Appendix I

Conceptual Hydrology Study
CONCEPTUAL HYDROLOGY STUDY
FOR
Kornerstone Muslim Cemetery
2205 E. Palmyra Avenue & 290 S. Yorba Street
Orange, CA

Prepared for Owner/Developer:
Kornerstone Park LLC
2500 E. Ball Road, Suite 260
Anaheim, CA 92806

Prepared By:
DRC ENGINEERING, INC.
160 S. Old Springs Road, Suite 210
Anaheim Hills, CA 92808
(714) 685-6860

Gregory R. Cooke  RCE 39478  Exp. 12-31-21

2021-05-20

DRC Job No. 19-124
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Section I  Introduction

This conceptual hydrology study has been prepared for Kornerstone Park LLC. The project site is located at 2205 E. Palmyra Avenue and 290 S. Yorba Street on the northwest corner of Palmyra Avenue and Tracy Lane. It is bounded by Santiago Creek on the west, Palmyra Avenue and a residential development on the south, Orange Unified School District Child Development Center on the east, and City of Orange’s Yorba Park and Orange Dog Park on the north.

A total of approximately 4.3 acres will be disturbed as a result of the development. The proposed development includes the removal of the existing paved parking area and the construction of a new paved parking area, sidewalk, landscaped areas, and cemetery plots.

Reference
Appendix A: Vicinity Map

Section II  Project Description

Existing Site Conditions:

The site was part of a former landfill known as the “La Veta Refuse Disposal Station” (Appendix B). The county operated the landfill from at least 1946 to 1956. As part of the closure of the landfill, a layer of soil, 3’ to 15’ thick, was placed over the landfill debris as a landfill cover.

By 1972, the existing YMCA building and parking area were constructed on the site. The YMCA facility was close in 2019 and the site is currently vacant.

Santiago Creek flows northeast to southwest through the northwest corner of the site. The area south of the existing building generally drains toward the existing parking lot and to Palmyra Avenue. The area north of the existing building, however, does not have definitive drainage directions with the existing Santiago Trail acting as a ridge:
• The area west of the trail drains directly into Santiago Creek.
• The area east of the trail drains in arbitrary directions and eventually, drain to the existing parking lot and to Palmyra Avenue.

There is no existing storm drain inlet in the vicinity of the site for Palmyra Avenue to drain into. According to Orange County Flood Control District, Base Map of Drainage Facilities (Appendix C), the closet inlet is located at the intersection of Tracy Lane and Debora Lane. There is an existing 24” RCP storm drain under the site, from Palmyra Avenue to Santiago Creek. The upstream of the 24” RCP is connected to an 18” storm drain from the adjacent OUSD Child Development Center (Appendix D).

The hydrology map for the existing condition in Appendix H shows the delineation of the drainage area boundaries in the existing site condition.

Reference
Appendix B: La Veta Landfill Site Survey Location Map
Appendix C: Orange County Flood Control District, Base Map of Drainage Facilities
Appendix D: City of Orange S.P. # 1362
Appendix H: Hydrology Map – Existing condition
Proposed Site Conditions:

Per Landfill Cover Investigation by Ardent (May 22, 2020):

A human health risk assessment completed in 2009 did not indicate a significant health risk to the YMCA workers or children as a result of exposure to the landfill cover soil, and indoor air samples collected within the on-site building showed no evidence of vapor intrusion. Based on the owner’s initial discussions with the DTSC, site redevelopment as a cemetery may be acceptable, pending on further assessment of the landfill cover.

In the proposed development, the existing building will be renovated for use as a reception room; the rest of facilities will be demolished. New parking area, drive aisles, walkways, landscape and gravesites will be constructed. Retaining walls and screen walls are proposed along the perimeter. The grave plots will be concrete encased with 4 inches of gravel on top.

The proposed construction will take place in the area east of the existing Santiago Trail; no disturbance is proposed in the area west of the trail. The area to be under construction is in Zone X in FEMA FIRMette.

The site is divided into 3 drainage areas in the proposed condition:

- The area west of Santiago Trail will remain the same as the existing condition and will drain into Santiago Creek
- The area south of the retaining/screen walls along Palmyra Avenue will drain into Palmyra Avenue; it will be infeasible to collect and convey the stormwater from this area to the proposed detention system
- The stormwater from the proposed construction area will be collected by the proposed inlets. The inlets will drain into the proposed storm drain systems and to the proposed underground detention system. A proposed vortex separator unit will be the pre-treatment for the stormwater in the storm drains before the water enters the detention system.

The underground detention system will outlet to a pipe connected to a proposed diversion manhole. The diversion manhole has been designed for 2 functions:

- The low flow will be discharged to a proposed pump, where the flow will be treated by a Modular Wetland unit
- The high flows will be controlled so that the sum of discharge from the site in the proposed condition will not exceed the flow rate from the existing condition.

The low flow and the high flow will confluence on the south side of the Modular Wetland unit; the pipe with the combined flow will be connected to the existing 24" RCP. See Appendix H for the proposed hydrology map.

The following table lists the peak discharge rates from the existing and the proposed conditions:
### Peak Discharge (cfs)

<table>
<thead>
<tr>
<th>Storm Frequency</th>
<th>Existing Peak Discharge (cfs)</th>
<th>10-Year</th>
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</thead>
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<td>7.77</td>
<td>10.27</td>
<td></td>
</tr>
<tr>
<td>DA B</td>
<td>4.47</td>
<td>5.41</td>
<td>7.07</td>
<td></td>
</tr>
<tr>
<td>DA C</td>
<td>2.05</td>
<td>2.49</td>
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<tr>
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<td>20.61</td>
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<td>19.82</td>
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<tr>
<td>DA B</td>
<td>4.69</td>
<td>5.65</td>
<td>7.37</td>
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<tr>
<td>Total</td>
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<td>21.59</td>
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<th>25-Year</th>
<th>100-Year</th>
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<td>5.38</td>
<td>6.44</td>
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</tr>
<tr>
<td>DA B</td>
<td>4.69</td>
<td>5.65</td>
<td>7.37</td>
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</tr>
<tr>
<td>DA C</td>
<td>0.54</td>
<td>0.65</td>
<td>0.84</td>
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<tr>
<td>Total</td>
<td>10.04</td>
<td>11.68</td>
<td>14.65</td>
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Reference

Appendix H: Hydrology Map – Proposed condition

### Section III  Methodology

According to the County’s soil map, the soil on-site is type A.

AES HydroWIN v.2015 Rational Method is used to calculate the time of concentration for hydrology analysis and the peak flow rates to be conveyed in the proposed storm drain pipes.

AES HydroWIN v.2015 CH1 Small Area Unit Hydrograph is used to calculate the unit hydrographs for the peak flow rates and runoff volumes.

Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2016 is used for the hydrograph routing for the detention system analysis.

Reference

Appendix A: Soil Map
Appendix E: Hydrological Calculations Rational Method - Existing condition
Appendix F: Hydrological Calculations Rational Method - Proposed condition

### Section IV  Detention System Design

In a letter from Arden, March 25, 2021, (Appendix B):

….. The site has historically been used as a landfill, and as a result, elevated metals potentially exceeding
hazardous waste criteria have been detected in samples collected within the landfill waste. Based on this information, the installation of a stormwater infiltration system is not recommended at the site as it may enhance the potential for the migration of contaminants to groundwater.

Due to the concern for potential contamination, infiltration will not be utilized for the proposed storm drain system. The proposed underground detention system will be solid wall 72" corrugated metal pipes. The unit hydrographs for DA C, the detention system data and the routing calculations are included in Appendix G.

Reference

Appendix B: Infiltration letter from Arden
Appendix G: Detention System Analysis
APPENDIX A

Vicinity Map
APPENDIX B

La Veta Landfill Site Survey Location Map

Letter from Arden, March 25, 2021 (Re: Infiltration)
Geophysical survey test
traverse T-1 (length 360 feet)

Figure 1
March 25, 2021
Project No. 10122805

Mr. Abdul Saquib
Kornerstone Park LLC
2500 East Ball Road, Suite 260
Anaheim, CA 92806

Subject: Stormwater Infiltration System
Proposed Korner Stone Park
2205 East Palmyra Avenue
Orange, California

Dear Mr. Saquib:

It is our understanding that the feasibility of a stormwater infiltration system is being evaluated as one of several approaches to stormwater management at 2205 East Palmyra Avenue, Orange California (site). The site has historically been used as a landfill, and as a result, elevated metals potentially exceeding hazardous waste criteria have been detected in samples collected within the landfill waste. Based on this information, the installation of a stormwater infiltration system is not recommended at the site as it may enhance the potential for the migration of contaminants to groundwater.

If there are any questions, please feel free to call the undersigned at your convenience.

Sincerely,
Ardent Environmental Group, Inc.

Dennis Kawasaki
Senior Project Scientist

Paul A. Roberts, P.G.
Principal Geologist

PAR/DK/aw
APPENDIX C

Orange County Flood Control District, Base Map of Drainage Facilities
APPENDIX D

City of Orange S.P. # 1362 (Storm Drain Plan for the existing 24” RCP)
APPENDIX E

Hydrologic Calculations, Existing Condition – Rational Method: 10-, 25-, 100-year
FILE NAME: 9124E010.DAT
TIME/DATE OF STUDY: 15:47 05/19/2021

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

---*TIME-OF-CONCENTRATION MODEL*---

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 8.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
DATA BANK RAINFALL USED*
*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

*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)

<p>| | | | | | | |</p>
<table>
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<tr>
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</tr>
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<td>0.67</td>
<td>2.00</td>
<td>0.0312</td>
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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.*
   *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

INITIAL SUBAREA FLOW-LENGTH(FEET) = 113.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 245.00

Tc = K*{(LENGTH** 3.00)/(ELEVATION CHANGE)}**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.954
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.907
SUBAREA Tc AND LOSS RATE DATA(AMC II):

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<th>DEVELOPMENT TYPE/</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS</th>
<th>Tc (MIN.)</th>
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<td>LAND USE</td>
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***********************************************************************
**KORNERSTONE MUSLIM CEMETERY**
**EXISTING CONDITION**
**10-YEAR FREQUENCY**

Analysis prepared by:
DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
714-685-6860
NATURAL POOR COVER
"BARREN"  A  0.17  0.40  1.000  78  8.95
SUBAREA AVERAGE Pervious LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE Pervious AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.39
TOTAL AREA(ACRES) = 0.17  PEAK FLOW RATE(CFS) = 0.39

