DEVELOPMENT PLAN REVIEW – VTPM 38811-2
PARCEL 1 – SITE 1
CITY OF PERRIS
RIVERSIDE COUNTY, CALIFORNIA

Drainage Study Report

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SECTION 1 - GENERAL OVERVIEW

INTRODUCTION

The purpose of this study is to support the entitlement phase and determine minimum drainage improvements required for the proposed industrial development of approximately 59.7 acres and 323,000 square feet warehouse building with 168 truck docks, and parking lot that lays within the Harvest Landing Specific Plan, located in the City of Perris, County of Riverside CA. More specifically, the project site is bounded to the north by Orange Avenue, the vacated Indian Avenue to the west, vacant land to the south and Barrett Avenue to the east.

The primary objectives of this report are as follows:

1. Delineate the drainage areas tributary to the onsite above/underground basin

2. Based on drainage patterns, ground slope, land use and soil type and using the Riverside County Rational Method, perform hydrologic and hydraulics of onsite drainage facilities.

3. Determine the 100-year peak storm flows based upon the pre-project, proposed land use per the MDP and post-project condition for the 24-hour storm duration utilizing the Unit Hydrograph Method as outlined in the Riverside County Flood Control & Water Conservation District Hydrology Manual.

4. Determine the required underground detention facilities to mitigate the 100-year peak storm flows for the 24-hour storm duration in the post-project condition to flows less than or equal to the proposed land use condition flow rates.

5. Determine the required the minimum storm drain infrastructure to flood protect the project site for the 100-year storm event.

6. Preparation of a hydrology report, which consist of hydrological and analytical results and exhibits.

BACKGROUND

EXISTING CONDITIONS

The project site is located within Riverside County Flood Control's Perris Valley Master Drainage Plan, and tributary to a low point in Perris Boulevard and the existing MDP Line "K" (earthen V-Channel) located about 2600 lineal feet east of Indian Avenue.

The site is in a relatively mild to flat sloping undeveloped terrain on a drainage area which drains easterly towards Barrett Avenue with no offsite flows. All the developed storm flows continue to travel easterly through the property, to Barrett Avenue and the vacant parcels to the east where it ultimately reaches a low point at Perris Boulevard; storm drain flows are intercepted by existing street inlets and the existing MDP Line "K". MDP Line "K" is an earthen "V" channel (w= 16', H=8' & z=1:1) and planned as a future Trapezoidal Channel (b=6', d=8').

DEVELOPED CONDITIONS

The preliminary offsite design is shown on Exhibit F "Harvest Landing Industrial Phase 1 Offsite Master Storm Drain & Low Flow System". The offsite master storm drain system (backbone) will be part of a separate report and therefore excluded. The onsite storm water runoff will be collected and treated using proprietary devices in order accommodate the water quality component of mitigation. The onsite storm water runoff will be conveyed to an underground chamber system to mitigate the increased storm runoff to be at or below the current MDP land use condition flow. See the table below for the rational method results:

Description	**Q100 Peak Flow Rates**		
Watershed Area	**A**	B	**A+B**
Proposed	75.2	69.1	136.6
Existing	43.9	41.4	85.3
Onsite MDP	49.6	47.0	96.6

For purposes of this preliminary drainage report, the 100-year 24-hour peak flow rates for the post developed condition, predeveloped condition and proposed developed condition per the land use on the MDP were the only storm events analyzed for mitigation. The project storm mitigation is provided by utilizing the underground storm drain detention system and the outlet control structures. The total mitigation volume required was determined by selecting the flow rates from the recess limb of the proposed unit hydrograph runs for the 100-year 24-hour storm event that are equal or less than the flow rates from the proposed land use conditions. Smaller storm events were analyzed in this, however, since the storm volume demand to mitigate the storm flows from the 100-year 24hour event are considerably larger than volumes produced by the smaller storm events, thus a conservative approach.

MDP Condition Watershed A Volume: 5.51 ac-ft; $Q_{100\text{-}24hr}$: 10.92 cfs
Proposed Condition Watershed A Volume: 6.47 ac-ft; $Q_{100\text{-}24hr}$: 18.28 cfs
Underground Chamber Watershed A Volume: *7.06 ac-ft

MDP Condition Watershed B Volume: 4.21 ac-ft; $Q_{100\text{-}24hr}$: 13.69 cfs
Proposed Condition Watershed B Volume: 6.46 ac-ft; $Q_{100\text{-}24hr}$: 17.81 cfs
Underground Chamber Watershed B Volume: *6.80 ac-ft

*For watershed "A" since this volume is greater than 6.67 ac-ft the underground chambers have enough storage to mitigate peak storm flows to the proposed land use levels. Similarly for watershed "B" since the volume provided by the underground chambers exceeds 6.75 ac-ft, there is enough storage to mitigate peak storm flows to the proposed land use levels. See the table on the following page for the unit hydrograph results:

Watershed A

Storm Duration	SP Q_{peak}	SP V_{TOTAL}	MDP Q_{PEAK}	MDP V_{TOTAL}
1	76.65	2.6604	75.64	1.9036
3	48.99	4.1488	46.44	2.9443
6	42.57	5.25	38.93	4.2237
24	18.28	9.956	15.58	7.5103
Acreage	32.84		33.45	

Watershed B

Storm Duration	SP Q_{peak}	SP V_{TOTAL}	MDP Q_{PEAK}	MDP V_{TOTAL}
1	71.90	2.5642	65.26	2.1434
3	45.93	3.354	40.29	3.0817
6	38.00	4.7612	32.71	3.736
24	17.81	10.036	13.69	6.6471
Acreage	30.51		29.54	

METHODOLOGY

HYDROLOGY

Hydrologic calculations were performed using the Riverside County Rational Method from RCFCD & WCD Hydrology Manual, dated April 1978. The 100-year design discharge was computed by generating a hydrologic "link-node" model in which divides the area into drainage sub-areas, each tributary to a concentration point or hydrologic "node" point determined by the proposed layout. The computer results are included in section 2. The following assumptions/guidelines were applied for use of the Rational Method:

1. The map from the Riverside County Hydrology Manual indicates that the study area is primarily Group "B" and "C" soils, with a small area as "A". A USGS soils map for the project site is included as Exhibit D, under the Exhibit section.
2. Initial sub-areas were drawn to be less than 10-acres in size and less than 1,000 feet in length, per County guidelines. Time of concentration for the initial sub-area is based on Time of Concentration Nomograph for Initial Sub-area from the Hydrology Manual.
3. Antecedent Moisture Condition 2 was used for 100-year storm events.
4. Standard intensity-duration curve data for the project area was used for the Perris Valley area; Plate D-4.1.

HYDRAULICS

Civil Design hydrology module was used for preliminarily sizing the storm drainpipe system. The onsite storm drain infrastructure will consist of pipe sizes ranging from 12"-48" in diameter. A more detail analysis will be provided in subsequent submittals and a WSPG analysis for onsite storm drainpipe system will be performed during final engineering.

CONCLUSIONS & RECOMMENDATIONS

The hydrology analyses evaluated the proposed development to determine the necessary onsite drainage improvements required to mitigate flows for increased runoff and it has been concluded that:

1. The proposed drainage facilities will adequately convey the 100-year flows and provide flood protection to the project site.
2. The proposed underground pipe chamber system will have sufficient storage to adequately mitigate for increased runoff.

SECTION 2 - HYDROLOGY ANALYSIS

100-YEAR EXISTING ON-SITE HYDROLOGY WATERSHED A (RATIONAL METHOD)

100-YEAR EXISTING ON-SITE HYDROLOGY WATERSHED B (RATIONAL METHOD)

100-YEAR PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (RATIONAL METHOD)

100-YEAR PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (RATIONAL METHOD)

100-YEAR PROPOSED ON-SITE HYDROLOGY WATERSHED A (RATIONAL METHOD)

100-YEAR PROPOSED ON-SITE HYDROLOGY WATERSHED B (RATIONAL METHOD)

100-YEAR PROPOSED ON-SITE HYDROLOGY WATERSHED A + B (RATIONAL METHOD)

100-YEAR-24 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-24 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-24 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

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100-YEAR-6 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-6 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-6 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

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100-YEAR-3 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:qa100site1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
EXISTING CONDITION - WATERSHED A
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

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Process from Point/Station 10.000 to Point/Station 10.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 806.000(Ft.)
Top (of initial area) elevation = 1457.000(Ft.)
Bottom (of initial area) elevation = 1451.000(Ft.)
Difference in elevation = 6.000(Ft.)

```
Slope =    0.00744  s(percent)=       0.74
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.533 min.
Rainfall intensity =      1.894(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.781
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  82.16
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.382(CFS)
Total initial stream area =        9.050(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station       10.100 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     26.506(CFS)
Depth of flow =   0.416(Ft.), Average velocity =   1.532(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     26.507(CFS)
  '     '    flow top width =     83.201(Ft.)
  '     '    velocity=    1.532(Ft/s)
  '     '    area =     17.306(Sq.Ft)
  '     '    Froude number =     0.592

Upstream point elevation =  1451.000(Ft.)
Downstream point elevation =  1447.400(Ft.)
Flow length =   464.000(Ft.)
Travel time  =    5.05 min.
Time of concentration =   25.58 min.
Depth of flow =   0.416(Ft.)
Average velocity =   1.532(Ft/s)
Total irregular channel flow =    26.506(CFS)
Irregular channel normal depth above invert elev. =   0.416(Ft.)
Average velocity of channel(s) =   1.532(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.340
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  80.72
Pervious area fraction =  1.000; Impervious fraction =  0.000
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Rainfall intensity =      1.701(In/Hr) for a   100.0 year storm
Subarea runoff =     26.184(CFS) for     20.310(Ac.)
Total runoff =     39.566(CFS)      Total area =      29.360(Ac.)
Depth of flow =   0.483(Ft.), Average velocity =   1.693(Ft/s)


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Process from Point/Station       10.100 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     29.360(Ac.)
Runoff from this stream =     39.566(CFS)
Time of concentration =   25.58 min.
Rainfall intensity =     1.701(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       11.100
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   627.000(Ft.)
Top (of initial area) elevation =  1461.500(Ft.)
Bottom (of initial area) elevation =  1454.000(Ft.)
Difference in elevation =     7.500(Ft.)
Slope =    0.01196  s(percent)=       1.20
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.890 min.
Rainfall intensity =      2.084(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.748(CFS)
Total initial stream area =        0.440(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station       11.100 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.936(CFS)
Depth of flow =   0.180(Ft.), Average velocity =   0.906(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
```

```
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      2.936(CFS)
  '     '    flow top width =     36.007(Ft.)
  '     '    velocity=    0.906(Ft/s)
  '     '    area =      3.241(Sq.Ft)
  '     '    Froude number =     0.532

Upstream point elevation =  1454.000(Ft.)
Downstream point elevation =  1448.000(Ft.)
Flow length =   724.000(Ft.)
Travel time  =   13.32 min.
Time of concentration =   30.21 min.
Depth of flow =   0.180(Ft.)
Average velocity =   0.906(Ft/s)
Total irregular channel flow =     2.936(CFS)
Irregular channel normal depth above invert elev. =   0.180(Ft.)
Average velocity of channel(s) =   0.906(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.753
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.590
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  81.28
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.568(In/Hr) for a   100.0 year storm
Subarea runoff =      4.306(CFS) for      3.650(Ac.)
Total runoff =      5.053(CFS)      Total area =       4.090(Ac.)
Depth of flow =   0.221(Ft.), Average velocity =   1.037(Ft/s)


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Process from Point/Station       11.100 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
_________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.090(Ac.)
Runoff from this stream =      5.053(CFS)
Time of concentration =   30.21 min.
Rainfall intensity =     1.568(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       39.566     25.58              1.701
2        5.053     30.21              1.568
Largest stream flow has longer or shorter time of concentration
Qp =     39.566 + sum of
        Qa          Tb/Ta
         5.053 *    0.847 =      4.279
Qp =     43.845
```

```
Total of 2 main streams to confluence:
Flow rates before confluence point:
      39.566       5.053
Area of streams before confluence:
       29.360        4.090


Results of confluence:
Total flow rate =     43.845(CFS)
Time of concentration =    25.582 min.
Effective stream area after confluence  =     33.450(Ac.)
End of computations, total study area =           33.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  81.2
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Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100bsite1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

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EXISTING CONDITION - WATERSHED B
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Rational Method Hydrology Program based on
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1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 20.000 to Point/Station 20.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 951.000(Ft.)
Top (of initial area) elevation = 1464.700(Ft.)
Bottom (of initial area) elevation = 1450.000(Ft.)
Difference in elevation = 14.700(Ft.)
Slope = 0.01546 s(percent)= 1.55

```
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.955 min.
Rainfall intensity =      1.970(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.765
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  79.28
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.936(CFS)
Total initial stream area =        7.260(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       23.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     26.163(CFS)
Depth of flow =   0.432(Ft.), Average velocity =   1.405(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     26.163(CFS)
  '     '    flow top width =     86.301(Ft.)
  '     '    velocity=    1.405(Ft/s)
  '     '    area =     18.620(Sq.Ft)
  '     '    Froude number =     0.533

Upstream point elevation =  1450.000(Ft.)
Downstream point elevation =  1447.500(Ft.)
Flow length =   402.000(Ft.)
Travel time  =    4.77 min.
Time of concentration =   23.72 min.
Depth of flow =   0.432(Ft.)
Average velocity =   1.405(Ft/s)
Total irregular channel flow =    26.163(CFS)
Irregular channel normal depth above invert elev. =   0.432(Ft.)
Average velocity of channel(s) =   1.405(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.773
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  82.16
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.765(In/Hr) for a   100.0 year storm
```

Subarea runoff = 30.399(CFS) for 22.280(Ac.)
Total runoff = 41.335(CFS) Total area = 29.540(Ac.)
Depth of flow = 0.512(Ft.), Average velocity = 1.575(Ft/s)
End of computations, total study area = 29.54 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 81.5

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:qa100site1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED A
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 10.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 806.000(Ft.)
Top (of initial area) elevation = 1457.000(Ft.)
Bottom (of initial area) elevation = 1451.000(Ft.)
Difference in elevation = 6.000(Ft.)
Slope = 0.00744 s(percent)= 0.74

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.109 min.
Rainfall intensity =      2.201(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.781
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.76
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     15.560(CFS)
Total initial stream area =        9.050(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     30.403(CFS)
Depth of flow =   0.438(Ft.), Average velocity =   1.585(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     30.403(CFS)
  '     '    flow top width =     87.592(Ft.)
  '     '    velocity=    1.585(Ft/s)
  '     '    area =     19.181(Sq.Ft)
  '     '    Froude number =     0.597

Upstream point elevation =  1451.000(Ft.)
Downstream point elevation =  1447.400(Ft.)
Flow length =   464.000(Ft.)
Travel time  =    4.88 min.
Time of concentration =   19.99 min.
Depth of flow =   0.438(Ft.)
Average velocity =   1.585(Ft/s)
Total irregular channel flow =    30.403(CFS)
Irregular channel normal depth above invert elev. =   0.438(Ft.)
Average velocity of channel(s) =   1.585(Ft/s)
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.759
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.340
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.42
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.919(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =     29.596(CFS) for     20.310(Ac.)
Total runoff =     45.156(CFS)      Total area =      29.360(Ac.)
Depth of flow =   0.508(Ft.), Average velocity =   1.750(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     29.360(Ac.)
Runoff from this stream =     45.156(CFS)
Time of concentration =   19.99 min.
Rainfall intensity =     1.919(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       11.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   627.000(Ft.)
Top (of initial area) elevation =  1461.500(Ft.)
Bottom (of initial area) elevation =  1454.000(Ft.)
Difference in elevation =     7.500(Ft.)
Slope =    0.01196  s(percent)=       1.20
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.428 min.
Rainfall intensity =      2.422(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.811
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.864(CFS)
Total initial stream area =        0.440(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.100 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
----------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      3.251(CFS)
Depth of flow =   0.187(Ft.), Average velocity =   0.929(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
```

```
----------------------------------------------------------------
Sub-Channel flow  =      3.251(CFS)
  '     '    flow top width =     37.411(Ft.)
  '     '    velocity=    0.929(Ft/s)
  '     '    area =      3.499(Sq.Ft)
  '     '    Froude number =     0.535

Upstream point elevation =  1454.000(Ft.)
Downstream point elevation =  1448.000(Ft.)
Flow length =   724.000(Ft.)
Travel time  =   12.99 min.
Time of concentration =   25.42 min.
Depth of flow =   0.187(Ft.)
Average velocity =   0.929(Ft/s)
Total irregular channel flow =     3.251(CFS)
Irregular channel normal depth above invert elev. =   0.187(Ft.)
Average velocity of channel(s) =   0.929(Ft/s)
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.751
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.590
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.33
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.706(In/Hr) for a   100.0 year storm
Subarea runoff =      4.680(CFS) for      3.650(Ac.)
Total runoff =      5.544(CFS)      Total area =       4.090(Ac.)
Depth of flow =   0.229(Ft.), Average velocity =   1.062(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.100 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.090(Ac.)
Runoff from this stream =      5.544(CFS)
Time of concentration =   25.42 min.
Rainfall intensity =     1.706(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       45.156     19.99               1.919
2        5.544     25.42               1.706
Largest stream flow has longer or shorter time of concentration
Qp =     45.156 + sum of
        Qa          Tb/Ta
         5.544 *    0.786 =      4.360
Qp =     49.516

Total of 2 main streams to confluence:
```

```
Flow rates before confluence point:
      45.156       5.544
Area of streams before confluence:
       29.360        4.090


Results of confluence:
Total flow rate =     49.516(CFS)
Time of concentration =    19.988 min.
Effective stream area after confluence  =     33.450(Ac.)
End of computations, total study area =           33.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  61.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100bsite1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 20.000 to Point/Station 20.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 951.000(Ft.)
Top (of initial area) elevation = 1464.700(Ft.)
Bottom (of initial area) elevation = 1450.000(Ft.)
Difference in elevation = 14.700(Ft.)
Slope = 0.01546 s(percent)= 1.55

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.948 min.
Rainfall intensity =      2.289(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.767
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.08
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     12.745(CFS)
Total initial stream area =        7.260(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       23.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     29.903(CFS)
Depth of flow =   0.454(Ft.), Average velocity =   1.453(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1             0.00              1.00
      2           100.00              0.00
      3           200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     29.903(CFS)
  '     '    flow top width =     90.736(Ft.)
  '     '    velocity=    1.453(Ft/s)
  '     '    area =     20.583(Sq.Ft)
  '     '    Froude number =     0.538

Upstream point elevation =  1450.000(Ft.)
Downstream point elevation =  1447.500(Ft.)
Flow length =   402.000(Ft.)
Travel time  =    4.61 min.
Time of concentration =   18.56 min.
Depth of flow =   0.454(Ft.)
Average velocity =   1.453(Ft/s)
Total irregular channel flow =    29.903(CFS)
Irregular channel normal depth above invert elev. =   0.454(Ft.)
Average velocity of channel(s) =   1.453(Ft/s)
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.772
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.76
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.990(In/Hr) for a   100.0 year storm
```

Subarea runoff = 34.233(CFS) for 22.280(Ac.)
Total runoff = 46.978(CFS) Total area = 29.540(Ac.)
Depth of flow = 0.537(Ft.), Average velocity = 1.627(Ft/s)
End of computations, total study area = 29.54 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number = 61.6

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100p1a.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 701.000(Ft.)
Top (of initial area) elevation = 1462.800(Ft.)
Bottom (of initial area) elevation = 1447.300(Ft.)
Difference in elevation = 15.500(Ft.)
Slope = 0.02211 s(percent)= 2.21

```
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.841 min.
Rainfall intensity =      2.862(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.360
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.68
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     22.296(CFS)
Total initial stream area =        8.860(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1444.600(Ft.)
Downstream point/station elevation =  1440.900(Ft.)
Pipe length  =   526.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.296(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    22.296(CFS)
Normal flow depth in pipe =   19.27(In.)
Flow top width inside pipe =   24.41(In.)
Critical Depth =   19.85(In.)
Pipe flow velocity =      7.34(Ft/s)
Travel time through pipe =    1.19 min.
Time of concentration (TC) =    10.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      8.860(Ac.)
Runoff from this stream =     22.296(CFS)
Time of concentration =   10.03 min.
Rainfall intensity =     2.690(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.100 to Point/Station       11.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   662.000(Ft.)
Top (of initial area) elevation =  1461.200(Ft.)
Bottom (of initial area) elevation =  1447.300(Ft.)
Difference in elevation =    13.900(Ft.)
Slope =    0.02100  s(percent)=       2.10
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    9.400 min.
Rainfall intensity =      2.778(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.880
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.56
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     18.125(CFS)
Total initial stream area =        7.650(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.200 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1442.440(Ft.)
Downstream point/station elevation =  1440.900(Ft.)
Pipe length  =    93.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.125(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    18.125(CFS)
Normal flow depth in pipe =   15.42(In.)
Flow top width inside pipe =   18.55(In.)
Critical Depth =   18.59(In.)
Pipe flow velocity =      9.58(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     9.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.200 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.650(Ac.)
Runoff from this stream =     18.125(CFS)
Time of concentration =    9.56 min.
Rainfall intensity =     2.755(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       22.296     10.03               2.690
2       18.125      9.56               2.755
Largest stream flow has longer time of concentration
Qp =     22.296 + sum of
        Qb         Ia/Ib
        18.125 *    0.977 =     17.701
Qp =     39.997
```

```
Total of 2 main streams to confluence:
Flow rates before confluence point:
      22.296      18.125
Area of streams before confluence:
        8.860        7.650


Results of confluence:
Total flow rate =     39.997(CFS)
Time of concentration =    10.034 min.
Effective stream area after confluence  =     16.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1440.900(Ft.)
Downstream point/station elevation =  1440.400(Ft.)
Pipe length  =   109.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    39.997(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    39.997(CFS)
Normal flow depth in pipe =   26.34(In.)
Flow top width inside pipe =   31.90(In.)
Critical Depth =   24.72(In.)
Pipe flow velocity =      7.22(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    10.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.510(Ac.)
Runoff from this stream =     39.997(CFS)
Time of concentration =   10.29 min.
Rainfall intensity =     2.658(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.100 to Point/Station       12.200
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   623.000(Ft.)
Top (of initial area) elevation =  1454.600(Ft.)
Bottom (of initial area) elevation =  1447.000(Ft.)
Difference in elevation =     7.600(Ft.)
Slope =    0.01220  s(percent)=       1.22
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.227 min.
Rainfall intensity =      2.665(In/Hr) for a   100.0 year storm
APARTMENT subarea type
```

```
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.260
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.38
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      9.584(CFS)
Total initial stream area =        4.210(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.200 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1442.830(Ft.)
Downstream point/station elevation =  1440.400(Ft.)
Pipe length  =   324.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.584(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.584(CFS)
Normal flow depth in pipe =   12.93(In.)
Flow top width inside pipe =   20.43(In.)
Critical Depth =   13.83(In.)
Pipe flow velocity =      6.17(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    11.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.200 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.210(Ac.)
Runoff from this stream =      9.584(CFS)
Time of concentration =   11.10 min.
Rainfall intensity =     2.560(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       39.997     10.29               2.658
2        9.584     11.10               2.560
Largest stream flow has longer or shorter time of concentration
Qp =     39.997 + sum of
        Qa          Tb/Ta
         9.584 *    0.927 =      8.880
Qp =     48.876

Total of 2 main streams to confluence:
Flow rates before confluence point:
      39.997       9.584
```

```
Area of streams before confluence:
       16.510        4.210


Results of confluence:
Total flow rate =     48.876(CFS)
Time of concentration =    10.286 min.
Effective stream area after confluence  =     20.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1440.400(Ft.)
Downstream point/station elevation =  1437.900(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    48.876(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    48.876(CFS)
Normal flow depth in pipe =   27.33(In.)
Flow top width inside pipe =   30.79(In.)
Critical Depth =   27.31(In.)
Pipe flow velocity =      8.49(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    11.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     20.720(Ac.)
Runoff from this stream =     48.876(CFS)
Time of concentration =   11.07 min.
Rainfall intensity =     2.564(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.100 to Point/Station       13.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   616.000(Ft.)
Top (of initial area) elevation =  1454.600(Ft.)
Bottom (of initial area) elevation =  1447.100(Ft.)
Difference in elevation =     7.500(Ft.)
Slope =    0.01218  s(percent)=       1.22
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.459 min.
Rainfall intensity =      2.769(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.880
```

```
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.56
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.033(CFS)
Total initial stream area =        3.310(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.100 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1441.330(Ft.)
Downstream point/station elevation =  1437.900(Ft.)
Pipe length  =   330.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.033(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.033(CFS)
Normal flow depth in pipe =   11.63(In.)
Flow top width inside pipe =   17.22(In.)
Critical Depth =   13.18(In.)
Pipe flow velocity =      6.65(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =    10.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.100 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.310(Ac.)
Runoff from this stream =      8.033(CFS)
Time of concentration =   10.29 min.
Rainfall intensity =     2.658(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       48.876     11.07               2.564
2        8.033     10.29               2.658
Largest stream flow has longer time of concentration
Qp =     48.876 + sum of
        Qb         Ia/Ib
         8.033 *    0.965 =      7.750
Qp =     56.626

Total of 2 main streams to confluence:
Flow rates before confluence point:
      48.876       8.033
Area of streams before confluence:
       20.720        3.310
```

```
Results of confluence:
Total flow rate =     56.626(CFS)
Time of concentration =    11.067 min.
Effective stream area after confluence  =     24.030(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1437.900(Ft.)
Downstream point/station elevation =  1437.500(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    56.626(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    56.626(CFS)
Normal flow depth in pipe =   30.56(In.)
Flow top width inside pipe =   32.12(In.)
Critical Depth =   28.82(In.)
Pipe flow velocity =      8.12(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    11.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     24.030(Ac.)
Runoff from this stream =     56.626(CFS)
Time of concentration =   11.23 min.
Rainfall intensity =     2.546(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   261.000(Ft.)
Top (of initial area) elevation =  1454.100(Ft.)
Bottom (of initial area) elevation =  1452.000(Ft.)
Difference in elevation =     2.100(Ft.)
Slope =    0.00805  s(percent)=       0.80
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.289 min.
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.820
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.66
```

```
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.651(CFS)
Total initial stream area =        2.750(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.100 to Point/Station       15.100
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.738
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.630
Decimal fraction soil group C = 0.370
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.81
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     7.29 min.
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
Subarea runoff =      9.190(CFS) for      3.960(Ac.)
Total runoff =     16.841(CFS)      Total area =       6.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.100 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1445.000(Ft.)
Downstream point/station elevation =  1437.500(Ft.)
Pipe length  =   295.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.841(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.841(CFS)
Normal flow depth in pipe =   14.86(In.)
Flow top width inside pipe =   13.66(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.80(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =     7.74 min.


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Process from Point/Station       15.100 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.710(Ac.)
Runoff from this stream =     16.841(CFS)
Time of concentration =    7.74 min.
Rainfall intensity =     3.054(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)
```

```
1       56.626     11.23               2.546
2       16.841      7.74               3.054
Largest stream flow has longer time of concentration
Qp =     56.626 + sum of
        Qb         Ia/Ib
        16.841 *    0.834 =     14.039
Qp =     70.665

Total of 2 main streams to confluence:
Flow rates before confluence point:
      56.626      16.841
Area of streams before confluence:
       24.030        6.710


Results of confluence:
Total flow rate =     70.665(CFS)
Time of concentration =    11.228 min.
Effective stream area after confluence  =     30.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1437.500(Ft.)
Downstream point/station elevation =  1435.600(Ft.)
Pipe length  =    54.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    70.665(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    70.665(CFS)
Normal flow depth in pipe =   22.64(In.)
Flow top width inside pipe =   25.82(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.78(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    11.28 min.


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Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     30.740(Ac.)
Runoff from this stream =     70.665(CFS)
Time of concentration =   11.28 min.
Rainfall intensity =     2.540(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
```

```
Initial area flow distance =   616.000(Ft.)
Top (of initial area) elevation =  1461.600(Ft.)
Bottom (of initial area) elevation =  1452.600(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01461  s(percent)=       1.46
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.121 min.
Rainfall intensity =      2.819(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.991(CFS)
Total initial stream area =        1.200(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       16.400
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1452.600(Ft.)
End of street segment elevation =  1449.200(Ft.)
Length of street segment  =   386.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  43.000(Ft.)
Distance from crown to crossfall grade break  =  41.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  16.000(Ft.)
Slope from curb to property line (v/hz) =   0.015
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.685(CFS)
Depth of flow =   0.305(Ft.), Average velocity =   2.001(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.912(Ft.)
Flow velocity =   2.00(Ft/s)
Travel time =    3.22 min.     TC =   12.34  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.50
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.431(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      1.280(CFS) for      0.600(Ac.)
Total runoff =      4.272(CFS)      Total area =       1.800(Ac.)
Street flow at end of street =      4.272(CFS)
Half street flow at end of street =      2.136(CFS)
Depth of flow =   0.317(Ft.), Average velocity =   2.068(Ft/s)
Flow width (from curb towards crown)=   9.519(Ft.)


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Process from Point/Station       16.200 to Point/Station       16.400
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.800(Ac.)
Runoff from this stream =      4.272(CFS)
Time of concentration =   12.34 min.
Rainfall intensity =     2.431(In/Hr)


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Process from Point/Station       16.300 to Point/Station       16.400
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   349.000(Ft.)
Top (of initial area) elevation =  1451.400(Ft.)
Bottom (of initial area) elevation =  1449.200(Ft.)
Difference in elevation =     2.200(Ft.)
Slope =    0.00630  s(percent)=       0.63
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.597 min.
Rainfall intensity =      2.902(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.50
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.767(CFS)
Total initial stream area =        0.300(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       16.300 to Point/Station       16.400
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.300(Ac.)
Runoff from this stream =      0.767(CFS)
Time of concentration =    8.60 min.
Rainfall intensity =     2.902(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)
```

```
1        4.272     12.34                 2.431
2        0.767      8.60                 2.902
Largest stream flow has longer time of concentration
Qp =      4.272 + sum of
        Qb         Ia/Ib
         0.767 *    0.838 =      0.642
Qp =      4.914

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.272       0.767
Area of streams before confluence:
        1.800        0.300
Results of confluence:
Total flow rate =      4.914(CFS)
Time of concentration =    12.336 min.
Effective stream area after confluence =      2.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.400 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1445.200(Ft.)
Downstream point/station elevation =  1435.600(Ft.)
Pipe length  =   104.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.914(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.914(CFS)
Normal flow depth in pipe =    7.20(In.)
Flow top width inside pipe =    7.21(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.97(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    12.47 min.


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Process from Point/Station       16.400 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.100(Ac.)
Runoff from this stream =      4.914(CFS)
Time of concentration =   12.47 min.
Rainfall intensity =     2.418(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       70.665     11.28              2.540
2        4.914     12.47              2.418
```

Largest stream flow has longer or shorter time of concentration
Qp = 70.665 + sum of
Qa Tb/Ta
4.914 * 0.904 = 4.444
Qp = 75.110

Total of 2 main streams to confluence:
Flow rates before confluence point:
70.665 4.914
Area of streams before confluence:
30.740 2.100

Results of confluence:
Total flow rate = 75.110(CFS)
Time of concentration = 11.278 min.
Effective stream area after confluence = 32.840(Ac.)
End of computations, total study area = 32.84 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.245
Area averaged RI index number = 60.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100p1a.out

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********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED B
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++

Process from Point/Station 20.000 to Point/Station 20.100
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1466.500(Ft.)
Bottom (of initial area) elevation =  1447.300(Ft.)
Difference in elevation =    19.200(Ft.)
Slope =    0.02723  s(percent)=       2.72
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.499 min.
Rainfall intensity =      2.918(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.970
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.39
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     19.823(CFS)
Total initial stream area =        7.750(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       20.100 to Point/Station       21.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1442.350(Ft.)
Downstream point/station elevation =  1439.410(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.823(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    19.823(CFS)
Normal flow depth in pipe =   13.62(In.)
Flow top width inside pipe =   15.45(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.82(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     8.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      7.750(Ac.)
Runoff from this stream =     19.823(CFS)
Time of concentration =    8.58 min.
Rainfall intensity =     2.904(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       20.100
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   688.000(Ft.)
Top (of initial area) elevation =  1462.800(Ft.)
```

```
Bottom (of initial area) elevation =  1447.300(Ft.)
Difference in elevation =    15.500(Ft.)
Slope =    0.02253  s(percent)=       2.25
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.742 min.
Rainfall intensity =      2.878(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.960
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.52
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     19.321(CFS)
Total initial stream area =        7.660(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       20.100 to Point/Station       21.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1442.850(Ft.)
Downstream point/station elevation =  1439.410(Ft.)
Pipe length  =   588.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.321(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    19.321(CFS)
Normal flow depth in pipe =   18.54(In.)
Flow top width inside pipe =   25.05(In.)
Critical Depth =   18.46(In.)
Pipe flow velocity =      6.64(Ft/s)
Travel time through pipe =    1.48 min.
Time of concentration (TC) =    10.22 min.


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Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.660(Ac.)
Runoff from this stream =     19.321(CFS)
Time of concentration =   10.22 min.
Rainfall intensity =     2.666(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       19.823      8.58                2.904
2       19.321     10.22                2.666
Largest stream flow has longer or shorter time of concentration
Qp =     19.823 + sum of
        Qa          Tb/Ta
```

```
        19.321 *    0.840 =     16.232
Qp =     36.055

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.823      19.321
Area of streams before confluence:
        7.750        7.660
Results of confluence:
Total flow rate =     36.055(CFS)
Time of concentration =     8.584 min.
Effective stream area after confluence =     15.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1439.410(Ft.)
Downstream point/station elevation =  1438.470(Ft.)
Pipe length  =   189.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    36.055(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    36.055(CFS)
Normal flow depth in pipe =   26.11(In.)
Flow top width inside pipe =   26.83(In.)
Critical Depth =   24.00(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =     9.02 min.


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Process from Point/Station       21.000 to Point/Station       22.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     15.410(Ac.)
Runoff from this stream =     36.055(CFS)
Time of concentration =    9.02 min.
Rainfall intensity =     2.834(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.100 to Point/Station       21.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   430.000(Ft.)
Top (of initial area) elevation =  1463.300(Ft.)
Bottom (of initial area) elevation =  1448.210(Ft.)
Difference in elevation =    15.090(Ft.)
Slope =    0.03509  s(percent)=       3.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.176 min.
Rainfall intensity =      2.974(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.821
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.30
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.247(CFS)
Total initial stream area =        0.920(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station       21.200 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1439.950(Ft.)
Downstream point/station elevation =  1438.470(Ft.)
Pipe length  =    95.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.247(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.247(CFS)
Normal flow depth in pipe =    6.04(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    7.70(In.)
Pipe flow velocity =      5.68(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =     8.46 min.


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Process from Point/Station       21.200 to Point/Station       22.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.920(Ac.)
Runoff from this stream =      2.247(CFS)
Time of concentration =    8.46 min.
Rainfall intensity =     2.926(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       36.055      9.02                2.834
2        2.247      8.46                2.926
Largest stream flow has longer time of concentration
Qp =     36.055 + sum of
        Qb         Ia/Ib
         2.247 *    0.969 =      2.176
Qp =     38.231

Total of 2 streams to confluence:
Flow rates before confluence point:
      36.055       2.247
Area of streams before confluence:
       15.410        0.920
```

```
Results of confluence:
Total flow rate =     38.231(CFS)
Time of concentration =     9.024 min.
Effective stream area after confluence =     16.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1438.470(Ft.)
Downstream point/station elevation =  1436.840(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.231(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    38.231(CFS)
Normal flow depth in pipe =   27.70(In.)
Flow top width inside pipe =   24.23(In.)
Critical Depth =   24.70(In.)
Pipe flow velocity =      7.18(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =     9.78 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       23.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     16.330(Ac.)
Runoff from this stream =     38.231(CFS)
Time of concentration =    9.78 min.
Rainfall intensity =     2.724(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.100 to Point/Station       22.200
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   221.000(Ft.)
Top (of initial area) elevation =  1453.300(Ft.)
Bottom (of initial area) elevation =  1448.500(Ft.)
Difference in elevation =     4.800(Ft.)
Slope =    0.02172  s(percent)=       2.17
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.020 min.
Rainfall intensity =      3.456(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      2.505(CFS)
Total initial stream area =        0.830(Ac.)
```

Pervious area fraction = 0.200

++
Process from Point/Station 22.200 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1443.500(Ft.)
Downstream point/station elevation = 1436.840(Ft.)
Pipe length = 20.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.505(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 2.505(CFS)
Normal flow depth in pipe = 3.96(In.)
Flow top width inside pipe = 5.68(In.)
Critical depth could not be calculated.
Pipe flow velocity = 18.21(Ft/s)
Travel time through pipe = 0.02 min.
Time of concentration (TC) = 6.04 min.

++
Process from Point/Station 22.200 to Point/Station 23.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 0.830(Ac.)
Runoff from this stream = 2.505(CFS)
Time of concentration = 6.04 min.
Rainfall intensity = 3.450(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	38.231	9.78	2.724
2	2.505	6.04	3.450

Largest stream flow has longer time of concentration
Qp = 38.231 + sum of
Qb Ia/Ib
2.505 * 0.790 = 1.978
Qp = 40.209

Total of 2 streams to confluence:
Flow rates before confluence point:
38.231 2.505
Area of streams before confluence:
16.330 0.830
Results of confluence:
Total flow rate = 40.209(CFS)
Time of concentration = 9.778 min.
Effective stream area after confluence = 17.160(Ac.)

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Process from Point/Station 23.000 to Point/Station 24.000

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1436.840(Ft.)
Downstream point/station elevation =  1435.420(Ft.)
Pipe length  =   283.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.209(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    40.209(CFS)
Normal flow depth in pipe =   25.52(In.)
Flow top width inside pipe =   32.70(In.)
Critical Depth =   24.78(In.)
Pipe flow velocity =      7.50(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    10.41 min.


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Process from Point/Station       23.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     17.160(Ac.)
Runoff from this stream =     40.209(CFS)
Time of concentration =   10.41 min.
Rainfall intensity =     2.643(In/Hr)


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Process from Point/Station       23.100 to Point/Station       23.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   345.000(Ft.)
Top (of initial area) elevation =  1453.400(Ft.)
Bottom (of initial area) elevation =  1448.300(Ft.)
Difference in elevation =     5.100(Ft.)
Slope =    0.01478  s(percent)=       1.48
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.216 min.
Rainfall intensity =      3.162(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.561(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       23.200 to Point/Station       24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1440.000(Ft.)
```

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Downstream point/station elevation =  1435.420(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.561(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     7.561(CFS)
Normal flow depth in pipe =    8.71(In.)
Flow top width inside pipe =   10.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.40(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     7.32 min.


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Process from Point/Station       23.200 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.700(Ac.)
Runoff from this stream =      7.561(CFS)
Time of concentration =    7.32 min.
Rainfall intensity =     3.140(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       40.209     10.41                2.643
2        7.561      7.32                3.140
Largest stream flow has longer time of concentration
Qp =     40.209 + sum of
        Qb         Ia/Ib
         7.561 *    0.842 =      6.364
Qp =     46.573

Total of 2 streams to confluence:
Flow rates before confluence point:
      40.209       7.561
Area of streams before confluence:
       17.160        2.700
Results of confluence:
Total flow rate =     46.573(CFS)
Time of concentration =    10.407 min.
Effective stream area after confluence =     19.860(Ac.)


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Process from Point/Station       24.000 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1435.420(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =    58.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    46.573(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    46.573(CFS)
```

```
Normal flow depth in pipe =   27.75(In.)
Flow top width inside pipe =   30.26(In.)
Critical Depth =   26.69(In.)
Pipe flow velocity =      7.97(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    10.53 min.


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Process from Point/Station       24.000 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     19.860(Ac.)
Runoff from this stream =     46.573(CFS)
Time of concentration =   10.53 min.
Rainfall intensity =     2.628(In/Hr)


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Process from Point/Station       15.000 to Point/Station       25.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   467.000(Ft.)
Top (of initial area) elevation =  1454.100(Ft.)
Bottom (of initial area) elevation =  1451.000(Ft.)
Difference in elevation =     3.100(Ft.)
Slope =    0.00664  s(percent)=       0.66
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.560 min.
Rainfall intensity =      2.755(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.280
Decimal fraction soil group C = 0.720
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.36
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.290(CFS)
Total initial stream area =        2.590(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       25.000 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1446.000(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =    65.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.290(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     6.290(CFS)
Normal flow depth in pipe =    6.86(In.)
Flow top width inside pipe =    7.67(In.)
Critical depth could not be calculated.
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```
Pipe flow velocity =     17.41(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     9.62 min.


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Process from Point/Station       25.000 to Point/Station       28.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.769
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.62 min.
Rainfall intensity =      2.746(In/Hr) for a   100.0 year storm
Subarea runoff =      2.069(CFS) for      0.980(Ac.)
Total runoff =      8.360(CFS)      Total area =       3.570(Ac.)


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Process from Point/Station       25.000 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.570(Ac.)
Runoff from this stream =      8.360(CFS)
Time of concentration =    9.62 min.
Rainfall intensity =     2.746(In/Hr)


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Process from Point/Station       26.000 to Point/Station       26.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   373.000(Ft.)
Top (of initial area) elevation =  1454.000(Ft.)
Bottom (of initial area) elevation =  1448.300(Ft.)
Difference in elevation =     5.700(Ft.)
Slope =    0.01528  s(percent)=       1.53
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.396 min.
Rainfall intensity =      3.124(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.130
Decimal fraction soil group C = 0.870
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.31
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.262(CFS)
Total initial stream area =        2.990(Ac.)
Pervious area fraction = 0.100
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Process from Point/Station       26.100 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =   104.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.262(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.262(CFS)
Normal flow depth in pipe =    8.29(In.)
Flow top width inside pipe =   14.92(In.)
Critical Depth =   13.52(In.)
Pipe flow velocity =     11.89(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     7.54 min.


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Process from Point/Station       26.100 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      2.990(Ac.)
Runoff from this stream =      8.262(CFS)
Time of concentration =    7.54 min.
Rainfall intensity =     3.094(In/Hr)


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Process from Point/Station       23.100 to Point/Station       27.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   256.000(Ft.)
Top (of initial area) elevation =  1453.400(Ft.)
Bottom (of initial area) elevation =  1451.000(Ft.)
Difference in elevation =     2.400(Ft.)
Slope =    0.00938  s(percent)=       0.94
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.015 min.
Rainfall intensity =      3.206(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.124(CFS)
Total initial stream area =        1.100(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       27.000 to Point/Station       27.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
CONDOMINIUM subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =     7.01 min.
Rainfall intensity =      3.206(In/Hr) for a   100.0 year storm
Subarea runoff =      0.845(CFS) for      0.310(Ac.)
Total runoff =      3.969(CFS)      Total area =       1.410(Ac.)


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Process from Point/Station       27.000 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1446.000(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =    65.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.969(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.969(CFS)
Normal flow depth in pipe =    4.95(In.)
Flow top width inside pipe =    8.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.94(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     7.08 min.


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Process from Point/Station       27.000 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 4
Stream flow area =      1.410(Ac.)
Runoff from this stream =      3.969(CFS)
Time of concentration =    7.08 min.
Rainfall intensity =     3.191(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       46.573     10.53                2.628
2        8.360      9.62                2.746
3        8.262      7.54                3.094
4        3.969      7.08                3.191
Largest stream flow has longer time of concentration
Qp =     46.573 + sum of
        Qb         Ia/Ib
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         8.360 *    0.957 =      7.999
        Qb         Ia/Ib
         8.262 *    0.849 =      7.016
        Qb         Ia/Ib
         3.969 *    0.823 =      3.269
Qp =     64.857

Total of 4 streams to confluence:
Flow rates before confluence point:
      46.573       8.360       8.262       3.969
Area of streams before confluence:
       19.860        3.570        2.990        1.410
Results of confluence:
Total flow rate =     64.857(CFS)
Time of concentration =    10.528 min.
Effective stream area after confluence =     27.830(Ac.)


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Process from Point/Station       28.000 to Point/Station       28.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.764
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.53 min.
Rainfall intensity =      2.628(In/Hr) for a   100.0 year storm
Subarea runoff =      1.586(CFS) for      0.790(Ac.)
Total runoff =     66.442(CFS)      Total area =      28.620(Ac.)


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Process from Point/Station       28.000 to Point/Station       29.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1435.100(Ft.)
Downstream point/station elevation =  1434.400(Ft.)
Pipe length  =   205.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    66.442(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    66.442(CFS)
Normal flow depth in pipe =   34.69(In.)
Flow top width inside pipe =   37.83(In.)
Critical Depth =   30.09(In.)
Pipe flow velocity =      7.28(Ft/s)
Travel time through pipe =    0.47 min.
Time of concentration (TC) =    11.00 min.


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Process from Point/Station       29.000 to Point/Station       29.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
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Upstream point/station elevation =  1434.400(Ft.)
Downstream point/station elevation =  1434.220(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    66.442(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    66.442(CFS)
Normal flow depth in pipe =   32.16(In.)
Flow top width inside pipe =   35.58(In.)
Critical Depth =   30.68(In.)
Pipe flow velocity =      8.40(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    11.07 min.


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Process from Point/Station       29.000 to Point/Station       29.100
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     28.620(Ac.)
Runoff from this stream =     66.442(CFS)
Time of concentration =   11.07 min.
Rainfall intensity =     2.564(In/Hr)


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Process from Point/Station       28.100 to Point/Station       28.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   594.000(Ft.)
Top (of initial area) elevation =  1451.300(Ft.)
Bottom (of initial area) elevation =  1448.200(Ft.)
Difference in elevation =     3.100(Ft.)
Slope =    0.00522  s(percent)=       0.52
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.044 min.
Rainfall intensity =      2.567(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.179(CFS)
Total initial stream area =        0.520(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       28.200 to Point/Station       28.300
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =  1448.200(Ft.)
End of street segment elevation =  1446.300(Ft.)
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Length of street segment  =   452.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.015
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.514(CFS)
Depth of flow =   0.366(Ft.), Average velocity =   1.616(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.954(Ft.)
Flow velocity =   1.62(Ft/s)
Travel time =    4.66 min.     TC =   15.71  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.160(In/Hr) for a   100.0 year storm
Subarea runoff =      2.605(CFS) for      1.370(Ac.)
Total runoff =      3.784(CFS)      Total area =       1.890(Ac.)
Street flow at end of street =      3.784(CFS)
Half street flow at end of street =      3.784(CFS)
Depth of flow =   0.409(Ft.), Average velocity =   1.781(Ft/s)
Flow width (from curb towards crown)=  14.135(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.300 to Point/Station       29.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1434.220(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.784(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.784(CFS)
Normal flow depth in pipe =    4.27(In.)
Flow top width inside pipe =    8.99(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.34(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    15.73 min.


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Process from Point/Station       28.300 to Point/Station       29.100
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.890(Ac.)
Runoff from this stream =      3.784(CFS)
Time of concentration =   15.73 min.
Rainfall intensity =     2.159(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       66.442     11.07                2.564
2        3.784     15.73                2.159
Largest stream flow has longer or shorter time of concentration
Qp =     66.442 + sum of
        Qa          Tb/Ta
         3.784 *    0.704 =      2.663
Qp =     69.105

Total of 2 streams to confluence:
Flow rates before confluence point:
      66.442       3.784
Area of streams before confluence:
       28.620        1.890
Results of confluence:
Total flow rate =     69.105(CFS)
Time of concentration =    11.069 min.
Effective stream area after confluence =     30.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       29.100 to Point/Station       30.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------------
Upstream point/station elevation =  1434.220(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    69.105(CFS)

Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    69.105(CFS)
Normal flow depth in pipe =   27.94(In.)
Flow top width inside pipe =   30.02(In.)
Critical Depth =   31.75(In.)
Pipe flow velocity =     11.73(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    11.27 min.
End of computations, total study area =           30.51 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.165
Area averaged RI index number =  62.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100p1a.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A + B
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 701.000(Ft.)
Top (of initial area) elevation = 1462.800(Ft.)
Bottom (of initial area) elevation = 1447.300(Ft.)
Difference in elevation = 15.500(Ft.)
Slope = 0.02211 s(percent)= 2.21

```
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.841 min.
Rainfall intensity =      2.862(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.360
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.68
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     22.296(CFS)
Total initial stream area =        8.860(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1444.600(Ft.)
Downstream point/station elevation =  1440.900(Ft.)
Pipe length  =   526.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.296(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    22.296(CFS)
Normal flow depth in pipe =   19.27(In.)
Flow top width inside pipe =   24.41(In.)
Critical Depth =   19.85(In.)
Pipe flow velocity =      7.34(Ft/s)
Travel time through pipe =    1.19 min.
Time of concentration (TC) =    10.03 min.


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Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      8.860(Ac.)
Runoff from this stream =     22.296(CFS)
Time of concentration =   10.03 min.
Rainfall intensity =     2.690(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.100 to Point/Station       11.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   662.000(Ft.)
Top (of initial area) elevation =  1461.200(Ft.)
Bottom (of initial area) elevation =  1447.300(Ft.)
Difference in elevation =    13.900(Ft.)
Slope =    0.02100  s(percent)=       2.10
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    9.400 min.
Rainfall intensity =      2.778(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.880
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.56
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     18.125(CFS)
Total initial stream area =        7.650(Ac.)
Pervious area fraction = 0.200


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Process from Point/Station       11.200 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1442.440(Ft.)
Downstream point/station elevation =  1440.900(Ft.)
Pipe length  =    93.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.125(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    18.125(CFS)
Normal flow depth in pipe =   15.42(In.)
Flow top width inside pipe =   18.55(In.)
Critical Depth =   18.59(In.)
Pipe flow velocity =      9.58(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     9.56 min.


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Process from Point/Station       11.200 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.650(Ac.)
Runoff from this stream =     18.125(CFS)
Time of concentration =    9.56 min.
Rainfall intensity =     2.755(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       22.296     10.03               2.690
2       18.125      9.56               2.755
Largest stream flow has longer time of concentration
Qp =     22.296 + sum of
        Qb         Ia/Ib
        18.125 *    0.977 =     17.701
Qp =     39.997
```

```
Total of 2 main streams to confluence:
Flow rates before confluence point:
      22.296      18.125
Area of streams before confluence:
        8.860        7.650


Results of confluence:
Total flow rate =     39.997(CFS)
Time of concentration =    10.034 min.
Effective stream area after confluence  =     16.510(Ac.)


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Process from Point/Station       12.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1440.900(Ft.)
Downstream point/station elevation =  1440.400(Ft.)
Pipe length  =   109.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    39.997(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    39.997(CFS)
Normal flow depth in pipe =   26.34(In.)
Flow top width inside pipe =   31.90(In.)
Critical Depth =   24.72(In.)
Pipe flow velocity =      7.22(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    10.29 min.


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Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.510(Ac.)
Runoff from this stream =     39.997(CFS)
Time of concentration =   10.29 min.
Rainfall intensity =     2.658(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       12.100 to Point/Station       12.200
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   623.000(Ft.)
Top (of initial area) elevation =  1454.600(Ft.)
Bottom (of initial area) elevation =  1447.000(Ft.)
Difference in elevation =     7.600(Ft.)
Slope =    0.01220  s(percent)=       1.22
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.227 min.
Rainfall intensity =      2.665(In/Hr) for a   100.0 year storm
APARTMENT subarea type
```

```
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.260
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.38
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      9.584(CFS)
Total initial stream area =        4.210(Ac.)
Pervious area fraction = 0.200


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Process from Point/Station       12.200 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1442.830(Ft.)
Downstream point/station elevation =  1440.400(Ft.)
Pipe length  =   324.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.584(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.584(CFS)
Normal flow depth in pipe =   12.93(In.)
Flow top width inside pipe =   20.43(In.)
Critical Depth =   13.83(In.)
Pipe flow velocity =      6.17(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    11.10 min.


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Process from Point/Station       12.200 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.210(Ac.)
Runoff from this stream =      9.584(CFS)
Time of concentration =   11.10 min.
Rainfall intensity =     2.560(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       39.997     10.29               2.658
2        9.584     11.10               2.560
Largest stream flow has longer or shorter time of concentration
Qp =     39.997 + sum of
        Qa          Tb/Ta
         9.584 *    0.927 =      8.880
Qp =     48.876

Total of 2 main streams to confluence:
Flow rates before confluence point:
      39.997       9.584
```

```
Area of streams before confluence:
       16.510        4.210


Results of confluence:
Total flow rate =     48.876(CFS)
Time of concentration =    10.286 min.
Effective stream area after confluence  =     20.720(Ac.)


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Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1440.400(Ft.)
Downstream point/station elevation =  1437.900(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    48.876(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    48.876(CFS)
Normal flow depth in pipe =   27.33(In.)
Flow top width inside pipe =   30.79(In.)
Critical Depth =   27.31(In.)
Pipe flow velocity =      8.49(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    11.07 min.


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Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     20.720(Ac.)
Runoff from this stream =     48.876(CFS)
Time of concentration =   11.07 min.
Rainfall intensity =     2.564(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       12.100 to Point/Station       13.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   616.000(Ft.)
Top (of initial area) elevation =  1454.600(Ft.)
Bottom (of initial area) elevation =  1447.100(Ft.)
Difference in elevation =     7.500(Ft.)
Slope =    0.01218  s(percent)=       1.22
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.459 min.
Rainfall intensity =      2.769(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.880
```

```
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.56
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.033(CFS)
Total initial stream area =        3.310(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       13.100 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1441.330(Ft.)
Downstream point/station elevation =  1437.900(Ft.)
Pipe length  =   330.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.033(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.033(CFS)
Normal flow depth in pipe =   11.63(In.)
Flow top width inside pipe =   17.22(In.)
Critical Depth =   13.18(In.)
Pipe flow velocity =      6.65(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =    10.29 min.


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Process from Point/Station       13.100 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.310(Ac.)
Runoff from this stream =      8.033(CFS)
Time of concentration =   10.29 min.
Rainfall intensity =     2.658(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       48.876     11.07               2.564
2        8.033     10.29               2.658
Largest stream flow has longer time of concentration
Qp =     48.876 + sum of
        Qb         Ia/Ib
         8.033 *    0.965 =      7.750
Qp =     56.626

Total of 2 main streams to confluence:
Flow rates before confluence point:
      48.876       8.033
Area of streams before confluence:
       20.720        3.310
```

```
Results of confluence:
Total flow rate =     56.626(CFS)
Time of concentration =    11.067 min.
Effective stream area after confluence  =     24.030(Ac.)


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Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1437.900(Ft.)
Downstream point/station elevation =  1437.500(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    56.626(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    56.626(CFS)
Normal flow depth in pipe =   30.56(In.)
Flow top width inside pipe =   32.12(In.)
Critical Depth =   28.82(In.)
Pipe flow velocity =      8.12(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    11.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     24.030(Ac.)
Runoff from this stream =     56.626(CFS)
Time of concentration =   11.23 min.
Rainfall intensity =     2.546(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       15.000 to Point/Station       15.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   261.000(Ft.)
Top (of initial area) elevation =  1454.100(Ft.)
Bottom (of initial area) elevation =  1452.000(Ft.)
Difference in elevation =     2.100(Ft.)
Slope =    0.00805  s(percent)=       0.80
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.289 min.
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.820
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.66
```

```
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.651(CFS)
Total initial stream area =        2.750(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       15.100 to Point/Station       15.100
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.738
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.630
Decimal fraction soil group C = 0.370
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.81
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     7.29 min.
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
Subarea runoff =      9.190(CFS) for      3.960(Ac.)
Total runoff =     16.841(CFS)      Total area =       6.710(Ac.)


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Process from Point/Station       15.100 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1445.000(Ft.)
Downstream point/station elevation =  1437.500(Ft.)
Pipe length  =   295.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.841(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.841(CFS)
Normal flow depth in pipe =   14.86(In.)
Flow top width inside pipe =   13.66(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.80(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =     7.74 min.


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Process from Point/Station       15.100 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.710(Ac.)
Runoff from this stream =     16.841(CFS)
Time of concentration =    7.74 min.
Rainfall intensity =     3.054(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)
```

```
1       56.626     11.23               2.546
2       16.841      7.74               3.054
Largest stream flow has longer time of concentration
Qp =     56.626 + sum of
        Qb         Ia/Ib
        16.841 *    0.834 =     14.039
Qp =     70.665

Total of 2 main streams to confluence:
Flow rates before confluence point:
      56.626      16.841
Area of streams before confluence:
       24.030        6.710


Results of confluence:
Total flow rate =     70.665(CFS)
Time of concentration =    11.228 min.
Effective stream area after confluence  =     30.740(Ac.)


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Process from Point/Station       16.000 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1437.500(Ft.)
Downstream point/station elevation =  1435.600(Ft.)
Pipe length  =    54.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    70.665(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    70.665(CFS)
Normal flow depth in pipe =   22.64(In.)
Flow top width inside pipe =   25.82(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.78(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    11.28 min.


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Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     30.740(Ac.)
Runoff from this stream =     70.665(CFS)
Time of concentration =   11.28 min.
Rainfall intensity =     2.540(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       16.100 to Point/Station       16.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
```

```
Initial area flow distance =   616.000(Ft.)
Top (of initial area) elevation =  1461.600(Ft.)
Bottom (of initial area) elevation =  1452.600(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01461  s(percent)=       1.46
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.121 min.
Rainfall intensity =      2.819(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.991(CFS)
Total initial stream area =        1.200(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       16.400
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1452.600(Ft.)
End of street segment elevation =  1449.200(Ft.)
Length of street segment  =   386.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  43.000(Ft.)
Distance from crown to crossfall grade break  =  41.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  16.000(Ft.)
Slope from curb to property line (v/hz) =   0.015
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.685(CFS)
Depth of flow =   0.305(Ft.), Average velocity =   2.001(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.912(Ft.)
Flow velocity =   2.00(Ft/s)
Travel time =    3.22 min.     TC =   12.34  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.50
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.431(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      1.280(CFS) for      0.600(Ac.)
Total runoff =      4.272(CFS)      Total area =       1.800(Ac.)
Street flow at end of street =      4.272(CFS)
Half street flow at end of street =      2.136(CFS)
Depth of flow =   0.317(Ft.), Average velocity =   2.068(Ft/s)
Flow width (from curb towards crown)=   9.519(Ft.)


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Process from Point/Station       16.200 to Point/Station       16.400
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.800(Ac.)
Runoff from this stream =      4.272(CFS)
Time of concentration =   12.34 min.
Rainfall intensity =     2.431(In/Hr)


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Process from Point/Station       16.300 to Point/Station       16.400
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   349.000(Ft.)
Top (of initial area) elevation =  1451.400(Ft.)
Bottom (of initial area) elevation =  1449.200(Ft.)
Difference in elevation =     2.200(Ft.)
Slope =    0.00630  s(percent)=       0.63
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.597 min.
Rainfall intensity =      2.902(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.50
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.767(CFS)
Total initial stream area =        0.300(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       16.300 to Point/Station       16.400
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.300(Ac.)
Runoff from this stream =      0.767(CFS)
Time of concentration =    8.60 min.
Rainfall intensity =     2.902(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)
```

```
1        4.272     12.34                 2.431
2        0.767      8.60                 2.902
Largest stream flow has longer time of concentration
Qp =      4.272 + sum of
        Qb         Ia/Ib
         0.767 *    0.838 =      0.642
Qp =      4.914

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.272       0.767
Area of streams before confluence:
        1.800        0.300
Results of confluence:
Total flow rate =      4.914(CFS)
Time of concentration =    12.336 min.
Effective stream area after confluence =      2.100(Ac.)


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Process from Point/Station       16.400 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1445.200(Ft.)
Downstream point/station elevation =  1435.600(Ft.)
Pipe length  =   104.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.914(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.914(CFS)
Normal flow depth in pipe =    7.20(In.)
Flow top width inside pipe =    7.21(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.97(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    12.47 min.


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Process from Point/Station       16.400 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.100(Ac.)
Runoff from this stream =      4.914(CFS)
Time of concentration =   12.47 min.
Rainfall intensity =     2.418(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       70.665     11.28              2.540
2        4.914     12.47              2.418
```

```
Largest stream flow has longer or shorter time of concentration
Qp =     70.665 + sum of
        Qa          Tb/Ta
         4.914 *    0.904 =      4.444
Qp =     75.110

Total of 2 main streams to confluence:
Flow rates before confluence point:
      70.665       4.914
Area of streams before confluence:
       30.740        2.100


Results of confluence:
Total flow rate =     75.110(CFS)
Time of concentration =    11.278 min.
Effective stream area after confluence  =     32.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       30.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1435.600(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =  1204.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    75.110(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =    75.110(CFS)
Normal flow depth in pipe =   40.78(In.)
Flow top width inside pipe =   34.32(In.)
Critical Depth =   31.46(In.)
Pipe flow velocity =      6.60(Ft/s)
Travel time through pipe =    3.04 min.
Time of concentration (TC) =    14.32 min.


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Process from Point/Station       17.000 to Point/Station       30.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     32.840(Ac.)
Runoff from this stream =     75.110(CFS)
Time of concentration =   14.32 min.
Rainfall intensity =     2.260(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       20.000 to Point/Station       20.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1466.500(Ft.)
Bottom (of initial area) elevation =  1447.300(Ft.)
```

```
Difference in elevation =    19.200(Ft.)
Slope =    0.02723  s(percent)=       2.72
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.499 min.
Rainfall intensity =      2.918(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.970
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.39
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     19.823(CFS)
Total initial stream area =        7.750(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       20.100 to Point/Station       21.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1442.350(Ft.)
Downstream point/station elevation =  1439.410(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.823(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    19.823(CFS)
Normal flow depth in pipe =   13.62(In.)
Flow top width inside pipe =   15.45(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.82(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     8.58 min.


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Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      7.750(Ac.)
Runoff from this stream =     19.823(CFS)
Time of concentration =    8.58 min.
Rainfall intensity =     2.904(In/Hr)


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Process from Point/Station       10.000 to Point/Station       20.100
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   688.000(Ft.)
Top (of initial area) elevation =  1462.800(Ft.)
Bottom (of initial area) elevation =  1447.300(Ft.)
Difference in elevation =    15.500(Ft.)
Slope =    0.02253  s(percent)=       2.25
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    8.742 min.
Rainfall intensity =      2.878(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.960
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.52
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     19.321(CFS)
Total initial stream area =        7.660(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       20.100 to Point/Station       21.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1442.850(Ft.)
Downstream point/station elevation =  1439.410(Ft.)
Pipe length  =   588.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.321(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    19.321(CFS)
Normal flow depth in pipe =   18.54(In.)
Flow top width inside pipe =   25.05(In.)
Critical Depth =   18.46(In.)
Pipe flow velocity =      6.64(Ft/s)
Travel time through pipe =    1.48 min.
Time of concentration (TC) =    10.22 min.


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Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.660(Ac.)
Runoff from this stream =     19.321(CFS)
Time of concentration =   10.22 min.
Rainfall intensity =     2.666(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       19.823      8.58                2.904
2       19.321     10.22                2.666
Largest stream flow has longer or shorter time of concentration
Qp =     19.823 + sum of
        Qa          Tb/Ta
        19.321 *    0.840 =     16.232
Qp =     36.055

Total of 2 streams to confluence:
```

```
Flow rates before confluence point:
      19.823      19.321
Area of streams before confluence:
        7.750        7.660
Results of confluence:
Total flow rate =     36.055(CFS)
Time of concentration =     8.584 min.
Effective stream area after confluence =     15.410(Ac.)


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Process from Point/Station       21.000 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1439.410(Ft.)
Downstream point/station elevation =  1438.470(Ft.)
Pipe length  =   189.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    36.055(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    36.055(CFS)
Normal flow depth in pipe =   26.11(In.)
Flow top width inside pipe =   26.83(In.)
Critical Depth =   24.00(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =     9.02 min.


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Process from Point/Station       21.000 to Point/Station       22.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     15.410(Ac.)
Runoff from this stream =     36.055(CFS)
Time of concentration =    9.02 min.
Rainfall intensity =     2.834(In/Hr)


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Process from Point/Station       21.100 to Point/Station       21.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   430.000(Ft.)
Top (of initial area) elevation =  1463.300(Ft.)
Bottom (of initial area) elevation =  1448.210(Ft.)
Difference in elevation =    15.090(Ft.)
Slope =    0.03509  s(percent)=       3.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.176 min.
Rainfall intensity =      2.974(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 2)  =  57.30
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.247(CFS)
Total initial stream area =        0.920(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station       21.200 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1439.950(Ft.)
Downstream point/station elevation =  1438.470(Ft.)
Pipe length  =    95.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.247(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.247(CFS)
Normal flow depth in pipe =    6.04(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    7.70(In.)
Pipe flow velocity =      5.68(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =     8.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.200 to Point/Station       22.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.920(Ac.)
Runoff from this stream =      2.247(CFS)
Time of concentration =    8.46 min.
Rainfall intensity =     2.926(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       36.055      9.02                2.834
2        2.247      8.46                2.926
Largest stream flow has longer time of concentration
Qp =     36.055 + sum of
        Qb         Ia/Ib
         2.247 *    0.969 =      2.176
Qp =     38.231

Total of 2 streams to confluence:
Flow rates before confluence point:
      36.055       2.247
Area of streams before confluence:
       15.410        0.920
Results of confluence:
Total flow rate =     38.231(CFS)
Time of concentration =     9.024 min.
Effective stream area after confluence =     16.330(Ac.)
```

