DRAINAGE STUDY
FOR
ONE ALEXANDRIA NORTH

(PRELIMINARY ENGINEERING)

Job Number 19366

June 22, 2021
Revised: September 10, 2021
Revised: November 5, 2021

RICK™
ENGINEERING COMPANY

DRAINAGE STUDY

FOR

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(PRELIMINARY ENGINEERING)

Job Number 19366

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DRAINAGE STUDY
FOR
ONE ALEXANDRIA NORTH
REVISION PAGE
November 5, 2021

This Drainage Study presents a revision to the September 10 study pursuant to first LDR-Engineering review comments from the City of San Diego. The following text is the City of San Diego's plan check comments (in italicized lettering), immediately followed by Rick Engineering Company's responses.

1st Review – 08/20/2021 (uncleared comments)

10. *Please note, property to the east is owned by the State of California and no additional runoff can be proposed at these locations (POI 2 and 3, drainage study)*

    Detention will be provided upstream of POI 2 within BMP 2A to reduce peak runoff to at or below existing conditions. Grading has been adjusted in Basin 300 to match pre and post areas. Updated hydrology shows that runoff will not increase at POI 3. Refer to appendix E for Detention calculations and Appendix B for detained peak runoff rational method calculations. The updated peak flows are shown on the Post Project Drainage exhibits and listed in the narrative of the Drainage Report.

Drainage Report – 1st Review (uncleared Comments)

32. *Please refer to previous drainage related comments #10-12. Please revise design to reduce or maintain existing drainage discharge values on site for next submittal. Property cannot increase drainage discharge onto eastern property (State of California Property). Please redesign for next submittal.*

    Comment Noted. See response to comment 10. Detention will be provided within BMP2A and grading has been updated in Basin 300 to match pre and post area.

2nd Review – 10/07/2021 (New Issue Comments)

39. *All unchecked comments from the previous review are still standing and need to be addressed.*

    Comment noted. See responses above.

40. *Drainage - Please revise drainage exhibit and report narrative to show and call out proposed mitigated flows.*

    Proposed Mitigated flows have been added to the post project drainage map at POI 2. Detention is not required for POI 1 and 3.

The report has also been revised to reflect the latest site layout and all relevant calculations have been updated.

DRAINAGE STUDY
FOR
ONE ALEXANDRIA NORTH
REVISION PAGE
September 10, 2021

This Drainage Study presents a revision to the June 22, 2021, study pursuant to first LDR-Engineering review comments from the City of San Diego. The following text is the City of San Diego's plan check comments (in italicized lettering), immediately followed by Rick Engineering Company's responses.

11. *The Please note, property to the east is owned by the State of California and no additional runoff can be proposed at these locations (POI 2 and 3, drainage study). (New Issue)*

    Comment noted. A slight increase in area is observed from pre project to post project at POI-3, from 1.3 acres to 1.4 acres, respectively. This increase in acreage (0.1 acres) has resulted in a 0.2 CFS increase in the post-project peak flow compared to the pre-project peak flow and is considered negligible. Preliminary detention calculations have been included in Appendix D for the proposed StormTrap vault unit, which shows a reduction in peak flows at POI-2. Detailed stage-storage, stage-discharge and outlet work sizes will be provided during Final Engineering for all facilities.

32. *Please refer to previous drainage related comments #10-12. Please revise drainage design to reduce or maintain existing drainage discharge values on site for next submittal. Property cannot increase drainage discharge onto eastern property (State of California Property). Please redesign for next submittal. (New Issue)*

    Please see response to comment 10.

The report has also been revised to reflect the latest site layout and all relevant calculations have been updated.

1.0 INTRODUCTION

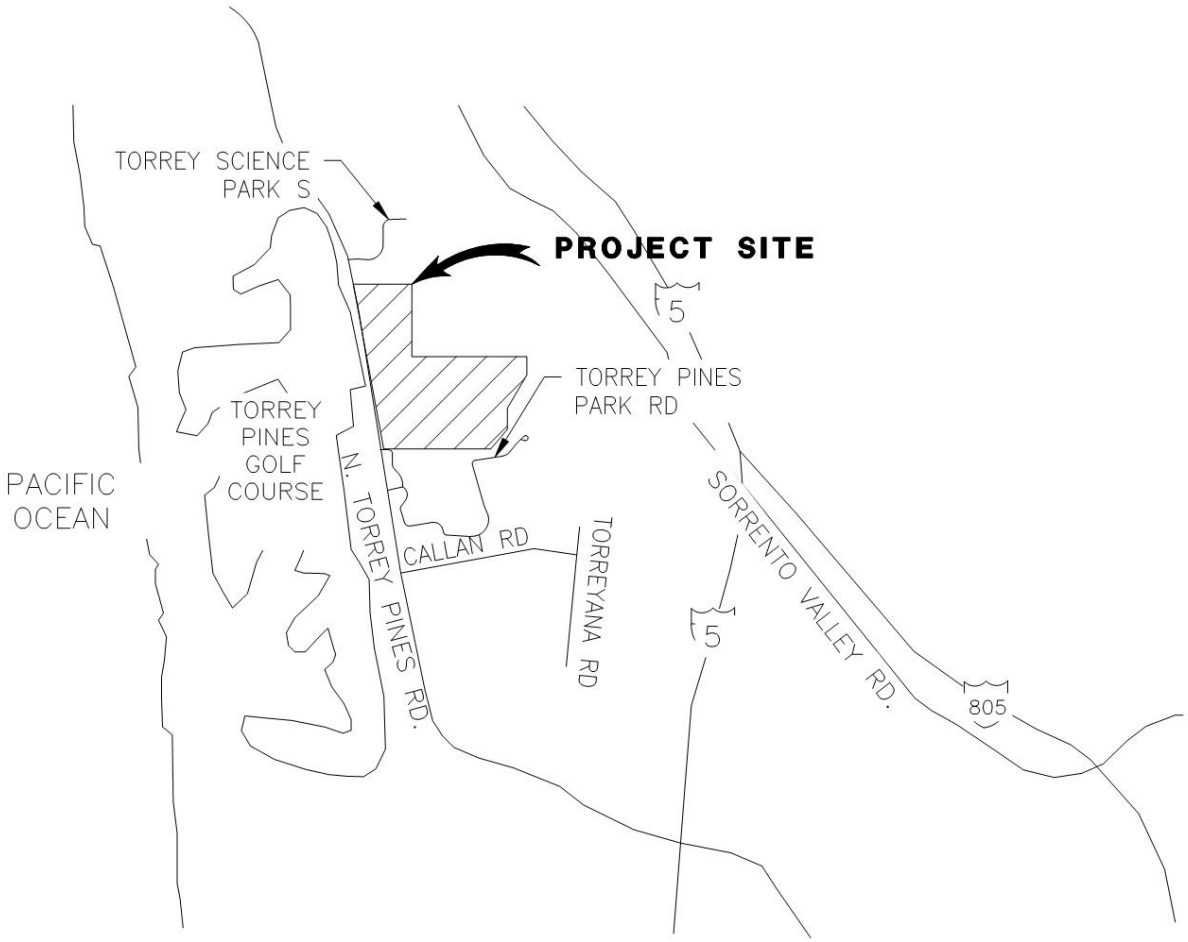
1.1 Project Description

This design report summarizes hydrologic and hydraulic analyses for the proposed One Alexandria North (OAN) Project (herein referred to as the "project"). The project is spread across two parcels within the City of San Diego. The northern parcel is located at 11355 North Torrey Pines Road, La Jolla, California 92037. The southern parcel is located at 11255 North Torrey Pines Road, La Jolla, California 92037. For the location of the project, please refer to the Vicinity Map in Figure 1, at the end of Section 1.0. The proposed redevelopment encompasses approximately 11.4 acres and consists of two (2) new 3-story research and development office buildings, one (1) parking garage structure, several parking lots, an amenity building, and event spaces and decks.

1.2 Water Quality

The project will include Low Impact Development (LID) Site Design, Source Control, Pollutant Control and Hydromodification Management Best Management Practices (BMPs), designed pursuant to the guidelines of the City of San Diego Storm Water Standards, dated October 1, 2018 (herein referred to as the "Storm Water Standards") to achieve water quality treatment and hydromodification management. Please refer to the report titled, "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP): One Alexandria North," dated November 05, 2021 (or any revisions thereafter), prepared by Rick Engineering Company (Job No. 19366), for more information on storm water quality requirements and post-construction BMPs.

Figure 1: Vicinity Map



2.0 HYDROLOGY

Hydrologic conditions for the project area have been analyzed for both pre-project and post-project conditions.

2.1 Methodology

The City of San Diego Drainage Design Manual dated January 2017 requires that the Rational Method be used for hydrologic analysis of a watershed up to but not exceeding 1.0 square-mile (640 acres). The Rational Method computer program developed by Advanced Engineering Software (AES 2003) was used for this study because it satisfies the City of San Diego's design criteria.

2.2 AES Rational Method Computer Model

The AES hydrologic model is developed by creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points. The AES program has the capability to perform calculations for 15 hydrologic processes. These processes are assigned code numbers that appear in the results. The code numbers and their significance are as follows:

Subarea Hydrologic Processes (Codes)

Code 1: Confluence analysis at node
Code 2: Initial subarea analysis
Code 3: Pipe flow travel time (computer-estimate pipe sizes)
Code 4: Pipe flow travel time (user-specified pipe size)
Code 5: Trapezoidal channel travel time
Code 6: Street flow analysis through a subarea
Code 7: User-specified information at a node
Code 8: Addition of the subarea runoff to mainline
Code 9: V-Gutter flow through subarea

Code 10: Copy mainstream data onto memory bank

Code 11: Confluence a memory bank with the mainstream memory

Code 12: Clear a memory bank

Code 13: Clear the mainstream memory

Code 14: Copy a memory bank onto the mainstream memory

Code 15: Hydrologic data bank storage functions

To perform the hydrologic analysis; base information for the study area is required. This information includes the existing drainage facility locations and sizes, existing land uses, flow patterns, drainage basin boundaries, and topographic elevations. Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage exhibits located in the map pockets.

2.3 Design Criteria

The hydrologic conditions were analyzed in accordance with the City of San Diego's design criteria as follows:

Design Storm:	100-year
Runoff Coefficients (1):	
Asphalt/Concrete	C = 0.95
Undisturbed, Natural Terrain	C = 0.45
Soil Type:	D
Rainfall Intensity:	Based on time-intensity criteria per City of San Diego

(1) Weighted runoff coefficients were calculated as required in in Section A.1.2 - Runoff Coefficient of the City of San Diego Drainage Design Manual (January 2017)

2.4 Hydrologic Results

The results of the Modified Rational Method analysis for the pre- and post-project are provided in Appendix A and B of this report, respectively. Please refer to Appendix C for the weighted runoff coefficient backup calculations. Please refer to Map pocket 1 and Map Pocket 2 for the drainage area boundaries, nodes, and areas used in the Modified Rational Method analysis for pre-project and post-project conditions, respectively. A summary of the hydrologic results is provided below in Table 1.

Table 1: Summary of Hydrologic Results

Points of Interest (POI)/ Node Number	Pre-Project			Post-Project Un-detained			Post-Project Detained		
	Area (acres)	Tc (minutes)	Peak Flow, Q_{100} (cfs)	Area (acres)	Tc (minutes)	Peak Flow, Q_{100} (cfs)	Area (acres)	Tc (minutes)	Peak Flow, Q_{100} (cfs)
POI-1 (Node 110)	2.5	8.5	7.3	2.5	9.3	7.4	N/A		
POI-2 (Node 220)	8.4	8.2	20.7	8.4	8.5	22.9	8.4	14.5	10.3
POI-3 (Node 310)	0.5	6.0	1.2	0.5	5.9	1.2	N/A		

Pre-Project Condition

The onsite area is approximately 11.4 acres. In the pre-project condition, the project has three (3) major drainage basins namely, Basin 100, 200 and 300. Basin 100 encompasses the northerly portion (approximately 2.5 acres) of the project site and generally flows east. Basin 1 has an existing on-site inlet and storm drain network that confluences at POI-1 (Node 110) by the eastern perimeter of the site and ultimately outfalls further downstream to an unnamed canyon east of the site. This canyon is tributary to Soledad Canyon and ultimately drains to the Pacific Ocean through Los Penasquitos Creek.

Basin 200 encompasses the southerly portion (approximately 8.4 acres) of the project site and generally flows east. Like Basin 100, Basin 200 has an existing on-site inlet and storm drain network that confluences at POI-2 (Node 220) by the eastern perimeter of the site and ultimately outfalls further downstream to a different unnamed canyon east of the site. This canyon is tributary to Soledad Canyon and ultimately drains to the Pacific Ocean through Los Penasquitos Creek.

Basin 300 encompasses approximately 0.5 acres and lies just north of Basin 200 in the southern parcel of the project. Runoff generally sheet flows along the slope and gets intercepted by a brow ditch that conveys to a Type F Catch Basin at POI-3 (Node 310) at the eastern perimeter of the site. The Type F Catch Basin outfalls further downstream to an unnamed canyon east of the site. This canyon is tributary to Soledad Canyon and ultimately drains to the Pacific Ocean through Los Penasquitos Creek.

Post-Project Condition

In the post-project condition, the drainage characteristics will remain like the pre-project condition. However, the percentage imperviousness between pre- and post-project for Basin 100 is approximately 66% and 71%, respectively. The increase in percent imperviousness results in a 0.1 CFS increase in the post-project peak flow compared to pre-project peak flow and is considered negligible.

The percentage imperviousness between pre- and post-project for Basin 200 is approximately 39% and 56%, respectively. The increase in percent imperviousness results in a 2.2 CFS increase in the post-project peak flow compared to pre-project peak flow. Hence, the project proposes detention for the 100-year 6-hour storm event via an underground detention vault, BMP 2A, in Basin 200 to attenuate the peak flow back to pre-project condition. Preliminary detention sizing was done using Hec1.

Drainage boundaries in Basin 300 will be preserved and land use will remain unchanged. The area of the basin is 0.5 acres and impervious cover is approximately 25%. No increase in peak flow is expected as result of the project.

The project does not propose to impact any jurisdiction water, or wetlands. As such, it is anticipated that the project will not be subject to requirements under the Federal Clean Water Act (CWA) Section 401 or 404.

3.0 HYDRAULICS

3.1 Hydraulic Methodology and Criteria

The 100-year pre-project and post-project peak flow rates determined using the Modified Rational Method were used to evaluate the potential impacts to existing storm drain system due to the project improvements. The 100-year post-project peak flow rates were also used to size the onsite storm drain system.

