Appendix G
Part III

Preliminary Hydrology Study

Appendix 4

FEMA Map

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/7/2020 at 4:53:47 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix 5

Existing Condition Hydrology

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2014 Advanced Engineering Software (aes)
            Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 210
                             Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY                                           *
* EXISTING CONDITION                                                    *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: SUNO10EX.DAT
  TIME/DATE OF STUDY: 18:44 05/26/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    54.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    343.10
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.362
```

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  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    343.10  DOWNSTREAM(FEET) =    341.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =   162.00   CHANNEL SLOPE =  0.0086
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.997
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.31
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.07
 Tc(MIN.) =    5.43
 SUBAREA AREA(ACRES) =     0.38       SUBAREA RUNOFF(CFS) =    1.65
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.91

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.54
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     216.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.997
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.04
 TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.96
 TC(MIN.) =    5.43

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    341.70  DOWNSTREAM(FEET) =    341.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    87.00   CHANNEL SLOPE =  0.0080
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.255
 BARREN COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  93
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.94
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   1.54
```

```
  Tc(MIN.) =    6.97
  SUBAREA AREA(ACRES) =     0.22       SUBAREA RUNOFF(CFS) =    0.33
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.699
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     303.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.255
  BARREN COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6750
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.07
  TC(MIN.) =    6.97

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    341.00
  DOWNSTREAM NODE ELEVATION(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    87.00
  "V" GUTTER WIDTH(FEET) =   2.50   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.250   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.05000
  MAXIMUM DEPTH(FEET) =   1.10
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.178
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.27
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    2.50
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.20   Tc(MIN.) =    7.17
  SUBAREA AREA(ACRES) =    0.05       SUBAREA RUNOFF(CFS) =    0.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.658
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.12

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    2.50
  FLOW VELOCITY(FEET/SEC.) =   7.27   DEPTH*VELOCITY(FT*FT/SEC) =   5.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  339.00  DOWNSTREAM ELEVATION(FEET) =  333.30
 STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 32.50

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.20
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.16
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
 STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =    8.74
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.675
 LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  74
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.603
 SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.15
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.12

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.04
 FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 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.) =    8.74
 RAINFALL INTENSITY(INCH/HR) =   3.67
 TOTAL STREAM AREA(ACRES) =     0.91
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.12

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 BARREN COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.00
 UPSTREAM ELEVATION(FEET) =    341.60
 DOWNSTREAM ELEVATION(FEET) =    341.10
 ELEVATION DIFFERENCE(FEET) =      0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.266
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.120
 SUBAREA RUNOFF(CFS) =      0.23
 TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.23
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.120
  BARREN COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3457
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.02
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.25
  TC(MIN.) =   11.27

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    341.10  DOWNSTREAM(FEET) =    338.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   188.00   CHANNEL SLOPE =  0.0122
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.516
  BARREN COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  93
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.70
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   4.46
  Tc(MIN.) =   15.73
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.51
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.349
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       0.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     249.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.516
  BARREN COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3399
  SUBAREA AREA(ACRES) =    0.18   SUBAREA RUNOFF(CFS) =    0.14
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       0.85
  TC(MIN.) =   15.73

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     15.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    338.80  DOWNSTREAM(FEET) =    333.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0387
```

```
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.417
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.35
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =   16.74
  SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    0.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.414
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       1.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   2.82
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     15.00 =     391.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.417
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4400
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    0.50
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       1.96
  TC(MIN.) =   16.74

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 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.) =   16.74
  RAINFALL INTENSITY(INCH/HR) =   2.42
  TOTAL STREAM AREA(ACRES) =     1.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.96

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.12     8.74        3.675          0.91
      2        1.96    16.74        2.417          1.84

  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        3.14     8.74       3.675
      2        3.35    16.74       2.417

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.35   Tc(MIN.) =   16.74
```

```
 TOTAL AREA(ACRES) =        2.8
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (2.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .4900
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    341.80
 DOWNSTREAM ELEVATION(FEET) =    340.70
 ELEVATION DIFFERENCE(FEET) =      1.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.902
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.923
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    340.70  DOWNSTREAM(FEET) =    338.80
 CHANNEL LENGTH THRU SUBAREA(FEET) =   136.00   CHANNEL SLOPE =  0.0140
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.89
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   2.55
 Tc(MIN.) =   10.45
 SUBAREA AREA(ACRES) =     0.42       SUBAREA RUNOFF(CFS) =    0.98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.647
 TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   1.06
 LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
```

```
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.36
  TC(MIN.) =   10.45

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 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        1.36    10.45       3.275        0.64
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     15.00 =     206.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.35    16.74       2.417        2.75
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.45      10.45        3.275
      2       4.36      16.74        2.417

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.36   Tc(MIN.) =   16.74
  TOTAL AREA(ACRES) =        3.4
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.4  TC(MIN.) =     16.74
  PEAK FLOW RATE(CFS)   =       4.36
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2014 Advanced Engineering Software (aes)
            Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 210
                             Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY                                           *
* EXISTING CONDITION                                                    *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: SUN100EX.DAT
  TIME/DATE OF STUDY: 18:50 05/26/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    54.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    343.10
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.362
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.39
TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    343.10  DOWNSTREAM(FEET) =    341.70
CHANNEL LENGTH THRU SUBAREA(FEET) =   162.00   CHANNEL SLOPE =  0.0086
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.139
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  97
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.57
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.42
AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.90
Tc(MIN.) =    5.26
SUBAREA AREA(ACRES) =     0.38       SUBAREA RUNOFF(CFS) =    2.36
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.73
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     216.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.139
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  97
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.06
TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       2.79
TC(MIN.) =    5.26

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    341.70  DOWNSTREAM(FEET) =    341.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    87.00   CHANNEL SLOPE =  0.0080
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.122
BARREN COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.02
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.42
```

```
  Tc(MIN.) =    6.68
  SUBAREA AREA(ACRES) =     0.22       SUBAREA RUNOFF(CFS) =    0.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.699
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     303.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.122
  BARREN COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6750
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.98
  TC(MIN.) =    6.68

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    341.00
  DOWNSTREAM NODE ELEVATION(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    87.00
  "V" GUTTER WIDTH(FEET) =   2.50   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.250   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.05000
  MAXIMUM DEPTH(FEET) =   1.10
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.007
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.27
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    2.50
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.20   Tc(MIN.) =    6.88
  SUBAREA AREA(ACRES) =    0.05       SUBAREA RUNOFF(CFS) =    0.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.658
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.05

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    2.50
  FLOW VELOCITY(FEET/SEC.) =   7.27   DEPTH*VELOCITY(FT*FT/SEC) =   5.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  339.00  DOWNSTREAM ELEVATION(FEET) =  333.30
 STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 32.50

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.16
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.31
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
 STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    8.35
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.300
 LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  74
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.603
 SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.22
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.05

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.19
 FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 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.) =    8.35
 RAINFALL INTENSITY(INCH/HR) =   5.30
 TOTAL STREAM AREA(ACRES) =     0.91
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.05

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 BARREN COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.00
 UPSTREAM ELEVATION(FEET) =    341.60
 DOWNSTREAM ELEVATION(FEET) =    341.10
 ELEVATION DIFFERENCE(FEET) =      0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.266
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.368
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.32
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.368
  BARREN COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3457
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.03
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.35
  TC(MIN.) =   11.27

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    341.10  DOWNSTREAM(FEET) =    338.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   188.00   CHANNEL SLOPE =  0.0122
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.616
  BARREN COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  93
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.82
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.84
  Tc(MIN.) =   15.11
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.349
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     249.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.616
  BARREN COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3399
  SUBAREA AREA(ACRES) =    0.18   SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       1.22
  TC(MIN.) =   15.11

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     15.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    338.80  DOWNSTREAM(FEET) =    333.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0387
```

```
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.491
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.68
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.81
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.84
 Tc(MIN.) =   15.95
 SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    0.94
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.414
 TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.11

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.10
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     15.00 =     391.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.491
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.4400
 SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    0.72
 TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       2.83
 TC(MIN.) =   15.95

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 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.) =   15.95
 RAINFALL INTENSITY(INCH/HR) =   3.49
 TOTAL STREAM AREA(ACRES) =     1.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.83

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.05     8.35        5.300          0.91
     2        2.83    15.95        3.491          1.84

 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        4.53     8.35       5.300
     2        4.83    15.95       3.491

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.83   Tc(MIN.) =   15.95
```

```
 TOTAL AREA(ACRES) =        2.8
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (2.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .4900
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    341.80
 DOWNSTREAM ELEVATION(FEET) =    340.70
 ELEVATION DIFFERENCE(FEET) =      1.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.902
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.492
 SUBAREA RUNOFF(CFS) =      0.46
 TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    340.70  DOWNSTREAM(FEET) =    338.80
 CHANNEL LENGTH THRU SUBAREA(FEET) =   136.00   CHANNEL SLOPE =  0.0140
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.669
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.00
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   2.26
 Tc(MIN.) =   10.16
 SUBAREA AREA(ACRES) =     0.42       SUBAREA RUNOFF(CFS) =    1.39
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.647
 TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.78

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.13
 LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.669
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
```

```
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.94
  TC(MIN.) =   10.16

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 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        1.94    10.16       4.669        0.64
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     15.00 =     206.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.83    15.95       3.491        2.75
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.02      10.16        4.669
      2       6.29      15.95        3.491

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.29   Tc(MIN.) =   15.95
  TOTAL AREA(ACRES) =        3.4
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.4  TC(MIN.) =     15.95
  PEAK FLOW RATE(CFS)   =       6.29
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2014 Advanced Engineering Software (aes)
            Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 210
                             Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY PARKING LOT                               *
* EXISTING CONDITION                                                    *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: SNPK10EX.DAT
  TIME/DATE OF STUDY: 16:11 06/04/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  LAWNS, GOLF COURSES, ETC. FAIR COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    338.00
  ELEVATION DIFFERENCE(FEET) =      5.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.158
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.843
 SUBAREA RUNOFF(CFS) =      0.10
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    338.00  DOWNSTREAM(FEET) =    335.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0151
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.306
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  79
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.45
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.14
 Tc(MIN.) =   10.30
 SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    1.31
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.410
 TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       1.39

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.90
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     286.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    335.20  DOWNSTREAM(FEET) =    334.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   111.00   CHANNEL SLOPE =  0.0108
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.105
 BARREN COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  91
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.87
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.76
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.05
 Tc(MIN.) =   11.35
 SUBAREA AREA(ACRES) =     1.01       SUBAREA RUNOFF(CFS) =    0.94
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.355
 TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       2.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   1.77
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     397.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.105
```

```
  BARREN COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3552
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.03
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       2.28
  TC(MIN.) =   11.35
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =     11.35
  PEAK FLOW RATE(CFS)   =       2.28
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
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            Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 210
                             Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY PARKING LOT                                *
* EXISTING CONDITION                                                     *
* 100-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: SNP100EX.DAT
  TIME/DATE OF STUDY: 16:18 06/04/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  LAWNS, GOLF COURSES, ETC. FAIR COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    338.00
  ELEVATION DIFFERENCE(FEET) =      5.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.158
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.380
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    338.00  DOWNSTREAM(FEET) =    335.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0151
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.719
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  79
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.69
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.84
 Tc(MIN.) =   10.00
 SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    1.86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.410
 TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       1.99

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.93
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     286.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    335.20  DOWNSTREAM(FEET) =    334.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   111.00   CHANNEL SLOPE =  0.0108
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.444
 BARREN COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  91
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.66
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.90
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   0.98
 Tc(MIN.) =   10.97
 SUBAREA AREA(ACRES) =     1.01       SUBAREA RUNOFF(CFS) =    1.35
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.355
 TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       3.22

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.04
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     397.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.444
```

```
  BARREN COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3552
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       3.27
  TC(MIN.) =   10.97
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =     10.97
  PEAK FLOW RATE(CFS)   =       3.27
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```



LEGEND:

- RIGHT-OF-WAY LINE
- CENTERLINE
- DMA BOUNDARY
- DMA SUB-BOUNDARY
- FLOW PATH
- SOIL TYPE DELINEATION

A5 / 0.14AC — SUBAREA DESIGNATION / AREA (ACRES)

(14) — HYDROLOGY NODE

Q_{10} Q_{100} — CALCULATED RUNOFF (CFS) FOR 10 / 100 YEAR FREQUENCY

T_{C100} — CALCULATED TIME OF CONCENTRATION (MIN) FOR 100 YEAR FREQUENCY

"C" 0.18AC — SOIL TYPE AREA WITHIN SUB-BOUNDARY

HYDROLOGIC SITE DATA

SOIL TYPE: C & D
TOTAL AREA: 3.39 AC

ABBREVIATIONS:

AC	ACRES
CFS	CUBIC FEET PER SECOND
EL	ELEVATION
L	LENGTH

EXISTING CONDITION SUMMARY TABLE

	Q_{10} (CFS)	Q_{100} (CFS)	AREA (ACRES)
TOTAL	4.36	6.29	3.39

30' 0' 15' 30'
SCALE: 1" = 30'

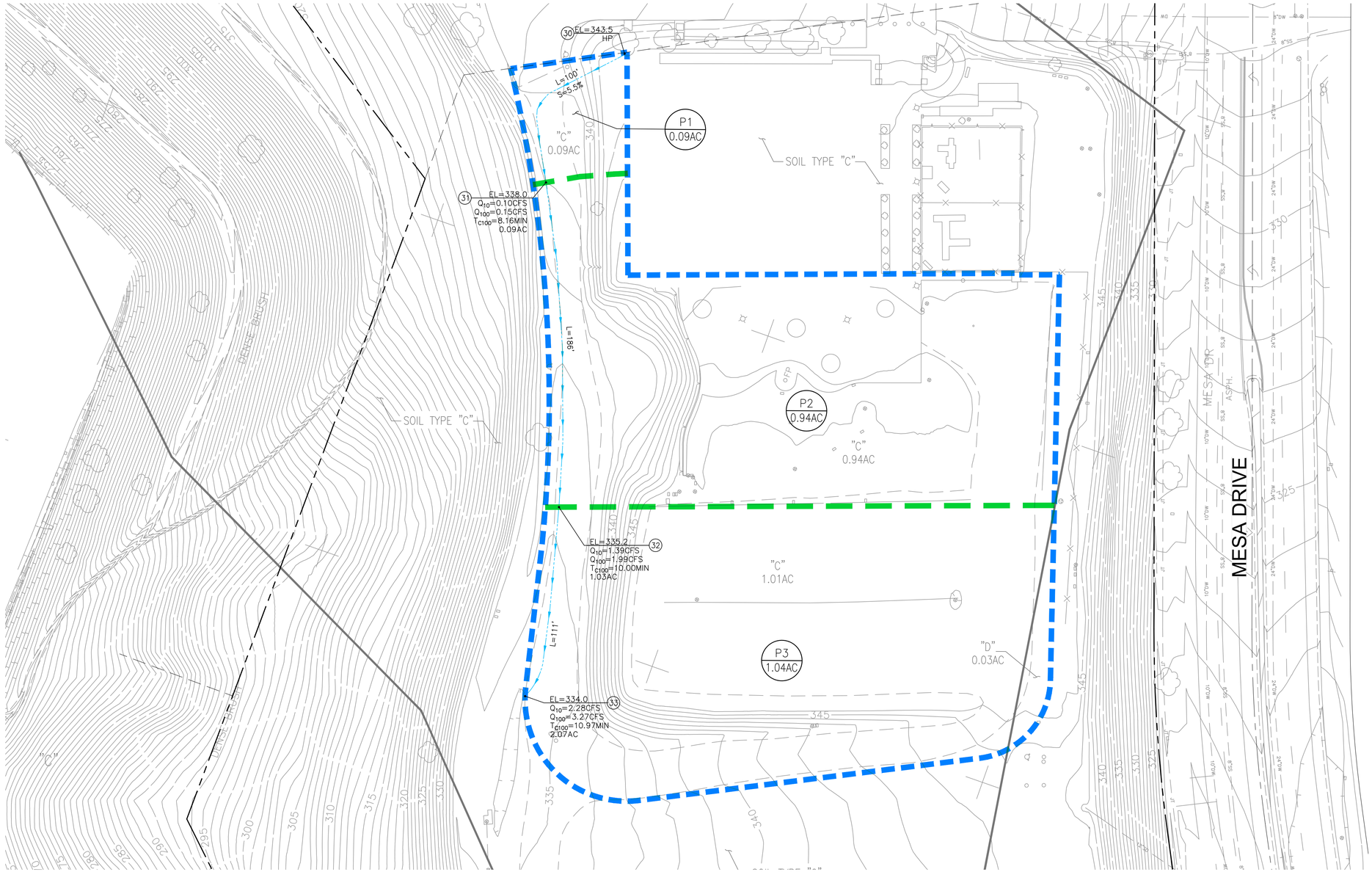
EXISTING HYDROLOGY MAP

SUNRISE SENIOR LIVING OF OCEANSIDE
4700 MESA DR, OCEANSIDE CA 92056

SUNRISE SENIOR LIVING

FUSCOE ENGINEERING
600 Wilshire Blvd., Suite 1470, Los Angeles, California 90017
tel 213.988.8802 ◦ fax 213.988.8803 ◦ www.fuscoe.com

F:\Projects\1571\003_Support Files\Reports\Hydrology\CAD\1571-003_Ex Hydr-R1.dwg (6/15/2020 11:25 AM) Plotted by: Dom Plata



LEGEND:

- RIGHT-OF-WAY LINE
- CENTERLINE
- DMA BOUNDARY
- DMA SUB-BOUNDARY
- FLOW PATH
- SOIL TYPE DELINEATION

P1 / 0.09AC — SUBAREA DESIGNATION / AREA (ACRES)

31 — HYDROLOGY NODE

Q_{10} Q_{100} — CALCULATED RUNOFF (CFS) FOR 10 / 100 YEAR FREQUENCY

T_{C100} — CALCULATED TIME OF CONCENTRATION (MIN) FOR 100 YEAR FREQUENCY

"C" 0.94AC — SOIL TYPE AREA WITHIN SUB-BOUNDARY

HYDROLOGIC SITE DATA

SOIL TYPE: C & D
TOTAL AREA: 2.07 AC

ABBREVIATIONS:

AC	ACRES
CFS	CUBIC FEET PER SECOND
EL	ELEVATION
L	LENGTH

EXISTING CONDITION SUMMARY TABLE

	Q_{10} (CFS)	Q_{100} (CFS)	AREA (ACRES)
TOTAL	2.28	3.27	2.07

30' 0' 15' 30'
SCALE: 1" = 30'

EXISTING HYDROLOGY MAP

SUNRISE SENIOR LIVING OF OCEANSIDE
4700 MESA DR, OCEANSIDE CA 92056

WEST PARKING LOT

SUNRISE SENIOR LIVING

FUSCOE ENGINEERING
600 Wilshire Blvd., Suite 1470, Los Angeles, California 90017
tel 213.988.8802 ◦ fax 213.988.8803 ◦ www.fuscoe.com

F:\Projects\1571\003_Support Files\Reports\Hydrology\CAD\1571-003_Ex Hydr-Parking Lot.dwg (6/15/2020 11:29 AM) Plotted by: Dom Pista

Appendix 6

Proposed Condition Hydrology

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
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             Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                              16795 Von Karman
                                 Suite 210
                              Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY                                           *
* PROPOSED CONDITION                                                    *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: SUNO10PR.DAT
  TIME/DATE OF STUDY: 14:25 06/07/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    341.90
  DOWNSTREAM ELEVATION(FEET) =    340.40
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.825
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.19
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    340.40  DOWNSTREAM(FEET) =    340.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =    16.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.234
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.17
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.23
 Tc(MIN.) =    5.05
 SUBAREA AREA(ACRES) =     0.05       SUBAREA RUNOFF(CFS) =    0.19
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.37

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.21
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =      91.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   340.20  DOWNSTREAM(FEET) =   340.10
 FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   1.71
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.37
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    5.46
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     133.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    340.10  DOWNSTREAM(FEET) =    338.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =    95.00   CHANNEL SLOPE =  0.0126
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.487
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  96
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.06
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.66
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.95
 Tc(MIN.) =    6.42
 SUBAREA AREA(ACRES) =     0.36       SUBAREA RUNOFF(CFS) =    1.37
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
 TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.69

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.79
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     228.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.487
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  96
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8216
 SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.19
 TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.88
 TC(MIN.) =    6.42

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   336.90  DOWNSTREAM(FEET) =   334.50
 FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.88
 PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    7.28
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     461.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.134
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  96
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8366
 SUBAREA AREA(ACRES) =    0.57   SUBAREA RUNOFF(CFS) =    2.00
 TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       3.73
 TC(MIN.) =    7.28

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.28
 RAINFALL INTENSITY(INCH/HR) =   4.13
```

```
  TOTAL STREAM AREA(ACRES) =     1.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.73

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    54.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    343.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.121
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    343.00  DOWNSTREAM(FEET) =    341.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   162.00   CHANNEL SLOPE =  0.0080
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.127
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.29
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =    5.22
  SUBAREA AREA(ACRES) =     0.38       SUBAREA RUNOFF(CFS) =    1.69
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.96

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     216.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.127
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.04
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       2.01
  TC(MIN.) =    5.22

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