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 52

>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<
>>>TRAVELTIME THRU SUBAREA<<<

ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 244.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 112.00 CHANNEL SLOPE = 0.0089
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.39
FLOW VELOCITY(Feet/SEC) = 1.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.32  Tc(MIN.) = 10.27
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 225.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

COMPUTE NATURAL VALLEY CHANNEL FLOW
TRAVELTIME THRU SUBAREA
ELEVATION DATA: UPSTREAM(FEET) = 244.00 DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 242.00 CHANNEL SLOPE = 0.0041
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.92
FLOW VELOCITY(Feet/SEC) = 0.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 4.18  Tc(MIN.) = 14.45
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 467.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 52

COMPUTE NATURAL VALLEY CHANNEL FLOW
TRAVELTIME THRU SUBAREA
ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 242.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 240.00 CHANNEL SLOPE = 0.0041
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.57
FLOW VELOCITY(Feet/SEC) = 0.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 4.18  Tc(MIN.) = 14.45
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 467.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

COMPUTE NATURAL VALLEY CHANNEL FLOW
TRAVELTIME THRU SUBAREA
ELEVATION DATA: UPSTREAM(FEET) = 244.00 DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 242.00 CHANNEL SLOPE = 0.0041
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.92
FLOW VELOCITY(Feet/SEC) = 0.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 4.18  Tc(MIN.) = 14.45
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 467.00 FEET.
LAND USE GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"BARREN"    A    0.91    0.40    1.000    78

SUBAREA AVERAGE PERVIOUS LOSS RATE, \( F_p \) (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, \( A_p \) = 1.000
SUBAREA AREA (ACRES) = 0.91
SUBAREA RUNOFF (CFS) = 1.49

EFFECTIVE AREA (ACRES) = 1.36
AREA-AVERAGED \( F_p \) (INCH/HR) = 0.40
AREA-AVERAGED \( A_p \) = 1.000
TOTAL AREA (ACRES) = 1.4

PEAK FLOW RATE (CFS) = 2.22

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 52

ELEVATION DATA: UPSTREAM (FEET) = 243.00  DOWNSTREAM (FEET) = 236.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 286.00  CHANNEL SLOPE = 0.0245
FLOW VELOCITY (FEET/SEC) = 2.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME (MIN.) = 1.73  \( T_c \) (MIN.) = 16.19
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 105.00 = 753.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

ELEVATION DATA: UPSTREAM (FEET) = 235.00  DOWNSTREAM (FEET) = 227.00
\( T_c \) = \( K \) \* [\( \text{LENGTH}^3 \)/(ELEVATION CHANGE)] \* 0.20

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 21

ELEVATION DATA: UPSTREAM (FEET) = 235.00  DOWNSTREAM (FEET) = 227.00


FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 21

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

FLOW PROCESS FROM NODE 101.00 TO NODE 105.00 IS CODE = 52

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 21
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21

>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<

USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

INITIAL SUBAREA FLOW-LENGTH(FEET) = 121.00
ELEVATION DATA: UPSTREAM(Feet) = 244.00 DOWNSTREAM(Feet) = 237.20

\[ Tc = K \cdot \left( \frac{\text{LENGTH}^3}{\text{ELEVATION CHANGE}} \right)^{0.20} \]

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.358
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.537

SUBAREA Tc AND LOSS RATE DATA(AMC II):

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<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>SCS</th>
<th>Tc (MIN.)</th>
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<tr>
<td>&quot;OPEN BRUSH&quot;</td>
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<td>62</td>
<td>6.36</td>
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SUBAREA AVERAGE Pervious LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE Pervious AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 2.05
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 2.05

END OF RATIONAL METHOD ANALYSIS
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
(c) Copyright 1983-2015 Advanced Engineering Software (aes)
Ver. 22.0 Release Date: 07/01/2015 License ID 1510

Analysis prepared by:

DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
714-685-6860

************************** DESCRIPTION OF STUDY **************************
* 19-124 KORNERSTONE MUSLIM CEMETERY                        *
* EXISTING CONDITION                                         *
* 25-YEAR FREQUENCY                                          *
*************************************************************************
FILE NAME: 9124E025.DAT
TIME/DATE OF STUDY: 15:49 05/19/2021

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
--*TIME-OF-CONCENTRATION MODEL*--
USER SPECIFIED STORM EVENT(YEAR) =   25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
*DATA BANK RAINFALL USED*
*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*
*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 0.0312 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)
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE = 21

>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) =   113.00
ELEVATION DATA: UPSTREAM(Feet) = 246.00 DOWNSTREAM(Feet) = 245.00
Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.954
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.469
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL POOR COVER
"BARREN"                   A        0.17      0.40     1.000    78    8.95
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, Ap = 1.000
SUBAREA Runoff(CFS) = 0.48
TOTAL AREA(ACRES) = 0.17   PEAK FLOW RATE(CFS) = 0.48

FLOW PROCESS FROM NODE  102.00 TO NODE  103.00 IS CODE = 52

>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 245.00  DOWNSTREAM(FEET) = 244.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 112.00  CHANNEL SLOPE = 0.0089
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.48
FLOW VELOCITY(FEET/SEC) = 1.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.32   Tc(MIN.) = 10.27
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 225.00 FEET.

FLOW PROCESS FROM NODE  103.00 TO NODE  103.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 10.27
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.209
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL   AREA      Fp         Ap     SCS
                  LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER "BARREN"                   A        0.28      0.40     1.000    78
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, Ap = 1.000
SUBAREA AREA(ACRES) = 0.28     SUBAREA Runoff(CFS) = 0.70
EFFECTIVE AREA(ACRES) = 0.45   AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.40     AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 0.4       PEAK FLOW RATE(CFS) = 1.14

FLOW PROCESS FROM NODE  104.00 TO NODE  104.00 IS CODE = 52

>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 244.00  DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 242.00  CHANNEL SLOPE = 0.0041
CHANNEL FLOW THRU SUBAREA(CFS) = 1.14
FLOW VELOCITY(FEET/SEC) = 0.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 4.08   Tc(MIN.) = 14.35
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 467.00 FEET.

FLOW PROCESS FROM NODE  104.00 TO NODE  104.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 14.35
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.656
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL   AREA      Fp         Ap     SCS
                  LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"BARREN" A 0.91 0.40 1.000 78
SUBAREA AVERAGE Pervious Loss Rate, \( F_p \) (INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, \( A_p \) = 1.000
SUBAREA AREA (ACRES) = 0.91 SUBAREA RUNOFF (CFS) = 1.85
EFFECTIVE AREA (ACRES) = 1.36 AREA-AVERAGED \( F_m \) (INCH/HR) = 0.40
AREA-AVERAGED \( F_p \) (INCH/HR) = 0.40 AREA-AVERAGED \( A_p \) = 1.00
TOTAL AREA (ACRES) = 1.4 PEAK FLOW RATE (CFS) = 2.76

*****************************************************************************
FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 52

>>> COMPUTE NATURAL VALLEY CHANNEL FLOW <<<<<
>>> TRAVELTIME THRU SUBAREA <<<<<

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 236.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 286.00 CHANNEL SLOPE = 0.0245
CHANNEL FLOW THRU SUBAREA (CFS) = 2.76
FLOW VELOCITY (FEET/SEC) = 2.89 (PER LACFCD/RFCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 16.01
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 105.00 = 753.00 FEET.

*****************************************************************************
FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

MAINLINE Tc (MIN.) = 16.01
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.497
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA \( F_p \) \( A_p \) SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 2.52 0.40 0.500 32
SUBAREA AVERAGE Pervious Loss Rate, \( F_p \) (INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, \( A_p \) = 0.500
SUBAREA AREA (ACRES) = 2.52 SUBAREA RUNOFF (CFS) = 5.20
EFFECTIVE AREA (ACRES) = 3.88 AREA-AVERAGED \( F_m \) (INCH/HR) = 0.27
AREA-AVERAGED \( F_p \) (INCH/HR) = 0.40 AREA-AVERAGED \( A_p \) = 0.68
TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 7.77

*****************************************************************************
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 21

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<<
USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA <<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 91.00
ELEVATION DATA: UPSTREAM (FEET) = 235.00 DOWNSTREAM (FEET) = 227.00

\( T_c = K*(LENGTH**3.00)/(ELEVATION CHANGE))^{0.20} \)
SUBAREA ANALYSIS USED MINIMUM \( T_c \) (MIN.) = 5.188
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.724
SUBAREA \( T_c \) AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA \( F_p \) \( A_p \) SCS \( T_c \)
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.) NATURAL POOR COVER
"OPEN BRUSH" A 1.39 0.40 1.000 62 5.19
SUBAREA AVERAGE Pervious Loss Rate, \( F_p \) (INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, \( A_p \) = 1.000
SUBAREA RUNOFF (CFS) = 5.41
TOTAL AREA (ACRES) = 1.39 PEAK FLOW RATE (CFS) = 5.41
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21

>>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<<
USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 121.00
ELEVATION DATA: UPSTREAM (FEET) = 244.00 DOWNSTREAM (FEET) = 237.20

Tc = K*[LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.358
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.210

SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL POOR COVER "OPEN BRUSH" A 0.73 0.40 1.000 62 6.36
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 2.49
TOTAL AREA (ACRES) = 0.73 PEAK FLOW RATE (CFS) = 2.49

END OF RATIONAL METHOD ANALYSIS
Analysis prepared by:

DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
714-685-6860

*************** DESCRIPTION OF STUDY ***********************
* 19-124 KORNERSTONE MUSLIM CEMETERY *
* EXISTING CONDITION *
* 100-YEAR FREQUENCY *

FILE NAME: 9124E100.DAT
TIME/DATE OF STUDY: 15:50 05/19/2021

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

---TIME-OF-CONCENTRATION MODEL---

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 8.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICITION SLOPE = 0.95

DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

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.
   USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

INITIAL SUBAREA FLOW-LENGTH(FEET) = 113.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 245.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.954
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.431
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL POOR COVER
"BARREN"  A  0.17  0.40  1.000  93  8.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, \( F_p \) (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, \( A_p \) = 1.000
SUBAREA RUNOFF (CFS) = 0.63
TOTAL AREA (ACRES) = 0.17  PEAK FLOW RATE (CFS) = 0.63

