APPENDIX I

100-YEAR DEVELOPED AND UNDEVELOPED HYDROLOGY STUDY

BAS
(909) 860-7777
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

JOB GREENLEY CANYON LANDFILL – HYDROLOGY
SHEET NO. 1 OF 1
CALCULATED BY CHM DATE 9/24/2004
CHECKED BY DATE
SCALE N.A.

FIND: DETERMINE THE PEAK RUNOFF FLOWS (Q_{100} & Q_{10}) TO USE IN SIZING THE STORM DRAIN STRUCTURES AND DESILTING BASIN.

CRITERIA: USE 2003 SAN DIEGO COUNTY HYDROLOGY MANUAL [SDCHM] MANUAL, WHICH IS BASED ON THE RATIONAL METHOD, AND THE AES SOFTWARE (WHICH IS COUNTY APPROVED)

INPUT DATA FROM SDCHM ARE:

APPENDIX A – SOIL TYPE = D

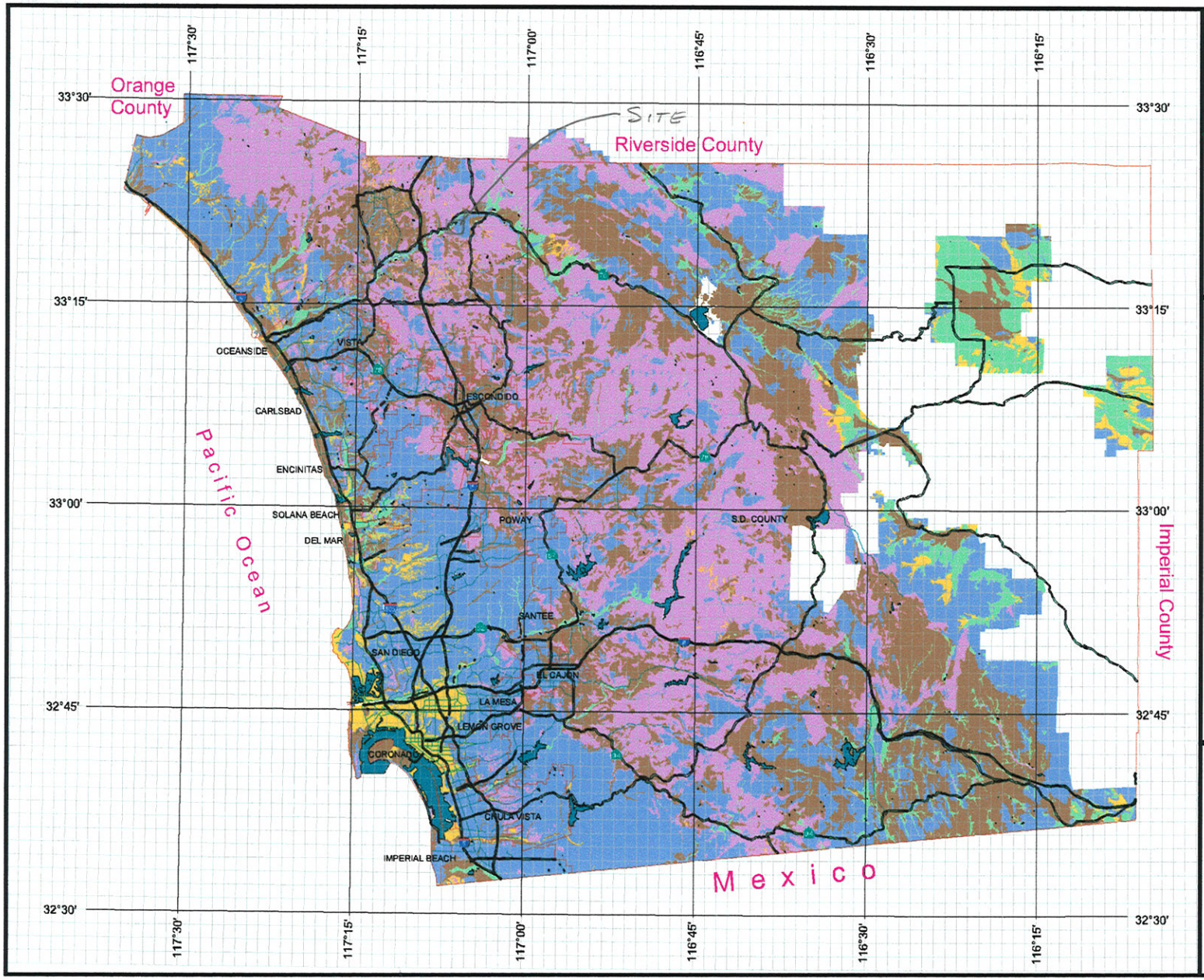
APPENDIX B – P^6 MUST BE 45% TO 65% OF P^{24}

P^6 100 YR 6HR – 3.5 IN P^6/P^{24} = 58% OK
P^{24} 100 YR 24HR – 6.0 IN

P^6 10 YR 6HR – 2.2 IN P^6/P^{24} = 55% OK
P^{24} 10 YR 24HR – 4.0 IN

APPENDIX C – PRN FIG C-1 = 2.0

(SEE FOLLOWING PAGES FOR REFERENCES)



County of San Diego Hydrology Manual

Soil Hydrologic Groups

Legend

Soil Groups

- Group A
- Group B
- Group C
- Group D ← USE
- Undetermined
- Data Unavailable

DPW GIS
Department of Public Works
Geographic Information Services

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N
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3 0 3 Miles

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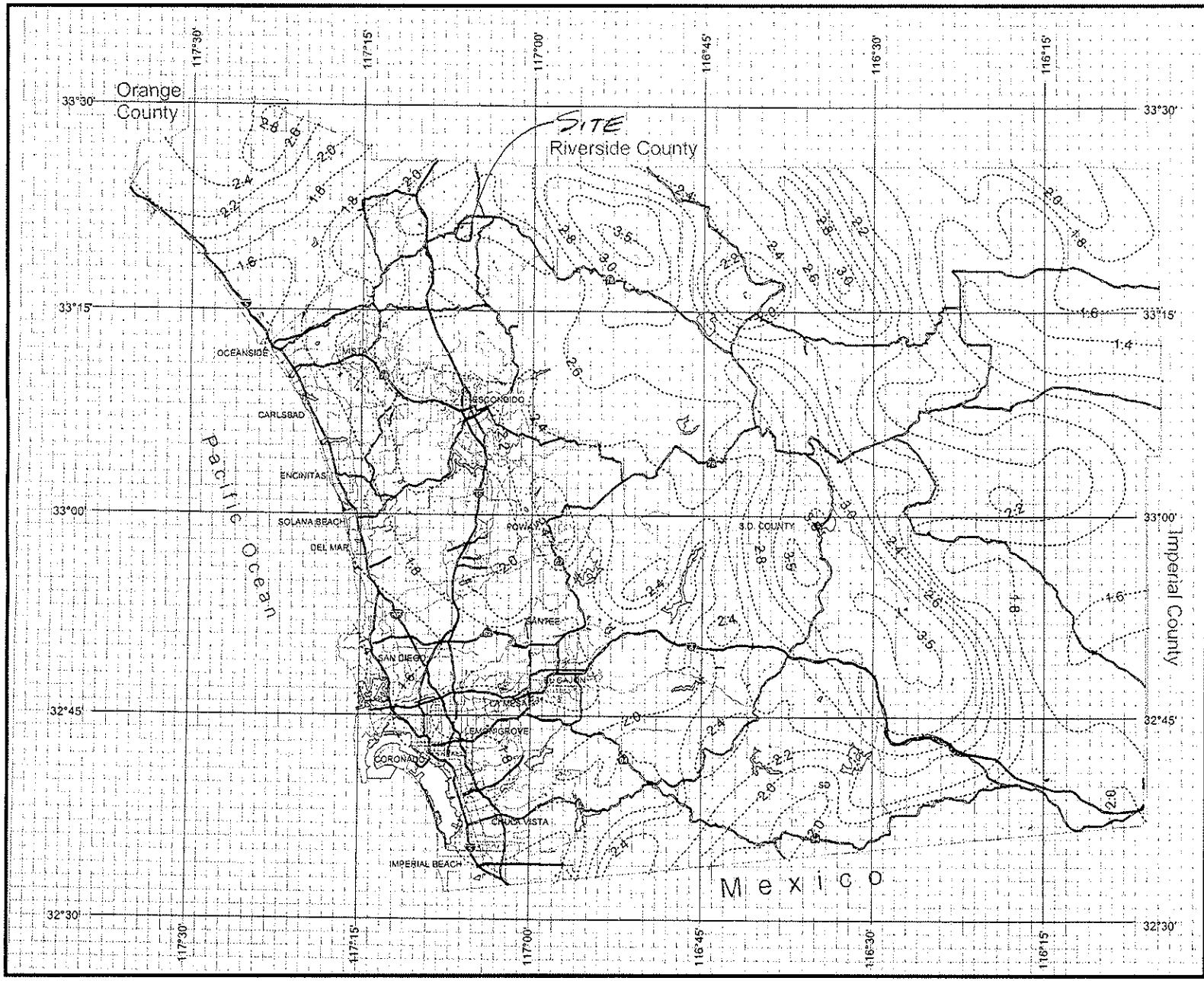
County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)