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Process from Point/Station       22.000 to Point/Station       23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1438.470(Ft.)
Downstream point/station elevation =  1436.840(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.231(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    38.231(CFS)
Normal flow depth in pipe =   27.70(In.)
Flow top width inside pipe =   24.23(In.)
Critical Depth =   24.70(In.)
Pipe flow velocity =      7.18(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =     9.78 min.


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Process from Point/Station       22.000 to Point/Station       23.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.330(Ac.)
Runoff from this stream =     38.231(CFS)
Time of concentration =    9.78 min.
Rainfall intensity =     2.724(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.100 to Point/Station       22.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   221.000(Ft.)
Top (of initial area) elevation =  1453.300(Ft.)
Bottom (of initial area) elevation =  1448.500(Ft.)
Difference in elevation =     4.800(Ft.)
Slope =    0.02172  s(percent)=       2.17
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.020 min.
Rainfall intensity =      3.456(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      2.505(CFS)
Total initial stream area =        0.830(Ac.)
Pervious area fraction = 0.200


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Process from Point/Station       22.200 to Point/Station       23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1443.500(Ft.)
Downstream point/station elevation =  1436.840(Ft.)
Pipe length  =    20.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.505(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     2.505(CFS)
Normal flow depth in pipe =    3.96(In.)
Flow top width inside pipe =    5.68(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.21(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     6.04 min.


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Process from Point/Station       22.200 to Point/Station       23.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.830(Ac.)
Runoff from this stream =      2.505(CFS)
Time of concentration =    6.04 min.
Rainfall intensity =     3.450(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       38.231      9.78                 2.724
2        2.505      6.04                 3.450
Largest stream flow has longer time of concentration
Qp =     38.231 + sum of
        Qb         Ia/Ib
         2.505 *    0.790 =      1.978
Qp =     40.209

Total of 2 streams to confluence:
Flow rates before confluence point:
      38.231       2.505
Area of streams before confluence:
       16.330        0.830
Results of confluence:
Total flow rate =     40.209(CFS)
Time of concentration =     9.778 min.
Effective stream area after confluence =     17.160(Ac.)


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Process from Point/Station       23.000 to Point/Station       24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1436.840(Ft.)
Downstream point/station elevation =  1435.420(Ft.)
```

```
Pipe length  =   283.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.209(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    40.209(CFS)
Normal flow depth in pipe =   25.52(In.)
Flow top width inside pipe =   32.70(In.)
Critical Depth =   24.78(In.)
Pipe flow velocity =      7.50(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    10.41 min.


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Process from Point/Station       23.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     17.160(Ac.)
Runoff from this stream =     40.209(CFS)
Time of concentration =   10.41 min.
Rainfall intensity =     2.643(In/Hr)


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Process from Point/Station       23.100 to Point/Station       23.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   345.000(Ft.)
Top (of initial area) elevation =  1453.400(Ft.)
Bottom (of initial area) elevation =  1448.300(Ft.)
Difference in elevation =     5.100(Ft.)
Slope =    0.01478  s(percent)=       1.48
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.216 min.
Rainfall intensity =      3.162(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.561(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       23.200 to Point/Station       24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1435.420(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.561(CFS)
Nearest computed pipe diameter  =     12.00(In.)
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Calculated individual pipe flow  =     7.561(CFS)
Normal flow depth in pipe =    8.71(In.)
Flow top width inside pipe =   10.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.40(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     7.32 min.


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Process from Point/Station       23.200 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.700(Ac.)
Runoff from this stream =      7.561(CFS)
Time of concentration =    7.32 min.
Rainfall intensity =     3.140(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       40.209     10.41                 2.643
2        7.561      7.32                 3.140
Largest stream flow has longer time of concentration
Qp =     40.209 + sum of
        Qb         Ia/Ib
         7.561 *    0.842 =      6.364
Qp =     46.573

Total of 2 streams to confluence:
Flow rates before confluence point:
      40.209       7.561
Area of streams before confluence:
       17.160        2.700
Results of confluence:
Total flow rate =     46.573(CFS)
Time of concentration =    10.407 min.
Effective stream area after confluence =     19.860(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1435.420(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =    58.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    46.573(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    46.573(CFS)
Normal flow depth in pipe =   27.75(In.)
Flow top width inside pipe =   30.26(In.)
Critical Depth =   26.69(In.)
Pipe flow velocity =      7.97(Ft/s)
```

```
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    10.53 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.860(Ac.)
Runoff from this stream =     46.573(CFS)
Time of concentration =   10.53 min.
Rainfall intensity =     2.628(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       25.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   467.000(Ft.)
Top (of initial area) elevation =  1454.100(Ft.)
Bottom (of initial area) elevation =  1451.000(Ft.)
Difference in elevation =     3.100(Ft.)
Slope =    0.00664  s(percent)=       0.66
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.560 min.
Rainfall intensity =      2.755(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.280
Decimal fraction soil group C = 0.720
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.36
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.290(CFS)
Total initial stream area =        2.590(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1446.000(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =    65.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.290(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     6.290(CFS)
Normal flow depth in pipe =    6.86(In.)
Flow top width inside pipe =    7.67(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.41(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     9.62 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       28.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.769
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.62 min.
Rainfall intensity =      2.746(In/Hr) for a   100.0 year storm
Subarea runoff =      2.069(CFS) for      0.980(Ac.)
Total runoff =      8.360(CFS)      Total area =       3.570(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.570(Ac.)
Runoff from this stream =      8.360(CFS)
Time of concentration =    9.62 min.
Rainfall intensity =     2.746(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       26.000 to Point/Station       26.100
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   373.000(Ft.)
Top (of initial area) elevation =  1454.000(Ft.)
Bottom (of initial area) elevation =  1448.300(Ft.)
Difference in elevation =     5.700(Ft.)
Slope =    0.01528  s(percent)=       1.53
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.396 min.
Rainfall intensity =      3.124(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.130
Decimal fraction soil group C = 0.870
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.31
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.262(CFS)
Total initial stream area =        2.990(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       26.100 to Point/Station       28.000
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =   104.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.262(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.262(CFS)
Normal flow depth in pipe =    8.29(In.)
Flow top width inside pipe =   14.92(In.)
Critical Depth =   13.52(In.)
Pipe flow velocity =     11.89(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     7.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       26.100 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      2.990(Ac.)
Runoff from this stream =      8.262(CFS)
Time of concentration =    7.54 min.
Rainfall intensity =     3.094(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       23.100 to Point/Station       27.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   256.000(Ft.)
Top (of initial area) elevation =  1453.400(Ft.)
Bottom (of initial area) elevation =  1451.000(Ft.)
Difference in elevation =     2.400(Ft.)
Slope =    0.00938  s(percent)=       0.94
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.015 min.
Rainfall intensity =      3.206(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.124(CFS)
Total initial stream area =        1.100(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       27.000 to Point/Station       27.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
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```
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =     7.01 min.
Rainfall intensity =      3.206(In/Hr) for a   100.0 year storm
Subarea runoff =      0.845(CFS) for      0.310(Ac.)
Total runoff =      3.969(CFS)      Total area =       1.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       27.000 to Point/Station       28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1446.000(Ft.)
Downstream point/station elevation =  1435.100(Ft.)
Pipe length  =    65.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.969(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.969(CFS)
Normal flow depth in pipe =    4.95(In.)
Flow top width inside pipe =    8.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.94(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     7.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       27.000 to Point/Station       28.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 4
Stream flow area =      1.410(Ac.)
Runoff from this stream =      3.969(CFS)
Time of concentration =    7.08 min.
Rainfall intensity =     3.191(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       46.573     10.53                2.628
2        8.360      9.62                2.746
3        8.262      7.54                3.094
4        3.969      7.08                3.191
Largest stream flow has longer time of concentration
Qp =     46.573 + sum of
        Qb         Ia/Ib
         8.360 *    0.957 =      7.999
        Qb         Ia/Ib
         8.262 *    0.849 =      7.016
        Qb         Ia/Ib
```

```
         3.969 *    0.823 =      3.269
Qp =     64.857

Total of 4 streams to confluence:
Flow rates before confluence point:
      46.573       8.360       8.262       3.969
Area of streams before confluence:
       19.860        3.570        2.990        1.410
Results of confluence:
Total flow rate =     64.857(CFS)
Time of concentration =    10.528 min.
Effective stream area after confluence =     27.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.000 to Point/Station       28.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.764
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.53 min.
Rainfall intensity =      2.628(In/Hr) for a   100.0 year storm
Subarea runoff =      1.586(CFS) for      0.790(Ac.)
Total runoff =     66.442(CFS)      Total area =      28.620(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.000 to Point/Station       29.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1435.100(Ft.)
Downstream point/station elevation =  1434.400(Ft.)
Pipe length  =   205.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    66.442(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    66.442(CFS)
Normal flow depth in pipe =   34.69(In.)
Flow top width inside pipe =   37.83(In.)
Critical Depth =   30.09(In.)
Pipe flow velocity =      7.28(Ft/s)
Travel time through pipe =    0.47 min.
Time of concentration (TC) =    11.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       29.000 to Point/Station       29.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.400(Ft.)
Downstream point/station elevation =  1434.220(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
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```
No. of pipes = 1  Required pipe flow  =    66.442(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    66.442(CFS)

Normal flow depth in pipe =   32.16(In.)
Flow top width inside pipe =   35.58(In.)
Critical Depth =   30.68(In.)
Pipe flow velocity =      8.40(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    11.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       29.000 to Point/Station       29.100
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     28.620(Ac.)
Runoff from this stream =     66.442(CFS)
Time of concentration =   11.07 min.
Rainfall intensity =     2.564(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.100 to Point/Station       28.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   594.000(Ft.)
Top (of initial area) elevation =  1451.300(Ft.)
Bottom (of initial area) elevation =  1448.200(Ft.)
Difference in elevation =     3.100(Ft.)
Slope =    0.00522  s(percent)=       0.52
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.044 min.
Rainfall intensity =      2.567(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.179(CFS)
Total initial stream area =        0.520(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.200 to Point/Station       28.300
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =  1448.200(Ft.)
End of street segment elevation =  1446.300(Ft.)
Length of street segment  =   452.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
```

```
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.015
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.514(CFS)
Depth of flow =   0.366(Ft.), Average velocity =   1.616(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.954(Ft.)
Flow velocity =   1.62(Ft/s)
Travel time =    4.66 min.     TC =   15.71  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.160(In/Hr) for a   100.0 year storm
Subarea runoff =      2.605(CFS) for      1.370(Ac.)
Total runoff =      3.784(CFS)      Total area =       1.890(Ac.)
Street flow at end of street =      3.784(CFS)
Half street flow at end of street =      3.784(CFS)
Depth of flow =   0.409(Ft.), Average velocity =   1.781(Ft/s)
Flow width (from curb towards crown)=  14.135(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.300 to Point/Station       29.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1434.220(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.784(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.784(CFS)
Normal flow depth in pipe =    4.27(In.)
Flow top width inside pipe =    8.99(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.34(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    15.73 min.


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Process from Point/Station       28.300 to Point/Station       29.100
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
```

```
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.890(Ac.)
Runoff from this stream =      3.784(CFS)
Time of concentration =   15.73 min.
Rainfall intensity =     2.159(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       66.442     11.07                2.564
2        3.784     15.73                2.159
Largest stream flow has longer or shorter time of concentration
Qp =     66.442 + sum of
        Qa          Tb/Ta
         3.784 *    0.704 =      2.663
Qp =     69.105

Total of 2 streams to confluence:
Flow rates before confluence point:
      66.442       3.784
Area of streams before confluence:
       28.620        1.890
Results of confluence:
Total flow rate =     69.105(CFS)
Time of concentration =    11.069 min.
Effective stream area after confluence =     30.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       29.100 to Point/Station       30.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.220(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    69.105(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    69.105(CFS)
Normal flow depth in pipe =   27.94(In.)
Flow top width inside pipe =   30.02(In.)
Critical Depth =   31.75(In.)
Pipe flow velocity =     11.73(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    11.27 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       29.100 to Point/Station       30.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     30.510(Ac.)
Runoff from this stream =     69.105(CFS)
Time of concentration =   11.27 min.
```

Rainfall intensity = 2.541(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	75.110	14.32	2.260
2	69.105	11.27	2.541

Largest stream flow has longer time of concentration
Qp = 75.110 + sum of
Qb Ia/Ib
69.105 * 0.889 = 61.463
Qp = 136.573

Total of 2 main streams to confluence:
Flow rates before confluence point:
75.110 69.105
Area of streams before confluence:
32.840 30.510

Results of confluence:
Total flow rate = 136.573(CFS)
Time of concentration = 14.320 min.
Effective stream area after confluence = 63.350(Ac.)
End of computations, total study area = 63.35 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.206
Area averaged RI index number = 61.5

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: q1auh10024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED A
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 33.45(Ac.) = 0.052 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 33.45(Ac.) = 0.052 Sq. Mi.
Length along longest watercourse = 1351.00(Ft.)
Length along longest watercourse measured to centroid = 643.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.50(Ft.)
Slope along watercourse = 52.7609 Ft./Mi.
Average Manning's 'N' = 0.024
Lag time = 0.073 Hr.
Lag time = 4.35 Min.
25% of lag time = 1.09 Min.
40% of lag time = 1.74 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

33.45 1.80 60.21

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
33.45	5.00	167.25

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
33.450	61.30	0.500

Total Area Entered = 33.45(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	114.833	23.683	7.984
2	0.167	229.667	48.833	16.462
3	0.250	344.500	13.786	4.647
4	0.333	459.334	6.296	2.122
5	0.417	574.167	3.503	1.181
6	0.500	689.000	2.103	0.709
7	0.583	803.834	1.796	0.605
			Sum = 100.000	Sum= 33.711

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.445)		0.020	0.020

2	0.17	0.07	0.040	(0.443)	0.020	0.020
3	0.25	0.07	0.040	(0.441)	0.020	0.020
4	0.33	0.10	0.060	(0.439)	0.030	0.030
5	0.42	0.10	0.060	(0.438)	0.030	0.030
6	0.50	0.10	0.060	(0.436)	0.030	0.030
7	0.58	0.10	0.060	(0.434)	0.030	0.030
8	0.67	0.10	0.060	(0.433)	0.030	0.030
9	0.75	0.10	0.060	(0.431)	0.030	0.030
10	0.83	0.13	0.080	(0.429)	0.040	0.040
11	0.92	0.13	0.080	(0.428)	0.040	0.040
12	1.00	0.13	0.080	(0.426)	0.040	0.040
13	1.08	0.10	0.060	(0.424)	0.030	0.030
14	1.17	0.10	0.060	(0.422)	0.030	0.030
15	1.25	0.10	0.060	(0.421)	0.030	0.030
16	1.33	0.10	0.060	(0.419)	0.030	0.030
17	1.42	0.10	0.060	(0.417)	0.030	0.030
18	1.50	0.10	0.060	(0.416)	0.030	0.030
19	1.58	0.10	0.060	(0.414)	0.030	0.030
20	1.67	0.10	0.060	(0.412)	0.030	0.030
21	1.75	0.10	0.060	(0.411)	0.030	0.030
22	1.83	0.13	0.080	(0.409)	0.040	0.040
23	1.92	0.13	0.080	(0.408)	0.040	0.040
24	2.00	0.13	0.080	(0.406)	0.040	0.040
25	2.08	0.13	0.080	(0.404)	0.040	0.040
26	2.17	0.13	0.080	(0.403)	0.040	0.040
27	2.25	0.13	0.080	(0.401)	0.040	0.040
28	2.33	0.13	0.080	(0.399)	0.040	0.040
29	2.42	0.13	0.080	(0.398)	0.040	0.040
30	2.50	0.13	0.080	(0.396)	0.040	0.040
31	2.58	0.17	0.100	(0.394)	0.050	0.050
32	2.67	0.17	0.100	(0.393)	0.050	0.050
33	2.75	0.17	0.100	(0.391)	0.050	0.050
34	2.83	0.17	0.100	(0.390)	0.050	0.050
35	2.92	0.17	0.100	(0.388)	0.050	0.050
36	3.00	0.17	0.100	(0.386)	0.050	0.050
37	3.08	0.17	0.100	(0.385)	0.050	0.050
38	3.17	0.17	0.100	(0.383)	0.050	0.050
39	3.25	0.17	0.100	(0.382)	0.050	0.050
40	3.33	0.17	0.100	(0.380)	0.050	0.050
41	3.42	0.17	0.100	(0.378)	0.050	0.050
42	3.50	0.17	0.100	(0.377)	0.050	0.050
43	3.58	0.17	0.100	(0.375)	0.050	0.050
44	3.67	0.17	0.100	(0.374)	0.050	0.050
45	3.75	0.17	0.100	(0.372)	0.050	0.050
46	3.83	0.20	0.120	(0.371)	0.060	0.060
47	3.92	0.20	0.120	(0.369)	0.060	0.060
48	4.00	0.20	0.120	(0.367)	0.060	0.060
49	4.08	0.20	0.120	(0.366)	0.060	0.060
50	4.17	0.20	0.120	(0.364)	0.060	0.060
51	4.25	0.20	0.120	(0.363)	0.060	0.060
52	4.33	0.23	0.140	(0.361)	0.070	0.070
53	4.42	0.23	0.140	(0.360)	0.070	0.070
54	4.50	0.23	0.140	(0.358)	0.070	0.070
55	4.58	0.23	0.140	(0.357)	0.070	0.070
56	4.67	0.23	0.140	(0.355)	0.070	0.070
57	4.75	0.23	0.140	(0.354)	0.070	0.070
58	4.83	0.27	0.160	(0.352)	0.080	0.080

59	4.92	0.27	0.160	(0.350)	0.080	0.080
60	5.00	0.27	0.160	(0.349)	0.080	0.080
61	5.08	0.20	0.120	(0.347)	0.060	0.060
62	5.17	0.20	0.120	(0.346)	0.060	0.060
63	5.25	0.20	0.120	(0.344)	0.060	0.060
64	5.33	0.23	0.140	(0.343)	0.070	0.070
65	5.42	0.23	0.140	(0.341)	0.070	0.070
66	5.50	0.23	0.140	(0.340)	0.070	0.070
67	5.58	0.27	0.160	(0.338)	0.080	0.080
68	5.67	0.27	0.160	(0.337)	0.080	0.080
69	5.75	0.27	0.160	(0.335)	0.080	0.080
70	5.83	0.27	0.160	(0.334)	0.080	0.080
71	5.92	0.27	0.160	(0.332)	0.080	0.080
72	6.00	0.27	0.160	(0.331)	0.080	0.080
73	6.08	0.30	0.180	(0.330)	0.090	0.090
74	6.17	0.30	0.180	(0.328)	0.090	0.090
75	6.25	0.30	0.180	(0.327)	0.090	0.090
76	6.33	0.30	0.180	(0.325)	0.090	0.090
77	6.42	0.30	0.180	(0.324)	0.090	0.090
78	6.50	0.30	0.180	(0.322)	0.090	0.090
79	6.58	0.33	0.200	(0.321)	0.100	0.100
80	6.67	0.33	0.200	(0.319)	0.100	0.100
81	6.75	0.33	0.200	(0.318)	0.100	0.100
82	6.83	0.33	0.200	(0.316)	0.100	0.100
83	6.92	0.33	0.200	(0.315)	0.100	0.100
84	7.00	0.33	0.200	(0.314)	0.100	0.100
85	7.08	0.33	0.200	(0.312)	0.100	0.100
86	7.17	0.33	0.200	(0.311)	0.100	0.100
87	7.25	0.33	0.200	(0.309)	0.100	0.100
88	7.33	0.37	0.220	(0.308)	0.110	0.110
89	7.42	0.37	0.220	(0.307)	0.110	0.110
90	7.50	0.37	0.220	(0.305)	0.110	0.110
91	7.58	0.40	0.240	(0.304)	0.120	0.120
92	7.67	0.40	0.240	(0.302)	0.120	0.120
93	7.75	0.40	0.240	(0.301)	0.120	0.120
94	7.83	0.43	0.260	(0.300)	0.130	0.130
95	7.92	0.43	0.260	(0.298)	0.130	0.130
96	8.00	0.43	0.260	(0.297)	0.130	0.130
97	8.08	0.50	0.300	(0.295)	0.150	0.150
98	8.17	0.50	0.300	(0.294)	0.150	0.150
99	8.25	0.50	0.300	(0.293)	0.150	0.150
100	8.33	0.50	0.300	(0.291)	0.150	0.150
101	8.42	0.50	0.300	(0.290)	0.150	0.150
102	8.50	0.50	0.300	(0.289)	0.150	0.150
103	8.58	0.53	0.320	(0.287)	0.160	0.160
104	8.67	0.53	0.320	(0.286)	0.160	0.160
105	8.75	0.53	0.320	(0.285)	0.160	0.160
106	8.83	0.57	0.340	(0.283)	0.170	0.170
107	8.92	0.57	0.340	(0.282)	0.170	0.170
108	9.00	0.57	0.340	(0.281)	0.170	0.170
109	9.08	0.63	0.380	(0.279)	0.190	0.190
110	9.17	0.63	0.380	(0.278)	0.190	0.190
111	9.25	0.63	0.380	(0.277)	0.190	0.190
112	9.33	0.67	0.400	(0.275)	0.200	0.200
113	9.42	0.67	0.400	(0.274)	0.200	0.200
114	9.50	0.67	0.400	(0.273)	0.200	0.200
115	9.58	0.70	0.420	(0.271)	0.210	0.210

116	9.67	0.70	0.420	(0.270)	0.210	0.210
117	9.75	0.70	0.420	(0.269)	0.210	0.210
118	9.83	0.73	0.440	(0.267)	0.220	0.220
119	9.92	0.73	0.440	(0.266)	0.220	0.220
120	10.00	0.73	0.440	(0.265)	0.220	0.220
121	10.08	0.50	0.300	(0.264)	0.150	0.150
122	10.17	0.50	0.300	(0.262)	0.150	0.150
123	10.25	0.50	0.300	(0.261)	0.150	0.150
124	10.33	0.50	0.300	(0.260)	0.150	0.150
125	10.42	0.50	0.300	(0.258)	0.150	0.150
126	10.50	0.50	0.300	(0.257)	0.150	0.150
127	10.58	0.67	0.400	(0.256)	0.200	0.200
128	10.67	0.67	0.400	(0.255)	0.200	0.200
129	10.75	0.67	0.400	(0.253)	0.200	0.200
130	10.83	0.67	0.400	(0.252)	0.200	0.200
131	10.92	0.67	0.400	(0.251)	0.200	0.200
132	11.00	0.67	0.400	(0.250)	0.200	0.200
133	11.08	0.63	0.380	(0.249)	0.190	0.190
134	11.17	0.63	0.380	(0.247)	0.190	0.190
135	11.25	0.63	0.380	(0.246)	0.190	0.190
136	11.33	0.63	0.380	(0.245)	0.190	0.190
137	11.42	0.63	0.380	(0.244)	0.190	0.190
138	11.50	0.63	0.380	(0.242)	0.190	0.190
139	11.58	0.57	0.340	(0.241)	0.170	0.170
140	11.67	0.57	0.340	(0.240)	0.170	0.170
141	11.75	0.57	0.340	(0.239)	0.170	0.170
142	11.83	0.60	0.360	(0.238)	0.180	0.180
143	11.92	0.60	0.360	(0.236)	0.180	0.180
144	12.00	0.60	0.360	(0.235)	0.180	0.180
145	12.08	0.83	0.500	0.234	(0.250)	0.266
146	12.17	0.83	0.500	0.233	(0.250)	0.267
147	12.25	0.83	0.500	0.232	(0.250)	0.268
148	12.33	0.87	0.520	0.231	(0.260)	0.289
149	12.42	0.87	0.520	0.229	(0.260)	0.291
150	12.50	0.87	0.520	0.228	(0.260)	0.292
151	12.58	0.93	0.560	0.227	(0.280)	0.333
152	12.67	0.93	0.560	0.226	(0.280)	0.334
153	12.75	0.93	0.560	0.225	(0.280)	0.335
154	12.83	0.97	0.580	0.224	(0.290)	0.356
155	12.92	0.97	0.580	0.223	(0.290)	0.357
156	13.00	0.97	0.580	0.221	(0.290)	0.359
157	13.08	1.13	0.680	0.220	(0.340)	0.460
158	13.17	1.13	0.680	0.219	(0.340)	0.461
159	13.25	1.13	0.680	0.218	(0.340)	0.462
160	13.33	1.13	0.680	0.217	(0.340)	0.463
161	13.42	1.13	0.680	0.216	(0.340)	0.464
162	13.50	1.13	0.680	0.215	(0.340)	0.465
163	13.58	0.77	0.460	0.214	(0.230)	0.246
164	13.67	0.77	0.460	0.213	(0.230)	0.247
165	13.75	0.77	0.460	0.212	(0.230)	0.248
166	13.83	0.77	0.460	0.210	(0.230)	0.250
167	13.92	0.77	0.460	0.209	(0.230)	0.251
168	14.00	0.77	0.460	0.208	(0.230)	0.252
169	14.08	0.90	0.540	0.207	(0.270)	0.333
170	14.17	0.90	0.540	0.206	(0.270)	0.334
171	14.25	0.90	0.540	0.205	(0.270)	0.335
172	14.33	0.87	0.520	0.204	(0.260)	0.316

173	14.42	0.87	0.520	0.203	(0.260)	0.317
174	14.50	0.87	0.520	0.202	(0.260)	0.318
175	14.58	0.87	0.520	0.201	(0.260)	0.319
176	14.67	0.87	0.520	0.200	(0.260)	0.320
177	14.75	0.87	0.520	0.199	(0.260)	0.321
178	14.83	0.83	0.500	0.198	(0.250)	0.302
179	14.92	0.83	0.500	0.197	(0.250)	0.303
180	15.00	0.83	0.500	0.196	(0.250)	0.304
181	15.08	0.80	0.480	0.195	(0.240)	0.285
182	15.17	0.80	0.480	0.194	(0.240)	0.286
183	15.25	0.80	0.480	0.193	(0.240)	0.287
184	15.33	0.77	0.460	0.192	(0.230)	0.268
185	15.42	0.77	0.460	0.191	(0.230)	0.269
186	15.50	0.77	0.460	0.190	(0.230)	0.270
187	15.58	0.63	0.380	0.189	(0.190)	0.191
188	15.67	0.63	0.380	0.188	(0.190)	0.192
189	15.75	0.63	0.380	0.187	(0.190)	0.193
190	15.83	0.63	0.380	0.186	(0.190)	0.194
191	15.92	0.63	0.380	0.185	(0.190)	0.195
192	16.00	0.63	0.380	0.184	(0.190)	0.196
193	16.08	0.13	0.080	(0.183)	0.040	0.040
194	16.17	0.13	0.080	(0.182)	0.040	0.040
195	16.25	0.13	0.080	(0.181)	0.040	0.040
196	16.33	0.13	0.080	(0.180)	0.040	0.040
197	16.42	0.13	0.080	(0.180)	0.040	0.040
198	16.50	0.13	0.080	(0.179)	0.040	0.040
199	16.58	0.10	0.060	(0.178)	0.030	0.030
200	16.67	0.10	0.060	(0.177)	0.030	0.030
201	16.75	0.10	0.060	(0.176)	0.030	0.030
202	16.83	0.10	0.060	(0.175)	0.030	0.030
203	16.92	0.10	0.060	(0.174)	0.030	0.030
204	17.00	0.10	0.060	(0.173)	0.030	0.030
205	17.08	0.17	0.100	(0.172)	0.050	0.050
206	17.17	0.17	0.100	(0.171)	0.050	0.050
207	17.25	0.17	0.100	(0.171)	0.050	0.050
208	17.33	0.17	0.100	(0.170)	0.050	0.050
209	17.42	0.17	0.100	(0.169)	0.050	0.050
210	17.50	0.17	0.100	(0.168)	0.050	0.050
211	17.58	0.17	0.100	(0.167)	0.050	0.050
212	17.67	0.17	0.100	(0.166)	0.050	0.050
213	17.75	0.17	0.100	(0.166)	0.050	0.050
214	17.83	0.13	0.080	(0.165)	0.040	0.040
215	17.92	0.13	0.080	(0.164)	0.040	0.040
216	18.00	0.13	0.080	(0.163)	0.040	0.040
217	18.08	0.13	0.080	(0.162)	0.040	0.040
218	18.17	0.13	0.080	(0.162)	0.040	0.040
219	18.25	0.13	0.080	(0.161)	0.040	0.040
220	18.33	0.13	0.080	(0.160)	0.040	0.040
221	18.42	0.13	0.080	(0.159)	0.040	0.040
222	18.50	0.13	0.080	(0.158)	0.040	0.040
223	18.58	0.10	0.060	(0.158)	0.030	0.030
224	18.67	0.10	0.060	(0.157)	0.030	0.030
225	18.75	0.10	0.060	(0.156)	0.030	0.030
226	18.83	0.07	0.040	(0.155)	0.020	0.020
227	18.92	0.07	0.040	(0.155)	0.020	0.020
228	19.00	0.07	0.040	(0.154)	0.020	0.020
229	19.08	0.10	0.060	(0.153)	0.030	0.030

230	19.17	0.10	0.060	(0.152)	0.030	0.030
231	19.25	0.10	0.060	(0.152)	0.030	0.030
232	19.33	0.13	0.080	(0.151)	0.040	0.040
233	19.42	0.13	0.080	(0.150)	0.040	0.040
234	19.50	0.13	0.080	(0.150)	0.040	0.040
235	19.58	0.10	0.060	(0.149)	0.030	0.030
236	19.67	0.10	0.060	(0.148)	0.030	0.030
237	19.75	0.10	0.060	(0.148)	0.030	0.030
238	19.83	0.07	0.040	(0.147)	0.020	0.020
239	19.92	0.07	0.040	(0.146)	0.020	0.020
240	20.00	0.07	0.040	(0.146)	0.020	0.020
241	20.08	0.10	0.060	(0.145)	0.030	0.030
242	20.17	0.10	0.060	(0.144)	0.030	0.030
243	20.25	0.10	0.060	(0.144)	0.030	0.030
244	20.33	0.10	0.060	(0.143)	0.030	0.030
245	20.42	0.10	0.060	(0.142)	0.030	0.030
246	20.50	0.10	0.060	(0.142)	0.030	0.030
247	20.58	0.10	0.060	(0.141)	0.030	0.030
248	20.67	0.10	0.060	(0.141)	0.030	0.030
249	20.75	0.10	0.060	(0.140)	0.030	0.030
250	20.83	0.07	0.040	(0.140)	0.020	0.020
251	20.92	0.07	0.040	(0.139)	0.020	0.020
252	21.00	0.07	0.040	(0.138)	0.020	0.020
253	21.08	0.10	0.060	(0.138)	0.030	0.030
254	21.17	0.10	0.060	(0.137)	0.030	0.030
255	21.25	0.10	0.060	(0.137)	0.030	0.030
256	21.33	0.07	0.040	(0.136)	0.020	0.020
257	21.42	0.07	0.040	(0.136)	0.020	0.020
258	21.50	0.07	0.040	(0.135)	0.020	0.020
259	21.58	0.10	0.060	(0.135)	0.030	0.030
260	21.67	0.10	0.060	(0.134)	0.030	0.030
261	21.75	0.10	0.060	(0.134)	0.030	0.030
262	21.83	0.07	0.040	(0.133)	0.020	0.020
263	21.92	0.07	0.040	(0.133)	0.020	0.020
264	22.00	0.07	0.040	(0.132)	0.020	0.020
265	22.08	0.10	0.060	(0.132)	0.030	0.030
266	22.17	0.10	0.060	(0.132)	0.030	0.030
267	22.25	0.10	0.060	(0.131)	0.030	0.030
268	22.33	0.07	0.040	(0.131)	0.020	0.020
269	22.42	0.07	0.040	(0.130)	0.020	0.020
270	22.50	0.07	0.040	(0.130)	0.020	0.020
271	22.58	0.07	0.040	(0.130)	0.020	0.020
272	22.67	0.07	0.040	(0.129)	0.020	0.020
273	22.75	0.07	0.040	(0.129)	0.020	0.020
274	22.83	0.07	0.040	(0.129)	0.020	0.020
275	22.92	0.07	0.040	(0.128)	0.020	0.020
276	23.00	0.07	0.040	(0.128)	0.020	0.020
277	23.08	0.07	0.040	(0.128)	0.020	0.020
278	23.17	0.07	0.040	(0.127)	0.020	0.020
279	23.25	0.07	0.040	(0.127)	0.020	0.020
280	23.33	0.07	0.040	(0.127)	0.020	0.020
281	23.42	0.07	0.040	(0.127)	0.020	0.020
282	23.50	0.07	0.040	(0.126)	0.020	0.020
283	23.58	0.07	0.040	(0.126)	0.020	0.020
284	23.67	0.07	0.040	(0.126)	0.020	0.020
285	23.75	0.07	0.040	(0.126)	0.020	0.020
286	23.83	0.07	0.040	(0.126)	0.020	0.020

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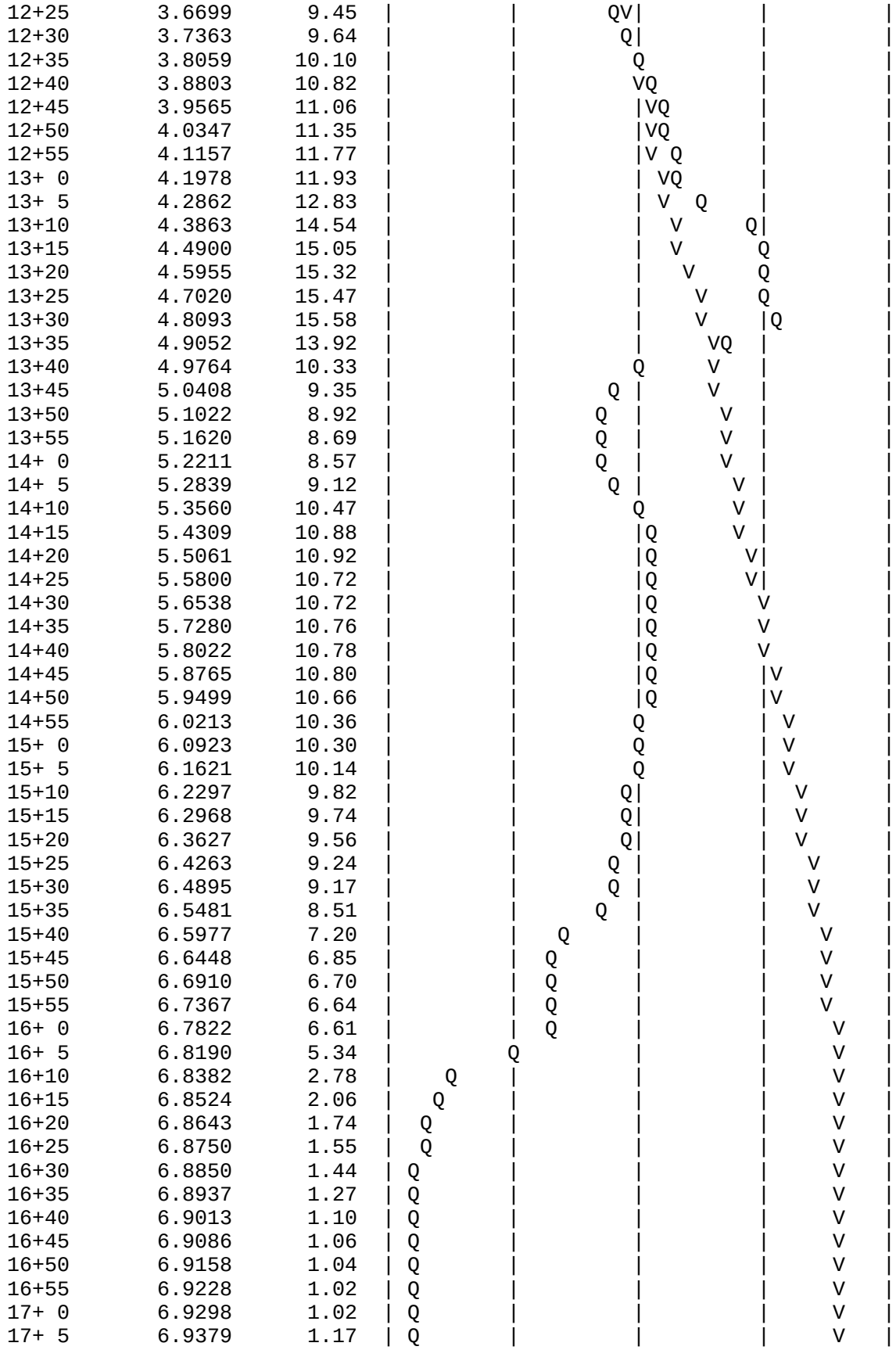
287  23.92     0.07      0.040       (  0.125)       0.020        0.020
288  24.00     0.07      0.040       (  0.125)       0.020        0.020
          (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    32.3
     Flood volume = Effective rainfall      2.69(In)
      times area      33.5(Ac.)/[(In)/(Ft.)] =       7.5(Ac.Ft)
     Total soil loss =      2.31(In)
     Total soil loss =     6.426(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =      327149.6 Cubic Feet
     Total soil loss =      279928.2 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     15.580(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
 ---------------------------------------------------------------------------
   0+ 5       0.0011      0.16  Q         |         |         |         |
   0+10       0.0045      0.49  Q         |         |         |         |
   0+15       0.0085      0.58  VQ        |         |         |         |
   0+20       0.0133      0.70  VQ        |         |         |         |
   0+25       0.0195      0.89  VQ        |         |         |         |
   0+30       0.0260      0.95  VQ        |         |         |         |
   0+35       0.0328      0.99  VQ        |         |         |         |
   0+40       0.0397      1.00  VQ        |         |         |         |
   0+45       0.0466      1.01  V Q       |         |         |         |
   0+50       0.0542      1.09  V Q       |         |         |         |
   0+55       0.0628      1.26  V Q       |         |         |         |
   1+ 0       0.0718      1.30  V Q       |         |         |         |
   1+ 5       0.0804      1.24  V Q       |         |         |         |
   1+10       0.0879      1.09  V Q       |         |         |         |
   1+15       0.0951      1.05  V Q       |         |         |         |
   1+20       0.1023      1.04  V Q       |         |         |         |
   1+25       0.1093      1.02  V Q       |         |         |         |
   1+30       0.1163      1.02  V Q       |         |         |         |
   1+35       0.1233      1.01  V Q       |         |         |         |
   1+40       0.1303      1.01  V Q       |         |         |         |
   1+45       0.1372      1.01  V Q       |         |         |         |
   1+50       0.1448      1.09  V Q       |         |         |         |
   1+55       0.1534      1.26  V Q       |         |         |         |
   2+ 0       0.1624      1.30  V Q       |         |         |         |
   2+ 5       0.1715      1.32  V Q       |         |         |         |
   2+10       0.1807      1.34  V Q       |         |         |         |
   2+15       0.1899      1.34  |VQ       |         |         |         |
   2+20       0.1992      1.35  |VQ       |         |         |         |
   2+25       0.2085      1.35  |VQ       |         |         |         |
   2+30       0.2178      1.35  |VQ       |         |         |         |
   2+35       0.2277      1.43  |VQ       |         |         |         |
   2+40       0.2386      1.59  |V Q      |         |         |         |
   2+45       0.2499      1.64  |V Q      |         |         |         |
   2+50       0.2614      1.66  |V Q      |         |         |         |
```

2+55	0.2729	1.67	V Q				
3+ 0	0.2845	1.68	V Q				
3+ 5	0.2961	1.69	V Q				
3+10	0.3077	1.69	V Q				
3+15	0.3193	1.69	V Q				
3+20	0.3309	1.69	V Q				
3+25	0.3425	1.69	V Q				
3+30	0.3542	1.69	V Q				
3+35	0.3658	1.69	V Q				
3+40	0.3774	1.69	VQ				
3+45	0.3890	1.69	VQ				
3+50	0.4012	1.77	VQ				
3+55	0.4145	1.93	VQ				
4+ 0	0.4281	1.98	VQ				
4+ 5	0.4418	2.00	VQ				
4+10	0.4557	2.01	V Q				
4+15	0.4696	2.02	V Q				
4+20	0.4841	2.10	V Q				
4+25	0.4997	2.27	V Q				
4+30	0.5156	2.31	V Q				
4+35	0.5317	2.34	V Q				
4+40	0.5479	2.35	V Q				
4+45	0.5641	2.35	VQ				
4+50	0.5809	2.44	VQ				
4+55	0.5989	2.61	V Q				
5+ 0	0.6171	2.65	V Q				
5+ 5	0.6344	2.51	V Q				
5+10	0.6496	2.20	VQ				
5+15	0.6641	2.11	VQ				
5+20	0.6789	2.15	VQ				
5+25	0.6947	2.29	VQ				
5+30	0.7107	2.33	VQ				
5+35	0.7274	2.42	VQ				
5+40	0.7452	2.59	V Q				
5+45	0.7635	2.65	VQ				
5+50	0.7819	2.67	VQ				
5+55	0.8004	2.68	VQ				
6+ 0	0.8189	2.69	VQ				
6+ 5	0.8380	2.78	VQ				
6+10	0.8583	2.94	VQ				
6+15	0.8789	2.99	VQ				
6+20	0.8996	3.01	V Q				
6+25	0.9204	3.02	V Q				
6+30	0.9413	3.03	VQ				
6+35	0.9627	3.12	VQ				
6+40	0.9853	3.28	VQ				
6+45	1.0082	3.33	VQ				
6+50	1.0313	3.35	VQ				
6+55	1.0544	3.36	VQ				
7+ 0	1.0776	3.37	VQ				
7+ 5	1.1009	3.37	VQ				
7+10	1.1241	3.37	VQ				
7+15	1.1473	3.37	Q				
7+20	1.1711	3.45	Q				
7+25	1.1960	3.62	VQ				
7+30	1.2212	3.66	VQ				
7+35	1.2472	3.76	VQ				

7+40	1.2743	3.94	VQ				
7+45	1.3018	3.99	VQ				
7+50	1.3301	4.10	VQ				
7+55	1.3595	4.28	VQ				
8+ 0	1.3894	4.33	VQ				
8+ 5	1.4205	4.52	V Q				
8+10	1.4540	4.86	V Q				
8+15	1.4881	4.96	V Q				
8+20	1.5226	5.01	V Q				
8+25	1.5573	5.03	V Q				
8+30	1.5920	5.05	V Q				
8+35	1.6274	5.14	V Q				
8+40	1.6640	5.30	V Q				
8+45	1.7008	5.35	VQ				
8+50	1.7384	5.45	VQ				
8+55	1.7771	5.63	V|Q				
9+ 0	1.8162	5.68	V|Q				
9+ 5	1.8567	5.87	V|Q				
9+10	1.8994	6.21	V Q				
9+15	1.9429	6.31	V Q				
9+20	1.9872	6.44	V Q				
9+25	2.0328	6.63	V Q				
9+30	2.0789	6.69	|V Q				
9+35	2.1257	6.80	|V Q				
9+40	2.1738	6.98	|V Q				
9+45	2.2222	7.03	|V Q				
9+50	2.2714	7.14	| V Q				
9+55	2.3217	7.31	| V Q				
10+ 0	2.3725	7.37	| V Q				
10+ 5	2.4195	6.84	| VQ				
10+10	2.4588	5.69	|Q V				
10+15	2.4958	5.38	Q V				
10+20	2.5318	5.23	Q V				
10+25	2.5673	5.15	Q V				
10+30	2.6025	5.10	Q V				
10+35	2.6400	5.46	Q V				
10+40	2.6833	6.28	| Q V				
10+45	2.7282	6.51	| QV				
10+50	2.7738	6.62	| QV				
10+55	2.8198	6.68	| Q V				
11+ 0	2.8660	6.72	| Q V				
11+ 5	2.9119	6.67	| Q V				
11+10	2.9567	6.50	| Q V				
11+15	3.0011	6.45	| Q V				
11+20	3.0454	6.43	| Q V				
11+25	3.0897	6.42	| Q V				
11+30	3.1338	6.41	| Q V				
11+35	3.1769	6.25	| Q V				
11+40	3.2176	5.92	|Q V				
11+45	3.2578	5.83	|Q V				
11+50	3.2981	5.86	|Q V				
11+55	3.3395	6.00	| Q V				
12+ 0	3.3811	6.04	| Q V				
12+ 5	3.4274	6.73	| Q V				
12+10	3.4837	8.17	| Q V				
12+15	3.5429	8.60	| QV				
12+20	3.6048	8.98	| Q V|				



17+10	6.9482	1.50	Q				V
17+15	6.9592	1.59	Q				V
17+20	6.9705	1.64	Q				V
17+25	6.9819	1.66	Q				V
17+30	6.9934	1.67	Q				V
17+35	7.0051	1.69	Q				V
17+40	7.0167	1.69	Q				V
17+45	7.0283	1.69	Q				V
17+50	7.0393	1.61	Q				V
17+55	7.0493	1.44	Q				V
18+ 0	7.0589	1.40	Q				V
18+ 5	7.0683	1.37	Q				V
18+10	7.0777	1.36	Q				V
18+15	7.0871	1.36	Q				V
18+20	7.0963	1.35	Q				V
18+25	7.1056	1.35	Q				V
18+30	7.1149	1.35	Q				V
18+35	7.1237	1.27	Q				V
18+40	7.1313	1.10	Q				V
18+45	7.1386	1.06	Q				V
18+50	7.1452	0.96	Q				V
18+55	7.1505	0.78	Q				V
19+ 0	7.1555	0.73	Q				V
19+ 5	7.1609	0.78	Q				V
19+10	7.1673	0.93	Q				V
19+15	7.1740	0.97	Q				V
19+20	7.1814	1.07	Q				V
19+25	7.1899	1.24	Q				V
19+30	7.1989	1.30	Q				V
19+35	7.2074	1.24	Q				V
19+40	7.2149	1.09	Q				V
19+45	7.2222	1.05	Q				V
19+50	7.2288	0.96	Q				V
19+55	7.2341	0.78	Q				V
20+ 0	7.2392	0.73	Q				V
20+ 5	7.2445	0.78	Q				V
20+10	7.2509	0.93	Q				V
20+15	7.2576	0.97	Q				V
20+20	7.2644	0.99	Q				V
20+25	7.2713	1.00	Q				V
20+30	7.2782	1.01	Q				V
20+35	7.2852	1.01	Q				V
20+40	7.2922	1.01	Q				V
20+45	7.2991	1.01	Q				V
20+50	7.3056	0.93	Q				V
20+55	7.3108	0.77	Q				V
21+ 0	7.3158	0.72	Q				V
21+ 5	7.3212	0.78	Q				V
21+10	7.3276	0.93	Q				V
21+15	7.3343	0.97	Q				V
21+20	7.3405	0.91	Q				V
21+25	7.3457	0.75	Q				V
21+30	7.3506	0.71	Q				V
21+35	7.3560	0.78	Q				V
21+40	7.3624	0.93	Q				V
21+45	7.3691	0.97	Q				V
21+50	7.3754	0.91	Q				V