*****************************************************************************
FLOW PROCESS FROM NODE  102.00 TO NODE  103.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<
*****************************************************************************
ELEVATION DATA: UPSTREAM (FEET) = 245.00  DOWNSTREAM (FEET) = 244.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 112.00  CHANNEL SLOPE = 0.0089
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA (CFS) = 0.63
FLOW VELOCITY (FEET/SEC) = 1.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME (MIN.) = 1.32  \( T_c \) (MIN.) = 10.27
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 225.00 FEET.
*****************************************************************************
FLOW PROCESS FROM NODE  103.00 TO NODE  103.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
*****************************************************************************
MAINLINE \( T_c \) (MIN.) = 10.27
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.096
SUBAREA LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA \( F_p \) \( A_p \) SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL POOR COVER  "BARREN"  A  0.28  0.40  1.000  93
SUBAREA AVERAGE PERVIOUS LOSS RATE, \( F_p \) (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, \( A_p \) = 1.000
SUBAREA AREA (ACRES) = 0.28  SUBAREA RUNOFF (CFS) = 0.91
EFFECTIVE AREA (ACRES) = 0.45  AREA-AVERAGED \( F_m \) (INCH/HR) = 0.40
AREA-AVERAGED \( F_p \) (INCH/HR) = 0.40  AREA-AVERAGED \( A_p \) = 1.00
TOTAL AREA (ACRES) = 0.4  PEAK FLOW RATE (CFS) = 1.49
*****************************************************************************
FLOW PROCESS FROM NODE  103.00 TO NODE  104.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<
*****************************************************************************
ELEVATION DATA: UPSTREAM (FEET) = 244.00  DOWNSTREAM (FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00  CHANNEL SLOPE = 0.0041
CHANNEL FLOW THRU SUBAREA (CFS) = 1.49
FLOW VELOCITY (FEET/SEC) = 1.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME (MIN.) = 3.87  \( T_c \) (MIN.) = 14.14
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 467.00 FEET.
*****************************************************************************
FLOW PROCESS FROM NODE  104.00 TO NODE  104.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
*****************************************************************************
MAINLINE \( T_c \) (MIN.) = 14.14
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.410
SUBAREA LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA \( F_p \) \( A_p \) SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL POOR COVER

"BARREN"                   A        0.91      0.40     1.000    93
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p$(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p$ = 1.000
SUBAREA AREA (ACRES) = 0.91      SUBAREA RUNOFF (CFS) = 2.47
EFFECTIVE AREA (ACRES) = 1.36      AREA-AVERAGED $F_m$(INCH/HR) = 0.40
AREA-AVERAGED $F_p$(INCH/HR) = 0.40      AREA-AVERAGED $A_p$ = 1.00
TOTAL AREA (ACRES) = 1.4      PEAK FLOW RATE (CFS) = 3.69

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 52

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 21

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 21
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<

USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

INITIAL SUBAREA FLOW-LENGTH (FEET) = 121.00
ELEVATION DATA: UPSTREAM (FEET) = 244.00 DOWNSTREAM (FEET) = 237.20

\[ T_c = K \left[ \frac{(\text{LENGTH}^3)}{\text{ELEVATION CHANGE}} \right]^{0.20} \]

SUBAREA ANALYSIS USED MINIMUM \(T_c\) (MIN.) = 6.358
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.391

SUBAREA \(T_c\) AND LOSS RATE DATA (AMC III):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>SCS</th>
<th>Tc (MIN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATURAL POOR COVER</td>
<td>&quot;OPEN BRUSH&quot;</td>
<td>A</td>
<td>0.73</td>
<td>0.40</td>
<td>1.000</td>
<td>81</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 3.27
TOTAL AREA (ACRES) = 0.73 PEAK FLOW RATE (CFS) = 3.27

END OF RATIONAL METHOD ANALYSIS
APPENDIX F

Hydrologic Calculations, Proposed Condition – Rational Method: 10-, 25-, 100-year
Analysis prepared by:

DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
714-685-6860

*DESCRIPTION OF STUDY*

19-124 KORNERSTONE MUSLIM CEMETERY
PROPOSED CONDITION
10-YEAR FREQUENCY

FILE NAME: 9124P010.DAT
TIME/DATe OF STUDY: 09:03 05/18/2021

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

**TIME-OF-CONCENTRATION MODEL**

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 8.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
DATA BANK RAINFALL USED*
ANTICEDEMD MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*

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.*
   USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1800.00 TO NODE 1800.00 IS CODE = 22

USER SPECIFIED Tc (MIN.) = 5.000
10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060
SUBAREA LOSS RATE DATA (AMC II):

<table>
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<tr>
<th>LAND USE</th>
<th>SCS SOIL</th>
<th>AREA</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.28</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 1.01
**TOTAL AREA (ACRES) = 0.28  PEAK FLOW RATE (CFS) = 1.01**

* FLOW PROCESS FROM NODE 1800.00 TO NODE 1700.00 IS CODE = 31 *

**>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<**
**>>> USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW) <<<**

---

**FLOW LENGTH (FEET) = 268.00  MANNING'S N = 0.013**
**DEPTH OF FLOW IN 9.0 INCH PIPE IS 6.6 INCHES**
**PIPE-FLOW VELOCITY (FEET/SEC.) = 2.93**
**ESTIMATED PIPE DIAMETER (INCH) = 9.00  NUMBER OF PIPES = 1**
**PIPE-FLOW (CFS) = 1.01**
**PIPE TRAVEL TIME (MIN.) = 1.53  Tc (MIN.) = 6.53**

LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1700.00 = 268.00 FEET.

---

**FLOW PROCESS FROM NODE 1700.00 TO NODE 1600.00 IS CODE = 31**

**>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<**
**>>> USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW) <<<**

---

**FLOW LENGTH (FEET) = 238.26  MANNING'S N = 0.013**
**DEPTH OF FLOW IN 9.0 INCH PIPE IS 6.6 INCHES**
**PIPE-FLOW VELOCITY (FEET/SEC.) = 2.93**
**ESTIMATED PIPE DIAMETER (INCH) = 9.00  NUMBER OF PIPES = 1**
**PIPE-FLOW (CFS) = 1.05**
**PIPE TRAVEL TIME (MIN.) = 1.01  Tc (MIN.) = 7.54**

LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1600.00 = 447.00 FEET.

---

**FLOW PROCESS FROM NODE 1600.00 TO NODE 1600.00 IS CODE = 81**

**>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<**

---

**MAINLINE Tc (MIN.) = 6.53**
**10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.485**

**SUBAREA LOSS RATE DATA (AMC II):**

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL</th>
<th>AREA</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.06</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

**SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40**
**SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100**
**SUBAREA AREA (ACRES) = 0.06  SUBAREA RUNOFF (CFS) = 0.19**
**EFFECTIVE AREA (ACRES) = 0.34  AREA-AVERAGED Fm (INCH/HR) = 0.04**
**AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10**
**TOTAL AREA (ACRES) = 0.3  PEAK FLOW RATE (CFS) = 1.05**

---

**FLOW PROCESS FROM NODE 1700.00 TO NODE 1600.00 IS CODE = 81**

**>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<**

---

**MAINLINE Tc (MIN.) = 7.54**
**10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.208**

**SUBAREA LOSS RATE DATA (AMC II):**

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL</th>
<th>AREA</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.06</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

**SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40**
**SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100**
SUBAREA AREA (ACRES) = 0.06  SUBAREA RUNOFF (CFS) = 0.17
EFFECTIVE AREA (ACRES) = 0.40  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.4  PEAK FLOW RATE (CFS) = 1.14

FLOW PROCESS FROM NODE 1600.00 TO NODE 1500.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 237.36 DOWNSTREAM (FEET) = 237.16
FLOW LENGTH (FEET) = 40.00  MANNING’S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.06
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1.14
PIPE TRAVEL TIME (MIN.) = 0.22  Tc (MIN.) = 7.76
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1500.00 = 487.00 FEET.

FLOW PROCESS FROM NODE 1500.00 TO NODE 1500.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<

MAINLINE Tc (MIN.) = 7.76
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.156
SUBAREA LOSS RATE DATA (AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.18</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.18  SUBAREA RUNOFF (CFS) = 0.50
EFFECTIVE AREA (ACRES) = 0.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.6  PEAK FLOW RATE (CFS) = 1.63

FLOW PROCESS FROM NODE 1500.00 TO NODE 1400.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 237.16 DOWNSTREAM (FEET) = 237.08
FLOW LENGTH (FEET) = 15.00  MANNING’S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.42
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1.63
PIPE TRAVEL TIME (MIN.) = 0.07  Tc (MIN.) = 7.83
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1400.00 = 502.00 FEET.

FLOW PROCESS FROM NODE 1400.00 TO NODE 1400.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<

MAINLINE Tc (MIN.) = 7.83
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.139
SUBAREA LOSS RATE DATA (AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
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<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.18</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>
COMMERCIAL A 1.12 0.40 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.12 SUBAREA RUNOFF(CFS) = 3.12
EFFECTIVE AREA(ACRES) = 1.70 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 4.74

FLOW PROCESS FROM NODE 1400.00 TO NODE 1300.00 IS CODE = 31

>>><<<COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>><<<USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.08 DOWNSTREAM(FEET) = 236.98
FLOW LENGTH(Feet) = 20.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.6 INCHES
PIPE-FLOW VELOCITY(Feet/SEC.) = 4.37
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.74
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 7.91
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.00 = 522.00 FEET.

FLOW PROCESS FROM NODE 1300.00 TO NODE 1300.00 IS CODE = 81

>>><<<ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.91
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.122
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.22 0.40 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 1.92 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.33

FLOW PROCESS FROM NODE 1300.00 TO NODE 1300.10 IS CODE = 31

>>><<<COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>><<<USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 236.98 DOWNSTREAM(FEET) = 235.89
FLOW LENGTH(Feet) = 139.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.7 INCHES
PIPE-FLOW VELOCITY(Feet/SEC.) = 5.17
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.33
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 8.35
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.10 = 661.00 FEET.