2.2 in



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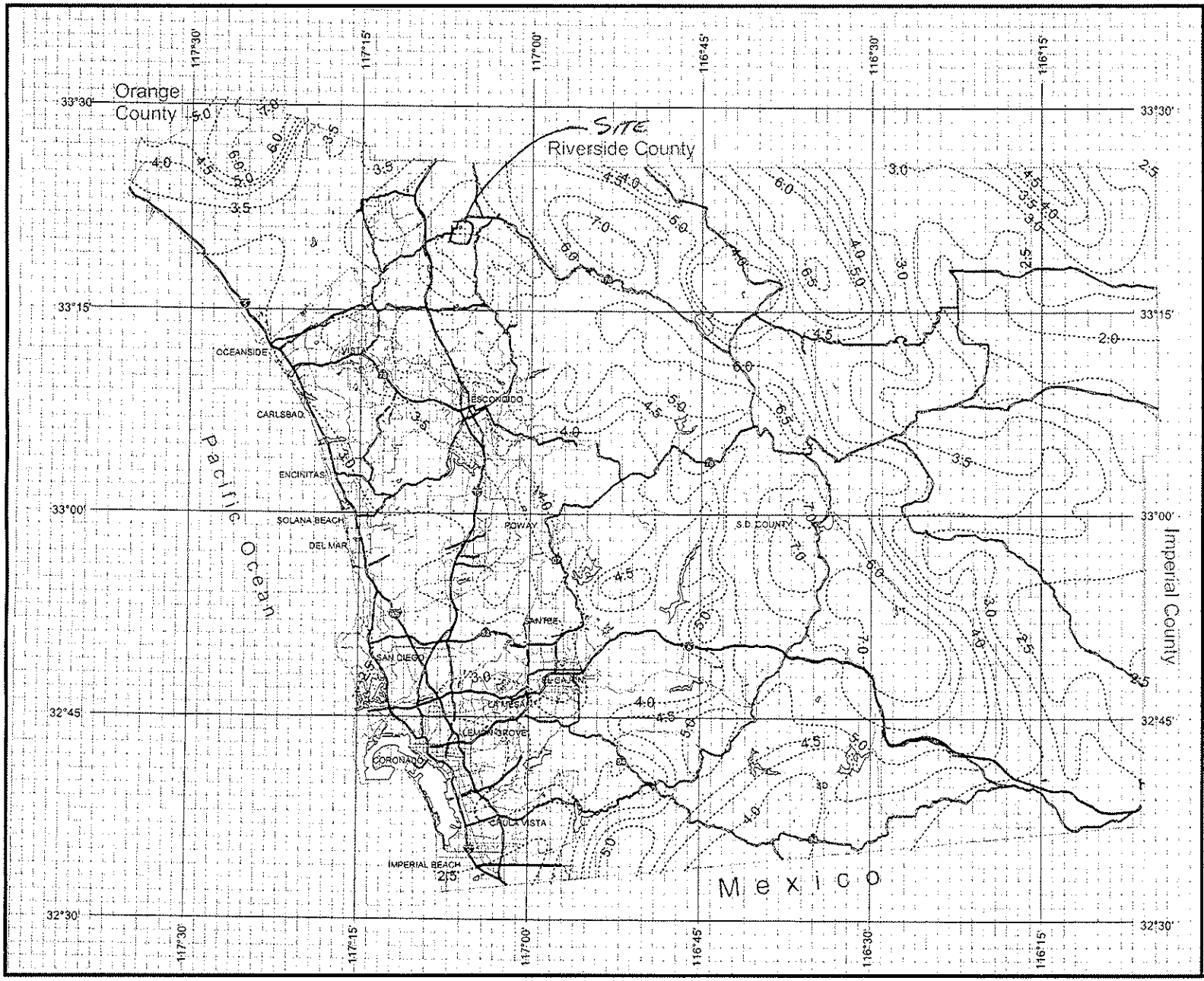
3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

4.0 IN

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3 0 3 Miles

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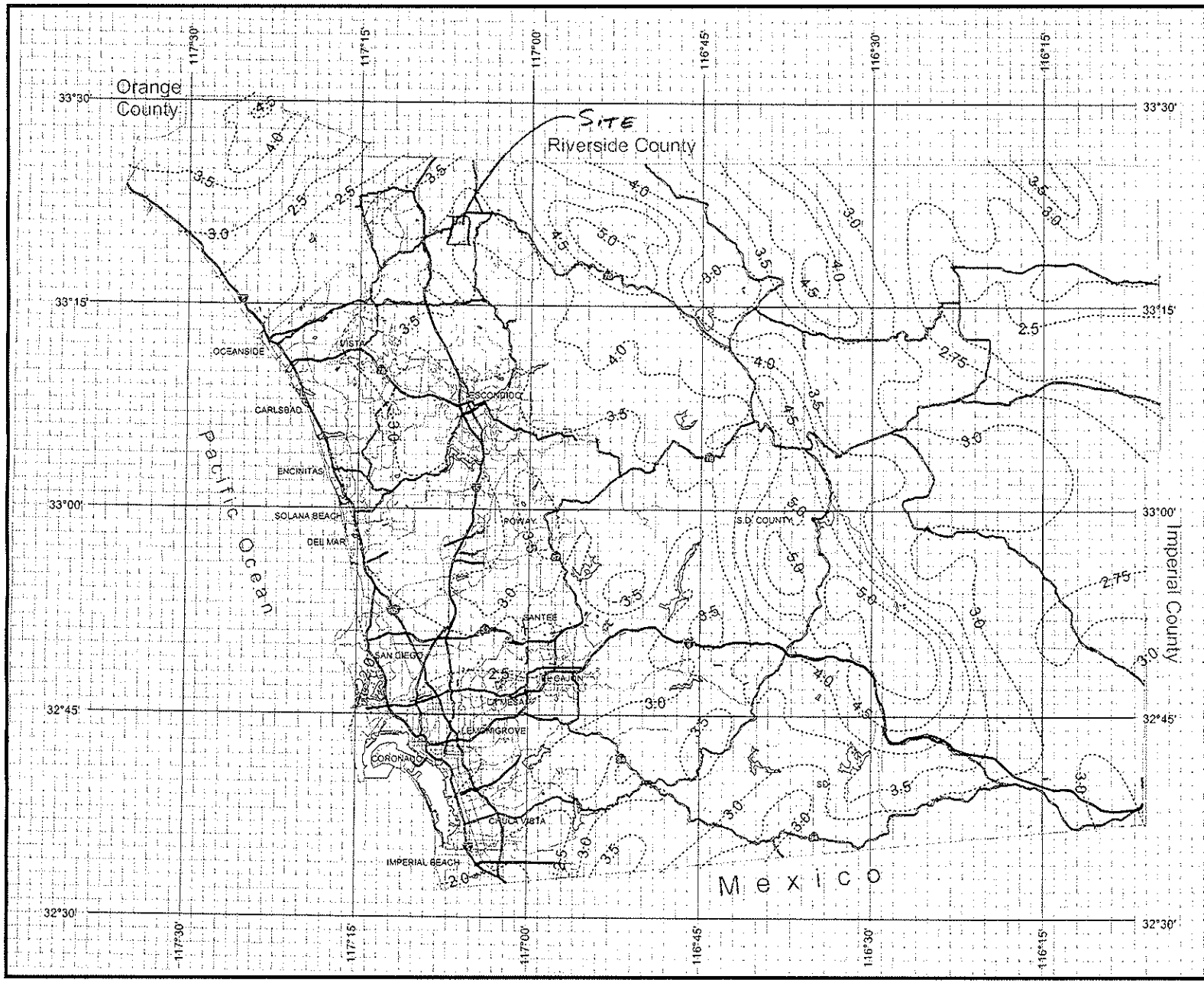

