LDPod-03946
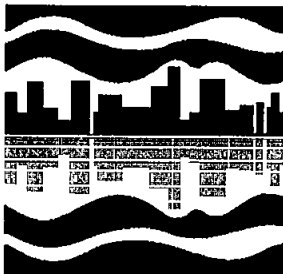
COIT PLAZA WAL-MART

HYDROLOGY

PREPARED FOR: CEI Engineering Associates, Inc.
4237 W. Swift Avenue
Fresno, CA 93722

PREPARED BY: John Mitchell, P.E.
Paula Hicks, E.I.

[Professional Engineer seal: JOHN D. MITCHELL, CIVIL, No. 9841, STATE OF NEVADA, 6.11.02]
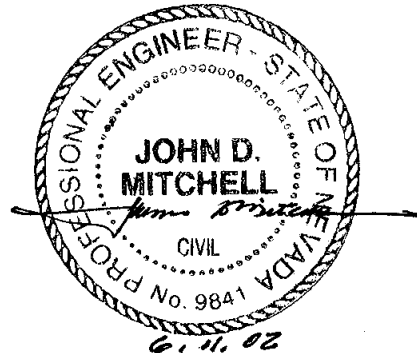
JEFF CODEGA PLANNING/DESIGN, INC.

planners ♡ landscape architects ♡ engineers

433 West Plumb Lane ♡ Reno, Nevada 89509 ♡ (702)322-5100
♡ fax (702) 322-1551

June 7, 2002

2002.0003

INTRODUCTION

Coit Plaza, APN numbers 39-051-07 & 39-490-02, totaling approximately 28.8 acres, is located in the southeast corner of Section 5, Township 19 North, Range 19 East M.D.M. The site, zoned AC, is bounded by McCarran Boulevard on the East, West Seventh Street on the North, Sierra Highlands Drive on the West and Mae Anne Boulevard and existing commercial development to the south. Apartments are located to the North and West and commercial development on the East and South. The site is undeveloped with ground cover of sage brush, grasses and stock piles of earth that are partially over grown. Figure 1, the vicinity map, shows the site in relationship to these surrounding features.

The site is shown on FEMA Flood Insurance Rate Map, (FIRM), Panel 320021 - 2984 E dated September 30, 1994. The map shows the site in an unshaded flood zone X , an areas determined to be outside the 500-year flood plain. A copy of this FIRM is included in the calculation section for reference.

RELATED STUDIES:

1. Improvement Plans for Coit Heights Unit No.1, SEA Engineers, October 1983.
2. Improvement Plans for Coit Heights Unit No.2, Joe L. Murin, November 1984.
3. Improvement Plans for Sierra Highlands Apartments, Jeff Codega Planning/Design, February 1995.
4. Hydrology Report for Pine Creek Village Apartments, Fricke Engineering, March 1993.
5. Hydrology Report Silverado Estates Unit 2 Phase 1, Summit Engineering, September 1994.
6. Hydrology Report for Silverado Estates Unit 2 Phase 2, Pyramid Engineers, January 1996.
7. Westcreek Apartments Hydrology, Jeff Codega Planning\Design, April 1996.
8. Coit Plaza Hydrology, Jeff Codega Planning\Design, February 1997.
9. Hydrology Report for Silverado Ranch Estates Unit #6, Summit Engineering, May 1999.

METHODOLOGY

The peak discharges for the project were calculated using the Rational Method:

$$Q=CiA$$

Where;

       Q= peak discharge in cubic feet per second,
       C= Rational discharge coefficient based on surface characteristics,
       I= peak rainfall intensity in inches per hour based on basin travel times,
       A= basin area in acres.

Where travel times were calculated to be less than 10 minutes a travel time of 10 minutes, was used.

Detention facilities were analyzed and designed using Pond Pack V7 from Haestad Methods.

The storm drain network for the site was analyzed using Flow Master from Haestad Methods.

FIGURE 1
SITE LOCATION MAP

N.T.S.

McCarran Blvd.

West 7th St.

Sierra Highlands Dr.

Site

Mae Anne Ave.
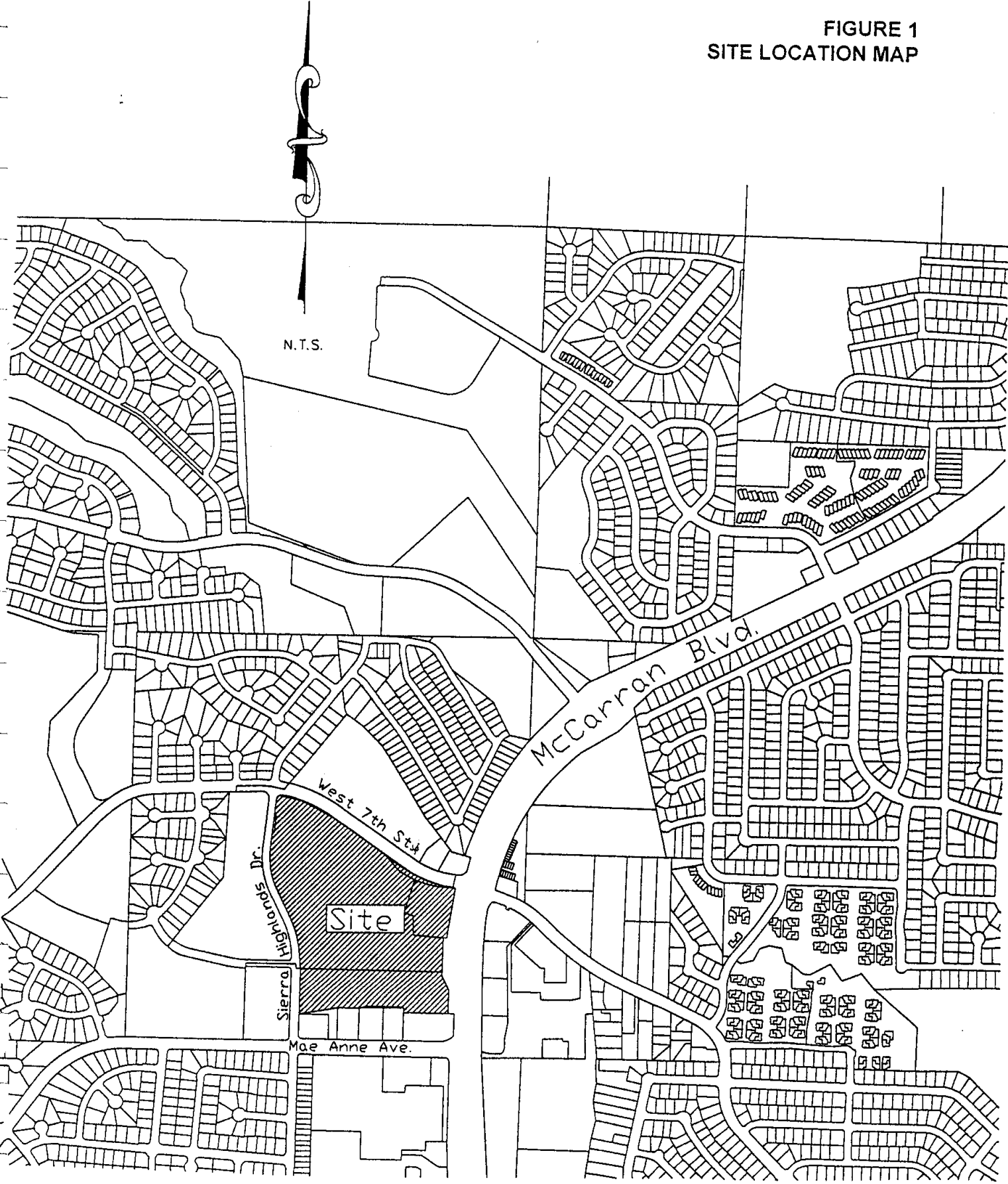
EXISTING CONDITIONS

The site is currently undeveloped with a vegetative cover of sagebrush and grasses. The terrain is typically gully and ridge. Some localized soil stock piling has occurred on the site in the past. The site drains generally to the southeast and exits the site in a 60" CMP under McCarran Boulevard. There is an existing 24" RCP storm drain system that flows west to east along the south of the site, that also exits under McCarran Boulevard near the Wells Fargo Bank. Both the 60" CMP and the 24" RCP drainage are collected in the 54" storm system constructed with Canyon Center Phase I. The 54" storm system exits into the existing drainage east of McCarran Boulevard. Figure 2 is the existing condition drainage map showing these features. The area of the overall watershed that will be affected by the proposed development is 28.8 acres. The rational coefficient used for the existing condition was 0.40 from the City of Reno Design Manual for open space. A travel time of 10 minutes was used to derive the rainfall intensity as per the City of Reno Design Manual. Table 1 is a summary of the hydrologic data and the discharges calculated for the watershed.

TABLE 1 Existing Condition Site Discharge

	Area (ac)	C	Travel Time (min)	Intensity (in/hr)	Discharge (cfs)
5 YEAR	28.8	0.40	10	1.4	16.1
100 YEAR	28.8	0.40	10	3.8	43.8

Some of the perimeter streets and lots surface drain onto the site. This perimeter flow is tabulated in Table 2.

TABLE 2 Existing Condition Perimeter Discharge

Basin #	Area (ac)	C	Travel Time (min)	Discharge 5-yr (cfs)	Discharge 100-yr(cfs)
13	1.56	0.90	10	1.97	5.33
14	0.42	0.90	10	0.53	1.43
15	0.33	0.90	10	0.42	1.13
16	0.77	0.90	10	0.97	2.63
17	0.70	0.85	10	0.83	2.26

Four existing storm drain pipes enter the site. Pipe number 1 is a 30" RCP located mid way along West Seventh Street, pipe number 2 is a 30" RCP and pipe 3 is a 24" RCP that enters one third of the way south along Sierra Highlands Drive and pipe 4 is an 18" RCP is located east of the intersection of Villa Verde and Sierra Highlands Drives. Table 3 shows the estimated discharge for each of the 4 pipes as modeled by HEC-1 (see calculations section). These discharges were estimated based on the applicable upstream hydrology reports and plans. The detention basin designed with Silverado Estates Unit 2 Phase 1 was included in the HEC-1 model for Pipe 1 to determine the detained flow in this pipe.

TABLE 3. Existing Discharge on Existing Pipes

PIPE	Q5 (cfs)	Q100 (cfs)	Capacity (cfs)
Pipe 1 (30" RCP)	25	140	91.6
Pipe 2 (30" RCP)	*	*	50.2
Pipe 3 (24" RCP)	12	60	17.1
Pipe 4 (18" RCP)	5	25	53.8
* Because Pipes 2 and 3 drain nearly the same area, the discharge for these areas is combined and is shown as the discharge in Pipe 3.			

FIGURE 2
EXISTING CONDITION
WATERSHED MAP

N.T.S.

WESTCREEK
APARTMENTS

WEST 7TH ST.

PERIMETER
BASINS

EX. 30"RCP
PIPE 2

EX. 30"RCP
PIPE 1

KRAGEN

EX. 24"RCP
PIPE 3

PINE CREEK
VILLAGE
APARTMENTS

McCARRAN BLVD.

CANYON
CENTER

EX. 60"CMP

EX. 16"RCP
PIPE 4

SIERRA HIGHLANDS DR.

EX. 54" SD

EX. 24" SD

AM-PM

KFC

TACO
BELL

BK

WELLS FARGO

MAE ANNE AVE.
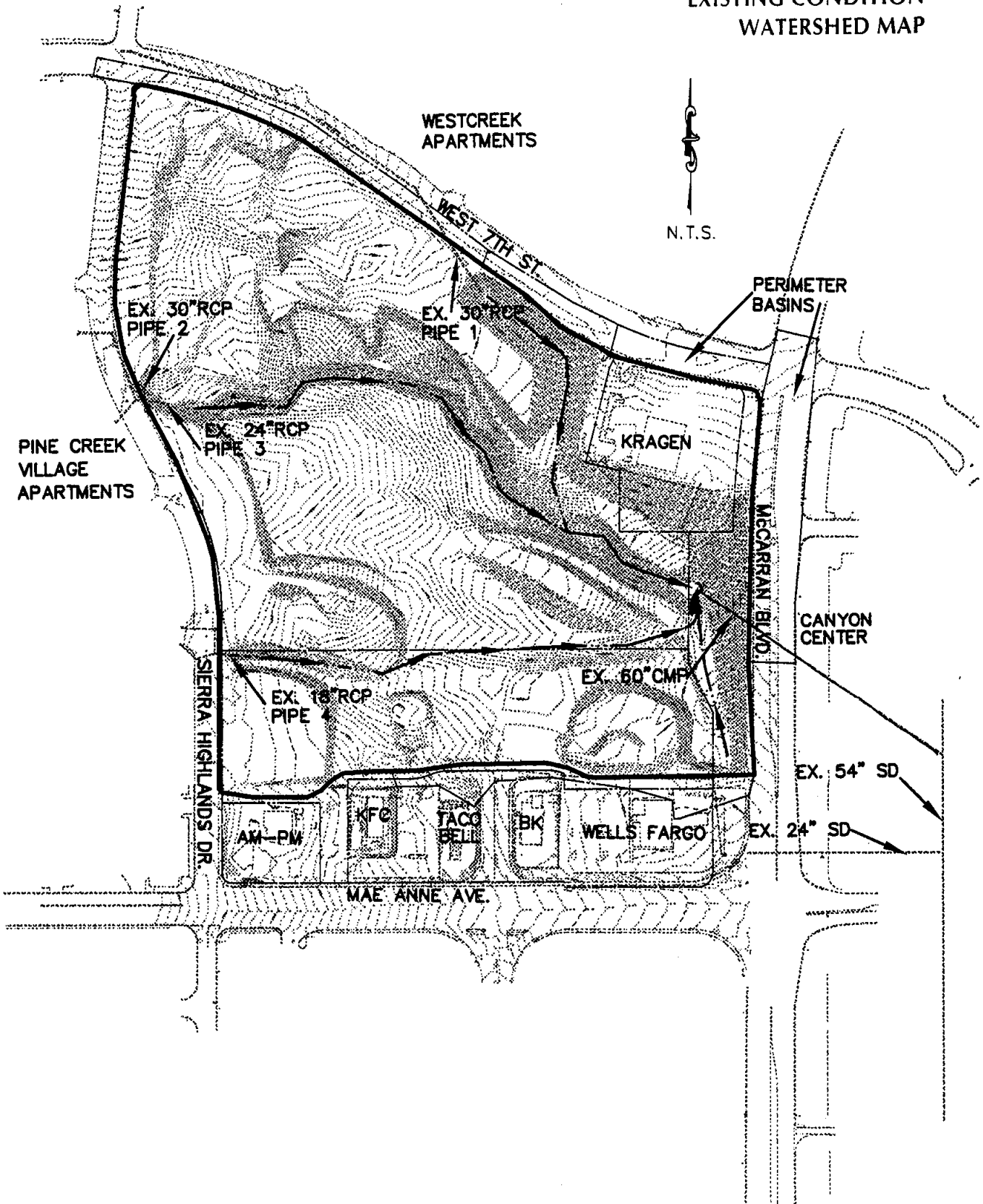
DEVELOPED CONDITIONS

The proposed development consists of the Wal-mart site (22.37ac), and two Out-lots (3.66ac and 0.59ac). This proposed development area (26.62ac) in addition to the existing Kragen auto Parts lot (2.18ac) composes the 28.8ac total area for Coit Plaza. The main Wal-mart retail building is near the west edge of the site with Sierra Highlands Drive on one side. The other three sides are parking areas. There is an area for a detention pond located south of the existing Kragen Auto Parts Building. The two Out-lots are located in the northwest and southeast corners of Coit Plaza. It is assumed that these Out-lots will be developed in the future.