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.10 IS CODE = 10

>>><<<MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.10 IS CODE = 10

>>><<<MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<
FLOW PROCESS FROM NODE 1222.00 TO NODE 1222.00 IS CODE = 22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 139.00
USER SPECIFIED Tc (MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060

SUBAREA LOSS RATE DATA (AMC II):
<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE / LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.74</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 2.68
TOTAL AREA (ACRES) = 0.74
PEAK FLOW RATE (CFS) = 2.68

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<

ELEVATION DATA: UPSTREAM (FEET) = 237.80
DOWNSTREAM (FEET) = 236.87
FLOW LENGTH (FEET) = 185.00
MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.4 INCHES
ESTIMATED PIPE DIAMETER (INCH) = 15.00
NUMBER OF PIPES = 1
PIPE FLOW (CFS) = 2.68
PIPE TRAVEL TIME (MIN.) = 0.81
Tc (MIN.) = 5.81
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 10

>>> MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<

FLOW PROCESS FROM NODE 1210.00 TO NODE 1210.00 IS CODE = 22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 185.00
USER SPECIFIED Tc (MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060

SUBAREA LOSS RATE DATA (AMC II):
<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE / LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.90</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 3.26
TOTAL AREA (ACRES) = 0.90
PEAK FLOW RATE (CFS) = 3.26

FLOW PROCESS FROM NODE 1210.00 TO NODE 1221.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<

ELEVATION DATA: UPSTREAM (FEET) = 242.40
DOWNSTREAM (FEET) = 236.87
FLOW LENGTH (FEET) = 158.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.28
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 3.26
PIPE TRAVEL TIME (MIN.) = 0.32  Tc (MIN.) = 5.32
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

------------------------------------------------------------------------------------------------------------------------------------------------------------------
** MAIN STREAM CONFLUENCE DATA **
STREAM  Q  Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 3.26 5.32 3.919 0.40 (0.04) 0.10 0.9 1210.00
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM  Q  Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 2.68 5.81 3.724 0.40 (0.04) 0.10 0.7 1222.00
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM  Q  Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 5.83 5.32 3.919 0.40 (0.04) 0.10 1.6 1210.00
2 5.77 5.81 3.724 0.40 (0.04) 0.10 1.6 1222.00
TOTAL AREA (ACRES) = 1.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 5.83  Tc (MIN.) = 5.318
EFFECTIVE AREA (ACRES) = 1.58  AREA-AVERAGED Fp (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

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** CLEAR MEMORY BANK # 2 <<<<<
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** ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<
------------------------------------------------------------------------------------------------------------------------------------------------------------------
MAINLINE Tc (MIN.) = 5.32
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.919
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.35 0.40 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.35  SUBAREA RUNOFF (CFS) = 1.22
EFFECTIVE AREA (ACRES) = 1.93  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0  PEAK FLOW RATE (CFS) = 6.73
FLOW PROCESS FROM NODE 1221.00 TO NODE 1300.10 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 236.87 DOWNSTREAM(FEET) = 235.89
FLOW LENGTH(FEET) = 196.00 MANNING’S N = 0.013
DEPT OF FLOW IN 18.0 INCH PIPE IS 13.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.65
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.73
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 6.02
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1300.10 = 539.00 FEET.

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.10 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
STREAM NUMBER Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NODE
1 6.73 6.02 3.650 0.40( 0.04) 0.10 1.9 1210.00
2 6.60 6.51 3.488 0.40( 0.04) 0.10 2.0 1222.00
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1300.10 = 539.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NODE
1 5.33 8.35 3.025 0.40( 0.04) 0.10 1.9 1800.00
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.10 = 661.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM NUMBER Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NODE
1 11.37 6.02 3.650 0.40( 0.04) 0.10 3.3 1210.00
2 11.40 6.51 3.488 0.40( 0.04) 0.10 3.5 1222.00
3 11.04 8.35 3.025 0.40( 0.04) 0.10 3.9 1800.00
TOTAL AREA(ACRES) = 3.9
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 11.40 Tc(MIN.) = 6.515
EFFECTIVE AREA(ACRES) = 3.49 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.9
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.10 = 661.00 FEET.

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.10 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.20 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 235.89 DOWNSTREAM(FEET) = 235.65
FLOW LENGTH (FEET) = 48.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.42
ESTIMATED PIPE DIAMETER (INCH) = 24.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 11.40
PIPE TRAVEL TIME (MIN.) = 0.15  Tc (MIN.) = 6.66
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 10

FLOW PROCESS FROM NODE 1120.00 TO NODE 1120.00 IS CODE = 22

INITIAL SUBAREA FLOW-LENGTH (FEET) = 48.00
USER SPECIFIED Tc (MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE
SCS SOIL GROUP
AREA (ACRES) Fp Ap SCS
COMMERCIAL A 0.18 0.40 0.100 32

SUBAREA AVERAGE PERVERSIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVERSIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 0.65
TOTAL AREA (ACRES) = 0.18  PEAK FLOW RATE (CFS) = 0.65

FLOW PROCESS FROM NODE 1120.10 TO NODE 1120.10 IS CODE = 81

MAINLINE Tc (MIN.) = 7.94
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.113
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE
SCS SOIL GROUP
AREA (ACRES) Fp Ap SCS
COMMERCIAL A 0.33 0.40 0.100 32

SUBAREA AVERAGE PERVERSIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVERSIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.33  SUBAREA RUNOFF (CFS) = 0.91
EFFECTIVE AREA (ACRES) = 0.51  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.5  PEAK FLOW RATE (CFS) = 1.41

FLOW PROCESS FROM NODE 1120.10 TO NODE 1300.20 IS CODE = 31

>>> COMPUTE PIPE- FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW) <<<

FLOW LENGTH (FEET) = 31.00  MANNING'S N = 0.013
ELEVATION DATA: UPSTREAM (FEET) = 241.54  DOWNSTREAM (FEET) = 235.65
DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.9 INCHES
PIPE FLOW VELOCITY (FEET/SEC.) = 12.57
ESTIMATED PIPE DIAMETER (INCH) = 8.00  NUMBER OF PIPES = 1
PIPE FLOW (CFS) = 1.41
PIPE TRAVEL TIME (MIN.) = 0.04
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
STREAM  Q  Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)   NODE
1       1.41  7.99  3.104  0.40(0.04) 0.10  0.5   1120.00
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM  Q  Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)   NODE
1       11.37 6.17  3.599  0.40(0.04) 0.10  3.3   1210.00
2       11.40 6.66  3.444  0.40(0.04) 0.10  3.5   1222.00
3       11.04 8.50  2.995  0.40(0.04) 0.10  3.9   1800.00
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM  Q  Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)   NODE
1       12.63 6.17  3.599  0.40(0.04) 0.10  3.7   1210.00
2       12.70 6.66  3.444  0.40(0.04) 0.10  3.9   1222.00
3       12.55 7.99  3.104  0.40(0.04) 0.10  4.3   1120.00
4       12.40 8.50  2.995  0.40(0.04) 0.10  4.4   1800.00
TOTAL AREA (ACRES) = 4.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 12.70  Tc(MIN.) = 6.662
EFFECTIVE AREA (ACRES) = 3.91  AREA- AVERAGED Fm (INCH/HR) = 0.04
AREA- AVERAGED Fp (INCH/HR) = 0.40  AREA- AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 4.4
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 12

>>> CLEAR MEMORY BANK # 1 <<<

FLOW PROCESS FROM NODE 2000.00 TO NODE 2000.10 IS CODE = 21
INITIAL SUBAREA FLOW-LENGTH (FEET) = 91.00
ELEVATION DATA: UPSTREAM (FEET) = 235.00 DOWNSTREAM (FEET) = 227.00

\[ T_c = K \left( \frac{\text{LENGTH}^3}{\text{ELEVATION CHANGE}} \right)^{0.20} \]

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060

SUBAREA Tc AND LOSS RATE DATA (AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>SCS</th>
<th>Tc (MIN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC PARK</td>
<td>A</td>
<td>1.40</td>
<td>0.40</td>
<td>0.850</td>
<td>32</td>
<td>5.00</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA RUNOFF (CFS) = 4.69
TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 4.69

FLOW PROCESS FROM NODE 3000.00 TO NODE 3000.00 IS CODE = 22

INITIAL SUBAREA FLOW-LENGTH (FEET) = 91.00
USER SPECIFIED Tc (MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060

SUBAREA LOSS RATE DATA (AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>SCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC PARK</td>
<td>A</td>
<td>0.16</td>
<td>0.40</td>
<td>0.850</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA RUNOFF (CFS) = 0.54
TOTAL AREA (ACRES) = 0.16 PEAK FLOW RATE (CFS) = 0.54

END OF RATIONAL METHOD ANALYSIS
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:
DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
714-685-6860

************************** DESCRIPTION OF STUDY **************************
* 19-124 KORNERSTONE MUSLIM CEMETERY *
* PROPOSED CONDITION *
* 25-YEAR FREQUENCY *
**************************************************************************

FILE NAME: 9124P025.DAT
TIME/DATE OF STUDY: 09:04 05/18/2021

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
---*TIME-OF-CONCENTRATION MODEL*---
USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 8.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
*DATA BANK RAINFALL USED*
*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*

<table>
<thead>
<tr>
<th>NO.</th>
<th>WIDTH CROSSFALL IN-</th>
<th>/ OUT-/PARK- HEIGHT</th>
<th>WIDTH</th>
<th>LIP</th>
<th>HIKE FACTOR</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30.0</td>
<td>20.0</td>
<td>0.018</td>
<td>0.018</td>
<td>0.020</td>
<td>0.67</td>
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<tr>
<td></td>
<td>0.67</td>
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<td>0.167</td>
<td>0.0150</td>
<td></td>
</tr>
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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.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1800.00 TO NODE 1800.00 IS CODE = 22

> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<

USER SPECIFIED Tc(MIN.) = 5.000
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.824

SUBAREA LOSS RATE DATA(AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP (ACRES)</th>
<th>AREA (INCH/HR) (DECIMAL)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.28</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.21
TOTAL AREA(ACRES) = 0.28  PEAK FLOW RATE(CFS) = 1.21

FLOW PROCESS FROM NODE 1800.00 TO NODE 1700.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 239.60  DOWNSTREAM(FEET) = 238.26
FLOW LENGTH(FEET) = 268.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.9 INCHES
PIPE-FLOW VELOCITY(Feet/SEC.) = 3.11
ESTIMATED PIPE DIAMETER(INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.21
PIPE TRAVEL TIME(MIN.) = 1.44  Tc(MIN.) = 6.44
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1700.00 = 268.00 FEET.

