SM1C-LAND USE- NATURAL DESERT(MOUNTAIN)
 422          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 423          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 424          BA   1.840
 425          LG    .150    .346   3.800    .623  50.000
 426          UC    .450    .220
 427          UA       0       3       5       8      12      20      43      75      90      96
 428          UA     100

 429          KK   SM1AC
 430          KM  SUB-BASIN SM1AC-LAND USE- NATURAL DESERT(MOUNTAIN)
 431          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 432          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 433          BA    .280
 434          LG    .150    .343   4.050    .528  10.000
 435          UC    .367    .288
 436          UA       0       3       5       8      12      20      43      75      90      96
 437          UA     100

 438          KK    CSM1
 439          KM  COMBINE FLOW FROM SUB-BASIN SM1C WITH SM1AC AT COMPUTATOIN
 440          KM  POINT CSM1
 441          HC       2

 442          KK    RSM1
 443          KM  ROUTE FLOW FROM COMPUTATION POINT CSM1  TO COMPUTATION POINT CSM2
 444          RS       2    ELEV      -1
 445          RC   0.035   0.035   0.035    4300   0.017
 446          RX       0      90     160     230     310     380     490     590
 447          RY    1390    1380    1377  1375.5    1377    1380    1383    1390

 448          KK    SM2C
 449          KM  SUB-BASIN SM2C-LAND USE- NATURAL DESERT(MOUNTAIN)
 450          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 451          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
              * KO     1       2
 452          BA   2.190
 453          LG    .150    .350   3.310    .820  86.000
 454          UC    .383    .134
 455          UA       0       3       5       8      12      20      43      75      90      96
 456          UA     100

 457          KK    CSM2
 458          KM  COMBINE RUNOFF FROM SUB-BASIN SM2C TO ROUTED FLOW FROM COMPUTATION
 459          KM  POINT CSM1
 460          HC       2

 461          KK   RDENT
 462          KM  ROUTE INFLOW HYDROGRAPH THROUGH SOUTH MOUNTAIN DETENTION BASIN
 463          RS       1    ELEV      -1
 464          SA    2.30    7.80   15.91   19.96   24.08   28.27   30.45   31.91
 465          SE    1292    1294    1300    1305    1310    1315    1318    1320
 466          SL    1298    7.06    0.58     0.5
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 467          SS    1318     200     2.7     1.5

 468          KK    RSM2
 469          KM  ROUTE FLOW FROM COMPUTATOIN POINT CSM2 TO COMPUTATOIN POINT CSM3
 470          RS      12    ELEV      -1
 471          RC   0.040   0.040   0.040    6600   0.019    1228
 472          RX       0      70     100     140     160     190     240     320
 473          RY    1228  1227.5    1227    1226    1228  1228.5    1229    1230

 474          KK    SM3C
 475          KM  SUB-BASIN SM3C-LAND USE- NATURAL DESERT(HILLSLOPE,MOUNTAIN),MINOR DEVELOPMENT
 476          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 477          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 478          BA    .480
 479          LG    .160    .348   3.850    .607   1.500
 480          UC    .333    .159
 481          UA       0       3       5       8      12      20      43      75      90      96
 482          UA     100

 483          KK    CSM3
 484          KM  COMBINE RUNOFF FROM SUB-BASIN SM3C TO ROUTED FLOW FROM COMPUTATION
 485          KM  POINT CSM2
 486          HC       2

 487          KK    RSM3
 488          KM  ROUTE FLOW FROM COMPUTATION POINT CSM3 TO COMPUTATION POINT CSM4
 489          RS       4    ELEV      -1
 490          RC   0.040   0.040   0.040    3000  0.0095
 491          RX       0     120     190     270     330     400     470     530
 492          RY    1178  1177.5    1177    1176    1176    1177  1177.5    1178

 493          KK    SM4C
 494          KM  SUB-BASIN SM4C-LAND USE-URBAN
 495          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 496          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 497          BA    .240
 498          LG    .260    .350   4.600    .592  14.400
 499          UC    .417    .387
 500          UA       0       5      16      30      65      77      84      90      94      97
 501          UA     100

 502          KK    RSM4
 503          KM  ROUTE FLOW FROM SUB-BASIN SM4C TO COMPUTATION POINT CSM4
 504          RS       2    ELEV      -1
 505          RC   0.035   0.035   0.035    1200   0.012
 506          RX       0      50      80     110     130     160     180     200
 507          RY    1170  1169.5    1169  1168.5    1168  1168.5    1169    1170

 508          KK   DRW2C
 509          KM  SUB-BASIN DRW2C-LAND USE- NATURAL DESERT(HILLSLOPE,MOUNTAIN)
 510          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 511          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 512          BA    .530
 513          LG    .150    .340   3.250    .859  30.000
 514          UC    .517    .377
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 515          UA       0       3       5       8      12      20      43      75      90      96
 516          UA     100

 517          KK  DRWC1C
 518          KM  SUB-BASIN DRWC1C-LAND USE-AGRICULTURE
 519          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 520          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 521          BA    .120
 522          LG    .500    .000   4.250    .727    .000
 523          UC    .600    .720
 524          UA       0       3       9      18      28      42      59      73      87      92
 525          UA     100

 526          KK    CSM4
 527          KM  COMBINE RUNOFF FROM SUB-BASINS DRW2C AND DRWC1C WITH ROUTED FLOW FROM SM4C
 528          KM  AND COMPUTATION POINT CSM3
 529          HC       4

 530          KK    RSM5
 531          KM  ROUTE FLOW FROM COMPUTATION POINT CSM4 TO COMPUTATION POINT CSM5
 532          RS       1    ELEV      -1
 533          RC   0.045   0.045   0.045    1800  0.0078
 534          RX       0      80     130     160     180     190     220     260
 535          RY    1160    1159  1158.5    1158    1156    1156    1158    1160

 536          KK    DR1C
 537          KM  SUB-BASIN DR1C-LAND USE-NATURAL DESERT(HILLSLOPE)
 538          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 539          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 540          BA    .160
 541          LG    .150    .265   5.300    .198    .000
 542          UC    .417    .442
 543          UA       0       3       5       8      12      20      43      75      90      96
 544          UA     100
              *

 545          KK    WC1A
 546          KM  SUB-BASIN WC1A-LAND USE- NATURAL DESERT(HILLSLOPE)
 547          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 548          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 549          BA    .250
 550          LG    .150    .264   4.680    .217    40.0
 551          UC    .400    .404
 552          UA       0       3       5       8      12      20      43      75      90      96
 553          UA     100
              *

 554          KK    RSM6
 555          KM  ROUTE FLOW FROM SUB-BASIN WC1A TO COMPUTATION POINT CPDR2C
 556          RS       1    ELEV      -1
 557          RC   0.045   0.045   0.045    1150   0.012    1150
 558          RX       0      30      50      70      90     110     130     170
 559          RY    1152    1151    1150    1148    1146    1146    1148    1150
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  560         KK    DR2C
  561         KM  SUB-BASIN DR2C-LAND USE- NATURAL DESERT(HILLSLOPE),AGRICULTURAL
  562         KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
  563         KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
  564         BA    .050
  565         LG    .150     .325   4.255     .423     .000
  566         UC    .350     .318
  567         UA       0        3       5        8       12       20       43       75       90       96
  568         UA     100
              *

  569         KK  CPDR2C
  570         KM  COMBINE FLOW FROM SUB-BASINS DR2C AND DR1C TO ROUTED FLOW FROM SUB-BASIN WC1A
  571         KM  AND COMPUTATION POINT CSM4 (JUST WEST OF 27TH AVE.)
  572         HC       4
              *

  573         KK  RRB27C
  574         KM  ROUTE FLOW FROM COMPUTATION POINT CPDR2C TO COMPUTATION POINT CPB27C
  575         RS      15    ELEV      -1
  576         RC   0.070   0.070   0.070    7400   0.009    1110
  577         RX       0     260     550     770     920    1170    1320    1500
  578         RY    1110    1109    1109    1108    1108  1107.8    1108    1110
              *

  579         KK   BR27C
  580         KM  SUB-BASIN BR27C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
  581         KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
  582         KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
  583         BA    .780
  584         LG    .500     .000   4.150     .695     .000
  585         UC    .700     .416
  586         UA       0        3       9       18       28       42       59       73       87       92
  587         UA     100
              *

  588         KK   BLSD7
  589         KM  RETRIEVE BASELINE STORMDRAIN FROM 7TH AVE.
  590         DR   BLSD7
              *

  591         KK  RBLSD7
  592         KM  ROUTE HYDROGRAPH THROUGH BASELINE STORMDRAIN TO OUTLET OF BR19C
  593         RD    5750   .0080    .013            CIRC     5.5
              *

  594         KK  BLSD19
  595         KM  RETRIEVE BASELINE STORMDRAIN AT 19TH AVE.
  596         DR  BLSD19
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 597          KK   CSD19
 598          KM  COMBINE STORMDRAIN FLOWS FROM 7TH AVE AND 19TH AVE.
 599          HC       2
              *

 600          KK   RSD19
 601          KM  ROUTE STORMDRAIN FROM 19TH AVE TO 27TH AVE
 602          RD    5280    .004    .013            CIRC       8
              *

 603          KK   OVL27
 604          KM  BASELINE STORMDRAIN DOWNSIZES TO FORCE FLOWS INTO A FUTURE BASIN.  MAXIMUM
 605          KM  CAPACITY IS 156 CFS
 606          KM  DIVERT BASELINE STORMDRAIN FLOWS
 607          DT  BLSD27
 608          DI       0     156    1000   10000
 609          DQ       0     156     156     156
              *

 610          KK  CPB27C
 611          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CPS19C TO RUNOFF FROM SUB-BASIN
 612          KM   BR27C
 613          HC       4
              *

 614          KK  OVL27C
 615          KM  DIVERT FLOWS INTO BASELINE STORMDRAIN AT 27TH AVE.
 616          DT  BLSD27
 617          DI       0     156   10000
 618          DQ       0     156     156
              *
              * KKRR35C3
              * KM ROUTE FLOW FROM COMPUTATION POINT CPS27C TO COMPUTATION POINT CPR35C
              * DUPLICATE REACH ROUTE, REMOVED BY AMM, 8/29/02
              * RS      8    ELEV      -1
              * RC 0.070   0.070   0.070    3400  0.0072    1042
              * RX     0     200     420     520     630     750    1120    1360
              * RY  1042  1041.5    1041  1040.8  1040.9    1041  1041.5    1042
              *

 619          KK  RR35C2
 620          KM  ROUTE FLOW FROM COMPUTATION POINT CPR27C TO COMPUTATION POINT CPR35C
 621          KM  REACH LENGTH AND SLOPE CORRECTED BY AMM, 8/29/02
 622          RS      20    ELEV      -1
 623          RC   0.070   0.070   0.070   10000  0.0065  1058.5
 624          RX       0     230     480     580     680     770     910    1600
 625          RY  1058.5    1057    1057    1057    1057    1057    1057  1059.3
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 626          KK   RR35C
 627          KM  SUB-BASIN RR35C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
 628          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 629          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 630          BA   1.890
 631          LG    .500     .000    5.500     .348     .000
 632          UC    .983     .310
 633          UA       0        3        9       18       28       42       59       73       87       92
 634          UA     100
              *

 635          KK  CPR35B
 636          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CPB27C TO RUNOFF FROM SUB-BASIN
 637          KM   RR35C
 638          HC       3
              *

 639          KK  RRS37C
 640          KM  ROUTE FLOW FROM COMPUTATION POINT CPR35C TO COMPUTATION POINT CPS37C
 641          RS       8    ELEV      -1
 642          RC    0.10     0.10     0.10     2400  0.0025
 643          RX       0      280      470      630      700      840     1390     1860
 644          RY    1028     1026     1026     1025     1025     1025     1026     1028
              *

 645          KK   SA37C
 646          KM  SUB-BASIN SA37C-LAND USE- URBAN, AGRICULTURE
 647          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 648          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 649          BA    .590
 650          LG    .320     .130    4.900     .323  15.000
 651          UC    .750     .337
 652          UA       0        5       16       30       65       77       84       90       94       97
 653          UA     100
              *

 654          KK  CPS37C
 655          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CPS37C WITH RUNOFF FROM SUB-
 656          KM  BASIN SA37C
 657          HC       2
              *

 658          KK  RAV431
 659          KM  ROUTE FLOW FROM COMPUTATION POINT CPS37C TO COMPUTATION POINT CAV43C
 660          RS      15    ELEV      -1
 661          RC    0.10     0.10     0.10     3200  0.0012
 662          RX       0      380      620      980     1320     1560     1700     2200
 663          RY  1022.8     1021   1020.6   1020.9   1021.4   1021.6   1021.8   1022.8
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 664          KK    WC2A
              *
 665          KM  SUB-BASIN WC2A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 666          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 667          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 668          BA    .080
 669          LG    .150     .251   8.600     .070     .000
 670          UC    .383     .530
 671          UA       0        3       5        8       12       20       43       75       90       96
 672          UA     100
              *

 673          KK  RD27.1
 674          KM  ROUTE FLOW FROM SUB-BASIN WC2A  TO COMPUTATION POINT CD27.1
 675          RS       1     ELEV      -1
 676          RC   0.035    0.035   0.035      960    0.016     1150
 677          RX       0       30      40       55       70       85      105      130
 678          RY    1150     1150    1148     1147     1148     1149     1150     1151
              *

 679          KK  WC2.1A
 680          KM  SUB-BASIN WC2.1A-LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 681          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 682          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 683          BA    .080
 684          LG    .150     .290   4.000     .520     .000
 685          UC    .350     .310
 686          UA       0        3       5        8       12       20       43       75       90       96
 687          UA     100
              *

 688          KK  RD27.2
 689          KM  ROUTE FLOW FROM SUB-BASIN WC2.1A TO COMPUTATION POINT CD27.1
 690          RS       1     ELEV      -1
 691          RC   0.035    0.035   0.035     1000    0.015     1153
 692          RX       0       35      75      100      135      145      165      195
 693          RY    1153     1152    1150     1149     1148     1150     1152     1154
              *

 694          KK  CD27.1
 695          KM  COMBINE ROUTED FLOW FROM SUB-BASINS WC2A AND WC2.1A
 696          HC       2
              *

 697          KK  RD27.3
 698          KM  ROUTE FLOW FROM COMPUTATION POINT CP27.1 TO COMPUTATION POINT CP27.2
 699          RS       1     ELEV      -1
 700          RC   0.035    0.035   0.035      450    0.011     1144
 701          RX       0       50     115      125      140      150      160      180
 702          RY    1144     1143    1142     1141     1142     1144     1146     1148
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 703          KK    WC3A
 704          KM  SUB-BASIN WC3A--LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 705          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 706          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 707          BA    .014
 708          LG    .150     .250   8.600     .066     .000
 709          UC    .300     .467
 710          UA       0        3       5        8       12       20       43       75       90       96
 711          UA     100
              *

 712          KK  RD27.4
 713          KM  ROUTE FLOW FROM SUB-BASIN WC3A TO COMPUTATION POINT CD27.2
 714          RS       1     ELEV      -1
 715          RC   0.035    0.040   0.035      640    0.022
 716          RX       0       40      80      100      110      120      150      200
 717          RY    1145     1144    1143     1142   1141.8     1142     1144     1145
              *

 718          KK  CD27.2
 719          KM  COMBINE ROUTED FLOWS FROM SUB-BASIN WC3A AND COMPUTATION POINT CD27.1
 720          HC       2
              *

 721          KK  RD27.5
 722          KM  ROUTE FLOW FROM COMPUTATION POINT CD27.2 TO COMPUTATION POINT CD27.3
 723          RS       1     ELEV      -1
 724          RC   0.035    0.035   0.035     1400    0.014
 725          RX       0       40     100      160      175      190      240      260
 726          RY    1126     1124    1123     1122     1121     1122     1124     1126
              *

 727          KK    WC4A
 728          KM  SUB-BASIN WC4A -LAND USE- DESERT MOUNTAIN, DESERT HILLS;  MINOR DEVELOPMENT
 729          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 730          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 731          BA    .360
 732          LG    .150     .297   3.950     .546   25.000
 733          UC    .383     .273
 734          UA       0        3       5        8       12       20       43       75       90       96
 735          UA     100
              *

 736          KK  RD27.6
 737          KM  ROUTE FLOW FROM SUB-BASIN WC4A TO COMPUTATION POINT CD27.3
 738          RS       3     ELEV      -1
 739          RC   0.035    0.035   0.035     2200    0.016
 740          RX       0       60     100      180      225      300      435      500
 741          RY    1142     1141  1140.5     1140     1140   1140.5     1141     1142
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 742          KK  CD27.3
 743          KM  COMBINE ROUTED FLOWS FROM COMPUTATION POINT CD27.2 AND SUB-BASIN WC4A
 744          HC       2
              *

 745          KK  RD27.7
 746          KM  ROUTE FLOW FROM COMPUTATION POINT CD27.3 TO COMPUTATION POINT CD27.4
 747          RS       2    ELEV      -1
 748          RC   0.040   0.050   0.035     950   0.006
 749          RX       0      20     135     170     220     280     400     460
 750          RY  1116.5    1116  1115.5    1115  1115.5  1115.8    1116  1116.5
              *

 751          KK   DR27C
 752          KM  SUB-BASIN DR27C-LAND USE- AGRICULTURE, DESERT HILLS; MINOR DEVELOMENT
 753          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 754          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 755          BA    .230
 756          LG    .210    .345   3.996    .609    .000
 757          UC    .467    .352
 758          UA       0       3       5       8      12      20      43      75      90      96
 759          UA     100
              *

 760          KK  CD27.4
 761          KM  COMBINE RUNOFF FROM SUB-BASIN DR27C WITH ROUTED FLOW FROM COMPUTATION POINT
 762          KM  CD27.3
 763          HC       2
              *

 764          KK  RB35C2
 765          KM  ROUTE FLOW FROM COMPUTATION POINT CD27.3 TO COMPUTATION POINT CPB352
 766          RS      20    ELEV      -1
 767          RC   0.070   0.070   0.070    7680   0.007    1070
 768          RX       0     280     660     850    1000    1130    1180    1320
 769          RY    1070  1069.8  1069.7    1069    1069    1069  1069.7    1070
              *

 770          KK  BR35C2
 771          KM  SUB-BASIN BR35C2-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
 772          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 773          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 774          BA    .730
 775          LG    .500    .000   3.550    .439    .000
 776          UC    .867    .689
 777          UA       0       3       9      18      28      42      59      73      87      92
 778          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 779          KK  CPB352
 780          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CD27.4 TO RUNOFF FROM SUB-BASIN
 781          KM  BR35C2
 782          HC       2
              *

 783          KK  BR35C1
 784          KM  SUB-BASIN BR35C1-LAND USE- AGRICULTURE; MINOR DEVELOPMENT
 785          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 786          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 787          BA    .550
 788          LG    .500    .000   5.100    .368    .000
 789          UC    .933    .670
 790          UA       0       3       9      18      28      42      59      73      87      92
 791          UA     100

 792          KK  CPB352
 793          KM  COMBINE RUNOFF FROM SUB-BASIN BR35C1 TO FLOW AT COMPUTATION POINT CPB352
 794          HC       2
              *

 795          KK  BLSD27
 796          KM  RETRIEVE BASELINE STORMDRAIN FLOWS FROM 27TH AVE.
 797          DR  BLSD27
              *

 798          KK   RSD27
 799          KM  ROUTE FLOWS IN BASELINE STORMDRAIN FROM 27TH AVE TO 35TH AVE.
 800          RD    5500   .0042    .013            CIRC       6
              *

 801          KK    35-2
 802          KM  COMBINE FLOWS AT 35TH AVE FROM STORMDRAIN AND OVERLAND FLOWS
 803          HC       2
              *

 804          KK  OV35-2
 805          KM  DIVERT FLOWS TO STORMDRAIN AT 35TH AVE.
 806          DT  BLSD35
 807          DI       0     284   10000
 808          DQ       0     284     284
              *

 809          KK  RAV432
 810          KM  ROUTE FLOW FROM COMPUTATION POINT CPB352 TO COMPUTATION POINT CAV43C( 1ST.
 811          KM  REACH )
 812          RS       9    ELEV      -1
 813          RC    0.07    0.07    0.07    3400  0.0056
 814          RX       0      90      91     360     640    1015    1016    1475
 815          RY    1044    1042    1042  1041.2  1041.2    1042    1042    1044
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 816          KK  RAV433
 817          KM  ROUTE FLOW FROM COMPUTATION POINT CPB352 TO COMPUTATION POINT CAV43C (2ND.
 818          KM  REACH )
 819          RS       8    ELEV      -1
 820          RC    0.07    0.07    0.07    3000  0.0060
 821          RX       0     300     301     570     630    1220    1400    1650
 822          RY    1030    1029    1029    1028    1028    1029    1029    1030
              *

 823          KK    WC5A
 824          KM  SUB-BASIN WC5A -LAND USE- DESERT HILLS; MINOR DEVELOMENT
 825          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 826          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
              * KO     1       2
 827          BA    .420
 828          LG    .150    .346   2.880   1.050  28.000
 829          UC    .500    .359
 830          UA       0       3       5       8      12      20      43      75      90      96
 831          UA     100
              *

 832          KK  RD35.1
 833          KM  ROUTE RUNOFF FROM SUB-BASIN WC5A TO COMPUTATION POINT CD35.1
 834          RS      10    ELEV      -1
 835          RC   0.040   0.055   0.035    4800   0.012
 836          RX       0     130     270     330     400     460     530     625
 837          RY    1126  1125.9  1125.7  1125.5    1125  1125.5  1125.7    1126
              *

 838          KK    WC6A
 839          KM  SUB-BASIN WC6A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 840          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 841          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 842          BA    .014
 843          LG    .150    .270   3.750    .293    .000
 844          UC    .233    .259
 845          UA       0       3       5       8      12      20      43      75      90      96
 846          UA     100
              *

 847          KK  RD35.2
 848          KM  ROUTE RUNOFF FROM SUB-BASIN WC6A TO COMPUTATION POINT CD35.1
 849          RS      13    ELEV      -1
 850          RC   0.070   0.070   0.070    3800   0.015
 851          RX       0     130     240     280     340     440     530     655
 852          RY    1122    1120    1118  1117.8    1118    1119    1120    1122
              *

 853          KK  CD35.1
 854          KM  COMBINE ROUTED FLOW FROM SUB-BASINS WC5A AND WC6A
 855          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 856          KK  RD35.3
 857          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.1 TO COMPUTATION POINT CD35.2
 858          RS       6    ELEV      -1
 859          RC   0.035   0.035   0.035    2480   0.005  1090.5
 860          RX       0     100     200     350     435     480     500     525
 861          RY    1092    1091    1090  1089.8  1089.7  1089.6    1090  1090.5
              *