Three systems to be dedicated to the City of Reno are continuations of the existing drainage entering the site, and these systems are displayed in Figure 3. System A is the continuation of the existing 30" RCP in West Seventh Street, Pipe 1. System B intercepts the existing 30" and 24" RCP in Sierra Highlands Drive, Pipes 2 and 3. Perimeter Basin 16 drains into a proposed D.I. in West 7th Street which joins System A and System B. System C is the continuation of the 30" RCP at the intersection of Villa Verde & Sierra Highland Drives, Pipe 4. Perimeter Basin 13 sheet flows into an existing rip rap swale that will be extended to discharge next to Systems A & B. Systems A, B, and C discharge into an open rip rap lined channel between McCarran and the onsite detention pond. From the rip rap channel the water will drop into the existing 60" RCP through a large drop inlet. (See Details 2 and 3)

The on-site developed flows were separated into two systems that run from the west side of the site to the detention pond on the east side of the site. System D connects basins 1, 2, 3, 5, and 6 on the north side of the Wal-Mart building. System E connects basins 4, 12, 11, 10, and 9 on the south side of the building. Basin 8 sheet flows into the pond. Perimeter Basin 17 drains into Basins 8, 10 and 11. Basin 7 (Kragen Auto Parts) and Perimeter Basins 14 and 15 drain into the detention pond through two existing 8" storm drain lines. The storage volume of water that must be detained is less than 3.0 acre-feet. The total pond volume is over 3.0 acre-feet calculated from a bottom elevation of 54.0 to the top water surface of 65.0. Detention calculations are provided for both the 5 year and 100 year storms. A detail of the outlet structure is included (Detail 4) which consists of a modified type 1A DI with a 15" RCP. The 15" RCP will function in the lower flow events, while the high flow will flow over the 48" grate on the top of the drop inlet (DI).

TABLE 3a. Developed Condition Site Discharge (overall)

	Area (ac)	C	Travel Time (min)	Intensity (in/hr)	Discharge (cfs)	Increase (cfs)
5 YEAR	28.8	0.850	10	1.4	34.3	18.2
100 YEAR	28.8	0.850	10	3.8	93.0	49.2

TABLE 3b. Developed Condition Site Discharge (by basin)

Basin #	Area (ac)	C	Travel Time (min)	Discharge 100-yr (cfs)	Discharge 5-yr (cfs)
1	5.46	0.850	10	17.6	6.5
2	1.44	0.850	10	4.6	1.7
3	1.45	0.850	10	4.7	1.7
4	6.10	0.850	10	19.7	7.3
5	0.32	0.850	10	1.0	0.4
6	2.62	0.850	10	8.5	3.1
7	1.68	0.850	10	5.4	2.0
8	3.34	0.850	10	10.8	4.0
9	2.62	0.850	10	8.4	3.1
10	1.70	0.850	10	5.5	2.0
11	0.89	0.850	10	2.9	1.1
12	1.20	0.850	10	3.9	1.4
TOTAL	28.8	0.850	10	93.0	34.3

ii

Some of the perimeter streets and lots surface drain onto the site. This perimeter flow is tabulated in Table 3c. (Note: perimeter flow does not change with site development).

TABLE 3c Proposed Condition Perimeter Discharge

Basin #	Area (ac)	C	Travel Time (min)	Discharge 5-yr (cfs)	Discharge 100-yr(cfs)
13	1.56	0.90	10	1.97	5.33
14	0.42	0.90	10	0.53	1.43
15	0.33	0.90	10	0.42	1.13
16	0.77	0.90	10	0.97	2.63
17	0.70	0.85	10	0.83	2.26

ON SITE DETENTION

The detention basin outlet structure will control the outlet flow rate. The 15 " RCP will be the limiting structure for 5-yr flows. This two stage structure will limit the 5 year and 100 year storms for the onsite water. The offsite water will bypass the detention pond and outlet structure. A detail of the outlet structure is included in the calculations section.

The detention basin will have 3:1 side slopes from the inlet elevation to the top of the basin at elevation 65.0. This provides more than 4' of freeboard from the 100-yr elevation 60.64. Drainage from the surface of McCarran Blvd. Will drain to the east and not enter the detention pond. Drainage from the DOT ROW west of the west shoulder of McCarran will enter the pond as part of Basin #8.

The detention pond and outlet structure were designed using the Pond Pack program. The increase in onsite flow (5-yr and 100-yr) due to development will all be detained in the onsite pond.

FIGURE 3
DEVELOPED CONDITION
WATERSHED MAP

COIT PLAZA
DEVELOPED CONDITIONS
HYDROLOGY MAP
FIGURE 3

SCALE = 1" = 60'

McCARRAN BLVD.

WEST 7TH ST.

MAE ANNE AVE.

SIERRA HIGHLANDS DR.

BASIN #13
1.56ac

BASIN #7
1.68ac

KRAGEN

BASIN #14
0.42ac

BASIN #15
0.33ac

BASIN #16
0.77ac

BASIN #6
2.62ac

BASIN #9
2.62ac

BASIN #10
1.70ac

BASIN #8
3.34ac

OUTLOT 2
OFF-SITE FLOW

BASIN #17
0.70ac

SYSTEM A

SYSTEM E

SYSTEM D

BASIN #3
1.45ac

BASIN #5
0.32ac

BASIN #11
0.89ac

BASIN #2
1.44ac

BASIN #4
6.10ac
WAL-MART

RETAIL LOT

SYSTEM C

SYSTEM B

BASIN #12
1.20ac

BASIN #1
5.46ac

OUTLOT 1

PIPE 1
EXISTING 30" RCP
FL=4880.09

BEGIN DEDICATED
STORM SYSTEM

RIP RAP

OFF-SITE OUTLET
(SEE DETAILS 2&3)

EXISTING 60" CMP
TO REMAIN

EXISTING 8"

EXISTING 8"
IE=4860.65

REMOVE EXIST.

ON SITE
FLOW

ON SITE
FLOW

OFF-SITE FLOW

ON-SITE OUTLET
(SEE DETAIL 4)

REMOVE FLARED END

PIPE 3
EXISTING 24" RCP

BEGIN DEDICATED
STORM SYSTEM
CONSTRUCT 30"

REMOVE FLARED END

PIPE 2
EXISTING 30" RCP

PIPE 4
EXISTING 18" RCP

BEGIN DEDICATED
STORM SYSTEM
CONSTRUCT 24"

LEGEND
INDICATES EXISTING STORM DRAIN
INDICATES PROPOSED DRAINAGE SYSTEM
INDICATES NEW PROPOSED MANHOLES
INDICATES PROPOSED DROP INLETS
INDICATES DRAINAGE BASIN LIMITS
INDICATES ROCK RIP-RAP
INDICATES EXISTING 60" CMP (TO BE MODIFIED)

NOTES
SYSTEM A TO BE DEDICATED TO PUBLIC
SYSTEM B TO BE DEDICATED TO PUBLIC
SYSTEM C TO BE DEDICATED TO PUBLIC
SYSTEM D TO BE MAINTAINED BY OWNER
SYSTEM E TO BE MAINTAINED BY OWNER

CONCLUSIONS

The design of the storm drain system in Coit Plaza is intended to provide adequate capacity to convey the flows for the 5 year storm onsite. The 100 year runoff onsite will be conveyed in the driveways and parking areas between the buildings as well as the storm drain system. The final building pad elevations should be set at least one foot above the 100 year water surface elevation in the area between the buildings. The 5-yr and 100-yr runoff arriving at the site (from off site) will be conveyed through a separate storm system.

The detention facility and both on and off site storm systems will be constructed with the development of Wal-mart.

The detention pond is utilized to detain onsite flows for both the 5-yr and 100-yr storm.

This report is intended to represent the fully developed Coit Center as it is planned at the date of this report. Development of this project should not adversely affect any adjacent or down stream properties.

i

CALCULATIONS SECTION

i

WASHOE COUNTY
CITY OF RENO

COL

ZONE X

ZONE X

COIT PLAZA SITE
ZONE X
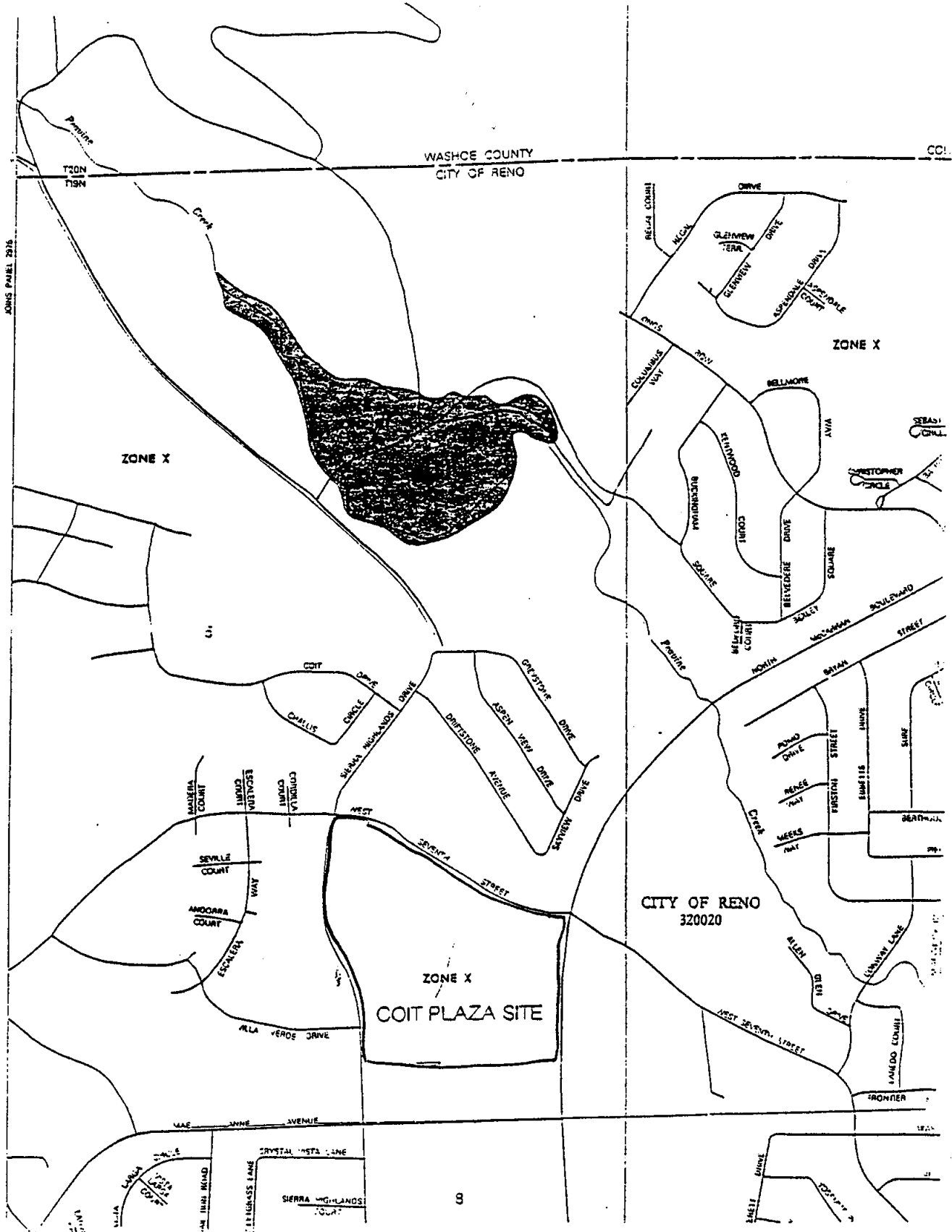
CITY OF RENO
320020

FIRM MAP PANEL NO.2986
320020 2986E   DATED   9-30-94

JEFF CODEGA
PLANNING/DESIGN, INC.

planners   landscape architects   engineers

Rainfall Depth - Duration - Frequency Data
Source: City of Reno Public Works Manual IDF Curve From Cannon Airport

Project:
JCPD Job No.
Date: 13-Feb-97
Watershed name:
NOAA Atlas Reigon #:   2

IDF CURVE VALUES

DEPTH (in)										
Return Period (Yr.)	5 min	10 min	15 min	30 min	1 hr	2 hr	3 hr	6 hr	12 hr	24 hr
2	0.11	0.16	0.19	0.24	0.29	0.40	0.48	0.66	0.84	1.08
5	0.18	0.23	0.28	0.34	0.40	0.52	0.60	0.78	1.02	1.42
10	0.23	0.31	0.36	0.45	0.52	0.62	0.72	0.90	1.20	1.68
25	0.33	0.42	0.50	0.59	0.70	0.80	0.87	1.08	1.56	2.14
50	0.38	0.53	0.60	0.73	0.85	0.96	1.05	1.32	1.80	2.64
100	0.48	0.63	0.73	0.90	1.08	1.20	1.32	1.62	2.16	2.88

INTENSITY (in/hr)										
Return Period (Yr.)	5 min	10 min	15 min	30 min	60 min	120 min	180 min	360 min	720 min	1440 min
2 yr	1.35	0.95	0.75	0.48	0.29	0.20	0.16	0.11	0.07	0.05
5 yr	2.10	1.40	1.10	0.68	0.40	0.26	0.20	0.13	0.09	0.06
10 yr	2.70	1.85	1.45	0.89	0.52	0.31	0.24	0.15	0.10	0.07
25 yr	3.90	2.51	2.00	1.18	0.70	0.40	0.29	0.18	0.13	0.09
50 yr	4.60	3.20	2.40	1.45	0.85	0.48	0.35	0.22	0.15	0.11
100 yr	5.80	3.80	2.90	1.80	1.08	0.60	0.44	0.27	0.18	0.12

DETENTION AND ROUTING CROSS-SECTION
DETAIL 1

McCARRAN BLVD.

