

**JORDAN BROOK WATERSHED MANAGEMENT PLAN
FINAL REPORT**

TOWN OF WATERFORD, CONNECTICUT

FEBRUARY 2000

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EXECUTIVE SUMMARY

Jordan Brook drains from an 8.2 square-mile watershed located along the eastern edge of the Town of Waterford. This watershed includes several major developments, including the Crystal Mall, and is bisected by the I-395 and I-95 highway right-of-ways. While a significant percentage of the southern portion of the watershed has been developed, water quality in Jordan Brook generally meets State drinking water standards, and the watershed wetland systems remain in relatively good condition.

Large areas of the watershed remain undeveloped, especially in its northern reaches. Uncontrolled future residential, commercial, or industrial development in the watershed would increase pollutant loadings from stormwater runoff to receiving wetlands and watercourses, reduce groundwater base flows that are necessary to maintain dry weather flows in streams, increase peak flows and flooding, and continue to encroach on upland fringe areas that "screen" wetlands from development.

The purpose of this study was to evaluate existing watershed resources and develop a recommended plan to protect those resources from potential impacts as identified above. The following paragraphs summarize the major findings and recommendations of this study.

- **Wetland areas generally in good condition:**

Wetland areas within the watershed remain in good condition and many have features that justify the wetlands as having special significance. Some wetlands appear to have been impacted by encroaching development and water quality impacts, and other wetlands would be sensitive to any future impacts to water quality.

- **Surface water quality generally fishable and drinkable:**

Surface water quality in the watershed generally meets "fishable and drinkable" standards established for the State of Connecticut with the exception of total coliforms. Since the source of total coliform can include non-pollution sources such as plant matter, this finding is not conclusive evidence of sanitary contamination.

- **Development impacts water quality:**

While surface water quality still meets standards, in-stream concentrations of pollutants increase downstream as development and impervious surfaces increase. Based on modeling of future pollutant loads, stormwater pollutant loadings could increase by more than 100% for zinc and between 30 and 50% for phosphorous, copper, and lead with future development. Copper, lead, and zinc can be toxic to aquatic life at certain concentrations in aqueous form. Phosphorous is a limiting nutrient for algal growth in surface water impoundments.

- **Water Quality Management Plan:**

A surface water quality management plan has been developed that specifies the levels of controls that would be recommended to be implemented based on the level of risk

that a new development would pose to water quality. Three tiers of controls are recommended.

- I. Base level controls would apply to developments with only small potential for impacts and would require controls to remove gross contaminants and minimize the risk of accidents such as spills causing major water quality impacts.
- II. Secondary controls would apply to developments with greater risk for water quality impacts and would require a minimum of 80% removal of total suspended solids.
- III. Tertiary controls would apply to developments with the greatest risk for water quality impacts and would require developers to demonstrate no net increase in pollutant loads from pre-development conditions.

- **Continue surface water quality monitoring:**

Surface water quality should continue to be monitored to evaluate trends in water quality and confirm that new developments have appropriate controls.

- **No net increase in peak flows:**

Evidence of flooding and channel scour was observed during watershed visits. It is recommended that future developments demonstrate no net increase in peak flows at downstream points-of-concern. The number of downstream points-of-concern to be evaluated is proposed to be dependant on the size of the development and its potential to increase flooding risk. A watershed-wide hydrologic model has been developed that should be incorporated into future evaluations.

- **Maintain pre-development groundwater base flows:**

Pre-development groundwater base flows should also be maintained. At a minimum, "clean" roof runoff should be infiltrated into the ground. This approach does not require a complicated technical evaluation of current on-site infiltration to groundwater, would typically maintain or increase base flows, and would minimize the risk of groundwater pollution by infiltrating only clean runoff.

- **Designate upland areas as open space and implement Upland Protection Zone:**

A number of upland areas in the watershed would provide value as open space by improving the value of watershed wetlands by screening developments, providing fringe habitat, maintaining wildlife access, and improving human access to wetlands of special significance. Upland areas that could provide value have been evaluated and ranked in terms of their importance. A 50-foot Upland Protection Zone is also recommended for all wetlands and a 100-foot Upland Protection Zone is recommended for perennial streams. Factors which should be considered in adjusting these widths are discussed.

1.0 INTRODUCTION

Jordan Brook drains from a watershed located along the eastern edge of the Town of Waterford. This watershed includes several major developments, including the Crystal Mall, and is bisected by the I-395 and I-95 highway right-of-ways. While a significant percentage of the southern portion of the watershed has been developed, water quality in Jordan Brook generally meets State fishing and drinking water standards, and watershed wetland systems remain in relatively good condition.

Large areas of the watershed remain undeveloped especially in its northern reaches. Uncontrolled future residential, commercial, or industrial development in the watershed would increase pollutant loadings from stormwater runoff to receiving wetlands and watercourses, reduce groundwater base flows that are necessary to maintain dry weather flows in streams, increase peak flows and flooding, and continue to encroach on upland fringe areas that "screen" wetlands from development.

The goal of this study was to evaluate existing wetland resources in the watershed and develop a plan to protect those resources from impacts related to future development. In order to conduct this study, the Town of Waterford retained Fuss & O'Neill, Inc. whose team included Dr. Priscilla Baillie of Marine and Freshwater Research Service. During this study several workshops were conducted with the project team and Fuss & O'Neill in order to develop a plan that best met the Town's needs and addressed specific issues in this watershed. Representatives from the Town of Waterford during these workshops included professional staff from the Waterford Planning Department as well as representatives from the Town's Conservation Commission and Department of Public Works.

This report outlines the results of the study. Current watershed conditions are evaluated, including wetlands, stream water quality, land use, and hydrologic conditions (Sections 2.0 and 3.0). A hydrologic model of the watershed was developed to address stormwater quantity management issues (Section 4.0). A stormwater quality control plan was developed for the Town to protect stormwater quality from future development in the Jordan Brook watershed (Section 5.0). Other watershed issues addressed as part of this project and incorporated into the watershed management plan include aquifer protection and open space planning (Section 6.0). The recommended watershed management plan is presented in Section 7.0. A Geographical Information System database has also been developed for this watershed that incorporates the results of this study. A user's guide and instructions for the database are attached as Appendix A of this report.

2.0 CURRENT WATERSHED CONDITIONS

2.1 Watershed Description

The Jordan Brook watershed is an 8.2 square-mile watershed located in southeastern Connecticut. A majority of the watershed (94%) is located in the Town of Waterford, with a small portion of the watershed (6%) located in the City of New London. This watershed is oriented in a north-south direction, extending approximately 5.5 miles from its headwaters near Waterford's northern border with Montville, south to Jordan Cove which discharges to the Long Island Sound.

The upper reaches of the Jordan Brook watershed are largely undeveloped. Jordan Brook crosses several highways, including Interstate-95, Interstate-395, and State Route 85 through the central portion of the watershed. Development and corresponding impervious areas increase as the brook flows south. Jordan Brook reaches its confluence with Nevins Brook approximately 400 feet upstream of Jordan Cove. Nevins Brook drains the southeastern portion of the watershed. Several smaller tributaries oriented in an east-west direction feed the central and southern portions of Jordan Brook. Figure 1 is a location map of the Jordan Brook watershed.

The northern half of the watershed is hilly and predominantly wooded, with a maximum elevation of approximately 380 feet atop Konomoc Hill near the Jordan Brook headwaters. The watershed topography gradually flattens south of Interstate-95 in the more developed portions of the watershed. Several impoundments are located in the upper and lower reaches of Jordan Brook. Tyack Swamp is a large wetland situated between Interstate-95 and Manitock Hill on the western side of the watershed. Two interconnected wetland/marsh systems located east of Clark Lane and south of Post Road (U.S. Route 1) comprise the southeastern corner of the watershed adjacent to the City of New London.

2.2 Water Quality Classifications

The surface waters of Jordan Brook and most of Nevins Brook are classified by the Connecticut Department of Environmental Protection (CTDEP) as B/A (CTDEP, 1986) with some upstream reaches of Nevins Brook classified as A. Inland surface waters classified by the CTDEP as B/A are those that may not meet Class A water quality criteria or one or more designated uses for Class A waters. Class A water quality standards and designated uses are provided in Appendix B. The goal for B/A surface waters is achievement of Class A criteria and attainment of Class A designated uses. Class A waters are a potential drinking water supply and support designated uses such as fish and wildlife habitat, recreational use, agricultural/industrial supply, and navigation (CTDEP, 1997). For the purposes of this study, water quality standards for Class A surface waters are used to evaluate water quality impacts since this level of quality is the stated goal for these waters.

Groundwater throughout a majority of the watershed is classified by the CTDEP as GA, however several areas in the northern half of the watershed have been classified as "GA, GAA may not meet current standards" (CTDEP, 1986). Such groundwater may not meet the GA or

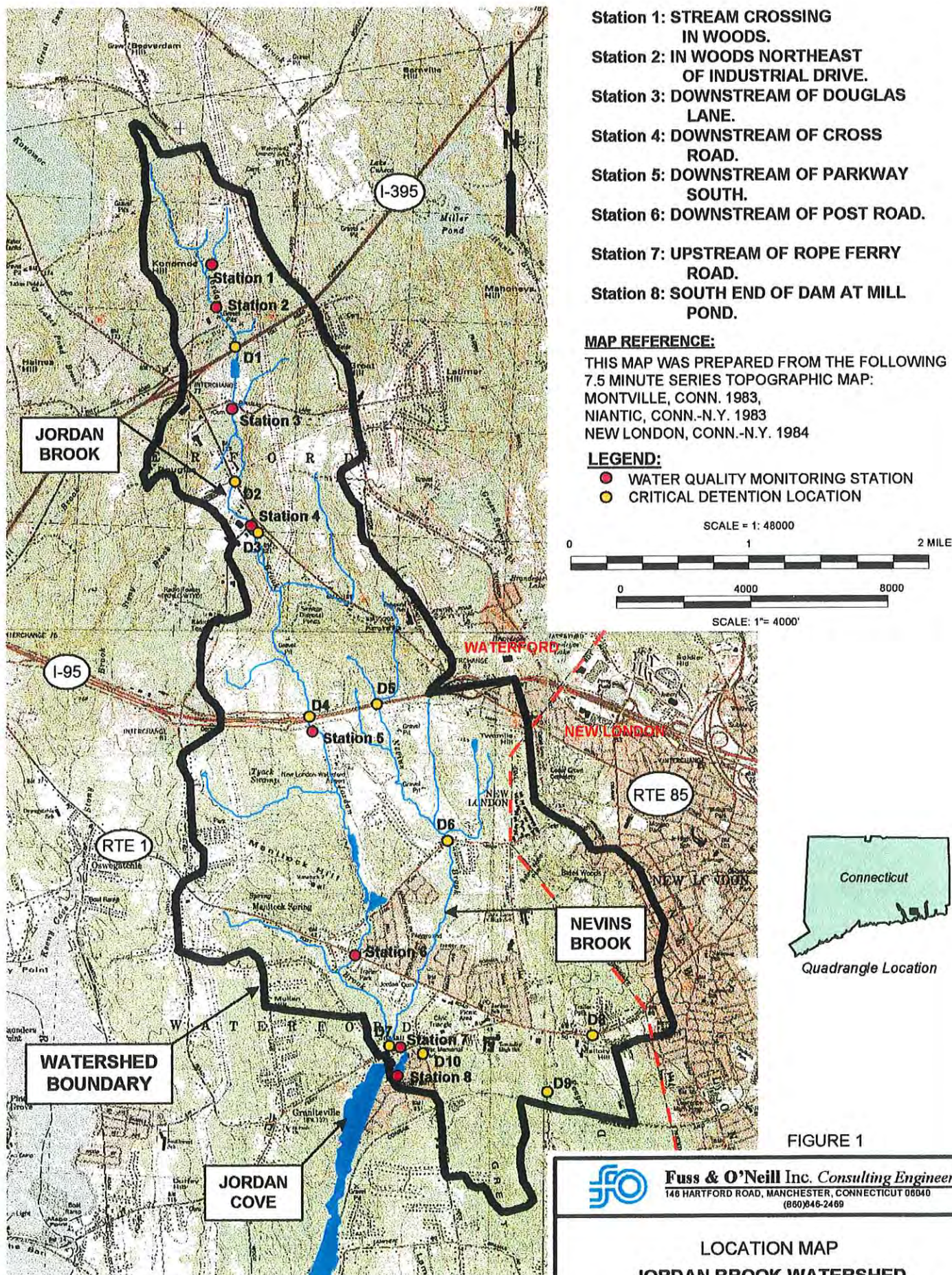


FIGURE 1



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LOCATION MAP
JORDAN BROOK WATERSHED
JORDAN BROOK WATERSHED MANAGEMENT PLAN

WATERFORD

CONNECTICUT

PROJ. NO. 93154A2

DATED: OCTOBER 1998

SCALE: 1"= 4000'

GAA water quality standards, which require the groundwater to be suitable for drinking without treatment (CTDEP, 1997). This classification is typically assigned by CTDEP to groundwaters where there may be a source of pollution. Class GA water quality standards are provided in Appendix B.

2.3 Land Use

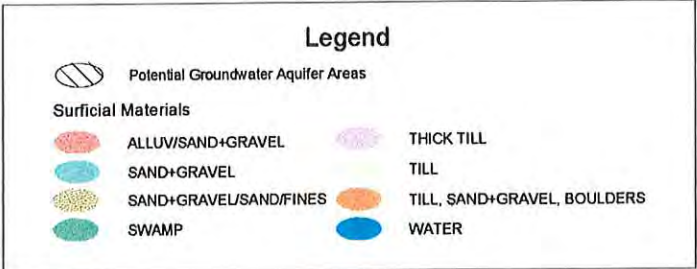
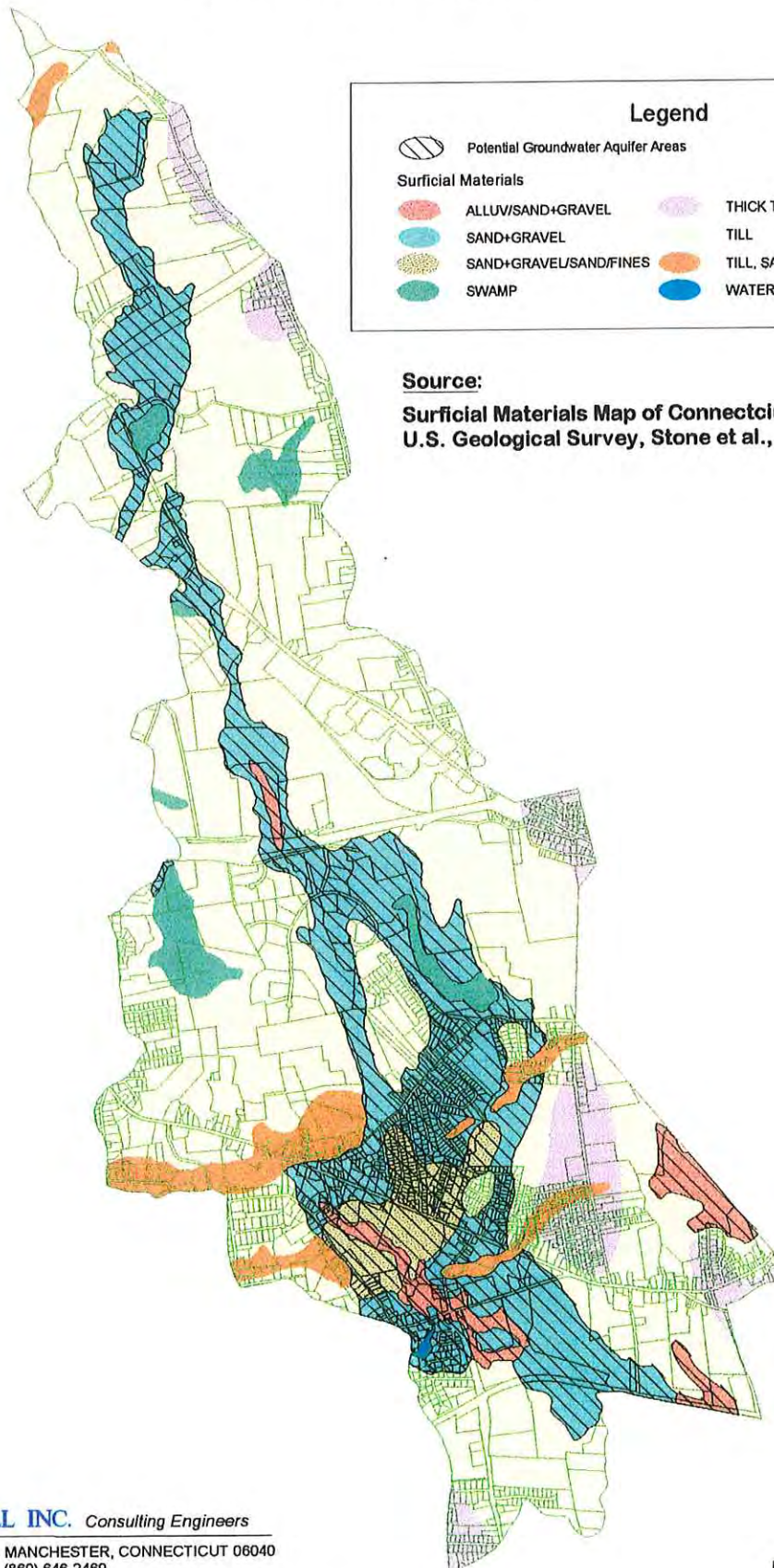
Watershed land use affects the quantity and quality of stormwater generated in the watershed. Factors such as impervious area, drainage system, development characteristics, traffic volume, air emissions, and exposure of other pollutant sources are dependent on land use. Land use mapping for the watershed was provided by the Town of Waterford. Several of the Town-defined land use categories were field-verified to determine the nature or level of development (e.g., undeveloped, commercial, residential, etc.) associated with these land uses.

Figure 2 depicts the land use categories within the Jordan Brook watershed. The percentages of each land use within the watershed are summarized in Table 1. As shown in the table, approximately 76 percent of the watershed consists of a combination of undeveloped, single family residential, and public facility land uses. Approximately 17 percent of the watershed consists of commercial, industrial and multi-family land uses. Highways and roads comprise approximately 7 percent of the watershed area.

In general, the level of development in the watershed increases proceeding from the headwaters to the lower reaches of the watershed. The northern portion of the watershed consists primarily of undeveloped woodland, with some residential areas along the eastern side of the watershed. Interstate 395 passes through the northern portion of the watershed. A combination of undeveloped woodland/meadows and residential land uses characterize the area between Interstate-395 and State Route 85. Commercial and industrial/manufacturing developments are located along the northern stretch of Route 85, which passes in a southeasterly direction through the northern half of the town. The area between Route 85 and Interstate 95, which passes in an east-west direction through the center of the watershed, includes several major commercial developments such as Crystal Mall, a large regional mall, and other high-traffic mall developments (i.e., Home Depot, Wal-Mart, Crossroads Centre).

The southern half of the watershed, roughly defined as the area south of Interstate-95, is characterized by a mixture of undeveloped land, open space, and residential and commercial land uses. The areas of highest intensity residential development are located north and south of Post Road (U.S. Route 1), which passes through the southern portion of the watershed in an east-west direction. Numerous commercial retail developments are located along Post Road, with several major shopping centers situated near the intersection of Post Road and State Route 156. A number of municipally-owned lands, including schools and parks, are also located in this area of the watershed. Additionally, the Northeast Rail Corridor traverses the watershed south of Route 1.

Potential Groundwater Aquifers Jordan Brook Watershed Management Study Town of Waterford



Source:

Surficial Materials Map of Connecticut,
U.S. Geological Survey, Stone et al., 1992.



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FIGURE 3

2.4 Aquifers

Groundwater aquifers are saturated permeable geologic units that can transmit significant quantities of water (Freeze and Cherry, 1979) for public drinking water supplies and other uses. Groundwater aquifers within the Jordan Brook watershed were delineated based upon surficial materials mapping for the State of Connecticut (Stone et al., 1992). Surficial materials are classified in terms of grain size distribution as well as areal and vertical extent. Glacial meltwater deposits such as gravel, sand, and silt and floodplain alluvium generally correspond to the major groundwater aquifers in Connecticut. As such, areas classified as glacial meltwater and floodplain alluvium deposits in the watershed were characterized as potential groundwater aquifer areas.

Figure 3 illustrates the distribution of potential groundwater aquifers across the Jordan Brook watershed. As shown in Figure 3, potential groundwater aquifers are generally concentrated along Jordan Brook, Nevins Brook, and their associated tributaries. In the northern portion of the watershed, sand and gravel deposits are confined to a relatively narrow corridor which follows the main stem of Jordan Brook. A more widespread area of potential groundwater aquifer deposits exists in the southern portion of the watershed. The potential groundwater aquifers in the southern half of the watershed are also located in some of the most highly developed areas in the watershed.

In its 1998 Plan of Preservation, Conservation & Development, the Town of Waterford identified potential public water supply well sites immediately north of the intersection of Jordan Brook and Interstate 95 and near the confluence of Jordan and Nevins Brook. These sites correspond to areas having some of the thickest stratified deposits in the watershed, which may provide significant yields for future public water supply (Town of Waterford, 1998).

3.0 WATERSHED EVALUATION

Jordan Brook and its associated wetlands were field visited during the course of this study by members of the project team. Additionally, the Town of Waterford currently monitors water quality in Jordan Brook at selected sampling locations. Results of the field evaluations and water quality monitoring are described in this section.

3.1 Jordan Brook

3.1.1 Field Observations

Fuss & O'Neill personnel conducted a site visit of the Jordan Brook watershed on March 12, 1998. The purpose of the site visit was to observe the general conditions of Jordan Brook and its surrounding watershed and to identify:

- Potential sources of stormwater pollution in the watershed (e.g., areas of erosion/sedimentation and areas of significant litter/debris), and

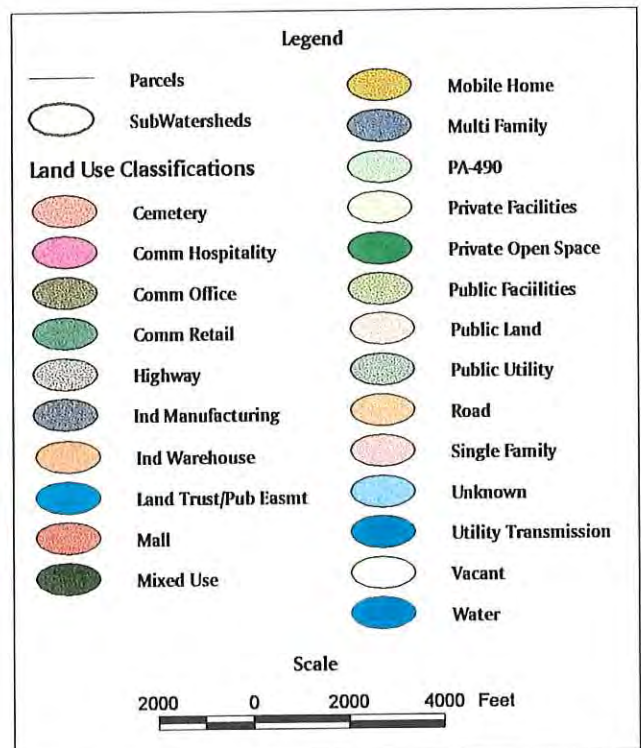
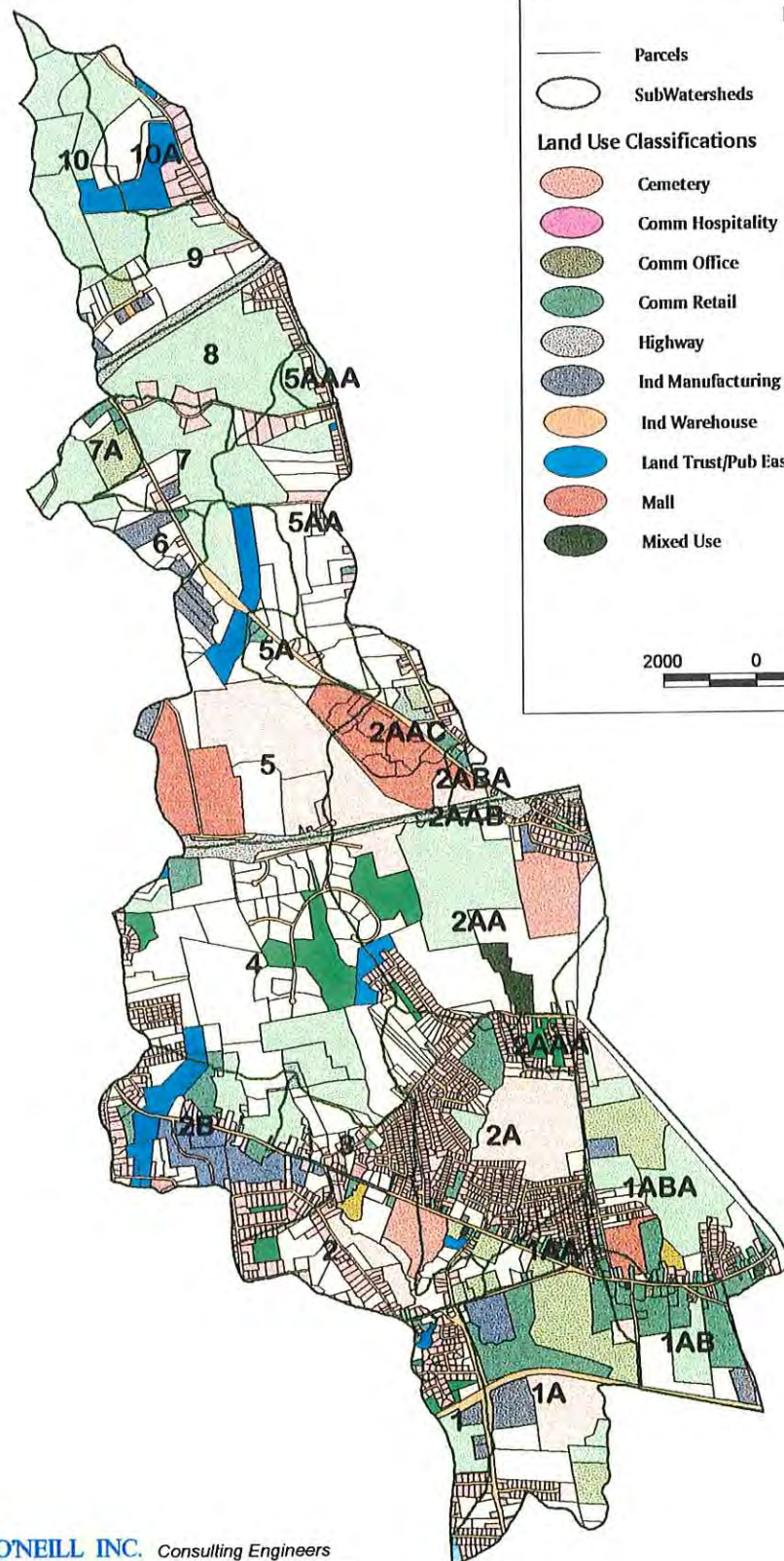
TABLE 1
SUMMARY OF WATERSHED LAND USES
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Land Use Classification	Area (acres)	Percent of Watershed Area
Vacant	1358	27.7%
PA-490 (Undeveloped)	981	20.0%
Single Family	613	12.5%
Public Land	415	8.4%
Road (Public ROW)	250	5.1%
Commercial Retail	241	4.9%
Mall	194	4.0%
Public Facilities	188	3.8%
Utility Transmission	125	2.5%
Private Open Space	115	2.3%
Cemetery	87	1.8%
Interstate Highway	83	1.7%
Multi-Family	83	1.7%
Industrial Manufacturing	81	1.7%
Mixed Use	24	0.5%
Private Facilities	22	0.5%
Land Trust/Public Easement	16	0.3%
Public Utility	14	0.3%
Mobile Home	11	0.2%
Water	3	0.1%
Unknown	2	0.05%
Industrial Warehouse	1	0.02%
Commercial Hospitality	1	0.02%
Commercial Office	1	0.02%
Total (1)	4908	100.0%

Notes:

(1) Table Excludes area of watershed located in New London.

Land Use Classifications Jordan Brook Watershed Management Study Town of Waterford



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FIGURE 2

- Restrictions where flooding may be a concern (e.g., bridges and culverts).

The site visit consisted of observing Jordan Brook and its major tributaries at selected road crossings, as well as observation of several major commercial developments. Observations from the site walkover and inspection are described in the following sections.

3.1.1.1 Areas of Erosion/Sedimentation

In general, the streambanks along Jordan Brook and its tributaries at the observed locations are either highly vegetated in undeveloped areas or lined with riprap or concrete in more developed areas. The site walkover was performed during dry weather, approximately 24 to 48 hours following a significant rainfall event. As a result, Jordan Brook and its tributaries were flowing nearly full at the time of the inspection.

Evidence of sediment input and erosion in Jordan Brook from adjacent upland areas was observed at several major road crossings. This evidence included in-stream sand bars, streambank gully erosion, and exposed (unvegetated) earthen areas adjacent to the brook that were observed at the following locations:

- Jordan Brook at Interstate-95
- Jordan Brook at Footbridge in Incomplete Subdivision near former Waterford Airport Property
- Jordan Brook at Route 1
- Jordan Brook at Route 156 (Rope Ferry Road)
- Jordan Brook Tributary (upper "Fenger Brook") at Route 1

The identified crossings are located in developed areas of the watershed south of Interstate-95. These observations are consistent with the relationship between sediment loading and level of development.

3.1.1.2 Areas of Significant Litter and Debris

Accumulated litter and debris was observed along the stream banks at several of the inspected stream crossings. The most significant quantities of litter and debris, which generally consisted of paper, styrofoam, plastic and other small, floatable materials, were noted at major road crossings and in the more developed areas of the watershed (i.e., south of Route 1). These locations included:

- Jordan Brook at Cross Road
- Jordan Brook at Route 85
- Jordan Brook Tributary at Ellen Ward Road
- Nevins Brook at Route 1
- Jordan Brook Tributary at Miner Lane
- Jordan Brook Tributary at Route 1

Larger materials such as tires, scrap metal, and discarded equipment were observed at the Interstate-95, Fog Plain Road, and Miner Lane crossings.

3.1.1.3 Evidence of Flooding

Although water surface elevations and flows were high at the time of the site inspection, evidence of significant historical or recent flooding was observed at only one location, Jordan Brook at Route 1 east of Reynolds Lane. Jordan Brook, the stormwater discharge from Route 1 or the adjacent cemetery, and the outlet of a wetland area converge immediately upstream of this culvert crossing. Several large uprooted trees, accumulated brush and organic debris, and matted overbank vegetation were observed, which are indicative of high-velocity flows and backwater associated with prior flooding. A stone retaining wall along the west bank of Jordan Brook immediately upstream of the crossing (single concrete box culvert) appears to restrict or channelize flood flows in this area.

3.1.2 Water Quality

The Town of Waterford currently conducts semiannual water quality monitoring of Jordan Brook. Surface water samples are collected at eight stations along Jordan Brook, which are shown on Figure 1. The sampling stations are located primarily at major road crossings and are approximately evenly spaced along Jordan Brook. The Jordan Brook sampling stations are listed (from upstream to downstream) in Table 2. Nine rounds of water samples have been collected since monitoring began in 1993. These samples were analyzed for the following parameters.

Total Phosphorous	Copper
Total Suspended Solids	Biochemical Oxygen Demand
Turbidity	Chemical Oxygen Demand
Total Coliforms	Nitrate
Fecal Coliforms	Dissolved Oxygen
Fecal Streptococci	Oxygen Saturation
Sodium	Color
Iron	Odor
Manganese	Temperature
Conductivity	Alkalinity
pH	Hardness
Chloride	

In order to evaluate Jordan Brook water quality, seven critical parameters were analyzed. These parameters were selected as they have greater potential to impact uses of the stream and are more likely to be affected by development as opposed to natural sources. The parameters-of-concern that were analyzed are total phosphorous, turbidity, total coliforms, dissolved oxygen, conductivity, chloride, and copper.

TABLE 2
JORDAN BROOK SAMPLING STATIONS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Station Number	Description
1	Stream crossing in woods, east of Konomoc Hill
2	Stream crossing in woods northeast of Industrial Drive cul de sac
3	Downstream of Douglas Lane
4	Downstream of Cross Road
5	Downstream of Parkway South
6	Downstream of Post Road
7	Upstream of Rope Ferry Road
8	South end of dam at Mill Pond

3.1.2.1 Analysis of Parameters-of-Concern

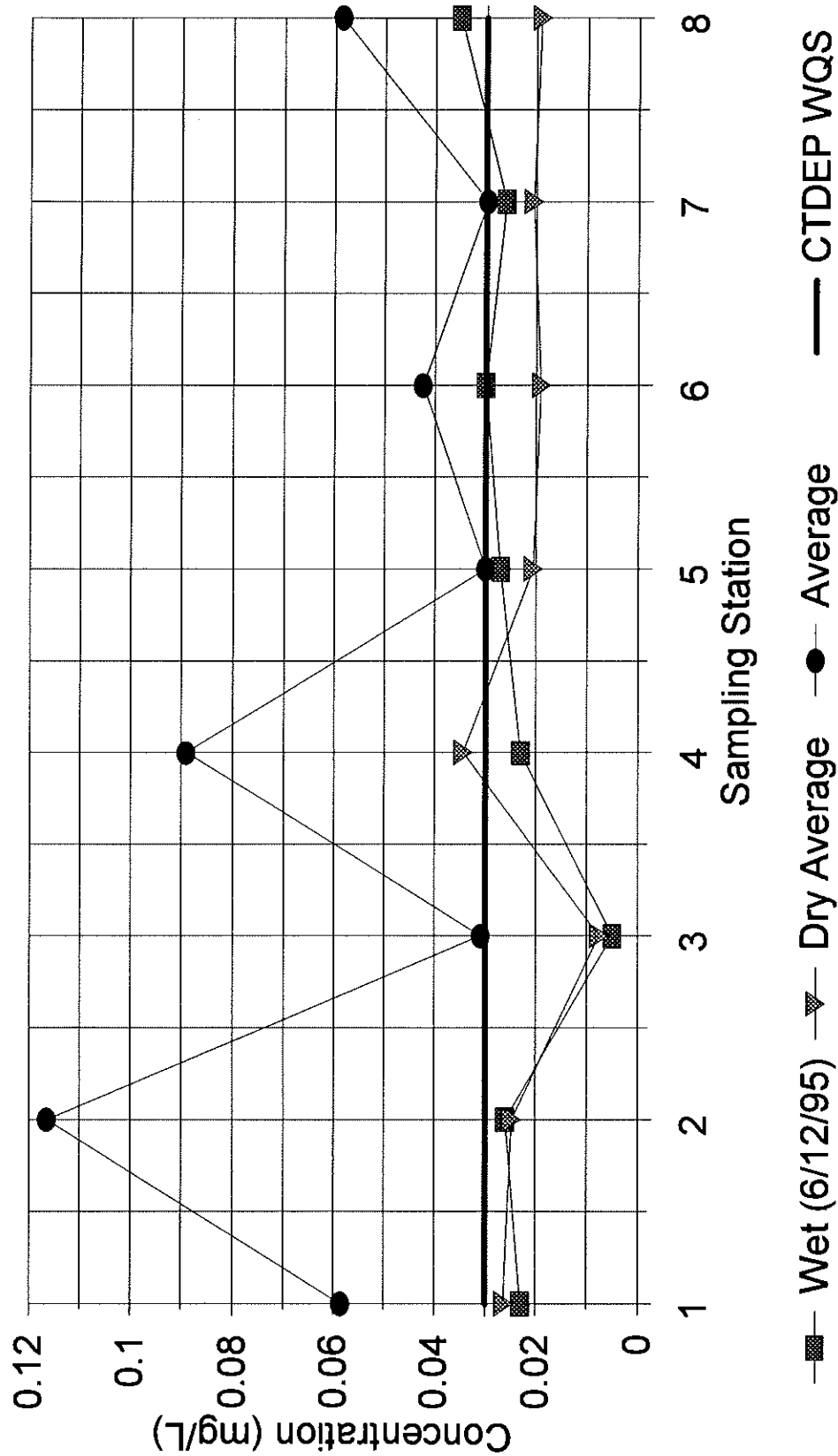
The average concentration of each of the parameters-of-concern at each of the sampling stations are shown on Figures 4-10. Of the nine events monitored, three events (9/14/93, 9/12/95, 6/10/94) had no rainfall for at least 48 hours before the sampling event and were defined as dry weather events. Only one event (6/12/95) was clearly influenced by wet weather. The other five sampling events occurred on 9/29/94, 6/18/96, 9/24/96, 6/25/97, and 9/23/97 and could not be classified as either "wet" or "dry". For comparison purposes, the average concentrations from these three dry and one wet weather events were plotted against the average concentration of all nine events. It should be noted that the wet weather concentrations are based on only one event and, therefore, are not statistically valid compared to the other average concentrations.

- **Phosphorous:** Phosphorous is typically the limiting nutrient in freshwater systems. The State of Connecticut Water Quality Standards (effective April 12, 1996) classify surface waters with 0.03 to 0.05 mg/l of total phosphorous as eutrophic and highly enriched with nutrients. Higher levels of phosphorous are considered highly eutrophic. Eutrophic conditions lead to algal blooms and dissolved oxygen depletion in impoundments.

In this watershed, average phosphorous concentrations are generally above 0.03 mg/l. A number of impoundments exist in the watershed where significantly increased phosphorous loads could lead to increased potential for eutrophication. However, these elevated levels are mostly due to high concentration results from two sampling events, 9/24/96 and 9/23/97. Phosphorous concentrations during other sampling events were generally below 0.03 mg/l.

- **Turbidity:** Surface water criteria specified in the Connecticut Water Quality Standards establish a turbidity standard of 5 NTU over ambient levels. Average concentrations in Jordan Brook are below this level.
- **Total Coliforms:** The standard for total coliforms in Class A streams is 500 counts/100 ml based on the Connecticut Water Quality Standards. Average water quality in the stream exceeded this standard at most stations. Dry and wet weather concentrations increased in the more developed downstream reaches of the watershed.
- **Nitrate:** While no criteria have been established for nitrate in the Connecticut Water Quality Standards, nitrogen is a limiting nutrient in salt water systems. Nitrate levels were significantly higher during the one wet weather event measured. Nitrate levels also increase with development. Septage lagoons are also shown on USGS mapping as being near the reach of brook where nitrate levels increase (stations 4 and 5).
- **Dissolved Oxygen:** All dissolved oxygen concentrations were above 5 mg/l which is the minimum criteria per the Connecticut Water Quality Standards. Concentrations generally decreased through developed areas of the watershed. This is likely due to the water temperature increase that is typically found through developed areas.

Figure 4 **Average Phosphorous Concentration** **Jordan Brook Watershed**



CTDEP WQS - Connecticut Dept. of Environmental Protection, Surface Water Quality Standards, effective April 8, 1997.

Figure 5
Average Turbidity and TSS
Jordan Brook Watershed

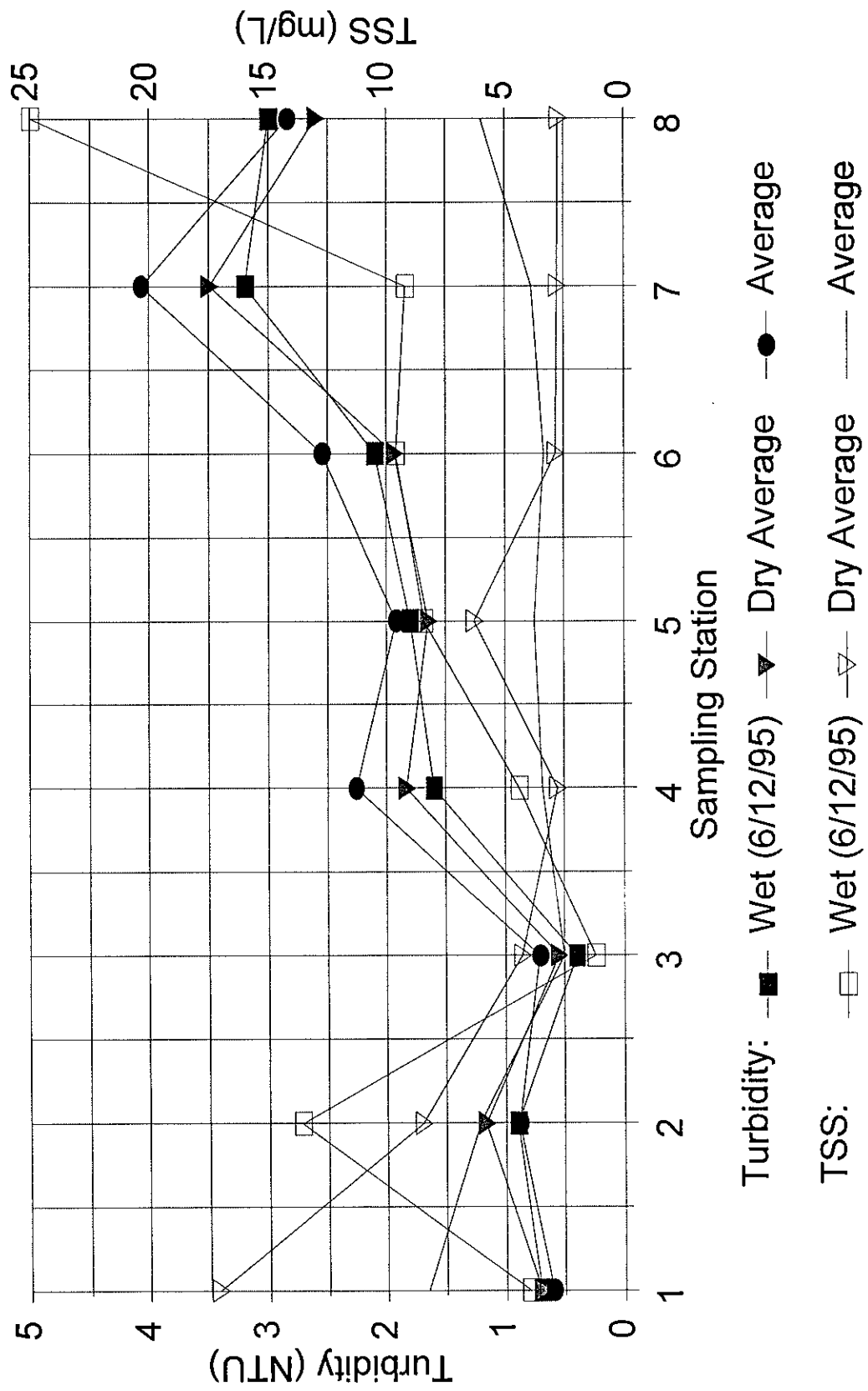
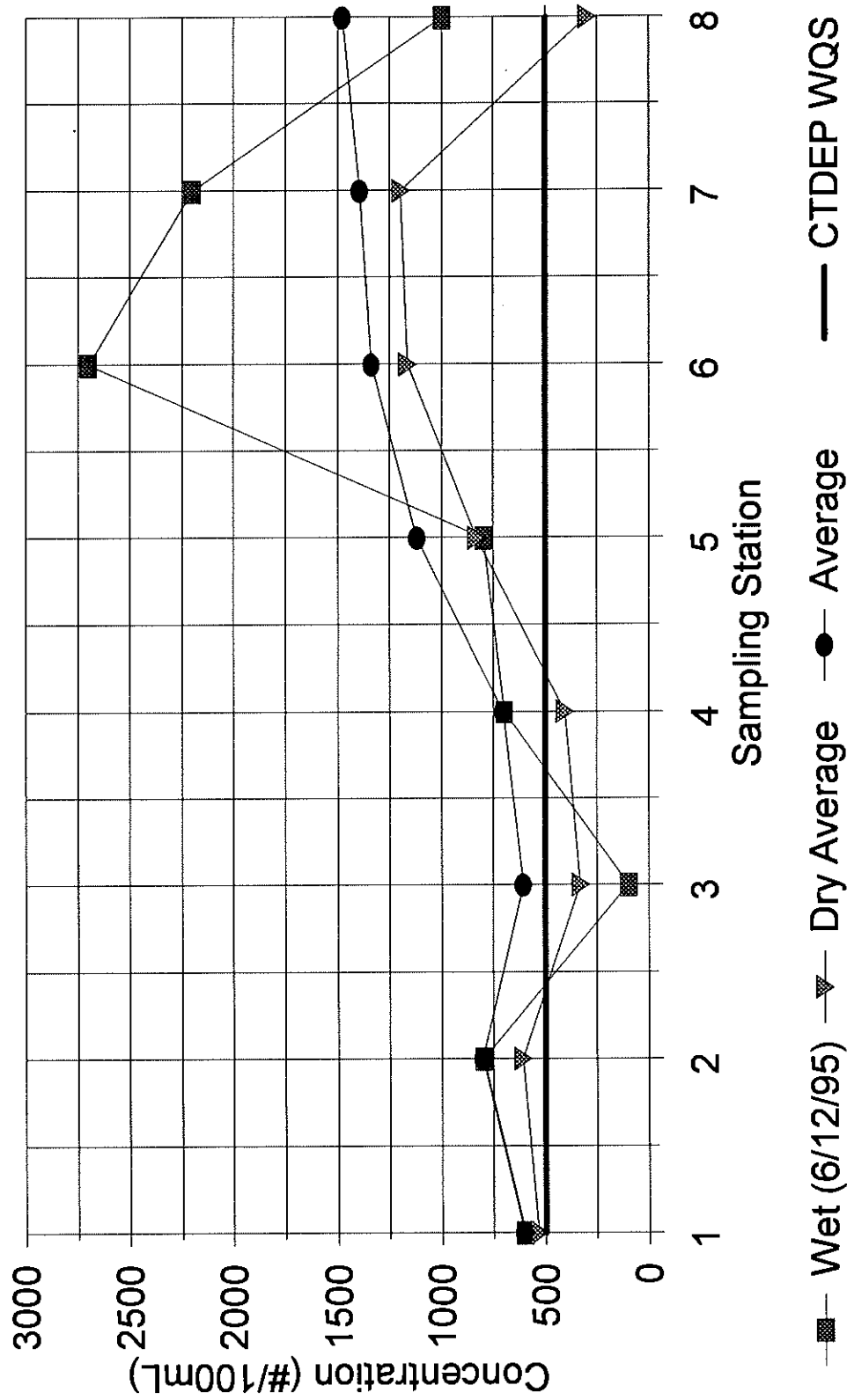


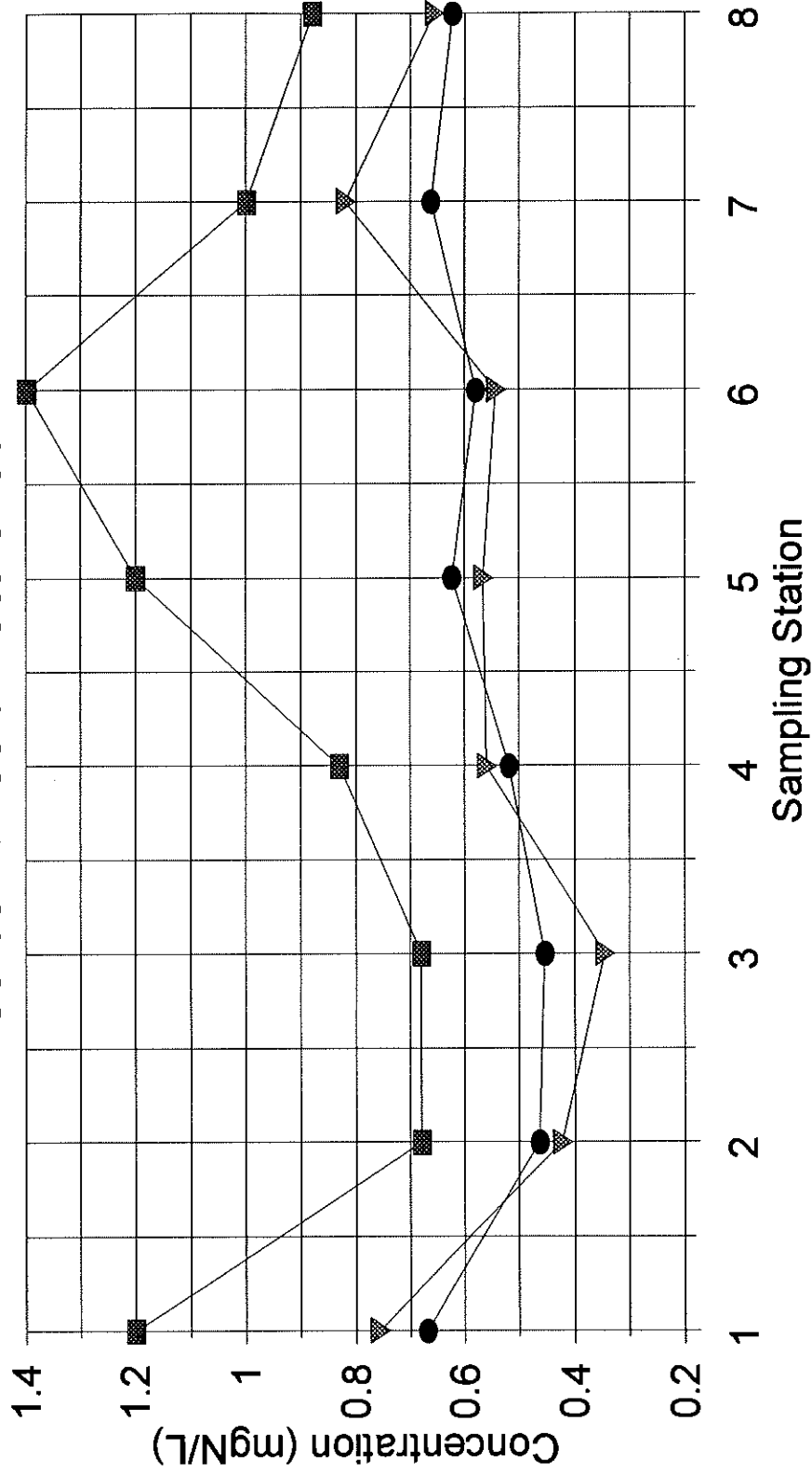
Figure 6
Average Total Coliforms
Jordan Brook Watershed



CTDEP WQS - Connecticut Dept. of Environmental Protection, Surface Water Quality Standards, effective April 8, 1997.

Figure 7

Average Nitrate Concentration Jordan Brook Watershed



Wet (6/12/95)
 Dry Average
 Average

Figure 8

Average DO and BOD Concentrations Jordan Brook Watershed

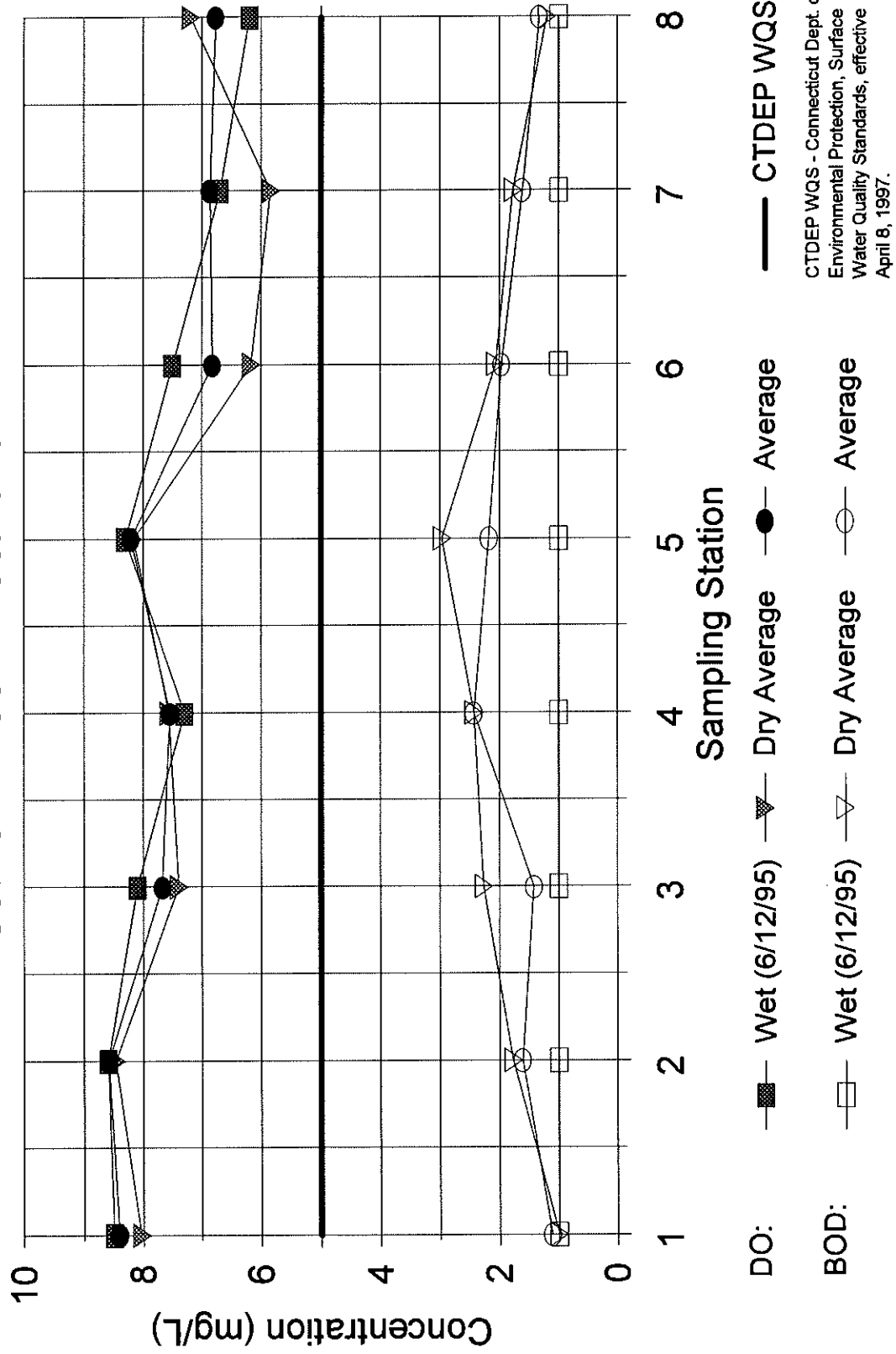


Figure 9
Average Conductivity
Jordan Brook Watershed

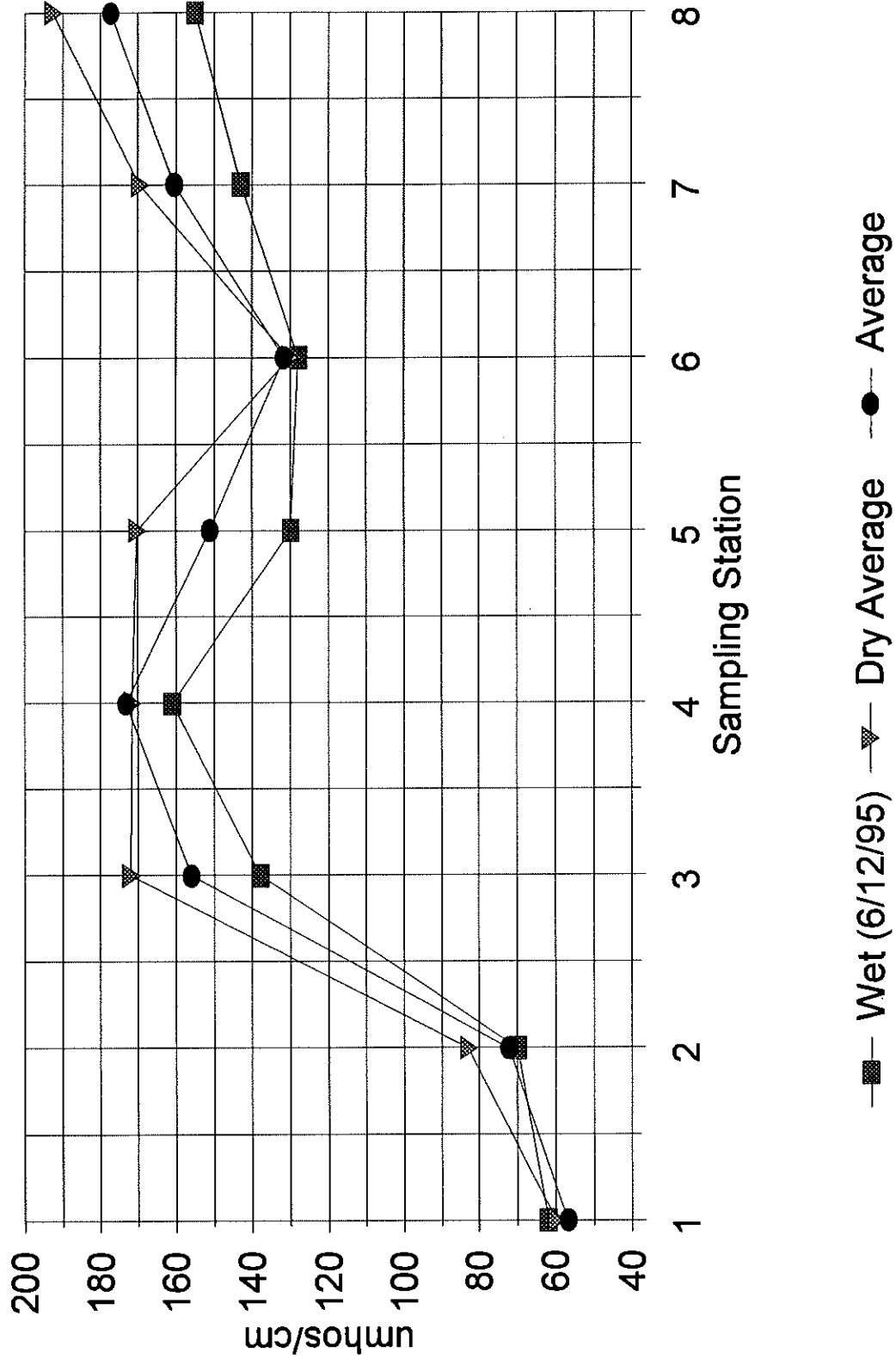
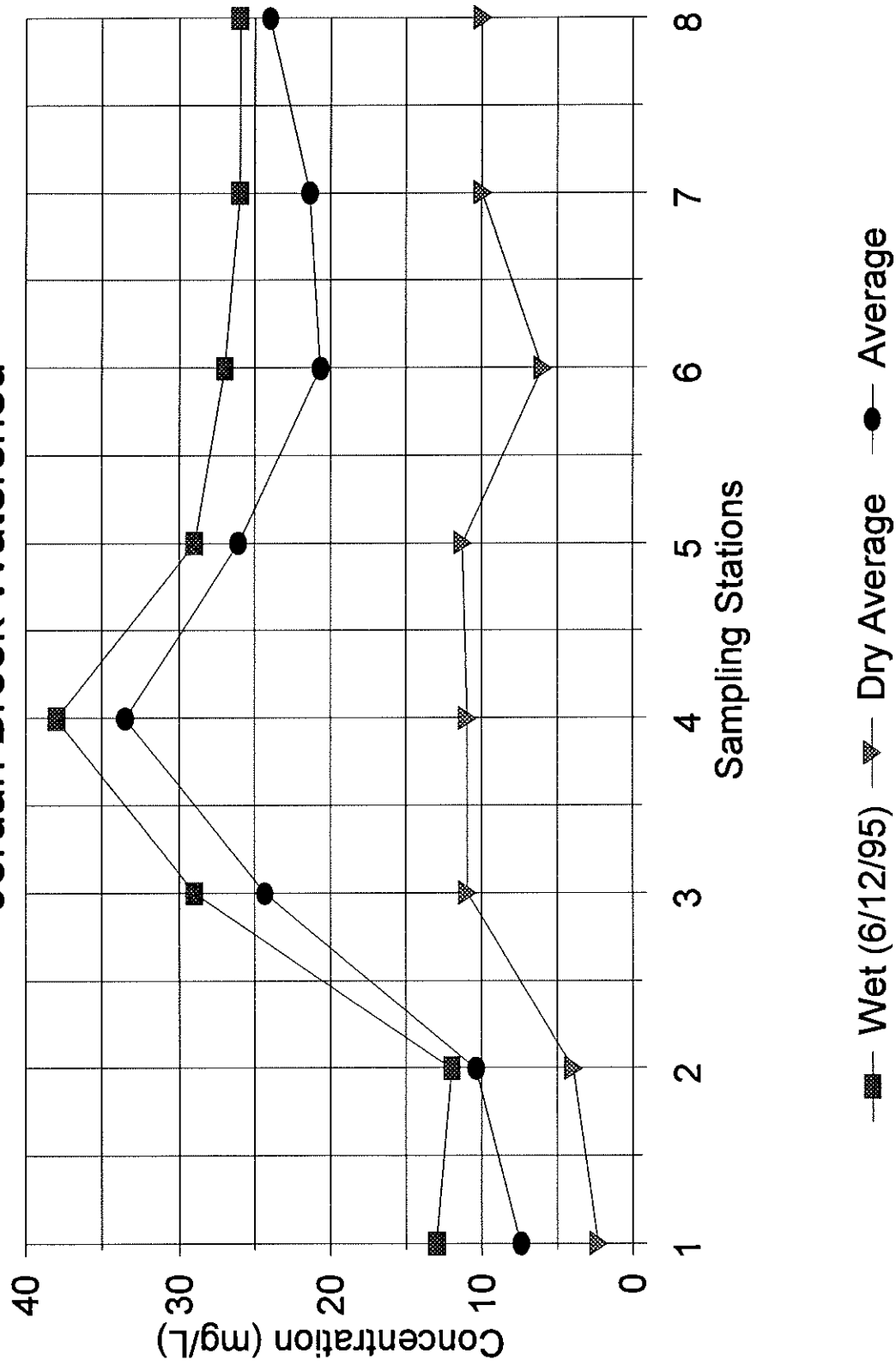


Figure 10
Average Chloride Concentration
Jordan Brook Watershed



- **Conductivity:** Conductivity is a measurement of inorganic salts in the water. Based on this monitoring, conductivity concentrations increase significantly immediately downstream of I-395. This is likely the result of the use of deicing salts on this highway.
- **Chloride:** Chloride concentrations also significantly increase immediately downstream of I-395 which is likely the result of the use of deicing salts on the highway. Concentrations generally decreased at downstream stations.
- **Copper:** Copper levels detected in the brook were either not detected or were detected just at detection limits. Detection limits used by the laboratory were equivalent to CTDEP chronic water quality criteria (0.0048 mg/l). No figure is provided for copper since levels of copper were never measured above detection limits.

In summary, with the exception of some elevated levels of phosphorous and coliforms, stream water quality appears to be within CTDEP Class A surface water quality criteria. However, current watershed development has increased levels of some of these parameters.

The data available to determine wet and dry weather impacts is limited. Future sampling should be conducted in a manner that would better determine wet and dry weather impacts.

While total coliform levels exceed Class A surface water quality criteria, these levels may not be attributable to a man-made source of pollution. Total coliform sources include degrading plant matter, as well as sewage and other man-made sources. In addition, since the elevated phosphorous levels are caused by only two of the nine sampling events, the elevated phosphorous levels may not be representative of actual stream conditions.

Some modifications to the monitoring program are recommended to better determine wet weather impacts and bacteria and phosphorous impacts in this surface water. The recommended water quality monitoring program is described in Section 7.1.

3.1.2.2 Effects of Imperviousness on Surface Water Quality

Research has found a strong correlation between impervious surfaces in a watershed and water quality in downgradient water resources. Literature reports that when 10 to 30% of the watershed consists of impervious surfaces, downgradient water resources are typically found to be impacted. When more than 30% of the watershed consists of impervious surfaces, downgradient water resources have been found to be degraded.

The average amount of impervious surface (i.e., roof and paved areas) associated with each watershed land use was determined using GIS land use and impervious surface data provided by the Town. Table 3 summarizes the percentage of the watershed that is impervious above each existing sampling station. For the purposes of this study, impervious areas are defined as roof and paved areas. The percent impervious represents the total impervious area in the watershed above the sampling station. The percent impervious is computed by dividing the impervious areas above the sampling station by the total watershed area above that station.

TABLE 3
SUMMARY OF IMPERVIOUS AREAS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Station	Total Area (Sq-ft)	Impervious Area (Sq-ft)	% Impervious (%)
1	5,820,000	186,000	3%
2	13,639,000	212,000	2%
3	29,216,000	1,340,000	5%
4	39,871,000	2,441,000	6%
5	72,550,000	5,008,000	7%
6	101,870,000	6,658,000	7%
7	172,093,000	16,568,000	10%
8	214,599,000	24,825,000	12%

Based on stream sampling, no significant water quality impacts were observed with the exception of total coliform levels that were consistently above desired levels for Class A waters through the watershed. Since most of the watershed is less than 10% impervious, this observation is consistent with the above research.

The only parameters that exhibited clear impacts with increased imperviousness during stream sampling were turbidity, conductivity and dissolved oxygen. Water quality standards for Class A streams only exist for turbidity and dissolved oxygen levels. The levels for both of these parameters in the stream are within standards.

3.1.2.3 Land Use Evaluation

The total amount of impervious area within each land use across the entire watershed was also computed. Results of the evaluation are summarized in Table 4, which includes the total area, impervious area, and percent imperviousness of each land use. The total area shown in Table 4 is the total land use area that is currently shown on the Town's electronic land use mapping. This total area does not correspond to zoning.

As shown in the table, the average level of imperviousness varies significantly with land use. Commercial, industrial, mall, and highway land uses generally contain the highest percentage of impervious surfaces (approximately 40 to 75 percent), while largely undeveloped land uses such as vacant land, open space, utility transmission, and land trust/public easements contain less than 3 percent impervious surfaces. Multi and single family residential land uses, public and private facility, and commercial retail land uses contain intermediate levels of imperviousness (approximately 18 to 30 percent).

3.1.2.4 Subwatershed Evaluation

For the purposes of this study, the Jordan Brook watershed was subdivided into 26 subwatersheds as shown in Figure 11. These subwatersheds were delineated from topographic mapping provided by the Town for Jordan Brook tributaries, at major road crossings, and at locations selected for hydrologic evaluation.

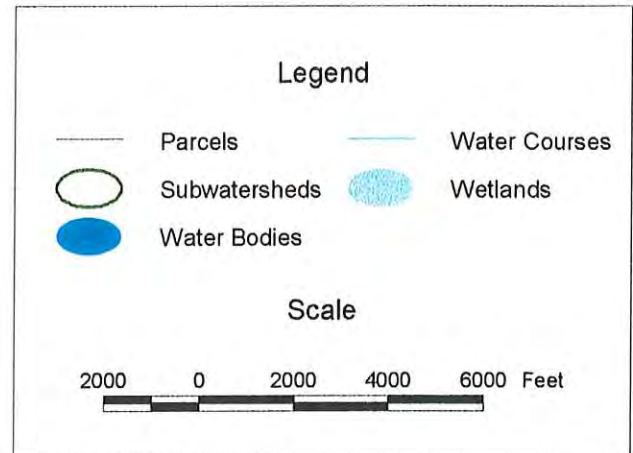
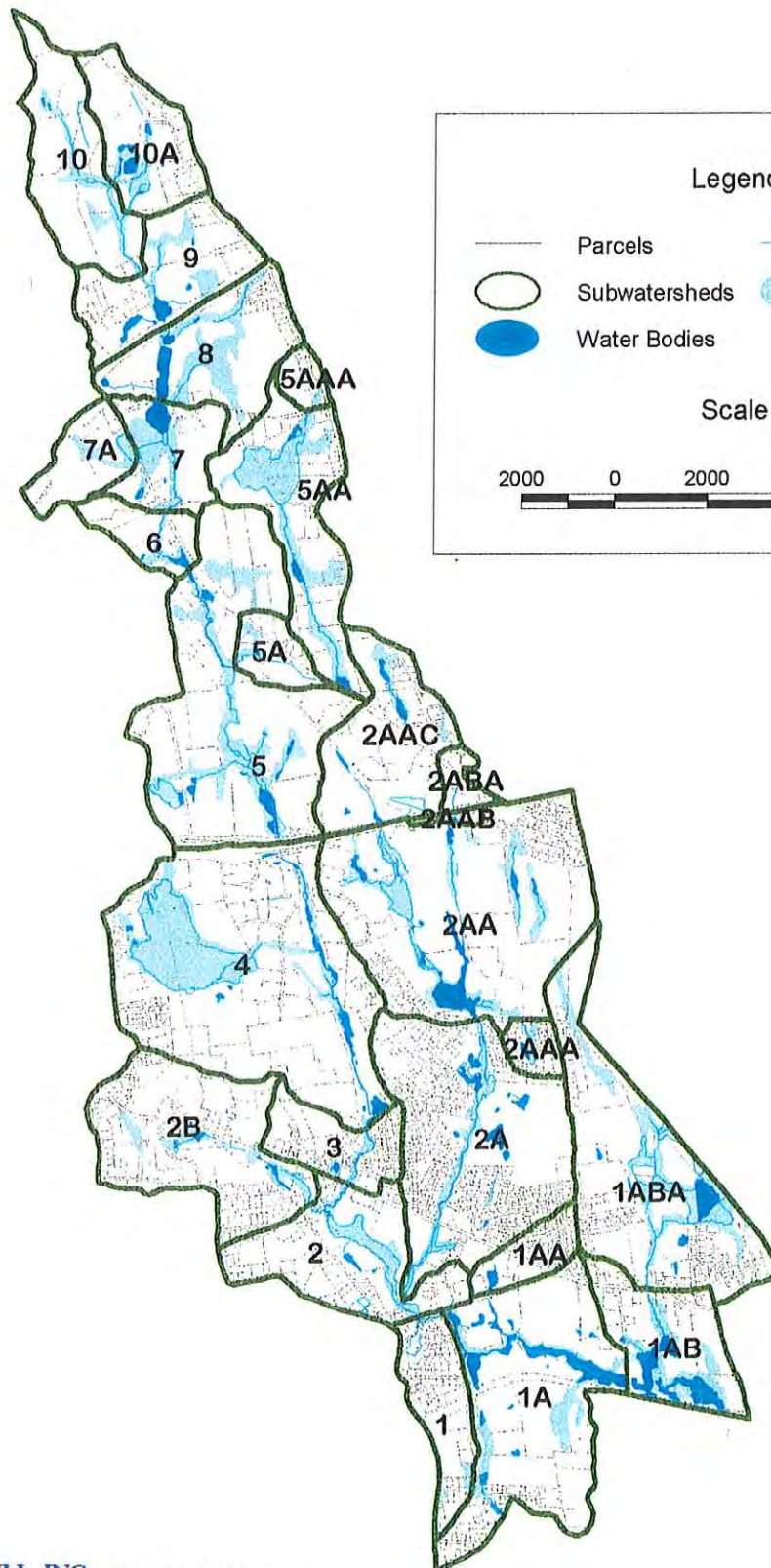
An evaluation was performed to determine the amount of impervious surface coverage within each subwatershed using GIS data on impervious surfaces and the subwatershed boundaries delineated for this project. The percent imperviousness of each subwatershed was calculated by dividing the impervious area within a subwatershed by the total subwatershed area. Results of the evaluation are summarized in Table 5. The impervious area values in Table 5 do not reflect future land use conditions since it is not possible to accurately determine the amount of impervious area that will be associated with future development.

The percentage of impervious area for individual subwatersheds ranges from approximately 20 to 30 percent in the most highly developed subwatersheds (1, 1AA, 1AB, 1ABA, 2AAB, 2AAC, and 2ABA) to less than 3 percent in subwatersheds 10 and 10A, which are located in a forested area near the Jordan Brook headwaters. In general, subwatersheds with the highest percentage

TABLE 4
CURRENT IMPERVIOUSNESS OF WATERSHED LAND USES
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Land Use	Total Area (sq-ft)	Impervious Area (sq-ft)	Percent Impervious
Cemetery	3,791,000	230,000	6%
Commercial Hospitality	42,000	20,000	48%
Commercial Office	42,000	17,000	40%
Commercial Retail	10,514,000	2,548,000	24%
Highway	3,633,000	1,396,000	38%
Industrial Manufacturing	3,537,000	1,294,000	37%
Industrial Warehouse	44,000	32,000	73%
Land Trust/Public Easement	686,000	19,000	3%
Mall	8,452,000	3,683,000	44%
Mixed Use	1,058,000	217,000	21%
Mobile Home	491,000	124,000	25%
Multi Family	3,597,000	713,000	20%
PA-490	42,713,000	327,000	<1%
Private Facilities	965,000	203,000	21%
Private Open Space	4,992,000	46,000	<1%
Public Facilities	8,176,000	2,094,000	26%
Public Land	18,057,000	271,000	2%
Public Utility	622,000	33,000	5%
Single Family	26,684,000	4,751,000	18%
Unknown	104,000	3,000	3%
Utility Transmission	5,425,000	50,000	<1%
Vacant	59,143,000	1,316,000	2%

Jordan Brook Subwatersheds Jordan Brook Watershed Management Study Town of Waterford



FUSS & O'NEILL INC. Consulting Engineers
146 HARTFORD ROAD, MANCHESTER, CONNECTICUT 06040
(860) 646-2469
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FIGURE 11

TABLE 5
CURRENT IMPERVIOUSNESS OF JORDAN BROOK SUBWATERSHEDS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Subwatershed	Total Area (sq-ft)	Impervious Area (sq-ft)	Percent Impervious
1	3,761,000	969,000	26%
1A	14,643,000	2,052,000	14%
1AA	1,981,000	659,000	33%
1AB	6,237,000	1,862,000	30%
1ABA	13,044,000	3,026,000	23%
2	8,679,000	981,000	11%
2A	15,605,000	2,837,000	18%
2AA	20,907,000	1,856,000	9%
2AAA	1,173,000	186,000	16%
2AAB	305,000	117,000	38%
2AAC	7,987,000	2,465,000	31%
2ABA	926,000	262,000	28%
2B	11,258,000	1,466,000	13%
3	3,645,000	608,000	17%
4	24,721,000	930,000	4%
5	19,307,000	1,902,000	10%
5A	2,093,000	282,000	13%
5AA	9,706,000	245,000	3%
5AAA	1,003,000	90,000	9%
6	2,542,000	380,000	15%
7	4,556,000	255,000	6%
7A	3,130,000	422,000	13%
8	8,113,000	468,000	6%
9	7,178,000	660,000	9%
10	7,987,000	26,000	<1%
10A	5,719,000	186,000	3%

Note:

1. Table excludes area of watershed located in New London

of impervious coverage are located in the southern and central portions of the Jordan Brook watershed.

3.2 Inland Wetlands

A survey of watershed wetlands and watercourses has been completed. The purpose of this survey was to develop a description and biological evaluation of significant surface water and wetland ecosystems within the Jordan Brook watershed. During this survey, available information on watershed wetland systems was reviewed which included CTDEP aerial photographs, town wetlands mapping, US Geological Survey (USGS) maps, and other CTDEP maps and reports. In addition, watershed wetlands and watercourses were evaluated visually at a number of stations. Based on this data, wetland functional values were estimated using CTDEP Bulletin No. 9 as a guide. Note that although this evaluation provides a baseline assessment of wetland resources throughout the watershed, it is not intended to supplant requirements that developers provide additional detailed information about on-site wetlands as required for a specific project.

3.2.1 Wetland Resources

For the purposes of this study, the long streams and wetland corridors within the watershed were divided into five major segments and a name was assigned to each segment. The mainstem of Jordan Brook was divided into three segments: Lower Jordan Brook (JL) from the dam at Jordan Mill Park north to Route I-95; Central Jordan Brook (JC) from Routes I-95 to I-395; and Upper Jordan Brook (JU) from Route I-395 north to the vicinity of Lake Konomoc. Nevins Brook (N) and an unnamed brook, hereafter designated East Brook (E), formed the fourth and fifth segments. Each of the five segments was further subdivided into sections of mainstem stream (M), tributaries (T), large swamps (S), or ponds (P). For example, a pond in the central section of Jordan Brook would be designated JCP2 (J for Jordan Brook, C for central section, P for pond and 2 as the pond number in the segment). A total of 41 wetlands within the watershed, varying in size from 2 to 94 acres, were so numbered for the purposes of evaluation during this study. The number of individual wetlands within the five main segments is shown below. The location of these areas are shown in Appendix C.

NUMBER AND TYPE OF WETLANDS

Segment	Mainstem Sections	Tributaries	Swamps	Ponds	Total
Jordan Lower	3	1	1	3	8
Jordan Center	2	6	2	1	11
Jordan Upper	1	1	1	2	5
Nevins Brook	2	3	2	2	9
East Brook	3	1	2	2	8
Total	11	12	8	10	41

The wetlands were visited between April 8 and April 28, 1998. A brief description of each of the wetlands is given in Appendix C.

3.2.2 Evaluation of Resources

Wetlands within the Jordan Brook watershed were evaluated using an adaptation of the method developed by the CTDEP (Ammann, et al., 1991). This method was designed for use by municipalities as a planning tool. It consists of a scientifically defensible numerical scoring system which can be used to compare the relative value of all wetlands within the same watershed. It is not intended to be used for the approval or rejection of specific development proposals. However, the scores can be used to establish wetland policy, to identify particularly high value wetlands, and to determine which wetlands may require special levels of protection or warrant detailed study.

The CTDEP method identifies thirteen functional values of wetlands. Because of the large number of individual wetlands in the Jordan Brook watershed, study resources were focused on the four major functional values most important to the ecology of wetlands: *Ecological Integrity*, *Wildlife Habitat*, *Finfish Habitat* and *Visual/Esthetic Quality*.

- *Ecological Integrity* is a measure of the overall health of a wetland and is based on such factors as the quality of the inflow water, the type of wetland soils, the degree of disturbance of soils and vegetation within and near the wetland, and the level of human activity in the vicinity.
- The suitability of the wetland as *Wildlife Habitat* is based on size of the wetland, the amount of open water, the number of different vegetation communities present, and the percentage of wetland edge bordered by undisturbed upland habitat.
- The value of the wetland as *Finfish Habitat* is considered separately for streams and ponds. Water quality is important, together with the size of the water body, the type of aquatic and wetland vegetation, the characteristics of the bottom and the abundance of cover available to fish.
- The *Visual/Esthetic Quality* of a wetland is based on the nature of the vegetation, the degree of noise and odors present, the amount of visible open water, and the appearance and use of the surrounding land. Although the visual quality of a wetland is not strictly an ecological function, it is an important factor to residents in the area, and to people using the wetland for such passive ecology-oriented recreation as hiking or bird watching.

Functional values not included in the study were: *Educational Potential*, *Water Based Recreation*, *Flood Control*, *Groundwater Use Potential*, *Nutrient Retention/Sediment Trapping*, *Shoreline Anchoring*, *Forestry Potential*, *Archaeological Potential*, *Urban Wetland Quality* and *Noteworthiness*.

Educational Potential is based primarily on such sociological factors as the proximity of the site to schools, the amount of parking, student safety issues, public access, the presence of trails, and the accessibility of open water. *Water Based Recreation* depends on whether fish are stocked and hunting is permitted. Parking is again important, together with access to other boating areas. Such issues are not relevant to the ecology of wetlands, and therefore these functions were not selected.

The CTDEP method of evaluating the *Flood Control* function is based on the area of watershed above a wetland compared to the area of watershed downstream at a potential flood damage location. The *Groundwater Potential* of a wetland depends on whether the wetland is upstream from a stratified drift aquifer and whether there are existing public or private wells. The quality of the groundwater is also taken into account. Thus *Flood Control* and *Groundwater Potential* are essentially based on the topography and hydrogeology of the area rather than on the ecology of the wetlands, and these functions were not included in this evaluation. *Flood Control* issues were considered, however, as part of the hydrologic evaluation of the watershed (Section 4.0), and *Groundwater Potential* was considered as part of the aquifer evaluation (Section 6.1).

To evaluate the *Nutrient Retention/Sediment Trapping* function, the CTDEP method relies on the average slope of the watershed above the wetland, the dominant land use, and potential sources of nutrients or sediments within the watershed (i.e., cropland, pasture, livestock, septic problems, areas of soil erosion, etc.). Consequently, the method does not consider the actual ability of the wetland to remove pollutants, but rather considers the contribution of pollutants from adjacent land uses. The *Shoreline Anchoring* function is based on the presence or absence of banks and shorelines, on the width of adjoining wetlands, and on the density of vegetation bordering the watercourse. The detailed field examination of the watershed and most of the forty one wetlands required to complete the evaluation of these functions was beyond the scope of this study.

The remaining four functional values were deemed not applicable to most of the Jordan Brook watershed wetlands. Including such functions in the study would tend to reduce the mean scores of otherwise valuable ecosystems, and to lower their evaluation. *Forestry Potential* is usually limited to wetlands on large privately owned tracts of agricultural or wooded land. The evaluation of *Urban Water Quality* requires that wetlands fall within a ½ mile radius of 90% commercial, industrial, or transportation land use. Very few of the wetlands meet these criteria. Criteria for *Noteworthiness* include the use of the wetland as a scientific research site, inclusion in the Federal list of Natural Landmarks, and the presence of unique biological or geological features. The Jordan Brook wetlands do not meet these criteria. Another criterion for *Noteworthiness* is the presence of rare species habitats. The Connecticut Natural Diversity Data Base was contacted to determine whether or not any Endangered, Threatened or Special Concern Species are known to occur within the watershed. Their reply of April 26, 1998 indicated that one plant and one bird species have been reported somewhere in the area, but no information was given concerning the exact location of these species (Appendix E). Information was also requested from the Connecticut State Archaeologist regarding possible archaeological sites within the wetlands. The Public Archaeology Survey Team is responsible for the development of *Archaeological Potential* information (Appendix E).

3.2.2.1 Evaluation Procedures

For each of the four functional values, a series of six to twelve questions are posed which are given a score of 1.0, 0.5 or 0.1, with the score of 1.0 representing the highest value. Some of the questions are designed to be answered in the office using maps, aerial photographs, reports, or reference books. Other questions are answered in the field by direct observation of conditions in and around the wetlands. Conductivity, a measure of the ionic content of the water which is frequently used to indicate pollution, was measured in the larger streams and ponds using a YSI Conductivity meter. A brief description of each wetland is given in Appendix C.

One of the limitations of the evaluation method is the problem of scale. Questions answered from maps and photographs in the office are very broad and are based on characteristics of the entire wetland and the watershed. On the other hand, questions answered by observations in the field are very specific, and are based on conditions at the individual viewing locations. This difference in scale is a disadvantage of the CTDEP method.

A total of thirty nine questions were answered for streams, thirty six questions for ponds, and thirty questions for wooded or shrub swamps. The average of the scores, designated the Functional Value Index (FVI), was calculated for each wetland. This index, the value of which is always less than or equal to 1.0, can be used to compare the relative values of different wetlands within the watershed. In addition, since larger wetlands are generally considered of greater value than smaller systems, each FVI was multiplied by the acreage of its wetland to yield a second index known as Wetland Value Units (WVU).

Because of the number of wetlands within the watershed, a total of over one thousand, six hundred and fifty questions were answered to develop the wetland values. Specific methods used to answer the questions are summarized in Appendix D. The individual scores for each question and the average scores for each of the four functional values are also presented in Appendix D.

3.2.3 Significant Resources

The results of the survey are summarized in Table 6. The table lists the wetlands and shows for each wetland the area and conductivity, together with the average FVI and WVU scores. Where a wetland was evaluated at two or more locations, the average value for all viewing locations is shown. Mean FVI and WVU scores for the various wetlands can be compared using the graphs in Appendix D.

In addition to the scores developed by the DEP method, Subjective Opinion scores are given for each wetland. These scores, ranging from 1 to 4, are predicated on years of experience and reflect the opinion of the biologist regarding the overall value of the wetland. The scores are formed in response to such characteristics as vegetation diversity, the density of the shrub layer and canopy, the presence or absence of invasive species, the prevalence of saturated soils or standing water, etc. The purpose of the Subjective Opinion scores was to complement the more schematic CTDEP method.

TABLE 6
INLAND WETLANDS SUMMARY
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Wetland	Area (acres)	Mean Conductivity (umhos/cm)	Mean FVI (Score)	Mean WVU (Score)	Subjective Opinion (Score)	Final Wetland Value	Water Quality Sensitive	Special Signif.
Lower Jordan Brook								
JLM1	37.4	80	0.66	24.67	3	High	I	X
JLM2	2.0	72	0.68	1.35	4	Very High	P	X
JLM3	17.1	60	0.66	11.25	2	High	P	
JLT1	18.9	94	0.50	9.51	2	Average	I	
JLS1	93.9		0.62	58.61	3	High		X
JLP1	3.0	98	0.49	1.48	2	Average	I	
JLP2	2.1	71	0.64	1.34	3	High		
JLP3	3.4	74	0.69	2.35	4	Very High	P	X
Central Jordan Brook								
JCM1	60.1	82	0.75	44.78	3	Very High	P	X
JCM2	31.4	83	0.57	17.99	2	Average	I	
JCT1	16.3	51	0.46	7.48	2	Low		
JCT2	47.0	56	0.68	31.86	3	High	P	X
JCT3	22.7		0.48	10.97	2	Low		
JCT4	7.0		0.49	3.43	2	Low		
JCT5	12.4		0.55	6.85	1	Low		
JCT6	40.4	154	0.62	25.24	4	High	P	X
JCS1	27.1		0.74	20.17	4	Very High		X
JCS2	26.6		0.47	12.53	2	Low	I	
JCP1	6.0		0.56	3.34	2	Average	I	
Upper Jordan Brook								
JUM1	45.5	38	0.72	32.96	4	Very High	P	X
JUT1	9.5		0.59	5.56	2	Average		
JUS1	3.6		0.48	1.73	1	Low		
JUP1	2.2		0.50	1.11	2	Average	I	
JUP2	2.8	56	0.59	1.65	3	High		
Nevins Brook								
NM1	30.3	97	0.56	16.99	2	Average	I	
NM2	16.3	102	0.71	11.56	3	Very High	P	X
NT1	26.8	110	0.74	19.82	4	Very High	P	X
NT2	6.5	253	0.50	3.25	3	High	I	
NT3	7.1	84	0.65	4.64	3	High		
NS1	13.9		0.60	8.35	4	High		
NS2	14.4	62	0.58	8.34	2	Average	I	
NP1	2.5	33	0.67	1.67	4	Very High	P	X
NP2	3.7	102	0.57	2.09	2	Average	I	

TABLE 6 (CONTINUED)
INLAND WETLANDS SUMMARY
JORDAN BROOK WATERSHED MANAGEMENT STUDY
TOWN OF WATERFORD
FEBRUARY 2000

Wetland	Area (acres)	Mean Conductivity (umhos/cm)	Mean FVI (Score)	Mean WVU (Score)	Subjective Opinion (Score)	Final Wetland Value	Improve Water Quality	Special Signif.
East Brook								
EM1	47.3	171	0.43	20.52	1	Low	I	X
EM2	17.8	178	0.39	6.85	2	Low	I	
EM3	39.9	195	0.71	28.37	3	High	P	
ET1	14.3	87	0.49	7.07	1	Low	I	
ES1	27.5		0.46	12.60	3	Average		X
ES2	34.9		0.76	26.53	4	Very High		
EP1	0.8		0.33	0.26	1	Low	I	
EP2	1.2	80	0.33	0.40	2	Low	I	

Notes:

Mean FVI represents average score assigned to each of the four functional values.

Mean WVU represents mean FVI multiplied by the acreage of the wetland.

I = Improve Water Quality

P = Preserve Water Quality

Each wetland was ranked in the Final Wetland Value column as Low, Average, High or Very High. To develop these rankings, mean FVI scores were first sorted into four categories: less than 0.50 (Low), from 0.50 to 0.60 (Average), from 0.60 to 0.70 (High) and over 0.70 (Very High). When mean WVU scores were also taken into consideration, it was found that most of the larger wetlands had already been rated as either High or Very High based on the FVI scores. Finally, the rankings were checked against the Subjective Opinion scores; seven wetlands were adjusted upwards and two were adjusted downwards.

It is important to note that the rankings reflect the comparative value of various wetlands within the watershed. One wetland may be considered more valuable than another for a variety of reasons, but all wetlands are important ecosystems which deserve protection. Therefore, a Low or Average ranking should never be construed as justification for lax development practices.

Some of the wetlands within the watershed would benefit greatly by improvements in the quality of stormwater flowing into them. These wetlands are designated "P" (preserve current water quality) or "I" (improve current water quality) in Table 6. Wetlands marked "P" are located primarily in undeveloped areas. They would be significantly impacted by degraded stormwater from road runoff or construction related sedimentation. Wetlands marked "I" are generally surface waters which flow through developed areas somewhere along their course. They are already adversely affected by urban drainage, and would be significantly enhanced by water quality improvements.

Those wetlands deemed especially sensitive and meriting all possible measures of protection or preservation are indicated in the last column of Table 6. All of the Very High value wetlands are considered to be of special significance, together with large High value wetlands (WVU's greater than 20). Protection or preservation measures should include detailed consideration of all development proposals impinging on Upland Review Areas and Upland Protection Zones (see below). Developers should be required to provide specific descriptions and evaluations of on-site and neighboring wetlands. Special efforts should be made to prevent erosion and sedimentation, and engineered stormwater controls should be required.

The Town of Waterford Inland Wetlands Regulations are currently being revised to include Upland Review Areas bordering all wetlands. Upland Review Areas are upland areas in which certain activities, such as grading, excavating or filling, are regulated by the Inland Wetlands Commission. The purpose of an Upland Review Area is to control long-term and short-term impacts from the development of uplands in close proximity to wetlands. Specific elements of each development site plan must be reviewed on a case by case basis. Upland Protection Zone recommendations are outlined in Section 7.6.1 of this report. A copy of the CTDEP Guidelines for Upland Review Area Regulations is provided in Appendix F.

4.0 HYDROLOGIC EVALUATION OF JORDAN BROOK

4.1 TR-20 Model Input Data

A hydrologic model has been developed for the existing watershed conditions. The TR-20 model, developed by the Soil Conservation Service (1983), was used to simulate the hydrology of the watershed. Model inputs for this watershed were developed based on electronic data and previous approved TR-20 runs provided by the Town of Waterford. The watershed's Geographic Information System has also been programmed to compute curve numbers for each subwatershed. As indicated in Section 2.1, the Jordan Brook watershed was subdivided into 26 subwatersheds, which correspond to locations where estimates of peak flows are desired. In general, these locations include major road crossings and the outlets of critical detention areas such as wetlands and ponds.

TR-20 simulates the hydrologic response of a watershed based on factors such as land use cover type, soil characteristics, rainfall depth, drainage area, watershed topography, channel characteristics, and detention effects. TR-20 model input data for the Jordan Brook watershed were developed from various sources, including published data and electronic GIS data coverages provided by the Town. The following paragraphs summarize the model inputs and data sources for the TR-20 model of the Jordan Brook watershed:

- **Rainfall:** Flood flows were simulated for the 10, 25, and 100 year frequency storms using a 24-hour Type III storm, which is the standard utilized for Connecticut. Rainfall depths for each of these storms were obtained from published rainfall records for New London County, Connecticut (U.S. Department of Commerce, 1961).
- **Watershed Drainage Areas:** Subwatersheds were delineated based upon topographic mapping provided by the Town. Subwatershed drainage areas were calculated using the ArcView® GIS.
- **Curve Numbers:** TR-20 curve numbers, which account for the combined effects of surface depressions, vegetation interception, evapotranspiration, and infiltration, were developed based upon soil mapping provided by the Town and estimates of cover type and hydrologic condition. A customized ArcView® GIS application was developed to calculate area-weighted curve numbers for each of the subwatersheds.
- **Time of Concentration:** Time of concentration, which is the time required for the most upstream point in a watershed to contribute flow at the watershed outlet, is affected by surface roughness, flow patterns, and land slope. Time of concentration was estimated for each watershed based on sheet flow, shallow concentrated flow, and open channel flow paths using topographic and watershed mapping provided by the Town.
- **Critical Detention Structures:** Structures or areas that could provide significant detention and attenuation of watershed flood flows were identified, as shown on Figure 1. Storage-elevation-discharge curves were developed for the identified culvert

crossings using survey information provided by the Town, as well as data developed by previous studies (Buck and Buck, 1989; Fugro, 1995). Table 7 summarizes the locations and identified wetland areas corresponding to the critical detention structures.

- **Channel Routing:** TR-20 simulates hydrograph attenuation resulting from channel reach length by performing stream channel routing. Channel reach lengths were estimated from mapping provided by the Town, and routing coefficients were calculated using nomographs developed by the Soil Conservation Service (1983) for a trapezoidal channel.

As indicated in Section 2.1, a portion of the Jordan Brook watershed is located within the City of New London, which was delineated as its own subwatershed. TR-20 model inputs for this subwatershed were developed from standard USGS topographic and Soil Conservation Service soils mapping, using the techniques described above. Backup calculations for this subwatershed are included in Appendix G.

Values of the TR-20 model input parameters (drainage area, curve number, and time of concentration) for each subwatershed are summarized in Table 8. The relationships of subwatersheds, detention structures, and reaches were defined within the model to accurately reflect the existing conditions within the Jordan Brook watershed. A schematic drawing showing these relationships is included in Appendix G. TR-20 model input data, supporting calculations, and model input/output files are also provided in Appendix G.

4.2 TR-20 Model Results

Table 9 summarizes the TR-20 model results at the downstream locations within each subwatershed along Jordan Brook and its major tributaries. The table includes predicted peak flows in cubic feet per second for the 10, 25, and 100-year frequency storms.

Modeled peak flows for the 10-year storm range from approximately 100 cfs in the upstream reaches of Jordan Brook to 1300 cfs near the watershed outlet upstream of Jordan Cove. Modeled peak flows are generally 10 to 20 percent higher and 40 to 90 percent higher for the 25-year and 100-year frequency storms, respectively compared to the 10-year storm, at each location. Peak flows generally increase proceeding downstream in the watershed, except at locations of significant detention where peak flows are attenuated. The highest peak flows along Jordan Brook are predicted to occur downstream of the confluence with the tributary associated with subwatershed 2B. Significant detention provided by the Route 156 crossing and the wetlands in the southernmost subwatersheds result in reduced peak flows south of Route 156.

Peak flows predicted by the model were compared to peak flows calculated from previous TR-20 studies of Jordan Brook (Buck and Buck, 1989), as well as peak flows derived by the Federal Emergency Management Agency using standard flood flow formulas for ungaged streams (FEMA, 1990). Table 10 presents a comparison of 100-year peak flows predicted by each study.

TABLE 7
CRITICAL DETENTION LOCATIONS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Location ID	Location Description	Subwatershed	Wetland Area
D1	I-395	9	JUM1
D2	Route 85	7	JCM2
D3	Cross Road	6	JCM2
D4	I-95	5	JCM1
D5	I-95 Nevins Brook	2AAC	NM2
D6	Fog Plain Road (Nevins Brook)	2AA	NS1
D7	Rope Ferry Road	2	JLM1
D8	Post Road (Unnamed East Brook)	1ABA	EM3
D9	Miner Lane (Unnamed East Brook)	1AB	EM2/ES1
D10	Great Neck Road (Unnamed East Brook)	1A	EM1

TABLE 8
TR-20 MODEL INPUT PARAMETERS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Subwatershed	Area (sq. mi.)	Area (acres)	Curve Number	Time of Concentration (hours)
1	0.165	105.7	74	1.00
1A	0.565	361.3	78	1.55
1AA	0.082	52.4	79	0.35
1AB	0.239	153.0	78	0.54
1ABA	0.474	303.4	78	0.83
2	0.318	203.7	67	0.64
2A	0.616	394.2	72	0.90
2AA	0.756	483.8	72	0.77
2AAA	0.048	30.4	71	0.29
2AAB	0.013	8.2	84	0.24
2AAC	0.301	192.9	80	0.71
2ABA	0.038	24.0	81	0.38
2B	0.430	274.9	73	0.60
3	0.146	93.1	67	0.47
4	0.906	580.0	61	1.01
5	0.708	453.1	72	0.85
5A	0.079	50.3	68	0.45
5AA	0.346	221.5	68	1.18
5AAA	0.040	25.3	76	0.40
6	0.095	61.1	75	0.44
7	0.169	108.4	70	0.58
7A	0.117	75.1	78	0.56
8	0.297	190.0	71	0.73
9	0.262	167.6	75	0.43
10	0.280	179.5	66	1.01
10A	0.209	133.6	69	0.80
New London	0.51	326.4	70	1.26
Subtotal	7.6978	4926.592		
Total	8.2078	5252.992		

TABLE 9
SUMMARY OF COMPUTED EXISTING PEAK FLOWS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Point of Concern (TR20 Section)	Description	TR-20 Peak Flow (cfs)		
		10-Year Storm	25-Year Storm	100-Year Storm
1 (003)	Outlet of subwatershed 10 Jordan Brook	264	342	510
2 (D1)	Outlet of subwatershed 9 (post-detention) Jordan Brook at I-395	122	140	171
3 (007)	Outlet of subwatershed 8 Jordan Brook at Douglas Lane	290	363	511
4 (D2)	Outlet of subwatershed 7 (post-detention) Jordan Brook at Route 85	460	567	792
5 (D3)	Outlet of subwatershed 6 (post-detention) Jordan Brook at Cross Road	193	211	955
6 (D4)	Outlet of subwatershed 5 (post-detention) Jordan Brook at I-95	820	951	1089
7 (023)	Outlet of subwatershed 4 Jordan Brook at Fog Plain Road	1100	1357	1711
8 (025)	Outlet of subwatershed 3 Jordan Brook at Route 1	1140	1416	1805

TABLE 9 (Continued)
SUMMARY OF COMPUTED EXISTING PEAK FLOWS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Point of Concern (TR20 Section)	Description	TR-20 Peak Flow (cfs)		
		10-Year Storm	25-Year Storm	100-Year Storm
9 (026)	Outlet of subwatershed 2B Jordan Brook tributary at Ellen Ward Rd.	380	477	676
10 (027)	Confluence of Jordan Brook and tributary associated with subwatershed 2B	1348	1722	2336
11 (D6)	Outlet of subwatershed 2AA (post-detention) Nevins Brook at Fog Plain Road	362	505	1126
12 (D7)	Outlet of subwatershed 2 (post-detention) Jordan Brook at Route 156	1049	1299	1919
13 (D8)	Outlet of subwatershed 1ABA (post-deten.) Jordan Brook tributary at Route 1	418	460	558
14 (D9)	Outlet of subwatershed 1AB (post-detention) Jordan Brook tributary at Miner Lane	314	366	461
15 (D10)	Outlet of subwatershed 1A (post-detention) Jordan Brook tributary at Great Neck Road	204	242	318
16 (053)	Outlet of subwatershed 1 Jordan Brook at entrance to Jordan Cove	1231	1505	2188

TABLE 10
COMPARISON OF PREDICTED PEAK FLOWS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Location	100-Year Peak Flows (cfs)		
	TR-20 Fuss & O'Neill (1998)	TR-20 Buck & Buck (1989)	FEMA (1990)
Jordan Brook at I-395	171	200	344
Jordan Brook at Douglas Lane	511	503	NA
Jordan Brook at Route 85	792	759	NA
Jordan Brook at Cross Road	955	949	NA
Jordan Brook at I-95	1089	904	588
Jordan Brook at Route 1	1805	1097	695
Jordan Brook at entrance to Jordan Cove	2188	NA	1923

Notes: 1) For comparison purposes only, FEMA reported flows were adjusted by the ratio of watershed areas used in the Fuss & O'Neill (1998) and FEMA (1990) studies.
N/A Flows not reported at these locations.

The results of this study are consistent with the TR-20 model results of Buck and Buck (1989). Peak flows predicted by both studies at most locations are within 15 percent, with the exception of flows in the lower portion of the watershed (i.e., south of Route 1), which may be attributable to differences in watershed delineations in these areas. Peak flows from this study are consistently higher than peak flows estimated by FEMA, which were adjusted by a ratio of drainage areas for comparison purposes. The exception was at the entrance to Jordan Cove where peak flows computed by TR-20 were consistent with FEMA reported peak flows. The discrepancy between the TR-20 and FEMA flows may be due to differences in the methods used in each study (i.e., physical modeling versus statistical regression).

4.3 Stormwater Quantity Control Evaluation

Development alters a watershed's runoff characteristics, causing higher peak flows, increases in runoff volume, and shorter travel times with increasing impervious surfaces. Without appropriate controls, future development could potentially aggravate flooding at critical downstream locations and cause erosion and scour of natural watercourses and wetlands. An evaluation was performed to identify areas in the watershed where additional stormwater detention could be recommended. The approach and outcome of this evaluation are described below.

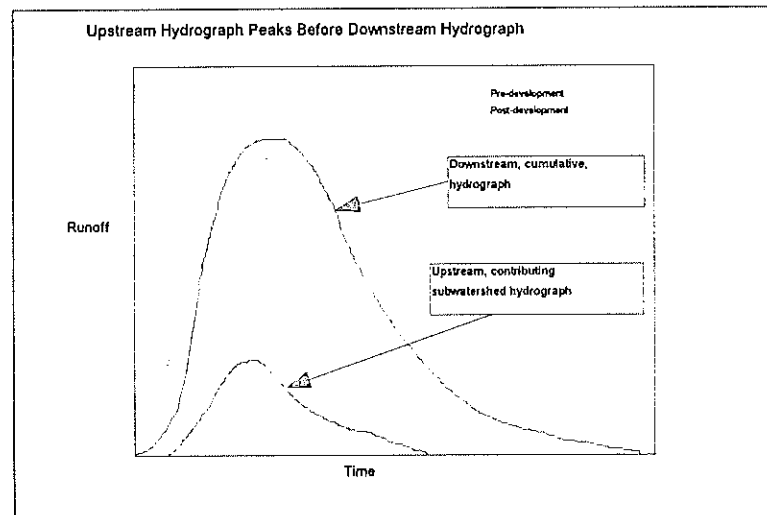
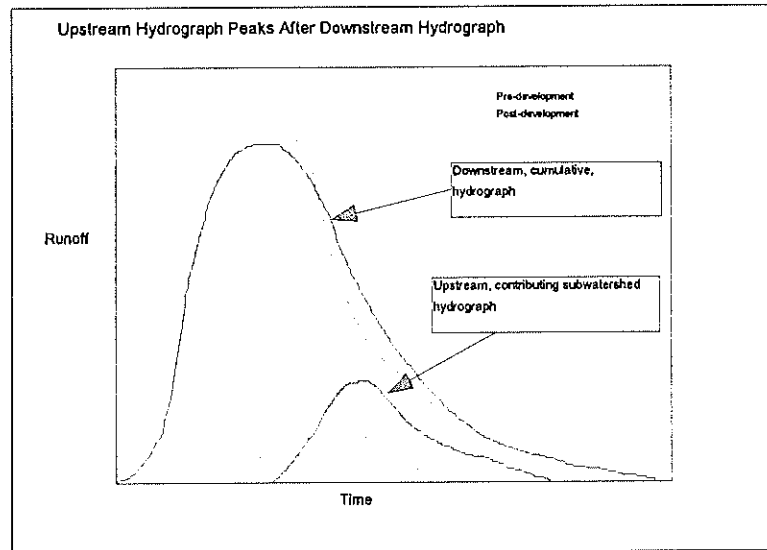
4.3.1 Methodology

Output from the TR-20 model developed for existing watershed conditions was evaluated in an effort to identify areas where stormwater detention should be provided. The modeled runoff hydrographs at potential points-of concern such as major road crossings and the outlets of existing detention areas (i.e., wetlands and ponds) were examined.

Specifically, the time to peak for upstream contributing subwatersheds was compared to the time to peak for cumulative hydrographs at downstream points-of-concern. Recognizing that future development will cause existing runoff hydrographs to peak earlier (i.e., shift to the left on the time scale), development in subwatersheds with runoff hydrographs that currently peak before the downstream cumulative hydrograph would not tend to increase peak flows at the downstream location. Similarly, development in subwatersheds with runoff hydrographs that currently peak after the downstream cumulative hydrograph would tend to increase peak flows at the downstream location since the upstream flows will reach the downstream location closer to the time of the peak at that location. This relationship is illustrated graphically in Figure 12.

An attempt was made to develop a generalized rule for identifying subwatersheds where detention should be provided based upon a comparison of the hydrograph time to peak for individual subwatersheds and downstream points-of-concern, as described above. However, this comparison is complicated by the attenuation provided by existing detention areas such as wetlands and major road crossings where flooding occurs. Actual runoff travel times are influenced by the amount of detention associated with these areas, which is a function of flow rate and available storage volume. Therefore, a generalized detention rule for future development is not possible due to the influence of existing detention.

FIGURE 12
EFFECT OF DEVELOPMENT ON RUNOFF HYDROGRAPHS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000



4.3.2 Conclusions

Based on our evaluation of existing hydrologic conditions in this watershed, the following has been concluded:

- Evidence of channel scour and erosion was observed in watershed watercourses during the course of this study. In addition, a number of culvert crossings exist in the watershed where high stormwater flows could potentially overtop the culvert crossing and cause flooding.
- In order to not increase channel erosion in watershed watercourses and to not exacerbate existing flooding conditions, future developments should demonstrate that their project would result in no net increase in peak flows at watershed points-of-concern. This may require controls that attenuate peak flows such as detention basins.
- Detention should not be automatically required for all developments since retaining peak flows in some subwatersheds could actually increase peak flows at downstream points-of-concern. Stormwater detention requirements should be determined on a case-by-case basis using the watershed's TR-20 model for proposed developments that have potential for downstream impacts. Developments that could be exempted from this evaluation are single family residences, subdivisions with four or less parcels and no new roads, or any other project that generates less than 5,000 square feet of new impervious surfaces that is not infiltrated. These developments would be expected to generate less than 1 cubic feet per second of peak stormwater flows during significant storm events.
- The volume of stormwater runoff may also need to be attenuated depending on the size and location of the site. Increased runoff volumes will prolong peak velocities in watercourses and consume flood storage capacity that is needed to attenuate existing peak flows.

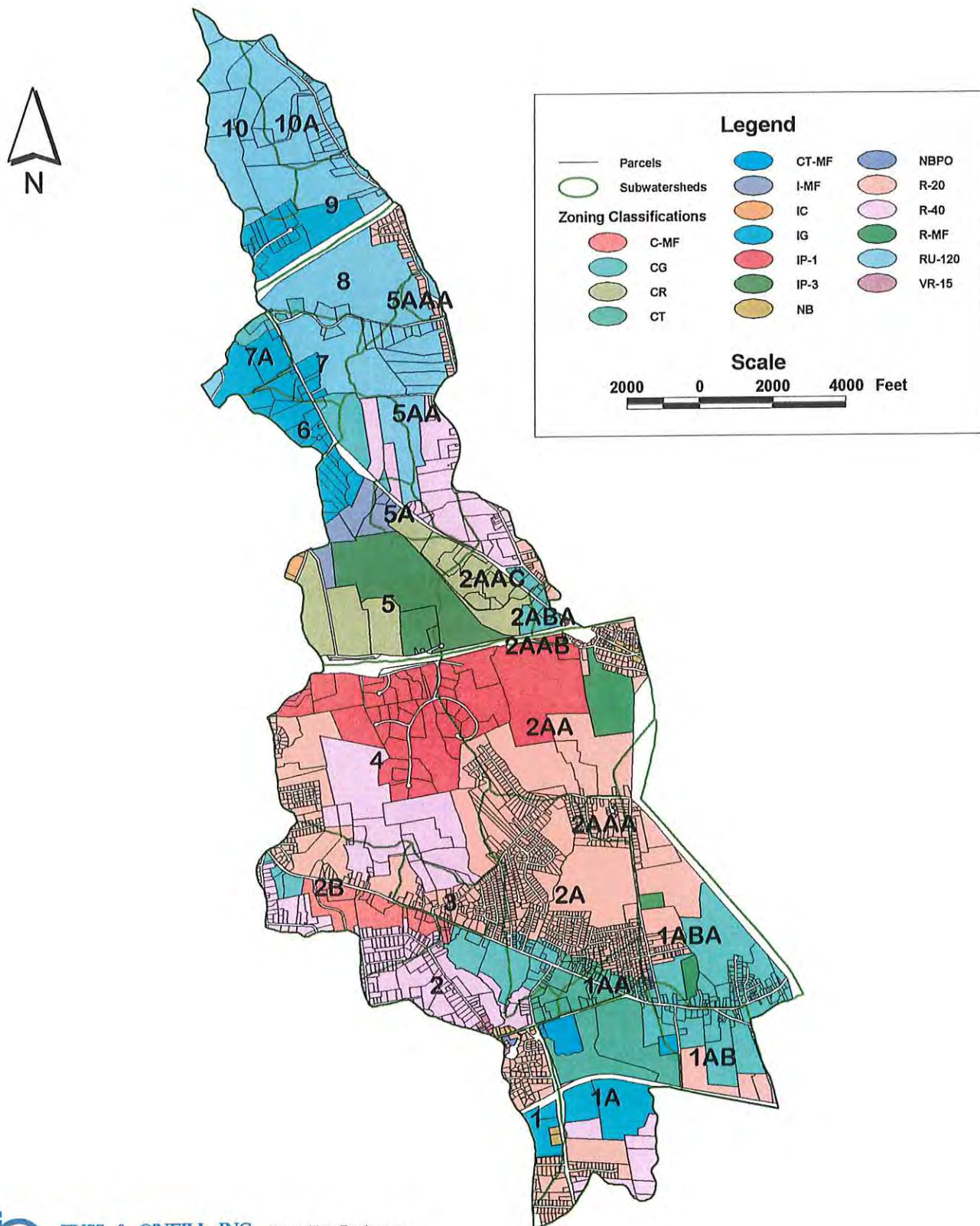
5.0 STORMWATER QUALITY EVALUATION

5.1 Future Watershed Land Use

Future land use in the Jordan Brook watershed is based on zoning classifications and mapping associated with the "Town of Waterford Zoning Regulations" (1993), which regulates future development in the Town of Waterford. Figure 13 depicts the zoning classifications within the watershed as defined by the Town zoning regulations. Zoning classifications for parcels within the Jordan Brook watershed are summarized in Table 11.

The central and northern portions of the Jordan Brook watershed are the least developed areas in the watershed and are subject to the most significant changes in future land uses according to the Town's zoning classifications. Largely forested areas north and south of Interstate-395 are zoned for residential development, which includes single and multi-family residences,

Zoning Classifications Jordan Brook Watershed Management Study Town of Waterford



FUSS & O'NEILL INC. Consulting Engineers
146 HARTFORD ROAD, MANCHESTER, CONNECTICUT 06040
(860) 646-2469
www.FandO.com

FIGURE 13

TABLE 11
WATERFORD ZONING CLASSIFICATIONS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Zoning District	Description
C-MF	Commercial Multi-Family
CG	General Commercial
CR	Regional Commercial
CT	Civic Triangle
CT-MF	Civic Triangle Multi-Family
I-MF	Industrial Multi-Family
IC	Industrial Commercial
IG	General Industrial
IP-1	General Industrial Park
IP-3	Special Aquifer Industrial Park
NB	Neighborhood Business
NBPO	Neighborhood Business Professional Office
R-20	Medium Density Residential
R-40	Low Density Residential
R-MF	Residential Multi-Family
RU-120	Rural Residential
VR-15	Village Residential

farming, and certain public facilities such as libraries, schools, parks, and playgrounds. Undeveloped parcels located south of Interstate-395 along the Route 85 corridor are zoned for commercial, industrial, and residential development. A Special Aquifer Industrial Park District located immediately north of Interstate-95 consists of several large parcels currently occupied by single family residences. Vacant and open space parcels immediately south of Interstate-95 are located within an Industrial Park zoning district. Undeveloped parcels scattered throughout the lower portion of the watershed are zoned for residential and commercial development. However, much of the lower Jordan Brook watershed is nearly fully developed and, therefore, land uses in the lower portions of the watershed are not expected to change significantly in the future.

5.2 Land Use Pollutants-of-Concern

Potential pollutants-of-concern associated with existing and potential future land uses within the watershed were identified for the stormwater quality evaluation. These pollutants were selected for the evaluation based upon the following factors:

- 1) their levels in stormwater are more heavily influenced by land use rather than natural sources, and
- 2) quantitative, land use-based loading factors for these pollutants are available from literature sources.

The land use pollutants-of-concern selected for the stormwater quality evaluation include total suspended solids (TSS), biochemical oxygen demand (BOD), nitrogen, phosphorous, copper, lead, and zinc. The following paragraphs summarize sources of these pollutants in stormwater runoff.

In general, there are two primary sources of suspended solids in stormwater runoff. Soil erosion is a potentially significant contributor of solids, especially at sites with unstabilized soils and inadequate erosion protection. To a lesser degree, some soil erosion also occurs on stabilized land during more severe storm events. In addition to soil erosion, stormwater runoff also sweeps other solids which accumulate on the land surface. Solids which are "washed off" include pet droppings, vegetative matter (i.e. leaves, grass clippings), litter, street sand, solids from atmospheric deposition and other debris.

Biochemical oxygen demand is a measure of how much oxygen is consumed by bacteria while they decompose organic matter in water and is therefore a measurement of the strength of organic matter in water (i.e., pollution). Sources of BOD in stormwater include organic material such as leaves, lawn clippings, sewage, manure, and food processing wastewaters.

Nitrogen and phosphorous are algal nutrients that are needed for algal growth. Excessive amounts of these nutrients leads to algal blooms and eutrophication in surface water impoundments. Phosphorous is typically the limiting nutrient in freshwater systems and nitrogen is typically the limiting nutrient in marine systems. The primary sources for these

nutrients include lawn and crop fertilizers, sewage, manure, detergents and atmospheric deposition.

The primary source of metals in stormwater runoff is exposure and dissolution of metals during precipitation. "Exposed" sources include galvanized pipes, roof gutters, downspouts, roofing materials, outdoor metal plating, paints, wood preservatives, catalytic converters, brake linings, and tires. Rainfall, which is acidic in the northeastern United States, mobilizes trace metals from surfaces. Atmospheric deposition is also a documented source of metals.

5.3 Pollutant Loading Evaluation

Stormwater pollutant loadings to surface water resources within the watershed were evaluated using a GIS pollutant loading model. The GIS pollutant loading model was applied to existing and future watershed conditions in order to evaluate potential stormwater impacts of future development. A description of the model and the results of the pollutant loading evaluation are presented below.

5.3.1 Model Description

The GIS pollutant loading model, which was developed for the ArcView® GIS system, calculates annual mass loadings of pollutants-of-concern for each of the Jordan Brook subwatersheds. The model integrates GIS database coverages of parcels, land use, subwatershed boundaries, and land use-based pollutant loading and reduction factors.

The following pollutants-of-concern are included in the GIS pollutant loading model:

- Biochemical Oxygen Demand (BOD)
- Total Suspended Solids (TSS)
- Total Nitrogen
- Total Phosphorous
- Copper, Lead, Zinc

Annual stormwater pollutant loading factors were selected based on a literature review of non-point source pollutant loadings associated with various land uses. Pollutant loading factors were assigned by matching the Town land use with the most closely related land use reported in the literature. The model includes a range of loading factors for each pollutant-of-concern, which reflects the range of values reported in the literature as well as variability in watershed conditions that affect stormwater quality. Table 12 lists the pollutant loading factors that were selected for the watershed land uses. Literature sources of the loading factor values are provided as a footnote to Table 12. Loading factors are expressed in units of mass per area per year (kilograms/hectare/year).

Stormwater pollutant loading reduction factors were developed to account for existing treatment measures or practices within the watershed that reduce pollutant loadings. Street sweeping and major structural stormwater controls for specific large developments were considered in

TABLE 12
LAND USE POLLUTANT LOADING FACTORS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Land Use	Pollutant Loading Factors (kg/ha-vr)													
	BOD		TSS		Nitrogen		Phosphorous		Copper		Lead		Zinc	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Cemetery	14.00	36.00	157.00	600.00	5.00	12.00	0.50	2.20	0.03	0.15	0.06	0.27	0.10	0.57
Commercial Hospitality	40.00	98.00	800.00	1300.00	5.00	16.30	1.20	2.20	0.07	0.35	0.30	1.00	1.63	3.24
Commercial Office	40.00	98.00	800.00	1300.00	5.00	16.30	1.20	2.20	0.07	0.35	0.30	1.00	1.63	3.24
Commercial Retail	40.00	98.00	800.00	1300.00	5.00	16.30	1.20	2.20	0.07	0.35	0.30	1.00	1.63	3.24
Highway	90.00	170.00	120.00	6300.00	17.00	25.00	1.40	2.40	2.80	5.60	1.10	1.40	4.10	5.10
Industrial Manufacturing	10.00	17.70	400.00	2000.00	3.00	14.00	0.35	6.00	0.29	1.30	0.37	0.50	0.98	12.00
Industrial Warehouse	10.00	17.70	400.00	2000.00	3.00	14.00	0.35	6.00	0.29	1.30	0.27	0.50	0.98	12.00
Land Trust/Public Easement	5.00	40.00	2.00	900.00	1.00	8.00	0.01	0.70	0.02	0.03	0.01	0.05	0.01	0.03
Mixed Use	10.00	17.70	400.00	2000.00	3.00	14.00	0.35	6.00	0.29	1.30	0.27	0.50	0.98	12.00
Mobile Home	30.00	90.00	300.00	1750.00	6.70	11.20	0.50	3.40	0.05	0.15	0.14	0.87	0.30	0.73
Multi Family	30.00	90.00	300.00	1750.00	6.70	11.20	0.50	3.40	0.05	0.15	0.14	0.87	0.30	0.73
PA-490	5.00	40.00	2.00	900.00	1.00	8.00	0.01	0.70	0.02	0.03	0.01	0.05	0.01	0.03
Private Facilities	30.00	90.00	300.00	1750.00	6.70	11.20	0.50	3.40	0.05	0.15	0.14	0.87	0.30	0.73
Private Open Space	5.00	40.00	2.00	900.00	1.00	8.00	0.01	0.70	0.02	0.03	0.01	0.05	0.01	0.03
Public Facilities	10.00	17.70	400.00	2000.00	3.00	14.00	0.35	6.00	0.29	1.30	0.27	0.50	0.98	12.00
Public Land	5.00	40.00	2.00	900.00	1.00	8.00	0.01	0.70	0.02	0.03	0.01	0.05	0.01	0.03
Public Utility	10.00	17.70	400.00	2000.00	3.00	14.00	0.35	6.00	0.29	1.30	0.27	0.50	0.98	12.00
Mall	76.00	186.00	800.00	1300.00	29.00	31.00	2.0	2.20	0.09	0.66	1.30	1.40	3.10	3.30
Single Family	14.00	36.00	157.00	600.00	5.00	12.00	0.50	2.20	0.03	0.15	0.06	0.27	0.10	0.57
Utility Transmission	5.00	40.00	2.00	900.00	1.00	8.00	0.01	0.70	0.02	0.03	0.01	0.05	0.01	0.03
Vacant	5.00	40.00	2.00	900.00	1.00	8.00	0.01	0.70	0.02	0.03	0.01	0.05	0.01	0.03
Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 12 (Continued)
LAND USE POLLUTANT LOADING FACTORS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

SOURCES:

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10. U.S. EPA, Environmental Impacts of Stormwater Discharges, EPA 841-R-92-01, 1992.

determining appropriate pollutant loading reduction factors for each of the watershed land uses. It should be noted that controls associated with smaller developments were not considered in this model as those controls have not been widely implemented through the watershed and thereby would not significantly change the watershed loadings that would be computed by this model.

Pollutant removal efficiencies associated with street sweeping were assigned based on a range of values reported in a street sweeping study prepared by the Southeastern Wisconsin Regional Planning Commission (dated 1991). The Waterford Department of Public Works sweeps public roads and municipal parking lots in the watershed twice per year. Therefore, pollutant removal due to street sweeping was considered for all "developed" land uses. Additionally, the major commercial developments in the watershed (i.e., Crystal Mall, Home Depot, Wal-Mart, etc.) are equipped with structural stormwater controls such as detention ponds and constructed wetlands, which are designed to provide significant removal of stormwater pollutants for these large developments. The pollutant removal effectiveness of these controls was considered for parcels having a "Mall" land use designation. Reduction factors for these parcels were determined based on literature-based pollutant removal efficiencies for detention basins. Table 13 summarizes the pollutant reduction factors used in the model.