3.2 Storm Drain Sizing

Pipe sizes were evaluated using Manning's equation:

$Q = (1.486/n)\ A\ R^{2/3}\ S^{1/2}$

Where:

Q = discharge (cfs)

n = Manning coefficient of roughness

A = Cross-sectional Area of flow (sq. ft.)

R = Hydraulic radius (ft.) = A/WP (WP = Wetted Perimeter)

S = Slope of pipe (ft./ft.)

The Manning's roughness coefficient "n" used for the hydraulic calculations for RCP and PVC pipes is 0.013.

3.3 Storm Drain Evaluation Results

Normal depth hydraulic calculations were performed to size the onsite storm drains. The pipe sizes were evaluated based on the AES rational method peak flow rates with a 30% bump up sizing factor and an assumed minimum pipe slope of 0.5%. A summary of the performed normal depth hydraulic analyses is provided in Appendix D in the form of a sizing matrix table.

4.0 DETENTION ANALYSES

Detention is provided within BMP 2A to bring the undetained 100-year peak discharge below or equal to pre-project conditions at POI 2. The detention analysis calculates the flow attenuation provided by the BMP. Results from the HEC-1 detention analysis was then used to create a new detained rational method AES run to demonstrate mitigation has been met at POI 2.

The sizing of a detention facility requires an inflow hydrograph. As the modified rational method only yields a peak discharge and time of concentration a hydrograph synthesizing procedure was used based on the 100-yr 6-hr storm precipitation, basin runoff coefficient, peak flow, and time of concentration. The hydrograph has 2/3 of the volume before the peak flow and 1/3 of the volume after the peak.

The 100-year hydrographs and preliminary elevation-storage-outflow rating curves were used in the HEC-1 to perform routing calculations for the storage vault, and to determine the preliminary 100-year detention volumes required for the vault to reduce the post-project peak discharge rate back to the pre-project peak discharge rate.

Based on the mitigated post-developed results, the proposed vault provides storage that reduces peak flows out of BMP 2A from 20.5 CFS to 8.3 CFS at Node 230 and 22.9 CFS to 10.3 CFS at POI 2. Refer to Appendix E for preliminary detention calculations and results.

5.0 CONCLUSION

This drainage report presents the hydrologic and hydraulic calculations in support of the One Alexandria North project. The 100-year pre- and post-project condition hydrologic analyses have been performed for the total tributary area to three (3) points of interests. The 100-year post-project peak flow rates were utilized to size the proposed drainage system. The peak discharge rates were determined using the Modified Rational Method based on the hydrologic methodology and criteria described in the City of San Diego, Drainage Design Manual January 2017 edition.

The project in general has been designed to improve the collection and conveyance of storm water runoff. The difference in the pre- and post-project 100-year peak flow is equal to 0.1 CFS for Basin 100 and this is considered negligible. The project proposes detention within BMP 2A for the 100-year, 6-hour storm event in Basin 200 so that the post-project peak flows are mitigated below pre-project conditions. Preliminary Detention calculations have been included for the TM submittal; detailed detention analysis will be included in final engineering. The project is not anticipated to result in any adverse impacts to downstream drainage facilities or adjacent properties. Normal Depth hydraulic calculations were performed to size the onsite storm drain system.

Post-project runoff will be treated via a network of storm water management features, designed pursuant to the guidelines of the City of San Diego Storm Water Standards, dated October 1, 2018. Please refer to the report titled, "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP): One Alexandria North," dated November 5, 2021 (or any revisions thereafter), prepared by Rick Engineering Company (Job No. 19366), for more information on storm water quality requirements and post-construction BMPs.

APPENDIX A

Modified Rational Method Analyses (100-year, 6-hour)
[Pre-Project]

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2012 Advanced Engineering Software (aes)
              Ver. 18.2 Release Date: 05/08/2012  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                  5620 Friars Rd
                                San Diego CA  92110
                           619-291-0707  Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* JN-19366    ONE ALEXANDRIA NORTH                                       *
* 100-YR 6-HR                                                            *
* BASIN 100     PRE-PROJECT                                              *
 **************************************************************************

  FILE NAME: AN100E00.RAT
  TIME/DATE OF STUDY: 22:14 06/17/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   13.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.10 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    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    64.00
  UPSTREAM ELEVATION(FEET) =    437.50
  DOWNSTREAM ELEVATION(FEET) =    433.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.082
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.384
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.50  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   133.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.66
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.19   Tc(MIN.) =    6.27
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.159
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.25
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.59
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   428.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =    87.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.43
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.54
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =     284.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.108
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6871
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.56
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.98
  TC(MIN.) =    6.54

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.98
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    7.72
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =     592.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.884
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7069
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.70
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       3.57
  TC(MIN.) =    7.72

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    110.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.57
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    8.48
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.738
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6727
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       3.77
  TC(MIN.) =    8.48

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.738
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7691
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.84
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       6.61
  TC(MIN.) =    8.48

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.738
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7764
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.64
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       7.26
  TC(MIN.) =    8.48
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =      8.48
  PEAK FLOW RATE(CFS)   =       7.26
============================================================================
============================================================================
  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 1982-2012 Advanced Engineering Software (aes)
              Ver. 18.2 Release Date: 05/08/2012  License ID 1261

                              Analysis prepared by:

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                                San Diego CA  92110
                           619-291-0707  Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* JN-19366      ONE ALEXANDRIA NORTH                                     *
* 100-YR 6-HR                                                            *
* BASIN 200       PRE-PROJECT                                            *
 **************************************************************************

  FILE NAME: AN200E00.RAT
  TIME/DATE OF STUDY: 22:38 06/17/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   24.0     19.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.10 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    200.00 TO NODE    202.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.00  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   282.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    6.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.149
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.735
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    3.03
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.60
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     282.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =   194.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.35
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.084
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6433
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.43
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.73
  TC(MIN.) =    6.66

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   393.00
  FLOW LENGTH(FEET) =   122.00   MANNING'S N =  0.013
```

```
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.73
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    6.97
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =     598.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7035
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.85
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       6.51
  TC(MIN.) =    6.97

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   393.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.51
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    209.00 =     702.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    359.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0109
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.858
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .5100
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.90
  AVERAGE FLOW DEPTH(FEET) =   0.28   TRAVEL TIME(MIN.) =   0.81
  Tc(MIN.) =    7.85
  SUBAREA AREA(ACRES) =     0.60       SUBAREA RUNOFF(CFS) =    1.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.663
  TOTAL AREA(ACRES) =        2.9         PEAK FLOW RATE(CFS) =       7.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     794.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    359.00  DOWNSTREAM(FEET) =    355.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    98.00   CHANNEL SLOPE =  0.0408
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.823
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.90
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   0.18
  Tc(MIN.) =    8.04
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.34
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       7.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   8.86
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     892.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 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.) =    8.04
  RAINFALL INTENSITY(INCH/HR) =   3.82
  TOTAL STREAM AREA(ACRES) =     3.10
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.70

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    252.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    91.00
  UPSTREAM ELEVATION(FEET) =    436.00
  DOWNSTREAM ELEVATION(FEET) =    429.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.654
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.276
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  429.00  DOWNSTREAM ELEVATION(FEET) =  419.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.19
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    7.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.959
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.601
```

```
  SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    3.86
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.71
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    254.00 =     424.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    256.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   415.00  DOWNSTREAM(FEET) =   401.00
  FLOW LENGTH(FEET) =   332.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.01
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.04
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    7.93
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    256.00 =     756.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.843
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6707
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.04
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =       6.96
  TC(MIN.) =    7.93

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.843
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6870
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.75
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       8.71
```

```
  TC(MIN.) =    7.93

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.843
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7089
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       9.81
  TC(MIN.) =    7.93

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    258.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.00  DOWNSTREAM(FEET) =   383.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.81
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    258.00 =     956.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.801
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6840
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      10.40
  TC(MIN.) =    8.15

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.801
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6977
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.00
  TOTAL AREA(ACRES) =        4.3   TOTAL RUNOFF(CFS) =      11.40
  TC(MIN.) =    8.15

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   383.00  DOWNSTREAM(FEET) =   355.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.40
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    220.00 =    1046.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.789
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6509
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.71
  TOTAL AREA(ACRES) =        5.3   TOTAL RUNOFF(CFS) =      13.07
  TC(MIN.) =    8.21

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 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.) =    8.21
  RAINFALL INTENSITY(INCH/HR) =   3.79
```

```
  TOTAL STREAM AREA(ACRES) =     5.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.70     8.04        3.823          3.10
      2       13.07     8.21        3.789          5.30

  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       20.49     8.04       3.823
      2       20.71     8.21       3.789

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.71   Tc(MIN.) =    8.21
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    220.00 =    1046.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.4  TC(MIN.) =      8.21
  PEAK FLOW RATE(CFS)   =      20.71
============================================================================
============================================================================
  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. 18.2 Release Date: 05/08/2012  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                  5620 Friars Rd
                                San Diego CA  92110
                           619-291-0707  Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* JN-19366    ONE ALEXANDRIA NORTH                                       *
* 100-YR 6-HR                                                            *
* BASIN 300     PRE-PROJECT                                              *
 **************************************************************************

  FILE NAME: AN300E00.RAT
  TIME/DATE OF STUDY: 22:59 06/17/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   13.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.10 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    301.00 TO NODE    305.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    368.00  DOWNSTREAM(FEET) =    357.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   277.00   CHANNEL SLOPE =  0.0397
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.218
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.83
  AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   0.96
  Tc(MIN.) =    5.96
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    1.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   5.49
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    310.00 =     554.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.96
  PEAK FLOW RATE(CFS)   =       1.20
================================================================================
================================================================================
  END OF RATIONAL METHD ANALYSIS
```

APPENDIX B

Modified Rational Method Analyses (100-year, 6-hour)
[Post-Project]

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                  5620 Friars Rd
                                San Diego CA  92110
                           619-291-0707  Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* JN-19366     ONE ALEXANDRIA NORTH                                      *
* 100-YEAR 6-HR                                                          *
* BASIN 100       POST-PROJECT                                           *
 **************************************************************************

  FILE NAME: AN100P00.RAT
  TIME/DATE OF STUDY: 01:33 06/18/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    435.00
  DOWNSTREAM ELEVATION(FEET) =    434.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.020
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   202.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8929
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.17
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.38
  TC(MIN.) =    8.16

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   419.00
  FLOW LENGTH(FEET) =   154.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.38
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    8.48
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =     406.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.739
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8273
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.30
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       4.64
  TC(MIN.) =    8.48

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   419.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.64
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    8.65
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =     486.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.706
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7563
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.73
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       5.33
  TC(MIN.) =    8.65

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.706
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8028
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.11
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       7.44
  TC(MIN.) =    8.65

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   416.00
  FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.44
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    9.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     681.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =      9.32
  PEAK FLOW RATE(CFS)   =       7.44
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                  5620 Friars Rd
                                San Diego CA  92110
                           619-291-0707  Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* JN-19366      ONE ALEXANDRIA NORTH                                     *
* 100-YR 6-HR                                                            *
* BASIN 200      POST-PROJECT                                            *
 **************************************************************************

  FILE NAME: AN200P00.RAT
  TIME/DATE OF STUDY: 01:22 06/18/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   14.0      9.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   12.0      7.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.10 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    200.00 TO NODE    201.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  430.00  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   158.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.49   Tc(MIN.) =    5.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.308
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.658
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.18   HALFSTREET FLOOD WIDTH(FEET) =   2.57
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     158.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.70
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    6.02
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     373.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.206
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7721
  SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    6.13
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.79
  TC(MIN.) =    6.02

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    88.00   MANNING'S N =  0.013
```

```
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.79
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.14
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     461.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.183
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7497
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =        3.0   TOTAL RUNOFF(CFS) =       9.41
  TC(MIN.) =    6.14

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.41
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =     694.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =    6.46
  RAINFALL INTENSITY(INCH/HR) =   4.12
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.41
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.00
  UPSTREAM ELEVATION(FEET) =    436.00
  DOWNSTREAM ELEVATION(FEET) =    430.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.129
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.24
  PIPE TRAVEL TIME(MIN.) =   2.03    Tc(MIN.) =    7.16
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     513.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.990
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6567
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.14
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.36
  TC(MIN.) =    7.16

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.990
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7614
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.90
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       4.25
  TC(MIN.) =    7.16

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =   216.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.25
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.49
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =     729.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.928
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7850
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.98
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.17
  TC(MIN.) =    7.49

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   344.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.17
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    1073.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =    8.22
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =     2.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.41     6.46        4.123          3.00
      2        6.17     8.22        3.787          2.00

  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       14.25     6.46       4.123
      2       14.81     8.22       3.787

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.81   Tc(MIN.) =    8.22
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    1073.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.787
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7848
```

```
  SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    6.04
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      20.51
  TC(MIN.) =    8.22

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    232.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.51
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1223.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.768
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7649
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =        7.4   TOTAL RUNOFF(CFS) =      21.33
  TC(MIN.) =    8.33

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.00  DOWNSTREAM(FEET) =   347.58
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.33
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    220.00 =    1368.00 FEET.

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

```
  FLOW PROCESS FROM NODE    233.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.738
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7503
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.72
  TOTAL AREA(ACRES) =        7.8   TOTAL RUNOFF(CFS) =      21.87
  TC(MIN.) =    8.49

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.738
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7288
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        8.4   TOTAL RUNOFF(CFS) =      22.88
  TC(MIN.) =    8.49
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.4  TC(MIN.) =      8.49
  PEAK FLOW RATE(CFS)   =      22.88
============================================================================
============================================================================
  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 1261

                            Analysis prepared by:

                           RICK ENGINEERING COMPANY
                               5620 Friars Road
                          San Diego, California 92110
                        619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* JN-19366      ONE ALEXANDRIA NORTH                                     *
* 100-YR 6-HR                                                            *
* BASIN 200        POST PROJECT DETAINED CONDITION                       *
 **************************************************************************

  FILE NAME: AN200D00.RAT
  TIME/DATE OF STUDY: 13:56 11/04/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   14.0      9.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   12.0      7.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.10 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    200.00 TO NODE    201.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  430.00  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   158.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.49   Tc(MIN.) =    5.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.308
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.658
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.18   HALFSTREET FLOOD WIDTH(FEET) =   2.57
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     158.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.70
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    6.02
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     373.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.206
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7721
  SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    6.13
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.79
  TC(MIN.) =    6.02