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Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

B.5.12

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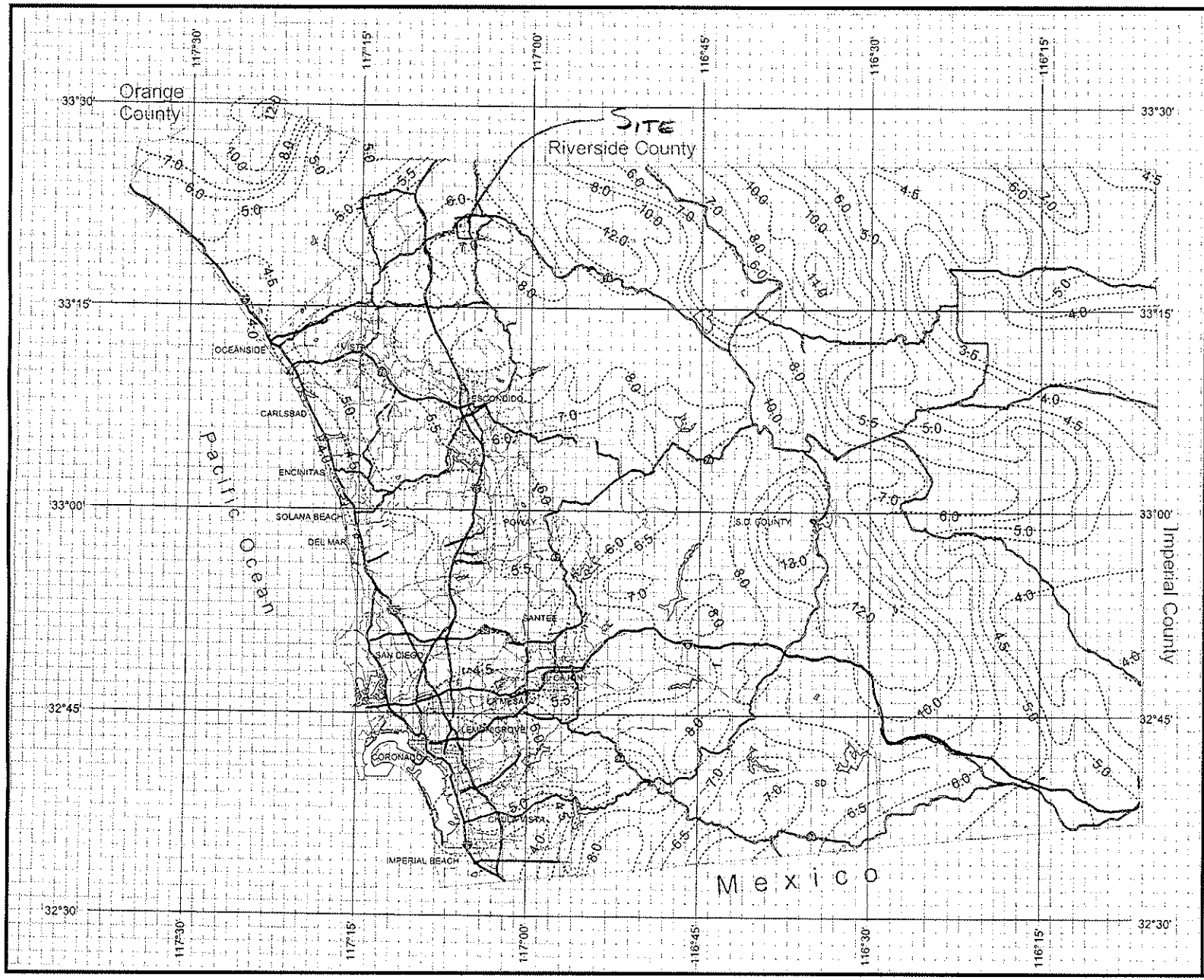
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

6.0 in

DPW GIS

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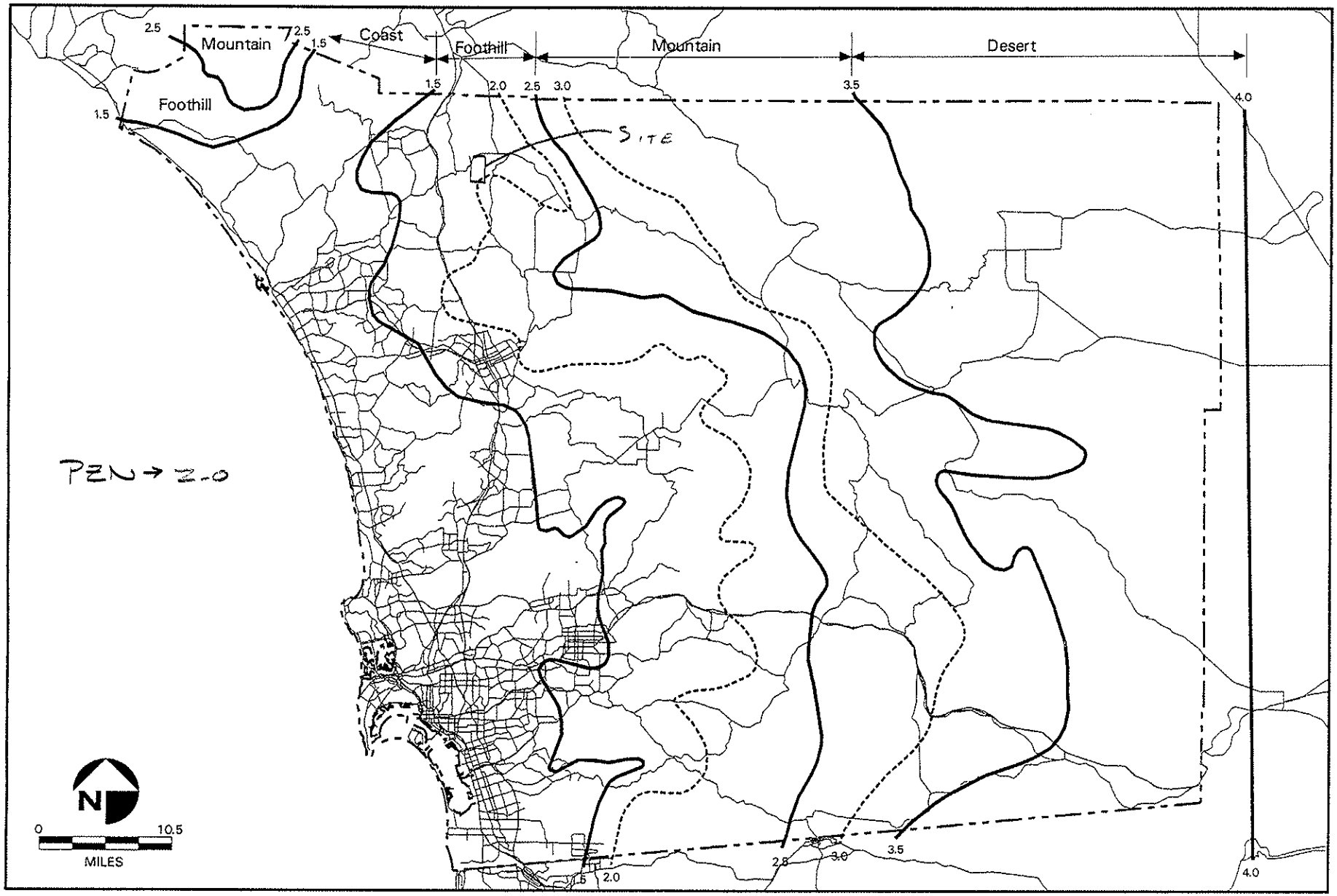
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Precipitation Zone Numbers (PZN)