 862          KK    WC7A
 863          KM  SUB-BASIN WC7A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 864          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 865          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 866          BA    .050
 867          LG    .150    .270   7.000    .141    .000
 868          UC    .317    .332
 869          UA       0       3       5       8      12      20      43      75      90      96
 870          UA     100
              *

 871          KK  RD35.4
 872          KM  ROUTE RUNOFF FROM SUB-BASIN WC7A TO COMPUTATION POINT CD35.3
 873          RS       4    ELEV      -1
 874          RC   0.035   0.035   0.035    2800   0.018  1128.5
 875          RX       0     100     170     240     250     260     330     360
 876          RY    1129    1128    1127    1126  1125.8    1126    1128  1128.5
              *

 877          KK    WC8A
 878          KM  SUB-BASIN WC8A -LAND USE- DESERT MOUNTAIN, DESERT HILLS; MINOR DEVELOMENT
 879          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 880          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 881          BA    .350
 882          LG    .150    .321   3.700    .651  30.000
 883          UC    .433    .366
 884          UA       0       3       5       8      12      20      43      75      90      96
 885          UA     100
              *

 886          KK  RD35.5
 887          KM  ROUTE FLOW FROM SUB-BASIN WC8A TO COMPUTATION POINT CD35.3
 888          RS       2    ELEV      -1
 889          RC   0.030   0.030   0.030    2200   0.022    1139
 890          RX       0      50     125     190     240     370     400     450
 891          RY    1139    1138  1137.5    1137  1137.5    1138    1140    1141
              *

 892          KK  CD35.3
 893          KM  COMBINE ROUTED FLOW FROM SUB-BASINS WC7A AND WC8A
 894          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 895          KK  RD35.6
 896          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.3 TO COMPUTATION POINT CD35.4
 897          RS       1    ELEV      -1
 898          RC   0.030   0.035   0.035     700   0.011
 899          RX       0      30      60     110     140     180     240     350
 900          RY    1103  1101.8  1101.6  1101.4    1101  1101.4  1101.7    1103
              *

 901          KK    WC9A
 902          KM  SUB-BASIN WC9A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 903          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 904          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 905          BA    .025
 906          LG    .150    .250   8.600    .066    .000
 907          UC    .300    .420
 908          UA       0       3       5       8      12      20      43      75      90      96
 909          UA     100
              *

 910          KK  RD35.7
 911          KM  ROUTE RUNOFF FROM SUB-BASIN WC9A TO COMPUTATION POINT CD35.5
 912          RS       1    ELEV      -1
 913          RC   0.035   0.035   0.035    1000   0.025    1130
 914          RX       0      30      40      60      70      90     120     140
 915          RY    1130    1130    1129    1128  1128.5    1129    1130  1130.5
              *

 916          KK   WC10A
 917          KM  SUB-BASIN WC10A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
 918          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 919          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 920          BA    .020
 921          LG    .150    .260   5.800    .059    .000
 922          UC    .233    .289
 923          UA       0       3       5       8      12      20      43      75      90      96
 924          UA     100
              *

 925          KK  RD35.8
 926          KM  ROUTE RUNOFF FROM SUB-BASIN WC10A TO COMPUTATION POINT CD35.5
 927          RS       1    ELEV      -1
 928          RC   0.035   0.035   0.035    1000   0.025
 929          RX       0      30      50      70     100     140     210     260
 930          RY    1134    1134    1133    1132    1132    1133  1133.5    1134
              *

 931          KK  CD35.5
 932          KM  COMBINE ROUTED FLOW FROM SUB-BASINS WC9A AND WC10A
 933          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 934          KK  RD35.9
 935          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.5 TO COMPUTATION POINT CD35.6
 936          RS       2    ELEV      -1
 937          RC   0.030   0.030   0.030    1200   0.015
 938          RX       0      60     110     170     210     240     330     370
 939          RY    1116  1115.8  1115.5    1115  1114.8    1115  1115.8    1116
              *

 940          KK   WC11A
 941          KM  SUB-BASIN WC11A -LAND USE- DESERT MOUNTAINS, DESERT HILLS; MINOR DEVELOPMENT
 942          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 943          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 944          BA    .290
 945          LG    .150    .335   3.600    .703  53.000
 946          UC    .367    .357
 947          UA       0       3       5       8      12      20      43      75      90      96
 948          UA     100
              *

 949          KK  RD3510
 950          KM  ROUTE RUNOFF FROM SUB-BASIN WC11A TO COMPUTATION POINT CD35.7
 951          RS       1    ELEV      -1
 952          RC   0.050   0.050   0.050    1100   0.024
 953          RX       0      50     170     180     225     260     380     460
 954          RY    1132  1131.8  1131.6  1131.5    1131  1131.5  1131.8    1132
              *

 955          KK   WC12A
 956          KM  SUB-BASIN WC12A -LAND USE- DESERT MOUNTAIN, DESERT HILLS; MINOR DEVELOPMENT
 957          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 958          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
 959          BA    .260
 960          LG    .150    .320   3.800    .632  28.000
 961          UC    .333    .217
 962          UA       0       3       5       8      12      20      43      75      90      96
 963          UA     100
              *

 964          KK  RD3511
 965          KM  ROUTE RUNOFF FROM SUB-BASIN WC12A TO COMPUTATION POINT CD35.7
 966          RS       1    ELEV      -1
 967          RC   0.040   0.040   0.040    1200   0.022    1144
 968          RX       0      10      25      45      70     120     235     290
 969          RY  1144.5    1144  1143.5    1143  1143.5  1143.7  1143.8    1144
              *

 970          KK  CD35.7
 971          KM  COMBINE ROUTED FLOWS FROM SUB-BASINS WC11A AND WC12A
 972          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 973          KK  RD3512
 974          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.7 TO COMPUTATION POINT CD35.6
 975          RS       2    ELEV      -1
 976          RC   0.055   0.055   0.055    1080   0.006
 977          RX       0      20      50      70     130     180     400     460
 978          RY  1122.5    1122    1121  1120.5    1121  1121.5    1122  1122.5
              *

 979          KK  CD35.6
 980          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINTS CD35.5 AND CD35.7
 981          HC       2
              *

 982          KK  RD3513
 983          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.6 TO COMPUTATION POINT CD35.4
 984          RS       1    ELEV      -1
 985          RC   0.040   0.035   0.030    1000   0.012
 986          RX       0      40     130     210     280     340     570     615
 987          RY  1102.5    1102  1101.8  1101.5    1101  1101.5    1102  1102.5
              *

 988          KK  CD35.4
 989          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINTS CD35.3 AND CD35.6
 990          HC       2
              *

 991          KK  RD3514
 992          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.4 TO COMPUTATION POINT CD35.2
 993          RS       3    ELEV      -1
 994          RC   0.070   0.070   0.070    1400   0.006    1194
 995          RX       0     120     200     300     400     470     560     660
 996          RY    1194  1193.0  1192.8  1192.5  1192.5  1192.8    1193    1194
              *

 997          KK   WC15A
 998          KM  SUB-BASIN WC15A -LAND USE- DESERT MOUNTAIN, DESERT HILLS; MINOR DEVELOMENT
 999          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1000          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
              * KO     1       2
1001          BA    .360
1002          LG    .150    .320   3.350    .784  50.000
1003          UC    .317    .245
1004          UA       0       3       5       8      12      20      43      75      90      96
1005          UA     100
              *

1006          KK  RD3515
1007          KM  ROUTE RUNOFF FROM SUB-BASIN WC15A TO COMPUTATION POINT CD35.8
1008          RS       1    ELEV      -1
1009          RC   0.030   0.035   0.030    1250   0.014    1136
1010          RX       0      30      50      70      85     100     140     200
1011          RY    1140    1138    1136    1134    1132    1134    1135    1136
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1012          KK    PM2A
1013          KM  SUB-BASIN PM2A -LAND USE- DESERT MOUNTAIN, DESERT HILLS; MINOR DEVELOMENT
1014          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1015          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1016          BA    .070
1017          LG    .150     .332   4.100     .502  15.000
1018          UC    .300     .282
1019          UA       0        3       5       8      12      20      43      75      90      96
1020          UA     100
              *

1021          KK  CD35.8
1022          KM  COMBINE ROUTED FLOW FROM SUB-BASIN WC15A TO SUB-BASIN PM2A
1023          HC       2
              *

1024          KK  RD3516
1025          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.8 TO COMPUTATION POINT CD35.9
1026          RS       1    ELEV      -1
1027          RC   0.035   0.040   0.030    1400   0.008    1126
1028          RX       0      25      35      50     130     150     200     260
1029          RY    1130    1126    1124    1122    1122    1124    1125    1126
              *

1030          KK   WC13A
1031          KM  SUB-BASIN WC13A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
1032          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1033          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1034          BA    .013
1035          LG    .150     .250   8.600     .066     .000
1036          UC    .250     .341
1037          UA       0        3       5       8      12      20      43      75      90      96
1038          UA     100
              *

1039          KK  RD3517
1040          KM  ROUTE RUNOFF FROM SUB-BASIN WC13A TO COMPUTATION POINT CD35.9
1041          RS       3    ELEV      -1
1042          RC   0.035   0.035   0.035    1280   0.023
1043          RX       0     115     180     225     270     350     435     530
1044          RY    1132  1131.5  1131.2    1131  1131.2  1131.5  1131.8    1132
              *

1045          KK   WC14A
1046          KM  SUB-BASIN WC14A -LAND USE- NATURAL DESERT HILLSLOPES; MINOR DEVELOPMENT
1047          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1048          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1049          BA    .050
1050          LG    .150     .290   4.000     .520     .000
1051          UC    .367     .427
1052          UA       0        3       5       8      12      20      43      75      90      96
1053          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1054          KK  RD3518
1055          KM  ROUTE RUNOFF FROM SUB-BASIN WC14A TO COMPUTATION POINT CD35.9
1056          RS       6    ELEV      -1
1057          RC   0.040   0.045   0.040    2000   0.013
1058          RX       0      60     150     220     250     280     310     360
1059          RY    1134  1133.9  1133.7  1133.4  1133.7  1133.8  1133.9    1134
              *

1060          KK    PM1A
1061          KM  SUB-BASIN PM1A -LAND USE- AGRICULTURE, DESERT HILLS; MINOR DEVELOPMENT
1062          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1063          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1064          BA    .070
1065          LG    .380    .097   4.210    .697    2.00
1066          UC    .383    .279
1067          UA       0       3       5       8      12      20      43      75      90      96
1068          UA     100
              *

1069          KK  CD35.9
1070          KM  COMBINE ROUTED FLOWS FROM SUB-BASINS WC13A AND WC14A, COMPUTATION POINT
1071          KM  CD35.8 WITH RUNOFF FROM SUB-BASIN PM1A
1072          HC       4
              *

1073          KK  RD3519
1074          KM  ROUTE FLOW FROM COMPUTATION POINT CD35.9 TO COMPUTATION POINT CD35.2
1075          RS       1    ELEV      -1
1076          RC   0.040   0.045   0.040     288   0.012
1077          RX       0      80     190     270     310     335     440     480
1078          RY  1102.5    1102  1101.7  1101.5    1101  1101.5    1102  1102.5
              *

1079          KK   DR35C
1080          KM  SUB-BASIN DR35C -LAND USE- AGRICULTURE; MINOR DEVELOPMENT
1081          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1082          KM  THIS BASIN USED RAINFALL REDUCTION FATOR OF .90
1083          BA    .600
1084          LG    .360    .221   4.200    .454    .000
1085          UC    .717    .443
1086          UA       0       3       5       8      12      20      43      75      90      96
1087          UA     100
              *

1088          KK  CD35.2
1089          KM  COMBINE ROUTED FLOWS FROM COMPUTATION POINTS CD35.1, CD35.4 AND CD35.9 WITH
1090          KM  RUNOFF FROM SUB-BASIN DR35C
1091          HC       4
              *
              *
              * TEST BY JUST DIVERTING OUT THE REQUIRED VOLUME FROM THE GOLG COURSE.
              *
              * KK    GC
              * KM  DIVERT STORAGE FROM AGUILA GOLF COURSE
              * DT  STGC     135
              * DI     0      50     100    1000   10000
              * DQ     0      50     100    1000   10000
              *      *
              * KK GCOUT
              * KM  DIVERT FLOWS IN EXCESS OF 50 CFS
              * DTGCOVLN
              * DI     0      50     100    1000   10000
              * DQ     0       0      50     950    9950
              *
              *
              *
              * START HEC-1 MODEL MODIFICATION FOR CESAR CHAVEZ DETENTION BASIN
              *
              *
              *
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1092          KK  DI35TH
1093          KM  SPLIT FLOW OPERATION AT THE INTERSECTION OF 35TH AVE AND DOBBINS ROAD
1094          DT   DIDOB
1095          DI       0      40     836    1575
1096          DQ       0      10     335     630
              *

1097          KK   RDI35
1098          KM  ROUTE DIVERSION FLOW WEST ACROSS 35TH AVE TO DET. STORAGE AT SRCC1
1099          RS       1    FLOW      -1
1100          RC     .03    .025     .03     700    .005
1101          RX       0      80     190     270     310     335     440     480
1102          RY    1083  1082.5    1082    1081    1081    1082  1082.5    1083
              *

1103          KK     CC1
1104          KM  RUNOFF HYDROGRAPH FROM GC WATERSHED CC1
1105          BA    .022
1106          LG    .400     .15   6.350    .259    .000
1107          UC    .213    .235
1108          UA       0       3       9      18      28      42      59      73      87
1109          UA     100
              *

1110          KK   CPCC1
1111          KM  COMBINE HYDROGRAPHS AT CPCC1
1112          HC       2
              *

1113          KK   SRCC1
1114          KM  STORAGE ROUTE THROUGH FIRST DET. BASIN IN CC1
1115          RS       1    STOR       0
1116          SV       0   1.576   4.110   7.819  13.036  16.318  20.104  24.633  29.653    35.9
1117          SQ       0       0       9      14      16      17      18     242     696      12
1118          SE    1060    1062    1064    1066    1068    1069    1070    1071    1072      10
              *

1119          KK   DICC5
1120          KM  SPLIT FLOW OPERATION AT BASIN CC1 - REMAINDER TO SRCC2
1121          DT   DICC2
1122          DI       0       9      14      17      18     242     696    1264
1123          DQ       0       0       0       0       0      84     254     467
              *

1124          KK    RCC5
1125          KM  ROUTE OVERFLOW FROM SRCC1 TO CPCC5
1126          RS       1    FLOW      -1
1127          RC     .03    .025     .03     550    .005
1128          RX       0      40      90     100     140     150     200     240
1129          RY    1072    1068    1062    1060    1060    1062    1068    1072
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1130          KK     CC5
1131          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC5
1132          BA    .026
1133          LG    .400      .15   6.350    .259    .000
1134          UC    .204     .118
1135          UA       0        3       9      18      28      42      59      73      87
1136          UA     100
              *

1137          KK   CPCC5
1138          KM  COMBINE HYDROGRAPHS AT CPCC5
1139          HC       2
              *

1140          KK   SRCC5
1141          KM  STORAGE ROUTE THROUGH DET. BASIN SRCC5 IN GOLF COURSE
1142          RS       1    STOR      -1
1143          SV       0    1.15    3.18    6.08   10.23   16.23   20.57   26.49   33.71     41.
1144          SQ       0       0       9      13      16      19      21     105     276       4
1145          SE    1056    1058    1060    1062    1064    1066    1067    1068    1069      10
              *

1146          KK    RCC6
1147          KM  ROUTE OVERFLOW FROM SRCC5 TO CPCC6
1148          RS       1    FLOW      -1
1149          RC     .03    .025     .03     450    .005
1150          RX       0      40      90     100     140     150     200     240
1151          RY    1072    1068    1062    1060    1060    1062    1068    1072
              *

1152          KK     CC6
1153          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC6
1154          BA    .025
1155          LG    .400      .15   6.350    .259    .000
1156          UC    .117     .059
              *

1157          KK   CPCC6
1158          KM  COMBINE HYDROGRAPHS AT CPCC6
1159          HC       2
              *

1160          KK   SRCC6
1161          KM  STORAGE ROUTE THROUGH DET. BASIN SRCC6 IN GOLF COURSE
1162          RS       1    STOR      -1
1163          SV       0    0.34    1.02    2.15    3.87    6.54   10.95   17.51   21.94     27.
1164          SV   34.94   42.41
1165          SQ       0       0       9      11      13      14      15      16      17       1
1166          SQ     272     485
1167          SE    1044    1046    1048    1050    1052    1054    1056    1058    1059      10
1168          SE    1061    1062
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1169          KK    RCC7
1170          KM  ROUTE OVERFLOW FROM SRCC6 TO CPCC7
1171          RS       1    FLOW      -1
1172          RC     .03    .025     .03     800    .005
1173          RX       0      40      90     100     140     150     200     240
1174          RY    1072    1068    1062    1060    1060    1062    1068    1072
              *

1175          KK     CC7
1176          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC7
1177          BA    .044
1178          LG    .400     .15   6.350    .259    .000
1179          UC    .196    .110
              *

1180          KK  ICPCC7
1181          KM  COMBINE INTERMEDIATE HYDROGRAPHS AT CPCC7
1182          HC       2
              *

1183          KK   DIDOB
1184          KM  RETURN DIVERSION FLOW NORTH ACROSS DOBBINS ROAD
1185          DR   DIDOB
              *

1186          KK  RDIDOB
1187          KM  ROUTE DIVERSION FLOW NORTH ACROSS DOBBINS TO DET. STORAGE AT SRCC2
1188          RS       1    FLOW      -1
1189          RC     .03    .025     .03     700    .005
1190          RX       0      80     190     270     310     335     440     480
1191          RY    1083  1082.5    1082    1081    1081    1082  1082.5    1083
              *

1192          KK     CC2
1193          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC2
1194          BA    .015
1195          LG    .400     .15   6.350    .259    .000
1196          UC    .158    .123
              *

1197          KK  ICPCC2
1198          KM  COMBINE HYDROGRAPHS AT CPCC2
1199          HC       2
              *

1200          KK   DICC2
1201          KM  RETURN DIVERSION FLOW NORTH TO DET BASIN SRCC2
1202          DR   DICC2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1203          KK   CPCC2
1204          KM  COMBINE HYDROGRAPHS AT CPCC2
1205          HC       2
              *

1206          KK   SRCC2
1207          KM  STORAGE ROUTE THROUGH DET. BASIN SRCC2 IN GOLF COURSE
1208          RS       1    STOR      -1
1209          SV       0    0.44    1.41    3.11    4.32    5.71    7.69   10.16  11.622
1210          SQ       0       0       9      10      12     153     437     792     995
1211          SE    1062    1064    1066    1068    1069    1070    1071    1072  1072.5
              *

1212          KK    RCC3
1213          KM  ROUTE OVERFLOW FROM SRCC2 TO CPCC3
1214          RS       1    FLOW      -1
1215          RC     .03    .025     .03     750    .005
1216          RX       0      40      90     100     140     150     200     240
1217          RY    1072    1068    1062    1060    1060    1062    1068    1072
              *

1218          KK     CC3
1219          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC3
1220          BA    .069
1221          LG    .400     .15   6.350    .259    .000
1222          UC    .233    .110
              *

1223          KK   CPCC3
1224          KM  COMBINE HYDROGRAPHS AT CPCC3
1225          HC       2
              *

1226          KK   SRCC3
1227          KM  STORAGE ROUTE THROUGH DET. BASIN SRCC3 IN GOLF COURSE
1228          RS       1    STOR       0
1229          SV       0    2.61    9.40   23.16   33.72   48.15   67.11   86.06
1230          SQ       0      10      20      23      26     110     281     494
1231          SE    1058    1060    1062    1064    1065    1066    1067    1068
              *

1232          KK    RCC4
1233          KM  ROUTE OVERFLOW FROM SRCC3 TO CPCC4
1234          RS       1    FLOW       0
1235          RC     .03    .025     .03    1100    .005
1236          RX       0      40      90     100     140     150     200     240
1237          RY    1072    1068    1062    1060    1060    1062    1068    1072
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1238          KK     CC4
1239          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC4
1240          BA    .066
1241          LG    .400      .15   6.350    .259    .000
1242          UC    .204     .091
1243          UA       0        3       9      18      28      42      59      73      87
1244          UA     100
              *

1245          KK   CPCC4
1246          KM  COMBINE HYDROGRAPHS AT CPCC4
1247          HC       2
              *

1248          KK   SRCC4
1249          KM  STORAGE ROUTE THROUGH DET. BASIN SRCC3 IN GOLF COURSE
1250          RS       1    STOR       0
1251          SV       0    0.91    3.43    8.89   18.90   26.34   35.88   47.79   60.36
1252          SQ       0       0       9      16      17      18     102     273     486
1253          SE    1052    1054    1056    1058    1060    1061    1062    1063    1064
              *

1254          KK    RCC7
1255          KM  ROUTE OVERFLOW FROM SRCC4 TO CPCC7
1256          RS       1    FLOW       0
1257          RC     .03    .025     .03    1100    .005
1258          RX       0      40      90     100     140     150     200     240
1259          RY    1072    1068    1062    1060    1060    1062    1068    1072
              *

1260          KK   CPCC7
1261          KM  COMBINE ALL HYDROGRAPHS AT CPCC7
1262          HC       2
              *

1263          KK   SRCC7
1264          KM  STORAGE ROUTE THROUGH DET. BASIN SRCC7 IN GOLF COURSE
1265          RS       1    STOR       0
1266          SV       0    0.77    2.10    4.03    6.73   10.47   15.75   17.32   20.45
1267          SV   21.08   22.65   22.70
1268          SQ       0       0      12    35.7    35.7    35.7    35.7    35.7    35.7
1269          SQ    35.7     234     280
1270          SE    1042    1044    1046    1048    1050    1052    1054  1054.5    1055
1271          SE  1055.7  1056.2  1056.5
              *

1272          KK   DICC7
1273          KM  SPLIT FLOW OPERATION AT BASIN CC7 - REMAINDER TO RPB352
1274          DT  GCOVLD
1275          DI       0      12      30    35.7     234
1276          DQ       0       0       0       0     198
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1277          KK  RPC352
1278          KM  ROUTE DISCHARGE FROM CCP7 TO 39TH & BASELINE
1279          RD    2640    .004    .012            CIRC       3
              *