21+55	7.3806	0.75	|Q	|	|	|	V|
22+ 0	7.3855	0.71	|Q	|	|	|	V|
22+ 5	7.3909	0.78	|Q	|	|	|	V|
22+10	7.3973	0.93	|Q	|	|	|	V|
22+15	7.4040	0.97	|Q	|	|	|	V|
22+20	7.4102	0.91	|Q	|	|	|	V|
22+25	7.4154	0.75	|Q	|	|	|	V|
22+30	7.4203	0.71	|Q	|	|	|	V|
22+35	7.4251	0.70	|Q	|	|	|	V|
22+40	7.4299	0.69	|Q	|	|	|	V|
22+45	7.4346	0.68	|Q	|	|	|	V|
22+50	7.4392	0.67	|Q	|	|	|	V|
22+55	7.4439	0.67	|Q	|	|	|	V|
23+ 0	7.4485	0.67	|Q	|	|	|	V|
23+ 5	7.4532	0.67	|Q	|	|	|	V|
23+10	7.4578	0.67	|Q	|	|	|	V|
23+15	7.4624	0.67	|Q	|	|	|	V|
23+20	7.4671	0.67	|Q	|	|	|	V|
23+25	7.4717	0.67	|Q	|	|	|	V|
23+30	7.4764	0.67	|Q	|	|	|	V|
23+35	7.4810	0.67	|Q	|	|	|	V|
23+40	7.4857	0.67	|Q	|	|	|	V|
23+45	7.4903	0.67	|Q	|	|	|	V|
23+50	7.4950	0.67	|Q	|	|	|	V|
23+55	7.4996	0.67	|Q	|	|	|	V|
24+ 0	7.5043	0.67	|Q	|	|	|	V|
24+ 5	7.5078	0.51	|Q	|	|	|	V|
24+10	7.5091	0.19	Q	|	|	|	V|
24+15	7.5097	0.09	Q	|	|	|	V|
24+20	7.5101	0.05	Q	|	|	|	V|
24+25	7.5102	0.03	Q	|	|	|	V|
24+30	7.5103	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: qbuh10024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED B
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 29.54(Ac.) = 0.046 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 29.54(Ac.) = 0.046 Sq. Mi.
Length along longest watercourse = 1353.00(Ft.)
Length along longest watercourse measured to centroid = 881.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.167 Mi.
Difference in elevation = 17.20(Ft.)
Slope along watercourse = 67.1220 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.098 Hr.
Lag time = 5.86 Min.
25% of lag time = 1.47 Min.
40% of lag time = 2.35 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
29.54	1.80	53.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
29.54	5.00	147.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
29.540	61.60	0.500

Total Area Entered = 29.54(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.6	61.6	0.453	0.500	0.249	1.000	0.249
					Sum (F) =	0.249

Area averaged mean soil loss (F) (In/Hr) = 0.249
Minimum soil loss rate ((In/Hr)) = 0.124
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	85.272	14.796	4.405
2	0.167	170.545	46.014	13.699
3	0.250	255.817	18.512	5.511
4	0.333	341.089	7.912	2.356
5	0.417	426.362	4.692	1.397
6	0.500	511.634	2.929	0.872
7	0.583	596.907	2.085	0.621
8	0.667	682.179	1.387	0.413
9	0.750	767.451	0.919	0.274
10	0.833	852.724	0.752	0.224
		Sum =	100.000 Sum=	29.771

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.07	0.040	(	0.441)	0.020	0.020
2	0.17	0.07	0.040	(	0.440)	0.020	0.020
3	0.25	0.07	0.040	(	0.438)	0.020	0.020
4	0.33	0.10	0.060	(	0.436)	0.030	0.030
5	0.42	0.10	0.060	(	0.435)	0.030	0.030
6	0.50	0.10	0.060	(	0.433)	0.030	0.030
7	0.58	0.10	0.060	(	0.431)	0.030	0.030
8	0.67	0.10	0.060	(	0.430)	0.030	0.030
9	0.75	0.10	0.060	(	0.428)	0.030	0.030
10	0.83	0.13	0.080	(	0.426)	0.040	0.040
11	0.92	0.13	0.080	(	0.424)	0.040	0.040
12	1.00	0.13	0.080	(	0.423)	0.040	0.040
13	1.08	0.10	0.060	(	0.421)	0.030	0.030
14	1.17	0.10	0.060	(	0.419)	0.030	0.030
15	1.25	0.10	0.060	(	0.418)	0.030	0.030
16	1.33	0.10	0.060	(	0.416)	0.030	0.030
17	1.42	0.10	0.060	(	0.414)	0.030	0.030
18	1.50	0.10	0.060	(	0.413)	0.030	0.030
19	1.58	0.10	0.060	(	0.411)	0.030	0.030
20	1.67	0.10	0.060	(	0.410)	0.030	0.030
21	1.75	0.10	0.060	(	0.408)	0.030	0.030
22	1.83	0.13	0.080	(	0.406)	0.040	0.040
23	1.92	0.13	0.080	(	0.405)	0.040	0.040
24	2.00	0.13	0.080	(	0.403)	0.040	0.040
25	2.08	0.13	0.080	(	0.401)	0.040	0.040
26	2.17	0.13	0.080	(	0.400)	0.040	0.040
27	2.25	0.13	0.080	(	0.398)	0.040	0.040
28	2.33	0.13	0.080	(	0.396)	0.040	0.040
29	2.42	0.13	0.080	(	0.395)	0.040	0.040
30	2.50	0.13	0.080	(	0.393)	0.040	0.040
31	2.58	0.17	0.100	(	0.392)	0.050	0.050
32	2.67	0.17	0.100	(	0.390)	0.050	0.050
33	2.75	0.17	0.100	(	0.388)	0.050	0.050
34	2.83	0.17	0.100	(	0.387)	0.050	0.050
35	2.92	0.17	0.100	(	0.385)	0.050	0.050
36	3.00	0.17	0.100	(	0.384)	0.050	0.050
37	3.08	0.17	0.100	(	0.382)	0.050	0.050
38	3.17	0.17	0.100	(	0.380)	0.050	0.050
39	3.25	0.17	0.100	(	0.379)	0.050	0.050
40	3.33	0.17	0.100	(	0.377)	0.050	0.050
41	3.42	0.17	0.100	(	0.376)	0.050	0.050
42	3.50	0.17	0.100	(	0.374)	0.050	0.050
43	3.58	0.17	0.100	(	0.373)	0.050	0.050
44	3.67	0.17	0.100	(	0.371)	0.050	0.050
45	3.75	0.17	0.100	(	0.369)	0.050	0.050
46	3.83	0.20	0.120	(	0.368)	0.060	0.060
47	3.92	0.20	0.120	(	0.366)	0.060	0.060
48	4.00	0.20	0.120	(	0.365)	0.060	0.060
49	4.08	0.20	0.120	(	0.363)	0.060	0.060
50	4.17	0.20	0.120	(	0.362)	0.060	0.060
51	4.25	0.20	0.120	(	0.360)	0.060	0.060
52	4.33	0.23	0.140	(	0.359)	0.070	0.070
53	4.42	0.23	0.140	(	0.357)	0.070	0.070
54	4.50	0.23	0.140	(	0.356)	0.070	0.070
55	4.58	0.23	0.140	(	0.354)	0.070	0.070
56	4.67	0.23	0.140	(	0.353)	0.070	0.070

57	4.75	0.23	0.140	(0.351)	0.070	0.070
58	4.83	0.27	0.160	(0.349)	0.080	0.080
59	4.92	0.27	0.160	(0.348)	0.080	0.080
60	5.00	0.27	0.160	(0.346)	0.080	0.080
61	5.08	0.20	0.120	(0.345)	0.060	0.060
62	5.17	0.20	0.120	(0.343)	0.060	0.060
63	5.25	0.20	0.120	(0.342)	0.060	0.060
64	5.33	0.23	0.140	(0.340)	0.070	0.070
65	5.42	0.23	0.140	(0.339)	0.070	0.070
66	5.50	0.23	0.140	(0.338)	0.070	0.070
67	5.58	0.27	0.160	(0.336)	0.080	0.080
68	5.67	0.27	0.160	(0.335)	0.080	0.080
69	5.75	0.27	0.160	(0.333)	0.080	0.080
70	5.83	0.27	0.160	(0.332)	0.080	0.080
71	5.92	0.27	0.160	(0.330)	0.080	0.080
72	6.00	0.27	0.160	(0.329)	0.080	0.080
73	6.08	0.30	0.180	(0.327)	0.090	0.090
74	6.17	0.30	0.180	(0.326)	0.090	0.090
75	6.25	0.30	0.180	(0.324)	0.090	0.090
76	6.33	0.30	0.180	(0.323)	0.090	0.090
77	6.42	0.30	0.180	(0.321)	0.090	0.090
78	6.50	0.30	0.180	(0.320)	0.090	0.090
79	6.58	0.33	0.200	(0.319)	0.100	0.100
80	6.67	0.33	0.200	(0.317)	0.100	0.100
81	6.75	0.33	0.200	(0.316)	0.100	0.100
82	6.83	0.33	0.200	(0.314)	0.100	0.100
83	6.92	0.33	0.200	(0.313)	0.100	0.100
84	7.00	0.33	0.200	(0.311)	0.100	0.100
85	7.08	0.33	0.200	(0.310)	0.100	0.100
86	7.17	0.33	0.200	(0.309)	0.100	0.100
87	7.25	0.33	0.200	(0.307)	0.100	0.100
88	7.33	0.37	0.220	(0.306)	0.110	0.110
89	7.42	0.37	0.220	(0.304)	0.110	0.110
90	7.50	0.37	0.220	(0.303)	0.110	0.110
91	7.58	0.40	0.240	(0.302)	0.120	0.120
92	7.67	0.40	0.240	(0.300)	0.120	0.120
93	7.75	0.40	0.240	(0.299)	0.120	0.120
94	7.83	0.43	0.260	(0.297)	0.130	0.130
95	7.92	0.43	0.260	(0.296)	0.130	0.130
96	8.00	0.43	0.260	(0.295)	0.130	0.130
97	8.08	0.50	0.300	(0.293)	0.150	0.150
98	8.17	0.50	0.300	(0.292)	0.150	0.150
99	8.25	0.50	0.300	(0.291)	0.150	0.150
100	8.33	0.50	0.300	(0.289)	0.150	0.150
101	8.42	0.50	0.300	(0.288)	0.150	0.150
102	8.50	0.50	0.300	(0.287)	0.150	0.150
103	8.58	0.53	0.320	(0.285)	0.160	0.160
104	8.67	0.53	0.320	(0.284)	0.160	0.160
105	8.75	0.53	0.320	(0.283)	0.160	0.160
106	8.83	0.57	0.340	(0.281)	0.170	0.170
107	8.92	0.57	0.340	(0.280)	0.170	0.170
108	9.00	0.57	0.340	(0.279)	0.170	0.170
109	9.08	0.63	0.380	(0.277)	0.190	0.190
110	9.17	0.63	0.380	(0.276)	0.190	0.190
111	9.25	0.63	0.380	(0.275)	0.190	0.190
112	9.33	0.67	0.400	(0.273)	0.200	0.200
113	9.42	0.67	0.400	(0.272)	0.200	0.200

114	9.50	0.67	0.400	(0.271)	0.200	0.200
115	9.58	0.70	0.420	(0.269)	0.210	0.210
116	9.67	0.70	0.420	(0.268)	0.210	0.210
117	9.75	0.70	0.420	(0.267)	0.210	0.210
118	9.83	0.73	0.440	(0.265)	0.220	0.220
119	9.92	0.73	0.440	(0.264)	0.220	0.220
120	10.00	0.73	0.440	(0.263)	0.220	0.220
121	10.08	0.50	0.300	(0.262)	0.150	0.150
122	10.17	0.50	0.300	(0.260)	0.150	0.150
123	10.25	0.50	0.300	(0.259)	0.150	0.150
124	10.33	0.50	0.300	(0.258)	0.150	0.150
125	10.42	0.50	0.300	(0.257)	0.150	0.150
126	10.50	0.50	0.300	(0.255)	0.150	0.150
127	10.58	0.67	0.400	(0.254)	0.200	0.200
128	10.67	0.67	0.400	(0.253)	0.200	0.200
129	10.75	0.67	0.400	(0.252)	0.200	0.200
130	10.83	0.67	0.400	(0.250)	0.200	0.200
131	10.92	0.67	0.400	(0.249)	0.200	0.200
132	11.00	0.67	0.400	(0.248)	0.200	0.200
133	11.08	0.63	0.380	(0.247)	0.190	0.190
134	11.17	0.63	0.380	(0.246)	0.190	0.190
135	11.25	0.63	0.380	(0.244)	0.190	0.190
136	11.33	0.63	0.380	(0.243)	0.190	0.190
137	11.42	0.63	0.380	(0.242)	0.190	0.190
138	11.50	0.63	0.380	(0.241)	0.190	0.190
139	11.58	0.57	0.340	(0.240)	0.170	0.170
140	11.67	0.57	0.340	(0.238)	0.170	0.170
141	11.75	0.57	0.340	(0.237)	0.170	0.170
142	11.83	0.60	0.360	(0.236)	0.180	0.180
143	11.92	0.60	0.360	(0.235)	0.180	0.180
144	12.00	0.60	0.360	(0.234)	0.180	0.180
145	12.08	0.83	0.500	0.232	(0.250)	0.268
146	12.17	0.83	0.500	0.231	(0.250)	0.269
147	12.25	0.83	0.500	0.230	(0.250)	0.270
148	12.33	0.87	0.520	0.229	(0.260)	0.291
149	12.42	0.87	0.520	0.228	(0.260)	0.292
150	12.50	0.87	0.520	0.227	(0.260)	0.293
151	12.58	0.93	0.560	0.226	(0.280)	0.334
152	12.67	0.93	0.560	0.224	(0.280)	0.336
153	12.75	0.93	0.560	0.223	(0.280)	0.337
154	12.83	0.97	0.580	0.222	(0.290)	0.358
155	12.92	0.97	0.580	0.221	(0.290)	0.359
156	13.00	0.97	0.580	0.220	(0.290)	0.360
157	13.08	1.13	0.680	0.219	(0.340)	0.461
158	13.17	1.13	0.680	0.218	(0.340)	0.462
159	13.25	1.13	0.680	0.217	(0.340)	0.463
160	13.33	1.13	0.680	0.215	(0.340)	0.465
161	13.42	1.13	0.680	0.214	(0.340)	0.466
162	13.50	1.13	0.680	0.213	(0.340)	0.467
163	13.58	0.77	0.460	0.212	(0.230)	0.248
164	13.67	0.77	0.460	0.211	(0.230)	0.249
165	13.75	0.77	0.460	0.210	(0.230)	0.250
166	13.83	0.77	0.460	0.209	(0.230)	0.251
167	13.92	0.77	0.460	0.208	(0.230)	0.252
168	14.00	0.77	0.460	0.207	(0.230)	0.253
169	14.08	0.90	0.540	0.206	(0.270)	0.334
170	14.17	0.90	0.540	0.205	(0.270)	0.335

171	14.25	0.90	0.540		0.204	(0.270)	0.336
172	14.33	0.87	0.520		0.203	(0.260)	0.317
173	14.42	0.87	0.520		0.202	(0.260)	0.318
174	14.50	0.87	0.520		0.201	(0.260)	0.319
175	14.58	0.87	0.520		0.200	(0.260)	0.320
176	14.67	0.87	0.520		0.199	(0.260)	0.321
177	14.75	0.87	0.520		0.197	(0.260)	0.322
178	14.83	0.83	0.500		0.196	(0.250)	0.303
179	14.92	0.83	0.500		0.195	(0.250)	0.304
180	15.00	0.83	0.500		0.194	(0.250)	0.305
181	15.08	0.80	0.480		0.193	(0.240)	0.286
182	15.17	0.80	0.480		0.192	(0.240)	0.287
183	15.25	0.80	0.480		0.191	(0.240)	0.288
184	15.33	0.77	0.460		0.191	(0.230)	0.269
185	15.42	0.77	0.460		0.190	(0.230)	0.270
186	15.50	0.77	0.460		0.189	(0.230)	0.271
187	15.58	0.63	0.380		0.188	(0.190)	0.192
188	15.67	0.63	0.380		0.187	(0.190)	0.193
189	15.75	0.63	0.380		0.186	(0.190)	0.194
190	15.83	0.63	0.380		0.185	(0.190)	0.195
191	15.92	0.63	0.380		0.184	(0.190)	0.196
192	16.00	0.63	0.380		0.183	(0.190)	0.197
193	16.08	0.13	0.080	(0.182)		0.040	0.040
194	16.17	0.13	0.080	(0.181)		0.040	0.040
195	16.25	0.13	0.080	(0.180)		0.040	0.040
196	16.33	0.13	0.080	(0.179)		0.040	0.040
197	16.42	0.13	0.080	(0.178)		0.040	0.040
198	16.50	0.13	0.080	(0.177)		0.040	0.040
199	16.58	0.10	0.060	(0.176)		0.030	0.030
200	16.67	0.10	0.060	(0.176)		0.030	0.030
201	16.75	0.10	0.060	(0.175)		0.030	0.030
202	16.83	0.10	0.060	(0.174)		0.030	0.030
203	16.92	0.10	0.060	(0.173)		0.030	0.030
204	17.00	0.10	0.060	(0.172)		0.030	0.030
205	17.08	0.17	0.100	(0.171)		0.050	0.050
206	17.17	0.17	0.100	(0.170)		0.050	0.050
207	17.25	0.17	0.100	(0.169)		0.050	0.050
208	17.33	0.17	0.100	(0.169)		0.050	0.050
209	17.42	0.17	0.100	(0.168)		0.050	0.050
210	17.50	0.17	0.100	(0.167)		0.050	0.050
211	17.58	0.17	0.100	(0.166)		0.050	0.050
212	17.67	0.17	0.100	(0.165)		0.050	0.050
213	17.75	0.17	0.100	(0.164)		0.050	0.050
214	17.83	0.13	0.080	(0.164)		0.040	0.040
215	17.92	0.13	0.080	(0.163)		0.040	0.040
216	18.00	0.13	0.080	(0.162)		0.040	0.040
217	18.08	0.13	0.080	(0.161)		0.040	0.040
218	18.17	0.13	0.080	(0.160)		0.040	0.040
219	18.25	0.13	0.080	(0.160)		0.040	0.040
220	18.33	0.13	0.080	(0.159)		0.040	0.040
221	18.42	0.13	0.080	(0.158)		0.040	0.040
222	18.50	0.13	0.080	(0.157)		0.040	0.040
223	18.58	0.10	0.060	(0.157)		0.030	0.030
224	18.67	0.10	0.060	(0.156)		0.030	0.030
225	18.75	0.10	0.060	(0.155)		0.030	0.030
226	18.83	0.07	0.040	(0.154)		0.020	0.020
227	18.92	0.07	0.040	(0.154)		0.020	0.020

228	19.00	0.07	0.040	(0.153)	0.020	0.020
229	19.08	0.10	0.060	(0.152)	0.030	0.030
230	19.17	0.10	0.060	(0.151)	0.030	0.030
231	19.25	0.10	0.060	(0.151)	0.030	0.030
232	19.33	0.13	0.080	(0.150)	0.040	0.040
233	19.42	0.13	0.080	(0.149)	0.040	0.040
234	19.50	0.13	0.080	(0.149)	0.040	0.040
235	19.58	0.10	0.060	(0.148)	0.030	0.030
236	19.67	0.10	0.060	(0.147)	0.030	0.030
237	19.75	0.10	0.060	(0.147)	0.030	0.030
238	19.83	0.07	0.040	(0.146)	0.020	0.020
239	19.92	0.07	0.040	(0.145)	0.020	0.020
240	20.00	0.07	0.040	(0.145)	0.020	0.020
241	20.08	0.10	0.060	(0.144)	0.030	0.030
242	20.17	0.10	0.060	(0.143)	0.030	0.030
243	20.25	0.10	0.060	(0.143)	0.030	0.030
244	20.33	0.10	0.060	(0.142)	0.030	0.030
245	20.42	0.10	0.060	(0.141)	0.030	0.030
246	20.50	0.10	0.060	(0.141)	0.030	0.030
247	20.58	0.10	0.060	(0.140)	0.030	0.030
248	20.67	0.10	0.060	(0.140)	0.030	0.030
249	20.75	0.10	0.060	(0.139)	0.030	0.030
250	20.83	0.07	0.040	(0.139)	0.020	0.020
251	20.92	0.07	0.040	(0.138)	0.020	0.020
252	21.00	0.07	0.040	(0.137)	0.020	0.020
253	21.08	0.10	0.060	(0.137)	0.030	0.030
254	21.17	0.10	0.060	(0.136)	0.030	0.030
255	21.25	0.10	0.060	(0.136)	0.030	0.030
256	21.33	0.07	0.040	(0.135)	0.020	0.020
257	21.42	0.07	0.040	(0.135)	0.020	0.020
258	21.50	0.07	0.040	(0.134)	0.020	0.020
259	21.58	0.10	0.060	(0.134)	0.030	0.030
260	21.67	0.10	0.060	(0.133)	0.030	0.030
261	21.75	0.10	0.060	(0.133)	0.030	0.030
262	21.83	0.07	0.040	(0.132)	0.020	0.020
263	21.92	0.07	0.040	(0.132)	0.020	0.020
264	22.00	0.07	0.040	(0.131)	0.020	0.020
265	22.08	0.10	0.060	(0.131)	0.030	0.030
266	22.17	0.10	0.060	(0.131)	0.030	0.030
267	22.25	0.10	0.060	(0.130)	0.030	0.030
268	22.33	0.07	0.040	(0.130)	0.020	0.020
269	22.42	0.07	0.040	(0.129)	0.020	0.020
270	22.50	0.07	0.040	(0.129)	0.020	0.020
271	22.58	0.07	0.040	(0.129)	0.020	0.020
272	22.67	0.07	0.040	(0.128)	0.020	0.020
273	22.75	0.07	0.040	(0.128)	0.020	0.020
274	22.83	0.07	0.040	(0.128)	0.020	0.020
275	22.92	0.07	0.040	(0.127)	0.020	0.020
276	23.00	0.07	0.040	(0.127)	0.020	0.020
277	23.08	0.07	0.040	(0.127)	0.020	0.020
278	23.17	0.07	0.040	(0.126)	0.020	0.020
279	23.25	0.07	0.040	(0.126)	0.020	0.020
280	23.33	0.07	0.040	(0.126)	0.020	0.020
281	23.42	0.07	0.040	(0.126)	0.020	0.020
282	23.50	0.07	0.040	(0.125)	0.020	0.020
283	23.58	0.07	0.040	(0.125)	0.020	0.020
284	23.67	0.07	0.040	(0.125)	0.020	0.020

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285  23.75     0.07      0.040       (  0.125)       0.020        0.020
286  23.83     0.07      0.040       (  0.125)       0.020        0.020
287  23.92     0.07      0.040       (  0.125)       0.020        0.020
288  24.00     0.07      0.040       (  0.125)       0.020        0.020
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    32.4
     Flood volume = Effective rainfall      2.70(In)
      times area      29.5(Ac.)/[(In)/(Ft.)] =       6.6(Ac.Ft)
     Total soil loss =      2.30(In)
     Total soil loss =     5.661(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =      289546.4 Cubic Feet
     Total soil loss =      246573.7 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     13.686(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
 ---------------------------------------------------------------------------
   0+ 5       0.0006      0.09  Q         |         |         |         |
   0+10       0.0031      0.36  Q         |         |         |         |
   0+15       0.0064      0.47  Q         |         |         |         |
   0+20       0.0102      0.56  VQ        |         |         |         |
   0+25       0.0153      0.73  VQ        |         |         |         |
   0+30       0.0208      0.80  VQ        |         |         |         |
   0+35       0.0265      0.84  VQ        |         |         |         |
   0+40       0.0325      0.86  VQ        |         |         |         |
   0+45       0.0385      0.87  VQ        |         |         |         |
   0+50       0.0449      0.93  VQ        |         |         |         |
   0+55       0.0522      1.07  V Q       |         |         |         |
   1+ 0       0.0600      1.13  V Q       |         |         |         |
   1+ 5       0.0676      1.11  V Q       |         |         |         |
   1+10       0.0744      0.99  VQ        |         |         |         |
   1+15       0.0809      0.94  VQ        |         |         |         |
   1+20       0.0873      0.92  VQ        |         |         |         |
   1+25       0.0935      0.91  VQ        |         |         |         |
   1+30       0.0998      0.91  VQ        |         |         |         |
   1+35       0.1060      0.90  VQ        |         |         |         |
   1+40       0.1122      0.90  VQ        |         |         |         |
   1+45       0.1184      0.90  VQ        |         |         |         |
   1+50       0.1248      0.94  VQ        |         |         |         |
   1+55       0.1322      1.07  V Q       |         |         |         |
   2+ 0       0.1400      1.13  V Q       |         |         |         |
   2+ 5       0.1479      1.15  V Q       |         |         |         |
   2+10       0.1560      1.17  V Q       |         |         |         |
   2+15       0.1641      1.18  V Q       |         |         |         |
   2+20       0.1722      1.18  |VQ       |         |         |         |
   2+25       0.1804      1.19  |VQ       |         |         |         |
   2+30       0.1886      1.19  |VQ       |         |         |         |
   2+35       0.1971      1.24  |VQ       |         |         |         |
   2+40       0.2066      1.37  |VQ       |         |         |         |
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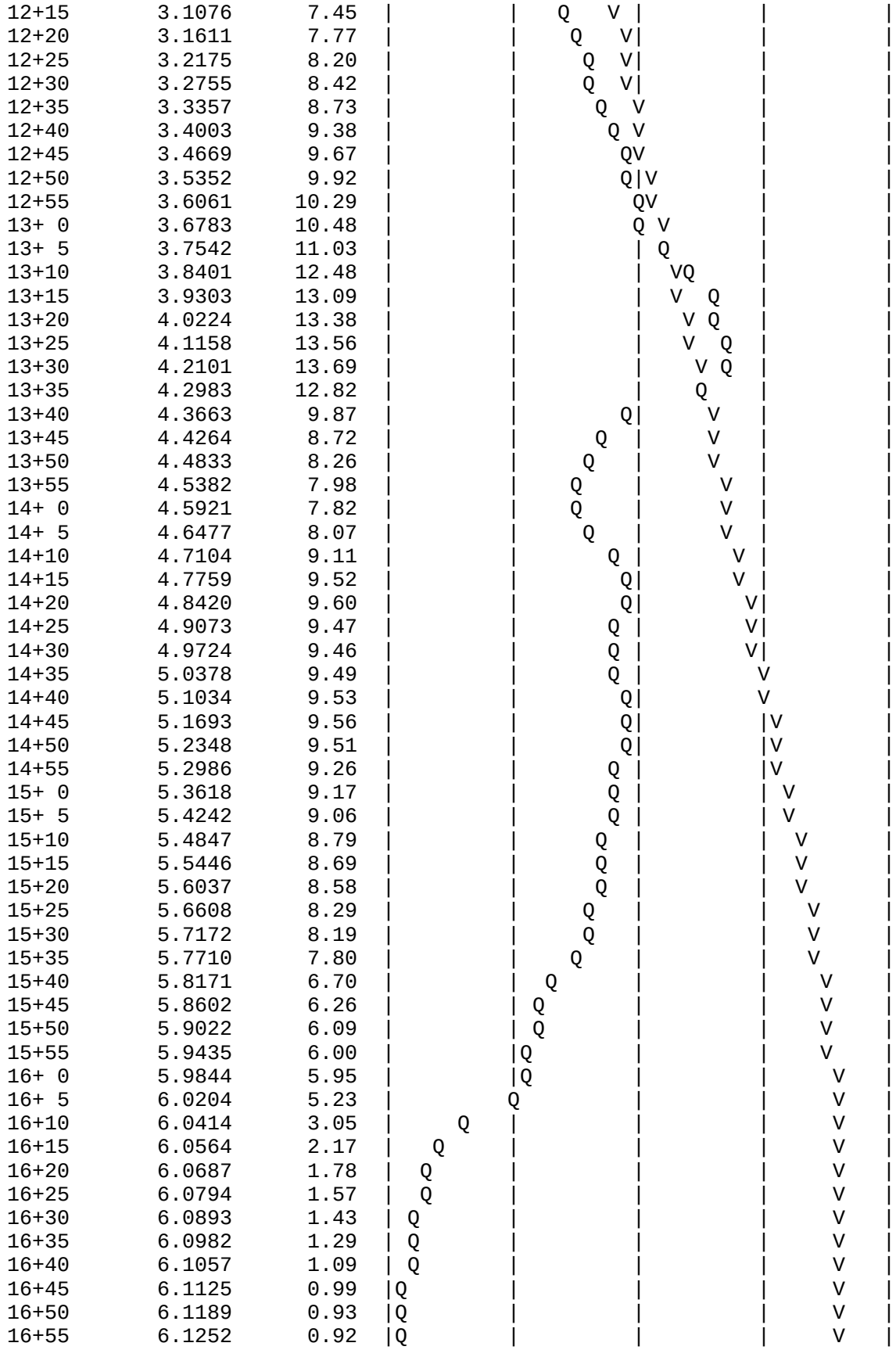
2+45	0.2164	1.43	|VQ	|	|	|	|
2+50	0.2264	1.45	|VQ	|	|	|	|
2+55	0.2365	1.47	|VQ	|	|	|	|
3+ 0	0.2466	1.47	|VQ	|	|	|	|
3+ 5	0.2568	1.48	|VQ	|	|	|	|
3+10	0.2670	1.48	|VQ	|	|	|	|
3+15	0.2773	1.49	|VQ	|	|	|	|
3+20	0.2875	1.49	|VQ	|	|	|	|
3+25	0.2978	1.49	|VQ	|	|	|	|
3+30	0.3080	1.49	|VQ	|	|	|	|
3+35	0.3183	1.49	|VQ	|	|	|	|
3+40	0.3286	1.49	|VQ	|	|	|	|
3+45	0.3388	1.49	| Q	|	|	|	|
3+50	0.3494	1.53	| VQ	|	|	|	|
3+55	0.3609	1.67	| VQ	|	|	|	|
4+ 0	0.3728	1.73	| VQ	|	|	|	|
4+ 5	0.3848	1.75	| VQ	|	|	|	|
4+10	0.3970	1.76	| VQ	|	|	|	|
4+15	0.4092	1.77	| VQ	|	|	|	|
4+20	0.4217	1.82	| VQ	|	|	|	|
4+25	0.4352	1.96	| VQ	|	|	|	|
4+30	0.4491	2.02	| V Q	|	|	|	|
4+35	0.4632	2.05	| V Q	|	|	|	|
4+40	0.4774	2.06	| V Q	|	|	|	|
4+45	0.4917	2.07	| V Q	|	|	|	|
4+50	0.5063	2.12	| VQ	|	|	|	|
4+55	0.5219	2.26	| VQ	|	|	|	|
5+ 0	0.5378	2.32	| VQ	|	|	|	|
5+ 5	0.5534	2.26	| VQ	|	|	|	|
5+10	0.5671	2.00	| Q	|	|	|	|
5+15	0.5802	1.89	| Q	|	|	|	|
5+20	0.5932	1.90	| Q	|	|	|	|
5+25	0.6071	2.01	| VQ	|	|	|	|
5+30	0.6212	2.05	| VQ	|	|	|	|
5+35	0.6357	2.11	| VQ	|	|	|	|
5+40	0.6513	2.25	| VQ	|	|	|	|
5+45	0.6672	2.31	| Q	|	|	|	|
5+50	0.6833	2.34	| Q	|	|	|	|
5+55	0.6995	2.35	| Q	|	|	|	|
6+ 0	0.7158	2.37	| Q	|	|	|	|
6+ 5	0.7324	2.42	| Q	|	|	|	|
6+10	0.7500	2.56	| VQ	|	|	|	|
6+15	0.7681	2.62	| VQ	|	|	|	|
6+20	0.7863	2.64	| VQ	|	|	|	|
6+25	0.8045	2.66	| VQ	|	|	|	|
6+30	0.8229	2.67	| VQ	|	|	|	|
6+35	0.8416	2.72	| Q	|	|	|	|
6+40	0.8613	2.86	| Q	|	|	|	|
6+45	0.8814	2.91	| Q	|	|	|	|
6+50	0.9016	2.94	| Q	|	|	|	|
6+55	0.9219	2.95	| Q	|	|	|	|
7+ 0	0.9424	2.96	| Q	|	|	|	|
7+ 5	0.9628	2.97	| Q	|	|	|	|
7+10	0.9833	2.97	| Q	|	|	|	|
7+15	1.0038	2.98	| QV	|	|	|	|
7+20	1.0246	3.02	| Q	|	|	|	|
7+25	1.0464	3.16	| Q	|	|	|	|

7+30	1.0685	3.21	Q				
7+35	1.0911	3.28	Q				
7+40	1.1148	3.43	Q				
7+45	1.1388	3.50	Q				
7+50	1.1634	3.57	Q				
7+55	1.1891	3.73	Q				
8+ 0	1.2152	3.79	Q				
8+ 5	1.2422	3.91	Q				
8+10	1.2711	4.21	VQ				
8+15	1.3009	4.33	VQ				
8+20	1.3311	4.38	Q				
8+25	1.3615	4.41	Q				
8+30	1.3921	4.43	Q				
8+35	1.4230	4.49	Q				
8+40	1.4549	4.64	VQ				
8+45	1.4873	4.70	VQ				
8+50	1.5202	4.77	Q				
8+55	1.5541	4.92	Q				
9+ 0	1.5884	4.99	Q				
9+ 5	1.6236	5.10	VQ				
9+10	1.6607	5.40	VQ				
9+15	1.6987	5.52	VQ				
9+20	1.7374	5.62	VQ				
9+25	1.7773	5.79	VQ				
9+30	1.8177	5.86	VQ				
9+35	1.8586	5.94	Q				
9+40	1.9006	6.10	VQ				
9+45	1.9432	6.17	VQ				
9+50	1.9862	6.25	VQ				
9+55	2.0303	6.41	Q				
10+ 0	2.0749	6.47	Q				
10+ 5	2.1176	6.20	Q				
10+10	2.1538	5.26	Q V				
10+15	2.1874	4.88	Q V				
10+20	2.2200	4.72	Q V				
10+25	2.2519	4.63	Q V				
10+30	2.2833	4.57	Q V				
10+35	2.3161	4.75	Q V				
10+40	2.3533	5.41	Q V				
10+45	2.3923	5.66	Q V				
10+50	2.4320	5.77	Q V				
10+55	2.4722	5.84	Q V				
11+ 0	2.5127	5.88	Q V				
11+ 5	2.5531	5.87	Q V				
11+10	2.5928	5.75	Q V				
11+15	2.6321	5.71	Q V				
11+20	2.6713	5.70	Q V				
11+25	2.7105	5.68	Q V				
11+30	2.7495	5.67	Q V				
11+35	2.7880	5.58	Q V				
11+40	2.8245	5.30	Q V				
11+45	2.8602	5.19	Q V				
11+50	2.8959	5.18	Q V				
11+55	2.9324	5.29	Q V				
12+ 0	2.9691	5.33	Q V				
12+ 5	3.0085	5.73	Q V				
12+10	3.0563	6.94	Q V				



17+ 0	6.1315	0.91	Q				V
17+ 5	6.1383	0.99	Q				V
17+10	6.1470	1.26	Q				V
17+15	6.1564	1.37	Q				V
17+20	6.1661	1.41	Q				V
17+25	6.1761	1.44	Q				V
17+30	6.1861	1.46	Q				V
17+35	6.1962	1.47	Q				V
17+40	6.2064	1.48	Q				V
17+45	6.2167	1.48	Q				V
17+50	6.2266	1.45	Q				V
17+55	6.2356	1.31	Q				V
18+ 0	6.2443	1.25	Q				V
18+ 5	6.2527	1.23	Q				V
18+10	6.2611	1.22	Q				V
18+15	6.2694	1.21	Q				V
18+20	6.2777	1.20	Q				V
18+25	6.2859	1.20	Q				V
18+30	6.2941	1.19	Q				V
18+35	6.3020	1.15	Q				V
18+40	6.3090	1.01	Q				V
18+45	6.3156	0.96	Q				V
18+50	6.3217	0.89	Q				V
18+55	6.3267	0.74	Q				V
19+ 0	6.3314	0.67	Q				V
19+ 5	6.3361	0.69	Q				V
19+10	6.3417	0.81	Q				V
19+15	6.3475	0.85	Q				V
19+20	6.3538	0.91	Q				V
19+25	6.3610	1.06	Q				V
19+30	6.3687	1.12	Q				V
19+35	6.3763	1.10	Q				V
19+40	6.3831	0.98	Q				V
19+45	6.3895	0.94	Q				V
19+50	6.3956	0.88	Q				V
19+55	6.4006	0.73	Q				V
20+ 0	6.4052	0.67	Q				V
20+ 5	6.4100	0.69	Q				V
20+10	6.4155	0.81	Q				V
20+15	6.4214	0.85	Q				V
20+20	6.4273	0.86	Q				V
20+25	6.4333	0.87	Q				V
20+30	6.4394	0.88	Q				V
20+35	6.4455	0.88	Q				V
20+40	6.4516	0.89	Q				V
20+45	6.4577	0.89	Q				V
20+50	6.4636	0.85	Q				V
20+55	6.4685	0.71	Q				V
21+ 0	6.4730	0.66	Q				V
21+ 5	6.4777	0.68	Q				V
21+10	6.4832	0.80	Q				V
21+15	6.4890	0.85	Q				V
21+20	6.4947	0.82	Q				V
21+25	6.4995	0.69	Q				V
21+30	6.5039	0.64	Q				V
21+35	6.5085	0.67	Q				V
21+40	6.5140	0.80	Q				V

21+45	6.5198	0.85	|Q	|	|	|	V|
21+50	6.5255	0.82	|Q	|	|	|	V|
21+55	6.5302	0.69	|Q	|	|	|	V|
22+ 0	6.5347	0.64	|Q	|	|	|	V|
22+ 5	6.5393	0.67	|Q	|	|	|	V|
22+10	6.5448	0.80	|Q	|	|	|	V|
22+15	6.5506	0.85	|Q	|	|	|	V|
22+20	6.5562	0.82	|Q	|	|	|	V|
22+25	6.5610	0.69	|Q	|	|	|	V|
22+30	6.5654	0.64	|Q	|	|	|	V|
22+35	6.5698	0.62	|Q	|	|	|	V|
22+40	6.5740	0.61	|Q	|	|	|	V|
22+45	6.5782	0.61	|Q	|	|	|	V|
22+50	6.5823	0.60	|Q	|	|	|	V|
22+55	6.5865	0.60	|Q	|	|	|	V|
23+ 0	6.5906	0.60	|Q	|	|	|	V|
23+ 5	6.5947	0.60	|Q	|	|	|	V|
23+10	6.5988	0.60	|Q	|	|	|	V|
23+15	6.6029	0.60	|Q	|	|	|	V|
23+20	6.6070	0.60	|Q	|	|	|	V|
23+25	6.6111	0.60	|Q	|	|	|	V|
23+30	6.6152	0.60	|Q	|	|	|	V|
23+35	6.6193	0.60	|Q	|	|	|	V|
23+40	6.6234	0.60	|Q	|	|	|	V|
23+45	6.6275	0.60	|Q	|	|	|	V|
23+50	6.6316	0.60	|Q	|	|	|	V|
23+55	6.6357	0.60	|Q	|	|	|	V|
24+ 0	6.6398	0.60	|Q	|	|	|	V|
24+ 5	6.6433	0.51	|Q	|	|	|	V|
24+10	6.6449	0.23	Q	|	|	|	V|
24+15	6.6458	0.12	Q	|	|	|	V|
24+20	6.6463	0.08	Q	|	|	|	V|
24+25	6.6466	0.05	Q	|	|	|	V|
24+30	6.6468	0.03	Q	|	|	|	V|
24+35	6.6470	0.02	Q	|	|	|	V|
24+40	6.6470	0.01	Q	|	|	|	V|
24+45	6.6471	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: q100p1auh24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION WATERSHED A
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 32.84(Ac.) = 0.051 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 32.84(Ac.) = 0.051 Sq. Mi.
Length along longest watercourse = 1812.00(Ft.)
Length along longest watercourse measured to centroid = 1348.00(Ft.)
Length along longest watercourse = 0.343 Mi.
Length along longest watercourse measured to centroid = 0.255 Mi.
Difference in elevation = 25.30(Ft.)
Slope along watercourse = 73.7219 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.063 Hr.
Lag time = 3.78 Min.
25% of lag time = 0.95 Min.
40% of lag time = 1.51 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
32.84	1.80	59.11

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
32.84	5.00	164.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
32.840	60.90	0.755

Total Area Entered = 32.84(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.9	60.9	0.460	0.755	0.148	1.000	0.148
					Sum (F) =	0.148

Area averaged mean soil loss (F) (In/Hr) = 0.148
Minimum soil loss rate ((In/Hr)) = 0.074
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.296

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	132.184	28.615	9.471
2	0.167	264.368	48.175	15.944
3	0.250	396.552	12.342	4.085
4	0.333	528.736	5.500	1.820
5	0.417	660.920	3.010	0.996
6	0.500	793.104	1.628	0.539
7	0.583	925.288	0.730	0.242
		Sum =	100.000 Sum=	33.097

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.262)		0.012	0.028
2	0.17	0.07	0.040	(0.261)		0.012	0.028

3	0.25	0.07	0.040	(0.259)	0.012	0.028
4	0.33	0.10	0.060	(0.258)	0.018	0.042
5	0.42	0.10	0.060	(0.257)	0.018	0.042
6	0.50	0.10	0.060	(0.256)	0.018	0.042
7	0.58	0.10	0.060	(0.255)	0.018	0.042
8	0.67	0.10	0.060	(0.254)	0.018	0.042
9	0.75	0.10	0.060	(0.253)	0.018	0.042
10	0.83	0.13	0.080	(0.252)	0.024	0.056
11	0.92	0.13	0.080	(0.251)	0.024	0.056
12	1.00	0.13	0.080	(0.250)	0.024	0.056
13	1.08	0.10	0.060	(0.250)	0.018	0.042
14	1.17	0.10	0.060	(0.249)	0.018	0.042
15	1.25	0.10	0.060	(0.248)	0.018	0.042
16	1.33	0.10	0.060	(0.247)	0.018	0.042
17	1.42	0.10	0.060	(0.246)	0.018	0.042
18	1.50	0.10	0.060	(0.245)	0.018	0.042
19	1.58	0.10	0.060	(0.244)	0.018	0.042
20	1.67	0.10	0.060	(0.243)	0.018	0.042
21	1.75	0.10	0.060	(0.242)	0.018	0.042
22	1.83	0.13	0.080	(0.241)	0.024	0.056
23	1.92	0.13	0.080	(0.240)	0.024	0.056
24	2.00	0.13	0.080	(0.239)	0.024	0.056
25	2.08	0.13	0.080	(0.238)	0.024	0.056
26	2.17	0.13	0.080	(0.237)	0.024	0.056
27	2.25	0.13	0.080	(0.236)	0.024	0.056
28	2.33	0.13	0.080	(0.235)	0.024	0.056
29	2.42	0.13	0.080	(0.234)	0.024	0.056
30	2.50	0.13	0.080	(0.233)	0.024	0.056
31	2.58	0.17	0.100	(0.232)	0.030	0.070
32	2.67	0.17	0.100	(0.231)	0.030	0.070
33	2.75	0.17	0.100	(0.230)	0.030	0.070
34	2.83	0.17	0.100	(0.229)	0.030	0.070
35	2.92	0.17	0.100	(0.228)	0.030	0.070
36	3.00	0.17	0.100	(0.227)	0.030	0.070
37	3.08	0.17	0.100	(0.226)	0.030	0.070
38	3.17	0.17	0.100	(0.225)	0.030	0.070
39	3.25	0.17	0.100	(0.224)	0.030	0.070
40	3.33	0.17	0.100	(0.224)	0.030	0.070
41	3.42	0.17	0.100	(0.223)	0.030	0.070
42	3.50	0.17	0.100	(0.222)	0.030	0.070
43	3.58	0.17	0.100	(0.221)	0.030	0.070
44	3.67	0.17	0.100	(0.220)	0.030	0.070
45	3.75	0.17	0.100	(0.219)	0.030	0.070
46	3.83	0.20	0.120	(0.218)	0.036	0.084
47	3.92	0.20	0.120	(0.217)	0.036	0.084
48	4.00	0.20	0.120	(0.216)	0.036	0.084
49	4.08	0.20	0.120	(0.215)	0.036	0.084
50	4.17	0.20	0.120	(0.214)	0.036	0.084
51	4.25	0.20	0.120	(0.213)	0.036	0.084
52	4.33	0.23	0.140	(0.212)	0.041	0.099
53	4.42	0.23	0.140	(0.212)	0.041	0.099
54	4.50	0.23	0.140	(0.211)	0.041	0.099
55	4.58	0.23	0.140	(0.210)	0.041	0.099
56	4.67	0.23	0.140	(0.209)	0.041	0.099
57	4.75	0.23	0.140	(0.208)	0.041	0.099
58	4.83	0.27	0.160	(0.207)	0.047	0.113
59	4.92	0.27	0.160	(0.206)	0.047	0.113

60	5.00	0.27	0.160	(0.205)	0.047	0.113
61	5.08	0.20	0.120	(0.204)	0.036	0.084
62	5.17	0.20	0.120	(0.203)	0.036	0.084
63	5.25	0.20	0.120	(0.203)	0.036	0.084
64	5.33	0.23	0.140	(0.202)	0.041	0.099
65	5.42	0.23	0.140	(0.201)	0.041	0.099
66	5.50	0.23	0.140	(0.200)	0.041	0.099
67	5.58	0.27	0.160	(0.199)	0.047	0.113
68	5.67	0.27	0.160	(0.198)	0.047	0.113
69	5.75	0.27	0.160	(0.197)	0.047	0.113
70	5.83	0.27	0.160	(0.196)	0.047	0.113
71	5.92	0.27	0.160	(0.196)	0.047	0.113
72	6.00	0.27	0.160	(0.195)	0.047	0.113
73	6.08	0.30	0.180	(0.194)	0.053	0.127
74	6.17	0.30	0.180	(0.193)	0.053	0.127
75	6.25	0.30	0.180	(0.192)	0.053	0.127
76	6.33	0.30	0.180	(0.191)	0.053	0.127
77	6.42	0.30	0.180	(0.190)	0.053	0.127
78	6.50	0.30	0.180	(0.190)	0.053	0.127
79	6.58	0.33	0.200	(0.189)	0.059	0.141
80	6.67	0.33	0.200	(0.188)	0.059	0.141
81	6.75	0.33	0.200	(0.187)	0.059	0.141
82	6.83	0.33	0.200	(0.186)	0.059	0.141
83	6.92	0.33	0.200	(0.185)	0.059	0.141
84	7.00	0.33	0.200	(0.184)	0.059	0.141
85	7.08	0.33	0.200	(0.184)	0.059	0.141
86	7.17	0.33	0.200	(0.183)	0.059	0.141
87	7.25	0.33	0.200	(0.182)	0.059	0.141
88	7.33	0.37	0.220	(0.181)	0.065	0.155
89	7.42	0.37	0.220	(0.180)	0.065	0.155
90	7.50	0.37	0.220	(0.179)	0.065	0.155
91	7.58	0.40	0.240	(0.179)	0.071	0.169
92	7.67	0.40	0.240	(0.178)	0.071	0.169
93	7.75	0.40	0.240	(0.177)	0.071	0.169
94	7.83	0.43	0.260	(0.176)	0.077	0.183
95	7.92	0.43	0.260	(0.175)	0.077	0.183
96	8.00	0.43	0.260	(0.175)	0.077	0.183
97	8.08	0.50	0.300	(0.174)	0.089	0.211
98	8.17	0.50	0.300	(0.173)	0.089	0.211
99	8.25	0.50	0.300	(0.172)	0.089	0.211
100	8.33	0.50	0.300	(0.171)	0.089	0.211
101	8.42	0.50	0.300	(0.171)	0.089	0.211
102	8.50	0.50	0.300	(0.170)	0.089	0.211
103	8.58	0.53	0.320	(0.169)	0.095	0.225
104	8.67	0.53	0.320	(0.168)	0.095	0.225
105	8.75	0.53	0.320	(0.167)	0.095	0.225
106	8.83	0.57	0.340	(0.167)	0.101	0.239
107	8.92	0.57	0.340	(0.166)	0.101	0.239
108	9.00	0.57	0.340	(0.165)	0.101	0.239
109	9.08	0.63	0.380	(0.164)	0.112	0.268
110	9.17	0.63	0.380	(0.163)	0.112	0.268
111	9.25	0.63	0.380	(0.163)	0.112	0.268
112	9.33	0.67	0.400	(0.162)	0.118	0.282
113	9.42	0.67	0.400	(0.161)	0.118	0.282
114	9.50	0.67	0.400	(0.160)	0.118	0.282
115	9.58	0.70	0.420	(0.160)	0.124	0.296
116	9.67	0.70	0.420	(0.159)	0.124	0.296

117	9.75	0.70	0.420	(0.158)	0.124	0.296
118	9.83	0.73	0.440	(0.157)	0.130	0.310
119	9.92	0.73	0.440	(0.157)	0.130	0.310
120	10.00	0.73	0.440	(0.156)	0.130	0.310
121	10.08	0.50	0.300	(0.155)	0.089	0.211
122	10.17	0.50	0.300	(0.154)	0.089	0.211
123	10.25	0.50	0.300	(0.154)	0.089	0.211
124	10.33	0.50	0.300	(0.153)	0.089	0.211
125	10.42	0.50	0.300	(0.152)	0.089	0.211
126	10.50	0.50	0.300	(0.151)	0.089	0.211
127	10.58	0.67	0.400	(0.151)	0.118	0.282
128	10.67	0.67	0.400	(0.150)	0.118	0.282
129	10.75	0.67	0.400	(0.149)	0.118	0.282
130	10.83	0.67	0.400	(0.148)	0.118	0.282
131	10.92	0.67	0.400	(0.148)	0.118	0.282
132	11.00	0.67	0.400	(0.147)	0.118	0.282
133	11.08	0.63	0.380	(0.146)	0.112	0.268
134	11.17	0.63	0.380	(0.145)	0.112	0.268
135	11.25	0.63	0.380	(0.145)	0.112	0.268
136	11.33	0.63	0.380	(0.144)	0.112	0.268
137	11.42	0.63	0.380	(0.143)	0.112	0.268
138	11.50	0.63	0.380	(0.143)	0.112	0.268
139	11.58	0.57	0.340	(0.142)	0.101	0.239
140	11.67	0.57	0.340	(0.141)	0.101	0.239
141	11.75	0.57	0.340	(0.140)	0.101	0.239
142	11.83	0.60	0.360	(0.140)	0.107	0.253
143	11.92	0.60	0.360	(0.139)	0.107	0.253
144	12.00	0.60	0.360	(0.138)	0.107	0.253
145	12.08	0.83	0.500	0.138	(0.148)	0.362
146	12.17	0.83	0.500	0.137	(0.148)	0.363
147	12.25	0.83	0.500	0.136	(0.148)	0.364
148	12.33	0.87	0.520	0.136	(0.154)	0.384
149	12.42	0.87	0.520	0.135	(0.154)	0.385
150	12.50	0.87	0.520	0.134	(0.154)	0.386
151	12.58	0.93	0.560	0.134	(0.166)	0.426
152	12.67	0.93	0.560	0.133	(0.166)	0.427
153	12.75	0.93	0.560	0.132	(0.166)	0.428
154	12.83	0.97	0.580	0.132	(0.172)	0.448
155	12.92	0.97	0.580	0.131	(0.172)	0.449
156	13.00	0.97	0.580	0.130	(0.172)	0.450
157	13.08	1.13	0.680	0.130	(0.201)	0.550
158	13.17	1.13	0.680	0.129	(0.201)	0.551
159	13.25	1.13	0.680	0.128	(0.201)	0.552
160	13.33	1.13	0.680	0.128	(0.201)	0.552
161	13.42	1.13	0.680	0.127	(0.201)	0.553
162	13.50	1.13	0.680	0.126	(0.201)	0.554
163	13.58	0.77	0.460	0.126	(0.136)	0.334
164	13.67	0.77	0.460	0.125	(0.136)	0.335
165	13.75	0.77	0.460	0.124	(0.136)	0.336
166	13.83	0.77	0.460	0.124	(0.136)	0.336
167	13.92	0.77	0.460	0.123	(0.136)	0.337
168	14.00	0.77	0.460	0.123	(0.136)	0.337
169	14.08	0.90	0.540	0.122	(0.160)	0.418
170	14.17	0.90	0.540	0.121	(0.160)	0.419
171	14.25	0.90	0.540	0.121	(0.160)	0.419
172	14.33	0.87	0.520	0.120	(0.154)	0.400
173	14.42	0.87	0.520	0.119	(0.154)	0.401

174	14.50	0.87	0.520	0.119	(0.154)	0.401
175	14.58	0.87	0.520	0.118	(0.154)	0.402
176	14.67	0.87	0.520	0.118	(0.154)	0.402
177	14.75	0.87	0.520	0.117	(0.154)	0.403
178	14.83	0.83	0.500	0.116	(0.148)	0.384
179	14.92	0.83	0.500	0.116	(0.148)	0.384
180	15.00	0.83	0.500	0.115	(0.148)	0.385
181	15.08	0.80	0.480	0.115	(0.142)	0.365
182	15.17	0.80	0.480	0.114	(0.142)	0.366
183	15.25	0.80	0.480	0.113	(0.142)	0.367
184	15.33	0.77	0.460	0.113	(0.136)	0.347
185	15.42	0.77	0.460	0.112	(0.136)	0.348
186	15.50	0.77	0.460	0.112	(0.136)	0.348
187	15.58	0.63	0.380	0.111	(0.112)	0.269
188	15.67	0.63	0.380	0.111	(0.112)	0.269
189	15.75	0.63	0.380	0.110	(0.112)	0.270
190	15.83	0.63	0.380	0.109	(0.112)	0.271
191	15.92	0.63	0.380	0.109	(0.112)	0.271
192	16.00	0.63	0.380	0.108	(0.112)	0.272
193	16.08	0.13	0.080	(0.108)	0.024	0.056
194	16.17	0.13	0.080	(0.107)	0.024	0.056
195	16.25	0.13	0.080	(0.107)	0.024	0.056
196	16.33	0.13	0.080	(0.106)	0.024	0.056
197	16.42	0.13	0.080	(0.106)	0.024	0.056
198	16.50	0.13	0.080	(0.105)	0.024	0.056
199	16.58	0.10	0.060	(0.105)	0.018	0.042
200	16.67	0.10	0.060	(0.104)	0.018	0.042
201	16.75	0.10	0.060	(0.103)	0.018	0.042
202	16.83	0.10	0.060	(0.103)	0.018	0.042
203	16.92	0.10	0.060	(0.102)	0.018	0.042
204	17.00	0.10	0.060	(0.102)	0.018	0.042
205	17.08	0.17	0.100	(0.101)	0.030	0.070
206	17.17	0.17	0.100	(0.101)	0.030	0.070
207	17.25	0.17	0.100	(0.100)	0.030	0.070
208	17.33	0.17	0.100	(0.100)	0.030	0.070
209	17.42	0.17	0.100	(0.099)	0.030	0.070
210	17.50	0.17	0.100	(0.099)	0.030	0.070
211	17.58	0.17	0.100	(0.098)	0.030	0.070
212	17.67	0.17	0.100	(0.098)	0.030	0.070
213	17.75	0.17	0.100	(0.097)	0.030	0.070
214	17.83	0.13	0.080	(0.097)	0.024	0.056
215	17.92	0.13	0.080	(0.096)	0.024	0.056
216	18.00	0.13	0.080	(0.096)	0.024	0.056
217	18.08	0.13	0.080	(0.095)	0.024	0.056
218	18.17	0.13	0.080	(0.095)	0.024	0.056
219	18.25	0.13	0.080	(0.095)	0.024	0.056
220	18.33	0.13	0.080	(0.094)	0.024	0.056
221	18.42	0.13	0.080	(0.094)	0.024	0.056
222	18.50	0.13	0.080	(0.093)	0.024	0.056
223	18.58	0.10	0.060	(0.093)	0.018	0.042
224	18.67	0.10	0.060	(0.092)	0.018	0.042
225	18.75	0.10	0.060	(0.092)	0.018	0.042
226	18.83	0.07	0.040	(0.091)	0.012	0.028
227	18.92	0.07	0.040	(0.091)	0.012	0.028
228	19.00	0.07	0.040	(0.091)	0.012	0.028
229	19.08	0.10	0.060	(0.090)	0.018	0.042
230	19.17	0.10	0.060	(0.090)	0.018	0.042