```
 FLOW PROCESS FROM NODE     18.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   334.90  DOWNSTREAM(FEET) =   334.50
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.50
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.01
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    5.58
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     15.00 =     291.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.58
 RAINFALL INTENSITY(INCH/HR) =   4.91
 TOTAL STREAM AREA(ACRES) =     0.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4600
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  84
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    341.90
 DOWNSTREAM ELEVATION(FEET) =    340.40
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.356
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.784
 SUBAREA RUNOFF(CFS) =      0.10
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    340.40  DOWNSTREAM(FEET) =    340.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =    30.00   CHANNEL SLOPE =  0.0067
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.622
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  94
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.26
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.85
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.59
 Tc(MIN.) =    8.94
 SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.31
```

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  AREA-AVERAGE RUNOFF COEFFICIENT =  0.674
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     20.00 =     110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.622
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6862
  SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.23
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.65
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.50  DOWNSTREAM(FEET) =   336.40
  FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.36
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =    9.98
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.373
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7009
  SUBAREA AREA(ACRES) =    0.42   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.61
  TC(MIN.) =    9.98

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.40  DOWNSTREAM(FEET) =   334.50
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.31
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.61
```

```
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   11.85
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.021
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7046
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.61
  TC(MIN.) =   11.85
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.021
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7206
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       1.96
  TC(MIN.) =   11.85

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.85
  RAINFALL INTENSITY(INCH/HR) =   3.02
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.96

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.00
  UPSTREAM ELEVATION(FEET) =    342.20
  DOWNSTREAM ELEVATION(FEET) =    340.00
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.560
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.14
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.41
  TC(MIN.) =    2.56

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    340.00  DOWNSTREAM(FEET) =    338.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   120.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.50   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.62
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    3.32
  SUBAREA AREA(ACRES) =     0.26       SUBAREA RUNOFF(CFS) =    1.15
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.848
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.04
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     24.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8488
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.34
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.91
  TC(MIN.) =    3.32

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.30  DOWNSTREAM(FEET) =   334.50
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.74
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.91
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    4.05
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     15.00 =     361.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.05
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.91

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.73     7.28        4.134          1.08
      2        2.01     5.58        4.912          0.45
      3        1.96    11.85        3.021          0.90
      4        2.91     4.05        5.269          0.65

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.11     4.05       5.269
      2        8.50     5.58       4.912
      3        8.91     7.28       4.134
      4        7.59    11.85       3.021

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.91   Tc(MIN.) =    7.28
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.50  DOWNSTREAM(FEET) =   334.00
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.91
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.59
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =     783.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  338.50  DOWNSTREAM ELEVATION(FEET) =  333.30
  STREET LENGTH(FEET) =   291.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 32.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    8.94
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.623
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.774
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    0.47
  TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =       9.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.92
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    1074.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.4  TC(MIN.) =      8.94
  PEAK FLOW RATE(CFS)   =       9.51
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                              16795 Von Karman
                                 Suite 210
                              Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY                                           *
* PROPOSED CONDITION                                                    *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: SUN100PR.DAT
  TIME/DATE OF STUDY: 14:40 06/07/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    341.90
  DOWNSTREAM ELEVATION(FEET) =    340.40
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.825
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.26
TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    340.40  DOWNSTREAM(FEET) =    340.20
CHANNEL LENGTH THRU SUBAREA(FEET) =    16.00   CHANNEL SLOPE =  0.0125
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.345
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  92
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.28
AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.21
Tc(MIN.) =    5.03
SUBAREA AREA(ACRES) =     0.05       SUBAREA RUNOFF(CFS) =    0.26
AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.37
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =      91.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   340.20  DOWNSTREAM(FEET) =   340.10
FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   1.86
ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       0.52
PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    5.41
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     133.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    340.10  DOWNSTREAM(FEET) =    338.90
CHANNEL LENGTH THRU SUBAREA(FEET) =    95.00   CHANNEL SLOPE =  0.0126
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.357
LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  96
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.49
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.78
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.89
 Tc(MIN.) =    6.30
 SUBAREA AREA(ACRES) =     0.36       SUBAREA RUNOFF(CFS) =    1.95
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
 TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.40

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   2.03
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     228.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.357
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  96
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8216
 SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.27
 TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.66
 TC(MIN.) =    6.30

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   336.90  DOWNSTREAM(FEET) =   334.50
 FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.66
 PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =    7.10
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     461.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.882
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  96
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8366
 SUBAREA AREA(ACRES) =    0.57   SUBAREA RUNOFF(CFS) =    2.85
 TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       5.31
 TC(MIN.) =    7.10

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.10
 RAINFALL INTENSITY(INCH/HR) =   5.88
```

```
  TOTAL STREAM AREA(ACRES) =     1.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.31

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    54.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    343.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.121
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    343.00  DOWNSTREAM(FEET) =    341.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   162.00   CHANNEL SLOPE =  0.0080
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.334
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.40
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =    5.05
  SUBAREA AREA(ACRES) =     0.38       SUBAREA RUNOFF(CFS) =    2.42
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.81

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   1.65
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     216.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.334
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.06
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       2.87
  TC(MIN.) =    5.05

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