The GIS pollutant loading model calculates stormwater pollutant loadings based on parcel area, land use pollutant loading rates, and pollutant reduction factors. It should be noted that pollutant loadings are the total mass of pollutants generated from an area and are not equivalent to pollutant concentrations which are a measure of the quantity of pollutants in a fixed volume of water. Stormwater pollutant loadings for individual parcels within the watershed are calculated by the following equation:

$$PL = \text{Area} \times [(1-RF_{\max})(LF_{\min}) + (1-RF_{\min})(LF_{\max})]/2$$

where:

PL	=	average pollutant load in kilograms per year (kg/yr)
Area	=	parcel area in hectares (ha)
LF _{min,max}	=	minimum and maximum pollutant loading rates in kg per hectare per year (kg/ha-yr)
RF _{min,max}	=	minimum and maximum pollutant reduction factors (expressed as decimal values)

The model calculates average pollutant loadings for each land parcel based on a range of pollutant loading rates and reduction factors as shown in the above equation. Loadings from individual parcels within a subwatershed are summed to obtain a pollutant loading value for the entire subwatershed.

TABLE 13
LAND USE POLLUTANT REDUCTION FACTORS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Land Use	Pollutant Reduction Factors (decimal values)													
	BOD		TSS		Nitrogen		Phosphorous		Copper		Lead		Zinc	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Cemetery	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Commercial Hospitality	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Commercial Office	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Commercial Retail	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Highway	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Industrial Manufacturing	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Industrial Warehouse	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Land Trust/Public Easement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mixed Use	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Mobile Home	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Multi Family	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
PA-490	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Private Facilities	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Private Open Space	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Public Facilities	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Public Land	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Public Utility	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Mall	0.000	0.000	0.709	0.903	0.212	0.606	0.120	0.609	0.238	0.619	0.238	0.619	0.238	0.619
Single Family	0.000	0.000	0.029	0.029	0.015	0.015	0.022	0.022	0.047	0.047	0.047	0.047	0.047	0.047
Utility Transmission	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vacant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NOTES:

Pollutant Removal Efficiencies:

Street Sweeping: BOD = 0% TSS = 2.9% Nitrogen = 1.5% Phosphorous = 2.2% Metals = 4.7%

Detention Basin: BOD = 0% TSS = 70-90% Nitrogen = 20-60% Phosphorous = 10-60% Metals = 20-60%

Overall pollutant removal efficiency for landuses having both street sweeping and detention basins are calculated assuming treatment in series.

SOURCES:

1. U.S. EPA, Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, USEPA, Office of Water, 840-B-92-002, 1993.
2. ASCE, Design of Urban Runoff Quality Controls, Proceedings of an Engineering Foundation Conference on Current Practice and Design Criteria for Urban Quality Control, July 10-15, 1988.
3. Design of Stormwater Wetland Systems, Antecostia Restoration Team, Department of Environmental Programs, Metropolitan Washington Council of Governments.
4. Current Assessment of Urban Best Management Practices, Metropolitan Washington Council of Governments.
5. Schueler, T.R., Controlling Urban Runoff, July, 1987.
6. Costs of Urban Nonpoint Source Water Pollution Control Measures, Tech. Report 31, Southeastern Wisconsin Regional Planning Commission, June, 1991.

5.3.2 Current Pollutant Loadings

A GIS pollutant loading model was developed for existing watershed conditions. The results of the pollutant loading evaluation are summarized in Table 14, which includes computed annual pollutant loadings (kg/yr) in each of the Jordan Brook subwatersheds. As shown, estimated pollutant loadings generally correlate with the level of development in the watershed with the highest modeled pollutant loadings occur in areas of the watershed with substantial commercial, industrial, and residential development (i.e., subwatersheds 1A, 1ABA, 2A, 2AA, 4, and 5). In general, larger subwatersheds also contribute higher pollutant loadings, as the current pollutant loading values were not converted to areal loading rates by dividing by subwatershed area.

While the modeled pollutant loadings represent the impacts of existing land use conditions in the watershed, it should be noted that the loadings are intended to be used for comparative purposes and are not appropriate for estimating contaminant concentrations or comparison to water quality monitoring data at individual sampling locations.

5.3.3 Future Pollutant Loadings

The GIS pollutant loading model was applied to “full-build” conditions in the watershed to evaluate the worst-case water quality impacts of future development. The goal of this exercise was to identify those subwatersheds which have the potential for significant water quality degradation as a result of future development by comparing pollutant loadings under existing and future conditions.

Full-build conditions were modeled based upon the Town zoning map and zoning classifications, which represent the potential maximum level of development allowed by the Town. Land uses were assigned to each of the Town’s zoning classifications, as shown in Table 15. Existing undeveloped parcels of land not designated as open space were then changed to reflect the land uses associated with the parcels’ zoning. For example, the land use designation of an existing vacant parcel which is zoned for medium density residential development (R-20) was changed from “vacant” to “single family”, with corresponding changes in pollutant loading and reduction factors. The land uses of undeveloped parcels containing wetlands, steep slopes (>15%), or that are currently public land or designated as PA-490 land were held fixed under the full-build scenarios to accurately reflect future development in the watershed. The GIS pollutant loading model was run with the updated pollutant loading and reduction factors associated with the “future” land uses, resulting in annual pollutant loadings representative of full-build conditions.

Table 16 summarizes modeled pollutant loadings under full-build conditions. The percent change in future pollutant loadings as compared to current pollutant loadings is shown in bold text. The results indicate that loadings of all of the parameters of concern under a full-build scenario will increase on average across the watershed as compared to existing conditions. On average, loadings of phosphorous and metals are predicted to experience the largest percentage increase, greater than 30 percent, whereas nitrogen, BOD, and TSS loadings are predicted to

TABLE 14
SUMMARY OF CURRENT POLLUTANT LOADINGS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Subwatershed	Area (acres)	Annual Pollutant Loadings (kg/yr)						
		BOD	TSS	Nitrogen	Phosphorous	Copper	Lead	Zinc
10	183	1700	34000	340	30	0	0	10
10A	131	1200	23000	280	30	0	0	10
9	165	2200	53000	450	60	40	10	110
8	186	2400	49000	470	40	30	10	40
5AAA	23	200	4100	50	10	0	0	0
5AA	223	2100	40000	450	40	0	0	10
7	105	1000	20000	210	20	0	0	20
7A	72	700	19000	170	30	10	10	80
6	58	500	15000	130	20	10	0	60
5	443	8100	89000	1360	120	30	40	150
5A	48	500	8900	100	10	0	0	0
2AAC	183	5000	35000	780	70	20	30	90
2ABA	21	600	7700	90	10	10	0	10
2AA	480	5100	110000	1140	140	30	20	140
2AAB	7	200	5600	40	0	10	0	10
4	568	6200	130000	1220	110	40	20	70
1ABA	299	3900	72000	830	130	20	20	230
2A	358	3900	70000	950	130	10	20	110
2AAA	27	300	4500	70	10	0	0	0
2B	258	3500	60000	710	110	10	20	60
3	84	800	15000	210	30	0	0	10
2	199	2000	38000	500	70	10	10	60
1AA	45	500	12000	140	30	0	0	60
1AB	143	2400	39000	430	60	10	20	100
1A	336	3900	100000	920	190	30	30	460
1	86	800	17000	220	30	0	0	50

TABLE 15
ZONING-BASED LAND USES
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Zoning District	Description	Land Use Classifications
C-MF	Commercial Multi-Family	Multi-Family
CG	General Commercial	Commercial Office
CR	Regional Commercial	Mall
CT	Civic Triangle	Commercial Office
CT-MF	Civic Triangle Multi-Family	Multi-Family
I-MF	Industrial Multi-Family	Multi-Family
IC	Industrial Commercial	Industrial Manufacturing
IG	General Industrial	Industrial Manufacturing
IP-1	General Industrial Park	Industrial Manufacturing
IP-3	Special Aquifer Industrial Park	Industrial Manufacturing
NB	Neighborhood Business	Commercial Retail
NBPO	Neighborhood Business Professional Office	Commercial Office
R-20	Medium Density Residential	Single Family
R-40	Low Density Residential	Single Family
R-MF	Residential Multi-Family	Multi-Family
RU-120	Rural Residential	Single Family
OS	Open Space	Private Open Space
VR-15	Village Residential	Multi-Family

TABLE 16
SUMMARY OF FUTURE POLLUTANT LOADINGS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

		Annual Pollutant Loadings (kg/yr) / Percent Change from Current Loadings						
Subwatershed	Area (ha)	BOD	TSS	Nitrogen	Phosphorous	Copper	Lead	Zinc
10	74	kr 1,757 5.7%	kr 36,434 7.1%	kr 365 8.3%	kr 34 21.4%	kr 3 50.0%	kr 3 50.0%	kr 21 90.9%
10A	53	kr 1,302 6.4%	kr 23,475 2.0%	kr 326 15.2%	kr 39 30.0%	kr 3 50.0%	kr 4 33.3%	kr 12 71.4%
9	67	kr 2,078 -6.3%	kr 68,941 29.5%	kr 561 23.6%	kr 119 116.4%	kr 51 45.7%	kr 21 61.5%	kr 358 222.5%
8	75	kr 2,356 0.1%	kr 49,011 -0.1%	kr 472 0.4%	kr 45 2.3%	kr 26 0.0%	kr 10 0.0%	kr 37 2.8%
5AAA	9	kr 216 0.0%	kr 4,043 -2.4%	kr 50 6.4%	kr 5 0.0%	kr 0 N/A	kr 1 N/A	kr 1 0.0%
5AA	90	kr 2,153 4.4%	kr 38,433 -3.8%	kr 548 23.1%	kr 66 57.1%	kr 4 33.3%	kr 7 75.0%	kr 21 162.5%
7	42	kr 979 2.1%	kr 23,613 21.0%	kr 233 9.9%	kr 32 45.5%	kr 5 150.0%	kr 3 50.0%	kr 60 275.0%
7A	29	kr 712 -0.4%	kr 16,703 -12.6%	kr 156 -8.8%	kr 22 -29.0%	kr 4 -33.3%	kr 3 -40.0%	kr 46 -43.9%
6	24	kr 452 -10.7%	kr 19,231 30.3%	kr 155 18.3%	kr 41 70.8%	kr 9 80.0%	kr 5 66.7%	kr 136 112.5%
5	179	kr 9,198 13.1%	kr 88,839 0.2%	kr 1,548 13.6%	kr 155 25.0%	kr 38 11.8%	kr 48 26.3%	kr 183 25.3%
5A	19	kr 1,125 124.1%	kr 8,789 -1.1%	kr 190 90.0%	kr 21 133.3%	kr 2 100.0%	kr 7 600.0%	kr 14 366.7%
2AAC	74	kr 5,072 2.1%	kr 36,729 5.9%	kr 827 6.4%	kr 82 13.9%	kr 19 0.0%	kr 29 3.6%	kr 97 6.6%
2ABA	9	kr 539 -9.9%	kr 7,814 1.0%	kr 90 -4.3%	kr 9 0.0%	kr 6 0.0%	kr 4 0.0%	kr 13 0.0%
2AA	194	kr 5,036 -1.2%	kr 123,008 15.7%	kr 1,375 20.8%	kr 236 74.8%	kr 55 61.8%	kr 33 57.1%	kr 444 212.7%
2AAB	3	kr 228 -3.8%	kr 6,223 12.0%	kr 43 10.3%	kr 6 100.0%	kr 7 16.7%	kr 2 0.0%	kr 19 137.5%
4	230	kr 5,719 -7.6%	kr 171,102 36.7%	kr 1,676 37.5%	kr 351 207.9%	kr 88 151.4%	kr 49 145.0%	kr 888 1187.0%
1ABA	121	kr 4,216 7.5%	kr 74,404 4.0%	kr 895 8.2%	kr 142 11.8%	kr 20 5.3%	kr 28 21.7%	kr 252 8.6%
2A	145	kr 4,145 7.3%	kr 72,312 3.7%	kr 1,035 8.9%	kr 151 13.5%	kr 13 8.3%	kr 23 21.1%	kr 124 18.1%
2AAA	11	kr 262 1.2%	kr 4,357 -2.5%	kr 76 8.6%	kr 11 22.2%	kr 1 0.0%	kr 1 0.0%	kr 4 33.3%
2B	105	kr 3,049 -12.8%	kr 53,632 -10.6%	kr 665 -6.2%	kr 91 -13.3%	kr 6 -14.3%	kr 15 -25.0%	kr 44 -26.7%
3	34	kr 811 0.9%	kr 14,456 -1.7%	kr 218 5.8%	kr 29 11.5%	kr 2 0.0%	kr 3 0.0%	kr 16 14.3%
2	81	kr 2,283 15.4%	kr 40,162 5.9%	kr 583 17.5%	kr 89 30.9%	kr 8 33.3%	kr 14 75.0%	kr 80 42.9%
1AA	18	kr 691 35.8%	kr 14,096 18.6%	kr 161 17.5%	kr 32 23.1%	kr 5 25.0%	kr 6 50.0%	kr 67 21.8%
1AB	58	kr 2,483 1.5%	kr 39,164 -0.2%	kr 446 4.7%	kr 63 8.6%	kr 8 0.0%	kr 17 6.3%	kr 102 4.1%
1A	136	kr 3,934 0.3%	kr 96,577 -2.6%	kr 1,002 8.4%	kr 206 10.8%	kr 34 3.0%	kr 33 6.5%	kr 463 1.3%
1	35	kr 825 2.5%	kr 16,179 -4.0%	kr 252 14.0%	kr 42 23.5%	kr 5 25.0%	kr 5 25.0%	kr 50 8.7%
Average		6.8%	5.8%	13.8%	38.9%	32.1%	50.3%	113.7%

Notes:

N/A - not applicable due to zero loading under current conditions

increase by less than 15 percent under a full-build development scenario. Negative percent change values in Table 16 suggest that pollutant loadings will decrease in a few subwatersheds under full-build conditions. These negative values are the result of future, zoning-based land uses which have slightly lower pollutant loading values than existing land uses. These loadings are not from existing non-conforming uses but rather from existing undeveloped land that has greater potential to contribute solids and organic matter than the zoned land uses. In actuality, pollutant loadings under full-build conditions in these watersheds will be similar to current pollutant loadings.

Several subwatersheds stand out as major potential future contributors of pollutant loadings. Subwatersheds 4, 5A, 6, 7, and 9 showed the largest percent increases in future loadings of nearly all of the modeled pollutants. Other subwatersheds, including 1AA, 2, 2AA, 2AAB, 5, and 5AA resulted in significant percent increases in future loadings of some, although fewer, pollutants. These areas are located within the central and northern portions of the Jordan Brook watershed, where the potential for development of currently undeveloped land or increased intensity of development is the highest.

The modeled pollutant loadings for each subwatershed were converted to unit area pollutant loadings (kg/acre-yr) by dividing by the area of each subwatershed. Unit area pollutant loadings represent average pollutant loading rates per unit area of the subwatershed, thereby allowing direct comparison of pollutant loadings from subwatersheds of different sizes. Predicted future unit area pollutant loadings for each subwatershed are summarized in Table 17. As shown in the table, subwatersheds 2AAB, 2ABA, 2AAC, 6, and 9 have the highest future areal pollutant loading rates for most of the pollutants considered. These subwatersheds are relatively small in size and, consistent with the pollutant mass loadings, are located in the central and northern portions of the Jordan Brook watershed which have a high potential for development of currently undeveloped land or increased intensity of development.

5.4 Conclusions

Based on our evaluation of current water quality and modeled pollutant loadings in the Jordan Brook watershed, the following conclusions have been made.

- While current water quality in the watershed generally meets Class A (fishable, drinkable) standards with the exception of total coliform, water quality in the watershed has been impacted by existing development.
- Future development in the watershed with no controls could increase current pollutant loadings by more than 100% for zinc and between 30 and 50% for phosphorous, copper and lead. Nitrogen, solids and organic loadings are also projected to increase by between 5 and 15%. Copper, lead and zinc are all metals that can be toxic to aquatic life at certain concentrations in aqueous form. Phosphorous is a limiting nutrient for algal growth in surface water impoundments.

TABLE 17
SUMMARY OF FUTURE UNIT AREA LOADINGS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Subwatershed	Area (acres)	Annual Unit Area Pollutant Loadings (kg/acre-yr)						
		BOD	TSS	Nitrogen	Phosphorous	Copper	Lead	Zinc
10	183	10	200	2.0	0.2	0.02	0.02	0.11
10A	131	10	180	2.5	0.3	0.02	0.03	0.09
9	165	13	420	3.4	0.7	0.31	0.13	2.17
8	186	13	260	2.5	0.2	0.14	0.05	0.20
5AAA	23	9	180	2.2	0.2	0.00	0.04	0.04
5AA	223	10	170	2.5	0.3	0.02	0.03	0.09
7	105	10	230	2.2	0.3	0.05	0.03	0.57
7A	72	10	230	2.2	0.3	0.06	0.04	0.64
6	58	9	330	2.7	0.7	0.15	0.09	2.33
5	443	20	200	3.5	0.3	0.09	0.11	0.41
5A	48	23	180	4.0	0.4	0.04	0.15	0.29
2AAC	183	28	200	4.5	0.4	0.10	0.16	0.53
2ABA	21	24	370	4.2	0.4	0.28	0.19	0.61
2AA	480	10	260	2.9	0.5	0.11	0.07	0.93
2AAB	7	29	890	6.1	0.9	1.00	0.29	2.72
4	568	10	300	3.0	0.6	0.16	0.09	1.56
1ABA	299	14	250	3.0	0.5	0.07	0.09	0.84
2A	358	11	200	2.9	0.4	0.04	0.06	0.35
2AAA	27	11	160	2.8	0.4	0.04	0.04	0.15
2B	258	12	210	2.6	0.4	0.02	0.06	0.17
3	84	10	170	2.6	0.3	0.02	0.04	0.19
2	199	12	200	2.9	0.4	0.04	0.07	0.40
1AA	45	15	310	3.5	0.7	0.11	0.13	1.47
1AB	143	17	270	3.1	0.4	0.06	0.12	0.71
1A	336	12	290	3.0	0.6	0.10	0.10	1.38
1	86	9	190	2.9	0.5	0.06	0.06	0.58

- Appropriate controls should be implemented as part of new developments to control water quality impacts from stormwater runoff. Some developments that have little potential to impact water quality should be exempt from applying water quality controls. These developments include single family homes and residential subdivisions with less than four lots and no new roads.

6.0 OTHER WATERSHED ISSUES

6.1 Aquifer Protection

A significant portion of the Jordan Brook watershed is underlain by stratified drift deposits which are potential groundwater aquifer areas. A large percentage of these aquifer areas are located in areas of potential future development according to current zoning regulations. Land use activities within groundwater aquifer areas should be regulated in order to minimize the potential for contamination of future groundwater supplies.

6.1.1 Land Uses of Concern

Potential groundwater aquifer areas in the watershed were identified based upon surficial materials mapping (Figure 3), as described in Section 2.4. Zoning-based land uses within these areas were reviewed to identify those uses that have significant potential to impact aquifer water quality. These "land uses of concern" (Table 18) were selected consistent with the State of Connecticut's draft aquifer protection regulations (C.G.S. 22a-354i-1 through 10), which rank regulated activities or land uses based on relative severity of impacts to groundwater quality. A copy of the draft regulations is provided in Appendix K. In general, regulated activities include businesses that use hazardous materials which are RCRA hazardous wastes and hazardous materials under CERCLA, as well as other substances which have significant potential to impact groundwater supplies as a result of outdoor exposure. It should be noted that the draft regulations have been developed to apply to well fields that supply water to water distribution systems serving more than 1000 people.

The land uses listed in Table 18 were selected as follows:

- 1) Land uses listed in the Town of Waterford zoning classifications which are located within potential aquifer areas (defined according to surficial deposits in the watershed) were identified.
- 2) The identified land uses which are listed as "land uses of concern" in the State of Connecticut draft aquifer protection regulations were included in Table 18.

6.1.2 Groundwater Recharge

Aquifer yield is dependent on the volume of water that infiltrates into the aquifer. In addition, groundwater recharge is critical to maintain stream base flows during dry periods which maintain aquatic life as well as maintain the moisture levels of wetland areas.

TABLE 18
AQUIFER PROTECTION AREAS - LAND USES OF CONCERN
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Land Use/Activity of Concern	
Cemetery, Crematory, Embalming Services	Construction Equipment Rental
Fossil Fuel Power Plants and Other Utility Plants	Chemical Manufacturing
Municipal, State, or Federal Garages	Primary Metal Industry and Electronics Manufacturing
Company Fleet Maintenance Garages and Storage Facilities	Photo Finishing Labs, Furniture Stripping/Finishing
Trucking and Motor Freight Terminals	Recycling Facilities (waste oil, spent antifreeze, spent lead-acid batteries)
Gas Stations, Vehicle Service Stations	Solid Waste Facilities (as regulated under CGS 22a-207, 208a, & 260)
Auto Body/Paint Shops	Rubber and Plastic Manufacturing
New and Used Car Dealers	Production of Stone, Clay, or Glass Products
Boat, Recreational Vehicle, and Motorcycle Dealers	Textile Mills, Tanneries, or Apparel Production Facilities
Boat Yards (storage, repair, or servicing)	Lumber and Wood Production
Laboratories (biological, chemical, clinical, educational, R&D)	Pulp and Paper Manufacturing
Temporary Outdoor Storage Facilities	Printing and Publishing
Golf Courses	Public Airports
Fuel Oil Dealers (wholesale or retail)	Salt Storage Facilities
Wholesale Trade (coal, minerals and ores, salvage auto parts, chemicals)	Hazardous Waste Treatment, Storage, or Disposal Facilities (TSDF)
Lawn Care Services, Commercial Greenhouses and Nurseries	Publicly Owned Treatment Works (POTW)
Dry Cleaners	Underground Petroleum or Hazardous Materials Storage/Transmission Equipment

Future development can reduce the volume of water that infiltrates into the ground by placing an impervious surface over the ground and forcing that water to runoff instead of allowing some portion of that water to infiltrate. The Minnesota Pollution Control Agency's best management practices manual, entitled "Protecting Water Quality in Urban Areas" (dated July 1991), estimates that approximately 50% of precipitation infiltrates into the ground with natural cover (i.e. leaf litter, meadow). In comparison, only 15% of precipitation infiltrates into the ground where 75 to 100% of the site consists of impervious surfaces.

The United States Geological Survey has estimated the amount of groundwater recharge in this watershed in Connecticut Water Resources Bulletin No. 15, "Water Resources Inventory of Connecticut, Part 3, Lower Thames and Southeastern Coastal River Basins," dated 1968. Table 3 of that report (see [Appendix H](#)) indicates that an average of 15.48 inches per year of precipitation infiltrates into the ground in the Jordan Brook watershed, with 20% of the watershed overlying stratified drift deposits. Figure 40 of that report (see [Appendix H](#)) shows that groundwater recharge varies with the surficial geology. For sites overlying stratified drift deposits, average groundwater infiltration is approximately 23.2 inches per year. For sites overlying glacial till deposits, average groundwater infiltration is approximately 8 inches per year.

6.2 Open Space Evaluation

6.2.1 Existing Conditions

In the Jordan Brook watershed, several tracts of potentially developable land have been preserved as "open space." [Figure 2](#) identifies these current open space areas in the watershed. In general, these open space areas include deeded open space that is privately owned, parcels owned by land trusts, land owned by the State of Connecticut as well as parks owned by the Town of Waterford including Stenger Farm, Cohanzie Park and North Road Park. This open space land is protected against future development and is generally located in the southern, more developed, half of the watershed. These parcels are typically unconnected and often are isolated by developed land.

In addition, approximately 20% of the watershed is designated under Public Act 490. While development is not prohibited on this land, this program reduces the tax burden on this land, thereby relieving some pressure to develop the land and allows it to continue to serve as "open space." Much of the undeveloped headwaters of Jordan Brook is currently designated PA-490 land.

The 1998 Waterford Plan of Preservation, Conservation, and Development included recommendations to preserve additional open space/greenways including the following:

- strive to increase the amount of preserved open space,
- pursue public ownership of open space,
- strive to set aside funds on the annual budget to acquire open space,
- encourage private ownership of open space,

- establish a coordinated open space and greenbelt system,
- acquire or preserve parcels that contribute the most to the Town's open space and greenbelt system,
- establish a comprehensive trail system in Waterford, and
- continue to encourage the use assessment (PA-490) program.

6.2.2 Watershed Evaluation

The purpose of this evaluation is to identify developable areas of land that would provide value as open space with the goal of protecting "important natural scenic or other resources and improve wildlife habitat and wildlife 'corridors,' especially stream corridors or riparian areas along watercourses" as stated in the 1998 Waterford Plan of Preservation, Conservation and Development. It should be noted that this evaluation did not include land already controlled by the Town. Since the Town already owns or controls this land via regulations, the Town could prevent development of this land. This includes both publicly-owned land as well as wetlands.

The following criteria were considered to identify parcels that could provide value as open space:

- **Significant Wetlands:** Parcels adjacent to wetlands identified as having special significance during this study could provide open space value by minimizing the encroachment of development into the wetlands and preserving the upland riparian zone adjacent to the wetlands.
- **Flood Control:** Areas that provide storage for watershed flood control were considered.
- **Existing Open Space Areas:** Opportunity to connect individual open space parcels were considered as providing value to create larger individual open space tracts and minimize isolated parcels.
- **Wetland Access:** Improving access to wetlands could increase their value by increasing their educational potential. New greenways can be created through secured open space areas to improve public access to wetlands of special significance in the watershed. Potential greenway locations are shown on Figure 14. These greenways were conceived as loops or segments from existing greenways (as identified in the 1998 Waterford Plan of Preservation, Conservation, and Development) in the watershed that can be added individually, as a group, or any combination thereof. The layout of the greenways was chosen to obtain the maximum benefit from a given wetland, considering its size and shape. Greenway configurations also were selected by considering other factors such as access to public facilities and scenic views. In one instance a proposed greenway skirts the perimeter of the junior high school property. The area of the greenway immediately across from the junior high school is noted for its scenic view in the westerly direction. For the two northern special significance wetlands, the greenways are proposed for the uphill sides of the wetlands to provide a panoramic view of the

wetlands. In addition, one of the greenways follows along the Crystal Mall to provide access to and from the mall.

- Erosion Hazards: Parcels that, if developed, would have greater erosion potential were also considered. In general these parcels have long, steep slopes that drain directly into wetlands.
- Aquifer areas: Securing open space in aquifer areas both maintains current infiltration and protects against future pollution.

6.2.3 Conclusions

Parcels that met one or more of these criteria are listed on Table 19. This table ranks the relative strengths of each of these parcels against each of these criteria. A score of 1 to 3 is assigned for each criteria. Higher scores are assigned for parcels which best meet the criteria. As a result, the highest total scores are assigned to parcels that appear to offer the greatest possible open space benefits. As numbered on Figure 14, the five parcels that provide the greatest potential as open space (i.e., parcels with the highest score) are parcels 6, 7, 19, 21 and 26. It should be noted that these recommendations are in addition to open space acquisitions that the Town is already considering for greenways and trails as identified in the 1998 Waterford Plan of Preservation, Conservation, and Development.

PA-490 parcels were considered in this evaluation. While the tax burden on these parcels has been reduced to alleviate the pressure to develop the parcel on its owner, this act does not prevent development. PA-490 parcels are indicated on the rating matrix.

7.0 RECOMMENDED PLAN

The following paragraphs outline a recommended plan to control wetland impacts that may be caused by new development or changed land use activities in the Jordan Brook watershed. The goal of these recommendations is to maintain or improve existing ecological conditions in watershed wetlands and watercourses while not unreasonably restricting future development.

In general, this plan controls several types of potential impacts associated with development. These potential impacts include:

- Degradation of surface water quality which would impair both human uses as well as aquatic life.
- Reduction of groundwater base flows which would lower water tables and potentially affect wetland moisture levels and stream flows that are necessary to support aquatic life during dry periods.
- Degradation of wetland habitat which would reduce capability to support existing flora and fauna in the wetlands.

TABLE 19
RATING MATRIX OF POTENTIAL OPEN SPACE AREAS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Parcel Number	Protect Wetlands of Special Significance	Flood Control	Connect Open Space/Wetland Areas	Improve Access	Erosion Hazard	Development Potential	Aquifer Areas	Size	Total
1	2	2	0	1	1	1	1	2	10
2	2	2	2	1	2	1	1	2	13
3	2	2	2	1	1	3	3	2	16
4	3	2	2	1	1	2	2	3	16
5	3	3	1	1	2	2	2	2	16
6	3	1	0	3	3	2	3	3	18
7	3	1	3	3	3	1	2	3	19
8	1	1	0	1	1	1	1	1	7
9	2	1	0	1	1	2	1	1	9
10	2	1	0	1	1	2	1	1	9
11	2	1	0	1	1	2	1	1	9
12	3	1	1	3	1	2	1	3	15
13	3	1	0	1	2	3	1	1	12
14	3	1	0	1	1	1	1	1	9
15	3	1	0	2	2	2	1	1	12
16	3	1	0	2	2	2	1	1	12
17	3	1	0	2	2	2	1	1	12
18	3	1	0	2	2	2	1	1	12
19	3	3	2	2	2	2	2	3	19
20	3	1	0	1	2	3	2	1	13
21	3	1	3	1	2	3	2	3	18
22	3	1	3	1	3	2	1	3	17
23	3	1	1	1	1	2	1	3	13
24	3	1	0	1	1	3	1	1	11
25	1	1	0	1	3	1	1	2	10
26	2	3	3	1	1	2	3	3	18
27	1	3	1	1	1	3	3	1	14
28	3	1	3	1	2	1	2	1	14
29	1	3	2	1	1	1	3	2	14
30	3	1	3	1	1	2	3	3	17

Key:

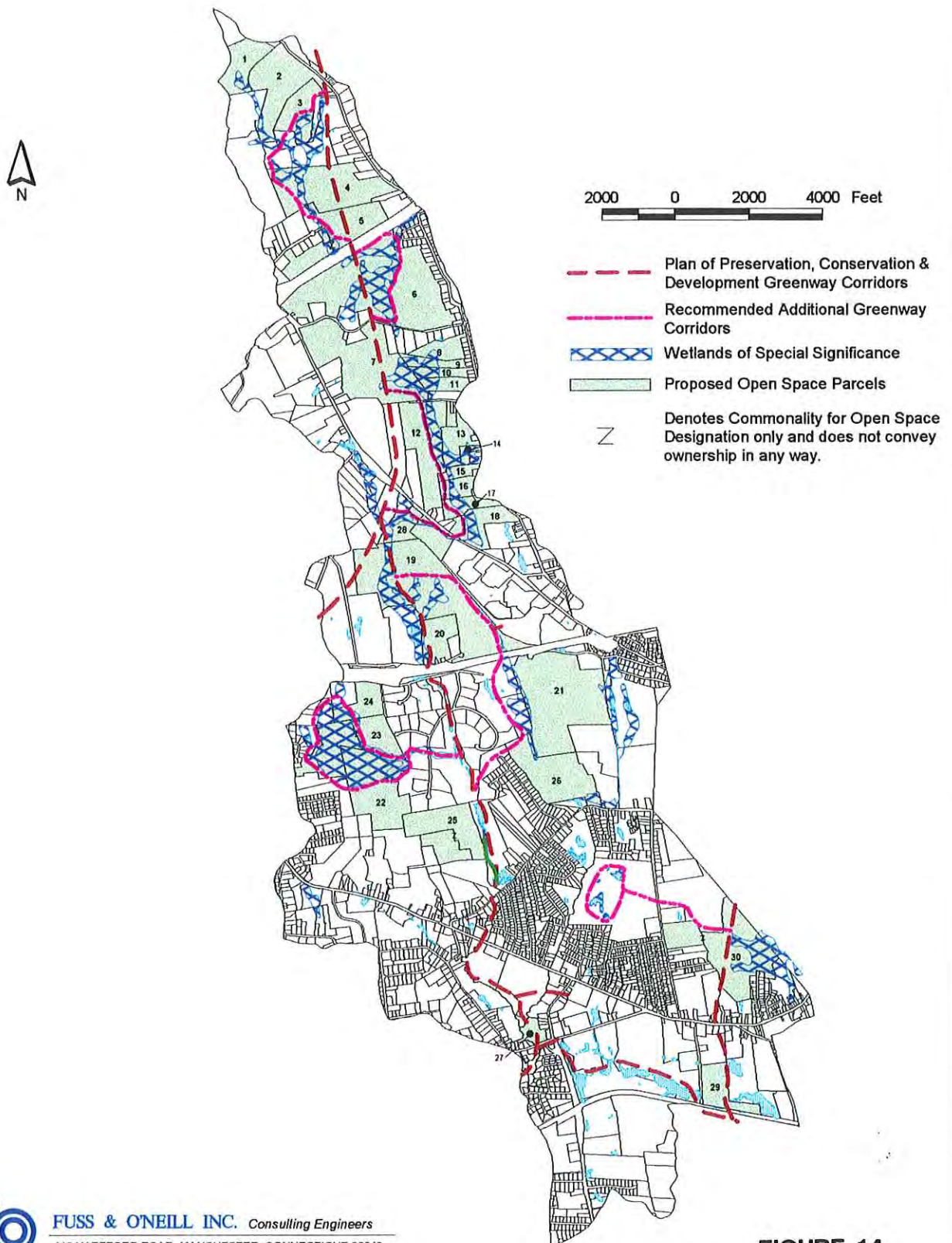
State Owned Property

Property Included in Public Act 490

Notes:

A score of 1 to 3 was assigned for each criteria in accordance with the following: A score of 0 which was assigned to parcels where criteria does not apply. A higher score was assigned for those parcels that best met the criteria.

Proposed Greenway Corridors & Open Space Parcels Jordan Brook Watershed Management Study Town of Waterford



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FIGURE 14

- Increase in stream flood flows which would increase scour of stream channels and reduce vegetative habitat along channel banks.

The implementation of this recommended plan is solely dependent on the Town of Waterford. No further study is recommended before implementation. All of these recommendations can be implemented upon approval by the Town.

The following paragraphs outline the recommended watershed plan.

7.1 Continue to Monitor Water Quality

Water quality in the Jordan Brook watershed should continue to be monitored to evaluate changes in future water quality as the watershed continues to be developed. If any statistically significant degradation of water quality is observed, the Conservation Commission should consider modifying this plan to further protect water quality.

The recommended monitoring program has been developed to be consistent with the scope of the existing program. The following paragraphs outline this proposed program and the modifications to the existing program.

- Continue to monitor Stations 2, 3, 4, 5, 6, 7 and 8 on Jordan Brook. Move Station 1 to the Nevins Brook crossing with Post Road to better define impacts from the Nevins Brook subwatershed. In the future, if additional funding becomes available, sampling stations could be added upstream of Station 1 to better define sources of impacts and effects of existing natural features to attenuate pollutants on Nevins Brook if it is determined to be a significant source of pollutant loadings.
- If funding would allow another sampling station to be added, the station should be located at Great Neck Road. This unnamed stream is not currently monitored and has a large drainage area that extends into New London. Depending on future sampling results, sampling stations could also be added upstream of this station to better define sources of impacts.
- Samples should continue to be collected at least twice annually. Samples should be collected during early spring (April) and late summer (August) which are the two periods of the year with the highest potential for water quality impacts. Early spring samples will better quantify impacts from winter sanding and deicing. Late summer will better quantify impacts during low flow conditions when there is little dilution available.
- Samples should be collected to attempt to better define dry and wet weather impacts. A minimum of one dry weather and one wet weather round of samples should be collected each year. Dry and wet weather sampling should alternate between April and August from year to year. The following criteria should be used to define wet and dry weather conditions:

Wet Weather: Wet weather samples should be collected during or immediately following storms with more than 0.5 inches of rainfall and that occur at least 72 hours after any previous storm event of 0.1 inch or greater. Samples should be collected during the first 30 minutes of a storm event discharge.

Dry Weather: Dry weather samples should be collected only after at least 72 hours of dry weather.

- The following parameters should be monitored:

Total Suspended Solids	pH
Turbidity	Conductivity
Total Phosphorous	Total Coliform
Ammonia (new)	Enterococcus (new)
Biochemical Oxygen Demand	Lead (new)
Dissolved Oxygen	Copper
Color	Zinc (new)
Chloride	Flow
Total Organic Nitrogen (new)	Temperature
Nitrate (new)	

Lead and zinc are proposed to be monitored as the concentrations of these metals can be significantly influenced by stormwater. Enterococcus is also proposed to be monitored, instead of fecal coliform or streptococcus, as it is a better indicator of sewage contamination. Also, ammonia has been added to better define nitrogen impacts. Total organic nitrogen and nitrate should be monitored as excessive nitrogen loads could impact surface water impoundments and the Long Island Sound. Nitrite is not typically present at significant levels in the environment and would not have to be monitored.

- Several parameters are not recommended for continued monitoring. The following parameters are recommended for elimination from the current monitoring program:

Fecal Coliforms and Fecal Streptococci: The Connecticut Water Quality Standards provide criteria for total coliform and enterococcus organisms, but provide no criteria for fecal coliform and fecal streptococci organisms in Class A waters. As a result, we recommend that the Town focus on total coliforms and enterococcus as indicators of sanitary contamination.

Iron, Manganese, Alkalinity, and Hardness: These parameters are significantly influenced by natural sources and are not good indicators of manmade impacts.

Sodium: Chlorides are being used as a measure of deicing impacts.

Chemical Oxygen Demand: Biochemical oxygen demand will be monitored and is typically used to measure the presence of oxygen demanding organics in natural waters.

Oxygen Saturation: This parameter is dependent on dissolved oxygen levels which will continue to be monitored. Dissolved oxygen standards are also specified by the State of Connecticut.

Odor: Odor is a qualitative assessment and could be caused by both natural and manmade conditions.

- Land development projects that rely on water quality controls should monitor both pre- and post-treatment stormwater discharges to confirm the adequacy of the design and operation of the controls. Influent and effluent grab samples should be collected from storm events that generate between 0.5 and 1.0 inch of rainfall during a 24-hour period. Before sampling, there should be at least a 72-hour period of no rainfall, and pre-treatment (influent) samples should be collected during the first flush of the storm. Runoff generated by the first half-inch or first inch of precipitation is typically considered the first flush. Post-treatment (effluent) samples should be collected after pre-treatment samples are collected with a delay in time equal to the time the water is detained in the treatment system during that storm. Initial and long-term post-construction monitoring of water quality controls is recommended.

Initial Monitoring: Initial monitoring should be performed within one year following installation and initial startup of the control system to assess the system's design and short-term pollutant removal efficiency. Sampling of five separate storm events is recommended in order to make a statistically-valid conclusion as to the effectiveness of the treatment system. The samples should be collected during early spring (April) and late summer (August) in order to examine seasonal variation of treatment performance. At least two storm events should be sampled during each season.

Long-Term Monitoring: Biennial (i.e., once every two years) monitoring should be performed to provide information on the long-term pollutant removal efficiency and operation and maintenance of water quality controls for developments requiring secondary or tertiary controls. Biennial monitoring should be initiated following completion of the initial, first-year monitoring program.

The table below lists the parameters that are recommended for initial and long-term monitoring. Discharge quality goals are also listed for each parameter. The ultimate goal would be for discharge quality to not be acutely toxic to aquatic life, however, this sampling does not account for stream dilution that would affect actual toxicity. At a minimum, it is recommended that stormwater discharges achieve CTDEP stormwater goals which, based on CTDEP's statistical analysis, is readily achievable in Connecticut with proper controls.

STORMWATER DISCHARGE QUALITY GOALS

Monitoring Parameter	Discharge Quality Goals
Total Oil and Grease	5 mg/l
Chemical Oxygen Demand	75 mg/l
Total Suspended Solids	100 mg/l
Total Phosphorous	0.5 mg/l
Total Kjeldahl Nitrogen	2.5 mg/l
Nitrate as Nitrogen	1.5 mg/l
Total Copper	0.100 mg/l
Total Lead	0.050 mg/l
Total Zinc	0.500 mg/l
Aquatic Toxicity	LC ₅₀ ≥ 50%

A more thorough monitoring approach would be to use automatic samplers to collect grab influent and effluent samples of discrete time intervals during a storm event. Influent and effluent flow meters should also be used to measure flows throughout the sampling period. This data would allow the Town to compute a pollutograph and resulting influent and effluent pollutant loadings. In addition to computing removal efficiencies, this data could be used to evaluate the controls' response throughout a storm event. Data should also be collected during periods that could affect performance (e.g. freezing weather, structure flooded from previous storms).

7.2 Control Stormwater Quality

A stormwater quality control plan is recommended for future developments to protect watershed water quality. This recommended plan utilizes a tiered approach to define the appropriate level of stormwater controls that would be necessary to protect downstream resources based on the type and size of development and its potential water quality impacts. The stormwater control plan consists of base level controls as well as two additional levels of controls which are triggered based on development characteristics such as level of imperviousness, size of the development, land use, and receiving water/wetland resources. The framework and elements of this plan are described below. The approach is summarized in Table 20.

7.2.1 Base Level Controls

Base level controls are intended to provide baseline protection against degradation of downstream resources across the entire watershed. Base level controls provide gross contaminant and sediment reduction and serve to dissipate the potential erosive energy of stormwater runoff. A base level of stormwater quality controls would be required for all new developments. Redevelopments that result in land use changes or modifications to the storm

TABLE 20
STORMWATER QUALITY CONTROL SELECTION CRITERIA
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
FEBRUARY 2000

Selection Criteria	Stormwater Quality Control Level		
	Base Level Controls	Secondary Controls	Tertiary Controls
Receiving Water Resource	All other wetlands/watercourses	All other wetlands/watercourses	Discharge to wetland/watercourse sensitive to water quality
Land Use	All other land uses	All other land uses	Facilities with potential for extremely high pollutant loadings
Percent Impervious	0 to 10 percent	Greater than 10 percent	—
Size of Development	0 to 5 acres	Greater than 5 acres	—

drainage system should also be required to implement these controls as an opportunity to improve current watershed water quality. Base level controls should not be required for single-family houses or residential subdivisions with four or fewer lots that have no new roads, provided that any discharge from the subdivision would not affect a wetland or watercourse which is sensitive to water quality. Development that is part of a phased development project should not be exempt from base level controls.

The intent of these controls is to treat all runoff from developed portions of a site. Diffuse controls would be required for sheet flow off of developed portions of a site and point controls would be required for discrete point discharges. Base level controls will consist of, at a minimum, one or a combination of the following stormwater Best Management Practices (BMPs):

- 1) Diffuse Stormwater Discharges: For stormwater which discharges off-site in a uniform, diffuse manner (i.e., sheet flow runoff), one or more of the following BMPs should be required:

- Vegetated buffer strip
- Level spreader
- Infiltration basin
- Vegetated drainage swale

These measures provide a minimum level of stormwater treatment by promoting infiltration and filtration of stormwater pollutants by vegetation.

- 2) Point Stormwater Discharges: Stormwater treatment using a gross particle separator or similar technology designed to remove gross solids and floatables would be required for all point stormwater discharges to storm drains, receiving waters, or wetlands. Appropriate treatment technologies include:

- Oil/particle separator,
- Sediment basin (with floatables trap),
- Vegetated drainage swale (would require additional measures to trap floatables),
- Infiltration basin.

- 3) Uncontaminated Runoff: Uncontaminated runoff such as rooftop runoff, except from metal roofs which can leach metals or roofs with industrial process venting, is recommended to be infiltrated directly into the ground using infiltration basins, trenches, or chambers.

A numeric pollutant reduction goal is not recommended for base level controls. Since developments that qualify for base level controls have a low potential for water quality impacts, the intent with this level of controls is to protect against gross contaminants that can be readily removed and emergency conditions such as spills.

7.2.2 Additional Stormwater Quality Controls

In addition to the base level controls required for all future development, more stringent stormwater quality controls would be required for developments which have the potential to generate higher pollutant loadings. Similarly, stormwater discharges to wetlands or watercourses identified as being sensitive to water quality (Section 3.2.3) would also require an additional level of protection to limit pollutant impacts to these resources. Under this stormwater quality control plan, two levels of additional controls may be required for stormwater discharges which meet these criteria.

7.2.2.1 Secondary Stormwater Quality Controls

This level of control would require implementation of stormwater quality control technologies which remove at least 80 percent of the total suspended solids (TSS) load. The 80 percent TSS removal requirement applies to post-development conditions after a site is stabilized. Examples of BMPs which have been shown to achieve 80 percent TSS removal on average include:

- Extended detention pond (equipped with sediment forebay)
- Wet pond (equipped with sediment forebay)
- Constructed wetland
- Sand or organic filter
- Devices using swirl/vortex technology
- Other proprietary technologies demonstrated to provide 80 percent TSS removal

Floatables such as oil and grease could be removed using a base level control such as an oil/water separator in combination or in addition to the above measures.

7.2.2.2 Tertiary Stormwater Quality Controls

This level of additional stormwater quality control has the goal of “no net increase” in future pollutant loadings as compared to existing conditions, considering maximum attainable reductions in stormwater pollutant loadings. This level of controls would require at least 80 percent removal of TSS, removal of floatables, and demonstration of no net increase in loadings of other pollutants suspected of being present in the stormwater (e.g., nutrients, metals, coliform bacteria). Required stormwater controls would likely consist of one or a series of state-of-the-art stormwater BMPs. This level of control would be required only for those developments with the greatest potential for significant pollutant loadings or potential impacts to wetlands or watercourses which are sensitive to water quality.

Tertiary stormwater quality controls would require developers to evaluate current and future pollutant loadings in order to demonstrate that the new discharge would not increase pollutant loadings as compared to existing conditions. This would require the use of a stormwater pollutant loading model to evaluate the stormwater quality impacts of the development and proposed Best Management Practices (BMPs). A watershed pollutant loading model with an

intermediate level of complexity such as the P8 Urban Catchment Model (P8), for example, would be appropriate for this application. Other models are available for this analysis.

7.2.3 Stormwater Quality Control Technologies

A list of commonly used stormwater quality controls and associated pollutant removal efficiencies is provided in Table 21. The BMPs shown in the table include generic categories of control technologies (e.g., wet ponds, sand filters, and swirl concentrators) as well as proprietary technologies such as Stormceptor™, Stormtreat™, and Vortech™ products. The range of pollutant removal efficiencies were obtained from published studies and vendor information and, therefore, do not necessarily have a common basis for comparison. However, they are provided as a guide to their potential application. The BMPs shown in Table 21 could potentially function as base level, secondary, tertiary stormwater quality controls, depending on the pollutant removal efficiency of a particular control technology.

The removal efficiencies listed in Table 21 are typical values reported by a variety of studies and BMP applications. Data collected from one type of control at one site cannot be assumed to apply to similar controls at other sites. A number of design conditions would affect actual efficiencies including peak flows at time of measurement, flow patterns through the structure and form of pollutant (e.g. aqueous or particulate form) in the site's stormwater. The literature data used in the model is a generalized average for these types of controls. Actual pollutant removal efficiencies would vary depending on site-specific pollutant loading and flow conditions. Monitoring is recommended to verify actual removal efficiencies for structural controls. Additionally, structural stormwater BMPs should be regularly inspected and maintained to ensure their proper operation. Recommended stormwater BMP operation and maintenance practices are summarized in Appendix I.

7.2.4 Selection Criteria for Level of Controls

Selection of the appropriate level of stormwater quality controls (base level or additional controls) for a particular development will be based on consideration of the following criteria:

- Receiving water resource
- Land use of proposed development
- Level of imperviousness
- Size of development

Selection criteria for each of these development characteristics are described below and are summarized in the matrix presented as Table 20. The most stringent of the applicable control levels will dictate the required level of controls for a particular development.

7.2.4.1 Receiving Water Resources

The quality of the water body or wetland receiving the stormwater discharge from a site is an important factor in determining the appropriate level of stormwater quality controls for a

TABLE 21
COMMON STORMWATER QUALITY CONTROLS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
JANUARY 2000

PRODUCT NAME	REMOVABLE MATERIALS - % removed							
	Floating Oil/Grease	Solids	Nitrogen	Phosphorous	Fecal Coliform	Hydrocarbons	Metals	BOD5
CPS - 2000 Coalescing Phase Separator	99%	99%	-----	-----	-----	-----	-----	-----
CSF Stormwater Treatment System	X	X	-----	-----	-----	-----	X	-----
Sedimentation Trap	-----	-----	-----	-----	-----	-----	-----	-----
Downstream Defender	X	X	-----	-----	-----	-----	-----	-----
NRCS Nutrient & Sediment Control System	-----	90-100%	80-90%	85-100%	-----	-----	50-80%	90-100%
Stormceptor	90%	60-80%	-----	-----	-----	-----	-----	-----
Stormtreat	X	99%	77%	90%	97%	-----	77%	-----
Streamguard Catch Basin Inserts	88%	X	-----	-----	-----	-----	-----	-----
Streamguard Passive Skimmer	-----	-----	-----	-----	-----	X	-----	-----
Vortechs	X	80%	-----	-----	-----	X	X	-----
Deep Sump (Modified) Catch Basin	-----	-----	-----	-----	-----	-----	-----	-----
Siltsack	X	X	-----	-----	-----	-----	-----	-----
Drainage Channel	-----	-----	-----	-----	-----	-----	-----	-----
Shallow Marsh	-----	80%	30%	45%	-----	-----	-----	-----
ED Shallow Wetland	-----	60%	20%	40%	-----	-----	-----	-----
Submerged Gravel Wetland	-----	90%	60%	70%	-----	-----	-----	-----
Pond/Wetland System	-----	85%	35%	60%	-----	-----	-----	-----
Pocket Marsh	-----	55%	60%	35%	-----	-----	-----	-----
Micropool ED pond	-----	50%	30%	30%	-----	-----	-----	-----
Wet Pond	-----	80%	40%	50%	-----	-----	-----	-----
Wet Extended Detention Pond	-----	75%	40%	65%	-----	-----	-----	-----
Multiple Pond System	-----	80%	45%	65%	-----	-----	-----	-----
Pocket Pond	-----	70%	30%	50%	-----	-----	-----	-----
Extended Detention Pond	-----	70-90%	20-60%	10-60%	-----	-----	20-60%	-----
Level Spreader/Vegetated Strip	-----	80-100%	40-60%	30-80%	-----	-----	20-80%	-----
Infiltration Trench	-----	90%	50%	65%	-----	-----	-----	-----
Infiltration Basin	-----	90%	50%	65%	-----	-----	-----	-----
Porous Pavement	-----	90%	85%	65%	-----	-----	-----	-----
Sand Filter	-----	70-90%	30-45%	40-60%	-----	-----	40-80%	-----
Surface Sand Filter	-----	85%	40%	50%	-----	-----	-----	-----
Underground Sand Filter	-----	80%	35%	50%	-----	-----	-----	-----
Perimeter Sand Filter	-----	80%	45%	45%	-----	-----	-----	-----
Organic Filter	-----	80%	50%	45%	-----	-----	-----	-----
Pocket Sand Filter	-----	80%	35%	40%	-----	-----	-----	-----
Bioretention	-----	80%	50%	50%	-----	-----	-----	-----
Dry Swale	-----	90%	90%	75%	-----	-----	-----	-----
Wet Swale	-----	80%	40%	25%	-----	-----	-----	-----
Grassed Biofilter Swale	-----	-----	-----	-----	-----	-----	-----	-----
Off-line Bioretention Cell	-----	80%	40%	50%	-----	-----	-----	-----
Dry Wells	-----	-----	-----	-----	-----	-----	-----	-----
Water Quality Inlets	-----	-----	-----	-----	-----	-----	-----	-----
Oil/Grit Separator	-----	10-25%	5-10%	5-10%	-----	-----	5-25%	-----
Swirl Concentrator	-----	15-40%	10-15%	10-15%	-----	-----	10-30%	-----

NOTES:

BOD5 - Biochemical Oxygen Demand

X - affirmative, but removal not quantified

----- - information not available

TABLE 21
COMMON STORMWATER QUALITY CONTROLS
JORDAN BROOK WATERSHED MANAGEMENT PLAN
TOWN OF WATERFORD
JANUARY 2000

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- 9) U.S. Environmental Protection Agency, Sand Filter Design for Water Quality Treatment, USEPA, Watershed Management Unit, April, 1992.

development. Wetlands or watercourses which are sensitive to water quality should be protected by providing the maximum attainable (i.e., tertiary) level of stormwater controls. Tertiary stormwater quality controls would be required for all developments which discharge to such wetlands or watercourses as a point source, either directly or via a storm drainage system, or as uniform, diffuse flow. Stormwater discharges to all other wetlands or watercourses would require base level or secondary controls, depending on the other selection criteria.

7.2.4.2 Land Use

As described in the pollutant loading evaluation presented in Section 5.4, research indicates that stormwater pollutant loadings are directly related to land use. Certain land uses generate higher concentrations of pollutants than found in typical runoff. In general, industrial, commercial, highway, and multi-family land uses generate the highest pollutant loads, as demonstrated by the pollutant loading evaluation. In contrast, single family residential, office, and institutional land uses normally yield smaller potential pollutant loads. Therefore, developments would require varying levels of stormwater quality controls depending on the proposed land use for the site.

Developments with the following land uses would require tertiary stormwater quality controls:

- 1) Industrial facilities subject to the U.S. EPA's National Pollution Discharge Elimination System (NPDES) Stormwater Permit Program
- 2) Auto salvage yards (auto recycling facilities)
- 3) Auto fueling facilities (gas stations)
- 4) Fleet storage areas (cars, buses, trucks, public works)
- 5) Vehicle service and maintenance facilities
- 6) Commercial parking lots with high intensity use (Shopping malls, fast food restaurants, convenience stores, supermarkets, etc.)
- 7) Road salt storage facilities (if exposed to rainfall)
- 8) Commercial nurseries
- 9) Flat metal rooftops of industrial facilities
- 10) Facilities with outdoor storage and hazardous substances loading/unloading areas, regardless of the primary land use of the facility or development

- 11) Facilities subject to chemical inventory reporting under Section 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA), if materials or containers are exposed to rainfall
- 12) Marinas (applicable to coastal areas)

As described previously, developments having the above land uses would be required to demonstrate, through the use of a pollutant loading model, that loadings of all potential pollutants of concern would not increase as compared to existing conditions. All other land uses would require either base level or secondary controls, depending on the results of other selection criteria.

7.2.4.3 Level of Imperviousness

Research has shown a strong correlation between the amount of impervious area in a watershed and water quality impacts to downstream water resources. Water quality of downgradient water resources is generally protected when less than 10 percent of the watershed consists of impervious surfaces. However, when 10 to 30 percent of the watershed consists of impervious surfaces, downgradient water resources typically show signs of impacts. When more than 30 percent of the watershed consists of impervious surfaces, downgradient water resources have been found to be degraded.

The level of stormwater controls required for a proposed development is recommended to be partially dependent on the level of imperviousness of the development. Greater impervious area would require more extensive controls. For the purposes of this plan, impervious area includes any surfaces which prevent infiltration of water into the subsurface such as pavement and structures. Such areas should be determined based on final project site plans. Developments with less than 10 percent impervious area would require base level controls. Developments with more than 10 percent impervious area would require secondary stormwater quality controls.

7.2.4.4 Size of Development

The size of a development is a gross indicator of the potential for stormwater pollutant loadings from a site. Developments with less than five acres of disturbed area would require base level controls. Developments with greater than five acres of disturbed area would require secondary stormwater quality controls. This criterion is consistent with the CTDEP's existing stormwater general permit that requires projects that result in more than five acres of disturbance to install controls with a goal of at least 80% TSS reduction. For the purpose of this plan, disturbed area means the total area on a site that will be exposed or susceptible to erosion during the entire construction period.

7.3 Maintain Groundwater Base Flows

It is recommended that new developments maintain pre-development groundwater base flows. One means of potentially accomplishing this recommendation would be for new developments

to infiltrate "clean" roof runoff. The only exception to this recommendation is that runoff from metallic roofs should not be infiltrated. Galvanized roof drains should also not be used. Alternatively, new developments can be allowed to infiltrate less water if they can demonstrate through an engineering evaluation of actual site conditions that less water can be infiltrated and still maintain groundwater base flows.

The advantage of this approach is that it minimizes risk of groundwater pollution by only infiltrating clean runoff. Since surface runoff can convey pollutants swept from surfaces, infiltration of this runoff will increase risk of groundwater pollution. Stormwater pollutants that pose the greatest risk to groundwater include leaked oils/greases and aqueous metals. While particulate pollutants would not reach groundwater, they could become trapped in the infiltration device and result in future maintenance problems. In addition, groundwater pollution is difficult to detect without careful monitoring and is also difficult to remediate. If runoff from paved surfaces is infiltrated, pretreatment should be provided in accordance with Section 7.4.

Infiltration structures should be designed by one of two methods:

- i. Provide adequate storage volume within the infiltration structure and stone backfill to store all of the runoff for a 10-year frequency storm.
- ii. Size the structure such that 10-year frequency storm peak discharge into the structure is equal to the following equation.

$$Q = (0.2)(k)(I)(H)$$

where:

Q = infiltration rate per foot perpendicular to flow net

k = hydraulic conductivity, as measured by a certified soils laboratory for the soils directly below the bottom elevation of the infiltration structure (ft/sec)

I = hydraulic gradient, as estimated by constructing a two-dimensional flow net and dividing the number of stream tubes by the number of equipotential lines

H = difference in elevation between the top of the infiltration structure and high groundwater (ft)

Only 20% effectiveness should be assumed because of long-term clogging by fines.

If the difference between groundwater and the bottom of the infiltration structure is more than five feet, it is recommended that a detailed engineering analysis be performed to confirm that hydraulic gradients do not vary in the strata below the structure.

7.4 Maintain Pre-Development Peak Discharge Rates

Increased development could result in increased impervious surfaces and, without adequately sized stormwater controls, will increase peak stormwater flows and increase the volume and rate at which runoff will drain from the site. In order to control this potential impact from new development, we recommend that developers include detention/retention devices such that pre-development peak discharge rates from the site are maintained. Some developments that have little potential to significantly impact off-site peak discharge rates could be exempted from this requirement. The developments that could be exempted are small projects that would generate a net increase of peak stormwater flows of less than 1 cubic foot per second and where this level of control may be overly burdensome and include:

- Single family residences,
- Subdivisions with four lots or less with no new public/private roads,
- A project with a net increase of less than 5,000 square feet of impervious surfaces.

In order to minimize peak flow impacts, we recommend that new developments conduct the following evaluation to determine whether adequate detention/retention devices have been proposed.

1. Demonstrate no net increase in pre-development peak flows from the site for proposed conditions.
 - Demonstration should be made at each point where runoff from newly developed areas drains from the site.
 - Acceptable methods to compute pre and post development peak flows are TR-20, TR-55 and Rational Method.
 - Peak flows should be evaluated for 2, 10, 25 and 100-year frequency storms.
2. Compare total proposed peak discharge from the site to existing peak flows at each downstream points-of-concern for the 10-year frequency storm. Points-of-concern and associated peak flows are provided on Table 9.
 - For multiple discharges from a site, applicant must sum the peak flows from all of the discharges from newly developed areas to compare to peak flows at downstream points-of-concern. Flows from multiple discharges can either be directly added or hydrographs can be summed reflecting the difference in the timing of the peaks.
3. If the total proposed peak discharge from the site exceeds 10% of the existing peak flow at a point-of-concern; demonstrate no net increase in pre-development peak flows at each point-of-concern between the site and the downstream most point-of-concern

where the proposed peak discharge from the site exceeds 10% of the existing peak flow at the point-of-concern.

- Peak flows should be evaluated for the 10, 25 and 100-year frequency storms.
- Acceptable method to compute post-development peak flows is TR-20.
- The watershed TR-20 model should be utilized as the base model to evaluate proposed impacts.

This evaluation of downstream points-of-concern may require additional infiltration of stormwater runoff from paved surfaces in order to reduce runoff volumes that may impact downstream detention systems that attenuate existing peak flows. In order to minimize the potential for groundwater pollution at a site due to infiltration of stormwater runoff from paved surfaces, we recommend that runoff from paved surfaces be pretreated before it is infiltrated into the ground. Pretreatment should include the following:

- **Oil/water Separation:** Oil/water separators should be designed and maintained in accordance with current CTDEP regulations. A copy of these regulations is attached as Appendix J.
- **Remove 80% of Total Suspended Solids:** A structure sized and designed to remove at least 80% of total suspended solids shall be used to pretreat runoff prior to infiltration.

7.5 Acquire Additional Open Space

While encroachment of new development into wetland areas can be prevented through existing regulations, upland areas can be developed, within limitations, unless that land is controlled/or owned by an entity (public or private) that prevents its development. The intent and benefit of maintaining adjacent upland areas is maintenance of wetland hydrology and ecological setting. Some upland areas significantly improve the value of wetlands by screening wetlands from development, providing fringe habitat and providing wildlife access to wetlands. In addition, upland areas can be used to improve human access to wetlands, thereby improving their educational value.

It is recommended that the Town continue to acquire upland open space that would improve the value of wetlands in this watershed. Instead of allowing developers to donate small isolated parts of a development as open space, we recommend the following:

- If a developer does not control land that has significant open space values, a monetary contribution can be made to a fund set aside to acquire open space with value elsewhere in the Town. This "fee in-lieu-of open space" practice is currently allowed under Section 8-25b of the Connecticut General Statutes, which provides mechanisms to establish and utilize the fund.

- If upland areas are to be purchased by the Town as open space, the Town should consider the value that they provide in this watershed. Table 19 identifies those parcels that would improve wetlands value and ranks their selective importance.

The State of Connecticut provides financial assistance to municipalities and non-profit land conservation organizations to acquire land for open space through its Open Space and Watershed Land Acquisition Grant Program (Public Act No. 98-157), administered through the CTDEP's Division of Land Acquisition & Management. Grants may be for the purchase of land that is:

- Valuable for recreation, forestry, fishing, conservation of wildlife or natural resources;
- A prime natural feature of the State's landscape;
- Habitat for listed threatened, endangered, or special concern species;
- Relatively undisturbed outstanding example of a native ecological community;
- Important for enhancing and conserving water quality;
- Valuable for preserving local agricultural heritage; or
- Eligible to be classified as Class I or Class II watershed land.

Other criteria considered in evaluating grant proposals include protection of land adjacent to and complementary to existing open space, closer proximity to urban areas, land vulnerable to development, and consistency with State and local plans of conservation and development. Land acquired under this program would be preserved in perpetuity, and a permanent conservation easement would be provided to the State to ensure that the property remains in a natural and open condition. The easement would include a requirement that the property be made available to the general public for recreational purposes, unless the municipality elects to purchase the development rights to the property.

Land owners may donate or sell land directly to the State under Connecticut's Recreation and Natural Heritage Trust Program (CGS 23-74 through 23-80), which is also administered through the Land Acquisition and Management Division of the CTDEP. Similar to the goals of the Watershed Land Acquisition Grant Program described above, the purpose of the Recreation and Natural Heritage Trust Program is to allow the State to acquire and thereby ensure the preservation and conservation of land having ecological diversity, unusual natural interest, or habitat for endangered or threatened species. Additional evaluation criteria for this program include consistency with the State plan of conservation and development, whether a parcel is threatened with conversion to incompatible land uses, and closer proximity to population centers for parcels identified as having a high priority recreation value.

7.6 Other Wetland Protection Techniques

7.6.1 Upland Protection Zones

One of the most effective ways to protect wetlands of special significance is to designate an Upland Protection Zone of undisturbed vegetation along the wetland boundary within the Upland Review Area. Natural vegetation stabilizes transitional soils between uplands and

wetlands, thereby preventing erosion and sedimentation. The ability to anchor soils on steep slopes is especially important. The vegetation slows the passage of stormwater, allowing infiltration into the soil, thereby removing nutrients and other pollution. Edge habitats in uplands bordering wetlands are also heavily utilized by wildlife, especially birds. An Upland Protection Zone 50 feet in width is recommended for all wetlands, and a 100-foot width is recommended adjacent to perennial streams. This width should be adequate to prevent soil erosion on sloping land and to provide upland nesting sites for birds. Also, 50 to 100 feet of undisturbed vegetation will offer an unbroken travel corridor for mammals, reptiles and amphibians.

Factors which should be considered in adjusting the width of an upland protection zone are as follows:

- **Significance of Wetland Resources:** While all wetlands provide some value, the relative significance of individual wetlands should be considered. More significant wetlands typically have greater utilization by wildlife and additional undisturbed upland area would minimize their disturbance.
- **Slopes:** As slopes increase, erosion potential on those slopes also increase. Increasing the width of upland protection zones in areas where steep slopes exist would provide an area stabilized by natural vegetation that could filter sediment before entering wetlands or water courses, both during and after construction.
- **Soil Types:** As with slopes, soil types are also a factor in erosion potential. Erosion potential of soils is a function of soil texture, cohesiveness and organic content. Lists of highly erodible soils are provided on the soil surveys prepared by the Natural Resources Conservation Service. Once again, increasing the width of the upland protection zone in areas with highly erodible soils would provide a strip of natural vegetation that could filter sediment before entering wetlands both during and after construction.
- **Flood Plain Limits:** Establishing an upland protection zone of the landward boundary of established flood plains would both preserve flood storage and carrying capacity of watercourses.

Maintenance of an Upland Protection Zone is minimal since the area is left as natural as possible. However, developers should be required to remove any trash which has accumulated within the Zone and in the wetland. Areas of the Zone which are damaged should be restored with plantings of high wildlife value. Hiking trails or picnic areas are allowable but the use of motorized recreational vehicles such as dirt bikes, all terrain vehicles or snow mobiles should be prevented. No structures, other than bridge supports, culvert abutments, stormwater control devices, or utility lines could be allowed in the Upland Protection Zone. Stormwater controls should include energy dissipaters, such as plunge pools, rip-rap pads, level spreaders or multiple outlets, to slow the rate of flow and disperse points of entry into the wetlands.

7.6.2 Biological Inventories

An alternative or supplementary means of evaluating water quality would be to conduct periodic biological inventories of the organisms that exist in watershed watercourses. This assessment consists of "counting" insects, amphibians and other organisms that may exist at a sample site. Organisms sensitive to water quality as well as diversity would decrease with increased water quality impacts. As a result, this approach would provide data on actual water quality impacts to fauna in a watercourse and would reflect long-term water quality trends. Conventional water quality monitoring only provides a snapshot of water quality at the time of sampling and data can only be compared to standards to estimate what impacts are occurring.

One approach to implement a biological inventory would be to establish four sample sites in undeveloped portions of the watershed. Three could be located on Jordan Brook, one below I-95 above developed areas, one between I-95 and I-395, and one above I-395 as background. The fourth sampling site could be located near Great Neck Road for the watercourse draining from New London. Exact locations of sampling sites should be determined by the scientist conducting the evaluation and would generally be riffles in the watercourse. In accordance with DEP recommendations, sampling should be done annually in the fall.

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APPENDIX C
DESCRIPTION OF WETLANDS

DESCRIPTION OF WETLANDS

LOWER JORDAN BROOK - From the dam at Jordan Mill Park north to Route I-95

JLM1 Jordan Lower Mainstem 1

Location: Between Rope Ferry Road and Pond 2

Area: 37.4 ac

Viewing Location A: Road along the wetland within Jordan Cemetery.

See Photographs.

The stream corridor at this location is a broad stretch of dense shrub swamp dominated by speckled alder and some red maple saplings. The stream channel was not visible from the cemetery upland edge, but considerable standing water was noted in the swamp. The wetland is especially valuable with respect to nutrient and sediment processing, and wildlife habitat. Birds noted included redwing blackbird, tree sparrow, song sparrow and grackle.

Viewing Location B: South of the Fog Plain Road crossing.

Conductivity: 80 umhos

See Photograph

The wetland in this location passes through a rather densely settled residential neighborhood. However, the condition of the stream was good. It flowed through riffles and pools into an undisturbed red maple swamp. The water was clear and stained brown by humic acids. Freshwater clams have been reported by residents at this location, and rising fish were noted. Cardinal, song sparrow and mallard were observed on or near the stream and wild turkey has been seen by residents.

JLM2 Jordan Lower Mainstem 2

Location: Between Pond 2 and Pond 3, west of Yorkshire Drive.

Area: 2.0 ac

Viewing Location: Behind Jordan Brook Terrace Condominiums.

Conductivity: 72 umhos

See Photograph

Stream is about 10 to 12 ft wide and 6 to 10 inches deep, with high banks and a stony bottom. Some areas of the banks were stabilized with rocks and boulders, and there were remnants of stone dam at this location. The water was clear and very dark in color. The stream flows through woodland, and was overhung by tall trees. A well-used trail runs along the western bank. A vernal pool was perched several feet above the level of the stream.

JLM3 Jordan Lower Mainstem 3

Location: Between Pond 3 and I-95, west of the closed New London-Waterford Airport.

Area: 17.1 ac

Viewing Location: Airport access road beside the stream

Conductivity: 60 umhos.

No Photograph.

The stream in this area runs through a narrow wetland dominated by red maple. The open grassy fields of the abandoned airport lie to the east of the wetland. Dense shrubs between the stream and road included speckled alder, multiflora rose, bittersweet and grape. Litter and construction debris were noted in the wetland on the airport side of the stream. The wetland on the opposite bank appeared undisturbed. A kestrel was observed flying.

JLT1 Jordan Lower Tributary 1

Location: Tributary between the Jordan Brook mainstem and Boston Post Road.

Area: 18.9 ac

Viewing Location A: Crossing at Ellen Ward Road.

Conductivity: 108 umhos

No Photograph

At the crossing the stream varies in width from about 7 to 15 ft. It flows through red maple swamp and is bordered by natural shrubby vegetation. However, the neighborhood is well settled, and there are houses and lawns in close proximity to the stream. There are deposits of sediment on the bottom, and the bank has been stabilized with rip rap in some areas. The stream appears to be flashy during periods of high runoff.

Viewing Location B: Stoneheights Road near Boston Post Road

Conductivity: 80 umhos

See Photograph

The stream, about 2 to 3 ft wide, runs along the side of Stoneheights Road through cattail and dense shrubs. The wetland provides good bird nesting habitat but is narrow, with about 30 ft of natural vegetation. There is a large condominium complex with lawns and parking lots on the slopes above the stream. Erosion controls include a stormwater detention basin.

JLS1 Jordan Lower Swamp 1 (Tyack Swamp)

Location: West of the mainstem, south of I-95 and north of Manitock Hill

Area: 93.9 ac

Viewing Location: East and west of the power line right-of-way.

No Photograph

There are few ways to gain access to this wetland. Observations of the north end of the swamp were made to the east and west of the power line right-of-way. The swamp is dominated by large red maple with an understory of spice bush. Braided standing water was noted on the forest floor, interspersed with skunk cabbage, cinnamon fern and occasional clumps of cowslip. The power line right-of-way bisecting the wetland was dominated by a dense stand of common reed (*Phragmites australis*), and by such shrubs as sweet pepperbush, speckled alder, swamp azalea, steplebush, highbush blueberry, willow, and red cedar.

JLP1 Jordan Lower Pond 1

Location: Immediately south of Rope Ferry Road at Mill Lane.

Area: 3.0 ac

Viewing Location: Bridge across the dam

Conductivity: 98 umhos

See Photographs.

The pond is contained by a large dam which precludes the migration of anadromous fish from the estuary. The pond appears to be of moderate depth. The water was clear and dark brown in color. A narrow band of shrubs and small trees lies along the west bank between the pond and Mill Lane. There are residences along the east bank with lawns reaching to the waters edge. A bridge across the dam provides access to a small park on the east side. Emergent vegetation consisted of two islands of water willow. Canada goose and swan were observed on the pond.

JLP2 Jordan Lower Pond 2

Location: At the junction of Fog Plain Road and Yorkshire Drive.

Area: 2.1 ac

Viewing Location: Small path off Fog Plain Road to the pond outflow

Conductivity 71 umhos

See Photograph

The pond was once used for skating. However, the dam has been removed, and the pond has reverted to a marsh dominated by cattail and *Phragmites*, with large areas of shallow open water. The wetland would be expected to have excellent filtering capacity for nutrients and sediments. The outflow water was clear. The banks are naturally vegetated for the most part, but development is presently taking place along Yorkshire Drive. Fog Plain Road borders the wetland to the south. Downy woodpecker, tree swallow and Canada goose were noted in or near the wetland.

JLP3 Jordan Lower Pond 3

Location: West of Yorkshire Drive.

Area: 3.4 ac

Viewing Location: Bank of the pond near the south end.

Conductivity: 74 umhos

See Photograph

The pond has a naturally wooded shoreline, with a dense shrubby border of speckled alder, red maple, bittersweet and honeysuckle. The water was clear and dark brown in color. The pond bottom consisted of soft sediment. Fish were seen rising. A phoebe, two mallard drakes and a red-tailed hawk were noted. Extensive residential development is taking place along Yorkshire Drive to the east. Erosion controls were in place but sediments have reached the pond during periods of high runoff.

CENTRAL JORDAN BROOK - Between Routes I-95 and 395

JCM1 Jordan Central Mainstem 1

Location: Between I-95 and the intersection of Cross Road and Route 85

Area: 60.1 ac

Viewing Location A: East of a rear Walmart parking lot off Waterford Parkway North.
See Photograph

The fast running stream flows through a broad undisturbed red maple swamp with hardwood forest upland edges. The water was clear and light golden brown in color. The moderately dense understory was mainly spice bush. Skunk cabbage and Indian poke dominated the herb layer. Braided standing water was noted on the forest floor. Deer tracks were observed and spring peepers could be heard. Several vernal pools were flagged to the west of the stream bed. Considerable paper, plastic and other trash had moved into the adjoining upland from the Walmart parking lot.

Viewing Location B: South of the Cross Road and Route 85 intersection.

Conductivity: 82 umhos

See Photographs

The stream flows through red maple swamp flanked by industrial buildings, parking lots and Route 85.

JCM2 Jordan Central Mainstem 2

Location: Route 85 and Cross Road Intersection, north to Route 395

Area: 31.4 ac

Viewing Location A: Flood control dike behind the Oakdell Motel west of Route 85

Conductivity: 88 umhos

See Photograph

The stream at this location has been diked along the north and west bank with large rip-rap. Some growth of *Phragmites* has resulted. The stream is about 20 ft wide and is shallow, with a sand and sediment bottom. The water was clear and golden in color but some filamentous green algae growth was noted. Upstream, the wetland consisted of a shrubby area under the power lines which provided nesting habitat for numerous redwing blackbirds. The dike and several small constructed waterfalls indicated possible flood control efforts in the area.

Viewing Location B: Douglas Road crossing.

Conductivity: 77 umhos

See Photograph

The outflow from a large pond emerges from a culvert under Douglas Road and flows through shrubby wetland and red maple swamp.

JCT1 - Jordan Central Tributary 1

Location: West of mainstem in the vicinity of Walmart and Caldors Shopping Centers

Area: 16.3 ac

Viewing Location: path crossing the tributary north of Caldors rear parking lot

Conductivity: 51 umhos

See Photographs

This wetland system appears on the USGS topographical map as a stream and three small ponds. Several large shopping centers have been constructed at this location, together with dikes and detention basins to control drainage. The outflow from the pond north of Caldors is a small stream 1 to 2 ft wide, which flows through an open marsh and meadow along the base of a detention basin. The wetland supports patchy vegetation, including occasional red maple saplings, various grasses and rushes, cattail and clumps of multiflora rose. The meadow is bounded to the north by red maple swamp and wooded uplands. A small pond with naturally vegetated banks is located on the edge of the woodland.

JCT2 - Jordan Central Tributary 2

Location - Stream flows south, crosses under Route 85 at Crystal Mall and enters the mainstem from the east.

Area: 47.0 ac

Viewing Location A: Path off Silva Lane down slope to the stream.

Conductivity: 60 umhos

See Photograph

This tributary system begins as the outflow from the large shrub swamp (JCS1) located south of Douglas Lane. The stream, about 2 to 4 ft wide with a sand and silt bottom, meanders through open forested wetland dominated by oak, red maple and skunk cabbage. The water was clear and golden brown. This attractive wetland appeared undisturbed and offers excellent wildlife habitat. Deer tracks were noted, and birds included red-tailed hawk, phoebe and yellow rumped warbler. The aerial photograph indicates that the stream flows through undisturbed forest south to Route 85

Viewing Location B: North side of Route 85 across from Crystal Mall

Conductivity: 43 umhos

See Photograph

The stream meanders through wooded swamp dominated by red maple, with highbush blueberry along the banks. The water was clear and coffee colored. Evidence of past farming activity included an abandoned building and a stone bridge across the stream. Further south, the wetland along Route 85 was flooded and supported tall red maple but no understory. Some trash was noted near the highway, but otherwise the wetland appeared undisturbed.

Viewing Location C: West of Route 85

No Photograph

After crossing under Route 85 the stream proceeded northwest through dense shrubby woodland to discharge into the Jordan Brook mainstem. The high banks of the stream were dominated by oak and red maple with an understory of bull brier and honeysuckle. The wetland appeared to be somewhat disturbed by the highway and mall.

JCT3 Jordan Central Tributary 3

Location: East side of Cross Road south of the Route 85 intersection

Area: 22.7 ac

Viewing Location: Off Cross Road

No Photograph

The wetland was a small wooded swamp on both sides of Cross Road. No stream or culvert under the road was located. The swamp was dominated by red maple with sweet pepperbush, highbush blueberry, bullbrier and grape vines in the understory. Standing water was noted in some areas.

JCT4 Jordan Central Tributary 4

Location: Behind Dunkin Donuts on the west side of Route 85

Area: 7.0 ac

Viewing Location: Where the tributary stream discharges into Jordan Brook

No Photograph

The tributary flows through a small marsh and empties into a curve in the Jordan Brook mainstem. This open section of wetland was dominated by tussock sedge and alder shrubs. It appeared to be undisturbed, although it was located quite close to the highway.

JCT5 Jordan Central Tributary 5

Location: East of Route 85 just south of the Cross Road intersection.

Area: 12.4 ac

Viewing Location: Base of the highway embankment

No Photograph

The wetland was a small forested area accepting drainage from the highway embankment. Other than a few sweet pepperbush shrubs and several skunk cabbage on the rocky forest floor, there was no wetland vegetation. The wetland may be quite dry in summer.

JCT6 Jordan Central Tributary 6

Location: Between Route 395 and Douglas Lane

Area: 40.4 ac

Viewing Location: Down slope from a pumping station parking lot off Briarwood Drive.

Conductivity: 154 umhos

See Photograph

A small stream, 1 to 2 ft wide at this location, flows through forest dominated by black birch yellow birch, oak, and beach, with an understory of spice bush and mountain laurel. Skunk cabbage was the major herb in the wetland. The stream was clear with a sand and silt bottom, and numerous deposits of sediment. The aerial photograph indicated that the wetland vegetation is fairly uniform throughout.

JCS1 - Jordan Central Swamp 1

Location: East of the mainstem and south of Douglas Lane

Area: 27.1 ac

Viewing Location: Power line right-of-way path off Vauxhall Street Extension

See Photographs

This valuable wetland is a large dense shrub swamp dominated by speckled alder, sweet pepperbush, swamp azalea and red maple saplings. Cattail, tussock sedge and sphagnum moss made up the herb layer. This expansive wetland provides excellent wildlife habitat and should readily attenuate nutrients and sediments. Outflow from the wetland forms the headwaters of JCT2, a major tributary to Jordan Brook.

JCS2 - Jordan Central Swamp 2

Location: Both sides of Route 85 south of Douglas Road

Area: 26.6 ac

Viewing Location A: East side of Route 85

No Photograph

A large wooded swamp associated with the Jordan Brook mainstem was divided into two sections by the construction of Route 85. On the east side of the highway, the swamp consists of large oaks and red maple with a dense understory of sweet pepperbush and swamp azalea. The wetland accepts drainage from Route 85, and extensive standing water was noted near the low point in the road. Considerable trash had accumulated along the highway.

Viewing Location B: West side of Route 85

No Photograph

This disturbed wetland is hemmed in by Route 85 to the east, by the Town of Waterford Public Works Department buildings and parking lots to the west, and by two access roads to the north and south. Wetland vegetation includes small red maple, skunk cabbage, swamp azalea, sweet pepperbush and a large patch of common reed, *Phragmites australis*. The wetland is fed by runoff from the slopes behind the Town buildings, and by drainage from the parking lots.

JCP1 Jordan Central Pond 1

Location: Immediately south of Route 395 and north of Douglas Lane

Area: 6.0 ac

See Photographs

Viewing Location: Douglas Lane at the pond outflow.

This pond is apparently the result of the sand and gravel quarrying operation to the west. The pond is surrounded by an access road and grassy field vegetation to the water's edge. There is no wetland vegetation along the banks. Waterfowl included domestic duck, mallard and Canada goose.

UPPER JORDAN BROOK - North of Route 395

JUM1 Jordan Upper Mainstem 1

Location: From Route 395 north to the vicinity of Lake Konomoc

Area: 45.5 ac

Viewing Location A: Old dam below the Industrial Drive cul-de-sac and gravel operation

Conductivity: 40 umhos

See Photograph

Stream meanders through a red maple swamp with a spice bush understory. The water was clear and golden in color. Old stone works were noted along the banks of the stream in the vicinity of a collapsed dam. The wetland above the dam, which now supports a large bed of cowslip, may have once been a pond. A large gravel operation is very close to the stream. Erosion controls included combined silt fence and hay bales, a dike and a sedimentation basin.

Viewing Location B: Mainstem near the confluence with a residential pond outflow

Conductivity: 36 umhos

See Photographs

Three small streams flowing through undisturbed open red maple swamp join to form the headwaters of Jordan Brook in this area. The water in the mainstem brook was clear and light golden color. The brook was 1 to 4 ft wide with a sand and cobble bottom. Skunk cabbage, Indian poke and sphagnum moss were the dominant herbs, with tussock sedge in some areas.

JUT1 Jordan Upper Tributary 1

Location: The power line right-of-way west of Vauxhall Road Extension

Area: 9.5 ac

Viewing Location: Path along the right-of-way

No Photograph

This shrubby wetland is fed by seepage from wooded slopes to the east of the right-of-way. Shrubs in the wetland included willow, spice bush, steplebush and multiflora rose. The herb layer included patches of skunk cabbage, cattail and *Phragmites*.

JUS1 Jordan Upper Swamp 1

Location: The power line right of way north of Route 395

Area: 3.6 ac

Viewing Location: Path along the right-of-way

No Photograph

This disturbed wetland, containing a small pond, appears to have been excavated as part of a sand pit or borrow pit operation. The open sandy area contains little vegetation other than some shrubs and red cedar.

JUP1 Jordan Upper Pond 1

Location: South of Price Waterhouse building off Industrial Drive

Area: 2.2 ac

Viewing Location: North bank of the pond

See Photograph

This impacted pond lies at the base of a steep slope leading up to an industrial park. Route 395 bounds the wetland to the south. The water was clear but dark in color, with some green algal growth along the shore. The depth is less than 4 ft as evidenced by the growth of water lilies across much of the surface. Woody vegetation along the shore included oak, red maple, gray birch, red cedar, mountain laurel and highbush blueberry.

JUP2 Jordan Upper Pond 2

Location: End of a long driveway off Vauxhall Road Extension.

Area: 2.8 ac

Viewing Location: Pond banks near the outflow

Conductivity: 56 umhos

See Photograph

This pond, surrounded by wooded swamp, appeared to have been a farm pond. The bank vegetation consisted of trees and shrubs, except for one small mowed area. The water was clear, and no vegetation or algae were visible. A phoebe was noted by the pond.

NEVINS BROOK - Major tributary entering Jordan Brook from the east

NM1 Nevins Mainstem 1

Location: From the confluence with Jordan Brook to Fog Plain Road

Area: 30.3 ac

Viewing Location A: Boston Post Road crossing (Route 1A)

Conductivity: 96 umhos

See Photograph

At the culvert the stream is 6 to 10 ft wide. The water was clear and dark brown in color. Considerable trash was present on the stream banks. The banks support natural vegetation dominated by multiflora rose and young red maple. However, the wetland zone is very narrow, and the vegetation has been cleared close to the banks on both sides of the stream.

Viewing Location B: Steinger Farm Park, stream-side cement property marker

Conductivity: 98 umhos

See Photographs

At this location the stream flows through dense shrubby wetlands, with hedges of multiflora rose along the banks. The shallow meandering stream is 10 to 20 ft wide, and the water is dark brown and clear. Wetland herbs included skunk cabbage, Indian poke, cowslip and a variety of wildflowers.

Viewing Location C: Fog Plain Road Crossing

Conductivity: 98 umhos

No Photograph

At this location, the stream is 6 to 10 ft wide, with natural banks and a sand and sediment bottom. The water was clear and golden brown in color. The stream flows along a shrubby vegetation corridor through a well settled residential neighborhood. A large construction storage facility lies along the west bank. Although impacted by development, the stream has some value as nesting habitat; phoebe, cardinal, chickadee and swallow were noted.

NM2 Nevins Mainstem 2

Location: Mainstem between large wooded swamp and I-95

Area: 16.3 ac

Viewing Location A: Farm Road at right angles to Devonshire Drive

Conductivity: 110 umhos

No Photograph

The stream at this location was about 8 to 10 ft wide with a silty bottom. The water was clear and golden in color. It flows through shrubby swamp and abandoned farmland, then through a culvert under the farm road and into the large wooded swamp (NS1). A red-tailed hawk was observed.

Viewing Location B: Southwest of the Gilead Road cul de sac

Conductivity 93 umhos

See Photographs

Branched stream beds flow through a red maple and red oak swamp carpeted with tussock sedge, Indian poke, sphagnum moss, skunk cabbage and ferns. Wildflowers included bloodroot and violets. The rather open understory was dominated by highbush blueberry and some multiflora rose. The stream is 1 to 2 ft wide and clear with a heavily silted bottom. To the north of the swamp is a wide shrubby wet meadow dominated by tussock sedge and patches of cattail. Red-winged blackbird was common.

NT1 Nevins Tributary 1

Location: Tributary south of Mary Street

Area: 26.8 ac

Viewing Location: Path behind the Twin Haven housing development parking lot.

Conductivity: 110 umhos

See Photographs

The wetland begins as a large flooded swamp with shallow water and very little vegetation. Numerous peepers were heard. Further south, the swamp becomes a pond contained by a small dam. A pair of mallards was present in the pond. The outflow stream is about 2 ft wide with riffles and pools. It flows into an undisturbed swamp dominated by large red maple, oak and black birch with a spice bush understory. Skunk cabbage, Indian poke and wildflowers dominated the herb layer. Conductivity was measured in the outflow stream.

NT2 Nevins Tributary 2

Location: Tributary flows under I-95 south to the large swamp (NS1)

Area: 6.5 ac

Viewing Location A: Gilead Road crossing

Conductivity: 253 umhos

See Photograph

At the culvert the stream is about 2 ft wide and clear with a silty bottom. A white frothy scum was noted on the surface and conductivity was extremely high. Downstream the brook flows through wooded wetland dominated by young red maple, black birch and such vines as grape, honeysuckle and bullbrier, eventually reaching a small farm pond. Thereafter the stream flows through forested and post-agricultural land to the large swamp (NS1). A flicker was seen in the area and raccoon prints were noted near the stream. This is a very scenic post agricultural area.

Viewing Location B: Off Rt. 85, between Home Depot and Mobile Station parking lots

Conductivity: 255 umhos

See Photographs

The wetland is a small pocket surrounded by on three sides by high filled slopes leading up to parking lots and Route 85. Vegetation includes red maple, spice bush, multiflora rose and skunk cabbage. The swamp appeared to be contaminated, with extremely high conductivity and accumulations of yellow and iridescent bacterial slime on the sediments. The water appeared black with scum on the surface. The outflow from this wetland is probably a source of contamination at Location A. Considerable amount of trash has accumulated in this degraded wetland.

NT3 Nevins Tributary 3

Location: Small tributary entering the mainstem from the west, downstream from I-95

Area: 7.1 ac

Viewing Location: Off the end of Waterford Parkway South

Conductivity: 84 umhos

See Photograph

This very small stream, only 1 to 2 ft wide, meanders through a narrow swamp about 30 ft wide which slopes up steeply to forested upland. The water was clear and colorless, and the stream bottom was silty. Considering its proximity to the airport and the Interstate highway, this wetland is relatively unspoiled. A red-tailed hawk and two kestrel were noted in the area.

NS1 Nevins Swamp 1

Location: North of Fog Plain Road and east of Devonshire Drive

Area: 13.9

Viewing Location: Path parallel to Devonshire Drive

No Photograph

This large wooded swamp lies at the confluence of the Nevins Brook mainstem and two major tributaries, NT1 and NT2. The vegetation is dominated by large red oak and white oak with

some red maple and a very dense understory of spice bush, swamp azalea, sweet pepperbush, highbush blueberry and mountain laurel. Skunk cabbage interspersed with standing water made up the forest floor. Considerable trash has accumulated in the wetland along the path behind the residences on Devonshire Drive.

NS2 Nevins Swamp 2

Location: Off Dayton Place

Area: 14.4 ac

Viewing Location A: Small footpath, east of Route 85 and north of Dayton Place

Conductivity: 62 umhos

No Photograph

This is a small red maple swamp with an open shrubby area and patches of cattail and tussock sedge in ponded water. The water was clear and coffee colored. The outflow is piped under Route 85 and is presumably routed around or under the Crystal Mall. The wetland is reached by a small trail which runs parallel to Route 85. Wooded swamp vegetation included sweet pepperbush and highbush blueberry, together with skunk cabbage. Wildlife included peeper, red-winged blackbird and yellow-rumped warbler.

Viewing Location B: Driveway to Temple Emanuel off Dayton Place

No Photograph

This remnant wetland has been much reduced and disturbed by filling. The remaining vegetation consisted of one tree, various vines and stands of *Phragmites australis*. This is an extensively disturbed area which offers no distinctive wetland characteristics.

NP1 Nevins Ponds 1

Location: A series of ponds and vernal pools located in Steinger Farm Park

Area: 2.5 ac

Viewing Location A: Banks of the large southern pond

Conductivity: 33 umhos

See Photographs

This is a very scenic pond in a park-like setting. About 60% of the shoreline consists of natural shrub and forest vegetation, mainly red maple, willow and oak. The rest of the shoreline is mowed grass, with large boulders between the pond and the park access road. The water was clear and very dark brown in color. A cooper's hawk and a female kestrel were observed roosting in the vicinity of the pond, and an osprey was seen overhead.

Viewing Location B: A natural pond and two vernal pools

See Photograph

The more northern pond is surrounded by natural woodland, and is somewhat less accessible than the southern pond. Additionally, two probable vernal pools were noted in woodland areas. The presence of a woodland pond, a more manicured park pond, two vernal pools and a sizable stream makes this park an excellent educational resource and wildlife observation area. The Town is very fortunate to own this property and should make every effort to preserve its unique character.

NP2 Nevins Ponds 2

Location: A series of ponds west of McKenzie Drive and south of Fog Plain Road
Area: 3.7 ac

Viewing Location: Southwestern pond off McKenzie Drive

Conductivity: 102 umhos

See Photographs

This residential pond consists of two basins lying behind the houses on McKenzie Drive. The presence of yellow water lily growing across the surface indicated that the pond is probably less than 4 ft deep in most areas. The water was slightly murky and scum was noted on the surface. Some lawns extend to the edge, but for the most part the pond has a naturally vegetated shoreline. Although the ponds are hedged in by habitations, birds were abundant around the pond and in the adjoining wooded wetlands. Species included Canada goose, mocking bird, boat-tailed grackle, red-winged blackbird, chickadee, blue jay and yellow-rumped warbler.

EAST BROOK - Unnamed brook, from the confluence with Jordan Park Pond, north to Bates Woods Park

EM1 East Mainstem 1

Location: From Jordan Park Pond east to Miner Avenue

Area: 47.3 ac

Viewing Location A: End of Old Great Neck Road

Conductivity: 158 umhos

See Photographs

Stream is 10 to 15 ft wide. The water is clear and dark in color. The stream runs parallel to Rope Ferry Road through a residential neighborhood. Shrubs including willow, small red maple and multiflora rose line the banks, but numerous lawns also extend up to the edge of the stream.

Viewing Location B: Miner Road crossing near railroad track

Conductivity: 183 umhos

See Photographs

The stream is several ft wide at this location and appears to have been channeled. The water was clear and dark brown. There was fill around the culvert, and a stone lined ditch along Miner Road discharges into the stream near the crossing. The wetland to the west was shrubby and dense with few trees, whereas the upstream wetland to the east was dominated by common reed, *Phragmites australis*. An accumulation of road trash was present in the wetland and stream.

EM2 East Mainstem 2

Location: Extends north from the Miner Street crossing to the vicinity of Terrace Drive

Area: 17.8 ac

Viewing Location: Boston Post Road crossing

Conductivity: 178 umhos

No Photograph

The stream is 6 to 8 ft wide, channeled with steep sides and buttressed with boulders. The bottom is rocky and the water appeared clear and light brown. Dense shrubs and small trees along the banks included willow, staghorn sumac and multiflora rose. This is a commercial area, and trash was observed in the stream.

EM3 East Mainstem 3

Location: From Terrace Drive north to Bates Woods Park (New London town line)

Area: 39.9 ac

Viewing Location A: Edge of stream east of abandoned drive-in movie, off Clark Lane

Conductivity: 195 umhos

No Photograph

The stream is about 8 ft wide with a stone and pebble bottom and low densely vegetated banks. The water was clear and light brown. It flowed through patches of skunk cabbage and oak forested uplands overgrown with bullbrier.

Viewing Location B: Footpath behind the New London dog pound at Bates Woods Park

Conductivity: 144 umhos

See Photograph

This wetland is located both in New London and Waterford. Several small streams meander through the forested swamp dominated by red oak, white oak, scarlet oak, and red maple. The understory consisted of highbush blueberry, arrowwood and multiflora rose, underlain by a carpet of skunk cabbage and Indian poke. A dense stand of Japanese knotweed grew on both sides of the footpath. Trash has accumulated along the path, and several benches have been vandalized. Severe erosion in various locations has resulted in deposits of sand and gravel in the streams. This wetland area would benefit from restoration efforts.

ET1 East Tributary 1

Location: Stream and wetland along the east side of Great Neck Road (Route 213)

Area: 14.3 ac

Viewing Location: Driveway crossing, off Great Neck Road, south of the railroad track

Conductivity: 87 umhos

See Photographs

This narrow swamp and intermittent stream runs along the base of the Great Neck Road embankment to a confluence with East Brook north of the railroad track. The wetland is a red maple swamp with some birch, hickory and oak. The herb layer included skunk cabbage, horse tail, Jack-in-the-pulpit, and ferns. The stream is 2 to 3 ft wide with a sand and cobble bottom. The water was clear with some scum around the culvert under the driveway.

ES1 East Swamp 1

Location: East of Miner Road and north of the railroad tracks

Area: 27.5 ac

Viewing Location: Off CL&P parking lots and off the railroad embankment

See Photograph

This large open wetland supports a variety of vegetation, including patches of shrub wetland, areas of wooded swamp and expanses of common reed *Phragmites*. Standing water, skunk cabbage and tussock sedge were noted. Woody vegetation included red maple, cottonwood and dense hedges of honeysuckle. Heavy sand and sediment deposits were noted in the area of a culvert outflow and, typically, considerable trash has accumulated along the railroad embankment.

ES2 East Swamp 2

Location: From the end of Pine Street east to the New London Town Line

Area: 34.9 ac

Viewing Location: The elevated Pine Street cul-de-sac

See Photograph

The wetland is a very large open swamp dominated by oak and red maple with a dense shrub understory. Standing water, skunk cabbage and tussock sedge were noted on the wetland floor. Trash had been deposited in the wetland near the cul-de-sac, but otherwise the wetland appeared undisturbed.

EP1 East Pond 1

Location: Rope Ferry Commons Condominiums off Rope Ferry Road

Area: 0.8 ac

Viewing Location: Pond edge from condominium access road

No Photograph

This condominium pond was surrounded by mowed lawn to the edge of the water. Some slumping of the banks was noted. The water appeared murky and some green algae had collected along the edges. A Chemlawn truck was noted on the grounds, indicating that heavy fertilization takes place near the pond. Fencing had been placed along the banks to deter geese.

EP2 East Pond 2

Location: Off Rope Ferry Road, east of the public library

Area: 1.2 ac

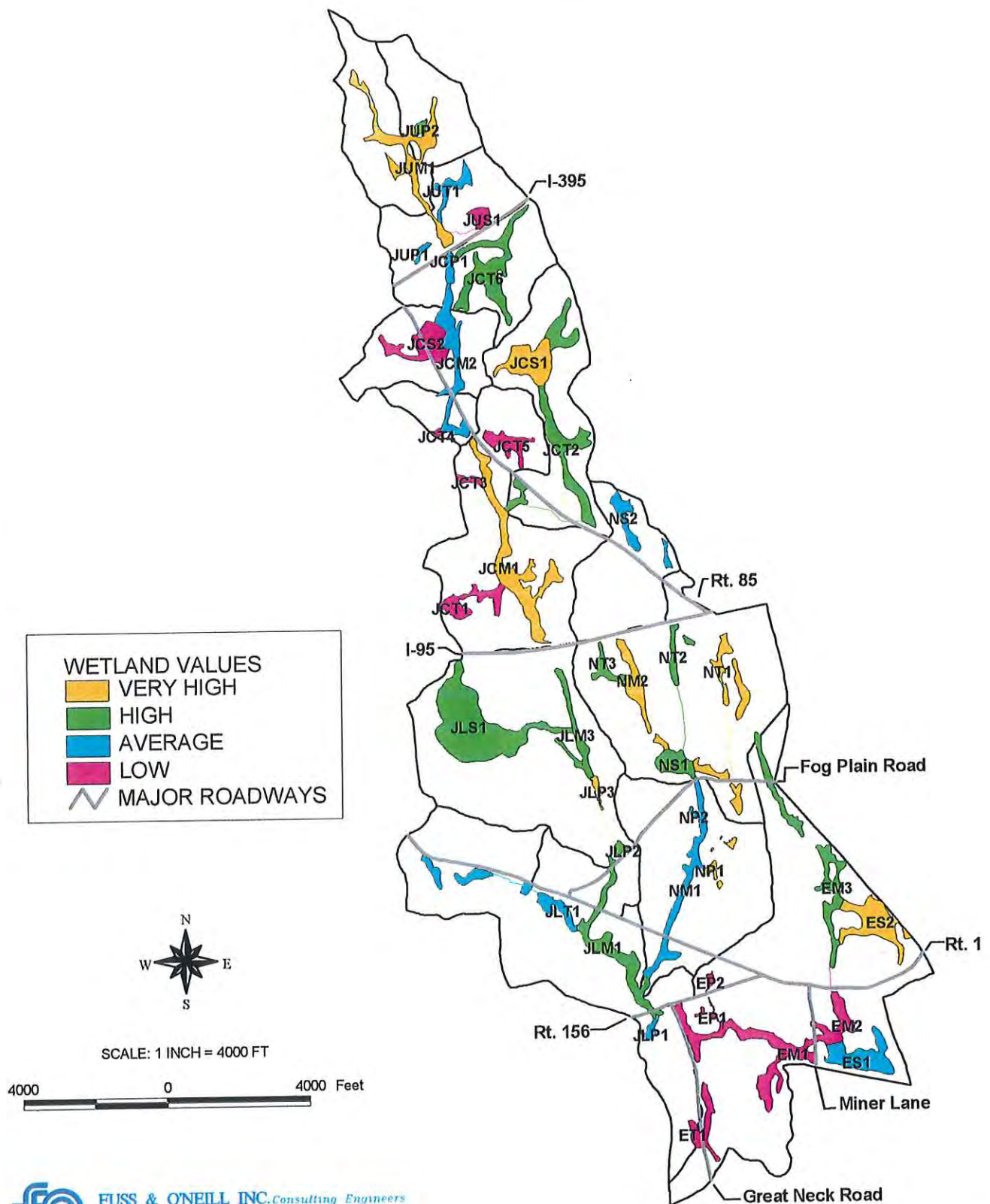
Viewing Location: Bridge across the outflow

Conductivity: 80 umhos

See Photograph

This small pond in a heavily trafficked public park supports a large population of waterfowl. About 80 to 100 birds were present during the site visit, including herring gull, ring-billed gull, Canada goose, domestic goose and mallard. About half of the shoreline is stone lined and the rest is grassy banks with occasional red maple or willow trees. The water was murky, but considering the number of birds present, the conductivity was not extremely high.

Town of Waterford WETLANDS SUMMARY



APPENDIX D
FUNCTIONAL VALUE SCORES

Appendix D

METHODS USED TO ANSWER QUESTIONS

Ecological Integrity

- 1.1 Water quality map used to estimate inflow quality, subject to field observations.
- 1.2 New London soils map used to estimate percent very poorly drained soils.
- 1.3 Town zoning map, current Fuss and O'Neill, Inc. (F&O) zoning map and aerial photos used for dominant land use zoning of wetlands.
- 1.4 Aerial photographs used to estimate the number of buildings within 500 ft of the wetland boundary (per 10 ac of wetland).
- 1.5 Field observations of fill, limited by viewing location.
- 1.6 Aerial photographs were measured to estimate percent natural vegetation edge.
- 1.7 Field observations of litter and disturbance in wetlands, limited by viewing locations.
- 1.8 Field observations of litter and disturbance within 500 ft, limited by viewing locations.
- 1.9 Field observations of mowing, farming, etc., limited by viewing locations.
- 1.10 Field observations of wetland drainage, limited by viewing locations.
- 1.11 Aerial photographs and town road map used to count crossings.
- 1.12 Aerial photographs, topo maps and road map used to locate for dams, dikes or impoundments.

Wildlife Habitat

- 2.1 Ecological Integrity score.
- 2.2 Used F&O calculations of wetland areas based on soils. Stream reach areas included adjoining wetlands.
- 2.3 Used a grid enumeration method to estimate pond areas from aerial photographs.
- 2.4 US Fish and Wildlife wetland class maps and arials used for total number of wetland classes. Field observations limited by viewing locations.
- 2.5 Same for dominant wetland class.
- 2.6 F&O wetland map used to locate upland islands.
- 2.7 Travel lanes to other wetlands estimated from aerial photos.
- 2.8 Aerial photographs were measured to locate 500 ft natural buffer areas.

Finfish Habitat - Streams

- 3.1 Water quality map used, subject to field observations.
- 3.2 Dam on Jordan Brook acts as an anadromous fish barrier for entire watershed.
- 3.3 Used topo map to determine stream order.
- 3.4 Used land use map, F&O watersheds map and aerial photos to determine dominant land use in the watershed.
- 3.5 Field observations of stream width. Limited by viewing locations.

- 3.6 Field observations of available shade. Limited by viewing locations.
- 3.7 Field observations of channel type. Limited by viewing locations.
- 3.8 Field observations of cover. Limited by viewing locations.
- 3.9 Field observations of spawning areas. Limited by viewing locations.

Finfish Habitat - Ponds

- 3.1 Water quality map used, subject to field observations.
- 3.2 Dam on Jordan Brook acts as an anadromous fish barrier for entire watershed.
- 3.3 Grid enumeration method used to estimate pond areas.
- 3.4 Depth estimated from observations of aquatic vegetation (i.e., lily pads = 4 ft or less., otherwise 4 - 20 ft. Unlikely that any of these small ponds are over 20 ft in depth).
- 3.5 Estimated transparency from shoreline water clarity. Based on my pond experience.
- 3.6 Percent emergent vegetation estimated from surface observations.

Visual/Esthetic Quality

Questions 5.1 through 5.9 were answered by observations in the field at the viewing locations. Question 5.10 is the Wildlife Habitat FVI score.

Appendix D

WETLAND VALUE GRAPHS

Functional Value Indices

Bar graphs show mean Functional Values Indices (FVI) for all wetlands within the five major segments: Lower, Middle and Upper Jordan Brook, Nevins Brook and East Brook. Wetlands are arranged from left to right in the order of Mainstem Sections, Tributaries, Swamps and Ponds. Each bar represents the average of four functional value indices for *Ecological Integrity*, *Wildlife Habitat*, *Fish Habitat* and *Visual/Esthetic*.

Wetland Value Units

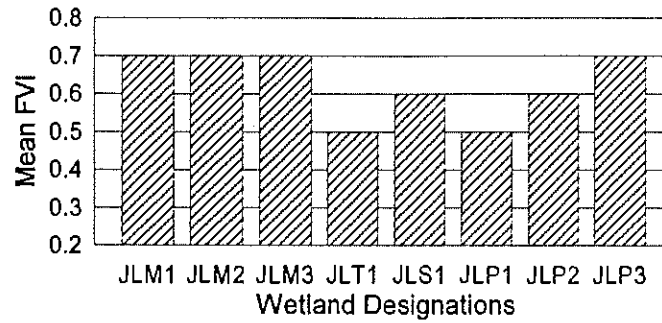
Bar graphs, arranged as above, show Wetland Value Units (WVU) which reflect the size of the various wetlands.

Cumulative Functional Values

Stacked bar graphs, similarly arranged, indicate the relative importance of the four functional values for each wetland.