FIGURE

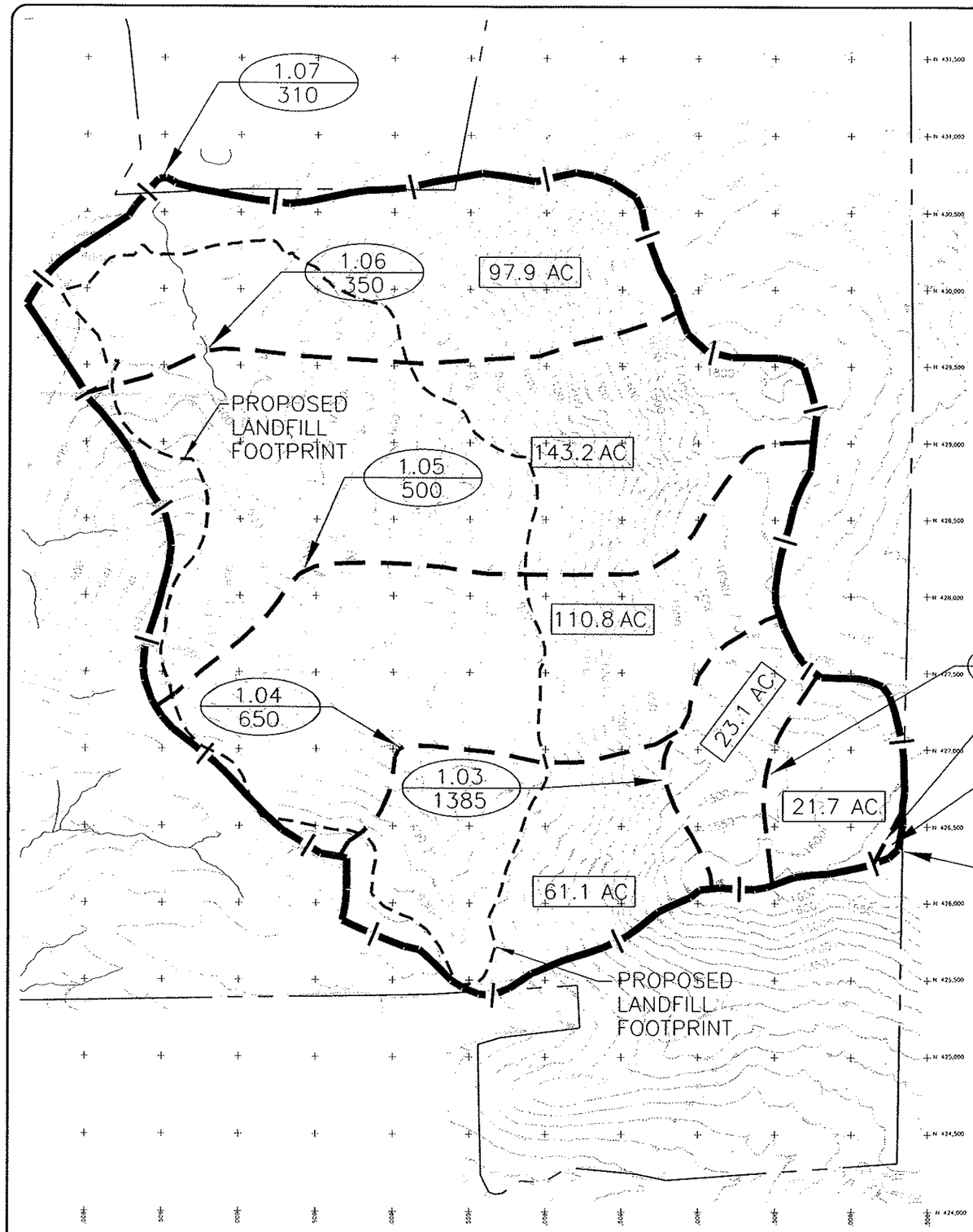
C-1

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

  INTEGRATED RATIONAL METHOD/UH METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2004 Advanced Engineering Software (aes)
            Ver. 2.0 Release Date: 01/01/2004  License ID 1211

                          Analysis prepared by:

                      Bryan A. Stirrat & Associates
                          1360 Valley Vista Dr.
                             Diamond Bar, Ca
                                 91786

 ************************** DESCRIPTION OF STUDY **************************
* GREGORY CANYON HYDROLOGY (100-YEAR)                                     *
* EXISTING CONDITION (PRE-LANDFILL)                                       *
* CHM                                                                     *
 ***************************************************************************

  FILE NAME: GREGEX.DAT
  TIME/DATE OF STUDY: 14:09 10/18/2004
---------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
---------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.350
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ======= ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    S.C.S. S-GRAPH USED.
    SAN DIEGO COUNTY DEPTH-AREA FACTORS USED
    UNADJUSTED  6-HOUR RAINFALL DEPTH (INCHES) =   3.50
    UNADJUSTED 24-HOUR RAINFALL DEPTH (INCHES) =   6.00
  *PRECIPITATION ZONE NUMBER (PZN) = 2.0
  *ANTECEDENT MOISTURE CONDITION (AMC) =  3.00 ASSUMED FOR UNIT HYDROGRAPH METHOD*


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
---------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===========================================================================
  *USER SPECIFIED(GLOBAL):
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1705.00
  DOWNSTREAM ELEVATION(FEET) =   1687.00
  ELEVATION DIFFERENCE(FEET) =     18.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1687.00  DOWNSTREAM(FEET) =   1525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00   CHANNEL SLOPE =  0.1800
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.710
  *USER SPECIFIED(GLOBAL):
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     27.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.82
  AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =   8.19
  SUBAREA AREA(ACRES) =    21.70       SUBAREA RUNOFF(CFS) =   50.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     22.20         PEAK FLOW RATE(CFS) =      52.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   9.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.02 =  1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1525.00  DOWNSTREAM(FEET) =   1385.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.2000
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.210
  *USER SPECIFIED(GLOBAL):
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     77.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.18
  AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =   9.23
  SUBAREA AREA(ACRES) =    23.10       SUBAREA RUNOFF(CFS) =   50.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     45.30         PEAK FLOW RATE(CFS) =      98.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =  11.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.03 =  1700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1385.00  DOWNSTREAM(FEET) =    650.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1700.00   CHANNEL SLOPE =  0.4324
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.612
*USER SPECIFIED(GLOBAL):
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    158.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  18.07
AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   1.57
Tc(MIN.) =  10.80
SUBAREA AREA(ACRES) =    61.10       SUBAREA RUNOFF(CFS) =  120.02
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =    106.40         PEAK FLOW RATE(CFS) =     209.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =  19.43
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  3400.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    500.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1300.00   CHANNEL SLOPE =  0.1154
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.131
*USER SPECIFIED(GLOBAL):
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    308.57
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.47
AVERAGE FLOW DEPTH(FEET) =   1.09   TRAVEL TIME(MIN.) =   1.61
Tc(MIN.) =  12.41
SUBAREA AREA(ACRES) =   110.80       SUBAREA RUNOFF(CFS) =  199.00
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =    217.20         PEAK FLOW RATE(CFS) =     390.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =  14.34
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  4700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    350.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1600.00   CHANNEL SLOPE =  0.0938
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.686
*USER SPECIFIED(GLOBAL):
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    507.60
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.22
AVERAGE FLOW DEPTH(FEET) =   1.45   TRAVEL TIME(MIN.) =   1.88
```