```
 FLOW PROCESS FROM NODE     18.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   334.90  DOWNSTREAM(FEET) =   334.50
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.87
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.87
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    5.37
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     15.00 =     291.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.37
 RAINFALL INTENSITY(INCH/HR) =   7.05
 TOTAL STREAM AREA(ACRES) =     0.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.87

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4600
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  84
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    341.90
 DOWNSTREAM ELEVATION(FEET) =    340.40
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.356
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.297
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    340.40  DOWNSTREAM(FEET) =    340.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =    30.00   CHANNEL SLOPE =  0.0067
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  94
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.96
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.52
 Tc(MIN.) =    8.87
 SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.44
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.674
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     20.00 =     110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6862
  SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.91
  TC(MIN.) =    8.87

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.50  DOWNSTREAM(FEET) =   336.40
  FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.68
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.91
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.772
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7009
  SUBAREA AREA(ACRES) =    0.42   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.27
  TC(MIN.) =    9.82

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.40  DOWNSTREAM(FEET) =   334.50
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.51
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.27
```

```
 PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =   11.58
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.291
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  94
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7046
 SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.10
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.27
 TC(MIN.) =   11.58
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.291
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7206
 SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.64
 TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.78
 TC(MIN.) =   11.58

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.58
 RAINFALL INTENSITY(INCH/HR) =   4.29
 TOTAL STREAM AREA(ACRES) =     0.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.78

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  97
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.00
 UPSTREAM ELEVATION(FEET) =    342.20
 DOWNSTREAM ELEVATION(FEET) =    340.00
 ELEVATION DIFFERENCE(FEET) =      2.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.560
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.39
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.39
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.19
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.58
  TC(MIN.) =    2.56

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    340.00  DOWNSTREAM(FEET) =    338.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   120.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.50   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.88
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =    3.25
  SUBAREA AREA(ACRES) =     0.26       SUBAREA RUNOFF(CFS) =    1.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.848
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       2.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   3.30
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     24.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.377
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8488
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.88
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       4.07
  TC(MIN.) =    3.25

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.30  DOWNSTREAM(FEET) =   334.50
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.97
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.07
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    3.94
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     15.00 =     361.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.94
  RAINFALL INTENSITY(INCH/HR) =   7.38
  TOTAL STREAM AREA(ACRES) =     0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.31     7.10        5.882          1.08
      2        2.87     5.37        7.047          0.45
      3        2.78    11.58        4.291          0.90
      4        4.07     3.94        7.377          0.65

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.08     3.94       7.377
      2       12.06     5.37       7.047
      3       12.66     7.10       5.882
      4       10.78    11.58       4.291

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.66   Tc(MIN.) =    7.10
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.50  DOWNSTREAM(FEET) =   334.00
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.66
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    7.38
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =     783.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  338.50  DOWNSTREAM ELEVATION(FEET) =  333.30
  STREET LENGTH(FEET) =   291.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 32.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.47
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    8.62
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.191
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.774
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =      13.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.67
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    1074.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.4  TC(MIN.) =      8.62
  PEAK FLOW RATE(CFS)   =      13.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2014 Advanced Engineering Software (aes)
            Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 210
                             Irvine CA 92606

 ************************* DESCRIPTION OF STUDY *************************
* SUNRISE OCEANSIDE HYDROLOGY PARKING LOT                               *
* PROPOSED CONDITION                                                    *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: SNPK10PR.DAT
  TIME/DATE OF STUDY: 16:56 06/04/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    338.00
  ELEVATION DIFFERENCE(FEET) =      5.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.099
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.203
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    338.00  DOWNSTREAM(FEET) =    335.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0151
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.330
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.84
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.68
 Tc(MIN.) =    6.78
 SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    2.81
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.682
 TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       3.04

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.17
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     286.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    335.20  DOWNSTREAM(FEET) =    334.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   111.00   CHANNEL SLOPE =  0.0108
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.014
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.44
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.19
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   0.84
 Tc(MIN.) =    7.62
 SUBAREA AREA(ACRES) =     1.01       SUBAREA RUNOFF(CFS) =    2.80
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.686
 TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       5.62

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.26
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     397.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.014
```

```
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6864
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       5.70
  TC(MIN.) =    7.62
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =      7.62
  PEAK FLOW RATE(CFS)   =       5.70
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2014 Advanced Engineering Software (aes)
            Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 210
                             Irvine CA 92606

 ************************ DESCRIPTION OF STUDY ************************
* SUNRISE OCEANSIDE HYDROLOGY PARKING LOT                             *
* PROPOSED CONDITION                                                  *
* 100-YEAR STORM EVENT                                                *
 **********************************************************************

  FILE NAME: SNP100PR.DAT
  TIME/DATE OF STUDY: 16:55 06/04/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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.*

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    338.00
  ELEVATION DIFFERENCE(FEET) =      5.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.099
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.285
 SUBAREA RUNOFF(CFS) =      0.39
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    338.00  DOWNSTREAM(FEET) =    335.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0151
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.178
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.09
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   1.48
 Tc(MIN.) =    6.58
 SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    4.01
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.682
 TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       4.34

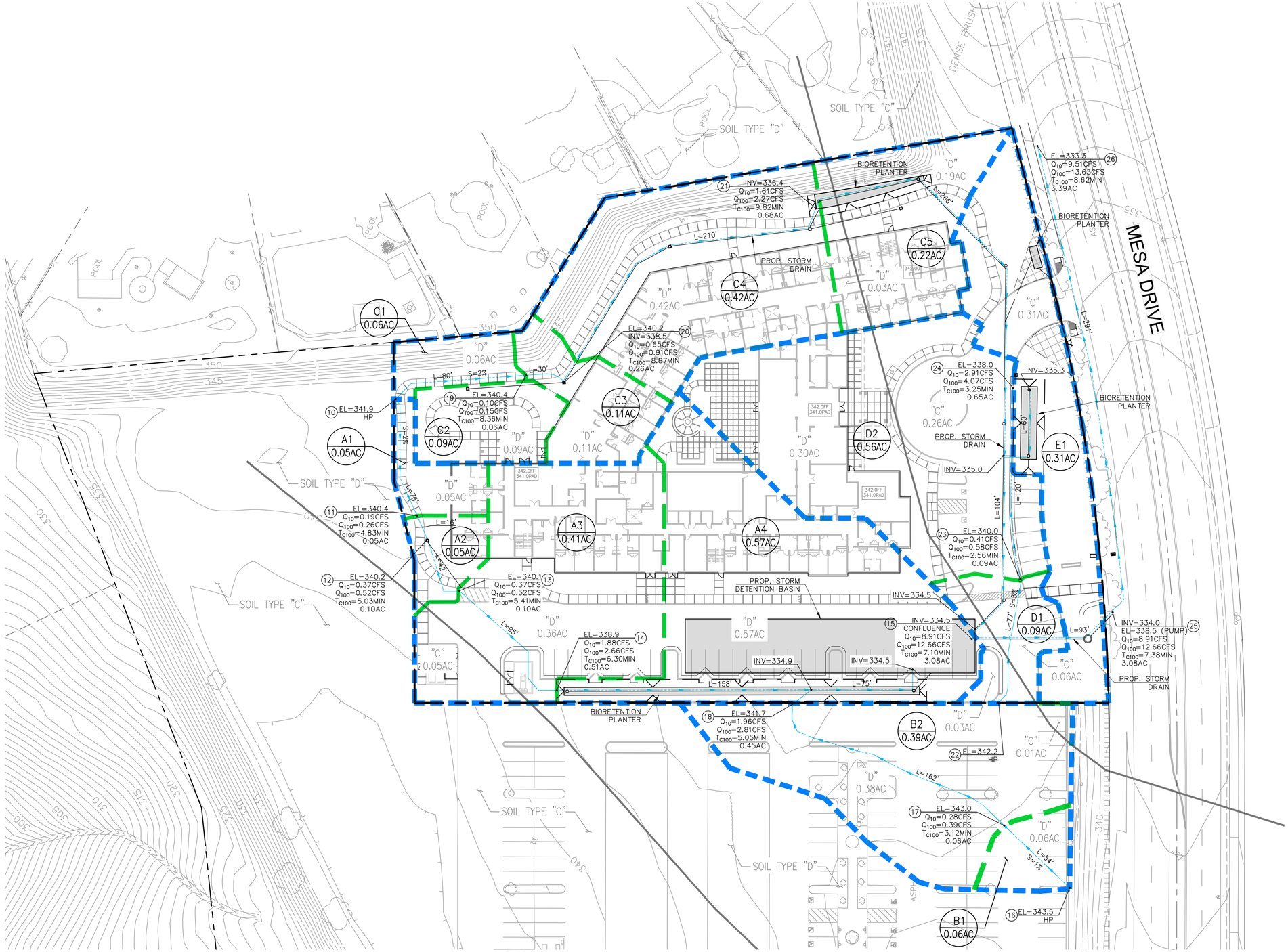
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.52
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     286.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    335.20  DOWNSTREAM(FEET) =    334.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   111.00   CHANNEL SLOPE =  0.0108
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.750
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.39
 AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.78
 Tc(MIN.) =    7.36
 SUBAREA AREA(ACRES) =     1.01       SUBAREA RUNOFF(CFS) =    4.01
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.686
 TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       8.05