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    88.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.79
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.14
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     461.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.183
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7497
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =        3.0   TOTAL RUNOFF(CFS) =       9.41
  TC(MIN.) =    6.14

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    230.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.41
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =     694.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =    6.46
  RAINFALL INTENSITY(INCH/HR) =   4.12
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.41

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.00
  UPSTREAM ELEVATION(FEET) =    436.00
  DOWNSTREAM ELEVATION(FEET) =    430.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.129
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.24
  PIPE TRAVEL TIME(MIN.) =   2.03    Tc(MIN.) =    7.16
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     513.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.990
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6567
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.14
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.36
  TC(MIN.) =    7.16

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.990
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7614
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.90
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       4.25
  TC(MIN.) =    7.16

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =   216.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.25
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.49
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =     729.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.928
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7850
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.98
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.17
  TC(MIN.) =    7.49
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   344.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.17
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    1073.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =    8.22
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =     2.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.41     6.46        4.123          3.00
      2        6.17     8.22        3.787          2.00

  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       14.25     6.46       4.123
      2       14.81     8.22       3.787

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.81   Tc(MIN.) =    8.22
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    1073.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.787
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7848
  SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    6.04
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      20.51
  TC(MIN.) =    8.22

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.22   RAIN INTENSITY(INCH/HOUR) =  2.99
  TOTAL AREA(ACRES) =     6.90   TOTAL RUNOFF(CFS) =      8.31

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    232.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   14.35
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1223.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.971
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4092
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.73
  TOTAL AREA(ACRES) =        7.4   TOTAL RUNOFF(CFS) =       9.00
  TC(MIN.) =   14.35

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.00  DOWNSTREAM(FEET) =   347.58
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.00
```

```
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   14.54
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    220.00 =    1368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.950
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4128
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        7.8   TOTAL RUNOFF(CFS) =       9.50
  TC(MIN.) =   14.54

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.950
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4155
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =        8.4   TOTAL RUNOFF(CFS) =      10.30
  TC(MIN.) =   14.54
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.4  TC(MIN.) =     14.54
  PEAK FLOW RATE(CFS)   =      10.30
============================================================================
============================================================================
  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 1261

                             Analysis prepared by:

                           RICK ENGINEERING COMPANY
                               5620 Friars Road
                          San Diego, California 92110
                        619-291-0707   Fax 619-291-4165

 ************************ DESCRIPTION OF STUDY *************************
* JN-19366    ONE ALEXANDRIA NORTH                                      *
* 100-YR 6-HR                                                           *
* BASIN 300    POST-PROJECT                                             *
 *************************************************************************

  FILE NAME: AN300P00.RAT
  TIME/DATE OF STUDY: 10:30 11/04/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   13.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.10 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    301.00 TO NODE    305.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.50  DOWNSTREAM(FEET) =    357.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00   CHANNEL SLOPE =  0.0672
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.224
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.77
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =    5.92
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    1.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    310.00 =     320.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.92
  PEAK FLOW RATE(CFS)   =       1.20
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

Weighted Runoff Coefficient Backup Calculations

One Alexandria North
J-19366
6/18/2021

Pre-Project Weighted Runoff Coefficient Backup

	Undisturbed Natural Terrain	Asphalt/ Concrete
Runoff Coefficient for 'D' Soils[1]	0.45	0.95
% Imperviousness	0%	100%

Basin	Subbasin	Area (Acres)	Area (SF)	Impervious area (SF)	% Impervious	Runoff Coefficent
100	102	0.1	5,573	0	0%	0.45
	104	0.4	18,611	11,341	61%	0.75
	106	0.2	10,238	4,639	45%	0.68
	108	0.5	23,626	13,107	55%	0.73
	110	0.2	6,861	0	0%	0.45
	110A	0.8	36,336	36,272	100%	0.95
	110B	0.2	8,227	6,775	82%	0.86
	Total	2.5	109,472	72,134	66%	0.779
200	202	0.1	5,083	3,318	65%	0.78
	204	1.0	43,293	24,590	57%	0.73
	206	0.7	32,285	3,421	11%	0.50
	208	0.5	20,139	18,761	93%	0.92
	210	0.6	28,020	3,123	11%	0.51
	220A	0.2	8,489	0	0%	0.45
	252	0.1	5,258	0	0%	0.45
	254	1.6	69,603	22,450	32%	0.61
	256	1.0	42,702	29,194	68%	0.79
	256A	0.6	27,032	17,014	63%	0.76
	256B	0.3	12,171	12,151	100%	0.95
	258A	0.4	16,177	182	1%	0.46
	258B	0.3	11,140	9,501	85%	0.88
	220	1.0	42,495	0	0%	0.45
	Total	8.4	363,887	143,705	39%	0.65
300	305	0.1	4354	0	0%	0.45
	310	0.4	19193	5932	31%	0.60
	Total	0.5	23547	5932	25%	0.58

Notes:

1. The runoff coefficients for each land use are based on guidance provided in the City of San Diego Drainage Design Manual (January 2017) and are modeled based on type 'D' soils.

One Alexandria North
J-19366
11/4/2021

Post-Project Weighted Runoff Coefficient Back-up

	Undisturbed Natural Terrain	Asphalt/Concrete
Runoff Coefficient for 'D' Soils[1]	0.45	0.95
% Imperviousness	0%	100%

Basin	U/S Node	D/S Node	AES Code	Area by Land Use		Weighted Runoff Coefficient
				Undisturbed Natural Terrain	Asphalt/Concrete	
100	100	102	2	0.08	0.02	0.55
	103	104	8	0.00	0.60	0.95
	105	106	8	0.29	0.51	0.77
	107	109	8	0.37	0.03	0.49
	108	109	8	0.00	0.60	0.95
Total				0.74	1.76	0.81
200	200	201	2	0.06	0.04	0.65
	201	202	6	0.29	0.21	0.66
	203	204	8	0.51	1.29	0.81
	205	206	8	0.35	0.25	0.66
	210	211	2	0.08	0.02	0.55
	212	214	8	0.46	0.34	0.67
	213	214	8	0.00	0.50	0.95
	215	216	8	0.14	0.46	0.84
	218	230	8	0.43	1.47	0.84
	231	232	8	0.46	0.04	0.49
	233	220	8	0.38	0.02	0.48
	234	220	8	0.60	0.00	0.45
Total				3.76	4.64	0.73
300	301	305	2	0.09	0.00	0.45
	305	310	5	0.33	0.13	0.60
Total				0.42	0.13	0.57

Notes:

1. The runoff coefficients for each land use are based on guidance provided in the City of San Diego Drainage Design Manual (January 2017) and are modeled based on type 'D' soils.

APPENDIX D

Normal Depth Storm Drain Sizing Matrix
[Post-Project]

One Alexandria North Normal Depth Pipe Sizing
JN-19366
6/18/2021

Storm Drain Size

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

Manning's n: 0.013

Sizing Factor (%): 30

	Slope at:	0.5%		1.0%		2.0%		3.0%	
Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
2.0	2.6	1.01	12"	0.89	12"	0.78	10"	0.72	10"
5.0	6.5	1.43	18"	1.25	18"	1.10	18"	1.02	18"
7.5	9.8	1.66	24"	1.46	18"	1.28	18"	1.19	18"
10.0	13.0	1.85	24"	1.62	24"	1.43	18"	1.32	18"
15.0	19.5	2.15	30"	1.89	24"	1.66	24"	1.54	24"
20.0	26.0	2.40	30"	2.11	30"	1.85	24"	1.71	24"
25.0	32.5	2.61	36"	2.29	30"	2.01	24"	1.86	24"
30.0	39.0	2.79	36"	2.45	30"	2.15	30"	1.99	24"
35.0	45.5	2.96	36"	2.60	36"	2.28	30"	2.11	30"
40.0	52.0	3.11	42"	2.73	36"	2.40	30"	2.22	30"
50.0	65.0	3.38	42"	2.97	36"	2.61	36"	2.42	30"
60.0	78.0	3.62	48"	3.18	42"	2.79	36"	2.59	36"
70.0	91.0	3.83	48"	3.37	42"	2.96	36"	2.74	36"
80.0	104.0	4.03	54"	3.54	48"	3.11	42"	2.88	36"
90.0	117.0	4.21	54"	3.70	48"	3.25	42"	3.01	42"
110.0	143.0	4.54	60"	3.99	48"	3.50	42"	3.25	42"
145.0	188.5	5.04	72"	4.42	54"	3.89	48"	3.60	48"
170.0	221.0	5.35	72"	4.70	60"	4.12	54"	3.82	48"
240.0	312.0	6.09	84"	5.35	72"	4.69	60"	4.35	54"
350.0	455.0	7.01	96"	6.16	84"	5.41	72"	5.01	72"

Note:

1. "cfs" = cubic feet per second.

2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor.

APPENDIX E

Detention Calculations

Preliminary Detention Calculations Summary
BMP-2A - StormTrap Vault

Pre-Project

Pre-Project Q100 at POI 2	20.71	cfs

Post-Project

Inflow Hydrograph to BMP 2A	$Q100_{undetained}$	20.51	cfs
	Watershed Area	6.9	acres
	Tc	8.22	min

Storm Trap Water Storage Prov:	32,505.81	cubic feet
	0.75	ac-ft
Storm Trap Water Storage Prov:	10.83	ft

HEC 1 - Vault Capacity Results		
Peak Flow Out	8.31	cfs
Max Stage	4.34	ft

Post-Project Q100 at POI 2	10.30	cfs

HEC1 INPUT FILE FOR BMP 2A

```
*DIAGRAM
*FREE
ID BMP2B VAULT HYDROMOD & 100-YR DETENTION
ID JN-19366 ONE ALEXANDRIA NORTH
IT 1 01JAN90 1200 600
IO 5 0
KK OAN_Vault_1104.hc1
KM RUN DATE   11/4/2021
KM RATIONAL METHOD HYDROGRAPH PROGRAM
KM COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
KM 6HR RAINFALL IS 2.3 INCHES
KM RATIONAL METHOD RUNOFF COEFFICIENT IS 0.76
KM RATIONAL METHOD TIME OF CONCENTRATION IS 8 MIN.
KM FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
KM IT 2 01JAN90 1200 200
BA 0.0108
IN 8 01JAN90 1156
QI 0  0.7  0.7  0.8  0.8  0.8  0.8  0.8  0.8  0.9
QI 0.9  0.9  1  1  1  1.1  1.1  1.2  1.2  1.3
QI 1.4  1.5  1.6  1.7  1.8  2.1  2.3  2.8  3.2  4.6
QI 9.5  20.51  3.7  2.5  2  1.6  1.4  1.3  1.2  1.1
QI 1  0.9  0.9  0.8  0.8  0.7  0  0  0  0
QI 0  0  0  0  0  0  0
KK DETAIN
KO 2 2 0 0 21
RS 1 STOR -1
SV 0 0.75
SQ 0 20.7
SE 0 10.8
ZZ
```

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                    *          609 SECOND STREET           *
 *                                      *                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   04NOV21  TIME  11:22:56  *                    *           (916) 756-1104             *
 *                                      *                    *                                      *
 ****************************************                    ****************************************
```

HEC1 OUTPUT FILE
FOR BMP 2A

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


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

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


1                                                  HEC-1 INPUT                                                  PAGE  1

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

                         *DIAGRAM
 *** FREE ***
               1         ID   BMP2B VAULT HYDROMOD & 100-YR DETENTION
               2         ID   JN-19366 ONE ALEXANDRIA NORTH
               3         IT       1 01JAN90    1200     600
               4         IO       5       0

               5         KKOAN_Vault_1104.hc1
               6         KM   RUN DATE   11/4/2021
               7         KM   RATIONAL METHOD HYDROGRAPH PROGRAM
               8         KM   COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
               9         KM   6HR RAINFALL IS 2.3 INCHES
              10         KM   RATIONAL METHOD RUNOFF COEFFICIENT IS 0.76
              11         KM   RATIONAL METHOD TIME OF CONCENTRATION IS 8 MIN.
              12         KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
              13         KM   IT 2 01JAN90 1200 200
              14         BA  0.0108
              15         IN       8 01JAN90    1156
              16         QI       0     0.7     0.7     0.8     0.8     0.8     0.8     0.8     0.8     0.9
              17         QI     0.9     0.9       1       1       1     1.1     1.1     1.2     1.2     1.3
              18         QI     1.4     1.5     1.6     1.7     1.8     2.1     2.3     2.8     3.2     4.6
              19         QI     9.5   20.51     3.7     2.5       2     1.6     1.4     1.3     1.2     1.1
              20         QI       1     0.9     0.9     0.8     0.8     0.7       0       0       0       0
              21         QI       0       0       0       0       0       0       0

              22         KK  DETAIN
              23         KO       2       2       0       0      21
              24         RS       1    STOR      -1
              25         SV       0    0.75
              26         SQ       0    20.7
              27         SE       0    10.8
              28         ZZ
1
                   SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     5    OAN_Vaul
                V
                V
    22      DETAIN

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                    ****************************************
```

```
*                                     *                                                    *                                     *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                                                    *    U.S. ARMY CORPS OF ENGINEERS     *
*              JUN   1998             *                                                    *    HYDROLOGIC ENGINEERING CENTER    *
*            VERSION 4.1              *                                                    *          609 SECOND STREET          *
*                                     *                                                    *       DAVIS, CALIFORNIA 95616       *
*  RUN DATE   04NOV21  TIME  11:22:56 *                                                    *           (916) 756-1104            *
*                                     *                                                    *                                     *
***************************************                                                    ***************************************
```

BMP2B VAULT HYDROMOD & 100-YR DETENTION
JN-19366 ONE ALEXANDRIA NORTH

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

    IT          HYDROGRAPH TIME DATA
                       NMIN           1  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         600  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1JAN90  ENDING DATE
                     NDTIME        2159  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .02 HOURS
                       TOTAL TIME BASE    9.98 HOURS

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


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


           **************
           *            *
  22 KK    *    DETAIN  *
           *            *
           **************

  23 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           2  PRINT CONTROL
                      IPLOT           2  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         600  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .017  TIME INTERVAL IN HOURS


             HYDROGRAPH ROUTING DATA

  24 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        STOR  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