```
Tc(MIN.) =  14.28
SUBAREA AREA(ACRES) =   143.20       SUBAREA RUNOFF(CFS) =  234.87
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =    360.40         PEAK FLOW RATE(CFS) =     591.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.56   FLOW VELOCITY(FEET/SEC.) =  14.81
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 =  6300.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    310.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00   CHANNEL SLOPE =  0.0333
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.319
*USER SPECIFIED(GLOBAL):
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    665.13
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.40
AVERAGE FLOW DEPTH(FEET) =   2.08   TRAVEL TIME(MIN.) =   1.92
Tc(MIN.) =  16.20
SUBAREA AREA(ACRES) =    97.90       SUBAREA RUNOFF(CFS) =  148.00
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =    458.30         PEAK FLOW RATE(CFS) =     692.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.12   FLOW VELOCITY(FEET/SEC.) =  10.51
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.07 =  7500.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =    458.30  TC(MIN.) =     16.20
PEAK FLOW RATE(CFS)    =    692.85
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```



N

800 400 0 800 1600

SCALE IN FEET

LEGEND

DRAINAGE TRIBUTARY AREA

LANDFILL FOOTPRINT

DRAINAGE SUB-AREA

1.00 / 725 — NODE NAME / ELEVATION — NODE DESCRIPTION

10.10 AC — AREA IN ACRES

GREGORY CANYON LANDFILL
100-YEAR RUNOFF SUMMARY TABLE

NODE NO.	SUBAREA (ACRES)	RUNOFF (CFS)	AREA (ACRES)	RUNOFF (CFS)	COMMENTS
1.00-1.01	0.5	1.4	0.5	1.4	INITIAL AREA
1.01-1.02	21.7	51.0	22.2	52.1	
1.02-1.03	23.1	50.2	45.3	98.5	
1.03-1.04	61.1	120.0	106.4	209.0	
1.04-1.05	110.8	199.0	217.2	390.1	
1.05-1.06	143.2	234.9	360.4	591.1	
1.06-1.07	97.9	148.0	458.3	692.9	

JOB NO. 9590
DATE 12-5-97
DRAWN BY D.L.L.
CHECKED BY G.V.N.

GREGORY CANYON LANDFILL-COUNTY OF SAN DIEGO

100-YEAR PRE-DEVELOPMENT CONDITION HYDROLOGY MAP

(909) 860-7777
BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE DIAMOND BAR, CA 91765

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

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            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2004 Advanced Engineering Software (aes)
            Ver. 2.0 Release Date: 01/01/2004  License ID 1211

                          Analysis prepared by:

                      Bryan A. Stirrat & Associates
                          1360 Valley Vista Dr.
                             Diamond Bar, Ca
                                 91786

 ************************** DESCRIPTION OF STUDY **************************
* GREGORY CANYON HYDROLOGY (100-YEAR)                                      *
* FINAL PROPOSED GRADING                                                   *
* CHM                                                                      *
 ***************************************************************************

  FILE NAME: GREGDEV.DAT
  TIME/DATE OF STUDY: 09:40 10/04/2004
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    S.C.S. S-GRAPH USED.
    SAN DIEGO COUNTY DEPTH-AREA FACTORS USED
    UNADJUSTED  6-HOUR RAINFALL DEPTH (INCHES) =   3.50
    UNADJUSTED 24-HOUR RAINFALL DEPTH (INCHES) =   6.00
  *PRECIPITATION ZONE NUMBER (PZN) = 2.0
  *ANTECEDENT MOISTURE CONDITION (AMC) =  3.00 ASSUMED FOR UNIT HYDROGRAPH METHOD*


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
  UPSTREAM ELEVATION(FEET) =   1820.00
  DOWNSTREAM ELEVATION(FEET) =   1800.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1800.00  DOWNSTREAM(FEET) =   1650.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.130
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.29
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   3.15
  Tc(MIN.) =   9.42
  SUBAREA AREA(ACRES) =     8.80       SUBAREA RUNOFF(CFS) =   18.88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      9.00         PEAK FLOW RATE(CFS) =      19.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   6.51
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.02 =  1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1650.00  DOWNSTREAM(FEET) =    915.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1350.00   CHANNEL SLOPE =  0.5444
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.556
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     58.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.51
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =  10.97
  SUBAREA AREA(ACRES) =    40.70       SUBAREA RUNOFF(CFS) =   79.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     49.70         PEAK FLOW RATE(CFS) =      96.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =  16.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.03 =  2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    890.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00   CHANNEL SLOPE =  0.0208
CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.152
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    129.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.70
AVERAGE FLOW DEPTH(FEET) =   1.58   TRAVEL TIME(MIN.) =   1.36
Tc(MIN.) =  12.33
SUBAREA AREA(ACRES) =    36.80       SUBAREA RUNOFF(CFS) =   66.36
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     86.50         PEAK FLOW RATE(CFS) =     155.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.75   FLOW VELOCITY(FEET/SEC.) =  15.48
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  3650.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    890.00  DOWNSTREAM(FEET) =    648.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00   CHANNEL SLOPE =  0.2689
CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.991
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    168.74
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  24.10
AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   0.62
Tc(MIN.) =  12.95
SUBAREA AREA(ACRES) =    14.60       SUBAREA RUNOFF(CFS) =   25.50
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =    101.10         PEAK FLOW RATE(CFS) =     176.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.35   FLOW VELOCITY(FEET/SEC.) =  24.38
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  4550.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    648.00  DOWNSTREAM(FEET) =    345.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1400.00   CHANNEL SLOPE =  0.2164
CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.50
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.850
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    222.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  39.50
AVERAGE FLOW DEPTH(FEET) =   1.10   TRAVEL TIME(MIN.) =   0.59
Tc(MIN.) =  13.54
SUBAREA AREA(ACRES) =    54.00       SUBAREA RUNOFF(CFS) =   91.66
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =    155.10         PEAK FLOW RATE(CFS) =     263.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =  41.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 =  5950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    330.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0333
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.650
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    268.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.22
  AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   0.91
  Tc(MIN.) =  14.45
  SUBAREA AREA(ACRES) =     6.60       SUBAREA RUNOFF(CFS) =   10.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =    161.70         PEAK FLOW RATE(CFS) =     263.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   8.18
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.07 =  6400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  14.45
  RAINFALL INTENSITY(INCH/HR) =   4.65
  TOTAL STREAM AREA(ACRES) =   161.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    263.26

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1705.00
  DOWNSTREAM ELEVATION(FEET) =   1688.00
  ELEVATION DIFFERENCE(FEET) =     17.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE      4.01 TO NODE      4.02 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1688.00  DOWNSTREAM(FEET) =   1610.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00   CHANNEL SLOPE =  0.1560
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
```

