HYDROLOGIC AND HYDRAULIC STUDY FOR NATIONAL QUARRIES

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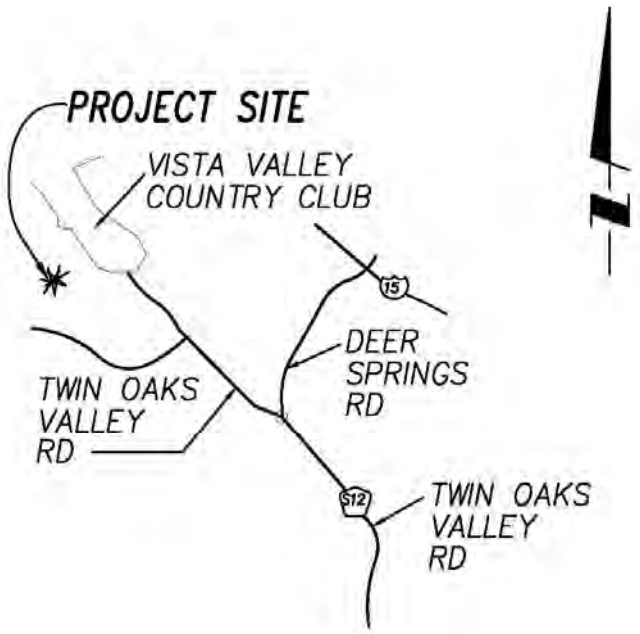
INTRODUCTION

The proposed project is a vested quarry located within a hillside west of the south fork of Gopher Canyon Creek in northern San Diego County (see Vicinity Map). Surface runoff from the quarry currently flows in an easterly direction into the south fork of Gopher Canyon Creek. There are no significant drainage improvements in the quarry. An approved replacement Reclamation Plan (RP 79-05M1) exists for the site. A revised Reclamation Plan with three phases has been prepared showing a larger reclamation area (the Reclamation Plan is included following the report text). Under the revised plan, the majority of the site's surface runoff will be directed towards a proposed storm drain pipe(s), which will continue to convey the runoff into the creek.

Site access is provided by a private road from Twin Oaks Valley Road. The road crosses Gopher Canyon Creek prior to entering the quarry operations area. The crossing is an earthen embankment with a single pipe culvert, and is located on an adjacent parcel. Access constraints prevented measurement of the culvert diameter, but visual observation suggests that the diameter may be 6 to 8 feet. The revised Reclamation Plan proposes realignment of the road at the creek crossing so that the road is entirely within the quarry site. The realignment would move the crossing approximately 400 feet upstream. In addition, the road will be designed with triple 84-inch corrugated metal pipe culverts with greater conveyance than the existing culvert.

Extractive activities have been divided into three phases as shown on the Reclamation Plan drawings included in this report. The first phase shows two large pads within the majority of the site separated by the existing access road. The second phase will lower the westerly pad to the level of the easterly pad, which will, in effect, create a single pad. The third phase will lower the entire second phase pad by approximately 50 feet. All three phases will reduce the flows leaving the site and reduce off-site flooding impacts because the pads will increase the time of concentration. The pads should also reduce sediment exiting the site. An industrial Storm Water Pollution Prevention Plan is required for extraction sites. The SWPPP will address specific best management practices for erosion and sediment control as well as other pollutants of concern. It is anticipated that the BMPs will primarily include additional desilting basins and stockpile protection, since sediment will be the main pollutant of concern from the site.

This report contains 100-year hydrologic analyses for the existing and ultimate proposed (Phase 3) site conditions, and hydraulic analyses for the proposed storm drain. In addition, hydrologic and hydraulic analyses have been prepared for the proposed creek crossing. The project is not located in or adjacent to any floodplain or floodway areas plotted on the County of San Diego or Federal Emergency Management Agency maps.



VICINITY MAP

N.T.S.

HYDROLOGIC CRITERIA

Existing and proposed condition 100-year rational method analyses were originally prepared for the site based on the County of San Diego's 1993 *Hydrology Manual*. In late 2003, the County published an updated hydrology manual. The hydrologic analyses in this report have been updated based on the 2003 criteria.

The drainage areas, flow lengths, and elevations were determined based on the revised Reclamation Plan as well as topographic mapping for the site and the United States Geological Survey's (USGS) quadrangle maps (see the Existing and Proposed Condition Rational Method Work Maps in Appendix A). The hydrologic soil group is "D" and the existing and proposed land uses are essentially natural terrain; therefore, the runoff coefficient is 0.35.

Hydrology analyses were also prepared to determine the flow rate in the creek at the proposed access road crossing. The tributary drainage area, flow lengths, and elevations were determined based on the USGS quadrangle maps. The drainage area is approximately 1.8 square miles; therefore, HEC-1 was used for the analyses. The land uses in the drainage area are primarily large estate lots. Consequently, the curve number was based on the hydrologic soil group and vegetative cover maps from the County of San Diego. Both 20- and 100-year flow rates were determined. The Surface Mining and Reclamation Act (SMARA) requires erosion control for a 20-year storm event; therefore, the access road was designed to prevent flow overtopping, and subsequent erosion, during at least a 20-year event. The 20-year flow rate was determined by performing HEC-1 analyses of the 10-, 25-, and 100-year storm events and interpolating the results.

HYDROLOGIC RESULTS

The 100-year existing and proposed condition rational method analyses are included in Appendix A. The overall existing condition watershed was set to match the overall proposed condition watershed to allow a fair comparison of the results. Under existing conditions, the quarry was divided into six drainage basins labeled Basins 10 through 60. The runoff from these basins enters the creek at different locations. The total drainage area is approximately 179.3 acres, and the sum of the runoff from the six basins is approximately 280 cubic feet per second (cfs). Table 1 summarizes the 100-year existing condition rational method results at the outlet of each basin.

Under the ultimate proposed condition (Phase 3), the quarry is modeled by Basin 100 and has a 100-year runoff of approximately 220 cfs from the 179.3 acre area. The total proposed condition runoff is lower than the total existing condition runoff because the revised Reclamation Plan creates a large pad, which increases the time of concentration. The pad will also assist in preventing sediment from entering the creek.

Using the proposed condition rational method results, a WSPGW analysis (see Appendix B) was performed to size the ultimate storm drain that will collect the plant runoff and discharge into the creek. The analyses showed that a 72 inch CMP could convey the 100-year flow. Grouted riprap will be constructed at the outlet of the pipe to dissipate the flow velocities and to protect against

erosion. The pipe outlet is within the National Quarries site; therefore, flow is not being concentrated on an adjacent property. The storm drain for Phases 2 and 3 were designed with the same size as the ultimate (Phase 3) storm drain. Since more area will be tributary to the ultimate storm drain, the storm drain sizing for Phases 2 and 3 is conservative.

These results indicate that the project will reduce the 100-year flow from the site. This is beneficial because it will slightly reduce flooding and erosion potential in the creek. In addition, the proposed drainage facilities have been designed to avoid impacts on adjacent properties.

Drainage Basin	Tributary Area, Ac	100-Year Flow, cfs
10	5.45	13.0
20	8.65	17.4
30	28.8	45.0
40	31.69	48.2
50	58.92	93.4
60	45.74	62.8
Total	179.25	280

Table 1. Summary of 100-Year Existing Condition Rational Method Analyses

The 10-, 25-, and 100-year HEC-1 analyses and backup data are included in Appendix C. The HEC-1 analyses show that the interpolated 20-year flow rate at the proposed access road crossing is approximately 1,950 cfs and the 100-year flow rate is approximately 2,786 cfs.

HYDRAULIC CRITERIA

HEC-RAS hydraulic analyses were performed to analyze the private road crossing of the creek. The adjacent portion of the creek is a relatively narrow, natural channel with steep side slopes and medium to dense vegetation and trees. The HEC-RAS cross-sections were based on the site topographic mapping and the roughness coefficients were based on the existing channel roughness (n=0.075). The existing road crossing is an earthen embankment with a single culvert, which is insufficient to convey the 100-year flow rate. The proposed crossing will be approximately 400 feet upstream of the existing crossing and will contain multiple culverts. The crossing is intended to provide at least 20-year conveyance of the creek flow in accordance with SMARA's requirements.

HYDRAULIC RESULTS

The 20- and 100-year HEC-RAS results and workmap are included in Appendix D. The analysis determined that three 84-inch corrugated metal pipe culverts are required to convey the 20-year flow without overtopping the road. The 100-year water surface will overtop the road; therefore, the road embankment may have to be reconstructed following large storm events. The proposed

culverts provide greater flow conveyance than the existing single culvert, which will generally result in lower water surface elevations.

CONCLUSION

Hydrologic and hydraulic analyses have been performed for National Quarries. Rational Method analyses were used to design the on-site storm drain pipes. The analyses demonstrated that the ultimate site condition according to the revised Reclamation Plan will decrease the 100-year flow in the south fork of Gopher Canyon Creek. The drainage patterns at the site will be altered by the project. The project will direct the majority of the site runoff to a proposed storm drain(s). This runoff will be adequately conveyed by the proposed storm drain(s) and riprap will mitigate for the erosive velocities existing the storm drain. The cumulative site runoff entering the receiving water body, Gopher Canyon Creek, will be reduced by the project. Since the proposed outlet location will be near the downstream portion of the project, the flow rates in the creek above the outlet will be reduced, i.e, runoff from the project will not enter the upstream reach of the creek. The project generally will reduce flood-related impacts on adjacent and downstream properties along Gopher Canyon Creek.

The project will occur in three phases as shown on the engineering drawings. A desiltation basin near the primary project outfall as well as other BMPs (pursuant to an industrial SWPPP) will be implemented during each phase. Containment in the form of silt fencing, straw waddles, gravel bags, etc. will be provided around on-site material stockpiles to prevent erosion, siltation, or flooding impacts.

Synthetic hydrograph and hydraulic analyses of the creek were used to design the realigned private access road serving the site. The road will contain three 84-inch corrugated metal pipes to convey the 20-year flow rate at a minimum. These pipes convey more flow than the existing culvert, which benefits upstream water surface elevations.

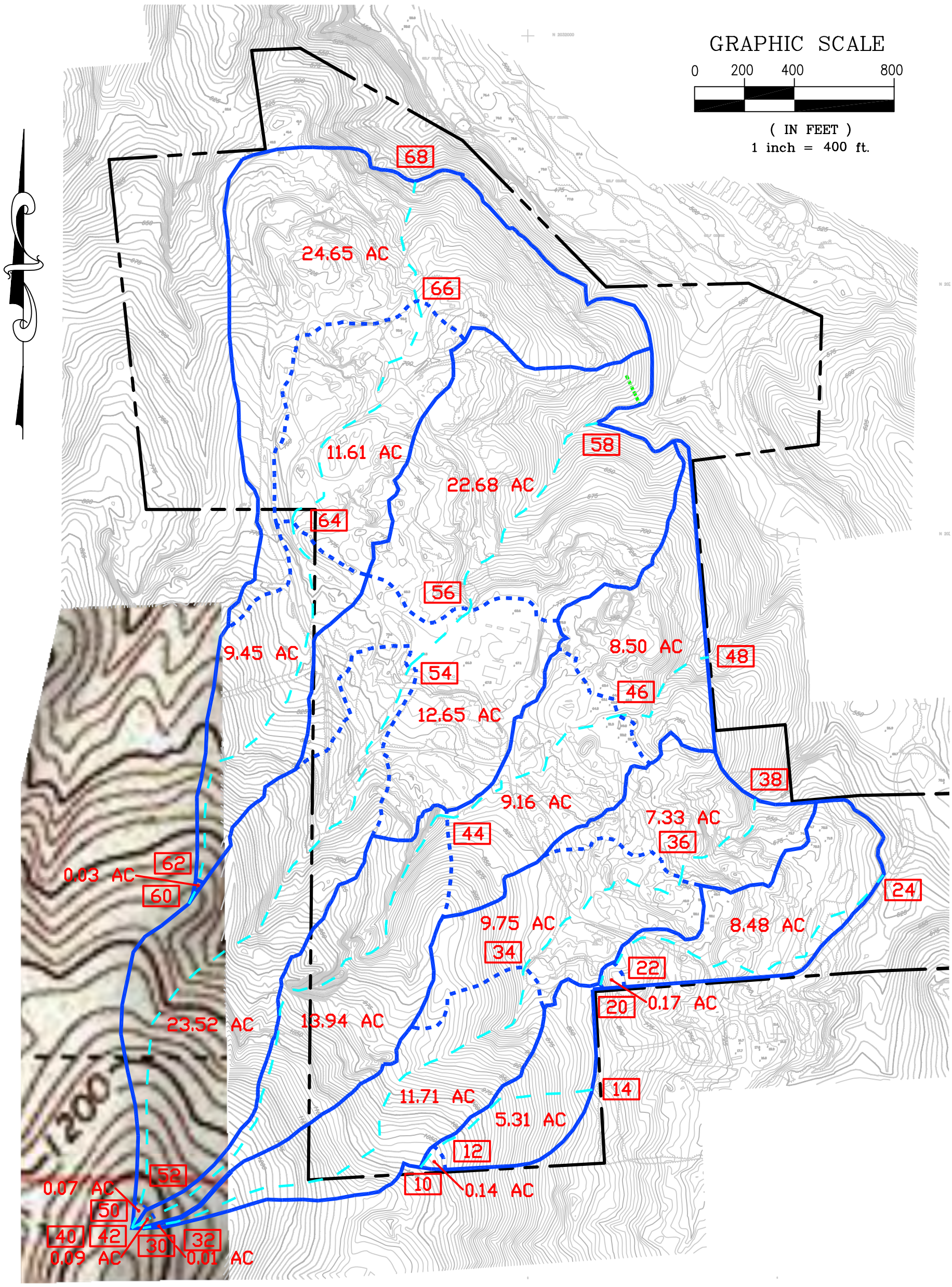
The northerly portion of the site crosses over the south fork of Gopher Canyon Creek. The proposed reclamation activities in this area will be confined to the hillside area that is many feet above the 100-year floodplain. The activities will not impact the existing floodplain. As a result, a hydraulic analysis has not been prepared for this reach of the creek.

APPENDIX A

EXISTING AND PROPOSED CONDITION

100-YEAR RATIONAL METHOD

ANALYSES AND WORKMAPS

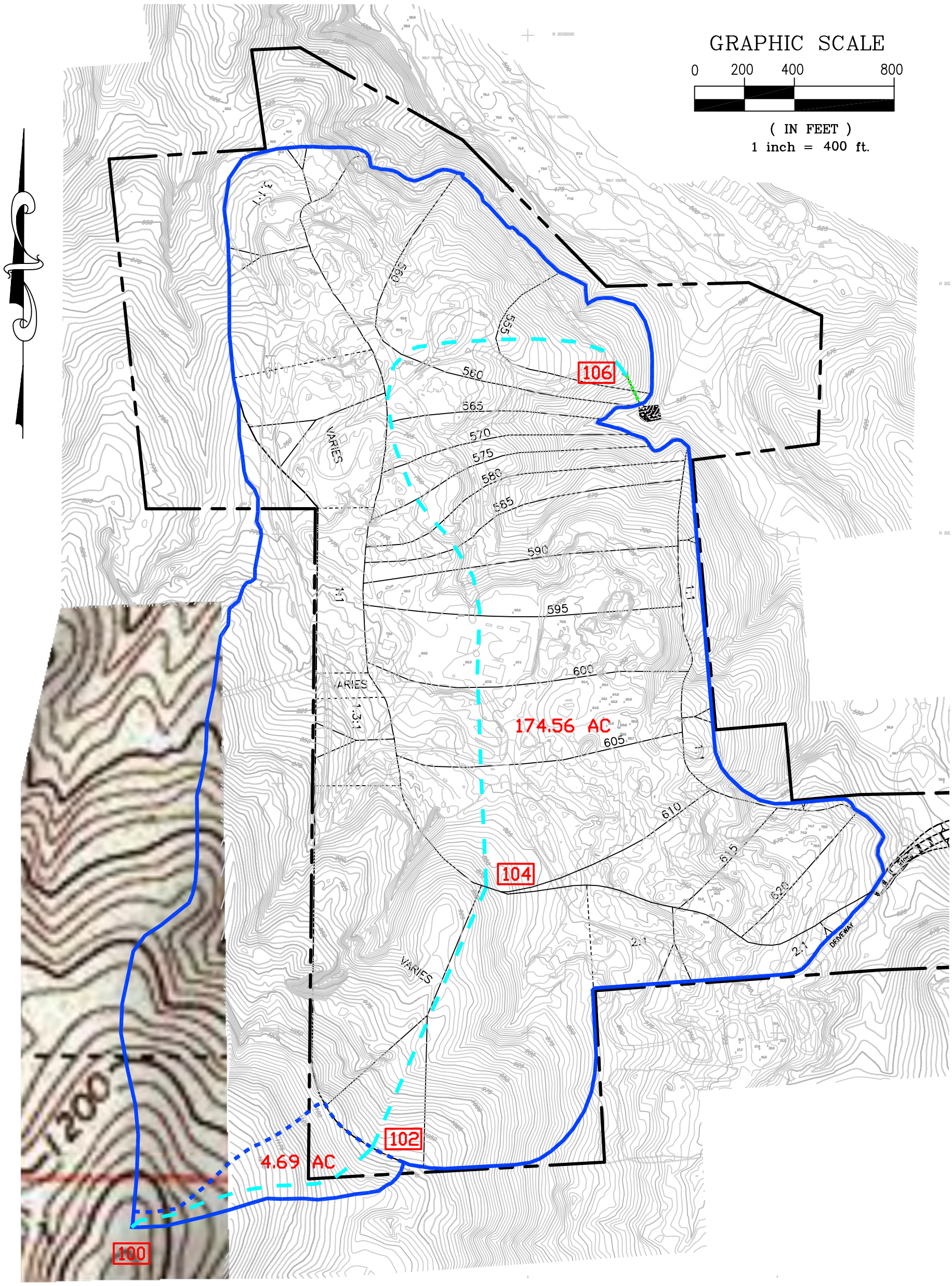


LEGEND:

- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- NATURAL FLOW PATH
- 3.62 AC DRAINAGE BASIN AREA
- 10 RATIONAL METHOD NODE NUMBER

EXISTING CONDITION

RATIONAL METHOD WORK MAP



LEGEND:

- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- FLOW PATH
- PROPOSED STORM DRAIN
- 3.62 AC DRAINAGE BASIN AREA
- 100 RATIONAL METHOD NODE NUMBER

PROPOSED CONDITION

RATIONAL METHOD WORK MAP

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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 06/11/06
----------------------------------------------------------------------
National Quarries
Existing Condition Analysis
100-Year Storm Event
Basin 10
----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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Program License Serial Number 4028

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Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.500
24 hour precipitation(inches) =  6.400
P6/P24 =    54.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1068.000(Ft.)
Lowest elevation = 1053.000(Ft.)
Elevation difference =   15.000(Ft.) Slope = 15.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  15.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.47 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  15.000^(1/3)]=   5.47
Rainfall intensity (I) =      8.698(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
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Subarea runoff =      0.426(CFS)
Total initial stream area =        0.140(Ac.)


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Process from Point/Station       12.000 to Point/Station       14.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  1053.000(Ft.)
Downstream point elevation =   825.000(Ft.)
Channel length thru subarea  =   695.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =      6.733(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      6.733(CFS)
Depth of flow =   0.131(Ft.), Average velocity =   4.536(Ft/s)
Channel flow top width =   12.624(Ft.)
Flow Velocity =    4.54(Ft/s)
Travel time  =    2.55 min.
Time of concentration =    8.03 min.
Critical depth =      0.223(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      6.795(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      1.907
Subarea runoff =     12.535(CFS) for      5.310(Ac.)
Total runoff =     12.961(CFS)      Total area =       5.450(Ac.)
Depth of flow =   0.191(Ft.), Average velocity =   5.683(Ft/s)
Critical depth =      0.332(Ft.)
End of computations, total study area =           5.450 (Ac.)
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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 06/11/06
----------------------------------------------------------------------
National Quarries
Existing Condition Analysis
100-Year Storm Event
Basin 20
----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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Program License Serial Number 4028

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Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.500
24 hour precipitation(inches) =  6.400
P6/P24 =    54.7%
San Diego hydrology manual 'C' values used


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Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  835.000(Ft.)
Lowest elevation =  813.000(Ft.)
Elevation difference =   22.000(Ft.) Slope = 22.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  22.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.82 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  22.000^(1/3)]=   4.82
Calculated TC of    4.818 minutes is less than 5 minutes,
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 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      9.222(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.549(CFS)
Total initial stream area =        0.170(Ac.)


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Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   813.000(Ft.)
Downstream point elevation =   622.000(Ft.)
Channel length thru subarea  =  1359.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =   5.000
Slope or 'Z' of right channel bank =   5.000
Estimated mean flow rate at midpoint of channel =      8.995(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      8.995(CFS)
Depth of flow =   0.203(Ft.), Average velocity =   4.023(Ft/s)
Channel flow top width =   12.030(Ft.)
Flow Velocity =    4.02(Ft/s)
Travel time  =    5.63 min.
Time of concentration =   10.45 min.
Critical depth =      0.277(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.733(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      3.027
Subarea runoff =     16.807(CFS) for      8.480(Ac.)
Total runoff =     17.356(CFS)      Total area =       8.650(Ac.)
Depth of flow =   0.298(Ft.), Average velocity =   5.074(Ft/s)
Critical depth =      0.422(Ft.)
End of computations, total study area =           8.650 (Ac.)
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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 06/11/06
----------------------------------------------------------------------
National Quarries
Existing Condition Analysis
100-Year Storm Event
Basin 30
----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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Program License Serial Number 4028

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Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.500
24 hour precipitation(inches) =  6.400
P6/P24 =    54.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       32.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1325.000(Ft.)
Lowest elevation = 1310.000(Ft.)
Elevation difference =   15.000(Ft.) Slope = 15.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  15.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.47 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  15.000^(1/3)]=   5.47
Rainfall intensity (I) =      8.698(In/Hr) for a   100.0 year storm
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Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.030(CFS)
Total initial stream area =        0.010(Ac.)


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Process from Point/Station       32.000 to Point/Station       34.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  1310.000(Ft.)
Downstream point elevation =   825.000(Ft.)
Channel length thru subarea  =  1948.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     11.010(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     11.010(CFS)
Depth of flow =   0.194(Ft.), Average velocity =   5.261(Ft/s)
Channel flow top width =   11.554(Ft.)
Flow Velocity =    5.26(Ft/s)
Travel time  =    6.17 min.
Time of concentration =   11.65 min.
Critical depth =      0.320(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.345(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      4.102
Subarea runoff =     21.896(CFS) for     11.710(Ac.)
Total runoff =     21.926(CFS)      Total area =      11.720(Ac.)
Depth of flow =   0.291(Ft.), Average velocity =   6.747(Ft/s)
Critical depth =      0.492(Ft.)


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Process from Point/Station       34.000 to Point/Station       36.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   825.000(Ft.)
Downstream point elevation =   750.000(Ft.)
Channel length thru subarea  =   857.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     28.549(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     28.549(CFS)
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Depth of flow =   0.459(Ft.), Average velocity =   5.252(Ft/s)
Channel flow top width =   13.674(Ft.)
Flow Velocity =    5.25(Ft/s)
Travel time  =    2.72 min.
Time of concentration =   14.36 min.
Critical depth =      0.586(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.669(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      7.515
Subarea runoff =     13.155(CFS) for      9.750(Ac.)
Total runoff =     35.082(CFS)      Total area =      21.470(Ac.)
Depth of flow =   0.517(Ft.), Average velocity =   5.627(Ft/s)
Critical depth =      0.664(Ft.)


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Process from Point/Station       36.000 to Point/Station       38.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   750.000(Ft.)
Downstream point elevation =   625.000(Ft.)
Channel length thru subarea  =   512.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     40.074(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     40.074(CFS)
Depth of flow =   0.415(Ft.), Average velocity =   8.271(Ft/s)
Channel flow top width =   13.324(Ft.)
Flow Velocity =    8.27(Ft/s)
Travel time  =    1.03 min.
Time of concentration =   15.40 min.
Critical depth =      0.719(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.464(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     10.080
Subarea runoff =      9.918(CFS) for      7.330(Ac.)
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Total runoff =     45.000(CFS)      Total area =      28.800(Ac.)
Depth of flow =   0.444(Ft.), Average velocity =   8.603(Ft/s)
Critical depth =      0.766(Ft.)
End of computations, total study area =          28.800 (Ac.)
```

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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 06/11/06
----------------------------------------------------------------------
National Quarries
Existing Condition Analysis
100-Year Storm Event
Basin 40
----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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Program License Serial Number 4028

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Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.500
24 hour precipitation(inches) =  6.400
P6/P24 =    54.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       42.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1330.000(Ft.)
Lowest elevation = 1320.000(Ft.)
Elevation difference =   10.000(Ft.) Slope = 10.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  10.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.27 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  10.000^(1/3)]=   6.27
Rainfall intensity (I) =      7.972(In/Hr) for a   100.0 year storm
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Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.251(CFS)
Total initial stream area =        0.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       44.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  1320.000(Ft.)
Downstream point elevation =   815.000(Ft.)
Channel length thru subarea  =  2174.000(Ft.)
Channel base width      =    7.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     12.830(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     12.830(CFS)
Depth of flow =   0.265(Ft.), Average velocity =   6.014(Ft/s)
Channel flow top width =    9.118(Ft.)
Flow Velocity =    6.01(Ft/s)
Travel time  =    6.02 min.
Time of concentration =   12.29 min.
Critical depth =      0.430(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.163(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      4.910
Subarea runoff =     25.100(CFS) for     13.940(Ac.)
Total runoff =     25.351(CFS)      Total area =      14.030(Ac.)
Depth of flow =   0.391(Ft.), Average velocity =   7.565(Ft/s)
Critical depth =      0.648(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       44.000 to Point/Station       46.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   815.000(Ft.)
Downstream point elevation =   750.000(Ft.)
Channel length thru subarea  =   879.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     31.021(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     31.021(CFS)
```

```
Depth of flow =   0.505(Ft.), Average velocity =   5.106(Ft/s)
Channel flow top width =   14.043(Ft.)
Flow Velocity =    5.11(Ft/s)
Travel time  =    2.87 min.
Time of concentration =   15.16 min.
Critical depth =      0.613(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.509(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      8.117
Subarea runoff =     11.248(CFS) for      9.160(Ac.)
Total runoff =     36.599(CFS)      Total area =      23.190(Ac.)
Depth of flow =   0.555(Ft.), Average velocity =   5.393(Ft/s)
Critical depth =      0.680(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       46.000 to Point/Station       48.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   750.000(Ft.)
Downstream point elevation =   650.000(Ft.)
Channel length thru subarea  =   490.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     42.448(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     42.448(CFS)
Depth of flow =   0.652(Ft.), Average velocity =   9.361(Ft/s)
Channel flow top width =    8.912(Ft.)
Flow Velocity =    9.36(Ft/s)
Travel time  =    0.87 min.
Time of concentration =   16.03 min.
Critical depth =      1.047(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.349(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     11.092
Subarea runoff =     11.642(CFS) for      8.500(Ac.)
```

```
Total runoff =     48.241(CFS)      Total area =      31.690(Ac.)
Depth of flow =   0.699(Ft.), Average velocity =   9.727(Ft/s)
Critical depth =      1.125(Ft.)
End of computations, total study area =          31.690 (Ac.)
```

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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 06/11/06
----------------------------------------------------------------------
National Quarries
Existing Condition Analysis
100-Year Storm Event
Basin 50
----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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Program License Serial Number 4028