EL=880.0

OFF-SITE ROUTING
AREA

R-3806 GRATE
(SEE DETAIL 2)

RIM=857.0

IE=842.8

EXISTING 60" CMP ESTIMATED S=2%
REMOVE WING WALLS AND
SHORTEN EXISTING CMP BY 27.5'

12' ACCESS
EL=865

12' X 12' SECTION
(SEE DETAIL 3)

24" RCP S=3.6%

ON-SITE
DETENTION POND OUTLET
(SEE DETAIL 4)

RIM=60.64

IE=854.0
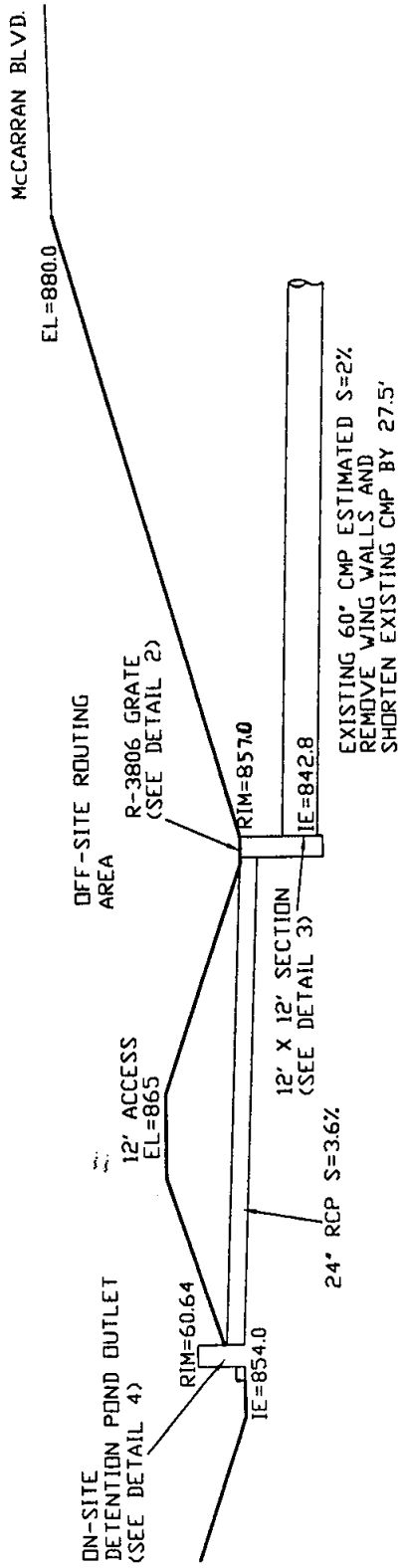
DETENTION AND ROUTING CROSS-SECTION

OFF-SITE OUTLET GRATE
DETAIL 2

PLAN

6 - GRATE SECTIONS @
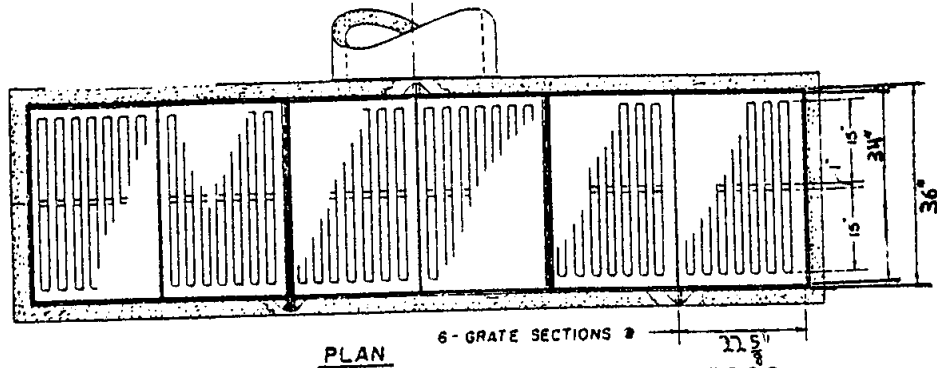
CAT. NO. R-3806
MEDIAN SLOPE OR SIDE SLOPE
AND DITCH CHECK DRAIN

DETAIL

SECTION

#8 @ 12" Rebar

#4 @ 12" Rebar

Y #7 Rebar

X #4 Rebar

60"

12'

12.71'

10"

Top
#7 Rebar
Continuous

#4 Rebar

1.5"

1.5"

#8 Rebar

20 diam
Overlap
(20")

4'

Construction
Joint

#4 Rebar
@ 12"

#8 Rebar
@ 12"

20"

16"

3"

10"

#5 Rebar
@ 12"

16
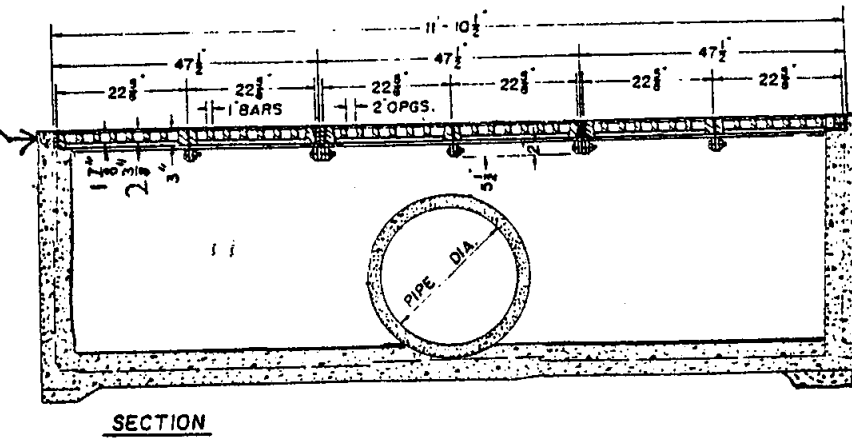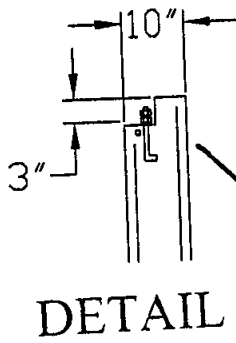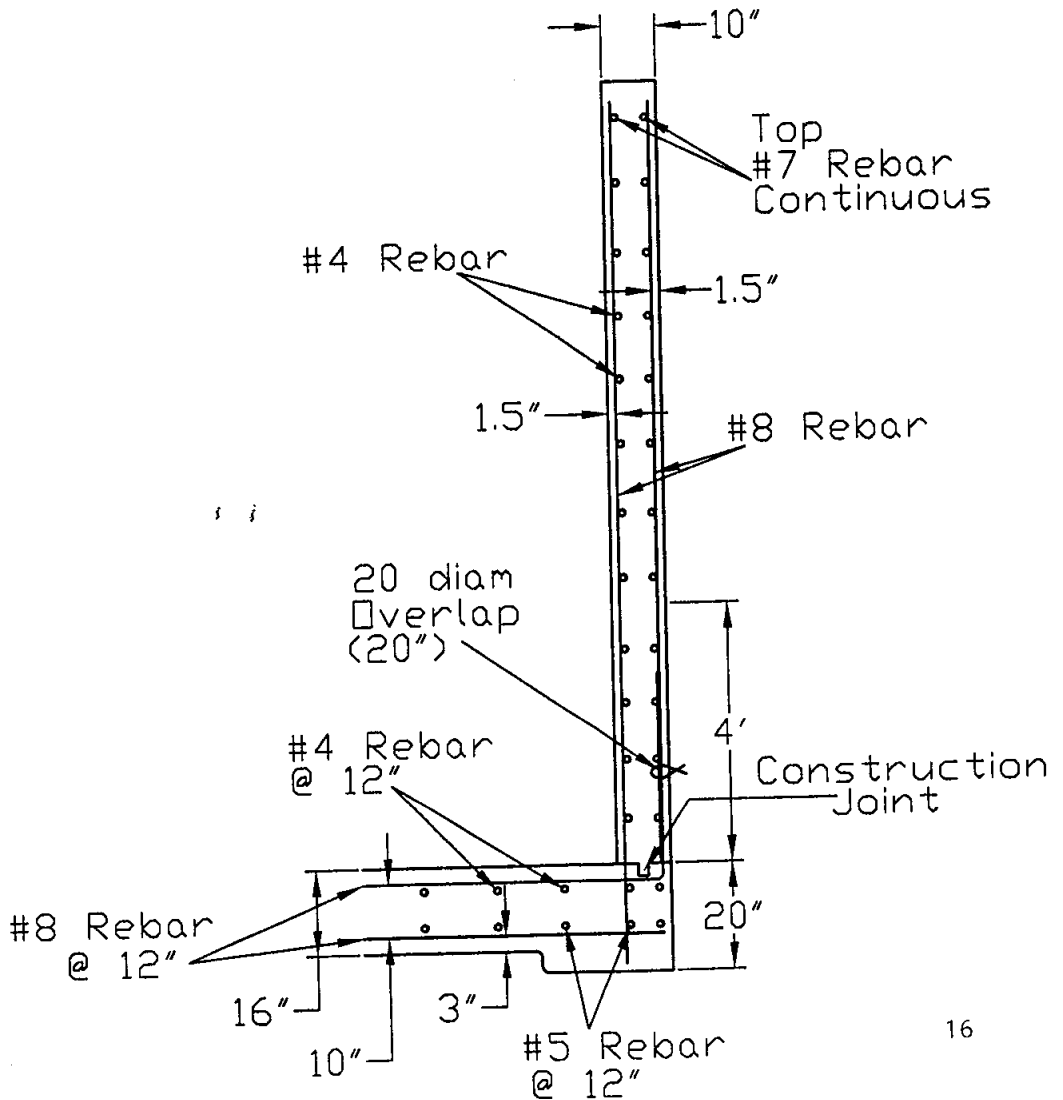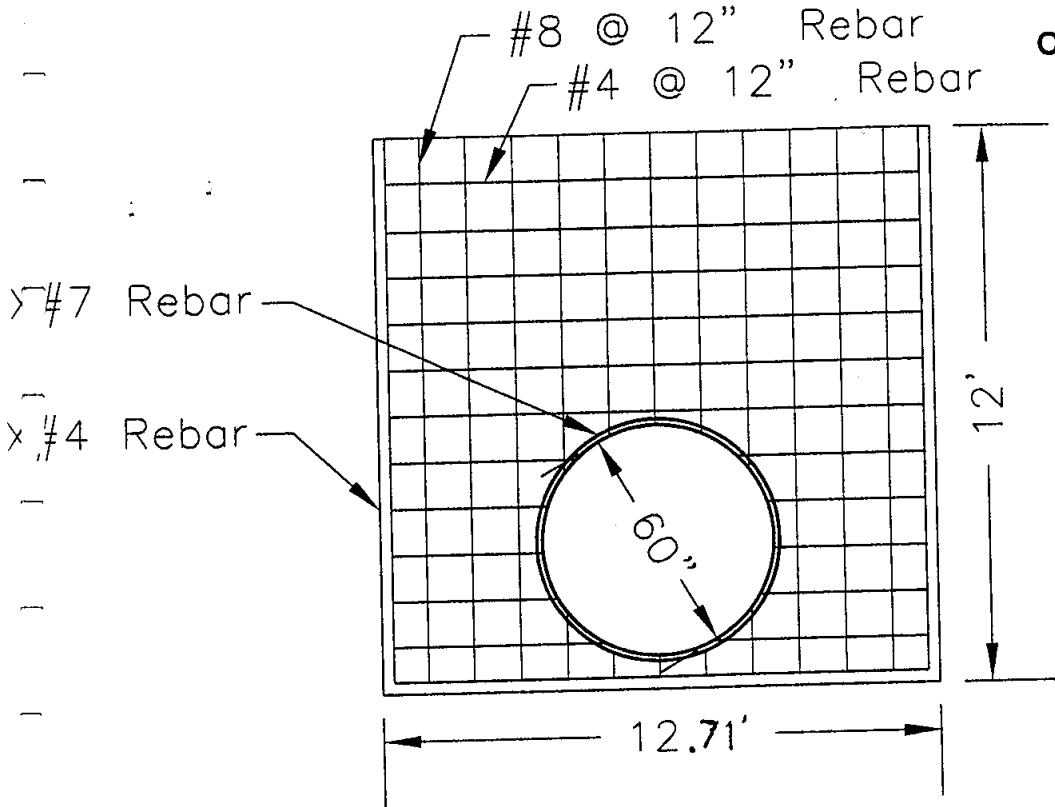
DETENTION POND (ON-SITE) OUTLET
DETAIL 4

EL=4865

38" GRATE
EL=4860.64

5-YR WS
=4858.22

15" RCP

IE= 4854.0

3:1

70LF 24" RCP SD
S=3.6%
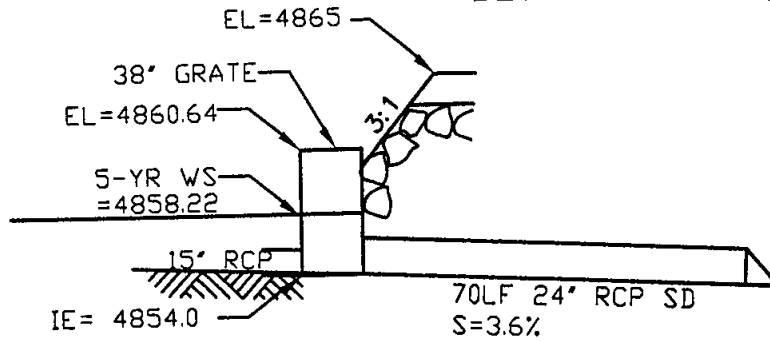
DETENTION POND OUTLET
NTS

A —— A
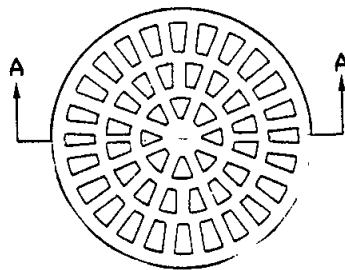
PLAN

NOTES:
1.) RENO-FOR USE ONLY IN UNIMPROVED
AREAS. A CONCRETE COLLAR SHALL
BE CONSTRUCTED AS SHOWN.
2.) OUTLET PIPE TO BE MINIMUM SIZE AS
SHOWN ON DWG.
3.) IN WASHOE CO. CONC. COLLAR SHALL BE 18"
IN WIDTH AT ALL LOCATIONS.

SEE NOTE 1

4"MIN.
TYP.