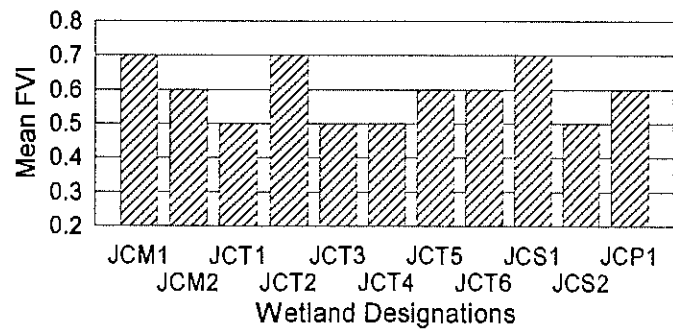
LOWER JORDAN BROOK

FUNCTIONAL VALUE INDICES



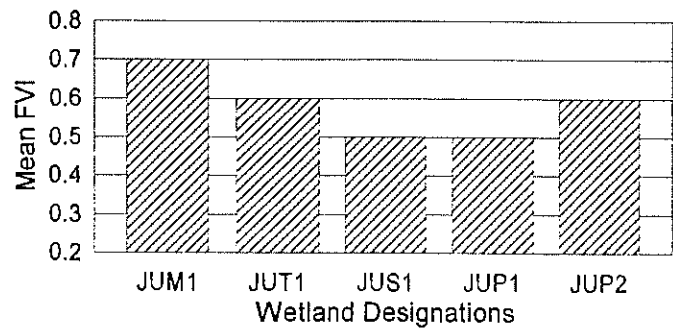
CENTRAL JORDAN BROOK

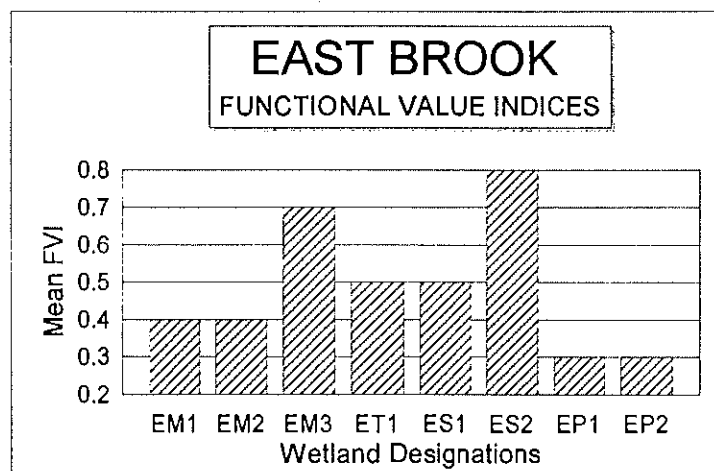
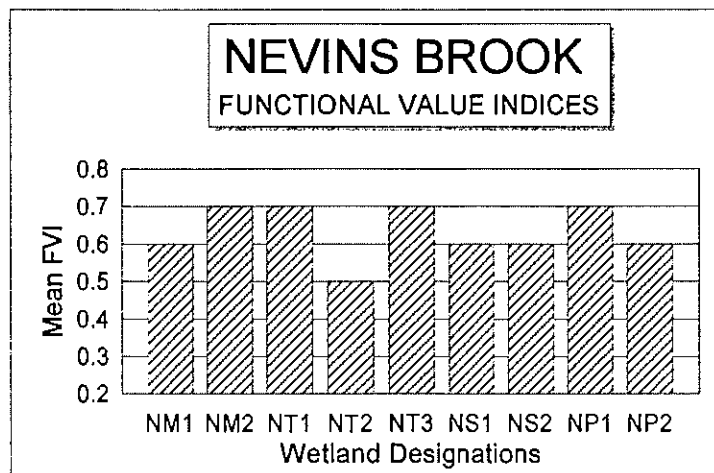
FUNCTIONAL VALUE INDICES

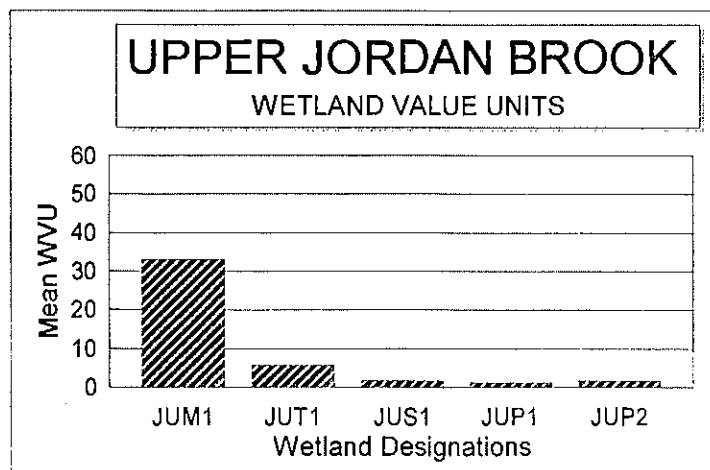
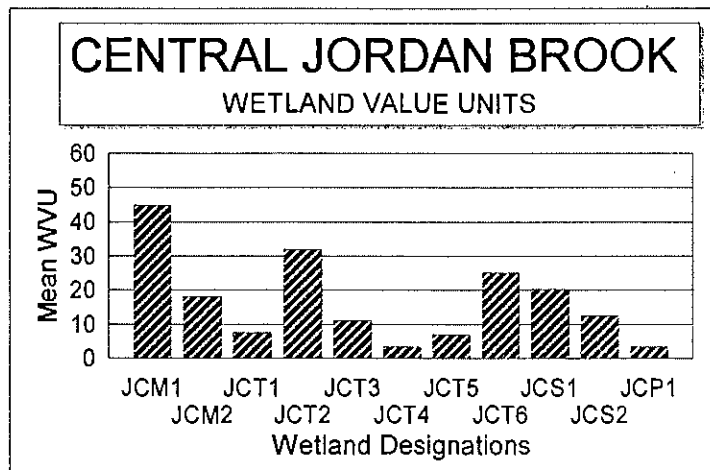
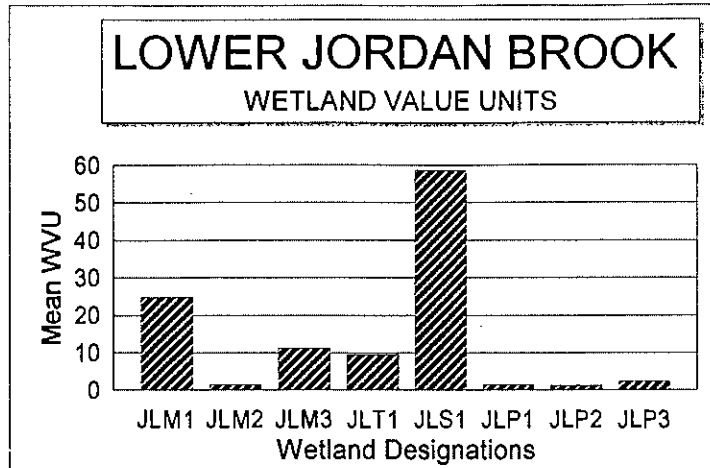


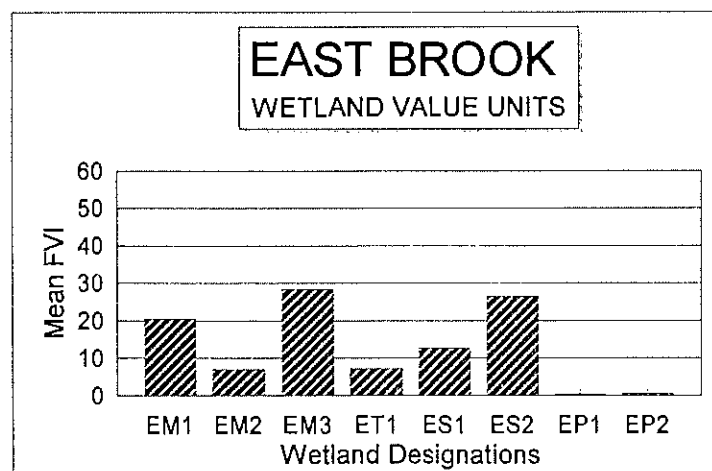
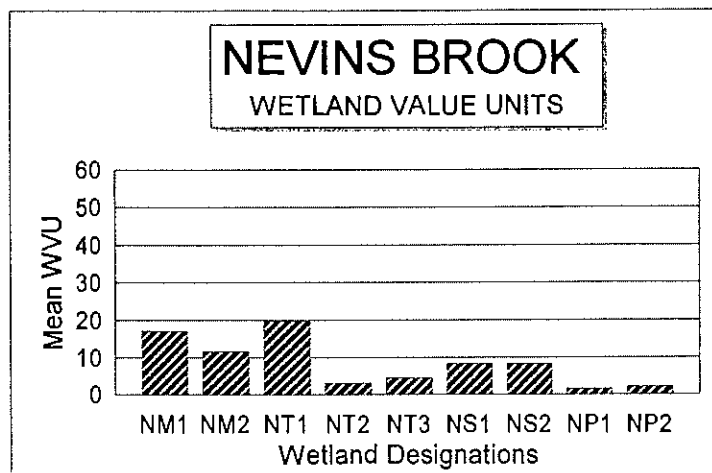
UPPER JORDAN BROOK

FUNCTIONAL VALUE INDICES



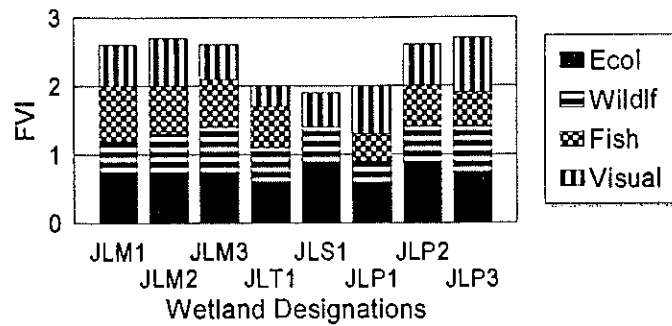






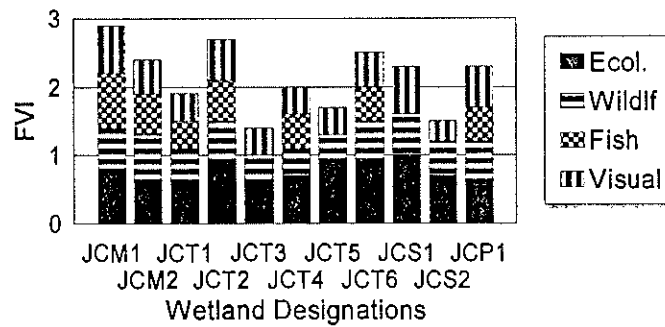
LOWER JORDAN BROOK

CUMULATIVE FUNCTIONAL VALUES



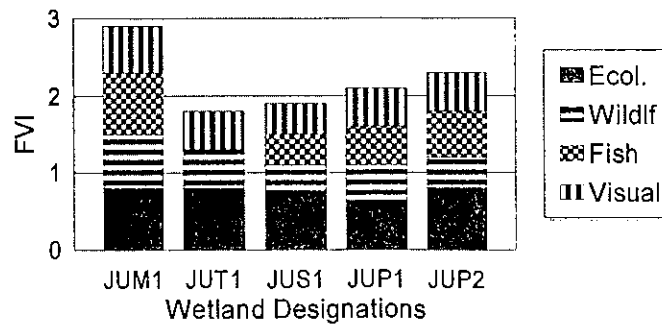
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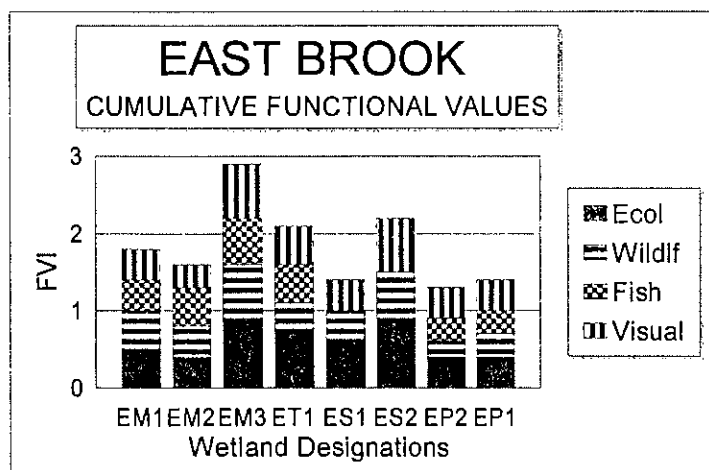
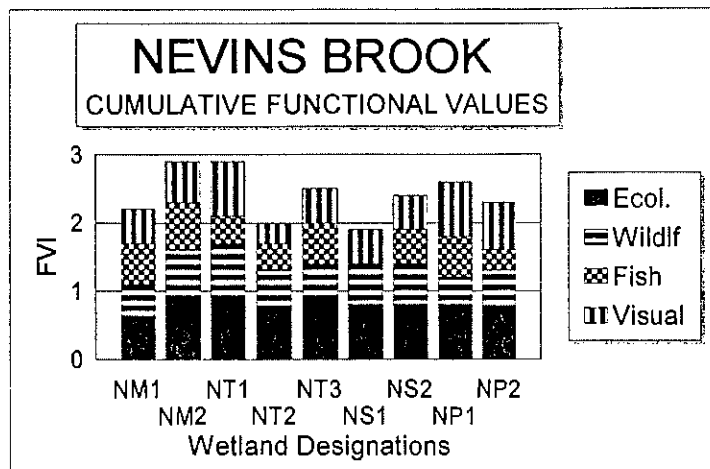
CUMULATIVE FUNCTIONAL VALUES



UPPER JORDAN BROOK

CUMULATIVE FUNCTIONAL VALUES





Appendix D

TABLES OF WETLAND VALUES

Scores are shown for the individual questions within each of the four functions. The average score, i.e. Functional Value Index (FVI), is indicated for each wetland. Mean FVI is the average for two or more viewing locations within a single wetland. The area of each wetland (in acres) multiplied by the FVI gives the Wetland Value Units score (WVU) for each wetland. A summary of these data is shown in Table 6

JORDAN BROOK WATERSHED			WETLAND FUNCTIONAL VALUES					
Waterford, CT								
			LOWER JORDAN BROOK					
Functional Values	Question	JLM1A	JLM1B	JLM2	JLM3	JLT1	JLS1	JLP1
Function 1								
Ecological Integrity								
	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.2	1.0	1.0	0.1	0.1	0.1	1.0	1.0
	1.3	0.5	0.5	1.0	1.0	0.1	1.0	0.1
	1.4	0.1	0.1	0.1	0.5	0.1	0.5	0.1
	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.6	0.1	0.1	0.5	0.5	0.1	1.0	0.1
	1.7	1.0	0.5	0.5	0.5	0.1	0.1	0.1
	1.8	0.1	0.5	0.5	0.1	0.1	0.5	0.1
	1.9	1.0	1.0	1.0	1.0	1.0	0.5	0.1
	1.10	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.12	1.0	1.0	0.5	1.0	1.0	1.0	0.1
	FVI	0.7	0.7	0.7	0.7	0.6	0.8	0.5
	Mean FVI	0.7						
	AREA	37.4		2.0	17.1	18.9	93.9	3.0
	WVU	27.3		1.4	12.4	10.4	75.1	1.4
Function 2								
Wildlife Habitat								
	2.1	0.7	0.7	0.7	0.7	0.6	0.8	0.5
	2.2	1.0	1.0	0.1	1.0	1.0	1.0	0.5
	2.3	0.5	0.5	0.1	0.5	0.1	0.1	0.5
	2.4	0.5	0.5	1.0	0.5	1.0	0.1	0.1
	2.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0
	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	2.7	0.1	0.1	1.0	1.0	0.5	1.0	0.5
	2.8	0.5	0.5	1.0	1.0	0.1	1.0	0.1
	FVI	0.5	0.5	0.6	0.7	0.5	0.6	0.4
	Mean FVI	0.5						
	AREA	37.4		2.0	17.1	18.9	93.9	3.0
	WVU	18.4		1.1	11.4	9.1	54.0	1.2
Function 3A								
Fish Habitat Streams								
	3.1	1.0	1.0	1.0	1.0	1.0		
	3.2	0.1	0.1	0.1	0.1	0.1		
	3.3	1.0	1.0	0.5	0.5	0.5		
	3.4	1.0	1.0	1.0	1.0	0.1		
	3.5	0.5	0.5	0.5	0.5	0.5		

JORDAN BROOK WATERSHED				WETLAND FUNCTIONAL VALUES				
Waterford, CT								
LOWER JORDAN BROOK								
Functional Values	Question	JLM1A	JLM1B	JLM2	JLM3	JLT1	JLS1	JLP1
	3.6	1.0	1.0	1.0	1.0	1.0		
	3.7	1.0	1.0	1.0	0.5	1.0		
	3.8	1.0	1.0	0.5	1.0	0.5		
	3.9	0.5	1.0	1.0	1.0	1.0		
	FVI	0.8	0.8	0.7	0.7	0.6		
	Mean FVI	0.8						
	AREA	37.4		2.0	17.1	18.9		
	WVU	30.5		1.5	12.5	12.0		
Function 3B								
Fish Habitat Ponds								
		N/A	N/A	N/A	N/A	N/A	N/A	
	3.1							1.0
	3.2							0.1
	3.3							0.5
	3.4							0.1
	3.5							0.5
	3.6							0.1
	FVI							0.4
	Mean FVI							
	AREA							3.0
	WVU							1.2
Function 5								
Visual/Esthetic								
	5.1	0.1	0.1	0.1	0.5	0.1	0.5	0.1
	5.2	0.5	0.1	0.1	0.1	0.1	0.1	1.0
	5.3	1.0	0.1	1.0	1.0	0.5	0.1	1.0
	5.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	5.5	0.1	1.0	1.0	0.1	0.1	0.1	1.0
	5.6	1.0	0.5	0.5	0.5	0.5	0.5	0.5
	5.7	0.5	0.5	1.0	0.1	0.1	0.1	0.5
	5.8	1.0	0.5	1.0	1.0	0.5	1.0	0.5
	5.9	1.0	1.0	1.0	0.1	0.1	1.0	1.0
	5.10	0.5	0.5	0.6	0.7	0.5	0.6	0.4
	FVI	0.7	0.5	0.7	0.5	0.3	0.5	0.7
	Mean FVI	0.6						
	AREA	37.4		2.0	17.1	18.9	93.9	3.0
	WVU	22.5		1.5	8.7	6.6	46.7	2.1

JORDAN BROOK WATERSHED								
Waterford, CT								
CENTRAL JORDAN BROOK								
Functional Values	Question	JLP2	JLP3	JCM1	JCM2A	JCT1	JCT2A	JCT2B
Function 1								
Ecological Integrity								
	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.2	1.0	1.0	0.1	0.1	0.5	1.0	1.0
	1.3	0.5	0.1	1.0	1.0	0.1	1.0	1.0
	1.4	0.1	0.1	1.0	0.5	0.5	0.5	0.5
	1.5	1.0	1.0	1.0	0.5	0.1	1.0	1.0
	1.6	0.5	0.5	1.0	0.5	1.0	1.0	1.0
	1.7	1.0	0.5	0.5	0.5	0.1	1.0	0.5
	1.8	1.0	0.5	0.5	0.1	0.1	1.0	0.5
	1.9	1.0	1.0	1.0	0.1	0.5	1.0	1.0
	1.10	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.12	0.5	0.5	1.0	1.0	1.0	1.0	0.5
	FVI	0.8	0.7	0.8	0.6	0.6	1.0	0.8
	Mean FVI						0.9	
	AREA	2.1	3.4	60.1	31.4	16.3	47.0	
	WVU	1.7	2.3	50.6	19.1	9.4	42.1	
Function 2								
Wildlife Habitat								
	2.1	0.8	0.7	0.8	0.6	0.6	1.0	0.8
	2.2	0.1	0.5	1.0	1.0	1.0	1.0	1.0
	2.3	0.5	1.0	0.5	1.0	0.1	0.5	0.5
	2.4	0.5	0.5	0.5	1.0	0.5	0.5	0.5
	2.5	1.0	1.0	0.5	0.5	0.5	0.5	0.5
	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	2.7	0.5	1.0	0.5	0.5	0.1	0.5	0.5
	2.8	1.0	1.0	1.0	0.5	1.0	1.0	1.0
	FVI	0.6	0.7	0.6	0.7	0.5	0.6	0.6
	Mean FVI						0.6	
	AREA	2.1	3.4	60.1	31.4	16.3	47.0	
	WVU	1.2	2.5	37.1	20.4	7.9	29.4	
Function 3A								
Fish Habitat Streams								
	3.1			1.0	1.0	1.0	1.0	1.0
	3.2			0.1	0.1	0.1	0.1	0.1
	3.3			0.5	0.5	0.1	0.1	0.1
	3.4			1.0	1.0	0.5	1.0	1.0
	3.5			0.5	0.5	0.1	0.5	0.5

JORDAN BROOK WATERSHED								
Waterford, CT								
CENTRAL JORDAN BROOK								
Functional Values	Question	JLP2	JLP3	JCM1	JCM2A	JCT1	JCT2A	JCT2B
	3.6			1.0	0.5	0.5	1.0	1.0
	3.7			1.0	0.1	0.5	1.0	0.5
	3.8			1.0	0.5	0.5	0.5	0.5
	3.9			1.0	1.0	0.1	0.1	0.5
	FVI			0.8	0.6	0.4	0.6	0.6
	Mean FVI						0.6	
	AREA			60.1	31.4	16.3	47.0	
	WVU			47.4	18.1	6.2	27.4	
Function 3B								
Fish Habitat Ponds								
				N/A	N/A	N/A	N/A	N/A
	3.1	1.0	1.0					
	3.2	0.1	0.1					
	3.3	0.1	0.1					
	3.4	0.5	0.5					
	3.5	1.0	1.0					
	3.6	1.0	0.5					
	FVI	0.6	0.5					
	Mean FVI							
	AREA	2.1	3.4					
	WVU	1.3	1.8					
Function 5								
Visual/Esthetic								
	5.1	0.5	0.5	0.5	0.1	0.5	1.0	0.5
	5.2	1.0	1.0	0.1	0.1	1.0	0.1	0.1
	5.3	0.5	0.5	1.0	0.1	0.1	1.0	0.1
	5.4	1.0	1.0	1.0	1.0	1.0	1.0	0.5
	5.5	0.5	1.0	1.0	0.5	0.1	1.0	0.5
	5.6	0.5	0.5	1.0	0.5	0.1	1.0	0.5
	5.7	0.1	1.0	0.1	1.0	0.1	0.5	0.5
	5.8	0.5	1.0	1.0	0.5	0.5	1.0	0.5
	5.9	0.5	1.0	1.0	0.1	0.1	1.0	0.1
	5.10	0.6	0.7	0.6	0.7	0.5	0.6	0.6
	FVI	0.6	0.8	0.7	0.5	0.4	0.8	0.4
	Mean FVI						0.6	
	AREA	2.1	3.4	60.1	31.4	16.3	47.0	
	WVU	1.2	2.8	44.0	14.3	6.5	28.6	

JORDAN BROOK WATERSHED								
Waterford, CT								
CENTRAL JORDAN BROOK								
Functional								
Values	Question	JCT3	JCT4	JCT5	JCT6	JCS1	JCS2A	JCP1
Function 1								
Ecological Integrity								
	1.1	1.0	1.0	1.0	0.5	1.0	1.0	1.0
	1.2	0.5	0.1	1.0	1.0	1.0	1.0	1.0
	1.3	0.1	0.1	1.0	1.0	1.0	0.1	0.1
	1.4	0.5	0.1	1.0	0.5	1.0	0.5	1.0
	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.6	0.1	0.1	1.0	1.0	1.0	0.5	1.0
	1.7	0.5	0.5	1.0	1.0	1.0	0.1	0.1
	1.8	0.5	1.0	0.5	1.0	1.0	0.1	0.1
	1.9	1.0	1.0	1.0	1.0	1.0	1.0	0.1
	1.10	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	0.5	1.0	1.0	1.0	1.0	1.0	1.0
	1.12	1.0	1.0	0.5	1.0	0.5	0.5	0.1
	FVI	0.6	0.7	0.9	0.9	1.0	0.7	0.6
	Mean FVI							
	AREA	22.7	7.0	12.4	40.4	27.1	26.6	6.0
	WVU	14.6	4.6	11.4	37.0	26.0	17.3	3.8
Function 2								
Wildlife Habitat								
	2.1	0.6	0.7	0.9	0.9	1.0	0.7	0.6
	2.2	1.0	0.5	0.1	1.0	1.0	1.0	0.5
	2.3	0.1	0.1	0.1	0.1	0.1	0.1	1.0
	2.4	0.1	0.1	0.1	0.1	0.1	1.0	0.1
	2.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0
	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	2.7	0.5	1.0	0.1	1.0	1.0	0.1	0.5
	2.8	0.1	0.1	1.0	1.0	1.0	0.5	1.0
	FVI	0.4	0.4	0.4	0.6	0.6	0.5	0.6
	Mean FVI							
	AREA	22.7	7.0	12.4	40.4	27.1	26.6	6.0
	WVU	8.6	2.7	4.5	23.8	16.1	13.1	3.6
Function 3A		N/A		N/A		N/A	N/A	N/A
Fish Habitat Streams								
	3.1		1.0		0.5			
	3.2		0.1		0.1			
	3.3		0.1		0.1			
	3.4		1.0		1.0			
	3.5		0.1		0.1			

JORDAN BROOK WATERSHED								
Waterford, CT								
CENTRAL JORDAN BROOK								
Functional								
Values	Question	JCT3	JCT4	JCT5	JCT6	JCS1	JCS2A	JCP1
	3.6		0.5		1.0			
	3.7		1.0		1.0			
	3.8		0.5		0.5			
	3.9		0.1		0.5			
	FVI		0.5		0.5			
	Mean FVI							
	AREA		7.0		40.4			
	WVU		3.4		21.5			
Function 3B								
Fish Habitat Ponds								
		N/A	N/A	N/A	N/A	N/A	N/A	
	3.1							1.0
	3.2							0.1
	3.3							0.5
	3.4							0.5
	3.5							0.5
	3.6							0.1
	FVI							0.5
	Mean FVI							
	AREA							6.0
	WVU							2.7
Function 5								
Visual/Esthetic								
	5.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	5.2	0.1	1.0	0.1	0.1	0.5	0.1	1.0
	5.3	0.5	0.5	0.1	0.1	1.0	0.1	0.5
	5.4	1.0	0.1	0.5	1.0	1.0	0.1	1.0
	5.5	0.1	0.1	0.1	0.1	0.1	0.1	1.0
	5.6	0.5	0.5	0.5	1.0	1.0	0.1	0.1
	5.7	0.1	0.1	0.5	0.5	0.5	0.1	0.1
	5.8	0.5	1.0	0.5	1.0	1.0	0.5	1.0
	5.9	1.0	0.5	1.0	0.1	1.0	1.0	0.1
	5.10	0.4	0.4	0.4	0.6	0.6	0.5	0.6
	FVI	0.4	0.4	0.4	0.5	0.7	0.3	0.6
	Mean FVI							
	AREA	22.7	7.0	12.4	40.4	27.1	26.6	6.0
	WVU	9.7	3.0	4.7	18.5	18.4	7.2	3.3

JORDAN BROOK WATERSHED							
Waterford, CT							
UPPER JORDAN BROOK							
Functional Values	Question	JUM1A	JUM1B	JUT1	JUS1	JUP1	JUP2
Function 1							
Ecological Integrity							
	1.1	1.0	1.0	1.0	1.0	1.0	1.0
	1.2	0.5	0.5	1.0	1.0	N/A	1.0
	1.3	1.0	1.0	1.0	1.0	0.1	1.0
	1.4	0.5	0.5	1.0	1.0	0.1	0.5
	1.5	1.0	1.0	0.1	0.5	1.0	1.0
	1.6	0.5	0.5	1.0	0.1	0.1	0.5
	1.7	1.0	1.0	0.5	0.5	1.0	1.0
	1.8	0.1	1.0	0.5	0.1	0.1	0.5
	1.9	1.0	1.0	0.1	0.5	1.0	0.5
	1.10	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	1.0	1.0	1.0	1.0	1.0	1.0
	1.12	0.5	1.0	1.0	0.5	0.5	0.1
	FVI	0.8	0.9	0.8	0.7	0.6	0.8
	Mean FVI	0.8					
	AREA	45.5		9.5	3.6	2.2	2.8
	WVU	37.2		7.3	2.5	1.3	2.1
Function 2							
Wildlife Habitat							
	2.1	0.8	0.9	0.8	0.7	0.6	0.8
	2.2	1.0	1.0	0.5	0.5	0.5	0.1
	2.3	1.0	1.0	0.1	0.1	1.0	0.5
	2.4	0.5	0.5	0.1	0.5	0.1	0.5
	2.5	0.5	0.5	0.5	0.5	1.0	1.0
	2.6	0.5	0.5	0.1	0.1	0.1	0.1
	2.7	0.1	0.1	1.0	1.0	0.5	0.5
	2.8	1.0	1.0	1.0	0.1	0.1	0.1
	FVI	0.7	0.7	0.5	0.4	0.5	0.4
	Mean FVI	0.7					
	AREA	45.5		9.5	3.6	2.2	2.8
	WVU	30.8		4.8	1.6	1.1	1.2
Function 3A							
Fish Habitat Streams							
	3.1	1.0	1.0				
	3.2	0.1	0.1				
	3.3	0.5	0.5				
	3.4	1.0	1.0				

JORDAN BROOK WATERSHED							
Waterford, CT							
UPPER JORDAN BROOK							
Functional							
Values	Question	JUM1A	JUM1B	JUT1	JUS1	JUP1	JUP2
	3.5	0.5	0.5				
	3.6	1.0	1.0				
	3.7	0.5	1.0				
	3.8	1.0	1.0				
	3.9	1.0	1.0				
	FVI	0.7	0.8				
	Mean FVI	0.8					
	AREA	45.5					
	WVU	34.6					
Function 3B							
Fish Habitat Ponds							
		N/A	N/A	N/A			
	3.1				1.0	1.0	1.0
	3.2				0.1	0.1	0.1
	3.3				0.5	0.5	0.1
	3.4				0.1	0.1	0.5
	3.5				0.5	1.0	1.0
	3.6				0.1	0.1	1.0
	FVI				0.4	0.5	0.6
	Mean FVI						
	AREA				3.6	2.2	2.8
	WVU				1.4	1.0	1.7
Function 5							
Visual/Esthetic							
	5.1	1.0	0.5	0.5	0.1	0.1	0.1
	5.2	0.1	0.1	0.5	0.5	1.0	1.0
	5.3	0.1	1.0	0.5	0.1	0.1	0.1
	5.4	1.0	1.0	1.0	1.0	1.0	1.0
	5.5	0.1	0.5	0.1	0.5	1.0	1.0
	5.6	0.1	1.0	0.1	0.5	0.1	0.5
	5.7	0.5	0.5	1.0	0.5	0.1	0.1
	5.8	1.0	1.0	0.5	0.5	0.5	1.0
	5.9	1.0	1.0	0.1	0.1	0.5	0.1
	5.10	0.7	0.7	0.5	0.4	0.5	0.4
	FVI	0.6	0.7	0.5	0.4	0.5	0.5
	Mean FVI	0.6					
	AREA	45.5		9.5	3.6	2.2	2.8
	WVU	29.2		4.6	1.5	1.1	1.5

JORDAN BROOK WATERSHED								
Waterford, CT								
NEVINS BROOK								
Functional Values	Question	NM1A	NM1B	NM1C	NM2A	NM2B	NT1	NT2A
Function 1								
Ecological Integrity								
	1.1	1.0	1.0	1.0	1.0	1.0	1.0	0.1
	1.2	0.1	0.1	0.1	0.1	0.1	1.0	1.0
	1.3	0.5	0.5	0.5	1.0	1.0	1.0	1.0
	1.4	0.1	0.1	0.1	1.0	1.0	0.1	1.0
	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.6	0.1	0.1	0.1	1.0	1.0	1.0	1.0
	1.7	0.1	1.0	0.1	1.0	1.0	1.0	0.5
	1.8	0.1	1.0	0.1	1.0	1.0	1.0	0.5
	1.9	1.0	1.0	0.5	1.0	1.0	1.0	1.0
	1.10	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.12	1.0	1.0	1.0	1.0	1.0	1.0	0.5
	FVI	0.6	0.7	0.5	0.9	0.9	0.9	0.8
	Mean FVI	0.6			0.9			0.7
	AREA	30.3			16.3		26.8	6.5
	WVU	18.8			15.1		24.8	4.4
Function 2								
Wildlife Habitat								
	2.1	0.6	0.7	0.5	0.9	0.9	0.9	0.8
	2.2	1.0	1.0	1.0	1.0	1.0	1.0	0.5
	2.3	1.0	1.0	1.0	0.5	0.5	0.5	0.1
	2.4	0.5	0.5	0.5	0.5	0.5	1.0	1.0
	2.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	2.7	0.5	0.5	0.5	1.0	0.5	1.0	1.0
	2.8	0.1	0.1	0.1	1.0	1.0	1.0	1.0
	FVI	0.5	0.6	0.5	0.7	0.6	0.8	0.6
	Mean FVI	0.5			0.7			0.6
	AREA	30.3			16.3		26.8	6.5
	WVU	16.4			10.7		20.2	4.0
Function 3A								
Fish Habitat Streams								
	3.1	1.0	1.0	1.0	1.0	1.0	1.0	0.1
	3.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	3.3	0.5	0.5	0.5	0.5	0.5	0.1	0.1
	3.4	0.5	0.5	0.5	1.0	1.0	0.1	1.0
	3.5	0.5	0.5	0.5	0.5	0.1	0.1	0.1

JORDAN BROOK WATERSHED								
Waterford, CT								
NEVINS BROOK								
Functional Values	Question	NM1A	NM1B	NM1C	NM2A	NM2B	NT1	NT2A
	3.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	3.7	0.5	1.0	1.0	1.0	1.0	1.0	0.5
	3.8	0.5	1.0	1.0	1.0	0.5	0.5	1.0
	3.9	0.1	1.0	0.1	0.5	0.1	0.1	0.1
	FVI	0.5	0.7	0.6	0.7	0.6	0.4	0.4
	Mean FVI	0.6			0.7			0.4
	AREA	30.3			16.3		26.8	6.5
	WVU	19.1	0.0	0.0	10.8		11.9	2.7
Function 3B								
Fish Habitat Ponds								
		N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.1							
	3.2							
	3.3							
	3.4							
	3.5							
	3.6							
	FVI							
	Mean FVI							
	AREA							
	WVU							
Function 5								
Visual/Esthetic								
	5.1	0.5	0.5	0.5	0.5	0.5	1.0	0.5
	5.2	0.5	0.5	0.1	0.5	0.1	0.1	0.1
	5.3	0.1	0.5	0.1	1.0	0.1	1.0	0.1
	5.4	0.5	1.0	1.0	1.0	1.0	1.0	0.5
	5.5	0.1	0.5	0.1	0.1	0.1	1.0	0.1
	5.6	0.5	1.0	0.1	1.0	1.0	1.0	0.5
	5.7	0.1	0.1	0.1	0.1	0.5	0.5	0.1
	5.8	0.5	1.0	0.5	1.0	1.0	1.0	1.0
	5.9	0.1	1.0	0.5	0.5	0.5	1.0	0.5
	5.10	0.5	0.6	0.5	0.7	0.6	0.8	0.6
	FVI	0.3	0.7	0.4	0.6	0.5	0.8	0.4
	Mean FVI	0.5			0.6			0.3
	AREA	30.3			16.3		26.8	6.5
	WVU	13.8			9.6		22.4	1.9

JORDAN BROOK WATERSHED							
Waterford, CT							
NEVINS BROOK							
Functional Values	Question	NT2B	NT3	NS1	NS2A	NP1A	NP2
	3.5	0.1	0.1				
	3.6	1.0	1.0				
	3.7	0.5	1.0				
	3.8	0.5	1.0				
	3.9	0.1	0.5				
	FVI	0.4	0.6				
	Mean FVI						
	AREA		7.1				
	WVU		4.6				
Function 3B							
Fish Habitat Ponds							
		N/A	N/A	N/A			
	3.1				1.0	1.0	1.0
	3.2				0.1	0.1	0.1
	3.3				0.5	0.1	0.5
	3.4				0.1	0.5	0.1
	3.5				1.0	1.0	0.1
	3.6				0.1	1.0	0.1
	FVI				0.5	0.6	0.3
	Mean FVI						
	AREA				14.4	2.5	3.7
	WVU				6.7	1.5	1.2
Function 5							
Visual/Esthetic							
	5.1	0.5	0.5	0.1	1.0	1.0	0.5
	5.2	0.1	0.1	0.1	1.0	1.0	1.0
	5.3	0.1	0.1	1.0	0.1	0.5	1.0
	5.4	0.1	1.0	0.5	0.5	1.0	1.0
	5.5	0.1	0.1	0.1	0.1	1.0	0.5
	5.6	0.1	1.0	0.5	0.5	1.0	0.5
	5.7	0.1	0.5	0.5	0.1	0.5	0.1
	5.8	0.1	1.0	0.5	0.5	1.0	0.5
	5.9	0.1	0.5	1.0	1.0	1.0	1.0
	5.10	0.6	0.5	0.6	0.6	0.4	0.6
	FVI	0.2	0.5	0.5	0.5	0.8	0.7
	Mean FVI						
	AREA		7.1	13.9	14.4	2.5	3.7
	WVU		3.8	6.8	7.7	2.1	2.5

JORDAN BROOK WATERSHED							
Waterford, CT							
		NEVINS BROOK					
Functional							
Values	Question	NT2B	NT3	NS1	NS2A	NP1A	NP2
Function 1							
Ecological Integrity							
	1.1	0.1	1.0	1.0	1.0	1.0	1.0
	1.2	1.0	0.1	1.0	1.0	1.0	1.0
	1.3	0.1	1.0	0.5	0.5	1.0	0.5
	1.4	1.0	1.0	0.1	0.1	0.1	0.1
	1.5	0.1	1.0	1.0	1.0	1.0	1.0
	1.6	1.0	1.0	0.5	1.0	0.1	0.1
	1.7	0.1	1.0	0.5	0.5	1.0	0.5
	1.8	0.1	1.0	0.5	0.5	0.5	0.5
	1.9	1.0	1.0	1.0	1.0	0.5	1.0
	1.10	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	0.1	1.0	1.0	1.0	1.0	1.0
	1.12	1.0	1.0	1.0	0.5	1.0	1.0
	FVI	0.6	0.9	0.8	0.8	0.8	0.7
	Mean FVI						
	AREA		7.1	13.9	14.4	2.5	3.7
	WVU		6.6	10.5	10.9	1.9	2.7
Function 2							
Wildlife Habitat							
	2.1	0.6	0.9	0.8	0.8	0.8	0.7
	2.2	0.5	0.5	1.0	1.0	0.1	0.5
	2.3	0.1	0.1	0.1	0.5	0.5	1.0
	2.4	1.0	0.5	0.5	1.0	0.5	0.5
	2.5	0.5	0.5	0.5	0.5	1.0	1.0
	2.6	0.1	0.1	0.1	0.1	0.1	0.1
	2.7	1.0	1.0	0.5	0.1	0.5	0.5
	2.8	1.0	0.5	1.0	0.5	0.1	0.1
	FVI	0.6	0.5	0.6	0.6	0.4	0.6
	Mean FVI						
	AREA		7.1	13.9	14.4	2.5	3.7
	WVU		3.7	7.7	8.0	1.1	2.0
Function 3A				N/A N/A		N/A	N/A
Fish Habitat Streams							
	3.1	0.1	1.0				
	3.2	0.1	0.1				
	3.3	0.1	0.1				
	3.4	1.0	1.0				

JORDAN BROOK WATERSHED								
Waterford, CT								
EAST BROOK								
Functional								
Values	Question	EM1A	EM1B	EM2	EM3A	EM3B	ET1	ES1
Function 1								
Ecological Integrity								
	1.1	0.5	0.5	0.5	0.5	0.5	1.0	0.5
	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.3	0.1	0.1	0.1	1.0	1.0	0.1	0.1
	1.4	0.5	0.5	0.1	0.5	0.5	0.1	0.5
	1.5	0.5	1.0	0.5	1.0	1.0	0.5	0.5
	1.6	0.1	0.1	0.1	1.0	1.0	0.5	0.1
	1.7	0.1	0.1	0.1	1.0	0.5	1.0	0.5
	1.8	0.1	0.1	0.1	1.0	0.5	0.1	0.5
	1.9	0.5	0.5	0.1	1.0	1.0	1.0	1.0
	1.10	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.11	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.12	0.5	0.1	0.5	1.0	1.0	0.5	0.1
	FVI	0.5	0.5	0.4	0.9	0.8	0.7	0.6
	Mean FVI	0.5			0.9			
	AREA	47.3		17.8	39.9		14.3	27.5
	WVU	23.5		7.6	34.9		9.3	15.6
Function 2								
Wildlife Habitat								
	2.1	0.5	0.5	0.4	0.9	0.8	0.7	0.6
	2.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2.3	0.5	0.5	0.1	0.1	0.5	0.1	0.1
	2.4	0.5	0.5	0.1	1.0	1.0	0.1	0.5
	2.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	2.6	0.1	0.1	0.1	0.5	0.5	0.1	0.1
	2.7	0.1	0.1	0.5	0.5	0.5	0.1	0.1
	2.8	0.5	0.5	0.1	1.0	1.0	0.5	0.1
	FVI	0.5	0.5	0.4	0.7	0.7	0.4	0.4
	Mean FVI	0.5			0.7			
	AREA	47.3		17.8	39.9		14.3	27.5
	WVU	21.9		6.3	28.3		5.5	10.2
Function 3A								
Fish Habitat Streams								
	3.1	0.5	0.5	0.5	0.5	0.5	1.0	
	3.2	0.1	0.1	0.1	0.1	0.1	0.1	
	3.3	0.5	0.5	0.5	0.1	0.1	0.1	
	3.4	0.1	0.1	1.0	1.0	1.0	0.5	
	3.5	0.5	0.5	0.5	0.5	0.1	0.1	

JORDAN BROOK WATERSHED								
Waterford, CT								
EAST BROOK								
Functional								
Values	Question	EM1A	EM1B	EM2	EM3A	EM3B	ET1	ES1
	3.6	0.5	0.5	0.5	1.0	1.0	1.0	
	3.7	0.5	0.5	0.5	1.0	1.0	0.5	
	3.8	0.5	0.5	0.5	1.0	0.5	0.5	
	3.9	0.5	0.5	0.1	1.0	0.1	0.5	
	FVI	0.4	0.4	0.5	0.7	0.5	0.5	
	Mean FVI	0.4			0.6			
	AREA	47.3		17.8	39.9		14.3	
	WVU	19.4		8.3	23.5		6.8	
Function 3B								
Fish Habitat Ponds								
		N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.1							
	3.2							
	3.3							
	3.4							
	3.5							
	3.6							
	FVI							
	Mean FVI							
	AREA							
	WVU							
Function 5								
Visual/Esthetic								
	5.1	0.1	0.5	0.1	0.1	0.1	0.5	1.0
	5.2	0.5	0.5	0.5	0.1	0.1	0.1	1.0
	5.3	0.5	0.5	0.1	1.0	0.5	0.5	0.5
	5.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	5.5	0.1	0.1	0.1	1.0	0.1	0.1	0.1
	5.6	0.1	0.1	0.1	1.0	1.0	0.5	0.1
	5.7	0.1	0.1	0.5	0.5	1.0	0.1	0.1
	5.8	0.5	0.1	0.1	1.0	1.0	1.0	0.1
	5.9	0.1	0.5	0.1	0.5	1.0	0.5	0.1
	5.10	0.5	0.5	0.4	0.7	0.7	0.4	0.4
	FVI	0.3	0.4	0.3	0.7	0.7	0.5	0.4
	Mean FVI	0.4			0.7			
	AREA	47.3		17.8	39.9		14.3	27.5
	WVU	17.3		5.3	26.8		6.7	12.0

JORDAN BROOK WATERSHED				
Waterford, CT				
EAST BROOK				
Functional				
Values	Question	ES2	EP1	EP2
Function 1				
Ecological Integrity				
	1.1	1.0	0.5	0.1
	1.2	1.0	1.0	1.0
	1.3	0.5	0.1	0.1
	1.4	0.5	0.1	0.1
	1.5	1.0	0.5	0.5
	1.6	1.0	0.1	0.1
	1.7	1.0	0.1	0.1
	1.8	1.0	0.1	0.1
	1.9	1.0	0.1	0.1
	1.10	1.0	1.0	1.0
	1.11	1.0	1.0	1.0
	1.12	1.0	0.1	0.1
	FVI	0.9	0.4	0.4
	Mean FVI			
	AREA	34.9	0.8	1.2
	WVU	32.0	0.3	0.4
Function 2				
Wildlife Habitat				
	2.1	0.9	0.4	0.4
	2.2	1.0	0.1	0.1
	2.3	0.1	0.1	0.5
	2.4	0.1	0.1	0.1
	2.5	0.5	1.0	1.0
	2.6	0.5	0.1	0.1
	2.7	1.0	0.1	0.1
	2.8	1.0	0.1	0.1
	FVI	0.6	0.2	0.3
	Mean FVI			
	AREA	34.9	0.8	1.2
	WVU	22.3	0.2	0.4
Function 3A				
Fish Habitat Streams				
	3.1			
	3.2			
	3.3			
	3.4			

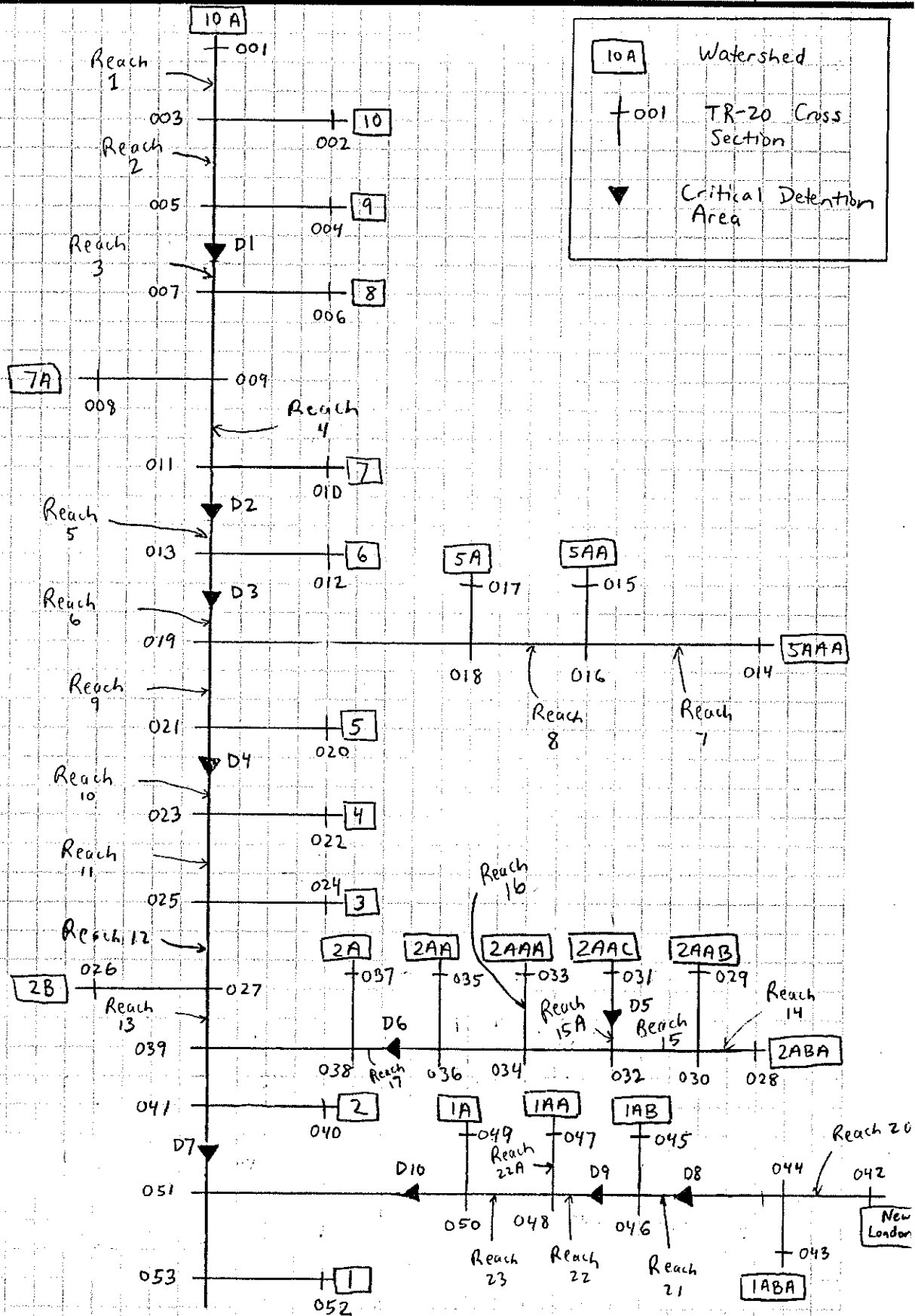
JORDAN BROOK WATERSHED				
Waterford, CT				
EAST BROOK				
Functional				
Values	Question	ES2	EP1	EP2
	3.5			
	3.6			
	3.7			
	3.8			
	3.9			
	FVI			
	Mean FVI			
	AREA			
	WVU			
Function 3B				
Fish Habitat Ponds				
		N/A		
	3.1		0.5	0.1
	3.2		0.1	0.1
	3.3		0.1	0.1
	3.4		0.1	0.5
	3.5		0.1	0.1
	3.6		1.0	1.0
	FVI		0.3	0.3
	Mean FVI			
	AREA		0.8	1.2
	WVU		0.3	0.4
Function 5				
Visual/Esthetic				
	5.1	0.5	0.1	0.1
	5.2	0.5	1.0	1.0
	5.3	1.0	0.5	0.1
	5.4	1.0	0.1	0.5
	5.5	0.1	0.5	0.5
	5.6	1.0	0.5	0.5
	5.7	0.5	0.1	0.1
	5.8	1.0	0.5	0.5
	5.9	1.0	0.1	0.1
	5.10	0.6	0.2	0.3
	FVI	0.7	0.4	0.4
	Mean FVI			
	AREA	34.9	0.8	1.2
	WVU	25.3	0.3	0.4

APPENDIX G-1

TR-20 Model Schematic Watershed Diagram



Jordan Brook Watershed Flow Diagram

SHEET NO.
1 of 1

APPENDIX G-2

Time of Concentration Calculation Worksheets

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked SSB Date 4/21/98

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

AB	
Dense Grass	
0.24	
200	
3.4	
0.01	
0.53	+

= 0.53

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

BC	
unpaved	
2600	
0.019	
2.2	
0.33	+

= 0.33

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

CD	
4 (Stream)	
2000	
0.14	+

= 0.14

1.00

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

1A

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Woods Lt. Underbrush	
0.40	
200	
3.4	
0.02	
0.60	+ [] = 0.60

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
Unpaved	
2500	
0.026	
2.6	
0.27	+ [] = 0.27

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
2 (wetlands)	
4900	
0.68	+ [] = 0.68
1.55	

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked SJB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_c through subarea

1 AA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Dense Grass	
0.24	
100	
3.4	
0.06	
0.15	+
	=
	0.15

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
200	
0.05	
3.6	
0.02	+
	=
	0.02

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (channel, storm drainage)	
2600	
0.18	+
	=
	0.18
	0.35

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

1 AB

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

<u>AB</u>	
Dense Grass	
0.24	
100	
3.4	
0.04	
0.17	+
	=
	0.17

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

<u>BC</u>	
unpaved	
400	
0.10	
5.1	
0.02	+
	=
	0.02

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

<u>CD</u>	
2 (wetlands)	
2500	
0.35	+
	=
	0.35
	0.54

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_c through subarea

1 ABA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Dense Grass	
0.24	
200	
3.4	
0.05	
0.28	+
	= 0.28

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
250	
0.10	
5.1	
0.01	+
	= 0.01

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
7800	
0.54	+
	= 0.54
	0.83

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

AB	
Dense Grass	
0.24	
200	
3.4	
0.04	
0.30	+
	= 0.30

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

BC	
unpaved	
2150	
0.077	
4.5	
0.13	+
	= 0.13

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
3000	
0.21	+
	= 0.21
	0.64

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

2 A

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

AB	
Woods Light Underbrush	
0.40	
150	
3.4	
0.05	
0.33	+
	= 0.33

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

BC	
Unpaved	
2100	
0.045	
3.4	
0.17	+
	= 0.17

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
5750	
0.40	+
	= 0.40
	0.90

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

2 AA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

<u>AB</u>	
Dense Grass	
<u>0.24</u>	
<u>200</u>	
<u>3.4</u>	
<u>0.035</u>	
<u>0.32</u>	+

= 0.32

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

<u>BC</u>	
unpaved	
<u>300</u>	
<u>0.05</u>	
<u>3.6</u>	
<u>0.02</u>	+

= 0.02

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

<u>CD</u>	
<u>4 (stream channel)</u>	
<u>6250</u>	
<u>0.43</u>	+

= 0.43

0.77

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JJB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_c through subarea

2 AAA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

<u>AB</u>	
Dense Grass	
0.24	
150	
3.4	
0.067	
0.20	+
	=
	0.20

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

<u>BC</u>	
unpaved	
500	
0.128	
5.7	
0.02	+
	=
	0.02

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

<u>CD</u>	
4 (stream channel)	
1000	
0.07	+
	=
	0.07
	0.29

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

2 AAB

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

<u>AB</u>	
Dense Grass	
0.24	
100	
3.4	
0.03	
0.20	+
	=
	0.20

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

<u>BC</u>	
unpaved	
500	
0.10	
5.1	
0.03	+
	=
	0.03

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

<u>CD</u>	
4 (stream channel)	
200	
0.01	+
	=
	0.01
	0.24

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By ERM Date 4/16/98

Location Waterford, CT Checked ITB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

2 AAC

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Woods Light underbrush	
0.40	
150	
3.4	
0.04	
0.36	+
	=
	0.36

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
950	
0.076	
4.4	
0.06	+
	=
	0.06

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream)	
4200	
0.29	+
	=
	0.29
	0.71

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JJB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

2 ABA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

Segment ID	
AB	
Woods Light Underbrush	
0.40	
100	
3.4	
0.03	
0.30	+ [] = 0.30

Shallow concentrated flow

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

Segment ID	
BC	
unpaved	
400	
0.09	
4.8	
0.02	+ [] = 0.02

Channel flow

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

Segment ID	
CD	
4	
900	
0.06	+ [] = 0.06
0.38	

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/17/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

28

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Dense Grass	
0.24	
100	
3.4	
0.03	
0.20	+

= 0.20

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
100	
0.08	
4.6	
0.01	+

= 0.01

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
5600	
0.39	+

= 0.39

0.60

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By ERM Date 4/16/98
 Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

3

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

AB	
Woods Light Underbrush	
0.40	
100	
3.4	
0.03	
0.30	+

= 0.30

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

BC	
unpaved	
2350	
0.089	
4.8	
0.14	+

= 0.14

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
400	
0.03	+

= 0.03

0.47

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By Erm Date 4/16/98

Location Waterford CT Checked SJB Date 4/21/98

Circle one: Present Developed

Circle one: (T_c) T_c through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total L ≤ 300 ft) ft
4. Two-yr 24-hr rainfall, P₂ in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ hr

AB		
Dense Grass		
0.24		
200		
3.4		
0.065		
0.25	+	

- 0.25

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ hr

BC	
unpaired	
1150	
0.07	
4.3	
0.07	+ $\sqrt{\quad} - 0.07$

Channel flow

Segment ID

12. Cross sectional flow area, a ft^2
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n ft/s
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6,

CD	DE
2 (wetland)	4 (stream)
2100	5700
0.29	0.40

11. and 19) $0.29 + 0.40 = 0.69$

1.01

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By ERM Date 4/16/98

Location Waterford, CT Checked JJB Date 4/21/98

Circle one: Resen Developed

Circle one: T_c T_c through subarea

5

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Dense Grass	(overhead Utility Line)
0.24	
200	
3.4	
0.04	
0.30	+ = 0.30

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
1750	
0.074	
4.6	
0.11	+ = 0.11

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
6300	
0.44	+ = 0.44
	0.85

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

5A

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Woods Light Underbrush	
0.40	
150	
3.4	
0.05	
0.33	+

= 0.33

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
150	
0.05	
3.6	
0.01	+

= 0.01

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
1650	
0.11	+

= 0.11

0.45

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98
 Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

SAA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

<u>AB</u>	
<u>Woods</u> <u>Light Underbrush</u>	
<u>0.40</u>	
<u>200</u>	
<u>3.4</u>	
<u>0.025</u>	
<u>0.55</u>	<u>+</u>
	<u>= 0.55</u>

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

<u>BC</u>	
<u>unpaved</u>	
<u>1000</u>	
<u>0.085</u>	
<u>4.7</u>	
<u>0.06</u>	<u>+</u>
	<u>= 0.06</u>

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, P_w ft
14. Hydraulic radius, $r = \frac{a}{P_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

<u>CD</u>	<u>DE</u>
<u>2 (Wetland)</u>	<u>4 (Stream)</u>
<u>2100</u>	<u>4100</u>
<u>0.29</u>	<u>+</u>
	<u>0.28</u>
	<u>= 0.57</u>

1.18

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By ERM Date 4/16/98

Location Waterford, CT Checked JTB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

5AAA

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

<u>AB</u>	
Dense Grass	
<u>0.24</u>	
<u>150</u>	
<u>3.4</u>	
<u>0.02</u>	
<u>0.32</u>	+

= 0.32

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

<u>BC</u>	
unpaved	
<u>850</u>	
<u>0.076</u>	
<u>4.4</u>	
<u>0.05</u>	+

= 0.05

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

<u>CD</u>	
<u>4 (Stream channel)</u>	
<u>400</u>	
<u>0.03</u>	+

= 0.03

0.40

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

6

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
woods Light underbrush	
0.40	
100	
3.4	
0.04	
0.26	+

= 0.26

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
1650	
0.09	
4.9	
0.09	+

= 0.09

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $v = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
1300	
0.09	+

= 0.09

0.44

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By Evm Date 4/16/98

Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

7

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Dense Grass	(overhead Utility Line)
0.24	
200	
3.4	
0.02	
0.40	+ [] = 0.40

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
1600	
0.088	
4.8	
0.09	+ [] = 0.09

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
1350	
0.09	+ [] = 0.09
	0.58

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JJB Date 4/2/98

Circle one: Present Developed

Circle one: T_c T_c through subarea

7A

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

<u>AB</u>	
<u>Woods</u>	
<u>Light Underbrush</u>	
<u>0.40</u>	
<u>200</u>	
<u>3.4</u>	
<u>0.05</u>	
<u>0.42</u>	<u>+</u>
	<u>= 0.42</u>

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

<u>BC</u>	
<u>unpaved</u>	
<u>1350</u>	
<u>0.107</u>	
<u>5.2</u>	
<u>0.07</u>	<u>+</u>
	<u>= 0.07</u>

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

<u>CD</u>	
<u>4 (stream channel)</u>	
<u>1050</u>	
<u>0.07</u>	<u>+</u>
	<u>= 0.07</u>

0.56

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98
 Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

8

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Grass, Dense	
0.24	
200	
3.4	
0.025	
0.37	+ = 0.37

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
1550	
0.097	
5.0	
0.09	+ = 0.09

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	DE
4 (stream)	2 (wetland/marsh)
1500	1250
0.10	+ 0.17 = 0.27
	0.73

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 4/16/98

Location Waterford, CT Checked JJB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

9

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

AB	
Dense Grass	
0.24	
150	
3.4	
0.053	
0.22	+

= 0.22

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

BC	
unpaved	
1300	
0.082	
4.6	
0.08	+

= 0.08

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
1900	
0.13	+

= 0.13

0.43

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By ERM Date 4/16/98

Location Waterford, CT Checked JJB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

10

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

AB	
Woods Light Underbrush	
0.40	
200	
3.4	
0.025	
0.55	+

= 0.55

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

BC	
unpaved	
2300	
0.049	
3.5	
0.18	+

= 0.18

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

CD	
4 (stream channel)	
4000	
0.28	+

= 0.28

1.01

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By ERM Date 4/16/98
 Location Waterford, CT Checked JSB Date 4/21/98

Circle one: Present Developed

Circle one: T_c T_t through subarea

10A

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total $L \leq 300$ ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr

Segment ID	AB	
1. Surface description	Woods Light Underbrush	
2. Manning's roughness coeff., n	0.40	
3. Flow length, L	200	
4. Two-yr 24-hr rainfall, P_2	3.4	
5. Land slope, s	0.02	
6. T_t	0.60	+ [] = 0.60

Shallow concentrated flow

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr

Segment ID	BC	
7. Surface description	unpaved	
8. Flow length, L	2050	
9. Watercourse slope, s	0.061	
10. Average velocity, V	4.0	
11. T_t	0.14	+ [] = 0.14

Channel flow

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

Segment ID	CD	
12. Cross sectional flow area, a		
13. Wetted perimeter, p_w		
14. Hydraulic radius, r		
15. Channel slope, s		
16. Manning's roughness coeff., n		
17. V	4 (stream channel)	
18. Flow length, L	800	
19. T_t	0.06	+ [] = 0.06
20. Watershed or subarea T_c or T_t		0.80

TR-20 Model Input Summary Table
Jordan Brook Watershed Management Study
Waterford, Connecticut
April, 1998

Subwatershed	Area (sq. mi.)	Area (acres)	CN	Tc (hours)
1	0.165	105.7	74	1.00
1A	0.565	361.3	78	1.55
1AA	0.082	52.4	79	0.35
1AB	0.239	153.0	78	0.54
1ABA	0.474	303.4	78	0.83
2	0.318	203.7	67	0.64
2A	0.616	394.2	72	0.90
2AA	0.756	483.8	72	0.77
2AAA	0.048	30.4	71	0.29
2AAB	0.013	8.2	84	0.24
2AAC	0.301	192.9	80	0.71
2ABA	0.038	24.0	81	0.38
2B	0.430	274.9	73	0.60
3	0.146	93.1	67	0.47
4	0.906	580.0	61	1.01
5	0.708	453.1	72	0.85
5A	0.079	50.3	68	0.45
5AA	0.346	221.5	68	1.18
5AAA	0.040	25.3	76	0.40
6	0.095	61.1	75	0.44
7	0.169	108.4	70	0.58
7A	0.117	75.1	78	0.56
8	0.297	190.0	71	0.73
9	0.262	167.6	75	0.43
10	0.280	179.5	66	1.01
10A	0.209	133.6	69	0.80

T_c Summary

- Sheetflow
 - Maximum length = 200' (100' - 200')
 - Surface Type: Dense Grass or woods (light underbrush)
- Shallow Concentrated Flow
 - Unpaved only
- Channel Flow
 - Stream, Velocity = 4 ft/s
 - Wetlands, Velocity = 2 ft/s
 - Some watersheds have both (2 segments)

APPENDIX G-3

Model Input Calculations - New London Subwatershed



Jordan Brook Watershed Management Study

SHEET NO.
1 of

Purpose : Calculate runoff curve number, area, and time of concentration for the New London portion of the Jordan Brook Watershed.

Method : Delineate subwatershed from a USGS topo. map. Planimeter area of watershed. Compute weighted runoff curve number based on landuses shown on USGS topo. map and soil types published in Soil Conservation Service Soil Survey maps. Compute time of concentration using USGS topo. map information.

Calculations :

A) Watershed Area: See attached USGS topo. map for delineated watershed area.

$$\text{Planimetered Area} = 3.55 \text{ in.}^2 \times \left(\frac{2000 \text{ ft}}{1 \text{ in.}} \right)^2 = 1.42 \times 10^7 \text{ ft}^2 = 326 \text{ acres}$$

B) Runoff Curve Number: See attached USGS topo. map for landuses and soil types (hydrologic soil groups).

- Soils - Soil Survey for New London County, CT
- Landuse - USGS Topo. Map

Description	Cover Type	Soil Group	CN	(in ²) Area	Area (Acres)
* Residential 1	Residential (1/4 ac)	C	83 ✓	0.87	80.2
Cemetery/Park	Open Space (Fair)	B, C	74 ✓	0.16	14.7 ✓
School	Industrial	B	88 ✓	0.20	18.4 ✓
Woods/Wetland	Woods (Fair)	B	60 ✓	2.06	189.2 ✓
* Residential 2	Residential (1/8 ac)	B	85 ✓	0.19	17.6
Park	Open Space (Fair)	B, C	74 ✓	0.02	1.8 ✓
Roads	Impervious/Paved	B, C	90.5 ✓	0.045	4.17

* Excluding estimated area of roads.



Jordan Brook Watershed Study

SHEET NO.
2 of 3

Estimate area of roads in residential areas as follows:

Avg. Road

Width $\approx$ 30 feet

Measure lengths off of USGS topo map

$$\text{Area} = (\text{Avg. Width}) \times (\text{Total Length})$$

Total Length of Roads

Measured from USGS map $\approx$ 6050 ft

$$\begin{aligned} \text{Road Area} &= (6050 \text{ ft}) \times (30 \text{ ft}) = 181,500 \text{ ft}^2 \\ &= \underline{\underline{4.17 \text{ acres}}} \end{aligned}$$

$$\text{Weighted Curve Number} = \left(\sum_{i=1}^n A_i (CN_i) \right) / \left(\sum_{i=1}^n A_i \right)$$

$$\begin{aligned} \text{Weighted CN} &= (80.2) \times (83) \\ &+ (14.7) \times (74) \\ &+ (18.4) \times (88) \\ &+ (189.2) \times (60) \\ &+ (17.6) \times (85) \\ &+ (1.8) \times (74) \\ &+ (4.17) \times (90.5) = 22722.18 / 326.07 \\ &= \underline{\underline{69.7 \approx 70}} \end{aligned}$$

c) Time of Concentration: Use SCS method described in TR-55/TR-20.

Flow path segments (sheetflow, shallow concentrated, channel flow) are shown on the attached map.

See the attached worksheet for T_c calculation.



Flow Type	Segment	Length
Sheetflow	AB	200 ft.
Shallow Concen.	BC	4000 ft.
Channel	CD	2000 ft.

- Assume a channel flow velocity of 2 feet per second.
 - Assume sheetflow vegetation is woods with light underbrush, $n = 0.40$
 - Shallow concentrated flow path ; slope $\approx \frac{(178-50)}{4000} = 0.032$
- Unpaved surface ; From TR-55 Fig. 3-1 Avg. Velocity = 2.9 fps

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Jordan Brook Watershed By EVM Date 3/31/98

Location New London Subwatershed Checked DEA Date 4/14/98

Circle one: Present Developed

Circle one: T_c T_t through subarea New London Subwatershed

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

	Segment ID	
1. Surface description (table 3-1)	A-B	
2. Manning's roughness coeff., n (table 3-1) ..	Woods lt. Underbrush	
3. Flow length, L (total L $\leq$ 300 ft)	0.40	
4. Two-yr 24-hr rainfall, P_2	200	
5. Land slope, s	3.4	
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c	0.02	
	0.60 +	0.60

Shallow concentrated flow

	Segment ID	
7. Surface description (paved or unpaved)	B-C	
8. Flow length, L	unpaved	
9. Watercourse slope, s	4000	
10. Average velocity, V (figure 3-1)	0.032	
11. $T_t = \frac{L}{3600 V}$ Compute T_t	2.9	
	0.38 +	0.38

Channel flow

	Segment ID	
12. Cross sectional flow area, a	C-D	
13. Wetted perimeter, P_w		
14. Hydraulic radius, $r = \frac{a}{P_w}$ Compute r		
15. Channel slope, s		
16. Manning's roughness coeff., n		
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V		
18. Flow length, L		
19. $T_t = \frac{L}{3600 V}$ Compute T_t		
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19)	2*	
	2000	
	0.28 +	0.28
		1.26

* Estimated velocity.

Table 2-2a.—Runoff curve numbers for urban areas¹

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ³		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ⁴					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹Average runoff condition, and $I_a = 0.25$.²The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c.—Runoff curve numbers for other agricultural lands¹

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Land Trust Utility Transmission Vacant Brush—brush-weed-grass mixture with brush the major element. ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ³	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
PA-490 Private Open Space Public Land Woods. ⁶	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹Average runoff condition, and $I_a = 0.28$.²Poor: <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: >75% ground cover and lightly or only occasionally grazed.

³Poor: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴Actual curve number is less than 39; use CN = 39 for runoff computations.⁵CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.⁶Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Tc Flow Path

Jordan Brook
Watershed Boundary

New London Portion
of Jordan Brook
Watershed

Boundary Between
Landuses

Estimated Area of Roads

Residential
Ud, PbB (C)

Cemetery / Park
Ud, CrC, WyB
(B) (C)

School
Ud, Ur (B)

Woods / Swamp
CrC, CrD, SwB (B)

Residential
Ur, Ud, CoB, CrC
(B)

Field / Park
Ud (B, C)

APPENDIX G-4

Elevation-Storage-Discharge Calculations

Jordan Brook Watershed Management Study
TR-20 Critical Detention CalculationsSHEET NO.
1 of 3Purpose:

Estimate elevation - storage curve for critical detention areas for which no information was available from previous studies.

Approach:

Based on the surveyed culvert configurations (provided by the Town of Waterford) (see attached fax) and two-foot topo. contour mapping, estimate the storage volume associated with elevation ranges between the culvert invert and top of road.

Calculations:

A) Culvert 1.2 - Miner Lane North of Tracks

Triple C.M. Pipe Arch Culverts (24" x 35")

Invert (in) = 13.20

Top of Pipe = 15.20

Centerline of road over culvert = 17.89

Elev. Range (ft)	ΔH (ft)	Planimetered Area (in ²)	Area (ft ²)	Increment. Vol. (ft ³)	Cumulative Vol. (ft ³)
13.2-16	2.8	2.33	23,300	65,240	65,240
16-17	1	21.32	213,200	213,200	278,440

B) Culvert 1.3 - Route 1 West of Miner Lane

4' x 9' Concrete Box Culvert

Invert (in) = 31.74

Top of Headwall = 37.47

Elev. of top of culvert = 35.74

Centerline of road over culvert = 42.85

Channel is steep and narrow. As a result, channel only provides conveyance during large flows, not significant storage. Storage is provided in an isolated area west of the stream, approximately 200' upstream of the culvert. Calculate the storage - elevation relationship for this area.



Fuss & O'Neill Inc. Consulting Engineers

PREPARED
BY
EVMDATE
5/18/98CHECKED
BY
JSBDATE
4/20/98PROJECT NO
93154 A2Jordan Brook Watershed Management Study
TR-20 Critical Detention CalculationsSHEET NO.
2 of 3

<u>Elev. Range (ft)</u>	<u>ΔH (ft)</u>	<u>Planimetered Area (in.²)</u>	<u>Area (ft²)</u>	<u>Incum. Volume (ft³)</u>	<u>Cumulative Volume (ft³)</u>
31.74-38	6.26	0.98	9800	61348	61348
38-40	2	2.29	229000	458000	519348
40-42	2	3.56	356000	712000	1,231,348

Jordan Brook Watershed Management Study
TR-20 Critical Detention CalculationsSHEET NO.
3 of 3C) Culvert 1 - Route 156 (Rope Ferry Road) 500' ± west of
Avery line

Conc. Box Culvert 5.3' x 14.5'

Inu. (In) = 7.79

Top of Headwall = 17.29

Center line of road over culvert = 15.07

Elev. Range (ft)	DH (ft)	Planimetered Area (in ²)	Area (ft ²)	Increment Volume (ft ³)	Cumulative Volume (ft ³)
7.79-12	4.21	18.09	180,900	761,589	761,589
12-14	2.0	10.77			
		57.93			
		41.62			
		+ 17.27			
		- 0.59			
		107.00	1,070,000	2,140,000	2,901,589

D) Culvert 1.1 - Great Neck Road 100' south of Rte 156

CM Pipe Arch 40" x 72"

Inu. (In) = 10.15

Top of Pipe = 13.47

Center line of Road over Culvert = 15.46.

Elev. Range (ft)	DH (ft)	Planimetered Area (in ²)	Area (ft ²)	Increment Volume (ft ³)	Cumulative Volume (ft ³)
10.15-14	3.85	50.33			
		- 0.84			
		- 0.33			
		49.16	491,600	1,892,660	1,892,660
14-15	1.00	66.50			
		+ 21.03			
		- 0.52			
		87.01	870,100	870,100	2,762,760

Jordan Brook Watershed Management Study
TR-20 Detention Calculations

Purpose: Calculate culvert discharge of critical detention locations based on measured culvert configuration and headwater depths.

Method: Use highway culvert charts to calculate culvert flow for 2' headwater depth intervals, assuming inlet control of culvert.

Calculations: Calculate discharge-depth relationships for the following structures:

(1) Miner Lane North of Tracks

Triple C.M. Pipe Arch Culverts (35" x 24")

Invert Elevation (In) = 13.20

Top of Pipe = 15.20

Centerline of Road over culvert = 17.89

Headwater Depth (HW)	Culvert Height (D)	(HW/D)	Discharge, Q [*] (cfs)
2.8	2	1.4	26
3.8	2	1.9	34
			} x 3 = 78
			102

use 36" x 22" culvert

(2) Great Neck Road 100' South of Rt. 156

C.M. Pipe Arch Culvert (72" x 40")

Invert Elevation (In) = 10.15

Top of Pipe = 13.47

Centerline of Road over Culvert = 15.46

(HW)	(D)	(HW/D)	Q [*]
3.85	3.32	1.2	110
4.85	3.32	1.5	135

Interpolate between
72" x 44" and 65" x 40"



* Q estimated from culvert chart based on the following assumptions:

- (1) inlet control
- (2) entrance type → headwall

Culvert Charts from: "Hydraulic Charts for the Selection of Highway Culverts", Hydraulic Engineering Circular No. 5, Hydraulics Branch, Bridge Division, Office of Engineering and Operations, Bureau of Public Roads, Washington, D.C., December 1965.

Hydraulic Charts for the Selection of Highway Culverts

Hydraulic Engineering Circular No. 5

December 1965*

Prepared by the Hydraulics Branch, Bridge Division, Office of Engineering
and Operations, Bureau of Public Roads, Washington, D. C. 20235

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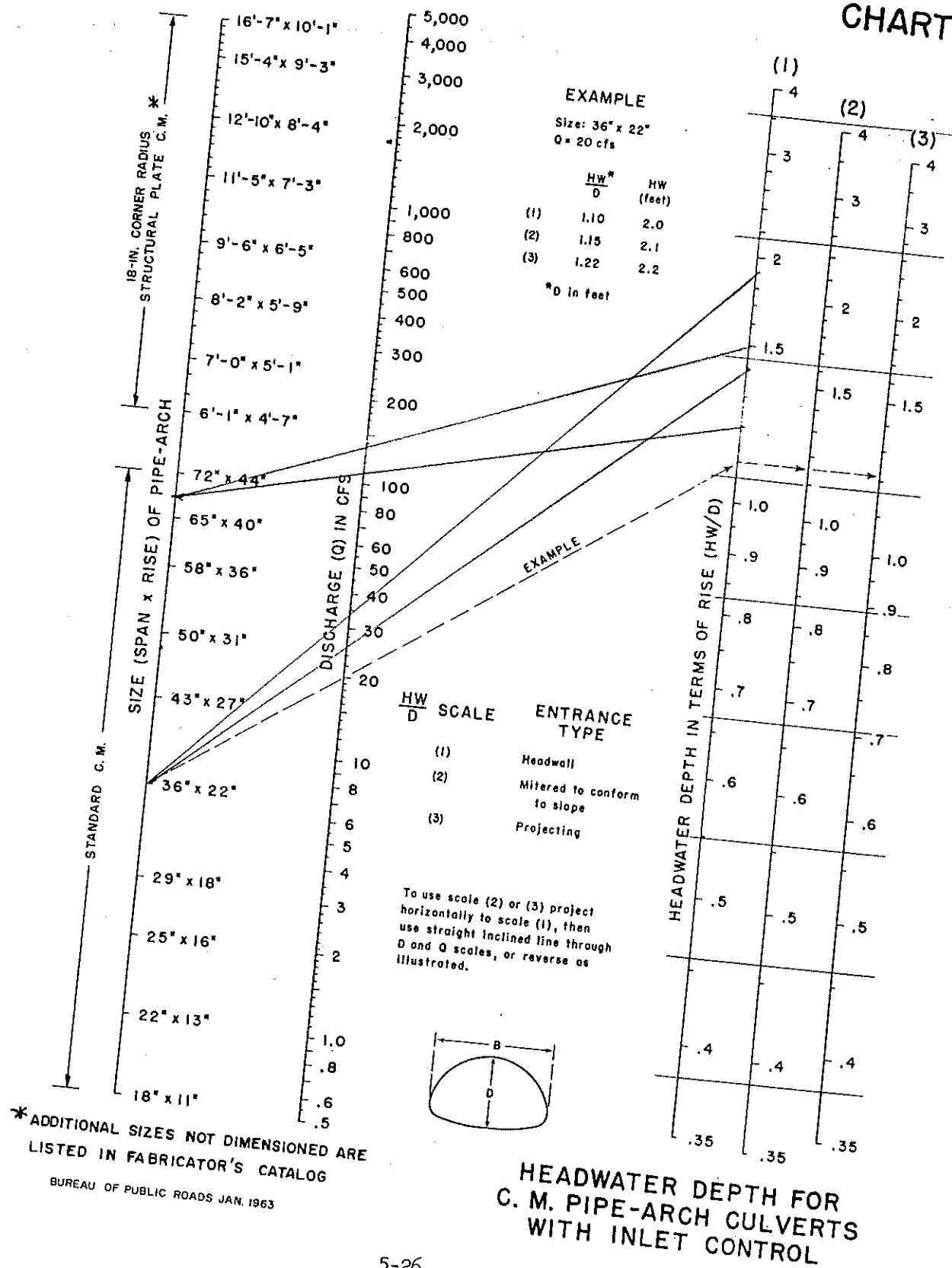
*See note back of cover for revisions.

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CHART 6



COPY
received
4/24 8:55**TOWN OF WATERFORD, CONNECTICUT INTER-OFFICE CORRESPONDENCE**

TO: Dean Audet, Eric Mas**FROM: Ronald Cusano P.E., L.S. - Assistant Director of Public Works***Rm Cusano***DATE: April 24, 1998****RE: Jordan Brook Management Study**

Enclosed is information on the four culvert locations as requested.

cc: **Edward D. Steward**
 Maureen Fitzgerald

APR 24 1998 8:56 NO.003 P.02

CULVERT DATA

(Information taken on 4/22/98 by survey crew)

1. Route 1 west of Miner Lane (1.3)

4'X9' Conc. Box Culvert

Inv (In) = 31.74

Top of Headwall = 37.47

Elev of top of Culvert = 35.74

Centerline of road over culvert = 42.85

2. Miner Lane North of Tracks (1.2)

Triple C.M. Pipe Arch Culverts 24"x35"

Inv(In) = 13.20

Top of pipe = 15.20

Centerline of road over culvert = 17.89

3. Route 156 (Rope Ferry Road) 500' +/- west of Avery Lane (1)

Conc. Box Culvert 5.3'x14.5'

Inv (In)= 7.79

Top of Headwall = 17.29

Centerline of road over culvert = 15.07

4. Great Neck Road 100' South of Rte 156 (1.1)

C.M. Pipe Arch 40"x72"

Inv(In)= 10.15

Top of pipe = 13.47

Centerline of road over culvert = 15.46

BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

May 27, 1998

Route 1

4' x 9' Box Culvert

Jordan Brook Watershed Management Study

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Span (Width of Opening) (feet).....	9.00
Culvert Rise (Height of Opening) (feet).....	4.00
FHWA Chart Number (8,9,10,11,12 or 13).....	8
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0120
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	50.0
Culvert Slope (feet per foot).....	0.0100

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Normal Depth Outlet Control	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
320.0	0.00	6.28	5.21	2.21	2.21	16.09
410.0	0.00	8.23	6.79	2.63	2.63	17.34
485.0	0.00	10.23	8.11	2.96	2.96	18.22

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BOX CULVERT ANALYSIS COMPUTATION OF CULVERT PERFORMANCE CURVE

May 27, 1998
Route 156
5.3' x 14.5' Box Culvert
Jordan Brook Watershed Management Study

PROGRAM INPUT DATA: DESCRIPTION

	VALUE
Culvert Span (Width of Opening) (feet).....	14.50
Culvert Rise (Height of Opening) (feet).....	5.30
FHWA Chart Number (8,9,10,11,12 or 13).....	8
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0120
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	50.0
Culvert Slope (feet per foot).....	0.0100

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet (ft) Control	Headwater Outlet (ft) Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
350.0	0.00	4.21	3.97	1.62	2.63	1.62	14.92
615.0	0.00	6.21	5.64	2.34	3.82	2.34	18.12

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Culvert 1.3 (Route 1) 4' x 9' Box Culvert

Elev.
Range
(ft)

31.74 - 38

38 - 40

40 - 42

Headwater
Depth
(ft)

6.26

8.26

10.26

330

410

485

Culvert 1 (Route 156) 5.3' x 14.5' Box Culvert

Elev.
Range
(ft)

7.79 - 12

12 - 14

Headwater
Depth
(ft)

4.21

6.21

350

415

BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

April 24, 1998
Route 1-4' x 9' Box Culvert
Jordan Brook Watershed Study
April 24, 1998

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Span (Width of Opening) (feet).....	9.00
Culvert Rise (Height of Opening) (feet).....	4.00
FHWA Chart Number (8,9,10,11,12 or 13).....	8
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0120
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	50.0
Culvert Slope (feet per foot).....	0.0100

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Normal Depth Outlet Control	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
75.0	0.00	2.05	2.26	0.84	1.29	6.45
200.0	0.00	4.02	3.53	1.60	1.60	13.85
305.0	0.00	6.00	4.97	2.14	2.14	15.85
400.0	0.00	7.99	6.63	2.58	2.58	17.22
480.0	0.00	10.08	8.01	2.94	2.94	18.16
540.0	0.00	11.90	9.21	3.19	3.19	18.78
600.0	0.00	13.93	10.55	3.45	3.45	19.34

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BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

April 24, 1998
Route 156 - 5.3' x 14.5' Box Culvert
Jordan Brook Watershed Study
April 24, 1998

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Span (Width of Opening) (feet).....	14.50
Culvert Rise (Height of Opening) (feet).....	5.30
FHWA Chart Number (8,9,10,11,12 or 13).....	8
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0120
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	50.0
Culvert Slope (feet per foot).....	0.0100

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet Control	Headwater Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
0.0	0.00	0.00	2.15	0.00	0.00	0.00	0.27
330.0	0.00	4.04	3.87	1.56	2.52	1.56	14.63
580.0	0.00	5.97	5.39	2.25	3.68	2.25	17.71
760.0	0.00	8.06	6.76	2.70	4.40	2.70	19.43
935.0	0.00	9.99	8.32	3.10	5.05	3.10	20.77

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APPENDIX G-5

Model "Reach" Calculations



Jordan Brook Watershed Management Study

SHEET NO.
1 ofPurpose

Generate "REACH" inputs for the TR-20 model run for the Jordan Brook Watershed existing conditions.

Approach

- 1) Select required reach segments
- 2) Measure reach lengths from 10' topographic map provided by the Town of Waterford
- 3) Estimate reach slope from 10' topo. map
- 4) Use the following assumptions to determine routing coefficients for the routing equation:

$$Q = x A^m \quad x, m = \text{coefficients}$$

- A) Trapezoidal stream channel
- B) Mannings $n = 0.04$
- C) Bottom width (average) = 8 ft
- D) Maximum depth (average) = 3 ft
- E) Side slopes of channel = 1:1

Use nomographs provided by the Soil Conservation Service for estimating x, m based on the above information.

Sources: Soil Conservation Service, 1982, "Draft - TR20 Computer Program for Project Formulation Hydrology", Revised by Northeast NTC and Hydrology Unit, Soil Conservation Service, Draft of Second Edition; May 1983.

Data Summary

See attached table for input parameters for each reach. Use attached nomographs, with input parameters, to estimate x, m .



Jordan Brook Watershed Management Study

SHEET NO.
2 of

Reach No.	Length (ft)	Upstream Elev. (ft)	Downstream Elev. (ft)	Slope	Manning's n	Bottom Width (ft)	Max. Depth (ft)	Side Slope	X	M
1	2100	190	130	0.029	0.04	8	3	1:1	1.70	1.53
2	1200	130	125	0.004					0.63	
3	1500	125	120	0.003					0.55	
4	2300	120	110	0.004					0.63	
5	1500	110	100	0.007					0.80	
6	2200	100	85	0.007					0.80	
7	6300	230	190	0.006					0.70	
8	2300	190	90	0.043					2.0	
9	4000	90	70	0.005					0.65	
10	6300	70	30	0.006					0.70	
11	1300	30	25	0.004					0.63	
12	800	25	20	0.006					0.70	
13	2500	20	10	0.004					0.63	
15	4200	110	30	0.019					1.40	
15A	4200	60	30	0.007					0.80	
16	1200	45	30	0.012					1.0	
17	6500	30	10	0.003					0.55	
20	1800	$\Delta H = 10$		0.005					0.65	
21	1800	40	20	0.011					1.0	
22	2700	20	15	0.002					0.45	
22A	1100	25	15	0.009					0.90	
23	1700	15	10	0.003					0.55	
14	200	$\Delta H \approx 1$		0.005					0.65	

PB83-223768

DRAFT

TR-20
COMPUTER PROGRAM
FOR
PROJECT FORMULATION
HYDROLOGY

Revised by
Northeast NTC and Hydrology Unit
Soil Conservation Service
May 1982

Draft of Second Edition, May 1983

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

NOMOGRAPH FOR ESTIMATING X
FOR A TRAPEZOIDAL CHANNEL

$$Q = XA^M$$

SLOPE = BOTTOM SLOPE (FT/FT)

n = MANNING'S n

B = BOTTOM WIDTH (FT)

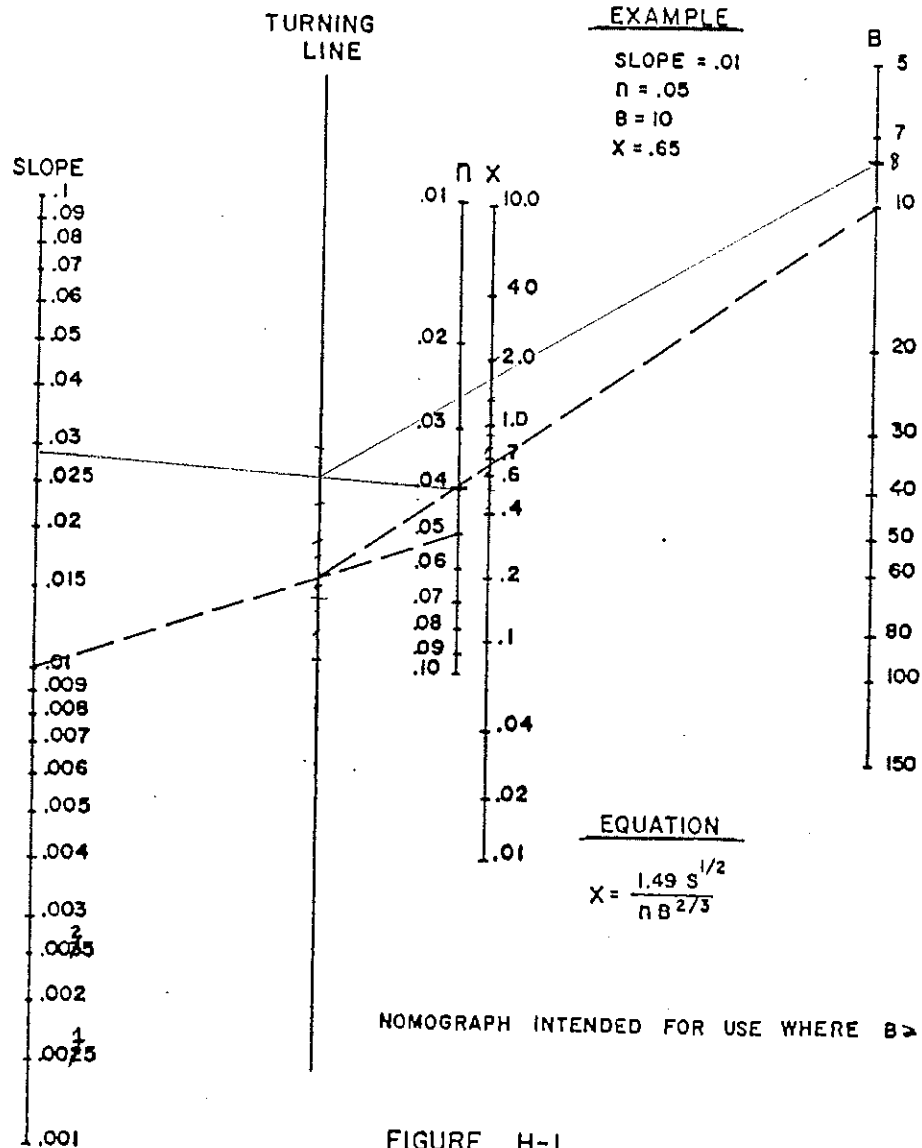


FIGURE H-1

$$n = 0.04$$

$$B = 8$$

NOMOGRAPH FOR ESTIMATING M
FOR A TRAPEZOIDAL CHANNEL

$$Q = XA^M$$

D = MAXIMUM DEPTH (FT)

B = BOTTOM WIDTH (FT)

Z = SIDE SLOPE

$$\text{AREA} = BD + ZD^2$$

EXAMPLE

$$D/B = 1.0$$

$$Z = 5.0$$

$$\text{AREA} = 1000 \text{ FT}^2$$

$$M = 1.44$$

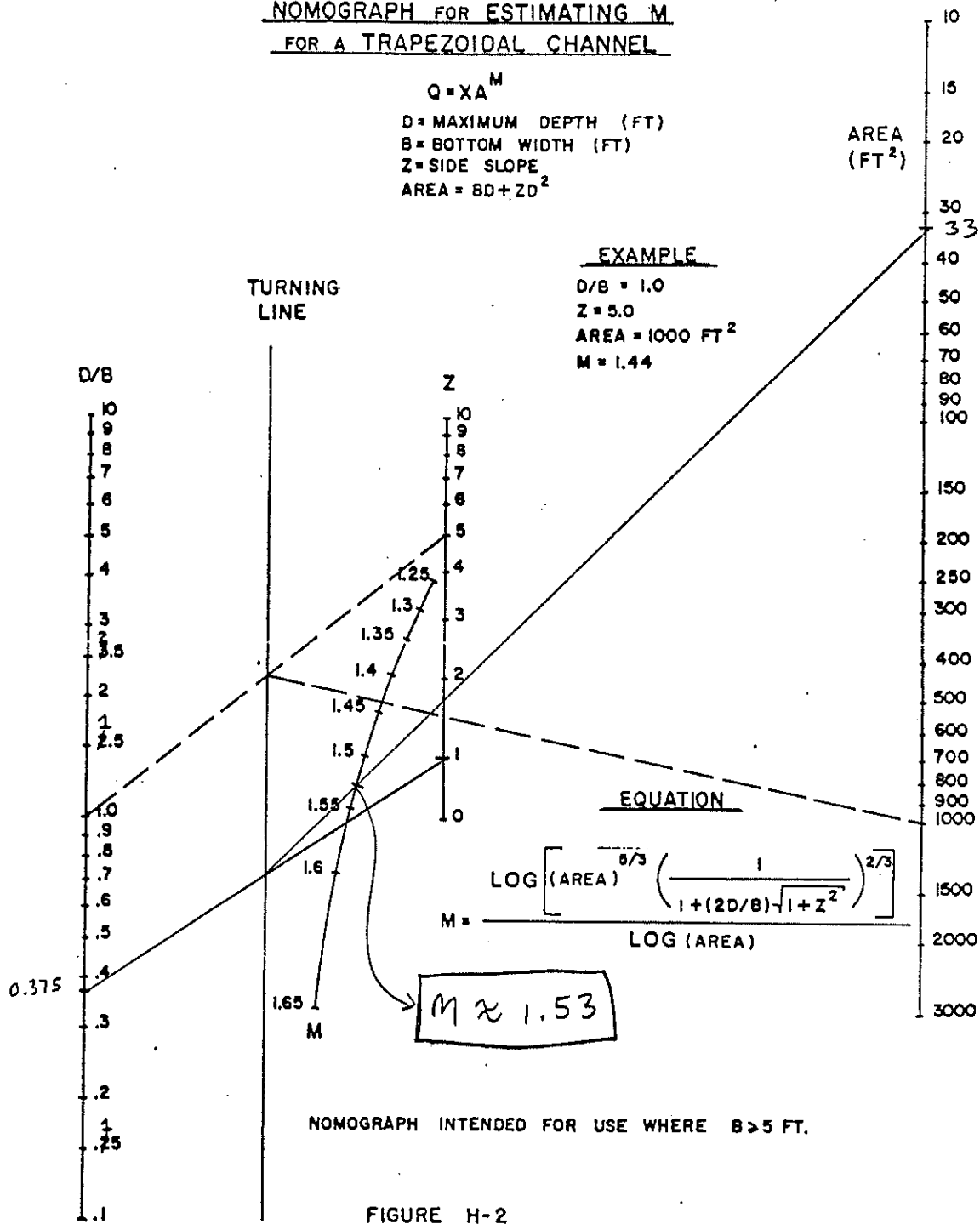


FIGURE H-2

$$D = 3 \text{ ft}$$

$$B = 8 \text{ ft}$$

$$Z = 1$$

$$\text{Area} = BD + ZD^2$$

$$= (8)(3) + (1)(3)^2$$

$$= 24 + 9 = 33 \text{ ft}^2$$

$$D/B = 3/8 = 0.375$$



Jordan Brook Watershed Management Study

SHEET NO.
3 of

TR-20 "REACH" Input Records: (Example)

6	REACH	3	001	7	5	1000.	0.4	0.2
Do not change			↑	↑	↑	↑	↑	↑
			Xsect ID	Input #1	Output	Reach length	X	M

* Edit the original TR-20 run to insert REACH records. See attached sheets.

APPENDIX G-6

Model Input and Output

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 JORDAN BROOK WATERSHED - WATERFORD

5 RAINFL 3	0.20				
8	0.0	0.002	0.004	0.006	0.008
8	0.010	0.012	0.014	0.016	0.018
8	0.020	0.022	0.024	0.027	0.029
8	0.031	0.034	0.036	0.038	0.041
8	0.043	0.046	0.049	0.051	0.054
8	0.057	0.060	0.063	0.066	0.069
8	0.072	0.075	0.079	0.082	0.085
8	0.089	0.093	0.097	0.103	0.109
8	0.115	0.121	0.127	0.134	0.140
8	0.148	0.155	0.163	0.171	0.180
8	0.189	0.199	0.210	0.222	0.235
8	0.250	0.266	0.287	0.312	0.363
8	0.500	0.638	0.689	0.714	0.734
8	0.751	0.766	0.779	0.790	0.801
8	0.811	0.821	0.829	0.838	0.845
8	0.853	0.860	0.867	0.874	0.880
8	0.886	0.892	0.898	0.903	0.908
8	0.911	0.915	0.919	0.922	0.925
8	0.929	0.932	0.935	0.938	0.941
8	0.944	0.946	0.949	0.952	0.955
8	0.957	0.960	0.962	0.965	0.967
8	0.969	0.972	0.974	0.976	0.978
8	0.981	0.983	0.985	0.987	0.989
8	0.991	0.993	0.995	0.997	0.990
8	1.0	1.0	1.0	1.0	1.0

9 ENDTBL 3 STRUCT	01	Elev(ft)	Q(cfs)	Storage (Ac-ft)
8		132.10	0.0	0.0
8		133.47	20.0	3.41
8		134.12	40.0	7.33
8		134.64	60.0	11.42
8		135.19	80.0	17.17
8		135.74	100.0	23.88
8		136.35	120.0	32.50
8		137.05	140.0	44.15
8		137.78	160.0	58.19
8		138.70	180.0	78.48
8		139.43	200.0	96.88
8		140.53	220.0	128.13

I-395

9 ENDTBL 3 STRUCT	02			
8		109.0	0.0	0.0
8		110.28	54.0	0.261

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	110.65	84.0	0.434
8	110.82	105.0	0.534
8	111.02	120.0	0.651
8	111.20	144.0	0.772
8	111.38	162.0	0.904
8	111.57	180.0	1.054
8	111.75	205.0	1.206
8	111.93	225.0	1.370
8	112.12	245.0	1.550
8	112.30	264.0	1.737
8	112.48	285.0	1.932
8	113.03	338.0	2.194
8	113.40	375.0	2.591
8	113.77	405.0	3.630
8	114.13	435.0	4.198
8	114.50	465.0	4.826
8	114.87	495.0	5.497

Route 85

9 ENDTBL 3 STRUCT	03			
8		100.16	0.0	0.0
8		101.66	23.0	0.25
8		101.73	25.0	0.28
8		101.91	30.0	0.35
8		102.20	40.0	0.47
8		102.53	50.0	0.64

Cross Road

8	102.89	54.0	0.84
8	103.05	60.0	1.00
8	103.31	70.0	1.44
8	103.60	80.0	2.03
8	103.88	90.0	2.66
8	104.20	100.0	3.45
8	104.98	120.0	5.79
8	105.30	140.0	6.52
8	106.67	160.0	9.59
8	107.96	180.0	25.46
8	108.76	200.0	39.95
8	110.01	220.0	56.71
8	111.0	1500.0	57.00

9 ENDTBL
3 STRUCT 04

8	59.0	0.0	0.0
8	61.21	240.0	0.79
8	61.90	360.0	1.36
8	62.50	480.0	1.98
8	63.09	600.0	2.70
8	63.58	720.0	3.23

I-95

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	64.14	940.0	4.79
8	64.60	960.0	7.51

9 ENDTBL
3 STRUCT 05

8	48.30	0.0	0.0
8	50.00	18.0	0.024
8	51.00	40.0	0.137
8	52.0	65.0	0.316
8	52.5	77.0	0.620
8	53.0	88.0	0.953
8	54.0	110.0	1.653
8	55.0	125.0	2.623
8	60.0	190.0	7.754

I-95 (Nevins Brook)

9 ENDTBL
3 STRUCT 06

8	26.0	0.0	0.0
8	28.26	43.0	6.047
8	28.76	70.0	8.446
8	29.23	100.0	10.702
8	29.52	120.0	12.094
8	30.00	157.0	14.397
8	30.50	195.0	19.792
8	31.20	250.0	27.346
8	32.88	370.0	45.474
8	33.50	400.0	52.164
8	34.00	665.5	57.559
8	35.00	2222.8	68.350

Fog Plain Road (Nevins Brook)

9 ENDTBL
3 STRUCT 07

8	7.79	0.0	0.0
8	12.0	350.0	17.48
8	14.0	615.0	66.61

Route 156 (Rope Ferry Rd.) 500' West
of Avery Lane

9 ENDTBL
3 STRUCT 08

8	31.74	0.0	0.0
8	38.0	320.0	1.41
8	40.0	410.0	11.92
8	42.0	485.0	28.27

Route 1 West of Miner Lane (unnamed east
brook)

9 ENDTBL
3 STRUCT 09

8	13.2	0.0	0.0
8	16.0	78.0	1.50
8	17.0	102.0	6.39

Miner Lane North of Tracks (unnamed east brook)

9 ENDTBL
3 STRUCT 10

8	10.15	0.0	0.0

Great Neck Road 100' South of Rt. 156 (unnamed
east brook)

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	14.0	110.0	43.45
8	15.0	135.0	63.42

9 ENDTBL
6 RUNOFF 1 001

1	0.209	69.0	0.80

1 1 1

6	RUNOFF	1	002	2	0.280	66.0	1.01	1	1	1
6	REACH	3	003	1	3 2100.	1.70	1.53	1		1
6	ADDHYD	4	003	2	3 4			1	1	1
6	RUNOFF	1	004	5	0.262	75.0	0.43	1	1	1
6	REACH	3	005	4	6 1200.	0.63	1.53	1		1
6	ADDHYD	4	005	5	6 7			1	1	1
6	RESVOR	2	01	7	1 132.10			1	1	1
6	RUNOFF	1	006	2	0.297	71.0	0.73	1	1	1
6	REACH	3	007	1	3 1500.	0.55	1.53	1		1
6	ADDHYD	4	007	2	3 4			1	1	1
6	RUNOFF	1	008	5	0.117	78.0	0.56	1	1	1
6	ADDHYD	4	009	4	5 6			1	1	1
6	RUNOFF	1	010	7	0.169	70.0	0.58	1	1	1
6	REACH	3	011	6	1 2300.	0.63	1.53	1		1
6	ADDHYD	4	011	7	1 2			1	1	1
6	RESVOR	2	02	2	3 109.0			1	1	1
6	RUNOFF	1	012	4	0.095	75.0	0.44	1	1	1
6	REACH	3	013	3	5 1500.	0.80	1.53	1		1
6	ADDHYD	4	013	4	5 6			1	1	1
6	RESVOR	2	03	6	7 100.16			1	1	1
6	RUNOFF	1	014	1	0.040	76.0	0.40	1	1	1
6	RUNOFF	1	015	2	0.346	68.0	1.18	1	1	1
6	REACH	3	016	1	3 6300.	0.70	1.53	1		1
6	ADDHYD	4	016	2	3 4			1	1	1
6	RUNOFF	1	017	5	0.079	68.0	0.45	1	1	1
6	REACH	3	018	4	6 2300.	2.0	1.53	1		1
6	ADDHYD	4	018	5	6 1			1	1	1
6	REACH	3	019	7	2 2200.	0.80	1.53	1		1
6	ADDHYD	4	019	1	2 3			1	1	1
6	RUNOFF	1	020	4	0.708	72.0	0.85	1	1	1
6	REACH	3	021	3	5 4000.	0.65	1.53	1		1
6	ADDHYD	4	021	4	5 6			1	1	1
6	RESVOR	2	04	6	1 59.0			1	1	1
6	RUNOFF	1	022	2	0.906	61.0	1.01	1	1	1
6	REACH	3	023	1	3 6300.	0.70	1.53	1		1
6	ADDHYD	4	023	2	3 4			1	1	1
6	RUNOFF	1	024	5	0.146	67.0	0.47	1	1	1
6	REACH	3	025	4	6 1300.	0.63	1.53	1		1
6	ADDHYD	4	025	5	6 7			1	1	1
6	RUNOFF	1	026	1	0.430	73.0	0.60	1	1	1
6	REACH	3	027	7	2 800.	0.70	1.53	1		1
6	ADDHYD	4	027	1	2 7			1	1	1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6	RUNOFF	1	028	1	0.038	81.0	0.38	1	1	1
6	RUNOFF	1	029	2	0.013	84.0	0.24	1	1	1
6	REACH	3	030	1	3 200.	0.65	1.53	1		1
6	ADDHYD	4	030	2	3 4			1	1	1
6	RUNOFF	1	031	5	0.301	80.0	0.71	1	1	1
6	RESVOR	2	05	5	6 48.30			1	1	1
6	REACH	3	032	6	1 4200.	0.80	1.53	1		1
6	REACH	3	032	4	2 4200.	1.40	1.53	1		1
6	ADDHYD	4	032	1	2 3			1	1	1
6	RUNOFF	1	033	4	0.048	71.0	0.29	1	1	1
6	REACH	3	034	4	5 1200.	1.0	1.53	1		1
6	ADDHYD	4	034	3	5 6			1	1	1
6	RUNOFF	1	035	1	0.756	72.0	0.77	1	1	1
6	ADDHYD	4	036	6	1 2			1	1	1
6	RESVOR	2	06	2	3 26.0			1	1	1
6	RUNOFF	1	037	4	0.616	72.0	0.90	1	1	1
6	REACH	3	038	3	5 6500.	0.55	1.53	1		1
6	ADDHYD	4	038	4	5 6			1	1	1
6	REACH	3	039	7	1 2500.	0.63	1.53	1		1
6	ADDHYD	4	039	6	7 1			1	1	1
6	RUNOFF	1	040	2	0.318	67.0	0.64	1	1	1
6	ADDHYD	4	041	2	1 3			1	1	1
6	RESVOR	2	07	3	7 7.79			1	1	1
6	RUNOFF	1	042	1	0.509	70.0	1.26	1	1	1
6	RUNOFF	1	043	2	0.474	78.0	0.83	1	1	1
6	REACH	3	044	1	3 1800.	0.65	1.53	1		1
6	ADDHYD	4	044	2	3 4			1	1	1
6	RESVOR	2	08	4	5 31.74			1	1	1
6	RUNOFF	1	045	6	0.239	78.0	0.54	1	1	1
6	REACH	3	046	5	1 1800.	1.0	1.53	1		1
6	ADDHYD	4	046	6	1 2			1	1	1
6	RESVOR	2	09	2	3 13.2			1	1	1
6	RUNOFF	1	047	4	0.082	79.0	0.35	1	1	1
6	REACH	3	048	4	5 1100.	0.90	1.53	1		1
6	REACH	3	048	3	6 2700.	0.45	1.53	1		1

6 ADDHYD 4 048 5 6 1
 6 RUNOFF 1 049 2 0.565 78.0 1.55 1 1 1
 6 REACH 3 050 1 3 1700. 0.55 1.53 1 1 1
 6 ADDHYD 4 050 2 3 4 1 1 1
 6 RESVOR 2 10 4 5 10.15 1 1 1
 6 ADDHYD 4 051 7 5 1 1 1 1
 6 RUNOFF 1 052 2 0.165 74.0 1.00 1 1 1
 6 ADDHYD 4 053 1 2 3 1 1 1
 ENDDATA
 7 INCREM 6 0.10
 7 COMPUT 7 001 053 0.0 5.0 1.0 3 2 01 10

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

ENDCMP 1
 7 COMPUT 7 001 053 0.0 5.7 1.0 3 2 01 25
 ENDCMP 1
 7 COMPUT 7 001 053 0.0 7.1 1.0 3 2 01 99
 ENDCMP 1
 ENDJOB 2
 *****END OF 80-80 LIST*****

TR20 XEQ 06-03-98 15:49 JORDAN BROOK WATERSHED - WATERFORD
 REV PC 09/83(.2)

JOB 1 PASS 1
 PAGE 1

EXECUTIVE CONTROL OPERATION INCREM

MAIN TIME INCREMENT = .10 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION COMPUT

FROM XSECTION 1

RECORD ID

TO XSECTION 53

STARTING TIME = .00 RAIN DEPTH = 5.00 RAIN DURATION = 1.00 RAIN TABLE NO. = 3 ANT. MOIST. COND = 2
 ALTERNATE NO. = 1 STORM NO. = 10 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH = 1

AREA = .21 SQ MI INPUT RUNOFF CURVE = 69. TIME OF CONCENTRATION = .80 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT = .1067 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.59	133.57	(RUNOFF)
19.96	6.76	(RUNOFF)
22.35	5.62	(RUNOFF)
24.33	7.64	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .21 SQ. MI.
10.00	DISCHG .02 .05 .12 .24 .41 .64 .93	1.28 1.68 2.14	
11.00	DISCHG 2.67 3.27 3.94 4.72 5.64 6.79 8.23	10.24 13.49 19.45	
12.00	DISCHG 29.96 46.55 68.81 93.47 115.46 129.66 133.53	127.85 115.86 101.08	
13.00	DISCHG 87.05 75.06 65.31 57.41 51.01 45.73 41.33	37.64 34.53 31.95	
14.00	DISCHG 29.84 28.11 26.70 25.50 24.42 23.36 22.38	21.52 20.78 20.08	
15.00	DISCHG 19.44 18.89 18.43 18.00 17.61 17.28 16.98	16.69 16.40 16.07	
16.00	DISCHG 15.71 15.33 14.99 14.70 14.48 14.28 14.07	13.81 13.46 13.04	
17.00	DISCHG 12.51 11.88 11.20 10.60 10.14 9.79 9.52	9.24 8.91 8.60	
18.00	DISCHG 8.36 8.23 8.18 8.14 8.06 7.93 7.78	7.62 7.48 7.38	
19.00	DISCHG 7.31 7.23 7.10 6.91 6.70 6.56 6.53	6.58 6.67 6.75	
20.00	DISCHG 6.76 6.68 6.55 6.42 6.32 6.23 6.15	6.13 6.12 6.04	
21.00	DISCHG 5.91 5.78 5.70 5.68 5.72 5.74 5.70	5.60 5.47 5.36	
22.00	DISCHG 5.33 5.40 5.53 5.61 5.61 5.53 5.42	5.28 5.17 5.09	
23.00	DISCHG 5.03 4.99 4.96 4.94 4.92 4.91 4.88	4.78 4.57 4.41	
24.00	DISCHG 4.68 5.65 6.92 7.59 7.44 6.69 5.52	4.19 3.03 2.21	
25.00	DISCHG 1.63 1.20 .88 .65 .47 .34 .25	.19 .14 .10	
26.00	DISCHG .07 .05 .04 .03 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 1.98 WATERSHED INCHES, 266.98 CFS-HRS, 22.06 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH = 2

AREA = .28 SQ MI INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = 1.01 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT = .0962 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.75	135.56	(RUNOFF)
20.01	8.40	(RUNOFF)
22.44	6.96	(RUNOFF)
24.44	7.70	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .28 SQ.MI.
10.00	DISCHG .00 .00 .00 .00 .00 .01 .03 .09 .19 .37		
11.00	DISCHG .62 .98 1.44 2.02 2.75 3.64 4.77 6.30 8.57 12.49		
12.00	DISCHG 19.35 30.54 47.13 68.12 90.93 111.92 127.24 134.73 134.86 128.90		
13.00	DISCHG 118.92 107.13 95.24 84.73 75.80 68.23 61.80 56.23 51.42 47.26		
14.00	DISCHG 43.70 40.68 38.13 35.96 34.09 32.46 30.99 29.64 28.43 27.33		
15.00	DISCHG 26.30 25.33 24.47 23.73 23.07 22.49 21.98 21.54 21.14 20.73		
16.00	DISCHG 20.30 19.86 19.44 19.04 18.68 18.35 18.05 17.74 17.40 16.98		
17.00	DISCHG 16.48 15.88 15.20 14.48 13.82 13.26 12.77 12.32 11.89 11.49		
18.00	DISCHG 11.15 10.87 10.66 10.50 10.35 10.20 10.04 9.87 9.71 9.54		
19.00	DISCHG 9.39 9.26 9.12 8.95 8.76 8.57 8.44 8.37 8.37 8.39		
20.00	DISCHG 8.40 8.39 8.34 8.23 8.11 8.01 7.90 7.80 7.73 7.67		
21.00	DISCHG 7.59 7.47 7.35 7.28 7.25 7.23 7.19 7.12 7.02 6.93		
22.00	DISCHG 6.86 6.83 6.85 6.91 6.95 6.95 6.89 6.81 6.70 6.58		
23.00	DISCHG 6.47 6.39 6.33 6.28 6.25 6.22 6.19 6.10 5.94 5.78		
24.00	DISCHG 5.77 6.01 6.56 7.25 7.67 7.62 7.16 6.42 5.50 4.45		
25.00	DISCHG 3.43 2.65 2.07 1.63 1.29 1.01 .79 .62 .49 .38		
26.00	DISCHG .29 .23 .18 .14 .11 .08 .06 .05 .04 .03		
27.00	DISCHG .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 1.75 WATERSHED INCHES, 315.42 CFS-HRS, 26.07 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 3
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
LENGTH = 2100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.70, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 3 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.59	133.57	(NULL)
19.96	6.76	(NULL)
22.35	5.62	(NULL)
24.33	7.64	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.98 WATERSHED INCHES, 266.98 CFS-HRS, 22.06 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.66	263.50	(NULL)
19.97	15.16	(NULL)
22.38	12.56	(NULL)
24.38	15.14	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .49 SQ.MI.
10.00	DISCHG .02 .05 .12 .24 .41 .65 .96 1.37 1.87 2.51		
11.00	DISCHG 3.29 4.25 5.38 6.75 8.39 10.42 13.00 16.54 22.05 31.93		
12.00	DISCHG 49.31 77.09 115.95 161.58 206.39 241.58 260.78 262.58 250.73 229.98		
13.00	DISCHG 205.97 182.19 160.55 142.14 126.80 113.97 103.14 93.86 85.95 79.21		
14.00	DISCHG 73.54 68.79 64.83 61.46 58.52 55.82 53.36 51.16 49.21 47.41		
15.00	DISCHG 45.74 44.22 42.90 41.73 40.69 39.76 38.96 38.23 37.54 36.80		
16.00	DISCHG 36.01 35.19 34.43 33.74 33.16 32.64 32.12 31.55 30.86 30.02		
17.00	DISCHG 28.99 27.76 26.40 25.09 23.96 23.05 22.28 21.56 20.80 20.09		
18.00	DISCHG 19.51 19.10 18.84 18.64 18.41 18.13 17.82 17.49 17.19 16.92		
19.00	DISCHG 16.71 16.49 16.22 15.86 15.45 15.14 14.97 14.95 15.04 15.14		
20.00	DISCHG 15.16 15.07 14.89 14.65 14.43 14.23 14.05 13.93 13.85 13.72		
21.00	DISCHG 13.50 13.25 13.05 12.96 12.97 12.97 12.89 12.72 12.50 12.30		

TIME	DISCHG	12.20	12.23	12.38	12.52	12.56	12.48	12.31	12.09	11.87	11.67
22.00	DISCHG	12.20	12.23	12.38	12.52	12.56	12.48	12.31	12.09	11.87	11.67
23.00	DISCHG	11.50	11.38	11.29	11.22	11.17	11.13	11.07	10.88	10.51	10.19
24.00	DISCHG	10.45	11.66	13.48	14.84	15.11	14.30	12.68	10.61	8.53	6.66
25.00	DISCHG	5.07	3.85	2.95	2.28	1.76	1.35	1.04	.81	.62	.48
26.00	DISCHG	.37	.28	.22	.17	.12	.08	.06	.05	.04	.03
27.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 1.85 WATERSHED INCHES, 582.40 CFS-HRS, 48.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 4
 OUTPUT HYDROGRAPH= 5
 AREA= .26 SQ MI INPUT RUNOFF CURVE= 75. TIME OF CONCENTRATION= .43 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0573 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.34	286.45	(RUNOFF)
17.45	12.96	(RUNOFF)
18.16	11.72	(RUNOFF)
19.82	9.88	(RUNOFF)
20.73	8.69	(RUNOFF)
21.37	8.48	(RUNOFF)
22.17	8.44	(RUNOFF)
23.45	6.84	(RUNOFF)
24.17	16.49	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.26 SQ.MI.
8.00	DISCHG	.00 .00 .00 .00 .00 .00	.01 .05 .15			
9.00	DISCHG	.35 .62 .90 1.19 1.52 1.89	2.27 2.67 3.12 3.61			
10.00	DISCHG	4.11 4.61 5.17 5.82 6.57 7.38	8.27 9.22 10.25 11.39			

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11.00	DISCHG	12.74	14.26	15.85	17.69	20.28	23.61	27.65	33.77	45.82	70.47
12.00	DISCHG	118.18	183.06	246.00	283.51	277.84	237.64	186.25	143.22	111.49	89.90
13.00	DISCHG	75.78	65.97	58.85	53.49	49.16	45.43	42.06	39.23	37.27	35.97
14.00	DISCHG	34.84	33.74	32.92	32.12	30.79	29.23	28.38	27.99	27.14	25.86
15.00	DISCHG	25.17	25.03	24.77	24.16	23.60	23.25	23.07	22.83	22.21	21.38
16.00	DISCHG	20.66	20.25	20.03	19.92	19.86	19.67	19.08	18.25	17.53	16.78
17.00	DISCHG	15.38	13.75	12.78	12.73	12.94	12.93	12.44	11.66	10.99	10.73
18.00	DISCHG	11.08	11.63	11.68	11.25	10.74	10.44	10.27	10.18	10.13	10.11
19.00	DISCHG	10.08	9.91	9.32	8.65	8.52	8.92	9.41	9.72	9.88	9.81
20.00	DISCHG	9.28	8.64	8.52	8.76	8.67	8.31	8.33	8.67	8.61	8.10
21.00	DISCHG	7.57	7.38	7.80	8.37	8.45	8.02	7.51	7.20	7.03	7.09
22.00	DISCHG	7.65	8.29	8.42	8.01	7.52	7.21	7.04	6.94	6.89	6.86
23.00	DISCHG	6.85	6.84	6.83	6.83	6.83	6.83	6.77	6.16	4.71	4.51
24.00	DISCHG	9.04	15.00	16.30	12.09	7.18	4.01	2.26	1.28	.72	.41
25.00	DISCHG	.23	.13	.07	.02	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 2.47 WATERSHED INCHES, 418.12 CFS-HRS, 34.55 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 5
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
 LENGTH = 1200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.66	263.50	(NULL)
19.97	15.16	(NULL)
22.38	12.56	(NULL)
24.38	15.14	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.85 WATERSHED INCHES, 582.40 CFS-HRS, 48.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 5
 INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.44	487.52	(NULL)
18.09	30.73	(NULL)
19.86	25.00	(NULL)
20.25	23.45	(NULL)
20.71	22.60	(NULL)
21.37	21.45	(NULL)

22.20
24.2020.80
29.78(NULL)
(NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .75 SQ.MI.
8.00 DISCHG .00 .00 .00 .00 .00 .00 .00 .01 .05 .15

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9.00	DISCHG	.35	.62	.90	1.19	1.52	1.89	2.27	2.67	3.12	3.61
10.00	DISCHG	4.13	4.66	5.29	6.06	6.98	8.03	9.23	10.58	12.12	13.89
11.00	DISCHG	16.03	18.50	21.23	24.44	28.67	34.03	40.65	50.31	67.87	102.41
12.00	DISCHG	167.48	260.15	361.94	445.09	484.23	479.22	447.02	405.80	362.22	319.87
13.00	DISCHG	281.75	248.16	219.39	195.63	175.96	159.40	145.20	133.10	123.22	115.19
14.00	DISCHG	108.38	102.54	97.74	93.58	89.31	85.05	81.75	79.16	76.35	73.27
15.00	DISCHG	70.91	69.26	67.67	65.90	64.28	63.02	62.03	61.07	59.75	58.18
16.00	DISCHG	56.67	55.45	54.46	53.66	53.01	52.31	51.20	49.80	48.39	46.80
17.00	DISCHG	44.36	41.50	39.18	37.82	36.90	35.98	34.72	33.21	31.79	30.83
18.00	DISCHG	30.59	30.72	30.52	29.89	29.15	28.57	27.67	27.32	27.32	27.03
19.00	DISCHG	26.79	26.40	25.54	24.51	23.97	24.06	24.39	24.67	24.92	24.95
20.00	DISCHG	24.44	23.71	23.40	23.42	23.10	22.54	22.39	22.60	22.46	21.82
21.00	DISCHG	21.07	20.63	20.86	21.33	21.42	20.99	20.40	19.92	19.53	19.39
22.00	DISCHG	19.84	20.52	20.80	20.53	20.08	19.69	19.35	19.03	18.76	18.53
23.00	DISCHG	18.35	18.22	18.12	18.05	18.00	17.97	17.84	17.04	15.21	14.70
24.00	DISCHG	19.48	26.66	29.78	26.93	22.29	18.31	14.94	11.89	9.25	7.06
25.00	DISCHG	5.29	3.98	3.01	2.30	1.76	1.35	1.04	.81	.62	.48
26.00	DISCHG	.37	.28	.22	.17	.12	.08	.06	.05	.04	.03
27.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.06 WATERSHED INCHES, 1000.52 CFS-HRS, 82.68 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1
SURFACE ELEVATION= 132.10

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.82	121.54	136.40
24.30	26.53	133.68

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.75 SQ.MI.
8.00	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00				
8.00	ELEV	132.10 132.10 132.10 132.10 132.10 132.10 132.10 132.10 132.10 132.10 132.10				
9.00	DISCHG	.02 .04 .07 .12 .18 .25 .34 .44 .55 .69				
9.00	ELEV	132.10 132.10 132.11 132.11 132.11 132.12 132.12 132.12 132.13 132.14 132.15				
10.00	DISCHG	.84 1.01 1.19 1.41 1.65 1.93 2.24 2.61 3.02 3.49				
10.00	ELEV	132.16 132.17 132.18 132.20 132.21 132.23 132.25 132.28 132.31 132.34 132.34				
11.00	DISCHG	4.03 4.66 5.38 6.21 7.17 8.31 9.69 11.38 13.64 17.02				
11.00	ELEV	132.38 132.42 132.47 132.53 132.59 132.67 132.76 132.88 133.03 133.27 133.27				
12.00	DISCHG	22.27 30.18 41.71 56.04 68.75 80.39 89.70 97.89 103.79 108.30				
12.00	ELEV	133.54 133.80 134.16 134.54 134.88 135.20 135.46 135.68 135.86 135.99 135.99				
13.00	DISCHG	111.95 114.86 117.12 118.83 120.08 120.75 121.19 121.45 121.54 121.51				
13.00	ELEV	136.10 136.19 136.26 136.31 136.35 136.38 136.39 136.40 136.40 136.40 136.40				
14.00	DISCHG	121.37 121.15 120.85 120.50 120.09 119.49 118.81 118.08 117.31 116.50				
14.00	ELEV	136.40 136.39 136.38 136.37 136.35 136.33 136.31 136.29 136.27 136.24 136.24				
15.00	DISCHG	115.66 114.80 113.92 113.02 112.11 111.19 110.27 109.34 108.41 107.47				
15.00	ELEV	136.22 136.19 136.16 136.14 136.11 136.08 136.05 136.02 136.00 135.97 135.97				
16.00	DISCHG	106.52 105.56 104.60 103.64 102.69 101.74 100.79 99.78 98.55 97.31				
16.00	ELEV	135.94 135.91 135.88 135.85 135.82 135.79 135.76 135.73 135.70 135.67 135.67				

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17.00	DISCHG	96.05	94.76	93.44	92.10	90.77	89.44	88.13	86.81	85.49	84.17
17.00	ELEV	135.63	135.60	135.56	135.52	135.49	135.45	135.41	135.38	135.34	135.30
18.00	DISCHG	82.87	81.60	80.36	79.00	77.59	76.21	74.86	73.53	72.22	70.94
18.00	ELEV	135.27	135.23	135.20	135.16	135.12	135.09	135.05	135.01	134.98	134.94
19.00	DISCHG	69.70	68.47	67.27	66.07	64.89	63.73	62.61	61.53	60.49	59.28
19.00	ELEV	134.91	134.87	134.84	134.81	134.77	134.74	134.71	134.68	134.65	134.62
20.00	DISCHG	57.91	56.57	55.26	54.00	52.78	51.59	50.44	49.33	48.27	47.23
20.00	ELEV	134.59	134.55	134.52	134.48	134.45	134.42	134.39	134.36	134.34	134.31
21.00	DISCHG	46.21	45.21	44.24	43.32	42.45	41.61	40.78	39.96	39.13	38.32
21.00	ELEV	134.28	134.26	134.23	134.21	134.18	134.16	134.14	134.12	134.09	134.07
22.00	DISCHG	37.54	36.83	36.16	35.52	34.89	34.27	33.66	33.07	32.48	31.91
22.00	ELEV	134.04	134.02	134.00	133.97	133.95	133.93	133.91	133.89	133.88	133.86

23.00	DISCHG	31.35	30.81	30.29	29.79	29.30	28.83	28.38	27.93	27.44	26.93
23.00	ELEV	133.84	133.82	133.80	133.79	133.77	133.76	133.74	133.73	133.71	133.70
24.00	DISCHG	26.52	26.38	26.46	26.53	26.45	26.20	25.81	25.29	24.69	24.00
24.00	ELEV	133.68	133.68	133.68	133.68	133.68	133.67	133.66	133.64	133.62	133.60
25.00	DISCHG	23.27	22.50	21.71	20.93	20.15	19.29	18.43	17.60	16.80	16.03
25.00	ELEV	133.58	133.55	133.53	133.50	133.47	133.42	133.36	133.31	133.25	133.20
26.00	DISCHG	15.30	14.59	13.91	13.26	12.64	12.05	11.48	10.94	10.42	9.93
26.00	ELEV	133.15	133.10	133.05	133.01	132.97	132.93	132.89	132.85	132.81	132.78
27.00	DISCHG	9.46	9.01	8.59	8.18	7.79	7.43	7.07	6.74	6.42	6.12
27.00	ELEV	132.75	132.72	132.69	132.66	132.63	132.61	132.58	132.56	132.54	132.52
28.00	DISCHG	5.83	5.55	5.29	5.04	4.80	4.57	4.36	4.15	3.95	3.77
28.00	ELEV	132.50	132.48	132.46	132.45	132.43	132.41	132.40	132.38	132.37	132.36
29.00	DISCHG	3.59	3.42	3.26	3.10	2.96	2.82	2.68	2.56	2.43	2.32
29.00	ELEV	132.35	132.33	132.32	132.31	132.30	132.29	132.28	132.28	132.27	132.26

RUNOFF VOLUME ABOVE BASEFLOW = 2.05 WATERSHED INCHES, 995.77 CFS-HRS, 82.29 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 6

OUTPUT HYDROGRAPH= 2

AREA= .30 SQ MI INPUT RUNOFF CURVE= 71. TIME OF CONCENTRATION= .73 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0973 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.53	217.03	(RUNOFF)
18.21	12.08	(RUNOFF)
19.93	10.06	(RUNOFF)
22.32	8.39	(RUNOFF)
24.33	10.25	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.30 SQ.MI.
9.00	DISCHG	.00	.00	.00	.06	.32
10.00	DISCHG	.55	.84	1.19	1.60	5.48
11.00	DISCHG	6.41	7.47	8.64	9.99	36.03
12.00	DISCHG	55.33	85.90	125.73	167.07	146.09
13.00	DISCHG	123.81	105.77	91.50	80.25	45.21
14.00	DISCHG	42.44	40.17	38.30	36.69	29.35
15.00	DISCHG	28.42	27.67	27.03	26.44	23.66

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16.00	DISCHG	23.09	22.52	22.02	21.62	21.32	21.07	20.75	20.32	19.76	19.08
17.00	DISCHG	18.23	17.19	16.13	15.25	14.63	14.21	13.87	13.47	12.96	12.47
18.00	DISCHG	12.14	12.04	12.08	12.06	11.90	11.67	11.39	11.15	10.97	10.86
19.00	DISCHG	10.77	10.65	10.43	10.11	9.79	9.62	9.61	9.74	9.93	10.06
20.00	DISCHG	10.02	9.84	9.60	9.42	9.28	9.15	9.06	9.04	9.01	8.89
21.00	DISCHG	8.68	8.47	8.35	8.38	8.50	8.54	8.43	8.23	7.98	7.79
22.00	DISCHG	7.81	8.01	8.27	8.38	8.33	8.16	7.94	7.72	7.56	7.46
23.00	DISCHG	7.39	7.34	7.30	7.27	7.26	7.24	7.19	6.96	6.44	5.93
24.00	DISCHG	6.11	7.38	9.16	10.19	9.93	8.67	6.78	4.86	3.41	2.44
25.00	DISCHG	1.75	1.24	.89	.63	.45	.32	.23	.16	.11	.08
26.00	DISCHG	.06	.04	.02	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 2.13 WATERSHED INCHES, 408.60 CFS-HRS, 33.77 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 7

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 1500.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .79 PEAK TRAVEL TIME = .20 HOURS

*** WARNING REACH 7 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.95	121.52	(NULL)
24.41	26.52	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.05 WATERSHED INCHES, 995.40 CFS-HRS, 82.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 7

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.61	290.28	(NULL)
24.33	36.71	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.05 SQ.MI.

9.00	DISCHG	.00	.01	.03	.06	.11	.16	.25	.38	.57	.84
10.00	DISCHG	1.20	1.64	2.15	2.75	3.43	4.20	5.08	6.06	7.16	8.39
11.00	DISCHG	9.78	11.36	13.14	15.19	17.58	20.50	24.10	28.94	36.22	49.11
12.00	DISCHG	71.53	106.91	154.00	205.98	252.44	281.25	290.26	283.07	267.17	248.19
13.00	DISCHG	230.82	216.69	205.54	196.73	189.63	183.71	178.49	173.94	170.02	166.72
14.00	DISCHG	163.95	161.57	159.50	157.62	155.79	153.93	152.06	150.31	148.62	146.86
15.00	DISCHG	145.13	143.55	142.06	140.58	139.16	137.79	136.43	135.10	133.75	132.32
16.00	DISCHG	130.81	129.29	127.83	126.47	125.22	124.00	122.74	121.35	119.81	117.94
17.00	DISCHG	115.86	113.57	111.23	109.03	107.08	105.33	103.67	101.94	100.11	98.30
18.00	DISCHG	96.66	95.25	94.02	92.74	91.25	89.63	87.97	86.36	84.85	83.42
19.00	DISCHG	82.05	80.67	79.23	77.70	76.18	74.82	73.65	72.65	71.75	70.82
20.00	DISCHG	69.61	68.09	66.52	65.02	63.61	62.25	60.97	59.78	58.64	57.44
21.00	DISCHG	56.19	54.95	53.82	52.88	52.07	51.22	50.27	49.23	48.16	47.14

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22.00	DISCHG	46.34	45.76	45.29	44.72	44.02	43.22	42.37	41.54	40.79	40.09
23.00	DISCHG	39.45	38.84	38.26	37.70	37.18	36.67	36.14	35.46	34.49	33.50
24.00	DISCHG	33.17	34.01	35.60	36.64	36.44	35.14	33.04	30.75	28.83	27.28
25.00	DISCHG	25.92	24.70	23.58	22.55	21.58	20.67	19.73	18.81	17.93	17.09
26.00	DISCHG	16.30	15.53	14.79	14.09	13.43	12.80	12.20	11.63	11.08	10.56
27.00	DISCHG	10.06	9.59	9.13	8.70	8.29	7.90	7.52	7.17	6.83	6.51
28.00	DISCHG	6.20	5.90	5.63	5.36	5.11	4.86	4.63	4.41	4.20	4.01
29.00	DISCHG	3.82	3.64	3.46	3.30	3.14	2.99	2.85	2.72	2.59	2.47

RUNOFF VOLUME ABOVE BASEFLOW = 2.08 WATERSHED INCHES, 1404.00 CFS-HRS, 116.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 8

OUTPUT HYDROGRAPH= 5

AREA= .12 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .56 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0747 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.41	127.96	(RUNOFF)
18.21	5.42	(RUNOFF)
22.24	3.82	(RUNOFF)
24.24	6.10	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .12 SQ.MI.
8.00	DISCHG .00 .01 .03 .07 .13 .22 .32 .44 .56 .69		
9.00	DISCHG .83 1.00 1.17 1.34 1.50 1.68 1.88 2.08 2.30 2.54		
10.00	DISCHG 2.79 3.05 3.33 3.63 3.99 4.38 4.81 5.28 5.78 6.33		
11.00	DISCHG 6.95 7.66 8.41 9.28 10.37 11.78 13.57 16.16 20.31 29.18		
12.00	DISCHG 45.16 69.10 96.00 118.18 127.89 121.33 105.90 86.74 69.73 56.34		
13.00	DISCHG 46.44 39.44 34.17 30.22 27.20 24.70 22.59 20.78 19.31 18.21		
14.00	DISCHG 17.39 16.73 16.20 15.72 15.17 14.54 14.00 13.61 13.22 12.76		
15.00	DISCHG 12.35 12.09 11.89 11.67 11.43 11.20 11.04 10.90 10.70 10.40		
16.00	DISCHG 10.08 9.81 9.62 9.51 9.43 9.35 9.17 8.89 8.58 8.22		
17.00	DISCHG 7.73 7.11 6.59 6.28 6.17 6.14 6.02 5.76 5.47 5.26		
18.00	DISCHG 5.22 5.34 5.42 5.37 5.21 5.05 4.93 4.86 4.81 4.78		
19.00	DISCHG 4.75 4.70 4.54 4.31 4.16 4.16 4.28 4.43 4.54 4.56		
20.00	DISCHG 4.46 4.26 4.13 4.09 4.07 4.00 3.97 4.00 4.01 3.92		
21.00	DISCHG 3.74 3.60 3.62 3.76 3.86 3.82 3.68 3.51 3.39 3.37		
22.00	DISCHG 3.47 3.67 3.80 3.79 3.67 3.51 3.39 3.32 3.28 3.25		
23.00	DISCHG 3.23 3.21 3.21 3.20 3.20 3.20 3.19 3.09 2.76 2.50		
24.00	DISCHG 3.18 4.78 6.00 5.82 4.66 3.15 2.01 1.29 .83 .54		
25.00	DISCHG .34 .22 .14 .09 .06 .04 .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.73 WATERSHED INCHES, 206.50 CFS-HRS, 17.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 9

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.53	403.67	(NULL)
24.29	42.47	(NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 1.17 SQ.MI.