----------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.500
24 hour precipitation(inches) =  6.400
P6/P24 =    54.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       52.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1330.000(Ft.)
Lowest elevation = 1320.000(Ft.)
Elevation difference =   10.000(Ft.) Slope = 10.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  10.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.27 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  10.000^(1/3)]=   6.27
Rainfall intensity (I) =      7.972(In/Hr) for a   100.0 year storm
```

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Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.195(CFS)
Total initial stream area =        0.070(Ac.)


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Process from Point/Station       52.000 to Point/Station       54.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  1320.000(Ft.)
Downstream point elevation =   765.000(Ft.)
Channel length thru subarea  =  2570.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     22.064(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     22.064(CFS)
Depth of flow =   0.447(Ft.), Average velocity =   7.793(Ft/s)
Channel flow top width =    7.680(Ft.)
Flow Velocity =    7.79(Ft/s)
Travel time  =    5.50 min.
Time of concentration =   11.76 min.
Critical depth =      0.727(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.311(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      8.256
Subarea runoff =     43.653(CFS) for     23.520(Ac.)
Total runoff =     43.849(CFS)      Total area =      23.590(Ac.)
Depth of flow =   0.653(Ft.), Average velocity =   9.641(Ft/s)
Critical depth =      1.070(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   765.000(Ft.)
Downstream point elevation =   760.000(Ft.)
Channel length thru subarea  =   323.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =     52.695(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     52.695(CFS)
```

```
Depth of flow =   0.919(Ft.), Average velocity =   2.986(Ft/s)
Channel flow top width =   28.388(Ft.)
Flow Velocity =    2.99(Ft/s)
Travel time  =    1.80 min.
Time of concentration =   13.57 min.
Critical depth =      0.742(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.844(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     12.684
Subarea runoff =     17.595(CFS) for     12.650(Ac.)
Total runoff =     61.443(CFS)      Total area =      36.240(Ac.)
Depth of flow =   0.991(Ft.), Average velocity =   3.113(Ft/s)
Critical depth =      0.805(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       58.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   760.000(Ft.)
Downstream point elevation =   568.000(Ft.)
Channel length thru subarea  =  1000.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   2.500
Slope or 'Z' of right channel bank =   2.500
Estimated mean flow rate at midpoint of channel =     77.466(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     77.466(CFS)
Depth of flow =   0.938(Ft.), Average velocity =  11.247(Ft/s)
Channel flow top width =    9.689(Ft.)
Flow Velocity =   11.25(Ft/s)
Travel time  =    1.48 min.
Time of concentration =   15.05 min.
Critical depth =      1.516(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.531(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     20.622
Subarea runoff =     31.992(CFS) for     22.680(Ac.)
```

```
Total runoff =     93.435(CFS)      Total area =      58.920(Ac.)
Depth of flow =   1.036(Ft.), Average velocity =  11.876(Ft/s)
Critical depth =      1.672(Ft.)
End of computations, total study area =          58.920 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 06/11/06

National Quarries
Existing Condition Analysis
100-Year Storm Event
Basin 60

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

Program License Serial Number 4028

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.500
24 hour precipitation(inches) = 6.400
P6/P24 = 54.7%
San Diego hydrology manual 'C' values used

++
Process from Point/Station 60.000 to Point/Station 62.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance = 100.000(Ft.)
Highest elevation = 1063.000(Ft.)
Lowest elevation = 1058.000(Ft.)
Elevation difference = 5.000(Ft.) Slope = 5.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 5.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 7.89 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*(100.000^.5)/(5.000^(1/3)]= 7.89
Rainfall intensity (I) = 6.868(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.072(CFS)
Total initial stream area =        0.030(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       62.000 to Point/Station       64.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  1058.000(Ft.)
Downstream point elevation =   750.000(Ft.)
Channel length thru subarea  =  1629.000(Ft.)
Channel base width      =    7.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      8.163(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      8.163(CFS)
Depth of flow =   0.218(Ft.), Average velocity =   4.895(Ft/s)
Channel flow top width =    8.307(Ft.)
Flow Velocity =    4.90(Ft/s)
Travel time  =    5.55 min.
Time of concentration =   13.44 min.
Critical depth =      0.332(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.873(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      3.318
Subarea runoff =     16.097(CFS) for      9.450(Ac.)
Total runoff =     16.169(CFS)      Total area =       9.480(Ac.)
Depth of flow =   0.325(Ft.), Average velocity =   6.237(Ft/s)
Critical depth =      0.508(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       64.000 to Point/Station       66.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   750.000(Ft.)
Downstream point elevation =   680.000(Ft.)
Channel length thru subarea  =  1161.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     23.053(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     23.053(CFS)
```

```
Depth of flow =   0.452(Ft.), Average velocity =   4.319(Ft/s)
Channel flow top width =   13.616(Ft.)
Flow Velocity =    4.32(Ft/s)
Travel time  =    4.48 min.
Time of concentration =   17.92 min.
Critical depth =      0.508(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.048(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      7.381
Subarea runoff =     13.710(CFS) for     11.610(Ac.)
Total runoff =     29.879(CFS)      Total area =      21.090(Ac.)
Depth of flow =   0.524(Ft.), Average velocity =   4.711(Ft/s)
Critical depth =      0.602(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       66.000 to Point/Station       68.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   680.000(Ft.)
Downstream point elevation =   563.000(Ft.)
Channel length thru subarea  =   510.000(Ft.)
Channel base width      =    7.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     46.367(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     46.367(CFS)
Depth of flow =   0.563(Ft.), Average velocity =   9.472(Ft/s)
Channel flow top width =   10.380(Ft.)
Flow Velocity =    9.47(Ft/s)
Travel time  =    0.90 min.
Time of concentration =   18.82 min.
Critical depth =      0.961(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.922(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     16.009
Subarea runoff =     32.912(CFS) for     24.650(Ac.)
```

```
Total runoff =     62.791(CFS)      Total area =      45.740(Ac.)
Depth of flow =   0.668(Ft.), Average velocity =  10.436(Ft/s)
Critical depth =      1.141(Ft.)
End of computations, total study area =          45.740 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 06/11/06

National Quarries
Proposed Condition Analysis
100-Year Storm Event
Basin 100

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

Program License Serial Number 4028

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.500
24 hour precipitation(inches) = 6.400
P6/P24 = 54.7%
San Diego hydrology manual 'C' values used

++
Process from Point/Station 100.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance = 1042.000(Ft.)
Highest elevation = 1330.000(Ft.)
Lowest elevation = 1062.000(Ft.)
Elevation difference = 268.000(Ft.) Slope = 25.720 %
Top of Initial Area Slope adjusted by User to 15.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 15.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 5.47 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*(100.000^.5)/(15.000^(1/3)]= 5.47

```
The initial area total distance of 1042.00 (Ft.) entered leaves a
remaining distance of  942.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   2.57 minutes
for a distance of 942.00 (Ft.) and a slope of 25.72 %
with an elevation difference of 242.28(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    2.568 Minutes
Tt=[(11.9*0.1784^3)/(242.28)]^.385=  2.57
Total initial area Ti =   5.47 minutes from Figure 3-3 formula plus
  2.57 minutes from the Figure 3-4 formula =   8.04 minutes
Rainfall intensity (I) =      6.787(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =     11.141(CFS)
Total initial stream area =        4.690(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      104.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  1062.000(Ft.)
Downstream point elevation =   610.000(Ft.)
Channel length thru subarea  =  1141.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Manning's 'N'    = 0.045
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     11.141(CFS)
Depth of flow =   0.233(Ft.), Average velocity =   6.533(Ft/s)
Channel flow top width =    9.655(Ft.)
Flow Velocity =    6.53(Ft/s)
Travel time  =    2.91 min.
Time of concentration =   10.95 min.
Critical depth =      0.406(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      106.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   610.000(Ft.)
Downstream point elevation =   552.000(Ft.)
Channel length thru subarea  =  3205.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =    115.787(CFS)
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =    115.787(CFS)
Depth of flow =   1.148(Ft.), Average velocity =   4.696(Ft/s)
Channel flow top width =   32.959(Ft.)
Flow Velocity =    4.70(Ft/s)
Travel time  =   11.38 min.
Time of concentration =   22.33 min.
Critical depth =      1.125(Ft.)
```

```
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.513(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     62.737
Subarea runoff =    209.230(CFS) for    174.560(Ac.)
Total runoff =    220.371(CFS)      Total area =     179.250(Ac.)
Depth of flow =   1.552(Ft.), Average velocity =   5.564(Ft/s)
Critical depth =      1.547(Ft.)
End of computations, total study area =         179.250 (Ac.)
```

APPENDIX B

WSPGW ANALYSIS

Program Package Serial Number: 1559

WATER SURFACE PROFILE LISTING Date: 6-11-2006 Time:10:17:30

National Quarries
100-Year Storm Event
Phase 3 Storm Drain

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	540.760	4.059	544.819	220.00	10.81	1.81	546.63	.00	4.06	5.61	6.000	.000	.00	1 .0
3.937	.0100					.0136	.05	4.06	1.00	4.71	.024	.00	.00	PIPE
1003.937	540.799	4.238	545.037	220.00	10.30	1.65	546.69	.00	4.06	5.47	6.000	.000	.00	1 .0
20.637	.0100					.0121	.25	4.24	.92	4.71	.024	.00	.00	PIPE
1024.575	541.006	4.432	545.438	220.00	9.82	1.50	546.94	.00	4.06	5.27	6.000	.000	.00	1 .0
85.908	.0100					.0109	.93	4.43	.84	4.71	.024	.00	.00	PIPE
1110.482	541.865	4.644	546.509	220.00	9.37	1.36	547.87	.00	4.06	5.02	6.000	.000	.00	1 .0
63.518	.0100					.0102	.65	4.64	.76	4.71	.024	.00	.00	PIPE
1174.000	542.500	4.678	547.178	220.00	9.30	1.34	548.52	.00	4.06	4.97	6.000	.000	.00	1 .0
WALL ENTRANCE														
1174.000	542.500	6.936	549.436	220.00	1.59	.04	549.47	.00	1.55	20.00	7.500	20.000	.00	0 .0

APPENDIX C

10-, 25-, AND 100-YEAR HEC-1 ANALYSES AND BACKUP DATA

WORKSHEET 4-3 NATIONAL QUARRIES (name of project) **Peak Discharge Computation**

*****For use with NRCS Hydrologic Method Computations*****

Items in boxes are required input parameters for the SDUH Peak Discharge Program.

Computed by: WAYNE CHANG Date: 6/12/06

Project Identification (Drainage Area Name): WATERSHED: 10-, 25-, & 100-YEAR DATA

Geographic location of center of drainage area: Long: 117° 10' 30" Lat: 33° 13' 20"

Drainage Area: 1.8 – square miles

Storm Frequency (Section 2.3): 100 – year 10- & 25-YEAR

6-Hour Storm Duration Precipitation (Appendix B): 3.5 – inches 2.4/2.8

24-Hour Storm Duration Precipitation (Appendix B): 6.4 – inches 4.1/4.9

Precipitation Zone Number (PZN): (Section 4.1.2.4 and Appendix C) PZN = 1.0 1.75 2.0 ____ 3.0 ____ 4.0

PZN Ajustment Factor for 5-year to 35-year storm frequency (interpolate): (Section 4.1.2.4 and Table 4-6) 1.5 2.25 2.5 ____ 2.0 ____ 1.5

PZN Ajustment Factor for 35-year to 150-year storm frequency (interpolate): (Section 4.1.2.4 and Table 4-6) 2.0 2.75 3.0 ____ 3.0 ____ 2.0

PZN Adjusted Runoff Curve Number (interpolate between nearest whole number PZN conditions): (Sections 4.1.2.4 and 4.2.4, Tables 4-6 and 4-10) $CN_{1.0 \text{ or } 2.0}$ 89 CN_X 94 $CN_{2.0 \text{ or } 3.0}$ 96 90.75

Watershed Length (L) (Section 4.3.1): 2.0 – miles

Length to Centroid (L_c) (Section 4.3.1): 0.9 – miles

Slope (s) (Section 4.3.1): 601 – feet/mile Basin $\bar{n}$ Factor (Section 4.3.5): 0.045

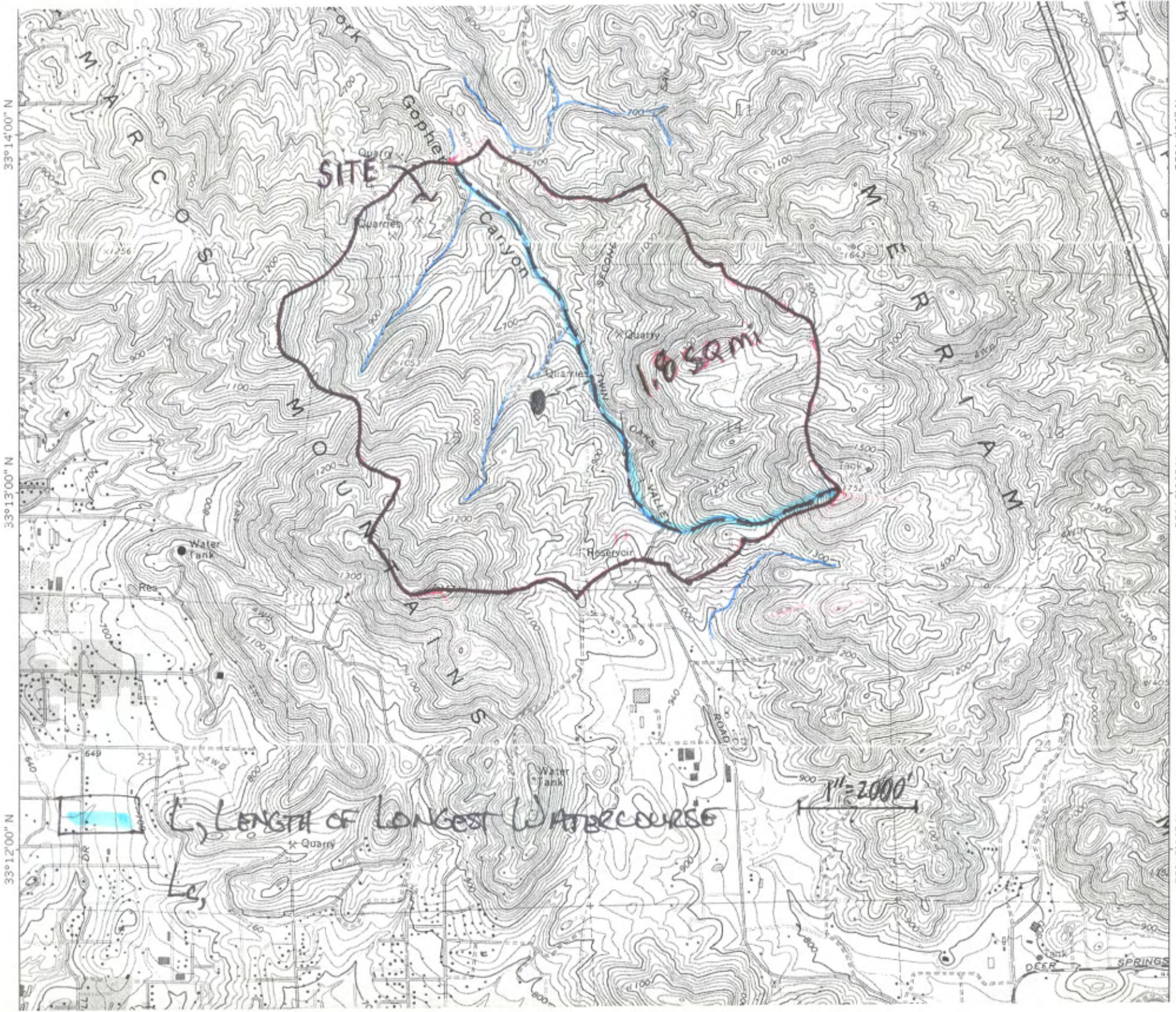
(1752' - 550')/2 mi = 601 ft/mi

Corps lag (T_L) = 24 $\bar{n}$ $((L \times L_c)/s^{0.5})^m$ (Section 4.3.1.1)

OR

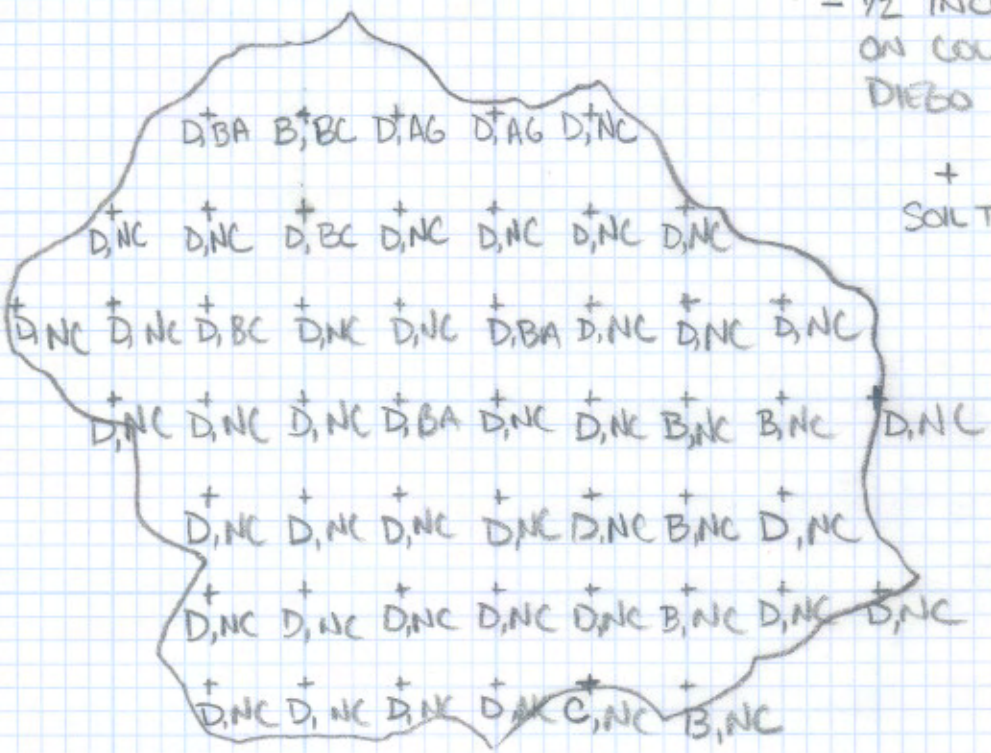
Corps lag (T_L) = 0.8 T_c (Section 4.3.1.2) Lag Time: 0.40 – hours

Time to Peak = 0.862 x Corps lag (Section 4.1.5.5): Time to Peak : ____ – hours


SITE
1.8 SQ MI
L, LENGTH OF LONGEST WATERCOURSE
Lc,
1" = 2000'
MARCOS MOUNTAINS
MT RAMM
Gopher Canyon
Quarries
Quarry
Reservoir
Water Tank
Res
Tank
ROAD
DEER SPRINGS
33°14'00" N
33°13'00" N
33°12'00" N

AREA = 1.8 SQ mi
- 1/2 INCH GRID BASED ON COUNTY OF SAN DIEGO CRITERIA

+
SOIL TYPE, VEGETATIVE COVER



LEGEND

TYPE B SOIL	B
TYPE C SOIL	C
TYPE D SOIL	D
NARROWLEAF CHAPARRAL	NC
BROADLEAF CHAPARRAL	BC
ANNUAL GRASS	AG
BARREN	BA

NATIONAL QUARRIES
J-160162
JULY 23, 2003

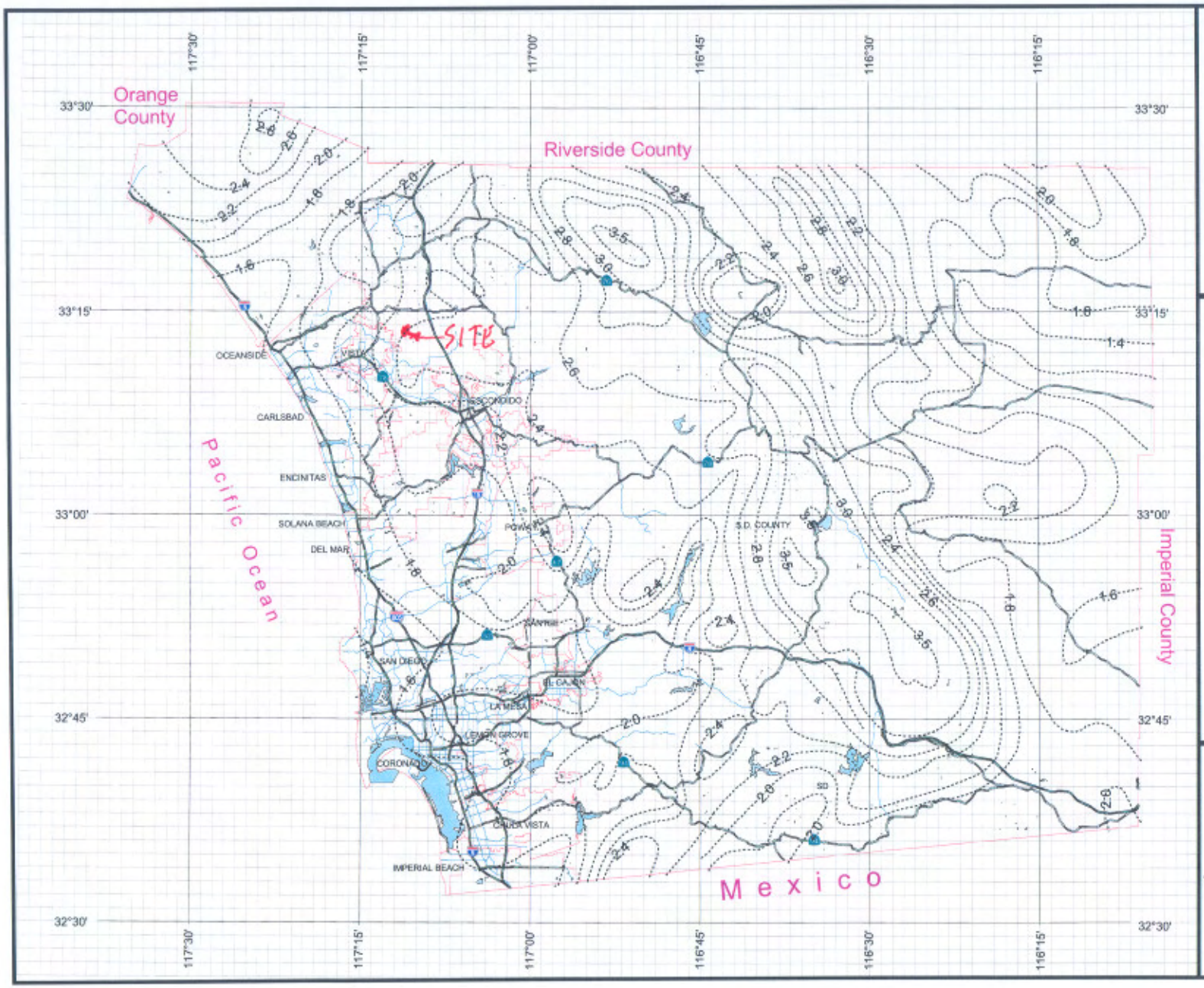
*HEC-1 ANALYSIS

National Quarries
J-160162
September 24, 2002

Basin 1

Land Use/ Veg. Cover	Soil	Ai	Ai/A	CN2	(Ai/A)CN2	
AG	D	2	0.039	89	3.49	
BC	B	1	0.020	70	1.37	
BC	D	2	0.039	85	3.33	
BA	D	3	0.059	93	5.47	
NC	B	5	0.098	82	8.04	
NC	C	1	0.020	88	1.73	
NC	D	37	0.725	91	66.02	
	Totals=	51	1.000		89	=CN2

For Narrowleaf Chaparral (NC) used poor



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

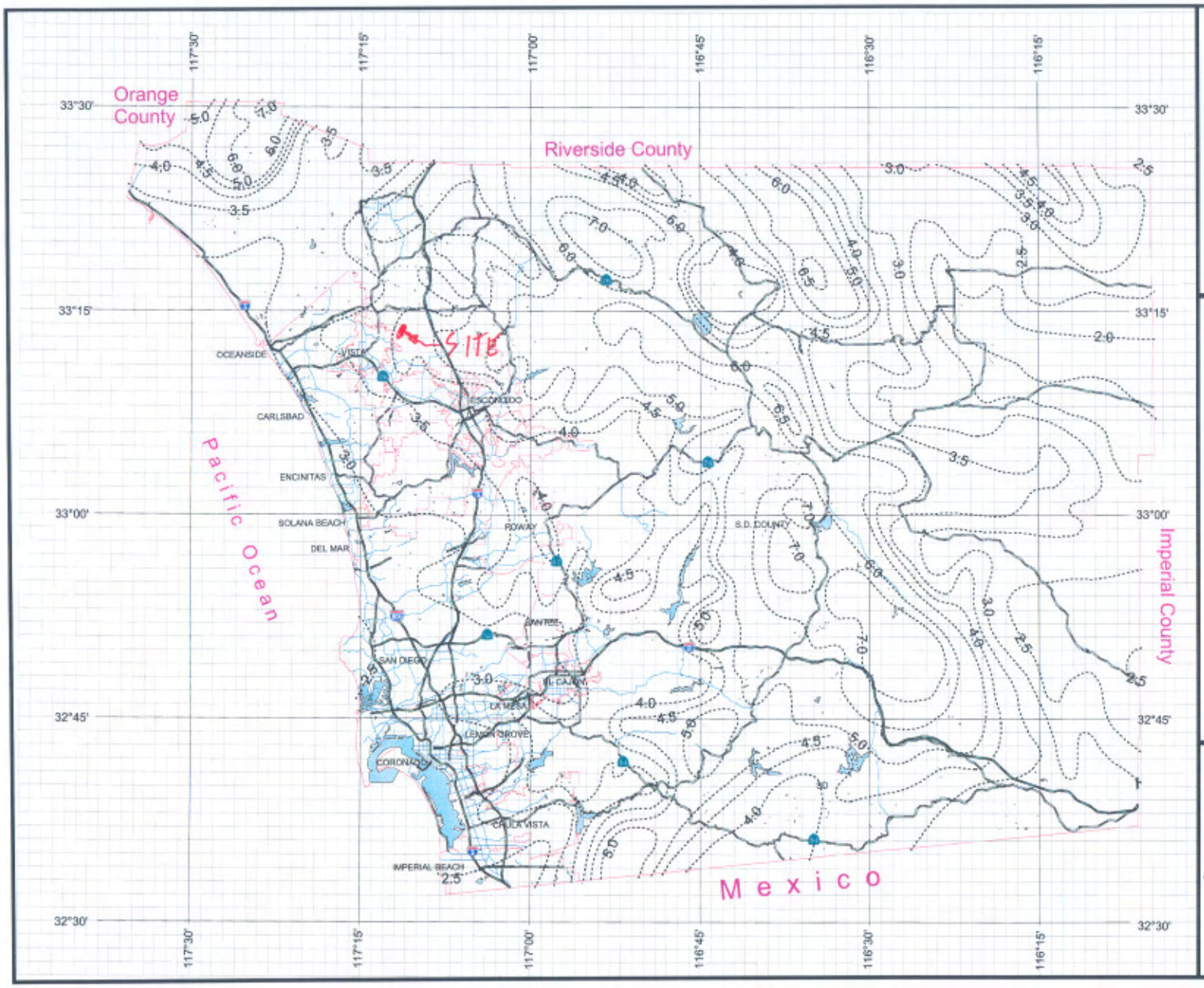
Isopluvial (inches)

DPW GIS

SanGIS

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS

SanGIS

We Have San Diego Covered!

N
W E
S

3 0 3 Miles

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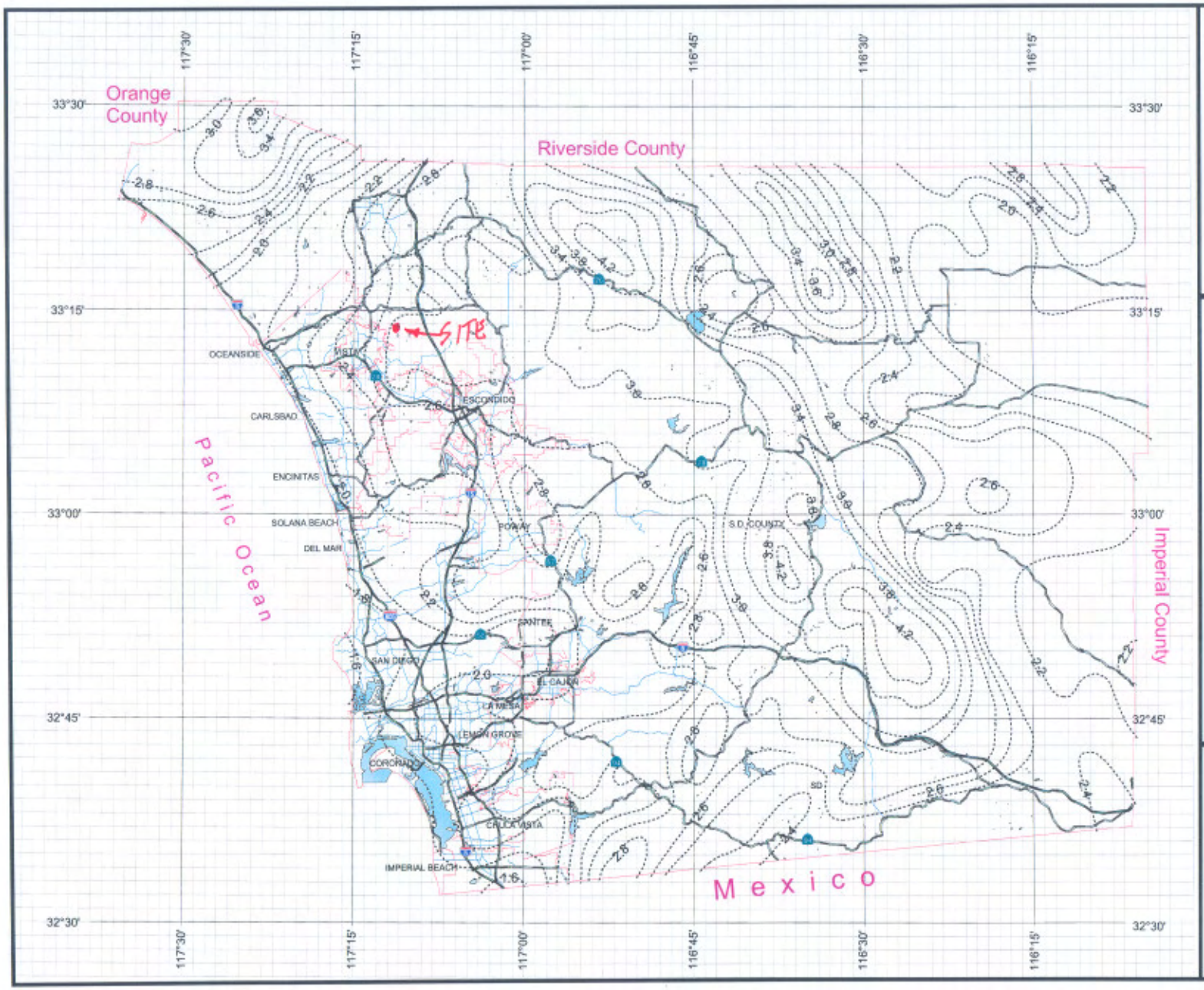

County of San Diego Hydrology Manual

Rainfall Isopluvials

25 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS

SanGIS

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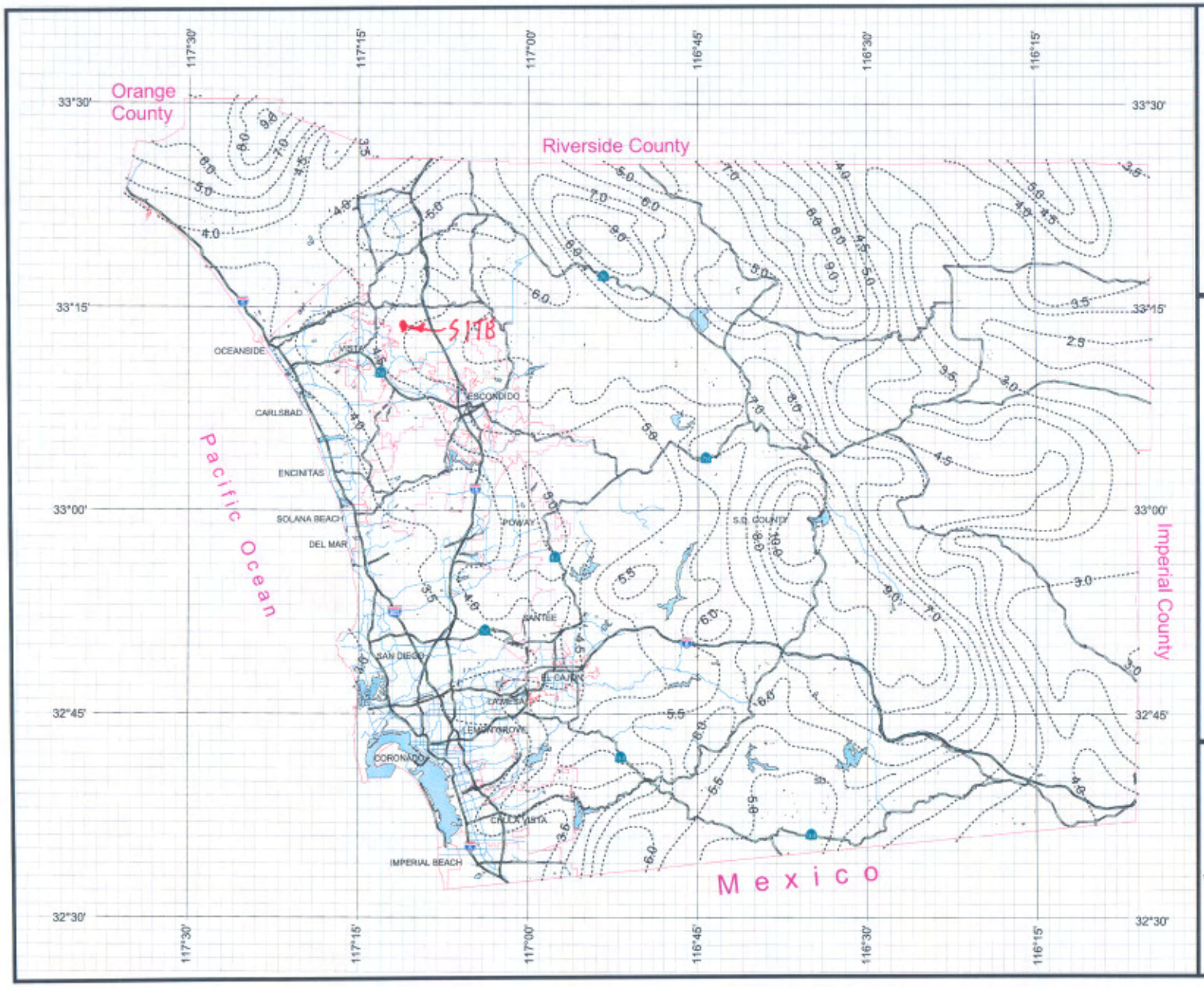
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

25 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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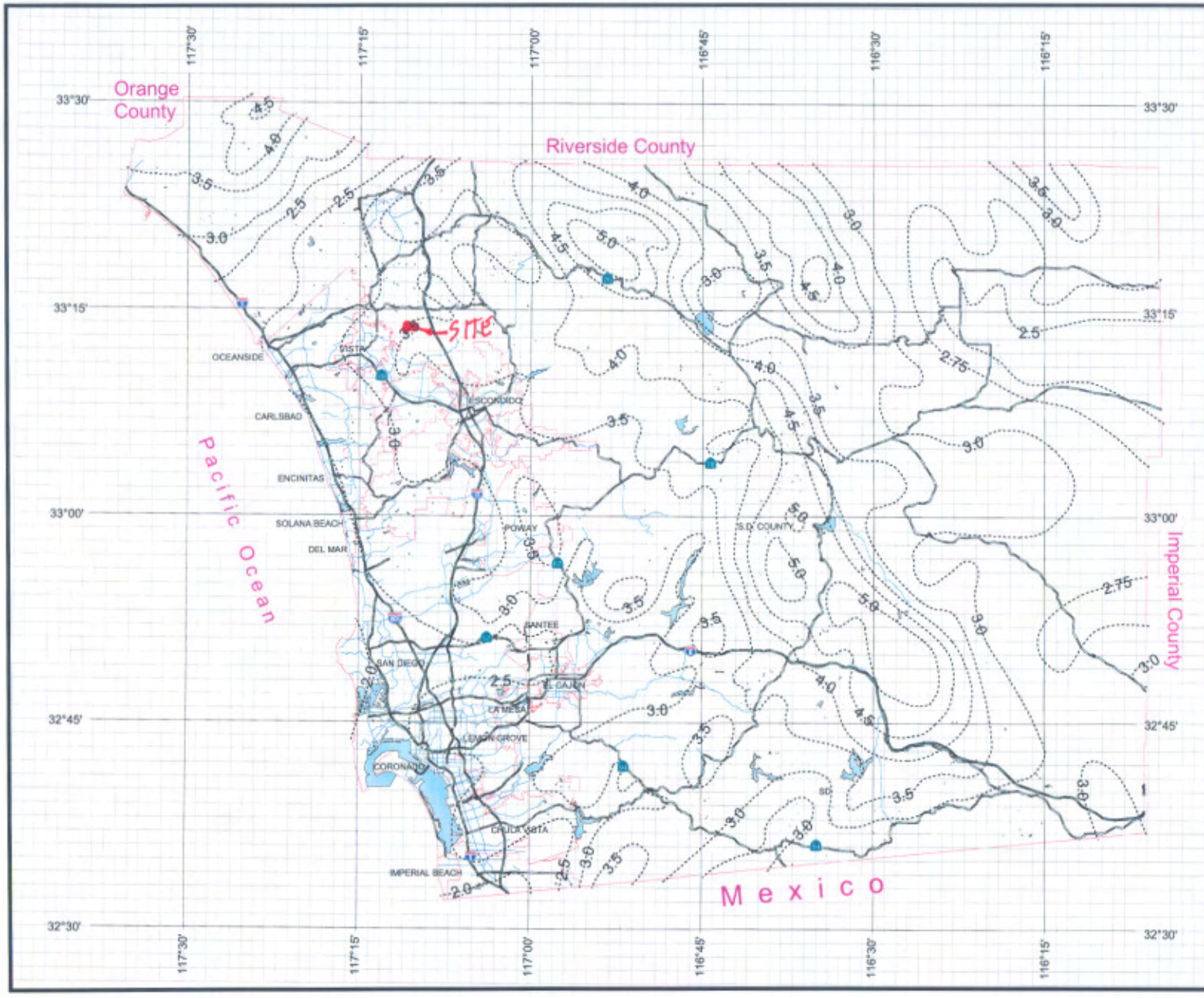
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS

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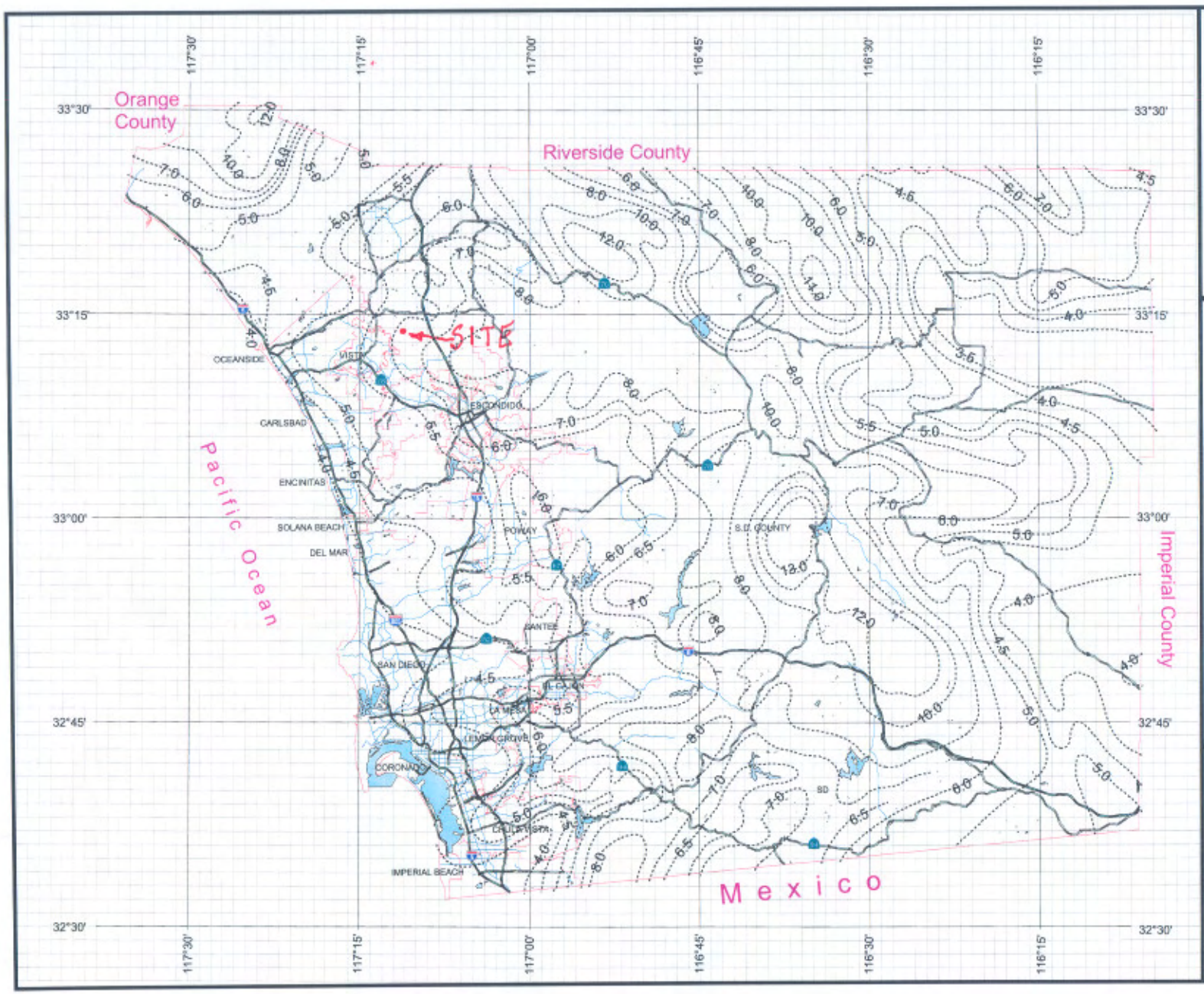
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS

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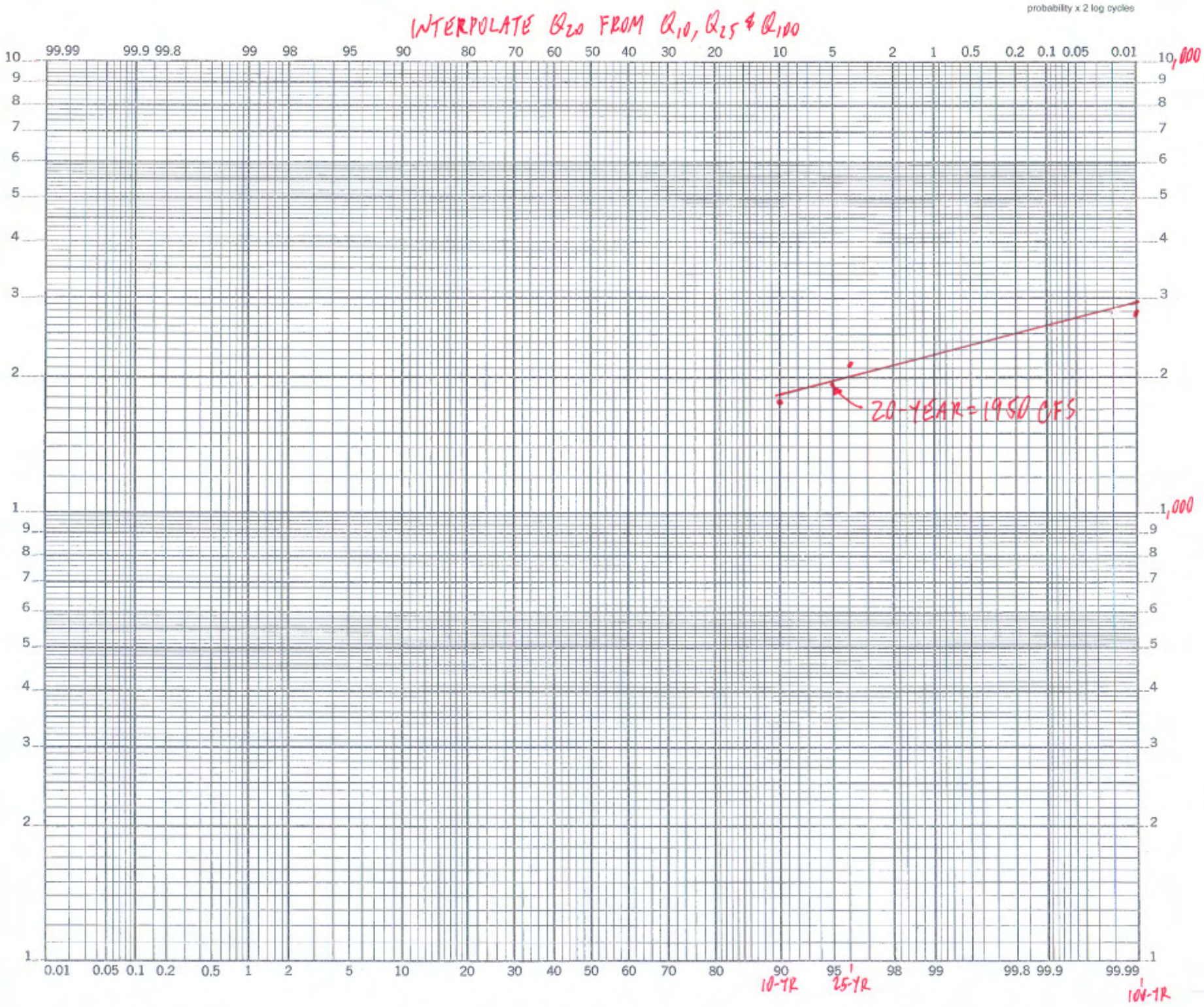
N W E S

3 0 3 Miles

INTERPOLATE Q_{20} FROM Q_{10}, Q_{25} & Q_{100}