1280          KK  BLSD35
1281          KM  RETRIEVE STORMDRAIN FLOWS FROM 35TH AVE.
1282          DR  BLSD35
              *

1283          KK   RDS35
1284          KM  ROUTE BASELINE STORMDRAIN FLOWS FROM 35TH AVE TO 39TH AVE
1285          RD    2600   .0062    .013            CIRC       7
              *

1286          KK    CG39
1287          KM  COMBINE HYDROGRAPHS FROM GOLF COURSE STORM DRAIN & RPB352 IN HDR MODEL
1288          KM  AT BASELINE ROAD
1289          HC       2
              *

1290          KK  RBSD43
1291          KM  ROUTE COMBINED STORMDRAIN FROM 29TH AVE TO 43RD & BASELINE
1292          RD    2640   0.028    .012            CIRC      10
              *

1293          KK     CC8
1294          KM  RUNOFF HYDROGRAPH FROM GOLF COURSE WATERSHED CC8
1295          BA    .033
1296          LG    .400     .15   6.350    .259    .000
1297          UC    .188    .115
1298          UA       0       3       9      18      28      42      59      73      87
1299          UA     100
              *

1300          KK  GCOVLD
1301          KM  RETRIEVE THE OVERLAND FLOWS THAT DO NOT MAKE IT INTO THE GOLF COURSE
1302          KM  OUTLET.
1303          DR  GCOVLD
              *

1304          KK    GCOL
1305          KM  COMBINE FLOWS FROM GOLF COURSE
1306          HC       2
              *

1307          KK   RGCOL
1308          KM  ROUTE FLOWS TO CBR43C
1309          RS       1    ELEV      -1
1310          RC    .035     .07     .07    3730    .003  1044.2
1311          RX       0       1      55      56      65      70      90     120
1312          RY  1044.9  1043.2  1043.2  1044.1  1043.5  1043.7  1043.8  1044.9
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1313          KK  SMA43C
1314          KM  SUB-BASIN SMA43C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1315          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1316          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1317          BA    .130
1318          LG    .500     .000   6.960    .244    .000
1319          UC    .400     .261
1320          UA       0        3       9      18      28      42      59      73      87      92
1321          UA     100
              *

1322          KK  RB43C2
1323          KM  ROUTE RUNOFF FROM SUB-BASIN SMA43C TO COMPUTATION POINT CBR43C
1324          RS       3     ELEV      -1
1325          RC    0.07     0.07    0.07    2600   0.003  1044.2
1326          RX       0        1      55      56      65      70      90     120
1327          RY  1044.5   1043.2  1043.2  1044.1  1043.5  1043.7  1043.8  1044.5
              *

1328          KK   BR43C
1329          KM  SUB-BASIN BR43C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT-LAND USE
1330          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1331          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1332          BA     .35
1333          LG    .500     .000   6.350    .259    .000
1334          UC    .883     .538
1335          UA       0        3       9      18      28      42      59      73      87      92
1336          UA     100
              *

1337          KK  CBR43C
1338          KM  COMBINE ROUTED FLOWS FROM COMPUTATION POINT CD35.2 AND SUB-BASIN SMA43C
1339          HC       2
              *

1340          KK     C43
1341          KM  COMBINE FLOWS BEFORE ENTERING BASELINE BASIN
1342          HC       3
              *
              * KK 43BAS
              * KM DETENTION BASIN AT 43RD AVE AND BASELINE ROAD
              * RS     1     STOR
              * SQ     0       26      80     115     175     210     240     265
              * SV     0       12    25.2    39.6    55.3    72.3    90.6   110.4
              * SE  1022     1024    1026    1028    1030    1032    1034    1036
              *

1343          KK  430VLD
1344          KM  AMM CORRECTED THE RATING CURVE 8/29/02
1345          KM  DIVERTS FLOWS INTO 43RD AVE STORMDRAIN
1346          KM  43RD AVENUE STORM DRAIN UNDER CONSTRUCTION
1347          KM  THE STORM DRAIN BEGINS NORTH OF BASELINE, DIVERTS FLOWS TO SALT RIVER
1348          DT    43SD
1349          DI       0      294   10000
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1350          DQ       0     294     294
              *

1351          KK  R43OVL
1352          KM  ROUTE THE OVERLAND FLOWS TO THE LOW SPOT IN 43RD AVE (MARICOPA DRAIN)
1353          KM  FLOWS CONTAINED WITHIN 43RD AVE AND ADJACENT LANDSCAPE,REVISED AMM, 8/29/02
1354          RS       6    FLOW      -1
1355          RC    .035     .07    .035    3750   .0043
1356          RX       0       1      55      56      65      70      90     120
1357          RY    1036  1035.5    1035    1033    1033    1035  1035.5    1036
              *
              *
              * CONTINUE EXISTING HEC1 MODEL PREPARED FOR THE LAVEEN AREA DRAINAGE MADY
              *
              *

1358          KK  AVR43C
1359          KM  SUB-BASIN AVR43C -LAND USE- URBAN, AGRICULTURE
1360          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1361          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1362          BA   1.030
1363          LG    .430    .059   4.000    .396   6.250
1364          UC    .717    .321
1365          UA       0       5      16      30      65      77      84      90      94      97
1366          UA     100
              *

1367          KK   DIVMD
1368          KM  DIVERT FLOWS THAT WILL GO TO THE SOUTHERN AVE BASIN, THE REMAINDER FLOWS WILL
1369          KM  GO TO THE MARICOPA DRAIN NORTH OF THE BASIN.
1370          KM  THE FLOWS TO THE MARICOPA DRAIN ARE APPROXIMATELY 38% OF THE AREA
1371          KM  THEREFORE, AN ESTIMATE OF 38% OF THE FLOW WILL FLOW TO THE MARICOPA DRAIN.
1372          DT     43C
1373          DI       0     625    1000   10000
1374          DQ       0     625     625     625
              *

1375          KK     MDA
1376          KM  OVERLAND FLOWS THAT CONCENTRATE AT THE LOW SPOT ON 43RD AVE
1377          HC       3
              *

1378          KK   DUMMY
1379          KM  DIVERT THE NORTH FLOWS TO TEMPORARILY GET RID OF THE HYGDROGRAPH
1380          DT    DMDA
1381          DI       0     100    1000   10000
1382          DQ       0     100    1000   10000
              *

1383          KK     43C
1384          KM  RETREIVE THE FLOWS FROM SUBBASIN AVR43C
1385          DR     43C
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1386          KK    SBAS
1387          KM  COMBINE FLOWS FROM THE EAST AND AVR43C TO ENTER INTO THE SOUTHERN AVE &
1388          KM  43RD AVE DETENTION BASIN.
1389          HC       3
              *

1390          KK  STOR43
1391          KM  PROPOSED BASIN AT THE CORNER OF 43RD AVE AND SOUTHERN
1392          KM  AMM CORRECTED THE 6TH FIELD ON THE SV CARD FROM 38.4 TO 88.4, 8/29/02
1393          KM  DATA  RELECTS TWO 1018 3-36" OPENINGS
1394          RS       1    STOR
1395          SV       0     .01    12.1    45.6    65.6    88.4   111.1   133.9   146.5
1396          SQ       0       0       0       0       0       0       0    56.3     340
1397          SE    1002    1003    1006    1012    1014    1016    1018    1020    1021
              *

1398          KK     43W
1399          KM  DIVERT THE ADDITIONAL FLOWS INTO 43RD AVE STORMDRAIN TO THE SALT RIVER
1400          DT   43SDS
1401          DI       0      29     100    1000
1402          DQ       0      29      29      29
              *
              *
              * ***** BEGINNING OF CHAMPION DRAIN WEST OF 43RD AVE *****
              *
              *

1403          KK    DMDA
1404          KM  RETRIEVE FLOWS AT LOW SPOT ON 43RD AVE (MARICOPA DRAIN)
1405          DR    DMDA
              *

1406          KK    MD43
1407          KM  COMBINE THE FLOWS IN THE MARICOPA DRAIN AT 43RD AVE SOUTH OF BASIN.
1408          HC       2
              *

1409          KK   RMD43
1410          KM  ROUTE FLOWS IN MARICOPA DRAIN FROM 43RD AVE TO 47TH AVE.
1411          RS       3    ELEV      -1
1412          RC    .030    .030    .030    3750   .0011
1413          RX       0      10      20      45     105     130     140     150
1414          RY  1015.2  1015.1    1015    1010    1010    1015  1015.1  1015.2
              *

1415          KK   VR47C
1416          KM  SUB-BASIN VR47C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1417          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1418          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1419          BA    .890
1420          LG    .500    .000   4.950    .385    .000
1421          UC    .933    .407
1422          UA       0       3       9      18      28      42      59      73      87      92
1423          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1424          KK  CVR47C
1425          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINTS CAV43C AND CBR43C WITH RUNOFF
1426          KM  FROM SUB-BASIN VR47C
1427          HC       2
              *

1428          KK  RBR511
1429          KM  ROUTE FLOW FROM COMPUTATION POINT CVR47C TO COMPUTATION POINT CB51C
1430          KM  MARICOPA DRAIN FROM 47TH AVE TO 51ST AVE.
1431          RS       2    ELEV      -1
1432          RC    .030    .030    .030    3200   .0011
1433          RX       0      10      20      45     115     140     150     160
1434          RY  1008.2  1008.1    1008    1003    1003    1008  1008.1  1008.2
              *

1435          KK  AVR51C
1436          KM  SUB-BASIN AVR51C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1437          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1438          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1439          BA    .280
1440          LG    .500    .000   6.200    .304    .000
1441          UC    .767    .457
1442          UA       0       3       9      18      28      42      59      73      87      92
1443          UA     100
              *

1444          KK  RBR512
1445          KM  ROUTE FLOW FROM SUB-BASIN AVR51C TO COMPUTATION POINT CB51C
1446          RS      24    ELEV      -1
1447          RC    0.07    0.07    0.07    3600   0.001  1010.5
1448          RX       0     120     240     380     570     640     670     740
1449          RY  1010.5  1009.7  1009.5  1009.4  1009.1  1009.1    1009  1010.5
              *

1450          KK   BR51C
1451          KM  SUB-BASIN BR51C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1452          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1453          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1454          BA    .700
1455          LG    .500    .000   3.650    .459    .000
1456          UC   0.900    .324
1457          UA       0       3       9      18      28      42      59      73      87      92
1458          UA     100
              *

1459          KK    CB51
1460          KM  INTERMEDIATE HYDROGRAPH
1461          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1462          KK   CB51C
1463          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CVR47C AND SUB-BASIN AVR51C
1464          KM  WITH RUNOFF FROM SUB-BASIN BR51C
1465          KM  CP AT 51ST AVE AND BASELINE RD.
1466          HC       2
              *

1467          KK  RB1591
1468          KM  ROUTE FLOW FROM 51ST AVE (CB51C) TO 59TH AVE. (CB159C)
1469          KM  MARICOPA DRAIN FROM 51ST AVE TO 59TH AVE.
1470          RS       3    ELEV      -1
1471          RC    .030    .030    .030    5200   .0011
1472          RX       0      10      20      45     125     150     160     170
1473          RY  1000.2  1000.1    1000     995     995    1000  1000.1  1000.2
              *

1474          KK  AVR55C
1475          KM  SUB-BASIN AVR55C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1476          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1477          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1478          BA    .230
1479          LG    .500    .000   6.330    .295    .000
1480          UC    .917    .623
1481          UA       0       3       9      18      28      42      59      73      87      92
1482          UA     100
              *

1483          KK  RB1592
1484          KM  ROUTE FLOW FROM SUBASIN AVR55C TO COMPUTATION POINT CB159C
1485          RS      28    ELEV      -1
1486          RC    .070    .070    .070    3720   .0018    1004
1487          RX       0     170     340     540     750     940    1120    1320
1488          RY    1004    1003    1003  1003.5  1003.5  1003.7  1008.8    1004
              *

1489          KK  BR159C
1490          KM  SUB-BASIN BR159C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1491          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1492          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1493          BA    .680
1494          LG    .500    .000   3.750    .462    .000
1495          UC    .983    .527
1496          UA       0       3       9      18      28      42      59      73      87      92
1497          UA     100
              *

1498          KK   VR59C
1499          KM  SUB-BASIN VR59C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1500          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1501          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1502          BA    .250
1503          LG    .500    .000   6.470    .298    .000
1504          UC    .967    .630
1505          UA       0       3       9      18      28      42      59      73      87      92
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1506          UA     100
              *

1507          KK  RB1593
1508          KM  ROUTE FLOW FROM SUB-BASIN VR59C TO COMPUTATION POINT CB159C
1509          RS      22    ELEV      -1
1510          RC    0.07    0.07    0.07    3000  0.0015    1002
1511          RX       0     280     660     840    1020    1120    1220    1250
1512          RY    1002  1001.3  1001.4  1001.4  1001.5  1001.5  1001.6    1002
              *

1513          KK  CB159N
1514          KM  COMBINE ROUTED FLOWS FROM COMPUTATION POINT CB51C AND SUB-BASINS AVR51C
1515          KM  AND VR59C WITH RUNOFF FROM SUB-BASIN BR159C
1516          KM  CP (NORTH FLOWS) AT 59TH AVE AND BASELINE RD.
1517          HC       4
              *

1518          KK  RET43C
1519          KM  RETRIEVE SPLIT FLOW FROM DIVERSION POINT DDR43C
1520          DR  RDR43C
              *

1521          KK   RS51C
1522          KM  ROUTE SPLIT FLOW FROM SUB-BASIN DR43C TO COMPUTATION POINT CS51C
1523          RS      20    ELEV      -1
1524          RC    0.07    0.07    0.07    6000  0.0026
1525          RX       0     240     420     580     760     890    1030    1150
1526          RY    1041  1039.2  1039.3  1039.5  1039.2    1039  1039.4    1041
              *

1527          KK   SM51C
1528          KM  SUB-BASIN SM51C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1529          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1530          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1531          BA    .500
1532          LG    .500    .000   5.850    .330    .000
1533          UC   1.017    .599
1534          UA       0       3       9      18      28      42      59      73      87      92
1535          UA     100
              *

1536          KK   CS51C
1537          KM  COMBINE ROUTED FLOW FROM SUB-BASIN DR43C TO RUNOFF FROM SUB-BASIN SM51C
1538          HC       2
              *

1539          KK  RB2591
1540          KM  ROUTE FLOW FROM COMPUTATION POINT CS51C TO COMPUTATION POINT CB259C
1541          KM  FIRST REACH
1542          RS      13    ELEV      -1
1543          RC    0.07    0.07    0.07    4200  0.0036
1544          RX       0     612    1085    1155    1595    1670    1765    2130
1545          RY  1029.6    1029    1028  1027.5  1027.5    1028    1028  1029.6
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1546          KK  RB2592
1547          KM  ROUTE FLOW FROM COMPUTATION POINT CS51C TO COMPUTATION POINT CB259C
1548          KM  2ND REACH
1549          RS      10    ELEV      -1
1550          RC    0.07    0.07    0.07    3000  0.0063
1551          RX       0      50     140     335    1120    1770    1825    1870
1552          RY    1006    1004    1003    1002    1001    1001    1002  1002.5
              *

1553          KK  BR259C
1554          KM  SUB-BASIN BR259C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1555          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1556          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1557          BA   1.000
1558          LG    .500    .000   3.550    .475    .000
1559          UC    .967    .506
1560          UA       0       3       9      18      28      42      59      73      87      92
1561          UA     100
              *

1562          KK  CB259A
1563          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CS51C AND RUNOFF FROM SUB-
1564          KM  BASIN BR259C
1565          HC       2
              *

1566          KK  DOA55C
1567          KM  RETRIEVE FLOW FROM HIDDEN VALLEY WATERSHED AT SUB-BASIN OA51B
1568          DR  DOA55C
              *

1569          KK   RO55C
1570          KM  ROUTE SPLIT FLOW FROM SUB-BASIN OA51B ( HIDDEN VALLEY WATERSHED ) TO
1571          KM  COMPUTATION POINT CPO55C
1572          RS       9    ELEV      -1
1573          RC   0.065   0.065   0.065    2600  0.0014
1574          RX       0      90     190     260     350     450     580     910
1575          RY  1033.8  1031.8  1031.5  1031.5  1031.5  1031.5  1031.5  1033.8
              *

1576          KK   OA55C
1577          KM  SUB-BASIN OA55C -LAND USE- RUAL DEVELEMENT
1578          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1579          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1580          BA    .250
1581          LG    .500    .000   3.550    .466    .000
1582          UC    .800    .468
1583          UA       0       3       9      18      28      42      59      73      87      92
1584          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1585          KK  CP055C
1586          KM  COMBINE ROUTED DIVERTED FLOW FROM SUB-BASIN OA51B TO RUNOFF FROM SUB-
1587          KM  BASIN OA55C
1588          HC       2
              *

1589          KK   RD57C
1590          KM  ROUTE FLOW FROM COMPUTATION POINT CPO55C TO COMPUTAION CDR57C
1591          RS      12    ELEV      -1
1592          RC    0.07    0.07    0.07    2920   0.001
1593          RX       0     230     370     520     720     870     990    1230
1594          RY    1030  1028.6  1028.4  1028.6  1028.6  1028.8  1028.9    1030
              *

1595          KK   DR57C
1596          KM  SUB-BASIN DR57C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1597          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1598          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1599          BA    .120
1600          LG    .500    .000   3.500    .470    .000
1601          UC    .950    .704
1602          UA       0       3       9      18      28      42      59      73      87      92
1603          UA     100
              *

1604          KK  CDR57C
1605          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CPO55C TO RUNOFF FROM SUB-BASIN
1606          KM   DR57C
1607          HC       2
              *

1608          KK   RD59C
1609          KM  ROUTE FLOW FROM COMPUTATION POINT CDR57C TO COMPUTATION POINT CDR59C
1610          RS       3    ELEV      -1
1611          RC    0.07    0.07    0.07    1200  0.0025
1612          RX       0     130     250     360     480     600     700     740
1613          RY  1027.2    1027    1027    1026  1025.5  1025.5    1026  1027.2
              *

1614          KK   DR59C
1615          KM  SUB-BASIN DR59C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1616          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1617          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1618          BA    .110
1619          LG    .500    .000   3.500    .470    .000
1620          UC    .817    .626
1621          UA       0       3       9      18      28      42      59      73      87      92
1622          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1623          KK  CDR59C
1624          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CDR57C TO RUNOFF FROM SUB-BASIN
1625          KM   DR59C
1626          HC       2
              *

1627          KK   RB259
1628          KM  ROUTE FLOW FROM COMPUTATION POINT CDR59C TO COMPUTATION POINT CB259C
1629          RS       6    ELEV      -1
1630          RC    0.07    0.02    0.07    5280  0.0046
1631          RX       0      10      20      35      70      80     120     180
1632          RY    1019  1017.7  1017.2  1017.2  1017.2  1017.7    1018    1019
              *

1633          KK  CB259S
1634          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CDR59C TO PREVIOUSLY
1635          KM  COMPUTED FLOW AT COMPUTATION POINT CB1592
1636          KM  CP (SOUTH SIDE) 59TH AVE AND BASELINE RD.
1637          HC       2
              *

1638          KK    CB59
1639          KM  COMBINE FLOWS AT 59TH AVE & BASELINE RD
1640          KM  COMBINED BOTH NORTH AND SOUTH FLOWS
1641          HC       2
              *

1642          KK  RB1631
1643          KM  ROUTE FLOW FROM 59TH AVE (CB259C) TO 63RD AVE. (CB163C)
1644          KM  MODIFY SLOPE TO INDICATE A REALISTIC VELOCITY OF LESS THAN 5 FT/SEC
1645          KM  ADJUST SLOPE FROM .0011 TO .0005
1646          RS       2    ELEV      -1
1647          RC   0.030    .030    .030    2640   .0009
1648          RX       0      10      20      45     135     160     170     180
1649          RY   997.8   997.7   997.6   992.6   992.6   997.6   997.7   997.8
              *

1650          KK  BR263C
1651          KM  SUB-BASIN BR263C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1652          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1653          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1654          BA    .500
1655          LG    .500    .000   3.500    .463    .000
1656          UC    .933    .639
1657          UA       0       3       9      18      28      42      59      73      87      92
1658          UA     100
              *

1659          KK     63S
1660          KM  FLOWS GENERATED FROM THE SOUTHSIDE OF BASELINE RD.
1661          HC       2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1662          KK  BR163C
1663          KM  SUB-BASIN BR163C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1664          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1665          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1666          BA    .260
1667          LG    .500     .000    4.700     .411     .000
1668          UC    .967     .642
1669          UA       0        3        9       18       28       42       59       73       87       92
1670          UA     100
              *

1671          KK  CB163C
1672          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CB159C WITH RUNOFF FROM SUB-BASINS
1673          KM  BR163C AND BR263C AND ROUTED FLOW FROM COMPUTATION POINT  CB259C
1674          HC       2
              *

1675          KK   RCD1C
1676          KM  ROUTE FLOW FROM COMPUTATION POINT CB163C TO COMPUTATION POINT CPCD1C
1677          KM  MARICOPA DRAIN FROM 63RD AVE TO 67TH AVE.
1678          RS       2    ELEV      -1
1679          RC   0.030     .030     .030    2640    .0011
1680          RX       0       10       20      45      135      160      170      180
1681          RY   996.2    996.1      996     991      991      996    996.1    996.2
              *

1682          KK   BR67C
1683          KM  SUB-BASIN BR67C-LAND USE - RURAL DEVELEMENT
1684          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1685          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1686          BA    .130
1687          LG    .500     .220    6.200     .305    15.0
1688          UC    .667     .454
1689          UA       0        3        9       18       28       42       59       73       87       92
1690          UA     100
              *

1691          KK  RCD1C2
1692          KM  ROUTE FLOW FROM SUBASIN BR67C TO COMPUTATION POINT CPCD1C
1693          RS      17    ELEV      -1
1694          RC    0.07     0.07     0.07    2100  0.0014
1695          RX       0       75      260     490     670      830     1000     1130
1696          RY     994    993.5    993.5     993     993      993      993      994
              *

1697          KK    CD1C
1698          KM  SUB-BASIN CD1C -LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1699          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1700          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1701          BA    .470
1702          LG    .500     .000    5.320     .351     .000
1703          UC    .933     .369
1704          UA       0        3        9       18       28       42       59       73       87       92
1705          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1706          KK  CPCD1C
1707          KM  COMBINE ROUTED FLOWS FROM COMPUTATION POINT CB163C AND SUB-BASIN BR67C
1708          KM  WITH RUNOFF FROM SUB-BASIN CD1C
1709          HC       3
              *