8.00	DISCHG	.00	.01	.03	.07	.13	.22	.32	.44	.56	.69
9.00	DISCHG	.83	1.01	1.20	1.40	1.61	1.85	2.13	2.46	2.87	3.38
10.00	DISCHG	3.99	4.69	5.48	6.38	7.42	8.59	9.89	11.34	12.94	14.72
11.00	DISCHG	16.73	19.02	21.55	24.47	27.95	32.28	37.68	45.10	56.53	78.29
12.00	DISCHG	116.69	176.01	249.99	324.16	380.33	402.58	396.16	369.81	336.90	304.52
13.00	DISCHG	277.26	256.13	239.71	226.95	216.83	208.41	201.08	194.72	189.33	184.93
14.00	DISCHG	181.34	178.30	175.69	173.33	170.96	168.47	166.06	163.92	161.84	159.62
15.00	DISCHG	157.48	155.63	153.95	152.26	150.59	148.99	147.47	146.00	144.45	142.71
16.00	DISCHG	140.89	139.10	137.45	135.98	134.65	133.35	131.90	130.24	128.38	126.16
17.00	DISCHG	123.59	120.69	117.82	115.31	113.25	111.47	109.68	107.70	105.58	103.56
18.00	DISCHG	101.88	100.59	99.43	98.11	96.46	94.68	92.90	91.22	89.66	88.20
19.00	DISCHG	86.81	85.37	83.77	82.01	80.34	78.98	77.93	77.08	76.29	75.38
20.00	DISCHG	74.07	72.35	70.64	69.12	67.68	66.26	64.93	63.78	62.64	61.36
21.00	DISCHG	59.93	58.56	57.44	56.64	55.93	55.05	53.94	52.74	51.55	50.51
22.00	DISCHG	49.81	49.43	49.09	48.51	47.69	46.73	45.77	44.86	44.06	43.34
23.00	DISCHG	42.67	42.05	41.46	40.91	40.38	39.87	39.34	38.55	37.25	36.01
24.00	DISCHG	36.35	38.79	41.60	42.46	41.10	38.29	35.05	32.05	29.66	27.82
25.00	DISCHG	26.27	24.92	23.73	22.64	21.64	20.71	19.76	18.82	17.93	17.09
26.00	DISCHG	16.30	15.53	14.79	14.09	13.43	12.80	12.20	11.63	11.08	10.56
27.00	DISCHG	10.06	9.59	9.13	8.70	8.29	7.90	7.52	7.17	6.83	6.51
28.00	DISCHG	6.20	5.90	5.63	5.36	5.11	4.86	4.63	4.41	4.20	4.01
29.00	DISCHG	3.82	3.64	3.46	3.30	3.14	2.99	2.85	2.72	2.59	2.47

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 1610.50 CFS-HRS, 133.09 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 10

OUTPUT HYDROGRAPH= 7

AREA= .17 SQ MI INPUT RUNOFF CURVE= 70. TIME OF CONCENTRATION= .58 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0773 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.44	133.47	(RUNOFF)
18.22	6.73	(RUNOFF)
22.25	4.78	(RUNOFF)
24.25	7.49	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .17 SQ.MI.
9.00 DISCHG	.00 .00 .00 .00	.00 .00 .00 .00	.00 .02 .06
10.00 DISCHG	.16 .30 .48 .72	.99 1.31 1.66	2.06 2.50 2.99
11.00 DISCHG	3.55 4.19 4.89 5.70	6.70 7.98 9.52	11.89 15.94 23.83
12.00 DISCHG	39.19 63.24 91.93 118.34	132.26 130.62 117.62	98.78 80.73 66.13
13.00 DISCHG	55.09 47.05 41.00 36.34	32.83 29.92 27.42	25.28 23.54 22.19
14.00 DISCHG	21.14 20.34 19.70 19.12	18.48 17.76 17.12	16.64 16.18 15.65

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15.00	DISCHG	15.16	14.83	14.58	14.32	14.04	13.77	13.58	13.41	13.17	12.83
16.00	DISCHG	12.46	12.13	11.90	11.76	11.67	11.56	11.36	11.03	10.65	10.22
17.00	DISCHG	9.63	8.91	8.27	7.87	7.70	7.65	7.50	7.20	6.85	6.58
18.00	DISCHG	6.52	6.63	6.72	6.68	6.52	6.32	6.17	6.07	6.01	5.97
19.00	DISCHG	5.94	5.87	5.69	5.42	5.22	5.21	5.34	5.52	5.66	5.70
20.00	DISCHG	5.59	5.36	5.19	5.14	5.10	5.02	4.97	5.00	5.01	4.91
21.00	DISCHG	4.72	4.55	4.55	4.71	4.83	4.80	4.63	4.44	4.28	4.24
22.00	DISCHG	4.36	4.58	4.76	4.75	4.62	4.44	4.29	4.19	4.13	4.09
23.00	DISCHG	4.07	4.05	4.04	4.04	4.03	4.03	4.02	3.88	3.48	3.14
24.00	DISCHG	3.89	5.74	7.32	7.26	5.98	4.19	2.70	1.78	1.17	.76
25.00	DISCHG	.50	.33	.21	.14	.09	.06	.04	.02	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.06 WATERSHED INCHES, 224.31 CFS-HRS, 18.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1

LENGTH = 2300.00 FEET

MODIFIED ATT-KIN ROUTING COEFFICIENT = .83 INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53

PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.65	400.08	(NULL)
24.41	42.22	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 1610.24 CFS-HRS, 133.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11

INPUT HYDROGRAPHS= 7,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.59 514.33 (NULL)
 24.35 48.59 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.33 SQ.MI.
8.00	DISCHG	.00	.00	.01	.02	.06
9.00	DISCHG	.66	.80	.97	1.16	1.36
10.00	DISCHG	3.44	4.17	5.03	6.04	7.19
11.00	DISCHG	17.90	20.51	23.44	26.73	30.58
12.00	DISCHG	113.37	172.64	256.51	353.67	441.17
13.00	DISCHG	366.27	330.13	301.76	279.66	262.59
14.00	DISCHG	207.03	202.46	198.65	195.37	192.32
15.00	DISCHG	175.23	172.75	170.60	168.62	166.65
16.00	DISCHG	155.52	153.39	151.37	149.55	147.96
17.00	DISCHG	136.24	133.02	129.54	126.27	123.54
18.00	DISCHG	110.49	108.87	107.60	106.36	104.90
19.00	DISCHG	94.45	92.97	91.35	89.51	87.59
20.00	DISCHG	81.15	79.69	77.88	76.13	74.54

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21.00	DISCHG	66.34	64.77	63.39	62.38	61.64	60.88	59.86	58.60	57.27	56.04
22.00	DISCHG	55.09	54.55	54.28	53.92	53.24	52.28	51.21	50.16	49.18	48.32
23.00	DISCHG	47.56	46.86	46.22	45.62	45.05	44.52	44.00	43.33	42.18	40.64
24.00	DISCHG	40.15	42.07	45.69	48.30	48.20	45.48	41.50	37.47	33.84	30.94
25.00	DISCHG	28.72	26.93	25.42	24.12	22.96	21.91	20.94	19.97	19.02	18.12
26.00	DISCHG	17.27	16.46	15.69	14.95	14.23	13.57	12.93	12.33	11.75	11.19
27.00	DISCHG	10.67	10.16	9.69	9.23	8.79	8.38	7.98	7.60	7.24	6.90
28.00	DISCHG	6.57	6.26	5.97	5.68	5.41	5.16	4.91	4.68	4.46	4.25
29.00	DISCHG	4.05	3.86	3.67	3.50	3.33	3.17	3.03	2.88	2.75	2.62

RUNOFF VOLUME ABOVE BASEFLOW = 2.13 WATERSHED INCHES, 1834.55 CFS-HRS, 151.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 109.00

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.80 459.84 114.44
 24.40 48.13 110.14

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.33 SQ.MI.
8.00	DISCHG	.00	.00	.01	.04	.09
8.00	ELEV	109.00	109.00	109.00	109.00	109.00
9.00	DISCHG	.59	.72	.87	1.05	1.24
9.00	ELEV	109.01	109.02	109.02	109.03	109.03
10.00	DISCHG	3.10	3.75	4.53	5.45	6.52
10.00	ELEV	109.07	109.09	109.11	109.13	109.15
11.00	DISCHG	16.57	19.00	21.74	24.83	28.36
11.00	ELEV	109.39	109.45	109.52	109.59	109.67
12.00	DISCHG	91.68	133.81	194.03	266.31	361.67
12.00	ELEV	110.71	111.12	111.67	112.32	113.27
13.00	DISCHG	429.58	402.27	383.87	346.33	283.76
13.00	ELEV	114.06	113.74	113.51	113.11	112.47
14.00	DISCHG	213.55	207.65	202.46	198.05	194.65
14.00	ELEV	111.83	111.77	111.73	111.70	111.68
15.00	DISCHG	177.69	175.24	172.88	170.71	168.67
15.00	ELEV	111.55	111.52	111.49	111.47	111.45
16.00	DISCHG	157.32	155.26	153.19	151.22	149.44
16.00	ELEV	111.33	111.31	111.29	111.27	111.25
17.00	DISCHG	137.88	134.95	131.65	128.28	125.24
17.00	ELEV	111.15	111.13	111.11	111.08	111.06
18.00	DISCHG	112.53	110.56	108.95	107.59	106.23
18.00	ELEV	110.92	110.89	110.87	110.85	110.84
19.00	DISCHG	95.32	93.82	92.28	90.56	88.69
19.00	ELEV	110.74	110.73	110.72	110.70	110.69
20.00	DISCHG	81.82	80.65	79.09	77.35	75.67
20.00	ELEV	110.62	110.61	110.59	110.57	110.55
21.00	DISCHG	67.33	65.85	64.37	63.13	62.20
21.00	ELEV	110.44	110.43	110.41	110.39	110.38

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22.00	DISCHG	55.78	54.98	54.51	54.17	53.64	52.83	51.83	50.77	49.76	48.83
22.00	ELEV	110.30	110.29	110.29	110.28	110.27	110.25	110.23	110.20	110.18	110.16
23.00	DISCHG	48.01	47.27	46.60	45.98	45.39	44.83	44.30	43.71	42.83	41.52
23.00	ELEV	110.14	110.12	110.10	110.09	110.08	110.06	110.05	110.04	110.02	109.98
24.00	DISCHG	40.48	41.06	43.66	46.73	48.13	46.94	43.76	39.82	35.98	32.67
24.00	ELEV	109.96	109.97	110.03	110.11	110.14	110.11	110.04	109.94	109.85	109.77
25.00	DISCHG	30.05	28.00	26.32	24.89	23.64	22.53	21.51	20.54	19.58	18.65
25.00	ELEV	109.71	109.66	109.62	109.59	109.56	109.53	109.51	109.49	109.46	109.44
26.00	DISCHG	17.77	16.94	16.14	15.38	14.65	13.96	13.31	12.68	12.09	11.52
26.00	ELEV	109.42	109.40	109.38	109.36	109.35	109.33	109.32	109.30	109.29	109.27
27.00	DISCHG	10.98	10.46	9.97	9.50	9.05	8.62	8.21	7.82	7.45	7.10
27.00	ELEV	109.26	109.25	109.24	109.23	109.21	109.20	109.19	109.19	109.18	109.17
28.00	DISCHG	6.76	6.44	6.14	5.85	5.57	5.31	5.06	4.82	4.59	4.37
28.00	ELEV	109.16	109.15	109.15	109.14	109.13	109.13	109.12	109.11	109.11	109.10
29.00	DISCHG	4.17	3.97	3.78	3.60	3.43	3.27	3.11	2.97	2.83	2.69
29.00	ELEV	109.10	109.09	109.09	109.09	109.08	109.08	109.07	109.07	109.07	109.06

RUNOFF VOLUME ABOVE BASEFLOW = 2.13 WATERSHED INCHES, 1834.01 CFS-HRS, 151.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 12

OUTPUT HYDROGRAPH= 4

AREA= .09 SQ MI INPUT RUNOFF CURVE= 75. TIME OF CONCENTRATION= .44 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.34	103.22	(RUNOFF)
18.17	4.24	(RUNOFF)
24.18	5.60	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	TIME INCREMENT =	DRAINAGE AREA =
8.00	.00	.10 HOURS	.09 SQ.MI.
9.00	.12	.00	.05
10.00	1.48	.54	1.30
11.00	4.58	.68	4.10
12.00	41.84	2.97	24.75
13.00	28.00	3.32	33.30
14.00	12.67	12.17	13.09
15.00	9.15	16.28	9.41
16.00	7.51	41.29	7.77
17.00	5.60	64.78	6.10
18.00	4.01	87.78	3.90
19.00	3.66	101.91	3.67
20.00	3.37	100.54	3.55
21.00	2.75	86.74	2.95
22.00	2.76	68.47	2.58
23.00	2.48	52.90	2.49
24.00	2.86	41.32	1.64
25.00	.09	33.30	.16

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RUNOFF VOLUME ABOVE BASEFLOW = 2.47 WATERSHED INCHES, 151.51 CFS-HRS, 12.52 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 13

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 1500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 13 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.80	459.84	(NULL)
24.40	48.13	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.13 WATERSHED INCHES, 1834.01 CFS-HRS, 151.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 13

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.72	505.65	(NULL)
24.33	51.18	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.43 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.01	.04	.09	.15	.24	.36	.52
9.00	DISCHG	.71	.93	1.19	1.48	1.79	2.12	2.48	2.87	3.33	3.89
10.00	DISCHG	4.58	5.41	6.39	7.55	8.88	10.40	12.12	14.03	16.15	18.50
11.00	DISCHG	21.15	24.13	27.45	31.19	35.64	41.02	47.58	56.33	69.55	91.11
12.00	DISCHG	133.52	198.60	281.81	368.22	462.21	479.71	493.93	505.23	501.11	484.04
13.00	DISCHG	457.57	426.56	405.48	365.97	301.77	283.13	268.05	254.99	243.62	234.15
14.00	DISCHG	226.22	219.92	214.42	209.73	205.85	202.15	198.71	195.54	192.41	189.30
15.00	DISCHG	186.84	184.32	181.87	179.49	177.24	175.13	173.15	171.25	169.23	167.04
16.00	DISCHG	164.83	162.61	160.46	158.45	156.64	154.98	153.26	151.37	149.04	146.46
17.00	DISCHG	143.49	139.99	136.33	132.91	129.94	127.41	125.11	123.12	120.96	118.65
18.00	DISCHG	116.55	114.76	113.18	111.67	110.14	108.38	106.06	104.11	102.27	100.56
19.00	DISCHG	98.98	97.42	95.68	93.71	91.79	90.11	88.77	87.75	87.01	86.24
20.00	DISCHG	85.20	83.80	82.19	80.53	78.81	77.11	75.59	74.29	73.00	71.61
21.00	DISCHG	70.08	68.53	67.19	66.16	65.26	64.33	63.28	62.07	60.75	59.49
22.00	DISCHG	58.55	57.97	57.56	57.08	56.38	55.45	54.39	53.29	52.26	51.32
23.00	DISCHG	50.49	49.75	49.08	48.45	47.87	47.31	46.77	46.04	44.67	43.16
24.00	DISCHG	43.34	46.09	49.22	51.06	50.72	48.42	44.61	40.30	36.26	32.83
25.00	DISCHG	30.14	28.05	26.35	24.90	23.64	22.53	21.51	20.54	19.58	18.65
26.00	DISCHG	17.77	16.94	16.14	15.38	14.65	13.96	13.31	12.68	12.09	11.52
27.00	DISCHG	10.98	10.46	9.97	9.50	9.05	8.62	8.21	7.82	7.45	7.10
28.00	DISCHG	6.76	6.44	6.14	5.85	5.57	5.31	5.06	4.82	4.59	4.37
29.00	DISCHG	4.17	3.97	3.78	3.60	3.43	3.27	3.11	2.97	2.83	2.69

RUNOFF VOLUME ABOVE BASEFLOW = 2.15 WATERSHED INCHES, 1985.52 CFS-HRS, 164.08 ACRE-Feet; BASEFLOW = .00 CFS

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OPERATION RESVOR STRUCTURE 3
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
SURFACE ELEVATION= 100.16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
14.79	192.82	108.47
24.47	49.33	102.51

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.43 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.00	.02	.04	.08	.15	.23	.35
8.00	ELEV	100.16	100.16	100.16	100.16	100.16	100.16	100.17	100.17	100.18	100.18
9.00	DISCHG	.49	.68	.89	1.14	1.41	1.71	2.03	2.39	2.78	3.24
9.00	ELEV	100.19	100.20	100.22	100.23	100.25	100.27	100.29	100.32	100.34	100.37
10.00	DISCHG	3.79	4.45	5.25	6.20	7.31	8.60	10.06	11.72	13.58	15.65
10.00	ELEV	100.41	100.45	100.50	100.56	100.64	100.72	100.82	100.92	101.05	101.18
11.00	DISCHG	17.95	20.53	23.34	25.97	29.37	33.88	39.22	44.38	50.64	56.06
11.00	ELEV	101.33	101.50	101.67	101.76	101.89	102.02	102.18	102.34	102.59	102.94
12.00	DISCHG	67.14	80.72	98.36	114.34	146.27	160.65	164.03	167.51	170.98	174.32
12.00	ELEV	103.24	103.62	104.15	104.76	105.73	106.71	106.93	107.15	107.38	107.59
13.00	DISCHG	177.39	180.14	182.82	185.12	186.81	188.01	189.00	189.82	190.50	191.05
13.00	ELEV	107.79	107.97	108.07	108.16	108.23	108.28	108.32	108.35	108.38	108.40
14.00	DISCHG	191.49	191.85	192.13	192.36	192.54	192.67	192.75	192.80	192.82	192.79
14.00	ELEV	108.42	108.43	108.45	108.45	108.46	108.47	108.47	108.47	108.47	108.47
15.00	DISCHG	192.74	192.66	192.55	192.42	192.26	192.07	191.87	191.65	191.41	191.14
15.00	ELEV	108.47	108.47	108.46	108.46	108.45	108.44	108.43	108.43	108.42	108.41
16.00	DISCHG	190.86	190.55	190.22	189.87	189.50	189.12	188.72	188.31	187.88	187.42
16.00	ELEV	108.39	108.38	108.37	108.35	108.34	108.32	108.31	108.29	108.28	108.26
17.00	DISCHG	186.94	186.43	185.88	185.30	184.69	184.05	183.40	182.73	182.04	181.33
17.00	ELEV	108.24	108.22	108.20	108.17	108.15	108.12	108.10	108.07	108.04	108.01
18.00	DISCHG	180.61	179.88	179.20	178.51	177.81	177.10	176.37	175.64	174.88	174.12
18.00	ELEV	107.98	107.95	107.91	107.86	107.82	107.77	107.73	107.68	107.63	107.58
19.00	DISCHG	173.35	172.57	171.79	170.99	170.18	169.36	168.53	167.70	166.86	166.03
19.00	ELEV	107.53	107.48	107.43	107.38	107.33	107.27	107.22	107.17	107.11	107.06
20.00	DISCHG	165.20	164.36	163.52	162.67	161.81	160.94	160.06	155.86	151.55	147.40
20.00	ELEV	107.01	106.95	106.90	106.84	106.79	106.73	106.67	106.39	106.09	105.81
21.00	DISCHG	143.39	138.06	123.79	117.37	113.85	110.50	107.32	104.27	101.35	97.86
21.00	ELEV	105.53	105.27	105.04	104.88	104.74	104.61	104.49	104.37	104.25	104.13
22.00	DISCHG	94.00	90.45	86.53	82.93	79.69	76.58	73.74	71.14	68.34	65.50
22.00	ELEV	104.01	103.89	103.78	103.68	103.59	103.50	103.42	103.34	103.27	103.19
23.00	DISCHG	62.99	60.78	58.17	55.65	53.79	52.85	51.96	51.11	50.23	48.13
23.00	ELEV	103.13	103.07	103.00	102.93	102.87	102.79	102.71	102.63	102.55	102.47
24.00	DISCHG	46.22	45.63	46.42	47.88	49.05	49.25	48.18	45.94	42.94	39.55
24.00	ELEV	102.41	102.39	102.41	102.46	102.50	102.51	102.47	102.40	102.30	102.19
25.00	DISCHG	35.42	32.18	29.67	27.83	26.21	24.79	23.59	22.34	21.08	20.00
25.00	ELEV	102.07	101.97	101.90	101.83	101.77	101.72	101.68	101.62	101.54	101.46
26.00	DISCHG	19.01	18.10	17.24	16.43	15.65	14.91	14.21	13.54	12.90	12.30
26.00	ELEV	101.40	101.34	101.28	101.23	101.18	101.13	101.09	101.04	101.00	100.96

1 27.00 DISCHG 11.72 11.17 10.64 10.14 9.66 9.21 8.77 8.36 7.96 7.58

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27.00	ELEV	100.92	100.89	100.85	100.82	100.79	100.76	100.73	100.70	100.68	100.65
28.00	DISCHG	7.23	6.88	6.56	6.25	5.95	5.67	5.40	5.15	4.90	4.67
28.00	ELEV	100.63	100.61	100.59	100.57	100.55	100.53	100.51	100.50	100.48	100.46
29.00	DISCHG	4.45	4.24	4.04	3.85	3.66	3.49	3.33	3.17	3.02	2.88
29.00	ELEV	100.45	100.44	100.42	100.41	100.40	100.39	100.38	100.37	100.36	100.35

RUNOFF VOLUME ABOVE BASEFLOW = 2.15 WATERSHED INCHES, 1985.30 CFS-HRS, 164.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 14

OUTPUT HYDROGRAPH= 1

AREA= .04 SQ MI INPUT RUNOFF CURVE= 76. TIME OF CONCENTRATION= .40 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0533 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.32	46.53	(RUNOFF)
15.05	3.90	(RUNOFF)
24.15	2.66	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .04 SQ.MI.
8.00	DISCHG .00 .00 .00 .00	.00 .00 .01 .03	.06 .10
9.00	DISCHG .14 .20 .25 .30	.35 .41 .48 .54	.62 .70
10.00	DISCHG .78 .86 .95 1.06	1.18 1.32 1.47 1.62	1.79 1.98
11.00	DISCHG 2.20 2.45 2.71 3.01	3.45 4.02 4.70 5.77	7.88 12.11
12.00	DISCHG 20.58 31.50 41.31 46.43	43.89 36.25 27.74 21.03	16.25 13.24
13.00	DISCHG 11.23 9.84 8.84 8.09	7.46 6.93 6.43 6.01	5.73 5.56
14.00	DISCHG 5.38 5.22 5.10 4.98	4.75 4.50 4.39 4.35	4.19 3.99
15.00	DISCHG 3.89 3.89 3.84 3.74	3.65 3.61 3.58 3.54	3.43 3.30
16.00	DISCHG 3.19 3.13 3.11 3.09	3.08 3.05 2.95 2.81	2.70 2.59
17.00	DISCHG 2.34 2.08 1.96 1.97	2.01 2.01 1.92 1.78	1.68 1.66
18.00	DISCHG 1.73 1.82 1.82 1.74	1.66 1.61 1.59 1.58	1.57 1.57
19.00	DISCHG 1.57 1.53 1.43 1.32	1.32 1.40 1.48 1.52	1.54 1.52
20.00	DISCHG 1.42 1.32 1.32 1.37	1.34 1.28 1.29 1.36	1.34 1.24
21.00	DISCHG 1.16 1.14 1.22 1.32	1.31 1.23 1.15 1.11	1.08 1.10
22.00	DISCHG 1.20 1.31 1.31 1.23	1.15 1.11 1.09 1.07	1.07 1.06
23.00	DISCHG 1.06 1.06 1.06 1.06	1.06 1.06 1.05 .95	.71 .69
24.00	DISCHG 1.49 2.54 2.53 1.72	.94 .51 .27 .15	.08 .04
25.00	DISCHG .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.56 WATERSHED INCHES, 66.04 CFS-HRS, 5.46 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 15

OUTPUT HYDROGRAPH= 2

AREA= .35 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= 1.18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0983 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.87	167.41	(RUNOFF)
22.44	8.97	(RUNOFF)
24.50	10.68	(RUNOFF)

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TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .35 SQ.MI.
10.00	DISCHG .00 .00 .01 .03	.08 .17 .32 .53	.82 1.20
11.00	DISCHG 1.67 2.24 2.92 3.73	4.68 5.81 7.17 8.94	11.35 15.38
12.00	DISCHG 22.29 33.30 49.64 71.08	95.68 120.64 142.34 157.80	165.97 167.15
13.00	DISCHG 162.45 153.09 141.12 127.99	115.30 104.13 94.42 86.02	78.71 72.24
14.00	DISCHG 66.58 61.66 57.38 53.66	50.41 47.58 45.11 42.89	40.89 39.08
15.00	DISCHG 37.44 35.95 34.59 33.38	32.31 31.34 30.45 29.61	28.84 28.13
16.00	DISCHG 27.48 26.84 26.24 25.67	25.15 24.66 24.20 23.76	23.30 22.79
17.00	DISCHG 22.21 21.54 20.79 19.97	19.13 18.35 17.63 16.97	16.36 15.78
18.00	DISCHG 15.26 14.82 14.46 14.17	13.91 13.65 13.41 13.17	12.95 12.74
19.00	DISCHG 12.54 12.33 12.12 11.91	11.69 11.46 11.26 11.12	11.03 10.99
20.00	DISCHG 10.95 10.91 10.86 10.77	10.66 10.54 10.42 10.30	10.18 10.07
21.00	DISCHG 9.96 9.84 9.72 9.60	9.51 9.46 9.41 9.32	9.21 9.11
22.00	DISCHG 9.02 8.97 8.95 8.95	8.97 8.97 8.93 8.87	8.78 8.67

23.00	DISCHG	8.56	8.43	8.32	8.24	8.17	8.12	8.09	8.02	7.88	7.83
24.00	DISCHG	7.99	8.33	8.89	9.70	10.42	10.68	10.44	9.81	8.89	7.82
25.00	DISCHG	6.66	5.43	4.32	3.47	2.81	2.30	1.88	1.52	1.23	1.00
26.00	DISCHG	.81	.66	.53	.43	.35	.28	.23	.18	.15	.12
27.00	DISCHG	.09	.07	.06	.05	.04	.03	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 1.90 WATERSHED INCHES, 424.87 CFS-HRS, 35.11 ACRE-FeET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 16
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 LENGTH = 6300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .23 PEAK TRAVEL TIME = .41 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FeET)
12.71	32.04	(NULL)
24.46	1.68	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.56 WATERSHED INCHES, 66.00 CFS-HRS, 5.45 ACRE-FeET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 16
 INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FeET)
12.84	197.56	(NULL)
22.45	10.20	(NULL)
24.49	12.34	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .39 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .01		
9.00	DISCHG .02 .04 .06 .09 .13 .17 .21 .26 .31 .36		
10.00	DISCHG .42 .48 .56 .66 .78 .95 1.19 1.51 1.91 2.41		
11.00	DISCHG 3.02 3.73 4.58 5.57 6.72 8.07 9.70 11.82 14.65 19.25		
12.00	DISCHG 27.09 39.79 59.39 85.86 116.60 147.46 173.11 189.84 197.01 195.88		

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13.00	DISCHG	188.29	176.02	161.34	145.81	131.04	118.10	106.88	97.21	88.79	81.38
14.00	DISCHG	74.93	69.37	64.54	60.37	56.75	53.61	50.84	48.33	46.08	44.08
15.00	DISCHG	42.25	40.57	39.05	37.71	36.52	35.44	34.44	33.51	32.67	31.90
16.00	DISCHG	31.16	30.44	29.74	29.08	28.49	27.95	27.44	26.95	26.43	25.85
17.00	DISCHG	25.18	24.43	23.55	22.57	21.58	20.69	19.89	19.18	18.50	17.84
18.00	DISCHG	17.23	16.72	16.32	16.01	15.75	15.47	15.18	14.91	14.66	14.42
19.00	DISCHG	14.19	13.96	13.73	13.50	13.24	12.96	12.72	12.56	12.48	12.45
20.00	DISCHG	12.43	12.41	12.33	12.21	12.07	11.94	11.81	11.66	11.52	11.41
21.00	DISCHG	11.30	11.16	11.00	10.85	10.75	10.72	10.68	10.58	10.45	10.31
22.00	DISCHG	10.20	10.13	10.12	10.16	10.19	10.19	10.14	10.05	9.94	9.81
23.00	DISCHG	9.68	9.54	9.42	9.33	9.25	9.20	9.16	9.08	8.95	8.87
24.00	DISCHG	8.96	9.23	9.93	11.09	12.07	12.34	11.93	11.07	9.92	8.65
25.00	DISCHG	7.32	5.95	4.72	3.78	3.05	2.48	2.01	1.63	1.31	1.06
26.00	DISCHG	.86	.69	.56	.45	.36	.29	.24	.19	.15	.12
27.00	DISCHG	.09	.07	.06	.05	.04	.03	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 1.97 WATERSHED INCHES, 490.87 CFS-HRS, 40.57 ACRE-FeET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 17
 OUTPUT HYDROGRAPH= 5
 AREA= .08 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .45 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0600 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FeET)
12.36	63.69	(RUNOFF)
24.19	4.01	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .08 SQ.MI.
10.00	DISCHG .00 .00 .02 .07 .16 .28 .43 .59 .78 1.00		
11.00	DISCHG 1.26 1.55 1.87 2.24 2.72 3.35 4.14 5.30 7.61 12.38		
12.00	DISCHG 21.77 35.95 50.91 62.17 63.12 56.16 45.53 35.70 28.19 22.82		
13.00	DISCHG 19.31 16.82 15.02 13.68 12.58 11.62 10.76 10.04 9.52 9.19		
14.00	DISCHG 8.90 8.62 8.41 8.22 7.90 7.53 7.30 7.19 6.98 6.69		
15.00	DISCHG 6.49 6.45 6.38 6.24 6.10 6.01 5.96 5.90 5.76 5.55		
16.00	DISCHG 5.37 5.26 5.20 5.17 5.15 5.11 4.97 4.77 4.59 4.39		
17.00	DISCHG 4.05 3.63 3.38 3.33 3.38 3.38 3.26 3.07 2.89 2.82		
18.00	DISCHG 2.89 3.02 3.05 2.95 2.83 2.74 2.70 2.67 2.66 2.65		
19.00	DISCHG 2.64 2.60 2.46 2.29 2.24 2.33 2.45 2.54 2.59 2.58		
20.00	DISCHG 2.45 2.29 2.25 2.29 2.28 2.19 2.19 2.27 2.26 2.15		

21.00	DISCHG	2.01	1.95	2.04	2.19	2.22	2.13	2.00	1.91	1.86	1.87
22.00	DISCHG	2.00	2.16	2.22	2.12	2.00	1.91	1.87	1.84	1.82	1.81
23.00	DISCHG	1.81	1.81	1.81	1.81	1.81	1.81	1.80	1.69	1.35	1.19
24.00	DISCHG	1.99	3.52	4.00	3.19	1.96	1.12	.65	.38	.22	.12
25.00	DISCHG	.07	.04	.02	.01	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 1.90 WATERSHED INCHES, 96.83 CFS-HRS, 8.00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 18

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INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.00, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 18 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.84	197.56	(NULL)
22.45	10.20	(NULL)
24.49	12.34	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.97 WATERSHED INCHES, 490.87 CFS-HRS, 40.57 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 18

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.75	226.29	(NULL)
22.19	12.33	(NULL)
24.31	14.28	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.46 SQ.MI.
8.00	DISCHG	.00	.00	.00	.00	.01
9.00	DISCHG	.02	.04	.06	.09	.13
10.00	DISCHG	.42	.48	.59	.73	.94
11.00	DISCHG	4.27	5.28	6.44	7.81	9.44
12.00	DISCHG	48.85	75.74	110.30	148.03	203.62
13.00	DISCHG	207.60	192.83	176.35	159.49	143.62
14.00	DISCHG	83.83	77.99	72.96	68.59	64.65
15.00	DISCHG	48.75	47.02	45.43	43.95	42.62
16.00	DISCHG	36.54	35.70	34.94	34.25	33.64
17.00	DISCHG	29.24	28.06	26.93	25.90	24.96
18.00	DISCHG	20.12	19.74	19.37	18.97	18.58
19.00	DISCHG	16.84	16.56	16.19	15.79	15.49
20.00	DISCHG	14.89	14.69	14.58	14.50	14.35
21.00	DISCHG	13.31	13.11	13.04	13.04	12.97
22.00	DISCHG	12.20	12.29	12.33	12.28	12.20
23.00	DISCHG	11.49	11.35	11.23	11.13	11.06
24.00	DISCHG	10.95	12.75	13.93	14.28	14.02
25.00	DISCHG	7.39	5.99	4.75	3.79	3.05
26.00	DISCHG	.86	.69	.56	.45	.36
27.00	DISCHG	.09	.07	.06	.05	.04

RUNOFF VOLUME ABOVE BASEFLOW = 1.96 WATERSHED INCHES, 587.70 CFS-HRS, 48.57 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 19

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

LENGTH = 2200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .80 PEAK TRAVEL TIME = .10 HOURS

0
1

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*** WARNING REACH 19 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.91	192.81	(NULL)
24.58	49.17	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.15 WATERSHED INCHES, 1985.24 CFS-HRS, 164.06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 19
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.81	391.73	(NULL)
24.51	62.22	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.89 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .01 .04 .07 .13 .22		
9.00	DISCHG .34 .50 .69 .93 1.20 1.51 1.85 2.21 2.61 3.05		
10.00	DISCHG 3.55 4.14 4.88 5.79 6.91 8.28 9.91 11.81 14.02 16.55		
11.00	DISCHG 19.42 22.68 26.36 30.46 34.75 39.99 46.67 55.07 65.38 80.79		
12.00	DISCHG 103.55 140.42 187.85 242.27 290.08 342.78 375.04 388.06 391.72 388.80		
13.00	DISCHG 381.08 369.45 355.80 341.64 328.15 316.07 305.32 295.98 287.92 280.89		
14.00	DISCHG 274.73 269.36 264.71 260.65 256.96 253.63 250.76 248.25 245.86 243.58		
15.00	DISCHG 241.54 239.77 238.11 236.52 235.07 233.74 232.52 231.34 230.13 228.92		
16.00	DISCHG 227.74 226.62 225.56 224.55 223.60 222.65 221.63 220.54 219.43 218.23		
17.00	DISCHG 216.77 215.12 213.49 211.91 210.40 208.90 207.36 205.80 204.28 202.86		
18.00	DISCHG 201.62 200.53 199.43 198.34 197.25 196.19 195.15 194.13 193.13 192.13		
19.00	DISCHG 191.15 190.10 188.96 187.77 186.67 185.67 184.73 183.83 182.97 182.10		
20.00	DISCHG 181.13 180.10 179.15 178.23 177.23 176.16 175.16 174.21 170.52 166.14		
21.00	DISCHG 161.73 157.49 152.36 139.90 132.22 127.76 124.05 120.61 117.34 114.26		
22.00	DISCHG 110.90 107.22 103.67 99.76 96.03 92.62 89.36 86.35 83.56 80.65		
23.00	DISCHG 77.68 74.97 72.57 69.93 67.33 65.29 64.09 62.97 61.62 60.51		
24.00	DISCHG 59.54 59.44 59.77 60.58 61.59 62.21 61.74 59.82 56.56 52.41		
25.00	DISCHG 47.75 42.38 37.76 34.12 31.37 29.10 27.17 25.53 23.96 22.46		
26.00	DISCHG 21.13 19.96 18.89 17.90 16.99 16.14 15.33 14.57 13.85 13.18		
27.00	DISCHG 12.54 11.94 11.37 10.82 10.30 9.81 9.34 8.89 8.46 8.06		
28.00	DISCHG 7.68 7.31 6.97 6.64 6.32 6.02 5.74 5.47 5.21 4.96		
29.00	DISCHG 4.73 4.50 4.29 4.09 3.89 3.71 3.53 3.37 3.21 3.06		

RUNOFF VOLUME ABOVE BASEFLOW = 2.10 WATERSHED INCHES, 2572.94 CFS-HRS, 212.63 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 20
OUTPUT HYDROGRAPH= 4
AREA= .71 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .85 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0944 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.62	497.59	(RUNOFF)
19.98	24.31	(RUNOFF)
21.47	20.65	(RUNOFF)
22.37	20.13	(RUNOFF)
24.37	27.26	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .71 SQ.MI.
9.00	DISCHG .00 .00 .00 .01 .03 .10 .24 .49 .87 1.39		
10.00	DISCHG 2.05 2.83 3.72 4.74 5.88 7.16 8.60 10.19 11.95 13.91		
11.00	DISCHG 16.08 18.51 21.22 24.31 27.91 32.23 37.57 44.83 55.32 74.38		
12.00	DISCHG 109.40 165.49 244.22 333.15 415.61 473.87 497.01 486.36 450.29 400.85		
13.00	DISCHG 348.33 301.02 261.43 229.23 202.87 181.16 162.99 147.77 134.91 124.18		
14.00	DISCHG 115.29 107.95 101.88 96.79 92.36 88.26 84.37 80.83 77.66 74.79		
15.00	DISCHG 72.18 69.94 68.11 66.49 64.93 63.55 62.38 61.28 60.15 58.95		
16.00	DISCHG 57.65 56.31 55.04 53.91 52.97 52.18 51.40 50.48 49.34 47.92		
17.00	DISCHG 46.16 44.01 41.60 39.35 37.56 36.16 34.99 33.91 32.81 31.71		
18.00	DISCHG 30.77 30.14 29.80 29.58 29.28 28.86 28.35 27.79 27.26 26.84		
19.00	DISCHG 26.54 26.23 25.80 25.20 24.53 23.99 23.74 23.77 23.97 24.21		
20.00	DISCHG 24.31 24.13 23.74 23.30 22.93 22.60 22.29 22.10 22.04 21.86		
21.00	DISCHG 21.46 21.03 20.72 20.60 20.61 20.65 20.54 20.26 19.85 19.46		
22.00	DISCHG 19.27 19.38 19.75 20.07 20.12 19.95 19.62 19.20 18.76 18.42		
23.00	DISCHG 18.19 18.02 17.89 17.79 17.73 17.68 17.56 17.21 16.40 15.91		
24.00	DISCHG 16.76 19.44 23.51 26.64 27.17 25.38 22.04 17.72 13.29 9.77		
25.00	DISCHG 7.29 5.49 4.11 3.08 2.30 1.71 1.27 .96 .72 .54		
26.00	DISCHG .39 .29 .21 .16 .12 .08 .04 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.22 WATERSHED INCHES, 1014.07 CFS-HRS, 83.80 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 21
INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

0 LENGTH = 4000.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .58 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
13.00 386.35 (NULL)
24.65 61.86 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.10 WATERSHED INCHES, 2572.14 CFS-HRS, 212.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 21
INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.72 833.69 (NULL)
24.40 87.42 (NULL)

1

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TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 2.60 SQ.MI.
8.00 DISCHG	.00 .00 .00 .00 .00 .00 .01	.02 .05 .10	
9.00 DISCHG	.17 .27 .40 .58 .81 1.12 1.54	2.11 2.84 3.73	
10.00 DISCHG	4.80 6.05 7.48 9.15 11.09 13.36 16.01	19.05 22.53 26.49	
11.00 DISCHG	30.97 36.03 41.75 48.24 55.64 64.05 74.15	87.28 105.12 133.26	
12.00 DISCHG	181.04 255.72 363.69 492.45 623.25 729.54 803.43	832.76 820.96 783.78	
13.00 DISCHG	734.68 684.30 636.65 593.14 553.81 518.82 488.08	461.34 438.24 418.53	
14.00 DISCHG	401.79 387.60 375.54 365.24 356.26 348.11 340.60	333.87 327.91 322.48	
15.00 DISCHG	317.47 313.05 309.27 305.87 302.65 299.72 297.13	294.73 292.37 289.95	
16.00 DISCHG	287.43 284.90 282.48 280.26 278.27 276.49 274.74	272.82 270.64 268.13	
17.00 DISCHG	265.21 261.74 257.81 253.97 250.60 247.66 244.98	242.37 239.72 237.09	
18.00 DISCHG	234.68 232.71 231.18 229.83 228.42 226.90 225.31	223.69 222.13 220.70	
19.00 DISCHG	219.40 218.09 216.63 214.94 213.12 211.46 210.16	209.20 208.47 207.82	
20.00 DISCHG	207.03 205.93 204.54 203.14 201.83 200.53 199.19	197.98 196.94 194.21	
21.00 DISCHG	190.19 185.68 181.20 176.34 167.13 158.83 152.65	147.67 143.30 139.36	
22.00 DISCHG	135.88 132.66 129.50 126.27 122.57 118.66 114.77	110.98 107.38 104.09	
23.00 DISCHG	100.93 97.81 94.88 92.21 89.53 86.87 84.48	82.48 80.33 78.49	
24.00 DISCHG	78.13 79.74 83.31 86.42 87.42 86.41 83.76	79.45 73.91 68.03	
25.00 DISCHG	62.14 56.21 49.97 44.22 39.35 35.45 32.31	29.74 27.60 25.72	
26.00 DISCHG	23.99 22.45 21.09 19.88 18.78 17.76 16.82	15.94 15.14 14.39	
27.00 DISCHG	13.69 13.02 12.39 11.79 11.23 10.69 10.17	9.69 9.22 8.78	
28.00 DISCHG	8.36 7.96 7.58 7.22 6.88 6.56 6.25	5.95 5.67 5.40	
29.00 DISCHG	5.14 4.90 4.67 4.45 4.24 4.04 3.85	3.66 3.49 3.32	

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 3586.21 CFS-HRS, 296.36 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1
SURFACE ELEVATION= 59.00

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.81 820.15 63.83
24.44 87.28 59.80

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 2.60 SQ.MI.
8.00 DISCHG	.00 .00 .00 .00 .00 .00 .00	.02 .04 .08	
8.00 ELEV	59.00 59.00 59.00 59.00 59.00 59.00 59.00	59.00 59.00 59.00	
9.00 DISCHG	.14 .23 .35 .50 .71 .99 1.37	1.88 2.54 3.37	
9.00 ELEV	59.00 59.00 59.00 59.00 59.01 59.01 59.01	59.02 59.02 59.03	
10.00 DISCHG	4.37 5.54 6.90 8.47 10.30 12.45 14.94	17.82 21.13 24.89	
10.00 ELEV	59.04 59.05 59.06 59.08 59.09 59.11 59.14	59.16 59.19 59.23	
11.00 DISCHG	29.16 33.99 39.45 45.62 52.65 60.66 70.06	81.92 97.82 121.61	
11.00 ELEV	59.27 59.31 59.36 59.42 59.48 59.56 59.65	59.75 59.90 60.12	
12.00 DISCHG	161.17 224.85 306.29 416.93 537.06 660.10 752.71	800.86 820.00 807.02	
12.00 ELEV	60.48 61.07 61.59 62.18 62.78 63.34 63.66	63.79 63.83 63.80	
13.00 DISCHG	771.83 725.92 664.51 616.54 578.83 544.15 510.95	481.39 453.43 431.17	
13.00 ELEV	63.71 63.60 63.35 63.16 62.99 62.82 62.65	62.51 62.37 62.26	
14.00 DISCHG	412.50 396.68 383.25 371.82 361.98 352.96 344.95	337.77 331.37 325.63	

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14.00	ELEV	62.16	62.08	62.02	61.96	61.91	61.86	61.81	61.77	61.74	61.70

15.00	DISCHG	320.37	315.62	311.47	307.84	304.51	301.41	298.64	296.12	293.73	291.34
15.00	ELEV	61.67	61.64	61.62	61.60	61.58	61.56	61.55	61.53	61.52	61.51
16.00	DISCHG	288.88	286.36	283.88	281.54	279.43	277.52	275.75	273.92	271.88	269.56
16.00	ELEV	61.49	61.48	61.46	61.45	61.44	61.43	61.42	61.41	61.39	61.38
17.00	DISCHG	266.87	263.71	260.05	256.18	252.56	249.37	246.53	243.87	241.24	238.32
17.00	ELEV	61.36	61.35	61.33	61.30	61.28	61.26	61.25	61.23	61.22	61.19
18.00	DISCHG	235.61	233.48	231.78	230.36	228.98	227.51	225.94	224.34	222.75	221.26
18.00	ELEV	61.17	61.15	61.13	61.12	61.11	61.09	61.08	61.07	61.05	61.04
19.00	DISCHG	219.91	218.61	217.22	215.63	213.85	212.11	210.66	209.57	208.76	208.08
19.00	ELEV	61.03	61.01	61.00	60.99	60.97	60.95	60.94	60.93	60.92	60.92
20.00	DISCHG	207.35	206.38	205.10	203.70	202.35	201.05	199.73	198.46	197.35	195.37
20.00	ELEV	60.91	60.90	60.89	60.88	60.86	60.85	60.84	60.83	60.82	60.80
21.00	DISCHG	191.84	187.49	182.98	178.30	170.99	162.07	155.03	149.61	145.02	140.91
21.00	ELEV	60.77	60.73	60.68	60.64	60.57	60.49	60.43	60.38	60.34	60.30
22.00	DISCHG	137.24	133.93	130.75	127.56	124.07	120.22	116.32	112.49	108.80	105.39
22.00	ELEV	60.26	60.23	60.20	60.17	60.14	60.11	60.07	60.04	60.00	59.97
23.00	DISCHG	102.18	99.05	96.04	93.26	90.60	87.93	85.42	83.26	81.19	79.21
23.00	ELEV	59.94	59.91	59.88	59.86	59.83	59.81	59.79	59.77	59.75	59.73
24.00	DISCHG	78.21	79.02	81.81	85.21	87.11	86.89	84.88	81.23	76.17	70.38
24.00	ELEV	59.72	59.73	59.75	59.78	59.80	59.80	59.78	59.75	59.70	59.65
25.00	DISCHG	64.48	58.57	52.47	46.49	41.26	36.97	33.53	30.74	28.44	26.46
25.00	ELEV	59.59	59.54	59.48	59.43	59.38	59.34	59.31	59.28	59.26	59.24
26.00	DISCHG	24.67	23.05	21.62	20.35	19.21	18.16	17.19	16.29	15.46	14.69
26.00	ELEV	59.23	59.21	59.20	59.19	59.18	59.17	59.16	59.15	59.14	59.14
27.00	DISCHG	13.96	13.28	12.64	12.03	11.45	10.90	10.38	9.88	9.40	8.95
27.00	ELEV	59.13	59.12	59.12	59.11	59.11	59.10	59.10	59.09	59.09	59.08
28.00	DISCHG	8.52	8.12	7.73	7.37	7.02	6.69	6.37	6.07	5.78	5.51
28.00	ELEV	59.08	59.07	59.07	59.07	59.06	59.06	59.06	59.06	59.05	59.05
29.00	DISCHG	5.25	5.00	4.76	4.54	4.32	4.12	3.92	3.74	3.56	3.39
29.00	ELEV	59.05	59.05	59.04	59.04	59.04	59.04	59.04	59.03	59.03	59.03

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 3586.46 CFS-HRS, 296.39 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 22

OUTPUT HYDROGRAPH= 2

AREA= .91 SQ MI INPUT RUNOFF CURVE= 61. TIME OF CONCENTRATION= 1.01 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0962 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.78	329.67	(RUNOFF)
20.02	23.77	(RUNOFF)
22.44	19.78	(RUNOFF)
24.44	21.96	(RUNOFF)

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .91 SQ.MI.		
11.00	DISCHG	.00	.00	.03	.12	.38	.93	2.00	3.96	7.61	15.03	
12.00	DISCHG	29.40	54.48	93.52	144.84	202.72	258.05	300.61	324.23	329.44	318.88	
13.00	DISCHG	297.40	270.41	242.34	217.17	195.63	177.29	161.59	147.88	135.97	125.62	

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14.00	DISCHG	116.71	109.11	102.68	97.20	92.46	88.29	84.52	81.05	77.90	75.04
15.00	DISCHG	72.37	69.84	67.57	65.62	63.89	62.34	61.00	59.83	58.77	57.68
16.00	DISCHG	56.51	55.33	54.19	53.12	52.15	51.27	50.45	49.62	48.69	47.55
17.00	DISCHG	46.16	44.51	42.62	40.63	38.80	37.22	35.86	34.62	33.43	32.33
18.00	DISCHG	31.38	30.59	30.00	29.56	29.15	28.74	28.30	27.84	27.38	26.92
19.00	DISCHG	26.51	26.14	25.74	25.28	24.74	24.23	23.86	23.68	23.67	23.73
20.00	DISCHG	23.77	23.75	23.60	23.30	22.97	22.67	22.39	22.11	21.92	21.76
21.00	DISCHG	21.52	21.18	20.86	20.65	20.57	20.52	20.40	20.20	19.95	19.69
22.00	DISCHG	19.49	19.41	19.48	19.65	19.77	19.75	19.61	19.36	19.06	18.73
23.00	DISCHG	18.42	18.18	18.02	17.89	17.79	17.72	17.62	17.37	16.92	16.47
24.00	DISCHG	16.44	17.13	18.71	20.65	21.85	21.71	20.42	18.31	15.68	12.69
25.00	DISCHG	9.79	7.55	5.90	4.66	3.67	2.87	2.26	1.77	1.38	1.08
26.00	DISCHG	.84	.66	.51	.40	.31	.24	.18	.14	.11	.08
27.00	DISCHG	.06	.03	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 1.38 WATERSHED INCHES, 809.64 CFS-HRS, 66.91 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 23

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 6300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .52 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.01	793.44	(NULL)
24.61	86.07	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 3585.31 CFS-HRS, 296.29 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 23
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS) 12.93 24.53
PEAK DISCHARGE(CFS) 1099.75 107.00
PEAK ELEVATION(Feet) (NULL) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 3.51 SQ.MI.
8.00	DISCHG	.00 .00 .00 .00	.00 .00 .00 .00	.00 .01 .02
9.00	DISCHG	.05 .10 .17 .26	.39 .56 .78	1.09 1.50 2.05
10.00	DISCHG	2.74 3.59 4.61 5.80	7.20 8.82 10.72	12.92 15.48 18.43
11.00	DISCHG	21.81 25.65 30.04 35.07	40.90 47.80 56.08	66.39 80.23 100.82
12.00	DISCHG	133.92 188.60 275.06 391.59	538.42 698.99 856.10	982.80 1062.38 1097.32
13.00	DISCHG	1090.77 1052.53 995.08 923.80	855.17 794.64 740.68	691.36 647.00 606.54
14.00	DISCHG	571.63 541.86 516.58 495.07	476.72 460.90 446.86	434.30 423.06 412.99
15.00	DISCHG	403.88 395.52 387.99 381.37	375.51 370.24 365.50	361.27 357.42 353.76
16.00	DISCHG	350.12 346.46 342.82 339.26	335.89 332.76 329.86	327.12 324.31 321.22
17.00	DISCHG	317.68 313.60 308.90 303.65	298.24 293.06 288.32	283.99 279.92 276.07
18.00	DISCHG	272.29 268.73 265.70 263.21	261.08 259.13 257.18	255.19 253.15 251.11
19.00	DISCHG	249.17 247.36 245.60 243.76	241.73 239.58 237.51	235.77 234.44 233.45

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20.00	DISCHG	232.63 231.82 230.79 229.40	227.81 226.21 224.62	223.04 221.55 220.20
21.00	DISCHG	218.35 215.41 211.56 207.32	202.86 196.90 189.30	181.85 175.30 169.64
22.00	DISCHG	164.72 160.46 156.81 153.54	150.35 146.93 143.15	139.13 135.02 130.95
23.00	DISCHG	127.07 123.45 120.04 116.78	113.74 110.87 108.04	105.18 102.35 99.68
24.00	DISCHG	97.56 96.73 98.00 101.26	104.86 106.87 106.48	103.75 98.92 92.23
25.00	DISCHG	84.55 76.93 69.63 62.50	55.58 49.21 43.70	39.08 35.26 32.11
26.00	DISCHG	29.48 27.22 25.25 23.51	21.98 20.62 19.40	18.30 17.29 16.36
27.00	DISCHG	15.51 14.71 13.96 13.26	12.62 12.01 11.43	10.88 10.36 9.86
28.00	DISCHG	9.38 8.93 8.51 8.10	7.72 7.35 7.00	6.67 6.36 6.05
29.00	DISCHG	5.77 5.49 5.23 4.99	4.75 4.53 4.31	4.11 3.91 3.73

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 4394.96 CFS-HRS, 363.20 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 24
OUTPUT HYDROGRAPH= 5
AREA= .15 SQ MI INPUT RUNOFF CURVE= 67. TIME OF CONCENTRATION= .47 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0627 HOURS

PEAK TIME(HRS) 12.38 18.18 23.45 24.20
PEAK DISCHARGE(CFS) 110.77 5.49 3.27 7.26
PEAK ELEVATION(Feet) (RUNOFF) (RUNOFF) (RUNOFF) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .15 SQ.MI.
10.00	DISCHG	.00 .00 .00 .01	.06 .17 .36	.61 .91 1.26
11.00	DISCHG	1.68 2.16 2.70 3.33	4.13 5.19 6.47	8.46 12.16 19.71
12.00	DISCHG	35.70 59.04 85.20 105.30	110.57 100.29 83.08	65.68 52.16 42.33
13.00	DISCHG	35.72 30.94 27.61 25.03	22.98 21.22 19.62	18.27 17.28 16.61
14.00	DISCHG	16.08 15.59 15.20 14.83	14.29 13.65 13.20	12.98 12.63 12.11
15.00	DISCHG	11.75 11.62 11.50 11.28	11.02 10.85 10.76	10.65 10.41 10.06
16.00	DISCHG	9.74 9.51 9.40 9.33	9.30 9.22 9.00	8.65 8.32 7.97
17.00	DISCHG	7.39 6.67 6.19 6.04	6.09 6.09 5.91	5.58 5.26 5.11
18.00	DISCHG	5.20 5.43 5.49 5.35	5.14 4.98 4.89	4.83 4.80 4.79
19.00	DISCHG	4.77 4.71 4.48 4.18	4.08 4.19 4.40	4.56 4.66 4.65
20.00	DISCHG	4.45 4.18 4.07 4.14	4.12 3.99 3.97	3.47 3.38 3.40
21.00	DISCHG	3.66 3.55 3.68 3.92	3.99 3.86 3.64	3.33 3.30 3.28
22.00	DISCHG	3.59 3.88 3.98 3.85	3.64 3.48 3.27	3.24 3.00 2.38
23.00	DISCHG	3.27 3.27 3.27 3.27	3.27 3.24 3.24	3.00 2.38 2.16
24.00	DISCHG	3.56 6.20 7.26 5.98	3.88 2.24 1.35	.79 .47 .28
25.00	DISCHG	.16 .10 .06 .03	.01 .00	

RUNOFF VOLUME ABOVE BASEFLOW = 1.82 WATERSHED INCHES, 171.65 CFS-HRS, 14.19 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 25
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
LENGTH = 1300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 25 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.93	1099.75	(NULL)
24.53	107.00	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 4394.96 CFS-HRS, 363.20 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 25
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.92	1140.12	(NULL)
24.47	109.17	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	3.65 SQ.MI.
8.00	DISCHG	.00	.00	.00	.00	.02
9.00	DISCHG	.05	.10	.17	.26	2.05
10.00	DISCHG	2.74	3.59	4.61	5.82	19.70
11.00	DISCHG	23.49	27.82	32.74	38.40	120.53
12.00	DISCHG	169.62	247.64	360.26	496.88	1139.65
13.00	DISCHG	1126.49	1083.47	1022.69	948.83	623.15
14.00	DISCHG	587.71	557.45	531.78	509.91	425.10
15.00	DISCHG	415.63	407.14	399.50	392.64	363.82
16.00	DISCHG	359.85	355.98	352.22	348.60	329.19
17.00	DISCHG	325.07	320.27	315.09	309.69	281.18
18.00	DISCHG	277.50	274.16	271.19	268.56	255.90
19.00	DISCHG	253.95	252.07	250.07	247.94	238.09
20.00	DISCHG	237.09	236.00	234.87	233.54	224.10
21.00	DISCHG	222.02	218.96	215.24	211.24	173.04
22.00	DISCHG	168.31	164.34	160.79	157.39	134.23
23.00	DISCHG	130.34	126.72	123.31	120.05	101.85
24.00	DISCHG	101.12	102.93	105.26	107.24	92.51
25.00	DISCHG	84.71	77.03	69.69	62.54	32.11
26.00	DISCHG	29.48	27.22	25.25	23.51	16.36
27.00	DISCHG	15.51	14.71	13.96	13.26	9.86
28.00	DISCHG	9.38	8.93	8.51	8.10	6.05
29.00	DISCHG	5.77	5.49	5.23	4.99	3.73

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 4566.61 CFS-HRS, 377.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 26
OUTPUT HYDROGRAPH= 1
AREA= .43 SQ MI INPUT RUNOFF CURVE= 73. TIME OF CONCENTRATION= .60 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0800 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.44	380.40	(RUNOFF)
18.22	18.20	(RUNOFF)
19.88	15.36	(RUNOFF)
20.76	13.57	(RUNOFF)
21.43	13.00	(RUNOFF)
22.26	12.81	(RUNOFF)
24.26	18.71	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.43 SQ.MI.
9.00	DISCHG	.00	.01	.03	.13	2.55
10.00	DISCHG	3.19	3.88	4.63	5.46	12.66
11.00	DISCHG	14.35	16.28	18.37	20.80	73.98
12.00	DISCHG	115.44	182.56	261.25	332.82	191.67
13.00	DISCHG	159.46	135.25	117.07	103.61	61.82
14.00	DISCHG	58.67	56.25	54.32	52.63	42.90
15.00	DISCHG	41.58	40.60	39.86	39.15	35.02
16.00	DISCHG	34.00	33.10	32.43	32.00	27.89
17.00	DISCHG	26.35	24.44	22.64	21.51	17.96

18.00	DISCHG	17.71	17.96	18.19	18.08	17.68	17.16	16.72	16.45	16.27	16.16
19.00	DISCHG	16.07	15.88	15.42	14.72	14.20	14.12	14.40	14.86	15.23	15.35
20.00	DISCHG	15.09	14.52	14.07	13.90	13.79	13.59	13.46	13.52	13.54	13.28
21.00	DISCHG	12.81	12.37	12.29	12.67	12.98	12.92	12.54	12.03	11.62	11.48
22.00	DISCHG	11.73	12.31	12.76	12.78	12.47	11.99	11.58	11.32	11.15	11.04
23.00	DISCHG	10.97	10.92	10.89	10.87	10.86	10.86	10.85	10.56	9.69	8.87
24.00	DISCHG	10.07	14.39	18.17	18.46	15.76	11.33	7.41	4.87	3.23	2.16
25.00	DISCHG	1.43	.94	.62	.41	.27	.18	.12	.08	.03	.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.30 WATERSHED INCHES, 638.32 CFS-HRS, 52.75 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 27

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

LENGTH = 800.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00

PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 27 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)

12.92

24.47

PEAK DISCHARGE(CFS)

1140.12

109.17

PEAK ELEVATION(FEET)

(NULL)

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 4566.61 CFS-HRS, 377.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 27

INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 7

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PEAK TIME(HRS)

12.80

24.32

PEAK DISCHARGE(CFS)

1347.84

125.75

PEAK ELEVATION(FEET)

(NULL)

(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 4.08 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	.02
9.00	DISCHG	.05	.10	.20	.39	.70	1.15	1.75	2.52	3.46	4.60
10.00	DISCHG	5.93	7.47	9.24	11.27	13.63	16.41	19.62	23.33	27.54	32.35
11.00	DISCHG	37.85	44.10	51.11	59.20	68.82	80.56	94.72	113.96	143.39	194.52
12.00	DISCHG	285.06	430.21	621.51	829.70	1025.39	1171.26	1275.93	1333.91	1347.82	1331.33
13.00	DISCHG	1285.95	1218.72	1139.76	1052.44	971.20	900.24	837.35	780.52	730.09	684.97
14.00	DISCHG	646.38	613.69	586.10	562.53	541.85	523.39	507.13	492.97	480.06	468.01
15.00	DISCHG	457.21	447.74	439.35	431.79	424.92	418.74	413.33	408.51	403.78	398.84
16.00	DISCHG	393.85	389.08	384.65	380.60	376.92	373.41	369.76	365.82	361.69	357.07
17.00	DISCHG	351.42	344.71	337.73	331.20	325.30	319.90	314.61	309.16	303.87	299.14
18.00	DISCHG	295.21	292.12	289.38	286.64	283.91	281.26	278.79	276.46	274.22	272.06
19.00	DISCHG	270.01	267.94	265.49	262.65	260.01	257.89	256.31	255.19	254.33	253.44
20.00	DISCHG	252.18	250.52	248.93	247.44	245.72	243.79	242.06	240.63	239.18	237.38
21.00	DISCHG	234.83	231.32	227.54	223.91	219.83	213.68	205.49	197.36	190.30	184.52
22.00	DISCHG	180.04	176.65	173.54	170.18	166.46	162.40	158.12	153.78	149.48	145.27
23.00	DISCHG	141.31	137.64	134.19	130.92	127.87	124.99	122.13	118.74	114.42	110.71
24.00	DISCHG	111.19	117.32	123.43	125.71	124.51	120.43	115.24	109.42	102.62	94.67
25.00	DISCHG	86.14	77.97	70.31	62.95	55.86	49.39	43.82	39.15	35.29	32.11
26.00	DISCHG	29.48	27.22	25.25	23.51	21.98	20.62	19.40	18.30	17.29	16.36
27.00	DISCHG	15.51	14.71	13.96	13.26	12.62	12.01	11.43	10.88	10.36	9.86
28.00	DISCHG	9.38	8.93	8.51	8.10	7.72	7.35	7.00	6.67	6.36	6.05
29.00	DISCHG	5.77	5.49	5.23	4.99	4.75	4.53	4.31	4.11	3.91	3.73

RUNOFF VOLUME ABOVE BASEFLOW = 1.97 WATERSHED INCHES, 5204.93 CFS-HRS, 430.14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 28

OUTPUT HYDROGRAPH= 1

AREA= .04 SQ MI INPUT RUNOFF CURVE= 81.

TIME OF CONCENTRATION= .38 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0507 HOURS

PEAK TIME(HRS)

12.30

15.07

24.14

PEAK DISCHARGE(CFS)

52.95

4.04

2.76

PEAK ELEVATION(FEET)

(RUNOFF)

(RUNOFF)

(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS										TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .04 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.00	.00	.01	.03	.06	.10	.14					
8.00	DISCHG	.18	.23	.27	.31	.35	.40	.45	.51	.56	.59					
9.00	DISCHG	.67	.76	.83	.87	.94	1.02	1.10	1.18	1.27	1.38					
10.00	DISCHG	1.48	1.57	1.69	1.83	1.99	2.16	2.34	2.53	2.73	2.96					

11.00	DISCHG	3.24	3.55	3.85	4.20	4.76	5.46	6.26	7.54	10.25	15.53
12.00	DISCHG	26.03	38.51	48.71	52.95	48.19	38.51	28.82	21.57	16.60	13.51
13.00	DISCHG	11.48	10.09	9.09	8.34	7.71	7.17	6.65	6.22	5.94	5.77

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14.00	DISCHG	5.59	5.41	5.29	5.16	4.91	4.64	4.54	4.51	4.33	4.09
15.00	DISCHG	4.02	4.04	3.97	3.85	3.76	3.72	3.70	3.66	3.53	3.38
16.00	DISCHG	3.28	3.22	3.20	3.18	3.18	3.14	3.02	2.87	2.76	2.63
17.00	DISCHG	2.37	2.10	1.99	2.03	2.07	2.06	1.95	1.81	1.71	1.69
18.00	DISCHG	1.78	1.88	1.87	1.77	1.69	1.65	1.63	1.61	1.61	1.61
19.00	DISCHG	1.61	1.57	1.45	1.33	1.34	1.44	1.52	1.56	1.58	1.56
20.00	DISCHG	1.45	1.33	1.35	1.41	1.37	1.30	1.33	1.39	1.36	1.25
21.00	DISCHG	1.17	1.16	1.26	1.36	1.34	1.25	1.17	1.12	1.10	1.13
22.00	DISCHG	1.24	1.35	1.34	1.25	1.17	1.12	1.10	1.09	1.09	1.08
23.00	DISCHG	1.08	1.08	1.08	1.08	1.08	1.08	1.07	.94	.65	.63
24.00	DISCHG	1.57	2.65	2.57	1.65	.87	.46	.24	.12	.07	.03
25.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 3.01 WATERSHED INCHES, 73.79 CFS-HRS, 6.10 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 29

OUTPUT HYDROGRAPH= 2

AREA= .01 SQ MI INPUT RUNOFF CURVE= 84. TIME OF CONCENTRATION= .24 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.21	21.76	(RUNOFF)
24.07	1.34	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
6.00	DISCHG	.00	.00	.00	.01	.03
7.00	DISCHG	.04	.05	.06	.07	.18
8.00	DISCHG	.19	.21	.22	.25	.35
9.00	DISCHG	.41	.45	.46	.51	.69
10.00	DISCHG	.72	.76	.82	.95	1.36
11.00	DISCHG	1.50	1.61	1.72	2.23	8.80
12.00	DISCHG	15.23	19.50	21.74	20.32	3.73
13.00	DISCHG	3.36	3.12	2.90	2.73	2.00
14.00	DISCHG	1.92	1.87	1.86	1.79	1.39
15.00	DISCHG	1.44	1.44	1.37	1.33	1.15
16.00	DISCHG	1.14	1.13	1.13	1.13	.88
17.00	DISCHG	.71	.65	.70	.74	.61
18.00	DISCHG	.69	.70	.63	.59	.57
19.00	DISCHG	.57	.54	.45	.44	.54
20.00	DISCHG	.45	.44	.51	.51	.40
21.00	DISCHG	.39	.42	.50	.51	.42
22.00	DISCHG	.50	.51	.45	.41	.38
23.00	DISCHG	.38	.38	.38	.38	.33
24.00	DISCHG	1.15	1.30	.63	.23	.08

RUNOFF VOLUME ABOVE BASEFLOW = 3.30 WATERSHED INCHES, 27.67 CFS-HRS, 2.29 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 30

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INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 30 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.30	52.95	(NULL)
15.07	4.04	(NULL)
24.14	2.76	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.01 WATERSHED INCHES, 73.79 CFS-HRS, 6.10 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 30
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.27	73.83	(NULL)
15.06	5.49	(NULL)
24.11	3.97	(NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .05 SQ.MI.
6.00	.00	.00	.00	.01
7.00	.04	.05	.06	.02
8.00	.38	.43	.49	.03
9.00	1.08	1.21	1.27	.04
10.00	2.20	2.33	2.51	.05
11.00	4.74	5.16	5.57	.06
12.00	41.26	58.02	70.44	.07
13.00	14.83	13.21	12.00	.08
14.00	7.51	7.29	7.15	.09
15.00	5.45	5.48	5.34	.10
16.00	4.41	4.35	4.33	.11
17.00	3.08	2.75	2.70	.12
18.00	2.47	2.58	2.50	.13
19.00	2.17	2.11	1.90	.14
20.00	1.90	1.78	1.85	.15
21.00	1.56	1.58	1.85	.16
22.00	1.74	1.87	1.79	.17
23.00	1.46	1.46	1.46	.18
24.00	2.71	3.95	3.20	.19
25.00	.02	.01	.00	.20

RUNOFF VOLUME ABOVE BASEFLOW = 3.08 WATERSHED INCHES, 101.46 CFS-HRS, 8.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 31
OUTPUT HYDROGRAPH= 5
AREA= .30 SQ MI INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .71 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0947 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.50	313.64	(RUNOFF)
18.21	14.32	(RUNOFF)
19.92	11.93	(RUNOFF)
22.31	9.84	(RUNOFF)
24.31	12.83	(RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .30 SQ.MI.
7.00	.00	.00	.00	.02
8.00	.29	.48	.71	.07
9.00	3.32	3.76	4.24	.15
10.00	8.65	9.35	10.09	.23
11.00	19.43	21.20	23.16	.32
12.00	98.30	144.20	201.93	.41
13.00	158.92	134.35	115.30	.50
14.00	51.76	48.89	46.54	.59
15.00	34.34	33.41	32.61	.68
16.00	27.68	26.95	26.33	.77
17.00	21.63	20.35	19.06	.86
18.00	14.35	14.26	14.32	.95
19.00	12.74	12.59	12.32	1.04
20.00	11.86	11.60	11.30	1.13
21.00	10.20	9.93	9.78	1.22
22.00	9.20	9.44	9.71	1.31
23.00	8.65	8.59	8.55	1.40
24.00	7.69	9.50	11.73	1.49
25.00	1.95	1.38	.97	1.58
26.00	.06	.03	.01	1.67

RUNOFF VOLUME ABOVE BASEFLOW = 2.92 WATERSHED INCHES, 566.65 CFS-HRS, 46.83 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 5
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 6
SURFACE ELEVATION= 48.30

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)

12.91	189.96	60.00
18.23	14.31	49.65
19.94	11.92	49.43
22.33	9.84	49.23
24.33	12.81	49.51

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .30 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.02	.06	.14
7.00	ELEV	48.30	48.30	48.30	48.30	48.30	48.30	48.30	48.30	48.30	48.31	48.31
8.00	DISCHG	.27	.45	.67	.93	1.20	1.49	1.81	2.16	2.16	2.51	2.87
8.00	ELEV	48.33	48.34	48.36	48.39	48.41	48.44	48.47	48.50	48.50	48.54	48.57
9.00	DISCHG	3.25	3.69	4.16	4.64	5.11	5.61	6.12	6.66	6.66	7.24	7.87

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9.00	ELEV	48.61	48.65	48.69	48.74	48.78	48.83	48.88	48.93	48.98	49.04
10.00	DISCHG	8.54	9.23	9.97	10.76	11.64	12.63	13.72	14.91	16.20	17.61
10.00	ELEV	49.11	49.17	49.24	49.32	49.40	49.49	49.60	49.71	49.83	49.96
11.00	DISCHG	18.69	20.14	21.96	24.02	26.42	29.31	32.95	37.82	44.26	55.43
11.00	ELEV	50.03	50.10	50.18	50.27	50.38	50.51	50.68	50.90	51.17	51.62
12.00	DISCHG	69.13	82.78	103.76	121.94	138.15	154.96	170.02	181.27	187.85	189.95
12.00	ELEV	52.17	52.76	53.72	54.80	56.01	57.30	58.46	59.33	59.83	60.00
13.00	DISCHG	188.41	184.25	178.34	171.33	163.69	155.76	147.76	139.85	132.13	124.64
13.00	ELEV	59.88	59.56	59.10	58.56	57.98	57.37	56.75	56.14	55.55	54.98
14.00	DISCHG	116.09	106.54	93.02	81.84	71.94	61.07	45.74	40.53	37.79	36.27
14.00	ELEV	54.41	53.84	53.23	52.72	52.29	51.84	51.23	51.02	50.90	50.83
15.00	DISCHG	35.05	34.00	33.12	32.34	31.64	31.01	30.43	29.89	29.38	28.80
15.00	ELEV	50.78	50.73	50.69	50.65	50.62	50.59	50.56	50.54	50.52	50.49
16.00	DISCHG	28.13	27.40	26.72	26.16	25.72	25.39	25.04	24.58	23.97	23.21
16.00	ELEV	50.46	50.43	50.40	50.37	50.35	50.34	50.32	50.30	50.27	50.24
17.00	DISCHG	22.27	21.13	19.86	18.68	17.60	16.78	16.56	16.02	15.44	14.80
17.00	ELEV	50.19	50.14	50.08	50.03	49.96	49.89	49.86	49.81	49.76	49.70
18.00	DISCHG	14.40	14.26	14.31	14.30	14.13	13.85	13.52	13.22	13.01	12.86
18.00	ELEV	49.66	49.65	49.65	49.65	49.63	49.61	49.58	49.55	49.53	49.51
19.00	DISCHG	12.75	12.62	12.37	11.98	11.57	11.32	11.32	11.48	11.73	11.91
19.00	ELEV	49.50	49.49	49.47	49.43	49.39	49.37	49.37	49.38	49.41	49.42
20.00	DISCHG	11.89	11.65	11.34	11.11	10.95	10.79	10.68	10.65	10.62	10.49
20.00	ELEV	49.42	49.40	49.37	49.35	49.33	49.32	49.31	49.31	49.30	49.29
21.00	DISCHG	10.25	9.97	9.80	9.83	10.00	10.07	9.95	9.70	9.40	9.18
21.00	ELEV	49.27	49.24	49.23	49.23	49.24	49.25	49.24	49.22	49.19	49.17
22.00	DISCHG	9.18	9.39	9.67	9.83	9.79	9.60	9.33	9.07	8.88	8.75
22.00	ELEV	49.17	49.19	49.21	49.23	49.22	49.21	49.18	49.16	49.14	49.13
23.00	DISCHG	8.66	8.60	8.55	8.52	8.50	8.49	8.45	8.25	7.78	7.28
23.00	ELEV	49.12	49.11	49.11	49.10	49.10	49.10	49.10	49.08	49.03	48.99
24.00	DISCHG	7.55	9.13	11.37	12.73	12.41	10.75	8.32	5.87	4.07	2.89
24.00	ELEV	49.01	49.16	49.37	49.50	49.47	49.32	49.09	48.85	48.68	48.57
25.00	DISCHG	2.06	1.46	1.03	.73	.51	.36	.25	.18	.12	.09
25.00	ELEV	48.49	48.44	48.40	48.37	48.35	48.33	48.32	48.32	48.31	48.31
26.00	DISCHG	.06	.04	.01	.00						
26.00	ELEV	48.31	48.30	48.30	48.30						

RUNOFF VOLUME ABOVE BASEFLOW = 2.92 WATERSHED INCHES, 566.77 CFS-HRS, 46.84 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 32

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1

LENGTH = 4200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .52 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.11	186.53	(NULL)
20.09	11.83	(NULL)
22.50	9.73	(NULL)
24.50	11.91	(NULL)

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RUNOFF VOLUME ABOVE BASEFLOW = 2.92 WATERSHED INCHES, 566.63 CFS-HRS, 46.83 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 32

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 2

0 LENGTH = 4200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.40, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .53 PEAK TRAVEL TIME = .14 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	66.83	(NULL)
24.26	3.15	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.08 WATERSHED INCHES, 101.43 CFS-HRS, 8.38 ACRE-FeET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 32
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.96	206.74	(NULL)
20.03	13.87	(NULL)
22.43	11.39	(NULL)
24.42	13.86	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .35 SQ.MI.
6.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .01		
7.00	DISCHG .02 .03 .04 .05 .05 .06 .08 .11 .17 .25		
8.00	DISCHG .36 .51 .70 .94 1.22 1.52 1.85 2.23 2.63 3.03		
9.00	DISCHG 3.44 3.90 4.42 4.95 5.48 6.04 6.62 7.22 7.85 8.53		
10.00	DISCHG 9.26 10.03 10.83 11.68 12.61 13.64 14.76 16.01 17.36 18.84		
11.00	DISCHG 20.44 22.00 23.72 25.70 28.01 30.82 34.19 38.31 43.93 52.30		
12.00	DISCHG 66.65 89.59 116.46 146.68 171.98 186.82 195.29 200.44 204.11 206.28		
13.00	DISCHG 206.61 204.76 200.92 195.39 188.64 181.01 172.86 164.42 155.99 147.76		
14.00	DISCHG 139.81 131.41 122.31 110.85 99.43 88.58 77.55 64.27 55.14 49.14		
15.00	DISCHG 45.31 42.82 41.09 39.72 38.58 37.62 36.80 36.09 35.43 34.74		
16.00	DISCHG 34.01 33.25 32.47 31.73 31.08 30.53 30.06 29.54 28.96 28.29		
17.00	DISCHG 27.48 26.37 25.07 23.76 22.56 21.45 20.47 19.79 19.08 18.38		
18.00	DISCHG 17.71 17.28 17.05 16.92 16.78 16.58 16.32 16.00 15.69 15.43		
19.00	DISCHG 15.23 15.07 14.89 14.57 14.14 13.77 13.53 13.47 13.54 13.72		
20.00	DISCHG 13.86 13.82 13.61 13.40 13.21 12.97 12.74 12.62 12.59 12.50		
21.00	DISCHG 12.32 12.05 11.79 11.67 11.69 11.74 11.73 11.61 11.40 11.13		
22.00	DISCHG 10.92 10.92 11.10 11.28 11.38 11.36 11.23 11.01 10.77 10.55		
23.00	DISCHG 10.38 10.25 10.15 10.08 10.03 9.99 9.97 9.93 9.70 9.10		
24.00	DISCHG 8.65 9.51 11.39 13.04 13.83 13.56 12.34 10.38 8.10 6.04		
25.00	DISCHG 4.43 3.21 2.31 1.64 1.17 .82 .58 .41 .29 .20		
26.00	DISCHG .14 .10 .07 .04 .02 .01 .00		

1 RUNOFF VOLUME ABOVE BASEFLOW = 2.94 WATERSHED INCHES, 668.06 CFS-HRS, 55.21 ACRE-FeET; BASEFLOW = .00 CFS

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OPERATION RUNOFF CROSS SECTION 33
OUTPUT HYDROGRAPH= 4
AREA= .05 SQ MI INPUT RUNOFF CURVE= 71. TIME OF CONCENTRATION= .29 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.27	51.32	(RUNOFF)
16.35	3.35	(RUNOFF)
24.10	3.63	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .05 SQ.MI.
9.00	DISCHG .00 .00 .00 .00 .00 .00 .02 .06 .11 .18		
10.00	DISCHG .25 .33 .42 .52 .64 .76 .90 1.05 1.21 1.40		
11.00	DISCHG 1.63 1.88 2.12 2.45 2.97 3.55 4.23 5.56 8.42 14.30		
12.00	DISCHG 26.57 39.25 48.44 50.78 41.28 30.48 21.95 16.29 13.03 11.16		
13.00	DISCHG 9.90 9.05 8.41 7.90 7.39 6.91 6.41 6.05 5.90 5.79		
14.00	DISCHG 5.59 5.44 5.38 5.23 4.86 4.61 4.67 4.65 4.32 4.10		
15.00	DISCHG 4.16 4.21 4.07 3.94 3.88 3.86 3.86 3.79 3.60 3.45		
16.00	DISCHG 3.38 3.35 3.34 3.34 3.34 3.28 3.09 2.93 2.85 2.69		
17.00	DISCHG 2.29 2.02 2.07 2.17 2.22 2.17 1.98 1.82 1.75 1.79		
18.00	DISCHG 1.97 2.07 1.95 1.81 1.75 1.73 1.72 1.71 1.71 1.71		
19.00	DISCHG 1.71 1.64 1.45 1.35 1.47 1.61 1.67 1.70 1.71 1.65		
20.00	DISCHG 1.45 1.35 1.48 1.55 1.41 1.34 1.47 1.54 1.41 1.27		
21.00	DISCHG 1.20 1.25 1.44 1.53 1.41 1.27 1.21 1.18 1.17 1.23		
22.00	DISCHG 1.44 1.54 1.41 1.27 1.21 1.18 1.17 1.17 1.16 1.16		
23.00	DISCHG 1.16 1.17 1.17 1.17 1.17 1.17 1.16 .99 .56 .72		
24.00	DISCHG 2.53 3.63 2.44 1.09 .46 .20 .09 .04 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 66.25 CFS-HRS, 5.48 ACRE-FeET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 34
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
LENGTH = 1200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.00, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .94 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 34 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.37	51.02	(NULL)
16.45	3.35	(NULL)
24.20	3.57	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 66.20 CFS-HRS, 5.47 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 34
INPUT HYDROGRAPHS= 3,5 OUTPUT HYDROGRAPH= 6

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.52	228.84	(NULL)
19.98	15.52	(NULL)
20.77	14.14	(NULL)
21.41	13.22	(NULL)
22.32	12.70	(NULL)
24.30	15.55	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .40 SQ.MI.
6.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .01		.01
7.00	DISCHG .02 .03 .04 .05 .05 .06 .08 .11 .17 .25		.25
8.00	DISCHG .36 .51 .70 .94 1.22 1.52 1.85 2.23 2.63 3.03		3.03
9.00	DISCHG 3.44 3.90 4.42 4.95 5.48 6.04 6.62 7.24 7.90 8.64		8.64
10.00	DISCHG 9.44 10.28 11.15 12.10 13.13 14.27 15.52 16.90 18.41 20.04		20.04
11.00	DISCHG 21.83 23.62 25.58 27.81 30.44 33.75 37.71 42.49 49.41 60.55		60.55
12.00	DISCHG 80.62 115.46 154.96 194.57 222.59 228.62 226.40 222.90 220.75 219.51		219.51
13.00	DISCHG 217.88 214.74 210.01 203.84 196.57 188.42 179.80 170.86 162.06 153.67		153.67
14.00	DISCHG 145.60 137.01 127.75 116.23 104.67 93.46 82.17 68.94 59.79 53.48		53.48
15.00	DISCHG 49.42 46.98 45.29 43.80 42.53 41.50 40.66 39.95 39.23 38.36		38.36
16.00	DISCHG 37.47 36.63 35.83 35.08 34.42 33.88 33.34 32.64 31.89 31.15		31.15
17.00	DISCHG 30.18 28.68 27.11 25.83 24.72 23.67 22.65 21.78 20.91 20.13		20.13
18.00	DISCHG 19.50 19.24 19.12 18.88 18.60 18.33 18.04 17.72 17.41 17.14		17.14
19.00	DISCHG 16.94 16.78 16.54 16.02 15.49 15.23 15.13 15.13 15.24 15.42		15.42
20.00	DISCHG 15.52 15.28 14.97 14.87 14.75 14.39 14.08 14.08 14.13 13.92		13.92
21.00	DISCHG 13.59 13.26 13.04 13.10 13.22 13.15 13.00 12.82 12.58 12.30		12.30
22.00	DISCHG 12.15 12.34 12.63 12.70 12.66 12.57 12.41 12.18 11.93 11.71		11.71
23.00	DISCHG 11.54 11.41 11.31 11.24 11.20 11.16 11.14 11.09 10.69 9.68		9.68
24.00	DISCHG 9.36 11.93 14.95 15.55 15.00 14.07 12.56 10.47 8.14 6.06		6.06
25.00	DISCHG 4.43 3.21 2.31 1.64 1.17 .82 .58 .41 .29 .20		.20
26.00	DISCHG .14 .10 .07 .04 .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.84 WATERSHED INCHES, 734.26 CFS-HRS, 60.68 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 35
OUTPUT HYDROGRAPH= 1
AREA= .76 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .77 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .1027 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.55	561.39	(RUNOFF)
19.95	26.11	(RUNOFF)
21.48	22.07	(RUNOFF)
22.34	21.61	(RUNOFF)
24.34	28.36	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .76 SQ.MI.
9.00	DISCHG .00 .00 .00 .01 .04 .14 .34 .69 1.19 1.84		1.84
10.00	DISCHG 2.65 3.57 4.62 5.79 7.10 8.57 10.21 12.03 14.03 16.25		16.25

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11.00	DISCHG	18.71	21.49	24.58	28.10	32.22	37.33	43.55	52.38	65.64	91.66
12.00	DISCHG	138.08	213.22	313.37	419.19	507.51	555.96	557.39	521.37	463.52	399.06
13.00	DISCHG	340.16	291.32	252.21	220.96	195.85	175.38	158.35	144.12	132.21	122.40
14.00	DISCHG	114.42	107.93	102.58	98.00	93.78	89.74	86.03	82.85	80.09	77.39
15.00	DISCHG	74.90	72.84	71.13	69.49	68.00	66.71	65.55	64.43	63.32	62.03
16.00	DISCHG	60.55	59.06	57.72	56.61	55.77	55.05	54.24	53.16	51.78	50.07
17.00	DISCHG	47.94	45.39	42.73	40.43	38.69	37.42	36.38	35.32	34.09	32.89
18.00	DISCHG	32.00	31.57	31.46	31.33	30.99	30.46	29.82	29.18	28.68	28.34
19.00	DISCHG	28.09	27.79	27.27	26.47	25.60	25.10	25.04	25.28	25.71	26.07
20.00	DISCHG	26.06	25.65	25.07	24.59	24.22	23.86	23.60	23.51	23.43	23.13
21.00	DISCHG	22.65	22.16	21.86	21.83	21.99	22.06	21.87	21.44	20.90	20.48
22.00	DISCHG	20.42	20.77	21.28	21.59	21.54	21.22	20.72	20.18	19.74	19.45
23.00	DISCHG	19.24	19.09	18.98	18.91	18.85	18.81	18.65	18.09	16.82	15.87
24.00	DISCHG	16.70	20.35	25.24	28.13	27.73	24.79	20.12	14.94	10.68	7.72
25.00	DISCHG	5.65	4.11	2.98	2.16	1.56	1.13	.82	.59	.42	.30
26.00	DISCHG	.22	.16	.11	.06	.02	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.22 WATERSHED INCHES, 1081.65 CFS-HRS, 89.39 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 36
INPUT HYDROGRAPHS= 6,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.55	791.10	(NULL)
19.96	41.63	(NULL)
21.45	35.25	(NULL)
22.33	34.31	(NULL)
24.33	43.86	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.16 SQ.MI.
6.00	DISCHG	.00	.00	.00	.00	.01
7.00	DISCHG	.02	.03	.04	.05	.08
8.00	DISCHG	.36	.51	.70	.94	1.22
9.00	DISCHG	3.44	3.90	4.42	4.95	5.52
10.00	DISCHG	12.09	13.85	15.77	17.89	20.23
11.00	DISCHG	40.55	45.11	50.16	55.91	62.66
12.00	DISCHG	218.70	328.68	468.33	613.76	730.11
13.00	DISCHG	558.04	506.06	462.22	424.80	392.42
14.00	DISCHG	260.03	244.94	230.33	214.22	198.46
15.00	DISCHG	124.32	119.82	116.42	113.29	110.53
16.00	DISCHG	98.01	95.69	93.54	91.68	90.19
17.00	DISCHG	78.12	74.07	69.84	66.26	63.41
18.00	DISCHG	51.50	50.81	50.58	50.21	49.60
19.00	DISCHG	45.03	44.57	43.80	42.49	41.10
20.00	DISCHG	41.58	40.93	40.03	39.45	38.97
21.00	DISCHG	36.24	35.42	34.89	34.92	35.20
22.00	DISCHG	32.57	33.11	33.91	34.29	34.20
23.00	DISCHG	30.78	30.50	30.30	30.15	30.05

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24.00	DISCHG	26.06	32.28	40.19	43.67	42.74	38.86	32.67	25.41	18.82	13.78
25.00	DISCHG	10.07	7.32	5.28	3.81	2.73	1.95	1.40	1.00	.71	.50
26.00	DISCHG	.36	.26	.18	.10	.04	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 2.43 WATERSHED INCHES, 1815.91 CFS-HRS, 150.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 6
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 26.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.51	361.93	32.77
24.57	34.52	27.81

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.16 SQ.MI.
7.00	DISCHG	.00	.00	.01	.01	.02
7.00	ELEV	26.00	26.00	26.00	26.00	26.00
8.00	DISCHG	.05	.07	.10	.15	.20
8.00	ELEV	26.00	26.00	26.01	26.01	26.01
9.00	DISCHG	.83	.99	1.17	1.37	1.60
9.00	ELEV	26.04	26.05	26.06	26.07	26.08
10.00	DISCHG	3.63	4.16	4.77	5.46	6.23
10.00	ELEV	26.19	26.22	26.25	26.29	26.33
11.00	DISCHG	13.30	14.99	16.85	18.92	21.22

11.00	ELEV	26.70	26.79	26.89	26.99	27.12	27.25	27.41	27.59	27.82	28.11
12.00	DISCHG	51.60	71.57	106.05	157.76	186.84	219.90	252.61	279.84	302.98	321.53
12.00	ELEV	28.42	28.78	29.32	30.01	30.39	30.82	31.24	31.62	31.94	32.20
13.00	DISCHG	335.74	346.19	353.54	358.33	361.01	361.92	361.33	359.48	356.56	352.76
13.00	ELEV	32.40	32.55	32.65	32.72	32.75	32.77	32.76	32.73	32.69	32.64
14.00	DISCHG	348.25	343.15	337.53	331.39	324.73	317.60	310.05	302.06	293.74	285.30
14.00	ELEV	32.58	32.50	32.43	32.34	32.25	32.15	32.04	31.93	31.81	31.69
15.00	DISCHG	276.91	268.66	260.65	252.88	244.93	237.01	229.43	222.18	215.24	208.60
15.00	ELEV	31.58	31.46	31.35	31.24	31.14	31.03	30.94	30.85	30.76	30.67
16.00	DISCHG	202.20	196.05	190.28	184.75	179.45	174.36	169.49	164.81	160.28	154.53
16.00	ELEV	30.59	30.51	30.44	30.37	30.30	30.23	30.16	30.10	30.04	29.97
17.00	DISCHG	145.21	136.60	128.55	121.02	114.62	108.75	103.29	98.35	93.94	89.78
17.00	ELEV	29.85	29.74	29.63	29.53	29.44	29.36	29.28	29.20	29.14	29.07
18.00	DISCHG	85.87	82.26	78.97	75.99	73.27	70.77	68.66	66.77	64.97	63.26
18.00	ELEV	29.01	28.95	28.90	28.85	28.81	28.77	28.74	28.70	28.67	28.64
19.00	DISCHG	61.66	60.16	58.74	57.36	55.97	54.62	53.34	52.18	51.16	50.27
19.00	ELEV	28.61	28.58	28.55	28.53	28.50	28.48	28.45	28.43	28.41	28.39
20.00	DISCHG	49.50	48.77	48.03	47.29	46.57	45.87	45.16	44.50	43.88	43.30
20.00	ELEV	28.38	28.37	28.35	28.34	28.33	28.31	28.30	28.29	28.28	28.27
21.00	DISCHG	42.81	42.41	42.00	41.59	41.22	40.88	40.54	40.20	39.84	39.46
21.00	ELEV	28.25	28.23	28.21	28.19	28.17	28.15	28.13	28.11	28.09	28.07
22.00	DISCHG	39.07	38.71	38.42	38.17	37.95	37.72	37.48	37.21	36.91	36.60
22.00	ELEV	28.05	28.03	28.02	28.01	27.99	27.98	27.97	27.96	27.94	27.92
23.00	DISCHG	36.28	35.95	35.64	35.33	35.03	34.74	34.47	34.18	33.85	33.43
23.00	ELEV	27.91	27.89	27.87	27.86	27.84	27.83	27.81	27.80	27.78	27.76

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24.00	DISCHG	33.00	32.78	32.97	33.49	34.04	34.43	34.50	34.19	33.50	32.52
24.00	ELEV	27.73	27.72	27.73	27.76	27.79	27.81	27.81	27.80	27.76	27.71
25.00	DISCHG	31.34	30.05	28.69	27.32	25.94	24.60	23.29	22.03	20.82	19.66
25.00	ELEV	27.65	27.58	27.51	27.44	27.36	27.29	27.22	27.16	27.09	27.03
26.00	DISCHG	18.57	17.52	16.54	15.60	14.71	13.87	13.08	12.34	11.63	10.97
26.00	ELEV	26.98	26.92	26.87	26.82	26.77	26.73	26.69	26.65	26.61	26.58
27.00	DISCHG	10.34	9.75	9.19	8.67	8.17	7.71	7.27	6.85	6.46	6.09
27.00	ELEV	26.54	26.51	26.48	26.46	26.43	26.41	26.38	26.36	26.34	26.32
28.00	DISCHG	5.74	5.42	5.11	4.82	4.54	4.28	4.04	3.81	3.59	3.38
28.00	ELEV	26.30	26.28	26.27	26.25	26.24	26.23	26.21	26.20	26.19	26.18
29.00	DISCHG	3.19	3.01	2.84	2.68	2.52	2.38	2.24	2.11	1.99	1.88
29.00	ELEV	26.17	26.16	26.15	26.14	26.13	26.13	26.12	26.11	26.10	26.10

RUNOFF VOLUME ABOVE BASEFLOW = 2.43 WATERSHED INCHES, 1813.02 CFS-HRS, 149.83 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 37

OUTPUT HYDROGRAPH= 4

AREA= .62 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .90 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .1000 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.65	423.30	(RUNOFF)
20.00	21.14	(RUNOFF)
21.47	18.01	(RUNOFF)
22.39	17.48	(RUNOFF)
24.38	23.77	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .62 SQ.MI.
9.00	DISCHG .00	.00	.07
10.00	DISCHG 1.61	2.25	8.38
11.00	DISCHG 13.31	15.34	36.95
12.00	DISCHG 87.59	131.01	45.28
13.00	DISCHG 314.13	272.53	395.13
14.00	DISCHG 104.49	97.51	122.96
15.00	DISCHG 64.02	61.79	69.25
16.00	DISCHG 50.61	49.45	52.80
17.00	DISCHG 40.66	38.91	43.32
18.00	DISCHG 27.14	26.51	33.92
19.00	DISCHG 23.23	22.96	23.92
20.00	DISCHG 21.14	21.06	20.87
21.00	DISCHG 18.78	18.38	19.23
22.00	DISCHG 16.86	16.87	17.37
23.00	DISCHG 15.90	15.74	16.45
24.00	DISCHG 15.27	17.18	14.74
25.00	DISCHG 7.18	5.49	12.89
26.00	DISCHG .47	.35	.81

RUNOFF VOLUME ABOVE BASEFLOW = 2.22 WATERSHED INCHES, 883.62 CFS-HRS, 73.02 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 38

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 6500.00 FEET

MODIFIED ATT-KIN ROUTING COEFFICIENT = .36 INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53

PEAK TRAVEL TIME = .30 HOURS

PEAK TIME(HRS)

13.84

24.76

PEAK DISCHARGE(CFS)

357.27

34.15

PEAK ELEVATION(FEET)

(NULL)

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.43 WATERSHED INCHES, 1812.07 CFS-HRS, 149.75 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 38

INPUT HYDROGRAPHS= 4,5

OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)

12.79

24.39

PEAK DISCHARGE(CFS)

621.75

57.06

PEAK ELEVATION(FEET)

(NULL)

(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.77 SQ.MI.
7.00	DISCHG	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .01 .02	.02
8.00	DISCHG	.02 .03 .05 .07	.09 .13 .18	.24 .31 .40	.33	.40
9.00	DISCHG	.50 .62 .76 .91	1.10 1.33 1.64	2.07 2.62 3.33	3.33	4.00
10.00	DISCHG	4.19 5.21 6.38 7.72	9.24 10.95 12.87	15.02 17.41 20.08	20.08	23.00
11.00	DISCHG	23.05 26.37 30.06 34.23	38.96 44.48 51.00	59.38 70.57 89.14	89.14	109.00
12.00	DISCHG	120.42 170.63 245.19 338.27	440.99 526.56 584.61	615.74 621.61 611.38	611.38	669.00
13.00	DISCHG	592.63 571.72 554.05 538.50	525.41 513.18 501.82	490.79 480.14 469.80	469.80	469.80
14.00	DISCHG	459.93 450.35 441.10 431.94	422.83 413.52 403.88	393.98 383.90 373.65	373.65	373.65
15.00	DISCHG	363.24 352.94 343.09 333.50	324.11 314.84 305.82	297.02 288.42 279.99	279.99	279.99
16.00	DISCHG	271.76 263.75 256.03 248.72	241.86 235.35 229.15	223.09 217.07 211.01	211.01	211.01
17.00	DISCHG	204.36 195.93 186.53 176.94	167.74 159.29 151.52	144.26 137.50 131.25	131.25	131.25
18.00	DISCHG	125.53 120.38 115.82 111.72	107.89 104.28 100.87	97.75 94.89 92.32	92.32	92.32
19.00	DISCHG	90.03 87.90 85.81 83.71	81.59 79.60 77.91	76.50 75.34 74.32	74.32	74.32
20.00	DISCHG	73.33 72.27 71.09 69.88	68.76 67.72 66.69	65.75 64.97 64.18	64.18	64.18
21.00	DISCHG	63.21 62.22 61.43 60.83	60.37 59.97 59.49	58.89 58.21 57.54	57.54	57.54
22.00	DISCHG	56.97 56.60 56.49 56.41	56.19 55.80 55.31	54.74 54.12 53.52	53.52	53.52
23.00	DISCHG	53.01 52.55 52.12 51.72	51.34 50.98 50.64	50.17 49.43 48.94	48.94	48.94
24.00	DISCHG	49.31 50.85 53.71 56.32	57.05 56.02 53.81	50.76 47.03 43.43	43.43	43.43
25.00	DISCHG	40.58 38.15 35.93 33.82	31.87 30.02 28.28	26.64 25.10 23.65	23.65	23.65
26.00	DISCHG	22.28 20.99 19.77 18.63	17.56 16.55 15.59	14.68 13.82 13.02	13.02	13.02
27.00	DISCHG	12.27 11.57 10.91 10.29	9.70 9.15 8.63	8.14 7.67 7.23	7.23	7.23
28.00	DISCHG	6.82 6.43 6.06 5.72	5.39 5.08 4.79	4.52 4.26 4.02	4.02	4.02
29.00	DISCHG	3.79 3.57 3.37 3.18	2.99 2.82 2.66	2.51 2.37 2.23	2.23	2.23

RUNOFF VOLUME ABOVE BASEFLOW = 2.36 WATERSHED INCHES, 2695.69 CFS-HRS, 222.77 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 39

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1

LENGTH = 2500.00 FEET

MODIFIED ATT-KIN ROUTING COEFFICIENT = .99 INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53

PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 39 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)

12.90

24.42

PEAK DISCHARGE(CFS)

1347.75

125.74

PEAK ELEVATION(FEET)

(NULL)

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.97 WATERSHED INCHES, 5204.85 CFS-HRS, 430.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 39

INPUT HYDROGRAPHS= 6,7

OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)

12.79

PEAK DISCHARGE(CFS)

1969.55

PEAK ELEVATION(FEET)

(NULL)

24.34

182.48

(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 5.86 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.02	
8.00	DISCHG	.02	.03	.05	.07	.09	.13	.18	.24	.32	.42
9.00	DISCHG	.56	.73	.95	1.29	1.79	2.48	3.40	4.59	6.08	7.93
10.00	DISCHG	10.12	12.68	15.62	19.00	22.87	27.36	32.50	38.35	44.96	52.43
11.00	DISCHG	60.90	70.46	81.17	93.42	107.78	125.04	145.72	173.34	213.96	283.66
12.00	DISCHG	405.48	600.83	866.70	1167.97	1466.38	1697.81	1860.54	1949.66	1969.42	1942.71
13.00	DISCHG	1878.58	1790.43	1693.81	1590.94	1496.61	1413.41	1339.17	1271.31	1210.23	1154.76
14.00	DISCHG	1106.31	1064.04	1027.19	994.47	964.68	936.91	911.01	886.95	863.97	841.66
15.00	DISCHG	820.45	800.68	782.44	765.29	749.04	733.58	719.15	705.53	692.20	678.84
16.00	DISCHG	665.61	652.83	640.68	629.32	618.78	608.76	598.91	588.91	578.76	568.09
17.00	DISCHG	555.78	540.63	524.26	508.14	493.04	479.19	466.12	453.43	441.36	430.39
18.00	DISCHG	420.73	412.49	405.21	398.36	391.80	385.54	379.66	374.21	369.12	364.38
19.00	DISCHG	360.04	355.84	351.30	346.36	341.60	337.50	334.22	331.69	329.67	327.76
20.00	DISCHG	325.51	322.80	320.02	317.32	314.48	311.51	308.76	306.38	304.16	301.57
21.00	DISCHG	298.04	293.55	288.97	284.74	280.21	275.65	264.97	256.25	248.51	242.05
22.00	DISCHG	237.01	233.25	230.03	226.59	222.65	218.20	213.43	208.53	203.59	198.79
23.00	DISCHG	194.32	190.19	186.32	182.64	179.20	175.97	172.77	168.92	163.85	159.65
24.00	DISCHG	160.49	158.17	156.14	154.20	152.36	150.61	149.05	147.68	146.49	145.36
25.00	DISCHG	126.73	126.13	125.24	124.36	123.51	122.68	121.87	121.08	120.31	119.56
26.00	DISCHG	51.77	48.21	45.02	42.14	39.53	37.17	34.99	32.98	31.11	29.38
27.00	DISCHG	27.78	26.28	24.87	23.56	22.32	21.16	20.06	19.01	18.03	17.09
28.00	DISCHG	16.20	15.36	14.57	13.82	13.11	12.43	11.80	11.19	10.62	10.07
29.00	DISCHG	9.56	9.07	8.60	8.16	7.74	7.35	6.97	6.62	6.28	5.96

RUNOFF VOLUME ABOVE BASEFLOW = 2.09 WATERSHED INCHES, 7900.62 CFS-HRS, 652.91 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 40

OUTPUT HYDROGRAPH= 2

AREA= .32 SQ MI INPUT RUNOFF CURVE= 67. TIME OF CONCENTRATION= .64 HOURS

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INTERNAL HYDROGRAPH TIME INCREMENT= .0853 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.49	208.53	(RUNOFF)
18.22	11.80	(RUNOFF)
19.89	9.99	(RUNOFF)
22.28	8.34	(RUNOFF)
24.28	12.70	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .32 SQ.MI.		
10.00	DISCHG	.00	.00	.00	.07	.20	.46	.84	1.34	1.96	
11.00	DISCHG	2.70	3.57	4.57	5.75	7.18	8.97	11.17	14.41	19.93	30.98
12.00	DISCHG	51.65	84.71	128.01	171.11	201.04	208.38	196.19	172.32	144.50	120.78
13.00	DISCHG	101.88	87.13	75.81	67.04	60.16	54.70	50.07	46.09	42.77	40.11
14.00	DISCHG	38.00	36.31	34.95	33.80	32.66	31.44	30.33	29.43	28.58	27.67
15.00	DISCHG	26.84	26.18	25.66	25.20	24.74	24.29	23.91	23.59	23.20	22.67
16.00	DISCHG	22.06	21.50	21.04	20.73	20.54	20.34	20.02	19.53	18.94	18.23
17.00	DISCHG	17.29	16.14	15.03	14.23	13.77	13.55	13.31	12.86	12.29	11.82
18.00	DISCHG	11.59	11.66	11.79	11.75	11.54	11.24	10.95	10.75	10.63	10.55
19.00	DISCHG	10.48	10.37	10.10	9.70	9.36	9.26	9.38	9.63	9.89	9.99
20.00	DISCHG	9.86	9.56	9.27	9.12	9.02	8.89	8.82	8.83	8.82	8.69
21.00	DISCHG	8.43	8.16	8.08	8.24	8.43	8.44	8.26	7.97	7.70	7.58
22.00	DISCHG	7.69	7.99	8.27	8.33	8.19	7.93	7.66	7.47	7.35	7.27
23.00	DISCHG	7.22	7.18	7.15	7.14	7.13	7.13	7.06	6.77	6.04	5.57
24.00	DISCHG	6.66	9.43	12.03	12.68	11.36	8.71	6.00	4.04	2.76	1.88
25.00	DISCHG	1.27	.86	.59	.40	.27	.18	.12	.09	.06	.03
26.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 1.82 WATERSHED INCHES, 374.00 CFS-HRS, 30.91 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 41

INPUT HYDROGRAPHS= 2,1

OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.74	2127.55	(NULL)
24.33	194.94	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 6.17 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.02	
8.00	DISCHG	.02	.03	.05	.07	.09	.13	.18	.24	.32	.42
9.00	DISCHG	.56	.73	.95	1.29	1.79	2.48	3.40	4.59	6.08	7.93

10.00	DISCHG	10.12	12.68	15.62	19.01	22.94	27.56	32.95	39.19	46.29	54.39
11.00	DISCHG	63.59	74.03	85.75	99.17	114.96	134.01	156.89	187.75	233.88	314.64
12.00	DISCHG	457.13	685.55	994.71	1339.09	1667.42	1906.19	2056.74	2121.98	2113.93	2063.49
13.00	DISCHG	1980.46	1877.56	1769.61	1657.98	1556.78	1468.11	1389.25	1317.40	1253.00	1194.87
14.00	DISCHG	1144.31	1100.35	1062.15	1028.28	997.34	968.35	941.34	916.38	892.55	869.33
15.00	DISCHG	847.28	826.86	808.10	790.49	773.77	757.87	743.06	729.12	715.40	701.50
16.00	DISCHG	687.67	674.32	661.72	650.05	639.32	629.10	618.93	608.44	597.70	586.31

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17.00	DISCHG	573.07	556.77	539.29	522.37	506.81	492.74	479.43	466.28	453.66	442.21
18.00	DISCHG	432.32	424.16	417.00	410.11	403.34	396.79	390.61	384.97	379.75	374.92
19.00	DISCHG	370.52	366.21	361.40	356.06	350.96	346.76	343.61	341.32	339.56	337.75
20.00	DISCHG	335.37	332.36	329.29	326.44	323.50	320.40	317.57	315.21	312.98	310.26
21.00	DISCHG	306.47	301.71	297.05	292.97	288.63	282.09	273.23	264.22	256.21	249.63
22.00	DISCHG	244.70	241.25	238.30	234.92	230.84	226.13	221.09	216.00	210.95	206.07
23.00	DISCHG	201.53	197.37	193.47	189.78	186.33	183.09	179.84	175.69	169.89	165.22
24.00	DISCHG	167.15	177.60	189.17	194.70	192.92	185.16	175.04	164.22	152.41	139.97
25.00	DISCHG	128.00	116.99	106.83	97.17	88.00	79.59	72.21	65.87	60.45	55.79
26.00	DISCHG	51.77	48.22	45.02	42.14	39.53	37.17	34.99	32.98	31.11	29.38
27.00	DISCHG	27.78	26.28	24.87	23.56	22.32	21.16	20.06	19.01	18.03	17.09
28.00	DISCHG	16.20	15.36	14.57	13.82	13.11	12.43	11.80	11.19	10.62	10.07
29.00	DISCHG	9.56	9.07	8.60	8.16	7.74	7.35	6.97	6.62	6.28	5.96

RUNOFF VOLUME ABOVE BASEFLOW = 2.08 WATERSHED INCHES, 8274.61 CFS-HRS, 683.81 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 7
INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 7
SURFACE ELEVATION= 7.79

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
14.24 1049.07 17.28
24.40 191.42 10.09

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	6.17 SQ.MI.
8.00	DISCHG	.01	.01	.02	.03	.04
8.00	ELEV	7.79	7.79	7.79	7.79	7.79
9.00	DISCHG	.20	.27	.36	.47	.64
9.00	ELEV	7.79	7.79	7.80	7.80	7.80
10.00	DISCHG	3.85	5.01	6.40	8.07	10.04
10.00	ELEV	7.84	7.85	7.87	7.89	7.91
11.00	DISCHG	31.35	37.08	43.62	51.09	59.64
11.00	ELEV	8.17	8.24	8.31	8.40	8.51
12.00	DISCHG	175.42	235.93	328.27	380.37	429.33
12.00	ELEV	9.90	10.63	11.74	12.23	12.60
13.00	DISCHG	802.65	851.77	894.14	929.88	959.43
13.00	ELEV	15.42	15.79	16.11	16.38	16.60
14.00	DISCHG	1044.06	1047.47	1048.94	1048.78	1047.21
14.00	ELEV	17.24	17.26	17.28	17.27	17.26
15.00	DISCHG	1016.22	1008.40	1000.08	991.32	982.20
15.00	ELEV	17.03	16.97	16.91	16.84	16.77
16.00	DISCHG	922.48	911.95	901.32	890.61	879.89
16.00	ELEV	16.32	16.24	16.16	16.08	15.92
17.00	DISCHG	815.69	804.76	793.56	782.10	770.44
17.00	ELEV	15.51	15.43	15.35	15.26	15.17
18.00	DISCHG	698.91	687.11	675.48	664.06	652.84
18.00	ELEV	14.63	14.54	14.46	14.37	14.29
19.00	DISCHG	589.96	580.30	570.86	561.61	552.54
19.00	ELEV	13.81	13.74	13.67	13.60	13.53

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20.00	DISCHG	503.05	495.68	488.49	481.48	474.66	468.00	461.50	455.17	449.02	443.03
20.00	ELEV	13.16	13.10	13.05	12.99	12.94	12.89	12.84	12.79	12.75	12.70
21.00	DISCHG	437.16	431.36	425.60	419.91	414.28	408.66	402.94	397.09	391.12	385.10
21.00	ELEV	12.66	12.61	12.57	12.53	12.49	12.44	12.40	12.36	12.31	12.26
22.00	DISCHG	379.08	373.15	367.33	361.63	356.02	350.46	332.21	314.84	299.35	285.46
22.00	ELEV	12.22	12.17	12.13	12.09	12.05	12.00	11.79	11.58	11.39	11.22
23.00	DISCHG	272.98	261.74	251.61	242.44	234.13	226.58	219.68	213.28	207.09	201.05
23.00	ELEV	11.07	10.94	10.82	10.71	10.61	10.52	10.43	10.36	10.28	10.21
24.00	DISCHG	195.72	192.15	190.81	190.98	191.42	191.05	189.38	186.36	182.07	176.59
24.00	ELEV	10.14	10.10	10.09	10.09	10.09	10.09	10.07	10.03	9.98	9.91

25.00	DISCHG	170.08	162.81	155.03	146.92	138.62	130.24	121.94	113.85	106.10	98.77
25.00	ELEV	9.84	9.75	9.65	9.56	9.46	9.36	9.26	9.16	9.07	8.98
26.00	DISCHG	91.90	85.49	79.55	74.05	68.98	64.30	59.98	56.01	52.35	48.97
26.00	ELEV	8.90	8.82	8.75	8.68	8.62	8.56	8.51	8.46	8.42	8.38
27.00	DISCHG	45.85	42.98	40.32	37.86	35.58	33.46	31.50	29.67	27.96	26.37
27.00	ELEV	8.34	8.31	8.27	8.25	8.22	8.19	8.17	8.15	8.13	8.11
28.00	DISCHG	24.89	23.50	22.19	20.97	19.82	18.75	17.73	16.78	15.88	15.03
28.00	ELEV	8.09	8.07	8.06	8.04	8.03	8.02	8.00	7.99	7.98	7.97
29.00	DISCHG	14.24	13.48	12.77	12.10	11.47	10.87	10.30	9.77	9.26	8.78
29.00	ELEV	7.96	7.95	7.94	7.94	7.93	7.92	7.91	7.91	7.90	7.90

RUNOFF VOLUME ABOVE BASEFLOW = 2.08 WATERSHED INCHES, 8269.24 CFS-HRS, 683.37 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 42

OUTPUT HYDROGRAPH= 1

AREA= .51 SQ MI INPUT RUNOFF CURVE= 70. TIME OF CONCENTRATION= 1.26 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .1050 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.92	258.43	(RUNOFF)
24.54	13.33	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .51 SQ.MI.
9.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .01 .03		
10.00	DISCHG .07 .15 .29 .49 .76 1.13 1.60 2.18 2.86 3.67		
11.00	DISCHG 4.60 5.66 6.86 8.24 9.84 11.70 13.95 16.82 20.89 27.31		
12.00	DISCHG 37.66 53.63 76.59 106.43 141.30 177.80 211.35 236.86 252.57 258.31		
13.00	DISCHG 255.38 245.13 229.80 211.45 192.21 174.04 157.88 143.79 131.52 120.74		
14.00	DISCHG 111.18 102.78 95.44 88.99 83.33 78.36 73.98 70.10 66.63 63.52		
15.00	DISCHG 60.71 58.14 55.79 53.68 51.81 50.13 48.63 47.25 45.95 44.73		
16.00	DISCHG 43.57 42.45 41.38 40.38 39.50 38.69 37.93 37.20 36.47 35.68		
17.00	DISCHG 34.79 33.80 32.71 31.50 30.26 29.05 27.91 26.86 25.88 24.96		
18.00	DISCHG 24.12 23.38 22.77 22.25 21.80 21.38 20.96 20.57 20.21 19.87		
19.00	DISCHG 19.56 19.24 18.89 18.55 18.21 17.87 17.55 17.30 17.13 17.02		
20.00	DISCHG 16.93 16.85 16.76 16.63 16.47 16.31 16.14 15.95 15.76 15.58		
21.00	DISCHG 15.40 15.21 15.04 14.86 14.71 14.60 14.52 14.40 14.24 14.08		
22.00	DISCHG 13.95 13.85 13.80 13.79 13.79 13.77 13.72 13.63 13.52 13.38		
23.00	DISCHG 13.22 13.05 12.88 12.73 12.62 12.53 12.42 12.23 11.92 11.61		
24.00	DISCHG 11.43 11.42 11.64 12.19 12.87 13.30 13.24 12.72 11.86 10.74		

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25.00	DISCHG	9.50	8.17	6.70	5.40	4.40	3.61	2.98	2.47	2.03	1.67
26.00	DISCHG	1.37	1.13	.93	.76	.62	.51	.42	.34	.28	.23
27.00	DISCHG	.18	.15	.12	.09	.08	.06	.05	.04	.03	.02
28.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 2.05 WATERSHED INCHES, 674.28 CFS-HRS, 55.72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43

OUTPUT HYDROGRAPH= 2

AREA= .47 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .83 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0922 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.59	421.85	(RUNOFF)
19.98	18.09	(RUNOFF)
21.49	15.33	(RUNOFF)
22.37	14.90	(RUNOFF)
24.37	19.99	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .47 SQ.MI.
8.00	DISCHG .00 .01 .04 .11 .24 .43 .70 1.03 1.42 1.85		
9.00	DISCHG 2.32 2.85 3.43 4.04 4.67 5.34 6.04 6.78 7.56 8.40		
10.00	DISCHG 9.30 10.25 11.25 12.33 13.52 14.82 16.25 17.82 19.55 21.44		
11.00	DISCHG 23.52 25.83 28.40 31.30 34.67 38.72 43.74 50.54 60.33 78.36		
12.00	DISCHG 110.60 160.91 228.92 302.90 368.10 410.13 421.73 404.90 368.47 322.89		
13.00	DISCHG 276.84 237.15 204.73 178.55 157.26 139.77 125.24 113.06 102.87 94.42		
14.00	DISCHG 87.46 81.76 77.09 73.23 69.82 66.62 63.57 60.83 58.44 56.28		
15.00	DISCHG 54.32 52.64 51.26 50.00 48.81 47.78 46.88 46.03 45.17 44.24		
16.00	DISCHG 43.23 42.19 41.21 40.35 39.64 39.06 38.47 37.76 36.86 35.74		
17.00	DISCHG 34.36 32.70 30.88 29.21 27.87 26.83 25.97 25.19 24.35 23.49		
18.00	DISCHG 22.79 22.35 22.15 22.01 21.79 21.47 21.07 20.63 20.23 19.93		
19.00	DISCHG 19.72 19.50 19.17 18.70 18.17 17.76 17.59 17.64 17.81 18.01		
20.00	DISCHG 18.08 17.92 17.59 17.26 16.99 16.75 16.52 16.40 16.33 16.17		
21.00	DISCHG 15.86 15.53 15.31 15.22 15.27 15.33 15.23 14.99 14.67 14.38		

22.00	DISCHG	14.24	14.35	14.63	14.86	14.90	14.76	14.49	14.16	13.84	13.59
23.00	DISCHG	13.43	13.30	13.21	13.14	13.09	13.05	12.98	12.73	12.15	11.81
24.00	DISCHG	12.46	14.50	17.46	19.63	19.89	18.42	15.81	12.47	9.18	6.70
25.00	DISCHG	5.00	3.75	2.80	2.09	1.55	1.14	.85	.63	.47	.34
26.00	DISCHG	.25	.18	.13	.10	.07	.04	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.73 WATERSHED INCHES, 836.52 CFS-HRS, 69.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 44
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 LENGTH = 1800.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53
 0 MODIFIED ATT-KIN ROUTING COEFFICIENT = .88 PEAK TRAVEL TIME = .10 HOURS

1 *** WARNING REACH 44 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.03	257.77	(NULL)
24.65	13.30	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.05 WATERSHED INCHES, 674.29 CFS-HRS, 55.72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 44
 INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.71	611.99	(NULL)
19.88	35.17	(NULL)
22.36	28.70	(NULL)
24.40	32.01	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.98 SQ.MI.
8.00	DISCHG	.00	.01	.04	.11	.24
9.00	DISCHG	2.32	2.85	3.43	4.04	4.67
10.00	DISCHG	9.33	10.32	11.40	12.60	13.98
11.00	DISCHG	27.08	30.30	33.92	38.00	42.73
12.00	DISCHG	137.09	197.26	280.54	376.57	470.70
13.00	DISCHG	534.22	492.76	451.08	410.28	371.08
14.00	DISCHG	209.65	194.23	181.00	169.66	159.68
15.00	DISCHG	118.25	113.74	109.74	106.10	102.78
16.00	DISCHG	88.12	85.92	83.81	81.87	80.16
17.00	DISCHG	70.14	67.61	64.81	62.06	59.52
18.00	DISCHG	47.87	46.58	45.63	44.86	44.12
19.00	DISCHG	39.64	39.10	38.44	37.64	36.77
20.00	DISCHG	35.12	34.86	34.46	34.03	33.64
21.00	DISCHG	31.47	30.96	30.55	30.28	30.16
22.00	DISCHG	28.34	28.32	28.49	28.67	28.69
23.00	DISCHG	26.82	26.54	26.28	26.04	25.84
24.00	DISCHG	24.11	25.96	28.88	31.24	32.01
25.00	DISCHG	15.89	13.42	11.14	8.98	7.12
26.00	DISCHG	1.97	1.59	1.30	1.06	.85
27.00	DISCHG	.23	.19	.15	.12	.10
28.00	DISCHG	.02	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.38 WATERSHED INCHES, 1510.81 CFS-HRS, 124.85 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 8
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 31.74

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.28	417.81	40.21
22.42	28.68	32.30
24.45	31.77	32.36

TIME(HRS)		FIRST HYDROGRAPH POINT =		.00 HOURS		TIME INCREMENT = .10 HOURS		DRAINAGE AREA =		.98 SQ.MI.	
8.00	DISCHG	.00	.01	.03	.07	.17	.33	.56	.85	1.21	1.62
8.00	ELEV	31.74	31.74	31.74	31.74	31.74	31.75	31.75	31.76	31.76	31.77
9.00	DISCHG	2.07	2.57	3.12	3.72	4.34	4.98	5.67	6.38	7.14	7.95
9.00	ELEV	31.78	31.79	31.80	31.81	31.82	31.84	31.85	31.86	31.88	31.90
10.00	DISCHG	8.84	9.79	10.82	11.96	13.25	14.71	16.38	18.29	20.44	22.85
10.00	ELEV	31.91	31.93	31.95	31.97	32.00	32.03	32.06	32.10	32.14	32.19
11.00	DISCHG	25.56	28.59	32.00	35.83	40.22	45.37	51.57	59.44	70.14	87.20
11.00	ELEV	32.24	32.30	32.37	32.44	32.53	32.63	32.75	32.90	33.11	33.45
12.00	DISCHG	116.93	165.57	236.55	320.40	327.45	339.85	355.64	372.56	388.57	402.17
12.00	ELEV	34.03	34.98	36.37	38.01	38.17	38.44	38.79	39.17	39.52	39.83
13.00	DISCHG	411.38	415.17	417.29	417.78	416.78	414.40	410.81	403.06	393.34	382.72
13.00	ELEV	40.04	40.14	40.19	40.21	40.18	40.12	40.02	39.85	39.63	39.39
14.00	DISCHG	371.51	359.92	348.14	336.33	324.60	221.11	149.04	139.32	132.46	126.42
14.00	ELEV	39.14	38.89	38.63	38.36	38.10	36.07	34.66	34.47	34.33	34.21
15.00	DISCHG	121.00	116.16	111.88	108.05	104.56	101.41	98.63	96.14	93.81	91.56
15.00	ELEV	34.11	34.01	33.93	33.85	33.79	33.72	33.67	33.62	33.58	33.53
16.00	DISCHG	89.32	87.09	84.93	82.91	81.07	79.47	78.02	76.58	75.02	73.29
16.00	ELEV	33.49	33.44	33.40	33.36	33.33	33.29	33.27	33.24	33.21	33.17
17.00	DISCHG	71.29	68.95	66.30	63.53	60.88	58.47	56.29	54.29	52.37	50.49
17.00	ELEV	33.13	33.09	33.04	32.98	32.93	32.88	32.84	32.80	32.76	32.73
18.00	DISCHG	48.74	47.27	46.14	45.27	44.52	43.75	42.94	42.10	41.28	40.54
18.00	ELEV	32.69	32.66	32.64	32.63	32.61	32.60	32.58	32.56	32.55	32.53
19.00	DISCHG	39.93	39.39	38.79	38.07	37.23	36.42	35.78	35.38	35.19	35.16
19.00	ELEV	32.52	32.51	32.50	32.48	32.47	32.45	32.44	32.43	32.43	32.43
20.00	DISCHG	35.14	34.99	34.67	34.25	33.84	33.45	33.06	32.72	32.44	32.15
20.00	ELEV	32.43	32.42	32.42	32.41	32.40	32.39	32.39	32.38	32.37	32.37
21.00	DISCHG	31.73	31.23	30.77	30.43	30.23	30.11	29.95	29.69	29.31	28.88
21.00	ELEV	32.36	32.35	32.34	32.34	32.33	32.33	32.33	32.32	32.31	32.30
22.00	DISCHG	28.50	28.34	28.40	28.57	28.68	28.62	28.41	28.08	27.70	27.32
22.00	ELEV	32.30	32.29	32.30	32.30	32.30	32.30	32.30	32.29	32.28	32.27
23.00	DISCHG	26.98	26.69	26.42	26.17	25.95	25.77	25.61	25.35	24.80	24.11
23.00	ELEV	32.27	32.26	32.26	32.25	32.25	32.24	32.24	32.24	32.23	32.21
24.00	DISCHG	23.95	25.00	27.34	29.98	31.57	31.60	30.17	27.47	23.95	20.43
24.00	ELEV	32.21	32.23	32.27	32.33	32.36	32.36	32.33	32.28	32.21	32.14
25.00	DISCHG	17.38	14.74	12.36	10.13	8.12	6.45	5.16	4.16	3.38	2.74
25.00	ELEV	32.08	32.03	31.98	31.94	31.90	31.87	31.84	31.82	31.81	31.79
26.00	DISCHG	2.22	1.79	1.46	1.19	.96	.77	.61	.49	.39	.32
26.00	ELEV	31.78	31.78	31.77	31.76	31.76	31.76	31.75	31.75	31.75	31.75
27.00	DISCHG	.26	.21	.17	.14	.11	.09	.07	.06	.05	.04
27.00	ELEV	31.75	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74
28.00	DISCHG	.02	.01	.00							
28.00	ELEV	31.74	31.74	31.74							

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RUNOFF VOLUME ABOVE BASEFLOW = 2.38 WATERSHED INCHES, 1510.92 CFS-HRS, 124.86 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 45