```
****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   12JUN06  TIME  19:51:11  *
 *                                      *
 ****************************************
```

```
****************************************
 *                                      *
 *    U.S. ARMY CORPS OF ENGINEERS      *
 *    HYDROLOGIC ENGINEERING CENTER     *
 *          609 SECOND STREET           *
 *       DAVIS, CALIFORNIA 95616        *
 *           (916) 756-1104             *
 *                                      *
 ****************************************
```

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

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

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

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

                       *DIAGRAM
*** FREE ***
            1          ID   NATIONAL QUARRIES
            2          ID   10-YEAR STORM EVENT
            3          IT       5 01JAN90    1200     300
            4          IO       1       2

            5          KK   BASIN
            6          KM   6HR RAINFALL IS  2.4  INCHES
            7          KM   24HR RAINFALL IS  4.1  INCHES
            8          KM   DAR30 =  .97912
            9          KM   DAR60 =  .9892
           10          KM   DAR180 =  .9928
           11          KM   DAR360 =  .9946
           12          KM   DAR1440 =  .9964
           13          KM   BASIN AREA IS  1.8  SQUARE MILES
           14          IN       5 01JAN90    1200     300
           15          PI  .00549  .00552  .00553  .00555  .00557  .00559   .0056  .00563  .00564  .00567
           16          PI  .00568   .0057  .00572  .00574  .00576  .00578   .0058  .00582  .00584  .00587
           17          PI  .00588  .00591  .00592  .00595  .00597    .006  .00601  .00604  .00606  .00609
           18          PI   .0061  .00613  .00615  .00618   .0062  .00623  .00625  .00628   .0063  .00633
           19          PI  .00635  .00638   .0064  .00643  .00645  .00649  .00651  .00654  .00656   .0066
           20          PI  .00662  .00666  .00668  .00672  .00674  .00678   .0068  .00684  .00686   .0069
           21          PI  .00693  .00697  .00699  .00704  .00706   .0071  .00713  .00717   .0072  .00725
           22          PI  .00727  .00732  .00735   .0074  .00742  .00748   .0075  .00756  .00758  .00764
           23          PI  .00767  .00772  .00775  .00781  .00784   .0079  .00793    .008  .00803  .00809
           24          PI  .00812  .00819  .00822  .00829  .00833   .0084  .00844  .00851  .00855  .00862
           25          PI  .00866  .00874  .00878  .00886   .0089  .00899  .00903  .00912  .00916  .00926
           26          PI   .0093   .0094  .00945  .00955   .0096   .0097  .00975  .00986  .00992  .01003
           27          PI  .01009   .0102  .01027  .01039  .01045  .01058  .01065  .01078  .01085    .011
           28          PI  .01107  .01122   .0113  .01146  .01154  .01171   .0118  .01198  .01207  .01226
           29          PI  .01236  .01256  .01267  .01197  .01207   .0123  .01241  .01265  .01277  .01303
           30          PI  .01316  .01344  .01359  .01389  .01405  .01438  .01455  .01492  .01511   .0155
           31          PI  .01572  .01617   .0164   .0169  .01716  .01773  .01803  .01886   .0192  .01993
           32          PI  .02032  .02118  .02164  .02265  .02321  .02444  .02512  .02664   .0275  .02946
           33          PI  .03058   .0332  .03475  .04038  .04256  .04818  .05191  .06108  .06958  .10216
           34          PI  .14394  .51594  .08194  .05659  .04512   .0365  .03182  .02843  .02585   .0238
           35          PI  .02213  .02074  .01955  .01834  .01744  .01665  .01594   .0153  .01473  .01421
           36          PI  .01374   .0133   .0129  .01253  .01218  .01277  .01246  .01216  .01189  .01163
           37          PI  .01138  .01115  .01093  .01072  .01052  .01033  .01015  .00997  .00981   .0096
           38          PI   .0095  .00935  .00921  .00908  .00895  .00882   .0087  .00858  .00847  .00836
           39          PI  .00826  .00816  .00806  .00796  .00787  .00778   .0077  .00761  .00753  .00745
           40          PI  .00737   .0073  .00722  .00715  .00708  .00701  .00695  .00688  .00682  .00676
           41          PI   .0067  .00664  .00658  .00653  .00647  .00642  .00636  .00631  .00626  .00621
           42          PI  .00616  .00612  .00607  .00603  .00598  .00594  .00589  .00585  .00581   .0057
           43          PI  .00573  .00569  .00565  .00562  .00558  .00554  .00551       0       0       0
           44          PI       0       0       0       0       0       0       0       0       0       0
           45          PI       0       0
           46          BA     1.8
           47          LS       0   90.75
           48          UD     0.4
           49          ZZ


                SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    5       BASIN

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

```
****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              JUN   1998              *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.1                *                                    *          609 SECOND STREET           *
*                                      *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   12JUN06  TIME  19:51:11  *                                    *           (916) 756-1104             *
*                                      *                                    *                                      *
****************************************                                    ****************************************


                        NATIONAL QUARRIES
                        25-YEAR STORM EVENT

  4 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          2  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2JAN90  ENDING DATE
                     NDTIME        1255  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

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


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


          **************
          *            *
  5 KK    *     BASIN  *
          *            *
          **************
                        6HR RAINFALL IS  2.4  INCHES
                        24HR RAINFALL IS  4.1  INCHES
                        DAR30 =  .97912
                        DAR60 =  .9892
                        DAR180 =  .9928
                        DAR360 =  .9946
                        DAR1440 =  .9964
                        BASIN AREA IS  1.8  SQUARE MILES

 14 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN          5  TIME INTERVAL IN MINUTES
                      JXDATE      1JAN90  STARTING DATE
                      JXTIME        1200  STARTING TIME

             SUBBASIN RUNOFF DATA

 46 BA          SUBBASIN CHARACTERISTICS
                      TAREA       1.80  SUBBASIN AREA

             PRECIPITATION DATA
```

```
15 PB              STORM       4.08  BASIN TOTAL PRECIPITATION

15 PI           INCREMENTAL PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .03       .03       .03       .03
                   .03       .03       .03       .04       .04       .05       .05       .06       .07       .10
                   .14       .52       .08       .06       .05       .04       .03       .03       .03       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01

47 LS           SCS LOSS RATE
                     STRTL        .20  INITIAL ABSTRACTION
                    CRVNBR      90.75  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

48 UD           SCS DIMENSIONLESS UNITGRAPH
                      TLAG        .40  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                         26 END-OF-PERIOD ORDINATES
            181.      557.     1173.     1734.     1959.     1913.     1662.     1317.      910.      666.
            497.      370.      269.      199.      145.      106.       78.       58.       43.       31.
             23.       18.       14.        9.        6.        2.