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   2.50
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     397.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.750
```

```
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6864
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       8.17
  TC(MIN.) =    7.36
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =      7.36
  PEAK FLOW RATE(CFS)   =       8.17
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```



LEGEND:

- RIGHT-OF-WAY LINE
- CENTERLINE
- DMA BOUNDARY
- DMA SUB-BOUNDARY
- FLOW PATH
- SOIL TYPE DELINEATION

A4 / 0.57AC — SUBAREA DESIGNATION / AREA (ACRES)

(14) — HYDROLOGY NODE

Q_{10} Q_{100} — CALCULATED RUNOFF (CFS) FOR 10 / 100 YEAR FREQUENCY

T_{C100} — CALCULATED TIME OF CONCENTRATION (MIN) FOR 100 YEAR FREQUENCY

"D" 0.30AC — SOIL TYPE AREA WITHIN SUB-BOUNDARY

HYDROLOGIC SITE DATA

SOIL TYPE: C & D
TOTAL AREA: 3.39 AC

ABBREVIATIONS:

AC	ACRES
CFS	CUBIC FEET PER SECOND
EL	ELEVATION
L	LENGTH

PROPOSED CONDITION SUMMARY TABLE

	Q_{10} (CFS)	Q_{100} (CFS)	AREA (ACRES)
TOTAL	9.51	13.63	3.39

30' 0' 15' 30'
SCALE: 1" = 30'

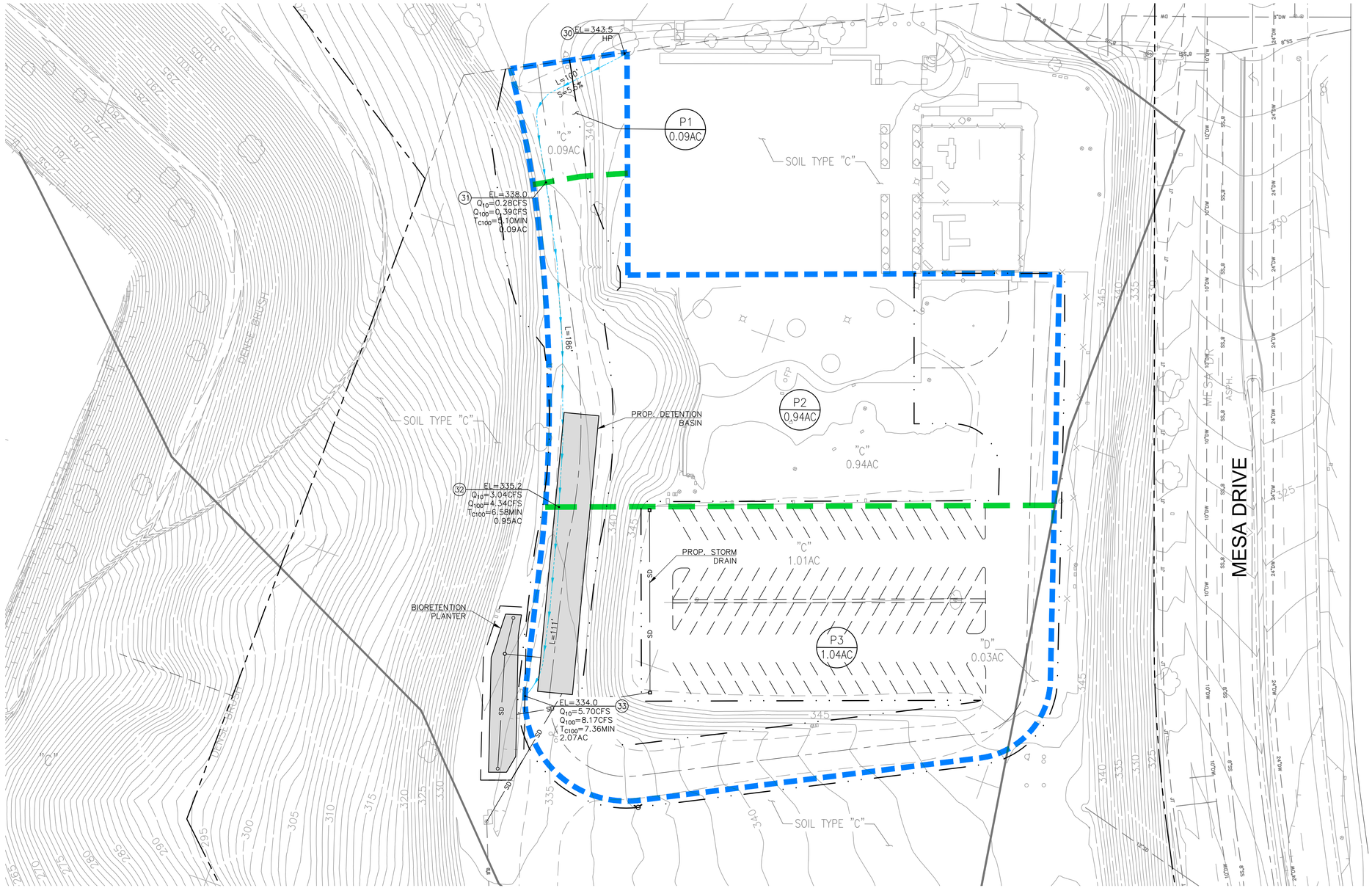
PROPOSED HYDROLOGY

SUNRISE SENIOR LIVING OF OCEANSIDE
4700 MESA DR

SUNRISE SENIOR LIVING

FUSCOE ENGINEERING
600 Wilshire Blvd., Suite 1470, Los Angeles, California 90017
tel 213.988.8802 ◦ fax 213.988.8803 ◦ www.fuscoe.com

F:\Projects\1571\003_Support Files\Reports\Hydrology\CAD\1571-003_Pr Hydr.dwg (6/15/2020 11:20 AM) Plotted by: Dom Pinto



LEGEND:

- RIGHT-OF-WAY LINE
- CENTERLINE
- DMA BOUNDARY
- DMA SUB-BOUNDARY
- FLOW PATH
- SOIL TYPE DELINEATION

P1 / 0.09AC — SUBAREA DESIGNATION / AREA (ACRES)

31 — HYDROLOGY NODE

Q_{10} Q_{100} — CALCULATED RUNOFF (CFS) FOR 10 / 100 YEAR FREQUENCY

T_{C100} — CALCULATED TIME OF CONCENTRATION (MIN) FOR 100 YEAR FREQUENCY

"C" 0.94AC — SOIL TYPE AREA WITHIN SUB-BOUNDARY

HYDROLOGIC SITE DATA

SOIL TYPE: C & D
TOTAL AREA: 2.07 AC

ABBREVIATIONS:

AC	ACRES
CFS	CUBIC FEET PER SECOND
EL	ELEVATION
L	LENGTH

EXISTING CONDITION SUMMARY TABLE

	Q_{10} (CFS)	Q_{100} (CFS)	AREA (ACRES)
TOTAL	5.70	8.17	2.07

30' 0' 15' 30'
SCALE: 1" = 30'

PROPOSED HYDROLOGY MAP

SUNRISE SENIOR LIVING OF OCEANSIDE
4700 MESA DR, OCEANSIDE CA 92056

WEST PARKING LOT

SUNRISE SENIOR LIVING

FUSCOE ENGINEERING
600 Wilshire Blvd., Suite 1470, Los Angeles, California 90017
tel 213.988.8802 ◦ fax 213.988.8803 ◦ www.fuscoe.com

F:\Projects\1571\003_Support Files\Reports\Hydrology\CAD\1571-003_P- Hydr-Parking Lot.dwg (6/15/2020 11:31 AM) Plotted by: Dom Pista

Appendix 7

Detention Analysis

```
       U N I T  H Y D R O G R A P H  A N A L Y S I S

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               Study date  06/08/20  File: sunrise.out

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Program License Serial Number 6103

------------------------------------------------------------------------
Sunrise of Oceanside
Main Site
100-year unit hydrograph analysis
Proposed Condition
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Storm Event Year = 100

Antecedent Moisture Condition = 3

 English (in-lb) Input Units Used

 English Rainfall Data (Inches) Input Values Used

Area averaged rainfall isohyetal data:
        Sub-Area(Ac.)       Rainfall (In)
             3.39              5.40

Rainfall Distribution pattern used in study:
Type B for SCS (small dam) or San Diego 6 hour storms
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

********* Area-Averaged SCS Curve Number and Fm *********

Area       Area          SCS CN    SCS CN    Fm      Soil
(Ac.)      fract         (AMC2)    (AMC3)   (In/Hr)  Group
     2.01   0.593         95.0      99.0     0.000    D
     0.86   0.254         98.0      98.0

     0.36   0.107         94.0      98.8     0.050    C
     0.16   0.046         98.0      98.0

Area-averaged catchment SCS Curve Number AMC(3) = 98.679
Area-averaged Fm value using values listed =  0.005(In/Hr)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
User entry of time of concentration  =   0.144 (hours)
Watershed area =       3.39(Ac.)
Catchment Lag time =   0.086 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 96.4506
Hydrograph baseflow =     0.00(CFS)
Minimum watershed loss rate(Fm) =  0.000(In/Hr)
Average adjusted SCS Curve Number = 98.679
```

Calibrated rainfall to obtain Rational Method runoff - used for detention routing