231	19.25	0.10	0.060	(0.089)	0.018	0.042
232	19.33	0.13	0.080	(0.089)	0.024	0.056
233	19.42	0.13	0.080	(0.088)	0.024	0.056
234	19.50	0.13	0.080	(0.088)	0.024	0.056
235	19.58	0.10	0.060	(0.088)	0.018	0.042
236	19.67	0.10	0.060	(0.087)	0.018	0.042
237	19.75	0.10	0.060	(0.087)	0.018	0.042
238	19.83	0.07	0.040	(0.086)	0.012	0.028
239	19.92	0.07	0.040	(0.086)	0.012	0.028
240	20.00	0.07	0.040	(0.086)	0.012	0.028
241	20.08	0.10	0.060	(0.085)	0.018	0.042
242	20.17	0.10	0.060	(0.085)	0.018	0.042
243	20.25	0.10	0.060	(0.085)	0.018	0.042
244	20.33	0.10	0.060	(0.084)	0.018	0.042
245	20.42	0.10	0.060	(0.084)	0.018	0.042
246	20.50	0.10	0.060	(0.083)	0.018	0.042
247	20.58	0.10	0.060	(0.083)	0.018	0.042
248	20.67	0.10	0.060	(0.083)	0.018	0.042
249	20.75	0.10	0.060	(0.082)	0.018	0.042
250	20.83	0.07	0.040	(0.082)	0.012	0.028
251	20.92	0.07	0.040	(0.082)	0.012	0.028
252	21.00	0.07	0.040	(0.081)	0.012	0.028
253	21.08	0.10	0.060	(0.081)	0.018	0.042
254	21.17	0.10	0.060	(0.081)	0.018	0.042
255	21.25	0.10	0.060	(0.080)	0.018	0.042
256	21.33	0.07	0.040	(0.080)	0.012	0.028
257	21.42	0.07	0.040	(0.080)	0.012	0.028
258	21.50	0.07	0.040	(0.080)	0.012	0.028
259	21.58	0.10	0.060	(0.079)	0.018	0.042
260	21.67	0.10	0.060	(0.079)	0.018	0.042
261	21.75	0.10	0.060	(0.079)	0.018	0.042
262	21.83	0.07	0.040	(0.078)	0.012	0.028
263	21.92	0.07	0.040	(0.078)	0.012	0.028
264	22.00	0.07	0.040	(0.078)	0.012	0.028
265	22.08	0.10	0.060	(0.078)	0.018	0.042
266	22.17	0.10	0.060	(0.077)	0.018	0.042
267	22.25	0.10	0.060	(0.077)	0.018	0.042
268	22.33	0.07	0.040	(0.077)	0.012	0.028
269	22.42	0.07	0.040	(0.077)	0.012	0.028
270	22.50	0.07	0.040	(0.076)	0.012	0.028
271	22.58	0.07	0.040	(0.076)	0.012	0.028
272	22.67	0.07	0.040	(0.076)	0.012	0.028
273	22.75	0.07	0.040	(0.076)	0.012	0.028
274	22.83	0.07	0.040	(0.076)	0.012	0.028
275	22.92	0.07	0.040	(0.075)	0.012	0.028
276	23.00	0.07	0.040	(0.075)	0.012	0.028
277	23.08	0.07	0.040	(0.075)	0.012	0.028
278	23.17	0.07	0.040	(0.075)	0.012	0.028
279	23.25	0.07	0.040	(0.075)	0.012	0.028
280	23.33	0.07	0.040	(0.075)	0.012	0.028
281	23.42	0.07	0.040	(0.074)	0.012	0.028
282	23.50	0.07	0.040	(0.074)	0.012	0.028
283	23.58	0.07	0.040	(0.074)	0.012	0.028
284	23.67	0.07	0.040	(0.074)	0.012	0.028
285	23.75	0.07	0.040	(0.074)	0.012	0.028
286	23.83	0.07	0.040	(0.074)	0.012	0.028
287	23.92	0.07	0.040	(0.074)	0.012	0.028

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288  24.00     0.07      0.040       (  0.074)       0.012        0.028
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    43.7
     Flood volume = Effective rainfall      3.64(In)
      times area      32.8(Ac.)/[(In)/(Ft.)] =      10.0(Ac.Ft)
     Total soil loss =      1.36(In)
     Total soil loss =     3.726(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =      433684.7 Cubic Feet
     Total soil loss =      162323.1 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     18.283(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
 ------------------------------------------------------------------------
   0+ 5       0.0018      0.27  Q          |         |         |         |
   0+10       0.0068      0.72  VQ         |         |         |         |
   0+15       0.0125      0.83  VQ         |         |         |         |
   0+20       0.0195      1.02  V Q        |         |         |         |
   0+25       0.0282      1.27  V Q        |         |         |         |
   0+30       0.0375      1.34  V Q        |         |         |         |
   0+35       0.0469      1.37  V Q        |         |         |         |
   0+40       0.0565      1.39  V Q        |         |         |         |
   0+45       0.0661      1.40  V Q        |         |         |         |
   0+50       0.0766      1.53  V  Q       |         |         |         |
   0+55       0.0887      1.76  V  Q       |         |         |         |
   1+ 0       0.1012      1.81  V  Q       |         |         |         |
   1+ 5       0.1130      1.71  V  Q       |         |         |         |
   1+10       0.1233      1.50  V Q        |         |         |         |
   1+15       0.1332      1.45  V Q        |         |         |         |
   1+20       0.1430      1.42  V Q        |         |         |         |
   1+25       0.1528      1.41  V Q        |         |         |         |
   1+30       0.1624      1.40  V Q        |         |         |         |
   1+35       0.1720      1.40  V Q        |         |         |         |
   1+40       0.1817      1.40  V Q        |         |         |         |
   1+45       0.1913      1.40  V Q        |         |         |         |
   1+50       0.2019      1.53  V  Q       |         |         |         |
   1+55       0.2140      1.76  V  Q       |         |         |         |
   2+ 0       0.2265      1.81  V  Q       |         |         |         |
   2+ 5       0.2391      1.84  V  Q       |         |         |         |
   2+10       0.2519      1.85  |V Q        |         |         |         |
   2+15       0.2647      1.86  |V Q        |         |         |         |
   2+20       0.2776      1.86  |V Q        |         |         |         |
   2+25       0.2904      1.86  |V Q        |         |         |         |
   2+30       0.3032      1.86  |V Q        |         |         |         |
   2+35       0.3170      2.00  |V Q        |         |         |         |
   2+40       0.3323      2.22  |V  Q       |         |         |         |
   2+45       0.3480      2.28  |V  Q       |         |         |         |
   2+50       0.3639      2.31  |V  Q       |         |         |         |
   2+55       0.3799      2.32  |V  Q       |         |         |         |
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3+ 0       0.3959      2.33  |V  Q     |          |          |          |
3+ 5       0.4120      2.33  |V  Q     |          |          |          |
3+10       0.4280      2.33  |V  Q     |          |          |          |
3+15       0.4441      2.33  |V  Q     |          |          |          |
3+20       0.4601      2.33  |V  Q     |          |          |          |
3+25       0.4762      2.33  |V  Q     |          |          |          |
3+30       0.4922      2.33  |V  Q     |          |          |          |
3+35       0.5083      2.33  | V Q     |          |          |          |
3+40       0.5243      2.33  | V Q     |          |          |          |
3+45       0.5404      2.33  | V Q     |          |          |          |
3+50       0.5574      2.46  | V Q     |          |          |          |
3+55       0.5759      2.69  | V  Q    |          |          |          |
4+ 0       0.5948      2.75  | V  Q    |          |          |          |
4+ 5       0.6139      2.77  | V  Q    |          |          |          |
4+10       0.6331      2.79  | V  Q    |          |          |          |
4+15       0.6523      2.79  | V  Q    |          |          |          |
4+20       0.6725      2.93  | V  Q    |          |          |          |
4+25       0.6942      3.16  | V   Q   |          |          |          |
4+30       0.7164      3.21  | V   Q   |          |          |          |
4+35       0.7387      3.24  | V   Q   |          |          |          |
4+40       0.7611      3.25  |  V  Q   |          |          |          |
4+45       0.7835      3.26  |  V  Q   |          |          |          |
4+50       0.8069      3.40  |  V  Q   |          |          |          |
4+55       0.8319      3.62  |  V   Q  |          |          |          |
5+ 0       0.8572      3.68  |  V   Q  |          |          |          |
5+ 5       0.8809      3.44  |  V  Q   |          |          |          |
5+10       0.9016      3.00  |  V  Q   |          |          |          |
5+15       0.9215      2.90  |  V Q    |          |          |          |
5+20       0.9420      2.98  |  V Q    |          |          |          |
5+25       0.9639      3.18  |  V  Q   |          |          |          |
5+30       0.9861      3.22  |  V  Q   |          |          |          |
5+35       1.0093      3.37  |   V Q   |          |          |          |
5+40       1.0342      3.61  |   V  Q  |          |          |          |
5+45       1.0595      3.68  |   V  Q  |          |          |          |
5+50       1.0850      3.70  |   V  Q  |          |          |          |
5+55       1.1106      3.72  |   V  Q  |          |          |          |
6+ 0       1.1363      3.73  |   V  Q  |          |          |          |
6+ 5       1.1629      3.86  |   V  Q  |          |          |          |
6+10       1.1910      4.09  |   V   Q |          |          |          |
6+15       1.2196      4.15  |   V   Q |          |          |          |
6+20       1.2483      4.17  |    V  Q |          |          |          |
6+25       1.2771      4.18  |    V  Q |          |          |          |
6+30       1.3060      4.19  |    V  Q |          |          |          |
6+35       1.3358      4.33  |    V  Q |          |          |          |
6+40       1.3672      4.55  |    V   Q|          |          |          |
6+45       1.3989      4.61  |    V   Q|          |          |          |
6+50       1.4309      4.64  |    V   Q|          |          |          |
6+55       1.4629      4.65  |    V   Q|          |          |          |
7+ 0       1.4950      4.66  |     V  Q|          |          |          |
7+ 5       1.5271      4.66  |     V  Q|          |          |          |
7+10       1.5592      4.66  |     V  Q|          |          |          |
7+15       1.5913      4.66  |     V  Q|          |          |          |
7+20       1.6243      4.80  |     V  Q|          |          |          |
7+25       1.6589      5.02  |     V   Q          |          |          |
7+30       1.6939      5.08  |     V   Q          |          |          |
7+35       1.7299      5.24  |     V   Q          |          |          |
7+40       1.7677      5.48  |      V  Q          |          |          |
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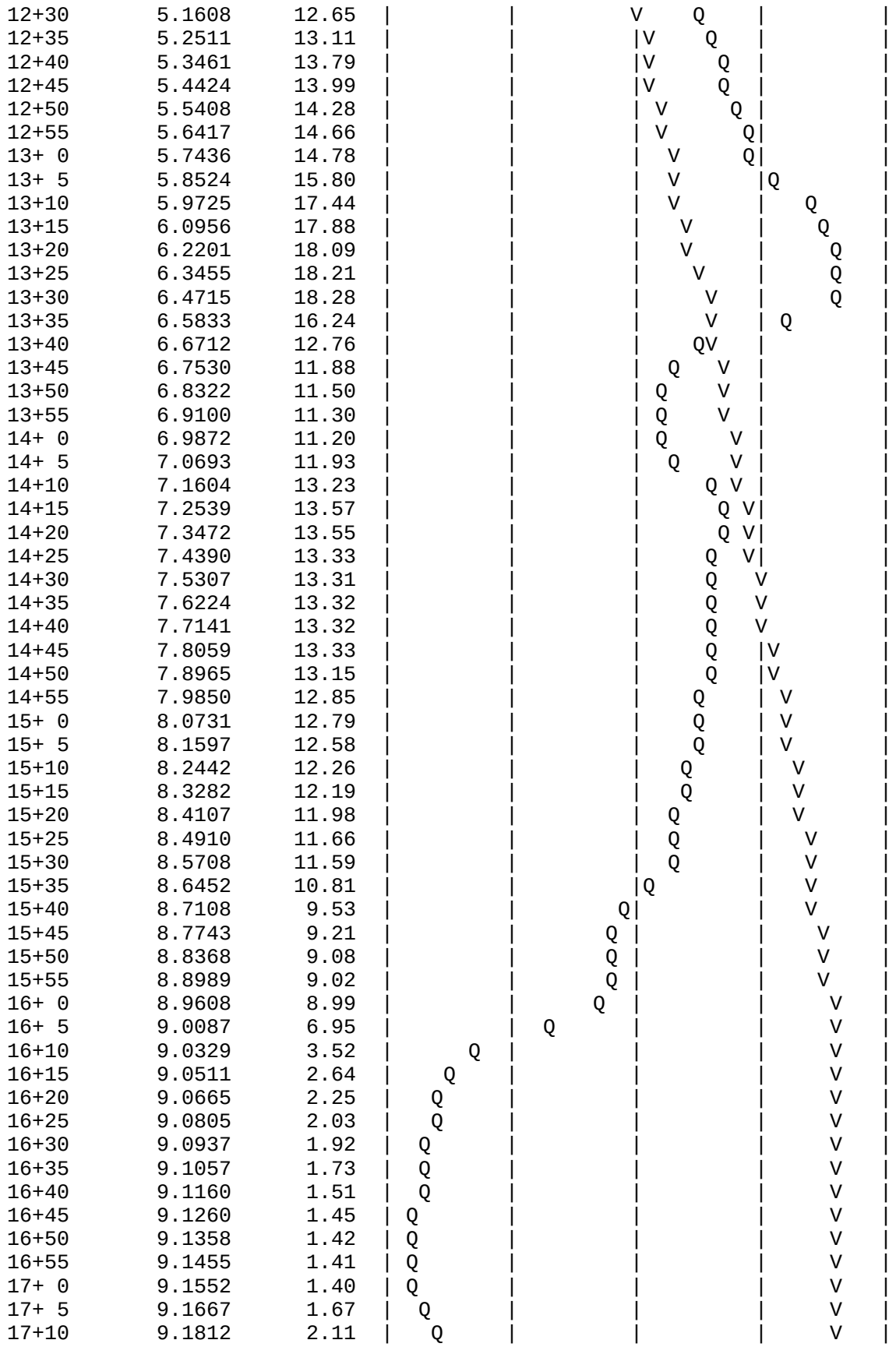
7+45	1.8058	5.54	|	V |Q	|	|	|
7+50	1.8451	5.70	|	V |Q	|	|	|
7+55	1.8860	5.94	|	V |Q	|	|	|
8+ 0	1.9274	6.01	|	V | Q	|	|	|
8+ 5	1.9708	6.30	|	V | Q	|	|	|
8+10	2.0174	6.77	|	V | Q	|	|	|
8+15	2.0648	6.89	|	V | Q	|	|	|
8+20	2.1126	6.94	|	V | Q	|	|	|
8+25	2.1606	6.97	|	V | Q	|	|	|
8+30	2.2088	6.99	|	V | Q	|	|	|
8+35	2.2578	7.13	|	V| Q	|	|	|
8+40	2.3085	7.35	|	V| Q	|	|	|
8+45	2.3595	7.41	|	V| Q	|	|	|
8+50	2.4116	7.57	|	V| Q	|	|	|
8+55	2.4654	7.81	|	V| Q	|	|	|
9+ 0	2.5196	7.87	|	V Q	|	|	|
9+ 5	2.5758	8.17	|	V Q	|	|	|
9+10	2.6353	8.63	|	V Q	|	|	|
9+15	2.6956	8.75	|	V Q	|	|	|
9+20	2.7571	8.94	|	|V Q	|	|	|
9+25	2.8205	9.19	|	|V Q	|	|	|
9+30	2.8843	9.27	|	|V Q	|	|	|
9+35	2.9492	9.43	|	|V Q	|	|	|
9+40	3.0158	9.67	|	| V Q|	|	|	|
9+45	3.0829	9.74	|	| V Q|	|	|	|
9+50	3.1511	9.90	|	| V Q|	|	|	|
9+55	3.2209	10.14	|	| V Q	|	|	|
10+ 0	3.2912	10.20	|	| V Q	|	|	|
10+ 5	3.3552	9.30	|	| V Q |	|	|	|
10+10	3.4085	7.74	|	| V Q	|	|	|
10+15	3.4591	7.34	|	| VQ	|	|	|
10+20	3.5084	7.17	|	| Q	|	|	|
10+25	3.5571	7.07	|	| Q	|	|	|
10+30	3.6055	7.02	|	| Q	|	|	|
10+35	3.6582	7.66	|	| VQ	|	|	|
10+40	3.7187	8.78	|	| V Q	|	|	|
10+45	3.7812	9.07	|	| V Q |	|	|	|
10+50	3.8445	9.20	|	| V Q |	|	|	|
10+55	3.9084	9.27	|	| V Q |	|	|	|
11+ 0	3.9725	9.31	|	| V Q |	|	|	|
11+ 5	4.0358	9.19	|	| V Q |	|	|	|
11+10	4.0975	8.97	|	| VQ |	|	|	|
11+15	4.1589	8.91	|	| VQ |	|	|	|
11+20	4.2201	8.88	|	| VQ |	|	|	|
11+25	4.2811	8.87	|	| Q |	|	|	|
11+30	4.3422	8.86	|	| Q |	|	|	|
11+35	4.4013	8.59	|	| Q |	|	|	|
11+40	4.4574	8.14	|	| QV |	|	|	|
11+45	4.5127	8.03	|	| Q V |	|	|	|
11+50	4.5685	8.11	|	| Q V |	|	|	|
11+55	4.6257	8.31	|	| Q V |	|	|	|
12+ 0	4.6832	8.35	|	| Q V |	|	|	|
12+ 5	4.7480	9.40	|	| QV|	|	|	|
12+10	4.8248	11.15	|	| V| Q	|	|	|
12+15	4.9048	11.62	|	| V| Q	|	|	|
12+20	4.9877	12.04	|	| V Q	|	|	|
12+25	5.0737	12.49	|	| V Q	|	|	|



17+15	9.1966	2.23	| Q	|	|	| V	|
17+20	9.2123	2.28	| Q	|	|	| V	|
17+25	9.2282	2.31	| Q	|	|	| V	|
17+30	9.2442	2.32	| Q	|	|	| V	|
17+35	9.2603	2.33	| Q	|	|	| V	|
17+40	9.2763	2.33	| Q	|	|	| V	|
17+45	9.2924	2.33	| Q	|	|	| V	|
17+50	9.3075	2.20	| Q	|	|	| V	|
17+55	9.3211	1.97	| Q	|	|	| V	|
18+ 0	9.3343	1.92	| Q	|	|	| V	|
18+ 5	9.3473	1.89	| Q	|	|	| V	|
18+10	9.3602	1.88	| Q	|	|	| V	|
18+15	9.3731	1.87	| Q	|	|	| V	|
18+20	9.3859	1.86	| Q	|	|	| V	|
18+25	9.3988	1.86	| Q	|	|	| V	|
18+30	9.4116	1.86	| Q	|	|	| V	|
18+35	9.4235	1.73	| Q	|	|	| V	|
18+40	9.4339	1.51	| Q	|	|	| V	|
18+45	9.4439	1.45	| Q	|	|	| V	|
18+50	9.4528	1.29	| Q	|	|	| V	|
18+55	9.4600	1.05	| Q	|	|	| V	|
19+ 0	9.4668	0.99	|Q	|	|	| V	|
19+ 5	9.4743	1.09	| Q	|	|	| V	|
19+10	9.4833	1.30	| Q	|	|	| V	|
19+15	9.4926	1.35	| Q	|	|	| V	|
19+20	9.5030	1.51	| Q	|	|	| V	|
19+25	9.5150	1.75	| Q	|	|	| V	|
19+30	9.5275	1.81	| Q	|	|	| V	|
19+35	9.5392	1.71	| Q	|	|	| V	|
19+40	9.5495	1.50	| Q	|	|	| V	|
19+45	9.5595	1.45	| Q	|	|	| V	|
19+50	9.5684	1.29	| Q	|	|	| V	|
19+55	9.5756	1.05	| Q	|	|	| V	|
20+ 0	9.5824	0.99	|Q	|	|	| V	|
20+ 5	9.5899	1.09	| Q	|	|	| V	|
20+10	9.5989	1.30	| Q	|	|	| V	|
20+15	9.6082	1.35	| Q	|	|	| V	|
20+20	9.6177	1.37	| Q	|	|	| V	|
20+25	9.6272	1.39	| Q	|	|	| V	|
20+30	9.6368	1.40	| Q	|	|	| V	|
20+35	9.6465	1.40	| Q	|	|	| V	|
20+40	9.6561	1.40	| Q	|	|	| V	|
20+45	9.6657	1.40	| Q	|	|	| V	|
20+50	9.6744	1.27	| Q	|	|	| V	|
20+55	9.6816	1.04	| Q	|	|	| V	|
21+ 0	9.6884	0.98	|Q	|	|	| V	|
21+ 5	9.6959	1.09	| Q	|	|	| V	|
21+10	9.7048	1.30	| Q	|	|	| V	|
21+15	9.7142	1.35	| Q	|	|	| V	|
21+20	9.7227	1.24	| Q	|	|	| V	|
21+25	9.7298	1.03	| Q	|	|	| V	|
21+30	9.7365	0.98	|Q	|	|	| V	|
21+35	9.7440	1.09	| Q	|	|	| V	|
21+40	9.7530	1.30	| Q	|	|	| V	|
21+45	9.7623	1.35	| Q	|	|	| V	|
21+50	9.7709	1.24	| Q	|	|	| V	|
21+55	9.7779	1.03	| Q	|	|	| V	|

22+ 0	9.7847	0.98	|Q	|	|	|	V|
22+ 5	9.7922	1.09	| Q	|	|	|	V|
22+10	9.8012	1.30	| Q	|	|	|	V|
22+15	9.8105	1.35	| Q	|	|	|	V|
22+20	9.8190	1.24	| Q	|	|	|	V|
22+25	9.8261	1.03	| Q	|	|	|	V|
22+30	9.8329	0.98	|Q	|	|	|	V|
22+35	9.8394	0.96	|Q	|	|	|	V|
22+40	9.8459	0.94	|Q	|	|	|	V|
22+45	9.8524	0.94	|Q	|	|	|	V|
22+50	9.8588	0.93	|Q	|	|	|	V|
22+55	9.8652	0.93	|Q	|	|	|	V|
23+ 0	9.8717	0.93	|Q	|	|	|	V|
23+ 5	9.8781	0.93	|Q	|	|	|	V|
23+10	9.8845	0.93	|Q	|	|	|	V|
23+15	9.8909	0.93	|Q	|	|	|	V|
23+20	9.8973	0.93	|Q	|	|	|	V|
23+25	9.9038	0.93	|Q	|	|	|	V|
23+30	9.9102	0.93	|Q	|	|	|	V|
23+35	9.9166	0.93	|Q	|	|	|	V|
23+40	9.9230	0.93	|Q	|	|	|	V|
23+45	9.9295	0.93	|Q	|	|	|	V|
23+50	9.9359	0.93	|Q	|	|	|	V|
23+55	9.9423	0.93	|Q	|	|	|	V|
24+ 0	9.9487	0.93	|Q	|	|	|	V|
24+ 5	9.9533	0.67	|Q	|	|	|	V|
24+10	9.9548	0.22	Q	|	|	|	V|
24+15	9.9555	0.10	Q	|	|	|	V|
24+20	9.9558	0.05	Q	|	|	|	V|
24+25	9.9560	0.02	Q	|	|	|	V|
24+30	9.9560	0.01	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: 100pquhb24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPSOED CONDITION WATERSHED B
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 30.51(Ac.) = 0.048 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.51(Ac.) = 0.048 Sq. Mi.
Length along longest watercourse = 2861.00(Ft.)
Length along longest watercourse measured to centroid = 2131.00(Ft.)
Length along longest watercourse = 0.542 Mi.
Length along longest watercourse measured to centroid = 0.404 Mi.
Difference in elevation = 26.97(Ft.)
Slope along watercourse = 49.7734 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.096 Hr.
Lag time = 5.77 Min.
25% of lag time = 1.44 Min.
40% of lag time = 2.31 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	1.80	54.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	5.00	152.55

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.510	62.10	0.835

Total Area Entered = 30.51(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.1	62.1	0.447	0.835	0.111	1.000	0.111
					Sum (F) =	0.111

Area averaged mean soil loss (F) (In/Hr) = 0.111
Minimum soil loss rate ((In/Hr)) = 0.056
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.232

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	86.658	15.197	4.673
2	0.167	173.316	46.362	14.256
3	0.250	259.974	18.174	5.588
4	0.333	346.632	7.832	2.408
5	0.417	433.290	4.614	1.419
6	0.500	519.948	2.896	0.891
7	0.583	606.606	2.040	0.627
8	0.667	693.264	1.339	0.412
9	0.750	779.923	0.910	0.280
10	0.833	866.581	0.634	0.195
		Sum = 100.000	Sum=	30.748

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.07	0.040	(0.197)	0.009	0.031
2	0.17	0.07	0.040	(0.196)	0.009	0.031
3	0.25	0.07	0.040	(0.196)	0.009	0.031
4	0.33	0.10	0.060	(0.195)	0.014	0.046
5	0.42	0.10	0.060	(0.194)	0.014	0.046
6	0.50	0.10	0.060	(0.193)	0.014	0.046
7	0.58	0.10	0.060	(0.193)	0.014	0.046
8	0.67	0.10	0.060	(0.192)	0.014	0.046
9	0.75	0.10	0.060	(0.191)	0.014	0.046
10	0.83	0.13	0.080	(0.190)	0.019	0.061
11	0.92	0.13	0.080	(0.190)	0.019	0.061
12	1.00	0.13	0.080	(0.189)	0.019	0.061
13	1.08	0.10	0.060	(0.188)	0.014	0.046
14	1.17	0.10	0.060	(0.187)	0.014	0.046
15	1.25	0.10	0.060	(0.187)	0.014	0.046
16	1.33	0.10	0.060	(0.186)	0.014	0.046
17	1.42	0.10	0.060	(0.185)	0.014	0.046
18	1.50	0.10	0.060	(0.184)	0.014	0.046
19	1.58	0.10	0.060	(0.184)	0.014	0.046
20	1.67	0.10	0.060	(0.183)	0.014	0.046
21	1.75	0.10	0.060	(0.182)	0.014	0.046
22	1.83	0.13	0.080	(0.181)	0.019	0.061
23	1.92	0.13	0.080	(0.181)	0.019	0.061
24	2.00	0.13	0.080	(0.180)	0.019	0.061
25	2.08	0.13	0.080	(0.179)	0.019	0.061
26	2.17	0.13	0.080	(0.178)	0.019	0.061
27	2.25	0.13	0.080	(0.178)	0.019	0.061
28	2.33	0.13	0.080	(0.177)	0.019	0.061
29	2.42	0.13	0.080	(0.176)	0.019	0.061
30	2.50	0.13	0.080	(0.176)	0.019	0.061
31	2.58	0.17	0.100	(0.175)	0.023	0.077
32	2.67	0.17	0.100	(0.174)	0.023	0.077
33	2.75	0.17	0.100	(0.173)	0.023	0.077
34	2.83	0.17	0.100	(0.173)	0.023	0.077
35	2.92	0.17	0.100	(0.172)	0.023	0.077
36	3.00	0.17	0.100	(0.171)	0.023	0.077
37	3.08	0.17	0.100	(0.171)	0.023	0.077
38	3.17	0.17	0.100	(0.170)	0.023	0.077
39	3.25	0.17	0.100	(0.169)	0.023	0.077
40	3.33	0.17	0.100	(0.168)	0.023	0.077
41	3.42	0.17	0.100	(0.168)	0.023	0.077
42	3.50	0.17	0.100	(0.167)	0.023	0.077
43	3.58	0.17	0.100	(0.166)	0.023	0.077
44	3.67	0.17	0.100	(0.166)	0.023	0.077
45	3.75	0.17	0.100	(0.165)	0.023	0.077
46	3.83	0.20	0.120	(0.164)	0.028	0.092
47	3.92	0.20	0.120	(0.164)	0.028	0.092
48	4.00	0.20	0.120	(0.163)	0.028	0.092
49	4.08	0.20	0.120	(0.162)	0.028	0.092
50	4.17	0.20	0.120	(0.161)	0.028	0.092
51	4.25	0.20	0.120	(0.161)	0.028	0.092
52	4.33	0.23	0.140	(0.160)	0.032	0.108
53	4.42	0.23	0.140	(0.159)	0.032	0.108
54	4.50	0.23	0.140	(0.159)	0.032	0.108
55	4.58	0.23	0.140	(0.158)	0.032	0.108
56	4.67	0.23	0.140	(0.157)	0.032	0.108

57	4.75	0.23	0.140	(0.157)	0.032	0.108
58	4.83	0.27	0.160	(0.156)	0.037	0.123
59	4.92	0.27	0.160	(0.155)	0.037	0.123
60	5.00	0.27	0.160	(0.155)	0.037	0.123
61	5.08	0.20	0.120	(0.154)	0.028	0.092
62	5.17	0.20	0.120	(0.153)	0.028	0.092
63	5.25	0.20	0.120	(0.153)	0.028	0.092
64	5.33	0.23	0.140	(0.152)	0.032	0.108
65	5.42	0.23	0.140	(0.151)	0.032	0.108
66	5.50	0.23	0.140	(0.151)	0.032	0.108
67	5.58	0.27	0.160	(0.150)	0.037	0.123
68	5.67	0.27	0.160	(0.149)	0.037	0.123
69	5.75	0.27	0.160	(0.149)	0.037	0.123
70	5.83	0.27	0.160	(0.148)	0.037	0.123
71	5.92	0.27	0.160	(0.147)	0.037	0.123
72	6.00	0.27	0.160	(0.147)	0.037	0.123
73	6.08	0.30	0.180	(0.146)	0.042	0.138
74	6.17	0.30	0.180	(0.145)	0.042	0.138
75	6.25	0.30	0.180	(0.145)	0.042	0.138
76	6.33	0.30	0.180	(0.144)	0.042	0.138
77	6.42	0.30	0.180	(0.143)	0.042	0.138
78	6.50	0.30	0.180	(0.143)	0.042	0.138
79	6.58	0.33	0.200	(0.142)	0.046	0.154
80	6.67	0.33	0.200	(0.142)	0.046	0.154
81	6.75	0.33	0.200	(0.141)	0.046	0.154
82	6.83	0.33	0.200	(0.140)	0.046	0.154
83	6.92	0.33	0.200	(0.140)	0.046	0.154
84	7.00	0.33	0.200	(0.139)	0.046	0.154
85	7.08	0.33	0.200	(0.138)	0.046	0.154
86	7.17	0.33	0.200	(0.138)	0.046	0.154
87	7.25	0.33	0.200	(0.137)	0.046	0.154
88	7.33	0.37	0.220	(0.137)	0.051	0.169
89	7.42	0.37	0.220	(0.136)	0.051	0.169
90	7.50	0.37	0.220	(0.135)	0.051	0.169
91	7.58	0.40	0.240	(0.135)	0.056	0.184
92	7.67	0.40	0.240	(0.134)	0.056	0.184
93	7.75	0.40	0.240	(0.133)	0.056	0.184
94	7.83	0.43	0.260	(0.133)	0.060	0.200
95	7.92	0.43	0.260	(0.132)	0.060	0.200
96	8.00	0.43	0.260	(0.132)	0.060	0.200
97	8.08	0.50	0.300	(0.131)	0.070	0.230
98	8.17	0.50	0.300	(0.130)	0.070	0.230
99	8.25	0.50	0.300	(0.130)	0.070	0.230
100	8.33	0.50	0.300	(0.129)	0.070	0.230
101	8.42	0.50	0.300	(0.129)	0.070	0.230
102	8.50	0.50	0.300	(0.128)	0.070	0.230
103	8.58	0.53	0.320	(0.127)	0.074	0.246
104	8.67	0.53	0.320	(0.127)	0.074	0.246
105	8.75	0.53	0.320	(0.126)	0.074	0.246
106	8.83	0.57	0.340	(0.126)	0.079	0.261
107	8.92	0.57	0.340	(0.125)	0.079	0.261
108	9.00	0.57	0.340	(0.124)	0.079	0.261
109	9.08	0.63	0.380	(0.124)	0.088	0.292
110	9.17	0.63	0.380	(0.123)	0.088	0.292
111	9.25	0.63	0.380	(0.123)	0.088	0.292
112	9.33	0.67	0.400	(0.122)	0.093	0.307
113	9.42	0.67	0.400	(0.121)	0.093	0.307

114	9.50	0.67	0.400	(0.121)	0.093	0.307
115	9.58	0.70	0.420	(0.120)	0.097	0.323
116	9.67	0.70	0.420	(0.120)	0.097	0.323
117	9.75	0.70	0.420	(0.119)	0.097	0.323
118	9.83	0.73	0.440	(0.119)	0.102	0.338
119	9.92	0.73	0.440	(0.118)	0.102	0.338
120	10.00	0.73	0.440	(0.117)	0.102	0.338
121	10.08	0.50	0.300	(0.117)	0.070	0.230
122	10.17	0.50	0.300	(0.116)	0.070	0.230
123	10.25	0.50	0.300	(0.116)	0.070	0.230
124	10.33	0.50	0.300	(0.115)	0.070	0.230
125	10.42	0.50	0.300	(0.115)	0.070	0.230
126	10.50	0.50	0.300	(0.114)	0.070	0.230
127	10.58	0.67	0.400	(0.113)	0.093	0.307
128	10.67	0.67	0.400	(0.113)	0.093	0.307
129	10.75	0.67	0.400	(0.112)	0.093	0.307
130	10.83	0.67	0.400	(0.112)	0.093	0.307
131	10.92	0.67	0.400	(0.111)	0.093	0.307
132	11.00	0.67	0.400	(0.111)	0.093	0.307
133	11.08	0.63	0.380	(0.110)	0.088	0.292
134	11.17	0.63	0.380	(0.110)	0.088	0.292
135	11.25	0.63	0.380	(0.109)	0.088	0.292
136	11.33	0.63	0.380	(0.109)	0.088	0.292
137	11.42	0.63	0.380	(0.108)	0.088	0.292
138	11.50	0.63	0.380	(0.107)	0.088	0.292
139	11.58	0.57	0.340	(0.107)	0.079	0.261
140	11.67	0.57	0.340	(0.106)	0.079	0.261
141	11.75	0.57	0.340	(0.106)	0.079	0.261
142	11.83	0.60	0.360	(0.105)	0.084	0.276
143	11.92	0.60	0.360	(0.105)	0.084	0.276
144	12.00	0.60	0.360	(0.104)	0.084	0.276
145	12.08	0.83	0.500	0.104	(0.116)	0.396
146	12.17	0.83	0.500	0.103	(0.116)	0.397
147	12.25	0.83	0.500	0.103	(0.116)	0.397
148	12.33	0.87	0.520	0.102	(0.121)	0.418
149	12.42	0.87	0.520	0.102	(0.121)	0.418
150	12.50	0.87	0.520	0.101	(0.121)	0.419
151	12.58	0.93	0.560	0.101	(0.130)	0.459
152	12.67	0.93	0.560	0.100	(0.130)	0.460
153	12.75	0.93	0.560	0.100	(0.130)	0.460
154	12.83	0.97	0.580	0.099	(0.135)	0.481
155	12.92	0.97	0.580	0.099	(0.135)	0.481
156	13.00	0.97	0.580	0.098	(0.135)	0.482
157	13.08	1.13	0.680	0.098	(0.158)	0.582
158	13.17	1.13	0.680	0.097	(0.158)	0.583
159	13.25	1.13	0.680	0.097	(0.158)	0.583
160	13.33	1.13	0.680	0.096	(0.158)	0.584
161	13.42	1.13	0.680	0.096	(0.158)	0.584
162	13.50	1.13	0.680	0.095	(0.158)	0.585
163	13.58	0.77	0.460	0.095	(0.107)	0.365
164	13.67	0.77	0.460	0.094	(0.107)	0.366
165	13.75	0.77	0.460	0.094	(0.107)	0.366
166	13.83	0.77	0.460	0.093	(0.107)	0.367
167	13.92	0.77	0.460	0.093	(0.107)	0.367
168	14.00	0.77	0.460	0.092	(0.107)	0.368
169	14.08	0.90	0.540	0.092	(0.125)	0.448
170	14.17	0.90	0.540	0.091	(0.125)	0.449

171	14.25	0.90	0.540	0.091	(0.125)	0.449
172	14.33	0.87	0.520	0.090	(0.121)	0.430
173	14.42	0.87	0.520	0.090	(0.121)	0.430
174	14.50	0.87	0.520	0.090	(0.121)	0.430
175	14.58	0.87	0.520	0.089	(0.121)	0.431
176	14.67	0.87	0.520	0.089	(0.121)	0.431
177	14.75	0.87	0.520	0.088	(0.121)	0.432
178	14.83	0.83	0.500	0.088	(0.116)	0.412
179	14.92	0.83	0.500	0.087	(0.116)	0.413
180	15.00	0.83	0.500	0.087	(0.116)	0.413
181	15.08	0.80	0.480	0.086	(0.111)	0.394
182	15.17	0.80	0.480	0.086	(0.111)	0.394
183	15.25	0.80	0.480	0.085	(0.111)	0.394
184	15.33	0.77	0.460	0.085	(0.107)	0.375
185	15.42	0.77	0.460	0.085	(0.107)	0.375
186	15.50	0.77	0.460	0.084	(0.107)	0.376
187	15.58	0.63	0.380	0.084	(0.088)	0.296
188	15.67	0.63	0.380	0.083	(0.088)	0.297
189	15.75	0.63	0.380	0.083	(0.088)	0.297
190	15.83	0.63	0.380	0.082	(0.088)	0.298
191	15.92	0.63	0.380	0.082	(0.088)	0.298
192	16.00	0.63	0.380	0.082	(0.088)	0.298
193	16.08	0.13	0.080	(0.081)	0.019	0.061
194	16.17	0.13	0.080	(0.081)	0.019	0.061
195	16.25	0.13	0.080	(0.080)	0.019	0.061
196	16.33	0.13	0.080	(0.080)	0.019	0.061
197	16.42	0.13	0.080	(0.080)	0.019	0.061
198	16.50	0.13	0.080	(0.079)	0.019	0.061
199	16.58	0.10	0.060	(0.079)	0.014	0.046
200	16.67	0.10	0.060	(0.078)	0.014	0.046
201	16.75	0.10	0.060	(0.078)	0.014	0.046
202	16.83	0.10	0.060	(0.078)	0.014	0.046
203	16.92	0.10	0.060	(0.077)	0.014	0.046
204	17.00	0.10	0.060	(0.077)	0.014	0.046
205	17.08	0.17	0.100	(0.076)	0.023	0.077
206	17.17	0.17	0.100	(0.076)	0.023	0.077
207	17.25	0.17	0.100	(0.076)	0.023	0.077
208	17.33	0.17	0.100	(0.075)	0.023	0.077
209	17.42	0.17	0.100	(0.075)	0.023	0.077
210	17.50	0.17	0.100	(0.074)	0.023	0.077
211	17.58	0.17	0.100	(0.074)	0.023	0.077
212	17.67	0.17	0.100	(0.074)	0.023	0.077
213	17.75	0.17	0.100	(0.073)	0.023	0.077
214	17.83	0.13	0.080	(0.073)	0.019	0.061
215	17.92	0.13	0.080	(0.073)	0.019	0.061
216	18.00	0.13	0.080	(0.072)	0.019	0.061
217	18.08	0.13	0.080	(0.072)	0.019	0.061
218	18.17	0.13	0.080	(0.072)	0.019	0.061
219	18.25	0.13	0.080	(0.071)	0.019	0.061
220	18.33	0.13	0.080	(0.071)	0.019	0.061
221	18.42	0.13	0.080	(0.071)	0.019	0.061
222	18.50	0.13	0.080	(0.070)	0.019	0.061
223	18.58	0.10	0.060	(0.070)	0.014	0.046
224	18.67	0.10	0.060	(0.070)	0.014	0.046
225	18.75	0.10	0.060	(0.069)	0.014	0.046
226	18.83	0.07	0.040	(0.069)	0.009	0.031
227	18.92	0.07	0.040	(0.069)	0.009	0.031

228	19.00	0.07	0.040	(0.068)	0.009	0.031
229	19.08	0.10	0.060	(0.068)	0.014	0.046
230	19.17	0.10	0.060	(0.068)	0.014	0.046
231	19.25	0.10	0.060	(0.067)	0.014	0.046
232	19.33	0.13	0.080	(0.067)	0.019	0.061
233	19.42	0.13	0.080	(0.067)	0.019	0.061
234	19.50	0.13	0.080	(0.066)	0.019	0.061
235	19.58	0.10	0.060	(0.066)	0.014	0.046
236	19.67	0.10	0.060	(0.066)	0.014	0.046
237	19.75	0.10	0.060	(0.065)	0.014	0.046
238	19.83	0.07	0.040	(0.065)	0.009	0.031
239	19.92	0.07	0.040	(0.065)	0.009	0.031
240	20.00	0.07	0.040	(0.065)	0.009	0.031
241	20.08	0.10	0.060	(0.064)	0.014	0.046
242	20.17	0.10	0.060	(0.064)	0.014	0.046
243	20.25	0.10	0.060	(0.064)	0.014	0.046
244	20.33	0.10	0.060	(0.063)	0.014	0.046
245	20.42	0.10	0.060	(0.063)	0.014	0.046
246	20.50	0.10	0.060	(0.063)	0.014	0.046
247	20.58	0.10	0.060	(0.063)	0.014	0.046
248	20.67	0.10	0.060	(0.062)	0.014	0.046
249	20.75	0.10	0.060	(0.062)	0.014	0.046
250	20.83	0.07	0.040	(0.062)	0.009	0.031
251	20.92	0.07	0.040	(0.062)	0.009	0.031
252	21.00	0.07	0.040	(0.061)	0.009	0.031
253	21.08	0.10	0.060	(0.061)	0.014	0.046
254	21.17	0.10	0.060	(0.061)	0.014	0.046
255	21.25	0.10	0.060	(0.061)	0.014	0.046
256	21.33	0.07	0.040	(0.060)	0.009	0.031
257	21.42	0.07	0.040	(0.060)	0.009	0.031
258	21.50	0.07	0.040	(0.060)	0.009	0.031
259	21.58	0.10	0.060	(0.060)	0.014	0.046
260	21.67	0.10	0.060	(0.060)	0.014	0.046
261	21.75	0.10	0.060	(0.059)	0.014	0.046
262	21.83	0.07	0.040	(0.059)	0.009	0.031
263	21.92	0.07	0.040	(0.059)	0.009	0.031
264	22.00	0.07	0.040	(0.059)	0.009	0.031
265	22.08	0.10	0.060	(0.058)	0.014	0.046
266	22.17	0.10	0.060	(0.058)	0.014	0.046
267	22.25	0.10	0.060	(0.058)	0.014	0.046
268	22.33	0.07	0.040	(0.058)	0.009	0.031
269	22.42	0.07	0.040	(0.058)	0.009	0.031
270	22.50	0.07	0.040	(0.058)	0.009	0.031
271	22.58	0.07	0.040	(0.057)	0.009	0.031
272	22.67	0.07	0.040	(0.057)	0.009	0.031
273	22.75	0.07	0.040	(0.057)	0.009	0.031
274	22.83	0.07	0.040	(0.057)	0.009	0.031
275	22.92	0.07	0.040	(0.057)	0.009	0.031
276	23.00	0.07	0.040	(0.057)	0.009	0.031
277	23.08	0.07	0.040	(0.057)	0.009	0.031
278	23.17	0.07	0.040	(0.056)	0.009	0.031
279	23.25	0.07	0.040	(0.056)	0.009	0.031
280	23.33	0.07	0.040	(0.056)	0.009	0.031
281	23.42	0.07	0.040	(0.056)	0.009	0.031
282	23.50	0.07	0.040	(0.056)	0.009	0.031
283	23.58	0.07	0.040	(0.056)	0.009	0.031
284	23.67	0.07	0.040	(0.056)	0.009	0.031

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285  23.75     0.07      0.040       (  0.056)       0.009        0.031
286  23.83     0.07      0.040       (  0.056)       0.009        0.031
287  23.92     0.07      0.040       (  0.056)       0.009        0.031
288  24.00     0.07      0.040       (  0.056)       0.009        0.031
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    47.4
     Flood volume = Effective rainfall      3.95(In)
      times area      30.5(Ac.)/[(In)/(Ft.)] =      10.0(Ac.Ft)
     Total soil loss =      1.05(In)
     Total soil loss =     2.676(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =      437166.1 Cubic Feet
     Total soil loss =      116557.4 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     17.808(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
 ---------------------------------------------------------------------------
   0+ 5       0.0010      0.14  Q         |         |         |         |
   0+10       0.0050      0.58  VQ        |         |         |         |
   0+15       0.0102      0.75  VQ        |         |         |         |
   0+20       0.0164      0.90  VQ        |         |         |         |
   0+25       0.0244      1.16  V Q       |         |         |         |
   0+30       0.0332      1.28  V Q       |         |         |         |
   0+35       0.0423      1.33  V Q       |         |         |         |
   0+40       0.0517      1.37  V Q       |         |         |         |
   0+45       0.0613      1.39  V Q       |         |         |         |
   0+50       0.0715      1.48  V Q       |         |         |         |
   0+55       0.0832      1.70  V  Q      |         |         |         |
   1+ 0       0.0955      1.79  V  Q      |         |         |         |
   1+ 5       0.1076      1.76  V  Q      |         |         |         |
   1+10       0.1184      1.56  V  Q      |         |         |         |
   1+15       0.1287      1.49  V Q       |         |         |         |
   1+20       0.1387      1.46  V Q       |         |         |         |
   1+25       0.1487      1.45  V Q       |         |         |         |
   1+30       0.1586      1.44  V Q       |         |         |         |
   1+35       0.1685      1.43  V Q       |         |         |         |
   1+40       0.1783      1.42  V Q       |         |         |         |
   1+45       0.1881      1.42  V Q       |         |         |         |
   1+50       0.1983      1.49  V Q       |         |         |         |
   1+55       0.2101      1.71  V  Q      |         |         |         |
   2+ 0       0.2224      1.79  V  Q      |         |         |         |
   2+ 5       0.2350      1.83  V  Q      |         |         |         |
   2+10       0.2478      1.85  V  Q      |         |         |         |
   2+15       0.2607      1.87  |V Q       |         |         |         |
   2+20       0.2736      1.88  |V Q       |         |         |         |
   2+25       0.2866      1.88  |V Q       |         |         |         |
   2+30       0.2996      1.89  |V Q       |         |         |         |
   2+35       0.3131      1.96  |V Q       |         |         |         |
   2+40       0.3281      2.18  |V  Q      |         |         |         |
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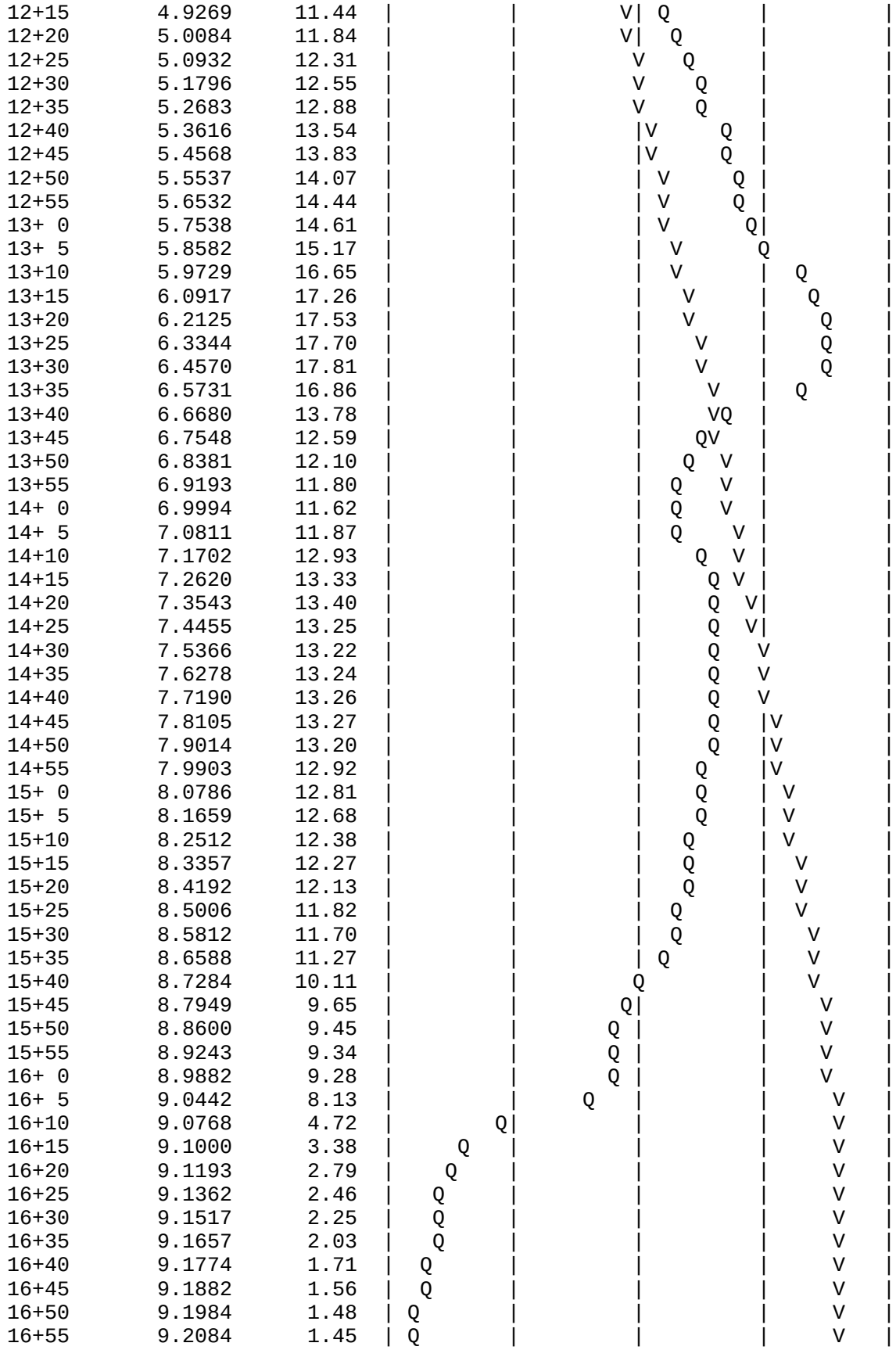
2+45	0.3437	2.27	V Q			
2+50	0.3596	2.30	V Q			
2+55	0.3756	2.33	V Q			
3+ 0	0.3917	2.34	V Q			
3+ 5	0.4079	2.35	V Q			
3+10	0.4241	2.36	V Q			
3+15	0.4403	2.36	V Q			
3+20	0.4566	2.36	V Q			
3+25	0.4729	2.36	V Q			
3+30	0.4891	2.36	V Q			
3+35	0.5054	2.36	V Q			
3+40	0.5217	2.36	V Q			
3+45	0.5380	2.36	V Q			
3+50	0.5547	2.43	V Q			
3+55	0.5730	2.65	V Q			
4+ 0	0.5919	2.74	V Q			
4+ 5	0.6110	2.78	V Q			
4+10	0.6303	2.80	V Q			
4+15	0.6496	2.81	V Q			
4+20	0.6695	2.89	V Q			
4+25	0.6910	3.12	V Q			
4+30	0.7131	3.21	V Q			
4+35	0.7355	3.25	V Q			
4+40	0.7580	3.27	V Q			
4+45	0.7806	3.28	V Q			
4+50	0.8038	3.37	V Q			
4+55	0.8286	3.59	V Q			
5+ 0	0.8539	3.68	V Q			
5+ 5	0.8786	3.58	V Q			
5+10	0.9003	3.16	V Q			
5+15	0.9210	3.00	V Q			
5+20	0.9417	3.01	V Q			
5+25	0.9637	3.19	V Q			
5+30	0.9862	3.26	V Q			
5+35	1.0092	3.35	V Q			
5+40	1.0338	3.58	V Q			
5+45	1.0591	3.67	V Q			
5+50	1.0846	3.71	V Q			
5+55	1.1104	3.74	V Q			
6+ 0	1.1362	3.75	V Q			
6+ 5	1.1626	3.84	V Q			
6+10	1.1906	4.06	V Q			
6+15	1.2192	4.15	V Q			
6+20	1.2481	4.19	V Q			
6+25	1.2772	4.22	V Q			
6+30	1.3063	4.23	V Q			
6+35	1.3360	4.31	V Q			
6+40	1.3672	4.54	V Q			
6+45	1.3991	4.63	V Q			
6+50	1.4312	4.67	V Q			
6+55	1.4635	4.69	V Q			
7+ 0	1.4959	4.70	V Q			
7+ 5	1.5283	4.71	V Q			
7+10	1.5608	4.72	V Q			
7+15	1.5933	4.72	V Q			
7+20	1.6264	4.80	V Q			
7+25	1.6609	5.02	V Q			

7+30	1.6961	5.10	V Q			
7+35	1.7319	5.21	V Q			
7+40	1.7695	5.45	V Q			
7+45	1.8077	5.55	V |Q			
7+50	1.8468	5.67	V |Q			
7+55	1.8875	5.92	V |Q			
8+ 0	1.9290	6.02	V | Q			
8+ 5	1.9718	6.21	V | Q			
8+10	2.0178	6.68	V | Q			
8+15	2.0651	6.87	V | Q			
8+20	2.1130	6.96	V | Q			
8+25	2.1613	7.01	V | Q			
8+30	2.2097	7.04	V | Q			
8+35	2.2589	7.13	V| Q			
8+40	2.3096	7.36	V| Q			
8+45	2.3609	7.46	V| Q			
8+50	2.4131	7.57	V| Q			
8+55	2.4669	7.81	V| Q			
9+ 0	2.5214	7.91	V Q			
9+ 5	2.5772	8.10	V Q			
9+10	2.6362	8.57	V Q			
9+15	2.6966	8.76	V Q			
9+20	2.7580	8.92	V Q			
9+25	2.8213	9.19	|V Q			
9+30	2.8854	9.30	|V Q			
9+35	2.9503	9.44	|V Q			
9+40	3.0171	9.69	| V Q|			
9+45	3.0846	9.80	| V Q|			
9+50	3.1529	9.92	| V Q|			
9+55	3.2229	10.17	| V Q			
10+ 0	3.2937	10.27	| V Q			
10+ 5	3.3613	9.82	| V Q|			
10+10	3.4186	8.31	| V Q			
10+15	3.4718	7.73	| V Q			
10+20	3.5234	7.49	| Q			
10+25	3.5739	7.34	| Q			
10+30	3.6238	7.25	| Q			
10+35	3.6758	7.54	| VQ			
10+40	3.7350	8.59	| V Q			
10+45	3.7969	8.99	| V Q			
10+50	3.8599	9.16	| V Q			
10+55	3.9238	9.27	| V Q			
11+ 0	3.9880	9.33	| V Q			
11+ 5	4.0522	9.31	| V Q			
11+10	4.1150	9.12	| V Q			
11+15	4.1774	9.06	| V Q			
11+20	4.2396	9.04	| V Q			
11+25	4.3017	9.01	| VQ			
11+30	4.3637	9.00	| VQ			
11+35	4.4246	8.85	| Q			
11+40	4.4825	8.40	| QV			
11+45	4.5392	8.23	| Q V			
11+50	4.5958	8.22	| Q V			
11+55	4.6536	8.40	| Q V			
12+ 0	4.7119	8.46	| Q V			
12+ 5	4.7741	9.03	| QV|			
12+10	4.8481	10.75	| V|Q			



17+ 0	9.2183	1.44	Q				V
17+ 5	9.2291	1.57	Q				V
17+10	9.2430	2.01	Q				V
17+15	9.2579	2.17	Q				V
17+20	9.2734	2.25	Q				V
17+25	9.2892	2.29	Q				V
17+30	9.3051	2.32	Q				V
17+35	9.3212	2.34	Q				V
17+40	9.3374	2.35	Q				V
17+45	9.3536	2.36	Q				V
17+50	9.3694	2.29	Q				V
17+55	9.3836	2.07	Q				V
18+ 0	9.3973	1.99	Q				V
18+ 5	9.4107	1.95	Q				V
18+10	9.4240	1.93	Q				V
18+15	9.4372	1.91	Q				V
18+20	9.4503	1.90	Q				V
18+25	9.4634	1.90	Q				V
18+30	9.4764	1.89	Q				V
18+35	9.4889	1.82	Q				V
18+40	9.4999	1.60	Q				V
18+45	9.5103	1.51	Q				V
18+50	9.5200	1.40	Q				V
18+55	9.5280	1.16	Q				V
19+ 0	9.5354	1.06	Q				V
19+ 5	9.5429	1.09	Q				V
19+10	9.5517	1.28	Q				V
19+15	9.5610	1.35	Q				V
19+20	9.5709	1.44	Q				V
19+25	9.5825	1.68	Q				V
19+30	9.5947	1.77	Q				V
19+35	9.6067	1.75	Q				V
19+40	9.6174	1.55	Q				V
19+45	9.6277	1.49	Q				V
19+50	9.6372	1.39	Q				V
19+55	9.6452	1.16	Q				V
20+ 0	9.6525	1.06	Q				V
20+ 5	9.6600	1.09	Q				V
20+10	9.6688	1.28	Q				V
20+15	9.6781	1.35	Q				V
20+20	9.6876	1.37	Q				V
20+25	9.6971	1.39	Q				V
20+30	9.7068	1.40	Q				V
20+35	9.7164	1.40	Q				V
20+40	9.7261	1.41	Q				V
20+45	9.7359	1.41	Q				V
20+50	9.7451	1.35	Q				V
20+55	9.7529	1.13	Q				V
21+ 0	9.7601	1.04	Q				V
21+ 5	9.7675	1.08	Q				V
21+10	9.7762	1.27	Q				V
21+15	9.7855	1.35	Q				V
21+20	9.7945	1.30	Q				V
21+25	9.8020	1.10	Q				V
21+30	9.8090	1.02	Q				V
21+35	9.8164	1.06	Q				V
21+40	9.8251	1.27	Q				V