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

                                          HYDROGRAPH AT STATION    BASIN

*****************************************************************************************************************
                                                  *
     DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q      *      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q
                                                  *
      1 JAN 1200    1     .00     .00     .00         0.      *       2 JAN 0030  151     .01     .00     .01       124.
      1 JAN 1205    2     .01     .01     .00         0.      *       2 JAN 0035  152     .01     .00     .01       126.
      1 JAN 1210    3     .01     .01     .00         0.      *       2 JAN 0040  153     .01     .00     .01       127.
      1 JAN 1215    4     .01     .01     .00         0.      *       2 JAN 0045  154     .01     .00     .01       129.
      1 JAN 1220    5     .01     .01     .00         0.      *       2 JAN 0050  155     .01     .00     .01       132.
      1 JAN 1225    6     .01     .01     .00         0.      *       2 JAN 0055  156     .01     .00     .01       134.
      1 JAN 1230    7     .01     .01     .00         0.      *       2 JAN 0100  157     .01     .00     .01       136.
      1 JAN 1235    8     .01     .01     .00         0.      *       2 JAN 0105  158     .01     .00     .01       139.
      1 JAN 1240    9     .01     .01     .00         0.      *       2 JAN 0110  159     .01     .00     .01       142.
      1 JAN 1245   10     .01     .01     .00         0.      *       2 JAN 0115  160     .02     .00     .01       145.
      1 JAN 1250   11     .01     .01     .00         0.      *       2 JAN 0120  161     .02     .00     .01       148.
      1 JAN 1255   12     .01     .01     .00         0.      *       2 JAN 0125  162     .02     .00     .01       151.
      1 JAN 1300   13     .01     .01     .00         0.      *       2 JAN 0130  163     .02     .00     .01       154.
      1 JAN 1305   14     .01     .01     .00         0.      *       2 JAN 0135  164     .02     .00     .01       158.
      1 JAN 1310   15     .01     .01     .00         0.      *       2 JAN 0140  165     .02     .00     .01       161.
      1 JAN 1315   16     .01     .01     .00         0.      *       2 JAN 0145  166     .02     .00     .01       165.
      1 JAN 1320   17     .01     .01     .00         0.      *       2 JAN 0150  167     .02     .00     .01       169.
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1 JAN	1325	18	.01	.01	.00	0.	*	2 JAN	0155	168	.02	.00	.01	173.
1 JAN	1330	19	.01	.01	.00	0.	*	2 JAN	0200	169	.02	.00	.02	178.
1 JAN	1335	20	.01	.01	.00	0.	*	2 JAN	0205	170	.02	.00	.02	183.
1 JAN	1340	21	.01	.01	.00	0.	*	2 JAN	0210	171	.02	.00	.02	188.
1 JAN	1345	22	.01	.01	.00	0.	*	2 JAN	0215	172	.02	.00	.02	194.
1 JAN	1350	23	.01	.01	.00	0.	*	2 JAN	0220	173	.02	.00	.02	200.
1 JAN	1355	24	.01	.01	.00	0.	*	2 JAN	0225	174	.02	.00	.02	206.
1 JAN	1400	25	.01	.01	.00	0.	*	2 JAN	0230	175	.02	.00	.02	213.
1 JAN	1405	26	.01	.01	.00	0.	*	2 JAN	0235	176	.02	.00	.02	220.
1 JAN	1410	27	.01	.01	.00	0.	*	2 JAN	0240	177	.02	.00	.02	227.
1 JAN	1415	28	.01	.01	.00	0.	*	2 JAN	0245	178	.03	.00	.02	236.
1 JAN	1420	29	.01	.01	.00	0.	*	2 JAN	0250	179	.03	.00	.02	244.
1 JAN	1425	30	.01	.01	.00	0.	*	2 JAN	0255	180	.03	.00	.02	254.
1 JAN	1430	31	.01	.01	.00	0.	*	2 JAN	0300	181	.03	.00	.02	265.
1 JAN	1435	32	.01	.01	.00	0.	*	2 JAN	0305	182	.03	.00	.03	276.
1 JAN	1440	33	.01	.01	.00	0.	*	2 JAN	0310	183	.03	.00	.03	289.
1 JAN	1445	34	.01	.01	.00	0.	*	2 JAN	0315	184	.03	.01	.03	304.
1 JAN	1450	35	.01	.01	.00	0.	*	2 JAN	0320	185	.04	.01	.03	321.
1 JAN	1455	36	.01	.01	.00	0.	*	2 JAN	0325	186	.04	.01	.04	341.
1 JAN	1500	37	.01	.01	.00	0.	*	2 JAN	0330	187	.05	.01	.04	365.
1 JAN	1505	38	.01	.01	.00	0.	*	2 JAN	0335	188	.05	.01	.05	394.
1 JAN	1510	39	.01	.01	.00	0.	*	2 JAN	0340	189	.06	.01	.05	428.
1 JAN	1515	40	.01	.01	.00	0.	*	2 JAN	0345	190	.07	.01	.06	470.
1 JAN	1520	41	.01	.01	.00	1.	*	2 JAN	0350	191	.10	.01	.09	524.
1 JAN	1525	42	.01	.01	.00	1.	*	2 JAN	0355	192	.14	.01	.13	602.
1 JAN	1530	43	.01	.01	.00	2.	*	2 JAN	0400	193	.52	.04	.47	776.
1 JAN	1535	44	.01	.01	.00	3.	*	2 JAN	0405	194	.08	.01	.08	1043.
1 JAN	1540	45	.01	.01	.00	3.	*	2 JAN	0410	195	.06	.00	.05	1388.
1 JAN	1545	46	.01	.01	.00	4.	*	2 JAN	0415	196	.05	.00	.04	1669.
1 JAN	1550	47	.01	.01	.00	5.	*	2 JAN	0420	197	.04	.00	.03	1768.
1 JAN	1555	48	.01	.01	.00	6.	*	2 JAN	0425	198	.03	.00	.03	1711.
1 JAN	1600	49	.01	.01	.00	7.	*	2 JAN	0430	199	.03	.00	.03	1538.
1 JAN	1605	50	.01	.01	.00	8.	*	2 JAN	0435	200	.03	.00	.02	1309.
1 JAN	1610	51	.01	.01	.00	9.	*	2 JAN	0440	201	.02	.00	.02	1060.
1 JAN	1615	52	.01	.01	.00	10.	*	2 JAN	0445	202	.02	.00	.02	882.
1 JAN	1620	53	.01	.01	.00	11.	*	2 JAN	0450	203	.02	.00	.02	744.
1 JAN	1625	54	.01	.01	.00	12.	*	2 JAN	0455	204	.02	.00	.02	633.
1 JAN	1630	55	.01	.01	.00	13.	*	2 JAN	0500	205	.02	.00	.02	543.
1 JAN	1635	56	.01	.01	.00	14.	*	2 JAN	0505	206	.02	.00	.02	473.
1 JAN	1640	57	.01	.01	.00	15.	*	2 JAN	0510	207	.02	.00	.02	416.
1 JAN	1645	58	.01	.01	.00	16.	*	2 JAN	0515	208	.02	.00	.02	370.
1 JAN	1650	59	.01	.01	.00	17.	*	2 JAN	0520	209	.02	.00	.01	333.
1 JAN	1655	60	.01	.01	.00	18.	*	2 JAN	0525	210	.01	.00	.01	304.
1 JAN	1700	61	.01	.01	.00	19.	*	2 JAN	0530	211	.01	.00	.01	279.
1 JAN	1705	62	.01	.01	.00	20.	*	2 JAN	0535	212	.01	.00	.01	259.
1 JAN	1710	63	.01	.01	.00	21.	*	2 JAN	0540	213	.01	.00	.01	242.
1 JAN	1715	64	.01	.01	.00	22.	*	2 JAN	0545	214	.01	.00	.01	228.
1 JAN	1720	65	.01	.01	.00	23.	*	2 JAN	0550	215	.01	.00	.01	216.
1 JAN	1725	66	.01	.00	.00	24.	*	2 JAN	0555	216	.01	.00	.01	205.
1 JAN	1730	67	.01	.00	.00	25.	*	2 JAN	0600	217	.01	.00	.01	195.
1 JAN	1735	68	.01	.00	.00	25.	*	2 JAN	0605	218	.01	.00	.01	186.
1 JAN	1740	69	.01	.00	.00	26.	*	2 JAN	0610	219	.01	.00	.01	180.
1 JAN	1745	70	.01	.00	.00	27.	*	2 JAN	0615	220	.01	.00	.01	176.
1 JAN	1750	71	.01	.00	.00	28.	*	2 JAN	0620	221	.01	.00	.01	172.
1 JAN	1755	72	.01	.00	.00	29.	*	2 JAN	0625	222	.01	.00	.01	169.
1 JAN	1800	73	.01	.00	.00	30.	*	2 JAN	0630	223	.01	.00	.01	166.
1 JAN	1805	74	.01	.00	.00	31.	*	2 JAN	0635	224	.01	.00	.01	162.
1 JAN	1810	75	.01	.00	.00	32.	*	2 JAN	0640	225	.01	.00	.01	159.
1 JAN	1815	76	.01	.00	.00	33.	*	2 JAN	0645	226	.01	.00	.01	156.
1 JAN	1820	77	.01	.00	.00	34.	*	2 JAN	0650	227	.01	.00	.01	153.
1 JAN	1825	78	.01	.00	.00	35.	*	2 JAN	0655	228	.01	.00	.01	150.
1 JAN	1830	79	.01	.00	.00	36.	*	2 JAN	0700	229	.01	.00	.01	147.
1 JAN	1835	80	.01	.00	.00	37.	*	2 JAN	0705	230	.01	.00	.01	144.
1 JAN	1840	81	.01	.00	.00	38.	*	2 JAN	0710	231	.01	.00	.01	142.
1 JAN	1845	82	.01	.00	.00	39.	*	2 JAN	0715	232	.01	.00	.01	139.
1 JAN	1850	83	.01	.00	.00	40.	*	2 JAN	0720	233	.01	.00	.01	137.
1 JAN	1855	84	.01	.00	.00	41.	*	2 JAN	0725	234	.01	.00	.01	134.
1 JAN	1900	85	.01	.00	.00	42.	*	2 JAN	0730	235	.01	.00	.01	132.
1 JAN	1905	86	.01	.00	.00	43.	*	2 JAN	0735	236	.01	.00	.01	130.
1 JAN	1910	87	.01	.00	.00	44.	*	2 JAN	0740	237	.01	.00	.01	128.
1 JAN	1915	88	.01	.00	.00	45.	*	2 JAN	0745	238	.01	.00	.01	126.
1 JAN	1920	89	.01	.00	.00	45.	*	2 JAN	0750	239	.01	.00	.01	124.
1 JAN	1925	90	.01	.00	.00	46.	*	2 JAN	0755	240	.01	.00	.01	122.
1 JAN	1930	91	.01	.00	.00	47.	*	2 JAN	0800	241	.01	.00	.01	120.

1	JAN	1935	92	.01	.00	.00	48.	*	2	JAN	0805	242	.01	.00	.01	119.
1	JAN	1940	93	.01	.00	.00	49.	*	2	JAN	0810	243	.01	.00	.01	117.
1	JAN	1945	94	.01	.00	.00	50.	*	2	JAN	0815	244	.01	.00	.01	115.
1	JAN	1950	95	.01	.00	.00	51.	*	2	JAN	0820	245	.01	.00	.01	114.
1	JAN	1955	96	.01	.00	.00	52.	*	2	JAN	0825	246	.01	.00	.01	112.
1	JAN	2000	97	.01	.00	.00	53.	*	2	JAN	0830	247	.01	.00	.01	111.
1	JAN	2005	98	.01	.00	.00	54.	*	2	JAN	0835	248	.01	.00	.01	110.
1	JAN	2010	99	.01	.00	.00	55.	*	2	JAN	0840	249	.01	.00	.01	108.
1	JAN	2015	100	.01	.00	.00	56.	*	2	JAN	0845	250	.01	.00	.01	107.
1	JAN	2020	101	.01	.00	.00	57.	*	2	JAN	0850	251	.01	.00	.01	106.
1	JAN	2025	102	.01	.00	.00	59.	*	2	JAN	0855	252	.01	.00	.01	104.
1	JAN	2030	103	.01	.00	.00	60.	*	2	JAN	0900	253	.01	.00	.01	103.
1	JAN	2035	104	.01	.00	.00	61.	*	2	JAN	0905	254	.01	.00	.01	102.
1	JAN	2040	105	.01	.00	.00	62.	*	2	JAN	0910	255	.01	.00	.01	101.
1	JAN	2045	106	.01	.00	.00	63.	*	2	JAN	0915	256	.01	.00	.01	100.
1	JAN	2050	107	.01	.00	.01	64.	*	2	JAN	0920	257	.01	.00	.01	99.
1	JAN	2055	108	.01	.00	.01	65.	*	2	JAN	0925	258	.01	.00	.01	98.
1	JAN	2100	109	.01	.00	.01	66.	*	2	JAN	0930	259	.01	.00	.01	97.
1	JAN	2105	110	.01	.00	.01	67.	*	2	JAN	0935	260	.01	.00	.01	96.
1	JAN	2110	111	.01	.00	.01	68.	*	2	JAN	0940	261	.01	.00	.01	95.
1	JAN	2115	112	.01	.00	.01	69.	*	2	JAN	0945	262	.01	.00	.01	94.
1	JAN	2120	113	.01	.00	.01	71.	*	2	JAN	0950	263	.01	.00	.01	93.
1	JAN	2125	114	.01	.00	.01	72.	*	2	JAN	0955	264	.01	.00	.01	92.
1	JAN	2130	115	.01	.00	.01	73.	*	2	JAN	1000	265	.01	.00	.01	91.
1	JAN	2135	116	.01	.00	.01	74.	*	2	JAN	1005	266	.01	.00	.01	91.
1	JAN	2140	117	.01	.00	.01	75.	*	2	JAN	1010	267	.01	.00	.01	90.
1	JAN	2145	118	.01	.00	.01	76.	*	2	JAN	1015	268	.01	.00	.01	89.
1	JAN	2150	119	.01	.00	.01	78.	*	2	JAN	1020	269	.01	.00	.01	88.
1	JAN	2155	120	.01	.00	.01	79.	*	2	JAN	1025	270	.01	.00	.01	88.
1	JAN	2200	121	.01	.00	.01	80.	*	2	JAN	1030	271	.01	.00	.01	87.
1	JAN	2205	122	.01	.00	.01	81.	*	2	JAN	1035	272	.01	.00	.01	86.
1	JAN	2210	123	.01	.00	.01	83.	*	2	JAN	1040	273	.01	.00	.01	85.
1	JAN	2215	124	.01	.00	.01	84.	*	2	JAN	1045	274	.01	.00	.01	85.
1	JAN	2220	125	.01	.00	.01	85.	*	2	JAN	1050	275	.01	.00	.01	84.
1	JAN	2225	126	.01	.00	.01	87.	*	2	JAN	1055	276	.01	.00	.01	83.
1	JAN	2230	127	.01	.00	.01	88.	*	2	JAN	1100	277	.01	.00	.01	83.
1	JAN	2235	128	.01	.00	.01	89.	*	2	JAN	1105	278	.01	.00	.01	82.
1	JAN	2240	129	.01	.00	.01	91.	*	2	JAN	1110	279	.01	.00	.01	81.
1	JAN	2245	130	.01	.00	.01	92.	*	2	JAN	1115	280	.01	.00	.01	81.
1	JAN	2250	131	.01	.00	.01	94.	*	2	JAN	1120	281	.01	.00	.01	80.
1	JAN	2255	132	.01	.00	.01	95.	*	2	JAN	1125	282	.01	.00	.01	80.
1	JAN	2300	133	.01	.00	.01	97.	*	2	JAN	1130	283	.01	.00	.01	79.
1	JAN	2305	134	.01	.00	.01	98.	*	2	JAN	1135	284	.01	.00	.01	78.
1	JAN	2310	135	.01	.00	.01	100.	*	2	JAN	1140	285	.01	.00	.01	78.
1	JAN	2315	136	.01	.00	.01	101.	*	2	JAN	1145	286	.01	.00	.01	77.
1	JAN	2320	137	.01	.00	.01	103.	*	2	JAN	1150	287	.01	.00	.01	77.
1	JAN	2325	138	.01	.00	.01	105.	*	2	JAN	1155	288	.01	.00	.01	76.
1	JAN	2330	139	.01	.00	.01	106.	*	2	JAN	1200	289	.00	.00	.00	75.
1	JAN	2335	140	.01	.00	.01	108.	*	2	JAN	1205	290	.00	.00	.00	71.
1	JAN	2340	141	.01	.00	.01	110.	*	2	JAN	1210	291	.00	.00	.00	65.
1	JAN	2345	142	.01	.00	.01	112.	*	2	JAN	1215	292	.00	.00	.00	55.
1	JAN	2350	143	.01	.00	.01	114.	*	2	JAN	1220	293	.00	.00	.00	45.
1	JAN	2355	144	.01	.00	.01	116.	*	2	JAN	1225	294	.00	.00	.00	34.
2	JAN	0000	145	.01	.00	.01	118.	*	2	JAN	1230	295	.00	.00	.00	26.
2	JAN	0005	146	.01	.00	.01	119.	*	2	JAN	1235	296	.00	.00	.00	18.
2	JAN	0010	147	.01	.00	.01	120.	*	2	JAN	1240	297	.00	.00	.00	14.
2	JAN	0015	148	.01	.00	.01	121.	*	2	JAN	1245	298	.00	.00	.00	10.
2	JAN	0020	149	.01	.00	.01	122.	*	2	JAN	1250	299	.00	.00	.00	7.
2	JAN	0025	150	.01	.00	.01	123.	*	2	JAN	1255	300	.00	.00	.00	5.
								*								

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TOTAL RAINFALL = 4.08, TOTAL LOSS = 1.01, TOTAL EXCESS = 3.07

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1768.	16.33		408.	148.	143.	143.
		(INCHES)	2.108	3.068	3.068	3.068
		(AC-FT)	202.	294.	294.	294.

CUMULATIVE AREA = 1.80 SQ MI

STATION BASIN

(O) OUTFLOW

		0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	0.	0.	0.
												(L) PRECIP,	(X) EXCESS	
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.4	.2	.0
DAHRMN	PER													
11200	10													
11205	20													
11210	30													
11215	40													
11220	50													
11225	60													
11230	70													
11235	80													
11240	90													
11245	100													
11250	110													
11255	120													
11300	130													
11305	140													
11310	150													
11315	160													
11320	170													
11325	180													
11330	190													
11335	200													
11340	210													
11345	220													
11350	230													
11355	240													
11400	250													
11405	260													
11410	270													
11415	280													
11420	290													
11425	300													
11430	310													
11435	320													
11440	330													
11445	340													
11450	350													
11455	360													
11500	370													
11505	380													
11510	390													
11515	400													
11520	410													
11525	420													
11530	430													
11535	440													
11540	450													
11545	460													
11550	470													
11555	480													
11600	490													
11605	500													
11610	510													
11615	520													
11620	53.0													
11625	54.0													
11630	55.0													
11635	56.0													
11640	57.0													
11645	58.0													
11650	59.0													
11655	60.0													
11700	61.0													
11705	62.0													
11710	63.0													
11715	64.0													
11720	65.0													
11725	66.0													
11730	67.0													

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11735  68.O       .       .       .       .       .       .       .       .       .       .       .
11740  69.O       .       .       .       .       .       .       .       .       .       .       .
11745  70.O       .       .       .       .       .       .       .       .       .       .       .
11750  71.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11755  72.O       .       .       .       .       .       .       .       .       .       .       .
11800  73. O      .       .       .       .       .       .       .       .       .       .       .
11805  74. O      .       .       .       .       .       .       .       .       .       .       .
11810  75. O      .       .       .       .       .       .       .       .       .       .       .
11815  76. O      .       .       .       .       .       .       .       .       .       .       .
11820  77. O      .       .       .       .       .       .       .       .       .       .       .
11825  78. O      .       .       .       .       .       .       .       .       .       .       .
11830  79. O      .       .       .       .       .       .       .       .       .       .       .
11835  80. O      .       .       .       .       .       .       .       .       .       .       .
11840  81. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11845  82. O      .       .       .       .       .       .       .       .       .       .       .
11850  83. O      .       .       .       .       .       .       .       .       .       .       .
11855  84. O      .       .       .       .       .       .       .       .       .       .       .
11900  85. O      .       .       .       .       .       .       .       .       .       .       .
11905  86. O      .       .       .       .       .       .       .       .       .       .       .
11910  87. O      .       .       .       .       .       .       .       .       .       .       .
11915  88. O      .       .       .       .       .       .       .       .       .       .       .
11920  89. O      .       .       .       .       .       .       .       .       .       .       .
11925  90. O      .       .       .       .       .       .       .       .       .       .       .
11930  91. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11935  92. O      .       .       .       .       .       .       .       .       .       .       .
11940  93. O      .       .       .       .       .       .       .       .       .       .       .
11945  94.  O     .       .       .       .       .       .       .       .       .       .       .
11950  95.  O     .       .       .       .       .       .       .       .       .       .       .
11955  96.  O     .       .       .       .       .       .       .       .       .       .       .
12000  97.  O     .       .       .       .       .       .       .       .       .       .       .
12005  98.  O     .       .       .       .       .       .       .       .       .       .       .
12010  99.  O     .       .       .       .       .       .       .       .       .       .       .
12015 100.  O     .       .       .       .       .       .       .       .       .       .       .
12020 101. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12025 102.  O     .       .       .       .       .       .       .       .       .       .       .
12030 103.  O     .       .       .       .       .       .       .       .       .       .       .
12035 104.  O     .       .       .       .       .       .       .       .       .       .       .
12040 105.  O     .       .       .       .       .       .       .       .       .       .       .
12045 106.  O     .       .       .       .       .       .       .       .       .       .       .
12050 107.  O     .       .       .       .       .       .       .       .       .       .       .
12055 108.  O     .       .       .       .       .       .       .       .       .       .       .
12100 109.  O     .       .       .       .       .       .       .       .       .       .       .
12105 110.  O     .       .       .       .       .       .       .       .       .       .       .
12110 111. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12115 112.  O     .       .       .       .       .       .       .       .       .       .       .
12120 113.   O    .       .       .       .       .       .       .       .       .       .       .
12125 114.   O    .       .       .       .       .       .       .       .       .       .       .
12130 115.   O    .       .       .       .       .       .       .       .       .       .       .
12135 116.   O    .       .       .       .       .       .       .       .       .       .       .
12140 117.   O    .       .       .       .       .       .       .       .       .       .       .
12145 118.   O    .       .       .       .       .       .       .       .       .       .       .
12150 119.   O    .       .       .       .       .       .       .       .       .       .       .
12155 120.   O    .       .       .       .       .       .       .       .       .       .       .
12200 121. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
12205 122.   O    .       .       .       .       .       .       .       .       .       .      L.
12210 123.   O    .       .       .       .       .       .       .       .       .       .      L.
12215 124.   O    .       .       .       .       .       .       .       .       .       .      L.
12220 125.   O    .       .       .       .       .       .       .       .       .       .      L.
12225 126.   O    .       .       .       .       .       .       .       .       .       .      L.
12230 127.   O    .       .       .       .       .       .       .       .       .       .      L.
12235 128.   O    .       .       .       .       .       .       .       .       .       .      L.
12240 129.    O   .       .       .       .       .       .       .       .       .       .      L.
12245 130.    O   .       .       .       .       .       .       .       .       .       .      L.
12250 131. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
12255 132.    O   .       .       .       .       .       .       .       .       .       .      L.
12300 133.    O   .       .       .       .       .       .       .       .       .       .      L.
12305 134.    O   .       .       .       .       .       .       .       .       .       .      L.
12310 135.    O   .       .       .       .       .       .       .       .       .       .      L.
12315 136.    O   .       .       .       .       .       .       .       .       .       .      L.
12320 137.    O   .       .       .       .       .       .       .       .       .       .      L.
12325 138.    O   .       .       .       .       .       .       .       .       .       .      L.
12330 139.    O   .       .       .       .       .       .       .       .       .       .      L.
12335 140.    O   .       .       .       .       .       .       .       .       .       .      L.
12340 141. . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
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12345 142.    0  .       .       .       .       .       .       .       .       .       .       .      L.
12350 143.    0  .       .       .       .       .       .       .       .       .       .       .      L.
12355 144.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20000 145.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20005 146.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20010 147.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20015 148.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20020 149.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20025 150.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20030 151. . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
20035 152.    0  .       .       .       .       .       .       .       .       .       .       .      L.
20040 153.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20045 154.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20050 155.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20055 156.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20100 157.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20105 158.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20110 159.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20115 160.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20120 161. . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20125 162.      0 .       .       .       .       .       .       .       .       .       .       .      X.
20130 163.      0 .       .       .       .       .       .       .       .       .       .       .      X.
20135 164.      0 .       .       .       .       .       .       .       .       .       .       .      X.
20140 165.      0 .       .       .       .       .       .       .       .       .       .       .      X.
20145 166.      0 .       .       .       .       .       .       .       .       .       .       .      X.
20150 167.      0 .       .       .       .       .       .       .       .       .       .       .      X.
20155 168.       0.       .       .       .       .       .       .       .       .       .       .      X.
20200 169.       0.       .       .       .       .       .       .       .       .       .       .      X.
20205 170.       0.       .       .       .       .       .       .       .       .       .       .      X.
20210 171. . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20215 172.        0       .       .       .       .       .       .       .       .       .       .      X.
20220 173.        0       .       .       .       .       .       .       .       .       .       .      X.
20225 174.        0       .       .       .       .       .       .       .       .       .       .      X.
20230 175.        .0      .       .       .       .       .       .       .       .       .       .      X.
20235 176.        .0      .       .       .       .       .       .       .       .       .       .      X.
20240 177.        .0      .       .       .       .       .       .       .       .       .       .      X.
20245 178.        . 0     .       .       .       .       .       .       .       .       .       .      X.
20250 179.        . 0     .       .       .       .       .       .       .       .       .       .      X.
20255 180.        .  0    .       .       .       .       .       .       .       .       .       .      X.
20300 181. . . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20305 182.        .   0   .       .       .       .       .       .       .       .       .       .     LX.
20310 183.        .   0   .       .       .       .       .       .       .       .       .       .     LX.
20315 184.        .    0  .       .       .       .       .       .       .       .       .       .     LX.
20320 185.        .     0 .       .       .       .       .       .       .       .       .       .     XX.
20325 186.        .      0.       .       .       .       .       .       .       .       .       .     XX.
20330 187.        .       0       .       .       .       .       .       .       .       .       .     XX.
20335 188.        .        0      .       .       .       .       .       .       .       .       .    LXX.
20340 189.        .         .0    .       .       .       .       .       .       .       .       .    XXX.
20345 190.        .          . 0  .       .       .       .       .       .       .       .       .    XXX.
20350 191. . . . . . . . . . . . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .XXXXX.
20355 192.        .       .       0       .       .       .       .       .       .       .      LXXXXX.
20400 193.        .       .       .       0.      .       .       .       .       .  LLXXXXXXXXXXXXXXXXXXXXX.
20405 194.        .       .       .       .       . 0     .       .       .       .       .      XXXX.
20410 195.        .       .       .       .       .       .       0.      .       .       .       .    XXX.
20415 196.        .       .       .       .       .       .       .       . 0     .       .       .     XX.
20420 197.        .       .       .       .       .       .       .       .     0 .       .       .     XX.
20425 198.        .       .       .       .       .       .       .       .   0   .       .       .     LX.
20430 199.        .       .       .       .       .       .       .     0 .       .       .       .      X.
20435 200.        .       .       .       .       .       .   0   .       .       .       .       .      X.
20440 201. . . . . . . . . . . . . . . . . . . . . . . . . .0. . . . . . . . . . . . . . . . . . . . .X.
20445 202.        .       .       .       .   0   .       .       .       .       .       .       .      X.
20450 203.        .       .       .     0 .       .       .       .       .       .       .       .      X.
20455 204.        .       .       . 0     .       .       .       .       .       .       .       .      X.
20500 205.        .       .     0 .       .       .       .       .       .       .       .       .      X.
20505 206.        .       .   0   .       .       .       .       .       .       .       .       .      X.
20510 207.        .       .0      .       .       .       .       .       .       .       .       .      X.
20515 208.        .      0 .      .       .       .       .       .       .       .       .       .      X.
20520 209.        .     0  .      .       .       .       .       .       .       .       .       .      X.
20525 210.        .    0   .      .       .       .       .       .       .       .       .       .      X.
20530 211. . . . . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20535 212.        . 0     .       .       .       .       .       .       .       .       .       .      X.
20540 213.        . 0     .       .       .       .       .       .       .       .       .       .      X.
20545 214.        .0      .       .       .       .       .       .       .       .       .       .      X.
20550 215.        .0      .       .       .       .       .       .       .       .       .       .      X.
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```
20555 216.        0        .        .        .        .        .        .        .        .        .        X.
20600 217.        0        .        .        .        .        .        .        .        .        .        X.
20605 218.       0.        .        .        .        .        .        .        .        .        .        X.
20610 219.       0.        .        .        .        .        .        .        .        .        .        X.
20615 220.       0.        .        .        .        .        .        .        .        .        .        X.
20620 221. . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20625 222.      0 .        .        .        .        .        .        .        .        .        .        X.
20630 223.      0 .        .        .        .        .        .        .        .        .        .        X.
20635 224.      0 .        .        .        .        .        .        .        .        .        .        X.
20640 225.      0 .        .        .        .        .        .        .        .        .        .        X.
20645 226.      0 .        .        .        .        .        .        .        .        .        .        L.
20650 227.      0 .        .        .        .        .        .        .        .        .        .        L.
20655 228.      0 .        .        .        .        .        .        .        .        .        .        L.
20700 229.     0  .        .        .        .        .        .        .        .        .        .         .
20705 230.     0  .        .        .        .        .        .        .        .        .        .         .
20710 231. . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20715 232.     0  .        .        .        .        .        .        .        .        .        .         .
20720 233.     0  .        .        .        .        .        .        .        .        .        .         .
20725 234.     0  .        .        .        .        .        .        .        .        .        .         .
20730 235.     0  .        .        .        .        .        .        .        .        .        .         .
20735 236.    0   .        .        .        .        .        .        .        .        .        .         .
20740 237.    0   .        .        .        .        .        .        .        .        .        .         .
20745 238.    0   .        .        .        .        .        .        .        .        .        .         .
20750 239.    0   .        .        .        .        .        .        .        .        .        .         .
20755 240.    0   .        .        .        .        .        .        .        .        .        .         .
20800 241. . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20805 242.    0   .        .        .        .        .        .        .        .        .        .         .
20810 243.    0   .        .        .        .        .        .        .        .        .        .         .
20815 244.    0   .        .        .        .        .        .        .        .        .        .         .
20820 245.    0   .        .        .        .        .        .        .        .        .        .         .
20825 246.    0   .        .        .        .        .        .        .        .        .        .         .
20830 247.    0   .        .        .        .        .        .        .        .        .        .         .
20835 248.   0    .        .        .        .        .        .        .        .        .        .         .
20840 249.   0    .        .        .        .        .        .        .        .        .        .         .
20845 250.   0    .        .        .        .        .        .        .        .        .        .         .
20850 251. . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20855 252.   0    .        .        .        .        .        .        .        .        .        .         .
20900 253.   0    .        .        .        .        .        .        .        .        .        .         .
20905 254.   0    .        .        .        .        .        .        .        .        .        .         .
20910 255.   0    .        .        .        .        .        .        .        .        .        .         .
20915 256.   0    .        .        .        .        .        .        .        .        .        .         .
20920 257.   0    .        .        .        .        .        .        .        .        .        .         .
20925 258.   0    .        .        .        .        .        .        .        .        .        .         .
20930 259.   0    .        .        .        .        .        .        .        .        .        .         .
20935 260.   0    .        .        .        .        .        .        .        .        .        .         .
20940 261. . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20945 262.   0    .        .        .        .        .        .        .        .        .        .         .
20950 263.   0    .        .        .        .        .        .        .        .        .        .         .
20955 264.   0    .        .        .        .        .        .        .        .        .        .         .
21000 265.   0    .        .        .        .        .        .        .        .        .        .         .
21005 266.   0    .        .        .        .        .        .        .        .        .        .         .
21010 267.  0     .        .        .        .        .        .        .        .        .        .         .
21015 268.  0     .        .        .        .        .        .        .        .        .        .         .
21020 269.  0     .        .        .        .        .        .        .        .        .        .         .
21025 270.  0     .        .        .        .        .        .        .        .        .        .         .
21030 271. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21035 272.  0     .        .        .        .        .        .        .        .        .        .         .
21040 273.  0     .        .        .        .        .        .        .        .        .        .         .
21045 274.  0     .        .        .        .        .        .        .        .        .        .         .
21050 275.  0     .        .        .        .        .        .        .        .        .        .         .
21055 276.  0     .        .        .        .        .        .        .        .        .        .         .
21100 277.  0     .        .        .        .        .        .        .        .        .        .         .
21105 278.  0     .        .        .        .        .        .        .        .        .        .         .
21110 279.  0     .        .        .        .        .        .        .        .        .        .         .
21115 280.  0     .        .        .        .        .        .        .        .        .        .         .
21120 281. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21125 282.  0     .        .        .        .        .        .        .        .        .        .         .
21130 283.  0     .        .        .        .        .        .        .        .        .        .         .
21135 284.  0     .        .        .        .        .        .        .        .        .        .         .
21140 285.  0     .        .        .        .        .        .        .        .        .        .         .
21145 286.  0     .        .        .        .        .        .        .        .        .        .         .
21150 287.  0     .        .        .        .        .        .        .        .        .        .         .
21155 288.  0     .        .        .        .        .        .        .        .        .        .         .
21200 289.  0     .        .        .        .        .        .        .        .        .        .         .
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 21205 290.   O      .         .         .         .         .         .         .         .         .         .         .         .
 21210 291. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 21215 292.  O       .         .         .         .         .         .         .         .         .         .         .         .
 21220 293. O        .         .         .         .         .         .         .         .         .         .         .         .
 21225 294. O        .         .         .         .         .         .         .         .         .         .         .         .
 21230 295.O         .         .         .         .         .         .         .         .         .         .         .         .
 21235 296.O         .         .         .         .         .         .         .         .         .         .         .         .
 21240 297.O         .         .         .         .         .         .         .         .         .         .         .         .
 21245 298.O         .         .         .         .         .         .         .         .         .         .         .         .
 21250 299O          .         .         .         .         .         .         .         .         .         .         .         .
 21255 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	BASIN	1768.	16.33	408.	148.	143.	1.80		