Rainfall depth area reduction factors:
Using a total area of 3.39(Ac.) (Ref: SCS Sup A, Sec.4)

Pacific Coastal Climate ratio used
Areal factor ratio (rainfall reduction) = 1.000
Rainfall entered for study = 5.400(In)
Adjusted rainfall = 5.400(In)

The following S-Graph or S-Graph combination is used in this study:

VALLEY DEVELOPED S-Graph

U N I T H Y D R O G R A P H

Time Ratio (t/Lag)	Time (hrs)	Discharge Ratios (Q/Qp)	Q (CFS)	Mass Curve Ratios (Qa/Q)
		(K = 41.02 (CFS))		
0.96	0.083	0.263	6.584	0.161
1.93	0.167	1.000	25.050	0.771
2.89	0.250	0.333	8.352	0.975
3.86	0.333	0.041	1.033	1.000

Total soil rain loss = 0.16(In)
Total effective runoff = 5.24(In)

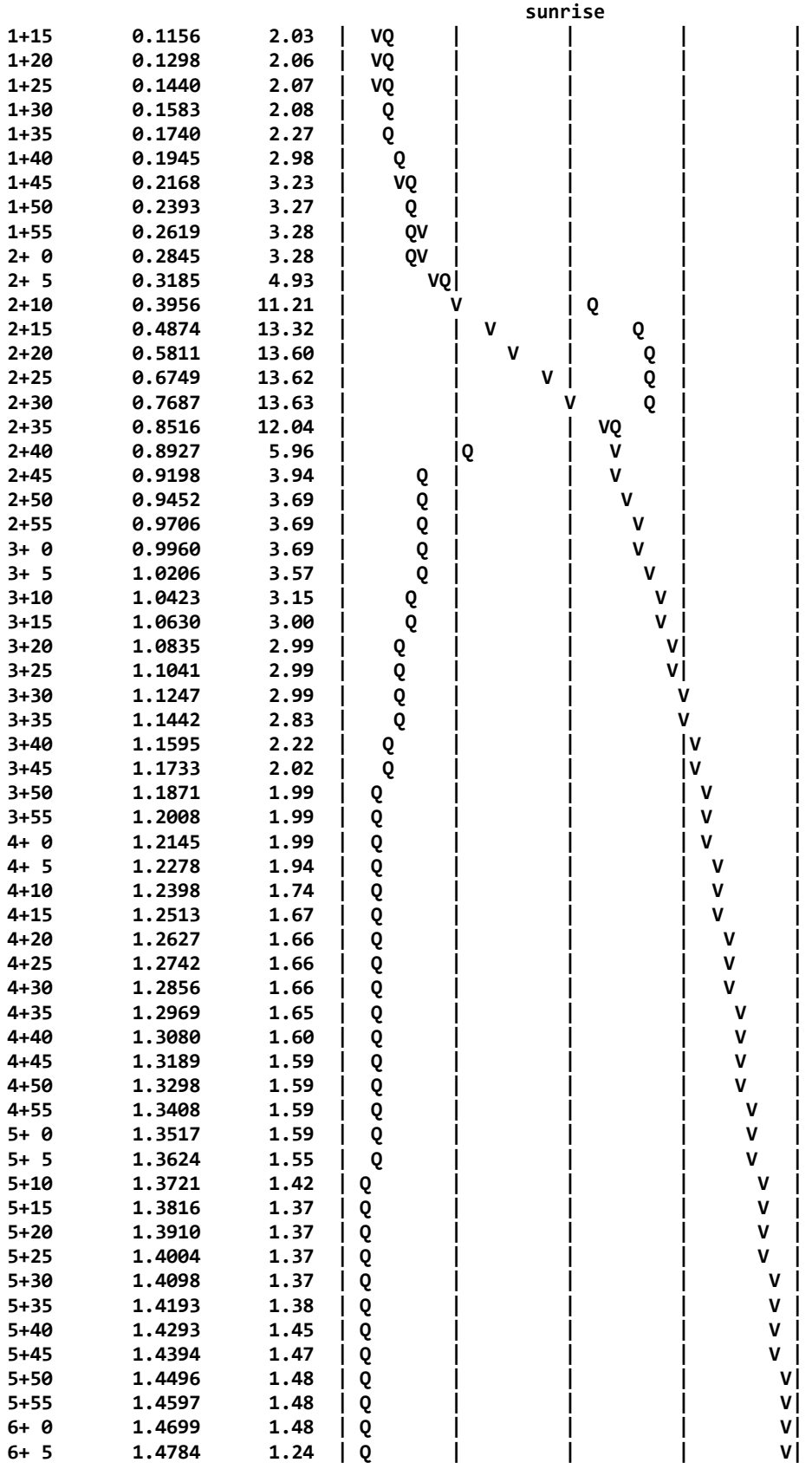
Peak flow rate this hydrograph = 13.63(CFS)
Total runoff volume this hydrograph = 64513.3(Ft3)

Proposed Q100 at main site - to be mitigated w/detention

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q				
0+10	0.0004	0.05	Q				
0+15	0.0024	0.29	Q				
0+20	0.0063	0.57	VQ				
0+25	0.0116	0.77	VQ				
0+30	0.0178	0.90	VQ				
0+35	0.0249	1.04	V Q				
0+40	0.0341	1.34	V Q				
0+45	0.0443	1.47	|VQ				
0+50	0.0549	1.53	|V Q				
0+55	0.0657	1.57	|V Q				
1+ 0	0.0767	1.60	| VQ				
1+ 5	0.0883	1.68	| VQ				
1+10	0.1016	1.94	| VQ				


sunrise
1+15 0.1156 2.03
1+20 0.1298 2.06
1+25 0.1440 2.07
1+30 0.1583 2.08
1+35 0.1740 2.27
1+40 0.1945 2.98
1+45 0.2168 3.23
1+50 0.2393 3.27
1+55 0.2619 3.28
2+ 0 0.2845 3.28
2+ 5 0.3185 4.93
2+10 0.3956 11.21
2+15 0.4874 13.32
2+20 0.5811 13.60
2+25 0.6749 13.62
2+30 0.7687 13.63
2+35 0.8516 12.04
2+40 0.8927 5.96
2+45 0.9198 3.94
2+50 0.9452 3.69
2+55 0.9706 3.69
3+ 0 0.9960 3.69
3+ 5 1.0206 3.57
3+10 1.0423 3.15
3+15 1.0630 3.00
3+20 1.0835 2.99
3+25 1.1041 2.99
3+30 1.1247 2.99
3+35 1.1442 2.83
3+40 1.1595 2.22
3+45 1.1733 2.02
3+50 1.1871 1.99
3+55 1.2008 1.99
4+ 0 1.2145 1.99
4+ 5 1.2278 1.94
4+10 1.2398 1.74
4+15 1.2513 1.67
4+20 1.2627 1.66
4+25 1.2742 1.66
4+30 1.2856 1.66
4+35 1.2969 1.65
4+40 1.3080 1.60
4+45 1.3189 1.59
4+50 1.3298 1.59
4+55 1.3408 1.59
5+ 0 1.3517 1.59
5+ 5 1.3624 1.55
5+10 1.3721 1.42
5+15 1.3816 1.37
5+20 1.3910 1.37
5+25 1.4004 1.37
5+30 1.4098 1.37
5+35 1.4193 1.38
5+40 1.4293 1.45
5+45 1.4394 1.47
5+50 1.4496 1.48
5+55 1.4597 1.48
6+ 0 1.4699 1.48
6+ 5 1.4784 1.24

```
       U N I T   H Y D R O G R A P H   A N A L Y S I S

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               Study date  06/08/20  File: pkglot.out


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Program License Serial Number 6103

------------------------------------------------------------------------
Sunrise of Oceanside
West Parking Lot
100-year unit hydrograph analysis
Proposed Condition
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Storm Event Year = 100

Antecedent Moisture Condition = 3

 English (in-lb) Input Units Used

 English Rainfall Data (Inches) Input Values Used

Area averaged rainfall isohyetal data:
        Sub-Area(Ac.)       Rainfall (In)
             2.07             5.31

Rainfall Distribution pattern used in study:
Type B for SCS (small dam) or San Diego 6 hour storms
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

********* Area-Averaged SCS Curve Number and Fm *********

Area       Area          SCS CN    SCS CN    Fm      Soil
(Ac.)      fract         (AMC2)    (AMC3)   (In/Hr)  Group
     0.83   0.400         94.0      98.8     0.050    C
     1.24   0.600         98.0      98.0

Area-averaged catchment SCS Curve Number AMC(3) = 98.320
Area-averaged Fm value using values listed =  0.020(In/Hr)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
User entry of time of concentration  =   0.123 (hours)
Watershed area =       2.07(Ac.)
Catchment Lag time =   0.074 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 112.9178
Hydrograph baseflow =     0.00(CFS)
Minimum watershed loss rate(Fm) =  0.000(In/Hr)
Average adjusted SCS Curve Number = 98.320

Rainfall depth area reduction factors:
Using a total area of       2.07(Ac.) (Ref: SCS Sup A, Sec.4)
```

Calibrated rainfall to obtain Rational Method runoff - used for detention routing

Pacific Coastal Climate ratio used
Areal factor ratio (rainfall reduction) = 1.000
Rainfall entered for study = 5.310(In)
Adjusted rainfall = 5.310(In)

The following S-Graph or S-Graph combination is used in this study:

VALLEY DEVELOPED S-Graph

U N I T H Y D R O G R A P H

Time Ratio (t/Lag)	Time (hrs)	Discharge Ratios (Q/Qp)	Q (CFS)	Mass Curve Ratios (Qa/Q)
		(K = 25.05 (CFS))		
1.13	0.083	0.334	5.395	0.215
2.26	0.167	1.000	16.138	0.860
3.39	0.250	0.200	3.225	0.988
4.52	0.333	0.018	0.289	1.000

Total soil rain loss = 0.20(In)
Total effective runoff = 5.11(In)