```
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.859
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      9.10
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.07
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.64
Tc(MIN.) =   7.91
SUBAREA AREA(ACRES) =     6.60       SUBAREA RUNOFF(CFS) =   15.84
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =      7.00         PEAK FLOW RATE(CFS) =      16.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   6.32
LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.02 =   600.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      4.02 TO NODE      4.03 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1610.00  DOWNSTREAM(FEET) =   1525.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.2125
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.468
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     33.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.86
AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   0.75
Tc(MIN.) =   8.66
SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   33.96
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     22.00         PEAK FLOW RATE(CFS) =      49.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =  10.05
LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.03 =  1000.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      4.03 TO NODE      4.04 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1525.00  DOWNSTREAM(FEET) =   1250.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.3438
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.033
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     79.09
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.47
AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   0.99
Tc(MIN.) =   9.65
SUBAREA AREA(ACRES) =    27.70       SUBAREA RUNOFF(CFS) =   58.49
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     49.70         PEAK FLOW RATE(CFS) =     104.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =  14.86
LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.04 =  1800.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE       4.04 TO NODE       4.05 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1250.00  DOWNSTREAM(FEET) =    945.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00   CHANNEL SLOPE =  0.2542
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.524
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    130.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.15
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.41
  Tc(MIN.) =  11.07
  SUBAREA AREA(ACRES) =    26.40       SUBAREA RUNOFF(CFS) =   51.04
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     76.10         PEAK FLOW RATE(CFS) =     147.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =  14.62
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.05 =  3000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       4.05 TO NODE       4.06 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    945.00  DOWNSTREAM(FEET) =    941.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1150.00   CHANNEL SLOPE =  0.0035
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.865
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    150.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.96
  AVERAGE FLOW DEPTH(FEET) =   2.79   TRAVEL TIME(MIN.) =   2.41
  Tc(MIN.) =  13.48
  SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    6.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     80.10         PEAK FLOW RATE(CFS) =     147.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.75   FLOW VELOCITY(FEET/SEC.) =   7.92
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.06 =  4150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       4.06 TO NODE       4.07 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    941.00  DOWNSTREAM(FEET) =    938.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0043
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.572
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    148.56
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  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.57
  AVERAGE FLOW DEPTH(FEET) =   2.62   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =  14.84
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     81.90         PEAK FLOW RATE(CFS) =     147.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.60   FLOW VELOCITY(FEET/SEC.) =   8.55
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.07 =  4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.07 TO NODE      4.08 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    938.00  DOWNSTREAM(FEET) =    912.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0325
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.429
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    147.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.85
  AVERAGE FLOW DEPTH(FEET) =   1.51   TRAVEL TIME(MIN.) =   0.75
  Tc(MIN.) =  15.59
  SUBAREA AREA(ACRES) =     1.10       SUBAREA RUNOFF(CFS) =    1.71
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     83.00         PEAK FLOW RATE(CFS) =     147.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =  17.86
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.08 =  5650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.08 TO NODE      4.09 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    912.00  DOWNSTREAM(FEET) =    450.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2100.00   CHANNEL SLOPE =  0.2200
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.257
  OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    153.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  35.46
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   0.99
  Tc(MIN.) =  16.57
  SUBAREA AREA(ACRES) =     9.10       SUBAREA RUNOFF(CFS) =   13.56
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     92.10         PEAK FLOW RATE(CFS) =     147.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =  34.96
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.09 =  7750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.08 TO NODE      4.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.257
OPEN BRUSH POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) =     4.60   SUBAREA RUNOFF(CFS) =     6.85
TOTAL AREA(ACRES) =      96.70   TOTAL RUNOFF(CFS) =  147.12
TC(MIN.) =  16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE      4.09 TO NODE      1.09 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  16.57
RAINFALL INTENSITY(INCH/HR) =   4.26
TOTAL STREAM AREA(ACRES) =    96.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =    147.12

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc       INTENSITY      AREA
NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1      263.26    14.45        4.650        161.70
    2      147.12    16.57        4.257         96.70

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc       INTENSITY
NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
    1      391.58    14.45       4.650
    2      388.16    16.57       4.257

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    391.58   Tc(MIN.) =   14.45
TOTAL AREA(ACRES) =    258.40
LONGEST FLOWPATH FROM NODE      4.00 TO NODE      1.09 =  7750.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      4.09 TO NODE      1.09 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  89
INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
UPSTREAM ELEVATION(FEET) =   1105.00
DOWNSTREAM ELEVATION(FEET) =   1104.00
ELEVATION DIFFERENCE(FEET) =      1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.029
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.886
SUBAREA RUNOFF(CFS) =      0.62
TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.62

****************************************************************************
FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1104.00  DOWNSTREAM(FEET) =   1100.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0089
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.510
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.46
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   5.13
  Tc(MIN.) =  15.16
  SUBAREA AREA(ACRES) =     3.70       SUBAREA RUNOFF(CFS) =    5.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      4.00         PEAK FLOW RATE(CFS) =       6.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   1.77
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.02 =   520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1100.00  DOWNSTREAM(FEET) =   1000.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.1538
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.198
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.07
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.78
  Tc(MIN.) =  16.94
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   17.04
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     15.60         PEAK FLOW RATE(CFS) =      22.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   6.92
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.03 =  1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1000.00  DOWNSTREAM(FEET) =    948.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0743
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.905
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     28.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.81
  AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =  18.95
```

```
  SUBAREA AREA(ACRES) =      7.50        SUBAREA RUNOFF(CFS) =    10.25
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      23.10          PEAK FLOW RATE(CFS) =       31.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   6.05
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.04 =  1870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   948.00  DOWNSTREAM(FEET) =   944.00
  FLOW LENGTH(FEET) =  1900.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     31.57
  PIPE TRAVEL TIME(MIN.) =   7.09    Tc(MIN.) =  26.04
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.05 =  3770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.181
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   13.30   SUBAREA RUNOFF(CFS) =   14.81
  TOTAL AREA(ACRES) =     36.40   TOTAL RUNOFF(CFS) =   40.53
  TC(MIN.) =  26.04

****************************************************************************
  FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   944.00  DOWNSTREAM(FEET) =   940.00
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.70
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     40.53
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =  26.99
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.06 =  4270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.108
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    9.60   SUBAREA RUNOFF(CFS) =   10.44
  TOTAL AREA(ACRES) =     46.00   TOTAL RUNOFF(CFS) =   50.04
  TC(MIN.) =  26.99