  25 SV            STORAGE          .0        .8

  26 SQ          DISCHARGE          0.       21.

  27 SE          ELEVATION         .00     10.80

                                                  ***

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

                                          HYDROGRAPH AT STATION   DETAIN
```

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	0.	.0	.2	1	JAN	1520	201	2.	.1	.9	1	JAN	1840	401	0.	.0	.1
1	JAN	1201	2	0.	.0	.2	1	JAN	1521	202	2.	.1	.9	1	JAN	1841	402	0.	.0	.1
1	JAN	1202	3	0.	.0	.2	1	JAN	1522	203	2.	.1	.9	1	JAN	1842	403	0.	.0	.1
1	JAN	1203	4	0.	.0	.2	1	JAN	1523	204	2.	.1	.9	1	JAN	1843	404	0.	.0	.1
1	JAN	1204	5	0.	.0	.2	1	JAN	1524	205	2.	.1	.9	1	JAN	1844	405	0.	.0	.1
1	JAN	1205	6	0.	.0	.2	1	JAN	1525	206	2.	.1	.9	1	JAN	1845	406	0.	.0	.1
1	JAN	1206	7	0.	.0	.2	1	JAN	1526	207	2.	.1	.9	1	JAN	1846	407	0.	.0	.1
1	JAN	1207	8	0.	.0	.2	1	JAN	1527	208	2.	.1	1.0	1	JAN	1847	408	0.	.0	.1
1	JAN	1208	9	0.	.0	.2	1	JAN	1528	209	2.	.1	1.0	1	JAN	1848	409	0.	.0	.1
1	JAN	1209	10	0.	.0	.2	1	JAN	1529	210	2.	.1	1.0	1	JAN	1849	410	0.	.0	.1
1	JAN	1210	11	0.	.0	.2	1	JAN	1530	211	2.	.1	1.0	1	JAN	1850	411	0.	.0	.1
1	JAN	1211	12	0.	.0	.2	1	JAN	1531	212	2.	.1	1.0	1	JAN	1851	412	0.	.0	.1
1	JAN	1212	13	0.	.0	.2	1	JAN	1532	213	2.	.1	1.0	1	JAN	1852	413	0.	.0	.1
1	JAN	1213	14	0.	.0	.2	1	JAN	1533	214	2.	.1	1.1	1	JAN	1853	414	0.	.0	.1
1	JAN	1214	15	0.	.0	.2	1	JAN	1534	215	2.	.1	1.1	1	JAN	1854	415	0.	.0	.1
1	JAN	1215	16	0.	.0	.3	1	JAN	1535	216	2.	.1	1.1	1	JAN	1855	416	0.	.0	.1
1	JAN	1216	17	0.	.0	.3	1	JAN	1536	217	2.	.1	1.1	1	JAN	1856	417	0.	.0	.1
1	JAN	1217	18	1.	.0	.3	1	JAN	1537	218	2.	.1	1.1	1	JAN	1857	418	0.	.0	.1
1	JAN	1218	19	1.	.0	.3	1	JAN	1538	219	2.	.1	1.1	1	JAN	1858	419	0.	.0	.1
1	JAN	1219	20	1.	.0	.3	1	JAN	1539	220	2.	.1	1.2	1	JAN	1859	420	0.	.0	.1
1	JAN	1220	21	1.	.0	.3	1	JAN	1540	221	2.	.1	1.2	1	JAN	1900	421	0.	.0	.1
1	JAN	1221	22	1.	.0	.3	1	JAN	1541	222	2.	.1	1.2	1	JAN	1901	422	0.	.0	.1
1	JAN	1222	23	1.	.0	.3	1	JAN	1542	223	2.	.1	1.2	1	JAN	1902	423	0.	.0	.1
1	JAN	1223	24	1.	.0	.3	1	JAN	1543	224	2.	.1	1.2	1	JAN	1903	424	0.	.0	.0
1	JAN	1224	25	1.	.0	.3	1	JAN	1544	225	2.	.1	1.3	1	JAN	1904	425	0.	.0	.0
1	JAN	1225	26	1.	.0	.3	1	JAN	1545	226	2.	.1	1.3	1	JAN	1905	426	0.	.0	.0
1	JAN	1226	27	1.	.0	.3	1	JAN	1546	227	3.	.1	1.3	1	JAN	1906	427	0.	.0	.0
1	JAN	1227	28	1.	.0	.3	1	JAN	1547	228	3.	.1	1.4	1	JAN	1907	428	0.	.0	.0
1	JAN	1228	29	1.	.0	.3	1	JAN	1548	229	3.	.1	1.4	1	JAN	1908	429	0.	.0	.0
1	JAN	1229	30	1.	.0	.3	1	JAN	1549	230	3.	.1	1.4	1	JAN	1909	430	0.	.0	.0
1	JAN	1230	31	1.	.0	.3	1	JAN	1550	231	3.	.1	1.5	1	JAN	1910	431	0.	.0	.0
1	JAN	1231	32	1.	.0	.3	1	JAN	1551	232	3.	.1	1.6	1	JAN	1911	432	0.	.0	.0
1	JAN	1232	33	1.	.0	.3	1	JAN	1552	233	3.	.1	1.6	1	JAN	1912	433	0.	.0	.0
1	JAN	1233	34	1.	.0	.3	1	JAN	1553	234	3.	.1	1.7	1	JAN	1913	434	0.	.0	.0
1	JAN	1234	35	1.	.0	.3	1	JAN	1554	235	3.	.1	1.8	1	JAN	1914	435	0.	.0	.0
1	JAN	1235	36	1.	.0	.3	1	JAN	1555	236	4.	.1	1.9	1	JAN	1915	436	0.	.0	.0
1	JAN	1236	37	1.	.0	.3	1	JAN	1556	237	4.	.1	2.0	1	JAN	1916	437	0.	.0	.0
1	JAN	1237	38	1.	.0	.3	1	JAN	1557	238	4.	.1	2.1	1	JAN	1917	438	0.	.0	.0
1	JAN	1238	39	1.	.0	.3	1	JAN	1558	239	4.	.2	2.3	1	JAN	1918	439	0.	.0	.0
1	JAN	1239	40	1.	.0	.4	1	JAN	1559	240	5.	.2	2.5	1	JAN	1919	440	0.	.0	.0
1	JAN	1240	41	1.	.0	.4	1	JAN	1600	241	5.	.2	2.6	1	JAN	1920	441	0.	.0	.0
1	JAN	1241	42	1.	.0	.4	1	JAN	1601	242	5.	.2	2.8	1	JAN	1921	442	0.	.0	.0
1	JAN	1242	43	1.	.0	.4	1	JAN	1602	243	6.	.2	3.1	1	JAN	1922	443	0.	.0	.0
1	JAN	1243	44	1.	.0	.4	1	JAN	1603	244	6.	.2	3.3	1	JAN	1923	444	0.	.0	.0
1	JAN	1244	45	1.	.0	.4	1	JAN	1604	245	7.	.2	3.6	1	JAN	1924	445	0.	.0	.0
1	JAN	1245	46	1.	.0	.4	1	JAN	1605	246	7.	.3	3.8	1	JAN	1925	446	0.	.0	.0
1	JAN	1246	47	1.	.0	.4	1	JAN	1606	247	8.	.3	4.0	1	JAN	1926	447	0.	.0	.0
1	JAN	1247	48	1.	.0	.4	1	JAN	1607	248	8.	.3	4.2	1	JAN	1927	448	0.	.0	.0
1	JAN	1248	49	1.	.0	.4	1	JAN	1608	249	8.	.3	4.3	1	JAN	1928	449	0.	.0	.0
1	JAN	1249	50	1.	.0	.4	1	JAN	1609	250	8.	.3	4.3	1	JAN	1929	450	0.	.0	.0
1	JAN	1250	51	1.	.0	.4	1	JAN	1610	251	8.	.3	4.3	1	JAN	1930	451	0.	.0	.0
1	JAN	1251	52	1.	.0	.4	1	JAN	1611	252	8.	.3	4.3	1	JAN	1931	452	0.	.0	.0
1	JAN	1252	53	1.	.0	.4	1	JAN	1612	253	8.	.3	4.2	1	JAN	1932	453	0.	.0	.0
1	JAN	1253	54	1.	.0	.4	1	JAN	1613	254	8.	.3	4.2	1	JAN	1933	454	0.	.0	.0
1	JAN	1254	55	1.	.0	.4	1	JAN	1614	255	8.	.3	4.1	1	JAN	1934	455	0.	.0	.0
1	JAN	1255	56	1.	.0	.4	1	JAN	1615	256	8.	.3	4.0	1	JAN	1935	456	0.	.0	.0
1	JAN	1256	57	1.	.0	.4	1	JAN	1616	257	7.	.3	3.9	1	JAN	1936	457	0.	.0	.0
1	JAN	1257	58	1.	.0	.4	1	JAN	1617	258	7.	.3	3.8	1	JAN	1937	458	0.	.0	.0
1	JAN	1258	59	1.	.0	.4	1	JAN	1618	259	7.	.3	3.7	1	JAN	1938	459	0.	.0	.0
1	JAN	1259	60	1.	.0	.4	1	JAN	1619	260	7.	.3	3.6	1	JAN	1939	460	0.	.0	.0
1	JAN	1300	61	1.	.0	.4	1	JAN	1620	261	7.	.2	3.5	1	JAN	1940	461	0.	.0	.0
1	JAN	1301	62	1.	.0	.4	1	JAN	1621	262	7.	.2	3.5	1	JAN	1941	462	0.	.0	.0
1	JAN	1302	63	1.	.0	.4	1	JAN	1622	263	6.	.2	3.4	1	JAN	1942	463	0.	.0	.0
1	JAN	1303	64	1.	.0	.4	1	JAN	1623	264	6.	.2	3.3	1	JAN	1943	464	0.	.0	.0
1	JAN	1304	65	1.	.0	.4	1	JAN	1624	265	6.	.2	3.2	1	JAN	1944	465	0.	.0	.0
1	JAN	1305	66	1.	.0	.4	1	JAN	1625	266	6.	.2	3.1	1	JAN	1945	466	0.	.0	.0
1	JAN	1306	67	1.	.0	.4	1	JAN	1626	267	6.	.2	3.1	1	JAN	1946	467	0.	.0	.0
1	JAN	1307	68	1.	.0	.4	1	JAN	1627	268	6.	.2	3.0	1	JAN	1947	468	0.	.0	.0
1	JAN	1308	69	1.	.0	.4	1	JAN	1628	269	6.	.2	2.9	1	JAN	1948	469	0.	.0	.0
1	JAN	1309	70	1.	.0	.4	1	JAN	1629	270	5.	.2	2.9	1	JAN	1949	470	0.	.0	.0
1	JAN	1310	71	1.	.0	.4	1	JAN	1630	271	5.	.2	2.8	1	JAN	1950	471	0.	.0	.0
1	JAN	1311	72	1.	.0	.4	1	JAN	1631	272	5.	.2	2.7	1	JAN	1951	472	0.	.0	.0
1	JAN	1312	73	1.	.0	.4	1	JAN	1632	273	5.	.2	2.7	1	JAN	1952	473	0.	.0	.0
1	JAN	1313	74	1.	.0	.4	1	JAN	1633	274	5.	.2	2.6	1	JAN	1953	474	0.	.0	.0
1	JAN	1314	75	1.	.0	.4	1	JAN	1634	275	5.	.2	2.5	1	JAN	1954	475	0.	.0	.0
1	JAN	1315	76	1.	.0	.4	1	JAN	1635	276	5.	.2	2.5	1	JAN	1955	476	0.	.0	.0
1	JAN	1316	77	1.	.0	.4	1	JAN	1636	277	5.	.2	2.4	1	JAN	1956	477	0.	.0	.0
1	JAN	1317	78	1.	.0	.4	1	JAN	1637	278	4.	.2	2.3	1	JAN	1957	478	0.	.0	.0
1	JAN	1318	79	1.	.0	.4	1	JAN	1638	279	4.	.2	2.3	1	JAN	1958	479	0.	.0	.0
1	JAN	1319	80	1.	.0	.4	1	JAN	1639	280	4.	.2	2.2	1	JAN	1959	480	0.	.0	.0

1 JAN 1320	81	1.	.0	.4 *	1 JAN 1640	281	4.	.2	2.2 *	1 JAN 2000	481	0.	.0	.0
1 JAN 1321	82	1.	.0	.4 *	1 JAN 1641	282	4.	.1	2.1 *	1 JAN 2001	482	0.	.0	.0
1 JAN 1322	83	1.	.0	.4 *	1 JAN 1642	283	4.	.1	2.1 *	1 JAN 2002	483	0.	.0	.0
1 JAN 1323	84	1.	.0	.4 *	1 JAN 1643	284	4.	.1	2.0 *	1 JAN 2003	484	0.	.0	.0
1 JAN 1324	85	1.	.0	.4 *	1 JAN 1644	285	4.	.1	2.0 *	1 JAN 2004	485	0.	.0	.0
1 JAN 1325	86	1.	.0	.4 *	1 JAN 1645	286	4.	.1	1.9 *	1 JAN 2005	486	0.	.0	.0
1 JAN 1326	87	1.	.0	.4 *	1 JAN 1646	287	4.	.1	1.9 *	1 JAN 2006	487	0.	.0	.0
1 JAN 1327	88	1.	.0	.4 *	1 JAN 1647	288	4.	.1	1.8 *	1 JAN 2007	488	0.	.0	.0
1 JAN 1328	89	1.	.0	.4 *	1 JAN 1648	289	3.	.1	1.8 *	1 JAN 2008	489	0.	.0	.0
1 JAN 1329	90	1.	.0	.4 *	1 JAN 1649	290	3.	.1	1.8 *	1 JAN 2009	490	0.	.0	.0
1 JAN 1330	91	1.	.0	.4 *	1 JAN 1650	291	3.	.1	1.7 *	1 JAN 2010	491	0.	.0	.0
1 JAN 1331	92	1.	.0	.4 *	1 JAN 1651	292	3.	.1	1.7 *	1 JAN 2011	492	0.	.0	.0
1 JAN 1332	93	1.	.0	.4 *	1 JAN 1652	293	3.	.1	1.6 *	1 JAN 2012	493	0.	.0	.0
1 JAN 1333	94	1.	.0	.5 *	1 JAN 1653	294	3.	.1	1.6 *	1 JAN 2013	494	0.	.0	.0
1 JAN 1334	95	1.	.0	.5 *	1 JAN 1654	295	3.	.1	1.6 *	1 JAN 2014	495	0.	.0	.0
1 JAN 1335	96	1.	.0	.5 *	1 JAN 1655	296	3.	.1	1.5 *	1 JAN 2015	496	0.	.0	.0
1 JAN 1336	97	1.	.0	.5 *	1 JAN 1656	297	3.	.1	1.5 *	1 JAN 2016	497	0.	.0	.0
1 JAN 1337	98	1.	.0	.5 *	1 JAN 1657	298	3.	.1	1.5 *	1 JAN 2017	498	0.	.0	.0
1 JAN 1338	99	1.	.0	.5 *	1 JAN 1658	299	3.	.1	1.4 *	1 JAN 2018	499	0.	.0	.0
1 JAN 1339	100	1.	.0	.5 *	1 JAN 1659	300	3.	.1	1.4 *	1 JAN 2019	500	0.	.0	.0
1 JAN 1340	101	1.	.0	.5 *	1 JAN 1700	301	3.	.1	1.4 *	1 JAN 2020	501	0.	.0	.0
1 JAN 1341	102	1.	.0	.5 *	1 JAN 1701	302	3.	.1	1.4 *	1 JAN 2021	502	0.	.0	.0
1 JAN 1342	103	1.	.0	.5 *	1 JAN 1702	303	3.	.1	1.3 *	1 JAN 2022	503	0.	.0	.0
1 JAN 1343	104	1.	.0	.5 *	1 JAN 1703	304	2.	.1	1.3 *	1 JAN 2023	504	0.	.0	.0
1 JAN 1344	105	1.	.0	.5 *	1 JAN 1704	305	2.	.1	1.3 *	1 JAN 2024	505	0.	.0	.0
1 JAN 1345	106	1.	.0	.5 *	1 JAN 1705	306	2.	.1	1.2 *	1 JAN 2025	506	0.	.0	.0
1 JAN 1346	107	1.	.0	.5 *	1 JAN 1706	307	2.	.1	1.2 *	1 JAN 2026	507	0.	.0	.0
1 JAN 1347	108	1.	.0	.5 *	1 JAN 1707	308	2.	.1	1.2 *	1 JAN 2027	508	0.	.0	.0
1 JAN 1348	109	1.	.0	.5 *	1 JAN 1708	309	2.	.1	1.2 *	1 JAN 2028	509	0.	.0	.0
1 JAN 1349	110	1.	.0	.5 *	1 JAN 1709	310	2.	.1	1.2 *	1 JAN 2029	510	0.	.0	.0
1 JAN 1350	111	1.	.0	.5 *	1 JAN 1710	311	2.	.1	1.1 *	1 JAN 2030	511	0.	.0	.0
1 JAN 1351	112	1.	.0	.5 *	1 JAN 1711	312	2.	.1	1.1 *	1 JAN 2031	512	0.	.0	.0
1 JAN 1352	113	1.	.0	.5 *	1 JAN 1712	313	2.	.1	1.1 *	1 JAN 2032	513	0.	.0	.0
1 JAN 1353	114	1.	.0	.5 *	1 JAN 1713	314	2.	.1	1.1 *	1 JAN 2033	514	0.	.0	.0
1 JAN 1354	115	1.	.0	.5 *	1 JAN 1714	315	2.	.1	1.0 *	1 JAN 2034	515	0.	.0	.0
1 JAN 1355	116	1.	.0	.5 *	1 JAN 1715	316	2.	.1	1.0 *	1 JAN 2035	516	0.	.0	.0
1 JAN 1356	117	1.	.0	.5 *	1 JAN 1716	317	2.	.1	1.0 *	1 JAN 2036	517	0.	.0	.0
1 JAN 1357	118	1.	.0	.5 *	1 JAN 1717	318	2.	.1	1.0 *	1 JAN 2037	518	0.	.0	.0
1 JAN 1358	119	1.	.0	.5 *	1 JAN 1718	319	2.	.1	1.0 *	1 JAN 2038	519	0.	.0	.0
1 JAN 1359	120	1.	.0	.5 *	1 JAN 1719	320	2.	.1	1.0 *	1 JAN 2039	520	0.	.0	.0
1 JAN 1400	121	1.	.0	.5 *	1 JAN 1720	321	2.	.1	.9 *	1 JAN 2040	521	0.	.0	.0
1 JAN 1401	122	1.	.0	.5 *	1 JAN 1721	322	2.	.1	.9 *	1 JAN 2041	522	0.	.0	.0
1 JAN 1402	123	1.	.0	.5 *	1 JAN 1722	323	2.	.1	.9 *	1 JAN 2042	523	0.	.0	.0
1 JAN 1403	124	1.	.0	.5 *	1 JAN 1723	324	2.	.1	.9 *	1 JAN 2043	524	0.	.0	.0
1 JAN 1404	125	1.	.0	.5 *	1 JAN 1724	325	2.	.1	.9 *	1 JAN 2044	525	0.	.0	.0
1 JAN 1405	126	1.	.0	.5 *	1 JAN 1725	326	2.	.1	.9 *	1 JAN 2045	526	0.	.0	.0
1 JAN 1406	127	1.	.0	.5 *	1 JAN 1726	327	2.	.1	.8 *	1 JAN 2046	527	0.	.0	.0
1 JAN 1407	128	1.	.0	.5 *	1 JAN 1727	328	2.	.1	.8 *	1 JAN 2047	528	0.	.0	.0
1 JAN 1408	129	1.	.0	.5 *	1 JAN 1728	329	2.	.1	.8 *	1 JAN 2048	529	0.	.0	.0
1 JAN 1409	130	1.	.0	.5 *	1 JAN 1729	330	2.	.1	.8 *	1 JAN 2049	530	0.	.0	.0
1 JAN 1410	131	1.	.0	.5 *	1 JAN 1730	331	2.	.1	.8 *	1 JAN 2050	531	0.	.0	.0
1 JAN 1411	132	1.	.0	.5 *	1 JAN 1731	332	1.	.1	.8 *	1 JAN 2051	532	0.	.0	.0
1 JAN 1412	133	1.	.0	.5 *	1 JAN 1732	333	1.	.1	.8 *	1 JAN 2052	533	0.	.0	.0
1 JAN 1413	134	1.	.0	.5 *	1 JAN 1733	334	1.	.1	.8 *	1 JAN 2053	534	0.	.0	.0
1 JAN 1414	135	1.	.0	.5 *	1 JAN 1734	335	1.	.1	.7 *	1 JAN 2054	535	0.	.0	.0
1 JAN 1415	136	1.	.0	.6 *	1 JAN 1735	336	1.	.1	.7 *	1 JAN 2055	536	0.	.0	.0
1 JAN 1416	137	1.	.0	.6 *	1 JAN 1736	337	1.	.1	.7 *	1 JAN 2056	537	0.	.0	.0
1 JAN 1417	138	1.	.0	.6 *	1 JAN 1737	338	1.	.0	.7 *	1 JAN 2057	538	0.	.0	.0
1 JAN 1418	139	1.	.0	.6 *	1 JAN 1738	339	1.	.0	.7 *	1 JAN 2058	539	0.	.0	.0
1 JAN 1419	140	1.	.0	.6 *	1 JAN 1739	340	1.	.0	.7 *	1 JAN 2059	540	0.	.0	.0
1 JAN 1420	141	1.	.0	.6 *	1 JAN 1740	341	1.	.0	.7 *	1 JAN 2100	541	0.	.0	.0
1 JAN 1421	142	1.	.0	.6 *	1 JAN 1741	342	1.	.0	.7 *	1 JAN 2101	542	0.	.0	.0
1 JAN 1422	143	1.	.0	.6 *	1 JAN 1742	343	1.	.0	.7 *	1 JAN 2102	543	0.	.0	.0
1 JAN 1423	144	1.	.0	.6 *	1 JAN 1743	344	1.	.0	.7 *	1 JAN 2103	544	0.	.0	.0
1 JAN 1424	145	1.	.0	.6 *	1 JAN 1744	345	1.	.0	.6 *	1 JAN 2104	545	0.	.0	.0
1 JAN 1425	146	1.	.0	.6 *	1 JAN 1745	346	1.	.0	.6 *	1 JAN 2105	546	0.	.0	.0
1 JAN 1426	147	1.	.0	.6 *	1 JAN 1746	347	1.	.0	.6 *	1 JAN 2106	547	0.	.0	.0
1 JAN 1427	148	1.	.0	.6 *	1 JAN 1747	348	1.	.0	.6 *	1 JAN 2107	548	0.	.0	.0
1 JAN 1428	149	1.	.0	.6 *	1 JAN 1748	349	1.	.0	.6 *	1 JAN 2108	549	0.	.0	.0
1 JAN 1429	150	1.	.0	.6 *	1 JAN 1749	350	1.	.0	.6 *	1 JAN 2109	550	0.	.0	.0
1 JAN 1430	151	1.	.0	.6 *	1 JAN 1750	351	1.	.0	.6 *	1 JAN 2110	551	0.	.0	.0
1 JAN 1431	152	1.	.0	.6 *	1 JAN 1751	352	1.	.0	.6 *	1 JAN 2111	552	0.	.0	.0
1 JAN 1432	153	1.	.0	.6 *	1 JAN 1752	353	1.	.0	.6 *	1 JAN 2112	553	0.	.0	.0
1 JAN 1433	154	1.	.0	.6 *	1 JAN 1753	354	1.	.0	.6 *	1 JAN 2113	554	0.	.0	.0
1 JAN 1434	155	1.	.0	.6 *	1 JAN 1754	355	1.	.0	.6 *	1 JAN 2114	555	0.	.0	.0
1 JAN 1435	156	1.	.0	.6 *	1 JAN 1755	356	1.	.0	.6 *	1 JAN 2115	556	0.	.0	.0
1 JAN 1436	157	1.	.0	.6 *	1 JAN 1756	357	1.	.0	.6 *	1 JAN 2116	557	0.	.0	.0
1 JAN 1437	158	1.	.0	.6 *	1 JAN 1757	358	1.	.0	.5 *	1 JAN 2117	558	0.	.0	.0
1 JAN 1438	159	1.	.0	.6 *	1 JAN 1758	359	1.	.0	.5 *	1 JAN 2118	559	0.	.0	.0
1 JAN 1439	160	1.	.0	.6 *	1 JAN 1759	360	1.	.0	.5 *	1 JAN 2119	560	0.	.0	.0
1 JAN 1440	161	1.	.0	.6 *	1 JAN 1800	361	1.	.0	.5 *	1 JAN 2120	561	0.	.0	.0
1 JAN 1441	162	1.	.0	.6 *	1 JAN 1801	362	1.	.0	.5 *	1 JAN 2121	562	0.	.0	.0
1 JAN 1442	163	1.	.0	.6 *	1 JAN 1802	363	1.	.0	.5 *	1 JAN 2122	563	0.	.0	.0
1 JAN 1443	164	1.	.0	.6 *	1 JAN 1803	364	1.	.0	.5 *	1 JAN 2123	564	0.	.0	.0

1	JAN	1444	165	1.	.0	.7	*	1	JAN	1804	365	1.	.0	.5	*	1	JAN	2124	565	0.	.0	.0
1	JAN	1445	166	1.	.0	.7	*	1	JAN	1805	366	1.	.0	.4	*	1	JAN	2125	566	0.	.0	.0
1	JAN	1446	167	1.	.0	.7	*	1	JAN	1806	367	1.	.0	.4	*	1	JAN	2126	567	0.	.0	.0
1	JAN	1447	168	1.	.0	.7	*	1	JAN	1807	368	1.	.0	.4	*	1	JAN	2127	568	0.	.0	.0
1	JAN	1448	169	1.	.0	.7	*	1	JAN	1808	369	1.	.0	.4	*	1	JAN	2128	569	0.	.0	.0
1	JAN	1449	170	1.	.0	.7	*	1	JAN	1809	370	1.	.0	.4	*	1	JAN	2129	570	0.	.0	.0
1	JAN	1450	171	1.	.0	.7	*	1	JAN	1810	371	1.	.0	.4	*	1	JAN	2130	571	0.	.0	.0
1	JAN	1451	172	1.	.0	.7	*	1	JAN	1811	372	1.	.0	.3	*	1	JAN	2131	572	0.	.0	.0
1	JAN	1452	173	1.	.0	.7	*	1	JAN	1812	373	1.	.0	.3	*	1	JAN	2132	573	0.	.0	.0
1	JAN	1453	174	1.	.0	.7	*	1	JAN	1813	374	1.	.0	.3	*	1	JAN	2133	574	0.	.0	.0
1	JAN	1454	175	1.	.0	.7	*	1	JAN	1814	375	1.	.0	.3	*	1	JAN	2134	575	0.	.0	.0
1	JAN	1455	176	1.	.0	.7	*	1	JAN	1815	376	1.	.0	.3	*	1	JAN	2135	576	0.	.0	.0
1	JAN	1456	177	1.	.0	.7	*	1	JAN	1816	377	1.	.0	.3	*	1	JAN	2136	577	0.	.0	.0
1	JAN	1457	178	1.	.1	.7	*	1	JAN	1817	378	1.	.0	.3	*	1	JAN	2137	578	0.	.0	.0
1	JAN	1458	179	1.	.1	.7	*	1	JAN	1818	379	1.	.0	.3	*	1	JAN	2138	579	0.	.0	.0
1	JAN	1459	180	1.	.1	.7	*	1	JAN	1819	380	0.	.0	.3	*	1	JAN	2139	580	0.	.0	.0
1	JAN	1500	181	1.	.1	.7	*	1	JAN	1820	381	0.	.0	.2	*	1	JAN	2140	581	0.	.0	.0
1	JAN	1501	182	1.	.1	.7	*	1	JAN	1821	382	0.	.0	.2	*	1	JAN	2141	582	0.	.0	.0
1	JAN	1502	183	1.	.1	.8	*	1	JAN	1822	383	0.	.0	.2	*	1	JAN	2142	583	0.	.0	.0
1	JAN	1503	184	1.	.1	.8	*	1	JAN	1823	384	0.	.0	.2	*	1	JAN	2143	584	0.	.0	.0
1	JAN	1504	185	1.	.1	.8	*	1	JAN	1824	385	0.	.0	.2	*	1	JAN	2144	585	0.	.0	.0
1	JAN	1505	186	1.	.1	.8	*	1	JAN	1825	386	0.	.0	.2	*	1	JAN	2145	586	0.	.0	.0
1	JAN	1506	187	1.	.1	.8	*	1	JAN	1826	387	0.	.0	.2	*	1	JAN	2146	587	0.	.0	.0
1	JAN	1507	188	1.	.1	.8	*	1	JAN	1827	388	0.	.0	.2	*	1	JAN	2147	588	0.	.0	.0
1	JAN	1508	189	2.	.1	.8	*	1	JAN	1828	389	0.	.0	.2	*	1	JAN	2148	589	0.	.0	.0
1	JAN	1509	190	2.	.1	.8	*	1	JAN	1829	390	0.	.0	.2	*	1	JAN	2149	590	0.	.0	.0
1	JAN	1510	191	2.	.1	.8	*	1	JAN	1830	391	0.	.0	.2	*	1	JAN	2150	591	0.	.0	.0
1	JAN	1511	192	2.	.1	.8	*	1	JAN	1831	392	0.	.0	.2	*	1	JAN	2151	592	0.	.0	.0
1	JAN	1512	193	2.	.1	.8	*	1	JAN	1832	393	0.	.0	.2	*	1	JAN	2152	593	0.	.0	.0
1	JAN	1513	194	2.	.1	.8	*	1	JAN	1833	394	0.	.0	.2	*	1	JAN	2153	594	0.	.0	.0
1	JAN	1514	195	2.	.1	.8	*	1	JAN	1834	395	0.	.0	.1	*	1	JAN	2154	595	0.	.0	.0
1	JAN	1515	196	2.	.1	.8	*	1	JAN	1835	396	0.	.0	.1	*	1	JAN	2155	596	0.	.0	.0
1	JAN	1516	197	2.	.1	.8	*	1	JAN	1836	397	0.	.0	.1	*	1	JAN	2156	597	0.	.0	.0
1	JAN	1517	198	2.	.1	.9	*	1	JAN	1837	398	0.	.0	.1	*	1	JAN	2157	598	0.	.0	.0
1	JAN	1518	199	2.	.1	.9	*	1	JAN	1838	399	0.	.0	.1	*	1	JAN	2158	599	0.	.0	.0
1	JAN	1519	200	2.	.1	.9	*	1	JAN	1839	400	0.	.0	.1	*	1	JAN	2159	600	0.	.0	.0
							*								*							

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	9.98-HR
+ (CFS)	(HR)				
	(CFS)				
+ 8.	4.17	2.	1.	1.	1.
	(INCHES)	1.705	1.756	1.756	1.756
	(AC-FT)	1.	1.	1.	1.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.98-HR
+ (AC-FT)	(HR)				
0.	4.15	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.98-HR
+ (FEET)	(HR)				
4.34	4.17	1.03	.64	.64	.64

CUMULATIVE AREA = .01 SQ MI

1 STATION DETAIN

(I) INFLOW, (O) OUTFLOW

0. 4. 8. 12. 16. 20. 24. 0. 0. 0. 0. 0. 0.

(S) STORAGE

.0 .0 .0 .0 .0 .0 .0 .1 .2 .3 .4 .0 .0

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DAHRMN PER
 11200   1.I--------.---------.---------.---------.---------.---------.S--------.---------.---------.---------.---------.---------.
 11201   2.I        .         .         .         .         .         .S        .         .         .         .         .         .
 11202   3.I        .         .         .         .         .         .S        .         .         .         .         .         .
 11203   4.OI       .         .         .         .         .         .S        .         .         .         .         .         .
 11204   5.OI       .         .         .         .         .         .S        .         .         .         .         .         .
 11205   6.OI       .         .         .         .         .         .S        .         .         .         .         .         .
 11206   7.OI       .         .         .         .         .         .S        .         .         .         .         .         .
 11207   8.OI       .         .         .         .         .         .S        .         .         .         .         .         .
 11208   9.OI       .         .         .         .         .         . S       .         .         .         .         .         .
 11209  10.OI       .         .         .         .         .         . S       .         .         .         .         .         .
 11210  11.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 11211  12.OI      .         .         .         .         .         . S       .         .         .         .         .         .
 11212  13.OI      .         .         .         .         .         . S       .         .         .         .         .         .
 11213  14.OI      .         .         .         .         .         . S       .         .         .         .         .         .