1710          KK  RCD2C1
1711          KM  ROUTE FLOW FROM COMPUTATION POINT CPCD1C TO COMPUTATION POINT CCD2C
1712          KM  MARICOPA DRAIN FROM 67TH AVE TO 75TH AVE.
1713          RS       3    ELEV      -1
1714          RC   0.030    .030    .030    4600   .0011
1715          RX       0      10      20      45     155     180     190     200
1716          RY   990.2   990.1     990     985     985     990   990.1   990.2
              *

1717          KK    CD2C
1718          KM  SUB-BASIN CD2C -LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1719          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1720          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1721          BA    .580
1722          LG    .500    .000   6.500    .277    .000
1723          UC    .867    .451
1724          UA       0       3       9      18      28      42      59      73      87      92
1725          UA     100
              *

1726          KK  CCD2C1
1727          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CPCD1C TO RUNOFF FROM SUB-BASIN
1728          KM    CD2C
1729          HC       2
              *

1730          KK  RIR63B
1731          KM  RETRIEVE SPLIT FLOW FROM COMPUTATION POINT CIR63B
1732          DR  RIR63B
              *

1733          KK  RIR65C
1734          KM  ROUTE RETRIEVED FLOW FROM SUB-BASIN IR63B TO COMPUTATION POINT CIR65C
1735          RS       7    ELEV      -1
1736          RC   0.030   0.030   0.030    3300  0.0010
1737          RX       0       1      11      21      26      31      41      46
1738          RY       6       5     4.7     4.7       5     5.5     5.5     6.2
              *

1739          KK   IR65C
1740          KM  SUB-BASIN IR65C -LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1741          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1742          KM  6-HOUR RAINFALL, PATTERN NO. 3.35 WAS USED TO FIND TC & R FOR THIS BASIN
1743          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1744          BA    .170
1745          LG    .500    .000   3.500    .470    .000
1746          UC    .933    .873
1747          UA       0       3       9      18      28      42      59      73      87      92
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1748          UA     100
              *

1749          KK  CIR65C
1750          KM  COMBINE RETRIEVED ROUTED FLOW FROM SUB-BASIN IR63B TO RUNOFF FROM SUB-BASIN
1751          KM   IR65C
1752          HC       2
              *

1753          KK   RIRDC
1754          KM  ROUTE FLOW FROM COMPUTATION POINT CIR65C TO COMPUTATION POINT CIRDC
1755          RS       4    ELEV      -1
1756          RC    0.03    0.03    0.03    3200  0.0018
1757          RX       0       1      10      20      30      40      50      51
1758          RY  1014.5    1013    1013    1013    1013    1013    1013  1014.5
              *

1759          KK  DIIRDC
1760          KM  ROUTED FLOW FROM COMPUTATION POINT CIR65C IS SPLIT AT COMPUTATION POINT
1761          KM   CIRDC
1762          DT  RIR65C
1763          DI       0      16      34      51      71      80     100     120     150
1764          DQ       0      16      25      32      40      49      69      89     119
              *

1765          KK    IRDC
1766          KM  SUB-BASIN IRDC-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1767          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1768          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1769          BA    .520
1770          LG    .500    .000   3.500    .470    .000
1771          UC   1.333    .968
1772          UA       0       3       9      18      28      42      59      73      87      92
1773          UA     100
              *

1774          KK   CIRDC
1775          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CIR65C TO RUNOFF FROM SUB-BASIN
1776          KM    IRDC
1777          HC       2
              *

1778          KK  RIRSMC
1779          KM  ROUTE FLOW COMPUTATION POINT CIRDC TO COMPUTATION POINT CIRSMC
1780          RS      11    ELEV      -1
1781          RC    0.07    0.07    0.07    3400  0.0058
1782          RX       0     160     240     470     530     780     900    1000
1783          RY  1006.2  1005.7  1005.7  1005.7  1005.6  1005.5  1005.7  1006.2
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1784          KK   IRSMC
1785          KM  SUB-BASIN IRSMC-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1786          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1787          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1788          BA    .250
1789          LG    .290     .177   3.890     .488     .000
1790          UC    .650     .469
1791          UA       0        3       9       18       28       42       59       73       87       92
1792          UA     100
              *

1793          KK  CIRSMC
1794          KM
1795          HC       2
              *

1796          KK  RCD2C2
1797          KM  ROUTE FLOW FROM COMPUTATION POINT CIRSMC TO COMPUTATION POINT CCD2C
1798          RS       4    ELEV      -1
1799          RC    0.07     0.07    0.07    1000  0.0040
1800          RX       0      100     300     400     560     620     750     870
1801          RY     989    987.6   987.6   987.6   987.6   987.6   987.6     989
              *

1802          KK  CCD2C2
1803          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CIRSMC TO PREVIOUSLY COMPUTED
1804          KM  FLOW AT COMPUTATION POINT CCD2C
1805          KM  MARICOPA DRAIN AT 75TH AVE.
1806          HC       2
              *

1807          KK  RCD3C1
1808          KM  ROUTE FLOW FROM DIVERSION POINT AT BASELINE ROAD (75TH AVE) TO COMPUTATION
1809          KM  POINT CPCD3C (SALT RIVER)
1810          KM  ADJUST SLOPE FROM .0011 TO REFLECT A VELOCITY OF LESS THAN 5 FT/SEC
1811          RS       2    ELEV      -1
1812          RC    0.03     .030    .030    3700   .0011
1813          RX       0       10      20      45     165     190     200     210
1814          RY   986.2    986.1     986     981     981     986   986.1   986.2
              *

1815          KK   A67AC
1816          KM  SUB-BASIN 67AC-LAND USE - AGRICULTURE, RURAL
1817          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1818          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1819          BA    .610
1820          LG    .500     .000   4.400     .416     .000
1821          UC   1.100     .631
1822          UA       0        3       9       18       28       42       59       73       87       92
1823          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1824          KK  RCD4C1
1825          KM  ROUTE FLOW FROM SUB-BASIN 67AC CPCD4C TO COMPUTATION POINT CPCD4C
1826          RS      11    ELEV      -1
1827          RC    0.07    0.07    0.07    2600  0.0024
1828          RX       0      80     230     340     590     730     850     920
1829          RY     988     984     984     984     984     984     984   987.8
              *

1830          KK    CD4C
1831          KM  SUB-BASIN CD4C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1832          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1833          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1834          BA    .190
1835          LG    .500    .000   3.800    .451    .000
1836          UC    .967    .553
1837          UA       0       3       9      18      28      42      59      73      87      92
1838          UA     100
              *

1839          KK  CPCD4C
1840          KM  COMBINE ROUTED FLOW FROM SUB-BASIN 67AC TO RUNOFF FROM SUB-BASIN CD4C
1841          HC       2
              *

1842          KK  RCD3C2
1843          KM  ROUTE FLOW FROM COMPUTATION POINT CPCD4C TO COMPUTATION POINT CPCD3C
1844          RS      22    ELEV      -1
1845          RC    0.07    0.07    0.07    5200  0.0024
1846          RX       0      80     230     340     590     730     850     920
1847          RY     988     984     984     984     984     984     984   987.8
              *

1848          KK    CD3C
1849          KM  SUB-BASIN CD3C-LAND USE - AGRICULTURE;MINOR DEVELOPMENT
1850          KM  24-HOUR TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1851          KM  THIS BASIN USED RAINFALL REDUCTION FACTOR OF .90
1852          BA    .480
1853          LG    .500    .000   4.800    .350    .000
1854          UC   0.983    .578
1855          UA       0       3       9      18      28      42      59      73      87      92
1856          UA     100
              *

1857          KK  CPCD3C
1858          KM  COMBINE ROUTED FLOW FROM COMPUTATION POINT CPCD4C, ROUTED FLOW FROM DIVERSION
1859          KM  POINT AT BASELINE ROAD WITH RUNOFF FROM SUB-BASIN CD3C
1860          HC       3
1861          ZZ
```

```
          SCHEMATIC DIAGRAM OF STREAM NETWORK

     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

      IR62B
          .
          .
          .       DR43C
          .           .
          .           .
          .           .-------> RDR43C
          .      DDR43C
          .           V
          .           V
          .      ROA51B
          .           V
          .           V
          .      ROA51B
          .           .
          .           .
          .           .       OA51B
          .           .           .
          .           .           .
          .      COA51B............
          .           .
          .           .
          .           .-------> DOA55C
          .      DFO51B
          .           V
          .           V
          .       RE55B
          .           .
          .           .
          .           .       ER55B
          .           .           .
          .           .           .
          .      CER55B............
          .           V
          .           V
          .       RE59B
          .           .
          .           .
          .           .       ER59B
          .           .           .
          .           .           .
          .      CER59B............
          .           V
          .           V
          .      RIR63B
          .           .
          .           .
          .           .       IR63B
          .           .           .
          .           .           .
     CIR63B........................
          .
          .
          .-------> RIR63B
     DIR63B
          .
          .
          .        CBDE
          .           .
          .           .
          .           .-------> BLSD7
          .        OVL7
          .           .
          .           .
          .           .       BR19C
          .           .           .
          .           .           .
          .           .           .-------> RETB19
          .           .      RETB19
          .           .           .
          .           .           .
          .           .           .-------> BLSD19
          .           .       OVL19
          .           .           .
          .           .           .
          .      COVL19............
          .           V
          .           V
          .      ROVL19
          .           .
          .           .
          .           .       SA27C
          .           .           .
          .           .           .
          .           .           .-------> RETA27
          .           .      RETA27
          .           .           .
          .           .           .
          .      CPS27C............
          .           V
          .           V
          .      RRS27C
          .           .
          .           .
          .           .       SA19C
```

```
[redacted]
291                                  .-------> RET19C
289                         RET19C
[redacted]
[redacted]6                          .-------> SA19C
294                         DSA19C
                                     V
                                     V
[redacted]9                 RR23C1
                                     V
                                     V
305                         RR23C2
                                     V
                                     V
[redacted]1                 RR23C3
[redacted]
317                                      CR23C
[redacted]8                                      .-------> RET23C
[redacted]6                                  RET23C
[redacted]1                 CPC23C............
                                     V
                                     V
334                          STR23
                                     V
                                     v
[redacted]1                 RSTR23
[redacted]
344                                      RR27C
[redacted]5                                      .-------> RET27C
[redacted]3                                  RET27C
[redacted]8             CPR27C.......................
                            V
                            V
362                     RCR27C
                            V
                            V
[redacted]6             RCR27C
[redacted]
369                       SM5C
                             V
                             V
[redacted]8               RSM7
[redacted]
384                                      SMA15C
[redacted]3                 CPS15C............
                             V
                             V
396                         RSM19C
[redacted]2                                      SMA19C
[redacted]
411                         CPS19C............
                             V
                             V
[redacted]4                 RRB27C
[redacted]0                                      SM1C
429                                                      SM1AC
[redacted]8                                      CSM1............
                                                    V
                                                    V
442                                              RSM1
[redacted]3                                                  SM2C
457                                              CSM2............
                                                    V
                                                    V
[redacted]1                                     RDENT
                                                    V
                                                    V
468                                              RSM2
[redacted]4                                                  SM3C
```

```
[redacted]  .           .           .       CSM3............
            .           .           .          V
            .           .           .          V
487         .           .           .       RSM3
            .           .           .          .
            .           .           .          .
[redacted]  .           .           .          .       SM4C
            .           .           .          .          V
            .           .           .          .          V
502         .           .           .          .       RSM4
            .           .           .          .          .
            .           .           .          .          .
[redacted]  .           .           .          .          .       DRW2C
            .           .           .          .          .          .
            .           .           .          .          .          .
[redacted]  .           .           .          .          .          .      DRWC1C
            .           .           .          .          .          .          .
            .           .           .          .          .          .          .
526         .           .           .       CSM4.................................
            .           .           .          V
            .           .           .          V
[redacted]  .           .           .       RSM5
            .           .           .          .
            .           .           .          .
536         .           .           .          .       DR1C
            .           .           .          .          .
            .           .           .          .          .
[redacted]  .           .           .          .          .       WC1A
            .           .           .          .          .          V
            .           .           .          .          .          V
554         .           .           .          .          .       RSM6
            .           .           .          .          .          .
            .           .           .          .          .          .
[redacted]  .           .           .          .          .          .        DR2C
            .           .           .          .          .          .          .
            .           .           .          .          .          .          .
569         .           .           .     CPDR2C.................................
            .           .           .          V
            .           .           .          V
[redacted]  .           .           .     RRB27C
            .           .           .          .
            .           .           .          .
[redacted]  .           .           .          .       BR27C
            .           .           .          .          .
            .           .           .          .          .
[redacted]  .           .           .          .          .          .<-------   BLSD7
588         .           .           .          .          .       BLSD7
            .           .           .          .          .          V
            .           .           .          .          .          V
[redacted]  .           .           .          .          .      RBLSD7
            .           .           .          .          .          .
            .           .           .          .          .          .
596         .           .           .          .          .          .           .<-------  BLSD19
[redacted]  .           .           .          .          .          .      BLSD19
            .           .           .          .          .          .          .
            .           .           .          .          .          .          .
597         .           .           .          .          .       CSD19............
            .           .           .          .          .          V
            .           .           .          .          .          V
[redacted]  .           .           .          .          .       RSD19
            .           .           .          .          .          .
            .           .           .          .          .          .
507         .           .           .          .          .          .-------> BLSD27
503         .           .           .          .          .       OVL27
            .           .           .          .          .          .
            .           .           .          .          .          .
[redacted]  .           .      CPB27C.................................
            .           .           .
            .           .           .
516         .           .           .-------> BLSD27
[redacted]  .           .      OVL27C
            .           .           V
            .           .           V
519         .           .      RR35C2
            .           .           .
            .           .           .
[redacted]  .           .           .       RR35C
            .           .           .          .
            .           .           .          .
535         .      CPR35B......................
            .           V
            .           V
[redacted]  .      RRS37C
            .           .
            .           .
545         .           .       SA37C
            .           .           .
            .           .           .
[redacted]  .      CPS37C............
            .           V
            .           V
[redacted]  .      RAV431
            .           .
            .           .
564         .           .        WC2A
            .           .           V
            .           .           V
[redacted]  .           .      RD27.1
            .           .           .
            .           .           .
579         .           .           .      WC2.1A
            .           .           .          V
```

```
                                  V
                            RD27.2
                                  .
                                  .
694                   CD27.1............
                            V
                            V
                      RD27.3
                            .
                            .
                                  .
                                  .
                                  .        WC3A
                                  .           V
                                  .           V
712                               .      RD27.4
                                  .           .
                                  .           .
                      CD27.2............
                            V
                            V
721                   RD27.5
                            .
                            .
                                  .        WC4A
                                  .           V
                                  .           V
736                               .      RD27.6
                                  .           .
                                  .           .
                      CD27.3............
                            V
                            V
745                   RD27.7
                            .
                            .
                                  .       DR27C
                                  .           .
                                  .           .
                      CD27.4............
                            V
                            V
                      RB35C2
                            .
                            .
                                  .      BR35C2
                                  .           .
                                  .           .
779                   CPB352............
                            .
                            .
                                  .      BR35C1
                                  .           .
                                  .           .
792                   CPB352............
                            .
                            .
                                  .           .<-------  BLSD27
                                  .      BLSD27
                                  .           V
                                  .           V
                                  .       RSD27
                                  .           .
                                  .           .
301                     35-2............
                            .
                            .
                            .-------> BLSD35
                      OV35-2
                            V
                            V
309                   RAV432
                            V
                            V
                      RAV433
                            .
                            .
                                  .        WC5A
                                  .           V
                                  .           V
                                  .      RD35.1
                                  .           .
                                  .           .
                                  .           .        WC6A
                                  .           .           V
                                  .           .           V
347                               .           .      RD35.2
                                  .           .           .
                                  .           .           .
                                  .      CD35.1............
                                  .           V
                                  .           V
356                               .      RD35.3
                                  .           .
                                  .           .
                                  .           .        WC7A
                                  .           .           V
                                  .           .           V
371                               .           .      RD35.4
                                  .           .           .
                                  .           .           .
                                  .           .           .        WC8A
                                  .           .           .           V
                                  .           .           .           V
```

```
[redacted]6          .         .         .         .         .      RD35.5
                     .         .         .         .         .         .
                     .         .         .         .         .         .
892                  .         .         .         .   CD35.3............
                     .         .         .         .       V
                     .         .         .         .       V
[redacted]5          .         .         .         .   RD35.6
                     .         .         .         .         .
                     .         .         .         .         .
901                  .         .         .         .         .     WC9A
                     .         .         .         .         .        V
                     .         .         .         .         .        V
[redacted]0          .         .         .         .         .   RD35.7
                     .         .         .         .         .         .
                     .         .         .         .         .         .
[redacted]6          .         .         .         .         .         .      WC10A
                     .         .         .         .         .         .        V
                     .         .         .         .         .         .        V
925                  .         .         .         .         .         .    RD35.8
                     .         .         .         .         .         .         .
                     .         .         .         .         .         .         .
[redacted]1          .         .         .         .         .   CD35.5............
                     .         .         .         .         .       V
                     .         .         .         .         .       V
934                  .         .         .         .         .   RD35.9
                     .         .         .         .         .         .
                     .         .         .         .         .         .
[redacted]0          .         .         .         .         .         .      WC11A
                     .         .         .         .         .         .        V
                     .         .         .         .         .         .        V
949                  .         .         .         .         .         .    RD3510
                     .         .         .         .         .         .         .
                     .         .         .         .         .         .         .
[redacted]5          .         .         .         .         .         .         .      WC12A
                     .         .         .         .         .         .         .        V
                     .         .         .         .         .         .         .        V
964                  .         .         .         .         .         .         .    RD3511
                     .         .         .         .         .         .         .         .
                     .         .         .         .         .         .         .         .
[redacted]0          .         .         .         .         .         .    CD35.7............
                     .         .         .         .         .         .        V
                     .         .         .         .         .         .        V
[redacted]3          .         .         .         .         .         .    RD3512
                     .         .         .         .         .         .         .
                     .         .         .         .         .         .         .
[redacted]9          .         .         .         .         .   CD35.6............
                     .         .         .         .         .       V
                     .         .         .         .         .       V
[redacted]2          .         .         .         .         .   RD3513
                     .         .         .         .         .         .
                     .         .         .         .         .         .
988                  .         .         .         .   CD35.4............
                     .         .         .         .       V
                     .         .         .         .       V
[redacted]1          .         .         .         .   RD3514
                     .         .         .         .         .
                     .         .         .         .         .
997                  .         .         .         .         .    WC15A
                     .         .         .         .         .       V
                     .         .         .         .         .       V
[redacted]5          .         .         .         .         .   RD3515
                     .         .         .         .         .         .
                     .         .         .         .         .         .
012                  .         .         .         .         .         .     PM2A
                     .         .         .         .         .         .         .
                     .         .         .         .         .         .         .
[redacted]           .         .         .         .         .   CD35.8............
                     .         .         .         .         .       V
                     .         .         .         .         .       V
024                  .         .         .         .         .   RD3516
                     .         .         .         .         .         .
                     .         .         .         .         .         .
[redacted]0          .         .         .         .         .         .      WC13A
                     .         .         .         .         .         .        V
                     .         .         .         .         .         .        V
[redacted]           .         .         .         .         .         .    RD3517
                     .         .         .         .         .         .         .
                     .         .         .         .         .         .         .
045                  .         .         .         .         .         .         .      WC14A
                     .         .         .         .         .         .         .        V
                     .         .         .         .         .         .         .        V
[redacted]           .         .         .         .         .         .         .    RD3518
                     .         .         .         .         .         .         .         .
                     .         .         .         .         .         .         .         .
060                  .         .         .         .         .         .         .         .         .      PM1A
                     .         .         .         .         .         .         .         .         .         .
                     .         .         .         .         .         .         .         .         .         .
[redacted]           .         .         .         .         .   CD35.9.......................................
                     .         .         .         .         .       V
                     .         .         .         .         .       V
073                  .         .         .         .         .   RD3519
                     .         .         .         .         .         .
                     .         .         .         .         .         .
[redacted]           .         .         .         .         .         .      DR35C
                     .         .         .         .         .         .         .
                     .         .         .         .         .         .         .
088                  .         .         .     CD35.2.................................
                     .         .         .         .
                     .         .         .         .
[redacted]           .         .         .         .-------->   DIDOB
092                  .         .         .     DI35TH
                     .         .         .         V
```

```
                    .         .         .         V
                    .         .         .      RDI35
                    .         .         .         .
                    .         .         .         .
                    .         .         .         .         CC1
                    .         .         .         .           .
                    .         .         .         .           .
                    .         .         .      CPCC1............
                    .         .         .         V
                    .         .         .         V
                    .         .         .      SRCC1
                    .         .         .         .
                    .         .         .         .
                    .         .         .         .-------->   DICC2
                    .         .         .      DICC5
                    .         .         .         V
                    .         .         .         V
                    .         .         .       RCC5
                    .         .         .         .
                    .         .         .         .
                    .         .         .         .         CC5
                    .         .         .         .           .
                    .         .         .         .           .
                    .         .         .      CPCC5............
                    .         .         .         V
                    .         .         .         V
                    .         .         .      SRCC5
                    .         .         .         V
                    .         .         .         V
                    .         .         .       RCC6
                    .         .         .         .
                    .         .         .         .
                    .         .         .         .         CC6
                    .         .         .         .           .
                    .         .         .         .           .
                    .         .         .      CPCC6............
                    .         .         .         V
                    .         .         .         V
                    .         .         .      SRCC6
                    .         .         .         V
                    .         .         .         V
                    .         .         .       RCC7
                    .         .         .         .
                    .         .         .         .
                    .         .         .         .         CC7
                    .         .         .         .           .
                    .         .         .         .           .
                    .         .         .   ICPCC7............
                    .         .         .         .
                    .         .         .         .
                    .         .         .         .           .<-------   DIDOB
                    .         .         .         .      DIDOB
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .     RDIDOB
                    .         .         .         .         .
                    .         .         .         .         .
                    .         .         .         .         .         CC2
                    .         .         .         .         .           .
                    .         .         .         .         .           .
                    .         .         .         .     ICPCC2............
                    .         .         .         .         .
                    .         .         .         .         .
                    .         .         .         .         .           .<-------   DICC2
                    .         .         .         .         .       DICC2
                    .         .         .         .         .           .
                    .         .         .         .         .           .
                    .         .         .         .      CPCC2............
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .      SRCC2
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .       RCC3
                    .         .         .         .         .
                    .         .         .         .         .
                    .         .         .         .         .         CC3
                    .         .         .         .         .           .
                    .         .         .         .         .           .
                    .         .         .         .      CPCC3............
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .      SRCC3
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .       RCC4
                    .         .         .         .         .
                    .         .         .         .         .
                    .         .         .         .         .         CC4
                    .         .         .         .         .           .
                    .         .         .         .         .           .
                    .         .         .         .      CPCC4............
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .      SRCC4
                    .         .         .         .         V
                    .         .         .         .         V
                    .         .         .         .       RCC7
                    .         .         .         .         .
                    .         .         .         .         .
                    .         .         .      CPCC7............
                    .         .         .         V
```