SHOP PROCESS FROM NODE 1700.00 TO NODE 1700.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.44
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.181
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE     SCS SOIL       AREA  Fp     Ap  SCS
                GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL        A    0.06    0.40   0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.06  SUBAREA RUNOFF(CFS) = 0.22
EFFECTIVE AREA(ACRES) = 0.34  AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 0.3  PEAK FLOW RATE(CFS) = 1.27

FLOW PROCESS FROM NODE 1700.00 TO NODE 1600.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 238.26  DOWNSTREAM(FEET) = 237.36
FLOW LENGTH(FEET) = 179.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.1 INCHES
PIPE-FLOW VELOCITY(Feet/SEC.) = 3.16
ESTIMATED PIPE DIAMETER(INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.27
PIPE TRAVEL TIME(MIN.) = 0.94  Tc(MIN.) = 7.38
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1600.00 = 447.00 FEET.

FLOW PROCESS FROM NODE 1600.00 TO NODE 1600.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.869
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE     SCS SOIL       AREA  Fp     Ap  SCS
                GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL        A    0.06    0.40   0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
Subarea area (acres) = 0.06  Subarea runoff (cfs) = 0.21
Effective area (acres) = 0.40  Area-averaged Fm (inch/hr) = 0.04
Area-averaged Fp (inch/hr) = 0.40  Area-averaged Ap = 0.10
Total area (acres) = 0.4  Peak flow rate (cfs) = 1.38

Flow process from node 1600.00 to node 1500.00 is code = 31

>>> Compute pipe-flow travel time thru subarea<<<<<

Elevation data: Upstream (feet) = 237.36  Downstream (feet) = 237.16
Flow length (feet) = 40.00  Manning's N = 0.013
Depth of flow in 12.0 inch pipe is 6.4 inches
Pipe-flow velocity (feet/sec.) = 3.22
Estimated pipe diameter (inch) = 12.00  Number of pipes = 1
Pipe-flow (cfs) = 1.38
Pipe travel time (min.) = 0.21  Tc (min.) = 7.59
Longest flowpath from node 1800.00 to node 1500.00 = 487.00 feet.

Flow process from node 1500.00 to node 1500.00 is code = 81

>>> Addition of subarea to mainline peak flow<<<<<<<

Mainline Tc (min.) = 7.59
* 25 year rainfall intensity (inch/hr) = 3.809
Subarea loss rate data (AMC II):
Development type/

<table>
<thead>
<tr>
<th>Land use</th>
<th>SCS group</th>
<th>Area (acres)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>A</td>
<td>0.18</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

Subarea average pervious loss rate, Fp (inch/hr) = 0.40
Subarea average pervious area fraction, Ap = 0.100
Subarea area (acres) = 0.18  Subarea runoff (cfs) = 0.61
Effective area (acres) = 0.58  Area-averaged Fm (inch/hr) = 0.04
Area-averaged Fp (inch/hr) = 0.40  Area-averaged Ap = 0.10
Total area (acres) = 0.6  Peak flow rate (cfs) = 1.97

Flow process from node 1500.00 to node 1400.00 is code = 31

>>> Compute pipe-flow travel time thru subarea<<<<<

Elevation data: Upstream (feet) = 237.16  Downstream (feet) = 237.08
Flow length (feet) = 15.00  Manning's N = 0.013
Depth of flow in 12.0 inch pipe is 7.9 inches
Pipe-flow velocity (feet/sec.) = 3.56
Estimated pipe diameter (inch) = 12.00  Number of pipes = 1
Pipe-flow (cfs) = 1.97
Pipe travel time (min.) = 0.07  Tc (min.) = 7.66
Longest flowpath from node 1800.00 to node 1400.00 = 502.00 feet.

Flow process from node 1400.00 to node 1400.00 is code = 81

>>> Addition of subarea to mainline peak flow<<<<<<<

Mainline Tc (min.) = 7.66
* 25 year rainfall intensity (inch/hr) = 3.789
Subarea loss rate data (AMC II):
Development type/

<table>
<thead>
<tr>
<th>Land use</th>
<th>SCS group</th>
<th>Area (acres)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS CN</th>
</tr>
</thead>
</table>

Subarea average pervious loss rate, Fp (inch/hr) = 0.40
Subarea average pervious area fraction, Ap = 0.10
Subarea area (acres) = 0.18  Subarea runoff (cfs) = 0.61
Effective area (acres) = 0.58  Area-averaged Fm (inch/hr) = 0.04
Area-averaged Fp (inch/hr) = 0.40  Area-averaged Ap = 0.10
Total area (acres) = 0.6  Peak flow rate (cfs) = 1.97
COMMERCIAL  A  1.12  0.40  0.100  32
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE Pervious Area Fraction, Ap =  0.100
SUBAREA AREA(ACRES) =  1.12  SUBAREA RUNOFF(CFS) =  3.78
EFFECTIVE AREA(ACRES) =  1.70  AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =  1.7  PEAK FLOW RATE(CFS) =  5.74

FLOW PROCESS FROM NODE  1400.00 TO NODE  1300.00 IS CODE =  31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) =  237.08  DOWNSTREAM(FEET) =  236.98
FLOW LENGTH(FEET) =  20.00  MANNING’S N =  0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.1 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) =  4.54
ESTIMATED PIPE DIAMETER(INCH) =  18.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  5.74
PIPE TRAVEL TIME(MIN.) =  0.07  Tc(MIN.) =  7.73
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.00 =  522.00 FEET.

FLOW PROCESS FROM NODE  1300.00 TO NODE  1300.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) =  7.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.769

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE
SCS SOIL  AREA  Fp  Ap  SCS CN
COMMERCIAL  A  0.22  0.40  0.100  32
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE Pervious Area Fraction, Ap =  0.100
SUBAREA AREA(ACRES) =  0.22  SUBAREA RUNOFF(CFS) =  0.74
EFFECTIVE AREA(ACRES) =  1.92  AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =  1.9  PEAK FLOW RATE(CFS) =  6.44

FLOW PROCESS FROM NODE  1300.00 TO NODE  1300.10 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) =  236.98  DOWNSTREAM(FEET) =  235.89
FLOW LENGTH(FEET) =  139.00  MANNING’S N =  0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.2 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) =  5.57
ESTIMATED PIPE DIAMETER(INCH) =  18.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  6.44
PIPE TRAVEL TIME(MIN.) =  0.42  Tc(MIN.) =  8.15
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.10 =  661.00 FEET.

FLOW PROCESS FROM NODE  1300.10 TO NODE  1300.10 IS CODE = 10

>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
FLOW PROCESS FROM NODE  1222.00 TO NODE  1222.00 IS CODE =  22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA <<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 139.00
USER SPECIFIED Tc (MIN.) =  5.000
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.824

SUBAREA LOSS RATE DATA (AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.74</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 3.19
TOTAL AREA (ACRES) = 0.74 PEAK FLOW RATE (CFS) = 3.19

FLOW PROCESS FROM NODE  1222.00 TO NODE  1221.00 IS CODE =  31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 237.80  DOWNSTREAM (FEET) = 236.87
FLOW LENGTH (FEET) = 185.00  MANNING’S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.4 INCHES
ESTIMATED PIPE DIAMETER (INCH) = 15.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 3.19
PIPE TRAVEL TIME (MIN.) = 0.78  Tc (MIN.) = 5.78
LONGEST FLOWPATH FROM NODE  1222.00 TO NODE  1221.00 = 324.00 FEET.

FLOW PROCESS FROM NODE  1221.00 TO NODE  1221.00 IS CODE =  10

>>> MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<

FLOW PROCESS FROM NODE  1210.00 TO NODE  1210.00 IS CODE =  22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA <<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 185.00
USER SPECIFIED Tc (MIN.) =  5.000
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.824

SUBAREA LOSS RATE DATA (AMC II):

<table>
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<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.90</td>
<td>0.40</td>
<td>0.100</td>
<td>32</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 3.87
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 3.87

FLOW PROCESS FROM NODE  1210.00 TO NODE  1221.00 IS CODE =  31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 242.40  DOWNSTREAM (FEET) = 236.87
FLOW LENGTH (FEET) = 158.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.7 INCHES
PIPE FLOW VELOCITY (FEET/SEC.) = 8.64
ESTIMATED PIPE DIAMETER (INCH) = 12.00 NUMBER OF PIPES = 1
PIPE FLOW (CFS) = 3.87
PIPE TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 5.30
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 11

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 3.87 5.30 4.665 0.40 (0.04) 0.10 0.9 1210.00
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 3.19 5.78 4.444 0.40 (0.04) 0.10 0.7 1222.00
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 6.95 5.30 4.665 0.40 (0.04) 0.10 1.6 1210.00
2 6.88 5.78 4.444 0.40 (0.04) 0.10 1.6 1222.00
TOTAL AREA (ACRES) = 1.6
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 6.95 Tc (MIN.) = 5.305
EFFECTIVE AREA (ACRES) = 1.58 AREA AVERAGED Fm (INCH/HR) = 0.04
AREA AVERAGED Fp (INCH/HR) = 0.40 AREA AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 81

** MAIN LINE TC (MIN.) = 5.30
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.665
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE SCS SOIL AREA Fp Ap SCS LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.35 0.40 0.100 32
SUBAREA AVERAGE PERVERIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVERIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.35 SUBAREA RUNOFF (CFS) = 1.46
EFFECTIVE AREA (ACRES) = 1.93 AREA AVERAGED Fm (INCH/HR) = 0.04
AREA AVERAGED Fp (INCH/HR) = 0.40 AREA AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 8.03
FLOW PROCESS FROM NODE  1221.00 TO NODE  1300.10 IS CODE =  31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) =  236.87  DOWNSTREAM(FEET) =  235.89
FLOW LENGTH(FEET) =  196.00  MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
PIPE-FLOW VELOCITY(Feet/SEC.) =  4.96
ESTIMATED PIPE DIAMETER(INCH) =  21.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  8.03
PIPE TRAVEL TIME(MIN.) =  0.66  Tc(MIN.) =  5.96
LONGEST FLOWPATH FROM NODE  1210.00 TO NODE  1300.10 =  539.00 FEET.

FLOW PROCESS FROM NODE  1300.10 TO NODE  1300.10 IS CODE =  11

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

** MAIN STREAM CONFLUENCE DATA **

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>Q</th>
<th>Tc</th>
<th>Intensity</th>
<th>Fp(Fm)</th>
<th>Ap</th>
<th>Ae</th>
<th>HEADWATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.03</td>
<td>5.96</td>
<td>4.366</td>
<td>0.40(0.04)</td>
<td>0.10</td>
<td>1.9</td>
<td>1210.00</td>
</tr>
<tr>
<td>2</td>
<td>7.89</td>
<td>6.44</td>
<td>4.180</td>
<td>0.40(0.04)</td>
<td>0.10</td>
<td>2.0</td>
<td>1222.00</td>
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</tbody>
</table>

LONGEST FLOWPATH FROM NODE  1210.00 TO NODE  1300.10 =  539.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>Q</th>
<th>Tc</th>
<th>Intensity</th>
<th>Fp(Fm)</th>
<th>Ap</th>
<th>Ae</th>
<th>HEADWATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.44</td>
<td>8.15</td>
<td>3.659</td>
<td>0.40(0.04)</td>
<td>0.10</td>
<td>1.9</td>
<td>1800.00</td>
</tr>
</tbody>
</table>

LONGEST FLOWPATH FROM NODE  1800.00 TO NODE  1300.10 =  661.00 FEET.