 11214  15.OI      .         .         .         .         .         . S       .         .         .         .         .         .
 11215  16.OI      .         .         .         .         .         . S       .         .         .         .         .         .
 11216  17.OI      .         .         .         .         .         . S       .         .         .         .         .         .
 11217  18.OI      .         .         .         .         .         . S       .         .         .         .         .         .
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11218  19.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11219  20.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11220  21.OI . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11221  22.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11222  23.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11223  24.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11224  25.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11225  26.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11226  27.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11227  28.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11228  29. I      .       .       .       .       .       . S     .       .       .       .       .       .
11229  30. I      .       .       .       .       .       . S     .       .       .       .       .       .
11230  31. I . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11231  32. I      .       .       .       .       .       . S     .       .       .       .       .       .
11232  33. I      .       .       .       .       .       . S     .       .       .       .       .       .
11233  34. I      .       .       .       .       .       . S     .       .       .       .       .       .
11234  35. I      .       .       .       .       .       . S     .       .       .       .       .       .
11235  36. I      .       .       .       .       .       . S     .       .       .       .       .       .
11236  37. I      .       .       .       .       .       . S     .       .       .       .       .       .
11237  38. I      .       .       .       .       .       . S     .       .       .       .       .       .
11238  39. I      .       .       .       .       .       . S     .       .       .       .       .       .
11239  40. I      .       .       .       .       .       . S     .       .       .       .       .       .
11240  41. I . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11241  42. I      .       .       .       .       .       . S     .       .       .       .       .       .
11242  43. I      .       .       .       .       .       . S     .       .       .       .       .       .
11243  44. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11244  45. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11245  46. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11246  47. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11247  48. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11248  49. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11249  50. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11250  51. I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11251  52. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11252  53. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11253  54. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11254  55. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11255  56. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11256  57. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11257  58. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11258  59. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11259  60. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11300  61. I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11301  62. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11302  63. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11303  64. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11304  65. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11305  66. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11306  67. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11307  68. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11308  69. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11309  70. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11310  71. I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11311  72. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11312  73. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11313  74. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11314  75. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11315  76. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11316  77. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11317  78. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11318  79. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11319  80. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11320  81. I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11321  82. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11322  83. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11323  84. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11324  85. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11325  86. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11326  87. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11327  88. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11328  89. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11329  90. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11330  91. I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11331  92. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11332  93. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11333  94. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11334  95. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11335  96. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11336  97. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11337  98. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11338  99. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11339 100. I      .       .       .       .       .       .  S    .       .       .       .       .       .
11340 101. I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11341 102. I      .       .       .       .       .       .  S    .       .       .       .       .       .
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11342 103. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11343 104. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11344 105. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11345 106. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11346 107. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11347 108. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11348 109. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11349 110. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11350 111. OI. . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . .
11351 112. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11352 113. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11353 114. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11354 115. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11355 116. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11356 117. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11357 118. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11358 119. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11359 120. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11400 121. OI. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11401 122. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11402 123. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11403 124. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11404 125. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11405 126. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11406 127.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11407 128.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11408 129.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11409 130.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11410 131. .I. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11411 132.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11412 133.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11413 134.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11414 135.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11415 136.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11416 137.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11417 138.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11418 139.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11419 140.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11420 141. .I. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11421 142.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11422 143.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11423 144.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11424 145.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11425 146.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11426 147.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11427 148.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11428 149.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11429 150.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11430 151. .I. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11431 152.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11432 153.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
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11434 155.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11435 156.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11436 157.  I     .       .       .       .       .       .   S    .       .       .       .       .       .
11437 158.  OI    .       .       .       .       .       .   S    .       .       .       .       .       .
11438 159.  OI    .       .       .       .       .       .   S    .       .       .       .       .       .
11439 160.  OI    .       .       .       .       .       .   S    .       .       .       .       .       .
11440 161. .OI . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11441 162.  OI    .       .       .       .       .       .   S    .       .       .       .       .       .
11442 163.  OI    .       .       .       .       .       .   S    .       .       .       .       .       .
11443 164.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11444 165.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11445 166.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11446 167.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11447 168.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
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11449 170.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11450 171. .OI . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . .
11451 172.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11452 173.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
11453 174.  OI    .       .       .       .       .       .    S   .       .       .       .       .       .
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11459 180.   I    .       .       .       .       .       .    S   .       .       .       .       .       .
11500 181. . I . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . .
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11503 184.   I    .       .       .       .       .       .    S   .       .       .       .       .       .
11504 185.   I    .       .       .       .       .       .    S   .       .       .       .       .       .
11505 186.   I    .       .       .       .       .       .    S   .       .       .       .       .       .
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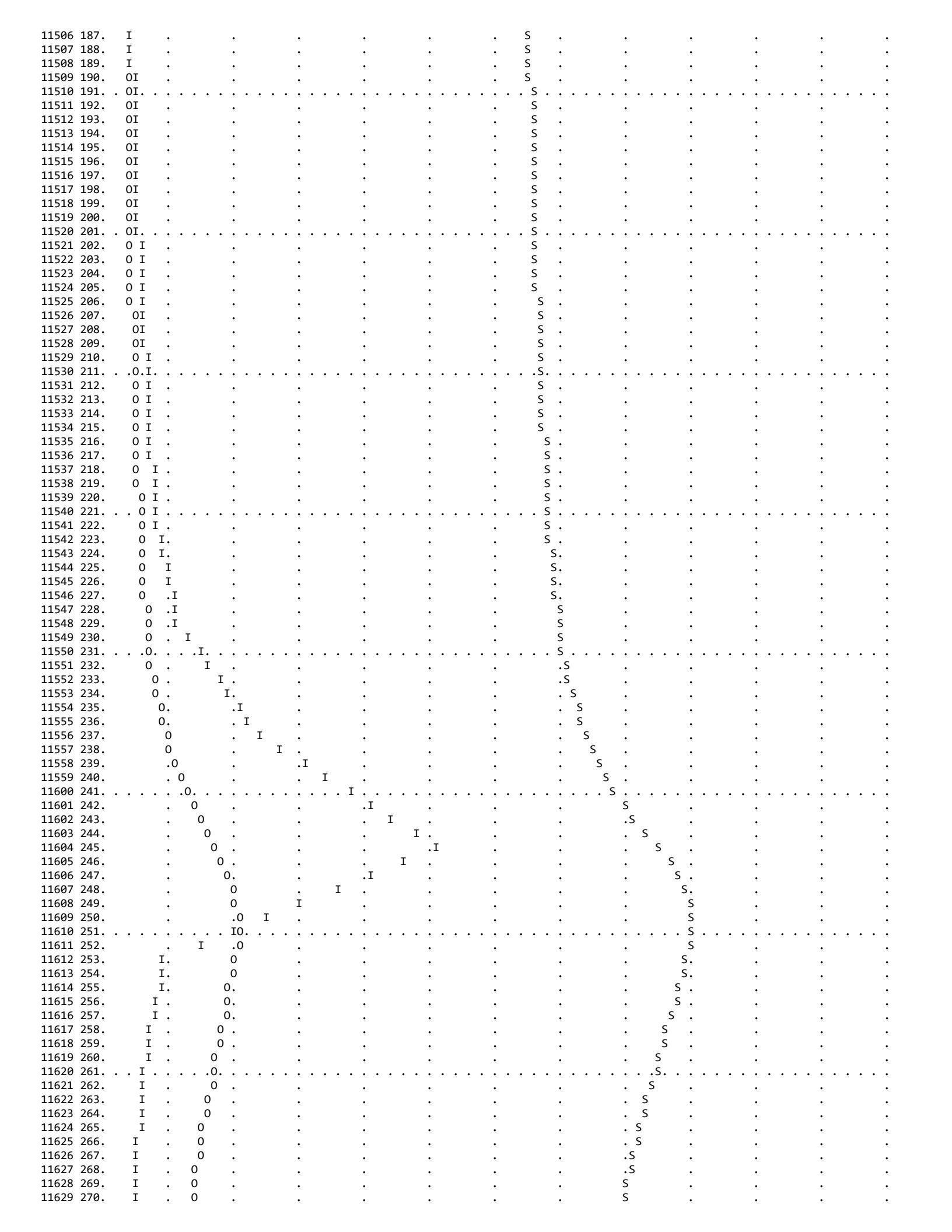

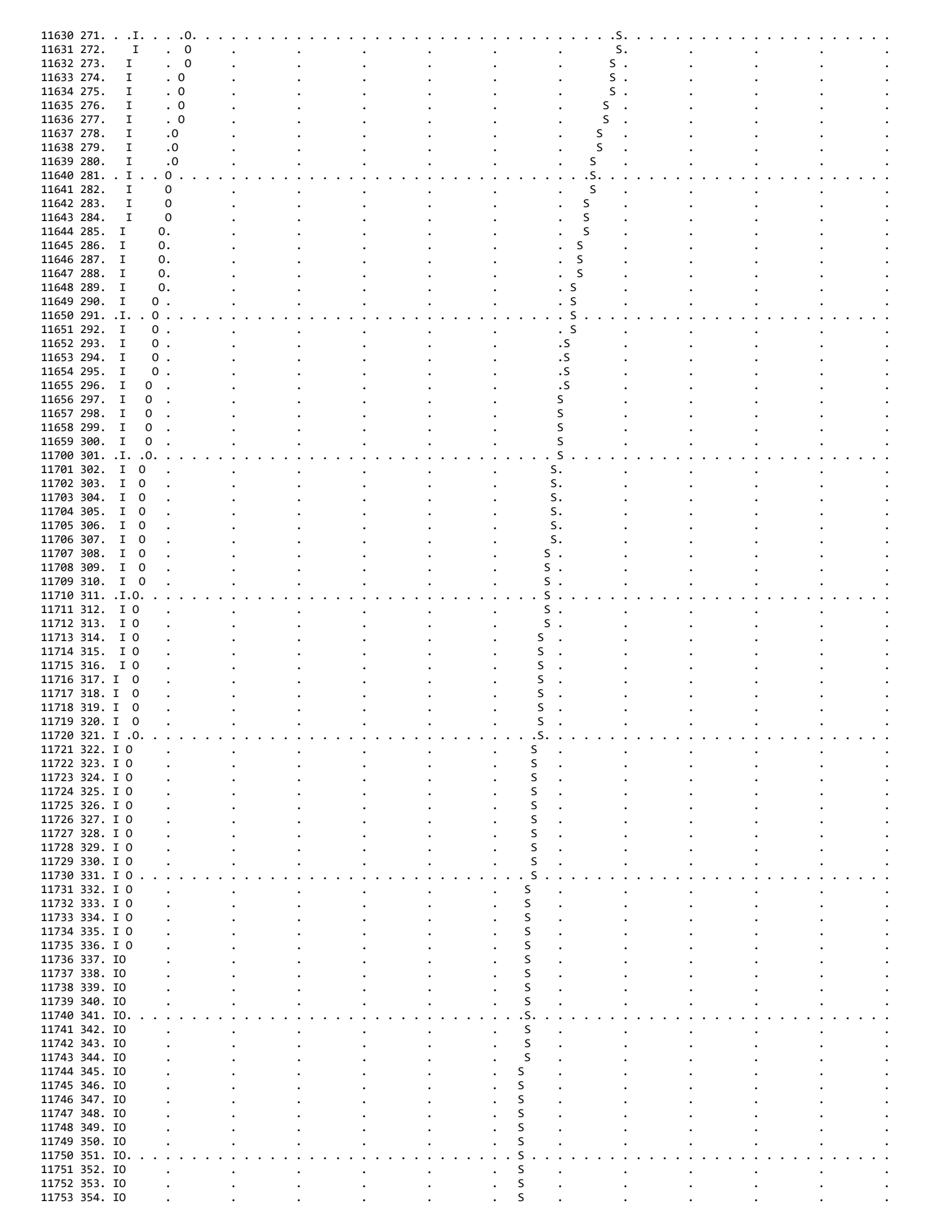

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11755 356. IO     .       .       .       .       .       .   S   .       .       .       .       .       .
11756 357. IO     .       .       .       .       .       .   S   .       .       .       .       .       .
11757 358. IO     .       .       .       .       .       .   S   .       .       .       .       .       .
11758 359.I O     .       .       .       .       .       .   S   .       .       .       .       .       .
11759 360.I O     .       .       .       .       .       .   S   .       .       .       .       .       .
11800 361.IO . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11801 362.IO      .       .       .       .       .       .   S   .       .       .       .       .       .
11802 363I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11803 364I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11804 365I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11805 366I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11806 367I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11807 368I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11808 369I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11809 370I O      .       .       .       .       .       .   S   .       .       .       .       .       .
11810 371I O . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11811 372I O      .       .       .       .       .       . S   .       .       .       .       .       .
11812 373I O      .       .       .       .       .       . S   .       .       .       .       .       .
11813 374I O      .       .       .       .       .       . S   .       .       .       .       .       .
11814 375IO       .       .       .       .       .       . S   .       .       .       .       .       .
11815 376IO       .       .       .       .       .       . S   .       .       .       .       .       .
11816 377IO       .       .       .       .       .       . S   .       .       .       .       .       .
11817 378IO       .       .       .       .       .       . S   .       .       .       .       .       .
11818 379IO       .       .       .       .       .       . S   .       .       .       .       .       .
11819 380IO       .       .       .       .       .       . S   .       .       .       .       .       .
11820 381IO. . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11821 382IO       .       .       .       .       .       . S   .       .       .       .       .       .
11822 383IO       .       .       .       .       .       . S   .       .       .       .       .       .
11823 384IO       .       .       .       .       .       . S   .       .       .       .       .       .
11824 385IO       .       .       .       .       .       .S    .       .       .       .       .       .
11825 386IO       .       .       .       .       .       .S    .       .       .       .       .       .
11826 387IO       .       .       .       .       .       .S    .       .       .       .       .       .
11827 388IO       .       .       .       .       .       .S    .       .       .       .       .       .
11828 389IO       .       .       .       .       .       .S    .       .       .       .       .       .
11829 390IO       .       .       .       .       .       .S    .       .       .       .       .       .
11830 391IO. . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11831 392IO       .       .       .       .       .       .S    .       .       .       .       .       .
11832 393IO       .       .       .       .       .       .S    .       .       .       .       .       .
11833 394IO       .       .       .       .       .       .S    .       .       .       .       .       .
11834 395IO       .       .       .       .       .       .S    .       .       .       .       .       .
11835 396IO       .       .       .       .       .       .S    .       .       .       .       .       .
11836 397IO       .       .       .       .       .       .S    .       .       .       .       .       .
11837 398IO       .       .       .       .       .       .S    .       .       .       .       .       .
11838 399IO       .       .       .       .       .       .S    .       .       .       .       .       .
11839 400IO       .       .       .       .       .       .S    .       .       .       .       .       .
11840 401IO. . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11841 402IO       .       .       .       .       .       .S    .       .       .       .       .       .
11842 403IO       .       .       .       .       .       .S    .       .       .       .       .       .
11843 404I        .       .       .       .       .       .S    .       .       .       .       .       .
11844 405I        .       .       .       .       .       .S    .       .       .       .       .       .
11845 406I        .       .       .       .       .       .S    .       .       .       .       .       .
11846 407I        .       .       .       .       .       .S    .       .       .       .       .       .
11847 408I        .       .       .       .       .       .S    .       .       .       .       .       .
11848 409I        .       .       .       .       .       .S    .       .       .       .       .       .