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

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*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   12JUN06  TIME  19:45:19  *
*                                      *
****************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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```
X     X  XXXXXXX   XXXXX          X
X     X  X       X    X         XX
X     X  X       X               X
XXXXXXX  XXXX    X       XXXXX   X
X     X  X       X               X
X     X  X       X    X          X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

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

                       *DIAGRAM
*** FREE ***
            1          ID   NATIONAL QUARRIES
            2          ID   25-YEAR STORM EVENT
            3          IT       5 01JAN90    1200     300
            4          IO       1       2

            5          KK   BASIN
            6          KM   6HR RAINFALL IS  2.8  INCHES
            7          KM   24HR RAINFALL IS  4.9  INCHES
            8          KM   DAR30 =  .97912
            9          KM   DAR60 =  .9892
           10          KM   DAR180 =  .9928
           11          KM   DAR360 =  .9946
           12          KM   DAR1440 =  .9964
           13          KM   BASIN AREA IS  1.8  SQUARE MILES
           14          IN       5 01JAN90    1200     300
           15          PI  .00686  .00689   .0069  .00693  .00695  .00698  .00699  .00702  .00704  .00707
           16          PI  .00708  .00712  .00713  .00716  .00718  .00721  .00723  .00726  .00728   .0073
           17          PI  .00733  .00736  .00738  .00742  .00743  .00747  .00749  .00752  .00754   .0075
           18          PI   .0076  .00764  .00765  .00769  .00771  .00775  .00777  .00781  .00783  .00787
           19          PI  .00789  .00794  .00796    .008  .00802  .00807  .00809  .00813  .00815   .0082
           20          PI  .00822  .00827  .00829  .00834  .00837  .00841  .00844  .00849  .00851   .0085
           21          PI  .00859  .00864  .00867  .00873  .00875  .00881  .00884  .00889  .00892   .0089
           22          PI  .00901  .00907   .0091  .00916  .00919  .00925  .00929  .00935  .00938  .00945
           23          PI  .00948  .00955  .00959  .00966  .00969  .00977   .0098  .00988  .00992  .00999
           24          PI  .01003  .01011  .01015  .01024  .01028  .01036  .01041   .0105  .01054  .01063
           25          PI  .01068  .01077  .01082  .01092  .01097  .01107  .01112  .01123  .01128   .0113
           26          PI  .01145  .01156  .01162  .01174   .0118  .01192  .01198  .01211  .01218  .01231
           27          PI  .01238  .01252  .01259  .01274  .01282  .01297  .01305  .01321   .0133  .01347
           28          PI  .01356  .01374  .01383  .01402  .01411  .01432  .01442  .01463  .01474   .0149
           29          PI  .01508  .01532  .01545  .01396  .01409  .01434  .01448  .01476   .0149   .0152
           30          PI  .01536  .01568  .01585  .01621  .01639  .01678  .01698   .0174  .01762  .01809
           31          PI  .01834  .01886  .01913  .01972  .02003  .02068  .02103    .022   .0224  .02325
           32          PI  .02371  .02471  .02525  .02643  .02708  .02851  .02931  .03108  .03208   .0343
           33          PI  .03568  .03873  .04054  .04711  .04965  .05621  .06057  .07127  .08117   .1191
           34          PI  .16793  .60194  .09559  .06602  .05264  .04258  .03712  .03317  .03016   .0277
           35          PI  .02582  .02419  .02281   .0214  .02035  .01942   .0186  .01785  .01719  .01658
           36          PI  .01603  .01552  .01505  .01462  .01421  .01557   .0152  .01485  .01452  .01421
           37          PI  .01392  .01364  .01338  .01313  .01289  .01267  .01245  .01224  .01205   .0118
           38          PI  .01168   .0115  .01133  .01117  .01102  .01087  .01072  .01059  .01045  .01032
           39          PI   .0102  .01007  .00996  .00984  .00973  .00962  .00952  .00942  .00932  .00922
           40          PI  .00913  .00904  .00895  .00886  .00878   .0087  .00862  .00854  .00846  .00839
           41          PI  .00832  .00825  .00818  .00811  .00804  .00798  .00791  .00785  .00779   .0077
           42          PI  .00767  .00762  .00756   .0075  .00745   .0074  .00735   .0073  .00725   .0072
           43          PI  .00715   .0071  .00705  .00701  .00696  .00692  .00688       0       0       0
           44          PI      0       0       0       0       0       0       0       0       0       0
           45          PI      0       0
           46          BA    1.8
           47          LS      0   90.75
           48          UD    0.4
           49          ZZ


              SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    5       BASIN

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

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****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              JUN   1998              *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.1                *                                    *          609 SECOND STREET           *
*                                      *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   12JUN06  TIME  19:45:19  *                                    *           (916) 756-1104             *
*                                      *                                    *                                      *
****************************************                                    ****************************************


                        NATIONAL QUARRIES
                        25-YEAR STORM EVENT

  4 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          2  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2JAN90  ENDING DATE
                     NDTIME        1255  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

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


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


          **************
          *            *
  5 KK    *     BASIN  *
          *            *
          **************
                        6HR RAINFALL IS  2.8  INCHES
                        24HR RAINFALL IS  4.9  INCHES
                        DAR30 =  .97912
                        DAR60 =  .9892
                        DAR180 =  .9928
                        DAR360 =  .9946
                        DAR1440 =  .9964
                        BASIN AREA IS  1.8  SQUARE MILES

 14 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN          5  TIME INTERVAL IN MINUTES
                      JXDATE      1JAN90  STARTING DATE
                      JXTIME        1200  STARTING TIME

              SUBBASIN RUNOFF DATA

 46 BA          SUBBASIN CHARACTERISTICS
                      TAREA       1.80  SUBBASIN AREA

              PRECIPITATION DATA
```

```
15 PB              STORM       4.87  BASIN TOTAL PRECIPITATION

15 PI           INCREMENTAL PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .02       .02       .02       .01       .01       .01       .01       .01       .01       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .03       .03       .03       .03       .03       .03       .03       .03
                   .04       .04       .04       .05       .05       .06       .06       .07       .08       .12
                   .17       .60       .10       .07       .05       .04       .04       .03       .03       .03
                   .03       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .01       .01       .02       .02       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01

47 LS           SCS LOSS RATE
                     STRTL        .20  INITIAL ABSTRACTION
                    CRVNBR      90.75  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

48 UD           SCS DIMENSIONLESS UNITGRAPH
                      TLAG        .40  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                         26 END-OF-PERIOD ORDINATES
            181.      557.     1173.     1734.     1959.     1913.     1662.     1317.      910.      666.
            497.      370.      269.      199.      145.      106.       78.       58.       43.       31.
             23.       18.       14.        9.        6.        2.