** PEAK FLOW RATE TABLE **

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>Q</th>
<th>Tc</th>
<th>Intensity</th>
<th>Fp(Fm)</th>
<th>Ap</th>
<th>Ae</th>
<th>HEADWATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13.67</td>
<td>5.96</td>
<td>4.366</td>
<td>0.40(0.04)</td>
<td>0.10</td>
<td>3.3</td>
<td>1210.00</td>
</tr>
<tr>
<td>2</td>
<td>13.71</td>
<td>6.44</td>
<td>4.180</td>
<td>0.40(0.04)</td>
<td>0.10</td>
<td>3.5</td>
<td>1222.00</td>
</tr>
<tr>
<td>3</td>
<td>13.34</td>
<td>8.15</td>
<td>3.659</td>
<td>0.40(0.04)</td>
<td>0.10</td>
<td>3.9</td>
<td>1800.00</td>
</tr>
</tbody>
</table>

TOTAL AREA(ACRES) =  3.9
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  13.71  Tc(MIN.) =  6.441
EFFECTIVE AREA(ACRES) =  3.51  AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =  3.9
LONGEST FLOWPATH FROM NODE  1800.00 TO NODE  1300.10 =  661.00 FEET.

FLOW PROCESS FROM NODE  1300.10 TO NODE  1300.10 IS CODE =  12

>>>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE  1300.10 TO NODE  1300.20 IS CODE =  31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) =  235.89  DOWNSTREAM(FEET) =  235.65
FLOW LENGTH (FEET) = 48.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.60
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OFPIPES = 1
PIPE-FLOW (CFS) = 13.71
PIPE TRAVEL TIME (MIN.) = 0.14 Tc (MIN.) = 6.58
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 10

FLOW PROCESS FROM NODE 1120.00 TO NODE 1120.00 IS CODE = 22

INITIAL SUBAREA FLOW-LENGTH (FEET) = 48.00
USER SPECIFIED Tc (MIN.) = 5.00 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.824
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE / SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.18 0.40 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 0.77
TOTAL AREA (ACRES) = 0.18 PEAK FLOW RATE (CFS) = 0.77

FLOW PROCESS FROM NODE 1120.10 TO NODE 1120.10 IS CODE = 81

MAINLINE Tc (MIN.) = 7.82 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.745
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE / SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.33 0.40 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.33 SUBAREA RUNOFF (CFS) = 1.10
EFFECTIVE AREA (ACRES) = 0.51 AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.5 PEAK FLOW RATE (CFS) = 1.70

FLOW PROCESS FROM NODE 1120.10 TO NODE 1300.20 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 241.54 DOWNSTREAM (FEET) = 235.65
FLOW LENGTH (FEET) = 31.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 8.000
DEPTH OF FLOW IN 8.0 INCH PIPE IS 3.2 INCHES
PIPE FLOW VELOCITY (FEET/SEC.) = 13.20
ESTIMATED PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1
PIPE FLOW (CFS) = 1.70
PIPE TRAVEL TIME (MIN.) = 0.04 Tc (MIN.) = 7.86
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
<table>
<thead>
<tr>
<th>STREAM NUMBER</th>
<th>Q (CFS)</th>
<th>Tc (MIN.)</th>
<th>Intensity</th>
<th>Fp (Fm)</th>
<th>Ap (ACRES)</th>
<th>Ae (INCH/HR)</th>
<th>HEADWATER NODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.70</td>
<td>7.86</td>
<td>3.735</td>
<td>0.40</td>
<td>0.10</td>
<td>0.5</td>
<td>1120.00</td>
</tr>
</tbody>
</table>
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
<table>
<thead>
<tr>
<th>STREAM NUMBER</th>
<th>Q (CFS)</th>
<th>Tc (MIN.)</th>
<th>Intensity</th>
<th>Fp (Fm)</th>
<th>Ap (ACRES)</th>
<th>Ae (INCH/HR)</th>
<th>HEADWATER NODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13.67</td>
<td>6.11</td>
<td>4.308</td>
<td>0.40</td>
<td>0.10</td>
<td>3.3</td>
<td>1210.00</td>
</tr>
<tr>
<td>2</td>
<td>13.71</td>
<td>6.58</td>
<td>4.128</td>
<td>0.40</td>
<td>0.10</td>
<td>3.5</td>
<td>1222.00</td>
</tr>
<tr>
<td>3</td>
<td>13.34</td>
<td>8.29</td>
<td>3.623</td>
<td>0.40</td>
<td>0.10</td>
<td>3.9</td>
<td>1800.00</td>
</tr>
</tbody>
</table>
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

** PEAK FLOW RATE TABLE **
<table>
<thead>
<tr>
<th>STREAM NUMBER</th>
<th>Q (CFS)</th>
<th>Tc (MIN.)</th>
<th>Intensity</th>
<th>Fp (Fm)</th>
<th>Ap (ACRES)</th>
<th>Ae (INCH/HR)</th>
<th>HEADWATER NODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15.19</td>
<td>6.11</td>
<td>4.308</td>
<td>0.40</td>
<td>0.10</td>
<td>3.7</td>
<td>1210.00</td>
</tr>
<tr>
<td>2</td>
<td>15.29</td>
<td>6.58</td>
<td>4.128</td>
<td>0.40</td>
<td>0.10</td>
<td>3.9</td>
<td>1222.00</td>
</tr>
<tr>
<td>3</td>
<td>15.13</td>
<td>7.86</td>
<td>3.735</td>
<td>0.40</td>
<td>0.10</td>
<td>4.3</td>
<td>1120.00</td>
</tr>
<tr>
<td>4</td>
<td>14.99</td>
<td>8.29</td>
<td>3.623</td>
<td>0.40</td>
<td>0.10</td>
<td>4.4</td>
<td>1800.00</td>
</tr>
</tbody>
</table>
TOTAL AREA (ACRES) = 4.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 15.29 Tc (MIN.) = 6.583
EFFECTIVE AREA (ACRES) = 3.93 AREA-AVERAGED Fp (INCH/HR) = 0.04
AREA-AVERAGED Fm (INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 4.4
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 12

>>> CLEAR MEMORY BANK # 1 <<<

FLOW PROCESS FROM NODE 2000.00 TO NODE 2000.10 IS CODE = 21
INITIAL SUBAREA FLOW-LENGTH(FEET) = 91.00
ELEVATION DATA: UPSTREAM(_FEET_) = 235.00  DOWNSTREAM(_FEET_) = 227.00

\[ Tc = K \times \left( \frac{\text{LENGTH}^3}{\text{ELEVATION CHANGE}} \right)^{0.20} \]

SUBAREA ANALYSIS USED MINIMUM \( Tc(\text{MIN.}) \) = 5.000
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.824

SUBAREA \( Tc \) AND LOSS RATE DATA(AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>( Fp ) (INCH/HR)</th>
<th>( Ap ) (DECIMAL)</th>
<th>SCS CN</th>
<th>( Tc ) (MIN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC PARK</td>
<td>A</td>
<td>1.40</td>
<td>0.40</td>
<td>0.850</td>
<td>32</td>
<td>5.00</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, \( Fp \) (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, \( Ap \) = 0.850
SUBAREA RUNOFF(CFS) = 5.65
TOTAL AREA(ACRES) = 1.40  PEAK FLOW RATE(CFS) = 5.65

FLOW PROCESS FROM NODE 3000.00 TO NODE 3000.00 IS CODE = 22

INITIAL SUBAREA FLOW-LENGTH(Feet) = 91.00
USER SPECIFIED \( Tc(\text{MIN.}) \) = 5.000
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.824

SUBAREA LOSS RATE DATA(AMC II):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>( Fp ) (INCH/HR)</th>
<th>( Ap ) (DECIMAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC PARK</td>
<td>A</td>
<td>0.16</td>
<td>0.40</td>
<td>0.850</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, \( Fp \) (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, \( Ap \) = 0.850
SUBAREA RUNOFF(CFS) = 0.65
TOTAL AREA(ACRES) = 0.16  PEAK FLOW RATE(CFS) = 0.65

END OF RATIONAL METHOD ANALYSIS
*** RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE ***
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 22.0 Release Date: 07/01/2015 License ID 1510

Analysis prepared by:

DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
714-685-6860

************************** DESCRIPTION OF STUDY **************************
* 19-124 KORNERSTONE MUSLIM CEMETERY                                       *
* PROPOSED CONDITION                                                       *
* 100-YEAR FREQUENCY                                                       *
**************************************************************************

FILE NAME: 9124P100.DAT
TIME/DATE OF STUDY: 09:05 05/18/2021

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

---"TIME-OF-CONCENTRATION MODEL"--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 8.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
*DATA BANK RAINFALL USED*
*ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*

<table>
<thead>
<tr>
<th>NO.</th>
<th>HALF-</th>
<th>CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WIDTH</td>
<td>CROSSFALL IN-/ OUT-/ PARK- HEIGHT WIDTH LIP HIKE FACTOR</td>
</tr>
<tr>
<td>-----</td>
<td>-------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>(FT)</td>
<td>SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)</td>
</tr>
<tr>
<td>1</td>
<td>30.0</td>
<td>20.0 0.018/0.018/0.020 0.67 2.00 0.0312 0.167 0.0150</td>
</tr>
</tbody>
</table>

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.*
   *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED*

FLOW PROCESS FROM NODE 1800.00 TO NODE 1800.00 IS CODE = 22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA <<<

USER SPECIFIED Tc(MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.187

SUBAREA LOSS RATE DATA(AMC III):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/</th>
<th>SCS SOIL</th>
<th>AREA (ACRES)</th>
<th>Fp</th>
<th>Ap</th>
<th>SCS CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.28</td>
<td>0.40</td>
<td>0.100</td>
<td>52</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.55
TOTAL AREA (ACRES) = 0.28  PEAK FLOW RATE (CFS) = 1.55