11849 410I        .       .       .       .       .       .S    .       .       .       .       .       .
11850 411I . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11851 412I        .       .       .       .       .       .S    .       .       .       .       .       .
11852 413I        .       .       .       .       .       .S    .       .       .       .       .       .
11853 414I        .       .       .       .       .       S     .       .       .       .       .       .
11854 415I        .       .       .       .       .       S     .       .       .       .       .       .
11855 416I        .       .       .       .       .       S     .       .       .       .       .       .
11856 417I        .       .       .       .       .       S     .       .       .       .       .       .
11857 418I        .       .       .       .       .       S     .       .       .       .       .       .
11858 419I        .       .       .       .       .       S     .       .       .       .       .       .
11859 420I        .       .       .       .       .       S     .       .       .       .       .       .
11900 421I . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11901 422I        .       .       .       .       .       S     .       .       .       .       .       .
11902 423I        .       .       .       .       .       S     .       .       .       .       .       .
11903 424I        .       .       .       .       .       S     .       .       .       .       .       .
11904 425I        .       .       .       .       .       S     .       .       .       .       .       .
11905 426I        .       .       .       .       .       S     .       .       .       .       .       .
11906 427I        .       .       .       .       .       S     .       .       .       .       .       .
11907 428I        .       .       .       .       .       S     .       .       .       .       .       .
11908 429I        .       .       .       .       .       S     .       .       .       .       .       .
11909 430I        .       .       .       .       .       S     .       .       .       .       .       .
11910 431I . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11911 432I        .       .       .       .       .       S     .       .       .       .       .       .
11912 433I        .       .       .       .       .       S     .       .       .       .       .       .
11913 434I        .       .       .       .       .       S     .       .       .       .       .       .
11914 435I        .       .       .       .       .       S     .       .       .       .       .       .
11915 436I        .       .       .       .       .       S     .       .       .       .       .       .
11916 437I        .       .       .       .       .       S     .       .       .       .       .       .
11917 438I        .       .       .       .       .       S     .       .       .       .       .       .
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11918 439I       .       .       .       .       .       S       .       .       .       .       .       .       .
11919 440I       .       .       .       .       .       S       .       .       .       .       .       .       .
11920 441I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11921 442I       .       .       .       .       .       S       .       .       .       .       .       .       .
11922 443I       .       .       .       .       .       S       .       .       .       .       .       .       .
11923 444I       .       .       .       .       .       S       .       .       .       .       .       .       .
11924 445I       .       .       .       .       .       S       .       .       .       .       .       .       .
11925 446I       .       .       .       .       .       S       .       .       .       .       .       .       .
11926 447I       .       .       .       .       .       S       .       .       .       .       .       .       .
11927 448I       .       .       .       .       .       S       .       .       .       .       .       .       .
11928 449I       .       .       .       .       .       S       .       .       .       .       .       .       .
11929 450I       .       .       .       .       .       S       .       .       .       .       .       .       .
11930 451I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11931 452I       .       .       .       .       .       S       .       .       .       .       .       .       .
11932 453I       .       .       .       .       .       S       .       .       .       .       .       .       .
11933 454I       .       .       .       .       .       S       .       .       .       .       .       .       .
11934 455I       .       .       .       .       .       S       .       .       .       .       .       .       .
11935 456I       .       .       .       .       .       S       .       .       .       .       .       .       .
11936 457I       .       .       .       .       .       S       .       .       .       .       .       .       .
11937 458I       .       .       .       .       .       S       .       .       .       .       .       .       .
11938 459I       .       .       .       .       .       S       .       .       .       .       .       .       .
11939 460I       .       .       .       .       .       S       .       .       .       .       .       .       .
11940 461I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11941 462I       .       .       .       .       .       S       .       .       .       .       .       .       .
11942 463I       .       .       .       .       .       S       .       .       .       .       .       .       .
11943 464I       .       .       .       .       .       S       .       .       .       .       .       .       .
11944 465I       .       .       .       .       .       S       .       .       .       .       .       .       .
11945 466I       .       .       .       .       .       S       .       .       .       .       .       .       .
11946 467I       .       .       .       .       .       S       .       .       .       .       .       .       .
11947 468I       .       .       .       .       .       S       .       .       .       .       .       .       .
11948 469I       .       .       .       .       .       S       .       .       .       .       .       .       .
11949 470I       .       .       .       .       .       S       .       .       .       .       .       .       .
11950 471I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11951 472I       .       .       .       .       .       S       .       .       .       .       .       .       .
11952 473I       .       .       .       .       .       S       .       .       .       .       .       .       .
11953 474I       .       .       .       .       .       S       .       .       .       .       .       .       .
11954 475I       .       .       .       .       .       S       .       .       .       .       .       .       .
11955 476I       .       .       .       .       .       S       .       .       .       .       .       .       .
11956 477I       .       .       .       .       .       S       .       .       .       .       .       .       .
11957 478I       .       .       .       .       .       S       .       .       .       .       .       .       .
11958 479I       .       .       .       .       .       S       .       .       .       .       .       .       .
11959 480I       .       .       .       .       .       S       .       .       .       .       .       .       .
12000 481I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12001 482I       .       .       .       .       .       S       .       .       .       .       .       .       .
12002 483I       .       .       .       .       .       S       .       .       .       .       .       .       .
12003 484I       .       .       .       .       .       S       .       .       .       .       .       .       .
12004 485I       .       .       .       .       .       S       .       .       .       .       .       .       .
12005 486I       .       .       .       .       .       S       .       .       .       .       .       .       .
12006 487I       .       .       .       .       .       S       .       .       .       .       .       .       .
12007 488I       .       .       .       .       .       S       .       .       .       .       .       .       .
12008 489I       .       .       .       .       .       S       .       .       .       .       .       .       .
12009 490I       .       .       .       .       .       S       .       .       .       .       .       .       .
12010 491I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12011 492I       .       .       .       .       .       S       .       .       .       .       .       .       .
12012 493I       .       .       .       .       .       S       .       .       .       .       .       .       .
12013 494I       .       .       .       .       .       S       .       .       .       .       .       .       .
12014 495I       .       .       .       .       .       S       .       .       .       .       .       .       .
12015 496I       .       .       .       .       .       S       .       .       .       .       .       .       .
12016 497I       .       .       .       .       .       S       .       .       .       .       .       .       .
12017 498I       .       .       .       .       .       S       .       .       .       .       .       .       .
12018 499I       .       .       .       .       .       S       .       .       .       .       .       .       .
12019 500I       .       .       .       .       .       S       .       .       .       .       .       .       .
12020 501I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12021 502I       .       .       .       .       .       S       .       .       .       .       .       .       .
12022 503I       .       .       .       .       .       S       .       .       .       .       .       .       .
12023 504I       .       .       .       .       .       S       .       .       .       .       .       .       .
12024 505I       .       .       .       .       .       S       .       .       .       .       .       .       .
12025 506I       .       .       .       .       .       S       .       .       .       .       .       .       .
12026 507I       .       .       .       .       .       S       .       .       .       .       .       .       .
12027 508I       .       .       .       .       .       S       .       .       .       .       .       .       .
12028 509I       .       .       .       .       .       S       .       .       .       .       .       .       .
12029 510I       .       .       .       .       .       S       .       .       .       .       .       .       .
12030 511I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12031 512I       .       .       .       .       .       S       .       .       .       .       .       .       .
12032 513I       .       .       .       .       .       S       .       .       .       .       .       .       .
12033 514I       .       .       .       .       .       S       .       .       .       .       .       .       .
12034 515I       .       .       .       .       .       S       .       .       .       .       .       .       .
12035 516I       .       .       .       .       .       S       .       .       .       .       .       .       .
12036 517I       .       .       .       .       .       S       .       .       .       .       .       .       .
12037 518I       .       .       .       .       .       S       .       .       .       .       .       .       .
12038 519I       .       .       .       .       .       S       .       .       .       .       .       .       .
12039 520I       .       .       .       .       .       S       .       .       .       .       .       .       .
12040 521I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12041 522I       .       .       .       .       .       S       .       .       .       .       .       .       .
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  12042 523I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12043 524I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12044 525I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12045 526I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12046 527I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12047 528I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12048 529I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12049 530I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12050 531I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12051 532I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12052 533I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12053 534I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12054 535I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12055 536I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12056 537I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12057 538I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12058 539I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12059 540I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12100 541I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12101 542I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12102 543I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12103 544I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12104 545I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12105 546I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12106 547I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12107 548I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12108 549I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12109 550I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12110 551I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12111 552I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12112 553I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12113 554I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12114 555I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12115 556I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12116 557I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12117 558I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12118 559I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12119 560I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12120 561I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12121 562I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12122 563I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12123 564I        .       .       .       .       .       S       .       .       .       .       .       .       .
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  12125 566I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12126 567I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12127 568I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12128 569I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12129 570I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12130 571I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12131 572I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12132 573I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12133 574I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12134 575I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12135 576I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12136 577I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12137 578I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12138 579I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12139 580I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12140 581I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12141 582I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12142 583I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12143 584I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12144 585I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12145 586I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12146 587I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12147 588I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12148 589I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12149 590I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12150 591I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  12151 592I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12152 593I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12153 594I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12154 595I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12155 596I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12156 597I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12157 598I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12158 599I        .       .       .       .       .       S       .       .       .       .       .       .       .
  12159 600I--------.--------.--------.--------.--------.--------S--------.--------.--------.--------.--------.--------.
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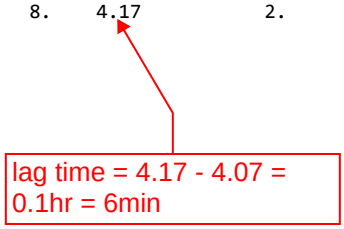
RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		OAN_Vaul	21.	4.07	2.	1.	1.	.01		
	ROUTED TO									
+		DETAIN	8.	4.17	2.	1.	1.	.01		
+									4.34	4.17

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