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   21+45       9.8343      1.34  | Q       |         |         |         V|
   21+50       9.8433      1.30  | Q       |         |         |         V|
   21+55       9.8508      1.10  | Q       |         |         |         V|
   22+ 0       9.8579      1.02  | Q       |         |         |         V|
   22+ 5       9.8652      1.06  | Q       |         |         |         V|
   22+10       9.8739      1.27  | Q       |         |         |         V|
   22+15       9.8831      1.34  | Q       |         |         |         V|
   22+20       9.8921      1.30  | Q       |         |         |         V|
   22+25       9.8996      1.10  | Q       |         |         |         V|
   22+30       9.9067      1.02  | Q       |         |         |         V|
   22+35       9.9135      0.99  |Q        |         |         |         V|
   22+40       9.9202      0.97  |Q        |         |         |         V|
   22+45       9.9269      0.97  |Q        |         |         |         V|
   22+50       9.9335      0.96  |Q        |         |         |         V|
   22+55       9.9400      0.95  |Q        |         |         |         V|
   23+ 0       9.9465      0.95  |Q        |         |         |         V|
   23+ 5       9.9531      0.95  |Q        |         |         |         V|
   23+10       9.9596      0.95  |Q        |         |         |         V|
   23+15       9.9661      0.95  |Q        |         |         |         V|
   23+20       9.9726      0.95  |Q        |         |         |         V|
   23+25       9.9791      0.95  |Q        |         |         |         V|
   23+30       9.9856      0.95  |Q        |         |         |         V|
   23+35       9.9921      0.95  |Q        |         |         |         V|
   23+40       9.9986      0.95  |Q        |         |         |         V|
   23+45      10.0051      0.95  |Q        |         |         |         V|
   23+50      10.0116      0.95  |Q        |         |         |         V|
   23+55      10.0181      0.95  |Q        |         |         |         V|
   24+ 0      10.0246      0.95  |Q        |         |         |         V|
   24+ 5      10.0302      0.80  |Q        |         |         |         V|
   24+10      10.0327      0.36  Q         |         |         |         V|
   24+15      10.0340      0.19  Q         |         |         |         V|
   24+20      10.0348      0.12  Q         |         |         |         V|
   24+25      10.0353      0.07  Q         |         |         |         V|
   24+30      10.0356      0.05  Q         |         |         |         V|
   24+35      10.0358      0.03  Q         |         |         |         V|
   24+40      10.0359      0.01  Q         |         |         |         V|
   24+45      10.0360      0.01  Q         |         |         |         V|
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: q1auh1006100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED A
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 33.45(Ac.) = 0.052 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 33.45(Ac.) = 0.052 Sq. Mi.
Length along longest watercourse = 1351.00(Ft.)
Length along longest watercourse measured to centroid = 643.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.50(Ft.)
Slope along watercourse = 52.7609 Ft./Mi.
Average Manning's 'N' = 0.024
Lag time = 0.073 Hr.
Lag time = 4.35 Min.
25% of lag time = 1.09 Min.
40% of lag time = 1.74 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
33.45	1.20	40.14

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
33.45	2.50	83.63

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
33.450	61.30	0.500

Total Area Entered = 33.45(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	114.833	23.683	7.984
2	0.167	229.667	48.833	16.462
3	0.250	344.500	13.786	4.647
4	0.333	459.334	6.296	2.122
5	0.417	574.167	3.503	1.181
6	0.500	689.000	2.103	0.709
7	0.583	803.834	1.796	0.605
			Sum = 100.000	Sum= 33.711

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.251)	0.075	0.075
2	0.17	0.60	0.180	(0.251)	0.090	0.090

3	0.25	0.60	0.180	(0.251)	0.090	0.090
4	0.33	0.60	0.180	(0.251)	0.090	0.090
5	0.42	0.60	0.180	(0.251)	0.090	0.090
6	0.50	0.70	0.210	(0.251)	0.105	0.105
7	0.58	0.70	0.210	(0.251)	0.105	0.105
8	0.67	0.70	0.210	(0.251)	0.105	0.105
9	0.75	0.70	0.210	(0.251)	0.105	0.105
10	0.83	0.70	0.210	(0.251)	0.105	0.105
11	0.92	0.70	0.210	(0.251)	0.105	0.105
12	1.00	0.80	0.240	(0.251)	0.120	0.120
13	1.08	0.80	0.240	(0.251)	0.120	0.120
14	1.17	0.80	0.240	(0.251)	0.120	0.120
15	1.25	0.80	0.240	(0.251)	0.120	0.120
16	1.33	0.80	0.240	(0.251)	0.120	0.120
17	1.42	0.80	0.240	(0.251)	0.120	0.120
18	1.50	0.80	0.240	(0.251)	0.120	0.120
19	1.58	0.80	0.240	(0.251)	0.120	0.120
20	1.67	0.80	0.240	(0.251)	0.120	0.120
21	1.75	0.80	0.240	(0.251)	0.120	0.120
22	1.83	0.80	0.240	(0.251)	0.120	0.120
23	1.92	0.80	0.240	(0.251)	0.120	0.120
24	2.00	0.90	0.270	(0.251)	0.135	0.135
25	2.08	0.80	0.240	(0.251)	0.120	0.120
26	2.17	0.90	0.270	(0.251)	0.135	0.135
27	2.25	0.90	0.270	(0.251)	0.135	0.135
28	2.33	0.90	0.270	(0.251)	0.135	0.135
29	2.42	0.90	0.270	(0.251)	0.135	0.135
30	2.50	0.90	0.270	(0.251)	0.135	0.135
31	2.58	0.90	0.270	(0.251)	0.135	0.135
32	2.67	0.90	0.270	(0.251)	0.135	0.135
33	2.75	1.00	0.300	(0.251)	0.150	0.150
34	2.83	1.00	0.300	(0.251)	0.150	0.150
35	2.92	1.00	0.300	(0.251)	0.150	0.150
36	3.00	1.00	0.300	(0.251)	0.150	0.150
37	3.08	1.00	0.300	(0.251)	0.150	0.150
38	3.17	1.10	0.330	(0.251)	0.165	0.165
39	3.25	1.10	0.330	(0.251)	0.165	0.165
40	3.33	1.10	0.330	(0.251)	0.165	0.165
41	3.42	1.20	0.360	(0.251)	0.180	0.180
42	3.50	1.30	0.390	(0.251)	0.195	0.195
43	3.58	1.40	0.420	(0.251)	0.210	0.210
44	3.67	1.40	0.420	(0.251)	0.210	0.210
45	3.75	1.50	0.450	(0.251)	0.225	0.225
46	3.83	1.50	0.450	(0.251)	0.225	0.225
47	3.92	1.60	0.480	(0.251)	0.240	0.240
48	4.00	1.60	0.480	(0.251)	0.240	0.240
49	4.08	1.70	0.510	0.251	(0.255)	0.259
50	4.17	1.80	0.540	0.251	(0.270)	0.289
51	4.25	1.90	0.570	0.251	(0.285)	0.319
52	4.33	2.00	0.600	0.251	(0.300)	0.349
53	4.42	2.10	0.630	0.251	(0.315)	0.379
54	4.50	2.10	0.630	0.251	(0.315)	0.379
55	4.58	2.20	0.660	0.251	(0.330)	0.409
56	4.67	2.30	0.690	0.251	(0.345)	0.439
57	4.75	2.40	0.720	0.251	(0.360)	0.469
58	4.83	2.40	0.720	0.251	(0.360)	0.469
59	4.92	2.50	0.750	0.251	(0.375)	0.499

```
60   5.00     2.60      0.780          0.251    (  0.390)        0.529
61   5.08     3.10      0.930          0.251    (  0.465)        0.679
62   5.17     3.60      1.080          0.251    (  0.540)        0.829
63   5.25     3.90      1.170          0.251    (  0.585)        0.919
64   5.33     4.20      1.260          0.251    (  0.630)        1.009
65   5.42     4.70      1.410          0.251    (  0.705)        1.159
66   5.50     5.60      1.680          0.251    (  0.840)        1.429
67   5.58     1.90      0.570          0.251    (  0.285)        0.319
68   5.67     0.90      0.270       (  0.251)       0.135        0.135
69   5.75     0.60      0.180       (  0.251)       0.090        0.090
70   5.83     0.50      0.150       (  0.251)       0.075        0.075
71   5.92     0.30      0.090       (  0.251)       0.045        0.045
72   6.00     0.20      0.060       (  0.251)       0.030        0.030
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.2
    Flood volume = Effective rainfall      1.52(In)
     times area      33.5(Ac.)/[(In)/(Ft.)] =       4.2(Ac.Ft)
    Total soil loss =      0.98(In)
    Total soil loss =     2.744(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =      183982.7 Cubic Feet
    Total soil loss =      119541.1 Cubic Feet
    ------------------------------------------------------------------------
     Peak flow rate of this hydrograph =     38.931(CFS)
    ------------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ------------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ------------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
----------------------------------------------------------------------------
  0+ 5       0.0041      0.60  Q         |         |         |         |
  0+10       0.0176      1.95  VQ        |         |         |         |
  0+15       0.0351      2.55  V Q       |         |         |         |
  0+20       0.0543      2.78  V Q       |         |         |         |
  0+25       0.0742      2.90  V Q       |         |         |         |
  0+30       0.0955      3.09  V  Q      |         |         |         |
  0+35       0.1189      3.39  |V Q      |         |         |         |
  0+40       0.1428      3.47  |V Q      |         |         |         |
  0+45       0.1669      3.50  |V Q      |         |         |         |
  0+50       0.1912      3.52  |V Q      |         |         |         |
  0+55       0.2155      3.53  | VQ      |         |         |         |
  1+ 0       0.2407      3.66  | VQ      |         |         |         |
  1+ 5       0.2676      3.91  | VQ      |         |         |         |
  1+10       0.2950      3.98  | VQ      |         |         |         |
  1+15       0.3226      4.01  |  VQ     |         |         |         |
  1+20       0.3504      4.03  |  VQ     |         |         |         |
  1+25       0.3782      4.04  |  VQ     |         |         |         |
  1+30       0.4061      4.05  |  VQ     |         |         |         |
  1+35       0.4339      4.05  |   Q     |         |         |         |
  1+40       0.4618      4.05  |   Q     |         |         |         |
  1+45       0.4897      4.05  |   Q     |         |         |         |
  1+50       0.5176      4.05  |   Q     |         |         |         |
  1+55       0.5454      4.05  |   QV    |         |         |         |
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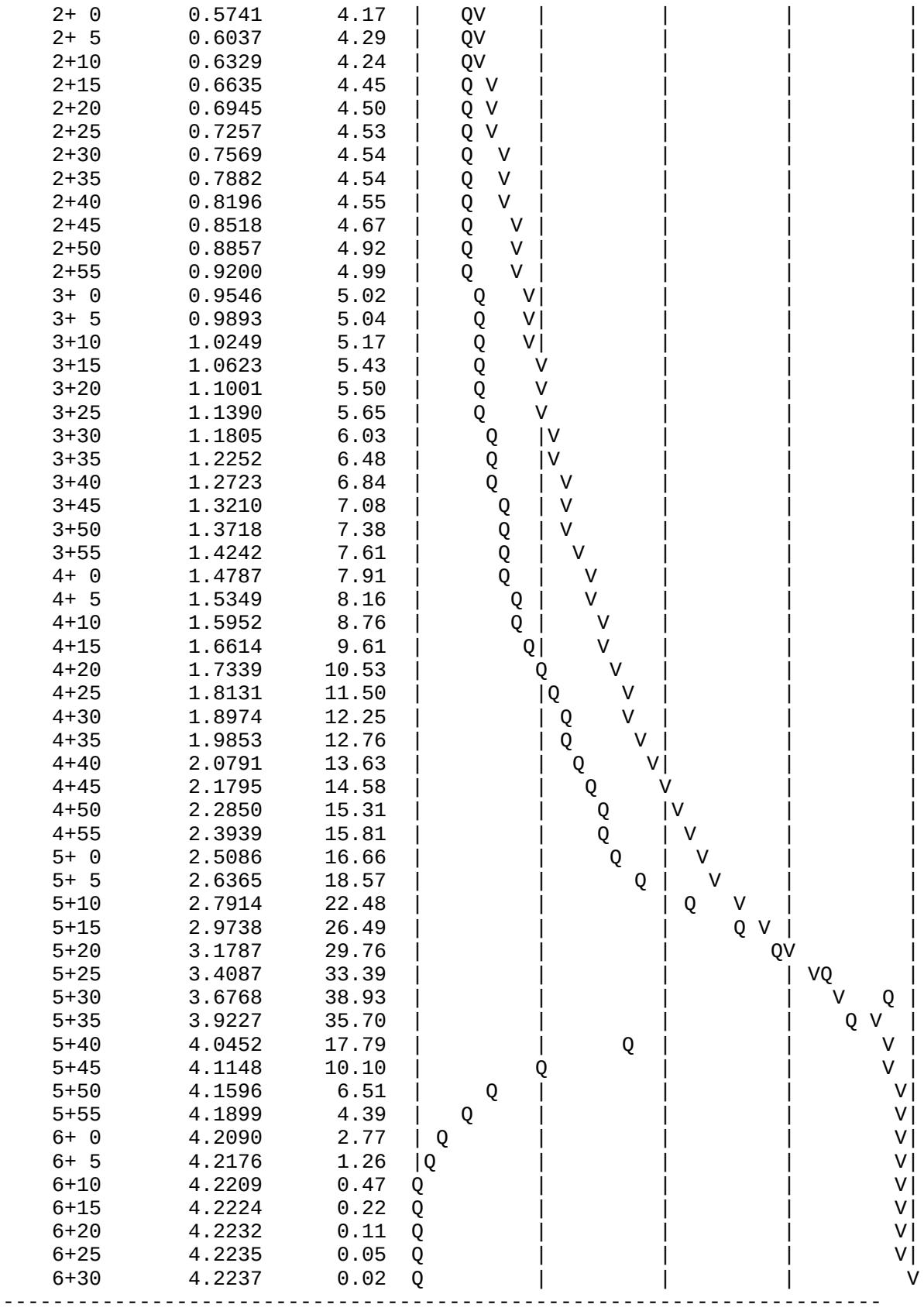

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: qbuh1006100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED B
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 29.54(Ac.) = 0.046 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 29.54(Ac.) = 0.046 Sq. Mi.
Length along longest watercourse = 1353.00(Ft.)
Length along longest watercourse measured to centroid = 881.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.167 Mi.
Difference in elevation = 17.20(Ft.)
Slope along watercourse = 67.1220 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.098 Hr.
Lag time = 5.86 Min.
25% of lag time = 1.47 Min.
40% of lag time = 2.35 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
29.54	1.20	35.45

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
29.54	2.50	73.85

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
29.540	61.60	0.500

Total Area Entered = 29.54(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.6	61.6	0.453	0.500	0.249	1.000	0.249
					Sum (F) =	0.249

Area averaged mean soil loss (F) (In/Hr) = 0.249
Minimum soil loss rate ((In/Hr)) = 0.124
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	85.272	14.796	4.405
2	0.167	170.545	46.014	13.699
3	0.250	255.817	18.512	5.511
4	0.333	341.089	7.912	2.356
5	0.417	426.362	4.692	1.397
6	0.500	511.634	2.929	0.872
7	0.583	596.907	2.085	0.621
8	0.667	682.179	1.387	0.413
9	0.750	767.451	0.919	0.274
10	0.833	852.724	0.752	0.224
		Sum =	100.000 Sum=	29.771

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.50	0.150	(0.249)		0.075	0.075
2	0.17	0.60	0.180	(0.249)		0.090	0.090
3	0.25	0.60	0.180	(0.249)		0.090	0.090
4	0.33	0.60	0.180	(0.249)		0.090	0.090
5	0.42	0.60	0.180	(0.249)		0.090	0.090
6	0.50	0.70	0.210	(0.249)		0.105	0.105
7	0.58	0.70	0.210	(0.249)		0.105	0.105
8	0.67	0.70	0.210	(0.249)		0.105	0.105
9	0.75	0.70	0.210	(0.249)		0.105	0.105
10	0.83	0.70	0.210	(0.249)		0.105	0.105
11	0.92	0.70	0.210	(0.249)		0.105	0.105
12	1.00	0.80	0.240	(0.249)		0.120	0.120
13	1.08	0.80	0.240	(0.249)		0.120	0.120
14	1.17	0.80	0.240	(0.249)		0.120	0.120
15	1.25	0.80	0.240	(0.249)		0.120	0.120
16	1.33	0.80	0.240	(0.249)		0.120	0.120
17	1.42	0.80	0.240	(0.249)		0.120	0.120
18	1.50	0.80	0.240	(0.249)		0.120	0.120
19	1.58	0.80	0.240	(0.249)		0.120	0.120
20	1.67	0.80	0.240	(0.249)		0.120	0.120
21	1.75	0.80	0.240	(0.249)		0.120	0.120
22	1.83	0.80	0.240	(0.249)		0.120	0.120
23	1.92	0.80	0.240	(0.249)		0.120	0.120
24	2.00	0.90	0.270	(0.249)		0.135	0.135
25	2.08	0.80	0.240	(0.249)		0.120	0.120
26	2.17	0.90	0.270	(0.249)		0.135	0.135
27	2.25	0.90	0.270	(0.249)		0.135	0.135
28	2.33	0.90	0.270	(0.249)		0.135	0.135
29	2.42	0.90	0.270	(0.249)		0.135	0.135
30	2.50	0.90	0.270	(0.249)		0.135	0.135
31	2.58	0.90	0.270	(0.249)		0.135	0.135
32	2.67	0.90	0.270	(0.249)		0.135	0.135
33	2.75	1.00	0.300	(0.249)		0.150	0.150
34	2.83	1.00	0.300	(0.249)		0.150	0.150
35	2.92	1.00	0.300	(0.249)		0.150	0.150
36	3.00	1.00	0.300	(0.249)		0.150	0.150
37	3.08	1.00	0.300	(0.249)		0.150	0.150
38	3.17	1.10	0.330	(0.249)		0.165	0.165
39	3.25	1.10	0.330	(0.249)		0.165	0.165
40	3.33	1.10	0.330	(0.249)		0.165	0.165
41	3.42	1.20	0.360	(0.249)		0.180	0.180
42	3.50	1.30	0.390	(0.249)		0.195	0.195
43	3.58	1.40	0.420	(0.249)		0.210	0.210
44	3.67	1.40	0.420	(0.249)		0.210	0.210
45	3.75	1.50	0.450	(0.249)		0.225	0.225
46	3.83	1.50	0.450	(0.249)		0.225	0.225
47	3.92	1.60	0.480	(0.249)		0.240	0.240
48	4.00	1.60	0.480	(0.249)		0.240	0.240
49	4.08	1.70	0.510	0.249	(	0.255)	0.261
50	4.17	1.80	0.540	0.249	(	0.270)	0.291
51	4.25	1.90	0.570	0.249	(	0.285)	0.321
52	4.33	2.00	0.600	0.249	(	0.300)	0.351
53	4.42	2.10	0.630	0.249	(	0.315)	0.381
54	4.50	2.10	0.630	0.249	(	0.315)	0.381
55	4.58	2.20	0.660	0.249	(	0.330)	0.411

```
56   4.67     2.30      0.690          0.249    (  0.345)        0.441
57   4.75     2.40      0.720          0.249    (  0.360)        0.471
58   4.83     2.40      0.720          0.249    (  0.360)        0.471
59   4.92     2.50      0.750          0.249    (  0.375)        0.501
60   5.00     2.60      0.780          0.249    (  0.390)        0.531
61   5.08     3.10      0.930          0.249    (  0.465)        0.681
62   5.17     3.60      1.080          0.249    (  0.540)        0.831
63   5.25     3.90      1.170          0.249    (  0.585)        0.921
64   5.33     4.20      1.260          0.249    (  0.630)        1.011
65   5.42     4.70      1.410          0.249    (  0.705)        1.161
66   5.50     5.60      1.680          0.249    (  0.840)        1.431
67   5.58     1.90      0.570          0.249    (  0.285)        0.321
68   5.67     0.90      0.270       (  0.249)       0.135        0.135
69   5.75     0.60      0.180       (  0.249)       0.090        0.090
70   5.83     0.50      0.150       (  0.249)       0.075        0.075
71   5.92     0.30      0.090       (  0.249)       0.045        0.045
72   6.00     0.20      0.060       (  0.249)       0.030        0.030
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.2
    Flood volume = Effective rainfall      1.52(In)
     times area      29.5(Ac.)/[(In)/(Ft.)] =       3.7(Ac.Ft)
    Total soil loss =      0.98(In)
    Total soil loss =     2.417(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =      162782.1 Cubic Feet
    Total soil loss =      105266.2 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     32.706(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
-------------------------------------------------------------------------
  0+ 5       0.0023      0.33  Q         |         |         |         |
  0+10       0.0121      1.42  VQ        |         |         |         |
  0+15       0.0262      2.04  V Q       |         |         |         |
  0+20       0.0420      2.30  V Q       |         |         |         |
  0+25       0.0588      2.44  V Q       |         |         |         |
  0+30       0.0767      2.60  V Q       |         |         |         |
  0+35       0.0964      2.86  |VQ       |         |         |         |
  0+40       0.1170      2.98  |VQ       |         |         |         |
  0+45       0.1380      3.05  |V Q      |         |         |         |
  0+50       0.1592      3.09  |V Q      |         |         |         |
  0+55       0.1806      3.10  |V Q      |         |         |         |
  1+ 0       0.2025      3.18  | VQ      |         |         |         |
  1+ 5       0.2259      3.39  | VQ      |         |         |         |
  1+10       0.2498      3.48  | VQ      |         |         |         |
  1+15       0.2740      3.52  | VQ      |         |         |         |
  1+20       0.2984      3.54  |  Q      |         |         |         |
  1+25       0.3229      3.55  |  Q      |         |         |         |
  1+30       0.3474      3.56  |  Q      |         |         |         |
  1+35       0.3719      3.57  |  Q      |         |         |         |
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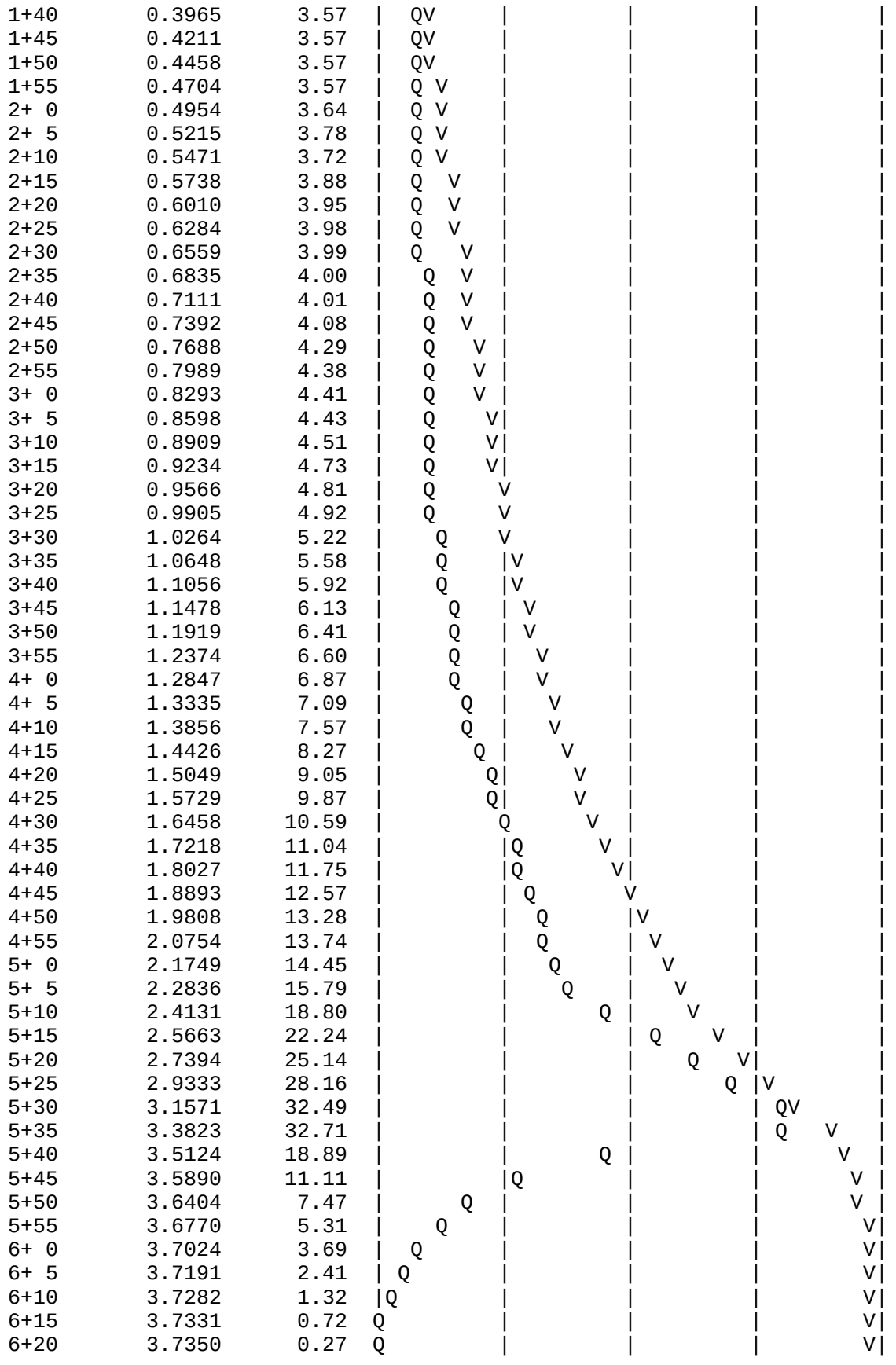

6+25	3.7360	0.14	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION WATERSHED A
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 32.84(Ac.) = 0.051 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 32.84(Ac.) = 0.051 Sq. Mi.
Length along longest watercourse = 1812.00(Ft.)
Length along longest watercourse measured to centroid = 1348.00(Ft.)
Length along longest watercourse = 0.343 Mi.
Length along longest watercourse measured to centroid = 0.255 Mi.
Difference in elevation = 25.30(Ft.)
Slope along watercourse = 73.7219 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.063 Hr.
Lag time = 3.78 Min.
25% of lag time = 0.95 Min.
40% of lag time = 1.51 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

32.84 1.20 39.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
32.84	2.50	82.10

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
32.840	60.90	0.755

Total Area Entered = 32.84(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.9	60.9	0.460	0.755	0.148	1.000	0.148
					Sum (F) =	0.148

Area averaged mean soil loss (F) (In/Hr) = 0.148
Minimum soil loss rate ((In/Hr)) = 0.074
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.296

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	132.184	28.615	9.471
2	0.167	264.368	48.175	15.944
3	0.250	396.552	12.342	4.085
4	0.333	528.736	5.500	1.820
5	0.417	660.920	3.010	0.996
6	0.500	793.104	1.628	0.539
7	0.583	925.288	0.730	0.242
		Sum = 100.000	Sum=	33.097

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.148)	0.044	0.106

2	0.17	0.60	0.180	(0.148)	0.053	0.127
3	0.25	0.60	0.180	(0.148)	0.053	0.127
4	0.33	0.60	0.180	(0.148)	0.053	0.127
5	0.42	0.60	0.180	(0.148)	0.053	0.127
6	0.50	0.70	0.210	(0.148)	0.062	0.148
7	0.58	0.70	0.210	(0.148)	0.062	0.148
8	0.67	0.70	0.210	(0.148)	0.062	0.148
9	0.75	0.70	0.210	(0.148)	0.062	0.148
10	0.83	0.70	0.210	(0.148)	0.062	0.148
11	0.92	0.70	0.210	(0.148)	0.062	0.148
12	1.00	0.80	0.240	(0.148)	0.071	0.169
13	1.08	0.80	0.240	(0.148)	0.071	0.169
14	1.17	0.80	0.240	(0.148)	0.071	0.169
15	1.25	0.80	0.240	(0.148)	0.071	0.169
16	1.33	0.80	0.240	(0.148)	0.071	0.169
17	1.42	0.80	0.240	(0.148)	0.071	0.169
18	1.50	0.80	0.240	(0.148)	0.071	0.169
19	1.58	0.80	0.240	(0.148)	0.071	0.169
20	1.67	0.80	0.240	(0.148)	0.071	0.169
21	1.75	0.80	0.240	(0.148)	0.071	0.169
22	1.83	0.80	0.240	(0.148)	0.071	0.169
23	1.92	0.80	0.240	(0.148)	0.071	0.169
24	2.00	0.90	0.270	(0.148)	0.080	0.190
25	2.08	0.80	0.240	(0.148)	0.071	0.169
26	2.17	0.90	0.270	(0.148)	0.080	0.190
27	2.25	0.90	0.270	(0.148)	0.080	0.190
28	2.33	0.90	0.270	(0.148)	0.080	0.190
29	2.42	0.90	0.270	(0.148)	0.080	0.190
30	2.50	0.90	0.270	(0.148)	0.080	0.190
31	2.58	0.90	0.270	(0.148)	0.080	0.190
32	2.67	0.90	0.270	(0.148)	0.080	0.190
33	2.75	1.00	0.300	(0.148)	0.089	0.211
34	2.83	1.00	0.300	(0.148)	0.089	0.211
35	2.92	1.00	0.300	(0.148)	0.089	0.211
36	3.00	1.00	0.300	(0.148)	0.089	0.211
37	3.08	1.00	0.300	(0.148)	0.089	0.211
38	3.17	1.10	0.330	(0.148)	0.098	0.232
39	3.25	1.10	0.330	(0.148)	0.098	0.232
40	3.33	1.10	0.330	(0.148)	0.098	0.232
41	3.42	1.20	0.360	(0.148)	0.107	0.253
42	3.50	1.30	0.390	(0.148)	0.115	0.275
43	3.58	1.40	0.420	(0.148)	0.124	0.296
44	3.67	1.40	0.420	(0.148)	0.124	0.296
45	3.75	1.50	0.450	(0.148)	0.133	0.317
46	3.83	1.50	0.450	(0.148)	0.133	0.317
47	3.92	1.60	0.480	(0.148)	0.142	0.338
48	4.00	1.60	0.480	(0.148)	0.142	0.338
49	4.08	1.70	0.510	0.148	(0.151)	0.362
50	4.17	1.80	0.540	0.148	(0.160)	0.392
51	4.25	1.90	0.570	0.148	(0.169)	0.422
52	4.33	2.00	0.600	0.148	(0.178)	0.452
53	4.42	2.10	0.630	0.148	(0.186)	0.482
54	4.50	2.10	0.630	0.148	(0.186)	0.482
55	4.58	2.20	0.660	0.148	(0.195)	0.512
56	4.67	2.30	0.690	0.148	(0.204)	0.542
57	4.75	2.40	0.720	0.148	(0.213)	0.572
58	4.83	2.40	0.720	0.148	(0.213)	0.572

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59   4.92     2.50      0.750          0.148    (  0.222)        0.602
60   5.00     2.60      0.780          0.148    (  0.231)        0.632
61   5.08     3.10      0.930          0.148    (  0.275)        0.782
62   5.17     3.60      1.080          0.148    (  0.320)        0.932
63   5.25     3.90      1.170          0.148    (  0.346)        1.022
64   5.33     4.20      1.260          0.148    (  0.373)        1.112
65   5.42     4.70      1.410          0.148    (  0.417)        1.262
66   5.50     5.60      1.680          0.148    (  0.497)        1.532
67   5.58     1.90      0.570          0.148    (  0.169)        0.422
68   5.67     0.90      0.270       (  0.148)       0.080        0.190
69   5.75     0.60      0.180       (  0.148)       0.053        0.127
70   5.83     0.50      0.150       (  0.148)       0.044        0.106
71   5.92     0.30      0.090       (  0.148)       0.027        0.063
72   6.00     0.20      0.060       (  0.148)       0.018        0.042
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    23.0
    Flood volume = Effective rainfall      1.92(In)
     times area      32.8(Ac.)/[(In)/(Ft.)] =       5.2(Ac.Ft)
    Total soil loss =      0.58(In)
    Total soil loss =     1.591(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =      228689.0 Cubic Feet
    Total soil loss =       69300.3 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     42.568(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
----------------------------------------------------------------------
  0+ 5       0.0069      1.00  Q         |         |         |         |
  0+10       0.0268      2.88  V Q       |         |         |         |
  0+15       0.0519      3.65  V Q       |         |         |         |
  0+20       0.0790      3.93  V  Q      |         |         |         |
  0+25       0.1071      4.08  V  Q      |         |         |         |
  0+30       0.1371      4.35  |V Q      |         |         |         |
  0+35       0.1696      4.73  |V Q      |         |         |         |
  0+40       0.2028      4.82  |V Q      |         |         |         |
  0+45       0.2363      4.86  |V Q      |         |         |         |
  0+50       0.2699      4.88  | VQ      |         |         |         |
  0+55       0.3035      4.89  | VQ      |         |         |         |
  1+ 0       0.3386      5.10  | V Q     |         |         |         |
  1+ 5       0.3760      5.43  | V Q     |         |         |         |
  1+10       0.4140      5.52  |  VQ     |         |         |         |
  1+15       0.4523      5.56  |  VQ     |         |         |         |
  1+20       0.4907      5.58  |  VQ     |         |         |         |
  1+25       0.5292      5.59  |   Q     |         |         |         |
  1+30       0.5677      5.59  |   Q     |         |         |         |
  1+35       0.6063      5.59  |   Q     |         |         |         |
  1+40       0.6448      5.59  |   Q     |         |         |         |
  1+45       0.6833      5.59  |   QV    |         |         |         |
  1+50       0.7219      5.59  |   QV    |         |         |         |
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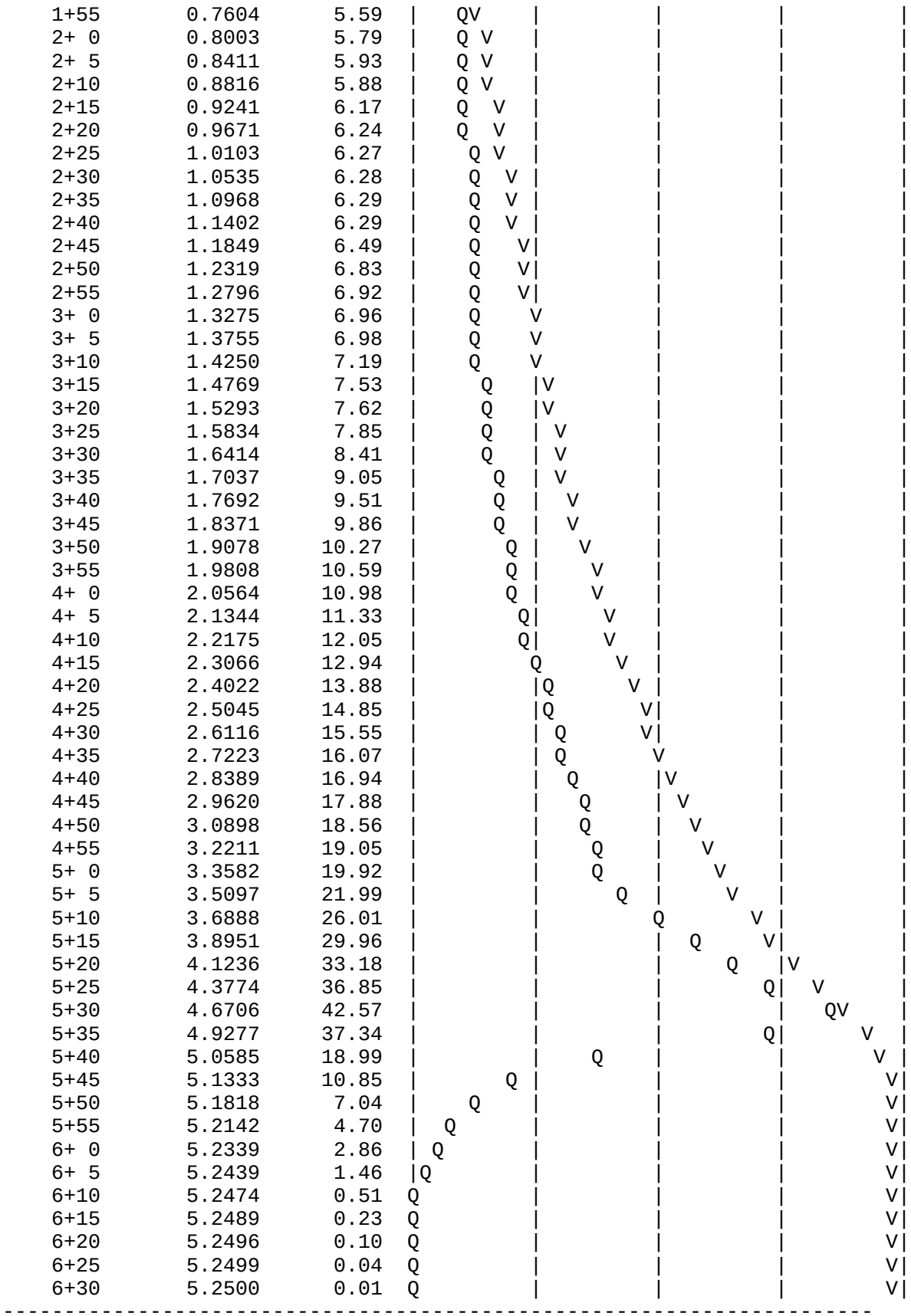

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPSOED CONDITION WATERSHED B
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 30.51(Ac.) = 0.048 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.51(Ac.) = 0.048 Sq. Mi.
Length along longest watercourse = 2861.00(Ft.)
Length along longest watercourse measured to centroid = 2131.00(Ft.)
Length along longest watercourse = 0.542 Mi.
Length along longest watercourse measured to centroid = 0.404 Mi.
Difference in elevation = 26.97(Ft.)
Slope along watercourse = 49.7734 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.096 Hr.
Lag time = 5.77 Min.
25% of lag time = 1.44 Min.
40% of lag time = 2.31 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

30.51	1.20	36.61

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	2.50	76.28

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.510	62.10	0.835

Total Area Entered = 30.51(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.1	62.1	0.447	0.835	0.111	1.000	0.111
					Sum (F) =	0.111

Area averaged mean soil loss (F) (In/Hr) = 0.111
Minimum soil loss rate ((In/Hr)) = 0.056
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.232

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	86.658	15.197	4.673
2	0.167	173.316	46.362	14.256
3	0.250	259.974	18.174	5.588
4	0.333	346.632	7.832	2.408
5	0.417	433.290	4.614	1.419
6	0.500	519.948	2.896	0.891
7	0.583	606.606	2.040	0.627
8	0.667	693.264	1.339	0.412
9	0.750	779.923	0.910	0.280
10	0.833	866.581	0.634	0.195
			Sum = 100.000	Sum= 30.748

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.111)	0.035	0.115
2	0.17	0.60	0.180	(0.111)	0.042	0.138
3	0.25	0.60	0.180	(0.111)	0.042	0.138
4	0.33	0.60	0.180	(0.111)	0.042	0.138
5	0.42	0.60	0.180	(0.111)	0.042	0.138
6	0.50	0.70	0.210	(0.111)	0.049	0.161
7	0.58	0.70	0.210	(0.111)	0.049	0.161
8	0.67	0.70	0.210	(0.111)	0.049	0.161
9	0.75	0.70	0.210	(0.111)	0.049	0.161
10	0.83	0.70	0.210	(0.111)	0.049	0.161
11	0.92	0.70	0.210	(0.111)	0.049	0.161
12	1.00	0.80	0.240	(0.111)	0.056	0.184
13	1.08	0.80	0.240	(0.111)	0.056	0.184
14	1.17	0.80	0.240	(0.111)	0.056	0.184
15	1.25	0.80	0.240	(0.111)	0.056	0.184
16	1.33	0.80	0.240	(0.111)	0.056	0.184
17	1.42	0.80	0.240	(0.111)	0.056	0.184
18	1.50	0.80	0.240	(0.111)	0.056	0.184
19	1.58	0.80	0.240	(0.111)	0.056	0.184
20	1.67	0.80	0.240	(0.111)	0.056	0.184
21	1.75	0.80	0.240	(0.111)	0.056	0.184
22	1.83	0.80	0.240	(0.111)	0.056	0.184
23	1.92	0.80	0.240	(0.111)	0.056	0.184
24	2.00	0.90	0.270	(0.111)	0.063	0.207
25	2.08	0.80	0.240	(0.111)	0.056	0.184
26	2.17	0.90	0.270	(0.111)	0.063	0.207
27	2.25	0.90	0.270	(0.111)	0.063	0.207
28	2.33	0.90	0.270	(0.111)	0.063	0.207
29	2.42	0.90	0.270	(0.111)	0.063	0.207
30	2.50	0.90	0.270	(0.111)	0.063	0.207
31	2.58	0.90	0.270	(0.111)	0.063	0.207
32	2.67	0.90	0.270	(0.111)	0.063	0.207
33	2.75	1.00	0.300	(0.111)	0.070	0.230
34	2.83	1.00	0.300	(0.111)	0.070	0.230
35	2.92	1.00	0.300	(0.111)	0.070	0.230
36	3.00	1.00	0.300	(0.111)	0.070	0.230
37	3.08	1.00	0.300	(0.111)	0.070	0.230
38	3.17	1.10	0.330	(0.111)	0.077	0.253
39	3.25	1.10	0.330	(0.111)	0.077	0.253
40	3.33	1.10	0.330	(0.111)	0.077	0.253
41	3.42	1.20	0.360	(0.111)	0.084	0.276
42	3.50	1.30	0.390	(0.111)	0.090	0.299
43	3.58	1.40	0.420	(0.111)	0.097	0.323
44	3.67	1.40	0.420	(0.111)	0.097	0.323
45	3.75	1.50	0.450	(0.111)	0.104	0.346
46	3.83	1.50	0.450	(0.111)	0.104	0.346
47	3.92	1.60	0.480	0.111	(0.111)	0.369
48	4.00	1.60	0.480	0.111	(0.111)	0.369
49	4.08	1.70	0.510	0.111	(0.118)	0.399
50	4.17	1.80	0.540	0.111	(0.125)	0.429
51	4.25	1.90	0.570	0.111	(0.132)	0.459
52	4.33	2.00	0.600	0.111	(0.139)	0.489
53	4.42	2.10	0.630	0.111	(0.146)	0.519
54	4.50	2.10	0.630	0.111	(0.146)	0.519

55	4.58	2.20	0.660	0.111	(0.153)		0.549
56	4.67	2.30	0.690	0.111	(0.160)		0.579
57	4.75	2.40	0.720	0.111	(0.167)		0.609
58	4.83	2.40	0.720	0.111	(0.167)		0.609
59	4.92	2.50	0.750	0.111	(0.174)		0.639
60	5.00	2.60	0.780	0.111	(0.181)		0.669
61	5.08	3.10	0.930	0.111	(0.216)		0.819
62	5.17	3.60	1.080	0.111	(0.251)		0.969
63	5.25	3.90	1.170	0.111	(0.271)		1.059
64	5.33	4.20	1.260	0.111	(0.292)		1.149
65	5.42	4.70	1.410	0.111	(0.327)		1.299
66	5.50	5.60	1.680	0.111	(0.390)		1.569
67	5.58	1.90	0.570	0.111	(0.132)		0.459
68	5.67	0.90	0.270	(0.111)	0.063		0.207
69	5.75	0.60	0.180	(0.111)	0.042		0.138
70	5.83	0.50	0.150	(0.111)	0.035		0.115
71	5.92	0.30	0.090	(0.111)	0.021		0.069
72	6.00	0.20	0.060	(0.111)	0.014		0.046

(Loss Rate Not Used)

Sum = 100.0 Sum = 24.6

Flood volume = Effective rainfall 2.05(In)
times area 30.5(Ac.)/[(In)/(Ft.)] = 5.2(Ac.Ft)
Total soil loss = 0.45(In)
Total soil loss = 1.140(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 227172.6 Cubic Feet
Total soil loss = 49676.6 Cubic Feet

Peak flow rate of this hydrograph = 38.001(CFS)

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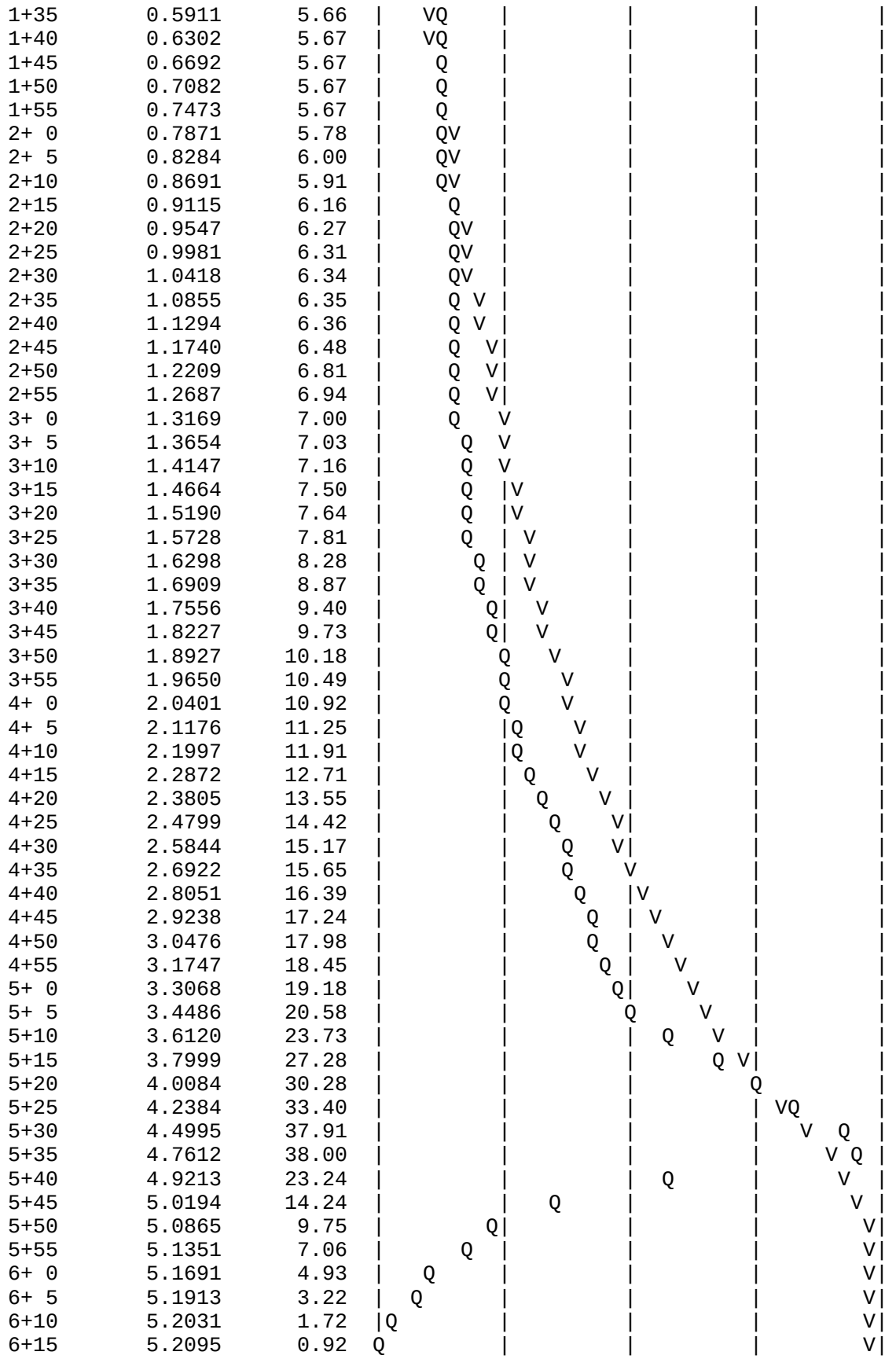
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0037	0.54	Q	|	|	|	|
0+10	0.0195	2.29	V Q	|	|	|	|
0+15	0.0419	3.26	V Q	|	|	|	|
0+20	0.0672	3.67	V Q	|	|	|	|
0+25	0.0940	3.89	V Q	|	|	|	|
0+30	0.1224	4.13	V Q	|	|	|	|
0+35	0.1538	4.55	|V Q	|	|	|	|
0+40	0.1864	4.74	|V Q	|	|	|	|
0+45	0.2198	4.84	|V Q	|	|	|	|
0+50	0.2535	4.90	|V Q	|	|	|	|
0+55	0.2874	4.93	| V Q	|	|	|	|
1+ 0	0.3222	5.05	| V Q	|	|	|	|
1+ 5	0.3593	5.39	| V Q	|	|	|	|
1+10	0.3973	5.52	| V Q	|	|	|	|
1+15	0.4358	5.58	| V Q	|	|	|	|
1+20	0.4744	5.61	| V Q	|	|	|	|
1+25	0.5133	5.63	| V Q	|	|	|	|
1+30	0.5522	5.65	| VQ	|	|	|	|



6+20	5.2122	0.40	Q	|	|	|	V|
6+25	5.2137	0.21	Q	|	|	|	V|
6+30	5.2145	0.12	Q	|	|	|	V|
6+35	5.2149	0.06	Q	|	|	|	V|
6+40	5.2151	0.03	Q	|	|	|	V|
6+45	5.2152	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: q1auh1003100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED A
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 33.45(Ac.) = 0.052 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 33.45(Ac.) = 0.052 Sq. Mi.
Length along longest watercourse = 1351.00(Ft.)
Length along longest watercourse measured to centroid = 643.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.50(Ft.)
Slope along watercourse = 52.7609 Ft./Mi.
Average Manning's 'N' = 0.024
Lag time = 0.073 Hr.
Lag time = 4.35 Min.
25% of lag time = 1.09 Min.
40% of lag time = 1.74 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

33.45	0.80	26.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
33.45	1.90	63.56

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
33.450	61.30	0.500

Total Area Entered = 33.45(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	114.833	23.683	7.984
2	0.167	229.667	48.833	16.462
3	0.250	344.500	13.786	4.647
4	0.333	459.334	6.296	2.122
5	0.417	574.167	3.503	1.181
6	0.500	689.000	2.103	0.709
7	0.583	803.834	1.796	0.605
		Sum = 100.000	Sum=	33.711

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.251)	0.148	0.148

2	0.17	1.30	0.296	(0.251)	0.148	0.148
3	0.25	1.10	0.251	(0.251)	0.125	0.125
4	0.33	1.50	0.342	(0.251)	0.171	0.171
5	0.42	1.50	0.342	(0.251)	0.171	0.171
6	0.50	1.80	0.410	(0.251)	0.205	0.205
7	0.58	1.50	0.342	(0.251)	0.171	0.171
8	0.67	1.80	0.410	(0.251)	0.205	0.205
9	0.75	1.80	0.410	(0.251)	0.205	0.205
10	0.83	1.50	0.342	(0.251)	0.171	0.171
11	0.92	1.60	0.365	(0.251)	0.182	0.182
12	1.00	1.80	0.410	(0.251)	0.205	0.205
13	1.08	2.20	0.502	(0.251)	0.251	0.251
14	1.17	2.20	0.502	(0.251)	0.251	0.251
15	1.25	2.20	0.502	(0.251)	0.251	0.251
16	1.33	2.00	0.456	(0.251)	0.228	0.228
17	1.42	2.60	0.593	0.251	(0.296)	0.342
18	1.50	2.70	0.616	0.251	(0.308)	0.365
19	1.58	2.40	0.547	0.251	(0.274)	0.296
20	1.67	2.70	0.616	0.251	(0.308)	0.365
21	1.75	3.30	0.752	0.251	(0.376)	0.502
22	1.83	3.10	0.707	0.251	(0.353)	0.456
23	1.92	2.90	0.661	0.251	(0.331)	0.410
24	2.00	3.00	0.684	0.251	(0.342)	0.433
25	2.08	3.10	0.707	0.251	(0.353)	0.456
26	2.17	4.20	0.957	0.251	(0.479)	0.707
27	2.25	5.00	1.140	0.251	(0.570)	0.889
28	2.33	3.50	0.798	0.251	(0.399)	0.547
29	2.42	6.80	1.550	0.251	(0.775)	1.299
30	2.50	7.30	1.664	0.251	(0.832)	1.413
31	2.58	8.20	1.869	0.251	(0.935)	1.619
32	2.67	5.90	1.345	0.251	(0.673)	1.094
33	2.75	2.00	0.456	(0.251)	0.228	0.228
34	2.83	1.80	0.410	(0.251)	0.205	0.205
35	2.92	1.80	0.410	(0.251)	0.205	0.205
36	3.00	0.60	0.137	(0.251)	0.068	0.068

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.0

Flood volume = Effective rainfall 1.25(In)
times area 33.5(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)
Total soil loss = 0.65(In)
Total soil loss = 1.814(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 151663.7 Cubic Feet
Total soil loss = 79007.2 Cubic Feet

Peak flow rate of this hydrograph = 46.436(CFS)

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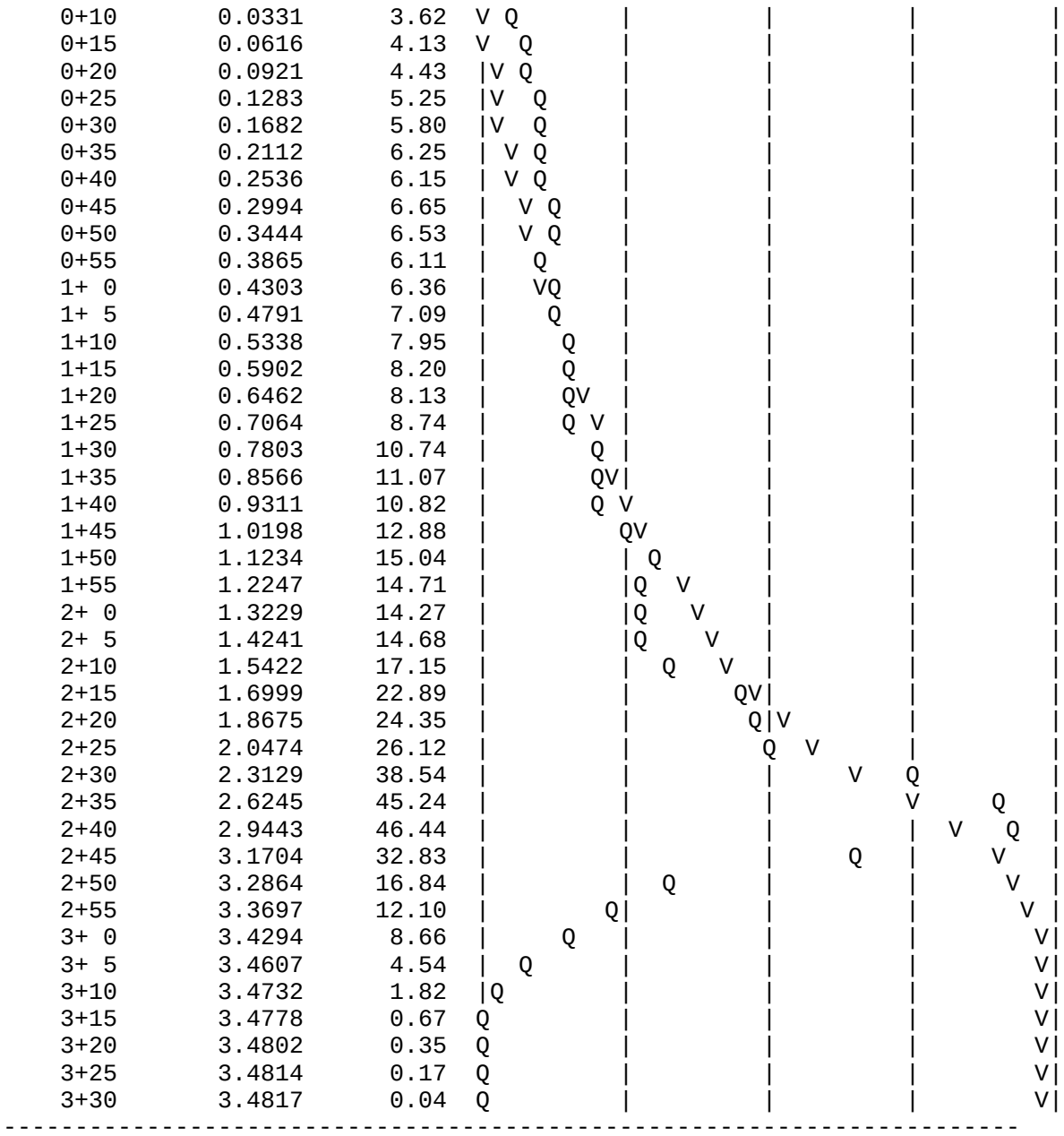
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0082	1.18	Q	|	|	|	|