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

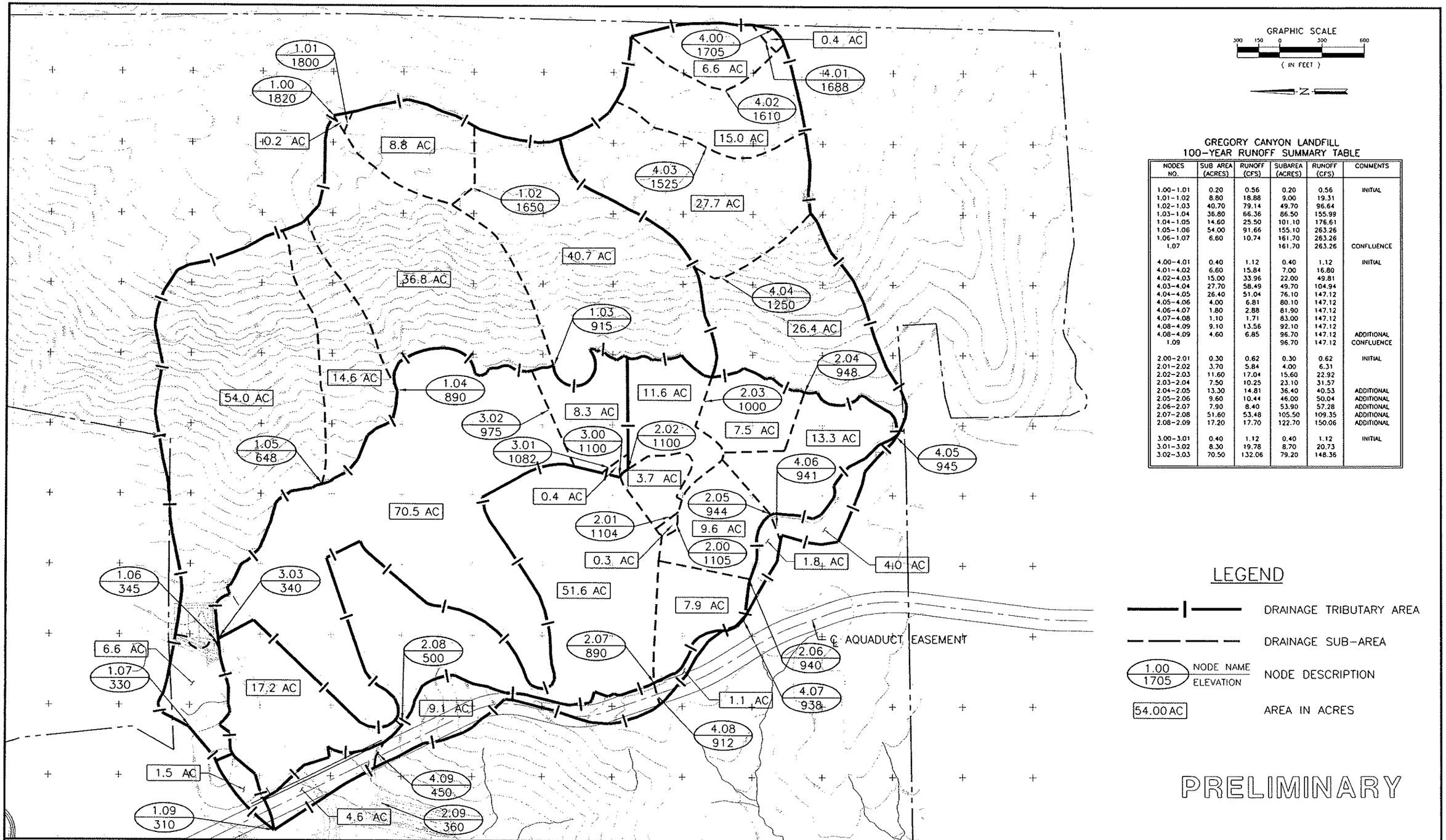
```
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.07 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   940.00  DOWNSTREAM(FEET) =   890.00
  FLOW LENGTH(FEET) =  1050.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     50.04
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =  27.99
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.07 =  5320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.07 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.036
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    7.90   SUBAREA RUNOFF(CFS) =    8.40
  TOTAL AREA(ACRES) =     53.90   TOTAL RUNOFF(CFS) =   57.28
  TC(MIN.) =  27.99

****************************************************************************
  FLOW PROCESS FROM NODE      2.07 TO NODE      2.08 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   890.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  2000.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.18
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     57.28
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =  29.09
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.08 =  7320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.07 TO NODE      2.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.961
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   51.60   SUBAREA RUNOFF(CFS) =   53.48
  TOTAL AREA(ACRES) =    105.50   TOTAL RUNOFF(CFS) =  109.35
  TC(MIN.) =  29.09

****************************************************************************
  FLOW PROCESS FROM NODE      2.08 TO NODE      2.09 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.72
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =     109.35
  PIPE TRAVEL TIME(MIN.) =    0.32     Tc(MIN.) =  29.41
  LONGEST FLOWPATH FROM NODE       2.00 TO NODE       2.09 =  8020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       2.08 TO NODE       2.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.941
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4159
  SUBAREA AREA(ACRES) =    17.20    SUBAREA RUNOFF(CFS) =    41.48
  TOTAL AREA(ACRES) =     122.70    TOTAL RUNOFF(CFS) =  150.06
  TC(MIN.) =  29.41

****************************************************************************
  FLOW PROCESS FROM NODE       2.09 TO NODE       3.03 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  29.41
  RAINFALL INTENSITY(INCH/HR) =   2.94
  TOTAL STREAM AREA(ACRES) =   122.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     150.06

****************************************************************************
  FLOW PROCESS FROM NODE       3.00 TO NODE       3.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
  UPSTREAM ELEVATION(FEET) =    1100.00
  DOWNSTREAM ELEVATION(FEET) =    1082.00
  ELEVATION DIFFERENCE(FEET) =      18.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =       1.12
  TOTAL AREA(ACRES) =       0.40    TOTAL RUNOFF(CFS) =       1.12

****************************************************************************
  FLOW PROCESS FROM NODE       3.01 TO NODE       3.02 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    1082.00  DOWNSTREAM(FEET) =     975.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    600.00   CHANNEL SLOPE =  0.1783
  CHANNEL BASE(FEET) =    10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =    2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.808
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    5.76
  AVERAGE FLOW DEPTH(FEET) =    0.16   TRAVEL TIME(MIN.) =    1.74
  Tc(MIN.) =    8.00
  SUBAREA AREA(ACRES) =      8.30       SUBAREA RUNOFF(CFS) =    19.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
```

```
TOTAL AREA(ACRES) =       8.70          PEAK FLOW RATE(CFS) =       20.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   7.19
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.02 =   700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    975.00  DOWNSTREAM(FEET) =    340.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  3000.00   CHANNEL SLOPE =  0.2117
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.024   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.352
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  89
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     87.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.81
AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   3.62
Tc(MIN.) =  11.62
SUBAREA AREA(ACRES) =    70.50       SUBAREA RUNOFF(CFS) =  132.06
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     79.20         PEAK FLOW RATE(CFS) =     148.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =  16.09
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.03 =  3700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  11.62
RAINFALL INTENSITY(INCH/HR) =   5.35
TOTAL STREAM AREA(ACRES) =    79.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =    148.36

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1      150.06    29.41        2.941       122.70
    2      148.36    11.62        5.352        79.20

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      207.66    11.62       5.352
    2      231.58    29.41       2.941

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    231.58   Tc(MIN.) =   29.41
TOTAL AREA(ACRES) =    201.90
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      3.03 =  8020.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  11
----------------------------------------------------------------------------
```

```
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc       INTENSITY      AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
   1        231.58    29.41        2.941       201.90
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      3.03 =  8020.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
STREAM      RUNOFF      Tc       INTENSITY      AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
   1        391.58    14.45        4.650       258.40
LONGEST FLOWPATH FROM NODE      4.00 TO NODE      3.03 =  7750.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc       INTENSITY
NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
   1       505.40      14.45        4.650
   2       479.24      29.41        2.941

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    505.40   Tc(MIN.) =   14.45
TOTAL AREA(ACRES) =    460.30
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)       =    460.30  TC(MIN.) =     14.45
PEAK FLOW RATE(CFS) Q100 =   505.40 < 692.9 (PRE-DEVELOPED Q100)
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

THE PEAK FLOW FOR THE PROPOSED SITE IS LESS THAN THE PRE-DEVELOPED THEREFORE THE BASIN DESIGNS NEED ONLY TO REDUCE THE SEDIMENT.



GREGORY CANYON LANDFILL
100-YEAR RUNOFF SUMMARY TABLE

NODES NO.	SUB AREA (ACRES)	RUNOFF (CFS)	SUBAREA (ACRES)	RUNOFF (CFS)	COMMENTS
1.00-1.01	0.20	0.56	0.20	0.56	INITIAL
1.01-1.02	8.80	18.88	9.00	19.31	
1.02-1.03	40.70	79.14	49.70	96.64	
1.03-1.04	36.80	66.36	86.50	155.99	
1.04-1.05	14.60	25.50	101.10	176.61	
1.05-1.06	54.00	91.66	155.10	263.26	
1.06-1.07	6.60	10.74	161.70	263.26	
1.07			161.70	263.26	CONFLUENCE
4.00-4.01	0.40	1.12	0.40	1.12	INITIAL
4.01-4.02	6.60	15.84	7.00	16.80	
4.02-4.03	15.00	33.96	22.00	49.81	
4.03-4.04	27.70	58.49	49.70	104.94	
4.04-4.05	26.40	51.04	76.10	147.12	
4.05-4.06	4.00	6.81	80.10	147.12	
4.06-4.07	1.80	2.88	81.90	147.12	
4.07-4.08	1.10	1.71	83.00	147.12	
4.08-4.09	9.10	13.56	92.10	147.12	
4.08-4.09	4.60	6.85	96.70	147.12	ADDITIONAL
1.09			96.70	147.12	CONFLUENCE
2.00-2.01	0.30	0.62	0.30	0.62	INITIAL
2.01-2.02	3.70	5.84	4.00	6.31	
2.02-2.03	11.60	17.04	15.60	22.92	
2.03-2.04	7.50	10.25	23.10	31.57	
2.04-2.05	13.30	14.81	36.40	40.53	ADDITIONAL
2.05-2.06	9.60	10.44	46.00	50.04	ADDITIONAL
2.06-2.07	7.90	8.40	53.90	57.28	ADDITIONAL
2.07-2.08	51.60	53.48	105.50	109.35	ADDITIONAL
2.08-2.09	17.20	17.70	122.70	150.06	ADDITIONAL
3.00-3.01	0.40	1.12	0.40	1.12	INITIAL
3.01-3.02	8.30	19.78	8.70	20.73	
3.02-3.03	70.50	132.06	79.20	148.36	

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
100-YEAR DEVELOPED CONDITION
HYDROLOGY MAP

DESIGNED BY : C.M.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 9-2004	FILE NO.: 241850B.DWG
CHECKED BY :	DATE :	DRAWING 24
APPROVED BY :	DATE :	

FOR PERMIT PURPOSES ONLY - NOT FOR CONSTRUCTION

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

  INTEGRATED RATIONAL METHOD/UH METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2004 Advanced Engineering Software (aes)
            Ver. 2.0 Release Date: 01/01/2004  License ID 1211

                          Analysis prepared by:

                       Bryan A. Stirrat & Associates
                           1360 Valley Vista Dr.
                              Diamond Bar, Ca
                                  91786

 *************************** DESCRIPTION OF STUDY **************************
* GREGORY CANYON HYDROLOGY (10-YEAR)                                       *
* FINAL PROPOSED GRADING                                                   *
* CHM                                                                      *
 ***************************************************************************

  FILE NAME: GREG10.DAT
  TIME/DATE OF STUDY: 07:47 10/06/2004
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.200
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  =====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    UNADJUSTED  6-HOUR RAINFALL DEPTH (INCHES) =   0.00
    UNADJUSTED 24-HOUR RAINFALL DEPTH (INCHES) =   0.00
  *PRECIPITATION ZONE NUMBER (PZN) = 0.0
  *ANTECEDENT MOISTURE CONDITION (AMC) =  0.00 ASSUMED FOR UNIT HYDROGRAPH METHOD*