```
DETAIN    11200  1JAN90 0 1 1 600      .011
       .350        .352        .356        .364        .375        .387        .399        .410        .421        .431
       .442        .451        .460        .470        .479        .488        .498        .507        .517        .527
       .537        .547        .556        .565        .574        .583        .591        .598        .606        .613
       .620        .627        .633        .640        .646        .651        .657        .662        .667        .672
       .677        .682        .686        .690        .694        .698        .702        .706        .709        .713
       .716        .719        .722        .725        .728        .731        .733        .736        .738        .740
       .743        .745        .748        .751        .754        .758        .762        .767        .771        .776
       .781        .785        .790        .794        .798        .801        .805        .809        .812        .815
       .818        .822        .824        .827        .830        .833        .836        .840        .843        .848
       .852        .857        .862        .867        .872        .877        .882        .886        .890        .894
       .898        .902        .906        .909        .913        .916        .919        .922        .925        .928
       .931        .935        .939        .944        .948        .953        .958        .964        .969        .974
       .978        .983        .987        .991        .996       1.000       1.004       1.009       1.014       1.019
      1.025       1.031       1.037       1.043       1.049       1.054       1.060       1.065       1.070       1.075
      1.080       1.084       1.089       1.095       1.100       1.106       1.112       1.118       1.125       1.132
      1.139       1.146       1.153       1.161       1.169       1.176       1.185       1.193       1.201       1.210
      1.219       1.227       1.236       1.246       1.255       1.264       1.274       1.283       1.293       1.303
      1.313       1.323       1.333       1.343       1.353       1.364       1.374       1.385       1.395       1.406
      1.417       1.428       1.438       1.449       1.460       1.471       1.482       1.494       1.505       1.516
      1.529       1.543       1.557       1.573       1.589       1.606       1.624       1.642       1.660       1.679
      1.698       1.717       1.737       1.756       1.776       1.797       1.819       1.843       1.868       1.895
      1.923       1.952       1.982       2.014       2.046       2.079       2.112       2.146       2.181       2.216
      2.252       2.290       2.334       2.383       2.436       2.494       2.556       2.623       2.693       2.776
      2.878       2.999       3.139       3.296       3.471       3.661       3.868       4.104       4.382       4.701
      5.060       5.457       5.890       6.358       6.861       7.331       7.705       7.987       8.179       8.287
      8.311       8.257       8.126       7.958       7.791       7.624       7.458       7.293       7.128       6.964
      6.800       6.639       6.481       6.326       6.175       6.028       5.883       5.742       5.604       5.468
      5.336       5.207       5.081       4.957       4.837       4.719       4.603       4.491       4.382       4.276
      4.172       4.072       3.975       3.880       3.788       3.699       3.612       3.529       3.448       3.369
      3.293       3.219       3.148       3.079       3.012       2.947       2.884       2.823       2.763       2.706
      2.650       2.595       2.543       2.491       2.442       2.393       2.346       2.300       2.256       2.212
      2.170       2.129       2.089       2.050       2.012       1.975       1.939       1.904       1.869       1.836
      1.803       1.771       1.739       1.709       1.679       1.650       1.622       1.595       1.569       1.544
      1.520       1.497       1.475       1.453       1.432       1.411       1.390       1.370       1.349       1.330
      1.310       1.291       1.273       1.255       1.238       1.222       1.206       1.191       1.176       1.162
      1.148       1.134       1.120       1.106       1.092       1.078       1.064       1.049       1.031       1.010
       .987        .962        .934        .904        .872        .840        .808        .778        .749        .721
       .694        .668        .643        .619        .596        .574        .553        .532        .512        .493
       .475        .457        .440        .423        .408        .392        .378        .364        .350        .337
       .325        .312        .301        .290        .279        .268        .258        .249        .239        .230
       .222        .214        .206        .198        .191        .183        .177        .170        .164        .158
       .152        .146        .141        .135        .130        .125        .121        .116        .112        .108
       .104        .100        .096        .093        .089        .086        .083        .079        .077        .074
       .071        .068        .066        .063        .061        .059        .056        .054        .052        .050
       .048        .047        .045        .043        .042        .040        .039        .037        .036        .034
       .033        .032        .031        .030        .028        .027        .026        .025        .024        .024
       .023        .022        .021        .020        .019        .019        .018        .017        .017        .016
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       .002        .002        .001        .001        .001        .001        .001        .001        .001        .001
       .001        .001        .001        .001        .001        .001        .001        .001        .001        .001
       .001        .001        .001        .001        .001        .001        .001        .001        .001        .001
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Peak Detained Q = 8.31 CFS