```
                                  V
                              SRCC7
                                  .
                                  .-------> GCOVLD
                              DICC7
                                  V
                                  V
                             RPC352
                                  .
                                  .
                                  .<-------  BLSD35
                                  .      BLSD35
                                  .          V
                                  .          V
                                  .       RDS35
                                  .          .
                                  .          .
                              CG39............
                                  V
                                  V
                             RBSD43
                                  .
                                  .
                                  .         CC8
                                  .          .
                                  .          .
                                  .          .<-------  GCOVLD
                                  .          .      GCOVLD
                                  .          .          .
                                  .          .          .
                                  .        GCOL............
                                  .          V
                                  .          V
                                  .       RGCOL
                                  .          .
                                  .          .
                                  .          .      SMA43C
                                  .          .          V
                                  .          .          V
                                  .          .      RB43C2
                                  .          .          .
                                  .          .          .
                                  .          .          .       BR43C
                                  .          .          .          .
                                  .          .          .          .
                                  .          .      CBR43C............
                                  .          .          .
                                  .          .          .
                                C43........................
                                  .
                                  .
                                  .------->    43SD
                             43OVLD
                                  V
                                  V
                             R43OVL
                                  .
                                  .
                                  .      AVR43C
                                  .          .
                                  .          .
                                  .          .------->     43C
                                  .       DIVMD
                                  .          .
                                  .          .
                            MDA........................
                              .
                              .
                              .------->    DMDA
                          DUMMY
                              .
                              .
                              .          .<-------     43C
                              .        43C
                              .          .
                              .          .
                       SBAS........................
                          V
                          V
                     STOR43
                          .
                          .
                          .------->   43SDS
                       43W
                          .
                          .
                          .          .<-------    DMDA
                          .        DMDA
                          .          .
                          .          .
                       MD43............
                          V
                          V
                     RMD43
                          .
                          .
                          .       VR47C
                          .          .
                          .          .
                     CVR47C............
                          V
```

```
                V
        RBR511
                .
                .
                .      AVR51C
                .           V
                .           V
                .      RBR512
                .           .
                .           .
                .           .       BR51C
                .           .           .
                .           .           .
                .        CB51............
                .           .
                .           .
        CB51C............
                V
                V
        RB1591
                .
                .
                .      AVR55C
                .           V
                .           V
                .      RB1592
                .           .
                .           .
                .           .      BR159C
                .           .           .
                .           .           .
                .           .           .       VR59C
                .           .           .           V
                .           .           .           V
                .           .           .      RB1593
                .           .           .           .
                .           .           .           .
        CB159N..................................
                .
                .
                .           .<-------  RDR43C
                .      RET43C
                .           V
                .           V
                .       RS51C
                .           .
                .           .
                .           .       SM51C
                .           .           .
                .           .           .
                .       CS51C............
                .           V
                .           V
                .      RB2591
                .           V
                .           V
                .      RB2592
                .           .
                .           .
                .           .      BR259C
                .           .           .
                .           .           .
                .      CB259A............
                .           .
                .           .
                .           .           .<-------  DOA55C
                .           .      DOA55C
                .           .           V
                .           .           V
                .           .       RO55C
                .           .           .
                .           .           .
                .           .           .       OA55C
                .           .           .           .
                .           .           .           .
                .           .      CPO55C............
                .           .           V
                .           .           V
                .           .       RD57C
                .           .           .
                .           .           .
                .           .           .       DR57C
                .           .           .           .
                .           .           .           .
                .           .      CDR57C............
                .           .           V
                .           .           V
                .           .       RD59C
                .           .           .
                .           .           .
                .           .           .       DR59C
                .           .           .           .
                .           .           .           .
                .           .      CDR59C............
                .           .           V
                .           .           V
                .           .       RB259
                .           .           .
                .           .           .
                .      CB259S............
                .           .
                .           .
```

```
[redacted]3   .        CB59............
              .           V
              .           V
642           .      RB1631
              .           .
              .           .
[redacted]0   .           .      BR263C
              .           .           .
              .           .           .
659           .        63S............
              .           .
              .           .
[redacted]2   .           .      BR163C
              .           .           .
              .           .           .
[redacted]1   .      CB163C............
              .           V
              .           V
[redacted]5   .       RCD1C
              .           .
              .           .
[redacted]2   .           .       BR67C
              .           .           V
              .           .           V
691           .           .      RCD1C2
              .           .           .
              .           .           .
[redacted]7   .           .           .        CD1C
              .           .           .           .
              .           .           .           .
706           .      CPCD1C........................
              .           V
              .           V
[redacted]0   .      RCD2C1
              .           .
              .           .
717           .           .        CD2C
              .           .           .
              .           .           .
[redacted]6   .      CCD2C1............
              .           .
              .           .
732           .           .           .<-------  RIR63B
[redacted]0   .           .      RIR63B
              .           .           V
              .           .           V
733           .           .      RIR65C
              .           .           .
              .           .           .
[redacted]9   .           .           .       IR65C
              .           .           .           .
              .           .           .           .
749           .           .      CIR65C............
              .           .           V
              .           .           V
[redacted]8   .           .       RIRDC
              .           .           .
              .           .           .
762           .           .           .-------> RIR65C
[redacted]9   .           .      DIIRDC
              .           .           .
              .           .           .
765           .           .           .        IRDC
              .           .           .           .
              .           .           .           .
[redacted]4   .           .       CIRDC............
              .           .           V
              .           .           V
778           .           .      RIRSMC
              .           .           .
              .           .           .
[redacted]4   .           .           .       IRSMC
              .           .           .           .
              .           .           .           .
793           .           .      CIRSMC............
              .           .           V
              .           .           V
[redacted]5   .           .      RCD2C2
              .           .           .
              .           .           .
302           .      CCD2C2............
              .           V
              .           V
[redacted]    .      RCD3C1
              .           .
              .           .
[redacted]    .           .       A67AC
              .           .           V
              .           .           V
324           .           .      RCD4C1
              .           .           .
              .           .           .
[redacted]    .           .           .        CD4C
              .           .           .           .
              .           .           .           .
339           .           .      CPCD4C............
              .           .           V
              .           .           V
[redacted]    .           .      RCD3C2
              .           .           .
              .           .           .
348           .           .           .        CD3C
```

```
          .          .          .          .
          .          .          .          .
857       .      CPCD3C.......................
```

RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*************************************                    *************************************
                                    *                    *                                   *
 FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS   *
          JUN   1998                *                    *    HYDROLOGIC ENGINEERING CENTER  *
        VERSION 4.1                 *                    *          609 SECOND STREET        *
                                    *                    *       DAVIS, CALIFORNIA 95616     *
RUN DATE   09NOV04  TIME  09:59:52  *                    *           (916) 756-1104          *
                                    *                    *                                   *
*************************************                    *************************************
```