12'
18"(NOTE 3)

15'

5-1/2"
6"

EXTEND GROUTED RIP-RAP
MIN 2' WIDTH AROUND
INLET TO INTERSECT F.L.
IF INCOMING DITCH.

55.68"

42" CONC.
PIPE

2-1/2"MIN.

24" RCP ← 24"

15" RCP

2'x2' WIRE MESH GRATE.
USE 2" WIRE MESH SCREEN.

6"MIN.

CLASS AA OR DA
CONCRETE

SECTION A-A

38"
1x6
36"
10"
49"
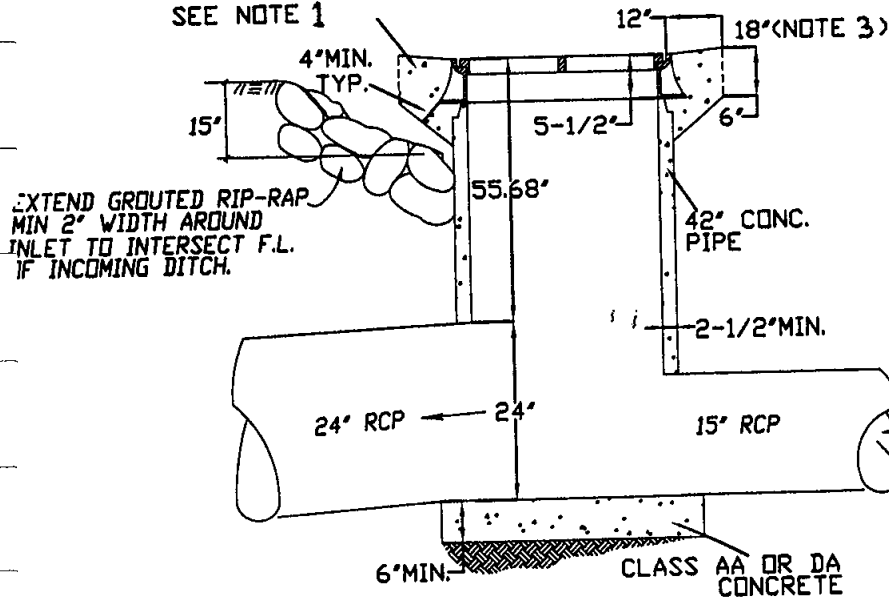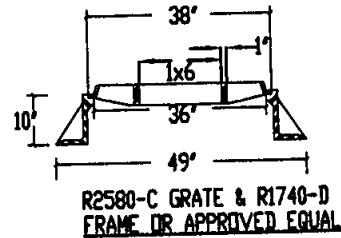
R2580-C GRATE & R1740-D
FRAME OR APPROVED EQUAL

DETENTION POND OUTLET (MODIFIED TYPE 3 DI)
NTS

OFF-SITE CALCULATIONS
HEC-1 MODEL

i

N.T.S.

FIGURE 4
OFFSITE WATERSHED MAP
AREAS USED IN
HEC - 1 MODEL

NEW
DEVEL.

SILVERADO
RANCH
ESTATES

SILVERADO
RANCH
ESTATES

BULLY'S
13.41 ac

COIT 1
31.51 AC

COIT 2
26.97 AC

PINE CREEK
VILLAGE

VILLA VERDE DR.

Sierra Highlands Jr.

COIT
PLAZA
28.07 ac

Mae Anne Ave.

West 7th St.

McCarran Blvd.

```
************************************               ************************************
*                                  *               *                                  *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *               *     U.S. ARMY CORPS OF ENGINEERS  *
*          MAY   1991              *               *     HYDROLOGIC ENGINEERING CENTER *
*        VERSION 4.0.1E            *               *         609 SECOND STREET         *
*    Lahey F77L-EM/32 version 5.01 *               *      DAVIS, CALIFORNIA 95616      *
*      Dodson & Associates, Inc.   *               *         (916) 551-1748           *
*  RUN DATE 02/14/97  TIME 10:35:51 *               *                                  *
************************************               ************************************
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    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

5 year

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

            *DIAGRAM
  1         ID  ***********************************************************************************
  2         ID       Jeff Codega Planning/Design
  3         ID          433 West Plumb Lane
  4         ID           Reno NV  89509
  5         ID     (702) 322-5100  Fax (702) 322-1551
  6         ID
  7         ID
  8         ID          Coit Center
  9         ID
 10         ID
 11         ID          JCPD JOB 1317.07
 12         ID
 13         ID
 14         ID
 15         ID
 16         ID    RAIN FALL DATA FROM NOAA ATLAS 2, VOLUME VII
 17         ID    LAG TIME COMPUTED WITH THE UPLAND METHOD AND THE PROCEDURES DESCRIBED IN TR
 18         ID    CURVE NUMBER FROM TR-55 AND NEH-4
 19         ID    ROUTING PREFORMED WITH MODIFIDE PULS
 20         ID
 21         ID  =====================  005 YEAR, 24 HOUR EVENT=============================
 22         ID
 23         ID
 24         ID  ==============================================================================
 25         IT     1                    1440
 26         IO     3        0

 27         KK  SREU21  Silverado Ranch Estates Unit 2 Phase 1 Detention Basin Calculation
 28         BA  0.1065
 29         PH    20              .18     .28     .40     .52     .60     .78    1.02    1.42
 30         LS             85
 31         UD  .1823

 32         KK  Silv08
 33         KM    Silverado Ranch Estates Detention Basin at Intersection of 7th and Brittania
 34         KM    Data from Summit Engineering Report for Silverado Ranch Estate Unit 2 Phase 1
 35         RS     1     STOR     -1
 36         SV     0    .2982   .5784  1.2810  2.0177  2.9420  3.8663  4.8843
 37         SQ     0      0      2.3     4.5     6.0     7.0     8.0     9.0
 38         SE   4970    4971    4972    4973    4974    4975    4976    4977

 39         KK  RipRap  Watershed Contributing to Riprap Ditch from Silverado Estates U2 P1
 40         BA  .0848
 41         PH    20              .18     .28     .40     .52     .60     .78    1.02    1.42
 42         LS             85
 43         UD  .15

 44         KK  DB&RR  Combine Hydrographs From Riprap Swale and Detention basin
 45         HC     2
```

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


46          KK  RT  C2  Route the outlet from D. Basin and RR Swale to outlet of Coit 2
47          RK    2500   0.025   .014          CIRC     30      0     YES
48          RM       1     .11    .35


49          KK  Coit 2  Watershed of Coit Heights Unit 2 and Area 15 from Silverado U2 P1
50          BA  .04214
51          PH      20             .18    .28    .40    .52    .60    .78   1.02   1.42
52          LS            87
53          UD     .25


54          KK  Comb    Combine Routed Detention basin and Riprap swale with Coit Heights 2
55          HC       2


56          KK  RTCOIT  Route the outlet from D. Basin and RR Swale to the Coit D. Basin
57          RK    1000   0.04    .014          CIRC     48      0     YES
58          RM       1     .11    .35


59          KK  Coit 1  Watershed of Coit Heights Unit 1, Sierra Heighlands and Future Dev.
60          BA  .04923
61          PH      20             .18    .28    .40    .52    .60    .78   1.02   1.42
62          LS            87
63          UD     .17


64          KK  RTCOIT  Route the outlet from D. Basin and RR Swale to the Coit D. Basin
65          RK    1000   0.025   .014          CIRC     36      0     YES
66          RM       1     .11    .35


67          KK  Bullys  Watershed Concenrtating at Bullys Sports bar
68          BA  .02094
69          PH      20             .18    .28    .40    .52    .60    .78   1.02   1.42
70          LS            87
71          UD     .17


72          KK  RTCOIT  Route the outlet from D. Basin and RR Swale to the Coit D. Basin
73          RK    1000   0.025   .014          CIRC     36      0     YES
74          RM       1     .11    .35


75          KK  CoitPl  Watershed of Coit Plaza
76          BA  .04386
77          PH      20             .18    .28    .40    .52    .60    .78   1.02   1.42
78          LS            87
79          UD     .17


80          KK  Comb    Combine outlet of Routed Silverado Detention Basin with Coit C3
81          HC       4


82          KK  Mccarn
83          KM     Reservoir routing at McCarran Blvd.
84          KM     With 54 inch storm drain in place through Canyon Center
85          RS       1    STOR    -1
86          SV       0    .038    .272    .589    .939   1.324   1.745   2.204   2.702   3.240
87          SV   3.819   4.442   5.110   5.826   6.592   7.410   8.281
88          SQ       0     5.1    18.3    37.8      61    79.3      94   106.6   118.1   123.4
89          SQ   137.9   146.9   155.3   163.3   170.9   178.2   185.2
```

LINE	ID	1	2	3	4	5	6	7	8	9	10
90	SE	48.4	49.4	50.4	51.4	52.4	53.4	54.4	55.4	56.4	57.4
91	SE	58.4	59.4	60.4	61.4	62.4	63.4	64.4			
92	ZZ										

```
********************************
*
*    U.S. ARMY CORPS OF ENGINEERS
*    HYDROLOGIC ENGINEERING CENTER
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
*         (916) 551-1748
*
********************************
```

```
***************************************************************
lanning/Design
Plumb Lane
V  89509
Fax (702) 322-1551


enter


JB 1317.07




ROM NOAA ATLAS 2, VOLUME VII
) WITH THE UPLAND METHOD AND THE PROCEDURES DESCRIBED IN TR
4 TR-55 AND NEH-4
) WITH MODIFIDE PULS

===  005 YEAR, 24 HOUR EVENT==================================


##########################################################################


IT CONTROL
' CONTROL
IOGRAPH PLOT SCALE
    5

ITES IN COMPUTATION INTERVAL
:TING DATE
:TING TIME
:ER OF HYDROGRAPH ORDINATES
NG DATE
NG TIME
URY MARK

2 HOURS
8 HOURS


LES
```

```
                    LENGTH, ELEVATION      FEET
                    FLOW                   CUBIC FEET PER SECOND
                    STORAGE VOLUME         ACRE-FEET
                    SURFACE AREA           ACRES
                    TEMPERATURE            DEGREES FAHRENHEIT
```

*** ***

```
               ***************
               *             *
    27 KK       *   SREU21    *    Silverado Ranch Estates Unit 2 Phase 1 Detention Basin Calculation
               *             *
               ***************
```

SUBBASIN RUNOFF DATA

    28 8A   SUBBASIN CHARACTERISTICS
                    TAREA   0.11 SUBBASIN AREA

PRECIPITATION DATA

    29 PH   DEPTHS FOR 20-PERCENT HYPOTHETICAL STORM

..... HYDRO-35	.... TP-40	.... TP-49 ....

5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.18	0.28	0.40	0.52	0.60	0.78	1.02	1.42	0.00	0.00	0.00	0.00

                            STORM AREA =   0.11

    30 LS   SCS LOSS RATE
                    STRTL   0.35 INITIAL ABSTRACTION
                    CRVNBR   85.00 CURVE NUMBER
                    RTIMP   0.00 PERCENT IMPERVIOUS AREA

    31 UD   SCS DIMENSIONLESS UNITGRAPH
                    TLAG   0.18 LAG

                                    ***

VALUE EXCEEDS TABLE IN LOGLOG   0.01667   0.01667   24.00000

                                UNIT HYDROGRAPH
                            57 END-OF-PERIOD ORDINATES

7.	22.	42.	67.	100.	139.	183.	221.	247.	263.
269.	268.	261.	246.	230.	211.	187.	160.	135.	115.
99.	86.	74.	66.	57.	50.	43.	37.	32.	28.
24.	21.	18.	16.	14.	12.	10.	9.	8.	7.
6.	5.	4.	4.	3.	3.	3.	2.	2.	2.
1.	1.	1.	1.	1.	0.	0.			

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

                    HYDROGRAPH AT STATION   SREU21

    TOTAL RAINFALL =   1.36, TOTAL LOSS =   1.00, TOTAL EXCESS =   0.37

    PEAK FLOW   TIME   MAXIMUM AVERAGE FLOW
      (CFS)   (HR)   6-HR   24-HR   72-HR   23.98-HR

		(CFS)	3.	1.	1.	1.
		(INCHES)	0.241	0.364	0.364	0.364
		(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA =   0.11 SQ MI

*** ***

```
               ***************
               *             *
32 KK          *   Silv08    *
               *             *
               ***************
```

Silverado Ranch Estates Detention Basin at Intersection of 7th and Brittania
Data from Summit Engineering Report for Silverado Ranch Estate Unit 2 Phase 1

HYDROGRAPH ROUTING DATA

35 RS   STORAGE ROUTING
             NSTPS   1 NUMBER OF SUBREACHES
             ITYP   STOR TYPE OF INITIAL CONDITION
             RSVRIC   -1.00 INITIAL CONDITION
             X   0.00 WORKING R AND D COEFFICIENT

36 SV	STORAGE	0.0	0.3	0.6	1.3	2.0	2.9	3.9	4.9
37 SQ	DISCHARGE	0.	0.	2.	5.	6.	7.	8.	9.
38 SE	ELEVATION	4970.00	4971.00	4972.00	4973.00	4974.00	4975.00	4976.00	4977.00

***

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

HYDROGRAPH AT STATION   Silv08

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
3.	13.03	(CFS)	2.	1.	1.	1.
		(INCHES)	0.218	0.338	0.338	0.338
		(AC-FT)	1.	2.	2.	2.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)		6-HR	24-HR	72-HR	23.98-HR
1.	12.97		1.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
(FEET)	(HR)		6-HR	24-HR	72-HR	23.98-HR
4972.34	13.03		4972.10	4971.39	4971.39	4971.39

CUMULATIVE AREA =   0.11 SQ MI

*** ***

```
                 ****************
                 *              *
  39 KK          *    RipRap    *      Watershed Contributing to Riprap Ditch from Silverado Estates U2 P1
                 *              *
                 ****************


                      SUBBASIN RUNOFF DATA

  40 BA                SUBBASIN CHARACTERISTICS
                            TAREA      0.08  SUBBASIN AREA


                      PRECIPITATION DATA

  41 PH                                DEPTHS FOR  20-PERCENT HYPOTHETICAL STORM
                      ..... HYDRO-35 ......  ................. TP-40 .................  ............ TP-49 ............
                      5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR    2-DAY   4-DAY   7-DAY   10-DAY
                      0.18    0.28    0.40    0.52    0.60    0.78    1.02    1.42     0.00    0.00    0.00    0.00


                                         STORM AREA =    0.08


  42 LS               SCS LOSS RATE
                           STRTL      0.35  INITIAL ABSTRACTION
                           CRVNBR    85.00  CURVE NUMBER
                           RTIMP      0.00  PERCENT IMPERVIOUS AREA


  43 UD               SCS DIMENSIONLESS UNITGRAPH
                           TLAG       0.15  LAG


                                                          ***


  VALUE EXCEEDS TABLE IN LOGLOG          0.01667        0.01667      24.00000

                                                   UNIT HYDROGRAPH
                                            47 END-OF-PERIOD ORDINATES
                       9.      28.     54.     89.     135.    184.    223.     248.    258.    258.
                     248.     230.    209.    183.     152.    123.    103.      86.     73.     63.
                      53.      45.     37.     32.      26.     22.     19.      16.     13.     11.
                       9.       8.      7.      6.       5.      4.      3.       3.      3.      2.
                       2.       2.      1.      1.       1.      0.      0.