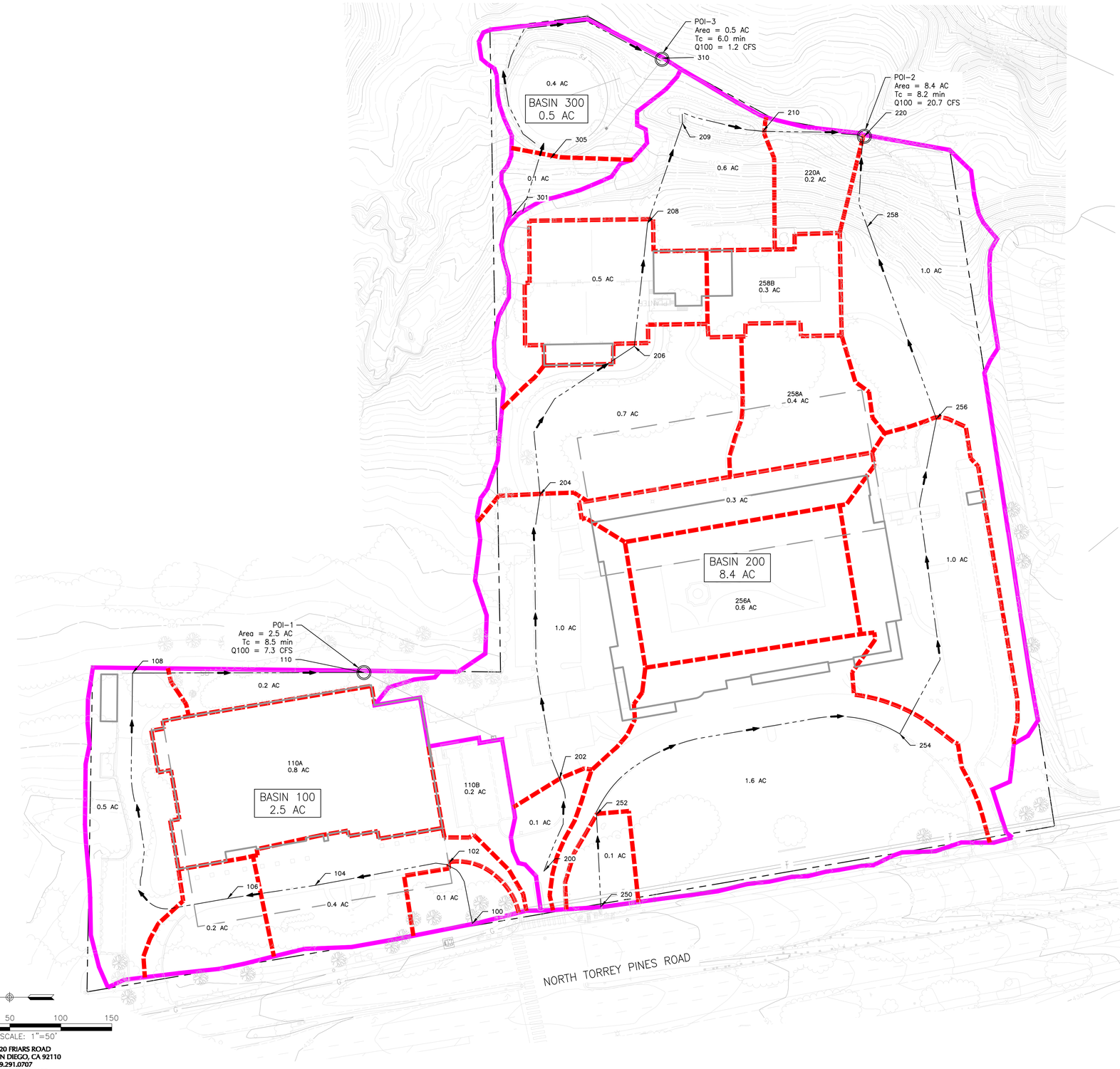
.001	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

MAP POCKET 1

Pre-Project Drainage Map

for

One Alexandria North



LEGEND

BASIN XXX X.X AC	MAJOR BASIN ID
	MAJOR BASIN BOUNDARY
	SUB-BASIN BOUNDARY
	POINT OF INTEREST (POI)
POI-X	POI ID
XXX	NODE ID
XXXX X.X AC	SUB-BASIN ID & ACREAGE
	FLOW PATH

DRAINAGE STUDY MAP FOR ONE ALEXANDRIA NORTH (PRE-PROJECT)

DATE: JUNE 23, 2021
REVISED: NOVEMBER 5, 2021

JN-19366

RICK ENGINEERING COMPANY
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NOT FOR CONSTRUCTION – EXHIBIT FOR DRAINAGE REPORT ONLY

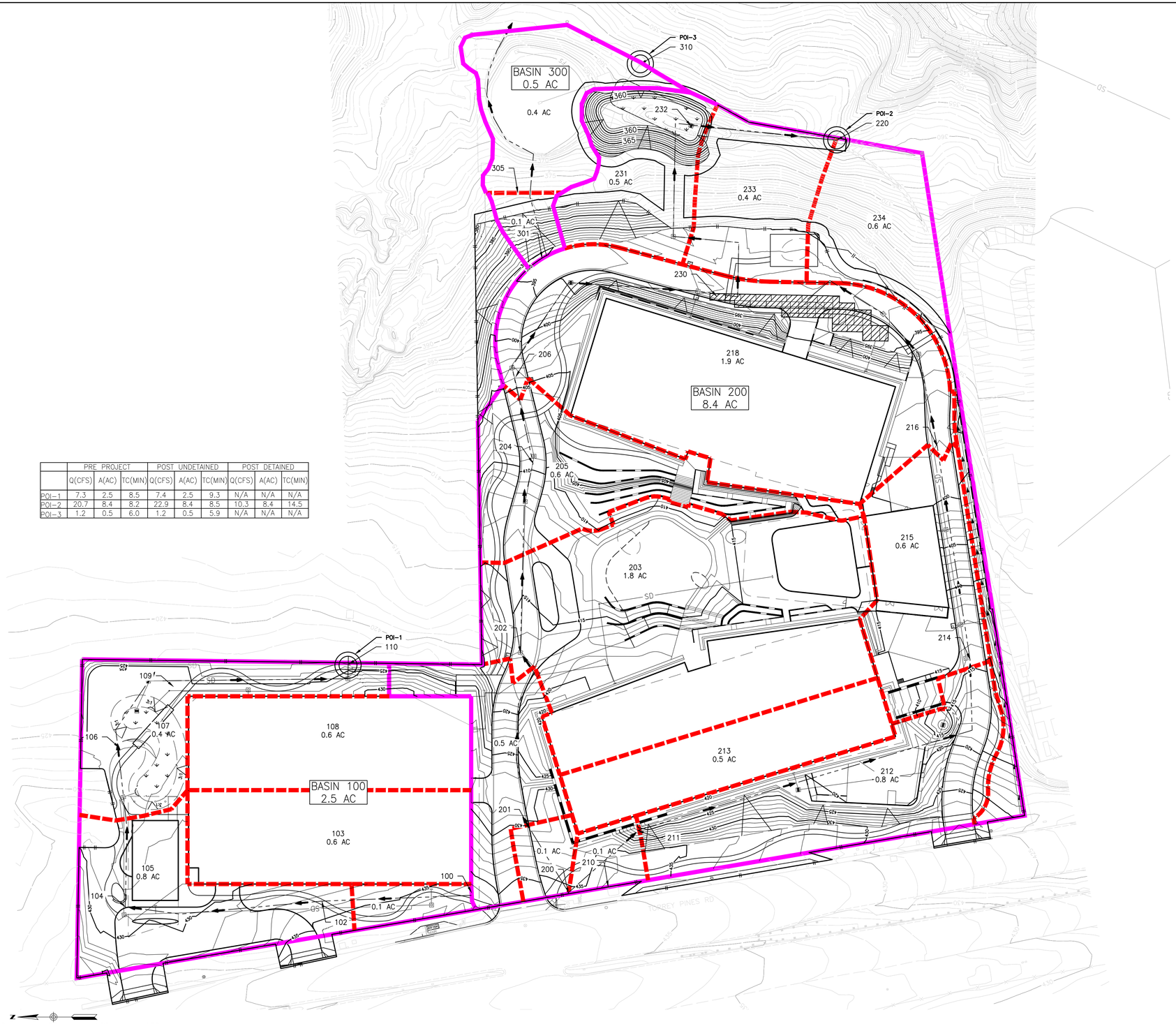
MAP POCKET 2

Post-Project Drainage Map

for

One Alexandria North

	PRE PROJECT			POST UNDETAINED			POST DETAINED		
	Q(CFS)	A(AC)	TC(MIN)	Q(CFS)	A(AC)	TC(MIN)	Q(CFS)	A(AC)	TC(MIN)
POI-1	7.3	2.5	8.5	7.4	2.5	9.3	N/A	N/A	N/A
POI-2	20.7	8.4	8.2	22.9	8.4	8.5	10.3	8.4	14.5
POI-3	1.2	0.5	6.0	1.2	0.5	5.9	N/A	N/A	N/A



LEGEND:

- MAJOR BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- FLOW PATH
- POINT OF INTEREST (POI)
- POI-X POI ID
- 310 NODE ID
- BASIN XXX X.X AC MAJOR BASIN ID & ACREAGE
- XXX X.X AC SUB-BASIN ID & ACREAGE
- BIOFILTRATION BMP (BF-1)
- UNDERGROUND DETENTION VAULT

DRAINAGE STUDY MAP FOR ONE ALEXANDRIA NORTH (POST-PROJECT)

JN-19366

DATE: JUNE 23, 2021
REVISED: NOVEMBER 08, 2021

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