LAVEEN ADMS (FINAL HEC-1) 100-YR 24-HR STORM CBA FILE # 40916-02-30
HIDDEN VALLEY WATERSHED/CHAMPION DRAIN WATERSHED

DATE: SEPTEMBER 12,2000
FINAL: NOVEMBER 2002

24-HOUR SCS TYPE II RAINFALL

REVISED SCHEMATIC TO INCLUDE FLOWS IN BOTH 43RD AVE. BASINS

```
*****************************************************************************
FOLLOWING REVISIONS BY AMIR MOTAMEDI, STEVEN TUCKER, FCDMD, 8/29/02
1- REMOVED THE PROPOSED BASIN ON NE CORNER OF BASELINE AND 43RD AVE PER PPM
2- REMOVED DUPLICATE RR35C3
3- CORRECTED THE LENGTH FOR THE REMAINING RR35C3
4- CORRECTED THE REACH LENGTH AND SLOPE FOR RR35C2
5- CORRECTED THE 43RD AVE. STORM DRAIN CAPACITY TO 294
6- CORRECTED THE RATING CURVE FOR THE 43RD AVE BASIN AT BASELINE RD
7- PLEASE NOTE: RAINFALL AREAL REDUCTION IS FOR ENTIRE WATERSHED. FOR DESIGN
OF LACC ONLY.  NOT TO BE USED FOR ANY OTHER DESIGN W/O PROPER MODIFICATION
*****************************************************************************

*****************************************************************************
FLOOD INSURANCE STUDY UPDATE
INCLUDE PHYSICAL CHANGES IN THE WATERSHED AS OF MARCH 2000
INCLUDED THE FOLLOWING FACILITIES:
  UPSTREAM OF 43RD AVE.  - EXISTING LANDUSE
     1- 43RD AVENUE STORM DRAIN, 1000 FT NORTH OF BASELINE TO SALT RIVER
     2- CESAR CHAVEZ GOLF COURSE, 35TH AVENUE AND DOBBINS
     3- BASELINE STORMDRAIN, FROM 7TH AVE TO 43RD AVE.
     4- 43RD AVE DETENTION BASIN AT SOUTHERN AVE.

  DOWNSTREAM OF 43RD AVE. - EXISTING LANDUSE
     PLAN 2 - PROPOSED CHANNEL

CHANGES BY H&H BRANCH, FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
8/29/02   INPUT FILE NAME LB2DR1.DAT

*****************************************************************************
UPDATED BY CVL, OCTOBER 2004
FCD CONTRACT #2003A004
COP CONTRACT #ST83120028
INPUT FILE NAME LAVEEN_FUTURE_CVL.DAT
*INCLUDES FUTURE CONDITIONS DEVELOMENT WITH 100-YR, 2 HR RETENTION FOR
SUB-BASINS BR19C, SA27C, SA19C, RR27C, AND CR23C
*INCLUDES THE FOLLOWING FACICITIES
1.  23RD AVENUE AND ROESER DETENTION BASIN
2.  42" STORM DRAIN FROM DETENTION BASIN TO 27TH AVENUE
3.  60" STORM DRAIN TO ROUTE FLOWS FROM SA27C ALONG 27TH AVENUE TO ROESER RD.
4.  78" STORM DRAIN TO ROUTE FLOWS FROM 27TH AVE AND ROESER TO THE SALT RIVER

*****************************************************************************


IO          OUTPUT CONTROL VARIABLES
                IPRNT          5  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE

IT          HYDROGRAPH TIME DATA
                 NMIN          5  MINUTES IN COMPUTATION INTERVAL
                IDATE      1   0  STARTING DATE
                ITIME       0000  STARTING TIME
                   NQ        500  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      2   0  ENDING DATE
               NDTIME       1735  ENDING TIME
                ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL     .08 HOURS
                 TOTAL TIME BASE   41.58 HOURS

      ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
           TEMPERATURE            DEGREES FAHRENHEIT

WARNING --- ROUTED OUTFLOW (    436.) IS GREATER THAN MAXIMUM OUTFLOW (    306.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (    517.) IS GREATER THAN MAXIMUM OUTFLOW (    306.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (    545.) IS GREATER THAN MAXIMUM OUTFLOW (    306.) IN STORAGE-OUTFLOW TABLE
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	IR62B	431.	12.50	87.	22.	13.	.55		
HYDROGRAPH AT	DR43C	1025.	12.33	152.	44.	25.	.94		
DIVERSION TO	RDR43C	906.	12.00	128.	38.	22.	.94		
HYDROGRAPH AT	DDR43C	119.	12.00	24.	6.	3.	.94		
ROUTED TO	ROA51B	115.	13.33	24.	6.	3.	.94	1041.42	13.33
ROUTED TO	ROA51B	67.	15.75	21.	6.	3.	.94	1037.30	15.75
HYDROGRAPH AT	OA51B	1334.	12.50	223.	60.	35.	1.37		
2 COMBINED AT	COA51B	1334.	12.50	237.	66.	38.	2.31		
DIVERSION TO	DOA55C	711.	12.50	126.	35.	20.	2.31		
HYDROGRAPH AT	DFO51B	623.	12.50	111.	31.	18.	2.31		
ROUTED TO	RE55B	443.	13.83	107.	31.	18.	2.31	1029.97	13.83
HYDROGRAPH AT	ER55B	207.	12.67	54.	13.	8.	.25		
2 COMBINED AT	CER55B	511.	13.75	155.	45.	26.	2.56		
ROUTED TO	RE59B	440.	14.50	154.	44.	26.	2.56	1025.96	14.50
HYDROGRAPH AT	ER59B	206.	12.58	42.	10.	6.	.28		
2 COMBINED AT	CER59B	452.	14.42	194.	55.	32.	2.84		
ROUTED TO	RIR63B	425.	15.00	190.	55.	32.	2.84	1021.48	15.00
HYDROGRAPH AT	IR63B	94.	12.50	19.	5.	3.	.13		
3 COMBINED AT	CIR63B	526.	12.50	289.	81.	47.	3.52		
DIVERSION TO	RIR63B	45.	12.50	45.	20.	12.	3.52		
HYDROGRAPH AT	DIR63B	481.	12.50	244.	61.	35.	3.52		
HYDROGRAPH AT	CBDE	120.	12.42	25.	7.	4.	.17		
DIVERSION TO	BLSD7	120.	.00	25.	7.	4.	.17		
HYDROGRAPH AT	OVL7	0.	.00	0.	0.	0.	.17		
HYDROGRAPH AT	BR19C	564.	12.00	64.	20.	11.	.39		
DIVERSION TO	RETB19	564.	12.25	54.	15.	8.	.39		
HYDROGRAPH AT	RETB19	182.	12.25	16.	5.	3.	.39		
DIVERSION TO	BLSD19	50.	12.25	13.	4.	3.	.39		
HYDROGRAPH AT	OVL19	132.	12.25	3.	1.	0.	.39		
2 COMBINED AT	COVL19	132.	12.25	3.	1.	0.	.56		
ROUTED TO	ROVL19	6.	17.25	3.	1.	0.	.56	1085.14	17.25
HYDROGRAPH AT	SA27C	751.	12.08	110.	33.	19.	.62		
DIVERSION TO	RETA27	751.	12.75	96.	26.	15.	.62		
HYDROGRAPH AT	RETA27	167.	12.75	25.	8.	4.	.62		
2 COMBINED AT	CPS27C	167.	12.75	27.	9.	5.	1.18		
ROUTED TO	RRS27C	154.	12.83	26.	8.	5.	1.18		
HYDROGRAPH AT	SA19C	615.	12.08	76.	23.	13.	.48		
DIVERSION TO	RET19C	345.	12.08	19.	6.	3.	.48		
HYDROGRAPH AT	RET19C	615.	12.08	65.	18.	10.	.48		
DIVERSION TO	SA19C	70.	12.08	22.	7.	4.	.48		
HYDROGRAPH AT	DSA19C	545.	12.08	43.	11.	6.	.48		
ROUTED TO	RR23C1	517.	12.17	43.	11.	6.	.48	1076.08	12.17
ROUTED TO	RR23C2	359.	12.75	43.	11.	6.	.48	1064.12	12.75
ROUTED TO	RR23C3	286.	13.25	43.	11.	6.	.48	1053.25	13.25
HYDROGRAPH AT	CR23C	840.	12.08	103.	31.	18.	.58		
DIVERSION TO	RET23C	840.	12.33	82.	22.	13.	.58		
HYDROGRAPH AT	RET23C	361.	12.33	30.	9.	5.	.58		

2 COMBINED AT	CPC23C	361.	12.33	73.	20.	11.	1.06		
ROUTED TO	STR23	60.	14.67	56.	20.	11.	1.06	1050.47	14.67
ROUTED TO	RSTR23	60.	14.67	56.	20.	11.	1.06		
HYDROGRAPH AT	RR27C	687.	12.00	78.	24.	14.	.48		
DIVERSION TO	RET27C	687.	12.33	68.	18.	10.	.48		
HYDROGRAPH AT	RET27C	168.	12.33	18.	6.	3.	.48		
3 COMBINED AT	CPR27C	227.	12.83	96.	34.	19.	2.72		
ROUTED TO	RCR27C	218.	12.83	96.	34.	19.	2.72		
ROUTED TO	RCR27C	208.	12.92	96.	34.	19.	2.72		
HYDROGRAPH AT	SM5C	164.	12.08	24.	7.	4.	.20		
ROUTED TO	RSM7	130.	12.75	24.	7.	4.	.20	1178.58	12.75
HYDROGRAPH AT	SMA15C	368.	12.17	43.	11.	6.	.36		
2 COMBINED AT	CPS15C	372.	12.17	67.	18.	10.	.56		
ROUTED TO	RSM19C	327.	12.50	67.	18.	10.	.56	1139.93	12.50
HYDROGRAPH AT	SMA19C	59.	12.58	17.	4.	3.	.16		
2 COMBINED AT	CPS19C	385.	12.50	84.	22.	13.	.72		
ROUTED TO	RRB27C	270.	14.08	80.	22.	13.	.72	1108.35	14.08
HYDROGRAPH AT	SM1C	2160.	12.25	341.	113.	65.	1.84		
HYDROGRAPH AT	SM1AC	253.	12.17	31.	9.	5.	.28		
2 COMBINED AT	CSM1	2401.	12.17	373.	121.	70.	2.12		
ROUTED TO	RSM1	2321.	12.33	372.	121.	70.	2.12	1378.07	12.33
HYDROGRAPH AT	SM2C	3451.	12.17	561.	196.	113.	2.19		
2 COMBINED AT	CSM2	5481.	12.17	933.	317.	183.	4.31		
ROUTED TO	RDENT	147.	17.33	146.	139.	103.	4.31	1317.99	17.33
ROUTED TO	RSM2	147.	17.67	146.	139.	101.	4.31	1227.22	17.33
HYDROGRAPH AT	SM3C	455.	12.17	43.	11.	6.	.48		
2 COMBINED AT	CSM3	535.	12.17	176.	148.	107.	4.79		
ROUTED TO	RSM3	499.	12.33	175.	148.	106.	4.79	1177.13	12.33
HYDROGRAPH AT	SM4C	168.	12.17	26.	7.	4.	.24		
ROUTED TO	RSM4	164.	12.17	26.	7.	4.	.24	1169.02	12.17
HYDROGRAPH AT	DRW2C	401.	12.33	71.	22.	13.	.53		
HYDROGRAPH AT	DRWC1C	70.	12.33	14.	3.	2.	.12		
4 COMBINED AT	CSM4	1120.	12.25	280.	176.	126.	5.68		
ROUTED TO	RSM5	1051.	12.42	279.	176.	125.	5.68	1159.49	12.42
HYDROGRAPH AT	DR1C	152.	12.25	22.	5.	3.	.16		
HYDROGRAPH AT	WC1A	274.	12.25	49.	15.	9.	.25		
ROUTED TO	RSM6	268.	12.25	49.	15.	9.	.25	1147.73	12.25
HYDROGRAPH AT	DR2C	46.	12.17	5.	1.	1.	.05		
4 COMBINED AT	CPDR2C	1473.	12.33	352.	196.	138.	6.14		
ROUTED TO	RRB27C	1183.	13.25	345.	195.	130.	6.14	1108.92	13.25
HYDROGRAPH AT	BR27C	594.	12.33	91.	23.	13.	.78		
HYDROGRAPH AT	BLSD7	120.	12.42	25.	7.	4.	.00		
ROUTED TO	RBLSD7	121.	12.50	25.	7.	4.	.00		
HYDROGRAPH AT	BLSD19	50.	12.25	13.	4.	3.	.00		
2 COMBINED AT	CSD19	171.	12.50	38.	11.	6.	.00		
ROUTED TO	RSD19	171.	12.50	38.	11.	6.	.00		
DIVERSION TO	BLSD27	156.	12.50	37.	11.	6.	.00		
HYDROGRAPH AT	OVL27	15.	12.50	1.	0.	0.	.00		
4 COMBINED AT	CPB27C	1286.	13.25	495.	237.	156.	7.64		
DIVERSION TO	BLSD27	156.	13.25	156.	149.	105.	7.64		
HYDROGRAPH AT	OVL27C	1130.	13.25	339.	89.	51.	7.64		

ROUTED TO	RR35C2	820.	14.92	310.	89.	51.	7.64	1057.75	14.92
HYDROGRAPH AT	RR35C	1694.	12.50	277.	69.	40.	1.89		
3 COMBINED AT	CPR35B	1815.	12.50	629.	191.	110.	12.25		
ROUTED TO	RRS37C	1579.	13.08	610.	191.	110.	12.25	1026.94	13.08
HYDROGRAPH AT	SA37C	571.	12.25	89.	25.	14.	.59		
2 COMBINED AT	CPS37C	1681.	13.08	656.	214.	125.	12.84		
ROUTED TO	RAV431	1352.	14.25	633.	214.	124.	12.84	1022.53	14.25
HYDROGRAPH AT	WC2A	78.	12.25	14.	3.	2.	.08		
ROUTED TO	RD27.1	76.	12.25	14.	3.	2.	.08	1148.15	12.25
HYDROGRAPH AT	WC2.1A	70.	12.17	8.	2.	1.	.08		
ROUTED TO	RD27.2	67.	12.25	8.	2.	1.	.08	1149.00	12.25
2 COMBINED AT	CD27.1	143.	12.25	21.	5.	3.	.16		
ROUTED TO	RD27.3	141.	12.25	21.	5.	3.	.16	1142.56	12.25
HYDROGRAPH AT	WC3A	15.	12.17	2.	1.	0.	.01		
ROUTED TO	RD27.4	15.	12.25	2.	1.	0.	.01	1142.19	12.25
2 COMBINED AT	CD27.2	155.	12.25	24.	6.	3.	.17		
ROUTED TO	RD27.5	146.	12.33	24.	6.	3.	.17	1122.49	12.33
HYDROGRAPH AT	WC4A	369.	12.17	52.	16.	9.	.36		
ROUTED TO	RD27.6	351.	12.33	52.	16.	9.	.36	1140.69	12.33
2 COMBINED AT	CD27.3	498.	12.33	75.	21.	12.	.53		
ROUTED TO	RD27.7	484.	12.42	75.	21.	12.	.53	1116.30	12.42
HYDROGRAPH AT	DR27C	157.	12.25	19.	5.	3.	.23		
2 COMBINED AT	CD27.4	608.	12.42	94.	26.	15.	.76		
ROUTED TO	RB35C2	398.	13.92	93.	26.	15.	.76	1069.76	13.92
HYDROGRAPH AT	BR35C2	460.	12.58	99.	25.	14.	.73		
2 COMBINED AT	CPB352	483.	13.83	190.	51.	29.	1.49		
HYDROGRAPH AT	BR35C1	361.	12.58	79.	20.	11.	.55		
2 COMBINED AT	CPB352	823.	12.58	269.	71.	41.	2.04		
HYDROGRAPH AT	BLSD27	156.	12.42	37.	11.	6.	.00		
ROUTED TO	RSD27	162.	12.58	37.	11.	6.	.00		
2 COMBINED AT	35-2	985.	12.58	305.	81.	47.	2.04		
DIVERSION TO	BLSD35	284.	12.58	172.	48.	28.	2.04		
HYDROGRAPH AT	OV35-2	701.	12.58	133.	33.	19.	2.04		
ROUTED TO	RAV432	552.	13.33	133.	33.	19.	2.04	1042.03	13.33
ROUTED TO	RAV433	436.	14.08	132.	33.	19.	2.04	1028.92	14.08
HYDROGRAPH AT	WC5A	290.	12.25	51.	16.	9.	.42		
ROUTED TO	RD35.1	239.	12.92	50.	16.	9.	.42	1125.88	12.92
HYDROGRAPH AT	WC6A	17.	12.08	2.	0.	0.	.01		
ROUTED TO	RD35.2	7.	13.42	2.	0.	0.	.01	1118.01	13.42
2 COMBINED AT	CD35.1	242.	12.92	52.	16.	10.	.43		
ROUTED TO	RD35.3	229.	13.17	52.	16.	10.	.43	1090.25	13.17
HYDROGRAPH AT	WC7A	57.	12.17	7.	2.	1.	.05		
ROUTED TO	RD35.4	51.	12.42	7.	2.	1.	.05	1126.41	12.42
HYDROGRAPH AT	WC8A	307.	12.25	51.	16.	9.	.35		
ROUTED TO	RD35.5	287.	12.33	51.	16.	9.	.35	1137.78	12.33
2 COMBINED AT	CD35.3	338.	12.33	58.	18.	10.	.40		
ROUTED TO	RD35.6	336.	12.42	58.	18.	10.	.40	1101.97	12.42
HYDROGRAPH AT	WC9A	28.	12.17	4.	1.	1.	.03		
ROUTED TO	RD35.7	27.	12.25	4.	1.	1.	.03	1128.65	12.25
HYDROGRAPH AT	WC10A	28.	12.08	4.	1.	1.	.02		
ROUTED TO	RD35.8	26.	12.17	4.	1.	1.	.02	1132.27	12.17

2 COMBINED AT	CD35.5	52.	12.17	8.	2.	1.	.05		
ROUTED TO	RD35.9	50.	12.33	8.	2.	1.	.05	1115.17	12.33
HYDROGRAPH AT	WC11A	295.	12.17	55.	18.	11.	.29		
ROUTED TO	RD3510	274.	12.25	55.	18.	11.	.29	1131.90	12.25
HYDROGRAPH AT	WC12A	280.	12.17	37.	11.	7.	.26		
ROUTED TO	RD3511	262.	12.25	37.	11.	7.	.26	1143.99	12.25
2 COMBINED AT	CD35.7	536.	12.25	92.	30.	17.	.55		
ROUTED TO	RD3512	499.	12.33	92.	30.	17.	.55	1122.15	12.33
2 COMBINED AT	CD35.6	549.	12.33	100.	32.	18.	.59		
ROUTED TO	RD3513	530.	12.42	100.	32.	18.	.59	1101.99	12.42
2 COMBINED AT	CD35.4	867.	12.42	158.	49.	28.	1.00		
ROUTED TO	RD3514	808.	12.67	158.	49.	28.	1.00	1193.75	12.67
HYDROGRAPH AT	WC15A	411.	12.17	65.	22.	12.	.36		
ROUTED TO	RD3515	403.	12.17	65.	22.	12.	.36	1134.77	12.17
HYDROGRAPH AT	PM2A	68.	12.17	9.	2.	1.	.07		
2 COMBINED AT	CD35.8	471.	12.17	74.	24.	14.	.43		
ROUTED TO	RD3516	455.	12.25	74.	24.	14.	.43	1123.33	12.25
HYDROGRAPH AT	WC13A	16.	12.08	2.	1.	0.	.01		
ROUTED TO	RD3517	15.	12.33	2.	1.	0.	.01	1131.21	12.33
HYDROGRAPH AT	WC14A	37.	12.17	5.	1.	1.	.05		
ROUTED TO	RD3518	32.	12.58	5.	1.	1.	.05	1133.78	12.58
HYDROGRAPH AT	PM1A	64.	12.17	7.	2.	1.	.07		
4 COMBINED AT	CD35.9	542.	12.25	88.	28.	16.	.56		
ROUTED TO	RD3519	539.	12.25	88.	28.	16.	.56	1102.22	12.25
HYDROGRAPH AT	DR35C	435.	12.42	63.	16.	9.	.60		
4 COMBINED AT	CD35.2	1548.	12.50	360.	109.	63.	2.59		
DIVERSION TO	DIDOB	619.	12.50	140.	40.	23.	2.59		
HYDROGRAPH AT	DI35TH	929.	12.50	220.	69.	40.	2.59		
ROUTED TO	RDI35	917.	12.58	220.	69.	40.	2.59	1082.55	12.58
HYDROGRAPH AT	CC1	27.	12.08	3.	1.	0.	.02		
2 COMBINED AT	CPCC1	922.	12.58	223.	70.	41.	2.61		
ROUTED TO	SRCC1	667.	12.50	40.	11.	6.	2.61	1071.68	12.42
DIVERSION TO	DICC2	243.	12.50	10.	3.	1.	2.61		
HYDROGRAPH AT	DICC5	424.	12.50	30.	8.	5.	2.61		
ROUTED TO	RCC5	414.	12.50	30.	8.	5.	2.61	1061.61	12.50
HYDROGRAPH AT	CC5	37.	12.00	3.	1.	0.	.03		
2 COMBINED AT	CPCC5	416.	12.50	33.	9.	5.	2.64		
ROUTED TO	SRCC5	18.	12.75	16.	9.	5.	2.64	1065.27	12.75
ROUTED TO	RCC6	18.	12.83	16.	9.	5.	2.64	1060.14	12.83
HYDROGRAPH AT	CC6	38.	12.00	3.	1.	0.	.03		
2 COMBINED AT	CPCC6	49.	12.00	19.	10.	6.	2.67		
ROUTED TO	SRCC6	13.	18.67	13.	9.	6.	2.67	1052.26	18.83
ROUTED TO	RCC7	13.	18.75	13.	9.	6.	2.67	1060.10	18.75
HYDROGRAPH AT	CC7	64.	12.00	6.	1.	1.	.04		
2 COMBINED AT	ICPCC7	75.	12.00	18.	11.	6.	2.71		
HYDROGRAPH AT	DIDOB	619.	12.50	140.	40.	23.	.00		
ROUTED TO	RDIDOB	612.	12.58	140.	40.	23.	.00	1082.34	12.58
HYDROGRAPH AT	CC2	22.	12.00	2.	0.	0.	.01		
2 COMBINED AT	ICPCC2	612.	12.58	142.	40.	23.	.01		
HYDROGRAPH AT	DICC2	243.	12.50	10.	3.	1.	.00		
2 COMBINED AT	CPCC2	849.	12.50	152.	43.	25.	.01		

ROUTED TO	SRCC2	776.	12.58	147.	43.	25.	.01	1071.96	12.58
ROUTED TO	RCC3	774.	12.58	147.	43.	25.	.01	1062.27	12.58
HYDROGRAPH AT	CC3	100.	12.00	9.	2.	1.	.07		
2 COMBINED AT	CPCC3	777.	12.58	156.	45.	26.	.08		
ROUTED TO	SRCC3	163.	13.83	89.	39.	25.	.08	1066.31	13.83
ROUTED TO	RCC4	163.	13.92	89.	39.	25.	.08	1060.92	13.92
HYDROGRAPH AT	CC4	97.	12.00	8.	2.	1.	.07		
2 COMBINED AT	CPCC4	163.	13.92	92.	41.	27.	.15		
ROUTED TO	SRCC4	66.	16.67	49.	29.	19.	.15	1061.57	16.67
ROUTED TO	RCC7	66.	16.75	49.	29.	19.	.15	1060.52	16.75
2 COMBINED AT	CPCC7	83.	12.00	62.	38.	26.	2.86		
ROUTED TO	SRCC7	36.	12.25	36.	36.	25.	2.86	1054.49	21.83
DIVERSION TO	GCOVLD	0.	12.25	0.	0.	0.	2.86		
HYDROGRAPH AT	DICC7	36.	12.25	36.	36.	25.	2.86		
ROUTED TO	RPC352	36.	15.67	36.	36.	25.	2.86		
HYDROGRAPH AT	BLSD35	284.	12.08	172.	48.	28.	.00		
ROUTED TO	RDS35	285.	12.17	172.	48.	28.	.00		
2 COMBINED AT	CG39	320.	12.42	204.	83.	53.	2.86		
ROUTED TO	RBSD43	320.	12.42	204.	83.	53.	2.86		
HYDROGRAPH AT	CC8	46.	12.00	4.	1.	1.	.03		
HYDROGRAPH AT	GCOVLD	0.	.00	0.	0.	0.	.00		
2 COMBINED AT	GCOL	46.	12.00	4.	1.	1.	.03		
ROUTED TO	RGCOL	18.	12.33	4.	1.	1.	.03	1043.51	12.33
HYDROGRAPH AT	SMA43C	168.	12.17	21.	5.	3.	.13		
ROUTED TO	RB43C2	113.	12.67	21.	5.	3.	.13	1044.46	12.67
HYDROGRAPH AT	BR43C	280.	12.50	57.	14.	8.	.35		
2 COMBINED AT	CBR43C	390.	12.58	78.	20.	11.	.48		
3 COMBINED AT	C43	723.	12.58	285.	103.	65.	3.37		
DIVERSION TO	43SD	294.	12.58	200.	82.	52.	3.37		
HYDROGRAPH AT	43OVLD	429.	12.58	85.	21.	12.	3.37		