****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =   1105.00
  DOWNSTREAM ELEVATION(FEET) =   1104.00
```

```
  ELEVATION DIFFERENCE(FEET) =       1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.029
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.700
  SUBAREA RUNOFF(CFS) =       0.39
  TOTAL AREA(ACRES) =       0.30   TOTAL RUNOFF(CFS) =       0.39

****************************************************************************
  FLOW PROCESS FROM NODE       2.01 TO NODE       2.02 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1104.00  DOWNSTREAM(FEET) =   1100.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0089
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.716
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.22
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   6.17
  Tc(MIN.) =  16.20
  SUBAREA AREA(ACRES) =     3.70       SUBAREA RUNOFF(CFS) =     3.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       4.00         PEAK FLOW RATE(CFS) =       3.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   1.49
  LONGEST FLOWPATH FROM NODE       2.00 TO NODE       2.02 =   520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       2.02 TO NODE       2.03 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1100.00  DOWNSTREAM(FEET) =   1000.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.1538
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.511
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.17
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =  18.29
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   10.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      15.60         PEAK FLOW RATE(CFS) =      13.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   5.87
  LONGEST FLOWPATH FROM NODE       2.00 TO NODE       2.03 =  1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       2.03 TO NODE       2.04 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1000.00  DOWNSTREAM(FEET) =    948.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0743
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.320
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  89
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.76
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.89
AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   2.39
Tc(MIN.) =  20.68
SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    6.09
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     23.10         PEAK FLOW RATE(CFS) =      18.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   5.12
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.04 =  1870.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   948.00  DOWNSTREAM(FEET) =   944.00
FLOW LENGTH(FEET) =  1900.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.37
GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     18.76
PIPE TRAVEL TIME(MIN.) =   7.25    Tc(MIN.) =  27.93
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.05 =  3770.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.911
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  89
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) =   13.30   SUBAREA RUNOFF(CFS) =    8.90
TOTAL AREA(ACRES) =     36.40   TOTAL RUNOFF(CFS) =   24.35
TC(MIN.) =  27.93

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   944.00  DOWNSTREAM(FEET) =   940.00
FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.70
GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     24.35
PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =  29.01
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.06 =  4270.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.865
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =     9.60   SUBAREA RUNOFF(CFS) =     6.27
  TOTAL AREA(ACRES) =      46.00   TOTAL RUNOFF(CFS) =    30.02
  TC(MIN.) =  29.01

****************************************************************************
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.07 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   940.00  DOWNSTREAM(FEET) =   890.00
  FLOW LENGTH(FEET) =  1050.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.17
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.02
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =  30.17
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.07 =  5320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.07 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.818
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =     7.90   SUBAREA RUNOFF(CFS) =     5.03
  TOTAL AREA(ACRES) =      53.90   TOTAL RUNOFF(CFS) =    34.30
  TC(MIN.) =  30.17

****************************************************************************
  FLOW PROCESS FROM NODE      2.07 TO NODE      2.08 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   890.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  2000.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.94
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.30
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =  31.45
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.08 =  7320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.07 TO NODE      2.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.770
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    51.60   SUBAREA RUNOFF(CFS) =    31.97
  TOTAL AREA(ACRES) =     105.50   TOTAL RUNOFF(CFS) =    65.36
  TC(MIN.) =  31.45

****************************************************************************
  FLOW PROCESS FROM NODE      2.08 TO NODE      2.09 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   360.00
FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  10.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  31.65
GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     65.36
PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  31.82
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.09 =  8020.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.08 TO NODE      2.09 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.757
GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  95
AREA-AVERAGE RUNOFF COEFFICIENT = 0.4159
SUBAREA AREA(ACRES) =   17.20   SUBAREA RUNOFF(CFS) =   24.78
TOTAL AREA(ACRES) =    122.70   TOTAL RUNOFF(CFS) =   89.65
TC(MIN.) =  31.82

****************************************************************************
FLOW PROCESS FROM NODE      2.09 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  31.82
RAINFALL INTENSITY(INCH/HR) =   1.76
TOTAL STREAM AREA(ACRES) =   122.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =     89.65

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      3.01 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  89
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =   1100.00
DOWNSTREAM ELEVATION(FEET) =   1082.00
ELEVATION DIFFERENCE(FEET) =     18.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
SUBAREA RUNOFF(CFS) =      0.70
TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      0.70

****************************************************************************
FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1082.00  DOWNSTREAM(FEET) =    975.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.1783
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.172
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
```

```
S.C.S. CURVE NUMBER (AMC II) =  89
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.83
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.86
AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   2.06
Tc(MIN.) =   8.32
SUBAREA AREA(ACRES) =     8.30       SUBAREA RUNOFF(CFS) =   12.12
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =      8.70         PEAK FLOW RATE(CFS) =      12.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   6.05
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.02 =   700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    975.00  DOWNSTREAM(FEET) =    340.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  3000.00   CHANNEL SLOPE =  0.2117
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.024   MAXIMUM DEPTH(FEET) =   5.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.205
ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  89
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     52.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.89
AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   4.20
Tc(MIN.) =  12.53
SUBAREA AREA(ACRES) =    70.50       SUBAREA RUNOFF(CFS) =   79.09
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     79.20         PEAK FLOW RATE(CFS) =      88.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =  13.80
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.03 =  3700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  12.53
RAINFALL INTENSITY(INCH/HR) =   3.21
TOTAL STREAM AREA(ACRES) =    79.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =     88.85

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       89.65    31.82       1.757        122.70
    2       88.85    12.53       3.205         79.20

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      124.14    12.53       3.205
    2      138.35    31.82       1.757

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
PEAK FLOW RATE(CFS) =     138.35   Tc(MIN.) =    31.82
TOTAL AREA(ACRES) =     201.90
LONGEST FLOWPATH FROM NODE       2.00 TO NODE       3.03 =  8020.00 FEET.
================================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =     201.90  TC(MIN.) =      31.82
PEAK FLOW RATE(CFS)    =     138.35
================================================================================
================================================================================
END OF RATIONAL METHOD ANALYSIS
```