OUTPUT HYDROGRAPH= 6

AREA= .24 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .54 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0720 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.40	264.46	(RUNOFF)
18.20	11.10	(RUNOFF)
19.86	9.36	(RUNOFF)
21.41	7.91	(RUNOFF)
22.23	7.82	(RUNOFF)
24.23	11.95	(RUNOFF)

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .24 SQ.MI.		
8.00	DISCHG	.00	.02	.06	.15	.29	.46	.69	.93	1.19	1.44	
9.00	DISCHG	1.73	2.09	2.44	2.78	3.12	3.49	3.89	4.31	4.76	5.27	
10.00	DISCHG	5.79	6.31	6.88	7.52	8.25	9.07	9.97	10.93	11.95	13.08	
11.00	DISCHG	14.37	15.85	17.44	19.23	21.54	24.49	28.11	33.58	42.64	61.71	
12.00	DISCHG	96.54	147.68	203.84	249.12	264.46	247.92	213.51	172.76	137.75	111.01	
13.00	DISCHG	91.81	77.67	67.67	60.09	54.18	49.40	45.21	41.63	38.80	36.69	
14.00	DISCHG	35.17	33.90	32.87	31.93	30.81	29.49	28.40	27.66	26.89	25.94	
15.00	DISCHG	25.10	24.57	24.20	23.76	23.25	22.80	22.50	22.22	21.78	21.15	
16.00	DISCHG	20.49	19.95	19.59	19.38	19.24	19.06	18.68	18.08	17.41	16.66	
17.00	DISCHG	15.63	14.35	13.26	12.71	12.57	12.53	12.24	11.69	11.08	10.67	
18.00	DISCHG	10.64	10.93	11.10	10.95	10.61	10.26	10.03	9.89	9.80	9.75	
19.00	DISCHG	9.71	9.58	9.24	8.74	8.45	8.48	8.76	9.08	9.31	9.34	
20.00	DISCHG	9.10	8.66	8.38	8.34	8.30	8.15	8.08	8.17	8.20	7.97	
21.00	DISCHG	7.59	7.30	7.39	7.71	7.91	7.79	7.48	7.14	6.91	6.87	

8.00	ELEV	13.20	13.20	13.20	13.20	13.21	13.21	13.22	13.23	13.25	13.27
9.00	DISCHG	2.39	3.04	3.77	4.57	5.42	6.32	7.28	8.28	9.35	10.49
9.00	ELEV	13.29	13.31	13.34	13.36	13.39	13.43	13.46	13.50	13.54	13.58
10.00	DISCHG	11.70	13.00	14.38	15.87	17.50	19.32	21.35	23.63	26.17	28.99
10.00	ELEV	13.62	13.67	13.72	13.77	13.83	13.89	13.97	14.05	14.14	14.24
11.00	DISCHG	32.16	35.70	39.68	44.12	49.18	55.06	62.03	70.64	78.45	80.54
11.00	ELEV	14.35	14.48	14.62	14.78	14.97	15.18	15.43	15.74	16.02	16.11
12.00	DISCHG	84.54	91.65	102.99	118.97	137.32	155.31	172.13	187.44	201.29	213.95
12.00	ELEV	16.27	16.57	17.04	17.71	18.47	19.22	19.92	20.56	21.14	21.66
13.00	DISCHG	225.65	236.48	246.52	255.85	264.54	272.61	280.05	286.82	292.85	298.13
13.00	ELEV	22.15	22.60	23.02	23.41	23.77	24.11	24.42	24.70	24.95	25.17
14.00	DISCHG	302.70	306.58	309.79	312.37	314.34	313.89	309.92	304.44	298.83	293.14
14.00	ELEV	25.36	25.52	25.66	25.77	25.85	25.83	25.66	25.44	25.20	24.96
15.00	DISCHG	287.42	281.70	276.00	270.35	264.76	259.25	253.82	248.49	243.26	238.13
15.00	ELEV	24.73	24.49	24.25	24.01	23.78	23.55	23.33	23.10	22.89	22.67
16.00	DISCHG	233.08	228.13	223.26	218.50	213.84	209.29	204.85	200.51	196.26	192.08
16.00	ELEV	22.46	22.26	22.05	21.85	21.66	21.47	21.29	21.10	20.93	20.75
17.00	DISCHG	187.96	183.87	179.80	175.75	171.74	167.78	163.88	160.04	156.25	152.52
17.00	ELEV	20.58	20.41	20.24	20.07	19.91	19.74	19.58	19.42	19.26	19.10
18.00	DISCHG	148.85	145.27	141.79	138.41	135.12	131.92	128.80	125.76	122.81	119.95
18.00	ELEV	18.95	18.80	18.66	18.52	18.38	18.25	18.12	17.99	17.87	17.75
19.00	DISCHG	117.16	114.47	111.84	109.28	106.78	104.33	101.96	99.68	97.48	95.38
19.00	ELEV	17.63	17.52	17.41	17.30	17.20	17.10	17.00	16.90	16.81	16.72
20.00	DISCHG	93.35	91.39	89.48	87.62	85.82	84.08	82.38	80.73	79.14	74.47
20.00	ELEV	16.64	16.56	16.48	16.40	16.33	16.25	16.18	16.11	16.05	15.87
21.00	DISCHG	62.18	53.95	48.43	44.79	42.44	40.87	39.74	38.82	38.01	37.29
21.00	ELEV	15.43	15.14	14.94	14.81	14.72	14.67	14.63	14.59	14.56	14.54
22.00	DISCHG	36.72	36.38	36.26	36.26	36.25	36.14	35.93	35.63	35.27	34.87
22.00	ELEV	14.52	14.51	14.50	14.50	14.50	14.50	14.49	14.48	14.47	14.45
23.00	DISCHG	34.47	34.10	33.75	33.43	33.13	32.87	32.63	32.31	31.70	30.77
23.00	ELEV	14.44	14.42	14.41	14.40	14.39	14.38	14.37	14.36	14.34	14.30
24.00	DISCHG	30.12	30.73	32.82	35.42	37.33	37.87	37.06	35.18	32.49	29.27
24.00	ELEV	14.28	14.30	14.38	14.47	14.54	14.56	14.53	14.46	14.37	14.25
25.00	DISCHG	25.87	22.57	19.48	16.63	14.02	11.66	9.61	7.86	6.42	5.23
25.00	ELEV	14.13	14.01	13.90	13.80	13.70	13.62	13.54	13.48	13.43	13.39
26.00	DISCHG	4.26	3.46	2.81	2.28	1.86	1.51	1.22	.98	.79	.64
26.00	ELEV	13.35	13.32	13.30	13.28	13.27	13.25	13.24	13.24	13.23	13.22
27.00	DISCHG	.52	.42	.34	.27	.22	.18	.14	.12	.09	.07
27.00	ELEV	13.22	13.21	13.21	13.21	13.21	13.21	13.21	13.20	13.20	13.20
28.00	DISCHG	.06	.05	.03	.02	.01	.01	.01			
28.00	ELEV	13.20	13.20	13.20	13.20	13.20	13.20	13.20			

RUNOFF VOLUME ABOVE BASEFLOW = 2.45 WATERSHED INCHES, 1932.04 CFS-HRS, 159.66 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 47

OUTPUT HYDROGRAPH= 4

AREA= .08 SQ MI INPUT RUNOFF CURVE= 79. TIME OF CONCENTRATION= .35 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0467 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.28	110.01	(RUNOFF)
15.08	8.42	(RUNOFF)
18.12	4.00	(RUNOFF)
23.45	2.28	(RUNOFF)
24.12	6.52	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.08 SQ.MI.
7.00	DISCHG	.00	.00	.00	.00	.02
8.00	DISCHG	.06	.12	.20	.36	.83
9.00	DISCHG	.99	1.16	1.27	1.51	2.38
10.00	DISCHG	2.57	2.75	2.99	3.59	5.54
11.00	DISCHG	6.12	6.73	7.33	9.26	32.48
12.00	DISCHG	56.05	82.61	102.81	96.79	26.17
13.00	DISCHG	22.50	20.03	18.23	15.70	11.91
14.00	DISCHG	11.53	11.18	10.96	10.10	8.44
15.00	DISCHG	8.35	8.42	8.25	7.83	7.01
16.00	DISCHG	6.81	6.71	6.67	6.65	5.48
17.00	DISCHG	4.84	4.25	4.12	4.35	3.54
18.00	DISCHG	3.78	4.00	3.90	3.67	3.37
19.00	DISCHG	3.36	3.27	2.98	2.75	3.26
20.00	DISCHG	2.98	2.75	2.84	2.99	2.59
21.00	DISCHG	2.42	2.42	2.68	2.91	2.37

22.00	DISCHG	7.12	7.55	7.81	7.74	7.46	7.13	6.90	6.76	6.67	6.61
23.00	DISCHG	6.58	6.56	6.55	6.54	6.54	6.53	6.46	6.03	5.01	4.20
24.00	DISCHG	5.61	9.14	11.77	11.28	8.79	5.76	3.61	2.28	1.46	.92
25.00	DISCHG	.58	.37	.23	.15	.09	.06	.03	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.73 WATERSHED INCHES, 421.21 CFS-HRS, 34.81 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 46
 INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 1
 LENGTH = 1800.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.00, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 46 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.28	417.81	(NULL)
22.42	28.68	(NULL)
24.45	31.77	(NULL)

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RUNOFF VOLUME ABOVE BASEFLOW = 2.38 WATERSHED INCHES, 1510.92 CFS-HRS, 124.86 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 46
 INPUT HYDROGRAPHS= 6,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	593.48	(NULL)
19.84	44.51	(NULL)
22.29	36.32	(NULL)
24.32	41.32	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.22 SQ.MI.
8.00	DISCHG .00 .02 .08 .22 .46 .79 1.24	1.79 2.40 3.06	
9.00	DISCHG 3.80 4.66 5.57 6.50 7.46 8.47 9.56	10.69 11.91 13.22	
10.00	DISCHG 14.62 16.11 17.70 19.48 21.50 23.79 26.35	29.21 32.39 35.94	
11.00	DISCHG 39.93 44.44 49.43 55.06 61.76 69.86 79.68	93.02 112.78 148.91	
12.00	DISCHG 213.47 313.24 440.39 569.52 591.91 587.77 569.15	545.32 526.32 513.17	
13.00	DISCHG 503.19 492.85 484.96 477.87 470.95 463.79 456.02	444.69 432.14 419.41	
14.00	DISCHG 406.68 393.82 381.01 368.26 355.41 250.60 177.45	166.98 159.36 152.36	
15.00	DISCHG 146.10 140.73 136.08 131.81 127.80 124.21 121.13	118.36 115.59 112.71	
16.00	DISCHG 109.81 107.05 104.52 102.28 100.32 98.53 96.69	94.65 92.43 89.95	
17.00	DISCHG 86.93 83.30 79.56 76.24 73.45 71.00 68.52	65.97 63.45 61.16	
18.00	DISCHG 59.38 58.20 57.24 56.23 55.13 54.01 52.97	52.00 51.08 50.29	
19.00	DISCHG 49.64 48.97 48.03 46.81 45.68 44.90 44.55	44.46 44.51 44.50	
20.00	DISCHG 44.24 43.65 43.05 42.59 42.15 41.61 41.14	40.89 40.64 40.12	
21.00	DISCHG 39.32 38.53 38.16 38.14 38.13 37.90 37.43	36.83 36.22 35.74	
22.00	DISCHG 35.62 35.89 36.21 36.32 36.13 35.75 35.31	34.85 34.37 33.93	
23.00	DISCHG 33.57 33.25 32.97 32.71 32.48 32.30 32.07	31.38 29.81 28.31	
24.00	DISCHG 29.56 34.14 39.11 41.25 40.36 37.36 33.78	29.75 25.42 21.35	
25.00	DISCHG 17.96 15.11 12.59 10.28 8.21 6.51 5.19	4.17 3.38 2.74	
26.00	DISCHG 2.22 1.79 1.46 1.19 .96 .77 .61	.49 .39 .32	
27.00	DISCHG .26 .21 .17 .14 .11 .09 .07	.06 .05 .04	
28.00	DISCHG .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.45 WATERSHED INCHES, 1932.13 CFS-HRS, 159.67 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 9
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 13.20

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.43	314.46	25.85
22.25	36.27	14.50
24.49	37.88	14.56

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.22 SQ.MI.
8.00	DISCHG .00 .00 .02 .07 .16 .33 .57	.91 1.33 1.82	

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TIME(HRS)	DISCHG	2.66	2.90	2.81	2.58	2.42	2.34	2.31	2.29	2.28	2.27
23.00	DISCHG	2.27	2.27	2.27	2.27	2.27	2.27	2.25	1.94	1.25	1.50
24.00	DISCHG	4.16	6.45	5.52	3.16	1.55	.77	.38	.19	.10	.05
25.00	DISCHG	.02	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 2.83 WATERSHED INCHES, 149.55 CFS-HRS, 12.36 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 48

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5

LENGTH = 1100.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .90, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00

PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 48 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.28	110.01	(NULL)
15.08	8.42	(NULL)
18.12	4.00	(NULL)
23.45	2.28	(NULL)
24.12	6.52	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.83 WATERSHED INCHES, 149.55 CFS-HRS, 12.36 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 48

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INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 6

LENGTH = 2700.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .45, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .61

PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
14.57	313.60	(NULL)
24.64	37.29	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.45 WATERSHED INCHES, 1931.99 CFS-HRS, 159.66 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION AODHYO CROSS SECTION 48

INPUT HYDROGRAPHS= 5,6

OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.36	207.88	(NULL)
14.57	323.05	(NULL)
24.12	37.03	(NULL)
24.62	37.59	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.30 SQ.MI.
7.00	DISCHG .00 .00 .00 .00	.00 .00 .00	.00 .00 .02
8.00	DISCHG .06 .12 .20 .29	.40 .56 .80	1.12 1.48 1.93
9.00	DISCHG 2.53 3.22 3.94 4.71	5.61 6.58 7.60	8.67 9.84 11.09
10.00	DISCHG 12.37 13.72 15.21 16.82	18.56 20.45 22.53	24.83 27.37 30.21
11.00	DISCHG 33.44 37.02 40.95 45.41	50.77 56.93 64.02	73.25 86.84 106.05
12.00	DISCHG 133.90 164.57 190.72 206.96	207.35 202.03 199.60	202.44 209.18 218.27
13.00	DISCHG 228.03 237.93 247.55 256.76	265.40 273.45 280.87	287.85 294.54 300.70
14.00	DISCHG 306.06 310.73 314.84 318.21	320.60 322.40 322.92	320.69 316.02 310.45
15.00	DISCHG 304.91 299.36 293.51 287.56	281.73 276.04 270.45	264.87 259.19 253.58
16.00	DISCHG 248.19 242.99 237.94 233.00	228.16 223.35 218.45	213.62 209.01 204.44
17.00	DISCHG 199.57 194.82 190.57 186.61	182.65 178.59 174.33	170.08 166.01 162.19
18.00	DISCHG 158.66 155.17 151.44 147.67	144.07 140.65 137.36	134.17 131.07 128.06
19.00	DISCHG 125.14 122.22 119.17 116.27	113.75 111.43 109.11	106.77 104.47 102.15
20.00	DISCHG 99.72 97.40 95.48 93.68	91.65 89.65 87.99	86.42 84.62 82.75
21.00	DISCHG 79.08 70.18 61.95 55.51	50.61 47.08 44.69	43.05 41.85 40.98
22.00	DISCHG 40.45 40.03 39.48 39.00	38.74 38.62 38.50	38.32 38.06 37.74
23.00	DISCHG 37.37 36.98 36.60 36.24	35.91 35.60 35.29	34.73 33.74 33.50
24.00	DISCHG 35.40 37.00 36.18 35.15	35.64 36.85 37.56	37.29 36.02 33.86
25.00	DISCHG 31.04 27.86 24.60 21.45	18.49 15.74 13.23	11.01 9.07 7.44
26.00	DISCHG 6.08 4.96 4.04 3.29	2.67 2.17 1.76	1.43 1.15 .93
27.00	DISCHG .75 .61 .49 .40	.32 .26 .21	.17 .14 .11
28.00	DISCHG .09 .07 .05 .04	.03 .02 .01	.01 .00 .00

RUNOFF VOLUME ABOVE BASEFLOW = 2.47 WATERSHED INCHES, 2081.54 CFS-HRS, 172.02 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 49

OUTPUT HYDROGRAPH= 2

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PEAK TIME(HRS) 13.09
24.61
PEAK DISCHARGE(CFS) 342.88
17.37
PEAK ELEVATION(FEET)
(RUNOFF)
(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.56 SQ.MI.
8.00	DISCHG	.00 .00 .01 .03 .06 .11 .19 .31 .46 .66				
9.00	DISCHG	.92 1.23 1.58 1.99 2.46 2.97 3.54 4.14 4.80 5.50				
10.00	DISCHG	6.25 7.05 7.91 8.83 9.81 10.86 12.00 13.23 14.58 16.04				
11.00	DISCHG	17.63 19.38 21.29 23.40 25.78 28.46 31.56 35.33 40.26 47.43				
12.00	DISCHG	58.32 74.24 96.53 125.48 160.51 199.93 240.15 277.24 307.10 328.23				
13.00	DISCHG	339.93 342.84 338.35 327.27 311.16 291.29 269.37 247.14 226.28 207.64				
14.00	DISCHG	191.19 176.62 163.65 152.01 141.50 132.05 123.63 116.07 109.24 103.07				
15.00	DISCHG	97.51 92.52 87.96 83.85 80.13 76.79 73.77 71.00 68.48 66.22				
16.00	DISCHG	64.11 62.15 60.32 58.63 57.04 55.52 54.09 52.71 51.36 50.01				
17.00	DISCHG	48.62 47.21 45.78 44.34 42.87 41.37 39.89 38.44 37.05 35.71				
18.00	DISCHG	34.46 33.29 32.21 31.24 30.41 29.69 29.03 28.38 27.77 27.19				
19.00	DISCHG	26.66 26.16 25.69 25.22 24.75 24.27 23.81 23.39 23.04 22.75				
20.00	DISCHG	22.51 22.30 22.11 21.91 21.69 21.46 21.25 21.05 20.84 20.60				
21.00	DISCHG	20.35 20.11 19.87 19.62 19.39 19.20 19.03 18.86 18.68 18.49				
22.00	DISCHG	18.31 18.14 17.99 17.89 17.84 17.80 17.74 17.63 17.50 17.36				
23.00	DISCHG	17.21 17.05 16.88 16.72 16.55 16.37 16.21 16.02 15.81 15.63				
24.00	DISCHG	15.59 15.67 15.81 16.09 16.56 17.09 17.36 17.22 16.68 15.82				
25.00	DISCHG	14.74 13.46 12.15 10.82 9.42 7.98 6.70 5.67 4.82 4.12				
26.00	DISCHG	3.53 3.03 2.58 2.20 1.87 1.60 1.36 1.16 .99 .84				
27.00	DISCHG	.71 .60 .51 .44 .37 .32 .27 .22 .19 .16				
28.00	DISCHG	.13 .11 .09 .08 .06 .05 .04 .03 .02 .01				
29.00	DISCHG	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.73 WATERSHED INCHES, 997.02 CFS-HRS, 82.39 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 50
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
LENGTH = 1700.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .90 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 50 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) 12.48
14.68
24.22
24.73
PEAK DISCHARGE(CFS) 207.21
322.92
36.87
37.52
PEAK ELEVATION(FEET)
(NULL)
(NULL)
(NULL)
(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.47 WATERSHED INCHES, 2081.55 CFS-HRS, 172.02 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 50
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

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PEAK TIME(HRS) 13.23
24.70
PEAK DISCHARGE(CFS) 575.41
54.69
PEAK ELEVATION(FEET)
(NULL)
(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.87 SQ.MI.
8.00	DISCHG	.01 .05 .12 .21 .33 .50 .73 1.08 1.54 2.10				
9.00	DISCHG	2.80 3.69 4.72 5.84 7.08 8.48 10.01 11.62 13.34 15.21				
10.00	DISCHG	17.19 19.27 21.47 23.86 26.44 29.22 32.23 35.53 39.14 43.11				
11.00	DISCHG	47.52 52.45 57.90 63.90 70.67 78.62 87.78 98.53 112.45 132.74				
12.00	DISCHG	162.20 205.00 257.57 313.10 365.45 407.03 442.71 477.15 509.27 536.68				
13.00	DISCHG	557.17 569.74 575.43 573.70 566.84 555.67 541.87 527.13 513.31 501.40				
14.00	DISCHG	491.16 482.05 473.83 466.36 459.31 452.36 445.82 438.91 430.16 419.60				
15.00	DISCHG	408.59 398.08 387.97 378.04 368.38 359.20 350.47 342.10 334.00 326.07				
16.00	DISCHG	318.34 310.97 303.93 297.16 290.62 284.25 278.00 271.73 265.54 259.56				

17.00	DISCHG	253.60	247.35	241.15	235.41	229.95	224.48	218.94	213.26	207.62	202.20
18.00	DISCHG	197.09	192.36	187.79	183.12	178.52	174.19	170.08	166.12	162.30	158.62
19.00	DISCHG	155.08	151.65	148.24	144.75	141.36	138.32	135.52	132.77	130.09	127.49
20.00	DISCHG	124.93	122.30	119.78	117.62	115.58	113.34	111.13	109.24	107.44	105.42
21.00	DISCHG	103.31	99.59	91.02	82.53	75.68	70.40	66.54	63.84	61.93	60.49
22.00	DISCHG	59.39	58.65	58.07	57.43	56.89	56.58	56.37	56.14	55.83	55.44
23.00	DISCHG	54.98	54.46	53.91	53.37	52.83	52.32	51.84	51.35	50.59	49.48
24.00	DISCHG	49.13	50.88	52.62	52.33	51.82	52.70	54.08	54.69	53.99	51.97
25.00	DISCHG	48.85	44.82	40.37	35.80	31.24	26.82	22.77	19.20	16.09	13.42
26.00	DISCHG	11.16	9.27	7.67	6.34	5.25	4.34	3.59	2.97	2.45	2.02
27.00	DISCHG	1.67	1.37	1.14	.94	.78	.64	.53	.44	.36	.30
28.00	DISCHG	.24	.20	.16	.13	.10	.08	.06	.04	.03	.01
29.00	DISCHG	.00									

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 3078.57 CFS-HRS, 254.41 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 10.15

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(Feet)					
17.86		204.44				17.78					
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.87 SQ.MI.	
8.00	DISCHG	.00	.00	.00	.01	.01	.02	.03	.05	.08	.11
8.00	ELEV	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15
9.00	DISCHG	.16	.22	.31	.41	.54	.69	.86	1.07	1.31	1.57
9.00	ELEV	10.16	10.16	10.16	10.16	10.17	10.17	10.18	10.19	10.20	10.21
10.00	DISCHG	1.88	2.22	2.59	3.01	3.47	3.97	4.52	5.13	5.80	6.53
10.00	ELEV	10.22	10.23	10.24	10.26	10.27	10.29	10.31	10.33	10.35	10.38
11.00	DISCHG	7.33	8.22	9.19	10.26	11.44	12.75	14.21	15.84	17.70	19.87
11.00	ELEV	10.41	10.44	10.47	10.51	10.55	10.60	10.65	10.70	10.77	10.85
12.00	DISCHG	22.51	25.85	30.10	35.39	41.68	48.81	56.60	64.95	73.82	83.12
12.00	ELEV	10.94	11.05	11.20	11.39	11.61	11.86	12.13	12.42	12.73	13.06

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13.00	DISCHG	92.72	102.47	111.09	115.86	120.54	125.08	129.44	133.61	137.59	141.39
13.00	ELEV	13.40	13.74	14.04	14.23	14.42	14.60	14.78	14.94	15.10	15.26
14.00	DISCHG	145.04	148.56	151.95	155.23	158.39	161.45	164.41	167.27	170.03	172.65
14.00	ELEV	15.40	15.54	15.68	15.81	15.94	16.06	16.18	16.29	16.40	16.51
15.00	DISCHG	175.13	177.48	179.70	181.79	183.76	185.62	187.36	188.99	190.53	191.96
15.00	ELEV	16.61	16.70	16.79	16.87	16.95	17.02	17.09	17.16	17.22	17.28
16.00	DISCHG	193.31	194.55	195.72	196.80	197.79	198.72	199.57	200.34	201.04	201.68
16.00	ELEV	17.33	17.38	17.43	17.47	17.51	17.55	17.58	17.61	17.64	17.67
17.00	DISCHG	202.24	202.74	203.17	203.53	203.83	204.07	204.25	204.37	204.43	204.44
17.00	ELEV	17.69	17.71	17.73	17.74	17.75	17.76	17.77	17.77	17.78	17.78
18.00	DISCHG	204.39	204.29	204.14	203.95	203.71	203.43	203.11	202.75	202.35	201.92
18.00	ELEV	17.78	17.77	17.77	17.76	17.75	17.74	17.72	17.71	17.69	17.68
19.00	DISCHG	201.46	200.96	200.44	199.88	199.30	198.69	198.05	197.39	196.71	196.01
19.00	ELEV	17.66	17.64	17.62	17.60	17.57	17.55	17.52	17.50	17.47	17.44
20.00	DISCHG	195.29	194.56	193.80	193.03	192.24	191.44	190.63	189.80	188.96	188.11
20.00	ELEV	17.41	17.38	17.35	17.32	17.29	17.26	17.23	17.19	17.16	17.12
21.00	DISCHG	187.25	186.36	185.43	184.41	183.33	182.19	181.02	179.83	178.63	177.42
21.00	ELEV	17.09	17.05	17.02	16.98	16.93	16.89	16.84	16.79	16.75	16.70
22.00	DISCHG	176.21	175.00	173.80	172.61	171.42	170.24	169.07	167.91	166.75	165.61
22.00	ELEV	16.65	16.60	16.55	16.50	16.46	16.41	16.36	16.32	16.27	16.22
23.00	DISCHG	164.47	163.34	162.22	161.10	159.99	158.89	157.79	156.69	155.61	154.52
23.00	ELEV	16.18	16.13	16.09	16.04	16.00	15.96	15.91	15.87	15.82	15.78
24.00	DISCHG	153.44	152.37	151.34	150.32	149.31	148.31	147.33	146.37	145.43	144.48
24.00	ELEV	15.74	15.69	15.65	15.61	15.57	15.53	15.49	15.45	15.42	15.38
25.00	DISCHG	143.51	142.51	141.48	140.42	139.32	138.18	137.02	135.82	134.61	133.37
25.00	ELEV	15.34	15.30	15.26	15.22	15.17	15.13	15.08	15.03	14.98	14.93
26.00	DISCHG	132.13	130.87	129.61	128.35	127.09	125.83	124.58	123.33	122.09	120.85
26.00	ELEV	14.89	14.83	14.78	14.73	14.68	14.63	14.58	14.53	14.48	14.43
27.00	DISCHG	119.63	118.41	117.21	116.01	114.82	113.65	112.49	111.33	110.19	108.11
27.00	ELEV	14.39	14.34	14.29	14.24	14.19	14.15	14.10	14.05	14.01	13.93
28.00	DISCHG	105.88	103.69	101.55	99.45	97.39	95.38	93.40	91.47	89.58	87.72
28.00	ELEV	13.86	13.78	13.70	13.63	13.56	13.49	13.42	13.35	13.29	13.22
29.00	DISCHG	85.91	84.13	82.38	80.68	79.01	77.37	75.77	74.20	72.67	71.16
29.00	ELEV	13.16	13.09	13.03	12.97	12.92	12.86	12.80	12.75	12.69	12.64

RUNOFF VOLUME ABOVE BASEFLOW = 2.27 WATERSHED INCHES, 2738.43 CFS-HRS, 226.30 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 51
INPUT HYDROGRAPHS= 7,5 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
14.47 1205.91 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	8.04 SQ.MI.
8.00	DISCHG	.01 .01 .01 .03 .04 .06 .09 .13 .19 .27				
9.00	DISCHG	.37 .50 .67 .89 1.17 1.55 2.05 2.68 3.49 4.49				
10.00	DISCHG	5.73 7.22 8.99 11.08 13.51 16.34 19.63 23.44 27.84 32.90				
11.00	DISCHG	38.69 45.29 52.81 61.34 71.08 82.30 95.36 110.93 130.47 157.32				

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12.00	DISCHG	197.93	261.78	358.37	415.76	471.01	537.34	610.23	685.54	759.70	830.18
13.00	DISCHG	895.37	954.24	1005.24	1045.75	1079.97	1108.62	1132.39	1151.84	1167.46	1179.72
14.00	DISCHG	1189.10	1196.03	1200.89	1204.00	1205.60	1205.86	1204.91	1202.90	1199.94	1196.06
15.00	DISCHG	1191.35	1185.89	1179.78	1173.12	1165.97	1158.38	1150.43	1142.17	1133.63	1124.84
16.00	DISCHG	1115.79	1106.51	1097.03	1087.41	1077.68	1067.89	1058.05	1048.15	1038.18	1028.13
17.00	DISCHG	1017.93	1007.49	996.73	985.63	974.27	962.70	951.00	939.18	927.26	915.28
18.00	DISCHG	903.30	891.40	879.63	868.01	856.55	845.25	834.11	823.14	812.37	801.79
19.00	DISCHG	791.42	781.26	771.30	761.49	751.83	742.34	733.05	724.00	715.20	706.66
20.00	DISCHG	698.35	690.23	682.29	674.51	666.90	659.44	652.13	644.97	637.98	631.14
21.00	DISCHG	624.41	617.72	611.03	604.32	597.61	590.85	583.97	576.92	569.75	562.51
22.00	DISCHG	555.29	548.15	541.13	534.24	527.44	520.69	501.28	482.75	466.10	451.07
23.00	DISCHG	437.46	425.09	413.83	403.54	394.12	385.46	377.47	369.97	362.69	355.57
24.00	DISCHG	349.16	344.52	342.15	341.30	340.72	339.36	336.71	332.74	327.50	321.07
25.00	DISCHG	313.59	305.32	296.51	287.34	277.94	268.42	258.95	249.67	240.71	232.14
26.00	DISCHG	224.02	216.36	209.16	202.40	196.06	190.12	184.56	179.34	174.43	169.82
27.00	DISCHG	165.48	161.39	157.52	153.87	150.40	147.11	143.98	141.00	138.16	134.49
28.00	DISCHG	130.77	127.19	123.74	120.42	117.21	114.12	111.13	108.25	105.46	102.76
29.00	DISCHG	100.14	97.61	95.16	92.78	90.48	88.24	86.07	83.97	81.92	79.94

RUNOFF VOLUME ABOVE BASEFLOW = 2.12 WATERSHED INCHES, 11007.68 CFS-HRS, 909.67 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 52

OUTPUT HYDROGRAPH= 2

AREA= .17 SQ MI INPUT RUNOFF CURVE= 74. TIME OF CONCENTRATION= 1.00 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0952 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.72	114.30	(RUNOFF)
20.00	5.86	(RUNOFF)
24.44	5.77	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.17 SQ.MI.
9.00	DISCHG	.00 .02 .04 .08 .14 .22 .33 .46 .62 .80				
10.00	DISCHG	1.00 1.22 1.46 1.72 2.01 2.33 2.68 3.07 3.49 3.96				
11.00	DISCHG	4.48 5.06 5.69 6.41 7.24 8.21 9.39 10.94 13.13 16.83				
12.00	DISCHG	23.15 33.34 48.01 65.78 84.07 99.84 110.25 114.22 112.27 105.59				
13.00	DISCHG	96.06 85.46 75.24 66.36 58.85 52.57 47.22 42.65 38.73 35.37				
14.00	DISCHG	32.52 30.13 28.13 26.42 24.96 23.69 22.54 21.50 20.57 19.72				
15.00	DISCHG	18.93 18.19 17.54 16.98 16.49 16.06 15.69 15.36 15.06 14.76				
16.00	DISCHG	14.44 14.11 13.79 13.50 13.24 13.00 12.77 12.55 12.29 11.99				
17.00	DISCHG	11.62 11.18 10.69 10.18 9.71 9.31 8.96 8.64 8.34 8.06				
18.00	DISCHG	7.82 7.61 7.47 7.36 7.25 7.14 7.03 6.91 6.79 6.67				
19.00	DISCHG	6.56 6.47 6.37 6.25 6.11 5.98 5.89 5.84 5.84 5.85				
20.00	DISCHG	5.86 5.85 5.81 5.73 5.65 5.57 5.50 5.43 5.38 5.34				
21.00	DISCHG	5.28 5.19 5.11 5.06 5.04 5.02 4.99 4.94 4.87 4.80				
22.00	DISCHG	4.75 4.73 4.75 4.80 4.83 4.82 4.78 4.71 4.64 4.55				
23.00	DISCHG	4.48 4.42 4.38 4.35 4.32 4.30 4.27 4.19 4.03 3.89				
24.00	DISCHG	3.92 4.19 4.74 5.39 5.75 5.70 5.33 4.75 4.02 3.21				
25.00	DISCHG	2.46 1.90 1.49 1.17 .92 .71 .56 .44 .34 .26				

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26.00	DISCHG	.21	.16	.13	.10	.07	.06	.04	.03	.03	.02
27.00	DISCHG	.01	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.38 WATERSHED INCHES, 253.93 CFS-HRS, 20.98 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 53

INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)
14.36

PEAK DISCHARGE(CFS)
1230.65

PEAK ELEVATION(FEET)
(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 8.21 SQ.MI.		
8.00	DISCHG	.01	.01	.01	.03	.04	.06	.09	.13	.19	.27
9.00	DISCHG	.37	.51	.70	.96	1.31	1.77	2.37	3.14	4.11	5.29
10.00	DISCHG	6.73	8.44	10.46	12.80	15.52	18.67	22.31	26.51	31.33	36.86
11.00	DISCHG	43.17	50.35	58.50	67.76	78.32	90.51	104.75	121.87	143.60	174.15
12.00	DISCHG	221.09	295.12	406.39	481.53	555.09	637.18	720.48	799.76	871.97	935.76
13.00	DISCHG	991.43	1039.69	1080.47	1112.10	1138.81	1161.18	1179.60	1194.48	1206.18	1215.09
14.00	DISCHG	1221.62	1226.16	1229.02	1230.43	1230.56	1229.54	1227.45	1224.41	1220.50	1215.78
15.00	DISCHG	1210.28	1204.08	1197.32	1190.10	1182.46	1174.44	1166.12	1157.53	1148.70	1139.60
16.00	DISCHG	1130.23	1120.62	1110.83	1100.91	1090.92	1080.89	1070.83	1060.70	1050.48	1040.11
17.00	DISCHG	1029.55	1018.68	1007.42	995.81	983.98	972.01	959.96	947.82	935.59	923.33
18.00	DISCHG	911.11	899.01	887.09	875.37	863.81	852.39	841.14	830.05	819.15	808.46
19.00	DISCHG	797.98	787.73	777.66	767.74	757.94	748.32	738.93	729.84	721.04	712.51
20.00	DISCHG	704.21	696.09	688.10	680.24	672.55	665.01	657.62	650.40	643.36	636.48
21.00	DISCHG	629.68	622.91	616.14	609.38	602.64	595.87	588.96	581.86	574.62	567.32
22.00	DISCHG	560.04	552.88	545.89	539.04	532.26	525.51	506.06	487.46	470.74	455.63
23.00	DISCHG	441.93	429.51	418.21	407.89	398.44	389.76	381.74	374.16	366.73	359.46
24.00	DISCHG	353.07	348.71	346.89	346.69	346.47	345.06	342.04	337.48	331.52	324.27
25.00	DISCHG	316.05	307.22	298.00	288.51	278.85	269.14	259.51	250.11	241.05	232.41
26.00	DISCHG	224.23	216.52	209.29	202.50	196.14	190.18	184.60	179.37	174.46	169.84
27.00	DISCHG	165.49	161.39	157.52	153.87	150.40	147.11	143.98	141.00	138.16	134.49
28.00	DISCHG	130.77	127.19	123.74	120.42	117.21	114.12	111.13	108.25	105.46	102.76
29.00	DISCHG	100.14	97.61	95.16	92.78	90.48	88.24	86.07	83.97	81.92	79.94

RUNOFF VOLUME ABOVE BASEFLOW = 2.13 WATERSHED INCHES, 11261.61 CFS-HRS, 930.66 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP

COMPUTATIONS COMPLETED FOR PASS 1

RECORD ID

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EXECUTIVE CONTROL OPERATION COMPUT

FROM XSECTION 1

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 5.70 TO XSECTION 53
ALTERNATE NO.= 1 STORM NO.=25 RAIN DURATION= 1.00 RAIN TABLE NO.= 3 ANT. MOIST. COND= 2
MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 1

AREA= .21 SQ MI INPUT RUNOFF CURVE= 69. TIME OF CONCENTRATION= .80 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .1067 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.58	171.29	(RUNOFF)
19.96	8.16	(RUNOFF)
22.35	6.76	(RUNOFF)
24.33	9.18	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .21 SQ.MI.		
9.00	DISCHG	.00	.00	.00	.01	.02	.06	.14	.26	.44	
10.00	DISCHG	.66	.93	1.23	1.58	1.98	2.42	2.91	3.46	4.06	4.74
11.00	DISCHG	5.48	6.32	7.25	8.32	9.57	11.13	13.09	15.81	20.19	28.15
12.00	DISCHG	42.00	63.55	92.03	123.10	150.30	167.29	171.08	162.87	146.89	127.66
13.00	DISCHG	109.57	94.19	81.70	71.62	63.46	56.75	51.18	46.50	42.58	39.34
14.00	DISCHG	36.68	34.51	32.73	31.23	29.88	28.56	27.33	26.26	25.35	24.48
15.00	DISCHG	23.68	23.01	22.44	21.91	21.43	21.01	20.64	20.28	19.92	19.52
16.00	DISCHG	19.07	18.61	18.19	17.84	17.56	17.32	17.06	16.73	16.31	15.79
17.00	DISCHG	15.15	14.38	13.56	12.83	12.27	11.85	11.51	11.17	10.78	10.40
18.00	DISCHG	10.11	9.95	9.89	9.84	9.74	9.59	9.40	9.20	9.04	8.92
19.00	DISCHG	8.83	8.73	8.57	8.34	8.08	7.92	7.88	7.94	8.05	8.14
20.00	DISCHG	8.15	8.05	7.90	7.75	7.62	7.51	7.42	7.38	7.38	7.29
21.00	DISCHG	7.12	6.97	6.87	6.85	6.89	6.91	6.87	6.75	6.59	6.46
22.00	DISCHG	6.42	6.51	6.65	6.75	6.75	6.66	6.52	6.36	6.22	6.12
23.00	DISCHG	6.05	6.00	5.97	5.94	5.92	5.91	5.87	5.75	5.49	5.31
24.00	DISCHG	5.63	6.80	8.32	9.13	8.95	8.04	6.64	5.03	3.65	2.65
25.00	DISCHG	1.96	1.45	1.06	.78	.57	.41	.30	.22	.16	.12
26.00	DISCHG	.09	.06	.05	.03	.02	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.51 WATERSHED INCHES, 338.13 CFS-HRS, 27.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH= 2

AREA= .28 SQ MI INPUT RUNOFF CURVE= 66. TIME OF CONCENTRATION= 1.01 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0962 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.74	177.89	(RUNOFF)
20.00	10.24	(RUNOFF)
22.43	8.46	(RUNOFF)
24.44	9.35	(RUNOFF)

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TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .28 SQ.MI.
10.00	DISCHG .01 .03 .07 .16 .31 .53 .83	1.20 1.66 2.21	
11.00	DISCHG 2.85 3.58 4.42 5.39 6.53 7.87 9.54	11.74 14.96 20.43	
12.00	DISCHG 29.82 44.87 66.80 94.13 123.38 149.83 168.62	177.14 176.18 167.46	
13.00	DISCHG 153.75 137.94 122.18 108.33 96.60 86.69 78.29	71.02 64.78 59.39	
14.00	DISCHG 54.80 50.90 47.62 44.83 42.43 40.33 38.45	36.74 35.20 33.80	
15.00	DISCHG 32.50 31.27 30.18 29.24 28.42 27.68 27.05	26.49 25.99 25.48	
16.00	DISCHG 24.94 24.39 23.86 23.36 22.91 22.51 22.12	21.74 21.31 20.80	
17.00	DISCHG 20.18 19.44 18.60 17.72 16.91 16.21 15.61	15.06 14.53 14.05	
18.00	DISCHG 13.63 13.28 13.02 12.82 12.64 12.45 12.25	12.05 11.84 11.64	
19.00	DISCHG 11.46 11.29 11.12 10.91 10.68 10.45 10.29	10.21 10.20 10.22	
20.00	DISCHG 10.24 10.22 10.16 10.03 9.88 9.75 9.62	9.50 9.41 9.34	
21.00	DISCHG 9.24 9.09 8.95 8.86 8.82 8.79 8.74	8.66 8.54 8.43	
22.00	DISCHG 8.34 8.31 8.33 8.40 8.45 8.44 8.38	8.27 8.14 8.00	
23.00	DISCHG 7.86 7.76 7.69 7.63 7.59 7.56 7.51	7.41 7.21 7.02	
24.00	DISCHG 7.00 7.30 7.97 8.80 9.30 9.24 8.69	7.80 6.67 5.40	
25.00	DISCHG 4.17 3.21 2.51 1.98 1.56 1.22 .96	.75 .59 .46	
26.00	DISCHG .36 .28 .22 .17 .13 .10 .08	.06 .05 .04	
27.00	DISCHG .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.24 WATERSHED INCHES, 405.13 CFS-HRS, 33.48 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 3

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 2100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 3 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.58	171.29	(NULL)
19.96	8.16	(NULL)
22.35	6.76	(NULL)
24.33	9.18	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.51 WATERSHED INCHES, 338.13 CFS-HRS, 27.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.65	342.01	(NULL)
19.97	18.39	(NULL)
22.38	15.21	(NULL)
24.38	18.30	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .49 SQ.MI.

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9.00	DISCHG	.00	.00	.00	.01	.02	.06	.14	.26	.44
10.00	DISCHG	.67	.96	1.31	1.75	2.29	2.95	3.74	4.66	5.73
11.00	DISCHG	8.33	9.90	11.67	13.72	16.10	19.00	22.62	27.55	35.15
12.00	DISCHG	71.82	108.42	158.83	217.23	273.68	317.12	339.70	340.00	323.07

13.00	DISCHG	263.32	232.12	203.88	179.95	160.05	143.44	129.46	117.53	107.36	98.73
14.00	DISCHG	91.48	85.41	80.35	76.06	72.31	68.89	65.78	63.01	60.54	58.28
15.00	DISCHG	56.18	54.28	52.62	51.16	49.85	48.69	47.69	46.78	45.91	45.00
16.00	DISCHG	44.01	43.00	42.05	41.20	40.47	39.83	39.19	38.47	37.63	36.59
17.00	DISCHG	35.33	33.82	32.16	30.56	29.18	28.06	27.12	26.24	25.31	24.45
18.00	DISCHG	23.74	23.23	22.91	22.66	22.38	22.04	21.65	21.25	20.88	20.56
19.00	DISCHG	20.29	20.03	19.69	19.25	18.76	18.38	18.17	18.15	18.24	18.36
20.00	DISCHG	18.39	18.28	18.05	17.77	17.50	17.26	17.04	16.89	16.79	16.63
21.00	DISCHG	16.36	16.06	15.82	15.71	15.71	15.71	15.61	15.40	15.14	14.89
22.00	DISCHG	14.77	14.81	14.99	15.16	15.20	15.11	14.90	14.63	14.37	14.12
23.00	DISCHG	13.92	13.77	13.66	13.57	13.51	13.46	13.39	13.16	12.70	12.32
24.00	DISCHG	12.63	14.09	16.29	17.93	18.26	17.29	15.33	12.83	10.32	8.05
25.00	DISCHG	6.13	4.66	3.57	2.76	2.13	1.64	1.26	.98	.75	.58
26.00	DISCHG	.44	.34	.26	.20	.15	.10	.08	.06	.05	.04
27.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.36 WATERSHED INCHES, 743.26 CFS-HRS, 61.42 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 4

OUTPUT HYDROGRAPH= 5

AREA= .26 SQ MI INPUT RUNOFF CURVE= 75. TIME OF CONCENTRATION= .43 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0573 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.33	354.63	(RUNOFF)
17.44	15.39	(RUNOFF)
18.16	13.91	(RUNOFF)
19.82	11.72	(RUNOFF)
20.73	10.30	(RUNOFF)
21.37	10.04	(RUNOFF)
22.17	9.99	(RUNOFF)
23.45	8.09	(RUNOFF)
24.17	19.50	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .26 SQ.MI.
8.00	DISCHG .00 .00 .01 .07 .20 .41 .68 .99 1.29 1.60		
9.00	DISCHG 1.99 2.47 2.90 3.28 3.70 4.20 4.70 5.22 5.81 6.47		
10.00	DISCHG 7.11 7.75 8.48 9.33 10.31 11.38 12.54 13.77 15.10 16.56		
11.00	DISCHG 18.32 20.26 22.30 24.64 27.96 32.25 37.42 45.26 60.70 92.01		
12.00	DISCHG 151.91 232.16 308.28 351.88 342.45 291.42 227.55 174.44 135.41 108.90		
13.00	DISCHG 91.59 79.58 70.88 64.34 59.07 54.54 50.46 47.05 44.67 43.09		
14.00	DISCHG 41.71 40.39 39.38 38.41 36.81 34.93 33.91 33.43 32.41 30.87		
15.00	DISCHG 30.04 29.87 29.54 28.81 28.13 27.71 27.49 27.20 26.45 25.45		
16.00	DISCHG 24.60 24.11 23.84 23.70 23.62 23.40 22.69 21.70 20.84 19.95		
17.00	DISCHG 18.28 16.34 15.19 15.13 15.37 15.35 14.78 13.84 13.05 12.74		

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18.00	DISCHG	13.15	13.80	13.87	13.35	12.75	12.39	12.19	12.08	12.02	11.99
19.00	DISCHG	11.96	11.75	11.05	10.26	10.10	10.58	11.16	11.52	11.71	11.63
20.00	DISCHG	11.00	10.25	10.09	10.39	10.27	9.85	9.87	10.27	10.20	9.59
21.00	DISCHG	8.96	8.74	9.24	9.91	10.01	9.50	8.90	8.52	8.33	8.40
22.00	DISCHG	9.06	9.81	9.97	9.48	8.90	8.53	8.33	8.22	8.16	8.12
23.00	DISCHG	8.10	8.09	8.09	8.08	8.08	8.09	8.01	7.28	5.57	5.34
24.00	DISCHG	10.69	17.74	19.28	14.30	8.50	4.74	2.67	1.51	.85	.48
25.00	DISCHG	.27	.16	.08	.02	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 3.06 WATERSHED INCHES, 516.69 CFS-HRS, 42.70 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 5

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6

LENGTH = 1200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.65	342.01	(NULL)
19.97	18.39	(NULL)
22.38	15.21	(NULL)
24.38	18.30	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.36 WATERSHED INCHES, 743.26 CFS-HRS, 61.42 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.44	619.70	(NULL)
18.09	37.03	(NULL)
19.86	30.06	(NULL)
20.25	28.20	(NULL)
20.71	27.16	(NULL)
21.37	25.76	(NULL)
22.20	24.96	(NULL)
24.20	35.57	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.75 SQ.MI.
8.00	DISCHG	.00	.01	.07	.20	.41
9.00	DISCHG	1.99	2.47	2.90	3.28	3.71
10.00	DISCHG	7.78	8.71	9.79	11.08	12.60
11.00	DISCHG	26.64	30.16	33.97	38.35	44.07
12.00	DISCHG	223.74	340.58	467.11	569.11	616.14
13.00	DISCHG	354.92	311.70	274.76	244.29	219.12
14.00	DISCHG	133.19	125.80	119.73	114.47	109.12
15.00	DISCHG	86.22	84.15	82.16	79.97	77.98

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16.00	DISCHG	68.61	67.11	65.89	64.90	64.10	63.23	61.87	60.18	58.47	56.54
17.00	DISCHG	53.60	50.16	47.35	45.69	44.55	43.42	41.90	40.08	38.36	37.19
18.00	DISCHG	36.89	37.03	36.77	36.01	35.13	34.43	33.84	33.33	32.90	32.55
19.00	DISCHG	32.25	31.78	30.74	29.51	28.87	28.95	29.34	29.67	29.96	30.00
20.00	DISCHG	29.39	28.52	28.15	28.16	27.77	27.11	26.91	27.16	26.99	26.22
21.00	DISCHG	25.32	24.80	25.06	25.61	25.72	25.20	24.51	23.93	23.46	23.29
22.00	DISCHG	23.82	24.62	24.96	24.64	24.11	23.64	23.23	22.85	22.52	22.24
23.00	DISCHG	22.02	21.86	21.74	21.66	21.59	21.55	21.40	20.44	18.27	17.66
24.00	DISCHG	23.32	31.84	35.57	32.23	26.75	22.03	18.00	14.34	11.17	8.53
25.00	DISCHG	6.40	4.82	3.65	2.78	2.13	1.64	1.26	.98	.75	.58
26.00	DISCHG	.44	.34	.26	.20	.15	.10	.08	.06	.05	.04
27.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.60 WATERSHED INCHES, 1259.95 CFS-HRS, 104.12 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1
SURFACE ELEVATION= 132.10

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.92	140.43	137.07

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.75 SQ.MI.
8.00	DISCHG	.00	.00	.01	.02	.05
8.00	ELEV	132.10	132.10	132.10	132.10	132.10
9.00	DISCHG	.27	.36	.47	.60	.74
9.00	ELEV	132.12	132.13	132.13	132.14	132.15
10.00	DISCHG	1.96	2.26	2.59	2.96	3.38
10.00	ELEV	132.23	132.25	132.28	132.30	132.33
11.00	DISCHG	7.37	8.36	9.48	10.75	12.19
11.00	ELEV	132.60	132.67	132.75	132.84	132.93
12.00	DISCHG	31.68	41.94	56.28	70.42	84.49
12.00	ELEV	133.85	134.17	134.54	134.93	135.31
13.00	DISCHG	129.79	132.66	134.92	136.68	138.02
13.00	ELEV	136.69	136.79	136.87	136.93	136.98
14.00	DISCHG	140.40	140.27	140.06	139.75	139.36
14.00	ELEV	137.06	137.06	137.05	137.04	137.03
15.00	DISCHG	135.86	135.15	134.41	133.66	132.89
15.00	ELEV	136.91	136.88	136.85	136.83	136.80
16.00	DISCHG	128.05	127.20	126.35	125.49	124.63
16.00	ELEV	136.63	136.60	136.57	136.54	136.51
17.00	DISCHG	119.11	117.83	116.52	115.19	113.86
17.00	ELEV	136.32	136.28	136.24	136.20	136.16
18.00	DISCHG	105.85	104.54	103.26	101.99	100.73
18.00	ELEV	135.92	135.88	135.84	135.80	135.76
19.00	DISCHG	91.66	90.21	88.77	87.35	85.93
19.00	ELEV	135.51	135.47	135.43	135.39	135.35
20.00	DISCHG	77.88	76.50	75.13	73.80	72.50
20.00	ELEV	135.13	135.09	135.06	135.02	134.98

21.00	DISCHG	65.26	64.12	63.01	61.94	60.92	59.88	58.49	57.13	55.81	54.52
21.00	ELEV	134.78	134.75	134.72	134.69	134.67	134.64	134.60	134.57	134.53	134.50
22.00	DISCHG	53.30	52.14	51.06	50.02	49.00	48.01	47.04	46.08	45.16	44.26
22.00	ELEV	134.47	134.44	134.41	134.38	134.35	134.33	134.30	134.28	134.25	134.23
23.00	DISCHG	43.38	42.53	41.71	40.92	40.15	39.39	38.65	37.92	37.15	36.36
23.00	ELEV	134.21	134.19	134.16	134.14	134.12	134.10	134.08	134.05	134.03	134.00
24.00	DISCHG	35.70	35.37	35.30	35.24	35.00	34.57	33.97	33.23	32.39	31.45
24.00	ELEV	133.98	133.97	133.97	133.97	133.96	133.94	133.92	133.90	133.87	133.84
25.00	DISCHG	30.46	29.44	28.40	27.36	26.33	25.32	24.33	23.38	22.45	21.55
25.00	ELEV	133.81	133.78	133.74	133.71	133.68	133.64	133.61	133.58	133.55	133.52
26.00	DISCHG	20.68	19.82	18.89	18.01	17.17	16.36	15.59	14.85	14.15	13.49
26.00	ELEV	133.49	133.46	133.39	133.33	133.28	133.22	133.17	133.12	133.07	133.02
27.00	DISCHG	12.85	12.24	11.66	11.11	10.59	10.08	9.61	9.15	8.72	8.31
27.00	ELEV	132.98	132.94	132.90	132.86	132.83	132.79	132.76	132.73	132.70	132.67
28.00	DISCHG	7.91	7.54	7.18	6.84	6.52	6.21	5.92	5.64	5.37	5.12
28.00	ELEV	132.64	132.62	132.59	132.57	132.55	132.53	132.51	132.49	132.47	132.45
29.00	DISCHG	4.87	4.64	4.42	4.21	4.01	3.82	3.64	3.47	3.31	3.15
29.00	ELEV	132.43	132.42	132.40	132.39	132.37	132.36	132.35	132.34	132.33	132.32

RUNOFF VOLUME ABOVE BASEFLOW = 2.59 WATERSHED INCHES, 1253.45 CFS-HRS, 103.58 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 6

OUTPUT HYDROGRAPH= 2

AREA= .30 SQ MI INPUT RUNOFF CURVE= 71. TIME OF CONCENTRATION= .73 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0973 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.53	275.01	(RUNOFF)
18.21	14.51	(RUNOFF)
19.93	12.07	(RUNOFF)
22.32	10.04	(RUNOFF)
24.33	12.25	(RUNOFF)

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .30 SQ.MI.	
9.00	DISCHG	.01	.03	.09	.20	.38	.62	.93	1.28	1.69	2.14
10.00	DISCHG	2.63	3.16	3.73	4.36	5.05	5.82	6.67	7.61	8.64	9.76
11.00	DISCHG	11.02	12.44	14.00	15.80	17.91	20.56	23.87	28.55	36.03	50.15
12.00	DISCHG	75.16	114.27	164.49	215.82	255.80	274.11	268.83	246.14	214.59	182.16
13.00	DISCHG	153.92	131.12	113.12	98.95	87.69	78.54	71.00	64.67	59.42	55.13
14.00	DISCHG	51.68	48.86	46.54	44.55	42.71	40.91	39.29	37.95	36.75	35.52
15.00	DISCHG	34.38	33.45	32.68	31.95	31.30	30.72	30.18	29.67	29.16	28.54
16.00	DISCHG	27.85	27.15	26.54	26.05	25.69	25.37	24.99	24.46	23.79	22.97
17.00	DISCHG	21.93	20.68	19.40	18.34	17.59	17.08	16.68	16.19	15.57	14.98
18.00	DISCHG	14.59	14.47	14.51	14.48	14.29	14.01	13.68	13.38	13.17	13.03
19.00	DISCHG	12.93	12.78	12.52	12.13	11.75	11.53	11.53	11.68	11.91	12.06
20.00	DISCHG	12.02	11.79	11.51	11.29	11.13	10.97	10.86	10.83	10.80	10.65
21.00	DISCHG	10.40	10.15	10.00	10.04	10.18	10.22	10.10	9.85	9.55	9.33
22.00	DISCHG	9.34	9.59	9.90	10.03	9.97	9.77	9.50	9.23	9.05	8.93
23.00	DISCHG	8.84	8.77	8.73	8.70	8.68	8.66	8.59	8.32	7.70	7.09

24.00	DISCHG	7.30	8.82	10.96	12.18	11.87	10.37	8.11	5.81	4.08	2.92
25.00	DISCHG	2.09	1.49	1.06	.75	.53	.38	.27	.19	.13	.09
26.00	DISCHG	.07	.05	.02	.01	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 513.12 CFS-HRS, 42.40 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 7

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 1500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .82 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 7 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.04	140.42	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.59 WATERSHED INCHES, 1253.05 CFS-HRS, 103.55 ACRE-FEET; BASEFLOW = .00 CFS

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.59	363.33	(NULL)
24.32	47.56	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.05 SQ.MI.
8.00	DISCHG	.00	.00	.00	.04	.12
9.00	DISCHG	.19	.29	.44	2.30	3.55
10.00	DISCHG	4.28	5.07	5.93	11.90	15.32
11.00	DISCHG	17.33	19.61	22.15	43.96	70.70
12.00	DISCHG	99.50	144.59	204.29	351.00	302.49
13.00	DISCHG	279.05	260.05	245.09	204.21	195.43
14.00	DISCHG	192.09	189.26	186.83	176.44	172.85
15.00	DISCHG	171.07	169.47	167.99	161.17	158.43
16.00	DISCHG	156.92	155.39	153.93	147.56	144.32
17.00	DISCHG	142.39	140.03	137.51	129.50	123.81
18.00	DISCHG	122.07	120.62	119.35	111.47	108.02
19.00	DISCHG	106.40	104.77	103.05	95.19	92.97
20.00	DISCHG	91.61	89.99	88.32	81.09	78.49
21.00	DISCHG	77.08	75.67	74.38	68.64	65.44
22.00	DISCHG	64.16	63.17	62.30	56.49	54.29
23.00	DISCHG	53.30	52.35	51.45	47.14	44.42
24.00	DISCHG	43.84	44.68	46.42	39.90	35.49
25.00	DISCHG	33.75	32.17	30.73	24.75	22.75
26.00	DISCHG	21.82	20.92	20.04	15.77	14.31
27.00	DISCHG	13.64	12.99	12.38	9.72	8.82
28.00	DISCHG	8.40	8.00	7.62	5.98	5.43
29.00	DISCHG	5.17	4.93	4.70	3.68	3.34

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RUNOFF VOLUME ABOVE BASEFLOW = 2.61 WATERSHED INCHES, 1766.18 CFS-HRS, 145.96 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 8
OUTPUT HYDROGRAPH= 5
AREA= .12 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .56 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0747 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.41	156.37	(RUNOFF)
18.21	6.38	(RUNOFF)
22.24	4.48	(RUNOFF)
24.24	7.16	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.12 SQ.MI.
7.00	DISCHG	.00	.00	.00	.02	.14
8.00	DISCHG	.23	.35	.47	1.22	1.55
9.00	DISCHG	1.73	1.96	2.19	3.35	3.94
10.00	DISCHG	4.26	4.59	4.94	7.43	8.75
11.00	DISCHG	9.54	10.43	11.37	21.10	37.36
12.00	DISCHG	57.14	86.49	118.99	104.86	67.80
13.00	DISCHG	55.77	47.27	40.88	24.71	21.63
14.00	DISCHG	20.65	19.85	19.21	16.11	15.11
15.00	DISCHG	14.62	14.30	14.06	12.88	12.28
16.00	DISCHG	11.90	11.58	11.36	10.48	9.69
17.00	DISCHG	9.12	8.39	7.77	6.79	6.19
18.00	DISCHG	6.15	6.29	6.38	5.72	5.63
19.00	DISCHG	5.60	5.53	5.34	5.22	5.37
20.00	DISCHG	5.25	5.01	4.85	4.70	4.61
21.00	DISCHG	4.40	4.24	4.25	4.13	3.98
22.00	DISCHG	4.08	4.32	4.47	3.90	3.81
23.00	DISCHG	3.79	3.78	3.77	3.63	2.94
24.00	DISCHG	3.73	5.61	7.05	1.52	.63
25.00	DISCHG	.41	.26	.17	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = 3.34 WATERSHED INCHES, 252.37 CFS-HRS, 20.86 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 9
INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.52	503.59	(NULL)
24.28	54.38	(NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 1.17 SQ.MI.
 7.00 DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .02 .07 .14
 8.00 DISCHG .23 .35 .47 .61 .74 .89 1.07 1.26 1.46 1.67
 9.00 DISCHG 1.92 2.25 2.63 3.06 3.57 4.17 4.87 5.65 6.53 7.50

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10.00	DISCHG	8.54	9.66	10.87	12.21	13.72	15.40	17.27	19.33	21.58	24.07
11.00	DISCHG	26.87	30.04	33.52	37.50	42.21	48.03	55.23	65.06	80.05	108.06
12.00	DISCHG	156.65	231.09	323.29	414.42	479.40	503.06	491.61	455.87	412.22	370.29
13.00	DISCHG	334.83	307.32	285.97	269.42	256.39	245.67	236.65	228.92	222.39	217.06
14.00	DISCHG	212.73	209.11	206.04	203.29	200.51	197.58	194.88	192.55	190.33	187.96
15.00	DISCHG	185.69	183.77	182.05	180.33	178.64	177.03	175.51	174.05	172.49	170.71
16.00	DISCHG	168.82	166.97	165.29	163.81	162.50	161.23	159.77	158.05	156.14	154.01
17.00	DISCHG	151.50	148.42	145.28	142.55	140.35	138.48	136.59	134.48	132.18	130.00
18.00	DISCHG	128.23	126.91	125.73	124.35	122.71	120.97	119.12	117.19	115.36	113.65
19.00	DISCHG	112.00	110.30	108.39	106.30	104.31	102.69	101.43	100.40	99.44	98.34
20.00	DISCHG	96.85	95.00	93.17	91.55	90.02	88.47	87.04	85.79	84.54	83.10
21.00	DISCHG	81.48	79.91	78.63	77.72	76.91	75.87	74.53	72.77	70.97	69.39
22.00	DISCHG	68.24	67.48	66.77	65.79	64.53	63.13	61.72	60.39	59.20	58.11
23.00	DISCHG	57.09	56.13	55.22	54.36	53.53	52.75	51.91	50.76	49.03	47.36
24.00	DISCHG	47.57	50.29	53.46	54.35	52.59	49.12	45.12	41.42	38.44	36.12
25.00	DISCHG	34.15	32.43	30.90	29.49	28.19	26.99	25.84	24.75	23.73	22.75
26.00	DISCHG	21.82	20.92	20.04	19.10	18.21	17.36	16.54	15.77	15.02	14.31
27.00	DISCHG	13.64	12.99	12.38	11.80	11.24	10.70	10.20	9.72	9.26	8.82
28.00	DISCHG	8.40	8.00	7.62	7.26	6.92	6.59	6.28	5.98	5.70	5.43
29.00	DISCHG	5.17	4.93	4.70	4.47	4.26	4.06	3.87	3.68	3.51	3.34

RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 2018.55 CFS-HRS, 166.81 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 10
 OUTPUT HYDROGRAPH= 7
 AREA= .17 SQ MI INPUT RUNOFF CURVE= 70. TIME OF CONCENTRATION= .58 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0773 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	169.94	(RUNOFF)
18.22	8.10	(RUNOFF)
22.25	5.74	(RUNOFF)
24.25	8.98	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .17 SQ.MI.
9.00	DISCHG .00 .00 .00 .03 .09 .19 .34 .53 .76 1.02		
10.00	DISCHG 1.30 1.61 1.93 2.30 2.71 3.17 3.68 4.23 4.84 5.50		
11.00	DISCHG 6.26 7.12 8.06 9.14 10.49 12.20 14.27 17.43 22.84 33.29		
12.00	DISCHG 53.32 84.14 120.22 152.67 168.89 165.53 148.18 123.90 100.88 82.35		
13.00	DISCHG 68.37 58.23 50.60 44.74 40.34 36.69 33.58 30.91 28.76 27.08		
14.00	DISCHG 25.78 24.78 23.98 23.27 22.48 21.59 20.81 20.22 19.64 18.99		
15.00	DISCHG 18.39 17.98 17.67 17.36 17.01 16.68 16.44 16.24 15.94 15.52		
16.00	DISCHG 15.07 14.67 14.39 14.21 14.10 13.97 13.72 13.32 12.86 12.33		
17.00	DISCHG 11.63 10.75 9.98 9.49 9.29 9.22 9.05 8.68 8.25 7.93		
18.00	DISCHG 7.85 7.99 8.10 8.05 7.85 7.61 7.43 7.31 7.23 7.19		
19.00	DISCHG 7.15 7.07 6.84 6.52 6.29 6.27 6.42 6.63 6.81 6.85		
20.00	DISCHG 6.72 6.44 6.24 6.18 6.13 6.03 5.98 6.01 6.03 5.90		
21.00	DISCHG 5.67 5.46 5.46 5.65 5.80 5.76 5.57 5.33 5.14 5.09		
22.00	DISCHG 5.23 5.50 5.71 5.71 5.55 5.32 5.15 5.03 4.96 4.91		

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23.00	DISCHG	4.88	4.86	4.85	4.84	4.84	4.83	4.82	4.65	4.17	3.77
24.00	DISCHG	4.67	6.89	8.77	8.70	7.17	5.02	3.23	2.13	1.40	.91
25.00	DISCHG	.60	.39	.25	.16	.11	.07	.05	.02	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.59 WATERSHED INCHES, 282.86 CFS-HRS, 23.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1
 LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .87 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.63	500.44	(NULL)
24.40	54.16	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 2018.15 CFS-HRS, 166.78 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11
INPUT HYDROGRAPHS= 7,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.58	647.60	(NULL)
24.34	61.95	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.33 SQ.MI.
7.00	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .02 .06				
8.00	DISCHG	.13 .22 .33 .46 .59 .72 .87 1.04 1.23 1.43				
9.00	DISCHG	1.64 1.89 2.20 2.60 3.08 3.68 4.42 5.30 6.29 7.41				
10.00	DISCHG	8.65 9.99 11.42 12.98 14.72 16.66 18.82 21.21 23.85 26.73				
11.00	DISCHG	29.95 33.57 37.62 42.13 47.38 53.70 61.42 71.57 86.44 111.14				
12.00	DISCHG	157.34 233.74 340.39 462.15 569.25 634.34 646.65 616.43 561.65 501.07				
13.00	DISCHG	445.15 398.68 362.36 334.16 312.44 295.18 280.96 269.00 258.90 250.51				
14.00	DISCHG	243.69 238.21 233.67 229.80 226.20 222.53 218.84 215.51 212.56 209.67				
15.00	DISCHG	206.71 204.02 201.74 199.68 197.61 195.59 193.71 191.98 190.22 188.25				
16.00	DISCHG	186.05 183.78 181.65 179.76 178.14 176.68 175.14 173.31 171.17 168.76				
17.00	DISCHG	165.96 162.63 158.86 155.25 152.27 149.93 147.82 145.57 143.05 140.47				
18.00	DISCHG	138.19 136.50 135.22 133.96 132.41 130.57 128.66 126.71 124.72 122.83				
19.00	DISCHG	121.06 119.32 117.40 115.21 112.91 110.89 109.37 108.27 107.38 106.44				
20.00	DISCHG	105.22 103.52 101.52 99.63 97.93 96.29 94.69 93.27 92.01 90.63				
21.00	DISCHG	88.98 87.19 85.61 84.49 83.67 82.79 81.59 80.06 78.18 76.34				
22.00	DISCHG	74.87 73.93 73.32 72.59 71.49 70.05 68.49 66.97 65.56 64.29				
23.00	DISCHG	63.16 62.11 61.13 60.20 59.33 58.50 57.69 56.69 55.10 53.05				
24.00	DISCHG	52.28 54.46 58.70 61.69 61.34 57.83 52.84 47.86 43.40 39.83				
25.00	DISCHG	37.09 34.86 32.96 31.30 29.82 28.47 27.22 26.04 24.93 23.89				
26.00	DISCHG	22.90 21.96 21.06 20.17 19.25 18.35 17.49 16.67 15.89 15.14				
27.00	DISCHG	14.42 13.74 13.09 12.48 11.89 11.32 10.79 10.28 9.79 9.33				

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28.00	DISCHG	8.89	8.47	8.06	7.68	7.32	6.97	6.64	6.33	6.03	5.74
29.00	DISCHG	5.47	5.21	4.97	4.73	4.51	4.29	4.09	3.90	3.71	3.54

RUNOFF VOLUME ABOVE BASEFLOW = 2.67 WATERSHED INCHES, 2301.01 CFS-HRS, 190.16 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 109.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.80	566.56	115.75
24.41	61.19	110.37

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.33 SQ.MI.
7.00	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .04				
7.00	ELEV	109.00 109.00 109.00 109.00 109.00 109.00 109.00 109.00 109.00 109.00 109.00				
8.00	DISCHG	.09 .16 .27 .38 .51 .64 .78 .94 1.12 1.32				
8.00	ELEV	109.00 109.00 109.01 109.01 109.01 109.02 109.02 109.02 109.02 109.03 109.03				
9.00	DISCHG	1.52 1.74 2.02 2.37 2.80 3.34 4.00 4.79 5.72 6.76				
9.00	ELEV	109.04 109.04 109.05 109.06 109.07 109.08 109.09 109.11 109.14 109.16 109.16				
10.00	DISCHG	7.93 9.21 10.59 12.08 13.71 15.53 17.57 19.83 22.32 25.06				
10.00	ELEV	109.19 109.22 109.25 109.29 109.33 109.37 109.42 109.47 109.53 109.59 109.59				
11.00	DISCHG	28.09 31.47 35.27 39.51 44.35 50.06 56.69 64.88 76.67 96.40				
11.00	ELEV	109.67 109.75 109.84 109.94 110.05 110.19 110.31 110.41 110.56 110.75 110.75				
12.00	DISCHG	126.24 178.32 253.10 358.82 402.24 468.71 522.29 556.36 566.55 555.58				
12.00	ELEV	111.07 111.55 112.20 113.24 113.74 114.55 115.21 115.63 115.75 115.62				
13.00	DISCHG	529.86 496.19 459.84 422.01 394.08 374.57 319.12 280.89 270.46 260.89				
13.00	ELEV	115.30 114.88 114.44 113.97 113.64 113.40 112.83 112.44 112.36 112.27				
14.00	DISCHG	252.73 245.76 239.63 234.66 230.47 226.63 222.75 219.01 215.68 212.62				
14.00	ELEV	112.19 112.13 112.07 112.02 111.98 111.95 111.91 111.88 111.85 111.82				
15.00	DISCHG	209.65 206.78 203.99 201.34 199.16 197.09 195.11 193.28 191.52 189.67				
15.00	ELEV	111.79 111.77 111.74 111.72 111.71 111.69 111.68 111.67 111.65 111.64				
16.00	DISCHG	187.63 185.43 183.23 181.18 179.49 178.11 176.65 175.04 173.18 171.05				
16.00	ELEV	111.62 111.61 111.59 111.58 111.56 111.55 111.53 111.52 111.50 111.48				
17.00	DISCHG	168.60 165.75 162.43 158.59 155.11 152.22 149.81 147.56 145.22 142.40				
17.00	ELEV	111.45 111.42 111.38 111.35 111.31 111.28 111.26 111.24 111.21 111.19				
18.00	DISCHG	139.63 137.57 136.03 134.73 133.34 131.67 129.82 127.89 125.93 123.99				

18.00	ELEV	111.17	111.15	111.14	111.13	111.12	111.11	111.09	111.08	111.06	111.05
19.00	DISCHG	122.15	120.39	118.90	117.10	114.99	112.85	110.96	109.48	108.33	107.34
19.00	ELEV	111.04	111.02	111.01	110.98	110.95	110.92	110.90	110.88	110.86	110.85
20.00	DISCHG	106.29	104.95	102.69	100.72	98.92	97.24	95.61	94.10	92.74	91.42
20.00	ELEV	110.84	110.82	110.80	110.79	110.77	110.76	110.74	110.73	110.72	110.71
21.00	DISCHG	89.92	88.22	86.53	85.15	84.15	83.37	82.39	81.08	79.44	77.62
21.00	ELEV	110.70	110.68	110.67	110.66	110.65	110.64	110.63	110.61	110.59	110.57
22.00	DISCHG	75.94	74.65	73.79	73.09	72.21	71.00	69.55	68.03	66.55	65.19
22.00	ELEV	110.55	110.53	110.52	110.52	110.50	110.49	110.47	110.45	110.43	110.42
23.00	DISCHG	63.97	62.85	61.82	60.86	59.95	59.08	58.26	57.37	56.14	54.42
23.00	ELEV	110.40	110.39	110.38	110.36	110.35	110.34	110.33	110.32	110.31	110.29
24.00	DISCHG	52.85	53.33	56.11	59.52	61.19	59.85	56.08	51.02	46.05	41.96

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24.00	ELEV	110.25	110.26	110.31	110.35	110.37	110.35	110.31	110.21	110.09	109.99
25.00	DISCHG	38.73	36.19	34.09	32.28	30.69	29.26	27.95	26.74	25.59	24.50
25.00	ELEV	109.92	109.86	109.81	109.77	109.73	109.69	109.66	109.63	109.61	109.58
26.00	DISCHG	23.48	22.51	21.59	20.69	19.79	18.87	17.99	17.15	16.35	15.58
26.00	ELEV	109.56	109.53	109.51	109.49	109.47	109.45	109.43	109.41	109.39	109.37
27.00	DISCHG	14.84	14.14	13.48	12.84	12.23	11.65	11.10	10.58	10.08	9.60
27.00	ELEV	109.35	109.34	109.32	109.30	109.29	109.28	109.26	109.25	109.24	109.23
28.00	DISCHG	9.15	8.71	8.30	7.91	7.53	7.18	6.84	6.51	6.20	5.91
28.00	ELEV	109.22	109.21	109.20	109.19	109.18	109.17	109.16	109.15	109.15	109.14
29.00	DISCHG	5.63	5.37	5.11	4.87	4.64	4.42	4.21	4.01	3.82	3.64
29.00	ELEV	109.13	109.13	109.12	109.12	109.11	109.10	109.10	109.10	109.09	109.09

RUNOFF VOLUME ABOVE BASEFLOW = 2.67 WATERSHED INCHES, 2301.96 CFS-HRS, 190.23 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 12

OUTPUT HYDROGRAPH= 4

AREA= .09 SQ MI INPUT RUNOFF CURVE= 75. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.34	127.82	(RUNOFF)
18.17	5.04	(RUNOFF)
24.18	6.62	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.09 SQ.MI.
8.00	DISCHG	.00	.03	.07	.14	.24
9.00	DISCHG	.71	.88	1.04	1.18	1.33
10.00	DISCHG	2.56	2.79	3.05	3.36	3.71
11.00	DISCHG	6.59	7.30	8.03	8.87	10.05
12.00	DISCHG	53.81	82.19	110.07	126.55	123.99
13.00	DISCHG	33.86	29.30	26.03	23.62	21.65
14.00	DISCHG	15.17	14.69	14.32	13.97	13.39
15.00	DISCHG	10.91	10.83	10.72	10.47	10.22
16.00	DISCHG	8.95	8.76	8.65	8.60	8.57
17.00	DISCHG	6.66	5.98	5.56	5.50	5.58
18.00	DISCHG	4.77	4.98	5.03	4.85	4.64
19.00	DISCHG	4.34	4.27	4.03	3.73	3.67
20.00	DISCHG	4.00	3.73	3.67	3.76	3.73
21.00	DISCHG	3.26	3.18	3.34	3.58	3.63
22.00	DISCHG	3.27	3.55	3.61	3.45	3.24
23.00	DISCHG	2.94	2.93	2.93	2.93	2.93
24.00	DISCHG	3.38	5.94	6.58	5.11	3.06
25.00	DISCHG	.11	.06	.03	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = 3.05 WATERSHED INCHES, 187.23 CFS-HRS, 15.47 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 13

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 1500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53

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MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 13 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)

12.80

24.41

PEAK DISCHARGE(CFS)

566.56

61.19

PEAK ELEVATION(FEET)

(NULL)

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.67 WATERSHED INCHES, 2301.96 CFS-HRS, 190.23 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 13

INPUT HYDROGRAPHS= 4,5

OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)

12.73

24.33

PEAK DISCHARGE(CFS)

621.58

64.76

PEAK ELEVATION(FEET)

(NULL)

(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.43 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.04	
8.00	DISCHG	.09	.16	.27	.41	.58	.78	1.02	1.29	1.58	1.88
9.00	DISCHG	2.23	2.63	3.06	3.55	4.13	4.85	5.69	6.67	7.81	9.09
10.00	DISCHG	10.49	12.00	13.64	15.44	17.42	19.63	22.08	24.79	27.76	31.02
11.00	DISCHG	34.68	38.77	43.30	48.39	54.40	61.63	70.14	81.19	98.25	128.74
12.00	DISCHG	180.05	260.51	363.17	485.36	526.23	575.13	605.99	620.82	616.72	595.94
13.00	DISCHG	563.71	525.50	485.87	445.63	415.72	394.51	337.54	298.07	286.73	276.57
14.00	DISCHG	267.90	260.45	253.95	248.63	243.86	239.35	235.07	231.16	227.46	223.85
15.00	DISCHG	220.57	217.61	214.72	211.80	209.38	207.15	205.09	203.15	201.13	198.92
16.00	DISCHG	196.58	194.19	191.89	189.78	188.05	186.59	184.89	182.94	180.76	178.30
17.00	DISCHG	175.26	171.73	167.99	164.10	160.69	157.79	155.18	152.61	149.97	147.03
18.00	DISCHG	144.40	142.55	141.05	139.59	137.98	136.18	134.25	132.28	130.29	128.34
19.00	DISCHG	126.49	124.65	122.92	120.84	118.66	116.67	115.00	113.64	112.57	111.56
20.00	DISCHG	110.29	108.68	106.36	104.49	102.65	100.82	99.19	97.81	96.44	94.92
21.00	DISCHG	93.18	91.40	89.87	88.74	87.78	86.82	85.63	84.18	82.47	80.68
22.00	DISCHG	79.21	78.20	77.40	76.54	75.45	74.10	72.58	71.01	69.51	68.14
23.00	DISCHG	66.91	65.79	64.75	63.79	62.88	62.02	61.18	60.12	58.32	56.36
24.00	DISCHG	56.23	59.27	62.69	64.63	64.24	61.59	57.08	51.58	46.37	42.14
25.00	DISCHG	38.84	36.25	34.12	32.29	30.69	29.26	27.95	26.74	25.59	24.50
26.00	DISCHG	23.48	22.51	21.59	20.69	19.79	18.87	17.99	17.15	16.35	15.58
27.00	DISCHG	14.84	14.14	13.48	12.84	12.23	11.65	11.10	10.58	10.08	9.60
28.00	DISCHG	9.15	8.71	8.30	7.91	7.53	7.18	6.84	6.51	6.20	5.91
29.00	DISCHG	5.63	5.37	5.11	4.87	4.64	4.42	4.21	4.01	3.82	3.64

RUNOFF VOLUME ABOVE BASEFLOW = 2.70 WATERSHED INCHES, 2489.19 CFS-HRS, 205.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 3

INPUT HYDROGRAPH= 6

OUTPUT HYDROGRAPH= 7

SURFACE ELEVATION= 100.16

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PEAK TIME(HRS)

15.33

PEAK DISCHARGE(CFS)

211.10

PEAK ELEVATION(FEET)

109.45

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.43 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	
7.00	ELEV	100.16	100.16	100.16	100.16	100.16	100.16	100.16	100.16	100.16	
8.00	DISCHG	.04	.09	.16	.26	.39	.55	.74	.97	1.23	1.51
8.00	ELEV	100.16	100.17	100.17	100.18	100.19	100.20	100.21	100.22	100.24	100.26
9.00	DISCHG	1.81	2.15	2.53	2.96	3.44	4.02	4.71	5.52	6.47	7.56
9.00	ELEV	100.28	100.30	100.33	100.35	100.38	100.42	100.47	100.52	100.58	100.65
10.00	DISCHG	8.79	10.14	11.62	13.23	14.99	16.94	19.10	21.49	23.88	26.33
10.00	ELEV	100.73	100.82	100.92	101.02	101.14	101.26	101.41	101.56	101.69	101.78
11.00	DISCHG	29.30	33.02	37.12	41.21	45.19	50.08	52.49	57.57	63.97	71.88
11.00	ELEV	101.88	102.00	102.12	102.24	102.37	102.54	102.75	102.99	103.15	103.36
12.00	DISCHG	82.53	97.66	113.01	145.79	160.92	164.96	169.37	173.97	178.58	183.30
12.00	ELEV	103.67	104.13	104.71	105.70	106.73	106.99	107.27	107.57	107.87	108.09
13.00	DISCHG	187.79	191.84	195.40	198.47	200.95	202.96	204.56	205.67	206.52	207.26
13.00	ELEV	108.27	108.43	108.58	108.70	108.82	108.94	109.04	109.11	109.17	109.21
14.00	DISCHG	207.89	208.45	208.92	209.34	209.70	210.02	210.28	210.51	210.69	210.84
14.00	ELEV	109.25	109.29	109.32	109.34	109.37	109.39	109.40	109.42	109.43	109.44
15.00	DISCHG	210.95	211.03	211.08	211.10	211.10	211.07	211.02	210.95	210.87	210.76
15.00	ELEV	109.44	109.45	109.45	109.45	109.45	109.45	109.45	109.44	109.44	109.43
16.00	DISCHG	210.63	210.48	210.31	210.12	209.91	209.69	209.46	209.20	208.94	208.65
16.00	ELEV	109.42	109.42	109.40	109.39	109.38	109.37	109.35	109.34	109.32	109.30
17.00	DISCHG	208.33	207.99	207.62	207.21	206.77	206.30	205.82	205.31	204.78	204.22
17.00	ELEV	109.28	109.26	109.24	109.21	109.18	109.15	109.12	109.09	109.06	109.02
18.00	DISCHG	203.65	203.06	202.46	201.85	201.23	200.60	199.95	199.19	198.42	197.64
18.00	ELEV	108.99	108.95	108.91	108.88	108.84	108.80	108.76	108.73	108.70	108.67
19.00	DISCHG	196.84	196.04	195.22	194.38	193.54	192.68	191.81	190.93	190.04	189.16

19.00	ELEV	108.63	108.60	108.57	108.54	108.50	108.47	108.43	108.40	108.36	108.33
20.00	DISCHG	188.27	187.38	186.47	185.55	184.62	183.68	182.73	181.78	180.82	179.87
20.00	ELEV	108.29	108.26	108.22	108.18	108.14	108.11	108.07	108.03	107.99	107.95
21.00	DISCHG	178.98	178.08	177.17	176.26	175.35	174.44	173.52	172.61	171.68	170.75
21.00	ELEV	107.89	107.84	107.78	107.72	107.66	107.60	107.54	107.48	107.42	107.36
22.00	DISCHG	169.81	168.86	167.92	166.98	166.03	165.09	164.14	163.18	162.22	161.25
22.00	ELEV	107.30	107.24	107.18	107.12	107.06	107.00	106.94	106.88	106.81	106.75
23.00	DISCHG	160.28	156.49	151.71	147.12	142.73	134.26	119.82	115.79	111.93	108.20
23.00	ELEV	106.69	106.43	106.10	105.79	105.49	105.21	104.97	104.82	104.67	104.52
24.00	DISCHG	104.66	101.46	98.10	94.68	91.67	88.53	84.94	81.17	77.03	72.74
24.00	ELEV	104.38	104.26	104.14	104.03	103.93	103.84	103.74	103.63	103.51	103.39
25.00	DISCHG	68.06	62.82	56.99	52.07	47.26	40.50	34.56	30.86	28.63	26.99
25.00	ELEV	103.26	103.12	102.97	102.72	102.44	102.22	102.04	101.94	101.86	101.80
26.00	DISCHG	25.62	24.46	23.42	22.28	21.16	20.15	19.20	18.31	17.45	16.63
26.00	ELEV	101.75	101.71	101.67	101.61	101.54	101.47	101.41	101.35	101.30	101.24
27.00	DISCHG	15.85	15.10	14.39	13.71	13.06	12.45	11.86	11.30	10.76	10.25
27.00	ELEV	101.19	101.14	101.10	101.05	101.01	100.97	100.93	100.90	100.86	100.83
28.00	DISCHG	9.77	9.31	8.86	8.45	8.05	7.66	7.30	6.96	6.63	6.31
28.00	ELEV	100.80	100.77	100.74	100.71	100.68	100.66	100.64	100.61	100.59	100.57

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29.00	DISCHG	6.02	5.73	5.46	5.20	4.95	4.72	4.50	4.28	4.08	3.89
29.00	ELEV	100.55	100.53	100.52	100.50	100.48	100.47	100.45	100.44	100.43	100.41

RUNOFF VOLUME ABOVE BASEFLOW = 2.70 WATERSHED INCHES, 2487.86 CFS-HRS, 205.60 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 14

OUTPUT HYDROGRAPH= 1

AREA= .04 SQ MI INPUT RUNOFF CURVE= 76. TIME OF CONCENTRATION= .40 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0533 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.31	57.31	(RUNOFF)
15.05	4.64	(RUNOFF)
24.15	3.14	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .04 SQ.MI.
8.00	DISCHG .00 .01 .04 .07 .11 .16 .21	.27 .31 .36	
9.00	DISCHG .43 .52 .58 .64 .71 .79 .87	.95 1.05 1.16	
10.00	DISCHG 1.27 1.37 1.49 1.63 1.79 1.96 2.16	2.36 2.57 2.81	
11.00	DISCHG 3.10 3.42 3.74 4.12 4.69 5.41 6.27	7.64 10.32 15.65	
12.00	DISCHG 26.23 39.63 51.40 57.24 53.77 44.21 33.71	25.48 19.64 15.97	
13.00	DISCHG 13.51 11.82 10.60 9.69 8.94 8.29 7.69	7.18 6.85 6.63	
14.00	DISCHG 6.42 6.22 6.08 5.94 5.66 5.36 5.22	5.18 4.99 4.74	
15.00	DISCHG 4.63 4.63 4.57 4.44 4.34 4.28 4.26	4.20 4.08 3.91	
16.00	DISCHG 3.79 3.72 3.69 3.67 3.66 3.62 3.49	3.33 3.20 3.07	
17.00	DISCHG 2.78 2.46 2.32 2.34 2.38 2.38 2.27	2.11 1.99 1.96	
18.00	DISCHG 2.05 2.16 2.15 2.05 1.96 1.91 1.88	1.87 1.86 1.86	
19.00	DISCHG 1.85 1.82 1.69 1.56 1.56 1.65 1.75	1.80 1.82 1.80	
20.00	DISCHG 1.68 1.56 1.56 1.62 1.59 1.51 1.53	1.60 1.58 1.46	
21.00	DISCHG 1.37 1.35 1.44 1.56 1.55 1.45 1.36	1.31 1.28 1.30	
22.00	DISCHG 1.42 1.54 1.55 1.45 1.36 1.31 1.28	1.27 1.26 1.25	
23.00	DISCHG 1.25 1.25 1.25 1.25 1.25 1.25 1.24	1.13 .84 .81	
24.00	DISCHG 1.76 2.99 2.98 2.03 1.11 .60 .32	.17 .09 .05	
25.00	DISCHG .03 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.15 WATERSHED INCHES, 81.30 CFS-HRS, 6.72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 15

OUTPUT HYDROGRAPH= 2

AREA= .35 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= 1.18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0983 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.86	216.54	(RUNOFF)
22.43	10.83	(RUNOFF)
24.50	12.88	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .35 SQ.MI.
9.00	DISCHG .00 .00 .00 .00 .00 .00 .00	.01 .04 .09	

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10.00	DISCHG	.19	.33	.53	.79	1.13	1.54	2.03	2.60	3.26	4.00
11.00	DISCHG	4.85	5.79	6.86	8.07	9.46	11.07	12.98	15.45	18.79	24.28
12.00	DISCHG	33.56	48.13	69.48	97.20	128.65	160.18	187.18	205.99	215.37	215.82
13.00	DISCHG	208.82	196.00	180.01	162.75	146.18	131.66	119.08	108.22	98.78	90.45
14.00	DISCHG	83.18	76.87	71.39	66.63	62.49	58.89	55.74	52.92	50.39	48.10
15.00	DISCHG	46.04	44.15	42.45	40.93	39.58	38.37	37.24	36.19	35.23	34.35
16.00	DISCHG	33.53	32.74	31.99	31.29	30.64	30.04	29.47	28.92	28.35	27.73
17.00	DISCHG	27.01	26.20	25.28	24.27	23.25	22.29	21.41	20.62	19.87	19.16
18.00	DISCHG	18.53	17.99	17.55	17.19	16.87	16.56	16.26	15.98	15.71	15.45
19.00	DISCHG	15.20	14.95	14.68	14.42	14.16	13.88	13.64	13.46	13.36	13.30
20.00	DISCHG	13.26	13.21	13.14	13.04	12.90	12.76	12.61	12.46	12.31	12.18
21.00	DISCHG	12.04	11.90	11.75	11.61	11.50	11.43	11.37	11.27	11.13	11.00
22.00	DISCHG	10.90	10.84	10.81	10.82	10.83	10.83	10.79	10.71	10.60	10.47
23.00	DISCHG	10.33	10.18	10.05	9.94	9.87	9.81	9.76	9.67	9.51	9.45
24.00	DISCHG	9.64	10.05	10.73	11.71	12.57	12.88	12.59	11.83	10.72	9.43
25.00	DISCHG	8.04	6.55	5.22	4.19	3.39	2.77	2.26	1.83	1.49	1.21
26.00	DISCHG	.98	.79	.64	.52	.42	.34	.28	.22	.18	.14
27.00	DISCHG	.11	.09	.07	.06	.04	.03	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 2.42 WATERSHED INCHES, 540.51 CFS-HRS, 44.67 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 16

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 6300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .25 PEAK TRAVEL TIME = .38 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.69	40.67	(NULL)
24.45	2.02	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.15 WATERSHED INCHES, 81.26 CFS-HRS, 6.72 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 16

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.82	254.58	(NULL)
22.44	12.29	(NULL)
24.49	14.88	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.39 SQ.MI.
8.00	DISCHG	.00	.00	.01	.07	.10
9.00	DISCHG	.19	.23	.28	.34	.46
10.00	DISCHG	1.00	1.22	1.51	1.87	2.31
11.00	DISCHG	6.88	8.02	9.30	10.75	12.40
12.00	DISCHG	40.12	56.94	82.58	116.85	156.13
13.00	DISCHG	240.50	223.80	204.29	183.95	164.77
14.00	DISCHG	92.84	85.78	79.69	74.42	69.85

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15.00	DISCHG	51.68	49.57	47.68	46.01	44.53	43.19	41.95	40.79	39.74	38.79
16.00	DISCHG	37.88	36.98	36.12	35.31	34.58	33.92	33.30	32.69	32.06	31.34
17.00	DISCHG	30.52	29.60	28.52	27.32	26.12	25.03	24.06	23.20	22.38	21.57
18.00	DISCHG	20.83	20.21	19.73	19.36	19.04	18.70	18.35	18.02	17.71	17.42
19.00	DISCHG	17.15	16.87	16.59	16.31	15.99	15.65	15.35	15.16	15.07	15.03
20.00	DISCHG	15.01	14.97	14.89	14.74	14.57	14.41	14.25	14.06	13.90	13.76
21.00	DISCHG	13.63	13.45	13.26	13.08	12.96	12.92	12.87	12.76	12.59	12.42
22.00	DISCHG	12.29	12.20	12.19	12.23	12.28	12.28	12.22	12.11	11.97	11.81
23.00	DISCHG	11.65	11.49	11.34	11.23	11.14	11.07	11.02	10.93	10.77	10.67
24.00	DISCHG	10.77	11.10	11.95	13.37	14.55	14.87	14.37	13.31	11.92	10.38
25.00	DISCHG	8.77	7.12	5.65	4.51	3.64	2.96	2.40	1.94	1.56	1.27
26.00	DISCHG	1.03	.83	.66	.54	.43	.35	.28	.22	.18	.14
27.00	DISCHG	.11	.09	.07	.06	.04	.03	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 2.50 WATERSHED INCHES, 621.77 CFS-HRS, 51.38 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 17

OUTPUT HYDROGRAPH= 5

AREA= .08 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .45 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0600 HOURS

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)										
12.35		81.97				(RUNOFF)										
24.19		4.84				(RUNOFF)										
TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS										TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .08 SQ.MI.		
9.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.03	.09	.17					
10.00	DISCHG	.28	.40	.55	.71	.89	1.10	1.32	1.57	1.84	2.14					
11.00	DISCHG	2.50	2.90	3.33	3.84	4.50	5.37	6.44	8.03	11.19	17.62					
12.00	DISCHG	30.02	48.29	67.02	80.56	80.91	71.43	57.57	44.94	35.34	28.50					
13.00	DISCHG	24.04	20.88	18.59	16.91	15.52	14.31	13.24	12.35	11.70	11.28					
14.00	DISCHG	10.92	10.58	10.32	10.07	9.68	9.21	8.93	8.80	8.54	8.17					
15.00	DISCHG	7.93	7.87	7.79	7.61	7.44	7.32	7.27	7.19	7.02	6.76					
16.00	DISCHG	6.54	6.40	6.33	6.29	6.27	6.21	6.04	5.80	5.57	5.34					
17.00	DISCHG	4.92	4.41	4.11	4.04	4.10	4.10	3.96	3.72	3.51	3.41					
18.00	DISCHG	3.50	3.66	3.69	3.58	3.43	3.32	3.27	3.23	3.22	3.21					
19.00	DISCHG	3.20	3.15	2.98	2.77	2.72	2.82	2.97	3.07	3.13	3.12					
20.00	DISCHG	2.97	2.77	2.72	2.77	2.76	2.65	2.65	2.74	2.74	2.60					
21.00	DISCHG	2.43	2.36	2.47	2.65	2.68	2.57	2.41	2.31	2.25	2.26					
22.00	DISCHG	2.42	2.61	2.67	2.56	2.42	2.31	2.25	2.22	2.20	2.19					
23.00	DISCHG	2.18	2.18	2.18	2.18	2.18	2.18	2.17	2.04	1.62	1.43					
24.00	DISCHG	2.41	4.25	4.82	3.84	2.36	1.35	.78	.45	.26	.15					
25.00	DISCHG	.09	.05	.03	.01	.00										

RUNOFF VOLUME ABOVE BASEFLOW = 2.42 WATERSHED INCHES, 123.19 CFS-HRS, 10.18 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 18
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
 LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.00, M= 1.53

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MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 18 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.82	254.58	(NULL)
22.44	12.29	(NULL)
24.49	14.88	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.50 WATERSHED INCHES, 621.77 CFS-HRS, 51.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 18
 INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.73	291.98	(NULL)
22.19	14.86	(NULL)
24.31	17.21	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS					TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .46 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.00	.01	.02	.05	.07	.10	.14
9.00	DISCHG	.19	.23	.28	.34	.40	.46	.52	.63	.78	1.00
10.00	DISCHG	1.28	1.63	2.06	2.58	3.20	3.93	4.77	5.73	6.80	8.01
11.00	DISCHG	9.38	10.92	12.63	14.58	16.89	19.67	23.01	27.52	34.57	47.24
12.00	DISCHG	70.14	105.23	149.60	197.41	237.04	266.43	284.24	291.59	289.65	279.94
13.00	DISCHG	264.54	244.68	222.88	200.86	180.29	162.37	146.87	133.57	122.17	112.32
14.00	DISCHG	103.76	96.36	90.00	84.48	79.53	75.12	71.34	68.07	65.00	62.13
15.00	DISCHG	59.60	57.45	55.47	53.62	51.97	50.51	49.21	47.99	46.76	45.55
16.00	DISCHG	44.42	43.39	42.45	41.60	40.85	40.13	39.34	38.49	37.63	36.68
17.00	DISCHG	35.44	34.01	32.63	31.36	30.22	29.13	28.02	26.92	25.88	24.98
18.00	DISCHG	24.33	23.87	23.42	22.94	22.47	22.02	21.62	21.26	20.93	20.63
19.00	DISCHG	20.35	20.01	19.57	19.08	18.71	18.47	18.32	18.23	18.20	18.15
20.00	DISCHG	17.98	17.74	17.60	17.51	17.32	17.06	16.90	16.81	16.63	16.36
21.00	DISCHG	16.05	15.81	15.73	15.72	15.64	15.49	15.28	15.06	14.84	14.69
22.00	DISCHG	14.70	14.81	14.86	14.80	14.70	14.59	14.47	14.33	14.17	14.00
23.00	DISCHG	13.84	13.67	13.52	13.40	13.32	13.25	13.19	12.98	12.39	12.10
24.00	DISCHG	13.18	15.35	16.77	17.21	16.92	16.22	15.15	13.77	12.18	10.53
25.00	DISCHG	8.86	7.17	5.68	4.53	3.64	2.96	2.40	1.94	1.56	1.27
26.00	DISCHG	1.03	.83	.66	.54	.43	.35	.28	.22	.18	.14
27.00	DISCHG	.11	.09	.07	.06	.04	.03	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 2.48 WATERSHED INCHES, 744.95 CFS-HRS, 61.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 19

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2
LENGTH = 2200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .82 PEAK TRAVEL TIME = .20 HOURS

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*** WARNING REACH 19 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
15.45 211.10 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.70 WATERSHED INCHES, 2486.76 CFS-HRS, 205.51 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 19
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.78 462.68 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.89 SQ.MI.
8.00	DISCHG .01 .03 .08 .14 .24 .38 .56 .77 1.03 1.32		
9.00	DISCHG 1.63 1.97 2.35 2.78 3.26 3.79 4.42 5.19 6.13 7.26		
10.00	DISCHG 8.60 10.15 11.91 13.88 16.08 18.53 21.28 24.35 27.76 31.35		
11.00	DISCHG 35.16 39.58 44.85 50.81 57.19 63.97 72.04 79.38 91.10 109.85		
12.00	DISCHG 140.33 185.50 244.08 307.03 376.22 423.38 447.74 459.89 462.58 457.49		
13.00	DISCHG 446.78 431.46 413.80 395.44 378.05 362.74 349.36 337.75 327.57 318.63		
14.00	DISCHG 310.85 304.11 298.32 293.30 288.78 284.73 281.29 278.29 275.45 272.78		
15.00	DISCHG 270.41 268.37 266.48 264.69 263.07 261.61 260.29 259.02 257.72 256.43		
16.00	DISCHG 255.20 254.05 252.96 251.95 251.01 250.09 249.07 247.99 246.89 245.67		
17.00	DISCHG 244.15 242.41 240.70 239.06 237.52 236.00 234.43 232.84 231.30 229.88		
18.00	DISCHG 228.68 227.65 226.61 225.53 224.45 223.39 222.35 221.35 220.29 219.22		
19.00	DISCHG 218.16 217.04 215.78 214.48 213.27 212.19 211.19 210.23 209.32 208.39		
20.00	DISCHG 207.34 206.21 205.18 204.18 203.08 201.89 200.79 199.75 198.62 197.39		
21.00	DISCHG 196.13 194.99 194.01 193.10 192.11 191.04 189.92 188.79 187.65 186.57		
22.00	DISCHG 185.66 184.83 183.94 182.93 181.89 180.83 179.77 178.68 177.56 176.44		
23.00	DISCHG 175.30 174.16 170.74 166.12 161.46 156.97 149.17 135.75 129.46 124.97		
24.00	DISCHG 122.23 120.81 118.97 116.06 112.36 108.58 104.38 99.49 94.18 88.47		
25.00	DISCHG 82.55 76.25 69.64 62.79 56.84 51.30 44.34 37.85 33.35 30.47		
26.00	DISCHG 28.42 26.77 25.39 24.19 22.96 21.76 20.66 19.64 18.69 17.78		
27.00	DISCHG 16.93 16.11 15.34 14.61 13.91 13.24 12.61 12.00 11.42 10.88		
28.00	DISCHG 10.37 9.88 9.41 8.96 8.54 8.14 7.75 7.38 7.03 6.70		
29.00	DISCHG 6.38 6.08 5.79 5.52 5.26 5.01 4.77 4.55 4.33 4.13		

RUNOFF VOLUME ABOVE BASEFLOW = 2.64 WATERSHED INCHES, 3231.71 CFS-HRS, 267.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 20
OUTPUT HYDROGRAPH= 4
AREA= .71 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .85 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0944 HOURS

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PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.61 627.38 (RUNOFF)
19.98 29.06 (RUNOFF)
21.47 24.66 (RUNOFF)
22.37 24.03 (RUNOFF)
24.37 32.50 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .71 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .01 .04		
9.00	DISCHG .13 .31 .61 1.04 1.60 2.28 3.07 3.97 4.96 6.04		
10.00	DISCHG 7.23 8.50 9.85 11.33 12.96 14.75 16.73 18.92 21.31 23.95		
11.00	DISCHG 26.86 30.09 33.69 37.77 42.51 48.19 55.22 64.75 78.51 103.36		
12.00	DISCHG 148.54 220.07 319.36 430.16 531.45 601.43 627.12 610.74 563.14 499.57		
13.00	DISCHG 432.83 373.04 323.15 282.65 249.56 222.35 199.64 180.65 164.65 151.31		
14.00	DISCHG 140.28 131.18 123.66 117.36 111.87 106.81 102.02 97.66 93.78 90.26		
15.00	DISCHG 87.07 84.34 82.10 80.11 78.21 76.53 75.09 73.74 72.36 70.90		
16.00	DISCHG 69.32 67.69 66.14 64.78 63.64 62.67 61.72 60.60 59.22 57.51		

17.00	DISCHG	55.38	52.80	49.90	47.19	45.04	43.35	41.94	40.64	39.31	37.99
18.00	DISCHG	36.86	36.10	35.69	35.43	35.06	34.55	33.93	33.26	32.62	32.12
19.00	DISCHG	31.76	31.39	30.86	30.15	29.34	28.69	28.39	28.42	28.66	28.95
20.00	DISCHG	29.06	28.85	28.37	27.85	27.41	27.01	26.64	26.41	26.33	26.11
21.00	DISCHG	25.64	25.12	24.75	24.60	24.62	24.65	24.53	24.19	23.70	23.24
22.00	DISCHG	23.00	23.13	23.57	23.95	24.02	23.81	23.41	22.90	22.39	21.98
23.00	DISCHG	21.70	21.50	21.34	21.22	21.14	21.08	20.95	20.52	19.56	18.97
24.00	DISCHG	19.98	23.18	28.03	31.76	32.39	30.26	26.27	21.13	15.85	11.65
25.00	DISCHG	8.69	6.55	4.90	3.67	2.74	2.04	1.52	1.14	.85	.64
26.00	DISCHG	.47	.35	.25	.19	.14	.09	.04	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 2.78 WATERSHED INCHES, 1268.03 CFS-HRS, 104.79 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 21

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 4000.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .61 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.96	457.40	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.64 WATERSHED INCHES, 3231.27 CFS-HRS, 267.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 21

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.69	1035.21	(NULL)
24.30	152.07	(NULL)

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TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 2.60 SQ.MI.
8.00	DISCHG .00 .01 .02 .05 .11 .19 .31 .46 .66 .92		
9.00	DISCHG 1.27 1.74 2.37 3.16 4.12 5.25 6.54 8.01 9.69 11.62		
10.00	DISCHG 13.82 16.31 19.08 22.18 25.64 29.49 33.77 38.53 43.80 49.63		
11.00	DISCHG 55.98 62.88 70.60 79.49 89.74 101.47 114.98 131.96 153.11 187.97		
12.00	DISCHG 248.46 344.51 480.84 641.74 800.93 935.66 1015.44 1035.10 1009.05 955.59		
13.00	DISCHG 889.75 823.80 762.20 706.38 656.12 611.61 572.81 539.38 510.65 486.13		
14.00	DISCHG 465.27 447.60 432.61 419.86 408.79 398.79 389.61 381.42 374.22 367.67		
15.00	DISCHG 361.67 356.39 351.92 347.90 344.12 340.71 337.71 334.95 332.24 329.47		
16.00	DISCHG 326.59 323.71 320.96 318.47 316.27 314.32 312.42 310.32 307.89 305.10		
17.00	DISCHG 301.81 297.84 293.34 288.97 285.17 281.90 278.94 276.08 273.18 270.30		
18.00	DISCHG 267.69 265.63 264.08 262.74 261.29 259.70 258.01 256.29 254.63 253.09		
19.00	DISCHG 251.67 250.24 248.61 246.70 244.63 242.76 241.32 240.30 239.54 238.88		
20.00	DISCHG 238.05 236.83 235.28 233.71 232.25 230.78 229.27 227.92 226.77 225.45		
21.00	DISCHG 223.80 222.04 220.51 219.29 218.34 217.40 216.24 214.81 213.21 211.62		
22.00	DISCHG 210.29 209.43 208.97 208.46 207.57 206.35 204.91 203.35 201.76 200.25		
23.00	DISCHG 198.86 197.53 196.24 193.60 189.72 185.34 180.78 173.89 162.24 153.62		
24.00	DISCHG 148.76 147.98 150.41 152.07 150.13 144.73 137.17 128.08 118.27 109.07		
25.00	DISCHG 100.68 92.81 85.09 77.46 69.86 62.92 56.59 49.70 42.91 37.41		
26.00	DISCHG 33.42 30.55 28.38 26.66 25.23 23.89 22.60 21.42 20.34 19.33		
27.00	DISCHG 18.39 17.50 16.66 15.86 15.10 14.38 13.69 13.03 12.40 11.81		
28.00	DISCHG 11.25 10.71 10.20 9.72 9.26 8.82 8.41 8.01 7.63 7.27		
29.00	DISCHG 6.92 6.60 6.28 5.99 5.70 5.43 5.18 4.93 4.70 4.47		

RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 4499.30 CFS-HRS, 371.82 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1
SURFACE ELEVATION= 59.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.90	951.45	64.40
24.33	151.61	60.40

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 2.60 SQ.MI.
8.00	DISCHG .00 .00 .02 .04 .09 .16 .26 .40 .58 .81		
8.00	ELEV 59.00 59.00 59.00 59.00 59.00 59.00 59.00 59.00 59.01 59.01		
9.00	DISCHG 1.13 1.55 2.11 2.84 3.73 4.79 6.02 7.42 9.02 10.84		
9.00	ELEV 59.01 59.01 59.02 59.03 59.03 59.04 59.06 59.07 59.08 59.10		
10.00	DISCHG 12.94 15.31 17.97 20.94 24.25 27.94 32.05 36.62 41.68 47.29		
10.00	ELEV 59.12 59.14 59.17 59.19 59.22 59.26 59.30 59.34 59.38 59.44		
11.00	DISCHG 53.43 60.11 67.49 75.90 85.61 96.74 109.53 125.05 144.51 173.48		

11.00	ELEV	59.49	59.55	59.62	59.70	59.79	59.89	60.01	60.15	60.33	60.60
12.00	DISCHG	223.28	294.13	402.44	538.39	703.84	828.79	936.86	944.96	949.51	951.45
12.00	ELEV	61.06	61.52	62.11	62.79	63.51	63.86	64.13	64.25	64.36	64.40
13.00	DISCHG	949.75	944.27	881.87	773.20	700.95	636.10	594.66	563.20	532.06	504.60
13.00	ELEV	64.36	64.24	63.99	63.72	63.50	63.24	63.06	62.91	62.76	62.62
14.00	DISCHG	481.03	459.26	442.23	428.01	415.84	405.13	395.41	386.61	378.80	371.82

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14.00	ELEV	62.51	62.40	62.31	62.24	62.18	62.13	62.08	62.03	61.99	61.96
15.00	DISCHG	365.47	359.74	354.55	350.23	346.31	342.69	339.45	336.55	333.80	331.06
15.00	ELEV	61.93	61.90	61.87	61.84	61.82	61.80	61.78	61.77	61.75	61.73
16.00	DISCHG	328.24	325.36	322.55	319.91	317.55	315.45	313.51	311.52	309.27	306.69
16.00	ELEV	61.72	61.70	61.68	61.67	61.66	61.64	61.63	61.62	61.61	61.59
17.00	DISCHG	303.68	300.09	295.91	291.49	287.38	283.80	280.65	277.73	274.84	271.95
17.00	ELEV	61.58	61.56	61.53	61.51	61.48	61.46	61.44	61.43	61.41	61.39
18.00	DISCHG	269.20	266.84	264.99	263.52	262.12	260.61	258.98	257.28	255.59	253.98
18.00	ELEV	61.38	61.36	61.35	61.35	61.34	61.33	61.32	61.31	61.30	61.29
19.00	DISCHG	252.49	251.06	249.54	247.79	245.82	243.84	242.16	240.90	239.99	239.13
19.00	ELEV	61.28	61.27	61.26	61.25	61.24	61.23	61.22	61.22	61.21	61.20
20.00	DISCHG	238.39	237.34	235.91	234.34	232.83	231.37	229.87	228.45	227.22	225.99
20.00	ELEV	61.20	61.19	61.17	61.16	61.14	61.13	61.12	61.10	61.09	61.08
21.00	DISCHG	224.47	222.74	221.11	219.76	218.71	217.77	216.71	215.39	213.86	212.25
21.00	ELEV	61.07	61.05	61.04	61.02	61.01	61.01	61.00	60.98	60.97	60.95
22.00	DISCHG	210.81	209.75	209.14	208.67	207.94	206.84	205.49	203.98	202.40	200.85
22.00	ELEV	60.94	60.93	60.93	60.92	60.91	60.90	60.89	60.88	60.86	60.85
23.00	DISCHG	199.41	198.05	196.75	194.71	191.31	187.10	182.60	176.74	167.08	156.90
23.00	ELEV	60.84	60.82	60.81	60.79	60.76	60.72	60.68	60.63	60.54	60.44
24.00	DISCHG	150.55	148.12	149.32	151.46	151.06	147.02	140.27	131.76	122.20	112.70
24.00	ELEV	60.39	60.36	60.37	60.39	60.39	60.35	60.29	60.21	60.13	60.04
25.00	DISCHG	103.99	95.93	88.16	80.50	72.89	65.66	59.08	52.47	45.61	39.55
25.00	ELEV	59.96	59.88	59.81	59.74	59.67	59.60	59.54	59.48	59.42	59.36
26.00	DISCHG	34.95	31.65	29.21	27.32	25.79	24.42	23.11	21.88	20.76	19.73
26.00	ELEV	59.32	59.29	59.27	59.25	59.24	59.22	59.21	59.20	59.19	59.18
27.00	DISCHG	18.77	17.85	16.99	16.17	15.40	14.66	13.96	13.29	12.65	12.05
27.00	ELEV	59.17	59.16	59.16	59.15	59.14	59.14	59.13	59.12	59.12	59.11
28.00	DISCHG	11.47	10.92	10.41	9.91	9.44	9.00	8.57	8.17	7.78	7.41
28.00	ELEV	59.11	59.10	59.10	59.09	59.09	59.08	59.08	59.08	59.07	59.07
29.00	DISCHG	7.06	6.73	6.41	6.10	5.82	5.54	5.28	5.03	4.79	4.56
29.00	ELEV	59.07	59.06	59.06	59.06	59.05	59.05	59.05	59.05	59.04	59.04

RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 4497.46 CFS-HRS, 371.67 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 22

OUTPUT HYDROGRAPH= 2

AREA= .91 SQ MI INPUT RUNOFF CURVE= 61. TIME OF CONCENTRATION= 1.01 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0962 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.76	451.09	(RUNOFF)
20.01	29.52	(RUNOFF)
22.44	24.48	(RUNOFF)
24.44	27.13	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.91 SQ.MI.
10.00	DISCHG	.00	.00	.00	.01	.04
11.00	DISCHG	.38	.84	1.63	2.83	4.54
12.00	DISCHG	55.69	92.09	146.83	216.91	294.05

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13.00	DISCHG	399.73	361.26	322.07	287.25	257.59	232.44	211.00	192.37	176.26	162.30
14.00	DISCHG	150.34	140.16	131.56	124.24	117.93	112.40	107.41	102.84	98.70	94.96
15.00	DISCHG	91.46	88.15	85.20	82.66	80.42	78.41	76.67	75.16	73.79	72.38
16.00	DISCHG	70.89	69.37	67.91	66.54	65.30	64.17	63.12	62.06	60.87	59.43
17.00	DISCHG	57.67	55.59	53.21	50.72	48.41	46.43	44.72	43.17	41.67	40.29
18.00	DISCHG	39.10	38.11	37.36	36.81	36.29	35.77	35.22	34.64	34.06	33.48
19.00	DISCHG	32.97	32.50	32.00	31.42	30.75	30.10	29.64	29.41	29.39	29.47
20.00	DISCHG	29.51	29.48	29.30	28.92	28.50	28.13	27.77	27.43	27.18	26.98
21.00	DISCHG	26.68	26.26	25.85	25.60	25.49	25.42	25.27	25.03	24.71	24.38
22.00	DISCHG	24.14	24.03	24.12	24.32	24.47	24.45	24.26	23.96	23.58	23.17
23.00	DISCHG	22.78	22.49	22.28	22.13	22.00	21.91	21.78	21.48	20.91	20.35

24.00	DISCHG	20.31	21.17	23.12	25.52	27.00	26.83	25.23	22.62	19.37	15.68
25.00	DISCHG	12.10	9.33	7.29	5.76	4.53	3.55	2.79	2.19	1.71	1.33
26.00	DISCHG	1.04	.81	.64	.49	.38	.29	.22	.17	.13	.10
27.00	DISCHG	.07	.04	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 1.83 WATERSHED INCHES, 1068.19 CFS-HRS, 88.28 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 23

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 6300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .54 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
13.14	945.53	(NULL)
24.45	151.12	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 4498.70 CFS-HRS, 371.77 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 23

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.89	1356.57	(NULL)
24.44	178.25	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 3.51 SQ.MI.
8.00	DISCHG .00 .00 .01 .03 .06 .11 .19 .30 .45		
9.00	DISCHG .64 .90 1.25 1.72 2.33 3.09 4.01 5.10 6.36 7.80		
10.00	DISCHG 9.45 11.34 13.49 15.92 18.64 21.69 25.08 28.87 33.11 37.88		
11.00	DISCHG 43.30 49.47 56.49 64.54 73.96 85.09 98.33 114.36 134.98 164.09		
12.00	DISCHG 209.44 283.58 394.03 548.38 737.83 950.92 1136.79 1283.41 1345.04 1356.41		
13.00	DISCHG 1338.97 1306.21 1266.64 1197.78 1093.58 995.13 904.98 832.43 774.60 724.66		
14.00	DISCHG 681.35 644.04 611.23 583.59 560.27 540.35 522.97 507.47 493.55 481.09		
15.00	DISCHG 469.83 459.52 450.25 442.01 434.82 428.41 422.70 417.63 413.04 408.67		
16.00	DISCHG 404.34 400.00 395.67 391.47 387.51 383.85 380.50 377.34 374.11 370.51		
17.00	DISCHG 366.37 361.56 355.99 349.77 343.36 337.27 331.74 326.73 322.06 317.67		
18.00	DISCHG 313.54 309.70 306.37 303.64 301.33 299.22 297.13 294.96 292.73 290.48		

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19.00	DISCHG	288.33	286.30	284.31	282.22	279.92	277.45	275.08	273.07	271.56	270.45
20.00	DISCHG	269.49	268.60	267.45	265.86	264.03	262.19	260.37	258.55	256.85	255.32
21.00	DISCHG	253.74	251.91	249.93	248.06	246.49	245.18	243.95	242.64	241.11	239.40
22.00	DISCHG	237.66	236.08	234.91	234.22	233.70	232.98	231.88	230.42	228.70	226.81
23.00	DISCHG	224.91	223.14	221.52	220.01	218.17	215.44	211.82	207.48	201.89	193.79
24.00	DISCHG	184.77	178.08	175.26	176.13	178.07	177.89	174.10	166.82	156.81	144.85
25.00	DISCHG	132.33	120.74	110.30	100.71	91.64	82.93	74.72	67.15	59.89	52.68
26.00	DISCHG	45.98	40.33	35.88	32.47	29.83	27.75	26.03	24.52	23.14	21.89
27.00	DISCHG	20.74	19.68	18.68	17.76	16.90	16.08	15.31	14.58	13.88	13.21
28.00	DISCHG	12.58	11.98	11.40	10.86	10.35	9.86	9.39	8.94	8.52	8.12
29.00	DISCHG	7.73	7.37	7.02	6.69	6.37	6.07	5.78	5.51	5.25	5.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.46 WATERSHED INCHES, 5566.89 CFS-HRS, 460.05 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 24

OUTPUT HYDROGRAPH= 5

AREA= .15 SQ MI INPUT RUNOFF CURVE= 67. TIME OF CONCENTRATION= .47 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0627 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.38	143.40	(RUNOFF)
17.45	7.45	(RUNOFF)
18.18	6.68	(RUNOFF)
23.45	3.96	(RUNOFF)
24.20	8.78	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .15 SQ.MI.
9.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .02 .07		
10.00	DISCHG .18 .34 .56 .81 1.11 1.45 1.83 2.25 2.72 3.23		
11.00	DISCHG 3.84 4.52 5.26 6.13 7.24 8.71 10.49 13.23 18.35 28.65		
12.00	DISCHG 49.97 80.34 113.33 137.71 142.85 128.50 105.77 83.21 65.79 53.19		
13.00	DISCHG 44.72 38.62 34.37 31.09 28.49 26.27 24.26 22.56 21.33 20.48		
14.00	DISCHG 19.82 19.20 18.71 18.24 17.57 16.77 16.21 15.94 15.50 14.85		
15.00	DISCHG 14.40 14.24 14.09 13.81 13.50 13.28 13.16 13.02 12.73 12.30		
16.00	DISCHG 11.90 11.62 11.48 11.39 11.35 11.25 10.98 10.55 10.15 9.71		

17.00	DISCHG	9.00	8.12	7.54	7.36	7.42	7.42	7.20	6.80	6.40	6.22
18.00	DISCHG	6.33	6.60	6.68	6.51	6.25	6.05	5.94	5.87	5.84	5.82
19.00	DISCHG	5.80	5.72	5.44	5.08	4.95	5.09	5.34	5.54	5.65	5.64
20.00	DISCHG	5.41	5.07	4.94	5.02	4.99	4.84	4.82	4.94	4.96	4.73
21.00	DISCHG	4.44	4.31	4.46	4.75	4.84	4.68	4.41	4.21	4.10	4.12
22.00	DISCHG	4.35	4.70	4.82	4.67	4.41	4.21	4.10	4.04	4.00	3.98
23.00	DISCHG	3.96	3.96	3.95	3.95	3.95	3.95	3.92	3.63	2.88	2.62
24.00	DISCHG	4.31	7.51	8.78	7.24	4.70	2.70	1.63	.96	.57	.34
25.00	DISCHG	.20	.12	.07	.04	.01	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.33 WATERSHED INCHES, 219.40 CFS-HRS, 18.13 ACRE-FEET; BASEFLOW = .00 CFS

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INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
LENGTH = 1300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 25 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.89	1356.57	(NULL)
24.44	178.25	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.46 WATERSHED INCHES, 5566.89 CFS-HRS, 460.05 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 25

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.85	1415.91	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 3.65 SQ.MI.
8.00	DISCHG .00 .00 .00 .01 .03 .06 .11 .19 .30 .45		
9.00	DISCHG .64 .90 1.25 1.72 2.33 3.09 4.01 5.10 6.37 7.87		
10.00	DISCHG 9.63 11.68 14.05 16.73 19.75 23.14 26.91 31.12 35.83 41.11		
11.00	DISCHG 47.14 53.99 61.75 70.67 81.20 93.80 108.82 127.59 153.34 192.74		
12.00	DISCHG 259.41 363.92 507.36 686.09 880.69 1079.42 1242.55 1366.62 1410.83 1409.60		
13.00	DISCHG 1383.69 1344.83 1301.01 1228.88 1122.07 1021.40 929.24 855.00 795.93 745.15		
14.00	DISCHG 701.16 663.24 629.93 601.83 577.84 557.12 539.18 523.40 509.05 495.94		
15.00	DISCHG 484.23 473.76 464.34 455.82 448.32 441.69 435.86 430.65 425.77 420.97		
16.00	DISCHG 416.24 411.62 407.15 402.86 398.86 395.10 391.48 387.89 384.25 380.22		
17.00	DISCHG 375.37 369.69 363.53 357.12 350.78 344.69 338.93 333.53 328.47 323.88		
18.00	DISCHG 319.87 316.30 313.05 310.15 307.57 305.27 303.06 300.83 298.56 296.30		
19.00	DISCHG 294.13 292.02 289.75 287.30 284.87 282.55 280.43 278.61 277.21 276.09		
20.00	DISCHG 274.90 273.67 272.39 270.88 269.02 267.03 265.19 263.49 261.81 260.05		
21.00	DISCHG 258.18 256.22 254.39 252.81 251.33 249.85 248.36 246.85 245.21 243.52		
22.00	DISCHG 242.01 240.77 239.74 238.89 238.11 237.19 235.98 234.46 232.70 230.79		
23.00	DISCHG 228.87 227.10 225.48 223.97 222.12 219.39 215.74 211.12 204.77 196.41		
24.00	DISCHG 189.08 185.58 184.04 183.37 182.77 180.59 175.73 167.78 157.38 145.18		
25.00	DISCHG 132.53 120.86 110.37 100.75 91.65 82.93 74.72 67.15 59.89 52.68		
26.00	DISCHG 45.98 40.33 35.88 32.47 29.83 27.75 26.03 24.52 23.14 21.89		
27.00	DISCHG 20.74 19.68 18.68 17.76 16.90 16.08 15.31 14.58 13.88 13.21		
28.00	DISCHG 12.58 11.98 11.40 10.86 10.35 9.86 9.39 8.94 8.52 8.12		
29.00	DISCHG 7.73 7.37 7.02 6.69 6.37 6.07 5.78 5.51 5.25 5.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.45 WATERSHED INCHES, 5786.29 CFS-HRS, 478.18 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 26