0+10 0.0331 3.62
0+15 0.0616 4.13
0+20 0.0921 4.43
0+25 0.1283 5.25
0+30 0.1682 5.80
0+35 0.2112 6.25
0+40 0.2536 6.15
0+45 0.2994 6.65
0+50 0.3444 6.53
0+55 0.3865 6.11
1+ 0 0.4303 6.36
1+ 5 0.4791 7.09
1+10 0.5338 7.95
1+15 0.5902 8.20
1+20 0.6462 8.13
1+25 0.7064 8.74
1+30 0.7803 10.74
1+35 0.8566 11.07
1+40 0.9311 10.82
1+45 1.0198 12.88
1+50 1.1234 15.04
1+55 1.2247 14.71
2+ 0 1.3229 14.27
2+ 5 1.4241 14.68
2+10 1.5422 17.15
2+15 1.6999 22.89
2+20 1.8675 24.35
2+25 2.0474 26.12
2+30 2.3129 38.54
2+35 2.6245 45.24
2+40 2.9443 46.44
2+45 3.1704 32.83
2+50 3.2864 16.84
2+55 3.3697 12.10
3+ 0 3.4294 8.66
3+ 5 3.4607 4.54
3+10 3.4732 1.82
3+15 3.4778 0.67
3+20 3.4802 0.35
3+25 3.4814 0.17
3+30 3.4817 0.04

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED B
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 29.54(Ac.) = 0.046 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 29.54(Ac.) = 0.046 Sq. Mi.
Length along longest watercourse = 1353.00(Ft.)
Length along longest watercourse measured to centroid = 881.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.167 Mi.
Difference in elevation = 17.20(Ft.)
Slope along watercourse = 67.1220 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.098 Hr.
Lag time = 5.86 Min.
25% of lag time = 1.47 Min.
40% of lag time = 2.35 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

```
       29.54              0.80                   23.63

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       29.54              1.90                   56.13

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.800(In)
Area Averaged 100-Year Rainfall =    1.900(In)

Point rain (area averaged) =    1.900(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    1.900(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    29.540           61.60          0.500
 Total Area Entered =     29.54(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
61.6  61.6      0.453     0.500        0.249       1.000      0.249
                                                   Sum (F) =   0.249
Area averaged mean soil loss (F) (In/Hr) =  0.249
Minimum soil loss rate ((In/Hr)) =  0.124
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.500
------------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                  VALLEY S-Curve
------------------------------------------------------------------------
            Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         85.272         14.796             4.405
    2   0.167        170.545         46.014            13.699
    3   0.250        255.817         18.512             5.511
    4   0.333        341.089          7.912             2.356
    5   0.417        426.362          4.692             1.397
    6   0.500        511.634          2.929             0.872
    7   0.583        596.907          2.085             0.621
    8   0.667        682.179          1.387             0.413
    9   0.750        767.451          0.919             0.274
   10   0.833        852.724          0.752             0.224
                              Sum = 100.000   Sum=      29.771
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value
```

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.249)	0.148	0.148
2	0.17	1.30	0.296	(0.249)	0.148	0.148
3	0.25	1.10	0.251	(0.249)	0.125	0.125
4	0.33	1.50	0.342	(0.249)	0.171	0.171
5	0.42	1.50	0.342	(0.249)	0.171	0.171
6	0.50	1.80	0.410	(0.249)	0.205	0.205
7	0.58	1.50	0.342	(0.249)	0.171	0.171
8	0.67	1.80	0.410	(0.249)	0.205	0.205
9	0.75	1.80	0.410	(0.249)	0.205	0.205
10	0.83	1.50	0.342	(0.249)	0.171	0.171
11	0.92	1.60	0.365	(0.249)	0.182	0.182
12	1.00	1.80	0.410	(0.249)	0.205	0.205
13	1.08	2.20	0.502	0.249	(0.251)	0.253
14	1.17	2.20	0.502	0.249	(0.251)	0.253
15	1.25	2.20	0.502	0.249	(0.251)	0.253
16	1.33	2.00	0.456	(0.249)	0.228	0.228
17	1.42	2.60	0.593	0.249	(0.296)	0.344
18	1.50	2.70	0.616	0.249	(0.308)	0.367
19	1.58	2.40	0.547	0.249	(0.274)	0.298
20	1.67	2.70	0.616	0.249	(0.308)	0.367
21	1.75	3.30	0.752	0.249	(0.376)	0.503
22	1.83	3.10	0.707	0.249	(0.353)	0.458
23	1.92	2.90	0.661	0.249	(0.331)	0.412
24	2.00	3.00	0.684	0.249	(0.342)	0.435
25	2.08	3.10	0.707	0.249	(0.353)	0.458
26	2.17	4.20	0.957	0.249	(0.479)	0.708
27	2.25	5.00	1.140	0.249	(0.570)	0.891
28	2.33	3.50	0.798	0.249	(0.399)	0.549
29	2.42	6.80	1.550	0.249	(0.775)	1.301
30	2.50	7.30	1.664	0.249	(0.832)	1.415
31	2.58	8.20	1.869	0.249	(0.935)	1.620
32	2.67	5.90	1.345	0.249	(0.673)	1.096
33	2.75	2.00	0.456	(0.249)	0.228	0.228
34	2.83	1.80	0.410	(0.249)	0.205	0.205
35	2.92	1.80	0.410	(0.249)	0.205	0.205
36	3.00	0.60	0.137	(0.249)	0.068	0.068

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.0

Flood volume = Effective rainfall 1.25(In)
times area 29.5(Ac.)/[(In)/(Ft.)] = 3.1(Ac.Ft)
Total soil loss = 0.65(In)
Total soil loss = 1.595(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 134240.8 Cubic Feet
Total soil loss = 69470.3 Cubic Feet

Peak flow rate of this hydrograph = 40.294(CFS)

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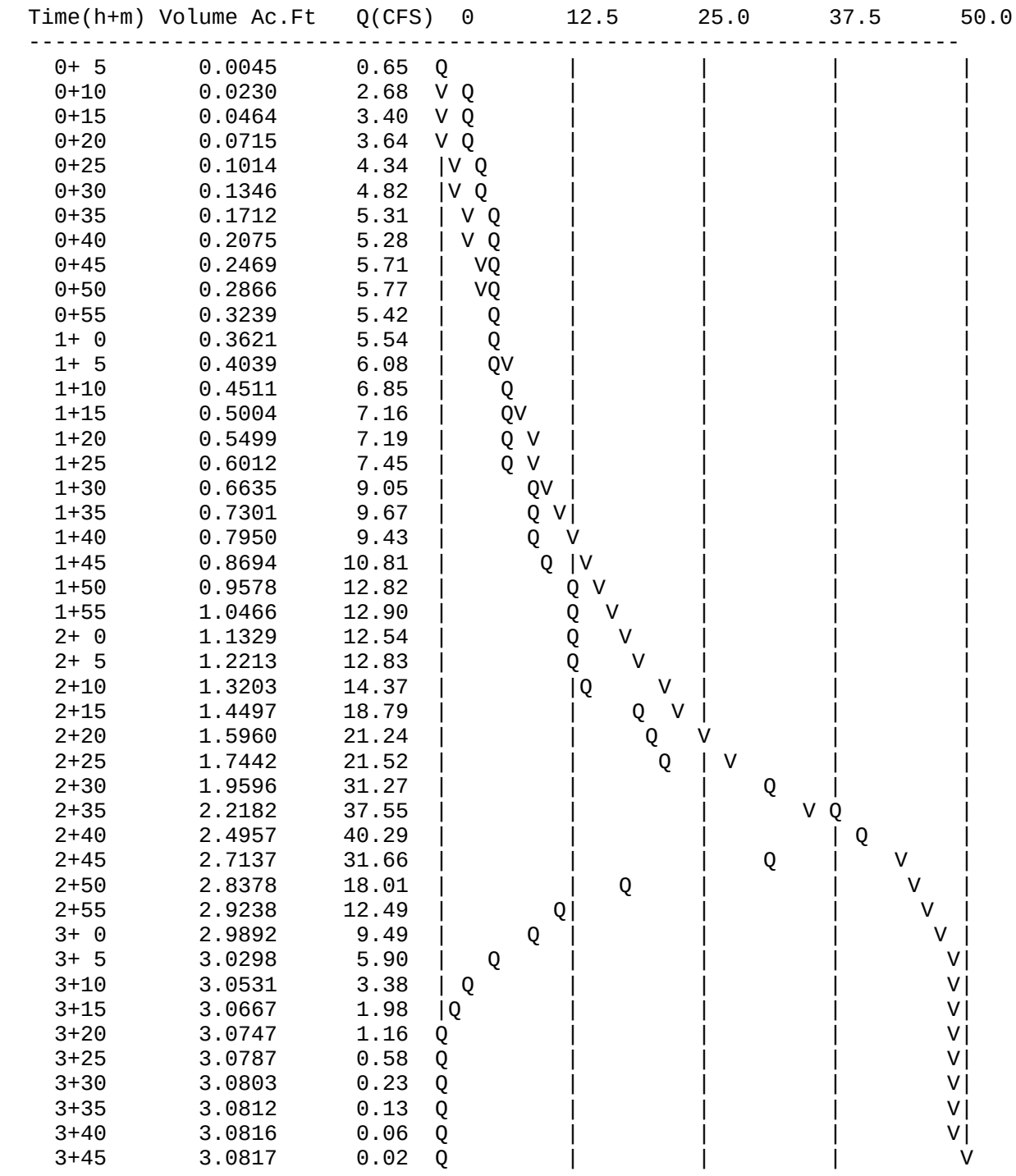
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))


Time(h+m) Volume Ac.Ft Q(CFS) 0 12.5 25.0 37.5 50.0
0+ 5 0.0045 0.65
0+10 0.0230 2.68
0+15 0.0464 3.40
0+20 0.0715 3.64
0+25 0.1014 4.34
0+30 0.1346 4.82
0+35 0.1712 5.31
0+40 0.2075 5.28
0+45 0.2469 5.71
0+50 0.2866 5.77
0+55 0.3239 5.42
1+ 0 0.3621 5.54
1+ 5 0.4039 6.08
1+10 0.4511 6.85
1+15 0.5004 7.16
1+20 0.5499 7.19
1+25 0.6012 7.45
1+30 0.6635 9.05
1+35 0.7301 9.67
1+40 0.7950 9.43
1+45 0.8694 10.81
1+50 0.9578 12.82
1+55 1.0466 12.90
2+ 0 1.1329 12.54
2+ 5 1.2213 12.83
2+10 1.3203 14.37
2+15 1.4497 18.79
2+20 1.5960 21.24
2+25 1.7442 21.52
2+30 1.9596 31.27
2+35 2.2182 37.55
2+40 2.4957 40.29
2+45 2.7137 31.66
2+50 2.8378 18.01
2+55 2.9238 12.49
3+ 0 2.9892 9.49
3+ 5 3.0298 5.90
3+10 3.0531 3.38
3+15 3.0667 1.98
3+20 3.0747 1.16
3+25 3.0787 0.58
3+30 3.0803 0.23
3+35 3.0812 0.13
3+40 3.0816 0.06
3+45 3.0817 0.02

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: q100p1auh3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION WATERSHED A
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 32.84(Ac.) = 0.051 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 32.84(Ac.) = 0.051 Sq. Mi.
Length along longest watercourse = 1812.00(Ft.)
Length along longest watercourse measured to centroid = 1348.00(Ft.)
Length along longest watercourse = 0.343 Mi.
Length along longest watercourse measured to centroid = 0.255 Mi.
Difference in elevation = 25.30(Ft.)
Slope along watercourse = 73.7219 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.063 Hr.
Lag time = 3.78 Min.
25% of lag time = 0.95 Min.
40% of lag time = 1.51 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

32.84 0.80 26.27

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
32.84	1.90	62.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
32.840	60.90	0.755

Total Area Entered = 32.84(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.9	60.9	0.460	0.755	0.148	1.000	0.148
					Sum (F) =	0.148

Area averaged mean soil loss (F) (In/Hr) = 0.148
Minimum soil loss rate ((In/Hr)) = 0.074
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.296

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	132.184	28.615	9.471
2	0.167	264.368	48.175	15.944
3	0.250	396.552	12.342	4.085
4	0.333	528.736	5.500	1.820
5	0.417	660.920	3.010	0.996
6	0.500	793.104	1.628	0.539
7	0.583	925.288	0.730	0.242
		Sum = 100.000	Sum=	33.097

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.148)	0.088	0.209

```
 2   0.17     1.30      0.296       (  0.148)       0.088        0.209
 3   0.25     1.10      0.251       (  0.148)       0.074        0.177
 4   0.33     1.50      0.342       (  0.148)       0.101        0.241
 5   0.42     1.50      0.342       (  0.148)       0.101        0.241
 6   0.50     1.80      0.410       (  0.148)       0.121        0.289
 7   0.58     1.50      0.342       (  0.148)       0.101        0.241
 8   0.67     1.80      0.410       (  0.148)       0.121        0.289
 9   0.75     1.80      0.410       (  0.148)       0.121        0.289
10   0.83     1.50      0.342       (  0.148)       0.101        0.241
11   0.92     1.60      0.365       (  0.148)       0.108        0.257
12   1.00     1.80      0.410       (  0.148)       0.121        0.289
13   1.08     2.20      0.502          0.148    (  0.148)        0.354
14   1.17     2.20      0.502          0.148    (  0.148)        0.354
15   1.25     2.20      0.502          0.148    (  0.148)        0.354
16   1.33     2.00      0.456       (  0.148)       0.135        0.321
17   1.42     2.60      0.593          0.148    (  0.175)        0.445
18   1.50     2.70      0.616          0.148    (  0.182)        0.468
19   1.58     2.40      0.547          0.148    (  0.162)        0.400
20   1.67     2.70      0.616          0.148    (  0.182)        0.468
21   1.75     3.30      0.752          0.148    (  0.223)        0.605
22   1.83     3.10      0.707          0.148    (  0.209)        0.559
23   1.92     2.90      0.661          0.148    (  0.196)        0.514
24   2.00     3.00      0.684          0.148    (  0.202)        0.536
25   2.08     3.10      0.707          0.148    (  0.209)        0.559
26   2.17     4.20      0.957          0.148    (  0.283)        0.810
27   2.25     5.00      1.140          0.148    (  0.337)        0.992
28   2.33     3.50      0.798          0.148    (  0.236)        0.650
29   2.42     6.80      1.550          0.148    (  0.459)        1.403
30   2.50     7.30      1.664          0.148    (  0.493)        1.517
31   2.58     8.20      1.869          0.148    (  0.553)        1.722
32   2.67     5.90      1.345          0.148    (  0.398)        1.197
33   2.75     2.00      0.456       (  0.148)       0.135        0.321
34   2.83     1.80      0.410       (  0.148)       0.121        0.289
35   2.92     1.80      0.410       (  0.148)       0.121        0.289
36   3.00     0.60      0.137       (  0.148)       0.040        0.096
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.2
    Flood volume = Effective rainfall      1.52(In)
     times area      32.8(Ac.)/[(In)/(Ft.)] =       4.1(Ac.Ft)
    Total soil loss =      0.38(In)
    Total soil loss =     1.050(Ac.Ft)
    Total rainfall =      1.90(In)
    Flood volume =      180722.9 Cubic Feet
    Total soil loss =       45742.0 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     48.987(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
---------------------------------------------------------------------
  0+ 5       0.0136      1.98  VQ        |         |         |         |
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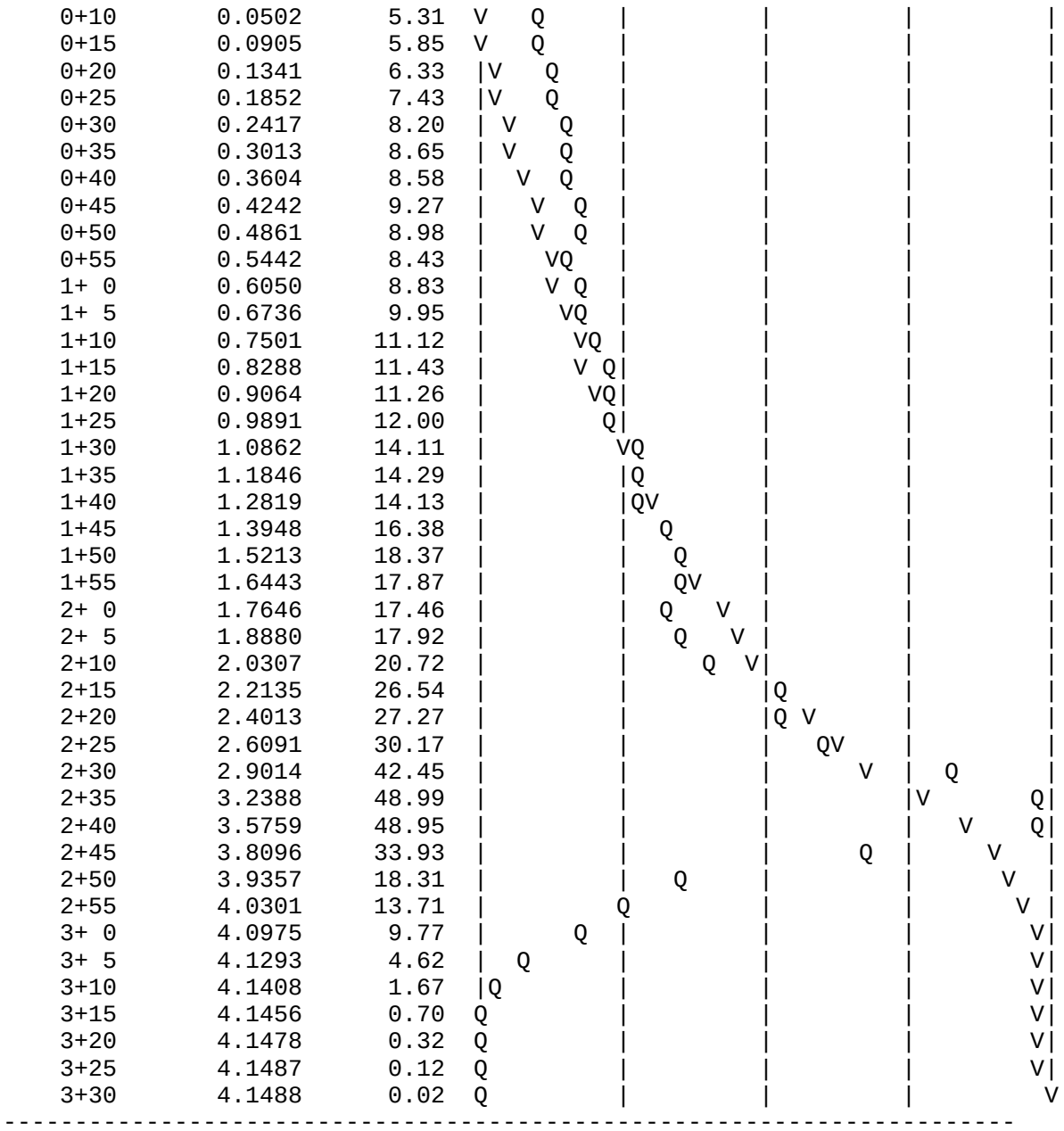
0+10 0.0502 5.31
0+15 0.0905 5.85
0+20 0.1341 6.33
0+25 0.1852 7.43
0+30 0.2417 8.20
0+35 0.3013 8.65
0+40 0.3604 8.58
0+45 0.4242 9.27
0+50 0.4861 8.98
0+55 0.5442 8.43
1+ 0 0.6050 8.83
1+ 5 0.6736 9.95
1+10 0.7501 11.12
1+15 0.8288 11.43
1+20 0.9064 11.26
1+25 0.9891 12.00
1+30 1.0862 14.11
1+35 1.1846 14.29
1+40 1.2819 14.13
1+45 1.3948 16.38
1+50 1.5213 18.37
1+55 1.6443 17.87
2+ 0 1.7646 17.46
2+ 5 1.8880 17.92
2+10 2.0307 20.72
2+15 2.2135 26.54
2+20 2.4013 27.27
2+25 2.6091 30.17
2+30 2.9014 42.45
2+35 3.2388 48.99
2+40 3.5759 48.95
2+45 3.8096 33.93
2+50 3.9357 18.31
2+55 4.0301 13.71
3+ 0 4.0975 9.77
3+ 5 4.1293 4.62
3+10 4.1408 1.67
3+15 4.1456 0.70
3+20 4.1478 0.32
3+25 4.1487 0.12
3+30 4.1488 0.02

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: 100pquhb3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION WATERSHED B
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 30.51(Ac.) = 0.048 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.51(Ac.) = 0.048 Sq. Mi.
Length along longest watercourse = 2861.00(Ft.)
Length along longest watercourse measured to centroid = 2131.00(Ft.)
Length along longest watercourse = 0.542 Mi.
Length along longest watercourse measured to centroid = 0.404 Mi.
Difference in elevation = 26.97(Ft.)
Slope along watercourse = 49.7734 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.096 Hr.
Lag time = 5.77 Min.
25% of lag time = 1.44 Min.
40% of lag time = 2.31 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	0.80	24.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	1.90	57.97

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.510	62.10	0.835

Total Area Entered = 30.51(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.1	62.1	0.447	0.835	0.111	1.000	0.111
					Sum (F) =	0.111

Area averaged mean soil loss (F) (In/Hr) = 0.111
Minimum soil loss rate ((In/Hr)) = 0.056
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.232

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	86.658	15.197	4.673
2	0.167	173.316	46.362	14.256
3	0.250	259.974	18.174	5.588
4	0.333	346.632	7.832	2.408
5	0.417	433.290	4.614	1.419
6	0.500	519.948	2.896	0.891
7	0.583	606.606	2.040	0.627
8	0.667	693.264	1.339	0.412
9	0.750	779.923	0.910	0.280
10	0.833	866.581	0.634	0.195
			Sum = 100.000	Sum= 30.748

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	1.30	0.296	(0.111)		0.069	0.228
2	0.17	1.30	0.296	(0.111)		0.069	0.228
3	0.25	1.10	0.251	(0.111)		0.058	0.193
4	0.33	1.50	0.342	(0.111)		0.079	0.263
5	0.42	1.50	0.342	(0.111)		0.079	0.263
6	0.50	1.80	0.410	(0.111)		0.095	0.315
7	0.58	1.50	0.342	(0.111)		0.079	0.263
8	0.67	1.80	0.410	(0.111)		0.095	0.315
9	0.75	1.80	0.410	(0.111)		0.095	0.315
10	0.83	1.50	0.342	(0.111)		0.079	0.263
11	0.92	1.60	0.365	(0.111)		0.085	0.280
12	1.00	1.80	0.410	(0.111)		0.095	0.315
13	1.08	2.20	0.502	0.111	(	0.116)	0.390
14	1.17	2.20	0.502	0.111	(	0.116)	0.390
15	1.25	2.20	0.502	0.111	(	0.116)	0.390
16	1.33	2.00	0.456	(0.111)		0.106	0.350
17	1.42	2.60	0.593	0.111	(	0.138)	0.482
18	1.50	2.70	0.616	0.111	(	0.143)	0.504
19	1.58	2.40	0.547	0.111	(	0.127)	0.436
20	1.67	2.70	0.616	0.111	(	0.143)	0.504
21	1.75	3.30	0.752	0.111	(	0.175)	0.641
22	1.83	3.10	0.707	0.111	(	0.164)	0.596
23	1.92	2.90	0.661	0.111	(	0.153)	0.550
24	2.00	3.00	0.684	0.111	(	0.159)	0.573
25	2.08	3.10	0.707	0.111	(	0.164)	0.596
26	2.17	4.20	0.957	0.111	(	0.222)	0.846
27	2.25	5.00	1.140	0.111	(	0.264)	1.029
28	2.33	3.50	0.798	0.111	(	0.185)	0.687
29	2.42	6.80	1.550	0.111	(	0.360)	1.439
30	2.50	7.30	1.664	0.111	(	0.386)	1.553
31	2.58	8.20	1.869	0.111	(	0.434)	1.758
32	2.67	5.90	1.345	0.111	(	0.312)	1.234
33	2.75	2.00	0.456	(0.111)		0.106	0.350
34	2.83	1.80	0.410	(0.111)		0.095	0.315
35	2.92	1.80	0.410	(0.111)		0.095	0.315
36	3.00	0.60	0.137	(0.111)		0.032	0.105

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.3

Flood volume = Effective rainfall 1.61(In)
times area 30.5(Ac.)/[(In)/(Ft.)] = 4.1(Ac.Ft)
Total soil loss = 0.29(In)
Total soil loss = 0.747(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 177874.0 Cubic Feet
Total soil loss = 32525.4 Cubic Feet

Peak flow rate of this hydrograph = 45.932(CFS)

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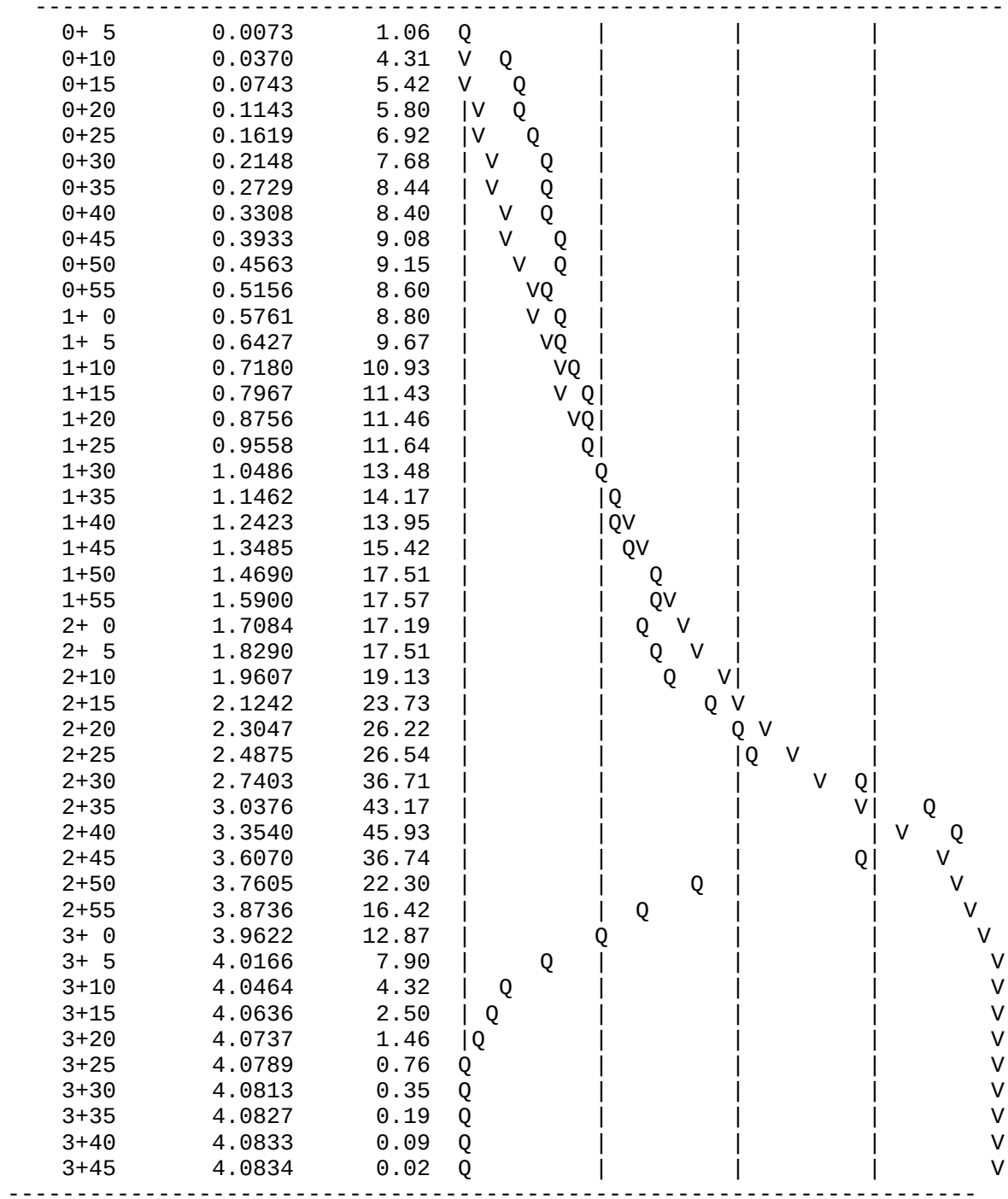
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m) Volume Ac.Ft Q(CFS) 0 12.5 25.0 37.5 50.0



U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED A
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 33.45(Ac.) = 0.052 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 33.45(Ac.) = 0.052 Sq. Mi.
Length along longest watercourse = 1351.00(Ft.)
Length along longest watercourse measured to centroid = 643.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.50(Ft.)
Slope along watercourse = 52.7609 Ft./Mi.
Average Manning's 'N' = 0.024
Lag time = 0.073 Hr.
Lag time = 4.35 Min.
25% of lag time = 1.09 Min.
40% of lag time = 1.74 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

33.45 0.50 16.73

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
33.45	1.12	37.46

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
33.450	61.30	0.500

Total Area Entered = 33.45(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	114.833	23.683	7.984
2	0.167	229.667	48.833	16.462
3	0.250	344.500	13.786	4.647
4	0.333	459.334	6.296	2.122
5	0.417	574.167	3.503	1.181
6	0.500	689.000	2.103	0.709
7	0.583	803.834	1.796	0.605
		Sum = 100.000	Sum=	33.711

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

```
     (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
 1   0.08     4.20      0.564          0.251    (  0.282)        0.314
 2   0.17     4.30      0.578          0.251    (  0.289)        0.327
 3   0.25     5.00      0.672          0.251    (  0.336)        0.421
 4   0.33     5.00      0.672          0.251    (  0.336)        0.421
 5   0.42     5.80      0.779          0.251    (  0.390)        0.529
 6   0.50     6.50      0.873          0.251    (  0.437)        0.623
 7   0.58     7.40      0.994          0.251    (  0.497)        0.743
 8   0.67     8.60      1.155          0.251    (  0.578)        0.905
 9   0.75    12.30      1.653          0.251    (  0.826)        1.402
10   0.83    29.10      3.910          0.251    (  1.955)        3.659
11   0.92     6.80      0.914          0.251    (  0.457)        0.663
12   1.00     5.00      0.672          0.251    (  0.336)        0.421
           (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    10.4
    Flood volume = Effective rainfall      0.87(In)
     times area      33.5(Ac.)/[(In)/(Ft.)] =       2.4(Ac.Ft)
    Total soil loss =      0.25(In)
    Total soil loss =     0.699(Ac.Ft)
    Total rainfall =      1.12(In)
    Flood volume =      105502.8 Cubic Feet
    Total soil loss =       30450.3 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     75.642(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        1 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0       20.0      40.0      60.0      80.0
 ----------------------------------------------------------------------
   0+ 5       0.0172      2.50  VQ        |         |         |         |
   0+10       0.0708      7.78  |V Q      |         |         |         |
   0+15       0.1411     10.21  | V  Q    |         |         |         |
   0+20       0.2271     12.48  |  V  Q   |         |         |         |
   0+25       0.3247     14.18  |    V Q  |         |         |         |
   0+30       0.4427     17.14  |      VQ |         |         |         |
   0+35       0.5837     20.46  |        VQ         |         |         |
   0+40       0.7523     24.48  |         | Q       |         |         |
   0+45       0.9731     32.06  |         |     Q   |         |         |
   0+50       1.3826     59.47  |         |         | V      Q|         |
   0+55       1.9036     75.64  |         |         |         |V     Q  |
   1+ 0       2.1532     36.25  |         |       Q |         |    V    |
   1+ 5       2.2946     20.54  |         Q         |         |      V  |
   1+10       2.3582      9.23  |   Q     |         |         |       V |
   1+15       2.3935      5.12  | Q       |         |         |        V|
   1+20       2.4154      3.18  |Q        |         |         |        V|
   1+25       2.4203      0.70  Q         |         |         |        V|
   1+30       2.4220      0.26  Q         |         |         |         V
----------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: qbuh1001100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION WATERSHED B
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 29.54(Ac.) = 0.046 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 29.54(Ac.) = 0.046 Sq. Mi.
Length along longest watercourse = 1353.00(Ft.)
Length along longest watercourse measured to centroid = 881.00(Ft.)
Length along longest watercourse = 0.256 Mi.
Length along longest watercourse measured to centroid = 0.167 Mi.
Difference in elevation = 17.20(Ft.)
Slope along watercourse = 67.1220 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.098 Hr.
Lag time = 5.86 Min.
25% of lag time = 1.47 Min.
40% of lag time = 2.35 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

```
       29.54              0.50                    14.77

 100 YEAR Area rainfall data:


 Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       29.54              1.12                    33.08

 STORM EVENT (YEAR) =  100.00
 Area Averaged 2-Year Rainfall =    0.500(In)
 Area Averaged 100-Year Rainfall =    1.120(In)

 Point rain (area averaged) =    1.120(In)
 Areal adjustment factor =   99.97 %
 Adjusted average point rain =    1.120(In)

 Sub-Area Data:
 Area(Ac.)         Runoff Index   Impervious %
     29.540           61.60         0.500
  Total Area Entered =     29.54(Ac.)


 RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
 AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
 61.6  61.6      0.453     0.500        0.249       1.000      0.249
                                                    Sum (F) =   0.249
 Area averaged mean soil loss (F) (In/Hr) =  0.249
 Minimum soil loss rate ((In/Hr)) =  0.124
 (for 24 hour storm duration)
 Soil low loss rate (decimal) =   0.500
 ------------------------------------------------------------------------
 Slope of intensity-duration curve for a 1 hour storm =0.5000
 ------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                   VALLEY S-Curve
 ------------------------------------------------------------------------
             Unit Hydrograph Data
 ------------------------------------------------------------------------
 Unit time period   Time % of lag   Distribution   Unit Hydrograph
     (hrs)                          Graph %           (CFS)
 ------------------------------------------------------------------------
     1   0.083         85.272         14.796             4.405
     2   0.167        170.545         46.014            13.699
     3   0.250        255.817         18.512             5.511
     4   0.333        341.089          7.912             2.356
     5   0.417        426.362          4.692             1.397
     6   0.500        511.634          2.929             0.872
     7   0.583        596.907          2.085             0.621
     8   0.667        682.179          1.387             0.413
     9   0.750        767.451          0.919             0.274
    10   0.833        852.724          0.752             0.224
                                Sum = 100.000   Sum=      29.771
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
```

rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.564	0.249	(0.282)	0.315
2	0.17	4.30	0.578	0.249	(0.289)	0.329
3	0.25	5.00	0.672	0.249	(0.336)	0.423
4	0.33	5.00	0.672	0.249	(0.336)	0.423
5	0.42	5.80	0.779	0.249	(0.390)	0.530
6	0.50	6.50	0.873	0.249	(0.437)	0.624
7	0.58	7.40	0.994	0.249	(0.497)	0.745
8	0.67	8.60	1.156	0.249	(0.578)	0.907
9	0.75	12.30	1.653	0.249	(0.826)	1.404
10	0.83	29.10	3.910	0.249	(1.955)	3.661
11	0.92	6.80	0.914	0.249	(0.457)	0.665
12	1.00	5.00	0.672	0.249	(0.336)	0.423

(Loss Rate Not Used)

Sum = 100.0 Sum = 10.4

Flood volume = Effective rainfall 0.87(In)
times area 29.5(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.25(In)
Total soil loss = 0.613(Ac.Ft)
Total rainfall = 1.12(In)
Flood volume = 93365.8 Cubic Feet
Total soil loss = 26699.9 Cubic Feet

Peak flow rate of this hydrograph = 65.263(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 17.5 35.0 52.5 70.0
0+ 5	0.0096	1.39	Q | | | |
0+10	0.0493	5.77	V Q | | | |
0+15	0.1052	8.11	|V Q | | | |
0+20	0.1755	10.21	| V Q | | | |
0+25	0.2559	11.68	| V Q | | | |
0+30	0.3529	14.08	| V Q | | | |
0+35	0.4689	16.84	| VQ| | | |
0+40	0.6080	20.20	| |Q | | |
0+45	0.7856	25.79	| | Q | | |
0+50	1.0890	44.06	| | V Q | |
0+55	1.5385	65.26	| | | V | Q |
1+ 0	1.7947	37.20	| | |Q | V |
1+ 5	1.9449	21.80	| | Q | | V |
1+10	2.0234	11.40	| Q | | | V |
1+15	2.0696	6.71	| Q | | | V |
1+20	2.1002	4.44	| Q | | | V|
1+25	2.1200	2.88	|Q | | | V|
1+30	2.1328	1.85	|Q | | | V|
1+35	2.1409	1.18	Q | | | V|
1+40	2.1427	0.26	Q | | | V|

```
    1+45       2.1434      0.09  Q         |         |         |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION WATERSHED A
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 32.84(Ac.) = 0.051 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 32.84(Ac.) = 0.051 Sq. Mi.
Length along longest watercourse = 1812.00(Ft.)
Length along longest watercourse measured to centroid = 1348.00(Ft.)
Length along longest watercourse = 0.343 Mi.
Length along longest watercourse measured to centroid = 0.255 Mi.
Difference in elevation = 25.30(Ft.)
Slope along watercourse = 73.7219 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.063 Hr.
Lag time = 3.78 Min.
25% of lag time = 0.95 Min.
40% of lag time = 1.51 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]

32.84 0.50 16.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
32.84	1.12	36.78

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
32.840	60.90	0.755

Total Area Entered = 32.84(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.9	60.9	0.460	0.755	0.148	1.000	0.148
					Sum (F) =	0.148

Area averaged mean soil loss (F) (In/Hr) = 0.148
Minimum soil loss rate ((In/Hr)) = 0.074
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.296

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	132.184	28.615	9.471
2	0.167	264.368	48.175	15.944
3	0.250	396.552	12.342	4.085
4	0.333	528.736	5.500	1.820
5	0.417	660.920	3.010	0.996
6	0.500	793.104	1.628	0.539
7	0.583	925.288	0.730	0.242
			Sum = 100.000	Sum= 33.097

Storm Event 5 Effective Rainfall = 0.112(In)

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	4.20	0.056	(0.148)		0.017	0.040
2	0.17	4.30	0.058	(0.148)		0.017	0.041
3	0.25	5.00	0.067	(0.148)		0.020	0.047
4	0.33	5.00	0.067	(0.148)		0.020	0.047
5	0.42	5.80	0.078	(0.148)		0.023	0.055
6	0.50	6.50	0.087	(0.148)		0.026	0.061
7	0.58	7.40	0.099	(0.148)		0.029	0.070
8	0.67	8.60	0.116	(0.148)		0.034	0.081
9	0.75	12.30	0.165	(0.148)		0.049	0.116
10	0.83	29.10	0.391	(0.148)		0.116	0.275
11	0.92	6.80	0.091	(0.148)		0.027	0.064
12	1.00	5.00	0.067	(0.148)		0.020	0.047

(Loss Rate Not Used)

Sum = 100.0 Sum = 0.9

Flood volume = Effective rainfall 0.08(In)
times area 32.8(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.03(In)
Total soil loss = 0.091(Ac.Ft)
Total rainfall = 0.11(In)
Flood volume = 9396.6 Cubic Feet
Total soil loss = 3950.8 Cubic Feet

Storm Event 4 Effective Rainfall = 0.168(In)

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	4.20	0.085	(0.148)		0.025	0.060
2	0.17	4.30	0.087	(0.148)		0.026	0.061
3	0.25	5.00	0.101	(0.148)		0.030	0.071
4	0.33	5.00	0.101	(0.148)		0.030	0.071
5	0.42	5.80	0.117	(0.148)		0.035	0.082
6	0.50	6.50	0.131	(0.148)		0.039	0.092
7	0.58	7.40	0.149	(0.148)		0.044	0.105
8	0.67	8.60	0.173	(0.148)		0.051	0.122
9	0.75	12.30	0.248	(0.148)		0.073	0.175
10	0.83	29.10	0.586	0.148	(	0.174)	0.439
11	0.92	6.80	0.137	(0.148)		0.041	0.096
12	1.00	5.00	0.101	(0.148)		0.030	0.071

(Loss Rate Not Used)

Sum = 100.0 Sum = 1.4

Flood volume = Effective rainfall 0.12(In)
times area 32.8(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.05(In)
Total soil loss = 0.130(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 14354.0 Cubic Feet
Total soil loss = 5667.2 Cubic Feet

Storm Event 3 Effective Rainfall = 0.213(In)

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	4.20	0.107	(0.148)		0.032	0.075
2	0.17	4.30	0.110	(0.148)		0.032	0.077
3	0.25	5.00	0.128	(0.148)		0.038	0.090
4	0.33	5.00	0.128	(0.148)		0.038	0.090
5	0.42	5.80	0.148	(0.148)		0.044	0.104
6	0.50	6.50	0.166	(0.148)		0.049	0.117
7	0.58	7.40	0.189	(0.148)		0.056	0.133
8	0.67	8.60	0.220	(0.148)		0.065	0.155
9	0.75	12.30	0.314	(0.148)		0.093	0.221
10	0.83	29.10	0.743	0.148	(	0.220)	0.595
11	0.92	6.80	0.174	(0.148)		0.051	0.122
12	1.00	5.00	0.128	(0.148)		0.038	0.090

(Loss Rate Not Used)

Sum = 100.0 Sum = 1.9

Flood volume = Effective rainfall 0.16(In)
times area 32.8(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.06(In)
Total soil loss = 0.156(Ac.Ft)
Total rainfall = 0.21(In)
Flood volume = 18572.5 Cubic Feet
Total soil loss = 6787.7 Cubic Feet

Storm Event 2 Effective Rainfall = 0.403(In)

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	4.20	0.203	(0.148)		0.060	0.143
2	0.17	4.30	0.208	(0.148)		0.062	0.146
3	0.25	5.00	0.242	(0.148)		0.072	0.170
4	0.33	5.00	0.242	(0.148)		0.072	0.170
5	0.42	5.80	0.281	(0.148)		0.083	0.198
6	0.50	6.50	0.314	(0.148)		0.093	0.221
7	0.58	7.40	0.358	(0.148)		0.106	0.252
8	0.67	8.60	0.416	(0.148)		0.123	0.293
9	0.75	12.30	0.595	0.148	(	0.176)	0.447
10	0.83	29.10	1.408	0.148	(	0.417)	1.260
11	0.92	6.80	0.329	(0.148)		0.097	0.232
12	1.00	5.00	0.242	(0.148)		0.072	0.170

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.7

Flood volume = Effective rainfall 0.31(In)
times area 32.8(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 0.09(In)
Total soil loss = 0.259(Ac.Ft)
Total rainfall = 0.40(In)

```
     Flood volume =       36785.2 Cubic Feet
     Total soil loss =       11265.7 Cubic Feet
---------------------------------------------------------------------
         Storm Event 1   Effective Rainfall =   1.120(In)
---------------------------------------------------------------------
```

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.564	0.148	(0.167)	0.417
2	0.17	4.30	0.578	0.148	(0.171)	0.430
3	0.25	5.00	0.672	0.148	(0.199)	0.524
4	0.33	5.00	0.672	0.148	(0.199)	0.524
5	0.42	5.80	0.779	0.148	(0.231)	0.632
6	0.50	6.50	0.873	0.148	(0.259)	0.726
7	0.58	7.40	0.994	0.148	(0.294)	0.847
8	0.67	8.60	1.155	0.148	(0.342)	1.008
9	0.75	12.30	1.653	0.148	(0.489)	1.505
10	0.83	29.10	3.910	0.148	(1.157)	3.762
11	0.92	6.80	0.914	0.148	(0.270)	0.766
12	1.00	5.00	0.672	0.148	(0.199)	0.524
	(Loss Rate Not Used)					
Sum =		100.0			Sum =	11.7

```
     Flood volume = Effective rainfall      0.97(In)
      times area      32.8(Ac.)/[(In)/(Ft.)] =       2.7(Ac.Ft)
     Total soil loss =      0.15(In)
     Total soil loss =     0.404(Ac.Ft)
     Total rainfall =      1.12(In)
     Flood volume =      115888.9 Cubic Feet
     Total soil loss =       17585.7 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     76.654(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
       TOTAL OF: 5       1 - H O U R    S T O R M  E V E N T S
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0026	0.38	Q	|	|	|	|
0+10	0.0096	1.02	Q	|	|	|	|
0+15	0.0183	1.26	Q	|	|	|	|
0+20	0.0282	1.44	Q	|	|	|	|
0+25	0.0391	1.58	Q	|	|	|	|
0+30	0.0515	1.80	Q	|	|	|	|
0+35	0.0655	2.03	VQ	|	|	|	|
0+40	0.0815	2.32	VQ	|	|	|	|
0+45	0.1014	2.89	VQ	|	|	|	|
0+50	0.1360	5.03	|VQ	|	|	|	|
0+55	0.1755	5.74	|VQ	|	|	|	|
1+ 0	0.1958	2.94	|Q	|	|	|	|
1+ 5	0.1997	0.56	QV	|	|	|	|

```
1+10       0.2102      1.53  QV        |         |         |         |
1+15       0.2232      1.89  Q V       |         |         |         |
1+20       0.2381      2.16  |QV       |         |         |         |
1+25       0.2545      2.37  |QV       |         |         |         |
1+30       0.2730      2.70  |QV       |         |         |         |
1+35       0.2941      3.05  |QV       |         |         |         |
1+40       0.3180      3.48  |QV       |         |         |         |
1+45       0.3479      4.33  | QV      |         |         |         |
1+50       0.4015      7.79  |  Q      |         |         |         |
1+55       0.4637      9.03  |   Q     |         |         |         |
2+ 0       0.4948      4.52  | Q V     |         |         |         |
2+ 5       0.4998      0.72  Q   V     |         |         |         |
2+10       0.5131      1.94  Q   V     |         |         |         |
2+15       0.5296      2.39  |Q  V     |         |         |         |
2+20       0.5484      2.74  |Q   V    |         |         |         |
2+25       0.5691      3.00  |Q   V    |         |         |         |
2+30       0.5927      3.42  |Q   V    |         |         |         |
2+35       0.6193      3.86  |Q   V    |         |         |         |
2+40       0.6496      4.41  | Q   V   |         |         |         |
2+45       0.6875      5.49  | Q   V   |         |         |         |
2+50       0.7579     10.24  |    Q V  |         |         |         |
2+55       0.8410     12.06  |     QV  |         |         |         |
3+ 0       0.8816      5.89  | Q     V |         |         |         |
3+ 5       0.8909      1.36  Q       V |         |         |         |
3+10       0.9162      3.67  |Q      V |         |         |         |
3+15       0.9474      4.53  | Q     V |         |         |         |
3+20       0.9831      5.19  | Q      V|
```

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 10/02/24 File: 100pquhb1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPSOED CONDITION WATERSHED B
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 30.51(Ac.) = 0.048 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.51(Ac.) = 0.048 Sq. Mi.
Length along longest watercourse = 2861.00(Ft.)
Length along longest watercourse measured to centroid = 2131.00(Ft.)
Length along longest watercourse = 0.542 Mi.
Length along longest watercourse measured to centroid = 0.404 Mi.
Difference in elevation = 26.97(Ft.)
Slope along watercourse = 49.7734 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.096 Hr.
Lag time = 5.77 Min.
25% of lag time = 1.44 Min.
40% of lag time = 2.31 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	0.50	15.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.51	1.12	34.17

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.510	62.10	0.835

Total Area Entered = 30.51(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.1	62.1	0.447	0.835	0.111	1.000	0.111
					Sum (F) =	0.111

Area averaged mean soil loss (F) (In/Hr) = 0.111
Minimum soil loss rate ((In/Hr)) = 0.056
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.232

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	86.658	15.197	4.673
2	0.167	173.316	46.362	14.256
3	0.250	259.974	18.174	5.588
4	0.333	346.632	7.832	2.408
5	0.417	433.290	4.614	1.419
6	0.500	519.948	2.896	0.891
7	0.583	606.606	2.040	0.627
8	0.667	693.264	1.339	0.412
9	0.750	779.923	0.910	0.280
10	0.833	866.581	0.634	0.195
		Sum = 100.000	Sum=	30.748

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.564	0.111	(0.131)	0.453
2	0.17	4.30	0.578	0.111	(0.134)	0.467
3	0.25	5.00	0.672	0.111	(0.156)	0.561
4	0.33	5.00	0.672	0.111	(0.156)	0.561
5	0.42	5.80	0.779	0.111	(0.181)	0.668
6	0.50	6.50	0.873	0.111	(0.203)	0.762
7	0.58	7.40	0.994	0.111	(0.231)	0.883
8	0.67	8.60	1.156	0.111	(0.268)	1.044
9	0.75	12.30	1.653	0.111	(0.383)	1.542
10	0.83	29.10	3.910	0.111	(0.907)	3.799
11	0.92	6.80	0.914	0.111	(0.212)	0.803
12	1.00	5.00	0.672	0.111	(0.156)	0.561

(Loss Rate Not Used)

Sum = 100.0 Sum = 12.1

Flood volume = Effective rainfall 1.01(In)
times area 30.5(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.283(Ac.Ft)
Total rainfall = 1.12(In)
Flood volume = 111696.2 Cubic Feet
Total soil loss = 12311.0 Cubic Feet

Peak flow rate of this hydrograph = 71.901(CFS)

++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 20.0 40.0 60.0 80.0
0+ 5	0.0146	2.12	VQ | | | |
0+10	0.0741	8.65	|V Q | | | |
0+15	0.1555	11.81	| V Q | | | |
0+20	0.2541	14.32	| V Q | | | |
0+25	0.3644	16.02	| V Q | | | |
0+30	0.4928	18.65	| V Q| | | |
0+35	0.6415	21.58	| Q | | |
0+40	0.8145	25.13	| | Q | | |
0+45	1.0280	31.00	| | QV | | |
0+50	1.3737	50.19	| | |V Q | |
0+55	1.8689	71.90	| | | V| Q |
1+ 0	2.1603	42.31	| | |Q | V |
1+ 5	2.3388	25.92	| | Q | | V |
1+10	2.4297	13.20	| Q | | | V |
1+15	2.4825	7.67	| Q | | | V |
1+20	2.5169	4.99	| Q | | | V|
1+25	2.5389	3.20	|Q | | | V|
1+30	2.5530	2.05	|Q | | | V|
1+35	2.5613	1.20	Q | | | V|
1+40	2.5634	0.31	Q | | | V|
1+45	2.5642	0.11	Q | | | V|

SECTION 3 - REFERENCE DATA

USGS SOILS REPORT

PLATE D-4.1

INFILTRATION REPORT (EXCERPT)

CONTECH UNDERGROUND CHAMBER SYSTEM

DCV CALCULATIONS (WQMP)

PP190005 – HARVILL DISTRIBUTION CENTER OFFSITE DRAINAGE IMPROVEMENTS (HYDROLOGY MAPS)

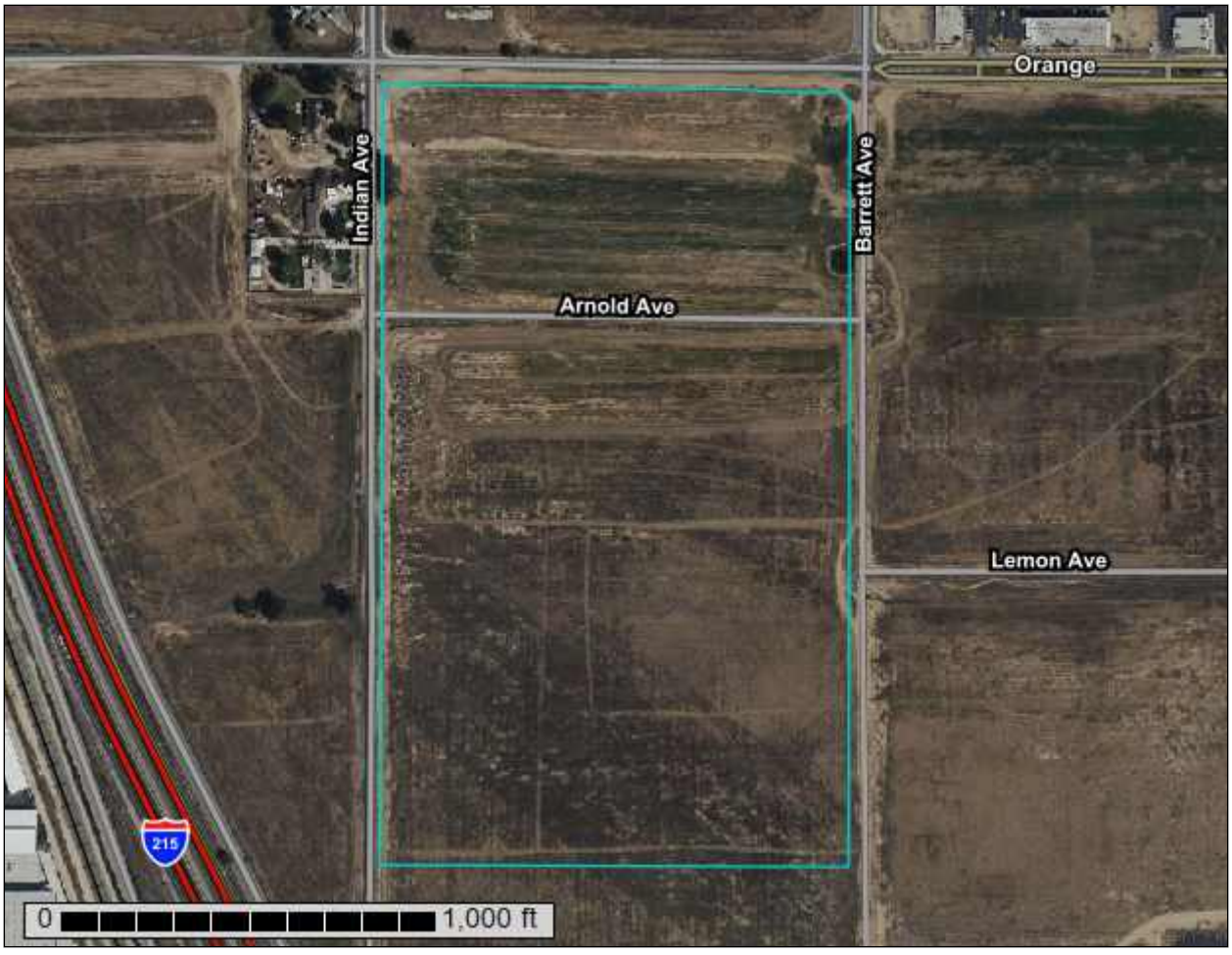
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California



October 1, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,710 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 17, Aug 30, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EpA	Exeter sandy loam, deep, 0 to 2 percent slopes	22.1	37.2%
EpC2	Exeter sandy loam, deep, 2 to 8 percent slopes, eroded	1.5	2.6%
PaA	Pachappa fine sandy loam, 0 to 2 percent slopes	35.7	60.2%
Totals for Area of Interest		**59.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

EpA—Exeter sandy loam, deep, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hctk
Elevation: 300 to 700 feet
Mean annual precipitation: 7 to 15 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Exeter and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exeter

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 16 inches: sandy loam
H2 - 16 to 37 inches: sandy clay loam
H3 - 37 to 50 inches: indurated
H4 - 50 to 60 inches: stratified sandy loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 35 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Greenfield
Percent of map unit: 5 percent
Hydric soil rating: No

Ramona
Percent of map unit: 5 percent
Hydric soil rating: No

Monserate
Percent of map unit: 5 percent
Hydric soil rating: No

EpC2—Exeter sandy loam, deep, 2 to 8 percent slopes, eroded

Map Unit Setting
National map unit symbol: hctl
Elevation: 300 to 700 feet
Mean annual precipitation: 7 to 15 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Exeter and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exeter

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 16 inches: sandy loam
H2 - 16 to 37 inches: sandy clay loam
H3 - 37 to 50 inches: indurated
H4 - 50 to 60 inches: stratified sandy loam to silt loam

Properties and qualities
Slope: 2 to 8 percent
Depth to restrictive feature: 35 to 60 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

Monserate

Percent of map unit: 5 percent
Hydric soil rating: No

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

PaA—Pachappa fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hcxn
Elevation: 1,000 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pachappa and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pachappa

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 20 inches: fine sandy loam
H2 - 20 to 63 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