*****************************************************************************
FLOW PROCESS FROM NODE 1800.00 TO NODE 1700.00 IS CODE = 31
*****************************************************************************

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
*****************************************************************************
ELEVATION DATA: UPSTREAM (FEET) = 239.60  DOWNSTREAM (FEET) = 238.26
FLOW LENGTH (FEET) = 268.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.30
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1.55
PIPE TRAVEL TIME (MIN.) = 1.35  Tc (MIN.) = 6.35
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1700.00 = 268.00 FEET.
*****************************************************************************

FLOW PROCESS FROM NODE 1700.00 TO NODE 1700.00 IS CODE = 81
*****************************************************************************

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
*****************************************************************************
MAINLINE Tc (MIN.) = 6.35
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.394
SUBAREA LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.06 0.40 0.100 52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.06  SUBAREA RUNOFF (CFS) = 0.29
EFFECTIVE AREA (ACRES) = 0.34  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.3  PEAK FLOW RATE (CFS) = 1.64
*****************************************************************************

FLOW PROCESS FROM NODE 1700.00 TO NODE 1600.00 IS CODE = 31
*****************************************************************************

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
*****************************************************************************
ELEVATION DATA: UPSTREAM (FEET) = 238.26  DOWNSTREAM (FEET) = 237.36
FLOW LENGTH (FEET) = 179.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.35
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1.64
PIPE TRAVEL TIME (MIN.) = 0.89  Tc (MIN.) = 7.24
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1600.00 = 447.00 FEET.
*****************************************************************************

FLOW PROCESS FROM NODE 1600.00 TO NODE 1600.00 IS CODE = 81
*****************************************************************************

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
*****************************************************************************
MAINLINE Tc (MIN.) = 7.24
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.004
SUBAREA LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.06 0.40 0.100 52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.06  SUBAREA RUNOFF (CFS) = 0.27
EFFECTIVE AREA (ACRES) = 0.40  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.4  PEAK FLOW RATE (CFS) = 1.79

FLOW PROCESS FROM NODE 1600.00 TO NODE 1500.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

ELEVATION DATA: UPSTREAM (FEET) = 237.36  DOWNSTREAM (FEET) = 237.16
FLOW LENGTH (FEET) = 40.00  MANNING’S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.41
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1.79
PIPE TRAVEL TIME (MIN.) = 0.20  Tc (MIN.) = 7.44
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1500.00 = 487.00 FEET.

FLOW PROCESS FROM NODE 1500.00 TO NODE 1500.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

MAINLINE Tc (MIN.) = 7.44
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.928

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ SCS SOIL  AREA      Fp         Ap     SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL           A        0.18      0.40     0.100    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.18  SUBAREA RUNOFF (CFS) = 0.79
EFFECTIVE AREA (ACRES) = 0.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 0.6  PEAK FLOW RATE (CFS) = 2.55

FLOW PROCESS FROM NODE 1500.00 TO NODE 1400.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

ELEVATION DATA: UPSTREAM (FEET) = 237.16  DOWNSTREAM (FEET) = 237.08
FLOW LENGTH (FEET) = 15.00  MANNING’S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.85
ESTIMATED PIPE DIAMETER (INCH) = 15.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 2.55
PIPE TRAVEL TIME (MIN.) = 0.06  Tc (MIN.) = 7.50
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1400.00 = 502.00 FEET.

FLOW PROCESS FROM NODE 1400.00 TO NODE 1400.00 IS CODE = 81

>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

MAINLINE Tc (MIN.) = 7.50
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.904

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ SCS SOIL  AREA      Fp         Ap     SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  A        1.12      0.40     0.100    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =  4.90
EFFECTIVE AREA(ACRES) =   1.70          AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.40          AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =    1.7          PEAK FLOW RATE(CFS) =   7.44

****************************************************************************
FLOW PROCESS FROM NODE   1400.00 TO NODE   1300.00 IS CODE =  31
----------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   237.08  DOWNSTREAM(FEET) =   236.98
FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
ESTIMATED PIPE DIAMETER(INCH) =  21.00   NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.44
PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.57
LONGEST FLOWPATH FROM NODE   1800.00 TO NODE   1300.00 =     522.00 FEET.
****************************************************************************
FLOW PROCESS FROM NODE   1300.00 TO NODE   1300.00 IS CODE =  81
----------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
============================================================================
MAINLINE Tc(MIN.) =    7.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.878
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp         Ap     SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        0.22      0.40     0.100    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =  0.96
EFFECTIVE AREA(ACRES) =   1.92          AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.40          AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =    1.9          PEAK FLOW RATE(CFS) =   8.36
****************************************************************************
FLOW PROCESS FROM NODE   1300.00 TO NODE   1300.10 IS CODE =  31
----------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   236.98  DOWNSTREAM(FEET) =   235.89
FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
ESTIMATED PIPE DIAMETER(INCH) =  18.00   NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       8.36
PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.97
LONGEST FLOWPATH FROM NODE  1800.00 TO NODE  1300.10 =     661.00 FEET.
****************************************************************************
FLOW PROCESS FROM NODE   1300.10 TO NODE   1300.10 IS CODE =  10
----------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
****************************************************************************
FLOW PROCESS FROM NODE 1222.00 TO NODE 1222.00 IS CODE = 22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA <<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 139.00
USER SPECIFIED Tc (MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 6.187

SUBAREA LOSS RATE DATA (AMC III):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.74</td>
<td>0.40</td>
<td>0.100</td>
<td>52</td>
</tr>
</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 4.09
TOTAL AREA (ACRES) = 0.74 PEAK FLOW RATE (CFS) = 4.09

FLOW PROCESS FROM NODE 1222.00 TO NODE 1221.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 237.80 DOWNSTREAM (FEET) = 236.87
FLOW LENGTH (FEET) = 185.00 MANNING'S N = 0.013
DEPHT OF FLOW IN 15.0 INCH PIPE IS 11.3 INCHES
ESTIMATED PIPE DIAMETER (INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 4.09
PIPE TRAVEL TIME (MIN.) = 0.75 Tc (MIN.) = 5.75
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 10

>>> MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<

FLOW PROCESS FROM NODE 1210.00 TO NODE 1210.00 IS CODE = 22

>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<
>>> USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA <<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 185.00
USER SPECIFIED Tc (MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 6.187

SUBAREA LOSS RATE DATA (AMC III):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMERCIAL</td>
<td>A</td>
<td>0.90</td>
<td>0.40</td>
<td>0.100</td>
<td>52</td>
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</tbody>
</table>

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 4.98
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 4.98

FLOW PROCESS FROM NODE 1210.00 TO NODE 1221.00 IS CODE = 31

>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<
>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<

ELEVATION DATA: UPSTREAM (FEET) = 242.40 DOWNSTREAM (FEET) = 236.87
FLOW LENGTH (FEET) = 158.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.11
ESTIMATED PIPE DIAMETER (INCH) = 12.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 4.98
PIPE TRAVEL TIME (MIN.) = 0.29  Tc (MIN.) = 5.29
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 11

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.98 5.29 5.991 0.40( 0.04) 0.10 0.9 1210.00
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.09 5.75 5.713 0.40( 0.04) 0.10 0.7 1222.00
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.93 5.29 5.991 0.40( 0.04) 0.10 1.6 1210.00
2 8.84 5.75 5.713 0.40( 0.04) 0.10 1.6 1222.00
TOTAL AREA (ACRES) = 1.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 8.93  Tc (MIN.) = 5.289
EFFECTIVE AREA (ACRES) = 1.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 81

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.93 5.29 5.991 0.40( 0.04) 0.10 1.6 1210.00
2 8.84 5.75 5.713 0.40( 0.04) 0.10 1.6 1222.00
TOTAL AREA (ACRES) = 1.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 8.93  Tc (MIN.) = 5.289
EFFECTIVE AREA (ACRES) = 1.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 12

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.98 5.29 5.991 0.40( 0.04) 0.10 0.9 1210.00
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.09 5.75 5.713 0.40( 0.04) 0.10 0.7 1222.00
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.93 5.29 5.991 0.40( 0.04) 0.10 1.6 1210.00
2 8.84 5.75 5.713 0.40( 0.04) 0.10 1.6 1222.00
TOTAL AREA (ACRES) = 1.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 8.93  Tc (MIN.) = 5.289
EFFECTIVE AREA (ACRES) = 1.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1221.00 = 343.00 FEET.

FLOW PROCESS FROM NODE 1221.00 TO NODE 1221.00 IS CODE = 11

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.09 5.75 5.713 0.40( 0.04) 0.10 0.7 1222.00
LONGEST FLOWPATH FROM NODE 1222.00 TO NODE 1221.00 = 324.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.93 5.29 5.991 0.40( 0.04) 0.10 1.6 1210.00
2 8.84 5.75 5.713 0.40( 0.04) 0.10 1.6 1222.00
TOTAL AREA (ACRES) = 1.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 8.93  Tc (MIN.) = 5.289
EFFECTIVE AREA (ACRES) = 1.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.58  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0  PEAK FLOW RATE (CFS) = 10.34

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.991
SUBAREA LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.35 0.40 0.100 52
SUBAREA AVERAGE PERVERIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVERIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.35  SUBAREA RUNOFF (CFS) = 1.87
EFFECTIVE AREA (ACRES) = 1.93  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0  PEAK FLOW RATE (CFS) = 10.34
FLOW PROCESS FROM NODE 1221.00 TO NODE 1300.10 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) = 236.87 DOWNSTREAM(FEET) = 235.89
FLOW LENGTH(FEET) = 196.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.17
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.34
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 5.92
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1300.10 = 539.00 FEET.

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.10 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 10.34 5.92 5.616 0.40( 0.04) 0.10 1.9 1210.00
2 10.16 6.38 5.381 0.40( 0.04) 0.10 2.0 1222.00
LONGEST FLOWPATH FROM NODE 1210.00 TO NODE 1300.10 = 539.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.36 7.97 4.737 0.40( 0.04) 0.10 1.9 1800.00
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.10 = 661.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 17.72 5.92 5.616 0.40( 0.04) 0.10 3.4 1210.00
2 17.77 6.38 5.381 0.40( 0.04) 0.10 3.5 1222.00
3 17.30 7.97 4.737 0.40( 0.04) 0.10 3.9 1800.00
TOTAL AREA(ACRES) = 3.9
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 17.77 Tc(MIN.) = 6.381
EFFECTIVE AREA(ACRES) = 3.53 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.9
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.10 = 661.00 FEET.