OUTPUT HYDROGRAPH= 1
AREA= .43 SQ MI INPUT RUNOFF CURVE= 73. TIME OF CONCENTRATION= .60 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0800 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.44	476.51	(RUNOFF)

18.22	21.72	(RUNOFF)
19.88	18.31	(RUNOFF)
20.76	16.16	(RUNOFF)
21.43	15.48	(RUNOFF)
22.26	15.25	(RUNOFF)
24.26	22.24	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .43 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.06	.16	.37
9.00	DISCHG	.69	1.12	1.62	2.16	2.74	3.37	4.04	4.76	5.55	6.40
10.00	DISCHG	7.29	8.22	9.22	10.33	11.55	12.95	14.48	16.14	17.92	19.90
11.00	DISCHG	22.12	24.64	27.37	30.53	34.41	39.37	45.34	54.38	69.82	99.51
12.00	DISCHG	152.48	236.96	334.46	421.51	472.70	464.20	418.19	353.09	287.62	235.66
13.00	DISCHG	195.51	165.40	142.82	126.14	113.06	102.36	93.33	85.78	79.54	74.64
14.00	DISCHG	70.78	67.81	65.46	63.39	61.21	58.78	56.62	54.93	53.33	51.56
15.00	DISCHG	49.95	48.75	47.85	46.98	46.06	45.16	44.45	43.87	43.08	41.97
16.00	DISCHG	40.73	39.65	38.84	38.31	37.98	37.61	36.97	35.94	34.75	33.35
17.00	DISCHG	31.51	29.22	27.06	25.71	25.05	24.78	24.34	23.40	22.32	21.45
18.00	DISCHG	21.14	21.45	21.72	21.58	21.11	20.48	19.96	19.62	19.41	19.28
19.00	DISCHG	19.16	18.94	18.39	17.56	16.93	16.84	17.17	17.71	18.16	18.30
20.00	DISCHG	17.99	17.31	16.76	16.57	16.43	16.19	16.04	16.10	16.13	15.82
21.00	DISCHG	15.26	14.73	14.64	15.09	15.46	15.38	14.93	14.32	13.83	13.67
22.00	DISCHG	13.97	14.65	15.18	15.21	14.84	14.27	13.78	13.47	13.27	13.14
23.00	DISCHG	13.05	12.99	12.95	12.93	12.92	12.91	12.90	12.56	11.53	10.54
24.00	DISCHG	11.97	17.11	21.61	21.95	18.74	13.47	8.81	5.79	3.84	2.56
25.00	DISCHG	1.71	1.12	.74	.49	.32	.21	.14	.09	.04	.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.86 WATERSHED INCHES, 795.02 CFS-HRS, 65.70 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 27
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2
 LENGTH = 800.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 27 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.85	1415.91	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.45 WATERSHED INCHES, 5786.29 CFS-HRS, 478.18 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 27
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 7

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.72	1721.92	(NULL)
24.24	205.91	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 4.08 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.01	.03	.06	.12	.25	.46	.82
9.00	DISCHG	1.34	2.03	2.88	3.88	5.07	6.46	8.05	9.86	11.92	14.26
10.00	DISCHG	16.92	19.91	23.27	27.06	31.31	36.09	41.39	47.26	53.74	61.01
11.00	DISCHG	69.26	78.64	89.13	101.20	115.61	133.16	154.16	181.98	223.16	292.25
12.00	DISCHG	411.89	600.88	841.82	1107.60	1353.39	1543.62	1660.74	1719.71	1698.45	1645.26
13.00	DISCHG	1579.20	1510.22	1443.82	1355.01	1235.13	1123.76	1022.57	940.77	875.47	819.79
14.00	DISCHG	771.95	731.05	695.39	665.22	639.05	615.90	595.81	578.34	562.39	547.50
15.00	DISCHG	534.18	522.51	512.19	502.80	494.38	486.86	480.32	474.52	468.85	462.94
16.00	DISCHG	456.97	451.27	445.99	441.18	436.83	432.71	428.45	423.83	419.00	413.57
17.00	DISCHG	406.88	398.90	390.60	382.83	375.83	369.47	363.27	356.93	350.79	345.33
18.00	DISCHG	341.01	337.75	334.77	331.73	328.68	325.75	323.02	320.46	317.97	315.57
19.00	DISCHG	313.29	310.95	308.14	304.85	301.81	299.38	297.60	296.33	295.37	294.39
20.00	DISCHG	292.89	290.98	289.15	287.44	285.46	283.22	281.23	279.59	277.94	275.87
21.00	DISCHG	273.44	270.94	269.03	267.90	266.78	265.23	263.30	261.17	259.04	257.19
22.00	DISCHG	255.98	255.43	254.92	254.10	252.95	251.46	249.76	247.93	245.96	243.92
23.00	DISCHG	241.92	240.09	238.43	236.90	235.03	232.30	228.65	223.67	216.30	206.95
24.00	DISCHG	201.05	202.69	205.65	205.32	201.50	194.07	184.53	173.57	161.23	147.75
25.00	DISCHG	134.23	121.98	111.10	101.24	91.97	83.15	74.86	67.24	59.93	52.69
26.00	DISCHG	45.98	40.33	35.88	32.47	29.83	27.75	26.03	24.52	23.14	21.89
27.00	DISCHG	20.74	19.68	18.68	17.76	16.90	16.08	15.31	14.58	13.88	13.21
28.00	DISCHG	12.58	11.98	11.40	10.86	10.35	9.86	9.39	8.94	8.52	8.12
29.00	DISCHG	7.73	7.37	7.02	6.69	6.37	6.07	5.78	5.51	5.25	5.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.50 WATERSHED INCHES, 6581.31 CFS-HRS, 543.88 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 28

OUTPUT HYDROGRAPH= 1

AREA= .04 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .38 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0507 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.29	63.78	(RUNOFF)
15.07	4.74	(RUNOFF)
24.14	3.22	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.04 SQ.MI.
6.00	DISCHG	.00	.00	.00	.00	.01
7.00	DISCHG	.02	.04	.07	.09	.38
8.00	DISCHG	.44	.49	.54	.59	.94
9.00	DISCHG	1.05	1.17	1.25	1.30	1.94
10.00	DISCHG	2.06	2.17	2.32	2.49	3.90
11.00	DISCHG	4.24	4.62	4.99	5.42	19.34
12.00	DISCHG	32.10	47.07	59.05	63.76	16.01

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13.00	DISCHG	13.58	11.92	10.74	9.84	9.09	8.45	7.83	7.33	7.00	6.79
14.00	DISCHG	6.57	6.36	6.22	6.07	5.76	5.45	5.33	5.30	5.08	4.80
15.00	DISCHG	4.71	4.74	4.66	4.52	4.41	4.36	4.34	4.29	4.14	3.96
16.00	DISCHG	3.84	3.78	3.74	3.73	3.72	3.67	3.54	3.36	3.23	3.08
17.00	DISCHG	2.78	2.46	2.33	2.37	2.42	2.41	2.29	2.12	2.00	1.98
18.00	DISCHG	2.09	2.20	2.18	2.07	1.97	1.93	1.90	1.89	1.88	1.88
19.00	DISCHG	1.88	1.84	1.69	1.55	1.57	1.68	1.78	1.82	1.85	1.82
20.00	DISCHG	1.69	1.56	1.57	1.64	1.60	1.51	1.55	1.63	1.59	1.47
21.00	DISCHG	1.37	1.36	1.47	1.59	1.57	1.46	1.36	1.31	1.29	1.32
22.00	DISCHG	1.45	1.58	1.57	1.45	1.36	1.31	1.29	1.27	1.27	1.26
23.00	DISCHG	1.26	1.26	1.26	1.26	1.26	1.26	1.25	1.10	.76	.73
24.00	DISCHG	1.83	3.10	3.00	1.93	1.01	.53	.28	.14	.08	.04
25.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 3.64 WATERSHED INCHES, 89.24 CFS-HRS, 7.37 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 29

OUTPUT HYDROGRAPH= 2

AREA= .01 SQ MI INPUT RUNOFF CURVE= 84. TIME OF CONCENTRATION= .24 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.21	25.87	(RUNOFF)
24.07	1.55	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
6.00	DISCHG	.01	.02	.02	.03	.07
7.00	DISCHG	.09	.10	.12	.13	.29
8.00	DISCHG	.30	.32	.34	.37	.49
9.00	DISCHG	.57	.62	.62	.63	.91
10.00	DISCHG	.95	1.00	1.07	1.14	1.73
11.00	DISCHG	1.90	2.04	2.17	2.39	10.71
12.00	DISCHG	18.38	23.36	25.86	24.05	4.37
13.00	DISCHG	3.93	3.65	3.40	3.19	2.34
14.00	DISCHG	2.24	2.19	2.17	2.09	1.62
15.00	DISCHG	1.67	1.68	1.60	1.55	1.34
16.00	DISCHG	1.32	1.32	1.31	1.31	1.02
17.00	DISCHG	.83	.76	.82	.86	.70
18.00	DISCHG	.80	.81	.73	.69	.66
19.00	DISCHG	.66	.62	.53	.51	.62
20.00	DISCHG	.53	.51	.59	.60	.47
21.00	DISCHG	.45	.49	.58	.59	.48
22.00	DISCHG	.58	.59	.52	.47	.44
23.00	DISCHG	.44	.44	.44	.44	.38
24.00	DISCHG	1.33	1.51	.73	.26	

RUNOFF VOLUME ABOVE BASEFLOW = 3.95 WATERSHED INCHES, 33.12 CFS-HRS, 2.74 ACRE-Feet; BASEFLOW = .00 CFS

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OPERATION REACH CROSS SECTION 30

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 30 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.29	63.78	(NULL)
15.07	4.74	(NULL)
24.14	3.22	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.64 WATERSHED INCHES, 89.24 CFS-HRS, 7.37 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 30

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.27	88.61	(NULL)
15.06	6.43	(NULL)
24.11	4.62	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .05 SQ.MI.
6.00	DISCHG .01 .02 .03 .04 .05 .06 .08		
7.00	DISCHG .11 .15 .18 .21 .25 .30 .36		
8.00	DISCHG .74 .81 .88 .95 1.01 1.10 1.22		
9.00	DISCHG 1.62 1.78 1.86 1.94 2.07 2.21 2.34		
10.00	DISCHG 3.00 3.17 3.38 3.63 3.92 4.22 4.54		
11.00	DISCHG 6.14 6.66 7.16 7.81 8.90 10.12 11.53		
12.00	DISCHG 50.48 70.43 84.90 87.81 74.80 57.95 42.49		
13.00	DISCHG 17.51 15.57 14.13 13.04 12.06 11.22 10.38		
14.00	DISCHG 8.81 8.55 8.39 8.16 7.66 7.28 7.22		
15.00	DISCHG 6.39 6.41 6.26 6.07 5.95 5.89 5.86		
16.00	DISCHG 5.16 5.09 5.06 5.04 5.03 4.95 4.72		
17.00	DISCHG 3.60 3.22 3.15 3.23 3.29 3.25 3.03		
18.00	DISCHG 2.88 3.01 2.92 2.76 2.64 2.59 2.56		
19.00	DISCHG 2.54 2.46 2.22 2.06 2.16 2.32 2.43		
20.00	DISCHG 2.22 2.07 2.16 2.24 2.12 2.02 2.14		
21.00	DISCHG 1.82 1.85 2.05 2.18 2.08 1.92 1.81		
22.00	DISCHG 2.03 2.18 2.08 1.92 1.81 1.76 1.73		
23.00	DISCHG 1.71 1.71 1.70 1.71 1.71 1.71 1.69		
24.00	DISCHG 3.16 4.61 3.73 2.19 1.11 .57 .29		
25.00	DISCHG .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.72 WATERSHED INCHES, 122.36 CFS-HRS, 10.11 ACRE-Feet; BASEFLOW = .00 CFS

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OPERATION RUNOFF CROSS SECTION 31

OUTPUT HYDROGRAPH= 5

AREA= .30 SQ MI INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .71 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0947 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.49	380.15	(RUNOFF)
18.21	16.79	(RUNOFF)
19.92	13.97	(RUNOFF)
21.47	11.79	(RUNOFF)
22.31	11.51	(RUNOFF)
24.31	15.00	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .30 SQ.MI.
7.00	DISCHG .00 .01 .02 .07 .14 .25 .41		
8.00	DISCHG 1.61 1.99 2.37 2.75 3.14 3.53 3.96		
9.00	DISCHG 5.83 6.41 7.02 7.63 8.23 8.86 9.50		
10.00	DISCHG 12.58 13.46 14.38 15.40 16.52 17.78 19.17		
11.00	DISCHG 26.08 28.29 30.72 33.47 36.75 40.81 45.99		
12.00	DISCHG 123.32 179.17 248.81 316.47 365.85 380.07 361.25		
13.00	DISCHG 190.26 160.56 137.56 119.63 105.50 94.11 84.77		
14.00	DISCHG 61.18 57.75 54.94 52.57 50.39 48.25 46.34		
15.00	DISCHG 40.43 39.33 38.38 37.52 36.74 36.03 35.37		
16.00	DISCHG 32.52 31.67 30.93 30.36 29.95 29.58 29.12		

TIME	DISCHG	25.38	23.88	22.36	21.13	20.29	19.74	19.29	18.72	17.96	17.26
17.00	DISCHG	16.82	16.72	16.79	16.74	16.52	16.18	15.79	15.45	15.21	15.05
18.00	DISCHG	14.92	14.75	14.43	13.96	13.48	13.24	13.28	13.49	13.78	13.97
19.00	DISCHG	13.89	13.58	13.23	12.97	12.79	12.61	12.49	12.46	12.42	12.24
20.00	DISCHG	11.94	11.63	11.45	11.53	11.74	11.78	11.60	11.29	10.94	10.71
21.00	DISCHG	10.76	11.04	11.36	11.51	11.42	11.18	10.86	10.56	10.35	10.21
22.00	DISCHG	10.11	10.05	10.00	9.96	9.94	9.92	9.87	9.59	8.98	8.44
23.00	DISCHG	8.99	11.11	13.71	14.98	14.29	12.16	9.22	6.45	4.49	3.20
24.00	DISCHG	2.27	1.61	1.14	.80	.57	.40	.28	.19	.14	.10
25.00	DISCHG	.07	.04	.01	.00						
26.00	DISCHG										

RUNOFF VOLUME ABOVE BASEFLOW = 3.54 WATERSHED INCHES, 687.66 CFS-HRS, 56.83 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 6
 SURFACE ELEVATION= 48.30

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.92	222.38	62.49
18.26	16.79	49.89
19.94	13.97	49.62
21.49	11.79	49.41
22.33	11.51	49.39
24.33	14.97	49.71

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TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .30 SQ.MI.
7.00	DISCHG .00 .02 .06 .12 .23 .38 .60 .87 1.20		
7.00	ELEV 48.30 48.30 48.30 48.31 48.31 48.32 48.34 48.36 48.38 48.41		
8.00	DISCHG 1.55 1.93 2.31 2.69 3.07 3.47 3.89 4.34 4.81 5.27		
8.00	ELEV 48.45 48.48 48.52 48.55 48.59 48.63 48.67 48.71 48.75 48.80		
9.00	DISCHG 5.75 6.31 6.92 7.53 8.13 8.76 9.40 10.07 10.80 11.60		
9.00	ELEV 48.84 48.90 48.95 49.01 49.07 49.13 49.19 49.25 49.32 49.40		
10.00	DISCHG 12.44 13.31 14.23 15.23 16.33 17.57 18.55 19.78 21.32 23.01		
10.00	ELEV 49.47 49.56 49.64 49.74 49.84 49.96 50.03 50.08 50.15 50.23		
11.00	DISCHG 24.87 26.93 29.22 31.79 34.75 38.34 42.34 47.67 56.06 67.09		
11.00	ELEV 50.31 50.41 50.51 50.63 50.76 50.92 51.09 51.31 51.64 52.09		
12.00	DISCHG 77.59 94.97 116.44 134.45 155.01 176.69 195.99 210.46 219.14 222.29		
12.00	ELEV 52.53 53.32 54.43 55.73 57.31 58.98 60.46 61.57 62.24 62.48		
13.00	DISCHG 220.98 216.44 209.74 201.67 192.80 183.55 174.19 164.90 155.84 147.10		
13.00	ELEV 62.38 62.03 61.52 60.90 60.22 59.50 58.78 58.07 57.37 56.70		
14.00	DISCHG 138.76 130.87 123.13 114.80 104.63 91.91 81.37 72.05 62.84 47.95		
14.00	ELEV 56.06 55.45 54.88 54.32 53.76 53.18 52.70 52.29 51.91 51.32		
15.00	DISCHG 42.94 40.70 39.21 38.08 37.23 36.48 35.78 35.15 34.54 33.86		
15.00	ELEV 51.12 51.03 50.96 50.91 50.87 50.84 50.81 50.78 50.75 50.72		
16.00	DISCHG 33.06 32.20 31.40 30.73 30.21 29.81 29.40 28.86 28.14 27.24		
16.00	ELEV 50.68 50.65 50.61 50.58 50.56 50.54 50.52 50.49 50.46 50.42		
17.00	DISCHG 26.14 24.79 23.30 21.92 20.84 20.10 19.58 19.07 18.42 17.48		
17.00	ELEV 50.37 50.31 50.24 50.18 50.13 50.10 50.07 50.05 50.02 49.95		
18.00	DISCHG 16.81 16.75 16.76 16.77 16.56 16.24 15.85 15.50 15.24 15.07		
18.00	ELEV 49.89 49.88 49.88 49.88 49.86 49.83 49.80 49.76 49.74 49.72		
19.00	DISCHG 14.94 14.78 14.49 14.04 13.55 13.26 13.26 13.45 13.73 13.95		
19.00	ELEV 49.71 49.70 49.67 49.63 49.58 49.55 49.55 49.57 49.60 49.62		
20.00	DISCHG 13.92 13.65 13.28 13.01 12.82 12.63 12.50 12.46 12.43 12.28		
20.00	ELEV 49.61 49.59 49.55 49.53 49.51 49.49 49.48 49.48 49.47 49.46		
21.00	DISCHG 11.99 11.67 11.47 11.50 11.70 11.79 11.64 11.35 10.99 10.74		
21.00	ELEV 49.43 49.40 49.38 49.39 49.41 49.41 49.40 49.37 49.34 49.31		
22.00	DISCHG 10.74 10.99 11.31 11.50 11.45 11.23 10.91 10.61 10.38 10.23		
22.00	ELEV 49.31 49.34 49.37 49.39 49.38 49.36 49.33 49.30 49.28 49.27		
23.00	DISCHG 10.13 10.05 10.00 9.97 9.94 9.92 9.88 9.65 9.09 8.51		
23.00	ELEV 49.26 49.25 49.24 49.24 49.24 49.23 49.21 49.16 49.16 49.10		
24.00	DISCHG 8.82 10.68 13.30 14.88 14.51 12.57 9.72 6.86 4.75 3.38		
24.00	ELEV 49.13 49.31 49.56 49.71 49.67 49.49 49.22 48.95 48.75 48.62		
25.00	DISCHG 2.41 1.70 1.21 .85 .60 .42 .30 .21 .14 .10		
25.00	ELEV 48.53 48.46 48.41 48.38 48.36 48.34 48.33 48.32 48.31 48.31		
26.00	DISCHG .07 .04 .02 .00		
26.00	ELEV 48.31 48.30 48.30 48.30		

RUNOFF VOLUME ABOVE BASEFLOW = 3.54 WATERSHED INCHES, 687.57 CFS-HRS, 56.82 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 32
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1
 LENGTH = 4200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .54 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.12	218.70	(NULL)
20.09	13.86	(NULL)
22.49	11.39	(NULL)
24.49	14.00	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.54 WATERSHED INCHES, 687.73 CFS-HRS, 56.83 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 32
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 2
LENGTH = 4200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.40, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .56 PEAK TRAVEL TIME = .13 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.42	81.18	(NULL)
24.26	3.73	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.72 WATERSHED INCHES, 122.34 CFS-HRS, 10.11 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 32
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.99	241.47	(NULL)
20.02	16.25	(NULL)
22.43	13.32	(NULL)
24.42	16.28	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	TIME INCREMENT =	DRAINAGE AREA =
6.00	DISCHG .00 .00 .01 .02 .02 .03 .04 .05 .05 .35 SQ.MI.		
7.00	DISCHG .07 .09 .12 .16 .22 .30 .43 .62 .88 1.20		
8.00	DISCHG 1.56 1.96 2.38 2.82 3.26 3.71 4.17 4.68 5.21 5.73		
9.00	DISCHG 6.26 6.86 7.53 8.21 8.89 9.60 10.34 11.10 11.88 12.74		
10.00	DISCHG 13.67 14.63 15.63 16.70 17.87 19.16 20.58 21.94 23.41 25.11		
11.00	DISCHG 27.02 29.18 31.57 34.17 37.11 40.66 44.89 49.77 56.31 66.82		
12.00	DISCHG 83.38 107.90 139.42 173.26 199.91 215.91 225.65 232.14 237.19 240.46		
13.00	DISCHG 241.45 239.71 235.47 229.15 221.32 212.42 202.88 192.99 183.09 173.45		
14.00	DISCHG 164.16 155.21 146.70 138.52 130.13 120.51 109.02 98.01 87.88 78.03		
15.00	DISCHG 65.28 56.68 51.53 48.26 46.04 44.50 43.35 42.43 41.62 40.78		
16.00	DISCHG 39.90 38.99 38.07 37.20 36.43 35.79 35.23 34.63 33.93 33.14		
17.00	DISCHG 32.17 30.85 29.31 27.76 26.35 25.16 24.18 23.33 22.54 21.75		
18.00	DISCHG 20.90 20.25 19.99 19.82 19.66 19.41 19.10 18.73 18.36 18.05		
19.00	DISCHG 17.81 17.63 17.42 17.03 16.53 16.09 15.82 15.75 15.85 16.06		
20.00	DISCHG 16.24 16.18 15.92 15.66 15.44 15.16 14.89 14.75 14.72 14.62		
21.00	DISCHG 14.40 14.08 13.78 13.64 13.66 13.73 13.72 13.57 13.32 13.00		
22.00	DISCHG 12.75 12.76 12.98 13.20 13.32 13.28 13.12 12.86 12.57 12.31		
23.00	DISCHG 12.11 11.96 11.85 11.77 11.72 11.68 11.65 11.61 11.32 10.60		

24.00	DISCHG	10.07	11.14	13.41	15.36	16.25	15.88	14.38	12.01	9.31	6.89
25.00	DISCHG	5.02	3.62	2.59	1.84	1.31	.92	.65	.46	.32	.23
26.00	DISCHG	.16	.11	.07	.04	.02	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 3.57 WATERSHED INCHES, 810.06 CFS-HRS, 66.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 33
OUTPUT HYDROGRAPH= 4
AREA= .05 SQ MI INPUT RUNOFF CURVE= 71. TIME OF CONCENTRATION= .29 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.27	64.61	(RUNOFF)
15.07	5.09	(RUNOFF)
16.35	4.03	(RUNOFF)
24.10	4.34	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .05 SQ.MI.		
9.00	DISCHG	.01	.03	.07	.13	.20	.27	.35	.43	.53	.63
10.00	DISCHG	.72	.82	.95	1.09	1.25	1.42	1.61	1.81	2.02	2.27
11.00	DISCHG	2.59	2.91	3.23	3.65	4.35	5.13	6.01	7.78	11.58	19.24
12.00	DISCHG	34.94	50.66	61.53	63.74	51.44	37.77	27.09	20.04	15.98	13.65
13.00	DISCHG	12.09	11.04	10.25	9.62	8.99	8.40	7.78	7.35	7.16	7.02
14.00	DISCHG	6.78	6.59	6.51	6.34	5.88	5.58	5.64	5.62	5.23	4.95
15.00	DISCHG	5.03	5.08	4.92	4.75	4.69	4.66	4.65	4.58	4.34	4.15
16.00	DISCHG	4.07	4.04	4.03	4.02	4.03	3.95	3.72	3.52	3.43	3.24
17.00	DISCHG	2.75	2.43	2.48	2.61	2.67	2.61	2.38	2.19	2.11	2.15
18.00	DISCHG	2.37	2.49	2.34	2.18	2.10	2.07	2.06	2.05	2.05	2.05
19.00	DISCHG	2.05	1.97	1.73	1.61	1.76	1.93	2.00	2.04	2.05	1.98
20.00	DISCHG	1.74	1.62	1.77	1.85	1.69	1.60	1.76	1.85	1.69	1.52
21.00	DISCHG	1.44	1.49	1.72	1.84	1.68	1.52	1.44	1.41	1.40	1.48
22.00	DISCHG	1.72	1.84	1.69	1.52	1.45	1.41	1.40	1.40	1.39	1.39
23.00	DISCHG	1.39	1.39	1.39	1.39	1.39	1.40	1.39	1.18	.67	.86
24.00	DISCHG	3.03	4.34	2.92	1.31	.56	.24	.10	.04	.02	.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.69 WATERSHED INCHES, 83.19 CFS-HRS, 6.87 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 34
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 LENGTH = 1200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.00, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .98 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 34 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.37	64.51	(NULL)
15.18	5.09	(NULL)
16.45	4.03	(NULL)
24.20	4.32	(NULL)

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RUNOFF VOLUME ABOVE BASEFLOW = 2.68 WATERSHED INCHES, 83.13 CFS-HRS, 6.87 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 34
 INPUT HYDROGRAPHS= 3,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.50	267.55	(NULL)
19.98	18.23	(NULL)
20.77	16.58	(NULL)
21.41	15.50	(NULL)
22.31	14.89	(NULL)
24.29	18.31	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .40 SQ.MI.		
6.00	DISCHG	.00	.00	.01	.02	.02	.03	.04	.05	.05	.06
7.00	DISCHG	.07	.09	.12	.16	.22	.30	.43	.62	.88	1.20
8.00	DISCHG	1.56	1.96	2.38	2.82	3.26	3.71	4.17	4.68	5.21	5.73
9.00	DISCHG	6.26	6.86	7.56	8.28	9.02	9.80	10.61	11.44	12.31	13.27
10.00	DISCHG	14.30	15.35	16.45	17.65	18.96	20.41	22.00	23.55	25.21	27.13
11.00	DISCHG	29.28	31.76	34.47	37.40	40.76	45.00	50.01	55.77	64.06	78.33
12.00	DISCHG	102.49	142.58	189.82	234.61	263.61	267.54	263.65	259.41	257.34	256.51
13.00	DISCHG	255.13	251.82	246.52	239.42	230.95	221.42	211.30	200.79	190.45	180.62
14.00	DISCHG	171.18	161.99	153.29	145.03	136.47	126.40	114.60	103.65	93.49	83.26
15.00	DISCHG	70.24	61.71	56.61	53.17	50.80	49.18	48.01	47.08	46.19	45.13
16.00	DISCHG	44.06	43.06	42.11	41.23	40.45	39.82	39.18	38.35	37.45	36.57
17.00	DISCHG	35.41	33.61	31.74	30.24	28.95	27.82	26.79	25.72	24.73	23.86
18.00	DISCHG	23.05	22.62	22.48	22.16	21.83	21.51	21.17	20.78	20.41	20.10
19.00	DISCHG	19.87	19.68	19.39	18.77	18.14	17.85	17.74	17.75	17.89	18.11
20.00	DISCHG	18.21	17.92	17.54	17.43	17.29	16.85	16.49	16.51	16.57	16.31
21.00	DISCHG	15.92	15.52	15.27	15.35	15.50	15.41	15.24	15.01	14.73	14.39
22.00	DISCHG	14.23	14.47	14.82	14.89	14.84	14.73	14.53	14.26	13.97	13.70
23.00	DISCHG	13.50	13.35	13.24	13.17	13.11	13.07	13.05	12.99	12.50	11.27
24.00	DISCHG	10.93	14.13	17.73	18.31	17.59	16.45	14.62	12.12	9.35	6.91
25.00	DISCHG	5.02	3.62	2.59	1.84	1.31	.92	.65	.46	.32	.23
26.00	DISCHG	.16	.11	.07	.04	.02	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 3.46 WATERSHED INCHES, 893.19 CFS-HRS, 73.81 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 35
 OUTPUT HYDROGRAPH= 1
 AREA= .76 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .77 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .1027 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.55	709.20	(RUNOFF)
19.95	31.22	(RUNOFF)
21.48	26.35	(RUNOFF)
22.34	25.79	(RUNOFF)
24.34	33.82	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .76 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .06		
9.00	DISCHG .19 .44 .84 1.39 2.08 2.90 3.83 4.87 6.00 7.24		
10.00	DISCHG 8.59 10.01 11.55 13.21 15.05 17.08 19.33 21.80 24.50 27.47		
11.00	DISCHG 30.76 34.44 38.52 43.17 48.58 55.30 63.47 75.07 92.45 126.33		
12.00	DISCHG 186.13 281.76 407.59 538.70 646.17 702.87 700.75 652.45 577.86 495.91		
13.00	DISCHG 421.51 360.01 310.88 271.68 240.25 214.67 193.46 175.76 160.99 148.84		
14.00	DISCHG 138.96 130.92 124.30 118.64 113.44 108.47 103.92 100.03 96.65 93.36		
15.00	DISCHG 90.32 87.81 85.71 83.71 81.89 80.31 78.89 77.52 76.16 74.59		
16.00	DISCHG 72.79 70.98 69.35 68.00 66.98 66.10 65.12 63.81 62.14 60.08		
17.00	DISCHG 57.51 54.44 51.24 48.47 46.38 44.85 43.60 42.32 40.85 39.40		
18.00	DISCHG 38.33 37.81 37.67 37.52 37.11 36.47 35.69 34.93 34.33 33.91		
19.00	DISCHG 33.62 33.24 32.62 31.66 30.62 30.02 29.94 30.23 30.74 31.17		
20.00	DISCHG 31.16 30.66 29.96 29.38 28.94 28.51 28.20 28.09 27.99 27.63		
21.00	DISCHG 27.05 26.47 26.10 26.07 26.26 26.35 26.12 25.60 24.95 24.45		
22.00	DISCHG 24.37 24.79 25.40 25.77 25.71 25.32 24.72 24.07 23.56 23.20		
23.00	DISCHG 22.95 22.77 22.64 22.55 22.49 22.44 22.24 21.58 20.06 18.92		
24.00	DISCHG 19.91 24.26 30.09 33.53 33.06 29.56 23.98 17.81 12.73 9.20		
25.00	DISCHG 6.73 4.90 3.55 2.58 1.86 1.35 .98 .70 .50 .36		
26.00	DISCHG .26 .19 .13 .07 .02 .00 .00 .00 .00 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.77 WATERSHED INCHES, 1352.64 CFS-HRS, 111.78 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 36
 INPUT HYDROGRAPHS= 6,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.54	976.01	(NULL)
19.96	49.44	(NULL)
21.45	41.81	(NULL)
22.33	40.68	(NULL)
24.33	52.03	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.16 SQ.MI.
6.00	DISCHG .00 .00 .01 .02 .02 .03 .04 .05 .05 .06		
7.00	DISCHG .07 .09 .12 .16 .22 .30 .43 .62 .88 1.20		
8.00	DISCHG 1.56 1.96 2.38 2.82 3.26 3.71 4.17 4.68 5.23 5.79		
9.00	DISCHG 6.44 7.30 8.40 9.67 11.10 12.70 14.45 16.31 18.31 20.51		
10.00	DISCHG 22.88 25.36 28.00 30.87 34.01 37.49 41.33 45.35 49.71 54.60		
11.00	DISCHG 60.04 66.20 72.99 80.56 89.34 100.29 113.48 130.84 156.51 204.66		

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12.00	DISCHG	288.61	424.34	597.41	773.31	909.78	970.42	964.40	911.86	835.20	752.42
13.00	DISCHG	676.64	611.84	557.40	511.10	471.20	436.09	404.76	376.55	351.44	329.46
14.00	DISCHG	310.14	292.92	277.59	263.67	249.91	234.87	218.52	203.68	190.14	176.61
15.00	DISCHG	160.56	149.52	142.32	136.89	132.68	129.49	126.90	124.60	122.36	119.71
16.00	DISCHG	116.85	114.04	111.46	109.23	107.43	105.92	104.30	102.16	99.59	96.65
17.00	DISCHG	92.92	88.05	82.98	78.72	75.33	72.67	70.40	68.04	65.58	63.26
18.00	DISCHG	61.38	60.43	60.15	59.68	58.94	57.98	56.86	55.71	54.74	54.01
19.00	DISCHG	53.48	52.93	52.01	50.43	48.77	47.87	46.68	45.98	44.55	43.94
20.00	DISCHG	49.37	48.58	47.50	46.81	46.23	45.37	44.69	44.60	43.55	42.88
21.00	DISCHG	42.97	41.99	41.37	41.42	41.76	41.76	41.35	40.61	39.68	38.84
22.00	DISCHG	38.60	39.26	40.22	40.66	40.55	40.05	39.26	38.34	37.52	36.91
23.00	DISCHG	36.46	36.12	35.89	35.72	35.60	35.51	35.29	34.57	32.56	30.19
24.00	DISCHG	30.84	38.38	47.82	51.84	50.65	46.00	38.60	29.93	22.08	16.11
25.00	DISCHG	11.75	8.52	6.14	4.42	3.17	2.27	1.63	1.16	.83	.59

26.00 DISCHG .42 .30 .21 .12 .04 .01 .00

RUNOFF VOLUME ABOVE BASEFLOW = 3.01 WATERSHED INCHES, 2245.83 CFS-HRS, 185.60 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 6

INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3

SURFACE ELEVATION= 26.00

PEAK TIME(HRS) 13.33 24.57
PEAK DISCHARGE(CFS) 505.24 40.41
PEAK ELEVATION(FEET) 33.70 28.12

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.16 SQ.MI.
6.00	DISCHG	.00	.00	.00	.01	.01
6.00	ELEV	26.00	26.00	26.00	26.00	26.00
7.00	DISCHG	.02	.02	.03	.07	.13
7.00	ELEV	26.00	26.00	26.00	26.01	26.01
8.00	DISCHG	.25	.34	.44	.57	.71
8.00	ELEV	26.01	26.02	26.02	26.03	26.04
9.00	DISCHG	1.93	2.22	2.54	2.91	3.33
9.00	ELEV	26.10	26.12	26.13	26.15	26.18
10.00	DISCHG	7.36	8.32	9.37	10.51	11.76
10.00	ELEV	26.39	26.44	26.49	26.55	26.62
11.00	DISCHG	22.13	24.47	27.05	29.89	33.03
11.00	ELEV	27.16	27.29	27.42	27.57	27.74
12.00	DISCHG	84.41	113.73	159.49	189.23	227.15
12.00	ELEV	28.99	29.43	30.03	30.42	30.91
13.00	DISCHG	395.33	440.71	489.35	504.52	500.00
13.00	ELEV	33.40	33.58	33.67	33.70	33.69
14.00	DISCHG	395.90	392.47	388.57	384.28	379.64
14.00	ELEV	33.42	33.34	33.26	33.18	33.08
15.00	DISCHG	333.55	324.05	314.56	305.25	296.17
15.00	ELEV	32.37	32.24	32.10	31.97	31.85
16.00	DISCHG	247.86	240.13	232.69	225.54	218.69
16.00	ELEV	31.17	31.07	30.98	30.89	30.80

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17.00	DISCHG	183.40	178.14	172.90	167.70	162.57	157.56	147.52	137.77	128.93	120.90
17.00	ELEV	30.35	30.28	30.21	30.14	30.07	30.01	29.88	29.75	29.64	29.53
18.00	DISCHG	114.24	108.27	102.89	98.21	94.15	90.44	87.00	83.80	80.82	78.07
18.00	ELEV	29.44	29.35	29.27	29.20	29.14	29.08	29.03	28.98	28.93	28.89
19.00	DISCHG	75.53	73.21	71.05	69.13	67.39	65.70	64.11	62.66	61.38	60.28
19.00	ELEV	28.85	28.81	28.78	28.74	28.71	28.68	28.65	28.62	28.60	28.58
20.00	DISCHG	59.31	58.39	57.47	56.55	55.66	54.78	53.92	53.09	52.34	51.62
20.00	ELEV	28.56	28.54	28.53	28.51	28.49	28.48	28.46	28.45	28.43	28.42
21.00	DISCHG	50.89	50.14	49.39	48.68	48.05	47.49	46.96	46.43	45.87	45.29
21.00	ELEV	28.41	28.39	28.38	28.37	28.35	28.34	28.33	28.32	28.31	28.30
22.00	DISCHG	44.70	44.19	43.79	43.50	43.24	42.99	42.80	42.57	42.30	42.01
22.00	ELEV	28.29	28.28	28.27	28.27	28.26	28.26	28.25	28.24	28.22	28.21
23.00	DISCHG	41.71	41.40	41.09	40.79	40.50	40.21	39.94	39.65	39.30	38.85
23.00	ELEV	28.19	28.18	28.16	28.14	28.13	28.11	28.10	28.08	28.07	28.04
24.00	DISCHG	38.38	38.16	38.44	39.09	39.79	40.27	40.39	40.04	39.24	38.09
24.00	ELEV	28.02	28.01	28.02	28.05	28.09	28.12	28.12	28.10	28.06	28.00
25.00	DISCHG	36.71	35.19	33.60	31.99	30.38	28.80	27.26	25.79	24.37	23.02
25.00	ELEV	27.93	27.85	27.77	27.68	27.60	27.51	27.43	27.36	27.28	27.21
26.00	DISCHG	21.74	20.51	19.36	18.26	17.22	16.24	15.32	14.44	13.62	12.84
26.00	ELEV	27.14	27.08	27.02	26.96	26.91	26.85	26.80	26.76	26.72	26.67
27.00	DISCHG	12.11	11.41	10.76	10.15	9.57	9.02	8.51	8.02	7.56	7.13
27.00	ELEV	26.64	26.60	26.57	26.53	26.50	26.47	26.45	26.42	26.40	26.37
28.00	DISCHG	6.73	6.34	5.98	5.64	5.32	5.01	4.73	4.46	4.20	3.96
28.00	ELEV	26.35	26.33	26.31	26.30	26.28	26.26	26.25	26.23	26.22	26.21
29.00	DISCHG	3.74	3.52	3.32	3.13	2.95	2.78	2.63	2.48	2.33	2.20
29.00	ELEV	26.20	26.19	26.17	26.16	26.16	26.15	26.14	26.13	26.12	26.12

RUNOFF VOLUME ABOVE BASEFLOW = 3.00 WATERSHED INCHES, 2241.83 CFS-HRS, 185.27 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 37

OUTPUT HYDROGRAPH= 4

AREA= .62 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .90 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .1000 HOURS

PEAK TIME(HRS) 12.64 20.00 21.47
PEAK DISCHARGE(CFS) 533.87 25.27 21.50
PEAK ELEVATION(FEET) (RUNOFF) (RUNOFF) (RUNOFF)

22.39				20.86				(RUNOFF)				
24.38				28.34				(RUNOFF)				
TIME(HRS)	FIRST HYDROGRAPH POINT =			.00 HOURS	TIME INCREMENT =			.10 HOURS	DRAINAGE AREA =			.62 SQ.MI.
8.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
9.00	DISCHG	.09	.23	.46	.80	1.24	1.79	2.45	3.19	4.02	4.93	
10.00	DISCHG	5.93	7.01	8.16	9.41	10.77	12.28	13.95	15.78	17.79	20.00	
11.00	DISCHG	22.44	25.15	28.16	31.57	35.48	40.17	45.86	53.63	64.56	84.40	
12.00	DISCHG	119.38	174.84	254.44	345.92	433.88	500.52	531.18	527.65	494.96	445.93	
13.00	DISCHG	390.91	338.24	294.48	257.88	228.40	203.52	182.83	165.18	150.27	137.68	
14.00	DISCHG	127.30	118.62	111.49	105.42	100.27	95.63	91.30	87.29	83.67	80.36	

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15.00	DISCHG	77.26	74.53	72.42	70.59	68.86	67.26	65.94	64.75	63.53	62.24	
16.00	DISCHG	60.87	59.45	58.09	56.87	55.83	54.93	54.09	53.15	52.00	50.56	
17.00	DISCHG	48.79	46.68	44.26	41.89	39.95	38.40	37.09	35.88	34.69	33.53	
18.00	DISCHG	32.51	31.76	31.33	31.04	30.70	30.26	29.74	29.19	28.63	28.14	
19.00	DISCHG	27.80	27.47	27.03	26.45	25.75	25.14	24.83	24.79	24.96	25.16	
20.00	DISCHG	25.27	25.17	24.81	24.36	23.98	23.65	23.32	23.06	22.97	22.84	
21.00	DISCHG	22.44	21.96	21.63	21.48	21.48	21.50	21.39	21.13	20.74	20.37	
22.00	DISCHG	20.13	20.14	20.44	20.76	20.86	20.73	20.45	20.07	19.63	19.24	
23.00	DISCHG	18.97	18.78	18.64	18.53	18.44	18.38	18.33	18.12	17.58	17.36	
24.00	DISCHG	18.20	20.49	24.28	27.55	28.31	26.77	23.76	19.86	15.37	11.36	
25.00	DISCHG	8.56	6.55	5.03	3.81	2.91	2.21	1.67	1.26	.96	.73	
26.00	DISCHG	.56	.42	.31	.23	.17	.13	.09	.06	.02	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 2.78 WATERSHED INCHES, 1104.87 CFS-HRS, 91.31 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 38

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 6500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .40 PEAK TRAVEL TIME = .30 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.58	479.69	(NULL)
24.76	39.99	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.00 WATERSHED INCHES, 2241.45 CFS-HRS, 185.23 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 38

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.76	780.70	(NULL)
13.31	689.99	(NULL)
24.40	67.09	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =			.00 HOURS	TIME INCREMENT =			.10 HOURS	DRAINAGE AREA =			1.77 SQ.MI.
7.00	DISCHG	.00	.01	.01	.02	.02	.03	.04	.05	.07	.09	
8.00	DISCHG	.13	.18	.24	.32	.42	.53	.67	.81	.98	1.19	
9.00	DISCHG	1.46	1.82	2.30	2.91	3.67	4.58	5.65	6.86	8.22	9.73	
10.00	DISCHG	11.40	13.23	15.21	17.38	19.75	22.37	25.24	28.40	31.85	35.65	
11.00	DISCHG	39.82	44.42	49.49	55.17	61.58	69.02	77.77	88.97	104.33	130.25	
12.00	DISCHG	173.33	240.88	339.41	460.46	578.07	677.62	744.01	776.83	779.45	763.04	
13.00	DISCHG	734.27	702.22	688.91	689.98	689.24	679.90	662.36	638.04	609.44	578.62	
14.00	DISCHG	551.51	531.59	516.32	503.80	493.05	483.20	473.73	464.36	454.17	443.44	
15.00	DISCHG	432.30	421.04	410.02	399.05	388.10	377.35	367.02	357.02	347.26	337.71	
16.00	DISCHG	328.35	319.15	310.02	301.16	292.68	284.57	276.79	269.18	261.62	254.04	
17.00	DISCHG	246.41	238.66	230.74	222.98	215.73	208.93	202.48	194.18	184.84	175.26	
18.00	DISCHG	165.97	157.59	150.19	143.56	137.54	132.06	127.04	122.40	118.10	114.18	
19.00	DISCHG	110.67	107.43	104.31	101.26	98.31	95.65	93.43	91.61	90.12	88.82	

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20.00	DISCHG	87.59	86.30	84.85	83.38	82.01	80.74	79.49	78.34	77.38	76.42	
21.00	DISCHG	75.24	74.00	72.92	72.01	71.28	70.60	69.86	69.00	68.04	67.10	
22.00	DISCHG	66.29	65.72	65.46	65.30	64.98	64.50	63.90	63.26	62.58	61.93	
23.00	DISCHG	61.39	60.92	60.48	60.07	59.69	59.32	58.99	58.49	57.66	57.13	
24.00	DISCHG	57.61	59.49	62.95	66.13	67.09	65.95	63.37	59.78	55.34	51.04	
25.00	DISCHG	47.61	44.67	41.98	39.44	37.09	34.88	32.80	30.86	29.05	27.34	

TIME(HRS)	DISCHG	25.74	24.23	22.82	21.49	20.24	19.07	17.96	16.91	15.92	14.99
26.00	DISCHG	14.14	13.33	12.57	11.85	11.18	10.54	9.94	9.37	8.83	8.33
27.00	DISCHG	7.85	7.41	6.98	6.58	6.21	5.85	5.52	5.20	4.91	4.63
28.00	DISCHG	4.36	4.11	3.88	3.66	3.45	3.25	3.07	2.89	2.72	2.57
29.00	DISCHG										

RUNOFF VOLUME ABOVE BASEFLOW = 2.93 WATERSHED INCHES, 3346.32 CFS-HRS, 276.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 39
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1
 LENGTH = 2500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 39 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.72	1721.92	(NULL)
24.24	205.91	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.50 WATERSHED INCHES, 6581.31 CFS-HRS, 543.88 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 39
 INPUT HYDROGRAPHS= 6,7 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.73	2502.60	(NULL)
24.30	271.45	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 5.86 SQ.MI.
7.00	DISCHG .00 .01 .02 .03 .04 .05 .07 .09		
8.00	DISCHG .13 .18 .24 .33 .44 .59 .79 1.06 1.45 2.01		
9.00	DISCHG 2.80 3.84 5.17 6.79 8.74 11.04 13.70 16.72 20.14 23.99		
10.00	DISCHG 28.32 33.14 38.48 44.43 51.06 58.45 66.63 75.66 85.60 96.66		
11.00	DISCHG 109.08 123.05 138.61 156.37 177.19 202.18 231.93 270.95 327.49 422.50		
12.00	DISCHG 585.22 841.77 1181.23 1568.06 1931.45 2221.24 2404.75 2496.54 2477.90 2408.29		
13.00	DISCHG 2313.48 2212.45 2132.74 2045.00 1924.37 1803.66 1684.93 1578.82 1484.91 1398.41		
14.00	DISCHG 1323.45 1262.65 1211.71 1169.02 1132.10 1099.10 1069.54 1042.70 1016.55 990.94		
15.00	DISCHG 966.48 943.55 922.21 901.85 882.48 864.20 847.34 831.54 816.12 800.65		
16.00	DISCHG 785.32 770.41 756.01 742.33 729.52 717.28 705.24 693.01 680.63 667.61		
17.00	DISCHG 653.29 637.56 621.34 605.81 591.56 578.40 565.75 551.11 535.62 520.59		
18.00	DISCHG 506.99 495.34 484.96 475.29 466.22 457.82 450.06 442.86 436.07 429.75		
19.00	DISCHG 423.97 418.38 412.45 406.11 400.11 395.03 391.02 387.93 385.50 383.21		
20.00	DISCHG 380.48 377.27 374.00 370.82 367.47 363.96 360.72 357.93 355.33 352.30		

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TIME(HRS)	DISCHG	348.68	344.95	341.95	339.91	338.06	335.83	333.15	330.16	327.07	324.28
22.00	DISCHG	322.26	321.14	320.38	319.40	317.93	315.96	313.67	311.19	308.54	305.85
23.00	DISCHG	303.31	301.01	298.91	296.97	294.72	291.62	287.63	282.16	273.96	264.08
24.00	DISCHG	258.67	262.18	268.60	271.45	268.59	260.01	247.91	233.35	216.56	198.78
25.00	DISCHG	181.84	166.65	153.09	140.67	129.06	118.03	107.66	98.10	88.97	80.03
26.00	DISCHG	71.73	64.56	58.70	53.95	50.07	46.82	43.99	41.43	39.06	36.88
27.00	DISCHG	34.88	33.01	31.25	29.61	28.07	26.62	25.25	23.95	22.71	21.54
28.00	DISCHG	20.43	19.38	18.39	17.45	16.56	15.71	14.91	14.15	13.43	12.74
29.00	DISCHG	12.10	11.48	10.90	10.34	9.82	9.32	8.85	8.40	7.97	7.57

RUNOFF VOLUME ABOVE BASEFLOW = 2.63 WATERSHED INCHES, 9927.63 CFS-HRS, 820.42 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 40
 OUTPUT HYDROGRAPH= 2
 AREA= .32 SQ MI INPUT RUNOFF CURVE= 67. TIME OF CONCENTRATION= .64 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0853 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.48	270.69	(RUNOFF)
18.22	14.35	(RUNOFF)
19.89	12.13	(RUNOFF)
21.46	10.25	(RUNOFF)
22.28	10.10	(RUNOFF)
24.28	15.37	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .32 SQ.MI.
9.00	DISCHG .00 .00 .00 .00 .00 .00 .02 .08		
10.00	DISCHG .22 .45 .78 1.21 1.74 2.35 3.07 3.86 4.75 5.75		
11.00	DISCHG 6.87 8.14 9.57 11.22 13.22 15.72 18.78 23.27 30.88 45.96		
12.00	DISCHG 73.66 117.12 172.85 226.90 263.11 270.12 252.46 220.45 183.99 153.17		

13.00	DISCHG	128.71	109.68	95.11	83.85	75.04	68.08	62.19	57.14	52.94	49.57
14.00	DISCHG	46.91	44.78	43.07	41.62	40.18	38.66	37.28	36.16	35.09	33.96
15.00	DISCHG	32.92	32.10	31.46	30.87	30.30	29.74	29.26	28.86	28.38	27.71
16.00	DISCHG	26.97	26.27	25.70	25.32	25.08	24.82	24.43	23.83	23.10	22.23
17.00	DISCHG	21.08	19.67	18.32	17.34	16.77	16.50	16.20	15.65	14.97	14.38
18.00	DISCHG	14.10	14.19	14.34	14.29	14.03	13.67	13.31	13.07	12.92	12.82
19.00	DISCHG	12.74	12.60	12.28	11.78	11.37	11.25	11.39	11.69	12.01	12.13
20.00	DISCHG	11.98	11.61	11.26	11.07	10.94	10.79	10.69	10.71	10.70	10.54
21.00	DISCHG	10.22	9.90	9.80	9.99	10.21	10.23	10.01	9.66	9.33	9.18
22.00	DISCHG	9.32	9.68	10.02	10.09	9.92	9.61	9.28	9.05	8.90	8.81
23.00	DISCHG	8.74	8.69	8.66	8.64	8.63	8.63	8.55	8.19	7.31	6.74
24.00	DISCHG	8.06	11.41	14.56	15.34	13.75	10.54	7.25	4.89	3.34	2.27
25.00	DISCHG	1.53	1.04	.71	.49	.33	.22	.15	.10	.07	.03
26.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 2.33 WATERSHED INCHES, 478.04 CFS-HRS, 39.51 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 41

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INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.70	2717.02	(NULL)
24.29	286.80	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	6.17 SQ.MI.
7.00	DISCHG	.00	.01	.02	.03	.04
8.00	DISCHG	.13	.18	.24	.33	.44
9.00	DISCHG	2.80	3.84	5.17	6.79	8.74
10.00	DISCHG	28.54	33.58	39.26	45.65	52.80
11.00	DISCHG	115.94	131.19	148.19	167.59	190.41
12.00	DISCHG	658.88	958.89	1354.08	1794.96	2194.56
13.00	DISCHG	2442.19	2322.13	2227.84	2128.84	1999.41
14.00	DISCHG	1370.36	1307.43	1254.78	1210.64	1172.28
15.00	DISCHG	999.40	975.65	953.66	932.72	912.78
16.00	DISCHG	812.29	796.68	781.71	767.65	754.59
17.00	DISCHG	674.37	657.23	639.66	623.15	608.33
18.00	DISCHG	521.09	509.53	499.30	489.58	480.26
19.00	DISCHG	436.70	430.98	424.73	417.89	411.48
20.00	DISCHG	392.45	388.88	385.26	381.89	378.41
21.00	DISCHG	358.90	354.85	351.75	349.90	348.27
22.00	DISCHG	331.58	330.83	330.41	329.49	327.85
23.00	DISCHG	312.05	309.70	307.57	305.61	303.35
24.00	DISCHG	266.72	273.59	283.15	286.79	282.34
25.00	DISCHG	183.38	167.70	153.80	141.16	129.39
26.00	DISCHG	71.73	64.56	58.70	53.95	50.07
27.00	DISCHG	34.88	33.01	31.25	29.61	28.07
28.00	DISCHG	20.43	19.38	18.39	17.45	16.56
29.00	DISCHG	12.10	11.48	10.90	10.34	9.82
						9.32
						8.85
						8.40

RUNOFF VOLUME ABOVE BASEFLOW = 2.61 WATERSHED INCHES, 10405.66 CFS-HRS, 859.92 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 7

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 7
SURFACE ELEVATION= 7.79

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.12	1298.72	19.16

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	6.17 SQ.MI.
7.00	DISCHG	.00	.00	.01	.01	.01
7.00	ELEV	7.79	7.79	7.79	7.79	7.79
8.00	DISCHG	.05	.06	.09	.12	.16
8.00	ELEV	7.79	7.79	7.79	7.79	7.79
9.00	DISCHG	.96	1.32	1.81	2.45	3.26
9.00	ELEV	7.80	7.81	7.81	7.82	7.83
10.00	DISCHG	13.16	15.89	19.03	22.61	26.68
10.00	ELEV	7.95	7.98	8.02	8.06	8.11
						8.17
						8.23
						8.30
						8.38
						8.46

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11.00	DISCHG	64.20	73.27	83.43	94.81	107.67	122.42	139.52	159.84	185.28	220.14
11.00	ELEV	8.56	8.67	8.79	8.93	9.09	9.26	9.47	9.71	10.02	10.44
12.00	DISCHG	272.65	351.31	386.42	438.23	506.10	586.20	672.89	760.72	844.82	921.87
12.00	ELEV	11.07	12.01	12.27	12.67	13.18	13.78	14.44	15.10	15.73	16.32
13.00	DISCHG	990.76	1051.44	1104.79	1151.60	1191.39	1223.84	1249.38	1268.66	1282.54	1291.71
13.00	ELEV	16.84	17.29	17.70	18.05	18.35	18.60	18.79	18.93	19.04	19.11
14.00	DISCHG	1296.83	1298.67	1297.90	1295.06	1290.54	1284.63	1277.55	1269.50	1260.59	1250.90
14.00	ELEV	19.15	19.16	19.15	19.13	19.10	19.05	19.00	18.94	18.87	18.80
15.00	DISCHG	1240.49	1229.46	1217.91	1205.93	1193.58	1180.93	1168.03	1154.97	1141.78	1128.47
15.00	ELEV	18.72	18.64	18.55	18.46	18.37	18.27	18.17	18.08	17.98	17.88
16.00	DISCHG	1115.03	1101.49	1087.87	1074.21	1060.56	1046.95	1033.38	1019.86	1006.36	992.86
16.00	ELEV	17.77	17.67	17.57	17.47	17.36	17.26	17.16	17.06	16.95	16.85
17.00	DISCHG	979.31	965.64	951.81	937.84	923.79	909.74	895.73	881.72	867.63	853.47
17.00	ELEV	16.75	16.65	16.54	16.44	16.33	16.22	16.12	16.01	15.91	15.80
18.00	DISCHG	839.28	825.15	811.16	797.35	783.73	770.30	757.10	744.13	731.41	718.95
18.00	ELEV	15.69	15.59	15.48	15.38	15.27	15.17	15.07	14.97	14.88	14.78
19.00	DISCHG	706.77	694.87	683.23	671.81	660.60	649.62	638.93	628.55	618.52	608.84
19.00	ELEV	14.69	14.60	14.51	14.43	14.34	14.26	14.18	14.10	14.03	13.95
20.00	DISCHG	599.46	590.36	581.50	572.87	564.46	556.27	548.28	540.51	532.96	525.61
20.00	ELEV	13.88	13.81	13.75	13.68	13.62	13.56	13.50	13.44	13.38	13.33
21.00	DISCHG	518.43	511.38	504.49	497.79	491.30	485.02	478.90	472.90	467.03	461.27
21.00	ELEV	13.27	13.22	13.17	13.12	13.07	13.02	12.97	12.93	12.88	12.84
22.00	DISCHG	455.65	450.23	445.01	439.99	435.14	430.41	425.78	421.24	416.77	412.38
22.00	ELEV	12.80	12.76	12.72	12.68	12.64	12.61	12.57	12.54	12.50	12.47
23.00	DISCHG	408.06	403.83	399.67	395.62	391.64	387.72	383.82	379.87	375.77	371.42
23.00	ELEV	12.44	12.41	12.37	12.34	12.31	12.28	12.26	12.23	12.19	12.16
24.00	DISCHG	366.95	362.73	359.05	355.82	352.71	347.84	334.85	321.38	307.27	292.48
24.00	ELEV	12.13	12.10	12.07	12.04	12.02	11.97	11.82	11.66	11.49	11.31
25.00	DISCHG	277.16	261.63	246.21	231.12	216.47	202.31	188.67	175.57	163.05	151.05
25.00	ELEV	11.12	10.94	10.75	10.57	10.39	10.22	10.06	9.90	9.75	9.61
26.00	DISCHG	139.57	128.65	118.41	108.92	100.22	92.31	85.14	78.66	72.79	67.46
26.00	ELEV	9.47	9.34	9.21	9.10	9.00	8.90	8.81	8.74	8.67	8.60
27.00	DISCHG	62.64	58.25	54.26	50.62	47.29	44.24	41.44	38.87	36.49	34.30
27.00	ELEV	8.54	8.49	8.44	8.40	8.36	8.32	8.29	8.26	8.23	8.20
28.00	DISCHG	32.26	30.38	28.62	26.98	25.46	24.03	22.70	21.45	20.28	19.18
28.00	ELEV	8.18	8.16	8.13	8.11	8.10	8.08	8.06	8.05	8.03	8.02
29.00	DISCHG	18.15	17.18	16.26	15.40	14.59	13.82	13.10	12.41	11.77	11.15
29.00	ELEV	8.01	8.00	7.99	7.98	7.97	7.96	7.95	7.94	7.93	7.92

RUNOFF VOLUME ABOVE BASEFLOW = 2.61 WATERSHED INCHES, 10398.96 CFS-HRS, 859.37 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 42

OUTPUT HYDROGRAPH= 1

AREA= .51 SQ MI INPUT RUNOFF CURVE= 70. TIME OF CONCENTRATION= 1.26 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .1050 HOURS

PEAK TIME(HRS)

12.90
24.54

PEAK DISCHARGE(CFS)

330.08
15.99

PEAK ELEVATION(Feet)

(RUNOFF)
(RUNOFF)

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TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .51 SQ.MI.		
9.00	DISCHG	.00	.00	.00	.01	.04	.09	.19	.34	.55	.84
10.00	DISCHG	1.21	1.66	2.19	2.82	3.53	4.33	5.23	6.24	7.37	8.62
11.00	DISCHG	10.01	11.55	13.27	15.21	17.42	19.98	23.03	26.92	32.39	40.93
12.00	DISCHG	54.56	75.35	104.94	143.06	187.22	232.99	274.57	305.65	324.19	330.07
13.00	DISCHG	325.05	310.89	290.49	266.51	241.61	218.24	197.53	179.50	163.84	150.09
14.00	DISCHG	137.94	127.27	117.96	109.80	102.64	96.36	90.85	85.97	81.60	77.70
15.00	DISCHG	74.19	70.97	68.03	65.41	63.07	60.99	59.12	57.40	55.79	54.27
16.00	DISCHG	52.83	51.45	50.12	48.90	47.81	46.81	45.88	44.99	44.10	43.13
17.00	DISCHG	42.04	40.84	39.51	38.05	36.54	35.07	33.69	32.41	31.22	30.11
18.00	DISCHG	29.09	28.20	27.45	26.83	26.28	25.76	25.26	24.78	24.34	23.94
19.00	DISCHG	23.56	23.17	22.75	22.34	21.92	21.51	21.12	20.82	20.62	20.48
20.00	DISCHG	20.37	20.27	20.16	20.00	19.81	19.61	19.41	19.18	18.95	18.73
21.00	DISCHG	18.51	18.28	18.07	17.86	17.67	17.54	17.44	17.30	17.10	16.91
22.00	DISCHG	16.75	16.64	16.58	16.56	16.55	16.53	16.47	16.37	16.23	16.05
23.00	DISCHG	15.86	15.66	15.46	15.28	15.14	15.03	14.90	14.67	14.30	13.93
24.00	DISCHG	13.71	13.70	13.96	14.61	15.43	15.94	15.88	15.25	14.22	12.88
25.00	DISCHG	11.39	9.79	8.03	6.47	5.27	4.32	3.58	2.96	2.44	2.00
26.00	DISCHG	1.65	1.35	1.11	.91	.74	.61	.50	.41	.34	.27
27.00	DISCHG	.22	.18	.14	.11	.09	.08	.06	.05	.03	.02
28.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 2.59 WATERSHED INCHES, 850.41 CFS-HRS, 70.28 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43

OUTPUT HYDROGRAPH= 2

AREA= .47 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .83 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0922 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.59	516.11	(RUNOFF)
19.98	21.28	(RUNOFF)
21.48	18.02	(RUNOFF)
22.37	17.52	(RUNOFF)
24.37	23.48	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .47 SQ.MI.
7.00	DISCHG .00 .00 .00 .00 .00 .00 .01 .04 .11 .24		
8.00	DISCHG .45 .74 1.10 1.52 1.99 2.49 3.04 3.62 4.24 4.88		
9.00	DISCHG 5.55 6.29 7.08 7.90 8.74 9.60 10.51 11.46 12.46 13.53		
10.00	DISCHG 14.69 15.91 17.18 18.56 20.07 21.72 23.55 25.56 27.75 30.15		
11.00	DISCHG 32.78 35.70 38.94 42.58 46.81 51.90 58.21 66.75 79.03 101.56		
12.00	DISCHG 141.55 203.51 286.60 376.18 454.25 503.58 515.74 493.48 447.79 391.44		
13.00	DISCHG 334.92 286.35 246.75 214.82 188.88 167.61 149.95 135.18 122.84 112.62		
14.00	DISCHG 104.21 97.33 91.69 87.03 82.91 79.07 75.40 72.12 69.25 66.67		
15.00	DISCHG 64.32 62.33 60.67 59.17 57.74 56.51 55.44 54.42 53.39 52.28		
16.00	DISCHG 51.08 49.84 48.67 47.65 46.81 46.11 45.41 44.56 43.49 42.16		
17.00	DISCHG 40.53 38.57 36.42 34.44 32.86 31.63 30.61 29.69 28.69 27.68		

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18.00	DISCHG	26.85	26.33	26.10	25.93	25.67	25.29	24.81	24.30	23.83	23.47
19.00	DISCHG	23.22	22.96	22.56	22.02	21.39	20.91	20.71	20.76	20.96	21.20
20.00	DISCHG	21.28	21.09	20.70	20.30	19.99	19.70	19.44	19.28	19.21	19.02
21.00	DISCHG	18.66	18.27	18.00	17.90	17.96	18.02	17.91	17.62	17.25	16.90
22.00	DISCHG	16.74	16.87	17.19	17.46	17.51	17.34	17.03	16.64	16.26	15.97
23.00	DISCHG	15.77	15.63	15.52	15.43	15.38	15.33	15.25	14.95	14.27	13.87
24.00	DISCHG	14.63	17.03	20.50	23.05	23.36	21.63	18.56	14.65	10.79	7.86
25.00	DISCHG	5.88	4.41	3.29	2.45	1.82	1.34	.99	.74	.55	.40
26.00	DISCHG	.29	.21	.16	.12	.08	.05	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.34 WATERSHED INCHES, 1022.29 CFS-HRS, 84.48 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 44

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 1800.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .93 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 44 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
13.01	329.60	(NULL)
24.65	15.96	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.59 WATERSHED INCHES, 850.42 CFS-HRS, 70.28 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 44

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.71	764.79	(NULL)
19.87	41.83	(NULL)
22.36	34.08	(NULL)
24.40	37.92	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .98 SQ.MI.
7.00	DISCHG .00 .00 .00 .00 .00 .00 .01 .04 .11 .24		
8.00	DISCHG .45 .74 1.10 1.52 1.99 2.49 3.04 3.62 4.24 4.88		
9.00	DISCHG 5.55 6.29 7.08 7.90 8.75 9.64 10.60 11.64 12.78 14.07		
10.00	DISCHG 15.51 17.08 18.81 20.71 22.83 25.19 27.81 30.72 33.91 37.42		
11.00	DISCHG 41.30 45.59 50.36 55.71 61.87 69.15 77.98 89.54 105.64 133.51		
12.00	DISCHG 181.81 256.99 360.32 478.78 594.29 687.27 745.04 764.66 750.86 714.05		
13.00	DISCHG 664.42 611.73 558.73 506.92 457.31 411.23 370.10 334.40 303.82 277.74		
14.00	DISCHG 255.43 236.27 219.83 205.75 193.38 182.29 172.27 163.42 155.62 148.63		
15.00	DISCHG 142.34 136.80 131.90 127.44 123.37 119.77 116.60 113.69 110.93 108.20		
16.00	DISCHG 105.47 102.79 100.23 97.88 95.81 94.01 92.31 90.52 88.55 86.33		
17.00	DISCHG 83.74 80.70 77.36 74.06 71.02 68.29 65.80 63.50 61.21 59.00		

20.00	DISCHG	41.76	41.46	40.98	40.47	40.00	39.53	39.06	38.71	38.41	37.99
21.00	DISCHG	37.40	36.80	36.30	35.99	35.84	35.70	35.46	35.07	34.55	34.02
22.00	DISCHG	33.67	33.63	33.83	34.04	34.07	33.90	33.56	33.11	32.63	32.21
23.00	DISCHG	31.84	31.51	31.19	30.91	30.67	30.48	30.29	29.86	28.96	28.20
24.00	DISCHG	28.59	30.76	34.20	36.99	37.92	37.00	34.46	30.52	26.08	22.16
25.00	DISCHG	18.86	15.92	13.21	10.62	8.42	6.71	5.40	4.38	3.56	2.88
26.00	DISCHG	2.33	1.89	1.54	1.25	1.01	.80	.63	.51	.42	.34
27.00	DISCHG	.28	.22	.18	.15	.12	.09	.08	.06	.05	.04
28.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.95 WATERSHED INCHES, 1872.72 CFS-HRS, 154.76 ACRE-FEET; BASEFLOW = .00 CFS

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OPERATION RESVOR  STRUCTURE  8
      INPUT HYDROGRAPH= 4      OUTPUT HYDROGRAPH= 5
      SURFACE ELEVATION= 31.74

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.40	460.30	41.34
22.41	34.05	32.41
24.45	37.64	32.48

TIME(HRS)		FIRST HYDROGRAPH POINT =		.00 HOURS		TIME INCREMENT = .10 HOURS			DRAINAGE AREA =		.98 SQ.MI.
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.02	.07	.17
7.00	ELEV	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74
8.00	DISCHG	.34	.59	.91	1.30	1.74	2.22	2.75	3.31	3.91	4.54
8.00	ELEV	31.75	31.75	31.76	31.77	31.77	31.78	31.79	31.80	31.82	31.83
9.00	DISCHG	5.19	5.90	6.66	7.46	8.30	9.17	10.09	11.09	12.17	13.38
9.00	ELEV	31.84	31.86	31.87	31.89	31.90	31.92	31.94	31.96	31.98	32.00
10.00	DISCHG	14.74	16.25	17.89	19.70	21.70	23.94	26.42	29.17	32.22	35.56
10.00	ELEV	32.03	32.06	32.09	32.13	32.16	32.21	32.26	32.31	32.37	32.44
11.00	DISCHG	39.24	43.31	47.83	52.87	58.60	65.29	73.30	83.42	97.13	118.86
11.00	ELEV	32.51	32.59	32.68	32.77	32.89	33.02	33.17	33.37	33.64	34.07
12.00	DISCHG	156.41	217.38	305.73	326.77	341.11	361.59	385.83	410.57	423.49	434.98
12.00	ELEV	34.80	35.99	37.72	38.15	38.47	38.92	39.46	40.02	40.36	40.67
13.00	DISCHG	444.44	451.65	456.62	459.45	460.30	459.33	456.77	452.88	447.91	442.06
13.00	ELEV	40.92	41.11	41.24	41.32	41.34	41.32	41.25	41.14	41.01	40.85
14.00	DISCHG	435.53	428.48	421.02	413.27	401.40	386.81	372.48	358.50	344.90	331.72
14.00	ELEV	40.68	40.49	40.29	40.09	39.81	39.48	39.17	38.86	38.55	38.26
15.00	DISCHG	305.70	144.91	134.69	129.83	125.55	121.70	118.30	115.25	112.41	109.66
15.00	ELEV	37.72	34.57	34.37	34.28	34.20	34.12	34.05	33.99	33.94	33.89
16.00	DISCHG	106.93	104.22	101.60	99.14	96.92	94.97	93.21	91.47	89.60	87.51
16.00	ELEV	33.83	33.78	33.73	33.68	33.64	33.60	33.56	33.53	33.49	33.45
17.00	DISCHG	85.12	82.31	79.14	75.82	72.64	69.75	67.13	64.73	62.43	60.18
17.00	ELEV	33.41	33.35	33.29	33.22	33.16	33.10	33.05	33.01	32.96	32.92
18.00	DISCHG	58.10	56.34	54.98	53.94	53.03	52.11	51.15	50.14	49.15	48.28
18.00	ELEV	32.88	32.84	32.82	32.80	32.78	32.76	32.74	32.72	32.70	32.68
19.00	DISCHG	47.55	46.89	46.18	45.31	44.31	43.34	42.58	42.10	41.87	41.82
19.00	ELEV	32.67	32.66	32.64	32.63	32.61	32.59	32.57	32.56	32.56	32.56
20.00	DISCHG	41.80	41.62	41.23	40.74	40.25	39.78	39.31	38.90	38.57	38.21

[illegible]

28.00 DISCHG .03 .02 .01 .00
28.00 ELEV 31.74 31.74 31.74 31.74

RUNOFF VOLUME ABOVE BASEFLOW = 2.95 WATERSHED INCHES, 1869.99 CFS-HRS, 154.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 45

OUTPUT HYDROGRAPH= 6

AREA= .24 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .54 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0720 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.39	323.12	(RUNOFF)
18.20	13.07	(RUNOFF)
19.86	11.01	(RUNOFF)
20.76	9.67	(RUNOFF)
21.41	9.30	(RUNOFF)
22.23	9.19	(RUNOFF)
24.23	14.04	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .24 SQ.MI.
7.00	DISCHG .00 .00 .00 .00 .00 .00 .01 .05 .14 .30		
8.00	DISCHG .50 .75 1.01 1.28 1.56 1.85 2.19 2.55 2.89 3.21		
9.00	DISCHG 3.60 4.08 4.56 4.99 5.41 5.88 6.39 6.92 7.51 8.15		
10.00	DISCHG 8.81 9.48 10.19 11.01 11.95 13.00 14.14 15.36 16.65 18.08		
11.00	DISCHG 19.71 21.56 23.56 25.81 28.70 32.41 36.96 43.82 55.18 78.97		
12.00	DISCHG 122.06 184.70 252.48 306.18 323.05 301.46 258.68 208.74 166.05 133.51		
13.00	DISCHG 110.19 93.04 80.92 71.75 64.60 58.84 53.79 49.50 46.10 43.57		
14.00	DISCHG 41.75 40.23 38.99 37.86 36.52 34.94 33.65 32.75 31.84 30.70		
15.00	DISCHG 29.70 29.07 28.63 28.10 27.49 26.95 26.59 26.26 25.73 24.98		
16.00	DISCHG 24.20 23.56 23.12 22.87 22.71 22.49 22.03 21.32 20.54 19.65		
17.00	DISCHG 18.44 16.92 15.64 14.99 14.82 14.77 14.42 13.77 13.06 12.57		
18.00	DISCHG 12.53 12.87 13.07 12.90 12.50 12.08 11.81 11.65 11.54 11.48		
19.00	DISCHG 11.43 11.28 10.87 10.29 9.94 9.98 10.31 10.69 10.96 10.99		
20.00	DISCHG 10.70 10.19 9.86 9.81 9.77 9.59 9.50 9.61 9.64 9.37		

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21.00	DISCHG	8.92	8.58	8.69	9.07	9.30	9.16	8.79	8.39	8.12	8.07
22.00	DISCHG	8.37	8.88	9.18	9.10	8.76	8.38	8.10	7.94	7.84	7.77
23.00	DISCHG	7.73	7.71	7.69	7.68	7.68	7.67	7.58	7.08	5.88	4.93
24.00	DISCHG	6.59	10.73	13.82	13.25	10.32	6.76	4.24	2.68	1.72	1.08
25.00	DISCHG	.68	.43	.27	.17	.11	.07	.03	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.34 WATERSHED INCHES, 514.80 CFS-HRS, 42.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 46

INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 1

LENGTH = 1800.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.00, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 46 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.40	460.30	(NULL)
22.41	34.05	(NULL)
24.45	37.64	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.95 WATERSHED INCHES, 1869.99 CFS-HRS, 154.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 46

INPUT HYDROGRAPHS= 6,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.45	667.67	(NULL)
19.83	52.83	(NULL)
22.29	43.04	(NULL)
24.32	48.82	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.22 SQ.MI.
7.00	DISCHG .00 .00 .00 .00 .00 .00 .01 .07 .21 .47		
8.00	DISCHG .84 1.33 1.92 2.58 3.30 4.07 4.93 5.86 6.80 7.75		
9.00	DISCHG 8.79 9.97 11.21 12.45 13.71 15.05 16.48 18.01 19.68 21.53		
10.00	DISCHG 23.55 25.73 28.09 30.71 33.65 36.94 40.56 44.53 48.87 53.64		
11.00	DISCHG 58.94 64.87 71.39 78.67 87.30 97.70 110.25 127.24 152.31 197.83		
12.00	DISCHG 278.47 402.08 558.20 632.95 664.16 663.05 644.51 619.31 589.54 568.49		

13.00	DISCHG	554.63	544.69	537.54	531.20	524.90	518.16	510.57	502.38	494.01	485.63
14.00	DISCHG	477.28	468.70	460.01	451.13	437.92	421.75	406.13	391.25	376.74	362.42
15.00	DISCHG	335.41	173.98	163.32	157.93	153.03	148.65	144.88	141.51	138.13	134.64
16.00	DISCHG	131.13	127.78	124.72	122.01	119.62	117.46	115.25	112.79	110.13	107.17
17.00	DISCHG	103.55	99.23	94.77	90.81	87.46	84.52	81.55	78.50	75.49	72.75
18.00	DISCHG	70.63	69.21	68.05	66.84	65.53	64.19	62.96	61.79	60.69	59.75
19.00	DISCHG	58.97	58.17	57.05	55.60	54.25	53.32	52.89	52.78	52.82	52.81
20.00	DISCHG	52.50	51.81	51.09	50.55	50.02	49.37	48.81	48.51	48.21	47.58
21.00	DISCHG	46.63	45.70	45.25	45.23	45.21	44.94	44.38	43.67	42.95	42.38
22.00	DISCHG	42.23	42.53	42.91	43.03	42.81	42.36	41.84	41.29	40.73	40.21

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23.00	DISCHG	39.77	39.39	39.05	38.74	38.47	38.26	37.98	37.16	35.31	33.54
24.00	DISCHG	34.99	40.36	46.21	48.74	47.71	44.22	40.03	35.27	30.16	25.34
25.00	DISCHG	21.31	17.93	14.93	12.17	9.71	7.70	6.14	4.93	4.00	3.25
26.00	DISCHG	2.63	2.13	1.73	1.40	1.14	.91	.72	.58	.47	.38
27.00	DISCHG	.31	.25	.21	.17	.13	.10	.09	.07	.05	.04
28.00	DISCHG	.03	.02	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 3.02 WATERSHED INCHES, 2384.79 CFS-HRS, 197.08 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 9

INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 13.20

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.87	366.41	28.02
24.49	44.79	14.81

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.22 SQ.MI.
7.00	DISCHG	.00	.00	.00	.02	.16
7.00	ELEV	13.20	13.20	13.20	13.20	13.21
8.00	DISCHG	.34	.60	.96	4.01	5.69
8.00	ELEV	13.21	13.22	13.23	13.34	13.40
9.00	DISCHG	6.61	7.59	8.65	13.43	16.22
9.00	ELEV	13.44	13.47	13.51	13.73	13.84
10.00	DISCHG	19.46	21.29	23.28	13.64	13.68
10.00	ELEV	13.90	13.96	14.04	13.73	13.78
11.00	DISCHG	48.42	53.19	58.47	13.40	14.41
11.00	ELEV	14.94	15.11	15.30	14.52	14.64
12.00	DISCHG	92.70	102.54	117.56	14.20	14.29
12.00	ELEV	16.61	17.02	17.65	14.06	14.09
13.00	DISCHG	255.48	267.17	278.07	16.05	16.11
13.00	ELEV	23.39	23.88	24.34	16.01	16.05
14.00	DISCHG	341.69	346.91	351.58	20.13	20.13
14.00	ELEV	26.99	27.20	27.40	20.92	20.92
15.00	DISCHG	365.67	361.25	353.60	21.64	21.64
15.00	ELEV	27.99	27.80	27.48	22.29	22.29
16.00	DISCHG	295.77	289.15	282.68	22.55	22.55
16.00	ELEV	25.07	24.80	24.53	22.99	22.99
17.00	DISCHG	236.01	230.66	225.35	23.76	23.76
17.00	ELEV	22.58	22.36	22.14	23.51	23.51
18.00	DISCHG	185.37	180.78	176.32	23.27	23.27
18.00	ELEV	20.47	20.28	20.10	23.75	23.75
19.00	DISCHG	144.89	141.46	138.12	23.51	23.51
19.00	ELEV	18.79	18.64	18.51	23.27	23.27
20.00	DISCHG	114.69	112.20	109.79	23.75	23.75
20.00	ELEV	17.53	17.43	17.32	23.51	23.51
21.00	DISCHG	92.91	91.05	89.24	23.27	23.27
21.00	ELEV	16.62	16.54	16.47	23.75	23.75
22.00	DISCHG	66.34	57.86	52.51	23.51	23.51

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22.00	ELEV	15.58	15.28	15.08	14.96	14.88	14.83	14.79	14.75	14.73	14.70
23.00	DISCHG	41.14	40.59	40.10	39.68	39.30	38.97	38.67	38.28	37.56	36.45
23.00	ELEV	14.68	14.66	14.64	14.62	14.61	14.60	14.59	14.57	14.55	14.51
24.00	DISCHG	35.68	36.38	38.83	41.89	44.13	44.78	43.84	41.65	38.49	34.69
24.00	ELEV	14.48	14.51	14.59	14.70	14.78	14.81	14.77	14.70	14.58	14.45
25.00	DISCHG	30.67	26.76	23.11	19.73	16.62	13.82	11.38	9.31	7.60	6.19
25.00	ELEV	14.30	14.16	14.03	13.91	13.80	13.70	13.61	13.53	13.47	13.42

26.00	DISCHG	5.04	4.10	3.33	2.71	2.20	1.78	1.44	1.16	.94	.76
27.00	ELEV	13.38	13.35	13.32	13.30	13.28	13.26	13.25	13.24	13.23	13.23
27.00	DISCHG	.61	.49	.40	.32	.26	.21	.17	.14	.11	.09
28.00	ELEV	13.22	13.22	13.21	13.21	13.21	13.21	13.21	13.20	13.20	13.20
28.00	DISCHG	.07	.05	.04	.03	.02	.01	.01	.00		
28.00	ELEV	13.20	13.20	13.20	13.20	13.20	13.20	13.20	13.20		

RUNOFF VOLUME ABOVE BASEFLOW = 3.03 WATERSHED INCHES, 2387.67 CFS-HRS, 197.32 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 47

OUTPUT HYDROGRAPH= 4

AREA= .08 SQ MI INPUT RUNOFF CURVE= 79. TIME OF CONCENTRATION= .35 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0467 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.28	133.57	(RUNOFF)
15.08	9.93	(RUNOFF)
18.12	4.70	(RUNOFF)
23.45	2.67	(RUNOFF)
24.12	7.64	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.08 SQ.MI.
7.00	DISCHG	.00	.00	.01	.19	.39
8.00	DISCHG	.50	.71	.91	.29	.51
9.00	DISCHG	1.72	2.10	2.38	1.33	1.51
10.00	DISCHG	3.73	4.26	5.02	2.97	3.50
11.00	DISCHG	8.19	9.70	12.11	6.38	7.47
12.00	DISCHG	69.85	125.63	133.16	19.53	40.96
13.00	DISCHG	26.76	21.64	20.01	49.02	31.18
14.00	DISCHG	13.64	13.22	12.96	37.90	14.09
15.00	DISCHG	9.86	9.93	9.73	15.06	9.96
16.00	DISCHG	8.02	7.90	7.85	11.10	8.25
17.00	DISCHG	5.70	5.00	4.85	8.97	6.44
18.00	DISCHG	4.44	4.70	4.58	6.99	4.16
19.00	DISCHG	3.95	3.84	3.50	4.39	3.96
20.00	DISCHG	3.50	3.23	3.33	3.97	3.83
21.00	DISCHG	2.84	2.84	3.15	3.87	3.03
22.00	DISCHG	3.12	3.39	3.29	3.47	2.78
23.00	DISCHG	2.66	2.66	2.66	2.74	2.66
24.00	DISCHG	4.87	7.55	6.46	2.68	1.76
25.00	DISCHG	.02	.00	3.70	2.27	.05

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RUNOFF VOLUME ABOVE BASEFLOW = 3.44 WATERSHED INCHES, 182.11 CFS-HRS, 15.05 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 48

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5

LENGTH = 1100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .90, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 48 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.28	133.57	(NULL)
15.08	9.93	(NULL)
18.12	4.70	(NULL)
23.45	2.67	(NULL)
24.12	7.64	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.44 WATERSHED INCHES, 182.11 CFS-HRS, 15.05 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 48

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 6

LENGTH = 2700.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .45, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .64 PEAK TRAVEL TIME = .11 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
15.01	366.09	(NULL)
24.64	44.17	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.03 WATERSHED INCHES, 2387.44 CFS-HRS, 197.30 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 48
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.35	244.74	(NULL)
15.02	375.95	(NULL)
24.12	43.74	(NULL)
24.62	44.53	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.30 SQ.MI.
7.00	DISCHG	.00 .00 .00 .00	.01 .04 .10	.19 .30 .43		
8.00	DISCHG	.61 .86 1.18 1.59	2.10 2.70 3.42	4.21 5.02 5.90		
9.00	DISCHG	6.94 8.06 9.15 10.27	11.54 12.89 14.26	15.70 17.26 18.93		
10.00	DISCHG	20.65 22.50 24.55 26.81	29.28 31.98 34.95	38.20 41.78 45.74		
11.00	DISCHG	50.18 55.04 60.31 66.23	73.28 81.31 90.18	96.84 106.29 122.69		
12.00	DISCHG	154.73 191.76 223.58 243.60	243.89 236.29 232.00	234.09 240.99 250.71		
13.00	DISCHG	261.13 271.62 281.80 291.59	300.81 309.47 317.48	325.09 332.48 339.45		
14.00	DISCHG	345.72 351.43 356.72 361.39	365.13 368.33 371.37	373.81 375.03 375.55		

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15.00	DISCHG	375.94 375.74 372.64 366.40 359.16 351.69 344.22 336.74 329.16 321.68
16.00	DISCHG	314.48 307.55 300.81 294.23 287.81 281.43 274.98 268.64 262.59 256.59
17.00	DISCHG	250.28 244.12 238.57 233.38 228.20 222.93 217.44 211.99 206.76 201.83
18.00	DISCHG	197.27 192.77 188.00 183.20 178.61 174.25 170.04 165.98 162.04 158.21
19.00	DISCHG	154.49 150.78 146.95 143.28 140.07 137.12 134.16 131.20 128.29 125.37
20.00	DISCHG	122.31 119.41 116.97 114.69 112.14 109.63 107.53 105.53 103.27 100.94
21.00	DISCHG	98.76 96.85 95.27 93.69 91.80 89.81 87.96 86.27 84.67 83.23
22.00	DISCHG	82.07 74.31 65.89 59.18 54.52 51.40 49.28 47.76 46.61 45.67
23.00	DISCHG	44.88 44.19 43.59 43.06 42.60 42.19 41.81 41.12 39.95 39.65
24.00	DISCHG	41.85 43.70 42.76 41.61 42.26 43.69 44.50 44.14 42.58 39.99
25.00	DISCHG	36.61 32.82 28.96 25.23 21.72 18.47 15.50 12.87 10.60 8.69
26.00	DISCHG	7.10 5.79 4.71 3.83 3.11 2.53 2.05 1.66 1.34 1.08
27.00	DISCHG	.87 .70 .57 .46 .37 .30 .24 .20 .16 .13
28.00	DISCHG	.10 .08 .06 .05 .03 .02 .01 .01 .01 .00

RUNOFF VOLUME ABOVE BASEFLOW = 3.05 WATERSHED INCHES, 2569.55 CFS-HRS, 212.35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 49

OUTPUT HYDROGRAPH= 2

AREA= .56 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= 1.55 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .1033 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.08	420.25	(RUNOFF)
24.61	20.40	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.56 SQ.MI.
7.00	DISCHG	.00 .00 .00 .00	.00 .00 .00	.01 .03 .06		
8.00	DISCHG	.11 .20 .32 .49	.71 .98 1.31	1.69 2.12 2.60		
9.00	DISCHG	3.13 3.72 4.35 5.02	5.74 6.52 7.33	8.19 9.09 10.05		
10.00	DISCHG	11.06 12.13 13.26 14.46	15.74 17.10 18.57	20.16 21.88 23.76		
11.00	DISCHG	25.80 28.02 30.45 33.14	36.14 39.54 43.45	48.20 54.40 63.38		
12.00	DISCHG	76.95 96.68 124.16 159.67	202.49 250.44 299.09	343.68 379.26 404.12		
13.00	DISCHG	417.44 420.06 413.71 399.41	379.04 354.22 327.03	299.61 273.95 251.07		
14.00	DISCHG	230.89 213.04 197.16 182.91	170.07 158.54 148.26	139.05 130.73 123.22		
15.00	DISCHG	116.47 110.41 104.88 99.90	95.39 91.35 87.70	84.36 81.32 78.58		
16.00	DISCHG	76.03 73.68 71.48 69.44	67.53 65.71 63.99	62.33 60.72 59.10		
17.00	DISCHG	57.44 55.75 54.05 52.34	50.60 48.83 47.07	45.36 43.70 42.13		
18.00	DISCHG	40.64 39.26 37.99 36.84	35.85 35.00 34.21	33.45 32.72 32.04		
19.00	DISCHG	31.41 30.82 30.26 29.71	29.15 28.59 28.04	27.55 27.13 26.79		
20.00	DISCHG	26.50 26.25 26.02 25.79	25.53 25.25 25.00	24.77 24.52 24.23		
21.00	DISCHG	23.94 23.65 23.37 23.08	22.81 22.58 22.38	22.18 21.96 21.75		
22.00	DISCHG	21.53 21.32 21.15 21.03	20.97 20.93 20.85	20.72 20.56 20.40		
23.00	DISCHG	20.22 20.03 19.84 19.65	19.44 19.24 19.04	18.83 18.57 18.36		
24.00	DISCHG	18.31 18.41 18.57 18.89	19.45 20.08 20.39	20.22 19.59 18.58		
25.00	DISCHG	17.32 15.81 14.26 12.71	11.06 9.37 7.87	6.66 5.66 4.83		
26.00	DISCHG	4.14 3.55 3.03 2.58	2.20 1.88 1.60	1.36 1.16 .99		
27.00	DISCHG	.83 .71 .60 .51	.44 .37 .31	.26 .22 .19		
28.00	DISCHG	.15 .13 .11 .09	.07 .06 .05	.04 .03 .01		

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29.00 DISCHG .00

RUNOFF VOLUME ABOVE BASEFLOW = 3.34 WATERSHED INCHES, 1218.54 CFS-HRS, 100.70 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 50

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 1700.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53

0 MODIFIED ATT-KIN ROUTING COEFFICIENT = .92 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 50 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.47	244.08	(NULL)
15.12	375.92	(NULL)
24.22	43.61	(NULL)
24.73	44.47	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.05 WATERSHED INCHES, 2569.67 CFS-HRS, 212.36 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 50

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.20	684.44	(NULL)
24.69	64.65	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.87 SQ.MI.
7.00 DISCHG	.00 .00 .00 .00	.00 .01 .04	.10 .21 .34
8.00 DISCHG	.53 .79 1.16 1.64	2.27 3.04 3.96	5.05 6.26 7.55
9.00 DISCHG	8.96 10.57 12.32 14.07	15.92 17.95 20.11	22.33 24.67 27.18
10.00 DISCHG	29.85 32.63 35.60 38.84	42.36 46.18 50.32	54.86 59.81 65.23
11.00 DISCHG	71.20 77.83 85.09 93.00	101.88 112.23 124.09	137.63 150.66 168.88
12.00 DISCHG	198.29 248.80 312.81 380.51	444.31 494.17 535.97	576.06 613.22 644.56
13.00 DISCHG	667.34 680.31 684.44 680.34	669.79 654.25 635.77	616.41 598.39 582.92
14.00 DISCHG	569.75 558.22 548.09 539.18	531.06 523.34 516.31	510.16 504.33 498.14
15.00 DISCHG	491.97 486.31 480.64 472.78	462.30 451.12 440.02	429.21 418.69 408.38
16.00 DISCHG	398.35 388.77 379.62 370.83	362.33 354.07 345.96	337.86 329.90 322.20
17.00 DISCHG	314.54 306.57 298.70 291.39	284.42 277.47 270.44	263.26 256.16 249.33
18.00 DISCHG	242.89 236.91 231.13 225.24	219.46 214.00 208.83	203.85 199.04 194.41
19.00 DISCHG	189.95 185.63 181.36 176.98	172.74 168.94 165.41	161.96 158.58 155.33
20.00 DISCHG	152.11 148.82 145.68 142.97	140.41 137.60 134.84	132.48 130.22 127.70
21.00 DISCHG	125.07 122.60 120.38 118.48	116.63 114.54 112.35	110.30 108.37 106.55
22.00 DISCHG	104.88 103.50 101.08 96.08	87.73 80.73 75.85	72.53 70.19 68.46
23.00 DISCHG	65.98 64.98 64.09 63.29	62.55 61.88 61.27	60.67 59.74 58.40
24.00 DISCHG	57.99 60.09 62.11 61.72	61.16 62.29 63.96	64.65 63.75 61.28
25.00 DISCHG	57.52 52.70 47.40 41.99	36.61 31.39 26.62	22.42 18.76 15.63
26.00 DISCHG	12.99 10.79 8.93 7.38	6.10 5.05 4.18	3.46 2.86 2.36
27.00 DISCHG	1.94 1.60 1.32 1.09	.91 .75 .62	.51 .42 .35

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28.00 DISCHG	.28 .23 .19 .15 .12 .09 .07 .05 .03 .02
29.00 DISCHG	.00

RUNOFF VOLUME ABOVE BASEFLOW = 3.14 WATERSHED INCHES, 3788.21 CFS-HRS, 313.06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5

SURFACE ELEVATION= 10.15

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
18.02	241.53	19.26

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.87 SQ.MI.
7.00 DISCHG	.00 .00 .00 .00	.00 .00 .00	.00 .01 .01
7.00 ELEV	10.15 10.15 10.15 10.15	10.15 10.15 10.15	10.15 10.15 10.15
8.00 DISCHG	.02 .03 .05 .08	.12 .17 .24	.33 .44 .57
8.00 ELEV	10.15 10.15 10.15 10.15	10.15 10.16 10.16	10.16 10.17 10.17
9.00 DISCHG	.73 .92 1.14 1.39	1.67 1.98 2.34	2.73 3.16 3.63
9.00 ELEV	10.18 10.18 10.19 10.20	10.21 10.22 10.23	10.25 10.26 10.28
10.00 DISCHG	4.15 4.71 5.32 5.98	6.69 7.47 8.32	9.23 10.23 11.31
10.00 ELEV	10.30 10.31 10.34 10.36	10.38 10.41 10.44	10.47 10.51 10.55
11.00 DISCHG	12.49 13.77 15.17 16.70	18.38 20.21 22.24	24.49 26.97 29.72
11.00 ELEV	10.59 10.63 10.68 10.73	10.79 10.86 10.93	11.01 11.09 11.19

12.00	DISCHG	32.90	36.85	41.90	48.21	55.75	64.31	73.65	83.64	94.22	105.29
12.00	ELEV	11.30	11.44	11.62	11.84	12.10	12.40	12.73	13.08	13.45	13.84
13.00	DISCHG	113.33	119.09	124.89	130.63	136.23	141.65	146.83	151.76	156.45	160.92
13.00	ELEV	14.13	14.36	14.60	14.83	15.05	15.27	15.47	15.67	15.86	16.04
14.00	DISCHG	165.20	169.30	173.25	177.06	180.75	184.31	187.77	191.12	194.37	197.53
14.00	ELEV	16.21	16.37	16.53	16.68	16.83	16.97	17.11	17.24	17.37	17.50
15.00	DISCHG	200.59	203.56	206.44	209.23	211.88	214.40	216.78	219.03	221.13	223.12
15.00	ELEV	17.62	17.74	17.86	17.97	18.08	18.18	18.27	18.36	18.45	18.52
16.00	DISCHG	224.97	226.71	228.33	229.84	231.25	232.55	233.76	234.87	235.89	236.82
16.00	ELEV	18.60	18.67	18.73	18.79	18.85	18.90	18.95	18.99	19.04	19.07
17.00	DISCHG	237.66	238.41	239.07	239.65	240.15	240.57	240.91	241.18	241.37	241.48
17.00	ELEV	19.11	19.14	19.16	19.19	19.21	19.22	19.24	19.25	19.25	19.26
18.00	DISCHG	241.53	241.51	241.44	241.30	241.11	240.86	240.55	240.20	239.80	239.36
18.00	ELEV	19.26	19.26	19.26	19.25	19.24	19.23	19.22	19.21	19.19	19.17
19.00	DISCHG	238.87	238.35	237.78	237.18	236.54	235.86	235.15	234.42	233.66	232.87
19.00	ELEV	19.15	19.13	19.11	19.09	19.06	19.03	19.01	18.98	18.95	18.91
20.00	DISCHG	232.05	231.21	230.35	229.46	228.56	227.64	226.70	225.74	224.77	223.78
20.00	ELEV	18.88	18.85	18.81	18.78	18.74	18.71	18.67	18.63	18.59	18.55
21.00	DISCHG	222.78	221.76	220.73	219.68	218.63	217.57	216.50	215.42	214.33	213.23
21.00	ELEV	18.51	18.47	18.43	18.39	18.35	18.30	18.26	18.22	18.17	18.13
22.00	DISCHG	212.12	211.01	209.86	208.65	207.37	206.04	204.68	203.31	201.93	200.55
22.00	ELEV	18.08	18.04	17.99	17.95	17.89	17.84	17.79	17.73	17.68	17.62
23.00	DISCHG	199.17	197.80	196.42	195.06	193.70	192.34	191.00	189.66	188.33	187.00
23.00	ELEV	17.57	17.51	17.46	17.40	17.35	17.29	17.24	17.19	17.13	17.08
24.00	DISCHG	185.67	184.37	183.10	181.85	180.61	179.39	178.19	177.02	175.86	174.69
24.00	ELEV	17.03	16.97	16.92	16.87	16.82	16.78	16.73	16.68	16.63	16.59

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25.00	DISCHG	173.51	172.29	171.03	169.73	168.39	167.00	165.58	164.13	162.65	161.16
25.00	ELEV	16.54	16.49	16.44	16.39	16.34	16.28	16.22	16.17	16.11	16.05
26.00	DISCHG	159.64	158.12	156.60	155.07	153.54	152.02	150.50	148.99	147.49	146.00
26.00	ELEV	15.99	15.92	15.86	15.80	15.74	15.68	15.62	15.56	15.50	15.44
27.00	DISCHG	144.52	143.05	141.59	140.15	138.72	137.30	135.89	134.50	133.12	131.75
27.00	ELEV	15.38	15.32	15.26	15.21	15.15	15.09	15.04	14.98	14.92	14.87
28.00	DISCHG	130.40	129.06	127.73	126.42	125.12	123.83	122.56	121.30	120.05	118.82
28.00	ELEV	14.82	14.76	14.71	14.66	14.60	14.55	14.50	14.45	14.40	14.35
29.00	DISCHG	117.59	116.38	115.18	114.00	112.83	111.66	110.51	108.75	106.50	104.29
29.00	ELEV	14.30	14.26	14.21	14.16	14.11	14.07	14.02	13.96	13.88	13.80

RUNOFF VOLUME ABOVE BASEFLOW = 2.73 WATERSHED INCHES, 3289.71 CFS-HRS, 271.86 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 51
INPUT HYDROGRAPHS= 7,5 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS) 14.30 PEAK DISCHARGE(CFS) 1472.12 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 8.04 SQ.MI.	
		.00	.00	.00	.00	.01	.01	.01	.02	.03	.04
7.00	DISCHG	.00	.00	.00	.00	.28	.38	.53	.71	.96	1.28
8.00	DISCHG	.07	.10	.14	.20	4.93	6.26	7.85	9.72	11.90	14.42
9.00	DISCHG	1.69	2.24	2.95	3.83	33.37	38.75	44.79	51.53	59.05	67.40
10.00	DISCHG	17.30	20.60	24.35	28.59	126.05	142.63	161.76	184.33	212.24	249.86
11.00	DISCHG	76.69	87.05	98.60	111.51	561.86	650.51	746.54	844.36	939.04	1027.16
12.00	DISCHG	305.55	388.16	428.32	486.44	1327.63	1365.49	1396.21	1420.42	1438.99	1452.63
13.00	DISCHG	1104.09	1170.53	1229.68	1282.23	1471.29	1468.95	1465.32	1460.62	1454.96	1448.43
14.00	DISCHG	1462.03	1467.97	1471.15	1472.12	1405.47	1395.33	1384.82	1374.00	1362.92	1351.58
15.00	DISCHG	1441.08	1433.02	1424.35	1415.16	1291.81	1279.50	1267.15	1254.73	1242.25	1229.68
16.00	DISCHG	1340.00	1328.19	1316.20	1304.05	1163.94	1150.31	1136.64	1122.89	1109.00	1094.95
17.00	DISCHG	1216.97	1204.05	1190.88	1177.49	1024.84	1011.16	997.65	984.33	971.21	958.31
18.00	DISCHG	1080.81	1066.66	1052.60	1038.65	897.13	885.48	874.08	862.97	852.18	841.70
19.00	DISCHG	945.65	933.22	921.01	908.99	793.02	783.91	774.98	766.25	757.72	749.39
20.00	DISCHG	831.52	821.57	811.84	802.33	709.94	702.59	695.40	688.32	681.35	674.49
21.00	DISCHG	741.20	733.14	725.22	717.47	642.51	636.45	630.46	624.55	618.71	612.93
22.00	DISCHG	667.77	661.24	654.87	648.64	585.34	580.07	574.82	569.53	564.10	558.42
23.00	DISCHG	607.24	601.62	596.10	590.67	533.32	527.23	513.05	498.40	483.13	467.17
24.00	DISCHG	552.62	547.09	542.15	537.67	486.01	481.54	477.33	473.37	469.61	466.05
25.00	DISCHG	450.66	433.91	417.24	400.85	369.31	354.25	339.70	325.70	312.21	298.21
26.00	DISCHG	299.21	286.77	275.01	263.99	244.33	235.64	227.65	220.28	213.46	206.19
27.00	DISCHG	207.16	201.30	195.85	190.77	186.01	181.54	177.33	173.37	169.61	166.05
28.00	DISCHG	162.66	159.44	156.35	153.40	147.87	145.26	142.75	140.33	138.00	135.77
29.00	DISCHG	135.74	133.56	131.44	129.40	127.41	125.48	123.61	121.16	118.26	115.44

RUNOFF VOLUME ABOVE BASEFLOW = 2.64 WATERSHED INCHES, 13688.68 CFS-HRS, 1131.23 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 52

OUTPUT HYDROGRAPH= 2
AREA= .17 SQ MI INPUT RUNOFF CURVE= 74. TIME OF CONCENTRATION= 1.00 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0952 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.71	142.67	(RUNOFF)
20.00	6.97	(RUNOFF)
22.43	5.73	(RUNOFF)
24.44	6.85	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.17 SQ.MI.
8.00	DISCHG	.00	.00	.01	.02	.05
9.00	DISCHG	.25	.37	.51	.68	.87
10.00	DISCHG	2.35	2.67	3.00	3.36	3.75
11.00	DISCHG	7.03	7.78	8.61	9.55	10.62
12.00	DISCHG	31.05	43.91	62.28	84.32	106.79
13.00	DISCHG	118.77	105.39	92.58	81.48	72.11
14.00	DISCHG	39.42	36.47	34.00	31.90	30.11
15.00	DISCHG	22.72	21.82	21.02	20.34	19.75
16.00	DISCHG	17.26	16.86	16.48	16.13	15.81
17.00	DISCHG	13.86	13.34	12.75	12.14	11.58
18.00	DISCHG	9.31	9.07	8.89	8.76	8.64
19.00	DISCHG	7.81	7.70	7.58	7.43	7.27
20.00	DISCHG	6.97	6.96	6.91	6.81	6.71
21.00	DISCHG	6.27	6.16	6.07	6.01	5.98
22.00	DISCHG	5.64	5.62	5.64	5.70	5.73
23.00	DISCHG	5.31	5.24	5.19	5.16	5.13
24.00	DISCHG	4.65	4.96	5.63	6.39	6.81
25.00	DISCHG	2.92	2.25	1.76	1.39	1.09
26.00	DISCHG	.24	.19	.15	.12	.09
27.00	DISCHG	.02	.01	.00	.12	.09

RUNOFF VOLUME ABOVE BASEFLOW = 2.96 WATERSHED INCHES, 315.02 CFS-HRS, 26.03 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 53
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.19	1505.17	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	8.21 SQ.MI.
7.00	DISCHG	.00	.00	.01	.01	.02
8.00	DISCHG	.07	.10	.14	.20	.28
9.00	DISCHG	1.94	2.61	3.46	4.51	5.79
10.00	DISCHG	19.65	23.27	27.35	31.95	37.12
11.00	DISCHG	83.72	94.83	107.21	121.06	136.67
12.00	DISCHG	336.60	432.08	490.60	570.76	668.65
13.00	DISCHG	1222.86	1275.92	1322.26	1363.71	1399.73
14.00	DISCHG	1501.45	1504.44	1505.15	1504.03	1501.40

15.00	DISCHG	1463.80	1454.84	1445.38	1435.50	1425.22	1414.56	1403.59	1392.38	1380.93	1369.23
16.00	DISCHG	1357.26	1345.06	1332.68	1320.18	1307.62	1295.02	1282.39	1269.71	1256.92	1243.99
17.00	DISCHG	1230.83	1217.39	1203.63	1189.62	1175.51	1161.40	1147.32	1133.19	1118.93	1104.55
18.00	DISCHG	1090.12	1075.73	1061.49	1047.41	1033.47	1019.66	1006.02	992.55	979.29	966.25
19.00	DISCHG	953.46	940.92	928.59	916.42	904.40	892.59	881.08	869.92	859.12	848.66
20.00	DISCHG	838.49	828.53	818.75	809.14	799.73	790.53	781.51	772.70	764.12	755.73
21.00	DISCHG	747.47	739.31	731.28	723.48	715.92	708.56	701.33	694.19	687.14	680.20
22.00	DISCHG	673.42	666.85	660.52	654.34	648.24	642.17	636.14	630.14	624.21	618.34
23.00	DISCHG	612.55	606.86	601.29	595.83	590.47	585.17	579.88	574.50	568.88	563.04
24.00	DISCHG	557.27	552.06	547.77	544.06	540.14	533.99	519.37	504.03	487.90	470.98
25.00	DISCHG	453.58	436.16	419.00	402.23	385.94	370.16	354.91	340.22	326.10	312.52
26.00	DISCHG	299.45	286.96	275.15	264.10	253.85	244.40	235.70	227.69	220.31	213.49
27.00	DISCHG	207.17	201.31	195.85	190.77	186.01	181.54	177.33	173.37	169.61	166.05
28.00	DISCHG	162.66	159.44	156.35	153.40	150.58	147.87	145.26	142.75	140.33	138.00
29.00	DISCHG	135.74	133.56	131.44	129.40	127.41	125.48	123.61	121.16	118.26	115.44

RUNOFF VOLUME ABOVE BASEFLOW = 2.64 WATERSHED INCHES, 14003.70 CFS-HRS, 1157.27 ACRE-Feet; BASEFLOW = .00 CFS

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EXECUTIVE CONTROL OPERATION COMPUT

RECORD ID

FROM XSECTION 1

TO XSECTION 53

STARTING TIME = .00 RAIN DEPTH = 7.10 RAIN DURATION = 1.00 RAIN TABLE NO. = 3 ANT. MOIST. COND = 2
ALTERNATE NO. = 1 STORM NO. = 99 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH = 1

AREA = .21 SQ MI INPUT RUNOFF CURVE = 69. TIME OF CONCENTRATION = .80 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT = .1067 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.57	251.00	(RUNOFF)
19.96	10.97	(RUNOFF)
22.35	9.07	(RUNOFF)
24.33	12.30	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .21 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .02 .06 .13 .25		
9.00	DISCHG .42 .63 .90 1.19 1.52 1.87 2.25 2.65 3.09 3.56		
10.00	DISCHG 4.07 4.61 5.18 5.80 6.48 7.23 8.05 8.96 9.95 11.04		
11.00	DISCHG 12.24 13.58 15.04 16.73 18.70 21.13 24.21 28.48 35.32 47.59		
12.00	DISCHG 68.58 100.63 142.20 186.60 224.46 246.93 250.19 236.35 211.81 183.11		
13.00	DISCHG 156.46 133.91 115.69 101.01 89.15 79.45 71.41 64.70 59.09 54.46		
14.00	DISCHG 50.67 47.58 45.04 42.91 40.99 39.13 37.40 35.91 34.63 33.42		
15.00	DISCHG 32.31 31.38 30.58 29.85 29.17 28.59 28.07 27.57 27.06 26.51		
16.00	DISCHG 25.89 25.26 24.68 24.19 23.80 23.47 23.11 22.66 22.08 21.37		
17.00	DISCHG 20.49 19.45 18.34 17.35 16.58 16.01 15.55 15.09 14.55 14.03		
18.00	DISCHG 13.64 13.42 13.34 13.27 13.13 12.92 12.67 12.40 12.17 12.01		
19.00	DISCHG 11.90 11.76 11.55 11.23 10.88 10.66 10.61 10.68 10.82 10.95		
20.00	DISCHG 10.96 10.83 10.62 10.41 10.25 10.09 9.97 9.92 9.91 9.79		
21.00	DISCHG 9.57 9.36 9.23 9.20 9.25 9.28 9.22 9.06 8.85 8.67		
22.00	DISCHG 8.62 8.73 8.93 9.06 9.05 8.93 8.74 8.53 8.34 8.21		
23.00	DISCHG 8.12 8.05 8.00 7.96 7.93 7.91 7.87 7.70 7.36 7.11		
24.00	DISCHG 7.54 9.10 11.15 12.23 11.99 10.77 8.89 6.74 4.88 3.55		
25.00	DISCHG 2.63 1.94 1.42 1.04 .76 .55 .41 .30 .22 .16		
26.00	DISCHG .11 .08 .06 .04 .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.63 WATERSHED INCHES, 489.79 CFS-HRS, 40.48 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH = 2

AREA = .28 SQ MI INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = 1.01 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT = .0962 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.72	268.34	(RUNOFF)
20.00	13.97	(RUNOFF)
22.43	11.50	(RUNOFF)
24.44	12.69	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .28 SQ.MI.
9.00	DISCHG .00 .01 .03 .07 .15 .28 .47 .71 1.02 1.40		
10.00	DISCHG 1.83 2.31 2.85 3.44 4.09 4.81 5.61 6.50 7.47 8.55		
11.00	DISCHG 9.74 11.06 12.54 14.20 16.12 18.36 21.12 24.75 30.04 38.87		
12.00	DISCHG 53.74 77.10 110.47 151.27 194.05 231.79 257.61 267.94 264.31 249.42		
13.00	DISCHG 227.57 203.04 178.98 157.98 140.26 125.35 112.75 101.90 92.61 84.62		

14.00	DISCHG	77.83	72.08	67.25	63.15	59.63	56.57	53.83	51.34	49.11	47.09
15.00	DISCHG	45.22	43.45	41.88	40.54	39.36	38.31	37.41	36.62	35.90	35.17
16.00	DISCHG	34.41	33.63	32.89	32.19	31.56	30.98	30.44	29.90	29.30	28.58
17.00	DISCHG	27.72	26.70	25.54	24.32	23.20	22.24	21.40	20.65	19.92	19.25
18.00	DISCHG	18.67	18.19	17.82	17.54	17.29	17.03	16.76	16.48	16.19	15.91
19.00	DISCHG	15.66	15.43	15.19	14.91	14.59	14.27	14.05	13.93	13.92	13.95
20.00	DISCHG	13.97	13.95	13.85	13.67	13.47	13.29	13.11	12.95	12.83	12.73
21.00	DISCHG	12.58	12.38	12.19	12.06	12.01	11.97	11.90	11.78	11.63	11.47
22.00	DISCHG	11.35	11.30	11.33	11.43	11.49	11.48	11.39	11.25	11.07	10.87
23.00	DISCHG	10.69	10.55	10.45	10.37	10.31	10.26	10.20	10.06	9.79	9.53
24.00	DISCHG	9.51	9.90	10.82	11.94	12.63	12.54	11.80	10.58	9.06	7.33
25.00	DISCHG	5.66	4.36	3.41	2.69	2.12	1.66	1.30	1.02	.80	.62
26.00	DISCHG	.49	.38	.30	.23	.18	.14	.10	.08	.06	.05
27.00	DISCHG	.03	.02	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 3.31 WATERSHED INCHES, 598.62 CFS-HRS, 49.47 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 3
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
LENGTH = 2100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.70, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 3 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.57	251.00	(NULL)
19.96	10.97	(NULL)
22.35	9.07	(NULL)
24.33	12.30	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.63 WATERSHED INCHES, 489.79 CFS-HRS, 40.48 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.64	510.30	(NULL)
19.97	24.94	(NULL)
21.38	21.26	(NULL)
22.38	20.55	(NULL)
24.38	24.67	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .49 SQ.MI.
8.00	DISCHG .00 .00 .00 .00	.00 .00 .02 .06	.13 .25
9.00	DISCHG .42 .64 .92 1.26	1.67 2.15 2.71 3.37	4.11 4.96
10.00	DISCHG 5.90 6.92 8.03 9.24	10.57 12.04 13.67 15.46	17.43 19.59
11.00	DISCHG 21.98 24.64 27.58 30.93	34.81 39.50 45.33 53.24	65.35 86.46
12.00	DISCHG 122.32 177.73 252.67 337.87	418.51 478.72 507.79 504.29	476.11 432.53
13.00	DISCHG 384.02 336.95 294.67 258.98	229.42 204.81 184.16 166.60	151.70 139.08
14.00	DISCHG 128.50 119.66 112.29 106.06	100.62 95.69 91.23 87.26	83.74 80.51
15.00	DISCHG 77.53 74.83 72.46 70.39	68.53 66.90 65.48 64.19	62.97 61.68
16.00	DISCHG 60.30 58.89 57.56 56.38	55.36 54.45 53.55 52.56	51.38 49.95
17.00	DISCHG 48.21 46.14 43.87 41.67	39.79 38.25 36.95 35.74	34.47 33.28
18.00	DISCHG 32.31 31.61 31.16 30.82	30.43 29.96 29.43 28.88	28.37 27.93
19.00	DISCHG 27.56 27.19 26.73 26.13	25.47 24.94 24.66 24.62	24.74 24.90
20.00	DISCHG 24.93 24.78 24.47 24.09	23.72 23.38 23.08 22.87	22.74 22.52
21.00	DISCHG 22.15 21.74 21.41 21.26	21.26 21.25 21.11 20.84	20.47 20.14
22.00	DISCHG 19.97 20.03 20.26 20.49	20.55 20.41 20.13 19.77	19.41 19.08
23.00	DISCHG 18.80 18.59 18.44 18.33	18.24 18.17 18.07 17.76	17.15 16.63
24.00	DISCHG 17.04 19.01 21.96 24.17	24.61 23.31 20.68 17.32	13.94 10.88
25.00	DISCHG 8.28 6.30 4.82 3.73	2.88 2.21 1.71 1.32	1.02 .78
26.00	DISCHG .60 .46 .36 .27	.20 .14 .10 .08	.06 .05
27.00	DISCHG .03 .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.45 WATERSHED INCHES, 1088.41 CFS-HRS, 89.95 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 4
OUTPUT HYDROGRAPH= 5
AREA= .26 SQ MI INPUT RUNOFF CURVE= 75. TIME OF CONCENTRATION= .43 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0573 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)

12.33	495.12	(RUNOFF)
17.44	20.26	(RUNOFF)
18.16	18.29	(RUNOFF)
19.82	15.38	(RUNOFF)
20.73	13.51	(RUNOFF)
21.37	13.17	(RUNOFF)
22.17	13.09	(RUNOFF)
23.45	10.59	(RUNOFF)
24.17	25.52	(RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .26 SQ.MI.