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

                                          HYDROGRAPH AT STATION    BASIN

*****************************************************************************************************************
                                                  *
     DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q      *      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q
                                                  *
      1 JAN 1200    1     .00     .00     .00         0.      *       2 JAN 0030  151     .02     .00     .01       160.
      1 JAN 1205    2     .01     .01     .00         0.      *       2 JAN 0035  152     .02     .00     .01       161.
      1 JAN 1210    3     .01     .01     .00         0.      *       2 JAN 0040  153     .02     .00     .01       162.
      1 JAN 1215    4     .01     .01     .00         0.      *       2 JAN 0045  154     .02     .00     .01       164.
      1 JAN 1220    5     .01     .01     .00         0.      *       2 JAN 0050  155     .02     .00     .01       166.
      1 JAN 1225    6     .01     .01     .00         0.      *       2 JAN 0055  156     .02     .00     .01       169.
      1 JAN 1230    7     .01     .01     .00         0.      *       2 JAN 0100  157     .02     .00     .01       172.
      1 JAN 1235    8     .01     .01     .00         0.      *       2 JAN 0105  158     .02     .00     .01       175.
      1 JAN 1240    9     .01     .01     .00         0.      *       2 JAN 0110  159     .02     .00     .01       178.
      1 JAN 1245   10     .01     .01     .00         0.      *       2 JAN 0115  160     .02     .00     .01       181.
      1 JAN 1250   11     .01     .01     .00         0.      *       2 JAN 0120  161     .02     .00     .01       185.
      1 JAN 1255   12     .01     .01     .00         0.      *       2 JAN 0125  162     .02     .00     .02       189.
      1 JAN 1300   13     .01     .01     .00         0.      *       2 JAN 0130  163     .02     .00     .02       192.
      1 JAN 1305   14     .01     .01     .00         0.      *       2 JAN 0135  164     .02     .00     .02       197.
      1 JAN 1310   15     .01     .01     .00         0.      *       2 JAN 0140  165     .02     .00     .02       201.
      1 JAN 1315   16     .01     .01     .00         0.      *       2 JAN 0145  166     .02     .00     .02       205.
      1 JAN 1320   17     .01     .01     .00         0.      *       2 JAN 0150  167     .02     .00     .02       210.
```

1 JAN 1325	18	.01	.01	.00	0.	*	2 JAN 0155	168	.02	.00	.02	215.
1 JAN 1330	19	.01	.01	.00	0.	*	2 JAN 0200	169	.02	.00	.02	221.
1 JAN 1335	20	.01	.01	.00	0.	*	2 JAN 0205	170	.02	.00	.02	226.
1 JAN 1340	21	.01	.01	.00	0.	*	2 JAN 0210	171	.02	.00	.02	233.
1 JAN 1345	22	.01	.01	.00	0.	*	2 JAN 0215	172	.02	.00	.02	239.
1 JAN 1350	23	.01	.01	.00	0.	*	2 JAN 0220	173	.02	.00	.02	247.
1 JAN 1355	24	.01	.01	.00	0.	*	2 JAN 0225	174	.03	.00	.02	254.
1 JAN 1400	25	.01	.01	.00	0.	*	2 JAN 0230	175	.03	.00	.02	262.
1 JAN 1405	26	.01	.01	.00	0.	*	2 JAN 0235	176	.03	.00	.02	271.
1 JAN 1410	27	.01	.01	.00	0.	*	2 JAN 0240	177	.03	.00	.02	280.
1 JAN 1415	28	.01	.01	.00	0.	*	2 JAN 0245	178	.03	.00	.03	290.
1 JAN 1420	29	.01	.01	.00	0.	*	2 JAN 0250	179	.03	.00	.03	300.
1 JAN 1425	30	.01	.01	.00	0.	*	2 JAN 0255	180	.03	.00	.03	312.
1 JAN 1430	31	.01	.01	.00	0.	*	2 JAN 0300	181	.03	.00	.03	324.
1 JAN 1435	32	.01	.01	.00	0.	*	2 JAN 0305	182	.04	.00	.03	338.
1 JAN 1440	33	.01	.01	.00	0.	*	2 JAN 0310	183	.04	.00	.03	354.
1 JAN 1445	34	.01	.01	.00	1.	*	2 JAN 0315	184	.04	.00	.04	371.
1 JAN 1450	35	.01	.01	.00	1.	*	2 JAN 0320	185	.05	.01	.04	391.
1 JAN 1455	36	.01	.01	.00	2.	*	2 JAN 0325	186	.05	.01	.04	415.
1 JAN 1500	37	.01	.01	.00	3.	*	2 JAN 0330	187	.06	.01	.05	444.
1 JAN 1505	38	.01	.01	.00	4.	*	2 JAN 0335	188	.06	.01	.05	478.
1 JAN 1510	39	.01	.01	.00	6.	*	2 JAN 0340	189	.07	.01	.06	520.
1 JAN 1515	40	.01	.01	.00	7.	*	2 JAN 0345	190	.08	.01	.07	569.
1 JAN 1520	41	.01	.01	.00	8.	*	2 JAN 0350	191	.12	.01	.11	634.
1 JAN 1525	42	.01	.01	.00	10.	*	2 JAN 0355	192	.17	.01	.15	728.
1 JAN 1530	43	.01	.01	.00	11.	*	2 JAN 0400	193	.60	.04	.56	935.
1 JAN 1535	44	.01	.01	.00	12.	*	2 JAN 0405	194	.10	.01	.09	1253.
1 JAN 1540	45	.01	.01	.00	14.	*	2 JAN 0410	195	.07	.00	.06	1664.
1 JAN 1545	46	.01	.01	.00	15.	*	2 JAN 0415	196	.05	.00	.05	1998.
1 JAN 1550	47	.01	.01	.00	17.	*	2 JAN 0420	197	.04	.00	.04	2114.
1 JAN 1555	48	.01	.01	.00	18.	*	2 JAN 0425	198	.04	.00	.04	2044.
1 JAN 1600	49	.01	.01	.00	19.	*	2 JAN 0430	199	.03	.00	.03	1836.
1 JAN 1605	50	.01	.01	.00	21.	*	2 JAN 0435	200	.03	.00	.03	1563.
1 JAN 1610	51	.01	.01	.00	22.	*	2 JAN 0440	201	.03	.00	.03	1264.
1 JAN 1615	52	.01	.01	.00	23.	*	2 JAN 0445	202	.03	.00	.02	1051.
1 JAN 1620	53	.01	.01	.00	25.	*	2 JAN 0450	203	.02	.00	.02	886.
1 JAN 1625	54	.01	.01	.00	26.	*	2 JAN 0455	204	.02	.00	.02	754.
1 JAN 1630	55	.01	.01	.00	27.	*	2 JAN 0500	205	.02	.00	.02	646.
1 JAN 1635	56	.01	.01	.00	29.	*	2 JAN 0505	206	.02	.00	.02	562.
1 JAN 1640	57	.01	.01	.00	30.	*	2 JAN 0510	207	.02	.00	.02	494.
1 JAN 1645	58	.01	.01	.00	31.	*	2 JAN 0515	208	.02	.00	.02	439.
1 JAN 1650	59	.01	.01	.00	32.	*	2 JAN 0520	209	.02	.00	.02	396.
1 JAN 1655	60	.01	.01	.00	34.	*	2 JAN 0525	210	.02	.00	.02	360.
1 JAN 1700	61	.01	.01	.00	35.	*	2 JAN 0530	211	.02	.00	.02	331.
1 JAN 1705	62	.01	.01	.00	36.	*	2 JAN 0535	212	.02	.00	.02	307.
1 JAN 1710	63	.01	.01	.00	37.	*	2 JAN 0540	213	.02	.00	.01	287.
1 JAN 1715	64	.01	.01	.00	39.	*	2 JAN 0545	214	.02	.00	.01	270.
1 JAN 1720	65	.01	.01	.00	40.	*	2 JAN 0550	215	.01	.00	.01	256.
1 JAN 1725	66	.01	.01	.00	41.	*	2 JAN 0555	216	.01	.00	.01	242.
1 JAN 1730	67	.01	.01	.00	42.	*	2 JAN 0600	217	.02	.00	.01	231.
1 JAN 1735	68	.01	.01	.00	44.	*	2 JAN 0605	218	.02	.00	.01	221.
1 JAN 1740	69	.01	.01	.00	45.	*	2 JAN 0610	219	.01	.00	.01	214.
1 JAN 1745	70	.01	.01	.00	46.	*	2 JAN 0615	220	.01	.00	.01	210.
1 JAN 1750	71	.01	.01	.00	47.	*	2 JAN 0620	221	.01	.00	.01	207.
1 JAN 1755	72	.01	.01	.00	49.	*	2 JAN 0625	222	.01	.00	.01	204.
1 JAN 1800	73	.01	.00	.00	50.	*	2 JAN 0630	223	.01	.00	.01	202.
1 JAN 1805	74	.01	.00	.00	51.	*	2 JAN 0635	224	.01	.00	.01	199.
1 JAN 1810	75	.01	.00	.00	52.	*	2 JAN 0640	225	.01	.00	.01	196.
1 JAN 1815	76	.01	.00	.00	53.	*	2 JAN 0645	226	.01	.00	.01	192.
1 JAN 1820	77	.01	.00	.00	55.	*	2 JAN 0650	227	.01	.00	.01	189.
1 JAN 1825	78	.01	.00	.00	56.	*	2 JAN 0655	228	.01	.00	.01	185.
1 JAN 1830	79	.01	.00	.00	57.	*	2 JAN 0700	229	.01	.00	.01	182.
1 JAN 1835	80	.01	.00	.00	58.	*	2 JAN 0705	230	.01	.00	.01	179.
1 JAN 1840	81	.01	.00	.00	59.	*	2 JAN 0710	231	.01	.00	.01	176.
1 JAN 1845	82	.01	.00	.00	61.	*	2 JAN 0715	232	.01	.00	.01	173.
1 JAN 1850	83	.01	.00	.00	62.	*	2 JAN 0720	233	.01	.00	.01	170.
1 JAN 1855	84	.01	.00	.01	63.	*	2 JAN 0725	234	.01	.00	.01	167.
1 JAN 1900	85	.01	.00	.01	64.	*	2 JAN 0730	235	.01	.00	.01	164.
1 JAN 1905	86	.01	.00	.01	65.	*	2 JAN 0735	236	.01	.00	.01	162.
1 JAN 1910	87	.01	.00	.01	67.	*	2 JAN 0740	237	.01	.00	.01	159.
1 JAN 1915	88	.01	.00	.01	68.	*	2 JAN 0745	238	.01	.00	.01	157.
1 JAN 1920	89	.01	.00	.01	69.	*	2 JAN 0750	239	.01	.00	.01	154.
1 JAN 1925	90	.01	.00	.01	70.	*	2 JAN 0755	240	.01	.00	.01	152.
1 JAN 1930	91	.01	.00	.01	71.	*	2 JAN 0800	241	.01	.00	.01	150.

1	JAN	1935	92	.01	.00	.01	73.	*	2	JAN	0805	242	.01	.00	.01	148.
1	JAN	1940	93	.01	.00	.01	74.	*	2	JAN	0810	243	.01	.00	.01	146.
1	JAN	1945	94	.01	.00	.01	75.	*	2	JAN	0815	244	.01	.00	.01	144.
1	JAN	1950	95	.01	.00	.01	76.	*	2	JAN	0820	245	.01	.00	.01	142.
1	JAN	1955	96	.01	.00	.01	78.	*	2	JAN	0825	246	.01	.00	.01	140.
1	JAN	2000	97	.01	.00	.01	79.	*	2	JAN	0830	247	.01	.00	.01	139.
1	JAN	2005	98	.01	.00	.01	80.	*	2	JAN	0835	248	.01	.00	.01	137.
1	JAN	2010	99	.01	.00	.01	81.	*	2	JAN	0840	249	.01	.00	.01	135.
1	JAN	2015	100	.01	.00	.01	83.	*	2	JAN	0845	250	.01	.00	.01	134.
1	JAN	2020	101	.01	.00	.01	84.	*	2	JAN	0850	251	.01	.00	.01	132.
1	JAN	2025	102	.01	.00	.01	85.	*	2	JAN	0855	252	.01	.00	.01	131.
1	JAN	2030	103	.01	.00	.01	86.	*	2	JAN	0900	253	.01	.00	.01	129.
1	JAN	2035	104	.01	.00	.01	88.	*	2	JAN	0905	254	.01	.00	.01	128.
1	JAN	2040	105	.01	.00	.01	89.	*	2	JAN	0910	255	.01	.00	.01	127.
1	JAN	2045	106	.01	.00	.01	90.	*	2	JAN	0915	256	.01	.00	.01	125.
1	JAN	2050	107	.01	.00	.01	92.	*	2	JAN	0920	257	.01	.00	.01	124.
1	JAN	2055	108	.01	.00	.01	93.	*	2	JAN	0925	258	.01	.00	.01	123.
1	JAN	2100	109	.01	.00	.01	94.	*	2	JAN	0930	259	.01	.00	.01	122.
1	JAN	2105	110	.01	.00	.01	96.	*	2	JAN	0935	260	.01	.00	.01	120.
1	JAN	2110	111	.01	.00	.01	97.	*	2	JAN	0940	261	.01	.00	.01	119.
1	JAN	2115	112	.01	.00	.01	98.	*	2	JAN	0945	262	.01	.00	.01	118.
1	JAN	2120	113	.01	.00	.01	100.	*	2	JAN	0950	263	.01	.00	.01	117.
1	JAN	2125	114	.01	.00	.01	101.	*	2	JAN	0955	264	.01	.00	.01	116.
1	JAN	2130	115	.01	.00	.01	103.	*	2	JAN	1000	265	.01	.00	.01	115.
1	JAN	2135	116	.01	.00	.01	104.	*	2	JAN	1005	266	.01	.00	.01	114.
1	JAN	2140	117	.01	.00	.01	106.	*	2	JAN	1010	267	.01	.00	.01	113.
1	JAN	2145	118	.01	.00	.01	107.	*	2	JAN	1015	268	.01	.00	.01	112.
1	JAN	2150	119	.01	.00	.01	109.	*	2	JAN	1020	269	.01	.00	.01	111.
1	JAN	2155	120	.01	.00	.01	110.	*	2	JAN	1025	270	.01	.00	.01	110.
1	JAN	2200	121	.01	.00	.01	112.	*	2	JAN	1030	271	.01	.00	.01	109.
1	JAN	2205	122	.01	.00	.01	113.	*	2	JAN	1035	272	.01	.00	.01	108.
1	JAN	2210	123	.01	.00	.01	115.	*	2	JAN	1040	273	.01	.00	.01	107.
1	JAN	2215	124	.01	.00	.01	116.	*	2	JAN	1045	274	.01	.00	.01	107.
1	JAN	2220	125	.01	.00	.01	118.	*	2	JAN	1050	275	.01	.00	.01	106.
1	JAN	2225	126	.01	.00	.01	120.	*	2	JAN	1055	276	.01	.00	.01	105.
1	JAN	2230	127	.01	.00	.01	121.	*	2	JAN	1100	277	.01	.00	.01	104.
1	JAN	2235	128	.01	.00	.01	123.	*	2	JAN	1105	278	.01	.00	.01	103.
1	JAN	2240	129	.01	.00	.01	125.	*	2	JAN	1110	279	.01	.00	.01	103.
1	JAN	2245	130	.01	.00	.01	126.	*	2	JAN	1115	280	.01	.00	.01	102.
1	JAN	2250	131	.01	.00	.01	128.	*	2	JAN	1120	281	.01	.00	.01	101.
1	JAN	2255	132	.01	.00	.01	130.	*	2	JAN	1125	282	.01	.00	.01	100.
1	JAN	2300	133	.01	.00	.01	132.	*	2	JAN	1130	283	.01	.00	.01	100.
1	JAN	2305	134	.01	.00	.01	134.	*	2	JAN	1135	284	.01	.00	.01	99.
1	JAN	2310	135	.01	.00	.01	136.	*	2	JAN	1140	285	.01	.00	.01	98.
1	JAN	2315	136	.01	.00	.01	138.	*	2	JAN	1145	286	.01	.00	.01	98.
1	JAN	2320	137	.01	.00	.01	140.	*	2	JAN	1150	287	.01	.00	.01	97.
1	JAN	2325	138	.01	.00	.01	142.	*	2	JAN	1155	288	.01	.00	.01	96.
1	JAN	2330	139	.01	.00	.01	144.	*	2	JAN	1200	289	.00	.00	.00	95.
1	JAN	2335	140	.01	.00	.01	146.	*	2	JAN	1205	290	.00	.00	.00	90.
1	JAN	2340	141	.01	.00	.01	148.	*	2	JAN	1210	291	.00	.00	.00	82.
1	JAN	2345	142	.02	.00	.01	150.	*	2	JAN	1215	292	.00	.00	.00	70.
1	JAN	2350	143	.02	.00	.01	152.	*	2	JAN	1220	293	.00	.00	.00	57.
1	JAN	2355	144	.02	.00	.01	155.	*	2	JAN	1225	294	.00	.00	.00	44.
2	JAN	0000	145	.01	.00	.01	157.	*	2	JAN	1230	295	.00	.00	.00	32.
2	JAN	0005	146	.01	.00	.01	158.	*	2	JAN	1235	296	.00	.00	.00	23.
2	JAN	0010	147	.01	.00	.01	159.	*	2	JAN	1240	297	.00	.00	.00	17.
2	JAN	0015	148	.01	.00	.01	159.	*	2	JAN	1245	298	.00	.00	.00	13.
2	JAN	0020	149	.01	.00	.01	159.	*	2	JAN	1250	299	.00	.00	.00	9.
2	JAN	0025	150	.01	.00	.01	159.	*	2	JAN	1255	300	.00	.00	.00	7.
								*								

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TOTAL RAINFALL = 4.87, TOTAL LOSS = 1.04, TOTAL EXCESS = 3.83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2114.	16.33		492.	186.	179.	179.
		(INCHES)	2.541	3.833	3.833	3.833
		(AC-FT)	244.	368.	368.	368.

CUMULATIVE AREA = 1.80 SQ MI

STATION BASIN

(O) OUTFLOW

		0.	400.	800.	1200.	1600.	2000.	2400.	0.	0.	0.	0.	0.	0.
												(L) PRECIP,	(X) EXCESS	
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.4	.2	.0
DAHRMN	PER													
11200	10													
11205	20													
11210	30													
11215	40													
11220	50													
11225	60													
11230	70													
11235	80													
11240	90													
11245	100													
11250	110													
11255	120													
11300	130													
11305	140													
11310	150													
11315	160													
11320	170													
11325	180													
11330	190													
11335	200													
11340	210													
11345	220													
11350	230													
11355	240													
11400	250													
11405	260													
11410	270													
11415	280													
11420	290													
11425	300													
11430	310													
11435	320													
11440	330													
11445	340													
11450	350													
11455	360													
11500	370													
11505	380													
11510	390													
11515	400													
11520	410													
11525	420													
11530	430													
11535	440													
11540	450													
11545	460													
11550	470													
11555	480													
11600	490													
11605	50.0													
11610	51.0													
11615	52.0													
11620	53.0													
11625	54.0													
11630	55.0													
11635	56.0													
11640	57.0													
11645	58.0													
11650	59.0													
11655	60.0													
11700	61.0													
11705	62.0													
11710	63.0													
11715	64.0													
11720	65.0													
11725	66.0													
11730	67.0													

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11735  68.0       .       .       .       .       .       .       .       .       .       .       .
11740  69.0       .       .       .       .       .       .       .       .       .       .       .
11745  70.0       .       .       .       .       .       .       .       .       .       .       .
11750  71.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11755  72.0       .       .       .       .       .       .       .       .       .       .       .
11800  73.0       .       .       .       .       .       .       .       .       .       .       .
11805  74.0       .       .       .       .       .       .       .       .       .       .       .
11810  75.0       .       .       .       .       .       .       .       .       .       .       .
11815  76.0       .       .       .       .       .       .       .       .       .       .       .
11820  77.0       .       .       .       .       .       .       .       .       .       .       .
11825  78.0       .       .       .       .       .       .       .       .       .       .       .
11830  79.0       .       .       .       .       .       .       .       .       .       .       .
11835  80.0       .       .       .       .       .       .       .       .       .       .       .
11840  81.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11845  82. 0      .       .       .       .       .       .       .       .       .       .       .
11850  83. 0      .       .       .       .       .       .       .       .       .       .       .
11855  84. 0      .       .       .       .       .       .       .       .       .       .       .
11900  85. 0      .       .       .       .       .       .       .       .       .       .       .
11905  86. 0      .       .       .       .       .       .       .       .       .       .       .
11910  87. 0      .       .       .       .       .       .       .       .       .       .       .
11915  88. 0      .       .       .       .       .       .       .       .       .       .       .
11920  89. 0      .       .       .       .       .       .       .       .       .       .       .
11925  90. 0      .       .       .       .       .       .       .       .       .       .       .
11930  91. 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11935  92. 0      .       .       .       .       .       .       .       .       .       .      L.
11940  93. 0      .       .       .       .       .       .       .       .       .       .      L.
11945  94. 0      .       .       .       .       .       .       .       .       .       .      L.
11950  95. 0      .       .       .       .       .       .       .       .       .       .      L.
11955  96. 0      .       .       .       .       .       .       .       .       .       .      L.
12000  97. 0      .       .       .       .       .       .       .       .       .       .      L.
12005  98. 0      .       .       .       .       .       .       .       .       .       .      L.
12010  99. 0      .       .       .       .       .       .       .       .       .       .      L.
12015 100. 0      .       .       .       .       .       .       .       .       .       .      L.
12020 101. 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
12025 102. 0      .       .       .       .       .       .       .       .       .       .      L.
12030 103. 0      .       .       .       .       .       .       .       .       .       .      L.
12035 104. 0      .       .       .       .       .       .       .       .       .       .      L.
12040 105. 0      .       .       .       .       .       .       .       .       .       .      L.
12045 106. 0      .       .       .       .       .       .       .       .       .       .      L.
12050 107. 0      .       .       .       .       .       .       .       .       .       .      L.
12055 108. 0      .       .       .       .       .       .       .       .       .       .      L.
12100 109. 0      .       .       .       .       .       .       .       .       .       .      L.
12105 110. 0      .       .       .       .       .       .       .       .       .       .      L.
12110 111. 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
12115 112. 0      .       .       .       .       .       .       .       .       .       .      L.
12120 113. 0      .       .       .       .       .       .       .       .       .       .      L.
12125 114.  0     .       .       .       .       .       .       .       .       .       .      L.
12130 115.  0     .       .       .       .       .       .       .       .       .       .      L.
12135 116.  0     .       .       .       .       .       .       .       .       .       .      L.
12140 117.  0     .       .       .       .       .       .       .       .       .       .      L.
12145 118.  0     .       .       .       .       .       .       .       .       .       .      L.
12150 119.  0     .       .       .       .       .       .       .       .       .       .      L.
12155 120.  0     .       .       .       .       .       .       .       .       .       .      L.
12200 121. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
12205 122.  0     .       .       .       .       .       .       .       .       .       .      L.
12210 123.  0     .       .       .       .       .       .       .       .       .       .      L.
12215 124.  0     .       .       .       .       .       .       .       .       .       .      L.
12220 125.  0     .       .       .       .       .       .       .       .       .       .      L.
12225 126.  0     .       .       .       .       .       .       .       .       .       .      L.
12230 127.  0     .       .       .       .       .       .       .       .       .       .      L.
12235 128.  0     .       .       .       .       .       .       .       .       .       .      L.
12240 129.  0     .       .       .       .       .       .       .       .       .       .      L.
12245 130.  0     .       .       .       .       .       .       .       .       .       .      L.
12250 131. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
12255 132.  0     .       .       .       .       .       .       .       .       .       .      X.
12300 133.  0     .       .       .       .       .       .       .       .       .       .      X.
12305 134.  0     .       .       .       .       .       .       .       .       .       .      X.
12310 135.  0     .       .       .       .       .       .       .       .       .       .      X.
12315 136.  0     .       .       .       .       .       .       .       .       .       .      X.
12320 137.  0     .       .       .       .       .       .       .       .       .       .      X.
12325 138.   0    .       .       .       .       .       .       .       .       .       .      X.
12330 139.   0    .       .       .       .       .       .       .       .       .       .      X.
12335 140.   0    .       .       .       .       .       .       .       .       .       .      X.
12340 141. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
```

```
12345 142.  O    .       .       .       .       .       .       .       .       .       .       .      X.
12350 143.  O    .       .       .       .       .       .       .       .       .       .       .      X.
12355 144.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20000 145.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20005 146.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20010 147.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20015 148.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20020 149.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20025 150.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20030 151. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20035 152.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20040 153.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20045 154.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20050 155.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20055 156.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20100 157.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20105 158.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20110 159.  O    .       .       .       .       .       .       .       .       .       .       .      X.
20115 160.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20120 161. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20125 162.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20130 163.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20135 164.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20140 165.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20145 166.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20150 167.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20155 168.   O   .       .       .       .       .       .       .       .       .       .       .      X.
20200 169.    O  .       .       .       .       .       .       .       .       .       .       .      X.
20205 170.    O  .       .       .       .       .       .       .       .       .       .       .      X.
20210 171. . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20215 172.    O  .       .       .       .       .       .       .       .       .       .       .      X.
20220 173.    O  .       .       .       .       .       .       .       .       .       .       .      X.
20225 174.    O  .       .       .       .       .       .       .       .       .       .       .      X.
20230 175.     O .       .       .       .       .       .       .       .       .       .       .      X.
20235 176.     O .       .       .       .       .       .       .       .       .       .       .      X.
20240 177.     O .       .       .       .       .       .       .       .       .       .       .      X.
20245 178.     O .       .       .       .       .       .       .       .       .       .       .      X.
20250 179.      O.       .       .       .       .       .       .       .       .       .       .     LX.
20255 180.      O.       .       .       .       .       .       .       .       .       .       .     LX.
20300 181. . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . XX.
20305 182.      O.       .       .       .       .       .       .       .       .       .       .     XX.
20310 183.       O.      .       .       .       .       .       .       .       .       .       .     XX.
20315 184.       O.      .       .       .       .       .       .       .       .       .       .     XX.
20320 185.        O      .       .       .       .       .       .       .       .       .       .     XX.
20325 186.        O      .       .       .       .       .       .       .       .       .       .     XX.
20330 187.        .O     .       .       .       .       .       .       .       .       .       .    XXX.
20335 188.        . O    .       .       .       .       .       .       .       .       .       .    XXX.
20340 189.        .  O   .       .       .       .       .       .       .       .       .       .   LXXX.
20345 190.        .   O  .       .       .       .       .       .       .       .       .       .   XXXX.
20350 191. . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LXXXXX.
20355 192.        .     O .       .       .       .       .       .       .       .       . XXXXXXX.
20400 193.        .       . O     .       .       .       .       .       LLXXXXXXXXXXXXXXXXXXXXXXXXXX.
20405 194.        .       .       .O      .       .       .       .       .       .       .   XXXXX.
20410 195.        .       .       .       . O     .       .       .       .       .       .    XXX.
20415 196.        .       .       .       .       O       .       .       .       .       .    LXX.
20420 197.        .       .       .       .       .  O    .       .       .       .       .     XX.
20425 198.        .       .       .       .       .O      .       .       .       .       .     XX.
20430 199.        .       .       .       .    O  .       .       .       .       .       .     XX.
20435 200.        .       .       .       O.      .       .       .       .       .       .     LX.
20440 201. . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20445 202.        .       .    O  .       .       .       .       .       .       .       .      X.
20450 203.        .       . O     .       .       .       .       .       .       .       .      X.
20455 204.        .      O.       .       .       .       .       .       .       .       .      X.
20500 205.        .    O  .       .       .       .       .       .       .       .       .      X.
20505 206.        .   O   .       .       .       .       .       .       .       .       .      X.
20510 207.        . O     .       .       .       .       .       .       .       .       .      X.
20515 208.        .O      .       .       .       .       .       .       .       .       .      X.
20520 209.        O       .       .       .       .       .       .       .       .       .      X.
20525 210.       O.       .       .       .       .       .       .       .       .       .      X.
20530 211. . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20535 212.      O .       .       .       .       .       .       .       .       .       .      X.
20540 213.     O  .       .       .       .       .       .       .       .       .       .      X.
20545 214.     O  .       .       .       .       .       .       .       .       .       .      X.
20550 215.    O   .       .       .       .       .       .       .       .       .       .      X.
```

```
20555 216.     0  .        .        .        .        .        .        .        .        .        .        .        X.
20600 217.     0  .        .        .        .        .        .        .        .        .        .        .        X.
20605 218.     0  .        .        .        .        .        .        .        .        .        .        .        X.
20610 219.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20615 220.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20620 221. . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20625 222.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20630 223.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20635 224.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20640 225.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20645 226.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20650 227.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20655 228.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20700 229.    0   .        .        .        .        .        .        .        .        .        .        .        X.
20705 230.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20710 231. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20715 232.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20720 233.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20725 234.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20730 235.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20735 236.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20740 237.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20745 238.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20750 239.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20755 240.   0    .        .        .        .        .        .        .        .        .        .        .        X.
20800 241. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
20805 242.   0    .        .        .        .        .        .        .        .        .        .        .        L.
20810 243.   0    .        .        .        .        .        .        .        .        .        .        .        L.
20815 244.   0    .        .        .        .        .        .        .        .        .        .        .        .
20820 245.   0    .        .        .        .        .        .        .        .        .        .        .        .
20825 246.   0    .        .        .        .        .        .        .        .        .        .        .        .
20830 247.  0     .        .        .        .        .        .        .        .        .        .        .        .
20835 248.  0     .        .        .        .        .        .        .        .        .        .        .        .
20840 249.  0     .        .        .        .        .        .        .        .        .        .        .        .