San emigdio

Percent of map unit: 5 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map Scale: 1:3,710 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 17, Aug 30, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EpA	Exeter sandy loam, deep, 0 to 2 percent slopes	C	22.1	37.2%
EpC2	Exeter sandy loam, deep, 2 to 8 percent slopes, eroded	C	1.5	2.6%
PaA	Pachappa fine sandy loam, 0 to 2 percent slopes	B	35.7	60.2%
Totals for Area of Interest			**59.4**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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RAINFALL INTENSITY–INCHES PER HOUR

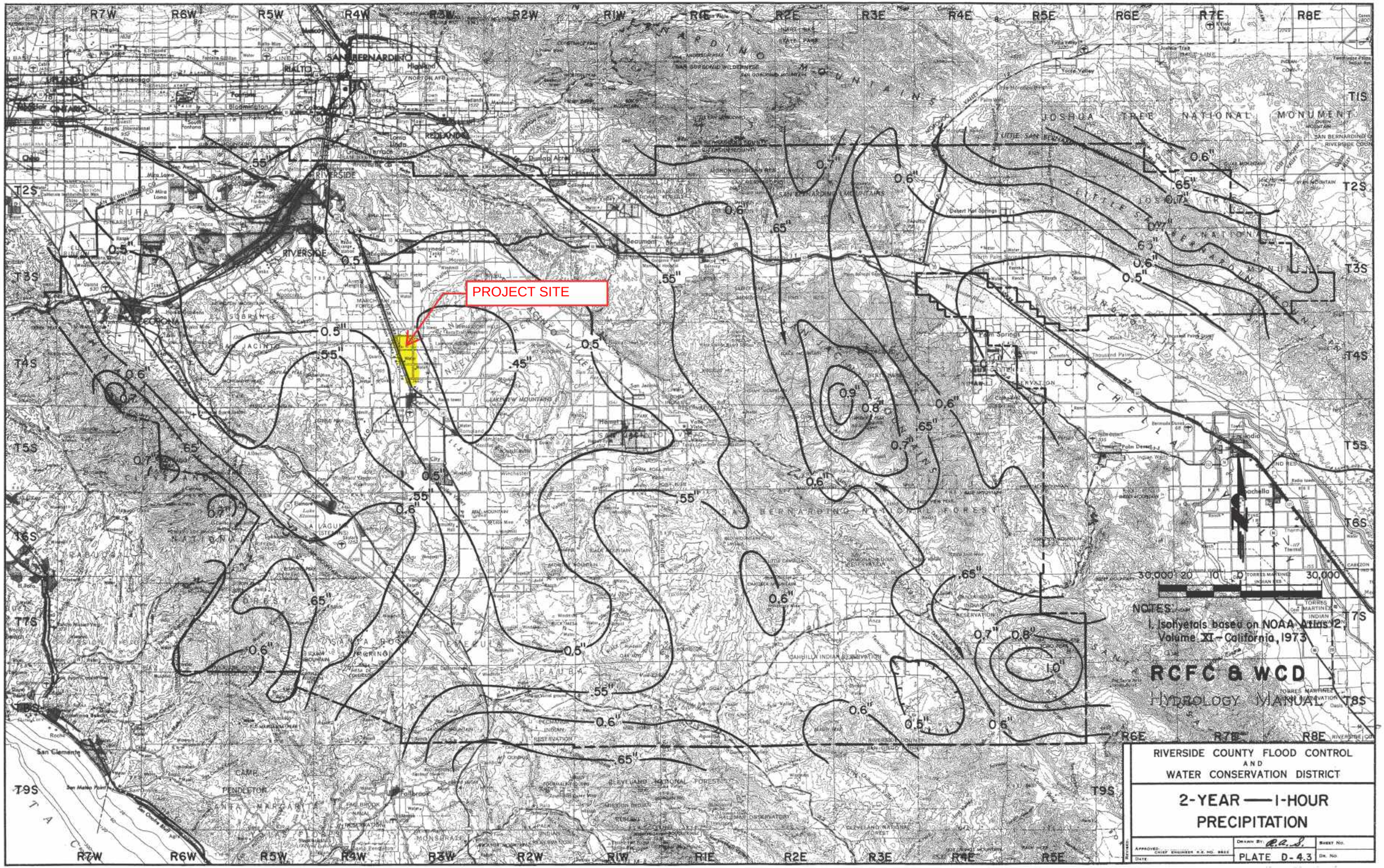
MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.48	5	3.45	5.10	5	2.77	4.16	5	4.23	6.76	5	2.64	3.78
6	2.58	4.07	6	3.12	4.61	6	2.53	3.79	6	3.80	6.08	6	2.41	3.46
7	2.37	3.75	7	2.87	4.24	7	2.34	3.51	7	3.48	5.56	7	2.24	3.21
8	2.21	3.49	8	2.67	3.94	8	2.19	3.29	8	3.22	5.15	8	2.09	3.01
9	2.08	3.28	9	2.50	3.69	9	2.07	3.10	9	3.01	4.81	9	1.98	2.84
10	1.96	3.10	10	2.36	3.48	10	1.96	2.94	10	2.83	4.52	10	1.88	2.69
11	1.87	2.95	11	2.24	3.30	11	1.87	2.80	11	2.67	4.28	11	1.79	2.57
12	1.78	2.82	12	2.13	3.15	12	1.79	2.68	12	2.54	4.07	12	1.72	2.46
13	1.71	2.70	13	2.04	3.01	13	1.72	2.58	13	2.43	3.88	13	1.65	2.37
14	1.64	2.60	14	1.96	2.89	14	1.66	2.48	14	2.33	3.72	14	1.59	2.29
15	1.58	2.50	15	1.89	2.79	15	1.60	2.40	15	2.23	3.58	15	1.54	2.21
16	1.53	2.42	16	1.82	2.69	16	1.55	2.32	16	2.15	3.44	16	1.49	2.14
17	1.48	2.34	17	1.76	2.60	17	1.50	2.25	17	2.08	3.32	17	1.45	2.08
18	1.44	2.27	18	1.71	2.52	18	1.46	2.19	18	2.01	3.22	18	1.41	2.02
19	1.40	2.21	19	1.66	2.45	19	1.42	2.13	19	1.95	3.12	19	1.37	1.97
20	1.36	2.15	20	1.61	2.38	20	1.39	2.08	20	1.89	3.03	20	1.34	1.92
22	1.29	2.04	22	1.53	2.26	22	1.32	1.98	22	1.79	2.86	22	1.28	1.83
24	1.24	1.95	24	1.46	2.15	24	1.26	1.90	24	1.70	2.72	24	1.22	1.75
26	1.18	1.87	26	1.39	2.06	26	1.22	1.82	26	1.62	2.60	26	1.18	1.69
28	1.14	1.80	28	1.34	1.98	28	1.17	1.76	28	1.56	2.49	28	1.13	1.63
30	1.10	1.73	30	1.29	1.90	30	1.13	1.70	30	1.49	2.39	30	1.10	1.57
32	1.06	1.67	32	1.24	1.84	32	1.10	1.64	32	1.44	2.30	32	1.06	1.52
34	1.03	1.62	34	1.20	1.78	34	1.06	1.59	34	1.39	2.22	34	1.03	1.48
36	1.00	1.57	36	1.17	1.72	36	1.03	1.55	36	1.34	2.15	36	1.00	1.44
38	.97	1.53	38	1.13	1.67	38	1.01	1.51	38	1.30	2.09	38	.98	1.40
40	.94	1.49	40	1.10	1.62	40	.98	1.47	40	1.27	2.02	40	.95	1.37
45	.89	1.40	45	1.03	1.52	45	.92	1.39	45	1.18	1.89	45	.90	1.29
50	.84	1.32	50	.97	1.44	50	.88	1.31	50	1.11	1.78	50	.85	1.22
55	.80	1.26	55	.92	1.36	55	.84	1.25	55	1.05	1.68	55	.81	1.17
60	.76	1.20	60	.88	1.30	60	.80	1.20	60	1.00	1.60	60	.78	1.12
65	.73	1.15	65	.84	1.24	65	.77	1.15	65	.95	1.53	65	.75	1.08
70	.70	1.11	70	.81	1.19	70	.74	1.11	70	.91	1.46	70	.72	1.04
75	.68	1.07	75	.78	1.15	75	.72	1.07	75	.88	1.41	75	.70	1.00
80	.65	1.03	80	.75	1.11	80	.69	1.04	80	.85	1.35	80	.68	.97
85	.63	1.00	85	.73	1.07	85	.67	1.01	85	.82	1.31	85	.66	.94
SLOPE = .530			SLOPE = .550			SLOPE = .500			SLOPE = .580			SLOPE = .490		

RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY–DURATION CURVES DATA

PLATE D-4.1 (4 of 6)



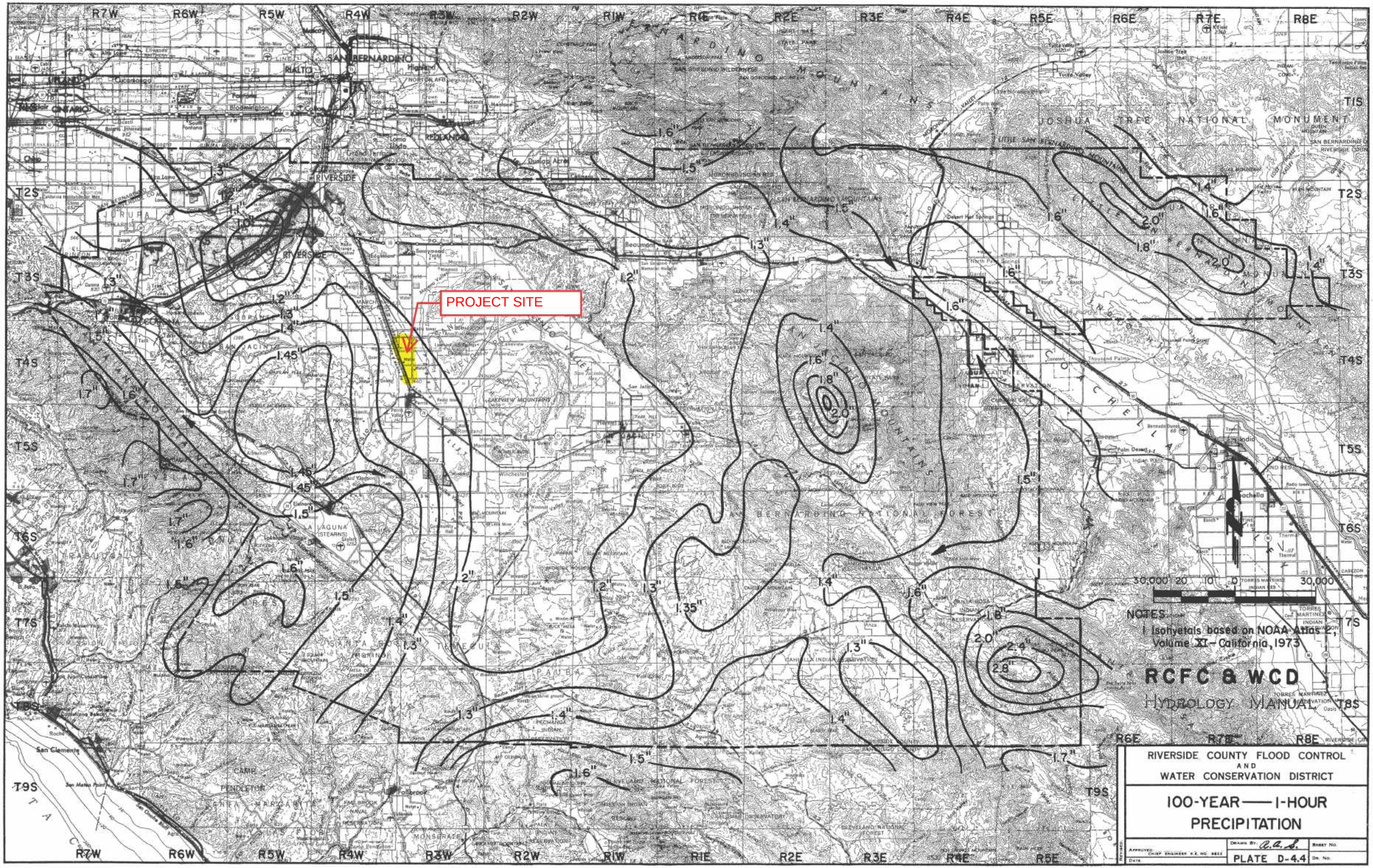
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI – California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR PRECIPITATION

APPROVED: CHIEF ENGINEER R.E. NO. 9825	DRAWN BY: R.A.S.	SHEET No.
DATE	PLATE D-4.3	DR. No.
REVISED		


PROJECT SITE
NOTES
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.4

September 20, 2023

Howard Industrial Partners
1944 North Tustin Street, Suite 122
Orange, California 92865

Attention: Mr. Mike Tunney
Vice President

Project No.: **22G183-4**

Subject: **Results of Additional Infiltration Testing**
Harvest Landing Industrial Development
Indian Avenue and Orange Avenue
Perris, California

Reference: 1) Geotechnical Investigation, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared for Howard Industrial Partners, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-1, dated June 13, 2022.

2) Results of Infiltration Testing, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-2, dated July 1, 2022.

3) Geotechnical Investigation, Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared for Howard Industrial Partners, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-3, dated September 21, 2023.

Mr. Tunney:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 23P306R, dated August 9, 2023. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, prepared for the Riverside County Department of Environmental Health (RCDEH), dated December, 2013.

Site and Project Description

The site is located at the southwest corner of North Perris Boulevard and Orange Avenue in Perris, California. The site is bounded to the north by Orange Avenue, West Water Avenue, and vacant land, to the west by Interstate 215 Frontage Road and Freeway I-215, to the south by an existing commercial development and a vacant land, and to the east by an existing commercial development, North Perris Boulevard and Barrett Avenue. The western portion of the site is partially transected by Indian Avenue (trending north-south). Orange Avenue (trending east-west) separates the northern portion of the overall site (designated as Phase 2 on the site plans) from Phase 1 in the central to southern portions of the western portion of the overall site. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 in Appendix A of this report.

The site consists of several parcels, which total 214.82± acres in size. The west-central area of the site, is developed with four (4) single-family residences (SFRs) which range from approximately 1,200 to 6,160 ft² in size. The residences are of wood-frame and stucco construction and are assumed to be supported on conventional shallow foundations, with slab-on-grade floors. Ground surface cover surrounding the SFRs includes asphaltic concrete with Portland cement concrete driveways, exposed soil, and trees. The remaining areas of the site are vacant and undeveloped. Ground surface cover consists of exposed soil with sparse to moderate native grass and weed growth and occasional trees. A water pump is present approximately 200 feet south of the intersection of Perris Boulevard and Orange Avenue, within the site's boundary. A 3- to 4-foot deep drainage rut is present in the central-eastern area of the site, trending east-west between a dirt road located and the east boundary of the site. Many small stockpiles of plant material and woodchips are located along the eastern side of Indian Avenue, approximately 2 to 4-feet in height. Based on historic aerial photographs obtained from Google Earth, the site was previously used for farming activities. Due to previous tilling activities, the ground surface throughout the site is generally hummocky.

Detailed topographic information was obtained from the Exhibit A-Infiltration Testing Locations plan, prepared by FM Civil Engineers, Inc. Based on this plan, the overall site topography slopes downward to the east at a gradient of 1.5± percent.

Proposed Development

Based on a site plan prepared by RGA, the site will be developed with the following industrial/commercial buildings, located throughout the site.

Building Type	Building Name	Location	Size (ft²)
Industrial	1	Northwest	380,000
Industrial	2	West-Central	88,400
Industrial	3	West-Central	50,000
Industrial	4	Southwest	18,800

Distribution	5	Central	440,000
Commercial	Big Box Retail	Southeast	165,000
Commercial	Shopping Center	Northeast	150,000
Retail	Pad 1	Northeast	6,500
Retail	Pad 2	Northeast	6,500
Restaurant	Pad 3	East	2,305
Retail	Pad 4	East	9,000
Restaurant	Pad 5	Southeast	3,172

Building Nos. 1 through 4 - Industrial Buildings

Dock-high doors will be constructed along a portion of at least one building wall for each of the industrial buildings. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

Detailed structural information has not been provided. We assume the new industrial buildings will be single-story structures of tilt-up concrete construction, typically supported on conventional shallow foundation systems with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively.

Building No. 5 - Distribution Building

Dock-high doors will be constructed along portions of the east and west building walls. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout. Two ancillary buildings, 15,300± ft² and 3,300± ft² in size are located to the south of the main distribution building.

Detailed structural information has not been provided. We assume the new main distribution building will be a two-story structure of tilt-up concrete construction, typically supported on conventional shallow foundation system with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 700 to 900 kips and 4 to 7 kips per linear foot, respectively.

Commercial – Big Box Retail

Dock-high doors will be constructed along a portion of the east building wall. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and limited areas of concrete flatwork and landscape planters

throughout. This commercial development will include an automobile service station located east of the building. The service station will include a canopy, five (5) fuel pump islands, and underground storage tanks (USTs).

Detailed structural information has not been provided. We assume that the commercial building will be a single-story structure of tilt-up concrete construction, typically supported on conventional shallow foundation system with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively. The new pump island canopy is expected to be a steel frame structure, typically supported on deepened shallow foundations. Maximum column loads for the canopy are expected to be in the range of 20 kips, with significant overturning and/or uplift loads.

Commercial – Shopping Center

The shopping center building will consist of eight (8) suites ranging from 2,400± ft² to 54,000± ft² in size. Dock-high doors will be constructed along a portion of the west building walls for four (4) of the suites of the shopping center building. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

Detailed structural information has not been provided. We assume that the new shopping center building will be a single-story structure of wood frame or masonry block construction, typically supported on conventional shallow foundation systems with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 50 kips and 2 to 3 kips per linear foot, respectively.

Retail and Restaurant Buildings

The two fast-food restaurant buildings will include drive-thru lanes. Pad 4 will contain four (4) suites. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, concrete flatwork, and limited areas of landscape planters throughout.

Detailed structural information has not been provided. We assume that the new retail and restaurant buildings will be single-story structures of wood frame construction, typically supported on conventional shallow foundation systems with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 20 kips and 1 to 3 kips per linear foot, respectively.

Streets

Barrett Avenue and two access streets will be constructed at the site. It is assumed that the new streets will consist of asphaltic concrete pavements.

General

No significant amounts of below-grade construction, such as basements or crawl spaces, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of up to 8 to 10± feet are expected to be necessary to achieve the proposed site grades

throughout the site.

Streets

Barrett Avenue and two access streets will be constructed at the site. It is assumed that the new streets will consist of asphaltic concrete pavements.

Previous Studies

Southern California Geotechnical (SCG) previously conducted a geotechnical investigation at the subject site (Reference No. 1). As a part of this study, twenty-three (23) borings (Identified as Boring Nos. B-1 through B-23) were advanced to depths of 15 to 25± feet below the existing site grades. Native alluvium was encountered at each boring locations, extending to at least the maximum depth explored of 25± feet below existing site grades. The alluvium generally consists of medium dense to very dense silty sands to sandy silts, with trace to little clay content. Free water was not encountered during the drilling of the borings. Based on the lack of water within the borings and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 25± feet at the time of the subsurface exploration.

SCG also previously conducted infiltration testing at the subject site (Reference No. 2). The subsurface exploration performed for the infiltration testing consisted of six (6) shallow infiltration trenches (identified as Infiltration Trench Nos. I-1 through I-6) and four (4) deep infiltration borings (identified as Infiltration Boring Nos. I-7 through I-10). The infiltration trenches were excavated to a depth of 7± feet below existing site grades. The infiltration borings were extended to a depth of 50± feet below existing site grades. In addition, one (1) exploratory boring was extended to a depth of 60± feet below site grades. Artificial fill soils were encountered at the ground surface at Infiltration Test No. I-3, extending to a depth of 1± foot below existing site grades. The fill soils consisted of medium dense fine to medium sandy silts with trace quantities of clay and fine gravel. Native alluvium was encountered at the ground surface at all of the remaining boring and trench locations, extending to at least the maximum explored depth of 60± feet below existing site grades. The near-surface alluvium encountered at depths less than 25± feet below existing site grades consisted of medium dense to very dense fine to medium sandy silts, silty fine to medium sands, clayey fine to coarse sands, and hard fine to coarse sandy clays. At depths greater than 25± feet, the alluvium consisted of medium dense to very dense fine sandy silts, fine to medium sandy silts, silty fine to medium sands, and hard fine to medium sandy clays. Based on the results of the testing, SCG recommended infiltration rates of 0.9 to 3.6 inches per hour for the proposed chamber systems. Additionally, SCG did not recommend dry well infiltration at the subject site.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site (Reference No. 3). As a part of this study, forty-three (43) borings (identified as Boring Nos. B-25 through B-67) were advanced to depths of 10 to 50± feet below the existing site grades.

Younger native alluvium was encountered at the ground surface at Boring Nos. B-25, B-28, B-29, B-31, B-32, B-50, B-55 through B-58, B-60, B-64, and B-67, extending to depths of 2½ to 5½± feet below existing site grades. The alluvium generally consists of loose to medium dense silty

fine sands, silty fine to medium sands, fine sandy silts, clayey fine sands. Occasional layers of very stiff fine sandy clays and silty clays. The younger native alluvial soils are classified as "alluvium" on the boring logs. Native older alluvium was encountered beneath the younger native alluvial soils (at the boring locations listed above) and at the ground surface at the remaining boring locations. All of the borings were terminated within the older alluvium, and the older alluvial soils extend to at least the maximum depth explored of 50± feet below ground surface. The older alluvial soils generally consist of medium dense to very dense well- to poorly-graded silty sands with varying clay content, well-graded to poorly-graded sandy silts with varying clay content, well-graded to poorly-graded clayey sands with varying silt content, and clayey silts. Additionally, layers of very stiff to hard fine sandy clays and silty clays were encountered. The older alluvium generally possesses weak to moderate cementation, and occasionally possesses trace to extensive calcareous nodules and veining.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the moisture content of the recovered soil samples and the lack of free water in the borings, the static groundwater table is at a depth greater than the maximum explored depth of 50± feet below existing site grades for this project.

Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well is located on the northeast corner of the site. Water level readings within this monitoring well indicates a groundwater level of 40± feet (March 2023) below the ground surface.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of thirty-seven (37) infiltration test borings, advanced to depths of 3 to 10½± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as Infiltration Test Nos. I-11 through I-37) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Native younger alluvium was encountered at the ground surface at Infiltration Test Nos. I-11, I-23, I-26 and I-39, extending to depths of 3 to 6± feet below the existing site grades. The younger alluvium generally consists of medium dense silty sands and sandy silts. Native older alluvium was encountered beneath the native younger alluvium and at the ground surface at the remaining

infiltration test locations, extending to at least the maximum depth explored of 10½± feet. The older alluvium generally consists of medium dense to very dense silty sands and sandy silts with trace to little clay content. The older alluvium occasionally possesses weak cementation. The Infiltration Boring Logs, which illustrate the conditions encountered at each of the borings, are included with this report.

Infiltration Testing

As previously mentioned, the infiltration testing was performed in general accordance with the Riverside County guidelines: Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A.

Pre-soaking

In accordance with the county infiltration standards all of the infiltration test borings were pre-soaked prior to the infiltration testing. The pre-soaking process consisted of filling the test borings by inverting a full 5-gallon bottle of clear water supported over each hole so that the water level reaches a level of at least 5 times the hole's radius above the gravel at the bottom of each hole. The pre-soaking was completed after all of the water had percolated through each test hole or after 15 hours since initiating the pre-soak. Based on the results of the pre-soaking process, 30-minute readings were utilized during all of the infiltration tests, except for Infiltration Test Nos. I-24 and I-45. For Infiltration Test Nos. I-24 and I-45, 10-minute readings were utilized during the infiltration tests.

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of each test hole. In accordance with the Riverside County guidelines, in areas where "non-sandy soils" were encountered at the bottom of each infiltration test boring, (where 6 inches of water did not infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), readings were taken at 30-minute intervals for a total of 6 hours at the test locations. At Infiltration Test Nos. I-24 and I-45, "sandy-soils" were encountered at the bottom of the test borings, (where 6 inches of water did infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), therefore, readings were taken at 10-minute intervals for 1 hour at the test locations. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the test are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Measured Infiltration Rate (inches/hour)
I-11	4½	YOUNGER ALLUVIUM: Brown Silty fine to coarse Sand, trace Clay	0.2

I-12	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.2
I-13	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.2
I-14	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.2
I-15	10½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-16	9½	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.2
I-17	10	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace to little Clay, trace coarse Sand	0.0
I-18	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace to little Clay, trace coarse Sand	0.0
I-19	3	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-20	3	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-21	3½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand	0.4
I-22	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand	0.3
I-23	9	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-24	9	OLDER ALLUVIUM: Brown Silty fine to coarse Sand	1.7
I-25	9	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-26	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-27	7	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand	0.1
I-28	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.0
I-29	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-30	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay	0.1
I-31	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-32	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-33	6½	OLDER ALLUVIUM: Brown fine to medium Sandy Silt to Silty fine to medium Sand, trace Clay	0.1
I-34	5	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-35	4½	OLDER ALLUVIUM: Light Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-36	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.0
I-37	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1

I-38	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-39	7½	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-40	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-41	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand	0.0
I-42	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand	0.0
I-43	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-44	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-45	5	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.8
I-46	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-47	7	OLDER ALLUVIUM: Brown fine to medium Sandy Silt, little Clay	0.1

Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples within the borings were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the bottom of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-37 of this report.

Design Recommendations

Thirty-seven (37) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range between 0.0 and 1.7 inches per hour. The major factors affecting the lack of infiltration at these locations are the presence of very dense older alluvium with high contents of fine-grained soil. **Based on these conditions and the results of infiltration testing we recommend the following design infiltration rates to be utilized for the proposed infiltration systems:**

Infiltration System(s)	Infiltration Test Nos.	Infiltration Test Depth (ft)	Infiltration System Type	Infiltration System Location	Design Infiltration Rate (inches/hour)
"A"	I-11	4½	Bio-Retention Basin	West	Not Recommended
"B"	I-12	4½	Bio-Retention Basin	West	Not Recommended
"C"	I-13	5½	Below-Grade Chamber	West	Not Recommended
"D"	I-14	7½	Below-Grade Chamber	Northwest	Not Recommended
"E"	I-15 through I-17	9½ to 10½	Bio-Retention Basin	North	Not Recommended
"F"	I-18	7½	Below-Grade Chamber	North	Not Recommended
"G"	I-19 through I-22	3 to 4½	Bio-Retention Basin	South	Not Recommended
"H"	I-23, I-24	9	Bio-Retention Basin	South	Not Recommended
"I" & "J"	I-25 through I-33	5½ to 9	Bio-Retention Basin	Northeast	Not Recommended
"K"	I-34 through I-36	4½ to 5½	Below-Grade Chamber	Southeast	Not Recommended
"L"	I-37	6½	Below-Grade Chamber	Southeast	Not Recommended
"M"	I-38, I-39	6½ to 7½	Below-Grade Chamber	Southeast	Not Recommended
"N"	I-40	7½	Below-Grade Chamber	Northeast	Not Recommended
"O"	I-41	6	Below-Grade Chamber	Northeast	Not Recommended
"P"	I-42	6	Below-Grade Chamber	Northeast	Not Recommended
"Q"	I-43	6	Below-Grade Chamber	Northeast	Not Recommended
"R"	I-44	4½	Below-Grade Chamber	Northeast	Not Recommended*
"S"	I-45	5	Below-Grade Chamber	Northeast	Not Recommended
"T"	I-46	5½	Below-Grade Chamber	Northeast	Not Recommended
"U"	I-47	7	Below-Grade Chamber	Northeast	Not Recommended

*Although the test results indicate an infiltration rate of 0.8 in/hr at this location, the subsurface soil profile at this site includes many soil layers with low permeability. Soil layers with some capacity for infiltration, such as the silty sand layer encountered at Infiltration test-location I-44, are generally interbedded between low permeability soil layers, based on our review of the boring logs for the overall site. Therefore, long-term infiltration is not considered to feasible.

Although infiltration is not considered feasible, the client may desire to use storm water disposal systems that do not rely on infiltration at this site. The design of the proposed storm water

disposal systems should be performed by the project civil engineer, in accordance with the City of Perris, and/or County of Riverside guidelines. However, it is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system.

Infiltration Rate Considerations

The infiltration rates presented herein were determined in accordance with the Riverside County guidelines and are considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rates presented above. The infiltration rates will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rates.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **Any proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically

apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

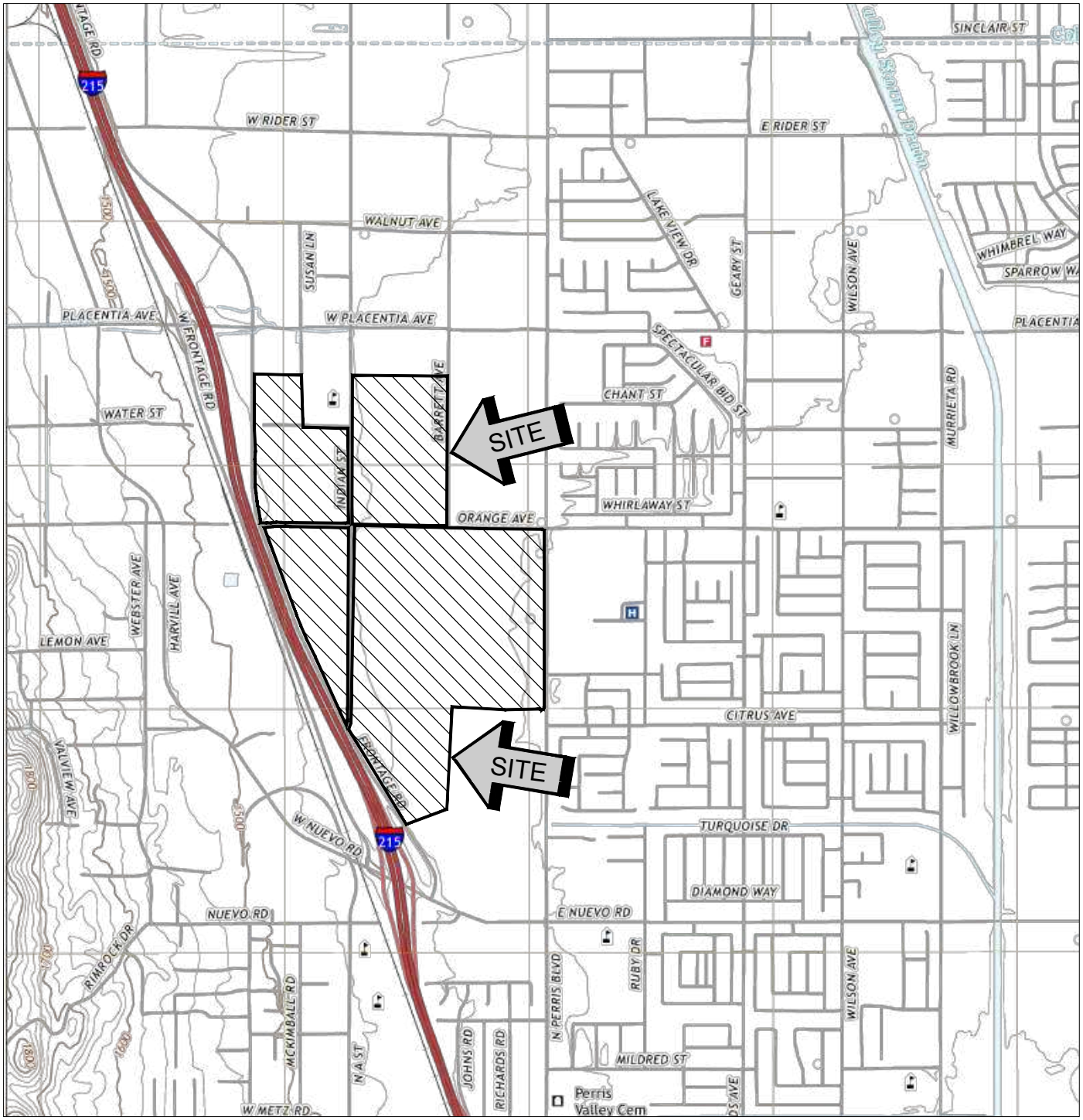
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Ryan Bremer
Staff Geologist

Daniel W. Nielsen, GE 3166
Senior Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs (39 pages)
Infiltration Test Results Spreadsheets (37 pages)
Grain Size Distribution Graphs (37 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA, 2021

SITE LOCATION MAP

HARVEST LANDING INDUSTRIAL DEVELOPMENT

PERRIS, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: RB CHKD: RGT	
SCG PROJECT 22G183-4	
PLATE 1	

SOUTHERN CALIFORNIA GEOTECHNICAL

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- CONCURRENT BORING LOCATION (SCG PROJECT NO. 22G183-3)
- PREVIOUS BORING LOCATION (SCG PROJECT NO. 22G183-1)
- PREVIOUS INFILTRATION LOCATION (SCG PROJECT NO. 22G183-2)
- PREVIOUS INFILTRATION LOCATION (SCG PROJECT NO. 22G183-2)
- PREVIOUS BORING LOCATION (SCG PROJECT NO. 22G183-2)
- PROPOSED BUILDING
- PROPOSED INFILTRATION SYSTEM LOCATION
- EXISTING STRUCTURE

NOTE: CONCEPTUAL GRADING PLAN PREPARED BY FMCIVIL ENGINEERING.

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SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

NORTH
SoCalGeo

SCALE: 1" = 200'
DRAWN: RB
CHKD: RGT
SCG PROJECT 22G183-4

INFILTRATION TEST LOCATION PLAN

HARVEST LANDING INDUSTRIAL DEVELOPMENT
PERRIS, CALIFORNIA

PLATE 2

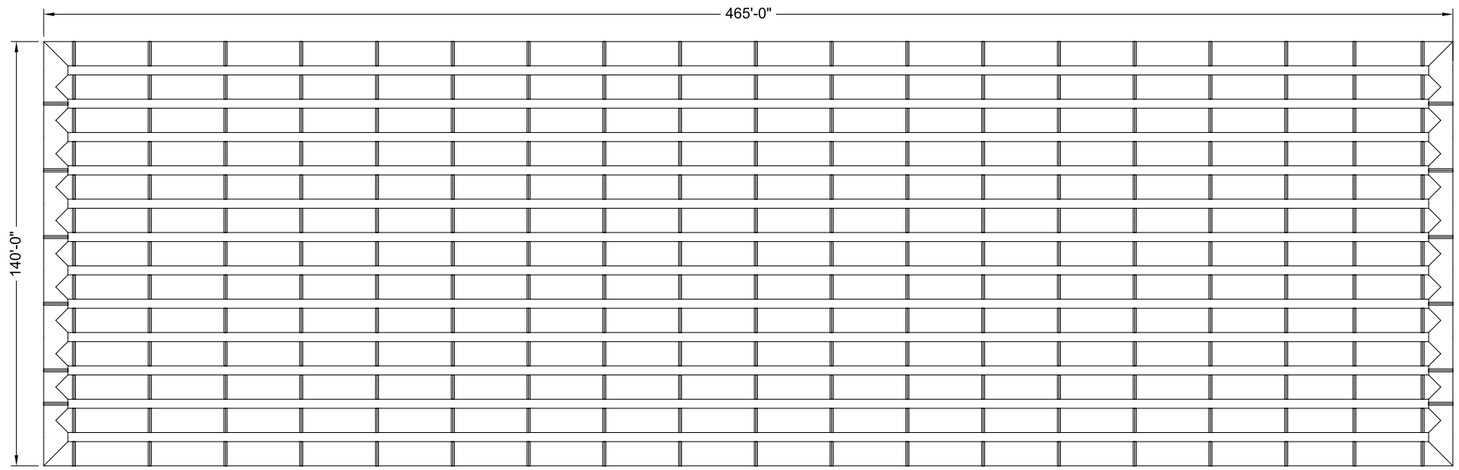
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 6,117 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 307,474 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 307,474 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY

SCALE: 1" = 50'

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The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Contech Engineered Solutions LLC ("Contech"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Contech. Failure to comply is done at the user's own risk and Contech expressly disclaims any liability or responsibility for such use.

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DATE	REVISION DESCRIPTION	BY

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CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

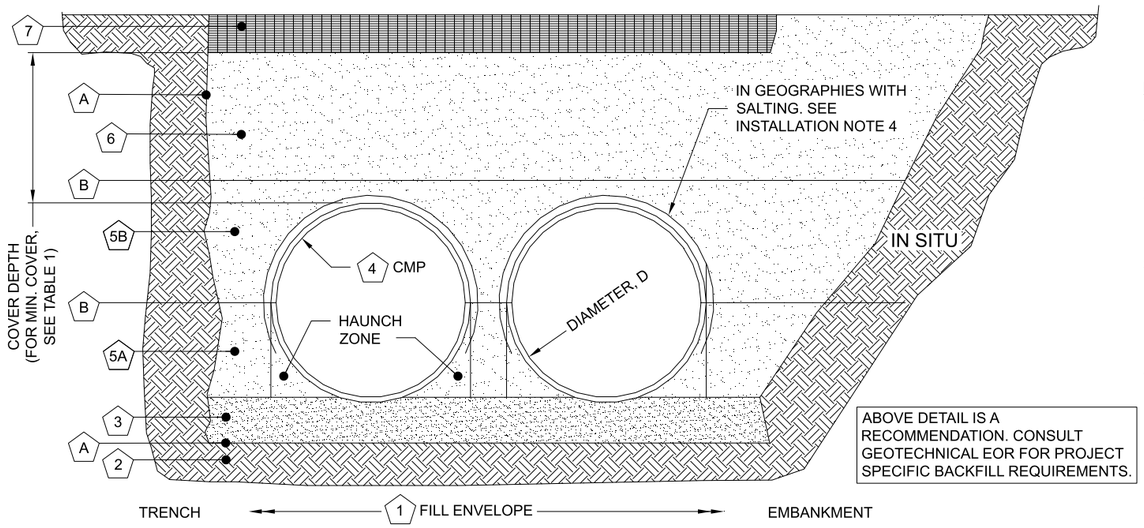
DYO36259 20-001 Harvest Landing Retail Center and Business Park
Site 1 - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24611	36259	10/4/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3** *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO36259 20-001 Harvest Landing Retail Center and Business Park
Site 1 - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24611	36259	10/4/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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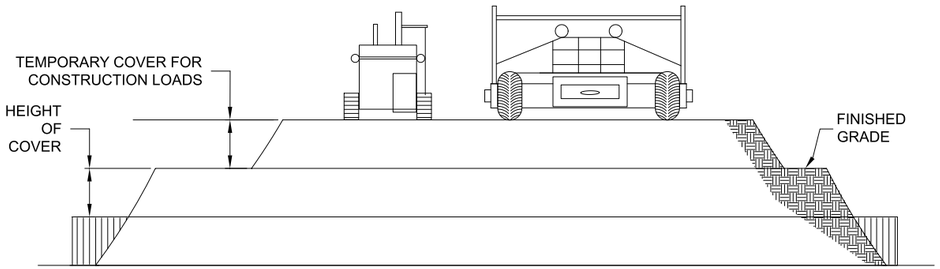


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

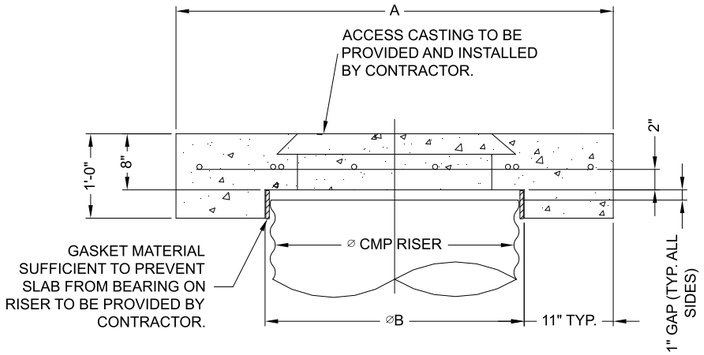
ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

REQUIREMENTS INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

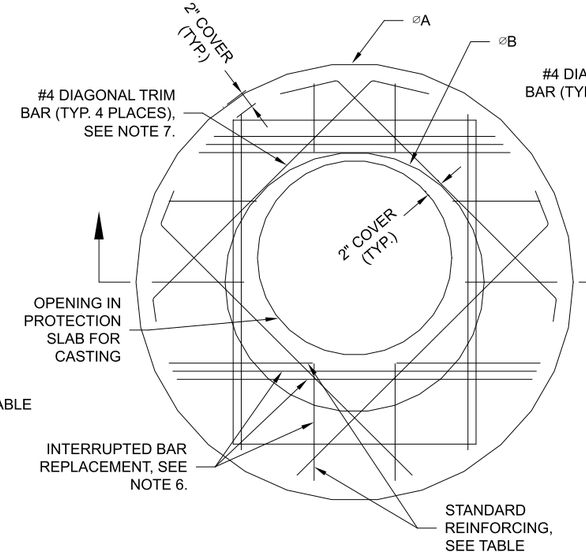
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



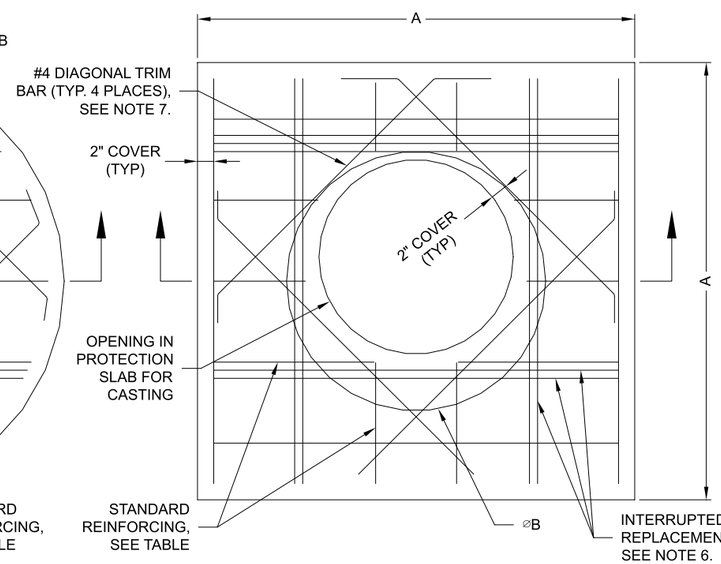
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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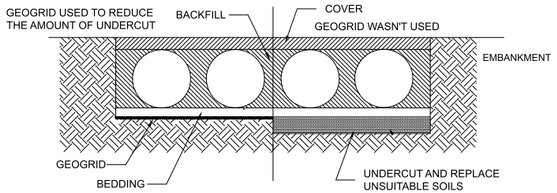
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

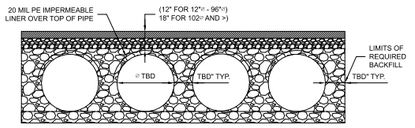
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

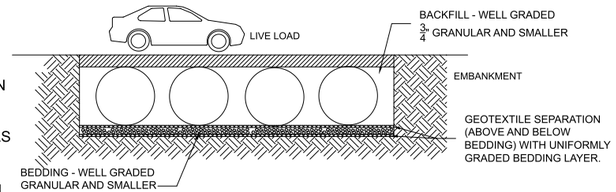
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

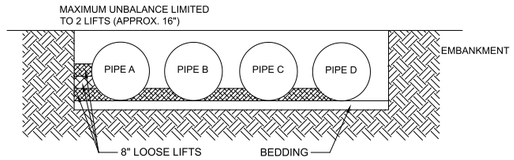
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



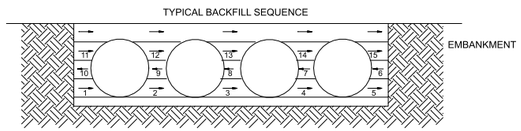
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

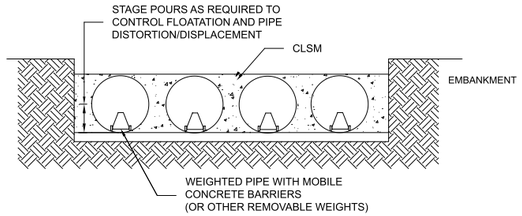


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

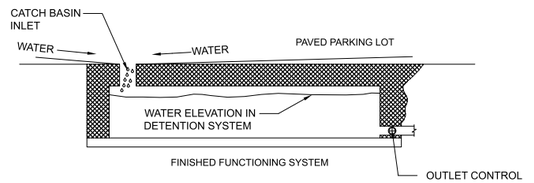


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36259 20-001 Harvest Landing Retail Center and Business Park
Site 1 - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24611	36259	10/4/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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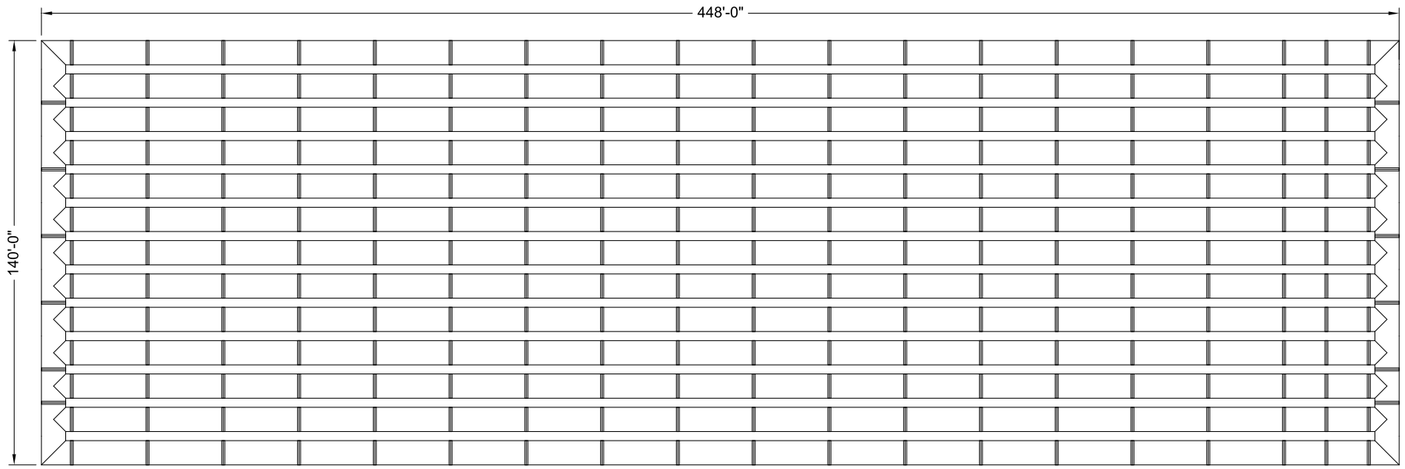
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 5,896 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 296,365 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 296,365 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY

SCALE: 1" = 50'

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CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

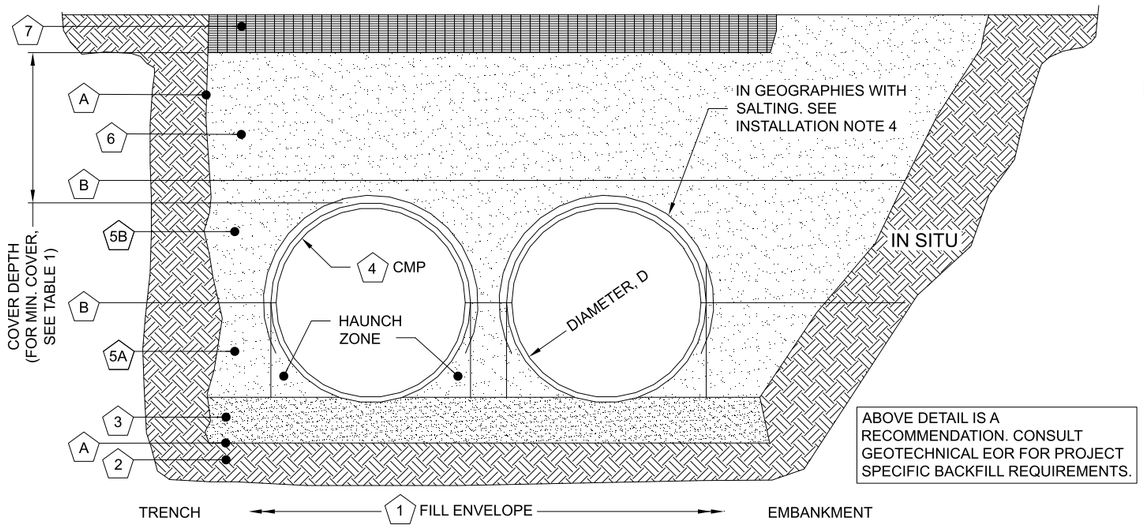
DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24609	36256	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3** *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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CONTECH DYODS DRAWING

DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24609	36256	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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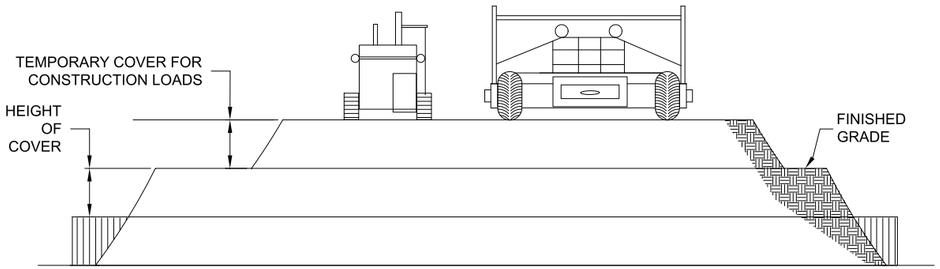

CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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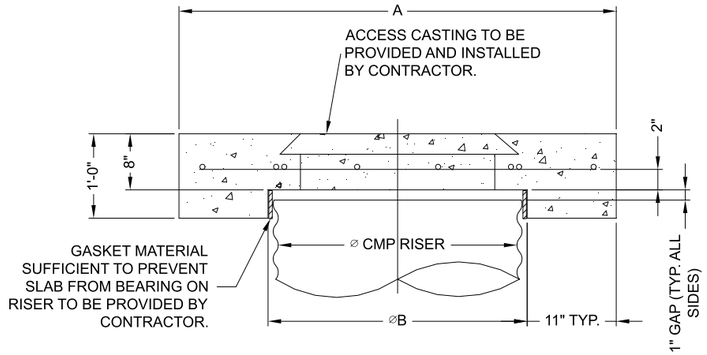
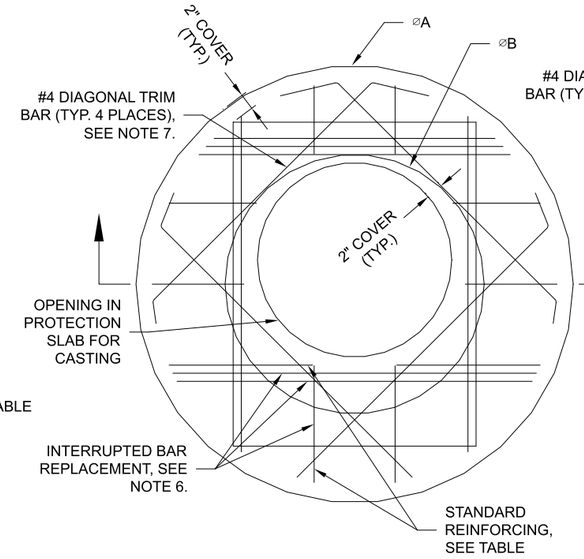


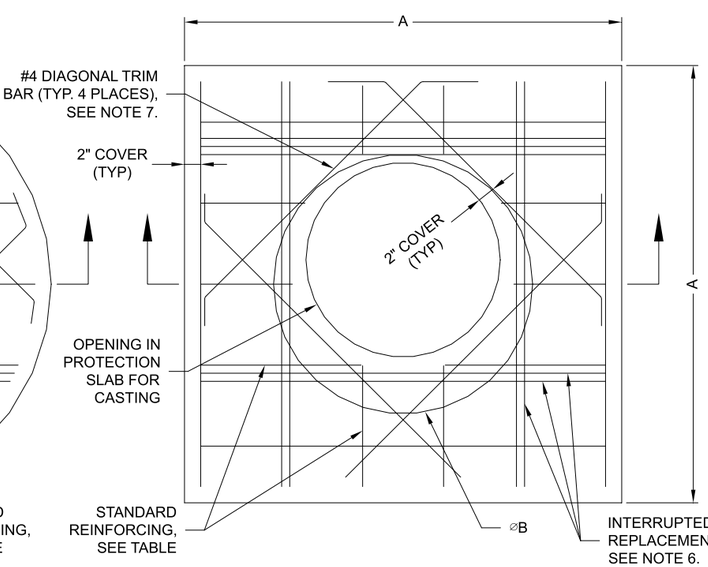
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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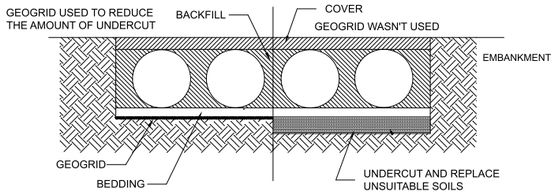
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

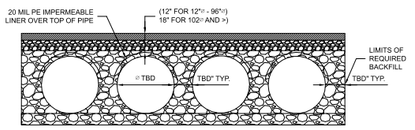
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

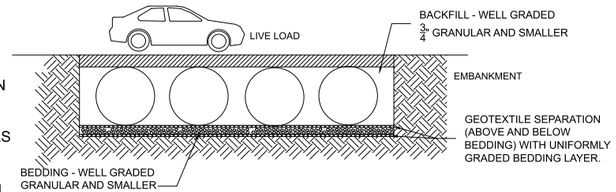
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

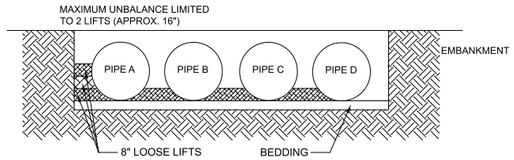
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



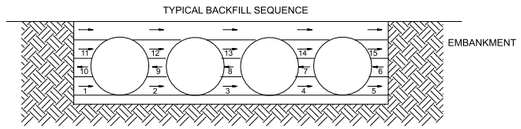
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

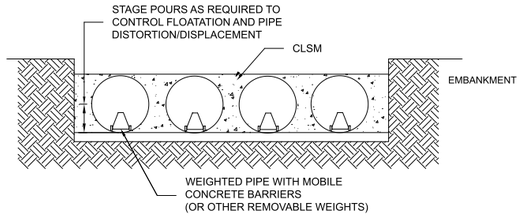


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

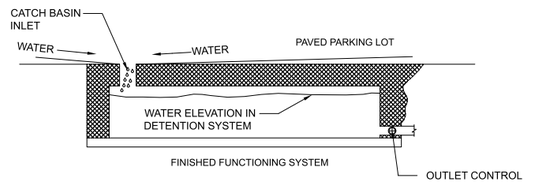


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24609	36256	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-1A	*40526.29*	*Roofs*	*1*	*0.89*	*36149.5*			
S1-1C	*277973.92*	*Concrete or Asphalt*	*1*	*0.892*	*247952.7*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-2A	*55315.38*	*Roofs*	*1*	*0.89*	*49341.3*			
S1-2C	*237178.68*	*Concrete or Asphalt*	*1*	*0.892*	*211563.4*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-3A	*95990.6*	*Roofs*	*1*	*0.89*	*85623.6*			
S1-3C	*254184.8*	*Concrete or Asphalt*	*1*	*0.892*	*226732.8*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-4A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-4C	*264175.33*	*Concrete or Asphalt*	*1*	*0.892*	*235644.4*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-5A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-5C	*117505*	*Concrete or Asphalt*	*1*	*0.892*	*104814.5*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-6 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-6A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-6C	*130304.77*	*Concrete or Asphalt*	*1*	*0.892*	*116231.9*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-7 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-7A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-7C	*140627.27*	*Concrete or Asphalt*	*1*	*0.892*	*125439.5*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-8 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-8A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-8C	*124278.2*	*Concrete or Asphalt*	*1*	*0.892*	*110856.2*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-9 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-9A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-9C	*38340*	*Concrete or Asphalt*	*1*	*0.892*	*34199.3*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-10 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-10A	*36878.51*	*Roofs*	*1*	*0.89*	*32895.6*			
S1-10C	*60733.1*	*Concrete or Asphalt*	*1*	*0.892*	*54173.9*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-11 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-11A	*70795.56*	*Roofs*	*1*	*0.89*	*63149.6*			
S1-11C	*29593.31*	*Concrete or Asphalt*	*1*	*0.892*	*26397.2*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-12 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-12A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-12C	*23273.88*	*Concrete or Asphalt*	*1*	*0.892*	*20760.3*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-13 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-13A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-13C	*28300.75*	*Concrete or Asphalt*	*1*	*0.892*	*25244.3*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-14 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-14A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-14C	*8629.3*	*Concrete or Asphalt*	*1*	*0.892*	*7697.3*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-15 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-15A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-15C	*0*	*Concrete or Asphalt*	*1*	*0.892*	*0*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-16 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-16A	*19615*	*Roofs*	*1*	*0.89*	*17496.6*			
S1-16C	*337.89*	*Concrete or Asphalt*	*1*	*0.892*	*301.4*			
	19952.89	***Total***			**17798**	**0.20**	***0.08***	***0.115***

Notes:

LINE A-C

LAT. H-10.1

H-10.1

AT. H-10

H-10

K-20

LAT. J-9

J-9

J-9.2

LAT. J-9.2

LAT. J-9.1

J-9.1

J-9

542-AC

552-AC

LAT. J-7.1

J-7.1

LAT. J-7

LAT. J-7

J-7

LAT. J-8

670-AC

J-8

LAT. P-5

P-5

P-4

PORTION OF
8K3
1" = 1000'

TOPEKA

H

H-1

LAT. H-1

H-2

LAT. H-2

LAT.