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7.00	DISCHG	.00	.00	.00	.00	.01	.08	.24	.50	.85	1.23
8.00	DISCHG	1.63	2.04	2.45	2.85	3.26	3.69	4.23	4.80	5.25	5.65
9.00	DISCHG	6.30	7.13	7.82	8.33	8.93	9.69	10.45	11.21	12.11	13.12
10.00	DISCHG	14.08	15.01	16.08	17.37	18.85	20.47	22.21	24.04	25.99	28.14
11.00	DISCHG	30.72	33.59	36.54	39.93	44.81	51.09	58.65	70.08	92.67	137.90
12.00	DISCHG	223.08	334.84	437.45	492.72	474.90	401.26	311.69	237.89	183.93	147.38
13.00	DISCHG	123.56	107.07	95.13	86.19	79.01	72.87	67.36	62.75	59.53	57.39
14.00	DISCHG	55.52	53.72	52.36	51.04	48.89	46.38	45.00	44.35	42.97	40.91
15.00	DISCHG	39.79	39.55	39.11	38.13	37.21	36.65	36.35	35.95	34.95	33.62
16.00	DISCHG	32.49	31.83	31.47	31.27	31.16	30.86	29.91	28.60	27.46	26.29
17.00	DISCHG	24.08	21.52	20.01	19.92	20.23	20.21	19.45	18.21	17.17	16.77
18.00	DISCHG	17.30	18.15	18.23	17.56	16.77	16.29	16.02	15.87	15.79	15.75
19.00	DISCHG	15.71	15.44	14.52	13.47	13.27	13.89	14.66	15.13	15.37	15.27
20.00	DISCHG	14.43	13.45	13.25	13.63	13.47	12.92	12.95	13.47	13.37	12.58
21.00	DISCHG	11.75	11.46	12.12	12.99	13.12	12.45	11.66	11.17	10.91	11.00
22.00	DISCHG	11.86	12.86	13.06	12.42	11.66	11.18	10.91	10.76	10.68	10.63
23.00	DISCHG	10.61	10.59	10.59	10.58	10.58	10.58	10.48	9.53	7.29	6.99
24.00	DISCHG	13.99	23.22	25.22	18.71	11.12	6.20	3.50	1.98	1.12	.63
25.00	DISCHG	.35	.20	.10	.03	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 4.27 WATERSHED INCHES, 722.63 CFS-HRS, 59.72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 5
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
LENGTH = 1200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.64	510.30	(NULL)
19.97	24.94	(NULL)
21.38	21.26	(NULL)
22.38	20.55	(NULL)
24.38	24.67	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.45 WATERSHED INCHES, 1088.41 CFS-HRS, 89.95 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 5
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	897.40	(NULL)
18.08	49.77	(NULL)
19.86	40.25	(NULL)
20.71	36.35	(NULL)
21.37	34.43	(NULL)
22.20	33.32	(NULL)
24.20	47.19	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.75 SQ.MI.
7.00	DISCHG	.00	.00	.01	.08	1.23
8.00	DISCHG	1.63	2.04	2.45	2.85	5.90
9.00	DISCHG	6.71	7.77	8.74	9.60	18.08

10.00	DISCHG	19.98	21.93	24.11	26.60	29.42	32.51	35.88	39.50	43.42	47.73
11.00	DISCHG	52.71	58.23	64.13	70.86	79.62	90.59	103.99	123.32	158.02	224.36
12.00	DISCHG	345.41	512.58	690.13	830.59	893.40	879.99	819.48	742.18	660.05	579.91
13.00	DISCHG	507.58	444.02	389.80	345.18	308.43	277.68	251.52	229.35	211.23	196.47
14.00	DISCHG	184.02	173.38	164.65	157.10	149.51	142.07	136.22	131.60	126.70	121.42
15.00	DISCHG	117.32	114.38	111.57	108.52	105.75	103.55	101.83	100.14	97.92	95.31
16.00	DISCHG	92.78	90.72	89.03	87.64	86.52	85.31	83.46	81.16	78.85	76.24
17.00	DISCHG	72.29	67.67	63.88	61.59	60.02	58.46	56.40	53.95	51.64	50.05
18.00	DISCHG	49.61	49.76	49.39	48.38	47.19	46.24	45.45	44.76	44.16	43.68
19.00	DISCHG	43.27	42.63	41.25	39.61	38.74	38.83	39.31	39.74	40.12	40.17
20.00	DISCHG	39.36	38.22	37.72	37.71	37.19	36.30	36.03	36.34	36.11	35.10
21.00	DISCHG	33.91	33.21	33.53	34.25	34.38	33.70	32.78	32.01	31.39	31.14
22.00	DISCHG	31.83	32.88	33.32	32.91	32.21	31.59	31.04	30.53	30.09	29.71
23.00	DISCHG	29.41	29.19	29.03	28.91	28.82	28.76	28.55	27.29	24.43	23.62
24.00	DISCHG	31.03	42.23	47.19	42.88	35.73	29.51	24.18	19.29	15.05	11.51
25.00	DISCHG	8.64	6.50	4.93	3.76	2.88	2.21	1.71	1.32	1.02	.78
26.00	DISCHG	.60	.46	.36	.27	.20	.14	.10	.08	.06	.05
27.00	DISCHG	.03	.02	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 3.74 WATERSHED INCHES, 1811.03 CFS-HRS, 149.66 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1
SURFACE ELEVATION= 132.10

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
14.13		171.20				138.30					
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .75 SQ.MI.	
7.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.03	.06	.10
7.00	ELEV	132.10	132.10	132.10	132.10	132.10	132.10	132.10	132.10	132.10	132.11
8.00	DISCHG	.17	.25	.34	.45	.57	.71	.86	1.04	1.23	1.44
8.00	ELEV	132.11	132.12	132.12	132.13	132.14	132.15	132.16	132.17	132.18	132.20
9.00	DISCHG	1.67	1.94	2.23	2.56	2.92	3.31	3.75	4.23	4.75	5.34
9.00	ELEV	132.21	132.23	132.25	132.28	132.30	132.33	132.36	132.39	132.43	132.47

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10.00	DISCHG	5.99	6.70	7.47	8.32	9.25	10.28	11.41	12.65	14.01	15.51
10.00	ELEV	132.51	132.56	132.61	132.67	132.73	132.80	132.88	132.97	133.06	133.16
11.00	DISCHG	17.15	18.96	20.84	22.77	24.93	27.42	30.30	33.74	38.16	44.30
11.00	ELEV	133.27	133.40	133.50	133.56	133.63	133.71	133.80	133.92	134.06	134.23
12.00	DISCHG	53.83	66.22	81.19	97.71	112.73	125.51	135.71	143.99	150.51	156.00
12.00	ELEV	134.48	134.81	135.22	135.68	136.13	136.54	136.90	137.20	137.43	137.63
13.00	DISCHG	160.38	162.94	165.00	166.64	167.94	168.95	169.73	170.30	170.71	170.98
13.00	ELEV	137.80	137.92	138.01	138.09	138.15	138.19	138.23	138.25	138.27	138.28
14.00	DISCHG	171.13	171.20	171.18	171.09	170.95	170.75	170.49	170.19	169.86	169.49
14.00	ELEV	138.29	138.29	138.29	138.29	138.28	138.27	138.26	138.25	138.23	138.22
15.00	DISCHG	169.08	168.65	168.20	167.73	167.23	166.73	166.21	165.68	165.14	164.58
15.00	ELEV	138.20	138.18	138.16	138.14	138.11	138.09	138.07	138.04	138.02	137.99
16.00	DISCHG	164.01	163.42	162.83	162.22	161.61	161.00	160.38	159.63	158.70	157.75
16.00	ELEV	137.96	137.94	137.91	137.88	137.85	137.83	137.80	137.77	137.73	137.70
17.00	DISCHG	156.77	155.75	154.70	153.62	152.54	151.45	150.35	149.23	148.10	146.97
17.00	ELEV	137.66	137.63	137.59	137.55	137.51	137.47	137.43	137.39	137.35	137.30
18.00	DISCHG	145.83	144.70	143.59	142.48	141.37	140.26	138.99	137.67	136.35	135.05
18.00	ELEV	137.26	137.22	137.18	137.14	137.10	137.06	137.01	136.97	136.92	136.88
19.00	DISCHG	133.76	132.48	131.21	129.93	128.65	127.38	126.14	124.92	123.72	122.54
19.00	ELEV	136.83	136.79	136.74	136.70	136.65	136.61	136.56	136.52	136.48	136.44
20.00	DISCHG	121.38	120.21	118.73	117.19	115.67	114.17	112.69	111.24	109.81	108.41
20.00	ELEV	136.40	136.36	136.31	136.26	136.22	136.17	136.13	136.08	136.04	136.00
21.00	DISCHG	107.00	105.61	104.23	102.90	101.60	100.31	98.77	97.15	95.56	94.00
21.00	ELEV	135.95	135.91	135.87	135.83	135.79	135.75	135.71	135.66	135.62	135.57
22.00	DISCHG	92.48	91.01	89.60	88.23	86.87	85.54	84.22	82.92	81.64	80.38
22.00	ELEV	135.53	135.49	135.45	135.42	135.38	135.34	135.31	135.27	135.24	135.20
23.00	DISCHG	79.00	77.59	76.22	74.88	73.57	72.31	71.07	69.85	68.60	67.34
23.00	ELEV	135.16	135.12	135.09	135.05	135.01	134.98	134.94	134.91	134.88	134.84
24.00	DISCHG	66.20	65.36	64.78	64.22	63.51	62.64	61.62	60.49	58.97	57.16
24.00	ELEV	134.81	134.79	134.77	134.76	134.74	134.71	134.68	134.65	134.61	134.57
25.00	DISCHG	55.30	53.41	51.52	49.65	47.81	46.02	44.28	42.58	40.94	39.33
25.00	ELEV	134.52	134.47	134.42	134.37	134.32	134.28	134.23	134.19	134.14	134.10
26.00	DISCHG	37.73	36.20	34.72	33.30	31.93	30.62	29.36	28.15	26.99	25.88
26.00	ELEV	134.05	134.00	133.95	133.90	133.86	133.82	133.77	133.73	133.70	133.66
27.00	DISCHG	24.81	23.79	22.81	21.87	20.96	20.10	19.16	18.25	17.39	16.57
27.00	ELEV	133.63	133.59	133.56	133.53	133.50	133.47	133.41	133.35	133.29	133.23
28.00	DISCHG	15.78	15.04	14.32	13.65	13.00	12.39	11.80	11.24	10.71	10.20
28.00	ELEV	133.18	133.13	133.08	133.03	132.99	132.95	132.91	132.87	132.83	132.80
29.00	DISCHG	9.72	9.26	8.82	8.40	8.01	7.63	7.27	6.92	6.59	6.28

29.00 ELEV 132.77 132.73 132.70 132.68 132.65 132.62 132.60 132.57 132.55 132.53
RUNOFF VOLUME ABOVE BASEFLOW = 3.71 WATERSHED INCHES, 1798.10 CFS-HRS, 148.59 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 6
OUTPUT HYDROGRAPH= 2
AREA= .30 SQ MI INPUT RUNOFF CURVE= 71. TIME OF CONCENTRATION= .73 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0973 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.52	396.54	(RUNOFF)
18.20	19.40	(RUNOFF)
19.93	16.09	(RUNOFF)
21.48	13.62	(RUNOFF)
22.32	13.35	(RUNOFF)
24.33	16.27	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .30 SQ.MI.
8.00 DISCHG	.00 .00 .02 .07 .18 .35 .59	.89 1.25 1.64	
9.00 DISCHG	2.08 2.57 3.11 3.67 4.24 4.85 5.48	6.15 6.87 7.65	
10.00 DISCHG	8.47 9.34 10.25 11.25 12.35 13.58 14.93	16.42 18.02 19.78	
11.00 DISCHG	21.72 23.91 26.32 29.06 32.29 36.34 41.41	48.54 59.93 81.21	
12.00 DISCHG	118.32 175.36 247.23 319.06 373.30 396.01 385.24	350.40 303.85 256.74	
13.00 DISCHG	216.02 183.29 157.52 137.29 121.25 108.28 97.60	88.69 81.31 75.30	
14.00 DISCHG	70.46 66.51 63.25 60.47 57.91 55.41 53.19	51.34 49.68 47.99	
15.00 DISCHG	46.42 45.16 44.09 43.08 42.19 41.39 40.64	39.94 39.23 38.39	
16.00 DISCHG	37.44 36.49 35.65 34.99 34.49 34.06 33.53	32.81 31.90 30.79	
17.00 DISCHG	29.39 27.71 25.99 24.57 23.56 22.87 22.32	21.66 20.83 20.04	
18.00 DISCHG	19.51 19.34 19.40 19.35 19.10 18.72 18.28	17.87 17.59 17.41	
19.00 DISCHG	17.26 17.06 16.71 16.19 15.68 15.39 15.39	15.59 15.88 16.08	
20.00 DISCHG	16.03 15.72 15.35 15.05 14.83 14.62 14.47	14.43 14.38 14.19	
21.00 DISCHG	13.85 13.52 13.32 13.36 13.55 13.61 13.44	13.12 12.71 12.42	
22.00 DISCHG	12.43 12.76 13.16 13.35 13.26 12.99 12.63	12.28 12.03 11.87	
23.00 DISCHG	11.75 11.66 11.61 11.56 11.53 11.51 11.42	11.05 10.23 9.42	
24.00 DISCHG	9.70 11.72 14.55 16.18 15.76 13.77 10.77	7.71 5.41 3.88	
25.00 DISCHG	2.78 1.98 1.41 1.00 .71 .50 .36	.25 .18 .13	
26.00 DISCHG	.09 .06 .03 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.83 WATERSHED INCHES, 734.39 CFS-HRS, 60.69 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 7
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
LENGTH = 1500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .85 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 7 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
14.25	171.19	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.71 WATERSHED INCHES, 1797.31 CFS-HRS, 148.53 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 7
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.56	510.65	(NULL)
24.30	81.07	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.05 SQ.MI.
7.00 DISCHG	.00 .00 .00 .00 .00 .00 .00	.01 .02 .05	
8.00 DISCHG	.10 .16 .26 .40 .61 .90 1.27	1.73 2.26 2.84	
9.00 DISCHG	3.48 4.21 5.00 5.85 6.75 7.70 8.72	9.82 11.01 12.31	
10.00 DISCHG	13.71 15.21 16.82 18.58 20.52 22.66 25.03	27.63 30.45 33.55	

11.00	DISCHG	36.96	40.78	44.97	49.57	54.72	60.89	68.39	78.34	93.08	118.61
12.00	DISCHG	161.58	227.59	311.33	397.67	468.13	506.03	508.41	484.23	446.30	406.03
13.00	DISCHG	371.01	342.85	319.95	301.90	287.59	275.97	266.36	258.28	251.50	245.93
14.00	DISCHG	241.39	237.61	234.43	231.64	229.02	226.39	223.97	221.87	219.93	217.90
15.00	DISCHG	215.97	214.31	212.81	211.36	210.00	208.71	207.46	206.24	205.00	203.62
16.00	DISCHG	202.12	200.60	199.18	197.92	196.82	195.77	194.64	193.30	191.66	189.64
17.00	DISCHG	187.30	184.65	181.92	179.45	177.37	175.60	173.96	172.20	170.26	168.34
18.00	DISCHG	166.68	165.37	164.30	163.14	161.78	160.29	158.74	157.08	155.49	153.99
19.00	DISCHG	152.54	151.05	149.42	147.62	145.83	144.27	142.99	141.95	141.02	140.02
20.00	DISCHG	138.78	137.31	135.77	134.03	132.29	130.56	128.91	127.39	125.88	124.25
21.00	DISCHG	122.51	120.77	119.17	117.84	116.69	115.44	113.98	112.15	110.15	108.26
22.00	DISCHG	106.71	105.51	104.44	103.20	101.73	100.11	98.40	96.73	95.18	93.73
23.00	DISCHG	92.35	90.91	89.45	88.02	86.65	85.32	83.95	82.34	80.29	78.24
24.00	DISCHG	77.26	78.13	80.07	81.07	80.08	77.40	73.55	69.51	66.10	63.11
25.00	DISCHG	60.25	57.60	55.15	52.85	50.69	48.65	46.70	44.84	43.06	41.36
26.00	DISCHG	39.71	38.08	36.50	34.99	33.55	32.18	30.85	29.59	28.37	27.20
27.00	DISCHG	26.08	25.00	23.97	22.98	22.03	21.13	20.25	19.33	18.42	17.55
28.00	DISCHG	16.71	15.92	15.17	14.45	13.77	13.12	12.50	11.90	11.34	10.80
29.00	DISCHG	10.29	9.81	9.34	8.90	8.48	8.08	7.70	7.33	6.98	6.65

RUNOFF VOLUME ABOVE BASEFLOW = 3.74 WATERSHED INCHES, 2531.70 CFS-HRS, 209.22 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 8

OUTPUT HYDROGRAPH= 5

AREA= .12 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .56 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0747 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.40	214.33	(RUNOFF)
18.21	8.30	(RUNOFF)
22.24	5.81	(RUNOFF)
24.24	9.28	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.12 SQ.MI.
6.00	DISCHG	.00 .00 .00 .00 .00 .00 .00	.01 .03 .07			
7.00	DISCHG	.12 .19 .27 .36 .46 .57 .72	.92 1.14 1.38			
8.00	DISCHG	1.61 1.82 2.03 2.23 2.43 2.64 2.88	3.15 3.39 3.62			
9.00	DISCHG	3.89 4.24 4.60 4.91 5.21 5.54 5.89	6.27 6.68 7.13			
10.00	DISCHG	7.60 8.07 8.57 9.13 9.79 10.53 11.32	12.18 13.09 14.07			

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11.00	DISCHG	15.20	16.47	17.81	19.35	21.29	23.81	27.02	31.63	39.02	54.59
12.00	DISCHG	82.15	122.53	166.33	201.01	214.33	201.10	174.01	141.53	113.14	90.92
13.00	DISCHG	74.56	63.02	54.36	47.89	42.97	38.92	35.50	32.58	30.23	28.46
14.00	DISCHG	27.15	26.09	25.23	24.47	23.60	22.60	21.75	21.12	20.51	19.79
15.00	DISCHG	19.14	18.72	18.40	18.06	17.67	17.31	17.05	16.83	16.51	16.04
16.00	DISCHG	15.54	15.12	14.82	14.64	14.52	14.39	14.10	13.67	13.19	12.63
17.00	DISCHG	11.88	10.93	10.12	9.63	9.47	9.42	9.23	8.83	8.39	8.06
18.00	DISCHG	8.01	8.18	8.30	8.22	7.99	7.73	7.54	7.44	7.36	7.31
19.00	DISCHG	7.28	7.18	6.94	6.59	6.36	6.37	6.55	6.78	6.94	6.97
20.00	DISCHG	6.81	6.51	6.30	6.25	6.22	6.11	6.05	6.10	6.12	5.98
21.00	DISCHG	5.71	5.50	5.52	5.74	5.89	5.83	5.61	5.36	5.17	5.13
22.00	DISCHG	5.29	5.60	5.80	5.77	5.59	5.35	5.17	5.06	4.99	4.94
23.00	DISCHG	4.91	4.89	4.88	4.88	4.87	4.87	4.86	4.70	4.20	3.81
24.00	DISCHG	4.84	7.27	9.13	8.85	7.08	4.79	3.06	1.97	1.27	.82
25.00	DISCHG	.52	.34	.22	.14	.09	.06	.03	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 4.60 WATERSHED INCHES, 347.38 CFS-HRS, 28.71 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 9

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.50	707.13	(NULL)
24.27	90.07	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.17 SQ.MI.
6.00	DISCHG	.00 .00 .00 .00 .00 .00 .00	.01 .03 .07			
7.00	DISCHG	.12 .19 .27 .36 .46 .57 .72	.92 1.17 1.43			
8.00	DISCHG	1.70 1.98 2.29 2.63 3.04 3.53 4.15	4.88 5.65 6.46			
9.00	DISCHG	7.37 8.44 9.60 10.76 11.96 13.24 14.61	16.09 17.69 19.44			
10.00	DISCHG	21.31 23.28 25.39 27.72 30.31 33.19 36.35	39.81 43.54 47.63			
11.00	DISCHG	52.17 57.25 62.78 68.92 76.01 84.70 95.41	109.98 132.10 173.21			
12.00	DISCHG	243.73 350.12 477.66 598.68 682.46 707.13 682.42	625.76 559.45 496.95			
13.00	DISCHG	445.57 405.87 374.30 349.79 330.56 314.89 301.86	290.86 281.72 274.39			

14.00	DISCHG	268.54	263.70	259.66	256.11	252.61	248.99	245.72	242.99	240.43	237.70
15.00	DISCHG	235.12	233.02	231.22	229.42	227.66	226.02	224.51	223.08	221.51	219.66
16.00	DISCHG	217.66	215.72	214.00	212.56	211.34	210.16	208.74	206.96	204.84	202.28
17.00	DISCHG	199.19	195.58	192.04	189.09	186.84	185.02	183.19	181.04	178.64	176.40
18.00	DISCHG	174.68	173.55	172.61	171.36	169.77	168.02	166.28	164.52	162.85	161.31
19.00	DISCHG	159.82	158.23	156.36	154.22	152.19	150.63	149.54	148.72	147.96	146.99
20.00	DISCHG	145.59	143.82	142.07	140.29	138.50	136.67	134.97	133.49	132.00	130.23
21.00	DISCHG	128.22	126.27	124.69	123.58	122.58	121.27	119.59	117.51	115.32	113.39
22.00	DISCHG	112.00	111.10	110.23	108.98	107.32	105.46	103.57	101.79	100.17	98.67
23.00	DISCHG	97.26	95.80	94.33	92.90	91.52	90.19	88.81	87.04	84.49	82.05
24.00	DISCHG	82.09	85.39	89.20	89.92	87.17	82.19	76.62	71.48	67.37	63.93
25.00	DISCHG	60.78	57.94	55.37	52.99	50.78	48.70	46.73	44.85	43.06	41.36
26.00	DISCHG	39.71	38.08	36.50	34.99	33.55	32.18	30.85	29.59	28.37	27.20
27.00	DISCHG	26.08	25.00	23.97	22.98	22.03	21.13	20.25	19.33	18.42	17.55

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28.00	DISCHG	16.71	15.92	15.17	14.45	13.77	13.12	12.50	11.90	11.34	10.80
29.00	DISCHG	10.29	9.81	9.34	8.90	8.48	8.08	7.70	7.33	6.98	6.65

RUNOFF VOLUME ABOVE BASEFLOW = 3.83 WATERSHED INCHES, 2879.08 CFS-HRS, 237.93 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 10

OUTPUT HYDROGRAPH= 7

AREA= .17 SQ MI INPUT RUNOFF CURVE= 70. TIME OF CONCENTRATION= .58 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0773 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.42	246.65	(RUNOFF)
18.22	10.88	(RUNOFF)
19.87	9.18	(RUNOFF)
22.25	7.66	(RUNOFF)
24.25	11.98	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .17 SQ.MI.
8.00	DISCHG .00 .00 .00 .00	.02 .07 .18	.33 .51 .73
9.00	DISCHG .98 1.27 1.58 1.89	2.22 2.56 2.92	3.31 3.73 4.19
10.00	DISCHG 4.67 5.17 5.69 6.28	6.94 7.69 8.50	9.39 10.35 11.39
11.00	DISCHG 12.58 13.92 15.38 17.04	19.12 21.78 24.97	29.84 38.19 54.13
12.00	DISCHG 84.10 129.15 180.55 225.31	245.86 238.53 211.81	176.03 142.59 115.84
13.00	DISCHG 95.74 81.21 70.29 61.94	55.68 50.52 46.13	42.39 39.36 37.01
14.00	DISCHG 35.19 33.80 32.68 31.69	30.59 29.36 28.28	27.46 26.67 25.76
15.00	DISCHG 24.93 24.37 23.94 23.50	23.02 22.57 22.23	21.94 21.54 20.96
16.00	DISCHG 20.34 19.80 19.41 19.16	19.00 18.82 18.48	17.94 17.32 16.60
17.00	DISCHG 15.65 14.47 13.42 12.76	12.49 12.40 12.16	11.66 11.08 10.66
18.00	DISCHG 10.54 10.72 10.87 10.80	10.54 10.22 9.96	9.80 9.70 9.64
19.00	DISCHG 9.58 9.47 9.17 8.74	8.42 8.40 8.60	8.89 9.12 9.17
20.00	DISCHG 8.99 8.63 8.35 8.27	8.20 8.07 8.00	8.04 8.06 7.89
21.00	DISCHG 7.58 7.31 7.30 7.55	7.75 7.70 7.44	7.12 6.87 6.81
22.00	DISCHG 6.99 7.35 7.63 7.62	7.40 7.11 6.87	6.72 6.62 6.55
23.00	DISCHG 6.51 6.49 6.47 6.46	6.45 6.45 6.43	6.21 5.56 5.03
24.00	DISCHG 6.22 9.18 11.70 11.61	9.57 6.70 4.31	2.85 1.87 1.21
25.00	DISCHG .80 .52 .34 .22	.14 .09 .06	.03 .01 .00

RUNOFF VOLUME ABOVE BASEFLOW = 3.73 WATERSHED INCHES, 407.23 CFS-HRS, 33.65 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1

LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .92 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.61	704.92	(NULL)
24.38	89.93	(NULL)

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RUNOFF VOLUME ABOVE BASEFLOW = 3.83 WATERSHED INCHES, 2878.37 CFS-HRS, 237.87 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11
 INPUT HYDROGRAPHS= 7,1 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)	
12.55		922.66		(NULL)	
24.33		100.68		(NULL)	
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =
6.00	DISCHG	.00	.00	.00	1.33 SQ.MI.
7.00	DISCHG	.07	.12	.18	.01
8.00	DISCHG	1.41	1.68	1.96	.91
9.00	DISCHG	7.37	8.57	9.94	5.33
10.00	DISCHG	23.97	26.32	28.81	19.70
11.00	DISCHG	59.88	65.72	72.21	49.87
12.00	DISCHG	254.06	367.30	522.20	147.00
13.00	DISCHG	597.83	531.05	479.49	772.76
14.00	DISCHG	310.19	302.83	296.78	331.13
15.00	DISCHG	262.85	259.70	257.14	269.88
16.00	DISCHG	240.15	237.62	235.29	244.73
17.00	DISCHG	218.13	213.90	209.29	224.42
18.00	DISCHG	187.12	185.55	184.52	192.29
19.00	DISCHG	171.01	169.41	167.53	174.36
20.00	DISCHG	156.06	154.33	152.31	157.91
21.00	DISCHG	137.96	135.69	133.73	141.67
22.00	DISCHG	120.54	119.47	118.81	124.55
23.00	DISCHG	105.31	103.86	102.39	108.55
24.00	DISCHG	88.48	91.29	96.85	92.74
25.00	DISCHG	65.01	61.56	58.51	73.77
26.00	DISCHG	41.50	39.84	38.21	45.01
27.00	DISCHG	27.30	26.17	25.09	29.69
28.00	DISCHG	17.62	16.78	15.99	19.40
29.00	DISCHG	10.85	10.33	9.85	11.95

RUNOFF VOLUME ABOVE BASEFLOW = 3.82 WATERSHED INCHES, 3285.60 CFS-HRS, 271.52 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 109.00

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)	
12.79		791.82		118.53	
24.38		99.90		110.78	
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =
6.00	DISCHG	.00	.00	.00	1.33 SQ.MI.
1	DISCHG	.00	.00	.00	.01

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6.00	ELEV	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
7.00	DISCHG	.05	.09	.15	.22	.30	.40	.50	.62	.79	1.01
7.00	ELEV	109.00	109.00	109.00	109.01	109.01	109.01	109.01	109.01	109.02	109.02
8.00	DISCHG	1.26	1.52	1.80	2.08	2.41	2.82	3.33	3.99	4.81	5.74
8.00	ELEV	109.03	109.04	109.04	109.05	109.06	109.07	109.08	109.09	109.11	109.14
9.00	DISCHG	6.75	7.87	9.15	10.55	12.01	13.52	15.11	16.79	18.60	20.56
9.00	ELEV	109.16	109.19	109.22	109.25	109.28	109.32	109.36	109.40	109.44	109.49
10.00	DISCHG	22.68	24.95	27.36	29.93	32.74	35.86	39.33	43.15	47.32	51.86
10.00	ELEV	109.54	109.59	109.65	109.71	109.78	109.85	109.93	110.02	110.12	110.23
11.00	DISCHG	56.56	61.77	67.78	74.47	81.97	91.41	102.26	112.95	131.32	158.66
11.00	ELEV	110.31	110.38	110.45	110.53	110.62	110.71	110.80	110.93	111.10	111.35
12.00	DISCHG	203.32	271.10	380.62	444.47	545.12	647.77	731.18	780.20	791.50	771.29
12.00	ELEV	111.74	112.36	113.47	114.25	115.49	116.75	117.78	118.39	118.53	118.28
13.00	DISCHG	730.11	678.44	624.43	572.90	526.21	485.32	449.29	416.32	395.09	380.21
13.00	ELEV	117.77	117.13	116.47	115.83	115.25	114.75	114.31	113.91	113.65	113.46
14.00	DISCHG	352.25	319.68	301.58	294.89	289.84	285.09	281.87	277.95	274.08	270.42
14.00	ELEV	113.17	112.84	112.65	112.58	112.53	112.48	112.45	112.42	112.39	112.36
15.00	DISCHG	266.85	263.44	260.47	257.83	255.40	253.08	250.89	248.87	246.97	245.02
15.00	ELEV	112.32	112.29	112.27	112.24	112.22	112.20	112.18	112.16	112.14	112.12
16.00	DISCHG	242.73	240.31	237.88	235.63	233.65	231.97	230.42	228.75	226.77	224.37
16.00	ELEV	112.10	112.08	112.05	112.03	112.01	112.00	111.98	111.97	111.95	111.92
17.00	DISCHG	221.35	217.78	213.63	209.32	205.39	201.61	199.00	196.71	194.23	191.53
17.00	ELEV	111.90	111.86	111.83	111.79	111.75	111.73	111.71	111.69	111.67	111.65
18.00	DISCHG	188.92	186.83	185.38	184.27	183.03	181.43	179.64	178.00	176.21	174.41
18.00	ELEV	111.63	111.62	111.61	111.60	111.59	111.58	111.57	111.55	111.53	111.51
19.00	DISCHG	172.69	171.05	169.34	167.39	165.16	162.92	160.94	159.50	158.57	157.84
19.00	ELEV	111.49	111.48	111.46	111.44	111.41	111.39	111.37	111.36	111.35	111.34

20.00	DISCHG	156.96	155.69	153.98	152.12	150.27	148.40	146.50	144.69	142.81	141.04
20.00	ELEV	111.33	111.33	111.30	111.28	111.26	111.24	111.23	111.21	111.19	111.18
21.00	DISCHG	139.19	137.06	134.94	133.24	132.03	131.00	129.73	128.02	125.93	123.67
21.00	ELEV	111.16	111.15	111.13	111.12	111.11	111.10	111.09	111.08	111.06	111.05
22.00	DISCHG	121.64	120.17	119.42	118.69	117.66	116.18	114.34	112.34	110.37	108.52
22.00	ELEV	111.03	111.02	111.01	111.00	110.99	110.97	110.94	110.92	110.89	110.87
23.00	DISCHG	106.83	105.28	103.37	101.77	100.30	98.88	97.51	96.04	94.08	91.43
23.00	ELEV	110.84	110.82	110.81	110.79	110.78	110.77	110.76	110.75	110.73	110.71
24.00	DISCHG	89.26	89.84	93.77	98.33	99.84	96.96	90.94	83.94	78.01	72.45
24.00	ELEV	110.69	110.70	110.73	110.77	110.78	110.75	110.71	110.65	110.58	110.51
25.00	DISCHG	67.87	64.04	60.69	57.74	55.09	52.53	50.19	48.11	46.14	44.27
25.00	ELEV	110.45	110.40	110.36	110.33	110.29	110.25	110.19	110.14	110.09	110.05
26.00	DISCHG	42.50	40.81	39.17	37.56	36.00	34.52	33.10	31.74	30.44	29.19
26.00	ELEV	110.01	109.97	109.93	109.89	109.85	109.82	109.78	109.75	109.72	109.69
27.00	DISCHG	27.98	26.83	25.73	24.66	23.65	22.67	21.73	20.84	19.94	19.02
27.00	ELEV	109.66	109.64	109.61	109.58	109.56	109.54	109.52	109.49	109.47	109.45
28.00	DISCHG	18.13	17.27	16.45	15.68	14.93	14.23	13.55	12.91	12.30	11.72
28.00	ELEV	109.43	109.41	109.39	109.37	109.35	109.34	109.32	109.31	109.29	109.28
29.00	DISCHG	11.16	10.64	10.13	9.65	9.20	8.76	8.35	7.95	7.57	7.22
29.00	ELEV	109.26	109.25	109.24	109.23	109.22	109.21	109.20	109.19	109.18	109.17

RUNOFF VOLUME ABOVE BASEFLOW = 3.81 WATERSHED INCHES, 3284.20 CFS-HRS, 271.41 ACRE-FEET; BASEFLOW = .00 CFS

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OPERATION RUNOFF CROSS SECTION 12

OUTPUT HYDROGRAPH= 4

AREA= .09 SQ MI INPUT RUNOFF CURVE= 75. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.33	178.50	(RUNOFF)
17.44	7.35	(RUNOFF)
18.17	6.62	(RUNOFF)
23.45	3.84	(RUNOFF)
24.18	8.66	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.09 SQ.MI.
7.00	DISCHG	.00	.00	.01	.03	.08
7.00	DISCHG	.58	.73	.88	1.02	1.17
8.00	DISCHG	2.27	2.56	2.82	3.01	3.22
9.00	DISCHG	5.08	5.42	5.80	6.26	6.80
10.00	DISCHG	11.07	12.10	13.17	14.39	16.11
11.00	DISCHG	79.07	118.61	156.33	177.32	172.06
12.00	DISCHG	45.70	39.44	34.95	31.65	28.96
13.00	DISCHG	20.19	19.54	19.03	18.57	17.79
14.00	DISCHG	14.46	14.35	14.19	13.85	13.52
15.00	DISCHG	11.81	11.56	11.42	11.35	11.30
16.00	DISCHG	8.78	7.88	7.32	7.24	7.34
17.00	DISCHG	6.27	6.56	6.61	6.38	6.10
18.00	DISCHG	5.70	5.60	5.29	4.90	4.82
19.00	DISCHG	5.25	4.90	4.81	4.94	4.89
20.00	DISCHG	4.27	4.17	4.38	4.70	4.75
21.00	DISCHG	4.28	4.65	4.72	4.51	4.24
22.00	DISCHG	3.85	3.84	3.84	3.84	3.84
23.00	DISCHG	4.42	7.78	8.61	6.69	4.00
24.00	DISCHG	.14	.08	.04	.02	.00

RUNOFF VOLUME ABOVE BASEFLOW = 4.27 WATERSHED INCHES, 261.87 CFS-HRS, 21.64 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 13

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 1500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 13 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.79	791.82	(NULL)
24.38	99.90	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.81 WATERSHED INCHES, 3284.20 CFS-HRS, 271.41 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 13
INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.72		868.93				(NULL)					
24.32		105.09				(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS					TIME INCREMENT = .10 HOURS			DRAINAGE AREA = 1.43 SQ.MI.		
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	.02
7.00	DISCHG	.05	.09	.15	.22	.31	.42	.58	.80	1.09	1.45
8.00	DISCHG	1.84	2.25	2.67	3.11	3.58	4.14	4.85	5.72	6.70	7.78
9.00	DISCHG	9.02	10.44	11.96	13.56	15.24	17.01	18.87	20.84	22.97	25.29
10.00	DISCHG	27.76	30.37	33.16	36.20	39.54	43.24	47.33	51.82	56.69	62.00
11.00	DISCHG	67.63	73.87	80.94	88.85	98.08	109.77	123.35	138.21	164.28	207.19
12.00	DISCHG	282.39	389.71	536.94	621.79	717.18	794.41	845.90	868.16	859.68	825.95
13.00	DISCHG	775.80	717.88	659.38	604.55	555.17	511.97	473.87	439.23	416.78	401.10
14.00	DISCHG	372.44	339.22	320.62	313.46	307.63	301.98	298.22	294.05	289.69	285.31
15.00	DISCHG	281.31	277.79	274.66	271.68	268.92	266.39	264.08	261.91	259.67	257.24
16.00	DISCHG	254.54	251.87	249.31	246.97	244.95	243.15	241.28	239.16	236.76	233.92
17.00	DISCHG	230.13	225.65	220.96	216.56	212.73	208.95	206.07	203.34	200.49	197.62
18.00	DISCHG	195.19	193.39	191.99	190.65	189.14	187.35	185.46	183.77	181.94	180.12
19.00	DISCHG	178.39	176.65	174.63	172.29	169.98	167.95	166.23	164.97	164.14	163.37
20.00	DISCHG	162.21	160.59	158.79	157.05	155.16	153.10	151.20	149.56	147.65	145.62
21.00	DISCHG	143.46	141.23	139.32	137.94	136.78	135.53	133.98	132.08	129.90	127.68
22.00	DISCHG	125.93	124.81	124.14	123.20	121.90	120.24	118.30	116.25	114.25	112.38
23.00	DISCHG	110.68	109.12	107.21	105.61	104.14	102.72	101.33	99.64	96.94	93.97
24.00	DISCHG	93.69	97.62	102.38	105.02	103.84	99.24	92.25	84.69	78.44	72.69
25.00	DISCHG	68.01	64.12	60.74	57.76	55.09	52.53	50.19	48.11	46.14	44.27
26.00	DISCHG	42.50	40.81	39.17	37.56	36.00	34.52	33.10	31.74	30.44	29.19
27.00	DISCHG	27.98	26.83	25.73	24.66	23.65	22.67	21.73	20.84	19.94	19.02
28.00	DISCHG	18.13	17.27	16.45	15.68	14.93	14.23	13.55	12.91	12.30	11.72
29.00	DISCHG	11.16	10.64	10.13	9.65	9.20	8.76	8.35	7.95	7.57	7.22

RUNOFF VOLUME ABOVE BASEFLOW = 3.85 WATERSHED INCHES, 3546.06 CFS-HRS, 293.05 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 3
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
SURFACE ELEVATION= 100.16

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PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)			
13.30		955.00				110.58			
13.50		793.29				110.45			
13.70		665.10				110.35			
13.90		573.85				110.28			
14.10		476.69				110.21			
14.30		382.89				110.14			
14.50		357.53				110.12			
14.70		338.69				110.10			
14.90		321.17				110.09			
15.10		306.58				110.08			

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.43 SQ.MI.		
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
6.00	ELEV	100.16	100.16	100.16	100.16	100.16	100.16	100.16	100.16	100.16	100.16
7.00	DISCHG	.02	.05	.09	.14	.21	.29	.41	.56	.77	1.05
7.00	ELEV	100.16	100.16	100.17	100.17	100.17	100.18	100.19	100.20	100.21	100.23
8.00	DISCHG	1.38	1.75	2.14	2.55	2.99	3.47	4.03	4.72	5.54	6.48
8.00	ELEV	100.25	100.27	100.30	100.33	100.35	100.39	100.42	100.47	100.52	100.58
9.00	DISCHG	7.54	8.74	10.10	11.56	13.13	14.78	16.52	18.36	20.31	22.41
9.00	ELEV	100.65	100.73	100.82	100.91	101.02	101.12	101.24	101.36	101.48	101.62
10.00	DISCHG	24.32	26.44	28.87	31.71	34.86	38.21	41.40	44.60	48.37	51.04
10.00	ELEV	101.71	101.78	101.87	101.96	102.05	102.15	102.25	102.35	102.48	102.62
11.00	DISCHG	53.14	57.22	61.69	65.67	70.34	74.74	80.20	86.43	93.56	101.87
11.00	ELEV	102.81	102.98	103.09	103.20	103.32	103.45	103.61	103.78	103.99	104.27
12.00	DISCHG	111.62	140.17	157.11	163.80	169.04	175.12	181.98	189.63	197.28	203.98
12.00	ELEV	104.65	105.31	106.47	106.92	107.25	107.65	108.04	108.35	108.65	109.01
13.00	DISCHG	209.84	215.11	219.76	954.95	243.77	793.24	223.82	665.10	219.98	573.85

13.00	ELEV	109.38	109.70	109.99	110.58	110.03	110.45	110.01	110.35	110.01	110.28
14.00	DISCHG	220.00	476.69	219.89	382.60	245.97	357.52	248.65	338.69	249.92	321.17
14.00	ELEV	110.01	110.21	110.00	110.14	110.03	110.12	110.03	110.10	110.03	110.09
15.00	DISCHG	249.39	306.58	249.03	294.80	248.34	284.96	247.56	276.83	246.42	269.24
15.00	ELEV	110.03	110.08	110.03	110.07	110.03	110.06	110.03	110.05	110.03	110.05
16.00	DISCHG	243.93	261.52	240.80	254.72	238.12	249.37	235.81	244.17	232.39	237.99
16.00	ELEV	110.03	110.04	110.03	110.04	110.02	110.03	110.02	110.03	110.02	110.02
17.00	DISCHG	226.69	228.97	219.99	219.98	219.93	219.84	219.72	219.57	219.40	219.20
17.00	ELEV	110.02	110.02	110.01	110.01	110.01	110.00	109.99	109.98	109.97	109.96
18.00	DISCHG	218.97	218.73	218.47	218.21	217.93	217.64	217.33	217.01	216.68	216.33
18.00	ELEV	109.95	109.93	109.91	109.90	109.88	109.86	109.84	109.82	109.80	109.78
19.00	DISCHG	215.96	215.59	215.19	214.78	214.36	213.91	213.45	212.98	212.51	212.03
19.00	ELEV	109.76	109.73	109.71	109.68	109.66	109.63	109.60	109.57	109.54	109.51
20.00	DISCHG	211.54	211.05	210.55	210.03	209.50	208.96	208.40	207.83	207.25	206.66
20.00	ELEV	109.48	109.45	109.42	109.39	109.35	109.32	109.29	109.25	109.21	109.18
21.00	DISCHG	206.05	205.42	204.78	204.13	203.48	202.82	202.15	201.47	200.78	200.07
21.00	ELEV	109.14	109.10	109.06	109.02	108.98	108.94	108.89	108.85	108.81	108.76
22.00	DISCHG	199.25	198.41	197.58	196.74	195.90	195.05	194.19	193.32	192.43	191.53
22.00	ELEV	108.73	108.70	108.66	108.63	108.60	108.56	108.53	108.49	108.46	108.42
23.00	DISCHG	190.63	189.71	188.78	187.85	186.91	185.96	185.01	184.05	183.08	182.08

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23.00	ELEV	108.39	108.35	108.31	108.27	108.24	108.20	108.16	108.12	108.08	108.04
24.00	DISCHG	181.08	180.11	179.27	178.49	177.72	176.93	176.09	175.19	174.22	173.19
24.00	ELEV	108.00	107.96	107.91	107.86	107.81	107.76	107.71	107.65	107.59	107.52
25.00	DISCHG	172.13	171.03	169.90	168.76	167.59	166.41	165.22	164.02	162.81	161.59
25.00	ELEV	107.45	107.38	107.31	107.23	107.16	107.08	107.01	106.93	106.85	106.77
26.00	DISCHG	160.37	155.62	149.56	143.73	132.73	117.62	111.90	106.48	101.33	94.83
26.00	ELEV	106.69	106.37	105.96	105.56	105.18	104.89	104.66	104.45	104.25	104.03
27.00	DISCHG	87.83	80.39	73.33	66.11	58.29	51.08	41.46	31.58	26.30	23.29
27.00	ELEV	103.82	103.61	103.41	103.21	103.00	102.63	102.25	101.96	101.78	101.67
28.00	DISCHG	20.77	19.08	17.86	16.87	16.01	15.22	14.49	13.80	13.14	12.52
28.00	ELEV	101.51	101.40	101.32	101.26	101.20	101.15	101.10	101.06	101.02	100.98
29.00	DISCHG	11.92	11.36	10.82	10.31	9.82	9.36	8.91	8.49	8.09	7.71
29.00	ELEV	100.94	100.90	100.87	100.83	100.80	100.77	100.74	100.71	100.69	100.66

RUNOFF VOLUME ABOVE BASEFLOW = 3.95 WATERSHED INCHES, 3646.80 CFS-HRS, 301.37 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 14

OUTPUT HYDROGRAPH= 1

AREA= .04 SQ MI INPUT RUNOFF CURVE= 76. TIME OF CONCENTRATION= .40 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0533 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.31	79.43	(RUNOFF)
24.15	4.10	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .04 SQ.MI.
7.00	DISCHG .00 .00 .01 .02 .04 .07 .12 .18 .25 .32		
8.00	DISCHG .38 .45 .51 .58 .64 .71 .80 .90 .96 1.02		
9.00	DISCHG 1.13 1.28 1.38 1.46 1.55 1.68 1.80 1.92 2.07 2.23		
10.00	DISCHG 2.39 2.53 2.70 2.92 3.16 3.42 3.70 4.00 4.31 4.66		
11.00	DISCHG 5.08 5.54 6.00 6.54 7.37 8.43 9.67 11.64 15.52 23.16		
12.00	DISCHG 38.08 56.54 72.21 79.40 73.93 60.39 45.82 34.50 26.48 21.46		
13.00	DISCHG 18.10 15.81 14.15 12.92 11.89 11.02 10.21 9.54 9.08 8.80		
14.00	DISCHG 8.51 8.24 8.05 7.85 7.48 7.08 6.90 6.84 6.59 6.26		
15.00	DISCHG 6.11 6.10 6.02 5.86 5.72 5.64 5.60 5.53 5.37 5.15		
16.00	DISCHG 4.98 4.89 4.84 4.82 4.81 4.75 4.59 4.37 4.21 4.03		
17.00	DISCHG 3.64 3.23 3.04 3.06 3.13 3.12 2.98 2.77 2.61 2.57		
18.00	DISCHG 2.68 2.82 2.82 2.69 2.57 2.50 2.46 2.44 2.43 2.43		
19.00	DISCHG 2.42 2.38 2.21 2.04 2.04 2.16 2.28 2.35 2.38 2.36		
20.00	DISCHG 2.20 2.03 2.04 2.11 2.07 1.97 2.00 2.10 2.06 1.91		
21.00	DISCHG 1.79 1.76 1.88 2.03 2.03 1.90 1.78 1.71 1.67 1.70		
22.00	DISCHG 1.85 2.02 2.02 1.90 1.77 1.71 1.67 1.65 1.64 1.64		
23.00	DISCHG 1.63 1.63 1.63 1.63 1.63 1.63 1.62 1.47 1.10 1.06		
24.00	DISCHG 2.30 3.90 3.89 2.64 1.44 .78 .42 .23 .12 .07		
25.00	DISCHG .04 .02 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 4.38 WATERSHED INCHES, 113.09 CFS-HRS, 9.35 ACRE-Feet; BASEFLOW = .00 CFS

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OPERATION RUNOFF CROSS SECTION 15

OUTPUT HYDROGRAPH= 2

AREA= .35 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= 1.18 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0983 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.84	321.32	(RUNOFF)
22.43	14.60	(RUNOFF)
24.50	17.32	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .35 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .04		
9.00	DISCHG .09 .17 .31 .50 .75 1.07 1.44 1.87 2.37 2.92		
10.00	DISCHG 3.52 4.17 4.89 5.66 6.50 7.41 8.42 9.52 10.72 12.05		
11.00	DISCHG 13.51 15.12 16.90 18.90 21.16 23.78 26.84 30.80 36.11 44.77		
12.00	DISCHG 59.13 81.34 113.33 154.34 200.17 245.36 283.25 308.78 320.34 318.90		
13.00	DISCHG 306.77 286.38 261.74 235.62 210.81 189.18 170.49 154.41 140.48 128.23		
14.00	DISCHG 117.56 108.32 100.31 93.38 87.36 82.14 77.58 73.51 69.86 66.58		
15.00	DISCHG 63.62 60.93 58.51 56.34 54.42 52.69 51.09 49.60 48.23 46.99		
16.00	DISCHG 45.83 44.74 43.68 42.70 41.80 40.97 40.18 39.40 38.62 37.75		
17.00	DISCHG 36.76 35.64 34.38 33.00 31.61 30.29 29.09 28.00 26.98 26.01		
18.00	DISCHG 25.14 24.41 23.81 23.31 22.88 22.45 22.03 21.64 21.27 20.92		
19.00	DISCHG 20.59 20.24 19.88 19.52 19.16 18.78 18.45 18.21 18.07 17.98		
20.00	DISCHG 17.92 17.85 17.76 17.62 17.43 17.24 17.03 16.83 16.62 16.44		
21.00	DISCHG 16.25 16.06 15.86 15.67 15.52 15.42 15.33 15.19 15.01 14.84		
22.00	DISCHG 14.70 14.61 14.57 14.58 14.60 14.59 14.54 14.43 14.28 14.10		
23.00	DISCHG 13.91 13.71 13.53 13.39 13.28 13.20 13.13 13.02 12.80 12.71		
24.00	DISCHG 12.97 13.51 14.43 15.75 16.90 17.32 16.94 15.91 14.42 12.69		
25.00	DISCHG 10.81 8.81 7.01 5.63 4.56 3.72 3.04 2.47 2.00 1.62		
26.00	DISCHG 1.32 1.07 .86 .70 .56 .46 .37 .30 .24 .19		
27.00	DISCHG .15 .12 .10 .08 .06 .04 .03 .01 .00 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.53 WATERSHED INCHES, 787.92 CFS-HRS, 65.11 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 16

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 6300.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .27 PEAK TRAVEL TIME = .33 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.57	58.86	(NULL)
24.35	2.73	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 4.38 WATERSHED INCHES, 113.05 CFS-HRS, 9.34 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 16

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.79	369.88	(NULL)
22.38	16.50	(NULL)
24.46	19.73	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .39 SQ.MI.
7.00	DISCHG .00 .00 .00 .00 .00 .01 .03 .05 .09 .13		
8.00	DISCHG .18 .24 .29 .35 .41 .47 .54 .61 .70 .80		
9.00	DISCHG .92 1.09 1.32 1.61 1.96 2.37 2.84 3.38 3.99 4.66		
10.00	DISCHG 5.39 6.19 7.04 7.96 8.97 10.07 11.28 12.61 14.06 15.65		
11.00	DISCHG 17.40 19.33 21.47 23.86 26.55 29.71 33.45 38.25 44.70 55.24		
12.00	DISCHG 73.05 101.84 143.64 196.05 252.15 303.31 341.87 363.91 369.85 362.15		
13.00	DISCHG 344.08 318.47 289.40 259.59 231.78 207.67 186.95 169.17 153.81 140.40		
14.00	DISCHG 128.81 118.83 110.20 102.77 96.33 90.70 85.74 81.33 77.41 73.87		
15.00	DISCHG 70.63 67.69 65.09 62.77 60.69 58.81 57.08 55.48 54.02 52.66		
16.00	DISCHG 51.36 50.12 48.93 47.84 46.85 45.95 45.09 44.23 43.32 42.32		
17.00	DISCHG 41.18 39.85 38.32 36.69 35.13 33.71 32.42 31.23 30.09 28.98		
18.00	DISCHG 28.00 27.22 26.62 26.13 25.66 25.17 24.69 24.25 23.84 23.45		
19.00	DISCHG 23.09 22.72 22.33 21.91 21.44 21.00 20.65 20.43 20.32 20.28		
20.00	DISCHG 20.23 20.13 19.97 19.78 19.58 19.36 19.12 18.89 18.70 18.51		
21.00	DISCHG 18.28 18.02 17.76 17.57 17.45 17.38 17.28 17.09 16.86 16.63		
22.00	DISCHG 16.47 16.40 16.42 16.48 16.50 16.46 16.36 16.21 16.03 15.82		

TIME(HRS)	DISCHG	15.61	15.39	15.19	15.04	14.93	14.84	14.77	14.65	14.39	14.17
23.00	DISCHG	15.61	15.39	15.19	15.04	14.93	14.84	14.77	14.65	14.39	14.17
24.00	DISCHG	14.32	15.12	16.66	18.43	19.57	19.66	18.85	17.42	15.57	13.56
25.00	DISCHG	11.47	9.30	7.37	5.89	4.75	3.86	3.14	2.54	2.05	1.66
26.00	DISCHG	1.35	1.09	.87	.71	.57	.46	.37	.30	.24	.19
27.00	DISCHG	.15	.12	.10	.08	.06	.04	.03	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.62 WATERSHED INCHES, 900.97 CFS-HRS, 74.46 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 17

OUTPUT HYDROGRAPH= 5

AREA= .08 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .45 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0600 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.34	121.42	(RUNOFF)
18.17	5.01	(RUNOFF)
23.45	2.93	(RUNOFF)
24.19	6.50	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .08 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .03 .07		
9.00	DISCHG .16 .27 .40 .52 .66 .82 .98 1.15 1.34 1.55		
10.00	DISCHG 1.77 1.98 2.22 2.50 2.81 3.16 3.54 3.94 4.37 4.86		
11.00	DISCHG 5.43 6.07 6.76 7.55 8.59 9.99 11.69 14.21 19.22 29.23		
12.00	DISCHG 48.11 74.99 101.49 119.57 118.38 103.43 82.69 64.16 50.17 40.25		
13.00	DISCHG 33.80 29.23 25.95 23.53 21.54 19.84 18.32 17.06 16.15 15.56		

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14.00	DISCHG	15.05	14.57	14.19	13.84	13.30	12.65	12.25	12.06	11.70	11.19
15.00	DISCHG	10.85	10.77	10.65	10.41	10.16	10.00	9.92	9.81	9.57	9.22
16.00	DISCHG	8.91	8.72	8.61	8.56	8.52	8.45	8.21	7.88	7.57	7.25
17.00	DISCHG	6.68	5.99	5.57	5.49	5.56	5.56	5.37	5.04	4.75	4.63
18.00	DISCHG	4.74	4.96	5.00	4.85	4.64	4.50	4.42	4.38	4.35	4.34
19.00	DISCHG	4.33	4.25	4.03	3.75	3.67	3.81	4.01	4.15	4.23	4.21
20.00	DISCHG	4.01	3.74	3.67	3.74	3.72	3.58	3.58	3.70	3.69	3.50
21.00	DISCHG	3.27	3.19	3.33	3.57	3.61	3.46	3.25	3.11	3.03	3.05
22.00	DISCHG	3.26	3.52	3.60	3.45	3.25	3.11	3.03	2.99	2.96	2.95
23.00	DISCHG	2.94	2.93	2.93	2.93	2.93	2.93	2.92	2.75	2.18	1.93
24.00	DISCHG	3.23	5.72	6.49	5.17	3.18	1.81	1.05	.61	.35	.20
25.00	DISCHG	.12	.07	.04	.02	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 3.52 WATERSHED INCHES, 179.60 CFS-HRS, 14.84 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 18

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6

LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.00, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 18 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.79	369.88	(NULL)
22.38	16.50	(NULL)
24.46	19.73	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.62 WATERSHED INCHES, 900.97 CFS-HRS, 74.46 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 18

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.68	428.29	(NULL)
21.29	21.13	(NULL)
22.20	20.03	(NULL)
24.28	23.61	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .46 SQ.MI.
7.00	DISCHG .00 .00 .00 .00 .00 .01 .03 .05 .09 .13		
8.00	DISCHG .18 .24 .29 .35 .41 .47 .54 .61 .73 .87		
9.00	DISCHG 1.07 1.36 1.72 2.14 2.62 3.19 3.82 4.54 5.33 6.21		
10.00	DISCHG 7.16 8.17 9.26 10.46 11.78 13.22 14.81 16.55 18.43 20.51		
11.00	DISCHG 22.83 25.40 28.23 31.40 35.15 39.69 45.14 52.45 63.92 84.47		
12.00	DISCHG 121.16 176.83 245.13 315.62 370.52 406.74 424.56 428.07 420.02 402.40		
13.00	DISCHG 377.88 347.70 315.34 283.12 253.32 227.51 205.28 186.23 169.96 155.96		

14.00 DISCHG 143.86 133.39 124.39 116.60 109.62 103.35 97.98 93.38 89.11 85.06
 15.00 DISCHG 81.48 78.46 75.74 73.18 70.85 68.81 67.00 65.29 63.58 61.88

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16.00	DISCHG	60.28	58.84	57.55	56.40	55.38	54.40	53.31	52.11	50.89	49.57
17.00	DISCHG	47.86	45.84	43.89	42.18	40.69	39.26	37.79	36.28	34.84	33.61
18.00	DISCHG	32.74	32.18	31.63	30.97	30.30	29.67	29.11	28.63	28.19	27.79
19.00	DISCHG	27.42	26.97	26.36	25.65	25.12	24.81	24.67	24.59	24.55	24.49
20.00	DISCHG	24.24	23.87	23.64	23.52	23.30	22.94	22.70	22.59	22.39	22.01
21.00	DISCHG	21.55	21.20	21.09	21.13	21.07	20.85	20.53	20.20	19.89	19.68
22.00	DISCHG	19.73	19.92	20.03	19.93	19.75	19.57	19.39	19.20	18.99	18.77
23.00	DISCHG	18.55	18.32	18.12	17.97	17.86	17.77	17.69	17.40	16.57	16.09
24.00	DISCHG	17.56	20.84	23.15	23.60	22.75	21.47	19.90	18.03	15.93	13.76
25.00	DISCHG	11.58	9.36	7.41	5.91	4.75	3.86	3.14	2.54	2.05	1.66
26.00	DISCHG	1.35	1.09	.87	.71	.57	.46	.37	.30	.24	.19
27.00	DISCHG	.15	.12	.10	.08	.06	.04	.03	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.60 WATERSHED INCHES, 1080.56 CFS-HRS, 89.30 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 19

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

LENGTH = 2200.00 FEET

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53

PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 19 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.30	955.00	(NULL)
13.50	793.29	(NULL)
13.70	665.10	(NULL)
13.90	573.85	(NULL)
14.10	476.69	(NULL)
14.30	382.89	(NULL)
14.50	357.53	(NULL)
14.70	338.69	(NULL)
14.90	321.17	(NULL)
15.10	306.58	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.95 WATERSHED INCHES, 3646.80 CFS-HRS, 301.37 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 19

INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.75	618.95	(NULL)
13.30	1238.19	(NULL)
13.50	1021.27	(NULL)
13.70	851.55	(NULL)
13.90	729.93	(NULL)
14.10	610.18	(NULL)
14.30	499.26	(NULL)
14.50	460.92	(NULL)
14.70	432.11	(NULL)
14.90	406.29	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.89 SQ.MI.
6.00	DISCHG	.00	.00	.00	.00	.01
7.00	DISCHG	.02	.05	.14	.21	.86
8.00	DISCHG	1.56	1.98	2.43	3.40	1.18
9.00	DISCHG	8.61	10.10	11.81	15.75	7.35
10.00	DISCHG	31.47	34.61	38.13	46.64	28.62
11.00	DISCHG	75.97	82.62	89.91	105.49	71.55
12.00	DISCHG	232.78	317.00	402.25	539.57	186.33
13.00	DISCHG	587.72	562.81	535.10	581.86	606.38
14.00	DISCHG	363.86	610.09	344.28	497.09	729.81
15.00	DISCHG	330.87	385.04	324.77	460.87	406.23
16.00	DISCHG	304.21	320.35	298.34	319.20	331.12
					303.77	287.55

17.00	DISCHG	274.55	274.81	263.89	262.16	260.61	259.10	257.51	255.85	254.24	252.81
18.00	DISCHG	251.72	250.91	250.10	249.18	248.23	247.31	246.44	245.64	244.86	244.12
19.00	DISCHG	243.38	242.56	241.55	240.44	239.47	238.72	238.12	237.57	237.06	236.51
20.00	DISCHG	235.79	234.92	234.19	233.55	232.81	231.90	231.10	230.42	229.64	228.67
21.00	DISCHG	227.60	226.62	225.87	225.27	224.55	223.66	222.68	221.67	220.67	219.75
22.00	DISCHG	218.98	218.33	217.60	216.67	215.65	214.61	213.58	212.51	211.42	210.30
23.00	DISCHG	209.17	208.03	206.91	205.82	204.77	203.73	202.70	201.45	199.65	198.18
24.00	DISCHG	198.64	200.95	202.42	202.09	200.47	198.40	195.99	193.21	190.14	186.96
25.00	DISCHG	183.71	180.39	177.32	174.66	172.35	170.28	168.36	166.56	164.86	163.25
26.00	DISCHG	161.71	156.71	150.44	144.44	133.30	118.08	112.27	106.78	101.57	95.03
27.00	DISCHG	87.98	80.51	73.43	66.18	58.35	51.12	41.49	31.59	26.30	23.29
28.00	DISCHG	20.77	19.08	17.86	16.87	16.01	15.22	14.49	13.80	13.14	12.52
29.00	DISCHG	11.92	11.36	10.82	10.31	9.82	9.36	8.91	8.49	8.09	7.71

RUNOFF VOLUME ABOVE BASEFLOW = 3.87 WATERSHED INCHES, 4727.36 CFS-HRS, 390.67 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 20

OUTPUT HYDROGRAPH= 4

AREA= .71 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .85 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0944 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.60	898.46	(RUNOFF)
19.98	38.60	(RUNOFF)
21.47	32.70	(RUNOFF)
22.37	31.83	(RUNOFF)
24.37	43.00	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .71 SQ.MI.			
8.00	DISCHG	.03	.10	.25	.53	.93	1.47	2.16	2.97	3.88	4.86
9.00	DISCHG	5.93	7.10	8.37	9.72	11.11	12.56	14.08	15.68	17.37	19.18
10.00	DISCHG	21.12	23.17	25.32	27.64	30.19	33.01	36.12	39.53	43.26	47.33
11.00	DISCHG	51.80	56.75	62.23	68.42	75.58	84.18	94.80	109.20	129.93	167.08
12.00	DISCHG	233.72	337.64	479.69	635.56	775.19	868.50	898.45	869.24	796.99	703.65
13.00	DISCHG	607.15	521.31	449.99	392.24	345.16	306.55	274.43	247.67	225.19	206.48
14.00	DISCHG	191.03	178.31	167.80	159.00	151.36	144.32	137.69	131.66	126.32	121.48
15.00	DISCHG	117.12	113.38	110.31	107.59	104.99	102.68	100.71	98.86	96.97	94.97
16.00	DISCHG	92.82	90.61	88.51	86.65	85.09	83.77	82.47	80.96	79.09	76.78
17.00	DISCHG	73.92	70.46	66.57	62.95	60.06	57.80	55.91	54.16	52.39	50.61
18.00	DISCHG	49.10	48.08	47.53	47.16	46.67	45.99	45.16	44.25	43.40	42.73
19.00	DISCHG	42.24	41.74	41.03	40.08	39.00	38.13	37.73	37.76	38.08	38.45
20.00	DISCHG	38.59	38.31	37.68	36.98	36.39	35.86	35.36	35.05	34.94	34.65
21.00	DISCHG	34.01	33.32	32.83	32.63	32.65	32.69	32.52	32.07	31.42	30.80
22.00	DISCHG	30.49	30.65	31.23	31.74	31.82	31.54	31.01	30.34	29.65	29.11
23.00	DISCHG	28.73	28.46	28.25	28.10	27.99	27.90	27.72	27.16	25.88	25.10
24.00	DISCHG	26.44	30.67	37.09	42.02	42.86	40.04	34.76	27.96	20.97	15.41
25.00	DISCHG	11.50	8.66	6.49	4.85	3.63	2.69	2.01	1.51	1.13	.84
26.00	DISCHG	.62	.46	.34	.25	.19	.12	.06	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.95 WATERSHED INCHES, 1803.73 CFS-HRS, 149.06 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 21

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 4000.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .76 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 21 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.88	616.38	(NULL)
13.40	1072.14	(NULL)
13.59	929.39	(NULL)
13.79	779.67	(NULL)
13.99	671.18	(NULL)
14.19	569.26	(NULL)
14.40	475.07	(NULL)
14.59	442.66	(NULL)
14.79	417.23	(NULL)
14.99	394.78	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.73 WATERSHED INCHES, 4563.71 CFS-HRS, 377.14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 21
INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.65	1472.92	(NULL)
13.40	1416.21	(NULL)
13.59	1206.38	(NULL)
13.79	1006.57	(NULL)
13.99	863.22	(NULL)
14.19	737.85	(NULL)
14.39	626.89	(NULL)
14.59	580.86	(NULL)
14.79	543.95	(NULL)
14.99	512.27	(NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 2.60 SQ.MI.
7.00	DISCHG	.00 .02 .04 .07 .12 .19 .28	.40 .56 .79	
8.00	DISCHG	1.11 1.54 2.11 2.82 3.69 4.72 5.94	7.35 8.98 10.85	
9.00	DISCHG	12.95 15.32 18.02 21.01 24.23 27.67 31.36	35.29 39.47 43.97	
10.00	DISCHG	48.82 53.74 58.96 64.69 71.13 78.28 86.06	94.23 102.85 112.40	
11.00	DISCHG	121.79 131.28 142.91 156.11 170.40 187.10 206.46	231.25 264.76 319.12	
12.00	DISCHG	411.80 557.27 773.28 1011.68 1229.78 1387.64 1465.23	1466.22 1409.71 1319.85	
13.00	DISCHG	1215.89 1114.09 1020.01 935.74 1416.21 941.65 1202.44	796.73 1003.83 689.89	
14.00	DISCHG	861.58 615.92 736.41 557.22 626.28 528.61 580.15	501.33 543.38 479.28	
15.00	DISCHG	511.70 459.57 486.01 444.60 465.52 431.81 448.55	421.42 434.39 411.57	
16.00	DISCHG	420.44 400.45 406.33 389.68 394.26 381.03 384.68	373.22 374.41 362.96	
17.00	DISCHG	361.15 348.06 342.05 329.62 323.30 319.04 315.53	312.17 308.75 305.36	
18.00	DISCHG	302.37 300.17 298.73 297.53 296.14 294.51 292.75	290.97 289.30 287.84	
19.00	DISCHG	286.60 285.35 283.84 281.93 279.77 277.91 276.70	276.09 275.83 275.68	
20.00	DISCHG	275.28 274.31 272.86 271.40 270.15 268.89 267.53	266.40 265.58 264.53	
21.00	DISCHG	262.97 261.24 259.77 258.76 258.12 257.46 256.45	255.04 253.41 251.79	
22.00	DISCHG	250.54 249.89 249.78 249.57 248.77 247.50 245.95	244.24 242.50 240.87	
23.00	DISCHG	239.38 237.99 236.64 235.36 234.16 233.01 231.79	230.19 227.71 225.27	
24.00	DISCHG	225.10 229.31 237.49 243.95 244.91 240.89 233.75	224.67 215.02 206.49	
25.00	DISCHG	199.45 193.39 187.92 183.16 179.17 175.81 172.96	170.49 168.27 166.25	
26.00	DISCHG	164.39 162.66 158.37 152.52 146.51 136.55 122.55	114.74 108.69 103.28	
27.00	DISCHG	97.01 90.15 82.83 75.69 68.47 60.78 53.44	44.37 34.66 28.31	
28.00	DISCHG	24.50 21.67 19.70 18.30 17.21 16.30 15.48	14.73 14.02 13.35	
29.00	DISCHG	12.72 12.11 11.54 10.99 10.47 9.98 9.51	9.06 8.63 8.22	

RUNOFF VOLUME ABOVE BASEFLOW = 3.79 WATERSHED INCHES, 6367.44 CFS-HRS, 526.21 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1
SURFACE ELEVATION= 59.001
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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.13	1084.69	67.47
13.54	1089.02	67.57
24.42	244.30	61.23

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 2.60 SQ.MI.
7.00	DISCHG	.00 .01 .03 .06 .10 .16 .24	.35 .50 .70	
7.00	ELEV	59.00 59.00 59.00 59.00 59.00 59.00 59.00	59.00 59.00 59.01	
8.00	DISCHG	.98 1.37 1.88 2.53 3.33 4.30 5.44	6.78 8.32 10.09	
8.00	ELEV	59.01 59.01 59.02 59.02 59.03 59.04 59.05	59.06 59.08 59.09	
9.00	DISCHG	12.10 14.37 16.93 19.81 22.94 26.29 29.88	33.72 37.80 42.17	
9.00	ELEV	59.11 59.13 59.16 59.18 59.21 59.24 59.28	59.31 59.35 59.39	
10.00	DISCHG	46.88 51.78 56.86 62.38 68.53 75.40 82.94	90.97 99.40 108.56	
10.00	ELEV	59.43 59.48 59.52 59.57 59.63 59.69 59.76	59.84 59.92 60.00	
11.00	DISCHG	118.06 127.49 138.18 150.79 164.67 180.34 198.64	221.14 249.23 288.97	
11.00	ELEV	60.09 60.17 60.27 60.39 60.52 60.66 60.83	61.04 61.26 61.49	
12.00	DISCHG	360.13 470.70 635.76 844.87 948.65 969.88 996.81	1024.47 1048.85 1067.48	
12.00	ELEV	61.90 62.45 63.24 63.90 64.34 64.83 65.45	66.08 66.64 67.07	
13.00	DISCHG	1079.30 1084.36 1083.33 1077.11 1082.94 1088.61 1087.63	1082.44 1071.69 1058.43	
13.00	ELEV	67.34 67.46 67.44 67.29 67.43 67.56 67.54	67.42 67.17 66.86	

14.00	DISCHG	1041.76	1023.89	1003.38	982.35	959.32	900.01	622.19	552.29	527.87	514.38
14.00	ELEV	66.48	66.07	65.60	65.11	64.58	64.04	63.18	62.86	62.74	62.67
15.00	DISCHG	498.97	488.09	475.22	466.41	456.33	449.52	441.22	435.68	428.77	423.62
15.00	ELEV	62.59	62.54	62.48	62.43	62.38	62.35	62.31	62.28	62.24	62.22
16.00	DISCHG	416.85	411.16	404.25	398.70	392.72	388.21	383.45	379.45	374.44	369.32
16.00	ELEV	62.18	62.16	62.12	62.09	62.06	62.04	62.02	62.00	61.97	61.95
17.00	DISCHG	362.86	355.31	345.77	336.53	327.16	321.59	317.58	314.11	310.72	307.31
17.00	ELEV	61.91	61.87	61.82	61.77	61.71	61.68	61.66	61.64	61.62	61.60
18.00	DISCHG	304.11	301.47	299.59	298.23	296.93	295.44	293.76	292.00	290.26	288.69
18.00	ELEV	61.58	61.56	61.55	61.54	61.54	61.53	61.52	61.51	61.50	61.49
19.00	DISCHG	287.32	286.07	284.70	283.01	281.00	278.99	277.43	276.47	276.00	275.77
19.00	ELEV	61.48	61.47	61.47	61.46	61.45	61.43	61.43	61.42	61.42	61.42
20.00	DISCHG	275.50	274.84	273.67	272.24	270.88	269.62	268.31	267.06	266.07	265.13
20.00	ELEV	61.41	61.41	61.40	61.40	61.39	61.38	61.37	61.37	61.36	61.35
21.00	DISCHG	263.84	262.23	260.63	259.36	258.50	257.84	257.02	255.83	254.34	252.72
21.00	ELEV	61.35	61.34	61.33	61.32	61.32	61.31	61.31	61.30	61.29	61.28
22.00	DISCHG	251.27	250.29	249.87	249.69	249.20	248.21	246.82	245.22	243.50	241.81
22.00	ELEV	61.27	61.27	61.27	61.27	61.26	61.26	61.25	61.24	61.23	61.22
23.00	DISCHG	240.24	238.56	237.18	235.87	234.63	233.46	232.28	230.84	228.74	226.24
23.00	ELEV	61.21	61.20	61.18	61.17	61.16	61.15	61.14	61.13	61.11	61.08
24.00	DISCHG	225.07	227.45	234.07	241.23	244.21	242.99	237.27	228.30	218.89	209.83
24.00	ELEV	61.07	61.09	61.16	61.22	61.23	61.23	61.18	61.10	61.02	60.93
25.00	DISCHG	202.19	195.77	190.08	185.03	180.73	177.12	174.08	171.46	169.15	167.05
25.00	ELEV	60.86	60.80	60.75	60.70	60.66	60.63	60.60	60.58	60.56	60.54
26.00	DISCHG	165.13	163.35	160.20	154.90	148.90	140.69	128.29	117.55	111.05	105.41
26.00	ELEV	60.52	60.50	60.48	60.43	60.37	60.30	60.18	60.08	60.02	59.97
27.00	DISCHG	99.55	92.91	85.77	78.52	71.35	63.86	56.35	48.06	38.55	30.69
27.00	ELEV	59.92	59.86	59.79	59.72	59.66	59.59	59.52	59.44	59.35	59.28

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28.00	DISCHG	25.92	22.76	20.45	18.84	17.64	16.66	15.80	15.02	14.30	13.62
28.00	ELEV	59.24	59.21	59.19	59.17	59.16	59.15	59.15	59.14	59.13	59.13
29.00	DISCHG	12.97	12.35	11.77	11.21	10.68	10.18	9.69	9.23	8.80	8.38
29.00	ELEV	59.12	59.11	59.11	59.10	59.10	59.09	59.09	59.09	59.08	59.08

RUNOFF VOLUME ABOVE BASEFLOW = 3.83 WATERSHED INCHES, 6432.32 CFS-HRS, 531.57 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 22

OUTPUT HYDROGRAPH= 2

AREA= .91 SQ MI INPUT RUNOFF CURVE= 61. TIME OF CONCENTRATION= 1.01 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0962 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.74	719.55	(RUNOFF)
20.00	41.33	(RUNOFF)
22.43	34.14	(RUNOFF)
24.44	37.74	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .91 SQ.MI.
9.00	DISCHG .00 .00 .00 .00	.00 .00 .00	.00 .00 .01
10.00	DISCHG .04 .13 .34 .73	1.36 2.27 3.50	5.05 6.94 9.17
11.00	DISCHG 11.77 14.76 18.18 22.12	26.72 32.18 38.92	47.83 60.90 83.06
12.00	DISCHG 121.08 181.98 270.71 381.23	499.48 606.34 682.23	716.55 712.57 677.20
13.00	DISCHG 621.69 557.68 493.93 437.89	390.44 350.38 316.39	287.02 261.77 239.99
14.00	DISCHG 221.41 205.65 192.37 181.09	171.40 162.93 155.33	148.41 142.16 136.51
15.00	DISCHG 131.26 126.31 121.88 118.10	114.77 111.79 109.23	106.99 104.96 102.88
16.00	DISCHG 100.70 98.48 96.34 94.34	92.53 90.88 89.34	87.79 86.07 83.99
17.00	DISCHG 81.47 78.50 75.11 71.56	68.28 65.46 63.03	60.82 58.69 56.72
18.00	DISCHG 55.04 53.62 52.55 51.76	51.02 50.27 49.48	48.65 47.82 47.01
19.00	DISCHG 46.27 45.60 44.89 44.06	43.12 42.21 41.54	41.21 41.18 41.27
20.00	DISCHG 41.33 41.28 41.01 40.48	39.89 39.36 38.84	38.36 38.01 37.72
21.00	DISCHG 37.29 36.70 36.13 35.76	35.61 35.50 35.29	34.95 34.49 34.03
22.00	DISCHG 33.69 33.53 33.64 33.93	34.13 34.09 33.83	33.40 32.87 32.29
23.00	DISCHG 31.75 31.34 31.04 30.82	30.64 30.50 30.33	29.90 29.11 28.33
24.00	DISCHG 28.27 29.46 32.17 35.51	37.56 37.32 35.10	31.47 26.94 21.81
25.00	DISCHG 16.83 12.97 10.14 8.01	6.31 4.93 3.88	3.04 2.38 1.85
26.00	DISCHG 1.44 1.13 .88 .69	.53 .41 .31	.24 .19 .14
27.00	DISCHG .10 .06 .02 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.80 WATERSHED INCHES, 1637.98 CFS-HRS, 135.36 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 23

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 6300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = .56 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.32	1080.37	(NULL)
13.69	1086.63	(NULL)
24.58	242.16	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.83 WATERSHED INCHES, 6425.89 CFS-HRS, 531.04 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 23
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.83	1711.27	(NULL)
24.53	278.46	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	3.51 SQ.MI.
7.00	DISCHG	.00 .00 .01 .02 .04 .08 .12 .19 .28 .40				
8.00	DISCHG	.57 .80 1.12 1.54 2.10 2.79 3.64 4.65 5.84 7.24				
9.00	DISCHG	8.84 10.67 12.74 15.10 17.74 20.66 23.82 27.22 30.87 34.77				
10.00	DISCHG	38.95 43.51 48.44 53.75 59.64 66.31 73.91 82.49 91.97 102.27				
11.00	DISCHG	113.55 125.68 138.40 152.43 168.53 186.82 207.99 233.51 266.49 313.15				
12.00	DISCHG	384.22 499.58 674.26 915.15 1207.98 1449.67 1596.61 1677.21 1709.05 1703.09				
13.00	DISCHG	1670.93 1623.80 1570.28 1518.16 1468.94 1431.37 1401.66 1373.61 1346.02 1317.19				
14.00	DISCHG	1288.07 1258.33 1228.89 1199.01 1169.35 1139.19 1088.78 907.10 784.97 714.79				
15.00	DISCHG	673.67 644.32 623.10 604.72 590.04 576.43 565.37 554.76 545.94 537.00				
16.00	DISCHG	528.92 520.32 512.18 503.67 495.89 488.27 481.58 475.10 468.96 462.13				
17.00	DISCHG	454.66 445.89 435.71 423.83 411.72 399.76 390.19 382.61 376.16 370.40				
18.00	DISCHG	365.14 360.36 356.33 353.18 350.65 348.38 346.09 343.66 341.14 338.61				
19.00	DISCHG	336.23 334.08 332.01 329.83 327.34 324.62 322.03 319.98 318.66 317.92				
20.00	DISCHG	317.49 317.07 316.27 314.84 313.06 311.24 309.45 307.68 306.06 304.65				
21.00	DISCHG	303.21 301.45 299.46 297.57 296.04 294.85 293.79 292.61 291.13 289.38				
22.00	DISCHG	287.56 285.94 284.86 284.39 284.15 283.65 282.63 281.09 279.17 277.02				
23.00	DISCHG	274.84 272.83 270.89 269.16 267.60 266.15 264.75 263.12 260.99 258.45				
24.00	DISCHG	256.21 255.79 259.13 266.46 274.28 278.25 277.18 270.85 260.10 246.95				
25.00	DISCHG	233.38 221.46 211.48 203.03 195.71 189.47 184.25 179.88 176.20 173.05				
26.00	DISCHG	170.31 167.90 165.73 162.92 158.65 153.35 146.37 136.32 125.86 117.61				
27.00	DISCHG	110.80 104.50 97.98 91.12 84.04 76.92 69.59 62.15 54.24 45.43				
28.00	DISCHG	37.15 30.85 26.31 23.02 20.67 18.97 17.67 16.62 15.72 14.92				
29.00	DISCHG	14.19 13.50 12.86 12.25 11.66 11.11 10.59 10.08 9.61 9.15				

RUNOFF VOLUME ABOVE BASEFLOW = 3.56 WATERSHED INCHES, 8063.86 CFS-HRS, 666.40 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 24
OUTPUT HYDROGRAPH= 5
AREA= .15 SQ MI INPUT RUNOFF CURVE= 67. TIME OF CONCENTRATION= .47 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0627 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.37	212.84	(RUNOFF)
17.45	10.12	(RUNOFF)
18.18	9.09	(RUNOFF)
21.38	6.56	(RUNOFF)
22.19	6.52	(RUNOFF)
24.20	11.87	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.15 SQ.MI.
8.00	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .01				
9.00	DISCHG	.06 .17 .33 .52 .75 1.01 1.28 1.58 1.91 2.27				
10.00	DISCHG	2.64 3.02 3.43 3.91 4.44 5.04 5.69 6.40 7.16 8.01				
11.00	DISCHG	8.99 10.11 11.29 12.67 14.47 16.85 19.72 24.12 32.35 48.64				
12.00	DISCHG	81.41 126.73 173.90 206.85 211.22 187.92 153.34 119.86 94.20 75.74				
13.00	DISCHG	63.37 54.48 48.31 43.57 39.82 36.63 33.78 31.37 29.62 28.42				
14.00	DISCHG	27.46 26.58 25.88 25.22 24.27 23.15 22.36 21.97 21.36 20.44				
15.00	DISCHG	19.82 19.58 19.37 18.97 18.53 18.22 18.05 17.86 17.45 16.85				
16.00	DISCHG	16.29 15.91 15.70 15.58 15.52 15.37 14.99 14.41 13.85 13.25				

TIME(HRS)	DISCHG	12.28	11.08	10.28	10.03	10.11	10.11	9.80	9.26	8.72	8.46
17.00	DISCHG	8.62	8.98	9.08	8.86	8.50	8.23	8.08	7.99	7.93	7.90
18.00	DISCHG	7.88	7.77	7.39	6.89	6.73	6.92	7.26	7.52	7.67	7.65
19.00	DISCHG	7.34	6.87	6.71	6.81	6.77	6.57	6.53	6.70	6.72	6.41
20.00	DISCHG	6.02	5.83	6.04	6.44	6.55	6.33	5.97	5.70	5.54	5.57
21.00	DISCHG	5.89	6.35	6.52	6.31	5.97	5.70	5.55	5.46	5.41	5.38
22.00	DISCHG	5.36	5.35	5.35	5.34	5.34	5.34	5.29	4.91	3.89	3.54
23.00	DISCHG	5.83	10.14	11.86	9.77	6.35	3.65	2.20	1.30	.77	.45
24.00	DISCHG	.27	.16	.10	.05	.02	.00				
25.00	DISCHG										

RUNOFF VOLUME ABOVE BASEFLOW = 3.42 WATERSHED INCHES, 321.97 CFS-HRS, 26.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 25
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 6
 LENGTH = 1300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 25 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.83	1711.27	(NULL)
24.53	278.46	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.56 WATERSHED INCHES, 8063.86 CFS-HRS, 666.40 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 25
 INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.77	1804.61	(NULL)
24.48	281.95	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 3.65 SQ.MI.
7.00	DISCHG .00 .00 .01 .02 .04 .08 .12 .19 .28 .40		
8.00	DISCHG .57 .80 1.12 1.54 2.10 2.79 3.64 4.65 5.84 7.25		
9.00	DISCHG 8.90 10.84 13.07 15.62 18.49 21.67 25.11 28.80 32.78 37.03		
10.00	DISCHG 41.59 46.53 51.87 57.66 64.08 71.35 79.61 88.89 99.14 110.28		
11.00	DISCHG 122.54 135.78 149.70 165.10 182.99 203.67 227.71 257.62 298.84 361.80		
12.00	DISCHG 465.64 626.31 848.17 1122.01 1419.20 1637.58 1749.95 1797.06 1803.25 1778.83		
13.00	DISCHG 1734.30 1678.28 1618.59 1561.74 1508.76 1468.00 1435.43 1404.98 1375.64 1345.61		
14.00	DISCHG 1315.54 1284.91 1254.77 1224.23 1193.62 1162.33 1111.14 929.07 806.33 735.23		
15.00	DISCHG 693.48 663.91 642.47 623.69 608.57 594.65 583.43 572.62 563.38 553.85		
16.00	DISCHG 545.21 536.23 527.88 519.26 511.41 503.64 496.57 489.51 482.81 475.39		
17.00	DISCHG 466.95 456.97 446.00 433.86 421.83 409.87 400.00 391.87 384.88 378.87		
18.00	DISCHG 373.76 369.34 365.42 362.04 359.15 356.61 354.16 351.65 349.07 346.51		
19.00	DISCHG 344.12 341.85 339.40 336.72 334.07 331.53 329.29 327.50 326.33 325.57		
20.00	DISCHG 324.82 323.94 322.97 321.65 319.83 317.81 315.99 314.38 312.78 311.07		
21.00	DISCHG 309.23 307.28 305.50 304.01 302.60 301.18 299.76 298.31 296.67 294.95		
22.00	DISCHG 293.45 292.30 291.38 290.70 290.12 289.35 288.18 286.55 284.58 282.40		
23.00	DISCHG 280.20 278.18 276.23 274.51 272.94 271.50 270.05 268.03 264.89 261.98		
24.00	DISCHG 262.04 265.92 270.99 276.23 280.63 281.90 279.39 272.15 260.87 247.41		
25.00	DISCHG 233.65 221.62 211.58 203.08 195.73 189.47 184.25 179.88 176.20 173.05		
26.00	DISCHG 170.31 167.90 165.73 162.92 158.65 153.35 146.37 136.32 125.86 117.61		
27.00	DISCHG 110.80 104.50 97.98 91.12 84.04 76.92 69.59 62.15 54.24 45.43		
28.00	DISCHG 37.15 30.85 26.31 23.02 20.67 18.97 17.67 16.62 15.72 14.92		
29.00	DISCHG 14.19 13.50 12.86 12.25 11.66 11.11 10.59 10.08 9.61 9.15		

RUNOFF VOLUME ABOVE BASEFLOW = 3.56 WATERSHED INCHES, 8385.83 CFS-HRS, 693.01 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 26
 OUTPUT HYDROGRAPH= 1
 AREA= .43 SQ MI INPUT RUNOFF CURVE= 73. TIME OF CONCENTRATION= .60 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0800 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	676.21	(RUNOFF)
18.22	28.79	(RUNOFF)
19.88	24.22	(RUNOFF)
20.76	21.36	(RUNOFF)
21.43	20.44	(RUNOFF)
22.26	20.13	(RUNOFF)
24.26	29.32	(RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .43 SQ.MI.
 7.00 DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .03 .12
 8.00 DISCHG .30 .62 1.03 1.52 2.06 2.65 3.32 4.04 4.75 5.46

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9.00	DISCHG	6.26	7.20	8.18	9.12	10.06	11.05	12.09	13.22	14.44	15.77
10.00	DISCHG	17.15	18.57	20.09	21.78	23.66	25.82	28.18	30.72	33.43	36.42
11.00	DISCHG	39.77	43.57	47.65	52.34	58.13	65.55	74.47	87.95	110.94	154.77
12.00	DISCHG	231.91	352.46	488.58	606.87	672.76	654.94	586.03	492.13	399.04	325.66
13.00	DISCHG	269.16	226.85	195.21	171.89	153.66	138.79	126.29	115.87	107.28	100.53
14.00	DISCHG	95.23	91.15	87.91	85.08	82.10	78.80	75.87	73.56	71.38	68.97
15.00	DISCHG	66.79	65.16	63.92	62.75	61.49	60.27	59.30	58.49	57.43	55.93
16.00	DISCHG	54.26	52.80	51.70	50.99	50.53	50.03	49.16	47.78	46.18	44.31
17.00	DISCHG	41.85	38.80	35.94	34.13	33.26	32.88	32.30	31.05	29.60	28.45
18.00	DISCHG	28.04	28.43	28.79	28.61	27.97	27.14	26.44	26.00	25.71	25.53
19.00	DISCHG	25.38	25.07	24.35	23.24	22.41	22.28	22.72	23.44	24.03	24.21
20.00	DISCHG	23.79	22.89	22.17	21.91	21.73	21.40	21.20	21.28	21.32	20.91
21.00	DISCHG	20.16	19.46	19.34	19.93	20.41	20.31	19.72	18.91	18.26	18.04
22.00	DISCHG	18.44	19.34	20.04	20.08	19.58	18.83	18.19	17.77	17.50	17.33
23.00	DISCHG	17.21	17.13	17.08	17.05	17.03	17.02	17.01	16.55	15.19	13.90
24.00	DISCHG	15.78	22.55	28.48	28.93	24.70	17.76	11.61	7.63	5.06	3.38
25.00	DISCHG	2.25	1.48	.97	.65	.42	.28	.19	.12	.05	.01

RUNOFF VOLUME ABOVE BASEFLOW = 4.05 WATERSHED INCHES, 1124.50 CFS-HRS, 92.93 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 27
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2
 LENGTH = 800.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .70, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 27 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.77	1804.61	(NULL)
24.48	281.95	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.56 WATERSHED INCHES, 8385.83 CFS-HRS, 693.01 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 27
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.60	2336.00	(NULL)
24.35	305.98	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 4.08 SQ.MI.
7.00	DISCHG .00 .00 .01 .02 .04 .08 .12 .19 .31 .52		
8.00	DISCHG .87 1.41 2.15 3.06 4.16 5.45 6.95 8.69 10.60 12.71		
9.00	DISCHG 15.16 18.03 21.25 24.74 28.55 32.72 37.20 42.02 47.21 52.80		
10.00	DISCHG 58.74 65.10 71.96 79.43 87.75 97.17 107.78 119.62 132.56 146.69		
11.00	DISCHG 162.31 179.35 197.35 217.44 241.12 269.22 302.17 345.57 409.78 516.57		
12.00	DISCHG 697.55 978.77 1336.75 1728.88 2091.96 2292.53 2335.98 2289.19 2202.30 2104.49		
13.00	DISCHG 2003.45 1905.14 1813.80 1733.63 1662.42 1606.80 1561.73 1520.86 1482.92 1446.14		

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14.00	DISCHG	1410.76	1376.06	1342.69	1309.30	1275.72	1241.13	1187.00	1002.63	877.71	804.21
15.00	DISCHG	760.27	729.07	706.39	686.44	670.07	654.92	642.72	631.11	620.81	609.78
16.00	DISCHG	599.48	589.03	579.59	570.25	561.94	553.67	545.73	537.28	528.99	519.70
17.00	DISCHG	508.80	495.77	481.94	468.00	455.09	442.76	432.29	422.91	414.49	407.31
18.00	DISCHG	401.80	397.77	394.20	390.65	387.12	383.75	380.61	377.64	374.78	372.04
19.00	DISCHG	369.50	366.92	363.75	359.96	356.48	353.82	352.01	350.94	350.35	349.77
20.00	DISCHG	348.62	346.83	345.14	343.56	341.56	339.21	337.19	335.66	334.10	331.97
21.00	DISCHG	329.39	326.74	324.84	323.94	323.01	321.50	319.48	317.22	314.93	312.99
22.00	DISCHG	311.88	311.64	311.42	310.78	309.70	308.18	306.36	304.32	302.08	299.72
23.00	DISCHG	297.41	295.31	293.31	291.56	289.97	288.52	287.06	284.58	280.08	275.88
24.00	DISCHG	277.81	288.47	299.47	305.17	305.33	299.66	290.99	279.78	265.94	250.79
25.00	DISCHG	235.89	223.10	212.55	203.73	196.16	189.75	184.44	180.00	176.25	173.05
26.00	DISCHG	170.31	167.90	165.73	162.92	158.65	153.35	146.37	136.32	125.86	117.61

27.00	DISCHG	110.80	104.50	97.98	91.12	84.04	76.92	69.59	62.15	54.24	45.43
28.00	DISCHG	37.15	30.85	26.31	23.02	20.67	18.97	17.67	16.62	15.72	14.92
29.00	DISCHG	14.19	13.50	12.86	12.25	11.66	11.11	10.59	10.08	9.61	9.15

RUNOFF VOLUME ABOVE BASEFLOW = 3.61 WATERSHED INCHES, 9510.34 CFS-HRS, 785.93 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 28

OUTPUT HYDROGRAPH= 1

AREA= .04 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .38 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0507 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.29	85.65	(RUNOFF)
15.07	6.13	(RUNOFF)
24.14	4.14	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .04 SQ.MI.
5.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .01		
6.00	DISCHG .03 .05 .07 .10 .13 .17 .19 .21 .22 .24		
7.00	DISCHG .29 .34 .39 .43 .47 .52 .63 .76 .87 .97		
8.00	DISCHG 1.05 1.12 1.19 1.25 1.32 1.40 1.51 1.63 1.69 1.74		
9.00	DISCHG 1.90 2.09 2.20 2.26 2.38 2.52 2.66 2.79 2.97 3.16		
10.00	DISCHG 3.33 3.48 3.68 3.93 4.21 4.51 4.83 5.16 5.51 5.90		
11.00	DISCHG 6.38 6.90 7.41 8.00 8.97 10.16 11.52 13.70 18.33 27.21		
12.00	DISCHG 44.54 64.50 80.00 85.58 77.03 61.06 45.41 33.82 25.91 20.99		
13.00	DISCHG 17.77 15.58 14.01 12.83 11.84 11.00 10.19 9.53 9.09 8.82		
14.00	DISCHG 8.53 8.26 8.07 7.87 7.47 7.06 6.91 6.86 6.58 6.22		
15.00	DISCHG 6.10 6.13 6.03 5.84 5.71 5.64 5.61 5.54 5.35 5.12		
16.00	DISCHG 4.96 4.88 4.83 4.81 4.80 4.74 4.56 4.34 4.17 3.98		
17.00	DISCHG 3.58 3.17 3.01 3.06 3.12 3.11 2.95 2.73 2.58 2.55		
18.00	DISCHG 2.69 2.84 2.81 2.66 2.54 2.48 2.45 2.43 2.42 2.42		
19.00	DISCHG 2.42 2.37 2.18 2.00 2.02 2.17 2.29 2.35 2.38 2.34		
20.00	DISCHG 2.17 2.01 2.02 2.11 2.05 1.95 1.99 2.09 2.04 1.88		
21.00	DISCHG 1.76 1.75 1.89 2.04 2.01 1.87 1.75 1.69 1.65 1.69		
22.00	DISCHG 1.86 2.03 2.01 1.87 1.75 1.69 1.65 1.64 1.63 1.62		
23.00	DISCHG 1.62 1.62 1.62 1.62 1.62 1.62 1.60 1.41 .98 .94		

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24.00	DISCHG	2.35	3.98	3.85	2.47	1.30	.68	.36	.19	.10	.05
25.00	DISCHG	.03	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 4.93 WATERSHED INCHES, 120.98 CFS-HRS, 10.00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 29

OUTPUT HYDROGRAPH= 2

AREA= .01 SQ MI INPUT RUNOFF CURVE= 84. TIME OF CONCENTRATION= .24 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.20	34.11	(RUNOFF)
15.05	2.16	(RUNOFF)
24.07	1.98	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.
5.00	DISCHG .01 .01 .02 .03 .04 .05 .06 .07 .08 .09		
6.00	DISCHG .09 .10 .11 .13 .16 .17 .16 .16 .17 .18		
7.00	DISCHG .22 .24 .26 .27 .29 .33 .41 .47 .51 .53		
8.00	DISCHG .56 .58 .60 .63 .65 .69 .76 .79 .77 .81		
9.00	DISCHG .93 .99 .98 1.01 1.08 1.14 1.18 1.23 1.33 1.39		
10.00	DISCHG 1.44 1.50 1.60 1.71 1.83 1.94 2.07 2.20 2.33 2.50		
11.00	DISCHG 2.73 2.91 3.09 3.38 3.92 4.41 4.98 6.37 9.18 14.58		
12.00	DISCHG 24.74 31.11 34.10 31.50 22.22 15.53 10.57 7.89 6.43 5.65		
13.00	DISCHG 5.07 4.70 4.37 4.11 3.82 3.57 3.27 3.12 3.07 3.00		
14.00	DISCHG 2.88 2.81 2.78 2.68 2.43 2.35 2.42 2.37 2.15 2.07		
15.00	DISCHG 2.15 2.15 2.05 1.99 1.97 1.96 1.96 1.90 1.78 1.72		
16.00	DISCHG 1.69 1.68 1.68 1.68 1.68 1.63 1.51 1.44 1.42 1.31		
17.00	DISCHG 1.06 .97 1.04 1.09 1.11 1.07 .95 .88 .86 .90		
18.00	DISCHG 1.02 1.03 .94 .88 .86 .85 .85 .84 .84 .84		
19.00	DISCHG .84 .79 .67 .65 .75 .81 .83 .84 .84 .79		
20.00	DISCHG .67 .65 .75 .76 .66 .65 .75 .76 .66 .60		
21.00	DISCHG .58 .62 .74 .76 .66 .60 .58 .57 .57 .62		
22.00	DISCHG .74 .76 .66 .60 .58 .57 .57 .57 .57 .57		
23.00	DISCHG .57 .57 .57 .57 .57 .57 .56 .42 .18 .49		
24.00	DISCHG 1.69 1.92 .94 .33 .12 .04 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 5.27 WATERSHED INCHES, 44.25 CFS-HRS, 3.66 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 30

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 200.00 FEET

INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00

PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 30 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

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PEAK TIME(HRS)

12.29

15.07

24.14

PEAK DISCHARGE(CFS)

85.65

6.13

4.14

PEAK ELEVATION(FEET)

(NULL)

(NULL)

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 4.93 WATERSHED INCHES, 120.98 CFS-HRS, 10.00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 30

INPUT HYDROGRAPHS= 2,3

OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)

12.26

15.06

18.11

23.45

24.11

PEAK DISCHARGE(CFS)

118.40

8.29

3.87

2.19

5.92

PEAK ELEVATION(FEET)

(NULL)

(NULL)

(NULL)

(NULL)

(NULL)

TIME(HRS)

FIRST HYDROGRAPH POINT = .00 HOURS

TIME INCREMENT = .10 HOURS

DRAINAGE AREA = .05 SQ.MI.

5.00	DISCHG	.01	.01	.02	.03	.04	.05	.06	.07	.08	.10
6.00	DISCHG	.12	.15	.18	.22	.29	.34	.35	.37	.39	.43
7.00	DISCHG	.50	.58	.65	.70	.75	.85	1.04	1.23	1.38	1.50
8.00	DISCHG	1.61	1.70	1.79	1.88	1.96	2.08	2.27	2.42	2.46	2.55
9.00	DISCHG	2.83	3.08	3.18	3.27	3.46	3.66	3.83	4.02	4.30	4.56
10.00	DISCHG	4.76	4.98	5.29	5.64	6.04	6.45	6.91	7.36	7.85	8.39
11.00	DISCHG	9.11	9.82	10.50	11.39	12.89	14.57	16.50	20.07	27.51	41.79
12.00	DISCHG	69.28	95.60	114.10	117.07	99.25	76.58	55.98	41.71	32.34	26.64
13.00	DISCHG	22.84	20.28	18.38	16.94	15.66	14.57	13.47	12.65	12.16	11.82
14.00	DISCHG	11.41	11.07	10.85	10.55	9.91	9.41	9.33	9.23	8.73	8.29
15.00	DISCHG	8.25	8.28	8.08	7.83	7.67	7.60	7.56	7.44	7.13	6.84
16.00	DISCHG	6.65	6.56	6.52	6.49	6.48	6.37	6.07	5.78	5.59	5.28
17.00	DISCHG	4.64	4.14	4.05	4.15	4.24	4.17	3.90	3.62	3.44	3.45
18.00	DISCHG	3.70	3.87	3.75	3.54	3.40	3.33	3.29	3.27	3.27	3.26
19.00	DISCHG	3.26	3.16	2.85	2.65	2.77	2.98	3.12	3.19	3.22	3.14
20.00	DISCHG	2.84	2.66	2.77	2.87	2.71	2.60	2.74	2.85	2.70	2.48
21.00	DISCHG	2.34	2.37	2.63	2.80	2.67	2.47	2.33	2.26	2.22	2.31
22.00	DISCHG	2.60	2.79	2.67	2.47	2.32	2.26	2.22	2.20	2.19	2.19
23.00	DISCHG	2.19	2.19	2.18	2.18	2.19	2.19	2.16	1.84	1.16	1.43
24.00	DISCHG	4.04	5.90	4.78	2.81	1.42	.73	.37	.19	.10	.05
25.00	DISCHG	.03	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 5.02 WATERSHED INCHES, 165.23 CFS-HRS, 13.65 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 31

OUTPUT HYDROGRAPH= 5

AREA= .30 SQ MI

INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .71 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0947 HOURS

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PEAK TIME(HRS)

12.49

18.21

19.92

21.47

22.31

24.31

PEAK DISCHARGE(CFS)

515.10

21.70

18.03

15.20

14.83

19.31

PEAK ELEVATION(FEET)

(RUNOFF)

(RUNOFF)

(RUNOFF)

(RUNOFF)

(RUNOFF)

(RUNOFF)

TIME(HRS)		FIRST HYDROGRAPH POINT =		.00 HOURS		TIME INCREMENT = .10 HOURS			DRAINAGE AREA =		.30 SQ.MI.
		.00	.01	.04	.09	.17	.30	.45	.61	.77	.93
6.00	DISCHG										
7.00	DISCHG	1.12	1.34	1.60	1.88	2.18	2.50	2.91	3.42	4.04	4.71
8.00	DISCHG	5.39	6.05	6.66	7.24	7.80	8.37	8.99	9.66	10.34	10.99
9.00	DISCHG	11.69	12.53	13.44	14.32	15.19	16.09	17.00	17.96	19.01	20.16
10.00	DISCHG	21.37	22.61	23.92	25.35	26.94	28.73	30.71	32.87	35.17	37.69
11.00	DISCHG	40.46	43.55	46.96	50.80	55.37	61.04	68.27	78.40	94.80	124.51
12.00	DISCHG	175.25	251.27	344.91	434.54	498.46	514.72	486.87	431.74	366.30	304.19
13.00	DISCHG	253.26	213.21	182.22	158.11	139.14	123.88	111.40	101.03	92.47	85.55
14.00	DISCHG	79.99	75.42	71.69	68.55	65.66	62.85	60.33	58.18	56.24	54.32
15.00	DISCHG	52.57	51.12	49.87	48.74	47.71	46.77	45.91	45.12	44.31	43.32
16.00	DISCHG	42.17	41.06	40.09	39.34	38.80	38.32	37.71	36.86	35.78	34.48
17.00	DISCHG	32.85	30.90	28.94	27.34	26.24	25.53	24.95	24.20	23.22	22.31
18.00	DISCHG	21.75	21.61	21.70	21.64	21.35	20.90	20.40	19.96	19.65	19.44
19.00	DISCHG	19.28	19.05	18.64	18.02	17.40	17.09	17.14	17.41	17.79	18.03
20.00	DISCHG	17.93	17.53	17.07	16.74	16.50	16.26	16.11	16.08	16.02	15.79
21.00	DISCHG	15.40	14.99	14.77	14.87	15.13	15.18	14.96	14.56	14.10	13.81
22.00	DISCHG	13.87	14.23	14.64	14.83	14.72	14.40	13.99	13.61	13.34	13.16
23.00	DISCHG	13.03	12.94	12.88	12.83	12.80	12.78	12.71	12.35	11.56	10.87
24.00	DISCHG	11.58	14.30	17.66	19.28	18.40	15.65	11.87	8.30	5.78	4.12
25.00	DISCHG	2.93	2.07	1.47	1.03	.73	.51	.36	.25	.18	.12
26.00	DISCHG	.09	.05	.02	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 4.82 WATERSHED INCHES, 936.96 CFS-HRS, 77.43 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 5
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 6
SURFACE ELEVATION= 48.30

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.93	289.85	67.68
18.25	21.69	50.17
19.94	18.02	50.00
21.49	15.20	49.74
22.33	14.83	49.70
24.36	19.04	50.05

		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .30 SQ.MI.		
TIME(HRS)		.00	.01	.03	.08	.16	.28	.43	.59	.74	.91
6.00	DISCHG										
6.00	ELEV	48.30	48.30	48.30	48.31	48.31	48.33	48.34	48.36	48.37	48.39

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7.00	DISCHG	1.09	1.30	1.55	1.83	2.13	2.45	2.84	3.33	3.94	4.60
7.00	ELEV	48.40	48.42	48.45	48.47	48.50	48.53	48.57	48.61	48.67	48.73
8.00	DISCHG	5.28	5.94	6.57	7.15	7.71	8.28	8.88	9.55	10.23	10.88
8.00	ELEV	48.80	48.86	48.92	48.98	49.03	49.08	49.14	49.20	49.27	49.33
9.00	DISCHG	11.57	12.39	13.30	14.18	15.05	15.94	16.85	17.80	18.49	19.47
9.00	ELEV	49.39	49.47	49.56	49.64	49.72	49.81	49.89	49.98	50.02	50.07
10.00	DISCHG	20.62	21.84	23.11	24.47	25.97	27.63	29.49	31.54	33.75	36.14
10.00	ELEV	50.12	50.17	50.23	50.29	50.36	50.44	50.52	50.62	50.72	50.82
11.00	DISCHG	38.76	41.36	44.21	47.63	51.62	56.44	62.45	67.08	72.55	82.10
11.00	ELEV	50.94	51.05	51.17	51.31	51.46	51.66	51.90	52.09	52.31	52.73
12.00	DISCHG	97.94	117.55	136.79	161.95	192.25	223.52	251.11	271.82	284.48	289.53
12.00	ELEV	53.45	54.50	55.91	57.84	60.17	62.58	64.70	66.29	67.27	67.66
13.00	DISCHG	288.45	282.96	274.48	264.10	252.61	240.56	228.34	216.19	204.30	192.83
13.00	ELEV	67.57	67.15	66.50	65.70	64.82	63.89	62.95	62.01	61.10	60.22
14.00	DISCHG	181.88	171.52	161.77	152.65	144.14	136.20	128.77	121.21	113.52	103.35
14.00	ELEV	59.38	58.58	57.83	57.13	56.47	55.86	55.29	54.75	54.23	53.70
15.00	DISCHG	91.87	82.43	74.38	67.35	57.13	49.90	47.30	45.99	45.06	44.15
15.00	ELEV	53.18	52.75	52.39	52.10	51.69	51.40	51.29	51.24	51.20	51.17
16.00	DISCHG	43.12	42.02	40.96	40.05	39.19	38.63	38.08	37.37	36.43	35.27
16.00	ELEV	51.12	51.08	51.04	51.00	50.96	50.94	50.91	50.88	50.84	50.79
17.00	DISCHG	33.84	32.09	30.15	28.36	26.96	26.00	25.32	24.66	23.81	22.88
17.00	ELEV	50.72	50.64	50.55	50.47	50.41	50.36	50.33	50.30	50.26	50.22
18.00	DISCHG	22.12	21.73	21.66	21.67	21.51	21.17	20.71	20.23	19.85	19.58
18.00	ELEV	50.19	50.17	50.17	50.17	50.16	50.14	50.12	50.10	50.08	50.07
19.00	DISCHG	19.38	19.19	18.88	18.39	17.64	17.05	17.15	17.34	17.74	18.00
19.00	ELEV	50.06	50.05	50.04	50.02	49.97	49.91	49.92	49.94	49.98	50.00
20.00	DISCHG	17.97	17.61	17.14	16.78	16.54	16.30	16.13	16.08	16.03	15.84
20.00	ELEV	50.00	49.96	49.92	49.89	49.86	49.84	49.82	49.82	49.81	49.80
21.00	DISCHG	15.47	15.06	14.79	14.83	15.09	15.20	15.01	14.63	14.17	13.84
21.00	ELEV	49.76	49.72	49.70	49.70	49.72	49.74	49.72	49.68	49.64	49.61
22.00	DISCHG	13.84	14.16	14.58	14.82	14.75	14.46	14.06	13.66	13.38	13.18
22.00	ELEV	49.61	49.64	49.68	49.70	49.69	49.67	49.63	49.59	49.56	49.55
23.00	DISCHG	13.05	12.95	12.89	12.84	12.80	12.78	12.72	12.43	11.71	10.96
23.00	ELEV	49.53	49.52	49.52	49.51	49.51	49.51	49.50	49.47	49.41	49.34

24.00	DISCHG	11.36	13.75	17.12	18.68	18.82	16.68	12.27	8.97	6.05	4.39
25.00	ELEV	49.37	49.60	49.92	50.03	50.04	49.88	49.46	49.15	48.87	48.71
25.00	DISCHG	3.09	2.20	1.55	1.10	.77	.55	.38	.27	.19	.13
26.00	ELEV	48.59	48.51	48.45	48.40	48.37	48.35	48.34	48.33	48.32	48.31
26.00	DISCHG	.09	.06	.02	.00						
26.00	ELEV	48.31	48.31	48.30	48.30						

RUNOFF VOLUME ABOVE BASEFLOW = 4.82 WATERSHED INCHES, 937.06 CFS-HRS, 77.44 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 32
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 1
 LENGTH = 4200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .80, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .58 PEAK TRAVEL TIME = .20 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
13.12	285.79	(NULL)
20.09	17.90	(NULL)
21.61	15.12	(NULL)
22.49	14.70	(NULL)
24.50	18.15	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 4.82 WATERSHED INCHES, 936.97 CFS-HRS, 77.43 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 32
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 2
 LENGTH = 4200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.40, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .60 PEAK TRAVEL TIME = .12 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.41	110.32	(NULL)
22.25	2.68	(NULL)
24.25	4.89	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 5.02 WATERSHED INCHES, 165.21 CFS-HRS, 13.65 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 32
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
13.00	314.14	(NULL)
20.02	20.97	(NULL)
21.53	17.70	(NULL)
22.42	17.17	(NULL)
24.42	20.84	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .35 SQ.MI.
5.00	DISCHG .00 .00 .01 .02 .03 .03 .04 .05 .06 .07		
6.00	DISCHG .09 .11 .13 .18 .25 .36 .51 .66 .83 1.00		
7.00	DISCHG 1.19 1.42 1.69 1.98 2.30 2.63 3.02 3.51 4.12 4.81		
8.00	DISCHG 5.56 6.33 7.09 7.82 8.52 9.19 9.87 10.61 11.40 12.14		
9.00	DISCHG 12.89 13.76 14.75 15.75 16.73 17.76 18.83 19.90 21.01 22.04		
10.00	DISCHG 23.19 24.46 25.82 27.31 28.93 30.71 32.67 34.83 37.19 39.74		
11.00	DISCHG 42.52 45.62 48.83 52.24 56.16 61.01 66.81 73.86 81.60 92.42		
12.00	DISCHG 110.91 144.05 184.67 223.51 255.81 276.11 289.33 298.86 306.72 312.09		
13.00	DISCHG 314.13 312.30 306.95 298.75 288.49 276.81 264.29 251.31 238.35 225.73		
14.00	DISCHG 213.59 201.90 190.77 180.32 170.46 161.00 152.13 144.05 136.21 128.17		
15.00	DISCHG 118.64 107.98 98.04 89.07 81.07 71.71 63.53 58.54 55.60 53.63		
16.00	DISCHG 52.10 50.75 49.50 48.33 47.30 46.36 45.58 44.75 43.82 42.78		
17.00	DISCHG 41.49 39.74 37.70 35.68 33.85 32.33 31.09 30.01 29.00 27.99		
18.00	DISCHG 27.03 26.34 25.92 25.63 25.38 25.10 24.75 24.32 23.85 23.43		
19.00	DISCHG 23.09 22.83 22.55 22.07 21.47 20.86 20.38 20.32 20.44 20.74		

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20.00	DISCHG	20.96	20.87	20.51	20.17	19.87	19.51	19.15	18.99	18.96	18.83
21.00	DISCHG	18.53	18.11	17.71	17.55	17.60	17.69	17.67	17.47	17.13	16.70
22.00	DISCHG	16.39	16.42	16.73	17.03	17.17	17.11	16.88	16.53	16.15	15.81

TIME(HRS)	DISCHG	15.56	15.37	15.24	15.14	15.07	15.02	15.07	14.99	14.93	14.54	13.56
23.00	DISCHG	12.89	14.39	17.48	20.02	20.83	20.44	18.66	15.17	11.70	8.50	
24.00	DISCHG	6.16	4.40	3.14	2.22	1.57	1.11	.78	.55	.39	.27	
25.00	DISCHG	.19	.13	.09	.05	.02	.01	.00				
26.00	DISCHG											

RUNOFF VOLUME ABOVE BASEFLOW = 4.85 WATERSHED INCHES, 1102.18 CFS-HRS, 91.08 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 33

OUTPUT HYDROGRAPH= 4

AREA= .05 SQ MI INPUT RUNOFF CURVE= 71. TIME OF CONCENTRATION= .29 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.26	92.35	(RUNOFF)
15.07	6.86	(RUNOFF)
18.09	3.32	(RUNOFF)
24.10	5.77	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .05 SQ.MI.
8.00	DISCHG .00 .00 .02 .06 .12 .19 .27	.36 .41 .49	
9.00	DISCHG .62 .75 .82 .90 1.02 1.15 1.26	1.39 1.55 1.72	
10.00	DISCHG 1.85 2.00 2.21 2.43 2.69 2.96 3.25	3.56 3.89 4.27	
11.00	DISCHG 4.76 5.25 5.72 6.37 7.45 8.65 9.98	12.67 18.48 29.92	
12.00	DISCHG 52.84 74.81 88.91 90.64 72.42 52.77 37.63	27.70 22.00 18.74	
13.00	DISCHG 16.56 15.09 14.00 13.11 12.24 11.43 10.58	9.98 9.72 9.52	
14.00	DISCHG 9.18 8.93 8.82 8.57 7.95 7.54 7.62	7.58 7.05 6.68	
15.00	DISCHG 6.78 6.85 6.62 6.40 6.30 6.27 6.25	6.15 5.84 5.58	
16.00	DISCHG 5.46 5.42 5.40 5.40 5.40 5.29 4.98	4.72 4.60 4.34	
17.00	DISCHG 3.68 3.25 3.33 3.49 3.57 3.49 3.19	2.93 2.82 2.87	
18.00	DISCHG 3.17 3.32 3.12 2.91 2.81 2.77 2.75	2.74 2.74 2.74	
19.00	DISCHG 2.74 2.63 2.31 2.15 2.35 2.57 2.67	2.72 2.73 2.63	
20.00	DISCHG 2.32 2.16 2.36 2.47 2.25 2.13 2.35	2.46 2.25 2.02	
21.00	DISCHG 1.92 1.99 2.29 2.45 2.24 2.02 1.92	1.88 1.86 1.96	
22.00	DISCHG 2.29 2.44 2.24 2.02 1.92 1.88 1.86	1.86 1.85 1.85	
23.00	DISCHG 1.85 1.85 1.85 1.85 1.85 1.85 1.84	1.57 .89 1.15	
24.00	DISCHG 4.02 5.77 3.88 1.74 .74 .32 .14	.06 .02 .00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.84 WATERSHED INCHES, 119.04 CFS-HRS, 9.84 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 34

INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5

LENGTH = 1200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 1.00, M= 1.53

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 34 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.26	92.35	(NULL)
15.07	6.86	(NULL)
18.09	3.32	(NULL)
24.10	5.77	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.84 WATERSHED INCHES, 119.04 CFS-HRS, 9.84 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 34

INPUT HYDROGRAPHS= 3,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.47	328.95	(NULL)
12.94	331.04	(NULL)
19.92	23.38	(NULL)
22.38	19.10	(NULL)
24.32	21.77	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .40 SQ.MI.
5.00	DISCHG .00 .00 .01 .02 .03 .03 .04	.05 .06 .07	
6.00	DISCHG .09 .11 .13 .18 .25 .36 .51	.66 .83 1.00	
7.00	DISCHG 1.19 1.42 1.69 1.98 2.30 2.63 3.02	3.51 4.12 4.81	
8.00	DISCHG 5.56 6.33 7.11 7.89 8.64 9.38 10.14	10.97 11.81 12.63	
9.00	DISCHG 13.51 14.51 15.57 16.65 17.76 18.91 20.09	21.28 22.56 23.76	
10.00	DISCHG 25.04 26.46 28.03 29.75 31.62 33.67 35.92	38.39 41.07 44.01	
11.00	DISCHG 47.28 50.86 54.56 58.61 63.61 69.65 76.79	86.53 100.08 122.34	

12.00	DISCHG	183.75	218.86	273.59	314.15	328.24	328.87	326.96	326.56	328.72	330.82
13.00	DISCHG	330.69	327.38	320.95	311.86	300.73	288.24	274.87	261.29	248.07	235.25
14.00	DISCHG	222.77	210.82	199.59	188.90	178.42	168.54	159.75	151.63	143.27	134.85
15.00	DISCHG	125.42	114.83	104.66	95.47	87.38	77.98	69.78	64.69	61.44	59.21
16.00	DISCHG	57.56	56.17	54.90	53.73	52.70	51.65	50.56	49.47	48.42	47.11
17.00	DISCHG	45.17	42.99	41.02	39.17	37.42	35.82	34.28	32.93	31.82	30.86
18.00	DISCHG	30.20	29.67	29.04	28.53	28.19	27.87	27.50	27.06	26.59	26.17
19.00	DISCHG	25.82	25.46	24.86	24.22	23.82	23.43	23.06	23.04	23.18	23.37
20.00	DISCHG	23.28	23.03	22.87	22.64	22.12	21.64	21.50	21.45	21.20	20.85
21.00	DISCHG	20.45	20.09	20.00	19.99	19.84	19.71	19.59	19.35	18.99	18.67
22.00	DISCHG	18.67	18.86	18.97	19.05	19.09	18.99	18.75	18.39	18.00	17.66
23.00	DISCHG	17.41	17.22	17.09	16.99	16.92	16.88	16.83	16.49	15.43	14.71
24.00	DISCHG	16.91	20.16	21.36	21.76	21.56	20.76	18.80	15.23	11.72	8.50
25.00	DISCHG	6.16	4.40	3.14	2.22	1.57	1.11	.78	.55	.39	.27
26.00	DISCHG	.19	.13	.09	.05	.02	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 4.73 WATERSHED INCHES, 1221.21 CFS-HRS, 100.92 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 35

OUTPUT HYDROGRAPH= 1

AREA= .76 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .77 HOURS

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INTERNAL HYDROGRAPH TIME INCREMENT= .1027 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.54	1015.37	(RUNOFF)
19.95	41.46	(RUNOFF)
21.48	34.95	(RUNOFF)
22.34	34.17	(RUNOFF)
24.34	44.74	(RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .76 SQ.MI.
7.00	DISCHG	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .01
8.00	DISCHG	.04 .14 .36 .73	1.26 1.94 2.78	3.74 4.78 5.89
9.00	DISCHG	7.09 8.43 9.87 11.37	12.90 14.50 16.18	17.94 19.82 21.86
10.00	DISCHG	24.02 26.29 28.69 31.30	34.17 37.35 40.87	44.72 48.90 53.47
11.00	DISCHG	58.51 64.14 70.33 77.35	85.52 95.69 108.02	125.53 151.69 202.29
12.00	DISCHG	290.30 428.85 607.97 790.98	937.07 1009.63 998.91	924.20 814.24 695.69
13.00	DISCHG	588.96 501.15 431.18 375.49	330.95 294.83 264.96	240.13 219.46 202.49
14.00	DISCHG	188.71 177.50 168.27 160.38	153.16 146.31 140.05	134.71 130.08 125.57
15.00	DISCHG	121.43 117.99 115.11 112.37	109.88 107.71 105.76	103.89 102.03 99.88
16.00	DISCHG	97.44 94.99 92.77 90.93	89.54 88.34 87.00	85.22 82.97 80.19
17.00	DISCHG	76.75 72.64 68.36 64.65	61.84 59.79 58.11	56.40 54.42 52.48
18.00	DISCHG	51.05 50.35 50.16 49.94	49.39 48.53 47.49	46.47 45.66 45.10
19.00	DISCHG	44.70 44.20 43.36 42.08	40.70 39.89 39.78	40.16 40.84 41.40
20.00	DISCHG	41.38 40.71 39.78 39.01	38.42 37.85 37.43	37.28 37.14 36.66
21.00	DISCHG	35.89 35.11 34.62 34.57	34.82 34.94 34.63	33.94 33.08 32.41
22.00	DISCHG	32.30 32.85 33.66 34.14	34.06 33.54 32.75	31.89 31.20 30.73
23.00	DISCHG	30.39 30.15 29.98 29.86	29.76 29.70 29.44	28.56 26.55 25.04
24.00	DISCHG	26.34 32.10 39.81 44.37	43.75 39.11 31.73	23.57 16.84 12.17
25.00	DISCHG	8.90 6.48 4.70 3.41	2.46 1.78 1.29	.93 .67 .48
26.00	DISCHG	.34 .25 .18 .10	.03 .00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.94 WATERSHED INCHES, 1924.31 CFS-HRS, 159.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 36

INPUT HYDROGRAPHS= 6,1

OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.54	1343.85	(NULL)
19.94	64.83	(NULL)
21.44	54.66	(NULL)
22.34	53.25	(NULL)
24.34	66.50	(NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.16 SQ.MI.
5.00	DISCHG	.00 .00 .01 .02	.03 .03 .04	.05 .06 .07
6.00	DISCHG	.09 .11 .13 .18	.25 .36 .51	.66 .83 1.00
7.00	DISCHG	1.19 1.42 1.69 1.98	2.30 2.63 3.02	3.51 4.12 4.82
8.00	DISCHG	5.60 6.47 7.47 8.62	9.90 11.32 12.92	14.71 16.60 18.52

9.00	DISCHG	20.60	22.94	25.45	28.01	30.66	33.41	36.27	39.22	42.39	45.62
10.00	DISCHG	49.07	52.76	56.73	61.05	65.79	71.02	76.79	83.11	89.98	97.48
11.00	DISCHG	105.79	115.00	124.88	135.96	149.13	165.34	184.81	212.06	251.78	324.64
12.00	DISCHG	454.05	647.71	881.56	1105.13	1265.31	1338.51	1325.86	1250.76	1142.96	1026.51
13.00	DISCHG	919.65	828.53	752.12	687.35	631.69	583.07	539.84	501.42	467.53	437.75
14.00	DISCHG	411.48	388.33	367.86	349.28	331.58	314.85	299.80	286.34	273.34	260.42
15.00	DISCHG	246.85	232.82	219.77	207.84	197.25	185.69	175.55	168.57	163.47	159.09
16.00	DISCHG	155.00	151.16	147.67	144.67	142.24	140.00	137.55	134.69	131.39	127.30
17.00	DISCHG	121.92	115.63	109.38	103.81	99.26	95.60	92.39	89.33	86.24	83.34
18.00	DISCHG	81.25	80.02	79.20	78.47	77.58	76.40	74.99	73.52	72.25	71.27
19.00	DISCHG	70.53	69.66	68.23	66.30	64.52	63.32	62.84	63.20	64.02	64.77
20.00	DISCHG	64.66	63.74	62.65	61.65	60.54	59.49	58.93	58.73	58.34	57.51
21.00	DISCHG	56.33	55.21	54.62	54.56	54.65	54.64	54.22	53.29	52.07	51.07
22.00	DISCHG	50.97	51.71	52.63	53.19	53.15	52.54	51.49	50.27	49.20	48.39
23.00	DISCHG	47.80	47.37	47.07	46.85	46.69	46.58	46.27	45.05	41.97	39.74
24.00	DISCHG	43.25	52.26	61.17	66.13	65.31	59.87	50.53	38.80	28.56	20.67
25.00	DISCHG	15.06	10.88	7.84	5.63	4.03	2.89	2.08	1.48	1.05	.75
26.00	DISCHG	.53	.38	.26	.15	.05	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 4.22 WATERSHED INCHES, 3145.53 CFS-HRS, 259.95 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 6
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 26.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.85	1126.33	34.30
24.57	52.92	28.44

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	1.16 SQ.MI.
5.00	DISCHG	.00	.00	.00	.01	.01
5.00	ELEV	26.00	26.00	26.00	26.00	26.00
6.00	DISCHG	.02	.03	.04	.05	.06
6.00	ELEV	26.00	26.00	26.00	26.00	26.00
7.00	DISCHG	.24	.30	.37	.46	.55
7.00	ELEV	26.01	26.02	26.02	26.02	26.03
8.00	DISCHG	1.51	1.77	2.07	2.41	2.80
8.00	ELEV	26.08	26.09	26.11	26.13	26.15
9.00	DISCHG	6.48	7.36	8.32	9.37	10.51
9.00	ELEV	26.34	26.39	26.44	26.49	26.55
10.00	DISCHG	19.27	21.08	23.00	25.05	27.24
10.00	ELEV	27.01	27.11	27.21	27.32	27.43
11.00	DISCHG	45.27	51.05	57.18	63.69	70.82
11.00	ELEV	28.30	28.41	28.52	28.64	28.77
12.00	DISCHG	162.11	184.10	217.66	261.82	310.99
12.00	ELEV	30.07	30.36	30.79	31.37	32.05
13.00	DISCHG	1001.35	906.27	819.65	745.00	681.13
13.00	ELEV	34.22	34.15	34.10	34.05	34.01
14.00	DISCHG	486.41	457.17	430.45	406.15	398.27

14.00	ELEV	33.66	33.61	33.56	33.51	33.46	33.41	33.34	33.27	33.18	33.10
15.00	DISCHG	375.85	370.90	363.62	355.64	347.49	339.18	330.74	322.29	313.97	305.84
15.00	ELEV	33.00	32.90	32.79	32.68	32.56	32.45	32.33	32.21	32.10	31.98
16.00	DISCHG	297.91	290.20	282.70	275.43	268.41	261.63	255.09	248.63	241.88	235.30
16.00	ELEV	31.87	31.76	31.66	31.56	31.46	31.36	31.27	31.18	31.10	31.01
17.00	DISCHG	228.84	222.41	215.99	209.60	203.29	197.10	191.20	185.53	180.00	174.61
17.00	ELEV	30.93	30.85	30.77	30.69	30.61	30.53	30.45	30.38	30.30	30.23
18.00	DISCHG	169.39	164.37	159.58	152.62	143.33	135.07	127.68	121.03	115.53	110.62
18.00	ELEV	30.16	30.10	30.03	29.94	29.82	29.72	29.62	29.53	29.46	29.38
19.00	DISCHG	106.17	102.12	98.52	95.26	92.15	89.21	86.49	84.04	81.92	80.09
19.00	ELEV	29.32	29.26	29.21	29.16	29.11	29.06	29.02	28.98	28.95	28.92
20.00	DISCHG	78.49	77.00	75.56	74.17	72.80	71.47	70.19	69.16	68.21	67.30
20.00	ELEV	28.89	28.87	28.85	28.83	28.80	28.78	28.76	28.74	28.73	28.71
21.00	DISCHG	66.38	65.43	64.50	63.62	62.82	62.09	61.41	60.73	60.01	59.26
21.00	ELEV	28.69	28.68	28.66	28.64	28.63	28.61	28.60	28.59	28.58	28.56
22.00	DISCHG	58.53	57.89	57.38	56.99	56.65	56.31	55.93	55.48	54.97	54.42
22.00	ELEV	28.55	28.54	28.53	28.52	28.51	28.51	28.50	28.49	28.48	28.47
23.00	DISCHG	53.86	53.30	52.76	52.24	51.76	51.30	50.87	50.41	49.79	49.00
23.00	ELEV	28.46	28.45	28.44	28.43	28.42	28.41	28.41	28.40	28.39	28.37
24.00	DISCHG	48.33	48.28	49.03	50.33	51.70	52.66	52.89	52.16	50.52	48.21
24.00	ELEV	28.36	28.36	28.37	28.40	28.42	28.44	28.44	28.43	28.40	28.36