20845 250.  0     .        .        .        .        .        .        .        .        .        .        .        .
20850 251. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20855 252.  0     .        .        .        .        .        .        .        .        .        .        .        .
20900 253.  0     .        .        .        .        .        .        .        .        .        .        .        .
20905 254.  0     .        .        .        .        .        .        .        .        .        .        .        .
20910 255.  0     .        .        .        .        .        .        .        .        .        .        .        .
20915 256.  0     .        .        .        .        .        .        .        .        .        .        .        .
20920 257.  0     .        .        .        .        .        .        .        .        .        .        .        .
20925 258.  0     .        .        .        .        .        .        .        .        .        .        .        .
20930 259.  0     .        .        .        .        .        .        .        .        .        .        .        .
20935 260.  0     .        .        .        .        .        .        .        .        .        .        .        .
20940 261. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20945 262.  0     .        .        .        .        .        .        .        .        .        .        .        .
20950 263.  0     .        .        .        .        .        .        .        .        .        .        .        .
20955 264.  0     .        .        .        .        .        .        .        .        .        .        .        .
21000 265.  0     .        .        .        .        .        .        .        .        .        .        .        .
21005 266.  0     .        .        .        .        .        .        .        .        .        .        .        .
21010 267.  0     .        .        .        .        .        .        .        .        .        .        .        .
21015 268.  0     .        .        .        .        .        .        .        .        .        .        .        .
21020 269.  0     .        .        .        .        .        .        .        .        .        .        .        .
21025 270.  0     .        .        .        .        .        .        .        .        .        .        .        .
21030 271. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21035 272.  0     .        .        .        .        .        .        .        .        .        .        .        .
21040 273.  0     .        .        .        .        .        .        .        .        .        .        .        .
21045 274.  0     .        .        .        .        .        .        .        .        .        .        .        .
21050 275.  0     .        .        .        .        .        .        .        .        .        .        .        .
21055 276.  0     .        .        .        .        .        .        .        .        .        .        .        .
21100 277.  0     .        .        .        .        .        .        .        .        .        .        .        .
21105 278.  0     .        .        .        .        .        .        .        .        .        .        .        .
21110 279.  0     .        .        .        .        .        .        .        .        .        .        .        .
21115 280.  0     .        .        .        .        .        .        .        .        .        .        .        .
21120 281. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21125 282.  0     .        .        .        .        .        .        .        .        .        .        .        .
21130 283. 0      .        .        .        .        .        .        .        .        .        .        .        .
21135 284. 0      .        .        .        .        .        .        .        .        .        .        .        .
21140 285. 0      .        .        .        .        .        .        .        .        .        .        .        .
21145 286. 0      .        .        .        .        .        .        .        .        .        .        .        .
21150 287. 0      .        .        .        .        .        .        .        .        .        .        .        .
21155 288. 0      .        .        .        .        .        .        .        .        .        .        .        .
21200 289. 0      .        .        .        .        .        .        .        .        .        .        .        .
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21205 290. O      .         .         .         .         .         .         .         .         .         .         .         .
21210 291. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21215 292. O      .         .         .         .         .         .         .         .         .         .         .         .
21220 293.0       .         .         .         .         .         .         .         .         .         .         .         .
21225 294.0       .         .         .         .         .         .         .         .         .         .         .         .
21230 295.0       .         .         .         .         .         .         .         .         .         .         .         .
21235 296.0       .         .         .         .         .         .         .         .         .         .         .         .
21240 2970        .         .         .         .         .         .         .         .         .         .         .         .
21245 2980        .         .         .         .         .         .         .         .         .         .         .         .
21250 2990        .         .         .         .         .         .         .         .         .         .         .         .
21255 3000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		BASIN	2114.	16.33	492.	186.	179.	1.80		

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

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   12JUN06  TIME  19:44:02  *
*                                      *
****************************************
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```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

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

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

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

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

                       *DIAGRAM
*** FREE ***
            1          ID   NATIONAL QUARRIES
            2          ID   100-YEAR STORM EVENT
            3          IT       5 01JAN90    1200     300
            4          IO       1       2

            5          KK   BASIN
            6          KM   6HR RAINFALL IS  3.5  INCHES
            7          KM   24HR RAINFALL IS  6.4  INCHES
            8          KM   DAR30 =  .97912
            9          KM   DAR60 =  .9892
           10          KM   DAR180 =  .9928
           11          KM   DAR360 =  .9946
           12          KM   DAR1440 =  .9964
           13          KM   BASIN AREA IS  1.8  SQUARE MILES
           14          IN       5 01JAN90    1200     300
           15          PI  .00966   .0097  .00972  .00976  .00978  .00982  .00984  .00988   .0099  .00994
           16          PI  .00996     .01  .01002  .01007  .01009  .01013  .01015   .0102  .01022  .01026
           17          PI  .01029  .01033  .01035   .0104  .01043  .01047   .0105  .01054  .01057  .01062
           18          PI  .01064  .01069  .01072  .01077   .0108  .01085  .01087  .01093  .01095  .01101
           19          PI  .01104  .01109  .01112  .01118   .0112  .01126  .01129  .01135  .01138  .01144
           20          PI  .01147  .01153  .01156  .01163  .01166  .01172  .01176  .01182  .01186   .0119
           21          PI  .01196  .01203  .01206  .01213  .01217  .01224  .01228  .01235  .01239   .0124
           22          PI  .01251  .01258  .01262  .01271  .01275  .01283  .01287  .01296    .013  .01309
           23          PI  .01313  .01322  .01327  .01336  .01341   .0135  .01355  .01365   .0137   .0138
           24          PI  .01385  .01395  .01401  .01411  .01417  .01428  .01434  .01445  .01451   .0146
           25          PI  .01469  .01481  .01488    .015  .01507   .0152  .01527   .0154  .01547  .01562
           26          PI  .01569  .01584  .01591  .01607  .01614   .0163  .01639  .01655  .01664  .01681
           27          PI   .0169  .01708  .01718  .01737  .01746  .01766  .01776  .01797  .01808   .0183
           28          PI  .01841  .01865  .01876  .01901  .01913  .01939  .01952   .0198  .01994  .02022
           29          PI  .02037  .02068  .02084  .01745  .01761  .01793   .0181  .01845  .01863    .019
           30          PI   .0192   .0196  .01981  .02026  .02049  .02097  .02122  .02175  .02203  .02262
           31          PI  .02292  .02358  .02392  .02465  .02503  .02585  .02629   .0275  .02799  .02906
           32          PI  .02964  .03088  .03156  .03304  .03385  .03564  .03663  .03885  .04011   .0429
           33          PI  .04459  .04842  .05067  .05889  .06207  .07026  .07571  .08908  .10147   .1489
           34          PI  .20991  .75242  .11949  .08253   .0658  .05322   .0464  .04147   .0377  .03471
           35          PI  .03228  .03024  .02851  .02675  .02543  .02428  .02324  .02232  .02148   .0207
           36          PI  .02003   .0194  .01881  .01827  .01777    .021  .02053  .02008  .01966  .01926
           37          PI  .01888  .01853  .01819  .01787  .01756  .01727  .01699  .01672  .01647   .0162
           38          PI  .01599  .01576  .01554  .01534  .01513  .01494  .01475  .01457  .01439   .0142
           39          PI  .01406   .0139  .01375   .0136  .01345  .01331  .01318  .01304  .01291  .01279
           40          PI  .01266  .01255  .01243  .01232  .01221   .0121  .01199  .01189  .01179  .01169
           41          PI   .0116   .0115  .01141  .01132  .01123  .01115  .01106  .01098   .0109  .01082
           42          PI  .01074  .01067  .01059  .01052  .01045  .01038  .01031  .01024  .01018   .0101
           43          PI  .01005  .00998  .00992  .00986   .0098  .00974  .00968       0       0       0
           44          PI       0       0       0       0       0       0       0       0       0       0
           45          PI       0       0
           46          BA     1.8
           47          LS       0      94
           48          UD     0.4
           49          ZZ


                 SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    5       BASIN

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
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****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*              JUN   1998              *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.1                *                                    *         609 SECOND STREET            *
*                                      *                                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE   12JUN06  TIME  19:44:02  *                                    *          (916) 756-1104              *
*                                      *                                    *                                      *
****************************************                                    ****************************************


                        NATIONAL QUARRIES
                        100-YEAR STORM EVENT

  4 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          2  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2JAN90  ENDING DATE
                     NDTIME        1255  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

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


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


          **************
          *            *
  5 KK    *     BASIN  *
          *            *
          **************
                        6HR RAINFALL IS  3.5  INCHES
                        24HR RAINFALL IS  6.4  INCHES
                        DAR30 =  .97912
                        DAR60 =  .9892
                        DAR180 =  .9928
                        DAR360 =  .9946
                        DAR1440 =  .9964
                        BASIN AREA IS  1.8  SQUARE MILES

 14 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN          5  TIME INTERVAL IN MINUTES
                      JXDATE      1JAN90  STARTING DATE
                      JXTIME        1200  STARTING TIME

             SUBBASIN RUNOFF DATA

 46 BA          SUBBASIN CHARACTERISTICS
                      TAREA        1.80  SUBBASIN AREA

             PRECIPITATION DATA
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15 PB              STORM       6.37  BASIN TOTAL PRECIPITATION

15 PI           INCREMENTAL PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .03       .03       .03       .03       .03       .03
                   .03       .03       .03       .03       .03       .04       .04       .04       .04       .04
                   .04       .05       .05       .06       .06       .07       .08       .09       .10       .15
                   .21       .75       .12       .08       .07       .05       .05       .04       .04       .03
                   .03       .03       .03       .03       .03       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                   .02       .02       .02       .02       .02       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01

47 LS           SCS LOSS RATE
                     STRTL        .13  INITIAL ABSTRACTION
                    CRVNBR      94.00  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

48 UD           SCS DIMENSIONLESS UNITGRAPH
                      TLAG        .40  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                         26 END-OF-PERIOD ORDINATES
            181.      557.     1173.     1734.     1959.     1913.     1662.     1317.      910.      666.
            497.      370.      269.      199.      145.      106.       78.       58.       43.       31.
             23.       18.       14.        9.        6.        2.

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

                                         HYDROGRAPH AT STATION    BASIN

*****************************************************************************************************************
                                                  *
     DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q      *      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q
                                                  *
      1 JAN 1200    1     .00     .00     .00         0.      *       2 JAN 0030  151     .02     .00     .02       243.
      1 JAN 1205    2     .01     .01     .00         0.      *       2 JAN 0035  152     .02     .00     .02       242.
      1 JAN 1210    3     .01     .01     .00         0.      *       2 JAN 0040  153     .02     .00     .02       242.
      1 JAN 1215    4     .01     .01     .00         0.      *       2 JAN 0045  154     .02     .00     .02       244.
      1 JAN 1220    5     .01     .01     .00         0.      *       2 JAN 0050  155     .02     .00     .02       246.
      1 JAN 1225    6     .01     .01     .00         0.      *       2 JAN 0055  156     .02     .00     .02       248.
      1 JAN 1230    7     .01     .01     .00         0.      *       2 JAN 0100  157     .02     .00     .02       251.
      1 JAN 1235    8     .01     .01     .00         0.      *       2 JAN 0105  158     .02     .00     .02       255.
      1 JAN 1240    9     .01     .01     .00         0.      *       2 JAN 0110  159     .02     .00     .02       259.
      1 JAN 1245   10     .01     .01     .00         0.      *       2 JAN 0115  160     .02     .00     .02       263.
      1 JAN 1250   11     .01     .01     .00         0.      *       2 JAN 0120  161     .02     .00     .02       267.
      1 JAN 1255   12     .01     .01     .00         0.      *       2 JAN 0125  162     .02     .00     .02       272.
      1 JAN 1300   13     .01     .01     .00         0.      *       2 JAN 0130  163     .02     .00     .02       277.
      1 JAN 1305   14     .01     .01     .00         0.      *       2 JAN 0135  164     .02     .00     .02       282.
      1 JAN 1310   15     .01     .01     .00         0.      *       2 JAN 0140  165     .02     .00     .02       288.
      1 JAN 1315   16     .01     .01     .00         0.      *       2 JAN 0145  166     .03     .00     .02       294.
      1 JAN 1320   17     .01     .01     .00         1.      *       2 JAN 0150  167     .03     .00     .02       300.
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1	JAN	1325	18	.01	.01	.00	1.	*	2	JAN	0155	168	.03	.00	.03	307.
1	JAN	1330	19	.01	.01	.00	3.	*	2	JAN	0200	169	.03	.00	.03	314.
1	JAN	1335	20	.01	.01	.00	5.	*	2	JAN	0205	170	.03	.00	.03	321.
1	JAN	1340	21	.01	.01	.00	7.	*	2	JAN	0210	171	.03	.00	.03	329.
1	JAN	1345	22	.01	.01	.00	10.	*	2	JAN	0215	172	.03	.00	.03	338.
1	JAN	1350	23	.01	.01	.00	13.	*	2	JAN	0220	173	.03	.00	.03	347.
1	JAN	1355	24	.01	.01	.00	16.	*	2	JAN	0225	174	.03	.00	.03	357.
1	JAN	1400	25	.01	.01	.00	20.	*	2	JAN	0230	175	.03	.00	.03	368.
1	JAN	1405	26	.01	.01	.00	23.	*	2	JAN	0235	176	.03	.00	.03	379.
1	JAN	1410	27	.01	.01	.00	26.	*	2	JAN	0240	177	.04	.00	.03	391.
1	JAN	1415	28	.01	.01	.00	29.	*	2	JAN	0245	178	.04	.00	.04	404.
1	JAN	1420	29	.01	.01	.00	33.	*	2	JAN	0250	179	.04	.00	.04	417.
1	JAN	1425	30	.01	.01	.00	36.	*	2	JAN	0255	180	.04	.00	.04	433.
1	JAN	1430	31	.01	.01	.00	39.	*	2	JAN	0300	181	.04	.00	.04	449.
1	JAN	1435	32	.01	.01	.00	42.	*	2	JAN	0305	182	.04	.00	.04	467.
1	JAN	1440	33	.01	.01	.00	45.	*	2	JAN	0310	183	.05	.00	.05	488.
1	JAN	1445	34	.01	.01	.00	48.	*	2	JAN	0315	184	.05	.00	.05	511.
1	JAN	1450	35	.01	.01	.00	50.	*	2	JAN	0320	185	.06	.00	.06	537.
1	JAN	1455	36	.01	.01	.00	53.	*	2	JAN	0325	186	.06	.00	.06	569.
1	JAN	1500	37	.01	.01	.01	56.	*	2	JAN	0330	187	.07	.00	.07	607.
1	JAN	1505	38	.01	.01	.01	58.	*	2	JAN	0335	188	.08	.00	.07	652.
1	JAN	1510	39	.01	.01	.01	61.	*	2	JAN	0340	189	.09	.00	.09	707.
1	JAN	1515	40	.01	.01	.01	63.	*	2	JAN	0345	190	.10	.00	.10	772.
1	JAN	1520	41	.01	.01	.01	66.	*	2	JAN	0350	191	.15	.00	.15	858.
1	JAN	1525	42	.01	.01	.01	68.	*	2	JAN	0355	192	.21	.00	.21	981.
1	JAN	1530	43	.01	.01	.01	70.	*	2	JAN	0400	193	.75	.01	.74	1253.
1	JAN	1535	44	.01	.01	.01	73.	*	2	JAN	0405	194	.12	.00	.12	1669.
1	JAN	1540	45	.01	.00	.01	75.	*	2	JAN	0410	195	.08	.00	.08	2206.
1	JAN	1545	46	.01	.00	.01	77.	*	2	JAN	0415	196	.07	.00	.06	2640.
1	JAN	1550	47	.01	.00	.01	79.	*	2	JAN	0420	197	.05	.00	.05	2786.
1	JAN	1555	48	.01	.00	.01	81.	*	2	JAN	0425	198	.05	.00	.05	2689.
1	JAN	1600	49	.01	.00	.01	83.	*	2	JAN	0430	199	.04	.00	.04	2412.
1	JAN	1605	50	.01	.00	.01	85.	*	2	JAN	0435	200	.04	.00	.04	2050.
1	JAN	1610	51	.01	.00	.01	87.	*	2	JAN	0440	201	.03	.00	.03	1656.
1	JAN	1615	52	.01	.00	.01	89.	*	2	JAN	0445	202	.03	.00	.03	1375.
1	JAN	1620	53	.01	.00	.01	91.	*	2	JAN	0450	203	.03	.00	.03	1158.
1	JAN	1625	54	.01	.00	.01	93.	*	2	JAN	0455	204	.03	.00	.03	984.
1	JAN	1630	55	.01	.00	.01	95.	*	2	JAN	0500	205	.03	.00	.03	842.
1	JAN	1635	56	.01	.00	.01	96.	*	2	JAN	0505	206	.03	.00	.03	732.
1	JAN	1640	57	.01	.00	.01	98.	*	2	JAN	0510	207	.02	.00	.02	643.
1	JAN	1645	58	.01	.00	.01	100.	*	2	JAN	0515	208	.02	.00	.02	571.
1	JAN	1650	59	.01	.00	.01	102.	*	2	JAN	0520	209	.02	.00	.02	514.
1	JAN	1655	60	.01	.00	.01	103.	*	2	JAN	0525	210	.02	.00	.02	467.
1	JAN	1700	61	.01	.00	.01	105.	*	2	JAN	0530	211	.02	.00	.02	429.
1	JAN	1705	62	.01	.00	.01	107.	*	2	JAN	0535	212	.02	.00	.02	398.
1	JAN	1710	63	.01	.00	.01	108.	*	2	JAN	0540	213	.02	.00	.02	371.
1	JAN	1715	64	.01	.00	.01	110.	*	2	JAN	0545	214	.02	.00	.02	350.
1	JAN	1720	65	.01	.00	.01	111.	*	2	JAN	0550	215	.02	.00	.02	330.
1	JAN	1725	66	.01	.00	.01	113.	*	2	JAN	0555	216	.02	.00	.02	313.
1	JAN	1730	67	.01	.00	.01	115.	*	2	JAN	0600	217	.02	.00	.02	298.
1	JAN	1735	68	.01	.00	.01	116.	*	2	JAN	0605	218	.02	.00	.02	287.
1	JAN	1740	69	.01	.00	.01	118.	*	2	JAN	0610	219	.02	.00	.02	280.
1	JAN	1745	70	.01	.00	.01	119.	*	2	JAN	0615	220	.02	.00	.02	277.
1	JAN	1750	71	.01	.00	.01	121.	*	2	JAN	0620	221	.02	.00	.02	276.
1	JAN	1755	72	.01	.00	.01	122.	*	2	JAN	0625	222	.02	.00	.02	275.
1	JAN	1800	73	.01	.00	.01	124.	*	2	JAN	0630	223	.02	.00	.02	274.
1	JAN	1805	74	.01	.00	.01	125.	*	2	JAN	0635	224	.02	.00	.02	272.
1	JAN	1810	75	.01	.00	.01	127.	*	2	JAN	0640	225	.02	.00	.02	269.
1	JAN	1815	76	.01	.00	.01	128.	*	2	JAN	0645	226	.02	.00	.02	265.
1	JAN	1820	77	.01	.00	.01	130.	*	2	JAN	0650	227	.02	.00	.02	262.
1	JAN	1825	78	.01	.00	.01	131.	*	2	JAN	0655	228	.02	.00	.02	258.
1	JAN	1830	79	.01	.00	.01	133.	*	2	JAN	0700	229	.02	.00	.02	254.
1	JAN	1835	80	.01	.00	.01	134.	*	2	JAN	0705	230	.02	.00	.02	250.
1	JAN	1840	81	.01	.00	.01	136.	*	2	JAN	0710	231	.02	.00	.02	246.
1	JAN	1845	82	.01	.00	.01	137.	*	2	JAN	0715	232	.02	.00	.02	242.
1	JAN	1850	83	.01	.00	.01	139.	*	2	JAN	0720	233	.02	.00	.02	238.
1	JAN	1855	84	.01	.00	.01	140.	*	2	JAN	0725	234	.02	.00	.02	234.
1	JAN	1900	85	.01	.00	.01	141.	*	2	JAN	0730	235	.02	.00	.02	231.
1	JAN	1905	86	.01	.00	.01	143.	*	2	JAN	0735	236	.02	.00	.01	227.
1	JAN	1910	87	.01	.00	.01	144.	*	2	JAN	0740	237	.01	.00	.01	224.
1	JAN	1915	88	.01	.00	.01	146.	*	2	JAN	0745	238	.01	.00	.01	221.
1	JAN	1920	89	.01	.00	.01	147.	*	2	JAN	0750	239	.01	.00	.01	218.
1	JAN	1925	90	.01	.00	.01	149.	*	2	JAN	0755	240	.01	.00	.01	215.
1	JAN	1930	91	.01	.00	.01	150.	*	2	JAN	0800	241	.01	.00	.01	212.

1	JAN 1935	92	.01	.00	.01	152.	*	2	JAN 0805	242	.01	.00	.01	209.
1	JAN 1940	93	.01	.00	.01	153.	*	2	JAN 0810	243	.01	.00	.01	206.
1	JAN 1945	94	.01	.00	.01	155.	*	2	JAN 0815	244	.01	.00	.01	204.
1	JAN 1950	95	.01	.00	.01	156.	*	2	JAN 0820	245	.01	.00	.01	201.
1	JAN 1955	96	.01	.00	.01	157.	*	2	JAN 0825	246	.01	.00	.01	199.
1	JAN 2000	97	.01	.00	.01	159.	*	2	JAN 0830	247	.01	.00	.01	196.
1	JAN 2005	98	.01	.00	.01	160.	*	2	JAN 0835	248	.01	.00	.01	194.
1	JAN 2010	99	.01	.00	.01	162.	*	2	JAN 0840	249	.01	.00	.01	192.
1	JAN 2015	100	.01	.00	.01	163.	*	2	JAN 0845	250	.01	.00	.01	190.
1	JAN 2020	101	.01	.00	.01	165.	*	2	JAN 0850	251	.01	.00	.01	188.
1	JAN 2025	102	.01	.00	.01	166.	*	2	JAN 0855	252	.01	.00	.01	186.
1	JAN 2030	103	.01	.00	.01	168.	*	2	JAN 0900	253	.01	.00	.01	184.
1	JAN 2035	104	.01	.00	.01	170.	*	2	JAN 0905	254	.01	.00	.01	182.
1	JAN 2040	105	.01	.00	.01	171.	*	2	JAN 0910	255	.01	.00	.01	180.
1	JAN 2045	106	.02	.00	.01	173.	*	2	JAN 0915	256	.01	.00	.01	178.
1	JAN 2050	107	.02	.00	.01	174.	*	2	JAN 0920	257	.01	.00	.01	177.
1	JAN 2055	108	.02	.00	.01	176.	*	2	JAN 0925	258	.01	.00	.01	175.
1	JAN 2100	109	.02	.00	.01	178.	*	2	JAN 0930	259	.01	.00	.01	173.
1	JAN 2105	110	.02	.00	.01	179.	*	2	JAN 0935	260	.01	.00	.01	172.
1	JAN 2110	111	.02	.00	.01	181.	*	2	JAN 0940	261	.01	.00	.01	170.
1	JAN 2115	112	.02	.00	.01	182.	*	2	JAN 0945	262	.01	.00	.01	169.
1	JAN 2120	113	.02	.00	.01	184.	*	2	JAN 0950	263	.01	.00	.01	167.
1	JAN 2125	114	.02	.00	.01	186.	*	2	JAN 0955	264	.01	.00	.01	166.
1	JAN 2130	115	.02	.00	.01	188.	*	2	JAN 1000	265	.01	.00	.01	164.
1	JAN 2135	116	.02	.00	.01	189.	*	2	JAN 1005	266	.01	.00	.01	163.
1	JAN 2140	117	.02	.00	.01	191.	*	2	JAN 1010	267	.01	.00	.01	161.
1	JAN 2145	118	.02	.00	.01	193.	*	2	JAN 1015	268	.01	.00	.01	160.
1	JAN 2150	119	.02	.00	.01	195.	*	2	JAN 1020	269	.01	.00	.01	159.
1	JAN 2155	120	.02	.00	.01	197.	*	2	JAN 1025	270	.01	.00	.01	158.
1	JAN 2200	121	.02	.00	.02	198.	*	2	JAN 1030	271	.01	.00	.01	156.
1	JAN 2205	122	.02	.00	.02	200.	*	2	JAN 1035	272	.01	.00	.01	155.
1	JAN 2210	123	.02	.00	.02	202.	*	2	JAN 1040	273	.01	.00	.01	154.
1	JAN 2215	124	.02	.00	.02	204.	*	2	JAN 1045	274	.01	.00	.01	153.
1	JAN 2220	125	.02	.00	.02	206.	*	2	JAN 1050	275	.01	.00	.01	152.
1	JAN 2225	126	.02	.00	.02	208.	*	2	JAN 1055	276	.01	.00	.01	151.
1	JAN 2230	127	.02	.00	.02	210.	*	2	JAN 1100	277	.01	.00	.01	149.
1	JAN 2235	128	.02	.00	.02	212.	*	2	JAN 1105	278	.01	.00	.01	148.
1	JAN 2240	129	.02	.00	.02	215.	*	2	JAN 1110	279	.01	.00	.01	147.
1	JAN 2245	130	.02	.00	.02	217.	*	2	JAN 1115	280	.01	.00	.01	146.
1	JAN 2250	131	.02	.00	.02	219.	*	2	JAN 1120	281	.01	.00	.01	145.
1	JAN 2255	132	.02	.00	.02	221.	*	2	JAN 1125	282	.01	.00	.01	144.
1	JAN 2300	133	.02	.00	.02	223.	*	2	JAN 1130	283	.01	.00	.01	143.
1	JAN 2305	134	.02	.00	.02	226.	*	2	JAN 1135	284	.01	.00	.01	142.
1	JAN 2310	135	.02	.00	.02	228.	*	2	JAN 1140	285	.01	.00	.01	141.
1	JAN 2315	136	.02	.00	.02	231.	*	2	JAN 1145	286	.01	.00	.01	141.
1	JAN 2320	137	.02	.00	.02	233.	*	2	JAN 1150	287	.01	.00	.01	140.
1	JAN 2325	138	.02	.00	.02	236.	*	2	JAN 1155	288	.01	.00	.01	139.
1	JAN 2330	139	.02	.00	.02	238.	*	2	JAN 1200	289	.00	.00	.00	136.
1	JAN 2335	140	.02	.00	.02	241.	*	2	JAN 1205	290	.00	.00	.00	130.
1	JAN 2340	141	.02	.00	.02	244.	*	2	JAN 1210	291	.00	.00	.00	118.
1	JAN 2345	142	.02	.00	.02	247.	*	2	JAN 1215	292	.00	.00	.00	101.
1	JAN 2350	143	.02	.00	.02	249.	*	2	JAN 1220	293	.00	.00	.00	81.
1	JAN 2355	144	.02	.00	.02	252.	*	2	JAN 1225	294	.00	.00	.00	63.
2	JAN 0000	145	.02	.00	.02	255.	*	2	JAN 1230	295	.00	.00	.00	46.
2	JAN 0005	146	.02	.00	.02	256.	*	2	JAN 1235	296	.00	.00	.00	34.
2	JAN 0010	147	.02	.00	.02	255.	*	2	JAN 1240	297	.00	.00	.00	25.
2	JAN 0015	148	.02	.00	.02	252.	*	2	JAN 1245	298	.00	.00	.00	18.
2	JAN 0020	149	.02	.00	.02	249.	*	2	JAN 1250	299	.00	.00	.00	13.
2	JAN 0025	150	.02	.00	.02	245.	*	2	JAN 1255	300	.00	.00	.00	10.
							*							

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TOTAL RAINFALL = 6.37, TOTAL LOSS = .71, TOTAL EXCESS = 5.66

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2786.	16.33		659.	274.	264.	264.
		(INCHES)	3.403	5.658	5.658	5.658
		(AC-FT)	327.	543.	543.	543.

CUMULATIVE AREA = 1.80 SQ MI

STATION BASIN

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                    (O) OUTFLOW
        0.     400.     800.    1200.    1600.    2000.    2400.    2800.       0.       0.       0.       0.       0.
                                                                                                (L) PRECIP,  (X) EXCESS
        .0       .0       .0       .0       .0       .0       .0       .0       .8       .6       .4       .2       .0
DAHRMN PER
 11200  10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 11205  20         .         .         .         .         .         .         .         .         .         .         .
 11210  30         .         .         .         .         .         .         .         .         .         .         .
 11215  40         .         .         .         .         .         .         .         .         .         .         .
 11220  50         .         .         .         .         .         .         .         .         .         .         .
 11225  60         .         .         .         .         .         .         .         .         .         .         .
 11230  70         .         .         .         .         .         .         .         .         .         .         .
 11235  80         .         .         .         .         .         .         .         .         .         .         .
 11240  90         .         .         .         .         .         .         .         .         .         .         .
 11245 100         .         .         .         .         .         .         .         .         .         .         .
 11250 110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 11255 120         .         .         .         .         .         .         .         .         .         .         .
 11300 130         .         .         .         .         .         .         .         .         .         .         .
 11305 140         .         .         .         .         .         .         .         .         .         .         L.
 11310 150         .         .         .         .         .         .         .         .         .         .         L.
 11315 160         .         .         .         .         .         .         .         .         .         .         L.
 11320 170         .         .         .         .         .         .         .         .         .         .         L.
 11325 180         .         .         .         .         .         .         .         .         .         .         L.
 11330 190         .         .         .         .         .         .         .         .         .         .         L.
 11335 200         .         .         .         .         .         .         .         .         .         .         L.
 11340 210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
 11345 220         .         .         .         .         .         .         .         .         .         .         L.
 11350 230         .         .         .         .         .         .         .         .         .         .         L.
 11355 240         .         .         .         .         .         .         .         .         .         .         L.
 11400 250         .         .         .         .         .         .         .         .         .         .         L.
 11405 26.0        .         .         .         .         .         .         .         .         .         .         L.
 11410 27.0        .         .         .         .         .         .         .         .         .         .         L.
 11415 28.0        .         .         .         .         .         .         .         .         .         .         L.
 11420 29.0        .         .         .         .         .         .         .         .         .         .         L.