ROUTED TO	R43OVL	405.	12.92	85.	21.	12.	3.37	1036.52	12.92
HYDROGRAPH AT	AVR43C	1009.	12.25	143.	38.	22.	1.03		
DIVERSION TO	43C	625.	12.25	120.	32.	18.	1.03		
HYDROGRAPH AT	DIVMD	384.	12.25	24.	6.	3.	1.03		
3 COMBINED AT	MDA	553.	14.00	237.	60.	35.	6.45		
DIVERSION TO	DMDA	553.	.00	237.	60.	35.	6.45		
HYDROGRAPH AT	DUMMY	0.	.00	0.	0.	0.	6.45		
HYDROGRAPH AT	43C	625.	12.00	120.	32.	18.	.00		
3 COMBINED AT	SBAS	1359.	14.25	638.	243.	143.	19.29		
ROUTED TO	STOR43	663.	15.25	514.	186.	109.	19.29	1022.14	15.25
DIVERSION TO	43SDS	29.	15.25	29.	28.	18.	19.29		
HYDROGRAPH AT	43W	634.	15.25	485.	158.	91.	19.29		
HYDROGRAPH AT	DMDA	553.	14.00	237.	60.	35.	.00		
2 COMBINED AT	MD43	914.	15.17	592.	218.	126.	19.29		
ROUTED TO	RMD43	902.	15.33	590.	218.	126.	19.29	1013.51	15.33
HYDROGRAPH AT	VR47C	727.	12.50	126.	32.	18.	.89		
2 COMBINED AT	CVR47C	961.	12.58	630.	250.	144.	20.18		
ROUTED TO	RBR511	887.	15.58	627.	250.	144.	20.18	1006.22	15.58
HYDROGRAPH AT	AVR51C	244.	12.42	43.	11.	6.	.28		
ROUTED TO	RBR512	162.	14.08	42.	11.	6.	.28	1009.93	14.08
HYDROGRAPH AT	BR51C	605.	12.50	94.	23.	14.	.70		

2 COMBINED AT	CB51	605.	12.50	133.	34.	20.	.98		
2 COMBINED AT	CB51C	1363.	12.67	730.	284.	164.	21.16		
ROUTED TO	RB1591	1241.	13.00	721.	283.	164.	21.16	998.64	13.00
HYDROGRAPH AT	AVR55C	166.	12.58	36.	9.	5.	.23		
ROUTED TO	RB1592	124.	14.50	35.	9.	5.	.23	1003.65	14.50
HYDROGRAPH AT	BR159C	468.	12.58	91.	23.	13.	.68		
HYDROGRAPH AT	VR59C	176.	12.58	39.	10.	6.	.25		
ROUTED TO	RB1593	124.	14.33	37.	10.	6.	.25	1001.73	14.33
4 COMBINED AT	CB159N	1577.	12.92	850.	324.	188.	22.32		
HYDROGRAPH AT	RET43C	906.	12.33	128.	38.	22.	.00		
ROUTED TO	RS51C	498.	13.83	126.	37.	22.	.00	1039.97	13.83
HYDROGRAPH AT	SM51C	347.	12.67	75.	19.	11.	.50		
2 COMBINED AT	CS51C	568.	13.83	195.	56.	32.	.50		
ROUTED TO	RB2591	456.	14.83	189.	56.	32.	.50	1028.28	14.83
ROUTED TO	RB2592	420.	15.50	185.	56.	32.	.50	1001.51	15.50
HYDROGRAPH AT	BR259C	700.	12.58	132.	33.	19.	1.00		
2 COMBINED AT	CB259A	702.	12.58	287.	89.	51.	1.50		
HYDROGRAPH AT	DOA55C	711.	12.50	126.	35.	20.	.00		
ROUTED TO	RO55C	624.	13.08	123.	35.	20.	.00	1032.73	13.08
HYDROGRAPH AT	OA55C	193.	12.42	33.	8.	5.	.25		
2 COMBINED AT	CPO55C	702.	13.00	154.	43.	25.	.25		
ROUTED TO	RD57C	554.	14.08	148.	43.	25.	.25	1029.62	14.08
HYDROGRAPH AT	DR57C	72.	12.58	16.	4.	2.	.12		
2 COMBINED AT	CDR57C	566.	14.08	159.	47.	27.	.37		
ROUTED TO	RD59C	539.	14.33	158.	47.	27.	.37	1026.93	14.33
HYDROGRAPH AT	DR59C	73.	12.50	15.	4.	2.	.11		
2 COMBINED AT	CDR59C	544.	14.33	170.	50.	29.	.48		
ROUTED TO	RB259	523.	14.67	169.	50.	29.	.48	1018.54	14.67
2 COMBINED AT	CB259S	806.	14.67	452.	139.	81.	1.98		
2 COMBINED AT	CB59	2201.	12.83	1289.	463.	268.	24.30		
ROUTED TO	RB1631	2152.	13.00	1285.	463.	268.	24.30	997.55	13.00
HYDROGRAPH AT	BR263C	319.	12.58	67.	17.	10.	.50		
2 COMBINED AT	63S	2368.	13.00	1338.	479.	278.	24.80		
HYDROGRAPH AT	BR163C	168.	12.58	36.	9.	5.	.26		
2 COMBINED AT	CB163C	2500.	12.92	1369.	488.	283.	25.06		
ROUTED TO	RCD1C	2464.	13.08	1364.	488.	283.	25.06	996.04	13.08
HYDROGRAPH AT	BR67C	98.	12.33	18.	5.	3.	.13		
ROUTED TO	RCD1C2	69.	13.67	17.	5.	3.	.13	993.33	13.67
HYDROGRAPH AT	CD1C	407.	12.50	69.	17.	10.	.47		
3 COMBINED AT	CPCD1C	2643.	13.00	1428.	509.	296.	25.66		
ROUTED TO	RCD2C1	2570.	13.25	1418.	508.	296.	25.66	989.68	13.25
HYDROGRAPH AT	CD2C	500.	12.50	92.	23.	13.	.58		
2 COMBINED AT	CCD2C1	2738.	13.25	1465.	530.	309.	26.24		
HYDROGRAPH AT	RIR63B	45.	11.83	45.	20.	12.	.00		
ROUTED TO	RIR65C	45.	13.17	45.	20.	12.	.00	5.81	13.42
HYDROGRAPH AT	IR65C	90.	12.58	23.	6.	3.	.17		
2 COMBINED AT	CIR65C	134.	12.67	65.	26.	15.	.17		
ROUTED TO	RIRDC	129.	12.92	64.	26.	15.	.17	1014.15	12.92
DIVERSION TO	RIR65C	98.	12.67	42.	19.	11.	.17		
HYDROGRAPH AT	DIIRDC	31.	12.67	22.	7.	4.	.17		
HYDROGRAPH AT	IRDC	235.	12.92	69.	17.	10.	.52		

2 COMBINED AT	CIRDC	266.	12.92	89.	24.	14.	.69		
ROUTED TO	RIRSMC	241.	13.83	85.	24.	14.	.69	1006.00	13.83
HYDROGRAPH AT	IRSMC	173.	12.33	27.	7.	4.	.25		
2 COMBINED AT	CIRSMC	251.	13.75	106.	31.	18.	.94		
ROUTED TO	RCD2C2	244.	14.08	104.	31.	18.	.94	988.06	14.08
2 COMBINED AT	CCD2C2	2812.	13.17	1567.	561.	327.	27.18		
ROUTED TO	RCD3C1	2744.	13.42	1560.	560.	326.	27.18	985.64	13.42
HYDROGRAPH AT	A67AC	379.	12.67	84.	21.	12.	.61		
ROUTED TO	RCD4C1	344.	13.42	84.	21.	12.	.61	984.60	13.42
HYDROGRAPH AT	CD4C	129.	12.58	26.	6.	4.	.19		
2 COMBINED AT	CPCD4C	387.	13.33	109.	27.	16.	.80		
ROUTED TO	RCD3C2	300.	14.92	105.	27.	16.	.80	984.55	14.92
HYDROGRAPH AT	CD3C	337.	12.58	70.	18.	10.	.48		
3 COMBINED AT	CPCD3C	2879.	13.33	1692.	605.	352.	28.46		

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
RRS27C	MANE	1.50	156.79	769.50	.27	5.00	153.96	770.00	.27

NTINUITY SUMMARY (AC-FT) - INFLOW= .1687E+02 EXCESS= .0000E+00 OUTFLOW= .1685E+02 BASIN STORAGE= .3729E-03 PERCENT ERROR= .1

RSTR23	MANE	4.46	60.50	882.92	.69	5.00	60.49	880.00	.69

NTINUITY SUMMARY (AC-FT) - INFLOW= .3889E+02 EXCESS= .0000E+00 OUTFLOW= .3889E+02 BASIN STORAGE= .3871E-03 PERCENT ERROR= .0

RCR27C	MANE	2.93	220.67	773.01	.46	5.00	217.78	770.00	.46

NTINUITY SUMMARY (AC-FT) - INFLOW= .6683E+02 EXCESS= .0000E+00 OUTFLOW= .6682E+02 BASIN STORAGE= .3329E-03 PERCENT ERROR= .0

RCR27C	MANE	2.81	208.33	776.51	.46	5.00	207.51	775.00	.46

INUITY SUMMARY (AC-FT) - INFLOW= .6679E+02 EXCESS= .0000E+00 OUTFLOW= .6672E+02 BASIN STORAGE= .3185E-03 PERCENT ERROR= .1

RBLSD7	MANE	5.00	120.75	750.00	-1.00	5.00	120.75	750.00	-1.00
RSD19	MANE	5.00	171.36	750.00	-1.00	5.00	171.36	750.00	-1.00
RSD27	MANE	5.00	161.87	755.00	-1.00	5.00	161.87	755.00	-1.00
RPC352	MANE	5.00	35.85	940.00	.56	5.00	35.85	940.00	.56

INUITY SUMMARY (AC-FT) - INFLOW= .8562E+02 EXCESS= .0000E+00 OUTFLOW= .8545E+02 BASIN STORAGE= .1796E+00 PERCENT ERROR= .0

RDS35	MANE	2.80	285.83	730.14	-1.00	5.00	285.49	730.00	-1.00
RBSD43	MANE	1.36	319.75	745.25	1.19	5.00	319.74	745.00	1.19

INUITY SUMMARY (AC-FT) - INFLOW= .1815E+03 EXCESS= .0000E+00 OUTFLOW= .1814E+03 BASIN STORAGE= .7051E-01 PERCENT ERROR= .0

NORMAL END OF HEC-1 ***

APPENDIX B

ST83120034
PHOENIX STREETS-MARICOPA CO.
23RD AVE & ROESER RD
STORM DRAIN

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ	ST83120034	5	35	

31475 PORTIA T. GONZALEZ — REGISTERED PROFESSIONAL ENGINEER (CIVIL) — ARIZONA U.S.A.

PRELIMINARY — NOT FOR CONSTRUCTION

7561 CHARLES DEE SCOTT — REGISTERED PROFESSIONAL ENGINEER (CIVIL) — ARIZONA U.S.A.

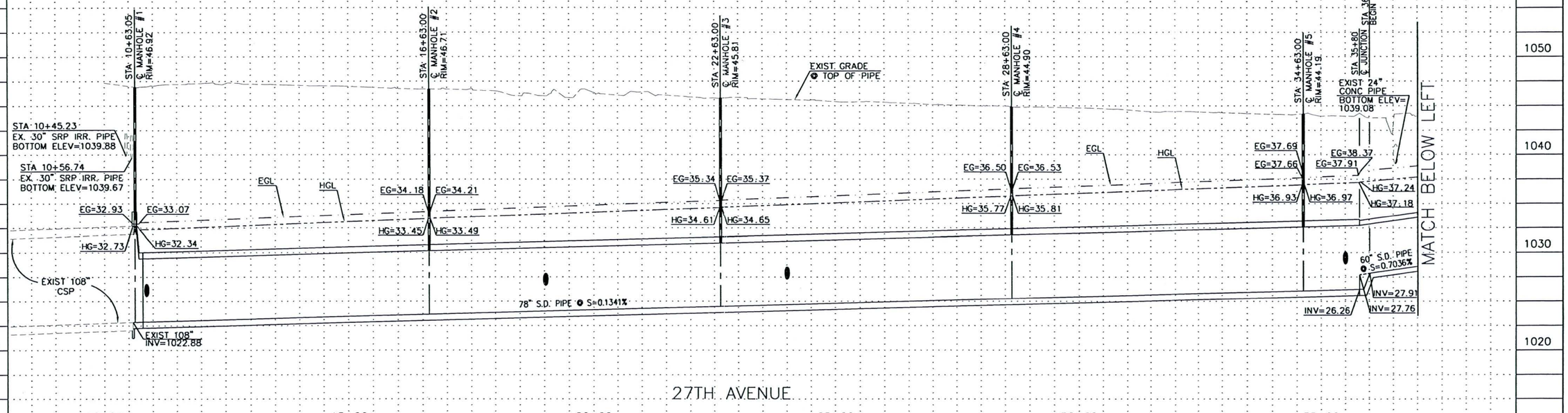
Coe & Van Loo Consultants, Inc.
4550 N. 12th Street
Phoenix, AZ 85014
602-264-6831

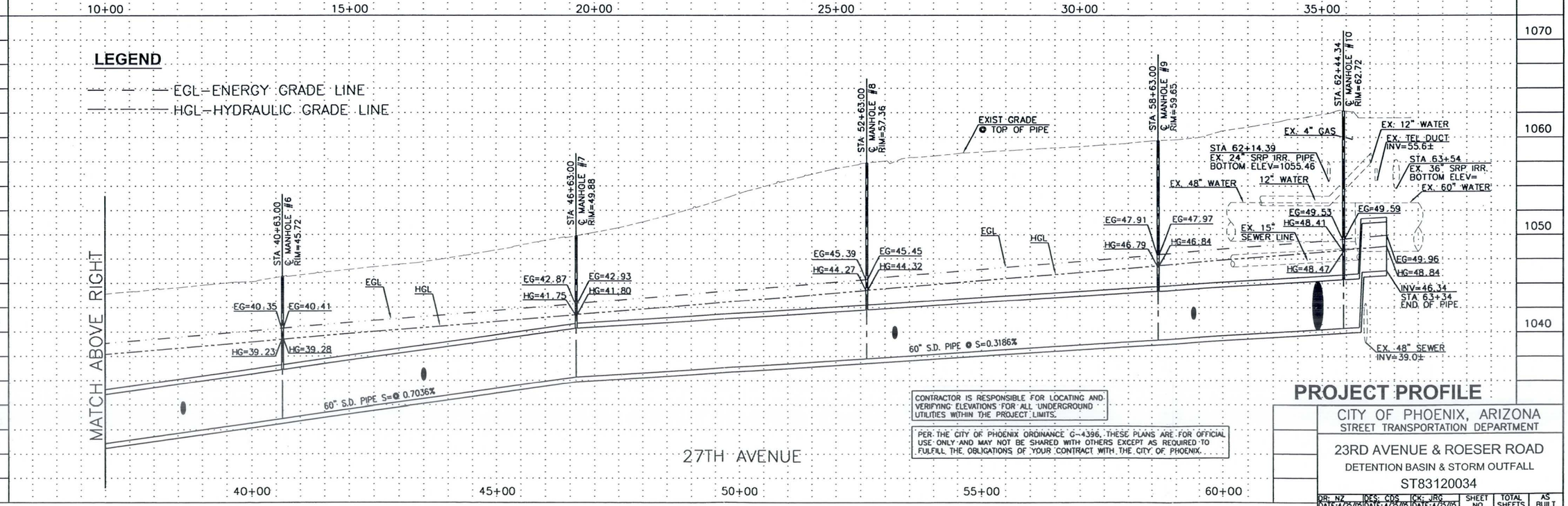
JLK Engineers
Transportation Drainage Public Works
1841 N. 25th Ave. Suite 103
Phoenix, AZ 85023
602-258-6529

DES: CDS | DR: NZ | CK: JRG | DATE: 4/25/05

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE





CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.

PER THE CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

PROJECT PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

23RD AVENUE & ROESER ROAD
DETENTION BASIN & STORM OUTFALL
ST83120034

DR: NZ DATE: 4/25/05	DES: CDS DATE: 4/25/05	CK: JRG DATE: 4/25/05	SHEET NO.	TOTAL SHEETS	AS BUILT
SCALE: 1"=100' HORIZONTAL 1"=5' VERTICAL			5	35	

ST83120034
PHOENIX STREETS-MARICOPA CO.
23RD AVE & ROESER RD
STORM DRAIN

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ	ST83120034	6	35	

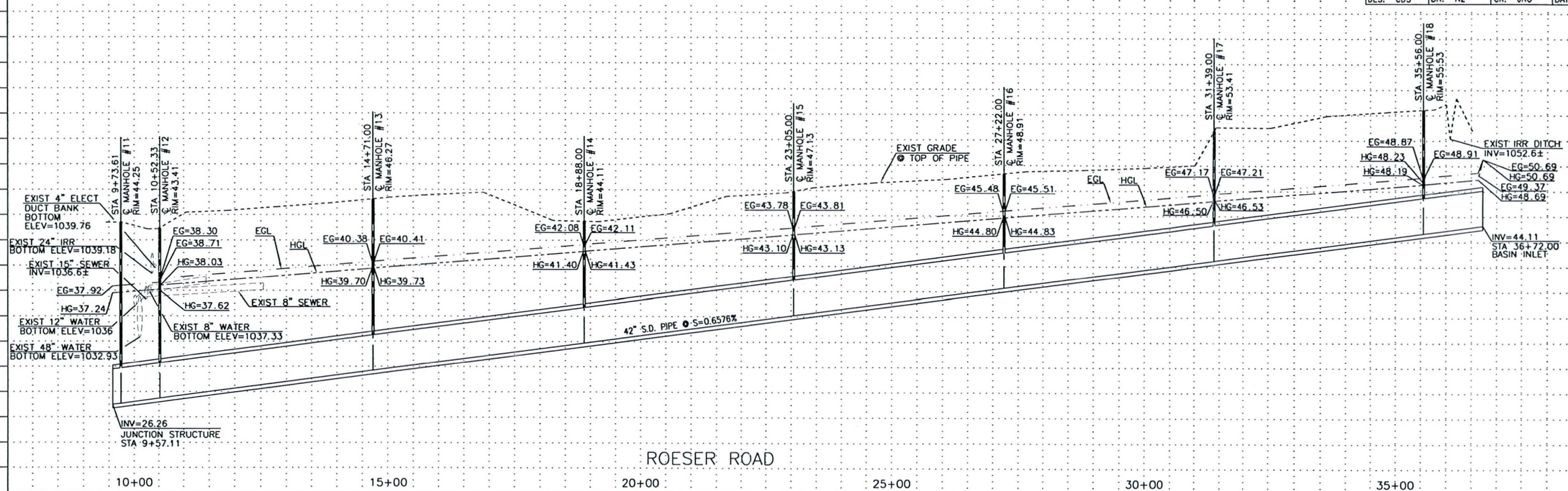
31475 PORFIR T. GONZALEZ — REGISTERED PROFESSIONAL ENGINEER — ARIZONA U.S.A.

PRELIMINARY — NOT FOR CONSTRUCTION — 7561 CHARLES DEE SCOTT — REGISTERED PROFESSIONAL ENGINEER — ARIZONA U.S.A.

Coe & Van Loo Consultants, Inc.
4550 N. 12th Street
Phoenix, AZ 85014
602-264-6831

JLK Engineers
Transportation Drainage Public Works
15441 N. 25th Ave, Suite 103
Phoenix, AZ 85023
602-266-6529

DES: CDS | DR: NZ | CK: JRG | DATE: 4/25/05



REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

LEGEND

— — — EGL-ENERGY GRADE LINE
—·—·— HGL-HYDRAULIC GRADE LINE

CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.

PER THE CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

PROJECT PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

23RD AVENUE & ROESER ROAD
DETENTION BASIN & STORM OUTFALL
ST83120034

DR: NZ	DES: CDS	CK: JRG	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 4/25/05	DATE: 4/25/05	DATE: 4/25/05	6	35	

SCALE: 1"=100' HORIZONTAL, 1"=5' VERTICAL

HYDRAULIC GRADIENT WORKSHEET
CITY OF PHOENIX STREET TRANSPORTATION DEPARTMENT
COE VAN LOO, LLC

Client : City of Phoenix
Project : 23rd Avenue & Roeser Road Detention Basin and Outfall Storm Drain
Project No : ST83120034 CVL No: 04705902
Comments : See HEC-1 Model for Design Discharge
Design : 100-year Return Frequency, 24-hour Duration

LEGEND
Input
Linked
Equation Don't Touch

Designed By: cds
Checked By: ek
Date:

Storm Drain Station	Pipe Manhole Junction	Main Pipe Dia. inches	Main Pipe Area s.f.	Main Pipe Length feet	Main Pipe Type	Main Pipe Manning's "n"	Design "Q" cfs	Pipe Velocity fps	Velocity Head $V^2/2g$	Pipe Friction Loss	Enlargement K_e	Enlargement $K_e(V_1^2-V_2^2)/2g$	Lateral Pipe Dia Inches	Lateral Pipe Q_3 cfs	Lateral Pipe V_3 fps	Lateral Pipe θ Deg.	Junction Loss (Thompson Equation) Q_2V_2	Q_1V_1	$Q_3V_3\cos\theta$	$(A_1+A_2)/2$	Δy	h_j	Bend Loss h_b k_b	$k_bV^2/2g$	Curve Loss h_c Δ	k_b	$k_bV^2/2g$	MH Riser h_{mh} $.05V^2/2g$	Total Structure Losses	Energy Grade Line Elev. Dn Stream	Energy Grade Line Elev. Up Stream	Hydraulic Grade Line Elev. Dn Stream	Hydraulic Grade Line Elev. Up Stream
27th AVENUE																																	
2+50	Outlet																													1030.76	1030.76	1030.76	1030.76
	Exist. Pipe	108	63.62	603.2	RCP	0.013	227	3.57	0.20	0.20															0	0	0.00		0.20	1030.96	1031.16	1030.76	1030.96
8+53.2	Thru M.H.										0	0.00	0	0	0.00	0	810	810	0	64	0.00	0.00	0.08	0.02				0.01	0.03	1031.16	1031.18	1030.96	1030.98
	Exist. Pipe	108	63.62	107.8	RCP	0.013	227	3.57	0.20	0.04															0	0	0.00		0.04	1031.18	1031.22	1030.98	1031.02
9+61	Angle Point										0	0.00	0	0	0.00	0	810	810	0	64	0.00	0.00	0.06	0.01				0.00	0.01	1031.22	1031.23	1031.02	1031.03
	Exist. Pipe	108	63.62	54	RCP	0.013	227	3.57	0.20	0.02															0	0	0.00		0.02	1031.23	1031.25	1031.03	1031.05
10+15	Trans. Sec.										0	0.00	0	0	0.00	0	810	810	0	64	0.00	0.00	0	0.00				0.00	1.67	1031.25	1032.91	1031.05	1032.72
	Exist. Pipe	108	63.62	44	RCP	0.013	227	3.57	0.20	0.01															0	0	0.00		0.01	1032.91	1032.93	1032.72	1032.73
10+59	Exist. Plug										0	0.00	0	0	0.00	0	810	810	0	64	0.00	0.00	0	0.00				0.00	0.00	1032.93	1032.93	1032.73	1032.73
	Pipe	108	63.62	4	RCP	0.013	227	3.57	0.20	0.00															0	0	0.00		0.00	1032.93	1032.93	1032.73	1032.73
10+63	Thru M.H.										0	0.00	0	0	0.00	0	810	810	0	64	0.00	0.00	0	0.00				0.01	0.01	1032.93	1032.94	1032.73	1032.74
	Pipe	108	63.62	10	RCP	0.013	227	3.57	0.20	0.00															0	0	0.00		0.00	1032.94	1032.94	1032.74	1032.75
10+73	Reducer										0.24	0.13	0	0	0.00	0	810	1553	0	48	0.00	0.00	0	0.00				0.00	0.13	1032.94	1033.07	1032.75	1032.34
	Pipe	78	33.18	590	RCP	0.013	227	6.84	0.73	1.11															0	0	0.00		1.11	1033.07	1034.18	1032.34	1033.45
16+63	Thru M.H.										0	0.00	0	0	0.00	0	810	1553	0	48	0.00	0.00	0	0.00				0.04	0.04	1034.18	1034.21	1033.45	1033.49
	Pipe	78	33.18	600	RCP	0.013	227	6.84	0.73	1.12															0	0	0.00		1.12	1034.21	1035.34	1033.49	1034.61
22+63	Thru M.H.										0	0.00	0	0	0.00	0	1553	1553	0	33	0.00	0.00	0	0.00				0.04	0.04	1035.34	1035.37	1034.61	1034.65
	Pipe	78	33.18	600	RCP	0.013	227	6.84	0.73	1.12															0	0	0.00		1.12	1035.37	1036.50	1034.65	1035.77
28+63	Thru M.H.										0	0.00	0	0	0.00	0	1553	1553	0	33	0.00	0.00	0	0.00				0.04	0.04	1036.50	1036.53	1035.77	1035.81
	Pipe	78	33.18	600	RCP	0.013	227	6.84	0.73	1.12															0	0	0.00		1.12	1036.53	1037.66	1035.81	1036.93
34+63	Thru M.H.										0	0.00	0	0	0.00	0	1553	1553	0	33	0.00	0.00	0	0.00				0.04	0.04	1037.66	1037.69	1036.93	1036.97
	Pipe	78	33.18	117	RCP	0.013	227	6.84	0.73	0.22															0	0	0.00		0.22	1037.69	1037.91	1036.97	1037.18
35+80	Junction										0.05	0.02	42	37	3.85	45	1553	1420	101	26	0.04	0.43	0	0.00				0.00	0.45	1037.91	1038.37	1037.18	1037.24
	Pipe	60	19.63	483	RCP	0.013	167	8.51	1.12	1.98															0	0	0.00		1.98	1038.37	1040.35	1037.24	1039.23
40+63	Thru M.H.										0	0.00	0	0	0.00	0	1420	1420	0	20	0.00	0.00	0	0.00				0.06	0.06	1040.35	1040.41	1039.23	1039.28
	Pipe	60	19.63	600	RCP	0.013	167	8.51	1.12	2.46															0	0	0.00		2.46	1040.41	1042.87	1039.28	1041.75
46+63	Thru M.H.										0	0.00	0	0	0.00	0	1420	1420	0	20	0.00	0.00	0	0.00				0.06	0.06	1042.87	1042.93	1041.75	1041.80
	Pipe	60	19.63	600	RCP	0.013	167	8.51	1.12	2.46															0	0	0.00		2.46	1042.93	1045.39	1041.80	1044.27
52+63	Thru M.H.										0	0.00	0	0	0.00	0	1420	1420	0	20	0.00	0.00	0	0.00				0.06	0.06	1045.39	1045.45	1044.27	1044.32
	Pipe	60	19.63	600	RCP	0.013	167	8.51	1.12	2.46															0	0	0.00		2.46	1045.45	1047.91	1044.32	1046.79
58+63	Thru M.H.										0	0.00	0	0	0.00	0	1420	1420	0	20	0.00	0.00	0	0.00				0.06	0.06	1047.91	1047.97	1046.79	1046.84
	Pipe	60	19.63	381	RCP	0.013	167	8.51	1.12	1.57															0	0	0.00		1.57	1047.97	1049.53	1046.84	1048.41
62+44	Thru M.H.										0	0.00	0	0	0.00	2	1420	1420	0	20	0.00	0.00	0	0.00				0.06	0.06	1049.53	1049.59	1048.41	1048.47
	Pipe	60	19.63	90	RCP	0.013	167	8.51	1.12	0.37															2	0.007	0.00		0.37	1049.59	1049.96	1048.47	1048.84
63+34	End Plug										0	0.00	0	0	0.00	4	1420	1420	0	20	0.00	0.00	0	0.00				0.06	0.00	1049.96	1049.96	1048.84	1048.84
	future pipe	60	19.63	16	RCP	0.013	167	8.51	1.12	0.07																							
ROESER ROAD																																	
											Entrance Loss K_e	$K_e(V_2^2/2G)$																					
9+57.11	Junction																														1037.92		1037.24
	Pipe	42	9.62	95.22	RCP	0.013	63.6	6.61	0.68	0.38																0	0.00		0.38	1037.92	1038.30	1037.24	1037.62
10+52.33	Thru MH										0	0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0.55	0.37				0.03	0.41	1038.30	1038.71	1037.62	1038.03
	Pipe	42	9.62	418.67	RCP	0.013	63.6	6.61	0.68	1.67																0	0.00		1.67	1038.71	1040.38	1038.03	1039.70
14+71	Thru MH											0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0	0.00				0.03	0.03	1040.38	1040.41	1039.70	1039.73
	Pipe	42	9.62	417	RCP	0.013	63.6	6.61	0.68	1.66																0	0.00		1.66	1040.41	1042.08	1039.73	1041.40
18+88	Thru MH											0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0	0.00				0.03	0.03	1042.08	1042.11	1041.40	1041.43
	Pipe	42	9.62	417	RCP	0.013	63.6	6.61	0.68	1.66																0	0.00		1.66	1042.11	1043.78	1041.43	1043.10
23+05	Thru MH											0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0	0.00				0.03	0.03	1043.78	1043.81	1043.10	1043.13
	Pipe	42	9.62	417	RCP	0.013	63.6	6.61	0.68	1.66																0	0.00		1.66	1043.81	1045.48	1043.13	1044.80
27+22	Thru MH											0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0	0.00				0.03	0.03	1045.48	1045.51	1044.80	1044.83
	Pipe	42	9.62	417	RCP	0.013	63.6	6.61	0.68	1.66																0	0.00		1.66	1045.51	1047.17	1044.83	1046.50
31+39	Thru MH											0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0	0.00				0.03	0.03	1047.17	1047.21	1046.50	1046.53