25.00	DISCHG	45.52	42.76	40.85	38.90	36.96	35.05	33.19	31.39	29.67	28.03
25.00	ELEV	28.31	28.25	28.15	28.04	27.94	27.84	27.74	27.65	27.56	27.47
26.00	DISCHG	26.47	24.98	23.58	22.24	20.98	19.78	18.65	17.59	16.58	15.64
26.00	ELEV	27.39	27.31	27.24	27.17	27.10	27.04	26.98	26.92	26.87	26.82
27.00	DISCHG	14.74	13.90	13.11	12.36	11.65	10.99	10.36	9.77	9.21	8.69
27.00	ELEV	26.77	26.73	26.69	26.65	26.61	26.58	26.54	26.51	26.48	26.46
28.00	DISCHG	8.19	7.72	7.28	6.87	6.47	6.10	5.76	5.43	5.12	4.83
28.00	ELEV	26.43	26.41	26.38	26.36	26.34	26.32	26.30	26.29	26.27	26.25
29.00	DISCHG	4.55	4.29	4.05	3.81	3.60	3.39	3.20	3.02	2.84	2.68
29.00	ELEV	26.24	26.23	26.21	26.20	26.19	26.18	26.17	26.16	26.15	26.14

RUNOFF VOLUME ABOVE BASEFLOW = 4.21 WATERSHED INCHES, 3141.51 CFS-HRS, 259.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 37

OUTPUT HYDROGRAPH= 4

AREA= .62 SQ MI INPUT RUNOFF CURVE= 72. TIME OF CONCENTRATION= .90 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .1000 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.63	764.83	(RUNOFF)
20.00	33.57	(RUNOFF)
21.46	28.52	(RUNOFF)
22.39	27.64	(RUNOFF)
24.38	37.50	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	TIME INCREMENT =	DRAINAGE AREA =
8.00 DISCHG	.02 .07	.10 HOURS	.62 SQ.MI.
9.00 DISCHG	4.84 5.81 6.89 8.04 9.22 10.45 11.75		2.37 3.12 3.94 13.13 14.56 16.10

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10.00	DISCHG	17.75	19.51	21.34	23.31	25.47	27.85	30.46	33.32	36.44	39.87
11.00	DISCHG	43.63	47.79	52.37	57.55	63.47	70.56	79.17	90.89	107.37	137.02
12.00	DISCHG	188.69	269.42	383.58	512.74	634.63	724.55	762.78	752.75	702.07	629.44
13.00	DISCHG	549.46	473.69	410.95	358.67	316.61	281.23	251.88	226.93	205.92	188.22
14.00	DISCHG	173.66	161.49	151.50	143.02	135.82	129.37	123.35	117.80	112.79	108.23
15.00	DISCHG	103.96	100.23	97.33	94.83	92.45	90.26	88.46	86.82	85.15	83.39
16.00	DISCHG	81.52	79.59	77.75	76.08	74.67	73.43	72.29	71.01	69.45	67.51
17.00	DISCHG	65.14	62.31	59.06	55.88	53.29	51.20	49.45	47.83	46.23	44.67
18.00	DISCHG	43.31	42.30	41.72	41.33	40.87	40.27	39.58	38.84	38.08	37.43
19.00	DISCHG	36.97	36.53	35.94	35.17	34.23	33.42	33.00	32.94	33.16	33.42
20.00	DISCHG	33.57	33.43	32.95	32.35	31.83	31.39	30.95	30.61	30.49	30.30
21.00	DISCHG	29.77	29.13	28.69	28.49	28.48	28.51	28.37	28.01	27.49	27.00
22.00	DISCHG	26.68	26.69	27.08	27.51	27.63	27.46	27.09	26.59	26.00	25.49
23.00	DISCHG	25.13	24.87	24.68	24.53	24.41	24.33	24.26	23.99	23.26	22.97
24.00	DISCHG	24.09	27.11	32.13	36.45	37.45	35.42	31.44	26.27	20.33	15.03
25.00	DISCHG	11.33	8.67	6.65	5.04	3.85	2.93	2.21	1.67	1.27	.97
26.00	DISCHG	.74	.55	.41	.31	.23	.18	.13	.08	.03	.00

RUNOFF VOLUME ABOVE BASEFLOW = 3.95 WATERSHED INCHES, 1571.58 CFS-HRS, 129.88 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 38

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5

LENGTH = 6500.00 FEET

MODIFIED ATT-KIN ROUTING COEFFICIENT = .49 INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53

PEAK TRAVEL TIME = .30 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.10	972.87	(NULL)
24.74	52.30	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 4.21 WATERSHED INCHES, 3140.11 CFS-HRS, 259.50 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 38

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.00	1495.09	(NULL)
24.41	87.04	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	TIME INCREMENT =	DRAINAGE AREA =
5.00 DISCHG	.00 .00	.10 HOURS	1.77 SQ.MI.
6.00 DISCHG	.01 .01		.00 .00 .00
7.00 DISCHG	.15 .20		.06 .09 .12
8.00 DISCHG	1.13 1.38		.67 .80 .94
9.00 DISCHG	9.85 11.54 13.41 15.44 17.58 19.86 22.30 24.90 27.65 30.59		5.65 6.90 8.31

10.00	DISCHG	33.74	37.10	40.64	44.41	48.50	52.93	57.74	62.96	68.63	74.80
11.00	DISCHG	81.52	89.27	98.52	109.08	120.94	134.54	150.87	171.40	197.95	239.91
12.00	DISCHG	308.12	409.68	545.23	701.72	859.16	991.28	1076.85	1113.17	1255.30	1442.31
13.00	DISCHG	1495.07	1446.49	1351.29	1240.11	1131.46	1030.83	951.72	887.09	829.61	776.59

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14.00	DISCHG	727.66	682.51	641.36	603.88	569.99	546.02	529.70	517.31	507.03	497.84
15.00	DISCHG	489.11	480.84	473.21	464.72	455.39	445.66	435.95	426.13	416.16	406.08
16.00	DISCHG	395.98	385.98	376.23	366.86	357.96	349.46	341.29	333.22	325.03	316.40
17.00	DISCHG	307.40	298.02	288.27	278.64	269.62	261.17	253.14	245.42	237.93	230.67
18.00	DISCHG	223.75	217.34	211.55	206.15	199.74	191.56	182.96	174.55	166.63	159.62
19.00	DISCHG	153.52	148.01	142.86	137.98	133.36	129.14	125.54	122.53	120.04	117.88
20.00	DISCHG	115.90	113.89	111.72	109.55	107.55	105.69	103.87	102.19	100.89	99.63
21.00	DISCHG	98.11	96.51	95.12	93.97	93.06	92.22	91.29	90.20	88.97	87.76
22.00	DISCHG	86.71	85.99	85.70	85.52	85.15	84.55	83.79	82.91	81.92	80.94
23.00	DISCHG	80.08	79.29	78.55	77.86	77.21	76.62	76.07	75.33	74.15	73.32
24.00	DISCHG	73.78	76.14	80.79	85.29	87.02	86.02	83.05	78.51	72.53	66.40
25.00	DISCHG	61.16	56.39	51.95	48.17	44.91	41.99	39.31	36.86	34.61	32.52
26.00	DISCHG	30.57	28.74	27.03	25.44	23.95	22.56	21.24	19.99	18.80	17.71
27.00	DISCHG	16.69	15.74	14.84	14.00	13.20	12.44	11.73	11.06	10.43	9.84
28.00	DISCHG	9.27	8.74	8.25	7.78	7.33	6.91	6.52	6.14	5.79	5.46
29.00	DISCHG	5.15	4.86	4.58	4.32	4.07	3.84	3.62	3.41	3.22	3.03

RUNOFF VOLUME ABOVE BASEFLOW = 4.12 WATERSHED INCHES, 4711.69 CFS-HRS, 389.37 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 39
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1
LENGTH = 2500.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .63, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 39 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.60	2336.00	(NULL)
24.35	305.98	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.61 WATERSHED INCHES, 9510.34 CFS-HRS, 785.93 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 39
INPUT HYDROGRAPHS= 6,7 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.64	3425.43	(NULL)
12.91	3548.32	(NULL)
24.37	392.68	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 5.86 SQ.MI.
5.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00		
6.00	DISCHG .01 .01 .02 .02 .03 .04 .05 .06 .09 .12		
7.00	DISCHG .15 .20 .25 .33 .42 .54 .68 .86 1.11 1.46		
8.00	DISCHG 2.00 2.79 3.87 5.26 6.96 9.03 11.49 14.33 17.50 21.01		
9.00	DISCHG 25.01 29.58 34.66 40.17 46.13 52.57 59.49 66.92 74.86 83.39		
10.00	DISCHG 92.48 102.20 112.59 123.85 136.24 150.10 165.52 182.58 201.19 221.49		
11.00	DISCHG 243.83 268.62 295.87 326.52 362.06 403.76 453.05 516.97 607.73 756.48		

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12.00	DISCHG	1005.68	1388.45	1881.98	2430.60	2951.12	3283.80	3412.83	3402.36	3457.60	3546.80
13.00	DISCHG	3498.52	3351.63	3165.09	2973.74	2793.88	2637.63	2513.45	2407.94	2312.53	2222.73
14.00	DISCHG	2138.43	2058.57	1984.05	1913.19	1845.71	1787.15	1716.70	1519.94	1384.73	1302.05
15.00	DISCHG	1249.38	1209.90	1179.60	1151.16	1125.46	1100.58	1078.67	1057.24	1036.97	1015.86
16.00	DISCHG	995.46	975.01	955.82	937.11	919.90	903.13	887.02	870.50	854.03	836.10
17.00	DISCHG	816.20	793.79	770.21	746.63	724.71	703.92	685.43	668.34	652.42	637.98
18.00	DISCHG	625.54	615.12	605.76	596.80	586.86	575.31	563.56	552.20	541.41	531.67
19.00	DISCHG	523.01	514.93	506.60	497.94	489.84	482.96	477.55	473.47	470.40	467.66
20.00	DISCHG	464.51	460.72	456.86	453.11	449.11	444.89	441.06	437.86	434.99	431.61
21.00	DISCHG	427.50	423.25	419.96	417.91	416.07	413.72	410.77	407.42	403.90	400.75
22.00	DISCHG	398.59	397.63	397.12	396.30	394.85	392.73	390.16	387.23	384.00	380.66
23.00	DISCHG	377.48	374.60	371.86	369.41	367.18	365.14	363.13	359.91	354.23	349.20
24.00	DISCHG	351.59	364.62	380.26	390.46	392.35	385.68	374.04	358.29	338.47	317.19

25.00	DISCHG	297.05	279.49	264.50	251.90	241.07	231.74	223.75	216.86	210.86	205.57
26.00	DISCHG	200.88	196.64	192.76	188.36	182.60	175.91	167.61	156.31	144.67	135.31
27.00	DISCHG	127.49	120.24	112.83	105.11	97.24	89.36	81.32	73.22	64.67	55.26
28.00	DISCHG	46.43	39.59	34.55	30.79	28.00	25.88	24.19	22.77	21.52	20.39
29.00	DISCHG	19.34	18.36	17.44	16.57	15.74	14.95	14.21	13.50	12.82	12.18

RUNOFF VOLUME ABOVE BASEFLOW = 3.76 WATERSHED INCHES, 14222.02 CFS-HRS, 1175.31 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 40

OUTPUT HYDROGRAPH= 2

AREA= .32 SQ MI INPUT RUNOFF CURVE= 67. TIME OF CONCENTRATION= .64 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0853 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.47	403.21	(RUNOFF)
18.22	19.53	(RUNOFF)
19.89	16.46	(RUNOFF)
20.71	14.52	(RUNOFF)
21.46	13.89	(RUNOFF)
22.28	13.66	(RUNOFF)
24.28	20.76	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .32 SQ.MI.
8.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00		
9.00	DISCHG .07 .20 .42 .73 1.12 1.59 2.12 2.69 3.32 4.01 4.75 5.54 6.37 7.29 8.31 9.45 10.72 12.11 13.62 15.27		
10.00	DISCHG 4.75 5.54 6.37 7.29 8.31 9.45 10.72 12.11 13.62 15.27 17.12 19.21 21.53 24.18 27.40 31.44 36.37 43.60 55.80 79.66		
11.00	DISCHG 17.12 19.21 21.53 24.18 27.40 31.44 36.37 43.60 55.80 79.66 122.54 188.24 270.16 346.86 395.58 401.13 371.30 321.73 266.80 220.91		
12.00	DISCHG 122.54 188.24 270.16 346.86 395.58 401.13 371.30 321.73 266.80 220.91 184.68 156.60 135.17 118.66 105.80 95.67 87.15 79.89 73.85 69.01		
13.00	DISCHG 184.68 156.60 135.17 118.66 105.80 95.67 87.15 79.89 73.85 69.01 65.18 62.14 59.69 57.62 55.58 53.43 51.48 49.90 48.40 46.81		
14.00	DISCHG 65.18 62.14 59.69 57.62 55.58 53.43 51.48 49.90 48.40 46.81 45.35 44.19 43.27 42.45 41.63 40.85 40.17 39.59 38.92 37.99		
15.00	DISCHG 45.35 44.19 43.27 42.45 41.63 40.85 40.17 39.59 38.92 37.99 36.95 35.98 35.19 34.65 34.30 33.95 33.40 32.56 31.55 30.35		
16.00	DISCHG 36.95 35.98 35.19 34.65 34.30 33.95 33.40 32.56 31.55 30.35 28.77 26.84 24.99 23.65 22.87 22.50 22.08 21.33 20.39 19.59		
17.00	DISCHG 28.77 26.84 24.99 23.65 22.87 22.50 22.08 21.33 20.39 19.59 19.21 19.32 19.53 19.45 19.09 18.60 18.11 17.78 17.57 17.43		
18.00	DISCHG 19.21 19.32 19.53 19.45 19.09 18.60 18.11 17.78 17.57 17.43 17.31 17.12 16.68 16.00 15.44 15.28 15.47 15.87 16.30 16.46		
19.00	DISCHG 17.31 17.12 16.68 16.00 15.44 15.28 15.47 15.87 16.30 16.46 16.25 15.75 15.27 15.02 14.84 14.63 14.50 14.52 14.51 14.29		
20.00	DISCHG 16.25 15.75 15.27 15.02 14.84 14.63 14.50 14.52 14.51 14.29		

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21.00	DISCHG	13.85	13.42	13.28	13.53	13.84	13.86	13.55	13.07	12.63	12.43
22.00	DISCHG	12.61	13.11	13.56	13.66	13.42	12.99	12.55	12.24	12.04	11.91
23.00	DISCHG	11.81	11.75	11.71	11.68	11.67	11.66	11.55	11.07	9.88	9.11
24.00	DISCHG	10.88	15.42	19.67	20.72	18.57	14.23	9.80	6.60	4.51	3.07
25.00	DISCHG	2.07	1.41	.96	.66	.44	.30	.20	.14	.09	.05
26.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 3.42 WATERSHED INCHES, 701.51 CFS-HRS, 57.97 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 41

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.61	3785.33	(NULL)
12.88	3769.37	(NULL)
24.35	412.49	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 6.17 SQ.MI.
5.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00		
6.00	DISCHG .01 .01 .02 .02 .03 .04 .05 .06 .09 .12 2.00 2.79 3.87 5.26 6.96 9.03 11.49 14.33 17.50 21.03		
7.00	DISCHG .15 .20 .25 .33 .42 .54 .68 .86 1.11 1.46 25.08 29.78 35.08 40.90 47.25 54.16 61.61 69.61 78.18 87.40		
8.00	DISCHG 2.00 2.79 3.87 5.26 6.96 9.03 11.49 14.33 17.50 21.03 97.24 107.74 118.96 131.14 144.55 159.56 176.24 194.69 214.81 236.76		
9.00	DISCHG 25.08 29.78 35.08 40.90 47.25 54.16 61.61 69.61 78.18 87.40 260.95 287.83 317.40 350.70 389.47 435.20 489.42 560.57 663.53 836.13		
10.00	DISCHG 97.24 107.74 118.96 131.14 144.55 159.56 176.24 194.69 214.81 236.76 1128.22 1576.69 2152.15 2777.46 3346.70 3684.93 3784.13 3724.09 3724.40 3767.71		
11.00	DISCHG 260.95 287.83 317.40 350.70 389.47 435.20 489.42 560.57 663.53 836.13 3683.20 3508.23 3300.26 3092.39 2899.68 2733.30 2600.60 2487.83 2386.38 2291.73		
12.00	DISCHG 1128.22 1576.69 2152.15 2777.46 3346.70 3684.93 3784.13 3724.09 3724.40 3767.71 2203.61 2120.71 2043.73 1970.81 1901.29 1840.58 1768.19 1569.84 1433.13 1348.86		
13.00	DISCHG 3683.20 3508.23 3300.26 3092.39 2899.68 2733.30 2600.60 2487.83 2386.38 2291.73 1294.73 1254.09 1222.87 1193.61 1167.09 1141.43 1118.84 1096.84 1075.89 1053.85		
14.00	DISCHG 2203.61 2120.71 2043.73 1970.81 1901.29 1840.58 1768.19 1569.84 1433.13 1348.86 1032.41 1010.99 991.01 971.76 954.20 937.08 920.41 903.06 885.57 866.45		
15.00	DISCHG 1032.41 1010.99 991.01 971.76 954.20 937.08 920.41 903.06 885.57 866.45 844.97 820.63 795.20 770.28 747.58 726.42 707.52 689.67 672.81 657.57		
16.00	DISCHG 844.97 820.63 795.20 770.28 747.58 726.42 707.52 689.67 672.81 657.57 644.75 634.44 625.28 616.25 605.95 593.91 581.67 569.98 558.98 549.10		
17.00	DISCHG 644.75 634.44 625.28 616.25 605.95 593.91 581.67 569.98 558.98 549.10 540.33 532.05 523.28 513.94 505.28 498.24 493.02 489.34 486.70 484.11		
18.00	DISCHG 540.33 532.05 523.28 513.94 505.28 498.24 493.02 489.34 486.70 484.11 480.77 476.47 472.13 468.13 463.95 459.52 455.56 452.38 449.49 445.90		
19.00	DISCHG 480.77 476.47 472.13 468.13 463.95 459.52 455.56 452.38 449.49 445.90 441.35 436.67 433.24 431.44 429.90 427.58 424.33 420.49 416.53 413.18		
20.00	DISCHG 441.35 436.67 433.24 431.44 429.90 427.58 424.33 420.49 416.53 413.18 411.21 410.73 410.68 409.95 408.26 405.72 402.71 399.47 396.04 392.57		
21.00	DISCHG 411.21 410.73 410.68 409.95 408.26 405.72 402.71 399.47 396.04 392.57 389.29 386.35 383.57 381.09 378.85 376.79 374.68 370.98 364.11 358.31		
22.00	DISCHG 389.29 386.35 383.57 381.09 378.85 376.79 374.68 370.98 364.11 358.31		
23.00	DISCHG 389.29 386.35 383.57 381.09 378.85 376.79 374.68 370.98 364.11 358.31		

24.00	DISCHG	362.48	380.03	399.92	411.18	410.92	399.91	383.84	364.89	342.98	320.26
25.00	DISCHG	299.13	280.91	265.47	252.56	241.51	232.03	223.95	217.00	210.95	205.62
26.00	DISCHG	200.89	196.64	192.76	188.36	182.60	175.91	167.61	156.31	144.67	135.31
27.00	DISCHG	127.49	120.24	112.83	105.11	97.24	89.36	81.32	73.22	64.67	55.26
28.00	DISCHG	46.43	39.59	34.55	30.79	28.00	25.88	24.19	22.77	21.52	20.39
29.00	DISCHG	19.34	18.36	17.44	16.57	15.74	14.95	14.21	13.50	12.82	12.18

RUNOFF VOLUME ABOVE BASEFLOW = 3.75 WATERSHED INCHES, 14923.54 CFS-HRS, 1233.28 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 7

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INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 7
SURFACE ELEVATION= 7.79

PEAK TIME(HRS) 14.38 PEAK DISCHARGE(CFS) 1918.98 PEAK ELEVATION(FEET) 23.84

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 6.17 SQ.MI.
6.00	DISCHG .00 .00 .01 .01 .01 .02 .02 .03 .04		
6.00	ELEV 7.79 7.79 7.79 7.79 7.79 7.79 7.79 7.79 7.79		
7.00	DISCHG .06 .07 .10 .13 .16 .21 .27 .35 .45		
7.00	ELEV 7.79 7.79 7.79 7.79 7.79 7.79 7.79 7.79 7.79		
8.00	DISCHG .75 1.00 1.36 1.85 2.50 3.34 4.40 5.70 7.26 9.09		
8.00	ELEV 7.80 7.80 7.81 7.81 7.82 7.83 7.84 7.86 7.88 7.90		
9.00	DISCHG 11.23 13.70 16.57 19.84 23.54 27.70 32.31 37.40 42.98 49.06		
9.00	ELEV 7.93 7.95 7.99 8.03 8.07 8.12 8.18 8.24 8.31 8.38		
10.00	DISCHG 55.67 62.83 70.55 78.88 87.89 97.70 108.43 120.20 133.12 147.28		
10.00	ELEV 8.46 8.55 8.64 8.74 8.85 8.97 9.09 9.24 9.39 9.56		
11.00	DISCHG 162.81 179.86 198.62 219.32 242.36 268.34 297.98 332.68 357.24 374.36		
11.00	ELEV 9.75 9.95 10.18 10.43 10.71 11.02 11.37 11.79 12.05 12.18		
12.00	DISCHG 400.86 442.36 504.37 589.85 697.66 820.54 947.61 1069.99 1185.73 1297.37		
12.00	ELEV 12.38 12.70 13.17 13.81 14.62 15.55 16.51 17.43 18.31 19.15		
13.00	DISCHG 1403.25 1498.85 1581.94 1652.33 1710.93 1759.13 1798.72 1831.23 1857.65 1878.64		
13.00	ELEV 19.95 20.67 21.30 21.83 22.27 22.63 22.93 23.18 23.38 23.54		
14.00	DISCHG 1894.73 1906.39 1914.06 1918.12 1918.91 1916.81 1911.91 1901.32 1883.88 1862.39		
14.00	ELEV 23.66 23.75 23.80 23.83 23.84 23.83 23.79 23.71 23.58 23.41		
15.00	DISCHG 1838.82 1814.21 1789.10 1763.77 1738.33 1712.86 1687.45 1662.18 1637.07 1612.12		
15.00	ELEV 23.24 23.05 22.86 22.67 22.48 22.29 22.09 21.90 21.71 21.53		
16.00	DISCHG 1587.31 1562.65 1538.15 1513.88 1489.85 1466.12 1442.69 1419.54 1396.64 1373.93		
16.00	ELEV 21.34 21.15 20.97 20.78 20.60 20.42 20.25 20.07 19.90 19.73		
17.00	DISCHG 1351.34 1328.73 1306.02 1283.20 1260.34 1237.52 1214.82 1192.31 1170.02 1148.01		
17.00	ELEV 19.56 19.39 19.22 19.04 18.87 18.70 18.53 18.36 18.19 18.02		
18.00	DISCHG 1126.34 1105.12 1084.40 1064.18 1044.42 1025.04 1005.97 987.22 968.78 950.70		
18.00	ELEV 17.86 17.70 17.54 17.39 17.24 17.09 16.95 16.81 16.67 16.53		
19.00	DISCHG 932.99 915.69 898.77 882.19 865.95 850.07 834.61 819.64 805.18 791.23		
19.00	ELEV 16.40 16.27 16.14 16.02 15.89 15.77 15.66 15.54 15.44 15.33		
20.00	DISCHG 777.77 764.72 752.06 739.77 727.83 716.23 704.95 694.00 683.40 673.12		
20.00	ELEV 15.23 15.13 15.03 14.94 14.85 14.76 14.68 14.60 14.52 14.44		
21.00	DISCHG 663.12 653.35 643.82 634.60 625.71 617.12 608.78 600.66 592.71 584.96		
21.00	ELEV 14.36 14.29 14.22 14.15 14.08 14.02 13.95 13.89 13.83 13.77		
22.00	DISCHG 577.42 570.17 563.21 556.55 550.12 543.88 537.79 531.83 525.98 520.24		
22.00	ELEV 13.72 13.66 13.61 13.56 13.51 13.46 13.42 13.37 13.33 13.28		
23.00	DISCHG 514.60 509.07 503.66 498.37 493.21 488.17 483.27 478.46 473.62 468.72		
23.00	ELEV 13.24 13.20 13.16 13.12 13.08 13.04 13.01 12.97 12.93 12.90		
24.00	DISCHG 463.99 459.95 456.90 454.66 452.76 450.69 448.13 444.91 440.95 436.18		
24.00	ELEV 12.86 12.83 12.81 12.79 12.78 12.76 12.74 12.72 12.69 12.65		
25.00	DISCHG 430.66 424.53 417.93 411.00 403.85 396.56 389.21 381.86 374.54 367.29		
25.00	ELEV 12.61 12.56 12.51 12.46 12.41 12.35 12.30 12.24 12.19 12.13		
26.00	DISCHG 360.13 353.10 336.65 314.32 294.63 277.00 260.91 245.79 231.22 217.28		
26.00	ELEV 12.08 12.02 11.84 11.57 11.33 11.12 10.93 10.75 10.57 10.40		
27.00	DISCHG 204.16 191.88 180.37 169.46 159.02 148.98 139.25 129.78 120.48 111.23		

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27.00	ELEV	10.25	10.10	9.96	9.83	9.70	9.58	9.46	9.35	9.24	9.13
28.00	DISCHG	102.00	92.99	84.44	76.53	69.33	62.85	57.07	51.93	47.38	43.34
28.00	ELEV	9.02	8.91	8.81	8.71	8.62	8.55	8.48	8.41	8.36	8.31
29.00	DISCHG	39.75	36.56	33.71	31.15	28.86	26.80	24.93	23.24	21.70	20.29
29.00	ELEV	8.27	8.23	8.20	8.16	8.14	8.11	8.09	8.07	8.05	8.03

RUNOFF VOLUME ABOVE BASEFLOW = 3.74 WATERSHED INCHES, 14912.96 CFS-HRS, 1232.41 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 42

OUTPUT HYDROGRAPH= 1

AREA= .51 SQ MI INPUT RUNOFF CURVE= 70. TIME OF CONCENTRATION= 1.26 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .1050 HOURS

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.89		481.19				(RUNOFF)					
24.54		21.32				(RUNOFF)					
TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS					TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .51 SQ.MI.		
8.00	DISCHG	.00	.00	.00	.00	.01	.03	.08	.17	.31	.52
9.00	DISCHG	.80	1.16	1.60	2.13	2.73	3.41	4.15	4.96	5.83	6.78
10.00	DISCHG	7.79	8.87	10.03	11.27	12.60	14.05	15.63	17.36	19.24	21.31
11.00	DISCHG	23.58	26.08	28.83	31.91	35.41	39.41	44.18	50.23	58.69	71.78
12.00	DISCHG	92.40	123.42	166.99	222.50	286.03	350.99	409.03	451.35	475.32	481.06
13.00	DISCHG	471.26	448.58	417.27	381.29	344.41	310.06	279.76	253.46	230.65	210.69
14.00	DISCHG	193.09	177.68	164.25	152.50	142.22	133.22	125.34	118.37	112.15	106.62
15.00	DISCHG	101.64	97.08	92.95	89.25	85.96	83.03	80.40	77.99	75.72	73.59
16.00	DISCHG	71.58	69.66	67.82	66.13	64.62	63.25	61.97	60.74	59.51	58.18
17.00	DISCHG	56.69	55.05	53.24	51.26	49.21	47.23	45.36	43.62	42.01	40.51
18.00	DISCHG	39.12	37.91	36.90	36.06	35.31	34.61	33.93	33.28	32.68	32.13
19.00	DISCHG	31.61	31.09	30.52	29.96	29.41	28.84	28.32	27.92	27.64	27.44
20.00	DISCHG	27.30	27.16	27.00	26.79	26.53	26.26	25.98	25.68	25.36	25.07
21.00	DISCHG	24.77	24.47	24.18	23.89	23.64	23.46	23.32	23.13	22.87	22.61
22.00	DISCHG	22.39	22.24	22.15	22.13	22.12	22.08	22.00	21.86	21.67	21.44
23.00	DISCHG	21.18	20.91	20.64	20.40	20.21	20.06	19.88	19.58	19.08	18.59
24.00	DISCHG	18.30	18.27	18.63	19.49	20.59	21.26	21.18	20.34	18.96	17.18
25.00	DISCHG	15.19	13.06	10.71	8.63	7.03	5.77	4.77	3.95	3.25	2.67
26.00	DISCHG	2.20	1.81	1.49	1.22	.99	.81	.67	.55	.45	.36
27.00	DISCHG	.30	.24	.19	.15	.12	.10	.08	.06	.05	.03
28.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 3.73 WATERSHED INCHES, 1224.58 CFS-HRS, 101.20 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43

OUTPUT HYDROGRAPH= 2

AREA= .47 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .83 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0922 HOURS

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PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)				
12.58		708.69				(RUNOFF)				
19.98		27.65				(RUNOFF)				
21.48		23.38				(RUNOFF)				
22.37		22.72				(RUNOFF)				
24.37		30.42				(RUNOFF)				
TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .47 SQ.MI.		
6.00	DISCHG	.00	.00	.00	.00	.00	.01	.02	.06	.12
7.00	DISCHG	.23	.39	.61	.88	1.19	1.55	1.98	2.51	3.16
8.00	DISCHG	4.70	5.54	6.39	7.22	8.03	8.86	9.72	10.63	11.58
9.00	DISCHG	13.57	14.67	15.87	17.11	18.34	19.61	20.94	22.32	23.76
10.00	DISCHG	27.02	28.79	30.63	32.62	34.80	37.20	39.85	42.76	45.93
11.00	DISCHG	53.16	57.33	61.96	67.15	73.17	80.40	89.36	101.50	118.94
12.00	DISCHG	206.69	292.45	406.22	527.31	631.13	694.74	707.50	673.74	608.88
13.00	DISCHG	452.50	385.84	331.64	287.99	252.60	223.63	199.65	179.63	162.94
14.00	DISCHG	137.79	128.52	120.92	114.64	109.11	103.95	99.04	94.67	90.85
15.00	DISCHG	84.31	81.66	79.46	77.47	75.58	73.93	72.52	71.16	69.79
16.00	DISCHG	66.74	65.10	63.56	62.21	61.09	60.17	59.25	58.12	56.71
17.00	DISCHG	52.84	50.28	47.47	44.88	42.80	41.20	39.87	38.67	37.36
18.00	DISCHG	34.96	34.27	33.96	33.74	33.40	32.89	32.28	31.60	30.98
19.00	DISCHG	30.20	29.85	29.33	28.62	27.80	27.17	26.91	26.97	27.24
20.00	DISCHG	27.64	27.39	26.88	26.37	25.96	25.59	25.24	25.04	24.94
21.00	DISCHG	24.22	23.71	23.36	23.23	23.30	23.38	23.23	22.86	22.37
22.00	DISCHG	21.72	21.88	22.30	22.64	22.70	22.49	22.08	21.57	21.08
23.00	DISCHG	20.45	20.26	20.11	20.00	19.93	19.87	19.76	19.38	18.50
24.00	DISCHG	18.96	22.06	26.56	29.86	30.26	28.03	24.05	18.97	13.97
25.00	DISCHG	7.61	5.71	4.26	3.17	2.36	1.74	1.29	.96	.71
26.00	DISCHG	.38	.28	.20	.15	.11	.06	.02	.00	.52

RUNOFF VOLUME ABOVE BASEFLOW = 4.60 WATERSHED INCHES, 1407.06 CFS-HRS, 116.28 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 44
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
LENGTH = 1800.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .65, M= 1.53
MODIFIED ATT-KIN ROUTING COEFFICIENT = .99 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 44 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.99	481.11	(NULL)
24.64	21.32	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 3.73 WATERSHED INCHES, 1224.60 CFS-HRS, 101.20 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 44
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.70	1082.21	(NULL)
19.87	55.18	(NULL)
22.36	44.85	(NULL)
24.40	49.74	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.98 SQ.MI.
6.00	DISCHG	.00	.00	.00	.02	.12
7.00	DISCHG	.23	.39	.61	.88	3.90
8.00	DISCHG	4.70	5.54	6.39	7.22	12.86
9.00	DISCHG	14.08	15.47	17.03	18.70	28.72
10.00	DISCHG	33.79	36.56	39.49	42.63	68.60
11.00	DISCHG	74.45	80.89	88.01	95.96	209.35
12.00	DISCHG	278.35	384.65	529.34	693.87	1005.52
13.00	DISCHG	933.50	857.20	780.43	705.57	380.01
14.00	DISCHG	348.68	321.78	298.74	279.03	199.64
15.00	DISCHG	190.98	183.35	176.58	170.45	144.07
16.00	DISCHG	140.35	136.70	133.23	130.04	114.49
17.00	DISCHG	111.03	106.98	102.53	98.14	78.07
18.00	DISCHG	75.48	73.41	71.88	70.66	63.21
19.00	DISCHG	62.33	61.47	60.43	59.15	55.18
20.00	DISCHG	55.08	54.69	54.05	53.37	50.06
21.00	DISCHG	49.28	48.49	47.83	47.41	44.80
22.00	DISCHG	44.33	44.27	44.53	44.80	42.38
23.00	DISCHG	41.89	41.44	41.03	40.64	37.06
24.00	DISCHG	37.55	40.36	44.84	48.48	29.16
25.00	DISCHG	24.81	20.92	17.34	13.91	3.78
26.00	DISCHG	3.05	2.48	2.01	1.64	.45
27.00	DISCHG	.37	.29	.24	.19	.05
28.00	DISCHG	.03	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 4.15 WATERSHED INCHES, 2631.66 CFS-HRS, 217.48 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 8
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 31.74

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.52	557.69	43.94
22.41	44.81	32.62
24.46	49.39	32.71

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.98 SQ.MI.
6.00	DISCHG	.00	.00	.00	.01	.09
6.00	ELEV	31.74	31.74	31.74	31.74	31.74
7.00	DISCHG	.18	.31	.50	.74	3.51
7.00	ELEV	31.74	31.75	31.75	31.75	31.81
8.00	DISCHG	4.28	5.10	5.94	6.78	12.27

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8.00	ELEV	31.82	31.84	31.86	31.87	31.89	31.90	31.92	31.94	31.96	31.98
9.00	DISCHG	13.43	14.73	16.20	17.81	19.53	21.34	23.28	25.34	27.52	29.86
9.00	ELEV	32.00	32.03	32.06	32.09	32.12	32.16	32.20	32.24	32.28	32.32
10.00	DISCHG	32.39	35.08	37.93	40.96	44.23	47.80	51.71	55.98	60.67	65.77
10.00	ELEV	32.37	32.43	32.48	32.54	32.61	32.68	32.75	32.84	32.93	33.03
11.00	DISCHG	71.34	77.47	84.23	91.74	100.22	110.09	121.86	136.69	156.71	188.18
11.00	ELEV	33.14	33.26	33.39	33.53	33.70	33.89	34.12	34.41	34.81	35.42
12.00	DISCHG	242.06	320.61	329.93	349.18	378.19	412.72	435.27	458.89	481.66	502.16
12.00	ELEV	36.48	38.01	38.22	38.65	39.29	40.07	40.67	41.30	41.91	42.46
13.00	DISCHG	519.55	533.53	544.15	551.54	555.95	557.64	556.95	554.27	549.95	544.31
13.00	ELEV	42.92	43.29	43.58	43.77	43.89	43.94	43.92	43.85	43.73	43.58
14.00	DISCHG	537.61	530.08	521.91	513.24	504.20	494.89	485.38	475.74	466.03	456.30
14.00	ELEV	43.40	43.20	42.98	42.75	42.51	42.26	42.01	41.75	41.49	41.23
15.00	DISCHG	446.59	436.93	427.37	417.93	407.46	390.71	374.79	359.67	345.32	331.69
15.00	ELEV	40.98	40.72	40.46	40.21	39.94	39.57	39.22	38.88	38.56	38.26
16.00	DISCHG	302.10	143.77	135.25	131.75	128.74	126.11	123.73	121.38	118.87	116.07
16.00	ELEV	37.65	34.55	34.39	34.32	34.26	34.21	34.16	34.11	34.07	34.01
17.00	DISCHG	112.87	109.13	104.90	100.48	96.25	92.38	88.89	85.69	82.62	79.63
17.00	ELEV	33.95	33.87	33.79	33.71	33.62	33.55	33.48	33.42	33.36	33.30
18.00	DISCHG	76.87	74.52	72.71	71.32	70.10	68.88	67.60	66.26	64.95	63.78
18.00	ELEV	33.24	33.20	33.16	33.14	33.11	33.09	33.06	33.04	33.01	32.99
19.00	DISCHG	62.80	61.93	60.98	59.82	58.50	57.22	56.20	55.55	55.24	55.17
19.00	ELEV	32.97	32.95	32.93	32.91	32.88	32.86	32.84	32.83	32.82	32.82
20.00	DISCHG	55.13	54.89	54.38	53.73	53.08	52.46	51.83	51.28	50.84	50.36
20.00	ELEV	32.82	32.81	32.80	32.79	32.78	32.77	32.75	32.74	32.73	32.73
21.00	DISCHG	49.69	48.91	48.18	47.64	47.31	47.12	46.87	46.46	45.87	45.17
21.00	ELEV	32.71	32.70	32.68	32.67	32.67	32.66	32.66	32.65	32.64	32.62
22.00	DISCHG	44.58	44.31	44.40	44.66	44.81	44.73	44.40	43.89	43.28	42.68
22.00	ELEV	32.61	32.61	32.61	32.61	32.62	32.61	32.61	32.60	32.59	32.57
23.00	DISCHG	42.15	41.68	41.25	40.85	40.50	40.21	39.96	39.55	38.70	37.60
23.00	ELEV	32.56	32.56	32.55	32.54	32.53	32.53	32.52	32.51	32.50	32.48
24.00	DISCHG	37.31	38.90	42.48	46.53	49.03	49.17	47.02	42.87	37.42	31.92
24.00	ELEV	32.47	32.50	32.57	32.65	32.70	32.70	32.66	32.58	32.47	32.36
25.00	DISCHG	27.14	23.00	19.25	15.74	12.56	9.98	7.99	6.45	5.25	4.26
25.00	ELEV	32.27	32.19	32.12	32.05	31.99	31.94	31.90	31.87	31.84	31.82
26.00	DISCHG	3.44	2.79	2.26	1.84	1.49	1.20	.95	.76	.61	.50
26.00	ELEV	31.81	31.79	31.78	31.78	31.77	31.76	31.76	31.75	31.75	31.75
27.00	DISCHG	.41	.33	.27	.22	.17	.14	.11	.09	.07	.06
27.00	ELEV	31.75	31.75	31.75	31.74	31.74	31.74	31.74	31.74	31.74	31.74
28.00	DISCHG	.04	.02	.01	.00						
28.00	ELEV	31.74	31.74	31.74	31.74						

RUNOFF VOLUME ABOVE BASEFLOW = 4.15 WATERSHED INCHES, 2630.28 CFS-HRS, 217.37 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 45

OUTPUT HYDROGRAPH= 6

AREA= .24 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .54 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0720 HOURS

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.39	442.82	(RUNOFF)
18.20	17.00	(RUNOFF)
19.86	14.31	(RUNOFF)
20.76	12.55	(RUNOFF)
21.41	12.06	(RUNOFF)
22.23	11.92	(RUNOFF)
24.23	18.19	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.24 SQ.MI.
6.00	DISCHG	.00	.00	.00	.01	.03
7.00	DISCHG	.26	.41	.58	.77	.97
8.00	DISCHG	3.36	3.79	4.22	4.63	5.03
9.00	DISCHG	8.02	8.77	9.51	10.14	10.74
10.00	DISCHG	15.67	16.63	17.65	18.83	20.20
11.00	DISCHG	31.36	34.02	36.85	40.02	44.13
12.00	DISCHG	175.29	261.39	352.53	422.92	442.43
13.00	DISCHG	147.19	123.93	107.53	95.13	85.49
14.00	DISCHG	54.89	52.86	51.21	49.70	47.92
15.00	DISCHG	38.89	38.05	37.46	36.75	35.94
16.00	DISCHG	31.60	30.76	30.18	29.85	29.62
17.00	DISCHG	24.02	22.04	20.37	19.52	19.30
18.00	DISCHG	16.31	16.75	17.00	16.78	16.26
19.00	DISCHG	14.86	14.66	14.13	13.37	12.92
20.00	DISCHG	13.90	13.23	12.80	12.74	12.68

[illegible]

7.00	DISCHG	.17	.32	.52	.79	1.13	1.54	2.02	2.62	3.35	4.22
7.00	ELEV	13.21	13.21	13.22	13.23	13.24	13.26	13.27	13.29	13.32	13.35
8.00	DISCHG	5.21	6.29	7.43	8.62	9.82	11.03	12.28	13.59	14.96	16.38
8.00	ELEV	13.39	13.43	13.47	13.51	13.55	13.60	13.64	13.69	13.74	13.79
9.00	DISCHG	17.87	19.50	21.31	23.26	25.33	27.51	29.84	32.31	34.95	37.77
9.00	ELEV	13.84	13.90	13.96	14.04	14.11	14.19	14.27	14.36	14.45	14.56
10.00	DISCHG	40.79	44.01	47.42	51.05	54.96	59.21	63.85	68.89	74.38	78.26
10.00	ELEV	14.66	14.78	14.90	15.03	15.17	15.33	15.49	15.67	15.87	16.01
11.00	DISCHG	79.08	80.19	81.63	83.41	85.58	88.22	91.41	95.33	100.31	107.09
11.00	ELEV	16.04	16.09	16.15	16.23	16.32	16.43	16.56	16.72	16.93	17.21
12.00	DISCHG	117.16	132.37	152.24	175.10	199.80	224.53	247.57	268.06	286.13	302.30
12.00	ELEV	17.63	18.27	19.09	20.05	21.07	22.11	23.07	23.92	24.67	25.35
13.00	DISCHG	317.07	330.79	343.66	355.81	367.27	378.05	388.13	397.50	406.15	414.10
13.00	ELEV	25.96	26.53	27.07	27.58	28.05	28.50	28.92	29.31	29.67	30.00
14.00	DISCHG	421.37	427.98	433.95	439.28	443.98	448.05	451.51	454.40	456.74	458.54
14.00	ELEV	30.31	30.58	30.83	31.05	31.25	31.42	31.56	31.68	31.78	31.86
15.00	DISCHG	459.83	460.64	461.01	460.96	460.49	459.46	457.80	455.57	452.83	449.60
15.00	ELEV	31.91	31.94	31.96	31.96	31.94	31.89	31.83	31.73	31.62	31.48
16.00	DISCHG	445.60	437.99	427.33	416.84	406.63	396.70	387.05	377.66	368.51	359.57
16.00	ELEV	31.32	31.00	30.56	30.12	29.69	29.28	28.88	28.49	28.10	27.73
17.00	DISCHG	350.81	342.19	333.69	325.30	317.05	308.96	301.03	293.27	285.65	278.18
17.00	ELEV	27.37	27.01	26.65	26.30	25.96	25.62	25.29	24.97	24.65	24.34
18.00	DISCHG	270.88	263.78	256.89	250.21	243.73	237.44	231.33	225.40	219.65	214.07
18.00	ELEV	24.04	23.74	23.45	23.18	22.91	22.64	22.39	22.14	21.90	21.67
19.00	DISCHG	208.67	203.44	198.36	193.43	188.61	183.93	179.39	175.03	170.83	166.80
19.00	ELEV	21.44	21.23	21.02	20.81	20.61	20.41	20.22	20.04	19.87	19.70
20.00	DISCHG	162.92	159.17	155.53	152.00	148.59	145.28	142.07	138.96	135.97	133.06
20.00	ELEV	19.54	19.38	19.23	19.08	18.94	18.80	18.67	18.54	18.42	18.29
21.00	DISCHG	130.23	127.47	124.78	122.18	119.68	117.28	114.95	112.67	110.46	108.29
21.00	ELEV	18.18	18.06	17.95	17.84	17.74	17.64	17.54	17.44	17.35	17.26
22.00	DISCHG	106.19	104.18	102.27	100.45	98.69	96.99	95.33	93.71	92.12	90.57
22.00	ELEV	17.17	17.09	17.01	16.94	16.86	16.79	16.72	16.65	16.59	16.52
23.00	DISCHG	89.06	87.58	86.14	84.75	83.39	82.07	80.80	79.54	78.27	76.90
23.00	ELEV	16.46	16.40	16.34	16.28	16.22	16.17	16.12	16.06	16.01	15.97
24.00	DISCHG	60.29	56.41	56.48	58.44	60.07	60.10	58.38	55.21	50.89	45.79
24.00	ELEV	15.36	15.22	15.23	15.30	15.36	15.36	15.30	15.18	15.03	14.84
25.00	DISCHG	40.44	35.26	30.42	25.95	21.84	18.14	14.93	12.21	9.96	8.12
25.00	ELEV	14.65	14.47	14.29	14.13	13.98	13.85	13.74	13.64	13.56	13.49
26.00	DISCHG	6.61	5.37	4.37	3.55	2.88	2.34	1.89	1.52	1.23	.99
26.00	ELEV	13.44	13.39	13.36	13.33	13.30	13.28	13.27	13.25	13.24	13.24
27.00	DISCHG	.80	.65	.53	.43	.34	.28	.22	.18	.15	.12
27.00	ELEV	13.23	13.22	13.22	13.22	13.21	13.21	13.21	13.21	13.21	13.20
28.00	DISCHG	.09	.07	.05	.03	.02	.01	.01	.01	.01	.01
28.00	ELEV	13.20	13.20	13.20	13.20	13.20	13.20	13.20	13.20	13.20	13.20

RUNOFF VOLUME ABOVE BASEFLOW = 4.24 WATERSHED INCHES, 3340.27 CFS-HRS, 276.04 ACRE-Feet; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 47

OUTPUT HYDROGRAPH= 4
AREA= .08 SQ MI INPUT RUNOFF CURVE= 79. TIME OF CONCENTRATION= .35 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0467 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.28	181.41	(RUNOFF)
15.08	12.95	(RUNOFF)
17.43	6.64	(RUNOFF)
18.12	6.10	(RUNOFF)
23.45	3.44	(RUNOFF)
24.12	9.86	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.08 SQ.MI.
6.00	DISCHG	.00	.00	.02	.14	.23
7.00	DISCHG	.30	.47	.62	.92	1.52
8.00	DISCHG	1.68	1.96	2.23	2.64	3.09
9.00	DISCHG	3.43	4.00	4.38	4.96	6.00
10.00	DISCHG	6.32	7.07	8.17	9.44	11.65
11.00	DISCHG	12.68	14.78	16.05	18.18	23.64
12.00	DISCHG	98.36	141.44	172.13	180.53	20.75
13.00	DISCHG	35.30	31.33	28.46	26.29	24.43
						22.74
						21.08
						19.73
						18.95

14.00	DISCHG	17.84	17.28	16.94	16.52	15.59	14.72	14.53	14.48	13.76	12.98
15.00	DISCHG	12.85	12.94	12.68	12.28	12.02	11.90	11.83	11.67	11.23	10.73
16.00	DISCHG	10.42	10.28	10.21	10.18	10.16	10.01	9.58	9.08	8.77	8.37
17.00	DISCHG	7.39	6.49	6.29	6.48	6.64	6.59	6.17	5.69	5.40	5.39
18.00	DISCHG	5.75	6.09	5.94	5.58	5.34	5.23	5.17	5.14	5.13	5.12
19.00	DISCHG	5.12	4.98	4.54	4.18	4.30	4.65	4.90	5.01	5.06	4.95
20.00	DISCHG	4.53	4.18	4.31	4.53	4.32	4.07	4.25	4.49	4.30	3.92
21.00	DISCHG	3.67	3.68	4.07	4.41	4.26	3.91	3.66	3.54	3.49	3.60
22.00	DISCHG	4.03	4.39	4.26	3.90	3.66	3.55	3.49	3.46	3.45	3.44
23.00	DISCHG	3.44	3.44	3.44	3.44	3.44	3.44	3.40	2.93	1.89	2.27
24.00	DISCHG	6.29	9.76	8.35	4.78	2.34	1.16	.58	.29	.14	.07
25.00	DISCHG	.02	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 4.71 WATERSHED INCHES, 249.36 CFS-HRS, 20.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 48
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 LENGTH = 1100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .90, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 48 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.28	181.41	(NULL)
15.08	12.95	(NULL)
17.43	6.64	(NULL)
18.12	6.10	(NULL)
23.45	3.44	(NULL)
24.12	9.86	(NULL)

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RUNOFF VOLUME ABOVE BASEFLOW = 4.71 WATERSHED INCHES, 249.36 CFS-HRS, 20.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 48
 INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 6
 LENGTH = 2700.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .45, M= 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .67 PEAK TRAVEL TIME = .20 HOURS

*** WARNING REACH 48 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
15.39	460.89	(NULL)
24.58	59.90	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 4.24 WATERSHED INCHES, 3340.32 CFS-HRS, 276.04 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 48
 INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(Feet)
12.34	326.71	(NULL)
15.32	473.00	(NULL)
24.51	60.57	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = 1.30 SQ.MI.
6.00	DISCHG .00 .00 .00 .00 .02 .06 .10 .14 .18 .25		
7.00	DISCHG .36 .52 .73 .98 1.30 1.71 2.27 2.95 3.70 4.54		
8.00	DISCHG 5.50 6.58 7.75 8.99 10.28 11.63 13.09 14.55 15.94 17.40		
9.00	DISCHG 19.13 20.97 22.74 24.59 26.73 29.04 31.43 33.96 36.74 39.70		
10.00	DISCHG 42.76 46.01 49.56 53.39 57.50 61.90 66.66 71.79 77.37 83.46		
11.00	DISCHG 88.82 91.87 94.30 96.99 100.78 105.35 110.67 116.60 122.50 128.73		
12.00	DISCHG 202.50 254.34 298.12 324.18 322.03 309.11 300.91 301.30 307.83 318.00		
13.00	DISCHG 329.24 340.83 352.28 363.45 374.13 384.26 393.71 402.79 411.71 420.21		
14.00	DISCHG 427.90 434.95 441.55 447.41 452.12 456.26 460.45 464.16 466.61 468.45		
15.00	DISCHG 470.38 472.01 472.81 473.00 472.90 472.51 471.67 470.14 467.75 464.77		
16.00	DISCHG 461.47 457.66 451.27 442.00 431.91 421.60 411.15 400.89 391.06 381.39		
17.00	DISCHG 371.37 361.61 352.72 344.34 336.04 327.68 319.11 310.62 302.48 294.78		
18.00	DISCHG 287.60 280.56 273.22 265.87 258.85 252.16 245.72 239.49 233.46 227.61		
19.00	DISCHG 221.94 216.32 210.56 205.05 200.17 195.64 191.13 186.65 182.25 177.87		
20.00	DISCHG 173.33 169.02 165.33 161.86 158.07 154.34 151.17 148.15 144.80 141.37		
21.00	DISCHG 138.17 135.31 132.90 130.51 127.73 124.83 122.13 119.64 117.29 115.15		
22.00	DISCHG 113.39 111.62 109.44 107.13 105.02 103.11 101.32 99.61 97.96 96.35		
23.00	DISCHG 94.77 93.24 91.74 90.29 88.87 87.50 86.13 84.36 82.05 81.16		

24.00	DISCHG	78.33	73.89	67.29	62.06	60.40	60.57	60.45	59.15	56.55	52.76
25.00	DISCHG	48.07	42.94	37.77	32.83	28.20	23.92	20.04	16.60	13.65	11.17
26.00	DISCHG	9.12	7.43	6.05	4.92	3.99	3.25	2.64	2.13	1.72	1.39
27.00	DISCHG	1.12	.91	.73	.59	.48	.39	.31	.25	.20	.16
28.00	DISCHG	.13	.10	.08	.06	.04	.03	.02	.01	.01	.00

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RUNOFF VOLUME ABOVE BASEFLOW = 4.27 WATERSHED INCHES, 3589.69 CFS-HRS, 296.65 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 49

OUTPUT HYDROGRAPH= 2

AREA= .56 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= 1.55 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .1033 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.06	578.68	(RUNOFF)
24.61	26.43	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.56 SQ.MI.
6.00	DISCHG	.00	.00	.00	.01	.01
7.00	DISCHG	.06	.11	.18	.07	.14
8.00	DISCHG	2.28	2.82	3.44	1.07	1.41
9.00	DISCHG	10.09	11.11	12.16	7.29	8.18
10.00	DISCHG	22.58	24.16	25.84	18.24	19.62
11.00	DISCHG	44.15	47.37	50.88	35.96	38.47
12.00	DISCHG	116.94	144.48	182.55	76.28	85.11
13.00	DISCHG	576.15	577.92	567.54	480.66	527.65
14.00	DISCHG	311.26	286.69	264.87	406.10	370.62
15.00	DISCHG	154.56	146.33	138.84	185.31	173.97
16.00	DISCHG	99.89	96.72	93.78	111.09	107.00
17.00	DISCHG	75.03	72.80	70.56	81.54	79.39
18.00	DISCHG	52.96	51.16	49.49	59.14	56.98
19.00	DISCHG	40.88	40.11	39.37	43.55	42.59
20.00	DISCHG	34.45	34.12	33.82	35.82	35.27
21.00	DISCHG	31.09	30.71	30.34	32.18	31.85
22.00	DISCHG	27.94	27.67	27.45	28.79	28.50
23.00	DISCHG	26.22	25.98	25.73	26.88	26.67
24.00	DISCHG	23.74	23.86	24.07	24.40	24.07
25.00	DISCHG	22.44	20.48	18.48	26.20	25.38
26.00	DISCHG	5.37	4.61	3.93	8.63	7.34
27.00	DISCHG	1.08	.92	.78	1.77	1.50
28.00	DISCHG	.20	.16	.14	.34	.29
29.00	DISCHG	.01	.00	.12	.05	.03

RUNOFF VOLUME ABOVE BASEFLOW = 4.60 WATERSHED INCHES, 1677.35 CFS-HRS, 138.62 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 50

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3

LENGTH = 1700.00 FEET

MODIFIED ATT-KIN ROUTING COEFFICIENT = .96 INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= .55, M= 1.53
PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 50 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

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PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.45	326.08	(NULL)
15.42	473.00	(NULL)
24.60	60.57	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 4.27 WATERSHED INCHES, 3589.64 CFS-HRS, 296.65 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 50

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.16	908.73	(NULL)

24.61

86.99

(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.87 SQ.MI.		
6.00	DISCHG	.00	.00	.00	.00	.02	.05	.10	.15	.21	
7.00	DISCHG	.31	.47	.69	.99	1.38	1.86	2.49	3.32	4.33	5.48
8.00	DISCHG	6.79	8.29	9.98	11.82	13.78	15.84	18.01	20.32	22.67	24.99
9.00	DISCHG	27.43	30.17	33.06	35.93	38.94	42.29	45.87	49.57	53.48	57.70
10.00	DISCHG	62.16	66.80	71.72	77.04	82.74	88.83	95.36	102.43	110.06	118.33
11.00	DISCHG	127.36	135.97	142.62	148.94	155.93	164.55	174.67	186.74	203.39	229.79
12.00	DISCHG	272.71	345.18	434.82	527.82	613.21	677.42	730.62	781.90	828.94	867.39
13.00	DISCHG	893.75	906.72	907.91	898.27	880.25	855.89	828.02	799.42	773.04	750.41
14.00	DISCHG	731.13	714.28	699.53	686.60	674.88	663.86	653.98	645.59	637.98	630.25
15.00	DISCHG	622.93	616.63	610.79	604.87	598.99	593.44	588.13	582.80	577.20	571.16
16.00	DISCHG	564.78	558.33	551.59	542.57	530.86	518.37	505.76	493.11	480.69	468.69
17.00	DISCHG	456.81	444.57	432.56	421.38	410.70	400.07	389.40	378.59	367.94	357.72
18.00	DISCHG	348.05	339.05	330.33	321.50	312.86	304.71	296.97	289.52	282.33	275.40
19.00	DISCHG	268.73	262.28	255.91	249.44	243.19	237.55	232.29	227.13	222.10	217.25
20.00	DISCHG	212.49	207.63	203.01	199.00	195.17	191.03	186.98	183.48	180.12	176.41
21.00	DISCHG	172.60	169.01	165.77	162.96	160.22	157.15	154.00	151.03	148.25	145.60
22.00	DISCHG	143.17	141.13	139.13	136.81	134.42	132.25	130.23	128.27	126.35	124.48
23.00	DISCHG	122.64	120.81	119.03	117.28	115.56	113.87	112.24	110.59	108.50	105.93
24.00	DISCHG	104.93	102.30	98.13	92.03	87.48	86.49	86.99	86.65	84.58	80.72
25.00	DISCHG	75.35	68.74	61.62	54.45	47.36	40.53	34.29	28.82	24.08	20.03
26.00	DISCHG	16.64	13.81	11.43	9.44	7.81	6.47	5.35	4.43	3.66	3.02
27.00	DISCHG	2.48	2.05	1.70	1.40	1.16	.96	.80	.66	.54	.45
28.00	DISCHG	.37	.30	.24	.20	.16	.12	.09	.07	.04	.03
29.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 4.37 WATERSHED INCHES, 5266.99 CFS-HRS, 435.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 10.15

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PEAK TIME(HRS) 18.34 PEAK DISCHARGE(CFS) 318.27 PEAK ELEVATION(FEET) 22.33

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.87 SQ.MI.		
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	
6.00	ELEV	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	
7.00	DISCHG	.01	.02	.03	.05	.07	.11	.15	.21	.28	.38
7.00	ELEV	10.15	10.15	10.15	10.15	10.15	10.15	10.16	10.16	10.16	
8.00	DISCHG	.50	.64	.82	1.03	1.27	1.55	1.87	2.23	2.63	3.06
8.00	ELEV	10.17	10.17	10.18	10.19	10.19	10.20	10.22	10.23	10.24	10.26
9.00	DISCHG	3.54	4.07	4.64	5.26	5.92	6.64	7.42	8.25	9.15	10.11
9.00	ELEV	10.27	10.29	10.31	10.33	10.36	10.38	10.41	10.44	10.47	10.50
10.00	DISCHG	11.14	12.24	13.42	14.69	16.04	17.48	19.03	20.68	22.45	24.35
10.00	ELEV	10.54	10.58	10.62	10.66	10.71	10.76	10.82	10.87	10.94	11.00
11.00	DISCHG	26.39	28.57	30.86	33.24	35.71	38.29	41.01	43.90	47.03	50.54
11.00	ELEV	11.07	11.15	11.23	11.31	11.40	11.49	11.59	11.69	11.80	11.92
12.00	DISCHG	54.70	59.96	66.80	75.38	85.63	97.22	109.78	116.55	123.64	131.09
12.00	ELEV	12.06	12.25	12.49	12.79	13.15	13.55	13.99	14.26	14.55	14.84
13.00	DISCHG	138.81	146.65	154.48	162.18	169.66	176.85	183.70	190.18	196.32	202.14
13.00	ELEV	15.15	15.47	15.78	16.09	16.39	16.67	16.95	17.21	17.45	17.69
14.00	DISCHG	207.68	212.98	218.07	222.96	227.67	232.21	236.61	240.86	244.99	248.99
14.00	ELEV	17.91	18.12	18.32	18.52	18.71	18.89	19.06	19.23	19.40	19.56
15.00	DISCHG	252.88	256.65	260.33	263.91	267.39	270.77	274.06	277.27	280.39	283.41
15.00	ELEV	19.72	19.87	20.01	20.16	20.30	20.43	20.56	20.69	20.82	20.94
16.00	DISCHG	286.34	289.17	291.91	294.53	297.03	299.37	301.56	303.59	305.48	307.22
16.00	ELEV	21.05	21.17	21.28	21.38	21.48	21.57	21.66	21.74	21.82	21.89
17.00	DISCHG	308.82	310.28	311.60	312.79	313.85	314.80	315.62	316.32	316.91	317.38
17.00	ELEV	21.95	22.01	22.06	22.11	22.15	22.19	22.22	22.25	22.28	22.30
18.00	DISCHG	317.75	318.01	318.18	318.26	318.25	318.16	317.98	317.72	317.40	317.00
18.00	ELEV	22.31	22.32	22.33	22.33	22.33	22.33	22.32	22.31	22.30	22.28
19.00	DISCHG	316.54	316.01	315.43	314.78	314.07	313.32	312.51	311.66	310.76	309.82
19.00	ELEV	22.26	22.24	22.22	22.19	22.16	22.13	22.10	22.07	22.03	21.99
20.00	DISCHG	308.85	307.83	306.77	305.69	304.57	303.42	302.24	301.04	299.81	298.56
20.00	ELEV	21.95	21.91	21.87	21.83	21.78	21.74	21.69	21.64	21.59	21.54
21.00	DISCHG	297.28	295.98	294.66	293.32	291.96	290.59	289.20	287.79	286.37	284.94
21.00	ELEV	21.49	21.44	21.39	21.33	21.28	21.22	21.17	21.11	21.05	21.00
22.00	DISCHG	283.49	282.03	280.57	279.11	277.63	276.14	274.65	273.16	271.65	270.15
22.00	ELEV	20.94	20.88	20.82	20.76	20.71	20.65	20.59	20.53	20.47	20.41
23.00	DISCHG	268.64	267.13	265.61	264.10	262.57	261.05	259.53	258.01	256.48	254.94
23.00	ELEV	20.35	20.29	20.22	20.16	20.10	20.04	19.98	19.92	19.86	19.80

24.00	DISCHG	253.40	251.86	250.30	248.70	247.07	245.42	243.78	242.17	240.56	238.93
24.00	ELEV	19.74	19.67	19.61	19.55	19.48	19.42	19.35	19.29	19.22	19.16
25.00	DISCHG	237.28	235.58	233.82	232.01	230.15	228.23	226.27	224.26	222.23	220.17
25.00	ELEV	19.09	19.02	18.95	18.88	18.81	18.73	18.65	18.57	18.49	18.41
26.00	DISCHG	218.09	216.00	213.91	211.81	209.72	207.64	205.56	203.50	201.44	199.40
26.00	ELEV	18.32	18.24	18.16	18.07	17.99	17.91	17.82	17.74	17.66	17.58
27.00	DISCHG	197.38	195.37	193.38	191.40	189.45	187.51	185.59	183.69	181.80	179.93
27.00	ELEV	17.50	17.41	17.34	17.26	17.18	17.10	17.02	16.95	16.87	16.80

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28.00	DISCHG	178.09	176.26	174.45	172.65	170.88	169.12	167.38	165.66	163.95	162.27
28.00	ELEV	16.72	16.65	16.58	16.51	16.44	16.36	16.30	16.23	16.16	16.09
29.00	DISCHG	160.60	158.94	157.31	155.69	154.09	152.50	150.93	149.38	147.84	146.32
29.00	ELEV	16.02	15.96	15.89	15.83	15.76	15.70	15.64	15.58	15.51	15.45

RUNOFF VOLUME ABOVE BASEFLOW = 3.64 WATERSHED INCHES, 4390.19 CFS-HRS, 362.81 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 51

INPUT HYDROGRAPHS= 7,5 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)
14.53

PEAK DISCHARGE(CFS)
2149.19

PEAK ELEVATION(FEET)
(NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	8.04 SQ.MI.
6.00	DISCHG	.00	.00	.01	.01	.02	.05
7.00	DISCHG	.07	.10	.18	.24	.32	.42
8.00	DISCHG	1.25	1.64	2.17	2.87	3.77	4.89
9.00	DISCHG	14.77	17.77	21.20	25.10	29.47	34.34
10.00	DISCHG	66.81	75.07	83.97	93.56	103.93	115.18
11.00	DISCHG	189.20	208.43	229.48	252.56	278.07	306.63
12.00	DISCHG	455.56	502.32	571.16	665.23	783.29	917.76
13.00	DISCHG	1542.06	1645.50	1736.41	1814.51	1880.59	1935.99
14.00	DISCHG	2102.41	2119.38	2132.13	2141.08	2146.57	2149.03
15.00	DISCHG	2091.70	2070.86	2049.43	2027.68	2005.72	1983.64
16.00	DISCHG	1873.65	1851.82	1830.06	1808.41	1786.88	1765.49
17.00	DISCHG	1660.16	1639.01	1617.62	1595.99	1574.19	1552.31
18.00	DISCHG	1444.09	1423.13	1402.58	1382.44	1362.68	1343.20
19.00	DISCHG	1249.53	1231.70	1214.20	1196.97	1180.02	1163.38
20.00	DISCHG	1086.61	1072.55	1058.83	1045.45	1032.40	1019.65
21.00	DISCHG	960.40	949.33	938.48	927.92	917.67	907.71
22.00	DISCHG	860.91	852.20	843.79	835.65	827.75	820.02
23.00	DISCHG	783.24	776.20	769.27	762.46	755.78	749.23
24.00	DISCHG	717.40	711.81	707.20	703.36	699.82	696.11
25.00	DISCHG	667.94	660.10	651.75	643.01	634.00	624.80
26.00	DISCHG	578.22	569.10	550.55	526.13	504.35	484.63
27.00	DISCHG	401.53	387.26	373.75	360.86	348.47	336.49
28.00	DISCHG	280.09	269.24	258.89	249.18	240.20	231.97
29.00	DISCHG	200.35	195.50	191.01	186.84	182.95	179.29

RUNOFF VOLUME ABOVE BASEFLOW = 3.72 WATERSHED INCHES, 19303.15 CFS-HRS, 1595.21 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 52

OUTPUT HYDROGRAPH= 2

AREA= .17 SQ MI INPUT RUNOFF CURVE= 74. TIME OF CONCENTRATION= 1.00 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0952 HOURS

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PEAK TIME(HRS)

12.70
20.00
22.42
24.44

PEAK DISCHARGE(CFS)

201.49
9.19
7.54
8.99

PEAK ELEVATION(FEET)

(RUNOFF)
(RUNOFF)
(RUNOFF)
(RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.17 SQ.MI.
7.00	DISCHG	.00	.00	.00	.00	.01	.03
8.00	DISCHG	.12	.21	.33	.48	.65	.84
9.00	DISCHG	2.04	2.33	2.64	2.97	3.32	3.67
10.00	DISCHG	5.73	6.22	6.73	7.28	7.88	8.53

11.00	DISCHG	12.85	13.98	15.22	16.61	18.20	20.06	22.32	25.29	29.46	36.42
12.00	DISCHG	48.13	66.57	92.57	123.40	154.40	180.33	196.55	201.49	196.28	183.14
13.00	DISCHG	165.46	146.30	128.10	112.41	99.19	88.18	78.83	70.89	64.10	58.31
14.00	DISCHG	53.41	49.31	45.89	42.98	40.50	38.33	36.40	34.65	33.08	31.66
15.00	DISCHG	30.34	29.12	28.03	27.11	26.30	25.59	24.98	24.44	23.95	23.45
16.00	DISCHG	22.93	22.39	21.88	21.40	20.97	20.58	20.22	19.85	19.44	18.94
17.00	DISCHG	18.35	17.66	16.88	16.06	15.32	14.68	14.12	13.62	13.13	12.69
18.00	DISCHG	12.30	11.99	11.75	11.57	11.41	11.23	11.05	10.85	10.66	10.47
19.00	DISCHG	10.31	10.16	9.99	9.81	9.59	9.38	9.23	9.16	9.15	9.17
20.00	DISCHG	9.19	9.17	9.10	8.98	8.84	8.72	8.60	8.50	8.42	8.35
21.00	DISCHG	8.25	8.12	7.99	7.91	7.87	7.85	7.80	7.72	7.62	7.51
22.00	DISCHG	7.42	7.39	7.42	7.49	7.54	7.52	7.46	7.36	7.24	7.10
23.00	DISCHG	6.98	6.89	6.83	6.78	6.74	6.70	6.65	6.53	6.28	6.06
24.00	DISCHG	6.11	6.52	7.39	8.39	8.95	8.87	8.31	7.40	6.26	5.00
25.00	DISCHG	3.83	2.96	2.31	1.82	1.43	1.11	.87	.68	.53	.41
26.00	DISCHG	.32	.25	.20	.15	.12	.09	.07	.05	.04	.03
27.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 4.16 WATERSHED INCHES, 443.05 CFS-HRS, 36.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 53
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(Feet)		DRAINAGE AREA =		8.21 SQ.MI.	
14.46		2187.58		(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS		TIME INCREMENT = .10 HOURS					
6.00	DISCHG	.00	.00	.01	.01	.02	.04	.05	
7.00	DISCHG	.07	.10	.13	.18	.24	.32	.42	.57
8.00	DISCHG	1.37	1.86	2.51	3.35	4.41	5.72	7.31	9.19
9.00	DISCHG	16.81	20.10	23.85	28.07	32.78	38.01	43.77	50.08
10.00	DISCHG	72.54	81.29	90.71	100.85	111.81	123.71	136.70	150.91
11.00	DISCHG	202.05	222.41	244.70	269.17	296.27	326.69	361.31	401.87
12.00	DISCHG	503.69	568.89	663.73	788.63	937.69	1098.09	1253.94	1388.02
13.00	DISCHG	1707.52	1791.79	1864.52	1926.92	1979.78	2024.17	2061.25	2092.30
14.00	DISCHG	2155.82	2168.69	2178.02	2184.07	2187.07	2187.36	2184.92	2176.83

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15.00	DISCHG	2122.04	2099.98	2077.46	2054.79	2032.02	2009.23	1986.50	1963.89	1941.41	1918.98
16.00	DISCHG	1896.57	1874.21	1851.94	1829.81	1807.85	1786.07	1764.46	1742.98	1721.55	1700.10
17.00	DISCHG	1678.51	1656.67	1634.50	1612.06	1589.51	1566.99	1544.56	1522.25	1500.06	1478.08
18.00	DISCHG	1456.40	1435.12	1414.33	1394.01	1374.08	1354.43	1335.00	1315.79	1296.84	1278.17
19.00	DISCHG	1259.84	1241.86	1224.19	1206.78	1189.61	1172.76	1156.35	1140.45	1125.09	1110.23
20.00	DISCHG	1095.80	1081.72	1067.93	1054.43	1041.24	1028.37	1015.79	1003.54	991.63	980.04
21.00	DISCHG	968.65	957.44	946.47	935.83	925.54	915.56	905.79	896.17	886.70	877.40
22.00	DISCHG	868.34	859.59	851.21	843.14	835.28	827.54	819.89	812.34	804.87	797.49
23.00	DISCHG	790.22	783.09	776.10	769.24	762.52	755.93	749.45	742.99	736.38	729.72
24.00	DISCHG	723.50	718.33	714.59	711.76	708.77	704.98	700.22	694.48	687.77	680.11
25.00	DISCHG	671.77	663.06	654.07	644.83	635.42	625.91	616.35	606.80	597.29	587.86
26.00	DISCHG	578.54	569.35	550.75	526.28	504.47	484.72	466.54	449.34	432.71	416.71
27.00	DISCHG	401.55	387.27	373.75	360.86	348.47	336.49	324.84	313.46	302.28	291.17
28.00	DISCHG	280.09	269.24	258.89	249.18	240.20	231.97	224.45	217.59	211.33	205.61
29.00	DISCHG	200.35	195.50	191.01	186.84	182.95	179.29	175.86	172.61	169.53	166.61

RUNOFF VOLUME ABOVE BASEFLOW = 3.73 WATERSHED INCHES, 19746.20 CFS-HRS, 1631.83 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP

COMPUTATIONS COMPLETED FOR PASS 3

RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB

RECORD ID

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JOB 1 SUMMARY
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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 10														
+														
XSECTION	1	RUNOFF	.21	3	2	.10	.0	5.00	24.00	1.98	---	12.59	133.57	639.1
XSECTION	2	RUNOFF	.28	3	2	.10	.0	5.00	24.00	1.75	---	12.75	135.56	484.1
XSECTION	3	REACH	.21	3	2	.10	.0	5.00	24.00	1.98	---	12.59	133.57	639.1
XSECTION	3	ADDHYD	.49	3	2	.10	.0	5.00	24.00	1.85	---	12.66	263.50	538.9
XSECTION	4	RUNOFF	.26	3	2	.10	.0	5.00	24.00	2.47	---	12.34	286.45	1093.3
XSECTION	5	REACH	.49	3	2	.10	.0	5.00	24.00	1.85	---	12.66	263.50	538.9
XSECTION	5	ADDHYD	.75	3	2	.10	.0	5.00	24.00	2.06	---	12.44	487.52	649.2
STRUCTURE	1	RESVOR	.75	3	2	.10	.0	5.00	24.00	2.05	136.40	13.82	121.54	161.8
XSECTION	6	RUNOFF	.30	3	2	.10	.0	5.00	24.00	2.13	---	12.53	217.03	730.7
XSECTION	7	REACH	.75	3	2	.10	.0	5.00	24.00	2.05	---	13.95	121.52	161.8
XSECTION	7	ADDHYD	1.05	3	2	.10	.0	5.00	24.00	2.08	---	12.61	290.28	277.0
XSECTION	8	RUNOFF	.12	3	2	.10	.0	5.00	24.00	2.73	---	12.41	127.96	1093.7
XSECTION	9	ADDHYD	1.17	3	2	.10	.0	5.00	24.00	2.14	---	12.53	403.67	346.5
XSECTION	10	RUNOFF	.17	3	2	.10	.0	5.00	24.00	2.06	---	12.44	133.47	789.8
XSECTION	11	REACH	1.17	3	2	.10	.0	5.00	24.00	2.14	---	12.65	400.08	343.4
XSECTION	11	ADDHYD	1.33	3	2	.10	.0	5.00	24.00	2.13	---	12.59	514.33	385.6
STRUCTURE	2	RESVOR	1.33	3	2	.10	.0	5.00	24.00	2.13	114.44	12.80	459.84	344.7
XSECTION	12	RUNOFF	.09	3	2	.10	.0	5.00	24.00	2.47	---	12.34	103.22	1086.5
XSECTION	13	REACH	1.33	3	2	.10	.0	5.00	24.00	2.13	---	12.80	459.84	344.7
XSECTION	13	ADDHYD	1.43	3	2	.10	.0	5.00	24.00	2.15	---	12.72	505.65	353.8
STRUCTURE	3	RESVOR	1.43	3	2	.10	.0	5.00	24.00	2.15	108.47	14.79	192.82	134.9
XSECTION	14	RUNOFF	.04	3	2	.10	.0	5.00	24.00	2.56	---	12.32	46.53	1163.4
XSECTION	15	RUNOFF	.35	3	2	.10	.0	5.00	24.00	1.90	---	12.87	167.41	483.9
XSECTION	16	REACH	.04	3	2	.10	.0	5.00	24.00	2.56	---	12.71	32.04	801.1
XSECTION	16	ADDHYD	.39	3	2	.10	.0	5.00	24.00	1.97	---	12.84	197.56	511.8
XSECTION	17	RUNOFF	.08	3	2	.10	.0	5.00	24.00	1.90	---	12.36	63.69	806.3
XSECTION	18	REACH	.39	3	2	.10	.0	5.00	24.00	1.97	---	12.84	197.56	511.8
XSECTION	18	ADDHYD	.46	3	2	.10	.0	5.00	24.00	1.96	---	12.75	226.29	486.6
XSECTION	19	REACH	1.43	3	2	.10	.0	5.00	24.00	2.15	---	14.91	192.81	134.9
XSECTION	19	ADDHYD	1.89	3	2	.10	.0	5.00	24.00	2.10	---	12.81	391.73	206.8
XSECTION	20	RUNOFF	.71	3	2	.10	.0	5.00	24.00	2.22	---	12.62	497.59	702.8
XSECTION	21	REACH	1.89	3	2	.10	.0	5.00	24.00	2.10	---	13.00	386.35	204.0

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(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 10														
+														
XSECTION	21	ADDHYD	2.60	3	2	.10	.0	5.00	24.00	2.14	---	12.72	833.69	320.4
STRUCTURE	4	RESVOR	2.60	3	2	.10	.0	5.00	24.00	2.14	63.83	12.81	820.15	315.2
XSECTION	22	RUNOFF	.91	3	2	.10	.0	5.00	24.00	1.38	---	12.78	329.67	363.9
XSECTION	23	REACH	2.60	3	2	.10	.0	5.00	24.00	2.14	---	13.01	793.44	304.9
XSECTION	23	ADDHYD	3.51	3	2	.10	.0	5.00	24.00	1.94	---	12.93	1099.75	313.5
XSECTION	24	RUNOFF	.15	3	2	.10	.0	5.00	24.00	1.82	---	12.38	110.77	758.7
XSECTION	25	REACH	3.51	3	2	.10	.0	5.00	24.00	1.94	---	12.93	1099.75	313.5
XSECTION	25	ADDHYD	3.65	3	2	.10	.0	5.00	24.00	1.94	---	12.92	1140.12	312.0
XSECTION	26	RUNOFF	.43	3	2	.10	.0	5.00	24.00	2.30	---	12.44	380.40	884.7
XSECTION	27	REACH	3.65	3	2	.10	.0	5.00	24.00	1.94	---	12.92	1140.12	312.0
XSECTION	27	ADDHYD	4.08	3	2	.10	.0	5.00	24.00	1.97	---	12.80	1347.84	330.0
XSECTION	28	RUNOFF	.04	3	2	.10	.0	5.00	24.00	3.01	---	12.30	52.95	1393.4
XSECTION	29	RUNOFF	.01	3	2	.10	.0	5.00	24.00	3.30	---	12.21	21.76	1673.8

XSECTION	30	REACH	.04	3	2	.10	.0	5.00	24.00	3.01	---	12.30	52.95	1393.4
XSECTION	30	ADDHYD	.05	3	2	.10	.0	5.00	24.00	3.08	---	12.27	73.83	1447.6
XSECTION	31	RUNOFF	.30	3	2	.10	.0	5.00	24.00	2.92	---	12.50	313.64	1042.0
STRUCTURE	5	RESVOR	.30	3	2	.10	.0	5.00	24.00	2.92	60.00	12.91	189.96	631.1
XSECTION	32	REACH	.30	3	2	.10	.0	5.00	24.00	2.92	---	13.11	186.53	619.7
XSECTION	32	REACH	.05	3	2	.10	.0	5.00	24.00	3.08	---	12.43	66.83	1310.4
XSECTION	32	ADDHYD	.35	3	2	.10	.0	5.00	24.00	2.94	---	12.96	206.74	587.3
XSECTION	33	RUNOFF	.05	3	2	.10	.0	5.00	24.00	2.14	---	12.27	51.32	1069.1
XSECTION	34	REACH	.05	3	2	.10	.0	5.00	24.00	2.14	---	12.37	51.02	1062.9
XSECTION	34	ADDHYD	.40	3	2	.10	.0	5.00	24.00	2.84	---	12.52	228.84	572.1
XSECTION	35	RUNOFF	.76	3	2	.10	.0	5.00	24.00	2.22	---	12.55	561.39	742.6
XSECTION	36	ADDHYD	1.16	3	2	.10	.0	5.00	24.00	2.43	---	12.55	791.10	684.3
STRUCTURE	6	RESVOR	1.16	3	2	.10	.0	5.00	24.00	2.43	32.77	13.51	361.93	313.1
XSECTION	37	RUNOFF	.62	3	2	.10	.0	5.00	24.00	2.22	---	12.65	423.30	687.2
XSECTION	38	REACH	1.16	3	2	.10	.0	5.00	24.00	2.43	---	13.84	357.27	309.1
XSECTION	38	ADDHYD	1.77	3	2	.10	.0	5.00	24.00	2.36	---	12.79	621.75	350.9
XSECTION	39	REACH	4.08	3	2	.10	.0	5.00	24.00	1.97	---	12.90	1347.75	330.0
XSECTION	39	ADDHYD	5.86	3	2	.10	.0	5.00	24.00	2.09	---	12.79	1969.55	336.3
XSECTION	40	RUNOFF	.32	3	2	.10	.0	5.00	24.00	1.82	---	12.49	208.53	655.8
XSECTION	41	ADDHYD	6.17	3	2	.10	.0	5.00	24.00	2.08	---	12.74	2127.55	344.6
STRUCTURE	7	RESVOR	6.17	3	2	.10	.0	5.00	24.00	2.08	17.28	14.24	1049.07	169.9
XSECTION	42	RUNOFF	.51	3	2	.10	.0	5.00	24.00	2.05	---	12.92	258.43	507.7
XSECTION	43	RUNOFF	.47	3	2	.10	.0	5.00	24.00	2.73	---	12.59	421.85	890.0

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(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 10														
XSECTION	44	REACH	.51	3	2	.10	.0	5.00	24.00	2.05	---	13.03	257.77	506.4
XSECTION	44	ADDHYD	.98	3	2	.10	.0	5.00	24.00	2.38	---	12.71	611.99	622.6
STRUCTURE	8	RESVOR	.98	3	2	.10	.0	5.00	24.00	2.38	40.21	13.28	417.81	425.0
XSECTION	45	RUNOFF	.24	3	2	.10	.0	5.00	24.00	2.73	---	12.40	264.46	1106.5
XSECTION	46	REACH	.98	3	2	.10	.0	5.00	24.00	2.38	---	13.28	417.81	425.0
XSECTION	46	ADDHYD	1.22	3	2	.10	.0	5.00	24.00	2.45	---	12.43	593.48	485.7
STRUCTURE	9	RESVOR	1.22	3	2	.10	.0	5.00	24.00	2.45	25.85	14.43	314.46	257.3
XSECTION	47	RUNOFF	.08	3	2	.10	.0	5.00	24.00	2.83	---	12.28	110.01	1341.6
XSECTION	48	REACH	.08	3	2	.10	.0	5.00	24.00	2.83	---	12.28	110.01	1341.6
XSECTION	48	REACH	1.22	3	2	.10	.0	5.00	24.00	2.45	---	14.57	313.60	256.6
XSECTION	48	ADDHYD	1.30	3	2	.10	.0	5.00	24.00	2.47	---	14.57	323.05	247.7
XSECTION	49	RUNOFF	.56	3	2	.10	.0	5.00	24.00	2.73	---	13.09	342.88	606.9
XSECTION	50	REACH	1.30	3	2	.10	.0	5.00	24.00	2.47	---	14.68	322.92	247.6
XSECTION	50	ADDHYD	1.87	3	2	.10	.0	5.00	24.00	2.55	---	13.23	575.41	307.9
STRUCTURE	10	RESVOR	1.87	3	2	.10	.0	5.00	24.00	2.27	17.78	17.86	204.44	109.4
XSECTION	51	ADDHYD	8.04	3	2	.10	.0	5.00	24.00	2.12	---	14.47	1205.91	149.9
XSECTION	52	RUNOFF	.17	3	2	.10	.0	5.00	24.00	2.38	---	12.72	114.30	692.8
XSECTION	53	ADDHYD	8.21	3	2	.10	.0	5.00	24.00	2.13	---	14.36	1230.65	149.9
ALTERNATE 1 STORM 25														
XSECTION	1	RUNOFF	.21	3	2	.10	.0	5.70	24.00	2.51	---	12.58	171.29	819.5
XSECTION	2	RUNOFF	.28	3	2	.10	.0	5.70	24.00	2.24	---	12.74	177.89	635.3
XSECTION	3	REACH	.21	3	2	.10	.0	5.70	24.00	2.51	---	12.58	171.29	819.5
XSECTION	3	ADDHYD	.49	3	2	.10	.0	5.70	24.00	2.36	---	12.65	342.01	699.4
XSECTION	4	RUNOFF	.26	3	2	.10	.0	5.70	24.00	3.06	---	12.33	354.63	1353.6
XSECTION	5	REACH	.49	3	2	.10	.0	5.70	24.00	2.36	---	12.65	342.01	699.4
XSECTION	5	ADDHYD	.75	3	2	.10	.0	5.70	24.00	2.60	---	12.44	619.70	825.2
STRUCTURE	1	RESVOR	.75	3	2	.10	.0	5.70	24.00	2.59	137.07	13.92	140.43	187.0
XSECTION	6	RUNOFF	.30	3	2	.10	.0	5.70	24.00	2.68	---	12.53	275.01	926.0

XSECTION	7	REACH	1.75	3	2	.10	.0	5.70	24.00	2.59	---	14.04	140.42	187.0
XSECTION	7	ADDHYD	1.05	3	2	.10	.0	5.70	24.00	2.61	---	12.59	363.33	346.7
XSECTION	8	RUNOFF	.12	3	2	.10	.0	5.70	24.00	3.34	---	12.41	156.37	1336.5
XSECTION	9	ADDHYD	1.17	3	2	.10	.0	5.70	24.00	2.68	---	12.52	503.59	432.3
XSECTION	10	RUNOFF	.17	3	2	.10	.0	5.70	24.00	2.59	---	12.43	169.94	1005.6
XSECTION	11	REACH	1.17	3	2	.10	.0	5.70	24.00	2.68	---	12.63	500.44	429.6
XSECTION	11	ADDHYD	1.33	3	2	.10	.0	5.70	24.00	2.67	---	12.58	647.60	485.5
STRUCTURE	2	RESVOR	1.33	3	2	.10	.0	5.70	24.00	2.67	115.75	12.80	566.56	424.7

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(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 25														
+														
XSECTION	12	RUNOFF	.09	3	2	.10	.0	5.70	24.00	3.05	---	12.34	127.82	1345.4
XSECTION	13	REACH	1.33	3	2	.10	.0	5.70	24.00	2.67	---	12.80	566.56	424.7
XSECTION	13	ADDHYD	1.43	3	2	.10	.0	5.70	24.00	2.70	---	12.73	621.58	435.0
STRUCTURE	3	RESVOR	1.43	3	2	.10	.0	5.70	24.00	2.70	109.45	15.33	211.10	147.7
XSECTION	14	RUNOFF	.04	3	2	.10	.0	5.70	24.00	3.15	---	12.31	57.31	1432.9
XSECTION	15	RUNOFF	.35	3	2	.10	.0	5.70	24.00	2.42	---	12.86	216.54	625.8
XSECTION	16	REACH	.04	3	2	.10	.0	5.70	24.00	3.15	---	12.69	40.67	1016.7
XSECTION	16	ADDHYD	.39	3	2	.10	.0	5.70	24.00	2.50	---	12.82	254.58	659.5
XSECTION	17	RUNOFF	.08	3	2	.10	.0	5.70	24.00	2.42	---	12.35	81.97	1037.6
XSECTION	18	REACH	.39	3	2	.10	.0	5.70	24.00	2.50	---	12.82	254.58	659.5
XSECTION	18	ADDHYD	.46	3	2	.10	.0	5.70	24.00	2.48	---	12.73	291.98	627.9
XSECTION	19	REACH	1.43	3	2	.10	.0	5.70	24.00	2.70	---	15.45	211.10	147.7
XSECTION	19	ADDHYD	1.89	3	2	.10	.0	5.70	24.00	2.64	---	12.78	462.68	244.3
XSECTION	20	RUNOFF	.71	3	2	.10	.0	5.70	24.00	2.78	---	12.61	627.38	886.1
XSECTION	21	REACH	1.89	3	2	.10	.0	5.70	24.00	2.64	---	12.96	457.40	241.5
XSECTION	21	ADDHYD	2.60	3	2	.10	.0	5.70	24.00	2.68	---	12.69	1035.21	397.9
STRUCTURE	4	RESVOR	2.60	3	2	.10	.0	5.70	24.00	2.68	64.40	12.90	951.45	365.7
XSECTION	22	RUNOFF	.91	3	2	.10	.0	5.70	24.00	1.83	---	12.76	451.09	497.9
XSECTION	23	REACH	2.60	3	2	.10	.0	5.70	24.00	2.68	---	13.14	945.53	363.4
XSECTION	23	ADDHYD	3.51	3	2	.10	.0	5.70	24.00	2.46	---	12.89	1356.57	386.7
XSECTION	24	RUNOFF	.15	3	2	.10	.0	5.70	24.00	2.33	---	12.38	143.40	982.2
XSECTION	25	REACH	3.51	3	2	.10	.0	5.70	24.00	2.46	---	12.89	1356.57	386.7
XSECTION	25	ADDHYD	3.65	3	2	.10	.0	5.70	24.00	2.45	---	12.85	1415.91	387.5
XSECTION	26	RUNOFF	.43	3	2	.10	.0	5.70	24.00	2.86	---	12.44	476.51	1108.2
XSECTION	27	REACH	3.65	3	2	.10	.0	5.70	24.00	2.45	---	12.85	1415.91	387.5
XSECTION	27	ADDHYD	4.08	3	2	.10	.0	5.70	24.00	2.50	---	12.72	1721.92	421.6
XSECTION	28	RUNOFF	.04	3	2	.10	.0	5.70	24.00	3.64	---	12.29	63.78	1678.4
XSECTION	29	RUNOFF	.01	3	2	.10	.0	5.70	24.00	3.95	---	12.21	25.87	1990.0
XSECTION	30	REACH	.04	3	2	.10	.0	5.70	24.00	3.64	---	12.29	63.78	1678.4
XSECTION	30	ADDHYD	.05	3	2	.10	.0	5.70	24.00	3.72	---	12.27	88.61	1737.4
XSECTION	31	RUNOFF	.30	3	2	.10	.0	5.70	24.00	3.54	---	12.49	380.15	1263.0
STRUCTURE	5	RESVOR	.30	3	2	.10	.0	5.70	24.00	3.54	62.49	12.92	222.38	738.8
XSECTION	32	REACH	.30	3	2	.10	.0	5.70	24.00	3.54	---	13.12	218.70	726.6
XSECTION	32	REACH	.05	3	2	.10	.0	5.70	24.00	3.72	---	12.42	81.18	1591.7
XSECTION	32	ADDHYD	.35	3	2	.10	.0	5.70	24.00	3.57	---	12.99	241.47	686.0
XSECTION	33	RUNOFF	.05	3	2	.10	.0	5.70	24.00	2.69	---	12.27	64.61	1346.1

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 25														
XSECTION 34	REACH	.05	3	2	.10	.0	5.70	24.00	2.68	---	12.37	64.51	1344.1	
XSECTION 34	ADDHYD	.40	3	2	.10	.0	5.70	24.00	3.46	---	12.50	267.55	668.9	
XSECTION 35	RUNOFF	.76	3	2	.10	.0	5.70	24.00	2.77	---	12.55	709.20	938.1	
XSECTION 36	ADDHYD	1.16	3	2	.10	.0	5.70	24.00	3.01	---	12.54	976.01	844.3	
STRUCTURE 6	RESVOR	1.16	3	2	.10	.0	5.70	24.00	3.00	33.70	13.33	505.24	437.1	
XSECTION 37	RUNOFF	.62	3	2	.10	.0	5.70	24.00	2.78	---	12.64	533.87	866.7	
XSECTION 38	REACH	1.16	3	2	.10	.0	5.70	24.00	3.00	---	13.58	479.69	415.0	
XSECTION 38	ADDHYD	1.77	3	2	.10	.0	5.70	24.00	2.93	---	12.76	780.70	440.6	
XSECTION 39	REACH	4.08	3	2	.10	.0	5.70	24.00	2.50	---	12.72	1721.92	421.6	
XSECTION 39	ADDHYD	5.86	3	2	.10	.0	5.70	24.00	2.63	---	12.73	2502.60	427.4	
XSECTION 40	RUNOFF	.32	3	2	.10	.0	5.70	24.00	2.33	---	12.48	270.69	851.2	
XSECTION 41	ADDHYD	6.17	3	2	.10	.0	5.70	24.00	2.61	---	12.70	2717.02	440.1	
STRUCTURE 7	RESVOR	6.17	3	2	.10	.0	5.70	24.00	2.61	19.16	14.12	1298.72	210.4	
XSECTION 42	RUNOFF	.51	3	2	.10	.0	5.70	24.00	2.59	---	12.90	330.08	648.5	
XSECTION 43	RUNOFF	.47	3	2	.10	.0	5.70	24.00	3.34	---	12.59	516.11	1088.8	
XSECTION 44	REACH	.51	3	2	.10	.0	5.70	24.00	2.59	---	13.01	329.60	647.5	
XSECTION 44	ADDHYD	.98	3	2	.10	.0	5.70	24.00	2.95	---	12.71	764.79	778.0	
STRUCTURE 8	RESVOR	.98	3	2	.10	.0	5.70	24.00	2.95	41.34	13.40	460.30	468.3	
XSECTION 45	RUNOFF	.24	3	2	.10	.0	5.70	24.00	3.34	---	12.39	323.12	1352.0	
XSECTION 46	REACH	.98	3	2	.10	.0	5.70	24.00	2.95	---	13.40	460.30	468.3	
XSECTION 46	ADDHYD	1.22	3	2	.10	.0	5.70	24.00	3.02	---	12.45	667.67	546.4	
STRUCTURE 9	RESVOR	1.22	3	2	.10	.0	5.70	24.00	3.03	28.02	14.87	366.41	299.8	
XSECTION 47	RUNOFF	.08	3	2	.10	.0	5.70	24.00	3.44	---	12.28	133.57	1628.9	
XSECTION 48	REACH	.08	3	2	.10	.0	5.70	24.00	3.44	---	12.28	133.57	1628.9	
XSECTION 48	REACH	1.22	3	2	.10	.0	5.70	24.00	3.03	---	15.01	366.09	299.6	
XSECTION 48	ADDHYD	1.30	3	2	.10	.0	5.70	24.00	3.05	---	15.02	375.95	288.3	
XSECTION 49	RUNOFF	.56	3	2	.10	.0	5.70	24.00	3.34	---	13.08	420.25	743.8	
XSECTION 50	REACH	1.30	3	2	.10	.0	5.70	24.00	3.05	---	15.12	375.92	288.3	
XSECTION 50	ADDHYD	1.87	3	2	.10	.0	5.70	24.00	3.14	---	13.20	684.44	366.2	
STRUCTURE 10	RESVOR	1.87	3	2	.10	.0	5.70	24.00	2.73	19.26	18.02	241.53	129.2	
XSECTION 51	ADDHYD	8.04	3	2	.10	.0	5.70	24.00	2.64	---	14.30	1472.12	183.0	
XSECTION 52	RUNOFF	.17	3	2	.10	.0	5.70	24.00	2.96	---	12.71	142.67	864.7	
XSECTION 53	ADDHYD	8.21	3	2	.10	.0	5.70	24.00	2.64	---	14.19	1505.17	183.4	
ALTERNATE 1 STORM 99														
+														
XSECTION 1	RUNOFF	.21	3	2	.10	.0	7.10	24.00	3.63	---	12.57	251.00	1201.0	
XSECTION 2	RUNOFF	.28	3	2	.10	.0	7.10	24.00	3.31	---	12.72	268.34	958.4	

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(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 99														
XSECTION	3	REACH	.21	3	2	.10	.0	7.10	24.00	3.63	---	12.57	251.00	1201.0
XSECTION	3	ADDHYD	.49	3	2	.10	.0	7.10	24.00	3.45	---	12.64	510.30	1043.6
XSECTION	4	RUNOFF	.26	3	2	.10	.0	7.10	24.00	4.27	---	12.33	495.12	1889.8
XSECTION	5	REACH	.49	3	2	.10	.0	7.10	24.00	3.45	---	12.64	510.30	1043.6
XSECTION	5	ADDHYD	.75	3	2	.10	.0	7.10	24.00	3.74	---	12.43	897.40	1194.9

STRUCTURE	1	RESVOR	.75	3	2	.10	.0	7.10	24.00	3.71	138.30	14.13	171.20	228.0
XSECTION	6	RUNOFF	.30	3	2	.10	.0	7.10	24.00	3.83	---	12.52	396.54	1335.1
XSECTION	7	REACH	.75	3	2	.10	.0	7.10	24.00	3.71	---	14.25	171.19	227.9
XSECTION	7	ADDHYD	1.05	3	2	.10	.0	7.10	24.00	3.74	---	12.56	510.65	487.3
XSECTION	8	RUNOFF	.12	3	2	.10	.0	7.10	24.00	4.60	---	12.40	214.33	1831.9
XSECTION	9	ADDHYD	1.17	3	2	.10	.0	7.10	24.00	3.83	---	12.50	707.13	607.0
XSECTION	10	RUNOFF	.17	3	2	.10	.0	7.10	24.00	3.73	---	12.42	246.65	1459.4
XSECTION	11	REACH	1.17	3	2	.10	.0	7.10	24.00	3.83	---	12.61	704.92	605.1
XSECTION	11	ADDHYD	1.33	3	2	.10	.0	7.10	24.00	3.82	---	12.55	922.66	691.6
STRUCTURE	2	RESVOR	1.33	3	2	.10	.0	7.10	24.00	3.81	118.53	12.79	791.82	593.6
XSECTION	12	RUNOFF	.09	3	2	.10	.0	7.10	24.00	4.27	---	12.33	178.50	1878.9
XSECTION	13	REACH	1.33	3	2	.10	.0	7.10	24.00	3.81	---	12.79	791.82	593.6
XSECTION	13	ADDHYD	1.43	3	2	.10	.0	7.10	24.00	3.85	---	12.72	868.93	608.1
STRUCTURE	3	RESVOR	1.43	3	2	.10	.0	7.10	24.00	3.95	110.58	13.30	955.00	668.3
XSECTION	14	RUNOFF	.04	3	2	.10	.0	7.10	24.00	4.38	---	12.31	79.43	1985.8
XSECTION	15	RUNOFF	.35	3	2	.10	.0	7.10	24.00	3.53	---	12.84	321.32	928.7
XSECTION	16	REACH	.04	3	2	.10	.0	7.10	24.00	4.38	---	12.57	58.86	1471.4
XSECTION	16	ADDHYD	.39	3	2	.10	.0	7.10	24.00	3.62	---	12.79	369.88	958.2
XSECTION	17	RUNOFF	.08	3	2	.10	.0	7.10	24.00	3.52	---	12.34	121.42	1536.9
XSECTION	18	REACH	.39	3	2	.10	.0	7.10	24.00	3.62	---	12.79	369.88	958.2
XSECTION	18	ADDHYD	.46	3	2	.10	.0	7.10	24.00	3.60	---	12.68	428.29	921.1
XSECTION	19	REACH	1.43	3	2	.10	.0	7.10	24.00	3.95	---	13.30	955.00	668.3
XSECTION	19	ADDHYD	1.89	3	2	.10	.0	7.10	24.00	3.87	---	13.30	1238.19	653.7
XSECTION	20	RUNOFF	.71	3	2	.10	.0	7.10	24.00	3.95	---	12.60	898.46	1269.0
XSECTION	21	REACH	1.89	3	2	.10	.0	7.10	24.00	3.73	---	13.40	1072.14	566.1
XSECTION	21	ADDHYD	2.60	3	2	.10	.0	7.10	24.00	3.79	---	12.65	1472.92	566.1
STRUCTURE	4	RESVOR	2.60	3	2	.10	.0	7.10	24.00	3.83	67.57	13.54	1089.02	418.5
XSECTION	22	RUNOFF	.91	3	2	.10	.0	7.10	24.00	2.80	---	12.74	719.55	794.2
XSECTION	23	REACH	2.60	3	2	.10	.0	7.10	24.00	3.83	---	13.69	1086.63	417.6
XSECTION	23	ADDHYD	3.51	3	2	.10	.0	7.10	24.00	3.56	---	12.83	1711.27	487.8
XSECTION	24	RUNOFF	.15	3	2	.10	.0	7.10	24.00	3.42	---	12.37	212.84	1457.8

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(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 99														
+														
XSECTION	25	REACH	3.51	3	2	.10	.0	7.10	24.00	3.56	---	12.83	1711.27	487.8
XSECTION	25	ADDHYD	3.65	3	2	.10	.0	7.10	24.00	3.56	---	12.77	1804.61	493.9
XSECTION	26	RUNOFF	.43	3	2	.10	.0	7.10	24.00	4.05	---	12.43	676.21	1572.6
XSECTION	27	REACH	3.65	3	2	.10	.0	7.10	24.00	3.56	---	12.77	1804.61	493.9
XSECTION	27	ADDHYD	4.08	3	2	.10	.0	7.10	24.00	3.61	---	12.60	2336.00	572.0
XSECTION	28	RUNOFF	.04	3	2	.10	.0	7.10	24.00	4.93	---	12.29	85.65	2254.1
XSECTION	29	RUNOFF	.01	3	2	.10	.0	7.10	24.00	5.27	---	12.20	34.11	2623.5
XSECTION	30	REACH	.04	3	2	.10	.0	7.10	24.00	4.93	---	12.29	85.65	2254.1
XSECTION	30	ADDHYD	.05	3	2	.10	.0	7.10	24.00	5.02	---	12.26	118.40	2321.5
XSECTION	31	RUNOFF	.30	3	2	.10	.0	7.10	24.00	4.82	---	12.49	515.10	1711.3
STRUCTURE	5	RESVOR	.30	3	2	.10	.0	7.10	24.00	4.82	67.68	12.93	289.85	963.0
XSECTION	32	REACH	.30	3	2	.10	.0	7.10	24.00	4.82	---	13.12	285.79	949.5
XSECTION	32	REACH	.05	3	2	.10	.0	7.10	24.00	5.02	---	12.41	110.32	2163.1
XSECTION	32	ADDHYD	.35	3	2	.10	.0	7.10	24.00	4.85	---	13.00	314.14	892.4
XSECTION	33	RUNOFF	.05	3	2	.10	.0	7.10	24.00	3.84	---	12.26	92.35	1923.9
XSECTION	34	REACH	.05	3	2	.10	.0	7.10	24.00	3.84	---	12.26	92.35	1923.9
XSECTION	34	ADDHYD	.40	3	2	.10	.0	7.10	24.00	4.73	---	12.94	331.04	827.6
XSECTION	35	RUNOFF	.76	3	2	.10	.0	7.10	24.00	3.94	---	12.54	1015.37	1343.1
XSECTION	36	ADDHYD	1.16	3	2	.10	.0	7.10	24.00	4.22	---	12.54	1343.85	1162.5
STRUCTURE	6	RESVOR	1.16	3	2	.10	.0	7.10	24.00	4.21	34.30	12.85	1126.33	974.3
XSECTION	37	RUNOFF	.62	3	2	.10	.0	7.10	24.00	3.95	---	12.63	764.83	1241.6

XSECTION	38	REACH	1.16	3	2	.10	.0	7.10	24.00	4.21	---	13.10	972.87	841.6
XSECTION	38	ADDHYD	1.77	3	2	.10	.0	7.10	24.00	4.12	---	13.00	1495.09	843.7
XSECTION	39	REACH	4.08	3	2	.10	.0	7.10	24.00	3.61	---	12.60	2336.00	572.0
XSECTION	39	ADDHYD	5.86	3	2	.10	.0	7.10	24.00	3.76	---	12.91	3548.32	605.9
XSECTION	40	RUNOFF	.32	3	2	.10	.0	7.10	24.00	3.42	---	12.47	403.21	1268.0
XSECTION	41	ADDHYD	6.17	3	2	.10	.0	7.10	24.00	3.75	---	12.61	3785.33	613.1
STRUCTURE	7	RESVOR	6.17	3	2	.10	.0	7.10	24.00	3.74	23.84	14.38	1918.98	310.8
XSECTION	42	RUNOFF	.51	3	2	.10	.0	7.10	24.00	3.73	---	12.89	481.19	945.4
XSECTION	43	RUNOFF	.47	3	2	.10	.0	7.10	24.00	4.60	---	12.58	708.69	1495.1
XSECTION	44	REACH	.51	3	2	.10	.0	7.10	24.00	3.73	---	12.99	481.11	945.2
XSECTION	44	ADDHYD	.98	3	2	.10	.0	7.10	24.00	4.15	---	12.70	1082.21	1100.9
STRUCTURE	8	RESVOR	.98	3	2	.10	.0	7.10	24.00	4.15	43.94	13.52	557.69	567.3
XSECTION	45	RUNOFF	.24	3	2	.10	.0	7.10	24.00	4.59	---	12.39	442.82	1852.8
XSECTION	46	REACH	.98	3	2	.10	.0	7.10	24.00	4.15	---	13.52	557.69	567.3
XSECTION	46	ADDHYD	1.22	3	2	.10	.0	7.10	24.00	4.23	---	12.46	826.80	676.6

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 99														
STRUCTURE	9	RESVOR	1.22	3	2	.10	.0	7.10	24.00	4.24	31.96	15.24	461.04	377.3
XSECTION	47	RUNOFF	.08	3	2	.10	.0	7.10	24.00	4.71	---	12.28	181.41	2212.3
XSECTION	48	REACH	.08	3	2	.10	.0	7.10	24.00	4.71	---	12.28	181.41	2212.3
XSECTION	48	REACH	1.22	3	2	.10	.0	7.10	24.00	4.24	---	15.39	460.89	377.2
XSECTION	48	ADDHYD	1.30	3	2	.10	.0	7.10	24.00	4.27	---	15.32	473.00	362.7
XSECTION	49	RUNOFF	.56	3	2	.10	.0	7.10	24.00	4.60	---	13.06	578.68	1024.2
XSECTION	50	REACH	1.30	3	2	.10	.0	7.10	24.00	4.27	---	15.42	473.00	362.7
XSECTION	50	ADDHYD	1.87	3	2	.10	.0	7.10	24.00	4.37	---	13.16	908.73	486.2
STRUCTURE	10	RESVOR	1.87	3	2	.10	.0	7.10	24.00	3.64	22.33	18.34	318.27	170.3
XSECTION	51	ADDHYD	8.04	3	2	.10	.0	7.10	24.00	3.72	---	14.53	2149.19	267.2
XSECTION	52	RUNOFF	.17	3	2	.10	.0	7.10	24.00	4.16	---	12.70	201.49	1221.1
XSECTION	53	ADDHYD	8.21	3	2	.10	.0	7.10	24.00	3.73	---	14.46	2187.58	266.5

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SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

HYDROGRAPH INFORMATION										ROUTING PARAMETERS						PEAK				
XSEC REACH		INFLOW		OUTFLOW		INTERV.AREA		BASE-	VOLUME	MAIN	ITER-	Q AND A		PEAK	S/Q	ATT-	TRAVEL TIME			
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)	
ALTERNATE		1	STORM	10																
+	3	2100	134	12.6	134	12.6	---	---	0	1.98	.10	0	1.70	1.53	.007	1.000	178	1.00?	.00	.00
+	5	1200	263	12.7	263	12.7			0	1.85	.10	0	.630	1.53	.005	1.000	154	1.00?	.00	.00

+	7	1500	122	13.8	122	14.0	0	2.05	.10	1	.550	1.53	.001	1.000	275	.79?	.20	.08
+	11	2300	403	12.5	397	12.6	0	2.14	.10	1	.630	1.53	.004	.985	255	.83?	.10	.07
+	13	1500	460	12.8	460	12.8	0	2.13	.10	0	.800	1.53	.002	1.000	136	1.00?	.00	.00
+	16	6300	46	12.3	32	12.7	0	2.56	.10	1	.700	1.53	.257	.690	1376	.23	.30	.41
+	18	2300	197	12.8	197	12.8	0	1.97	.10	0	2.00	1.53	.004	1.000	153	1.00?	.00	.00
+	19	2200	193	14.8	193	14.9	0	2.15	.10	1	.800	1.53	.001	1.000	269	.80?	.10	.07
+	21	4000	392	12.8	386	13.0	0	2.10	.10	1	.650	1.53	.004	.986	438	.58	.20	.12
+	23	6300	820	12.8	793	13.0	0	2.14	.10	1	.700	1.53	.010	.968	509	.52	.20	.14
+	25	1300	1097	12.9	1097	12.9	0	1.94	.10	0	.630	1.53	.001	1.000	102	1.00?	.00	.00
+	27	800	1140	12.9	1140	12.9	0	1.94	.10	0	.700	1.53	.000	1.000	58	1.00?	.00	.00
+	30	200	53	12.3	53	12.3	0	3.01	.10	0	.650	1.53	.001	1.000	44	1.00?	.00	.00
+	32	4200	190	12.9	187	13.1	0	2.92	.10	1	.800	1.53	.018	.982	516	.52	.20	.14
+	32	4200	73	12.3	66	12.4	0	3.08	.10	1	1.40	1.53	.056	.906	498	.53	.10	.14
+	34	1200	51	12.3	51	12.4	0	2.14	.10	1	1.00	1.53	.015	.997	201	.94?	.10	.06
+	38	6500	362	13.5	357	13.8	0	2.43	.10	1	.550	1.53	.017	.987	816	.36	.30	.23
+	39	2500	1348	12.8	1348	12.9	0	1.97	.10	1	.630	1.53	.003	1.000	182	.99?	.10	.05
+	44	1800	258	12.9	257	13.0	0	2.05	.10	1	.650	1.53	.006	.996	228	.88?	.10	.06
+	46	1800	418	13.3	418	13.3	0	2.38	.10	0	1.00	1.53	.002	1.000	145	1.00?	.00	.00
+	48	1100	110	12.3	110	12.3	0	2.83	.10	0	.900	1.53	.009	1.000	151	1.00?	.00	.00
+	48	2700	314	14.4	313	14.6	0	2.45	.10	1	.450	1.53	.004	.997	406	.61	.20	.11
+	50	1700	323	14.6	323	14.7	0	2.47	.10	1	.550	1.53	.002	1.000	222	.90?	.10	.06
+	ALTERNATE	1	STORM	25														
+	3	2100	171	12.6	171	12.6	0	2.51	.10	0	1.70	1.53	.006	1.000	163	1.00?	.00	.00
+	5	1200	340	12.7	340	12.7	0	2.36	.10	0	.630	1.53	.004	1.000	141	1.00?	.00	.00
+	7	1500	140	13.9	140	14.0	0	2.59	.10	1	.550	1.53	.001	1.000	261	.82?	.10	.07
+	11	2300	503	12.5	498	12.6	0	2.68	.10	1	.630	1.53	.004	.991	236	.87?	.10	.07

+ 50	1700	376	15.0	376	15.1			0	3.05	.10	1	1.53	.001	1.000	211	.92?	.10	.06	
+						---	---												
	ALTERNATE	1	STORM	99															
+																			
+ 3	2100	250	12.6	250	12.6			0	3.63	.10	0	1.70	1.53	.005	1.000	143	1.00?	.00	.00
+						---	---												
+ 5	1200	508	12.6	508	12.6			0	3.45	.10	0	.630	1.53	.003	1.000	123	1.00?	.00	.00
+						---	---												
+ 7	1500	171	14.1	171	14.2			0	3.71	.10	1	.550	1.53	.001	1.000	244	.85?	.10	.07
+						---	---												
+ 11	2300	707	12.5	705	12.6			0	3.83	.10	1	.630	1.53	.003	.997	209	.92?	.10	.06
+						---	---												
+ 13	1500	792	12.8	792	12.8			0	3.81	.10	0	.800	1.53	.001	1.000	112	1.00?	.00	.00
+						---	---												
+ 16	6300	79	12.3	59	12.6			0	4.38	.10	1	.700	1.53	.193	.738	1142	.27	.30	.33
+						---	---												
+ 18	2300	370	12.8	370	12.8			0	3.62	.10	0	2.00	1.53	.003	1.000	123	1.00?	.00	.00
+						---	---												
+ 19	2200	955	13.3	955	13.3			0	3.95	.10	0	.800	1.53	.002	1.000	154	1.00?	.00	.00
+						---	---												
+ 21	4000	1238	13.3	1071	13.4			0	3.87	.10	1	.650	1.53	.005	.865	294	.76?	.10	.08
+						---	---												
+ 23	6300	1089	13.5	1087	13.7			0	3.83	.10	1	.700	1.53	.005	.998	461	.56	.20	.13
+						---	---												
+ 25	1300	1709	12.8	1709	12.8			0	3.56	.10	0	.630	1.53	.001	1.000	87	1.00?	.00	.00
+						---	---												
+ 27	800	1803	12.8	1803	12.8			0	3.56	.10	0	.700	1.53	.000	1.000	49	1.00?	.00	.00
+						---	---												
+ 30	200	86	12.3	86	12.3			0	4.93	.10	0	.650	1.53	.001	1.000	37	1.00?	.00	.00
+						---	---												
+ 32	4200	290	12.9	286	13.1			0	4.82	.10	1	.800	1.53	.013	.987	446	.58	.20	.12
+						---	---												
+ 32	4200	117	12.3	110	12.4			0	5.02	.10	1	1.40	1.53	.043	.941	423	.60	.10	.12
+						---	---												
+ 34	1200	91	12.3	91	12.3			0	3.84	.10	0	1.00	1.53	.011	1.000	165	1.00?	.00	.00
+						---	---												
1																			

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SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

HYDROGRAPH INFORMATION										ROUTING PARAMETERS										PEAK
OUTFLOW+																				TRAVEL TIME
XSEC REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	VOLUME		MAIN	ITER-	Q AND A		PEAK	S/Q	ATT-	TRAVEL TIME			
ID	LENGTH	PEAK	TIME	PEAK	TIME	PEAK	TIME	BASE	ABOVE	TIME	ATION	EQUATION	LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-		
	(FT)	(CFS)	(HR)	(CFS)	(HR)	(CFS)	(HR)	(CFS)	(IN)	(HR)	#	COEFF	POWER	FACTOR	O/I	(K)	COEFF	AGE	MATIC	
												(X)	(M)	(K*)	(Q*)	(SEC)	(C)	(HR)	(HR)	
ALTERNATE 1 STORM 99																				
+ 38	6500	1085	12.8	973	13.1			0	4.21	.10	1	.550	1.53	.022	.896	558	.49	.30	.16	

+	39	2500	2336	12.6	2336	12.6	---	---	0	3.61	.10	0	.630	1.53	.002	1.000	151	1.00?	.00	.00
+	44	1800	481	12.9	481	13.0	---	---	0	3.73	.10	1	.650	1.53	.005	1.000	184	.99?	.10	.05
+	46	1800	558	13.5	558	13.5	---	---	0	4.15	.10	0	1.00	1.53	.001	1.000	132	1.00?	.00	.00
+	48	1100	181	12.3	181	12.3	---	---	0	4.71	.10	0	.900	1.53	.007	1.000	127	1.00?	.00	.00
+	48	2700	461	15.2	461	15.4	---	---	0	4.24	.10	1	.450	1.53	.003	1.000	355	.67?	.20	.10
+	50	1700	473	15.3	473	15.4	---	---	0	4.27	.10	1	.550	1.53	.001	1.000	194	.96?	.10	.05

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SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....		
		10	25	99
0 STRUCTURE 10	1.87			
ALTERNATE 1		204.44	241.53	318.27
STRUCTURE 9	1.22			
+				
ALTERNATE 1		314.46	366.41	461.04
STRUCTURE 8	.98			
+				
ALTERNATE 1		417.81	460.30	557.69
0 STRUCTURE 7	6.17			
+				
ALTERNATE 1		1049.07	1298.72	1918.98
STRUCTURE 6	1.16			
+				
ALTERNATE 1		361.93	505.24	1126.33
STRUCTURE 5	.30			
+				
ALTERNATE 1		189.96	222.38	289.85
0 STRUCTURE 4	2.60			
+				
ALTERNATE 1		820.15	951.45	1089.02
STRUCTURE 3	1.43			
+				
ALTERNATE 1		192.82	211.10	955.00
STRUCTURE 2	1.33			
+				
ALTERNATE 1		459.84	566.56	791.82
0 STRUCTURE 1	.75			
+				
ALTERNATE 1		121.54	140.43	171.20
XSECTION 1	.21			
+				
ALTERNATE 1		133.57	171.29	251.00
XSECTION 2	.28			
+				
ALTERNATE 1		135.56	177.89	268.34
0 XSECTION 3	.49			
+				
ALTERNATE 1		263.50	342.01	510.30
XSECTION 4	.26			
+				
ALTERNATE 1		286.45	354.63	495.12

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SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....		
		10	25	99
0 XSECTION 5	.75			
+				
ALTERNATE 1		487.52	619.70	897.40
0 XSECTION 6	.30			
+				
ALTERNATE 1		217.03	275.01	396.54
0 XSECTION 7	1.05			
+				
ALTERNATE 1		290.28	363.33	510.65
0 XSECTION 8	.12			
+				
ALTERNATE 1		127.96	156.37	214.33
0 XSECTION 9	1.17			
+				
ALTERNATE 1		403.67	503.59	707.13
0 XSECTION 10	.17			
+				
ALTERNATE 1		133.47	169.94	246.65
0 XSECTION 11	1.33			
+				
ALTERNATE 1		514.33	647.60	922.66
0 XSECTION 12	.09			
+				
ALTERNATE 1		103.22	127.82	178.50
0 XSECTION 13	1.43			
+				
ALTERNATE 1		505.65	621.58	868.93
0 XSECTION 14	.04			
+				
ALTERNATE 1		46.53	57.31	79.43
0 XSECTION 15	.35			
+				
ALTERNATE 1		167.41	216.54	321.32
0 XSECTION 16	.39			
+				
ALTERNATE 1		197.56	254.58	369.88
0 XSECTION 17	.08			
+				
ALTERNATE 1		63.69	81.97	121.42
0 XSECTION 18	.46			
+				
ALTERNATE 1		226.29	291.98	428.29
1				

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SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....		
		10	25	99
0 XSECTION 19	1.89			
+				
ALTERNATE 1		391.73	462.68	1238.19
0 XSECTION 20	.71			
+				
ALTERNATE 1		497.59	627.38	898.46
0 XSECTION 21	2.60			
+				
ALTERNATE 1		833.69	1035.21	1472.92
0 XSECTION 22	.91			
+				
ALTERNATE 1		329.67	451.09	719.55
0 XSECTION 23	3.51			
+				
ALTERNATE 1		1099.75	1356.57	1711.27
0 XSECTION 24	.15			
+				

ALTERNATE	1	110.77	143.40	212.84
XSECTION	25	3.65		
ALTERNATE	1	1140.12	1415.91	1804.61
XSECTION	26	.43		
ALTERNATE	1	380.40	476.51	676.21
XSECTION	27	4.08		
+				
ALTERNATE	1	1347.84	1721.92	2336.00
XSECTION	28	.04		
ALTERNATE	1	52.95	63.78	85.65
XSECTION	29	.01		
ALTERNATE	1	21.76	25.87	34.11
XSECTION	30	.05		
+				
ALTERNATE	1	73.83	88.61	118.40
XSECTION	31	.30		
ALTERNATE	1	313.64	380.15	515.10
XSECTION	32	.35		
ALTERNATE	1	206.74	241.47	314.14

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SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....		
		10	25	99
XSECTION 33	.05			
ALTERNATE 1		51.32	64.61	92.35
XSECTION 34	.40			
+				
ALTERNATE 1		228.84	267.55	331.04
XSECTION 35	.76			
ALTERNATE 1		561.39	709.20	1015.37
XSECTION 36	1.16			
ALTERNATE 1		791.10	976.01	1343.85
XSECTION 37	.62			
+				
ALTERNATE 1		423.30	533.87	764.83
XSECTION 38	1.77			
ALTERNATE 1		621.75	780.70	1495.09
XSECTION 39	5.86			
ALTERNATE 1		1969.55	2502.60	3548.32
XSECTION 40	.32			
+				
ALTERNATE 1		208.53	270.69	403.21
XSECTION 41	6.17			
ALTERNATE 1		2127.55	2717.02	3785.33
XSECTION 42	.51			
ALTERNATE 1		258.43	330.08	481.19
XSECTION 43	.47			
+				
ALTERNATE 1		421.85	516.11	708.69
XSECTION 44	.98			
+				
ALTERNATE 1		611.99	764.79	1082.21
XSECTION 45	.24			
ALTERNATE 1		264.46	323.12	442.82
XSECTION 46	1.22			
+				
ALTERNATE 1		593.48	667.67	826.80

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....		
		10	25	99
0 XSECTION 47	.08			
+				
ALTERNATE 1		110.01	133.57	181.41
0 XSECTION 48	1.30			
+				
ALTERNATE 1		323.05	375.95	473.00
0 XSECTION 49	.56			
+				
ALTERNATE 1		342.88	420.25	578.68
0 XSECTION 50	1.87			
+				
ALTERNATE 1		575.41	684.44	908.73
0 XSECTION 51	8.04			
+				
ALTERNATE 1		1205.91	1472.12	2149.19
0 XSECTION 52	.17			
+				
ALTERNATE 1		114.30	142.67	201.49
0 XSECTION 53	8.21			
+				
ALTERNATE 1		1230.65	1505.17	2187.58

1END OF 1 JOBS IN THIS RUN