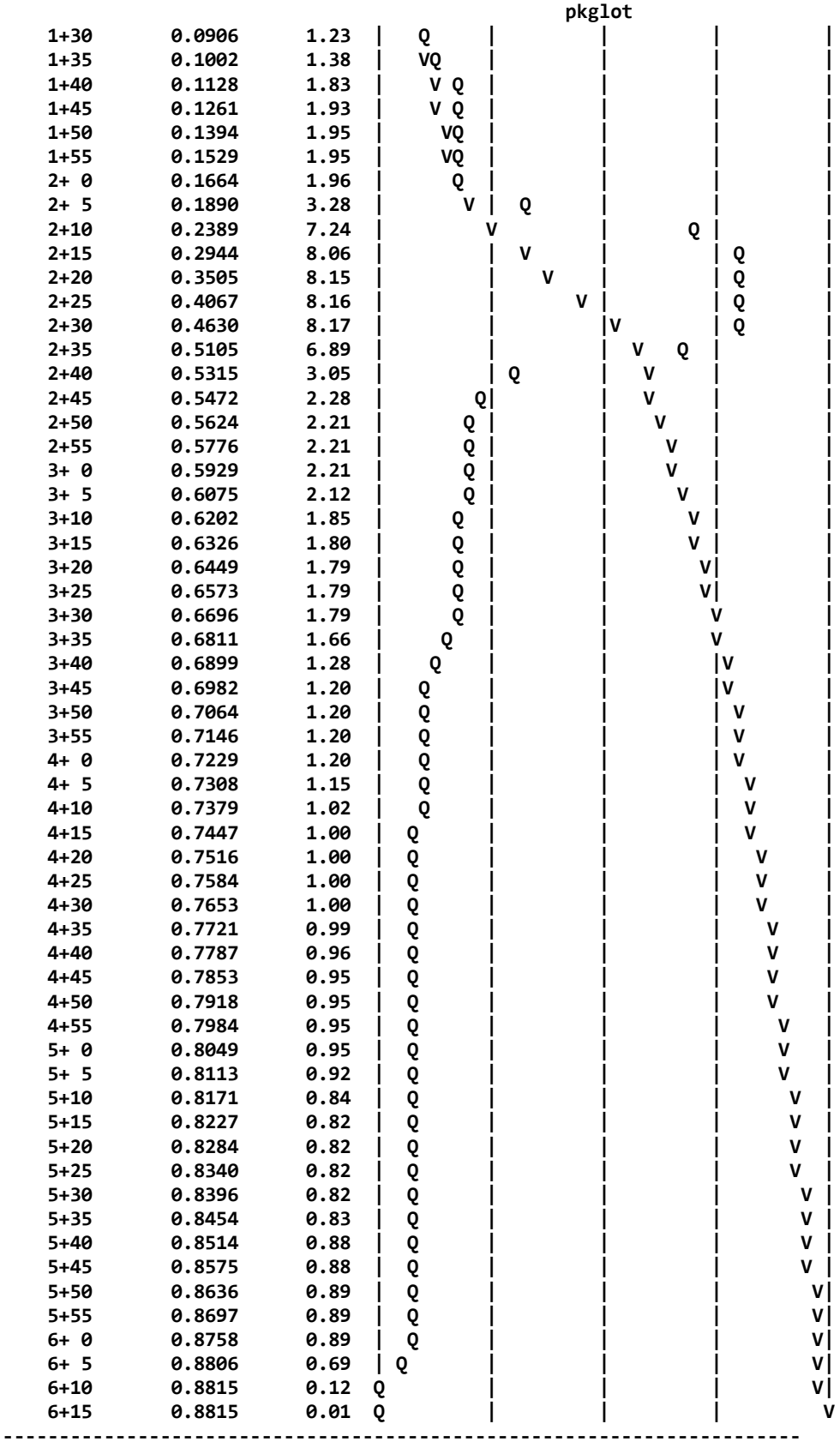
Peak flow rate this hydrograph = 8.17(CFS)
Total runoff volume this hydrograph = 38399.4(Ft3)

Proposed Q100 at parking lot - to be mitigated w/detention

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0000	0.00	Q
0+10	0.0001	0.02	Q
0+15	0.0010	0.12	Q
0+20	0.0029	0.28	VQ
0+25	0.0056	0.40	VQ
0+30	0.0089	0.48	VQ
0+35	0.0129	0.58	V Q
0+40	0.0181	0.76	V Q
0+45	0.0239	0.83	|V Q
0+50	0.0299	0.87	|V Q
0+55	0.0361	0.90	|V Q
1+ 0	0.0425	0.92	|V Q
1+ 5	0.0493	0.99	| VQ
1+10	0.0572	1.15	| V Q
1+15	0.0655	1.19	| V Q
1+20	0.0738	1.21	| VQ
1+25	0.0822	1.22	| VQ


pkglot
1+30 0.0906 1.23
1+35 0.1002 1.38
1+40 0.1128 1.83
1+45 0.1261 1.93
1+50 0.1394 1.95
1+55 0.1529 1.95
2+ 0 0.1664 1.96
2+ 5 0.1890 3.28
2+10 0.2389 7.24
2+15 0.2944 8.06
2+20 0.3505 8.15
2+25 0.4067 8.16
2+30 0.4630 8.17
2+35 0.5105 6.89
2+40 0.5315 3.05
2+45 0.5472 2.28
2+50 0.5624 2.21
2+55 0.5776 2.21
3+ 0 0.5929 2.21
3+ 5 0.6075 2.12
3+10 0.6202 1.85
3+15 0.6326 1.80
3+20 0.6449 1.79
3+25 0.6573 1.79
3+30 0.6696 1.79
3+35 0.6811 1.66
3+40 0.6899 1.28
3+45 0.6982 1.20
3+50 0.7064 1.20
3+55 0.7146 1.20
4+ 0 0.7229 1.20
4+ 5 0.7308 1.15
4+10 0.7379 1.02
4+15 0.7447 1.00
4+20 0.7516 1.00
4+25 0.7584 1.00
4+30 0.7653 1.00
4+35 0.7721 0.99
4+40 0.7787 0.96
4+45 0.7853 0.95
4+50 0.7918 0.95
4+55 0.7984 0.95
5+ 0 0.8049 0.95
5+ 5 0.8113 0.92
5+10 0.8171 0.84
5+15 0.8227 0.82
5+20 0.8284 0.82
5+25 0.8340 0.82
5+30 0.8396 0.82
5+35 0.8454 0.83
5+40 0.8514 0.88
5+45 0.8575 0.88
5+50 0.8636 0.89
5+55 0.8697 0.89
6+ 0 0.8758 0.89
6+ 5 0.8806 0.69
6+10 0.8815 0.12
6+15 0.8815 0.01

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 06/08/20

Sunrise of Oceanside
Proposed Main Site
Detention Analysis
100-year storm event mitigation

Program License Serial Number 6103

********** HYDROGRAPH INFORMATION **********

From study/file name: sunrise.rte
**********HYDROGRAPH DATA**********
Number of intervals = 75
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 13.628 (CFS)
Total volume = 1.481 (Ac.Ft)

Q100 Proposed Main Site

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 75
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.250	0.034	0.300	0.033	0.035
0.500	0.069	0.700	0.067	0.071

Rectangular Tank
6000 square feet
x 4 feet (depth)
(24,000 cubic feet total)

0.750	0.103	1.500	0.098	0.108
1.000	0.138	1.900	0.131	0.145
1.250	0.172	2.300	0.164	0.180
1.500	0.207	2.600	0.198	0.216
1.750	0.241	2.900	0.231	0.251
2.000	0.275	3.200	0.264	0.286
2.250	0.310	3.400	0.298	0.322
2.500	0.344	3.700	0.331	0.357
2.750	0.379	3.900	0.366	0.392
3.000	0.413	4.100	0.399	0.427
3.250	0.448	4.300	0.433	0.463
3.500	0.482	4.500	0.467	0.497
3.750	0.517	4.600	0.501	0.533
4.000	0.551	4.800	0.534	0.568
4.250	0.585	5.000	0.568	0.602

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 3.4 6.81 10.22 13.63	Depth (Ft.)
0.083	0.00	0.00	0.000	O	0.00
0.167	0.05	0.00	0.000	O	0.00
0.250	0.29	0.01	0.001	O	0.01
0.333	0.57	0.04	0.004	OI	0.03
0.417	0.77	0.07	0.008	OI	0.06
0.500	0.90	0.12	0.013	O I	0.10
0.583	1.04	0.17	0.019	O I	0.14
0.667	1.34	0.23	0.026	O I	0.19
0.750	1.47	0.30	0.034	O I	0.25
0.833	1.53	0.39	0.042	O I	0.31
0.917	1.57	0.48	0.050	O I	0.36
1.000	1.60	0.56	0.057	O I	0.41
1.083	1.68	0.64	0.064	O I	0.46
1.167	1.94	0.76	0.072	O I	0.52
1.250	2.03	0.95	0.079	O I	0.58
1.333	2.06	1.11	0.086	O I	0.63
1.417	2.07	1.25	0.092	O I	0.67
1.500	2.08	1.38	0.098	OI	0.71
1.583	2.27	1.50	0.103	O I	0.75
1.667	2.98	1.58	0.110	O I	0.80
1.750	3.23	1.70	0.120	O I	0.87
1.833	3.27	1.82	0.131	O I	0.95
1.917	3.28	1.93	0.140	O I	1.02
2.000	3.28	2.03	0.149	O I	1.08
2.083	4.93	2.19	0.163	O I	1.18
2.167	11.21	2.56	0.202	O	1.47
2.250	13.32	3.13	0.267	O	1.94
2.333	13.60	3.63	0.337	O I	2.45
2.417	13.62	4.05	0.404	O I	2.93
2.500	13.63	4.42	0.469	O I	3.40
2.583	12.04	4.65	0.526	O I	3.81
2.667	5.96	4.82	0.555	O I	4.03
2.750	3.94	4.83	0.556	I O	4.04
2.833	3.69	4.79	0.549	I O	3.99
2.917	3.69	4.74	0.542	I O	3.93
3.000	3.69	4.70	0.534	I O	3.88

Peak Q100 into tank

Peak Q100 out of tank

Maximum storage used (acre-feet)

Maximum Depth in Tank

3.083	3.57	4.66	0.527	I O			3.82
3.167	3.15	4.61	0.518	I O			3.76
3.250	3.00	4.57	0.508	I O			3.69
3.333	2.99	4.54	0.497	I O			3.61
3.417	2.99	4.51	0.487	I O			3.53
3.500	2.99	4.47	0.476	I O			3.46
3.583	2.83	4.40	0.466	I O			3.38
3.667	2.22	4.33	0.453	I O			3.29
3.750	2.02	4.24	0.438	IO			3.18
3.833	1.99	4.16	0.423	IO			3.07
3.917	1.99	4.07	0.408	IO			2.97
4.000	1.99	3.99	0.394	IO			2.86
4.083	1.94	3.91	0.381	IO			2.76
4.167	1.74	3.83	0.367	IO			2.66
4.250	1.67	3.75	0.352	IO			2.56
4.333	1.66	3.65	0.338	IO			2.46
4.417	1.66	3.53	0.325	IO			2.36
4.500	1.66	3.42	0.312	IO			2.27
4.583	1.65	3.35	0.301	IO			2.18
4.667	1.60	3.28	0.289	IO			2.10
4.750	1.59	3.21	0.278	IO			2.02
4.833	1.59	3.13	0.267	IO			1.94
4.917	1.59	3.04	0.256	IO			1.86
5.000	1.59	2.95	0.247	IO			1.79
5.083	1.55	2.87	0.237	IO			1.72
5.167	1.42	2.79	0.228	IO			1.66
5.250	1.37	2.70	0.219	IO			1.59
5.333	1.37	2.63	0.210	IO			1.52
5.417	1.37	2.55	0.201	IO			1.46
5.500	1.37	2.48	0.194	IO			1.40
5.583	1.38	2.42	0.186	IO			1.35
5.667	1.45	2.36	0.179	IO			1.30
5.750	1.47	2.31	0.173	IO			1.26
5.833	1.48	2.25	0.168	IO			1.22
5.917	1.48	2.19	0.163	IO			1.18
6.000	1.48	2.13	0.158	IO			1.15
6.083	1.24	2.07	0.153	IO			1.11
6.167	0.34	1.97	0.144	IO			1.05
6.250	0.04	1.84	0.132	IO			0.96
6.333	0.00	1.70	0.120	IO			0.87
6.417	0.00	1.57	0.109	IO			0.79
6.500	0.00	1.40	0.099	IO			0.72
6.583	0.00	1.19	0.090	IO			0.65
6.667	0.00	1.01	0.082	IO			0.60
6.750	0.00	0.86	0.076	IO			0.55
6.833	0.00	0.73	0.070	IO			0.51
6.917	0.00	0.66	0.066	IO			0.48
7.000	0.00	0.61	0.061	IO			0.44
7.083	0.00	0.56	0.057	IO			0.42
7.167	0.00	0.52	0.053	IO			0.39
7.250	0.00	0.48	0.050	IO			0.36
7.333	0.00	0.45	0.047	IO			0.34
7.417	0.00	0.41	0.044	O			0.32
7.500	0.00	0.38	0.041	O			0.30
7.583	0.00	0.35	0.039	O			0.28
7.667	0.00	0.33	0.036	O			0.27
7.750	0.00	0.30	0.034	O			0.25
7.833	0.00	0.28	0.032	O			0.24
7.917	0.00	0.27	0.030	O			0.22