LINE H

H-3

LAT. H-3

K-24

AT. K-24

K-21

K-22

Water Tank

K-23

LAT. K-23

LAT. K-22

LAT. K-21

K-14

LAT. K-14

K-6

LAT. K-6

LAT. K-20

K-19

LAT. K-19

K-16

LAT. K-16

K-18

LAT. K-18

K-17

LAT. K-17

K-15

LAT. K-15

K-13

LAT. K-13

K-3

LAT. K-3

K

LINE K

J-1

LAT. J-1

J-2

LAT. J-2

J-3

LAT. J-3

J

LINE J

J-5

LAT. J-5

J-4

LAT. J-4

J-6

LAT. J-6

A-D

LINE A-D

A-E

LINE A-E

A-F

LINE A-F

A-G

LINE A-G

L-1

LAT. L-1

L

LINE L

REDLANDS BLVD.

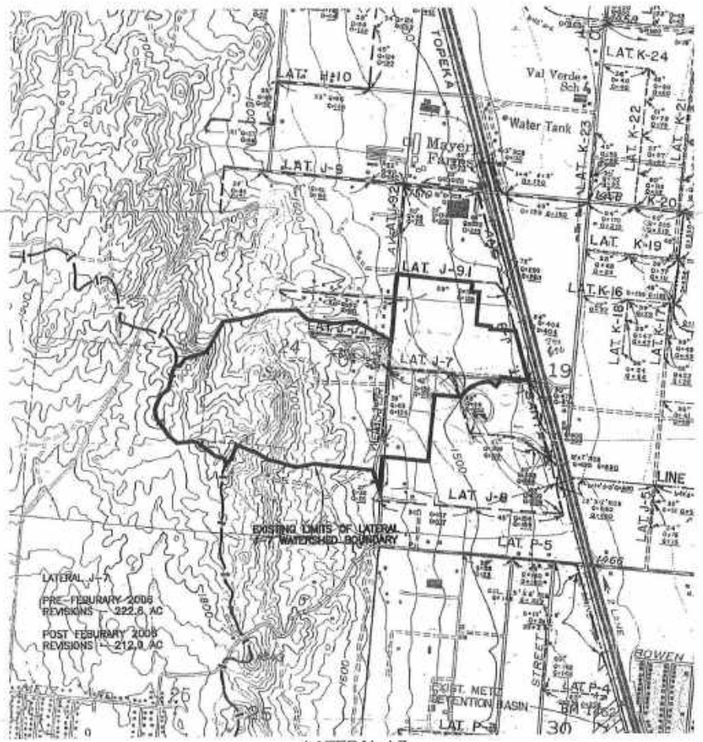
PVSD

M-1

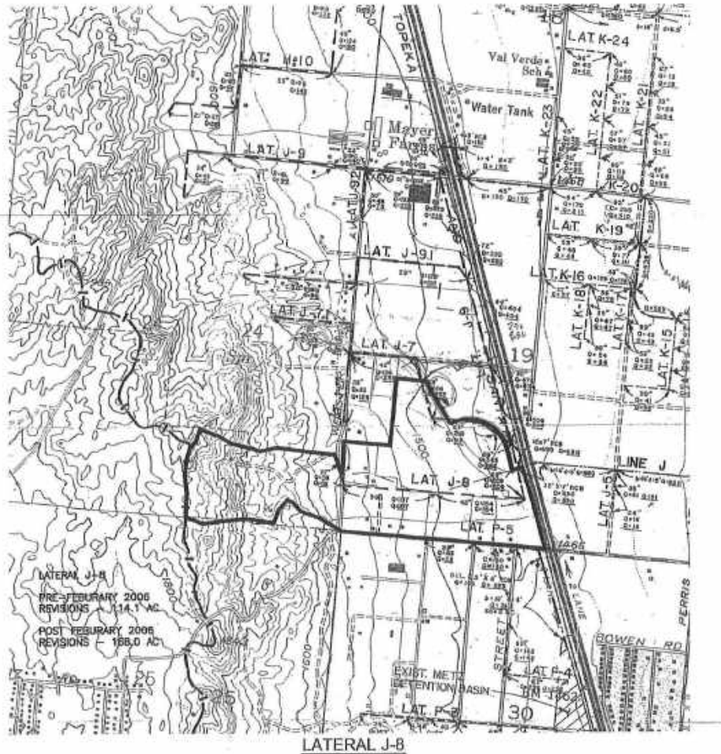
BROWN RD.

REVISED HYDROLOGY MAP
PERRIS MASTER DRAINAGE PLAN

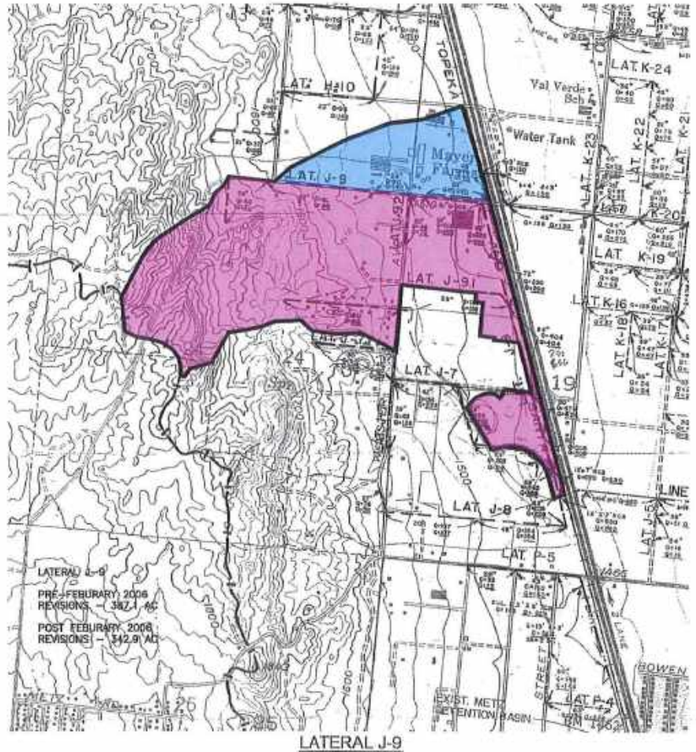
LATERALS J-7, J-8, & J-9



LATERAL J-7



LATERAL J-8



LATERAL J-9

LATERAL No.	PRE-FEBURARY 2006 REVISIONS	POST FEBURARY 2006 REVISIONS	INCREASE/DECREASE (ACRES)
LAT J-8	114.1	168.0	+53.9
LAT J-9	609.8	555.9	-53.9

LEGEND

PROPOSED LATERAL, WATERSHED BOUNDARIES AFTER FEBRUARY 2006 REVISION

N

SCALE: 1"=1000'

WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

DATE	BY	MARK	REVISIONS	APPR	DATE
			COUNTY		
	ENGINEER				

SEAL—COUNTY

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:

ALAN D. FRENCH, P.E.
CIVIL ENGINEER, R.C.E. NO. 45702 — DATE

RECOMMENDED — DATE

SEAL—ENGINEER

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL — APPROVED BY:

PLANNING ENGINEER — CHIEF ENGINEER

DATE: — DATE:

ENGINEERING SOLUTIONS
ENGINEERING LAND PLANNING SURVEYING MAPPING
3185 CHICAGO AVENUE, STE. 101
RIVERSIDE, CA. 92507
PHONE - (951) 784-0288
FAX - (951) 784-0287

PREPARED BY:

DATE
EXP. 06-30-07

BENCHMARK:

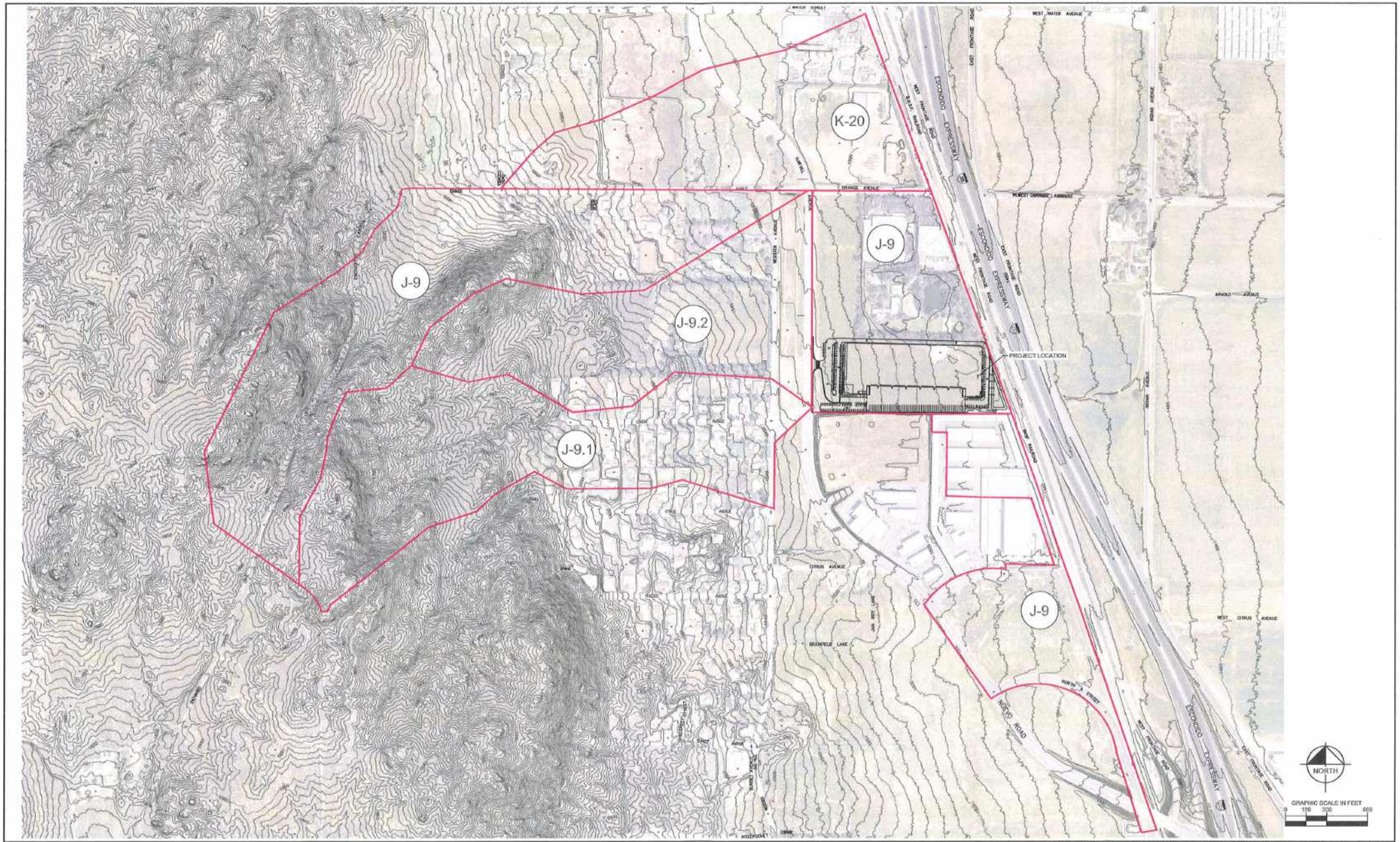
SCALE:

L.P. No. XXXXX
COUNTY OF RIVERSIDE
REVISED HYDROLOGY MAP
PERRIS MASTER DRAINAGE PLAN
LATERALS J-7, J-8, & J-9

SHEET NO. 1 OF 1 SHTS.

FOR: | W.O. | COUNTY FILE NO.:

B:\CAD\Nuevo Industrial Park - NV\PE\ExhibitsNV\P Perris MDP Hydrology map lat 7 and lat 8.dwg, 2/2/2007 1:10:03 PM, Donal Pearce



Kimley»Horn

RCFC MDP DRAINAGE AREA MAP LINE J-9
ROCKEFELLER HARVILL INDUSTRIAL PARK
October 9, 2020

k:\sd_ldev\rockefeller - riverside_harvill\lb\rcfc\2020.10.09 - mdp letter\2020.10.09 - mdp drainage area.dwg 10/9/2020

EXHIBITS

EXHIBIT A: VICINITY MAP

EXHIBIT B: EXISTING HYDROLOGY MAP

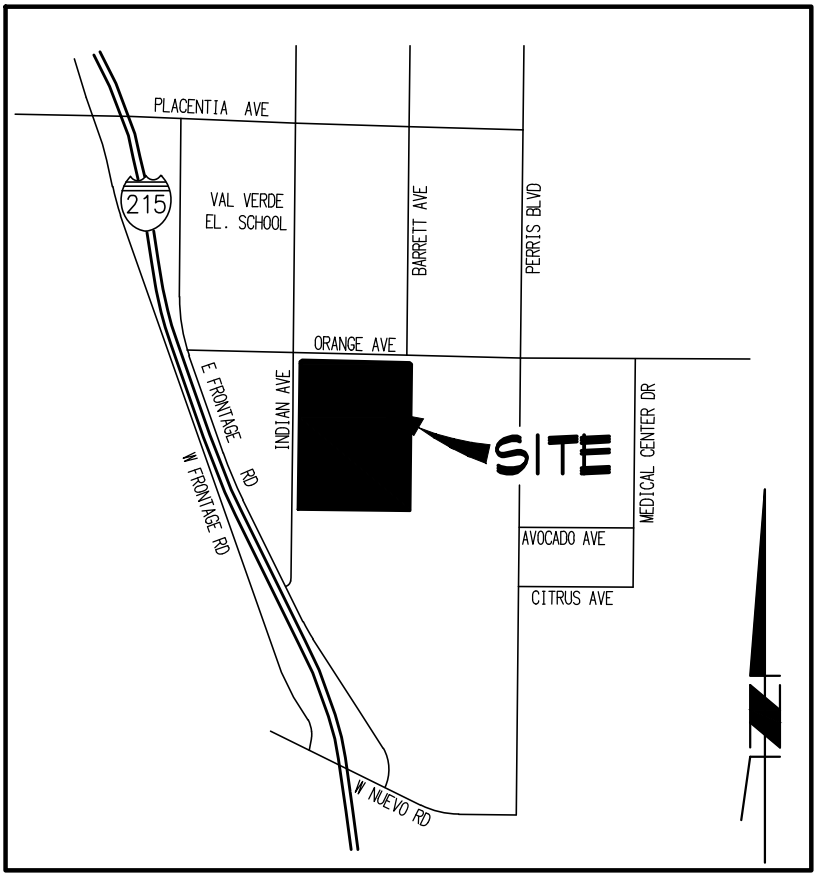
EXHIBIT C: PROPOSED HYDROLOGY MAP

EXHIBIT D: HYDROLOGIC SOILS GROUP MAP

EXHIBIT E: RCFCD MDP FACILITIES OVERLAY

EXHIBIT F: PHASE 1 OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM

EXHIBIT G: CONCEPTUAL GRADING



VICINITY MAP

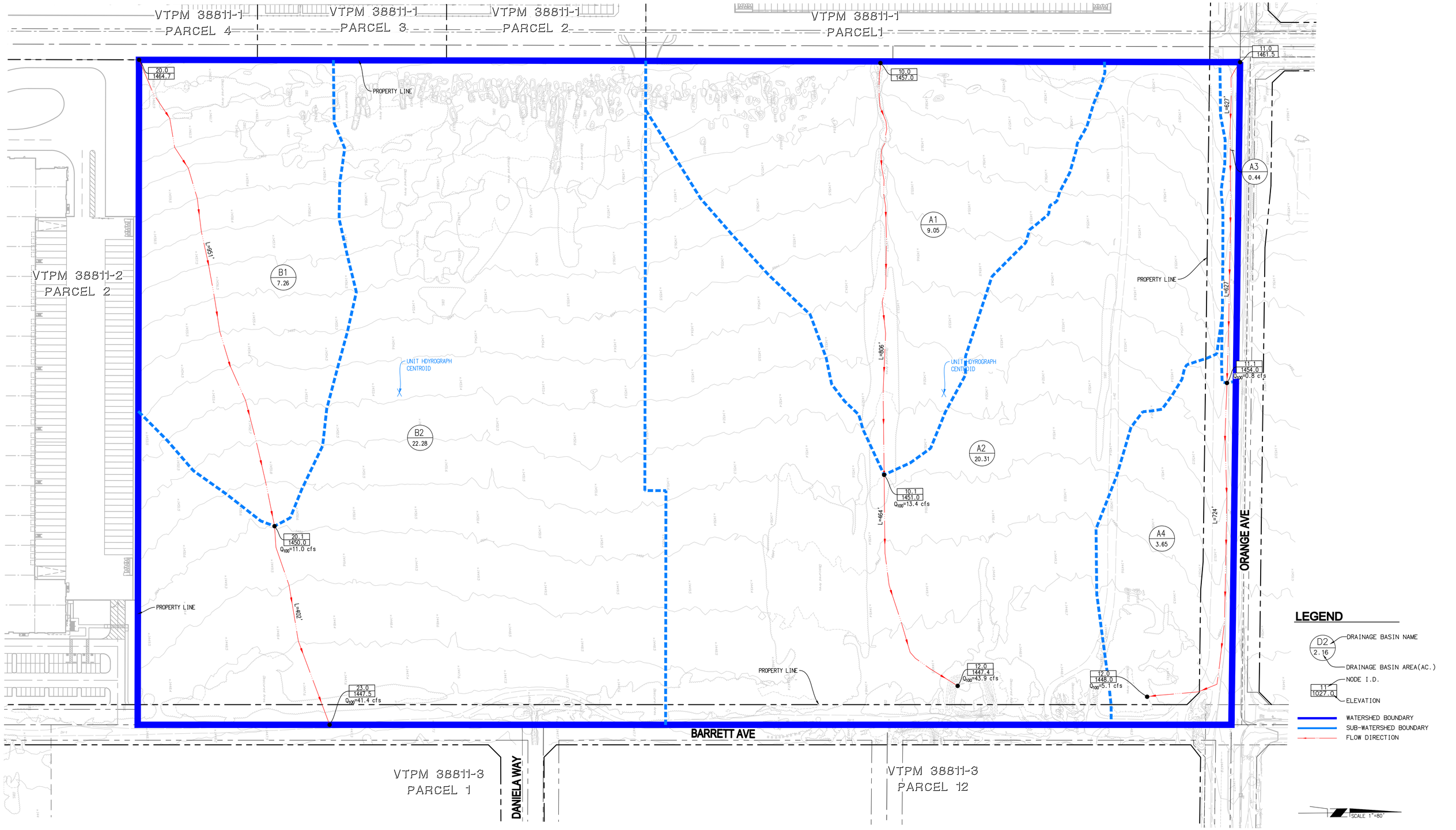
T4S, R3W, SEC 19
NOT TO SCALE

FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.331.9873 - FMCIVIL.COM

SITE 1 AT HARVEST LANDING

FIGURE 1
VICINITY MAP

H:\PDATA\20-001 HARVEST LANDING\DWGS\EXHIBITS\20-001-FEDEX-VICINITY-MAP .DWG DANNY 10/1/2024 11:02 AM



UNIT HYDROGRAPH PARAMETERS - AREA A			
L_{HC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
1,351	643	13.5	0.024

UNIT HYDROGRAPH PARAMETERS - AREA B			
L_{HC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
1,353	881	17.2	0.03

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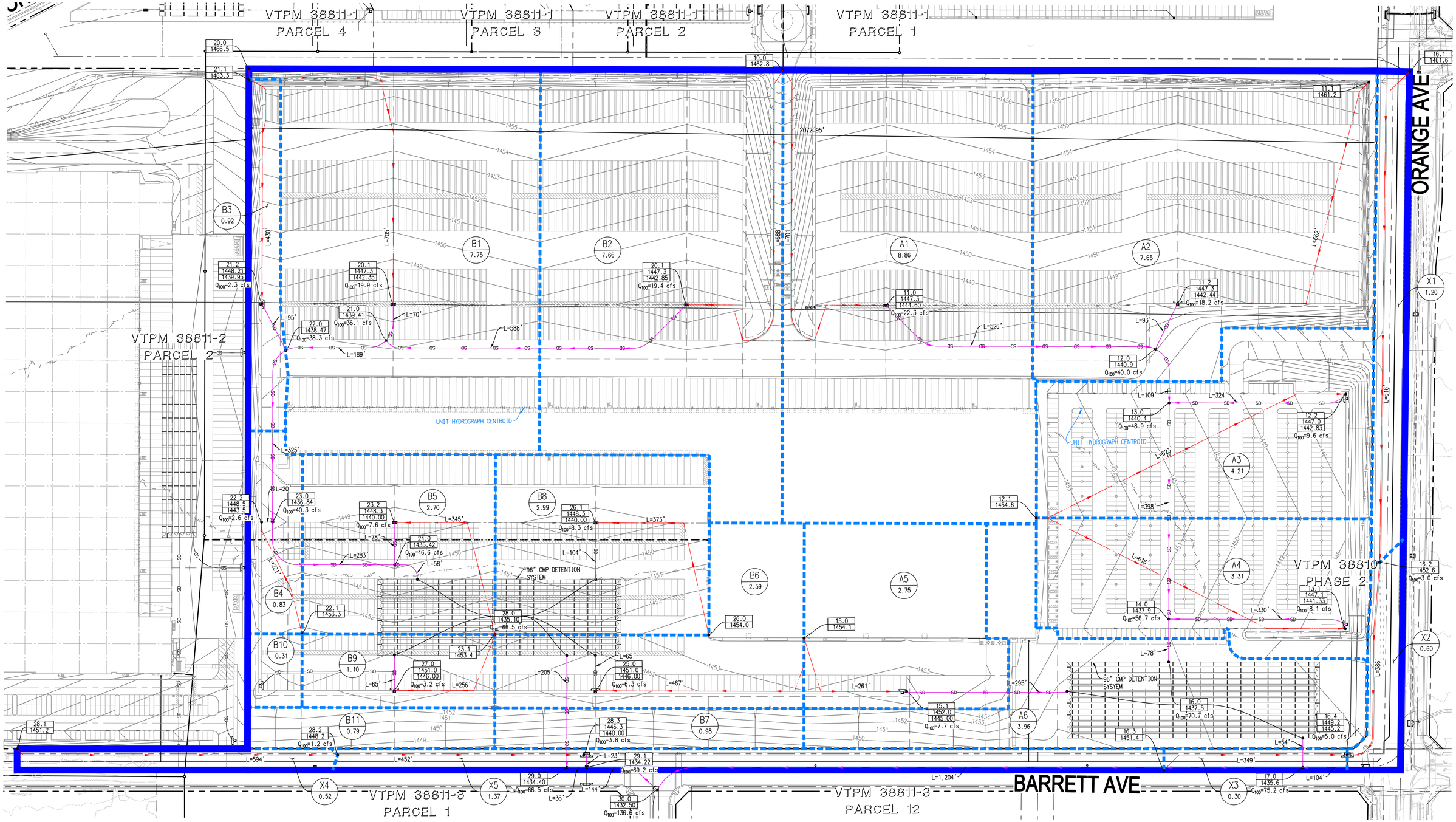
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA | CA 92563
951.331.9873 - FMCIVIL.COM

HARVEST LANDING

SITE 1 - EXISTING DRAINAGE



LEGEND

- D2 / 2.16 — DRAINAGE BASIN NAME / DRAINAGE BASIN AREA(AC.)
- 11 / 1027.0 — NODE I.D. / ELEVATION
- WATERSHED BOUNDARY
- SUB-WATERSHED BOUNDARY
- FLOW DIRECTION
- PIPE FLOW DIRECTION

UNIT HYDROGRAPH PARAMETERS - AREA A			
L_{WC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
1,812	1,348	25.30	0.015

UNIT HYDROGRAPH PARAMETERS - AREA B			
L_{WC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
2,861	2,131	26.97	0.015

SCALE 1"=80'

80 40 0 80 160 240

SCALE: 1"=80'

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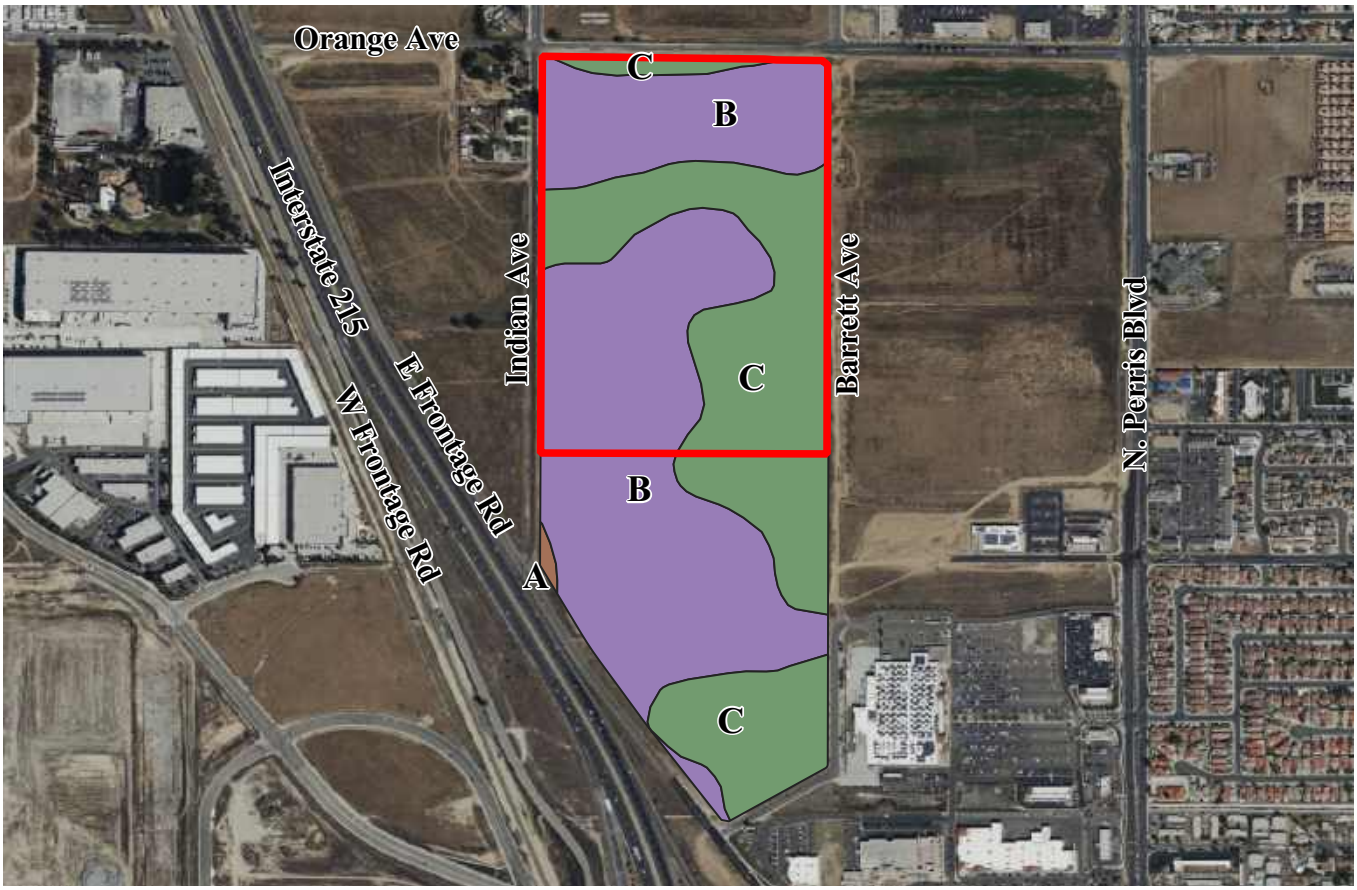
MURRIETA | CA 92563
951.331.9873 - FMCIVIL.COM

HARVEST LANDING

SITE 1 - PROPOSED DRAINAGE



LEGEND

- SITE 1 BOUNDARY
- HYDROLOGIC SOIL A
- HYDROLOGIC SOIL B
- HYDROLOGIC SOIL C

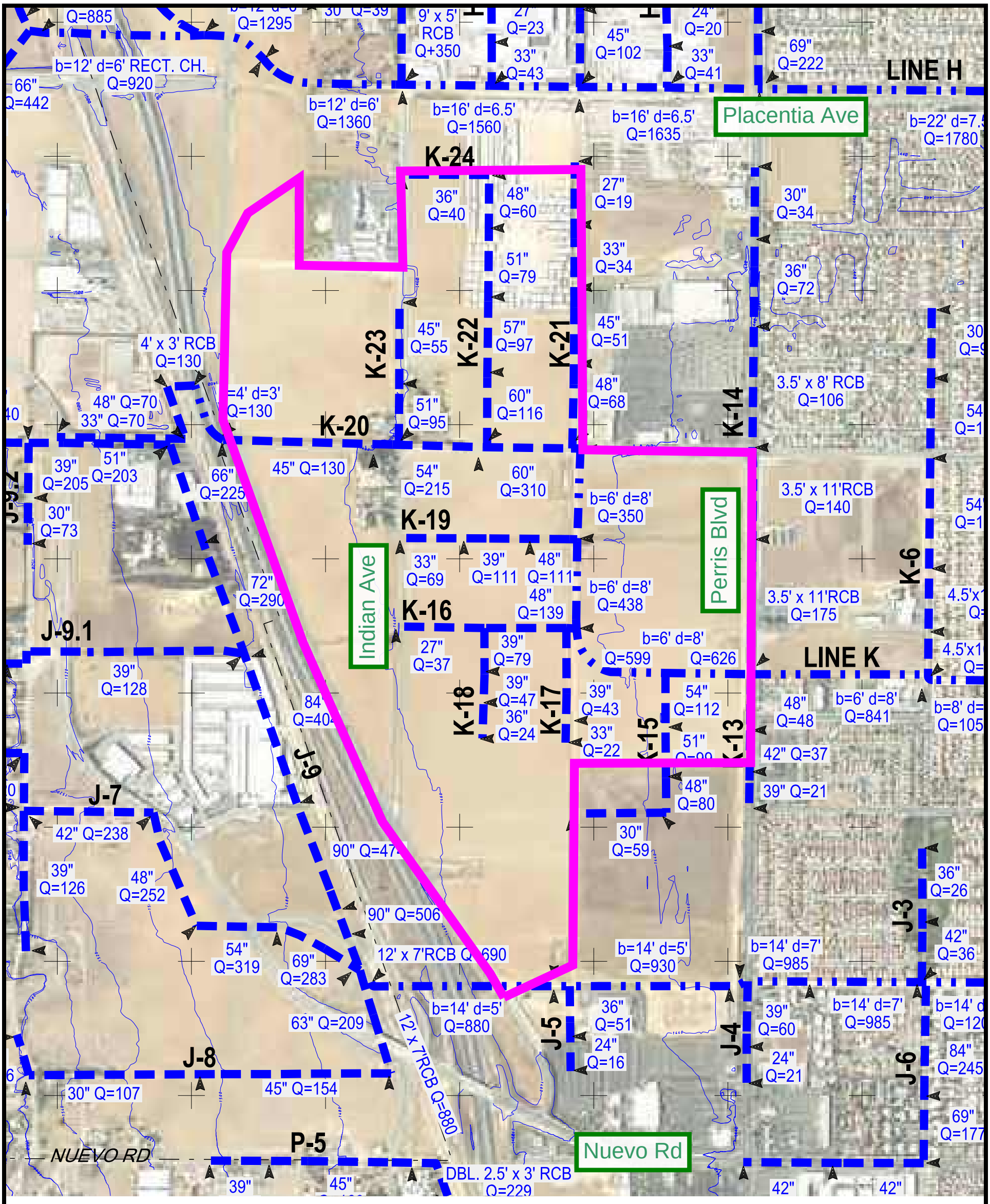
0 500 1,000 ft

FMCIVIL ENGINEERS INC.

Source: USDA Web Soil Survey

HARVEST LANDING

SITE 1 - HYDROLOGICAL SOIL GROUPS



N.T.S.

Site Boundary

MDP Facilities

Perris Harvest Landing MDP Exhibit

FMCIVIL ENGINEERS INC.

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING INDUSTRIAL - PHASE I
OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM

VICINITY MAP

T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER

FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA, CA 92563
CONTACT: FRANCISCO MARTINEZ
(TEL)951-331-9813

ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: STEPHEN PRZYBYLOWSKI
(TEL)714-639-9860

LEGEND

- RIGHT OF WAY
- (1025) EXISTING CONTOUR
- EASEMENT
- SD PROP. ONSITE STORM DRAIN SYSTEM
- SD PROP. OFFSITE STORM DRAIN SYSTEM
- PROP. STORM DRAIN LOW FLOW SYSTEM
- PROP. STORM DRAIN UNDER DRAIN SYSTEM
- W EXISTING WATER LINE
- W PROP. WATER LINE
- SS EXISTING SWR LINE
- SS PROP. SEWER LINE
- SD EXISTING STORM DRAIN PIPE
- E EXISTING OVERHEAD LINES

SCALE 1"=200'

200 100 0 200 400 600

SCALE: 1"=200'

CITY OF PERRIS

HARVEST LANDING INDUSTRIAL - PHASE I
OFFSITE MASTER STORM DRAIN
& LOW FLOW SYSTEM EXHIBIT

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

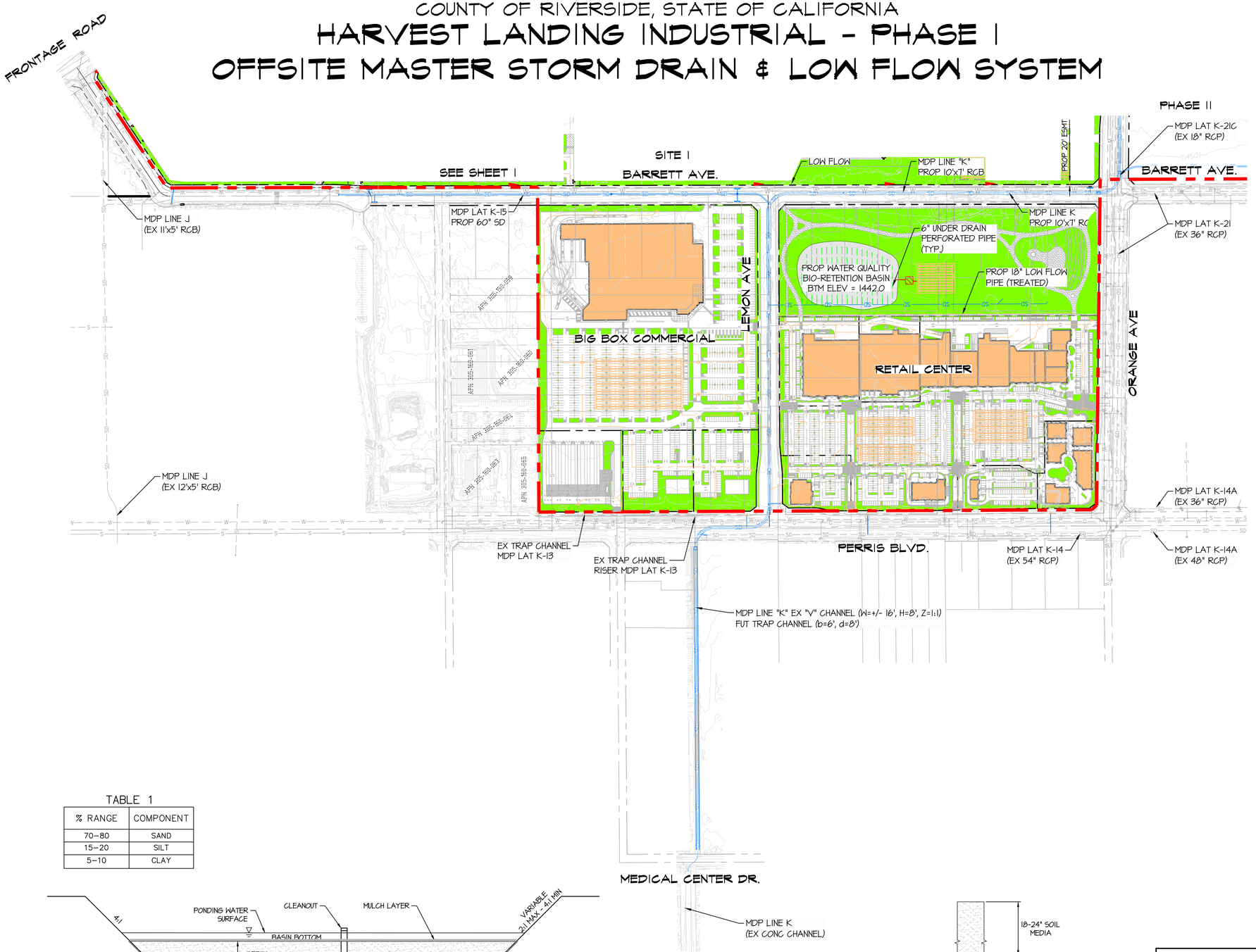
FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.473.0202 - FMCIVIL.COM

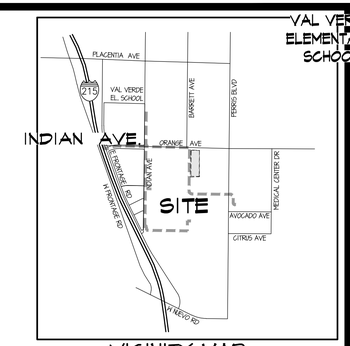
SHEET 1 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLOT\ENTITLEMENT\CUP\ALT-3\20-001-CUP_MSD3-01.DWG DANNY 10/7/2024 4:55 PM

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING INDUSTRIAL - PHASE I
OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM





VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER
HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

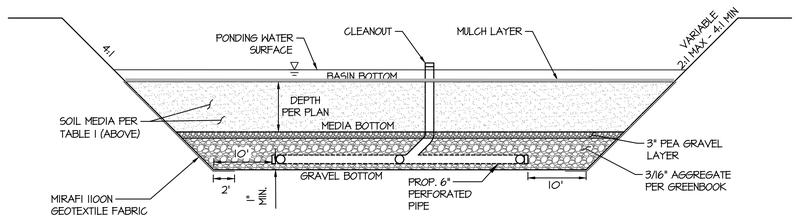
ENGINEER
FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA, CA 92563
CONTACT: FRANCISCO MARTINEZ
(TEL)951-331-9873

ARCHITECT
AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: STEPHEN PRZYBYLOWSKI
(TEL)714-639-9860

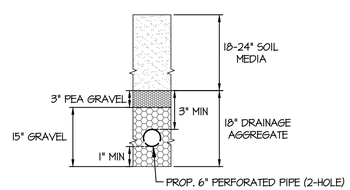
TABLE 1

% RANGE	COMPONENT
70-80	SAND
15-20	SILT
5-10	CLAY

LEGEND
- RIGHT OF WAY
- (1025) EXISTING CONTOUR
- EASEMENT
- SD PROP. ONSITE STORM DRAIN SYSTEM
- SD PROP. OFFSITE STORM DRAIN SYSTEM
- PROP. STORM DRAIN LOW FLOW SYSTEM
- PROP. STORM DRAIN UNDER DRAIN SYSTEM
- W EXISTING WATER LINE
- W PROP. WATER LINE
- SS EXISTING SWR LINE
- SS PROP. SEWER LINE
- SD EXISTING STORM DRAIN PIPE
- E EXISTING OVERHEAD LINES



BASIN CROSS SECTION
N.T.S.



AGGREGATE CROSS SECTION
N.T.S.

CITY OF PERRIS

HARVEST LANDING INDUSTRIAL - PHASE I OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM EXHIBIT

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF.:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 2 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNCK\ENTITLEMENT\CUP\ALT-3\20-001-CUP_MSD3-01.DWG DANNY 10/8/2024 7:35 AM

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

LEGEND

- (1025) EXISTING CONTOUR
- 1025 PROPOSED CONTOUR
- A RETAINING WALL
- FENCE
- E EDGE OF PAVEMENT
- SIGN
- MH MANHOLE
- RIGHT OF WAY
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- SCREEN WALL
- COMBINATION SCREEN/RETAINING WALL
- EXISTING LOT LINE
- RIDGE LINE
- RIBBON GUTTER
- FLOW ARROW
- PROPOSED EDGE OF PAVEMENT
- W EXISTING WATER LINE
- W PROPOSED WATER LINE
- SS EXISTING SWR LINE
- SS PROPOSED SEWER LINE
- SD EXISTING STORM DRAIN PIPE
- SD PROPOSED STORM DRAIN PIPE
- E EXISTING OVERHEAD LINES
- CUT/FILL LINE
- SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

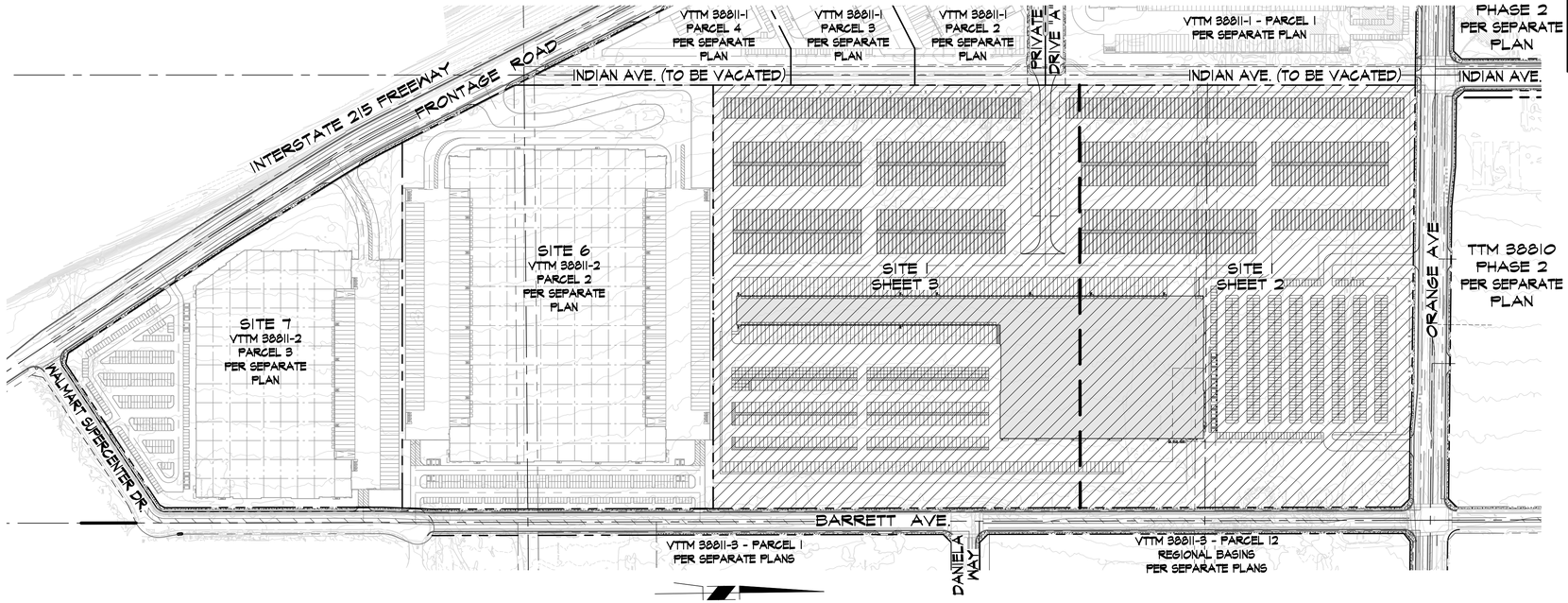
PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-120-004 thru 008, 020 thru 026, &
305-130-001 thru 006, 009, &
305-160-001 thru 003, 025 thru 030, &
305-190-014, 019, 020, 028 thru 031, &
305-220-011, 054 thru 062

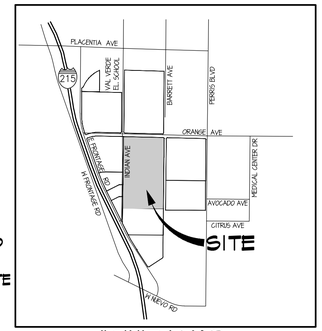
LEGAL DESCRIPTION

BLOCKS 1-4 OF FIGADOTA FARMS NO. 1A AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 68 TOGETHER WITH LOTS 1-8, AND 13-20 OF FIGADOTA FARMS AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 53 EXCEPTING THAT PORTION LYING WEST OF THE EASTERLY LINE OF THE FRONTAGE ROAD.



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP

T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
2244 NORTH PACIFIC STREET
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-637-3333

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

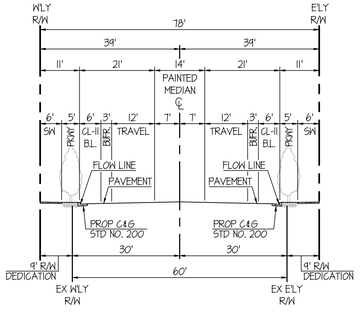
ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

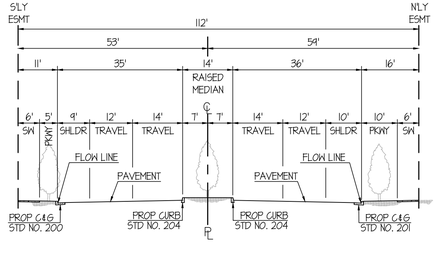
EARTHWORK ESTIMATE:

RAW CUT:	291,230 CY
RAW FILL:	93,330 CY
NET:	197,900 CY EXPORT

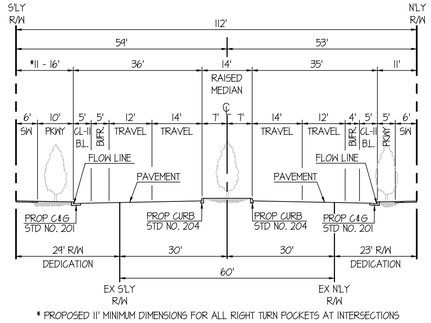
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 15,223



BARRETT AVE
(N'LY WALMART DWY - ORANGE AVE)
MAJOR COLLECTOR
(78'/56')

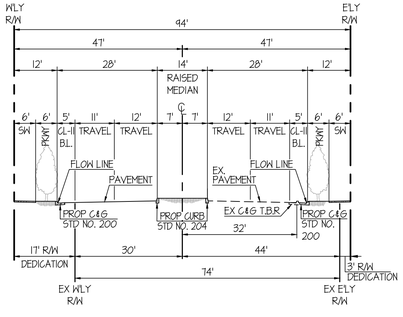


PRIVATE DRIVE "A"
SECONDARY ARTERIAL
(112'/85')



* PROPOSED 11' MINIMUM DIMENSIONS FOR ALL RIGHT TURN POCKETS AT INTERSECTIONS

ORANGE AVENUE
(WEST OF BARRETT AVE)
SECONDARY ARTERIAL
(112'/85')



INDIAN AVE
(NORTH OF ORANGE)
SECONDARY ARTERIAL
(94'/70')

CITY OF PERRIS

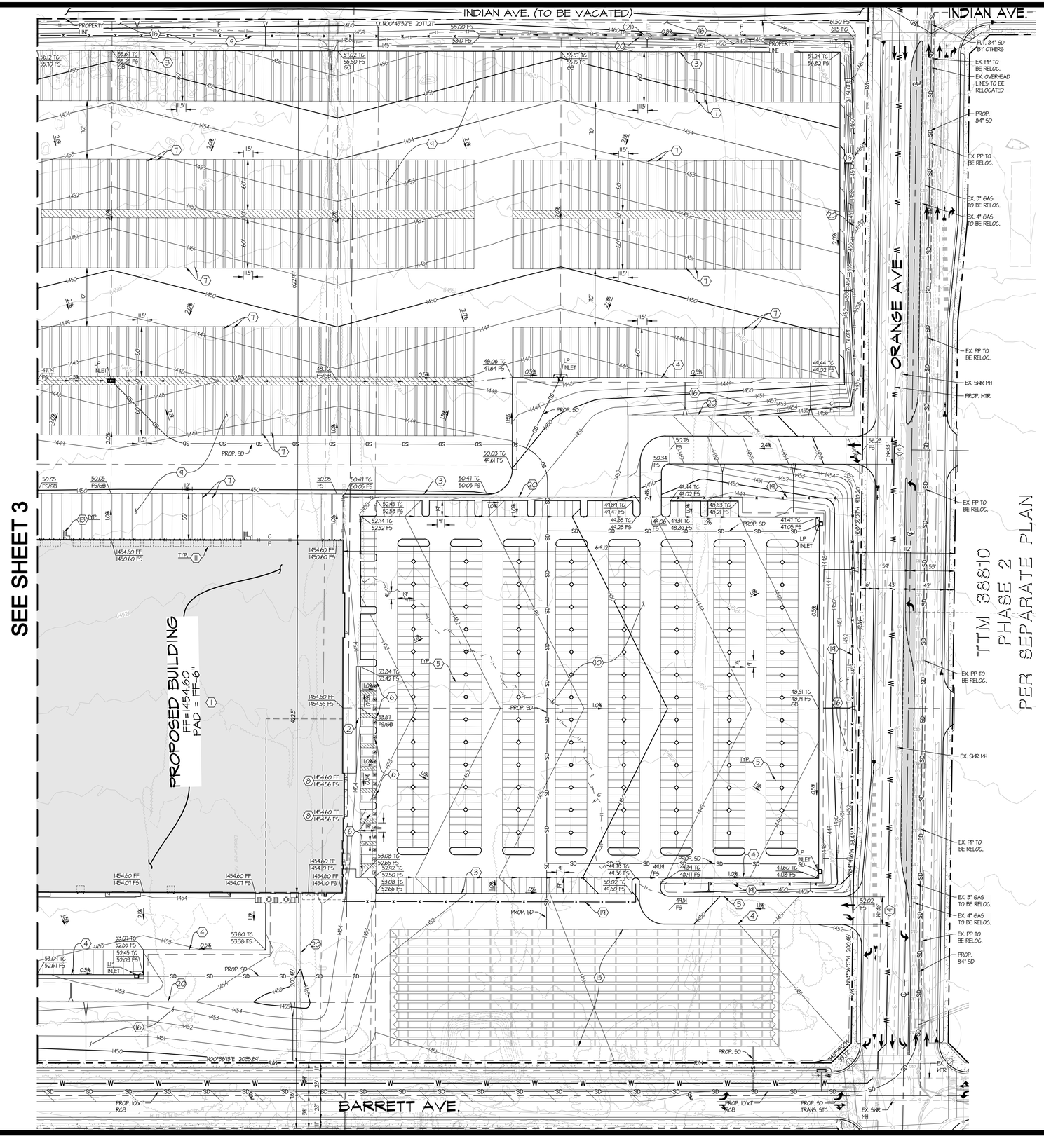
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 1 OF 3 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-1-FEDEX\20-001-CUP_BLDG1_FEDEX-CG-01.DWG JASON STOUFFER 10/2/2024 4:49 PM



SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND STORM WATER CHAMBER SYSTEM
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. CHAIN LINK FENCE PER ARCHITECT'S PLANS
20. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
21. CONCRETE RIBBON GUTTER/SWALE

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

SCALE:	AS SHOWN
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41810 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
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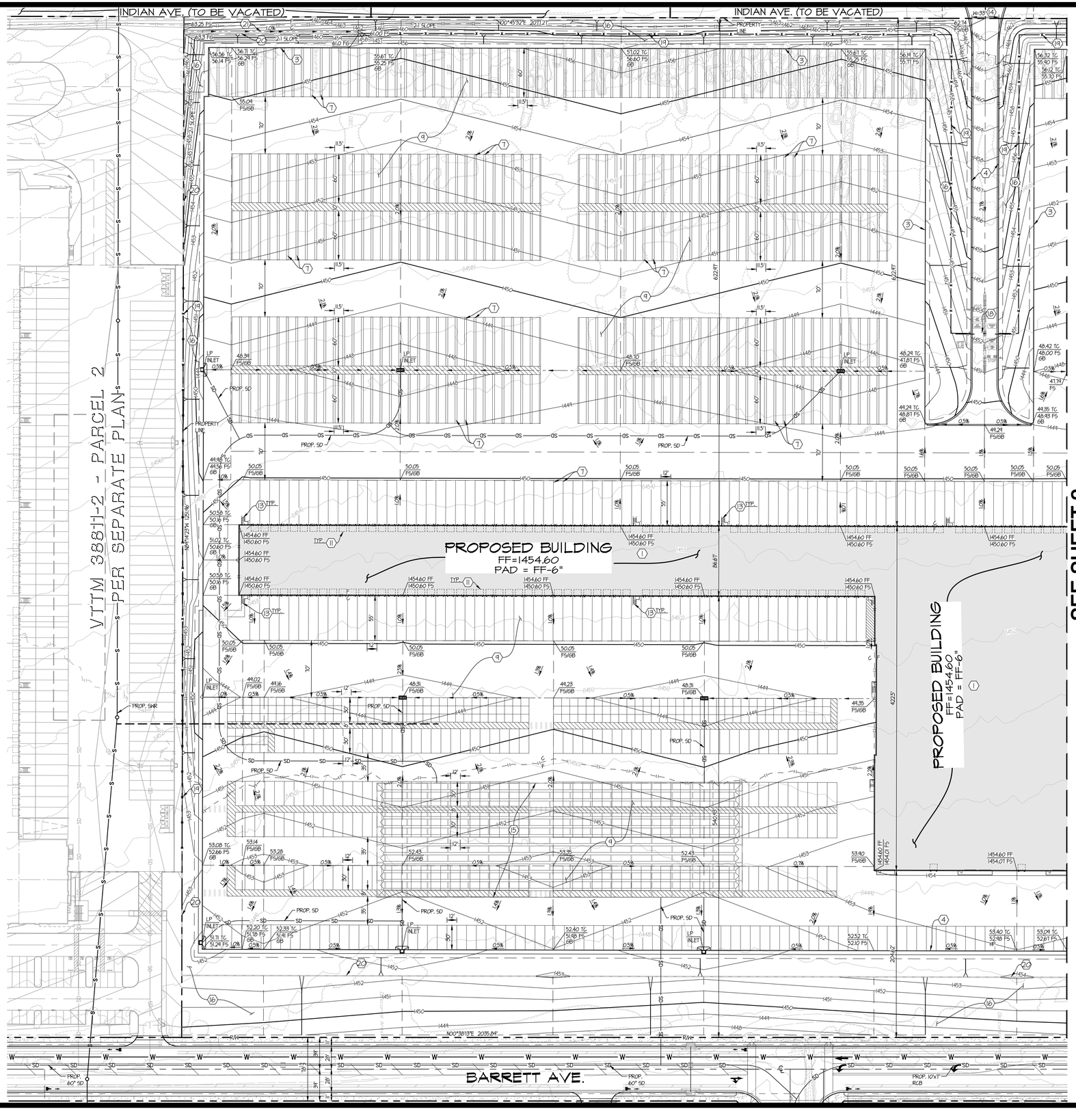
SHEET 2 OF 3 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-1-FEDEX\20-001-CUP_BLDG1_FEDEX-CG-01.DWG JASON STOUFFER 10/7/2024 4:09 PM



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HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

SCALE: AS SHOWN	SHEET
DATE: OCT. 2024	3
DESIGNED: AJ	OF 3 SHEETS
CHECKED: FM	
PLN CK REF:	

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MURRIETA, CA 92562
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H:\PDATA\20-001 HARVEST LANDING\DWGS\PLOT\ENTITLEMENT\CUP\ALT-3\BLDG-1-FEDEX\20-001-CUP_BLD01_FEDEX-GG-01.DWG JASON STOUFFER 10/7/2024 4:09 PM