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


                 HYDROGRAPH AT STATION   RipRap


     TOTAL RAINFALL =    1.36, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.37


  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
    (CFS)       (HR)              6-HR      24-HR      72-HR     23.98-HR
     17.       12.17     (CFS)     2.         1.         1.         1.
                         (INCHES) 0.241     0.364      0.364      0.364
                         (AC-FT)   1.         2.         2.         2.


                     CUMULATIVE AREA =    0.08 SQ MI




  *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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```
                ***************
                *             *
44 KK           *   DB&RR    *      Combine Hydrographs from Riprap Swale and Detention basin
                *             *
                ***************


45 HC           HYDROGRAPH COMBINATION
                    ICOMP         2  NUMBER OF HYDROGRAPHS TO COMBINE


                                                    ***


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


                HYDROGRAPH AT STATION     DB&RR


PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
  (CFS)       (HR)              6-HR        24-HR        72-HR       23.98-HR
   19.       12.17    (CFS)      5.          2.           2.            2.
                      (INCHES)  0.226       0.350        0.350        0.350
                      (AC-FT)    2.          4.           4.            4.


                CUMULATIVE AREA =    0.19 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
                ***************
                *             *
46 KK           *   RT C2    *      Route the outlet from D. Basin and RR Swale to outlet of Coit 2
                *             *
                ***************


                HYDROGRAPH ROUTING DATA


48 RM           MUSKINGUM ROUTING
                    NSTPS         1 NUMBER OF SUBREACHES
                    AMSKK      0.11 MUSKINGUM K
                        X      0.35 MUSKINGUM X
```

```
                                          ***
```

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RT C2.
       REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

```
        ***           ***           ***           ***           ***


                HYDROGRAPH AT STATION    RT C2


PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
  (CFS)       (HR)              6-HR        24-HR        72-HR       23.98-HR
   17.       12.27    (CFS)      5.          2.           2.            2.
                      (INCHES)  0.226       0.348        0.348        0.348
                      (AC-FT)    2.          4.           4.            4.


                CUMULATIVE AREA =    0.19 SQ MI
```

```
               ***************
               *             *
49 KK          *    Coit 2   *        Watershed of Coit Heights Unit 2 and Area 15 from Silverado U2 P1
               *             *
               ***************


          SUBBASIN RUNOFF DATA


50 BA        SUBBASIN CHARACTERISTICS
                   TAREA      0.04  SUBBASIN AREA


          PRECIPITATION DATA


51 PH                         DEPTHS FOR  20-PERCENT HYPOTHETICAL STORM

        ..... HYDRO-35 ......  ................ TP-40 ................   ............ TP-49 ............
        5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
        0.18    0.28    0.40    0.52   0.60   0.78   1.02    1.42    0.00    0.00    0.00    0.00


                              STORM AREA =    0.04


52 LS        SCS LOSS RATE
                   STRTL      0.30  INITIAL ABSTRACTION
                   CRVNER     97.00 CURVE NUMBER
                   RTIMP      0.00  PERCENT IMPERVIOUS AREA


53 UD        SCS DIMENSIONLESS UNITGRAPH
                   TLAG       0.25  LAG


                                            ***


VALUE EXCEEDS TABLE IN LOGLOG       0.01667      0.01667     24.00000


                                    UNIT HYDROGRAPH
                              77 END-OF-PERIOD ORDINATES
              2.      4.      8.     12.     17.     23.     31.     39.     49.     58.
             65.     71.     75.     78.     79.     79.     78.     75.     72.     68.
             64.     60.     55.     49.     43.     38.     34.     30.     27.     25.
             22.     20.     18.     16.     15.     13.     12.     11.     10.      9.
              8.      7.      6.      6.      5.      5.      4.      4.      3.      3.
              3.      2.      2.      2.      2.      2.      1.      1.      1.      1.
              1.      1.      1.      1.      1.      1.      1.      1.      0.      0.
              0.      0.      0.      0.      0.      0.      0.


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


              HYDROGRAPH AT STATION    Coit 2


     TOTAL RAINFALL =    1.36, TOTAL LOSS =    0.92, TOTAL EXCESS =    0.44


  PEAK FLOW     TIME                     MAXIMUM AVERAGE FLOW
    (CFS)       (HR)            6-HR      24-HR      72-HR     23.98-HR
      8.       12.27   (CFS)    1.         0.         0.         0.
                       (INCHES) 0.291     0.437      0.437      0.437
                       (AC-FT)  1.         1.         1.         1.
```

CUMULATIVE AREA =   0.04 SQ MI

*** ***

```
             ***************
             *             *
54 KK        *    Comb     *        Combine Routed Detention basin and Riprap swale with Coit Heights 2
             *             *
             ***************
```

55 HC   HYDROGRAPH COMBINATION
                   ICOMP   2 NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

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

                   HYDROGRAPH AT STATION   Comb

PEAK FLOW   TIME   MAXIMUM AVERAGE FLOW
  (CFS)   (HR)   6-HR   24-HR   72-HR   23.98-HR
   25.   12.27   (CFS)   6.   2.   2.   2.
                       (INCHES) 0.237   0.364   0.364   0.364
                       (AC-FT)   3.   5.   5.   5.

                   CUMULATIVE AREA =   0.23 SQ MI

*** ***

```
             ***************
             *             *
56 KK        *   RTCOIT    *        Route the outlet from D. Basin and RR Swale to the Coit D. Basin
             *             *
             ***************
```

              HYDROGRAPH ROUTING DATA

58 RM   MUSKINGUM ROUTING
                   NSTPS   1 NUMBER OF SUBREACHES
                   AMSKK   0.11 MUSKINGUM K
                       X   0.35 MUSKINGUM X

                                                          ***

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RTCOIT.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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

                   HYDROGRAPH AT STATION   RTCOIT

PEAK FLOW   TIME   MAXIMUM AVERAGE FLOW

	(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
	23.	12.37	(CFS)	6.	2.	2.	2.
			(INCHES)	0.237	0.362	0.362	0.362
			(AC-FT)	3.	5.	5.	5.

CUMULATIVE AREA =   0.23 SQ MI

.

*** ***

```
              ***************
              *             *
59 KK         *   Coit 1    *     Watershed of Coit Heights Unit 1, Sierra Heighlands and Future Dev.
              *             *
              ***************
```

SUBBASIN RUNOFF DATA

60 8A   SUBBASIN CHARACTERISTICS
                    TAREA   0.05 SUBBASIN AREA

PRECIPITATION DATA

61 PH   DEPTHS FOR 20-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.18	0.28	0.40	0.52	0.60	0.78	1.02	1.42	0.00	0.30	0.00	0.00

STORM AREA =   0.05

62 LS   SCS LOSS RATE
                    STRTL   0.30 INITIAL ABSTRACTION
                    CRVNBR   87.00 CURVE NUMBER
                    RTIMP   0.00 PERCENT IMPERVIOUS AREA

63 UD   SCS DIMENSIONLESS UNITGRAPH
                    TLAG   0.17 LAG

***

VALUE EXCEEDS TABLE IN LOGLOG   0.01667 ;   0.01667   24.00000

UNIT HYDROGRAPH
53 END-OF-PERIOD ORDINATES

```
       4.      12.      23.      37.      56.      78.     100.     116.     127.     133.
     133.     130.     123.     114.     104.      91.      77.      64.      54.      46.
      40.      35.      30.      26.      22.      19.      16.      14.      12.      10.
       9.       7.       6.       6.       5.       4.       4.       3.       3.       2.
       2.       2.       1.       1.       1.       1.       1.       1.       1.       0.
       0.       0.       0.
```

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

HYDROGRAPH AT STATION   Coit 1

TOTAL RAINFALL =   1.36, TOTAL LOSS =   0.92, TOTAL EXCESS =   0.44

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
12.	12.18	(CFS)	2.	1.	1.	1.
		(INCHES)	0.291	0.438	0.438	0.438
		(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA =   0.05 SQ MI

*** ***

```
       ***************
       *             *
64 KK  *   RTCOIT    *     Route the outlet from D. Basin and RR Swale to the Coit D. Basin
       *             *
       ***************
```

HYDROGRAPH ROUTING DATA

66 RM   MUSKINGUM ROUTING
              NSTPS   1 NUMBER OF SUBREACHES
              AMSKK   0.11 MUSKINGUM K
              X   0.35 MUSKINGUM X

***

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RTCOIT.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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

HYDROGRAPH AT STATION   RTCOIT

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
11.	12.28	(CFS)	2.	1.	1.	1.
		(INCHES)	0.291	0.436	0.436	0.436
		(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA =   0.05 SQ MI

*** ***

```
       ***************
       *             *
67 KK  *   Bullys    *     Watershed Concenrtating at Bullys Sports bar
       *             *
       ***************
```

SUBBASIN RUNOFF DATA

68 3A   SUBBASIN CHARACTERISTICS
              TAREA   0.02 SUBBASIN AREA

69 PH   DEPTHS FOR 20-PERCENT HYPOTHETICAL STORM

      ..... HYDRO-35 .... TP-40 .... TP-49 ....
      5-MIN 15-MIN 60-MIN   2-HR   3-HR   6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY   10-DAY
      0.18   0.28   0.40   0.52   0.60   0.78   1.02   1.42   0.00   0.00   0.00   0.00

                              STORM AREA =   0.02

70 LS   SCS LOSS RATE
                STRTL   0.30   INITIAL ABSTRACTION
                CRVNBR   87.00   CURVE NUMBER
                RTIMP   0.00   PERCENT IMPERVIOUS AREA

71 UD   SCS DIMENSIONLESS UNITGRAPH
                TLAG   0.17   LAG

                                        ***

VALUE EXCEEDS TABLE IN LOGLOG   0.01667   0.01667   24.00000

                                  UNIT HYDROGRAPH
                             53 END-OF-PERIOD ORDINATES
          2.   5.   10.   16.   24.   33.   42.   50.   54.   56.
         57.   55.   52.   48.   44.   39.   33.   27.   23.   20.
         17.   15.   13.   11.   9.   8.   7.   6.   5.   4.
          4.   3.   3.   2.   2.   2.   2.   1.   1.   1.
          1.   1.   1.   1.   0.   0.   0.   0.   0.   0.
          0.   0.   0.

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

          HYDROGRAPH AT STATION   Bullys

   TOTAL RAINFALL =   1.36, TOTAL LOSS =   0.92, TOTAL EXCESS =   0.44

PEAK FLOW   TIME   MAXIMUM AVERAGE FLOW
  (CFS)   (HR)   6-HR   24-HR   72-HR   23.98-HR
    5.   12.18   (CFS)   1.   0.   0.   0.
                    (INCHES) 0.291   0.438   0.438   0.438
                    (AC-FT)   0.   0.   0.   0.

          CUMULATIVE AREA =   0.02 SQ MI

*** ***

             ****
             *   *
72 KK   *   RTCOIT   *   Route the outlet from D. Basin and RR Swale to the Coit D. Basin
             *   *
             ****

          HYDROGRAPH ROUTING DATA

74 RM   MUSKINGUM ROUTING
                    NSTPS   1 NUMBER OF SUBREACHES

```
                      AMSKK       0.11 MUSKINGUM K
                         X        0.35 MUSKINGUM X


                                        ***

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH  RTCOIT.
        REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).


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


                    HYDROGRAPH AT STATION   RTCOIT

PEAK FLOW    TIME                      MAXIMUM AVERAGE FLOW
  (CFS)      (HR)              6-HR     24-HR     72-HR    23.98-HR
    4.      12.28      (CFS)     1.       0.        0.        0.
                      (INCHES) 0.291    0.436     0.436     0.436
                      (AC-FT)    0.       0.        0.        0.


                    CUMULATIVE AREA =   0.02 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


              ***************
              *             *
75 KK         *   CoitPl    *     Watershed of Coit Plaza
              .             .
              ***************


          SUBBASIN RUNOFF DATA


76 BA         SUBBASIN CHARACTERISTICS
                 TAREA       0.04  SUBBASIN AREA


          PRECIPITATION DATA


77 PH                         DEPTHS FOR  20-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......  ................ TP-40 ................  ............ TP-49 ............
               5-MIN  15-MIN  60-MIN    2-HR   3-HR   6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               0.18    0.28    0.40    0.52   0.60   0.78   1.02    1.42    0.00    0.00    0.00    0.00

                                     STORM AREA =    0.04


78 LS         SCS LOSS RATE
                 STRTL       0.30  INITIAL ABSTRACTION
                 CRVNBR     87.00  CURVE NUMBER
                 RTIMP       0.00  PERCENT IMPERVIOUS AREA


79 UD         SCS DIMENSIONLESS UNITGRAPH
                 TLAG        0.17  LAG


                                        ***


VALUE EXCEEDS TABLE IN LOGLOG            0.01667       0.01667      24.00000


                                UNIT HYDROGRAPH
                         53 END-OF-PERIOD ORDINATES
           3.     11.     20.     33.     50.     70.     89.    104.    113.    118.
```

```
        119.    :   116.      109.      101.       92.       81.       68.       57.       48.       41.
         36.        31.       27.        23.       20.       17.       15.       12.       11.        9.
          8.         7.        6.         5.        4.        4.        3.        3.        2.        2.
          2.         1.        1.         1.        1.        1.        1.        1.        0.        0.
          0.         0.        0.
```

        ***   ***   ***   ***   '   ***

                    HYDROGRAPH AT STATION   CoitPl

     TOTAL RAINFALL =   1.36, TOTAL LOSS =   0.92, TOTAL EXCESS =   0.44

```
PEAK FLOW    TIME                          MAXIMUM AVERAGE FLOW
  (CFS)      (HR)                  6-HR       24-HR      72-HR     23.98-HR
    10.     12.18      (CFS)        1.          1.          1.         1.
                       (INCHES)    0.291       0.438       0.438      0.438
                       (AC-FT)      1.          1.          1.         1.
```

                    CUMULATIVE AREA =   0.04 SQ MI

*** ***

            ****
            *   *
 30 KK   *   Comb   *   Combine outlet of Routed Silverado Detention Basin with Coit 08
            *   *
            ****

 81 HC   HYDROGRAPH COMBINATION
                     ICOMP   4   NUMBER OF HYDROGRAPHS TO COMBINE

                                            ***

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

                    HYDROGRAPH AT STATION   Comb