8.000	0.00	0.25	0.028	O	|	|	|	0.21
8.083	0.00	0.24	0.027	O	|	|	|	0.20
8.167	0.00	0.22	0.025	O	|	|	|	0.18
8.250	0.00	0.21	0.024	O	|	|	|	0.17
8.333	0.00	0.20	0.022	O	|	|	|	0.16
8.417	0.00	0.18	0.021	O	|	|	|	0.15
8.500	0.00	0.17	0.020	O	|	|	|	0.14
8.583	0.00	0.16	0.019	O	|	|	|	0.14
8.667	0.00	0.15	0.017	O	|	|	|	0.13
8.750	0.00	0.14	0.016	O	|	|	|	0.12
8.833	0.00	0.14	0.015	O	|	|	|	0.11
8.917	0.00	0.13	0.015	O	|	|	|	0.11
9.000	0.00	0.12	0.014	O	|	|	|	0.10
9.083	0.00	0.11	0.013	O	|	|	|	0.09
9.167	0.00	0.11	0.012	O	|	|	|	0.09
9.250	0.00	0.10	0.011	O	|	|	|	0.08
9.333	0.00	0.09	0.011	O	|	|	|	0.08
9.417	0.00	0.09	0.010	O	|	|	|	0.07
9.500	0.00	0.08	0.010	O	|	|	|	0.07
9.583	0.00	0.08	0.009	O	|	|	|	0.07
9.667	0.00	0.07	0.008	O	|	|	|	0.06
9.750	0.00	0.07	0.008	O	|	|	|	0.06
9.833	0.00	0.07	0.007	O	|	|	|	0.05
9.917	0.00	0.06	0.007	O	|	|	|	0.05
10.000	0.00	0.06	0.007	O	|	|	|	0.05
10.083	0.00	0.05	0.006	O	|	|	|	0.05
10.167	0.00	0.05	0.006	O	|	|	|	0.04
10.250	0.00	0.05	0.006	O	|	|	|	0.04
10.333	0.00	0.05	0.005	O	|	|	|	0.04
10.417	0.00	0.04	0.005	O	|	|	|	0.04
10.500	0.00	0.04	0.005	O	|	|	|	0.03
10.583	0.00	0.04	0.004	O	|	|	|	0.03
10.667	0.00	0.04	0.004	O	|	|	|	0.03
10.750	0.00	0.03	0.004	O	|	|	|	0.03
10.833	0.00	0.03	0.004	O	|	|	|	0.03
10.917	0.00	0.03	0.003	O	|	|	|	0.02
11.000	0.00	0.03	0.003	O	|	|	|	0.02
11.083	0.00	0.03	0.003	O	|	|	|	0.02
11.167	0.00	0.02	0.003	O	|	|	|	0.02
11.250	0.00	0.02	0.003	O	|	|	|	0.02
11.333	0.00	0.02	0.002	O	|	|	|	0.02
11.417	0.00	0.02	0.002	O	|	|	|	0.02
11.500	0.00	0.02	0.002	O	|	|	|	0.02
11.583	0.00	0.02	0.002	O	|	|	|	0.02
11.667	0.00	0.02	0.002	O	|	|	|	0.01
11.750	0.00	0.02	0.002	O	|	|	|	0.01
11.833	0.00	0.02	0.002	O	|	|	|	0.01
11.917	0.00	0.01	0.002	O	|	|	|	0.01
12.000	0.00	0.01	0.002	O	|	|	|	0.01
12.083	0.00	0.01	0.001	O	|	|	|	0.01
12.167	0.00	0.01	0.001	O	|	|	|	0.01
12.250	0.00	0.01	0.001	O	|	|	|	0.01
12.333	0.00	0.01	0.001	O	|	|	|	0.01
12.417	0.00	0.01	0.001	O	|	|	|	0.01
12.500	0.00	0.01	0.001	O	|	|	|	0.01
12.583	0.00	0.01	0.001	O	|	|	|	0.01
12.667	0.00	0.01	0.001	O	|	|	|	0.01
12.750	0.00	0.01	0.001	O	|	|	|	0.01
12.833	0.00	0.01	0.001	O	|	|	|	0.01

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                                                    main
12.917    0.00    0.01      0.001  O       |       |       |       |     0.01
13.000    0.00    0.01      0.001  O       |       |       |       |     0.01
13.083    0.00    0.01      0.001  O       |       |       |       |     0.01
13.167    0.00    0.01      0.001  O       |       |       |       |     0.00
13.250    0.00    0.01      0.001  O       |       |       |       |     0.00
13.333    0.00    0.01      0.001  O       |       |       |       |     0.00
13.417    0.00    0.00      0.001  O       |       |       |       |     0.00
13.500    0.00    0.00      0.001  O       |       |       |       |     0.00
13.583    0.00    0.00      0.000  O       |       |       |       |     0.00
13.667    0.00    0.00      0.000  O       |       |       |       |     0.00
13.750    0.00    0.00      0.000  O       |       |       |       |     0.00
13.833    0.00    0.00      0.000  O       |       |       |       |     0.00
13.917    0.00    0.00      0.000  O       |       |       |       |     0.00
14.000    0.00    0.00      0.000  O       |       |       |       |     0.00
14.083    0.00    0.00      0.000  O       |       |       |       |     0.00
14.167    0.00    0.00      0.000  O       |       |       |       |     0.00
14.250    0.00    0.00      0.000  O       |       |       |       |     0.00
14.333    0.00    0.00      0.000  O       |       |       |       |     0.00
14.417    0.00    0.00      0.000  O       |       |       |       |     0.00
14.500    0.00    0.00      0.000  O       |       |       |       |     0.00
14.583    0.00    0.00      0.000  O       |       |       |       |     0.00
14.667    0.00    0.00      0.000  O       |       |       |       |     0.00
14.750    0.00    0.00      0.000  O       |       |       |       |     0.00
14.833    0.00    0.00      0.000  O       |       |       |       |     0.00
14.917    0.00    0.00      0.000  O       |       |       |       |     0.00
15.000    0.00    0.00      0.000  O       |       |       |       |     0.00
15.083    0.00    0.00      0.000  O       |       |       |       |     0.00
15.167    0.00    0.00      0.000  O       |       |       |       |     0.00
15.250    0.00    0.00      0.000  O       |       |       |       |     0.00
15.333    0.00    0.00      0.000  O       |       |       |       |     0.00

*****************************HYDROGRAPH DATA*****************************
                Number of intervals =   184
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       4.829 (CFS)
                Total volume =       1.481 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
*************************************************************************

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Proposed Main Site (Senior Living Facility) Max Q100 out of Detention Tank

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                FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
                     Study date: 06/08/20

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Sunrise of Oceanside
Proposed West Parking Lot
Detention Analysis
100-year storm event mitigation
------------------------------------------------------------------------

Program License Serial Number 6103

------------------------------------------------------------------------
******************** HYDROGRAPH INFORMATION **********************