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.20 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) = 235.89 DOWNSTREAM(FEET) = 235.65

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.10 IS CODE = 12

>>>>>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

FLOW PROCESS FROM NODE 1300.10 TO NODE 1300.20 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) = 235.89 DOWNSTREAM(FEET) = 235.65
FLOW LENGTH (FEET) = 48.00  MANNING'S N = 0.013
DEPT OF FLOW IN 27.0 INCH PIPE IS 18.8 INCHES
PIPE FLOW VELOCITY (FEET/SEC.) = 6.01
ESTIMATED PIPE DIAMETER (INCH) = 27.00  NUMBER OF PIPES = 1
PIPE FLOW (CFS) = 17.77
PIPE TRAVEL TIME (MIN.) = 0.13  Tc (MIN.) = 6.51
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 10

FLOW PROCESS FROM NODE 1120.00 TO NODE 1120.00 IS CODE = 22

FLOW PROCESS FROM NODE 1120.10 TO NODE 1120.10 IS CODE = 31

FLOW PROCESS FROM NODE 1120.10 TO NODE 1120.10 IS CODE = 81

FLOW LENGTH (FEET) = 471.00  MANNING'S N = 0.013
DEPT OF FLOW IN 9.0 INCH PIPE IS 6.5 INCHES
PIPE FLOW VELOCITY (FEET/SEC.) = 2.91
ESTIMATED PIPE DIAMETER (INCH) = 9.00  NUMBER OF PIPES = 1
PIPE FLOW (CFS) = 1.00
PIPE TRAVEL TIME (MIN.) = 2.70  Tc (MIN.) = 7.70
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1120.10 = 519.00 FEET.

FLOW PROCESS FROM NODE 1120.10 TO NODE 1120.10 IS CODE = 81

MAINLINE Tc (MIN.) = 7.70
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.832
SUBAREA LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp     Ap       SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A        0.33   0.40    0.100    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 1.00
TOTAL AREA (ACRES) = 0.33  PEAK FLOW RATE (CFS) = 1.42

SUBAREA AREA (ACRES) = 0.33  SUBAREA RUNOFF (CFS) = 1.42
EFFECTIVE AREA (ACRES) = 0.51  AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.40  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 0.5 PEAK FLOW RATE(CFS) = 2.20

FLOW PROCESS FROM NODE 1120.10 TO NODE 1300.20 IS CODE = 31
>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<
>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 241.54 DOWNSTREAM(FEET) = 235.65
FLOW LENGTH(FEET) = 31.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 8.0 INCH PIPE IS 3.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12
ESTIMATED PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.20
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 7.74
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 11
>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 2.20 7.74 4.819 0.40( 0.04) 0.10 0.5 1120.00
LONGEST FLOWPATH FROM NODE 1120.00 TO NODE 1300.20 = 550.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 17.72 6.05 5.545 0.40( 0.04) 0.10 3.4 1210.00
2 17.77 6.51 5.317 0.40( 0.04) 0.10 3.5 1222.00
3 17.30 8.10 4.692 0.40( 0.04) 0.10 3.9 1800.00
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 19.70 6.05 5.545 0.40( 0.04) 0.10 3.8 1210.00
2 19.82 6.51 5.317 0.40( 0.04) 0.10 4.0 1222.00
3 19.61 7.74 4.819 0.40( 0.04) 0.10 4.3 1120.00
4 19.44 8.10 4.692 0.40( 0.04) 0.10 4.4 1800.00
TOTAL AREA(ACRES) = 4.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 19.82 Tc(MIN.) = 6.514
EFFECTIVE AREA(ACRES) = 3.96 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.4
LONGEST FLOWPATH FROM NODE 1800.00 TO NODE 1300.20 = 709.00 FEET.

FLOW PROCESS FROM NODE 1300.20 TO NODE 1300.20 IS CODE = 12
>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 2000.00 TO NODE 2000.10 IS CODE = 21
INITIAL SUBAREA FLOW-LENGTH (FEET) = 91.00
ELEVATION DATA: UPSTREAM (FEET) = 235.00 DOWNSTREAM (FEET) = 227.00

\[ T_c = K \times \left( \frac{\text{LENGTH}^3}{\text{ELEVATION CHANGE}} \right)^{0.20} \]

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 6.187

SUBAREA Tc AND LOSS RATE DATA (AMC III):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
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<th>Tc (MIN.)</th>
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<td>PUBLIC PARK</td>
<td>A</td>
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SUBAREA AVERAGE Pervious Loss Rate, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.850

SUBAREA RUNOFF (CFS) = 7.37

TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 7.37

FLOW PROCESS FROM NODE 3000.00 TO NODE 3000.00 IS CODE = 22

INITIAL SUBAREA FLOW-LENGTH (FEET) = 91.00
USER SPECIFIED Tc (MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 6.187

SUBAREA LOSS RATE DATA (AMC III):

<table>
<thead>
<tr>
<th>DEVELOPMENT TYPE/ LAND USE</th>
<th>SCS SOIL GROUP</th>
<th>AREA (ACRES)</th>
<th>Fp (INCH/HR)</th>
<th>Ap (DECIMAL)</th>
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<tr>
<td>PUBLIC PARK</td>
<td>A</td>
<td>0.16</td>
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SUBAREA AVERAGE Pervious Loss Rate, Fp (INCH/HR) = 0.40
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.850

SUBAREA RUNOFF (CFS) = 0.84

TOTAL AREA (ACRES) = 0.16 PEAK FLOW RATE (CFS) = 0.84

END OF RATIONAL METHOD ANALYSIS
APPENDIX G

Detention System Analysis
Problem Descriptions:
19-124
PROPOSED CONDITION DA A
10-YEAR

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA (ACRES) = 4.44
SOIL-LOSS RATE, Fm, (INCH/HR) = 0.040
LOW LOSS FRACTION = 0.062
TIME OF CONCENTRATION (MIN.) = 6.66
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY (YEARS) = 10
5-MINUTE POINT RAINFALL VALUE (INCHES) = 0.34
30-MINUTE POINT RAINFALL VALUE (INCHES) = 0.72
1-HOUR POINT RAINFALL VALUE (INCHES) = 0.95
3-HOUR POINT RAINFALL VALUE (INCHES) = 1.59
6-HOUR POINT RAINFALL VALUE (INCHES) = 2.20
24-HOUR POINT RAINFALL VALUE (INCHES) = 3.68

TOTAL CATCHMENT RUNOFF VOLUME (ACRE-FeET) = 1.15
TOTAL CATCHMENT SOIL-LOSS VOLUME (ACRE-FeET) = 0.21

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90%  6.7
**Problem Descriptions:**
19-124  
PROPOSED CONDITION DA A  
25-YEAR

**RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90**  
**TOTAL CATCHMENT AREA (ACRES) = 4.44**  
**SOIL-LOSS RATE, Fm, (INCH/HR) = 0.040**  
**LOW LOSS FRACTION = 0.050**  
**TIME OF CONCENTRATION (MIN.) = 6.58**  
**SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA**  
**ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED**  
**RETURN FREQUENCY (YEARS) = 25**

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TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

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Problem Descriptions:
19-124
PROPOSED CONDITION DA A
100-YEAR

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA (ACRES) = 4.44
SOIL-LOSS RATE, Fm, (INCH/HR) = 0.040
LOW LOSS FRACTION = 0.041
TIME OF CONCENTRATION (MIN.) = 6.51
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY (YEARS) = 100
5-MINUTE POINT RAINFALL VALUE (INCHES) = 0.52
30-MINUTE POINT RAINFALL VALUE (INCHES) = 1.09
1-HOUR POINT RAINFALL VALUE (INCHES) = 1.45
3-HOUR POINT RAINFALL VALUE (INCHES) = 2.43
6-HOUR POINT RAINFALL VALUE (INCHES) = 3.36
24-HOUR POINT RAINFALL VALUE (INCHES) = 5.63

TOTAL CATCHMENT RUNOFF VOLUME (ACRE-FEET) = 1.79
TOTAL CATCHMENT SOIL-LOSS VOLUME (ACRE-FEET) = 0.29

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TIME DURATION (minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)
## Pond No. 1 - detention

### Pond Data

**UG Chambers** - Invert elev. = 235.30 ft, Rise x Span = 6.00 x 6.00 ft, Barrel Len = 380.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

### Stage / Storage Table

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<th>Stage (ft)</th>
<th>Elevation (ft)</th>
<th>Contour area (sqft)</th>
<th>Incr. Storage (cuft)</th>
<th>Total storage (cuft)</th>
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### Culvert / Orifice Structures

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<th>[C]</th>
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### Weir Structures

**Crest Len (ft) = 3.00**
**Crest El. (ft) = 240.30**
**Weir Type = Rect**
**Multi-Stage = No**

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<th>Wr A cfs</th>
<th>Wr B cfs</th>
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Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).
Hyd. No. 13

10-YR ROUTING

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Time interval = 7 min
Inflow hyd. No. = 3 - 10-YR
Reservoir name = detention

Peak discharge = 4.809 cfs
Time to peak = 17.03 hrs
Hyd. volume = 52,584 cuft
Max. Elevation = 238.43 ft
Max. Storage = 5,217 cuft

Storage Indication method used.

10-YR ROUTING

Hyd. No. 13 -- 10 Year

Q (cfs)

Hyd No. 13

Hyd No. 3

Total storage used = 5,217 cuft
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Hyd. No. 15
25-YR ROUTING

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<td>Time interval</td>
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<td>detention</td>
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<td>Max. Storage</td>
<td>6,881 cuft</td>
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Storage Indication method used.

25-YR ROUTING
Hyd. No. 15 -- 25 Year

Q (cfs)

0.00 0.00 3.00 3.00 6.00 6.00 9.00 9.00 12.00 12.00 15.00 15.00 18.00 18.00

Time (hrs)
0 35 70 105 140 175 210 245 280 315 350

Total storage used = 6,881 cuft
Hyd. No. 17

100-YR ROUTING

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 7 min
Inflow hyd. No. = 7 - 100-YR
Reservoir name = detention

Peak discharge = 6.443 cfs
Time to peak = 17.38 hrs
Hyd. volume = 83,802 cuft
Max. Elevation = 240.66 ft
Max. Storage = 9,632 cuft

Storage Indication method used.
APPENDIX H

Existing Hydrology Map

Proposed Hydrology Map