```
PEAK FLOW    TIME                          MAXIMUM AVERAGE FLOW
  (CFS)      (HR)                  6-HR       24-HR      72-HR     23.98-HR
    42.     12.30      (CFS)        9.          4.          4.         4.
                       (INCHES)    0.253       0.387       0.387      0.387
                       (AC-FT)      5.          7.          7.         7.
```

                    CUMULATIVE AREA =   0.35 SQ MI

*** ***

            ****
            *   *
 32 KK   *   Mccarn   *
            *   *
            ****

Reservoir routing at McCarran Blvd.
With 54 inch storm drain in place through Canyon Center

HYDROGRAPH ROUTING DATA

85 RS	STORAGE ROUTING									
	NSTPS	1	NUMBER OF SUBREACHES							
	ITYP	STOR	TYPE OF INITIAL CONDITION							
	RSVRIC	-1.00	INITIAL CONDITION							
	X	0.00	WORKING R AND O COEFFICIENT							

86 SV	STORAGE	0.0	0.0	0.3	0.6	0.9	1.3	1.7	2.2	2.7	3.2
		3.8	4.4	5.1	5.8	6.6	7.4	8.3			

88 SQ	DISCHARGE	0.	5.	18.	38.	61.	79.	94.	107.	118.	128.
		138.	147.	155.	163.	171.	178.	185.			

90 SE	ELEVATION	48.40	49.40	50.40	51.40	52.40	53.40	54.40	55.40	56.40	57.40
		58.40	59.40	60.40	61.40	62.40	63.40	64.40			

***

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

HYDROGRAPH AT STATION   Mccarn

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
31.	12.47	(CFS)	9.	4.	4.	4.
		(INCHES)	0.253	0.385	0.385	0.385
		(AC-FT)	5.	7.	7.	7.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)		6-HR	24-HR	72-HR	23.98-HR
0.	12.45		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
(FEET)	(HR)		6-HR	24-HR	72-HR	23.98-HR
51.06	12.47		49.71	48.97	48.97	48.97

CUMULATIVE AREA = 0.35 SQ MI

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	SREU21	19.	12.20	3.	1.	1.	0.11		
ROUTED TO	SilvOB	3.	13.03	2.	1.	1.	0.11	4972.34	13.03
HYDROGRAPH AT	RipRap	17.	12.17	2.	1.	1.	0.08		
2 COMBINED AT	OB&RR	19.	12.17	5.	2.	2.	0.19		
ROUTED TO	RT C2	17.	12.27	5.	2.	2.	0.19		
HYDROGRAPH AT	Coit 2 (	8.	12.27	1.	0.	0.	0.04		
2 COMBINED AT	Comb (2,2,1)	25.	12.27	6.	2.	2.	0.23		
ROUTED TO	RTCOIT	23.	12.37	6.	2.	2.	0.23		
HYDROGRAPH AT	Coit 1 (!P⇒ 2{3)	12.	12.18	2.	1.	1.	0.05		
ROUTED TO	RTCOIT	11.	12.28	2.	1.	1.	0.05		
HYDROGRAPH AT	Bullys (2,P≤3)	5.	12.18	1.	0.	0.	0.02		
ROUTED TO	RTCOIT	4.	12.28	1.	0.	0.	0.02		
HYDROGRAPH AT	CoitPl	10.	12.18	1.	1.	1.	0.04		
4 COMBINED AT	Comb	42.	12.30	9.	4.	4.	0.35		
ROUTED TO	Mccarn	31.	12.47	9.	4.	4.	0.35	51.06	12.47

*** NORMAL END OF HEC-1 ***

```
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

100 YR

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

              *DIAGRAM
   1    ID  *********************************************************************************
   2    ID          Jeff Codega Planning/Design
   3    ID             433 West Plumb Lane
   4    ID               Reno NV  89509
   5    ID          (702) 322-5100  Fax (702) 322-1551
   6    ID
   7    ID
   8    ID               Coit Center
   9    ID
  10    ID
  11    ID           JCPD JOB 1317.07
  12    ID
  13    ID
  14    ID
  15    ID
  16    ID   RAIN FALL DATA FROM NOAA ATLAS 2, VOLUME VII
  17    ID   LAG TIME COMPUTED WITH THE UPLAND METHOD AND THE PROCEDURES DESCRIBED IN TR
  18    ID   CURVE NUMBER FROM TR-55 AND NEH-4
  19    ID   ROUTING PREFORMED WITH MODIFIDE PULS
  20    ID
  21    ID   ===================== 100 YEAR, 24 HOUR EVENT=============================
  22    ID
  23    ID
  24    ID   #######################################################   #######################
  25    IT     1                  1440
  26    IO     3         0

  27    KK  SREU21  Silverado Ranch Estates Unit 2 Phase 1 Detention Basin Calculation
  28    BA  0.1065
  29    PH     1                .48     .73    1.08    1.2    1.32    1.62    2.16    2.88
  30    LS            85
  31    UD  .1823

  32    KK  Silv08
  33    KM   Silverado Ranch Estates Detention Basin at Intersection of 7th and Brittania
  34    KM   Data from Summit Engineering Report for Silverado Ranch Estate Unit 2 Phase 1
  35    RS     1    STOR     -1
  36    SV     0   .2982   .5784  1.2810  2.0177  2.9420  3.8663  4.8843
  37    SQ     0      0     2.3     4.5     6.0     7.0     8.0     9.0
  38    SE  4970    4971    4972    4973    4974    4975    4976    4977

  39    KK  RipRap  Watershed Contributing to Riprap Ditch from Silverado Estates U2 P1
  40    BA  .0848
  41    PH     1                .48     .73    1.08    1.2    1.32    1.62    2.16    2.88
  42    LS            85
  43    UD  .15

  44    KK  08&RR   Combine Hydrographs From Riprap Swale and Detention basin
  45    HC     2
```

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


  46        KK  RT  C2  Route the outlet from D. Basin and RR Swale to outlet of Coit 2
  47        RK   2500   0.025    .014         CIRC      30        0      YES
  48        RM      1    .11     .35


  49        KK  Coit 2  Watershed of Coit Heights Unit 2 and Area 15 from Silverado U2 P1
  50        BA  .04214
  51        PH      1              .48     .73    1.08     1.2    1.32    1.62    2.16    2.88
  52        LS            87
  53        UD    .25


  54        KK  Comb    Combine Routed Detention basin and Riprap swale with Coit Heights 2
  55        HC      2


  56        KK  RTCOIT  Route the outlet from D. Basin and RR Swale to the Coit D. Basin
  57        RK   1000   0.04     .014         CIRC      48        0      YES
  58        RM      1    .11     .35


  59        KK  Coit 1  Watershed of Coit Heights Unit 1, Sierra Heighlands and Future Dev.
  60        BA  .04923
  61        PH      1              .48     .73    1.08     1.2    1.32    1.62    2.16    2.88
  62        LS            87
  63        UD    .17


  64        KK  RTCOIT  Route the outlet from D. Basin and RR Swale to the Coit D. Basin
  65        RK   1000   0.025    .014         CIRC      36        0      YES
  66        RM      1    .11     .35


  67        KK  Bullys  Watershed Concenrtating at Bullys Sports bar
  68        BA  .02094
  69        PH      1              .48     .73    1.08     1.2    1.32    1.62    2.16    2.88
  70        LS            87
  71        UD    .17


  72        KK  RTCOIT  Route the outlet from D. Basin and RR Swale to the Coit D. Basin
  73        RK   1000   0.025    .014         CIRC      36        0      YES
  74        RM      1    .11     .35


  75        KK  CoitPl  Watershed of Coit Plaza
  76        BA  .04386
  77        PH      1              .48     .73    1.08     1.2    1.32    1.62    2.16    2.88
  78        LS            87
  79        UD    .17


  80        KK  Comb    Combine outlet of Routed Silverado Detention Basin with Coit DB
  81        HC      4


  82        KK  Mccarn
  83        KM      Reservoir routing at McCarran Blvd.
  84        KM      With 54 inch storm drain in place through Canyon Center
  85        RS      1    STOR     -1
  86        SV      0    .038    .272    .589    .939   1.324   1.745   2.204   2.702   3.240
  87        SV  3.819   4.442   5.110   5.326   6.592   7.410   8.281
  88        SQ      0     5.1    18.3    37.8      61    79.3      94   106.6   118.1   128.4
  89        SQ  137.9   146.9   155.3   163.3   170.9   178.2   185.2
```

1 NETWORK

......3.......9......10

:RSION OR PUMP FLOW

4.·   55.4   56.4   57.4

IRN OF DIVERTED OR PUMPED FLOW

§

CoitPt

· · · · · · · · ·

```
**************************************                    **************************************
*                                    *                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *     U.S. ARMY CORPS OF ENGINEERS   *
*            MAY   1991               *                    *    HYDROLOGIC ENGINEERING CENTER   *
*          VERSION 4.0.1E             *                    *         609 SECOND STREET          *
*     Lahey F77L-EM/32 version 5.01   *                    *      DAVIS, CALIFORNIA 95616       *
*     : Dodson & Associates, Inc.     *                    *           (916) 551-1748           *
*  RUN DATE  02/14/97 TIME  10:28:47  *                    *                                    *
**************************************                    **************************************
```

```
                  ***********************************************************************
                                   Jeff Codega Planning/Design
                                        433 West Plumb Lane
                                          Reno NV  89509
                                  (702) 322-5100  Fax (702) 322-1551


                                          Coit Center


                                        JCPO JOB 1317.07



                         RAIN FALL DATA FROM NOAA ATLAS 2, VOLUME VII
                         LAG TIME COMPUTED WITH THE UPLAND METHOD AND THE PROCEDURES DESCRIBED IN TR
                         CURVE NUMBER FROM TR-55 AND NEH-4
                         ROUTING PREFORMED WITH MODIFIDE PULS


                         =====================  100 YEAR, 24 HOUR EVENT====================================



                         ###########################################################################################
```

26 IO   OUTPUT CONTROL VARIABLES
                    IPRNT   3 PRINT CONTROL
                    IPLOT   0 PLOT CONTROL
                    QSCAL   0. HYDROGRAPH PLOT SCALE

     IT   HYDROGRAPH TIME DATA
                    NMIN   1 MINUTES IN COMPUTATION INTERVAL
                    IDATE   1   0 STARTING DATE
                    ITIME   0000 STARTING TIME
                      NQ   1440 NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE   1   0 ENDING DATE
                    NDTIME   2359 ENDING TIME
                    ICENT   19 CENTURY MARK

                 COMPUTATION INTERVAL   0.02 HOURS
                    TOTAL TIME BASE   23.98 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
```

*** ***

```
              ***************
              *             *
27 KK         *   SREU21    *     Silverado Ranch Estates Unit 2 Phase 1 Detention Basin Calculation
              *             *
              ***************
```

              SUBBASIN RUNOFF DATA

28 BA   SUBBASIN CHARACTERISTICS
                    TAREA   0.11 SUBBASIN AREA

              PRECIPITATION DATA

29 PH   DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .... TP-40 .... TP-49 ....
              5-MIN 15-MIN 60-MIN   2-HR   3-HR   6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY 10-DAY
              0.48   0.73   1.08   1.20   1.32   1.62   2.16   2.88   0.00   0.00   0.00   0.00

                                         STORM AREA =   0.11

30 LS   SCS LOSS RATE
                    STRTL   0.35 INITIAL ABSTRACTION
                    CRVNBR   85.00 CURVE NUMBER
                    RTIMP   0.00 PERCENT IMPERVIOUS AREA

31 UD   SCS DIMENSIONLESS UNITGRAPH
                    TLAG   0.18 LAG

                                            ***

VALUE EXCEEDS TABLE IN LOGLOG   0.01667   0.01667   24.00000

                                             UNIT HYDROGRAPH
                                         57 END-OF-PERIOD ORDINATES
              7.   22.   42.   67.   100.   139.   183.   221.   247.   263.
            269.   268.   261.   246.   230.   211.   187.   160.   135.   115.
             99.   86.   74.   66.   57.   50.   43.   37.   32.   28.
             24.   21.   18.   16.   14.   12.   10.   9.   8.   7.
              6.   5.   4.   4.   3.   3.   3.   2.   2.   2.
              1.   1.   1.   1.   1.   0.   0.
```

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

                    HYDROGRAPH AT STATION    SREU21

      TOTAL RAINFALL =    2.88, TOTAL LOSS =    1.39, TOTAL EXCESS =    1.49

PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
  (CFS)        (HR)            6-HR     24-HR     72-HR    23.98-HR

| 111. | 12.18 | (CFS) | 12. | 4. | 4. | 4. |
| | | (INCHES) | 1.033 | 1.477 | 1.477 | 1.477 |
| | | (AC-FT) | 6. | 8. | 8. | 8. |

CUMULATIVE AREA = 0.11 SQ MI

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
***************
*             *
32 KK   *  Silv08  *
*             *
***************
```

Silverado Ranch Estates Detention Basin at Intersection of 7th and Brittania
Data from Summit Engineering Report for Silverado Ranch Estate Unit 2 Phase 1

HYDROGRAPH ROUTING DATA

35 RS   STORAGE ROUTING
         NSTPS   1 NUMBER OF SUBREACHES
         ITYP   STOR TYPE OF INITIAL CONDITION
         RSVRIC   -1.00 INITIAL CONDITION
         X   0.00 WORKING R AND D COEFFICIENT

36 SV	STORAGE	0.0	0.3	0.6	1.3	2.0	2.9	3.9	4.9
37 SQ	DISCHARGE	0.	0.	2.	5.	6.	7.	8.	9.
38 SE	ELEVATION	4970.00	4971.00	4972.00	4973.00	4974.00	4975.00	4976.00	4977.00