	Pipe	42	9.62	417	RCP	0.013	63.6	6.61	0.68	1.66																0	0.00		1.66	1047.21	1048.87	1046.53	1048.19
35+56	Thru MH											0.00	0	0	0.00	0	420	420	0	10	0.00	0.00	0	0.00				0.03	0.03	1048.87	1048.91	1048.19	1048.23
	Pipe	42	9.62	116	RCP	0.013	63.6	6.61	0.68	0.46						0										0	0.00		0.46	1048.91	1049.37	1048.23	1048.69
36+72	Basin Inlet										0.8	0.54	0	0	0.00	0	0	0	0	5	0.00	0.00	0.14	0.09				0.00	1.32	1049.37	1050.69	1048.69	1050.69

APPENDIX C

CITY OF PHOENIX
WEST SIDE OF 27TH AVENUE FROM SOUTHERN AVENUE TO ROESER ROAD
RATIONAL METHOD RUNOFF CALCULATIONS
10-YEAR RETURN FREQUENCY

DRAINAGE AREA LOCATION	CATCH BASIN STATION	FROM STATION	TO STATION	REACH		RATIONAL EQUATION WEIGHTED "C"			TIME OF CONCENTRATION - $T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$								RUNOFF Q=CIA
				LENGTH	AREA	RD,C&G, S/W	LANDSCAPE	"C"	AVE SLOPE	AVE SLOPE	FLOW PATH	TABLE 3.1 - K_b			INTENSITY	TIME	
				feet	acres	WIDTH	WIDTH	RATIONAL	FT/FT	S (FT/MILE)	L (MILES)	m	b	K_b	i (IN/HR)	Tc	cfs
WEST SIDE OF 27TH AVENUE	5938	62+85.33	59+40	345	0.44	47.58	8	0.89	0.0091	48	0.0654	-0.00625	0.04	0.04	4.38	10.00	1.69
	5320	61+30	53+20	810	1.32	47.58	23.42	0.30	0.0050	26	0.1534	-0.00625	0.04	0.04	4.38	10.00	4.64
	4350	53+20	43+50.1	970	1.58	47.58	23.42	0.80	0.0090	48	0.1837	-0.00625	0.04	0.04	4.38	10.00	5.55
	3861	43+50.1	38+60	490	0.80	47.58	23.42	0.80	0.0056	30	0.0928	-0.00625	0.04	0.04	4.38	10.00	2.80

CITY OF PHOENIX
WEST SIDE OF 27TH AVENUE FROM SOUTHERN AVENUE TO ROESER ROAD
GUTTER FLOW AND CURB OPENING CATCH BASIN CAPACITY
10-YEAR RETURN FREQUENCY

DRAINAGE AREA LOCATION	CATCH BASIN STATION	GUTTER FLOW cfs	EQUIVALENT X-SLOPE "Se"							CURB OPENING FOR TOTAL INTERCEPTION					EFFICIENCY			INTERCEPTED FLOW cfs	FLOWBY TO NEXT CATCH BASIN	SUMPING CAPACITY		
			X-SLOPE S_x	GUTTER S'_w	SPREAD T	GUTTER W	RATIO T/W	RATIO S'_w/S_x	FIGURE 3.6 Eo	GUTTER SLOPE "S"	MANNING'S n	X-SLOPE Se	DESIGN Q - cfs	OPENING 1.25 x L_T	SELECTED L	CURB OPENING	E %			WEIR Cw	DEPTH d	SPREAD T=22 max
WEST SIDE 27TH AVENUE	5938	1.69	0.02	0.222	9.09	1.42	6.40	11.08	0.63	0.6000%	0.015	15.90%	1.69	7.55	3	6	94%	1.59	0.10	2.3	0.34	17.17
	5320	4.64	0.02	0.222	12.53	1.42	8.82	11.08	0.46	0.9300%	0.015	12.25%	4.73	15.51	10	13	96%	4.55	0.18			
	4350	5.55	0.02	0.222	13.58	1.42	9.56	11.08	0.42	0.9000%	0.015	11.41%	5.73	17.37	10	13	92%	5.25	0.48			
	3861	2.80	0.02	0.222	11.99	1.42	8.44	11.08	0.48	0.5600%	0.015	12.73%	3.28	11.16	6	9	95%	3.11	0.17			

CITY OF PHOENIX
WEST SIDE OF 27TH AVENUE FROM SOUTHERN AVENUE TO ROESER ROAD
GUTTER FLOW - SPREAD AND DEPTH
10-YEAR RETURN FREQUENCY

LOCATION		GUTTER SPREAD UPSTREAM OF CATCH BASIN LOCATION - CALCULATED BY SUPERPOSITION											SUMP
DRAINAGE AREA LOCATION	CATCH BASIN STATION	RUNOFF + FLOWBY	MANNING'S COEFFICIENT n	ROADWAY X-SLOPE S_x	GUTTER SLOPE S	SELECT T VALUE	SPREAD T_2 VALUE	MODIFIED MANNING'S Q_1	MODIFIED MANNING'S Q_2	MODIFIED MANNING'S Q_3	GUTTER FLOW $Q_1+Q_2-Q_3$	FLOW DEPTH INCHES	APPROACH GUTTER SLOPE
WEST SIDE 27TH AVENUE	5938	1.69	0.015	0.020	0.600%	9.09	4.03	0.97	1.05	0.33	1.69	2.84	
	5320	4.73	0.015	0.020	0.930%	12.53	5.22	3.24	2.60	1.12	4.73	3.67	
	4350	5.73	0.015	0.020	0.900%	13.58	5.58	4.06	3.06	1.40	5.73	3.92	
	3861	3.28	0.015	0.020	0.560%	11.99	5.03	2.20	1.84	0.76	3.28	3.54	

23RD AVENUE ROESER ROAD DETENTION BASIN AND OUTFALL STORM DRAIN
CATCH BASINS AND CONNECTOR PIPES

CATCH BASIN CONNECTOR PIPE PROFILES																						
	CATCH BASIN DIMENSIONS						CONNECTOR PIPES				HYDRAULIC RADIUS		HYDRAULICS									
DRAINAGE ELEMENT LOCATION	CATCH BASIN STATION	NORMAL GUTTER ELEVATION	GUTTER DEPRESSION INCHES	SURFACE FREEBOARD INCHES	DETAIL 1569-1 L	DETAIL 1569-1 MIN "V"	PIPE DIAMETER INCHES	PIPE LENGTH FEET	PIPE END AREA sf	PIPE INVERT AT C.B.	WETTED PERIMETER P IN FEET	HYDRAULIC RADIUS R=A/P feet	PIPE Q cfs	PIPE VELOCITY fps	VELOCITY HEAD $V^2/2g$	ENTRANCE LOSS $0.5\ V^2/2g$	TOTAL LOSS AT ENTRANCE	PIPE FRICTION LOSS	VELOCITY HEAD AT EXIT	TOTAL ENERGY LOSS	W.S. ELEV IN C. B.	H.G. ELEV AT MAIN STORM DRAIN
WEST SIDE OF 27TH AVENUE	5938	1,060.12	2	6.00	3.00	3.50	15.00	22.58	1.23	1,057.12	3.93	0.31	1.69	1.38	0.03	0.01	0.04	0.02	0.03	0.09	1,059.45	1,059.36
	5320	1,057.77	2	6.00	10.00	4.00	15.00	22.58	1.23	1,054.27	3.93	0.31	4.64	3.78	0.22	0.11	0.33	0.12	0.22	0.67	1,057.10	1,056.43
	4350	1,046.92	2	6.00	10.00	4.00	15.00	22.58	1.23	1,043.42	3.93	0.31	5.55	4.52	0.32	0.16	0.48	0.17	0.32	0.96	1,046.25	1,045.29
	3861	1,044.21	2	6.00	6.00	3.50	15.00	22.58	1.23	1,041.21	3.93	0.31	2.80	2.28	0.08	0.04	0.12	0.04	0.08	0.25	1,043.54	1,043.30

23RD AVENUE ROESER ROAD DETENTION BASIN AND OUTFALL STORM DRAIN CATCH BASINS AND CONNECTOR PIPES

LOCATION	PIPE FRICTION LOSS				PIPE HYDRAULIC GRADE ELEVATIONS				CATCH BASIN ELEVATIONS					MAIN STORM DRAIN ELEVATIONS				
CATCH BASIN STATION	$K = 2gn^2/2.21$	Manning's Roughness Coefficient	PIPE FRICTION SLOPE S_f	PIPE FRICTION LOSS h_f	WATER SURFACE ELEV	UPSTREAM H.G. ELEV	DOWN STREAM H.G. ELEV	MAIN S.D. H.G. ELEV	NORMAL GUTTER ELEVATION	DEPRESSED GUTTER ELEV	PIPE INVERT AT C.B.	TOP CURB ELEV	Does it Work?	INITIAL ELEV	INITIAL STATION	STORM DRAIN SLOPE	S.D. INVERT ELEV	S.D. SPRINGLINE ELEV
5938	0.0049	0.013	0.0007	0.02	1,059.45	1,059.41	1,059.39	1047.19	1,060.12	1,059.95	1,057.12	1,060.62	OK	1035.38	4663.00	0.003186	1039.44	1042.69
5320	0.0049	0.013	0.0051	0.12	1,057.10	1,056.77	1,056.65	1044.59	1,057.77	1,057.60	1,054.27	1,058.27	OK	1035.38	4663.00	0.003186	1037.47	1040.72
4350	0.0049	0.013	0.0074	0.17	1,046.25	1,045.77	1,045.61	1040.50	1,046.92	1,046.75	1,043.42	1,047.42	OK	1027.91	3601.00	0.007036	1033.18	1036.43
3861	0.0049	0.013	0.0019	0.04	1,043.54	1,043.42	1,043.38	1038.43	1,044.21	1,044.04	1,041.21	1,044.71	OK	1027.91	3601.00	0.007036	1029.74	1032.99

EAST SIDE OF 27TH AVENUE FROM FROM BROADWAY ROAD TO SOUTHERN AVENUE
CATCH BASIN DRAINAGE AREAS

Drainage Area Location	Catch Basin Station	FROM STATION	TO STATION	Distance In Miles	Total Area Acres	$Reach_1$ - Dirt			$Reach_2$ - Pave, S/W, C&G			$Reach_3$ - Landscaped			$Reach_4$. Misc.		
						Length Feet	Width Feet	Area Acres	Length Feet	Width Feet	Area Acres	Length Feet	Width Feet	Area Acres	Length Feet	Width Feet	Area Acres
EAST SIDE OF 27TH AVENUE	1091																
	1903	1091	1903	0.15	0.98	390	15.42	0.14	812	39.58	0.74	422	10.42	0.10	812		0.00
	2400	1903	2400	0.09	0.57				497	39.58	0.45	497	10.42	0.12			
	3550	2400	3550	0.22	1.32				1150	39.58	1.04	1150	10.42	0.28			
	3706	3641	4700	0.20	1.21				1059	39.58	0.96	1029	10.42	0.25			
	4700	4700	5328	0.12	0.72				628	39.58	0.57	628	10.42	0.15			
	5328	5328	6285	0.18	1.09				957	39.58	0.87	917	10.42	0.22			

EAST SIDE OF 27TH AVENUE FROM BROADWAY ROAD TO SOUTHERN AVENUE
RATIONAL METHOD RUNOFF CALCULATIONS
10-YEAR RETURN FREQUENCY

DRAINAGE AREA LOCATION	CATCH BASIN STATION	FROM STATION	TO STATION	RATIONAL EQUATION WEIGHTED "C"					TIME OF CONCENTRATION - $T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$								RUNOFF Q=CIA
				Dirt	RD,C&G, S/W	LANDSCAPE	Misc.	"C"	AVE SLOPE	AVE SLOPE	FLOW PATH	TABLE 3.1 - K_b			INTENSITY	TIME	
				Width	WIDTH	WIDTH	WIDTH	RATIONAL	FT/FT	S (FT/MILE)	L (MILES)	m	b	K_b	i (IN/HR)	Tc	cfs
EAST SIDE OF 27TH AVENUE	1903	1091	1903	15	39.58	10.42	0	0.75	0.0015	8	0.15	-0.00625	0.04	0.03	4.38	10.00	3.22
	2400	1903	2400	0	39.58	10.42	0	0.88	0.0015	8	0.09	-0.00625	0.04	0.03	4.38	10.00	2.19
	3550	2400	3550	0	39.58	10.42	0	0.88	0.0015	8	0.22	-0.00625	0.04	0.03	4.38	10.00	5.07
	3706	3641	4700	0	39.58	10.42	0	0.88	0.0056	30	0.20	-0.00625	0.04	0.03	4.38	10.00	4.64
	4700	4700	5328		39.58	10.42		0.88	0.0090	48	0.12	-0.00625	0.04	0.03	4.38	10.00	2.77
	5328	5328	6285		39.58	10.42		0.88	0.0093	49	0.18	-0.00625	0.04	0.03	4.38	10.00	4.18

EAST SIDE OF 27TH AVENUE FROM BROADWAY ROAD TO SOUTHERN AVENUE
GUTTER FLOW AND CURB OPENING CATCH BASIN CAPACITY
10-YEAR RETURN FREQUENCY

DRAINAGE AREA LOCATION	CATCH BASIN STATION	GUTTER FLOW cfs	EQUIVALENT X-SLOPE "S_e"							CURB OPENING FOR TOTAL INTERCEPTION					EFFICIENCY			INTERCEPTED FLOW cfs	FLOWBY TO NEXT CATCH BASIN	P1570, TYPE "N" - SUMPING WEIR CAPACITY								
			X-SLOPE S_x	GUTTER S'_w	SPREAD T	GUTTER W	RATIO T/W	RATIO S'_w/S_x	FIGURE 3.6 E_o	GUTTER SLOPE "S"	MANNING'S n	X-SLOPE S_e	DESIGN Q - cfs	OPENING 1.25 x L_T	SELECTED L	CURB OPENING	E %			SINGLE			DOUBLE			TRIPLE		
																				C_w	P	d	C_w	P	d	C_w	P	d
EAST SIDE 27TH AVENUE	1903	3.22	0.02	0.222	15.38	1.42	10.83	11.08	0.37	0.1500%	0.015	10.19%	3.22	8.52	6	9	100%	3.22	0.00									
	2400	2.19	0.02	0.222	13.25	1.42	9.33	11.08	0.44	0.1500%	0.015	11.66%	2.19	6.69	3	6	98%	2.16	0.04									
	3550	5.11	0.02	0.222	18.35	1.42	12.92	11.08	0.30	0.1500%	0.015	8.68%	5.11	11.39	10	13	100%	5.11	0.00									
	3706	4.64	0.02	0.222	13.72	1.42	9.66	11.08	0.42	0.5600%	0.015	11.31%	4.64	13.86	10	13	99%	4.64	0.00	3.00	5.88	0.41	3.00	8.92	0.31	3.00	11.96	0.26
	4700	2.77	0.02	0.222	10.21	1.42	7.19	11.08	0.57	0.9000%	0.015	14.55%	2.77	11.06	10	13	100%	2.77	0.00	3.00	5.88	0.29	3.00	8.92	0.22	3.00	11.96	0.18
	5328	4.18	0.02	0.222	11.93	1.42	8.40	11.08	0.49	0.9300%	0.015	12.79%	4.18	14.35	10	13	99%	4.18	0.00	3.00	5.88	0.38	3.00	8.92	0.29	3.00	11.96	0.24

EAST SIDE OF 27TH AVENUE FROM BROADWAY ROAD TO SOUTHERN AVENUE
GUTTER FLOW - SPREAD AND DEPTH
10-YEAR RETURN FREQUENCY

LOCATION		GUTTER SPREAD UPSTREAM OF CATCH BASIN LOCATION - CALCULATED BY SUPERPOSITION											SUMP
DRAINAGE AREA LOCATION	CATCH BASIN STATION	RUNOFF + FLOWBY	MANNING'S COEFFICIENT n	ROADWAY X-SLOPE S_x	GUTTER SLOPE S	SELECT T VALUE	SPREAD T_2 VALUE	MODIFIED MANNING'S Q_1	MODIFIED MANNING'S Q_2	MODIFIED MANNING'S Q_3	GUTTER FLOW $Q_1+Q_2-Q_3$	FLOW DEPTH INCHES	APPROACH GUTTER SLOPE
EAST SIDE 27TH AVENUE	1903	3.22	0.015	0.020	0.150%	15.38	6.18	2.40	1.64	0.82	3.22	4.35	
	2400	2.19	0.015	0.020	0.150%	13.25	5.46	1.54	1.18	0.53	2.19	3.84	
	3550	5.11	0.015	0.020	0.150%	18.35	7.21	4.01	2.48	1.38	5.11	5.06	
	3706	4.64	0.015	0.020	0.560%	13.72	5.62	3.30	2.47	1.14	4.64	3.95	
	4700	2.77	0.015	0.020	0.900%	10.21	4.43	1.71	1.65	0.59	2.77	3.11	
	5328	4.18	0.015	0.020	0.930%	11.93	5.01	2.80	2.34	0.96	4.18	3.52	

EAST SIDE OF 27TH AVENUE FROM BROADWAY ROAD TO SOUTHERN AVENUE
CATCH BASINS CONNECTOR PIPES

CATCH BASIN CONNECTOR PIPE PROFILES																						
CATCH BASIN DIMENSIONS							CONNECTOR PIPES				HYDRAULIC RADIUS		HYDRAULICS									
DRAINAGE ELEMENT LOCATION	CATCH BASIN STATION	NORMAL GUTTER ELEVATION	GUTTER DEPRESSION INCHES	SURFACE FREEBOARD INCHES	DETAIL 1569-1 L	DETAIL 1569-1 & 1570 MIN "V"	PIPE DIAMETER INCHES	PIPE LENGTH FEET	PIPE END AREA sf	PIPE INVERT AT C.B.	WETTED PERIMETER P IN FEET	HYDRAULIC RADIUS R=A/P feet	PIPE Q cfs	PIPE VELOCITY fps	VELOCITY HEAD $V^2/2g$	ENTRANCE LOSS $0.5\ V^2/2g$	TOTAL LOSS AT ENTRANCE	PIPE FRICTION LOSS	VELOCITY HEAD LOSS AT EXIT	TOTAL ENERGY LOSS	WATER SURFACE ELEVATION IN CATCH BASIN	H.G. ELEVATION AT MAIN STORM DRAIN
EAST SIDE OF 27TH AVENUE	1091	1,047.08	2	6.00	6.42	4.00	15.00	49.58	1.23	1,043.58	3.93	0.31	10.00	8.15	1.03	0.52	1.55	1.19	1.03	3.76	1,046.41	1,042.65
	1903	1,045.86	2	6.00	6	3.50	15.00	49.58	1.23	1,042.86	3.93	0.31	3.22	2.62	0.11	0.05	0.16	0.12	0.11	0.39	1,045.19	1,044.80
	2400	1,045.25	2	6.00	3	3.50	15.00	49.58	1.23	1,042.25	3.93	0.31	2.19	1.79	0.05	0.02	0.07	0.06	0.05	0.18	1,044.58	1,044.40
	3550	1,043.10	2	6.00	10	4.00	15.00	49.58	1.23	1,039.60	3.93	0.31	5.07	4.13	0.27	0.13	0.40	0.31	0.27	0.97	1,042.43	1,041.47
	3706	1,043.90	3	6.00		4.00	15.00	49.58	1.23	1,040.40	3.93	0.31	4.64	3.78	0.22	0.11	0.33	0.26	0.22	0.81	1,043.15	1,042.34
	4700	1,050.30	3	6.00		4.00	15.00	49.58	1.23	1,046.80	3.93	0.31	2.77	2.26	0.08	0.04	0.12	0.09	0.08	0.29	1,049.55	1,049.26
	5328	1,057.70	3	6.00		4.00	15.00	49.58	1.23	1,054.20	3.93	0.31	4.18	3.41	0.18	0.09	0.27	0.21	0.18	0.66	1,056.95	1,056.29

EAST SIDE OF 27TH AVENUE FROM BROADWAY ROAD TO SOUTHERN AVENUE
CATCH BASINS CONNECTOR PIPES

EAST SIDE OF 27TH AVENUE

CONNECTOR PIPE HYDRAULIC GRADIENT

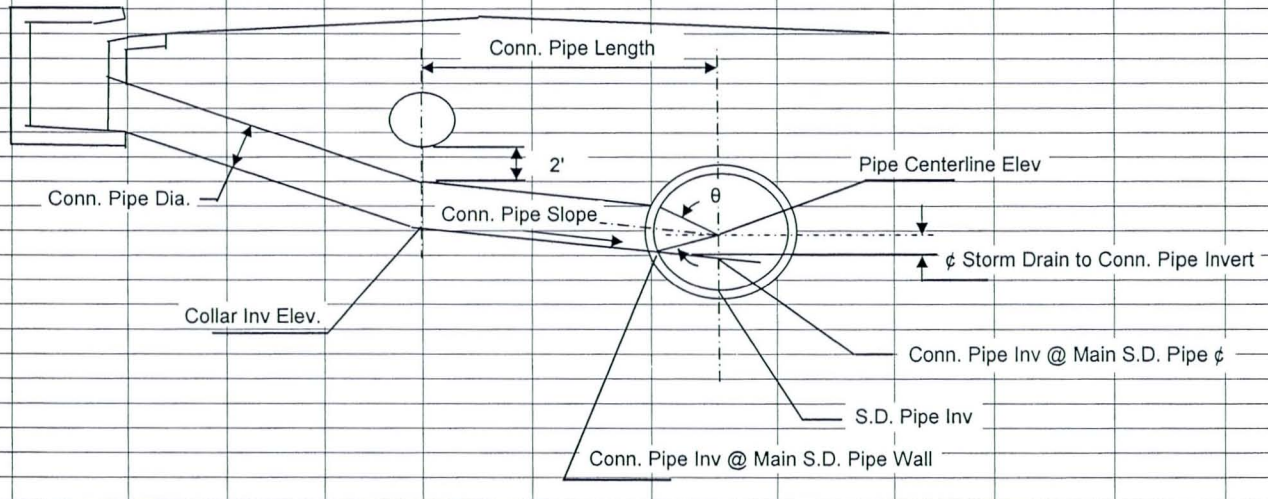
LOCATION	PIPE FRICTION LOSS				PIPE HYDRAULIC GRADE ELEVATIONS				CATCH BASIN ELEVATIONS					MAIN STORM DRAIN ELEVATIONS				
CATCH BASIN STATION	$K = 2gn^2/2.21$	Manning's Roughness Coefficient	PIPE FRICTION SLOPE S_f	PIPE FRICTION LOSS h_f	WATER SURFACE ELEV	UPSTREAM H.G. ELEV	DOWN STREAM H.G. ELEV	MAIN S.D. H.G. ELEV	NORMAL GUTTER ELEVATION	DEPRESSED GUTTER ELEV	PIPE INVERT AT C.B.	TOP CURB ELEV	Does it Work?	INITIAL ELEV	INITIAL STATION	STORM DRAIN SLOPE	S.D. INVERT ELEV	S.D. SPRINGLINE ELEV
1091	0.0049	0.013	0.0239	1.19	1,046.41	1,044.86	1,043.68	1032.37	1,047.08	1,046.91	1,043.58	1,047.58	OK	1022.88	1059.05	0.001341	1022.92	1026.17
1903	0.0049	0.013	0.0025	0.12	1,045.19	1,045.03	1,044.91	1033.94	1,045.86	1,045.69	1,042.86	1,046.36	OK	1022.88	1059.05	0.001341	1024.01	1027.26
2400	0.0049	0.013	0.0011	0.06	1,044.58	1,044.51	1,044.45	1034.91	1,045.25	1,045.08	1,042.25	1,045.75	OK	1022.88	1059.05	0.001341	1024.68	1027.93
3550	0.0049	0.013	0.0062	0.31	1,042.43	1,042.03	1,041.73	1037.13	1,043.10	1,042.93	1,039.60	1,043.60	OK	1022.88	1059.05	0.001341	1026.22	1029.47
3706	0.0049	0.013	0.0052	0.26	1,043.23	1,042.90	1,042.64	1037.76	1,043.90	1,043.73	1,040.40	1,044.40	OK	1027.91	3601.00	0.007036	1028.65	1031.90
4700	0.0049	0.013	0.0018	0.09	1,049.63	1,049.51	1,049.42	1041.95	1,050.30	1,050.13	1,046.80	1,050.80	OK	1035.38	4683.00	0.003186	1035.43	1038.68
5328	0.0049	0.013	0.0042	0.21	1,057.03	1,056.76	1,056.55	1044.59	1,057.70	1,057.53	1,054.20	1,058.20	OK	1035.38	4683.00	0.003186	1037.43	1040.68

23RD AVENUE ROESER ROAD
DETENTION BASIN OUTFALL STORM DRAIN
CONNECTOR PIPE SLOPES AND ELEVATONS AT MAIN PIPE

Beginning Station	Beginning Elevation	C. B. Station	Pipe Elevation	Pipe Diameter	Pipe ¢ Elevation	Conn. Pipe Length *Horizontal	Conn. Pipe Length True Length	Conn. Pipe Diameter	Collar Inv Elev	Conn. Pipe Slope	Angle θ/2 Radians	Angle θ/2 Degrees	¢ S.D. to C.P. Invert	Conn. Pipe Inv Elev @ Main S.D. Pipe Wall	Conn. Pipe Inv Elev @ Main S.D. Centerline
1059.05	1022.88	1091	1022.92	78	1026.17	28	25.65	15	1032.70	0.2562	0.1935	11.0875	0.19	1026.36	1025.53
1059.05	1022.88	1903	1024.01	78	1027.26	28	25.16	15	1031.46	0.1726	0.1935	11.0875	-0.07	1027.19	1026.63
1059.05	1022.88	2400	1024.68	78	1027.93	28	24.95	15	1030.66	0.1200	0.1935	11.0875	-0.24	1027.69	1027.30
1059.05	1022.88	3550	1026.22	78	1029.47	28	24.77	15	1030.00	0.0413	0.1935	11.0875	-0.49	1028.98	1028.84
3580.00	1027.76	3706	1028.65	60	1031.15	40	37.54	15	1,032.25	0.0432	0.2527	14.4775	-0.52	1030.63	1030.52
3580.00	1027.76	3861	1029.74	60	1032.24	22.58	21.86	15	1040.71	0.4051	0.2527	14.4775	0.33	1032.57	1031.56
3580.00	1027.76	4350	1033.18	60	1035.68	22.58	21.60	15	1043.42	0.3724	0.2527	14.4775	0.26	1035.94	1035.01
4663.00	1035.38	4700	1035.50	60	1038.00	28	25.50	15	1037.50	0.0045	0.2527	14.4775	-0.61	1037.38	1037.37
4663.00	1035.38	5320	1037.47	60	1039.97	22.58	24.63	15	1054.27	0.6664	0.2527	14.4775	0.82	1040.80	1039.22
4663.00	1035.38	5328	1037.50	60	1040.00	28	25.85	15	1043.81	0.1587	0.2527	14.4775	-0.24	1039.76	1039.37
4663.00	1035.38	5938	1039.44	60	1041.94	22.58	24.85	15	1056.62	0.6836	0.2527	14.4775	0.85	1042.79	1041.19

* Horizontal Length Measured to centerline of Main Storm Drain

23RD AVENUE ROESER ROAD
DETENTION BASIN OUTFALL STORM DRAIN
CONNECTOR PIPE SLOPES AND ELEVATONS AT MAIN PIPE



CATCH BASIN CONNECTOR PIPE PROFILE