 11425 30.0        .         .         .         .         .         .         .         .         .         .         L.
 11430 31.0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
 11435 32.0        .         .         .         .         .         .         .         .         .         .         L.
 11440 33.0        .         .         .         .         .         .         .         .         .         .         L.
 11445 34.0        .         .         .         .         .         .         .         .         .         .         L.
 11450 35.0        .         .         .         .         .         .         .         .         .         .         L.
 11455 36.0        .         .         .         .         .         .         .         .         .         .         L.
 11500 37.0        .         .         .         .         .         .         .         .         .         .         L.
 11505 38.0        .         .         .         .         .         .         .         .         .         .         L.
 11510 39. 0       .         .         .         .         .         .         .         .         .         .         L.
 11515 40. 0       .         .         .         .         .         .         .         .         .         .         L.
 11520 41. 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
 11525 42. 0       .         .         .         .         .         .         .         .         .         .         L.
 11530 43. 0       .         .         .         .         .         .         .         .         .         .         L.
 11535 44. 0       .         .         .         .         .         .         .         .         .         .         L.
 11540 45. 0       .         .         .         .         .         .         .         .         .         .         L.
 11545 46. 0       .         .         .         .         .         .         .         .         .         .         L.
 11550 47. 0       .         .         .         .         .         .         .         .         .         .         L.
 11555 48. 0       .         .         .         .         .         .         .         .         .         .         L.
 11600 49. 0       .         .         .         .         .         .         .         .         .         .         L.
 11605 50. 0       .         .         .         .         .         .         .         .         .         .         L.
 11610 51. 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
 11615 52. 0       .         .         .         .         .         .         .         .         .         .         L.
 11620 53. 0       .         .         .         .         .         .         .         .         .         .         L.
 11625 54. 0       .         .         .         .         .         .         .         .         .         .         L.
 11630 55. 0       .         .         .         .         .         .         .         .         .         .         L.
 11635 56. 0       .         .         .         .         .         .         .         .         .         .         L.
 11640 57. 0       .         .         .         .         .         .         .         .         .         .         L.
 11645 58. 0       .         .         .         .         .         .         .         .         .         .         L.
 11650 59.  0      .         .         .         .         .         .         .         .         .         .         L.
 11655 60.  0      .         .         .         .         .         .         .         .         .         .         L.
 11700 61. .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .L.
 11705 62.  0      .         .         .         .         .         .         .         .         .         .         L.
 11710 63.  0      .         .         .         .         .         .         .         .         .         .         L.
 11715 64.  0      .         .         .         .         .         .         .         .         .         .         L.
 11720 65.  0      .         .         .         .         .         .         .         .         .         .         L.
 11725 66.  0      .         .         .         .         .         .         .         .         .         .         L.
 11730 67.  0      .         .         .         .         .         .         .         .         .         .         L.
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11735  68.  O     .     .     .     .     .     .     .     .     .     .     L.
11740  69.  O     .     .     .     .     .     .     .     .     .     .     L.
11745  70.  O     .     .     .     .     .     .     .     .     .     .     L.
11750  71. .O.    .     .     .     .     .     .     .     .     .     .     .L.
11755  72.  O     .     .     .     .     .     .     .     .     .     .     L.
11800  73.  O     .     .     .     .     .     .     .     .     .     .     L.
11805  74.  O     .     .     .     .     .     .     .     .     .     .     L.
11810  75.  O     .     .     .     .     .     .     .     .     .     .     L.
11815  76.  O     .     .     .     .     .     .     .     .     .     .     L.
11820  77.  O     .     .     .     .     .     .     .     .     .     .     L.
11825  78.  O     .     .     .     .     .     .     .     .     .     .     X.
11830  79.  O     .     .     .     .     .     .     .     .     .     .     X.
11835  80.  O     .     .     .     .     .     .     .     .     .     .     X.
11840  81. .O.    .     .     .     .     .     .     .     .     .     .     .X.
11845  82.  O     .     .     .     .     .     .     .     .     .     .     X.
11850  83.  O     .     .     .     .     .     .     .     .     .     .     X.
11855  84.  O     .     .     .     .     .     .     .     .     .     .     X.
11900  85.   O    .     .     .     .     .     .     .     .     .     .     X.
11905  86.   O    .     .     .     .     .     .     .     .     .     .     X.
11910  87.   O    .     .     .     .     .     .     .     .     .     .     X.
11915  88.   O    .     .     .     .     .     .     .     .     .     .     X.
11920  89.   O    .     .     .     .     .     .     .     .     .     .     X.
11925  90.   O    .     .     .     .     .     .     .     .     .     .     X.
11930  91. . O    .     .     .     .     .     .     .     .     .     .     .X.
11935  92.   O    .     .     .     .     .     .     .     .     .     .     X.
11940  93.   O    .     .     .     .     .     .     .     .     .     .     X.
11945  94.   O    .     .     .     .     .     .     .     .     .     .     X.
11950  95.   O    .     .     .     .     .     .     .     .     .     .     X.
11955  96.   O    .     .     .     .     .     .     .     .     .     .     X.
12000  97.   O    .     .     .     .     .     .     .     .     .     .     X.
12005  98.   O    .     .     .     .     .     .     .     .     .     .     X.
12010  99.   O    .     .     .     .     .     .     .     .     .     .     X.
12015 100.   O    .     .     .     .     .     .     .     .     .     .     X.
12020 101. . O    .     .     .     .     .     .     .     .     .     .     .X.
12025 102.   O    .     .     .     .     .     .     .     .     .     .     X.
12030 103.   O    .     .     .     .     .     .     .     .     .     .     X.
12035 104.   O    .     .     .     .     .     .     .     .     .     .     X.
12040 105.   O    .     .     .     .     .     .     .     .     .     .     X.
12045 106.   O    .     .     .     .     .     .     .     .     .     .     X.
12050 107.   O    .     .     .     .     .     .     .     .     .     .     X.
12055 108.   O    .     .     .     .     .     .     .     .     .     .     X.
12100 109.   O    .     .     .     .     .     .     .     .     .     .     X.
12105 110.   O    .     .     .     .     .     .     .     .     .     .     X.
12110 111. . .O.    .     .     .     .     .     .     .     .     .     .     .X.
12115 112.    O    .     .     .     .     .     .     .     .     .     .     X.
12120 113.    O    .     .     .     .     .     .     .     .     .     .     X.
12125 114.    O    .     .     .     .     .     .     .     .     .     .     X.
12130 115.    O    .     .     .     .     .     .     .     .     .     .     X.
12135 116.    O    .     .     .     .     .     .     .     .     .     .     X.
12140 117.    O    .     .     .     .     .     .     .     .     .     .     X.
12145 118.    O    .     .     .     .     .     .     .     .     .     .     X.
12150 119.    O    .     .     .     .     .     .     .     .     .     .     X.
12155 120.    O    .     .     .     .     .     .     .     .     .     .     X.
12200 121. . .O.    .     .     .     .     .     .     .     .     .     .     .X.
12205 122.    O    .     .     .     .     .     .     .     .     .     .     X.
12210 123.    O    .     .     .     .     .     .     .     .     .     .     X.
12215 124.    O    .     .     .     .     .     .     .     .     .     .     X.
12220 125.    O    .     .     .     .     .     .     .     .     .     .     X.
12225 126.    O    .     .     .     .     .     .     .     .     .     .     X.
12230 127.    O    .     .     .     .     .     .     .     .     .     .     X.
12235 128.    O    .     .     .     .     .     .     .     .     .     .     X.
12240 129.    O    .     .     .     .     .     .     .     .     .     .     X.
12245 130.    O    .     .     .     .     .     .     .     .     .     .     X.
12250 131. . .O.    .     .     .     .     .     .     .     .     .     .     .X.
12255 132.     O    .     .     .     .     .     .     .     .     .     .     X.
12300 133.     O    .     .     .     .     .     .     .     .     .     .     X.
12305 134.     O    .     .     .     .     .     .     .     .     .     .     X.
12310 135.     O    .     .     .     .     .     .     .     .     .     .     X.
12315 136.     O    .     .     .     .     .     .     .     .     .     .     X.
12320 137.     O    .     .     .     .     .     .     .     .     .     .     X.
12325 138.     O    .     .     .     .     .     .     .     .     .     .     X.
12330 139.     O    .     .     .     .     .     .     .     .     .     .     X.
12335 140.     O    .     .     .     .     .     .     .     .     .     .     X.
12340 141. . . O    .     .     .     .     .     .     .     .     .     .     .X.
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12345 142.    0  .       .       .       .       .       .       .       .       .       .       .      X.
12350 143.    0  .       .       .       .       .       .       .       .       .       .       .      X.
12355 144.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20000 145.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20005 146.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20010 147.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20015 148.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20020 149.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20025 150.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20030 151. . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20035 152.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20040 153.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20045 154.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20050 155.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20055 156.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20100 157.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20105 158.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20110 159.    0  .       .       .       .       .       .       .       .       .       .       .      X.
20115 160.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20120 161. . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20125 162.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20130 163.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20135 164.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20140 165.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20145 166.     0 .       .       .       .       .       .       .       .       .       .       .      X.
20150 167.      0 .      .       .       .       .       .       .       .       .       .       .      X.
20155 168.      0 .      .       .       .       .       .       .       .       .       .       .      X.
20200 169.      0 .      .       .       .       .       .       .       .       .       .       .      X.
20205 170.      0 .      .       .       .       .       .       .       .       .       .       .      X.
20210 171. . . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20215 172.      0 .      .       .       .       .       .       .       .       .       .       .      X.
20220 173.       0.      .       .       .       .       .       .       .       .       .       .     LX.
20225 174.       0.      .       .       .       .       .       .       .       .       .       .     XX.
20230 175.       0.      .       .       .       .       .       .       .       .       .       .     XX.
20235 176.       0.      .       .       .       .       .       .       .       .       .       .     XX.
20240 177.        0      .       .       .       .       .       .       .       .       .       .     XX.
20245 178.        0      .       .       .       .       .       .       .       .       .       .     XX.
20250 179.        0      .       .       .       .       .       .       .       .       .       .     XX.
20255 180.        .0     .       .       .       .       .       .       .       .       .       .     XX.
20300 181. . . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . XX.
20305 182.        . 0    .       .       .       .       .       .       .       .       .       .     XX.
20310 183.        . 0    .       .       .       .       .       .       .       .       .       .     XX.
20315 184.        .  0   .       .       .       .       .       .       .       .       .       .    LXX.
20320 185.        .  0   .       .       .       .       .       .       .       .       .       .    XXX.
20325 186.        .   0  .       .       .       .       .       .       .       .       .       .    XXX.
20330 187.        .    0 .       .       .       .       .       .       .       .       .       .   LXXX.
20335 188.        .     0 .      .       .       .       .       .       .       .       .       .   XXXX.
20340 189.        .      0 .     .       .       .       .       .       .       .       .       .   XXXX.
20345 190.        .       0.     .       .       .       .       .       .       .       .       .  XXXXX.
20350 191. . . . . . . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .XXXXXX.
20355 192.        .       .  0   .       .       .       .       .       .       .       .XXXXXXXXX.
20400 193.        .       .      .0      .       .       .       .       . LXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX.
20405 194.        .       .      .       . 0     .       .       .       .       .       .  XXXXXX.
20410 195.        .       .      .       .       .  0    .       .       .       .       .   XXXX.
20415 196.        .       .      .       .       .       .  0    .       .       .       .    XXX.
20420 197.        .       .      .       .       .       .       0       .       .       .    XXX.
20425 198.        .       .      .       .       .       .     0 .       .       .       .     XX.
20430 199.        .       .      .       .       .       0       .       .       .       .     XX.
20435 200.        .       .      .       .      .0       .       .       .       .       .     XX.
20440 201. . . . . . . . . . . . . . . . . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . XX.
20445 202.        .       .      .  0    .       .       .       .       .       .       .     XX.
20450 203.        .       .     0.       .       .       .       .       .       .       .     LX.
20455 204.        .       .  0   .       .       .       .       .       .       .       .      X.
20500 205.        .      .0      .       .       .       .       .       .       .       .      X.
20505 206.        .     0 .      .       .       .       .       .       .       .       .      X.
20510 207.        .    0  .      .       .       .       .       .       .       .       .      X.
20515 208.        .   0   .      .       .       .       .       .       .       .       .      X.
20520 209.        .  0    .      .       .       .       .       .       .       .       .      X.
20525 210.        . 0     .      .       .       .       .       .       .       .       .      X.
20530 211. . . . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20535 212.        0       .      .       .       .       .       .       .       .       .      X.
20540 213.       0.       .      .       .       .       .       .       .       .       .      X.
20545 214.       0.       .      .       .       .       .       .       .       .       .      X.
20550 215.      0 .       .      .       .       .       .       .       .       .       .      X.
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20555 216.      0 .         .         .         .         .         .         .         .         .         .         .         X.
20600 217.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20605 218.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20610 219.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20615 220.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20620 221. . . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20625 222.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20630 223.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20635 224.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20640 225.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20645 226.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20650 227.     0  .         .         .         .         .         .         .         .         .         .         .         X.
20655 228.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20700 229.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20705 230.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20710 231. . . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20715 232.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20720 233.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20725 234.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20730 235.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20735 236.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20740 237.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20745 238.    0   .         .         .         .         .         .         .         .         .         .         .         X.
20750 239.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20755 240.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20800 241. . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20805 242.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20810 243.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20815 244.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20820 245.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20825 246.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20830 247.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20835 248.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20840 249.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20845 250.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20850 251. . .0. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20855 252.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20900 253.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20905 254.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20910 255.   0    .         .         .         .         .         .         .         .         .         .         .         X.
20915 256.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20920 257.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20925 258.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20930 259.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20935 260.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20940 261. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
20945 262.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20950 263.  0     .         .         .         .         .         .         .         .         .         .         .         X.
20955 264.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21000 265.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21005 266.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21010 267.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21015 268.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21020 269.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21025 270.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21030 271. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
21035 272.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21040 273.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21045 274.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21050 275.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21055 276.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21100 277.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21105 278.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21110 279.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21115 280.  0     .         .         .         .         .         .         .         .         .         .         .         X.
21120 281. . 0 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .X.
21125 282.  0     .         .         .         .         .         .         .         .         .         .         .         L.
21130 283.  0     .         .         .         .         .         .         .         .         .         .         .         .
21135 284.  0     .         .         .         .         .         .         .         .         .         .         .         .
21140 285.  0     .         .         .         .         .         .         .         .         .         .         .         .
21145 286.  0     .         .         .         .         .         .         .         .         .         .         .         .
21150 287.  0     .         .         .         .         .         .         .         .         .         .         .         .
21155 288.  0     .         .         .         .         .         .         .         .         .         .         .         .
21200 289.  0     .         .         .         .         .         .         .         .         .         .         .         .
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21205 290.  O        .         .         .         .         .         .         .         .         .         .         .         .
21210 291. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21215 292.  O        .         .         .         .         .         .         .         .         .         .         .         .
21220 293. O         .         .         .         .         .         .         .         .         .         .         .         .
21225 294. O         .         .         .         .         .         .         .         .         .         .         .         .
21230 295.O          .         .         .         .         .         .         .         .         .         .         .         .
21235 296.O          .         .         .         .         .         .         .         .         .         .         .         .
21240 297.O          .         .         .         .         .         .         .         .         .         .         .         .
21245 298O           .         .         .         .         .         .         .         .         .         .         .         .
21250 299O           .         .         .         .         .         .         .         .         .         .         .         .
21255 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
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                                                  RUNOFF SUMMARY
                                           FLOW IN CUBIC FEET PER SECOND
                                          TIME IN HOURS,  AREA IN SQUARE MILES

                                      PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
         OPERATION        STATION     FLOW     PEAK                                            AREA       STAGE    MAX STAGE
+                                                          6-HOUR      24-HOUR     72-HOUR

         HYDROGRAPH AT
+                          BASIN     2786.   16.33          659.         274.        264.       1.80


 *** NORMAL END OF HEC-1 ***
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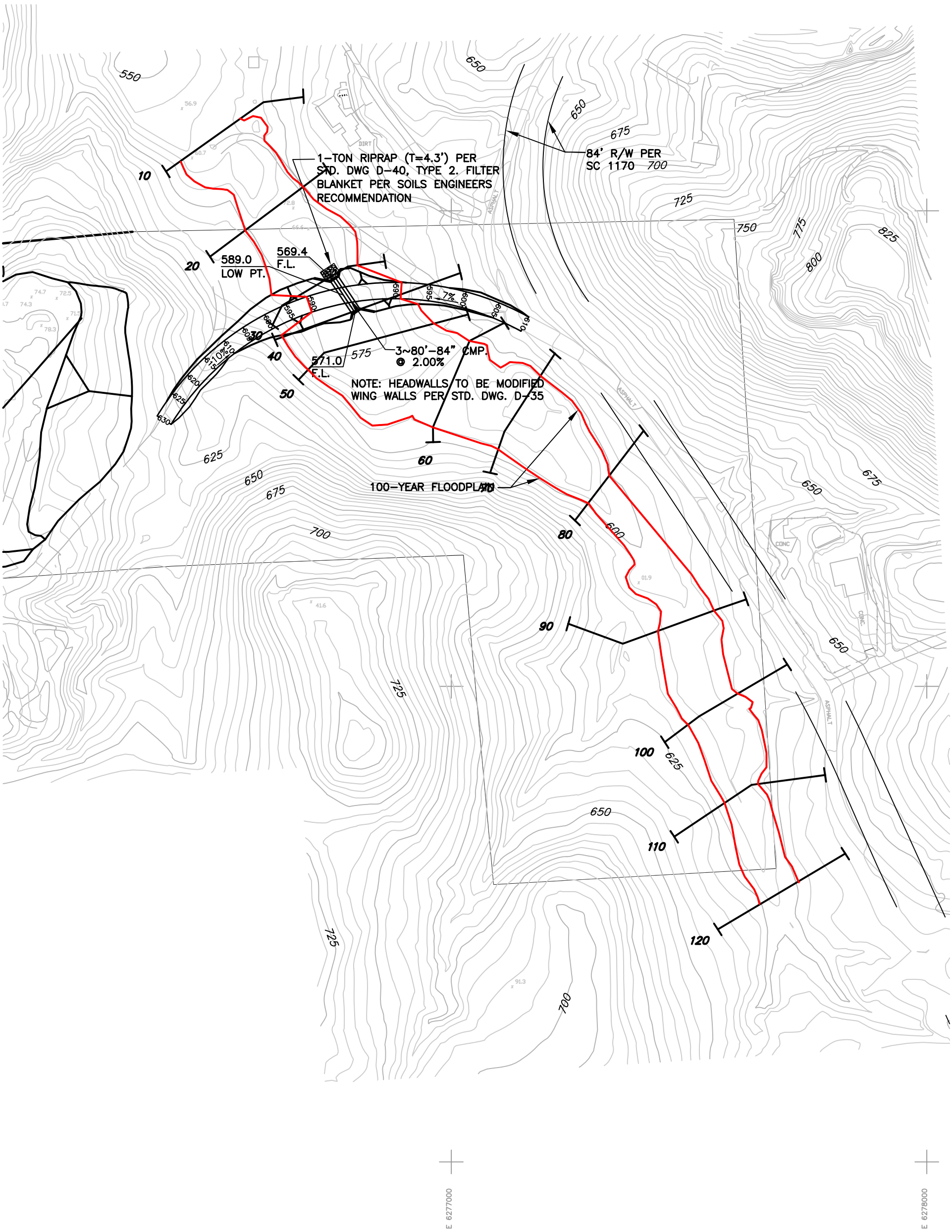
APPENDIX D

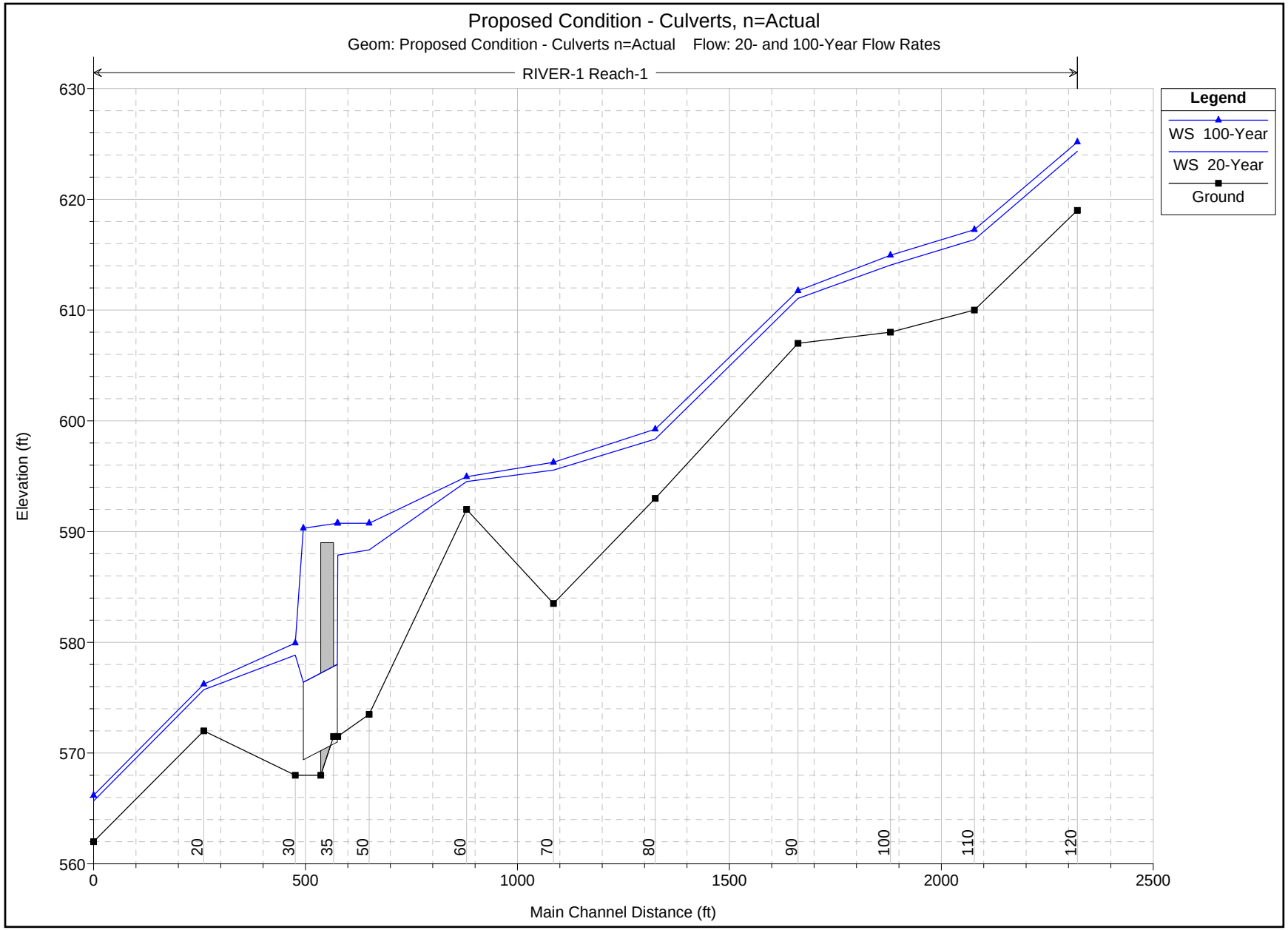
20- AND 100-YEAR HEC-RAS ANALYSES AND WORKMAP

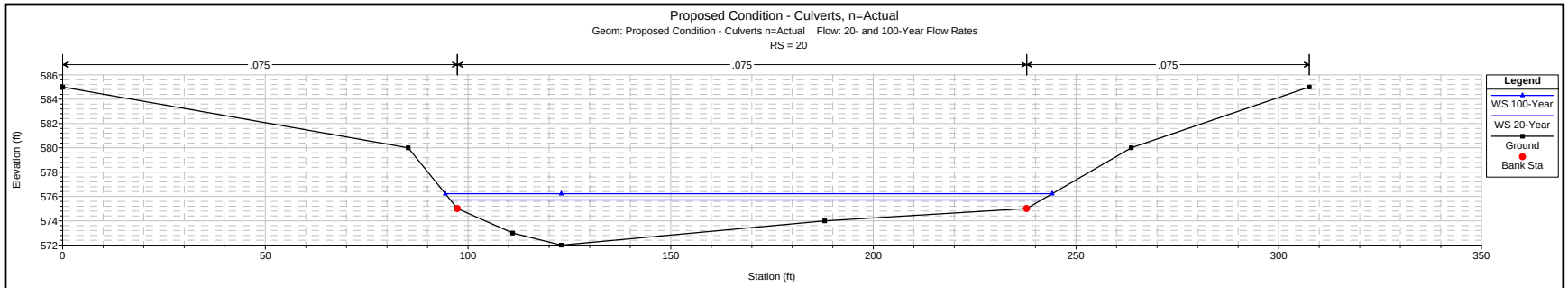


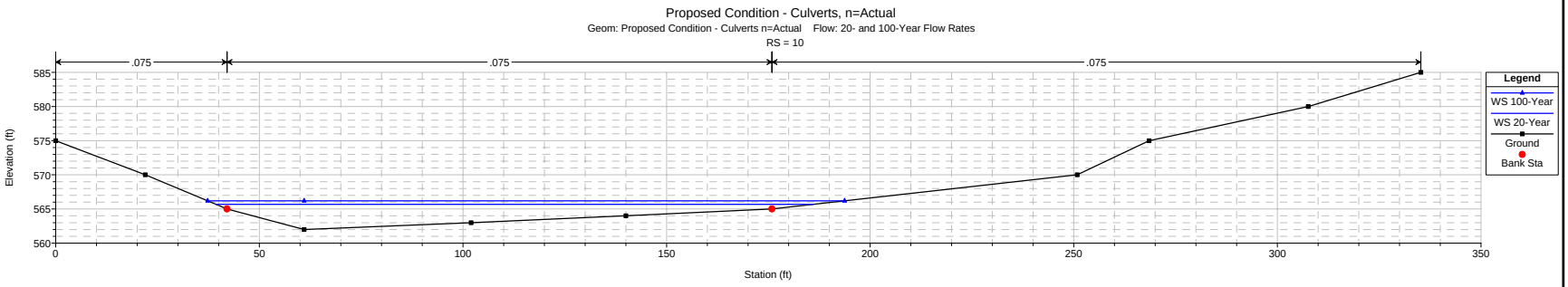
HEC-RAS WORKMAP
1"=200'

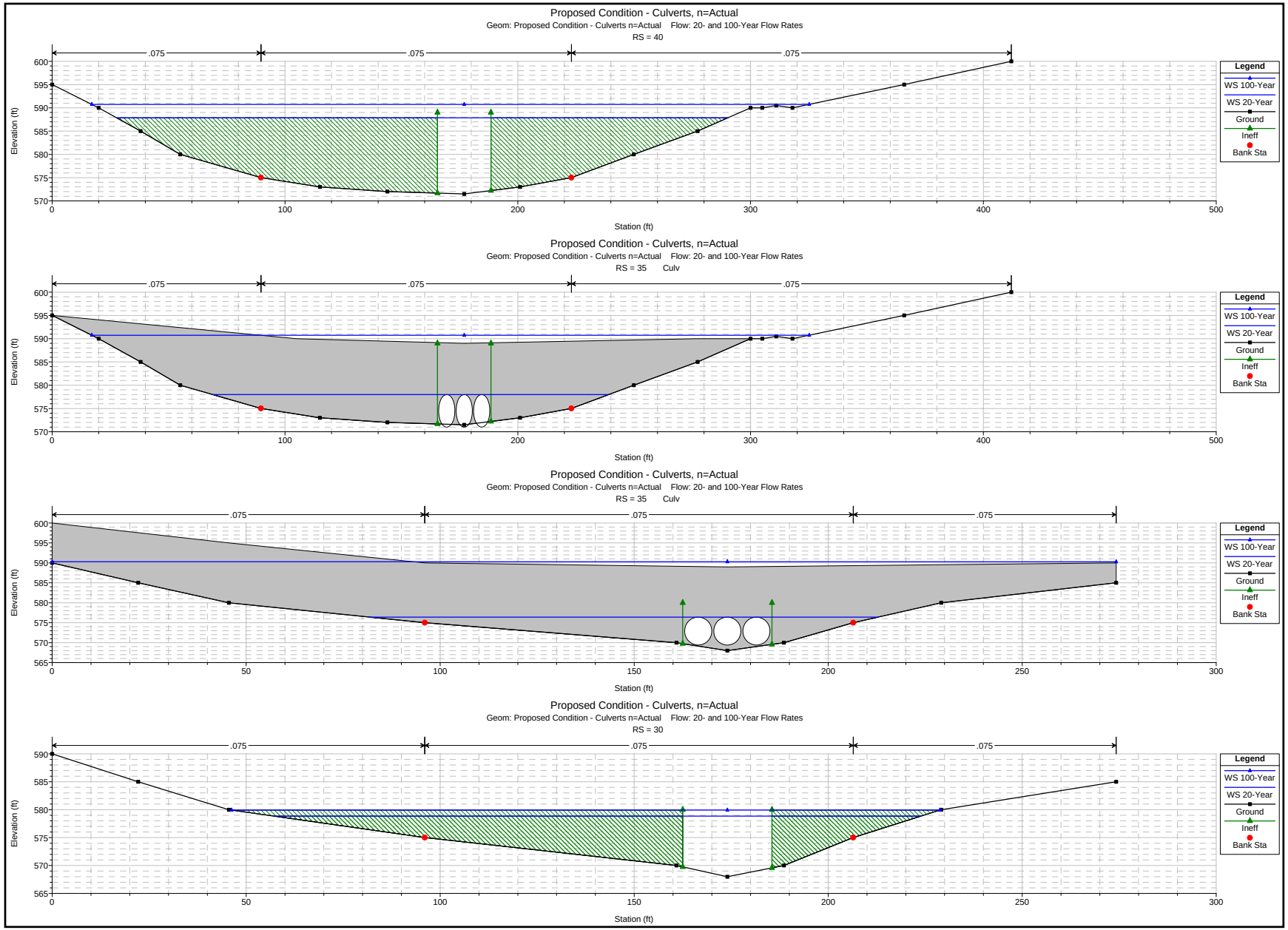
HEC-RAS Plan: Culvert Act River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	120	20-Year	1950.00	619.00	624.3	623.9	625.39	0.039730	8.24	236.56	77.49	0.83
Reach-1	120	100-Year	2786.00	619.00	625.2	624.8	626.46	0.039572	9.13	305.33	87.49	0.85
Reach-1	110	20-Year	1950.00	610.00	616.4		617.36	0.027764	8.06	247.81	74.26	0.72
Reach-1	110	100-Year	2786.00	610.00	617.3		618.53	0.027321	9.18	317.69	82.30	0.74
Reach-1	100	20-Year	1950.00	608.00	614.1		614.44	0.008216	5.32	423.21	119.11	0.41
Reach-1	100	100-Year	2786.00	608.00	614.9		615.44	0.008878	6.15	534.37	132.20	0.44
Reach-1	90	20-Year	1950.00	607.00	611.0	610.3	611.63	0.022786	6.17	320.66	128.54	0.63
Reach-1	90	100-Year	2786.00	607.00	611.7	610.9	612.51	0.022477	7.05	406.35	142.14	0.65
Reach-1	80	20-Year	1950.00	593.00	598.3	598.3	599.87	0.058852	9.91	196.79	65.40	1.01
Reach-1	80	100-Year	2786.00	593.00	599.3	599.3	601.03	0.056238	10.71	260.10	74.27	1.01
Reach-1	70	20-Year	1950.00	583.50	595.5	586.8	595.58	0.000300	1.40	1393.02	170.49	0.09
Reach-1	70	100-Year	2786.00	583.50	596.3	587.4	596.30	0.000468	1.85	1514.92	176.34	0.11
Reach-1	60	20-Year	1950.00	592.00	594.5	594.5	595.29	0.071797	7.05	276.77	180.79	1.00
Reach-1	60	100-Year	2786.00	592.00	595.0	595.0	595.89	0.068201	7.75	359.27	195.54	1.01
Reach-1	50	20-Year	1950.00	573.50	588.3	575.8	588.36	0.000047	0.80	2762.51	255.33	0.04
Reach-1	50	100-Year	2786.00	573.50	590.7	576.3	590.76	0.000053	0.95	3404.76	281.20	0.04
Reach-1	40	20-Year	1950.00	571.50	587.9	577.8	588.30	0.001722	5.25	371.49	262.68	0.23
Reach-1	40	100-Year	2786.00	571.50	590.7	579.4	590.76	0.000043	0.89	3720.27	308.17	0.04
Reach-1	35		Culvert									
Reach-1	30	20-Year	1950.00	568.00	578.8	574.9	579.96	0.008596	8.47	230.18	166.62	0.47
Reach-1	30	100-Year	2786.00	568.00	579.9	576.5	581.78	0.012434	10.92	255.24	182.56	0.58
Reach-1	20	20-Year	1950.00	572.00	575.7		576.37	0.039187	6.49	301.68	145.91	0.78
Reach-1	20	100-Year	2786.00	572.00	576.2	575.9	577.09	0.039236	7.48	375.96	149.73	0.81
Reach-1	10	20-Year	1950.00	562.00	565.7	565.3	566.34	0.038042	6.55	300.60	146.67	0.78
Reach-1	10	100-Year	2786.00	562.00	566.2	565.9	567.06	0.038024	7.53	378.49	156.44	0.80

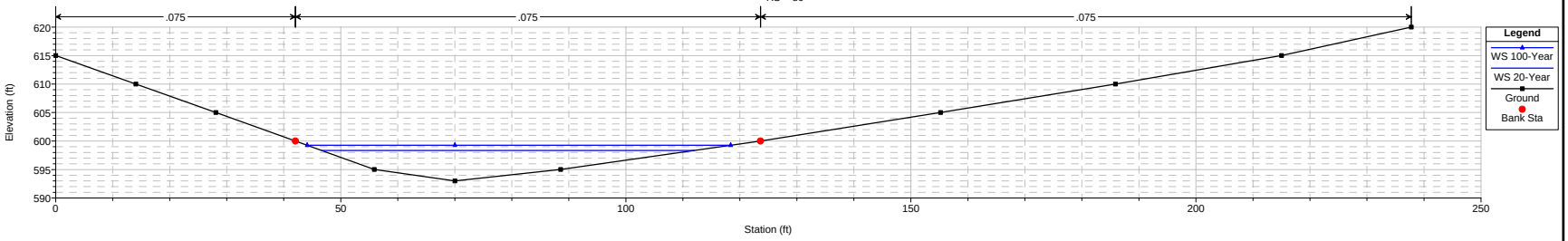

Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RIVER-1 Reach-1
Legend
WS 100-Year
WS 20-Year
Ground
Elevation (ft)
630
620
610
600
590
580
570
560
0
500
1000
1500
2000
2500
Main Channel Distance (ft)
20
30
35
50
60
70
80
90
100
110
120


Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 20
.075
.075
.075
Elevation (ft)
586
584
582
580
578
576
574
572
0
50
100
150
200
250
300
350
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Bank Sta

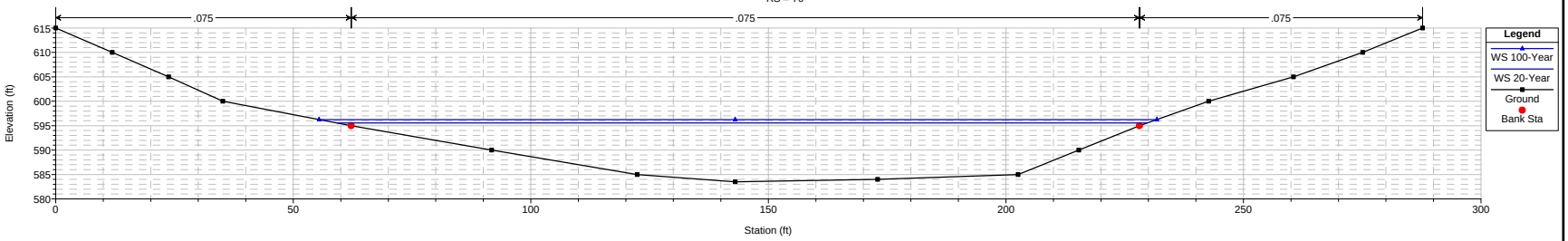

Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 10
.075
.075
.075
Elevation (ft)
585
580
575
570
565
560
0
50
100
150
200
250
300
350
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Bank Sta


Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 40
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Ineff
Bank Sta
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 35 Culv
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Ineff
Bank Sta
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 35 Culv
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Ineff
Bank Sta
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 30
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Ineff
Bank Sta

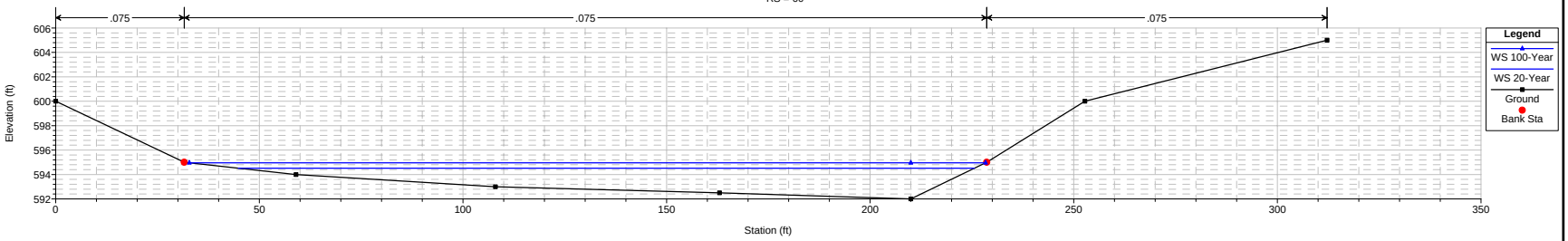
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 80



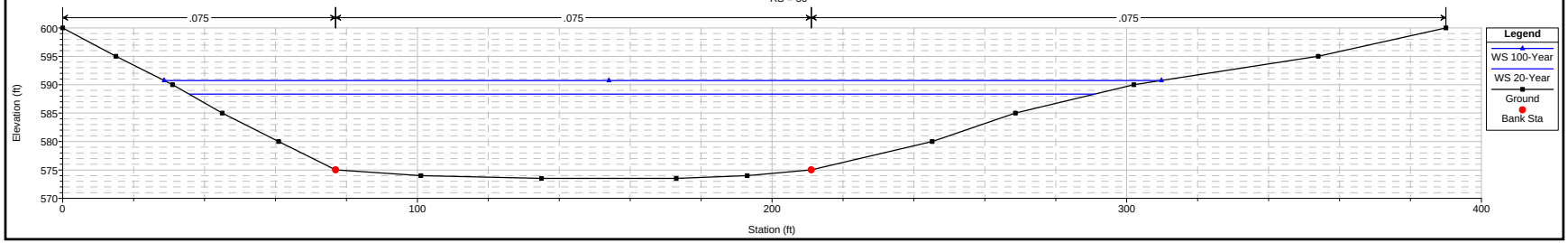
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 70

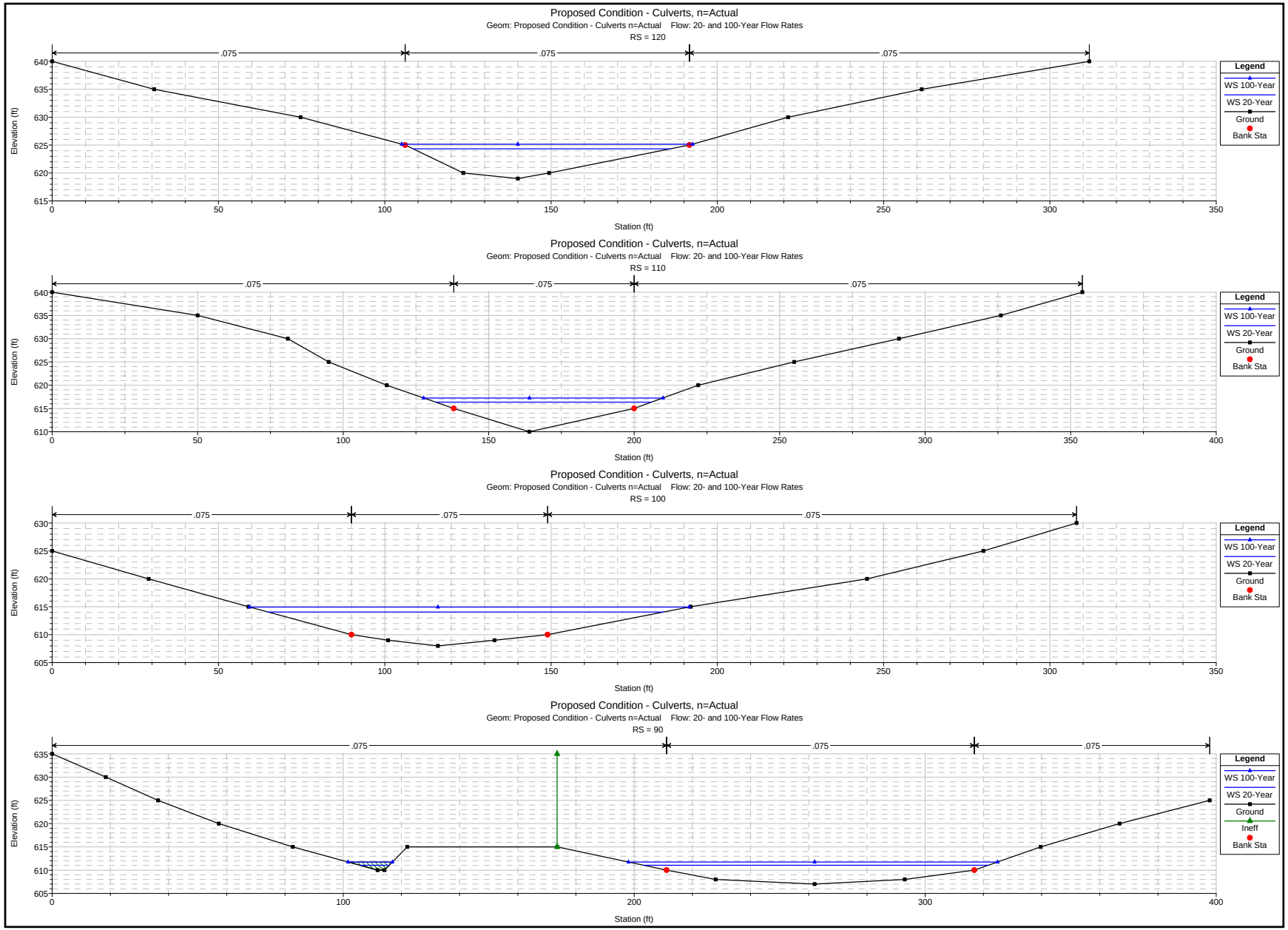


Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 60



Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 50




Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 120
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Bank Sta
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 110
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Bank Sta
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 100
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Bank Sta
Proposed Condition - Culverts, n=Actual
Geom: Proposed Condition - Culverts n=Actual Flow: 20- and 100-Year Flow Rates
RS = 90
.075
.075
.075
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 20-Year
Ground
Ineff
Bank Sta