```
                                         ***

***          ***          ***          ***          ***
```

HYDROGRAPH AT STATION   Silv08

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
8.	12.85	(CFS)	7.	4.	4.	4.
		(INCHES)	0.651	1.258	1.258	1.258
		(AC-FT)	4.	7.	7.	7.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)		6-HR	24-HR	72-HR	23.98-HR
4.	12.85		3.	2.	2.	2.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
(FEET)	(HR)		6-HR	24-HR	72-HR	23.98-HR
4975.95	12.88		4975.45	4972.99	4972.99	4972.99

CUMULATIVE AREA = 0.11 SQ MI

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
                    **************
                    *            *
     39 KK          *   RipRap   *       Watershed Contributing to Riprap Ditch from Silverado Estates U2 P1
                    *            *
                    **************


                    SUBBASIN RUNOFF DATA

     40 BA             SUBBASIN CHARACTERISTICS
                          TAREA        0.08   SUBBASIN AREA


                    PRECIPITATION DATA

     41 PH                              DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM

                    ..... HYDRO-35 ......  ................. TP-40 ................  ............ TP-49 ............
                    5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    0.48    0.73    1.08    1.20    1.32    1.62    2.16    2.88    0.00    0.00    0.00    0.00


                                       STORM AREA =     0.08


     42 LS          SCS LOSS RATE
                          STRTL        0.35   INITIAL ABSTRACTION
                          CRVNBR      85.00   CURVE NUMBER
                          RTIMP        0.00   PERCENT IMPERVIOUS AREA


     43 UD          SCS DIMENSIONLESS UNITGRAPH
                          TLAG         0.15   LAG


                                                    ***


     VALUE EXCEEDS TABLE IN LOGLOG          0.01667       0.01667      24.00000


                                         UNIT HYDROGRAPH
                                   47 END-OF-PERIOD ORDINATES
                         9.     28.     54.     89.    135.    184.    223.    248.    258.    258.
                       248.    230.    209.    183.    152.    123.    103.     86.     73.     63.
                        53.     45.     37.     32.     26.     22.     19.     16.     13.     11.
                         9.      8.      7.      6.      5.      4.      3.      3.      3.      2.
                         2.      2.      1.      1.      1.      0.      0.


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


                    HYDROGRAPH AT STATION   RipRap


       TOTAL RAINFALL =    2.88, TOTAL LOSS =    1.39, TOTAL EXCESS =    1.49


     PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
      (CFS)        (HR)               6-HR      24-HR     72-HR    23.98-HR
      100.        12.15    (CFS)        9.        3.        3.        3.
                           (INCHES)   1.033     1.479     1.479     1.479
                           (AC-FT)      5.        7.        7.        7.


                      CUMULATIVE AREA =    0.08 SQ MI


     *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
                  ***************
                  *             *
    44 KK         *    OB&RR    *      Combine Hydrographs from Riprap Swale and Detention basin
                  *             *
                  ***************


    45 HC           HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE


                                                        ***


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


                    HYDROGRAPH AT STATION    OB&RR


    PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
      (CFS)        (HR)                6-HR        24-HR      72-HR     23.98-HR
      105.         12.15     (CFS)     17.          7.         7.         7.
                             (INCHES)  0.805       1.356      1.356      1.356
                             (AC-FT)   8.          14.        14.        14.


                    CUMULATIVE AREA =    0.19 SQ MI
```

*** ***

```
                  ***************
                  *             *
    46 KK         *   RT  C2    *      Route the outlet from D. Basin and RR Swale to outlet of Coit 2
                  *             *
                  ***************


                    HYDROGRAPH ROUTING DATA


    48 RM           MUSKINGUM ROUTING
                        NSTPS          1 NUMBER OF SUBREACHES
                        AMSKK       0.11 MUSKINGUM K
                            X       0.35 MUSKINGUM X


                                                        ***

***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH   RT  C2.
       REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).


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


                    HYDROGRAPH AT STATION    RT  C2


    PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
      (CFS)        (HR)                6-HR        24-HR      72-HR     23.98-HR
       94.         12.25     (CFS)     17.          7.         7.         7.
                             (INCHES)  0.805       1.349      1.349      1.349
                             (AC-FT)   8.          14.        14.        14.


                    CUMULATIVE AREA =    0.19 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


              ***************
              *             *
49 KK         *   Coit 2    *      Watershed of Coit Heights Unit 2 and Area 15 from Silverado U2 P1
              *             *
              ***************


         SUBBASIN RUNOFF DATA

50 BA        SUBBASIN CHARACTERISTICS
                  TAREA      0.04  SUBBASIN AREA


         PRECIPITATION DATA

51 PH                              DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM

        ..... HYDRO-35 ......  ................. TP-40 .................  ............ TP-49 ............
        5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR   12-HR  24-HR   2-DAY  4-DAY  7-DAY  10-DAY
         0.48   0.73    1.08    1.20   1.32   1.62   2.16   2.88    0.00   0.00   0.00    0.00


                                    STORM AREA =    0.04


52 LS        SCS LOSS RATE
                  STRTL     0.30  INITIAL ABSTRACTION
                  CRVNBR   87.00  CURVE NUMBER
                  RTIMP     0.00  PERCENT IMPERVIOUS AREA


53 UD        SCS DIMENSIONLESS UNITGRAPH
                  TLAG     0.25  LAG


                                             ***


VALUE EXCEEDS TABLE IN LOGLOG        0.01667        0.01667     24.00000


                                    UNIT HYDROGRAPH
                               77 END-OF-PERIOD ORDINATES
              2.      4.      8.     12.     17.     23.     31.     39.     49.     58.
             65.     71.     75.     78.     79.     79.     78.     75.     72.     68.
             64.     60.     55.     49.     43.     38.     34.     30.     27.     25.
             22.     20.     18.     16.     15.     13.     12.     11.     10.      9.
              8.      7.      6.      6.      5.      5.      4.      4.      3.      3.
              3.      2.      2.      2.      2.      2.      1.      1.      1.      1.
              1.      1.      1.      1.      1.      1.      1.      1.      0.      0.
              0.      0.      0.      0.      0.      0.      0.


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


         HYDROGRAPH AT STATION   Coit 2


     TOTAL RAINFALL =    2.88, TOTAL LOSS =    1.25, TOTAL EXCESS =    1.63


PEAK FLOW    TIME                        MAXIMUM AVERAGE FLOW
  (CFS)      (HR)            6-HR      24-HR      72-HR    23.98-HR
    40.     12.25    (CFS)     5.         2.         2.         2.
                   (INCHES)  1.122      1.620      1.620      1.620
                   (AC-FT)      3.        -.          4.         4.
```

CUMULATIVE AREA =   0.04 SQ MI

*** ***


```
               ***************
               *             *
54 KK          *    Comb     *        Combine Routed Detention basin and Riprap swale with Coit Heights 2
               *             *
               ***************
```

```
55 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
```

                                                            ***

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

                    HYDROGRAPH AT STATION   Comb

PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
134.	12.25	(CFS)	22.	9.	9.	9.
		(INCHES)	0.861	1.398	1.398	1.398
		(AC-FT)	11.	17.	17.	17.

                    CUMULATIVE AREA =   0.23 SQ MI

*** ***


```
               ***************
               *             *
56 KK          *   RTCOIT    *        Route the outlet from D. Basin and RR Swale to the Coit D. Basin
               *             *
               ***************
```

                    HYDROGRAPH ROUTING DATA


```
58 RM          MUSKINGUM ROUTING
                    NSTPS          1 NUMBER OF SUBREACHES
                    AMSKK       0.11 MUSKINGUM K
                       X        0.35 MUSKINGUM X
```

                                                            ***

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RTCOIT.
        REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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

                    HYDROGRAPH AT STATION   RTCOIT

PEAK FLOW   TIME   MAXIMUM AVERAGE FLOW

	(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
	123.	12.35	(CFS)	22.	9.	9.	9.
			(INCHES)	0.860	1.392	1.392	1.392
			(AC-FT)	11.	17.	17.	17.

CUMULATIVE AREA = 0.23 SQ MI

*** ***

```
              **************
              *            *
59 KK         *  Coit 1   *      Watershed of Coit Heights Unit 1, Sierra Heighlands and Future Dev.
              *            *
              **************
```

SUBBASIN RUNOFF DATA

60 BA   SUBBASIN CHARACTERISTICS
              TAREA   0.05 SUBBASIN AREA

PRECIPITATION DATA

61 PH   DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM

..... HYDRO-35	.... TP-40	.... TP-49 ....
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.48	0.73	1.08	1.20	1.32	1.62	2.16	2.88	0.00	0.00	0.00	0.00

STORM AREA = 0.05

62 LS   SCS LOSS RATE
              STRTL   0.30 INITIAL ABSTRACTION
              CRVNBR   87.00 CURVE NUMBER
              RTIMP   0.00 PERCENT IMPERVIOUS AREA

63 UD   SCS DIMENSIONLESS UNITGRAPH
              TLAG   0.17 LAG

***

VALUE EXCEEDS TABLE IN LOGLOG   0.01667   0.01667   24.00000

UNIT HYDROGRAPH
53 END-OF-PERIOD ORDINATES

4.	12.	23.	37.	56.	78.	100.	116.	127.	133.
133.	130.	123.	114.	104.	91.	77.	64.	54.	46.
40.	35.	30.	26.	22.	19.	16.	14.	12.	10.
9.	7.	6.	6.	5.	4.	4.	3.	3.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	0.
0.	0.	0.							

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

HYDROGRAPH AT STATION   Coit 1

TOTAL RAINFALL =   2.88, TOTAL LOSS =   1.25, TOTAL EXCESS =   1.63

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
59.	12.17	(CFS)	6.	2.	2.	2.
		(INCHES)	1.123	1.624	1.624	1.624
		(AC-FT)	3.	4.	4.	4.

CUMULATIVE AREA =   0.05 SQ MI

*** ***

```
                 ****************
                 *              *
   64 KK         *    RTCOIT    *      Route the outlet from D. Basin and RR Swale to the Coit D. Basin
                 *              *
                 ****************
```

HYDROGRAPH ROUTING DATA

```
   66 RM          MUSKINGUM ROUTING
                       NSTPS        1 NUMBER OF SUBREACHES
                       AMSKK     0.11 MUSKINGUM K
                          X      0.35 MUSKINGUM X
```

***

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RTCOIT.
    REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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

                 HYDROGRAPH AT STATION   RTCOIT

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
54.	12.27	(CFS)	6.	2.	2.	2.
		(INCHES)	1.123	1.619	1.619	1.619
		(AC-FT)	3.	4.	4.	4.

CUMULATIVE AREA =   0.05 SQ MI

f_j

*** ***

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                 ****************
                 *              *
   67 KK         *    Bullys    *      Watershed Concenrtating at Bullys Sports bar
                 *              *
                 ****************
```

SUBBASIN RUNOFF DATA

```
   68 BA          SUBBASIN CHARACTERISTICS
                       TAREA     0.02  SUBBASIN AREA
```

PRECIPITATION DATA

69 PH   DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .... TP-40 .... TP-49 ....
              5-MIN 15-MIN 60-MIN   2-HR   3-HR   6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY   10-DAY
               0.48   0.73   1.08   1.20   1.32   1.52   2.16   2.88   0.00   0.00   0.00   0.00

                                    STORM AREA =   0.02

70 LS   SCS LOSS RATE
                   STRTL   0.30   INITIAL ABSTRACTION
                   CRVNBR   87.00   CURVE NUMBER
                   RTIMP   0.00   PERCENT IMPERVIOUS AREA

71 UD   SCS DIMENSIONLESS UNITGRAPH
                   TLAG   0.17   LAG

                                          ***

VALUE EXCEEDS TABLE IN LOGLOG   0.01667   0.01667   24.00000

                                    UNIT HYDROGRAPH
                              53 END-OF-PERIOD ORDINATES
              2.   5.   10.   16.   24.   33.   42.   50.   54.   56.
             57.   55.   52.   48.   44.   39.   33.   27.   23.   20.
             17.   15.   13.   11.   9.   8.   7.   6.   5.   4.
              4.   3.   3.   2.   2.   2.   2.   1.   1.   1.
              1.   1.   1.   1.   0.   0.   0.   0.   0.   0.
              0.   0.   0.

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

            HYDROGRAPH AT STATION   Bullys

   TOTAL RAINFALL =   2.88, TOTAL LOSS =   1.25, TOTAL EXCESS =   1.63

PEAK FLOW   TIME   MAXIMUM AVERAGE FLOW
  (CFS)   (HR)   6-HR   24-HR   72-HR   23.98-HR
   25.   12.17   (CFS)   3.   1.   1.   1.
                     (INCHES) 1.123   1.624   1.624   1.624
                     (AC-FT)   1.   2.   2.   2.

               CUMULATIVE AREA =   0.02 SQ MI

*** ***

              ****
              *   *
72 KK   *   RTCOIT   *   Route the outlet from D. Basin and RR Swale to the Coit D. Basin
              *   *
              ****

              HYDROGRAPH ROUTING DATA

74 RM   MUSKINGUM ROUTING
                   NSTPS   1 NUMBER OF SUBREACHES

```
                    AMSKK      0.11 MUSKINGUM K
                       X       0.35 MUSKINGUM X


                                          ***

***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH  RTCOIT.
         REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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


                      HYDROGRAPH AT STATION   RTCOIT

PEAK FLOW    TIME                       MAXIMUM AVERAGE FLOW
  (CFS)      (HR)               6-HR       24-HR       72-HR      23.98-HR
   23.      12.27     (CFS)      3.          1.          1.          1.
                     (INCHES)   1.123       1.620       1.620       1.620
                     (AC-FT)     1.          2.          2.          2.

                     CUMULATIVE AREA =    0.02 SQ MI
```

*** ***

```
                ***************
                *             *
 75 KK          *    CoitPl   *      Watershed of Coit Plaza
                *             *
                ***************

              SUBBASIN RUNOFF DATA

 76 BA          SUBBASIN CHARACTERISTICS
                      TAREA        0.04  SUBBASIN AREA

                PRECIPITATION DATA

 77 PH                          DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ............ TP-49 ............
                5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                0.48    0.73    1.08    1.20   1.32   1.62   2.16    2.88    0.00    0.00    0.00    0.00

                                          STORM AREA =     0.04


 78 LS          SCS LOSS RATE
                      STRTL        0.30  INITIAL ABSTRACTION
                      CRVNBR      87.00  CURVE NUMBER
                      RTIMP        0.00  PERCENT IMPERVIOUS AREA


 79 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         0.17  LAG


                                          ***


VALUE EXCEEDS TABLE IN LOGLOG          0.01667       0.01667      24.00000


                                 UNIT HYDROGRAPH
                            53 END-OF-PERIOD ORDINATES
          3.     11.     20.     33.     50.     70.     89.    104.    113.    118.
```

119.	116.	109.	101.	92.	81.	68.	57.	48.	41.
36.	31.	27.	23.	20.	17.	15.	12.	11.	9.
8.	7.	6.	5.	4.	4.	3.	3.	2.	2.
2.	1.	1.	1.	1.	1.	1.	1.	0.	0.
0.	0.	0.							