                From study/file name: pkglot.rte
****************************HYDROGRAPH DATA****************************
                Number of intervals =    75
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =        8.172 (CFS)
                Total volume =       0.882 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
************************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 75
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
------------------------------------------------------------------------
  0.000      0.000      0.000      0.000        0.000
  0.250      0.018      0.300      0.017        0.019
  0.500      0.037      0.700      0.035        0.039
```

Q100 Proposed
West Parking Lot

Rectangular Tank
3200 square feet
x 4 feet (depth)
(12,800 cubic feet total)

pkgte

0.750	0.055	1.100	0.051	0.059
1.000	0.073	1.400	0.068	0.078
1.250	0.092	1.600	0.086	0.098
1.500	0.110	1.800	0.104	0.116
1.750	0.129	2.000	0.122	0.136
2.000	0.147	2.200	0.139	0.155
2.250	0.165	2.300	0.157	0.173
2.500	0.184	2.500	0.175	0.193
2.750	0.202	2.600	0.193	0.211
3.000	0.220	2.700	0.211	0.229
3.250	0.239	2.900	0.229	0.249
3.500	0.257	3.000	0.247	0.267
3.750	0.275	3.100	0.264	0.286
4.000	0.294	3.200	0.283	0.305
4.250	0.312	3.300	0.301	0.323

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.0 4.09 6.13 8.17	Depth (Ft.)
0.083	0.00	0.00	0.000	O	0.00
0.167	0.02	0.00	0.000	O	0.00
0.250	0.12	0.01	0.001	O	0.01
0.333	0.28	0.03	0.002	OI	0.02
0.417	0.40	0.06	0.004	OI	0.05
0.500	0.48	0.10	0.006	OI	0.09
0.583	0.58	0.15	0.009	O I	0.12
0.667	0.76	0.21	0.012	O I	0.17
0.750	0.83	0.27	0.016	O I	0.23
0.833	0.87	0.34	0.020	O I	0.28
0.917	0.90	0.42	0.023	O I	0.32
1.000	0.92	0.48	0.027	O I	0.36
1.083	0.99	0.55	0.030	OI	0.40
1.167	1.15	0.62	0.033	O I	0.45
1.250	1.19	0.69	0.037	O I	0.50
1.333	1.21	0.76	0.040	O I	0.54
1.417	1.22	0.83	0.043	OI	0.58
1.500	1.23	0.88	0.045	OI	0.62
1.583	1.38	0.94	0.048	O I	0.65
1.667	1.83	1.04	0.052	O I	0.71
1.750	1.93	1.14	0.058	O I	0.79
1.833	1.95	1.23	0.063	O I	0.86
1.917	1.95	1.31	0.068	O I	0.92
2.000	1.96	1.38	0.072	O I	0.98
2.083	3.28	1.47	0.080	O I	1.09
2.167	7.24	1.75	0.105	O	1.43
2.250	8.06	2.17	0.144	O	1.96
2.333	8.15	2.50	0.184	O	2.50
2.417	8.16	2.72	0.222	O I	3.03
2.500	8.17	3.01	0.259	O I	3.52
2.583	6.89	3.18	0.289	O I	3.94
2.667	3.05	3.24	0.301	IO	4.10
2.750	2.28	3.22	0.298	I O	4.05
2.833	2.21	3.18	0.291	I O	3.96
2.917	2.21	3.15	0.284	I O	3.87
3.000	2.21	3.12	0.278	I O	3.79

Peak Q100 into tank

Peak Q100 out of tank

Maximum storage used (acre-feet)

Maximum Depth in Tank

pkgte

3.083	2.12	3.08	0.272	| I O |	|	|	3.70
3.167	1.85	3.04	0.264	| I| O |	|	|	3.60
3.250	1.80	2.99	0.256	| I| O |	|	|	3.49
3.333	1.79	2.95	0.248	| I| O |	|	|	3.37
3.417	1.79	2.91	0.240	| I| O |	|	|	3.26
3.500	1.79	2.83	0.233	| I| O |	|	|	3.17
3.583	1.66	2.76	0.225	| I | O |	|	|	3.07
3.667	1.28	2.68	0.217	| I | O |	|	|	2.95
3.750	1.20	2.63	0.207	| I | O |	|	|	2.82
3.833	1.20	2.57	0.197	| I | O |	|	|	2.69
3.917	1.20	2.52	0.188	| I |O |	|	|	2.56
4.000	1.20	2.45	0.179	| I |O |	|	|	2.44
4.083	1.15	2.36	0.171	| I |O |	|	|	2.32
4.167	1.02	2.28	0.162	| I O |	|	|	2.21
4.250	1.00	2.24	0.154	| I O |	|	|	2.09
4.333	1.00	2.18	0.145	| I O |	|	|	1.98
4.417	1.00	2.09	0.137	| I O |	|	|	1.87
4.500	1.00	2.01	0.130	| I O|	|	|	1.77
4.583	0.99	1.94	0.123	| I O|	|	|	1.68
4.667	0.96	1.87	0.117	| I O|	|	|	1.59
4.750	0.95	1.81	0.111	| I O|	|	|	1.51
4.833	0.95	1.75	0.105	| I O |	|	|	1.43
4.917	0.95	1.69	0.100	| I O |	|	|	1.36
5.000	0.95	1.63	0.095	| I O |	|	|	1.29
5.083	0.92	1.58	0.090	| I O |	|	|	1.23
5.167	0.84	1.53	0.086	| I O |	|	|	1.17
5.250	0.82	1.48	0.081	| I O |	|	|	1.11
5.333	0.82	1.44	0.077	| I O |	|	|	1.05
5.417	0.82	1.39	0.072	| I O |	|	|	0.99
5.500	0.82	1.33	0.069	| I O |	|	|	0.94
5.583	0.83	1.27	0.065	| IO |	|	|	0.90
5.667	0.88	1.23	0.063	| IO |	|	|	0.86
5.750	0.88	1.19	0.060	| IO |	|	|	0.83
5.833	0.89	1.16	0.058	| IO |	|	|	0.80
5.917	0.89	1.13	0.057	| IO |	|	|	0.77
6.000	0.89	1.10	0.055	| IO |	|	|	0.75
6.083	0.69	1.06	0.053	| I O |	|	|	0.72
6.167	0.12	0.97	0.049	I O |	|	|	0.67
6.250	0.01	0.84	0.043	I O |	|	|	0.59
6.333	0.00	0.72	0.038	I O |	|	|	0.51
6.417	0.00	0.62	0.033	I O |	|	|	0.45
6.500	0.00	0.54	0.029	I O |	|	|	0.40
6.583	0.00	0.46	0.026	IO |	|	|	0.35
6.667	0.00	0.40	0.023	IO |	|	|	0.31
6.750	0.00	0.35	0.020	IO |	|	|	0.28
6.833	0.00	0.30	0.018	IO |	|	|	0.25
6.917	0.00	0.27	0.016	IO |	|	|	0.22
7.000	0.00	0.24	0.014	O |	|	|	0.20
7.083	0.00	0.21	0.013	O |	|	|	0.18
7.167	0.00	0.19	0.011	O |	|	|	0.16
7.250	0.00	0.17	0.010	O |	|	|	0.14
7.333	0.00	0.15	0.009	O |	|	|	0.13
7.417	0.00	0.13	0.008	O |	|	|	0.11
7.500	0.00	0.12	0.007	O |	|	|	0.10
7.583	0.00	0.11	0.006	O |	|	|	0.09
7.667	0.00	0.10	0.006	O |	|	|	0.08
7.750	0.00	0.08	0.005	O |	|	|	0.07
7.833	0.00	0.08	0.005	O |	|	|	0.06
7.917	0.00	0.07	0.004	O |	|	|	0.06

									pkgte
8.000	0.00	0.06	0.004	O	|	|	|	|	0.05
8.083	0.00	0.05	0.003	O	|	|	|	|	0.04
8.167	0.00	0.05	0.003	O	|	|	|	|	0.04
8.250	0.00	0.04	0.003	O	|	|	|	|	0.04
8.333	0.00	0.04	0.002	O	|	|	|	|	0.03
8.417	0.00	0.03	0.002	O	|	|	|	|	0.03
8.500	0.00	0.03	0.002	O	|	|	|	|	0.03
8.583	0.00	0.03	0.002	O	|	|	|	|	0.02
8.667	0.00	0.02	0.001	O	|	|	|	|	0.02
8.750	0.00	0.02	0.001	O	|	|	|	|	0.02
8.833	0.00	0.02	0.001	O	|	|	|	|	0.02
8.917	0.00	0.02	0.001	O	|	|	|	|	0.01
9.000	0.00	0.02	0.001	O	|	|	|	|	0.01
9.083	0.00	0.01	0.001	O	|	|	|	|	0.01
9.167	0.00	0.01	0.001	O	|	|	|	|	0.01
9.250	0.00	0.01	0.001	O	|	|	|	|	0.01
9.333	0.00	0.01	0.001	O	|	|	|	|	0.01
9.417	0.00	0.01	0.001	O	|	|	|	|	0.01
9.500	0.00	0.01	0.000	O	|	|	|	|	0.01
9.583	0.00	0.01	0.000	O	|	|	|	|	0.01
9.667	0.00	0.01	0.000	O	|	|	|	|	0.01
9.750	0.00	0.01	0.000	O	|	|	|	|	0.00
9.833	0.00	0.00	0.000	O	|	|	|	|	0.00
9.917	0.00	0.00	0.000	O	|	|	|	|	0.00
10.000	0.00	0.00	0.000	O	|	|	|	|	0.00
10.083	0.00	0.00	0.000	O	|	|	|	|	0.00
10.167	0.00	0.00	0.000	O	|	|	|	|	0.00
10.250	0.00	0.00	0.000	O	|	|	|	|	0.00
10.333	0.00	0.00	0.000	O	|	|	|	|	0.00
10.417	0.00	0.00	0.000	O	|	|	|	|	0.00
10.500	0.00	0.00	0.000	O	|	|	|	|	0.00
10.583	0.00	0.00	0.000	O	|	|	|	|	0.00
10.667	0.00	0.00	0.000	O	|	|	|	|	0.00
10.750	0.00	0.00	0.000	O	|	|	|	|	0.00
10.833	0.00	0.00	0.000	O	|	|	|	|	0.00
10.917	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 131
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 3.241 (CFS)
Total volume = 0.881 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Proposed West Parking Lot
Max Q100 out of Detention Tank

Detention Tank Volume and Outflow (Main Site)					
H (ft)	Square Feet	Area (Acre)	Volume (ac-ft)	Total Volume (cf)	Outflow (cfs)
0	6000	0.14	0.000	0	0.0
0.25	6000	0.14	0.034	1500	0.3
0.5	6000	0.14	0.069	3000	0.7
0.75	6000	0.14	0.103	4500	1.5
1	6000	0.14	0.138	6000	1.9
1.25	6000	0.14	0.172	7500	2.3
1.5	6000	0.14	0.207	9000	2.6
1.75	6000	0.14	0.241	10500	2.9
2	6000	0.14	0.275	12000	3.2
2.25	6000	0.14	0.310	13500	3.4
2.5	6000	0.14	0.344	15000	3.7
2.75	6000	0.14	0.379	16500	3.9
3	6000	0.14	0.413	18000	4.1
3.25	6000	0.14	0.448	19500	4.3
3.5	6000	0.14	0.482	21000	4.5
3.75	6000	0.14	0.517	22500	4.6
4	6000	0.14	0.551	24000	4.8
4.25	6000	0.14	0.585	25500	5.0

Detention Tank Volume and Outflow (West Parking Lot)					
H (ft)	Square Feet	Area (Acre)	Volume (ac-ft)	Total Volume (cf)	Outflow (cfs)
0	3200	0.07	0.000	0	0.0
0.25	3200	0.07	0.018	800	0.3
0.5	3200	0.07	0.037	1600	0.7
0.75	3200	0.07	0.055	2400	1.1
1	3200	0.07	0.073	3200	1.4
1.25	3200	0.07	0.092	4000	1.6
1.5	3200	0.07	0.110	4800	1.8
1.75	3200	0.07	0.129	5600	2.0
2	3200	0.07	0.147	6400	2.2
2.25	3200	0.07	0.165	7200	2.3
2.5	3200	0.07	0.184	8000	2.5
2.75	3200	0.07	0.202	8800	2.6
3	3200	0.07	0.220	9600	2.7
3.25	3200	0.07	0.239	10400	2.9
3.5	3200	0.07	0.257	11200	3.0
3.75	3200	0.07	0.275	12000	3.1
4	3200	0.07	0.294	12800	3.2
4.25	3200	0.07	0.312	13600	3.3

Flowmaster 8" outlet rating table

Rating Table for Circular Orifice - 1

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	4.50	ft
Centroid Elevation	4.0	in
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.60	
Diameter	8.0	in

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.25		
0.50	0.7	2.0
0.75	1.1	3.1
1.00	1.4	3.9
1.25	1.6	4.6
1.50	1.8	5.2
1.75	2.0	5.7
2.00	2.2	6.2
2.25	2.3	6.7
2.50	2.5	7.1
2.75	2.6	7.5
3.00	2.7	7.9
3.25	2.9	8.2
3.50	3.0	8.6
3.75	3.1	8.9
4.00	3.2	9.2
4.25	3.3	9.5
4.50	3.4	9.8

Flowmaster 10" outlet rating table

Rating Table for Circular Orifice - 10-inch

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	4.25	ft
Centroid Elevation	5.0	in
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.58	
Diameter	10.0	in

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.25		
0.50	0.7	1.3
0.75	1.5	2.7
1.00	1.9	3.6
1.25	2.3	4.2
1.50	2.6	4.8
1.75	2.9	5.4
2.00	3.2	5.9
2.25	3.4	6.3
2.50	3.7	6.7
2.75	3.9	7.1
3.00	4.1	7.5
3.25	4.3	7.8
3.50	4.5	8.2
3.75	4.6	8.5
4.00	4.8	8.8
4.25	5.0	9.1
4.50	5.1	9.4

Runoff Curve Numbers for AMC II - Used for Unit Hydrograph Analyses

Land use	Hydrologic Soil Group			
	A	B	C	D
Agriculture (without Kharif)	72	81	88	91
Double Crop	62	71	88	91
Plantation	45	53	67	72
Commercial	89	92	94	95
Industrial	81	88	91	93
Urban	89	92	94	95
Village	72	82	87	91
Land with scrub	36	60	73	79
Land without scrub	45	66	77	83
Scrub forest	33	47	64	67
Canal	100	100	100	100
River	97	97	97	97
Reservoir	100	100	100	100
Prosophis	61	70	74	78
Quarry	71	87	89	91

Runoff curve numbers (AMC II) for hydrologic soil covers (Ref-TR 55, 1986).