```
***          ***          ***          ***          ***
```

HYDROGRAPH AT STATION   CoitPl

TOTAL RAINFALL =   2.88, TOTAL LOSS =   1.25, TOTAL EXCESS =   1.63

PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
53.	12.17	(CFS)	5.	2.	2.	2.
		(INCHES)	1.123	1.624	1.624	1.624
		(AC-FT)	3.	4.	4.	4.

CUMULATIVE AREA =   0.04 SQ MI

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
        ***************
        *             *
80 KK   *    Comb     *     Combine outlet of Routed Silverado Detention Basin with Coit 08
        *             *
        ***************
```

81 HC   HYDROGRAPH COMBINATION
               ICOMP   4 NUMBER OF HYDROGRAPHS TO COMBINE

```
                                    ***
```

```
    ***          ***          ***          ***          ***
```

HYDROGRAPH AT STATION   Comb

PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
223.	12.30	(CFS)	35.	14.	14.	14.
		(INCHES)	0.944	1.467	1.467	1.467
		(AC-FT)	17.	27.	27.	27.

CUMULATIVE AREA =   0.35 SQ MI

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
        ***************
        *             *
82 KK   *   Mccarn    *
        *             *
        ***************
```

Reservoir routing at McCarran Blvd.
With 54 inch storm drain in place through Canyon Center

HYDROGRAPH ROUTING DATA

85 RS	STORAGE ROUTING									
	NSTPS	1	NUMBER OF SUBREACHES							
	ITYP	STOR	TYPE OF INITIAL CONDITION							
	RSVRIC	-1.00	INITIAL CONDITION							
	X	0.00	WORKING R AND D COEFFICIENT							

86 SV	STORAGE	0.0	0.0	0.3	0.6	0.9	1.3	1.7	2.2	2.7	3.2
		3.3	4.4	5.1	5.8	6.6	7.4	8.3			

88 SQ	DISCHARGE	0.	5.	18.	38.	61.	79.	94.	107.	118.	128.
		138.	147.	155.	163.	171.	178.	185.			

90 SE	ELEVATION	48.40	49.40	50.40	51.40	52.40	53.40	54.40	55.40	56.40	57.40
		58.40	59.40	60.40	61.40	62.40	63.40	64.40			

***

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

HYDROGRAPH AT STATION   Mccarn

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	23.98-HR
129.	12.52	(CFS)	35.	14.	14.	14.
		(INCHES)	0.940	1.459	1.459	1.459
		(AC-FT)	17.	27.	27.	27.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)		6-HR	24-HR	72-HR	23.98-HR
3.	12.52		1.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
(FEET)	(HR)		6-HR	24-HR	72-HR	23.98-HR
57.51	12.52		51.35	49.77	49.77	49.77

CUMULATIVE AREA =   0.35 SQ MI

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			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SREU21	111.	12.18	12.	4.	4.	0.11		
ROUTED TO	Silv08	8.	12.85	7.	4.	4.	0.11	4975.95	12.38
HYDROGRAPH AT	RipRap	100.	12.15	9.	3.	3.	0.08		
2 COMBINED AT	08&RR	105.	12.15	17.	7.	7.	0.19		
ROUTED TO	RT C2	94.	12.25	17.	7.	7.	0.19		
HYDROGRAPH AT	Coit 2	40.	12.25	5.	2.	2.	0.04		
2 COMBINED AT	Comb (Pipe 1)	134.	12.25	22.	9.	9.	0.23		
ROUTED TO	RTCOIT	123.	12.35	22.	9.	9.	0.23		
HYDROGRAPH AT	Coit 1 (Pipe 2+3)	59.	12.17	6.	2.	2.	0.05		
ROUTED TO	RTCOIT	54.	12.27	6.	2.	2.	0.05		
HYDROGRAPH AT	Bullys (Pipe 4)	25.	12.17	3.	1.	1.	0.02		
ROUTED TO	RTCOIT	23.	12.27	3.	1.	1.	0.02		
HYDROGRAPH AT	CoitPl	53.	12.17	5.	2.	2.	0.04		
4 COMBINED AT	Comb	223.	12.30	35.	14.	14.	0.35		
ROUTED TO	Mccarn	129.	12.52	35.	14.	14.	0.35	57.51	12.52

*** NORMAL END OF HEC-1 ***

ON-SITE CALCULATIONS
FLOW MASTER

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System A
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	12.00	in
Discharge	2.26	cfs

Results

Channel Slope	0.004024	ft/ft
Depth	12.0	in
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Top Width	0.00	ft
Critical Depth	0.64	ft
Percent Full	100.00	
Critical Slope	0.007253	ft/ft
Velocity	2.88	ft/s
Velocity Head	0.13	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	2.43	cfs
Full Flow Capacity	2.26	cfs
Full Flow Slope	0.004024	ft/ft

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System A
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data		
Mannings Coefficient	0.013	
Diameter	36.00	in
Discharge	91.60	cfs

Results		
Channel Slope	0.018863	ft/ft
Depth	36.0	in
Flow Area	7.07	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.86	ft
Percent Full	100.00	
Critical Slope	0.016351	ft/ft
Velocity	12.96	ft/s
Velocity Head	2.61	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	98.53	cfs
Full Flow Capacity	91.60	cfs
Full Flow Slope	0.018863	ft/ft

System A
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	48.00	in
Discharge	151.60	cfs

Results

Channel Slope	0.011140	ft/ft
Depth	48.0	in
Flow Area	12.57	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.61	ft
Percent Full	100.00	
Critical Slope	0.009789	ft/ft
Velocity	12.06	ft/s
Velocity Head	2.26	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	163.08	cfs
Full Flow Capacity	151.60	cfs
Full Flow Slope	0.011140	ft/ft

i

05/08/02
03:13:38 PM
  Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666
  FlowMaster v5.13
Page 1 of 1

System B
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	30.00	in
Discharge	60.00	cfs

Results

Channel Slope	0.021400	ft/ft
Depth	30.0	in
Flow Area	4.91	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	2.39	ft
Percent Full	100.00	
Critical Slope	0.018607	ft/ft
Velocity	12.22	ft/s
Velocity Head	2.32	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	64.54	cfs
Full Flow Capacity	60.00	cfs
Full Flow Slope	0.021400	ft/ft

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System B
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	36.00	in
Discharge	60.00	cfs

Results

Channel Slope	0.008093	ft/ft
Depth	36.0	in
Flow Area	7.07	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.50	ft
Percent Full	100.00	
Critical Slope	0.007855	ft/ft
Velocity	8.49	ft/s
Velocity Head	1.12	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	64.54	cfs
Full Flow Capacity	60.00	cfs
Full Flow Slope	0.008093	ft/ft

i

System C
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	24.00	in
Discharge	25.00	cfs

Results

Channel Slope	0.012214	ft/ft
Depth	24.0	in
Flow Area	3.14	ft²
Wetted Perimeter	6.28	ft
Top Width	0.00	ft
Critical Depth	1.76	ft
Percent Full	100.00	
Critical Slope	0.010977	ft/ft
Velocity	7.96	ft/s
Velocity Head	0.98	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	26.89	cfs
Full Flow Capacity	25.00	cfs
Full Flow Slope	0.012214	ft/ft

i

System D
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	18.00	in
Discharge	10.30	cfs

Results

Channel Slope	0.009616	ft/ft
Depth	18.0	in
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Top Width	0.00	ft
Critical Depth	1.24	ft
Percent Full	100.00	
Critical Slope	0.009538	ft/ft
Velocity	5.83	ft/s
Velocity Head	0.53	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	11.08	cfs
Full Flow Capacity	10.30	cfs
Full Flow Slope	0.009616	ft/ft

i

System D
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	24.00	in
Discharge	13.40	cfs

Results

Channel Slope	0.003509	ft/ft
Depth	24.0	in
Flow Area	3.14	ft²
Wetted Perimeter	6.28	ft
Top Width	0.00	ft
Critical Depth	1.32	ft
Percent Full	100.00	
Critical Slope	0.005901	ft/ft
Velocity	4.27	ft/s
Velocity Head	0.28	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	14.41	cfs
Full Flow Capacity	13.40	cfs
Full Flow Slope	0.003509	ft/ft

System E
Worksheet for Circular Channel

Project Description

Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data

Mannings Coefficient	0.013	
Diameter	18.00	in
Discharge	8.70	cfs

Results

Channel Slope	0.006860	ft/ft
Depth	18.0	in
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Top Width	0.00	ft
Critical Depth	1.14	ft
Percent Full	100.00	
Critical Slope	0.007972	ft/ft
Velocity	4.92	ft/s
Velocity Head	0.38	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	9.36	cfs
Full Flow Capacity	8.70	cfs
Full Flow Slope	0.006860	ft/ft

System E
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data		
Mannings Coefficient	0.013	
Diameter	18.00	in
Discharge	10.63	cfs

Results		
Channel Slope	0.010242	ft/ft
Depth	18.0	in
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Top Width	0.00	ft
Critical Depth	1.25	ft
Percent Full	100.00	
Critical Slope	0.009925	ft/ft
Velocity	6.02	ft/s
Velocity Head	0.56	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	11.43	cfs
Full Flow Capacity	10.63	cfs
Full Flow Slope	0.010242	ft/ft

i

System E
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\coit-pla.fm2
Worksheet	SYSTEM A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data		
Mannings Coefficient	0.013	
Diameter	12.00	in
Discharge	2.00	cfs

Results		
Channel Slope	0.003152	ft/ft
Depth	12.0	in
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Top Width	0.00	ft
Critical Depth	0.60	ft
Percent Full	100.00	
Critical Slope	0.006859	ft/ft
Velocity	2.55	ft/s
Velocity Head	0.10	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	2.15	cfs
Full Flow Capacity	2.00	cfs
Full Flow Slope	0.003152	ft/ft

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = COIT.RNQ coit plaza

Storm Tag Name   = Pre..5

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency   = 5 yr
Total Rainfall Depth= 1.4200 in
Duration Multiplier = 1
Resulting Duration   = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

| | | HYG Vol | | Qpeak | Qpeak | Max WSEL |
Node ID	Type	ac-ft	Trun.	hrs	cfs	ft
Outfall OUTFALL	JCT	.692		12.0300	10.12	
PRE-DEVELOPED	AREA	.692		12.0300	10.12	

```
                        NETWORK SUMMARY -- NODES
         (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

      DEFAULT Design Storm File,ID = COIT.RNQ  coit plaza


      Storm Tag Name       = Pre100
      ----------------------------------------------------------------
      Data Type, File, ID = Synthetic Storm  SCSTYPES.RNF  TypeII 24hr
      Storm Frequency      = 100 yr
      Total Rainfall Depth= 2.8800 in
      Duration Multiplier =  1
      Resulting Duration  = 24.0000 hrs
      Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


                              HYG Vol       Qpeak     Qpeak     Max WSEL
             Node ID        Type  ac-ft Trun.  hrs      cfs        ft
      ----------------     ----  ---------- -- --------- --------- ---------
Outfall OUTFALL            JCT      3.008    12.0000    49.32
        PRE-DEVELOPED      AREA     3.008    12.0000    49.32
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                            NETWORK SUMMARY -- NODES
            (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

          DEFAULT Design Storm File,ID = COIT.RNQ  coit plaza


          Storm Tag Name       = Dev..5
          ------------------------------------------------------------------
          Data Type, File, ID = Synthetic Storm  SCSTYPES.RNF  TypeII  24hr
          Storm Frequency      = 5 yr
          Total Rainfall Depth= 1.4200 in
          Duration Multiplier =  1
          Resulting Duration   = 24.0000 hrs
          Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs
```

	Node ID		Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
	DEVELOPED		AREA	2.932		11.9800	44.40	
Outfall	OUTLET		JCT	2.932		11.9800	44.40	
	POND	IN	POND	2.932		11.9800	44.40	
	POND	OUT	POND	2.932		11.9800	44.40	

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                      NETWORK SUMMARY -- NODES
          (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

     DEFAULT Design Storm File,ID = COIT.RNQ  coit plaza


     Storm Tag Name      = Dev100
     ------------------------------------------------------------------
     Data Type, File, ID = Synthetic Storm  SCSTYPES.RNF  TypeII  24hr
     Storm Frequency     = 100 yr
     Total Rainfall Depth= 2.8800 in
     Duration Multiplier =  1
     Resulting Duration  = 24.0000 hrs
     Resulting Start Time= .0000 hrs   Step= .1000 hrs   End= 24.0000 hrs
```

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
	DEVELOPED		AREA	6.411		11.9800	93.12	
Outfall	OUTLET		JCT	6.411		11.9800	93.12	
	POND	IN	POND	6.411		11.9800	93.12	
	POND	OUT	POND	6.411		11.9800	93.12	

i

File.... C:\HAESTAD\PPKW\SAMPLE\COIT-MAYPOST.PPW

DETENTION STORAGE ESTIMATES -- Target Peak Outflow Rate

Return Events	Peak In (cfs)	Target (cfs)	Lower (ac-ft)	Linear (ac-ft)	Curvlinr (ac-ft)	Upper (ac-ft)	Total (ac-ft)
	44.399	10.120	.759	.887	1.221	1.850	2.932

CALCULATION TIME RANGES

Return Events	Lower From (hrs)	Lower To (hrs)	Linear From (hrs)	Linear To (hrs)	Curvilinear From (hrs)	Curvilinear To (hrs)	Upper From (hrs)	Upper To (hrs)	Total From (hrs)	Total To (hrs)
	11.68	12.23	11.51	12.23	2.40	12.23	2.40	12.23	2.40	24.46

i

File.... C:\HAESTAD\PPKW\SAMPLE\COIT-MAYPOST.PPW

DETENTION STORAGE ESTIMATES -- Target Peak Outflow Rate

Return Events	Peak In (cfs)	Target (cfs)	Lower (ac-ft)	Linear (ac-ft)	Curvlinr (ac-ft)	Upper (ac-ft)	Total (ac-ft)
	93.117	43.800	.802	1.197	2.018	3.939	6.411

CALCULATION TIME RANGES

Return Events	Lower From (hrs)	Lower To (hrs)	Linear From (hrs)	Linear To (hrs)	Curvilinear From (hrs)	Curvilinear To (hrs)	Upper From (hrs)	Upper To (hrs)	Total From (hrs)	Total To (hrs)
	11.80	12.13	11.56	12.13	1.26	12.13	1.26	12.13	1.26	24.49

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File.... C:\HAESTAD\PPKW\SAMPLE\COIT-MAYPOST.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
854.00	-----	.0973	.0000	.000	.000
865.00	-----	.5420	.8689	3.186	3.186

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

  Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

  where: EL1, EL2   = Lower and upper elevations of the increment
         Area1,Area2 = Areas computed for EL1, EL2, respectively
         Volume   = Incremental volume between EL1 and EL2

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Elev. vs. Volume
POND

Currently Plotted Curves
POND